COAL AGE

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DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

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June 1938

Footnote to Cincinnati

BITUMINOUS PRODUCTION last year was approximately 6,000,000 tons greater than in 1936, but the quantity loaded mechanically by deep mines, according to preliminary estimates, topped 1936 totals by 16,500,000 tons. Compared with 1935, the increase was 77 per cent. The tonnage of anthracite so loaded showed a slight decline under 1936, but an increase of 13.1 per cent over 1935 figures. These data and related statistics on mechanical cleaning, given in more detail elsewhere in this issue, offer small comfort to the producer who still insists that his particular operations are not susceptible to mechanization; they explain, too, why the drastic depression slump in current output had no appreciable effect on the attendance at the Cincinnati convention-exposition last month. Progressive management must keep abreast of the machine.

Sand and Grit

LOCOMOTIVE track sand cost mounts high—not the cost of sand alone but the total, including increased maintenance cost of equipment and increased power use and haulage delays resulting from faulty operation. Regular operation over grades that require continuous sanding is sure to be costly. Grades should be adjusted, size of locomotives increased, cars per trip reduced, tracks cleaned or water holes drained. It is bad enough to have a trip stalled but still worse to use power at the same time to overheat the motors, grind tires and throw grit into the bearings.

Sanding equipment on railroad locomotives is for emergency use only. To a large extent the same should be true for mine locomotives. Dirty tracks in mines encourage the use of excess sand, and the latter aggravates the dirty condition. Under certain conditions the insulating effect of sand on the rails may result in severe electric shock. It is unfortunate that sand itself is relatively inexpensive. Magnify its cost twenty times, then the item may appear in its true significance. A locomotive haulage system which requires almost no sand moves coal at low cost.

Not Our Quarrel

FOR SEVERAL YEARS the bituminous-coal industry as a whole has enjoyed a large measure of freedom from industrial strife. Now that freedom is threatened on a wide front—not by disagreement between employers and employees but by the struggle for mastery between two rival labor groups. As part of that struggle, the American Federation of Labor has placed its benediction on the Progressive Miners' Union it once denounced as a dual movement and has publicly pledged that organization its support in a drive to supplant the United Mine Workers in the coal fields.

While possibly some operators might welcome a competitive curb on Mr. Lewis' power, the threatened quarrel is not of their making and the decision as to ultimate allegiance must rest with the mine workers themselves. Here a chastened National Labor Relations Board with its power to hold elections to determine workers' affiliation desires could serve as a real

agency of peace and order. Certainly no one who reads the record of injury, death and destruction that has attended the fight for control between these two rival mine-labor groups in Illinois in recent years can relish the thought of an extension and intensification of such warfare.

Classicism in Mining

Safety in mining is safety in the modern mine. Unfortunately, too much training follows lines that developed during an earlier safety movement when mining was still in its infancy. With all the change from manual and equine operation to electrical and mechanical, with all the new hazards and new preventives, there is need for an entirely new view of mining education. A drift from classicism to modernism is desirable. Job analysis is necessary not only for the man at the face but for mine officials. Are they sure they know the safest, most economical and effective way of performing things, or are they looking wise and leaving it to their employees to initiate safety methods?

False Confidence

Members of the Anthracite Coal Industry Commission appointed by Governor Earle voice a faith in the magic of State control which, it is feared, few outsiders familiar with the vicissitudes of hard coal in recent years will share. The final report of the commission recommends a State public service commission to regulate mine costs and prices and to establish district production quotas. Creation of non-profit cooperative marketing organizations of producers and the establishment of State-owned mining corporations to alleviate the bootleg situation also are authorized in a bill proposed by the Earle commission.

Substantial increase in output and sales, declares the report, should be the first objective in the campaign "to revive and rehabilitate the industry and the anthracite communities." To achieve this, in the opinion of the commission, calls for improved methods and lower production costs, drastic reductions in freight rates and other costs of distribution, and the development of effective marketing methods with particular reference to burning equipment. But nowhere is it suggested that wage rates and labor efficiency may play a part in present production costs and the commission shrinks from immediate action on reducing the tax burdens of the industry until "new sources of tax revenues" can be found for the boroughs and townships which largely exist on coal-land levies.

Certainly the financial position of the industry so darkly sketched in the report gives no safe basis for major reductions in prices which are not tied directly to lowered costs. While it may be socially desirable to curb bootlegging by employing workers now engaged in such illegal enterprises at State-owned mining corporations, such employment promises no increase in anthracite production or consumption. Neither will limitation of the number of retailers franchised to sell anthracite ease the competitive situation. Assuming the proposed producers' marketing agency has a complete monopoly on distribution, disfranchised dealers naturally will swing still more vigorously into the sale of competitive fuels.

Operators who favor federal instead of State regulation are accused of being "devoid of political and economic realism." Little Congressional support, says the report, could be expected for such a proposal; on the contrary, "it is obvious that delegations in Congress from other fuel-producing States would actually oppose legislation designed to improve the competitive status of Pennsylvania anthracite." If this be so, how can the commission hope that other States and consumers therein will take more kindly to an attempt by the Commonwealth of Pennsylvania to control one important source of their fuel supply? Has the anthracite tonnage tax of a few years ago and its reception in New England and Middle Atlantic States been so soon forgotten?

DUAL HAULAGE SYSTEM

+ Cuts Down Car-Changing Time

At No. 1 Mine of Wasson Coal Co.

By IVAN A. GIVEN

Associate Editor, Coal Age

MECHANICAL LOADING history has been marked by a constant search for a better transportation medium: i. e., a system that will enable a machine to spend the maximum part of the operating shift actually moving coal. Perhaps the most common method of achieving this result is increasing car size and thus, as changing time usually is little increased, reducing the loss resulting from the service locomotive having to pull the loaded car out of the place and return with an empty. But, in addition to other limiting factors, car size may be fixed by the size of the hoisting shaft, as at Wasson No. 1 mine, Wasson Coal Co., Harrisburg, Ill., where a dual transportation system already has shown tangible benefits and seems to promise even greater returns when more experience is gained.

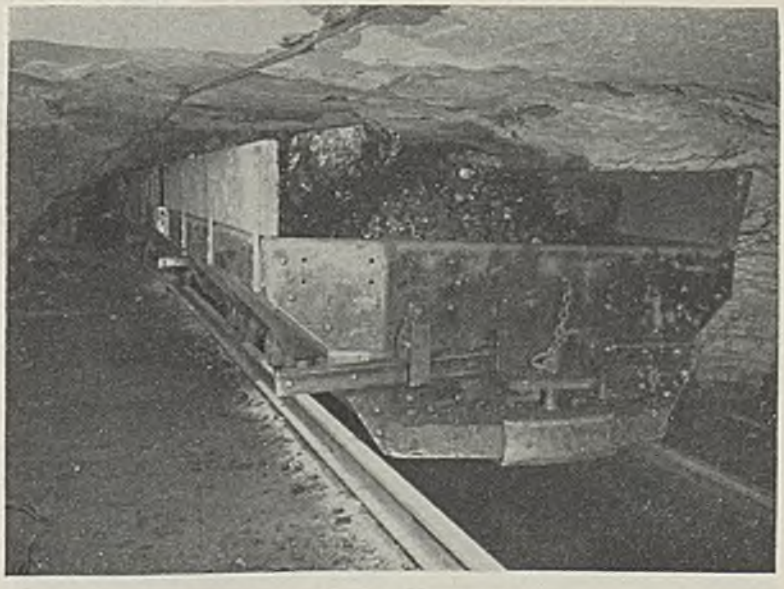
The Wasson system, installed in the 4th Main West section in November, 1937, provides for the use of large cars behind loading machines while at the same time retaining the original mine-car equipment for the main-haulage and hoisting cycles. The use of two sizes of cars is made possible by the interposition of a dump hopper, feeder and trip-loading conveyor in the haulage circuit. Thus, the loading machines are serviced with the largest possible units commensurate with conditions, while the small cars, which can be accommodated on the cages, are loaded in trips without uncoupling, thus substantially reducing the total time required for car changing in a working shift.

Wasson No. 1 mine recovers the Illinois No. 5 seam, with an average thickness of 5 ft. in the big-car territory. This territory, as compared with other sections in the mine, is comparatively free from hills. Natural conditions over the operation as a whole, however, offer a production problem varying from difficult to extremely difficult. Consequently, output per machine shift is reduced, as compared with what might be expected at more favorably situated mines.

In addition to the hills, the coal at Wasson No. 1 is overlaid by a draw-slate, or "draw rock," varying from 1 to 24 in. or more in thickness. While good in spots, in most cases this draw rock makes a very treacherous top, in addition to complicating the problem of face preparation and loading. Close and careful timbering is required at all times, and the necessity for carrying props close to the face frequently hampers the loading machines in reaching the coal. Also, the rock usually comes down with the cut, and thus, to maintain quality, a certain amount of picking is necessary while loading, in addition to other methods employed to keep the rock out of the product after it is shot down.

With the conditions outlined above, Wasson, like many other companies adopting mechanization, was faced with the problem of removing the top material underground at some sacrifice of loading capacity or installing additional preparation facilities, notably mechanical cleaning equipment, on the surface and attempting to absorb the higher reject cost and possible loss of salable material, in addition to possible repercussions in established markets, by a corresponding increase in loader tonnage. After a careful investigation of the problem, it was decided to attempt removal of the major part of the material underground as in former hand-loading days. To date,

How a trip of cars looks over the dump hopper.



the management is satisfied that it has made the correct decision under present producing and market conditions.

To achieve the goal stated above, top cutting with Sullivan 7AU and Jeffrey 29U machines was adopted in 1936 to facilitate elimination of the draw rock. At the same time the machines also make possible a shear cut for increasing the yield of coarse coal. The top cut is made in the coal just under the draw rock. If the rock stays up, well and good. But if, as usually is the case, the rock falls after the cut is made, rock men remove it and throw it in the gob. Occasionally, however, the draw rock falls after the rock men have made their rounds or while the coal is being loaded. In this case, as soon as enough coal has been moved so that the crew can get at it, the rock is picked out and thrown back. As it comes down as a rule in fairly large slabs, it usually can be picked out easily.

The first loading machines were installed some years ago in Wasson No. 1, and later were removed in accordance with an agreement with the miners. Restoration began in the autumn of 1935, and by June, 1936, the mine had been fully mechanized. Regular production equipment consists of nine Joy 7BU loaders, including one spare machine. These have been supplemented in recent months by various trial machines of the track-mounted type. Normally, eight machine shifts are worked for an output of around 1,800 tons. This is expected to increase as more experience is gained in operating under the adverse conditions encountered in the mine.

While the use of the big cars and the supplementary dump-hopper and conveying equipment constitutes a departure from usual practice and thus partakes of the nature of an experiment, preliminary studies by the operating and engineering departments of the Wasson Coal Co. showed sufficient expectation of tangible benefits to warrant an investment of $10,565.37. This investment is made up of the following: sixteen 4-ton Sanford-Day "1-2-3 Automatic" bottom-dumping mine cars, $5,701.46; Barber-Greene dump hopper, feeder and trip-loading conveyor, $3,013.78; labor for digging pit and installing hopper, feeder and conveyor, $1,602.62; and additional work on tracks and partings, $247.51. The 6-ton cable-reel locomotives serving the loading machines and moving the cars in trips of three or four between hopper and working place already were on hand.

As set up at present, this equipment is expected to handle a total of about 100,000 tons of coal. The dump hopper is located near the mouth of 7th and 8th North room entry. This entry, consisting of two 18-ft.-wide headings on 36-ft. centers, ultimately is expected to extend about 2,500 ft. north to the boundary. Rooms are turned both ways from the entry, but those on the east are being worked at present only just sufficient to keep them abreast with those to the west. To the west, rooms are expected to have an ultimate depth of about 1,150 ft. In fact, the Wasson operating system has been changed to provide almost entirely for rooms around 1,000 ft. deep, as compared with the short rooms of around 300 ft. previously employed. A major objective is a reduction in entry driving.

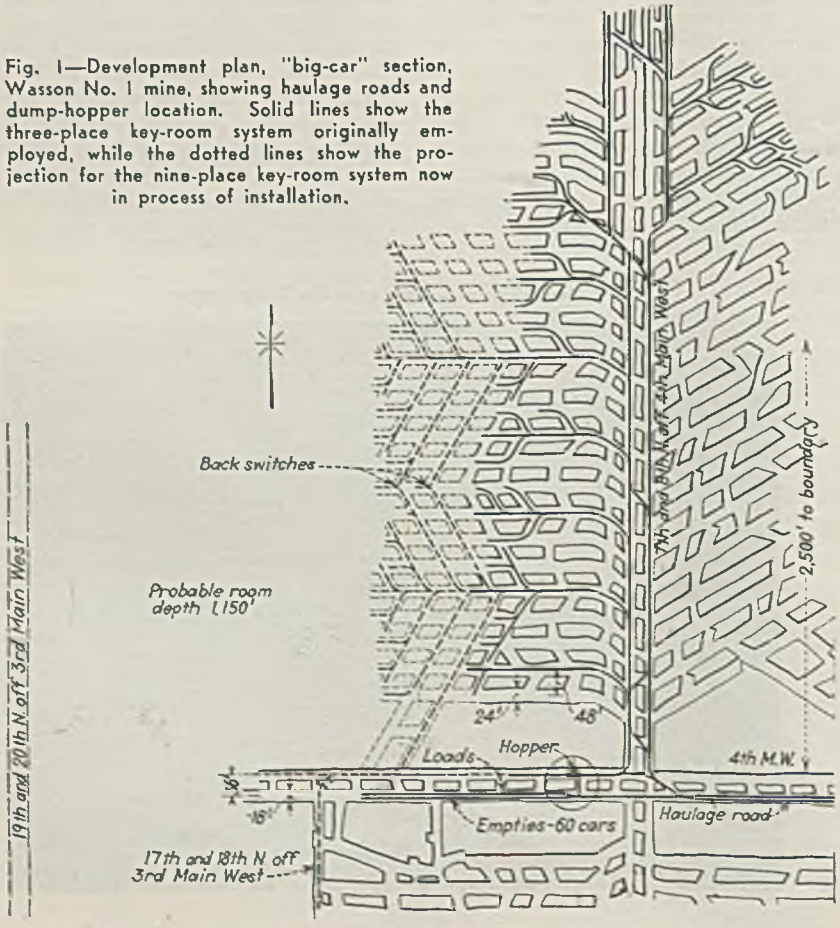
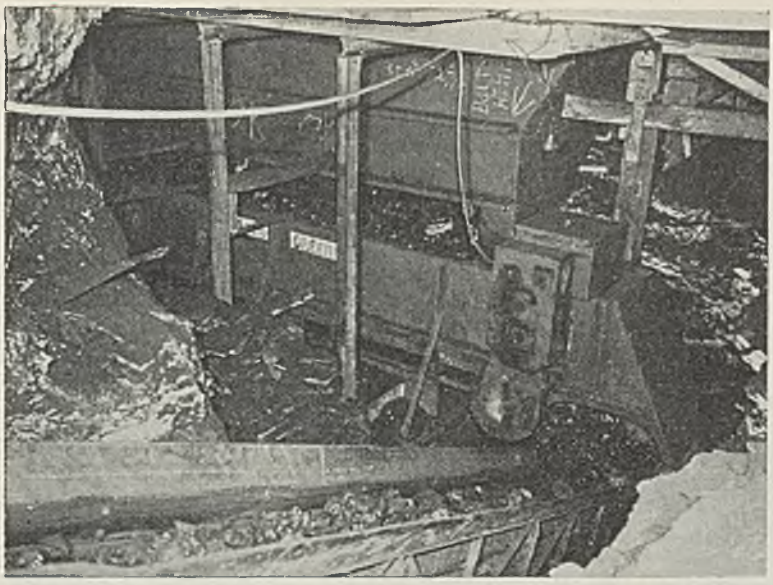


Fig. 1—Development plan, "big-car" section, Wasson No. 1 mine, showing haulage roads and dump-hopper location. Solid lines show the three-place key-room system originally employed, while the dotted lines show the projection for the nine-place key-room system now in process of installation.

Key-Room Plan Adopted

In the case of the short-room panels, usually 28-ft. rooms on 48-ft. centers, the key-room system, in which two side rooms were picked up through each crosscut from a center room, was employed to reduce changing distance and consequently changing time. An extension of this system providing for picking up either three or four rooms on a side is proposed for the long rooms now being developed. In the case of the big-car territory (Fig. 1) four rooms are picked up on each side through crosscuts about 20 ft. wide at 60-ft. intervals. These crosscuts are turned at an angle of 60 deg. to reduce the sharpness of the curves off the switches and thus ease equipment travel. Under this system, the loading machine and cutting machine can work nine places and the supplementary crosscuts without coming out on the entry, and in fact can work all the key-room groups in a similar manner, inasmuch as a back switch (Fig. 1) is proposed to connect one key-room group with another. The key rooms proper become auxiliary haulageways in which good track can be kept with less difficulty and expense than if several smaller key-room groups were operated.

Rooms in the big-car territory are driven 24 ft. wide on 48-ft. centers. Necks are turned at an angle of 60 deg. to facilitate equipment travel. Width of the necks at the heading is about 18 ft., and the necks are driven 70 ft. before the rooms are straightened up. Crosscuts between rooms, as indicated above, are cut on 60-ft. centers, but 80 ft. is under



Looking down into the pit at the dump hopper and feeder, with the elevating and trip loading conveyor at the left of the feeder.

consideration. If the big-car panel entries (7th and 8th North) are driven 2,500 ft. to the boundary, as contemplated, and the dump hopper remains at the present point, the average one-way haul from the hopper to the face of the key room when driven 1,150 ft. deep will be close to 2,500 ft. over the life of the territory. However, it is conceivable that the dump hopper may be moved to shorten this haul. Also, if 1,150 ft. should prove an impracticable depth, rooms may be driven back from the 19th and 20th North panel entry to be driven through to the west, as indicated in Fig. 1. Inspection of the figure will show that it is possible to bring coal to the hopper from several working sections.

Of the sixteen big cars purchased, twelve are in service at the present time. These twelve are divided into four trips of three each, and the operating schedule is based on having one trip at a loading machine while the other is being hauled to the hopper, dumped and returned to the working place. Three-car trips have been found large enough with the short haul now prevailing. As the haul grows longer, an extra car will be added to each trip.

Two loading machines are employed in the territory in question, although one at present is operating largely in an extra capacity in the rooms on the east of the panel entry. Incidentally, this territory, aside from grades, offers some of the worst top and other conditions in the mine, and consequently is employed as a demonstrating ground when it is desired to determine the operation of loading equipment under adverse conditions. Two trips of big cars are assigned to each loading machine, and cars used in connection with track-mounted equipment have been fitted with 12-in. side- and endboards, with the exception of the end next to the loading machine. With the extension boards, the cars have a capacity of approximately 5 tons.

In handling trips, one locomotive is kept at the loader while the other operates between the working places and the dump hopper. This necessitates disconnecting the road locomotive from the empty trip and coupling it to the loaded trip, as leaving the locomotive hooked to the empties would result in crossed cables. When the transfer has been made, the service locomotive heads the trip in to the loader. As soon as the front car is filled, it is kicked into the nearest available track, which may be up the straight in an adjacent place or in on a crosscut track. This process is repeated until the entire trip is loaded, whereupon the road locomotive couples onto it and takes it out, leaving the empty trip.

The Sanford-Day cars in use have an over-all height of 30 in. over the rail. Inside length is 12 ft.; width, 6 ft. Track gage is 40 in. Without the sideboards, loading time, according to time-study results, ranges from 1.4 to 3.2 minutes, with occasional even longer periods. Usually, however, the time is 2 to 2.5 minutes. Changing time ranges from 1.2 to 1.7 minutes, with some figures above and some below. Generally, however, changing time is 1.4 to 1.5 minutes. With the small car formerly used (capacity, 1.48 tons) loading time normally was 1 to 1.2 minutes, while changing time was slightly less (0.1 to 0.2 minute) than in the case of the big cars.

From the standpoint of possible effect on loading-machine performance one comparison may be cited. With the small cars, loading machines on the territory immediately before installation of the new equipment averaged 190 tons per shift of seven hours. With the big cars in service, a loader in the first half of February averaged 350 tons per shift. These figures, however, are not strictly comparable because of differences in loader types and variations in natural conditions.

Capacity of the dump hopper is nominally 12 tons. Steel construc-

Small car under the conveyor discharge.

tion is employed, although the hopper is supported on wooden uprights. Locomotives and cars operate over the pit on 70-lb. rails, in part carried on auxiliary steel staging. Length of the hopper is 25 ft. at the top and 16 ft. at the bottom for maximum capacity in the limited space available. The back of the hopper is sloped toward the feeder opening to reduce pit excavation. The feeder, consisting of a 30-in.-wide chain-and-bar-flight conveyor 17 ft. long, is mounted separately and discharges into a 24-in.-wide chain-and-flight elevating and trip-loading conveyor with pushbutton control for starting and stopping in loading cars.

Design inclination of the conveyor was 29 deg. This was necessary to get the required height at the discharge under the installation plan, which was based (Fig. 1) on placing the hopper in one 18-ft. heading with the trip-loading conveyor extending through a crosscut to a point over the track on the parallel heading 36 ft. away, center-to-center distance. With this inclination, a chain-and-flight conveyor naturally was indicated. As finally installed, however, the inclination was reduced to about 26 deg.

Capacity of the elevating conveyor is 150 tons per hour, and with coal in the hopper it will load a 1.48-ton car in 20 seconds. Usually, however, the time ranges from 25 to 30 seconds. Record loading to the time this article was prepared was 427 small cars in seven hours. Experience with the present units has convinced the management that a belt conveyor on a small inclination would be more satisfactory, although the present unit functions satisfactorily in the main. Reducing the inclination and using a belt, it is felt, probably could be best accomplished by driving a third heading for a haulageway parallel to the other two. A wood dump hopper, it also is felt, would be equally satisfactory and could be built probably for less than half the cost of the steel hopper installed. Also, with the knowledge gained in the present installation, it is believed that the labor cost of digging the next pit will be substantially reduced.

Big-car trips at present are run across the dump hopper and then are reversed in direction to return to the working section. A tripper to actuate the latch-tripping mechanism on the doors is on hand but has not been installed as yet, as the locomotive operators, with the present short haul, have ample time to trip the doors by hand. Small cars are handled in trips of around 30, the trip being pulled along under the conveyor discharge by a locomotive. Partings above and below the conveyor discharge, as shown in Fig. 1, facilitate exchanging empty trips for loads.

VERTICAL AUGERS

+ Improve Shooting of Certain Overburdens

At Two Sinclair Strip Mines

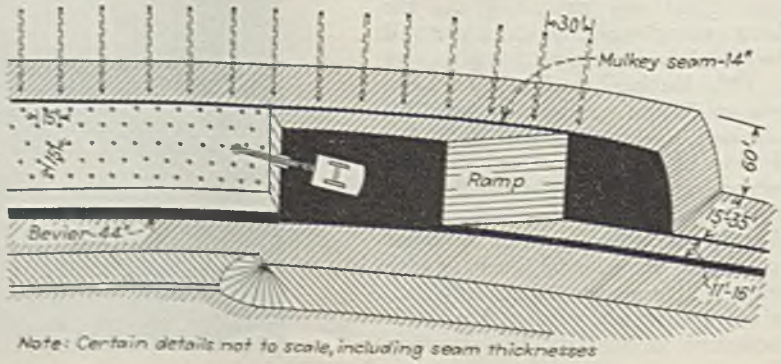
VERTICAL AUGERS for overburden drilling where conditions favor their use are a relatively recent addition to equipment for recovering coal by the stripping method. Included in the limited list of operations as yet employing this equipment are the Huntsville-Sinclair and Delta coal mining companies, Huntsville, Mo., and Carrier Mills, Ill., respectively. In addition, an auger prospecting outfit has been used constantly by the Sinclair organization for more than two years.

Development of the overburden auger by Sinclair was an outgrowth of an unusual set of stripping conditions at the Mark Twain mine, at Huntsville, and dates back to 1933. Two seams of coal, separated by 11 to 16 ft. of blue shale, are present on the Mark Twain property. The average interval between the two is 13 ft. The top, or Mulkey seam, 14 in. thick, lies under cover ranging from 15 to 35 ft. in thickness and consisting of clay and surface soil, 62 in. of limestone, and 36 in. of black slate. Thickness of the underlying Bevier seam is 44 in.

Naturally, recovery of the Mulkey coal is a desirable objective, provided it can be done at a reasonable cost, as experience has shown it can be. Several recovery methods have been employed, but the best system so far involves stripping the overburden down to the Mulkey, loading this seam, drilling and shooting the blue-shale interval, and then turning the 5320 Marion shovel with 12¼-cu.yd. Man-Ten dipper around and removing the remaining overburden down to the Bevier.

Before turning the shovel, the Mulkey is loaded up to it, whereupon the stripper is merely revolved

Fig. 1—Diagrammatic plan of mining two seams at Mark Twain, showing location of overburden holes



Note: Certain details not to scale, including seam thicknesses

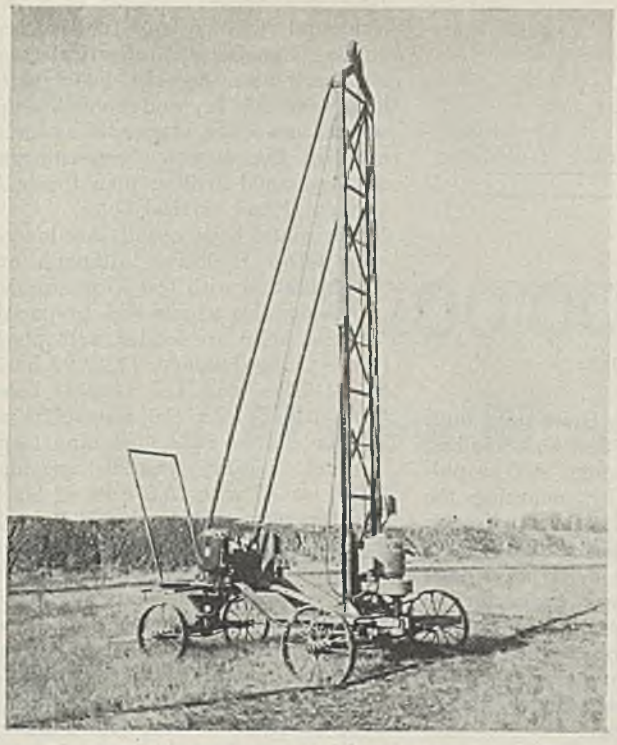


Fig. 2—Early type of vertical auger drill used at Delta

Fig. 3—Late-type tractor-mounted auger drill used at Delta

180 deg. and starts cutting down to the Bevier on an incline. When it reaches the Bevier, the shovel works back along the pit to the previous ramp, casting the blue shale behind the spoil row made in cutting down to the Mulkey. The length of the cut made in the interval is dependent to a considerable extent upon market conditions. In the summer, for example, an entire pit may be stripped down to the Mulkey only, whereupon the shovel moves to another pit to continue its uncovering work. Then, when demand is good, the shovel may be returned to the pit to uncover the Bevier seam. As the interval is comparatively thin, the shovel is enabled to uncover a large tonnage of Bevier coal in a relatively short time. In times of good demand, however, the shovel frequently stays in the same pit, alternating in the overburden above the Mulkey and the interval between the Mulkey and Bevier. In this case, after a section of the interval is removed, the shovel is deadheaded back to and up the ramp to resume stripping over the Mulkey seam.

Hard, tough and sandy, and in places grading into sandstone, the interval must be drilled and shot. Because of the presence of the spoil row from the cut over the Mulkey, use of the sidewall drill customarily employed is impossible. Consequently, standard well drills had to be used at first, in spite of the fact that they were slow and costly. Casting about for some other means of putting down the holes, the management hit upon the idea of turning a sidewall drill up vertically and trying it out. It worked, and this led to the construction of the first regular vertical boring machine at a Sinclair property, using an old Ford chassis as a base.

The drill handled 16-ft.-long augers 3 in. in diameter and with a spiral pitch of 4 in. Augers were driven at a speed of 338 r.p.m. by a 10-hp. Westinghouse gearmotor. At present, Central Mines Equipment Co. "Coal-Master" bits are employed. The Ford chassis eventually was discarded and the gearmotor was used in constructing a unit substantially similar to that illustrated in Fig. 2. This rig consists essentially of a fabricated steel mast made of channels, which serve as guides in which shoes on the gearmotor operate to permit raising and lowering the unit, either in boring or pulling augers. The latter operation is performed by an electric hoist from which a steel line passes over a pulley on the top of the mast and down to a ring on the gearmotor base.

