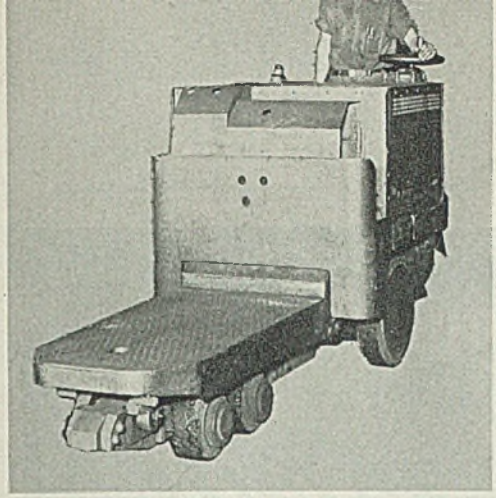

Complete program of industrial truck maintenance will pay good dividends. Page 100

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Volume 112—No. 9 STEEL March 1, 1943

NEWS

FEATURES

TECHNICAL

PRODUCTION

MARKETS

An actual example of the time-saving gains of the Graybar MM Plan*

The contractor for an important Mid-West ordnance plant had solicited bids on electrical supplies on a piecemeal basis, month-to-month. For each order, requisitions went from the engineering department to the purchasing department, which in turn obtained prices from a number of different sources, and finally let the contract with a plea for fast delivery. In the meantime, several weeks time were lost, and no plan for scheduling deliveries could be developed.

Working with the project engineer to speed up delivery, GRAYBAR proposed that bids for material be sought on an "all-that's-needed" basis, covering the period of construction of the entire project. Then, items could be obtained as needed from a continuous source of supply.

The proposal was adopted, and GRAYBAR'S quotations proved that no sacrifice of economy was necessary in instituting the new purchasing plan. The balance of electrical supplies for the job were delivered *as needed* by GRAYBAR. Delivery delays were cut, record-keeping was simplified, and the contractor expressed himself as "entirely satisfied".

In other cases, purchasing is done on "open order", without securing estimates, again at no sacrifice in economy, and with an appreciable saving in time.

*Serving as your MATERIALS MOBILIZER

. . . on electrical supplies, GRAYBAR makes its procurement experience a part of your war production facilities. In less than one hour, your GRAYBAR Procurement Adviser can review the *four-point plan* which "dovetails" your electrical needs with the available production of more than 200 electrical manufacturers, distributed locally from more than 80 warehouses. Why not call him about it today?

Executive Offices:
GRAYBAR BUILDING
New York, N. Y.

GRAYBAR
IN OVER 80 PRINCIPAL CITIES

Everything Electrical . . . . THAT IT TAKES TO WIN!

HIGHLIGHTING

this issue of STEEL

MANPOWER Acute manpower shortages are keeping employment and personnel managers scurrying these days to hold their present labor forces as well as to obtain and train new employes. Devices that are receiving increasing attention are exit interviews (p. 56) and personnel counseling. The former prevent many "quits", avoid necessity of inducting and training new workers, while the latter can be used to settle incipient grievances on the floor of the plant. . . Unions are becoming concerned with the problem of absenteeism (p. 59) and the United Steelworkers have advanced a program designed to reduce it. . . Subcontracting is sought as a means for doubling production of aircraft engines by Ford without increasing manpower needs (p. 73). The Army believes this can be done by having parts manufactured outside the Detroit area and converting the Ford plant into largely an assembly and testing operation.

SUBSTITUTES Materials from excess and idle inventories are being offered as substitutes by the War Production Board to expedite production (p. 69). Co-operation of production managers, purchasing agents and outside expediters can successfully overcome material shortages, Ralph Parker, assistant deputy regional director of WPB, New York, contends. . . Carbon iron and steel are recommended as substitutes for nonferrous metals (p. 70) in the seventh list of critical materials released by the WPB. . . Battelle Memorial Institute, Columbus, O., points out a method for cutting the country's refined tin requirements several thousand tons per year (p. 71). Its research experts claim several alloys can be used as tin substitutes without sacrificing bearing quality. . . American, Canadian and British metallurgical experts will meet early in March to discuss conservation of alloying metals (p. 71).

WASHINGTON Six postwar economic suggestions are included in the sixth Windows of Washington series (p. 66). One planning group is strongly in favor of liberalizing consumers' credit after the war and proposes a sharp reduction in liquor and tobacco taxes. The article points out that postwar planning is already in "blueprint" stage and is not the result of crackpots but of those holding responsible positions. . . Approximately $50,000,000 will be saved the government annually through OPA's action in reducing maximum prices of most steel castings from 10 to 25 per cent (p. 80). . . United States Maritime Commission has designed a "price-minus" form of contract which will benefit both the government and shipbuilder (p. 80). . . Rights of American licensees in seized patents are not vested (p. 65).

IN THE NEWS Wing Tips this week discusses the much-publicized Ford Willow Run bomber plant (p. 76) and reveals what happened to interfere with production forecasts for the plant.

Chrysler Corp. has tested its parts packing system (p. 85) which proves satisfactory to Army Ordnance officials. Until the present system was devised, many tons of parts shipped overseas were practically worthless on arrival because identification was illegible through poor packaging. Weathering has a serious effect on shipments, causing corrosion; therefore the part must be protected.

Steel producers' 1942 earnings (p. 60) were a third lower than in 1941, while taxes increased 40 per cent.

Can the abilities our war plant managers have discovered in converting to new products be applied profitably in the postwar period is a question posed by E. L. Shaner (p. 55).

TECHNICAL P. W. Brown and E. V. Farrar discuss the requirements and manufacture of the gearing (p. 90) so vitally important in aircraft engines because of the great increase in torque from the engine to the propeller as well as the difference in speed.

S. I. Rosenthal examines some of the factors having to do with the use of root openings (p. 92) in welding. Their value is not entirely agreed upon by welding authorities, a number of whom comment on Mr. Rosenthal's presentation. Other comments are solicited.

Continuing STEEL's complete coverage of the NE steels, R. W. Roush presents a brief up-to-date picture of their development (p. 94). This review is particularly valuable with the increasing importance of these steels.

Industrial truck care pays good dividends, says A. E. Dorod (p. 100), and he goes on to explain what should be done to assure maximum life and service from these important aids to materials handling in your plant.

New sintering facilities installed recently at the Campbell, O., plant of the Youngstown Sheet & Tube Co. are expected to aid materially in increasing the daily output of blast furnaces in that district. The plant (p. 102) handles fine ores and flue dust.

SWITCH TO NE STEELS

---with Assurance

Jominy End-Quench Hardenability Testing in Ryerson Lab. All NE Alloy Steels are tested before they are accepted for stock and check tests are conducted to assure accuracy of results. This data is passed on to customers with each shipment.

NE Alloys in Ryerson Stocks

Write for New Booklet

New Technical data — including heat treatment response—is available on NE (National Emergency) Steels. Ryerson tests all NE Steels in stock. This test information is furnished with each shipment of that particular NE Steel. Thus, users can choose which of the lean-alloy steels will best replace the steels of high alloy content previously used.

Jominy End-Quench Hardenability Tests, standard for NE Steels, are a quick, reliable method of determining heat treatment response. How this test is made, the results obtained, and how to interpret hardenability in terms of tensile strength, yield point, elongation, and reduction of area, are clearly told in a recent Ryerson publication on NE Steels. Copies are available—call or write your nearby Ryerson plant.

Representative stocks of NE Steels are available at Ryerson for prompt shipment. Turnover is rapid; withdrawals are heavy, but new stocks are constantly being received. Ryerson engineers and metallurgists will gladly answer any question you may have and help you get started with NE Steels.

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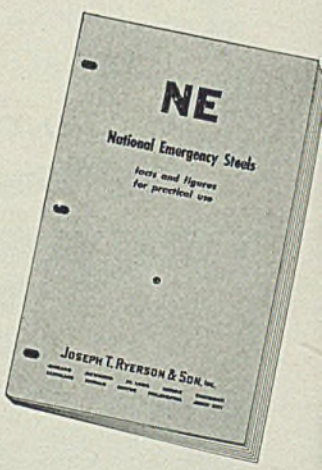
★ ★ ★

A HANDBOOK ON NE STEELS
New, complete, authoritative! Compiled by Ryerson. If you are adapting NE Steels to your production and haven't a copy, ask for one today!



RYERSON STEEL—SERVICE

STEEL
March 1, 1943

War Baby "Know How"

If an accurate census could be taken of the extent to which conversion to wartime production has broadened the scope of the abilities of individual manufacturing establishments, the result probably would surprise even those who have the highest regard for the adaptability of American private enterprise.

A company once engaged in making cast iron pipe now is producing intricate machine tool castings and centrifugally cast steel liners for aircraft engine cylinders. Hundreds of plants which were making parts for automobiles now are turning out more intricate components for aircraft and guns. Thousands of establishments are manufacturing products which bear little resemblance to the articles produced in the same shops in peacetime.

However, the fact the finished products are radically different is not as significant as the fact that the methods of manufacture are dissimilar. Many companies have discovered that they can perform satisfactorily certain operations they had never tried before. Some are working near-miracles with materials they never had used previously.

Equally significant is the discovery that some companies, engaging in new practices and processes for the first time, have developed refinements which constitute definite advances over the technic in vogue prior to the war.

Possibly the explanation is that men, unencumbered with the traditions of technology in certain lines, have hit pay dirt in experiments which older hands at the game would not have dared to try.

At any rate, thousands of manufacturers will be emerging from the war period with newly discovered abilities. Naturally they will be eager to find out whether their recently acquired talents can be applied to postwar production.

This is one of the practical approaches to intelligent postwar planning for industry. Can the skills our plant is demonstrating in wartime be applied to a product that will be in demand after the war? Can we make and market that product profitably?

These are questions which every manufacturer can explore to advantage. War baby "know how" is a national asset.

E. L. Shaner

Editor-in-Chief

Minimize Quits for Petty Causes; Aid War Output

Sympathetic personnel counselors, listening for the "Boss," able to correct many employe dissatisfactions in the plant, help maintain labor force and avoid production interruptions

EXIT interviews to eliminate unnecessary quits are paying rich dividends to many metalworking companies troubled by the current "sellers' " labor market.

Normally quits are not too great a problem. However, the manpower shortage, encouraging almost any worker to "shop around" for a better job has posed a difficult and expensive problem for most employers.

How expensive? One Cleveland war plant personnel manager figures it costs his company $250 merely to induct a worker, to say nothing of the training necessary to equip him for a skilled position. A West Coast shipyard figures $100 is necessary to hire a man and start start him on the job. An aluminum forging plant estimates the average cost at $150 per new employe.

Exit interviewing, according to a survey of representative war plants by STEEL, often reveals superficial reasons for a worker wanting to quit his job, and if the interviewer is sympathetic, the difficulty, real or supposed, can be ironed out with a saving to the worker and the company.

For example, a West Coast aircraft plant interviewer discovered an employe wanted to quit because he had become involved with a loan shark and figured that if he changed jobs he could thereby elude the finance company. The interviewer explained that the company maintained a credit union and a loan was arranged through that agency.

Differences Are Settled

A shipyard interviewer learned that an employe wanted to quit because he was "broke" and figured that by quitting he could collect wages due immediately and then get another job. The personnel man advanced him a small loan and the worker returned to his job.

Difficulties with foremen often are cited by disgruntled employes, and an intelligent personnel interviewer may settle the difference, through transfer or other means, and save a valuable employe.

Personnel managers interviewed by STEEL agree on two points:

1—Best policy is to anticipate quits and prevent them from reaching the exit interview stage, if possible.

2—Personnel interviewers must have *status*.

R. S. Livingstone, vice president in charge of personnel, Thompson Products Inc., Cleveland, says that a personnel program should be conceived with the idea of preventing rather than settling disputes after they have arisen.

"Under a good system, most of the grievances will be settled on an individual basis, right out on the floor of the plant, before they get into the meeting stage and before they assume all the threatening characteristics that bring in such agencies as the Department of Conciliation, arbitration or the War Labor Board.

"An excellent personnel organization is one which operates with the conception in mind that it is the president of the company operating by proxy. In other words, the personnel staff is on the firing line, seeing that all the situations that develop in the shop are being called just the way the president would call them if he were down there on the line calling the play himself.

"The personnel supervisor must have status—and nothing will make the personnel supervisor more important in the eyes of the men than to have the president occasionally walk through the department with him arm in arm, and stop and talk with some of the men on the machines. These visits put the president's stamp of approval on the personnel supervisor. It shows that he has weight, authority, and the prestige to get something done in the organization."

Counselors At Douglas

Douglas Aircraft Co., Santa Monica, Calif., follows a similar vein of thought in its system of employe counselors described as "President Donald Douglas' representatives to you in the shops and offices."

In Mr. Douglas' own words: "In the old days when there was but one plant and I knew everybody in it, people in the shop and offices came to me freely with their problems. If working conditions in a department were difficult, I wanted to know about it so that we could make them right.

"When a workman would stop me on a tour of the factory and say 'Doug, we need more light here,'—or better ventilation, or more electrical outlets or what-

Exit interviewer discusses job problem with Thompson Products Inc., Cleveland, employe who had announced his intention of quitting. This man's problem was solved by transfer to another job

ever the complaint was—why something was done about it pronto.

"Well, the company has grown and expanded so tremendously, that it's no longer humanly possible for one man to keep track of all that's going on, all that needs to be changed, improved or corrected."

Mr. Douglas' statement, published in the company's house organ, placed the stamp of approval on the counselors, who have scored some outstanding successes in straightening out misunderstanding between employes and between employes and management.

As an instance in point, a highly skilled machine operator was about to be discharged for repeated and persistent violations of working rules. It turned out, under the shrewd questioning of a counselor, that the employe had a long-seated grudge against his leadman who, unwittingly, had offended him. When the two were brought together, the matter was cleared up in five minutes. They shook hands and have been the firmest friends since.

Douglas retained a skilled employe they could ill afford to lose, and was saved the expense of breaking in a new worker.

Quits Are Anticipated

Another exponent of the idea of anticipating quits and preventing them from reaching the exit interview stage is Theodore S. Sadler, personnel manager, Cleveland Graphite Bronze Co., Cleveland. Misplacement in jobs, says Mr. Sadler, is one of the most frequent causes for quits. He cites the example of a woman machine operator who was employed, trained and at present is satisfied with her work. During her training period it was observed that she not only was qualified to be a machine operator but also was capable of other work.

"Now in a case like this," Mr. Sadler says, "there is a further follow up in our vocational guidance department. Her interest pattern showed high concentrated interest in the entire field of dealing with people. She is satisfied at the present time as a machine operator but it is felt she has too much ability to remain satisfied. So it is our intention to transfer her, thereby avoiding another exit interview."

Another success reported by Mr. Sadler was the case of a production inspector who applied for his release because he felt he was capable of doing more important and highly skilled work. He was satisfied with his wages and with the company. He had had no previous experience with the exception of six months' training with the company. An exit interviewer recommended he be transferred to the tool room to learn steel hardening, and now he is satisfied with his job.

Ted Trackler, assistant employment manager, Aluminum Co. of America, Cleveland, reports his company has saved tremendously through the exit interview plan adopted last June.

"But there is more to it than money involved. It creates a great deal of good will."

Many peculiar problems are uncovered by exit interviewers. Prime example is that of the Aluminum Co. of America worker who reported that he was about to be inducted into the Army. His release, of course, was granted immediately, and his fellow workers made a collection and presented him with a farewell party and several expensive gifts. A few days later he applied for a job at another war plant. The second plant called his original employer to check his references and was apprised of nature of his "quit". He was refused employment and sent back to the Aluminum Co. where he was rehired and put to work with the same men who had presented him with the induction gifts.

Essential Activities Listed To Facilitate Job Stabilization

To facilitate the carrying out of the Job Stabilization plan, WMC has published a basic list of essential activities. WMC area directors have the power to augment this list with those industries or critical jobs which they consider essential because of conditions pertinent to the particular area over which they have jurisdiction.

The following general governing factors were used in compiling this list of essential activities:

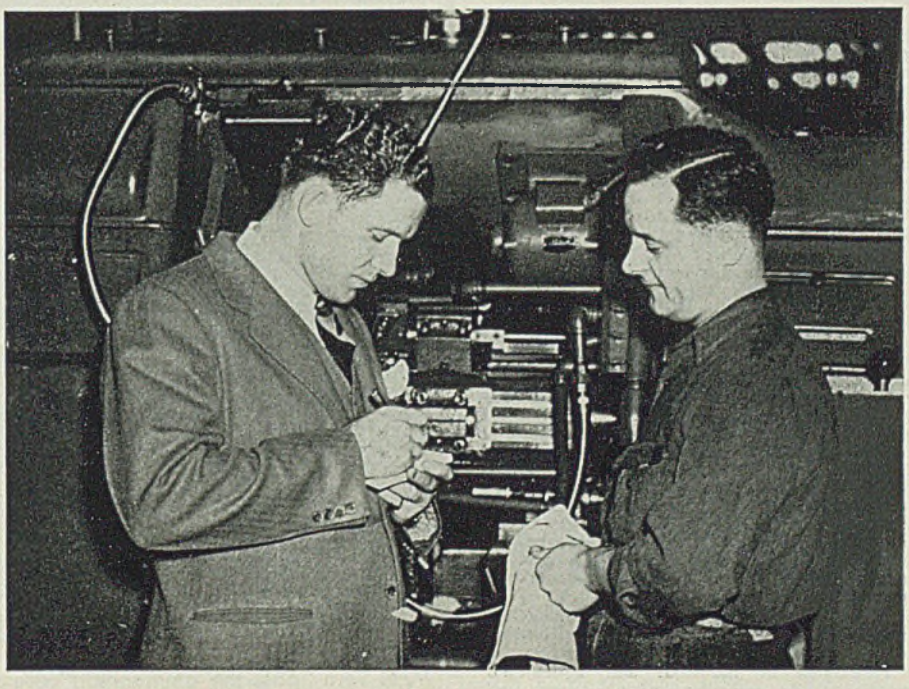
(A) Fulfilling a contract of the army, navy, maritime commission or facilitating war production.

(B) Performing governmental services; engaged, concerned with promoting or facilitating war production.

(C) Performing a service, governmental or private, directly concerned with the maintenance of indispensable civilian activities, health, safety, welfare or security.

(D) Supplying material under subcontracts for contracts included in A, B and C categories.

(E) Production of raw materials, manufacturing materials, supplies or equipment or performing services necessary for the fulfillment of contracts (includ-



Personnel supervisor listens to complaint of a machine operator. The supervisor was able to eliminate the cause of the complaint, a "quit" was averted, and the worker returned to his machine convinced the company was a pretty good outfit after all

ing necessary clothing and other supplies required by workers employed on those contracts) included in A, B, C or D.

BASIC LIST OF ESSENTIAL ACTIVITIES

Production of aircraft and parts: The production, maintenance and repair of aircraft gliders, parachutes, dirigibles, balloons, aircraft engines, parts, pontoons, propellors and similar products.

Production of ships, boats and parts: The production, maintenance and repair of ships, boats, parts and equipment.

Production of ordnance and accessories: The production, repair and maintenance of firearms, guns, howitzers, motors, gun turrets, mounts, tanks, sighting and fire-control equipment, torpedo tubes and similar products.

Production of ammunition: Bombs, mines, torpedoes, grenades, chemical warfare projectiles, explosives, fuses, pyrotechnics as well as products such as glycerin which go into the manufacture of ammunition.

Agriculture: Dairy, livestock, poultry, truck, sugar-beet, sugar-cane, hay, peanut, soybean, cotton, fruit and nut, potato, dried pea and bean, crop specialty (e.g. flax, hemp), seed and general farms; agricultural and horticultural and animal husbandry services such as tree planting, cattle food-lot operation, threshing, grist milling, grain cleaning, plowing, corn shelling. Includes also assembly and marketing services such as milk and cream assembly stations and co-operative marketing associations.

Food processing: Fishing, meat-packing and slaughtering, production of butter, cheese, condensed and evaporated milk, canned and cured fish, canned and dried fruits and vegetables, canned soups, fruit and vegetable juices, flour and other grain mill products, prepared feeds for animals and fowls, starch, cereals, baking powder, rice, bread and other bakery products, sugar, leavening compounds, corn syrup and edible fats and oils.

Forestry, logging and lumbering: Timber tracts, logging camps, sawmills, and veneer, lath, shingle, cooperage-stock, planing and plywood mills, raising of tung-oil trees; fire prevention, pest control, forest nurseries and reforestation services; gathering of gums and barks for the manufacture of naval stores and medical purposes.

Construction: Highway and street construction, marine construction, and construction of approved industrial plants, houses, hospitals and military projects and repair of such facilities; and services necessary to complete such construction.

Coal mining: The mining of anthracite, bituminous coal, semi-anthracite, lignite and peat and the operation of breakers or preparation plants. Includes also removing over-burden and other such activities preparatory to coal mining operations.

Metal mining: The mining of iron, copper, lead, zinc, aluminum mercury, manganese, chromium, molybdenum, tungsten, vanadium and similar ores, and in the dressing of such ores. Includes also removing over-burden, sinking shafts, and other such activities preparatory to metal-mining operations.

Nonmetallic mining and processing and quarrying: The mining and processing of rock salt, phosphate rock, sulphur, potash, asbestos, graphite pyrites, graphite, borates and other salines, fluorspar, mica, talc, abrasive sands, and similar products. Excludes all mined or quarried nonmetallic materials used exclusively in construction.

Smelting, refining, and rolling of metals: Primary and secondary smelting and refining, alloying, rolling and drawing of iron, steel, copper, lead, zinc, magnesium, aluminum, brass, bronze, nickel, tin, cadmium, and any other metals used in the production of war materials.

Production of metal shapes and forgings: The manufacture of castings, die castings, forgings, wire, nails, chains, anchors, axles, pipe, springs, screws, tubing, stampings, pressings, and structural shapes.

Finishing of metal products: Enameling, japanning, lacquering, painting, and galvanizing of metal products.

Production of industrial and agricultural equipment: Power boilers, wiring devices and supplies; agricultural implements; electric lamps; storage and primary batteries; pumps, compressors, and pumping equipment; recording, controlling and measuring instruments and meters; conveyors; industrial cars and trucks; blowers, exhaust and ventilating fans; mechanical power-transmission equipment such as clutches, drives and shafts; mechanical stokers; tools, files, and saws; plumbers' supplies; professional and scientific instruments, photographic apparatus, and optical goods; and all equipment necessary to operate plants producing essential commodities.

Production of machinery: Engines and turbines; machine tools, equipment and accessories; electrical generating, distribution and industrial apparatus for electric public utility, manufacturing, mining, transportation and construction use, for incorporation in manufactured products, or for use in service industries; construction, mining, agricultural, oil field, smelting and refining, as well as all machinery necessary to produce, equip and maintain aircraft, ships, ordnance and other military material.

Production of chemicals and allied products: Glycerin; turpentine, rosin and other naval stores; wood tars, oils, acids, and alcohols; lubricating oils and greases; animal and vegetable oils; fertilizers; tanning materials; salt; synthetic rubber; primary coal-tar products plastics; compressed and liquefied gases; refined sulphur; sulphuric and other acids; caustic and other sodas; industrial alcohols; electrochemical and electrometallurgical products such as carbide, sodium and potassium metals and high-percentage ferro-alloys; drugs and medicines; insecticides and related chemical compounds; nylon and other synthetic textile fibers used in military equipment exclusively; grease and tallow; candles. (Explosives, flares, and other fireworks, generally classified as chemical products are included with ammunition).

Production of rubber products: All rubber products.

Production of leather products: Sole and belting leather; industrial belting for transmission of power; boots, shoes, and gloves, for military and industrial use; saddlery, harness, and accessories.

Production of textiles: Spinning and weaving of silk and nylon for parachutes and powder bags; of canvas for tents, sails, tarpaulins, and other related heavy canvas products; cotton, woolen, linen and knit goods for military use.

Production of apparel: Apparel for the armed forces, and working clothing.

Production of stone, clay and glass products: Technical, scientific, and industrial pressed and blown ware; sand-lime and fire-brick and other heat-resisting clay products; lime; abrasive wheels, stones, paper, cloth and related products; asbestos products including steam and other packing, pipe and boiler covering; crucibles and retorts; porcelain electrical supplies; as well as parts of military apparatus.

Production of petroleum, natural-gas and petroleum and coal products: Drilling, rig building, and maintenance service operations, and petroleum refining. Includes also production of tar and pitch; coal gas, coke.

Production of finished lumber products: Cork products such as life preservers, storage battery boxes, and insulating material; cars, matches, and wood preservation activities, as well as wooden parts of aircraft ships; and other military equipment.

Production of transportation equipment: Motor vehicles such as trucks, ambulances, fire engines, buses and military motorized units, essential parts and accessories of such motor vehicles; motorcycles, bicycles, and parts; locomotives and parts; railroad and street cars and equipment.

Transportation services: Line-haul railroads and railroad service; switching and terminal services; railway express service; local and street railways, and bus lines; trucking; warehousing of perishable commodities, stock piles, and essential materials; pipe lines; air and water transportation including shore services such as stevedoring. Includes also services allied to transportation such as freight forwarding and packing, operation of terminals, roads and tunnels.

Production of materials for packing and shipping products: Textile bags, vegetable and fruit baskets, cooperage, wooden boxes, excelsior, pulp, and paper, paper bags, paperboard containers and boxes, glass and fiber containers, cordage and twine, metal barrels, kegs, drums, and cans.

Production of communication equipment: Including radios and radio equipment, television, telephone and telegraph equipment, and signalling apparatus.

Communication services: Telephone, telegraph, newspapers, radio broadcasting, and television services and the repair of facilities.

Heating, power and illuminating services:

(*Please turn to Page* 143)

GARY STEEL WORKERS SERENADE MAJOR GENERAL

MEN who "pass the ammunition" are shown serenading Major General Charles P. Gross, chief of transportation, service of supply, United States Army, when he spoke before the Union League Club of Chicago, recently. The group of 12 singing steelworkers, Gary works, Carnegie-Illinois Steel Corp., rendered a program of songs saluting the nation's military services

Find Labor Stabilization Plan Reduces Absenteeism 50 Per Cent

LABOR turnover has been reduced 50 per cent, absenteeism cut drastically and labor piracy practically eliminated in war production plants in the Louisville, Ky., area. This is the report of a survey made recently at the request of R. C. Goodwin, WMC Director of Region No. 5, which covers Ohio, Kentucky and Michigan.

Louisville's labor stabilization plan was "one of the first in the nation", having been approved Nov. 9, 1942. "I consider it to be an outstanding demonstration of what employers and workers can do in solving manpower problems locally," Paul V. McNutt, WMC chairman, said.

Based on a sample of 21 firms, holding about one-third of all war orders in the Louisville area, the indicated turnover rate in the 60 days following adoption of the plan has been reduced at least 50 per cent below that recorded in the preceding 60-day period.

In the metalworking industries, labor turnover was cut from 24 to 7 per cent; in wood products from 33 to 4 per cent; in aircraft from 11 to 3 and in trailer manufacturing from 35 to 11. Absenteeism, much of which was caused by job shopping, has been considerably reduced.

Separation Certificate Necessary

As each worker must obtain from his employer a certificate of separation if he wishes to change his job, a number of employers have established a system of "quit interviews". The existence of the job stabilization plan, therefore, has tended to restrict turnover indirectly, through adoption of sounder personnel practices as well as through controls of the plan.

The Review Unit of USES to which dissatisfied employes or employes may take their case, has been "almost completely successful" in dealing with decisions as to whether certificates of separation should be granted. Of 100 review cases, 56 were granted certificates leaving them free to accept any essential job. Four were directed to specific jobs; 33 were referred back to their original employer and seven refused to continue their jobs. Thirty-five of workers were granted certificates because they were employed on jobs that did not utilize their full skill.

The report concludes that as control of job transfers and in-migration under the existing plan restricts the supply of workers while demand continues to increase, a serious situation will develop unless the area WMC applies an equally effective procedure to transfer workers from less to more essential industries.

Steelworkers Advance Program To Improve Attendance

United Steelworkers of America-CIO last week advanced a four-point program to reduce absenteeism in war plants at a labor-management meeting in Pittsburgh, attended by 580 representatives of steel companies and the union. The program:

1. Determine the extent of absenteeism in individual plants.
2. Canvas the workers, find their reasons for absenteeism and their suggestions for its elimination.
3. Present and enforce a program to cut absenteeism to the minimum.

Another proposal to reduce the effects of absences was advanced by Walter Reuther, Detroit, vice president of the United Automobile Workers. He suggested immediate firm government action to end absenteeism by curing the "basic causes" for it which he said are chiefly faults in housing, transportation, health programs and care of the children of working mothers. He also urged rationing of all foods.

Mr. Reuther contended that labor leaders could "hold rallies, deliver pep speeches and put on a big campaign to persuade workers that they should not miss a day's work, but it won't do any good until the basic reasons behind the absences are sought out and stopped by government action."

To combat absenteeism, the labor-management war production committee, Monroe Calculating Machine Co., Orange, N. J., announced the names of employes habitually absent from their jobs would be turned over to their Selective Service Board for possible reclassification into 1-A. The committee was composed of three members of the United Electrical, Radio and Machine Workers Union, and three management representatives.

"BANK NIGHT" AT WAR PLANT BRINGS 'EM IN

ATTENDANCE of employes on their jobs at DX Crystal Corp., Chicago, has improved about 25 per cent since the company inaugurated a "bank night" system to reward those who qualify. Payroll numbers are drawn twice daily from a fishbowl, once each for the day and night shifts. To receive the award, a $25 War Bond, the employe must have a perfect attendance record for the past week. Bonds not awarded are allowed to accumulate. A woman worker, waving ticket, has just received five bonds. NEA photo

EARNINGS OF MAJOR STEEL PRODUCERS SUMMARIZED

	Fourth Quarter, 1942	Fourth Quarter, 1941	Year 1942	Year 1941	Taxes 1942	Taxes 1941
United States Steel Corp.	$25,646,452	$20,484,984	$72,142,195	$116,171,075	$227,891,237	$191,502,574
Bethlehem Steel Corp.	5,731,289	10,459,742	25,387,760	34,457,796	188,040,000	110,002,700
Republic Steel Corp.	6,501,357	6,041,244	17,154,578	24,038,340	67,875,000	46,250,000
National Steel Corp.	3,664,701	4,180,078	11,929,867	17,102,350	30,300,000	19,825,000
Inland Steel Co.	2,607,482	3,576,711	10,721,372	14,824,053	23,866,000	13,255,000
Jones & Laughlin Steel Corp.	2,550,257	4,234,599	10,020,443	16,274,983	24,000,000	14,342,670
Youngstown Sheet & Tube Co.	2,978,354†	3,678,557	10,305,705	16,124,401	24,700,000	21,500,000
Wheeling Steel Corp.	1,606,657	1,938,753	4,441,964	8,506,304	9,254,367°	10,336,567
Pittsburgh Steel Co.	599,839†	803,202	2,480,000‡	3,169,597	7,146,141§	4,946,141
Lukens Steel Co.	.....	.....	1,172,522	2,195,604	3,900,000	1,695,000
Continental Steel Corp.	316,853	293,525	938,852	1,225,674	993,680	1,335,321
Keystone Steel & Wire Co.†	265,355	413,999	1,486,550	1,815,414	1,711,289	1,454,126
Colorado Fuel & Iron Corp.†	386,904	806,450	2,261,652	3,615,570	4,626,662	2,331,344
Totals	$52,855,501	$56,911,844	$175,308,241	$259,521,161	$614,304,376	$438,776,443

†Fiscal year ends June 30. §Estimated. °Federal, state and local, only. ‡Before renegotiation of war contracts.

Steel Earnings Decline One-Third; Tax Bill Increases 40 Per Cent

THIRTEEN major steel producers, possessing approximately 85 per cent of total ingot capacity, reported net income for 1942 of $175,308,241. This is a reduction of 32.5 per cent from 1941 earnings of $259,521,161.

Taxes paid for 1942 by the producers were 40 per cent higher than in 1941, or $614,304,376 compared with $438,776,443 in 1941. Last year's taxes for the 13 companies amounted to three and one-half times net income.

Each of the producers showed a decrease in 1942 earnings from 1941, and all except one showed an increase in taxes.

For the fourth quarter of last year earnings of 12 companies totaled $52,855,501, a slight decrease from $56,911,844 in the last period in 1941.

Sharon Steel Corp.

Net income of $1,383,065 was earned by Sharon Steel Corp., Sharon, Pa., in 1942, compared with $1,633,364 in preceding year. Net for latest period was after charges and federal income and excess profits taxes. Net sales for the year totaled $35,780,000, greatest in company's history, as compared with $31,948,515 in 1941.

Superior Steel Corp.

Superior Steel Corp., Pittsburgh, reports net income for the year ended Dec. 31 as $978,184, after all deductions, including state and federal income and excess profits taxes, after a postwar credit estimated at approximately $60,000, but before renegotiation of war contracts. This is equivalent to $8.63 on capital stock. In 1941 company reported net profit after all deductions, including lower state and federal taxes, of $683,358, or $5.77 a share on its stock.

Scullin Steel Co.

Scullin Steel Co., St. Louis, reports net income for the past year as $441,010, after depreciation, provision of $2,200,000 for renegotiation of war contracts, reserve of $110,000 for additional wages, $694,850 for federal and state income and excess profits taxes, and after deducting credit of $49,050 applied to the reduction of debt. This compares with 1941 net income of $588,415 which, after providing for preferred dividends and $25,000 note retirement, left balance available for common stock of $488,565, against $241,160 balance in 1942.

Vanadium-Alloys Steel Co.

Vanadium-Alloys Steel Co., Pittsburgh, Pa., reported net income of $488,662 for the six months ended Dec. 31, equal to $2.45 a share on the capital stock, contrasting with $745,394, or $3.76 a share, in the corresponding 1941 period. Taxes for the latest period totaled $1,598,193, against $749,864 in the six months ended Dec. 31, 1941.

Woodward Iron Co.

Net income of Woodward Iron Co., Birmingham, Ala., for 1942 totaled $1,293,750, or $3.85 per share on common stock, against $1,013,662, or $3.01 per share, in 1941. Total taxes incurred last year amounted to $2,505,693, of which $159,377 represented postwar refund, and compared with taxes of $1,947,739 in prior year. Reserve for depletion and depreciation totaled $975,558, and contingency reserve, $125,000.

Republic Steel Corp.

Dividend of $1.50 per share has been declared by Republic Steel Corp., Cleveland, on its 6 per cent cumulative convertible prior preferred stock, series A, and an equal amount on the 6 per cent cumulative convertible preferred, payable April 1 to stock of record March 10, 1943. Common stock dividend of 25 cents per share will be paid April 2 to record March 10. Directors have authorized setting aside $300,000 on April 1 for purchase of the 6 per cent cumulative preferred.

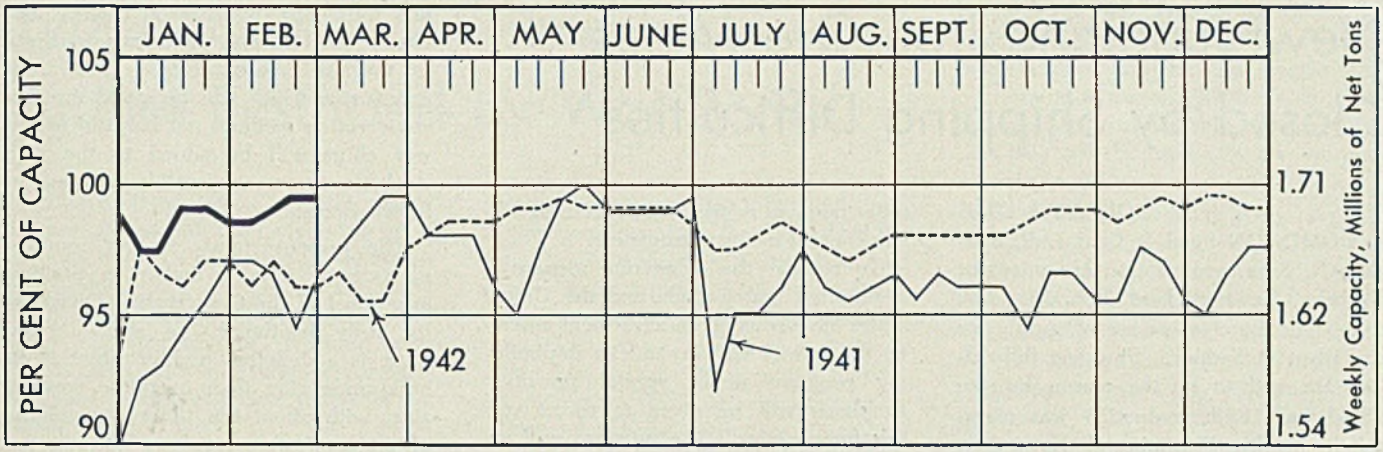
On May 1 corporation will act on an authorization to redeem $8,000,000 principal amount of its first mortgage convertible 5½ per cent bonds, due Nov. 1, 1954. Price is 102½ and the particular bonds to be redeemed will be designated by lot.

M. A. Hanna Co.

Consolidated net profit of M. A. Hanna Co., Cleveland, for 1942 totaled $4,254,663, after all expenses and taxes, equivalent to $3.55 a share on the common after preferred dividends. In 1941 net was $4,093,717, equal to $3.39 a common share. Payment of the regular preferred stock dividends of $5.00 a share and of common dividend of $1.50 left balance of $2,114,697 which was added to surplus.

During 1942 the company and its subsidiaries sold and delivered more than 25 million tons of coal and ore. Over 8,000,000 tons of bituminous coal, 3,500,000 tons of anthracite and 8,500,000 tons of iron ore were handled by Hanna in the period, according to the firm's annual report.

Company anticipates a record lake movement of bulk freight exceeding 1942 in the coming season.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	....	....	....	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	....	....	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Ingot Rate Steady At 99½ Per Cent

Production of open-hearth, bessemer and electric furnace ingots last week was unchanged from the prior week, at 99½ per cent. Four districts gained, three declined and five were unchanged. A year ago the rate was 96 per cent; two years ago it was 96½ per cent, both based on capacity figures as of those dates.

Changes in district production rates were small, the rise of ½-point at Chicago, nearly balancing ½-point decline at Pittsburgh and the gains in Wheeling, Buffalo and Cleveland being approximately equal to the drop in Cincinnati and Detroit. All the shifts in production were caused by exigencies of furnace repair, no scrap shortage developing at any point.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Feb. 27	Change	Same week 1942	Same week 1941
Pittsburgh	98.5	—0.5	95.5	96
Chicago	101.5	+0.5	102	99
Eastern Pa.	95	None	90	95
Youngstown	97	None	91	97
Wheeling	83.5	+3.5	86.5	88
Cleveland	93.5	+1	92	91.5
Buffalo	93	+2.5	79.5	90.5
Birmingham	100	None	95	100
New England	95	None	95	92
Cincinnati	91	—4	86	97.5
St. Louis	91	None	88.5	93
Detroit	91	—2	84	92
Average	99.5	None	°96	°96.5

°Computed on basis of steelmaking capacity as of those dates.

Steel & Wire Plants Continue To Report Higher Production

Plants of the American Steel & Wire Co. in January continued to increase production, making a total of 74 new records to add to the 901 new marks set in 1942.

Plants at Worcester, Mass., broke 30 former records, North Works 16 and South Works 14. Cleveland plants established 20 new highs, nine at Consolidated Works, five at Cuyahoga Works, four at American Works and two at Newburgh Works. At Donora, Pa., 13 records were broken; at Joliet, Ill., five; New Haven, Conn., four and Allentown, Pa., one.

WPB Directives "Choking" WMI Activities, B. C. Boise Charges

WPB directives are choking the activities of War Materials Inc., according to B. C. Moise, president of the latter organization. In a statement issued by Mr. Moise and sent to the directors of WMI he outlined the reasons why the organization is not now functioning for the purpose it was set up in August of last year.

Mr. Moise said, "We have an excellent organization but the War Production Board has strangled it by its directives. If we were turned loose, we could find a large amount of scrap at $40 or less per ton."

Recent WPB directives have prevented WMI from obtaining any scrap above $40 per ton. About 85 per cent of the total scrap turned over by the Salvage Section of WPB has been in the form of street car rails. Subsequent directives canceled large tonnages of the rails and in many cases WMI is now buying back contracts previously made, and thus is actually paying contractors not to get the scrap out.

The average price per gross ton paid by WMI for rail scrap was $59.30, on non-rail scrap the average price was $33.28 per gross ton. Performance in the past six months of the company's existence has actually brought to market only 8522 tons of steel. Contracts have been executed for about 60,000 tons, most of which were canceled by WPB directives.

OPA Permits Premiums for Nickel Bearing Pig Iron

Office of Price Administration has added $2 a ton to base prices for pig iron containing 0.50 to 0.75 per cent nickel and $1 for each additional quarter of 1 per cent. Higher prices are aimed at encouraging the salvaging of high-alloy steel scrap, including chips, borings and shavings.

Carnegie-Illinois Steel Corp., the price agency said, has been experimenting successfully in producing pig iron containing from 0.5 to 1.5 per cent nickel, permitting charging directly into steel furnaces.

The price action is designed to compensate for the additional cost involved. Increase becomes effective March 3.

Newfoundland Iron Ore Mines Closed by Shipping Difficulties

TORONTO, ONT.

DOMINION Steel & Coal Ltd., Sydney, N. S., closed its iron ore mines at Wabana, Newfoundland, Feb. 25. The mines are the chief source of supply for the plant at Sydney. Shipping difficulties are said to be the reason for the shutdown. Full production was maintained until the beginning of November, when the mines were put on a five-day basis. At the beginning of this year operation was reduced to three days, production being cut from 5700 to 2400 tons per week. Excessive cost of operation at that level was a factor in closing.

Stockpiles at mines are estimated at 500,000 tons but stocks at the Sydney works are not stated. At current rate of consumption in three blast furnaces with rated capacity of 490,560 tons of pig annually ore is available for about six months. The company is completing a new 1000-ton blast furnace, which will increase ore demand this year.

Prior to the war the company shipped about 600,000 tons of Wabana ore to its Sydney plant, 800,000 tons to Germany and about 300,000 tons to Great Britain.

J. L. Ilsley, finance minister, will ask parliament for an appropriation of $3,890,000,000 for war purposes for the fiscal year 1943-44. This is in addition to the $1,000,000,000 appropriation for aid to other United Nations countries under lend-lease and exceeds the total for the current fiscal year by more than a billion dollars. Total budget for the next fiscal year is expected to be $5,500,000,000, a new high record.

Restrictions on Electrical Equipment

Restrictions have been placed on manufacture of electrical generators, switchgear, circuit breakers, disconnecting switches, instrument transformer and the like, except by order by the Department of Munitions or under authorization by the administrator of electrical apparatus.

A master inventory of surplus cutting tools available to war industry has been established at 57 Bloor street West, Toronto, by the cutting tool division of the Department of Munitions and Supply.

An order-in-council provides that certain ferromanganese imports be exempted from customs duty of 1 cent per pound of contained manganese and the war exchange tax of 10 per cent. A further order removes restrictions concerning silicon content in ferromanganese.

To combat the submarine menace it is reported that Canada and the United States have reached an agreement whereby the former will expand its shipbuilding program under special priorities. Emphasis will be given to escort vessels for convoys. The program will exceed that of 1942, when 74 corvettes and 80 cargo ships were built.

Galvanizers Informed of Zinc Situation

The galvanizing industry cannot hope for any significant increase in business, according to R. L. Wilcox, Conservation Division, War Production Board, speaking before the annual meeting of the American Hot Dip Galvanizers Association in Pittsburgh, Feb. 25.

Mr. Wilcox indicated that according to the latest information slab zinc statistics show an approximate balance between total supply and requirements for the last three quarters of 1943. Any excess zinc which can be saved through conservation methods not harmful to the war effort will be added to the zinc stockpile against a possible increase in future demand.

The present supply against requirements ratio in zinc makes its position in group 1 of the Conservation Division's list fully legitimate, he said. While there is a definitely tighter situation in high-grade zinc than in prime western zinc, with about ten times the volume of prime western zinc available in the market and in government stockpiles, there is a considerable volume of conversion now being done and the supply and demand of both grades are about in balance at present.

A memorandum issued recently by the Conservation Division and approved by the Zinc Division states that no further cut in the use of zinc for galvanizing is necessary if the use measures up to three yardsticks: First, the product is essential to the war effort; second, the use of zinc in the product is technically sound; third, no equally satisfactory less critical substitute is available.

PARADE EMPHASIZES IMPORTANCE OF WAR JOBS

STEEL companies and foundries were among the companies to present the most attractive "floats" in a Labor-Management-Army-Navy "United We Attack" parade in Buffalo last week. It was estimated 200,000 persons witnessed the parade, which included more than 100 "floats." Afterwards 18,000 packed Memorial Auditorium, as heroes of the battle fronts spoke to workers, impressing on them the need for more production. Bethlehem's parade feature was one of the most elaborate

Types of Steel Mill Products Further Restricted by War Board

ADDITIONAL steps to limit manufacture of steel mill products to the minimum number of varieties which will satisfy current needs have been taken by WPB with issuance of National Emergency specifications for structural steel shapes, steel axles and forgings, mechanical steel tubing, and rails and track accessories.

These specifications, embodied in Schedules 4, 5, 6, and 7 to Limitation Order L-211, define varieties and shapes, as well as composition, types, grades, and qualities which may be produced and delivered. They become effective immediately.

New schedules are expected to increase production by promoting the use of existing facilities to their most economical extent. At the same time, mill and consumer inventories will be decreased as a result of the reduction in compositions and forms needed for maintenance or replacement.

A secondary effect of the schedules is the establishment of standards for the guidance of foreign purchasers. To obtain deliveries as rapidly as possible, it is anticipated that foreign governments will voluntarily comply with the specifications, unless local conditions make use of the standard compositions impossible.

Schedule on structural steel shapes (No. 4) limits production to a relatively small number of standard specifications. The list of permissible sizes made standard by the schedule is one which was put into effect on a voluntary basis with the approval of the Attorney General on Feb. 1, 1942. Selection of specifications covering the needs of the armed forces was made by the services.

Tubing Orders May Be Pooled

Schedule on steel axles and forgings (No. 5) is applicable to those used by railroads and rail transit services. Production of these items must conform to the terms of the schedule; however, production of axles for the repair and maintenance of railroad passenger cars and tenders built earlier is permitted.

Schedule on mechanical steel tubing (No. 6) prohibits the production or delivery of cold-drawn seamless tubing made of low-carbon steel except on an order for certain minimum quantities. Orders, however, may be pooled for manufacture, if the total of the pooled orders exceeds the minimum quantities shown in the schedule. In addition, the schedule requires that all tubing delivered to warehouses conform to standards of the American Iron and Steel Institute Manual as revised September, 1942, or to Army, Navy, or federal government specifications. Furthermore, the schedule prohibits production of free cutting tubing containing more than 0.05 per cent sulphur.

Purpose of these restrictions is to establish standard sizes of tubing for jobber or warehouse stocks in order to relieve steel mills of the necessity of rolling small quantities of many different sizes of the product. The limitation on the sulphur content of free cutting grades is expected to eliminate a considerable loss of mill scrap, since sulphur contamination of scrap in machining operations will be reduced.

Schedule on rails and track accessories (No. 7) covers production and delivery of new standard tee rails weighing over 60 pounds; plain grooved and guard types of new steel girder rails; new steel joint bars; tie plates; track spikes; and track bolts and nuts. An exemption is provided in the case of certain standard length rails for use in the fabrication of frogs, switches, and crossings. Before a manufacturer may deliver such lengths, not conforming to the specifications, the purchaser must certify on the purchase order that they will be used only for the permitted purposes.

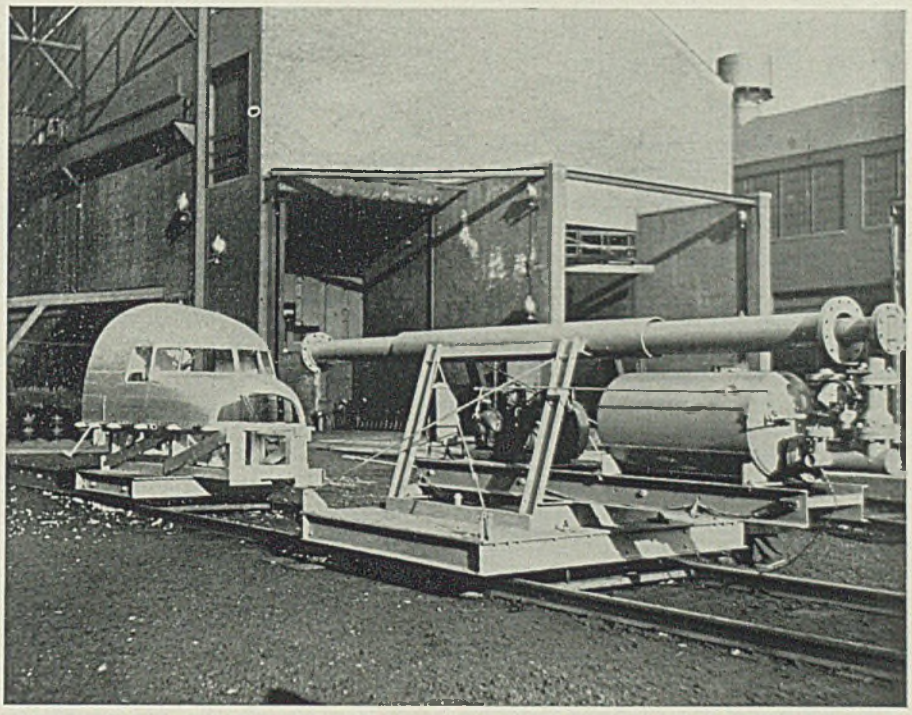
All schedules permit delivery of products already fabricated, and of those so processed that conformance to the specifications would be impractical.

The schedules were developed by WPB working with technical advisory committes representing consumers and producers. The committees had available the experience and guidance of the War and Navy Departments and of the American Iron and Steel Institute, the American Society for Testing Materials, the Society of Automotive Engineers, and the American Association of Railroads.

MRC Premium Payment Program Is Broadened

Scope of Metals Reserve Co.'s premium payment program covering over-quota production of domestic copper, lead and zinc has been broadened to afford an additional premium for lead and an additional premium or premiums for zinc in cases where such additional premiums are considered essential to insure

TEST BIRD-PROOF WINDSHIELD ASSEMBLY



DEAD birds, hurled by the compressed air gun, right, at speeds up to 300 miles per hour, are stopped by the windshield of this transport plane cockpit equipped with a half-inch sheet of plastic laminated between two panes of special glass. Tests of the bird-proof assembly, perfected by E. I. DuPont de Nemours & Co. to protect pilots, are being conducted at a DuPont plant. NEA photo

maximum necessary mine production.

Each such case is considered independently by the WPB-OPA Quota Committee, and payment of an additional premium or premiums is recommended to Metals Reserve Co. if deemed necessary in the particular case.

These premium payments are made on production in excess of monthly production quotas established by the Quota Committee, with the highest premium payable on over-quota production of lead reflecting the difference between the ceiling price and 12 cents per pound, New York basis, and the highest premium payable on over-quota production of zinc reflecting the difference between the ceiling price and the 12¾ cents per pound, East St. Louis basis, or 16½ cents per pound, East St. Louis basis, depending on the quotas assigned to the particular zinc mine.

Copper is not eligible for any additional premiums; only one additional premium is available for lead, and whether a zinc producer receives one or both of the additional premiums available for that metal is determined by the Quota Committee.

The quotas on which the additional premiums are based may be increased at any time or may be revoked at any time upon 30 days notice. Metals Reserve Co. will not effect any settlement with producers based on the additional premiums in the event of termination of the premium payment program prior to July 31.

Heavy Forged Hand Tool Output Further Limited

To reduce inventory stocks of heavy forged hand tools in distributors' and dealers' hands, WPB has ordered further curtailment in number of products permitted to be manufactured.

Sixteen types of picks were removed from the permitted list as well as all copper-headed tampers. To provide for certain industrial operations, there were added to the list one special-sized hammer, one 22-pound crow bar, and two lengths of tongs.

Net result was to reduce by more than 20 the number of products approved for manufacture, which total had been decreased from approximately 1150 to less than 360 under the original order and amendments.

Smaller War Plants' Share In Army Contracts Increase

Taking of its first prime contract for $10,000,000 and the negotiation of 38 loans totaling $2,568,770 were reported last week to Congress by the Smaller War Plants Corp. In addition, the Smaller War Plants Division recommened to the procurement agencies 1191 firms who received business in the amount of $195,000,000 during the last 60 days.

So effectively has the division's operation functioned since early December that the number of small business concerns obtaining contracts through its direct efforts has increased more than fourfold and the dollar volume has increased more than sixfold over the figures submitted in the last previous report to Congress.

Of the contracts arranged by the Division to date, 84 per cent are with the various supply services of the Army. More than half the dollar volume of the Army contracts are with the Ordnance Department. Both the Quartermaster Corps and the Air Corps are, however, the source of considerable additional volume. The Navy bureaus, all of which are represented, account for 11 per cent and other procurement agencies, principally Treasury procurement, for 5 per cent of the total dollar volume.

Form Advisory Committee For Rolled Strip Makers

Formation of a Rolled Strip Manufacturing Industry Advisory Committee has been completed by WPB, according to an announcement last week. David Evans was named government presiding officer. Other members include:

O. J. Crowe, general manager, Herring-Zimmers Moulding Co., Detroit; James H. Dunbar Jr., Dunbar-Kapple Inc., Chicago; T. H. Huff, Brasco Mfg. Co., Harvey, Ill.; Louis A. Macklanburg, Macklanburg-Duncan, Oklahoma City; Jack Stein, Rolled Metal Section Inc., Long Island; F. R. Eaglesfield, Kawneer Co., Niles, Mich.; A. Naughton Lane, vice president, Monarch Metal Weatherstrip Co., St. Louis; Shirley D. Murphy, Mouldings Inc., Indianapolis.

Mechanics' Hand Tool Advisory Group Appointed

WPB has announced a new Mechanics' Hand Service Tool Industry Advisory Committee, with Percy Ridings as government presiding officer. Members are: C. P. Brewster, K-D Mfg. Co., Lancaster, Pa.; Harry B. Curtis, Bridgeport Hardware Mfg. Corp., Bridgeport, Conn.; George J. Michel, H. Baker & Co. Inc., New York; Edward Morris, Utica Drop Forge & Tool Corp., Utica, N. Y.; William H. Hall, Kraeuter & Co. Inc., Chicago; W. R. Hosford, Duro Metal Products Co., Chicago; A. E. Keating, Trimont Mfg. Co., Roxbury, Mass.; Edwin Krall, Vlchek Tool Co., Cleveland; J. W. McDonough, The Sherman-Klove Co., Chicago; John Merker, Blackhawk Mfg. Co., Milwaukee; Rogers Palmer, Snap-On Tools Corp., Kenosha, Wis.; M. L. Peterson, Crescent Tool Co., Jamestown, N. Y.; Harold L. Schlosser, Lectrolite Corp., Defiance, O.; Dillon Stevens, Plomb Tool Co., Los Angeles; Otto Swanstrom, Diamond Calk & Horseshoe Co., Duluth, Minn.; and C. Nelson Wright, The Wright Tool & Forge Co., Barberton, O.

Plumbing, Heating Division Adds Four Consultants

Four consultants have been added to the staff of the WPB Plumbing and Heating Division to handle various problems within the industry.

L. N. Hunter, vice president, National Radiator Co., Johnstown, Pa., is consultant on cast iron boilers and radiators. He had worked with the division for a few months early last year.

Gerald E. Otis, vice president, Herman Nelson Corp., Moline, Ill., has been appointed consultant on extended surface heating equipment which includes unit heaters, unit ventilators, and similar products.

Leslie R. Taylor, vice president of International Heater Co., Utica, N. Y., is now consultant on warm air furnaces.

David Gulick, vice president, director and sales manager of Eljer Co., Ford City, Pa., is consultant on plumbing fixtures and equipment.

Act To Force Carbuilders To Use Surplus Inventories

Action to require producers of freight cars to use their surplus inventory stocks, where possible, and thereby reduce the volume of new material required, was taken last week through the issuance of Supplementary Limitation Order L-97-a-1, as amended.

Original order and previous amendments were designed to permit the exchange of inventories of car parts obtained prior to the "freeze" order on freight cars dated April 4, 1942. However, some of this surplus supply was not being used because car purchasers specified accessories produced by manufacturers other than those who made the parts considered as surplus.

Some of this surplus stock is still on hand and the new action is aimed to require its early use. However, the customer is allowed to appeal to WPB from the restrictions of the new action, if he feels it would result in an unreasonable hardship upon him.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, Dec. 14, 1942

L ORDERS

L-41 (Amendment): Construction, effective Feb. 19. Specifically designates that where a single job is partly maintenance and repair and partly new construction, the whole project will be considered new construction and subject to the order. Reduces to $200 new construction which may be undertaken, without specific authority, by a number of manufacturing enterprises which are not essential to the war program. Amendment applies to private dwellings and commercial structures. Provides for emergency work on any damaged structures for protection of the structure and the public; forbids carrying on or participating in prohibited construction; excludes financing and insurance charges as elements of cost; exempts certain types of agricultural construction to reflect the USDA rationing program.

L-42 (Amendment): Plumbing Fixtures, effective Feb. 20. Eases restrictions on use of metals in plumbing fixtures by changing Schedule XII as follows: Eliminates "trap standard" from definition of "plumbing fixture"; permits use of a maximum of one pound of ferrous metal for spuds; increases limits on weight of metal in component parts of tanks for urinals, heretofore restricted to four pounds.

L-211 (Amendment): National Emergency Steel Products, effective Feb. 24. Provides specifications covering structural steel shapes, steel axles and forgings and mechanical steel tubing, wheels and track accessories.

L-227 (Amendment): Fountain Pens, Mechanical Pencils, Wood-Cased Pencils, Pen Nibs, and Pen Holders, effective Feb. 22. Permits use of copper for alloying silver for pen nibs as well as for 14-karat gold pen nibs. Allows up to three gallons of finishing material for 100 gross of pen holders (previous amount was one gallon). Permits production of pen holders up to 31.25 per cent of total 1941 output for each three month period against previous 18.75 per cent rate. Removes restrictions upon production of novelty writing instruments. Charges date of required filing of PD-721 from 10th to the 20th of each month.

L-268: Oxy-acetylene Apparatus, effective Feb. 24. Restricts use of nonferrous metals and stainless steels in production of parts for oxy-acetylene apparatus. Bars purchase orders on preference ratings below AA-5 and restricts inventories of repair parts to 60 days' supply. Restrictions do not apply on apparatus for under-water use.

M ORDERS

M-81 (Interpretation): Cans, issued Feb. 22. Defines "frozen" tin plate, terne plate or black plate as material which, since Dec. 9, 1942, has been held in the inventory of a can manufacturer or his supplier for the following reason: The plate had been so processed, or was of such size, gauge or grade that it was not suitable for the manufacture of cans for which tin plate, terne plate, or black plate are specified, without qualification, in the various schedules of the order.

M-287: Anhydrous Aluminum Chloride, effective March 15. Prohibits delivery or use except as specifically authorized by Director General for Operations. Application for authorization to accept or deliver anhydrous aluminum chloride in any month beginning with April must be filed on or before 15th of the preceding month.

PRIORITIES REGULATIONS

Priorities Regulation No. 3 (Amendment), issued Feb. 16. Eliminates from definition of maintenance, repair and operating supplies the following categories of material: Materials for maintenance or repair of buildings; fabricated containers required for packaging products to be shipped or delivered; printed matter, stationery and office supplies; paper, paperboard and products manufactured therefrom; molded pulp production; fuel or electric power; office machinery or office equipment; wearing apparel (with specific exceptions), if made of leather or textiles; materials for plant expansion or plant construction.

Priorities Regulation No. 11 (Amendment), issued Feb. 20. Specifically excludes the following from definition of maintenance, repair and operating supplies: Fabricated containers required for packaging products to be shipped or delivered; printed matter, stationery, and office supplies; paper, paperboard and products manufactured therefrom; molded pulp products; fuel or electric power; office machinery or office equipment; wearing apparel (with specific exceptions), if made of leather or textiles; production material; materials for plant expansion or plant construction. Allows acceptance during second quarter of this year by PRP unit of supplies as previously defined, following proper application of preference ratings to purchase orders placed before Feb. 20.

Priorities Regulation No. 16 (Amendment), issued Feb. 17. Add 38 orders to the list of those which may be appealed only through WPB field offices. Removes from the requirements of Regulation No. 16 the following: L-5-c, L-6-c, L-78, L-83, L-84, L-91, L-108, L-131.

PRICE SCHEDULES

No. 136 (Amendment): Machines and Parts, effective Feb. 20. Closely defines regulation to cover only open tanks, vessels and pressure vessels, with certain exceptions; to exclude outboard motors but covers fully all dies, molds and patterns unless sold in connection with a casting, or where a charge is made for it in the sale of a casting. Maximum price established for the latter includes the price for the die, mold or pattern.

No. 321: Feldspar Fire Extinguishers, effective Feb. 24. Establishes margins over manufacturers' original prices for sales of extinguishers between distributors and consumers.

No. 49 (Amendment): Resale Iron and Steel Products, effective March 1. Provides for reductions ranging from 10 to 35 per cent in warehouse maximum prices of secondary iron and steel products. Establishes for first time maximum prices for flat rolled iron and steel products, including hot rolled, cold rolled, galvanized, galvannealed, and long terne sheets; hot and cold rolled strips; sheared and universal mill plates; and tin mill black plate. Maximum base prices are accompanied by schedules of permissible extras. Establishes size restrictions for each product. Establishes delivered prices for semifinished secondary products at 110 per cent of the mill prime price, being bought at 85 per cent of the mill prime.

Form CMP-6 Eliminated To Save Paper Work

Further reduction in the amount of paper work under the Controlled Materials Plan is made by a WPB decision to do away with the requirement that manufacturers file Form CMP-6 with all purchase orders for controlled materials. This action is made possible by simplification of allotment procedures effected in the recent amendment of CMP Regulation No. 1

Original purpose of the forms was to keep Washington Officials informed of the loads being placed on individual mills, so that they might divert orders from those producers already operating at capacity to others with available facilities. A simpler procedure for obtaining this information from steel, aluminum and copper mills, which relieves the purchaser of controlled materials of paper work in this respect, is being developed.

It is estimated that the new procedure will eliminate approximately 12,000,000 pieces of paper, which otherwise had to be handled by American industry during the first six months of CMP operations.

WPB Manual To Simplify Manufacturers' Record Keeping

A manual to assist manufacturers in organizing records and accounting required under the Controlled Materials Plan will be available soon, Harold Boeschenstein, director, WPB's plan division, announced last week.

The manual is directed at the problem of manufacturers' record keeping and accounting for allotments of controlled materials and re-allotment or placement of orders for delivery of materials. It suggests simple methods that may be used.

Manufacturers operating under the Controlled Materials Plan are required to keep records but not in any specific form. Records which a manufacturer normally maintains on material received, put into production and in inventory, should be sufficient to show that the materials were used for the authorized production schedule.

Rights of American Licensees Not Vested in Seized Patents

Leo T. Crowley, alien property custodian, last week announced that vesting by his office of patents of foreign nations did not mean that rights of American licensees under seized patents were likewise vested.

Opinion of the general counsel to the Office of Alien Property Custodian holds that an American licensee under a vested patent or patent application need not file a Form APC-1 to assert his claim to rights under his license.

The opinion holds, further, that an American licensee under seized foreign patents or patent applications cannot be prejudiced by his failure to file a claim within one year of the date the patent or patent application is vested. The opinion applies equally to exclusive and non-exclusive licenses.

WINDOWS of WASHINGTON

Group believes a maximum limitation on profits would result in disruptive economic repercussions. . . Propose six policies as pattern. . . Postwar planning by officials reaches "blueprint" stage

LAST week this department was devoted to a discussion of a treatise on postwar planning written by Dr. Alvin H. Hansen, Littauer professor of economics, Harvard University, and special economic adviser to the Board of Governors of the Federal Reserve System. This treatise has been published by the National Resources Planning Board under the title *After the War—Full Employment*.

What makes the pamphlet particularly important is that the National Resources Planning Board sent copies of the original manuscript to members of the Federal Reserve Banks and to a group of business men, economists and labor leaders. As a result of their suggestions, Dr. Hansen made numerous revisions in his text. As published, therefore, the pamphlet actually represents the viewpoint of many of our leading postwar planners.

Findings Are Interesting

Last week's discussion in these columns was built principally around what Dr. Hansen's group thinks can be done to guarantee full employment and high productivity in the postwar period by maintaining a sound relationship between public debt and public spending and by stimulating private enterprise.

Dr. Hansen's findings embrace some exceedingly interesting conclusions as to how—from the long-run standpoint—we should view (1) the distribution of income and (2) the proportion of a full employment income which would be expended on consumption. He believes it reasonable to suppose that the ratio of consumption to income in a full employment economy would tend automatically to be higher than the ratio of consumption to income, at the peak of a boom in a violently fluctuating economy.

A full employment economy would tend automatically, in his opinion, toward a distribution favorable to high consumption. He further argues that such a policy—if successfully pursued—would tend to develop repercussions upon the distribution of income which would reinforce the program to maintain full employment.

"That this is true," he explains, "can best be seen if we analyze the problem of corporate profits in a society continually operating at a full employment level. Peak prosperity profits have never in the past been realized for any considerable period of time. In a highly fluctuating society such as we have known, normal profits are some sort of average of good and bad times. Thus, for example, in the period 1925-40, the net income of corporations fluctuated very violently in relation to the total national income. In periods of high prosperity, the ratio of net income of corporations to the total national income was high, while in periods of depression, despite a fall in the national income, the ratio of the net corporate income to the total national income was low.

"Over the entire 16-year period from 1925-40, inclusive, corporate net income averaged only 4.6 per cent of the national income. It should be remembered, moreover, that this 16-year period included many years of serious depression, so that the average national income was relatively low. In other words, corporate profits constituted only a low per cent of a small national income—small in comparison with the income potentially realizable."

Dr. Hansen goes on to declare average corporate profit must be adequate to motivate a profit economy and insure its workability even in a highly fluctuating economy.

"If it were possible to maintain continuously a full-employment national income", he continues, "it is obvious that corporate profits, representing the same percentage of national income as that averaged over the cycle in the past, would yield an absolute profit figure far above the experience of 1925-40. Yet such a percentage continuously maintained would be much lower than the high ratio of profits to national income reached in a fluctuating society in the peak boom years.

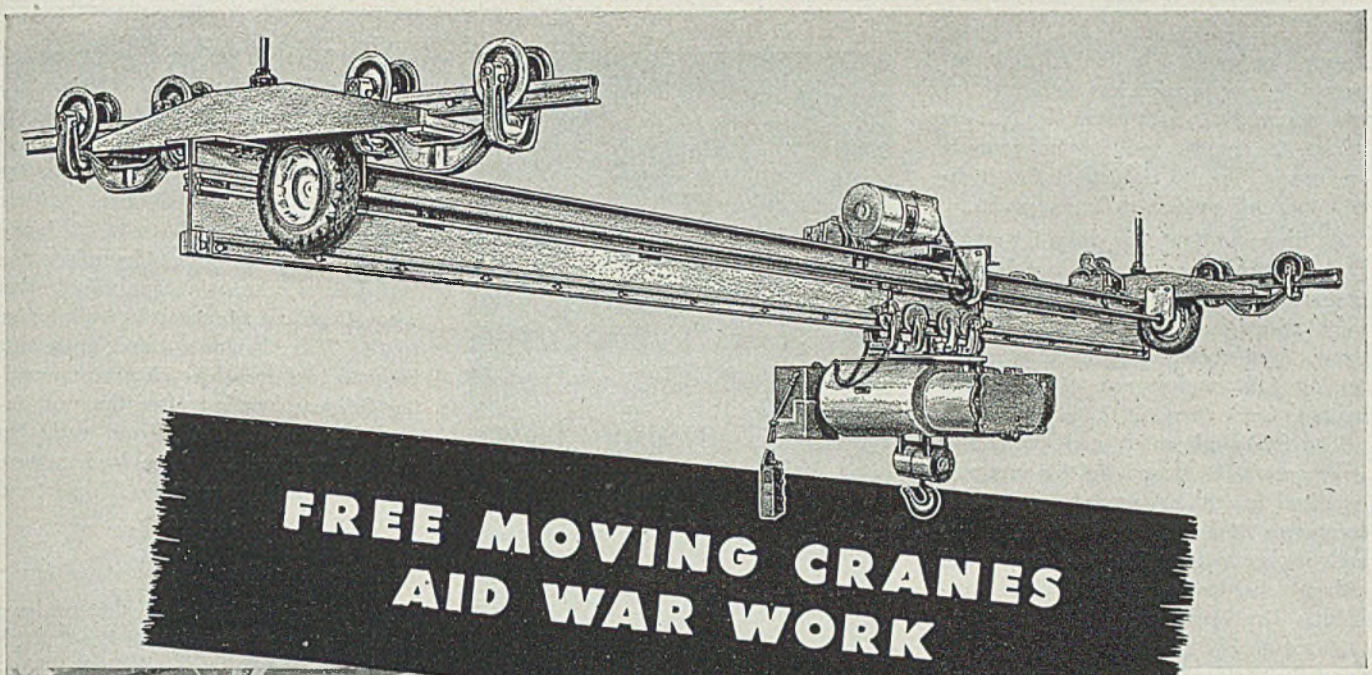
"In a society operating at continuously full employment, it is not probable that peak-prosperity profits (in 1925-29 approximately twice the average for the entire period 1925-40) could indefinitely be maintained. In a fluctuating society such high profits are necessary to offset the losses of the depression years, but it is unreasonable to suppose profits of the magnitude of boom periods would be realized indefinitely in a full employment system. They would almost certainly be eaten into, partly by competitive price decreases benefitting consumers and partly by the pressure for higher wages which invariably occurs in industries making large profits.

Discusses Business Profits

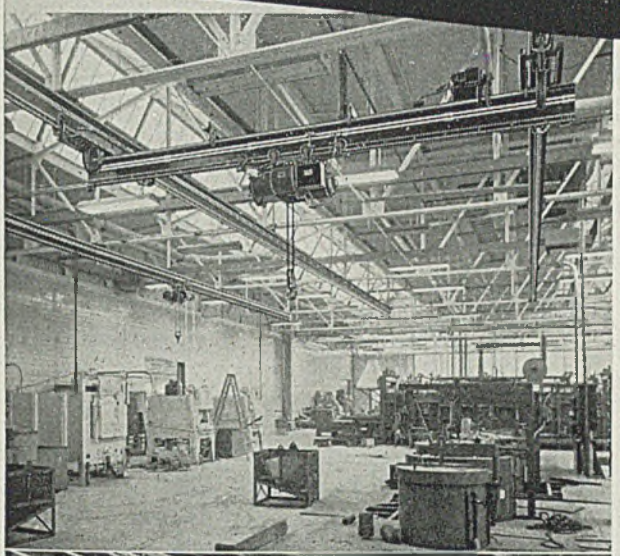
"Either development would tend toward a more equal distribution of income than has prevailed in the past in boom periods when full employment was reached. This is true because of the relative decline in the ratio of business profits to the national income at full employment levels. Yet if a full employment income were continuously maintained, the ratio of business profits to national income over the whole cycle would probably be greater than that experienced in the past, while the magnitude of business profits would be considerably greater, owing partly to the higher average ratio, and partly to the higher average national income for the whole period."

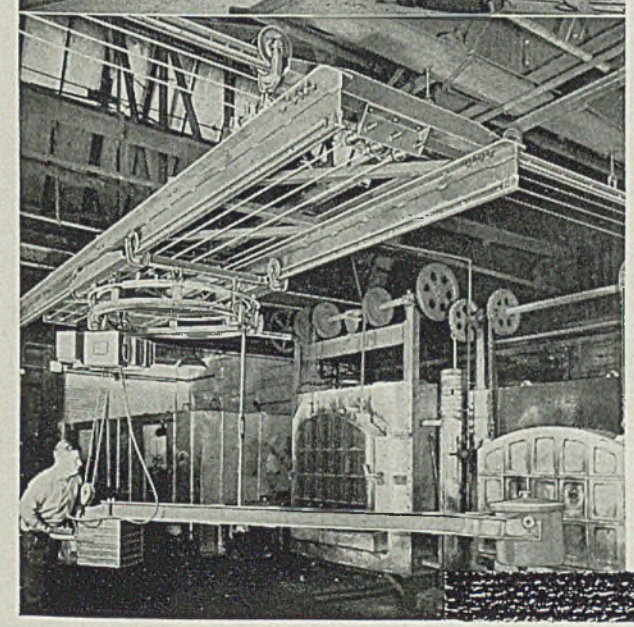
But Dr. Hansen makes the qualification that there are certain limitations on how far profits can be encroached upon, either through wage increases or price decreases, without encountering unfavorable economic repercussions with respect to the cost-price structure. Wage increases and price reduction are likely to cut across all firms in an industry, whether they make profits or not; and wage increases are likely to spread even to industries which are not making abnormally large profits. Dr. Hansen warns that the process of encroachment upon profits, if carried too far, might disrupt the appropriate balance in the cost-price system.

He believes redistribution of income



FREE MOVING CRANES AID WAR WORK





Flexible Design Permits later adaptability to regular production

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through progressive individual and corporate income taxes is less disruptive for the reason that such taxes apply only where the profits and income actually emerge. They do not effect the high-cost industries which make no profits.

At the same time, the group for which Dr. Hansen is spokesman does believe consumption can be very materially raised through wage and price adjustments in a society continuously maintaining full employment. It is just a matter of not carrying things too far.

The full employment, high productivity program envisioned by this group is expected to add to our annual national income as time goes on. Naturally, our entire labor potential cannot be placed either in wartime or peacetime jobs overnight. Dr. Hansen concludes that we may reasonably expect to have available for industrial and military employment a labor potential by 1943 or 1944 of 12 to 16 million workers in excess of the average number employed in 1940. He points out that even totalitarian Germany, with her drastic labor regimentation, was not able from 1933 to 1939 to absorb more than 1,800,000 workers in any single year. He estimates our maximum ability to absorb workers, not now enrolled in our working forces, would be between 3,000,000 and 4,000,000 a year. Obviously, the quicker all concerned can come to a definite understanding as to our national policy, the better it will be.

On the basis of a national income of 100 billions—which is not exactly predicted and which is just named as a handy sum with which to calculate—the Hansen group believes postwar consumption will rise from 55 billions to 80 billions, that net capital formation will go from 5 to 10 billions and that defense will drop from 40 to 10 billions.[1]

Favor War Tax Reduction

They favor such policies as again liberalizing consumers' credit after the war, sharp reduction of taxes imposed during the war on liquor and tobacco, and complete abolition of excises on consumers' durables and luxury products.

For the postwar period, the Hansen group suggests the following policies:

1—Retention of progressive (graduated) tax structure and broadened tax base, with major emphasis on individual income tax and less reliance on the corporate income tax;

2—Sharp reduction in defense consumption taxes;

DR. ALVIN H. HANSEN

Author of "After the War—Full Employment," discussed by Washington's postwar planners. The Harvard professor's pamphlet is a study of the economic problems facing the nation's business and political leaders

3—Adequate plans by private enterprise for private-investment projects in manufacturing plants and equipment, in railroads, in public utilities, and in housing;

4—An adequate program of public-improvement projects, including a nation-wide development of national resources, express highways, urban redevelopment (involving among other things outlays in terminal facilities and reorganization of urban transportation), and a reorganized public housing program (including the setting up of a Housing Research Laboratory designed to reduce construction costs and thus enlarge the scope of private housing construction).

5—Expansion of public-welfare expenditures—federal aid to education, public health, old-age pensions and family allowances. This involves in part an expanded program, and in addition provisions for reducing state and local property and community taxes, thereby stimulating private consumption expenditures;

6—International collaboration in the pursuit of internal policies designed to promote active employment; to explore development projects in backward countries; to implement ways and means to open outlets for foreign investment; to promote world trade, and more effective use of productive resources.

It should be entirely clear from this and previous discussions of postwar planning that have appeared in this department in recent weeks, that when President Roosevelt, Vice President Wallace, Sumner Welles and others high in the government have talked about postwar planning, when they have talked about our determination "not only to win the war but also to win the peace", that when President Roosevelt in his message to the 78th Congress called upon that body to take measures aimed at providing full employment after the war, including absorption of our returning soldiers and sailors, these leaders were not just reaching up into thin air and grasping at day dreams.

No Crackpot Ideas

Actual fact of the case is that we have a real postwar "economic design" which has to a large degree reached the "blueprint" stage. This design definitely is not the product of reformers and crackpots. Rather, it has been evolved and continues to be perfected by some of the keenest economic, business and industrial minds in this country. Up until recently it has been to some extent soft-pedaled in order not to detract maximum attention from organizing for war.

Inasmuch as President Roosevelt publicly emphasized the importance of doing something right now to insure full employment after the war, "the lid is off". Congress will now get busy on preparation of a legislative program aimed at this objective. In months to come there should be considerable action—as well as talk—on the subject of postwar planning.

OWI Reports "Victory Model" To Be Standard Term of War Goods

Government war agencies dealing with price and material control have agreed to the standard terminology "War Model" to indicate specified commodities designed "to provide greatest wartime serviceability at given price levels with the least drain upon manpower, critical materials, plant and transportation facilities."

This was announced last week by the OWI after an exchange of letters among the Office of Economic Stabilization, Office of Price Administration, and the War Production Board. Proposal for adoption of the term originated with the Office of Price Administration.

"Victory model", "utility model", "simplified model" and "war model" have been used interchangeably among government officials to designate models of the type in question, resulting in confusion.

1—The expected national income during 1943, as recently forecast by the Office of War Information, should be somewhere between 125 and 135 billions, of which some 90 billions will be direct war expenditures.

WPB Offers Alternate Materials From Excess and Idle Inventories

NEW YORK

CO-OPERATION between purchasing agents, production managers and the War Production Board, in the use of available substitutes will go far in expediting production, Ralph A. Parker, assistant deputy regional director of WPB, stated last week.

These substitutes, he explains, do not entail radical departures from specifications necessarily, but frequently the use of merely a slightly different size, as in steel items, for example, which can be turned down to meet requirements. Such substitutes are obtainable from excess or idle inventories of which the WPB district office maintains a record. Nevertheless, adherence to standardized peacetime procedures between plant operations and purchasing departments has offered the chief obstacle encountered by the WPB Redistribution Division in its efforts to provide available substitutes.

Recent instances in which the district staff has been able to expedite production by providing substitutes include:

1. A machinery manufacturer seriously needed 4000 pounds of 3-inch round SAE 3135 steel for gear blanks, and had tried all warehouses in the East and as far west as Chicago, without being able to get the material. Appeal was made to WPB. There was no record of that particular size available but the office located some SAE 2330. The purchasing agent was doubtful about accepting that material but it was suggested that he check with his production manager. As a result of that conference the material recommended was accepted. It was provided promptly and the work proceeded without interruption.

2. An elevator company thoroughly canvassed all known sources for a supply of 100 feet of 5-inch round cold-rolled bars without success. Appeal was made to WPB; the district office had an inventory record of some 5⅛-inch round cold-rolled bars and offered this as a substitute, suggesting that the material could be turned down to the desired size. The recommendation was accepted, the material was promptly obtained, and the job was completed without delay.

3. An aviation plant needed 10,000 pounds of ¾-inch round SAE cold-finished X-4130 steel for airplane parts. The material had been on order in the mill for several months but no definite promise of delivery could be obtained. The company consulted WPB, which had an inventory record of some 13/16-inch hot rolled X-4130. The company was advised that this material was immediately available and it was urged to get in touch with a certain cold finishing mill near its own plant, to draw this down to proper size. The suggestion was accepted, the material was obtained and finished, and it was available for the company within three weeks.

Co-operation Solves Problems

4. A drop forging plant needed 10,000 pounds of 1¼-inch round hot-rolled SAE 1020 steel for drop forged parts, for receiving sets for the Navy. The company had unsuccessfully checked with six or seven warehouses. The district WPB office found some material that it was thought would be suitable, and a sample of that material was taken to the company by a representative for analysis. The analysis showed that the material was satisfactory, it was obtained, and the company was able to make delivery on its contract on time.

