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STEEL

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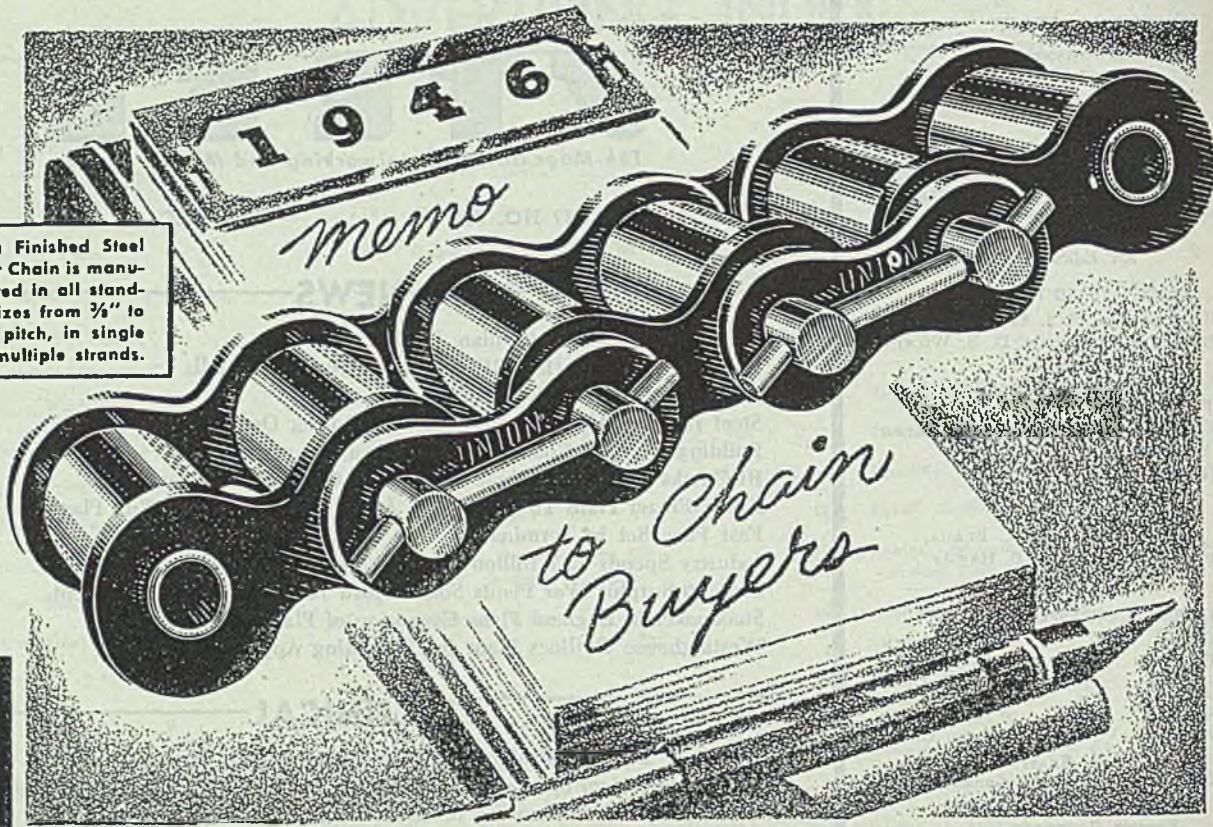
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Union Finished Steel Roller Chain is manufactured in all standard sizes from $\frac{3}{8}$ " to $2\frac{1}{2}$ " pitch, in single and multiple strands.



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- Roller chain type
- Silent chain type

The Common Herd

Sen. James E. Murray, in a special report to the Senate Small Business Committee evidences genuine concern for small business in the present period of readjustment. He lists a number of problems which hit small companies particularly hard and lists 853 mergers which occurred in the five-year period of 1939-1944.

His analysis of these mergers seems to confirm other evidence that a definite trend toward consolidation of industrial companies has been under way since before the war. The situation prompts the senator to ask a few questions. For instance: "Do these mergers flow from a concentration of economic power which makes it evident that the smaller participant in the merger will be unable to survive?" Do the mergers reflect a lack of adequate financing for small and medium-sized concerns? Why did the number of small companies decline by more than 500,000 or about 17 per cent between 1941 and 1944? Was this decline due entirely to war conditions?

These and similar questions deserve good answers. Undoubtedly the mortality rate of small business went up sharply because of wartime regulations, but it would be a mistake to assume that this was the only important factor. A painstaking study probably would show that numerous government policies dating back to 1933 are responsible for much of the shrinkage in the number of small businesses.

NRA, although short-lived, was more of a threat than a help to small industrial concerns. The consistent attempt of the government to establish uniform wage rates throughout the country hurts small employers, especially those in small communities. The political alliance of CIO and the government administration which promotes collective bargaining and wage rate negotiation on an industry-wide basis is definitely a serious threat to small manufacturers. The intricate rulings of OPA are particularly hard on the smaller companies. In fact, the time, expense, paperwork, confusion and uncertainty attending the relations of a small enterprise with the scores of government bureaus with which it is compelled to deal in many instances is sufficient to tempt the owners to sell out to a larger competitor.

This condition arises from the tendency of many government agencies to consider all units of industry as a common herd. This has wiped out many advantages once enjoyed by the smaller companies.

If the present tendency continues, the result will be an industrial setup so heavily dominated by big companies that even greater regimentation by government will be inevitable.

GRANDSTAND PLAYERS: As one looks over the labor relations scene under the mellow light of the approaching Christmas spirit, one wonders how the participants can get so wrapped up in bitter antagonism that they can forget the precepts of fair play.

The transcript of a portion of the negotiation rep-
arTEE published a few days ago revealed the spokes-
men of both sides engaging in the kind of verbal
abuse one would expect from schoolboys. They

were not settling anything. Reuther was playing to the grandstand according to his own ideas of what would make "good press" for the union cause. Anderson and DuBrul were countering in milder fashion, but obviously with an eye to what other employers might think of their performance.

A somewhat similar condition prevailed in the late lamented labor-management conference. All participants acted consistently as if they were performing before the great audience of public opinion.

Questions of face and prestige outweighed questions of negotiation and harmony.

One wonders what would happen if the labor disputants could meet in a hunting lodge—far from telephone, radio, newspapers and public. In man-to-man discussions, concentrating on the issues at stake and not playing to a grandstand, they might find it easier to resolve their differences.

—pp. 50, 63

. . .

ORCHIDS FOR ORDNANCE: At a time when progress in reconversion is held back by the inability of many people to resolve their differences, it is heartening to find situations in which the participants have come to amicable agreement promptly.

After V-J Day the Chicago Ordnance District was confronted with the task of terminating the war contracts under its jurisdiction. Many of these contracts involved large sums of money and endless detail. In spite of the difficulties involved, the district office settled 291 claims in September, 226 in October, and 347 in November. As of Dec. 1 only 387 cases remained to be completed and it was expected that most of them would be cleaned up before the end of the year.

This is a fine record. Col. John Slezak, district chief, says the credit belongs to the contractors who prepared for the emergency. We have an idea the contractors would say that the Colonel and his office also deserve a lot of credit. Achievements of this kind thrive on teamwork.

—p. 55

. . .

ACTS OF GOD AND MAN: As if man-made obstacles to production were not enough, nature now has taken a hand in the mess. Heavy snow has hit industrial operations hard in the north-eastern section of the country. The result is a serious check to industrial activity that may continue for weeks.

Thousands of plants with bulging order books are operating at only a fraction of capacity. The causes range from labor trouble and shortage of manpower to transportation difficulties and inability to obtain materials, parts and supplies. On top of all these obstacles are government controls—principally as to prices—which prevent some companies from going ahead with work for which there is a heavy demand.

Given a little time, industry can surmount the difficulties caused by severe weather. The real obstacle is man's stupidity. Perhaps the coming of a new year will help some of us to see the light.

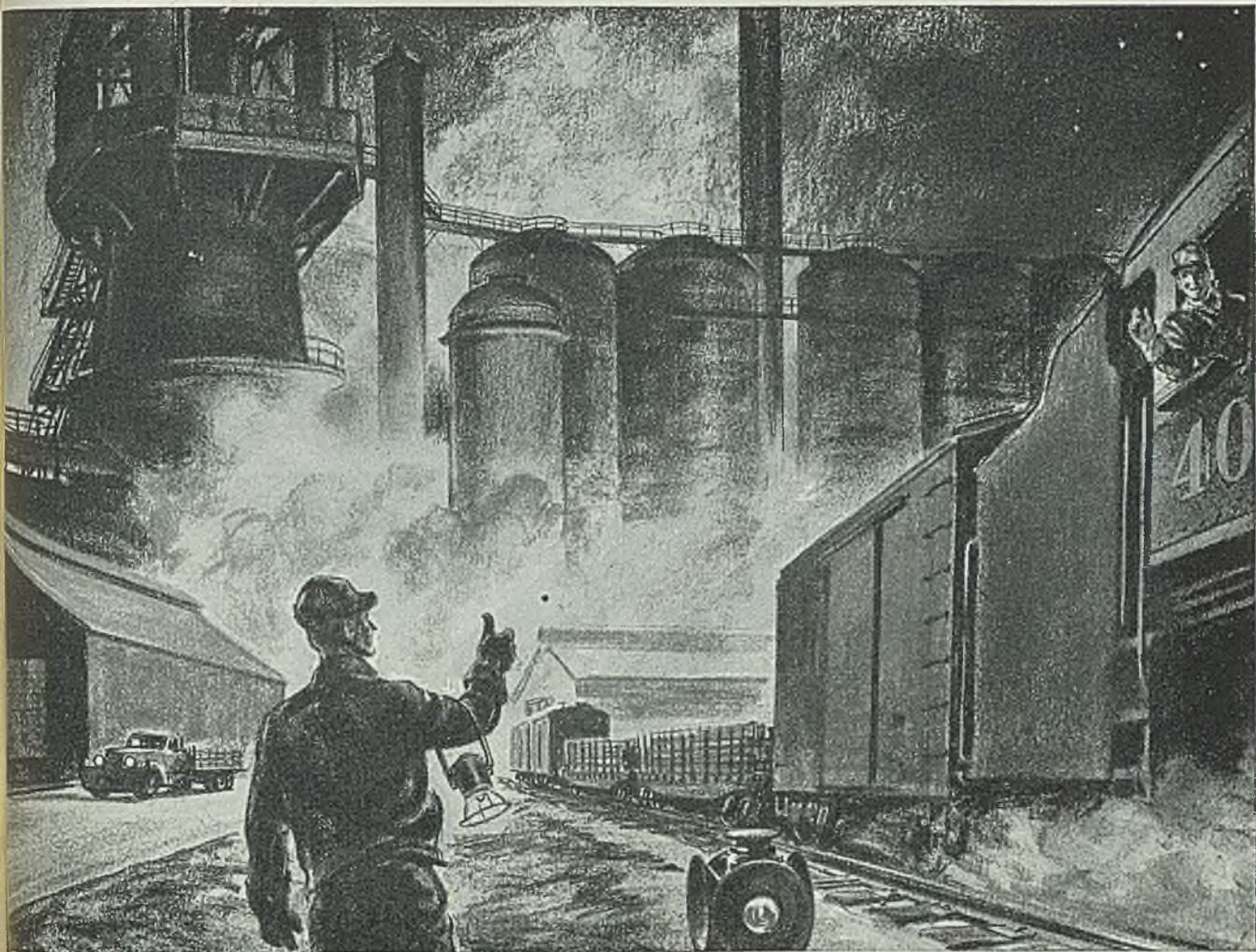
—pp. 47, 50

POSTWAR POSTSCRIPTS: According to a survey conducted by the Department of Commerce and SEC (p. 59), American industry in 1945 invested about \$5.7 billion in new plant and equipment. This was the largest amount thus spent since 1942. . . . RFC has listed the first 66 surplus war plants sold to private account up to Nov. 30. These plants, originally costing \$99 million, were sold for \$75 million (p. 60), netting the government a return of about 75 per cent. . . . Department of Agriculture estimates that farm purchases of tractors will average at least 225,000 per year over the next four years. Farm tractors in the United States numbered about 2,000,000 on Jan. 1, 1945 (p. 64) and will number at least 2,500,000 on Jan. 1, 1950, allowing for the normal rate of junking. . . . Dorman, Long & Co., Ltd. will build a universal beam mill—the first in the United Kingdom—and a new steel plant on the river Tees (p. 66) as part of an expansion program to cost £8 million. . . . Pullman-Standard Car Mfg. Co. and Edward G. Budd Mfg. Co. have orders for new railroad passenger cars (p. 69), which when completed will usher in a new era of de luxe passenger service. Stainless steel enters prominently into the design of part of the new facilities. . . . Automobile assemblies in the week ended Dec. 15 totaled 16,240 (p. 134), Ford and Nash accounting for 63 per cent of this output. . . . A flexible pilot mill 4-stories high is one of the features of the new research facilities developed at Milwaukee by the Allis-Chalmers Mfg. Co. The new and expanded laboratories (p. 80) serve the mining, milling and processing interests of the basic industries. . . . Russell, Burdsall & Ward is observing its 100th anniversary. Its present plants and its modern methods of manufacturing fasteners (p. 82) are a far cry from the crude equipment in a rented shop with which the founders challenged the supremacy of the "Philadelphia bolt". . . . RFC invites sealed bids or proposals for the purchase or lease of the Geneva steel plants (p. 53), these offers to be opened March 1, 1946. . . . Kaiser-Frazer Corp. announces it will manufacture its own bodies for Kaiser and Frazer models (p. 54) at its Willow Run plant. . . . For the first time in five years, all of us can say with conviction, "Peace on Earth, Good Will to Men."

Merry Christmas!



EDITOR-IN-CHIEF



HOW TO DEVELOP LOWER DELIVERED COSTS OF STEEL

Here Is a Cost Factor Worth Checking

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping—and the manufacturers' methods of receiving and handling.

Inland metallurgists control quality from the ore to the finished product . . . but the preservation of that quality is still another factor in final machine side delivery.

So Inland shipping experts prepare the steel with care and pack it for safe arrival and quick economical receiving and handling.

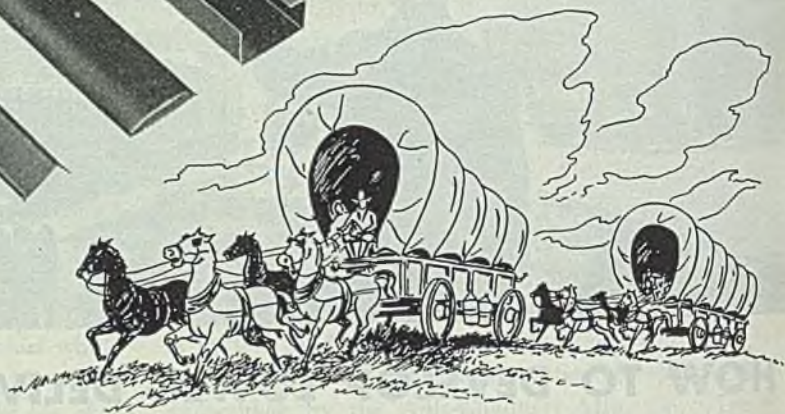
But there are so many types of equipment that may

be used in receiving and handling that it is important that the shipping and receiving methods dovetail in order to secure the lowest possible costs. To develop this teamwork between us, it is often advisable to compare notes.

Inland shippers are available to consult with you at any time and make recommendations toward the lowering of your final machine side cost of steel.

Inland Steel Company, 38 South Dearborn Street, Chicago 3, Ill. Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. Principal Products: Bars • Structural • Plates • Sheets • Strip • Tin Plate • Floor Plate • Piling • Reinforcing Bars • Rails • Track Accessories

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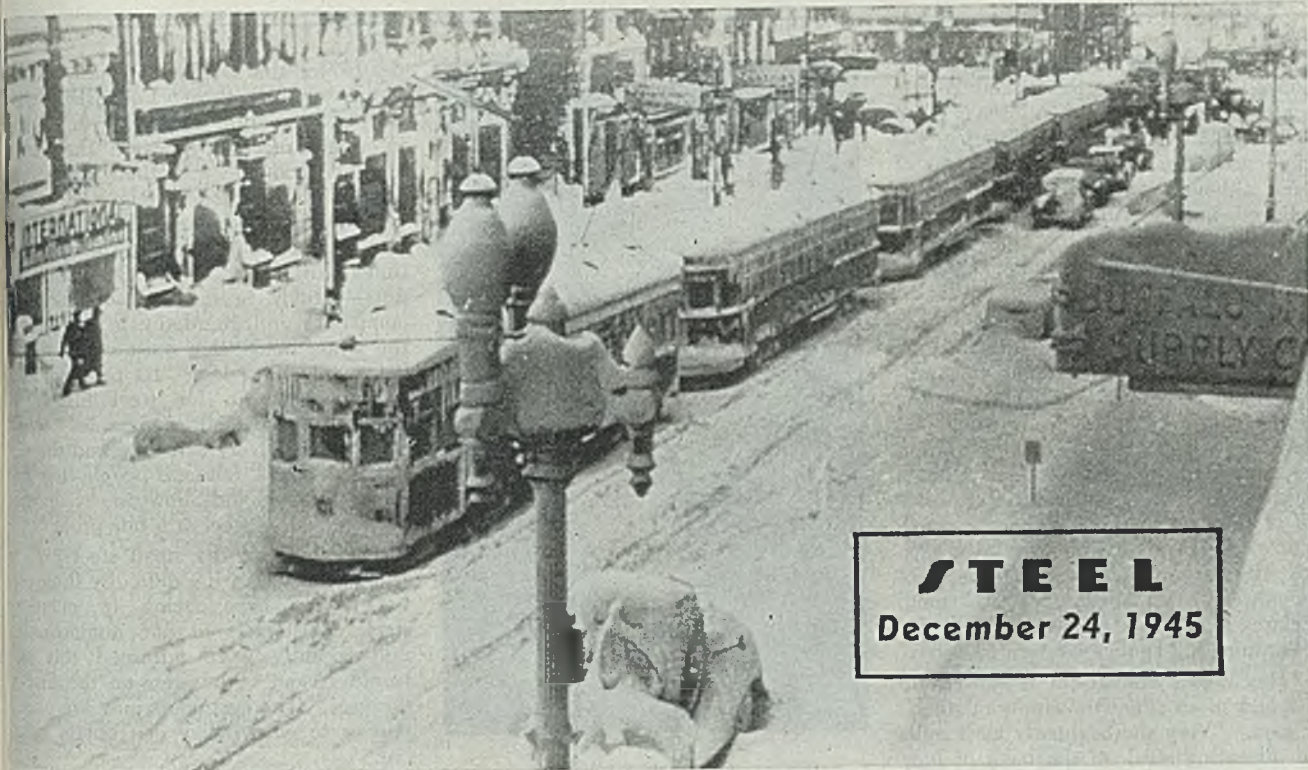
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Buffalo industrial operations were seriously impeded when a 68-inch snowfall disrupted transportation systems. This photo shows a line of street cars tied up by the blizzard. Manu plants were forced to close when workers were unable to get to their jobs. NEA photo

Shortages Retarding Civilian Output

Northeastern Area Hard Hit by Cold, Heavy Snowfalls

Labor unrest, price ceilings and scarcity of some critical materials prevent industrial production from reaching peak levels. Auto industry falls far short of 1945 goals as strikes, parts and materials shortages slow assembly lines

BLIZZARDS and unusually heavy snowfalls have slowed down industrial operations in the northern and eastern industrial areas.

Freight yards have been snowbound and switches frozen, disrupting rail traffic. Drifted highways have made truck transportation difficult. A freight embargo was necessary at Buffalo.

Many plants have either been closed down or operations slackened as a result of employees being unable to get to their jobs. Absenteeism rose sharply in many areas.

In some centers, it was necessary to divert gas from industrial plants as the frigid temperatures increased home needs. This necessitated temporary closing of some plants and shutting down some departments in others.

A severe blizzard enveloped the eastern seaboard from Washington to the Canadian border. In some centers production virtually was brought to a halt by storm conditions. Even in areas where the storm was less severe, dif-

CIVILIAN goods production—four months after the war's end—still is limping along, instead of galloping, because of insufficient supplies of parts and materials. Reconversion output which should be approaching the torrential stage continues to be only a trickle.

Plants which have solved their physical reconversion problems and which have capacity and manpower for large-scale production often are operating at only partial capacity. The automotive industry, expected to be the bellwether in the reconversion parade, is an outstanding example of this unfortunate paralysis. The leading producer is strikebound; Ford will produce less than 40 per cent of its 1945 schedule; Packard is virtually idle; and all builders are affected by the scarcity of materials and components.

Three major causes for the bogging down of production are apparent. One is labor unrest; strikes at critical plants have made their effects felt in the customer plants; workers displaced from high-paying war jobs have been reluctant to accept work in other plants where they are critically needed but which offer a

somewhat lower weekly wage.

A second cause is found in price ceilings. Parts suppliers in many cases find they are unable to manufacture and sell their products at present ceilings without incurring a loss. Consequently they lack any incentive to produce.

A third cause is a shortage in certain materials. Sometimes this results from either one or both of the causes mentioned above. Sometimes it is simply the result of a postwar demand that is greater than capacity.

A possible fourth cause that may be mentioned is the severe weather which recently has handicapped production in northern centers. Heavy snowfall and blizzards have greatly increased absenteeism, caused diversion of gas from industrial consumers, and disrupted transportation.

Despite the fact that steel producers have shipped about 18 million tons of finished steel since V-J Day, steel continues in tight supply and some consumers complain their production is being held back by a shortage of supplies.

Tightness is particularly evident in pig

(Please turn to Page 158)

iron, semifinished, electrical sheets, galvanized sheets, bars, bands and certain light structurals. This situation has given rise to recurrent rumors that it may become necessary to resume allocations of steel, although such action generally is believed unlikely unless and until the scheduled strike closes the mills Jan. 14. Steel shipments now are being made on a voluntary quota system by the mills.

This quota system, while generally conceded to be fair, is being criticized by some consumers on the ground that producers ship steel only in proportion to the buyer's prewar volume. New companies and those which greatly expanded during the war are thus placed at a disadvantage. Western consumers particularly are critical of this system. K. T. Norris, president of the Norris Stamping & Mfg. Co., Los Angeles, and chairman of the steel committee of the Western States Council, declares it amounts to eastern producers "discriminating against western industry."

"The West's conversion is slowed up by a lack of an adequate supply of steel," he says. "Very shortsightedly most mills are allocating steel on the basis of how much each factory bought prewar.

"In order to survive, the new and expanded industries on the West Coast can't get by on the basis of how much steel they consumed prewar. Many western factories are virtually shut down by the lack of steel or else are not permitted to produce as they could. The steel companies should take into account our greatly increased population and the necessity for manufacturing more than prewar. Why, my plant alone can use more steel than has been allocated to the whole Coast."

Inventory Controls Modified

Closer attention to inventory regulations is being required by the Civilian Production Administration to prevent large quantities of materials standing idle. CPA has announced a modification of its general inventory controls where manufacturers' plants are struck. It is pointed out that strict application of inventory restrictions in such cases might require immediate deferment of shipments, regardless of the length of stoppage, thereby requiring rearrangement of suppliers' schedules and adversely affecting the production and distribution of critical materials, and might also delay resumption of full-scale operations at the termination of the work stoppage. The modified rule permits continued receipts at strike-bound plants during the first 30 days following a work stoppage but requires complete readjustment of outstanding orders by the end of that time. It applies only to materials already on order. Thus critical materials will be diverted to other users in the event of work stoppages of more than 30 days while, at the same time, a small reserve of materials may be built up to help in the later resumption of operations.

To assure equitable distribution of pig



HENRY FORD II

iron, users of this metal in the northeastern states have been advised by CPA to hold their purchases within the 30-day inventory restrictions prescribed in the regulations. Otherwise, CPA warned, stricter control will be enforced.

In the West, the Geneva Steel Co. has been ordered to discontinue shipments of pig iron to Bethlehem Steel Co. on the Coast and presumably to all other private companies. Action was taken by the Reconstruction Finance Corp. following protests from the Kaiser steel interests against government competition. This situation is causing some concern to West Coast steel fabricators.

To make more steel available for domestic consumers, initial requests for 4 million tons of steel for export during the first half of 1946 already have been screened down to 850,000 tons, CPA has informed members of the General Steel Products Committee. This represents only about 3 per cent of the anticipated finished steel production.

CPA officials have also discussed with major steel producers possible means of enabling nonintegrated producers to obtain semifinished steel to carry them through the reconversion period.

The nonintegrated producers have been especially hard hit by the price ceiling of the Office of Price Administration. Not only are some of them forced to produce at a loss, but they find it difficult to obtain the semifinished material they need.

Although price relief was promised to these producers when the OPA recently denied the industry a general increase, such relief has not been granted. Actually, the smaller companies do not want the higher prices that OPA indicated it would grant them.

The OPA offer would be the "kiss of

death" for the small companies, Lawson Stone, president of Follansbee Steel Corp., Pittsburgh, explained in a radio interview recently, because they could not then compete with their larger competitors on an equal footing.

"OPA should change its basic policy with respect to the steel industry," continued Mr. Stone. "The OPA itself admits—frankly in the case of the small companies and guardedly in the case of the larger ones—that most steel today is being sold at a loss. Its proposal of a two-price system for steel instead of helping the small companies would threaten their very existence and the jobs of the hundred thousand people they employ. OPA should allow any steel company to sell its steel at a fair profit."

The plight of the small steel mills is being reflected in the difficulty their customers are experiencing in obtaining steel. Customers of one nonintegrated mill recently were informed this mill would go out of business on the first of the year. The customers now are uncertain as to where they can obtain material.

The difficulties confronting manufacturers of consumers durable goods under present conditions were outlined recently by Henry Ford II, president of the Ford Motor Co.

"Immediately after V-J Day, we told the American people we expected to make 80,000 cars before Christmas. While it is true we have already built almost half of all new cars made, we will produce only 30,000 by that time. We are 50,000 cars short of our promise.

Ford Explains Reduced Production

"I feel the American people should know why.

"This situation definitely is not the fault of our employees. Since V-J Day we have not had a single unauthorized work stoppage. On the other hand, we ourselves have had to lay off almost 40,000 employees for five weeks on one occasion, and on a second we had to lay off 20,000 for five days.

"We are producing. But it is a desperate, frustrating kind of production. We cannot predict even on a day-to-day basis whether we will have enough material to keep our lines going a full shift. We are using every kind of expedient and patchwork operation—some of them very costly—to keep production going.

"One group of suppliers has told us that they have canceled our contracts because ceiling prices on their products mean a loss on every sale. A second group says they are unable to fulfill contracts because they cannot raise wages and are therefore losing their employees to other industries.

"Whatever the reasons, the plain fact is that today Ford is completely cut off by 14 major suppliers, while from many others we are getting a mere trickle of parts and materials.

"An easy way out would be to ask

government to raise ceiling prices. But the government has declared that retention of price ceilings is a basic policy in the fight against inflation.

"And even if that were the right way to get this situation straightened out, we just haven't time.

"Ford has set a 1946 production schedule of 120,000 cars and trucks monthly. If we can meet this schedule, we know that we will be doing our part in beating down inflation by bringing the supply of automobiles once more in step with demand.

"But we cannot achieve that goal unless we can get supplies—parts, materials, specialties. I invite suppliers, wherever they may be, to get them to us, subject only to two things—that they meet our specifications for quality and meet competition for price. I invite them to wire or write us at Dearborn for lists of the things we must have at once.

"The No. 1 job before the company today is production—all-out peacetime production. Production means jobs at high wages and more and more products for more people at lower costs. Only maximum production can end this country's present economy of scarcity."

Mr. Ford's reference to contracts canceled because of inequitable price ceilings dealt principally with castings, since price ceilings have been lifted by OPA on all other types of parts going into original equipment for passenger cars, but not for trucks, however. At the same time, some price relief has been granted gray iron castings suppliers.

Among the parts in critically short supply at Ford are the following specific items: Crankshafts, passenger car hubs, jacks, tractor radiator caps, generators and starters for export engines, ingot molds and stools, tractor seats, flywheels, flywheel friction disk pressure plates, bushings and bearings, mica segments, transmissions, clutch facings and plate and sheet glass.

Packard Operations Curtailed

Progressive shutdown of Packard operations began last Tuesday because of exhaustion of parts inventories and suspension of shipments of key parts from strikebound suppliers. By Dec. 24, it is expected most of the 10,000 employees at the plant will be idle. Assemblies up to the time of shutdown had reached 3000 against a planned 8000 by Jan. 1.

Notices were posted in the Packard plant explaining the reason for the closing. Final assembly line is affected by shortage of transmission synchronizing brake bushings, two of which go into every car. Source is Cleveland Graphite Bronze Co. which has been out of production since Oct. 30 because of differences between the MESA union and management. It is reported this tieup is now in its final stages and production may be resumed shortly. No other source for this particular part is available, according to Packard.

The motor line, which stopped last

Thursday, is short crankshaft and connecting rod bearings, supplied by Moraine Products Division of General Motors at Dayton, O., and closed since Nov. 21. There are four sources for these bearings, three of them now strikebound and the fourth so loaded with orders for prior work that Packard emergency orders were refused.

Packard was able to continue operations 49 days after the Cleveland plant went down, and 29 days after the Dayton plant closed, but parts stockpiles are now exhausted, and there was no choice but to close automotive lines. George T. Christopher, Packard president, said he was hopeful of resuming production after Jan. 1. Meanwhile annual inventory will be taken, providing work for 1000.

Military Stockpile To Get Strategic Materials

Critical and strategic materials needed by the Army and Navy for defense pur-

poses will be transferred to the military stockpile, although civilian deficiencies in minerals and metals essential to the peacetime economy will be taken care of before any such transfer is made. This was provided in regulation 17 which has been issued by the Civilian Production Administration.

The regulation does not apply to contractor inventory, small lots, and items which would deteriorate if transferred to the stockpile. Fabricated articles containing strategic materials and metals will be stockpiled if the Army and Navy Munitions Board determines they are suitable for the use of the armed services in the form in which fabricated. CPA classifies the following as strategic minerals and metals: Antimony, beryl, cadmium, chromite, cobalt, copper, industrial diamonds, fluorspar, graphite, lead, magnesium, manganese, mercury, mica, molybdenum, nickel and monel, platinum, quartz crystals, tantalite, tin, tungsten, vanadium, and zinc.

Present, Past and Pending

■ CHEMICAL INDUSTRY PLANS \$200 MILLION EXPANSION

NEW YORK—Chemical industry will spend \$200 million in the next three years on plant expansion, according to the American Chemical Society. Dow Chemical Co., Midland, Mich., American Cyanamid Co., New York, and General Electric Co., Schenectady, N. Y., are among the firms which have big expansion programs.

■ ELECTRIC AUTO-LITE SUBSIDIARY LEASES WAR PLANT

CINCINNATI—Corcoran-Brown Lamp Division, Electric Auto-Lite Co. Toledo, O., will expand output of lighting equipment for automobiles. It has announced it had taken a five-year lease of a former war plant near this city.

■ OPA TO EXEMPT CONTROL OVER MANY BUILDERS' ITEMS

WASHINGTON—Office of Price Administration is planning to exempt from price control soon many builders' supplies, including valves, pipe fittings, pipe accessories, cast iron pressure pipes and fittings, manholes and covers, miscellaneous sheet metal building materials, besides ingot molds of pig iron.

■ CAST IRON RADIATION PLACED UNDER INVENTORY CONTROL

WASHINGTON—Cast iron radiation, gypsum board and lath have been placed under 60-day inventory limitations by the Civilian Production Administration.

■ LEAD SUPPLY OUTLOOK IS EXTREMELY UNFAVORABLE

WASHINGTON—Outlook for sufficient primary lead for even essentials is unfavorable, Civilian Production Administration said last week. First quarter allocations have been reduced to 22 per cent of total 1944 use for automotive batteries and to 80 per cent of estimated fourth quarter 1945 use for tetraethyl.

■ CLOSE CHECK OF SCRAP PRICES ORDERED BY OPA

WASHINGTON—Office of Price Administration has ordered its field offices to closely check iron and steel scrap prices, alleging that dealer practices are violating ceilings.

■ PANAMA LOANS RAILROAD \$500,000 FOR ROLLING STOCK

PANAMA CITY, PANAMA—Government of Panama has approved a loan of \$500,000 to the Chiriqui National Railroad for the purchase of new locomotives, freight and passenger cars. An additional loan of \$200,000 to buy a refrigerator boat is under consideration.

■ SENATE PASSES STRATEGIC METAL STOCKPILING BILL

WASHINGTON—The Senate last week passed and sent to the House a bill designed to create stockpiles of strategic materials for defense purposes. Under provisions of the measure domestic sources of supply would be developed where possible. Surplus Property Administration's stockpiling regulation has been extended to April 1, 1946.

■ PENNSYLVANIA REGION SOFT COAL PRICES RAISED

PITTSBURGH—Effective Dec. 21, Office of Price Administration has increased ceiling prices 7 cents a ton on soft coal in the central Pennsylvania area, district 1.

Steel Wage Negotiations Stalled

Both sides in controversy mark time. Preparations being made for scheduled strike Jan. 14. Interest centers in procedure of oil fact-finding panel

WITH negotiations in the steel wage controversy at a standstill last week it began to look as though only government intervention would prevent a nationwide strike of steelworkers set for Jan. 14.

Steelmakers continued adamant in their position that they must have price relief before they can even consider higher wages. At the same time the steelworkers' union was just as insistent upon pressing its "or else" demand for a \$2 per day wage boost.

Meanwhile, the Office of Price Administration gave no intimation it would depart from its announced plan of postponing price action until some time early next year when it will have an opportunity to examine steelmakers' earnings statements for 1945.

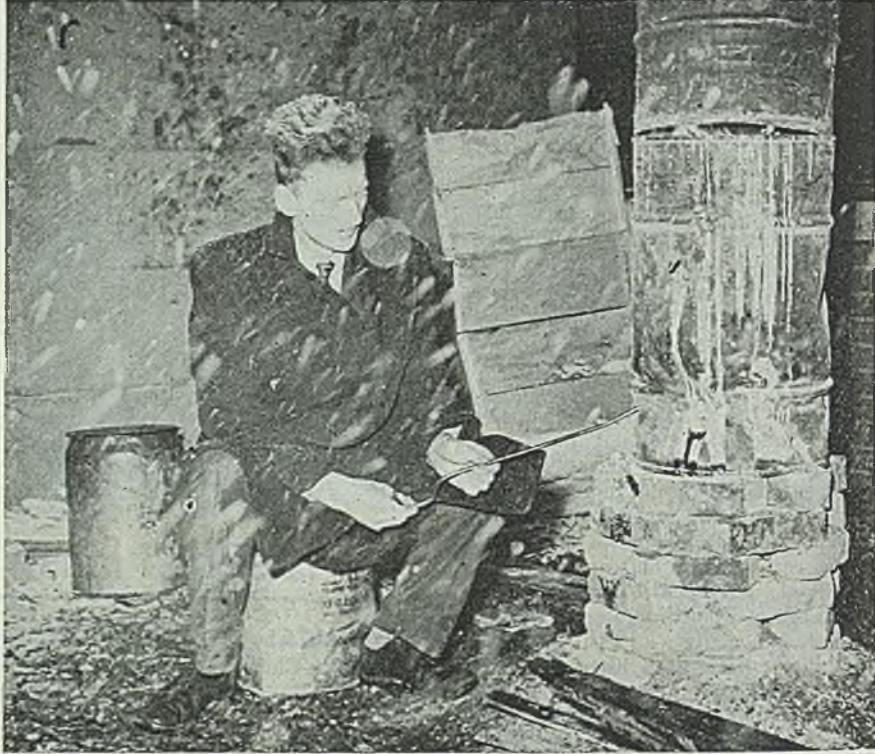
Whether the OPA or higher government authority will be prevailed upon to accede to the requests of the steel industry and grant an increase in prices before the strike date, thus possibly opening the way for resumption of wage negotiations and at least temporarily averting a strike, is a question no one in the industry can answer. It is pointed out that at this juncture OPA holds the key position in the steel controversy. If it should wait until after financial reports are out for 1945 to decide on price policy, however, it would act too late to stall off a walkout since it would be virtually impossible for the steelmakers to submit their reports before the strike date.

Government Seizure Unlikely

Another possibility for preventing a nationwide steel shutdown is that the government under the War Powers Act can move to take over the steel plants pending settlement of the dispute. However, such action, it was said, was unlikely except as a last resort.

Hope was also expressed that possibly settlement of the automotive wage controversy would be effected before the steel strike date, in which event it might serve as a pattern upon which to handle the steel case. At the end of last week, however, there was little sign that General Motors and the auto workers' union were anywhere near composing their differences.

Meanwhile, preparations are going ahead for a steel strike. Steelmakers are shipping out as much steel to consumers as they can, hoping to provide their customers with stocks sufficient to



Members of the United Automobile Workers of America (CIO) voted last week to end their 14-week strike at the Windsor, Ont., plant of Ford Motor Co. of Canada and return to work pending negotiation and arbitration of issues. As end of the strike neared, a union member on picket duty paused at an improvised stove, shown above, to get warm while snow pelted down. NEA photo

carry them for a little way should a strike actually be effected. However, indications are little stockpiling will be possible.

Union officers are understood to have advised the steel companies that in event of a strike, maintenance men would be permitted to continue at work to prevent damage to machinery and equipment. All other workmen, however, will be pulled off the job.

Interest late last week centered on the activities of the fact finding panel set up in the oil industry dispute. Procedure developed by this body, it was thought, may be the pattern for the panel set up for the automotive industry, and that to be named for the steel industry. Presence of representatives of the automobile, steel and other industries as well as various unions reflected the keen interest in the oil panel as the administration's attempt to devise a peacetime instrument for settling wage disputes.

The oil panel started its hearings last Monday but soon found itself in deep water and had to recess to consult Economic Stabilizer Collet to ascertain whether it had power to couple with any recommendation it made for a wage increase a stipulation that the wage

increase should not be used by the oil companies to seek higher prices.

Early in the week the panel announced it was authorized to recommend a wage increase but that it had no authority in determining whether companies might seek a compensation price increase. Union attorneys declared such action would give the union "a complete and total runaround" after which the panel recessed to go over the whole matter again with attorneys of the Office of Economic Stabilization and the Office of War Mobilization & Reconversion.

At meetings with these attorneys a decision was made which is basic not only for the oil panel but for the automotive and other fact-finding bodies, including possibly steel. This was that fact-finding panels will consider profits and ability to pay when they hand down findings on wage increases. This decision was based on President Truman's wage-price policy of Oct. 30 when the President stated industry could pay substantially higher wages without raising prices. Only this basic decision was made however, and the oil panel late in the week was formulating a procedural program.

One of the decisions it will make is whether it will rely on the Office of

Price Administration, Petroleum Administration for War, Treasury Department, and other government agencies for data on company production, earnings, prices, profits and related factors, or whether it will subpoena companies to produce books. It was considered unlikely that subpoena powers will be invoked. In fact it remains to be seen what legal powers the oil panel has.

Company representatives, it is said insist they'll not open their books to a panel without subpoena power, and since the President's labor legislation program is now stalled in Congress, it is apparent the oil panel cannot get subpoena power in time to meet its Dec. 27 deadline to make its recommendations.

In view of this situation the Oil Workers International Union, CIO, suggested that the panel acquire data on profits from federal sources such as the Bureau of Internal Revenue, Bureau of Labor Statistics, Commerce Department, and the Securities & Exchange Commission.

Panel members characterized this suggestion as impractical, since it is illegal for certain government bureaus to turn over their information to an outside body without reservation. It might be possible, however, for a fact finding group to get some government figures on certain conditions. For instance, information might be given the panel provided it is not made public or opened to union representatives. To carry this out, it might be necessary to deputize the panel.

Hearings by the fact-finding board

set up in the General Motors dispute got under way late last week. Following the initial session Lloyd K. Garrison, chairman, said the board would not rule on whether to accept testimony on profits and possible price increases until later in the week. It was said General Motors declined to show its books in answer to the union's claim it could absorb a 30 per cent wage increase and also, according to Mr. Garrison, the company maintained prices are a matter for discussion with the Office of Price Administration and do not concern the union or the fact-finding board.

Termination of the 99-day strike of 10,000 CIO workers at the Windsor, Ont., plant of the Ford Motor Co. of Canada highlighted labor developments of the week. The union voted to accept a Canadian government proposal for negotiation and, if necessary, arbitration of the dispute involving demands for a closed shop and union dues check-off.

Over the country last week it was estimated some 400,000 workers were idle because of strikes. About half the total was made up of striking General Motors' employees.

SAE Meeting To Be Held In Detroit, Jan. 7-11

Comprehensive survey of prospects and problems attending automotive technological progress, and including possible applications of atomic energy, has been announced for the annual meeting of the Society of Automotive Engineers, Jan. 7-11, in Book-Cadillac Hotel, Detroit.

Steel Industry Employment Up During October

Wages and average hours worked per week also gain, reversing trend that had been under way for several months

EMPLOYMENT and wages in the iron and steel industry were higher in October than in September, the American Iron & Steel Institute reported last week.

The average hours per week worked by wage earners also made a slight gain.

The industry's monthly payroll totaled \$121,258,100, compared with \$119,107,500 in September, and \$141,656,700 in October 1944. The gain in October reversed a decline in total payrolls which started in June and took place month by month.

The average number of employees in October was 521,700, compared with 521,200 in September and 564,300 in October 1944. Here again the latest report marked the end of a decline which started in April.

The average earning of employees receiving hourly, piecework or tonnage wages was 119.6 cents, compared with 123.4 cents per hour in September and 118.3 cents in October 1944.

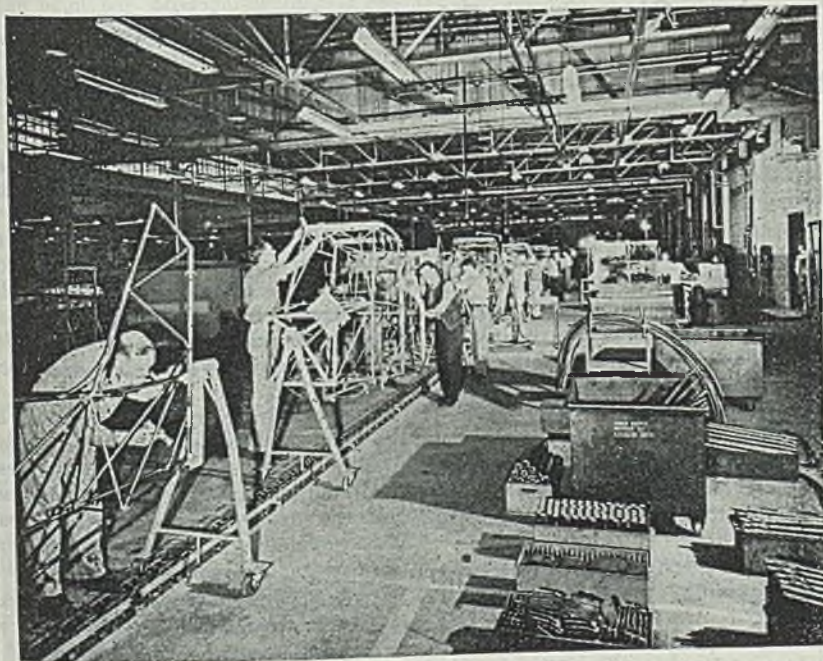
Wage earners worked an average of 41.7 hours per week in October, against 40.9 hours per week in September and 46.3 hours per week in October 1944.

Chicago, Gary Named Bases For Electrical Sheets

Carnegie-Illinois Steel Corp. last week announced, effective Dec. 22, establishment of Chicago and Gary, Ind., as basing points for various grades of electrical sheets. Prices quoted at those points are: Field grade, 24 gage, \$3.33 per 100 lbs; armature, 24 gage, \$3.68; electrical, 24 gage, \$4.18; motor, in cut lengths not core plated, 24 gage, \$5.08. All prices are for delivery within the switching limits of Chicago and Gary and are f.o.b. cars in carload lots with published extras and deductions applying.

Alabama's Coal, Red Ore Production Down in 1945

Alabama's coal production for the first nine months of this year totalled 14,222,000 tons as compared with 14,528,000 tons for the same period last year. Red ore production for the 1944 period is listed at 5,130,978 tons as compared with 4,353,486 tons for the same period this year.



LIGHT PLANE ASSEMBLY LINE: This 1275-foot mechanized conveyor assembly system has been established in the Aeronca Aircraft Corp., Middletown, O., to produce 20 light airplanes daily. Section shown is the fuselage assembly line. NEA photo

Building Makes Headway Slowly

Pacific Coast construction men see some rays of hope but warn months will elapse before full-scale activity will be possible

SAN FRANCISCO

CONSTRUCTION men in this area are beginning to see some rays of hope. They believe they have passed the worst of the shortages which have delayed a resumption of building. However, they warn that it still will be many months before anything approaching full-scale activity can be attained.

For example, in San Francisco alone it is estimated that approximately \$100 million of construction of new industrial buildings, hotels, retail stores, office buildings and factories has been built up during the war years. This dammed-up backlog now is leashed by shortages of materials and labor and will continue so until next spring. Then, it is believed, the first projects will get under way. But it will be summer before this small beginning can mushroom into a volume large enough to make sizable headway on the pent-up demand.

Contractors and architects themselves are advising clients to put away their plans for a while yet. Commercial builders, unlike home builders, will not begin work on a big job unless they have assurance at the start that the job can be completed on schedule. They simply do not take chances of getting halfway through a construction job and then being forced to stop work indefinitely.

Right now, none has any assurance that work started will be finished.

High Costs Cut Activity

Some contractors believe that even when material shortages loosen up, a lot of projects will not be possible for a long while because present high costs forbid construction. For instance, an office building or hotel derives its income from rents. When rents are frozen, that income also is frozen. If the costs of construction are higher in ratio to the return on the investment, then the project is uneconomic. Present rent ceilings and construction costs are too far apart now, and unless costs come down or rent ceilings are lifted, a lot of prospective building is going to be delayed until one or the other gives way.

Factories or industrial buildings are a slightly different proposition. In most cases the higher building costs can be passed on in selling prices of the product. For that reason, contractors believe that factory construction will be started more quickly than will other



WILSON WYATT

Has been appointed as an overall housing boss by President Truman. Mr. Wyatt, former Louisville mayor, has the title of housing expeditor. NEA photo

types of commercial building.

At present, lumber shortages are the most serious drawback to new construction in San Francisco. Scarcity of plumbing equipment ranks next. There are,

however, all sorts of bottlenecks which pop up continuously and unexpectedly.

These material shortages are expected to be lessened after the first of the year. The lumber strike created a severe scarcity of that already scarce material. However, lumber is starting to move again, and in addition there are signs that the attempt to get releases of Army and Navy stockpiles is beginning to succeed.

The lack of labor chiefly is in skilled workers, as common labor is fairly adequate although not plentiful yet.

As more materials become available, prices are expected to come down, but not much. Right now the per foot cost of commercial building is about \$3 higher than in 1940. It is believed that any decline in material prices will be more than offset by higher wages.

Pretty much the same shortages apply to home building in the San Francisco area. Although considerable work is proceeding (by using green lumber and substitute materials), building now in progress is only a fraction of what would be under way were ample supplies available.

Housing, meanwhile, is becoming an increasingly serious problem, especially now that war veterans are returning. Unless building of homes can pick up sharply fairly soon, a chaotic situation is feared.

Housing Shortage Discourages Job Seekers In Southern California Industrial Cities

LOS ANGELES

LACK of adequate housing is reported discouraging workers from seeking permanent job connections in industrial cities and towns of Southern California. At last reports jobs available in the state exceeded the number of persons seeking work and one of the reasons for this is claimed to be many workers' reluctance to accept employment without assurance of suitable housing.

Industrial employment in San Diego has dropped from a wartime peak of about 50,000 to around 13,000, but in spite of this total of layoffs, the city is expanding.

This seeming paradox was disclosed last week during a tour sponsored by the National Association of Manufacturers and reported by the Industrial Department, Los Angeles Chamber of Commerce.

San Diego, it was stated, needs some 20,000 new homes for its resident population. Approximately 1300 jobs are open, chiefly because lack of housing

keeps workers from attempting to establish a permanent connection in industry.

Payrolls of Army and Navy have, of course, served as a bulwark against too drastic an economic shock during the first stages of reconversion. Now San Diego manufacturers are preparing for a sharp upturn in business, which they are sure is coming.

Typical of industrial developments in the Southern California city is the Solar Aircraft Co. Solar makes stainless steel muffler assemblies for more than half the nation's planes. In addition, it is producing heat resistant units for jet engines and gas turbines.

According to company representatives, expansions soon to be made insure a future employment of about 3500.

Another growing company is the Poulsen & Nardon Works, which in wartime produced fuse boxes and is now engaged in the making of aluminum cooking utensils. J. A. Marshall, general manager, said that the concern now has

RFC Asks Bids for Geneva Plant

Proposals, to be opened March 1, may be predicated on purchase "as is" for cash or on credit terms, on lease "as is" or on terms requiring additions to be financed by government

orders insuring full production until next July.

National Iron Works officials disclosed that the company's plans call for an initial peacetime production totaling about \$2 million a year. Some \$20 million worth of cargo barges for the Navy were manufactured during wartime. The plant is now being enlarged for resumption of production on oil ranges and metal tuna clippers.

Pocket boosters, liquid-fuel jet propulsion engines, which will give an additional 375 horsepower for 12 seconds when attached to planes at take-off, will be coming off Aerojet Engineering Corp. production lines at Azusa at the rate of 1000 a month, probably soon after the first of the year.

This was announced last week in Los Angeles by J. K. Nunan, in charge of Aerojet Engineering Corp.'s rocket power applications.

Los Angeles' first used airplane lot opened for business last week. Parked for display on a West Side corner were two Stearman and a Fairchild, surplus Army training ships. According to the proprietor, cars or old planes will be taken in trade for the former Army ships. Customers take delivery at an airport where flying lessons may also be obtained and included in the price of the purchased plane. Interest in the surplus aircraft was considerable.

New Pacific Coast Truck Plant

International Harvester Co. has announced establishment of its first Pacific Coast truck manufacturing plant. The factory will be located at Emeryville, on San Francisco Bay.

The plant will produce six models of heavy duty International trucks designed especially for use in the western section of the country.

Two months will be required to install machinery and prepare for operations. The plant will employ 250 to 300 men and is expected to start its assembly line in February with capacity scheduled to be reached sometime next summer.

Some Southern California manufacturers have been forced to temporarily suspend operation of gas-fired furnaces and other heat appliances because of gas shortages.

Worst hit by the reduction of gas following drops in temperature are those plants, many of wartime origin, which did not provide "stand-by" sources of oil heating facilities under the terms of contracts with gas utilities which make mandatory shutting off of some industrial gas when temperatures fall to a predetermined level.

An official of the Southern California Gas Co. said that heavy industries in the Los Angeles area have been restricted due to the fact that the company services domestic consumers during cool weather ahead of industry, as ruled by the State Railroad Commission.

SEALED bids or proposals for the purchase or lease of the government-owned Geneva steel plant and properties in Utah, have been invited by the Reconstruction Finance Corp. They are scheduled to be opened March 1, 1946, at the RFC headquarters at 811 Vermont Ave. N. W., Washington.

RFC has announced that the property "which will soon be declared surplus to government needs includes a steel plant at Geneva, coal mines at Columbia, iron ore mine facilities at Cedar City, and quarry facilities at Payson, all in Utah."

Bids may be predicated upon cash or credit terms. The RFC has prepared a guide containing instructions on how to go about preparing bids or proposals, and copies of it may be had from the RFC headquarters in Washington or from any of the RFC regional offices. Copies also may be had of a brochure describing the properties in detail.

This describes the Geneva steel plant at Geneva, including "approximately 1600 acres of land on which are located ore storage facilities, ore bedding system, sintering plant, by-product coke oven plant, blast furnaces, ingot mold foundry, open-hearth furnaces, blooming and slabbing mill, plate mill and a structural mill, together with all utility, transportation, and other auxiliary facilities necessary for the operation of the plant."

Geneva Coal Mines Described

It describes the Geneva coal mines at Columbia, Utah, consisting of 360 acres of patented coal land and 868 acres of surface rights. The rights include permission to mine 2500 acres. The mines "are provided with standard coal mining equipment and with water supply, transportation facilities and other auxiliary facilities."

The Iron Mountain ore facilities at Cedar City, Utah, are located on land owned by the Columbia Iron Mining Co. or on the adjoining right of way of the Union Pacific Railroad Co. "Facilities include primary and secondary crusher buildings and screening building. Equipment includes electric shovels, automotive equipment and other equipment for surface mining. The mine is serviced with water and power and by railroads and highway."

The quarries at Payson, Utah, are on land owned by the Columbia Steel Co. and produce dolomite and limestone. "Facilities include primary and secondary crushing stations and screening shipping buildings. Equipment consists of trucks, shovels, crushers, screens, con-

vveyors, pumps, compressors, cranes, etc. Water is supplied by a deep well. Power and light service is obtained from the Utah Power & Light Co. The property is serviced by railroad and highway."

The brochure also describes the Interchange Yard located about 120 miles southeast of Geneva on a site of 20 acres. Constructed to furnish railroad yard facilities, with 2596 miles of trackage, the yard connects with the main line to the Geneva coal mines and also serves the Geneva plant. The buildings consist of boiler house, engine house and filter building.

The guide which the RFC has prepared for assistance to prospective bidders is intended to provide a "reasonable degree of uniformity and comparability in bids and proposals, as well as to describe some of the factors which the disposal agency will definitely consider in its evaluations of bids and proposals and the extent to which the bids and proposals meet the objectives of the Surplus Property Act, and the policies laid down in the report to Congress of Oct. 8, 1945, of the Surplus Property Administration on disposal of government iron and steel plants and facilities."

Other Factors May Be Included

At the same time, the guide makes clear, "the bidder is free to include any other factors which, in his opinion, are pertinent to his bid or proposal."

Types of bids which the RFC expects, according to the guide, are as follows:

A—Bid or proposal for purchase of plant "as is" by cash payment.

B—Bid or proposal for purchase of the plant "as is" by term payment. Down payment to be a reasonable amount or percentage of the purchase price. In determining the acceptability of the down payment, amortization and interest terms proposed, the disposal agency will give due consideration to changes or additions to be made in the plant or facilities by the bidder and the proposed method of financing the same. Quarterly amortization and interest payments will be required, except that consideration will be given to waiving such payments for the first two years, final payment of balance of purchase price to be made within 18 years of date of sale. Interest to be at the rate of 4 per cent per year, except that interest may be waived for the first two years. In evaluating cash bids as compared with term bids, waived interest on term bids will be computed at 2 per cent.

C—Bids or proposals for lease of the plant "as is," or upon terms requiring

reasonable additions or changes to be made at government expense for converting or adapting the plant and facilities to permit civilian production in a competitive market, must provide for firm minimum rentals which will amortize the additional government expense required, with interest, over a reasonable period less than the term of the lease. The term of the lease as proposed and rental payments including minimum annual rentals, should be set forth. If part of rental terms is based on production, it should be expressed in percentage of sales. Proposals for lease are to be predicated upon lessee paying taxes and insurance. Proposals to lease may include options to purchase, upon reasonable terms, at any time prior to two years preceding the effective date of termination of the lease.

In all cases full information as to expected employment at the Geneva properties, and the basis upon which this determination is made, should be furnished. This should include the number of men to be required on new construction, and the length of their period of employment. It should set forth the date for start of operations, the number of men to be employed as of this date, and the estimated total employment which may reasonably be expected upon the basis of the operating and production plans of the bidder.

Bidders Must Be Experienced

The bidder in each case will be required to show steel production and sales experience and ability to provide executive, operating and sales personnel.

Each bidder should describe his proposed effort to secure a maximum share of available business, give his projected schedule of production for each major product for each of the next five years, state his price policy including any possible plans for the establishment of basing points on major products, state his plans for developing additional consuming markets, and declare his plans for preserving the original facilities for future emergencies. He is expected—although this is an optional feature—to state his projected gross earnings for each of the next five years.

Each bidder should state what existing producing facilities will be needed to carry out the above operating program, and what new producing facilities—and their cost—will be needed to implement this program. He should state other changes required in existing facilities, including cost. He should give the locations of the proposed additional producing facilities, state what existing producing facilities will not be needed to carry out his production program, and state his plan for financing the cost of additional facilities needed. He should state his proposed methods for disposing of salable or usable inventories.

The pricing policy to govern the pro-

(Please turn to page 158)

Kaiser-Frazer Plans To Build Own Auto Bodies at Willow Run Plant

KAISER-FRAZER Corp., last week, announced it will manufacture its own bodies at Willow Run for the new Kaiser and Frazer automobiles. This step has been taken, Joseph W. Frazer, president, said, in order to insure the highest quality and increased economies in the production of the two cars.

"Both Mr. Kaiser and I have made this important manufacturing decision in order to be able to pass on to the consumer the highest quality materials in these automobiles at the lowest price," Mr. Frazer declared.

Mr. Frazer, who is president and chairman of Graham-Paige Motors which is also operating at Willow Run, said the first of a series of huge 900-ton presses is now being made for the Kaiser-Frazer Corp. for installation within the next 60 days.

Volume production of the Frazer is expected to begin about March with the Kaiser following six weeks later.

Summing up the advantages in body manufacture at Willow Run, Mr. Frazer said: "First, it gives us more control over quality of our products. Second, we expect a large saving in costs and similar economies. Third, we will have a better opportunity to observe and put into effect more quickly any changes necessary to improve our cars."

He said that to insure most efficient

production the company has made "broad experience" the essential requirement of all those employed in the body manufacturing division. Norman C. Schassberger, who has had 15 years of body engineering experience, recently was appointed chief body engineer of Kaiser-Frazer, and Fred R. Watson, formerly with Chrysler and Fisher Body, is manager of the body division.

H. C. McCaslin, vice president of Kaiser-Frazer Corp. in charge of engineering, announced appointment of Frederick W. Watson as manager of the Body Division at Willow Run. Mr. Watson, who was a tool and design engineer with Chrysler Corp. for nine years, resigned in 1936 to join the Fisher Body Division of General Motors. He left Fisher in 1943 to form the Quality Engineering Co., Van Dyke, Mich., a business which he gave up to accept the present position.

Canadian Machinery Exports Show Decline

Canadian machinery exports, excluding farm machines, were valued at \$1,297,000, Canadian, in September, 1945, compared to \$1,769,000 for the same month last year, according to a report received in Washington.



Negotiations between the Kaiser-Frazer Corp. and the United Automobile Workers open at the Hotel Statler in Detroit. Left to right are: James W. Wilson, supervisor of labor relations for the company; Edward Rierdon, director of industrial relations; William McAulay, UAW regional director; R. J. Thomas, UAW president. NEA photo

Fast Pace Set In Terminating War Contracts

Chicago Ordnance District settles 347 cases in November, leaving only 387 to be completed before end of year

BY SETTLING 347 cases in November, the Chicago Ordnance District set a new record for contract terminations. This compares with 226 settlements in October and 291 in September.

According to Col. John Slezak, district chief, the 347 cases closed last month involved the cancellation of \$185,428,765 worth of ordnance production. Claims submitted by contractors on these cases totaled \$19,057,642, but subsequent negotiations with the district reduced the amount paid out by the government to \$17,617,796, or 92.4 per cent of original claims.

As of Dec. 1, the district had only 387 contract termination cases remaining to be completed, and the expectation is that most of them will be settled by the end of the month. Of the pending cases, 160 represent canceled ammunition contracts; 133, tank-automotive contracts; 86, artillery contracts; and 8, small arms contracts.

"Credit for the progress this district has made toward final settlement of its terminations belongs to our contractors," Colonel Slezak states. "Their foresight in building and training capable termination organizations well before the end of the war is paying off dividends today. Almost without exception they have given the highest degree of co-operation and have been extremely prompt in submitting inventories and claims."

Largest of the November settlements was a Studebaker Corp. contract, involving canceled orders for Army trucks and spare parts amounting to \$94,482,028. Both Studebaker and ordnance officials attribute the speed of the large settlement to a pre-termination agreement reached in May in which advanced determination was made as to methods of inventory disposition and inspection, and establishment of various rates and percentages used in computing the company's charges.

Mexican Foundrymen Join American Foundry Group

A chapter of the American Foundrymen's Association has been approved with headquarters in Mexico City, Mexico. The petition for this chapter was signed by 56 prominent foundrymen in the

Mexico City area and was recently approved by the AFA board of directors.

Interest in formation of this chapter developed as the result of visits to the United States by members of the Mexican foundry industry during the past year, and this fall an organizational committee was formed consisting of the following foundrymen: Ernesto Villalobos, general manager, Cia Constructora de Marquinaria S. A.; Manuel Goiccechea, general manager, Herio Malleable de Mexico, Fundiciones de Hierro Y. Acero S. A.; A. Zapata, manager, Ferrio Esmaltade; Enrique Molina, production manager, La Fundicion La Mexicana; and Nicholas Covacevich, Foundry Supplies & Equipment, all of Mexico City.

Heating Institute Holds Meeting; Officers Elected

New model stoves will not be produced until next spring, according to Samuel Dunkel, managing director, Institute of Heating & Cooking Manufacturers, who said that the stove manufacturers are too busy meeting current demand to change designs. Mr. Dunkel spoke at the three-day convention of the institute held recently in Cincinnati.

At this convention the following officers for 1946 were elected: Henry H. Morse, president; M. F. Cotes, Fosskett

Brown, Sheldon Coleman, and Alden P. Chester, vice presidents; and Neil H. Cargyle, secretary-treasurer.

Tin Placed Under Control Of General Imports Order

Tin has been placed under control of the general imports order, M-63, by the Civilian Production Administration. This action was taken in order to strengthen controls for implementing the international allocation of that metal, which is still in critically worldwide short supply. Tin bars, blocks, pigs, grain or granulated, and tin alloys including alloy scrap, which are now being returned to M-63, were removed from import control in August, 1944, because under wartime conditions its private importation was not feasible.

Distribution Controls Over Industrial Diamonds Lifted

Order M-109 has been revoked by the Civilian Production Administration, freeing industrial diamonds from distribution controls. Overall domestic inventory controls in priorities regulation 32 are still applicable. Adequate industry stocks and imports are available for anticipated requirements, CPA disclosed.

TRANSITION TOPICS

MATERIALS SHORTAGES—Scarcity of supplies of materials and parts retarding industrial output. Labor unrest, price ceilings major contributing causes. See page 47.

LABOR—Negotiations in steel wage dispute at standstill, with strike scheduled for Jan. 14. OPA adamant on steel prices, generally considered key to solution of controversy. See page 50.

WEST COAST—Construction slow on Pacific Coast. Little progress to be made before spring. Housing shortage discouraging job seekers in many cities. See page 52.

GENEVA STEEL—RFC asks for new bids on huge government-owned mill in Utah. See page 53.

SURPLUS WAR PLANTS—Government realizes 75 per cent of cost on first 66 plants sold. See page 60.

RESEARCH CENTER—Five-story pilot plant, equipped with apparatus such as 54-foot elevator to carry ore from crushers on ground floor to hoppers three floors above, especially built to serve future needs of basic industries. See page 80.

ELECTRONICS—No longer an engineer's dream, electronics applications in industry expected to be greatly expanded. See page 81.

FASTENERS—Continuous boltmakers and other automatic equipment for making fasteners show significant advances in methods of a century-old manufacturer. See page 82.

LUBRICATION—Problems of loading or fouling due to frictional characteristics of aluminum may be alleviated with various combinations of lubricants and special tool designs. Experiments point way to trouble-free production. See page 98.

Congressional Action Urged To Help Postwar Small Business

Sen. James E. Murray, in special report to Small Business Committee, sums up specifications for the job to be done. Holds time opportune to press to conclusion certain questions about business raised in TNEC investigation

WITH the problems facing small business more difficult and the hazards more dangerous, it is more incumbent upon Congress to do something about them, states Sen. James E. Murray (Dem., Mont.) in a special report to the Senate Small Business Committee of which he is chairman.

In this report Senator Murray may have been motivated to some extent by the fact this is a special committee, requiring a new authorization and appropriation if it is to continue in existence after the end of 1945. The report sums up the specifications of a big job that, in his opinion, should be done for small business, and Senator Murray makes it clear that the Small Business Committee is an ideal instrument for performing this service.

On the other hand, the report coincides with utterances on the part of many members of Congress over the past year pointing out that the prewar studies of the Temporary National Economic Committee never were completed. In his report, Senator Murray expresses the belief that the time now has come to press to a conclusion some of the questions about business in this country which were left unanswered in the TNEC hearings.

"Prior to the war, smaller manufacturers in the United States were repre-

sented by 190,000 plants employing from 1 to 500 persons and providing a total of 9,000,000 factory jobs. Larger manufacturing plants employing 500 or more workers numbered only 3000 and provided employment for 6,000,000 workers," says Senator Murray. "Thus small firms are more important to the economic whole than big business."

During the war years, says the report, competition among industries was necessarily suspended to bring about the defeat of Germany and Japan.

"United States industry is now emerging from the war production period with a widespread acceptance of co-operative action—a basic characteristic of monopoly—contained in its economic structure, and if this seed is permitted to grow, it may sprout into a totalitarian economic system in which small and freely competitive business cannot survive . . . While small business does not need, nor do many advocate for it, paternalistic protection, it does need a fair chance to compete with big business under a set of laws and an administration which deals equitably with all parties concerned."