In boring, the auger is held in position by a collar just above ground level, with the upper end in a socket on the gearmotor shaft. At Mark Twain, only single 16-ft.-long augers are employed, whereas at the Delta mine enough 12-ft. lengths are coupled together by the shank-and-socket method to permit boring the required depth of hole. The necessary pressure to enable the bits to cut is supplied by the weight of the gearmotor and the augers, although one line from the hoist may be used for additional pressure, if desired. The revised Mark Twain unit was mounted on a chassis fitted with steel agricultural-type wheels and was fitted with a drawbar so that it can be moved around by a tractor, team or man power (short moves only).

Well drills for overburden were replaced with side-wall drills at all Sinclair operations some years ago. At Mark Twain, the side-wall type is used in drilling the overburden over the Mulkey seam. Normal pit width is 60 ft., and horizontal holes of the same depth are put in on about 30-ft. centers. Auger diameter is 4 in. and the holes are drilled near the top of the black-slate stratum over the coal, which both eases the drilling problem and offers a cushion for protecting the coal. Originally, 3-in. augers were used at Mark Twain, but as overburden depth increased, it was found that the necessary breaking effect could not be obtained because the explosive charge was limited. Consequently, a 4-in. auger was adopted. In fact, auger diameter has been increased at all Sinclair properties to eliminate springing in favor of column loading, which results in a 10 per cent saving in explosives requirements, in addition to a better distribution of the breaking force of the charge. Horizontal holes at

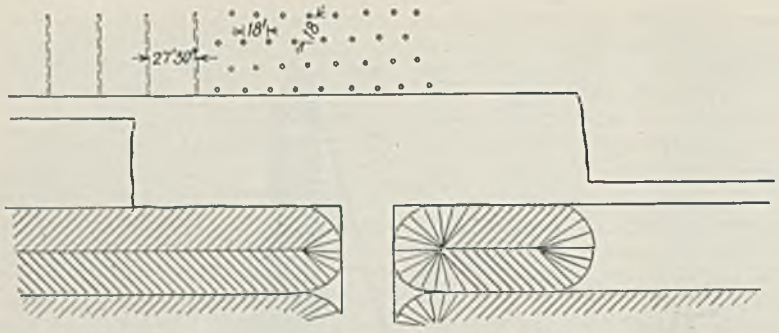


Fig. 4—Diagrammatic plan of stripping and drilling at Delta

Mark Twain are loaded with 150 to 300 lb. of 40 per cent "Quarry-Gel," depending on overburden thickness, giving a yield of about 9 cu.yd. per pound of explosive.

Vertical holes in the blue shale at Mark Twain are drilled about 15 ft. apart, starting with a row along the rib line as shown in Fig. 1 and staggering the holes in successive rows. Holes are shot with Equitable QD-55. Using the vertical auger and two men, as many as 100 holes have been drilled, loaded and shot in five hours. From Nov. 27 to Dec. 31, 1937, 244 holes averaging 15 ft. in depth were drilled and shot for a labor cost of $117.76. Explosive per hole averaged 25.7 lb. and the yield was 6.2 cu.yd. of shale per pound of explosive.

Use of the vertical-overburden auger was started at the Delta mine, in southern Illinois, in the summer of 1936, primarily for drilling overburden over 40 ft. in. thickness. In material this thick, from 10 to 18 ft., usually close to the former, of clay and surface soil is encountered, with the remainder consisting of hard gray shale. Vertical cracks in the shale offer a difficult shooting problem because of loss of gas pressure. The reason for the use of the vertical auger in burden over 40 ft. thick is the occurrence of hard spots high up in the bank, with the result that it is difficult to break the material to the surface with horizontal holes.

The first vertical unit used at Delta (Fig. 2) was mounted on wheels, as described above, and was built by the company at a cost of about $1,300. This unit, with another smaller drill of the same type, is now in service in coal at the Sentry Coal Mining Co. operation near Madisonville, Ky. In addition to certain objections from the standpoint of drilling performance, team or tractor pulling was found inconvenient at times in the case of this particular type when used in overburden. Consequently, the unit shown in Fig. 3 was developed.

In the latest-type Delta unit, built at a cost of about $1,600, excluding the tractor and augers, self-propulsion was secured by mounting the mast, hoist and other auxiliaries on an old gasoline-driven Allis-Chalmers tractor. Plans are under way, however, for substituting a motor for the engine and thus completely electrifying the unit. Augers are operated at slightly over 300 r.p.m. by a 25-hp. General Electric gearmotor, while gearmotor and auger lengths are raised, when necessary, by a 7½-hp. Sullivan hoist. Six-inch-diameter augers in 12-ft. lengths are employed. Pitch of the spirals is 6 in. When vertical drilling was first adopted, a 3½-in. auger was used. The 6-in. auger was later adopted to obviate the necessity for springing the holes.

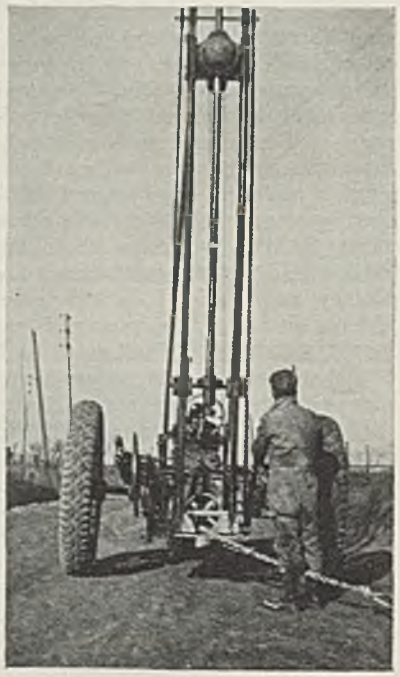
To facilitate handling the heavy auger lengths, swinging racks were installed on each side of the mast, as shown in Fig. 3. Each rack holds two auger lengths and is fitted with two separate latches, one to secure each auger. When it is necessary to add another length to the drill column, the gearmotor is raised to the top of the mast, the rack is swung around under the gearmotor shaft, the gearmotor is dropped to engage the shank, a locking collar is dropped down to hold the shank in the gearmotor socket and then a latch at the top of the rack is opened to release the auger, which then is raised by the hoist and dropped onto the auger length in the hole. A cotterpin through the socket and shank holds the auger lengths together for pulling them out when the hole is completed. In pulling the augers the column is held in place while a length is being detached and placed in the rack by a fork cut out of steel plate resting on the ground at the top of the hole.

Usual cut width at Delta is 50 ft. Horizontal holes, where employed, generally are put in at intervals of 27 to 30 ft., although hole spacing varies considerably with the character and thickness of the overburden. Horizontal-auger diameter is 4 in., compared with 6 in. for vertical augers. Spacing of the vertical holes also varies considerably, but usually is around 18 ft., and holes in the several rows are staggered as indicated in Fig. 4, which gives in general the usual drilling plan for both horizontal and vertical holes.

Horizontal holes usually are loaded with QD-5 explosive, although experimentation with QD-55 was under way when this article was prepared. Vertical holes are loaded with black powder. In January, 1938, 99 horizontal holes and 117 vertical holes were drilled with 110 man-shifts at a labor cost of $658, including loading and shooting. The 99 horizontal holes, loaded with 25,575 lb. of black powder, accounted for 113,196 cu.yd. The Delta vertical drill has put down as many as fourteen holes 40 to 50 ft. deep in fourteen hours, while the record for seven hours is nine holes.

The prospecting drill used by the Sinclair organization is built on a rubber-tired "Farmall" tractor with a power take-off fitted with a pulley at the rear, where the mast also was installed. Cost of the drill was $1,129.82, including tractor but excluding augers. A differential out of an old Hudson car was installed at the top of the mast, with a pulley for a vertical belt drive from the take-off pulley. Boring is done with a 2½-in. round shaft about 12 ft. long, keyseated from one end to the other, which fits loosely in the differential. A socket on the lower end

Fig. 5—Sinclair prospecting drill at Tiger mine, Hume-Sinclair Coal Mining Co., Hume, Mo.



is used for attaching the auger lengths. Usual practice with this machine is to bore down to within a few feet of the coal and then finish out the hole with a standard churn drill. Using this system and the vertical augers, the cost of prospect drilling has been cut about 25 per cent.

Operation of the prospect drill in Iowa, Illinois, Indiana, Kentucky, Missouri and Oklahoma has shown that it is possible to bore successfully anything but limestone. In drilling overburden, however, the horizontal drill is preferred in the absence of special conditions because fewer holes are required for the same yardage. However, Sinclair experience shows that the vertical auger has a certain field in which it can excel.

$200,000 IMPROVEMENT

+ At New River Co.'s Cranberry No. 2

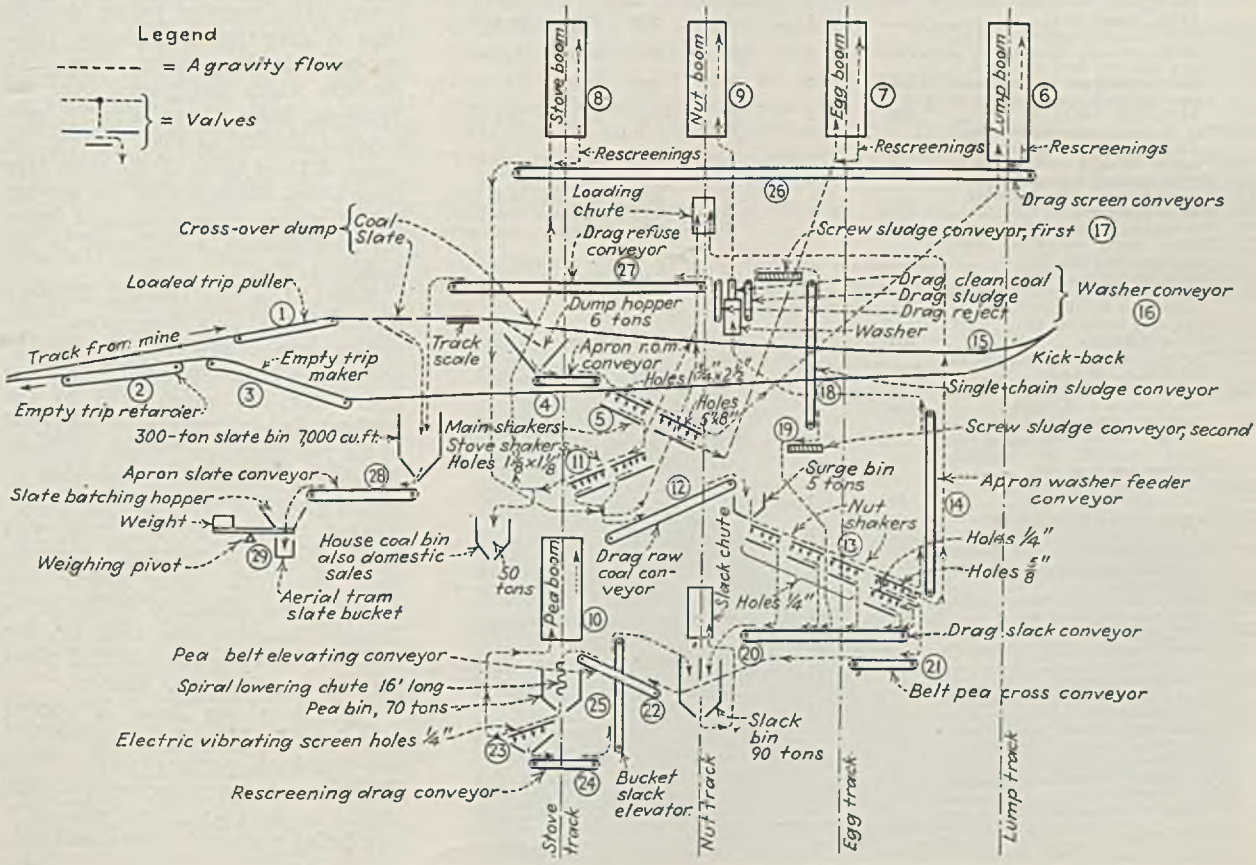
Includes New Washer and Aerial Tram

By J. H. EDWARDS
Associate Editor, Coal Age

COMPLETION of a $200,000 outside-equipment improvement program was signalized the past winter when an aerial tram was placed in service at Cranberry No. 2 mine of the New River Co., Skelton, Raleigh County, West Virginia. This program began three years ago with a new 350-ton-per-hour preparation plant which included the first installation of a new type of automatic washer unit. In February, 1937, a pea-coal plant was added, and soon after that date the contract was let for the aerial tram to carry mine slate and plant reject to a valley which is higher in elevation and 2,200 ft. from the plant.

Erection of the 185-ft. tail tower of the tram was accomplished by adding sections near the bottom and pushing the tower straight up.

Fig. 1—On this flowsheet of Cranberry No. 2 plant, items indicated by circled numerals refer to the numerical listing of Table I



This new plant at Cranberry No. 2, which is a slope operation with a one-mile rope haul to the outside, replaced a single-track mine-run wooden tipple which had served since the opening of the mine, in 1903. That the loading of only run-of-mine sufficed until such recent times is explained by the fact that the New River Co. has ten other mines in the same seam (Sewell) and the prepared sizes were shipped from those other plants.

Originally at this Cranberry No. 2 mine a wooden trestle elevated the dump approach track to tipple height. As time went on, this was replaced by a fill of mine rock and the dumping of refuse around the tipple was continued until the adjoining available space had been taken. A large volume of this material had to be moved to make room for the new plant and rearranged railroad tracks and especially to bare the original ground for foundation excavations.

The first job, consisting of mine-car handling and dumping equipment and an all-steel four-track tipple with nut-coal washer and a separate slack bin on the upgrade side on the nut track, was furnished and installed by the Pittsburgh Coal Washer Co. The second job—a pea plant with storage bin for raw $\frac{5}{8}$x$\frac{1}{4}$-in. coal, electric vibrating screen, apron-type conveyors and loading boom, all on the stove track and also upgrade of the tipple—was built by the Jeffrey Manufacturing Co. The third and last project included a refuse-disposal tram built by John A. Roebling's Sons Co. and a 300-ton slate bin and a feeder conveyor from it to the tram, built by Pittsburgh Coal Washer Co. Coal-treating equipment (both calcium chloride and oil) was erected by the coal company in a separate building.

Loads are pulled out of the mine and up to the tipple in 24-car trips by a 400-hp. electric hoist. A loaded chain-type trip puller feeds the cars over a hump leading to the cross-over dumps and track scale. Slate cars are emptied in the first dump and the empty cars then pass over the scale and the coal dump to the kickback. Coal loads average 2.5 tons except that a few cars with new bodies average 2.8 tons. The coal is mined by hand loading exclusively and the size characteristic of the product is indicated by the following percentages: lump, 6; egg, 21; stove, 15; nut, 12; pea, 6; slack, 40.

Table I—Motor and Drive Details, Skelton Preparation Plant

Flowsheet Number and Description	Speed, Feet or Strokes per Minute	Motors: Number	Motors: Horsepower	Motors: R. P. M.	Drive
(1) Loaded-trip puller, 72 ft. c. c., 10 15/16-in. pitch chain	26	1	15	870	Reducer, 58.5 to 1
(2) Empty trip retarder, 82 ft. c. c., 12½-in pitch chain	33 to 100	1	10 to 3	1,745 1,145 877 572	Reducer, 22.2 to 1
(3) Empty trip maker, 42 ft. c. c., 12½-in. pitch chain	33	1	7.5	850	Reducer, 25 to 1
(4) Apron r.o.m. conveyor, 48-in., 21 ft. c. c.	35	1	15	1,700 860	Reducer, 35 to 1
(5) Main shakers, counterbalanced, 7 ft. wide	120	1	15	870	V-belt
(6) Lump-boom drag conveyor, 4 ft., 44½ ft. c. c.	60	1	7.5	44	Type FD gear motor
(7) Egg-boom drag conveyor, 3 ft., 44½ ft. c. c.	60	1	7.5	44	Type FD gear motor
(8) Stove-boom drag conveyor, 3 ft., 44½ ft. o. c.	60	1	7.5	44	Type FD gear motor
(9) Nut-boom belt conveyor, 30 in., 48½ ft. c. c., horizontal section 8½ ft., hinged 40 ft.	.....	1	5	870	Reducer, 28 to 1
(10) Pea-boom apron conveyor, 24 in., 36 ft. c. c.	.....	1	2	1,150	V-belt and gears
(11) Stove shakers, first section 6 ft. wide; second section 6½ ft. wide.	440	1	10	870	V-belt
(12) Raw-coal drag conveyor, 24 in. 55 ft. c. c., 250 t.p.h.	110	1	20	1,160	Reducer, 14.2 to 1
(13) Nut shakers, two sections each 11 ft. long set in tandem· first screen of each section, 6½ ft. wide· second, 6 ft. wide	450	2	7.5	1,160	V-belt
(14) Washer feeder apron conveyor	.....	1	5	870	Reducer, 28 to 1
(15) Washer plunger	.....	1	5	870	Reducer, 9 to 1
(16) Washer conveyors	.....	1	5	870	Reducer, 16 to 1
(17) Sludge screw conveyor (first) (driven from No. 16)	.....				
(18) Sludge conveyor, single chain	.....	1	15	49	Type FD gear motor.
(19) Sludge screw conveyor (second) (driven by No. 18)	.....				
(20) Slack drag conveyor, 30 in., 92 ft. c. c., 200 t.p.h	100	1	25	1,155	Reducer, 14.2 to 1
(21) Pea-belt cross conveyor, 16 in. 14 ft. c. c., 30 t.p.h	200	1	3	1,160	V-belt
(22) Pea-belt elevating conveyor, 16 in., 95 ft. c. c., 30 t.p.h.	175	1	5	1,160	V-belt
(23) Vibrating screen, Type FB-2 50 t.p.h. (d. c. modulating current supplied by fraction-horsepower m.g. set)	.....				
(24) Rescreenings drag conveyor, 18 in., 18 ft. c. c. 8 t.p.h	50	1	2	1,150	V-belt
(25) Rescreenings bucket elevator, 37 ft. c. c., 8 t.p.h	232	1	1½	1,154	V-belt
(26) Rescreenings conveyor at loading booms, 8-in. single chain type, 56 ft. c. c.	90	1	5	44	Type FD gear motor.
(27) Reject drag conveyor, 10-in. single chain, 57 ft. c. c.	60	1	5	870	Reducer, 28 to 1
(28) Slate apron conveyor, 42 in., 47 ft. c. c., capacity 110 cu. ft. per minute	30	1	15	22	Type FD gear motor
(29) Aerial tram disposal	.....	1	100	1,750	Reducer, 8.7 to 1
Four hoists for booms (lump, egg, nut and stove)	.....	4	7½	850	Gears
Hoist for pea boom	.....	1	5		Gears
Layer loading hoist	.....	1	10	1,600	Gears
Calcium-chloride pump	.....	1	7½	1,735	Direct
Oil pump	.....	1	7½	1,735	Direct
Calcium-chloride mixer	.....	1	3	1,740	
Calcium-chloride elevator	.....	1	1½	1,740	Reducer, 57 to 1
Totals	.....	37	393	.....	

Counterbalanced Shaker Used

The mine-run coal is fed from a 6-ton dump hopper to a counterbalanced main shaker with lip-screen plates having 1¾x2½-in. holes in the upper section and 5x8-in. in the lower. The oversize passes directly onto a drag-type rescreening picking-table loading boom. Egg coal, the size which has passed over the 1¾x2½-in. holes, flows directly onto a boom similar to that loading the lump. A third boom of the same type loads stove, which is made by another set of shaker screens situated below the main shakers, as indicated by the flowsheet, Fig. 1.

Minus 1⅛-in. coal through the stove shakers feeds to a four-screen two-section two-motor-drive nut shaker and normally is separated into three sizes: 1⅛x¾-in., which goes to the washer; $\frac{5}{8}$x¼-in., which is conveyed to the pea plant, and a ¼x0-in. slack. All shaker screens are suspended by second-growth hickory and are reciprocated through wooden rods with flexible hickory connections. A crankshaft drives the main shaker and eccentrics the other two shaker units. Timken bearings are used on the shaft of the stove shakers and plain bearings on the other shakers.

Fifty tons per hour is normal capacity of "Llewellyn Automatic" self-contained plunger-type washer. The plunger, operating with a 5-in. stroke at 40 r.p.m., acts also as a circulating pump; the clean-coal con-

A 5,965-ft. rope haul delivers 28-car trips to this point, where a loaded trip puller completes the haul into the tipple.

veyor, bar type, 18 in. wide, 15-ft. centers distance and operating at 80 f.p.m., includes a rescreen over which are sprays of clear make-up water. The unit is the single wash-box model with washing compartment 4 ft. wide and 6½ ft. long.

One 5-hp. motor drives the plunger and another the screw and drag conveyors. No middling product is made. Reject taken out by the washer consists principally of slate from the top of the seam and at times some heavy material from accidental cutting into the bottom. The coal seam has no regular parting. The New River Co. has installed another of these washers at the Cranberry No. 1 mine.

Slack-bin capacity is 90 tons and pea-bin capacity 70 tons. Capacity of the belt conveyors delivering to a spiral lowering chute at the top of the pea bin is 30 t.p.h. A Jeffrey-Traylor screen with ¼-in. openings and acting as its own feeder receives the coal directly from the bottom of the pea bin at the rate of 50 tons per hour. The rescreened pea then passes to an apron-type loading boom and the undersize is elevated to the slack bin. No crusher is included in the plant.

Stove coal for employees and to supply the local domestic demand is loaded into the trucks from a 50-ton bin under the main tipple. Pea coal for this local trade is loaded directly from the pea boom into trucks driven to a position alongside and parallel to the pea track. By reason of a convenient arrangement of hopper and chute the changing of loading from car to truck or vice versa is accomplished with but slight loss of time. The hinged chutes from boom to truck are supported from an A-frame at the end of the boom. A sliding hopper attached to the under side of the boom discharges into the hinged chutes when they have been lowered into the truck-loading position. This domestic-trade pea coal can be oil-treated the same as when the pea is loaded into the cars.

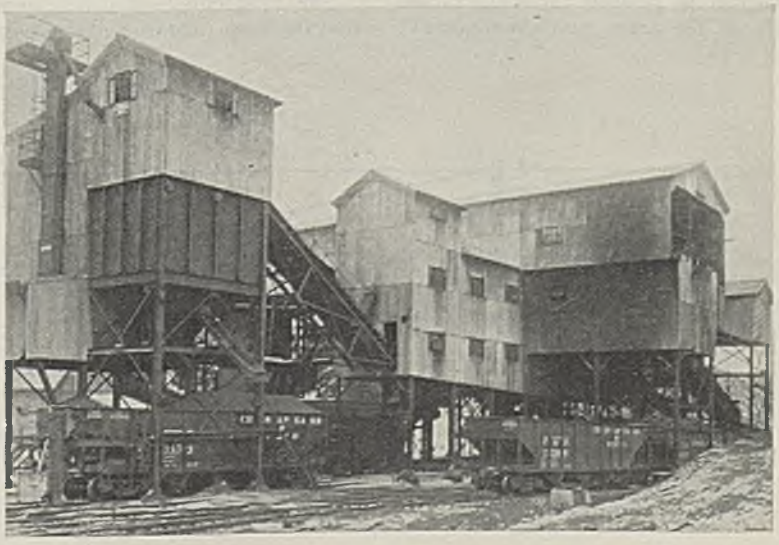
Close to the tipple a Fairbanks-Morse beam weighing scale and weighhouse has been provided to handle the trucking sales. The same make of scale, but fitted with Streeter-Amet recorder, is used for mine-car weighing in the tipple. Buildings and structures of the new plant are covered with corrugated galvanized steel; No. 20 gage on the roof and No. 22 gage on the sides.

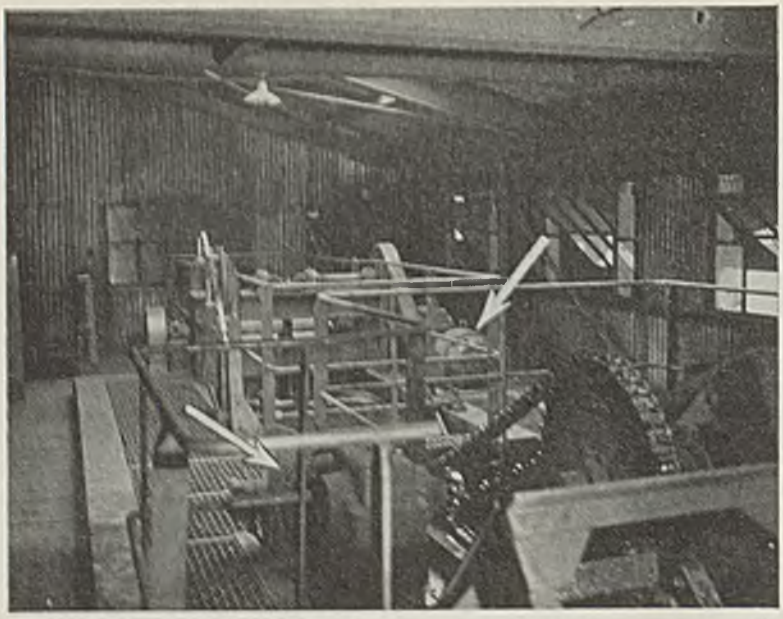
Dumping space of the aerial tram is 38,000,000 cu.ft., equal to twenty years of operation at the present rate of handling 120 cars of slate per seven-hour day (each car 70 cu.ft. and its load weighing 3 tons). Track cables, two 1½-in. lock-coil type, are 2,250 ft. long and the capacity of the equipment is 61 tons per hour when dumping two-thirds of the full travel. This tram is a single-bucket type operating at 800 f.p.m. and requiring 4.17 minutes per trip at the two-third point. Capacity of the bucket is 100 cu.ft. and the load, figuring 85 lb. of refuse per cubic foot, is 4½ tons. Bucket construction consists of aluminum alloy sheets and a steel frame; the track wheels, six in number, have Timken bearings. Traction rope sheaves are fitted with the same type anti-friction bearings.

The traction rope is a ⅝-in. 6x19 Blue Center steel with independent steel center and the length is 4,800 ft. It is driven by a 60-in. elliptical-face spool having manganese tread. The bucket is loaded from a batch hopper which at full loading overbalances a weight to operate a limit switch and stop the feeder conveyor (No. 28 on the plant flowsheet, Fig. 1). Use of the batch hopper saves the time that would be required if the bucket had to remain in the loading terminal while it was being filled from the conveyor. The plan also assures uniform loading and prevents spillage. One man, stationed at the loading terminal, operates the tram. The 100-hp. wound-rotor drive motor is equipped with a Thrustor brake, but in addition the spool shaft is equipped with a friction brake which the operator may use in case of emergency.

Three tail and intermediate towers support the track cables, and all are of the pivoted-base guyed type. The 185-ft. tail tower has its pivot 24 ft. from the ground in a 30-ft. rigid-base tower. Following erection of this rigid base the topmost section of the tower was assembled and

Cranberry No. 2 progress includes replacement of a single-track run-of-mine tipple with this 350-t.p.h. preparation plant equipped with a washer and complete facilities for preparing junior sizes.





Both 5-hp. motors of the self-contained washer are mounted on the operating floor, where they are easy to inspect. Arrows point to these two drives.

then jacked up to be connected to the section next below, and so on. Thus all workers were stationed close to the ground. Guy cables to hold the "growing" tower in a vertical position were let out from four anchor points.

Permanent guys or stays for the towers are 19-wire galvanized bridge strand. Back stays, two in number, for the tail tower are 1 9/16-in. and each side guy is 15/16-in. The intermediate tower, in addition to supporting the track cables, serves also as a support for one end of a protection screen over the State highway. This screen is 12 ft. wide at the bottom, has sloping sides 3 ft. high and consists of ½-in. netting over 2-in. mesh.

Profiting by tram experience at its other mines, the coal company specified that the bucket wheels should be guarded to prevent throwing to one side of the tram, and thus possibly missing the screen guard, any material that might accidentally spill over the top edge of the bucket. Field connections of tramway towers were made with bolts fitted with locking nuts. Shipping weight of the tramway materials, excluding foundation materials, was approximately 135,000 lb.