5. An arsenal canvassed the entire country for approximately 150,000 pounds of 128-pound terne plate of specified lengths and widths. WPB inventories provided about 25,000 pounds, but it was suggested that there was a supply of 135,000 pounds of tin plate which probably would answer the purpose. As a result of that offer, about 120,000 pounds of the tin plate was obtained and used satisfactorily for the purpose, which called for material to be pressed into cylinders as containers of powder to be used for smoke screen purposes.

"The effort of the Redistribution Division to avoid production delays through the use of substitutes has been most successful when purchasing agents have been willing to co-operate with WPB staff men by consulting with plant managements," Mr. Parker said. "The analysis of the division's records, however, offers convincing evidence that much more along this line of speeding war production could be done if purchasing agents would collaborate with their engineering and plant departments in each case where an available substitute for critical material could be used to meet the requirements of specifications and avoid delay in production."

CRUDE RUBBER FLOWN TO U. S. FROM CENTRAL AMERICA

MORE than 100 tons of crude rubber have been flown to the United States from Panama, Nicaragua and Guatemala since last December. Part of this was enemy tonnage seized in the Canal zone and the remainder was "tree scrap" from the wild castilloa trees. Pictured above are 100-pound sacks of tree scrap being loaded into an Army plane at a Nicaragua airfield to be flown to San Antonio, Tex.

Seventh List Covering Supply And Substitution Issued by WPB

SEVENTH list of critical materials was issued last week by the War Production Board. Available supply of materials in Group 1 is inadequate for war and essential civilian uses, and in many cases for war purposes.

Secondary and scrap metal, unless otherwise shown, is classified with the corresponding primary metal; in any given case the higher grades are more critical and the secondary grades less critical.

Carbon iron and steel are recommended as substitutes for nonferrous metals. In the list below order of listing has significance only in the case of metals. Asterisks denote the most critical materials.

GROUP I—METALS

List I (a)

°Magnesium, °Aluminum, °Copper, °Tin, °Cadmium, °Zinc, Bismuth.

List I (b)

°Tantalum, Beryllium, Lithium, Iridium.

List I (c)

°Molybdenum, °Nickel, °Vanadium, °Tungsten, °Chromium, Cobalt, Calcium Silicon.

List I(d)

°Chrome-Nickel Stainless Steel, °Straight Chrome Stainless Steel, AISI Alloy Steel, NE Alloy Steel, Tool Steel (High Speed), Low Phosphorous Pig Iron, Alloy Cast Iron.

List I(e)

Steel Products: °Bars (1½ in. and larger, except reinforcing) °Forgings, °Seamless Tubing, °Plates, Sheet and Strip, Bars (under 1½ in., except reinforcing), Wire Rope, Wire Products, Castings, Tinplate, Galvanized Sheet.

Plastics

Copolymers of: Vinyl Acetate and Vinyl Chloride.

Ethyl Cellulose, °Methyl Methacrylate.

Phenolic: Laminates: Laminated Rods, Laminated Tubes, Molding Compound.

Polystyrene, Polyvinyl: Acetate: Alcohol, Butyral, Chloride, Formal.

Vulcanized Fiber.

Chemicals

Acrylic Acid and Acrylates; °Acrylonitrile.

Alcohol: Amyl; Butyl (all Isomers); Capryl; Lauryl; Methyl.

Aluminum Chloride: Anhydrous (liquid, crystal); aluminum sulfate (iron-free); °Aluminum Trihydrate; Ammonia and Derivatives; Aniline and Derivatives; Anthraquinone and Derivatives.

Aromatic Petroleum Solvents; Arsenic and Derivatives; Ascorbic Acid.

°Benzol and Derivatives; Bleaching Powder.

°Butadiene; Butyl Acetate.

Calcium Cyanamide and Derivatives; Calcium Hypochlorite; Chlorosulphonic Acid, Cobalt Chemicals; Copper Chemicals; °Cresols; Cyanamide.

Dichlorethyl Ether; Dithenylamine.

Ethylene Dichloride.

Formaldehyde and Paraformaldehyde; Furfural.

Glycerol.

Hexachlorethane; Hexamethylene Tetramine.

Iron Oxide: Synthetic Yellow Hydrated.

°Lithium Chemicals.

Manitol; Monoethanolamine; Naphthenic Acids and Derivatives; Nitric Acid.

Pentaerythritol; Perchlorethylene; Perchloric Acid. °Phenol and Derivatives; Phosphate: Tricresyl, Triphenyl; Phosphorous Phthalic Anhydride and Derivatives; Pyridene.

Silica Gel; Sodium Nitrate, Sorbitol; Strontium Chemicals; °Sulfamic Acid; Sulphur Chlorides.

Tetrachlorethane; °Toluol and Derivatives; Trichlorethylene.

Urea; Xylol; Zinc Oxide: French Process.

Lumber

(of Specified Grades)

Balsa (all grades); Beech (F.A.S.—Selects—No. 1-No. 2): especially 6/4 and thicker).

Cypress (Tank and Boat Stock).

Douglas Fir (Stress Grades—No. 1—No. 2 all Boards—Thick Clears).

Eastern Spruce (No. 1—No. 2—No. 3); Eastern White Pine (No. 2—No. 3).

Hard Maple (F.A.S.—Selects—No. 1 in 6/4 and thicker).

Hickory (F.A.S.—Selects—No. 1).

Magnolia (F.A.S.—Selects—No. 1); Mahogany (F.A.S.—Selects—No. 1).

Noble Fir (No. 1—No. 2)—Aircraft and Ladder Stock.

Northern White Pine (No. 2—Boards—No. 3 Boards); Norway Pine (No. 2—No. 3).

Rattan; Rock Elm (F.A.S.—Selects—No. 1).

Sitka Spruce (Aircraft and Ladder); Southern Pine (Stress Grades—No. 2 Boards).

°Teak (All Grades).

West Coast Hemlock (Boards—Aircraft-Ladder); Western Larch (Stress Grades); White Ash (F.A.S.—Selects—No. 1—No. 2); White Oak (F.A.S.—Selects—No. 1).

Yellow Birch (F.A.S.—Selects—No. 1); Yellow Poplar (F.A.S.—Saps—Selects—No. 1).

Textiles and Fibers

Agave: Cantala, Fourcroydes, °Henequen, etc., °Sisalana.

Alpaca; Bristles: Pig, Hog (2" and over).

Cotton: Duck, Long Staple.

Down; Feathers: Goose, Duck (Up to 4").

Hemp: Fiber, Seed; Jute: Burlap, Fiber; Kapok; °Manila; Nylon.

Rayon: High Tenacity; Silk: °Garnetted, °Noils and Waste, °Raw, Used and Reclaimed.

Miscellaneous Products

Acrylic Resins; °Agar; °Alumina: Calcined; Aluminum Oxide Abrasives; Aluminum Pigments; Asbestos: Long Fiber.

Babassu Kernels; °Bauxite: Low Silica; Carbon Black: Furnace; °Castor Beans; Coke: Petroleum; Copra; Corundum; Cotton: Chemical Pulp, °Linters; Cryolite.

Diamond Dies: Fine Sizes; Fluorspar: Metallurgical; Fuel Oil: East Coast and Pacific Northwest; Gasoline: Aviation; Motor—East Coast; Graphite.

Mica: °Block.

Oils: Babassu, Cashew Nut Shell, °Castor, Coconut, °Oiticica, Palm Kernel, Rapeseed, Sperm, °Tung.

Phenol-Formaldehyde Resins; Plywood: Restricted Binder: Birch, °Douglas Fir.

Polystyrene Resins; Pyrethrum; ° Quartz Crystals; °Quinine.

Refractories: Chromite, High Alumina, Indian Kyanite; Rotenone.

Rubber: °Chlorinated, °Crude, °Latex, Scrap and Reclaimed, °Synthetic.

Seedlac; °Shellacs; Spodumene; Talc: Steatite; Vinyl Resins; Vulcanized Fiber.

GROUP II

Materials that are essential to the war industries but the supplies of which are not as limited as those in Group I and which are in approximate balance with war and essential civilian demand. When one is considering the use of an item in Group II as a substitute for an item in Group I, their relative available quantity should be kept in mind, since substitution of a small tonnage material, as, for example, silver for copper, would, if continued indefinitely, soon exhaust the supply of the smaller tonnage material. The order of listing has significance only in the case of metals.

Metals

List II (b)

Rhodium, Platinum, Ruthenium, Mercury, Silver, Palladium, Indium.

List II (c)

Calcium, Columbium, Ferrotitanium, Zirconium and Alloys, Silico-manganese, Ferrosilicon, Spiegeleisen, Silvery Iron.

List II (d)

Tool Steel (except high speed); Open Hearth Steel (c); Cast Iron: Malleable, Gray Cast; Pig Iron (Except Low Phosphorous); Bessemer Steel.

List II (e)

Steel Products: Black and Terne Plate; Pipe; Rails; Structurals; Piling; Wire Mesh Reinforcing; Reinforcing Bars (Rerolled Rail); Rerolled Rail Products.

Plastics

Cellulose: Acetate, Acetate Butyrate, Nitrate. Melamine Molding Compound.

Chemicals

Acetic Acid; Acetic Anhydride; Acetone.

Alcohol: Diacetone, Ethyl, Isopropyl; Amyl Chloride; Alebrine (for Quinine).

Bromine.

Chlorates and Perchlorates: Chlorinated Hydrocarbon Solvents: except those in Group I; Chlorinated Waxes; Chlorine; Chromium Chemicals; Citric Acid; Ethers.

Glycols.

Hydrogen Chloride: Anhydrous; Iodine; Ketones: Lactic Acid and Lactates.

Maleic Acid and Anhydride; Manganese Chloride: Anhydrous; Mercury Chemicals; Molybdenum Chemicals.

Naphthalene and Derivatives; Nickel Chemicals: Nitrocellulose.

Phosphorus: Oxychloride; Pentoxide; Potassium Permanganate.

Silver Chemicals; Sodium: Metallic, Aluminate, Sulphide; Sulphuric Acid Oleum; Tannic Acid.

Lumber

(of Specified Grades)

Cypress (F.A.S.—Selects—No. 1 Shop—No. 1—No. 2—No. 3).

Douglas Fir (Flooring—Drop Siding—Ceiling—Dimension).

Eastern Hemlock (No. 1—No. 2—No. 3); Eastern White Pine (Selects—No. 1); Hard Maple (F.A.S.—Selects—No. 1 in 4/4" and 5/4"—No. 2 in 4/4" and 5/4").

Idaho White Pine (Selects—No. 1—No. 2—No. 3—No. 4); Mahogany (No. 2).

Noble Fir (Selects—Shop); Northern White Pine (Selects—No. 1—No. 4—Shop).

Pecan (F.A.S.—Selects—No. 1); Ponderosa Pine (Selects—No. 1—No. 2—No. 3—No. 4); Redgum (F.A.S.—Selects—No. 1); Red Oak (F.A.S.—Selects—No. 1); Redwood (Selects—No. 1).

Sap Gum (F.A.S.—Selects—No. 1); Sitka Spruce (Shop—Box—Dimension); Soft Maple (F.A.S.—Selects—No. 1).

Southern Pine (No. 1 Dimension—No. 2 Dimension); Sugar Pine (Selects—No. 1—No. 2—No. 3—No. 4), Sycamore (F.A.S.—Selects—No. 1).

Water Tupelo (F.A.S.—Selects—No. 1).

Walnut (F.A.S.—Selects—No. 1); West Coast Hemlock (Flooring—Drop Siding—Ceiling—Dimension); Western Redcedar (Selects—No. 1); White Ash (No. 3); White Fir (No. 2—No. 3); White Oak (No. 2—No. 3).

Yellow Poplar (No. 2—No. 3).

Miscellaneous Products

Albumin: Blood; Alkyd Resins; Alpha Cellulose Wood Pulp; Asphalt.

Cadmium Pigments; Caffeine; Cellophane; Cellulose Acetate; Chrome Pigments; Cohune Nuts and Kernels; Cotton Seed S X P.

Diamonds: Industrial; Diatomite.

Ester Gums; Fluorspar: Acid; Glass: Fibrous, Optical; Halogenated Hydrocarbon Refrigerants.

Hides.

Melamine Resins; Mercury Pigments; Mo-

(*Please turn to Page* 142)

Substitute Alloys for Bearings May Save Tons of Tin, Battelle Reports

A MEANS by which America can cut her refined tin requirements several thousand tons per year was suggested last week by Battelle Memorial Institute, Columbus, O., in a report on its experiments with substitute alloys for leaded bronze bearings for possible use in machine tool, aircraft and automotive engine manufacture.

Investigations by Battelle research metallurgists have indicated that there are several alloys which possibly can be used as substitutes for the standard 80:10:10 bearing bronze without sacrifice of bearing quality. The use of the substitute alloys would reduce the refined tin requirements for this purpose 70 per cent or more, depending upon the alloy selected and the extent to which scrap were used in its production.

In a technical publication describing their investigations Battelle technologists point out that the bronze industry is the third major user of refined tin. During the period from October, 1940 to September, 1941 it consumed 9000 long tons of refined tin, third to tin plate and solder industries, which consumed 44,000 and 17,000 long tons, respectively.

Tin requirements for tin plate will ultimately be cut to less than 10,000 tons per year by substitutes already developed. Lead-tin solders are practically entirely substitutable by lead-silver solders. Silicon-bronze will serve for most castings formerly made from tin-bronze, but some thousands of tons of tin would still be required for bronze bearing bushings were substitutes not adopted.

Bronze Demand Increasing

Demand for bronze is increasing with expansion of war production. Considering the total tin requirements for primary tin and for that contained in scrap "bronze bids fair to become the largest single user of tin."

Bearing bronze most used for bushings in which the shaft runs directly on the bronze is constituted of 80 per cent copper, 10 per cent lead, and 10 per cent tin, called 80:10:10 alloy. This alloy has special virtues, recognized ever since its introduction in about 1870, that make it especially suitable for bearing use. Various emergency alternates have been proposed in which the tin content is dropped to as low as 6 per cent, but the experiments show that satisfactory bearing alloys can be made with a tin content as low as 2.8 per cent, or for some purposes with no tin.

In performance tests of bearings manufactured from two of the developed alloys it was established that the alloys were much better for some purposes than the standard 80:10:10 alloy. Both of these contained no tin, it being entirely replaced in one by copper and in the other by copper, silver, and phosphorus in the ratio 4:5:1. Another alloy, in which tin was reduced to 2.8 per cent by the substitution of antimony and copper for tin, gave a behavior almost identical with that of the standard alloy in the performance tests.

Substitute alloys have tensile and hardness properties different from the standard, but performance tests do not indicate difficulties because of these differences. Practicability of manufacture from standard tin-containing scrap has been taken into consideration, and technically it would appear that from among the alloys one can be chosen to fit all needs for 80:10:10 bronze.

The possibility of conserving several thousand tons of tin a year by substitute bearing alloys is of special concern because of a recent government order further restricting tin consumption for 1943 by 12,000 tons.

VERA CRUZ, a gunboat sunk in 1914 by the crew to prevent it from falling into the hands of revolutionists, will be salvaged to help provide scrap for Mexico's growing steel production, according to a Mexican radio broadcast.

Tri-Nation Mission Will Study Conservation of Alloying Materials

METALLURGICAL problems of the British, Canadian, and American steel industries, particularly those relating to the conservation of alloying metals, will be discussed by a metallurgical mission of the British Iron and Steel Control, Canadian representatives, and an American group named by H. G. Batcheller, director, WPB Steel Division, at meetings scheduled to begin early in March.

Members of the British Mission include E. W. Senior, director, Iron and Steel Division of the British Raw Materials Mission; C. R. Wheeler, deputy controller of raw materials; Dr. W. H. Hatfield, Thomas Firth & John Brown; Dr. T. Swinden, director ,Research of the United Steel Corp.; William Barr, Colville's Ltd.; D. A. Oliver, William Jessop's Ltd.; D. L. Burn, deputy director of statistics of the Iron and Steel Control; and F. H. Saniter, British Raw Materials Mission.

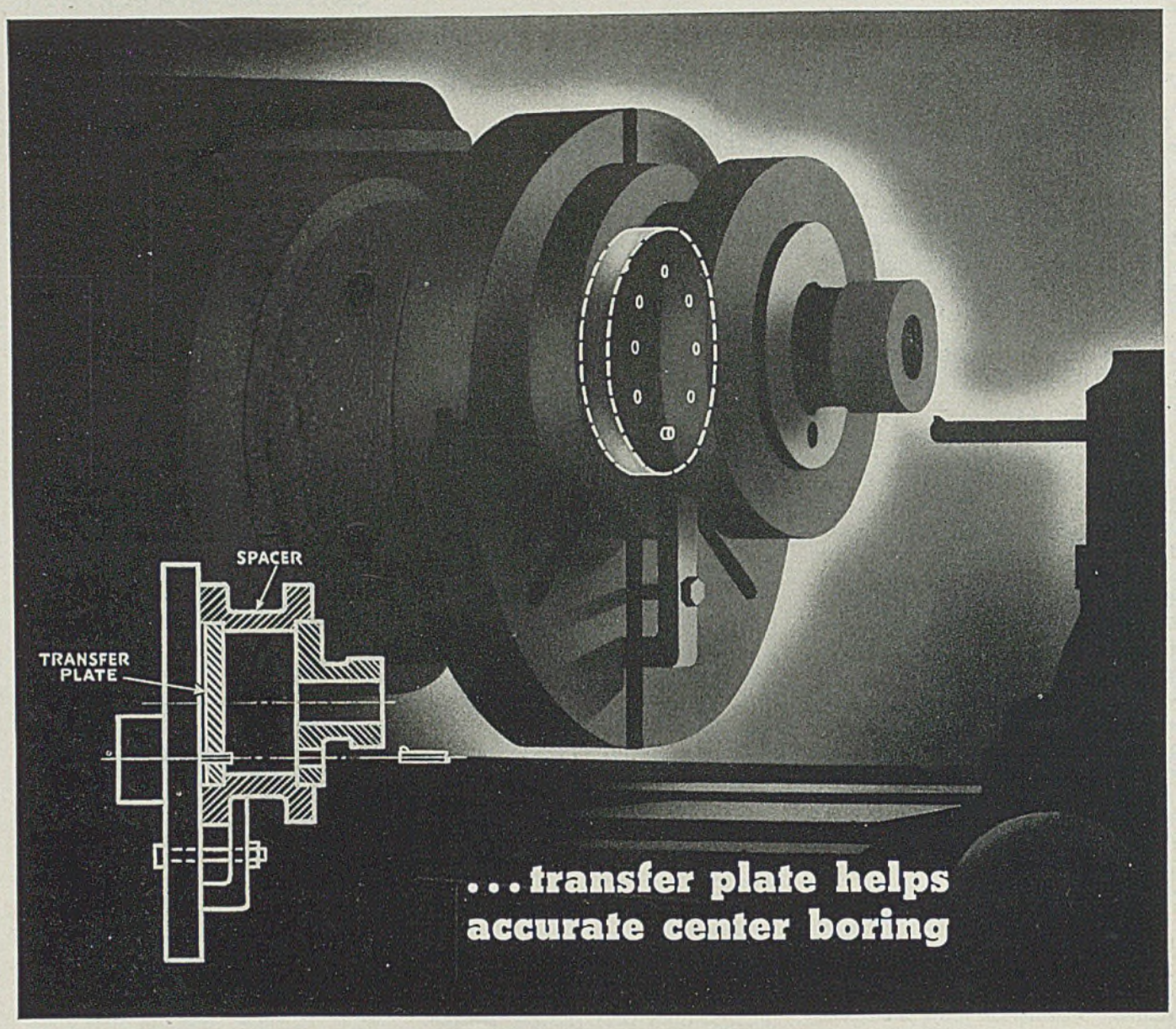
Mr. Batcheller has appointed a committee of 13, headed by Quincy Bent, vice president, Bethlehem Steel Co., to meet with the British and Canadians. The other members of the American committee are:

Dr. H. J. French, chief, Metallurgical and Conservation Branch of the Steel Division; Howard Young, director, WPB Mineral Resources Coordinating Division; Dr. G. B. Waterhouse, Office of Lend-Lease Administration; Earle Smith, chief metallurgist, Republic Steel Corp. (alloys); A. D. Shankland, chief metallurgist, Bethlehem Steel Co. (shot and bombs); John Mitchell, Carnegie-Illinois Steel Corp. (constructional steels); James A. Kinnear Jr., Carnegie-Illinois Steel Corp. (armor plate); A. O. Shaefer, Midvale Co. (ingots); L. P. McAllister, Lukens Steel Co. (high tensile steel); W. C. Hamilton, American Steel Foundries (cast armor); F. B. Lounsberry, Allegheny Ludlum Steel Corp. (tool steel); and C. E. Tuttle, Rustless Iron & Steel Corp.

Canadian representatives are J. C. Morrow, Steel Co. of Canada; R. H. Davis, Atlas Steel Ltd., and Howard Biers, Electro Metallurgical Co. of Canada.

Among the topics to be discussed are methods of conservation in the United States, Canada and the United Kingdom, and methods of recovery, segregation, and useage of alloy scrap.

As a basis for possible recommendations to the proper agencies of each government, the combined group will discuss the production of alloy steel ingots, and the use of virgin alloying metals for many products. It is expected that statistical data will be presented covering alloy steel scrap consumption; the percentage of various critical alloys charged in virgin form; the monthly consumption of all alloys in relation to alloy steel output; and the monthly production of alloy steels in the main analysis categories.



Information supplied by an Industrial Publication

The problem of drilling a number of holes in a part on precise center distances is seldom simple. It is particularly complicated in mass production of parts where holes must register accurately.

The answer in one plant is what is known as a transfer plate. This is really a circular template, of any thickness over ⅛ inch, with uniform holes drilled on accurate centers. These holes fit a pin located at the exact center of a lathe face plate.

In mounting, the work is assembled to the transfer plate with a spacer between. The assembly is pinned to the face plate through one of the holes in the transfer plate, and clamped tight.

A boring bar in the lathe tool rest can be used to bore a hole of any desired size in the work. The hole will be exactly in line with the pin, and consequently with the hole in the transfer plate.

Subsequent holes are bored by passing the pin through the remaining holes in the plate, until all are bored. When finished, every hole, regardless of diameter should be on the same center as the corresponding hole in the plate.

MIRRORS of MOTORDOM

Aim to step up Detroit production without increasing labor load, by more widespread subcontracting. Concentrate on airplane engines. . . Armored force general lauds U. S. combat equipment

DETROIT

HINTS of a forthcoming change in the overall production pattern in war industry here, especially as it relates to aircraft and aviation engines, are contained in announcement by the Army Air Forces Central Procurement District that Ford is being asked to double output of Pratt & Whitney 2000-horsepower radial engines, but without requiring any increase in employment at the aircraft engine plant in Dearborn. This would be accomplished ostensibly by subcontracting many of the manufactured parts now made here to areas outside Detroit and converting the Ford P&W plant into largely an assembly and testing operation.

This means doubtless that important new orders for engine parts are streaming out of the airplane engine purchasing offices, since announcement of the doubled production rate was held up 30 days pending completion of arrangements for spreading subcontracts.

This news follows on the heels of tripling schedules for Buick-built Pratt & Whitney engines at Flint and Melrose Park, Ill., and new contracts calling for a five-fold increase in the current rate of Pratt & Whitney production at Chevrolet plants in Michigan and Tonawanda, N. Y. Chevrolet's contract increases were made less than a year after original contracts were signed.

Follows Chrysler Plan

The new production pattern at the Ford air engine plant is similar to that worked out for the Chrysler Tank Arsenal which, shortly after production of M-3 medium tanks had begun in volume, was switched over almost altogether to assembly operations, and manufacturing steps were farmed out to other Chrysler automobile plants in the middle west.

In conferences with WPB, WMC and air force officials, Ford executives agreed on a four-point procedure for stepping up assemblies without increasing labor demands: (1) Some work will be subcontracted to other states where either Ford or the government has production facilities; (2) A portion of production requirements will be allocated to regular suppliers, over and above what they are now furnishing; (3) parts of the job will be pieced out to Michigan plants owned by Ford and some other companies in localities where no labor shortage is now apparent; and (4) certain other arms jobs will be tapered off in the near future.

This realignment is not peculiar to Ford. Conferences are going to be held with other prime contractors in war production here with a view to working out similar arrangements. Briefly, it amounts to a further fanning out of work from Detroit and a move to establish the large plants in this area as primarily assemblers, fitting stuff together which has been shipped in from a wider range of outside suppliers.

May Overload Railroads

In theory this technique would appear to provide a satisfactory solution to the problem of getting more production from Detroit without adding to the labor burden, but it at once throws a much heavier load on transportation facilities, now creaking with inordinate war production demands. The railroads are about up to the limit on what they can handle and are operating on virtually disrupted schedules now. The outlook in motor truck transport is not too good. Highways are deteriorating. Restrictions on speed limits are hampering efficient truck fleet operation. Repair parts are difficult to obtain. Tires are scarce and tests of new synthetic rubber truck tires are showing difficulties in respect to ply separation under heat.

A logical answer to the trucking problem, but one which would never be accepted because it is too simple, is to make use of the thousands of new army trucks now stored almost everywhere. These could be leased to fleet operators with the proviso that they handle only war plant production in certain specified categories, and that they be returned to the army on demand.

Acres and acres of these new trucks now fill the fields in outlying sections here. They carry the finest tires the industry can build. Mechanically they can take the toughest pounding imaginable and show little damage. What better use could they be put to than to help move large quantities of parts and materials from subcontractors' plants to the war production centers like Detroit? When the Army's Services of Supply needed them they could be dispatched to check-up depots and then to shipment points just as quickly as from storage lots—and as a matter of fact a few thousand miles of service before going into the field would make them even better performing vehicles.

Back from the Front

Lieut.-Gen. J. L. Devers, Chief of the Armored Forces, and Brig.-Gen. G. M. Barnes, Chief of the Technical Division of the Office of the Chief of Ordnance (why doesn't somebody get busy at the job of simplifying the titles of generals?), returned to the Tank-Automotive Center here after a survey of equipment and conditions in North Africa to make suggestions for minor improvements in various types of combat equipment. General Devers was full of praise for the performance of American equipment and said U. S. guns could outrange the best the Germans had to offer. He did not appear to be seriously concerned over the set-back in Tunisia, inferring that U. S. troops had just "got their noses bloodied a bit" and would eventually return the compliment several fold.

The general disclosed a few details of a hitherto restricted ordnance item, the M-10 tank destroyer, a 28-ton track vehicle mounting a high-velocity 3-inch gun in an open turret. Now in production for some months, this juggernaut has lines similar to the M-4 medium tank but is not armored as heavily. Upper section of the hull carries a series of studs to which extra armor plate sections may be bolted, if it is desired to reinforce the structure in combat. Addition of this extra armor requires no other changes, but of course slows down top speed and lessens overall mobility and maneuverability.

These M-10 destroyers are now at the front and, firing an improved armor-piercing projectile, make short shrift of even the heaviest German armor, even at long range. Track, suspension and power systems are identical with the M-4 tank, simplifying the service problem.

General Devers said he had come across no glaring deficiencies in U. S. armor, but did pick up a few "week-end headaches", as he called them, which he expected to have corrected quickly. They involve principally the necessity for more detailed and thorough inspections of certain parts.

Commenting on the observations of his two field generals, Maj.-Gen. L. H. Campbell Jr., Chief of Ordnance, concluded, "I don't mind telling Hitler that we're never satisfied and that out of

this conference between industry, the armored forces and our technicians will come still more effective weapons to insure ultimate victory."

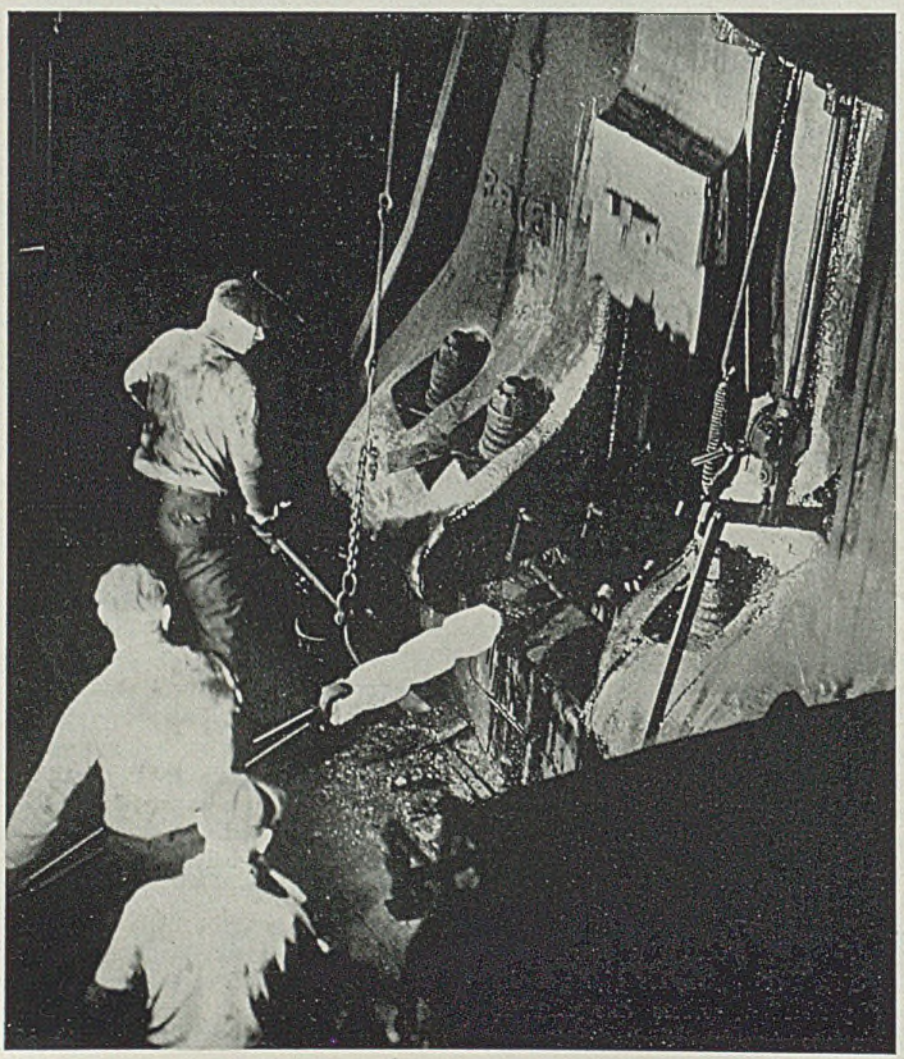
Latest item to be added to the list of Ordnance Department vehicles is the WAACycle—specially styled military bicycle for the WAACs. They are simply the standard military bicycle, with modified frame, saddle and front sprocket, plus maple wood pedal blocks and plastic handlebar grips.

Winter wardrobes now are being supplied for combat cars and transport vehicles on the African front where a broiling mid-day sun often changes to subfreezing temperature after dark. Rather than complicate the supply problem by adding antifreeze solution to radiators, special radiator and hood covers have been developed by the Tank-Automotive Center to protect vehicles against temperature extremes and swirling sand. The covers are of fireproof, waterproof duck lined with hair felt. Large zippers have been substituted for conventional ties for closing the covers and thus speed up the tactical operation of each vehicle and its crew.

Some statistics have been assembled on the employment of handicapped workers at the Rouge plant of Ford, indicating that 11,652 men, in various stages of disability, are receiving full pay, amounting to roughly 10 per cent of total employment. Of this group, 687 are sightless, 66 are deaf and dumb, 42 partially paralyzed, 112 epileptics, 80 with but one arm, 12 with no arms, 223 with one arm crippled, 91 with one leg, 36 with one leg crippled, 31 without the use of some parts of their bodies because of spine fractures, 96 with spine curvatures and 101 with organic heart ailments.

Engagement of handicapped persons is not an outgrowth of wartime demands for manpower. It started some 20 years ago when Mr. Ford instructed his plant managers to survey the communities in which they operated and to hire the proportions of handicapped that were present in these communities. Actually, Ford employment of handicapped is now higher than the average percentage of such persons in the various communities.

Reports from 36 states and the District of Columbia, covering an estimated 80 per cent of all motor vehicle registrations in the U. S., show disappearance of about 2,000,000 passenger cars and trucks from streets and highways during the year 1942. On this basis, according to the National Automobile Dealers Association, there were at the end of 1942 in the entire country a total of 28,553,945 passenger cars and 4,378,780 trucks in service, or 32,932,725 in all.



Where Are War Jobs with Wages Like This?

Reading the report in Mirrors of Motordom concerning an unskilled crippled young man who quit shining shoes in a Detroit barber shop to take a war job and who is now reaping $75 a week in wages, despite union restrictions on his production, the manager of an Iowa manufacturing plant writes:

"Without further comment on this story, what I would like to know is where to find contracts like this which will allow a profit at such a low rate of production. The work that we are able to get comes at a price where, in the first place, we cannot pay our best men at the rate which the crippled lad in your article receives.

"We have to receive full production from our workmen and at the same time keep ourselves busy figuring better methods to get the work done. And when one has to repeat this process every month or two because the jobs are small, we become a wee bit discouraged in doing our part for production. Our condition is nothing more than what one would expect in war times, but we would also like a little equality.

"Of course, we realize we are a small plant, located at a distance from industrial areas. Our machinery is not new. We do not have an engineering set-up. We have to break down our jobs so that they can be handled by operators recently converted from unskilled workers —our only source of labor supply. But even so, we have always been able to do a job on the work which we have had. However, we could do a better job and could take on tougher assignments if there was more margin to work on."

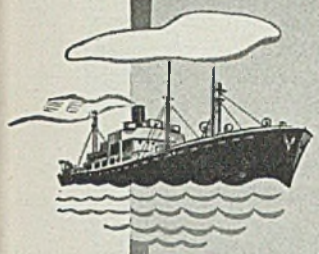
Editor's note—Let our discouraged reader take comfort from the fact he is not alone in his complaint. As to where to find "work like this" we can suggest only Detroit and other large industrial centers where such instances as that referred to are common.

P. S. Recent check on the young man in question reveals he has now been transferred to tool crib work. His last weekly paycheck, with overtime, was $90.82. Going up!

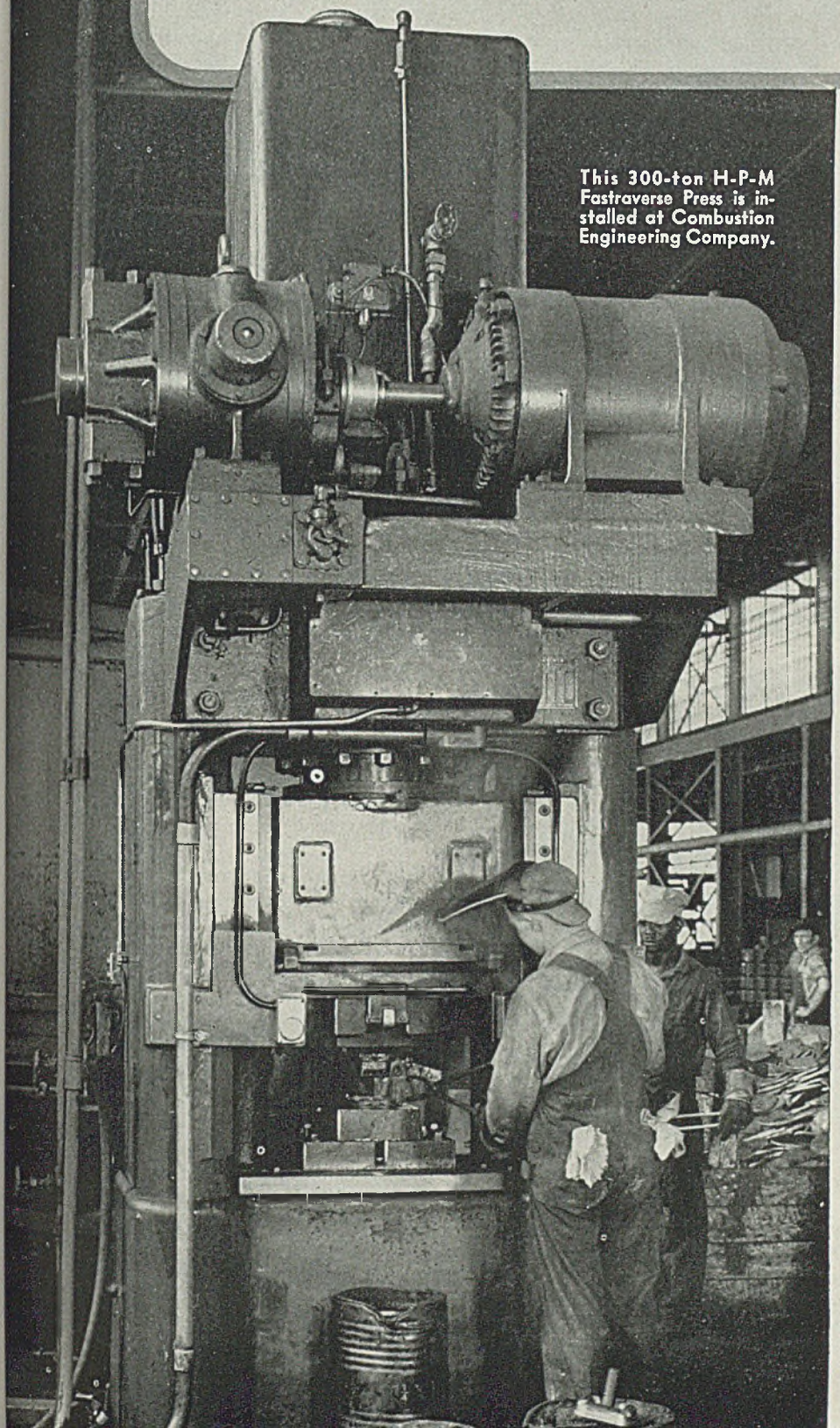
—o—

FORGING CRANKSHAFT FOR ARMY TRUCK

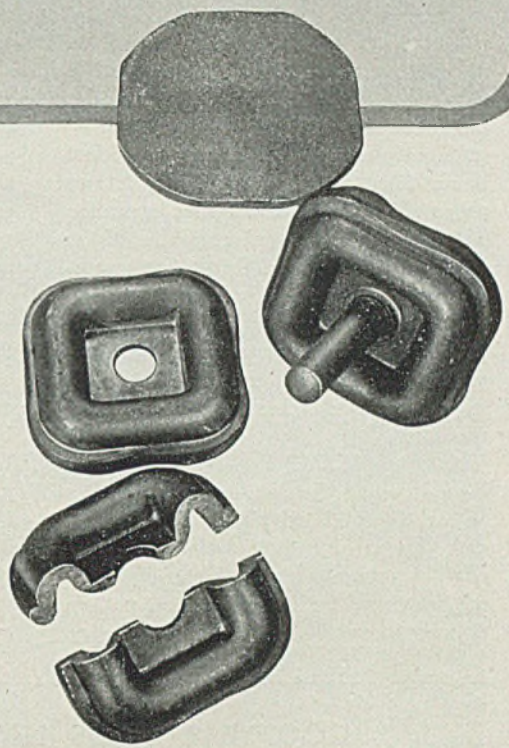
WAR workers forge crankshafts for Dodge-built Army truck engines on 12,000-pound steam hammers. Special die-rolled steel sections are heated in a continuous furnace, then shaped in dies held in this powerful hammer



BOILER HAND HOLE COVERS FOR *Liberty Ships* ARE FORGED with an H-P-M FASTRAVERSE PRESS



This 300-ton H-P-M Fastraverse Press is installed at Combustion Engineering Company.



Die-forging technique has been revolutionized by the H-P-M FASTRAVERSE FORGING PRESS. Advantages over mechanical forging machinery are numerous:

1. *Completely self-contained; driven by an H-P-M radial pump mounted overhead.*
2. *Smooth high speed operation with shockless reversal—no drop hammer action.*
3. *Economical to install, operate and maintain.*
4. *No auxiliary equipment required for press operation.*
5. *Automatic press cycle—push-button operation.*

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WING TIPS

Labor shortages and frequent design changes are chief obstacles to incidence of real mass production of bombers at Willow Run, but Air Forces say plant is "on schedule"

WHAT are the inside facts on the Ford Willow Run bomber plant? What can you believe in the welter of conflicting statements, opinions, rumors, charges and countercharges which profess to tell what is wrong, if anything, with the plant?

In the first place, it would be well to dismiss every idle rumor and fragmentary report heard so far and to consider the following facts:

When plans for Willow Run were first being discussed early in 1941, it was proposed as a manufacturing operation which would supply subassemblies of the B-24 Consolidated bomber to an assembly plant in the Southwest. Before these plans had crystallized, it was decided by the Air Forces to ask for complete bombers from the plant as well; so preliminary sketches were considerably expanded.

A group of 250 Ford engineers had been studying the details of the bomber at the Consolidated plant in San Diego and, backed by their intimate knowledge of automotive manufacturing methods, came up with a production pattern entirely new to the aviation industry. These ideas were based on mass output of bombers, something the aircraft industry had not known because it had never received any mass orders. They involved the use of conventional automotive-type presses with iron and steel dies for forming operations; the rather complete conveyorization of the plant, so that synchronized handling of subassemblies like wings, fuselages, nose sections and the like would bring the right part to the assembly line at the right time and in the right quantity; and finally the use of precision-built, massive iron and steel jigs in which subassemblies could be built up in a minimum of time with a minimum of skill required from labor.

This was no simple task, in spite of the fact the huge plant was built, equipped and operating—not at peak of course—in less than two years' time. Ford engineers will admit now that while they realized it was going to be a tough job to get the plant rolling at the original schedule, they had not bargained for many of the obstacles which have had to be hurdled since the spring of 1941 when construction began.

Foremost among the obstacles was the matter of design changes. There have been literally thousands of design changes effected in the B-24 since Willow Run was started—not changes which alter the exterior lines appreciably but shifts and revisions to fit the demands of military expediency, safety and recent aircraft research.

When Ford engineers took on the bomber job they knew there would be changes, but they visioned the possibility of establishing a "block" system of production, with all designs frozen for one block of, say, 500 planes. However, the Air Forces insisted upon immediate adoption of changes which affected safety of operation, so this concession was made by Ford and such changes are put into effect at once. Further it was decided to reduce the number of planes in a block from 500 to perhaps 100 or maybe even less if it appeared necessary.

Changes Hinder Production

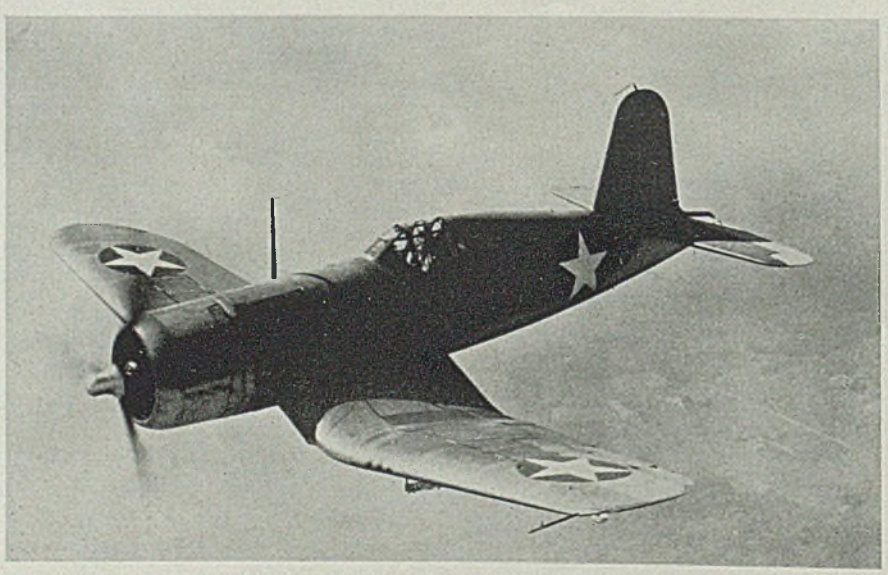
Admittedly Willow Run cannot and will not ever be a plant in which bombers can be rolled out at breakneck speed and still incorporate every last change and new development which science can contribute to airplane performance and combat. No manufacturer can do that. Basic air strategy must recognize the two extremes of having too few planes of the ultimate in quality and too many planes of inferior characteristics. The former was Britain's trouble early in the war, and the latter was the reason Germany's air blitz on Britain failed.

The United States will not be caught at either extreme. Some of the smaller Coast plants have the necessary flexibility to produce planes embodying the latest discoveries in air research, but their production will be limited in comparison with a plant like Willow Run—and others now on the way—where design changes have to be subdued in the interests of getting out production volume.

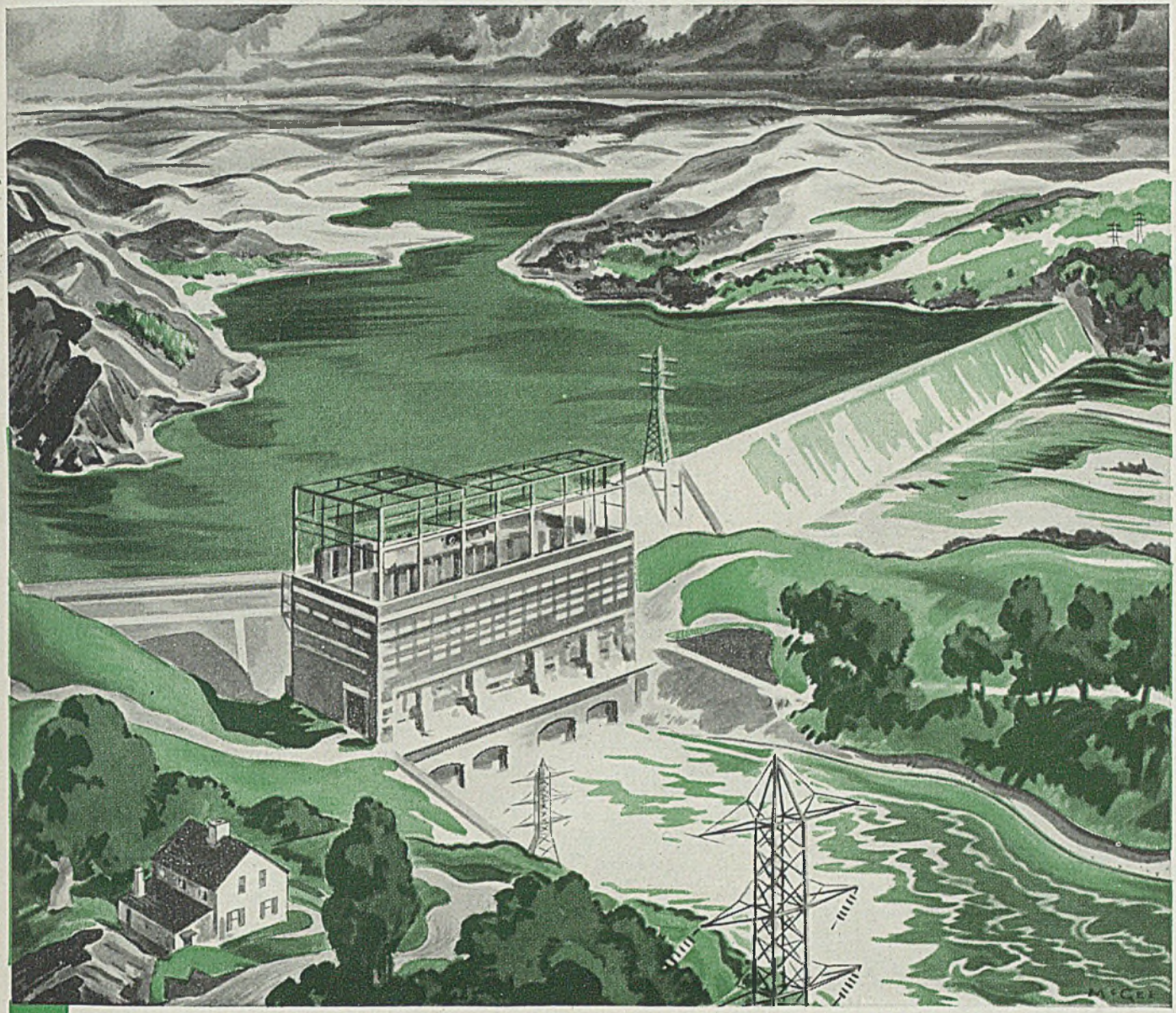
If there is any criticism of Willow Run production on the score of numbers, then it is primarily a matter of not sticking to the same plane that Ford engineers broke down into 70 production elements when they first started laying out the Ypsilanti plant. All things considered, the present pace at Willow Run is a powerful tribute to the manufacturing ingenuity of Ford and all contributing suppliers and equipment designers.

Consider the fact that B-24 comprises more than 500,000 separate parts, plus 700,000 rivets. As originally built on the West Coast it was figured as being a 200,000 man-hour plane. This figure already has been cut substantially on the West Coast and at Willow Run, and it is at least within the realm of

GOODYEAR BUILDS NAVY FIGHTER PLANE



SOON ready for flight tests is this FG-1, a Navy fighter plane built by Goodyear Aircraft Corp., Akron, O., to the design of the famous Vought-Sikorsky Corsair. Powered by a 2000 horsepower Pratt & Whitney engine, the single seater fighter reportedly can "attain a speed in excess of 400 miles per hour." Inverted gull wing design permits folding for use aboard carriers and wheels of the plane are retractable. Its service ceiling is 35,000 feet and is described as "a match for the Zero in maneuverability"



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possibility the B-24 may some day be built with only 20,000-25,000 man-hours of production labor.

Crying need at Willow Run today is labor. Tooling has been fairly well completed. The materials situation is good. But the unsettlement in the ranks of the working force is, if not chaotic, then at least highly unsatisfactory. There are something like 30,000 now at work in the plant, men and women, old and young. If stepped-up production schedules are to be met, tens of thousands more will be needed, and most of them will have to be women, trained before they can take their places in production. Employment offices in Detroit and at Willow Run could handle more than 400 a day, but they are getting only a fraction of this number, and some days the net change in employment is actually downward because of the effect of "quits".

Why do they quit? Well, here are some of the reasons stated by a few hundred departing workers who have left the plant since Feb. 1, with reasons and numbers:

No return after 10-day absence	58
Another job nearer home	131
Inducted by selective service	327
Enlisted in service	69
Discharged for infractions	4
No housing	13
Moved away	16
Poor health or not adapted to work	78
Medical reasons	57
Returned to old job	3
Returned to school	7
Died	2
Needed at home or returned to farming	49
Married	1
Left to join husband	7
Left to join WAAC's	7

Since June 16, 1942, or covering a period of about eight months, total employment losses have exceeded 15,000, with 5188 of these entering the armed service and the balance leaving for other reasons.

Absenteeism also has been a serious problem, aggravated by the particularly severe winter of 1942-43 and by the comparatively long distance to travel to and from the plant by many workers living in Detroit. It is hoped that moderating weather may lessen this difficulty.

Training of new employes, many of whom have never worked previously, was a superhuman task, and the training school at Willow Run has now "processed" about 15,000 for work in the plant. Of course, it takes more than just a short schooling to train a new employe, for they have to be further instructed on the job. This means that the casual visitor to the plant will notice groups of workers standing around appar-

(*Please turn to Page* 142)

SUMMARY OF NATION'S WARPLANES SIMPLIFIES IDENTIFICATION

SO great is becoming the confusion in identifying leading types of United States warplanes, because of the dual system of numerical and name identification, that the accompanying summary of all principal types of bombers, transports, trainers and observation planes produced for the Army and Navy, with name, number and manufacturer, should prove valuable to anyone trying to keep tab on these planes. The compilation was made by the Aeronautical Chamber of Commerce of America, and is reproduced through the courtesy of that organization.

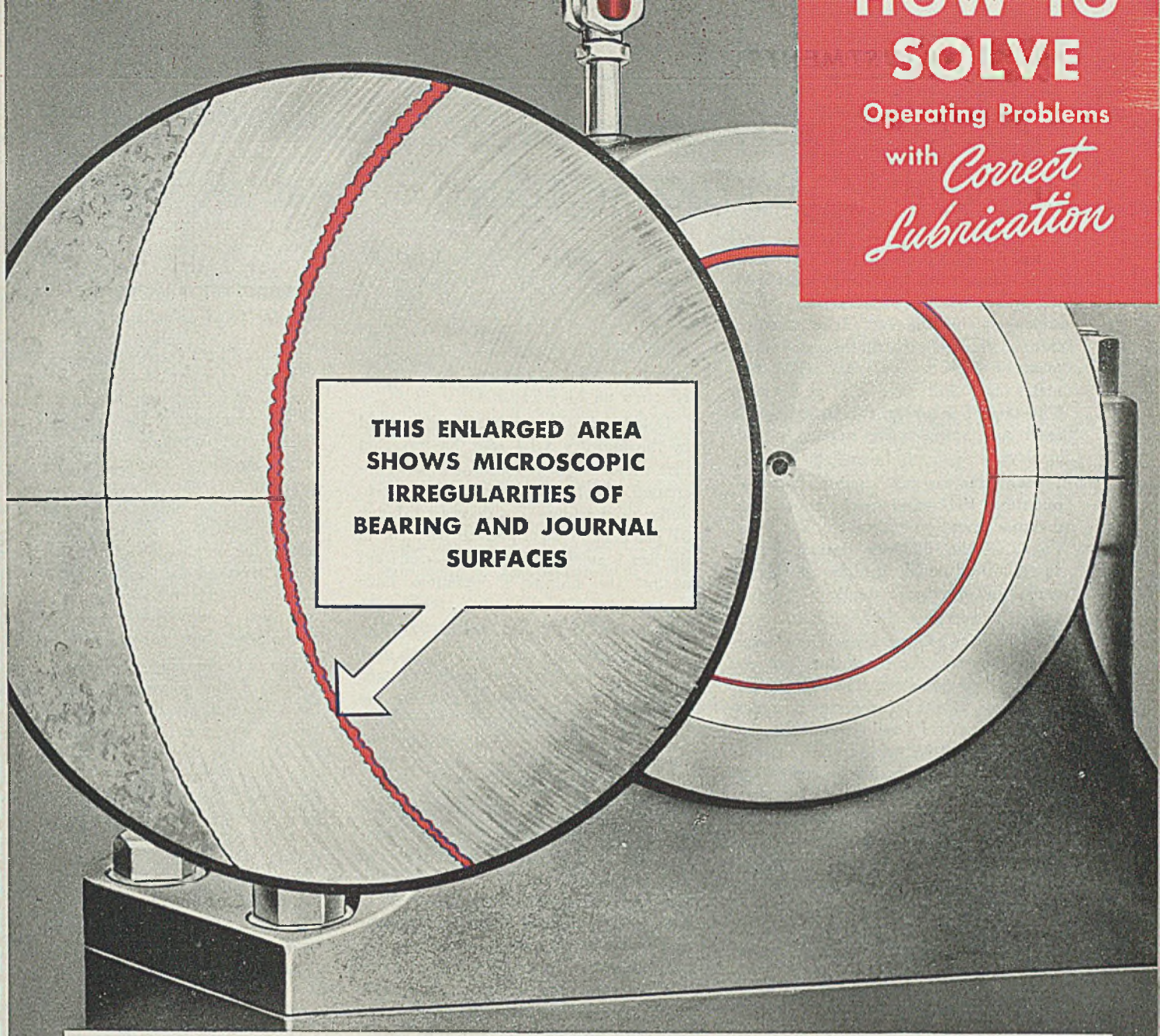
MILITARY AIRCRAFT

"So the general public may have a better idea of the character of military aircraft and more readily identify them, every American warplane—bomber, fighter, transport, trainer or other type—will hereafter have a name of its own instead of being a mere number. In adopting this policy, the Army and Navy will follow a practice which has long been in effect in England and which has made certain plane names household words throughout the world.

"Many American combat planes are already widely known by a particular name, but certain minor changes have been made, as in the case of the Curtiss P-40 series of fighters, models of which have been known as the "Tomahawk," "Kittyhawk" and "Warhawk," but which hereafter will be known only as the "Warhawk." The new names of the U. S. combat planes, together with the old letter-numeral designations and the companies manufacturing them are the following:

Army	Navy and Marine Cps.	Manufacturer	Name
		HEAVY BOMBERS	
B-17		Boeing	Flying Fortress
B-24	PB4Y	Consolidated	Liberator
		MEDIUM BOMBERS	
B-18		Douglas	Bolo
B-23		Douglas	Dragon
B-25	PBJ1	North American	Mitchell
B-26		Martin	Marauder
B-34	PV	Vega	Ventura
		LIGHT BOMBERS	
A-20	BD	Douglas	Havoc (Attack)
A-24	SBD	Douglas	Dauntless (Dive)
A-25	SB2C	Curtiss	Helldiver (Dive)
A-29	PBO	Lockheed	Hudson (Patrol)
A-34	SB2A	Brewster	Buccaneer (Dive)
A-35		Vultee	Vengeance (Dive)
	SB2U	Vought-Sikorsky	Vindicator (Dive)
	TBD	Douglas	Devastator (Torpedo)
	TBF	Grumman	Avenger (Torpedo)
		PATROL BOMBERS (Flying Boats)	
OA-10	PBY	Consolidated	Catalina
	PB2Y	Consolidated	Coronado
	PBM	Martin	Mariner
		FIGHTERS	
P-38		Lockheed	Lightning
P-39		Bell	Airacobra
P-40		Curtiss	Warhawk
P-43		Republic	Lancer
P-47		Republic	Thunderbolt
P-51		North American	Mustang
	F2A	Brewster	Buffalo
	F4F	Grumman	Wildcat
	F4U	Vought-Sikorsky	Corsair
		SCOUTING OBSERVATION (Seaplanes)	
	SO3C	Curtiss	Seagull
	OS2U	Vought-Sikorsky	Kingfisher
		TRANSPORTS	
C-43	GB	Beech	Traveler
C-45A	JRB	Beech	Voyager
C-46	R5C	Curtiss	Commando
C-47	R4D1	Douglas	Skytrain
C-53	R4D3	Douglas	Skytrooper
C-54	R5D	Douglas	Skymaster
C-56	R5O	Lockheed	Lodestar
C-61	GK	Fairchild	Forwarder
C-69		Lockheed	Constellation
C-76		Curtiss	Caravan
C-87		Consolidated	Liberator Express
	JR2S	Vought-Sikorsky	Excalibur
		TRAINERS	
PT-13 & 17	N2S1 & 3	Boeing	Caydet
PT-19 & 23		Fairchild	Cornell
PT-22	NR	Ryan	Recruit
	N2T	Timm	Tutor
BT-13 & 15	SNV	Vultee	Valiant
AT-6	SNJ	North American	Texan
AT-7	SNB2	Beech	Navigator
AT-8 & 17		Cessna	Bobcat
AT-10		Beech	Wichita
AT-11	SNB1	Beech	Kansas
AT-13 & 14		Fairchild	Yankee Doodle
AT-15		Boeing	Crewmaker
AT-19		Vultee	Reliant
	SNC	Curtiss	Falcon
		LIAISON	
L-1		Vultee	Vigilant
L-2		Taylorcraft	Grasshopper
L-3		Aeronca	Grasshopper
L-4	NE (Navy Trainer)	Piper	Grasshopper

HOW TO
SOLVE
Operating Problems
with *Correct Lubrication*



Keep Journals "Floating"

PROBLEM: That's a picture of a simple bearing and journal lubricated by a circulation system. See how their surfaces, so polished to the naked eye, are actually jagged hills and valleys under the microscope! Unless a thick film of oil separates these surfaces the irregularities tend to interlock, cause friction and excessive wear. When bearings are supplied with sufficient oil, rotation of the journal forms an oil wedge thick enough to *actually float the journal.* When deposits in the oil passages prevent adequate oil supply, the oil wedge is destroyed and excessive wear results — and that's the problem in a nutshell.

ANSWER: Gargoyle Vacuoline Oils are ideal for circulation-oiled machine bearings. They resist to a maximum the most severe deposit-forming influences and assure continuous oil flow to the bearing.

GARGOYLE
Lubricants

SOCONY-VACUUM OIL COMPANY, INC. — Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. White Eagle Div. • Wadhams Div. • Southeastern Div. (Baltimore) • Magnolia Petroleum Co. • General Petroleum Corp.

CALL IN SOCONY-VACUUM

OPA Cuts Steel Castings 10 to 25% To Save $50,000,000 in Costs

REDUCTION of 10 to 25 per cent in maximum prices of most steel castings used in war production has been announced by Office of Price Administration, effective Feb. 26, through amendment to Price Schedule 41. OPA estimates this will save the government $50,000,000 this year, the largest saving from any single price action by this agency.

The reduction was based on the statement that 1942 earnings of steel castings manufacturers were three to five times those of the 1936-39 period, before taxes. Additional studies are being made and further reductions may result.

The action follows a number of conferences with representatives of the steel castings industry. The reduction in cast armor turrets incorporates a suggestion by the Steel Castings Industry Advisory Committee. Other cuts go beyond those recommended by representatives of the industry.

During the past few months armor casting prices have been reduced voluntarily and in the case of the heavier cast turrets current prices are near the new reduced ceilings. For the most part the new maximum prices are 10 to 15 per cent below current schedules and in some cases 25 per cent lower.

Show Unusual Profits

Profits before taxes due to war production in 1942 had risen markedly since the years 1936-39, OPA said. For 72 companies accounting for two-thirds of the output, profits on sales rose from 5.8 per cent to 25 per cent and profits on net worth rose from 5.7 per cent to 73.2 per cent. For 54 exclusive and primary producers of steel castings, profits on sales rose from 6.0 per cent to 77.3 per cent. For the seven major producers of armor castings, profits on sales rose from 6.7 per cent to 33.9 per cent and profits on net worth rose from 4.9 per cent to 82.7 per cent. For these groups in 1942 profits on sales were thus three to five times as large and profits on net worth were 12 to 16 times as large as they had been in 1938-39.

This extremely favorable profit showing, OPA pointed out, also reflected stabilized costs resulting from OPA ceilings on prices the industry has had to pay for its raw materials.

For example, price ceilings that removed inflationary pressure on the steel castings industry were established for steel scrap on April 3, 1941, and on pig iron on June 24, 1941, through OPA action. Costs of other materials were kept down through operation of the general maximum price regulation that became effective on May 11, 1942.

Detailed study of other costs incurred by the industry, OPA said, has revealed that while the total wages paid have increased, the proportion of labor cost to dollar sales volume has decreased, being 31 per cent in 1939 and 26 per cent in the first 9 months of 1942. Other charges against the industry's operations have shown a similar decline in relation to sales.

Steel castings production in the first nine months of 1942 was 1,625,000 tons, compared with 1,300,000 tons in the full year 1941, the latter figure being nearly twice the annual average for 1936-39.

The new schedule establishes four classes of steel castings, armor, ordnance, navy, ship and marine. Specific cents-per-pound ceiling prices on a delivered basis are set for each of these classes. Change is made by assigning castings to various price schedule series and quantity discount differential brackets in the comprehensive report of the steel foundry industry for third quarter, 1941. Specific prices not included in that report are presented in a table incorporated in the amendment. In a few cases no reduction is made, because the price in the comprehensive report for second and third quarter, 1941, was the same or because a reduction would have placed the price below that for a similar classification in the industrial group.

Special prices previously established on a price estimate and proposed price are retained. Thirty days grace from the effective date of the regulation are given for deliveries at former prices of material bought before the new prices were established.

Aluminum Co. Reduces Prices On Some Fabricated Products

Aluminum Co. of America has reduced prices, effective March 1, on some fabricated and partially fabricated products, as a result of contract renegotiations between the company and the government. New schedules will be available in a few days, covering the new prices.

Economies in manufacture have resulted in higher profits on many items, states Roy A. Hunt, president. To reduce profits on war contracts, they have been renegotiated.

Base price of aluminum, 15 cents per pound, is not affected by these reductions.

Renegotiation Agencies Move To Expedite Cases

A joint directive, designed to expedite clearance of cases involving renegotiation of war contracts, has been signed by the secretaries of the War, Navy and Treasury Departments and the chairman of the Maritime Commission. The directive, which is indicative of the close cooperation being maintained between the four renegotiating agencies, should result in the elimination of the time heretofore required for participating departments to study and approve agreements with war contractors prepared by any of the other departments.

The new arrangement involves a delegation of the powers of each of the three secretaries and the Maritime Commission chairman to each other. Overall review of the war profits of a contractor or subcontractor is handled by the department having the predominant monetary interest although the contractor is doing business for two or more departments. The secretary of the department handling the renegotiation is now empowered to conclude an agreement with a contractor and sign it on behalf of the other departments with which the contractor may have business.

Maritime Commission Designs "Price-Minus" Contracts

United States Maritime Commission has designed a new type of contract known as the "price-minus" form, under which the government shares savings in cost equally with the shipbuilders. Under it the shipbuilders share savings in cost equally with the government. Under it the shipbuilder, while assured of his actual costs and a small minimum fee, can increase his earnings only by lowering his costs, thus giving him an incentive to effect savings for the government.

This new formula for determining the cost and fee arose out of the commission's objection to the "cost-plus-fixed fee" contract commonly in use, and the desire to encourage the contractor to effect savings and economies in base costs. It is referred to as the "price-minus" type of contract because under it the contractor receives, in effect, the "contract price" minus half of any savings made. The balance of such savings go to government.

War Plant Expansions, Equipment Purchases Authorized by DPC

CONTRACTS for new war plant facilities, expansions or equipment purchases authorized last week by the Defense Plant Corp., which will retain title to the property, include:

With Hershey Metal Products Co., Derby, Conn., to provide machinery and equipment in a plant in Connecticut at a cost of approximately $410,000.

With Plymouth Steel Co., Detroit, to provide plant facilities in Michigan.

With Aeronca Aircraft Corp., Middletown, O., to provide additional plant facilities for a plant in Ohio at a cost of approximately $280,000, resulting in an overall commitment of approximately $1,115,000.

With Bellanca Aircraft Corp., New Castle, Del., for additional plant facilities at a plant in Delaware. This increase will result in an overall commitment of approximately $1,375,000.

With General Motors Corp., Detroit, for additional facilities at plants in New Jersey at a cost of approximately $730,000, resulting in an overall commitment of approximately $7,275,000.

With General Motors Corp., Detroit, for additional plant facilities in New Jersey, New York, and Maryland, at a cost of approximately $1,290,000 resulting in an overall commitment of approximately $10,850,000.

With McDonnell Aircraft Corp., St. Louis, to provide additional equipment for a plant in Missouri at a cost of approximately $150,000 and resulting in an overall commitment of approximately $520,000.

With Pacific Aviation Inc., Los Angeles, to provide additional equipment for a plant in California at a cost of approximately $160,000, resulting in an overall commitment of approximately $1,110,000.

With American Export Airlines Inc., New York, to provide facilities in New York at a cost of approximately $925,000.

With the Electric Auto-Lite Co., Toledo, O., to provide plant facilities in Ohio and New York at a cost of approximately $950,000.

With Tantalum Defense Corp., Chicago, to provide additional equipment in a plant in Illinois at a cost of approximately $60,000, resulting in an overall commitment of approximately $4,225,000.

With General Motors Corp., Detroit, to provide additional equipment for plants in Ohio, Tennessee and Michigan, at a cost of approximately $9,925,000, resulting in an overall commitment approximating $27,000,000.

With Southern Acid & Sulphur Co. Inc., St. Louis, to provide plant facilities in Texas at a cost of approximately $700,000.

With American Type Founders Inc., Elizabeth, N. J., to provide plant facilities in New Jersey at a cost of approximately $520,000.

With Air Reduction Sales Co., New York, to provide additional plant facilities in California at a cost of approximately $40,000, resulting in an overall commitment of approximately $190,000.

Construction of 50,000 Federal Dwellings Begun in January

Construction of more than 50,000 government-financed housing units for war workers was begun in January. This was over three times the monthly average in the fourth quarter of 1942. Measures speeding preconstruction operations and facilitating the flow of critical materials were responsible for the increase.

A total of 246,514 federal-financed dwelling units for war workers were completed from the summer of 1940 to Jan. 31, 1943. Of these, 181,755 represent accommodations for families, 49,913 are dormitory units, and 14,846 are merely trailers.

New Duluth Stack Blown In; Record in Rebuilding

American Steel & Wire Co., Cleveland, United States Steel Corp. subsidiary, blew in a blast furnace at its Morgan Park, Duluth plant, adding more than 250,000 tons annually to pig iron capacity.

The stack replaces one dismantled several years ago. It was moved from Joliet, Ill., and has been modernized with funds provided by the Defense Plant Corp. Daily rated capacity is 800 tons. Construction of an entirely new blast furnace ordinarily requires the better part of two years, but moving and rebuilding in this instance required less than one year, establishing a record for such work. The project also required removal of considerable auxiliary equipment, boilerhouse, stoves, blowing engines and stockhouse equipment.

Engineering and designing was by the Day & Zimmerman Co., Philadelphia, and Bates & Rogers Construction Co., Chicago, were contractors.

WPB Lifts Construction Ban On Neville Detinning Plant

War Production Board last week authorized Vulcan Detinning Co., Sewaren, N. J., to resume construction on its Neville Island (Pittsburgh) plant which had been halted by a revocation order Feb. 10.

Resumption of work is permitted in view of the fact that a very small amount of critical material and equipment is needed to place the plant in operation Revocations of authorizations to construct other detinning plants, as announced Feb. 10, remain in effect.

Construction of the detinning facilities was banned because motors, boilers, tanks, and other equipment used in detinning are more urgently needed in other phases of the war effort.

New Columbia Steel Plant Capacity 750,000 Tons

Construction of Columbia Steel Co.'s Geneva steelworks near Provo, Utah, is being delayed by material shortages and it probably will not be in operation much before the end of 1943, despite earlier estimates that it would be finished by midsummer.

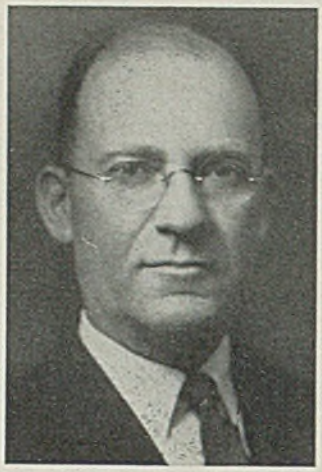
The plant, which will cost about $150,000,000 and will be the largest integrated steel mill west of the Mississippi river, is being built by the United States Steel Corp., subsidiary for the Defense Plant Corp. to supply steel for Pacific Coast shipbuilding. Its annual capacity will be about 750,000 tons of finished steel, mainly plates and structural steel.

Iron ore, limestone and coal will be obtained in Utah. The new Geneva coal mine is in production in southeastern Utah with capacity for 8500 tons daily. Iron ore will be shipped from Columbia's open-pit mines in southern Utah, which are being enlarged. Limestone is available at a short distance.

The plant will include 252 coke ovens in four batteries, nine steelmaking furnaces and three blast furnaces.

For many years Columbia has been operating a blast furnace at its Ironton plant near Provo and the Defense Plant Corp. is building a second and larger furnace, scheduled to go into blast within a few days, with capacity of 950 tons daily.

MEN of INDUSTRY



I. L. JENNINGS

W. C. SHATTUCK

B. H. QUACKENBUSH

F. D. JONES

I. L. Jennings, vice president, Lamson & Sessions Co., Cleveland, retired from active business Feb. 1 for reasons of health. He joined Lamson & Sessions Oct. 1, 1907, and worked through various departments for six years. From 1913 to 1919 he was a salesman, later becoming assistant sales manager and then sales manager. Mr. Jennings then became successively assistant secretary, secretary, factory manager in charge of operations, vice president in charge of sales, vice president and treasurer, and has been vice president since 1941. He will remain a director. Mr. Jennings is also a director of Johnson & Jennings Co., Upson-Walton Co. and Guarantee Specialty Mfg. Co., all of Cleveland.

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Wilfred C. Shattuck has been appointed wire sales manager, Wickwire Spencer Steel Co., New York. Mr. Shattuck returns to Wickwire after two years with John A. Roebling's Sons Co., first in its New York office and later as manager of sales of the round wire, flat wire and specialties division, Trenton, N. J. He became associated with Wickwire Spencer in 1925, serving in various sales capacities until 1940.

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Fred B. Greve, treasurer, Cleveland Pneumatic Tool Co., Cleveland, has been named vice president in charge of purchases. He is the son of the late L. W. Greve, who was president of the company.

—o—

Floyd A. Ferguson, former member of the headquarters treasury staff of Westinghouse Electric & Mfg. Co. at Pittsburgh, has been appointed treasury manager of the company's Electric Appliance Division, with headquarters at Mansfield, O. He succeeds **Howard C. Little,** who has been transferred to the headquarters treasury staff to be responsible for "financial security in connection with advances and progress payments to suppliers, and assignments to third parties."

—o—

B. H. Quackenbush has been appointed assistant sales manager, Foote Bros. Gear & Machine Corp., Chicago. He joined Foote Bros. in 1933 and three years later was placed in charge of the Contract Division. He will continue to handle contract sales and in addition will supervise activities of the priority department and the sales department under the Office of Price Administration on price regulations.

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John M. Davies, in the research division of B. F. Goodrich Co., Akron, O., since 1926, has been named director of physical research.

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Harry S. Wheller has been elected president and general manager, L. J. Wing Mfg. Co., New York. Vice president since 1917, Mr. Wheller succeeds the late Alfred E. Seelig. He has been associated with the Wing company over 35 years. **Walter W. Wilson,** with the company over 30 years, has been elected vice president and treasurer, and **Charles H. Smith** has been elected secretary.

—o—

Albert D. Wilson has been elected chairman of the board, Bristol Brass Corp., Bristol, Conn., and **Roger E. Gay** has become president. Mr. Wilson has been associated with the corporation 40 years, the past seven years as president. Mr. Gay joined Bristol Brass in 1938 as assistant to Mr. Wilson, later becoming first vice president.

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N. R. Mehler has been named manager of cold rolled strip sales, Sharon Steel Corp., Sharon, Pa. He will continue as manager of coated products sales. **E. A. Heutsche** has been made assistant manager of cold rolled strip and coated products sales.

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F. D. Jones has been appointed assistant advertising manager, Copperweld Steel Co., Warren, O. He will handle advertising for Copperweld's alloy tool, stainless and special steels. Mr. Jones formerly was advertising manager, Dresser Mfg. Co., Bradford, Pa., and previous to that was associated with the advertising department of Republic Steel Corp., Cleveland.

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Timothy E. Colvin, vice president, Aircraft Accessories Corp., has been appointed executive vice president in charge of the Burbank division, Burbank, Calif.

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Earl L. Young, vice president in charge of production, Laminated Shim Co. Inc., Glenbrook, Conn., has retired after 22 years' association with the company.

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Joseph J. Jilbert, for 20 years superintendent, Mattison Machine Works, Rockford, Ill., and the past four years machine shop superintendent, Ampco Metal Inc., Milwaukee, is now associated with Stokerunit Corp., Milwaukee, maker of precision boring machines, milling machines and special machinery.

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James A. Davis, former metallurgist with Colorado Fuel & Iron Corp., Pueblo, Colo., has been appointed to the technical staff of Battelle Memorial Institute, Columbus, O., where he has been assigned to metallurgical research related to the war effort.

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W. McKean White Jr., vice president, White Mfg. Co., Elkhart, Ind., has been given a leave of absence and is now second lieutenant in the United States Army Air Corps. **Merritt A. King** has joined

the company as assistant to the president. He formerly was associated with the Godfrey Conveyor Co., Elkhart, Ind., and before that with the Hillsman Equipment Co., Chicago.

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T. F. Patton, general counsel, Republic Steel Corp., Cleveland, has been elected a director. He has been associated with Republic since 1936, joining the corporation as resident counsel.

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Jack Levand has been appointed Ohio district manager for Luria Bros. & Co. Inc., Philadelphia, with headquarters in the Terminal Tower, Cleveland. Mr. Levand was secretary-treasurer, Simon-Levand Co., Cleveland, scrap broker. He is vice president, Northern Ohio chapter, Institute of Scrap Iron and Steel Inc., and is a member, American Foundrymen's Association.

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W. J. Reagan, research metallurgist, Copperweld Steel Co., Warren, O., was elected chairman of the newly formed Warren chapter of the American Society for Metals. **C. R. Wiggins**, metallurgist, Federal Machine & Welder Co., is vice chairman, and **E. W. Husemann**, metallurgist, Copperweld Steel Co., is secretary-treasurer.

JACK LEVAND

Members of the executive committee are: **John C. Barrett**, metallurgist, Taylor-Winfield Corp.; **L. Y. Deuchler**, chief metallurgist, Mullins Mfg. Co.; **Emil Dubeck**, plant superintendent, Warren Tool Corp.; **John G. Dun**, metallurgist, Republic Steel Corp.; **Howard G. Porter**, metallurgist, Niles Rolling Mill, and **E. Schuerer**, tool room foreman, Federal Machine & Welder Co.

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F. M. Beaudoin has been named employment manager, and **John M. Kennedy**, salary analyst, United States Steel Supply Co., Chicago. Mr. Beaudoin joined the company in April, 1942, as a wage and salary administrator, and before that was associated with Chicago district plants of Carnegie-Illinois Steel Corp. Mr. Kennedy, identified with the company since December, 1941, was formerly assistant supervisor of priorities.

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J. P. Enright has been named abrasive engineer for Indianapolis and vicinity by Norton Co., Worcester, Mass. **Robert W. Crawford** has been appointed a Norton abrasive engineer in the Pittsburgh territory, replacing **William A. Russell**, who is now an ensign in the United States Navy.

OBITUARIES . . .

John W. Hughes, since December, 1936, general superintendent of Republic Steel Corp.'s Cleveland strip mill, died Feb. 20, at his home in that city. Before his transfer to Cleveland he was superintendent of Republic's hot strip departments, Warren, O., plant.

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Earl Wiggins, 58, president, Wiggins Tool Co. Inc., Los Angeles, died at his home in that city recently.

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Joseph H. Harnischfeger, 64, member of the board of directors, Harnischfeger Corp., Milwaukee, for 31 years, died Feb. 17, in that city.

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William F. Senn, president, Brightman Nut & Mfg. Co., Sandusky, O., died Feb. 6, in that city.

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Thomas Warner Larkin, 82, president, LeRoy Plow Co., LeRoy, N. Y., died Feb. 7, at his home in LeRoy.

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Albert H. Reiber, 48, vice president in charge of development and research, Teletype Corp., Chicago, died Feb. 1, in Rochester, Minn.

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Otto W. Lange, 72, president, National Sand Co., and vice president, Indiana Core Sand Co., Chicago, died in that city, Feb. 11.

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Willard G. Nims, 67, treasurer, L. S. Starrett Co., Athol, Mass., died Feb. 17 at Gardner, Mass. He had been with the Starrett company 45 years, becoming assistant treasurer in 1911 and treasurer in 1923.

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Raymond G. Ellis, 57, the past 24 years identified with the advertising department, Electric Storage Battery Co., Philadelphia, died Feb. 14, in that city.

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Lieut. Commander Frank K. Moss, U. S. N. R., noted scientist for 20 years with General Electric Co. at Nela Park, Cleveland, died Feb. 14, in the United States Naval hospital at Bethesda, Md. Lieut. Commander Moss entered the service last September.

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Jonas Waffle, 63, managing director, Coal Trades Association of Indiana, died at his home in Terre Haute, Ind., Feb. 17. He was chairman of the Bituminous Coal Producers' board for district 11, and chairman of the board, Indiana Coals Corp.

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Thomas H. Carruthers, 71, retired manager of the old Bourne Fuller Co., Cleveland, died in Glendale, O., recently. He had been identified with the steel industry many years until 1914 when he resigned management of Bourne Fuller, due to illness. Later he became secretary-treasurer, Corcoran Victor Lamp Co., Cincinnati, and still later became associated with Field-Richards Co. He had been inactive the past several years.

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Edward W. Lindstamer, 72, a superintendent in the Clifton, N. J., plant of Athenia Steel Co., and for more than 30 years an employe of that company, died recently in Passaic, N. J.

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James W. Costello, 57, chief engineer, Newark, N. J., and a member of the Port of New York Authority, died at his home in Newark recently. He had been on the engineering staff of that city since 1918 and chief engineer since 1923.

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Elmer Henry Schwartz, 63, consulting engineer, died Feb. 21, at his home in Englewood, N. J. He was associated with General Electric Co., Schenectady, N. Y., for several years prior to establishing the engineering firm of Hammer & Schwartz, New York, in 1905.