Senator Murray sees the following as the more serious problems immediately confronting small business:

1—Labor-Management Relations. Small firms face the problem of ad-

justing wages in accordance with recent recommendations of the President, and where management thinks it will need to increase prices to meet increased wage costs it will have to go to the OPA for approval. This places the price-wage relationship high on the list of problems of small business.

2—Prices. Many small firms with price problems are unable to get relief because they are unable to determine what their rights are, or unable to employ legal advice, or cannot cut the red tape of administrative controls. In the months ahead these pricing problems will pyramid.

3—Finance. Small firms have both reconversion and long-term finance problems. In addition, small business faces many tax problems. Government action about these problems seems imperative.

4—Marketing and Distribution. Problems in these fields affect many levels of small business operations, including manufacturers, wholesalers and retailers. These include transportation costs, credit controls, inventory maintenance, direct selling by manufacturers, monopoly of the market place through uneconomic practices, combines to freeze out independent operators, etc. Entering into this picture are policies of disposing of government-owned goods, participation in foreign trade, etc.

5—Materials and Equipment Procurement. Problems arise in this field because of short supplies resulting from war procurement, dislocations in production of materials and parts, and labor disputes.

6—Technical Advice. Many fields of production are open to small firms which have never taken advantage of them because of their inability to employ technicians to advise on methods and production techniques. The development of an adequate field service of reports and technical aids for small business is of great concern. While some government services are now available, "small firms either do not use them, do not know about them, or cannot avail themselves of these services as now rendered."

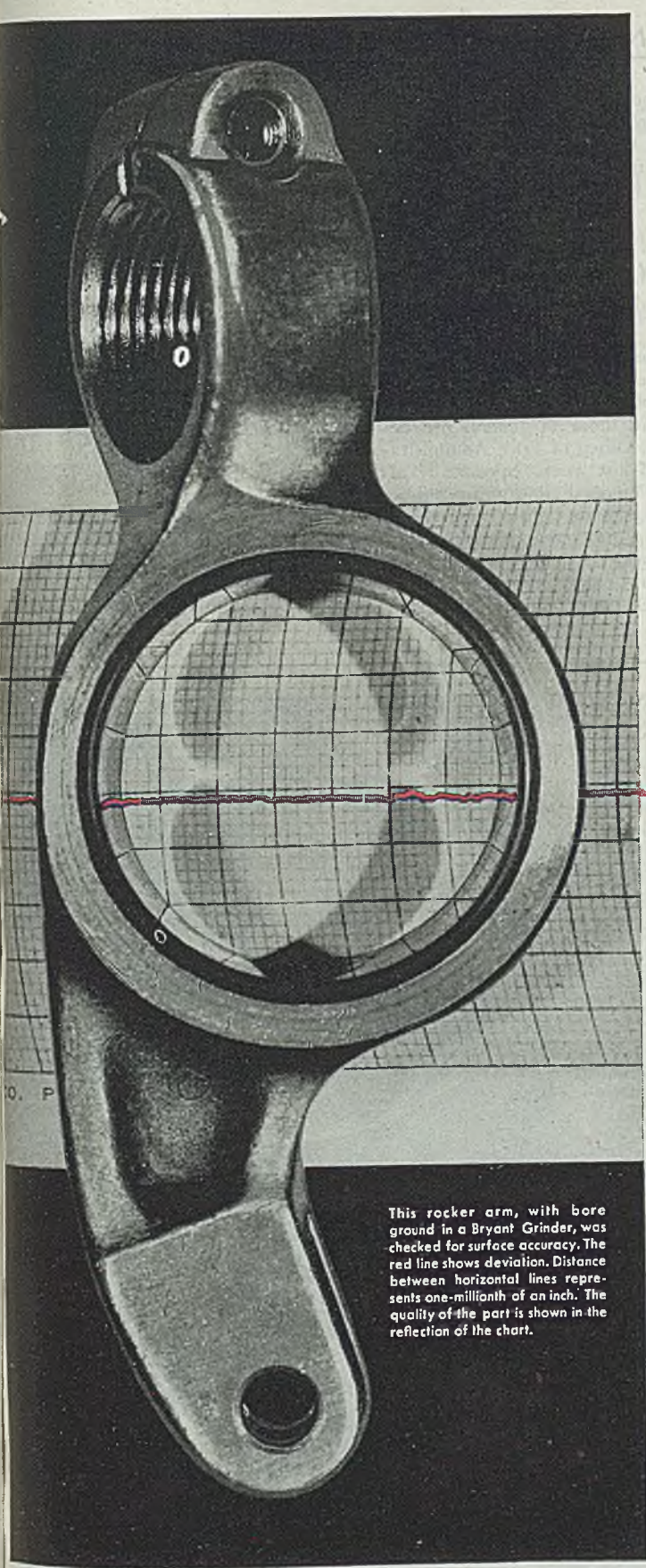
7—Representation in Washington. Small firms usually are at a disadvantage because they usually do not have individual representatives in Washington to care for their interests. Techniques must be worked out to remedy this condition.

"In addition, small business is now faced with the overall probability that emergence of the economy from war production will result in concentration of economic power in all fields—production and distribution, the latter including wholesaling, jobbing and retailing—in the hands of a few."

Senator Murray believes that a complete analysis of mergers which the Federal Trade Commission proposes to make should suggest measures for halting the continued absorption of independent private enterprise. He lists 853 mer-



SCRAPPED: Awaiting the wrecker's torch and hammer are these P-40 pursuit planes upended at Walnut Ridge Army Air Base, Ark. These planes, used and greatly depended on in early months of the war, were superseded by heavier, more powerful and better armed pursuit aircraft.
NEA photo



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gers which occurred during 1939-1944 inclusive, and can find in this record no reversal in the trend toward concentration and monopoly developed during the Temporary National Economic Committee investigations over several years prior to Pearl Harbor.

He mentions numerous questions which the record suggests to him, such as: 1—Do these mergers flow from a concentration of economic power which makes it evident that the smaller participant in the merger will be unable to survive? and 2—do they reflect a lack of adequate financing for small and medium-sized concerns?

"Will amendment of the Clayton Act to cover the acquisition of physical assets as well as securities result in a reduction in the number of mergers and acquisitions which eliminate competition?" he asks.

Senator Murray also wants an answer to the question as to why the number of small firms in operation declined by more than 500,000 between 1941 and 1944, "representing a reduction in the total number of enterprises by one-sixth." Very small firms, particularly one-man enterprises, he says, were major casualties. If the mortalities were caused largely by war conditions, he would like to have that assurance. If the wartime trends are to continue, he declares, "our hopes for greater business opportunity for the veteran and other potential entrepreneurs will remain unfulfilled."

Senator Murray's report does not accept the "optimistic" view of the Securities and Exchange Commission and the Federal Reserve Board; he holds that the working capital position of many businesses may be in precarious state.

"The National Industrial Conference Board," he reports, "offers certain conclusions on the working-capital position of small firms which suggest that some companies may have difficulty because of inadequate amounts of liquid working capital — particularly smaller corporations which were heavily engaged in war production. The Conference Board's study of 125 companies engaged in metal fabricating revealed that at the end of 1943 most firms were not too sanguine about their postwar financial requirements and the financial resources with which to meet them. For the group of metalworking companies current assets were only 1.17 times current liabilities. For corporations in the smallest-size class—those with net worth of less than \$100,000—current assets were only 1.07 times current liabilities. This very slight margin could spell disaster."

Senator Murray has some questions in mind in looking at the farm equipment industry.

"In the farm equipment industry," he says, "the small or single-line manufacturer finds it difficult to market his product. Leading manufacturers force dealers to carry complete lines of their

products whether profitable or not. This penalizes the dealer in farm implements as well as the small manufacturer to whom important retail outlets are thus closed."

OPA Revises Pricing of General Line Tin Cans

Manufacturers have been given a method for calculating ceiling prices on some types of tin cans made of materials different from those in general use before the war, Office of Price Administration reported last week. Specifically affected are "general line" cans (those made of 28-gage or lighter steel sheets and requiring protective packaging for shipment), formerly made of hot dip tin plate but now made of electrolytic tin plate or black plate. Prices of packers'

tin cans and of condensed milk cans are not affected.

For cans made of electrolytic tin plate, the new ceiling price will be the March, 1942, price for a hot dip tin plate can minus the difference in cost, computed on a current basis, between a hot dip tin plate can and an electrolytic tin plate can. Manufacturers of new types or sizes of general line cans, not offered for sale during March, 1942, will calculate maximum prices by using the formula they used during that month.

Report Haitian Machine Imports Down from 1944

Haitian machinery imports for the second quarter of 1945 were valued at 1,536,000 gourdes (approximately 5 to the dollar) compared with 1,601,000 gourdes for the comparable 1944 period.



END OF JAP ATOM EQUIPMENT. Broken remnants of two cyclotrons and other atomic equipment taken from the Japanese are dumped into the sea at Yokohama by Army personnel. NEA photo

Industry Spends \$5.7 Billion for New Plants and Equipment in 1945

Privately-financed expansion highest since 1942, but far below peak reached in 1941. Additional \$600 million spent during year on old or used plant and equipment. Rate of spending increased steadily after first quarter

AMERICAN industry, exclusive of agriculture, spent about \$5.7 billion for new plant and equipment during 1945, according to a survey made by the Department of Commerce and the Securities and Exchange Commission. This investment was the highest for any year since 1942 but was considerably less than for the peak year 1941.

Of the total approximately \$5.2 billion was spent by corporations, the remainder by unincorporated business. In addition, American industry spent another \$600 million during the year on old or used plant and equipment.

There was a steady increase in the amount of such expenditures over the year, with estimated expenditures in the fourth quarter about three-fourths higher than in the first quarter.

The \$5.7 billion expenditure on new plant and equipment for 1945 compares with \$8.3 billion in 1941 and \$5.2 billion in 1939. Adjusting for differences in price level, plant and equipment expenditures in 1945 will be less than two-thirds of 1941. The much smaller private investment in 1945 as compared with 1941, in spite of the very great increase in the level of business activity is, of course, attributable to the war effort. Scarcities and allocations effectively prevented industry from engaging in a large amount of new capital investment, particularly in the first half of the year, so that the usual peacetime relationship between private investment and business activity does not hold.

Government Financed War Plants

For the war period as a whole, depreciation and depletion charges were somewhat in excess of private expenditures on plant and equipment. During this period, much of the capital formation which occurred was for purposes of munitions and related production and was financed largely by the government, representing an expenditure of public funds rather than private investment.

The survey indicates expenditures on new plant and equipment in the last half of the year were substantially above expenditures in the first half. Thus expenditures estimated at \$1.0 billion and \$1.3 billion in the first and second quarters compare with anticipated expenditures of \$1.6 billion and \$1.8 billion in the third and fourth quarters. This increase reflects the lifting of controls

and gradual easing of materials resulting from the end of the war.

Accompanying table presents estimates of new plant and equipment expenditures by industry groups for the years

INVESTMENT IN PLANT AND EQUIPMENT BY U.S. BUSINESS

(Millions of dollars)

	1939		1940		1945				Total
	1939	1940	1941	1942	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.	
Manufacturing and mining	2,310	3,050	4,090	580	730	960	1,100	3,370	
Railroad	280	440	560	120	140	200	150	610	
Electric and gas utilities	460	640	800	90	110	170	190	560	
Commercial and miscellaneous	2,130	2,360	2,840	220	280	310	340	1,150	
Total	5,180	6,490	8,290	1,010	1,260	1,640	1,780	5,690	

*Figures for 1939-1941 are Federal Reserve Board estimates based on Securities and Exchange Commission and other data. These figures do not agree precisely with the totals included in the gross national product estimates of the Department of Commerce. The main difference lies in the inclusion in Commerce Department figures of certain outlays charged to current account. Data for 1942-1944 are not presented as they currently are being revised.

Pricing Formula for Used Machine Tools Revised

Age and condition requirements governing sales of used machine tools have been revised by the Office of Price Administration. Selling prices for second-hand machine tools now will be calculated on the basis of age so as to provide automatic reductions in ceiling prices for used machine tools as they grow older. Ceiling prices are established according to age on the basis "if rebuilt and guaranteed" and "if sold in other condition," respectively, percentages being those of the price when new: Four years old or under, 95 per cent and 70 per cent; more than four years but less than ten years, 85 per cent and 60 per cent; ten years but less than 15, 80 per cent and 55 per cent; 15 years but less than 20, 70 per cent and 45 per cent; 20 years or older, 60 per cent and 35 per cent.

Warns Against Headlong Expansion in New Fields

Warning against headlong expansion into new markets by going concerns, has been sounded by the Department of Commerce.

"Unprofitable expansion of market coverage will, in the long run, benefit no one," the department cautions, urging that manufacturers and others, contemplating expanding their field of cover-

1939-41 and 1945. Of the major industries shown in the table, railroads were the only group with higher expenditures in 1945 than in 1941. Their estimated expenditures of over \$600 million in 1945 were more than twice as much as in 1939.

Plant and equipment outlays by electric and gas utilities in 1945 were also higher than in 1939. But this is not true for commercial and miscellaneous companies; trade firms particularly show much smaller capital investment in 1945 than in 1939. Expenditures by manufacturing and mining companies in 1945 are estimated at \$3.4 billion, close to 60 per cent of the total amount spent by all industries. This outlay represents an increase of \$1.1 billion over 1939.

age, consider first if the added costs involved would match the advantages expected.

The department pointed out that the war has brought many shifts in population, and has otherwise acted to level many formerly varied buying markets, to the extent that buying power and buying habits are more uniform over the country than formerly. Also, the department said, "new products may completely alter the market potentials of existing products in postwar markets."

Simplified Practice for Steel Rivets Proposed

A proposed Simplified Practice Recommendation for Steel Rivets has been submitted by the National Bureau of Standards to producers, distributors and users for consideration. It would establish a voluntary simplified list of stock production sizes for small rivets having round head, flat head, truss or wagon-box head, and countersunk head, also belt rivets, tinner's and cooper's rivets, and large rivets with button head.

Issues Simplified Practice For Cast-Brass Fittings

Simplified Practice Recommendation R212-45, Cast-Brass Solder-Joint Fittings, has been issued by the Division of Simplified Practice, National Bureau of Standards.

First 66 Surplus War Plants Sold Return 75 per cent of Investment

Interest in government-owned facilities reported picking up. Many plants leased on commercial or interim basis to encourage absorption into civilian economy. Reconstruction Finance Corp. warns recovery on special purpose plants will be lower

APPROXIMATELY 75 per cent of cost has been realized by the government in early sales of surplus war plants, according to a tabulation by the Reconstruction Finance Corp. listing the first 66 such plants sold to Nov. 30. The 66 plants originally cost \$99,719,741.20 and were sold for \$75,127,418.01. Eighteen other plants, costing \$52 million, had been sold tentatively, subject to legal clearance.

RFC officials noted that although interest in surplus war plants was slow immediately after V-J Day, more manufacturers have entered the market for these facilities in recent weeks. During November, 27 plants costing \$54,450,000 were sold. During the same month, commercial leases on nine plants costing \$44 million were approved and short-term or interim leases on 62 other plants, representing an investment of \$90.6 million, were authorized.

The rate of plant disposal is expected to be further accelerated. At the end of November negotiations were underway for the sale or lease of 327 other government-owned plants representing an investment of \$3 billion.

Up to Nov. 30, a total of 21 plants had been leased for periods up to five years and leases for 13 others had been tentatively approved. Short-term leases covering 169 plants also had been arranged.

Lease Policy Successful

The policy of disposing of plants by lease has proved highly successful as a means to encourage absorption of the war plants into the postwar civilian economy. This policy has worked out especially well in interesting the wartime operators of the plants.

"Approval to continue the use of a government-owned plant for civilian production by its wartime lessee on an interim lease basis has been given as a means of fostering plant use in the interest of employment," reads an RFC statement. "It also gives the lessee an opportunity to determine whether he is interested in making an offer to purchase the plant. Where a plant cannot be sold immediately upon termination of government contracts, the interim lease arrangement permits continuity of plant operation until the plants can be sold or otherwise leased for a period of years.

"The 600-odd plants sold, leased or

in various stages of negotiations up to and including Nov. 30 represent slightly less than one-half the total number of government-owned plants for whose disposition the RFC has the responsibility.

"Recovery of the government's investment in plants sold to date is averaging about three-fourths of original cost," the RFC statement says. "However, there is no assurance that this high average can be maintained on future sales involving many special-purpose plants. While plants will continue to be sold as advantageously as possible, the factors of expanding employment and impact on community welfare are regarded as the chief considerations in their sale or lease."

The list of plants sold includes:

Aero Supply Mfg. Co. Inc., Corry, Pa., costing \$661,875.27, to Aero Supply Mfg. Co. Inc. for \$587,310.97.

W. F. & John Barnes, Rockford, Ill., costing \$552,145.19, to W. F. & John Barnes for \$552,145.19.

Bethlehem Steel Corp., Bethlehem, Pa. costing \$6,538,648.44, to Bethlehem Steel Corp., for \$6,538,648.44.

Bethlehem Steel Corp., Steelton, Pa., costing \$2,885,245.77, to Bethlehem Steel Corp., for \$2,885,245.77.

Bethlehem Steel Corp., Lackawanna, N. Y., costing \$4,302,957.34, to Bethlehem Steel Corp. for \$4,302,957.34.

Bethlehem Steel Corp., Lackawanna, N. Y., costing \$4,180,644.28, to Bethlehem Steel Corp. for \$4,180,644.28.

Bethlehem Steel Corp., Sparrows Point, Md., costing \$1,669,724.80, to Bethlehem Steel Corp. for \$1,669,724.80.

Bethlehem Steel Corp., Bethlehem, Pa., costing \$629,352.24, to Bethlehem Steel Corp. for \$629,352.24.

Molybdenum Corp. of America, Empire, Colo., costing \$351,503.99, to Molybdenum Corp. of America for \$351,503.99.

Engineering & Research Corp., Riverdale, Md., costing \$116,579.89, to Engineering & Research Corp., for \$116,579.89.

Kollsman Instrument Division, Square D. Co., Binghamton, N. Y. costing \$239,456.70, to General Aniline & Film Corp., for \$175,000.

Central Foundry Co., Anniston, Ala., costing \$72,865.46, to C. C. Pope, Anniston, for \$30,000.

Coast Carbons Inc., Tacoma, Wash., costing \$121,230.06, to Earl Rowe, Tacoma, for \$24,000.

Oilgear Co., Milwaukee, costing \$152,453.22, to Eschweiler & Eschweiler, Milwaukee, for \$45,000.

Metal & Thermit Corp., Chicago, costing \$76,260.36, to Harrison Iron Works Inc., Chicago, for \$60,000.

Ostrander-Seymour, Cicero, Ill., costing \$204,000, to Elkay Mfg. Co., Chicago, for \$230,000.

General Motors Corp., Buffalo, costing \$3,070,992, to General Motors Corp., for \$2,550,000.

Micromatic Hone Corp., Detroit, costing \$395,340, to Micromatic Hone Corp., for \$325,000.

Canton Drop Forging Co., Massillon, O., costing \$793,797, to Massillon Aluminum Co., Massillon, for \$275,000.

Kelsey-Hayes Wheel Co., Plymouth, Mich., costing \$1,870,352, to Evans Products Co., Detroit, for \$1,435,124.60.

Eaton Mfg. Co. Massillon, O., costing \$528,480, to Eaton Mfg. Co. Massillon, for \$291,302.

Die-Typing Corp., Pontiac, Mich., costing \$297,773, to Budd Wheel Co., Detroit, for \$92,617.

Briggs Mfg. Co., Detroit, costing \$3,278,922, to Briggs Mfg. Co., Detroit, for \$2,315,956.

American Broach & Machine Co., Ann Arbor, Mich., costing \$77,009, to American Broach & Machine Co., Ann Arbor, Mich., for \$70,000.

General Electric Co., Erie, Pa., costing \$2,195,985, to General Electric Co., Schenectady, N. Y., for \$1,529,413.

General Electric Co., Erie, Pa., costing \$1,977,032, to General Electric Co., Schenectady, N. Y., for \$1,423,220.

General Electric Co., Fort Edward, N. Y., costing \$814,867, to General Electric Co., Schenectady, N. Y., for \$589,500.

General Electric Co., Decatur, Ind., costing \$734,592, to General Electric Co., Schenectady, N. Y., for \$550,000.

Westvaco Chlorine Products Co., Newark, Calif., costing \$287,354, to Westvaco Chlorine Products Co., Newark, Calif., for \$72,000.

General Electric Co., West Lynn, Mass., costing \$382,969.69, to General Electric Co., Schenectady, N. Y., for \$323,000.

General Electric Co., Trenton, N. J., costing \$1,837,581, to General Electric Co., Schenectady, N. Y., for \$1,408,872.

Aviation Corp. of America, South Williamsport, Pa., costing \$73,019, to Ray-O-Vac, Madison, Wis., for \$65,000.

Aetna Ball Bearing Mfg. Co., Chicago, costing \$177,890, to Twentieth Century Glove Co., Chicago, for \$225,000.

National Instrument Co., Houston, Tex., costing \$125,097, to Modern Optics Inc., Houston, Tex., for \$100,000.

Ex-Cell-O Corp., Detroit, costing \$694,358, to Detrex Corp., Detroit, for \$515,000.

Aeronautical Products Inc., Washington C. H., O., costing \$360,345, to Aeronautical Products Inc., Washington C. H., for \$219,622.

Peoples Transport Corp., Muskegon, Mich., costing \$88,168, to Peoples Transport Corp., Muskegon, Mich., for \$61,000.

Samuel Greenfield Co. Inc., Buffalo, costing \$67,463, to Samuel Greenfield Co. Inc., Buffalo, for \$25,000.

Thompson Aircraft Products Co., Euclid, O., costing \$7,416,271, to Thompson Aircraft Products Co., Euclid, O., for \$5,000,000.

Ex-Cell-O Corp., Highland Park, Mich., costing \$3,388,587, to Ex-Cell-O Corp., Highland Park, Mich., for \$1,574,255.

Buffalo Arms Corp., Buffalo, N. Y., costing \$1,891,238, to American Machine & Foundry Co., New York, for \$1,436,656.

Aluminum Co. of America, Maspeth, L. I., N. Y., costing \$10,114, to George Jacobs, New York, for \$20,000.

Brown Fence & Wire Co., Adrian, Mich., costing \$165,432, to Service Steel Co., Brown Fence & Wire Co., for \$109,578.47.

Murchey Machine Tool Co., Detroit, costing \$99,453, to Simon Engineering Co., Hazel Park, Mich., for \$95,000.

General Motors Corp., Melrose Park, Ill., costing \$20,823,048, to International Harvesting Co., Chicago, for \$13,750,000.

Consolidated Vultee Aircraft Corp., Miami, Fla., costing \$930,963, to Dade County Food Authority, Miami, Fla., for \$700,000.

Consolidated Vultee Aircraft Corp., Allentown, Pa., costing \$199,760.32, to Small War Plants Corp., for \$206,378.

Ohio Crankshaft Inc., Cleveland, costing \$811,484, to Ohio Crankshaft Inc., Cleveland, for \$608,000.

General Motors Corp., Danville, Ill., costing \$2,261,761, to General Motors Corp., Detroit, for \$1,587,910.

Michigan Tool Co., Detroit, costing \$300,718, to Michigan Tool Co., Detroit, for \$250,000.

N. A. Woodworth Co., Detroit, costing \$122,460, to N. A. Woodworth Co., Detroit, for \$105,700.

United States Rubber Co., Scottsville, Va., costing \$2,202,186, to United States Rubber Co., New York, for \$1,837,500.

Ex-Cell-O Corp., Highland Park, Mich., costing \$1,217,177, to Ex-Cell-O Corp., Highland Park, Mich., for \$950,000.

General Electric Co., Cleveland, costing \$1,501,951, to White Motor Co., Cleveland, for \$807,350.

American Type Founders Inc., Newark, N. J., costing \$316,865, to Bri-Test Products, New York, for \$325,000.

Chicago Chemical Co., Chicago, costing \$195,396, to Chicago Chemical Co., Chicago, for \$400,000.

Fairchild Engine & Airplane Corp., Jamaica, L. I., N. Y., costing \$1,949,754, to Ideal Novelty & Toy Co., Long Island City, N. Y., for \$1,225,000.

Western Electric Mfg. Co., Scranton, Pa., costing \$698,939, to General Electric Co., Schenectady, N. Y., for \$400,000.

Minneapolis-Honeywell Regulator Co., Chicago, costing \$968,281, to Leaf Gum Co., Chicago, for \$1,101,500.

Tentative approvals of sales of industrial plants, subject to legal clearances and other conditions, include:

Mathieson Alkali Works, Lake Charles, La., costing \$3,208,489, to Gulf States Utilities Co.

General Tire & Rubber Co., Waco, Tex., costing \$447,290, to General Tire & Rubber Co.

Ford Motor Co., (assembly plant), Norfolk, Va., costing \$2,135,000, to Ford Motor Co., Detroit.

Armstrong Tire & Rubber Co., Natchez, Miss., costing \$1,050,000, to Armstrong Tire & Rubber Co.

Superior Tube Co., Evansburg, Pa., costing \$534,374.86, to Superior Tube Co.

General Motors Corp., Bedford, Ind., costing \$2,765,765, to General Motors Corp., Delco Remy Division.

Tung Sol Lamp Works Inc., Weatherly, Pa., costing \$485,448, to Tung Sol Lamp Works Inc., Newark, N. J.

Howarth Pivoted Bearing Co., Philadelphia, costing \$182,430, to John J. Nesbitt, Philadelphia.

Curtiss-Wright Corp., Indianapolis, costing \$3,931,968, to Eli Lilly & Co., Indianapolis.

Murray Corp. of America, Scranton, Pa., costing \$5,134,847, to Scranton, Pa., civic group.

Grumman Aircraft & Engineering Corp., Port Washington, L. I., N. Y., costing \$1,792,358, to Cairns Corp., Brooklyn, N. Y.

Goodyear Tire & Rubber Co., Topeka, Kans., costing \$7,961,533, to Goodyear Tire & Rubber Co., Akron, O.

Curtiss-Wright Corp., Cheektowaga, N. Y., costing \$18,134,432, to Westinghouse Electric Corp., Pittsburgh, Pa.

N. A. Woodworth Co., Ferndale, Mich., costing \$628,089, to Peninsular Metal Products Co., Detroit.

Perfex Corp., Milwaukee, costing \$192,706, to Milwaukee Electric Tool Co., Milwaukee.

National Carbon Co., Charlotte, N. C., costing \$705,255, to National Carbon Co.

housing provisions of the Wagner-Ellender-Tait Housing Bill, S. 1592, on which the committee is holding hearings. The bill would increase authorizations for annual federal contributions to communities by \$22 million a year in each of the first four years after its passage and would authorize appropriations over a five-year period to provide 38,000 rural homes a year.

Senate Subcommittee To Study Stockpiling Bill

A subcommittee to consider an aluminum stockpiling bill, S. 1612, has been appointed by the Senate Banking and Currency Committee. The bill proposes Reconstruction Finance Corp. purchase of 1.5 billion pounds of aluminum from government-owned plants for defense stockpiles. Members of the subcommittee are: Sen. Hugh B. Mitchell (Dem., Wash.), chairman; Sen. Ernest W. McFarland, (Dem., Ariz.); Sen. J. William Fulbright (Dem., Ark.); Sen. Hugh Butler (Rep., Neb.); and Sen. Eugene D. Millikin (Rep., Colo.).

Government Wins Lawsuit On Armor Plate Shipments

A final settlement has been reached on the litigation between the United States government and about 450 railroads over the proper rate for the shipment of armor plate, according to a recent announcement by Attorney General Tom C. Clark.

The government had claimed before

the Interstate Commerce Commission that it had been overcharged on about 50,000 shipments of armor plate since the beginning of World War II.

In 1944 the War Department, the Navy Department and the Maritime Commission instituted proceedings before the ICC asking that the rates on the shipment of armor plate be sharply reduced. The ICC ordered the reduction, and the railroads, after contesting the matter, acceded to virtually all the requests of the government.

A conservative estimate made by government officials of the amount to be recovered as the result of the settlement is approximately \$4 million. Under the terms of the agreement the government will avoid years of litigation and will also have the benefit of the new rates immediately.

Mechanical Press Shortage Slows Reconversion Pace

Scarcity of power-driven mechanical presses may present a serious threat to reconversion in the next six to nine months, Civilian Production Administration reported recently. The agency stresses the urgent need for large presses and the desirability of releasing idle presses for productive use.

The rate of delivery of these presses is one of the key factors determining the rate of reconversion in mass production industries and the pace of reconversion generally. The presses most critical to reconversion are those of the large mechanical forming and shaping types of 150 tons and over. These presses are made by eight of the 20 companies in the industry.

Manufacturers report a backlog of orders ranging from 13 to 24 months, at the current rate of production. The normal "lead time" before the war ran from 3 to 12 months. Value of total production of presses in 1939 averaged about \$760,000 compared with actual output in August, 1945, of \$1,618,245, and estimated September output of \$2,135,000. Dollar value of shipments are estimated at \$4,843,000 in the third and \$9,279,000 in the fourth quarter of this year; \$11 million in the first and \$12 million in the second quarter of 1946.

Restrictions Relaxed on Use of Rated Materials

Restrictions have been relaxed by the Civilian Production Administration on use or resale of materials purchased with the aid of an AA rating or Controlled Materials Plan allotment or by means of any other WPB or CPA action which has been revoked. The holder of such materials now may use or dispose of them, within the limits of CPA inventory controls, in any way he wishes, providing such use is not contrary to other CPA orders or controls.

500,000 Homes Requested, Says Housing Commissioner

Applications for nearly 500,000 units of public housing requested as a three-year program have already been filed with the Federal Public Housing Authority by urban communities and rural areas, FPHA Commissioner Philip M. Klutznick told the Senate Banking and Currency Committee recently.

The applications consist of 355,599 units requested by 335 urban localities, 141,473 units for 282 rural counties.

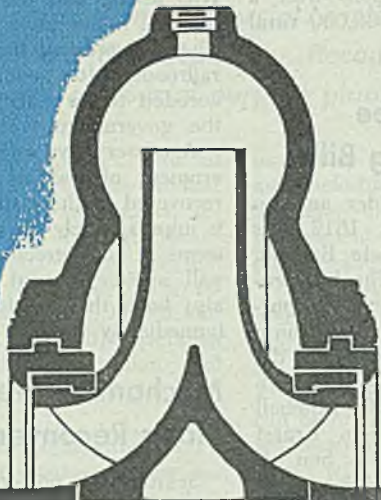
Mr. Klutznick endorsed the public



COL. BERNARD BERNSTEIN

Chief Army cartel investigator, testified before a Senate committee that I. G. Farben's war potential is "far larger" than it was in 1939 and needs only fuel and raw materials to lead Germany into another bid for world domination. NEA photo

A TIGHT-SPOT with a drive shaft . . . that's a centrifugal pump. It's necessary to fit the rotating element that does the pumping so closely inside the housing that clearances are extremely minute. That's how you get suction and it's also how you can get into trouble if there's end-play in the drive shaft. Only ball bearings can take that combination of heavy radial and thrust load and high speed and hold vital clearances.



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It's the way Fafnir enters into working partnership with machine designers and machine users in offering practical solutions to any bearing problem that makes so many executives say, "Let's put it up to Fafnir." The Fafnir Bearing Company, New Britain, Connecticut.



FAFNIR BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

MIRRORS of MOTORDOM

Union rejects Ford offer of conditional increase of 15 cents an hour. General Motors proposals for inclusion in new union contract include penalties for wildcat strikes, limitation of collective bargaining to wages and working conditions

DETROIT

LEST anyone labor under the misconception that negotiations between General Motors and the UAW-CIO are being conducted on a high plane of Wharton School of Finance economics and measured jurisprudence, let him hastily be assured to the contrary. As the following brief excerpts from the verbatim transcript will demonstrate:

Mr. Anderson (Harry W. Anderson, GM vice president in charge of labor relations): It is 5 o'clock now.

Mr. Reuther (Walter P. Reuther, UAW vice president): When labor does what Lewis has done in the past, then we are hijacking the public. When labor does what we are doing in this case, protecting the public interest, then we are no good either. What can labor do that is right?

Mr. DuBrul (Stephen DuBrul, GM labor economics adviser): Work hard.

Mr. Reuther: I still will give you the proposition that when the strike is settled—when it is settled—I invite Harry Anderson or Steve DuBrul, either one of you fellows, or both of you, to let Hugh Dean (Chevrolet manufacturing manager) have us go over here in the Chevrolet Forge or Chevrolet Gear & Axle plant, and you let me pick a job out for you, and you pick one out for me, and if you can last 40 hours on that job, you can have my pay for the week.

Mr. Anderson: You would pay that much to get that kind of a publicity stunt for yourself.

Mr. Reuther: It would be the last time you would talk about labor productivity being low.

Mr. Anderson: I worked harder in my life than you ever knew how.

Mr. Reuther: Steve or you couldn't last four hours, and I don't claim I could last four hours. I am not saying you are lazy; you are saying these fellows are laying down on the job.

Mr. DuBrul: We never said any such thing. You brought this up.

Mr. Reuther: Wait a minute. This came up way back, and it was brought up on the basis the guys were not working hard. Go over and let them wrestle with some of those banjo housings or the rear spring assembly.

Mr. Anderson: Don't be silly enough to sit there and think that we don't think there are hard jobs down in the plant, but that does not say all our men in the plants are working on their jobs as they might.

Mr. Reuther: The fact of the matter is efficiency in General Motors is way up there, it always has been, and certainly the corporation—

Mr. Anderson (interposing): If there

is any way to keep it up there, we are going to do it in the future, too.

Mr. Reuther: We are not arguing about that. We are merely saying—

Mr. Anderson (interposing): We are going to show you where labor efficiency has gone down on operations, and show you the operations.

Mr. DuBrul: We don't claim we get a productivity by working our people to death.

Mr. Reuther: Mr. Wilson says labor is always after getting more for doing nothing.

Mr. DuBrul: Of course, that is the foundation of unionism.

Mr. Reuther: What we say is, gentlemen, we want a bigger pie, and we want a bigger share of that pie. We say the only way labor can have more things, is if it creates more things. No feather-bedding in our philosophy, no feather-bedding whatever in our philosophy. When do we meet again, Harry.

Mr. Anderson: We have something else we have to do tomorrow. We are going to give you the demands on the contract changes Monday.

Mr. Reuther: You are?

Mr. Anderson: Yes.

Mr. Reuther: We will be prepared to discuss those demands in about the same schedule you were prepared to discuss our wage demands, about six weeks, so six weeks from now we will be prepared to talk about those things.

Mr. Anderson: All right.

Mr. Reuther: And then we will give

you the union's demands. For every one you give us we will give you a counter-demand.

Mr. Anderson: All right.

Mr. Reuther: If you want to talk about those six weeks or eight weeks from now it is O.K. with us.

Mr. Reuther: Because you ain't fooling nobody.

Mr. Anderson: You ain't fooling us, either.

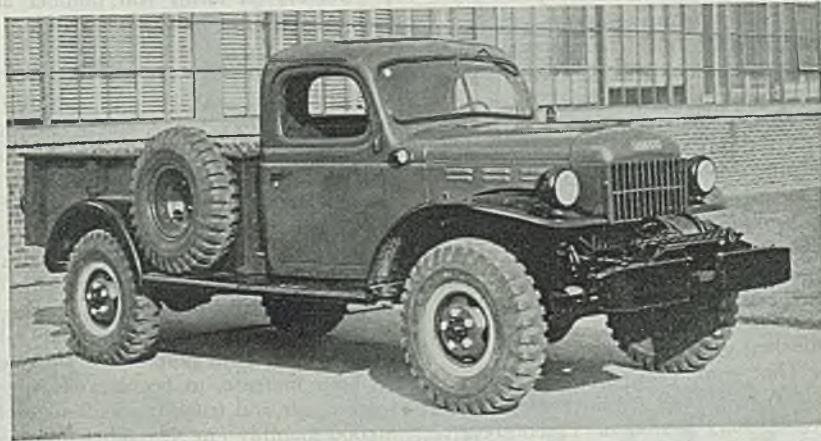
Mr. Reuther: We are not trying to.

Mr. Anderson: You are trying awfully hard, but you are not.

Mr. Reuther: We are telling you frankly you are not going to make any automobiles until this is settled, and you can go through all the contract cancellations you want. We worked damned hard at this job, and I think you guys have treated the General Motors workers like they weren't worth a minute's consideration. A corporation that has the money you have, and you fellows sitting on top and enjoying every damn decent thing of life, everything money can buy, and all the security, and when a bunch of workers ask for their share of it you thumb your nose at them, tell them to go to hell, refuse to conciliate, refuse to bargain, refuse to negotiate, refuse to arbitrate. That is the way you do it. You are asking for a fight, and, brother, you are going to get it, and if it is the last thing we do, brother, we are going to sweat this one out to the bitter end.

Mr. Anderson: All right.

Mr. Reuther: Every man on our staff is giving his full pay. Every one of you is getting your full pay. You haven't lost a damn red cent, and we will take it right down to the last bitter inch of the road, and when the plants open up, remember, part of it goes back into the plants. Don't forget about that. We have just started to fight, since this is the way you have asked



NEW TRUCK: Newest addition to the Dodge job-rated civilian truck line is this full-size, four-wheel drive, one-ton general purpose truck designed for economical "off-the-highway" use and operations over unimproved roads where ordinary trucks are restricted in operations. The new model is adapted from the four-wheel drive Dodge military vehicle

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for it. You made that decision when you canceled the contracts, you asked for it, you will get it, you will get it with everything we have got, and then we will break it off.

I give you that as a little commitment. When it is all over some day you will say: "What about taking care of this problem?"

We will say: "No, don't you remember how you said you were going to get tough?"

And, that is the way it is going to be, on a straight fighting basis all the way, and then your old General Motors record is in the ash-can. You put it there by your arbitrary arrogance, by your unwillingness to sit down and collective bargain on the basis of economic facts. That is what you have done. You have destroyed the work of a lot of honest people who worked hard for four years, destroyed it, and you sit there in your millions and say we did.

Mr. Anderson: You asked for it.

Mr. Reuther: We destroyed it. You sit there with your \$90,000, with guys in the plants working a hell of a lot harder than you guys on the other side of the table.

Mr. Anderson: They never have.

Mr. Reuther: Oh, Harry.

Mr. Anderson: They never have.

Mr. Reuther: You asked for it, and you are going to get the damndest fight you ever had. The whole American labor movement is behind us. We are backed to the last — damn inch. You can get all the injunctions you want, but Dean isn't going to make Chevrolets and Buicks.

GM Proposals Listed

Proposals listed by GM for inclusion in a new UAW contract are 11 in number and can be briefed as follows:

1. That collective bargaining be limited to wages, hours and other conditions of employment.

2. That both parties recognize the rights of employees to elect or refuse membership in any union, plus the right to maintain or resign such membership.

3. That management have sole responsibility for products to be made, location of plants, schedules of production, methods of manufacturing, and the right to hire, promote, transfer, discharge or discipline employees.

4. That corporation and union share equally payments to union committeemen.

5. That grievances be handled under established grievance procedure.

6. That employees, except veterans of World War II, shall acquire seniority after a probationary period of 12 consecutive months during which they shall acquire no rights with respect to re-employment if laid off or discharged during such period.

7. That there be appropriate penalties, including loss of seniority, against employees taking part in strikes or work stoppages in violation of the agreement.

8. That the union give adequate

guarantees against personal attacks, false accusations and vilification of management through official union publications, handbills, etc., and that the international union accept full responsibility for publication of such material.

9. That abuses be eliminated from leave of absence procedure.

10. That the international union withdraw its objections to local unions negotiating incentive pay plans.

11. That World War II veterans have equal opportunity of employment with civilians hired during the war, regardless of seniority.

As negotiators moved to Washington to present their cases before the President's fact-finding board, GM announced

TRACTOR DEMAND

Department of Agriculture students of the farm machinery market expect that farm purchases of tractors will average at least 225,000 per year in the continental United States over the next four years. Farm tractors numbered 2,070,000 on Jan. 1, 1945, and of this total at least 150,000 units were worn out and ready to be junked. Normal purchases of tractors for replacement purposes should range between 110,000 and 120,000 yearly. In addition, there is a demand for a new tractor for every decline of 4½ animals in the horse and mule population—and this population is declining at the rate of 250,000 to 300,000 animals annually. Counting these three factors—normal replacement needs, accumulated replacement needs because of wartime conditions, and demand entailed in replacing horses and mules—it is estimated that tractors on farms will number at least 2,500,000 on Jan. 1, 1950.

it would advance funds, where necessary, for employees to maintain group insurance and hospitalization policies, such advances being deductible from future earnings.

Those who were expecting Ford to step forward with a wage increase offer far beyond the 13½ cents an hour already offered by GM were somewhat taken aback at the Ford proposal of a 15 cents an hour increase, to become effective as soon as car and truck production reaches 80,000 monthly (in November, Ford output was about 22,500, in December it will be less). The offer, promptly rejected by the UAW, made no bones about the company's position. It said the company was willing to risk loss already indicated for 1946 operations at present wage rates, because: 1. It wanted to retain the confidence and co-operation of employees; 2. it wanted to stay in production and

keep employment at a high level; 3. it wanted to sharpen its production skills and efficiency; and 4. it wanted to halt the inflationary trend by turning out sufficient cars to meet swollen demand.

The Ford wage offer would have been effective for a period of two years, and was made contingent upon elimination of work stoppages and retention of prerogatives by management. A further stipulation was that should OPA grant increases in car prices, they could not be made the basis of additional wage demands.

Despite the union's rejection of the offer, the proposals reflect a high degree of ingenuity and capability in the fields of public relations and labor relations somewhere in the Ford organization. While ostensibly, policies are determined by Ford directors and its labor relations department, headed by John S. Bugas and M. B. Lindquist, the current proposals may spring from suggestions outside this group. It has been hinted Ernest C. Kanzler, long close to the Ford family and active during the war in government-industry circles, may be giving valuable advice and counsel to the Ford management in labor relations.

After frantic appeals to Prime Minister Attlee of Great Britain to intervene in GM-UAW wage dispute by virtue of its retention of proprietary interest in 400,000-odd shares of GM stock—a move obviously made solely for its publicity value, the UAW-CIO next will appeal to the Treasury Department to disallow expenditures currently being made by GM on advertising wage settlement offers as a legitimate cost of doing business. Another publicity venture, this move likely will be followed by some more grand strategy—perhaps an appeal to Premier Stalin or Mahatma Gandhi.

Ford Constructing Annex To Administration Building

Construction of an annex to the present Ford administration building on Schaefer road, Dearborn, Mich., has started. The two-story annex is being built directly east of the main office structure to which it will be attached by a 76-foot overpass and will be a temporary structure accommodating 1000, with floor space of 66,000 sq. ft.

CPA Rules on "CC" Ratings For New Truck Purchases

Ratings for obtaining new trucks will be granted by the Civilian Production Administration only to producers of, or those intending to produce, material that CPA has found to be in such tight supply as to be a serious threat to the civilian economy. A "CC" rating issues for a truck can be applied only to a distributor or dealer and is not extendable to a manufacturer. This action was effected by direction 6 to priorities regulation 28.



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Steelmaker in England Plans Expansion of Plant Facilities

Dorman, Long & Co. Ltd. will build first universal beam mill in United Kingdom, having capacity of 350,000 tons annually, and will erect a large open-hearth steel plant. Central ore unloading, ore preparation and sintering plant also planned

UNIVERSAL beam mill, the first in the United Kingdom and a new steel plant are to be built on Tees-side by Dorman, Long & Co. Ltd., at a cost of about £8 million. The installations will be erected on a 650-acre site between the company's existing Cleveland and Redcar works at the mouth of the river Tees.

Central feature of the project will be the universal beam mill which will produce a broad flange section not hitherto rolled in Great Britain, and will revolutionize some 75 per cent of the steel joist production of the country.

The development is comparable in importance to the introduction of wide strip mills, and the same advantages resulting from specialization in manufacture will be secured.

Designed for a capacity of 350,000 tons of universal beams yearly, the mill will be based on the latest American methods but incorporating British practice essential to meet the special requirements of home consumers of structural steel. A large open-hearth steel plant will be installed on the site so that the beam mill may be supplied with high quality constructional steels at minimum cost.

Approximately 23,000 tons of machinery and 14,500 tons of steel work will be used in constructing the new mill and an additional 17,500 tons of steel will be used in building the open-hearth steel plant. A minimum of two years will be required to complete the works.

The company has also approved an expenditure of over £1 million at its Cleveland works for installation of a central ore unloading, ore preparation and sintering plant. The installation will permit the largest ships engaged in the ore carrying trade to be expeditiously handled, and the time required for discharging ore cargoes will be halved. In addition first class facilities for dealing with rail-borne materials will be provided. The plant will be capable of handling over 2 million tons of imported and local ores per year, and will serve the blast furnace units of the whole group, including those supplying the new steel works.

First Luxembourg Blast Furnace Starts Operation

With the prospects for larger fuel supplies brighter than in many months, one

of the large steel companies in Luxembourg lighted fires in the first of its blast furnaces to be put in operation for almost a year, according to a report to the Department of Commerce.

The steel mills whose production normally forms the backbone of the economy of the country and places it among the principal steel producing countries of the world, closed down about a month after the country's liberation on Sept. 10, 1944, when it became impossible to secure further supplies of fuel. Only one company which had military contracts and, consequently, was provided coal by the Army was able to operate during the winter and spring of 1945.

Hydroelectric Projects Underway in Ireland

Extensive hydroelectric development is underway in Ireland, and will be spread over the next several years.

In August, it is reported to the Department of Commerce, work was begun on damming the River Erne, preliminary to a hydroelectric station. Bids have been asked for the turbines. About four years will be required for completion of the project. However, when complete, it is estimated the plant will have a capacity of 200,000,000 units of electricity annually.

Other developments reported include the Poulaphouca hydroelectric station near Dublin, expected to produce 30,000,000 units per year, and a steam generating plant at Portarlinton, which will use the peat from surrounding bogs to produce 50,000,000 units per year of electricity.

Urges Large Industry for Germany; Strict Control

Advocating a sizable steel industry for Germany, Lord Riverdale, the former Sir Arthur Balfour, and managing director of Arthur Balfour & Co. Ltd., Sheffield, England, recently said that occupation of Germany should last between ten and twenty years, during which time a completely de-Nazified generation will have had a chance to grow up and will no longer be a menace to society.

Lord Riverdale asserted that it is the viewpoint of British industrialists that Germany must again become a strong industrial nation, but he stressed that the

rebuilding process "would, of course, be subject to strict Allied control."

"If you reduce industry, what is to become of the people?" Lord Riverdale asked. Pointing out the huge economic problems of a people without industry and the need for our feeding millions of unemployed over an indefinite period of time, he questioned the advisability of dismantling German mills for shipment to other parts of the world, and stressed the need for German transportation and manufacturing activities in the heart of Europe as vital to the proper functioning of commerce in all other countries.

Egypt To Ask Bids For Generator Construction

The Egyptian government has announced early opening of bids for construction of a generating station at Aswan Reservoir, Egypt. The work to be covered includes civil engineering works and buildings, seven 57,000 horsepower Kaplan type water turbines and auxiliaries, seven 45,000 kva alternator-excitors and auxiliaries, switchgear, busbars and supports, connections, metering, synchronizing equipment and protective gear, three 105 kva transformers, cables, wiring, penstocks, valves and cranes.

Completes Jap Inventory; Lists Production Figures

A sweeping inventory of twenty-three major Japanese industries has been made by Lt. Comdr. Joseph Z. Reday, chief of the Economic and Scientific Section's Research Division in Tokyo, for American Ambassador Edwin W. Pauley.

With only twelve days to complete the job covering the iron and steel, mining, light metals, other nonferrous metals, shipbuilding, machine tools, railroad equipment, automotive, electric machinery and other industries, Lt. Comdr. Reday enlisted the help of 15 Germans and Japanese who had been jailed for their anti-Nazi and anti-military philosophies and with their aid compiled the figures of production, war damage, plant equipment, inventories, price indexes, estimates of assets abroad and the tentative import and export programs.

Ireland Expects Larger Farm Machinery Imports

Ireland expects larger imports of farm machinery in 1946, it is indicated in advices to the Department of Commerce.

In the third quarter of 1945 receipts of such machines by Eire included 800 reapers and binders, 600 tractors and 35 threshing machines with smaller agricultural implements being received from the United States in minor numbers.



Tata Reconverts

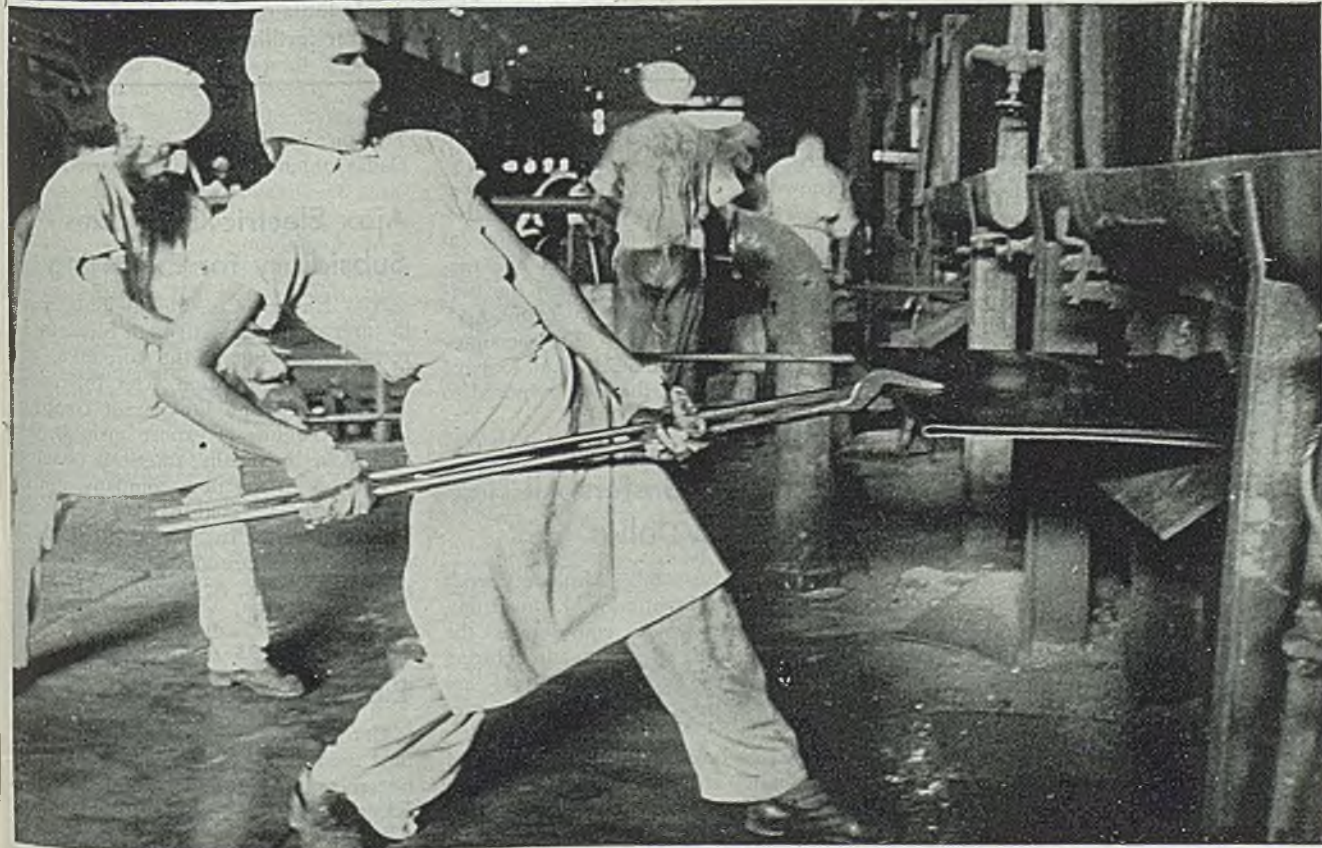
India's great Tata steelworks, largest in the British Empire, contributed substantially to the Allied war effort and now is again producing steel products for peacetime use. These photos show some operations at the works, largely engineered by Americans

Above, billets are being rolled into bars and light structurals on the merchant mill

At left, ferromanganese is being produced in blast furnace

Below, workmen are placing a pack of tin plate into the furnace. India now offers a large market for tin plate. First fabricated into oil cans, this material generally serves seven or eight uses before it's finally flattened out to help roof a native's hut.

Authenticated News photos



Westinghouse Tells Plans for Appliance Sales

Corporation will stand back of manufacturer-distributor-dealer method of distributing merchandise

PLANS for promoting the complete line of 1946 electrical appliances made by the Appliance Division of the Westinghouse Electric Corp. were outlined to wholesale salesmen associated with the division's distributor organizations at a week-long meeting recently at Mansfield, O. This was the first meeting of this group since 1941 and was attended by more than 450 salesmen.

J. H. Ashbaugh, Westinghouse vice president in charge of the Appliance Division, told the group that it is the "firm conviction" of the company that the manufacturer-distributor-dealer method of distributing goods is "fundamentally sound," and Westinghouse will stand back of that method of distribution.

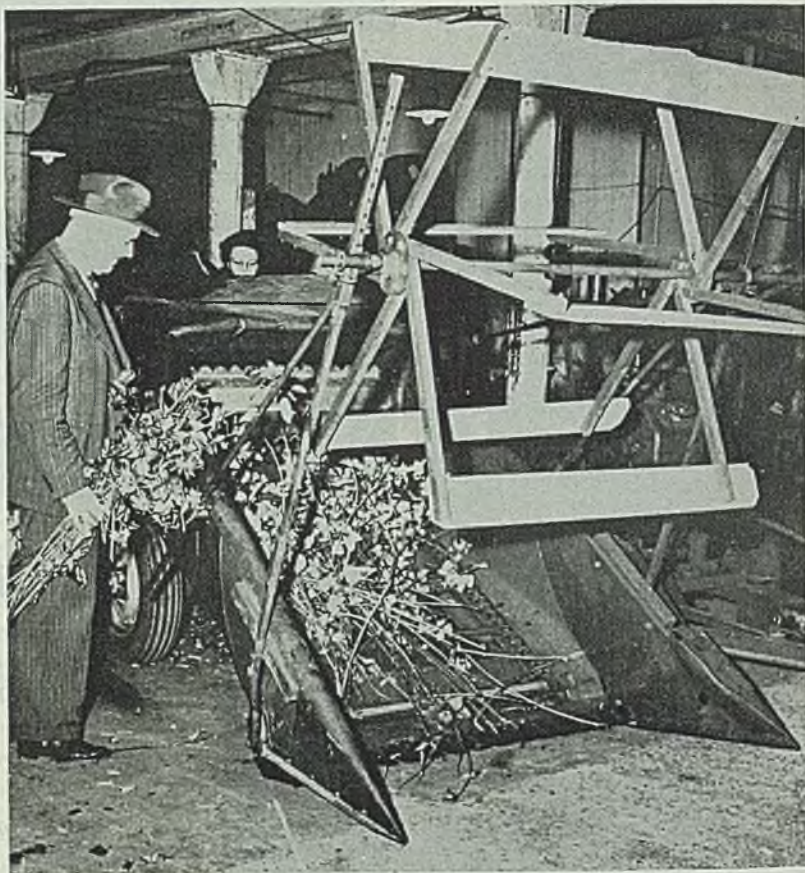
Mr. Ashbaugh said that with completion of the company's \$6½ million expansion program at Mansfield by June, 1946, and with production at peak capacity the plant will employ 7500 people to mark the full start on the "second 30 million appliances" to be made by the company.

Discussing the operations planned for the Mansfield plant, Mr. Ashbaugh said that a trainload of 150 freight cars will have to enter and leave this plant each day to handle production. Twelve carloads of steel will be required each day to meet production demands. A carload of nails will be used every five days just to crate the appliances as they roll off the manufacturing lines.

Pointing out that the Appliance Division has kept up to and, in a number of cases, ahead of projected reconversion schedules, Mr. Ashbaugh said, "if we can continue on schedule, we will be up to prewar refrigerator capacity in seven months after the end of the war, which is one month better than the timetable we set up for this task. Electric irons, vacuum sweepers, fans and electric roasters and a few other appliances were started more quickly."

ATSC Discloses Method of Bombing Through Overcast

Development of a radar navigational device permitting the pinpoint bombing of overcast targets with an accuracy rivalling the performance of the Norden bombsight in clear weather, was an-



NEW MACHINE: This new harvester and decordicator makes possible the use of ramie, a fiber which because of its toughness, had defied efforts to cut and decordicate it. Albert Brereton, inventor of the machine, in a demonstration at New Orleans feeds ramie stalks through the harvester. In the field, the machine cuts, de-leaves and decordicates ramie and deposits the residue in the field for fertilizer. NEA photo

nounced recently by the Air Technical Service Command.

Known as "Shoran," the equipment was developed by the electronic subdivision of the Engineering Division at Wright Field and Radio Corp. of America, New York, and was called the perfect system for bombing by many AAF pilots and bombardiers. The accuracy of this radar equipment is said to have materially shortened the time required to defeat the Germans.

Luscombe Transfers All Activities to Dallas

Transfer of Luscombe Airplane Corp.'s operations from Trenton, N. J., to Dallas, Tex., a move which consolidates the home office and all the manufacturing activities of the corporation, was announced recently by L. H. P. Klotz, president.

Mr. Klotz said that the transfer of all personnel for the production of the all-metal Silvaire plane has already been carried out and that all operations at

Trenton would be absorbed into the Dallas organization by the year end.

Ajax Electric Co. Forms Subsidiary for Exporting

Ajax Electric Co., Philadelphia, manufacturer of electric salt bath furnaces, has recently announced the formation of a subsidiary organization, Ajax International Co., to handle the parent company's growing volume of export business, principally in the Latin American countries.

Officers of the new company are: Dr. G. H. Clamer, chairman of the board; William Adam Jr., president; Leon B. Rosseau, vice president; John E. Haig, secretary; and E. A. Ginkinger, treasurer.

Los Angeles Appliance Plant Work To Begin Soon

Construction will begin within the next month on the Los Angeles plant to be erected by Hurley Machine Division, Electric Household Utilities Corp., Chicago.

New Passenger Cars Promised For Railroads

Revolutionary equipment coming from plants of Pullman-Standard Car Mfg. Co. and Edward G. Budd Mfg. Co.

A NEW ERA of railroad travel is promised to begin in 1946 with delivery of revolutionary new passenger cars by Pullman-Standard Car Mfg. Co., Chicago, and the Edward G. Budd Mfg. Co., Philadelphia.

Cars designed by Pullman-Standard Car Mfg. Co., will transform a train into a "modern city on wheels," Arthur M. Unger, welding engineer for that company, predicted.

Among the new cars which Mr. Unger described and which are expected to become popular immediately with the public is the "living room" car. Designed by Pullman-Standard as the successor to the conventional parlor car, the living room car is spacious and has deep-piled carpeting and movable lounge chairs. Built-in radios, full view windows, and smart interior styling mark it as a key unit in the new mode of rail travel, Mr. Unger said.

Incorporate Many New Features

Other new cars, he pointed out, are a junior club car, where young travelers will play under supervision of a stewardess; a club-cinema car, which by day is a combination bar and observation lounge and by night is a night club and movie theater; a new diner featuring diagonal rather than conventional side-by-side seating; a grillroom car offering self service for a quick snack or a full meal; a "day-nite" coach with new type chairs with leg rests; a three-tier sleeper that is expected to cut cost of sleeping accommodations; a "threedex" coach for commuter travel; and a "casino" car with private daytime rooms.

Mr. Unger pointed out that Pullman-Standard's vast wartime operations constitute a valuable laboratory for streamlined production techniques which today are being applied to carbuilding.

Edward G. Budd, president of the Edward G. Budd Mfg. Co., announced that approximately 80 per cent of the 112 stainless steel railroad cars ordered from his company by the New York Central Railroad will be sleepers embodying the most luxurious double bedrooms ever offered the public for moderate price travel. These cars were designed to offer a choice of sleeping accommodations lengthwise or crosswise of the car, room-width windows, a ward-

robe, and a fully-enclosed toilet and lavatory, Mr. Budd pointed out. Another feature, he said, is the convertibility of two adjacent double bedrooms to provide a master room of greater size, capacity and apartment comfort than heretofore available in any sleeping cars.

The new 112-car order consists of cars with double bedrooms and cabins, lounge facilities, observation facilities, diners, combination kitchen and lounge

cars, and baggage-dormitory cars. This new equipment will be used to make up eight additional stainless steel trains for the New York Central fleet. Deliveries are scheduled to begin in the autumn of 1946. In addition, the Budd company is working on an order for 127 passenger cars for the New York Central and total business on the books of the Budd company with the New York Central approximates \$22 million.

BRIEFS

Paragraph mentions of developments of interest and significance within the metalworking industry

H. K. Porter Co. Inc., Pittsburgh, has acquired Ft. Pitt Spring Co., Pittsburgh, manufacturer of coil and elliptical springs, and will operate it as the Ft. Pitt Spring Division.

W. O. Hebler Co., Hillside, N. J., has granted an exclusive license for manufacture and sale of its thermal conductivity cells to Davis Emergency Equipment Co., Newark, N. J.

Leslie Co., Lyndhurst, N. J., manufacturer of regulators and controllers, has announced appointment of the following sales and service agents: J. N. Fehlinger, New York, for New York and vicinity; Frank Howell Co., Richmond, Va., for Virginia; John Zimmerman, Louisville, for Kentucky; and Bruce Greaves Co., St. Louis, for eastern Missouri and southwestern Illinois.

DeVilbiss Co., Toledo, O., will conduct four one-week courses for industrial finishers in its School of Spray Painting. Free to users of DeVilbiss spray painting equipment, the classes will start Jan. 14, Mar. 11, April 8, and June 10.

D. E. Makepeace Co., Attleboro, Mass., has developed a method of combining gold and palladium in diagonal, vertical, or horizontal stripes for use by jewelry manufacturers for making compacts, cigarette cases, belt buckles and similar items.

Warner & Swasey Co., Cleveland, has announced an employee retirement plan, applicable to all employees, all costs being paid by the company. The plan provides for retirement of any 65-year-old employee who has been with the company for 10 years, or a 55-year-old with 15 years of company service.

M. F. Becker & Associates, Chicago, has been formed by M. F. Becker to operate as manufacturers' representative for the foundry and other industries.

Non-Ferrous Metal Co., Pittsburgh, has acquired the physical assets of Bell

Bros., that city, and will produce brass and bronze ingots.

Pittsburgh Plate Glass Co., Pittsburgh, has announced plans for a branch to be opened the first of the year at 509 Joplin Ave., Joplin, Mo. Also announced were details of its Kokomo, Ind., plant expansion which will treble the plant's size at a cost of approximately \$800,000.

Elgin National Watch Co., Elgin, Ill., has acquired a plant in Lincoln, Nebr., from Elastic Stop Nut Corp., Union, N. J., as one step to expand watch production.

Tennessee Eastman Corp., Kingsport, Tenn., has announced its expansion program now under way will call for expenditure of more than \$5 million during each of the years 1946 and 1947.

Tar & Chemical Division, Pittsburgh, Koppers Co. Inc., has developed a roofing material, "Plastipitch," which provides protection for metal roofing against rust, corrosion and chemical fumes.

Detrex Corp., Detroit, has opened its enlarged Pacific Coast sales and service offices at 112 W. Ninth St., Los Angeles 15.

Carboloy Co. Inc., Detroit, has appointed Harris Pump & Supply Co., Pittsburgh, as distributors for Pittsburgh, western Pennsylvania, eastern Ohio and northern West Virginia.

Industrial Research & Tool Inc., Dayton, O., has been formed as engineering consultant and designer. Its address is 136 S. Ludlow St., Dayton 2, O., and its branch office is at 5946 W. Cermak Rd., Cicero 50, Ill. Officers are: George D. Ludington, president; W. W. Anderson, vice president; R. H. Dedy, secretary.

Bright Light Reflector Co. Inc., Bridgeport, Conn., has moved its office and plant to Fairfield and State Sts., Bridgeport 5.

MEN of INDUSTRY



W. H. NORRIS

William H. Norris has been appointed manager of the Titusville, Pa., plant, Universal-Cyclops Steel Corp., Bridgeville, Pa. Previously he had served as manager, Watervliet, N. Y. plant, Allegheny Ludlum Steel Corp. W. J. Long, assistant general sales manager since 1940, has been appointed manager, tool steel sales. L. S. Fulton has joined the Universal-Cyclops corporation as stainless metallurgical engineer, having formerly been associated with Crucible Steel Co. of America, New York. J. F. Bookwalter, until recently connected with the Edgcomb Steel Co., Philadelphia, and previously with the Steel Division, War Production Board, has joined the stainless strip sales department.

Glenn W. Thompson, vice president, Noblitt-Sparks Industries Inc., Columbus, Ind., has been elected president to succeed Q. G. Noblitt, who will become chairman of the board Jan. 1.

Harold J. Ritter has been elected president and treasurer, and a member of the board of directors, Norma-Hoffmann Bearings Corp., Stamford, Conn., succeeding O. P. Wilson who had resigned. Hubert L. Williams, vice president in charge of plant operations, also resigned, and is succeeded temporarily by Percy Butchard, director.