Westinghouse Type CS ball-bearing induction motors predominate in the plant. The aggregate connected horsepower of all motors (37) driving the plant, aerial tram and dustless-treatment equipment is 393. Power at 440 volts to supply these motors is furnished by a bank of three 100-kva. General Electric transil-oil transformers mounted on a steel tower close beside the hoist house. The primary supply of 2,300 volts comes from lines of the Appalachian Electric Power Co.

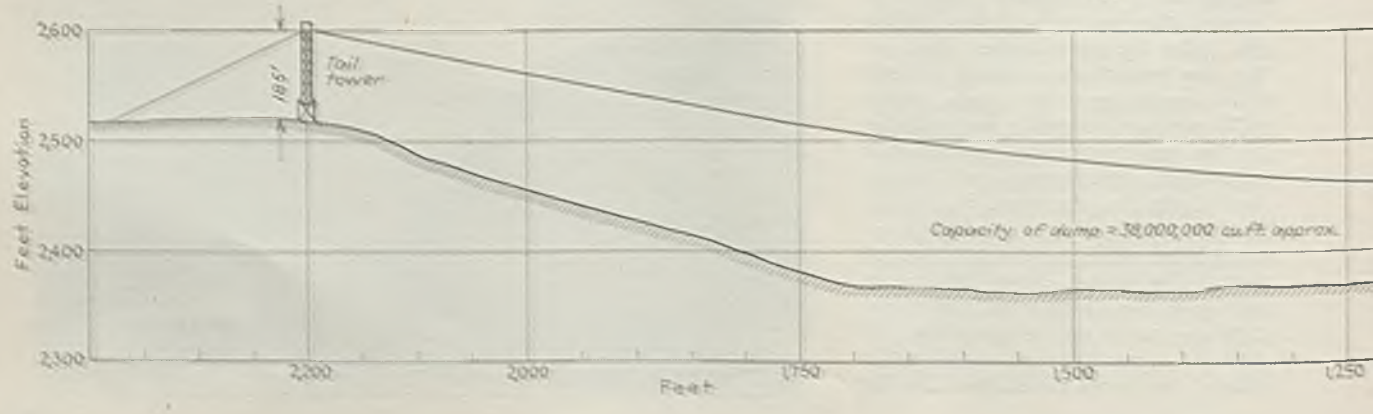
The predominating drive connection between motor and unit is a Foote Bros. gear reducer. Twelve of these are in use and the range of ratios is from 8-to-1 to 58½-to-1. The largest reducer, that on the aerial tram, was made by Westinghouse. Six conveyors of the plant, including three of the loading booms, are driven by that number of Westinghouse gearmotors. Four of the boom hoists are Pittsburgh Coal Washer make with Westinghouse motors and the other (on pea boom) is a Robbins & Myers. The calcium-chloride elevator of the dustless-treatment

Base of the tail tower, which was erected bottom section first, top section second, next to top section third, and so on.

plant is driven by a Louis Allis motor connected to a Link-Belt reducer, the mixer is driven by a Fairbanks, Morse motor, and the two pumps by General Electric motors.

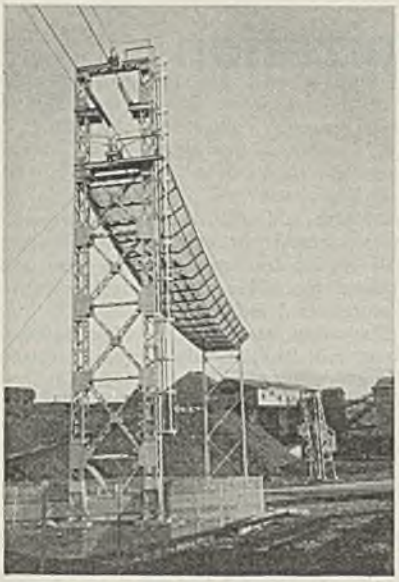
Controls of the 32 motors of the tipple and preparation plant proper are grouped in a room 6x16 ft. with tight partition between it and the plant. No fuses are included in any

Fig. 2—Profile of the aerial tram which



of the electrical circuits. The control for each motor consists of a Westinghouse line contactor and Deion breaker. Provision for disconnecting the incoming line consists of a 400-amp. 3-pole Westinghouse unfused safety switch.

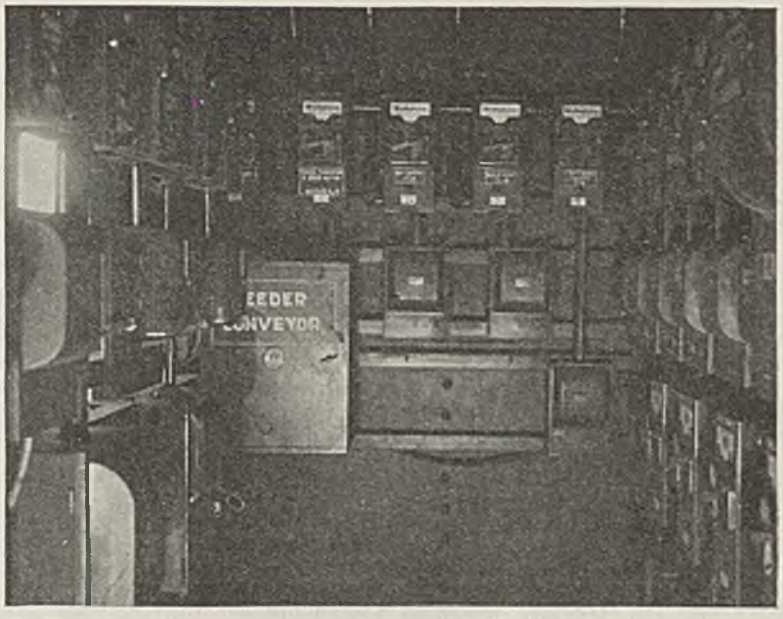
Instead of complete sequence starting the motors are divided into several groups whose individual controls are connected in automatic sequence. Provision for emergency stopping of the whole plant consists of ten oil-immersed-contact 110-volt pushbut-



Looking back at the new plant from the intermediate tower which supports both the track cables and the highway protection screen.

ton stations mounted at appropriate points. Pushing any one of these buttons operates the low-voltage release of an oil switch in the 2,300-volt primary feed to the transformers. This oil switch is mounted in the hoist house. All wiring in the plant is protected by rigid conduit.

Steel bodies of many of the mine cars, which have been in use seven



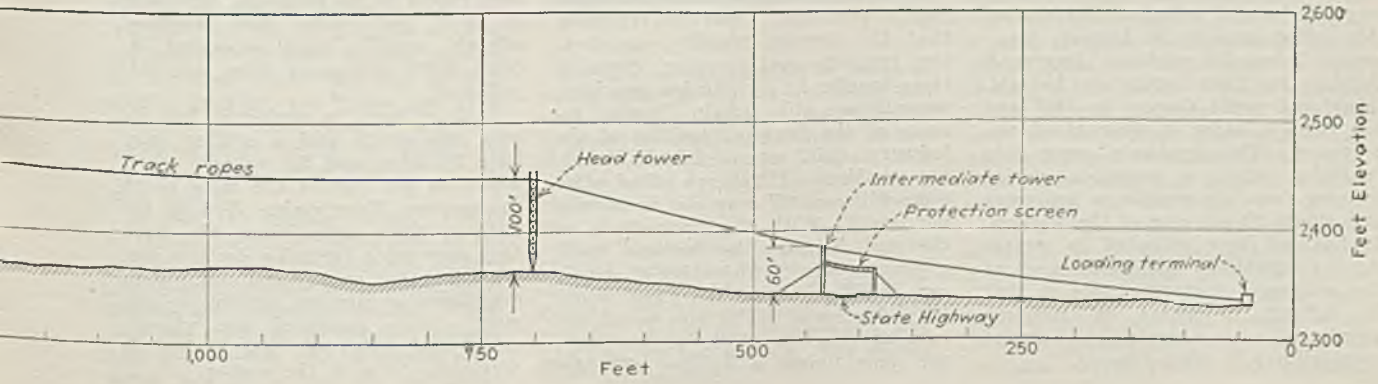
The "no-fuse" distribution and control group is on the walls of a 6 x 16-ft. room.

to nine years, are corroded to the point of failure. Because the trucks, which have Timken-bearing 14-in. wheels, have been maintained necessarily in good condition, the car bodies as they get beyond repair are being replaced by new bodies of the same height (28 in.) but of 71-in. width instead of 66 in. Length of the car remains the same, 12 ft. over all, and the same three-board wood-bottom construction is used. Twenty-five of these cars with new Watt bodies are now in use and their dumps average 2.8 tons, compared with 2.5 tons for the remaining 425 cars. Track gage is 40 in. and the coal thickness of the seam averages 40 in.

Thirty-five trips of 24 cars each in a seven-hour shift is the maximum hoisting capacity and, generally speaking, 2,100 tons of coal is the mine capacity. The hoisting slope enters at the outcrop and follows the seam on a grade of 5 to 6 per cent adverse to the loads. This rope haulage is the unbalanced method with a single rope, except that a tail-rope drum is engaged and operated in case of a snow or ice condition which would prevent free running of the empty trip over the 1,000-ft. outside track from tipple to mine portal. Total length of haul is 5,965 ft. and, because of the slight gradient, lowering of empty trips is done with the hoist-drum clutch disengaged and by friction braking instead of by regenerative braking.

Room-and-pillar is the mining method and the undercutting is done with Goodman 12AA and Jeffrey 35BB shortwalls. Gathering is done with cable-reel locomotives. While the new tipple and preparation plant was under construction the mine was continued in operation by hauling the output through the adjoining Cranberry No. 1 mine and there hoisting and preparing the coal on the night shift.

andle the refuse during 20 years of operation



CINCINNATI CONVENTION

+ Shows Operators Alert to Advantages Of Pressing Forward on Modernization

APOSTLES OF GLOOM found no welcome at the 15th Annual Coal Convention and Exposition of the American Mining Congress at Cincinnati, Ohio, May 2–6. Despite the sharp drop in business the first four months of the year, coal producers from all parts of the country registered their keen interest in studying improved methods and equipment by rolling up an attendance which was only six per cent under the record-smashing figures of 1937. Manufacturers also showed their confidence in the vitality of the industry and its reserve buying power by exhibiting more than $1,000,000 worth of machinery and supplies.

WHILE, as in the past, mechanical loading and cleaning were the major themes of the eight technical sessions of the convention, other phases of operation and management also had their place on the program. Mining methods, power distribution, transportation, maintenance, ventilation, pumping and drainage were among the subjects discussed. Safety, too, was very much to the fore. Sales problems, except as related to preparation and cleaning practices, were not highlighted as at the 1937 convention and there was no session given over to research.

For an outside presentation of what can be accomplished in promoting sound industrial relations the convention called upon S. M. Lowrey, director of industrial relations, Procter & Gamble Co. That institution, he said, introduced profit sharing in 1887 and has been a leader in guaranteed employment. This guaranty comes into operation after a probation period running from six months to two years and affects 97 per cent of the workers. It has not been extended to certain smaller subsidiary operations, such as the cottonseed factory, where it may be difficult to assure an adequate supply of raw materials because of crop failures or other reasons.

After trying questionnaires to discover what employees wanted, the company concluded that the best solution lay in sound reasoning. Procter & Gamble welfare provisions now cover wages above the average, bonuses for increased production, security against discharge except for proved cause, 52 weeks of employment per year except in cases of disability, with the latter well compensated; retirement pensions, death benefits of $1,000 for men and $500 for women, collective bargaining, safe and healthy working conditions, cafeterias and washrooms, personal recognition, the 5-day week, and vacations with pay.

All these provisions, remarked D. H. Pape, president, Sheridan-Wyoming Coal Co., deserve friendly consideration from the coal operator. Some of these benefits he already has provided, many others still remain Utopian because of the financial position of the industry. Still, remarked L. E. Young, vice-president, Pittsburgh Coal Co., some will say, "If soap can do it, why not coal?" With the fluctuations of the coal industry, he for one could give no answer. Introduction of certain new machines, added Mr. Pape, would lower his costs, but it also would cut running time from 140 to 113 days per year unless a number of older men were laid off. So the change was not made and part of the tonnage was still loaded by hand to take care of workers too old to fit themselves into a reorganized industry.

Too often, stated A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association, training of workmen is not given its due consideration. Men employed on an hourly rate need better supervision than men on a tonnage basis, and the use of machinery needs more than good miners. As a result of Bureau of Mines and other training, casualties have been reduced so that now there is one fatality to about 1,250,000 tons mined. Vocational schools are to be started for men from 18 to 30 years old; students will work part time and go to school part time.

Anthracite Board Praised

Though outlaw strikes have occurred, the Anthracite Board of Conciliation—oldest of such boards in the coal-mining industry of the country—has been found the most satisfactory means of settling disputes, declared J. R. Sharp, director of public relations, Philadelphia & Reading Coal & Iron Co. Fourteen new contracts have been made subsidiary to the original agreement of 1902, but the conciliation board still continues its useful function of interpretation. Much objection has been raised to its decisions, especially by labor, but United Mine Workers' officials steadily have supported it. Some 5,300 grievances have been adjudicated.

Each colliery, he explained, has its own rate sheets and a colliery may have 70 labor and 80 contract rates. About 65 per cent of the cases go to the umpire. Many claims filed by the mine workers arise from the hope they may get a favorable decision and are not based on the contract. With everything to gain and nothing to lose, many claims presented are without merit, and only one case in ten is decided in favor of the worker.

In the early days of stripping, three one-man shifts with a team might remove 3,000 cu.yd. of dirt in a month; today, said Ira Clemens, president, Commercial Fuel Co., that operation has been stepped up to about 1,000,000 yd. with one stripping shovel and three men. Bucket size has increased since 1910, the year when mechanical stripping became commercially successful, to 32 cu.yd. and the job will not be complete until buckets of 50 cu.yd. capacity have been introduced. A shovel with a 40-yd. bucket already has been designed, but not built.

Drainage Big Problem

Drainage, he continued, is the most important problem of the stripper. Formerly he never knew how soon after a rainstorm he could operate his shovels; recently, when it rained 72 out of 75 days, not a single shovel was out of commission. Preparation is a *sine qua non*. He takes four samples from the coal stream for every railroad car and thereby is enabled to analyze the product loaded in each unit. The kind of coal each customer needs—whether one with 6, 10 or 15 per cent ash—is ascertained and the coal prepared accordingly. Each car sample is analyzed and that analysis, with a duplicate of the sample, is kept for six months. Coal is treated with oil or with an anti-clinkering compound if the customer so desires.

Auger-type drills are being introduced, said T. G. Gerow, chief engineer, Truax-Traer Coal Co., but they still are in the experimental stage. The bigger shovels give smoother operation and cost less for maintenance than earlier equipment. Mr. Gerow believed no one would question that trucks running on the coal floor are the cheapest form of transportation, but the combination of truck haulage in the pit with a transfer bin loading into railroad cars operating to the tipple has advantages where the haul is considerable.

Pumping Job Grows

With companies passing out of existence and mines being closed, the Northern anthracite field faces a situation which shortly will become desperate because of inadequate or undetermined barrier pillars, asserted H. H. Otto, mining engineer, and J. F. K. Brown, assistant general manager, Hudson Coal Co., in a paper read by the former. In 1920, Hudson pumped 8.4 tons of water per ton of coal mined; in 1936, the figure had risen to 26.5. Installed capacity had been increased 68,900 g.p.m. by Hudson at an expenditure of $1,075,015 in the past decade.

In 1922 the company began a study of the adequacy or inadequacy of the pillars in neighboring mines. There are 15 square miles of workings being drained at Carbondale between Forest City and Carbondale. Between Carbondale and Jermyn are 10 square miles which can drain out at the latter point, but all the rest of the area must be freed by pumping. If flooded, this would constitute an underground lake covering 126 square miles. Somewhat similar but less severe problems, remarked S. M. Cassidy, manager, Weirton Coal Co., confront the bituminous field south of Pittsburgh.

Making Mechanization Pay

MECHANIZATION without recasting operating methods is more likely to end in failure than in profit, asserted R. L. Ireland, Jr., president, Hanna Coal Co., at the opening session of the convention. Such "retooling" of the industry calls for careful planning. This theme was reiterated by D. D. Wilcox, general superintendent, Superior Coal Co. Practically every department must be altered and suitable accounting and repair-parts handling systems set up when mobile loaders are installed. Pitfalls also await the unwary in conveyor mining, added R. G. Pfahler, mining engineer, Berwind-White Coal Mining Co. Success, it was emphasized by various speakers, comes to those who thoroughly analyze the problems to be conquered. Adequate electrical power must be provided to cope with higher power requirements per ton and the concentration of tonnage per unit area, said Mr. Wilcox. Rail size probably must be increased and layout changed at the working face and perhaps on the main line. A ventilation increase also is due because coal must be broken more thoroughly, thus more explosive used and more fumes are to be swept away.

Roy L. Cox

Roy L. Cox, vice-president in charge of mining sales, Jeffrey Manufacturing Co., was elected chairman of the board of governors of the Manufacturers' Division of the American Mining Congress at a meeting of the board in Cincinnati May 3. He succeeds William E. Goodman, Goodman Manufacturing Co.

Frank E. Mueller, Roberts & Schaefer Co., was advanced to the post of first vice-chairman of the board; Arthur S. Knoizen, Joy Manufacturing Co., moved into the second vice-chairmanship, and E. J. Burnell, Link-Belt Co., was elected third vice-chairman.

Drilling and shooting no longer can be left to the judgment of the miner. Shearing may be included among the changes necessary in the cutting. Competent men will be required to handle the timbering. First cost of additional cleaning equipment may exceed the cost of the loading machines. Distinctly different from that with hand loading is the gathering problem; hence changes must surely be made there.

Less coal transported per car loading must be considered. Mr. Wilcox said that one Illinois operator uses a 5-ton car to haul from the loader to the entry, where the coal is transferred to the regular mine-car equipment (see p. 33). New safety problems are introduced and the increased tonnage per man should not be allowed to overshadow the increased mechanical hazards to the individual. Management was not slighted and a difficulty to be overcome is lack of ability on the part of some foremen to adjust themselves to the new requirements.

A means of breaking down coal at the face at no greater cost than using powder was termed the greatest need of the industry in the West, declared George A. Schultz, vice-president, Liberty Fuel Co., in a paper read by J. H. Edwards, associate editor, *Coal Age*. Because the thinner seams in the West generally are cleaner, of better quality and have better roof, several companies which have been mining in high coals are now opening thin seams. One company laid off 23 men at its preparation plant when it switched from an 8-ft. dirty seam with frail top to conveyor mining in a 4-ft. clean seam with good top. Realization was increased and costs lowered. Another company having a fully mechanized mine in 20-ft. coal is now opening a 5-ft. seam. A small mine in 3½ ft. of coal realizes 68c. per ton more on its product than a mine in coal five times as thick, because of a higher percentage of large size coal mined from the thin seam.

Added concentration with consequent saving is to be gained with conveyor mining as compared to using mobile loaders and track-mounted cutters. One working place per unit against seven or eight is the ratio. The ideal working plan of the future was specified

Traffic Cops

R. L. Ireland, Jr., president, Hanna Coal Co., and national chairman of the program committee, headed the group responsible for the technical session of the 15th Annual Convention and Exposition at Cincinnati. Louis Ware, president, United Electric Coal Cos., was general chairman of the committee on arrangements. William E. Goodman, Goodman Manufacturing Co., and chairman of the Manufacturers' Division of the American Mining Congress, headed up the exposition end; L. W. Shugg, General Electric Co., was again director of exhibits.

The eight technical sessions of the convention were presided over by the following chairmen:

W. E. E. Koepke, secretary, Pocahontas Operators' Association, Monday morning.

J. S. Morgan, preparation manager, Pittsburgh Coal Co., Monday afternoon.

W. J. Jenkins, president, Consolidated Coal Co., Tuesday morning.

T. F. McGrath, general superintendent, Cherokee Rhemkus Coal Corporation, Tuesday afternoon.

S. S. Taylor, Jr., vice-president, Pocahontas Coal Corporation, Wednesday morning.

J. J. Sellers, vice-president, Virginia Iron, Coal & Coke Co., Wednesday afternoon.

Albert Gallatin, general superintendent, Republic Coal Co., Thursday morning.

T. S. Pope, president, Sheridan-Wyoming Coal Co., Thursday afternoon.

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to caterpillar mobile machines loading into conveyors.

Commenting on fundamental problems to be faced in mechanization, J. J. Rutledge, chief mine engineer, Maryland Bureau of Mines, declared that attention must be given to breaking or widening airways in low coal workings to provide sufficient ventilation area.

William Cunningham, superintendent, Union-Summit Coal Co., discussed mobile loading experiences in the 6- to 8-ft. beds of Indiana, which he said are conditioned like seams in that State. As a practice, he sees no choice between track and caterpillar loading. For wide rooms the caterpillar is a necessity, but may give trouble if the bottom is soft. Cars as large as possible and mine here of the greatest practical length make for better efficiency.

Good track is essential. Using gathering locomotives too light and too slow for handling the large cars may be a mistake. Indiana has prohibited shooting during the loading shift. Dust choke is methane. When a large acreage of thin coal is to be mined from one shaft, main and cross headings are required to handle the air. Management talks is an item which cannot be overemphasized.

Reference to specific mines was avoided by J. W. Woomer, chief mining engineer, Hanna Coal Co., in discussing transportation for mechanical loading. Maximum safety was given first place, minimum investment and operating cost second, and keeping cars to the loading point third place in his presentation. Tests of loading-machine capacity indicate clearly the necessity of using the largest car possible. Size of the new equipment and the required speeds will determine the weight of rail and size of turnouts.

Due consideration should be given to the power requirements for the locomotives and to the possibility of using battery units. Whether or not to use relay locomotives also must be decided. A good haulage system for hand loading will prove a helpful basis from which to organize efficient transportation for mechanical loading. Use of larger cars, however, may require material changes. Adequate personnel to operate equipment is equally important.

Use of storage-battery locomotives which can be charged during off-peak periods will pay dividends in mechanical-loading haulage, declared Andrew Moffat, Consolidated Coal Co. Maximum safety is the first consideration.

A caterpillar shortwall transport truck has proved successful with trackless rubber-tired transportation. Mr. Moffat prefers the tractor-trailer type of trackless haulage over the self-propelling car type because the former can maneuver into places where the other cannot. Because the "buggy operators" are to a great extent choose the route to avoid obstacles such as approaching buggies, falls and prop-loader-servicing time can be reduced materially.

Use of a relay motor has bettered the haulage at Island Creek mines, according to A. L. Roberts. He also stated in effect that an indifferent timbering may be worse than none at all because it may lead to false confidence.

Discuss Conveyor Mining

Hand loading onto conveyors represents the highest degree of mechanization practical at this time for thin seams having bad conditions, said Mr. Pishler. Geological conditions may limit the degree of mechanization, and conditions such as rolling soft or hard bottom should influence the selection. If a system of mining has proved its worth over a number of years, it is possible that no radical changes should be made in adopting conveyors.

Whether flight, belt or shaker conveyors are used will depend largely upon mine conditions. The new method likely will call for several changes in underground operation, especially in transportation. Mr. Pishler stressed the importance of carefully considering cleaning of the coal and said that it is probable that some additional means of cleaning must be provided.

Whether to use single or multiple conveyors is a problem. Installation was another question advanced by R. L. Wilhelm, superintendent, New Jellico Coal Co. Power supply probably will have to be revamped. How to dispose of slate or drawrock must be considered and also the height required to allow loading the largest lumps without roof interference.

M. A. Sharp, mining engineer, Union Pacific Coal Co., Rock Springs, Wyo., in a paper read by G. B. Pryde, vice-president, stated that in the last calendar year 91 per cent of the production from the Union Pacific mines was loaded by shaking conveyors and duckbills working up the pitch and driving 300-ft. rooms 16 to 30 ft. wide and taking pillars by the pocket-and-stump method. Advance mining was abandoned in favor of a full retreat system in 1928. Many standard conveyor set-ups have been adopted since a start in 1925 and each superseded by another due to some improvement in equipment or method. Drive mountings came back to screw roof jacks after going through the evolution of wood posts and concrete bases built with quick-setting cement. Chain hanging of pans from the roof is not satisfactory where the seam is too thin for a proper length of chain.

Speeding Conveyor Handling

Conveyors formerly were moved by men trained for that job, but now the moving is done by the regular crew. Drives with axles onto which car wheels could be placed to effect moving were abandoned because of derailments due to the long wheelbase. Special low-bottom carrying cars have been provided. The seam mined by shaker conveyors ranges from 5 to 9 ft. thick.

The Union Pacific Coal Co., said President Eugene McAuliffe, now has 245 shaker conveyors in use and last year loaded "some 2,500,000 tons" with them. Recovery was 60 per cent by the old hand-loading-into-car methods. Now, recovery is 90 per cent. Approximately 85 per cent of the mine timber is recovered. Loading with the duckbill at an angle to the main conveyor is common practice; at times the turn effected by swivels and jack posts is 90 deg.

A cardinal principle in dealing with mechanization is that "no difficulties are recognized." Although forecasts include no mechanical cleaning plants, the mine output is kept sufficiently clean to give satisfaction in the mechanical locomotives. Picking from the underground shaker conveyors affords a worth-while means of removing refuse. All Union Pacific mines work two shifts; three-shift operation also has been carried on. Conveyor crews are paid a bonus. More efficient machinery is now available due to the alloy steels and other new materials.

Reporting on conveyor mining in an Ohio coal averaging 40 in., with a working height of 42 to 45 in., C. B. Walker, chief engineer, Sunday Creek Coal Co., said the average man-shift production is now 16.31 tons. Two chain-flight and eight shaker units are in use. A chain-flight unit consists of

two 300-ft. room conveyors, two face conveyors, one cross-conveyor and one elevating conveyor. Two room shakers make up a shaker-conveyor unit. Systems include 50-ft. rooms advanced 300 ft., 60-ft. rooms advanced 250 ft., and 35-ft. rooms advanced 300 ft. with 35-ft. pillars mined on return.

Entries with one conveyor in the aircourse and one in the heading are developed 24 ft. per day, stated F. D. Welsh, Clearfield Bituminous Coal Corporation. Both flight and shaker conveyors are in use. A. E. Long, of the same company, described the use of the McCarthy (Goodman) mobile conveyor. Built with three 6-ft. sections on a 6½-ft. gage and used in 36-in. coal, the capacity is 5 tons. The car is self-propelling between face and loading entry by means of power drums and ropes anchored at each destination. Shoveling distance is kept to a minimum because all loading is at the extreme back end. The conveyor bottom is moved up 3 ft. at a time to carry the load forward. One 50-hp. motor furnishes power for conveyor and tramming.

Unloads Directly Into Cars

Unloading directly into mine cars on the entry is accomplished by further moving the conveyor bottom of the unit. The complete loading, tramming and unloading cycle for the car takes 25 to 30 minutes. Men like to work with this conveyor car because of lack of noise, simplicity of operation, nothing heavy to lift, and because all of the crew are together at the face instead of one man being stationed on the entry. Among the advantages are low power consumption, flexibility (conveyor will negotiate 90-deg. curves of 25-ft. radius), low maintenance cost (steel ropes principal item) and the fact that its use allows operation with a mounted cutting machine.

One mine of the West Kentucky Coal Co., stated H. L. Richardson, Jr., is completely mechanized with shaker conveyors, operates two shifts, produces 1,600 tons per day from 54-in. coal in which rooms are driven 30 to 33 ft. wide and 350 ft. deep. Room conveyors load directly into the mine car on the entry. Production is 62 to 75 tons per unit per shift. Six-foot cutter bars have been used but 8-ft. are now being adopted, and with them it is hoped to attain not less than 80 and perhaps 90 tons per shift and to produce lump of just as high a quality.

With hand loading for the same production, four to six pickers were employed. With shakers, sixteen are required, with results "none too good." Sixty-five to 80 tons of material formerly retained in the mine is now removed on the picking tables. Wear of shaker-pan lines is a maintenance item which has exceeded the manufacturer's estimate.

Two of three Alabama thin-seam mines in which recovery methods were described by W. C. Chase, general superintendent, Alabama By-Products Co., use conveyors. Empire mine (DeBardeleben Coal Corporation), which produces 1,200 to 1,400 tons from the 26- to 28-in. Black Creek seam, hand loads into chain-flight face conveyors, two of which, working advancing, discharge into one chain-flight room conveyor. Room conveyors discharge into 2½-ton cars on the entry. Cribs along the room conveyors support the roof and keep the conveyorway open. Rock hauled out of the mine averages 200 tons per day.