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James Griswold Blunt, 74, assistant to vice president in charge of engineering, American Locomotive Co., New York, died in Schenectady, N. Y., Feb. 15. Many devices for meeting the high-speed requirements of railroads in recent years were designed and perfected by Mr. Blunt.

Mrs. Minnie Schuster, designated "typical Ilg.-woman", is congratulated after receiving "E" emblem from Maj. Lauris Eek during Army-Navy production award ceremonies at the Ilg Electric Ventilating Co., Chicago. From left to right: John M. Frank, Ilg president; Gunnar Nelson, "typical Ilg-man"; Mrs. Schuster; Major Eek; Lieut. Commander T. H. Urdahl

Shown on tour of inspection following "E" award to Western Gear Works, Seattle, are, left to right: William Brown, chief patternmaker; Thomas J. Bennan, executive vice president; Capt. Samuel P. Ginder, United States Navy; Brig. Gen. Eley P. Denson, United States Army. Official U. S. Navy photograph

Elliott Co.'s Jeannette, Pa., plant (below) receives the "E" award for outstanding performance in the production of power equipment for the Army, Navy and war industries. On the platform, as Howard M. Hubbard, Elliott president, accepts the award for the company, were invited guests from the armed services, company officials and labor representatives

War Plants Cited By Armed Services

ARMY-NAVY production awards for outstanding performance on war contracts announced last week included:

American Cast Iron Pipe Co., Birmingham, Ala.
Baker Brothers Inc., Toledo, O.
Cochran Foil Co., Louisville, Ky.
Continental Motors Corp., Muskegon Plant, Muskegon, Mich.
Dexter Folder Co., Pearl River, N. Y.
E. I. du Pont de Nemours & Co. Inc., plants 1 and 2, Alabama Ordnance Works, Sylacauga, Ala.
Electric Vacuum Cleaner Co. Inc., East Cleveland, O.
Exposition Cotton Mills Co., Atlanta, Ga.
The Galanot Products Co., Alliance, O.
Goslin-Birmingham Mfg. Co. Inc., Birmingham, Ala.
Hendrick Mfg. Co., Carbondale, Pa.
Hinson Mfg. Co., Waterloo, Iowa.
Ingram-Richardson Mfg. Co., Beaver Falls plant, Beaver Falls, Pa.
Johns-Manville Corp., Borough of Manville, N. J.

National Electric Instrument Co. Inc., Elmhurst, Long Island, N. Y.
National Machinery Co., Tiffin, O.
Porcelain Metals Corp., Louisville, Ky.
Pressed Steel Car Co. Inc., McKees Rocks plant, McKees Rocks, Pa.
Queen City Steel Treating Co., Cincinnati.
Republic Steel Corp., Cleveland plant, Steel and Tubes Division, Cleveland.
Rex Cutlery Corp., Irvington, N. J.
Rice Stix Dry Goods Co., Farmington, Mo.
Seamless Rubber Co., New Haven, Conn.
Standard Forgings Corp., East Chicago plant, East Chicago, Ind.
Standard Oil Development Co., Esso Laboratories, Bayway, N. J.
Wagner Electric Corp., St. Louis.
Waterhouse Co., Webster, Mass.
Trion Co., Trion, Ga.
Willamette Hyster Co., Peoria, Ill.

Maritime Commission Honors 12 Companies

Twelve manufacturing plants have been designated by the Maritime Commission to receive the "M" pennant Maritime flag and labor merit badges.

General Machinery Co., Hamilton, O., which supplies reciprocating engines for Liberty Ships, will receive its second award, a gold star to be added to the "M" pennant for continued excellence in performanc.

Other winners of "M" awards follow:

Simplex Wire & Cable Co., Cambridge, Mass.
Maine Steel Products Co., South Portland, Me.
Colvin-Slocum Boats Inc., Amesbury, Mass.
Columbia Steel Co., Pittsburg, Calif.
Mercer Tube & Mfg. Co., Sharon, Pa.
Buckeye Iron & Brass Works, Dayton, O.
Pitcairn Co., Barberton, O.
Trill Indicator Co., Pittsburgh.
Eastern Cold Storage Insulation Co., New York.
John Lucas & Co. Inc., Gibbsboro, N. J.
Socony Paint Products, New York.

Overseas Shipments of Millions of War Service Items Test Packaging

DETROIT

IN 1942 it was necessary to provide $500,000,000 worth of spare parts for Army vehicles. The amount is considerably larger this year. Crux of the problem is to get parts to vehicles in usable condition.

From the outset it was determined by the supply branch of the ordnance tank-automotive center, Detroit, that seven basic factors must be considered to insure maximum protection in shipping these parts.

First basic "precaution" is protection of the part from "itself." This is necessary because metal has a tendency to sweat under various atmospheric conditons, increasing the tendency to corrode. A shipment going from Detroit to Australia passes through varying climatic conditions. Shipped on a freighter across thousands of miles of salt water parts are subjected to cold, wind, rain, tropic heat and salt spray. They would be moisture coated and dried 20 times on one trip.

Second necessary consideration was identification of the part. Before the war there were tons of unidentified parts in commercial service stations and army depots which were practically worthless, except as scrap. To prevent repetition of waste, each part was boxed in a wax-coated carton with identification on six sides in specially treated ink.

Third was the fact that there might not be dock, crane or lighter facilities for unloading shipments. Often they might be unloaded under battle conditions. Boxes should not be too heavy, nor too large in size to prevent handling without mechanical means. Maximum size and weight of 12 cubic feet and 200 pounds was found most advantageous. Where the part exceeded this maximum, the rule could not apply.

To protect against mechanical damage such as dropping, bouncing, shifting, and abuse by untrained personnel, elaborate precautions were taken to insure the parts against rough handling This was the fourth factor. Parts were braced in boxes to prevent shifting.

Indexed Directories Provided

To conserve shipping space, it was necessary to reduce the cubic footage of each package to absolute minimum. In tackling this fifth problem every attempt was made to fit parts in small boxes. Parts for 100 vehicles totaling 35,000 items were reduced from 1900 to 1300 cubic feet.

Sixth factor was insuring a replacement depot in an open field, if necessary. Replacement parts were packed in sequences and in numbered boxes. Cross indexed box directories were printed.

Final factor was that of outside identification. Engineers finally contrived a plate that would stand any tests they could give it without decomposing or become illegible. A water-proof and wind-proof label was placed inside the top of the box as an extra precaution.

The Chrysler Corp. devised a test to give the protective process a thorough trial. Two boxes of parts, with varying degrees of protection, were sunk in San Francisco bay. They remained in the water for 14 days and were then shipped back to Detroit by southern route so they would be subject to extreme heat on the trip back which took 25 days. The boxes were 115 pounds heavier because of water saturation. After another 10 days they were opened and found in perfect condition.

This test, according to Colonel Rutten and Brig. Gen. John K. Christmas, assistant chief of the tank-automotive center, satisfies the ordnance department with present shipments of parts.

TROPHIES AWARDED TO MACHINE TOOL BUILDERS

Sheffield Corp., Dayton, O., and Defiance Machine Works, Defiance, O., have been awarded the National Machine Tool Builders' Association President's Trophies offered at the association's annual meeting last October for the largest fourth quarter increase in number of machine tools shipped, and in dollar value of shipments.

Sheffield showed in the fourth quarter of 1942 a 224 per cent increase in dollar value of shipments over the corresponding figure for third quarter. Defiance showed an increase of 100 per cent in number shipped.

The trophies were offered by John S. Chafee, who at the time of the meeting was vice president, Brown & Sharpe Mfg. Co., and president of the association. He now is deputy director, Tools Division, WPB.

Identical except for inscription, they are bronze statuettes by Max Kalish, American sculptor. The figure is entitled "The Spirit of American Labor".

Southern Foundrymen Hear Comments on Production

BIRMINGHAM, ALA.

SEVERAL hundred members and guests of the Birmingham district chapter, American Foundrymen's Association attended the organization's eleventh annual Foundry Practice Conference here Feb. 19. Highlight was the annual banquet in Tutweiler Hotel, when E. L. Shaner, president, Penton Publishing Co., Cleveland, and editor-in-chief, STEEL, emphasized the fact that production is industry's No. 1 problem; that need for production can be measured only in terms of the enemy's ability to destroy what we build; and, incidentally, that industry must have a greater part in postwar planning and economy.

In the address, heard by an overflow audience in the Terrace ballroom, Mr. Shaner, referring to many phases of production, said one of the best ways to cope with absenteeism is continually to impress upon workers the importance of their efforts. American industry, he stated, has done a magnificent job; wartime problems as they arise will be solved with typical ingenuity and resourcefulness. Commenting on the Washington scene, he declared there are indications the American people are increasingly aware of a top-heavy centralized government, and that steps are being taken and will continue to be taken to correct that situation.

The conference began with a technical session, followed by a discussion of conversion from production to war work by D. W. Moore, president, American Cast Iron Pipe Co. Warren E. Whitney, manager, Birmingham plant, National Cast Iron Pipe Co., and president of Associated Industries of Alabama, was toastmaster; E. A. Thomas, president, Thomas Foundries, Birmingham, and chapter president, presided at the conference.

Electronics To Feature Machine Tool Forum

Application of electronics of metalworking tools will be explained by engineers in the 1943 Westinghouse Machine Tool Forum, Westinghouse Electric & Mfg. Co.'s East Pittsburgh Works, April 6-7. Many of the problems facing machine tool manufacturers and users will be discussed by experts. Government representatives, leaders in the machine tool industry, and Tell Berna, general manager, National Machine Tool Builders' Association, also are scheduled.

American Society of Tool Engineers—Speakers at the annual meeting of the American Society of Tool Engineers, Hotel Schroeder, Milwaukee, March 25-27, will include Prof. O. W. Boston, University of Michigan, who will discuss "Machining Characteristics of NE Steels"; M. J. Judkins, chief engineer, Firth-Sterling Co., who will describe high speed milling of steel using new forms of carbide tools; T. J. Thompson, manager, industrial division, Corning Glass Works, a paper on "Latest Developments in Glass Gages"; and F. W. Curtis, chief engineer, Van Norman Machine Tool Co., "Future Possibilities of Induction Heating".

American Gas Association—A war conference on industrial and commercial gas will be held in Hotel Statler, Detroit, March 11-12. At the Friday sessions some of the topics to be discussed are: "What the War Period Is Doing to Metal Treating with Gas", "New Developments in Furnaceless Heating Methods", "New Developments and Data on Immersion Tube Heating", and "New Fields of Dip Lacquering Using De-Pearing Equipment".

American Society for Testing Materials—Authorities on powdered metallurgy and paints and paint materials will present technical papers and discussions in two symposiums at the Spring meeting, Hotel Statler, Buffalo, March 3. Beginning March 1, the A.S.T.M. Committee Week will be in progress for those responsible for the society's work including standardizing of specifications and tests for engineering materials and research programs.

At speakers' table, meeting of the Birmingham District Chapter, American Foundrymen's Association, Feb. 19. Left to right: E. L. Shaner, president, Penton Publishing Co., and editor-in-chief of STEEL; E. A. Thomas, president, Thomas Foundries and chairman of the chapter; Warren E. Whitney, general manager, National Cast Iron Pipe Co., and president, Associated Industries of Alabama

Program for Three-Day Foundry Conference Announced

Special castings' production problems related to war effort will feature a three-day conference of American Foundrymen's Association, in Hotel Jefferson, St. Louis, April 28-30.

Four special sessions will include speakers of national prominence in business and industry; other sessions will provide for group discussions and the presentation of technical and practice papers. The tentative schedule follows:

April 28—Malleable melting symposium (Section 1), aluminum and magnesium practice, mold and coremaking, foundry costs, heading and gating of castings lecture, job evaluation and time study, cast iron, foundry instruction in engineering schools, sand shop course, gray iron shop course, special session on foundry war production problems.

April 29—Business and awards meeting, aluminum and magnesium division round table luncheon discussion, malleable division round table luncheon discussion, patternmaking, steel, symposium on gray iron as an engineering material (Section 1), heading and gating of castings lecture, brass and bronze, malleable melting symposium (Section 2), foreman training, sand shop course, gray iron shop course, malleable melting symposium (Section 3), aluminum and magnesium round table discussion.

April 30—Steel, brass and bronze, apprentice training, sand research, gray cast iron as an engineering material symposium (Section 2), steel division round table, brass and bronze division round table, safety and hygiene, refractories, cast iron as an engineering material symposium (Section 3), heading and gating of castings lecture, plant and plant equipment, steel castings, annual dinner, sand shop course, and gray iron shop course.

War Construction Shows Marked Decline

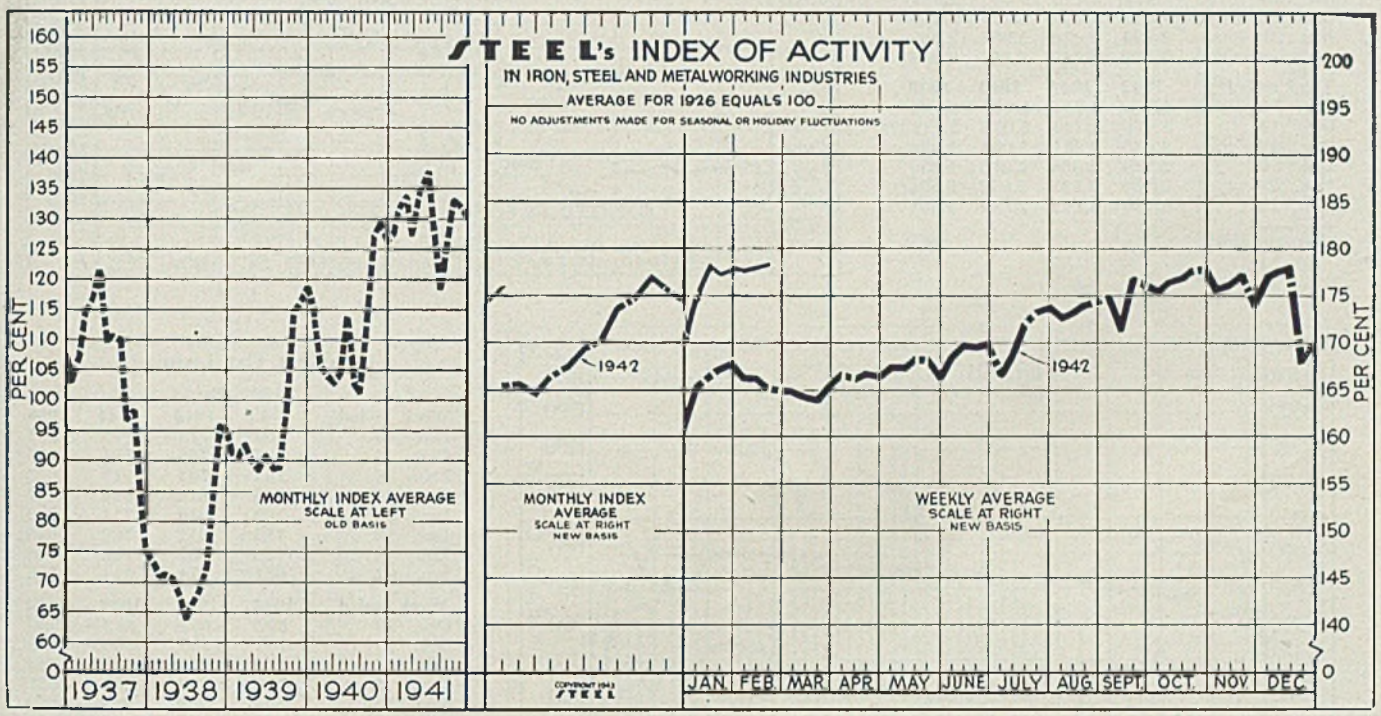
IN 1942 added working space for essential manufacturing required new construction amounting to $12,145,000,000, double the volume of the preceding year and close to 97 per cent of the construction objective set by WPB. A peak of $1,406,000,000 in monthly building activity was reached in August, from which it tapered off to a final $973,285,000 in December, a reduction of 30 per cent. Trend for 1943 is indicated by a further drop of 8 per cent in January.

More emphasis will be laid now on improving production with facilities at hand, and results of a policy of progressive curtailment in new construction will be apparent in monthly dollar volume.

Construction for nonwar purposes steadily dwindled through the late months of 1942. During the first six weeks of this year WPB halted work on projects of this class valued at $1,300,000,000. Illustrating the extent to which government will go in holding civilian activity on bedrock is the order limiting to $200 expenditures for alterations in nonwar structures and private homes.

Steel ingot operations advanced ½ point during the week ended Feb. 20 to 99.5 per cent, compared with 97 and 94.5 per cent, respectively, in the corresponding weeks of 1942 and 1941. Steel rate moved into this top range only four times in the past year, once in May, once in November and twice in December. Output in the first seven weeks of 1943 was at an annual rate of 88.3 million tons, against 86 million tons in 1942.

Although a slight decline was registered in the latest week in carloadings of revenue freight and minor improvement shown in electric power consumption from the week of Feb. 13, STEEL's index for the iron, steel and metalworking industries was stimulated by the higher rate of activity in the steel industry, rising to 178.3.



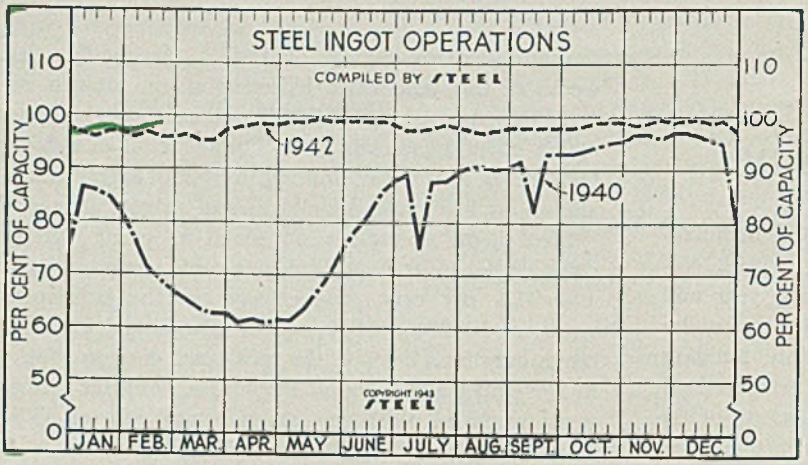
STEEL'S index of activity moved up to 178.3 in the week ending Feb. 20:

Week Ended	1943	1942
Feb. 20	178.3†	131.2
Feb. 13	177.9	166.2
Feb. 6	177.6	166.3
Jan. 30	177.6	167.9
Jan. 23	177.2	167.4
Jan. 16	177.9	166.6
Jan. 9	175.7	165.6
Jan. 2	170.0	161.0
Week Ended	1942	1941
Dec. 26	167.8	120.5

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	175.7	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.		165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3
March		164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April		166.7	127.2	102.7	89.8	70.3	116.6	100.8	85.0	83.6	52.4	52.8
May		167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June		169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July		171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1
Aug.		173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.		174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.		176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4
Nov.		175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.		174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

(Per Cent)

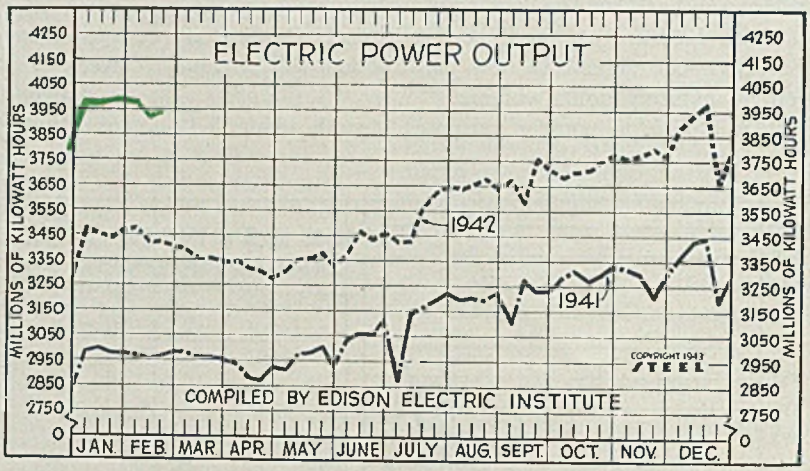
Week ended	1943	1942	1941	1940
Feb. 20	99.5	97.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0
Jan. 2	97.5	97.5	92.5	86.5
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	99.0	93.5	80.0	75.5
Dec. 19	99.0	97.5	95.0	90.5
Dec. 12	99.5	97.5	95.5	92.5
Dec. 5	99.5	96.5	96.5	94.0
Nov. 28	99.0	95.0	97.0	94.0
Nov. 21	99.5	95.5	97.0	93.5
Nov. 14	99.0	97.0	96.0	93.5

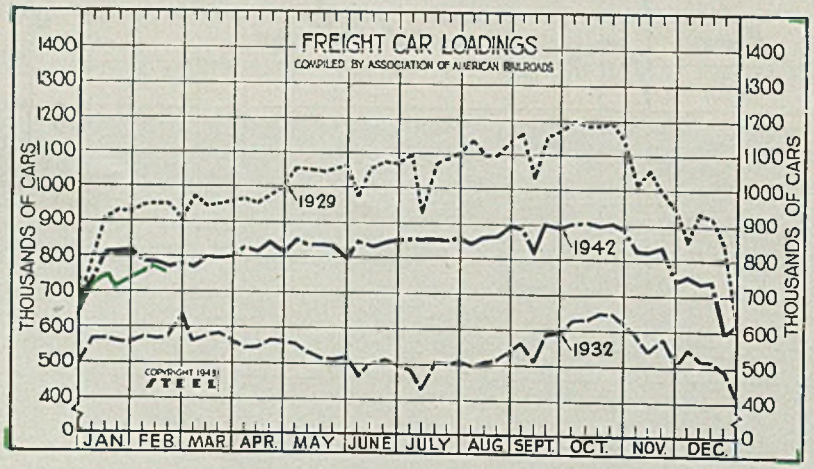
Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
Feb. 20	3,943†	3,424	2,820	2,455
Feb. 13	3,939	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,523
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	3,656	3,234	2,757	2,465
Dec. 19	3,976	3,449	3,052	2,712
Dec. 12	3,938	3,431	3,004	2,674
Dec. 5	3,884	3,368	2,976	2,654
Nov. 28	3,766	3,295	2,932	2,605
Nov. 21	3,795	3,205	2,839	2,561

†Preliminary.





Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
Feb. 20	760†	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657
Jan. 23	709	818	711	649
Jan. 16	755	811	703	646
Jan. 9	716	737	712	668
Jan. 2	621	674	614	592
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	592	607	545	550
Dec. 19	743	799	700	655
Dec. 12	740	807	736	681
Dec. 5	760	833	739	687
Nov. 28	844	866	729	689
Nov. 21	836	799	783	677

†Preliminary.

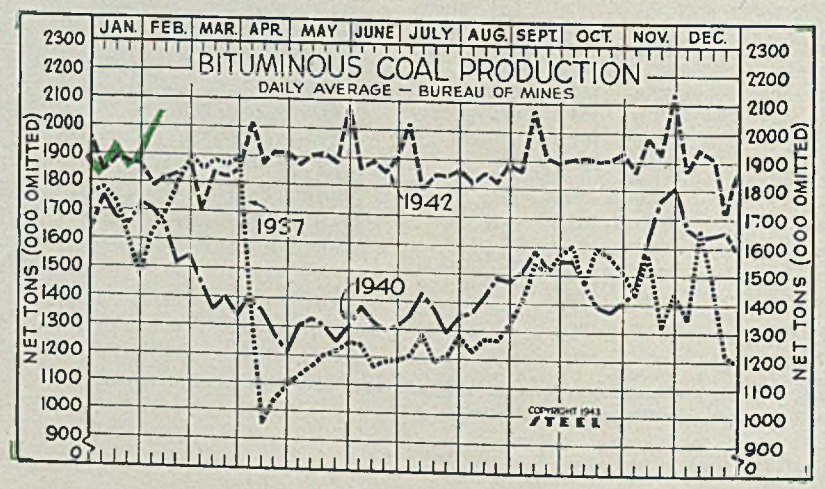
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
Feb. 13	2,047†	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,900	1,866	1,684	1,466
Jan. 23	1,867	1,886	1,656	1,605
Jan. 16	1,929	1,883	1,609	1,731
Jan. 9	1,833	1,842	1,691	1,780
Jan. 2	1,860	1,960	1,762	1,764
Week ended	**1942**	**1941**	**1940**	**1937**
Dec. 26	1,714	1,632	1,591	1,230
Dec. 19	1,913	1,792	1,656	1,477
Dec. 12	1,944	1,817	1,645	1,669
Dec. 5	1,853	1,813	1,636	1,347

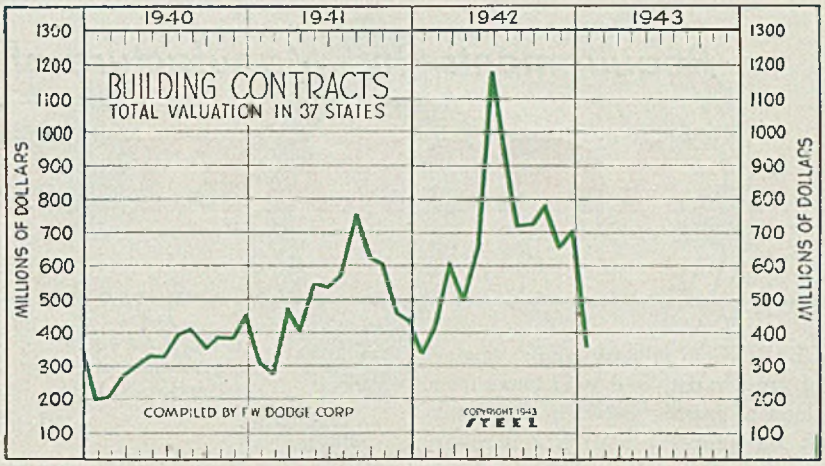
†Preliminary.

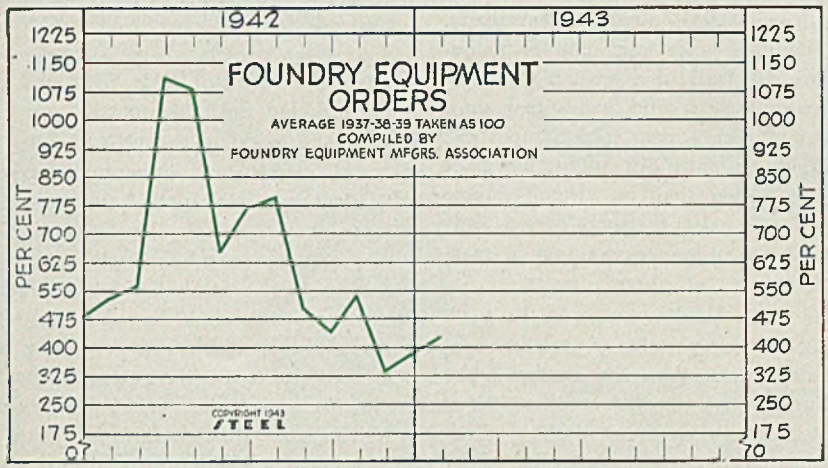


Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1943	1942	1941	1940	1939
Jan.	$350.6	$316.8	$305.2	$196.2	$251.7
Feb.		433.6	270.4	200.6	220.2
Mar.		610.8	479.9	272.2	300.7
April		498.7	406.7	300.5	330.0
May		673.5	548.7	328.9	308.5
June		1190.3	539.1	324.7	288.3
July		943.8	577.4	398.7	299.9
Aug.		721.0	760.3	414.9	312.3
Sept.		723.2	623.3	347.7	323.2
Oct.		780.4	606.3	383.1	261.8
Nov.		654.2	458.6	380.3	299.8
Dec.		708.7	431.6	456.2	354.1
Ave.		$687.9	$500.6	$333.7	$295.9





Foundry Equipment Orders

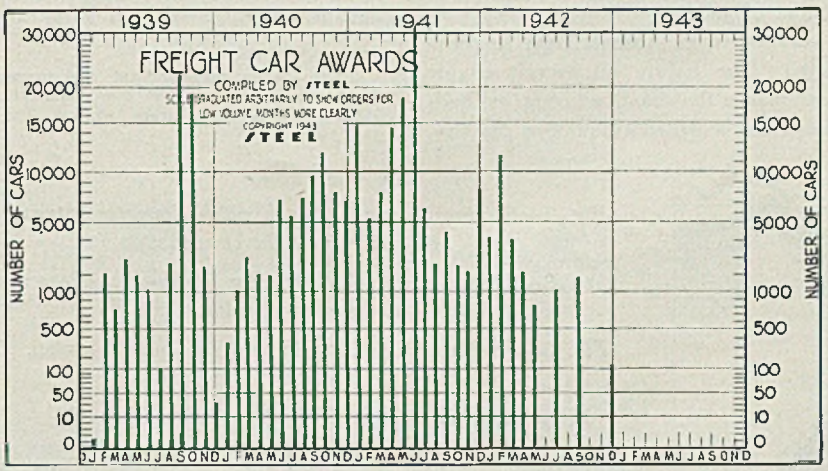
Monthly Average

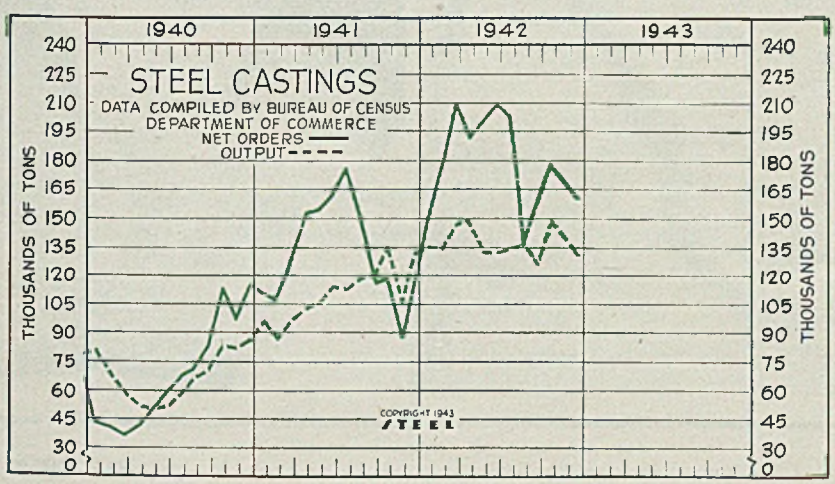
(1937-38-39 equals 100)

	1943	1942	1941	1940
Jan.	429.8	532.7	285.3	149.0
Feb.		567.9	281.1	135.7
March		1122.4	315.2	183.2
April		1089.3	377.2	145.2
May		653.6	298.7	129.1
June		774.0	281.1	164.9
July		800.8	358.1	194.4
Aug.		510.8	312.9	165.4
Sept.		446.4	363.8	161.2
Oct.		540.6	403.8	264.0
Nov.		338.8	408.5	254.2
Dec.		382.5	481.2	257.8
Year		646.7	345.6	184.0

Freight Car Awards

	1943	1942	1941	1940
Jan.	0	4,253	15,169	360
Feb.		11,725	5,508	1,147
March		4,080	8,074	3,104
April		2,125	14,645	2,077
May		822	18,630	2,010
June		0	32,749	7,475
July		1,025	6,459	5,846
Aug.		0	2,668	7,525
Sept.		1,863	4,470	9,735
Oct.		0	2,499	12,195
Nov.		0	2,222	8,234
Dec.		135	8,406	7,181
Total		26,028	121,499	66,889





Steel Castings

	—Net Orders—		—Production—	
	1942	1941	1942	1941
Jan.	150,551	110,579	134,778	94,409
Feb.	179,880	105,125	133,726	84,492
Mar.	211,081	126,140	146,507	95,185
Apr.	191,195	152,007	149,625	101,977
May	199,619	153,143	131,492	104,971
June	208,243	161,512	131,458	113,988
July	201,334	175,892	134,461	112,364
Aug.	140,673	147,316	139,059	117,703
Sept.	171,265	115,066	135,823	118,543
Oct.	175,484	117,516	149,268	135,272
Nov.	169,862	84,534	137,428	104,605
Dec.	161,147	113,034	130,207	131,518
Tot.	2,160,334	1,561,864	1,653,832	1,316,027

Requirements and Manufacture of . . . .

AIRCRAFT GEARS

By P. W. BROWN
And
E. V. FARRAR
Wright Aeronautical Corp.
Paterson, N. J.

GEARING in military aircraft engines is of great variety and vital importance. Reduction gearing between the crankshaft and propeller shaft is a necessary feature of all aircraft engines of military size because of the great increase in torque from engine to propeller as well as difference in speed. A centrifugal supercharger gear-driven at tremendous speed usually is employed to maintain engine power from sea level to high altitudes. When the engine is intended for extremely high-altitude performance, the controlling means for this supercharger frequently incorporates a two-speed driving mechanism.

Gears are also required for driving large electrical generators, magnetos and fuel pumps. Frequently there is a connection for taking rather large amounts of power from the rear section of the engine to drive miscellaneous airplane accessories, which also requires a large number of gears.

Automotive vs. Aircraft Gear Requirements: The nature of aircraft engine gears makes the manufacturing methods differ from accepted automotive practice. In automotive gears, freedom from noise is of paramount importance. Therefore, helical gears are in almost universal use. To eliminate noise and simplify manufacture, the body of a great many automotive gears is a solid, heavy disk since weight of such a gear is not important. Maximum pressure on automotive gears may be higher than on aircraft engine gears, but it exists for short periods only as against continuous operation at maximum rating for aircraft gears.

The mean bending stress in the teeth during service operation is probably considerably lower than the similar figure for aircraft gears so that a full radius at the tooth root is of no particular advantage. The improvement effected by this radius does not become great unless many cycles of high stress are applied to a given tooth in service. For the same reason, the finish at the roots between the teeth is not particularly important, and the sharp ends of the teeth need not be broken.

Many truck and bus gears are of carburized and hardened SAE 3312 with ground spur teeth. Some passenger car gears are made of SAE 3312 and carburized, but the major portion are deep hardened without carburizing.

The majority of automotive gears are finished by shaving, and the procedure is to shape or hob the teeth with an undercut or protuberance-type tool allowing approximately 0.003 to 0.004-inch on tooth thickness for shaving. The shaving tool finishes the working surface of the tooth, the root and fillet remaining as produced by the shaper cutter or hob. Most transmission gears are either on solid shafts or are of bulky proportions so that they can be solidly mounted during the machining operation. This rigidity tends to eliminate considerable error during operations.

In aircraft engines, however, noise is not of great importance because exhaust and propeller noises far exceed gear noises in intensity, and emphasis is placed on performance and reliability with a minimum of weight. Plain spur gears are, therefore, the accepted type for use in aircraft engines. Because of

(*Please turn to Page* 124)

From paper presented at the twenty-fifth semi-annual meeting of the American Gear Manufacturers' Association, Skytop, Pa., Oct. 15, 1942.

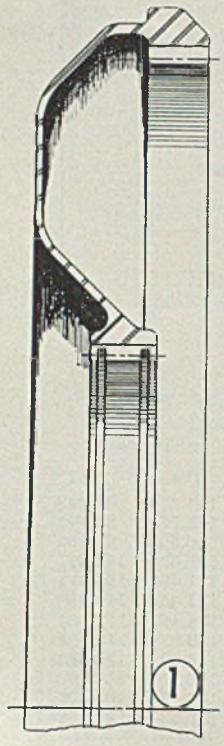
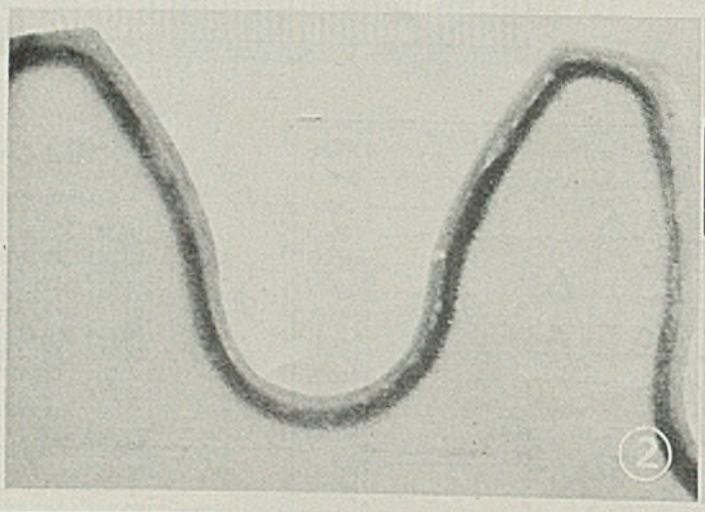
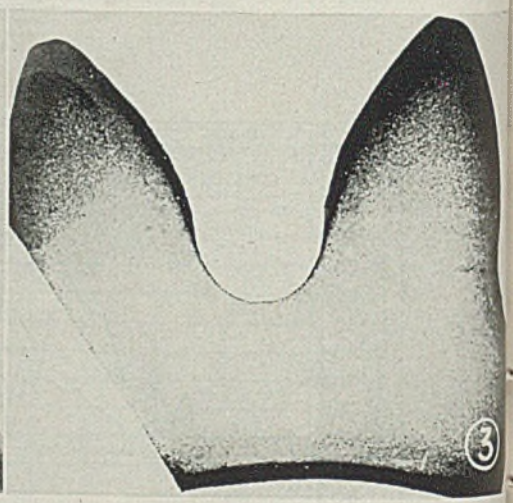


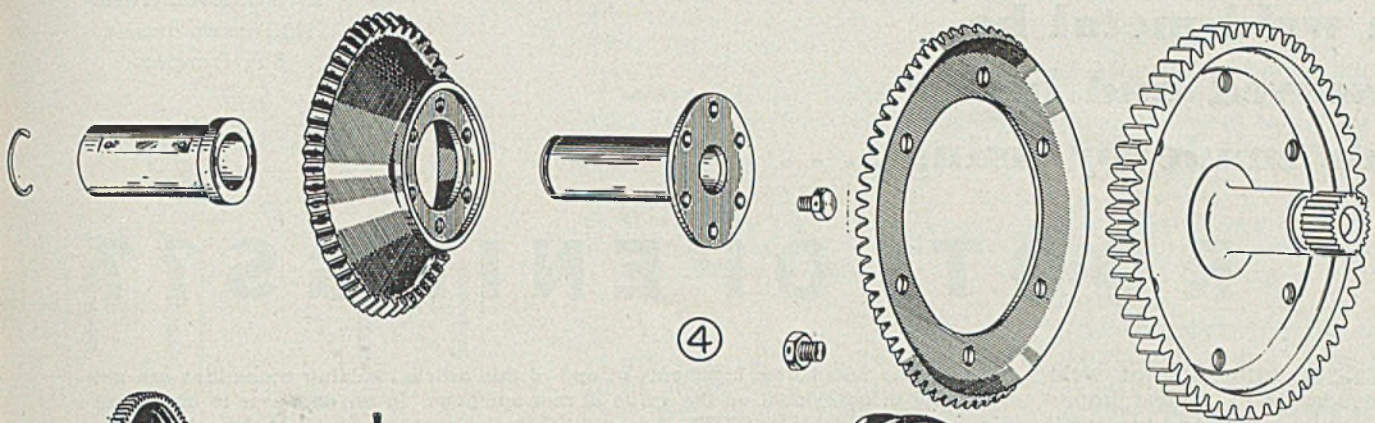
Fig. 1—Section through 20-inch pitch diameter internal gear of extremely light construction

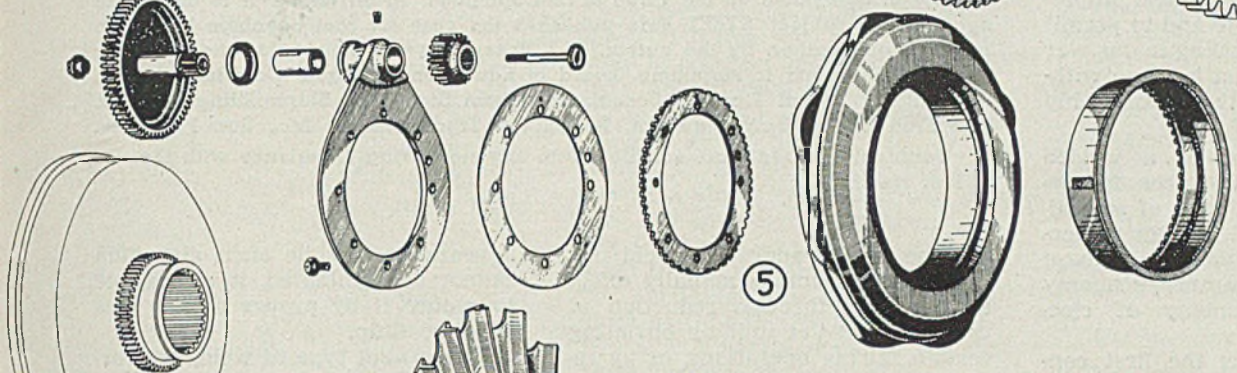
Fig. 2—Section through a correctly hardened and ground reduction gear pinion

Fig. 3—Section through an improperly ground pinion. Compare with Fig. 2









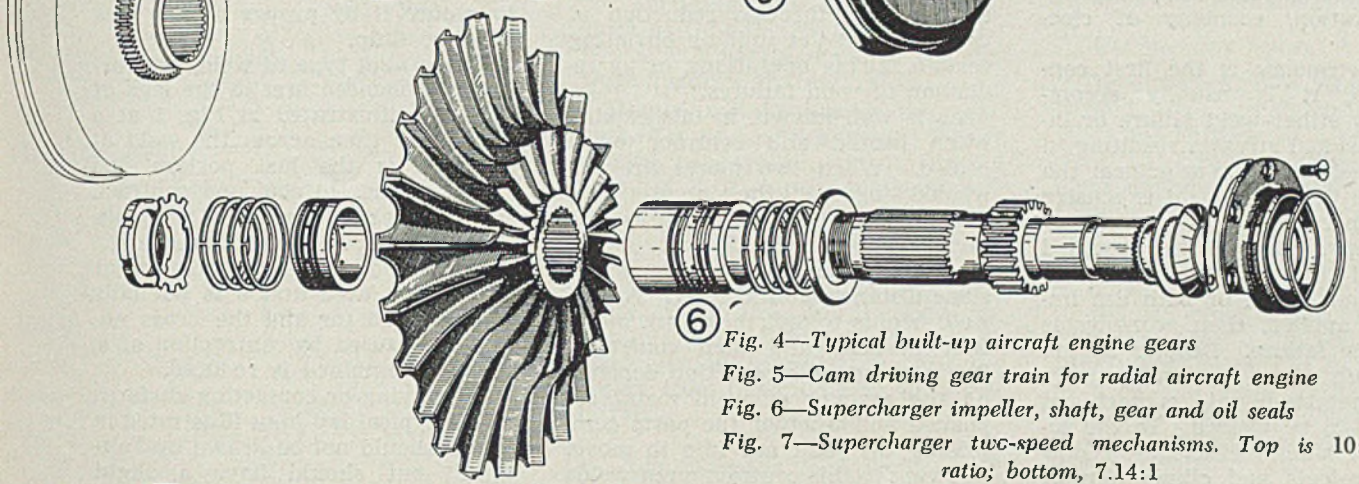


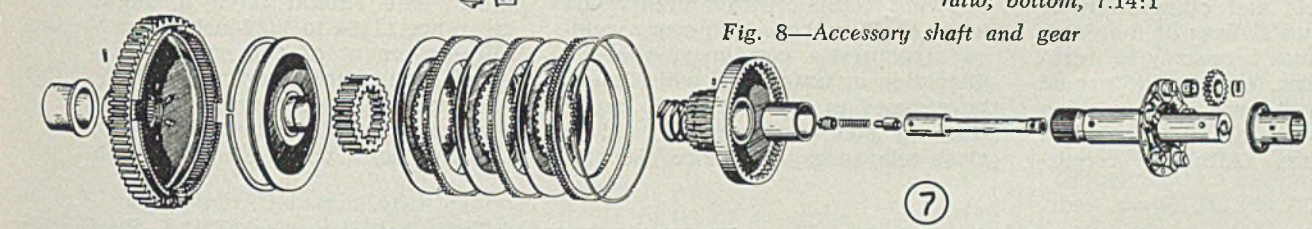
Fig. 4—Typical built-up aircraft engine gears

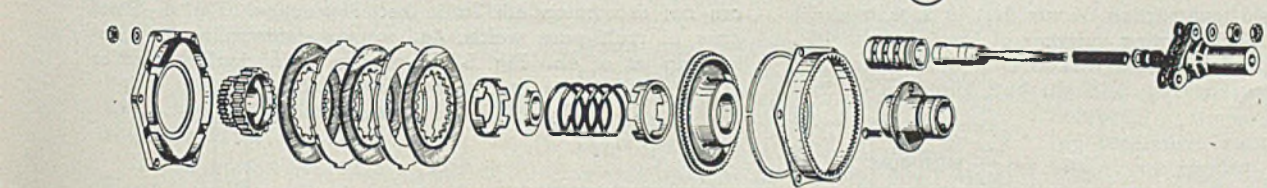
Fig. 5—Cam driving gear train for radial aircraft engine

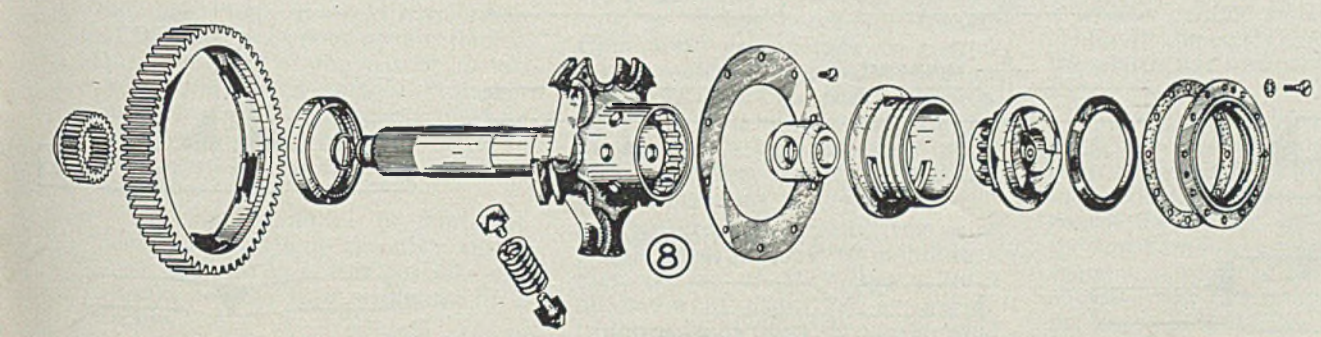
Fig. 6—Supercharger impeller, shaft, gear and oil seals

Fig. 7—Supercharger two-speed mechanisms. Top is 10:1 *ratio; bottom,* 7.14:1

Fig. 8—Accessory shaft and gear







Can weld metal be conserved and better welds made by using . . . .

ROOT OPENINGS??

By S. I. ROSENTHAL
190 Funston avenue
San Francisco

As will be noted from comments at end of this article, welding authorities are not entirely in agreement on the value of root openings. In an endeavor to cast some light on this subject, STEEL here publishes the case for root openings based on personal observation by the author, S. I. Rosenthal, who now holds the following positions: instructor in shipfitting, Board of Education, Oakland, Cal.; instructor in shipbuilding, Naval Training School, Bethlehem Steel Co., Shipbuilding Division, San Francisco; technical advisor, Associated Trade Schools Inc., San Francisco.

Pertinent comments are solicited from anyone having experience with the use of root openings.

EFFICIENT utilization of welding electrodes is of utmost importance to reduce waste and to permit maximum use of welding in our war effort. Yet this must be done without sacrificing quality, workmanship or appearance.

The prime intent of a welded joint is strength, with the following governing conditions of secondary importance, and in their respective order: Endurance, utility, ease of application, appearance, economy of fabrication, economy of electrodes.

When economy is the first consideration, it is usually accompanied by either weld failure or inherent residual stresses resulting in pronounced distortion at or near the weld with the subsequent expensive fairing operations.

Obviously, good design coupled with good fitup will govern economy factors, but if one or both are improperly applied, then economy is a foregone failure. Despite design, good fitup does not necessarily mean metal-to-metal contact of members to be welded. In the interests of safety, efficiency, reduction of rejects and elimination of unnecessary unfairness of material, it often becomes necessary to introduce clearances, commonly termed "root openings", especially in thick welding plates such as those used in shipbuilding. Although requiring the use of additional weld material, root openings actually effect an economy through reduction of time element per unit by obviating certain fairing operations, or by reduction of weld failures.

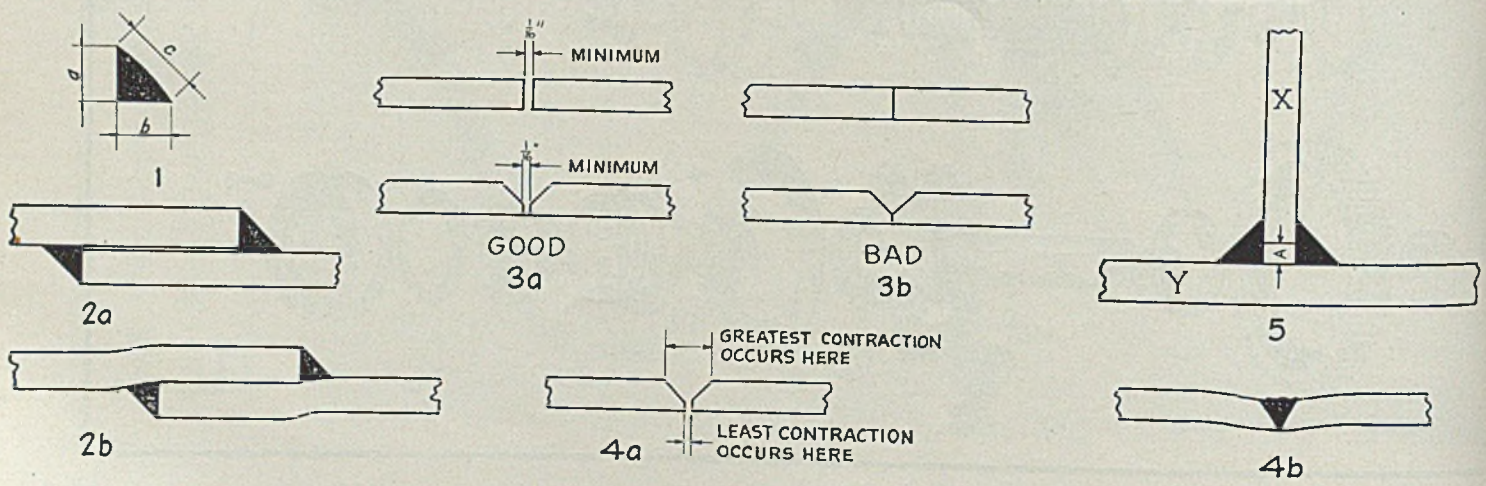
As is well known, metals expand when heated and contract when cooled. When two pieces are arc welded together the intense heat liberated at the joint causes the metal to become soft and plastic close to the arc and to expand for some distance from the arc. As the weld begins to cool, the plastic metal first hardens and then contracts. The amount of contraction depends on the amount of weld metal deposited and whether the parts comprising the joint are free to move.

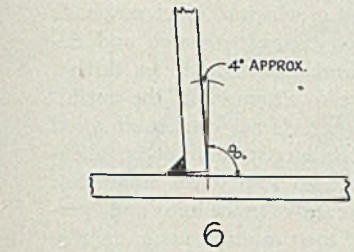
Owing to this contraction of welds when cooling, there is in every welded structure a certain amount of distortion or unfairness which must be reduced in many cases in order that the structure may be held to close tolerances or a more pleasing appearance. While such distortion cannot be eliminated, it is possible to reduce it by proper design plus effective fitup.

In the fillet type of weld, contraction is evidenced first in the legs of the fillet, illustrated in Fig. 1 at *a* and *b* and then across the weld at *c*, which is the last portion and greatest mass to cool and contract. Here is the major cause of warping. When clearance is introduced at or near the heel of the fillet, the initial contraction at *a* and *b* is partially compensated for and the gross unfairness caused by contraction of *a*, *b* and *c* combined is reduced.

The faying or contacting surfaces of the typical lap joint illustrated in Fig. 2 should not be drawn up "airtight" but should have a slight clearance (1/64 to 1/32-inch) to permit movement of the surfaces toward each other upon the cooling and subsequent contraction of the legs of the weld. When the faying surfaces lie in positive contact with

Fig. 1—In fillet weld, contraction occurs first in legs **a** and **b**, then in **c**. Fig. 2—Contacting surfaces of lap joint should not be tight as at **2b** but with a 1/64 to 1/32-inch clearance between them as at **2a**. Fig. 3—Tight butt joints as at **3b** are not recommended; **3a** is better practice. Fig. 4—Final pass in multi-pass welds, **4a**, causes deformation on contraction as at **4b**. Fig. 5—Clearance **A** in double fillet or T-joints produces a better connection





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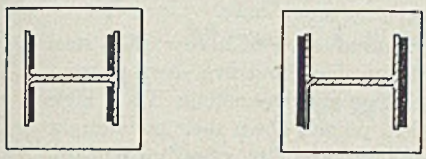
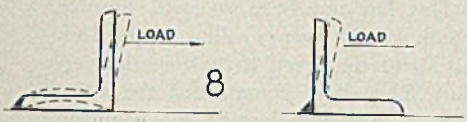


7a 7b



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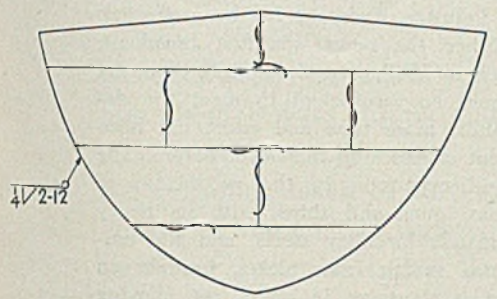

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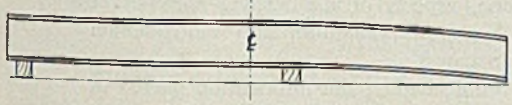

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one another, the weld, upon cooling and contracting, will pull the lapping member about itself causing the kinking action illustrated at the right in Fig. 2 and destroying the efficient stress continuity between the members.

If the plates are of a sufficiently heavy cross-section to resist this kinking action, the weld may crack. If the weld is of poor penetration, it may pull out of the parent metal. When the faying surfaces are separated, a slight unfairness may be observed due to the contraction of the leg of the weld on the lapping member.

The lap should be of sufficient length to distribute the fiber stress over as large an era as possible and should be held to a minimum of 2 inches.

Butt joints, whether of the plain or grooved type, should be separated as shown in Fig. 3 in order to circumvent weld failure or excessive distortion by permitting the weld to contract and draw the members toward each other.

Fig. 6—Contraction produces this effect if no clearance is employed at root of fillet. Fig. 7—Welding on inside of flanges as at 7a tends to cause failure; 7b is better design. Fig. 8—Attaching a clip as at 8b produces greater strength than method at 8a. Fig. 9—Proper sequence will create a tension that holds bulkhead assemblies flat. Fig. 10—Camber can be controlled and excessive sagging prevented by utilizing contraction effects

On butt joints where grooving is applied as at left in Fig. 4, the final pass in multipass beads or the top of a single pass bead will provide the greatest contraction, causing the condition illustrated at the right in Fig. 4. This condition may be eliminated by grooving both sides so that the contraction of the welds will nearly equalize the distortion caused by the first beads.

Metal-to-metal contact of the members of a double-fillet welded T-joint should be avoided. If in Fig. 5 member *X* is seated on member *Y* so that *A* equals zero, the shrinkage of the fillet welds will tend to draw *X* and *Y* against each other. Because they are already against each other, *Y* will kink sharply about the juncture with *X*. If *Y* is of sufficient section to resist the kinking action, then the weld may ultimately fail.

Two Operators Solve Problem

When clearance of 1/32-inch or more is permitted at *A*, the fillet weld in shrinking will draw *X* toward *Y*. Having little or no opposition, the only unfairness produced will be that due to shrinkage of the weld itself.

If restraint by proper bracing is neglected in the T-type joint, then when final contraction of the first bead occurs, the intersecting member will be inclined as shown in Fig. 6. Placing a bead on the opposite side to attempt self-alignment by contraction of the second bead may prove disastrous. Because one side now is under maximum tension from weld contraction, a greater force would be required in the opposite direction to overcome this tension. This is impossible because the two beads have the same physical properties, and thus satisfactory adjustment is prevented.

After properly bracing this type of joint it is possible to maintain a high degree of alignment with a minimum of distortion by having two operators simultaneously weld both sides.

Cap and sole plates on pillars should not be welded on the inside of the flanges because the welds, on cooling and contracting, will tend to draw the plate closer. This may cause the weld to fail as a result of impaired movement and the resulting increased load on the weld, for the center of the web acts as a fulcrum and the arching of the plate toward the web causes a high magnitude of leverage in opposition to the weld.

When welded on the outside of the flanges as at Fig. 7B, the edges of the flanges nearest the welds act as fulcrums and the plate is arched away from the web only a small amount, introducing but slight weld stress as compared with Fig. 7A.

These are typical instances where economy is not dependent on restriction of electrodes but on elimination of defective welds caused by excessive residual stresses, or from excessive deformation requiring expensive fairing processes arising from faulty design or fitup.

Use of Clips Source of Debate

The most efficient attachment of welded clips used with bolts or jacks for shifting of adjoining sections has been a source of argument among many users for some time. There is a tendency on the part of many to apply the clip as at Fig. 8A. Here the force required to perform the operation is applied to the standing flange of the clip. Then the heel of the clip acts as a fulcrum, causing the lower flange to arch and start fracture at the heel of the weld continuing through the throat to ultimate failure of the weld.

However, if the clip is turned as at Fig. 8B, the heel of the clip acts as a fulcrum and is restrained by the attachment weld. Thus it produces but little effect on the weld and consequently this type of attachment has a higher capacity than that shown in Fig. 8A.

Warping and buckling of bulkhead assemblies can be materially reduced by tacking the outer edges of the assembly to the slab and performing the welding in a wandering sequence from the center. Then when contraction of the welds at the seams takes place, there will be a tension created radially from the center to the edges tending to force the plates flat against the slab. See Fig. 9.

Where long girders have cleats welded to the top flange, it is necessary that any evident camber be maintained. If care is not taken, contraction of the welds will cause the top flange to contract with consequent sagging of the girder. One effective way to circumvent the sagging problem is to allow the beam to

(*Please turn to Page* 133)

Brief Up-To-Date Picture Of Development of . . . .

NE (National Emergency) ALLOY STEELS

By R. W. ROUSH
Chief Metallurgist
Timken-Detroit Axle Co.
Detroit

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41, p. 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102.

For reports from users of NE steels, see STEEL, Nov. 16, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p.99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100.

For latest revised list of NE steels, see Jan. 25, p. 84.

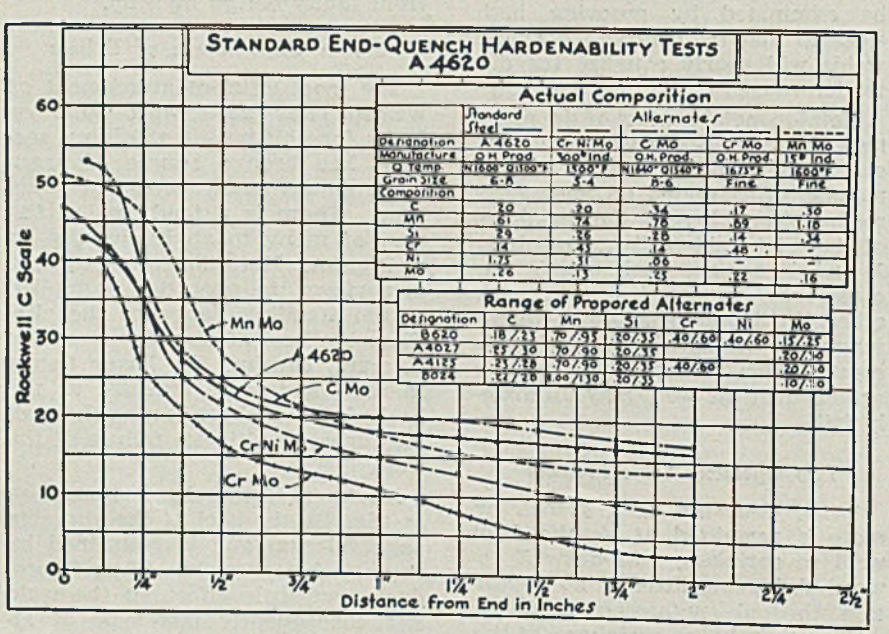

Fig. 1. (Upper view)—Standard end-quench hardenability curves for AISI-SAE A-4620 and for three basic compositions of NE steels

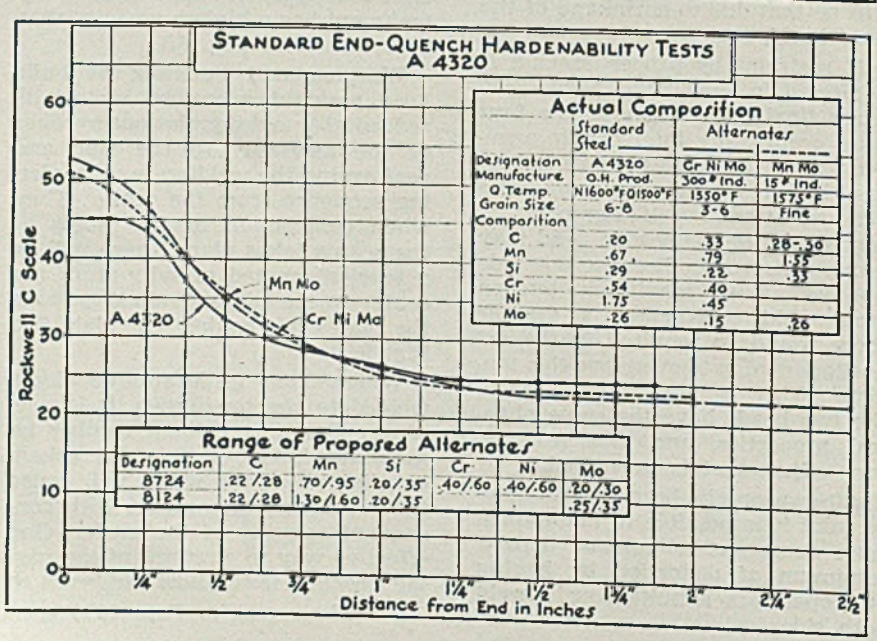

Fig. 2. (Lower view)—Hardenability curve of AISI-SAE A-4320 is almost duplicated by curves of two basic compositions of NE steels

IN A WAR in which so much emphasis is placed upon speed, research and development work have had to be thrown into high gear. Progress in the metallurgy of alloy steels has broken all speed records. Metallurgists and other scientists have had to step down from their regular laboratory procedure and perform most of their experiments on rapidly moving production lines.

The introduction of a new alloy steel used to involve about five years of arguing, selling and promoting. Then after they had pinned down their metallurgist with full responsibility, a few brave manufacturers would chance a small experimental lot. The metallurgist, providing himself with insurance policies, body guards, running shoes and other protection, would spend a year or so on the verge of a nervous breakdown until the test lot was through. If everything was satisfactory, in another five years the new steel might stand a chance of being used.

This has not been so with the NE (National Emergency) alloy steels. They have had the green light from the very start. They have commanded the attention of more metallurgists and engineers than any other project in the history of all industry. Everyone has been affected.

Since the news was first broadcast, back in 1940, that the supply of nickel would be insufficient to meet the demands, more time and effort has been spent on research than ever before. The rapid expansion in the production of tanks, guns and ships, with its heavy demands for alloy steels, and the universal switch from nickel, brought on similar shortages in all of the alloying elements used in steel making. One by one, reports of diminishing supplies of chromium, vanadium and molybdenum appeared.

Fortunately, the information gained in the many years of co-operative research and the free exchange of ideas by American metallurgists has revealed to us the functions of the alloying elements in steel, singly and in combination. With this knowledge we have been able to face the problem of reducing the alloy content in our important steels and make great strides toward striking a long-

From a paper presented at the War Engineering Production meeting of the Society of Automotive Engineers, Jan. 11 to 15, 1943, Detroit.

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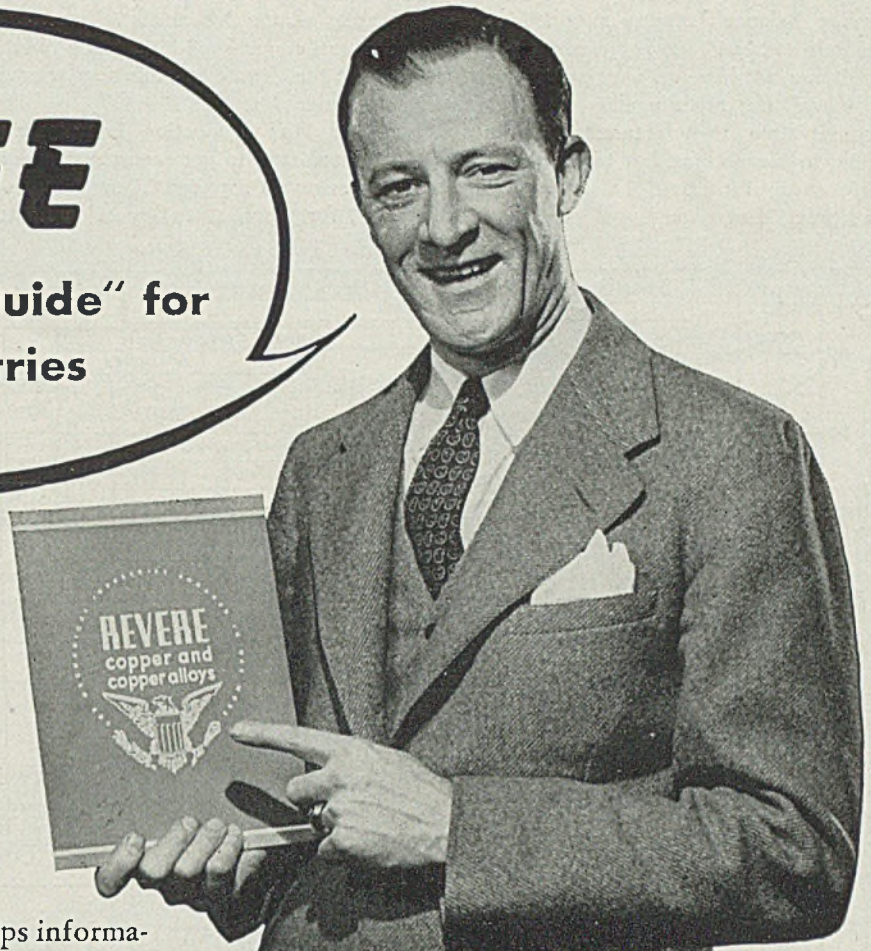

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range balance between production demands and available supplies.

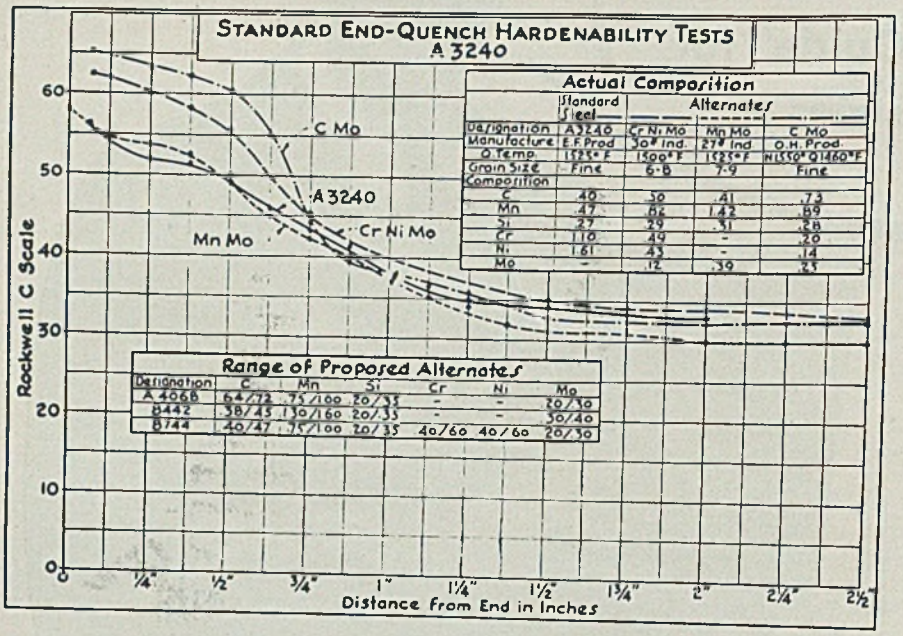
It has not been an easy matter to toss aside all our favorite alloy steels. Some conservative manufacturers have been able to see nothing but trouble in making any substitution. This is a natural attitude. But wide usage of such substitutes as the NE steels is necessary if the needed production is to be obtained with the strategic alloying elements available.

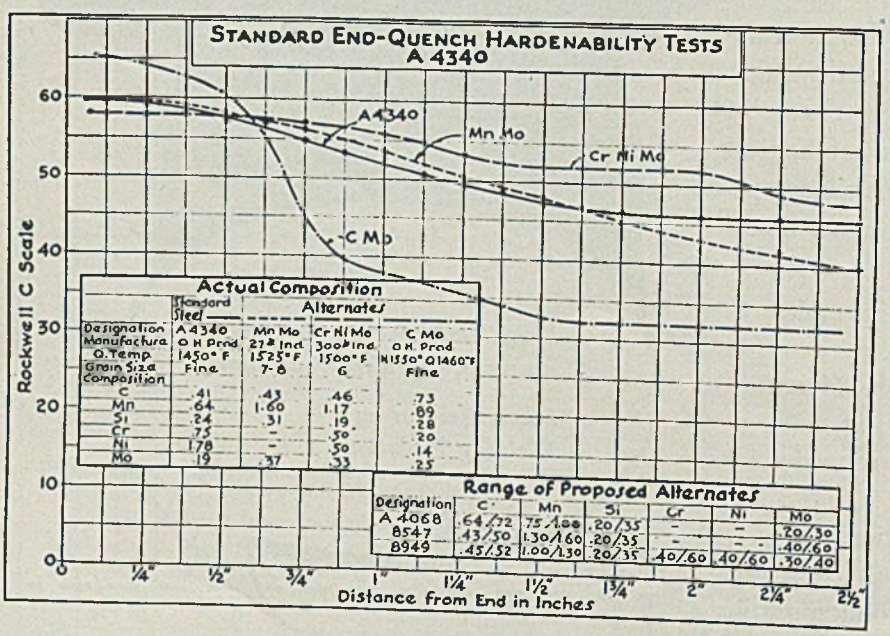
The War Production Board has set up machinery to get accurate production figures on all supplies. Thus it can, with the information at its disposal, determine how much of any item can be used without producing a shortage and can, by proper regulation, keep a constant flow of the proper materials to the proper places at the proper times. On the basis of this information, the WPB suggested and promoted the development of the National Emergency steel specifications. The original allowance was ½ of 1 per cent for nickel and chromium.

Many committees from such organizations as the American Iron & Steel Institute and the Society of Automotive Engineers War Engineering Board helped. Work was started on three basic steel compositions, namely: carbon-molybdenum, manganese-molybdenum and chromium-nickel-moybdenum. The supply of molybdenum, at that time, was thought to be sufficient. Attempts were made to design specifications for these three series of steels in the required carbon ranges having an alternate in each series to match the properties of each of the alloy steels previously used.

As time would not permit a long research program or full production heats for testing, a large number of induction furnace heats were made. Adjustments were made in the carbon, manganese and silicon contents to balance the reductions of the principle alloying elements. Test bars were made and the standard Jominy hardenability test was used as a means of evaluation. At first, criticism was heard on the small heats of 10 to 30 pounds each, and the use of hardenability tests as the only means of comparison. However, no equal amount of information could have been gathered in such a short time.

A great deal of emphasis is placed upon hardenability today as a means of evaluting a steel. It is a rapid and convenient means of determining the hardening properties and a first indication of the possibilities of a steel. *But to draw all of our conclusions on the basis of hardenability is neglecting the very important consideration of ductility.* It is generally conceded that a steel will perform best





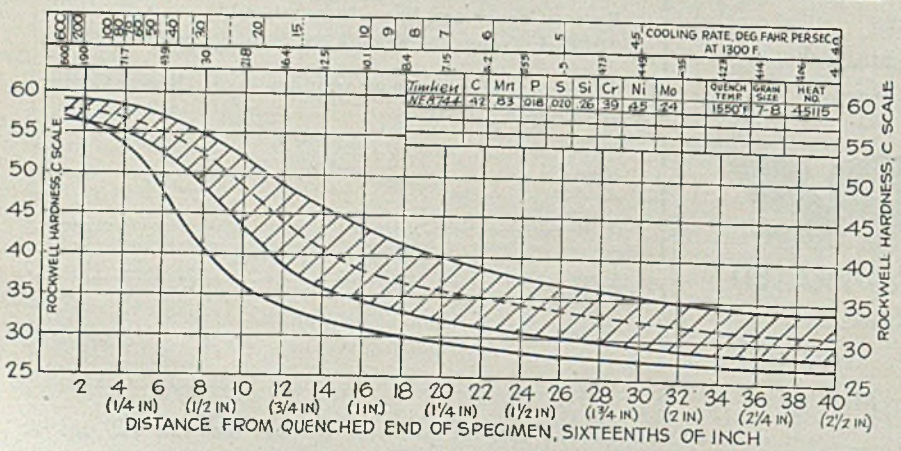


Fig. 3. (Top view)—Hardenability curve for structural grade steel, AISI-SAE A-3240 is compared with those of NE steels

Fig. 4. (Center) — Hardenability curves for deep-hardening grades. Here AISI-SAE A-4340 is compared with NE steels. In this case, the chromium-molybdenum steel does not have the requisite hardenability

Fig. 5. (Bottom)—Any particular NE steel type is set up to have its hardenability of various heats fall within a band as shown here. The one outside did not meet specifications

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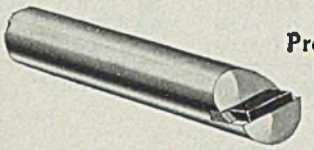

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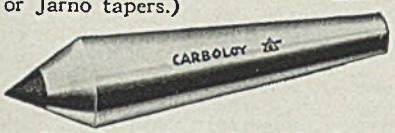

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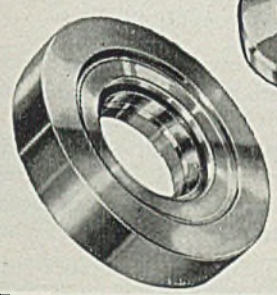

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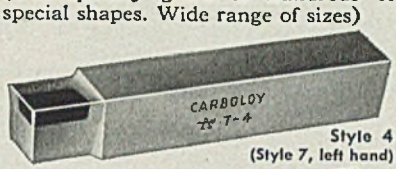

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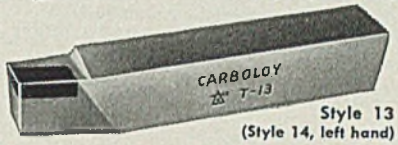

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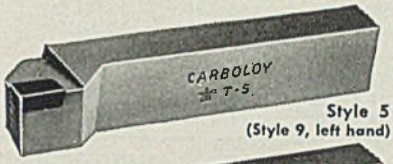

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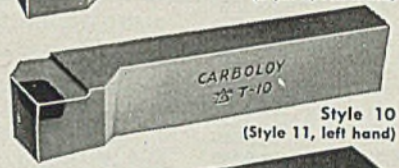

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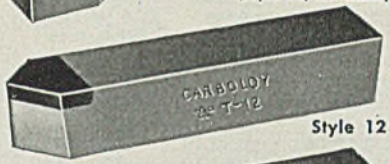

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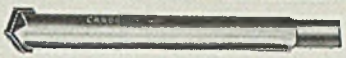

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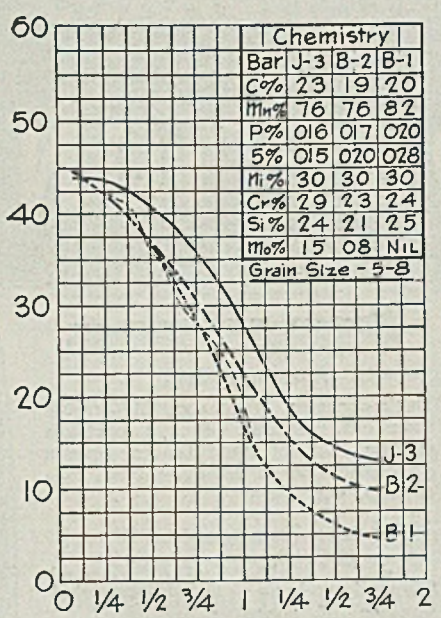


Fig. 6—Showing effect of varying molybdenum in NE-9420 steel. Chart shows hardness reading along Jominy "L" bars, not normalized, quenched from 650 degrees Fahr.

if it has been hardened to its maximum hardness all the way through and then tempered back to the hardness desired.

We cannot hope to get the most out of a steel unless it is so hardened. It is, therefore, important to know *how it will harden.* As tensile strength is closely proportional to hardness, it can be said that hardenability is a measure of strength, or rather the capacity for strength, especially the strength of different portions through a cross-section. The elastic limit and endurance limit are proportional to hardness, provided initial hardening was complete, but are not always consistent after incomplete initial hardening.

Elongation, reduction in area, and impact properties show a definite relationship to hardness and strength in the lower hardness ranges. But in the as-quenched condition and in the high-hardness ranges, this relationship does not always hold, and there are a large number of parts, such as gears, which are used in these conditions. In this case, laboratory or performance tests on actual parts are the only safe and sure means of proving the value of a steel.

The hardenability test has been a wonderful yardstick in building the NE steel specifications but the real value of a steel should be confirmed and verified by laboratory and performance tests. This is being done as rapidly as possible, and steels not satisfactory are either being altered or deleted.

There are applications which do not require full deep hardening, in fact some parts perform better if they are not hardened throughout. In shafts and members subjected to torsional stress only, it has been found that a high surface hardness and a lower center hardness gives the best torsional fatigue properties. Then there are a number of automotive parts being used today, which have never been fully hardened and yet are giving good performance. Their design is adequate, and full hardness and strength are not required.

Hardenability may be determined in a number of different ways. The most common is the Jominy or end-quench method. Briefly, it consists of cooling the end of a 1-inch round 3-inch long bar in a stream of water at a constant temperature and pressure, and measuring the rockwell hardness at 1/16-inch intervals along the side of the bar, beginning at the water-cooled end. Hardness is plotted against distance from the water-cooled end, showing the familiar hardenability curve. By correlating these results with hardness tests made on various sized parts, a close prediction can be made of the hardness possible in a desired section. This is a standard method and is given in full in the *SAE Handbook.*

Another method is the through-hard-

(*Please turn to Page* 135)

TABLE I—CARBON-MANGANESE STEELS

	C	Mn	Si
NE 1330	0.28-0.33	1.60-1.90	0.20-0.35
NE 1335	0.33-0.38	1.60-1.90	0.20-0.35
NE 1340	0.38-0.43	1.60-1.90	0.20-0.35
NE 1345	0.43-0.48	1.60-1.90	0.20-0.35
NE 1350	0.48-0.53	1.60-1.90	0.20-0.35

MANGANESE-MOLYBDENUM STEELS

	C	Mn	Si	Mo
NE 8020	0.18-0.23	1.00-1.30	0.20-0.35	0.10-0.20
NE 8442°	0.40-0.45	1.30-1.60	0.20-0.35	0.30-0.40

NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 8613	0.12-0.17	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8615	0.13-0.18	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8617	0.15-0.20	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-.025
NE 8620	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8630	0.28-0.33	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8635	0.33-0.38	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8637	0.35-0.40	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8640	0.38-0.43	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8642	0.40-0.45	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8645	0.43-0.48	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8650	0.48-0.53	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8720	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.20-0.30

SILICON-MANGANESE AND SILICON-MANGANESE-CHROMIUM STEELS

	C	Mn	Si	Cr
NE 9255	0.50-0.60	0.70-0.95	1.80-2.20	.....
NE 9260	0.55-0.65	0.75-1.00	1.80-2.20	.....
NE 9262	0.55-0.65	0.75-1.00	1.80-2.20	0.20-0.40

MANGANESE-SILICON-CHROMIUM-NICKEL-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 9415	0.13-0.18	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9420	0.18-0.23	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9422	0.20-0.25	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9430	0.28-0.33	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9435	0.33-0.38	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9437	0.35-0.40	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9440	0.38-0.43	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9442	0.40-0.45	1.00-1.30	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9445	0.43-0.48	1.00-1.30	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9450	0.48-0.53	1.20-1.50	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE 9537°	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9540°	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9542°	0.40-0.45	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9550°	0.48-0.53	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25

MANGANESE-SILICON-CHROMIUM STEELS

	C	Mn	Si	Cr
NE 9630	0.28-0.33	1.20-1.50	0.40-0.60	0.40-0.60
NE 9635	0.33-0.38	1.20-1.50	0.40-0.60	0.40-0.60
NE 9637	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60
NE 9640	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60
NE 9642	0.40-0.45	1.30-1.60	0.40-0.60	0.40-0.60
NE 9645	0.43-0.48	1.30-1.60	0.40-0.60	0.40-0.60
NE 9650	0.48-0.53	1.30-1.60	0.40-0.60	0.40-0.60

CARBON-CHROMIUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 52100A	0.95-1.10	0.25-0.45	0.20-0.35	1.30-1.60	0.35 max.	0.08 max.
NE 52100B	0.95-1.10	0.25-0.45	0.20-0.35	0.90-1.15	0.35 max.	0.08 max.
NE 52100C	0.95-1.10	0.25-0.45	0.20-0.35	0.40-0.60	0.35 max.	0.08 max.