Robert M. Lloyd has been appointed assistant to vice president, raw materials, United States Steel Corp. of Delaware, Pittsburgh. He first joined U. S. Steel as an employee in the sales department, Carnegie-Illinois Steel Corp., in 1926, and was transferred to the raw materials department of that company in 1933. Until his recent appointment, he was assistant director of raw materials.

James A. Lind has been elected treasurer, Independent Pneumatic Tool Co., Chicago, succeeding the late Edward G. Gustafson. Frank J. Weitekamp was elected to succeed Mr. Lind as comptroller. John A. McGuire was re-elected



DONALD S. GRUBBS

secretary, a position he held before entering the Navy.

Donald S. Grubbs, previously associated with the United States Steel Corp., New York, has been appointed treasurer, Luscombe Airplane Corp., Dallas, Tex., and Trenton, N. J. Mr. Grubbs had served from 1929 to 1941 as comptroller, Oil Well Supply Co., Dallas.

James A. Downey Jr. has returned to his post as director of personnel and manager of the safety department, Sloss-Sheffield Steel & Iron Co., Birmingham. For the past two and a half years, Mr. Downey has been area director of the War Manpower Commission.

Charles T. Campbell, operator of river fleets in the Pittsburgh district, has been appointed assistant to the president, Dravo Corp., Pittsburgh. Mr. Campbell founded the Water Transport Co., Union Barge Line and the Campbell Transportation Co.

Robert T. Harris, formerly vice president in charge of the construction equipment department, Blaw-Knox Division, Blaw-Knox Co., Pittsburgh, has been elected president, Matt A. Doetsch Machinery Co., Washington, which has represented Blaw-Knox Co. in the sale of construction machinery for several years. In addition the company will also represent Blaw-Knox in the sale of standard steel buildings and heavy steel forms for miscellaneous concrete construction.

Max J. Pischke, formerly Pittsburgh district sales manager, has been promoted to manager of warehouse sales, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. Pischke has been associated with the company since 1941, after having served eight years in the industrial supply field in Pittsburgh.

Charles C. Martin has been appointed a vice president, Rheem Research Products Inc., Baltimore, Md., having served since July, 1944 as administrative man-

ager and assistant director of the company's research laboratories at Pasadena, Calif.

John M. Newman recently was appointed general engineering supervisor over steel mill, machine tool, brakes and drum controller divisions, Cut'er-Hammer Inc., Milwaukee.

William H. Knight resigned recently as manager of the Duluth, Minn., branch sales office, Allis-Chalmers Mfg. Co., Milwaukee. He will be succeeded as manager by John G. Barta, previously of the Milwaukee district office.

Ferdinand G. Schultz will resign as Pittsburgh district sales manager, American Foundry Equipment Co., Dec. 31, 1945, to devote his entire time to the Ferdinand G. Schultz Co., Pittsburgh. The company represents a group of foundry equipment manufacturers.

John J. Conroy III was elected president, Milton Lennard, vice president, and George W. Lonergan, treasurer, National Magnesium Corp. of Maryland, New York. Mr. Lonergan is president, H. V. Walker Co., Elizabeth, N. J.

Earl F. Noyes recently was named sales manager, Arrowhead Rubber Co., Los Angeles, a division of National Motor Bearing Co.

Adrian L. Potter, since March, 1942, executive secretary, American Society of Tool Engineers, Detroit, has been appointed staff head of the New England Division, National Patent Council. His headquarters will be in Boston.

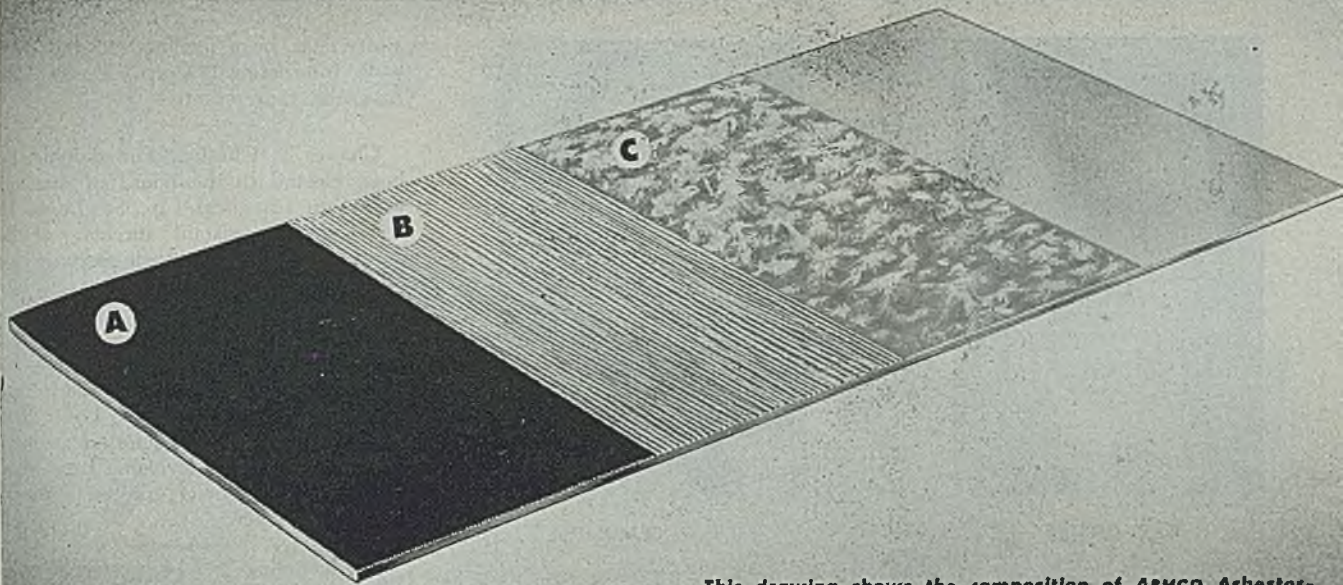
Lon W. Evans has been appointed southwestern district sales manager for American Central Mfg. Corp., Connersville, Ind. Mr. Evans will make Fort Worth, Tex., his sales headquarters.

William Pohn, Pohn Iron & Steel Co., Chicago, who retired in October as president, Chicago chapter, Institute of Scrap Iron & Steel Inc., after occupying that post for six years, was honored by the chapter recently at a special dinner meeting.

Rudolph R. Rothenberg has been appointed manager, New York office, American 3 Way-Luxfer Prism Co. Inc., Chicago.

Maj. Gen. Victor E. Bertrandias, who left his position as vice president, Douglas Aircraft Co. Inc., Santa Monica, Calif., in July, 1942, has returned and is in charge of export sales.

Stanley M. Friden, Robert E. Malone and Harding J. McGuire have been elected to the board of directors, Friden Calculating Machine Co. Inc., San Leandro, Calif. Re-elected to the board were



This drawing shows the composition of ARMCO Asbestos-Bonded sheet steel. (A) indicates the asphalt coating on the asbestos fibers (B). These are embedded in the galvanized coating (C) on a sheet of open hearth or copper steel.

here is ASBESTOS-BONDED STEEL..

Armco's Newest Coated Sheet



The newest special-purpose sheet steel for atmospheric, chemical, underground and underwater uses is "ARMCO Asbestos-Bonded Steel."

It is the sheet steel counterpart of ARMCO Asbestos-Bonded Steel Pipe

—used successfully for many years in better-grade drainage structures. Now this coated steel is available in sheet form in 16-gage and heavier.

ARMCO Asbestos-Bonded has a coating of zinc with a layer of asbestos felt that is firmly pressed into the zinc coating while it is still molten. The asbestos felt layer is then saturated with hot asphalt. The surface is relatively smooth and uniform and is off-black in color.

HAS VARIED USES

Because it has exceptional resistance to acids, alkalis, and water, ARMCO Asbestos-Bonded is ideal for products and equipment exposed to severe corrosion. These include various kinds

of industrial air conditioning equipment, chemical and salt brine tanks, marine, underground and underwater applications and railway car parts.

You are invited to test ARMCO Asbestos-Bonded sheets for your own products or equipment. Our metallurgists will be glad to work with you. For full information address: The American Rolling Mill Company, 3061 Curtis Street, Middletown, Ohio. Export: The Armco International Corporation.

SPECIAL-PURPOSE SHEET STEEL



THE AMERICAN ROLLING MILL COMPANY



C. B. SMYTHE



B. D. BEAMISH

C. T. Gruenhagen, W. S. Johnson, J. B. Lewis, John M. Lund and M. D. Webster-Martinet.

C. B. Smythe, Elyria, O., recently was elected president, Thew Shovel Co., Lorain, O., succeeding his father, the late F. A. Smythe. Mr. Smythe joined the company in 1910 and was elected vice president in 1920.

Joseph Klein, Albany, N. Y., was elected president, Capitol District chapter, Institute of Scrap Iron & Steel Inc., Albany, N. Y. Mr. Klein succeeds Milton Symansky, Symansky Bros., Watervliet, N. Y. Other officers elected include: Vice President, Louis Sirk, Trojan Scrap Iron Corp., Troy, N. Y.; secretary, Benjamin Apple, Symansky Bros., Watervliet; and treasurer, Philip Sher, Hudson Scrap Iron & Metal Co., Albany.

Ernest G. Jarvis, president, Niagara Falls Smelting & Refining Corp., Buffalo, has assumed the office of acting president, Continental Industries Inc., and Continental Services Inc., New York. James G. Murray Jr. has been elected first vice president.

Commander George Gellhorn, who left Worthington Pump & Machinery Corp., Harrison, N. J., nearly four years ago for active duty with the Navy, has been released to inactive status and has returned to resume his position as export manager with offices in the company's Harrison works.

A. D. Hannah, former chief, Forgings and Castings Section, Steel Division, War Production Board, Washington, has been elected assistant vice president, Colonial Trust Co., Pittsburgh. He assumed his duties Dec. 15 in the field of customer relations.

Charles L. Harris has been appointed manager of distributor sales, Manning, Maxwell & Moore Inc., Bridgeport, Conn. Newton P. Selover succeeds Mr. Harris as manager, midwestern district

immediately upon his release from the Navy. William F. Loos has been appointed eastern district manager, with headquarters in New York. William H. Bolin has been appointed mideastern district manager with offices in Pittsburgh, succeeding Mr. Loos.

B. Delacour Beamish, administrative vice president, National Can Corp., New York, has been elected president, director and member of the executive committee. Arthur G. Hopkins vice president, has been named to the board of directors.

James R. Allan, first assistant manager, industrial engineering and construction department, International Harvester Co., Chicago, has been appointed manager of the department, succeeding James D. McGann, who is relinquishing the post because of ill health.

Robert T. Kain, recently placed on inactive status by the Navy, has been appointed San Francisco district manager, Industrial Products Sales Division, B. F. Goodrich Co., Akron, O. Mr. Kain succeeds H. A. Schulz, who is retiring after having served the company 30 years.

E. Finley Carter, formerly vice president in charge of industrial relations, Sylvania Electric Products Inc., Ipswich, Mass., has been named vice president in charge of engineering, following the resignation of Roger M. Wise. Howard L. Richardson, formerly manager of personnel administration, becomes director of industrial relations.

Rufus K. Schriber Jr., for the past seven years building and operating plants in Europe and in South America for the General Milk Co., has returned to this country to become vice president and general manager, United States Motors Corp., Oshkosh, Wis.

H. Gottwald, for 17 years a service engineer for Pittsburgh Equitable Meter Co., and its subsidiary Nordstrom Valve Co. in the metropolitan New York ter-

ritory, has been assigned to the Rockwell International Corp. as its Latin American representative.

Charles S. Cheston, Philadelphia, has been elected to the board of directors, Monsanto Chemical Co., St. Louis. He resigned as assistant director of the Army's Office of Strategic Services two months ago.

Gene P. Robers has been appointed vice president in charge of publicity and promotion for the National Aircraft Show to be held in Cleveland, Jan. 11-20, 1946. Mr. Robers is sales promotion manager, Weatherhead Co., Cleveland, from which position he has been granted a 90-day leave of absence.

L. R. Boling has been elected treasurer, Oliver United Filters Inc., Oakland, Calif., and E. L. Oliver Jr. was appointed secretary.

C. F. Johnson has joined Watson-Stillman Co., Roselle, N. J., and he will be in charge of all engineering for the Forged Steel Fitting, and Bronze & Forged Steel Valve Divisions.

Peter V. Armstrong, industrial designer, has been named chief of the newly organized Consumer Goods Division, Federal Machine & Welder Co., Warren, O. Mr. Armstrong formerly was with H. K. Ferguson Co., Cleveland.

Paula S. Hoddeson has been appointed manager of advertising and sales promotion, Walker-Turner Co., Plainfield, N. J. For the past two years, Mrs. Hoddeson has been sales promotion manager.

John B. Anderson has been appointed assistant manager of the central district, Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J. He succeeds the late Stanley Waechter, and will have headquarters in Pittsburgh. Joseph Hoffman has been appointed representative for the southern Pennsylvania and northern West Virginia territory.

R. R. Robinson has been named assistant chief engineer in charge of engine design, Caterpillar Tractor Co., Peoria, Ill.

Henry L. Randall recently was honored by officers, staff and employes upon completion of 25 years as president, Riverside Metal Co., Riverside, N. J.

Frank E. Wartgow, formerly connected with Hasbrouck Haynes Engineers, Chicago, and American Steel Foundries, Chicago, has joined the staff of the American Foundrymen's Association. He will be occupied at the outset with arranging and staging the fiftieth anniversary foundry congress and show to be held in Cleveland in May, 1946, and thereafter will turn his attention to the co-ordination of

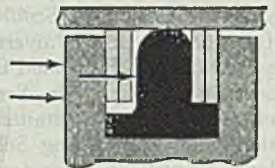
Improved

WEATHERHEAD T-RING PACKING

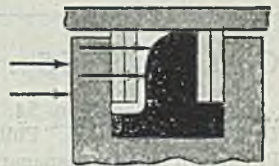
The efficiency of the T-ring Packing assembly is shown by the three cross-sectional panels below.



① Packing before pressure is applied. Note clearance between the flanges and the guard rings.



② Packing upon immediate application of pressure which swells the flange under the farther guard ring and against cylinder wall.



③ Full application of pressure. Guard rings are held tightly against cylinder wall — no binding or jamming.

Look Ahead with



Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO
Plants: Cleveland, Columbia City, Ind., Warsaw, Ind., Los Angeles
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The problem of properly sealing fluids in many types of machines is an important one. The new, improved Weatherhead T-ring Packing, recently patented, meets the requirements for both standard and special applications. This seal is available in two types and in sizes varying from ½ inch to 4 inch O. D. For information or literature write or phone any Weatherhead branch office.

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E. J. SANNE

Who has been appointed manager of sales, Tin Plate & Export Division, Inland Steel Co., Chicago, noted in STEEL, Dec. 17 issue, p. 90.



GEORGE E. DIAMOND

Who recently was elected treasurer, Washington Steel Corp., Washington, Pa., noted in STEEL, Dec. 3 issue, p. 106.



RALPH E. KRAMER

Who has been elected vice president in charge of sales, Hammond Iron Works, Warren, Pa., and noted in STEEL, Dec. 10 issue, p. 110.

the association's chapter work and programs. Herbert F. Scobie, instructor in foundry practice, University of Minnesota, Minneapolis, joined the association's staff in October. Mr. Scobie will work closely with the Committee on Co-operation with Engineering Schools and Colleges as well as other committees of the association concerned with training and educational problems.

John M. Stewart, resident manager at Pittsburgh, Hickman, Williams & Co., Chicago, has been elected to the company's board of directors. Mr. Stewart has been with the company continually

since beginning his duties at Pittsburgh, June 1, 1909.

E. J. Bush, vice president, Diamond T Motor Car Co., Chicago, has been elected president and treasurer, to succeed Charles A. Tilt, who is retiring to become chairman. C. A. Peirce, formerly vice president, has been appointed executive vice president. Sidney A. Cook, vice president and secretary, has resigned as secretary and that post is being assumed by J. F. Danielson, auditor. T. C. Huxley Jr., vice president in charge of sales for the eastern territory, becomes general sales manager, and H. C. Ember-

son, director of purchases, is promoted to vice president in charge of purchasing.

E. D. Connell, manager, merchant iron and steel department, has been elected vice president, Iron & Steel Products Inc., Chicago.

Howard Rushton has been named general manager of the Freight Car Division Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., and will have headquarters in that city. For the past nine years he has been works manager, Pressed Steel Car Co., Pittsburgh.

OBITUARIES . . .

Joseph E. Jacobson, 54, vice president, Luria Bros. & Co., Philadelphia, and Pittsburgh district manager, died Dec. 18 in Pittsburgh after a short illness. Mr. Jacobson had been with the Luria company in Pittsburgh 25 years and at one time was president, Institute of Scrap Iron & Steel Inc.

George T. Cook, 74, retired president, Sheffield Steel Corp., Kansas City, Mo., died Dec. 12 at his home at Pebble Beach, Calif.

Bryson D. Horton, 74, electrical engineer, inventor and founder-president of Square D Co., Detroit, died in that city, Dec. 14. He founded Square D in 1903 and continued as president until 1928 when he disposed of his interests.

Frank G. Luth, 53, vice president, and one of the founders, International Railway Car & Equipment Mfg. Co., Chicago, died Dec. 13 in that city.

Jesse P. Bardwell, 62, for the past 15 years sales manager, Ward Steel Co., Boston, died Dec. 9. He had been asso-

ciated 41 years with Edgar T. Ward's Sons Co., a predecessor concern, and had served also as manager of the company's Chicago office.

Albert H. Emery, 69, consulting and designing engineer and inventor of testing and weighing devices, died Dec. 12 at his home in Stamford, Conn. He became president of the A. H. Emery Co. in 1920.

Samuel B. Wardwell, 65, vice president and treasurer, Carthage Machine Co., Carthage, N. Y., died Dec. 10.

George E. Smith, 55, vice president and a director, Midvale Co., Philadelphia, died Dec. 12. Mr. Smith was with the Midvale Co. for 31 years.

William D. Woolson, 79, treasurer, Jones & Lamson Machine Co.; vice president, Fellows Gear Shaper Co.; director of Vermont Foundries Inc. and Boston & Maine Railroad, died Dec. 10, Springfield, Vt.

Rudolph A. Eidam, 46, general foundry foreman, Indiana Harbor Works, American Steel Foundries, East Chicago,

Ind., died Dec. 12 in Hammond, Ind. He had been associated with the company 28 years and in his present position eight years.

Judge M. F. Gaaney, 79, for nearly 20 years receptionist at general office of Fisher Body Division, General Motors Corp., Detroit, and prior to that active in civic and political affairs of the motor city, died there recently.

John W. Keller, 84, formerly chief engineer, General Steel Castings Corp., Granite City, Ill., died recently in that city.

Herbert G. Walker, 82, retired president of the H. G. Trout Co., Buffalo, died Dec. 10 in Los Angeles.

Joseph A. Ulmer, 73, engineer and founder, Ulmer Machinery Co., Los Angeles, died in that city recently.

Elmer N. Wahrenbrock, 51, operator of a lawn mower and lawn sprinkler equipment plant in Los Angeles, for the past 10 years, died Dec. 7 as a result of injuries sustained in an accident.

October Steel Shipments Increase

Slight gain in movement of finished products reported by American Iron & Steel Institute for the month. Shipments total for year to November under like 1944 period

FINISHED steel shipments in October totaled 4,660,237 net tons, compared with 4,391,143 tons in September and 5,752,147 tons in October, 1944, according to figures of the American Iron & Steel Institute, New York.

Most of the gain came in sheets, strip, shapes and bars, while plates and standard rails were shipped in less volume than in the prior month. Hot-rolled sheets increased from 517,337 tons to 569,056 tons, cold-rolled sheets from 237,125 tons to 301,333 tons, galvanized sheets from 124,921 to 145,151 tons, hot-rolled strip from 113,819 to 136,822 tons, cold-rolled strip from 84,351 to 104,247 tons.

Heavy structural shapes rose from 272,165 to 333,106 tons and drawn wire from 139,739 to 172,322 tons. Plates, sheared and universal, declined from 424,804 to 415,032 tons and standard

rail from 206,356 to 189,905 tons.

During October 393,060 tons of steel products were shipped to members of the industry for conversion into further finished products, compared with 435,945 tons in September.

Total shipments for the year to Oct. 31 aggregated 52,740,917 tons, compared with 58,054,060 tons in the comparable period in 1944.

Manganese Demand Steady

Demand for manganese in September was virtually unchanged from August, the Bureau of Mines reports, consumption of ferromanganese being 44,451 net tons, compared with 44,876 tons in August. A drop in output of ferromanganese in September resulted in a 4 per cent decline in consumption of man-

ganese ore. Of manganese ore consumed in September 94 per cent was used in manufacture of manganese alloys, 4 per cent in batteries and 1 per cent each in chemicals and pig iron and steel. Industrial stocks of manganese ore at the month end were 6 per cent greater than on Aug. 31.

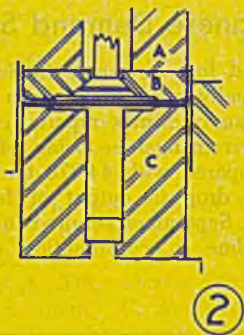
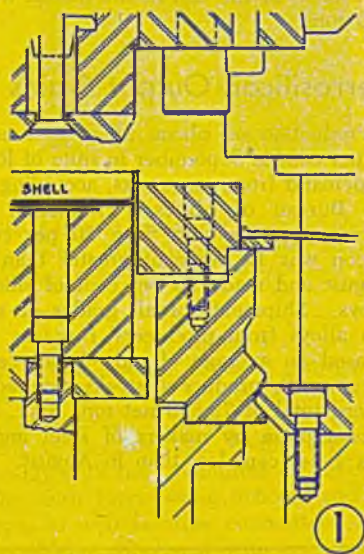
Domestic production of manganese ore containing 35 per cent or more manganese during September was 16,100 net tons, shipments 16,200 tons and producers' stocks at the end of the month were 300 tons.

Ferrosilicon Output Gains

Production of silicon alloys increased 10 per cent in September in spite of lower demand from consumers, according to the Bureau of Mines. Production of silvery pig iron with 5 to 20 per cent silicon was 17 per cent greater than in August and made 60 per cent of silicon alloys. Shipments of all grades of silicon alloys from producers' furnaces increased an average of only 1 per cent. As a result, producers' stocks reached a record total of 79,896 net tons Sept. 30. Consumption by makers of steel ingots was 1 per cent less than in August.

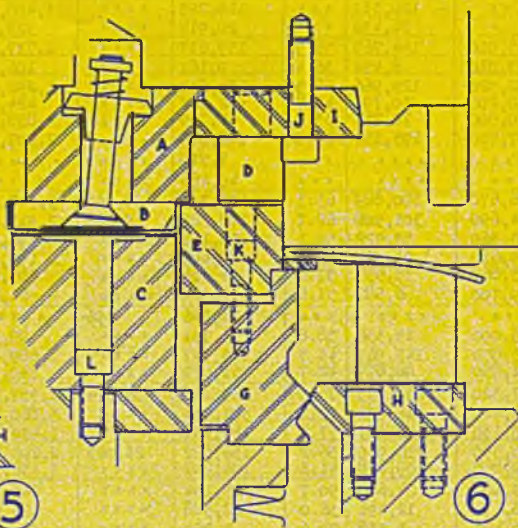
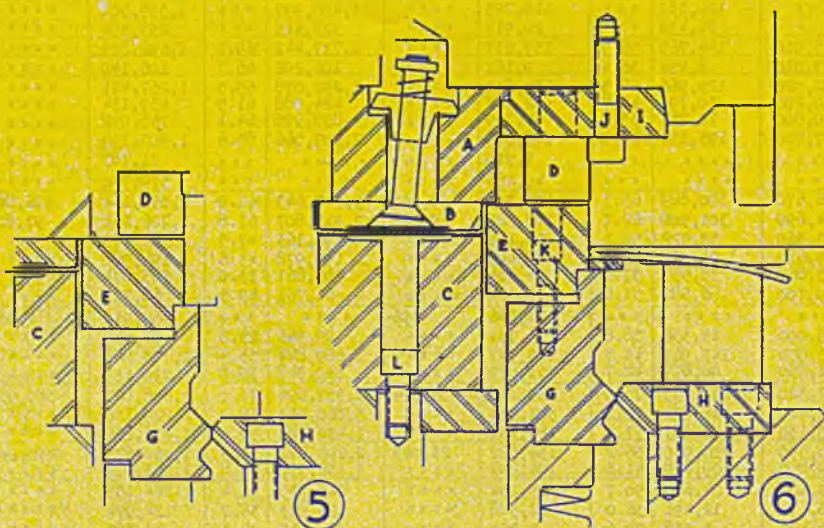
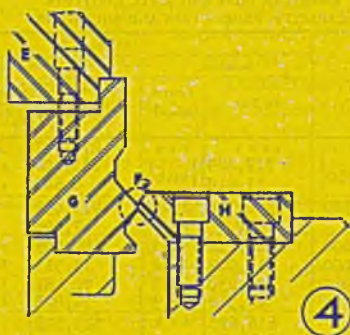
AMERICAN IRON AND STEEL INSTITUTE CAPACITY, PRODUCTION AND SHIPMENTS											Period - OCTOBER - 1945		
Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month				To Date This Year					
				Production		Shipments (Net Tons)		Production		Shipments (Net Tons)			
				Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products	Net Tons	Per cent of capacity	Total	To members of the industry for conversion into further finished products		
Ingot, bloom, billets, tube rounds, sheet and tin bars, etc.	51	1	xxxx	xxxx	xxx	271,447	132,095	xxxx	xxx	6,175,813	1,621,927		
Structural shapes (heavy)	11	2	} 5,800,550 {	317,229	} 404 {	333,106	xxxx	2,895,204	} 38.5 {	2,903,864	xxxx		
Steel piling	4	3		11,610		xxxx	8,606	xxxx		180,105	xxxx	179,855	xxxx
Plates (sheared and universal)	27	4		17,841,320		392,340	25.9	415,032		40,064	6,351,575	42.7	6,230,405	483,356
Strip	6	5	xxxx	xxxx	xxxx	47,398	22,941	xxxx	xxx	627,019	323,479		
Rails - Standard (over 60 lbs.)	4	6	3,669,000	181,251	58.1	189,905	xxxx	1,863,274	61.0	1,843,736	xxxx		
- All other	5	7	512,000	17,912	41.2	13,313	xxxx	139,897	32.8	142,088	xxxx		
Splice bars and tie plates	12	8	1,745,960	70,230	47.3	70,481	xxxx	637,743	43.9	657,945	xxxx		
Track spikes	10	9	349,400	14,382	48.3	14,828	xxxx	129,883	44.6	134,972	xxxx		
Hot Rolled Bars - Carbon	38	10	xxxx	616,623	xxx	523,328	76,242	7,005,951	xxx	5,575,501	869,739		
- Reinforcing - New billet	13	11	xxxx	74,189	xxx	72,251	xxxx	572,993	xxx	581,113	xxxx		
- Rerolled	14	12	xxxx	9,263	xxx	8,668	xxxx	64,354	xxx	70,090	xxxx		
- Alloy	24	13	xxxx	164,090	xxx	126,340	12,499	2,292,618	xxx	1,672,019	197,818		
- TOTAL	46	14	22,381,700	864,165	45.4	730,587	88,741	9,935,916	53.3	7,898,723	1,067,537		
Cold Finished Bars - Carbon	25	15	xxxx	120,333	xxx	118,723	xxxx	1,408,997	xxx	1,399,501	xxxx		
- Alloy	25	16	xxxx	24,432	xxx	20,914	xxxx	328,445	xxx	293,354	xxxx		
- TOTAL	32	17	3,015,910	144,765	56.5	139,637	xxxx	1,737,442	69.2	1,692,855	xxxx		
Total steel bars	17	18	273,010	8,454	36.4	9,161	xxxx	106,292	46.7	106,140	xxxx		
Pipe & Tubes - Butt weld	16	19	2,232,520	129,966	68.5	134,631	xxxx	1,292,078	69.5	1,267,421	xxxx		
- Lap weld	9	20	830,200	30,791	43.7	32,367	xxxx	428,988	61.5	439,134	xxxx		
- Electric weld	11	21	1,570,900	70,751	53.0	62,739	xxxx	838,995	64.1	745,052	xxxx		
- Seamless	16	22	3,377,700	195,152	68.0	148,075	xxxx	2,407,566	85.6	1,905,355	xxxx		
- Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	7,919	xxxx	xxxx	xxx	71,787	xxxx		
- Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	40,485	xxxx	xxxx	xxx	579,790	xxxx		
Wire rods	27	25	7,266,670	390,889	63.3	107,702	39,448	3,747,643	61.9	1,090,134	376,804		
Wire - Drawn	41	26	5,664,690	301,908	62.7	172,322	9,448	2,915,807	61.8	1,726,242	97,802		
- Nails and staples	19	27	1,253,360	53,322	50.1	51,141	xxxx	496,163	47.5	500,215	xxxx		
- Barbed and twisted	15	28	539,610	21,068	46.0	19,407	xxxx	199,078	43.6	194,961	xxxx		
- Woven wire fence	16	29	1,113,860	39,557	37.6	34,434	xxxx	305,861	33.0	309,874	xxxx		
- Bale ties	12	30	149,700	6,587	51.8	6,920	xxxx	61,761	49.5	68,715	xxxx		
Black Plate - Ordinary	9	31	xxxx	xxxx	xxx	76,346	596	xxxx	xxx	464,919	4,082		
- Chemically treated	8	32	465,000	15,336	38.8	13,751	xxxx	99,946	25.8	91,050	xxxx		
Tin and Terne Plate - Hot dipped	10	33	3,793,850	145,967	45.3	145,147	xxxx	1,689,844	53.5	1,773,848	xxxx		
- Electrolytic	10	34	2,231,850	80,877	42.7	69,879	xxxx	740,348	39.8	730,459	xxxx		
Sheets - Hot rolled	30	35	19,197,320	1,231,535	75.5	569,056	36,704	11,357,394	71.0	5,648,827	389,955		
- Cold rolled	12	36	7,131,460	446,871	73.8	301,333	xxxx	3,060,047	65.0	2,279,180	xxxx		
- Galvanized	16	37	2,915,130	142,087	57.4	143,151	xxxx	1,432,321	59.0	1,436,279	xxxx		
Strip - Hot rolled	24	38	7,055,390	216,960	36.2	136,822	23,023	2,205,272	37.3	1,362,675	230,031		
- Cold rolled	35	39	3,119,850	109,478	41.3	104,247	xxxx	1,136,997	43.8	1,063,071	xxxx		
Wheels (car, rolled steel)	5	40	319,400	24,620	90.7	25,154	xxxx	243,135	91.4	244,155	xxxx		
Axles	6	41	408,170	12,491	36.0	12,348	xxxx	123,013	36.2	124,974	xxxx		
All other	5	42	190,490	3,338	20.6	3,360	xxxx	38,549	24.3	35,387	xxxx		
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	4,660,237	393,060	xxxx	xxx	52,740,917	4,794,993		
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx		
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	74.6%	xxxx	xxxx	xxx	85.5%	xxxx		

"Shimmy" Dies



Straight edge trimming, with or without notches and projections, can be done in one operation on Brehm dies. Variety and sizes handled ranges from small, round ferrules, and women's gold wrist watch cases to stainless steel beer barrels, ends of burial vaults and electric refrigerator doors

By JOHN PARINA JR.
Assistant Editor, STEEL



PERFECTLY flat and straight edges on round, square or irregular shaped shells can be obtained with the Brehm trimming die in one press stroke operation. Furthermore, the edges are free of burrs, or vertical fins. These dies, designed and made by Steel Products Engineering Co., Springfield, O., can trim brass, zinc, stainless steel, mild steel—in fact, any material that can be drawn—in metal thicknesses from 0.005-in. brass to 0.218-in. steel.

Production rates attained with small shells are reported to be 1000 to 1200 per hour with air equipped dies. Larger articles such as electric refrigerator doors have been trimmed at the rate of 125 per hour. Excellent uniformity of depth of the trimmed shells is maintained even at high production rates. Watch cases, for example, are held within a tolerance of plus or minus 0.001-in., while larger deep drawn shapes are held within plus or minus 0.003-in.

This attainment of uniform depth is possible because shells are gaged from the inside, and the shells are held in a stationary position during trimming. The shell is firmly pressed against a gage member, which fits within the shell to the desired depth, by a spring ejector. Also, the cutting action increases pressure of shell against gage member.

Cutting edges of punch and die are very similar in construction to those of the blanking die. Cutting action, however, is considerably different. Instead of the cutting member moving in a vertical direction with the cutting clearance between the punch contour and the die opening, the punch of the Brehm trimming die fits the inside of the shell, and

its downward travel is converted into a horizontal shearing thrust by lateral movement of the die plate toward the punch. This cutting action can be better explained by reference to Figs. 1-6, which delineate the construction and function of these dies.

Fig. 1 illustrates the relative position of the die's components to the shell before descent of the punch.

Figs. 2-6 show the functions of these parts during the cutting action. As the die closes, Fig. 2, the snug-fitting movable gage member "B" presses the shell against the supporting spring-actuated ejector "C". This ejector in turn is forced down, Fig. 3, until the pressure studs "D" surrounding the punch rest on the die face "E". Depth of the gage member is equal to that of the trimmed part whereas length of the studs is slightly greater than that of the punch "A" in order that proper cutting clearance be provided. During the cutting action, the studs "D" rest on the die surface and thus maintain the punch at right angle to the work and the die face.

As the press makes its downward stroke, a series of cams are brought into action at the point "F", Fig. 4, to transfer the direction of the applied force from a vertical to a horizontal plane. This lateral movement manifested by "G" carries "E", Fig. 5, toward the center and past the cutting edge of the punch "A", thus shearing away that portion which extends above the die face. The relative positions of the components during this cycle are shown in Fig. 6. By the time the down stroke is completed, all of the cams have operated in moving the die toward the punch from various consecu-

tive directions to shear away portions of the scrap. These portions of the trimmed edges blend together without points of demarcation to produce a smooth edge.

Cutting clearance, obtained by grinding the punch shorter than the studs, is one of the factors in producing straight edges without burrs. The nature of the cutting action of these trimming dies is similar to that obtained with blanking dies; the inner portion of the edge is cut while the outer is fractured. Elimination of burrs is attained with this fracture of the surface material. If burrs should result from dull cutting members their location will be on the outside corner of the edge and consequently can be easily removed.

When dies are ground for resharpening, the die plate "E" is surface ground to perfect flatness. The pressure studs and the punch to be resharpened are also surface ground. And, not only must the cutting edges be sharp and the proper clearance be provided, but the ground faces

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Fig. 1—Brehm die in open position with shell in place for trimming

Fig. 2—Die closed, gage member "B" holds shell in stationary position by pressing it against spring ejector "C"

Fig. 3—Ejector depressed until studs "D" rest on die face

Fig. 4—Cams in region "F" transfer downstroke of press to a lateral movement of "G"

Fig. 5—Lateral movement of "G" carries "E" past cutting edge of "A"

Fig. 6—Relative position of components during cycle

Fig. 7—Die used to trim five different sizes of refrigerator doors. Die also notches corners to aid subsequent forming of inside flanges

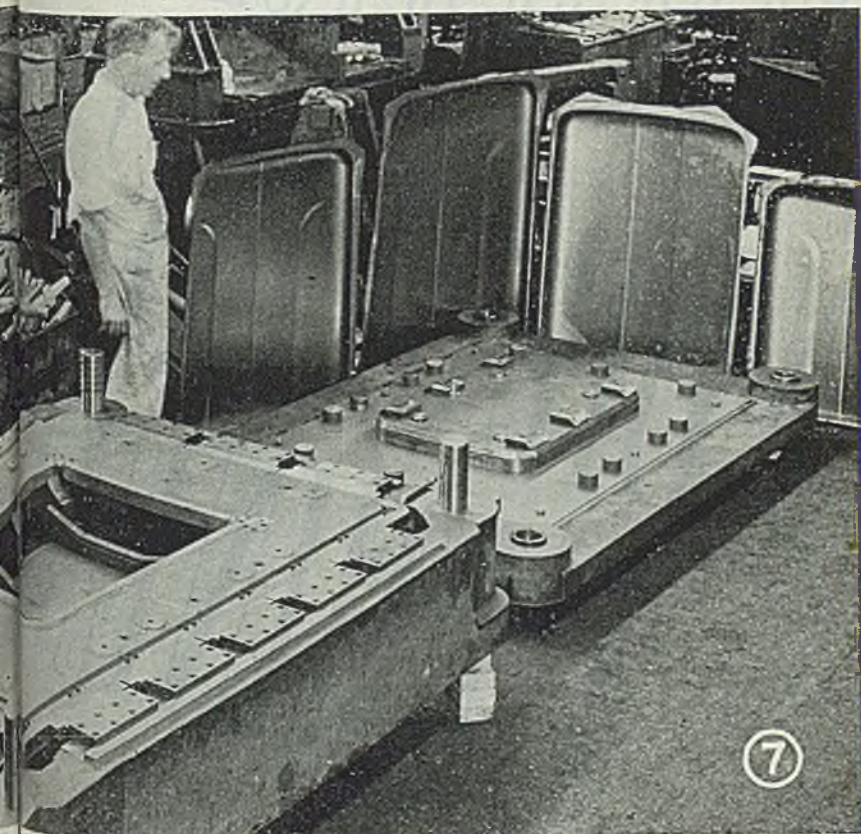
Fig. 8—Example of notches and projections which can be obtained on shell edges with "shimmy" dies. Material of this rectangular shell is 0.040-in. aluminum

Fig. 9—Example of notches and projections which can be obtained on shell edges with "shimmy" dies. Material of this rectangular shell is 0.040-in. aluminum

Fig. 10—Example of notches and projections which can be obtained on shell edges with "shimmy" dies. Material of this rectangular shell is 0.040-in. aluminum

Fig. 11—Example of notches and projections which can be obtained on shell edges with "shimmy" dies. Material of this rectangular shell is 0.040-in. aluminum

Fig. 12—Example of notches and projections which can be obtained on shell edges with "shimmy" dies. Material of this rectangular shell is 0.040-in. aluminum



Frictional characteristics of aluminum during drawing frequently result in loading or fouling tools, despite small force required for plastic deformation of many alloys. Various combinations of lubricants used to alleviate this tendency, as well as tool design for minimizing ironing and other factors are here discussed by the author. In STEEL for Dec. 31, Mr. Spring deals with problems of lubrication in drawing magnesium

By SAMUEL SPRING

Chemist
Frankford Arsenal
Philadelphia

ALTHOUGH forces required for plastic deformation of many aluminum alloys are considerably less than those required for steel or brass, lubrication difficulties during drawing are by no means greatly reduced. In fact, there is frequently more trouble due to loading or fouling of tools with these metals, especially with pure aluminum or its alloys in their softer condition.

In its more academic form, a discussion of the frictional properties of aluminum may be presented by comparing the coefficient of friction for aluminum against steel with that for various other metals. This is done in Table I. It may be seen that the coefficient of friction for aluminum against steel is considerably higher than for any of the other metals. In addition, Gemant¹ reports the coefficient of friction of aluminum against aluminum to be about 1.4, which is the highest value recorded for the series of metals investigated. It may be considered that when aluminum is deposited on the tools during drawing there are, in effect, two aluminum surfaces in contact.

At first glance, these frictional characteristics appear to be inconsistent, as aluminum forms tenaciously held coatings of oxide much more readily than many other metals. It has been established fairly conclusively that oxide coatings prevent welding between portion of the metal surfaces in contact and thus serve as efficient lubricants². However, in this case there is found a fairly soft metal covered with a hard and brittle oxide deposit. Upon subjecting aluminum to a deformation process, the oxide deposit is probably cracked at various spots and the soft metal underneath extruded through to the surface. Because of the ready formability of the metal, this permits easy and close contact between the metal surfaces, which results in welding. These welded regions, upon reaching sufficient dimensions, would manifest themselves as build-up on the tools³, which causes scoring and galling of pieces drawn subsequently. This mechanism is based on hypotheses by Egeberg and Promise⁴, who obtained confirmatory evidence for nickel, and Rosenberg and Jordon⁵, who presented considerable evidence for this action on mild steel. Aluminum being a softer metal would be even more susceptible

to these effects than nickel or steel.

Effect of Metallurgical and Engineering Factors: Effect of these factors has been given considerable emphasis by Jevons⁶ and Weber and his co-workers^{7, 8}. However, it is desirable to give a brief resume of some of the most important factors that influence lubrication, such as those that increase forces

required for drawing, tendency toward loading of tools, and the tendency toward breakage. Other difficulties—such as the tendency to pucker or wrinkle—are particularly affected by the hardness of the sheet but no information is available on the influence of lubrication on this tendency.

An estimate of the relative forces required for deformation and of ductility can be gleaned by examination of Table II, which condenses data on mechanical properties and composition of the most generally used aluminum alloys. These data are taken from the publication of Weber and his co-workers.

Commercially pure aluminum (2S) and, to a lesser extent, the manganese alloy (3S) are the most ductile and can be most severely deformed. Operations involving ironing should be kept to a minimum with the other alloys even though a larger number of operations are made necessary. Coupled with the high ductility of pure aluminum is a very low rate of work-hardening. This permits a number of severe draws without intermediate anneals although the tendency for

Lubrication IN DRAWING ALUMINUM

tearing of the metal and for loading of the tools is greater for this metal under these conditions. In connection with these effects, it is sometimes desirable to draw metal that has already been partially cold worked, e. g., one-quarter hardness, in preference to the dead-soft metal. This frequently reduces the tendency toward loading of the tools¹. Another reason for this practice is to keep out of the range of critical-strain crystal growth, which has been discussed in considerable detail by Jevons².

Physical properties of the non-heat-treatable aluminum alloys, such as 2S, 3S, 4S and 52S, can be improved only by cold working. If high physicals are required, it usually is necessary to draw the metal in its hard condition with attendant increases in lubrication difficulties, which require resolution for good performance.

Where higher physical properties are required, it is more customary to utilize the heat-treatable alloys, such as 17S, 24S, 53S or 61S. Even in these cases it is desirable to heat-treat to an intermediate temper and attain the finally

TABLE I
COEFFICIENT OF FRICTION OF VARIOUS METALS RUBBING AGAINST MILD STEEL²

Metal	Coefficient of Friction
Tin	0.18
Cadmium	0.24
Nickel	0.32
Lead	0.33
Bismuth	0.27
Copper	0.36
Silver	0.51
Aluminum	0.74 to 1.0

desired physical properties by a cold-working operation. This is so because of the considerable tendency for distortion during the quenching process. Under these conditions, again, it is necessary to pay prime attention to lubrication because of the high forces required for deformation of these hardened alloys and because of their low ductility.

In this respect, a redeeming feature in the properties of heat-treatable alloys is their delayed age-hardening, after heating to effect solution of insoluble constituents, followed by rapid quenching. This per-

mits the drawing of the metal before it hardens, after which high physical properties are attained upon appropriate aging. Under these conditions, every attempt should be made to perform the forming operations before age hardening occurs. To increase the time during which advantage can be taken of this property, it is frequent practice to store the metal at low temperature, including its transportation in refrigerated cars. For every severe forming operations, however, it is not possible to use these alloys in the as-quenched conditions and it is necessary to thoroughly anneal the alloy before forming.

Wherever possible, aluminum alloys should be annealed between forming operations. Temperature of recrystallization is influenced by amount of cold work, but many additional factors, too involved for the present discussion, must be considered. As in drawing operations on all metals, the extent of lubrication difficulties are frequently dependent on the skill and control exercised in annealing operations. On the other hand, al-

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TABLE II
PROPERTIES OF ALUMINUM ALLOYS^{*, 10}

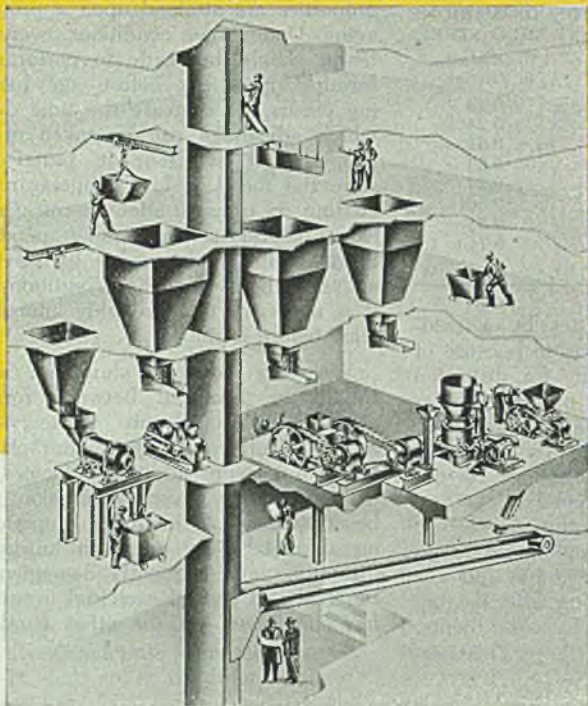
Alloy and Temper†	Mechanical Properties				Composition ²				
	Ultimate Strength psi	Yield Strength psi	Elongation % in 2 in.	Brinell Hardness 500 Kg. 10 mm. ball	Cu	Si	Mn	Mg	Cr
2S-O	13,000	5,000	35	23	...	...	...	...	...
2S-1/4H	15,000	13,000	12	28	...	...	...	...	...
2S-1/2H	17,000	14,000	9	32	...	...	...	...	...
2S-H	24,000	21,000	5	44	...	...	...	...	...
3S-O	16,000	6,000	30	28	...	...	1.25	...	...
3S-1/4H	18,000	15,000	10	35	...	...	1.25	...	...
3S-1/2H	21,000	18,000	8	40	...	...	1.25	...	...
3S-H	29,000	25,000	4	45	...	...	1.25	...	...
4S-O	26,000	10,000	20	45	...	...	1.25	1.0	...
4S-1/4H	31,000	22,000	10	52	...	...	1.25	1.0	...
4S-1/2H	34,000	27,000	9	63	...	...	1.25	1.0	...
4S-H	40,000	34,000	5	77	...	...	1.25	1.0	...
17S-O	26,000	10,000	20	45	4.0	...	0.5	0.5	...
17S-T	62,000	40,000	20	100	4.0	...	0.5	0.5	...
17S-RT	65,000	47,000	13	110	4.0	...	0.5	0.5	...
24S-O	26,000	10,000	20	42	4.5	...	0.6	1.5	...
24S-T	68,000	45,000	19	105	4.5	...	0.6	1.5	...
24S-RT	70,000	55,000	13	116	4.5	...	0.6	1.5	...
52S-O	29,000	14,000	25	45	...	...	...	2.5	0.25
52S-1/4H	34,000	26,000	12	62	...	...	...	2.5	0.25
52S-1/2H	37,000	29,000	10	67	...	...	...	2.5	0.25
52S-H	41,000	36,000	7	85	...	...	...	2.5	0.25
53S-O	16,000	7,000	25	26	...	0.7	...	1.3	0.25
53S-W	33,000	20,000	22	65	...	0.7	...	1.3	0.25
53S-T	39,000	33,000	14	80	...	0.7	...	1.3	0.25
61S-O	18,000	8,000	22	30	0.25	0.6	...	1.0	0.25
61S-W	35,000	21,000	22	65	0.25	0.6	...	1.0	0.25
61S-T	45,000	39,000	12	95	0.25	0.6	...	1.0	0.25

*Remainder aluminum containing normal commercial impurities.

†Temper designations are:

- O = annealed (dead soft)
- H = Hardness (induced by cold working)
- T = Fully heat treated temper
- RT = Temper obtained by additional cold working after heat-treatment
- W = As-quenched temper after aging at room temp.

Research Center



Mining, milling and processing industries will be served by extensive new research facilities of Allis-Chalmers Mfg. Co. Flexible pilot mill 4-stories high feature of layout

Fig. 1—Three-dimensional cutaway drawing of pilot plant. Materials processed go from pilot plant to other laboratory departments for testing

NEW research facilities — the most extensive ever developed for the basic industries—are serving mining, milling and processing interests of the United States and many other countries in the Allis-Chalmers Mfg. Co.'s greatly expanded program of laboratory testing at Milwaukee.

Special sections designed to handle the specific problems of concentration, recovery and processing of almost every kind of industrial basic raw material enable Allis-Chalmers engineers to make

recommendations which can be expected to avoid costly errors of process or design in the equipment installations involved. Ores and minerals, portland cement, and many other raw materials undergo tests which continually promise to increase their value or utility.

Among the complete facilities for both milling and mining operations is a flexible pilot mill four stories high, while later additions to the new laboratories which have been under construction for the past two years will include an ex-

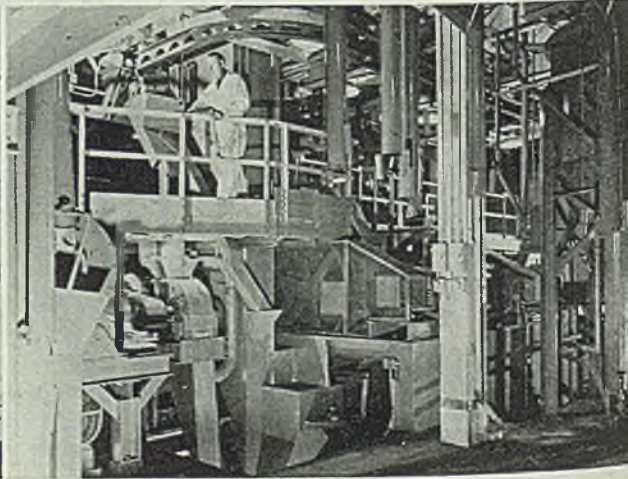
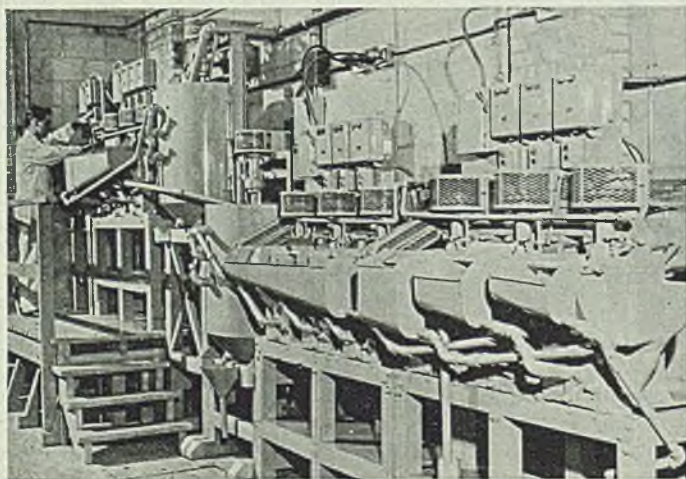
perimental kiln 30 ft long. From floor to floor of the pilot mill samples of from 500 lb to 10 tons flow through crushing, grinding, concentrating and pyro-processing sections, as technicians analyze the effect of the great variety of machinery on the raw materials involved. Simulating as closely as possible the actual plant operation, the pilot mill consists mostly of machines of actual commercial design in small capacity size.

Where a flow of materials is not involved, batch testing facilities supply the answers. Samples of from 25 to 50 lb are put through various processes in

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Fig. 2 (left)—Two-mineral flotation circuit for differential flotation in kiln room receives wet mixtures from either grinding mills or thickening tank. Spiral rake classifier, air separator, wet and dry magnetic separators, and sink-float machines are also part of separation equipment

Fig. 3 (right)—Portion of ground floor of 4-story pilot plant equipped with 54-ft elevator to carry ore from crushers on this floor to three 10-ton hoppers three floors above



Electronics

Are no longer an engineer's dream

By E. H. ALEXANDER

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General Electric Co.
Schenectady, N. Y.

THE future of industrial electronics can best be predicted and influenced by extending the existing uses of electronics. Often, we are hardly conscious of progress being made right before our eyes but after a short time—even a few months in the electronic art—we look back and are surprised to see how fast we are progressing. Few branches of engineering can claim less elapse of time between the engineer's dream and the finished, working article, than electronics.

Microwaves: One of the most thought-provoking fields for future growth is the use of microwaves for industrial purposes. The great strides made during the war with microwaves (radar) for detection, direction, recognition and navigation open a new field. These ultra-high frequency radiations have some promise of supplanting light beams now used with photoelectric relays and their unique transmission possibilities of being "piped" around corners are interesting.

Such waves (in the vicinity of 3000 megacycles) can be polarized, reflected and absorbed, suggesting some of the properties of light. For instance, the transparency of paper, thin wood and coarse wire screens to these waves compared with the opaqueness of wet paper, wet cloth and fine wire screens suggests many uses. Just one is a moisture-content controller for a continuous process industry. A thickness gage is another possibility. Any metal surface reflects the microwave beam; it need not be a polished surface. Although the human body absorbs the waves, it will also reflect waves of sufficient intensity.

Already several future industrial applications of this new electronic tool are in developmental stages. The principle of the proximity fuse, for example, developed for explosive shells might find application in railway signaling or train control, who knows.

Dielectric Heat: Stepping down a little in the frequency spectrum, from 3000 megacycles to the range of 3 to 40 megacycles, we find electronic sources for dielectric heat increasing the productivity of many machines or processes and, indeed, the worker himself. Notably, the use of dielectric heat in the plastics molding industry has been gratifying. Preheating of "stills" or "preforms" increases the product of the

machine; allows the same piece to be molded on a smaller press; and improves the quality of the finished piece. The drying of synthetic and natural fibers or yarn, while in continuous motion, seems justified because of improved quality and tensile strength. Even food technologists are looking to this source of internal heat for de-hydration and sterilization of food products.

Electronic Motor Control: Controlled electronic rectifiers have been used to supply regulated power to dc motors for more than 18 years, but only within the past four years has a packaged system for a complete, wide-range, variable speed drive come into its own. During this short period of rapid expansion we have seen a previous limit of 15 hp extended to an operating installation of a 40-hp drive. Now a 75-hp drive is in the building and we already look with eagerness to a prospective 600-hp drive. Electronic motor control for ship propulsion and even main-line locomotive drives is in the offing.

Electronic Inspection of Surfaces: The technique of the television camera has been suggested as a means for the inspection of surfaces of materials in motion such as strips of metal, cloth and rubber. There are, of course, many problems to be solved, particularly what to do with a signal of imperfection. However, no apparently insurmountable object stands in the way of accomplishment. Who knows but what centralized quality control system of the future will have instantaneous and integrated pictures at one central point of the quality of several remote continuous processes. The accomplishment of this feat stands a much better chance, in my opinion, than, for instance, the radical improvement of the induction motor or the power transformer.

Electronic Control of Resistance Welding: Experience has proved that America's high standards of living have resulted in large measure from increased productivity of the worker. Perhaps no single tool of fabrication has contributed more to this increased productivity than electronically controlled resistance welding. In 1930, the production of steel evaporators for domestic refrigerators was increased by 400 per cent by this method of fabrication. In 1932 it made

the use of stainless steel economically possible. Aircraft subassemblies, parts of high explosive shells, and the indispensable electronic tube were all made by this precision method of heat and pressure control.

Now, air-hardenable steels are joined by resistance welding, next annealed, and then tempered in one continuous sequence of precision-controlled events. It isn't careless speculation to predict that in the future the fabrication of large steel buildings and ships will be by this method. And *because of electronics* every joint will "write" on a permanent record its own certification of strength. An electronic weld recorder will do the job.

The versatility of resistance welding, when controlled electronically, offers tremendous possibilities for the future.

Light Sources: Although one has been inclined to neglect light sources as electronic devices, because of the incandescent predominance, such sources of light are coming into prominence. Beginning with the early neon-sign lighting, followed by sodium vapor and mercury vapor highway lighting, the fluorescent lamp appeared. The germicidal lamp and the Circleline and Slimline are more recent additions. All of these sources of light are electronic devices and their development reminds us that electronics will play a definite part in the future of light sources.

It is only natural to be enthusiastic about the future of electronics. After all, the electron is one of constituent particles of the atom and all of us have heard recently of great things going on in the exploitation of atomic energy. We need only, however, to concern ourselves with electrons freed from the bondage of matter, which is the science of electronics, to predict a bright future for this particular field of engineering.

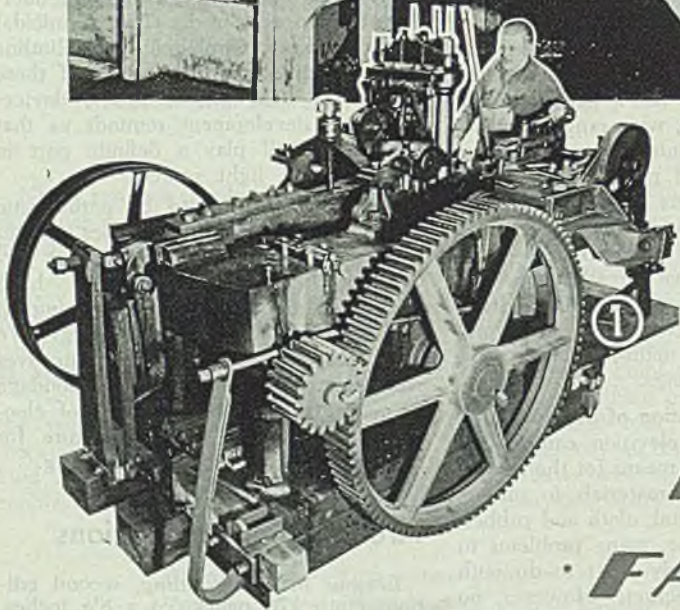
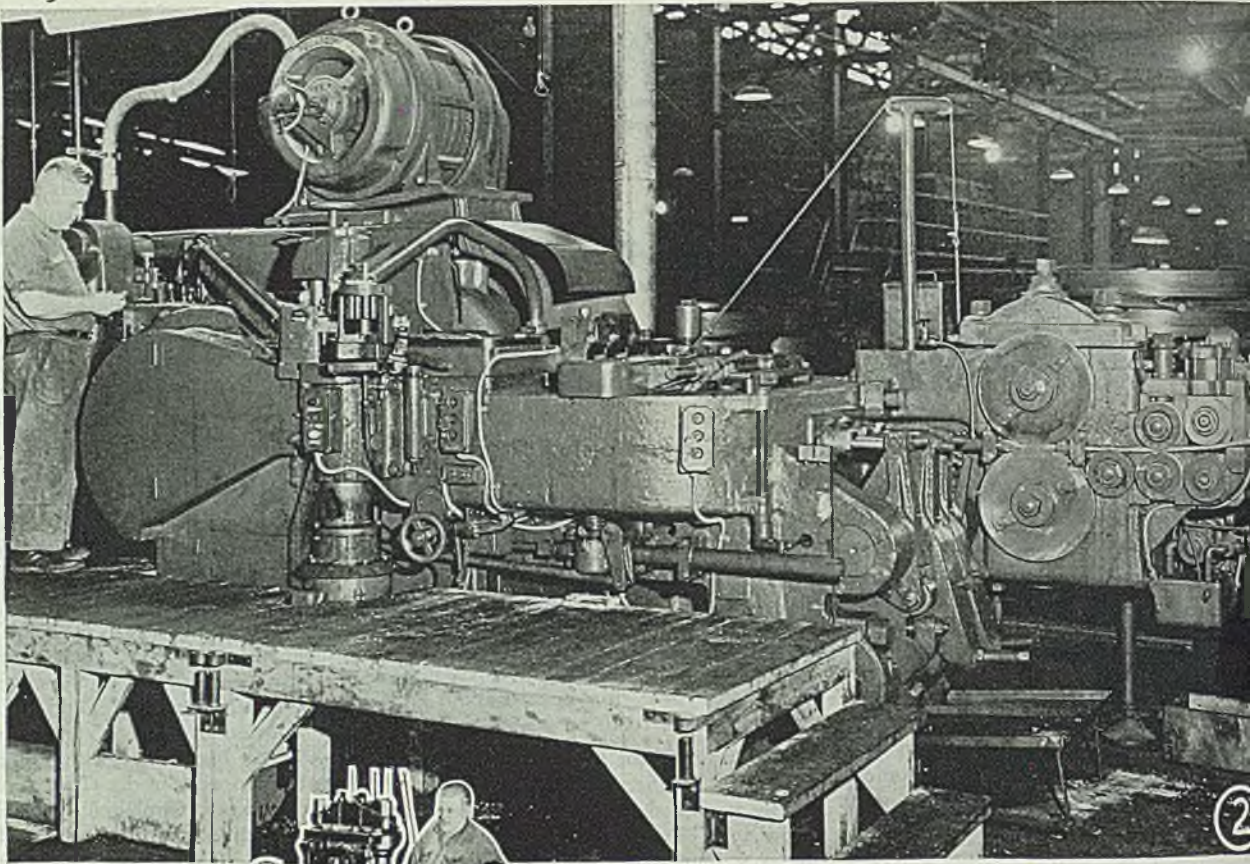
Arc Welding Instructions

Lessons in Arc Welding, second edition; cloth 176 pages 5½ x 8½ inches, published by Lincoln Electric Co., Cleveland 1, for 50 cents in the United States and 75 cents elsewhere.

This second edition is a revised print designed to assist both new and experienced welders as well as all persons interested or concerned with the subject, with complete instructions in all phases of arc welding.

It includes 61 lessons and has 200 photos and illustrations to supplement the text. The lessons set forth in simple language the practical instruction given in the Lincoln arc welding school. The closing pages contain 571 examination questions and answers relating to the lessons.

Explanation is given of the fundamentals of this method of joining metals by the fusion principle and incorporates much new information, such as how to apply the latest types of electrodes and welding techniques developed during the war.



100 Years IN MAKING FASTENERS

Continuous boltmakers and other automatic equipment now used represent great advance in production methods from a century ago when the founders of the Russell, Burdsall & Ward Bolt & Nut Co. rented a room and a lathe in a button shop and started the manufacture of wood screws

SINCE the day nearly a century ago when supremacy of the "Philadelphia bolt" was seriously and successfully challenged by a young mechanic, William E. Ward, and his bookkeeping partner, Ellwood Burdsall, both Quakers, advancement and progress in production of bolts, nuts and other metal fastenings has closely paralleled that of the company they founded, Russell, Burdsall &

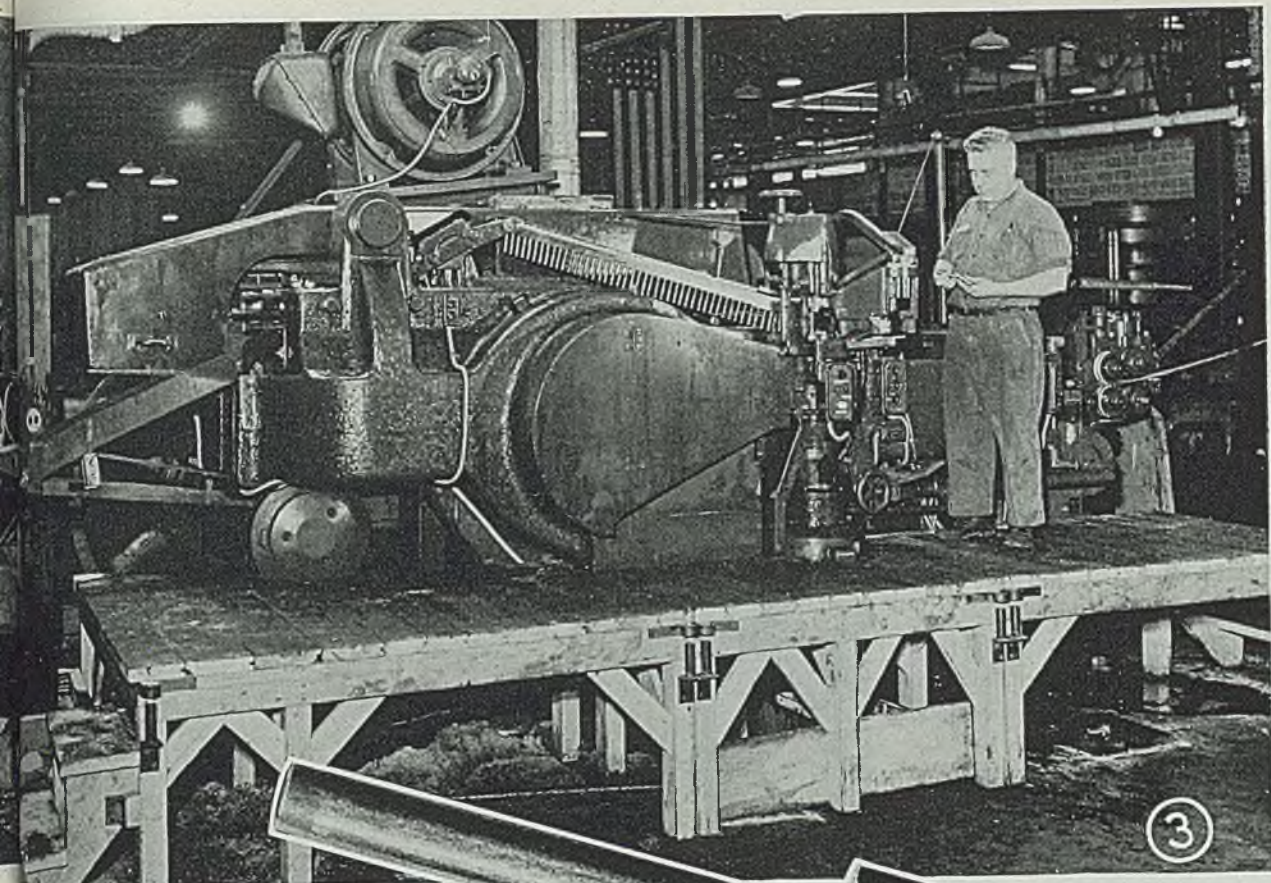
By L. E. BROWNE
Associate Editor, STEEL

Ward Bolt & Nut Co., this year observing its 100th anniversary.