Chain Flights in Alabama

Chain-flight conveyors on walls 450 ft. long advanced to within 15 ft. of new conveyor rooms (driven on 500-ft. centers) deliver 500 tons per shift at the New River mine (Brookside-Pratt Mining Co.). Two 225-ft. conveyors in line on a wall but delivering in opposite directions load into 1½-ton 29-in. mine cars on the opposite panel entries. Coal is 26-in. Black Creek seam.

Power-distribution problems in conveyor mining were outlined by L. H. Schnerr, division manager, Consolidation Coal Co. An abstract of Mr. Schnerr's paper appears on page 50.

At the tipple of the Baton Coal Co., Westmoreland County, Pennsylvania, only one picker was added for each 130 tons of mechanically loaded coal and quantity of slack is running only 2 per cent over the 46 per cent average under hand loading, stated Charles B. Baton, vice-president, who outlined 18 months' experience with Joy 8 BU loaders working pillars—the only coal left in the mine. Mining is in the eastern horizon of the Pittsburgh seam, where the coal is 6½ ft. thick, contains the usual binder 2½ ft. from the bottom and has a tender roof which requires extreme care in shooting. Existing track conditions prevent the adoption of mounted machines, therefore undercutting with shortwalls is continued. At first, loading-machine operation caused slack to jump to 55 per cent. Improved methods then lowered it by 9 per cent.

Holes are drilled parallel to and a few inches from the top to produce an artificial parting. All holes are drilled to within 4 in. of the back of the cut. Top holes, which are fired last, are spaced 5 ft. apart, and bottom holes 10 ft. Sharp augers are a necessity for drilling straight holes. The shift foreman examines all holes before loading. Safety stemming plugs are used; the air space in top holes is 12 in. and in bottom holes 8 in.

Experiment With Pick Hammers

Experimenting with pick hammers in conjunction with the loaders is now under way. As much refuse as possible is picked out at the face between shooting and loading because the machine would break up the material to some extent and cause fines to mix with the smaller coal. It is impractical to remove all the binder at the face. Crossbars with roof jacks and posts are used close to the face and in some cases it is necessary to move the posts to make room for the loader. Working only on remaining pillar coal makes it impossible at times to have more than two working places per loader.

At the Arkwright Coal Co., mining the lower 7 ft. of the Pittsburgh seam and leaving top coal to hold the roof, eight men on the tipple pick the plus-2-in. sizes, said E. D. Gall, superintendent. Last year the company installed track-mounted loaders; because it has no mechanical means of cleaning on the outside, great care is required in face preparation. Rooms are driven 270 ft. deep and the pillar is taken on the retreat. Mounted machines with 9-ft. cutter bars do top cutting and vertical shearing. Shooting then is done from the bottom to prevent breaking up lenses of impurities near the top.

Preparation Problems Up

DRYING is one of the weakest links in the whole cleaning process, declared K. R. Bixby, general manager, Midland Electric Coal Corporation, in opening the session on preparation problems. Crushing, screening and blending and the more exacting standards in preparation of coal for metallurgical purposes, as contrasted with ordinary commercial uses, also were emphasized at this session. Anthracite problems were discussed from the standpoint of the practical limits of slate removal.

Consumer reactions rank first and the selection of drying equipment second, said Mr. Bixby. Centrifugal drying is favored for ¾-in. and smaller coal, and heat drying for the larger sizes. Degradation, he continued, limits centrifugal drying to the smaller sizes. In the heat systems, most of which use screen plates to support the coal, reduction of surface tension and rapid removal of the vapor are prime considerations.

J. B. Morrow, preparation manager, Pittsburgh Coal Co., remarked that drying is now a subject almost as important as washing. T. W. Guy, consulting engineer, agreed that meeting the consumers' requirement is the first consideration, but cautioned against the economic waste of taking out an excess and leaving less of the natural product to sell.

Two installations of the "Roto-Louvre" process are now working, one

at Willow Grove (Ohio) mine of Hanna Coal Co., and the other at the Carrier Mills (Ill.) plant of the Delta Coal Co., said N. L. Davis, Link-Belt Co. Feed to the Hanna unit is 32 t.p.h. of ¼x0-in. of 14.2 per cent moisture (wet basis) and the product contains 2.75 per cent moisture (dry basis). At Carrier Mills the feed is 70 t.p.h. of ¾x0-in. coal.

Experience revealed that when the top size was stepped up to 1 in. there was a tendency for the dried coal to fire in cars and in storage. This tendency was due to the reduced surface per unit of volume for the larger pieces, resulting in rapid elimination of all surface moisture and consequent early heating of the coal itself in the dryer. To guard against volatilization it was found necessary to limit the heating of the coal to 155 deg. F. Mr. Morrow added that successful heat drying depends upon velocity, or "power in the air," as well as upon the heat application. Sulphur in coal is "not a minor detail" if fan blades are eaten up in a few months.

It still is desirable to produce maximum lump in mining, even though crushing is necessary to supply the demand for small coals or to obtain more thorough cleaning, asserted H. F. Hebley, coal preparation engineer, Commercial Testing & Engineering Co., in describing crushers and screens now in use. Small coal without an excess of fines should be produced by careful and proper crushing and not by heavy shooting and rough handling during mining. New crusher designs to produce stoker coals have come into use. These new designs include pyramid teeth and pick points.

Always the buyer is right and, although already doing a good job of crushing and screening, the producer continues to improve his equipment and thus increases the cost to the consumer, said W. J. Borries, general manager, Dawson Daylight Co. Combustion engineers could do a great service by establishing size standards which would limit size demands.

Success in building a fine-coal screen which will self-clean after receiving a slug of wet coal was reported by G. R. Delamater, W. S. Tyler Co. Dry-coal screening down to 28-mesh is now practical but it was a battle to increase the life of the stainless-steel facing cloth from two seven-hour shifts to the present several months.

Quantity of machine cuttings going into the output at certain times during the day is the largest factor in variation in screen analysis, said O. O. Malleis, District 8 producers' board. Citing tests reported in the proceedings of the Fuel Engineering Division, Appalachian Coals, Inc., he stressed that results of nut-slack screen analyses through the Southern fields were very much alike; that is, the percentage variations were relatively small. Mr. Hebley pointed out that swings in material coming from the mine during the day often account for the condemnation of certain cars.

"I wish it would hurry and get quitting time. I'm due at a banquet at six-thirty."

Three combination Link-Belt Simon-Carves wet and Stump dry plants placed in service in May, 1936, and one combination Rheolaveur and American dry plant placed in service in 1937 were described in rapid-fire detail by E. C. Carris, preparation manager, Island Creek Coal Co. He emphasized the necessity for presizing equipment that performs a sufficient number of separations and that has ample capacity to take care of present needs and future changes in washing or blending requirements. Three 125-ton steel bins, elevators, feeders, control gates and belt conveyors comprise the blending equipment of each plant.

Plant operators are furnished with charts showing proper settings of equipment to secure given results. Twelve men comprise the crew of each cleaning plant and because samples are taken every 10 minutes for analysis in a central laboratory, and plant operation is governed by charts, it has not been difficult to secure plant foreman and operators of the right caliber.

Drying Stoker Coal

Drying of 1¼x¼-in. stoker coal is done by high-velocity hot air as the coal passes over inclosed shaker screens. Cost of drying is 1½c. per ton of dried material. Feed to the screens contains 5½ to 6 per cent moisture. Dried at 500 deg. F., the resultant product carries 2¼ to 2½ per cent moisture; at 700 deg., 1.9 to 2.2 per cent; at 1,000 deg., it is practically bone dry. With the same amount of cold air, the coal carries 4 to 4½ per cent moisture.

When cleaning coal for metallurgical purposes, declared F. A. Jordan, mining engineer, Youngstown Sheet & Tube Co., the standards of operation of the plants previously described would produce results of "almost nothing." A 0.03-per-cent increase in sulphur, from 1.27 to 1.30, for example, invites "nasty questions" from a coke plant. Mr. Jordan said he would not think of drying plus ¼-in. coal by heat because it can be done much cheaper by mechanical means. The plant foreman should know "a lot" about cleaning and should make more tests than anyone else. It is good luck to pick the one man in fifty with the right temperament for a good preparation foreman.

Answering H. L. Richardson, Jr., West Kentucky Coal Co., Mr. Jordan said that in 1937 the cost of washing 1,400,000 tons was 11.2c. per ton, including 3c. for depreciation, taxes and so on. If allowance were made for discarding a mined product that possibly cost $2 per ton, the cost in some instances might be 10c. per ton more. Thorough cleaning, therefore, might cost 15 to 30c. per ton.

The higher standards of anthracite cleaning were outlined by D. B. Baird, chief coal inspector, Philadelphia & Reading Coal & Iron Co. Impurities to be eliminated generally are classed as

either free slate (55 per cent or more ash) and fixed slate which contains admixtures, such as laminations and bone. Cleaning methods are now in use which will bring the free slate content approximately to zero with negligible bank loss.

John Griffen, Koppers-Rheolaveur Co., cautioned against the tendency to allow the ash content to be forced down to an uneconomic point. There may also be a loss to the producer by excessive crushing to accomplish this too-perfect cleaning job.

Don't Sell Safety Short

"WHEN you pull up safety, you also pull up efficiency," declared Eugene McAuliffe, president, Union Pacific Coal Co. The readiness to take a chance which makes mines unsafe may also be used to create safety. A man may take a chance that he will not be injured if he violates safety rules, but he also may enter into a competition where the opportunity to attempt to cheat death and injury is surrended for the chance to win a prize for having taken all due precautions against accident. His company plans to induce men to replace one kind of chance-taking for another—and the plan works.

In establishing better safety records for the Bell & Zoller Coal & Mining Co., the first endeavor was to sell safety to the bosses at the mine, asserted John Lyons, safety engineer. The mines also were visited and investigated by the U. S. Bureau of Mines and suggestions made. Comparisons have been made between the record of the company and those of other companies to encourage the competitive spirit and to learn where the methods adopted are defective.

At the mines of the United States Fuel Co., in Utah, stated W. W. Wetzel, general superintendent, bosses receive awards of from $5 to $25 a month for commendable safety records. In his opinion, safety bulletins may be so generously spread around as to attract in time no more attention than is given to the paper on the parlor wall. Such appeals can be overdone.

Biweekly Reports Made

Reports are made every two weeks by the Bird Coal Co., Johnstown, Pa., showing the costs of compensation, hospitalization and medical aid, so that every official will realize the burden thus laid on costs of production, said J. J. Coffey, operating manager.

When trolley lines are so poorly installed that the motorman with his hand on the pole must guide the trolley in order to keep it on the wire, how can he be expected to keep his attention on the dangers ahead? When switch points will not close and are not clean, how can accidents be avoided? inquired D. W. Jones, superintendent, Princeton Mining Co. Safety cannot be expected if car couplings are made "on the fly" and trip runners dart in front of speeding trips over badly cleaned tracks to throw a switch. Clean the tracks and stop the trip whenever and wherever men must travel ahead to handle the switch levers.

With the large trips customary today, the steel car is essential for safety, as are also other railroad adjuncts to safety, such as automatic couplers and heavy rail and ties. Swags and hills should be lighted, for vertical curvature blocks the view ahead. On sharp pitches, derails are needed, lest ropes or couplings break. As for safety instruction, bank nights are to be recommended. They bring out the men.

Among the suggestions of William Lauder, assistant production manager, Pittsburgh Coal Co., were headings driven carefully to sights, adequacy of equipment, easy curvature, rail braces, heavy rails and ties, adequate headroom. For disobedience to safety rules, a suspension of a day or two, and for the second offense discharge is imposed. Since men will step to the tight side of the heading even when safe clearance is always provided on the same side of the track, Pittsburgh Coal Co. leaves enough room so that a man flustered by an emergency can escape on the tight side by flattening himself against the rib. True, that is the trolley side and he is risking electrocution, but the company believes that it is better to leave room so that, should men thus risk their lives, they nevertheless may save them by making the most of the conditions created by their folly.

In Ohio, the State Industrial Commission's reports are used to promote competition in safety. Mines are pitted against each other to see which can make the best record. As a result of this and other safety moves, the Wheeling Township Coal Mining Co.'s record, declared C. E. Young, personnel manager, shows that tons per accident have increased 91.6 per cent since 1929. Those companies which participate in the contest have four times as enviable a record as those which abstain. It is inspired—not compelled—safety, and inspired safety lasts.

An inefficient mine cannot be safe, however much accident-prevention work may be done, declared F. E. Cash, district engineer, U. S. Bureau of Mines. Contests between sections of mines are better than contests between men at different mines. The more the contests are expanded, the less intensive the competition.

Two motion pictures have been made by the Koppers Coal Co. at Powellton, W. Va., and the development of a third is in progress. Parts of these pictures were shown by C. R. Stahl, division superintendent. Realistically they show the effects of not following safety rules at the face, on the haulage road and in haulage. These pictures are shown to the school children in the morning, to the women in the afternoon and to the men after working hours.

Keep the Wheels Turning

MAINTAIN to "keep out of trouble" instead of to "get out" of it was the advice of E. A. Rickard, chief electrician, Koppers Coal Co., Weeksbury, Ky. Proper maintenance, W. E. Wolfe, electrical and mechanical supervisor, Clinchfield Coal Corporation, pointed out, has a direct relation to the economical use of power. Aspects of power service and distribution at both mechanized and hand-loading operations also were scrutinized by other speakers at the convention sessions. One such presentation was devoted to proper power distribution for conveyor-mining systems.

Electrical maintenance, said Mr. Rickard, is principally maintenance of insulation; therefore it is necessary to understand the properties of insulating materials. Commutator maintenance is reduced by keeping away oil, which attacks the mica binder, causes accumulation of dirt and final breakdown. Beveling edges of commutators after they have been undercut reduces chance of failure; when new brushes are installed their edges should be beveled. Bearings are an important maintenance item; whether they last a few months or many years depends principally upon lubrication and protection from dirt. For both gas and arc welding of large and complicated shapes, charcoal preheating was mentioned as a useful auxiliary in the Koppers shop.

The character of maintenance, declared Mr. Wolfe, may determine whether a company stays in business or goes into receivership. Proper care of machinery calls for a systematic program of maintenance and inspection. Operation of equipment at high power factor saves money for both the mining and power companies.

A motor manufacturer was able to reduce the weight of a 7½-hp. Class A motor from 275 to 183 lb. by use of glass insulation, stated Randall Hagner, Owens-Illinois Glass Co., who predicted that such insulation, still undergoing development, will be outstanding in mining. Its permanence is due to resistance to high temperature, acids, alkalis and moisture. Space saving also is important and the heat conductivity of glass is claimed to be superior to certain other insulations.

New River Co. practice for the last fourteen years has been to use surface substations and take direct current into the mine through boreholes, said C. C. Ballard, master mechanic. The company, however, has used 2,300 volts underground with no trouble for many years to drive pump motors. Development of non-inflammable transformer liquids and portable substations was classed as a new factor to be considered when planning changes in power distribution.

One 1,000,000-circ.mil feeder and a 300,000-circ.mil trolley wire suspended by a combination clamp has been the New River Co. practice for several years and has proved highly satisfactory and much cheaper than carrying the feeder on separate insulators. Automatic reclosing breakers should be used for isolating substations from each other in case of trouble and should be used between the mains and all working sections. The advent of the seven-hour day and consequent necessity for plugging small leaks has made the use of sectionalizing breakers still more desirable.

The return is the "forgotten" section of the d.c. power circuit. There are three principal types of bonds: (1) pin-driven, (2) arc-weld copper and (3) mild steel arc-weld. The third, concluded Mr. Ballard, finds much wider use than the copper arc-weld because the latter requires more thorough cleaning of the rail and gives trouble in application if moisture is present.

For mechanical loading, copper is too costly for long-line distribution sufficient to maintain proper voltage at the face, so the only alternative is to keep the substation close to the working face, stated Andrew Hyslop, Jr., electrical engineer, Snow Hill Coal Corporation. At Talleydale mine, 4,000-volt a.c. power is fed to inside rotary converter substations by wire-armored cable down the shaft and rubber-covered cable through the mine. Substation rooms are protected by automatic steel firedoors and the concrete foundation includes a 6-in. raised rim or curb around the sides to confine insulating oil in case of transformer difficulty.

Mr. Hyslop thought 4/0 trolley wire preferable to 6/0 for mechanical-loading sections where the wire must be moved often and is paralleled by feeder wire. Ease of coiling and handling 4/0 wire outweighs the disadvantage of lower conductivity. Heavy main hauls where rapid wire wear is a factor may justify the use of the larger trolley wire. Where substation generators are operated in parallel, it is important to install automatic reclosing circuit breakers to isolate any one in case of trouble.

F. P. Brightman, General Electric Co., emphasized the adaptability of the portable substation for delivering ample power efficiently to the working face. The new non-inflammable transformer liquids add to the possibilities of keeping underground substations close to the face. He warned that lightning may travel into a mine via an underground high-voltage a.c. cable and damage rotating equipment unless that equipment is protected both by a lightning arrester and a capacitor.

Power for Conveyor Mining

The objectives of power distribution for conveyor mining, according to L. H. Schnerr, division manager, Consolidation Coal Co., Somerset, Pa., should be (1) safety, which is covered by State regulations; (2) efficiency, which means few delays and low production cost, and (3) ease and convenience of transfer to a new location. A portable panel board with reversing conveyor control used at the loading head is not disconnected therefrom when moving but is laid complete with its rail and trolley leads on top of the head for transportation.

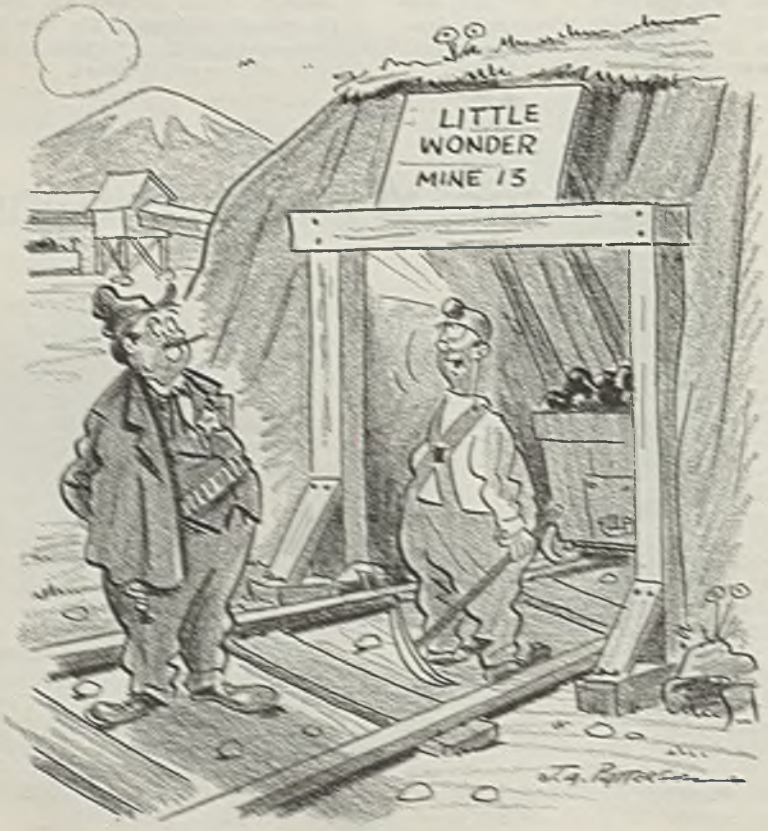
Mining machines are operated from a separate cable nipped to the trolley. Conforming with the law, cables are kept off the floor, and for this purpose special non-insulated metal loops kept permanently on the cable are attached to props by driving into the wood a pointed part which is turned 90 deg. to the hanging loop. Cable is positioned midway between floor and roof.

For mines where closed equipment is demanded there is a definite need for a permissible multiple junction box for use at the face. The lack has caused some operators to return to the use of individual cables extending to the room necks. Insulation failures in drill cables at or near the point where the cables enters the drill have not been solved even by use of rubber-hose protectors.

Use of an overload circuit breaker on the loading-head panel board through which all power for the conveyor unit is delivered was advocated by H. P. Musser, West Virginia Engineering Co. Two plans for minimizing power loss through room cables were advanced: To use three cables each 100 ft. long with connectors, putting the power through all three cables in series only during a third of the mining; and using cables of larger size than the usual No. 4—perhaps as large as No. 2.

Emphasing the necessity for reducing room-cable loss, Mr. Musser pointed out that a typical loss of 2.75 kw. in a 300-ft. No. 4 machine cable must be multiplied by 1.25 to 2.25 to determine the real loss, which includes the transmission to the point of cable feed. Total loss by reason of the cable resistance may be between 3.5 and 7 kw.

"—an' who shall I say is calling, please?"



Speeding Up Haulage

HOW TO IMPROVE underground transportation was the theme which ran through several addresses at the Cincinnati convention. Road construction and maintenance, rail weight, automatic couplers and brakes, and the dangers of overloading mine-locomotive motors all came up for special discussion. Transportation problems with mechanical loading was the subject of a detailed presentation at one of the sessions devoted to mechanization (see page 46).

Derailments inevitably will occur, declared E. H. Jenks, mining engineer, Rochester & Pittsburgh Coal Co., unless improved gradients for main track replace rolling floor-profiles. Where track is to be reasonably permanent and where traffic density is considerable, 80-lb. rail is fully justified for main lines. Tie sizes vary from 4x6 in. to 7x9 in. and their lengths exceed track gage by 18 to 36 in. He regarded 6x8 in. as the preferable cross-section. Depth of a tie should be at least ½ in. greater than the length of the spikes to insure adequate spike adhesion. Spikes should be large enough to hold the rail and prevent spreading, but not so large that they split the tie.

All Ties Should Be Treated

All ties, said Mr. Jenks, should be treated. Those in temporary track can be used over and over if the spike holes are plugged with wood similarly treated. Sixteen ties per 30-ft. rail are preferable to more, because the lesser number can be tamped more readily, giving more rather than less rail support. Ties preferably should be sawn, not adzed, because what is desired is a tie with a face as wide as any part of its cross-section, thus leaving maximum tamping space and giving maximum support. Type of ballast is less important than superstructure. After five or six years, because of droppings from cars and roof and the heaving of the softened bottom, all forms of ballast will have much the same characteristics. Support should be provided by ballast under rails and under tie ends, but the material under the center of the tie should be relatively loose.

At his company's mines 80-lb. rail have been Thermit welded and, though derailments have thrown the track 2 ft. out of line, no joints have failed. Thermit joints have now been adopted as standard on permanent track and are installed along a mile of track at one time. With ordinary track 90 per cent of the maintenance costs is for work on the joints, but with Thermit welds all the labor can be spent on ditching and tamping, with manifest advantage to the track. Maintenance of track is more important than heavy rail and large ties.

Observation has shown, said H. B. Husband, general manager, Chesapeake & Ohio Ry. coal mines, that curvatures in the mines run from 30- to 700-ft. radius, elevations from 1 to 4 in. and widening of gages on curves from ⅛ to 1 in. Too often elevation and gage width is left to the judgment of the trackman. To Mr. Husband, 80-lb. rail seems excessively heavy. In all cases of mine track 60 lb. is enough, but any track will be destroyed if inadequately ditched.

So long as cars were of small capacity, the surcharge for modern draft rigging was too great for any such improvement, but with the larger cars a recognition of its value is rapidly growing, declared Sheldon Smillie, speaking for his associate, P. F. Loftus, consulting engineer, Pittsburgh, Pa. With semi-automatic and automatic couplings, large reductions in accidents from car connections are effected. Spring couplers cushion the jerks from the locomotive and thus prevent loss of coal and degradation. They also largely prevent the wracking of cars. Less sand also is required. Cars should be of the same general design, front and back, so that they can be run into the room with either end forward. Automatic draft rigging will cost $30 to $75 per car unmounted.

Hydraulic braking for mine cars has been found desirable by the Pardee & Curtin Lumber Co. at its Bergoo No. 4 coal mine, according to E. P. Selby, mine superintendent, speaking for F. K. Day, general mine superintendent, and himself. At this time, 150 all-welded swivel-coupling mine cars 14 ft. long, 6½ ft. wide and 24 in. high, 3,900-lb. tare weight and 42-in. track gage, are thus equipped. The cars will carry 6 tons, but the average loading is 4 tons. The hydraulic pipes are protected by a 1¼x1¼x¼-in angle. Travel of pistons from the off to the on position is 6 in. Bendix brakes are used; they save 260 lb. in the weight of the car. In the author's opinion mine locomotives also should be provided with hydraulic brakes.

With occasional heavy gradients, followed by others less severe, there is less likelihood of heating locomotive motors than when the inclinations are more even and where, accordingly, the management provides that the locomotive will be loaded up to its maximum capacity at the ruling gradient. The motors are therefore overloaded for the entire length of the run and may become overheated, urged Carl Lee, chief electrical engineer, Peabody Coal Co. In such cases, it may be safe by proper ventilation to double the burden on such motors. Headlights give much trouble. With arc lamps, the light may go out because of low voltage. Low-voltage lamps that will operate at 32 volts are a satisfactory solution.

Spotlighting Mining Methods

DISCUSSION of mining methods at the Cincinnati convention was concentrated on shaft sinking in Alabama and Colorado, improvements in cutting practice and equipment, and face preparation. Problems introduced into face preparation by the installation of mechanical-loading equipment also were reviewed; this particular phase of the subject is treated on page 45. The program included only one major presentation on ventilation—the installation at the Caretta mine of the Carter Coal Co., described by William Norris, Jr., safety director of the company, and a discussion of this paper and propeller-type fans by A. Lee Barrett, Pittsburgh Coal Co.

With the higher loading rate growing out of a shorter workday and crushing coal to stoker sizes, declared C. F. Connelly, general manager, Kemmerer Gem Coal Co., it has become difficult to keep down unnecessary coal breakage. Workers strive to save the time required to change jackposts, but when they are not reset, the face cannot be cut without gripping the ribs. Too many cutters will grip the rib from 20 to 24 in., whereas a 12-in. grip should not be exceeded.

In discussion, W. D. Ingle, Jr., general superintendent, Ingle Coal Co., said he refrained from using water on the cutter bar because of the disastrous effect on bits, cutter chains and electric cables. Standard 1x½-in. bits had been replaced with "Duplex" bits, because of rock in the undercutting. Without due taper, the standard bit grinds the coal to pieces and operates with increased frictional resistance, while with greater taper the bit is weakened and breaks. With the new bits, cuttings are 7 per cent larger and power consumption is down 30 per cent. Alloy steel is more expensive than ordinary steel, but bit weight is cut in four. Bits are discarded when dulled.

"Duplex" bits are retipped at the mines of the Nellis Coal Corporation, said C. W. Connor, general superintendent, and give better results than new. The No. 2 Gas seam at Nellis is very hard, and a set of ordinary bits was

"Oh! Hello, Hapgood. Quite a coincidence, isn't it?"

dulled in cutting a single place. Now, fourteen places are cut with one set of the improved bits. Four tons per "Duplex" bit, said Mr. Ingle, is the performance he has obtained. Experiments are being made, asserted Mr. Connor, with a 9-point wave lacing. It may increase power cost, but he feels sure that it will give coarser cuttings.

In some fields, declared Paul Weir, consulting mining engineer, the rate for cutting with the old breast machine is no lower than when using the most modern of "universals," yet even in these cases the advantages of mobility, decreased shooting and protection of roof made the use of the modern equipment desirable. Such universal machines are now provided with caterpillars, when desired, and a machine with pneumatic tires also is offered.

More advances have been made in cutting machinery in the last three years than in the prior thirty, asserted H. A. Christy, Wheeling Township Coal Mining Co. In the No. 8 seam of Ohio, where rooms and headings are driven 8 ft. wide, cutting and shearing machines save the roof from breakage and increases the yield of 2-in. lump from 18 to 40 per cent. The coal can be sheared on both sides of the entry, but if only one side is to be sheared it should be the one from which rooms are turned, as it requires the greater protection in shooting. The shots are placed on the opposite side.

Sixteen to 60 ft. is the usual range of collar depth required in shafts in Alabama; loading 0.45 cu.yd. of rock per hour is expected of a mucker, and 14 ft. of hole per hour is expected of each driller; those were some of the general observations of Percy G. Cowin, Salmon & Cowin, Inc., who spoke on shaft-sinking methods in that State. His company employs white hoistmen and drillers but colored muckers. Usually drill men work on the night shift and muckers during the day. Paying a bonus, one-half of it with the regular pay days and the balance upon completion of the job, has reduced labor turnover.