°Recommended for large sections only.

CENTURY FORM J MOTOR

Protection Against Falling Solids and Dripping Liquids

The top half of the motor is closed. Cooling air enters at both ends and is discharged below the shaft line.

The upper half of the Century Form J general purpose, open, continuous duty motor is closed to minimize the possibility of dripping liquids or falling solids entering the vital parts of the motor.

This added protection feature is made possible because of the scientifically designed Century mechanical ventilation system. All motors generate heat, so if the insulation is to have long life, the heat must be rapidly carried away from the windings. Two powerful fans located behind each bearing bracket draw cooling air "IN" through the bearing bracket openings. This cooling air is deflected first around the bearings to keep them cool and then across the windings and to air passages between the outer surfaces of the magnetic core and the frame—the heated air being finally discharged "OUT" through the openings located at the sides and bottom of the frame.

These modern, protected, industrial, general purpose motors meet the requirements of more than 80% of all polyphase motor applications. This Form J construction is at present available in 2 to 15 horsepower four-pole frame sizes.

Your Century Motor Specialist has full information and his wide experience may well prove valuable to you. We suggest you call him in today.

Century MOTORS

Help You Beat the Production Promise

318

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis, Mo.

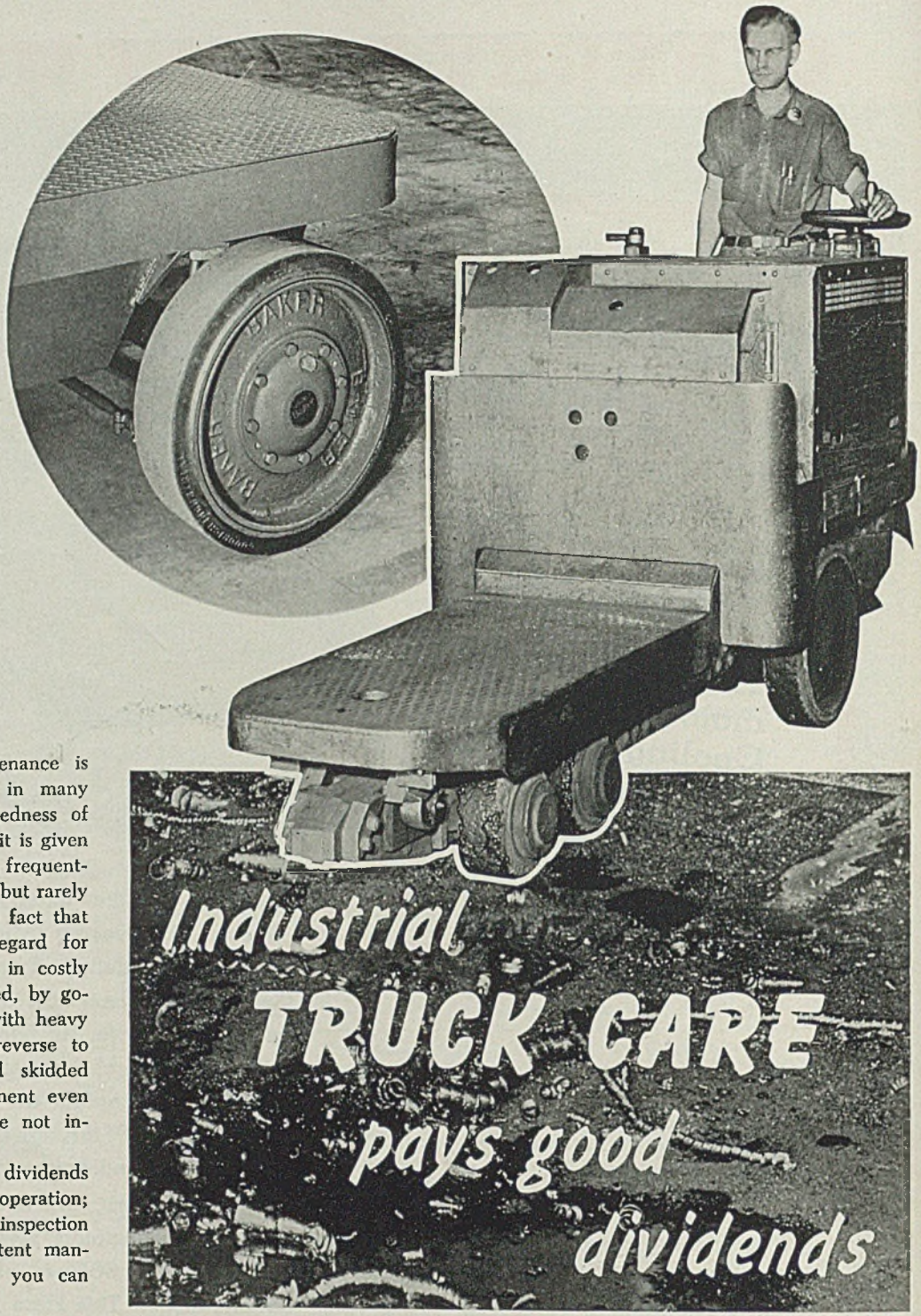
Offices and Stock Points in Principal Cities

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World.

By A. E. DOROD
Assistant Chief Engineer
Baker Industrial Truck Division
Baker-Raulang Co.
Cleveland

Immediate right — Good floor conditions as illustrated assure long tire life and low truck maintenance costs

Far right—Note conditions under which this truck is operating—rough floors, oil, steel turnings and sharp-edge steel plate —all of these waste vital rubber



Industrial TRUCK CARE pays good dividends

INDUSTRIAL truck maintenance is purely a mythical operation in many plants. Because of the ruggedness of this equipment, in many cases it is given only a hasty inspection; in fact, frequently, none at all. And it may be but rarely lubricated. Coupled with the fact that some operators have little regard for careful operation, this results in costly breakdowns. Trucks are forced, by going from low to high speed with heavy loads; they are plugged in reverse to stop; they are rammed, and skidded around corners. Such treatment even their sturdy constitutions were not intended to withstand.

The industrial truck can pay dividends only so long as it is kept in operation; and the investment of regular inspection and lubrication, under competent management, is one of the best you can make.

First: Provide good floor conditions, and DO NOT overload. With rubber at a premium and tires so difficult to replace, greater care should be paid to the floor conditions where industrial trucks are operated. Aisles should be kept cleared of chips, scrap and anything else that would tend to cut the tires. In the past far more industrial truck tires have been cut to pieces than have ever worn out. Loading is also important. Each truck is designed to carry a definite capacity. To overload it taxes its various component parts and materially reduces its life. Every operator who overloads his truck is helping the Axis by breaking down irreplaceable equipment.

Second: Place your industrial truck under the supervision of a competent and careful mechanic for thorough weekly inspections.

This does not mean that your truck should be tinkered with unnecessarily. Do not make adjustments until required. But many possible causes of excessive wear, or loss of power are not apparent in ordinary running and can be determined only by inspection. The main points of inspection are set forth later in this article.

Third: Insist on regular lubrications in accordance with the manufacturers recommendations. These instructions should be placed in the hands of a lubrication expert. As much or more care is required in greasing this equipment as in caring for a good pleasure car. It is important that the proper types of lubricants be used as well as the best quality obtainable. The industrial truck has many types of bearing surfaces, working under widely different conditions. Do not over-lubricate your truck since it can often be as harmful as under-lubrication.

Fourth: The maintenance man should be charged with keeping a complete log sheet or record on each industrial truck. This record should cover in detail weekly inspection findings, lubrications, all

(*Please turn to Page* 137)

LOOK OUT, you Axis aviators! This bomber is a hornet with a sting on every side . . . protected from attack by blistering fire poured to all points of the compass.

Protection is also important here at home. Guard your equipment and tools to save vital metals . . . cut down needless waste and we can produce more war materials. Storage batteries, for example, last longer when you follow these four simple rules. Obey them all now and you're hitting the Axis. *Buy to Last and Save to Win!*

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

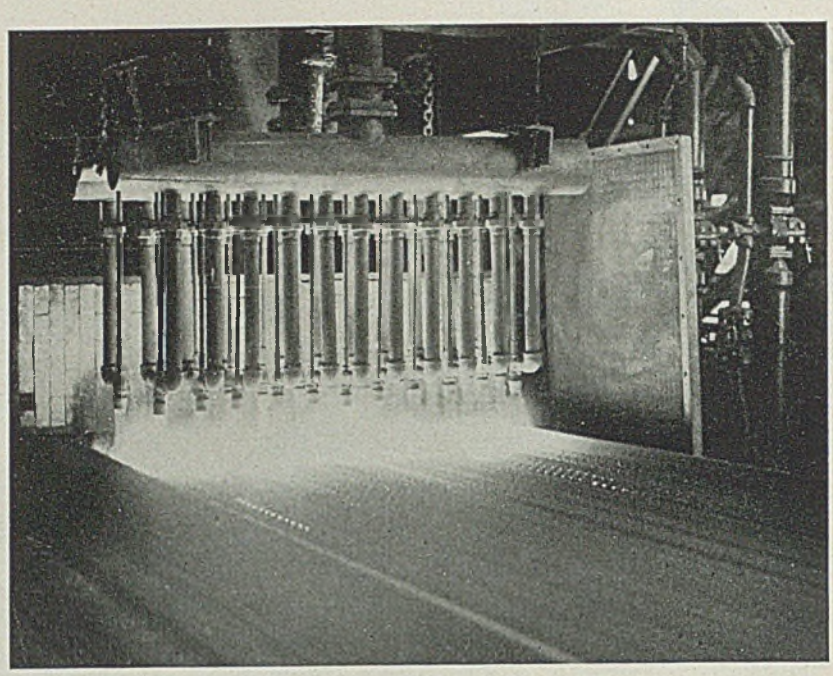
PROTECT YOUR BATTERIES FROM THESE FOUR ANGLES:

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

Modern Sintering Plant

Handles Fine Ores and Flue Dust



Furnace end of sintering machine showing gas burner arrangement. The actual sintering operation starts here

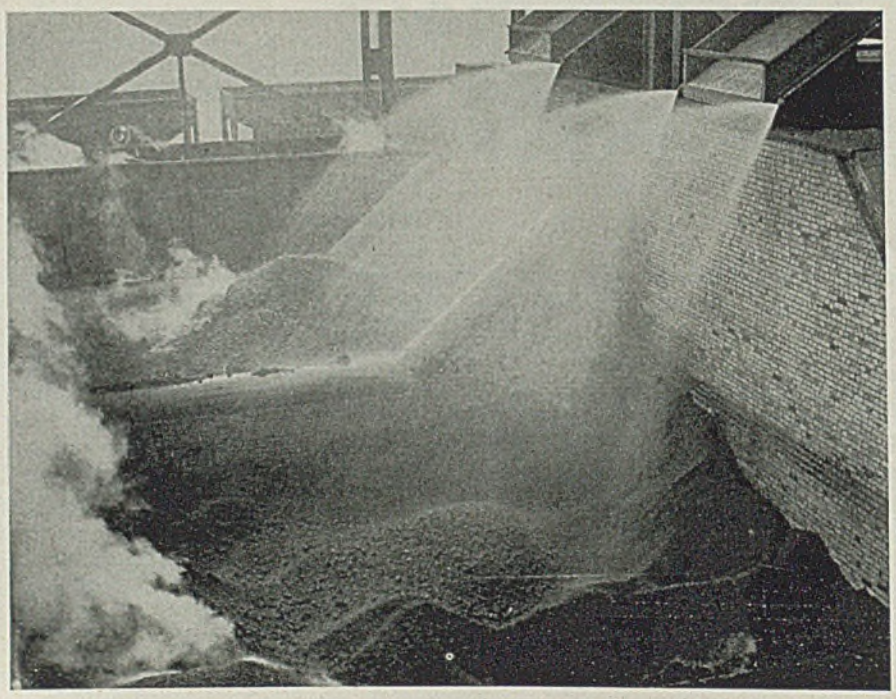
NEW sintering facilities recently placed in operation at the Campbell, O. plant of the Youngstown Sheet & Tube Co., will aid materially in increasing the daily output of blast furnaces in the Youngstown district. The new plant, which has a rated daily capacity of 2400 tons of sinter, is located directly east of the Campbell blast furnace unit of the company.

Functions of this plant consist of combining flue dust and fine ores which, because of their physical size, make them impractical to charge directly into the blast furnace; then processing these materials and making them coherent by heating the properly prepared material to a partial fusion point while a strong air stream is passed through the mass thereby forming air cells or pockets throughout the entire mass. The particular advantage in the use of properly prepared sinter is increased output and reduction of fuel consumption in the blast furnace plus the recovery of valuable raw materials which otherwise could not be used.

The plant was located and designed to process fine lake ores and the dust from the dry dust catchers which are located at the blast furnaces.

The blast furnace larry track, which carries the larry cars servicing the blast furnaces with necessary raw materials, was extended as a trestle track to the site of the new plant. A 50-ton larry car driven by a gas locomotive delivers the ores to a trestle hopper. Other materials such as flue dust, coke breeze and scale are delivered on a low level, standard-gage track and placed in a track hopper preparatory to being processed.

Finished sinter is delivered to separate pits under a crane runway

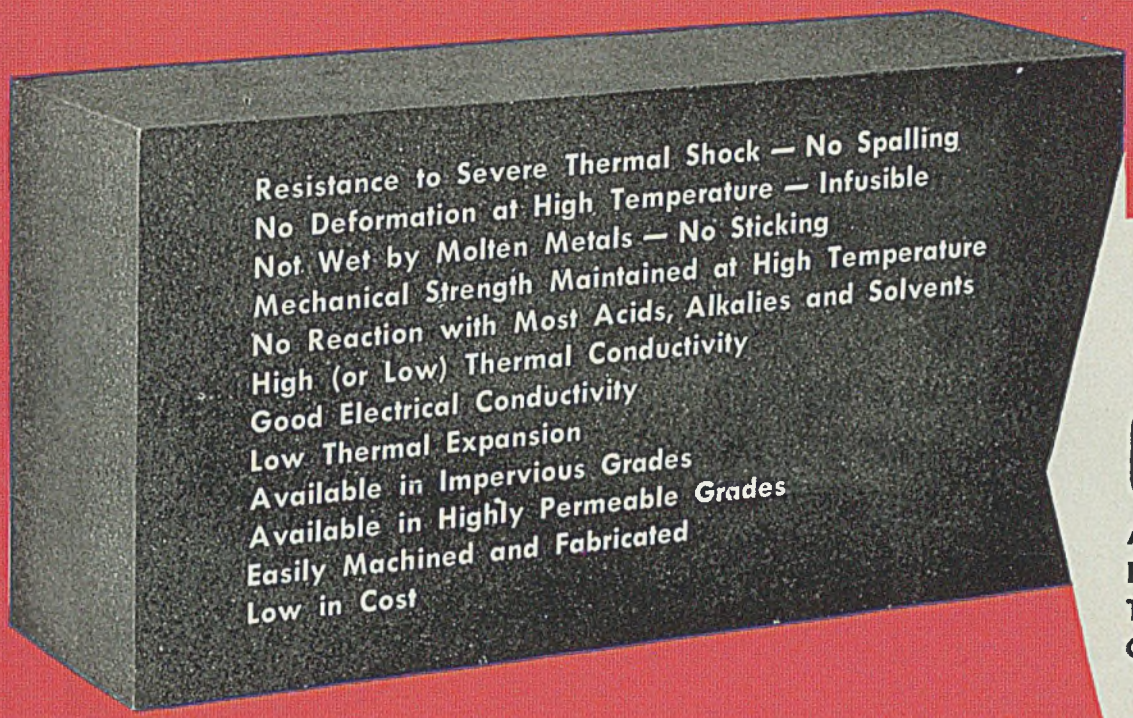


Feeders at the bottom of these hoppers deliver material, in proper proportions, onto a gathering belt which discharges to an elevating belt conveyor. This elevating belt conveyor is located outside of the plant proper and is approximately 197 feet long. The burden from this conveyor is discharged onto a 5 x 14 foot vibrating screen which removes all material over ½-inch size. The trestle hopper feeder belts and the feeder belts from the track hoppers may be operated separately or together in order that ore and flue dust may be blended in any ratio desired, by controlling amount of feed from each hopper.

The oversize material passes through a chute to cars and is sent to the open-hearth furnaces or the blast furnaces. The fines which pass through the screen fall on another belt conveyor, approximately 64 feet long, and are discharged onto a shuttle belt conveyor which is located above and over the storage bins. By moving this shuttle conveyor back and forth the material may be placed into any one of the seven storage bins which are located on the inside of the plant proper.

These raw material storage bins are 19 feet diameter and have a nominal capacity of 450 tons each. Since there are two sintering machines in this plant there is a separate feeder system for each of them, located on opposite sides of the storage bins, thus different grades of sinter can be made at the same time,

YOU HAVE NEED FOR MATERIAL WITH THESE PROPERTIES



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ARE THE ONLY MATERIALS POSSESSING THIS ADVANTAGEOUS COMBINATION OF PHYSICAL AND CHEMICAL PROPERTIES

★ FABRICATED PRODUCTS

Practically any design can be machined or fabricated from stock materials.

★ STANDARD STOCK FORMS

BEAMS • BLOCKS • SLABS • PLATES • BRICK
RODS, ROUND AND RECTANGULAR • TUBES
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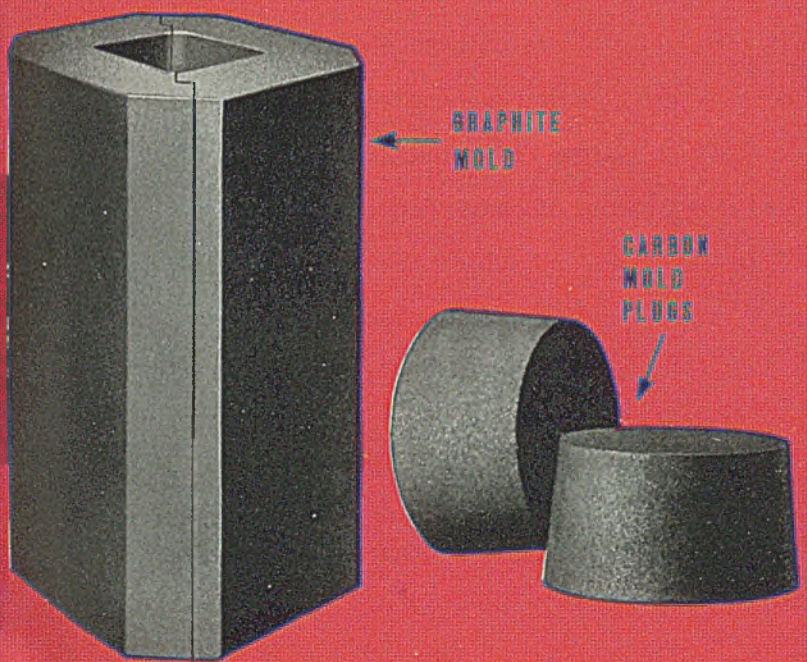
★ MOLDED PRODUCTS

Carbon and graphite products are molded to form when quantity justifies.



IMPROVED PRODUCTION AND REDUCED MAINTENANCE HAVE BEEN EFFECTED ON MANY METALLURGICAL APPLICATIONS BY USE OF

NATIONAL (TRADE-MARK) and KARBATE (TRADE-MARK) CARBON AND GRAPHITE PRODUCTS

SUCH AS

Carbon mold plugs, inserts and stools. Carbon and graphite molds, crucibles and cores. Impervious carbon tanks and tank linings. Carbon trough and furnace linings. Carbon rolls and graphite electrodes for pickling tanks. "Karbate" impervious pipe, valves, pumps and fittings. Porous carbon and graphite diffusers and filters.

WRITE for information on the use of carbon and graphite products for applications where a material with the properties listed above would be advantageous.

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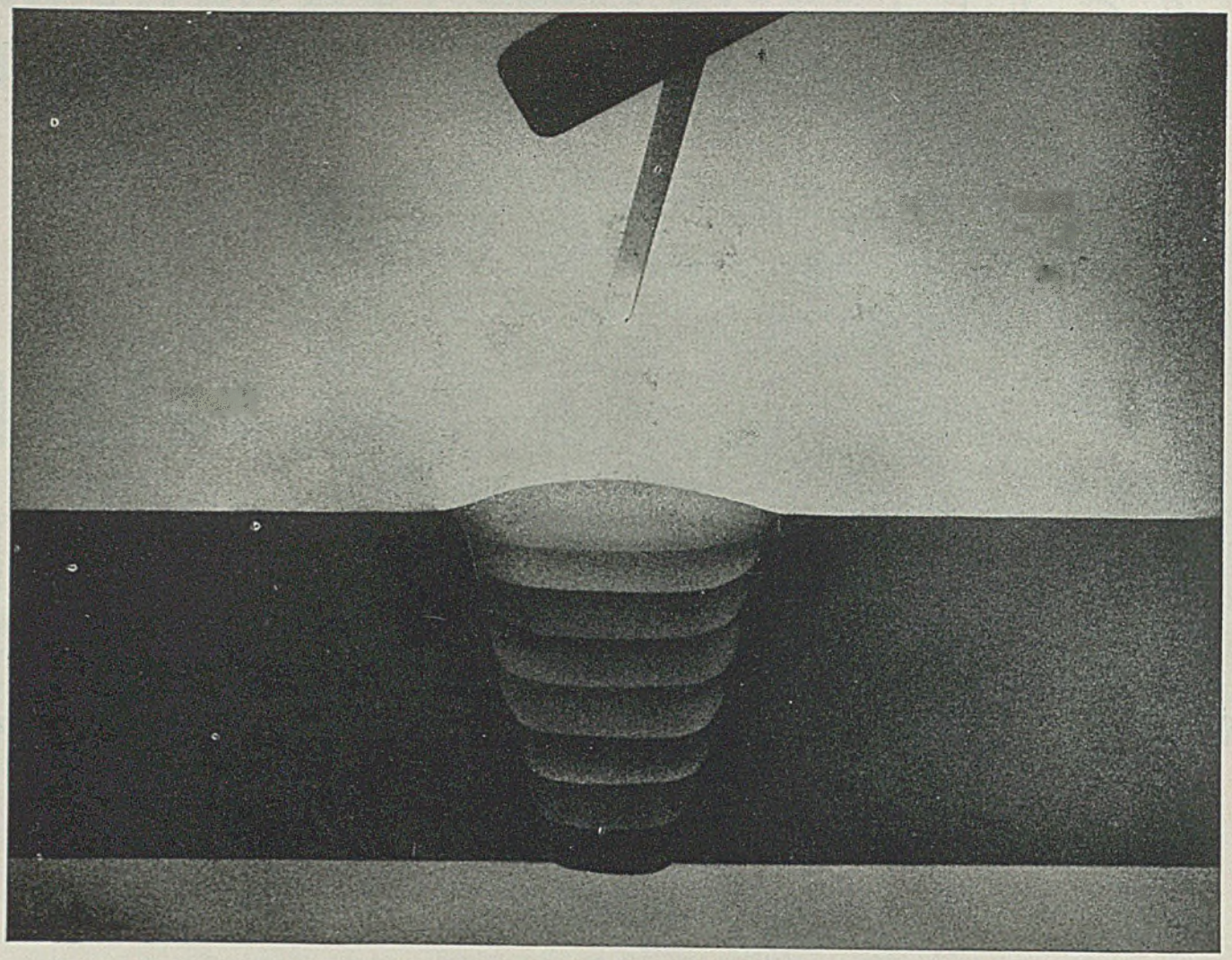

TO HELP CONSERVE ELECTRODES LIMIT PASSES TO EIGHT TO THE INCH

MOST specifications in butt welding call for passes one-eighth of an inch thick. If more than eight passes to an inch are used, a needless waste of both electrodes and welding time results—especially in heavy plate where cleaning is necessary after each pass. ¶ The shortage of electrodes, despite the fact that 1942 production was nearly 80% over that of 1941, makes it essential that every means of conserving electrodes be used. ¶ This advertisement is one of a series on this important subject. Should you wish reprints for your plant bulletin-board, without charge, let us know the number you require.

METAL & THERMIT CORPORATION

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

MUREX ELECTRODES

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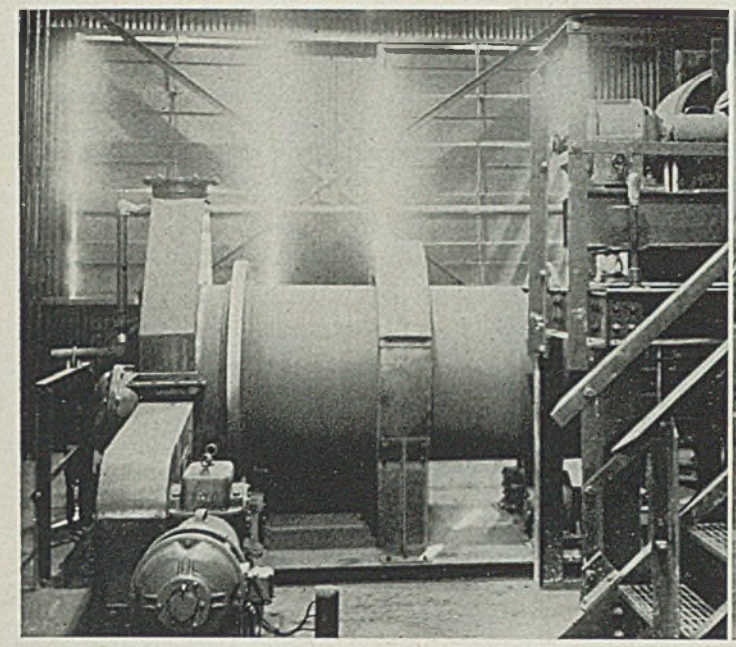
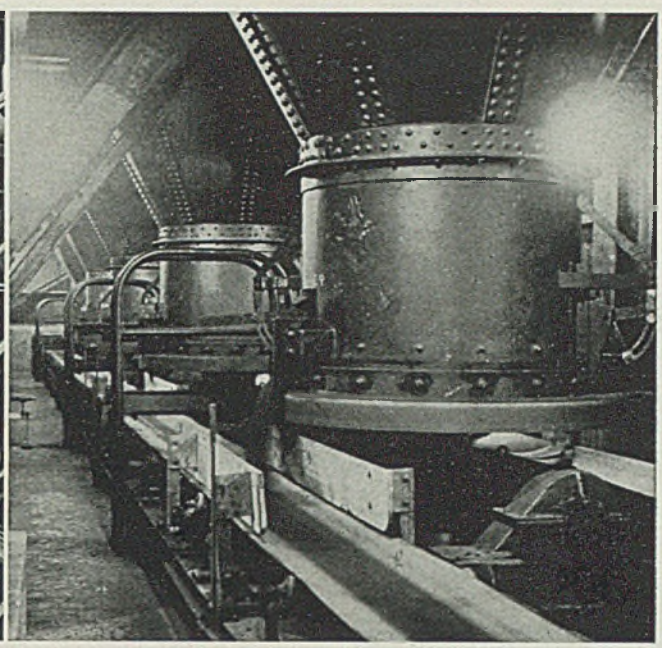
SO. SAN FRANCISCO • TORONTO





Left, above—Fluffer unit in which final mixing of presintered material is accomplished. Operation eliminates packing and assures maximum porosity of material on the bed

Right—Bin-hoppers and feeders and belt conveyor for supplying proper percentages of material to pug mill

or different grades of material may be charged allowing each machine to operate at best speed and desired depth of material on the grate bars.

Under each bin there is a revolving table serving as a circular disk feeder driven by a 600 to 1800 revolutions per minute adjustable-speed motor. From this point the flow of material is independent for each sintering machine.

Any combination of bins may be placed in operation discharging their burdens upon the belt conveyors at one time. The amount of material flowing from each bin is controlled by means of a sliding gate, therefore, by discharging from two or more bins and controlling the flow of material any mixture of materials with any percentage of each material can be obtained in the sinter mix; for example, two different types of ore, each combined with a given proportion of flue dust, which was blended on the conveyor belt at the trestle hopper can now be mixed in predetermined percentages and then combined with the desired percentage of coke breeze. The belt conveyors at the storage bins are 24 inches wide and approximately 185 feet 8 inches long.

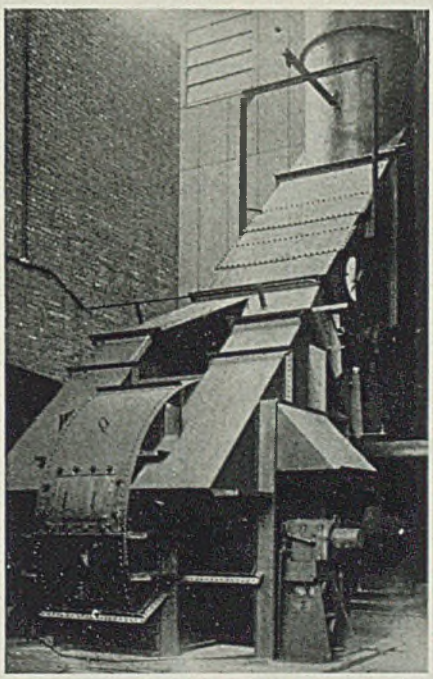
The material mixed in proper proportions is discharged onto another belt conveyor located at right angles to the conveyor carrying material from the storage bins and is deposited into a hopper at the primary pug mill along with screenings from the finished sinter which are known as "return fines."

These "return fines" are fed out of a hopper, under the sinter screen located at the discharge end of the sinter machine, by a magnetic vibrator conveyor. Dust which is automatically dumped from dust collectors and spillage from head and discharge end of sintering machine is discharged, also, into hopper at the pug mill.

While the volume handled by this belt conveyor is small it is important to keep the material moving to the pug mill in a constant proportion. Surges of wet and dry material produce an unknown factor and since the operator would be unable to compensate for changes the uncontrolled operation would result in substandard sinter.

The pug mill mixes the material delivered from the hopper which is located directly above it. Water is added as necessary. From the pug mill the mixed material is elevated by belt conveyor to a junction feeder from where it is discharged on another belt conveyor and further elevated to the "fluffer" where the material is thoroughly mixed and final moisture tempering accomplished. This method of mixing presintered materials makes it possible to produce a sinter suitable to any grade of iron. The "fluffer" which is located directly above the charging end of the sintering machine discharges the prepared material directly into a swinging chute which spreads it uniformly on the pallets of the sintering machine.

Induction fan which produces suction for draft system



The sintering machines, which are approximately 87 feet long with grate widths of 72 inches, follow the conventional design. For each machine there are a series of pallets each designed to carry grate bars which form a bed on which the sinter lies. These pallets form an endless carrier, driven by a sprocket at the charging end of the machine, which makes a continuous return system.

Material, which has been deposited on the slowly moving pallets by the swinging chute, is leveled to the desired depth by a stripping plate and then passes under an ignition furnace. This furnace consists of a series of coke gas burners supplied with high-pressure blast air making them literally blow torches in their functional operation.

As the material passes along the machine, which is driven by an adjustable speed-motor giving a variation in pallet

(*Please turn to Page* 139)

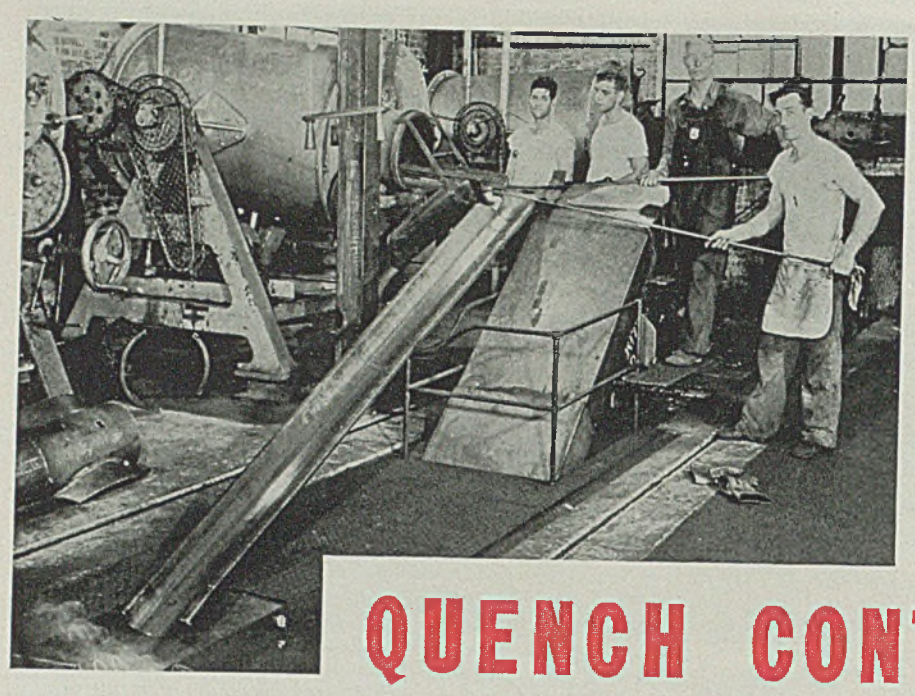


Fig. 1—Raking red-hot parts from end furnace to removable chute, then to drop chute to submerged conveyor in quench tank

By REGINALD TRAUTSCHOLD

QUENCH CONTROL PAYS

. . . . by assuring better and more uniform hardening

CARBURIZING has for its object the increasing of the carbon concentration in the surface of the steel being treated, thereby increasing its hardenability. Thus proper heat treatment will produce high hardness and resistance to wear. The part then has the strong, tough interior characteristics of a low-carbon steel and the extremely hard surface characteristics of a high-carbon steel.

The carburizing compound is placed in the furnace together with the parts to be carburized. When heated, the work absorbs carbon from this compound.

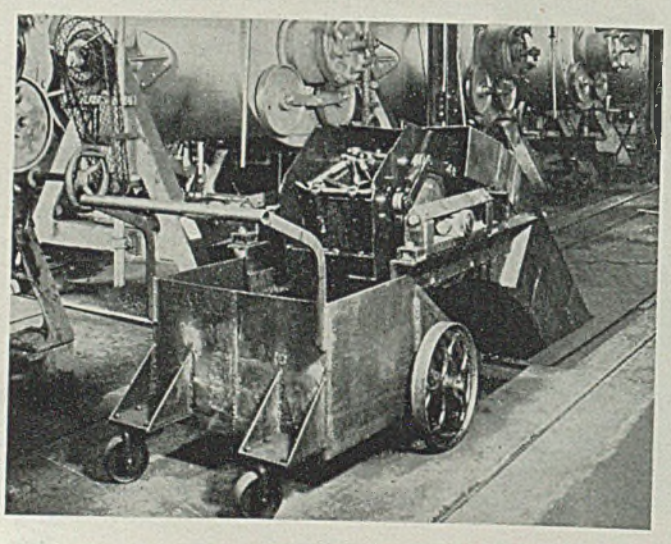
The importance of the quench in the case-hardening process is well brought out in recent developments at the Ross Gear & Tool Co., Lafayette, Ind. Here clever arrangement of reversible hinged-pan conveyor serves a large-volume quench tank, caring for the treated output of a battery of half a dozen American 2B gas-fired horizontal-retort case-carburizing machines. By the regulation afforded in respect to quench timing and temperature control, the surface hardness of the furnace-treated parts is quite appreciably elevated, and the case formed is more uniform throughout each batch run.

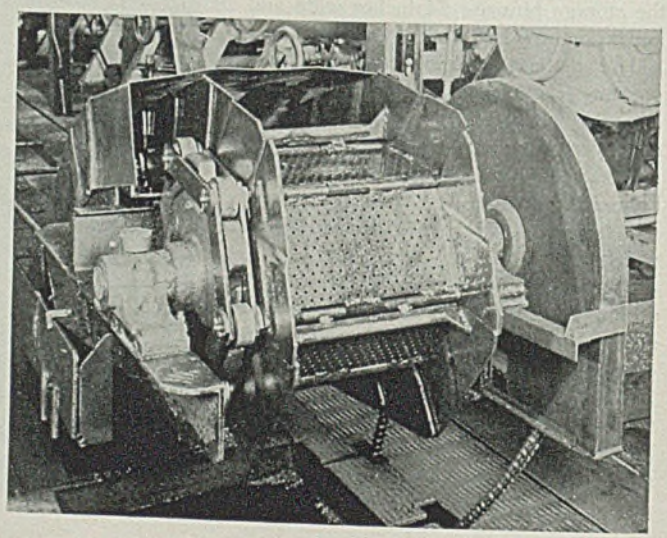
The below-floor quenching tank is some 45 feet in length, the pan-conveyor following a dished path of travel—that is, running horizontally along the bottom of the tank for the central 24 feet and rising gradually at each end to a height sufficient to permit gravity discharge of the hardened parts into wire baskets on buggies wheeled into position under the overhanging ends of the conveyor, as shown in Fig. 2.

Fig. 4 shows conveyor before its installation in the tank. With the conveyor in place, the tank accommodates some 6000 gallons of quenching oil, kept in continuous agitation by two Lightnin' mixers and the movement of the running conveyor to maintain uniform heating of the work in the shortest possible time. Each of the American carburizing furnaces has a capacity of about 500 pounds of work parts that on completion of the carburizing treatment

Fig. 2. (Left, below)—Carburized and quenched parts are discharged from pan conveyor by gravity into wheel buggies fitted with wire baskets

Fig. 3. (Right)—Closeup of drive end of pan conveyor showing construction of apron, chains, sprocket wheels, bearings. Photos from Link-Belt Co.





can be unloaded to quench in approximately 6 minutes.

Quenching Cycle Control: As the heated work is raked from the furnace retorts, the red hot pieces pass first over a short trough fitted with a screen bottom, through which the loose carburizing compound escapes to a reclaiming box for subsequent re-use. Then the parts slide down a removable, adjustable, inclined chute to one or another of two fixed, vertical drop chutes to the straight section of the submerged conveyor. See Fig. 3. These conveyor loading points are situated 24 feet apart, one being provided for each group of three furnaces, so that the quenching path of the conveyor is 24 feet longer in one direction than in the other.

The red hot parts give off about 100,000 B.t.u. per minute as they come from the retorts and plunge into the quench, elevating the temperature of the oil less than a dozen degrees Fahr. per furnace load—even momentarily. As the discharge of successive furnace batches is necessarily more or less intermittent, permitting the dissipation of excess quench heat, the thermal quenching cycle is substantially the same in respect to temperature extremes and timing for each and every work part plunged into the oil bath.

The conveying equipment was furnished by Link-Belt Co., Chicago. The

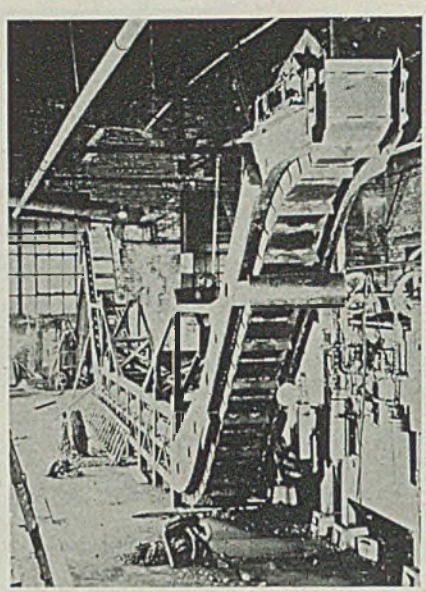


Fig. 4—Pan conveyor assemblage before erection in quench tank

pan conveyor proper consists of an endless, power-operated 18-inch wide, perforated, self-draining steel apron with overlapping steel-plate sides 6 inches high. Pusher rods extend across the apron at 18-inch intervals, as can be seen in Fig. 3. Each pan is thus hinged on a cross rod, the ends of which carry rollers and constitute also the joint-pins for matched strands of strap-link chain. These endless chains run about sprocket wheels at the conveyor ends, the chain rollers supported on tracks forming part of the conveyor framework. Two bails 24 feet apart permit lifting the entire unit out of the tank.

Variable-Speed Drive: The conveyor is driven from one end by a 1-horsepower motor through a P.I.V. gear variable-speed transmission and a worm-gear reducer connected to the conveyor drive sprocket by an endless strand of Silver-link roller chain, the other end of the conveyor being provided with the take-up mechanism. This variable-speed transmission assemblage, the P.I.V. gear and speed reducer unit, are mounted on a one-piece baseplate conveniently located outside the quench tank. Hand control-wheel manipulation provides a conveyor speed range of from 3 to 12 feet per minute. Since the direction of conveyor travel is reversible, any particular batch of treated parts can be run through the quench via either the long or short conveyor section, prolonging or shortening the quenching period for the batch as desired.

This distinctive double quench period regulation—by conveyor speed regulation and by short or 24-foot longer quench path selection—enables all pieces of carburized work to be quenched exactly the right amount at the highest speed possible.

Handling Emergency Shutdowns At Blast Furnace Plants

By W. H. BURNETT
Supt. of Blast Furnaces
Carnegie-Illinois Steel Corp.,
Youngstown, O.

SUCCESSFUL blast furnace operation depends, among many other important factors, upon a continuous and adequate supply of cooling water. Any interruption in the water supply, particularly if it is complete and without previous warning, represents one of the most serious emergencies possible in furnace operation. Such a water failure occurred last November at Ohio Works of the Carnegie-Illinois Steel Corp. while all six available furnaces were in blast. The loss of cooling was complete, lasted about 30 minutes, and affected all six units.

The emergency started about 9:00 p.m. The first signs were dimming and subsequent extiguishing of all lights throughout the department. The drop in water pressure was observed immediately after the lights went out. At the time no furnace was casting. Actions taken immediately after the complete loss of water became apparent, were as follows:

Wind on all furnaces was reduced to the minimum. All gas consumption in the stoves and boiler houses was stopped. Gas pressure in the common gas main was watched closely to determine the advisability of purging the main system. Cinder notches were opened on the three furnaces which were due to be flushed. This step was prompted by the fact that the delays required for changing of monkeys and intermediate coolers would be far shorter than the cleaning of 16 blowpipes and blowstocks.

Action taken on the restoration of the water supply included the delegation of a foreman to watch the gas pressure and to report promptly any sudden drop or a reduction to 3 inches of water. (Actually the pressure never dropped below 4 inches).

From a paper presented at the annual winter meeting of the Eastern States Blast Furnace and Coke Oven Association, Hotel William Penn, Pittsburgh, Feb. 12.

A quick check was made on all furnaces to determine the extent of damage and to shut water off of all burned bronze. While this check was in progress an explosion occurred in the No. 5 furnace cold blast main, blowing off the headers on both ends and damaging all cold blast valves. As a result of this explosion and the inevitable delay incurred by repairs to the cold blast system it became necessary to isolate the furnace from the gas main drop the blowpipes and plug the tuyeres. This furnace was being blown by two gas engines. Due to excessive hydrogen in the gas caused by the extensively burned bronze, both engines were stopped.

No. 1 furnace was found to have suffered the loss of only two tuyeres which appeared to be the least damaged of any unit. Consequently, it was decided to isolate it from the gas system and change the two tuyeres. After the blast was resumed on this furnace positive control over the gas pressure in the common main was restored and the threat of a possible gas explosion, therefore, was eliminated.

After changing the necessary bronze and making the indicated repairs at No. 5 furnace, the blast was resumed ini-

(*Please turn to Page* 141)

High Speed Production

WITH TOOLROOM ACCURACY

War Production demands maximum speed and absolute precision. Both of these requirements are met in hundreds of war plants with South Bend Lathes.

Their rigidity and wide range of spindle speeds permit taking full advantage of the higher cutting speeds possible with tungsten-carbide tools. Their dependable accuracy makes it possible to machine work with such precision that subsequent finishing operations can often be omitted.

South Bend Engine Lathes and Toolroom Lathes are made in five sizes, 9″ to 16″ swings. Write for a catalog and the name of our nearest distributor.

Use THESE BOOKS AND FILMS ON LATHE OPERATION

South Bend training helps — books, sound films, wall charts, and bulletins on the care and operation of a lathe — are available for training new operators. Write for Bulletin No. 21-C.

ARMY E NAVY

SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 36 YEARS SOUTH BEND, INDIANA, U.S.A.

INDUSTRIAL EQUIPMENT

Safety Hats

B. F. McDonald Co., 1248 South Hope street, Los Angeles, is offering a new series of safety hats for women war workers. These are in four designs.

One is a "dashing" cap with broad visor of plastic mesh with a contrasting color band, and set off with a military pin. Another is a turban, also of plastic mesh, bound in a contrasting color and similarly ornamented. A third design features a one-piece crown and visor of transparent plastic. Close-fitting, it has a detachable snood. The fourth design

is similar to the third, except that the crown is slit for adjustment.

All models are ventilated to make them cool and comfortable, even when worn constantly.

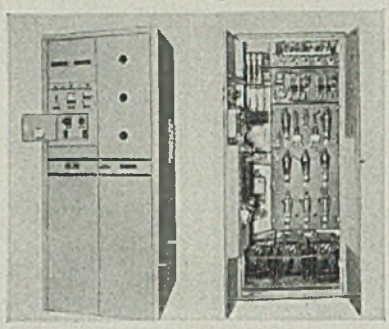
Electronic Control

General Electric Co., Schenectady, N. Y., announces a new electronic control for resistance welding of aluminum. Its construction is reported to not only eliminate vital materials but facilitates thorough inspection and servicing.

Employing the energy-storage principle, the control effectively performs all the functions for which a control of this type is designed. Aluminum has low resistance and high heat conductivity. This control provides the very high currents and short welding time required.

The control consists of a charging circuit, a discharge circuit, control station, Pyranol capacitors and sequence control. All these are mounted in one cabinet-type industrial control enclosure with full-length front doors and removable rear covers. The enclosure is ventilated by filtered air which, drawn in by a blower, creates a positive pressure within the cabinet minimizing infiltration of dust and dirt.

Main anode transformer and all tubes

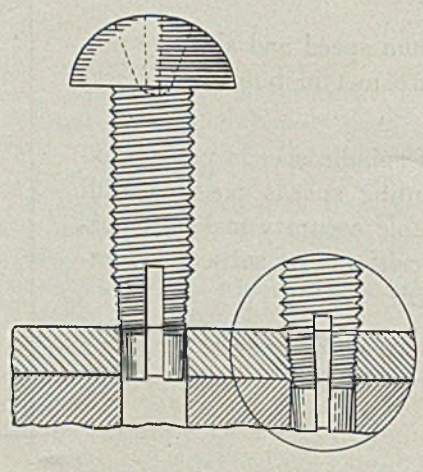


of the unit requiring cooling are air-cooled by a ductless system. The charging and discharge-tube circuits are mounted on a single, hinged compound base that can be swung out readily for servicing. Another feature is the control station—consisting of the capacitor selector switch, voltage adjusting potentiometer, sequence adjusters, voltmeter, control switches, and indicating lights which can be removed from the cabinet and attached to the welding machine. Thus, the control cabinet can be located on a balcony or some other remote point.

Metal Fastener

Continental Screw Co., New Bedford, Mass., announces a new metal to metal and plastic fastener which cuts its own threads as it is applied. A pilot point below its tapered threads automatically effects a self-aligning and holding action when screw is applied.

The screw, recently patented (No. 2,292,195) cuts threads accurately in correct alignment as it is driven in. Another feature consists of a complete slotted

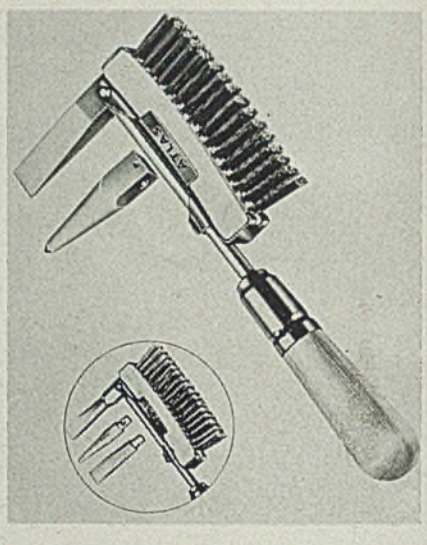


opening at entering end of screw. This produces a self-cutting edge that closely simulates the cutting action of a tap, and insures quicker, easier and self thread-cutting action. In addition the slot provides a "spring" or yield when screw is fitted in hole and during the self-threading action. This allows a screw with the same diameter to be driven more accurately in openings of varying diameters.

Cleaning Tool

Atlas Welding Accessories Co., 307 Boulevard building, Detroit, is offering a new improved weld cleaning tool for welding operators in shipyards, aircraft and tank plants, boiler and sheet metal shops, and for pipe line, factory maintenance and general welding work.

Called the Dual-Tool, it combines a wire bristle brush and a slag-removing bit in one unit and features a specially-developed brush holder which permits removal of brush for reversing or re-

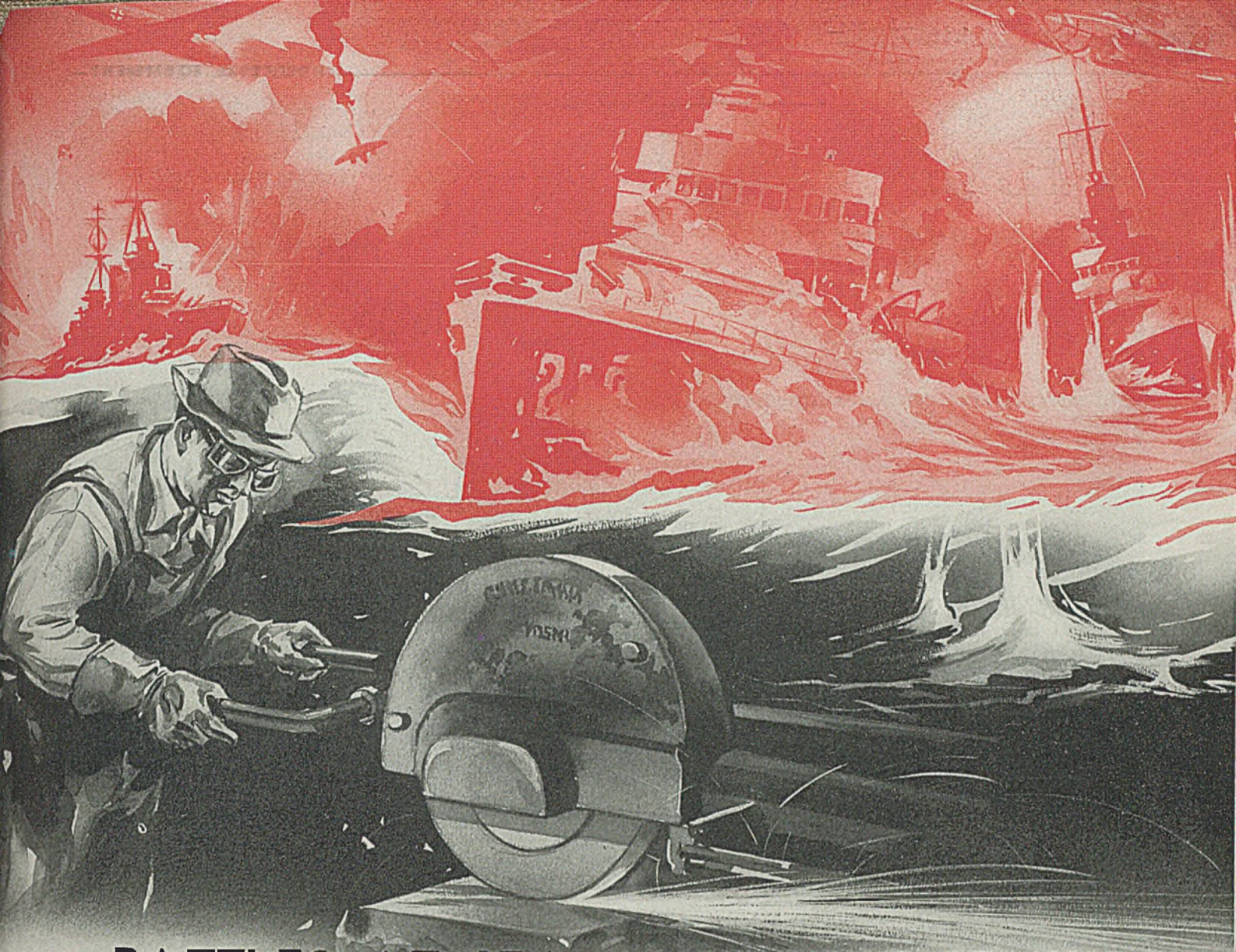


placement. Latter is done by inserting screw driver or other sharp object at rear end of holder. Every part of the tool is replaceable, including interchangeable cone and chisel bits.

Water Strainer

S. P. Kinney Engineers, Pittsburgh, announces an improved Brassert self-cleaning water strainer for use in straining sea water, and also for service at coke and similar plants for straining ammoniacal liquor. It is reported to remove fine suspended particles from raw or process water, and disposes of these particles in a continuous, automatic and self-cleaning manner.

Made in 3 to 30-inch pipe line sizes, the unit is equipped with ni-resist cones, chromium-nickel body and covers, admiralty metal ring gear and monel metal liners, stellite bushing and sleeve, stainless steel main shaft and pinion gear, and stainless steel retainer rings for stainless or porcelain straining media. Strainers for ammoniacal liquor are equipped with chrome-nickel body, cover and revolving



BATTLES AT SEA MUST FIRST BE WON IN YOUR STEEL PLANT . . . .

★ ★ ★ THAT Jap destroyer sunk a few days ago might never have been lost had it not been for a determined worker in the billet grinding department of some American steel plant.

The U. S. Navy depends upon steel for its new ships, available steel is limited by speed of billet delivery, and billet stocks depend upon record-breaking grinding if victory is to come quickly.

Efficiency of the operator and his grinding wheel is the important factor that will hurry work through your billet department. Sterling Grinding Wheels, made to the demands of wartime production, are daily helping turn out billets faster.

These "Wheels of Industry" in your plant can help you achieve new speed on all types of grinding. A Sterling engineer will gladly call and make a victory survey of your plant's grinding departments . . no obligation! Write!

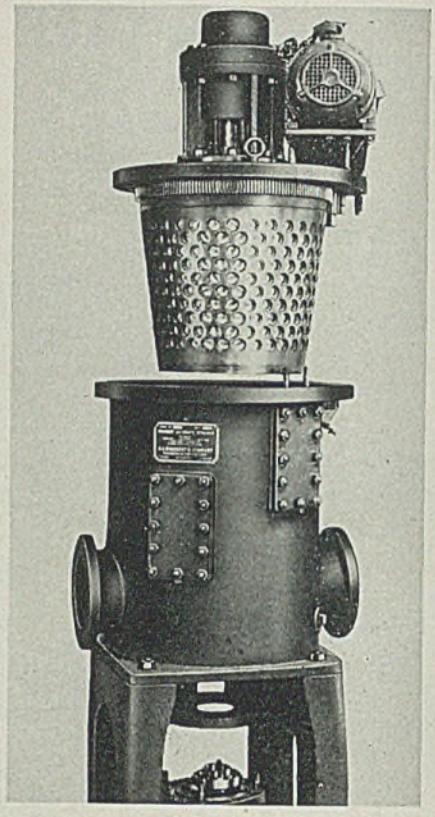
• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

drum castings, forged steel ring gear, stellite bushing and stainless pinion gear, stainless steel liners, stainless steel retainer rings for stainless steel or porcelain straining media.

The strainer consists essentially of a slowly-rotating conical drum, mounted on a vertical shaft, within a cast iron housing. Entire surface of the drum is drilled to receive the straining media which consists of porcelain disks, or flat, or conical wire stainless steel screens.

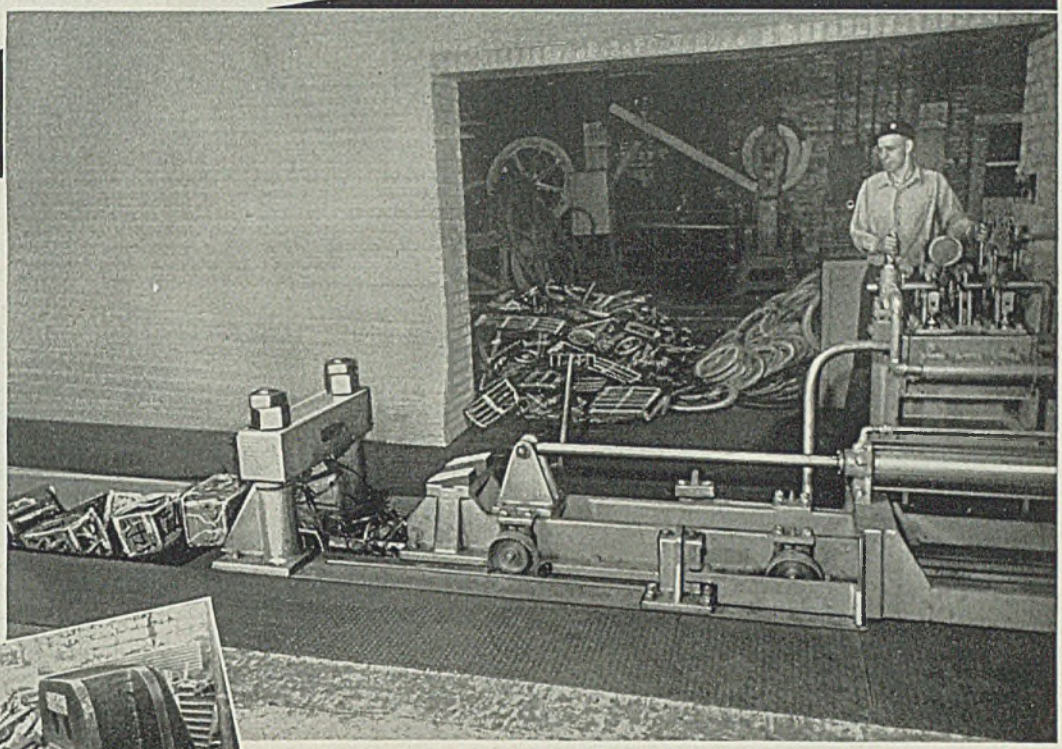


The dirty water, or other liquid to be strained, enters through an inlet at the bottom of the housing and then rises around the outside of a revolving drum. Discharge of the clean water is effected through an outlet at the bottom of the housing. The dirty water entering the strainer is under pressure and passes through the straining elements in the drum. The foreign matter in the water is retained on the surface of the perforated porcelain disks, or screens, and is carried in this position, by slow rotation of the drum, to a backwash slot. At the slot a reversal of flow takes place, and clean water from the inside of the drum flushes through the screening media and removes the dirt from the strainer. Differential pressure, between water in the interior of the drum, and atmospheric pressure provides an efficient means for backwashing the straining media.

Centering Machine

Kent-Owens Machine Co., Toledo, O., is introducing a new machine for centering both ends of large work such as gun

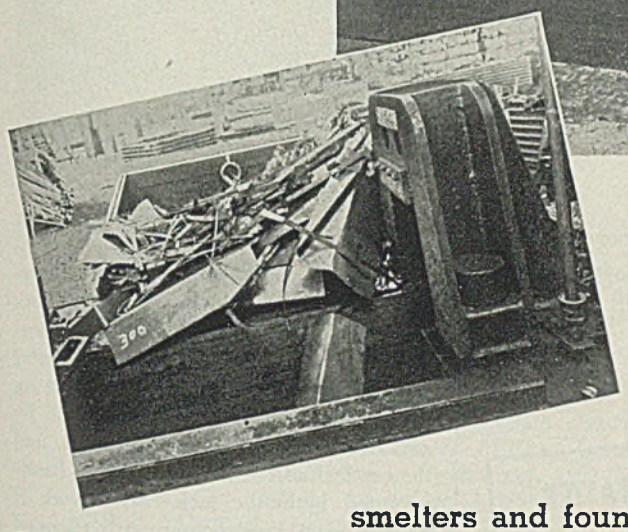
G-H BALERS "at the Front" in the Scrap for Victory Program



Model 20 MCY Double-Compression Hydraulic Baler for moderate accumulations of steel stampings and clippings.

•

Other types and models with capacities from ½ ton up to 20 tons per hour, and more.



Close-up view, charging box of Model 100TC Triple Compression Baler used for large, bulky scrap in a body plant now devoted to war production. Capacity, 10 tons per hr.

Throughout the metal-producing and metal-working industries, Galland-Henning hydraulic baling presses speed the salvaging of metal scrap for the war effort.

Dense, mill-sized bales of carefully segregated scrap metal find their way back to the mills, smelters and foundries in record time. As a result, production of vital metals is kept in step with war-time needs.

The right type and size of G-H Hydraulic Baler can be the key to success in your scrap metal salvaging and disposal operations . . . can put your plant "at the Front" in producing Scrap-for-Victory.

For Experienced Counsel on Your Baling Problems, write

G-H

GALLAND-HENNING MFG. CO.

2747 SOUTH 31st STREET • MILWAUKEE, WISCONSIN

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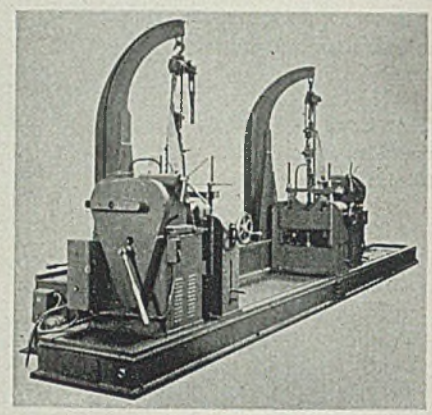
forgings. It will accommodate work up to 14 inches in diameter and up to 19 feet in length. However, simple modifications can be made to handle work of larger diameter and greater length.

Work is suspended freely in slings, and is quickly adjusted into position by means of two davits, each equipped with a chain hoist. Suspending the work in slings, according to the company, permits locating the centers in the approximate center of gravity of the piece. The davits, work supports, and centering heads are adjustable along the base for proper setting to suit a given job.

While work is freely suspended in the slings, a vertical line is scribed across each end by means of a square resting on a surface plate and located against a centering gage immediately above the sling. The work is then rotated slightly by means of a chain wrench, and another vertical line is scribed across the ends, and so on. The intersection of these lines

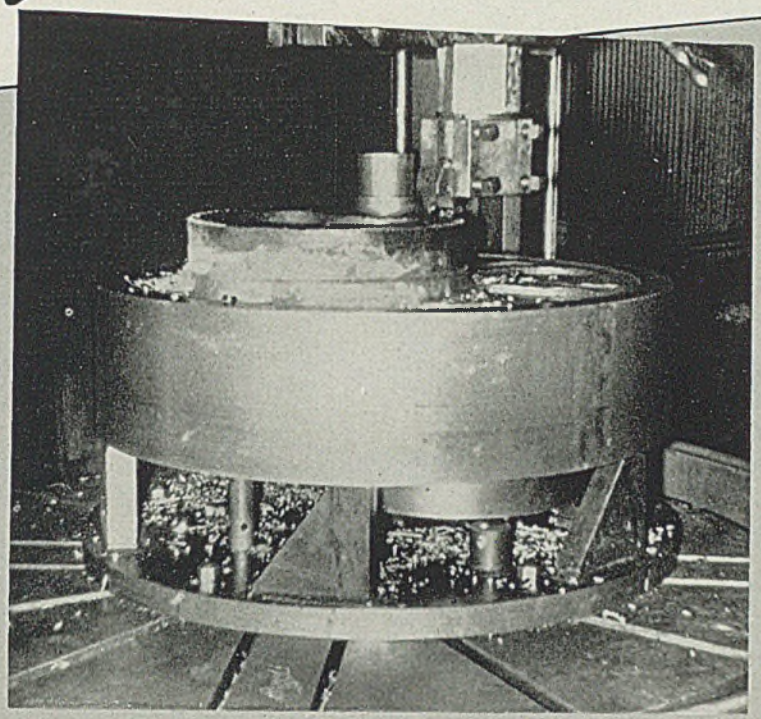


clearly and definitely indicates the center of gravity. After the centers are thus located, the work is lowered into the V-blocks of the two work supports. Work supports have both horizontal and vertical adjustment to properly position the center scribed on the end with the centering tool. The horizontal adjustment is by means of a screw and hand wheel, and the vertical adjustment by a simple hand-operated hydraulic jack. After work is fixed in each work support, it is clamped in position.

Each of the centering heads is provided with two spindles, one for a starting tool, and the other for the final centering operation. Both tools in each head are driven by a standard foot-mounted motor, mounted in the base of the head and driven through a simple V-belt and gear drive.

After the work is secured in the work supports, the first tool on each head is fed into the work and withdrawn by hand by means of the star hand wheels. Heads are then moved laterally by means of a hand lever, and properly indexed into position for the second tool by a simple spacing arrangement. Final centering

if you turn, face, or bore steel



KENNAMETAL* WILL INCREASE YOUR *Production*

STYLE 3 TOOL

KENNAMETAL*

Efficiently cuts HIGH BRINELL STEELS, SCALY SURFACES, SAND HOLES, and WELD SPOTS.

If your shop cannot economically machine steels because the jobs entail cutting through sand holes, weld spots, shaving off scaly surfaces, or taking interrupted cuts . . . get KENNAMETAL immediately.

KENNAMETAL not only slices through high Brinell steels, it consistently increases production on steels of any hardness . . . because of its high transverse rupture strength it takes interrupted cuts at economical feeds and speeds . . . weld spots and rough surfaces are taken off at efficient speeds and feeds.

The illustration shows KENNAMETAL tools, styles 3 and 6, making a finish turning on an eccentric herringbone power gear for a fluid power pump. It is being machined at a speed of 285 S.F.P.M., with a feed of .024 per rev. The depth of the cut is 5/16 of an inch.

For similar economical performance on boring, turning, and facing operations, use KENNAMETAL. Write for your copy of the New KENNAMETAL Tool Manual which gives complete information about this efficient steel cutting carbide.

*INVENTED AND MANUFACTURED IN THE U. S. A.

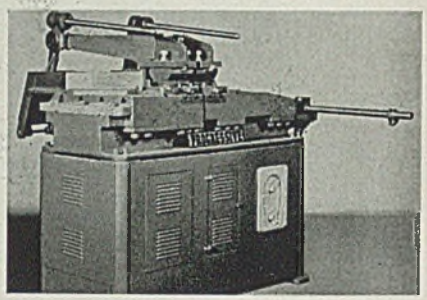
tools are then fed into the work in the same manner as the first tools.

Each head is provided with a separate motor-driven coolant pump and individual push button control for the spindle drive. Separate coolant tanks are formed integrally in each end of the welded base construction.

Flashwelder

Progressive Welder Co., Detroit, announces a new standard model C flashwelder incorporating a Flash-trol monitor which provides an automatic weld-quality control by eliminating short-circuiting of the flash-welding arc. The welder is rated at 150 kilovolt amperes.

The Flash-trol unit is based on the application of an electronic device which "warns" the machine of an impending short-circuit in the welding arc. At that point, forward movement of the feed platen is interrupted, the platen jumps back a few thousandths of an inch and then re-approaches. The device makes possible, it is claimed, a higher than nor-



mal rate of acceleration of the feed-platen while performing the weld, thus insuring maximum rate of weld-completion is automatically employed, without danger of incomplete welds or line-overloads due to short-circuiting. This also improves weld quality in the direction of simplifying the upsetting problem following completion of the weld.

Upsetting speed and pressure is obtained through the use of a single and positive air hydraulic booster which forces oil in the proper quantity at high speed into the platen traversing cylinder. Actuation of this air cylinder is by a relay which is tripped by the platen when the "upset position" is reached.

The high pressure oil is obtained by using the air cylinder to force a hydraulic piston into the circuit supplying oil to the regular platen feed. This movement also cuts off the connection between the hydraulic cylinder and the flashing-feed oil pump, so that the oil displaced by the hydraulic piston is rapidly forced into the traverse cylinder. The amount of upset is thus governed by the oil displaced. The pressure obtained is a direct ratio of the piston areas and the air-pressure applied. The platen feed pump on the flashwelder is driven by a shunt direct-current

PROPHECY OF THE FUTURE . . .

THOUSANDS of small plants with war-learned efficiency will create new competition with new and better products . . . New designs, materials and methods of fabrication will produce better homes, appliances, implements and machines.

For this is the new world of the future, and our prophecy concerning it is based upon facts — such facts, for instance, as these:

• Before the war there was one magnesium and one aluminum producer in the United States. After the war there will be as many as ten magnesium producers and four aluminum producers . . . the "Light Metal Age" is being born of war.

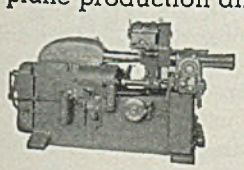
• Before the war, 200,000 rivets went into a transport plane. Today, rivetless bombers, welded throughout, have made possible a 30% increase in plane production and up to 15% decreases in weight . . . New skills and techniques are being developed by war.

• Before the war, prices were stabilized by restricting production, and buying power was down. Today, the increased earnings, enforced savings and restricted buying of our full-production war economy are creating the greatest reserve of buying power and consumer demand this nation has ever seen . . . A new *market* is being made by war.

If prosperity is to be yours after this war, the time to start your production planning is *now* . . . and in that there is one way we can help you:

Send us your internal grinding problems, and take advantage of the work which our engineers can do now to help you formulate production plans and tool up for the great peacetime future of America.

SEND FOR THE MAN FROM BRYANT



BRYANT

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U.S.A.

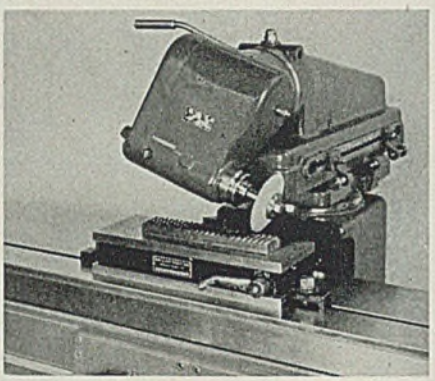
ARMY E NAVY

motor, powered from a single phase alternating-current line through medium of grid controlled rectifiers. The feed is preset to an acceleration of platen travel somewhat faster than normal than the average for the pieces being welded. The actual rate of platen feed is monitored by amount the platen has traveled from its starting position by means of a recently developed rectifier control.

Broach Sharpener

Colonial Broach Co., Detroit, is offering a new universal broach sharpening machine for sharpening either round or flat broaches. Of modern "streamline" design construction, it is designed to assist shops in doing their own broach sharpening by providing a rapid and accurate means of maintaining the same tooth forms and cutting effectiveness as originally provided by the broach maker.

The sharpener accommodates flat broaches up to 65 inches in length between end teeth and round broaches up



to 72 inches between centers and 6-inch overall diameter. Changeover from round to flat broach sharpening is accomplished without special tools. The machine consists of a broad rectangular cast iron base, ends of which are extended outward to provide a full-length support from the working table, which has an overall length of 99 inches.

The table travels on one flat and one V-shaped guide. Dust guards are incorporated in the ends. Lubrication of the table is maintained by rollers submerged in oil wells which contact the sliding surfaces. Width of the working table is 11½ inches.

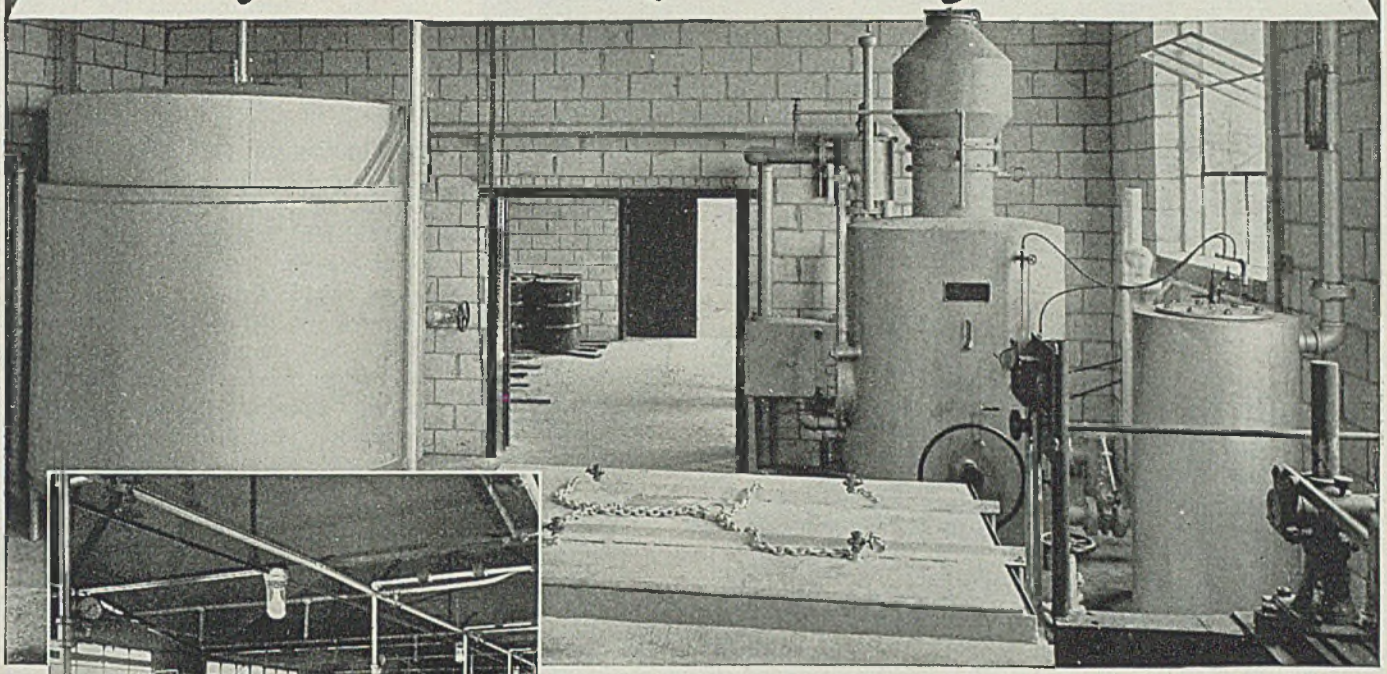
Grinding wheel head is mounted on a vertical column attached to the bed of the machine. Its maximum amount of travel is 12 inches. A cross slide above the graduated indexing support at the top of the vertical column provides a 10-inch travel of the grinding wheel spindle transversely to the working table. Interchangeable pulleys provide various spindle speeds up to approximately 7500 revolutions per minute.

A feature of the sharpener is the use

Independent Engineering Co.

PRODUCERS OF MODERN

Acetylene Compressing Plants



A Typical Acetylene Compressing Plant laid out and constructed by the same long experienced engineers available through *Independent* facilities for design and construction. Backed by over 50 years of accumulated operating experience.

INDEPENDENT Acetylene Compressing Plant Installations represent the accumulated operating experience of more than 50 years . . . in the design and construction of this type of equipment.

When the opportunity arises to erect a plant of this type—take advantage of this long experience—bring your problems to us—we have the "know how" that will give you maximum operating efficiency plus maximum operating *safety.*

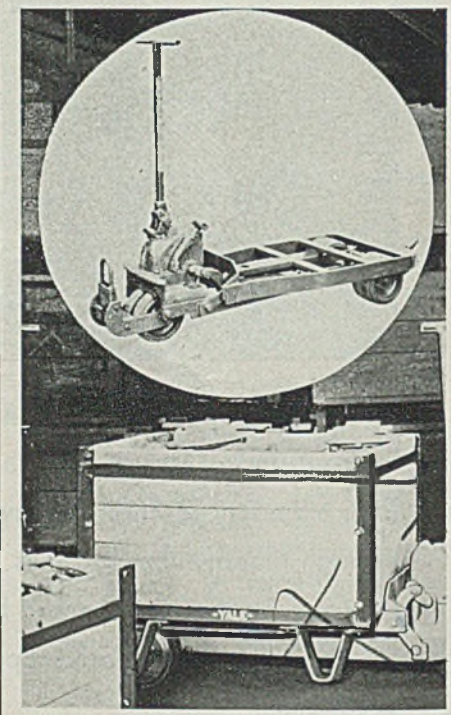
Independent Engineering Co.

105 WEST SECOND STREET—O'FALLON, ILLINOIS

of two hand wheels to provide three movements of the grinding wheel head and work table. Rotation of the hand wheel on the right moves the table to the right and left under the grinding wheel head. The left hand wheel has two positions "in" and "out". At "in" position, rotation of the wheel controls horizontal feed of the slide and grinding wheel head. In the "out" position the hand wheel controls the vertical movement of the grinding wheel head. For cylindrical broach sharpening the headstock is provided with a 1/3-horsepower and reduction gearing to produce two spindle speeds of 200 and 400 revolutions per minute. The speed change is actuated by a shift-lever contained in the headstock housing. The headstock and grinding wheel spindle motors are designed for operation on either 220 or 440 volts. Push button controls with overload and low voltage releases are provided. Total space occupied by the machine is approximately 20 x 4 feet, including maximum table travel.

Combination Truck

Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia, announces a new trailer type hand lift truck suited for trailer train operations. When not used



as a trailer, it functions as a conventional hand lift truck.

Self-coupler attachments embodied front and rear of trucks simplify method of connecting train formations. The operator merely pushes trucks together. Front end coupler loop slides through jaw ends of the other truck coupler, push-

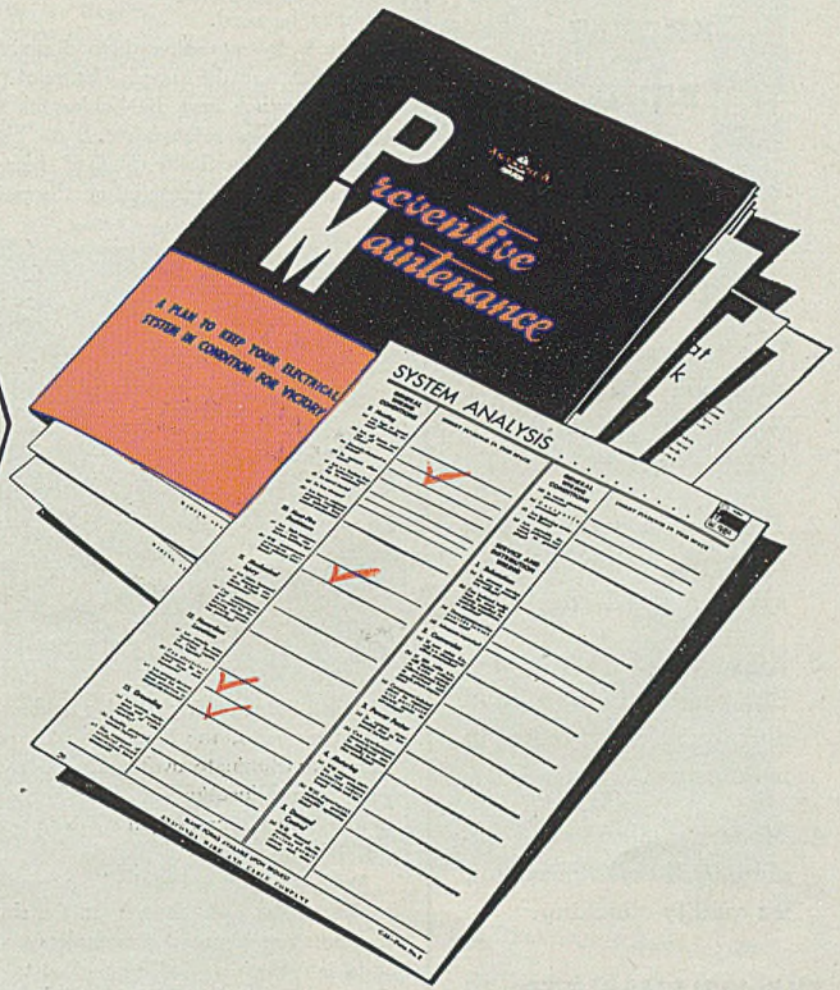
Electrical failure somewhere in your plant may be more imminent than you think . . . .