Their first ace was a bolt fitted with a forged nut produced by machinery, a development in cold-heading which has gone far, although some basic principles introduced by young Ward in his original machine are still in-

corporated in modern mammoth cold-heading machinery. Nor did young Messrs. Burdsall and Ward hide their light under the proverbial bushel, in 1867, addressing the carriage and tire bolt trade, they stressed superiority of their stock and finish, thoroughly forged nuts by machine, proclaiming to the world:

"This wins them a confidence which ever they are used, equal to that



of Progress

joyed by the Philadelphia bolts, which are sold by a list about 25 per cent higher than the standard list we sell by, and which even at the same discount leaves a large margin in favor of the purchaser of our bolts."

To openly challenge the Philadelphia bolt then in some parts might have appeared presumptuous, but the young men had the product after 21 years of "exclusive labor bestowed on facilities for their special production, and in experiments to discover the kind of iron best adapted to making the most reliable bolts".

Like several Connecticut metal-working plants, this company's origin was in a button shop at Pemberwick, Conn., the main business being that of making buttons from oyster shells, although Messrs. Ward or Burdsall never made buttons. In 1845 they hired a room and a lathe in the shop and started manufacture of wood screws. They did well, but a gimlet-

Fig. 1—Invention of an automatic bolt cold-header by William E. Ward around 1850 marked an important step forward in the production methods employed by the fastener industry. Prior to 1847, most bolts were made by a blacksmith with hammer, anvil and vise. Contrast this machine with the one shown in Figs. 2 and 3 which forms and threads a completed bolt in one continuous operation

Figs. 2 & 3—This modern bolt-maker makes completed bolts, screws and similar products in one continuous operation in sizes up to 1-in. in diameter. Wire is fed into the machine from coils, cut off and extruded to the required body diameter and bulbed; section to be threaded is further extruded and the head formed; headed, trimmed, pointed and roll-threaded. The fastener industry as a whole uses 2½ per cent of total production annually, making millions of pieces per day in 250,000 kinds of sizes

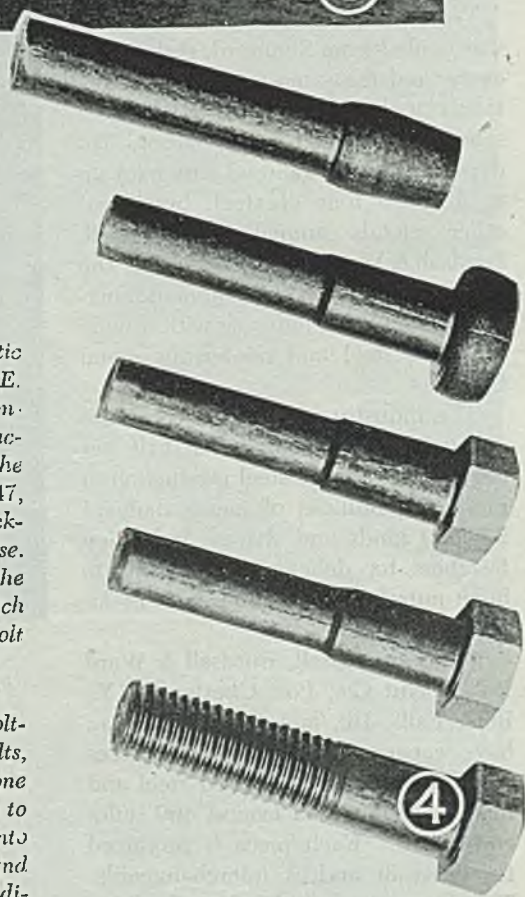


Fig. 4—Steps in continuous production of bolt in machine shown in Figs. 2 and 3

pointed screw was patented which proved superior to their product. Soon they began production of the first stove bolts and nuts ever made. A New York stove manufacturer had told Burdsall that iron bolts, if fitted with nuts, could be used to assemble this product. Ward invented the machine to make the fasteners.

Burdsall became a salesman, billing clerk and correspondent, relinquishing his bookkeeper's stool, while Ward kept right on inventing new improved machinery for production of bolts and nuts for Burdsall to sell. Isaac D. Russell joined the firm in 1851. He was Burdsall's brother-in-law and it was in his firm's oyster shell button shop the original company first started producing wood screws.

By 1850 Ward had designed, built and patented the first automatic cold-heading machine. This machine and subsequent improvements by the young mechanic placed the company into a position of leadership in the industry which it continues to hold.

With horse and wagon, bolt iron was hauled from Stamford, eight miles away, and the same type of transportation took the finished product to schooners in Port Chester harbor. Today hundreds of railroad cars haul up to 130,000 tons of steel, brass and other metals annually to Russell, Burdsall & Ward plants, fodder for the maw of hundreds of automatic machines supplying industry with a wide range of steel and nonferrous metal fasteners.

The industry as a whole consumes approximately two and one half per cent of the nation's steel production in producing millions of pieces daily of 250,000 kinds and shapes, from tiny fasteners for delicate mechanisms to huge nuts for the running gear of locomotives.

Plants of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., Rock Falls, Ill., and Coraopolis, Pa., have capacity for 15,000,000 pieces per day requiring processed steel and metal which would extend 400 miles end-to-end. Each piece is produced for close fit and is interchangeable. The automatic cold-heading machine is the basis for this tremendous production at ever closer tolerances.

At Port Chester is located the oldest and largest plant, outgrowth of the first shop at nearby Pemberwick, Conn. The Rock Falls plant was acquired in 1907 and since greatly ex-

panded. The largest in the world devoted entirely to production of nuts, the Coraopolis plant was completed in 1928 and is especially designed and equipped for making nuts.

Basically, Ward's first cold-header embraced the same principles incorporated in the machines of varied design operated automatically today. His header cut bolt stock to desired length, gripped the piece in a die where it is struck by a ram forcing the metal to take form of the punch. Completion in bolt fabrication varies in sequence of operations, depending on equipment and Russell, Burdsall & Ward first devised a system by which ma-

chines required for threading, pointing and other work were lined up in tandem, an automatic conveyor taking bolts from one machine to another. Now modern cold-heading machines fabricate raw stock into a finished bolt in one continuous operation.

Nut blanks are produced at the rate of 1000 a minute in the ¼-in. square size; larger machines punch the hole in rectangular bars, cut off the nut blank, form the chamber, retrim, repunch in one operation and burnish. Small sizes, weighing only a fraction of an ounce, to large nuts weighing 25 pounds, are included in

(Please turn to Page 112)

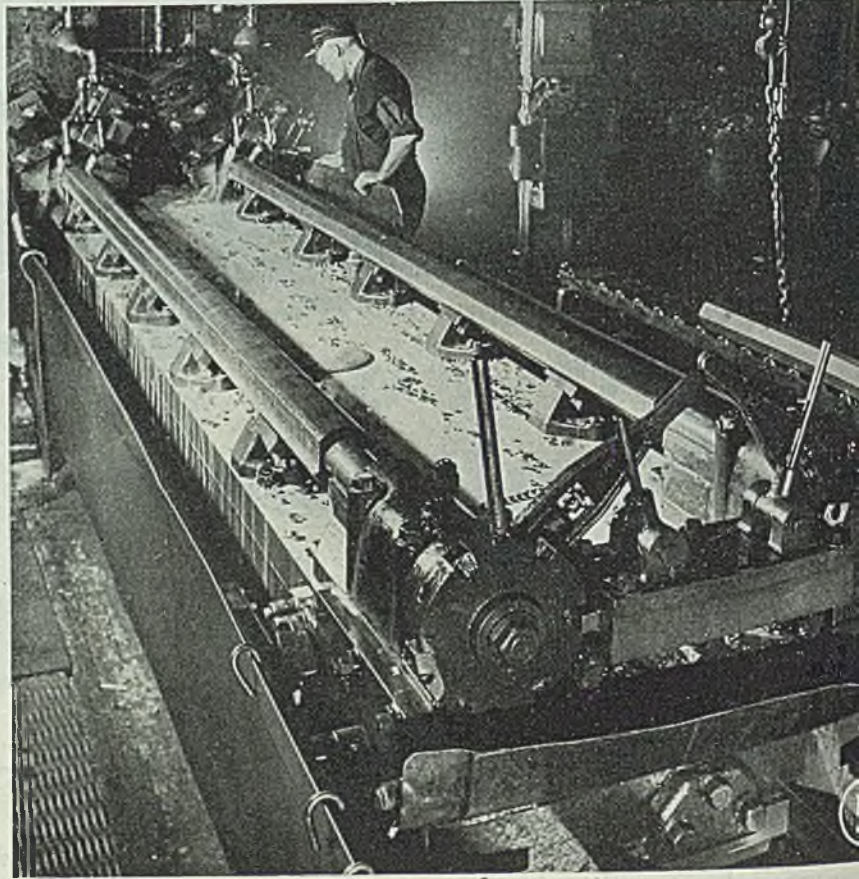
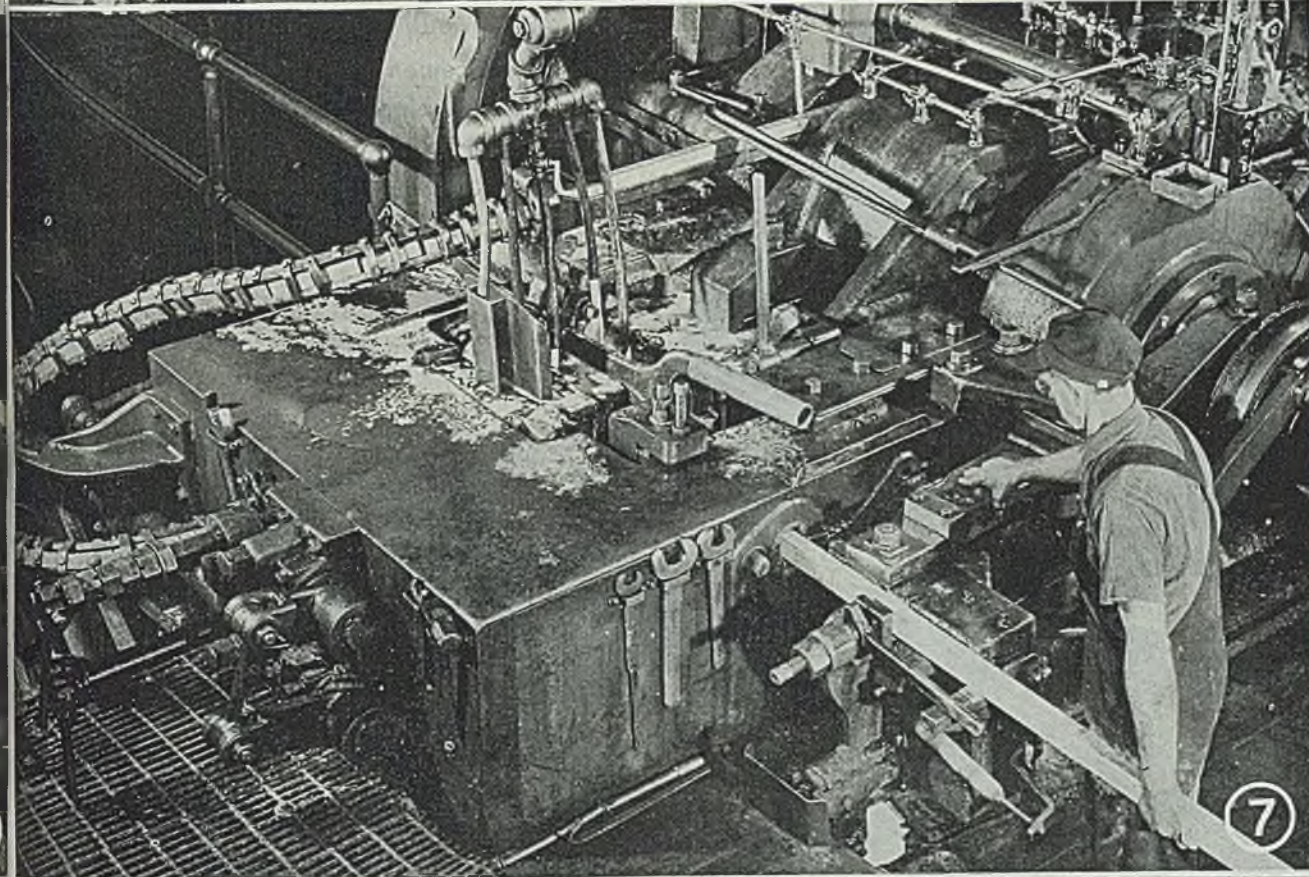
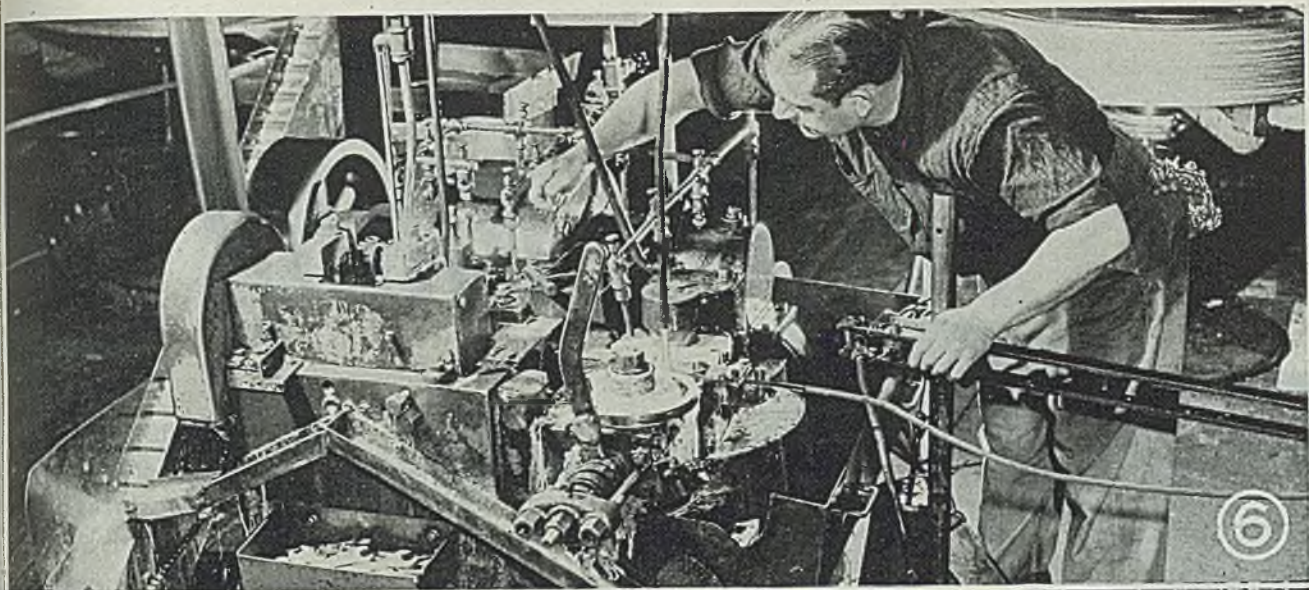


Fig. 5—Hot-forged round bars are planed to a hexagonal shape on this mammoth planer, prior to fabrication of nuts in larger sizes

Fig. 6—This high-speed machine produces 1000 square nuts per minute. In doing so, it chews up a ton of steel every three hours

Fig. 7—Fed rectangular bars, this machine punches the hole, cuts off the nut blank, forms the chamfer, retrim to clear the hole and burnishes the sides. It is the largest of its type, making cold-punched nuts measuring 2½-in. across the flats. It performs every operation except tapping

Fig. 8—These batteries of continuous, bent-shank nut tappers, designed by Russell, Burdsall & Ward, are used for tapping small nuts. For larger sizes another type developed by the company is used. Tap is held rigid and blanks are fed to it



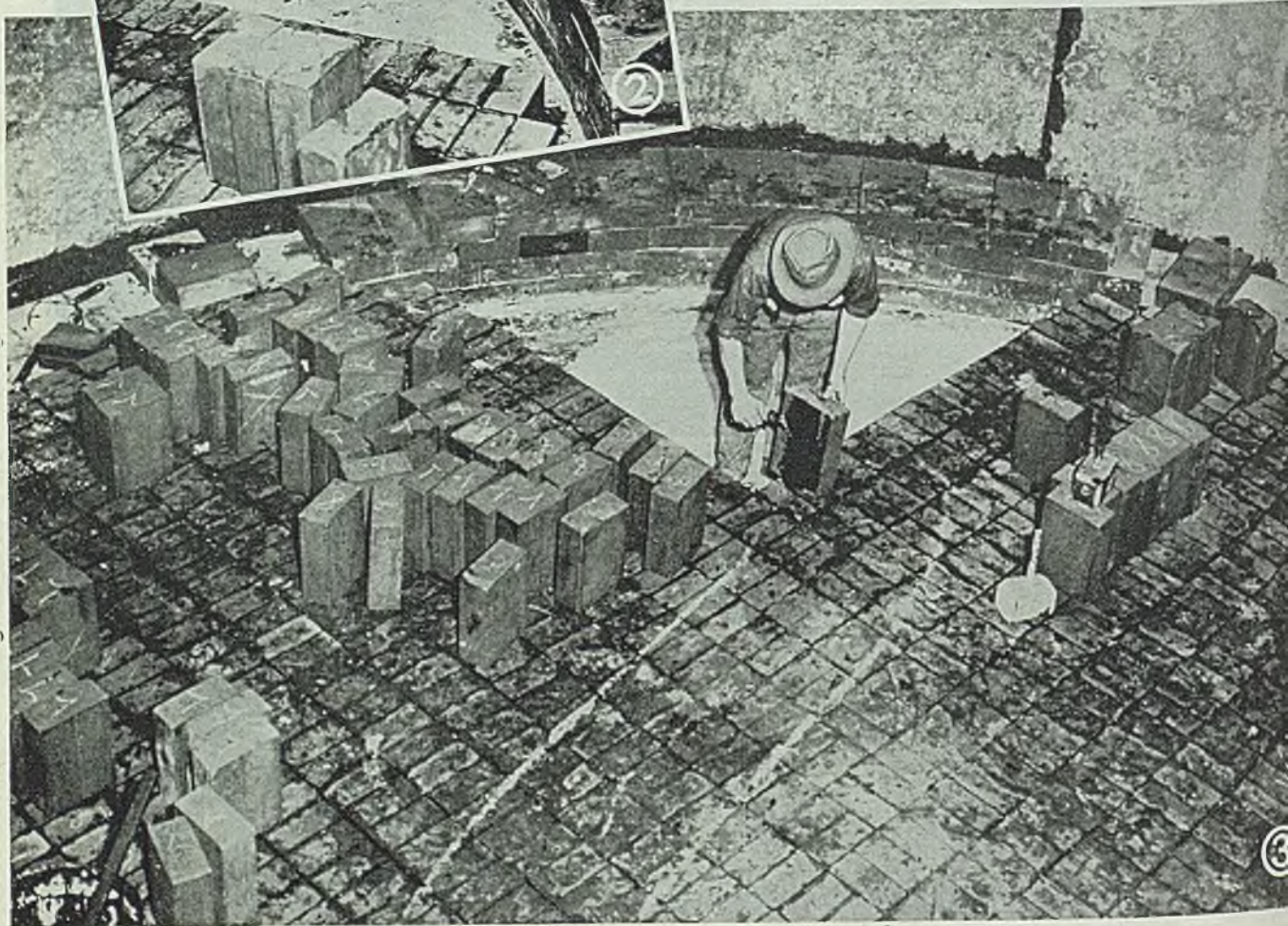
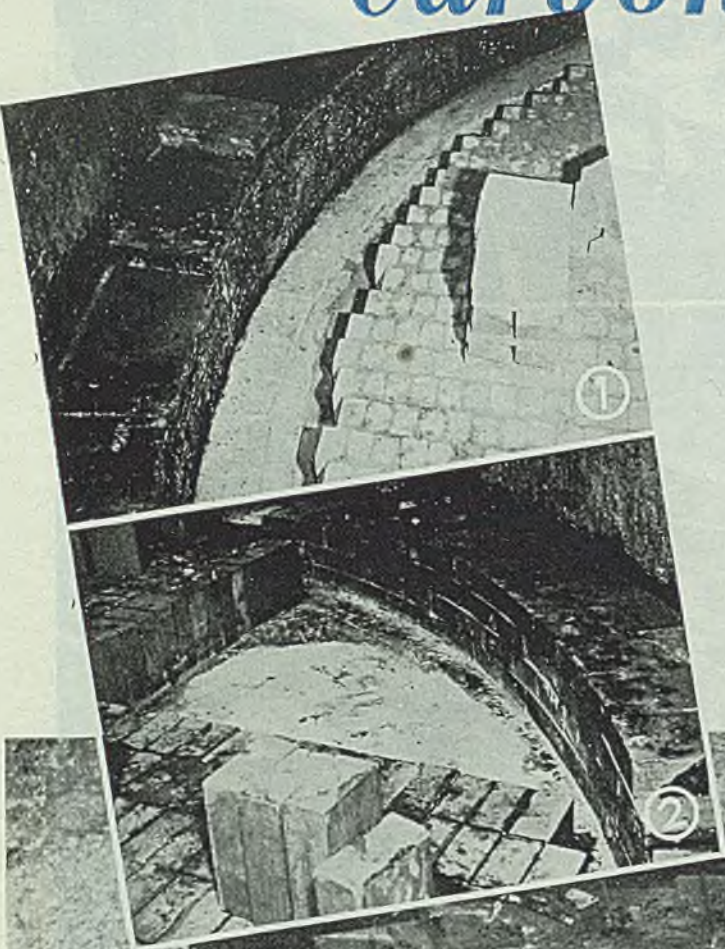
carbon lining for

Use of tamped carbon ramming mix was started in this country as an emergency. Hearths of English and German stacks laid up with this material were subject to cracking and breakouts. Salamanders seldom are encountered with carbon block linings. American furnacemen show keen interest in the use of carbon blocks for hearth construction

Fig. 1—Carbon sidewall blocks and inner lining of sidewall and hearth with fire clay blocks

Fig. 2—Close-up of carbon hearth and sidewall blocks

Fig. 3—General view of blast furnace interior showing installation of carbon hearth and wall blocks



Blast furnaces

ITS HISTORY, INSTALLATION AND ADVANTAGE

By FRANK J. VOSBURGH
Product Development Manager
National Carbon Co., Inc.
New York

FIRST recorded use of a carbon lining for a blast furnace was carried out by Burgers in 1886¹ though there is evidence that carbon blocks were used in the hearth walls of blast furnaces in Southern France as early as 1876. Little further data were available until 1912 when a number of operators reported (*Stahl und Eisen*) the results of various experimental runs. The only information seemingly available regarding the contemporaneous situation in the United States is a report by Ralph H. Sweetser, consultant in Blast Furnace Practice, New York, that, in or about 1892, carbon was tried in a furnace lining of the Maryland Steel Co., Sparrows Point, Md. with unsuccessful results. The carbon (?) blocks were put in the hearth of the furnace in an inverted arch set against skewbacks in the walls but, in spite of the care in construction, the blocks floated out and plugged the tap hole causing a great deal of trouble. Mr. Sweetser believes the blocks were 4½ x 9 x 13½ in., a standard of those days. No further information can be found regarding this earliest use of carbon in the United States.

Mr. Sweetser refers to the blocks as graphite but Acheson did not invent graphite until 1896, which makes the use of that material impossible. There is no record indicating that the blocks were made by the National Carbon Co. and it is highly improbable that any other carbon manufacturer in existence at that time could have made them. It is more likely that the bricks or blocks were a clay-natural graphite mixture such as is used in graphite crucibles. Assuming this is correct, it would be expected that the blocks would have disintegrated because of attack on the contained clay and would have lasted no longer, if as long, than the usual refractories of the period.

Use of carbon linings did not interest blast furnace operators in the United States for several reported reasons, chief of which appears to be that domestic ceramics gave much better service than

was generally obtained abroad. It is worthy of note, however, that C. D. King, Chairman, United States Steel Corp. Operating Committees, possesses files dating from 1910 which disclose the use of carbon in blast furnaces and indicate a continued interest in the subject.

Extent of interest in the subject during this period is impossible to determine. Undoubtedly many operators, recognizing the valuable characteristics of carbon, gave thought to it from time to time as they encountered furnace problems traceable to refractories. Still the next indication of any real concern appears to have been that of Tennessee Coal, Iron & Railroad Co. which in 1927-1928 in cooperation with the Republic Carbon Co., now a part of National Carbon Co. Inc., gave considerable thought to the designing of a carbon hearth for one of its stacks. This matter, however, was dropped because of the business recession of 1929-30.

Installs Carbon Ramming Mix

The next date of interest appears to be 1937. On July 8 of that year Carnegie-Illinois Steel Corp. blew in its No. 2 Clairton furnace, into the hearth of which had been tamped a mass of coke braize and pitch paste. It was an emergency procedure adopted to get the furnace, then idle for reconstruction, back into operation with the least possible delay. The furnace had produced 400,000 tons of iron before blowing out and went on to produce 800,000 tons more, a total of 1,200,000 tons or more than ever taken from it before. When No. 2 was relined carbon ramming mix² was again used in

² Carbon ramming mix, frequently called carbon paste, is a mixture of carbon such as calcined anthracite, petroleum coke or metallurgical coke and pitch or tar in proper proportions so that upon heating the mass may be tamped into location.

the hearth, and also later in the No. 1 Clairton stack.

Use of tamped carbon ramming mix for blast furnace linings both in Germany and in the United States appears to have started as an emergency or repair operation. Dr. Junius of Vereinigte Stahlwerke³ reported to the writer in 1939 that after a successful repair job in which carbon ramming mix had been employed some time previously in a Swedish furnace, he had advocated and patented the application of carbon ramming mix for both hearth and bosh sections of blast furnaces up to the mantel. He reported that carbon ramming mix linings were most successful and much cheaper than either the small blocks which an associated company made, or the large blocks purchased from carbon manufacturers. It should be noted, however, that at about the time of the discussion a very serious breakout had occurred in one of the furnaces so lined.

Henry T. Rudolf reported⁴ on the use of tamped carbon ramming mix in the hearth sections of blast furnaces in England and Europe, and commented as follows:

"The coke-and-tar hearths fail invariably from cracks. The cause of the cracks has not yet been definitely found; whether it lies in inferior material or in mixed material having different rates of expansion in patches, no one seems to know."

Mr. Rudolf compared the results from tamped linings with those from blocks but made no attempt to differentiate between the usual ceramic size blocks and the many times larger ones becoming more generally used in Germany.

G. D. Elliot, blast furnace superintendent, Appleby-Frodingham Steel Co., Ltd., Scunthorpe, Lincolnshire, England, informed the writer recently:

"Several people in this country, including ourselves, have tried tamped linings but I am very strongly of the opinion that a tamped lining cannot be installed efficiently. I know of some plants which have had satisfactory experience with tamped linings, but I know of an equal number who have had serious breakouts through tamped linings. Obviously, the molding pressure of a tamped lining can only be low and we have found the firing shrinkage tends to open up very large cracks rather than a large number of very small cracks."

In this connection it is noteworthy that Mr. Elliott states that his company now has two carbon lined furnaces and is putting in three more and that other concerns have lined or are lining five furnaces, all using carbon in ceramic size blocks.

The Hanna Furnace Corp., Buffalo, blew in a stack in Oct. 1943 with a hearth covering which had been made up of crushed scrap electric furnace graphite and pitch tamped into place over the ceramic hearth blocks. The lining was 10 in. thick in the center of the hearth and the top contour was dished by making the outer edge thicker than the center. The ramming mix was tamped into the corbeling of the brick at the edges.

The furnace was blown out Sept. 11,

¹ All references are presented at the end of this article.

1944 after making 129,731 tons of iron, and blown in again Jan. 31, 1945 and is still in blast. While out of blast the hearth was thoroughly inspected. There was some evidence of iron penetration of the carbon but no other evidence of a salamander. The corbeled brickwork under the ramming mix was in perfect condition. The carbon was not removed but patched where inspections had been made and the stack later put in blast. A second furnace was blown in with a similar hearth section on July 11, 1944 and a third furnace in Sept. 1945, in which the paste was not of graphite but carbon and the hearth was made thicker.

This saucer-shaped carbon bottom is designed to take advantage of carbon protection, but at the same time provided with as much refractory under the hearth as would exist after the furnace has been in blast in ordinary firebrick construction for a relatively short period of time. Results to date have indicated that the somewhat thicker layer of carbon might be safely installed in the bottom.

Further reference to the use of carbon ramming mix is made by George Bulle²³. He says:

"The crucible and bosh of the standardized blast furnace are lined with tamped-in carbon paste, the mantel and shaft are lined with fire clay masonry."

Rudolf, in his previously referred to article¹⁰, states:

"Anything less than 8 in. of bottom is not worth putting in . . . Layers should be not less than 2 in. thick, tamped in with red hot rammers . . . One layer should be burned off before the next is applied."

These statements agree with the information received from Dr. Junius covering the way he advocated the use of carbon ramming mix in Germany, though

the ramming mix was carried to the top of the mantel. It should be added, however, that the job of tamping-in and burning off the ramming mix may be a most miserable one. The fumes from the hot material may burn the skin so seriously that the hands, face and neck should be protected and the men should work in gas masks as the fumes may be very irritating to the eyes, nose and throat because of the volume of fume evolved in a definitely limited space.

Cites Failure and Remedy

R. Klesper, in dealing with the failures of blast furnace refractory linings and the ramming of carbon aggregates²² cites one failure discovered on drilling the shell plate around a carbon lined hearth which had been in operation about two years. He states:

"A space about 1½ to 2½ in. wide was found between the back of the rammed lining and the plate and the lining itself had vertical cracks in it which were full of loose powder. It is probable that starting the furnace too quickly was the initial cause of this failure. The correct pre-heating of the mix is very important because if it is made too hot the heavier hydrocarbons in the tar are cracked and its binding properties are destroyed. Crushed coke mixed with tar should be prepared for ramming by heating to 212°F on an iron plate heated with steam or by a coke oven gas flame.

"Since the requirements for the protective brickwork in the case of a rammed carbon hearth are much more exacting than for a hearth made of carbon blocks, the wall in the former case should be at least 10 in. thick."

To revert to the carbon brick or carbon block linings, it may be well to differentiate between the words "brick" and "block" as used in this article. Carbon brick are relatively small pieces varying

in size from the usual 2½ x 4½ x 9 in. to the largest size of block the ceramic manufacturers produce. Carbon blocks are larger than the largest ceramic blocks and include homogeneous pieces up to 24 x 30 x 180 in. weighing up to 7000 lb. each.

While Tennessee Coal, Iron & Railroad Co. gave definite thought to the use of carbon before 1930, no action was taken. In 1937 Carnegie-Illinois Steel Corp., Chicago, became actively interested in the subject, particularly the use of large blocks as a pad across the hearth from shell to shell. Designs were drawn up and discussed, and prices quoted, but nothing further was done at that time.

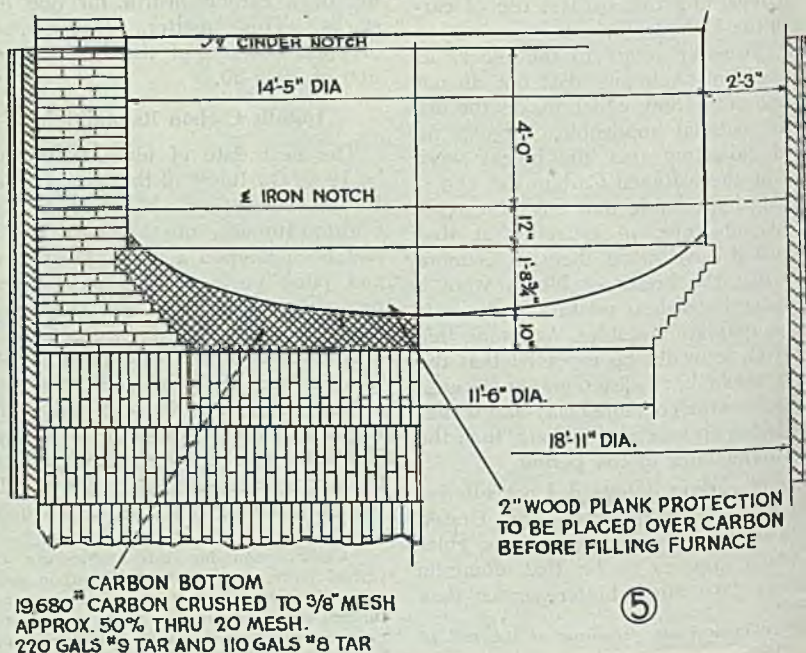
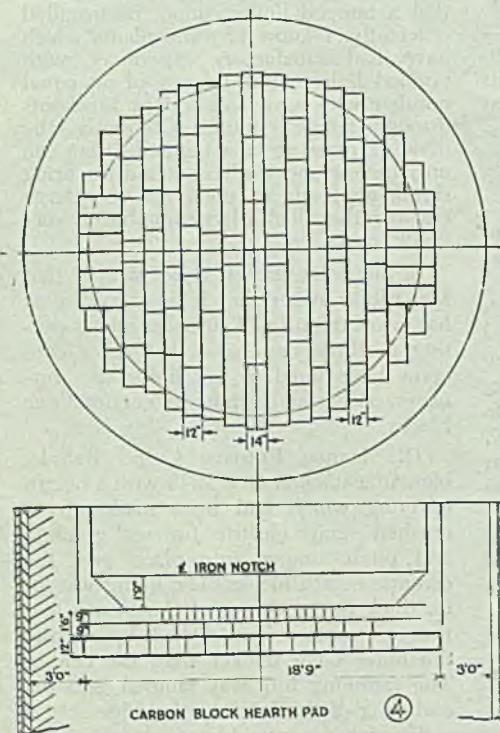
Largely as a result of this interest, the writer went to Germany to secure first hand knowledge of European adaptation of carbon to blast furnaces. Unfortunately it was not a very good time to visit Europe as the war had, for all practical purposes, started. However, it was possible to see one lining made of large blocks installed in a new furnace and to talk with a large carbon manufacturer and several other people with knowledge of the application. Much of the information gathered was published¹¹.

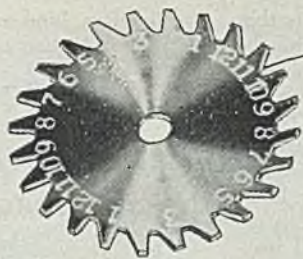
After the writer's return in 1939 he visited and talked with many furnace operators discussing the use of carbon pro and con and found a very general interest in the subject and just as general a disinclination to be the first to try carbon.

In the latter part of 1939 one blast furnace operator installed in a furnace pad of carbon. The blocks 12 in. square by various lengths were unmachined except as to length. The joints were reasonably wide and filled with carbon ramming mix tamped in hot. The furnace was blown in Jan. 13, 1940 and was

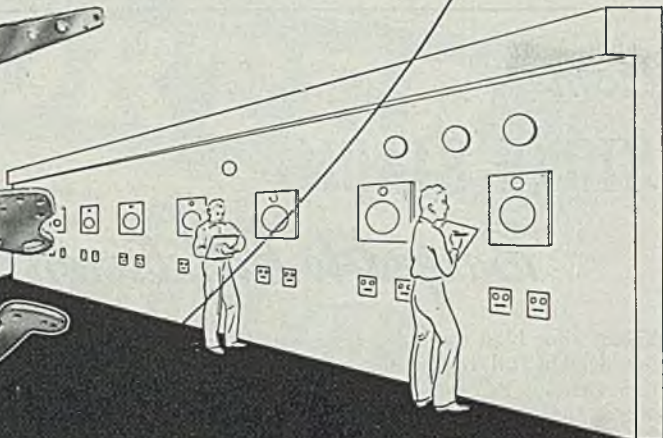
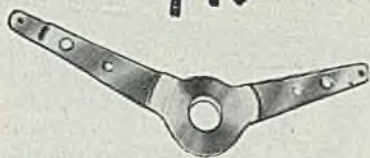
Fig. 4—Installation of tamped carbon ramming-mix over fire brick hearth at Hambleton Furnace Co., Buffalo

Fig. 5—Experimental installation of 12-in. square carbon blocks in blast furnace hearth





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blown out in the spring of 1945 after more than five years of service. When the furnace was blown out there was no evidence whatever of the carbon blocks being present. They had disappeared entirely. It was felt, however, that there was considerably less salamander formed than average and, furthermore that the experiment was not entirely fair as there was not a sufficient quantity of blocks on hand to run the 12-in. line all the way over to the staves and for that reason with any cutting out of brickwork along the hearth sidewalls, the carbon could be readily attacked.

Chronologically, the next step was the purchase in 1943 by Carnegie-Illinois Steel Corp., Pittsburgh, of sufficient carbon bricks to line a portion of one of the Carrie furnaces at Rankin, Pa. The lining consisted of a hearth section 24-in. thick running from shell to shell, made up of two layers of blocks 4 x 8 x 12 in. long installed just about as ceramic blocks of the same size would be. The wall was made of 11 x 9 29/32 x 4 x 18-in. long blocks installed against the shell and extending to the top of the hearth jacket. Inside the carbon wall blocks was a ring of ceramic blocks 9 in. thick. The furnace

was lined in June and July 1944 but as of Sept. 1945 had not been blown in.

(Continued next week)

Outlines Policy on Use of Respirators

Where the concentration from organic solvent vapors is not above 2 per cent, a gas mask which filters the contaminant out chemically may be used, according to Safety Research Institute Inc., 420 Lexington avenue, New York 17. This type of respirator consists of a mask connected to a canister by means of a short length of tubing, the canister being strapped on chest or back. Respirators are especially useful for: Small solvent operations where mechanical ventilation is not practical, occasional protection where mechanical ventilation is provided as in spray painting.

Since different air impurities require different chemicals, the canister should be clearly marked to indicate whether it is suitable for organic solvent vapors. Its contents will gradually become exhausted, so it should be discarded as soon as the odor of solvent becomes noticeable to the wearer. Where possible, canisters should be marked as to permissible length of service and a record kept of the time each one has been in active use, so that it may be discarded when its limit of service has been reached. If there is any doubt about the amount of use a canister has had, it should be replaced.

Some gas masks are equipped with a chemical cartridge, rather than with a canister. These can be used for only slightly contaminated air. Their life span is short, and they are not approved for regular use.

If the air is deficient in oxygen or contains a high vapor concentration, as in solvent tanks, filtering is inadequate, and an independent source of air must be provided. This is done with a "supplied air" respirator, which supplies air from an uncontaminated area to the wearer of the respirator by means of a long, flexible hose. If the hose is longer than 25 ft, air must be blown in by means of a manually operated blower. In addition, the wearer of the respirator should be protected by a life line and a watcher, strong enough to lift out the man in the tank, stationed outside the danger zone.

All respirators should be of types approved for the specific conditions of use by the U. S. Bureau of Mines.

Caution should be observed by those depending upon respirator protection. A respirator may protect individual operating the solvent process, but vapors can spread and endanger workers in nearby area. Even with respirators, workers should not be exposed to highly contaminated atmospheres because of the danger of skin difficulties and also, with certain solvents, of fire. Respirators should not be used as a substitute for good ventilating procedures.

Iron from OLD STONE STACK *Barged to Pittsburgh*

In 1845 a cold blast stone blast furnace was built on Scotch Hill road about 8 miles from Clarion, Pa. and was given the name of Helen. Locally, it is called "Heelen," for this reason: It was located on the farm of Alexander McNaughton and was originally named "Highland" furnace because McNaughton prided himself on being a Scotch highlander. The name pronounced "Heeland," according to north-Scotch dialect, soon became corrupted to "Heelen," and thence to "Helen."

The stack last operated about 1857, was about 25 ft square at the base,

32 ft high and had an 8-ft bosh. During a run of 26 weeks in 1856, the stack made 756 tons of iron or an average weekly output of 25.23 tons. Pig iron was floated down the Clarion river in flat bottom boats to the Allegheny river and thence to Pittsburgh. Upon reaching their destination the boats were unloaded and then sold to a Pittsburgh concern for shipping coal and merchandise down the Ohio and Mississippi rivers. All that remains at present of the Helen stack is shown in the accompanying illustration, which was recently taken by H. M. Mayer, Cleveland.



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"Shimmy" Dies

(Concluded from Page 77)

of the cutting members must be straight inasmuch as this straightness patterns the condition of the trimmed edges.

In an article describing the die, Charles M. Brehm of Steel Products Engineering Co., states in the *Tool & Die Journal*, April, 1943, that the cutting clearance allowed in this type of die will vary somewhat from that usually given blanking dies. This variation in clearance is partially attributable to the extent material has become crystallized at the trim line by multiple draw operations and the number of annealing operations, if any, between draws. Mr. Brehm reports that on one part made of 0.218-in. steel, a

cutting clearance of 0.001-in. gave excellent results while on a second part of the same gage but different size, 0.008-in. clearance worked best. Usually, the clearance is 6 per cent of the thickness of the metal being cut.

By changing the cutting members, the Brehm dies can be used to trim a number of shells. Cutting members or adapters required for each shell consist of the punch unit, the die plate, gage member, and the shell ejector. The punch, punch plate "I", and the studs make up the punch unit. Screws "J", "K" and "L" hold the adapters in place. This arrangement permits easy accessibility to the adapters when the die is in the press. Shells of different heights are trimmed by changing gages and ejectors.

Notches and projections, such as those

shown in Fig. 8, can be obtained on the shell edges. This is accomplished by cutting or adding similar male and female cutting outlines on the punch or die. To cut a notch in a shell, a portion of the die plate adjacent to the shell opening is removed and a rectangular insert is fitted into the die plate. An opening is cut into this insert of the same size as the required notch in the shell. The periphery of the punch has an opening cut into it to accommodate a rectangular insert that carries a projecting part of the same shape as the opening in the die insert. The various cam movements that trim the straight part of the shell also cut the notch.

In addition to trimming shells with straight edges, or edges with notches, or projections, curved edges and straight edges at angles other than 90° to the shell sides have been produced.

Press requirements for the Brehm dies are met by the ordinary single action presses, usually back-gearred to obtain the proper strokes per minute. However, speeds of some of the other press operations can be used. Toggle and hydraulic presses have been employed.

Trims Wide Range of Sizes

A considerable latitude of sizes can be handled by this method of trimming — from women's wristwatch cases to doors of 8 cu ft refrigerators. Fig. 7 shows a die capable of trimming such doors. In the case of long sections of shells and tubing, horizontal type dies are used. Cutting member in this die is located on the inside of the front plate, and punch is carried by a cam member attached to a shoe positioned toward the back of the die. Angular cams, one of which is attached to the shoe and the other to press slide, transmit the press stroke to the bottom of the shoe.

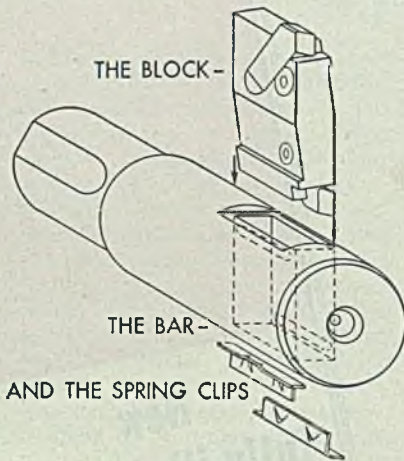
Factors which determine the press stroke are: Cam block travel for the metal thickness being used; desired depth of shell as measured by the gage member "B"; and, the height of the untrimmed shell plus a minimum clearance factor of 1/4-in.

For example, cam block travel given for the largest stock thickness of 0.250 in. is 4.728 in. Therefore, if the desired depth of shell is 1.250 in., and the height of the untrimmed shell is 1.500 plus 0.250-in. loading clearance, the sum of these values would give 7.728 in. as the required press stroke.

Height of the portion to be trimmed, should be equal to the thickness of the stock. Complications result if the scrap is too short. Consequences of this condition are burred and uneven edges due to the fact that instead of the scrap being sheared off, excess metal rolls ahead of the punch in the form of shavings. And, if the scrap portion is of varying height, higher portions will break away cleanly while the shorter are shaved away thus causing nonconformity of the trimmed portions. Scrap cut free of the shell is pushed to the surface of the die "E" from which it may be removed by pneumatic means.

BORING BAR

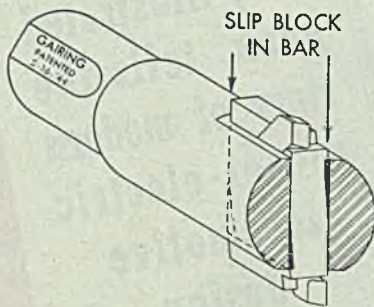
—features easily detached, self-centering cutter block



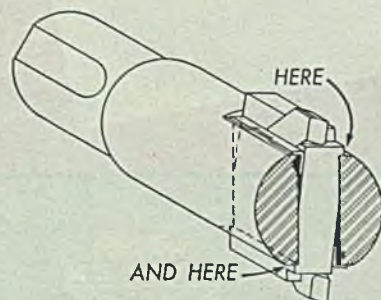
SELF-CENTERING, positive-locking, quick inserting of block in boring bar and easy removal, without the aid of locating holes or screws, keys, wedges of taper pins, is provided by the easily detached cutter block shown in schematic drawing at extreme left in illustration. It contains fully adjustable blades, and is made to engage both sides of the precision ground flats on the bar, where it quickly and accurately centers itself. When located, cutting thrust pressure is evenly distributed against the back and bottom of the slot.

This tool, made by Gairing Tool Co., Detroit, combines quick change, positive drive, and accuracy. Greater rigidity is assured because the bar is free from centralizing screw holes.

To insert, the block is slipped through the slot in the bar until the projecting lugs engage the ground flats on the bar. It then is perfectly centered. Spring clips which hold the block in place are snapped in, effectively sealing the unit from dirt, chips, etc.

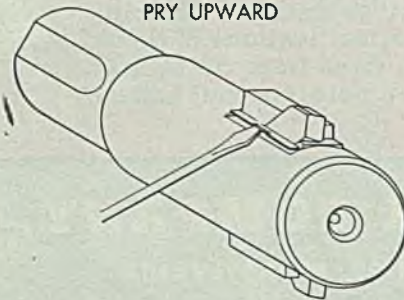


SLIGHT CLOCKWISE MOVEMENT
ENGAGES BLOCK



AND IT IS CENTRALIZED ON
THE BAR, SECURED IN PLACE
BY SPRING CLIPS

TO REMOVE BLOCK,
INSERT SCREWDRIVER
IN CLIP OPENINGS AND
PRY UPWARD



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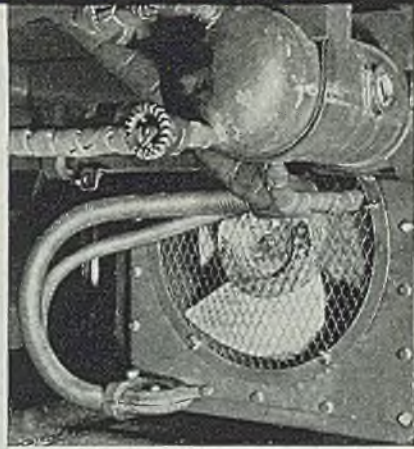
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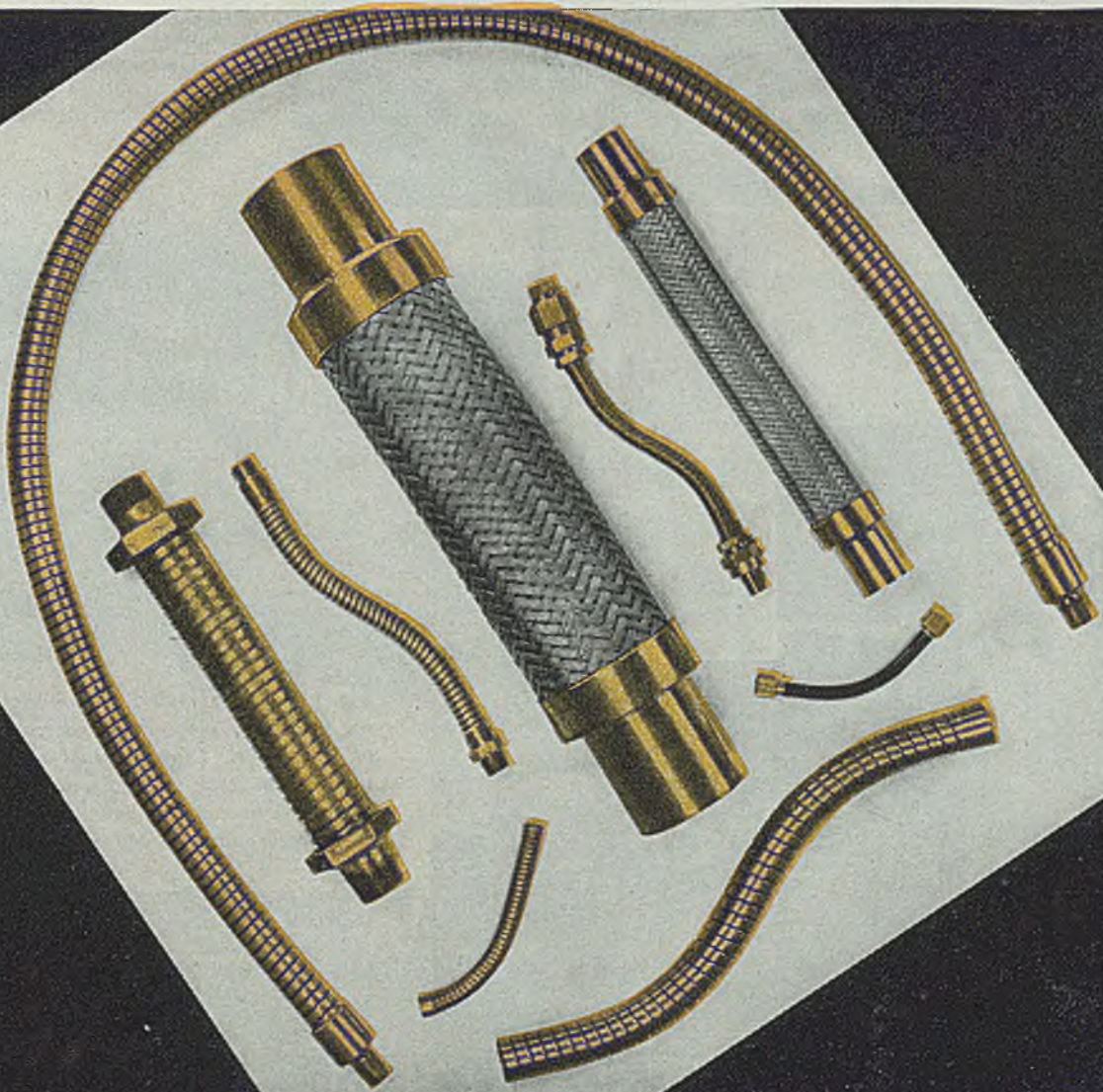
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Supersonic inspection

A nondestructive inspection method for continuous production processes is capable of detecting flaws 1/1000-in. thick within interior of metal parts

SUPERSONIC wave frequencies between 50 and 1000 kilocycles are used in the Hypersonic Analyser, made by Brush Development Co., Cleveland, for the examination of the interior of metal. This development is an outcome of the experience the company acquired during the war in the design and manufacture of submarine detecting devices.

Virtue of the supersonic waves is that they are compressional in character and may be transmitted through liquids, gases and solids. Furthermore, they are easily directed and formed into a cone or beam by conveniently small radiators. These waves are generated by a piezoelectric crystal (ammonium dihydrogen phosphate crystals) connected to a standard circuit consisting of frequency oscillator, frequency modulator and amplifier. The Transducer, which propagates the impulses, sends a beam through a specimen whose properties modify the beam and the resulting energy pattern is picked up on the side opposite the generator by means of a microphone.

This method of flaw detection is based

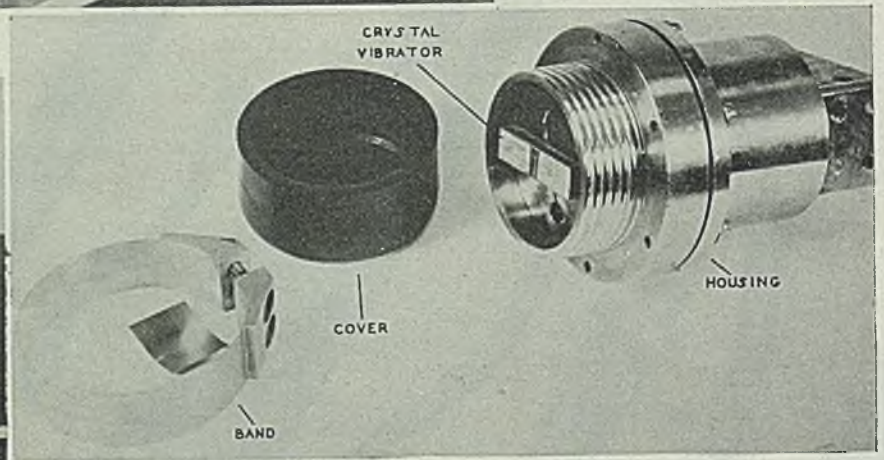
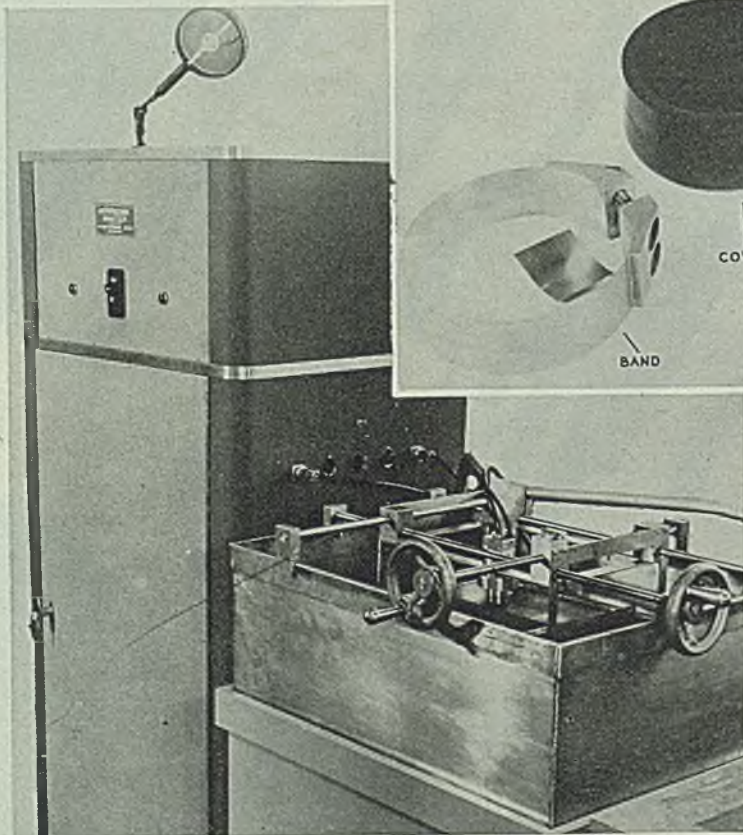
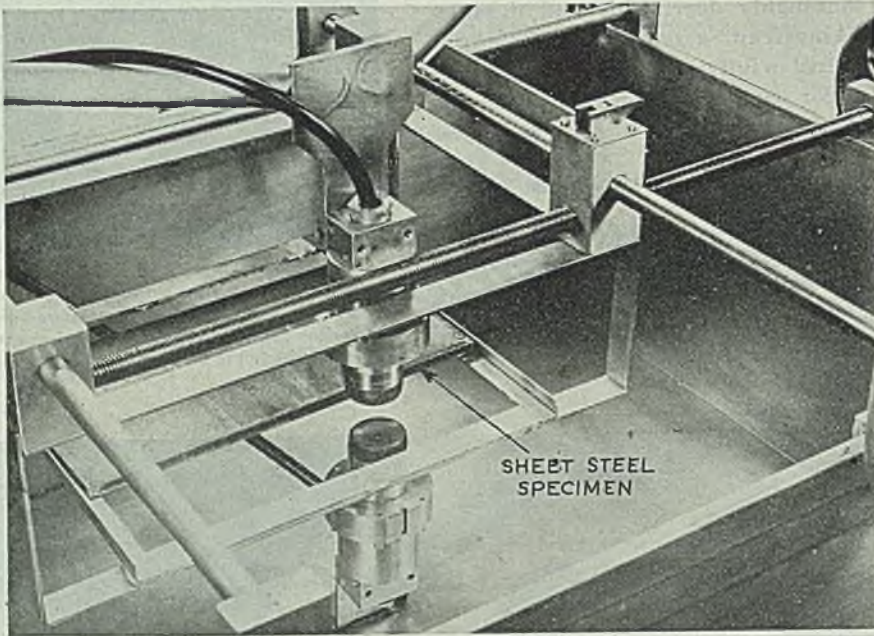


Fig. 1 (top)—Sample test tank showing transducer placement, and sample of sheet steel. During actual operation of unit, tank is filled with water to provide necessary coupling between radiator, sample, and receiver

Fig. 2 (center)—Transducer, or radiator, with cover removed to show heart of apparatus—the piezoelectric crystal

Fig. 3 (left)—Analyzer test unit, showing housing for electronic apparatus, signal light (mounted atop cabinet) and sample test tank

Good Will Is the Disposition of
The Customer To Return To the Place
Where He Has Been Well Served

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WE of Benjamin Wolff and Company are sincerely grateful to the thousands of our business friends whose preference for our organization has been so manifest this past year. We are particularly appreciative of your confidence during a period in which we have not been able to do for anyone all that we would like to do.

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on two physical properties of the material: An apparent change in density and/or an apparent change in the modulus of elasticity. Since a single reading or relay operation is obtained, the method does not distinguish as to which property is changed but indicates that one or both have changed. For example, X-rays detect changes in density or total mass in the field of the beam, whereas supersonic waves are also sensitive to changes in elasticity and consequently fine fissures are more easily detectable in the material by the use of sound waves.

The fissure type of flaw is one where the change in total mass is negligible, but at the separation junction the effective

modulus is small since the material is already separated. Flaws of this nature, as small as 1/1000-in. thick, may be detected with the sonic method.

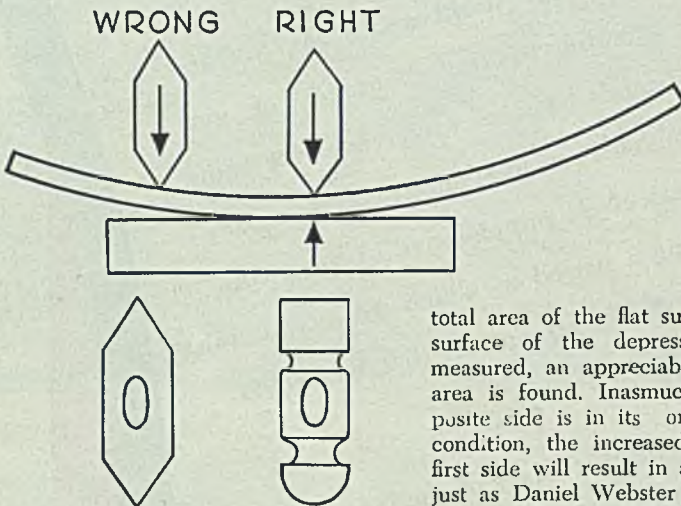
Supersonic inspection is particularly applicable to the detection of pipes, fissures, etc., during the rolling of sheet steel or, during the pickling of steel. Also, it can be applied for the detection of separation between bonded metal strips. In addition to its use in inspection of steel, tests have shown that it can be used satisfactorily on aluminum, brass, phosphor bronze, beryllium copper, and other metals and alloys.

Detection and identification of the flaw or defect may be indicated in any one of

several ways: On a meter, by a signal light, by a bell; or a relay hook-up may be used to make such physical markings as plant spray, spot weld, continuous ink-chart record, etc.

Use of liquid as the transmitting medium is desirable in this inspection method, because fluids such as water and oil give better coupling between transmitter, material under inspection, and receiver, at supersonic frequencies. In certain instances, air or other gases make a satisfactory transmitting medium. Choice of medium depends upon the particular material being examined and also the physical possibility of exposure of material to the medium.

Peen Straighten Steel BY HAMMERING



STAFF members of Lindberg Engineering Co., Chicago, recently proved Daniel Webster right in defining the verb *peening* as meaning "to draw, bend, or straighten, as metals, by blows with the peen end of a hammer or sledge." To further clarify the word *peen*, Webster said it is a noun meaning "the hemispherical, round-edge, sharp, or thin end of the head of a hammer, or sledge, opposite to the face." It derives from the German *pinne*, meaning "to peen."

This excursion in semantics began when one company engineer asked these questions: What do we do with it and when do we use it? Has the application of the operation been modernized or is it still in the horse and buggy stage? Discussion ended in a series of simple but illuminating experiments.

With the two types of hammers shown in accompanying illustration, it was demonstrated readily that hitting a soft, flat piece of steel or iron repeated blows in different spots will result in a series of dents or depressions in the metal hammered. If the

total area of the flat surface and the surface of the depressions then is measured, an appreciable increase in area is found. Inasmuch as the opposite side is in its original surface condition, the increased area of the first side will result in a slight warp, just as Daniel Webster predicted.

It may be noted that the high side of the warp is the side peened. If the piece then is turned over and opposite side peened an equal amount, the piece again will be straight, but it will have increased in length because there now are two sides with equally increased surface area.

What if a piece of steel is hard? Can the surface be dented? The Lindberg engineers found that it can. But the operation must be performed with the part in solid contact with a flat surface having at least the hardness of annealed steel. If part is not in solid contact with base plate, then the peen hammer blow will result in a sharp, short bend which will be conducive to fracture.

In the original experiment the part was intentionally warped back, straightened by blows on the opposite side which, in shop vernacular, is the "hollow side," or inside of the warp. Heat treatment often produces structural changes that cause similar warpage. Thermal shock or lack of support while the metal is hot likewise results in warped parts. This has had the effect of increasing the length of one

side, which, according to the experiment, will be the high side of the warp. To correct dimensional change, the high side then is placed in contact with a suitable base plate or anvil and the short, or hollow side, is peened. Stretching of that side will result in straightening the part.

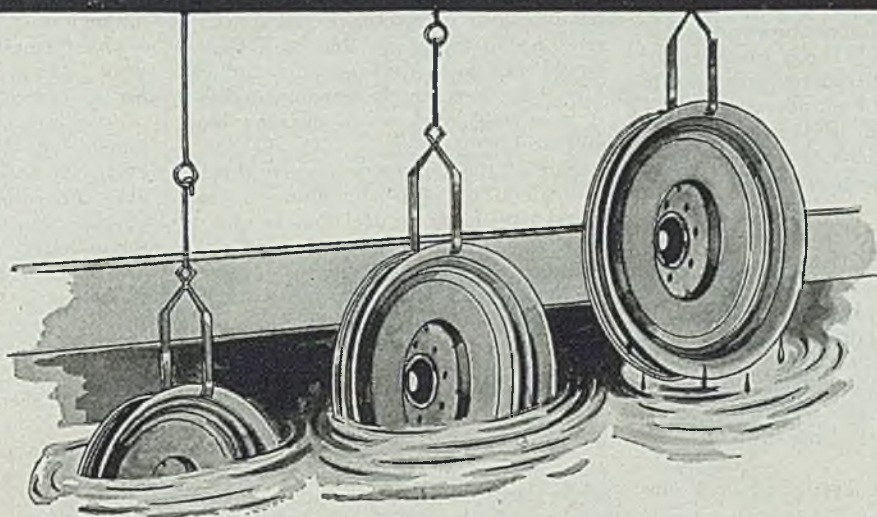
It is thought this operation will be most successful when applied to parts having considerable length as opposed to their cross section. Amount of peening necessary is determined by rate of movement noticed as the operation progresses.

Very hard materials can be peened by using a peen hammer with a sharp edge instead of a rounded edge. If the first series of blows resulting in a series of sharp indentations like this */////* do not produce the desired effect, a second series of blows at an angle to the first indentations will intensify the effect, resulting in a somewhat knurled appearance like this *XXXXX*. Rounds as well as flats can be straightened successfully by peening, when the technique has been mastered, Lindberg men say.

Examination of a sand blasted, or shot blasted surface will show that these operations also cause surface indentations. Therefore, some parts can be straightened merely by sand or shot blasting the hollow side of the warps. If parts previously have been cleaned by blasting all over, then the effect of reblasting is reduced and operation is not so successful.

While peening surfaces to produce higher fatigue strength usually is performed by machine blasting under carefully controlled conditions, the investigators concluded that intelligent use of hand peening can be made to perform somewhat similar results.

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Drawing Aluminum

(Continued from Page 79)

most pure aluminum can be given surprisingly severe deep drawing without inter-stage annealing if careful attention is paid to tool design, lubrication and other relevant factors.

Because of necessity for keeping ironing to a minimum and to allow relatively free flow of metal, tool design is to some extent more critical for aluminum alloys than for other metals, such as brass and steel. In addition, considerable attention should be paid to lubrication and to tool and work surfaces. These practices are of the greatest concern and will now be given more detailed consideration.