Pressure grouting from a prospect drillhole was used recently to cut off a 125-g.p.m. water flow before sinking a 14-ft. shaft 230 ft. deep for the Gulf States Steel Co. Upon redrilling the hole after the first grouting, 25 g.p.m. persisted, but this was cut to ½ g.p.m. by a second grouting. The usual practice in shooting is a hole to every 4½ sq.ft. of area in the smaller shafts and every 6 sq.ft. in the larger.

The company just finished sinking a 23x12x450-ft. unlined shaft at a Sloss-Sheffield mine, with a concrete curtain wall. After the shaft was completed the wall was begun at the bottom and the work done by using steel forms 12 ft. high to which were attached working platforms. Four hours was required to raise the forms and place the seals ready for the next pouring of concrete. Salmon & Cowin now use detachable drill bits; so they no longer take shop equipment into the field. All bit sharpening is done in the central shop in Birmingham.

Forty-five days and $4,009.25 total labor cost ($13.69 per foot) for an 8x10x293-ft. air shaft and 55 days, $6,366.50 labor cost ($20.49 per foot) for a 10x17x304-ft. main shaft were the records made at the recently opened New Continental mine, Boulder Valley Coal Co., north-central Colorado, said Fred Nesbit, vice president of the company, in a paper read by T. E. Jenkins, president, National Fuel Co. Before starting sinking, which was done by three-shift work using the company's own miners, a prospect hole, later used for a power cable, was drilled at a point midway between the proposed shaft locations. This hole indicated 16 ft. of surface material, 8 ft. of gravel containing water, 26 ft. of clays, 2 ft. of limestone, and the remainder all highly varied strata.

For the main shaft the 3-in. planking used in the difficult first 50 ft. proved too light, but it was too late to change to 4-in. material. Blue clay was puddled in back of the timbers to form the water seals. Sinking the air shaft was done with a 40-hp. single-drum permanent hoist. At the main shaft the work was done with a 50-hp. temporary hoist later replaced by a 300-hp. Vulcan double-drum hoist. Shaft timbering is Oregon fir and the lagging is 2- to 3-in. plank. Mine development from the shaft bottom was done with two Goodman shaker conveyors. Equipment now working in the mine consists of nine Goodman and two Vulcan shaker conveyors. Storage-battery locomotives are used for haulage.

Hand Loading in Thin Seams

In 1937, the Bradford mine of the Alabama By-Products Co., said W. C. Chase, general superintendent, produced 260,000 tons by hand-loading into mine cars in coal averaging less than 24 in. thick. The seam is the Black Creek, which runs from 1 to 36 in.; at this location the sections of workable thickness lie in lenses less than 1,000 ft. long.

A room-and-pillar system is used with rooms driven 25 to 30 ft. wide but not on centers, as are the entries. Room directions are varied to follow the line of thicker coal. More than 4 ft. of rock is taken on entries and height for the 28-in. cars is provided in rooms by lifting bottom to within 7 ft. of the face, thus leaving a bench on which the mining machine works. Production is 1,400 tons in a 7-hour shift during which 1,000 tons of rock is hauled out for dumping on the surface.

Installation of a 13-ft. Aerodyne fan at Olga No. 2 mine of the Carter Coal Co., together with a new air shaft 20½ ft. in inside diameter and 756 ft. deep close to the workings, said Mr. Norris, increased air volume 218,000 c.f.m. with an additional power expenditure of only 70 hp. The primary object of this ventilation improvement was to increase volume above the existing 500,000 c.f.m., which was limiting production due to the very gaseous conditions.

The new fan, completed in September, 1937, works in parallel with a 14x6-ft. steam fan (both blowing) near the hoisting and man shafts, both of which are upcasts. Tests with the two units indicate that when fans operate in parallel their pressures should be "somewhere" near in balance. That was indicated by a short-time half-speed test of the Aerodyne while the steam fan was operating at normal. In that case the new fan produced practically no flow.

A test on the Aerodyne with the steam fan stopped and its air shaft closed showed 453,000 c.f.m. delivered at a 5.1-in. water gage, 531 hp. and a ventilation efficiency of 73.85 per cent. In that test air-velocity readings were taken at the bottom of the shaft by the traverse methods regularly employed at the mine and did not take into account some small leakage known to exist. From a manufacturer's test made later, the efficiency was calculated to be 78-plus per cent.

The new fan has a General Electric 600-hp. direct-connected-synchronous-motor drive and a 500-hp. motor drive through a countershaft and V-belt. Because power is purchased for the new fan, it is operated at the lowest speed which will produce the required amount of air and allow the steam fan to operate at full load. At this time the 500-hp. motor is in use and the speed is considerably lower than if driven by the 600-hp. motor. By a change of V-belt pulleys a still lower speed could be obtained. At first the two fans together produced 720,000 c.f.m. and consumed 890 hp. Later, after certain air restrictions inside of the mine were removed, the volume jumped to 774,000 c.f.m. and the input to 980 hp. After that the Aerodyne speed was reduced to cut purchased-power cost.

Fifteen propeller fans of the Troller type (*Coal Age*, January, 1936, p. 15) are now in use by Pittsburgh Coal Co., said Mr. Barrett. A peak efficiency of 89-plus per cent has been attained, velocity pressure deducted. The fan has an adjustable-pitch blade which provides a wide range of high efficiency. Improvements in the Troller fans during the past two years include the substitution of metal for wooden blades, use of split bearings and pulley, and a general change of design which provides accessibility and allows removing and replacing any part in 3 to 4 hours. A Troller-type installation recently completed at a Frick mine and moving 119,000 c.f.m. against a 2½-in. water gage has an efficiency of 85-plus per cent (traverse-test velocity pressure deducted).

MECHANIZATION GROWTH

+ Keynote of Equipment Exhibits

At Cincinnati Exposition

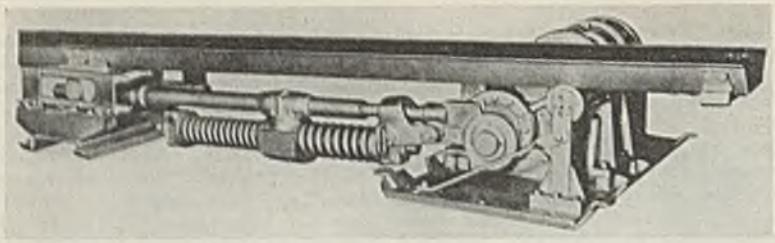
EQUALING the 1937 show, the biggest in history, nearly 150 manufacturers and service organizations presented many new and improved products for coal mines and preparation plants to operating men attending the 15th Annual Convention of Practical Coal Operating Men and National Exposition of Coal Mining Equipment, held at the Music Hall, Cincinnati, Ohio, May 2–6, under the auspices of the Manufacturers' Division of the American Mining Congress. Mechanization of both underground and surface activities again was the theme of the exposition, paralleled by greater emphasis on measures for increasing the operating life of equipment and promoting safe working conditions for mine employees.

MANUFACTURERS of equipment for cutting, drilling and loading coal again emphasized increased productivity in machines displayed at Cincinnati. Improvements in units already developed were stressed and a number of new machines were offered. Barber-Greene Co., Aurora, Ill., for example, showed a new portable belt-type underground conveyor, available in different heights and sectionalized in 6-ft. lengths for easy handling. Lightness and strength and the use of standard troughing and return idlers were pointed out.

Bowdil Co., Canton, Ohio, displayed, in addition to Bowdil machine and auger bits, cutter chains and cutter bars, a standard Bowdil chain arranged to take two bits side by side to replace chisel bits in tough, woody cutting. Another item was a replaceable auger point of the "throw-away" type. This bit fits in a special head welded on the end of the auger and is said to save taking augers outside for resharpening, in addition to keeping them the same length.

Stripping and excavating equipment for coal-mine use was shown pictorially of Bucyrus-Erie Co., South Milwaukee, Wis. Underground conveyors were featured by Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., a subsidiary of the United States Steel Corporation. Portable hand-held and mounted electric coal drills in both open and approved types, rotary hand-held air-driven drills, one-piece "twisted-steel" augers; special auger cutting heads; a post head bringing the drill to within 3 in. of the top or bottom; and other drilling specialities were displayed by Chicago Pneumatic Tool Co., New York, which also offered a new CP-32 rock drill in the 45-lb. class.

The "Duplex" bit-making machine for turning out an average of 500 to 600 bits per hour from bar stock was demonstrated by Cincinnati Mine Machinery Co., Cincinnati, which also offered regular- and thin-kerf cutter bars machined from solid heat-treated alloy steel, "Duplex" cutter chains, and



Drive section of La-Del RU-16 uphill and reversible shaker conveyor

regular alloy-steel cutter bars and chains to match.

Leading off the exhibit of Goodman Mfg. Co., Chicago, was the Type 360 track-loading machine, which follows the design of the original 260 unit except that it is 12 in. lower. Higher speeds and certain refinements were stated to give a high loading capacity, thus making it possible to consider coals as low as 4 ft. high-tonnage seams.

A Type H 12½ reversible shaker-conveyor drive having four speeds in the direction of coal travel and three in reverse for transporting supplies was another Goodman offering. The fourth coal motion was declared to have sufficient "kick" to drive coal up a severe grade, as when the pan line is just starting and consequently is short. Along with the above drive was a Type A1B automatic duckbill, said to eliminate the necessity of training an operator to skilfully synchronize the operation of the handle with the stroke of the drive, inasmuch as it is only necessary to set the handle in the desired position: forward, reverse or locked. The duckbill also may be operated by hand, if desired.

Goodman also showed the 95AR18 "Roombelt" featuring a provision for storing surplus belt in the driving head, usually 17 ft. of belting or 8½ ft. of conveyor. With this storage, it was pointed out, and the sliding telescopic section at the tension end, the conveyor quickly may be extended the full length of the surplus belt. It is available in 14-, 18- and 22-in. sizes and is said to be able to operate better over swales or sags.

The Type 87A "McCarthy" mobile conveyor was another Goodman unit. It consists essentially of a sectional chain conveyor on wheels equipped also with an electric cable reel and two wire-rope reels. The conveyor, as wide as the bottom of the car, moves the coal out of the loader's way as he shovels it into the inby end of the conveyor. When the conveyor is loaded it is moved out by one of the wire ropes and the conveyor is started up to discharge the coal. The empty unit then is returned to the face by the second wire rope.

With a 512 shortwall standing by for comparison, Goodman also displayed a Type 612 shortwall cutter, described as a low-priced unit for conveyor mining. Very similar to the 512, the new unit is equipped with a 20-hp. motor and drum-type control. Body length is 5½ in.; height, 23½ in. With a thin-kerf bar and special underframe, height is reduced to 21½ in. Undercut depth is 6, 6½ and 7 ft.

Featuring the 955 LC dragline with 100-ft. aluminum-alloy boom, special gantry and 2½-cu.yd. bucket, Harnischfeger Corporation, Milwaukee, Wis., offered a pictorial summary of P&H excavators.

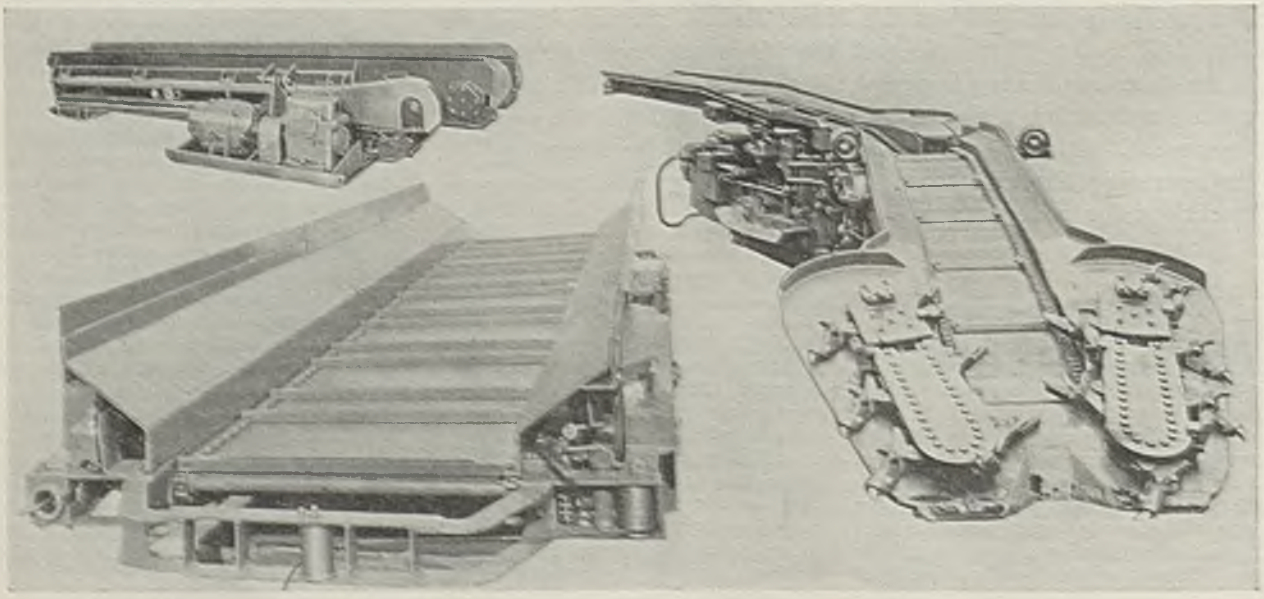
Underground mechanization equipment displayed by the Jeffrey Mfg. Co., Columbus, Ohio, included the L-400 track-mounted loading machine, the 29-U track-mounted cutting machine, A-6 post-mounted and A-7 hand-held electric coal drills, and the 61-HG face and 61-AM room conveyors. For use on the A-7 drills, Jeffrey also showed a new safety clutch, which fits onto the shank shaft. Of the friction type, the clutch protects the operator from a whirling drill in case the auger sticks.

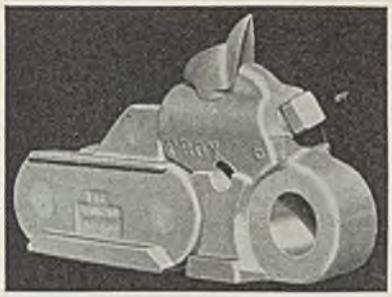
Joy Mfg. Co., Franklin, Pa., in addition the 11-BU loading machine, Joy shortwall caterpillar truck, and a heavy-duty portable face conveyor in lengths from 24 to 50 ft., with power in proportion, for driving crosscuts, mining long faces and extending chain conveyors, displayed a new Joy, Jr., loading machine. The latter was stated to have a 50 per cent greater speed, raising the rated loading capacity to 1¼ tons per minute. A fully automatic control revised for easier operation, simplicity and lower maintenance was another feature of the new Joy, Jr., which has a height of 26 in. and is adaptable to coal as low as 30 in.

Supplementing sections of other types of belt and chain conveyors, La-Del Conveyor & Mfg. Co., New Philadelphia, Ohio, offered a new uphill and reversible shaker conveyor (Model RU-16) designed to convey coal uphill and at the same time follow irregularities in the mine bottom without interference with normal operation. It eliminates elevators and the reversing feature permits also moving supplies to the face. Other advantages cited by the manufacturer are: low operating cost, low maintenance and extreme mechanical simplicity.

A section of an underground belt conveyor was shown by Link-Belt Co., Chicago. Stripping and loading shovels and draglines were presented pictorially by Marion Steam Shovel Co., Marion, Ohio.

Top left, Goodman 95AR18 "Roombelt"; lower left, 87A "McCarthy" mobile conveyor; right, Type 360 track-mounted loading machine



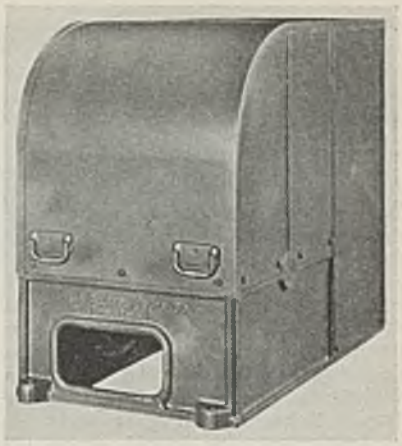


Prox Invincible "TooLSteeL" cutter chain and bit

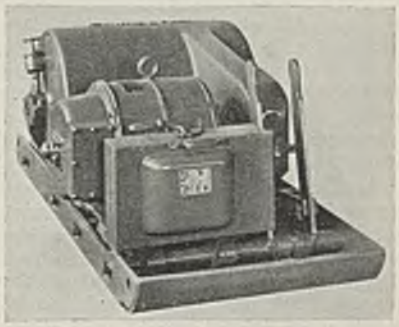
Myers-Whaley Co., Knoxville, Tenn., demonstrated a No. 3 size Whaley "Automat" track-mounted coal-loading machine with parallel-lift rear conveyor and permissible equipment.

Frank Prox Co., Inc., Terre Haute, Ind., offered the new Prox "ToolSteeL" cutter bit and Invincible "ToolSteeL" cutter chain. The new bit, of the crescent type with two points, is made by a multiple-forging process which gives a circular back for maximum strength and cutting power. The bit is made in "Senior" and "Junior" sizes for hard or moderate cutting. Other features cited by the company are: uniform cutting points, perfect clearance, and elimination of paddle or ball points and fins, uneven setting and set-screw troubles. The Invincible "Tool-SteeL" chain provides a special tool post fitting into a round socket and carries the Prox "lifetime" guarantee. In operation, this chain has established a record of 36 places cut per shift with an average output of 1,000 tons and has cut over 500,000 tons, the manufacturer states.

Troughing-type portable underground belt-conveyor equipment was featured by Robins Conveying Belt Co., New York. Truss-frame carriers for underground conveyors were shown by Stephens-Adamson Mfg. Co., Aurora, Ill. Sullivan Machinery Co., Claremont, N. H., employed pictorial methods to present its line of cutting machines and auxiliary underground equipment. Timken detachable bits for rock drills were shown by Timken Roller Bearing Co., Canton, Ohio.



Brownie RD car retarder



Brownie HGD electric hoist

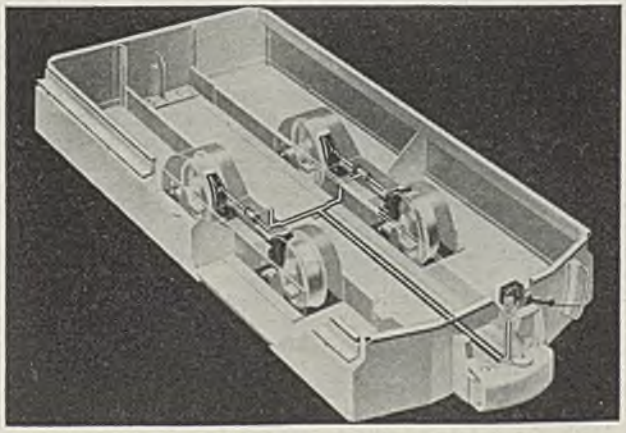
Speeding Coal Movement

TRANSPORTATION exhibits at the Cincinnati exposition featured not only new media for moving coal but also improvements in equipment hitherto employed. Bronze and steel-welded joints for mine track were shown by Air Reduction Sales Co., New York. American Car & Foundry Co., New York, featured a new low-type all-steel four-axle car with a new design of welded end sills and journal boxes, a double-acting spring bumper and a new design of mechanical brake, stated to be simple, thoroughly dependable in service and easy to maintain. With 14-in. heavy-duty plate-rib wheels, the car has a level-full capacity of 85 cu.ft. and weighs 4,396 lb. Wheelbase and track gage are 48 in. Other dimensions are: length over bumpers, 14 ft. 1¼ in.; inside, 12 ft. 5½ in.; inside width, 6 ft. 7⅞ in.; height, 20 in.

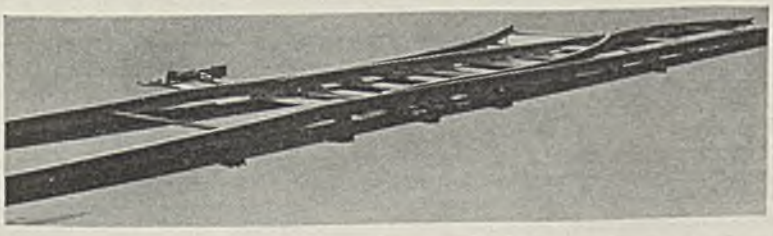
Other A.C.F. products included mining-machine wheels and chilled-tread mine-car wheels made under the improved A.C.F. heat-treating process stated to give a tread and flange with a Brinell of 500 to 600 deg., as well as lower coefficient of friction between the wheel and the rail, thus reducing resistance to car movement. Adjustment of design and manufacturing to eliminate soft spots on the tread or flange was emphasized by the company in its wheel presentation.

In addition to the Canton automatic signal system and electric switch-thrower, American Mine Door Co., Canton, Ohio, featured the Canton mine-car transfer, consisting essentially of a small four-wheeled truck operating on a special cross-track section supplementing the regular working track. Locking dogs with levers are provided to lock a car on the truck, and thus permit it to be moved over to one side of the regular track. The object of the transfer is to keep an empty at the loading machine at all times and thus permit a nearer approach to constant loader operation, in addition to other advantages. The transfer may be worked with either one or two tracks and with various car-changing systems.

Baker battery-powered rubber-tired tractors for pulling bottom-dumping trailers serving loading machines under the Fletcher mining system (January *Coal Age*, p. 47) were dis-



Bethlehem mine car with hydraulic brakes



Bethlehem portable turnout

played by Baker-Raulang Co., Cleveland, Ohio. The unit shown was designed for 42- to 48-in. seams, supplementing tractors now under development for seams as low as 30 in. and over 60 in.

A feature of the exhibit of the Bethlehem Steel Co., Inc., Bethlehem, Pa., was an all-welded rotary-dump-type copper-bearing-steel mine car with four-wheel hydraulic brakes, one of any type which can be fitted with such brake equipment. A 12-in. movement of the handle applies all brakes effectively, it is asserted, and braking action on all wheels is equalized without a complicated system of levers or intricate linkages. All brake parts, including shoes, are placed above the floor level to protect them from damage if derailed. Spring bumpers are installed on both ends, with spring draft on one. All wheels (forged steel) are equipped with roller bearings. Capacity is 4 tons with the following dimensions: over-all length, 13 ft. 8 in.; width, 6 ft. 3 in.; height, 24 in.; wheelbase, 42 in.; track gage, 36 in; wheel diameter, 14 in.

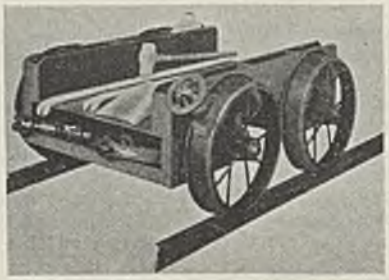
Another new Bethlehem product was a portable turnout consisting of closure, stock and incline rails, switch points, switch stand, steel ties and a frog. The turnout is laid on top of the regular track and, it is stated, can be moved when desired by sliding it along. The turnout is guided by permanent flanges welded to the ties and the inclined rails. No bolts are used except on the two gage rods and the splice bars. Bethlehem also offered new-type switch-tie sets in which bolts are done away with in favor of heavy riveted clamps, reducing the number of loose parts and resulting in a more substantial construction. To show switch position, Bethlehem demonstrated a reflector-type target stand which can be seen 200 ft. or more away with a cap lamp alone. The stand can be placed on either side and stands 12 in. above the ties. Other Bethlehem products included steel ties, forged-steel mine-car wheels, switch stands, manganese-steel frogs and Koppers "Ar-moored" combination steel-and-wood ties.

Supplementing a new TRF 5x16-in. rubber-covered and TRE 6x16-in. chilled-cast-iron track rollers carried in "sealed" ball bearings, Brown-Fayro Co., Johnstown, Pa., offered two new hoists and a car retarder. The "Brownie" electric car retarder, in addition to handling trips of mine cars, also is suitable for railroad cars. It is provided with an electrically operated brake and rewind mechanism and is arranged for pushbutton control. Rated safe braking-duty rope pull is 12,000 lb. and the retarder is said to operate without shock because of the "soft" action of the Thrustor-controlled brake mechanism. The rope is rewound by a torque motor capable of withstanding stalling loads safely.

One of the two hoists was the HGD portable electric unit designed particularly for use for handling equipment, supplies, etc., in conveyor sections. Rated rope pull is 2,000 to 2,500 lb. at approximately 60 f.p.m. The hoist, which has a silent balanced drive and anti-friction bearings throughout, is provided with roof jacks. The second hoist was the HKL car-spotting unit for handling mine cars at loading terminal or dumping point. Of the low-seam type, this hoist has an over-all height of 24 in. Rated rope pull is 6,000 lb. at 25 f.p.m. All working parts, including the drum, are thoroughly guarded or inclosed.

A photographic display of the Weirton Coal Co. 10-ton mine car (to be described in the forthcoming July *Coal Age*) and the electric trains used by the Enos Coal Mining Co. for transporting strip coal (*Coal Age*, April, 1938, p. 50) was featured by Differential Steel Car Co., Findlay, Ohio.

"Cor-Ten" light-weight mine cars, steel ties, rails, forged mine-car wheels, track bolts, spikes, frogs and other track materials were exhibited by Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., a subsidiary of the United States Steel Corporation. A featured product was the new U.S.S. No. 2 steel-tie clip developed for mechanical mining and having the following characteristics: heel designed so

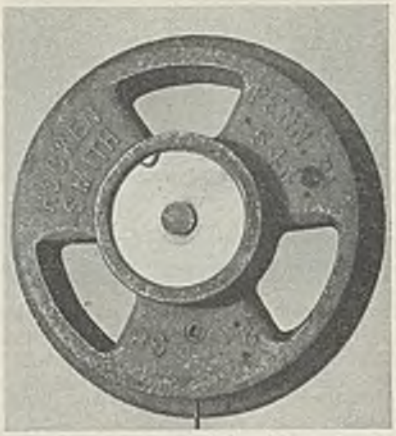


Gemco "Tru-Blu" tool car

that it will not bend under derailed equipment or tractor treads; large flat surface under the clip, which, with tight riveting, strengthens the rivet grip, the clip itself and the tie; large striking surface on the toe of the clip; gage lug designed for accurate gage maintenance; and use of a special steel for toughness and long life. Another U.S.S. subsidiary, the Tennessee Coal, Iron & R. R. Co., offered rails and ties.

Car No. 207, delivered to No. 33 colliery, Pocahontas Corporation, in May, 1931, and termed the "pioneer stub-axle car," was shown by Enterprise Wheel & Car Corporation, Bristol, Va.-Tenn. With the original chilled semi-steel wheels, the car was said to have traveled 12,030 miles in delivering 15,754 tons to the tipple. Maximum recorded load has been 14,100 lb.; average, 10,100 lb. Lubrication cost has been 5c. per month. Enterprise also exhibited sample "Mascot" split-hook sheaves.

A redesigned 5-hp. room hoist, featuring a new internally expanding friction was displayed by Flood City Brass & Electric Co., Johnstown, Pa. The new design, it was stated, provides increased



Hockensmith "Oilspok" mine-car wheel

friction surface with a positive release.

Gemco "Tru-Blu" light-weight track tools were featured by Gibraltar Equipment & Mfg. Co., St. Louis, Mo., which also showed a new tracklayers' and drillers' tool car. Constructed of steel, the car is equipped with roller-bearing wheels. A modernized 8-ton cable-reel gathering locomotive was demonstrated by Goodman Mfg. Co., Chicago.

The "Oilspok" wheel, said to provide the first continuous circulating-fluid lubricating system for tapered roller bearings, was shown by Hockensmith Wheel & Mine Car Co., Penn, Pa. The wheel is made with a series of tapered hollow spokes which act as reservoirs. Each spoke has three ports leading into the hub. Advantages cited by the company include: longer wheel life, less power, less lubricant and lubricating labor, longer bearing life, longer axle-box life, eliminating of the disadvantages of small-diameter wheels, and stronger wheels without extra weight. Irwin Foundry & Mine Car Co., Irwin, Pa., stressed mine cars and wheels.