WARTIME restrictions make copper products hard to get—this includes electrical wire and cable. It will pay you to protect what you have.

Anaconda's Preventive Maintenance Plan will help you check to see that cables in your plant are not being abused . . . to detect electrical weaknesses that can be corrected.

If you follow this free plan you not only help yourself, but more important, you help the war effort. This manual provides a practical automatic method for complete analysis of circuits and equipment...uncovers potential weaknesses . . . methods for correcting them . . . with charts to enable quick periodic check-ups. 43228

NOTE: Through this Preventive Maintenance Plan you may uncover the evidence necessary to obtain an "emergency repair priority." This is explained fully in the plan book.



"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding production.

Individual.....

Company.....

Address.....City..... .....

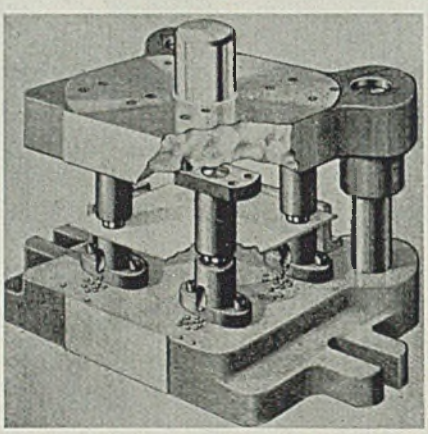
3P

ing up the latch which automatically drops into locked position. To break train, the operator merely steps on the pedal pad of the latch casting, of each unit.

Hole Punching Units

Strippit Corp., North Tonawanda, N. Y., announces new Wales CD hole punching units for use in conventional die sets. Each unit it self-contained and independently mounted to either punch or die shoe, according to the company. Punch unit half contains a punch with a pilot, a holder, a stripping spring and a guide. The die unit half consists of a holder with a slug clearance chute and a die. Built into each holder and die holder is a pilot pin centered on the punch or die to automatically assure perfect punch and die alignment. Two methods of mounting the units into a die set may be used.

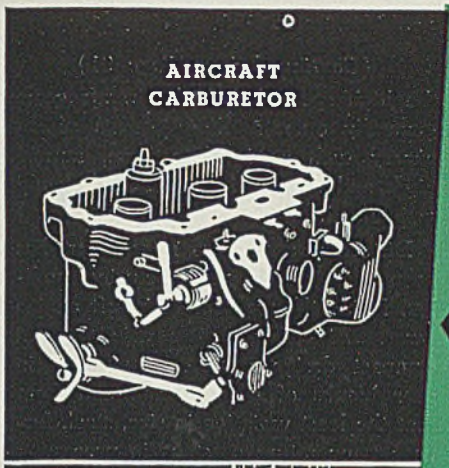
One is by mounting them directly to the punch and die shoe. The pilot pins on each punch and die holder fits into the pilot holes in punch and die shoes and are automatically aligned because the pilot pins are centered on the punch



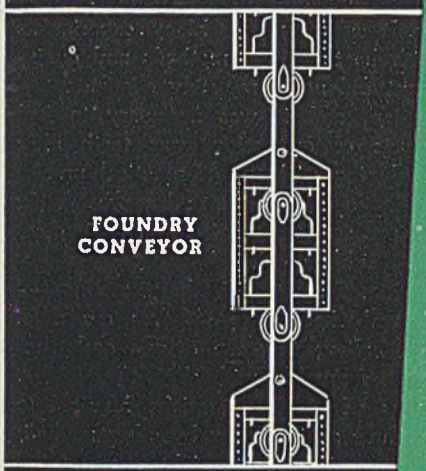
and die. By placing all the holders on the pilot holes, the flange can be positioned to eliminate overlapping. At the same time, location of bolt holes for holders can be marked on shoes for exact drilling and tapping.

With the other method, instead of mounting the units directly to the shoes, the units are mounted on templets which slide into position and are bolted to the shoes. Aligning the punch and die templet mountings is automatically accomplished by an alignment ring that fits over the die and allows the punch to drop into it. By aligning one punch and one die, both punch and die templets are aligned, and after bolting into secure position on shoes, the die set is ready to operate.

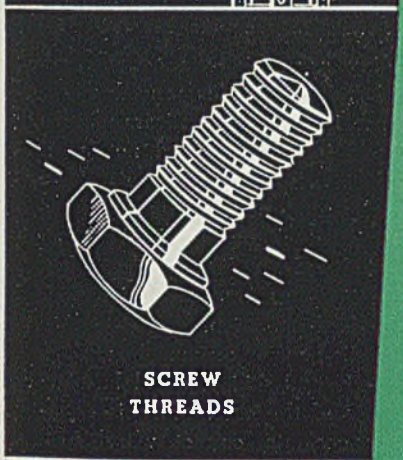
These units are used in either punch presses or press brakes to punch holes from 1/16 to 1⅛-inch diameter.



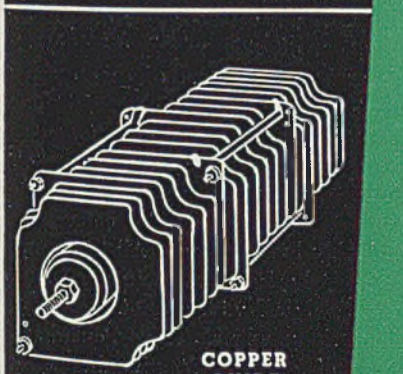
AIRCRAFT CARBURETOR



FOUNDRY CONVEYOR



SCREW THREADS



COPPER OXIDE RECTIFIER

Win A War Bond! Tell Why

"dag" COLLOIDAL GRAPHITE

IS IMPORTANT in the Manufacture or Use of the Items Illustrated

How to Win

Acheson Colloids Corporation will give a $25.00 War Bond to each of the 5 people who submit complete and accurate answers together with the 5 best letters on the question, "Why is **"dag"** colloidal graphite important in the manufacture and/or use of the products pictured here?" (1) State business connections (no one in the graphite field or their families will be eligible). (2) All entries must be legible. (3) All entries must state the publication in which the advertisement was seen. (4) Entries must be postmarked not later than May 15, 1943. (5) In case of ties, duplicate awards will be made. (6) Entries become the property of the Acheson Colloids Corp. (7) The verdict of the judges will be final.

* "dag" COLLOIDAL GRAPHITE USED TO IMPREGNATE POROUS BODIES

Porous bodies such as wood, porcelain, textiles, paper, asbestos packing, leather, porous bearing metals, felt, brake linings, clutch facings, grinding wheels, etc. are impregnated with **"dag"** colloidal graphite. The purpose is to give these materials physical and electrical properties of graphite that they otherwise would not possess.

By impregnation the porous body acquires lubricating qualities, it is made an electrical conductor, its heat radiating and absorbing capacity is increased, its color is changed or it may be made perfectly opaque.

Graphite in no other form can be used for all these purposes because only colloidal graphite particles are small enough to enter the small capillary pores of most porous bodies. Larger particles would be filtered out on the surface — there would be very little penetration.

Other properties of **"dag"** colloidal graphite that enhance its value as an impregnating material are that it does not enter into chemical combination with either the porous material or other substances. Consequently, it retains all its physical, electrical and chemical properties under all operating conditions.

*A TYPICAL APPLICATION

Write for Illustrated Booklet 430AZ

Gives properties and important uses for "dag" Colloidal Graphite

ACHESON COLLOIDS CORPORATION

PORT HURON • MICHIGAN

dag COLLOIDAL PRODUCTS

Aircraft Gears

(*Continued from Page* 91)

the high speed at which aircraft gears generally operate, the elements of accuracy such as involute form, normal pitch and concentricity must be closely maintained.

Distortion during heat treatment has been the greatest manufacturing problem facing the makers of aircraft engine gears. Aircraft weight restrictions and compact design requirements result in gear blanks of such section and form that the least variation in size, steel, furnace temperature or steps in processing produces warpage. Many experiments with heat treating methods and equipment did not completely eliminate distortion, and it was necessary to find means of correcting gear teeth after hardening. The most practical process available is grinding, and approximately 80 per cent of all aircraft engine gears are finish ground.

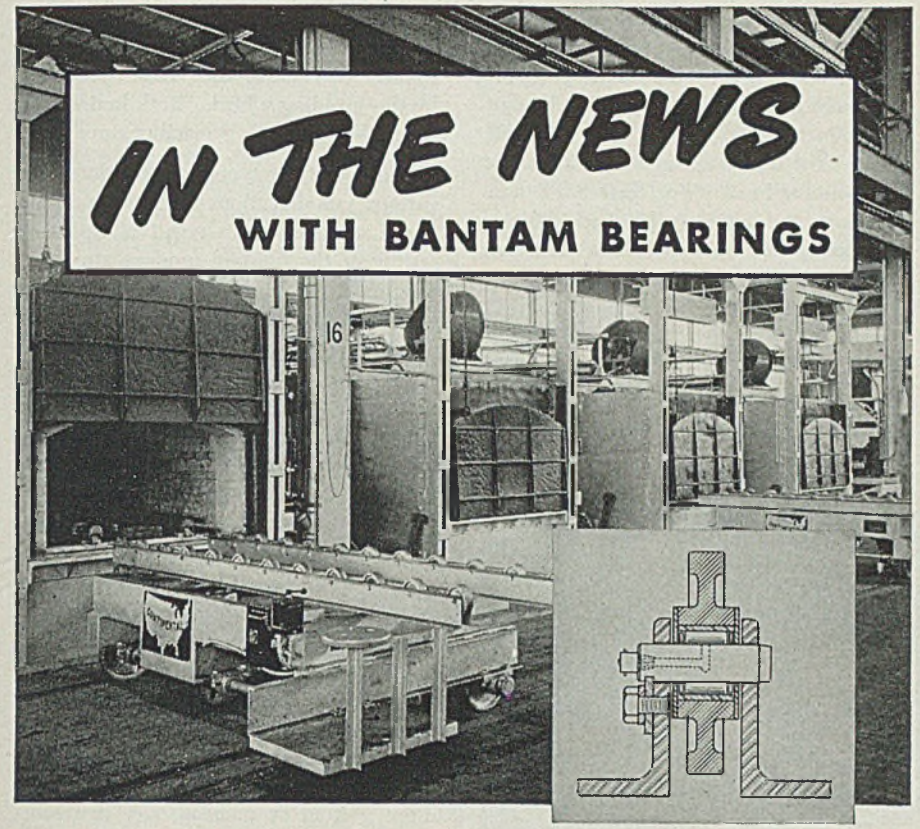
Gear Grinding: Both generating and formed-wheel type grinders are used. We believe that the overall cost compares favorably with that of unground gears when all operations required to produce similar gears by other methods are considered. Wright Aeronautical Corp. was among the first to use gear grinding as a high-production method and has followed this procedure closely since its inception. Gears which are to be finish ground need not be prepared as accurately as those to be finished by some other method. It is important that all operations prior to finish grinding be sufficiently accurate that substantially uniform stock is removed at the final operation.

Grinding operations must be performed with care and skill to avoid burning or cracking of the case. This is done by proper coolants, correct wheel speeds, selection of the correct grade of wheels, elimination of side wheel grinding of large areas and control of case carbon content and hardness. With experienced operators, we do not find rejections due to grinding checks excessive.

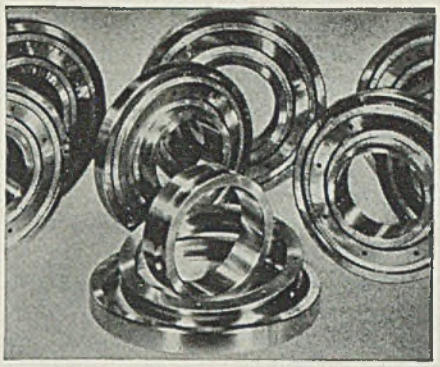
Finishing Gear Teeth: Finish is an important consideration in connection with highly loaded gears. All tooth surfaces must be free from cutter or wheel marks and blend with adjoining surfaces without sharp edges. A particular advantage of gear grinding is the possibility of refining the tooth finish at the root fillet, where the bending stresses are greatest. This is especially true on pinions where the cutters or hobs produce generating ridges, which are the source of possible tooth failure.

An important operation in connection with the finishing of many aircraft en-

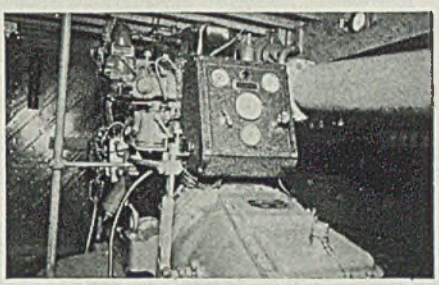
IN THE NEWS
WITH BANTAM BEARINGS



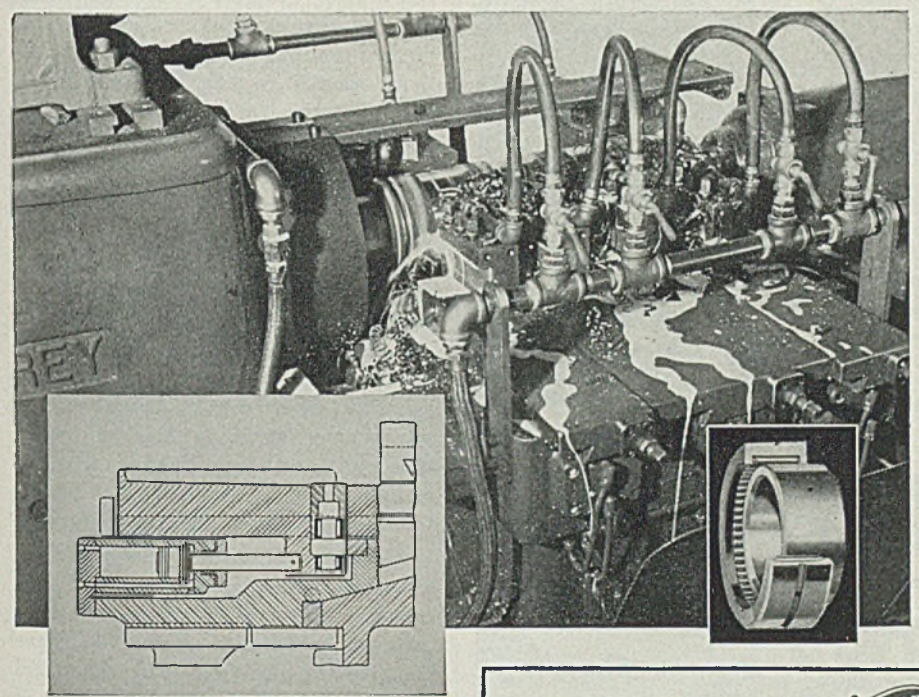
TO SPEED THE ANNEALING of iron alloys, these furnaces built by Continental Industrial Engineers, Inc., are designed for rapid handling of the work. Metal to be heat treated glides smoothly into the furnace on easy-turning rollers. As shown in cross-section, each roller turns on an anti-friction bearing unit assembled from Bantam Needle Rollers. A hardened sleeve, also furnished by Bantam, forms the outer raceway.



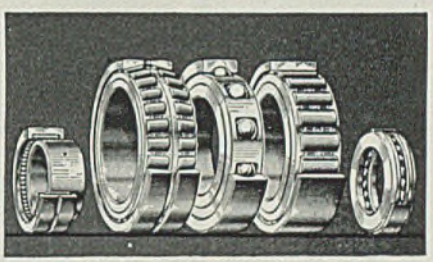
DESIGN OF SPECIAL BEARINGS is an important aspect of Bantam's service in meeting unusual requirements. These triple-race radial ball bearings were designed to eliminate starting friction in dynamometers, where this variable factor would seriously affect the accuracy of the test results. Very close dimensional tolerances were maintained in these bearings as an added assurance of accurate results.



IN MARINE APPLICATIONS TOO, Bantam Bearings play their part in improving product performance. Twin Disc Clutch Company uses Bantam Bearings for the throwout bearing on its widely used Marine Reverse and Reduction Gears, one of which is shown here on a 215-HP engine.



IN MACHINE TOOLS, the Quill Bearing's small size, high capacity, low friction coefficient, and efficient lubrication make it possible to combine long life, low power consumption, and compact product design. A typical instance is the use of Quill Bearings on the front carriage assembly of Semi-Automatic Shell Lathes built by Morey Machinery Co., Inc. For further details on this unusual anti-friction bearing unit, write for Bulletin H-104.



WHEN LARGE-SIZE BEARINGS ARE NEEDED, Bantam's experience in the design and manufacture of heavy-duty bearings is of special value. Bantam's line includes every major type of anti-friction bearing—in sizes up to the largest ever built. If you have a problem involving exceptionally severe bearing requirements, TURN TO BANTAM.

ARMY E NAVY

BANTAM BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

BANTAM BEARINGS CORPORATION · SOUTH BEND · INDIANA

SUBSIDIARY OF THE TORRINGTON COMPANY · TORRINGTON, CONN.

gine gears is that of breaking the edges at the ends of the teeth in order to prevent fatigue failure from possible nicks in the sharp edges. The break-edge operation and subsequent polishing must be carefully and correctly performed in order to accomplish its object. The edges must be broken and blended along the entire tooth profile as well as at the root fillet. This involves considerable bench work.

The standard time for cutting and grinding teeth of a 20-pinion 16.9 reduction gear is 9.2 minutes, and that for burring and breaking edges is 5.8 minutes. This indicates that 36 per cent of the time required to produce the gear teeth is consumed by the hand operation of breaking the edges. The break-edge operation is usually done with a pencil wheel or a thin disk on a special high-speed motor head. For final finish and blending, the edge is brushed with a Tampico wheel on a polishing jack. A cup-type holder is used to prevent any surface but the edge from being brushed.

There are some gears which cannot be ground because of their design and which require a double setup for roughing and finishing. The surfaces of important gears of this nature are finished by lapping. Ground gears are lapped slightly to remove the "fuzz" produced by the grinding wheel. Both helical and internal-type lapping machines are used.

With certain types of grinders, the various modifications of tooth form found necessary as a result of full-scale testing of the finished product are easily produced. This modification takes various forms and may differ on similar gears used in different type engines. Some teeth require a slight dropping off of the involute at the tip and others at the flank. Some require both, to produce a barrel-type form. In some cases it is necessary to grind the required pressure angle slightly off to produce a full bearing under operating conditions.

Inspection and Testing: In order to minimize the possibility of any defective gears getting into service, most aircraft engine gears are inspected 100 per cent. One of the most important parts of this inspection is the Magnaflux check. This operation consists of magnetizing the part by one of various means and dipping it in or pouring over it a solution containing finely divided magnetic iron oxide. The slightest surface crack will be disclosed as a black mark on the part. The aircraft industry was one of the first to use Magnaflux inspection of gear teeth. Grinding checks and minute flaws in the material revealed by this method resulted in a number of rejections when it was first adopted, but it has led to the improvement of materials and processes so that we have today gears much superior to those produced prior to the general adoption of Magnaflux inspection.

The involute form and normal pitch of gear teeth are checked at the final finishing operation as a check on equipment and machine setups. In many instances permanent records are kept to determine the effect of shop variations after definite running periods. At final inspection, gear teeth are checked for size, surface finish, and for roll on both adjustable and nonadjustable-type fixtures.

A final check on the gears as well as all other aircraft engine parts is the so-called "green run", which involves approximately 3 hours of running of the completed engine from low load to full speed and power. After this run, all parts are disassembled and inspected for possible flaws before final assembly, test and shipment.

Nitralloy steel has several advantages for production of many aircraft engine gears. Today, about 20 per cent of the gears in the engine are of this material. One of the important advantages of Nitralloy is that its use makes possible sur-

face hardening of the teeth of large gears of light section which would be utterly impractical to carburize and quench. The surface hardness does not drop after brief service, as frequently happens with a curburized case. Our planetary gear systems are generally constructed with a carburized pinion running between a Nitralloy stationary gear and a Nitralloy driving gear because the "sun" gear and surrounding gear are usually large and of thin or complicated section, though there are some exceptions to this practice where it is possible or advisable for other reasons to carburize two members of the gear train.

All gears are made from forgings with carefully controlled flow lines in order to secure maximum strength since it has been well established that steel parts are somewhat weaker under repeated loading and impact. Thus gears made of bar stock are not apt to be satisfactory. Forgings are normalized and annealed before machining. Gear blanks are usually finished to grinding size before carburizing. Because of the generally fragile and irregular sections of aircraft engine gears, the major portion are quenched in dies.

Shaving vs. Grinding: We are frequently asked why aircraft-engine gear teeth are not shaved. We believe that gear grinding has many advantages in connection with the type of gearing we must produce. Furthermore, before shaved gears can be widely used in aircraft engines, many details of manufacturing procedure will have to be worked out and the resulting gears proved by engine test. Some of the points which need clarification are:

—If gears which cannot be ground are shaved, will the undercut necessary to clear the tip of the shaving tool cause a reduction of load-carrying ability?

—Can distortion at heat treat be kept small enough to permit shaving, and can hardening subsequent to shaving be done without further distortion?

—Will the cost of controlling and inspecting preparatory operations exceed the possible time saved by shaving?

Will existing furnace equipment and heat treating methods produce surfaces free from decarburization in view of the hardness required to withstand the loads?

The demand for gear grinders necessitated by the production expansion program in the present war emergency has made it necessary seriously to consider shaving of all aircraft gears where there is a reasonable possibility of success. This is being done in conjunction with various co-operative vendors, and we have no doubt that many new and useful methods will spring from this work.

One obvious answer to the problem of shaving aircraft gears would be redesign of parts to facilitate the process. This would be a tremendous job under any circumstances and is impossible at the moment. It will, no doubt, proceed over a period of time as has the process of redesign to facilitate manufacture in the automotive industry.

Flame hardening and induction hardening of teeth have been studied in connection with speeding up the production process but are not yet adaptable to aircraft gears because these hardening processes are as yet incapable of producing a tooth satisfactory from a structural standpoint.

With very few exceptions, all aircraft engine gears are of the spur type. Helical gears, preferred for automotive assemblies because of their quietness, have not found much favor in aircraft engines. Should the ultimate in quiet running gears ever be demanded, provisions will have to be made to absorb end thrust, which is the present objectionable feature in this type of gear, before it will be suitable for aircraft engine use. Herringbone gears would introduce many assembly problems and be difficult to handle because of dimensional changes

in the support caused by temperature and deflection. Spiral gears have not been used in aircraft engines because they do not stand up under the high rubbing speeds with the lubricants available.

Accompanying illustrations show typical gearing setups and gears employed in a 2-row air-cooled radial aircraft engine rated at 1600 horsepower at 2400 revolutions per minute for take-off at sea level and which will maintain 1280 horsepower at 2300 crankshaft revolutions per minute to 12,000 feet altitude.

Fig. 5 shows the front cam driving train. At the left is shown the rear side of the large internal gear of the propeller reduction system. The cam is driven from the gear on the back side of the propeller gear through an intermediate shaft to an internal gear on the inside of the plate-type cam. The internal gear on the cam does not show in the figure but is cut directly beneath the cam tracks. This gear system operates at comparatively low speed but is subject to considerable shock because of the 1500-pound load on the push rod required to open an exhaust valve under cylinder pressure.

Fig. 6 shows the supercharger impeller and its driving gear. This gear is required to transmit as much as 170 horsepower and to revolve the impeller at a maximum of ten times engine speed or 24,000 revolutions per minute. There are 24 teeth on the impeller drive pinion. The pitch line velocity reaches 15,120 feet per minute with an interchange of 9600 teeth per second. In order to operate successfully under these conditions, tooth form, tooth spacing and concentricity about the bearing axis must be closely held. These limits are plus or minus 0.0002-inch for normal pitch and within 0.002-inch for concentricity of the pitch circle with the bearing axis.

An extremely highly loaded gear set is shown in Fig. 7. This is the speed change mechanism which provides two supercharger impeller speeds in order to extend the range of altitude over which the engine will produce a satisfactory power output. This gear system is located between the crankshaft driving gear and the impeller gear of Fig. 6. The large gear at the left in the 10:1 ratio train meshes directly with the impeller pinion. Inside this gear is placed a clutch to control the speed ratio change.

Many Gears, Splines Used

At the extreme right in the 10:1 ratio train is shown a frame which carries five small pinions, one of which is shown. The speed ratio changes are accomplished by utilizing a planetary system, of which these pinions and their mating gears are among the most highly loaded parts. At full engine speed, these pinions revolve at 8100 revolutions per minute on their own axes and the carrying frame at 6000 revolutions per minute. In the lower part of Fig. 7 are shown the remaining parts of the supercharger two-speed drive mechanism. The numerous and rather complicated gears and splines employed will undoubtedly be of interest to gear men. In order to compare this speed change mechanism with more conventional ones, note that the pitch diameter of the large gear which houses one clutch is 6.0 inches. The entire weight of the parts shown is approximately 15 pounds. Under some intermittent conditions the driving pinion, shown near the center in the 10:1 ratio train, carries a load of 1700 pounds per inch of face and rotates at approximately 7000 revolutions per minute.

Fig. 8 shows the main power take-off shaft from the engine crankshaft to the

supercharger and all other accessories located in the rear of the engine. The left end of the shaft, as shown, is connected to the crankshaft through a double splined coupling, shown at the extreme left. The large ring-type gear, shown near the left, when assembled, fits over the spider at the right end of the power take-off shaft. The gear is driven through a cushioning spring system, one of the springs of which is shown. The jaw-type clutch near the right end of the assembly fits into the power shaft and is the means by which the engine starter couples to the engine during the starting period.

The driving gear illustrated has 63 teeth of 10 diametral pitch, 20-degree pressure angle and is 0.64-inch wide. It is required under certain conditions to transmit to the supercharger and accessories a total of 200 horsepower at 2400 revolutions per minute.

A pair of gears typical of the fragile and complicated construction used throughout aircraft engines in order to meet weight and other design requirements is shown in Fig. 4. Such construction derives from the fact that all aircraft engine gears are highly loaded and must be heat treated but must also be of accurate tooth form and with pitch surface concentric with the bearing surfaces in order to perform satisfactorily.

Fig. 1 is a section through a large internal gear of approximately 20-inch pitch diameter. Particular attention is called to light cross-section of the web. The teeth on the smaller diameter are splines which couple the gear to the shaft and on which it must be centered. These particular splines are a shrink fit on the supporting member.

A section through a correctly hardened and ground pinion is shown in Fig. 2. Note the heavy uniform case which runs from 0.030 to 0.035-inch with a minimum surface hardness of 60 rockwell C and the full radius at the roots of the teeth. A cross section through an incorrectly ground pinion of the type used in the 16:9 reduction gear is shown in Fig. 3 and demonstrates possible manufacturing difficulties. The radius at the root of the teeth has been ground so deep as to remove the hardened surface and is not properly blended with the flank of one of the teeth. Removal of the hardened case in this manner invites failure because of the lowered endurance limit of the material at the surface of the radius, which is a very highly stressed region. Improper blending of the radius and flank invites failure because of surface discontinuity.

We think it of great interest to note that it has frequently been necessary to modify the lubrication of gears operating at extremely high velocity in order to prevent the entrance of undue quantities of oil, which at high speed apparently jams the teeth much as a handful of sand would at lower speed. The result is breakdown of tooth surfaces and possibly bending failure.

Summary: We feel that gear grinding as a high-production process has important advantages in connection with the manufacture of aircraft-engine gears because it enables us to finish accurately the teeth and bearing surfaces of hardened gears which are subject to distortion during the heat-treating process. It produces an excellent surface finish and facilitates production of a well finished full radius at the tooth root. It has been used exclusively to date because of these advantages and because it was the only well developed method available when the present expansion period began. Shaving is being extensively studied because of its production possibilities and through the necessities of war will undoubtedly develop rapidly as applied to the production of certain types of gears. Hardening methods other than nitriding and carburizing may eventually prove useful in this connection.

Domestic Potassium Cyanide Speeds Plating of Bearings

Potassium cyanide now being made in the United States is more than trebling the rate of plating in the production of silver-plated bearings for airplane motors.

This was revealed recently by the Electrochemicals Department of E. I. du Pont de Nemours & Co., Wilmington, Del., makers of the potassium cyanide.

Formerly imported from Europe, potassium salts now are recovered by recrystallization from the vast Searles Lake salt deposits in the desert country of California. These salts provide the basic material from which potassium cyanide is manufactured, the company reports.

In an electroplating bath potassium cyanide not only increases the rate at which silver plate is deposited on the motor bearings, but also gives required heavier coatings that are smooth, firmly adherent, fine grained and easily machined or burnished. Coatings of silver deposited on the bearings, some of which are 3 to 4 inches in diameter, range from three to five one-hundredths of an inch in thickness, whereas silver electrodeposits usually are measured in thousandths of an inch.

Potassium cyanide also is used in copper plating of war materials and as a nitriding agent in the surface hardening of tool steel.

Before the war virtually all the potassium cyanide used in this country came from Germany. The famous Stassfurt deposits and brine deposits in Alsace were the main sources of the potassium salts from which this cyanide was made. Halt of imports threatened to delay important electroplating and surface-hardening jobs until provisions were made for manufacture of potassium cyanide in the United States.

Planes and Armaments of All Nations' Air Forces

Aerosphere—1942, third annual edition; cloth, 1156 pages, 8½ x 11½ inches; 655 halftones and drawing; published by Aircraft Publications, 370 Lexington avenue, New York, for $12.50.

Dedicated to America's war effort this is the only source book of its kind published in the United States. The entire contents have been approved by the government.

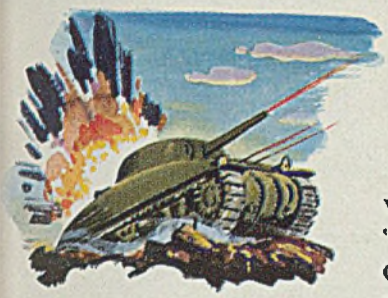
Lt. Gen. H. H. Arnold, commanding general Army Air Forces, has contributed a foreword in which he says, "Air power is the key to victory in the war which is now waging in every continent. The war is everywhere because the air is everywhere. There is no doubt that the past year has been, mainly for aviation, the most important and momentous since men first flew."

At the request of the country's leading aviation authorities the third annual edition, which presents photographs and detailed drawings of the planes and engines of all the world, has been radically enlarged to include special sections on the United States war effort and on air armament.

There is three times as much information on Japanese warplanes as in the 1941 edition and twice as much on Russian planes. The section on United States military and naval aviation has been expanded from 108 to 160 pages. Extensive specifications and performance figures are given.

A section added this year incorporates photographs in silhouette of various types of airplanes used by the United States Army forces, for identification use by local volunteer civilian aircraft observers and college students in preflight training.

The armament section includes latest obtainable information from official sources on aircraft bombs, weapons, turrets, armor plating, German aircraft weapons and predictions on future battleplane weapons.



Ramparts of Production

With Continental it is not "too little and too late."

One reason for this is the spirit and the hard work poured into arms production by our men and women. Into this tremendous task Continental has thrown every ounce of heart and strength.

Together, for the past year, Continental men and machines, working three shifts, seven days a week, have manned tirelessly the Ramparts of Production. We feel a patriotic pride in new production records set, and are deeply grateful for recognition given us by the Army and Navy. Another year begins with every man and woman of Continental determined to surpass past records in the production of quality war equipment for the fighting men who inspire our efforts.

* * *

Continental products include carbon and alloy steel castings, armor castings, rolls, rolling mill equipment, and special machinery of many types.

CONTINENTAL

ROLL AND STEEL FOUNDRY COMPANY

CHICAGO • PITTSBURGH

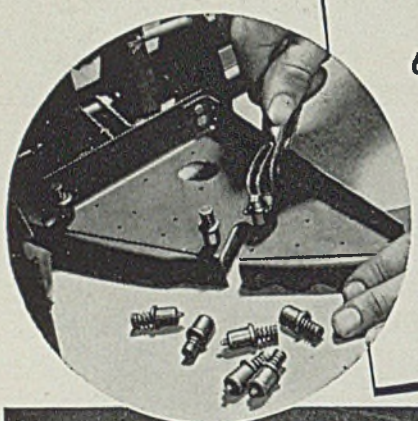
CLECO
SHEET HOLDERS

Why the ORIGINAL Sheet Holder Offers You the FINEST Service:

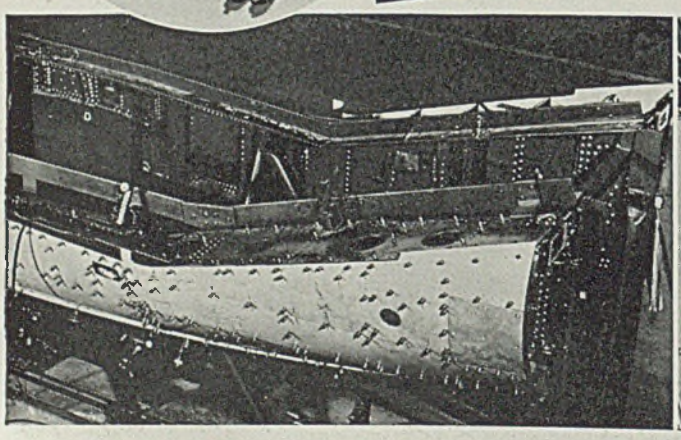
1. Saves 80% of time ordinarily required for securing sheets prior to riveting. Eliminates use of holding screws or bolts.
2. Exerts 50 lbs. of *even* clamping pressure—no buckling or distortion—no loosening due to vibration of riveting.
3. Different color for each size facilitates identification, speeds up insertion.
4. Access to *only one side* is necessary for insertion and removal.
5. Locking stem has correct diameter for rivets being used—no drilling or reaming.
6. EXCLUSIVE REPAIR AND EXCHANGE SERVICE. Damaged sheet holders can be sent to our plant or branch office repair stations for prompt repair at nominal cost. Exchange stocks also available at these repair stations.

Write for Bulletin 87. THE CLEVELAND PNEUMATIC TOOL COMPANY, 3781 East 77th St., Cleveland, Ohio.
Branch offices in all principal cities.

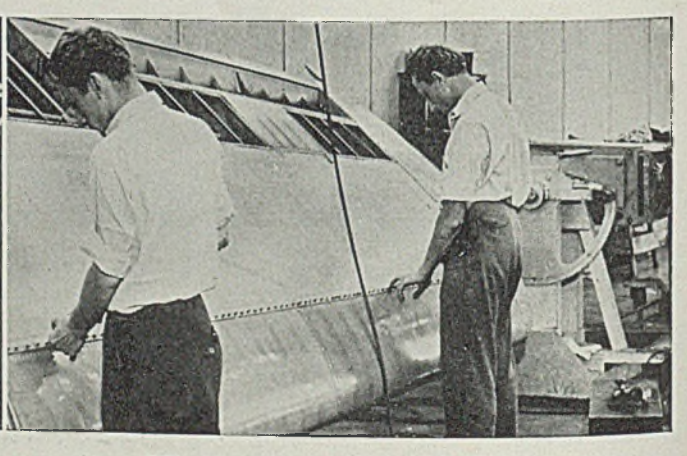
Cleco Sheet Holders being used on a Nose Web



★ **BUY U. S. WAR BONDS AND STAMPS**



Cleco Sheet Holders on a Fuselage Assembly in Jig



"Clecoing" an Airplane Wing

Root Openings

(*Continued from Page* 93)

overhang the workskids or blocks to introduce additional camber as in Fig. 10 and then perform the welding operations on the overhanging section. Then allow the welds to cool before shifting the beam and overhanging the opposite end.

COMMENT . . . .

By R. B. LINCOLN
Director
National Weld Testing Bureau Division
Pittsburgh Testing Laboratory
Pittsburgh

THE COMMENTS on root openings given below are based on the observation of a large number of qualification tests of welders. My observation would indicate that if a weld is to pass the "back bend" test required by the American Welding Society Standard Qualification Procedure and the American Society of Mechanical Engineers' Unfiled Pressure Vessel Code, it must have complete penetration at the root. Lack of fusion for 1/16-inch at the root is practically certain to produce failure with any kind of material and with some of the harder grades of pipe and plate a defect that can be seen will cause failure.

Making Root Opening Difficult

Few welders can secure perfect root penetration without a root opening. To do this it is necessary to melt an opening just ahead of the weld and carry this opening the entire length of the seam. The welder is actually making his root opening as he goes along but many men find this exceedingly difficult. If an operator is given a butt weld without a root opening and lays his first bead in the usual manner without meeting, though, it is hardly worth while to test the specimens because we know that it is almost certain to fail.

My observation leads me to believe that for material up to approximately 5/8-inch in thickness without a backing strip, the average welder will get best results by using 1/8-inch electrodes with 1/8-inch root opening and having the plate or pipe beveled to within 1/16-inch of the surface on the root side. If the plates are beveled to a sharp edge, they can be brought very nearly in contact and the very thin edge will melt away readily to give the desired root opening. For thicker plates, I favor the use of a 5/32-inch electrode for the first pass with 5/32-inch opening when no backing strip is used.

For all thicknesses, the opening given above should be maintained during the tacking and welding operation. Frequently a welder starts with a 1/8-inch space and permits the tack welds to draw the edges together so that when he actually starts to weld, the opening is reduced to a point where imperfect welding results. While the welding operation tends to draw the edges together, if satisfactory welds are to be produced, the root spacing must be maintained the entire length. This can be done in many cases by the use of large tack welds, and in other cases, by providing a slightly greater space to allow for contraction during welding.

When the backing strip is used, I favor a root spacing of 5/32-inch when 1/8-inch electrodes are to be used and 3/16-inch spacing when 5/32-inch or 1/8-inch electrodes are being used. If the weld is to pass the back bend test, it must be completely fused into the backing strip.

I believe that a spacing of 1/64 to 1/32-inch between the faying surfaces of lap welds or fillet welds is desirable but usually not necessary. It is almost impracticable to maintain such a clearance in producing lap welded tanks and pressure vessels. On the other hand, inspec-

tors sometimes cause needless expense by checking such joints with a 0.003-inch feeler gage and demanding that they be drawn up until the gage will not enter.

If the surfaces are in perfect contact before welding is started, there certainly must be considerable stress due to contraction after the parts have cooled. The contraction that occurs while the weld is still hot enough to yield, say at about 800 degrees Fahr., does but litle harm. The real stress is induced by the final cooling, and this naturally amounts to but a few one-thousandths-of-an-inch per inch. I believe that the irregularities of ordinary rolled surfaces probably give us the clearance we need to permit this contraction without excessive stresses.

We do not have much trouble with cracked fillet welds when modern heavily coated electrodes are used on mild steel plates. I have seen a few cases of a weld cracking when heavy bearing plates are welded to the milled ends of columns. Introducing a space of as little as 1/64 to 1/32-inch will usually cure the trouble but this is a questionable practice when the design is based on the assumption that the milled surface of the columns has a uniform bearing on the machine surface of the place. Usually cracking can be avoided without resorting to spacing in such cases.

COMMENT . . . .

By A. F. DAVIS
Vice President
Lincoln Electric Co.
Cleveland

IN REFERENCE to the article by S. I. Rosenthal concerning the root openings, in general I would say that he has the right idea. In other words, the selection of the gap is a matter of what you want to do and how you want to do it. To make an out and out statement either for or against use of root openings is inadvisable. I have seen statements by authorities saying that gaps should be avoided because they tend to produce cracking. However, there are times when a gap will just do the opposite and have a tendency to reduce the cracking. On the other hand, I would not say that gaps should always be used. As for example where distortion and cracking are not serious factors. This whole subject is a matter of design and fabrication. I believe the fitup should be as tight as economically possible, as the speed of welding will increase, and the pounds of electrode used will decrease as the size of the gap goes down.

COMMENT . . .

By J. W. MEADOWCROFT
Assistant Works Manager
Edward G. Budd Mfg. Co.
Philadelphia

THE PROBLEM discussed by Mr. Rosenthal is nothing like as simple as it seems to be. There are many variables involved in welding which he has not considered.

For example, when welding the two V-butt joints illustrated in Figs. 3a and 3b, assume that in the Fig. 3a joint the root opening is maintained ahead of the weld by spacers which are removed as the weld progresses. When the weld is made it cools under the restraint imposed by the maintenance of the root opening ahead of the weld.

When the joint Fig. 3b is welded, the root shoulders are completely fused through, if the weld is properly made, and the weld cools under the restraint of the unfused shoulder ahead of the fusion zone. In other words the degree of restraint during cooling is identical in the two cases.

If, on the other hand, we assume that in making the Fig. 3b weld the shoulder

is not fused through but a portion of it remains as a restraint during the cooling of the upper part of the weld, the picture changes and there will be a higher residual stress in the actual weld zone accompanied by a considerable bending moment at that point. With this assumption and only then will the root opening have any significance.

It is thus obvious that it all depends upon the technique of welding and that a reasonably small root shoulder which should always be fused through by proper welding procedure would yield the same result as to residual stresses with or without the root opening.

Referring now to the fillet welds of a lap joint, the device shown in Fig. 2a would doubtless relieve the transverse shrinkage stresses provided the gap between the overlapping ends was exactly the proper thickness,, but it would have no bearing on the longitudinal stresses which are superimposed upon the work-stresses. Even then this would be desirable provided it did not involve too much extra labor, although it would constitute a very small factor in the strength of the joint.

Logical deductions in any field are often dangerous when they do not take into account all the significant variables involved. They are doubly dangerous when they are accepted and used blindly. This is most likely to happen when the phenomena involved are as complicated as in the present instance.

NE Alloy Steels

(*Continued from Page* 98)

ness method. This consists in taking the rockwell hardness at ⅛-inch intervals across the cross-section of a round bar or a finished part after it has been properly quenched, and plotting a curve showing hardness at all points across the section. This is a useful and direct method of observing the hardness of shafts and round sections where a definite surface and center hardness is desired. While it is possible to get some variation in hardenability from steels of the same type, the complete chemical composition and the grain size offer a means of predicting the hardenability very closely. Using the hardenability factors for the alloying elements shown by Grossman, it is possible to produce hardenability in many different ways with the alloys available.

Fig. 1 shows the hardenability curve for a popular gear steel, SAE-4620. With it are curves for steels of three basic compositions using much smaller quantities of the alloying elements, nickel and chromium. The hardenability curves are very similar and are well within normal allowable limits. Aside from the manganese-molybdenum and chromium-molybdenum, the curves are quite comparable.

In Fig. 2 the hardenability curve for SAE-4320 has been almost exactly duplicated with a manganese-molybdenum and a chromium-nickel-molybdenum steel. This shows that these steels have a similar hardness in a given section. For instance, if we have been getting a certain hardness in the center at the root of a gear tooth when using SAE-4320, we know we can get the same hardness at the same point in the same gear when made of this manganese-molybdenum or this chromium-nickel-molybdenum steel. This manganese-molybdenum steel was designated as NE-8124 and the chromium-nickel-molybdenum as NE-8724. The NE-8124 has since been deleted and the NE-8724 altered to NE-8720.

A structural grade, SAE-3240, is shown in Fig. 3. The steels proposed to match this hardenability curve were carbon-molybdenum, A-4068 (now deleted); manganese-molybdenum, NE-8442; chromium - nickel - molybdenum, NE - 8744. These curves are close enough to give assurance that an equal hardness can be obtained in a given section in either of

these steels, even though they have different compositions.

Fig. 4 shows curves for deep-hardening grades. The hardenability curve for SAE-4340 has been matched by manganese-molybdenum, NE-8547 (now deleted) and chromium-nickel-molybdenum, NE-8949. In this case the carbon-molybdenum (NE-4068) does not have the hardenability. These deep-hardening grades are used for heavy sections where other steels will not harden through.

All of the common alloy steels were matched in this manner with alternate steels having similar hardenability.

With the commercial limits necessary to allow in any steel, it is natural that we cannot expect to match the hardenability exactly to a line. In the core hardness at any point in a gear, for instance, we have to have limits. We have determined by performance testing that a given gear will be satisfactory with a core hardness range of say 10 points, rockwell C.

In specifications for hardenability we likewise have to consider limits. We therefore establish a hardenability band instead of a single-line curve. One example of this is given in Fig. 5, which shows the limits required and obtained with thirty 100-ton production heats of NE-8744 for axle drive shafts. The curve outside the band represents a heat which would not give the required hardness in production.

The first specifications for the NE steels cover the manganese-molybdenum, NE-8000 to 8500 series, and the chromium-nickel-molybdenum types, NE-8600 to 8900, inclusive. The carbon-molybdenum steels were designated as the NE-4000 series. Alternates for practically all of the alloy steels previously used were included in this list. These steels were ordered by manufacturers and tests made in production and in the laboratory. Some trouble was experienced with the manganese-molybdenum series in the low-carbon carburizing grades. Core hardnesses were high, but ductility and impact strength were low. Improved heat-treating practice made a great difference, and good gears have been produced from NE-8024 and 8124.

NE-8442 is an excellent steel and has been used for a number of structural parts. It has been used for studs, bolts, capscrews, (both machined and cold headed). When hardened to between 200 and 400 brinell, it shows excellent properties.

By far the most popular of the NE steels have been the NE-8600 and NE-8700 series. In the carburizing grades, either make good gears. While there are only 5 points difference in molybdenum, the NE-8700 series is probably better for heavy-duty gears. NE-8630 is used for a number of structural parts. It can be water quenched and shows good fatigue properties when between 200 and 400 brinell.

About the time the steels of the NE-8000 series were being well established and their use for important applications showing a gradual growth, further shortage of the strategic alloying elements, brought about by increased alloy-steel production, made necessary further reductions in order to ensure uninterrupted production of (high) alloy steels. Since great shortages have occurred in molybdenum, this group of steels has been practically eminated.

Watchful and careful checking of the scrap situation showed good possibilities for a chromium-nickel-molybdenum series of steels, which could be made with little or no alloy additions. The alloy contents were 0.20 to 0.40 per cent chromium, 0.20 to 0.40 nickel, 0.08 to 0.15 molybdenum.

By making experimental heats with these alloy contents, plus slight modifications in silicon and manganese, hardenabilities were found to compare favorably with those of all of the important alloy steels. This has led to the formation of a supplementary list of National Emergency steel specifications. The first

of these is the NE-9400 series with very low alloy content. The next is the NE-9500 series, which is the same as the NE-8600 series but with additional silicon and manganese. This series has high hardenability and is intended for heavy sections.

As the chromium situation improved, the NE-9600 series was added. These steels have chromium, silicon and manganese as the principle alloying elements.

Within recent months it has been necessary to alter some of these specifications on account of the alloy content of the available scrap. The percentage of nickel has been running higher than was anticipated and the limits for this element are being broadened from 0.40-0.60 to 0.40-0.70 per cent for the NE-8600 and 8700 series and the NE-9400 series changed from 0.20-0.40 to 0.20-0.50 per cent.

The extremely critical condition in molybdenum has forced greater reductions in this element, so the NE-8700 series except for NE-8720 is being deleted.

The latest list is shown in Table I, page 98.

In eliminating the NE-8700 series and substituting the NE-8600, we are sacrificing 0.05 per cent molybdenum. The effect of this can be seen in Fig. 6, which shows hardenabilities of NE-9420 analysis with 0.15 per cent molybdenum, 0.08 per cent molybdenum and no molybdenum.

(*Concluded Next Week*)

Truck Care

(*Continued from Page* 100)

adjustments and repairs. Thus any part calling for excessive care or repairs can be spotted and the cause investigated and corrected before serious damage occurs. The names of persons performing each operation should be listed together with date performed.

Every Day: Industrial trucks are frequently operated in dust-laden atmospheres; and even where this is not true, the normal running of the truck disturbs the dust. For this reason it is well to blow the dirt off the truck daily before proceeding with oiling the cold points. Wipe all oil holes clean and make sure to oil all bearings, pins, joints and other "cold points" on brakes and steering linkage, interlocking mechanisms and switch controls. Check battery in accordance with battery manufacturer's instructions.

Every Week: Make a thorough weekly inspection of all of the following parts:

Brakes: Test service brakes for stopping with heaviest load to be carried. Test parking brakes for holding maximum load on steepest incline which truck must negotiate. Adjust the brakes as required. Inspect brake linings to make sure they are not filled with dirt or grease. If so, remove shoes and wash thoroughly in gasoline. If lining is worn it should be replaced with grade of lining equal to original equipment. Make sure shoe is trued up to fit drum after relining. Inspect brake drum to make sure it is not scored or rough.

Steering Connections: Ease of steering is highly important in the operation of any truck. See that all connections are kept tight but that steering control works freely. Test for lost motion at ball joints and rod yokes due to wear; tight joints at rod yokes due to bent levers or rods; misalignment of steering wheels; and worn bearings in steering post or bell crank.

Excessive play in ball joints should be taken up by loosening lock nut and taking up on adjusting screw. If ball pins are badly worn they should be replaced. Loose connections in rod yokes indicate pin or bearing wear and should be replaced. Pins should be free at center, extreme right and left. Tight connections in rod yokes indicate bend or twisted rods. Straighten bent rods making sure lever faces are parallel. Always replace levers that are bent. Do

not attempt to straighten them.

In replacing lever arms make sure taper hole in steering knuckle is not stretched out of shape and that key and keyway are in good condition.

Wheel Alignment: Never change rod lengths. Steering rods are made adjustable as to length to facilitate assembly at factory and should not require adjustment thereafter. *Staighten rods that are bent and replace levers that are bent.*

On 4-wheel steer trucks the most usual cause of misalignment is the bending of the C-lever by hitting an obstruction. It is recognizable as follows:

With drive wheels straight, both trailing wheels will slant either right or left. Wheels are lined up exactly parallel at factory and employ no "toe-in". Check alignment by placing two long straight edges against side of power axle wheels, touching rims at two points and extending past training axle wheels. The drive wheels are adjusted by cross rods until parallel, checking distance between front and rear of straight edges. Trailing wheels are then adjusted parallel and checked by measuring in from straight edges until equal distance at front and rear from rims. Fore and aft steering rods are then adjusted. To co-ordinate front and rear steer, the tiller is moved, full throw away from operator. Measure distance from training wheel to frame; then reverse and check other wheel. If unequal, adjust the two rods connecting bellcrank until equal steer is obtained. Lock rods to correct length. Next check post lever and adjust drag link so lever lacks 3 inches of lining up with drag link at full throw of tiller handle toward operator. If this 3-inch safety distance is decreased there is possibility that lever can be sprung over center, thereby locking steering mechanism.

Lift or Hoist: Clean all grease and dirt from rails. Inspect chains and anchor bolts. Inspect hydraulic lever to valve and limit switch. If valve plunger sticks, a few drops of machine oil should free it. If piston rod binds or leathers leak, a little neatsfoot oil on piston rod will work down and soften up leathers; or hydraulic hose may be disconnected at upper end of cylinder and a little neatsfoot oil inserted directly at leathers.

Lubrication: Carefully follow the manufacturer's instructions and lubricate each point called for on weekly lubrication. For most part, this will consist of Alemiting the steering connections and other bronze pushed parts. Over-lubrication is almost as bad as under-lubrication, and therefore parts such as motor and wheel bearings should not be included in weekly lubrications.

Electrical Equipment: When working in extremely dusty environments it is

well to remove the covers from motors, controller, contactors and limit switches and blow out any dust that may have worked into these parts. Bleed air line of moisture before blowing out electrical equipment.

(*Concluded Next Week*)

Modern Sintering Plant

(*Continued from Page* 105)

speed from 4 to 12 feet per minute, the suction from the draft system, consisting of 12 wind boxes located beneath the pallets, produces a sufficient flow of air, downward through the bed, continuing combustion.

The correct mixture of materials is important and the right amount of carbon must be supplied to complete the sintering operation by the time the material reaches the discharge end of the machine. The carbon percentage is controlled by the blending of varying amounts of coke breeze or other fuel.

Ore to be sintered correctly must contain a sufficient amount of carbon as otherwise it would not be possible to produce the necessary combustion temperature required to give satisfactory output and efficiency. The sintering machine operator has facilities for producing uniform sinter of the desired hardness and porosity.

Finished sinter is discharged from the end of the machine onto a double deck bar screen and is delivered to a sinter pit under an open-yard crane runway from where it is loaded either into standard-gage cars at ground level, or into a larry car on a trestle track by a 20-ton crane and grab bucket.

Dust Catchers Provided

The down-draft system consists of 12 wind boxes which are connected to primary dust catchers by downcomers. Gases are taken off at the top and then pass through two Sirroco dust catchers and then to the induced draft fan. The dust and return fines which are collected in this system are returned to the pug mill as described previously. Fans which produce the draft with which this system is operated, have a capacity of 140,000 cubic feet of air per minute at a 25-inch static head. Each of these 2 fans is driven by 1250 horsepower motor at 720 revolutions per minute. These fans have a greater capacity than any other used in installations of this character at the present time.

Auxiliary equipment in the completed sintering facilities include motor room which houses the fan motors, transformers and switch gear, drinking water coolers, a modern locker and wash room, etc.

Electrical power for this plant is trans-

mitted underground from the main power house through two 400,000 circular mils, varnish cambric lead-covered cables at 6600 volts, 60 cycle.

The down-draft fan motors are 6600 volt, 3-phase, squirrel-cage type, equipped with across-the-line oil circuit breaker control. A bank of transformers is installed in the motor room which supply the 220-volt power for the auxiliary operations in the plant. The oil circuit breakers and the alternating-current feeder panels along with a section of auxiliary control panels, are installed on the second floor of the motor room.

The motor and control room is constructed as a closed system in the interest of overall economy from the maintenance standpoint. This procedure was necessary since the main electrical equipment is high voltage and the air surrounding the plant carries an excessive amount of abrasive dust. A small makeup fan and electrolytic air filter is employed to keep the room under pressure. Air circulating fans are installed under each main fan motor. This circulating air is passed through cooling coils, supplied with special coolant by a compressor and economizer, since sufficient water for cooling was not available.

Panels in Separate Building

One other brick control house was provided on the ground floor, adjacent to the storage bin building, in which other auxiliary control panels are installed.

Approximately 60 motors are installed in this plant, not including those operating the bucket crane. The latter crane has a capacity of 20 tons and a hoisting speed of 70 feet per minute. It is equipped with two bridge motors connected in series, 4-wheel drive and two trolley motors also connected in series with 4-wheel drive.

The 230-volt direct-current feeder, which supplies the cranes and adjustable-speed motors, is underground—one 1,250,000 circular mils, varnish cambric lead-covered cable per side.

The control of the electrical equipment in this plant is unique in that all main operating motors are controlled by the sintering machine operator at one central point on the firing floor, immediately adjacent to the sintering machine. This system of control includes sequence starting and stopping of equipment with emergency stop push buttons throughout the entire plant. A loud speaker system is employed for giving instructions.

The structural steel for this plant was designed by Harry L. Dovall Co., Chicago; fabricated by Hansell-Elcock Co., Chicago, and erected by Hunter Construction Co., Youngstown, O. Foundations were installed by Rust Engineering Co., Pittsburgh.

Emergency Shutdowns

(*Concluded from Page* 108)

tially at the various units as shown in the following table:

(Water loss occurred at 9 p.m., Nov. 12, 1942.)

Operation resumed	Time	Furnace
Nov. 12	11:50 p.m.	1
Nov. 13	3:45 a.m.	2
Nov. 13	4:30 a.m.	3
Nov. 13	9:55 a.m.	4
Nov. 13	6:45 p.m.	5
Nov. 13	10:50 a.m.	6

At Nos. 3 and 4 furnaces, additional time was lost after full blast pressure was restored, due to excessive amounts of water chilling the hearth.

Bronze losses which occurred on all six stacks as a result of the water failure, were as follows:

No. 1 Furnace: Two tuyeres.

No. 2 Furnace: Ten tuyeres, monkey and intermediate cooler.

No. 3 Furnace: All 12 tuyres burned at the start of the emergency resulting in the loss of communication between the tuyere zone and the iron notch. The total loss from the foregoing causes was 22 tuyeres, two coolers, and eight blowpipes. The time required to restore normal operations was five days.

No. 4 Furnace: All 16 tuyeres, monkey and intermediate cooler wre burned which also resulted in the loss of communication between the tuyere zone and the iron notch. The total loss was 24 tuyeres, four coolers, the monkey and intermediate cooler, and six blowpipes. The time required to restore normal operations was six days.

No. 5 Furnace: Two tuyeres were burned and damage was done to the blast line.

No. 6 Furnace: Sixteen tuyeres and the monkey were burned.

Overall Plant Loss: 76 tuyeres, six coolers, three intermediate coolers and six cinder notch monkeys. Lost time amounted to 155 hours. Loss in the production of iron was 10,150 net tons.

All tuyeres lost at the start of the trouble were well ironed in and as a result the time required for replacement was considerably longer than during a normal tuyere change. Furnaces Nos. 2, 3, 4 and 6 suffered from the admission of large amounts of water which entered the hearths during the interval between the return of water and disconnecting the feeds. It is impossible to estimate the amount of water which entered each furnace, but it appeared that No. 6 stack had at least as much as either Nos. 3 or 4 stacks. Yet upon resumption of the blast, Nos. 2 and 6 stacks quickly returned to normal, while great difficulties were encountered in starting up Nos. 3 and 4 furnaces.

Safety measures arising out of the experience of the operating personnel at this plant in connection with a total water loss are applicable to any multiple furnace plant: They are as follows:

1. Take all precautions to safeguard the plant gas main system.
2. Ascertain as quickly as possible the extent of burned bronze.
3. Disconnect the feed water lines on all burned bronze as promptly as possible.
4. At plants where most furnaces are blown either with turboblowers or reciprocating steam engines and only a few gas engines, and where the necessary interconnections permit, replace the gas engines with at least part steam engines as soon as possible. If this is not feasible turn steam into the cold blast main immediately, plug tuyeres on affected furnace, and stop gas engines.

Wing Tips

(*Concluded from Page* 78)

ently doing nothing; actually they are being trained by another operator and are standing by to observe the operations they will later be taking over actively.

Willow Run may be divided broadly into two general sections—manufacturing and assembly. The latter is of course the more spectacular to watch in operation, but manufacturing departments are equally important. Thus, the machine shop alone handles the fabrication of 11,000 separate pieces. The press shop, with 260 presses ranging from 10 to 1,000-ton capacity, has a stock of 13,000 dies for various parts required in the bomber assembly. Die practice is to use a combination of Kirksite and boiler plate for blanking and piercing operations, with ferrous dies for drawing and forming.

Ford is particularly fortunate in respect to the latter types of dies. A large tool and die shop, fully equipped with Keller machines for diesinking operations, is operated at the Rouge plant and has been able to devote much of its capacity to supplying Willow Run. Also, there are dozens of tool and die shops around Detroit which are equipped to produce iron and steel dies because of their long experience in automotive work. This combination perhaps explains why Ford has found it expedient to use this type for aircraft parts where most aviation companies stick to the less expensive Kirksite forming dies. True, a design change might make obsolete a cast iron die after it had run only a fraction of the number of pieces necessary to amortize its cost, but Ford is taking this chance, with the double-barreled advantage of having capacity to obtain such dies without delay and of knowing that by equipping in this way the tendency to institute major design changes should be restrained to a certain extent.

Two of the most apparent changes made in the B-24 are the use of removable hatch covers in the rear fuselage to permit free action by machine gunners handling guns at these points, and the new oval type of nacelle housing each of the four 1250-horsepower engines. This type of nacelle and cowling has air intake ports at either side of the propelled hub. The fuselage hatches are counterparts of those on the B-17 Flying Fortress. Machine guns in the "stinger" tail of the ship likewise are improvements patterned after those in the Flying Fortress.

Among the more spectacular phases of final assembly operations are the large paint spray booths in which the completely assembled bombers are painted and camouflaged. Since the wing span is 110 feet, length 64 feet and height 19 feet, the size of a paint spray booth to accommodate the ship can be imagined. Single doors extending the full width of the booth on both entrance and exit sides are used to seal off the paint area from the rest of the plant. These fireproof doors weigh 45 tons each and are counterbalanced and electrically controlled to move up and down easily.

Camouflage paint on the bottom of the fuselage of Ford-built B-24 bombers has an escalloped edge design which readily identifies the ship as one from Willow Run.

J. D. STITES

Named manager of the newly organized Wickwire Spencer Aviation Corp., subsidiary of Wickwire Spencer Steel Co., with administrative offices in New York and plant facilities in Virginia and Illinois. Principal product is recently announced automatic variable-pitch propeller. Mr. Stites has been with Wickwire Spencer for several years in an engineering capacity and has spent the last two years in propeller development work. In earlier years he served with Mack International Truck Co., as assistant engineer, and with Ford Motor Co. as production engineer.

Issue Seventh List of Critical Materials

(*Concluded from Page* 70)

lasses; Natural Gas; Natural Resins: except Rosin.

Oils: Corn, Cottonseed, Fish Liver, Palm, Peanut, Pine, Soybean; Sunflower, Tall.

Petroleum Products: Lubricating Oil (Penn Grade); Plywood: Unrestricted Binder; Douglas Fir.

Refractories: Insulating Brick, Kyanite (Domestic), Silicon Carbide, Sillimanite.

Rutile; Silicon Carbide Abrasives; Tanning Materials; Tetraethyl Lead; Theobromine.

Urea-Formaldehyde Resins; Vermiculite.

Waxes: Bees, Carnauba, Ouicury, Vegetable.

GROUP III

Non-critical materials that are available in significant quantities as substitutes for scarcer materials—unless supply is locally restricted by labor, manufacturing or transportation difficulties.

Metals

Antimony, Antimonial Lead, Ferroboron, Ferromanganese, Gold, Lead, Osmium.

Plastics

Bitumen, Casein, Lignin.

Chemicals

Alumen: Amonium, Potash, Soda; Aluminum Sulphate: Commercial; Barium Carbonate; Borax; Boric Acid; Camphor; Caustic Soda, Chromic Acid for Plating; Lead Chemicals; Muriatic Acid; Nicotine Sulphate; Sodium Silicates; Sodium Silicofluoride; Zinc Chemicals: except Zinc Oxide (French Process).

Lumber

(of Specified Grades)

Beech (No. 3); Cypress (No. 3—Box—Pecky).

Eastern Hemlock (No. 4—No. 5); Eastern White Pine (No. 4—No. 5); Hard Maple (No. 3); Hickory (No. 2—No. 3).

Idaho White Pine (No. 5); Magnolia (No. 2—No. 3); Northern White Pine (No. 5).

Pecan (No. 2—No. 3); Ponderosa Pine (No.

5); Redgum (No. 2—No. 3); Red Oak (No. 2—No. 3); Redwood (No. 2—No. 3).

Sap Gum (No. 2—No. 3); Soft Elm (all Grades); Soft Maple (No. 2—No. 3); Southern Pine (Selects—Shop—No. 3); Sugar Pine (No. 5); Sycamore (No. 2—No. 3).

Walnut (No. 2—No. 3); Water Tupelo (No. 2—No. 3); Western Larch (No. 3); Western Redcedar (No. 3); White Fir (No. 4); Yellow Birch (No. 2—No. 3).

Miscellaneous Products

Asbestos: Short Fiber; Bauxite High Silica; Bentmite; Brick.

Carbon Black: Except Furnace; Casein; Cement: Portland; Ceramics; Charcoal; Clay: Common; Coal; Coal Tar: Hi-Flash Naphtha, Solvent, Pitch; Coke: Coal; Concrete: Non-reinforced; Cork; Corn Stalks.

Emery; Feldspar; Fiberboard; Flint; Fuller's Earth; Garnet; Gilsonite; Glass: except Fibrous and Optical; Glues: Animal, Vegetable; Gypsum and Products.

Ilmenite; Lead Pigments; Lignin: Extender for Plastics, Linoleum Paste; Lime; Lithopone.

Mica: except Block; Mineral Wool; Oils. Fish, Linseed, Neatsfoot.

Paper and Products; Paperboard and Products: Waste Paper Base Pref.; Petroleum Products: Aliphatic Naphthas, Crude Oil, Gasoline (except Aviation, and East Coast Motor), Inbricating oil (except Penn Grade).

Plywood: Unrestricted Binder: Cottonwood, Hard Maple, Ponderosa Pine, Red Oak, Sweet Gum, Water Tupelo; Pottery; Pyrophyllite.

Red Lead; Refractories: Dolomite, Fire Clay, Magnesite, Olivine, Silica.

Rosin and Derivatives: except Ester Gums.

Salt; Silica Sand; Soybean Protein; Starch: Domestic; Stones: Granite, Limestone, Marble, Slate.

Soapstone; Straw; Sulphur.

Talc: except steatite; Tile; Titanium Pigments; Tripoli; Turpentine; Vitamin "A" Oils.

Wallboard; Whiting; Wood Products: Sawdust, Wood Fiber, Wood Flour, Wood Pulp (except Alpha Cellulose).

Zinc Oxide: American Process.

Supplementary List

Materials (not all in Group III) on which the inventory restrictions of Priorities Regulation No. 1 have been released

Andalusite: Domestic; Ball Clay; Bentonite; Borax; Boric Acid; Caustic Soda; Coal and Coal Coke; Dumortierite: Domestic.

Feldspar; Ilmenite; Kaolin.

Phosphate Rock; Pinite; Potter's Flint; Pyrophyllite.

Salt; Silicate of Soda; Salt Cake: (Sodium Sulphate); Soapstone; Soda Ash; Stoneware Clay; Sulphur; Waste Paper.

Essential Activities Designated by WMC

(*Concluded from Page 58*)

Electric light and power and gas utilities; steam-heating companies.

Repair and hand trade services: Blacksmithing; armature rewinding; electrical and bicycle repair; automobile repair and service; harness and leather repair; clock repair; tool repair and sharpening.

Health and welfare services, facilities and equipment: Water supply and sewerage systems; irrigation systems; dental and medical laboratories; hospitals; nursing services; fire and police protection; public health services; weather services; coast and geodetic services; engineering and other testing laboratories; offices of dentists, physicians, surgeons, osteopaths, chiropodists and veterinarians; professional engineering services. Includes also the manufacture of X-ray and therapeutic apparatus, and of surgical, medical, and dental instruments, equipment and supplies.

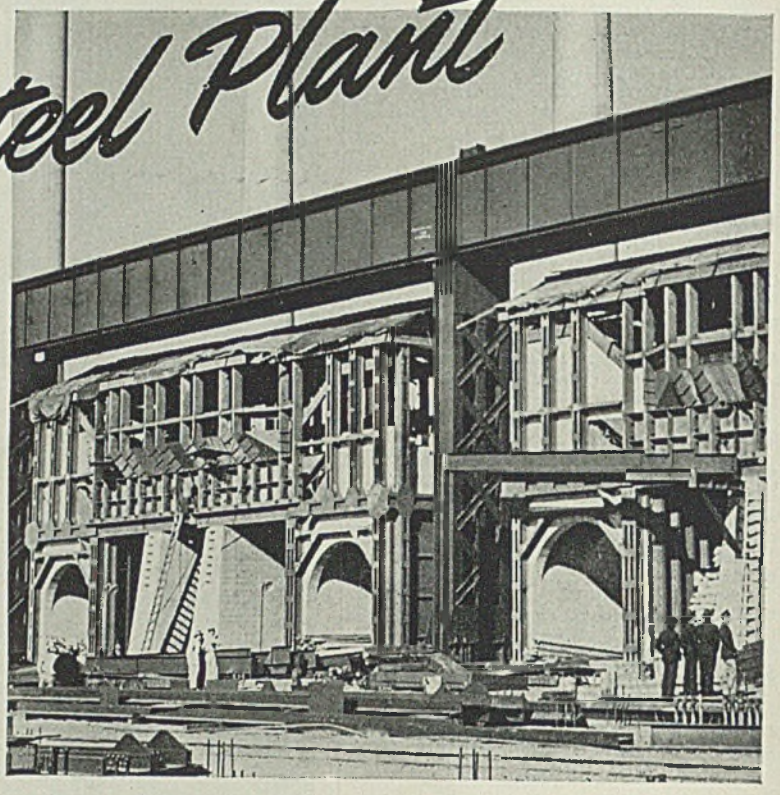
Educational services: Public and private industrial vocational training; elementary, secondary and preparatory schools; junior colleges, colleges, universities, and professional schools; educational and scientific research agencies.

Governmental services: Includes services necessary for the maintenance of health, safety, and morale, and the prosecution of the war.

Technical, Scientific and Management Service.

New Kaiser Steel Plant

Assures Peak Efficiency with J-M Insulations!



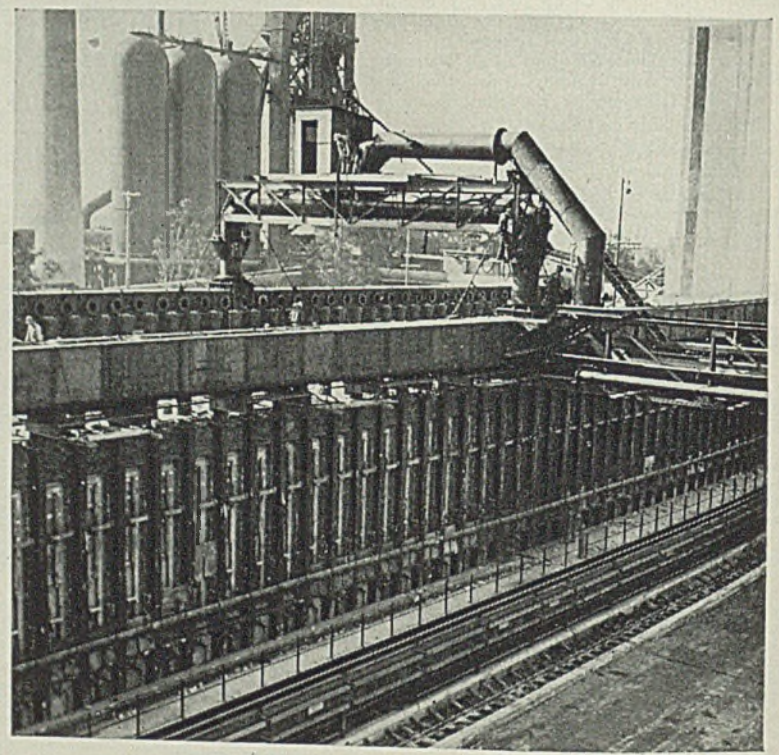
TO REDUCE HEAT LOSS and maintain peak efficiency, open hearths of the Kaiser Iron and Steel Plant use J-M Superex Blocks, Sil-O-Cel C-22 Brick, Sil-O-Cel C-3 Concrete and J-M No. 500 Insulating Cement. Sil-O-Cel Natural Brick are used in the stacks.

HERE'S JUST ONE MORE PROOF of the versatility and usefulness of J-M Insulating Materials!

In the new Kaiser Iron and Steel Plant in California, seven different J-M insulations are in use . . . in the open hearths and stacks, in the coke ovens, in the hot blast stoves, in the soaking pits, and in the flues between open hearths and stacks.

Specialists in conservation for 85 years, Johns-Manville brings you the accumulated experience of nation-wide steel mill service—to help you save fuel, cut costs and avoid waste. No matter what your insulation problem may be, there is a J-M material to meet your needs.

For complete information on the full line of J-M Insulations, write for Catalog IN-55A. Johns-Manville, 22 E. 40th St., New York, N. Y.



IN THESE COKE OVENS and hot blast stoves maximum efficiency is provided by use of the following Johns-Manville products: Superex Blocks, Sil-O-Cel C-22 Brick, Sil-O-Cel Super Brick, J-M 500 Insulating Cement, Sil-O-Cel C-3 Concrete and Asbestos Millboard.

JOHNS-MANVILLE
Industrial Insulations

FOR EVERY TEMPERATURE . . . EVERY SERVICE

Steel Buying Increases As War Program Develops

Ship, rubber, gasoline and railroad needs boost plate demand. . . Bar deliveries more difficult. . . Pig iron situation easier. . . . Salvage section pushes dormant scrap campaign

DEMAND
Plate buying heavy.

PRODUCTION
Steady at 99½ per cent.

PRICES
Ceilings set on steel seconds.

INCREASED demand for steel, which appeared recently after a slight lull in buying, continues and is gaining force, says STEEL.

Compared with a fortnight ago inquiry is livelier and booking of orders is on a wider scale. Part of this increase is attributed to placing of plate orders for April rolling. Ship requirements are larger, both from builders and subcontractors on parts and equipment. More specifications are coming out for synthetic rubber units and railroad and carbuilding requirements are increasing. Specifications for steel going into high-test gasoline plants are well maintained and a further phase of this program is expected to require additional material within a short time.

Mills are operating more smoothly because of better planning on output and character of production. Directive orders are more stable, and fewer changes in mill equipment are required, making for longer runs and less lost time. This results in much greater efficiency and adds appreciably to tonnage turned out.

♦ ♦ ♦

Larger plate tonnage now being allocated is being handled better than in the past, as added experience has avoided former confusion. Even under these improved conditions plate demand is so strong that tonnage with ratings as high as AA-1 sometimes can obtain only extended delivery. After shipyards and their subcontractors are served each month little is left for others. Demand from these sources is constantly broadening. Structural fabricators engaged on work foreign to their normal lines, including gun mounts, are requiring large plate tonnages.

March pig iron allocations are expected to be larger and over a wider range than in February, somewhat counter to the trend of recent months, during which many melters met decline in their business. Makers of pipe, stoves and machine tool castings still find demand lower than a few months ago. It is believed these have reached the low point for the present.

Deliveries on hot-rolled carbon bars are becoming more difficult, now extending to small and medium sizes as well as large sections. Some sellers of medium rounds recently quoting six to seven weeks now offer eight to ten weeks, others claiming 12 weeks as their best. Smaller rounds are available in five to six weeks and large sizes in 12 weeks, the tendency being to longer periods. Some can promise little before June or July. Some progress is being made in substitution of bessemer for open-hearth steel and deliveries of the former are being extended proportionately.

Public Roads Division has awarded 14,000 tons of structural steel for bridges on the new Alaska-Canada highway. Prices are on a negotiated basis and the tonnage was divided among eight producers of the 26 bidders.

Industrial Salvage Section of WPB is pushing its projects for recovery of dormant scrap, working under an estimate that 13,000,000 tons of purchased material will be needed during first half, the larger part to come from industrial sources. Regional chiefs are being urged to exert every effort to bring out everything available in their areas. The government is also pressing its program of industrial salvage from shipyards, Army and Navy establishments and other agencies. The current easy situation has a tendency to relax efforts and measures are being taken to counteract this effect as far as possible.

♦ ♦ ♦

Office of Price Administration has issued an amendment establishing dollar prices on secondary flat-rolled products from warehouse, including rejects, wasters, waste-wasters and side and end shearings. Reductions are 10 to 35 per cent and parallel mill reductions made last September. This action will end confusion over prices of these materials which has existed for some time.

Production last week unchanged at 99½ per cent of capacity. Chicago advanced ½-point to 101½ per cent, Wheeling 3½ points to 83½, Buffalo 2½ points to 93 and Cleveland 1 point to 93½. Pittsburgh dropped ½-point to 98½ per cent, Cincinnati 4 points to 91 and Detroit 2 points to 91. Rates were unchanged at Youngstown, 97; New England 95; Eastern Pennsylvania 95; Birmingham, 100; St. Louis, 91.

Composite average prices of steel and iron are steady, held immovable by OPA ceilings. Finished steel composite is $56.73, semifinished steel $36.00, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Feb. 27	Feb. 20	Feb. 13	One Month Ago Jan., 1943	Three Months Ago Nov., 1942	One Year Ago Feb., 1942	Five Years Ago Feb., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.05
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.92
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.70

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 27, 1943	Jan. 1943	Nov. 1942	Feb. 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron

	Feb. 27, 1943	Jan. 1943	Nov. 1942	Feb. 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$6.50	$6.00	$6.00	$6.00
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bll.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c, (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Pheonixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel Blk.	Galv.		Iron Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

	Lap Weld Steel Blk.	Galv.		Iron Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base. per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	66
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	...	...	28.15
Birdsboro, Pa., del	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	‡19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	...	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.75	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	...	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	...	.....	.....
Steelton, Pa., base	...	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54

(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	3.98[1]	3.85[1]	3.85[1]	5.66[1]	3.71[1]	4.06[1]	5.06[1]	5.11[14]	4.68[14]	4.13[21]	3.46	7.75[23]	6.05[23]
New York	3.84[1]	3.75[1]	3.76[1]	5.56[1]	3.58[1]	3.96[1]	3.96[1]	5.00[13]	4.60[1]	4.09[21]	3.51	7.60[23]	5.90[23]
Philadelphia	3.85[1]	3.55[1]	3.55[1]	5.25[1]	3.55[1]	3.95[1]	4.45[1]	4.90[16]	4.63[15]	4.06[21]	3.31	7.56[23]	5.86[23]
Baltimore (city)	3.85[1]	3.70[1]	3.70[1]	5.25[1]	3.50[1]	4.00[1]	4.35[1]	5.05[17]	5.00[20]	4.04[21]	....	....	....
Baltimore (country)	3.85[1]	3.70[1]	3.45[1]	5.25[1]	3.25[1]	4.00[1]	4.35[1]	4.75[17]	5.00[20]	4.04[21]	....	....	....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[20]	4.03[21]	....	....	....
Norfolk, Va.	4.00[1]	4.05[1]	4.05[1]	5.45[1]	3.85[1]	4.10[1]	4.10[1]	5.40[17]	4.50[24]	4.15[21]	....	....	....
Bethlehem, Pa.[a]	3.45[1]	....	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.[a]	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.[a]	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[15]	4.30[10]	3.75[21]	3.52	7.35[23]	5.65[23]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[15]	4.20[10]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.00[24]	3.65[21]	....	7.45[23]	5.75[23]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[24]	3.65[21]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[21]	3.20	7.55[23]	5.85[23]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[21]	....	....	....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[12]	4.30[24]	3.80[21]	3.40	7.67[23]	5.97[23]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[10]	4.37[24]	4.00[21]	3.45	7.69[23]	5.99[23]
Youngstown, O.[a]	....	....	....	....	....	....	....	4.40[13]	....	....	....	....	....
Middletown, O.[a]	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[10]	4.10[24]	3.75[21]	3.50	7.35[23]	5.65[23]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[10]	4.00[24]	3.65[21]	....	....	....
Milwaukee	3.68[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[10]	4.23[24]	3.88[21]	3.54	7.33[23]	5.88[23]
St. Paul	3.75[2]	3.80[2]	3.80[2]	5.40[2]	3.50[2]	3.85[2]	3.85[2]	5.00[2]	4.35[2]	4.34[21]	3.83	7.70[23]	6.00[23]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[10]	4.24[24]	4.02[21]	3.61	7.72[23]	6.02[23]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[10]	4.25[24]	3.97[21]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[10]	4.00[24]	3.97[21]	....	....	....
Memphis, Tenn.	3.90[5]	3.95[5]	3.95[5]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[11]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[5]	3.55[5]	3.55[5]	5.83[5]	3.45[5]	3.70[5]	3.70[5]	4.75[10]	4.78[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[5]	3.45[5]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[10]	4.78[24]	4.43[21]	....	....	....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[20]	4.95[10]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[10]	4.60[21]	....	....	....
Houston, Tex.	3.75[2]	4.25[2]	4.25[2]	5.50[9]	3.75[2]	4.30[2]	4.30[2]	5.25[16]	5.43[10]	4.50[22]	....	....	....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[18]	7.15[8]	5.70[22]	....	9.55[23]	8.55[18]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[19]	7.55[19]	5.55[23]	....	9.80[9]	8.80[9]
San Francisco (country)	3.85[1]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[19]	7.45[19]	5.45[23]	....	....	....
Tacoma	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.70[6]	6.63[24]	5.75[23]	....	....	....
Seattle (city)	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.35[6]	5.45[6]	5.70[6]	6.63[24]	5.75[23]	....	....	8.00[9]

[a]Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [34]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African 48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50
less $7 freight allowance	

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	....	....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9587	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES — Low Phos. Grades: Billet, Bloom Forge Crops	Low Phos. Grades: Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate: 3 ft. and less	Heavy Structural, Plate: 2 ft. and less	Heavy Structural, Plate: 1 ft. and less	Foundry Steel: 2 ft. and less	Foundry Steel: 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	...	...	...	...	...	...	...	...	...	...
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails: 3 ft. and under	Scrap Rails: 2 ft. and under	Scrap Rails: 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the 'corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

LOGEMANN Presses for Sheet Scrap

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

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In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

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Sheets, Strip . . .