Lubricants Used in Drawing Aluminum: Lubricants that have been used in aluminum drawing are of the following types:

1. Mineral oil of various viscosities.
2. Blends of mineral oil with fatty matter.
3. Tallow and paraffin wax mixtures.
4. Sulphurized fatty oil blended with mineral oil.
5. Soap or soap and fat emulsions in water.
6. Solid deposits from volatile solvents.
7. Lubricants of Type 1, 2 or 4 plus filler.
8. Lubricants of Type 5 plus filler.
9. Solids in powder form (for rubber pad forming).

Weber and his co-workers^{9, 10} suggest mineral oil of increasing viscosities for draws of increasing severity from light to fairly severe. For severe draws they suggest tallow and paraffin wax mixtures containing from 30 to 50 per cent of mutton tallow. They have also observed that heavier oils are required when less satisfactory tool materials are used, when heavier sheet is used, or when reduction per draw is increased and radius made sharper. For the most severe draws,

on the basis of the foregoing, tallow and paraffin are used.

Jevons has expressed surprise at the use of paraffin in this application. It is, in fact, very surprising that mineral oil should be a satisfactory drawing lubricant. It has been shown that in most drawing operations, lubrication is of the boundary or polar type⁵, in which lubricants are required that have a structural group that can react with metal surfaces and thereby secure firm anchorage. Mineral oil is not of this type of polar lubricant, particularly when well refined, and it would not be anticipated on this basis that it would be good drawing lubricant. In fact, it has been amply demonstrated that it is a poor lubricant in drawing brass and steel.

Part of the difference in performance of mineral oil with aluminum as compared with brass or steel may be due to the lower yield strength of aluminum and mildness of the operations in which it yields satisfactory performance. However, there are indications of several basic differences between aluminum and its alloys on the one hand and brass and steel on the other. For example, in studying the spreading of droplets of oil on cleaned and pickled steel and aluminum panels, it was observed that while lard oil spread readily on the steel panels, it spread very little on the aluminum. However, mineral oil spread readily on both metals in the condition described.

Another indication that there might be this difference among the metals is provided by the research investigations of some Russian scientists. Thus, Kalesnikova¹² found that the coefficient of friction between steel and aluminum was not decreased as the concentration of stearic acid in the oil-base lubricant is increased. This is in contrast with steel and copper. Rebinder¹³ also reports an increase in the coefficient of friction of aluminum against steel as the concentra-

tion of several additives, including stearic acid, was increased. This is an opposite tendency from that of copper, magnesium or tin. On the other hand, Chertavskikh¹⁴ found an increase in the extension of aluminum in a rolling mill when aluminum was lubricated with oleic acid in kerosene, which increased as the oleic acid concentration was increased until a constant value was reached. At any rate, these observations indicate that generalizations made in brass and steel drawing lubrication must be carefully examined before their application to aluminum.

One type of lubricant which appears to have given very good results, particularly for severe drawing operations, consists of sulphurized fatty oils blended with mineral oil. This type of lubricant, however, has not found widespread acceptance. For example, propeller domes for aircraft were drawn from 61S alloy in three draws. The piece was 23-in. dia. and the sheet approximately 0.5-in. in thickness. In the first two draws there was no material change in thickness of sheet, and tallow was an adequate lubricant. However, in the third draw in which the sheet was reduced to 0.385-in. tallow was unsatisfactory. On the other hand, use of a sulphur-chlorinated fatty base diluted with mineral oil and applied with rollers, resulted in satisfactory performance. The writer also has had occasion to use a sulphurized fatty base diluted with a light mineral oil to a concentration of about 15 per cent in a rather severe drawing operation in which there was considerable ironing. This gave quite satisfactory results but no comparative studies were made.

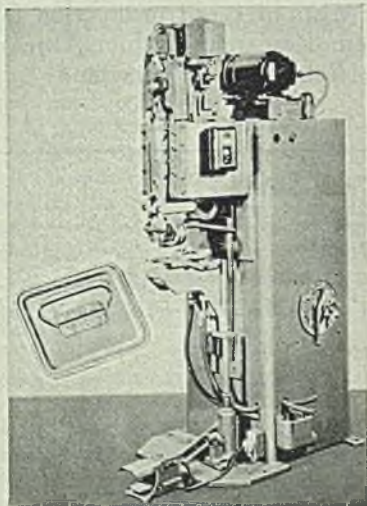
In designing a laboratory test for evaluating the drawability of aluminum sheet, Brewer and Rockwell¹⁵ ran into considerable difficulties attributed to lack of proper lubrication. These were largely overcome by use of a fast and steady pull and by use of a sulphurized lard oil containing suspended, finely divided mica.

In general, it appears that use of sulphurized fatty oil blends would be promising for many drawing operations on aluminum, just as similar blends with light oil have been very promising machining lubricant for aluminum.

Mixtures of tallow and paraffin have been used for more severe draws by Aluminum Co. of America. It is quite probable that other fats and waxes could also be used since the Russian, Chertavskikh¹⁴ has reported that 50 per cent hydrated cachalot oil plus 50 per cent paraffin wax or 35 beeswax, 55 paraffin wax, and 10 per cent wax surrogate were found to be best for rolling mill operations. In general, this type of lubricant applied in the molten condition which means that the method of application could readily become cumbersome.

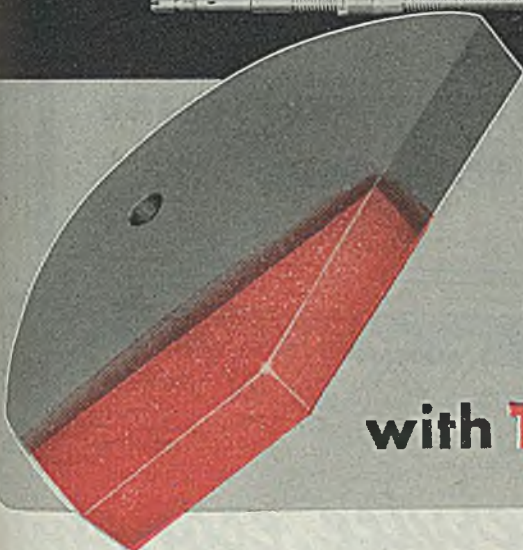
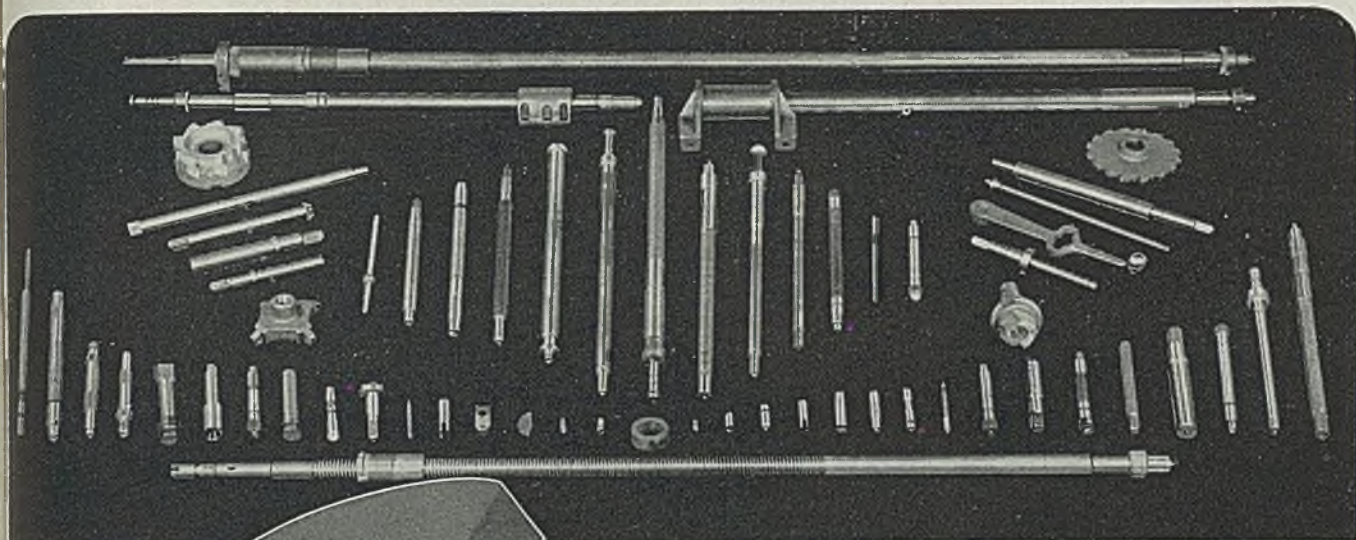
Jevons has reported considerable success with what he calls "evaporated lubricants." Essential feature of this type is that the lubricating substance which are often of either a waxy or soapy character, are dissolved or suspended in a volatile solvent. After im-

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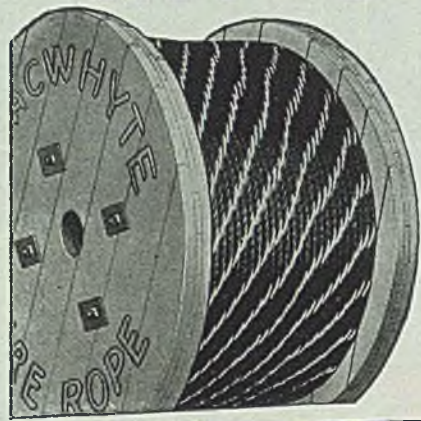
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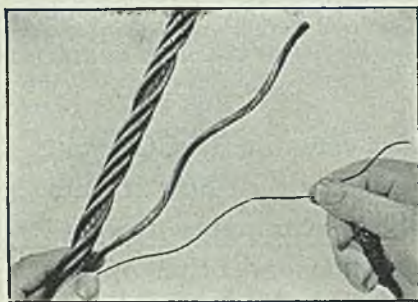
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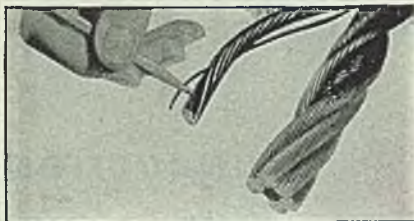
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S37-R

STEEL

mersion in lubricant, work is allowed to drain and dry. This leaves a very thin film that acts as an excellent lubricant in severe draws, particularly for the duralumin type of alloy, in which the forces required for deformation are high. One precaution that is suggested for this type of lubricant is complete removal of the solvent before use. In a particular instance in which the writer had occasion to recommend use of a lubricant for a very severe draw on heavy stock of 61S aluminum alloy, there was suggested a solution of stearic acid in a volatile petroleum solvent. This was used with excellent success but, because of the temporary nature of the job, the problems mentioned were not encountered.

It is self-evident that while this type of lubricant could be highly advantageous, problems arising from removal of volatile solvents of an inflammable or poisonous nature would prohibit its usage in most shops. In this respect, it would be well to examine lubricants operating in a similar fashion that have yielded excellent performance in deep drawing of steel. As explained, waxes in volatile solvents were good but their use was prohibited. Recourse was had to deposits from hot, concentrated solutions of soap or from hot wax emulsion. In this method, the possible effect of the alkalinity of the bath coupled with high temperature in etching aluminum should be considered and neutral emulsions would probably be more desirable. Easiest way to apply this deposit is by allowing metal to heat up in the bath and then allowing drying to occur by evaporation. However, better results are obtained if the work is dipped in the hot soap or wax emulsion and dried in a hot air furnace at about 200-300°F.

It should also be mentioned that in using this type of lubricant with softer metals, surface of the drawn work exhibits a somewhat milky or dull appearance rather than the bright surface obtained with liquid lubricants. Presence of filler in a lubricant frequently results in the same effect. A possible mechanism for the action of this type of lubricant has been presented in STEEL⁵.

While water-base emulsions have been used in aluminum drawing to some extent, their use is by no means as wide-

spread as in drawing other metals. While Weber reports poor results for water-base lubricants, Jevons claims that good results are obtained with "ordinary suds" for light draws; those containing considerable quantities of lard oil being best. He recommends that percentage of lard oil be increased for more severe draws. Moreover, the Massillon Aluminum Co. has been using an emulsion lubricant comprised of fatty matter, soap, mineral oil and a fine pigment (filler) in water as well as a reversed emulsion in an oil vehicle for various deep drawing operations on aluminum^{17, 18}.

One of the influential factors limiting use of ordinary water base lubricants is the tendency for these mildly alkaline emulsions to cause some corrosion of aluminum if left in contact with the metal for some time after the draw. If used, therefore, they should be washed off as soon as possible. Morgan¹⁹ also reports that the use of drawing emulsions that are normally used for steel, which contain sulphur, results in discoloration of aluminum. While this condition is a limiting factor, it should also be recognized that oil base lubricants are generally far more difficult to remove from the metal than water-base lubricants. One of the commonly used methods of removing oils from aluminum is by means of vapor degreasers such as those using trichlorethylene. Considerable precautions should be exercised in this case, to prevent moisture from coming in contact with trichlorethylene, as a corrosive product results.

Tools: It ordinarily might be considered that drawing tool problems would be greatly reduced in drawing a soft metal like aluminum. To a certain extent this is correct and many instances are current in which aluminum is being drawn with tools which would be entirely unsatisfactory for drawing other metals, such as steel. However, because of the peculiar frictional characteristics of aluminum, which have been discussed early in this article a good deal of attention must be paid to drawing tools, if production is not to be interrupted by build-up of aluminum on the tools, with its attendant troubles. This is especially true when process involves considerable "ironing" of the metal or when long production runs are to be made.

For some of the less severe drawing

operations, nonferrous metals such as bronze are used. In addition, the novel stamping processes in which zinc and its alloys or rubber are used have received a great deal of attention in recent publications. Wooden tools with zinc or mild steel facings have also been used.

So far as rubber forming by the Guerin process is concerned, lubrication is important mainly to prevent sticking of the rubber to the work²⁰. Solid powders such as mica, French chalk, fine graphite, or soft soap have been used successfully. Oils or greases must not be used with natural rubber because they damage it and cause it to swell. However, cast iron, low and high carbon plain steels and alloy steels generally are used for most aluminum drawing operations. Workers in this field agree on the importance of having well hardened, well polished tools for long production runs and severe draws. Nitrided or case hardened steel tools are also employed to some extent, especially for alloys of the duralumin type.

Weber reports that in using cast iron or low carbon steel tools, it is necessary to use heavier lubricants to prevent build-up on the tools than if hardened steel is used. This forces attention of the relationship⁵ between lubricants and tools, which has been discussed previously in STEEL.

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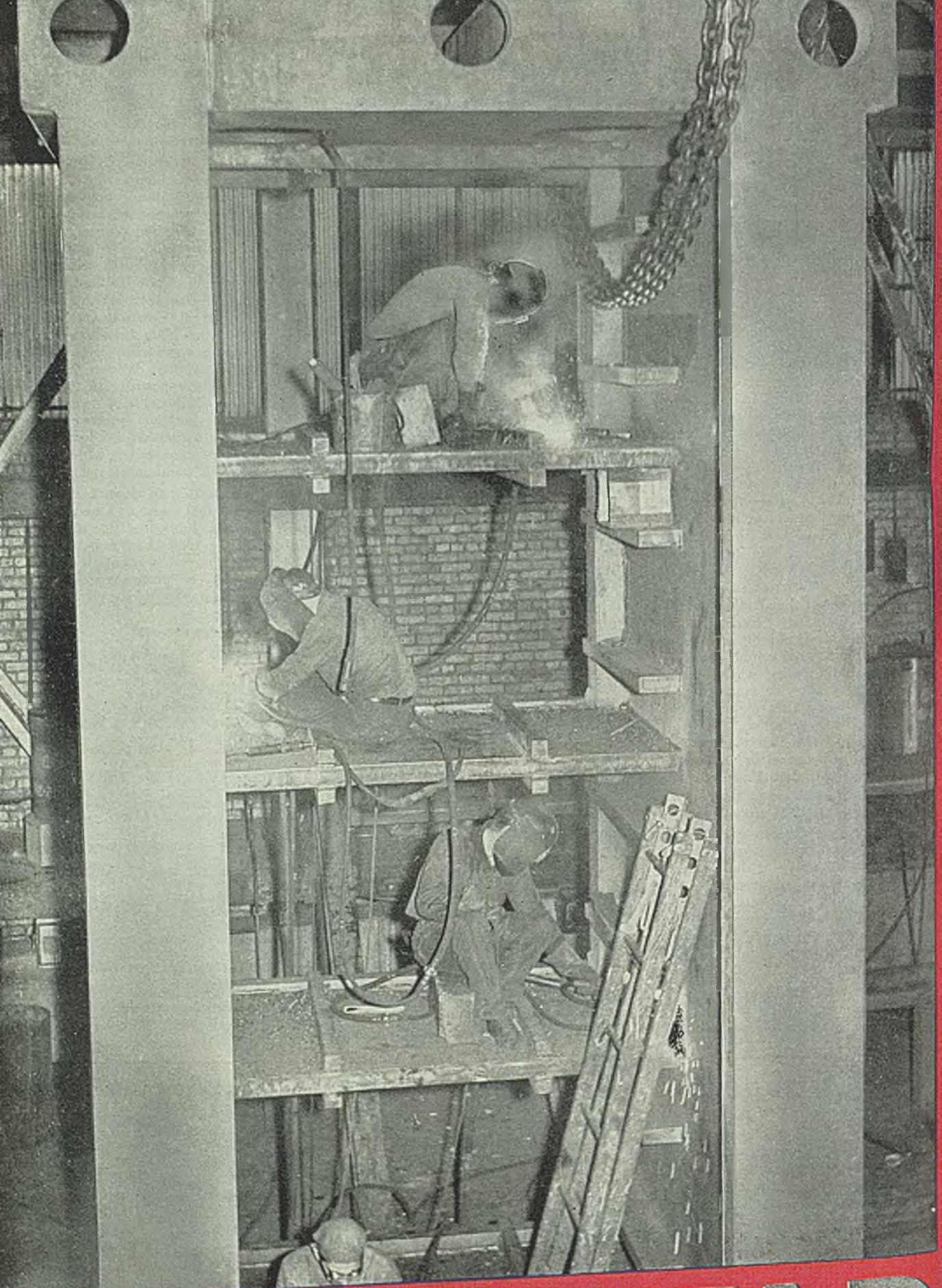
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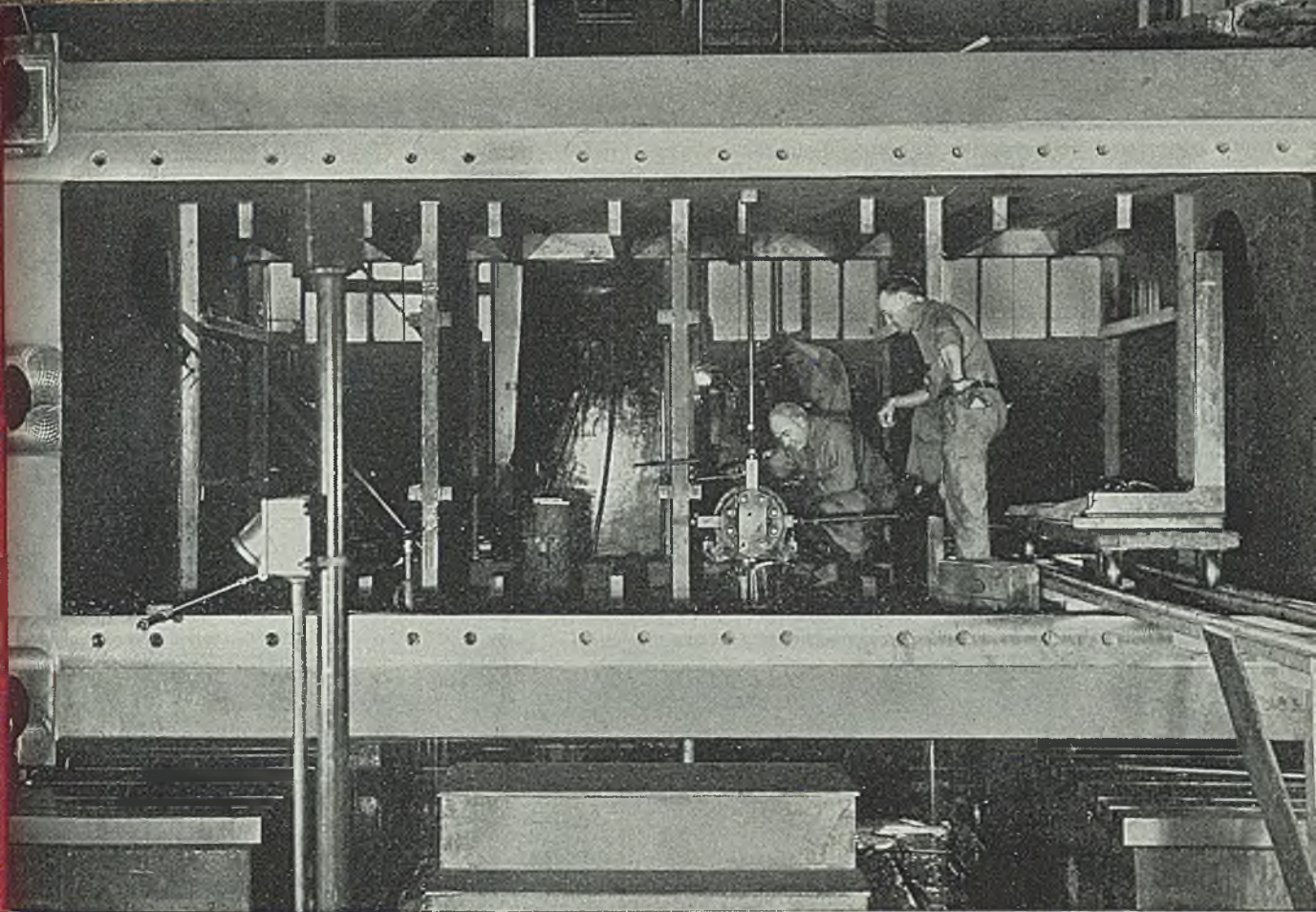
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Research Center

(Concluded from Page 80)

successive steps, the material being carefully weighed and controlled throughout each test.

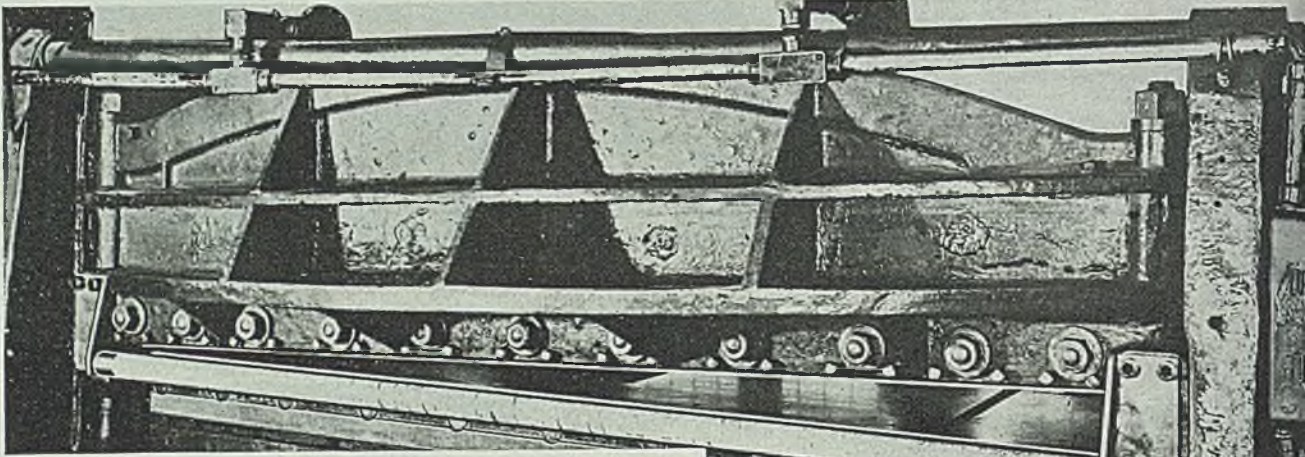
Batch and pilot mill sections constitute a testing service in which practically all

known processes of treatment can be tried out, and with their application experimentally, the "guess factor" in making recommendations is virtually eliminated.

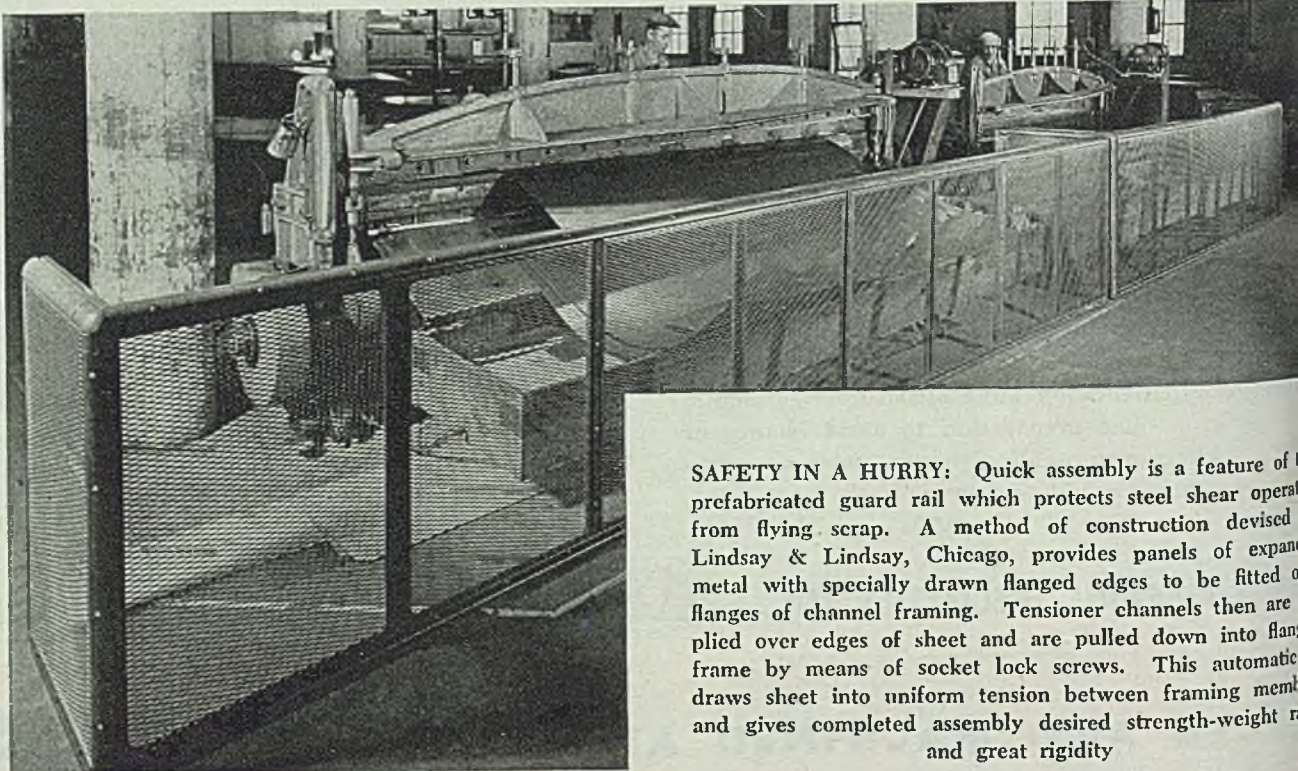
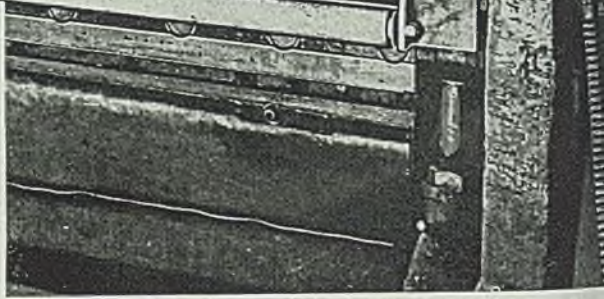
In the new milling section, problems of the flour mill, cereal mill, vegetable oil extractor, chemical and plastic processor are undertaken and solved. De-

monstrated here are proper application of many kinds of machines for grinding, sifting or gradual reduction.

These special laboratories for the basic industries, combined with the company's general chemical, analytical, electrical and physical laboratories afford a great variety of industries the opportunity of solving major processing problems.



ROLLER ATTACHMENT FOR SHEAR: This roller attachment for shear used at Westinghouse Appliance Division, Mansfield, O., has decreased production costs and eliminated scratches during fabrication of large aluminum sheets. It is fastened on top blade in a position 1/16-in. above bottom blade, so that sheet may be rolled over the latter without deep scratching that previously required refinishing. Feeding operation also is simplified, relieving one of the three operators formerly necessary for this work



SAFETY IN A HURRY: Quick assembly is a feature of the prefabricated guard rail which protects steel shear operators from flying scrap. A method of construction devised by Lindsay & Lindsay, Chicago, provides panels of expanded metal with specially drawn flanged edges to be fitted over flanges of channel framing. Tensioner channels then are applied over edges of sheet and are pulled down into flange frame by means of socket lock screws. This automatic method draws sheet into uniform tension between framing members and gives completed assembly desired strength-weight ratio and great rigidity

STAINLESS STEEL *for hot spots*

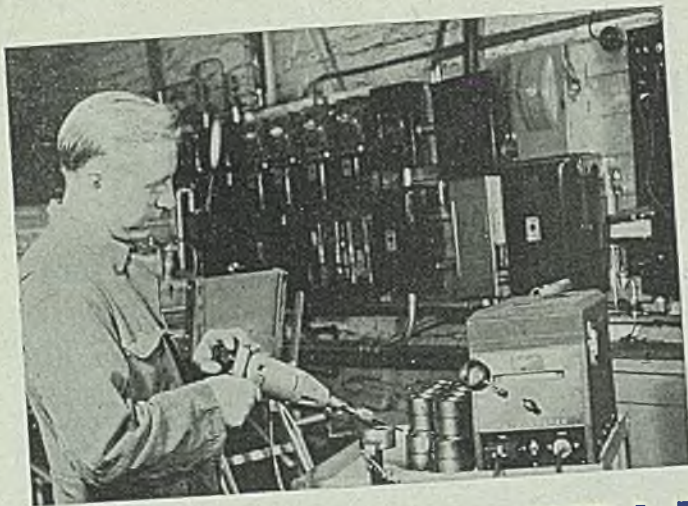
Design engineers specified stainless steel for the places in this fluid catalyst cracking unit where hot corrosive gases and swirling catalysts create a bad corrosion problem. And because stainless steel resists heat, wear, and corrosion, this and many other units like it stay "on stream" without failure in the potential trouble spots.

There are many other applications in industry where the use of stainless steel means longer life, fewer shut-downs, and more economical operation. Stainless steel should be considered whenever a metal is needed to resist heat, wear, or corrosion.

Other interesting uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, the Unit of UNION CARBIDE AND CARBON CORPORATION that produces alloys for making steel. If you need this complimentary publication, write on your business letterhead to ELECTRO METALLURGICAL COMPANY, Room 328, 30 East 42nd Street, New York 17, N. Y.

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Centuries old electrostatic phenomenon engineered to meet modern identification needs

By ANTONY DOSCHECK

Development Engineer
Farmers Engineering & Mfg. Co.
Pittsburgh

SORTING METALS

by Tribo-Electrification

WIDESPREAD use of a large variety of alloys presents the metal working industry with one of its major problems; namely, retaining metallurgical identity of the raw material through to the end-use product. Efficient and economical plant operation demands that proper material identity be maintained through manifold working and handling processes. Overall cost of further processing so-called "wrong" material needs no discussion here except to mention that this cost, in terms of time lost, effort expended, and worry, has seldom been estimated at a sufficiently high value.

One of the most straightforward approaches to the rapid identification of metals and alloys has been the determination of some physical property of the metal in question. Comparison of a property with the same property as found in a standard or acceptable piece serves to identify the unknown as regards its similarity or dissimilarity to the standard.

Certain physical properties lend them-

selves more readily to observation than others but do not give enough information relative to the nature of the material being tested. For example, the determination of surface hardness serves, in some instances, as an identification of acceptability. A hardness test on a metallic part is accurately and conveniently made, but a measurement and calculation of the electrical resistance of the part will yield much more information concerning its composition. However, the determination of the specific electrical resistivity of a metallic part is a many times more difficult and complex procedure than is the determination of the surface hardness of the part.

Many types of equipments for the identification of steels and other alloys have been developed but, due to their complexity of setup and operation and lack of versatility, have been confined principally to the laboratories of metal working plants.

A sorting method or instrument, in order to be generally useful in the shops,

warehouses and shipping rooms of the metals industry must be rapid to setup for a particular job as well as sound in basic principle of operation. It must be rugged and readily repairable by plant personnel in the event of accidental damage so as not to delay a production line. It should be completely portable to permit operation at any division of the plant. This last is considered important in view of handling problems as well as the danger of further confusion when mixed material must be transported to the sorting equipment.

Since metals are produced and fabricated into an almost limitless diversity of shapes and sizes, a really practical sorting method and instrument should not be affected by variables arising from shape and size factors.

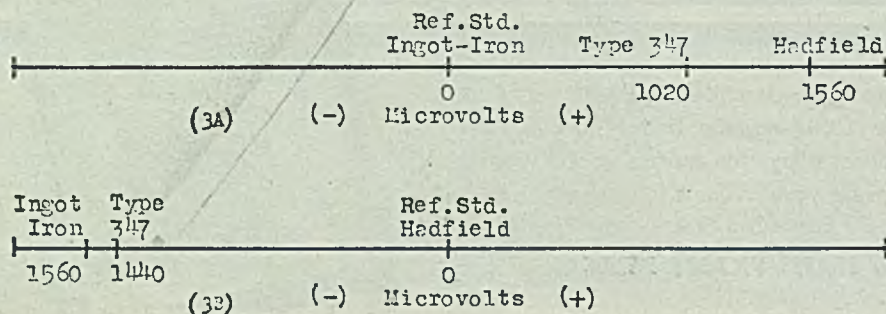
The test itself must be nondestructive. Application of the test should be sufficiently rapid to insure a high percentage check of material at the pace of present day production and, results obtained must be reproducible from day to day and from one operator to another.

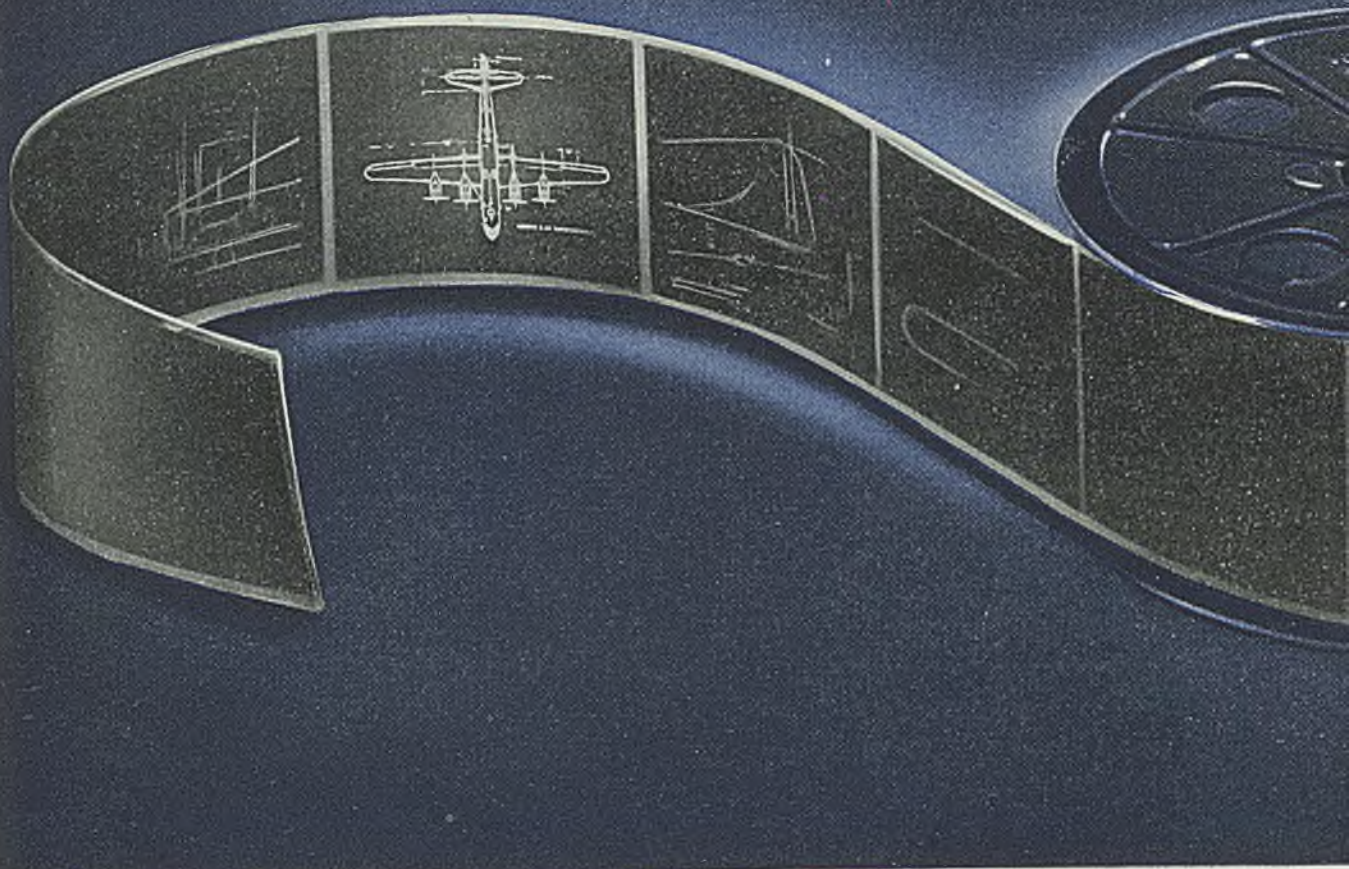
Consideration of these factors has led to the development of a new instrument for electrically sorting and identifying pure metals, steels and nonferrous alloys. This instrument, which has been named the Metalsorter, employs the triboelectric effect in metals as its basic principle of operation. Manufacturer of this sorting device is Farmers Engineering & Mfg. Co., Pittsburgh.

Although application of this principle to sorting metals is the latest use for tribo-electrification, the phenomenon has its roots in the observations of ancient philosophers. Some 600 years B. C. Thales of Miletus noted that amber, jet and other dialectrics gained an attraction for bits of light materials after having been rubbed with a suitable electrifying substance. Later observers recorded

Fig. 1 (above)—Checking analysis of bearing races before heat treating at the Ferrotherm Co., Pittsburgh

Fig. 2 (below)—Showing selective properties of Hadfield steel with respect to 18-8 alloys. Significantly, the net differential between ingot iron and Hadfield steel (13 per cent Mn) remains the same whether one or the other is used as reference. Type 347 18-8 Cb steel changes its relative position whether ingot iron or Hadfield steel is the reference





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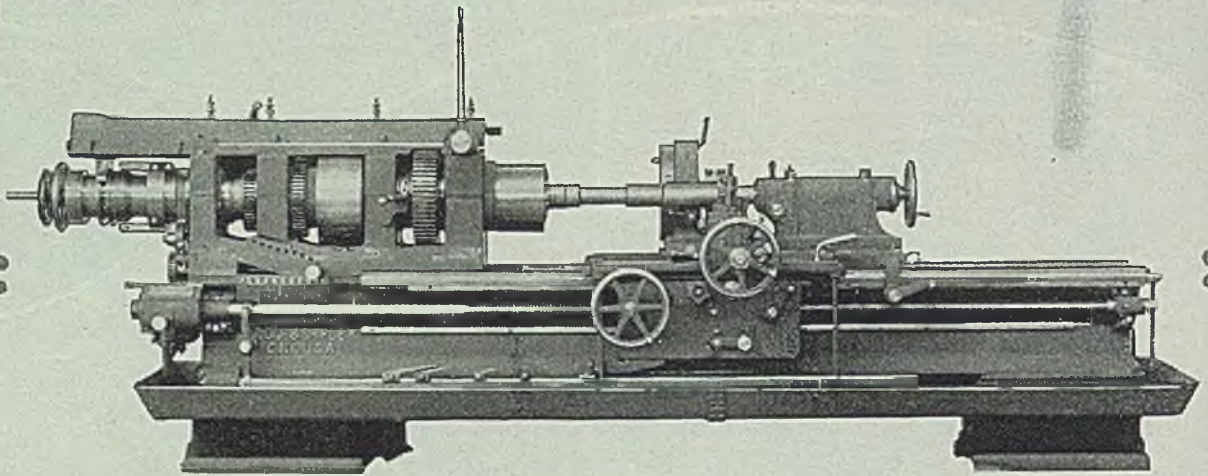
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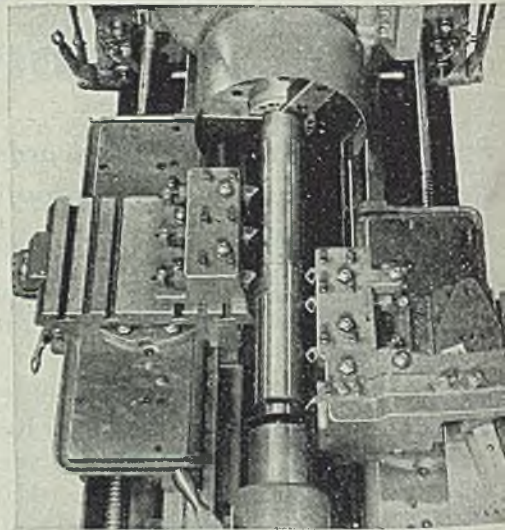
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TRIBO-ELECTRIFICATION

The derivation of this word is from the Greek *tribein*, "to rub" hence, *tribo* is used as a combining form denoting "resulting from friction."

the effect with various substances and, about 1600 A. D., William Bilbert named the phenomenon "vis electrika", derived from the Greek word for amber.

Magnetic mechanisms of tribo-electric attractions are imparted by the electrical field forces induced by friction between mutually electrifying substances. Tribo-electrification of two dielectrics or one dielectric and one conductor results in a static charge, the amount of which can be measured by an electroscope^{1,2}—two conductors show a dynamic electrical quantity, the magnitude of which can be measured by a microvoltmeter or by electronic high input impedance methods. The magnitudes of tribo-electric potentials in metals range from less than 10 microvolts to upward of 4000 microvolts, depending upon the amount and nature of the dissimilarity existing between the mutually electrifying metals.

Fundamentally, tribo-electrification is simply friction electricity which is created, in a manner of speaking, when two chemically dissimilar substances are caused to rub together. Chemically identical substances subjected to frictional contact create no electrification.

Use of the tribo-electric effect for metal sorting is accomplished by means of reciprocating a standard reference specimen of known or acceptable character against the surface of the unknown piece and registering the potential developed, if any. Obviously, if no potential is developed during reciprocation, the indication is that two pieces are metallurgically identical and therefore the unknown is acceptable for further processing. On the other hand, if a tribo-electric potential is registered during reciprocation it means that the reference standard and the unknown are metallurgically dissimilar. The nature of the dissimilarity is indicated by the polarity and size of the potential developed providing preliminary tests involving the types of metals on hand have been made.

Essentials of the tribo-electric method consist of a variable-speed motor-driven reciprocating mechanism, a bias control, a test-initiating push-button switch, a specimen holding chuck and a flexible connector lead with spring clip; all mounted within a pistol-grip type aluminum alloy housing. Housing is connected to main body or control unit of the instrument by means of a multi-conductor cable equipped with a nonreversible plug. Complete portability and flexibility are attained and the operator is provided with ready access to most commonly used controls. This assembly is referred to as the testing tool.

The control unit houses a Thyatron

timing circuit (which automatically controls the reciprocating time of the testing tool after test has been initiated by depressing the push button switch), an electronic bias supply circuit, a specially designed high sensitivity microvoltmeter, overload protection devices and adjustment controls which are of a semipermanent nature. Only one "sensitivity" adjustment is mounted on the exterior panel of the control unit (Fig. 1). This is calibrated in a ratio of 1, 2 and 4 times the readings obtained at the minimum setting of 1 and is provided in order that the operator may select, without the confusion of cross-settings, the optimum point of "sensitivity" at which to sort any given types of metals. Other than the "sensitivity" control, the panel contains an illuminated scale calibrated in millimeters to the left (negative) and right (positive) of center zero, an ON-OFF switch, and receptacles for the power input and testing tool plugs. Control unit also houses the testing tool, cables and fixtures. Operating power required is less than 100 w, at 115 v, 60 cycles, and the entire equipment weighs about 40 lb.

Testing Procedure

With instrument connected to a source of power and turned to ON, a typical test procedure consists of chucking a reference standard into the nose of the testing tool and clipping the flexible lead to the piece to be tested. The reference standard is then held in contact against a small cleaned area on the unknown and any parasitic or thermoelectric potentials which may be present are balanced to zero indication on the scale by means of the bias control. The test is initiated by pressing the push button switch. Under average operating conditions the time of reciprocation is automatically held to about 1/2-sec. at a frequency of 15% in. strokes per sec. Pressure at the point of contact between the two specimens is about 2 lb. During this time the indicator on the illuminated scale will have moved to a maximum position if the specimens are dissimilar and this reading is then noted by the operator.

To prevent seizure or scoring during reciprocation, a small quantity of a lubricant such as grease or graphited oil is applied to the reference standard. Scoring has been found to cause erratic readings which probably result from a redistribution of surface strains during the progress of the test.

Reference standards are commonly made into round bars about 1/4-in. in diameter by 3 in. long. These may be inserted easily into the chuck of testing tool; fixtures are provided which enable use of larger sections of bars, forgings or castings. Additional fixtures, supplied as standard equipment, permit the use of wire, strip or sheet sections for reference standards. Since the mechanical destruction of reference standards during testing is negligible, the proper standards, having once been determined and selected,

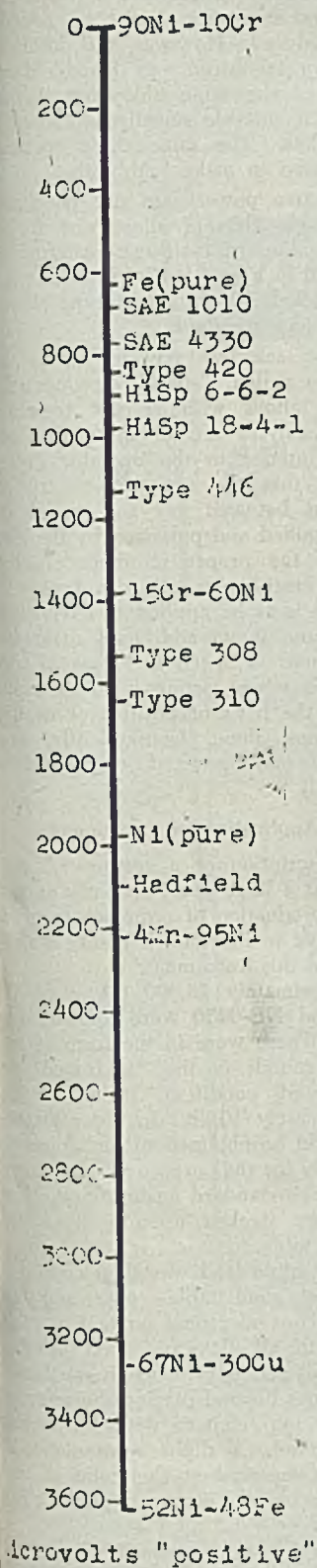


Fig. 3—Relative distribution of tribo-electric voltage (representing saturation values of "positive" polarity with respect to reference standard) with 90 Ni-10 Cr alloy reference standard, those alloys above it will show "negative" polarity while those below will remain "positive"

may be used indefinitely. There is no thermal or electrical damage.

When dissimilar specimens are compared tribo-electrically, potential registered is a composite result of several metallurgical variables. It is therefore necessary to confine tests comparing the chemical compositions of the specimens to only those specimens which are known to be in approximately like constitutional states, i.e., a tribo-electric potential can be ascribed to a difference in chemical composition only when it is known that the constitution of the two pieces being compared is of the same order. Shifts in constitution may be detected and defined as such when it is known that the chemical composition of the pieces is identical.

This latter function of the tribo-electric test has been used to determine the constitutional gradient along finished parts which have been subjected to localized heat treatment.

Because the tribo-electric effect is confined purely to the surfaces of the materials being tested, a potential indication representative of the main composition of the part will not be obtained if the surface is either carburized or decarburized or if it contains scale or rust. Although the test will show differences in surface carbon of carburized material it can not be relied upon to indicate the degree of penetration. Amount of clean surface necessary to provide for tribo-electric test need not exceed an area of about $\frac{1}{4}$ x $\frac{1}{8}$ -in. and can be obtained by

manual application of fine emery cloth.

The fields of application for the Metalsorter are not restricted to any one class of metals although some types of analyses are tribo-electrically more powerful than are others. The high nickel-chrome, nickel-copper, and manganese-iron alloys are all very powerful tribo-electrically with respect to each other (see Fig. 3). While the high chromium-nickel stainless types show large readings against chromium-irons and low alloy steels, some chromium-irons, contrary to expectation, show only moderate readings against low alloy and carbon steels. Carbon and low alloy types are tribo-electrically separable but the registered potential is not necessarily indicative of a shift in carbon only or of a shift in any one element alone.

Many types of brasses, bronzes and aluminum alloys can be sorted by the tribo-electric method; precious metals also are responsive to the test.

One of the most interesting and as yet not entirely explained phenomena of the tribo-electric test is the apparent selective power exhibited by certain analyses with regard to magnifying the effects of otherwise tribo-electrically weak specimens. For example, Fig. 2 (A) shows the tribo-electric differential in microvolts between Type 347 and Handfield steel when ingot-iron is used as a reference standard. Fig. 2 (B) shows how this differential has been magnified by

use of the Handfield steel as a reference standard; the differential between Type 347 and ingot-iron has been considerably reduced. However, the differential between ingot-iron and Handfield steel remained the same indicating that one is not a suitable selective standard for the other. The same three specimens were used to make both tests.

Selective powers are not peculiar to any single class of alloys and for this reason, the tribo-electric spectrum, as outlined in Fig. 3 is based on the use of a 90-nickel, 10 chromium type alloy as a reference standard.

These selective powers or, as they may be called, "specific" properties of certain alloys with respect to certain other analyses are of more than academic interest to the operator since it follows that the net tribo-electric differential between any two metals can be magnified and polarized by the selection of the proper reference standard. Such versatility is of advantage when the test is to be applied to a variety of alloys, and shows additional advantages for reasons of speed and ease of interpretation when sorting is to be carried out on the basis of positive or negative deflections alone. Consequently, scrap materials may be sorted quickly and economically.

Application of Instrument

A description of a sorting job completed at a large plant formerly engaged in the production of ordnance parts will best serve to illustrate a practical application of this instrument.

Approximately 10,000 pieces of NE-8620 and NE-9450 were known to be mixed. These were in the form of cup-shaped rounds in the "as forged" and sandblasted condition, each weighing approximately 10 lb. In order that access could be obtained to each piece individually for the purpose of reciprocating a reference standard against it, the forgings were stacked upon a sheet steel covered table.

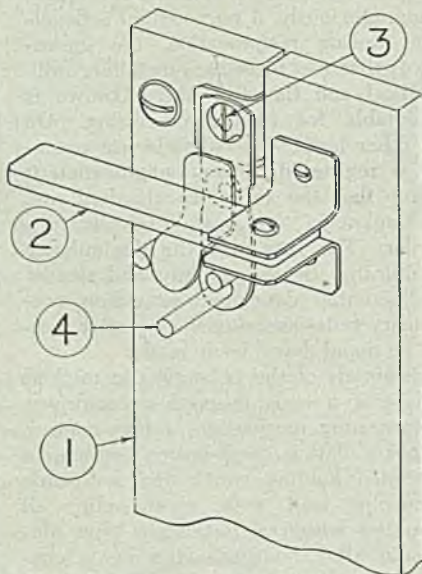
The flexible lead was then clipped to the sheet steel table cover and the simultaneous electrical contact was obtained with all of the pieces on the table. It was not necessary to make any further connections beyond placing the reference standard into contact with the forgings to be sorted. A slight accumulation of rust was removed at the point of testing by means of a pass or two with a fine file.

The reference standard chosen for this job was a $\frac{1}{4}$ x 3 in. bar of NE-8620 machined out of an identified piece. At the lowest sensitivity setting of the instrument it was found that this standard gave a zero reading when reciprocated against NE-8620 and a reading of 1 mm "positive" deflection against NE-9450. The entire sorting job was easily accomplished in a short time since it was demonstrated that a testing rate of 500 separations per hour could be maintained. Three different operators worked the equipment after about 15 min instruction.

New Fixture AIDS Assembly of Clamps

A solution to the slow and tedious job of assembling electrical clamps has been found in a new tool which holds the parts together in perfect alignment. Previously, it had been necessary to use hand tools to tighten the screws and nuts which held the parts together. This procedure often resulted in parts getting out of alignment and a great many crooked clamps which had to be loosened, realigned and retightened, causing an additional loss of time.

With the new tool, developed at Glenn L. Martin Co., Baltimore, all such errors are eliminated. It also makes possible the use of a compressed air nut runner for faster assembly. Base of the tool, shown at (1) in accompanying illustration, is made of fiber board and when the tool is in operation is placed in a vise. Parts are held by a slot in the base and a series of three pins (4) while the fiber arm (2) is held down on the clamp keeping constant pressure on the screw which joins the two parts. When the nut is turned, the head of the screw is automatically forced on to the "built-



in" screwdriver (3), holding it until the nut is tight.

With slight modifications, tools of this type can be adapted to assembling other types of clamps, saving not only time in assembly, but also improving quality of workmanship.

METAL SHOW -

CLEVELAND

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IS THE WORD FOR IT!

An idea of the magnitude of the 27th National Metal Congress and Exposition is indicated by the fact that over three hundred and fifty manufacturers have reserved over eight acres of display space. Certainly an event of these proportions will be unsurpassed in the presentation of new ideas, processes and production equipment. Many of the processes, techniques and products that will be revealed to you have not been available, until now, for wide spread application. Many will fit into your production scheme, will help you increase production and improve your products.

The Metal Show at Cleveland's Public Auditorium, February 4 through 8, will be unparalleled for its contribution of profitable production ideas. Be sure to attend!

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NATIONAL METAL CONGRESS AND EXPOSITION

FEBRUARY 4TH THRU 8TH

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100 Years of Progress

(Concluded from Page 85)

the range of products. Headed and threaded parts include rivets and a great variety of special shapes, which have been developed for and by cold up-setting.

Cold-working has been the key to this company's manufacturing strategy and for it steel and other metals suitable for fastenings in a wide range of analyses, sizes and types have been developed. From special rods with quality control beginning at the blast furnace and open hearth, Russell, Burdsall & Ward draw their own wire, permitting further flexibility in raw material control and assuring strict adherence to tolerances essential to proper cold-heading results. For extremely severe and exacting work or difficult heading, wire is spheroidized.

Commercial bolts are cold-headed through the wide size range up to $\frac{7}{8}$ x 8 in. and cap screws and numerous special shapes up to 1 x 6 in. Bolts are threaded by cold-forming or die-cutting and practice here is to cold-form threads in the same size range they cold-head. A bolt breaking under tension fractures in the thread and a process insuring maximum strength in the threaded section has material advantages; accuracy, uniformity of pitch and lead are important for automatic or line assembly.

Forming of threads by pressure, rather than cutting, eliminates tear on the metal, assuring an accurate thread formation, preserving density of the grain structure at crest of the thread and intensifying it at the root. Cold working also increases the tensile strength permitting the bolt to carry 20 per cent greater load in some instances. Length of the body to be threaded is first swaged or extruded down to the proper diameter for cold-forming the threads.

Cold-formed bolt threads give accurate mating fit with the nut, maximum wrenching efficiency, improved load distribution and added resistance to shock and torsion. Bolts are heat-treated to relieve any stress which might result from cold-heading and to increase toughness and strength. Some longer lengths and larger diameters are hot-forged and most bolts formed hot are threaded by the die-cutting method in machines equipped with lead screw attachments to assure accuracy.

Although an integrally important part,

a nut has few characteristics in common with a bolt, being subject to shear, and the manufacturing process should insure against splitting and stripping. Metal in a bolt is usually stressed in tension, subject to fracture from shock or fatigue. Maximum in strength and safety with the ultimate in accuracy and finish is the goal in nut-making. First machine for cold-punching nuts and all machines now in use at the company's plants were invented by Russell, Burdsall & Ward engineers. A new machine in the experimental stage, embodying new and radically different methods, is now on trial runs.

Nuts for bolts up to 1½-in. are cold-punched on automatic equipment. All forming work on nuts is done at right angles to the direction in which the steel is rolled. No defective bar can pass through production without detection, punching operations automatically showing up seamy stock.

Develop Repunching Process

Repunching, also developed by RB&W, has been a significant improvement in nut making; this clears and trues the hole, leaving it clean and concentric for tapping. For final proof of soundness, this automatically subjects the blank to a drift test. By passing the blank through convex dies, side walls are compressed and burnished, toughening surface for resistance to wrench abuse and improving appearance.

Russell, Burdsall & Ward engineers not only developed the first automatic tapper and built the fastest continuous tapper, but also introduced a new principle in tapping which made possible improved accuracy in pitch and lead; the cutting tool is held stationary while the nuts are advanced, insuring thread formation uniformity.

Bolt-making came into its own with the first cold automatic header. Developments which have definitely led to improvement in the product since include the solid die header, soon after the turn of the century. The solid die header required wire and for some years was limited to small diameter and short length bolts. About 25 years ago use of this type of machine became more general. Improvements have been developed to the extent 1-in. diameter machines are now available.

This header is limited in length, but permits high quality products to be cold

headed due to the extreme accuracy of the shank, concentricity of the head and control in flow of the material.

Reducing the shank so that the rolled thread might be applied to full body size products was another forward step in manufacture. Termed swedging, Russell, Burdsall & Ward developed practice for reducing the shank about 25 years ago.

Later, development of the solid die header made this same operation possible in the header itself. The operation is known as extruding. This extruding, or swedging, made the process of cold forming of threads or thread rolling on full body size bolts possible. As indicated, this process for producing threads adds much to accuracy.

Tungsten carbide drawing dies for the sizing of wire also contribute much to production of high quality products, but the use of tungsten carbide in cold-heading dies did even more to improve accuracy of shank, as well as the extruded section.

Improvement in the manufacture of nuts has kept pace with that for bolts. Cold punched nuts were made on a series of presses; holes were punched in rectangular bars and a stamping press stamped out hexagonal and other shapes. Although the product was tough and sound, the operation was crude and slow.

A nut-producing machine which combined these operations was first developed by this company 30 years ago. Operations were also added for repunching and retrimming, greatly improving the nut with a more concentric hole, closer dimensional tolerances and an improved hole for tapping. Nuts were again improved by the development of a burnishing attachment with burnished sides of the nut, resulting in very close tolerances with a smooth and tough wrenching surface.

Accuracy in tapping has gone forward with great strides since the first continuous tapper was designed two score years ago. This replaced the in-and-out tapper, permitting closer tapping tolerances. This continuous tapping operation was again improved by introduction of bent shank taps. The bent shank tapper again improved tolerance to which nuts could be tapped. There are several bent shank tappers, involving such improvements as the S-bent tap, the stationary bent shank tap and the floating chuck tapper, all improving the thread.

Labels Simplify Marking

Quick Labels speed up and simplify the marking or coding of wires, motor leads, harnesses, etc., provide permanent, legible identification and stick without moistening to any round or flat surface, according to the W. H. Brady Co., 2904Z-East Linwood avenue, Milwaukee. They are pre-cut to exact size, and come on handy code cards ready for instant use. Labels are peeled from the card by means of self-starter feature which automatically exposes the ends of

the labels, permitting them to be pulled off quickly.

More than 200 different code cards are available, including 14 colors, to meet requirements of all types of electrical production problems.

Roller Bearing Engineering

Ball and Roller Bearing Engineering, by Arvid Palmgren; cloth, 270 pages, 7 x 10 inches; published by SKF Industries Inc., Front St. and Erie Ave., Philadelphia 34, for \$1.75.

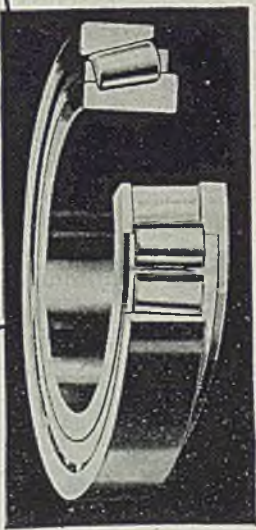
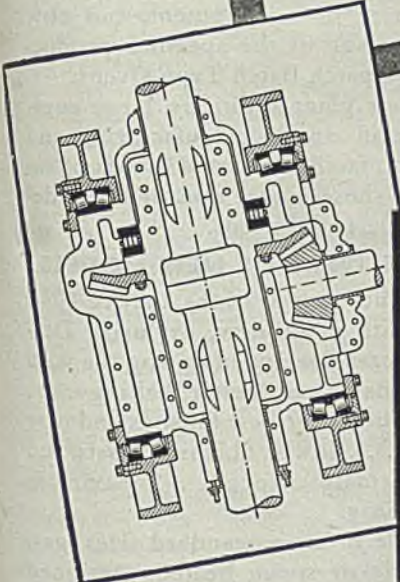
This volume by Dr. Arvid Palmgren

is intended to serve as a fundamental text, not as a comprehensive treatise or a bearing catalog. Those seeking to probe more deeply into the technical aspects are referred to publications listed in the bibliography.

The author has specialized for almost 30 years in research and engineering of ball and roller bearings and has become an authority, earning the gold medal of the Engineering Science Academy of Sweden in 1938 for his research on fatigue phenomena and developing methods for calculation of their life.



**HELPING LIFT THE LOAD
ON WORLD'S LARGEST FLOATING CRANE**



Cut-away view of Bantam single-row tapered roller bearing, designed to carry radial load of 455,000 pounds at 100 RPM on world's largest sea-going crane. O. D., 52"; I. D., 43". Cross-section shows installation of 4 of 8 Tapered Roller Bearings which carry this radial load and one of two Thrust Bearings for handling the weight of the luffing mechanism.

When you start lifting 125 tons or more of dead weight out of the ocean, you can't take any chances with the tremendous radial and thrust loads involved. That's why, when Anthony M. Meyerstein, Inc., was asked to build the world's largest sea-going crane (*shown above*), they turned to Torrington to engineer and build the bearings which would carry these loads. Result: eight specially-designed Torrington Bantam Tapered Roller Bearings handle the radial load for the luffing drive with tons to spare; two specially-designed Torrington Bantam Thrust Bearings carry the weight of the luffing mechanism with the same sure, safe ease.

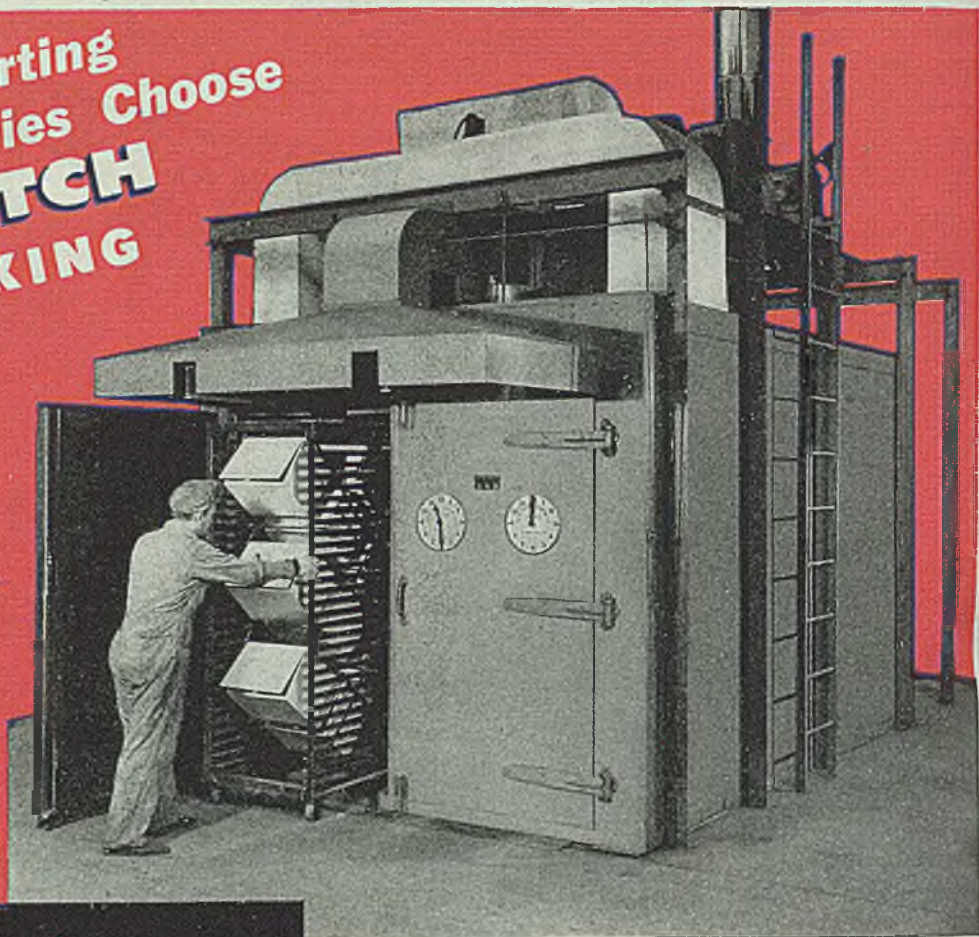
Designing such unusual jobs for heavy industry is all in the day's work for Torrington engineers. No matter how big or complex your load or friction problem, Torrington will solve it for you... solve it with bearings that give you peak performance, ease of lubrication and maintenance, long years of outstanding, trouble-free service. Save yourself time, headaches and money by consulting Torrington whenever you have bearing problems, routine or unusual.