The Joy shuttle car, a self-propelling rubber-tired haulage unit for use behind mechanical loaders, was featured by Joy Mfg. Co., Franklin, Pa. Power is supplied by a storage battery on the back of the car to two 2-hp. motors, one on each rear wheel, giving speeds of approximately 3½ m.p.h. loaded and 5 m.p.h. light. The bottom of the car contains a conveyor primarily used for unloading purposes but which also may be used to distribute the load for maximum capacity. Moving a single lever operates the car in either direction at any one of three speeds. Average unloading time is 20 seconds. The conveyor is driven by a 5-hp. motor. While the car can be built in smaller sizes, the unit shown had the following specifications: maximum height, 3 ft. 8 in.; over-all width, 7 ft.; wheelbase, 7 ft. 6 in.; turning radius, 13 ft.; over-all length, 19 ft. 5 in.; weight, 11,200 lb.; water-level capacity, 4 tons; heaped capacity, 4½ tons.

Materials and equipment for Thermit-welding rail joints were demonstrated by Metal & Thermit Corporation, New York. A new electric safety-block-signal system with Gill manually operated switches for turning on or off

"Stop" and "Go" lights was displayed by Mosebach Electric & Supply Co., Pittsburgh, Pa. Lights are installed in series and when the switch is thrown, all lights in the series change. Switches may be placed at convenient points.

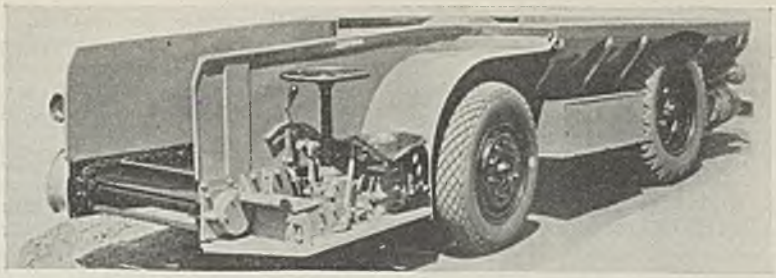
Nachod & United States Signal Co., Inc., Louisville, Ky., demonstrated the following: B 6554 electric track switch operated from a moving locomotive; spring-switch control to prevent switch closing between trucks; the "Nussco" automatic block-signal system for main haulages; new time-control switch for electric switch operation from a moving locomotive without the use of relays; new controller to operate lights for showing main-line switch position; and the Davies "Safelectric" trolley-pole controller which drops the pole in case the wheel leaves the wire. The controller consists of a solenoid in the pole base which is energized when the wheel is on the wire and in turn compresses the pole spring. Conversely, the spring is released when the trolley is dewired, allowing the pole to drop. Advantages cited by the company are: elimination of pole breakage and consequent hazard to the motorman; elimination of short circuits, damage to overhead line and mine delays from pulling down frogs and wire; and adaptability to operation as a conventional trolley pole.

In addition to mine-car hitchings, National Malleable & Steel Castings Co., Cleveland, Ohio, displayed "Naco" cast-steel wheels, Willison automatic mine-car couplers and the National friction draft gear for use with the Willison coupler. Designed with shock-absorbing and cushioning characteristics suitable for large-capacity mine cars, National draft gear is available for both rotary-dump and non-rotary-dump cars.

Ohio Brass Co., Mansfield, Ohio, demonstrated the O-B automatic coupler for mine cars (*Coal Age*, November, 1937, p. 125).

The Buckhorn Coal Co. car, believed to be 100 per cent larger than any previous four-wheeled underground mine car, was featured by Sanford-Day Iron Works, Inc., Knoxville, Tenn., which also displayed a rubber-tired semi-trailer with "1-2-3 automatic" doors, as compared with the previous doors, for use with the Fletcher battery-tractor-trailer system of gathering coal behind loaders; a small 244-lb. lightweight tool-car truck with pressed-steel wheels and a capacity of 1 ton; operating models of "1-2-3 automatic" and other types of drop-bottom mine cars and semi-trailers for strip mines; and "S-D-Floater" ball-bearing and other anti-friction wheels.

Water-level capacity of the Buckhorn car is close to 10 tons. Capacity with sideboards is 14 tons. Equipment includes spring bumpers, spring drawbars, spring pedestals and 18-in.-diameter plate-type anti-friction-bearing wheels. Dimensions are: length, 21 ft. 3½ in. over bumpers; width inside, 7 ft.; height without sideboards, 52 in. Weight is approximately 5 tons and the car is designed for use with a No. 3 frog.

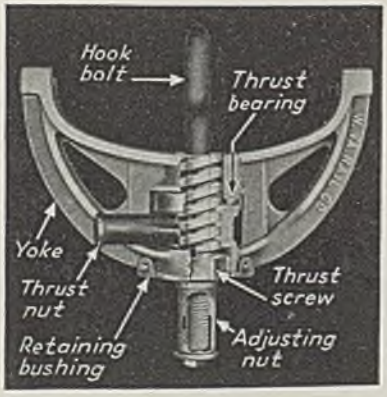


Joy shuttle Car

Room and car-pulling hoists were shown pictorially by Sullivan Machinery Co., Claremont, N. H. In addition to "Umeco" light-weight aluminum-alloy rail benders, punches and other track tools, Utility Mine Equipment Co., St. Louis, Mo., offered new light-weight steel rail benders equipped with Timken bearings. Rail sizes and bender weights are: 12- to 30-lb. rail, 20 lb.; 30- to 40-lb. rail, 26 lb.; 40- to 60-lb. rail, 43 lb. Utility also offered a new line of alloy-steel light-weight car stops, said to be easily applied without bolts by slipping them over the ball of the rail, as well as a new line of derailers with the same characteristics. Both stops and derailers are made in 25- to 60-lb.-rail sizes.

Watt Car & Wheel Co., Barnesville, Ohio, showed a low-type through-axle mine car equipped with Watt-Dalton bumpers. Capacity is 75.5 cu.ft. level full and weight is 3,430 lb. Dimensions are: height, 23 in.; inside width, 72 in.; length over bumpers, 144 in.; inside, 120 in. Weir-Kilby Corporation, Cincinnati, offered Weir "Titan" titanium- or manganese-steel frogs, switch stands, including the Model 25 low-type parallel-throw stand with a new adjustable feature; guard-rail clamps, switch slide plates and braces and other track materials.

West Virginia "Quick" rail bender



In addition to West Virginia steel ties, rails, frogs, turnouts and switch stands, West Virginia Rail Co., Huntington, W. Va., offered the "Quick" rail bender, described as a light-weight high-strength aluminum-alloy unit reducing bending time more than one-half. Bending pressure is taken on a heavy-duty ball bearing and all moving parts have machined fits. Bending effect is obtained by a thrust nut turning on a fast-pitch screw and a one-half-circle movement of the bar produces a full bending stroke. The yoke casting does not hook over the rail and thus is less subject to breakage, while the hook bolt is a heat-treated drop forging. The nut is double acting and returns the screw to the open position at the end of each stroke. Weight of the bender, provided with a convenient hand grip, is 28 lb. in the 16- to 25-lb. size. Another new West Virginia product was a rotary-clip brace for switch ties which does away with a bolted brace or any brace with loose parts. The clip has a cam-tightening surface and thus tightens as it is driven into place.

Koppers "Ar-moored" combination treated wood and steel ties for room and room-entry service were shown by Wood Preserving Corporation, Pittsburgh, Pa.

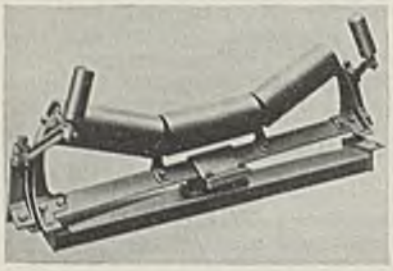
Bettering Coal Quality

PREPARATION equipment offered at the Cincinnati exposition ran the gamut from various types of mechanical cleaners through screens, drying units, tipple equipment and dustless treatment to trademarking the the product. Allis-Chalmers Mfg. Co., Milwaukee, Wis., showed, in addition to low-head and "Aero-Vibe" screens, a model preparation installation featuring positive control of feeder and conveyor operation and including a 4-in. vertical bucket elevator, Utah-type electromagnetic vibrating feeder, low-head screen, Utah-type electric vibrating screen, crushing rolls and a Utah-type electromagnetic vibrating conveyor. Barber-Greene Co., Aurora, Ill., presented pictorially its line of coal-handling, stocking and reclaiming equipment.

A miniature tower and aerial tramway for coal and refuse handling was displayed by American Steel & Wire Co., Chicago, a subsidiary of the United States Steel Corporation. Brown-Fayro

Co., Johnstown, Pa., offered a Model 2F8 high-pressure oil-spray unit capable of delivering 15 g.p.m. at 600 lb. per square inch. Calcium Chloride Association, Detroit, Mich., explained dust- and freeze-proofing with calcium chloride. A chute-type tramp-iron magnet was displayed by Central Electric Repair Co., Fairmont, W. Va. The "Waxolizing" method of rendering coal dustless (*Coal Age*, May, 1938, p. 55) was demonstrated by Coal Process Co., Kansas City, Mo. Models and pictures were used by Deister Concentrator Co., Ft. Wayne, Ind., to show features of the Leahy "No-Blind" vibrating screen and "Concenco Duplex" coal-washing table. "Concenco" spray nozzles were another company product.

Models of the deck surface and photographs of the New Deister "Plat-O" coal-washing table were displayed by Deister Machine Co., Ft. Wayne, Ind.



Jeffrey belt-training idlers

The new table design, it is stated, results in an increase of 100 to 300 per cent in capacity. The company aso showed graphically the "Plat-O" heavy-duty vibrating screen featured by flat screening angle and minimum headroom, high speed to eliminate blinding, extra strong construction and easy, quick screen-cloth changing. Three-way dumping refuse-disposal larries were presented graphically by Differential Steel Car Co., Findlay, Ohio.

Recovery of fine sizes by the use of the Dorr hydroseparator was shown by Dorr Co., Inc., New York, in addition to Dorr thickener systems for clarification of wash water and prevention of stream pollution. Dustproofing by the Dustlix process was featured by Dustlix Systems, Inc., Milwaukee, Wis., which also offered a machine for automatically feeding gummed trademark labels into coal as it is loaded into the car. The machine is designed, according to the company, to distribute equally through the coal a predetermined quantity of individually printed trademarks bearing a design reproduced on a special grade of papr stock. The adhesive used is stated to be insoluble in water and is applied as the labels are fed out of the machine. Machine dimensions are: height, 36 in.; width, 38½ in.; length, 23 in.

P&H loading-boom hoists were presented pictorially by Harnischfeger Corporation, Milwaukee, Wis. Hendrick Mfg. Co., Carbondale, Pa., showed samples of its complete line of screen plate with various perforations, including stainless-steel dewatering screens; and testing sieves and other preparation products, in addition to "Mitco" interlocking grating, grilles and other steel products. Past-year research work in coal utilization, including briquetting, experimental coking, etc., was the theme of Illinois State Geological Survey, Urbana, Ill.

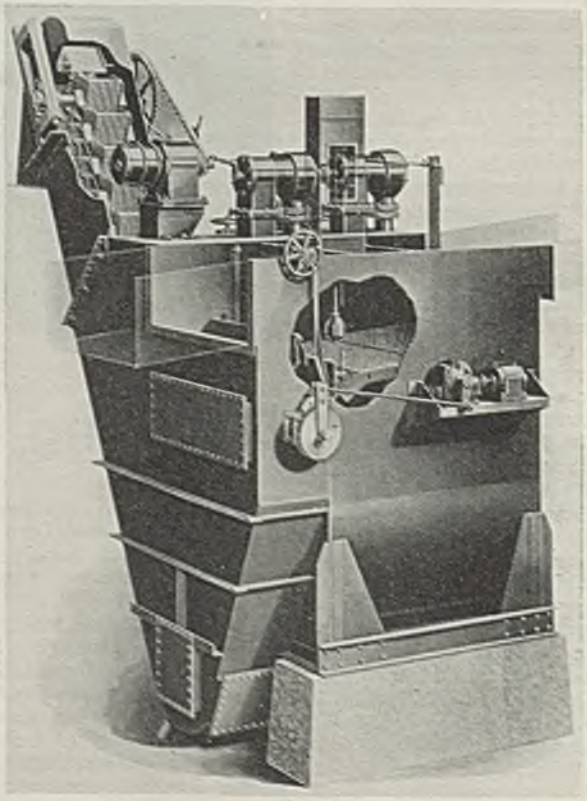
Jeffrey Mfg. Co., Columbus, Ohio, in addition to pictorial exhibits of the Jeffrey Baum-type and diaphragm coal-washing jigs, Jeffrey self-contained washery, diversion chutes for loading booms and also actual conveying equipment of various types and the Jeffrey-Traylor electric vibrating "Conveyanscreen," featured mat rescreens and picking tables and the Jeffrey "Stokerkol" sizer. The rescreen units consist of a continuous mat of cast blocks operated by a suitable drive. As the mat carries the coal forward, either in rescreening or on a picking table, degradation falls through the openings in the links. Additional mat-screen applications are feeding box-car loaders and crushers, and rough screening or scalping. Mat widths range from 36 to 60 in.

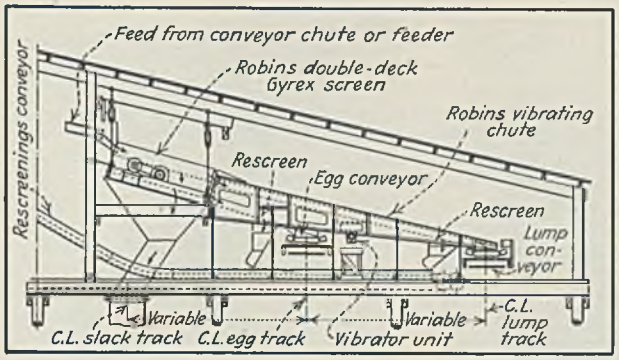
The Jeffrey "Stokerkol" sizer, according to the company, is designed for producing premium-size stoker coals. Uniform sizing is accomplished by a combination of thin spear-point and pyramid teeth, said to have a clean piercing action which splits, rather than mashes, the lumps. Included in the Jeffrey conveyor exhibit was a new self-aligning idler for automatically training belts without damage. The unit consists of a standard anti-friction idler assembly pivoted on a supporting cross member. Guide rolls at each end swing the assembly when the belt touches them, thus returning the belt to position.

Diagrams and photographs were employed by Koppers-Rheolaveur Co., Pittsburgh, Pa., to present its coal-preparation equipment and services, including Rheolaveur coarse- and fine-coal washers, Menzies cone separators, Koppers-Llewellyn automatic coal washers, Koppers-Battelle Rheo launders, Carpenter centrifugal dryers and Koppers-Rheolaveur heat-drying screens similar to those installed at the Buckheart mine (*Coal Age*, March, 1938, p. 52).

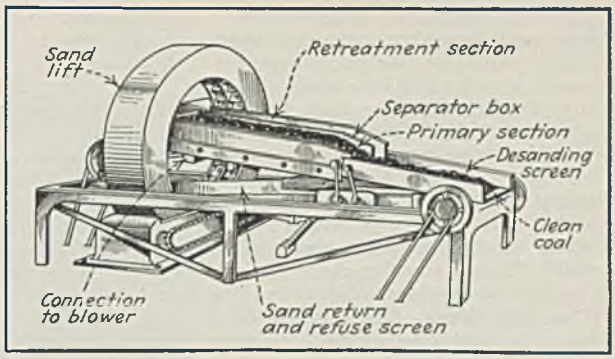
A full-sized working unit of the Link-Belt "Junior" Baum-type washery for moderate capacities was featured by Link-Belt Co., Chicago, along with a new model vibrating screen, the Link-Belt Simon-Carves washer, belt-conveyor carriers, chain-conveyor items, a scene-in-action view of the "Roto-Louvre" heat dryer and Link-Belt crushers, including the Type C chain-driven unit (*Coal Age*, May, 1938, p. 95). The "Junior" washer is a two-cell unit with a capacity of 20 to 50 tons per hour for cleaning sized coal from ⅜ to 6 in. in size. Outstanding features cited by the company are: Baum principle of air pulsation; "Electric-Eye Auto-Constant" refuse-discharge control; individual air and water control for each cell; construction as a complete unit requiring minimum height, length and width of ac-

Link-Belt "Junior" Baum-type coal washer





Robins vibrating transfer chute distributing coal from vibrating screen to loading points



Stephens-Adamson simplified air-sand coal cleaner with wheel-type sand lift and launder separator

commodations; and oscillating air valves operated from a common shaft.

The new Link-Belt "V-V" vibrating screen was stated to provide positive variable vibration, giving positive screening action regardless of load. Features cited by Link-Belt include: controlled variable vibratory motion; ability to operate on an incline, although decks usually are set level; operation on wet or dry material; adaptability to any practical screening problem; availability in multiple decks; low headroom; either open or inclosed construction; easy, quick replacement of screen cloth; feed hopper for distributing material uniformly over the width of the screen surface; lower power consumption per ton of coal; overhead suspension or floor mounting; counterbalancing arrangement to minimize vibration in supporting structures; lower buildings and elevators; few-minutes adjustment of vibratory rate; and minimum upkeep.

The Bixby heat dryer, developed by K. R. Bixby, Midland Electric Coal Corporation, was explained at the booth of the Marion Steam Shovel Co., Marion, Ohio. Black Diamond "Steelstrut" quickly adjustable single- and double-roll crushers with automatic tramp-iron protection were offered by McLanahan & Stone Corporation, Hollidaysburg, Pa.

Presenting pictorially McNally-Pittsburg preparation services, the McNally-Norton automatic coal washer, McNally-Norton vertical pick breakers, and other preparation equipment, McNally-Pittsburg Mfg. Corporation, Chicago, called attention to the McNally-Pittsburg improved Vissac jig designed for use on narrow ranges of sized coal where characteristics require a different specific-gravity separation of large sizes and egg, nut, stoker, pea and slack grades. The jig is recommended by the company for applications calling for washing of certain sizes and the elimination of hand-picking of the larger sizes; also for rewashing crushed middlings to increase plant capacity by making it unnecessary to return these middlings to the primary washer. With a capacity of 100 tons per hour, width is 4½ ft.; length and height, 7 ft.; weight, 15,000 lb.; water consumption, 1,500 to 2,500 g.p.m. depending upon the size of coal.

Another McNally-Pittsburg offering was the McNally-Pittsburg Vissac heat dryer equipped with an exhaust fan and pulsator to time the maximum suction for the period when the coal bed is thrown into the air by the action of the balanced tandem shaker equipped with wedge-wire sieves on which the coal travels while being dried. Gas travel is down through the coal bed. Low gas temperature is a feature cited for the dryer, which has a capacity, depending upon coal conditions and desired results, of 50 to 100 tons per hour per unit. Over-all height is 15 ft.; width, 7½ ft.; length, 28 ft. Weight is 25,000 lb. Operation is completely automatic, it is stated.

The "Floegel" process of washery-water clarification was demonstrated by A. M. Meincke & Son, Inc., Chicago.

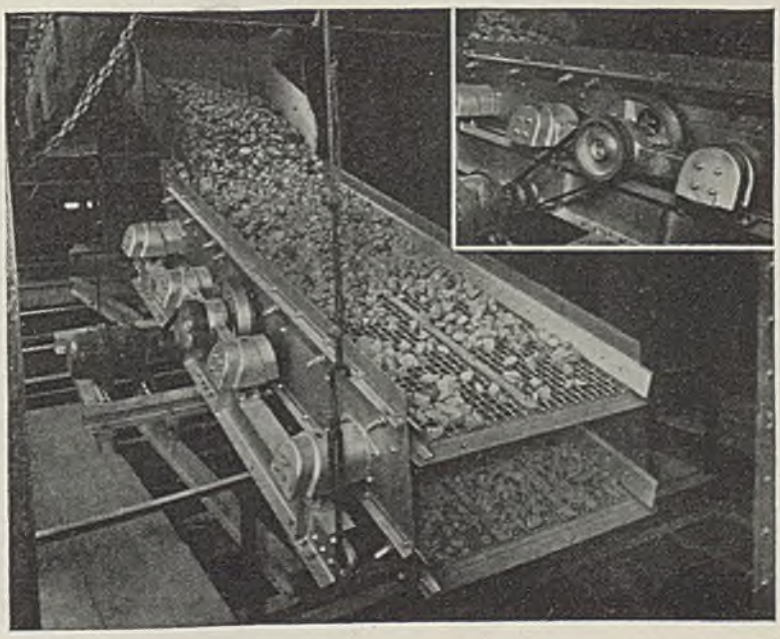
A working model of the Morrow-Prins "Multiflow" coal washer was shown by Morrow Mfg. Co., Wellston, Ohio, which pointed to small space requirements; a novel arrangement of water currents flowing in different directions toward a common outlet; entirely automatic operation without electrical or mechanical controls; entirely open construction; ability to handle tramp iron; simple construction without rotating parts beneath the water surface; and efficiency with low cost. Capacity is 75 tons per hour per foot of width, according to the company, and recirculation-water requirements are 10 to 20 g.p.m. per ton of coal cleaned per hour. Operating power is stated to be ⅛ to ¼ hp. per ton of cleaned coal per hour.

One unit from its line of Symons horizontal screens was demonstrated by Nordberg Mfg. Co., Milwaukee, Wis. Productive Equipment Corporation, Chicago, displayed the "Selectro" vibrating screen and drive unit for quickly adjusting screen stroke and inclination.

In addition to a pictorial summary of its other preparation equipment and services, Roberts & Schaefer Co., Chicago, showed one of the "Streamlined Stump Air-Flow" cleaning units designed for the Mather Collieries plant. The widest such unit built (6 ft.), it has a capacity of 75 tons of minus ⅜-in. coal per hour. Screen cloths for mine service were exhibited by John A. Roebling's Sons Co., Trenton, N. J.

Supplementing a 2x4-ft. Style J "Vibrex" screen; screen cloths, includ-

"Ty-Rock" screen and drive mounting



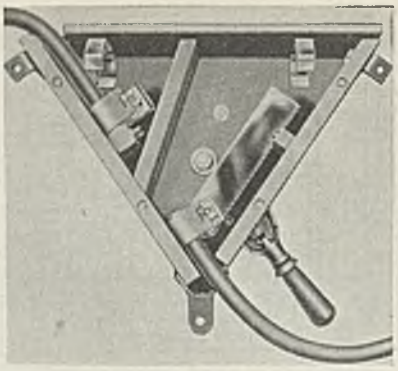
ing the "Improved Super-Gyraloy" types; and troughing and return idlers for belt conveyors, including a rubber-covered abrasion-resisting unit. Robins Conveying Belt Co., New York, featured a new 3x8-ft. "Gyrex" screen for separating mine-run into various sizes. The upper deck was fitted with a 4-in. flat-top screen cloth, with a 2-in. cloth on the lower. Along with this screen, Robins offered a high-speed offset-weight-vibrated transfer chute for distributing the various sizes to loading booms and chutes. High capacity and and low power consumption were claimed for the transfer unit.

An operating model of the new air-sand coal cleaner was demonstrated by Stephens-Adamson Mfg. Co., Aurora, Ill., in addition to Redler conveyors, elevators and conveyor-elevators, S-A vibrating screens and S-A impact-type rubber-covered rollers for belt conveyors. Stated to have three to four times the capacity of former air-sand separators, the new unit is said to reduce considerably the size of the structure necessary to house it. The separator proper is of a new launder type without dams, rollers or any other obstruction. It may be built with the refuse-cleaning compartment in series with or parallel to the primary cleaning section, and is supplemented by clean-coal and refuse-desanding screens and a revolving lift for returning the sand to the separator for reuse. The wheel, it is stated, is ideal for lifting large tonnages and is balanced so as to require only the power necessary to handle the sand. Capacities are: 14-ft.-diameter wheel and 6-ft.-wide primary separator, about 150 tons per hour; 10-ft. wheel and 4-ft. separator, about 80 tons per hour.

"Coalkotes" for dustproofing coal were offered by the Sun Oil Co., Philadelphia, Pa.

The Tyler 400 electric screen with Thermionic power unit and the new "Ty-Rock" high-speed circle-throw screen were shown by W. S. Tyler Co., Cleveland, Ohio. Combining circle-throw action with the advantages of a full-floating positive-drive eccentric shaft, the "Ty-Rock" screen is carried on live-rubber mountings. The shaft also is carried on arms supported by the same-type mountings, with the result that operation is extremely quiet and no vibration is transmitted to the screen frame and surrounding structures. Another feature cited by the company is perfect balance regardless of screening angle or load. Furthermore, "the positive powerful action of the 'Ty-Rock' provides an active, forward movement of the material even when operated at low angles. The 'Ty-Rock' is capable of screening record tonnages of the coarsest material while maintaining an accurate, thorough separation."

The Chance sand-flotation process of coal cleaning, including a Chance washer for small-capacity mines, was explained in pictures by United Engineers & Constructors, Inc., Philadelphia, Pa. Coal research work carried on by that agency was stressed by the U. S. Bureau of Mines. Viking Mfg. Co., Jackson, Mich., presented a pictorial exhibit of Viking hot-oil-vapor dustless-treating equipment. Grate-bar-type rescreening loading booms, conveyor rolls, chain conveyors of various types, elevators, car hauls and other car- and coal-handling and preparation equipment were featured by Webster Mfg. Co., Tiffin, Ohio.



Ohio Brass low-capacity safety feeder switch

Bryant "Choke-Arc" transfer switches were shown by Bowdil Co., Canton, Ohio. Large nickel-iron-alkali batteries for 8- to 10-ton locomotives were featured by Thomas A. Edison, Inc., West Orange, N. J., which stressed adaptability to continuous operation over a 24-hour day because of rapid charging characteristics.

Electric Railway Equipment Co., Cincinnati, displayed equipment necessary for the complete installation of an approved trolley and feeder system. "Erico" rail bonds and welders were shown by Electric Railway Improvement Co., Cleveland, Ohio. Exide-Ironclad and Exide-Hycap cells and Mipor separators, including a "Super Type FLM" 1,080-amp.-hr. battery for industrial trucks and switching locomotives, were shown by Electric Storage Battery Co., Philadelphia, Pa., along with cells in a "monobloc" container giving a substantial increase in capacity in a given space. Splashproof motors were demonstrated by Fairbanks, Morse & Co., Chicago.

"No Fuse"-type permissible starters, hand and automatic transfer switches, room-hoist and conveyor controllers, rail bonds and trolley-line materials were exhibited by Flood City Brass & Electric Co., Johnstown, Pa., which also displayed a new style G section-insulator switch adaptable for right- or left-handed operation, and an automatic sectionalizing switch with a rocking member opened or closed by the trolley wheel. Trolley poles and pole heads were other Flood City overhead-line items.

In addition to Deltabeston-insulated wire and cable, motor coils, Pyranol non-inflammable transformers and pellet-type lightning arresters, General Electric Co., Schenectady, N. Y., showed a portable motor-generator set and switchgear equipment. The set was equipped with squirrel-cage induction motor (375 hp., 1,200 r.p.m., 2,200 volts, three phase, 60 cycles) driving a compound-wound d.c. generator (250 kw., 250 to 275 volts, 50 per cent overload for two hours). Hazard Insulated Wire Works—Division of the Okonite Co., Wilkes-Barre, Pa., offered borehole and shaft cables, inside-distribution cables, "Hazacord" rubber-jacketed portable cables and shotfiring cable and portable cords.

Offering information on recent mech-

Promoting Power Use

ELECTRICAL equipment and products exhibited at Cincinnati ranged all the way from full-sized portable d.c. substations to telephone and magnet wire, including motors and controls, line material and bonds and storage batteries. A feature of the coil and wire offerings was the use of Owens-Illinois "Fiberglas" insulation in the products displayed under various trade names by a number of manufacturers. Advantages cited for this insulation are: high resistance to moisture and heat, less space, mechanical strength, excellent electrical properties and high resistance to impact and abrasion.

Louis Allis Co., Milwaukee, Wis., displayed the following from its line of electric motors: d.c. splashproof, a.c. splashproof, a.c. non-ventilated totally inclosed, a.c. dustproof, a.c. explosion-proof and d.c. Bureau of Mines "explosion-proof" units. Allis-Chalmers Mfg. Co., Milwaukee, Wis., showed Types AR and ARZ inclosed induction motors and ARX linestart motors. "Amerglas" magnet wire, "Tigerweld" rail bonds and "Amerclad" and "Amercore" electrical wires and cables were among the exhibits of American Steel & Wire Co., Chicago, a subsidiary of the United States Steel Corporation.