Sheet & Strip Prices, Page 146

Occasional CMP orders are being received by sheet producers and this is believed to be the forerunner of more active demand, which has been slow the past few weeks. This is attributed to government controls and has enabled mills to put books in better shape for the new system, despite heavy backlogs in the lower ratings. Gradual adjustments in the past few months have brought a broader, better balanced schedule. A feature in these adjustments has been an increase in high-rated demand for electrical sheets.

Quotas of semifinished steel are fairly steady and heavier rolling schedules are possible than was the case during part of last year.

Deliveries are little changed but the tendency is toward longer promises. In general seven to eight weeks is required on new bookings, though on some specifications for hot-rolled six or even five weeks can be done. Shipments of cold-rolled sheets generally are slightly more extended than on hot-rolled.

New business in both hot and cold-rolled sheets continues light and most mills have labor problems resulting from light working schedules and opportunities for better wages elsewhere. Larger mills are handicapped by many orders for small tonnages, which interfere with rolling schedules. Many mills are not flexible enough to handle these small quantities and schedules have become tangled and deliveries difficult.

On mills converted to plate production increase of plate demand is reducing time available for sheet rolling. Many mills which cannot be converted to plate production have much idle time.

Pending concentration of galvanized sheet production in a few mills those normally producing this material continue to accept orders but it is not certain these orders will be completed before the program goes into effect.

CMP allotment numbers, some with preference ratings, are appearing with a few orders for narrow cold strip steel. Incoming volume is in excess of shipments, fabricators in more instances placing tonnage freely against anticipated allocations under CMP, up to 70 per cent for the first two months of second quarter. Requirements for cartridge clips are lower; that for links is holding and needs for cups are heavier. One eastern producer is expanding to nearly 5000 tons per month for the latter. Annealing capacity is a bottleneck with some processors. Hot strip deliveries are keyed to directive allowances with no excess rerollers beyond that point.

Plates . . .

Plate Prices, Page 147

Demand for steel plates is orderly but tonnage is larger. Shipbuilding requirements are heavier and fabricators engaged in production of gun mounts, ship assembly work and other war work somewhat foreign to their normal business are specifying more freely. Within the past few weeks heavier allocations of war work have been made to these shops.

Heavier orders have also been received from railroads and railroad equipment builders, mainly maintenance work from the former. A locomotive builder in the East is placing orders for plates and other steel products for ten locomotives for Nashville, Chattanooga & St. Louis and for 50 diesel locomotives for unstated purchasers.

This month has seen the first important buying of steel for freight cars in some time. Much of this is against the 20,000-car program for domestic railroads, the final releases against which were made a few days ago. Indications are that most steel for this purpose will be rolled in second quarter.

In general shipyards are the largest purchasers of plates in the East, with fabricators next, despite the sharp curtailment of building, and warehouses third.

So strong is demand for plates that some tonnage with ratings as high as AA-1 frequently is extended in rolling schedules, depending on urgency of need. Tonnage for warehouses is also affected, indicating that highly rated orders and extensions do not assure a favorable place in allocations. After shipyards and their subcontractors are covered each month little plate tonnage is left for other fabricators. More tonnage is required each month as shipbuilding broadens.

Plate schedules for allocations must be in 30 days before the month of rolling and experience in ordering has lessened confusion, though first allocations are sometimes revised in emergencies. To fill gaps in small and sheared lots, demand on warehouses is substantial.

Contracts for 14 coastal cargo vessels have been awarded to builders on the Great Lakes and Gulf Coast. The ships are to be 258 feet long and are contracted on a fixed-price basis of $950,000 each, to be delivered this year. Barnes-Duluth Shipbuilding Corp., Duluth, will build eight and Ingalls Shipbuilding Corp., Decatur, Ala., six.

Bars . . .

Bar Prices, Page 146

Deliveries on hot-rolled carbon bars are becoming more extended, this change applying to small and medium-sized rounds as well as to larger sections. Some sellers in the East who recently were quoting six to seven weeks on medium rounds, about ⅝ to 1¼ inches, now quote eight to ten weeks. Some will not quote, even tentatively, under 12 weeks, although their deliveries for some time have been well above average. Small rounds still are available in some instances within five to six weeks, but the tendency is toward longer schedules. In large rounds and flats at least 12 weeks is the best that can be done. Some sellers can offer little before June and others have little before third quarter. So tight is the situation in large rounds that some producers refuse any promise.

Little tonnage has been ordered under CMP and there is doubt if forms are in full accordance with regulations. Sellers are being guided by priority ratings until the situation is clearer. While plans call for full application of CMP by third quarter some trade leaders doubt if the system will be fully under way by that time and expect PRP to be operating in some instances into fourth quarter.

Limitations on supply of semifinished and concentration on some sizes, the latter frequently shifting, makes for an uneven overall production schedule. Demand for bessemer steel for screw machine work is slightly heavier and this grade is moderately more active in other directions. Bessemer deliveries are tightening but still are better than open-hearth and electric furnace steel.

Agricultural implement builders express doubt that they can increase production to the extent that recent steel allowances would indicate. This is because a large part of their schedules call for heavy types which require parts made from alloy steel, deliveries on which are extended.

Pipe . . .

Pipe Prices, Page 147

Seamless boiler tubes are among the tightest of steel products, four or five months being the best delivery some producers can promise. Distributor stocks are low. Coupled with heavy demand, limited supply of semifinished accounts for this tightness with most tube mills. Another factor is diversion of steel for small welded tubing. More users are turning to electric welded tubing and lapwelded for pressure needs in view of the tightness in seamless. Demand for butt weld pipe by plumbing jobbers is off, restricted by curtailed building and repairs, and, while some fair orders for direct shipment on lapweld are noted, buying has slackened. This lower demand has not enabled distributors to balance stocks to the point expected, due largely to close scheduling of steel to pipe mills.

Wire

Wire Prices, Page 147

Order backlogs for wire products at most points have been reduced to 60 days or less. A fair volume of merchant wire business is moving, particularly in lighter products. Some capacity is idle in nearly all departments of wire mills and difficulty is met in maintaining full crews, many men leaving for other work promising continuous operations and better earnings.

Demand for manufacturers' wire items is steady on mill orders and through warehouses. Some producers are hopeful that the tendency to aid the farmer may bring modifications of restrictions on production for agricultural use. Practically all fencing, barbed wire and miscellaneous items now available are light gage items which under normal conditions the farmer would not buy. However, the market is active, as these are the only material available.

New orders for wire products are in excess of shipments and somewhat broader. Buying is concentrated on material required for war, making for a somewhat uneven balance in backlogs. Users have clarified requirements under CMP and PRP to a greater extent and some orders, held in abeyance until recently, are entered. Mill production schedules subject to frequent revisions, are steadier. Allocations apply to most rod tonnage and of heavier sizes mills can supply little below AA-1. Welding wire is being produced at close to 250,000 tons annually, much heavy coated, and all electrodes are distributed through allocation. For every ton of finished steel produced approximately eight pounds of welding wire is now made.

Substantial volume of fine wire spe-

cialties requires four to eight weeks processing; annealing and special finish equipment is heavily loaded. Incoming orders are heavy, but spotty; some departments are at capacity while others drag. Busiest are fine specialties and a few lines of heavier goods; rope mills require large allotments of finished strand wire. Heavy demand for aircraft wires tends to mount. Production quotas for the most part are unchanged, but are flexible enough to meet emergency demand. Over-all production averages 80 to 85 per cent.

Rails, Cars . . .

Track Material Prices, Page 147

American Locomotive, New York, has booked an order for ten steam locomotives from the Nashville, Chattanooga & St. Louis. Application has been made to the Interstate Commerce Commission by the New York, Chicago & St. Louis for permission to issue $1,230,000 in equipment trust certificates to finance purchase of ten freight locomotives.

Estimates are heard that railroads may be permitted to purchase as many as 40,000 freight cars in last half, doubling the first half program. Production of steel rails this year probably will be restricted in some areas and enlarged in others, due to concentration of rolling in few mills, while others are kept busy on other products.

Structural Shapes . . .

Structural Shape Prices, Page 147

Most important tonnage of structural shapes awarded for some time is 14,000 tons for bridges on the Alaska-Canada highway. Public Roads Division opened bids Feb. 13 from 26 fabricators and awarded the tonnage to eight firms on negotiated bids. The successful bidders are: Dominion Bridge Co., Winnipeg, Man.; United States Steel Export Co., New York; Stupp Bros. Bridge & Iron Co., St. Louis; Pittsburgh-Des Moines Steel Co., Pittsburgh; St. Joseph Structural Steel Co., St. Joseph, Mo.; Hassel Iron Works, Colorado Springs, Colo.; Joseph T. Ryerson & Son Inc., Chicago; Des Moines Steel Co., Des Moines, Iowa.

Fabricators, confronted with an almost total lack of new business, and resigned to a long period with building construction restricted, find they can perform work of a nature that they had not previously considered within their field. Included is miscellaneous work, involving plate fabrication, for use in the shipbuilding and maritime program. However, this is not obtainable in sufficient volume to keep facilities fully occupied, and all shops are grasping for anything they can get. Some interest was generated in about 10,000 tons of steel for bridges for the Alcan highway, which has been distributed. Shape mills have declining backlogs, in spite of the fact that shipwork has partially offset the loss from building construction.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 147

Buying of reinforcing bars has reached a low point. January placements totaled less than 20,000 tons, about 14,000 tons being domestic business and the remainder for export. February will show a lighter tonnage unless two or three large pending jobs are placed. Most tonnage this month has been for rail steel. The pending projects call for both billet and rail steel. One of these is for barges, specifying all billet steel and tonnage is expected to be about 30,000 tons. Two other jobs of similar size will take both rail and billet steel.

Warehouse stocks of new billet steel bars now total about 100,000 tons, according to careful estimates. Total backlogs of orders for all reinforcing bars, both rail and billet steel, now total less than the average 30-day output of the industry last year. Easing of specifications to permit use of reinforcement in many construction projects formerly prohibited may aid the situation somewhat.

Pig Iron . . .

Pig Iron Prices, Page 148

In view of applications for March pig iron allocations made early in February it is generally believed tonnages will be heavier, not only because of the longer month but because requests on a daily basis were somewhat larger. It also is possible the tonnage will be more widely distributed as it appears more companies applied and with good priority ratings.

This is somewhat different from the trend of the past few months, during which some melters have experienced easing in their business. This has been true not only in connection with pipe and stove makers but with producers of machine tool castings. However, it

is indicated that in at least some districts the low point in pig iron melt has been reached for the time being.

Little extra pressure is being exerted for deliveries. Where a few months ago many foundries sought deliveries as early as possible they now in most cases let deliveries take their course and in some instances have asked sellers to hold their tonnage as late in the month as possible.

Scrap . . .

Scrap Prices, Page 150

Fearful that easing in the scrap situation may tend to cause relaxation in efforts to bring out material and that another summer shortage may result, Industrial Salvage Section of WPB is pushing its efforts to get dormant scrap into the open. It is estimated that 13,000,000 tons of purchased material will be required for first half steel mill supply.

Meanwhile, supply continues sufficient and little recourse is had to reserves, though occasionally this is necessary. Labor shortage is still a factor in scrap preparation but in spite of this grading is continued to a degree that is keeping up shipment.

Buffalo mills are well supplied and in some cases reserves accumulated before winter set in have scarcely been touched. Yard operators are receiving good supply and buying is relatively light by major consumers. Suspension of turnings shipments by a leading melter is still in effect and dealers have difficulty in moving these grades. Industrial Salvage Section reports over 9600 tons was collected from Jan. 21 to Feb. 20 in the Buffalo area.

Cincinnati melters have sufficient scrap to last until open weather of spring may be expected to increase collections. Foundry demand for better grades of cast scrap is heavy and supplies limited. A recent general drive yielded less tonnage and less desirable grades than a similar campaign last fall, perhaps indicating exhaustion of sources tapped by special appeals last year. Foundries are becoming more critical of material offered them.

Better weather has brought a slight increase in scrap receipts in the Chicago area but shortage of workers in yards is hampering preparation. Some dealers are refusing to take further material into yards until the labor situation is cleared. Request for authority to raise wages has not yet been answered and manpower losses continue. Steelmakers are dipping into reserves as current shipments fail to meet needs.

In eastern Pennsylvania increased interest is shown in heavy breakable cast. Electric furnace operators seem to be in comfortable position for the first time in several months. Cast iron pipe makers are well supplied, some having sufficient scrap for several months at probable rate of operation.

Allocations of scrap from the East to Pittsburgh and the Valley are fewer and deliveries on older orders are about completed. Consumers in that area are reluctant to pay the price resulting from high freight charges from some points.

Confusion increases in alloy turnings, production of which is high in some districts, with demand small, largely because of uncertain analysis. The proposal has been made that blast furnaces afford relief by making pigs of alloy turnings, to be sold by analysis.

Demand for chemical borings has softened slightly with the market mixed. Character of offerings has depreciated somewhat, soft dry material being tighter, due to the influence of alloys in current production. Users with heavier inventories ask that deliveries be spread over more extended periods and holding up

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

shipments by an Indiana consumer has brought offers to ship tonnage East against a high freight, nearly $8.

Dollar Prices Set On Jobber Seconds

Amendment 12 to revised schedule 49, setting dollar prices on flat rolled secondary steel from warehouse, effective March 1, has been issued by Office of Price Administration. Methods for operating under the new order were reviewed at meetings in New York and Cleveland last week, under the auspices of the Steel Products Warehouse Association Inc., E. L. Wyman, chief of the Warehouse and Jobbers Section of OPA, giving the explanation.

As of March 1 prices are reduced 10 to 35 per cent. The amendment covers rejects, wasters and waste wasters in hot, cold, galvanized, galvannealed and long terne sheets, sheared and universal plates and tin mill black plate.

The new dollar prices reflect closely mill reductions ordered by OPA last September. Nearly a million tons annually are affected. Prices on a delivered basis are given for each of the main warehouse districts of the country. On sales covered in the tables supplied, the seller will add freight from a city for which there is a base price.

Accompanied by schedules of permissible extras for shearing, slitting and other warehouse service, established warehouse prices on secondary flats vary from 90 per cent of prime quality quotations in case of rejects to 65 per cent for side and end shearings. Size restrictions for each product are also established.

Fixed dollar prices on rejects and other off-prime material are aimed to end confusion which has existed for more than a year. Delivered prices for semifinished secondary products are also established, at 110 per cent of the mill prime price, being bought at 85 per cent of the mill prime. The addition is to compensate for warehouse handling. Total tonnage is small. While charges for flame cutting plates more than one inch thick are unchanged, increased economies achieved in warehouse shearing and slitting are passed on to the consumer for most operations.

Iron Ore . . .

Iron Ore Prices, Page 149

Consumption of Lake Superior ore in January set a new record at 7,765,174 gross tons, in the United States and Canada, the previous high being 7,759,366 tons in December, according to the Lake Superior Iron Ore Association, Cleveland. In January, 1942, consumption was 7,158,423 tons. The gain in the year was due mainly to addition of six active furnaces, four in the United States and two in Canada. The increase in the United States more than offset the loss at Canadian furnaces by the recent strike.

Total ore stocks at furnaces and on Lake Erie docks Feb. 1 aggregated 39,742,766 tons, compared with 47,424,421 tons Jan. 1 and 33,919,063 tons a year ago. Of the furnace stocks 33,815,476 tons was held in the United States, compared with 29,627,177 tons a year ago.

Active furnaces in the United States Feb. 1 totaled 175, the same as on Jan. 1, compared with 171 on Feb. 1, 1942. Seven furnaces were idle in the United States, compared with ten on the corresponding date in 1942.

Tungsten Ore . . .

Information that some non-marginal producers of tungsten ores and concentrates were considering an advance in price over current levels has led the Office of Price Administration to state its conclusion that no increase in price is justified.

Confusion has arisen, says OPA, over a recent announcement of the revised buying schedule of the Metals Reserve Co., which advanced prices from $24 to $30 per unit to "eligible and new" domestic tungsten ore producers. Production by these interests was in fact marginal and submarginal. No bulk-line advance generally was contemplated.

OPA calls attention to its approval of the following prices for tungsten ore and concentrates as sold by the Metals Reserve Co. to consumers: Wolframite and ferberite, $24 per unit for ores of Metals Reserve Co. standard specifications; scheelite and huebnerite, $25 per unit for ores containing 60 per cent tungsten trioxide meeting Metals Reserve Co. maximums for impurities, with 20 cents premium per 1 per cent tungsten trioxide above 60 per cent up to and in-

cluding 70 per cent and 10 cents per 1 per cent to and including 75 per cent, with a penalty of 20 cents for cash 1 per cent down to and including 55 per cent.

Prices are f.o.b. New York, plus a 10-cent per unit handling fee.

Pacific Coast . . .

Seattle—More heavy melting scrap is required to supply demands of rolling mills in this area to enable them to keep the 1943 schedule. While large stockpiles were accumulated in recent months, it is found that the proportion of light gage material is so large that a lack of heavier materials is felt. This is the substance of a report by L. W. Eilertsen, chairman of the state salvage drive committee, to James O. Jensen, regional chief of WPB. Future efforts will be made to increase supplies from industrial plants and other sources of heavy scrap. There are still large accumulations of scrap at various centers ready to be serviced for melting but shortage of the better grades is pronounced. At the moment, mills are receiving large supplies but a record amount of material will be necessary for the year's consumption. In the last six months 96,000 tons of metal have been gathered in Washington state in addition to 8000 tons of nonferrous materials and rubber. There is a strong demand for nonferrous scrap, particularly copper, brass, bronze and aluminum.

Washington state received bids at Olympia Feb. 25 for sale of 3700 tons of steel wire cable salvaged from the Narrows bridge.

Tacoma has awarded contract to supply 325 tons of 12 and 16-inch cast iron pipe to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co. At Bremerton, Wash., 100 tons of 12-inch cast iron pipe is pending, the general award having been made. Several major housing operations are under way in this area, for which a large tonnage of water pipe will be required.

Purchase of 50 acres on Tacoma's tideflats by the Navy is announced. This move indicates a major addition to the plant of the Seattle-Tacoma Shipbuilding Corp., now operating at capacity. J. M. Martinac and associates have purchased a waterfront site at Tacoma where it is planned to install a large yard for wooden ship construction.

Ross B. Hammond, Portland, Ore., is low at $218,660 for construction of addition to plant No. 2, Columbia Steel Co., 734 N. E. Fifty-Fifth street, Portland, Ore. The structure will be 400 feet in length, steel frame and fireproof.

Port of Seattle has received bids for construction of a 50-ton electric shear leg derrick, at the East Waterway terminal.

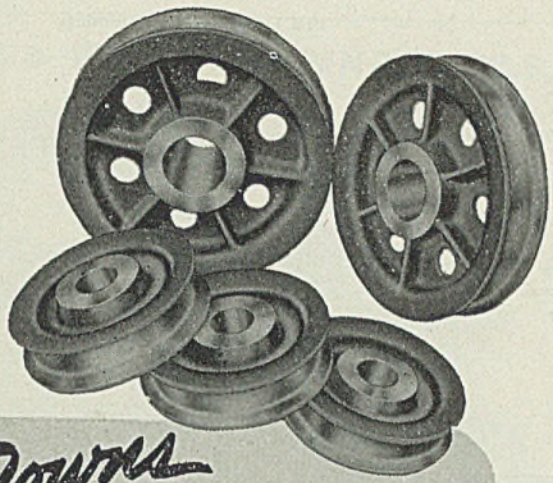
Canada . . .

Toronto, Ont. — Improvement was reported in new business, with most of the orders for delivery in second quarter. Some specialized buying also has been reported for quick delivery by consumers that have run out of supplies as the result of the strike at Algoma Steel Corp., last month. Further announcements have been made regarding changes in the Canadian shipbuilding policy, involving more attention to building of escort and fighting ships.

It is estimated that Canadian plate requirements this year will reach a total of close to a million tons, less than half of which can be provided by domestic mills. In addition to increasing demand for plate on shipbuilding account, numerous smaller orders are appearing from other consumers, with specially heavy call reported for ¼ and ⅜-inch.

Sheet buying has developed more action, with a large flow of orders from consumers other than top-ranking war industries. Demand is absorbing all available supply of galvanized sheets, production of which has been cut to a minimum. Warehouse operators also report growing demand for sheets in small lots.

While there was some improvement in deliveries of bars, a number of consumers still complain of shortage for current needs. Sales are well sustained and bookings now are being extended to the end of second quarter. Local mill representatives state that on pressing war contracts delivery may be had anywhere from three to five weeks, while on most other orders shipment can reasonably be expected in six to eight weeks, but delivery has no guarantee. The supply situation is tightening, chiefly due to the fact that supplies are not so plentiful from the United States. Canadian producers are endeavoring to meet domestic requirements of alloy steels and it



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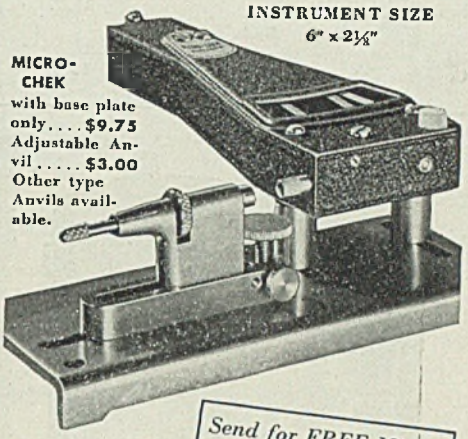

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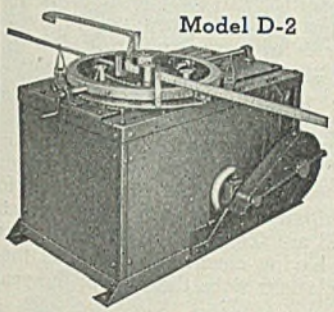
Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal bender. With this bender when binding large bars it is not necessary to turn bars over to make reverse or second bends or 180 degree hook bends. The Model D-2 is equipped to bend bars around collars from 2 inch to 6 inch in diameter. Also made to bend up to 8 inch in diameter. Capacity of Model D-2 1¼ inch Square Bars. The Model D-2 is a production bender for concrete reinforcing steel for shop or fabricating plant. Ask for our catalog of our complete line of reinforcing bar benders.

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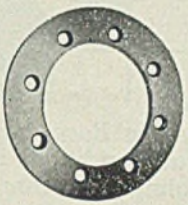

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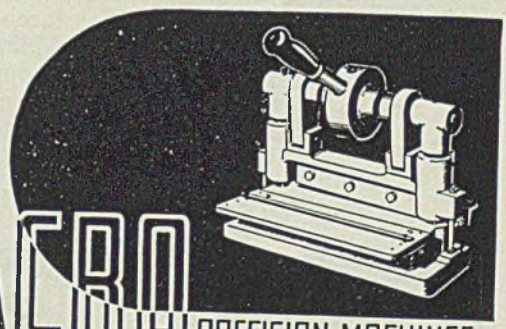

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Nonferrous Metal Prices

Feb.	Copper, Electro, del. Conn.	Copper, Lake, del. Midwest	Copper, Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-25	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets	
Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15
Tubes	
High yellow brass	22.23
Seamless copper	21.37
Rods	
High yellow brass	15.01
Copper, hot rolled	17.37
Anodes	
Copper, untrimmed	18.12
Wire	
Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper	
No. 1 heavy	9.25-10.00
Light	7.25- 8.00
Brass	
No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50
Zinc	
Old	4.75- 5.00
New clippings	6.00- 6.50
Aluminum	
Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25
Lead	
Heavy	4.75- 5.25
Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75
Tin and Alloys	
Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

is stated output now is about equal to demand. However, no large surplus stocks are reported.

Some easing in demand for merchant pig iron was noted. This is partly due to the fact that most melters have made known their immediate requirements, and improvement in weather conditions may result in some additional supply of iron scrap. Deliveries for the week held at approximately 7000 tons, for foundry and malleable grades, with about 1000 tons of basic iron, while orders dropped to approximately 5000 tons. Melters are not permitted to place quarterly contracts for pig iron, thus practically all business is of a spot nature.

Mild weather has brought a more optimistic tone to the scrap iron and steel markets, as well as some improvement in dealers' receipts. However, offerings are all from local sources of supply, chiefly war plants, but dealers look for early shipments from some outside points. Dealers are carrying only small yard stocks, having cleaned out most of their accumulations since the turn of the year.

Steel in Europe

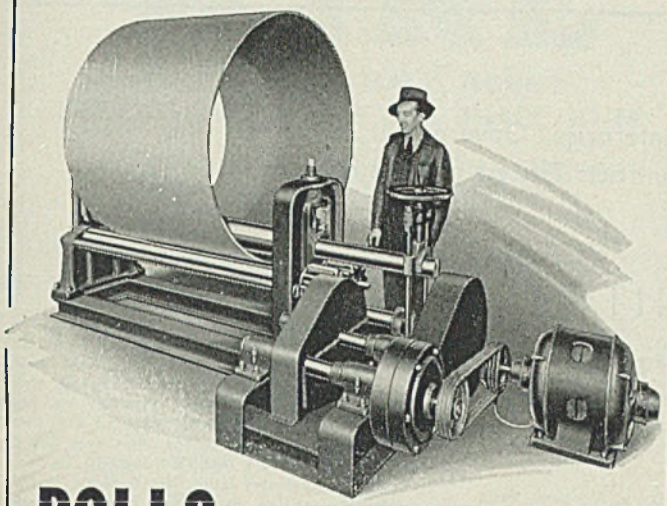
London—(*By Radio*)—Plate demand is the feature of the steel market in Great Britain as shipbuilding and tank construction call for larger supply. Heavy structural steel is in somewhat less demand but light sections are more active. Heavy forward bookings of steel sheets are being made.

NE Steel Extras Revised

Carnegie-Illinois Steel Corp. has issued a revision of extras for alloy content of NE steels in the form of bars, bar strip, billets, blooms and slabs. Ten grades are eliminated and six added. The extras on the additions, which are all in the NE 8600 series, are the same as previously announced.

The grades added are NE 8635, 8637, 8640, 8642, 8645, and 8650. Grades dropped are NE 8022, 8339, 8715, 8722, 8735, 8739, 8740, 8744, 8749, and 8949.

WEBB PLATE BENDING ROLLS



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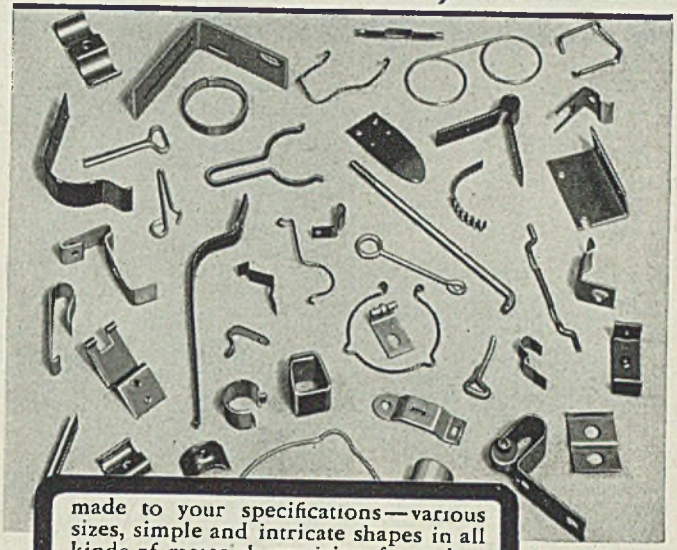

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BEALL KANT-LINK SPRING WASHERS

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BEALL Spring Washers compensate for wear, bolt-stretch, corrosion and break-down of finish. They meet rigid Army, Navy and Air Corps specifications. Available in Carbon Steel, Stainless Steel, Phosphor Bronze, Everdur and Monel Metal. Finished in Cadmium Plate, Galvanized, Silver and Parkerized. IMMEDIATE SHIPMENT of all standard sizes.

WIRE US your requirements
BEALL TOOL CO. (Div. Hubbard & Co.)
EAST ALTON, ILLINOIS

THE SIMONDS GEAR & MFG. CO.

25TH STREET, PITTSBURGH, PA.

To all gear users:

1942 marks our 50th year in the gear business; this means that our quality gears are now backed by half a century of experience in the manufacture of all types of dependable gears—spur, bevel, mitre, worm, rack, internal, etc. If we haven't just the type you need, we can make it—and in a hurry, too!

WIRE STRAIGHTENING and CUTTING MACHINERY

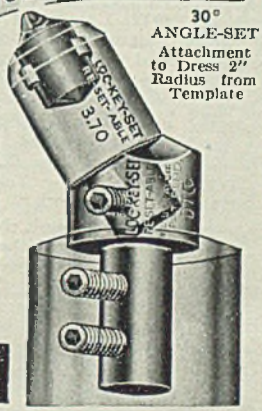
HIGH SPEED Machines for round wire, flat wire, welding wire, all kinds of wire.

The F. B. Shuster Company
New Haven, Conn.

Straightener Specialists Since 1866

DIAMONDS *for Victory*

CENTERLESS GRINDING WHEEL (Template Dressing)



30° ANGLE-SET Attachment to Dress 2" Radius from Template

SPEED PRODUCTION—Improve Finish

Only $10.00 Extra. Requires only Common Quality Diamonds. BIG-HED Nibs to fit $12.00 per carat (3 to 4 carat size RE-SET-ABLE recommended.)

LOC-KEY-SET Rotate Nib to Sharpen

Enables bullet nose grinders to use common quality diamonds to dress form wheels by dressing from 1" to 6" radius with the ANGLE-SET. Mean fixed position of nib prevents wear of setting and eliminates hazardous use of thin diamonds.

Send specifications and prints for prices on turning and boring form tools.

DIAMOND TOOL COMPANY, Not Inc.
Sheldon M. Booth, Pres.
938 E. 41st Street CHICAGO, ILL.

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Keefer-2-2: A Pennsylvania contractor requires subcontracting facilities to produce 200,000 heads monthly, starting at once. Equipment, multiple-spindle screw machines. Materials, steel, WD1020 or WDX112. Dimensions, length 1 inch, O.D. .615-inch. Tolerances, plus .001, minus .002. External threading. Print at Philadelphia office.

Buescher-1-1: A Pennsylvania manufacturer requires additional facilities for machining top cap and adjusting cap for 60,000-pound universal testing machine. Equipment, horizontal boring machine, 2 or 3-inch bar; planer, 24 inches wide; drill press; slotter; No. 4 milling machine. Tolerance, plus or minus .002. Experience required, deep boring. Bore diameter, 1¼-inch, length 33½ inches. Overall dimensions, 41¾ inches long x 9 inches wide X 7⅜ inches high. Material, cast steel, castings to be furnished. Prints at Philadelphia office.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 4821: Ball stud bearing. Quantity, 50,000. Material, steel. Equipment, punch press, coining press, heat treat. Dimensions, 1 1/16 O.D. x 13/32-inch. Tolerance, plus or minus .001.

Job No. 4853: Lock. Quantity, 14,000 per month. Material, bronze, furnished. Equipment, screw machine, horizontal mill. Dimensions, 29/32-inch O.D. x 23/64-inch long. Tolerance, plus or minus .001.

Job No. 4875: Hook, 10,000 per month. Material, steel forging. Equipment, board drop hammer, pickle or sand blast. Dimensions, 11 x 7 1/16 x 2 inches overall. Tolerance, plus or minus .030.

Job. No. 4876: Strap, 10,000 per month. Material, steel forging. Equipment, board drop hammer, pickle or sand blast, coining press. Dimensions, 10½ x 5⅛ x 2¾ inches overall. Tolerance, minus .015.

Job No. 4912: Connecting rod bearing, 2000 pieces. Material, steel tube, furnished. Equipment, hand screw machine, high-duty drill. Dimensions, 2¼-inch O.D. x 1⅜-inch long. Tolerance, plus or minus .0025, 155 micro.

Job No. 4913: Bushing, 2000 pieces. Material, steel tubing, furnished. Equipment, hand screw machine, lathe. Dimensions, 2¼-inch O.D. x 1⅜-inch long. Tolerance, .0025, 155 micro.

Job No. 4917: Internal shaft bearing, 2000 pieces. Material, steel tube, furnished. Equipment, hand screw machine, heavy-duty drill. Dimensions, 2 inches O.D. x 2 1/16-inches long. Tolerance, plus or minus .0025, 155 micro.

Job No. 4520: Worm adjuster, 10,000 pieces. Steel furnished. Equipment, automatic or hand screw machine, hand mill, lathe. Dimensions, .953-inch O.D. x 3¼-inch long. Tolerance, plus .000, minus .002.

Job No. 4304: Driving pinion, 100 per day. Steel available. Equipment, hand screw machine, key seater, gear hobber, internal grinder. Dimensions, 1¼-inch O.D. Tolerance, plus .001, minus .000.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-70: Horizontal boring mill work for machines having from 5 to 7-inch diameter bar. Secondary operation on vertical boring mill having 72-inch rail height. Approximate dimension of item 30-inch diameter by 72 inches long. Tolerance, plus or minus .001. Weight, 7900 pounds. Material, cast steel, supplied by prime contractor. Quantity, 25 pieces, to be sublet in small quantities if necessary. Reference, 1-A-578.

SC-71: Toolmaking facilities for supplying drill jigs and milling fixtures. Material supplied by prime contractor. Concerns having jig borers preferred. Continuous work. Reference, 1-A-585.

SC-72: Toolmaking facilities for supplying plug and snap gages. Also thread gages. Small quantities, various sizes. Continuous work. Reference, 1-A-586.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-7-9836: A Buffalo prime contractor seeks subcontracting facilities requiring automatic screw machines for brass and steel ⅛-inch pipe fittings for aircraft. Quantity, 2500 to 105,000 pieces per month. Tolerance, .001.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson Boulevard, is seeking contractors for the following:

Ainsworth Mfg. Corp., 2200 Franklin street, Detroit, attention E. O. Hascall. Priority, AA-1. Ball stud bearing, subcontractor to furnish entire job, including material. Deliveries to start April 1, in lots of 10,000 to 100,000. Size, ⅜ x 1 inch. Material hot-rolled steel. Equipment, OBI press, 15 ton; coining press, 75 ton; surface hardening equipment.

American Gear & Mfg. Co., 645 West Sixty-fifth street, Chicago, attention N. A. Klipper. Priority AA-1. Various items to be machined from bar stock. Delivery of at least 200 per day required. Subcontractors in Chicago area preferred. Contractor supplies material. Equipment, turret lathe, 4½-inch bar capacity.

All-Steel-Equip Co. Inc., Aurora, Ill., attention P. E. Sweigart. Priority, AA-1. Two items, gland nut bushings. Quantities 5000 and 15,000 per week, continuously. Subcontractor to furnish material, but contractor will allocate under CMP. Dimensions, ½ x 1 inch. Material, cold-rolled steel. Equipment, 1¼-inch capacity single-spindle automatic screw machine. Tolerance, .006.

Automatic Transportation Co., 101 West Eighty-seventh street, Chicago, attention J. J. Elliott. Three items, steering ball case, right hand thread, same, left hand thread, ball seat. Contractor furnishes steel forgings for first two items. Quantity, 1500 each of first two, 3000 of third. Dimensions, first two 2 x 5 inches, third 1 x 1 inch. Equipment, 1½-inch bar capacity turret lathe, No. 3 Morse single-spindle sensitive drill, No. 2 Morse four-spindle sensitive drill. Universal speed lathe 8 x 14½-inch, heat treat, polish and buff.

American Perforator Co., 625 West Jackson boulevard, Chicago, attention J. R. Below. Four items with high priority, of alloy steel. Contractor can furnish material in about two weeks. Subcontractor to make delivery of finished products 10 days after receipt of material. Quantity 1000 each of three items, 4200 of the fourth. Dimensions, 1 x 1½-inch, 1 x 2¼-inch, ¼ x ¼ and ½ x ½-inch. Equipment, one-inch bar capacity turret lathe, ⅜-inch capacity turret lathe, single-spindle bench drill 5/16-inch drilling capacity.

General Electric Co., 1635 Broadway, Fort Wayne, Ind., attention Robert E. Bangert. Three items, connector, connector housing and locknut. Weekly production requirements, 5000 on two items and 10,000 on third. Contractor supplies material. Equipment, one-inch capacity single-spindle automatic screw machine, one-inch bar capacity turret lathe. Material, cold-rolled steel, aluminum.

Hoof Products Co., 6543 South Laramie avenue, Chicago, attention C. B. Seymour. Priority, AA-1. Inlet fitting with thread, No. 3 fit. Contractor will furnish material. Material, aluminum. Quantity, 19,000. Size, 1 x 1¼-inch. Equipment, 1½-inch capacity single-spindle automatic screw machine, ⅝-inch bar capacity turret lathe.

Link-Belt Co., 300 West Pershing Road, Chicago, attention Carl Urban. Priority AA-2X. Two items of cast steel housings. During operations these two must be bolted together before final boring. Delivery required at rate of 8 per month. Contractor furnishes steel castings. Quantity, 36 of each. Dimensions, 22 x 28 and 20 x 45 inches. Equipment, 4-inch spindle horizontal boring mill, 48-inch double-housing planer, 60-inch arm radial drill.

Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, attention R. H. Park. Contractor will furnish material and all tools for production of cup ¼ x ¾-inch. Equipment, ⅜-inch capacity single-spindle automatic screw machine. Machine must be equipped with vertical slide attachment and cross drilling attachment. Requirements, 300,000 at 50,000 per week, beginning March 1. Tolerance, .002.

Federal Motor Truck Co., 5780 Federal avenue, Detroit, attention M. L. Burrell. Priority, AA-1. Job is starting crank for motor truck. Requirements, 4000 at 500 per month starting March 15. Potential subcontractor may offer any suggestion to simplify manufacture of this item. Subcontractor supplies complete job, including material. Dimensions, ¾ x 32 inches. Material hot-rolled steel. Equipment, light-duty engine lathe 10 x 36 inches; two-spindle bench drill, ½-inch drilling capacity; ¾-inch capacity hand lever cold bending machine; bench lathe, 6 x 12 x ½-inch collet.

Hercules Motor Corp., Canton, O., attention

A. R. Miller. Heavy forging equipment for six-throw crankshafts. Quantity, 5000 each of three sizes, at 100 to 150 per day. Dimensions, 6 x 33, 7 x 37 and 8 x 42 inches. Material, steel forgings. Equipment, heavy forging.

Electric Auto-Lite Co., Toledo, O., attention F. W. May. Job comprises assembling of complicated electrical device known as turn control assembly, which serves with a gyro-pilot. Contractor supplies all component parts but no tools or equipment. Quantity, 4000. Dimensions, 5 x 7.

Pioneer Gen-E-Motor Corp., 5841 West Dickens street, Chicago, attention Joe Weiner. Priority, AA-1. Covers machining and assembly of various sizes of fractional horsepower armatures. Contractor furnishes commutators, slip rings and end fibers, remainder by subcontractor. Quantity 5000.

Stewart-Warner Corp., 1828 Diversey Parkway, Chicago, attention J. R. Brandenburg. Priority, AA-1. Two sleeves 1 x 1¼-inch, cold-rolled steel. Quantity 50,000 of each. Contractor will assist in obtaining material. Equipment, 1¼-inch capacity single-spindle automatic screw machine. Tolerance, .003.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

S.O. No. 331: Parts, knurled units ⅛-inch and bushings ⅜-inch. Equipment required, automatic screw machines. Material, cold-rolled steel. Quantities, 50,000 of each. Tolerance, reasonable. Deliveries to start at once. Prices, 1½ to 2½ cents each. Samples available.

S.O. No. 332: Parts, channels. Equipment, gang punch. Operations, cutting and punching six holes. Quantity, 8800. Material, furnished, 24-foot x 5-inch channels to be cut to 8-foot lengths. Dies supplied. Deliveries to start in 60 days.

S.O. No. 336: Part, shackle (cable, aeronautical). Material, 1020 steel, furnished. Quantity, 2000 each of nine sizes. Deliveries to start at once. Price, approximately 30 cents each, quotation to be based on parts plated as well as unplated.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

14,000 tons, for bridges on Alaska-Canada highway, awarded by Public Roads Division on negotiated bids, to eight fabricators.

REINFORCING BARS . . .

REINFORCING STEEL PENDING

300 tons, U. S. Veterans' hospital, St. Cloud, Minn.; requirements being reduced and bids postponed from Feb. 23 to March 16.

125 tons, U. S. Veterans' hospital, Marion, Ind.; requirements reduced to 80 tons and bids postponed from Feb. 16 to March 2.

PIPE . . .

CAST PIPE AWARDS

325 tons, 12 and 16-inch for housing project, Tacoma, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST PIPE PENDING

100 tons, 12-inch water system improvement, Bremerton, Wash.; general contract to Henrik Vallee Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Nashville, Chattanooga & St. Louis, 10 steam locomotives, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

New York, Chicago & St. Louis, 10 freight locomotives, with railroad filing request with Interstate Commerce Commission for approval to acquire such equipment.

BUSES BOOKED

Twin Coach Co., Kent, O.: Twelve 35-passenger for Washington, Virginia & Maryland Coach Co., Arlington, Va.; seven 31-passenger for Syracuse Transit Corp., Syracuse, N. Y.; six 41-passenger for Southern Coach Lines Inc., Chattanooga, Tenn.; six 41-passenger for United Electric Railways, Providence, R. I.; five 41-passenger for Southern Coach Lines Inc., Nashville, Tenn.; three 27-passenger for Peoples Transport Corp., Muskegon, Mich.; two 31-passenger for Dayton-Suburban Bus Co., Dayton, O.; two 31-passenger for Tri-City Railway Co. of Iowa, Davenport, Iowa; two 31-passenger for Tri-City Railway Co. of Illinois, Rock Island, Ill.; two 44-passenger for Georgia Power Co., Atlanta, Ga.; two 43-passenger for Cincinnati Street Railway Co., Cincinnati, O.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Industrial Rayon Corp., 9801 Walford avenue, is building $90,000 factory addition.

CLEVELAND—National Bronze & Aluminum Foundry Co., 4397 Hamilton avenue, John Schmeller, president-treasurer, is planning $18,000 alteration to plant.

CLEVELAND—Cleveland Graphite Bronze Co., James L. Myers, secretary, is starting another addition to plant at 16800 St. Clair avenue. The $100,000 addition will cover 16,500 square feet of space and will be two stories high.

ELYRIA, O.—Hahn Mfg. Co., Buckeye street, M. F. Hahn, owner, will build factory on

Race road, costing $30,000.

LORAIN, O.—Brush Beryllium Co. has under way an expansion program to cost $600,000. About $200,000 will be spent on an addition, and $400,000 for new equipment.

WARREN, O.—Gilmore-Carmichael-Olson Co., engineer and builder, Cleveland, has contract for a $7,000,000 addition to Copperweld Steel Co. plant here. Construction will include eight new buildings.

NEW JERSEY

BLOOMFIELD, N. J.—Walter Kidde & Co. Inc. has leased the former Townsend Lawn Mower plant at Glenwood avenue and Henry street, to provide 82,000 square feet of additional floor space.

NEWARK, N. J.—Vitascope Inc., maker of tools, has leased part of the building at 23-40 Marshall street.

NEWARK, N. J.—Lithium Corp., 1180 Raymond boulevard, has let contract for two-story plant to Roth Buermann & Co., 319 Mt. Pleasant avenue. Estimated cost $40,000. Charles A. Horton, 222 Clinton avenue, architect.

PERTH AMBOY, N. J.—Philip Carey Mfg. Co., Cincinnati, has purchased a 35-acre tract from this city. The property fronts on Raritan Bay and adjoins the Pardee Tile Works, which was purchased by the Ohio firm in 1941.

PENNSYLVANIA

ERIE, PA.—Separate contracts have been awarded for new units and rehabilitation of manufacturing plant here for Aluminum Forgings Co. Inc., 400 Vulcan street, Buffalo.

PITTSBURGH—Kerotest Mfg. Co., 2525 Liberty avenue, has taken bids for alterations to its plant. Stanley L. Roush, Chamber of Commerce building, Pittsburgh, architect.

MICHIGAN

BENTON HARBOR, MICH.—Alloy Castings Inc., 246 Fourth street, has been incorporated to engage in general foundry business; Jack A. Bianco, 1040 Beechmont drive, Dearborn, Mich., correspondent.

DETROIT—Haberkorn-Barry Co., Detroit, has general contract for factory for Die-Typing Corp., Pontiac, Mich.

DETROIT—Campbell Construction Co., 3255 Goldner, has contract for addition to factory at 5101 North Campbell street for Commercial Tool & Engineering Co.

GRAND RAPIDS, MICH.—Owen, Ames & Kimball Co., Grand Rapids, has been awarded contract for remodeling factory for testing laboratory for Michigan Light Alloys Corp., Grand Rapids.

SAGINAW, MICH.—Edward G. Wobig, Saginaw, has been awarded general contract for remodeling the former Lenmar factory buildings here.

INDIANA

EVANSVILLE, IND.—Schnake & Fawcett Co., 1307 First avenue, has plans by Walter Wagner, Breslin building, Louisville, Ky., for remodeling and building addition to factory. Warren & Ronald, Heyburn place, Louisville, mechanical engineers. Estimated cost $125,000.

MARYLAND

BALTIMORE—Eastern Aircraft Division of General Motors Corp., C. E. White 2122 Broening highway, has taken bids for alteration to manufacturing building.

BALTIMORE—Maryland Bolt & Nut Co. will take bids March 4 at office of Crout, Snyder & Crandell, 20 East Lexington street, for alteration and addition to plant at Mount Washington.

ALABAMA

SHEFFIELD, ALA.—Reynolds Alloys Corp., Sheffield, has let contract for plant addition to Andrew Weston Co., 7 East Forty-second street, New York. Estimated cost $100,000.

TENNESSEE

ATHENS, TENN.—Victory Mfg. Co., R. F. Ball, president, will soon take bids for addition to factory.

CLARKSVILLE, TENN.—City, William Kleeman, mayor, will construct water plant and distribution system. Estimated cost $30,000.

COLUMBIA, TENN.—City utilities board, E. E. Loftin, will spend approximately $210,000 for expansion of waterworks system.

MADISONVILLE, TENN.—City will extend water and sewer system. Estimated cost $60,000.

LOUISIANA

SHREVEPORT, LA.—Louisiana Public Utilities Co. plans improvements in electric, water gas and ice manufacturing system and plant. Estimated cost $175,000.

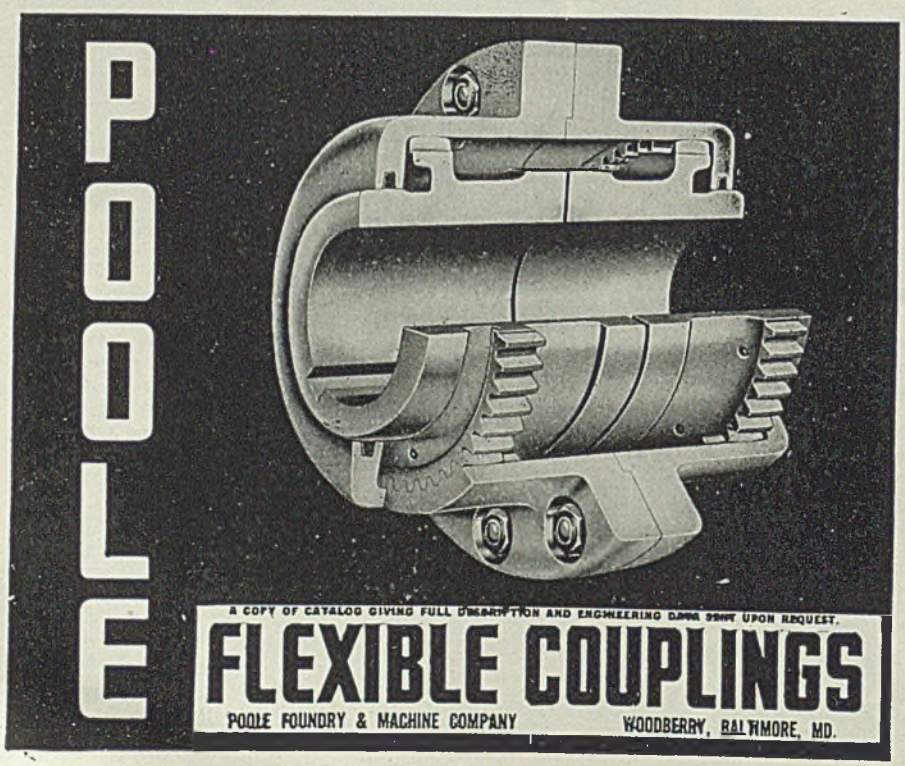
OKLAHOMA

ENID, OKLA.—Champlin Oil Refining Co. is rebuilding oil refinery.

TEXAS

AUSTIN, TEX.—E. B. Snead, Bull Creek road, Austin, has contract for sewage disposal plant in Kinney county, United States Engineer office, San Antonio, Tex., in charge. Cost under $50,000.

FORT WORTH, TEX.—Defense Plan Corp.



announces contract with Frank Kent Mfg. Co., Fort Worth, to provide equipment for plant in Texas.

GARLAND, TEX.—Continental Motors Corp., Garland, has asked bids for constructing and equipping plant. Gieb, La Roche, Dahl & Chappell, Texas Bank building, Dallas, architects.

MIDLAND, TEX.—Gulf Oil Corp., Petroleum building, Fort Worth, will build oil and gasoline and by-products wholesale plant, and install steel tanks and loading racks. Estimated cost $90,000.

WYOMING

LARAMIE, WYO.—Permanent Construction Co., Milwaukee, is building a pilot plant here for manufacture of sponge iron for the Bureau of Mines, at approximate cost of $600,000.

CALIFORNIA

EL SEGUNDO, CALIF.—Work will begin soon on butadiene plant here for Standard Oil Co. to cost approximately $6,200,000, and to be built by Bechtel, McCone, Parsons Corp., 601 West Fifth street, Los Angeles.

LOS ANGELES—Cannon Electric & Mfg. Co., 3209 Humboldt street, is having plans prepared for addition to factory to provide 5000 square feet of floor space. Estimated cost $12,500.

MARIPOSA, CALIF.—Henry Kaiser Co., Iron and Steel Division, Latham Square building, Oakland, Calif., will build crushing plant near here.

WASHINGTON

SEATTLE—Hydraulic Supply Co. will erect sand blasting building at plant at 7500 Eighth avenue South.

VANCOUVER, WASH.—Contract has been awarded for extensive additions to the Kaiser Co. shipyard here, to include a two-story addition to outfitting building, two-story electrical warehouse, etc.

CANADA

VANCOUVER, B. C.—Plans have been prepared for $37,000 addition to plant of Vivian Engine Works Ltd., 1100 North Sixth street.

HAMILTON, ONT.—Hamilton Foundry Co. Ltd., Clinton and Ruth streets, is considering plans for foundry addition to cost about $100,000, with equipment.

HAMILTON, ONT.—Otis-Fensom Elevator Co. Ltd., Victoria street, has started work with W. H. Yates Construction Co. Ltd., 400 Wellington street North, for addition to brass foundry. Hamilton Bridge Co. Ltd., Bay street North, has structural steel contract.

HAMILTON, ONT.—Hamilton Bridge Co. Ltd., Bay street North, has given general contract to W. H. Cooper Construction Co. Ltd., Medical Arts building, for addition to east end plant to cost $8000, and general contract to Frid Construction Co. Ltd., 126 King street East, for alterations to shop No. 1 on Barton street.

LONDON, ONT.—Acme Machine Co., 672 Bathurst street East, has given general contract to Putherbough Construction Co. Ltd., 320 Colborne street, for plant addition to cost about $10,000, equipment extra. Samuel Kohn, 136 Dundas street, architect.

ST. THOMAS, ONT.—British American Foundry & Machine Ltd., 102 Centre street, H. Pickard, manager, plans to demolish present wooden foundry building and erect new plant on same location and install additional equipment. Estimated cost $40,000.

TORONTO, ONT.—Turnbull Elevator Co. Ltd., 126 John street, plans new building on site of building recently destroyed by fire. Estimated cost $50,000.

TORONTO, ONT.—Dominion Wheel & Foundries Ltd., 171 Eastern avenue, is receiving bids through James, Proctor & Redfern Ltd., 36 Toronto street, for plant addition to cost $10,000, equipment extra.

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Sheppard avenue, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, for further addition to plant to cost $35,000. David Shepherd, 57 Bloor street West, consulting engineer.

LAUZON, QUE.—Davie Shipbuilding & Repairing Co. Ltd., in association with Department of Munitions and Supply, Ottawa, R. T. Donald, secretary, has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, Montreal, for addition to shipyards to cost, with equipment, upwards of $100,000. Hutchinson & Wood, 204 Notre Dame street West, architects.

LENNOXVILLE, QUE.—Union Screen Plate Co. of Canada Ltd., 72 Main street, plans plant addition and installation of new equipment, to cost about $20,000.

MONTREAL, QUE.—The Shawinigan Water & Power Co. Ltd., P. O. Box 6072, is planning to install additional equipment in station No. 3, to cost about $150,000.

MONTREAL, QUE.—Precision Tool & Supply Co. Ltd., 1359 Notre Dame street West, is completing plans for plant addition, and will install equipment. Estimated cost $40,000.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, has plans by Spence & Burge, architects, 2063 Union avenue, for further addition to its Turcot works, estimated to cost $65,000, with equipment.

ST. JOHNS, QUE.—Singer Mfg. Co., St. Paul street, plans installation of new equipment to cost about $20,000.

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FOR SALE—STEEL BUILDINGS & CRANES

1—60' x 270' with 20' lean-to either side with 1-10 P&H crane 47' 4" span 230 V. DC—A-1 condition.
1—75' x 150' with 5-ton Shepard crane 70' span 440 V. 25 cy. 35' lift—A-1 condition.
1—106' x 350' having main aisle and lean-to either side. Has no runway or crane. A-1 condition. Building now covered with Robertson protected sheets that can be salvaged 100%.
1—100' x 443' with 5-ton 60' span P&H crane, main aisle 62' with 20' lean-to either side.
800 lin. ft.—crane girders—20'-25' lengths.

HETZ CONSTRUCTION COMPANY — Phone 4474 — WARREN, OHIO

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AND ACCESSORIES

RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.
NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Track Accessories.

Although our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.
Every effort made to take care of emergency requirements. *Phone, Write or Wire . . .*

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

COLD ROLLED COMMODITY STRIP STEEL

19,000 lbs.	#4 temper	— .062	x 5.062
24,000 lbs.	#4 temper	— .035	x 4.218
12,000 lbs.	#4 temper	— .035	x 7.156
5,500 lbs.	#4 temper	— .0375	x 7.000
5,000 lbs.	#4 temper	— .0375	x 6.218
19,000 lbs.	#4 temper	— .035	x 5.25
13,500 lbs.	#4 temper	— .035	x 6.25
13,000 lbs.	#4 temper	— .062	x 4.968
5,000 lbs.	#4 temper	— .0375	x 2.062

SNEAD & COMPANY
Foot of Pine St. Jersey City, N. J.

FOR SALE
HOT ROLLED STRIP STEEL IN COILS

Carbon .60 to .70
Other analysis—standard

¾" x 105	⅝" x 120	½" x 135
⅞" x 105	⅞" x 120	¾" x 135
	1" x 105	

The above is surplus stock available for immediate shipment.

THE SENECA WIRE & MFG. CO.
FOSTORIA, OHIO

FOR SALE
GARRISON 16" ROLLING MILL

consisting of
Two 2 High Stands—Cast Iron Shoes
Direct Steam Engine Drive
Fifteen Plain Rolls—Each 16" Diameter, 24" Face, 13" Diameter Necks
Also Roll Lathe

WROUGHT WASHER MFG. CO.
2100 S. Bay St. Milwaukee, Wis.

FOR SALE

Very good used Central Type Pulverized Coal Plants, 3000 lbs. and 6000 lbs. capacity per hour. Also dryers, pulverizers, distributing and burning equipment at bargain prices.

HOLBECK ENGINEERING COMPANY
600 Griswold St., Detroit, Mich.

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STEEL BUILDINGS
AND TANKS
PIPE AND BOILER TUBES

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yds., Illinois

WANTED
HORIZONTAL ANGLE BENDING ROLL

Similar to Buffalo No. 2 or Williams and White No. 2, Capacity 4" x 4" x ½" Angle 36" Dia. with leg out.

MANUFACTURERS AND FABRICATORS, INC.
Elyria, Ohio

FOR SALE

1,000,000 ft. used pipe 2" to 20"
—valve fittings—boiler flues
—high tensile steel rods, etc.

Industrial Supply & Equipment Co., Inc.
338 Baronne St. New Orleans, La.
RA 0889

FOR SALE

Loudon Electric Overhead Tramrail, Automatic Dispatch equipment.
1—No. 3 Waterbury Farrel Rotary Swager.

Reply Box 839
STEEL, Penton Bldg., Cleveland

WANTED

12—28" Diameter Chilled Iron Rolls for Hot Sheet or Tin Mills.

FRANK B. FOSTER
829 Oliver Bldg. Pittsburgh, Pa.

FOR SALE
RAILROAD SCALES, CRANES, ETC.

One—BUDA 80 ton railroad scale, 46 ft.; One—Fairbanks-Morse type E 150 ton railroad scale, 50 ft.; one 15 ton Brownhoist locomotive crane. Also several overhead electric travelling cranes; railroad steam locomotives; relaying rails; spikes and bolts. Write for complete information.

SONKEN-GALAMBA CORP.
108 N. 2d Street Kansas City, Kansas

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RAILWAY EQUIPMENT

• BOUGHT • SOLD •

WRITE—WIRE—PHONE
DULIEN STEEL PRODUCTS, INC.
414 First Ave., So. Seattle, Wash. 2280 Woolworth Bldg. New York, N. Y.

WANT TO PURCHASE

4 inch O.D. Boiler tubes; steel pipe of all sizes; Valves; Fittings; Industrial plants; Mills; railroads; trackage, etc. Write, wire or phone

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Grinder, Roll 30"x76" Farrel, M.D.
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Shaper, 36" Morton Draw Cut.
Shear, Rotary 3/4" Newbold, 50" gap.
Shears, Alligator, 1"—4".
Slotter, 12" Putnam, 33" table, B.D.
Straightener, 48"—17 rolls—4" dia.
Straightener, 54"—17 rolls—4-1/4" dia.
Straightener, No. 2 Sutton, 3-1/2" M.D.
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Connersville-Roots positive blowers.
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HAMMER, Steam Forging 1100 lb. N-B-P
HAMMER, STEAM Forging 2000 lb. Morgan
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LANG MACHINERY COMPANY
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AGENTS WANTED

Established manufacturer of machine units closely allied with industrial ball and roller bearings desires representation in valuable territories now open. Attractive commission arrangement in cooperation with distributors in these territories. Line has excellent reception in trade and deliveries are extremely prompt. The possibilities are unlimited in both war work and domestic production after the war. Write giving full details of previous activities. Address Box 858, STEEL, Penton Bldg., Cleveland.

Opportunities

EXPEDITING

National — on the spot expediting and material procurement service where you *want it* when you *need it*.

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Positions Wanted

INDUSTRIAL ENGINEER

38 years old, married, desires position either as PLANT MANAGER, PRODUCTION MANAGER or PLANT ENGINEER. Presently employed as consultant on production and engineering for WPB. Can secure release and furnish best of references. Reply Box 860, STEEL, Penton Bldg., Cleveland.

FACTORY MANAGER 24 YEARS BROAD practical and administrative machine shop, stamping, tooling, purchasing, production planning, engineering and cost control experience. Efficient aggressive organizer, age 44. American born, technical education. Communications confidential. Reply Box 856, STEEL, Penton Bldg., Cleveland, Ohio.

QUALIFIED ALLEVIATE MANUFACTURING PROBLEMS PARTICULARLY MATERIAL CONTROL EITHER PERMANENT OR CONSULTING BASIS. FAMILIAR CMP. YEARS INDUSTRIAL, CONSULTING EXPERIENCE. REPLY BOX 861, STEEL, PENTON BLDG., CLEVELAND.

AMERICAN, AGE 57 WITH 20 YEARS EXperience as superintendent of structural and plate shops available at once. Address Box 853, STEEL, Penton Bldg., Cleveland.

Help Wanted

WANTED

Competent foremen for large structural steel shop located in the South. Must be experienced and capable of handling men. Reply Box 851, STEEL, Penton Bldg., Cleveland.

STEEL FOUNDRY FOREMAN

Desire foreman or assistant foreman with previous experience. However, man with steel moulding experience or background and capable of rigging, gating or risering jobs would be considered. Reply Box 849, STEEL, Penton Bldg., Cleveland.

GENERAL SHEET AND STEEL PLATE FABricators in need of Mechanical Engineer capable designing, making detailed shop drawings and bills of material. Excellent future, right party. Growing concern. Dallas Tank & Welding Company, Inc., P. O. Box 5351, Dallas, Texas.

WANTED: FIRST CLASS LAYOUT MAN FOR sheet and steel plate products, also first class fitters and welders. Reply Box 846, STEEL, Penton Bldg., Cleveland.

Bids Wanted

Federal Works Agency, Public Buildings Administration, North Interior Building, Washington, D. C., Feb. 11, 1943—On or about Feb. 24, 1943, drawings and specifications for the construction and equipment of a Federal Recreation Building at Greenville, Pa., will be available for distribution to general contractors by this office. Applications from general contractors interested in bidding on this work, for not to exceed one set of drawings and specifications, should be filed promptly with this office and the bidding material will be forwarded as soon as available. Drawings and specifications are for the project complete and bidding material will be furnished only to established building contractors. Bids on this project will be opened by the Public Buildings Administration on the date named in the specification, which will be about 15 days after the bidding material is available for distribution. W. E. Reynolds, Commissioner of Public Buildings.

Employment Service

SALARIED POSITIONS—This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Send for details. R. W. BIXBY, Inc., 110 Delward Bldg., Buffalo, N. Y.

Help Wanted

STEEL FOUNDRY SPECIALISTS

We have recently placed into partial operation a large steel foundry which will require approximately 6,000 employes, and we are now looking for a few men to join our organization who have the ability to handle, solve, and follow through production problems in the various departments.

Qualifications for this work are, educational background in mechanical engineering, or mechanical experience; experienced in handling men, and in working with men and getting things done; steel foundry experience preferred but not necessary.

Only persons should apply who are not now engaged to their fullest extent in war work.

Cast Armor Plant
AMERICAN STEEL FOUNDRIES
3200 South Dickey Road
East Chicago — Indiana

YOUNG AGGRESSIVE MAN BETWEEN 35 and 48 who has leadership and organizing ability as well as complete foundry knowledge to start as assistant superintendent, gray iron jobbing foundry, making castings ranging up to approximately 7000 lbs. Must have thorough knowledge of modern cupola, core, moulding, foundry, and pattern experience. Also, opportunity to learn alloy non-ferrous metal casting business later and this position holds great post war possibilities as company well established in their field with large expansion planned for after war. Location in tri-state area Pittsburgh. State experience, salary and qualifications in replying. Also, if accepted, how soon could you report. Reply Box 859, STEEL, Penton Bldg., Cleveland.

SMALL MANUFACTURER OF LIGHT EQUIPment desires research engineer to develop new products for the post war period. There is a permanent position in our western Pennsylvania plant for a man with mechanical and electrical experience. Applicant must be citizen, 35 to 50 years of age, and a graduate mechanical engineer. When replying, give education, experience, references, age and salary desired. Reply Box 857, STEEL, Penton Bldg., Cleveland.

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GALVANIZED PRODUCTS
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Send your inquiries for
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designers and builders of wire and ribbon stock forming machines.
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KING FOUNDRIES, INC., NORTH WALES, Pa. Grey Iron and Semi Steel Castings, also alloyed with Nickel, Chrome, and Molybdenum. Wood, Iron, Brass, and Aluminum Pattern work.

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WELDED MACHINE BASES, PEDESTALS and FRAMES
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GEAR and BELT GUARDS
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THE KIRK & BLUM MFG. CO.
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The Red Cross has Problems like your own

—*of Planning*

Your Red Cross operates a vast planning program to enable it to be ready for any disaster or emergency anywhere—whether it comes in the Americas, Europe, Australia, Asia, or Africa.

—*of Organization*

Your Red Cross is responsible for the smooth operation of 3,750 chapters and 6,000 branches, all engaged in the same enterprise of helping all who need help.

—*of Personnel*

Your Red Cross has tripled its staff since Pearl Harbor and has had to enlist the aid of and train over 6,000,000 volunteers in the principles of First Aid, Water Safety, Accident Prevention, Home Nursing, Nutrition, Nurse's Aideing, Mass Feeding, Motor Mechanics, and other subjects allied to our country's war effort.

—*of Production*

Your Red Cross is not only one of the world's foremost purchasers of supplies, but it has the immense distribution job of collecting millions of items from 10,000 different communities in the United States, assembling and storing them, and then shipping them to practically every country in the world. Last year your Red Cross shipped some $60,000,000 worth of food, clothing, and medical supplies to over 20,000,000 homeless people in foreign countries.

—*of Finance*

Your Red Cross, whose war-time and post-war expenses will run well into hundreds of millions, must account to the public for every penny it collects and puts to work. Its accounts are audited annually by the U.S. War Department.

The Red Cross faces the same problems as are in your business. With your support it can successfully meet them.

The Second War Fund is greater than the First, but no greater than the increased needs.

Business men can help with time and with money, as organizations and as individuals.

March is the Red Cross month . . . Cooperate with your Red Cross Chapter.

Your Dollars help make possible the

AMERICAN RED CROSS

This space contributed by **STEEL**

ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

(Continued on next page)

ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.

(Continued from preceding page)

SOME WAYS TO CONSERVE TOOL STEEL

HINTS on annealing

If a forged tool is to be machined or ground, prior to hardening, it must be annealed. Since annealing temperatures range from 1300 to 1650 deg. F., depending upon the grade of steel and the desired microstructure, special care is needed to protect the steel from scaling and decarburization.

If possible, anneal tool steel in a controlled-atmosphere furnace. Where such a furnace is not available, pack-anneal in a sealed container with mica, coke breeze, or other suitable carbonaceous material. Either method requires slow heating from a low temperature to the annealing temperature, and the tool steel should be held in the furnace until thoroughly heated through.

Furnace-cool the steel if at all possible. If not possible, the still-hot container may be removed from the furnace and cooled slowly by burying in dry ashes, silocel, lime or other retardant medium, although this practice is not recommended.

Tool steel bar stock is usually furnished in the annealed condition, and hence does not require further annealing prior to machining or treatment. However, if annealed bar stock is subjected to severe machining operations, stresses are frequently set up. These can be removed by a sub-anneal at around 900 to 1100 deg. F. When high-speed steel is involved, a full-anneal is recommended.

NORMALIZING—Certain types of tool steel should be given an intermediate heat-treatment between forging and annealing. This treatment, called normalizing, conditions the steel so that it will react better in subsequent operations. Normalizing involves a slow heating of the steel to between 1600 and 1700 deg. F., soaking until uniformly heated, and then air cooling. Normalizing refines grain structure, relieves forging stresses, and produces a more uniform structure in the steel.

However, due to the air-cooling, there are stresses set up in the steel. For this reason do not normalize high-speed steels or high-carbon, high-alloy steels, as these are easily air-hardened and hence subject to dangerous cooling stresses. Whenever normalizing is used, always anneal immediately after the normalizing has been completed.

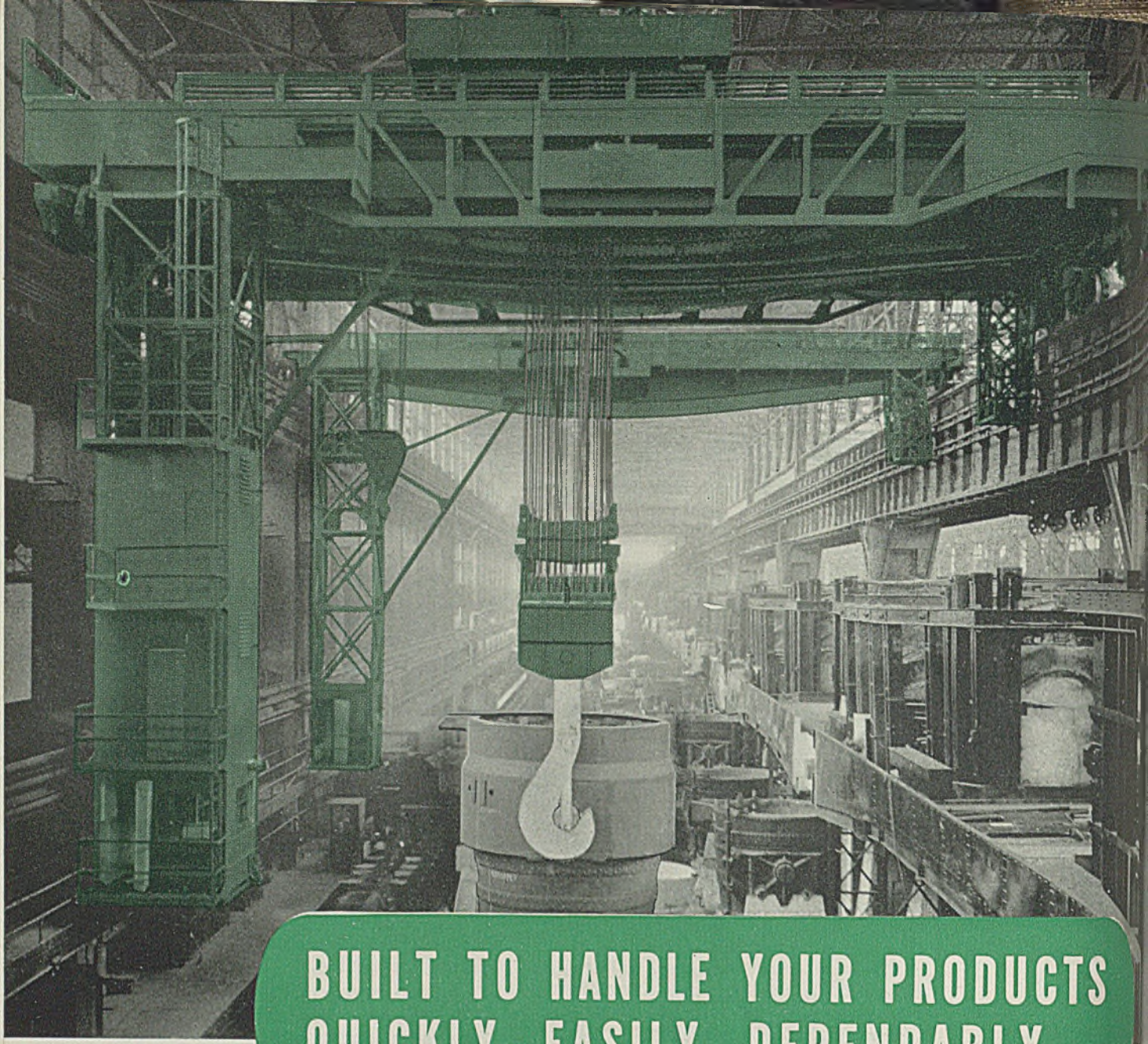
SPHEROIDIZING—To develop the best properties of carbon and carbon-vanadium steels having more than .90 per cent carbon, they should be completely spheroidized prior to hardening.

Spheroidizing is accomplished by annealing at temperatures of approximately 1400 deg. F. To promote greater uniformity, spheroidizing may be carried out by quenching in oil from between 1550 to 1600 deg. F., or by normalizing (air cooling) from between 1600 to 1700 deg. F. After the steel has cooled, either operation is followed by annealing at about 1400 deg. F. Holding time at annealing temperature must be sufficiently long, and the cooling rate sufficiently slow, to produce the desired spheroidized structure in the tool steel.

The above information is available on durable cards suitable for hanging in office or shop. Get your free supply by writing to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY



265 TON POURING CRANE
40 TON AUXILIARY TROLLEY
66′ 1½″ SPAN

BUILT TO HANDLE YOUR PRODUCTS QUICKLY, EASILY, DEPENDABLY...

- LADLE CRANES
- GANTRY CRANES
- FORGING MANIPULATORS
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- STRIPPER CRANES
- SLAB AND BILLET CHARGING MACHINES
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Alliance heavy duty cranes, charging machines, strippers, etc., synchronize production operations with plant facilities. They meet the demands of steel plants, forge shops, foundries, and other war production plants because a survey by experienced Alliance engineers precedes preliminary recommendations, the development of engineering drawings, and construction. Alliance engineers incorporate patented and unique features which foster smooth, rapid, safe operation. Completed cranes and machines, built to your individual requirements, demonstrate the benefits of Alliance's world-wide experience plus years of specialization.

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SPECIAL AND STANDARD CRANES FOR HEAVY DUTY

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Macklin Grinding Wheels are made in all sizes and shapes for every type of grinding job. No matter what your grinding problem may be there is a Macklin wheel that will show cost saving results and "Protect Your Production". Ask for the services of a Macklin Field Engineer—no obligation.

● *If you use grinding wheels write for Macklin's new 64 page book "Helpful Hints and Safety Suggestions". To such requests on business stationery this book will be mailed free.*

Address:

MACKLIN COMPANY
Dept. M Jackson, Mich.

BEHIND THE SCENES

Wartime Trim Size

■ No—you haven't grown since last week; STEEL has just shrunk a speck. With this issue we come down to the new wartime trim size of 8⅛ x 11¼-inches, but as you will notice, the editorial page size remains the same. It is still a marvel of mathematics to us that this slight reduction which will no doubt go unnoticed by most everyone except those who have been using past issues to make airplanes for the kids, actually saves 10 per cent of the total paper weight.

Magazine of Metalworking and Metalproducing

■ The more observant will also notice a new by-line on the front cover this week, proclaiming that STEEL is *The Magazine of Metalworking and Metalproducing.* This, of course, is not a new function but simply a little more expressive explanation of the job STEEL has been performing now for more than 60 years.

Or Is It Mentalworking?

■ Which reminds us of the letter this week from a good company over east which has in the past few months converted its entire plant over to war work and now say they are "willing to be convinced that a subscription to your magazine would be worthwhile". That, of course, is one of the things we do best and with the kind of material the editors are pounding into each issue these days all that's necessary is to grab any current issue and thumb it through. It's a job that shouts for itself.

But the high point of their letter was the request for our new study of the *Mental* Working Market. About the only thing we could figure out to send them was an old copy of *THINK,* which one of our IBM friends gave us once.

More On NE Steel Handbook

■ The week before last we ran in a two or three line filler—mentioning the NE Steel Handbook which is now in preparation and suggesting that if anyone wanted to make an advance reservation for one or more copies, it would be a good thing to send them in to the Readers Service Department, Penton Building, Cleveland. It seemed like a simple suggestion at the time but today the third mailman gave up with strained back from toting in the letters, and the RSD has practically had to move out to make room for the mail.

All of which means we did get quite a stack of reservations and it calls for a more complete explanation of just what the Handbook will be so that you, too, can place your order now, and have a copy as soon as it's off the press.

As you know, STEEL began early last year to report as quickly as available all new developments and information on NE steels. It became evident almost immediately that there was a tremendous interest in these data, and for several weeks now we have planned to correlate all the previously published information into a reprint handbook. This is now in the works and when finished it will run about 60 pages and contain a cross-index on both the standard steels and the possible alternate NE Steels, the complete series of end-quench hardenability test charts, and ten user reports on successful applications of NE Steels. Some additional material is being prepared for inclusion and it will probably be early in April before the books are ready.

Accompanying the NE Handbook will be the NE Steel Selector, a unique slide-chart giving at a glance the chemical analyses of the National Emergency steels, the comparative standard steels, and in reverse a listing of the more popular standard steels with the possible alternate NE Steels.

The Handbook and Selector, together, will sell for $1.50 per set. Particularly if you are interested in any quantity it will be appreciated if you can place your order now to be included in the original run.

Army-Navy Cooperation

■ This story comes from Pittsburgh, where a contractor doing war work appealed to Captain J. K. Murray, the Army's officer at the Steel Recovery Corporation, for steel. After obtaining the steel through the Captain's assistance, the contractor wrote a very nice letter of appreciation, and explained that the steel was used on a *Navy* job.

In a spirit of good sportsmanship, the Captain wrote "My God!" on the letter and placed it on the desk of Lieut. W. F. Horsch, the Navy's representative at Steel Recovery Corp. The letter was not on the Lieutenant's desk five minutes before a call came through from Captain Gerald Scanlon, a Pittsburgher at Army Headquarters in Washington, asking the Navy for some reserved steel. Without this steel an Army contractor could not proceed with his job. Needless to say he got it!

Man-Hour Revision

■ *As much money as it costs to produce* 13 *bullets is wasted every time an American worker loses, destroys or mutilates his social security card. So states H. L. McCarthy, Chicago regional director of Social Security. Nearly* 2,000,000 *duplicate cards were issued in* 1942—*at a cost that could have provided* 550 *jeeps for the Army.*

Social Security Cards Come High

■ A couple of weeks ago we quoted the Senate economy committee report that 495,480 man-hours a year have been going toward replying to government questionnaires, but Bill Gude, priorities expert on the editorial staff, swears a few zeros were lost in the shuffle. He points out, for example, that WPB recently eliminated 20 per cent of their required reports and figured it would save 30,000,000 man-hours a year. We hasten to explain that this was no pointed effort on our part to cause any further differences between Congress and WPB; anyway you figure it, questionnairing is still the great American game, baseball notwithstanding.

Incidentally, Bill says that WPB receives an average of 35,000 PD-1a's a week and that 16 per cent of them are useless and have to be tossed out. Despite all the griping done about the work involved apparently this many manufacturers still forget to either sign the name of their company on the form, or have an insufficient address so it can't be located!

Vol. 112, No. 10, March 8, 1943. issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 49

WAR SERVICE BRINGS OUT *its* EXTRA CAPACITY

The general superintendent of a plant now on war work remarked to one of our representatives:

"This war effort has given us a real chance to learn about the production rates of our machine tools. Now, with the close tolerances and fast production demanded by the various governmental agencies, we find that Warner & Swasey stands out head and shoulders in our turret lathe department."

Yes, under war pressure thousands of Warner & Swasey turret lathes are being worked continuously, 24 hours a day, month after month, without breakdown or time out for repairs. In this emergency of high speed production on precision work, Warner & Swaseys are given full opportunity of proving they can turn metal better—and faster.

And when war against the Axis ceases, there will be another "war period"—a war against unemployment, lower standards of living, and enormous per capita debt,—another "war" which can only be won by production! In that period it will be our challenge to design and build turret lathes that will out-produce the turret lathes that today seem to be the last word.