**THE TORRINGTON COMPANY • BANTAM BEARINGS DIVISION
SOUTH BEND 21, INDIANA**

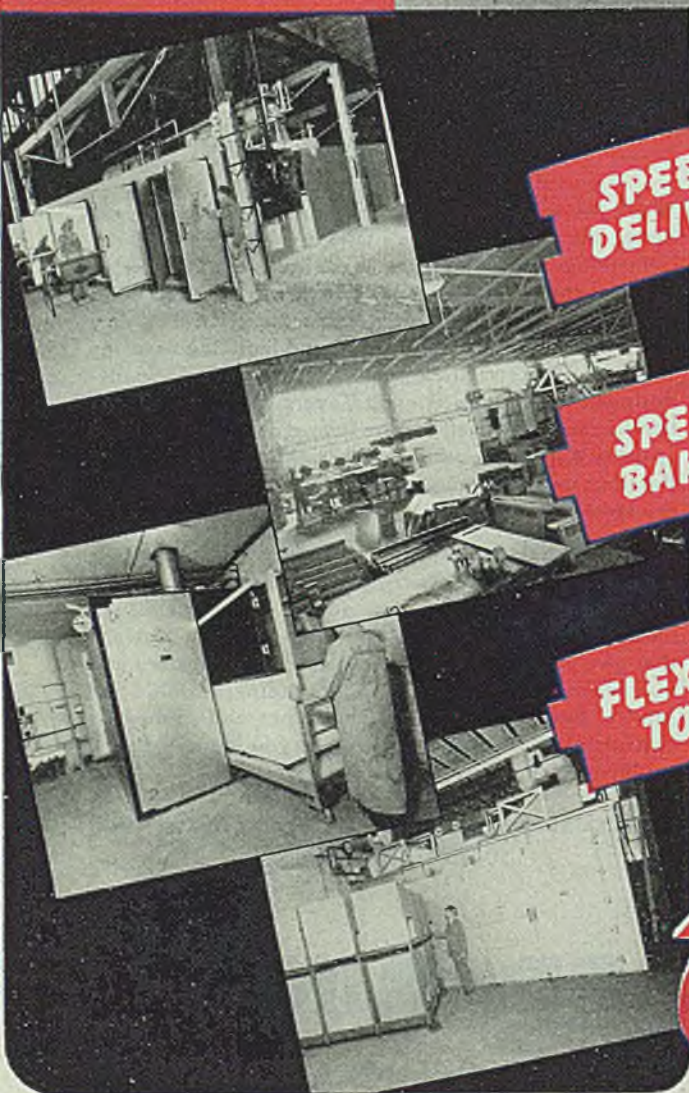
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DESPATCH
FINISH BAKING
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Despatch Rack-loaded Batch type Oven with gas fired convection heating system.



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These are not prewar ovens; they're 1946 models with many new, exclusive Despatch features developed during the war. This means faster, better baking . . . more flexibility for new finishes and new products . . . lower finishing costs . . . minimum maintenance . . . maximum dependability.

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CHICAGO 1

Conditions affecting the application of this widely-used process, and methods for control are reviewed in the light of recent developments in the field

brass plating

—for Rubber-to-Metal Adhesion

BRASS plating still is the most widely used commercial method of obtaining rubber to metal adhesion. Brass plating is adaptable to low carbon steels, some alloy steels, cast and malleable iron, brass, bronze, and manganese steel. High chromium and high silicon steels, as well as some aluminum alloys which usually are not plated, are attached to rubber by cements. Use of adhesives is increasing and in some cases is necessary, as plating process limits size of items which can be processed, as well as metals which can be plated. In some cases the characteristics of certain synthetic rubbers may result in difficulties.

A list of products in which rubber-metal adhesion is required includes vibrator mountings, valves, bumpers, flexible couplings, gaskets, wheels, pulleys, hose, pump and tank linings, plating racks and insulators. It is evident from the foregoing that there are two general classes, using either elastic or protective properties of rubber. Brass plating as a means of obtaining adhesion between rubber and metal has been used commercially since 1923. Since that time approximately 50 patents and 20 major articles have appeared in the United States on brass plating and rubber-to-metal adhesion. Compounds of natural rubber, neoprene, buna-N and butyl will adhere to brass plate if they are compounded for this purpose.

Adhesion based on brass plating has had wide acceptance because of several important characteristics. Strength of the rubber-brass plate bond can be as high as 1000 psi in tension. This value will vary according to the rubber compound and manufacturing conditions. Several rubber companies guarantee a minimum of 250 psi for brass bonded items. Adhesion is not noticeably effected by temperatures from minus 60 to plus 212°F and is resistant to all conditions which the rubber and metal themselves will withstand. Failure of the brass bond over a steel base may be influenced by corrosive conditions.

Theory of Adhesion: Adhesion of rubber to brass appears to depend on two chemical reactions. In general, special rubber compounds and a somewhat critical type of brass plate are required.

The rubber or synthetic rubber stock must be compounded with sulphur, specifically for brass adhesion. The copper content of the brass plate should be maintained between 65 and 80 per cent, and best adhesion is obtained when the brass crystals are in a strained condition.

Rubber in contact with brass plate is depolymerized by the copper in the brass. This degradation of the chain molecule makes available certain forces for adhesion. In addition, a copper-sulphur linkage occurs which is essential for high adhesion. It appears that copper alone is insufficient to activate the adhesion reactions. However, a weak bond generally results due to severe depolymerization which occurs. Presence of zinc acts as a diluent of copper and also provides a crystal interface for chemical attack. Adhesion apparently is best to brass crystals that are "strained," thereby rendering the brass as "active" as possible.

Experiment illustrating the advantage of a strained crystal structure consists of annealing a cold-rolled strip of commercial yellow brass in an inert atmosphere until all the strain had been removed. This gives good adhesion to rubber. With annealing, adhesion becomes progressively less until there is no adhesion to the completely annealed material¹.

Process of producing rubber-to-metal bonded items by brass plating includes cleaning and brass plating of metal, and molding rubber to metal under heat and pressure to vulcanize rubber in required shape (and thus obtain adhesion). Brass plating operation, similar to other types of cyanide plating procedures, may be carried out in still or barrel tanks and is adaptable to either fully or semiautomatic operations.

Plating Bath Recommendations: All commercial brass baths are cyanide solutions, primarily sodium cyanide solutions. There is a wide choice of plating baths as under certain conditions the same copper-zinc ratio in deposit can be obtained from a number of different baths. Among variables that may be encountered in plating are total metal content, copper-zinc ratio, free cyanide content, ammonia content, and pH of the bath, as well as temperature, current density and filtra-

tion. A brass plating bath recommended by Hayford and Rogers as suitable for consistently satisfactory rubber adhesion has the following composition:

Constituent	Concentration oz/gal
Copper (Metal)	3.00
Zinc (Metal)	0.30
Free Sodium Cyanide (NaCN) ...	1.50
Ammonia (NH ₃)	0.30
Sodium Bicarbonate (as carbonate)	5-10
pH	9.5

Recommended conditions for operation of this solution are current density of 7 to 15 amp/sq ft at temperature of 75 to 90° F, with continuous filtration. It is reported that the deposit will consist of approximately 75 per cent copper.

In brass plating, zinc is plated from the bivalent state while copper is deposited from the monovalent state. Zinc exists as complexes of sodium-zinc cyanide or sodium zincate, whereas copper exists only in the form of one or more complexes of sodium cyanide. Purpose of sodium cyanide in bath is to dissolve copper cyanide and zinc cyanide. This is accomplished by forming water-soluble complexes. As these complex cyanides supply many more zinc-ions than copper-ions, copper and zinc are deposited simultaneously. This is not possible with copper and zinc salts such as the sulphates, which supply nearly equal numbers of copper and zinc-ions. In an acid sulphate bath only copper would be deposited until the bath was almost exhausted as to copper, as it is more noble than zinc. In all brass plating baths there is an excess of sodium cyanide present over the amount required to form the two primary complexes.

Hayford and Rogers give some pertinent general principles with reference to operation of their bath. These may be summed up as follows:

(1) *Total metal content* is not critically limited. Customary effects of decreased electrode efficiencies and reduction of throwing power do not influence rubber adhesion properties. On changing total metal content, change in free cyanide content and pH exert a more important influence.

(2) *Copper-zinc ratio* in plating bath has an important effect on plating

... wrap it up ... I can carry this light one home"



A happy surprise ... that first experience with ultra-light magnesium! ✧ You may meet it in buying a bulky metal toy ... finding it unbelievably light. Such a toy is easy to carry up and down steps ... in and out of playroom or basement. You'll bless that lightness! And magnesium is tough and sturdy, too—equal to all the punishment five-year-olds can give it. ✧ Millions will gladly pay a little more for products freed from useless weight. ✧ Dow makes no toys. As the leading producer of magnesium metal, however, it cooperates with manufacturers in many fields who are developing a growing variety of new lightweight products for you. Keep your eyes open for them!

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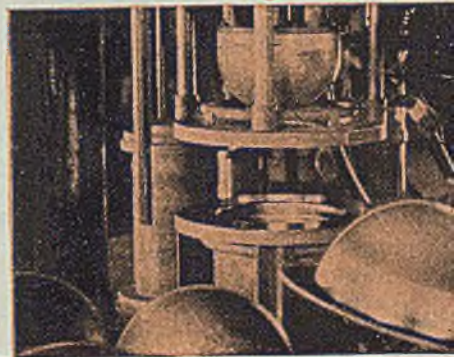


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People will buy *lightness*—just like the gentleman on the opposite page! They'll even pay a little more, if necessary, to get it. Magnesium—lightest of all structural metals—gives consumer products a special appeal that makes them *sell faster* because it makes them *better*. It's true in industry, too. Alert designers, fabricators, manufacturers are thoroughly aware that many industrial products can be bettered . . . made more salable . . . with magnesium. It gives you lightness, strength, easy workability—does something for industrial products that no other metal can do. Great strides have been made in magnesium application; greater ones are in the making.

DEEP DRAWN PARTS of many kinds are produced of magnesium in a single cost-saving operation. Cylindrical cups, for example, are commonly drawn to a depth of 1½ times their diameter in a single draw by this hot forming method. Similar results with steel would require drawing, annealing, and redrawing several times.



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DIE CASTINGS of magnesium are gaining a growing place in many fields. Leading die casters are turning out parts and finished products of magnesium with accurate dimensions, a minimum of machining, good surface finish, low cost—in addition to the fundamental magnesium advantages of lightness and high strength-weight ratio.



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(Left) Reprint of a Dow advertisement seen by millions of readers in national magazines.

conditions. By increasing copper content, percentage of copper in deposit is increased.

(3) *Free sodium cyanide* is defined as that amount of cyanide, calculated as sodium cyanide, which is present in solution and not combined in copper-zinc complex. It is difficult to measure this variable, which is calculated by measuring total cyanide content and subtracting amount calculated to be tied up with copper and zinc. By increasing free cyanide content, the following results are obtained: Decrease in metal-ion concentration; increase in per cent of copper in deposit; decrease in cathode efficiency; increase in anode efficiency.

(4) *Ammonia* usually is added to a new or idle solution and will build up on continued operation. In a bath of composition described, ammonia has a striking effect on current density operating range. Also, when using a high ammonia content (as in the above bath) a low zinc content is advisable. By increasing ammonia content the following changes may be predicted: Decrease in metal-ion concentration; decrease in per cent copper in deposit; stabilize color of the deposit; slight increase in pH (unbuffered solution); minimize effect of current density; minimize effect of copper-zinc ratio; increase cathode efficiency; this addition also may cause some zinc to precipitate out.

(5) Solution pH should be controlled using colorimetric or preferably electrometric methods. With increasing pH the following effects are noted: Decrease in per cent of copper in the deposit; decrease in metal-ion concentration.

Control: In summary, variables usually encountered in brass plating which influence the deposition of plate of a given composition are: (a) copper-zinc ratio in the solution, (b) free cyanide, (c) pH, (d) ammonia, (e) current density. Hayford and Rogers' emphasize the fact that in the presence of at least 0.3 oz/gal of ammonia close control of solution is not required and effect of variations in copper-zinc ratio and current density is minimized.

Other Brass Plating Baths: It also is of interest to note that Coats in an article on *Brass Plating* recommends two bath compositions for rubber adhesion plating applications. First of these bath compositions, reported to offer a number of advantages, is as follows

Constituent	Concentration oz/gal
Copper Cyanide (CuCN)	3.5
Zinc Cyanide (ZnCN)	1.5
Total Sodium Cyanide (NaCN) ...	6.0

Upon analysis this bath will show a free cyanide content of 1 oz per gal. Temperature of operation should be between 80 and 95°F with a recommended current density of about 10 amp per sq ft. The pH may vary between 10.3 and 11.0, measured colorimetrically. Brass anodes of 75 per cent copper and 25 per cent zinc are used. Anode and cathode efficiencies are above 75 per cent and the throwing power is good. Brass containing from 18 to 40 per cent zinc is readily deposited from the bath by varying the time of current density. According to Coats, advantages of this bath are "simplicity of operation and control analysis, good anode corrosion, good conductivity and throwing power as well as rapid deposition".

Second bath recommended by Coats for

rubber bonding deposits has the following composition:

Constituent	Concentration oz/gal
Copper Cyanide (CuCN)	2.4
Zinc Cyanide (ZnCN)	1.3
Free Sodium Cyanide (NaCN)	1.6

Operating conditions for this bath are: Current density about 5 amp per sq ft; temperature around 80°F.

Brass Plating Process: Brass plating often is done by the rubber manufacturer who is processing the article. This may have certain advantages due to the special type of brass plating required, the simplification of scheduling and the benefits of centralized responsibility. However, there is no reason why manufacturers and fabricators cannot secure suitable brass plate for rubber adhesion purposes from the job plater. If this is done, a slightly heavier brass plate should be deposited. This subsequently is reactivated prior to use by the rubber processor by dipping in 2 per cent sodium cyanide solution.

REFERENCES

¹Experiment described before Newark, N. J. branch meeting of Electroplaters' Society by W. Hayford and H. S. Rogers. Also published in *Monthly Review*, American Electroplaters' Society, May, 1945.

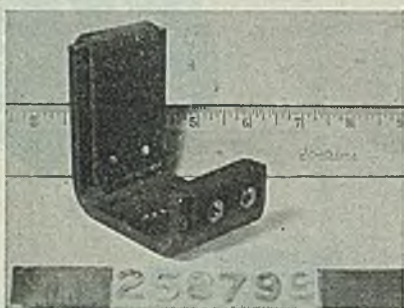
²Detailed description of methods for analyzing and maintaining common brass plating baths are given in *Modern Electroplating*, Electrochemical Society, 1942.

³Gray, A. G., Proc. Am. Electroplaters' Society, 1941.

⁴"Modern Electroplating", Electrochemical Society, Inc., 1942.

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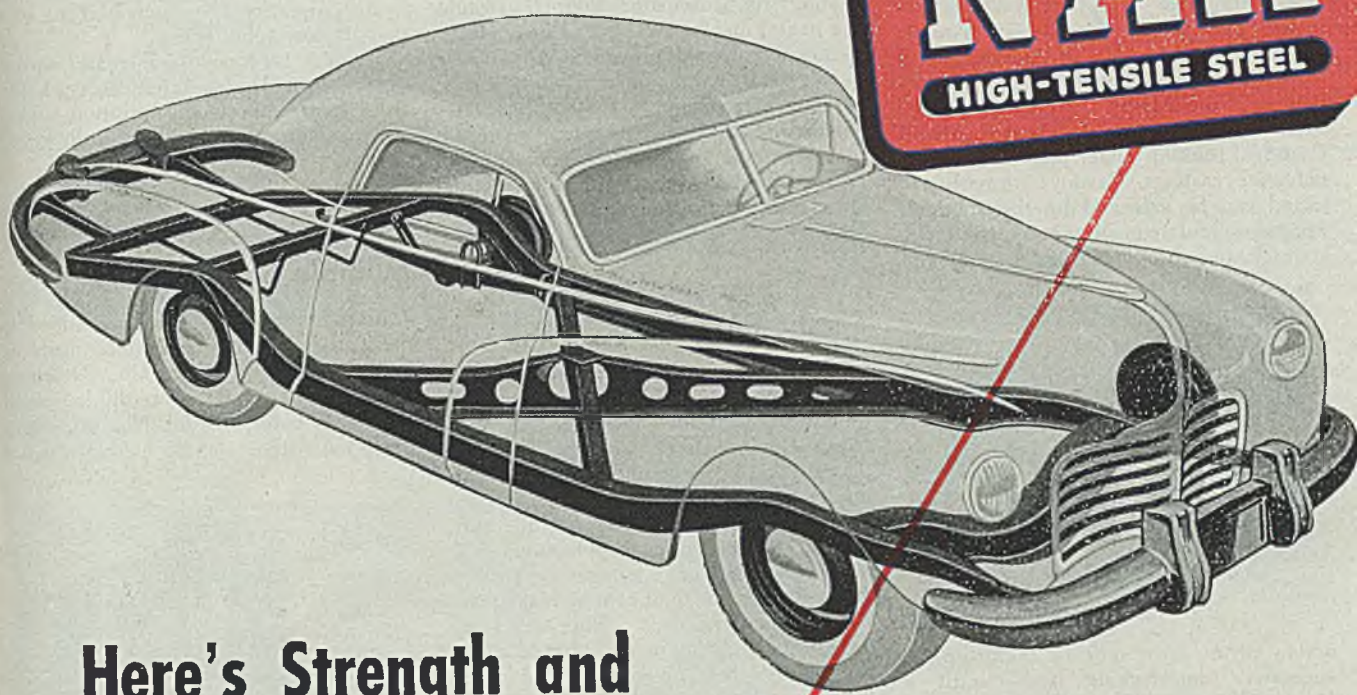
Seamless nickel tubing is used by the J.B.T. Instrument Co., New Haven, Conn., for bulb casings of resistance thermometers employed in temperature measuring instruments.



PHOTOGRAPHY as a means of identifying obsolete war materials aids in disposing of surplus equipment. A piece-part photograph shows item, piece number, and relative size by comparison with a ruler, thus readily establishing identity of contents. System is used by Chicago Vitreous Enamel Product Co., Chicago, for storing many small, odd-shaped materials in compact, orderly fashion in surplus shipping boxes. Packing slips with photographs of each part in box then are

stapled to outside. Warehoused to relieve overcrowded stockroom space, material is available for disposal upon receipt of contractor's instructions. A cross-referenced file record is kept containing photograph, description, usage, obsolescence history, and such factors as quantities, values, location, and final disposition. System can be used by personnel not familiar with parts and blueprints and simplifies final disposition of surplus war materials or other surplus stock.





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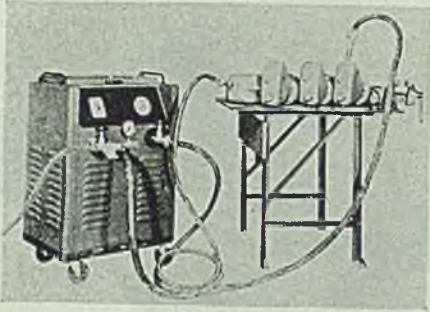
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INDUSTRIAL EQUIPMENT

Circulator for Salvage

To eliminate scrapping castings rejected because of porosity or pinhole cracks, Metallizing Co. of America, 1330 West Congress street, Chicago, has developed the Mogul circulator model M-1500 which circulates heated Mogul Cast-Seal solution under pressure through defective castings. Castings formerly rejected can be salvaged by this method. Pressure-circulated solution enters crack at its maximum opening and by colloidal



action of its base quickly builds-up in successive, interlocking layers until a bond which will effectively seal opening for life of casting has been formed.

Compact unit is mounted on rollers and consists of a sturdily constructed cabinet, housing one 15 gal tank with electric immersion heater, a turbine-type pump equipped with 1/3 hp, 110 v single phase motor. The 30 gpm capacity pump has an automatic pressure switch which maintains pressure at setting by operator. Pressure switch features a device sensitive to changes in pressure which controls speed of pumping action. Operator's pressure setting thereby is

assured. Both immersion heater and motor are fully protected from overheating by automatic thermal switch. For heater and motor 12 ft of heavy-duty electrical cable is provided, in addition to two 12 ft lengths of heavy-duty safety hose for attachment to the castings. Circulator is furnished complete with air pressure gage, air control petcock and 12 ft of air hose fitted with quick-acting air connector for pressure testing.

Item No. 9836

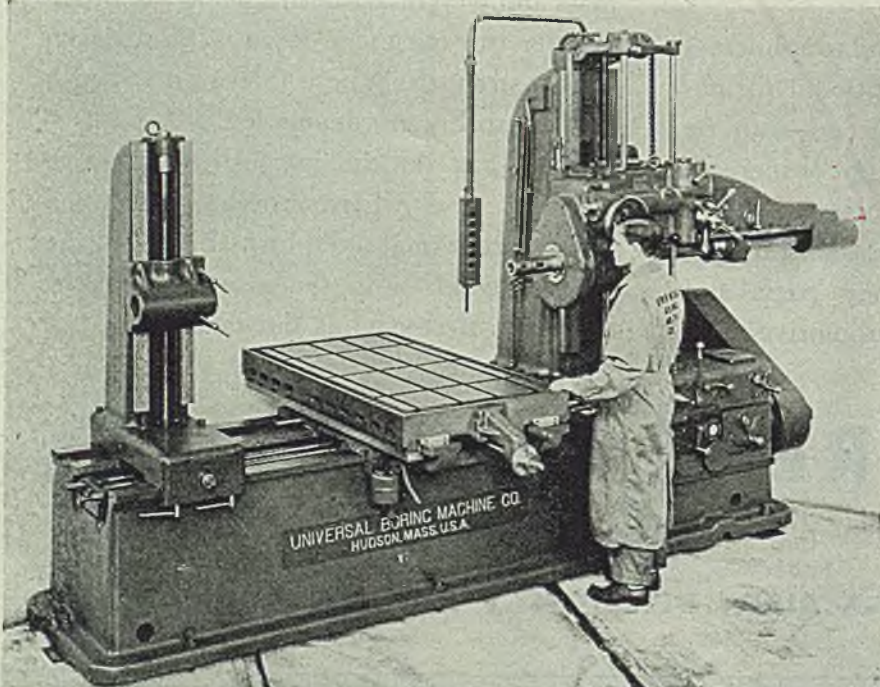
Plastic Pipe Seals

Plastic pipe seals and thread protectors in countersunk pattern are announced by American Molded Products Co., 1644 North Honore street, Chicago 22. The plastic takes accurate and durable threading, is non-corrosive, dielectric, and most efficiently excludes moisture, oil, dirt, grit, etc., for economical protection. The square sockets of countersunk pattern are of dimensions to fit commercial square bars of standard sizes. Dimensions are the same as maximum size of cold rolled square steel bars given in ASTM specifications. Sizes available are 1/8, 1/4, 3/8, 1/2, 3/4 and 1 in.

Item No. 9879

Horizontal Boring Machine

The 3-in. horizontal boring machine, made by Universal Boring Machine Co., Hudson, Mass., has been redesigned to provide new features for increased accuracy and productivity. Some of these changes include higher speed ranges and an increase in the number of speeds.



(All claims are those of the manufacturer of the equipment being described.)

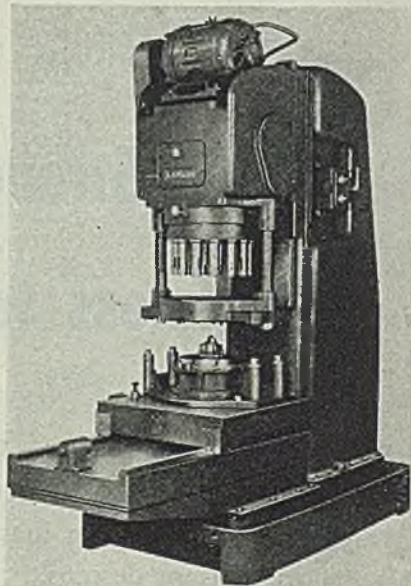
The increase in horsepower has also necessitated changes in gearing—they have been proportionately increased to compensate for higher speed.

Pendant type control increases ease of operation, as the operator can work controls from almost any position around the machine during milling, drilling, and boring.

Item No. 9915

Multiple Spindle Drill

Another standard machine added to the vertical drilling machines made by LeMaire Tool & Mfg. Co., Dearborn, Mich., is the single or multiple spindle drill and borer, model No. 20. It is furnished with a spindle having a milled



drive slot for multiple head adaptation. Provision is made for a Morse taper adapter for single spindle operations.

Movement of the head for rapid advance and feed is actuated by means of a heavy duty hydraulic cylinder mounted to the column between the ways, controlled by Vickers control panel. Machine is equipped with fourteen spindles set to drill eight holes 17/32-in. diameter and six holes 39/64-in. diameter. Then, while part is still in fixture, six drills are replaced by six reamers to ream the holes to 0.6245. Magic quick change chucks are used. A manually operated shuttle-type fixture is provided to facilitate the loading and the removal of parts with a hoist. A rigid box-type table 25 x 29 in. maximum is standard equipment.

Power is transmitted by V-belts to a pick-off gear shaft, and through pick-off gears to a worm and worm wheel, which drives the spindle. Spindle is mounted in double row ball bearing at the upper end and in a double row Timken roller



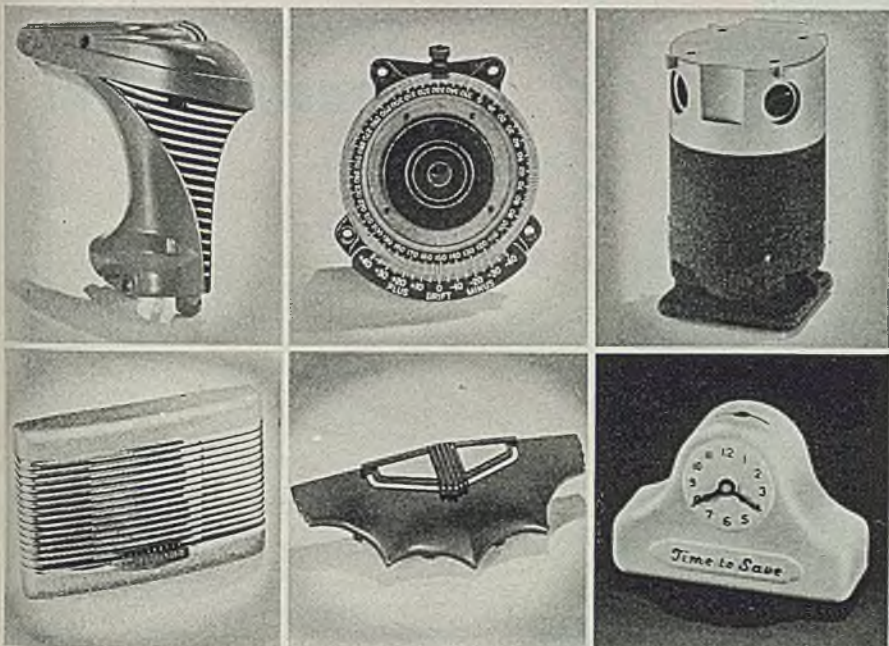
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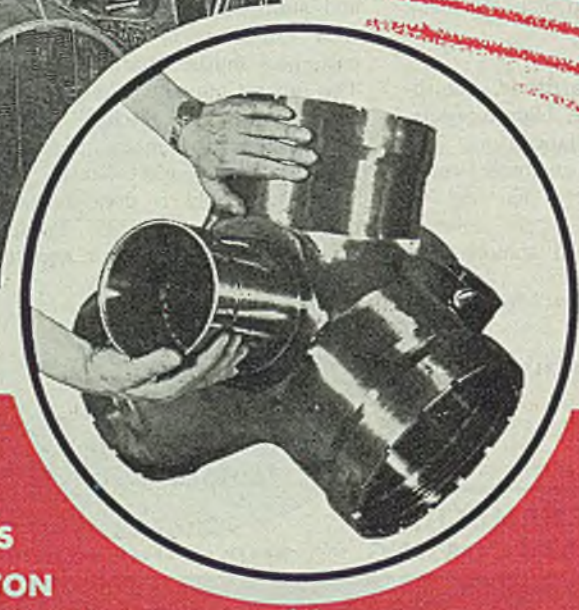
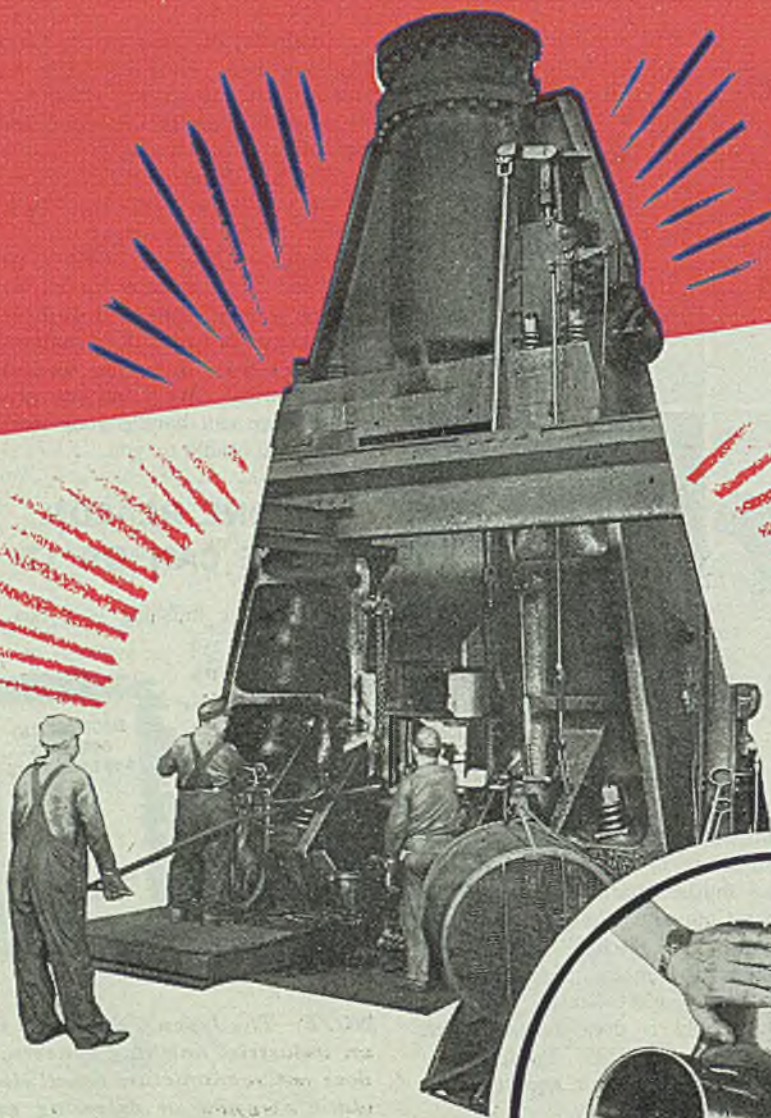
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Today we're supplying automotive, airplane and shipbuilding industries with indestructible parts formed under our huge hammers. At Canton there is concentrated America's greatest metal-forming force of forging hammers, upsetters, and hydraulic presses. This power now can be applied to bettering the products of peace. Let us see your blue prints. We'll make almost anything you can design . . . at surprisingly low unit cost.

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During these years, particularly in the tri-state area, they met the ever-increasing demands for such high-quality products as Plasteel Roofing and Bates Grates.

Levinson has been almost fanatically discriminating in their selection of the products they distribute. No less selective was the choice of THORN Steel Windows, now also being distributed by Levinson Steel Sales Co.

These products, proven by time and performance, are backed by a service as reliable as the products!



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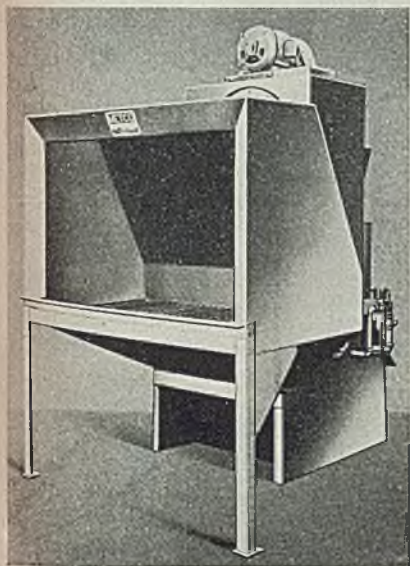
bearing at the lower end. Gears and bearings in driving head are lubricated through splash system. The sliding surfaces on the head are greased by Alemite system.

Item No. 9906

Metal Spray Booths

A complete line of spray booths and dust collecting equipment designed specially to handle metal spray dust, is offered by Metallizing Engineering Co., Long Island City 1, N. Y. Equipment is designed for paint and similar materials and intended to solve problems created by strong blasts of air and metal from metallizing guns.

Line includes spray booths for exhausting to present exhaust systems, to



the atmosphere, or into a Metco wet collector. Featured is a lathe exhaust unit which is mounted directly on lathe carriage and moves with it. Also featured are wet collectors and water-wash spray booths which gather metal particles in a sludge sump where valuable dust may be reclaimed for salvage. Spray booths have sloping rear wall to eliminate eddies and recirculation, open type work table, down draft, dust trap and cleanout door.

Item No. 9822

Shock Absorbing Lamp

Development of a high-impact filament lamp, equipped with a rubber cushion base and designed to withstand violent physical shocks, has been announced by General Electric's Lamp Department, Nela Park, Cleveland. Lamp was designed for service aboard United States ships, but should have many industrial applications.

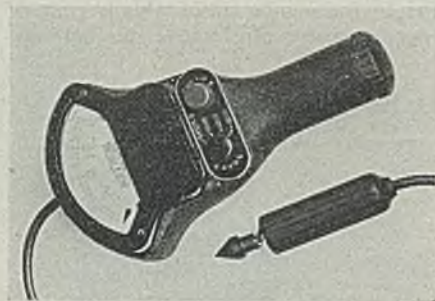
Except for a thick band of rubber surrounding the neck of the bulb, lamp closely resembles the ordinary household lamp. Remainder of the heat and shock-resisting rubber skirted insert is firmly

located between the medium-screw brass base and bulb's glass neck. Rated at 50 w and equipped with extra sturdy internal construction, lamp has undergone laboratory tests wherein it withstood shocks of 2000 footpounds and more. This is equivalent to impact caused by a 400-lb weight dropping 5 ft.

Item No. 9871

Hand Tachometer

Portable hand tachometer based on new principle is announced by Metron Instrument Co., 432 Lincoln street, Denver. No gears or gear shifts are used. Head consists merely of a set of contacts



operated by the rotating shaft. It has low driving torque, extreme stability, and is equipped with two disks allowing 6 fpm ranges.

Item No. 9928

Pneumatic Drills

Eight new drills have been added to a line of precision-built pneumatic tools of Aro Equipment Corp., Bryan, O. The drills are of 3/16 and 1/4-in. capacity, especially suited for assembly operations where they contribute greater speed and efficiency to production. Their design embodies features for powerful, stall-



proof operation, combined with lightweight construction to lessen fatigue.

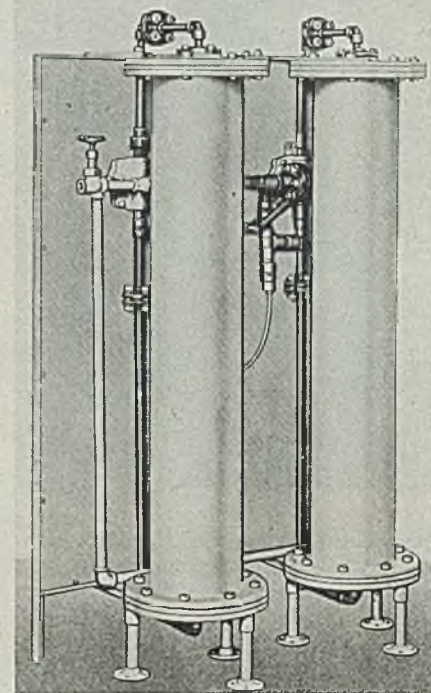
Model 209 with button throttle, and model 309 with lever throttle, have aluminum housing, either a 3/16 or 1/4-in. chuck, and weigh 1 lb 13 oz. They are straight-type drills capable of 2500 rpm. Model 2013 is similar to model 209, except it offers speed of 4000 rpm, as does model 3013. Model 2010 has button throttle, and model 3010 a lever throttle; they operate at 2500 rpm. These models have aluminum housing and handle, 3/16 or 1/4 in. Jacobs chuck, and chuck guard. Weight of each is 2 lb 1 oz. Model 2014 is similar to model 2010, except speed is increased to 4000 rpm, the speed of model 3014. Standard

equipment with all eight models includes 8 ft of 1/4-in. hose with 1/8 and 1/4-in. male fittings on ends.

Item No. 9823

Water Purifying Unit

Compact laboratory units for producing purified water comparable to distilled water are announced by Illinois Water Treatment Co., Rockford, Ill. Portable 12-gph unit weighs only 35 lb. It is 22 in. high, 13 in. wide, and 8 in. deep. Larger laboratory units, providing 60 gph and 100 gph, are approximately 60 in. high, 30 in. wide, and 20 in. deep.



Periodic dismantling for cleaning is not required, and quality of the water is protected throughout the equipment by Saran plastic and hard rubber. Water remains under pressure to point of use. No cooling water, heat or fuel is required.

Item No. 9837

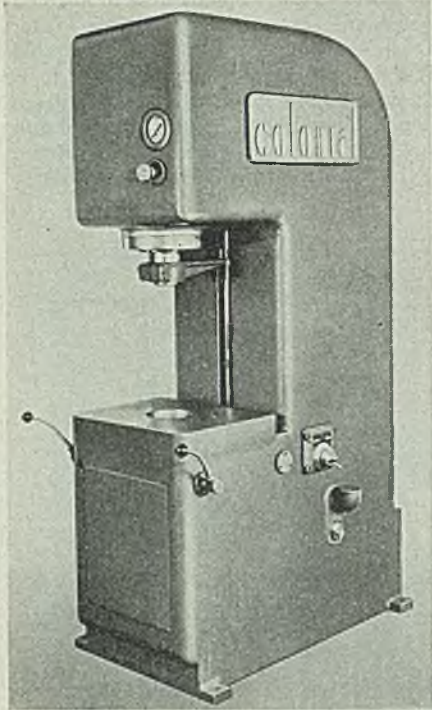
Hydraulic Presses

Standardized presses specifically designed for assembly operations are announced by Colonial Broach Co., Box 37, Harper Station, Detroit.

Machines are available with capacities of 15, 20, 35, and 50 tons, and are of sturdy reinforced steel construction with open side frame design. Motors are built-in and the direct acting hydraulic cylinder which operates ram is built into press head. Normal ram speed on power stroke ranges from 180 ipm on the 15-ton press to 60 ipm on the 50-ton press. Ram speed, adjustable over a wide range, is set by means of speed control valve located on right hand side of machine column. Return speed of each machine is constant regardless of its downward

speed, ranging from 360 ipm for the 15-ton press to 120 ipm for the 50-ton press. Maximum stroke on all machines is 12 in.

Maximum hydraulic pressure is from 75 to 1000 psi in the 15, 20, and 35-ton presses; upper range of the 50-ton press is 1500 psi. Accurate control of oper-



ating pressure is provided through a combination hand control requiring only light pressure. Actual operating maximum pressure is adjustable in all presses by means of a pressure control valve mounted on face of machine head. If predetermined operating pressure is exceeded due to misalignment of parts, errors in machining tolerances, etc, ram stops preventing damage to parts. Press can not be damaged with maximum pressure available. Pressure gage is mounted on head of machine immediately above pressure control knob where operator has unobstructed view. It indicates exact pressure applied to the work piece at all times.

Standard machines are available with table heights 33, 27, and 21 in. on all presses, corresponding to daylight space of 18, 24, and 30 in. respectively. Table size of 15-ton press is 17 x 23 in.; of the 20 and 35-ton presses, 17 x 24 in.; and of the 50-ton press, 17 x 25 in. All sizes of machines have a 10 in. throat and an overall height of 85 in. Floor space of the 15 and 20-ton presses is 27 x 42 in.; of 35-ton press, 29 x 46 in.; and of the 50-ton press, 29 x 50 in. The 15-ton press is powered by a 10 hp motor; other machines by 15 hp motors.

Standard equipment includes hand control, pressure gage, and mounting and wiring of the motor. Accessories include pressure control valve, speed control, and a foot pedal control for use in operations

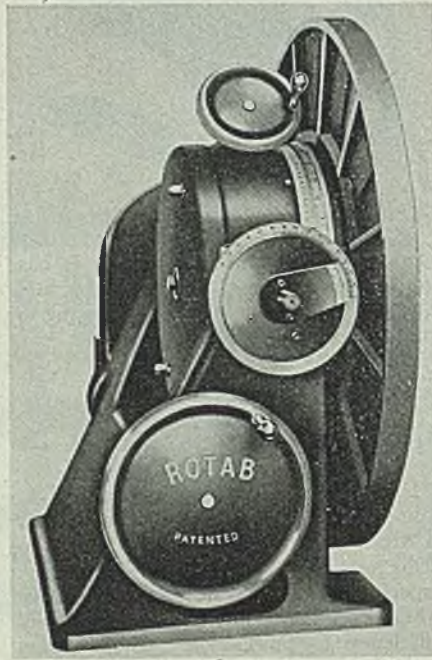
where it is desirable for operator to have both hands free.

Item No. 9724

Adjustable Table

Improved model Rotab is announced by Machine Products Corp., Detroit. Chief improvement is in design of minute control dials. By having verniers positioned on same axes with rotating members, perfect synchronization is achieved assuring greater accuracy. Locations of vernier dials eliminate back lash (valuable in cases where it is used as a fixture for clamping parts on a boring mill or on radial drilling or boring machines).

Vernier for rotating table is conveniently located directly underneath table. Vernier for angular tilt of table is located opposite gear control where sine bar can



be attached for second readings if required.

Table, or faceplate, to which work is clamped can be rotated to any degree, and at same time (by turning another crank) can be tilted to any angle from vertical to horizontal and even 30° back in opposite direction. Simple cranking moves table to required angle, where it can be locked. Three sizes of faceplates are available: 12-in., 23-in. and 36-in.

Item No. 9840

Rivet Remover

A tool designed to remove defective rivets more rapidly from a metal skin without enlarging the hole or distorting the skin has been built by Topflight Tool Co., Towson 4, Md. As the faulty rivet is removed without damage, no redrilling or redimpling is necessary; the new rivet can be inserted in the same hole. Guides, chucks and drills

are dispensed with. A two-way bucking bar is provided with each rivet remover at slight extra charge.

Standard models remove 3/32, 1/8, 3/16, 5/32 and 1/4-in. rivets. Special models can be made to accommodate rivets of any other sizes. Unit is attached to air gun in the usual manner with retainer spring. Point of punch on remover is centered on rivet head. The bucking bar is used in back of rivet to prevent deformation of skin surface while rivet is being removed. Operator gives rivet a few light blows before applying full gun pressure so that punch may seat itself in the rivet head and remain centered after full pressure is applied.

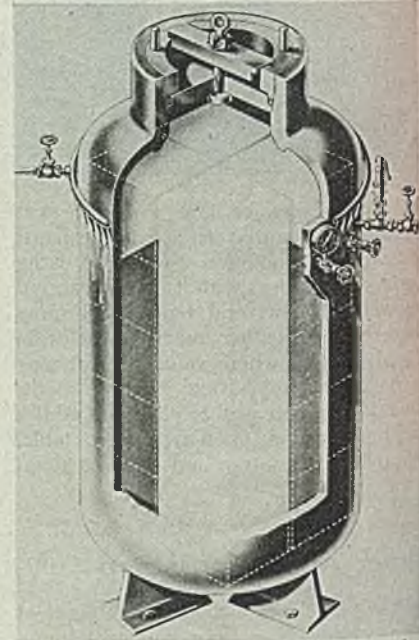
Topflight rivet remover is attached to any standard automatic rivet gun. Pulsating action operates the tool without effort on part of operator. Results are uniform.

Item No. 9765

Dry Ice Liquefier

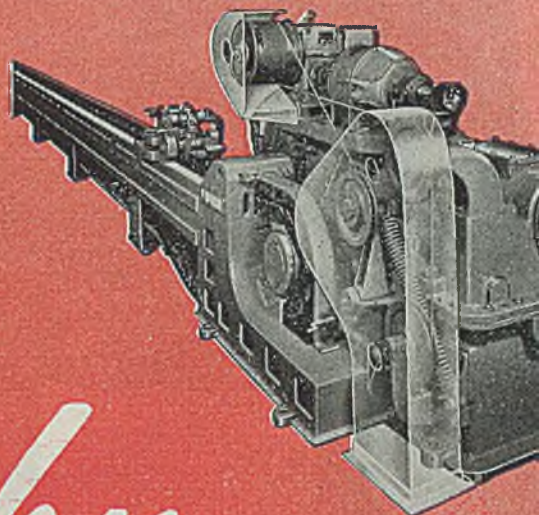
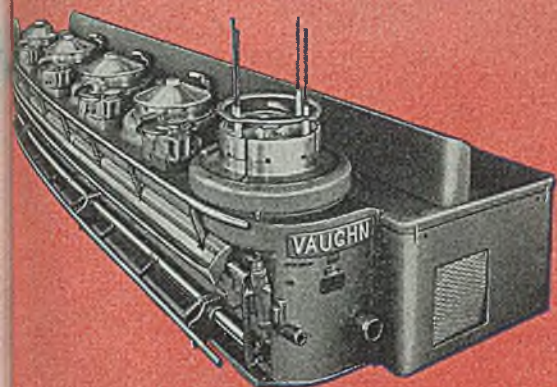
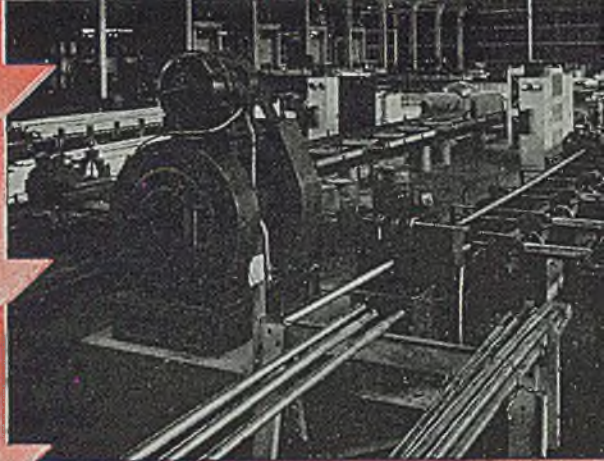
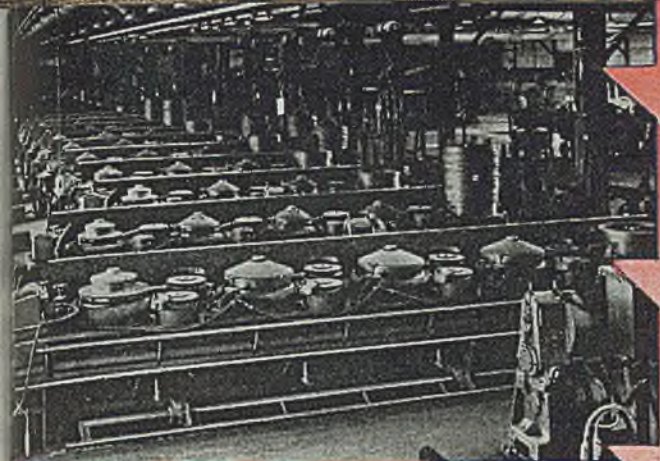
A dry ice liquefier, which transforms solid carbon dioxide into the liquid form, has been developed by Mathieson Alkali Works, 60 East 42 street, New York 17, to assist users of carbon dioxide fire extinguishers, and other carbon dioxide consumers.

Known as the Jumbo Mathieson liquefier consists of a tank, 6 ft 8 in. high and



34 in. in diameter, made of special steel and welded throughout. It has capacity of 20 full-sized blocks of 1000 lb of dry ice. Use of uncrushed blocks saves labor and reduces evaporation loss, it is said. Equipped with safety pressure relief devices, liquefier is engineered according to ASME specifications and carries the stamped approval of Hartford Steam Boiler Inspection & Insurance Co.

To charge liquefier, blocks of dry ice



IT'S

Vaughn

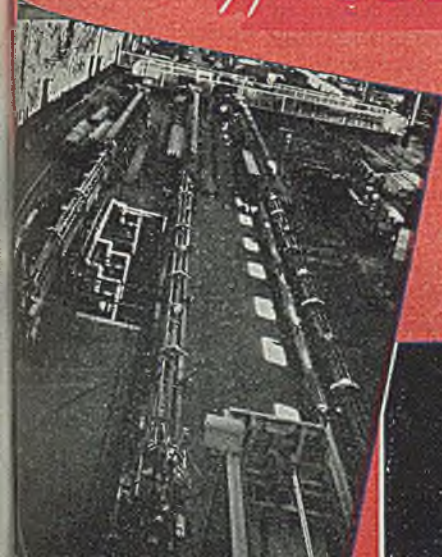
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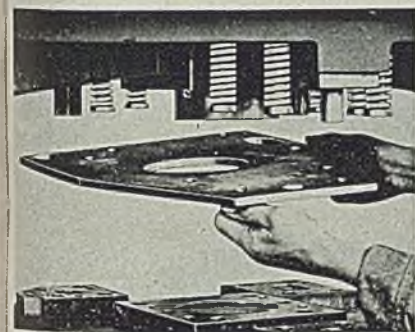
are dropped through the 15-in. circular opening at the top. It is then closed, water is run down the outside surface from perforated ring near top, and liquefier is ready for operation.

In addition to its large capacity, special features claimed are: Absence of moving parts; long life of special molded gasket, due to easy operation of closure head; and operation without compressor and refrigeration unit, electric heating coils, or sensitive control equipment.

Item No. 9825

Stripping Attachments

Improved line of Strippits is announced by Wales-Strippit Corp., North Tonawanda, N. Y. Strippits are used wherever spring pressures are required in a die such as stripping work and scrap from conventional blanking and forming dies or returning cam slides on underturning dies. In making a die, the punch holder or die shoe castings do not have to be turned over after the back sides have been planed. All machining is done



from face side. Each unit is a spring held compressed by means of a retainer which is telescopic, non-revolving and self-contained. One end of the mechanism has a projection with a screw thread by means of which Strippit is held to the punch or die shoe casting. Other end has a tapped hole to accommodate stripper screw which holds the stripper plate to unit. As Strippits are held compressed by retainer, no pressure is exerted on stripper plate until it moves into action. This feature reduces necessary thickness of stripper plates.

All units of same length have uniform stripping pressure which assures even stripping action over entire plate regardless of how many are required, providing they are equally spaced around the die. They standardize stripping pressures to produce easier, better operating dies. Difficulties caused by conventional method of applying stripper plates to punches and dies such as removing dies from the press to repair broken punches, broken springs or defective die steel are eliminated. Units are easy to install.

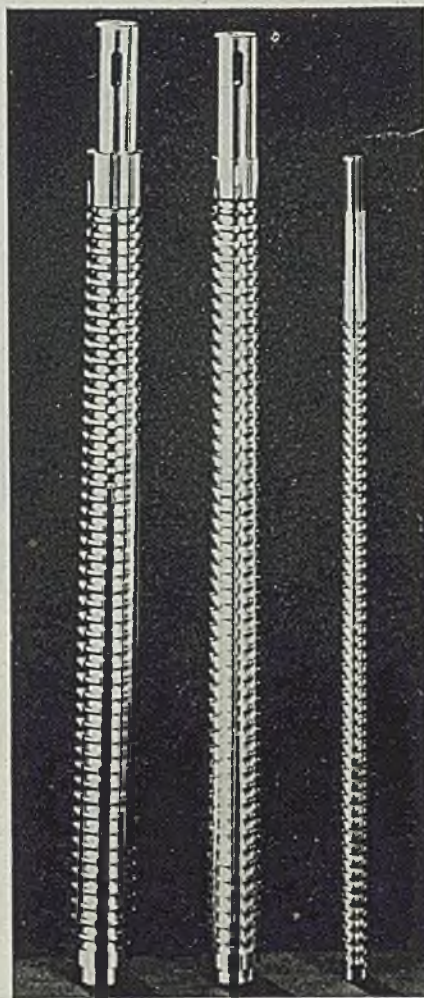
Lifetime lubrication is provided, and units are available in 2, 2 1/2 and 3 in. length and may be used in combina-

tions to provide 3 1/2, 4, 4 1/2, 5, 5 1/2, and 6 in. lengths. Initial loads range from 140 lbs on the 3 in. Strippit to 175 lbs on the 2 in. Strippit.

Item No. 9832

Broaches

Typical broaches, a new line of products made by Zagar Tool, Inc., 23880 Lakeland Boulevard, Cleveland 17, shown are: (1) 6-spline broach 1 1/2



in. diameter at widest point; (2) another conventional broach with key slot; (3) threaded-end type for use with Zagar quick-action broach-holder.

Item No. 9923

Selenium Rectifiers

As an addition to their industrial electrical equipment, Radio Receptor Co. Inc., 251 West 19th street, New York, announces a line of selenium rectifiers for alternating current to direct current conversion units. High efficiency, stability, long life, compactness and an almost total absence of maintenance cost have characterized selenium rectifier performance, as evidence by their extensive use by the Armed Forces.

These units utilize aluminum in place of iron or similar metals. Also, a method

of sealing the unit hermetically has been developed, thereby assuring maximum performance under all climatic conditions.

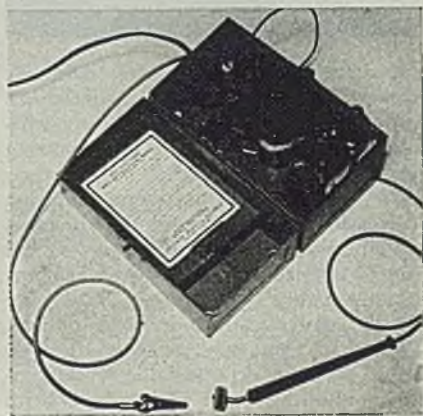
Use of aluminum reduces the unit weight by two-thirds and at the same time enables efficient heat dissipation and provides for an increased margin of protection beyond normal plate rating. This line embraces a range of units from 25 mils up to capacities of hundreds of amperes—thus offering units for all combinations of voltage and current outputs and for various types of circuits.

Item No. 9876

Etching Marker Kit

An etching marker which permanently engraves steel parts or tools with legible typewritten names, part numbers, patent numbers, instructions or other data has been announced by Nagle Brothers, Chicago Heights, Ill. This etching method makes possible easy identification of parts, prevents loss or theft in plant and tool rooms, and saves time.

Etching marker is an electrochemical device, consisting of a small metal case



containing a rectifier power kit, a pad-roller electrode, connecting cords, tips and clip, stencil paper and conditioner, and electrolytic chemicals. It operates on 110 v, ac, single phase. The etching is completed in about 1/2-min. Stencil is cut on a typewriter.

Operation is simple. A blotter pad is moistened with liquid conditioner and stencil is laid on this pad. Stencil is then moved and placed on part to be marked. Cathode clamp is attached and pad roller, charged with electrolyte, is rolled over typed area of stencil. Cotton applicator, moistened with coloring paste, is then applied to typed area. When stencil is removed, a neatly etched marking appears on part. No special ability is required.

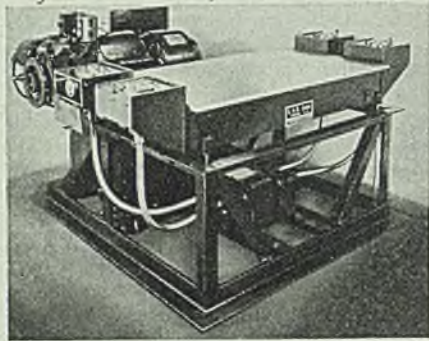
No heat is generated, and there is no distortion of etched part, nor any raised "lip" or burr. Markings can be made on journals, ball bearing races and other accurately fitting surfaces. The etching is deep, sharp, clean and permanent. This method marks equally well on finished

surfaces of cast iron, high or low carbon steel, on alloy tool steels, either hardened or annealed, or on stainless steel or aluminum. It can be applied to either flat or cylindrical surfaces. It can be used for marking individual pieces or readily set up on a production line.

Item No. 9912

Vibration Test Table

A reaction type vibration test table used to locate faults in assemblies and components is announced by L. A. B. Corp., Summit, N. J. Large table top is supported by four vertical rods acting as flexing columns to permit free table vibration in the two horizontal directions. Four sets of rotating eccentric weights



induce rectilinear and pure harmonic vibrations. Weights are mounted on vertical shafts and are driven by a variable speed drive through a synchronizing gear box and flexible shafts.

Amplitude (1/8-in maximum excursion at 100 lb table load) and the direction of vibration (horizontal crosswise or lengthwise) are adjustable when machine is not running. Increase in load over 100 lb automatically reduces amplitude.

Standard frequency range is 10 to 60 cycles per second, adjustable while running, either by hand wheel or 1/4 hp motor-driven automatic frequency change control, with 1 min complete

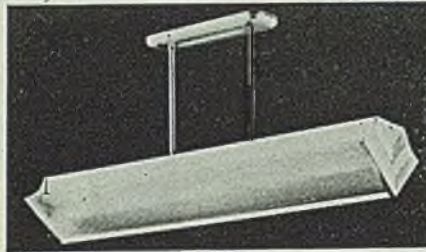
cycle. Amplitude does not vary with frequency. Equipment has a maximum capacity of 400 lb, weighs 1500 lb, and is operated by a 5 hp motor. Overall dimensions are 52 x 58 x 32 in. high. Table top is 24 x 40 3/4 in. Installations can be made on upper floors of buildings without concrete bases.

Item No. 9927

Fluorescent Light Fixture

Glass-shielded fluorescent fixture is announced by Spero Electric Corp., 18222 Lanken avenue, Cleveland 19.

Four 40 w tubes are set in panels of specially selected ribbed, ceramic coated glass having an 80 per cent transmission factor. Panels are easily removed for cleaning and servicing. Unit features a simplified mounting plate, making in-



stallation for stem or flush-to-ceiling mounting easy and quick. It is designed for effective use without glass where desired.

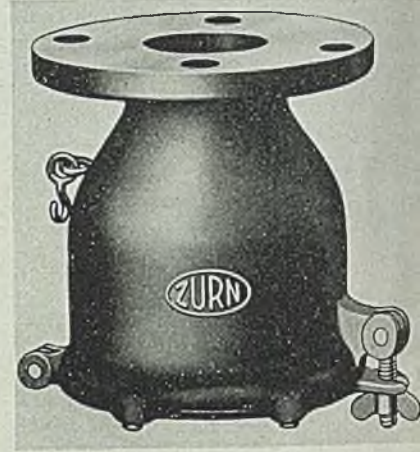
Item No. 9937

Safety Vents

Safety vents with rupture diaphragm have been developed to provide protection against fire and explosion to tanks and processing vessels containing inflammable liquids. These units are a combination vapor valve and rupture diaphragm that will break to relieve exces-

sive pressures which build up within a storage tank.

In addition to the rupture diaphragm these units have the ordinary function of permitting safe escape of inflammable gases from a tank. This is accomplished by means of a unit with perforated brass flame barrier plates. Tests have proved



that this feature prevents flames from flashing back through the perforated vent plates into the tank where inflammable liquids might be ignited.

The vents are made in caast bronze, steel, semi-steel or cast iron, with flange or butt-weld connections, in a wide range of sizes. These devices are made by J. A. Zurn Mfg. Co., Erie, Pa.

Item No. 9943

Radius Dresser

U. S. Tool & Mfg. Co., 6906 Kingsley avenue, Dearborn, Mich., has developed a precision No. T-124, that not only does the work of a radius dresser but is also designed to dress corrected radius on a wheel for grinding compound or compound-complex forms on flat form tools etc. This dual-purpose tool employ the direct reading principle, eliminating

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9836	9823	9923
9879	9837	9876
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9928	9832	9958

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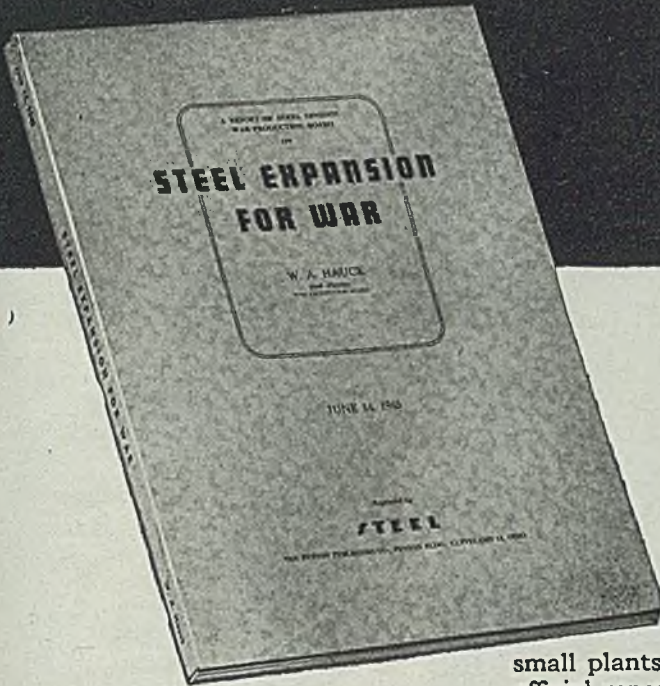
Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

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STEEL INDUSTRY ARE NOW REVEALED IN . . .

"Steel Expansion for War"

By W. A. HAUCK

[An official report by Mr. Hauck
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192 pages of pertinent data on both industry and government financed projects. Detailed schedules on capacities, location and cost. Including 148 photographs.

• Mr. Hauck has been with the Steel Division since its inception in June, 1940, then under the National Defense Advisory Commission (predecessor to WPB). Assigned to the task of expanding and balancing steel capacity for war, Mr. Hauck has inspected both large and small plants all over the United States. He prepared several official reports which lead to the addition of 10,000,000 tons of integrated steel capacity, plus over 5,000,000 tons of capacity by the expansion of existing facilities.

"STEEL EXPANSION FOR WAR" is an official report on this gigantic undertaking prepared for the War Production Board and other government agencies. A large part of the data will be presented before the Senate when it takes up the problem of disposing of billions of dollars worth of surplus government-owned war plants.

Much heretofore unpublished information is presented on new and revamped facilities of hundreds of plants, including those in the ore, ore transportation, coal and coke, refractory, ferro alloy, scrap, foundry and forging industries. The report provides details on types of products, capacity increases, plant locations, costs, etc. Included are 148 photographs, plus charts and tables.