Anaconda Wire & Cable Co., New York, in addition to the Anaconda borehole suspension unit, trailing cables, mine and machine cables, trolley and feeder wire and other electrical wires and cables, offered the new "Vitrotex" (glass textile) insulation and magnet wire; the new "Sunex Security-Flex" cable jacket, stated to have better resistance to abrasion, high temperatures and the effects of exposure to the sun, in addition to being impervious to moisture, acids and alkalis; the new "Old Gold" shotfiring cable with strengthened jacket colored to facilitate finding it after a shot; and the new "Duraseal" non-metallic-sheath telephone cable, suitable for use in trenches and stated to have high resistance to moisture, alkalis, acid and crushing.

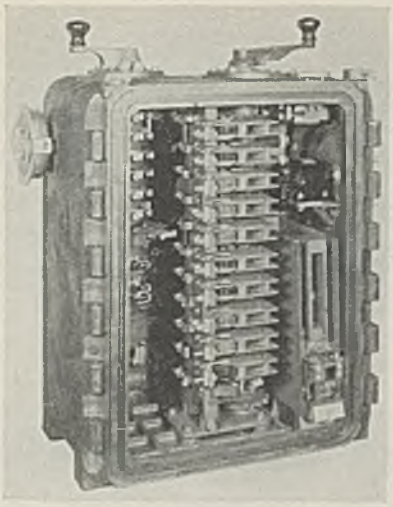
anized and non-mechanized mining applications, I-T-E Circuit Breaker Co., Philadelphia, Pa., displayed its improved Type KSC automatic-reclosing sectionalizing circuit breaker, the KSA switchboard breaker with relay control suitable for use in either a full- or semi-automatic substation operating in parallel with others, various d.c. control relays and one of the latest thermal magnetically controlled K-type a.c. breakers for preparation plants, said to provide full protection in both starting and running. Trolley-line and overhead materials, trolley wheels, "Mesco" wobbler-type bronze sliders and "Mescoweld" rail bonds were exhibited by Mosebach Electric & Supply Co., Pittsburgh, Pa.

Carbon brushes and electrodes were featured by National Carbon Co., Cleveland, Ohio. National "Mica-Glas" (mica and fiber-glass) coils were displayed by National Electric Coil Co., Columbus, Ohio, along with other NEMA electric-coil insulations.

Showing overhead line materials, trolley and feeder equipment, rail bonds, automatic circuit-breaker switches, KAD starters with thermostat for adjusting conveyor speed and for voltage variation, gas-proof junction boxes, insulators, fused trolley taps, pole heads with wheels and shoes, wire lubricators, etc., Ohio Brass Co., Mansfield, Ohio, also demonstrated a number of new devices. One was the M-6 section insulating switch designed especially for heavy-duty applications and furnished for 4/0, 6/0 and Section 9 wire. Another was a line-section switch of the quick-break type inclosed in a metal case to facilitate locking and protect the switch. With hanger insulation, this switch is available in sizes up to 1,000 amp.

For replacing open knife switches, Ohio Brass offered a new, inexpensive low-capacity feeder safety switch of the quick-make quick-break type in 300- and 400-amp. sizes for 250 to 600 volts. Safety is provided by inclosing the switch in a fireproof case which permits operation under load. An automatic section insulator switch with a rocking member opened and closed by the trolley wheel was another Ohio Brass feature, in addition to a Bulldog feeder clamp with mechanical clamping lug to eliminate soldering.

In the bonding line, Ohio Brass displayed the AW-20 end-weld rail bond. Provision for end welding prevents heating of the strands in application and permits the bond to be pried off and used over again as many as seven or eight times. Another saving, it was stated, results from a shorter bond. An additional exhibit was a new portable track drill using a standard shop drill in a four-wheeled mounting for drilling holes for the stud-terminal type of bond in as little as 15 seconds. This was supplemented by a new wedge-type bond. Ease of application by driving a wedge into the hole was stressed, this operation forcing the copper perfectly tight against the steel. Installation and reclamation in one minute, and good installed efficiency, were noted.



Westinghouse ventilated explosion-tested locomotive controller

New MS and MB locomotive headlights also were featured by Ohio Brass, along with headlight focussing mechanisms of three types: outside, manual adjustment; inside, push-and-pull adjustment, permanent after case is closed; and prefocussing by means of a special globe. The headlight display was supplemented by a new "Form L" resistance for all types of globes and trolley voltages.

"Everlast Super-Weld" rail bonds were displayed by Penn Machine Co., Johnstown, Pa., which pointed to a new modification permitting use with a setscrew for temporary work behind loading machines, etc., followed by welding on permanent track. Featuring its new plant for the manufacture of armature and field coils, Pennsylvania Electric Coil Corporation, Pittsburgh, Pa., showed "Fiberglas" coil insulation, "Benolite" No. 129 synthetic heat-reactive varnish and Bakelite-impregnated coils. Philco Battery Division, Philco Radio & Television Corporation, Philadelphia, Pa., displayed Floté-grid cells in the 21AM 560-amp.-hr. and 25AM 672-amp.-hr. types, featuring monoblock construction for greater capacity.

Steel-grid resistors were shown by Post-Glover Electric Co., Cincinnati, in addition to transfer switches, d.c. self-starters and K. & H. solderless terminal plugs.

Exhibiting a complete line of electrical wires and cables, Simplex Wire & Cable Co., Chicago, stressed selenium-vulcanized "Tirex" for portable cables and cords and the "Anhydrex" line of deproteinized rubber insulation for telephone, borehole, power and shaft cables. Low water absorption, it was stated, renders the use of lead unnecessary and thus reduces cost.

Electrical wires and cables, including "Fiberglas" magnet wire, was shown by John A. Roebling's Sons Co., Trenton, N. J., along with coils of various types.

In addition to "Glasweve" insulation, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offered an Ignitron-type portable substation with a 300-amp. rating similar to those installed by the Weirton Coal Co. (*Coal Age*, March, 1938, p. 65; see also the forthcoming July issue). Fully automatic in operation, the substation consists of a transformer and a.c. control truck, rectifier truck and a d.c. switching and control truck. High efficiency at all loads and high overload capacity were stressed by the company.

Westinghouse also featured the new explosion-tested locomotive controller furnished on Weirton Coal Co. gathering locomotives. This controller, in addition to other features for improved operation, is equipped with a ventilating system especially designed to prevent deterioration from the formation of nitrous oxide and ionizing of the air in the controller case.

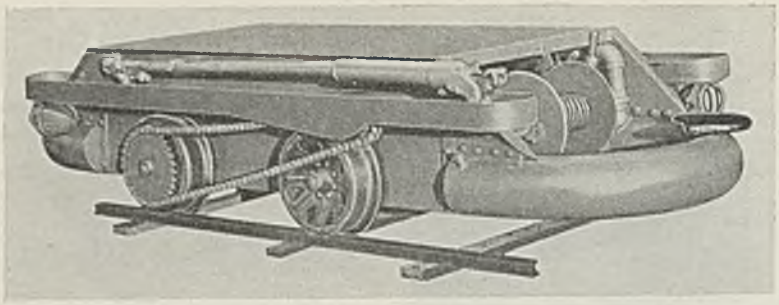
Aids to Mine Operation

EXHIBITORS at the Cincinnati show offered a wide variety of staple and special products for coal-mine applications, including power-transmission equipment, bearings, explosives, lubricants, wood preservatives, repair parts, compressors, steel and steel products, etc.

The Acme Model 100 "Lowboy" mine-car compressor (*Coal Age*, April, 1938, p. 88) was demonstrated by Acme Compressor Co., Williamson, W. Va. A full line of hand-welding and cutting apparatus, supplies and gases was presented by Air Reduction Sales Co., New York, which featured the new, portable light-weight No. 10 Radiagraph—a semi-automatic flame cutting machine designed for straight lines, arcs and complete circles. Airco also stressed its flame hardening process for gears, plate and rail surfaces, etc. This hardening is accomplished by suitable heating with an oxyacetylene flame followed by quenching.

The new "Vari-Pitch" speed changer, employing multi-groove "Vari-Pitch" sheaves for speed variations, was demonstrated by Allis-Chalmers Mfg. Co., Milwaukee, Wis. A totally inclosed unit designed for use with a standard motor, the changer can be supplied with a handwheel for manual control or with auxiliary equipment for remote electrical or manual control. Ratings up to 33 hp. with ratios as high as 3¾:1 now are available.

"Lay-Set" and "Tru-Lay" wire ropes were shown by Hazard Wire Rope and American Cable divisions, American Chain & Cable Co., Inc., Bridgeport, Conn., along with "Acco-Morrow" pressure lubricators and fitting for transforming conventional bearings into



Cantrell portable mine-car compressor

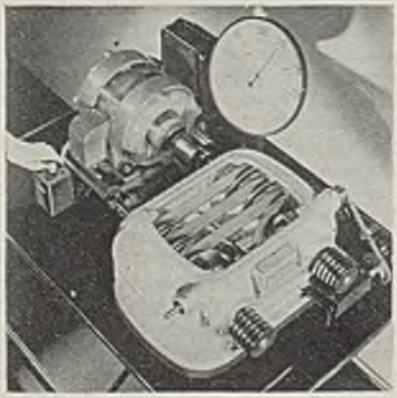
pressure units. "American" permissible explosives, pellet powders and blasting supplies were featured by the General and Burton divisions, American Cyanamid & Chemical Corporation, New York.

New "Manasite" blasting and electric blasting caps were shown by Atlas Powder Co., Wilmington, Del. Pointing out that while no detonator properly should be called "safe," the company contends that "Manasite" detonators substantially increase the safety margin in handling explosives. Full detonating power and the usual handling advantages are retained with the new detonators, which are, however, said to be less sensitive to impact and friction.

All types of wire rope commonly used in mining were displayed by Bethlehem Steel Co., Bethlehem, Pa. Bowdil Co., Canton, Ohio, offered miners' picks with detachable alloy-steel points. "Yellow-Strand" wire ropes, including "Flex-Set" preformed types for mining applications were displayed by Broderick & Bascom Rope Co., St. Louis, Mo.

Cardox Corporation, Chicago, exhibited low-pressure Cardox shells and demonstrated its equipment for delivering liquid carbon dioxide from distributing centers throughout the United States. Another Cardox development was fire extinguishers for mining and industrial use. In addition to a new line of universal grinders and other shop tools, Chicago Pneumatic Tool Co., New York, showed a mine-car nut runner equipped with an automatic clutch to predetermine nut tightness. The tool was stated to be capable of driving ¾-in. nuts at 500 r.p.m. Coal Mine Equipment Sales Co., Terre Haute, Ind., featured its new and used equipment services.

Allis-Chalmers "Vari-Pitch" speed changer



A full line of ratchet hoists was shown by the Coffing Hoist Co., Danville, Ill. Duff-Norton Mfg. Co., Pittsburgh, Pa., exhibited roof jacks with universal joints on both ends and special trip-prevention and collapsing features, automatic lowering jacks, ball-bearing journal jacks, pinion pullers, etc., including a new 5-ton No. 516 jack with curved top, with or without quick release, and a new adjustable timber jack in one-man size and five standard heights.

Products and services featured by E. I. du Pont de Nemours & Co., Inc., comprised permissible and pellet-type explosives, including "Lump Coal C" and "CC," blasting accessories, chemicals, powder bags, chromated zinc-chloride wood preservatives and Neoprene "chloroprene rubber," made from coal, limestone and salt. The Fairbanks dial scale with "Printomatic" weigher was demonstrated by Fairbanks, Morse & Co., Chicago. Cable vulcanizers and new and replacement parts for pumps were shown by Flood City Brass & Electric Co., Johnstown, Pa. Gemco "Tru-Blu" keyseaters were offered by Gibraltar Equipment & Mfg. Co., St. Louis, Mo. Mining lubricants of all types were shown by Gulf Oil Corporation, Pittsburgh, Pa.

Grouting equipment and methods for stopping water inflow in sinking shafts and driving tunnels and headings were explained by Halliburton Oil Well Cementing Co., Pittsburgh, Pa. P&H-Hansen arc welders and "Smoothare" welding electrodes were shown by Harnischfeger Corporation, Milwaukee, Wis., including the new "Smoothare 110" electrode for building up car wheels, rail ends, etc., and in flame-hardening procedure. This electrode is available in 3/32- to ¼-in. sizes for 30- to 300-amp. currents. The weld metal is not machineable. Packing electrodes in airtight cans to prevent moisture difficulties also was stressed.

Haynes "Stellite" and "Haystellite" uses in prolonging cutter-bit life were featured by Haynes Stellite Co., New York, along with other "Haystellite" and "Hastelloy" products. Permissible explosives and blasting devices were displayed by the Hercules Powder Co., Wilmington, Del. Hulburt "Quality" greases for mining equipment were shown by Hulburt Oil & Grease Co., Philadelphia, Pa.

In addition to compressor units for truck mounting to suit coal-company requirements and machines for shops, tipples and other stationary services, Imperial Bronze Mfg. Co., Jellico, Tenn., demonstrated Cantrell self-propelling and conveyor-mine air compressors. Described as completely self-contained and equipped with combined tool trays and wheel guards, combined bumper and air receiver, spring mounting, 16-in. pressed-steel wheels, forced-feed lubrication and a reel holding 300 ft. of cable, the self-propelled unit, in capacities of 105-120-150 c.f.m., weighs, in one series, 3,300 lb., is 11½ ft. long and 26 in. high. In the other series, weight is 2,600 lb., length is 9½ ft. and height is 26 or 28 in. The conveyor compressor is similar to the portable unit except that it is mounted on a skid.

Replacement parts for mining equipment were displayed by Jeffrey Mfg. Co., Columbus, Ohio. Offering a complete line of jacks for coal-mine use, Joyce-Cridland Co., Columbus, Ohio, called attention to a new hydraulic unit in capacities of 1½ to 30 tons for use on mine trucks and coal-cutting machines. Koppers products and services were detailed in pictures by the Koppers Co., Pittsburgh, Pa. Hercules "Red Strand" wire ropes and mining cables were shown by A. Leschen & Sons Rope Co., St. Louis, Mo., along with "Le Pro" wire-rope protecting compound. Oxyacetylene welding and cutting equipment and gases and low- and medium-pressure "Carbic" acetylene generators were presented by Linde Air Products Co., New York.

Lincoln "Kleenseal" filler-type grease guns and gun fillers, hose fittings and other products for coal-mine lubrication were demonstrated by Lincoln Engineering Co., St. Louis, Mo., which featured the "Flex-O-Matic" lubricating system, consisting of an electric "Lubrigum," a lubricant line with branches and a group of bearing injectors. Injectors adjustable to deliver lubricant at a predetermined rate are available, along with controls to time lubricating periods and other modifications to suit the system to plant conditions and power supply.

Link-Belt Co., Chicago, displayed the "P.I.V." variable-speed transmission, power chains and fittings, plain and anti-friction-bearing pillow blocks, herringbone speed reducers, motorized reducers, "RC" flexible couplings, Link-Belt stokers and Penn controls. Monarch "Whyte Strand" internally lubricated wire ropes, including preformed types, and rope slings and fittings were shown by Macwhyte Co., Kenosha, Wis. National Carbide Corporation, New York, featured National carbide, lamps, lanterns and "handy lights."

Mining-machine and locomotive replacement parts were exhibited by Penn Machine Co., Johnstown, Pa., which called attention to its new bearing

bronze, known as "special alloy," for heavy-duty high-speed work, its continuous axle liners for all types of locomotives, its general line of forged heat-treated alloy-steel parts for mining machines and its complete line of mechanical replacement parts for locomotives.

The "Perfection" cone-stove sand dryer was shown by Princeton Foundry & Machine Co., Princeton, W. Va. Mining lubricants of all types were featured by Pure Oil Co., Columbus, Ohio. "Blue Center" rope and wire products and wire fittings were shown by John A. Roebling's Sons Co., Trenton, N. J.

Shell Petroleum Corporation, St. Louis, Mo., called attention to its line of mining lubricants. Over 60 oils and greases for mining applications were offered by Socony-Vacuum Oil Co., Inc., New York. Mining lubricants and lubrication services were featured by Standard Oil Co. of Indiana, Chicago.

Dial-type mine-car and truck scales with selective designating-numbers keyboards were demonstrated by Streeter-Amet Co., Chicago. Patch fastenings for conveyor belts and conveyor- and transmission-belt fastenings were shown by W. O. & M. W. Talcott, Inc., Providence, R. I. "Seal-Tite" tamping bags and the vibrating "Dummy Maker," a machine for filling and packing tamping bags, were exhibited by Tamping Bag Co., Mt. Vernon, Ill. A complete line of "Simplex" mining jacks was shown by Templeton, Kenly & Co., Chicago, including the improved, stronger and safer 85 series, the new 1017 jack designed especially for track cutters, loading machines and locomotives; a new car-straightening jack of the geared pushing and pulling type, and improved roof jacks for temporary propping. "Tycol" oils and greases were featured by Tide Water Associated Oil Co., New York.

A wide assortment of bearings for mine-car wheels, conveyors, pumps, loaders and other mining equipment, together with special dust collars, closures and typical wheels, was shown by Timken Roller Bearing Co., Canton, Ohio.

"Soft-ending" of locomotive gear teeth was stressed by Tool Steel Gear & Pinion Co., Cincinnati, this development bringing the advantages of this process to gears as well as pinions. Soft-ending, the company pointed out, in which the inside end of the tooth is softened for a distance of ¼ to ¾ in., permits peening of the tooth in cases of misalignment and thus prevents the chipping encountered in case the tooth were hard throughout. At the same time, the remainder of the tooth is left "Tool-Steel" hard for maximum wear.

Tyson tapered "cageless" roller bearings were shown by Tyson Roller Bearing Corporation, Massillon, Ohio. Union Carbide Co., New York, offered miners'-lamp "Union" carbide and "Carbic" floodlights.

United States Steel Corporation subsidiaries, including American Steel & Wire Co., Carnegie-Illinois Steel Corporation, Columbia Steel Co., Cyclone Fence Co., Scully Steel Products Co. and Tennessee Coal, Iron & R. R. Co., offered welding rods and electrodes, wire rope and fittings, nails, wire, etc.; steel mine timbers, structural plates and shapes; high-tensile corrosion-resisting steels, steel sheets and piling, industrial fencing, Lorain collapsible mine posts and Santmeyer timber jacks. "Tulc" mining lubricants were exhibited by Universal Lubricating Co., Cleveland, Ohio. Western blasting caps and supplies were displayed by Western Cartridge Co., East Alton, Ill.

White's water-soluble aluminum paint was shown by H. Kirk White & Co., Inc., Oconomowoc, Wis. Wilson Welder & Metals Co., New York, exhibited its new 300-amp. motor-driven arc welder. Wood preservatives and methods and the Koppers "Ar-moored" combination wood and steel tie were shown by Wood Preserving Corporation, Pittsburgh, Pa.

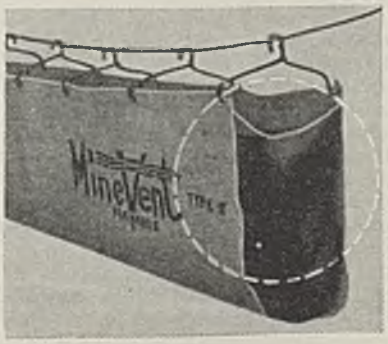
Mine-Safety Equipment

SAFETY and comfort were the themes of a number of exhibits at the Cincinnati exposition. "Tru-to-Life" safety dramalogues, changed each week and using models, color and light to present safety messages, were demonstrated by Advertising Displays, Inc., Covington, Ky. Aerovent "Macheta" airfoil fans were shown by Aerovent Fan Co., Piqua, Ohio, which stressed high flexibility and mechanical efficiencies through the use of two, four or six blades and variations in blade pitch, as well as low power requirements and quiet operation.

"MineVent" ventilating tubing and brattice cloth were displayed by American Brattice Cloth Corporation, Warsaw, Ind., along with a new tubing coupling (*Coal Age*, March, 1938, p. 102), special "Box-L" sections for rounding corners and the new double-seam construction and Type B suspension which prevents collapsing of the tubing when the air is cut off. Use of two seams, it was stated, provides positive support from two directions.

In addition to automatic doors and previously developed rock-dusting machines, American Mine Door Co., Canton, Ohio, offered the "Mighty Midget" conveyor-section duster, stated to be adaptable also to dusting rooms after each cut is loaded, thus making it possible to keep dust closer to the face than with standard machines. The "Mighty Midget" is designed so that it can be transported on a conveyor belt or mounted on a light push truck. Weight is 240 lb. without wheels in the a.c. type; d.c., 250 lb. Height is 18½ in.; width, 22 in.; length, 40 in. Equipped with a 2-hp. motor, the machine has a capacity of 1,200 lb. per hour with a 4-ft. hose and 720 lb. with a 50-ft. hose.

"Mine Vent" Type B tubing suspension



Bemis Bro. Bag Co., St. Louis, Mo., displayed "Flexipipe" ventilating tubing and special detachable couplings, and in addition called attention to its new rope-seam suspension, said to streamline the tubing, keep it straight and also do away with a suspension wire. Other features are fewer suspension points, the use of special suspension clamps which will tear off without injuring the tubing, easier installation, greater strength and prevention of kinking.

The new "Brownie" Model BB tubing blower, described as a convenient portable electric blower for auxiliary ventilation of working places in mechanized operations, was shown by Brown-Fayro Co., Johnstown, Pa. Equipped with a 1½-hp. motor, the blower will furnish 1,200 c.f.m. under normal working conditions. "Ventube" flexible ventilating duct was presented by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

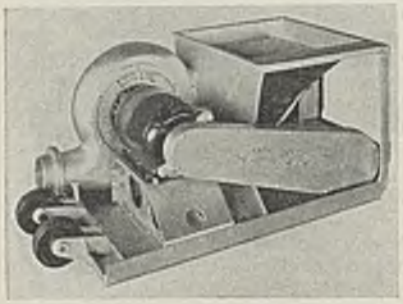
Jeffrey Mfg. Co., Columbus, Ohio, exhibited an "8-72" Aerodyne fan with the following characteristics: 90,000 c.f.m., 6-in.-water-gage static pressure, 1,375 r.p.m., 104 brake-horsepower, and 81 per cent static efficiency. An optional rotor assembly for installing adjustable-pitch blades also was displayed.

A ventilating-tubing blower with a capacity of 2,300 c.f.m., free delivery, was shown by Joy Mfg. Co., Franklin, Pa., which cited construction as a complete unit, including switch, motor and all auxiliaries.

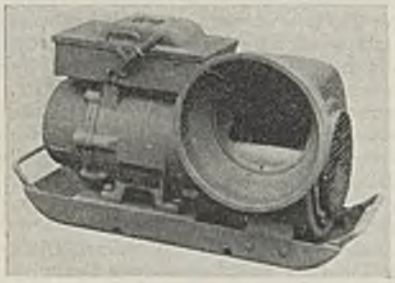
A "La-Del-Troller" intermediate-pressure fan, one of a line of high, intermediate- and low-pressure units, was exhibited by La-Del Conveyor & Mfg. Co., New Philadelphia, Ohio, which pointed to adjustable-pitch blades for retaining peak efficiencies throughout a wide operating range, reduced power consumption and flexible operation throughout mine life. Another new product was the "La-Del-Troller" portable mine blower weighing approximately 100 lb. and said to give 30 to

60 per cent more air at a given pressure per pound of blower weight. The motor is mounted centrally in the air stream, and the blower, which is less than 20 in. high, is equipped with tubular-steel skids.

New products shown by Mine Safety Appliances Co., Pittsburgh, Pa., included a light-weight one-hour breathing apparatus, the Dustfoe respirator and the McDonald safety hat (May *Coal Age*, p. 95), safety hats in color, salt tablets in one-at-a-time dispensers; and a methane tester detecting down to 0.2 per cent. Pocket size, the tester weighs 2 lb. without case. Operation merely requires working a small pump handle and reading the methane percentage directly. A new Stromberg accident-recording clock is designed to register on a time card any injuries suffered by an employee and may be hooked up to operate an audible signal.



"Mighty Midget" conveyor-type dust distributor



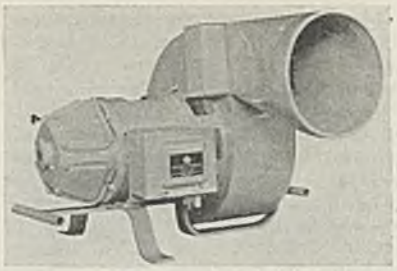
"Brownie" BB tubing blower

Features of a new single-shot blasting unit shown by M-S-A are a wood case with a screw top in which is placed three No. 2 dry cells. To fire a shot, wires are placed against contacts at either end. Cells are replaceable and the unit is equipped with a sling for easy carrying. To enable a man to put off a methane detector while doing other work, M-S-A also offered a new attachment, approved by the Bureau of Mines, which permits attaching and detaching the detector from the battery top underground. Another new product was a goggle attachment, consisting of a clip under the visor of a safety hat in which the goggles are slipped when not in use, thus keeping them clean and eliminating breakage. All-weather first-aid kits for section foremen have been improved by adding an all-rubber replaceable gasket. M-S-A also showed a stainless-steel insulated-against-heat portable drinking fountain with 4-gal. capacity. Pressure built up by a pump forces the water out through a trigger-controlled jet.

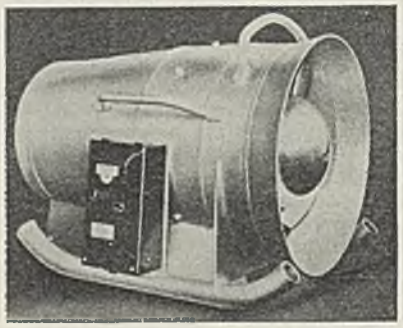
Other M-S-A products included: continuous methane recorders, portable methane indicators, Edison electric cap, hand and trip lamps, McCaa permissible oxygen breathing apparatus, gas masks of all kinds, "Comfo" respirators, "Comfo-Caps," "Skullgards," safety shoes, goggles and other protective clothing and devices, safety harness for car trimmers and handlers, first-aid material and equipment, Wolf safety lamps, H-H inhalators, M-S-A car stops, etc.

A complete line of protective equipment, including "Cool-Caps" and "Cool-Hats" in black and various natural colors, goggles, respirators and safety shoes; Wheat electric cap and hand lamps; Koehler safety lamps; heated first-aid cabinet and materials, stretcher boards, knee pads and other safety equipment and devices, was shown by Portable Lamp & Equipment Co., Pittsburgh, Pa., in addition to three new haulage safety devices: an "improved" portable car stop attached to the rail with a steel wedge and flipped on and off as desired; a holding skid, one size of which fits all standard mine rails; and a running skid consisting of a shoe with an indefinite life and right and left half soles of special alloy metal, said to be inexpensive to replace.

Methods of determining ventilation data and mine fans and tubing blowers were featured by Robinson Ventilating Co., Zelienople, Pa., which stressed custom-built qualities.



Joy tubing blower



La-Del-Troller portable mine blower

The U.C.C. methane-indicating detector was displayed by Union Carbide Co., New York. With a range of 0 to 7 per cent, the instrument is said to be accurate to within 0.1 per cent. Needle fluctuations permit ascertaining whether the methane percentage observed is above or below the explosive range. The detector can be set back to zero in gas.

"So-White" hand cleaner and "Miner's Special" liquid soap were exhibited by H. Kirk White & Co., Inc., Oconomowoc, Wis.

Mine-Dewatering Equipment

PUMPS led the list of equipment and supplies for mine dewatering shown at Cincinnati. Allis-Chalmers Mfg. Co., Milwaukee, Wis., demonstrated a multistage SSU pumping unit. Brown-Fayro Co., Johnstown, Pa., displayed a new 6-in. rubber-lined multiport check valve designed particularly for use with centrifugal pumps handling mine water. The rubber lining, according to the company, protects internal surfaces and thus makes it possible to use a cast-iron body.

A new self-priming pump for mine gathering and also for automatic applications in sumps where the unit will not get air-bound was shown in action by the Deming Co., Salem, Ohio. Features, according to the company, are elimination of valves, springs, packing, etc., along with simplicity, low maintenance and adaptability to manufacture in special metals. The impeller is adjustable for clearance, power input, etc. Deming also called attention to its "Prima-Vac-Trap," which acts as an automatic priming device, vacuum chamber and dirt trap, and in addition showed deep-well turbine and centrifugal pumping units.

Pumping units displayed by Fairbanks, Morse & Co., Chicago, included: Fig. 5720 12-in. horizontal angle-flow pump with 40-hp. F-M motor; Fig. 5554 4-in. "Builtogether" pump with 40-hp. motor; and a Fig. 6155 5x5-in. gathering pump with 5-hp. motor.