WARNER & SWASEY FOR VICTORY

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

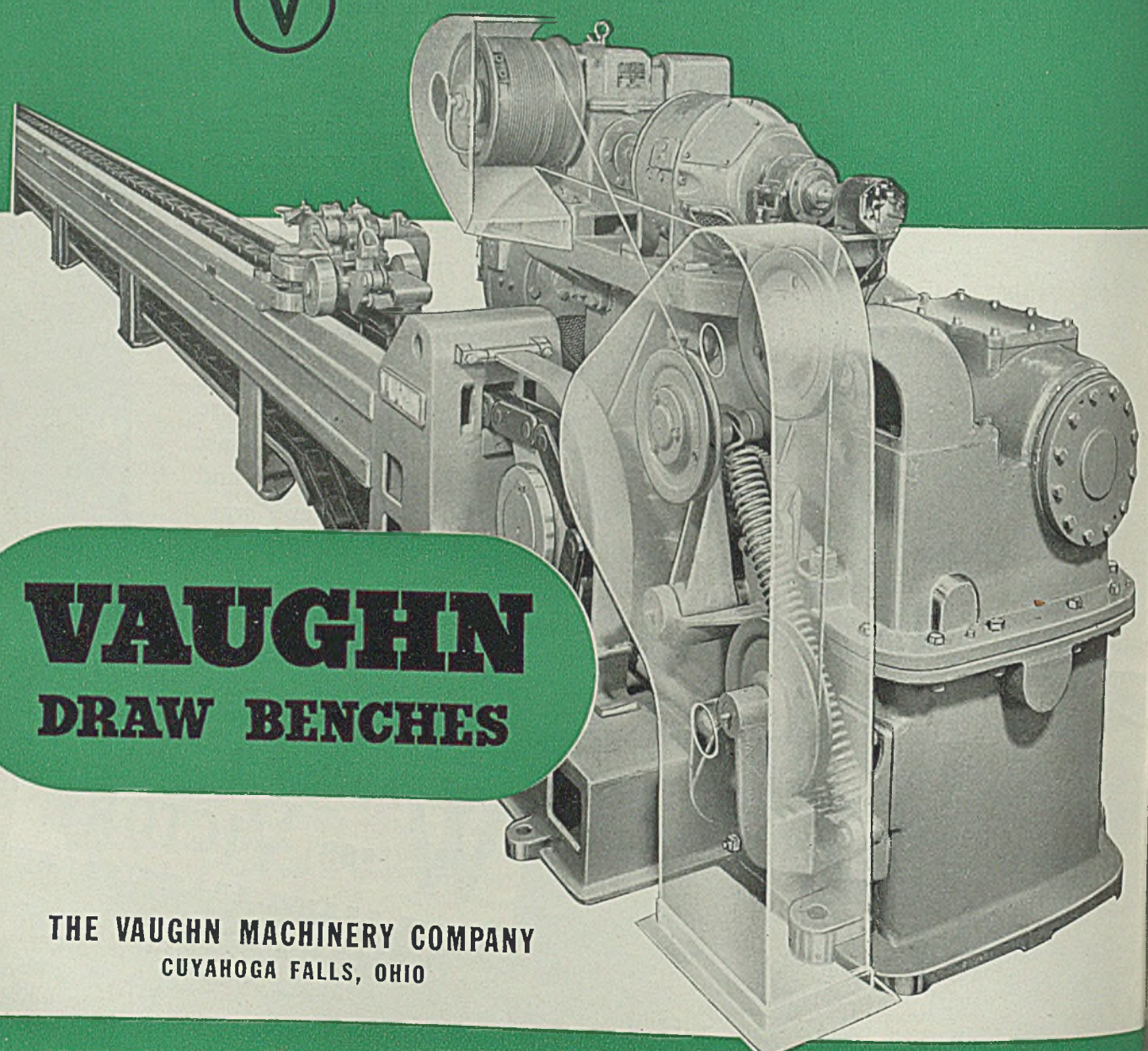
MAJOR ELEMENTS IN VAUGHN DRAW BENCH *Victory* PERFORMANCE

Compact, fully enclosed, anti-friction drive with carriage return mechanism on top

Single or double mandrel for tubes

Tong or block-type carriage

Arranged for 1, 2, or 3 dies for bars

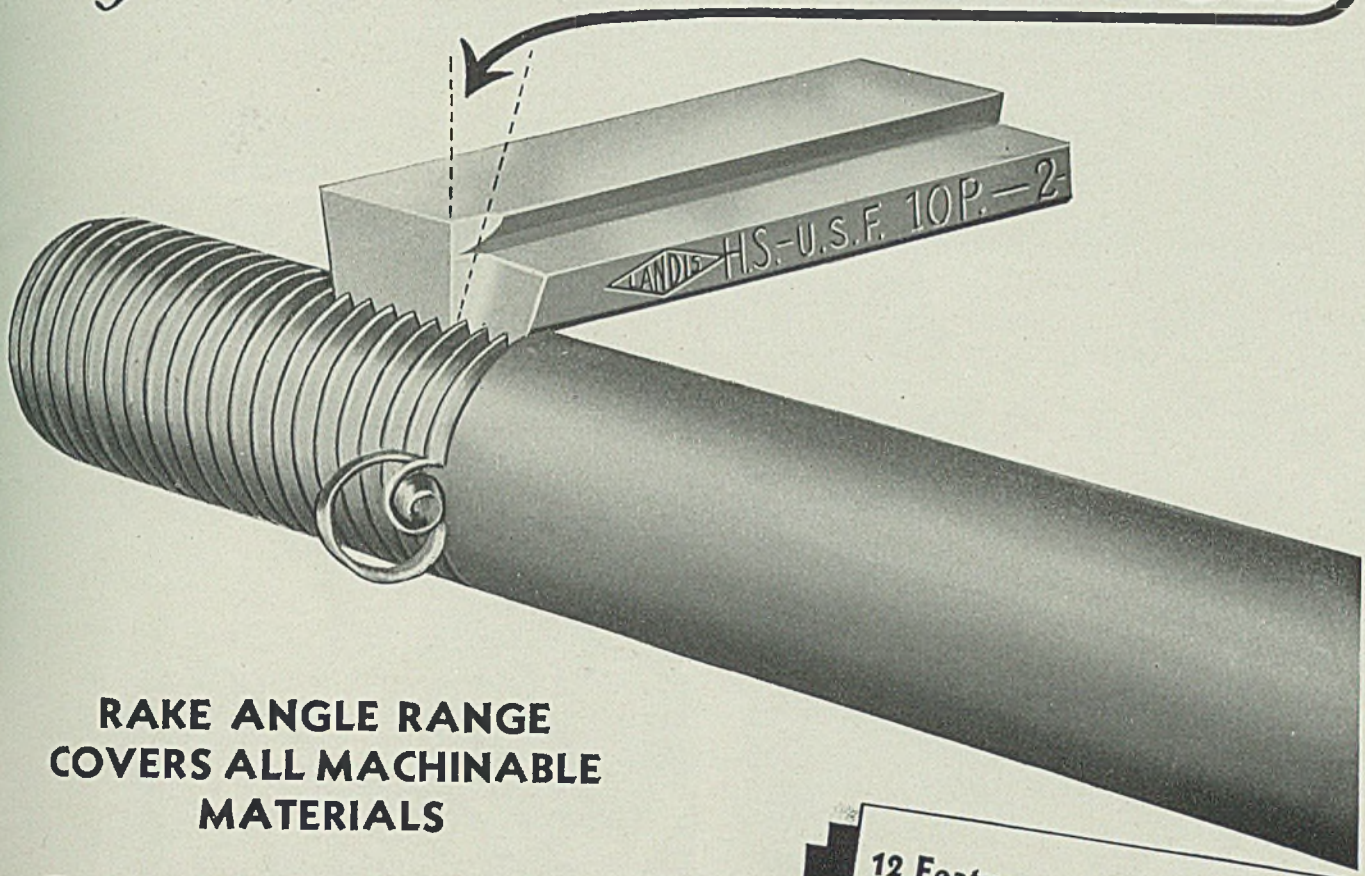


VAUGHN
DRAW BENCHES

THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO

COMPLETE COLD DRAWING EQUIPMENT: Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

With the LANDIS *Chaser – Thread Quality is Assured by the Variable* RAKE ANGLE



RAKE ANGLE RANGE COVERS ALL MACHINABLE MATERIALS

The rake of the Landis chaser is variable, ranging from 5° negative to 35° positive.

This variable rake permits the use of the suitable cutting angle for each machinable material and assures the production of cleanly cut and correctly formed threads.

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers

2–Rake angle range covers all machinable materials

3–Free cutting condition permits maximum cutting speeds

4–Simple grinding operation renews entire cutting edge and leading feature

5–Line contact with work lessens friction and minimizes thread distortion

6–Leading feature insures thread of accurate lead

7–Lateral absorption of cutting strain reduces vibration and chaser breakage

8–Right and lefthand threading feature reduces chaser equipment

9–Standard chasers thread all diameters with proper chaser holders

10–Interchangeability of chasers lowers operating cost

11–Chaser length provides exceptionally long life and low tool cost

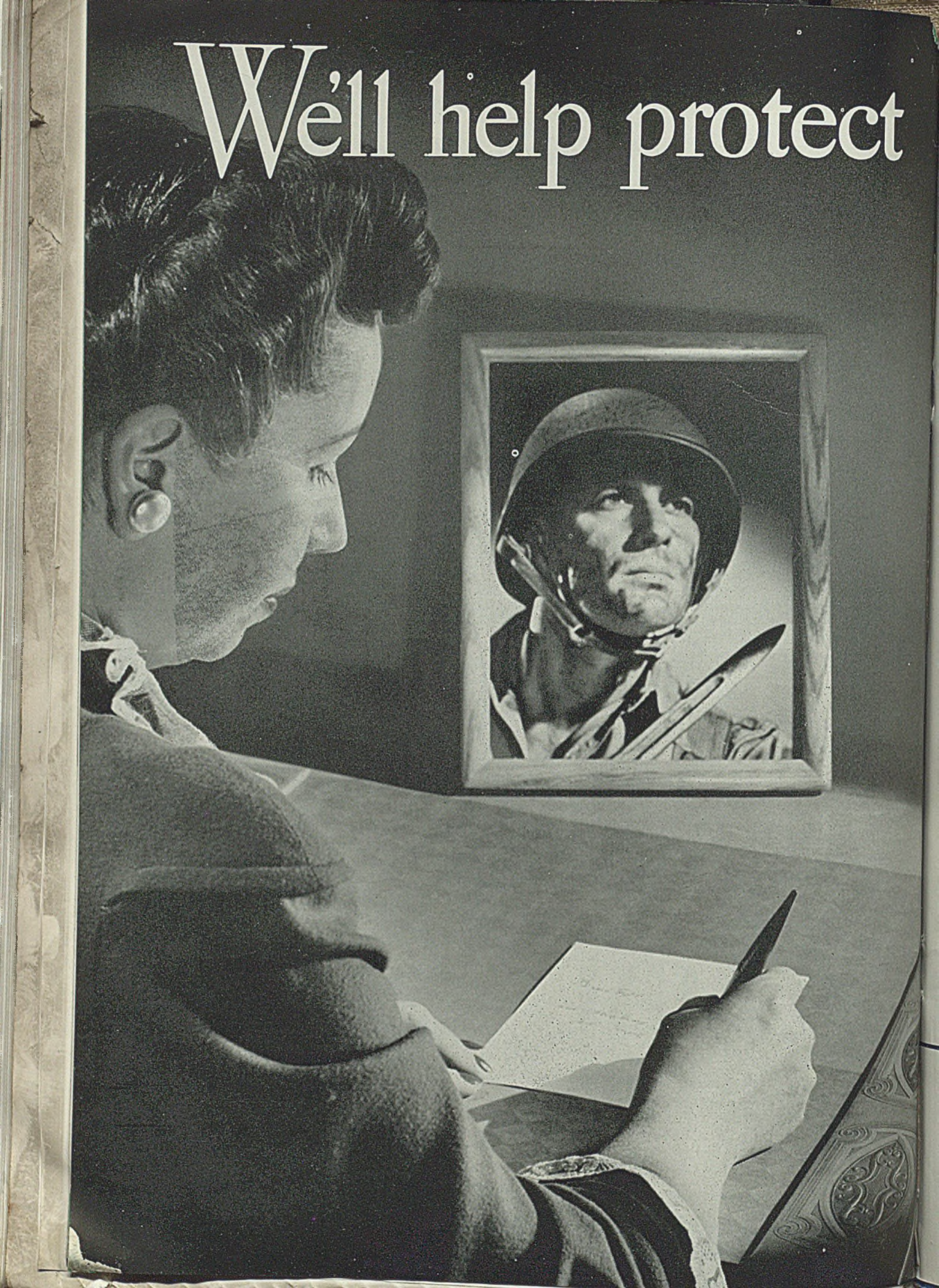
12–Permanent throat gives equal distribution of cut

LANDIS MACHINE COMPANY

WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

We'll help protect



him, Mrs. Smith!®

—but we'll need the full cooperation of every steel fabricating plant to do it

Mrs. Smith—or maybe you're Mrs. Kelly or Cohen or Jankowsky—it makes no difference, because each of you has a boy in the armed forces of our country.

Is he on Guadalcanal, in North Africa, in Australia, in Iceland, Mrs. Smith? That's where our boys are, too. You see, thousands have gone from the mills, mines and offices of the steel industry (more than 13,000 from Republic alone). Thousands more in service are sons or brothers of steel workers.

So maybe your boy, in a sense, is our boy. But does it matter? We want all of them to come home victorious—and safe—just as soon as possible.

And that, Mrs. Smith, is where we, the steel industry, can help—by furnishing enough of the strong, tough alloy steels needed to produce the best, the safest fighting tools in the world for your boy. But—to do so, WE MUST HAVE THE FULL COOPERATION OF EVERY STEEL FABRICATING PLANT.

Fabricators MUST segregate Alloy Steel Scrap—or schedules may COLLAPSE!

Alloy steels cannot be made without nickel, chromium, molybdenum or other critical alloying elements. And such materials are scarce—growing scarcer every day. There just isn't enough to go around now. So what about the future?

Here's what! We must reclaim every possible ounce of alloy from steel scrap.

Every time you machine alloy steels, substantial quantities of alloying elements go into the scrap pile. But unless you keep each lot of alloy steel chips, turnings, shearings and other scrap separate—segregated at the machine and correctly labeled with its grade number (SAE, AISI, NE or other), the maximum value of those alloys may be wasted, even lost.

To charge scrap of unknown alloy content into the furnace may mean possible loss or waste of the alloys—possible ruin of that heat of steel—certainly, disruption of melting schedules. On the other hand, the only way we can determine the alloy content of mixed, unmarked scrap is by melting it down and pouring it into ingots, wasting the time of furnaces and skilled crews which should be producing usable steel.

Chemists and metallurgists must take time to analyze the ingots to determine what and how much alloys they contain. Finally, the scrap ingots must be remelted again when the desired analysis is being produced. That is waste of materials, manpower, time—costly waste.

We know you're busy—that you face many problems—*BUT THIS IS EQUALLY IMPORTANT*—and can be taken care of in a hurry. Just take a few minutes *right now* to issue an order to your plant to segregate alloy steel scrap, *mark* it correctly and return it *promptly*. While you're at it, make some one responsible for checking at least once a week to see that your order is being carried out. You'll help protect Mrs. Smith's son—maybe your own son—and, incidentally, the American System of Free Enterprise which made your business possible.

REPUBLIC STEEL — PRODUCTION FOR VICTORY

This Advertisement Sponsored by

REPUBLIC STEEL CORPORATION

Alloy Steel Division Sales Offices: Massillon, Ohio • General Offices: Cleveland, Ohio

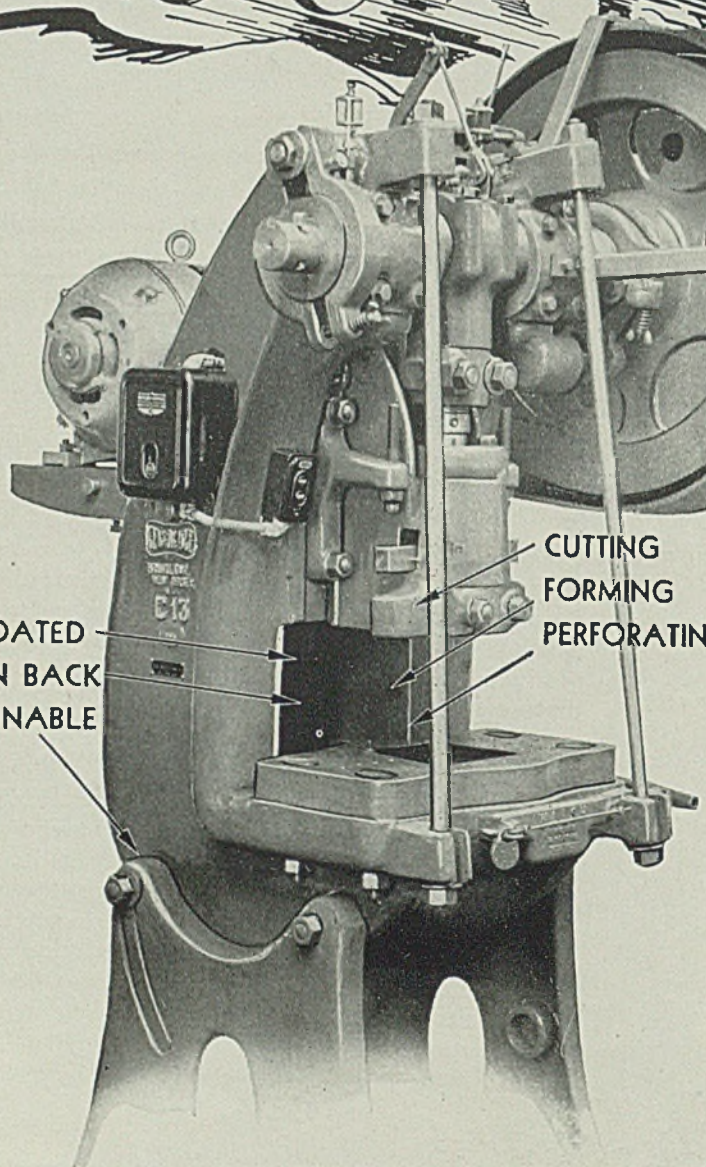
Berger Manufacturing Division • Culvert Division • Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company • Export Department: Chrysler Building, New York, New York

In Cooperation with the U. S. Government's Salvage Campaign

Poster size reprints of this advertisement and wall cards giving official W.P.B. alloy scrap classifications will be sent upon request.

"JEEP" OF PRODUCTION

FERRACUTE *General Purpose* CUTTING PRESS



TRADE FERRACUTE MARK

Ferracute Cutting Press C13 Equipped with a motor shelf for direct motor drive. Flywheel and motor pinion entirely encased for greater safety. Electric push button control aids in the speed of operation. In addition to the hereditary Ferracute heavy frame, this press is equipped with stay rods to attain the maximum in rigidity.

ADAPTABLE AND FLEXIBLE

Ready for any Job. . .
Any Time–Anywhere

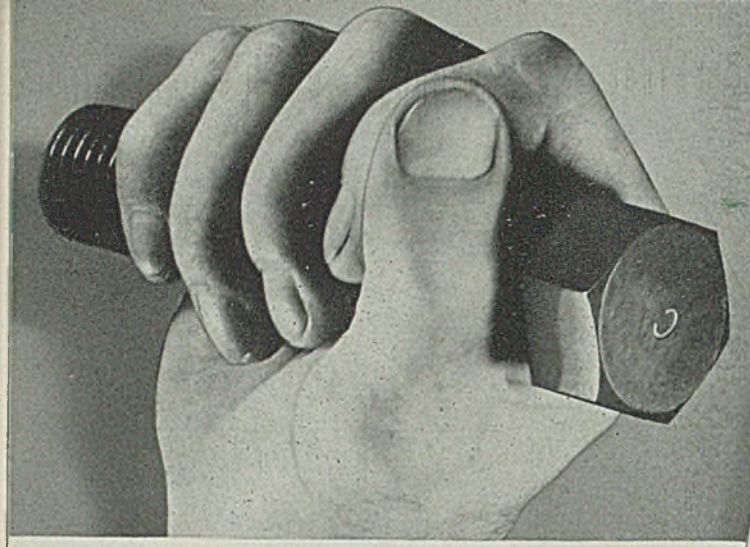
Meet the problems of changing design and specifications with the flexibility of the FERRACUTE General Purpose CUTTING PRESS. Perfectly adaptable to a wide range of operations on sheet metal.

The hole in the bed of the press allows work made in "cutting" or "push-through" forming dies to drop through or pass to one side by means of a chute. Cut and formed work that is "knocked-up" in combination or spring drawing dies may be pushed to one side; or the press may be inclined and work allowed to slide by gravity through the opening in the throat.

FERRACUTE MACHINE COMPANY

Presses and Press Brakes

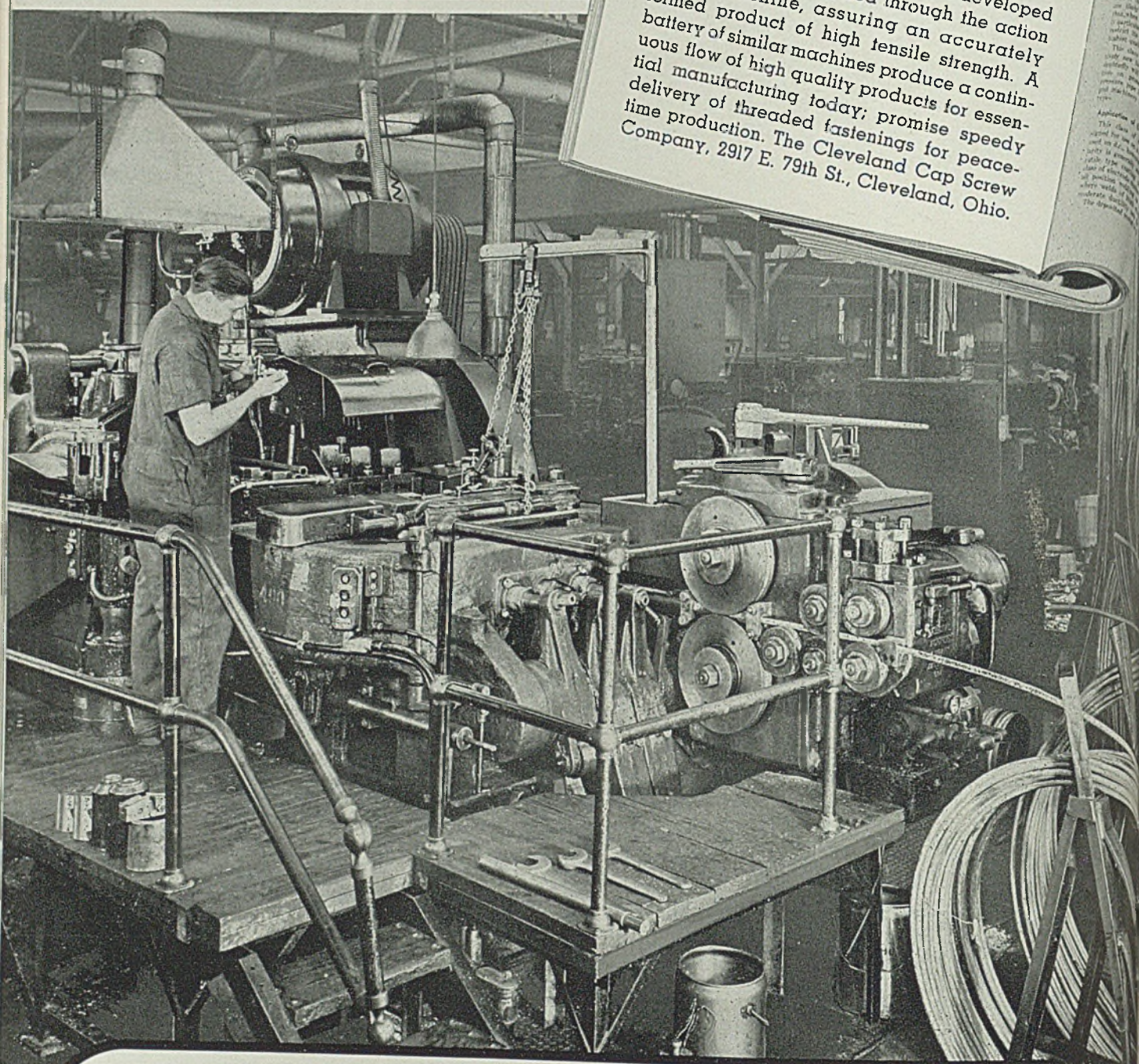
BRIDGETON, N. J., U. S. A.



Largest BOLTMAKER Speeds Cold Heading Production

Modern methods help you get high-grade products faster at Cleveland Cap Screw Co.

A RECENT development of interest to users of headed and threaded products is the unusual machine which processes raw material (steel "wire") into the completed product—an outstanding example of modern manufacturing methods employed at The Cleveland Cap Screw Company. The principles of the Kaufman Process, as developed in this plant, are applied through the action of this machine, assuring an accurately formed product of high tensile strength. A battery of similar machines produce a continuous flow of high quality products for essential manufacturing today; promise speedy delivery of threaded fastenings for peacetime production. The Cleveland Cap Screw Company, 2917 E. 79th St., Cleveland, Ohio.



Cleveland Cap Screws

Set Screws and Special Upset Parts

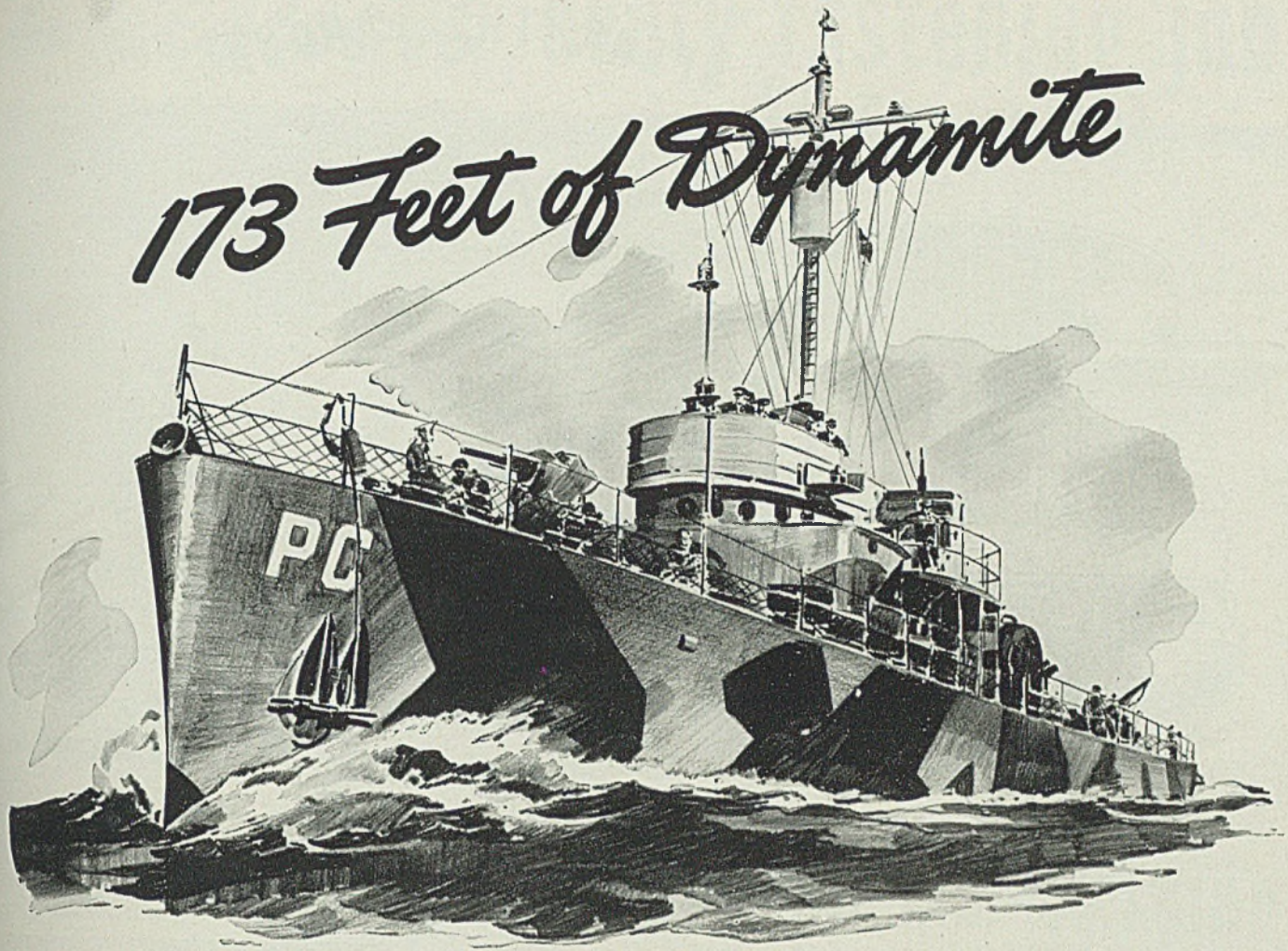
Made by the Originators of the Kaufman Process for Greater Strength and Accuracy

Specialists for 26 years in Headed and Threaded Products

WAREHOUSES

CHICAGO: 726 W. Washington Blvd. . **HAY**market **1392**
PHILADELPHIA: 12th & Olive Sts. . **POP**lar **7530**
NEW YORK: 47 Murray St. . . . . **BARC**lay **7-5088**
LOS ANGELES: 1015 E. 16th St. . . **PROS**pect **8326**

173 Feet of Dynamite



The Pistons That Drive This PC Sub-Chaser Are of

ArmaSteel*

Hunting the hunters with a hold full of depth charges is a ticklish job. It calls for fine seamanship from officers and crew, and quick response from the Diesel engines that provide the necessary speed and maneuverability.

The selection of ArmaSteel pistons for the engines used in this service was influenced by the exceptional record they have established in Diesel locomotives.

Piston life has been greatly extended, and maintenance reduced, as a result of the desirable physical characteristics obtained.

ArmaSteel castings are speeding the production of many vital parts through better machinability and closer conformity to final shapes. Investigate the possibilities of using ArmaSteel in place of critical materials for present production and future developments.

SAGINAW MALLEABLE IRON DIVISION
General Motors Corporation, Saginaw, Michigan

*Reg. U. S. Pat. Off.

CAST FOR A LEADING ROLE IN INDUSTRY

DRIVING 'EM OR BUILDING 'EM!

IN PURDY, war plants can find an organization that knows steel problems and talks and thinks about them in the language of production. When standard materials and procedures don't work out or can't be used, Purdy men are right there with practical ideas to get the job done—and they can draw on the complete line of PLANET drill rod, tool steel, spring steel and cold-drawn steel to see it through.

Tanks, trucks, planes or guns—whatever you're making today, if you have a problem in steel supply or application, or a tough angle that demands extra ingenuity in using steel, call on Purdy for quick action.

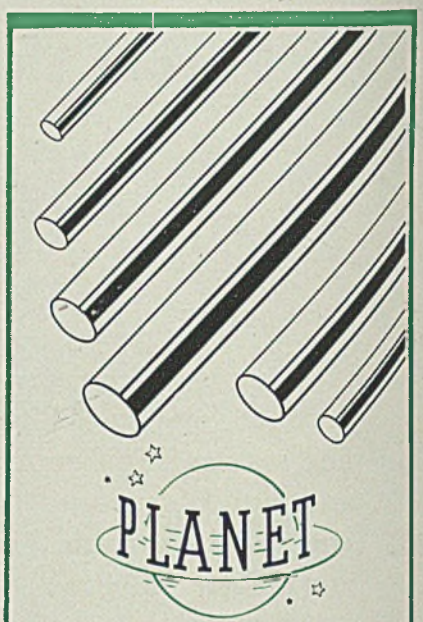
A. R. PURDY CO., Inc., 792 Greenwich St., New York, N. Y.

PLANET Polished Drill Rod is one Purdy product that "talks" production language too. Commercial grade—1.00 Carbon. Finish ground and annealed. For dies, reamers, rollers, drills. (Sizes from .013 to two inches.) All sizes in 3-foot lengths, many sizes in 12-foot lengths.

Special Drill Rods: Choice grade—1.15/1.25 Carbon. Best for higher-type work, sharper edges, finer tools. Particularly good for punches. (Sizes from .024 to 1.5 inches.) Carried in 3-foot lengths.

Flat Drill Rods: High grade—1.00 Carbon tool steel. Lime drawn and annealed. For former parts, gravers, dies, punches, cutters. Sizes of flats from 1/16 by 1/32 to 1/2 by one inch, of squares from 1/16 to one inch. Carried in 3-foot lengths.

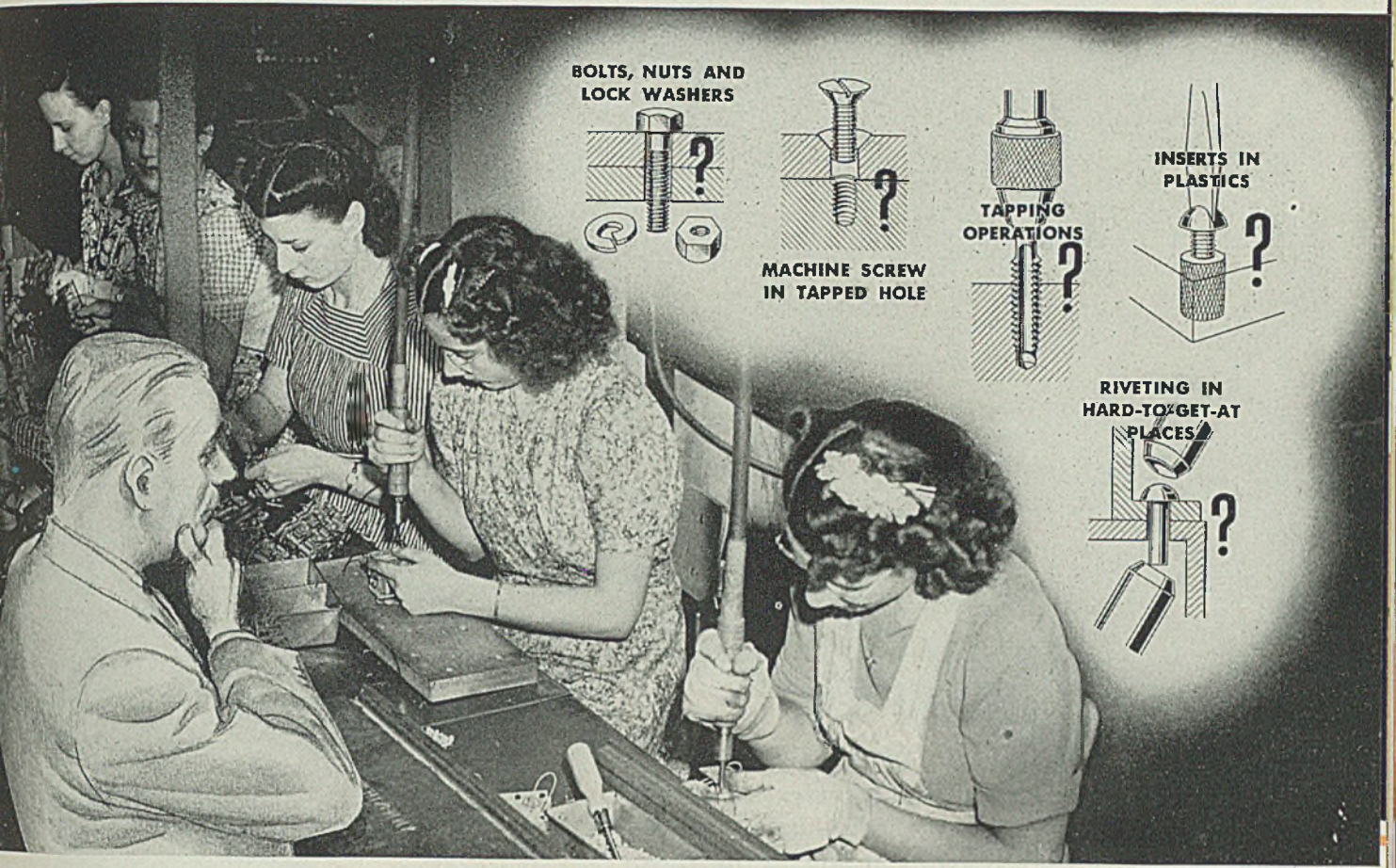
Simonds "Red Streak" Flat Ground Stock, made from Annealed Tool Steel and ground within limits of plus or minus .001 inch. Square on both edges and ends. Saves time in making jigs, gauges, templates and tools. Sizes from 1/64" x 4" to 1" Square.



PURDY

War steels PLUS *Know how* . . .

Question every fastening job



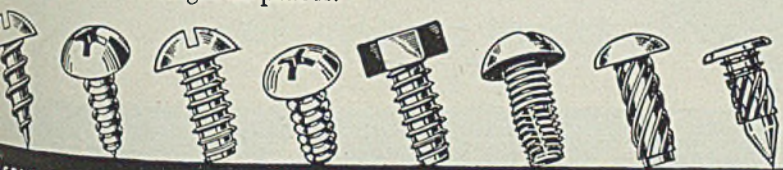
ASK—"Why Can't It Be Done the Simple Way.. with time-saving P-K Self-tapping Screws?"

That question is standard practise with hundreds of engineers and production men who are trying to conserve vital time and labor. They put it to themselves, and to their associates . . . not only at the drafting board but also on the production line.

They don't expect Parker-Kalon Self-tapping Screws to be the best means of making EVERY fastening under ALL conditions. But they know that, for a *very large percentage* of metal and plastic fastening jobs, these Screws offer a combination of ease, speed and real security that no other fastening device or method can match!

How to Save Operations . . . to Save Vital Time and Labor

Make it *your* practise to see that you can't employ the simple Self-tapping Screw method before you put up with a more difficult one. Wherever P-K Self-tapping Screws can be used, operations will be eliminated, vital time and labor will be saved. You merely drive P-K Self-tapping Screws into plain, untapped holes. Such simplicity eliminates tapping and tap maintenance . . . solves the problem of getting scarce taps . . . stops fumbling with bolts and nuts and placing of lock washers . . . does away with inserts in plastics . . . cuts out riveting and welding in hard-to-get-at places.



SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY

Call in a P-K Assembly Engineer to check over fastening jobs with you. He can show you how to search out ALL opportunities to apply P-K Self-tapping Screws. And, he'll recommend them only when they will do the job better and faster. If you prefer, mail in assembly details for recommendations.

Change to Self-tapping Screws Overnight . . No matter what kind of material you're working with . . . light or heavy steel, cast iron, aluminum, brass, plastics . . . you can adopt P-K Self-tapping Screws to advantage. And you can make the change-over without interrupting production. No special tools or skilled help are required. Parker-Kalon Corporation, 194-200 Varick Street, New York, N. Y.

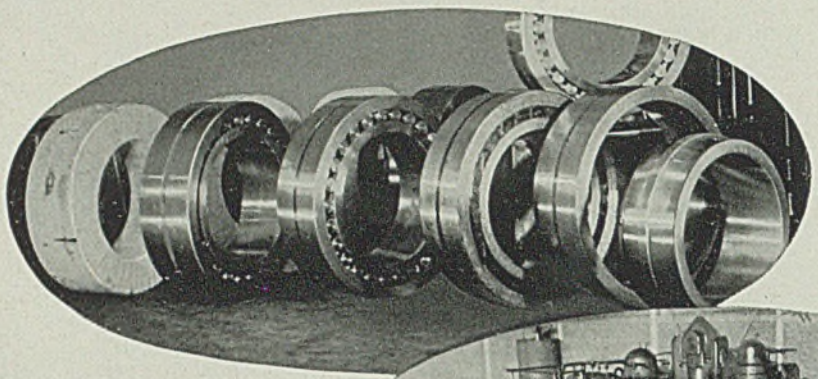
PARKER-KALON

Quality-Controlled

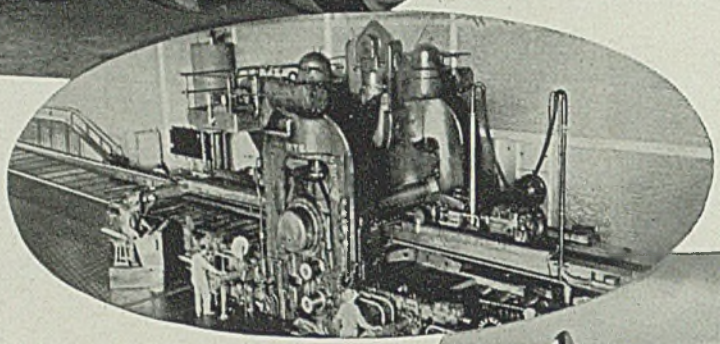
SELF-TAPPING SCREWS

Give the Green Light to War Assemblies

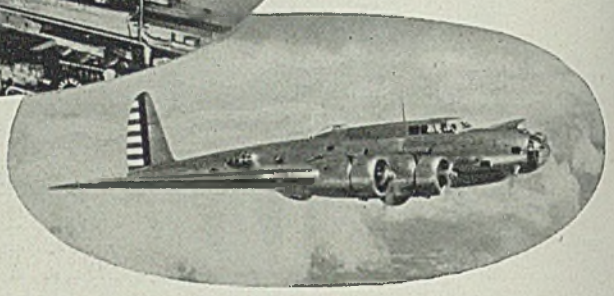
FROM *Bearings* TO *Bombers*



SKF PRODUCTION



SKF's PRODUCING



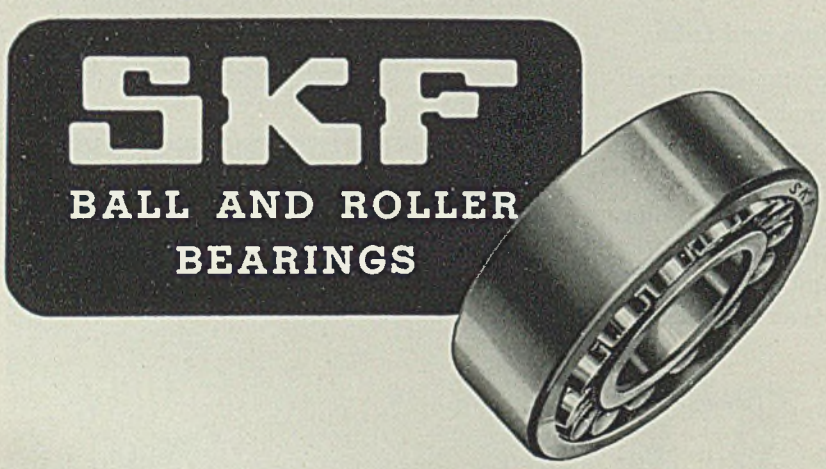
It takes BIG bearings for the mills that produce the duraluminum needed for the rapidly increasing number of bombers. SKF supplies the BIG Back-up Roll Bearings for the mills running today and for the mills that will be running tomorrow. For instance, SKF has just completed an order, *in record time*, for:

No. Bearings	Bore	O. D.	Width
112	31″	48″	14¾″
92	26″	42″	12⁵⁄₁₆″

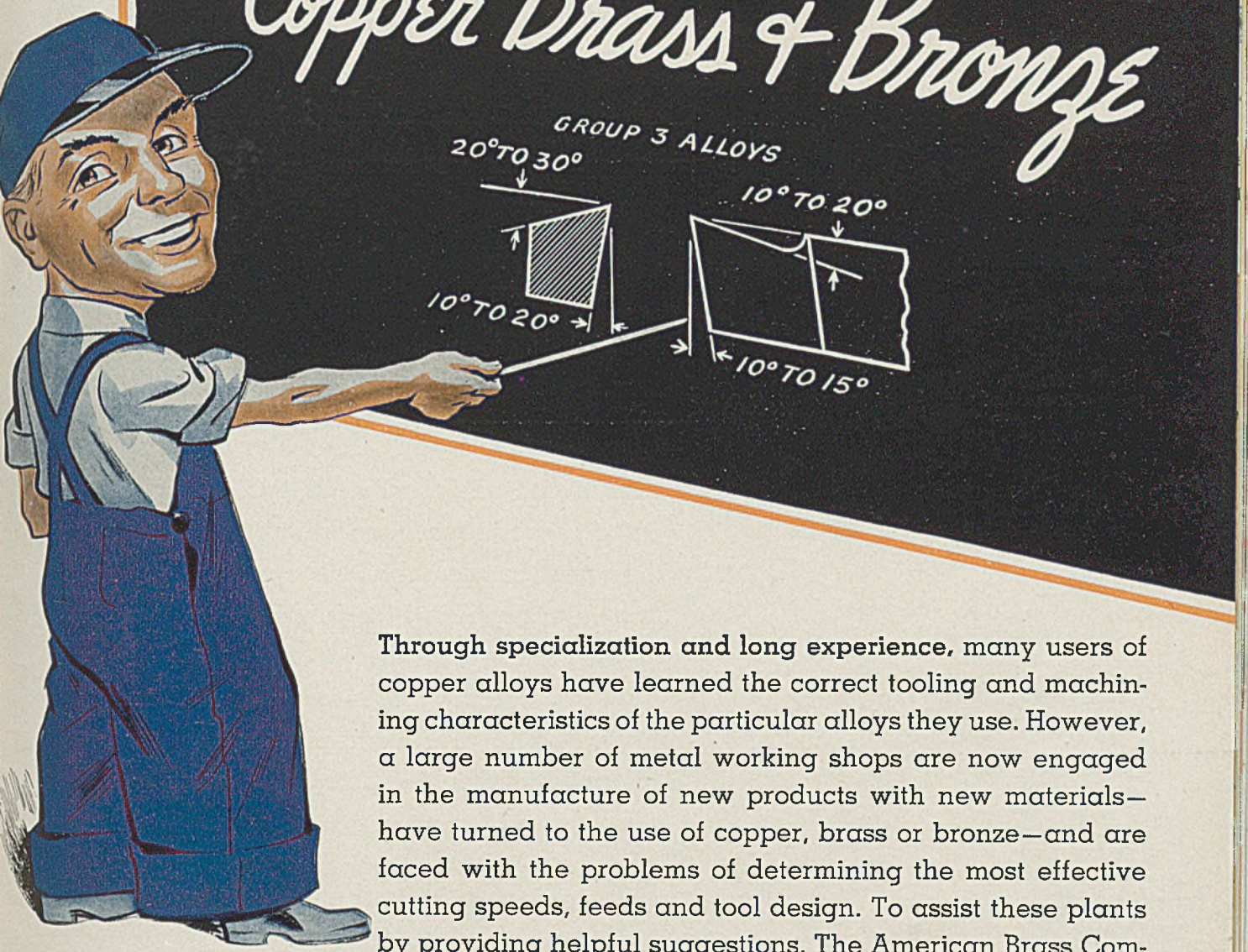
This is in addition to 272 SKF Work Roll Bearings ranging in O. D. from 17⁵⁄₁₆″ to 30¾″. Properly authorized persons are urged to send for our new catalog, "Steel Mill Data for Calculation and Design."

5255

SKF INDUSTRIES, INC., PHILADELPHIA, PENNA.



The ABC of machining Copper Brass & Bronze



Through specialization and long experience, many users of copper alloys have learned the correct tooling and machining characteristics of the particular alloys they use. However, a large number of metal working shops are now engaged in the manufacture of new products with new materials—have turned to the use of copper, brass or bronze—and are faced with the problems of determining the most effective cutting speeds, feeds and tool design. To assist these plants by providing helpful suggestions, The American Brass Company has made available a new publication, "Machining Copper and Copper Base Alloys." If your manufacturing operations include turning, drilling, tapping, threading or milling any of the copper base alloys, you'll find this booklet decidedly helpful.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut

A ready-reference manual... Illustrated and condensed for your convenience

ANACONDA from mine to consumer

Anaconda Copper & Copper Alloys

If you are machining any of THESE Copper Alloys . . .

ANACONDA COPPER ALLOYS

COPPERS
- Electrolytic Tough Pitch
- Deoxidized Copper—939
- Leaded Copper—946

BRASSES
- Commercial Bronze 90%—14
- Red Brass 85%—24
- Red Brass 80%—32
- Yellow Brass—61
- Muntz Metal—66

LEADED BRASSES
- Leaded Commercial Bronze—202
- Hardware Bronze—267
- Leaded Red Brass 80%—205
- Leaded Brass—211
- Butt Brass—229
- Free Cutting Yellow Brass—271
- Forging Brass—250
- Extruded Architectural Bronze—280

SPECIAL BRASSES
- Naval Brass—452
- *Tobin Bronze
- Manganese Bronze—937
- Leaded Naval Brass—612

PHOSPHOR BRONZES
- Phosphor Bronze 4%—903
- Phosphor Bronze 5%—351
- Leaded Phosphor Bronze 5%—979
- Phosphor Bronze 8%—353
- Phosphor Bronze 10%—354
- Special Free Cutting Phosphor Bronze—619
- Phosphor Bronze—314
- Phosphor Bronze—316

NICKEL SILVERS
- Extruded Leaded Nickel Silver 10%—823
- Leaded Nickel Silver 12%—796
- Leaded Nickel Silver 18%—789
- Nickel Silver 18%—719
- Nickel Silver 18%—723
- *Ambrac—850

SUPER NICKEL—701

ALUMINUM BRONZES
- Ambraloy—901
- Ambraloy—917
- Ambraloy—928
- *Avialite—915

COPPER-SILICON ALLOYS
- *Everdur—1010
- Everdur—1012 (Leaded)
- Everdur—1015

BERYLLIUM COPPER—175

CHROMIUM COPPER—999

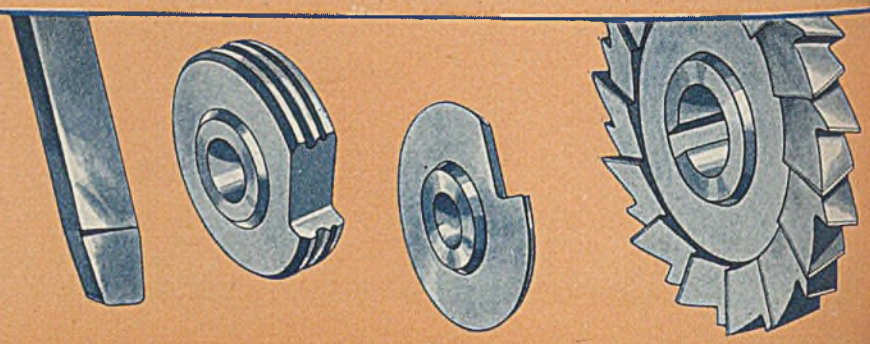
*Trade-Marks Registered United States Patent Office

You will want a copy of this NEW BOOKLET

Here is a new Anaconda Publication suggesting cutting speeds, feeds, tool rakes and clearances to be used on more than 40 copper alloys—from free cutting yellow brass all the way to copper and the tough bronzes. It is based on the use of standard cutting tool materials and contains many helpful, useful and practical suggestions on turning and cutting-off tools; form tools; drills, reamers and taps; thread chasers, milling cutters and coolants. Production engineers, tool setters and machine operators will find a copy both interesting and useful.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut



ANACONDA from mine to consumer

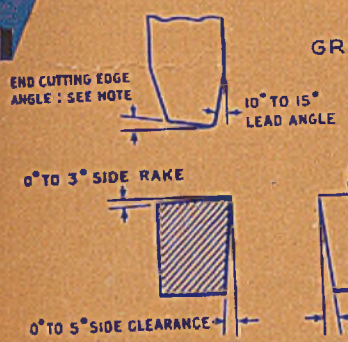
Anaconda Copper & Copper Alloys

THREE REASONS WHY you should use the right speeds, feeds and cutting tool angles:

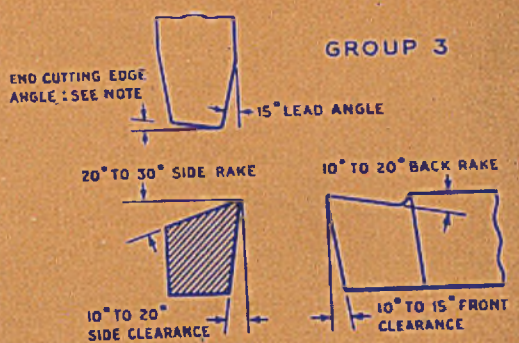
1. To save valuable time and scarce materials
2. To produce finer finishes and closer tolerances
3. To get top production out of your present equipment

LATHE TURNING TOOLS

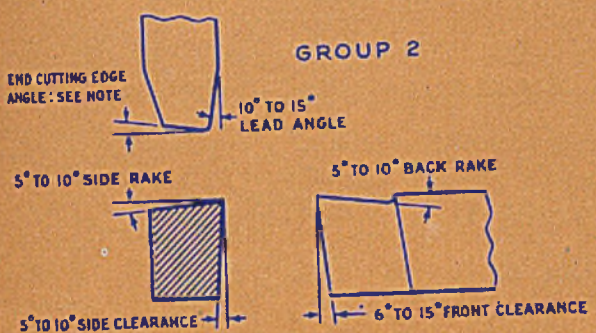
GROUP 1



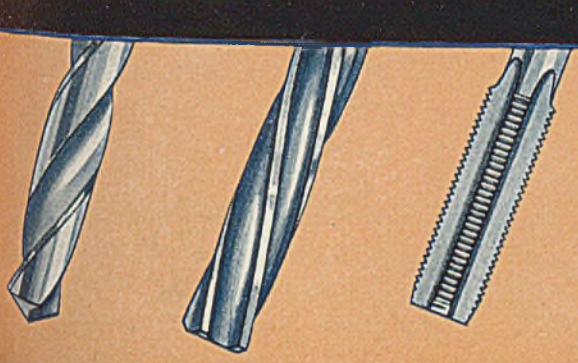
GROUP 3

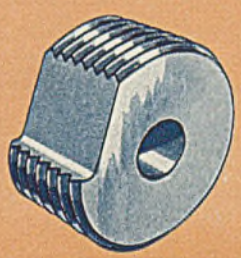


GROUP 2



* NOTE:
WHEN THE END CUTTING EDGE OF THE FINISHING TOOL IS GROUND WITH A DRAG, OR PARALLEL WITH THE AXIS, CONSIDERABLY HEAVIER FEEDS MAY BE EMPLOYED ON LIGHT FINISHING CUTS.





USE THE CONVENIENT COUPON ON THE NEXT PAGE, PLEASE

Made by The American Brass Company

CUT-OFF

Correct cutti

The standard st
several sizes an
factory for copp
clearance and n
front end for the

Circular cut-off
matic screw ma
tool frequently
edge as indicate
the angular typ

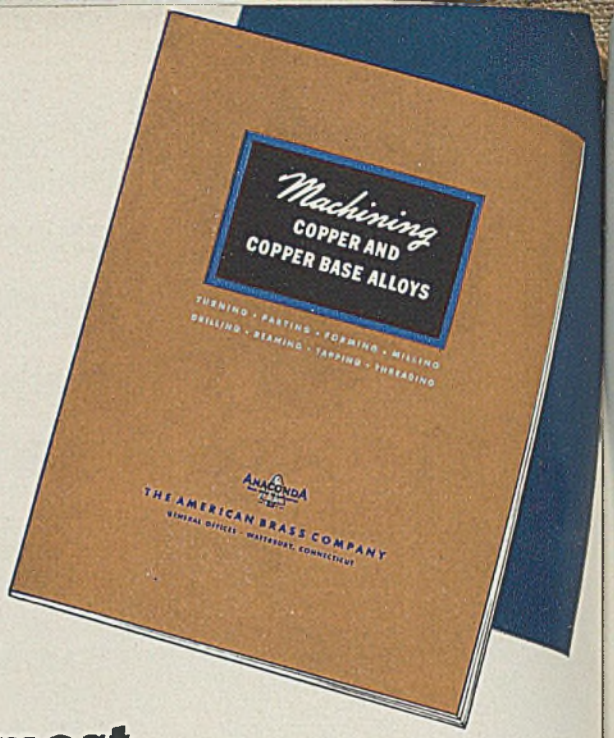
9

STRAIG

APPROXIMATELY O
OF TOOL THICKN

BACK RAKE SA
AS FOR STRAIG
BLADE TOOLS

$\frac{1}{8}$" TO $\frac{3}{16}$" ABOVE



It's yours

to help you get the most out of your machining operations

Fill in and mail the attached coupon. A copy of this new Anaconda Publication, "Machining Copper and Copper Base Alloys," will be sent to you promptly. In addition to suggestions on cutting speeds, feeds and tool designs, this booklet contains tables of compositions, physical constants and physical properties on more than 40 copper and copper alloy free cutting, general purpose and engineering rods. Convenient weight tables and conversion factors are also included. No obligation, of course.

THE AMERICAN BRASS COMPANY

ANACONDA
from mine to consumer

General Offices: Waterbury, Connecticut—*Offices and Agencies in Principal Cities*
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., *New Toronto, Ont.*

A Request for Anaconda Publication B-3, First Edition,
"Machining Copper and Copper Base Alloys"

Print your name and address and mail to: The American Brass Company, General Offices, Waterbury, Connecticut. Additional Copies will be mailed on request.

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COMPANY.....

STREET.....

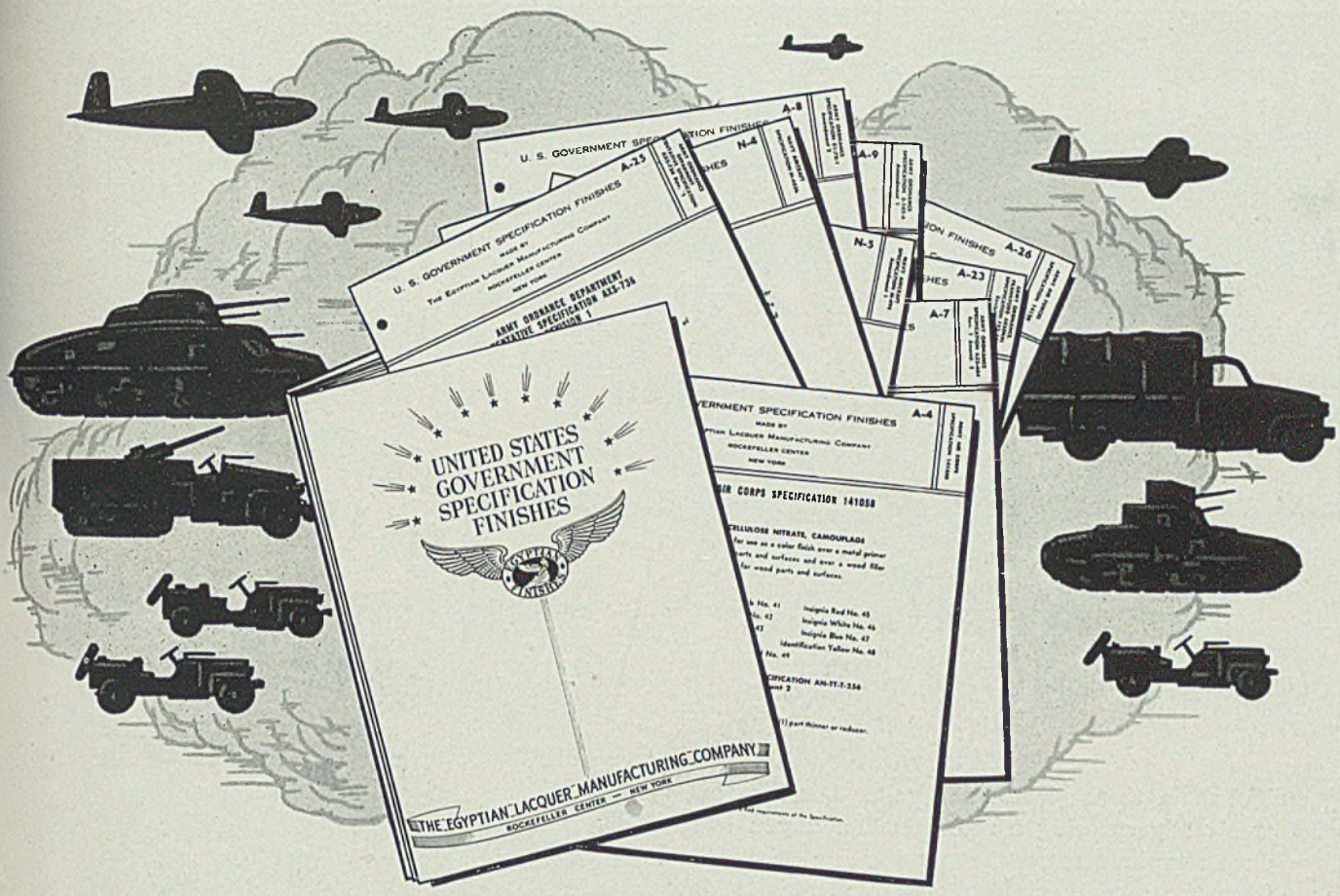
CITY and STATE.....

☐ Check here if you also want a copy of B-14, "Anaconda Free Cutting Brass Rods."

421035

Screw Machine Products?

Publication B-14, 4th Edition, is a 24-page booklet on 46 Anaconda Copper and Copper Alloy Rods for screw machine use. Includes helpful cost finding charts and references to Standard Specifications. If you make, buy, sell or use screw machine parts of any material, you'll want this booklet.



Washington says, "Finish It With----"

DO YOU KNOW all the answers regarding U. S. Government Specification finishes? You can keep abreast of the rapidly changing requirements by sending for a copy of our new book, giving the more important "Spec" finishes made by EGYPTIAN. It's in loose-leaf form and we keep it up-to-the-minute for you by sending you new sheets and revisions as changes are made.

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THE EGYPTIAN LACQUER MANUFACTURING CO.
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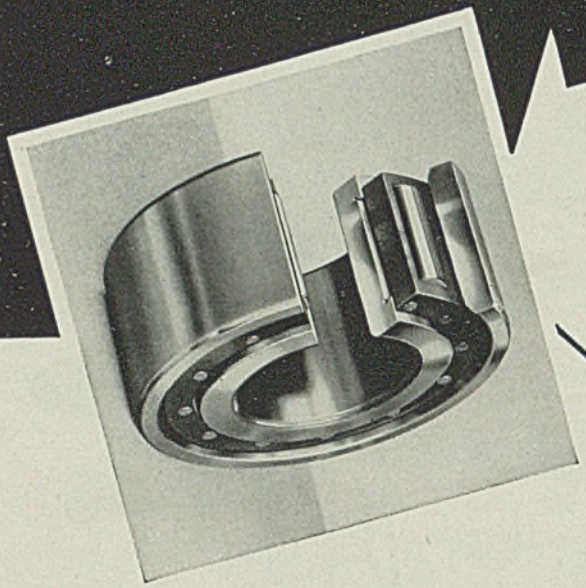
Longer Life for Every Bearing Because:

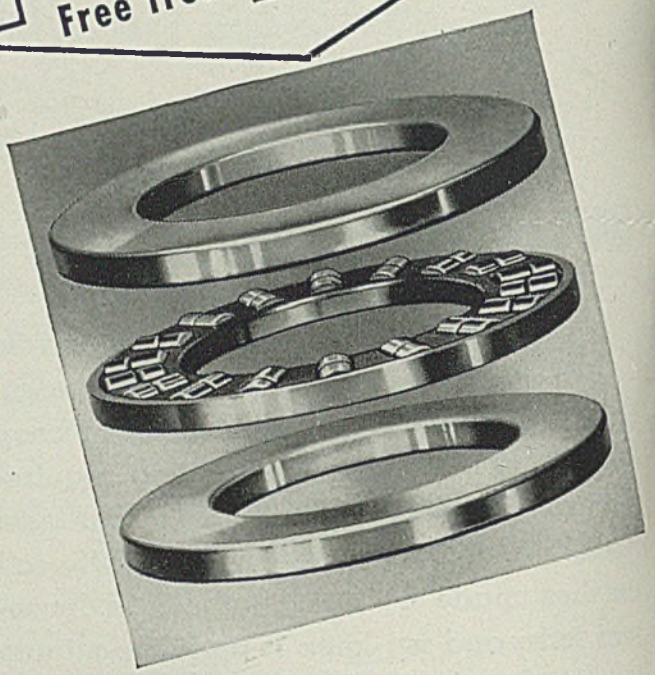


All ROLLWAY RADIAL BEARINGS are Free from Thrust Loads

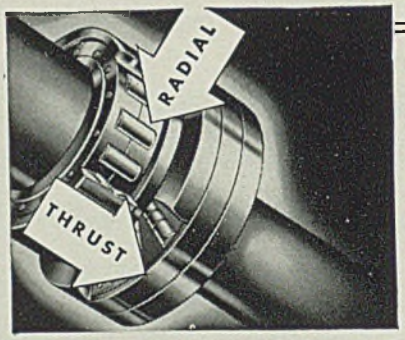
All ROLLWAY THRUST BEARINGS are Free from Radial Loads

PILE a thrust load on a roller bearing that's already carrying a radial load and you introduce complex stresses that tend to force the rollers from the race . . . that tend to increase sliding friction and wear-back between the roller ends and the radius of the race . . . and that tend to cause earlier fatigue failure.

That's why Rollway Solid-Cylindrical Roller Bearings split every load into its two simplest components of *pure* radial and *pure* thrust . . . carrying each of these on separate roller assemblies at RIGHT ANGLES TO THE ROLLER AXIS. Both torque per bearing and load per roller are substantially reduced. You get greater roller cross-section and greater roller contact area per unit of load, hence more strength to meet stress, and less hazard of spalling and brinelling the race.



You can usually change over from other bearings to Rollways of higher load capacities without increasing boundary dimensions. But, for maximum life and service, your bearings should be carefully chosen as to size and type. Send us your drawings, or a description of your application, for free and confidential bearing recommendation.



For longer bearing life, more efficient performance and more economical maintenance . . .

FOLLOW THIS BASIC BEARING PRINCIPLE

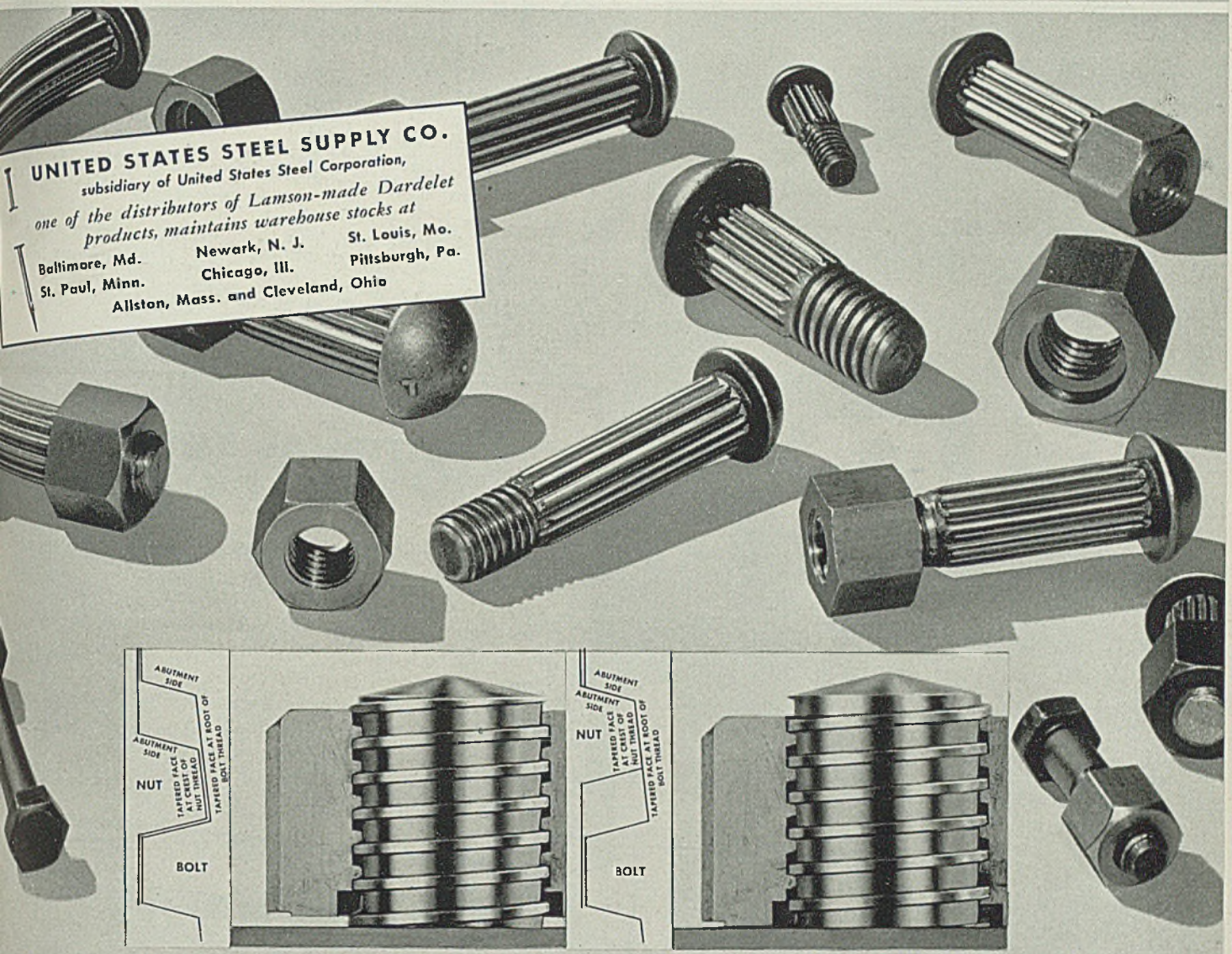
- All radial loads carried at right angles to the roller axis.
- All thrust loads carried at right angles to the roller axis.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N.Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

JUST A MAN, A MAUL AND A WRENCH

WITH A Dardelet RIVET-BOLT



LEFT, ABOVE—UNLOCKED POSITION

RIGHT, ABOVE—LOCKED POSITION

No air compressors. No forge for heating rivets. No pneumatic hammers. No five or seven man crew. Just a man and maul and wrench can apply Dardelet *RIVET-BOLTS.* You an see how they are applied by observing their appearance. You drive them into the punched or drilled hole, and the deep splines flatten to make a body-bound fit. Apply the nut, which spins freely on the Dardelet thread, until it seats, then apply the wrench. When the root of the Dardelet nut thread rides up on the opposing high diameter of the bolt, you have the famous Dardelet Thread-Lock. (See diagrams for understanding this action.) During a time study in the field, 5 men drove and fastened 750 ⅞-inch Dardelet *RIVET-BOLTS* in an 8 hour day, whereas, a 5 man crew installed only 300 hot-driven rivets in the same period. Construction engineers throughout the country are specifying Dardelet *RIVET-BOLTS* without hesitation for they have established the fact that their use provides a sounder construction than a hot riveted job. Specific engineering data on request—and samples too, if you want to make your own tests. Lamson & Sessions makes all types of bolts with Dardelet threads as well as *RIVET-BOLTS* and Machine Bolts for structural steel erection and assemblies. ● In present-day construction where alterations, additions and even complete dismantling may be necessary, Dardelet *RIVET-BOLT* assembly is the only efficient method providing quick solution of all three problems.

THE LAMSON & SESSIONS COMPANY • 1971 West 85th Street • Cleveland, Ohio

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

LAMSON & SESSIONS

LTS • • NUTS • • COTTERS • • CAP SCREWS • • SPECIALS

Your Jobber Stocks the Lamson Line

Call us

for GENERAL PURPOSE STEELS

Steel products, tools, machinery and equipment

Like yours, our first job is to speed war production. So, if your production on a war job is in danger of being slowed down for want of some piece of steel—call our nearest warehouse. Many such calls have kept wheels turning.

Although our stocks are not what we wish they were, what we have can be yours—in a hurry—subject, of course, to priority restrictions.

If we don't have what you need, we'll do everything we can to help you find a source of supply. So try us—note our phone and teletype numbers below, at the left.

for NATIONAL EMERGENCY ALLOY STEELS

These new alloy steels were developed as substitutes for the old style alloy steels to save critical materials such as nickel and chromium. They cover a wide range of properties—were especially designed to meet present conditions. In fact, many "NE" steels are actually out-performing the steels previously used.

We welcome your inquiries and will gladly assist you in determining the grades best suited to your needs. Telephone, write or wire the warehouse nearest you.

for AIRPLANE MATERIALS

Our Chicago Warehouse has been designated by the War Production Board as a warehouse to distribute the following aircraft products:

WD-X-4130 Sheets, *Open Hearth, Normalized, Pickled and Oiled to Spec. AN-QQ-S-685, Condition N. All gauges .016 to .50 sheets 18 x 72".*

Stainless Steel Rounds, *Spec. AN-QQ-S-771.*

Stainless Sheets—*Spec. AN-QQ-S-772. Spec. AN-QQ-S-757.*

These materials are for use in airplanes only and available only to the aircraft industry and sub-contractors. If you are eligible for these materials, phone, write or wire: United States Steel Supply Company, P. O. Box MM, Chicago, Ill. Telephone, BRUnswick 2000—Teletype CG. 605.

UNITED STATES STEEL SUPPLY COMPANY

USS STEELS

SERVICE

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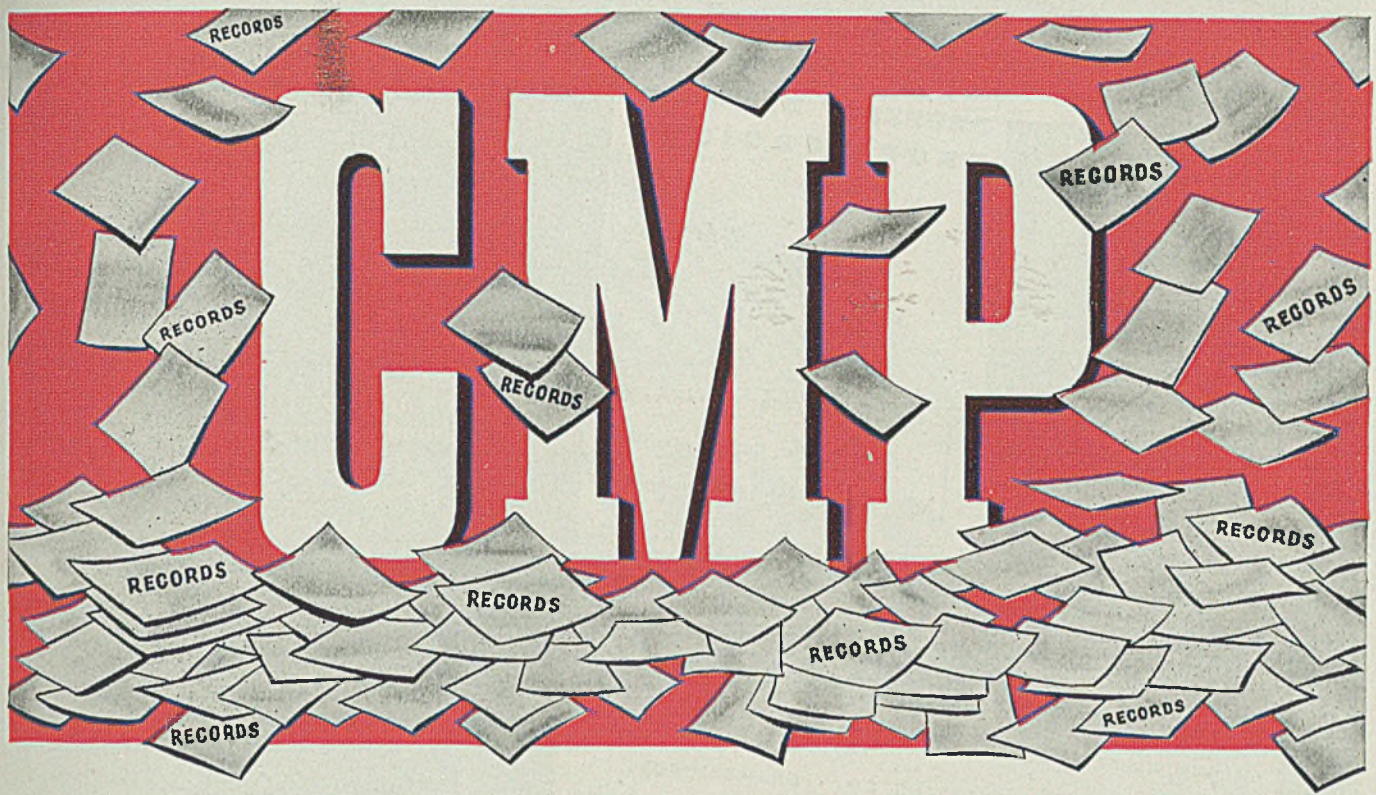
BALTIMORE	GILmore 3100
BOSTON	STAdium 9400
Teletype BRTN. 10	
CLEVELAND	HEnderson 5750
Teletype CV. 153	
PITTSBURGH	CEdar 7780
Teletype PG. 475	
ST. LOUIS	MAin 5235
TWIN CITY - St. Paul, Minn.	NEstor 2821
Teletype STP. 154	
NEWARK, N.J.	Bigelow 3-5920
BErgen 3-1614 -	REctor 2-6560
Teletype NK. 74	

UNITED STATES STEEL SUPPLY COMPANY

(formerly Scully Steel Products Company)

UNITED STATES STEEL



POSITIVE RECORD CONTROL IS ESSENTIAL

TO assure management of materials under the Controlled Materials Plan. Cardineer will give you that control. In addition, Cardineer speeds posting and finding over 60%. Work is easily divided for peak loads. Mobile unit may be moved anywhere in the office. Records paraded before the eyes of the operator with an easy touch of the pull ring. Eliminates fatigue. Assures greater accuracy.

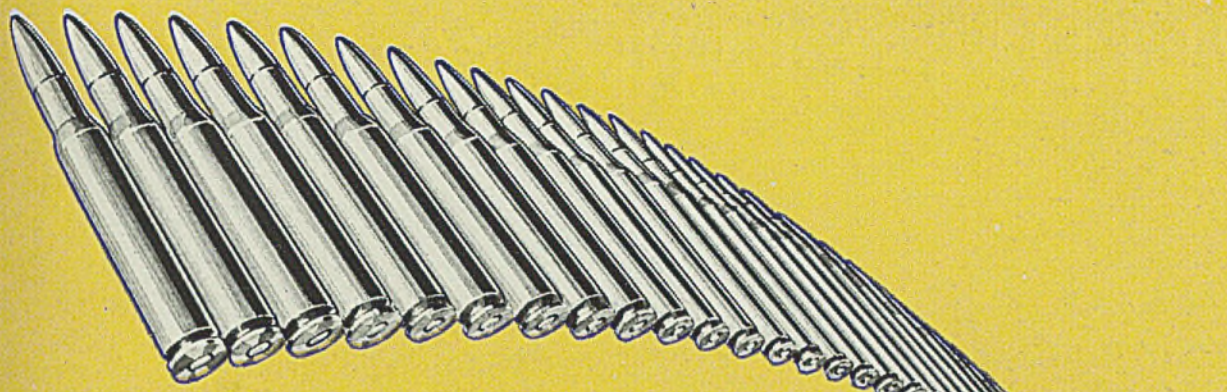
You can put Cardineer to work now! Because it is made of non-critical materials, Cardineer is available for immediate delivery.

Cardineer with its many advantages can assist you in solving your CMP and inventory problems. Address our Methods Division, Department S-3, today, for assistance. No obligation.

DIEBOLD SAFE & LOCK CO.
General Offices: Canton, Ohio
BRANCH OFFICES IN PRINCIPAL CITIES

ASK FOR YOURS. Booklets in time-money saving are free as follows; check and pin on your letterhead: Inventories ☐, Costs ☐, Payroll and Personnel ☐, Plant and Equipment ☐, Purchases ☐, Production ☐.

DIEBOLD Cardineer ROTARY FILE



BILLIONS

OF CARTRIDGE CASES

cleaned with

PENNSALT CLEANERS

in 1942!

Ten and a quarter billion rounds of small arms ammunition, President Roosevelt told Congress in his address on January 7th, were produced in 1942. This is a figure to stagger the imagination and it is something of which industry justly is proud.

The important part played by Pennsalt Cleaners in this tremendous job is, of course, a source of pride to us.