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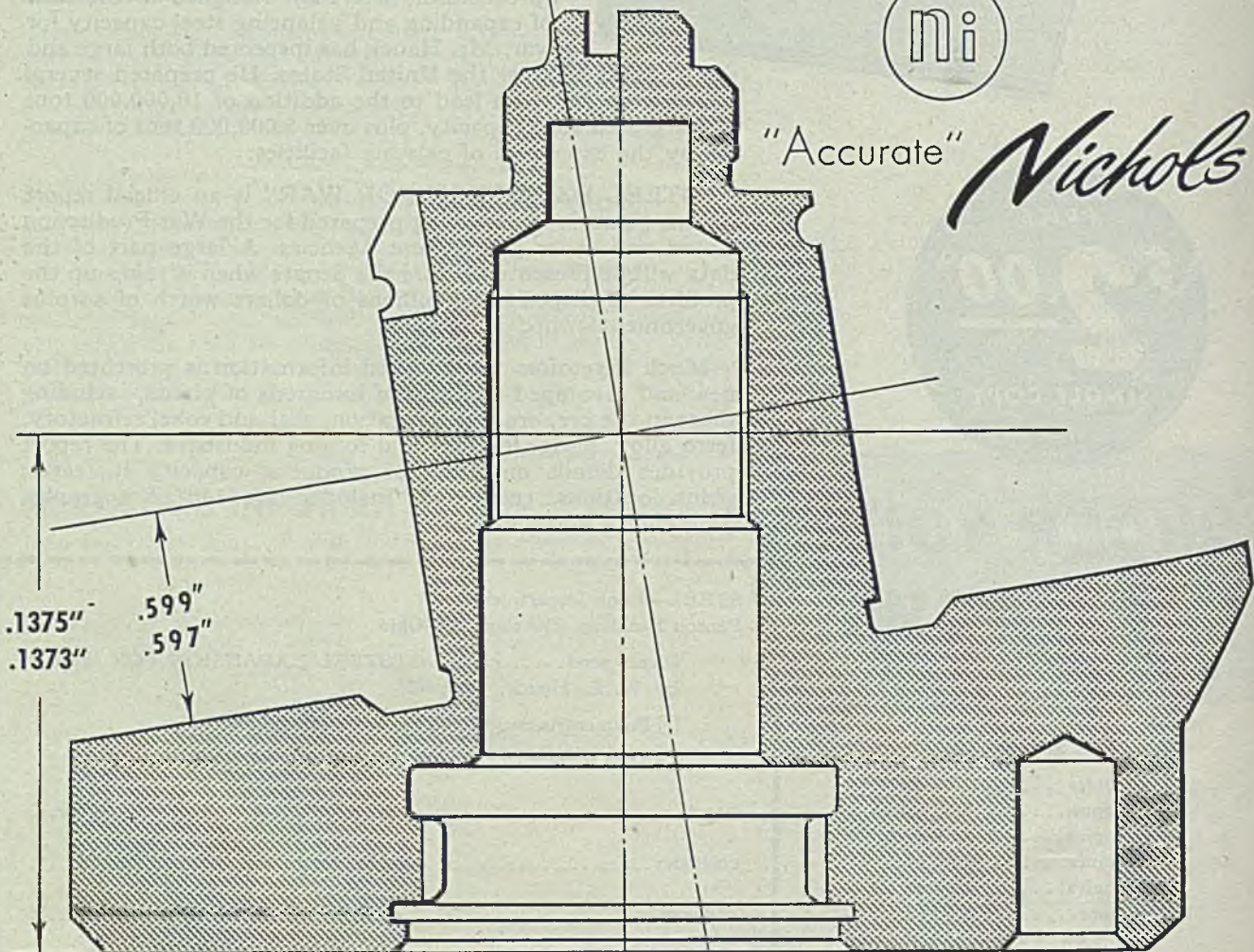
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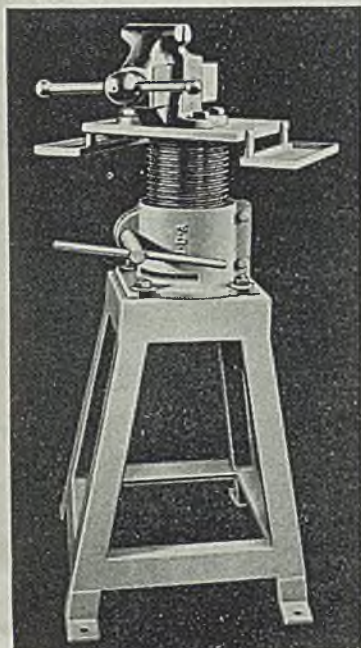
PRECISION ENGINEERING AND MANUFACTURING FACILITIES FOR MASS PRODUCTION

all guess work from this type of wheel dressing.

Procedure with this new U. S. Tool radius dresser is to swing diamond dresser arm mechanism through specified number of degrees, as indicated on graduated scale and lock in position. Reading is taken directly from the print, if a 20° relief angle is called for, the dresser is set at 20°. Radius dresser then is put on the chuck, exactly on the centerline of wheel and dressed to the radius re-

General Purpose Positioner

The general purpose positioner shown here is offered by the U. D. A. Co., 2807 North Grand



boulevard, St. Louis 4. A detailed description of the device was given on p. 130 of the Nov. 26 issue of STEEL.

quired. For compound-complex angle, same procedure is followed with the addition of swinging base of dresser away from parallel bar of chuck, using upper right hand corner of base as pivot point, directly reading the angle (from the blueprint) as before.

This tool is light in weight, yet sturdy in construction to guarantee smooth and precise radii. Both angle scales are easy to read and easily accessible. All exposed unpainted parts are chrome plated to insure against stain and rust. Dresser is constructed with hardened tool-steel wear plate on under side of base to prevent chipping and wear of the cast iron body. Timken taper roller bearings and a one piece hardened steel spindle arm are other highlights. Patent has been applied for.

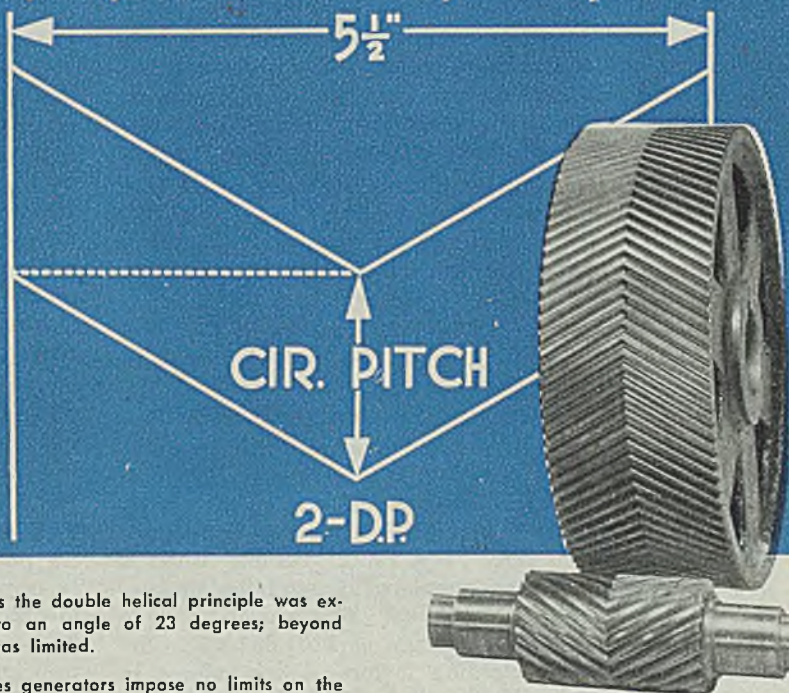
Item No. 9958

December 24, 1945

The importance of the 30°

helix angle in OTTUMWA

Sykes-generated herringbone gears



For years the double helical principle was exploited to an angle of 23 degrees; beyond that it was limited.

The Sykes generators impose no limits on the maximum helix angle. Therefore, 30° helix angle was chosen as standard. The full benefit of the helical principle is obtained with the 30° helix angle. Overlapping of the teeth is obtained with a face width of only 10.88 divided by the diametrical pitch, so that wide faces in proportion to the pitch are now optional, not compulsory. The best proportion can be chosen for each individual case—some gears will have as many as four, or even more, teeth in contact.

OTTUMWA can furnish Sykes continuous tooth herringbone gears up to 10'2" diameter, 24 face, and in all pitches up to 1 1/4 D.P., in steel or semi-steel. We also cut blanks furnished by our customers.

Write for our catalog—it shows a complete line of gears, together with a complete line of speed reducers and increasers for all types of industrial drives.

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THE BUSINESS TREND

Industrial Activity Level Shows No Change

INDUSTRIAL activity continues to show little variation from the level prevailing since the first of December. However, that level is considerably below what economists and industrialists had expected to see by this time. With labor unrest, shortage of materials, and price ceilings preventing full speed forward into peacetime production the upward movement that would stem from the huge backlog of demand for goods is noticeably absent.

STEEL—Steel ingot production on a percentage basis remains steady in the low eighties. Meanwhile, consumers of steel and pig iron are pressing for deliveries on tonnage already ordered in an effort to build up inventories before the steel strike scheduled for Jan. 14.

COAL—Bituminous coal output in the week ended Dec. 8 was 3 per cent lower than in the previous week but still ranked high in the record for this year. Output to date this year is 8.2 per cent behind that for the corresponding period of last year.

AUTOS—Assembly of 16,240 automobiles in the week ended Dec. 15 exceeded that of the previous week by 1660 units, with the Ford Motor Co. and the Nash Motors Division accounting for 63 per cent of the output.

CONSTRUCTION—Reflecting the demand for new buildings, particularly houses, a Dun & Bradstreet report shows that dollar volume of building permits issued in November went slightly above the high October level and topped all previous months since May, 1930. Permits issued in 215 cities represented contemplated construction amounting to \$163,369,902 in November. This was about 1 per cent more than the October sum of \$161,851,437. Regardless of present retarding factors, dollar volume of new construction in 1946 will be 50 per cent greater than in 1945 in the 37 states east of the Rocky mountains, the F. W. Dodge Corp. predicts. Estimate for all construction in those states is \$4,750,000,000 compared with \$3,160,000,000 expected for 1945. In dollars, this volume is greater than that of any of the years immediately preceding the war. Taking cost increases into consideration, it represents a physical volume somewhere between that of 1939 and 1940.

BANK CLEARINGS—Bank clearings for the week ended

Dec. 12 totaled \$13,456,402,000 which was exceeded this year by only two weeks, one of which was the previous week.

STOCKS—Widest break since June occurred in the stock market last week, when in one day around 2 million shares accompanied the sell-off. Brokers point out that the market could retreat considerably more without disturbing the major uptrend that has prevailed with only minor interruptions since V-J Day.

PRICES—Marking the first decrease since mid-September, the Bureau of Labor Statistics index of wholesale commodity prices in the week ended Dec. 8 declined 0.1 per cent from that of the preceding week because of lower prices for agricultural commodities.

DIVIDENDS—Publicly reported dividend payments amounting to \$132,500,000 in November, brought the total for the three months ending in November to \$840,600,000, or 2 per cent more than in the same three months of 1944, the U. S. Department of Commerce reported. Trade and finance with gains of 12 and 10 per cent, respectively, made the best showing in the three-month comparison, while mining was down 6 per cent and railroads down 22 per cent. The drop in dividend payments of railroads was due largely to substantial arrearage payments in September, 1944.

BUSINESS FAILURES—Total number of failures of commercial and industrial firms in 1945 will be approximately 30 per cent less than that of 1944. In the latter year 1234 firms failed. Thus far in 1945, approximately 800 failures have been recorded by Dun & Bradstreet, compared with 1197 in the corresponding period of 1944.

EQUIPMENT—A new alltime high in production of electric power plant equipment is expected in 1946, with utility companies anticipating that electrical energy requirements in 1947 will surpass wartime peak consumption, the National Industrial Conference Board reports. Three principal factors on which this prediction is based are anticipated expansion in electric production capacity, heavy demand for industrial electric equipment that will consume a large part of this power increase, and prospects for extensions of service lines to agricultural areas.

FORGINGS—New low levels for this year were set in September by shipments of and unfilled orders for steel forgings. Shipments, amounting to 109,514 tons, were 4 per cent under those of August, and unfilled orders of 623,186 tons at the end of September were 11 per cent less than those at the end of the previous month.

FIGURES THIS WEEK

INDUSTRY

	Latest Period°	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	83.5	83.5	80.5	96.5
Electric Power Distributed (million kilowatt hours)	4,154	4,097	3,985	4,563
Bituminous Coal Production (daily av.—1000 tons)	2,000	2,050	2,075	2,036
Petroleum Production (daily av.—1000 bbls.)	4,515	4,469	4,474	4,770
Construction Volume (ENR—Unit \$1,000,000)	\$67.6	\$80.3	\$76.3	\$31.8
Automobile and Truck Output (Ward's—number units)	16,240	14,580	30,165	21,445

°Dates on request.

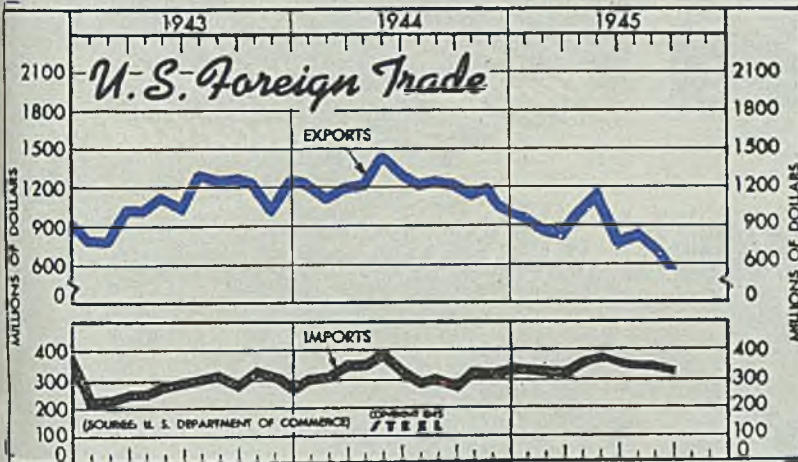
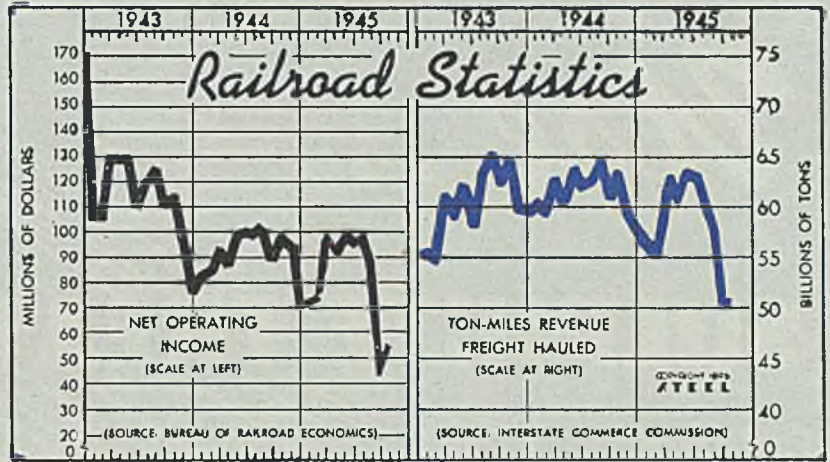
TRADE

Freight Carloadings (unit—1000 cars)	770†	776	800	750
Business Failures (Dun & Bradstreet, number)	10	14	12	33
Money in Circulation (in millions of dollars)†	\$28,370	\$28,279	\$28,178	\$25,163
Department Store Sales (change from like wk. a yr. ago)†	+10%	+7%	+13%	+23%

†Preliminary. †Federal Reserve Board.

Statistics of Class I Railroads

	1945		1944		1943	
	Net Operating Income (millions)	Ton-Miles Revenue Freight (billions)	Net Operating Income (millions)	Ton-Miles Revenue Freight (billions)	Net Operating Income (millions)	Ton-Miles Revenue Freight (billions)
Jan.	\$73.0	\$84.9	\$105.3	56.8	60.5	55.1
Feb.	73.2	84.5	105.8	55.3	59.3	54.4
Mar.	99.9	92.5	129.7	62.9	62.7	61.2
Apr.	91.9	87.7	128.7	61.6	60.4	59.1
May	99.9	98.5	129.5	64.6	64.0	62.1
June	96.1	99.8	109.0	63.6	62.0	58.0
July	97.1	98.6	127.8	60.1	62.8	63.7
Aug.	86.7	101.4	132.3	56.4	64.5	65.1
Sept.	44.0	89.1	110.3	52.2	61.0	62.5
Oct.	54.4	97.3	118.1	51.5	63.5	65.0
Nov.	91.6	96.4	96.4	59.4	59.9	59.9
Dec.	69.8	76.9	57.3	60.6	60.6	60.6
Ave.	\$91.3	\$113.7	61.5	60.6	60.6	60.6



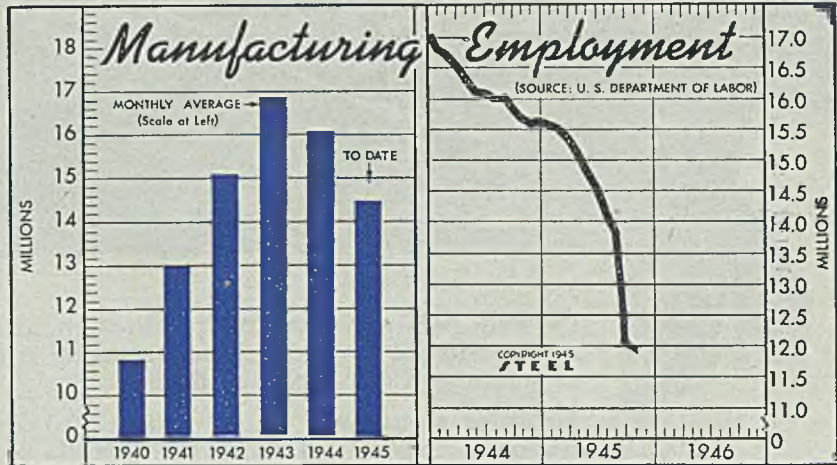
Foreign Trade
Bureau of Foreign and Domestic Commerce

(Unit Value—\$1,000,000)

	Exports		Imports	
	1945	1944	1945	1944
Jan.	900	1,124	730	334
Feb.	882	1,086	719	324
Mar.	881	1,197	988	324
Apr.	1,002	1,182	980	366
May	1,133	1,419	1,085	372
June	866	1,271	1,002	360
July	883	1,198	1,262	356
Aug.	737	1,207	1,204	360
Sept.	515	1,199	1,235	334
Oct.	1,140	1,195	327	329
Nov.	1,184	1,074	322	317
Dec.	934	1,244	336	281
Total	14,141	12,718	9,907	8,372

Factory Employment
(000 omitted)

	1945	1944	1943
January	15,555	16,825	16,423
February	15,517	16,735	16,599
March	15,368	16,559	16,747
April	15,102	16,309	16,774
May	14,811	16,122	16,753
June	14,538	16,093	16,908
July	14,136	16,013	17,059
August	13,862	16,023	17,182
September	12,132	15,843	17,136
October	11,960	15,692	17,194
November	15,607	15,607	17,238
December	15,632	15,632	17,080
Monthly Ave.	16,121	16,924	16,924



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	\$13,456	\$15,265	\$10,008	\$10,210
Federal Gross Debt (billions)	\$278.6	\$270.0	\$263.2	\$229.2
Bond Volume, NYSE (millions)	\$41.3	\$40.9	\$33.0	\$75.3
Stocks Sales, NYSE (thousands)	8,488	12,375	9,538	8,328
Loans and Investments (billions)†	\$67.1	\$62.4	\$61.0	\$58.6
United States Gov't. Obligations Held (millions)†	\$48,654	\$45,501	\$45,263	\$43,066

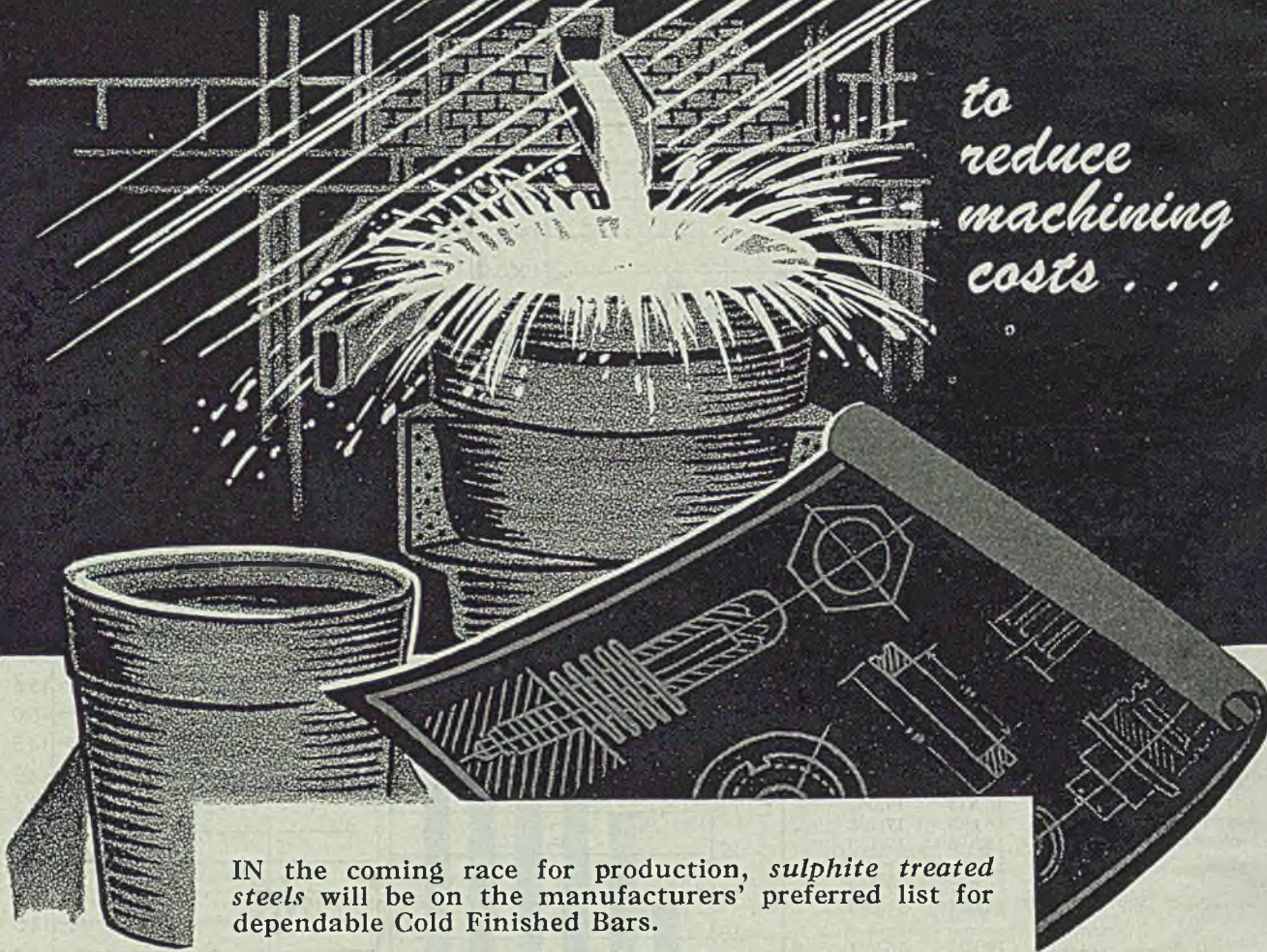
†Member banks, Federal Reserve System.

PRICES

	Latest Period	Prior Week	Month Ago	Year Ago
STEEL's composite finished steel price average	\$58.27	\$58.27	\$58.27	\$56.73
All Commodities†	106.5	106.8	106.1	104.2
Industrial Raw Materials†	119.1	120.1	118.6	114.3
Manufactured Products†	102.5	102.5	102.2	101.3

†Bureau of Labor Statistics Index, 1926 = 100.

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COLD FINISHED STEEL AND SHAFTING

HELPFUL LITERATURE

1. Stainless Steels

Jessop Steel Co.—8-page data folder provides information on characteristics, uses, physical properties, mechanical characteristics, corrosion resistance and fabrication properties of stainless steel bars, billets, sheets, castings, circles, plate, rings, strip, flanged and dished heads and special shapes. Stainless clad steels also are covered.

2. Clutches

Carlyle Johnson Machine Co.—16-page illustrated catalog No. 45 entitled "Maxitorg Floating Disc Clutches" discusses clutch applications on standard and special types of machine tools and other industrial machinery. Features of three basic types are covered and engineering service is offered.

3. Pneumatic Power Units

Curtis Pneumatic Machinery Div., Curtis Mfg. Co.—12-page illustrated bulletin No. A-4-B presents full details of line of patented all-steel air hoists, cylinders and valves. Specifications and application information are given on equipment.

4. Magnetic V-Block

MagVblock Co.—6-page illustrated folder described MagVblock magnetic V-block which can be used in any of four positions to hold either large or small work pieces in conjunction with magnetic chuck.

5. Hardness Conversion

Michigan Seamless Tube Co.—Data card lists conversion numbers for brinell, Rockwell C and B, Shore Scleroscope and tensile strength. Reverse of card tabulates decimel equivalents up to 1 inch in increments of 1/64-inch.

6. Rings and Flanges

King Fifth Wheel Co.—4-page illustrated folder discusses rolling and welding processes used in production of flanges and rings from bar stock. Flats, angles, channels, tees, squares and rounds are shown.

7. Shielded Arc Welding

Lincoln Electric Co.—28-page illustrated booklet No. 439 explains basic principles and advantages of Lincolnweld automatic metallic arc welding process employing flux coated electrode. Data are given for producing butt, fillet, and lap welds by this process. Typical installations, equipment, accessories and supplies are shown.

8. Tempering & Heating

Lindberg Engineering Co.—4-page illustrated folder No. 170 presents information on Cyclone gas fired production box type furnace for production tempering, low temperature annealing, stress relieving and other heating operations extending up to 1400 F. Features and dimensions are covered.

9. Rust Removers

E. F. Houghton & Co.—4-page leaflet No. 2-374 describes Houghto-Clean rust removers which include No. 35 wipe-off type, No. 34 dip type for light or medium rust, and No. 29 dip type for heavy duty.

10. Tubing Tools

Imperial Brass Mfg. Co.—Illustrated folder form No. 347 describes line of tubing service tools for cutting, flaring, bending, coiling, pinch-off, swedging, soldering, reaming and refacing. Tools are designed for use with copper, brass, aluminum, thin-wall steel and similar tubing. Prices are included.

11. Overhead Materials Handling

Forker Corp.—12-page illustrated bulletin No. 100-7 describes line of Ohio Tramrail systems. Various below-hook devices for use with these overhead materials handling systems are covered. Data are included on ceiling fittings, T-rail sections, Beamrail sections, electrification, switches, yoke assemblies, trolleys and cranes.

12. Engineering Data

Manufacturers Screw Products — Pocket library of engineering data is comprised of durable pocket envelope and four cards listing machine screw weights, decimel equivalents of twist drills, decimel equivalents and machine screw thread dimensions.

13. Adjustable Reamers & Bars

Madison Mfg. Co.—32-page illustrated bulletin on "Production Reaming Tools" shows design and lists operating advantages offered by line of adjustable reamers and bars which are claimed to provide tolerances within 0.0002-inch. Standard and special applications of these tools are shown.

14. Extruded Plastic

Tennessee Eastman Corp.—12-page illustrated bulletin "Tenite Extrusion" describes extrusion of sheeting using circular die. How Tenite plastic is formed by dry extrusion process and available shapes are covered. Forms include strips, tubes, rods, monofilaments, sheeting and various profile sections.

15. Gas Turbine Plant

Elliott Co.—20-page illustrated bulletin "The Gas Turbine Power Plant—Now a Reality" discusses operating principle of gas turbine and traces development of this type of prime mover. Design, applications and complete units are described.

16. Electronic Heaters

General Electric Co.—8-page illustrated bulletin No. GEA-4076 features electronic heaters for heating metals. Operating principle, simplicity and specifications of 5 and 15-kilowatt, 550-kilocycle electronic heaters are discussed. Use of heaters for brazing, soldering or surface hardening of small parts is covered.

17. Metal Coloring

Enthone Corp.—8-page illustrated bulletin "Enthone Ebonol Coloring and Blackening Processes for Metal" describes coloring processes for copper and copper alloys, and blackening processes for zinc and steel. Data are given on colors, cost, applications, procedures and characteristics of final finish.

18. Centralized Lubrication

Farval Corp.—4-page illustrated folder No. 76 is entitled "When You Reconvert" and describes how centralized lubricating system effects specific savings on typical equipment. Details are given on how equipment operates and typical applications are suggested.

19. Flow Meter

Fischer & Porter Co.—Two illustrated data sheets list dimensions of Rotasleeve units for measuring large flows of water, steam, corrosive gases and liquids. Bulletin No. 82-A is descriptive of these flow meters and gives size and capacity information.

20. Furnace Refractories

Chicago Fire Brick Co.—4-page illustrated bulletin No. 845 describes Durabilt engineered suspended type wall arch and roof construction for industrial furnaces. Intermeshed and directly suspended from supporting brackets tile provide air tightness, smooth continuous surfaces and free movement under temperature changes. They are nonspalling.

21. Motor-Generator Repair

Ideal Commutator Dresser Co.—36-page illustrated bulletin form MMH entitled "Modern Motor-Generator Maintenance and Repair Equipment for War Worn Machinery" describes all types of tools and equipment for maintenance of electric motors and generators.

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22. Car Thawing Pits

Hauck Mfg. Co.—4-page illustrated bulletin No. 1040 describes equipment and layouts of oil fired thawing pit installations for radiant method of heating car hoppers. Frozen materials in hopper type railroad cars are thawed without direct flame contact and resultant car damage.

23. Arc Welding Symbols

Hobart Brothers Co.—8-page illustrated folder discusses "Simplified" arc welding and shows features of line of electric welding machines. Included is large chart showing basic characters of symbol writing for arc welding. This chart is available separately also for wall mounting. Symbols are given for fusion and resistance welding, as well as for typical joints, sections and welds.

24. Color in Industry

McDougall-Butler Co.—10-page illustrated loose-leaf bulletin "New Concepts of Color" is treatise on selection of correct colors for finishing offices, factories and institutions to assure or improve efficiency, safety, health and comfort of employees. Factors such as improved lighting, therapeutic value of colors, increased heating efficiency and lessening of eyestrain are discussed.

25. Steam-Jet Ejectors

Ingersoll-Rand Co.—8-page illustrated bulletin form No. 9013 covers steam-jet ejectors for producing vacuum or removing air, gas and vapor from vacuum equipment. Operating characteristics, principles and features are given, as well as construction details and schematic diagrams of various single and multi-stage setups, with and without intercondensers, pre-coolers and after condensers.

26. Spiral Dividing Head

Kearney & Trecker Corp.—12-page illustrated catalog No. WA12 describes Milwaukee model K universal spiral dividing head. Shop applications of unit and its accessories are illustrated with photographs of actual installations. General specifications are included.

27. High Temperature Fans

Michiana Products Corp.—4-page illustrated bulletin No. 645 discusses design, construction, applications, sizes and capacities of Michiana fans for high temperature applications. Heat and corrosion resistant alloy castings are used to insure long service life under exacting conditions. Sizes range upward from 400 cubic feet of air per minute.

28. Industrial Opportunity

Iowa Industrial & Defense Commission—160-page illustrated book entitled "Iowa—Land of Industrial Opportunity" outlines history, raw materials, living conditions, industrial background, data on principal towns and cities, and other information on this state which provide opportunity for establishment of successful industrial ventures.

29. Adhesives

Minnesota Mining & Mfg. Co.—12-page illustrated bulletin "3-M Adhesives in Industry" contains data for users of adhesives, sealers, coating or insulating compounds, impregnators and sound-deadeners. Operations in different industries, methods of application and physical properties of line of adhesive materials are shown. Formulas, viscosities, bonding range, color, weight, characteristics and uses are included.

30. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 861-4B-45 describes model 861-4B gear finisher for fine pitch gears. Principle of operation, specifications and typical setups are covered. Machine is designed primarily for gears of fine pitches such as 32, 48 and 64, etc. Maximum pitch recommended for machine is 16.

31. Packings

Graton & Knight Co.—24-page illustrated bulletin "Packing Pointers" is series of twelve informative articles to aid the design engineer in the selection of cup, flange, U and V packings. Also shown is correct design of machine parts adjacent to mechanical packings.

32. Pressure Castings

Meehanite Research Institute of America—page illustrated bulletin on "Pressure Casting" describes variety of pressure casting applications and illustrates faulty and correct design for pressure units. Advantages of pressure casting are covered.

33. Over-Running Clutch

Gear Grinding Machine Co.—4-page illustrated bulletin describes operation and applications of Formspray full complement over-running clutch. Consisting of cylindrical inner and outer races, full complement of springs between races and means of energizing, units provide control of forward motion while preventing reverse motion.

34. Rotary Dryers

Louisville Drying Machinery Co.—8-page illustrated bulletin describes Louisville direct heat rotary dryers of parallel-current and counter-current types for low or high temperature drying of all types of materials. Application operation, dust collection, design and advantages are covered.

35. Hydraulic Power Units

Vickers Inc.—8-page illustrated folder "New Developments in Oil Hydraulics" shows new applications of oil-controlled power and outlines available literature on uses of hydraulic power in equipment and machines.

36. Management Engineering

Associated Engineers, Inc.—10-page illustrated folder entitled "Management Engineering Counsel" outlines industrial engineering, business administration, architectural design, structural engineering and general counsel services offered by this firm of management consultants. Education, experience and function of each member of firm are covered.

37. Wooden Boxes & Crates

General Box Co.—12-page illustrated "General Box" issue provides up-to-date information on containers and relates part they played in supplying equipment to the armed forces of the United States. Various types, boxes, crates and containers manufactured, described and designs for special packaging purposes are discussed.

38. Fire Extinguishing

General Detroit Corp.—24-page illustrated booklet "How to Put Out a Motor Vehicle Fire" discusses rules to follow in event of a motor vehicle fire until the fire department arrives. Proper use of approved fire extinguishers on commercial and passenger car fires is outlined. Elimination of potential causes of vehicle fires is covered.

39. Air & Hydraulic Devices

Gerotor May Corp.—16-page illustrated catalog No. 50 describes new line of air cylinders and air valves. Seven models of nonrotating double-acting air cylinders are shown and construction details are covered. Typical applications of these air operated, as well as hydraulic units, are discussed.

40. Hydraulic Presses

Hydraulic Press Mfg. Co.—84-page illustrated bulletin No. 4500 describes all hydraulic presses for sheet metal working, forging, powder metallurgy, die casting and plastics molding. Typical installations and examples of work shown.

41. Straddle Truck

Willamette Hyster Co.—10-page illustrated bulletin No. 593C describes series MH F straddle truck for handling structural steel, bars, bridge members, ship steel, lumber and other materials. Specifications are given in tables of dimensions, load capacities and weights are included.

42. Synthetic Rubber

B. F. Goodrich Co.—8-page illustrated catalog section No. 8000 lists properties of A pol D oil and heat resistant synthetic rubber which was developed for special purposes. Table gives property relation of natural and various types of synthetic rubbers. Guide is provided for proper application of this material.

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Steel Users Hit by Strike Threat, Snow, Export Needs

Holiday observance also will cut supply . . . Weather handicap severe in some areas . . . Tight situation likely to become worse in new year

HIGHLY adverse weather and influence of the yearend holiday season have accentuated the tight steel situation, both production and transportation being affected.

At some producing centers, notably in the Buffalo area, production has been brought almost to a halt and at others there is threat of curtailment, even where weather is less severe, because of difficulty of transportation of raw materials, mainly pig iron and scrap. On top of this is indication of lowered output at various plants over the two holidays, two or three days perhaps being lost in some cases.

Domestic consumers are confronted with further difficulties in the new year as in addition to the threatened general steel strike set for Jan. 14 other complications are developing, the newest and most important being substantial export directives, affecting some of the most critical products. Approximately 850,000 tons will be involved in these directives, with substantially more than a third, according to reliable information, composed of sheets, strip and tin plate, the latter being the largest single item.

Some of this tonnage will be credited to export orders already on books, but the greater part is understood to be at the expense of domestic requirements. The program has been set up by Washington mainly to meet some of the more urgent rehabilitation requirements abroad, particularly in Europe, and to provide tin plate for food preservation. The program represents screening of more than four million tons asked by foreign countries as urgently needed during first half. France is said to take almost half. The Steel Industry Advisory Committee to the Civilian Production Administration is endeavoring to set up quotas for various mills, based on estimated production of the products involved.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended		Same Week	
	Dec. 22	Change	1944	1943
Pittsburgh	78.5	None	90	90
Chicago	90	None	99.5	92
Eastern Pa.	78	-2	94	87
Youngstown	75	-6	90	80
Wheeling	95	None	97	94
Cleveland	86.5	+1.5	94.5	84
Buffalo	46.5	-42	83.5	83
Birmingham	95	None	95	95
New England	83	+3	87	90
Cincinnati	67	None	82	92
St. Louis	68	+2.5	75	89.5
Detroit	89	None	88	87
Estimated national rate	80.5	-3	96	93

*Based on steelmaking capacities as of these dates.

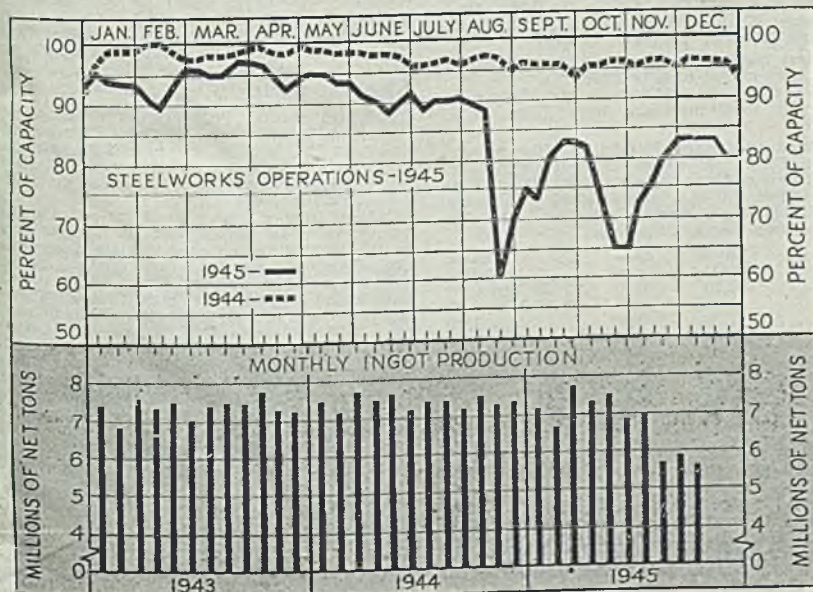
There is some speculation as to possibility of return to widespread allocations, similar to those under CMP, but most trade leaders regard this as doubtful. Probably existing CC, MM and AAA ratings will be more generally used. These in the past have been used sparingly, though recently the number has increased.

Steelmaking operations dropped last week because of weather conditions, notably in the Buffalo district, the estimated national rate being down 3 points to 80½ per cent of capacity. Slight increases in some districts were not sufficient to balance the losses. Buffalo dropped 42 points to 46½ per cent, Youngstown 6 points to 75 and eastern Pennsylvania 2 points to 78. Cleveland gained 1½ points to 86½ per cent, St. Louis 2½ points to 68 and New England 3 points to 83. Rates were unchanged as follows: Pittsburgh 78½, Chicago 90, Wheeling 95, Cincinnati 67, Birmingham 95 and Detroit 89.

No easing in the tight scrap situation has appeared and supply, while apparently sufficient to maintain current operations, does not allow accumulation of reserves usually built up for winter. Pressure on brokers is strong and melters are willing to pay freight from remote locations in order to obtain material. Some scrap from the Pacific Coast is being taken by mills in the Middle West on which freight charges are nearly equal to cost of the scrap at point of origin. Use of premium grades in open hearths continues, in spite of high cost.

Office of Price Administration has ordered field offices to check closely iron and steel scrap prices, alleging dealer practices are violating ceiling prices.

Steel warehouses are squeezed between heavy demand and slow deliveries from mills, with the result assortments are broken and supply is low. With mills crowded far ahead and deliveries deferred, many consumers seek large orders from warehouse and inquiry is received from users in territory remote from that usually served by the supplier. With shipments rationed by mills jobbers are forced to divide their tonnage among customers in proportion to usual buying.



Enamelling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20 gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh	Pacific	Granite
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	
65	7.25c	8.00c	
58	7.75c	8.50c	
52	8.55c	9.30c	

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.25c.

Cold Finished Spring Steel: Pittsburgh, Cleveland, base, 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.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, \$4.35; 0.50 lb. tin, \$4.50; 0.75 lb. tin \$4.65; Granite City, \$4.45, \$4.60, \$4.75, respectively.

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; Pacific ports 4.55c.

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; 30-lb. \$17.25; 40-lb. \$19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c; Gulf ports, 2.45c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads. Bright basic, bessemer wire \$2.75 Spring wire \$3.35

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, \$2.90; Pac. ports, \$3.40; galvanized, \$2.55 and \$3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham \$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham \$3.55

Woven fence, 15 1/2 gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barless wire, column 72.

*Add \$0.10 for Worcester, \$0.05 for Duluth; add \$0.50 for bright, annealed, galvanized and \$0.70 for other finishes for Pacific ports.

†Same bases as for bright basic except Birmingham.

‡Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled 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.

Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
1/2	56	33	1/2	24	3 1/2
3/4	59	40 1/2	3/4	30	10
1	63 1/2	51	1-1/4	34	16
1 1/4	66 1/2	55	1 1/2	38	18 1/2
1-3/4	68 1/2	57 1/2	2	37 1/2	18

Steel			Iron		
In.	Blk.	Galv.	In.	Blk.	Galv.
2	61	49 1/2	1 1/4	23	3 1/2
2 1/4-3	64	54 1/2	1 1/2	28 1/2	10
3 1/4-6	66	54 1/2	2	30 1/2	12
7-8	65	52 1/2	2 1/4-3 1/2	31 1/2	14 1/2
9-10	64 1/2	52	4	33 1/2	18
11-12	63 1/2	51	4 1/2-8	32 1/2	17
			9-12	28 1/2	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	Hot Rolled		Cold Drawn		Steel	Char-coal Iron
	B.W.G.	Roll	Drawn	Steel		
1"	13	\$ 7.82	\$ 9.01			
1 1/4"	13	9.26	10.67			
1 1/2"	13	10.23	11.72	\$ 9.72	\$23.71	
1 3/4"	13	11.64	13.42		11.06	22.93
2"	13	13.04	15.03		12.38	19.35
2 1/4"	13	14.54	16.76		13.79	21.63
2 1/2"	12	16.01	18.45		15.16	
2 3/4"	12	17.54	20.21		16.58	26.57
3"	12	18.59	21.42		17.54	29.00
3 1/2"	12	19.50	22.48		18.35	31.38
4"	11	24.63	28.37		23.15	39.81
4 1/2"	10	30.54	35.20		28.66	49.90
4 1/2"	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

Rails, Supplies: Standard rails, over 60-lb., f.o.b. mill, gross ton, \$43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, \$31-\$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates \$46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., 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.

	Tung.	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1			67.00c
1.5	4	1		8.5	54.00c
	4	2		3	54.00c
6.40	4.15	1.90		5	57.50c
5.50	4.50	4		4.50	70.00c

Stainless Steels

Base, Cents per lb.

CHROMIUM NICKEL STEEL				H. R.	C. R.
Type	Bars	Plates	Sheets	Strip	Strip
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
312	36.00	40.00	49.00		
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
†347	33.00	38.00	45.00	33.00	42.00
‡31	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL					
*403	*404	*416	†420	†430F	†440A
21.50	24.50	29.50	21.25	27.00	27.00
18.50	21.50	26.50	17.00	22.00	22.00
19.00	22.00	27.00	18.25	23.50	23.50
24.00	28.50	33.50	23.75	36.50	36.50
19.00	22.00	29.00	17.50	22.50	22.50
19.50	22.50	29.50	18.75	24.50	24.50
24.00	28.50	33.50	23.75	36.50	36.50
22.50	25.50	32.50	24.00	32.00	32.00
22.50	25.50	32.50	24.00	32.00	32.00
27.50	30.50	36.50	35.00	52.00	52.00
8.00	12.00	15.75	12.00	17.00	17.00
9.00	13.00	16.75	13.00	18.00	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.

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago Birmingham

Structural 3.75c

3/4-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

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine	
1/2 x 6 and smaller	65 1/2 off
Do., 1/2 and 3/4 x 6-in. and shorter	63 1/2 off
Do., 3/4 to 1 x 6-in. and shorter	61 off
1 1/2 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; bulk 50 off on 15.00 of 3-inch and shorter, or 5000 over 3-in.

Nuts	U.S.S.	S.A.E.
3/4-inch and less	62	64
1/2-1-inch	59	60
1 1/2-1 1/2-inch	57	58
1 1/2 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 61 off
Headless, 1/4-in., larger 70 off
No. 10, smaller 70 off

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.

Extra 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.

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.

Metallurgical Coke

Price Per Net Ton	Beehive Ovens
Connellsville, furnace	\$7.50
Connellsville, foundry	8.00-8.50
New River, foundry	9.00-9.25
Wise county, foundry	7.75-8.25
Wise county, furnace	7.25-7.75

By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.85
St. Louis, delivered	13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.25

*Operators of hand-drawn ovens using trucked coal may charge \$8.00; effective May 26, 1945, \$14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	15.00c
Pure and 90% benzol	28.00c
Toluol, two degree	23.00c
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 \$20.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	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	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044 ¹	3.912 ¹	3.912 ¹	5.727 ¹	3.774 ¹	4.106 ¹	5.106 ¹	5.224 ¹⁴	4.744 ¹⁴	4.244 ¹⁴	4.715	6.012 ²³	6.012 ²³
New York	3.853 ¹	3.758 ¹	3.768 ¹	5.574 ¹	3.590 ¹	3.974 ¹	3.974 ¹	5.010 ¹⁵	4.618 ¹⁴	4.203 ¹⁴	4.774		
Jersey City	3.853 ¹	3.747 ¹	3.768 ¹	5.574 ¹	3.590 ¹	3.974 ¹	3.974 ¹	5.010 ¹⁵	4.618 ¹⁴	4.203 ¹⁴	4.774		
Philadelphia	3.822 ¹	3.666 ¹	3.605 ¹	5.272 ¹	3.518 ¹	3.922 ¹	4.272 ¹	5.018 ¹⁵	4.872 ¹⁴	4.172 ¹⁴	4.772	5.816 ²³	5.860 ²³
Baltimore	3.802 ¹	3.759 ¹	3.594 ¹	5.252 ¹	3.394 ¹	3.902 ¹	4.252 ¹	4.894 ¹	4.852 ¹⁴	4.152 ¹⁴			
Washington	3.941 ¹	3.930 ¹	3.796 ¹	5.341 ¹	3.596 ¹	4.041 ¹	4.391 ¹	5.196 ¹⁷	4.841 ¹⁶	4.141 ¹⁶			
Norfolk, Va.	4.065 ¹	4.002 ¹	3.971 ¹	5.465 ¹	3.771 ¹	4.165 ¹	4.515 ¹	5.371 ¹⁷	4.965 ¹⁶	4.265 ¹⁶			
Philadelphia, Pa.		3.45 ¹											
Claymont, Del.			3.45 ¹										
Coatesville, Pa.			3.45 ¹										
Buffalo (city)	3.35 ¹	3.40 ¹	3.63 ¹	5.26 ¹	3.35 ¹	3.81 ¹	3.81 ¹	4.75 ¹⁵	4.40 ¹⁵	3.85 ¹⁵	4.669	5.60 ²³	5.75 ²³
Buffalo (country)	3.25 ¹	3.30 ¹	3.80 ¹	4.90 ¹	3.25 ¹	3.81 ¹	3.50 ¹	4.65 ¹⁵	4.30 ¹⁵	3.75 ¹⁵	4.35	5.60 ²³	5.75 ²³
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 ¹⁵	4.40 ¹⁵	3.85 ¹⁵			
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 ¹⁵	4.30 ¹⁵	3.75 ¹⁵			
Cleveland (city)	3.35 ¹	3.588 ¹	3.40 ¹	5.188 ¹	3.35 ¹	3.60 ¹	3.60 ¹	4.877 ¹⁵	4.40 ¹⁵	3.85 ¹⁵	4.45 ¹⁵	5.60 ²³	5.65 ²³
Cleveland (country)	3.25 ¹		3.30 ¹		3.25 ¹	3.50 ¹	3.50 ¹		4.30 ¹⁵	3.75 ¹⁵	4.35 ¹⁵		
Detroit	3.450 ¹	3.661 ¹	3.609 ¹	5.281 ¹	3.450 ¹	3.700 ¹	3.700 ¹	5.000 ¹⁵	4.500 ¹⁵	3.900 ¹⁵	4.659	5.93 ²³	5.93 ²³
Omaha (city, delivered)	4.115 ¹	4.165 ¹	4.165 ¹	5.765 ¹	3.665 ¹	4.215 ¹	4.215 ¹	5.608 ¹⁵	5.443 ¹⁵	4.543 ¹⁵			
Omaha (country, base)	4.015 ¹	4.065 ¹	4.065 ¹	5.665 ¹	3.765 ¹	4.115 ¹	4.115 ¹	5.508 ¹⁵					
Cincinnati	3.611 ¹	3.691 ¹	3.661 ¹	5.291 ¹	3.425 ¹	3.675 ¹	3.675 ¹	4.825 ¹⁵	4.475 ¹⁵	4.111 ¹⁵	4.711	6.10 ²³	6.20 ²³
Youngstown, O.					3.25 ¹	3.50 ¹	3.50 ¹	4.40 ¹⁵					
Middletown, O.					3.25 ¹	3.50 ¹	3.50 ¹	4.65 ¹⁵					
Chicago (city)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.25 ¹	3.60 ¹	3.60 ¹	5.281 ¹⁵	4.20 ¹⁵	3.85 ¹⁵	4.65	5.75 ²³	5.85 ²³
Milwaukee	3.637 ¹	3.687 ¹	3.687 ¹	5.287 ¹	3.387 ¹	3.737 ¹	3.737 ¹	5.272 ¹⁵	4.337 ¹⁵	3.987 ¹⁵	4.787	5.987 ²³	6.087 ²³
Indianapolis	3.58 ¹	3.63 ¹	3.63 ¹	5.23 ¹	3.518 ¹	3.768 ¹	3.768 ¹	4.918 ¹⁵	4.568 ¹⁵	4.08 ¹⁵	4.78	6.08 ²³	6.18 ²³
St. Paul	3.76 ¹	3.81 ¹	3.81 ¹	5.41 ¹	3.51 ¹	3.86 ¹	3.86 ¹	5.257 ¹⁵	4.46 ¹⁵	4.46 ¹⁵	5.102	6.09 ²³	6.19 ²³
St. Louis	3.647 ¹	3.697 ¹	3.697 ¹	5.297 ¹	3.397 ¹	3.747 ¹	3.747 ¹	5.172 ¹⁵	4.347 ¹⁵	4.131 ¹⁵	4.931	6.131 ²³	6.281 ²³
Memphis, Tenn.	4.015 ¹	4.065 ¹	4.065 ¹	5.78 ¹	3.965 ¹	4.215 ¹	4.215 ¹	5.265 ¹⁵	4.78 ¹⁵	4.43 ¹⁵			
Birmingham	3.50 ¹	3.55 ¹	3.55 ¹	5.903 ¹	3.45 ¹	3.70 ¹	3.70 ¹	4.75 ¹⁵	4.852 ¹⁵	4.64	5.215		
New Orleans (city)	4.10 ¹	3.90 ¹	3.90 ¹	5.85 ¹	4.058 ¹	4.20 ¹	4.20 ¹	5.25 ¹⁵	5.079 ¹⁵	4.70 ¹⁵	5.429		
Houston, Tex.	3.75 ¹	4.25 ¹	4.25 ¹	5.50 ¹	3.763 ¹	4.313 ¹	4.313 ¹	5.313 ¹⁵	4.10 ¹⁵	3.75 ¹⁵			
Los Angeles	4.40 ¹	4.65 ¹	4.95 ¹	7.20 ¹	5.00 ¹	4.95 ¹	6.75 ¹	6.00 ¹⁵	7.20 ¹⁵	5.683 ¹⁵	5.613	5.85 ²³	5.95 ²³
San Francisco	4.15 ¹	4.35 ¹	4.65 ¹	6.35 ¹	4.55 ¹	4.50 ¹	5.75 ¹	6.85 ¹⁵	7.30 ¹⁵	5.483 ¹⁵	7.393	8.304 ²³	8.404 ²³
Portland, Oreg.	4.45 ¹	4.45 ¹	4.75 ¹	6.50 ¹	4.85 ¹	4.75 ¹	6.30 ¹	5.75 ¹⁵	6.60 ¹⁵	5.633 ¹⁵			
Tacoma	4.35 ¹	4.45 ¹	4.75 ¹	6.50 ¹	4.65 ¹	4.25 ¹	5.45 ¹	5.95 ¹⁵	7.60 ¹⁵	5.883 ¹⁵			8.00 ²³
Seattle	4.35 ¹	4.45 ¹	4.75 ¹	6.50 ¹	4.65 ¹	4.25 ¹	5.45 ¹	5.95 ¹⁵	7.05 ¹⁵	5.883 ¹⁵			8.00 ²³

*Basing point cities with quotations representing mill prices, plus warehouse spread.
 NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

¹400 to 1999 pounds; ²400 to 14,999 pounds; ³any quantity;
⁴300 to 1999 pounds; ⁵400 to 8999 pounds; ⁶300 to 9999 pounds;
⁷400 to 39,999 pounds; ⁸under 2000 pounds; ⁹under 4000 pounds;
¹⁰500 to 1499 pounds; ¹¹one bundle to 39,999 pounds; ¹²150 to 2249 pounds; ¹³150 to 1499 pounds; ¹⁴three to 24 bundles; ¹⁵456 to 1499 pounds; ¹⁶one bundle to 1499 pounds; ¹⁷one to nine bundles; ¹⁸one to six bundles; ¹⁹100 to 749 pounds; ²⁰300 to 1999 pounds; ²¹1500 to 39,999 pounds; ²²1500 to 1999 pounds; ²³1000 to 39,999 pounds; ²⁴400 to 1499 pounds; ²⁵1000 to 1999 pounds; ²⁶under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; ²⁷300 to 4999 pounds.

Ores

Lake Superior Iron Ore	48% 2.8:1	\$41.00
Gross ton, 5 1/2% (Natural)	48% 3:1	43.50
Lower Lake Ports	48% no ratio	31.00
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, units, del. E. Pa.		
Foundry and basic 56-89% 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, 68-89% f.o.b. Rio de Janeiro		7.50-8.00
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.		
NE 8612	10-15	.70-.90
NE 8720	18-23	.70-.90
NE 9415	13-18	.80-1.10
NE 9425	23-28	.80-1.20
NE 9442	40-45	1.00-1.30
NE 9722	20-25	.50-.80
NE 9830	28-33	.70-.90
NE 9912	10-15	.50-.70
NE 9920	18-23	.50-.70

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	48.50
Domestic (seller's nearest rail)	
48% 3:1 less \$7 freight allowance	52.80

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif.,

Provo, Utah, and Pueblo, Colo.

91.6c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines \$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent							Basic open-hearth Electric furnace			
	Carbon	Mn.	Si	Cr.	Ni.	Mo.	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT	
NE 8612	10-15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	\$0.85	\$13.00	\$1.15	\$23.00	
NE 8720	18-23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00	
NE 9415	13-18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00	
NE 9425	23-28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00	
NE 9442	40-45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00	
NE 9722	20-25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00	
NE 9830	28-33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00	
NE 9912	10-15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00	
NE 9920	18-23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00	

(S paying for discharge; dry basis, subject to penalties if guarantees are not met.)
 Extras are in addition to a base price of 2.70c. per pound on finished products and \$54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (In gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Mal- leable
Bethlehem, Pa., base	\$26.75	\$26.25	\$27.75	\$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25			29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	22.13	20.75	26.75	
Baltimore, del.	27.36			
Boston, del.	26.89			
Chicago, del.	25.97			
Cincinnati, del.	25.81	24.48		
Cleveland, del.	25.87	24.99		
Newark, N. J.	27.90			
Philadelphia, del.	27.21	26.71		
St. Louis, del.	25.87	24.99		
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28		28.28	27.78
Syracuse, del.	27.83		28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	23.94			23.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.25	25.75
Everett, Mass., base	26.75	26.25	27.25	26.75
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75		26.25
Hamilton, O., base	25.75	25.25		25.75
Cincinnati, del.	26.19	26.36		26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
Pittsburgh, del.				
No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25		
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25		
Baltimore, del.	27.74			
Steelton, Pa., base		26.25		27.25
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09		28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Alliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., \$2 per ton; for each additional 0.25% nickel, \$1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	\$31.25
6.51-7.00	\$32.25
7.01-7.50	\$33.25
7.51-8.00	\$34.25
8.01-8.50	\$35.25
8.51-9.00	\$36.25
9.01-9.50	\$37.25
9.51-10.00	\$38.25
10.01-10.50	\$39.25
10.51-11.00	\$40.25
11.01-11.50	\$41.25

F.o.b. Jackson county, O., per gross ton, Buffalo base \$1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferro-silicon: Sil. 14.01 to 14.50%, \$45.50; each additional .50% silicon up to and including 18% add \$1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add \$1.

Bessemer Ferro-silicon

Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn.	\$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. \$33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa.	\$25.25
Valley base	25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$31.25 base; \$32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, \$28.25.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: 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%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Celling 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 Celling Prices: 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.

Refractories

Per 1000 f.o.b. Works, Net Prices
Fire Clay Brick
Super Duty

Pa., Mo., Ky.	\$68.50
First Quality	

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	50.86
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.80
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45
Silica Brick	
Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry Press	32.90
Wire Cut	30.80

Magnesite
Domestic dead-burned grains,
net ton f.o.b. Chewelah,
Wash., net ton, bulk

net ton, bags	22.00
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

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF₂ content, 70% or more, \$33; 65 but less than 70%, \$32; 60 but less than 65% \$31; less than 60%, \$30. After Aug. 29 base price any grade \$30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, \$135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; \$140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add 6¢ for packed c.l., \$10 for ton, \$13.50 for less ton; \$1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., \$36; Pittsburg, \$40.50; Chicago, \$40.60. Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, \$2.25; less-ton lots \$2.30. Spot prices 10 cents per lb. higher.

Ferrocrome: High carbon, eastern

zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add 40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential 45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang.

4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.85c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.05c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silicaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSS Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSS Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c,

packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, \$1.20, less ton lots \$1.30, eastern, freight allowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.623, central, \$1.935 and \$2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, \$1.90, 1 ton to 5 tons, \$2.00, less than ton \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

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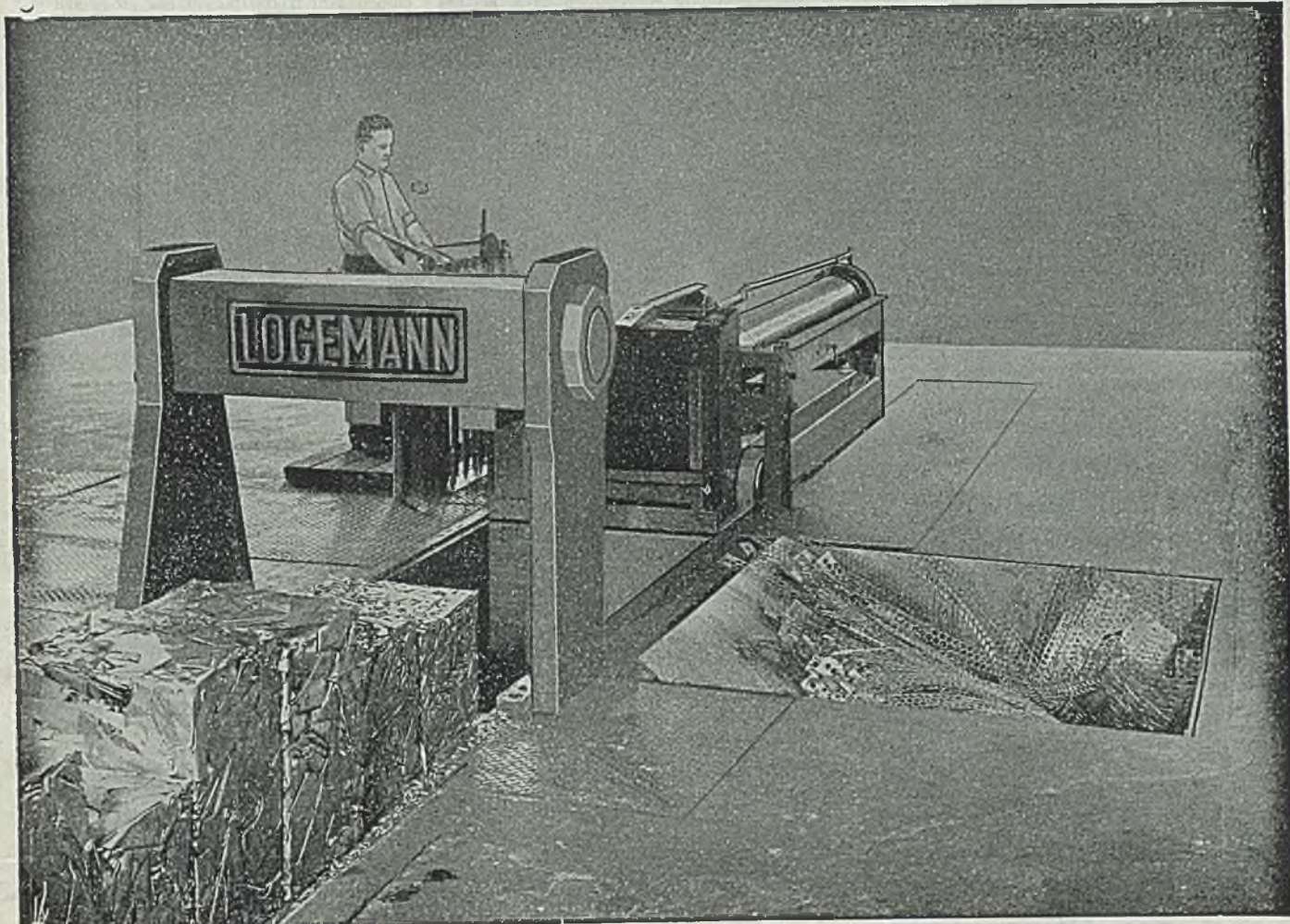
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NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Castings 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corrod- ing, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Mil- waukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Rich- mond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, cSpringfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 95-97½% 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.50c to 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) stand- ard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magne- sium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing, screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight al- lowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239. 2¼c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99.99-99.99% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. La- redo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distribu- tors and jobbers add ¼c, 1c, and 3c, respec- tively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, \$108- \$110 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., \$17 lb. con- tained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes,

balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, \$1.50 lb. for 550 lb. (bbl.); \$1.52 lb. for 100 lb. (case); \$1.57 lb. under 100 lb.

Indium: 99.9%, \$2.25 per troy ounce.

Gold: U. S. Treasury, \$35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: \$35 per ounce.

Iridium: \$165 per troy ounce.

Palladium: \$24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculey, Duronze or equiv. 28.06c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculey, Duronze or equiv. 25.50c; Naval brass 19.12c; manga- nese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weather- proof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less car- lots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Gras- sell, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¼c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 90%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculey, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¼c for shipment of 60,000 lbs. of one group and ¼c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, alumi- num bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of ship- ment, truckloads of 5000 pounds or over; Seg- regated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for re- fined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ¼c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ¼c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 140

Tightness in sheets and strip has not eased and mills are filled into third quarter or further, with delivery promises difficult to obtain. Most producers are on a quota system and consumers in general insist they are not being allowed sufficient tonnage for needs.

Philadelphia—Where sheet mills are not on a quarterly quota system they are booked well into third quarter and even into fourth quarter in some cases, despite efforts to restrict orders. This applies to hot and cold-rolled and galvanized. In electrical sheets the situation is even tighter. In fact, this specialty now represents perhaps the hardest bottleneck in the flat-rolled category, particularly the less profitable low silicon grades. Demand for electrical sheets exceeds by many times possible supply, especially for fractional motors for household appliances. There has been little expansion in facilities for producing electrical sheets in recent years, particularly in annealing facilities and there is considerable pressure for such expansions, although special ratings will be necessary to provide equipment.

Chicago—New business in sheets is so heavy that all producers are forced to adhere closely to the quota systems which were devised to assure equitable distribution to established customers. The headaches come in pressure from consumers trying to establish new accounts, but in virtually all cases this tonnage is being declined. Shipping schedules are approximately one month behind, sheet-makers being unable to make headway against the loss of output suffered from the coal strike last fall. Increased production is out of the question because of inadequate manpower, shortage of hot metal and scrap and the necessity for watching coal consumption with the arrival of winter weather.

Cleveland—Dissatisfaction over the sheet and strip supply is growing in consumer circles. An increasing number of top executives of companies which have expected larger shipments to sustain production schedules are visiting the main offices of the steel producers in an attempt to get relief. They generally are dissatisfied with the maximum tonnages which have been assigned by branch managers and are unable to find additional sources of supply. Unless they are able to prove existence of unusual circumstances, the consumers get no assurance of adjustment in promised supplies. Many manufacturers will be forced to close their plants soon after the first of the year if larger supplies are not available by that time. In some instances, consumers are receiving as little as 5 per cent of the amount of some steel products they received in a base period.

The producers' position has been made more difficult by the necessity of exporting 850,000 tons of steel during the first six months of 1946. Government officials claim that this tonnage represents the minimum amount necessary to meet essential rehabilitation needs in Europe and Africa. Members of the General Steel Products Committee have offered co-operation in the effort to meet this requirement.

A steady extension and refinement of various quota plans is being made by

steel producers. In some cases, producers have reduced their forward sheet and strip bookings, many now accepting only first quarter business and planning to defer second quarter business until February. In some other cases, producers have informed their customers of the maximum tonnage which they can purchase for delivery in any one month.

Boston—Although some are behind re-conversion schedules, fabricators of narrow cold strip are absorbing current deliveries and efforts to build inventory are futile. Most orders now accepted are for third quarter delivery. Consumers in scattered instances are pinched for steel. Hot strip outlook is increasingly uncertain, although to date rerollers have

lost little tonnage of consequence from lack of material. Extended sheet deliveries tend to discourage attempts at new buying but pressure for tonnage holds, notably volume included in and bordering on carryover. Silicon electrical and polished stainless are extended into third quarter and beyond. Demand for both grades and for galvanized is heavy, with buyers combing surplus. Sales of the latter total 965 tons, of which 665 tons were graded as in poor condition and the remainder only fair.

Cincinnati—Sheet mills facing obligation, under government directives, to supply tonnage in first half for export to Europe under a proposed rehabilitation program, indicate that schedules for



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first quarter are so tight that such rolling would be, if permissible, postponed to second quarter. Until the export proposal is definitely settled, and mill quotas fixed, it is not likely definite domestic commitments will be made for second quarter. Storing of sheets by strike-bound plants may be nearing saturation point, but any tonnage released by cutbacks from this cause would be rapidly absorbed and the demand still far exceed supply.