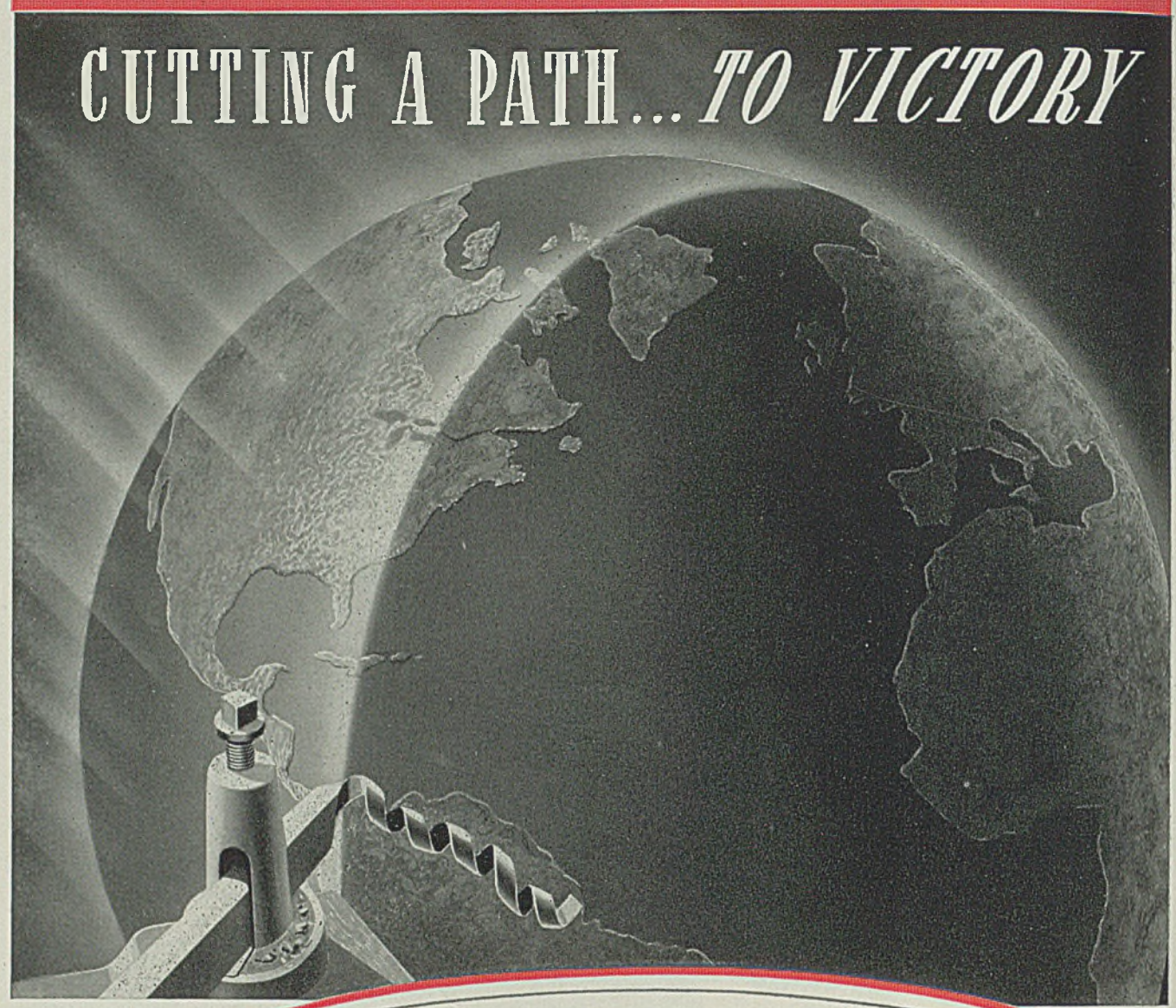
To the many cartridge case manufacturers who today are changing over from brass to steel, Penn Salt servicemen are offering valuable aid. Because of the experience gained by our trained experts, Penn Salt should be able to assist you in any cleaning problem which you may have.

Consult us without obligation.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals

1000 Widener Building, Philadelphia, Pa.
New York · Chicago · St. Louis · Pittsburgh · Wyandotte · Tacoma

CUTTING A PATH... *TO VICTORY*



FROM the threat of abysmal global darkness, our world is gradually emerging into the Light of Freedom. The prospect of eventual Victory is but a reflection of America's collosal and unequalled capacity for production . . . *a record output that would be impossible without TOOLS!*

• LATROBE is proud to play its role through the development of quality high-speed steels, so vital to Industry's manifold cutting operations.

The service of Latrobe's highly specialized organization is at the command of every tool producer . . . with modern research, skilled engineering and timely technical assistance.

LESCO

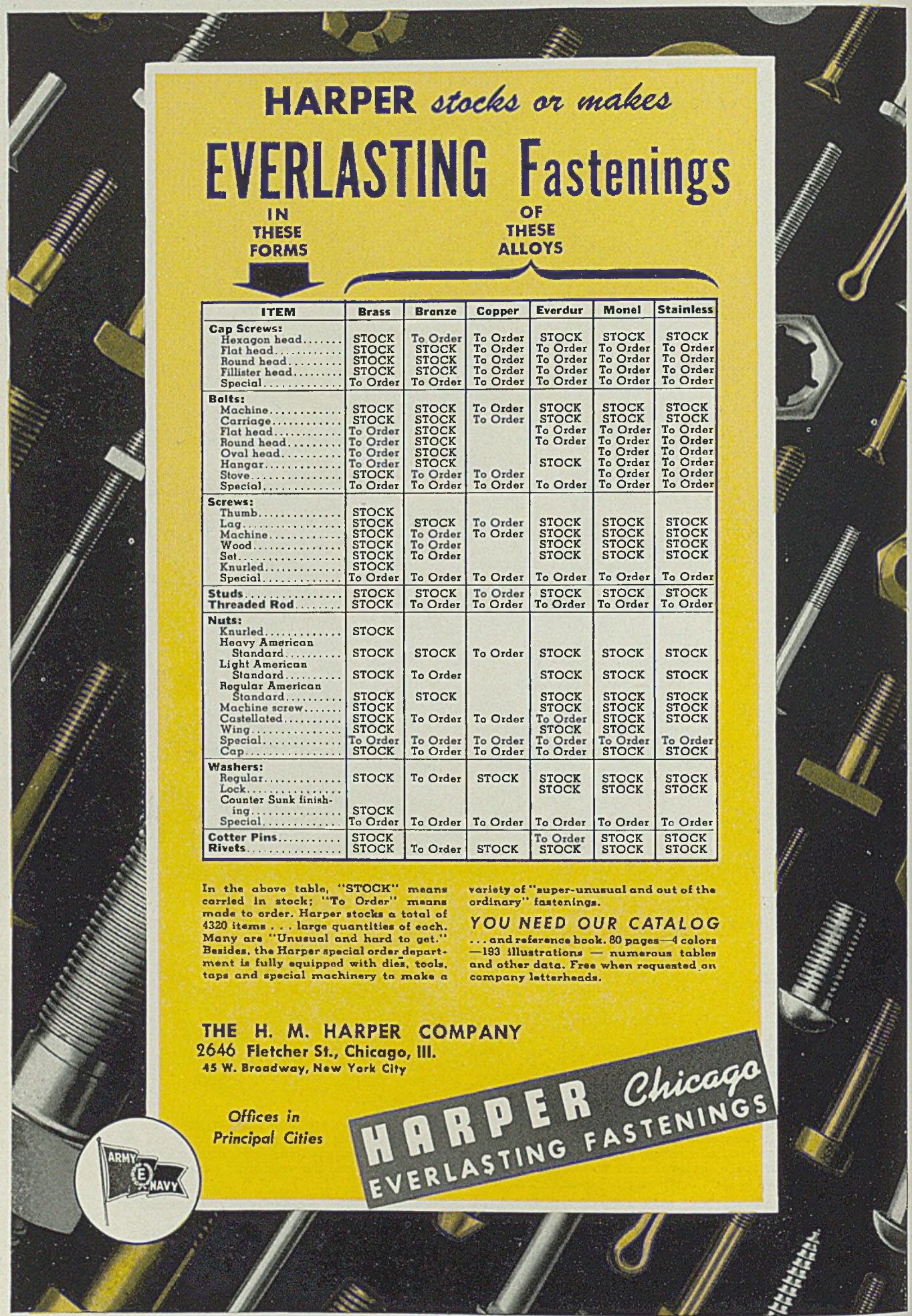
HIGH SPEED STEELS FOR VICTORY

LATROBE

ELECTRIC STEEL COMPANY

MAIN OFFICES *and* PLANT . . . LATROBE · PA·

STEEL



HARPER *stocks or makes*

EVERLASTING Fastenings

IN THESE FORMS — OF THESE ALLOYS

ITEM	Brass	Bronze	Copper	Everdur	Monel	Stainless
Cap Screws:						
Hexagon head	STOCK	To Order	To Order	STOCK	STOCK	STOCK
Flat head	STOCK	STOCK	To Order	To Order	To Order	To Order
Round head	STOCK	STOCK	To Order	To Order	To Order	To Order
Fillister head	STOCK	STOCK	To Order	To Order	To Order	To Order
Special	To Order	To Order	To Order	To Order	To Order	To Order
Bolts:						
Machine	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Carriage	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Flat head	To Order	STOCK		To Order	To Order	To Order
Round head	To Order	STOCK		To Order	To Order	To Order
Oval head	To Order	STOCK			To Order	To Order
Hangar	To Order	STOCK		STOCK	To Order	To Order
Stove	STOCK	To Order	To Order		To Order	To Order
Special	To Order	To Order	To Order	To Order	To Order	To Order
Screws:						
Thumb	STOCK					
Lag	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Machine	STOCK	To Order	To Order	STOCK	STOCK	STOCK
Wood	STOCK	To Order		STOCK	STOCK	STOCK
Set	STOCK	To Order		STOCK	STOCK	STOCK
Knurled	STOCK					
Special	To Order	To Order	To Order	To Order	To Order	To Order
Studs	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Threaded Rod	STOCK	To Order	To Order	To Order	To Order	To Order
Nuts:						
Knurled	STOCK					
Heavy American Standard	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Light American Standard	STOCK	To Order		STOCK	STOCK	STOCK
Regular American Standard	STOCK	STOCK		STOCK	STOCK	STOCK
Machine screw	STOCK			STOCK	STOCK	STOCK
Castellated	STOCK	To Order	To Order	To Order	STOCK	STOCK
Wing	STOCK			STOCK	STOCK	
Special	To Order	To Order	To Order	To Order	To Order	To Order
Cap	STOCK	To Order	To Order	To Order	STOCK	STOCK
Washers:						
Regular	STOCK	To Order	STOCK	STOCK	STOCK	STOCK
Lock				STOCK	STOCK	STOCK
Counter Sunk finishing	STOCK					
Special	To Order	To Order	To Order	To Order	To Order	To Order
Cotter Pins	STOCK			To Order	STOCK	STOCK
Rivets	STOCK	To Order	STOCK	STOCK	STOCK	STOCK

In the above table, "STOCK" means carried in stock; "To Order" means made to order. Harper stocks a total of 4320 items . . . large quantities of each. Many are "Unusual and hard to get." Besides, the Harper special order department is fully equipped with dies, tools, taps and special machinery to make a variety of "super-unusual and out of the ordinary" fastenings.

YOU NEED OUR CATALOG

. . . and reference book. 80 pages—4 colors —193 illustrations — numerous tables and other data. Free when requested on company letterheads.

THE H. M. HARPER COMPANY
2646 Fletcher St., Chicago, Ill.
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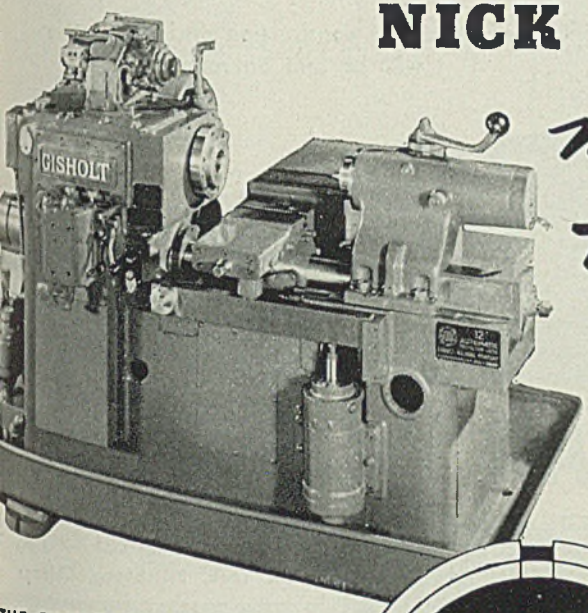
Offices in Principal Cities

ARMY E NAVY

HARPER *Chicago*
EVERLASTING FASTENINGS

NICK BARLOW'S DAUGHTER

may run this Hydraulic Lathe



MARY BARLOW is thoroughly feminine. Certainly, she would never work in a machine shop from choice. But she's ready to substitute for a man at the front if necessary. And it *may* be—soon.

She doesn't relish a complex job that involves a long apprenticeship. Give her work she can do right away—on a machine that's simple to operate; that requires very little training—a machine like the Gisholt Hydraulic Automatic Lathe where she merely loads and removes the work, and the machine does all the rest.

Because, once this war is over, she wants to go back to her woman's world.

THE GISHOLT HYDRAULIC AUTOMATIC LATHE . . .

performs its swift cycle of machining operations automatically, maintaining accuracy at high cutting speeds. Extremely simple to operate, it handles a wide variety of chucking and between-centers work.

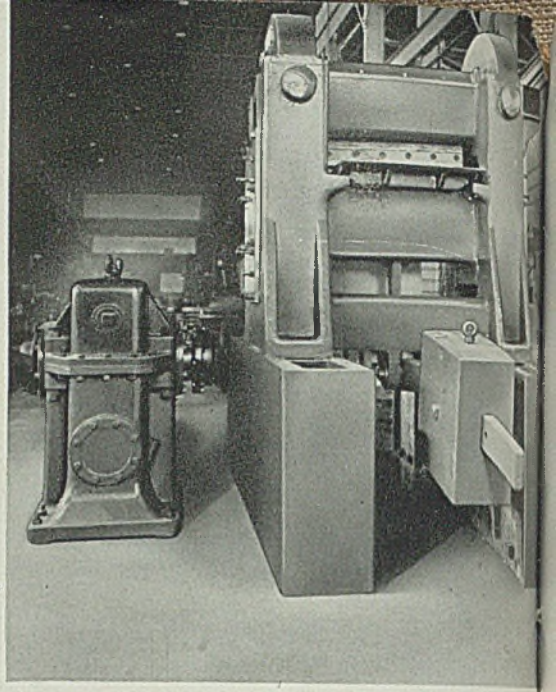
GISHOLT MACHINE COMPANY
1217 East Washington Ave., Madison, Wisconsin

LOOK AHEAD . . . KEEP AHEAD . . . WITH GISHOLT IMPROVEMENTS IN METAL TURNING

At Gisholt, the Army-Navy "E" and the Treasury Flag fly side by side

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

Philadelphia Worm Reducers have what it takes for tough jobs like this . . .



For hard service like driving the upset hot shear shown here at a metal plant Philadelphia Worm Gear Reducers prove the value of selecting a unit designed to include all efficiency features, with ample housing to assure adequate heat dispersal areas. These reducers are made for both horizontal and vertical drive conditions and in a wide range of horsepowers and ratios. Efficiencies of 85% to 95% are usual. Little, if any, maintenance is required except occasional lubrication.

Full details of construction and application will be sent on request.

PHILADELPHIA GEAR WORKS

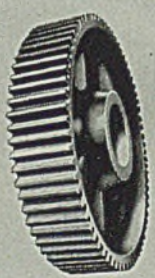
INDUSTRIAL GEARS
AND SPEED REDUCERS
IMITORQUE VALVE CONTROLS

ERIE AVENUE & G STREET
PHILADELPHIA, PA.
New York, Pittsburgh, Chicago

Philadelphia
LIMITORQUE CONTROL
operates all types of valves, etc., safely, economically, from convenient stations.

Philadelphia
WORM GEAR SPEED REDUCER
right angle drives — vertical or horizontal. Wide range of ratios and horsepowers.

Philadelphia
MOTOREDUCER
The economical self-contained drive, Horizontal or Vertical types — various ratios and horsepowers.



Philadelphia
GEARS
All types and sizes of industrial gears. Can be supplied in all materials.

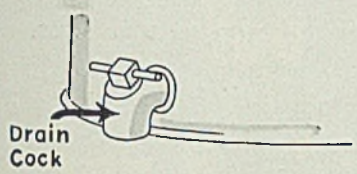
Philadelphia
HERRINGBONE SPEED REDUCER
for heavy loads at high speed. Single, Double, Triple Reductions, various ratios and horsepowers.

How to make Acetylene Generators last longer and work more efficiently...

Acetylene generators are a convenient and economical source of acetylene gas for use in the oxy-acetylene process. When operated and maintained in accordance with the manufacturer's instructions, a good generator should function safely and efficiently indefinitely. A few suggestions are outlined here to help you keep your generator working its best for a long time.

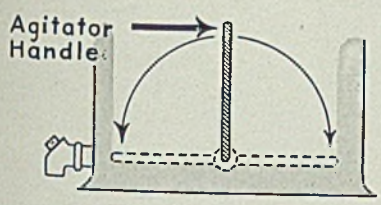
WHEN RECHARGING

1. *Always change the water* whenever a generator is to be recharged, and replace it with clean, cool, water. This will



guard against a rise in temperature within the generator to an abnormal level that would affect the safety and efficiency of operation.

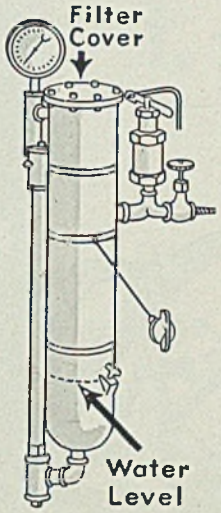
2. *Operate the residue agitator* while draining the generating chamber. This



will help assure thorough removal of the residue.

3. *Flush the generating chamber* with clean water after draining off all the residue. If this is not done, the lime deposit will build up so that the amount of water that can be put into the generating chamber is considerably reduced. In addition, the caked deposit will make difficult operation of the residue agitator, and will slow up recharging by partially plugging the drain cock.

4. *Check the hydraulic* water level each time the generator is recharged, and add water to the correct level if needed. This is important to assure protection to the generator in case of a flashback of flame.



MAINTENANCE SUGGESTIONS

5. *Clean filter pads* should be installed at regular intervals. This is necessary not only because dirty pads may restrict the flow of acetylene, but also because they permit entrained moisture and small particles of lime to be carried over into the hose and apparatus.

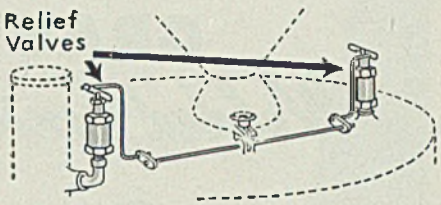
6. *Test for leaks* with soapy water at periodic intervals, particularly around gaskets—and always immediately after a gasket has been replaced. This is important not only because leaks represent a serious hazard, but also because gas leaks are costly.

7. *Prevent rust* on the outside of the generator by painting it or touching up bare spots whenever needed.

FOR SAFETY'S SAKE

8. *Prevent freezing* of water in any part of the generator, as freezing may destroy its usefulness and will in many cases present serious hazards. The book illustrated here will help you to do this. Copies may be obtained from any Linde Office, without charge.

9. *Relief valves* should be kept in good operating condition at all times, and set



to release at the pressures recommended by the manufacturer.

10. *Do not remove* permanently any part of the generator mechanism. Each part is specifically designed to help assure safe and efficient operation.

11. *Follow all instructions* furnished with the generator. Duplicate instruction books for all Oxweld generators can be obtained from any Linde office without charge.

This Flame Cutter was built to work for you!

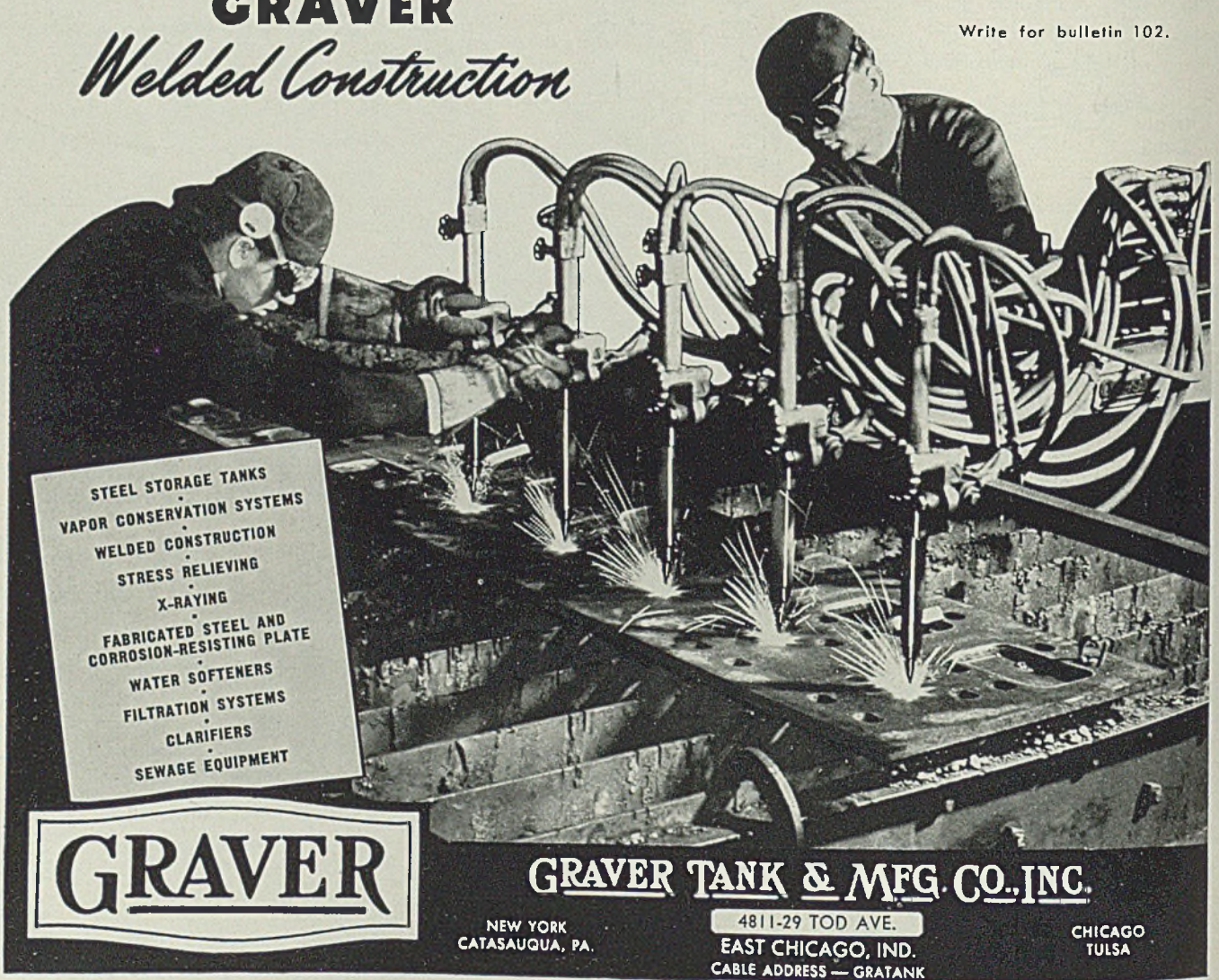
Spitting fire and spraying sparks, this modern flame cutting machine slices through heavy steel plate like so much butter. Sure it's a time saver—and it insures accuracy, too. It's typical of the modern methods used in Graver Welded Construction, and its efficiency is reflected in the quality and cost of the finished job.

Graver Welding Division fabricates welded machine bases, frames, and other types of equipment to meet the most exacting specifications. Today, more and more manufacturers are recognizing the outstanding advantages of this type of construction. For instance, there are no wood patterns required—a definite saving of both time and money. There are no concealed defects such as might occur in castings. Deadweight is eliminated and tolerances are held to an absolute minimum. Assemblies can be fabricated from two or more dissimilar metals such as mild steel, alloy steels, steel castings or forgings, welded together into a single unit. And alterations to equipment thus built can be made quickly and at a minimum of expense.

Graver offers a complete welding service including x-raying and stress relieving when required. Whatever your requirements may be, consult Graver. We shall be glad to discuss your problems with you and there is no obligation.

GRAVER
Welded Construction

Write for bulletin 102.



GRAVER

GRAVER TANK & MFG. CO., INC.

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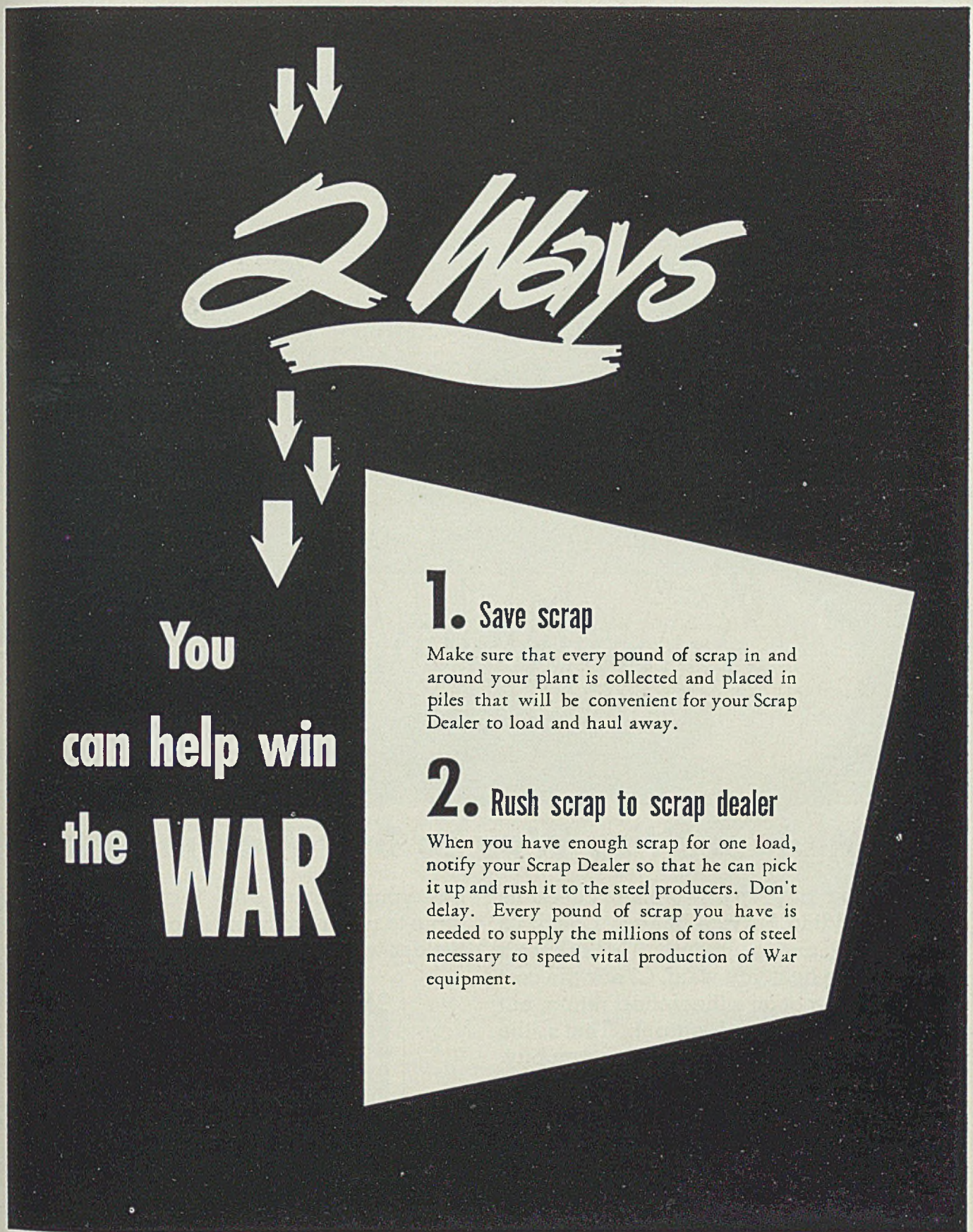
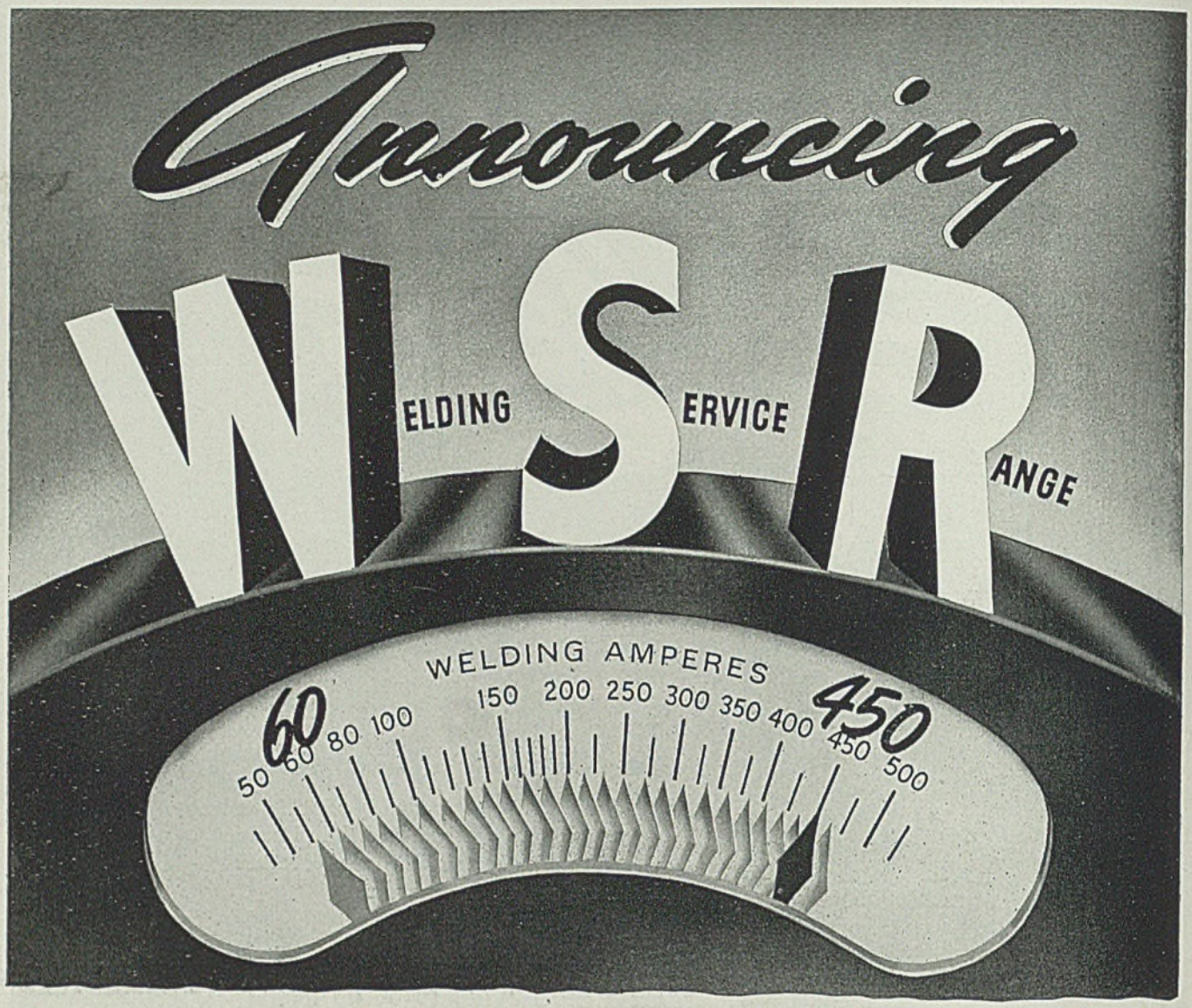


WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

division of NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.



The Welder-Wise Way to Buy Welding Heat

Before you buy any machine, check its WSR (Welding Service Range). Check its minimum to maximum output. Make sure it delivers the heat you want. Check the cost per ampere, *not* on a theoretical rating, but on maximum *actual* output. That's the *value* you pay for in any machine you buy.

Then compare, for example, the P&H Model WK300 which has a WSR of 60 to 450 amps. You get true welder value and pay less than $1 per amp per maximum output.

In addition, and at no extra cost, P&H Welders provide single control to speed up welding, instantaneous arc response, better arc characteristics, and other refinements which assure better welding results and lower cost.

See your nearest P&H representative or write to us for complete information on the welder-wise way to buy welding heat.

P&H
ARC WELDERS

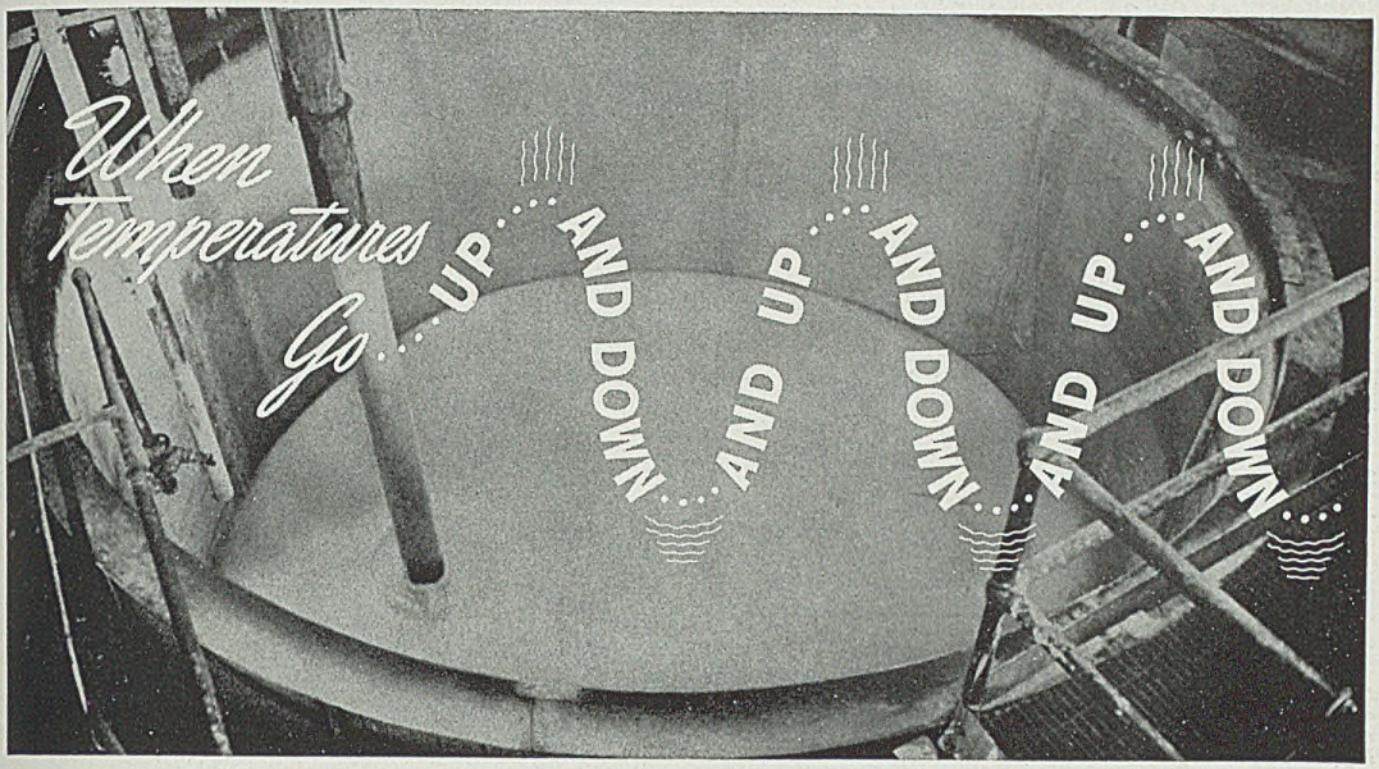
P&H also manufactures a complete line of alloy and mild steel electrodes.

General Offices: 4411 W. National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER
CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · P&H · MOTORS · HOISTS · WELDING ELECTRODES

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

How to Keep Acids Working for Victory . . . . . No. 1



TODAY, acids have a bigger job of work to do than ever before—helping industry turn out munitions, oils, metals, chemicals, fertilizers, textiles in a steady flow.

Shutdowns are critical. Everything possible must be done to prevent the breakdown of acid handling equipment.

* * *

High among causes of shutdowns in many acid processes are the repeated, drastic temperature changes to which tanks used to heat and cool acid solutions are subjected.

The continuous expansion and contraction, with its accompanying movement or working of the lining, is severe service for any material to withstand.

* * *

Tellurium Lead has been found by certain users to perform better than other types of lead under conditions where repeated and abrupt temperature changes occur. It is thought that this may be due, among other things, to Tellurium Lead's *work-hardening* property. As this lead is worked, it is toughened—increased in tensile strength.

The work-hardening property of Tellurium Lead is also a safeguard wherever lead must be bent, stretched or hammered as in elbows, flanges, coils, joints and turnover points.

* * *

Another source of acid equipment trouble is vibration. The resultant dynamic or fatigue stresses, acting in combination with corrosion, are more disastrous than either factor alone.

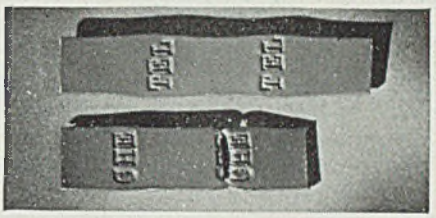
To meet this condition, Tellurium Lead not only has all the acid corrosion resistance for which lead is noted but, under vibration tests, it exhibits a 60% greater endurance limit than lead without the tellurium addition.

* * *

Undoubtedly, another factor in Tellurium Lead's resistance to corrosion under severe conditions of heat and stress is its finer, more uniform grain structure, shown in the accompanying photomicrographs. The surface of Tellurium Lead sheet and pipe is smoother—there is less possibility of pitting and local corrosion.

Tellurium Lead of our manufacture is time-tested St. Joe chemical lead alloyed with a small quantity of tellurium. It is available in sheet or pipe form, or fabricated in coils for heating and cooling purposes.

For further information address the nearest Company branch listed below.



It *work-hardens:* These strips of Tellurium Lead (top) and regular lead (bottom) were stamped and pulled out in a tensile testing machine. Note how Tellurium Lead was strengthened by the stamping, whereas the other lead was weakened—and fractured.

Note Finer Grain Structure: Photomicrographs of Tellurium Lead (left) and ordinary lead (right), showing the finer, more uniform grain formation brought about by the addition of tellurium. Another significant point: In laboratory tests extruded strips of Tellurium Lead, annealed at 150°C for six months, showed no grain enlargement. Metallurgists agree that freedom from grain growth means less danger of rapid corrosion at elevated temperatures.

USERS "TELL" RESULTS

"We used your Tellurium Lead sheet to line an acid-cutting tank. Strong sulphuric acid is dumped into the tank and sufficient water added to bring it to the proper strength. This naturally generates considerable heat. The operation has been repeated daily for nearly three years. To date no leakage or other difficulty has been experienced. The lining is as good as the day installed."

* * *

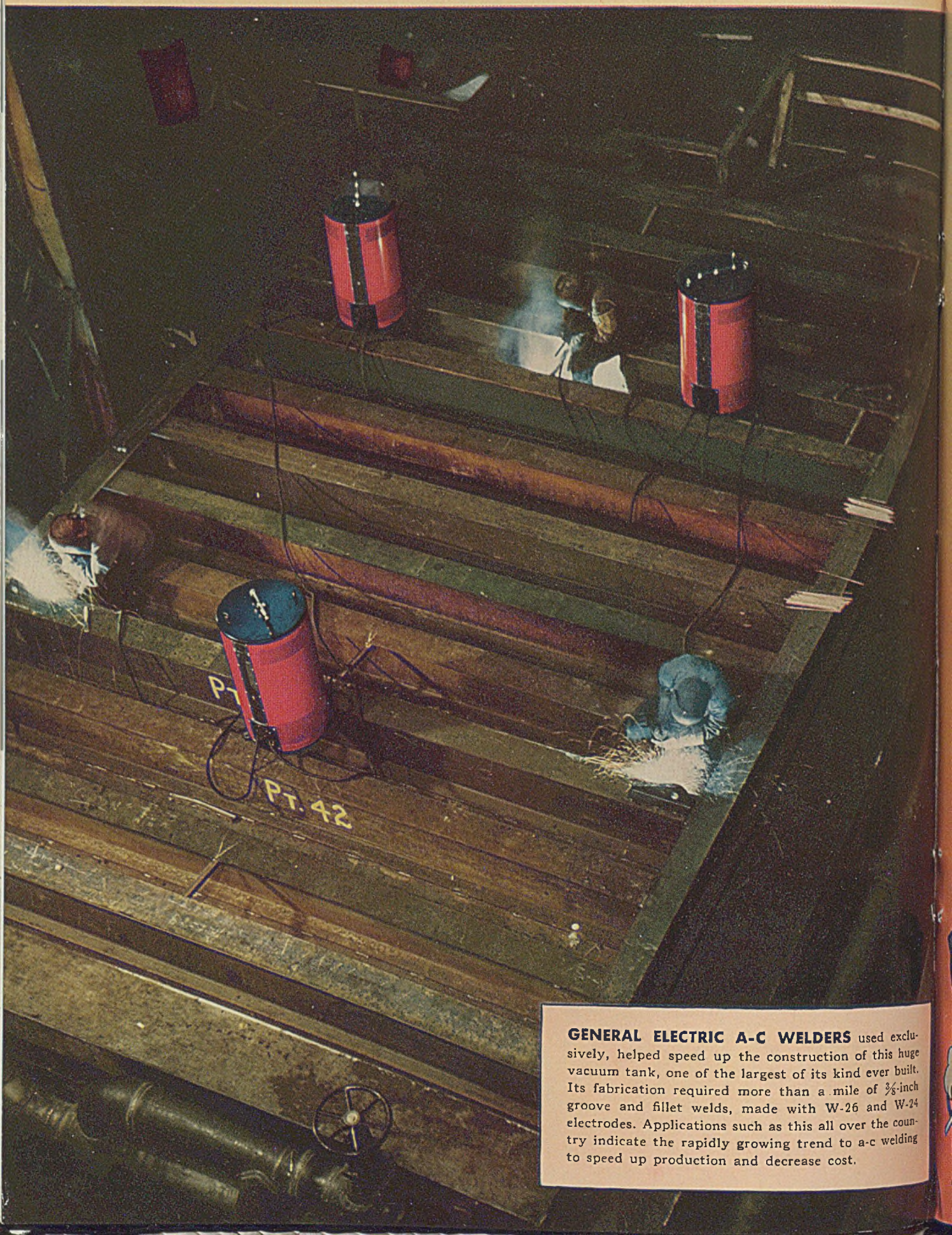
"Tellurium Lead sheet was used to replace a tank lining which had been in service about three years. The old lining had bulged to such an extent that it rendered the tank useless. The Tellurium Lead lining has now been in service about two years. No bulging has occurred. The lead still conforms to the tank shape as snugly as it did on installation."

* * *

"We have just checked up on the condition of the 3-year old Tellurium Lead lining in our large sulphuric acid mixing tank. We found the lead to be very smooth and uniform with no signs whatever of buckling although the tank is used for cutting raw acid to low specific gravities. Comparison with other tanks in the same room and used for identical purposes shows that Tellurium Lead makes an ideal lining. The other linings have given us trouble by buckling and cracking open along the welded joints."

TELLURIUM LEAD

Want to Increase



GENERAL ELECTRIC A-C WELDERS used exclusively, helped speed up the construction of this huge vacuum tank, one of the largest of its kind ever built. Its fabrication required more than a mile of ⅜-inch groove and fillet welds, made with W-26 and W-24 electrodes. Applications such as this all over the country indicate the rapidly growing trend to a-c welding to speed up production and decrease cost.

Welding Speeds 15%?

THAT'S WHAT MANY MANUFACTURERS HAVE DONE BY CHANGING TO A-C WELDERS*

WITH a-c welding, arc-blow is seldom troublesome, therefore larger electrodes and higher currents can be used wherever the work permits. As a result, welding speed can often be increased 15 to 30 per cent.

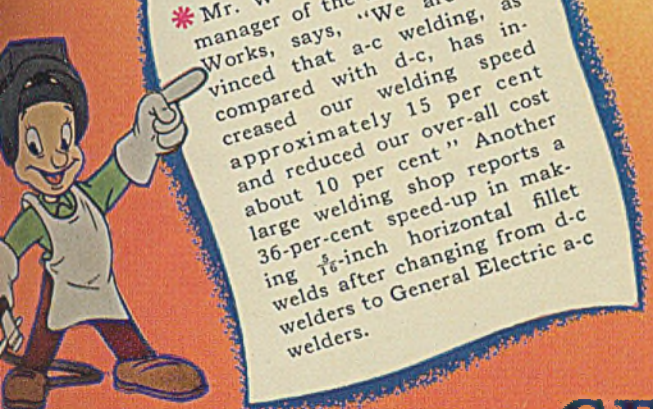
In addition, a-c welding gives these four extra advantages:

1. ASSURES HIGH-QUALITY WELDS—The molten pool is easily controlled, and the weld is uniformly strong because the operator is not troubled by arc-blow. This advantage is particularly apparent when welding in such locations as corners, where magnetic disturbance is usually most troublesome.

2. REDUCES ELECTRODE LOSS—Electrodes larger than 3/16 inch in diameter are furnished in 18 inch lengths. Because a-c welding facilitates the use of these larger electrodes it often reduces stub-end losses as much as 20 per cent.

3. CONSERVES POWER AND CRITICAL MATERIALS Power consumption is reduced as much as 50 per cent, compared with the power used by d-c welders of the same rating. This is because of the high efficiency of General Electric welding transformers. In addition, only half as much copper and electrical sheet steel is used in their construction.

4. REDUCES MAINTENANCE—General Electric a-c welders have no heavy rotating parts; therefore they require very little attention, other than oiling the fan and the adjusting screw.



FOR FIRST-CLASS A-C WELDING *In All Positions*

Use the W-26 Electrode

With this G-E alternating-current electrode you can now do *all-position* a-c welding to meet the following specifications:

A.W.S. Filler Metal Specification E6011

Navy Bureau of Ships, Specification 46E3, Grade III, Class I

A.S.M.E. Boiler Code, Paragraph U68

The W-26 electrode provides a strong, forceful arc and enables operators to make finished welds equal to those made with the best d-c electrodes used for mild-steel work

FOR COMPLETE INFORMATION about General Electric a-c welders, or the W-26 electrode—or for engineering help in increasing the speed and efficiency of your arc-welding operations—simply contact your local G-E arc-welding distributor or G-E office, or write direct to General Electric Company, Schenectady, N. Y.

The Army-Navy "E" for Excellence in the manufacture of war equipment, now flies over six G-E plants employing 100,000 men and women

GENERAL ELECTRIC

673-47-8748

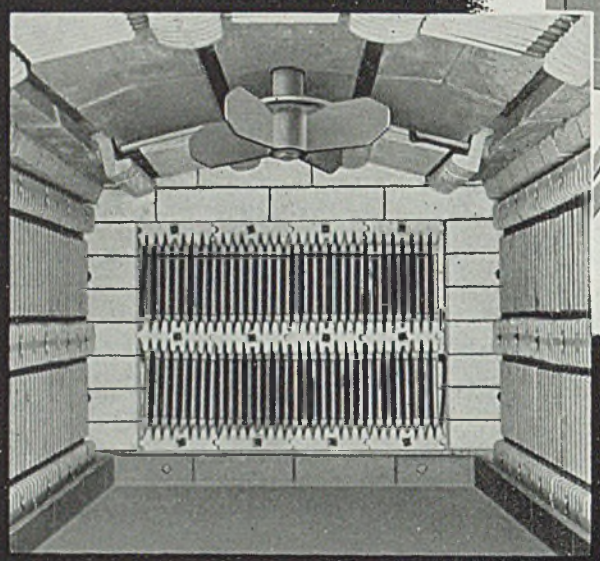
Multi Range
CONVECTION FURNACES *Box Type*

AN ALL PURPOSE FURNACE
400° F TO 1850° F

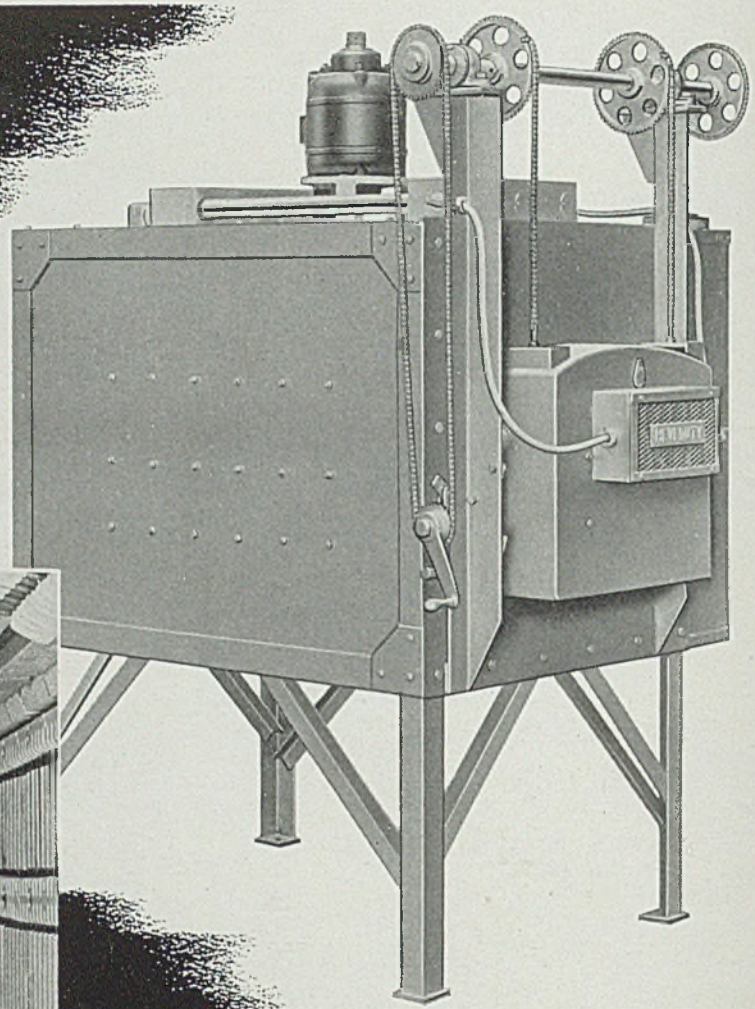
- USE OVER WIDE RANGE OF TEMPERATURES

with

- HIGH DEGREE OF UNIFORMITY
- USE WITH OR WITHOUT FAN AGITATION
- WITH OR WITHOUT PROTECTIVE ATMOSPHERE
- PLAIN OR ROLLER RAIL HEARTH



Interior view of a Multi Range Convection Furnace.



Type HD-183613-A — 27 KW Rating. Typical of all widths up to the 18" wide furnaces where the chamber length requires only one fan.

Hevi Duty Multi Range Convection Box Furnaces, with fan agitation, produce a high speed of heating with exceptional uniformity of temperatures from 400° F to 1850° F. They have a wide adaptability for general heat treating processes for both ferrous and non-ferrous metals.

SEND FOR BULLETIN HD 341

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

SPEEDIER WINGS

without sacrifice of strength, fire power or protection. That's what the increased use of cast magnesium parts is giving America's planes. This lightest of structural metals, as cast at the Howard foundries, has ample strength for many weight-saving applications in the planes which are inexorably giving the United States full control of the air. Every pound saved means a little more speed — greater aircraft losses for the enemy, and far fewer for us.

Every week sees an increase in the tonnage of magnesium airplane castings shipped from our new foundry; and tons of aluminum, brass and bronze parts, too — always more bomb racks, bomb parts, gun mounts, turret mounts, landing wheels, nose pieces — to name only a few. Our three foundries are all turning out an endless volume of cast nonferrous parts for ordnance, tanks, tank destroyers, ships, machine tools and essential war machinery.

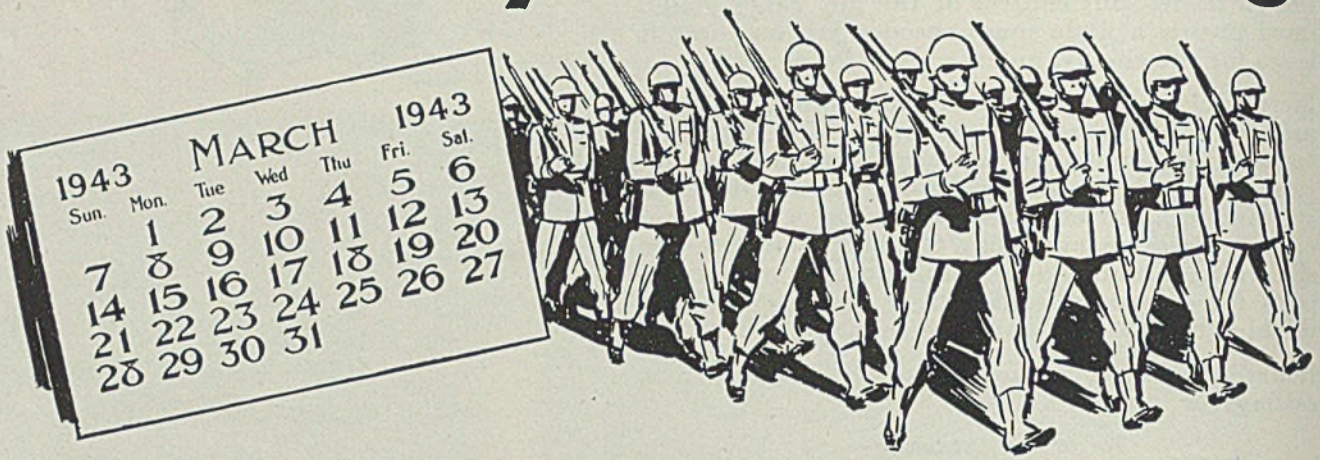
Howard should be a source of supply of non-ferrous castings for you.

For armament today—
for utility tomorrow.

Howard Foundry Company
4900 Bloomingdale Road Chicago

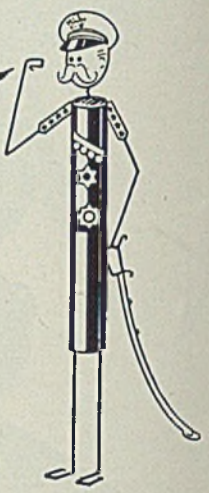
MARCH...MARCH

Our Boys are Marching!



on to VICTORY

"You Bet", *says the General*—
"and Let's Back up Our Boys
with U. S. BONDS
Buy More and More!"



. . . and in the Meanwhile, DEPEND on

GENSCO for Dependable Steel Service for

COLD FINISHED BARS
COLD ROLLED STRIP STEEL
COLD ROLLED SHIM STEEL
SHEET STEEL
TEMPERED AND ANNEALED SPRING STEEL
ROUND EDGE FLAT WIRE
ROUND WIRES
DRILL ROD
STEEL BALLS
FEELER GAUGE

GENERAL STEEL WAREHOUSE CO. Inc.

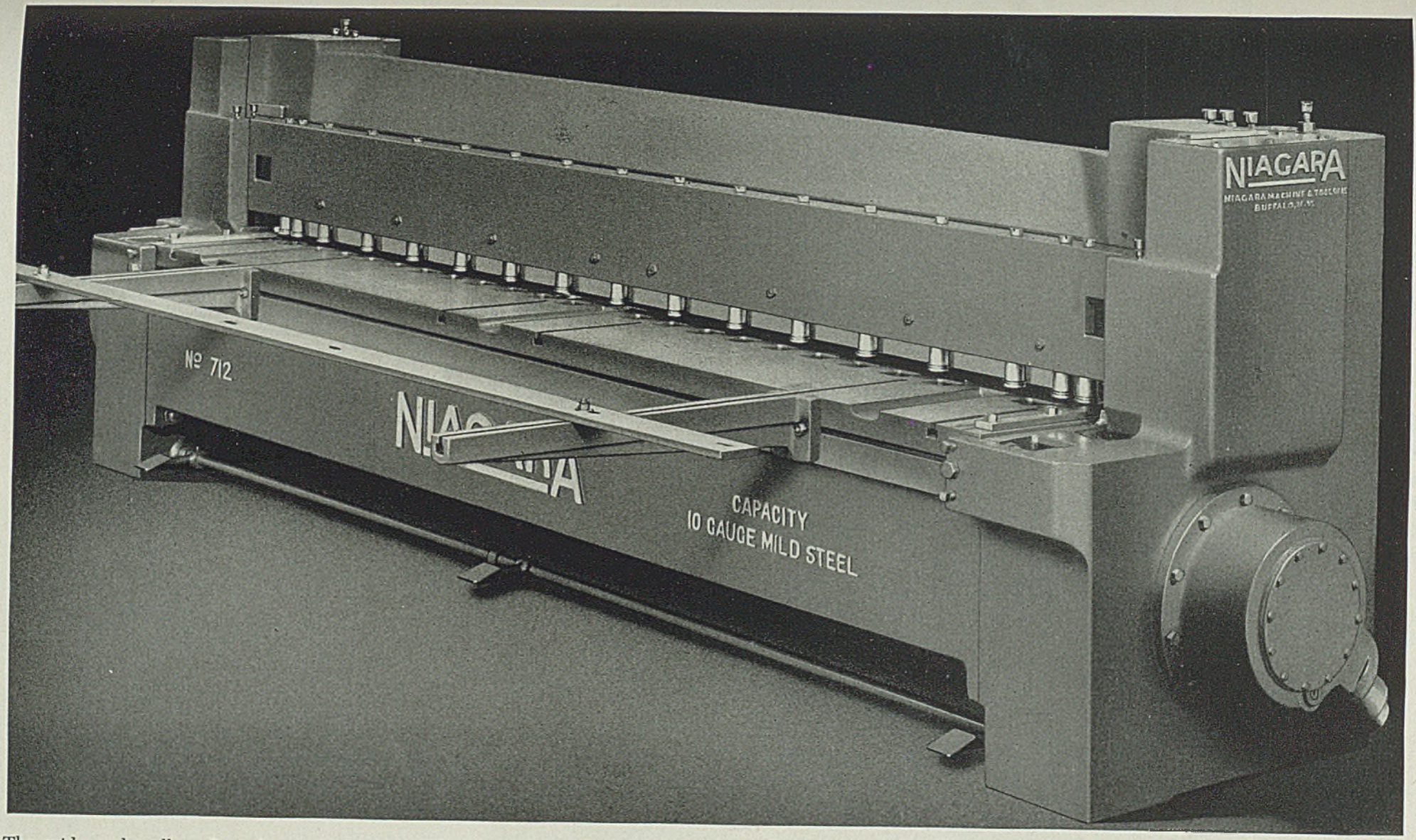
CHICAGO—1830 N. KOSTNER AVE.

NEW YORK
441 Lexington Ave.
Vanderbilt 6-2750

CINCINNATI
5826 Hamilton Ave.
Kirby 5891

MILWAUKEE
3844 W. Wisconsin Ave.
West 3810

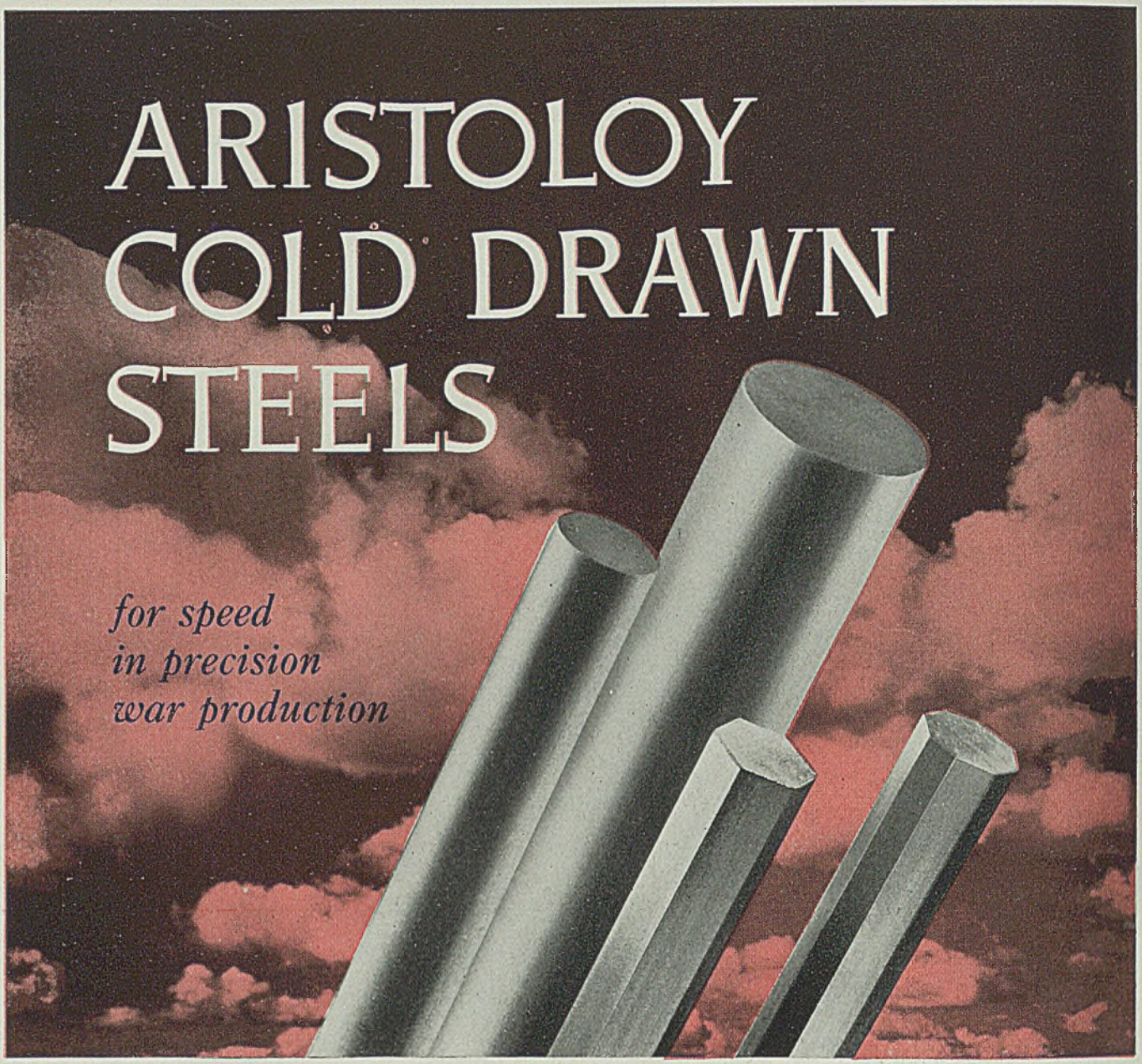
Immediate WAREHOUSE SHIPMENTS



The wide and well-graduated range of Niagara Power Squaring Shears offers the most productive machines for the many requirements of war plants. They cut sheared edges and narrow strips straight to within a few thousandths of an inch. They are arranged for convenient operation to speed up squaring and trimming. Niagara Machine & Tool Works, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives. —Advt.

BUY UNITED STATES WAR BONDS AND STAMPS



Cold Drawn Steels have the vital wartime job of keeping fast automatic production machines operating continuously at peak loads. The uniform surface and close tolerance of Aristoloy Cold Drawn Steels assure smooth machining with longer tool life and uninterrupted production.

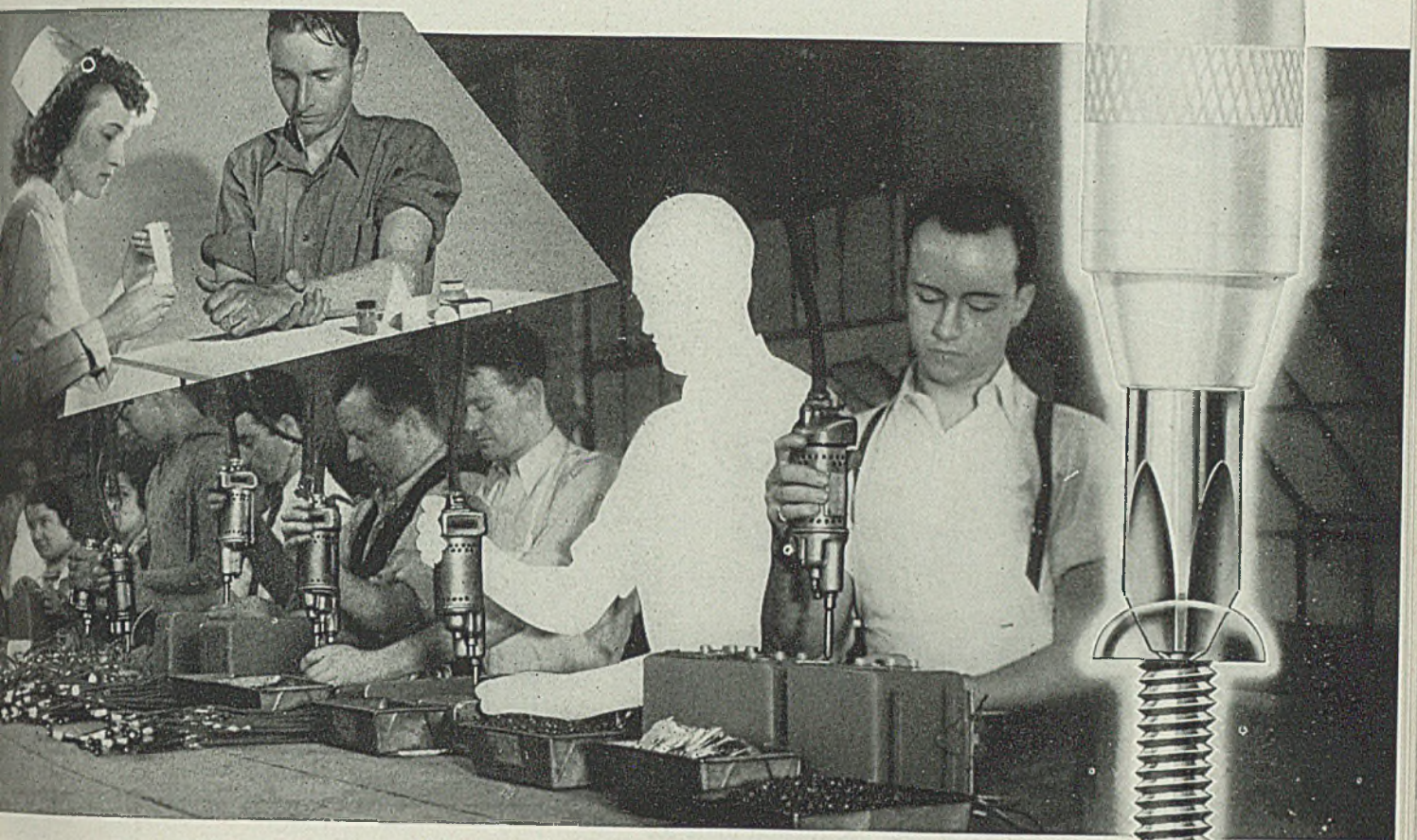
COPPERWELD STEEL COMPANY
WARREN, OHIO

ARISTOLOY STEELS

TO BUILD MORE • • • BETTER • • • FASTER

Carbon Tool Steels • Aircraft Quality Steels • Nitralloy Steels • Alloy Tool Steels • Stainless Steels • Bearing Quality Steels • Cold Drawn Steels

PREVENT CASUALTIES in Your Screw Driving Army



PHILLIPS SCREWS END DRIVER-SKIDS!

"Speed up, and do it safely!" That's 1943's war production challenge. This year we can't afford another sacrifice of 500 million worker days to preventable shop accidents . . . like injuries from skidding screw drivers.

Safety measure No. 1 for screw driving operations is accomplished when you specify screws with the Phillips Recessed Head. The driver *can't* slip out of the recess to slash a worker, or damage the work!

Relieved of fear, workers naturally step up speed. And, the *automatic centering of driving force* in the scientifically designed Phillips Recess eliminates many other handicaps to speed: the fumbling, wobbly starts . . . re-driving of slant-driven screws . . . removal of broken-head screws . . . reclaiming of marred parts. Fast, faultless, *safe* driving becomes automatic, even for "green hands." Power driving becomes practical.

They cost less to use! Compare the cost of driving Phillips and slotted head screws. You'll find that the price of screws is a minor item in your total fastening expense . . . that it actually costs less to have the many advantages of the Phillips Recess!

KEY TO FASTENING SPEED AND ECONOMY

The Phillips Recessed Head was scientifically engineered to afford:

Fast Starting – Driver point automatically centers in the recess . . . fits snugly. Screw and driver "become one unit." Fumbling, wobbly starts are eliminated.

Faster Driving – Spiral and power driving are made practical. Driver won't slip out of recess to injure workers or spoil material. (Average time saving is 50%.)

Easier Driving – Turning power is fully utilized by automatic centering of driver in screw head. Workers maintain speed without tiring.

Better Fastenings – Screws are set-up uniformly tight, without burring or breaking heads. A stronger, neater job results.

PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS • SELF-TAPPING SCREWS • STOVE BOLTS

21 SOURCES

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Reading Screw Co., Norristown, Pa.
Pheoll Manufacturing Co., Chicago, Ill.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

Follow these suggestions for better grinding results in your tool room. Your cutting tools are vital production tools for war production. By keeping them at peak efficiency you are speeding production of the materials of war!

1. *Sharpen tools and cutters frequently* . . . before the cutting edges become too dull . . . otherwise you waste time and metal in renewing an overly dull edge.
2. *Use fine grain abrasive wheels* . . . for finish grinding the cutting edges of milling cutters, hobs, reamers, broaches, lathe and planer tools, etc. . . . to obtain keener edges that last longer.
3. *Do not quench a hot tool edge in water* during offhand tool grinding. You will check and crack the cutting edge.
4. *Frequent dressing and truing of the wheel face* permits best precision grinding. However, excessive dressing wastes the abrasive wheel.
5. *Use open-density wheels* for grinding the newer, tough alloy steels after heat treating. The open-density wheels have a wider grain spacing which provides chip clearance for the abrasive cutting particles.
6. *Use the proper grain and grade of abrasive wheel* for your work. ABRASIVE COMPANY "white" and "red" Tool Room Grinding Wheels have been standard for many years for all types of tool and cutter grinding. Use the one *best suited* to your job.

ABRASIVE COMPANY

Standard Specifications

Tool Room Grinding Wheels

Broaches	W60- J- KY
Cutters	W46- K- HY
Die Blocks	W46- G- KY
Drills—Small	60- M- DY
Drills—Large	36- M- DY
Gears	W60- J- K8
Hobs	W60- J- K9
Machine Shops	
General Offhand	46- M- DY
Reamers	W46- J- HY
Stellite Cutters	W46- J- HY
Tools	
Lathe and Planer	
Light Offhand	46- M- DY
Heavy Offhand	46- N- D9
Heavy—Large Wheels	30- O- D9
Fixture Grinding	W46- J- HY
Tungsten Carbide Tools	
Roughing—Offhand	G601- I- V9
Semi-Finishing—Offhand	G80 -H- V8
Finishing Offhand	G120- H- V8

Write for copy of our Grinding Wheel Data Book.

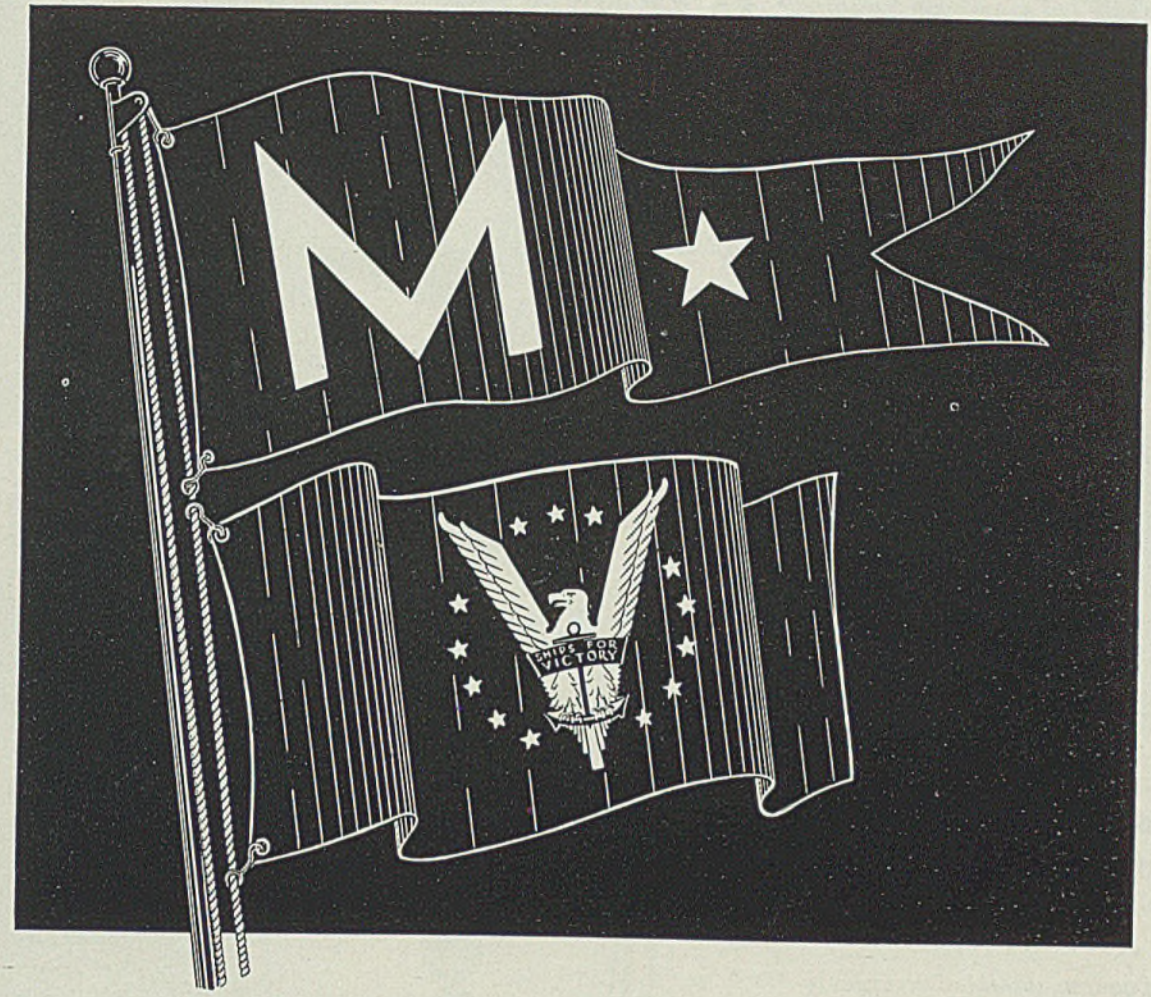
TRADE ABRASIVE REGISTERED

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • CHICAGO BRANCH: 127 SOUTH GREEN ST.

DISTRIBUTORS IN ALL PRINCIPAL CITIES



FORT PITT STEEL CASTING COMPANY

Awarded Maritime "M" Pennant

AND VICTORY FLEET FLAG

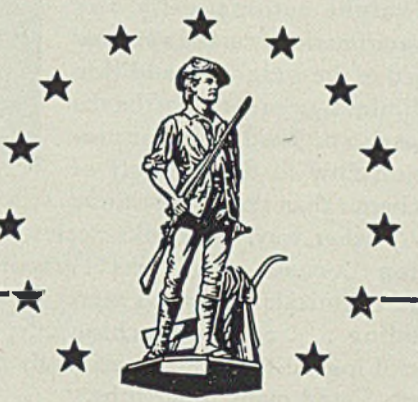
GOVERNMENT awards to war plants for meritorious achievement serve the purpose of removing the curtain of necessary secrecy to give the public a glimpse of what's going on behind the scenes.

Fort Pitt Steel Casting Co. received such an award yesterday, an "M" from the Maritime Commission. What this means is indicated by the fact that the local company is one of only seven so honored in the country at this time.

What has Fort Pitt done? The citation states it in generalities. The firm has been excellent in production. It has kept up or exceeded production schedules. It has been economical in the use of critical materials. It has lost no time through labor difficulties. It has achieved a high spirit of co-operation between management and workers. Its employes have demonstrated their concern for their country in various ways including large percentage purchases of war bonds.

Altogether these accomplishments add up to sincere patriotism. McKeesport is proud of the company and its 1000 workers who, by achieving the "M", have brought a high industrial honor to the city.

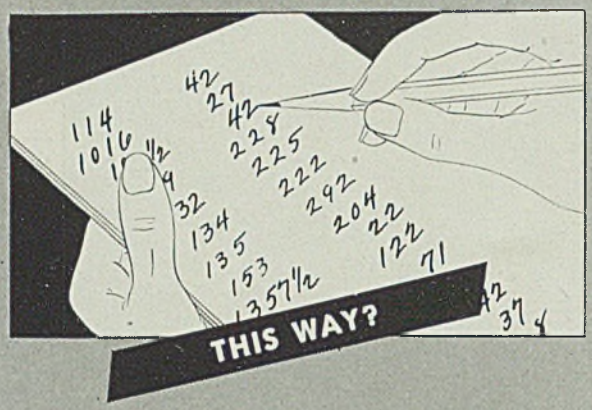
McKeesport Daily News
For Feb. 16, 1943

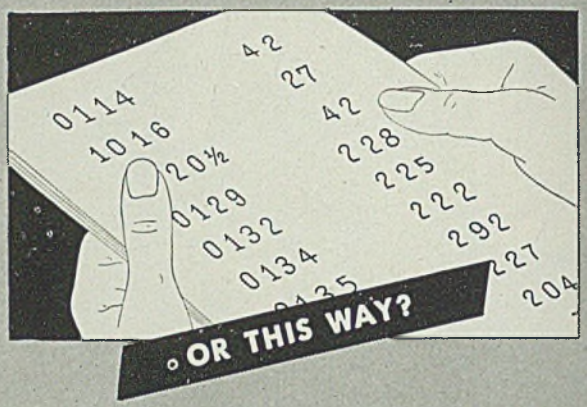


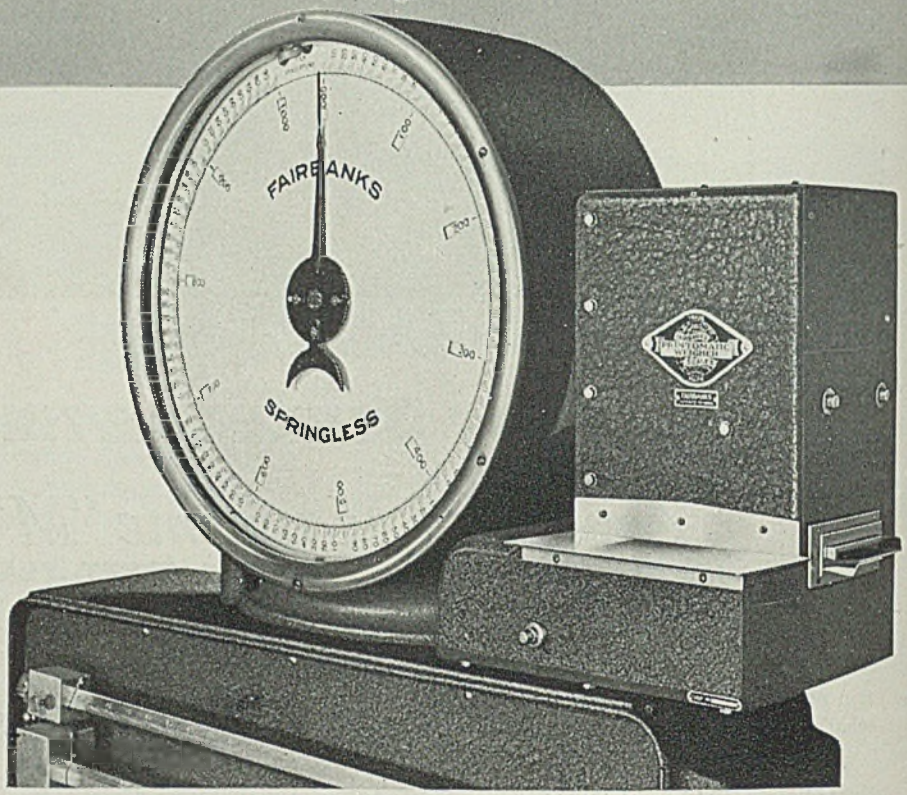
FORT PITT
STEEL CASTING COMPANY
McKeesport, Penna.

Pressure tested electric steel castings

How Are Weight Records Made In Your Plant—







For precision weighing and precision recording use Fairbanks Scales with Printomatics

● Of course, *sustained accuracy* in the weighing machine is vitally important. But no matter how accurate the machine is, unless weights are *accurately recorded,* the element of error still remains.

Fairbanks Scales with Printomatics eliminate these human errors—because the scales read the weight automatically and then automatically make a *printed* record of the weight. In addition to eliminating errors, Fairbanks Scales can be fitted into your production flow to do a variety of jobs better than they can be done in any other way. Fairbanks Scales weigh loads in motion . . . count small parts . . . record the flow of liquid chemicals . . . guard secret formulas in compounding . . . control batching . . . automatically control ingredients . . . automatically control aggregates . . . and many other jobs.

The organization which made Fairbanks the greatest name in weighing brings you 113 years of scale manufacturing experience. That, too, is worth serious consideration.

Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, Illinois.

FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
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Scales