St. Louis—Sheet production, which reached the best point since July in November, continues to drop, largely because of labor shortage. A slight improvement, particularly in semiskilled classifications, has not yet been reflected in output. Demand for sheets continues

unabated, with inquiries in heavy volume from remote points which never before attempted to enter this market. Most pressure is on hot-rolled, cold-rolled and electrical sheets. Schedules on the former two are filled through 1946 and electrical sheets are into 1947. A conservative policy in back-ordering permits rollers to keep pretty well abreast of delivery promises.

Steel Bars . . .

Bar Prices, Page 140

Bars are no easier to obtain than for several weeks, such gaps as appear in mill schedules being filled by contracts already on books, offering no opportunity for current buyers to obtain a foothold.

Small sizes continue to be most heavily booked and with some producers backlogs extend as far as third quarter. On larger diameters bookings extend to late second quarter.

New York—While there have been a few gaps recently in carbon bar schedules due to cancellations, they have meant little to anyone with new tonnage to place on mill books, for the reason that producers generally are well behind on current commitments and consequently take such openings as are available as an opportunity for catching up in at least a limited measure. Generally speaking it would appear that most mills are anywhere from three to four weeks behind on hot-rolled.

Most producers of hot carbon have little to offer in the way of new tonnage before the latter part of second quarter, and on the very small sizes many are booked up solidly until well in the third quarter.

Cold-drawn bar deliveries range around March, although some producers are booked beyond that. Hot alloy bars are still being freely offered for February, with some tonnage available in January.

Cleveland—Bar deliveries are being extended further as demand continues to exceed production. While some producers have adopted various quota systems and others have restricted forward bookings to short periods, such as first quarter, a few still accept 1946 business on an unrestricted basis so far as their own customers are concerned. Sellers in the latter class have booked their small mills almost solidly through fourth quarter but have open spaces as early as January on their larger mills.

At least one leading seller virtually canceled all orders on its books and informed its customers of what bar tonnage would be available each month. The tonnage can consist of any sizes and shapes the company produces with delivery entirely dependent upon the first open space on its mills. This varies widely among producers and the various mills of each producer.

The alloy bar situation is comparatively easy with the following positions now available: January on hot-rolled, February on hot-rolled annealed, and March on cold-rolled. Deliveries of carbon bars are generally four to five weeks behind schedule, reflecting delays occasioned during the early fall fuel shortage.

Operations were retarded at some mills early last week, especially in the Buffalo district, due to a heavy snowfall.

Boston—Carbon bar demand centers heavily in smaller sizes, 2-inch and under, on which deliveries are most extended. Practically no tonnage in this size range is available for second quarter delivery. Cold-drawn material is also more extended by two months in smaller sizes, reflecting heavier demand and some reduction in hot bars for finishing. Alloys can be shipped in February and while there has been some switching of specifications to that grade, volume is not great enough to lengthen schedules substantially. Leading consumers of bars, including forge shops, are generally covered well through first half and providing delivery schedules on a monthly basis are maintained reasonably well. Most will not become short unless production is increased.

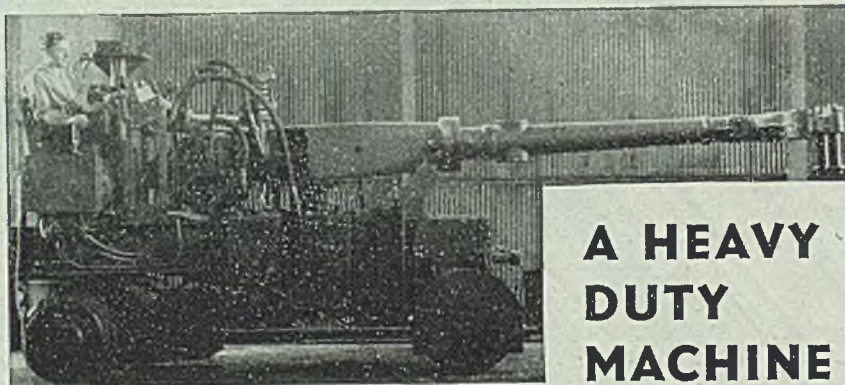
Philadelphia—Carbon bar demand con-

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tinues strong, with quickening activity among forgers, heavy as well as light, and with agricultural implement manufacturers and carbuilders pressing for tonnage. However, so light are existing stocks that some manufacturing consumers plan to suspend promptly should a general steel strike go into effect next month. While some hot carbon bar tonnage can still be picked up in June, deliveries generally fall in third quarter and even beyond in some instances. Cold-drawn carbon shipments fall in March and beyond and hot alloy bars in February.

Steel Plates . . .

Plate Prices, Page 141

Plate demand continues to exceed expectations, especially in lighter gages, with mills filled well into next year and backlogs growing. Tank work leads in demand, though freight car builders and shipyards take considerable tonnage.

Boston — Demand for plates, still topheavy in lighter gages for welded tanks, is broadening for miscellaneous industrial fabrication. Heavier sizes are available in April, an extension with some mills, but lighter stock is well sold through second quarter. Most plates sold from surplus during the latest compilation period have been listed as fair to poor, totaling 835 tons. American Steel & Iron Co., Boston, bought 341 tons graded as good; this distributor has been notably active in the surplus market, recently buying 10,000 tons of steel rail at \$430,000, and 575 tons black plate.

Philadelphia—Railroad car builders as well as fabricators of light fuel oil storage tanks are inquiring actively for light plates. One builder is now inquiring for 20,000 tons of 3/16-inch material for delivery over ten months and is having difficulty getting it. Such tonnage is said to be not too desirable from a production standpoint and some producers insist on a certain portion of heavier gage tonnage in accepting such business. Most sellers quote second quarter, although one large producer still has some March tonnage available. One seller is booked solidly into June. No plate tonnage is included in the 850,000 tons of steel up for directive action for first half export. Plates are in demand from abroad, but apparently Washington does not believe supply is tight enough here to warrant use of directives.

Chicago — Plate order books currently show considerable open space in second quarter, and unless these are filled shortly, indications are that this product will be in a comfortable position within four months. Universal and narrow sheared plates now are available for February delivery, but wide sheared cannot be had before April. Material for pipe lines forms a great part of overall demand.

St. Louis — Demand for plates, 3/16 to 1/4-inch, continues strong. Plate production currently is 12 to 15 per cent of total flat-rolled tonnage and bookings are into fourth quarter of 1946. Unexpected pressure is coming from the farm equipment industry.

Birmingham — Plate order backlogs are increasing in spite of steady production. Ingot supply for plate mills is variable but somewhat more flexible. Demand shows no indication of lessening.

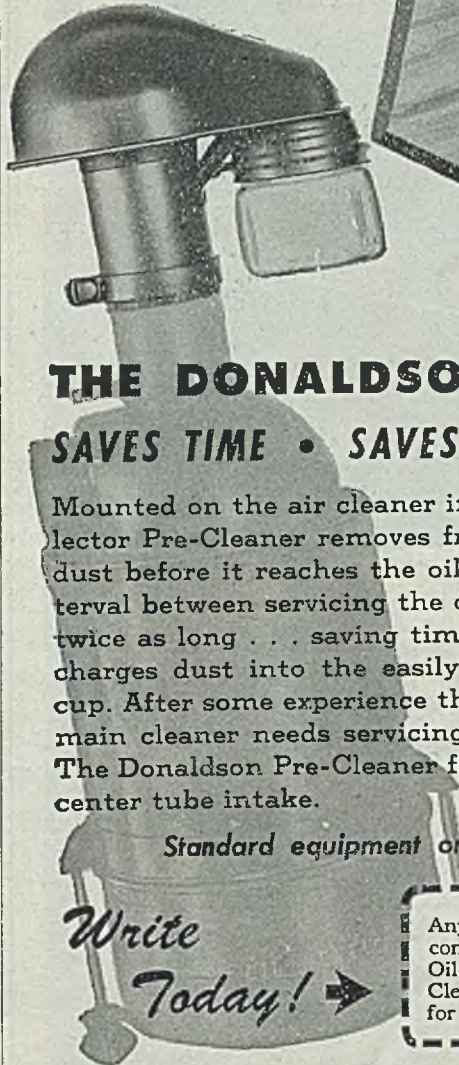
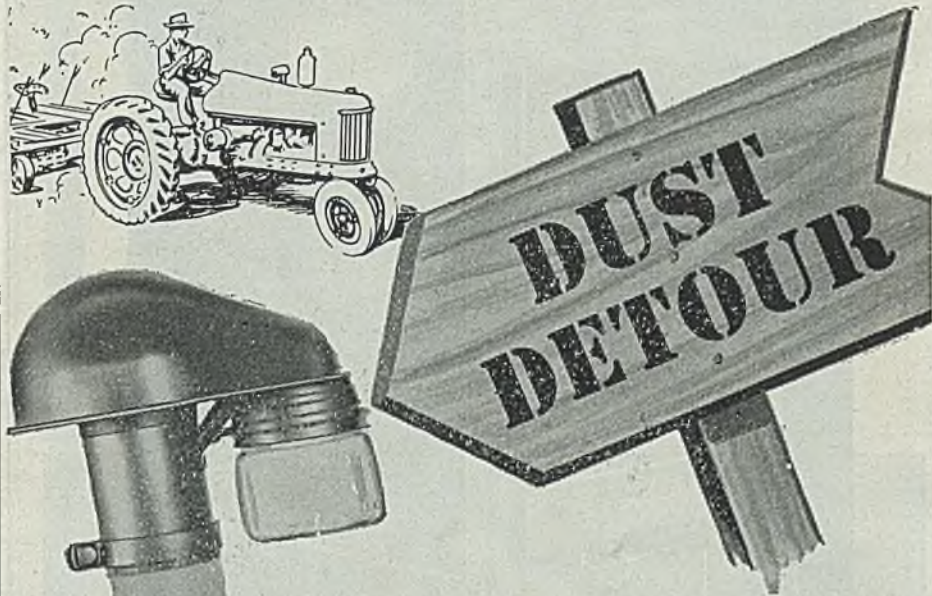
Tubular Goods . . .

Tubular Goods Prices, Page 141

Pittsburgh — Despite exceptionally high inventory turn-over rate, jobbers' and dealers' stocks are in fairly good balance. No easing in demand for merchant pipe is indicated and little headway has been made in improving delivery schedules which now extend into March. Further improvement in steel and cast iron pipe requirements is anticipated next spring, due largely to miscellaneous plant expansion and municipal projects. While a large potential demand for standard pipe is in the offing for home construction, there apparently will be some delay in getting that program launched on a major scale, due to

shortage in construction materials. Cast iron pipe producers have four months' order backlogs, with manpower shortage the chief factor restricting output although scarcity of pig iron is also a retarding influence. A number of post-war municipal projects, requiring unusually large pipe tonnage, are expected to come up for bids early next spring. However, some of this work may be held up, for a few municipalities are seeking federal financial aid. Bids went in last week on 400 tons of 6 and 8-inch cast pipe for the Moon Township airport here.

Cleveland—Pipe deliveries are falling further behind, being from two to six weeks behind schedule. Mills were unable to make all deliveries promised



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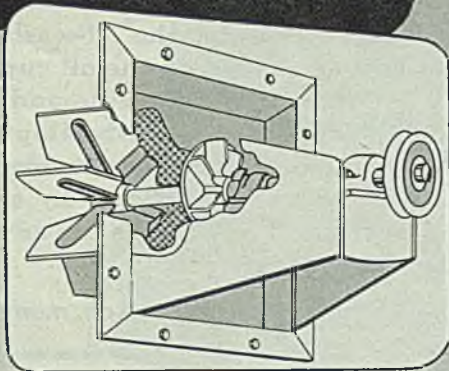
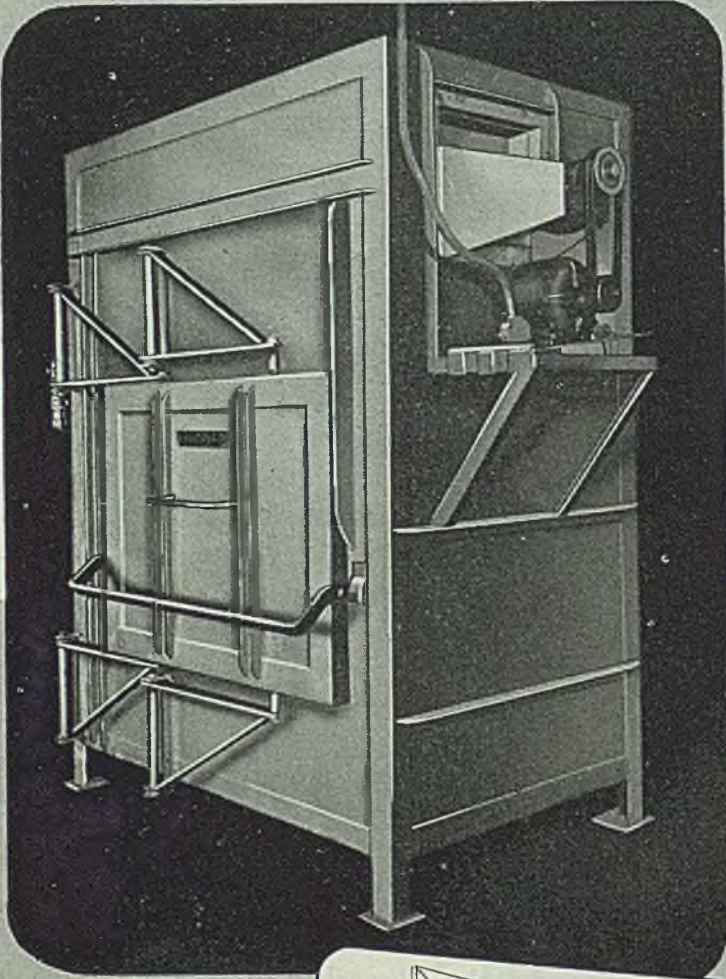
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in the early fall and were hampered last week by weather. An embargo was clamped on all freight, including pipe shipments, consigned to the Buffalo area, while two pipe mills were closed during the early part of the week in the Youngstown district from shortage of gas. Most producers have withdrawn from the market on a direct-shipment basis and have been forced to reduce quotas in an effort to catch up on deliveries. Butt-weld deliveries extend into September while most electric weld pipe and seamless tube mills are filled through first half.

Seattle — Cast iron pipe demand is increasing but suppliers report the delivery situation is more acute and definite promises cannot be made. Potential demand in the Pacific Northwest seems to assure active demand through 1946 as many communities postponed improvements during the war. M. Moschetto, Seattle, has a contract to \$231,234 for the Eighth Ave. SW., project in Seattle, requiring 2000 tons of cast pipe, which has not yet been placed. Other pending business involves 900 tons at Portland, Oreg., and 500 tons at Tacoma, Wash. Pasco, Wash., has opened bids on about 350 tons. Tacoma, Wash., will open bids Dec. 28 for 11,053 feet of 48-inch steel pipe, with alternate for concrete pipe.

Wire . . .

Wire Prices, Page 141

Chicago — Demand for manufacturers' wire exceeds production, and the picture is expected to remain tight for months ahead. In merchant products, pressure is relentless for fencing, barbed wire and nails. Jobber stocks are inadequate to accommodate consumers. A midwestern farm implement manufacturer is understood to be developing a new baling wire, to be put up on 100-pound cores. Probability is that production will amount to several hundred tons next year.

New York — Most mills are allocating rod tonnage on a monthly basis against orders which in some cases extend through the remainder of the year. Drawn wire schedules also are frozen on a rationing basis through first quarter and while backlogs include enough tonnage to fill second quarter, allocations have not been made by one leading eastern producer. Numerous rod consumers are not getting more than 50 per cent of the volume requested and finished wire users fare only slightly better. Pressure for wire on a broad scale is heavy, with most current shipments going into consumption. Inventories are barely maintained where they exist and some fabricators are forced to dip into limited reserves.

Boston — Mills in some instances are taking no new orders for galvanized wire. Overall inquiry continues heavy, only part of which is given firm acceptance, with delivery on some products extended to third quarter. Pressure for tonnage on books is maintained and orders are frequently rescreened, with scattered cancellations as justified. No material dent is made in backlogs with shipments less than inquiry and orders. Cancellations for the most part result from inability to produce as expected and in this the growing tightness in rods is a factor with some.

Tin Plate . . .

Tin Plate Prices, Page 141

Pittsburgh — Barring further interruptions to production, tin plate output next quarter should show a moderate increase. There are good indications that the manpower problem may be relieved somewhat and also the possibility of further revisions in tin plate order M-81. Recently this order was revised to increase permitted uses for tin cans to 190 from 189, and there is hope that the number of end uses soon will be further enlarged. Sellers are booked well into second quarter and in general have not yet opened books for third quarter.

Indicative of the somewhat improved tin supply, OPA last week eased restrictions on use of tin in manufacturing by a revision of order M-43, which was designed to line up the limited supply of tin more closely with requirements of the reconversion program. Tin andterne plate may now be used for domestic baking pans, maximum permitted coating 0.25 of a pound per base box, and closure for all food products 1.50 pounds per base box. The closure order L-103B and collapsible tube order M-115 are incorporated in M-43 by this recent amendment.

Chicago — Following several weeks in which lack of box cars held up shipments of tin plate, one district producer now reports car supply has improved to the extent that shipments exceed production. Specifications have been pouring in steadily and first openings in schedules are in March.

Structural Shapes . . .

Structural Shape Prices, Page 141

New York — While substantial work is in prospect, structural activity is still lagging because of the uncertain outlook with regard to wages and material deliveries. Included in the few outstanding awards at the moment are 1000 tons for a further navy addition at White Oak, Md., placed through the Dyker Building Co., New York, general contractor, with Bethlehem Steel Co., Bethlehem, Pa. This fabricator also booked 450 tons for the Beverwyck Brewery Co., Albany, N. Y., this being in addition to 300 tons booked for the same company earlier in the year. Included in the larger jobs in prospect, although not up for early action, is a store and office building at 270 Park avenue, involving 17,000 tons.

The Wagner Co. is low on the Governors Island shaft of the Brooklyn-Battery tunnel, with a bid of \$2,991,803, with George H. Flynn second low, with an offer of \$3,989,937, a difference of approximately \$1,000,000. The shaft will require about 4000 tons of structurals.

Boston — Allocation of larger ratio of building materials for home building will delay some industrial and commercial construction planned for early next year. Higher costs, 50 to 60 per cent over prewar, are also a factor. However, on current awards builders want early delivery on fabricated steel, some in March, which is ahead of mill rolling schedules. On some sizes mills are in third quarter on plain material. Inventories with fabricators and warehouses are small as a rule.

Philadelphia — Shape deliveries fall mainly in April and May on both standard and wide-flange sections with pro-

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ducers generally behind on current commitments. On small sizes one producer is behind six to eight weeks. Some mills are further restricting quotas. At present structural demand is tapering, in some eastern seaboard districts, very appreciably, because of unsettled outlook with respect to wages and material deliveries. Not only are orders fewer but also inquiries. Any material easing in pressure on shape mills as a result is likely to be offset by new directives on export tonnage.

Birmingham — Demand for structural shapes is heavy and bookings are being extended further into next year. Small orders are being supplied fairly well from warehouse stocks.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Seattle — Demand for reinforcing steel has eased, due to the holiday season, but many important projects are up for early consideration. Seattle plans a \$3 million steel and elevated road on Alaskan Way, plans to be ready during first quarter. L. H. Hoffman, Portland, Oreg., has a contract for about \$1 million for expansion of the Sears-Roebuck plant at Portland.

Pig Iron . . .

Pig Iron Prices, Page 143

Pig iron scarcity continues, though melters are being supplied fairly well and no important interruption of foundry work has occurred. Shortage of cast scrap puts an additional burden on pig iron. Considerable switching of analyses is being done to adapt available supplies in cases where usual grades cannot be obtained. Neither producers nor consumers are able to add to inventory and iron is shipped as soon as produced and promptly melted by consumers.

Pittsburgh — Pig iron supplies here are not as tight as at Chicago and in the East. Despite the close balance between production and consumption most pig iron sellers are opposed to enforced allocations, preferring to work out their own problems. Chief concern of foundries in this district is lack of cast scrap, although in some instances they have had to wait two to three weeks to obtain type of iron analysis needed. No shipment hold-ups of significance have occurred yet from the General Motors strike. Slight improvement in foundry operations has developed, resulting from moderate easing in manpower. Steady upturn in blast furnace operations has occurred since the coal strike, with output this month closely matching that of September. An additional furnace was added last week with the blowing in of No. 2 stack by Jones & Laughlin Steel Corp. at Aliquippa, Pa. This 800-ton unit, along with the new by-product coke ovens at this plant, has been ready for operation since mid-October, but lack of coal prevented starting until last week.

New York — Supply and demand for pig iron are in close balance, with neither producers nor consumers able to build up much inventory. Most consumers in this district, in fact, have been unable to get stocks up to even the 30-day limitation imposed by Washington, notwithstanding the anxiety of buyers to build

some backlog before still more adverse weather conditions set in and before the date set for the proposed steel strike, which is Jan. 14.

There is still question in the minds of many as to whether the strike will actually materialize, but all regard it as a serious possibility and are endeavoring to prepare themselves accordingly. This is especially true in view of the possibility that if a strike does occur it will take some time after that before the blast furnaces will again be operating full.

Severe storms in the Buffalo area have begun to retard shipments to this district and should there be any considerable delay a number of consumers will be hard put in maintaining production during January.

While in normal times many foundries close down during the last week in December because of the holidays and inventory period, there have been few indications of any such action this year. Certainly, it appears, those that do close down for the entire week will be the exception rather than the rule.

Boston—Setbacks in pig iron delivery schedules are developing at shipping points, notably at Buffalo, where a high ratio of tonnage for New England originates. Storms have also reduced production and the predicted scarcity of iron this winter has developed for some. While many consumers are well under the 30-day inventory limit, CPA claims checkups reveal numerous inventory violations in this area. These are advised not to accept deliveries which would bring inventories over the 30-day supply. Producers are told not to ship to consumers over the limit and consumers will be required to report monthly consumption and inventory at the end of each month. From now on, however, the major problem will be to get enough iron to maintain melt.

Philadelphia — Due in part to bad weather conditions, which hinder both production and transportation, pig iron supply is increasingly tight. Those dependent principally on iron from the Buffalo district are being hard pressed in maintaining anything like a 30-day inventory. Some have scarcely enough to run beyond the first week in January. Sellers generally limit tonnage to regular customers and hold even these down tightly. Complicating the situation is the fact that foundry labor is easier and more iron could be melted.

Cincinnati — Orders are being placed for first quarter pig iron requirements, and these are affected by an unofficial rationing. Furnace interests asked that orders be not padded with tonnage beyond actual needs. Meanwhile melters are trying to expand output to meet insistent demand for castings; in many cases holiday shutdowns will be held to a minimum, as evidenced by shipping instructions for iron. Delays in deliveries have had no serious results.

Birmingham — Pig iron production is retarded because of furnaces under repair and shortage of labor. Deliveries to larger users are steady but some smaller melters report difficulty obtaining tonnage. Three furnaces are under repair, two by Tennessee Coal, Iron & Railroad Co. and one by Woodward Iron Co.

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Scrap . . .

Scrap Prices, Page 144

Scramble for scrap continues and brokers are hard pressed to obtain sufficient material to satisfy melters. Springboards continue to be paid and premium grades are taken for open-hearth use. Shipment of some 60,000 tons of steelmaking grades from the Portland, Oreg., area to Chicago mills is a feature and more is expected to follow.

Boston — Keen bidding for steel and cast iron scrap in open sales at ceiling prices reflects limited supply and curtailed shipments. Here and there consumers have the 60-day limit inventory, but many are well below that level. Steelworks reserves are not sufficient to slacken buying of good heavy melting, but on the whole forward position on scrap is better than for pig iron. Low phos steel supply is lower with shipyard liquidations, but the volume selling commands the \$2.50 premium, including short steel to foundries in this grade. Yard shipments continue below normal.

Cincinnati — Although iron and steel scrap continues as strong as ever, a pre-holiday dullness is evident. Little, if any, of this sag in activity is attributed to anticipation of a steel strike. Dealers and brokers are not aware that the strike threat has been reflected so far on scrap. Melters are fairly well supplied and hence are not being pushed to acquire tonnage taking higher freight charges. Available tonnage is lighter in production, termination and country scrap. Unfavorable weather hampers preparation.

New York — Little scrap tonnage is moving, particularly as a result of severe snowstorms, and indications are that the flow will be small over the remainder of the year. Turnings and cast grades are exceedingly scarce, there being a poor supply to begin with, and indicative of the pressure for melting steel are \$3 springboard prices being offered in the East by Pittsburgh consumers. Also indicative of this pressure is the purchase of 2700 tons of landing mat steel in Brooklyn by Charles Dreifus Co., Philadelphia, at \$14.25 per gross ton, a figure \$1.20 higher than the next bid.

Cleveland — Scarcity of scrap in all grades has not been relieved and all consumers are making strenuous efforts to obtain tonnage. Open-hearth operators are taking as much low phos as possible to obtain, even at the advanced price, while electric furnace operators press for delivery of the same grades. Yards are handicapped in preparing scrap by the deep snow, which makes it difficult to get at their unprepared material. Consumers here are paying \$1.25 springboard for scrap from other areas. Cast grades are almost unobtainable.

Pittsburgh — Scrap supply is becoming steadily tighter, due to continued heavy demand, while source of production scrap supply at General Motors Corp.'s plants has been shut off and heavy snows and cold weather have hampered processing material through dealers' yards. Indicative of the keen competition for available scrap is the fact that mills are now willing to pay \$3 a ton freight equalization on open-hearth grades, which is \$2 above former normal practice and represents an upward adjustment of 50 cents this past week. Another indication of the increasing

shortage of scrap is illustrated in the greater use of low phos material in the open-hearth operations. Due to the manpower shortage and inability to adequately process material, scrap dealers are hesitant to load up with large tonnages of unprepared material. They hold it is too much of a risk, although prices have been firm for some time and there is little indication of weakness in near future. Bids were taken Dec. 20 on 10,000 tons of landing mat scrap, f.o.b. cars Norfolk, Va., Army base, by the director of regional disposal center, Fort Eustis, Va. Bids also went in last week on 1250 tons of tank treads at Fort Eustis, Va. Luria Bros. & Co., Philadelphia, were high bidders on a similar lot of 10,000 tons of landing mat scrap, taken Dec. 13 at Fort Eustis, bidding \$14.65 a ton on a lot of 2000 tons and \$13.55 a ton on the remainder.

Philadelphia — With possibly one exception district consumers of heavy melting steel find themselves short of comfortable supply. With two weeks of adverse weather and with movement dwindling accordingly, some consumers are hard pressed, with possibility the melt may be affected soon unless relief is provided. One interest at the moment is relying entirely on home scrap and is making rapid inroads into this.

St. Louis — Bad weather and labor shortage continue to reduce scrap shipments and material from terminated contracts is not moving as well as in November. Mill reserves, though still around 30 days, continue to decline and some melters are increasing springboards to bring in more. Foundries are reported in comfortable position. Order volume is good but brokers are reluctant to accept because of uncertainty they can be filled under present conditions. In best demand are rails, angle bars, cast scrap and open-hearth steel grades. All prices are at ceilings.

Birmingham — Scrap supply is light in most grades, with blast furnace material in heavy demand. Ceiling prices prevail on all classifications.

Seattle — Steelmakers in the Chicago area are reported to have bought 60,000 tons of scrap at Portland, Oreg. This material was bought recently by Dulein Steel Products Inc., Seattle, as surplus from the Portland shipyard. Its movement has been facilitated by an overland freight rate reduction, effective this month. It is believed other tonnages will be shipped from Portland, the total aggregating 100,000 tons. Locally the scrap situation is satisfactory, offerings being more than ample for current needs. Shipyard material predominates but other good material is also available. Price is unchanged at \$10, mill, for steelmaking grades.

Metallurgical Coke . . .

Coke Prices, Page 141

Pittsburgh — Coke production capacity here has been substantially increased by completion of the \$7 million battery of 106 ovens at Jones & Laughlin Steel Corp.'s Aliquippa Works. This new battery, considered the largest in the world, produced its first coke last week. Although it has been ready for operation since early in October, lack of coal prevented operations at that time. The ovens are the Kopper-Becker underjet

type, with waste gas return for heat control and are equipped with automatic self-sealing doors. Operating capacity is estimated at 2800 tons of coal a day for production of 1900 tons of coke. Limited coal supply and manpower shortage are retarding primary steelmaking operations in this district. However gradual easing in the coal situation has permitted steady improvement in coke production here the past six weeks from the low point reached during the coal strike. By-product coke oven output has recovered nearly the entire drop which occurred at that time, while bee-hive operations are estimated at 61.5 per cent of capacity compared with less than 40 per cent reported Oct. 15.

Warehouse . . .

Warehouse Prices, Page 142

Pittsburgh — Steel distributors' inventories are unusually low in relation to the exceptionally heavy demand. They are not getting replacement tonnage in volume needed, particularly in sheets, strip, large structural sections and small bars. Shipments out of warehouse stocks are nearly 15 per cent above that earlier this year, reflecting extended mill delivery promises and effort on part of many consumers to build up stocks as a hedge against a possible steel strike Jan. 14. Unusually heavy requirements for maintenance and repair, plus the initial steel needed for civilian goods production, are said to be important factors in the current overall warehouse steel demand picture. Steel distributors' customers are forced to take substitute specifications on a temporary basis because of the low and unbalanced inventory position of most warehouse steel interests.

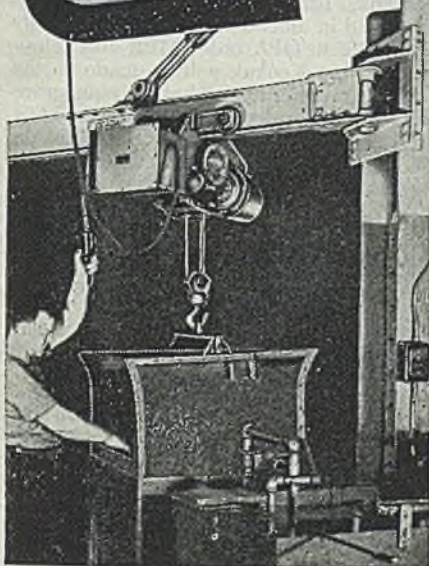
New York — As mill deliveries lengthen demand for steel in larger lots from warehouse increases, opening wider gaps in some sizes and grades on a larger number of products. Cold-finished bars have lengthened up to two months with some mills, but the pinch in stocks is most severe in flat-rolled products. Mild improvement in alloy buying is maintained. Usually demand at this time reflects concern as to yearend inventories, but not this year.

Philadelphia — Jobbers find business limited only by ability to supply requirements. Pressure for sheets, shapes and bars is particularly heavy. Some distributors expect December bookings to be about equal to those of November, despite yearend holiday influences.

Cincinnati — Warehouse business is holding close to wartime peaks, partly at the expense of inventory. Inquiry is persistent even though holidays may modify pressure for delivery. Structural and sheets are particularly scarce. Mill replacements lag so that there is little hope for keeping stocks in balance under impact of heavy buying.

St. Louis — Warehouse steel inventories continue to decline and indications are they will lose ground further. Demand for all warehouse items is heavy and replacements are slow. Pressure for sheets, bars, strip, plates and structurals is especially heavy. Buyers apparently expect greater scarcity in first quarter and are attempting to place orders which normally would go to mills. Mills are allocating to warehouses, which, in turn are spreading the limited supply among customers. The result is substantial

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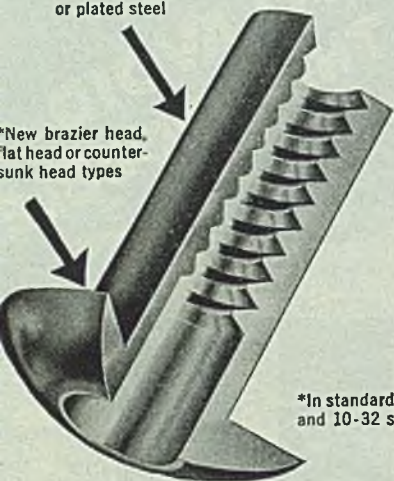
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increase in orders, with total tonnage declining.

Iron Ore . . .

Iron Ore Prices, Page 178

Consumption of Lake Superior iron ore in November totaled 5,611,627 gross tons, compared with 4,491,246 tons in October and with 6,882,696 tons in November, 1944, according to statistics of the Lake Superior Iron Ore Association, Cleveland. Cumulative consumption for 11 months was 69,476,744 tons, against 80,156,826 tons in the comparable period last year.

Stocks of ore at furnaces and Lake Erie docks Dec. 1 totaled 44,706,399 tons, almost exactly as much as Dec. 1, 1944, when they were 44,721,674 tons. Active blast furnaces in the United States Dec. 1 numbered 154, compared with 169 a year ago.

Steel in Europe . . .

London — (By Radio) — Condition in the steel industry in Great Britain are quieter, due to approach of the holidays. Most steel mills are well booked through first quarter of 1946. Ingot output is rising and now is at the rate of 13 million tons per year.

Canada . . .

Toronto, Ont. — Canadian iron and steel markets have fallen into the full grip of the year-end holiday season. Buying is slow, also due to the fact that producers' books are filled for first quarter and will not open for several days for second quarter. Demand for steel, however, is sustained and consumers still are pressing for delivery. Civilian production is slated for a sharp upswing early in the New Year when large quantities of consumer goods are expected to appear in wholesale and retail stores. It is apparent that many producers have been withholding goods from the market in order to take full advantage of the 16 per cent reduction in excess profits tax which becomes effective Jan. 1. Practically all controls on iron, steel and other metals have been withdrawn with free markets as far as supply is concerned now in effect. However, price ceilings continue under Wartime Prices and Trade Board direction and there are no indications that these regulations will be dropped or amended soon.

In steel the outlook is bright, and producers look for heavy buying for second quarter as soon as books open. The heavy industries, such as car and locomotive builders, agricultural implement makers and structural steel fabricators, have booked large orders recently and these will be reflected in extensive steel buying. The automotive industry and electrical equipment makers also have large orders.

Bar orders are on about the same basis as sheets. Demand exceeds supply in smaller sizes and mills report books filled for first quarter.

Scrap receipts show further decline and dealers now are providing less than 25 per cent of requirements. Most dealers report no yard reserves of scrap and are depending on day-to-day receipts. Steel mills are seeking larger quantities of steelmaking scrap but meet little success and a rather serious shortage is shap-

ing up for winter. Foundries and other users of iron scrap have given up hope of obtaining enough cast and stove plate for winter needs and are turning to pig iron. Local dealers state that no iron scrap is reaching yards from rural districts and is not expected that shipments will be resumed until next April or May.

Keokuk Made Basing Point On High Silicon Silvery

Keokuk Electro Metals Co., Keokuk, Iowa, effective at once, announces a Keokuk basing point on all grades of high silicon silvery pig iron 14 to 18 per cent silicon range, inclusive. Carload price for 14.01 to 14.50 per cent silicon grade is \$48.75 per gross ton f.o.b. Keokuk, Iowa, plus usual differentials provided in amendment No. 1, dated July 21, 1943, to OPA order MPR 405. Shipments from Keokuk will be made on the lowest combination of basing point price plus freight to destination: Silicon 14.01 to 14.50 per cent \$48.75 f.o.b. Keokuk; \$45.50 f.o.b. Jackson; \$46.75 f.o.b. Niagara Falls.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

- 2700 tons, bottling plant, Milwaukee, for Schlitz Brewing Co., to Worden-Allen Co., Milwaukee; bids Dec. 17.
- 1600 tons, building, Federal Telephone & Radio Corp., Nutley, N. J., reported placed with Belmont Iron Works, Eddystone, Pa., through Turner Construction Co., New York.
- 1200 tons, power house, Alma, Wis., for Dairyland Power Co-operative, to Duffin Iron Co., Chicago; Vern E. Alden, Chicago, engineer; bids Dec. 7.
- 1000 tons, addition to navy project, White Oak, Md., awarded through Dyker Building Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.
- 975 tons, gymnasium, Princeton University, Princeton, N. J., to Bethlehem Fabricators, Bethlehem, Pa., through N.A.K. Buckbee, Trenton, N. J., erector.
- 675 tons, 1946 bridge requirements various locations, for Atechison, Topeka & Santa Fe railroad; 405 tons to American Bridge Co., Pittsburgh, and 270 tons to Bethlehem Steel Co., Bethlehem, Pa.; bids Nov. 30.
- 595 tons, girder bridge, Farmington, Iowa, for State Highway Commission, to Clinton Bridge Works; bids Nov. 27.
- 500 tons, generating plant, Montaup Electric Co., Fall River, Mass., to American Bridge Co., Pittsburgh; Stone & Webster Engineering Corp., Boston, contractor-engineer.
- 450 tons, addition to Beverwyck Brewery Co., Albany, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
- 428 tons, cupola building, Waterloo, Iowa, for John Deere Tractor Works, to Pittsburgh-Des Moines Steel Co.; bids Dec. 6.
- 408 tons, highway upgrade crossing, Mason City, Iowa, for State Highway Commission, to American Bridge Co., Pittsburgh; bids Nov. 27.
- 350 tons, building, Northeastern University, Boston, to Harris Structural Steel Co., New York; Sawyer Construction Co., Boston, general contractor.
- 320 tons, building for Armstrong Corp. Co., Fulton, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
- 310 tons, high pressure boiler plant, El Paso Electric Co., El Paso, Tex., to Mosher Steel Co., Dallas; Stone & Webster Engineering Corp., Boston, contractor-engineer.
- 250 tons, production unit, H. K. Porter Co., Somerville, Mass., to Bethlehem Steel Co.,

Bethlehem, Pa.

- 180 tons, outlet pipes, Anderson Ranch Dam, Idaho, for Bureau of Reclamation, to Wilamette Iron & Steel Corp., Portland, Oreg.
- 150 tons, building for West Co., Phoenixville, Pa., to Belmont Iron Works, Eddystone, Pa., through Hughes-Foulkrod Co., Philadelphia.
- 135 tons, bin supports, Link-Belt Co., Elizabethport, N. J., to Bethlehem Steel Co., Bethlehem, Pa.
- 121 tons, bridge FAS-213, Nebraska, for State Highway Commission, to St. Joseph Structural Steel Co., St. Joseph, Mo.; bids Nov. 20.
- 100 tons, building, National Battery Co., Marlboro, Mass., to West End Iron Works, Cambridge, Mass.; S. Volpe, Boston, general contractor.

STRUCTURAL STEEL PENDING

- 4000 tons, Governors Island shaft, Brooklyn-Battery tunnel; Wagner Co., low on general contract.
- 1500 tons, expansion, Peoria, Ill., for Pabst Brewing Co.; bids Jan. 3.
- 1000 tons, building, Detroit, for Pfeiffer Brewing Co.
- 600 tons, addition to buildings, Crawfordsville, Ind., for R. R. Donnelley & Sons Co.; bids Dec. 11.
- 500 tons, mail order warehouse, Minneapolis, for Sears, Roebuck & Co.; bids Dec. 19.
- 364 tons, experimental building No. 89, Laporte, Ind., for Allis-Chalmers Mfg. Co.; bids Dec. 13.
- 240 tons, sheet piling, power station, Tyrone, Ky., for Kentucky Utilities & Power Co.; Bates & Rogers Construction Corp., Chicago, contractor; bids Dec. 10.
- 100 tons, bridge, Washington county, Iowa, for State Highway Commission; bids Nov. 27; project abandoned.

REINFORCING BARS . . .

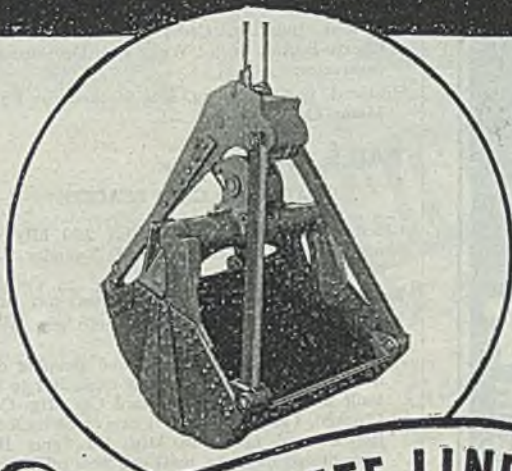
REINFORCING BARS PLACED

- 1000 tons, Crowell-Collier Publishing Co., Springfield, O., to Truscon Steel Co., Youngstown, through Austin Co., Cleveland.
- 750 tons, building, Chicago, for Cadillac Motors, to Ceco Steel Products Corp., Cicero, Ill.; Ragnar Benson Inc., Chicago, contractor; bids Nov. 27.
- 175 tons, flood control, U. S. Engineers, Paducah, Ky., to Laclede Steel Co., St. Louis.
- 150 tons, store, F. W. Woolworth Co., Bridgeport, Conn., to Truscon Steel Co., Youngstown, O.; J. R. Worcester & Co., general contractor.
- 101 tons, boiler house, Chicago, for Sherwin-Williams Co., to Joseph T. Ryerson & Son Inc., Chicago; bids Nov. 28.
- 100 tons, building, Norwich Pharmacal Co., Norwich, Conn., to Truscon Steel Co., Youngstown, O.; Austin Company, Cleveland, general contractor.

REINFORCED BARS PENDING

- 1200 tons, grain elevator, Toledo, O.
- 300 tons, building for Loose-Wiles Biscuit Co., Dayton, O.
- 600 tons, expansion, Milwaukee, for Blatz Brewing Co.
- 500 tons, expansion, Milwaukee, for Schlitz Brewing Co.
- 450 tons, expansion, St. Paul, for Ziegler Corp.
- 400 tons, expansion, Minneapolis, for Minneapolis-Honeywell Regulator Co.
- 400 tons, expansion, Milwaukee, for Gimbel Bros.
- 385 or 467 tons, new building, Glen Ellyn, Ill., for College for Catholic Foreign Missions; bids Dec. 18.
- 350 tons, expansion, Minneapolis, for Minneapolis Star Journal.
- 175 tons, Sec. D6-F of subway, Chicago, for Department of Subways and Superhighways; bids Dec. 27.
- 170 tons, science building, St. Paul, for St. Thomas College; McGough Bros., St. Paul,

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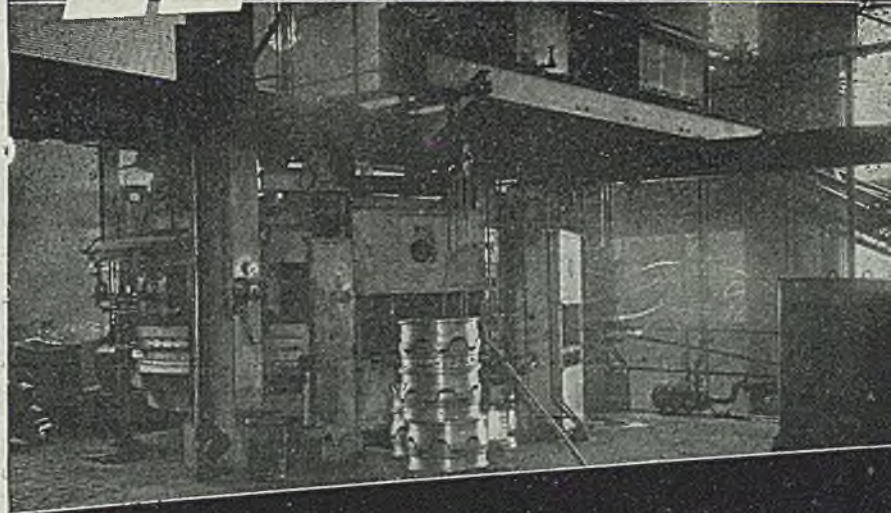
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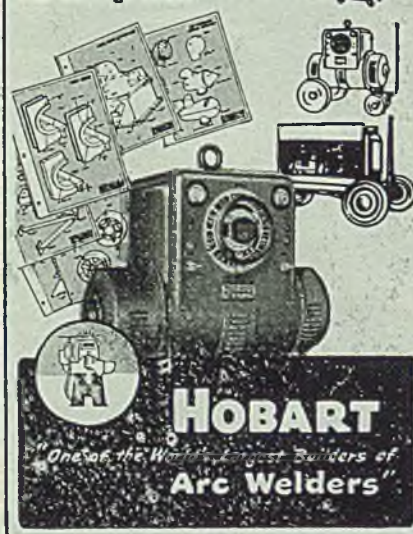
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- 148 tons, asphalt tile plant, Kankakee, Ill., for Armstrong Cork Co.; bids taken Nov. 2 rejected; new bids Dec. 18.
- 135 tons, Copley hospital, Aurora, Ill.; Smith, Gardner & Erickson, Chicago, architects.
- 120 tons, Farmers Union Grain Terminal, St. Paul.
- 100 tons, building, Cedar Rapids, Iowa, for Cherry-Burrell Corp.; Weitz Co., Des Moines, contractor.
- Unstated, parts building, Des Moines, for Ford Motor Co.; bids Dec. 21.

RAILS, CARS . . .

RAILROAD CARS PLACED

- Chicago, Rock Island & Pacific, 250 fifty-ton auto cars, to American Car & Foundry Co., New York.
- Bessemer & Lake Erie, 250 seventy-ton steel hopper cars, to Pressed Steel Car Co., Pittsburgh.
- New York Central, 22 streamlined sleeping car trains, totaling 420 passenger cars, 200 to be built by the Pullman-Standard Car Mfg. Co., Chicago, 112 stainless steel cars to be built by the Edward G. Budd Mfg. Co., and 108 streamlined baggage, mail and post office cars by the American Car & Foundry Co., New York.

LOCOMOTIVE PLACED

- Live Oak, Perry & Gulf, two 800-horsepower freight and switch diesel-electric locomotives, to General Electric Co., Schenectady, N. Y.
- Missouri-Kansas-Texas, seven 4500-horsepower diesel-electric freight locomotives, to Electro Motive Division, General Motors Corp., La Grange, Ill.
- Western Maryland, twelve 4-8-4 freight locomotives to Baldwin Locomotive Works, Philadelphia.

RAILS PLACED

- Bessemer & Lake Erie, 4500 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.
- Central of Georgia, 15,000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham.
- Reading Co., 15,000 tons, to Bethlehem Steel Co., Bethlehem, Pa.

Blizzards Impede Production In Northeastern States

(Concluded from Page 47)

ficulty was experienced in bringing in raw materials. Hardest hit by weather conditions was Buffalo which was practically buried under a freak blizzard.

Unable to cope with a 68-inch snowfall, the Bethlehem Steel Co.'s Lackawanna plant last week was forced to bank its five active blast furnaces and suspend all charging operations in 30 open hearths. About 1000 executives and workers out of a total force of 11,000, who were in the plant when the storm broke on Dec. 15, worked through until Dec. 17 with little sleep. Hundreds of cots were pressed into service in the plant.

As the storm subsided and workers managed to get to their jobs, plants were hamstrung by snowbound yards and frozen switches and a freight embargo was imposed on the city. Mayor Kelly declared a state of emergency and the New York State National Guard was ordered by Governor Dewey to help clear the main thoroughfares of snow-covered automobiles.

At midweek, steel operations were

still below 50 per cent of capacity with Bethlehem reporting 13 open hearths and three blast furnaces in action. Republic Steel Corp. announced ingot output at 65 per cent of capacity.

Plants which closed down entirely, except for small crews housed to maintain boilers or coke oven operations, included Worthington Pump & Machinery Corp., Curtiss-Wright Corp., Houde Engineering Co., Symington, Gould, American Magnesium, and the Globe Weaving & Belting. Absenteeism in plants which endeavored to stay open ran from 10 to 90 per cent.

Hanna Furnace Co. reported it was able to keep three blast furnaces going, but it had lost production. Hanna dumped the iron on the ground as cars were unable to get into the mill. Many foundries working on low inventories were staggering melting operations until delayed shipments were received. Large consignments were held back for New England consumers.

Scrap markets were at a standstill as workers were unable to process material in snow-buried yards.

RFC Asks for Bids for Geneva Steel's Properties

(Concluded from Page 54)

posed sale or lease of the Geneva properties was described by the Surplus Property Administration in its Oct. 8, 1945, report to Congress as follows:

"To adhere rigidly to a pricing policy based solely or primarily on the production cost of the facilities would seriously impede the disposal of government-owned property and add to the difficulties of disposal in conformity with the objectives of the Surplus Property Act.

"To the prospective private buyer of facilities capable of independent operation, real value will be dependent primarily upon ability to produce income over and above amortization, interest and depreciation as well as over operating costs. For the government to attempt to get more than a price measured by earning power regardless of what the facilities cost, will hamper sales and lessen financial return to the government. Only on the basis of intensive individual plant analysis, can a proper price be approximated.

"Therefore, it is proposed, that the cost of equivalent facilities set an approximate maximum to price and that primary consideration be given to prospective earnings. The price must, of course, reflect the additional expenditures necessary to complete, expand or add facilities which are required to round out the proposed peacetime production program.

"The administration recognizes that determination of prospective earnings of some plants, especially those in new steel producing areas, involves estimation of uncertainties and can involve assumption of excessive risk by purchasers, that must be considered in pricing plants."

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CONSTRUCTION AND ENTERPRISE

MICHIGAN

DETROIT—General Magnetic Corp., 2128 East Fort St., has let contract to Leo E. Kuhlman, 16206 East Warren Ave., for a plant addition. Ivan Dise, 2631 Woodward Ave., is architect.

DETROIT—Ford Motor Co., M. L. Bricker, vice president in charge of manufacturing, will remodel its Rouge production foundry, at cost of \$10 million. Plans are for pouring 1,500,000 pounds of iron daily for motor blocks.

DETROIT—Dumont Inc., 11111 Chalmers St., has been incorporated with \$20,000 capital to manufacture tools, dies and fixtures, by Delbert Doud, same address.

DETROIT—Experimental Metalcraft Co., 1321 Majestic Bldg., has been incorporated with \$50,000 capital to manufacture metal, wood and plastic products, by Wilbur W. Ginny, 17607 Parkwood, Detroit.

DETROIT—Michigan Screw Products Co., 2661 East Grand Blvd., has been incorporated with \$150,000 capital to do general manufacturing, by Elwood L. Kukes, 8905 East Jefferson Ave.

DETROIT—Monopower Corp., 423 Ford Bldg., has been incorporated with \$300,000 capital to manufacture devices for motor-driven vehicles, by Frank Kuhn, 6110 Cass Ave.

DETROIT—Prestyle Mfg. Co., 14400 Oakland Ave., has been incorporated with \$50,000 capital to manufacture tools, dies and fixtures, by Harry Docks, 18257 Wisconsin Ave.

DETROIT—Commercial Screw Products Co., 8046 West Fort St., has been incorporated with \$60,000 capital to manufacture screw machine products, by Fred C. Jones, 15041 White St., Allen Park.

DETROIT—Detroit Materials Engineering Co., 3123 East Jefferson St., has been incorporated with \$50,000 capital to manufacture tools, dies, jigs, fixtures and molds, by Clarence L. Mays, 1188 Delaware Ave.

DETROIT—Border Mfg. Co., 3456 Penobscot Bldg., has been incorporated with \$50,000 capital to manufacture tools and dies, by Windsor Patterns Ltd., 315 Devonshire Rd., Windsor, Ont.

DETROIT—Bellevue Industrial Furnace Co., 2971 Bellevue St., has been incorporated with \$100,000 capital to build industrial and domestic heating units, by Walter E. Hinz, same address.

DEXTER, MICH.—Saveback Products Corp., 8071 Main St., has been incorporated with \$50,000 capital to manufacture machinery, tools and dies, by S. Gross, 2737 Glynn Court, Detroit.

FENTON, MICH.—Flint Tool & Mfg. Co., 403 South LeRoy Ave., has been incorporated with \$50,000 capital to manufacture carbide tools, by David C. Pence, 885 West Oakridge, Ferndale, Mich.

FERNDALE, MICH.—Atom Products Co., 19660 West Eight Mile Rd., has been incorporated with \$50,000 capital to manufacture bicycles, tricycles, scooters and other metal products, by Leon J. Simon, same address.

GRAND RAPIDS, MICH.—Doehler-Jarvis Co. has let contract to Owen, Ames, Kimball Co., Grand Rapids, for a plant building, from plans by Ralph Seeger, architect, Grand Rapids.

LANSING, MICH.—Lansing Mfg. Co., 735 East Kalamazoo St., has been incorporated with 500 shares no par value to manufacture metal products, by Maude L. Refior, 1203 West Grand River Ave., East Lansing, Mich.

LUDINGTON, MICH.—Great Lakes Founders & Machine Corp., North Washington St., has been incorporated with \$100,000 capital to operate a general foundry and machine shop, by Donald B. Birtwistle, 1427 Eastland Rd., Muskegon, Mich.

MUSKEGON, MICH.—L. & M. Motor Co. is

having plans drawn by A. Hooker, Muskegon, for a steel and concrete plant building to cost about \$50,000.

SAULT STE. MARIE, MICH.—Babbitt, Hotchkiss & Co., 1099 East Portage St., has been incorporated with 50,000 shares no par value to operate a foundry business, by Donald G. Babbitt, 1517 Dorchester Ave., Birmingham, Mich.

MASSACHUSETTS

CAMBRIDGE, MASS.—B. B. Chemical Co., 784 Memorial Drive, has let contract to the Aberthaw Co., 80 Federal St., Boston, for a two-story 65 x 145-foot brick and steel plant addition, estimated to cost about \$75,000.

NEW BEDFORD, MASS.—Fawson's Brewery Inc., 29 Brooke St., has let contract to Theo. Loranger & Sons, 234 Phillips Ave., for a six-story and basement brewhouse addition 50 x 68 feet, estimated to cost \$200,000.

SOMERVILLE, MASS.—Builders Specialty & Hardware Co., 26 Western Ave., will build a plant costing more than \$50,000. Plans are by Clark F. Merrick, 71 Newbury St., Boston.

WALTHAM, MASS.—Public works department, City Hall, is taking bids for a rubbish and refuse incinerator costing about \$110,000. J. R. Worcester & Co., 79 Milk St., Boston, and Whitman & Howard, 89 Broad St., Boston, are engineers.

WATERTOWN, MASS.—National Tag & Label Corp., 61 Roger St., Cambridge, Mass., plans a one-story plant on Bridge St., to cost about \$75,000.

CONNECTICUT

BRISTOL, CONN.—Fletcher-Terry Co., Mountain Rd., has let contract to P. Allaire & Son Inc., 350 Riverside Ave., for a two-story 43 x 100-foot plant building estimated to cost about \$40,000.

HAMDEN, CONN.—Plasticrete Corp., 1883 Dixwell Ave., has let contract to Paterson Construction Co., 66 Anderson St., New Haven, Conn., for a one-story 100 x 125-foot and 20 x 30-foot machine shop and office, estimated to cost about \$50,000.

STRATFORD, CONN.—Bendix Helicopter Inc., 50 Rockefeller Plaza, New York, plans a helicopter assembly plant on 28-acre site near here, to cost about \$500,000.

RHODE ISLAND

WARWICK, R. I.—Johnson Automatics Mfg. Co., Second Ave., Cranston, R. I., plans a manufacturing plant building to cost over \$50,000.

VERMONT

NEWPORT, VT.—Lakeside Plywood Inc., Newport, has let contract to Wright & Morrissy, 150 Bank St., Burlington, Vt., for a one-story 42 x 58-foot, 42 x 80-foot and 80 x 300-foot mill, including boiler plant, estimated to cost about \$65,000.

NEW JERSEY

NEWARK, N. J.—Irvington Varnish & Insulator Co., 476 Doremus Ave., has let contract to H. K. Ferguson Co. Inc., Hanna Bldg., Cleveland, for design and construction of a new plant.

PARLIN, N. J.—E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington, Del., is having surveys made by the Ballinger Co., 105 South Twelfth St., Philadelphia, for manufacturing building, laboratory and office building, estimated to cost about \$1,500,000.

PENNSYLVANIA

WASHINGTON, PA.—Jessop Steel Co., J. M. Benot, chief engineer, plans a one-story cold-rolling mill to cost about \$250,000.

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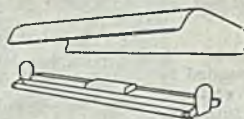
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OHIO

AKRON—United Industries Inc., recently incorporated, will manufacture tools, dies, jigs and fixtures at 614 Carroll St. Plans additional equipment and perhaps a new plant next year. L. Hanson Jr. is president. (Noted Nov. 5).

AKRON—Ornamental Iron Works Co., Fred Zindel, president, 929 Sweitzer Ave., plans a one-story addition for manufacturing and storage.

BEDFORD, O.—City, Catherine Loomis, clerk, plans construction of three-story 28 x 30-foot brick incinerator, to cost about \$40,000. Bids Nov. 26 were rejected and will readvertise. R. Scott, 774 North Main St., Akron, is engineer.

CLEVELAND—Whiteway Stamping Co., Harry S. Whiteway, president, 1205 East 55th St., has plans for a factory and office building 95 x 250 feet at 1160 East 222nd St., Euclid, O.

CLEVELAND—Sabin Machine Co., O. C. Sabin, secretary, 6536 Carnegie Ave., has plans for a one-story machine shop to cost about \$35,000.

CLEVELAND—Industrial Rayon Corp., West 98th St. and Walford Ave., Hiram S. Rivitz, president, plans new rayon plant somewhere between Buffalo and Chicago, to cost about \$40 million, to consist of one-story buildings, with extensive new equipment.

CLEVELAND—E. F. H. Aluminum Foundry & Smelting Co., Frank Schmeller, president, 3300 East 87th St., will build a foundry addition costing about \$30,000, to include molding, grinding and polishing rooms, air compressor, cleaning room and loading dock.

CLEVELAND—Toreon Corp. has been incorporated with \$500 capital and 1000 shares no par value to manufacture transmissions, machines, etc., by A. H. Edgerton, agent, Union Commerce Bldg.

CLEVELAND—Mid-West Metallic Products Inc. has been incorporated by Mid-West Metallic Products Co., formerly a partnership engaged in wire fabrication, 4810 Prospect Ave. Firm will move to 1652 Rockwell Ave. where larger space is available.

CLEVELAND—Cuyahoga Tool & Mold Co., care James L. Love, 16131 Holmes Ave., will start work soon on a one and two-story factory and office building 60 x 178 feet, at 17920 Waterloo Rd.

CLEVELAND—Continental Aluminum & Bronze Foundry Co. has been incorporated to manufacture aluminum and bronze castings, by Harry F. Getler, 151 East 216th St., Euclid, O. Company has an option on a plant at Westford, Pa., and plans operations there by Feb. 1.

CLEVELAND—Machine Tooling Inc. has been incorporated with \$500 capital and 100 shares no par value to manufacture machinery, tools, dies and jigs, by Max D. Gustin, 1409 N.B.C. Bldg., agent.

CLEVELAND—Harding Products Co. has been incorporated with \$500 capital and 250 shares no par value to manufacture ferrous and nonferrous metal products, by Forrest F. France, 1186 Union Commerce Bldg., agent.

WARREN, O.—Peerless Electric Co. plans a two-story plant addition to cost about \$100,000.

ILLINOIS

CHICAGO—La Vezzi Machine Works, 180 North Wacker Dr., has plans by N. Ronneberg, 10 South LaSalle St., for a 100 x 180-foot machine shop.

LINCOLNWOOD, ILL.—Bell & Howell, 1801 West Larchmont Ave., has plans by B. A. Gordon, 1 North LaSalle St., for a plant addition, three stories.

INDIANA

FORT WAYNE, IND.—Nu-Way Fabricating

Co. Inc., 3414 Alexander St., has been incorporated with 1300 shares no par value to manufacture metal products, by Frank S. Romanowski and associates.

INDIANAPOLIS—Speed-Steels Inc., 545 West McCarty St., has been incorporated with 100,000 shares common stock at \$1 per share and 5000 shares preferred at \$100 per share, to fabricate steel, by F. T. Holliday and associates.

KOKOMO, IND.—Pittsburgh Plate Glass Co. has let contract to Mahony-Troast Co., Pasaic, N. J., for expansion of its metal store front plant, adding over 30,000 square feet, at estimated cost of \$800,000.

MUNCIE, IND.—Permalite Casting Corp., 116 Main St., has been incorporated with 1000 shares no par value to conduct a general foundry business, by William M. Nelson and Robert H. Bibler.

WEST VIRGINIA

WHEELING, W. VA.—Wheeling Machine Products Co., River Rd., has let contract to Engstrom & Wynn, 1117 Chapline St., for a plant building to cost about \$1 million.

MISSOURI

ST. LOUIS—Harman Body Co., 4400 Clayton Ave., will build a one-story 41 x 200-foot plant addition from plans by Hari Van Hofen, 2173 Railway Exchange Bldg., St. Louis.

ST. LOUIS—Ford Motor Co. has let general contract to Patrick Warren Construction Co., 228 North LaSalle St., Chicago, for an \$8 million assembly plant on a 90-acre tract at Lindbergh Drive and highway 140. Includes a one-story assembly building 522 x 1485 feet and office building 170 x 312 feet.

ST. LOUIS—Daybrite Lighting Inc., 5411 Bulwer St. has let contract to I. E. Millstone Construction Co., 4343 Clayton Ave., for a one-story 100 x 216-foot plant addition, to cost about \$80,000.

OKLAHOMA

OKLAHOMA CITY, OKLA.—W. N. W. Steel Mfg. Co., 1700 West Reno St., is building a one-story plant 125 x 225 feet.

TEXAS

FREEMPORT, TEX.—Dow Chemical Co., Freeport, has let contract to Tellepsen Construction Co., 3900 Clay Ave., Houston, Tex., for chemical plant unit, to cost about \$2 million.

CALIFORNIA

LOS ANGELES—American Air Lines, 523 West Sixth St., has permit for administration building and hangar at 5954 Century Blvd., 120 x 540 feet, to cost about \$350,000.

POMONA, CALIF.—H. W. Loud Machine Works is building a shop at 969 East Second St., 50 x 50 feet, to cost about \$9000. Nigg Engineering Co., Covina, Calif., is engineer.

VENICE, CALIF.—Davis Precision Machine Co. has permit for machine shop and office building at 9730 Airport Ave., 100 x 200 feet, to cost about \$63,000.

VERNON, CALIF.—Plomb Tool Co. will build factory building at 2209 Santa Fe Ave., including annealing shop, roughing shop, storage area and two ramps. Cost is estimated at \$70,000. William J. Moran Co., 1011 South Fremont Ave., Alhambra, Calif., is engineer.

VERNON, CALIF.—Gilmore Steel & Supply Co. has building permit for warehouse 75 x 360 feet and 75 x 180 feet, to cost about \$70,000.

VERNON, CALIF.—Chicago Metallic Mfg. Co. is building a plant costing \$82,000 at Boyle and Leones Ave.

VERNON, CALIF.—Byron Jackson Co. is building a shop costing \$24,000.

Iron & Steel Institute to Specify Light Steel Forms

RESEARCH which the Committee on Building Codes of American Iron & Steel Institute has been sponsoring since 1939 at Cornell University has provided sufficient data for presentation soon to the engineering profession in a specification for the design of light gage steel structural members.

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The specification being developed from the data will include provisions which distinguish between the behavior of stiffened and unstiffened flanges and their relative load carrying capacities.

Among other provisions in the specification will be:

1. In addition to the basic bending stress of 18,000 lb per sq in. for structural grade carbon steel, the use of higher strength steels at correspondingly increased unit stresses is permitted for those recognized grades whose minimum properties are guaranteed by the manufacturer.

2. Two sets of allowable column stresses are given, based on considerations of end restraint, and giving recognition to deviations from straightness of the member, and to unavoidable eccentricity due to loading.

3. Stresses for beams with laterally unbraced compression flanges are given in terms of the ratio of length to radius of gyration, rather than flange width. Recognition is accorded to the fact that many structural members are provided with lips, and that a flange with lips is inherently stiffer in resisting lateral distortion than a flange without such lips.

4. Maximum flat width ratios (ratio of width to thickness), as related to different unit design stresses, are specified for various types of compression elements.

5. Cognizance is taken of the bracing effect of collateral wall sheathing material on the strength of steel stud sections, and provisions are included for evaluating the lateral restraint required from, and supplied by, these wall materials and their attachments.

Uranium Deposits Found In Two Brazilian States

Uranium, the source of atomic energy to date, has been found in Brazil, according to a report submitted at a recent meeting of the Brazilian Academy of Sciences. The Academy has requested the government to allocate funds for an exploratory program to determine what quantities are present. Deposits were found in the states of Minas Gerais and Paraiba.



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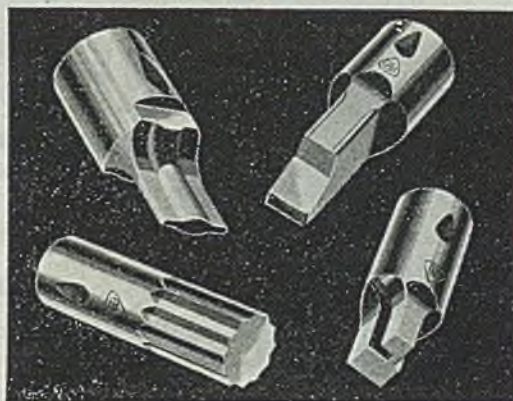
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