The exhibit of the LaBour Co., Elkhart, Ind., was designed to show how the LaBour self-priming centrifugal pumps for mine service operate when priming and also their ability to handle air along with water.

National Tube Co., a subsidiary of the United States Steel Corporation, showed "Duroline" copper-steel pipe, plain copper-steel pipe and scale-free pipe, also seamless boiler tubes.

A working model of a deep-well turbine pump featuring adaptability to automatic operation, with consequent reduction in attention, was displayed by the Sterling Pump Corporation, South Bend, Ind.

OPERATING IDEAS

From

Production, Electrical and Mechanical Men

Removal of Rusted Nuts Eased By Using Proper Methods

At times when it becomes necessary to remove rusted nuts from their bolts the task may be very difficult, points out John E. Hyler, Peoria, Ill., because of the fact that wherever corrosion is present the threading is obstructed, in addition to a certain amount of swelling which occurs when rusting takes place. Quite frequently it has been necessary to split a nut with a cold chisel to release it or use a gas torch. Where the corrosion is not too great and it is felt that the nut is worth saving a good method is to apply penetrating oil to the threads and let it stand for 10 minutes or so,

FIG.1

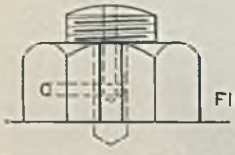


FIG.2


FIG.3

Details of methods of loosening or removing rusted nuts

after which it often is possible to remove the nut.

Where the end of the bolt above the nut is badly incrusted, the threading often may be cleaned out by using a rotary wire brush. A means of getting ordinary thin oil down into the threading of a nut when no penetrating oil is available is shown in Figs. 1 and 2. In this case, a small hole is drilled through the side of the nut and into the center of the bolt, where it joins up with a hole in the latter. Oil poured in Hole *A* will run out at Hole *B* in the nut until the nut is turned far enough so that the two parts of Hole *B* are not in register, after which the oil goes into the threads, where it is held.

Where a portable electric drill is available, an alternative to using a cold chisel or a torch is shown in Figs. 1 and 2. In this case, a hole is drilled so as to cut the nut almost in two, leaving the two parts joined by only a thin wall next to the threads. Then a pin similar to that shown in Fig. 3 may be driven down into the hole to spread the nut sufficiently for its removal. The pin may be flattened on one side so that it will not damage the threads on the bolt.

Damaged Hitchings Removed By Carbon Arc

Installing a resistance and hanging near by a carbon-electrode holder and mask solved the problem of quickly removing damaged hitchings from mine cars in Zeigler No. 2 mine, Bell & Zoller Coal & Mining Co., Zeigler, Ill. In the accompanying illustration, *A* is the holder with carbon electrode and *B* is the resistance to which the holder is permanently connected. To get ready to burn off a hitching it is necessary only to hang a nip on the 275-volt trolley wire. This carbon-arc outfit is installed at the junction of a chute with the empty truck at the shaft bottom. Only a portion of the cars in the mine lack a pin-and-clevis hitching attachment and thus become possible candidates for this burner.

With this carbon arc a damaged hitching can be burned from a car in a few seconds.

Trolley Added to Machine Facilitates Moving

To promote safety and save time and expense, the trolley pole shown in the accompanying illustrations has been developed by John Gill, foreman, Barnes Coal Co., Barnesboro, Pa., to eliminate the danger of shock or arc when tramming cutting machines from room to room. As is well known, the method in general use at present is for the operator to hold the cable hook or trolley tap against the trolley wire while tramming. The connection naturally is poor, with resultant

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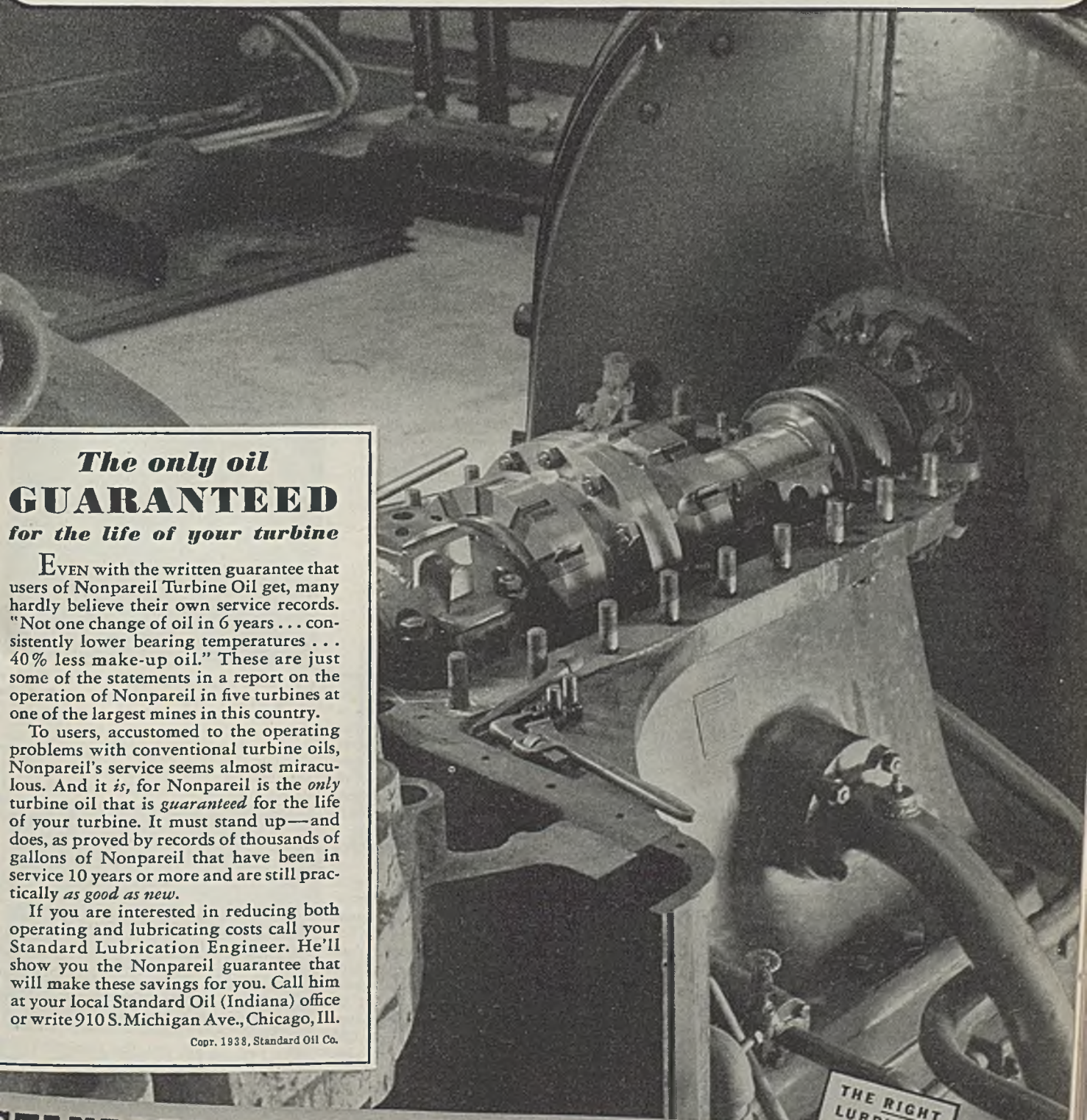

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arcing and burning of the wire or tap and danger to the operator.

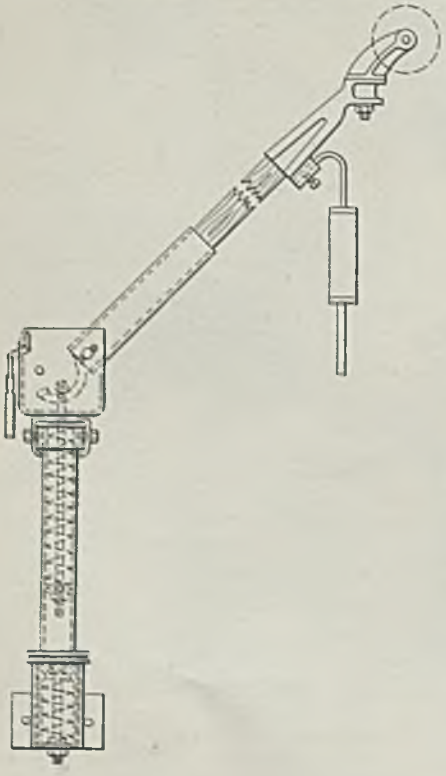
The trolley illustrated weighs only 48 lb. and slips into a socket bolted on the frame of the machine truck, as shown.

Pole in place on the machine truck

When moving between rooms, the cable hook is slipped into a receptacle on the pole head, giving a connection somewhat similar to that on locomotives. The operator then can give the movement of the machine his undivided attention. While the machine is working in the room the pole either may be latched down and left in place or slipped out of the socket and left on the heading—a matter of but a few moments in either case.

To eliminate any chance of damage as a result of collision with a protruding object, a ball-and-socket joint with a sturdy spring is provided in the base. This permits the upper portion to spring back and cushion any shocks of this nature. The main spring is adjustable as to tension and is designed to give the correct wheel pressure with the light pole, harp and wheel used. Mr. Gill's trolley pole is being manufactured by the Flood City Brass & Electric Co.

Details of trolley for facilitating tramming of cutting machines



Division

The line between making a thing go and having it stop often is almost invisible. Following out this thought, a little incident may mean a big trouble. Conversely, forestalling or arresting trouble may require only an isolated bit of knowledge, but the knowledge must be available. Experience—both one's own and that of other people—is the fountainhead of really worth-while knowledge. Look through these pages for the experience of others; perhaps it may give you an idea. Furthermore, if you are an electrical, mechanical, operating or safety man and have developed something of your own which has helped you in your work, this is the place for it. So send it in, along with a sketch or photograph if it will help to make it clearer. For each acceptable idea, Coal Age pays $5 or more.

Scotch Handle Turning Labor Reduced by Two-Thirds

With less skill required and less chance of accident, 165 scotch handles can now be turned out in an hour, as compared to a former record of 50 in an hour. This recent improvement in a method at the central shops of the New River Co., Mount Hope, W. Va., resulted from the construction of a special pencil-sharpener-type turning machine to supplant the wood lathe for that particular duty.

Referring to Fig. 1, the machine, which was built in the coal company's shop, consists of a hollow turning barrel rotating in ball bearings lubricated through pressure-gun fittings in the top of the stationary case. Screwed to the outer end of the hollow rotating barrel is a hollow cutter head with renewable blade. Mounted ⅜ in. from the end of the cutter head is a combination guard and holder. By double V-belt the 3-hp. 1,100-r.p.m. motor drives the turning barrel and its cutter head at 1,650 r.p.m., which speed, however, has been found to be short by several hundred revolutions of the ideal for the work.

Sitting on top of the machine in Fig. 2 is a completed "scotch," which is the loca term for the chock used in controlling an holding cars in the ten mines of the com pany. Sticking part way through the ma chine is a piece of 1½-in. square hickor

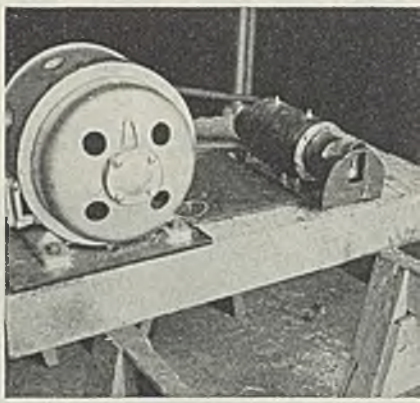


Fig. 1—Three-horsepower motor and machin for making handles.

stock which by one passage through th machine is reduced to 1⅜-in. round. Th stock is forced through by hand but th guard with its rectangular hole checks th tendency to turn.

After a supply of the round sticks ha been made and cut to the required 15-i length a different cutter head is put on th

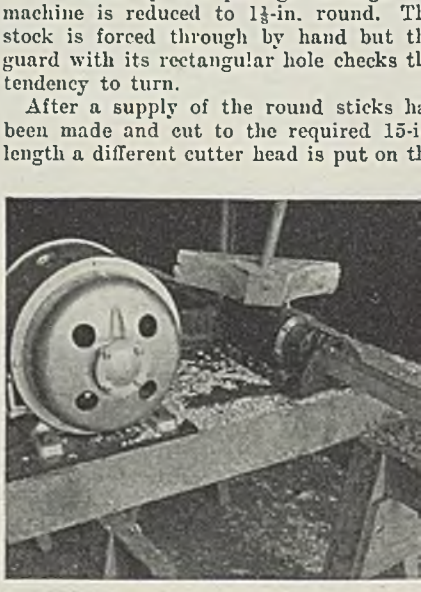
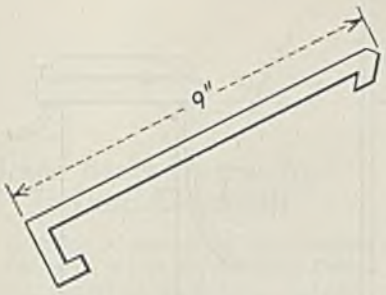


Fig. 2—A completed scotch on top and partly worked length of handle stock in th machine.

machine and each handle is inserted to cu the beveled and shouldered fit that driven into the hole of the scotch block. is the plan to build a still larger machi to supplant the lathe for making trolle poles.

Expansion-Shell Recovery Aided by Special Tool

In recovering trolley material fro abandoned or worked-out sections of th Reid Coal Co. mine, New Bethlehem, Pa it has been a rather difficult problem i the past to get out the expansion shel for the trolley hangers, writes Jame Thompson, mine foreman. When th shells take a firm grip in the hole i



Details of shell-recovery tool

the roof, removing the clamp and bell generally results in the expansion bolt turning out of the nut and thus leaving the shell firmly fixed in the roof.

Picking out the roof rock from around the shell to remove it, of course, is both slow and expensive, "so we took a piece of ½-in. scrap iron and formed a hook on one end small enough to slip up through the hole and catch in one of the slots in the shell. The other end of the iron was curved to afford a place on which a pry could be exerted. Thus, by the use of almost any wireman's tools or trolley wrench we can easily dislodge and recover the expansion-shell part of our trolley supports. This small, inexpensive home-made tool is carried by our wireman in his tool kit and enables us to quickly recover the complete trolley support."

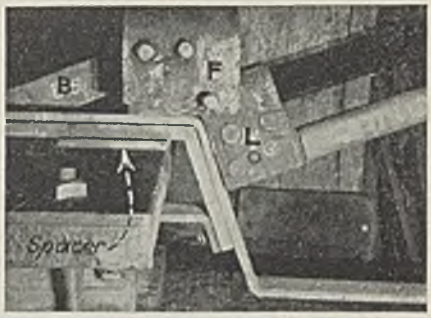


Fig. 3—Showing how Bends 3 and 4 (Fig. 14) are made. These follow Bends 1 and 2, which are made with the same pattern.

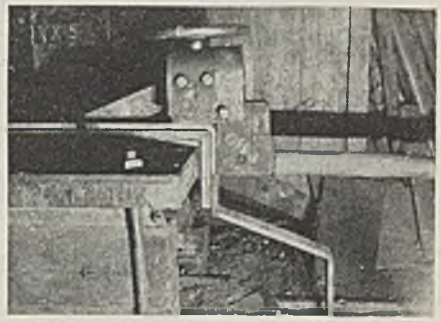


Fig. 4—Showing how Bends 5 and 6 (Fig. 14) are made. When these bends are made, the board coverings are removed from pits in the floor into which the ends of the irons extend to permit making the bends.

Fig. 5—Showing how the lever is held up by moving the latch under the lug to permit insertion and removal of the irons.

Hints From a Shopman's Notebook; Single-Heat Iron Bending

By WALTER BAUM
Master Mechanic, Perry Coal Co.
O'Fallon Ill.

THOUSANDS of bends have been made over a period of years by the single-heat method with the bender which I describe below. This bender was made of scrap from around the shop, including the old bearing plate used as the base. The bender consists primarily of the frame, clamping screw and block, lever, and brace and latch.

Details of the frame are given in Fig. 6, which also shows the drilling plan for the various holes. The clamping screw (Fig. 8) was made out of a 2-in.-diameter bolt end. To hold the screw in the frame (see Fig. 2) the nut was cut out as shown in that and Fig. 8, using a hand torch. Next the clamping block and the split locking plates which hold it to the bottom of the screw were made as detailed in Fig. 9. The nut then was bolted in the frame, and a hole was cut in top of the frame to allow the screw to protrude up through it. The screw then was run in the nut and the clamping block was put in place to make the assembly shown in Fig. 2.

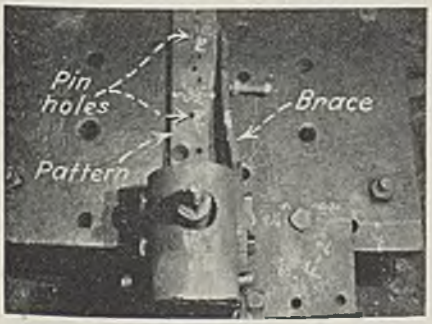


Fig. 1—Looking down on the bender with the pattern shown in Fig. 13 in place. The pin-holes are used for positioning the irons for bending.

In constructing the lever (Fig. 10) I used two pieces of 1x6x8-in. steel, one piece of 1¼x5x6-in. and one piece of 1¼x3x18-in., the latter forming the handle part, over which a 2-in. pipe flattened at one end is slipped for extra leverage. These four pieces were clamped together and drilled with 25/32-in. holes, countersunk on both sides, and then were riveted together. The corners of the lever then were rounded off as indicated to clear the frame. The lug which is engaged by the latch described below to hold the lever up for inserting and removing irons was then made and bolted to the side of the lever as indicated in Fig. 10.

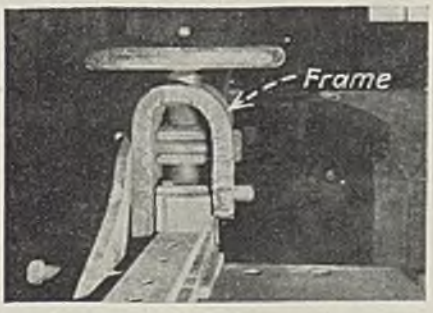
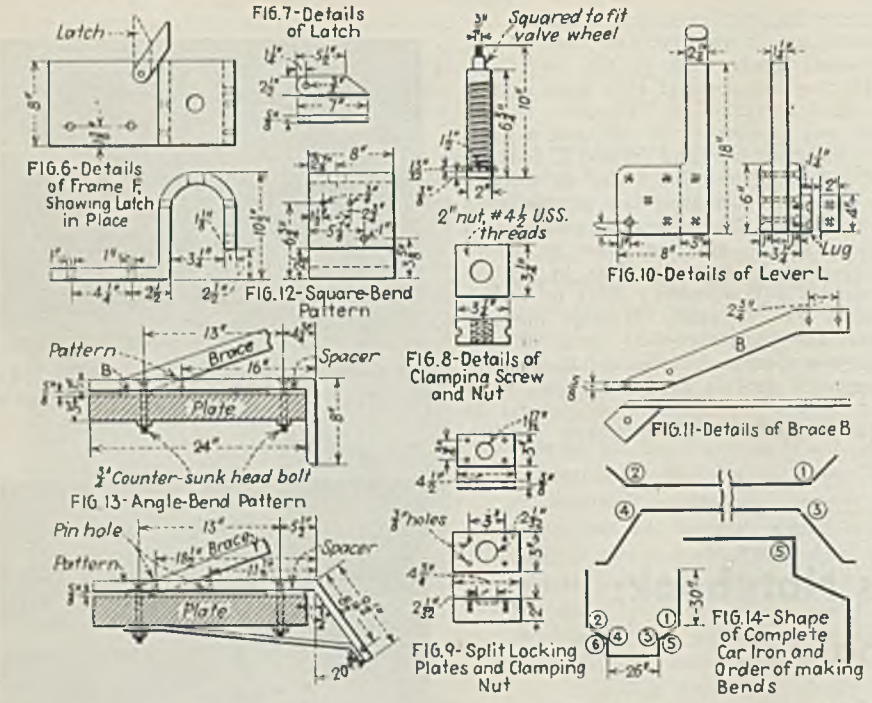


Fig. 2—Showing clamping screw with hand-wheel and clamping block in place in the frame.

Upon completion of the lever, it was installed in the frame by means of a 1-in.-diameter hinge pin, as shown in Figs. 2 and 3. Then the latch shown in Fig. 7 was made and bolted to the frame as indicated, completing the bender except for the construction of the patterns shown in Figs. 12 and 13. These patterns were made of 1x3½-in. mild steel bent to the same angles as the bends and drilled for bolting them to the baseplate. As one end of the brace is bolted under the pattern in each case, the spacer (⅝x3½x6 in. in size) shown in Figs. 12 and 13 is necessary at the point where the other pattern-holding bolt is passed through the base. One pattern, as indicated, has two pinholes drilled in it for use in locating the ear irons—previously marked off and drilled as described in the April *Coal Age*, p. 64—so that each will be bent in exactly the same place. One hole only is necessary in the other pattern for the style of iron shown in Fig. 14.

When I made this bender it was for the purpose of bending ⅝x3-in. iron at a right angle. In this case, the pattern for the bend rests against the end of the baseplate (Fig. 12), whereas in the case of the



Figs. 6 to 14—Details of bender parts and order of making bends in the car iron sketched.

pattern for the odd-angle bends an auxiliary brace is required for additional support, as shown in Fig. 13.

I bend thinner iron than ⅝ in., for which the bender originally was designed, by bringing the lever down on the iron, then raising it and slipping in a piece of ⅜-in. iron between lever and iron being formed and then coming down again with the lever. This sets the iron down at a very sharp angle. In addition to the irons which I have described, this bender also has been used for bending irons for the square-box type of car, door-hinge irons and for other bends where a number must be made before the irons are used. Where the irons must be drilled, this always is done first to permit use of the pin method for locating the bends, except that in the case of short irons a piece of iron may be clamped on top of the pattern for use as a stop. Four bolts hold the bender to the base, and consequently it is easy to take off and replace.

Spark From Circuit Breaker Causes Substation Fire

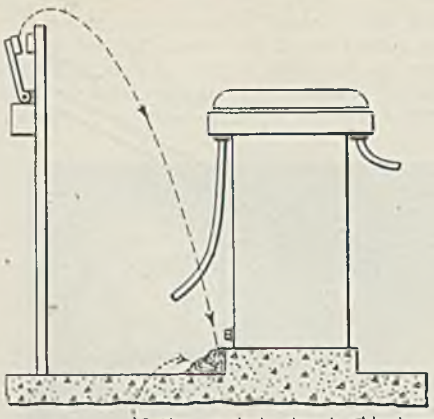
Successful prevention of fires, accidents and equipment breakdowns depends in no small measure on recognizing potential hazards and interpreting and acting promptly upon operating irregularities or "close calls." The following incident, which might have resulted in mine substation fire damage and loss of time, was witnessed by a *Coal Age* editor a few months ago.

On the way out of the mine it was observed that the lights along the heading near the mine portal went out several times, indicating opening of a breaker. No sooner did the party reach daylight than a man who had chanced by the outside substation gave an alarm of fire. A bunch of oily cotton waste was burning merrily. Caught as it was in its early stages, the fire was put out quickly and without damage, although it would shortly have ignited the braid and rubber insulation of the large leads from the converter transformer to the control board. Left alone for a time it probably would have heated the transformer oil to the point of spreading the blaze.

The cotton waste had been placed on the concrete floor to absorb oil which was leaking at a very slow rate from the transformer tank and was showing up near the drain plug. Because the 275-volt d.c. automatic reclosing breaker had opened several times just prior to the discovery of the fire it is reasonable to assume that a spark from the breaker contact flew back over the top of the switchboard, as indicated by the accompanying sketch, and landed on the oily waste. Because of the small quantity of waste and its being well exposed to the air it is improbable that spontaneous combustion was responsible.

Among the lessons indicated by the incident is one of prime but not commonly recognized importance—an open-type circuit breaker may cause dangerous sparks to fly a considerable distance. Under favorable conditions wood shavings, paper, cloth, waste and even frayed insulation might become ignited. Complete inclosure, now a standard practice for automatic circuit breakers purchased for use inside of mines, would eliminate this fire hazard in substations and generating plants.

The evident lesson of not allowing continuance of even very small oil leaks can be supplemented by the practicability of concrete floor construction, including dams or drains around the transformer



A spark from the circuit breaker landed in the bunch of oily waste.

to prevent the oil spreading all over the floor in case a serious leak should develop. Anticipating the thoughts of many readers, it is in order to mention that transformers filled with non-inflammable liquid are available. One more point is worthy of consideration: when emergency does require a delay in repairing an oil leak, and this applies also to lubricating oil in power plant or substation equipment, sand, instead of cotton waste, should be used to absorb the oil.

Interchangeable Heads Used On Combination Hammer

Always a machinist, writes Charles H. Willey, Penacook, N. H., "I loved to fool around during noon hour making a lot of my own small tools or working out ideas I had seen in the magazines. Among my improvisations is what I consider a very handy combination hammer, shown in the accompanying illustration. It originally was a regular machinist's-type ball-peen hammer, which I modified by annealing, removing the regular ball peen and then drilling out the top as indicated and fitting it with a taper pin. The illustration also shows several of the types of tips which I have made and used and others can be developed to suit other readers' needs or fancies. They work perfectly and make the ordinary tool more useful. The taper pin holds the heads securely and they are easily interchangeable."

Details of hammer and several types of heads which may be used.

WORD FROM THE FIELD

Green Backs Progressives; To Drop Check-Off

By granting a charter to the Progressive Miners on April 28, William Green, president, American Federation of Labor, took a bold step in his combat with John L. Lewis, president, United Mine Workers, for labor leadership. This move was announced at Washington in the presence of Joe Ozanic, president of the Progressives, to whom the charter was awarded. Mr. Green said that organizers would be sent into the various coal fields to lure miners into the Ozanic organization. Contracts with the Progressives will not include the check-off.

In his announcement Mr. Green said: "The jurisdiction of the new international union will be, 'All workmen eligible for membership who are employed in and around coal mines, coal washers, coal-processing plants and coke ovens on the American continent.' The officers of the new international union, until its first convention, will be Joe Ozanic, president, and C. F. Pearcy, secretary-treasurer, with a vice-president to be selected later. The offices of the new international union will be in the Chicago district and charter No. 1 will be granted to the State of Illinois. Applications already have been received from Pennsylvania, West Virginia, Ohio, Indiana, Kentucky, Alabama, Kansas, Oklahoma, Arkansas, Colorado, and other coal-producing regions.

"An extensive campaign will be started at once to enroll mine workers. The new international union will also undertake immediately an educational campaign to acquaint them wherein their interests have been disregarded by the United Mine Workers, and how they will benefit by affiliation with the new union. In this campaign the new organization will receive the aggressive and full support of the American Federation of Labor."

Insurgent Attacks Lewis Regime

Mr. Ozanic assailed the "autocratic rule" of Mr. Lewis and said the new union will be guided by four principles: Contracts with operators will not include the check-off of union dues; strikes will be called only with consent of the rank and file; rules will make it impossible for the union officers to gain control of the officers of subdivisions; and loans to outside organzations, like the Committee for Industrial Organization, will not be made without referendum to the rank and file.

The latest action of the A.F.L. was foreshadowed when, early in February, it revoked the U.M.W. charter following the latter's amendment to its constitution eliminating reference to affiliation with the A.F.L. and substituting C.I.O.

When representatives of the Progressives, scheduled to address a mass meeting at Bluefield, W. Va., on May 8, failed to appear, the hall was taken over by the

U.M.W., who declared "we will not allow them to destroy our union." Progressive advocates were hooted when they attempted to speak. Thomas Cairns, president of the West Virginia Federation of Labor, termed the meeting "just a false start."

Keeping Step With Coal Demand

Bituminous Production

Week Ended	1938 (1,000 Tons)	1937* (1,000 Tons)
March 5	6,420	11,105
March 12	6,500	11,298
March 19	5,860	11,228
March 26	5,380	11,368
April 2	4,570	7,182
April 9	5,760	5,829
April 16	5,520	6,300
April 23	5,186	6,047
April 30	5,155	6,915
Total to April 30	107,232	160,099
Month of March	26,745	51,315
Month of April	22,195	26,041

Anthracite Production

March 5	1,041	663
March 12	1,092	1,028
March 19	611	1,373
March 26	632	1,226
April 2	893	1,120
April 9	752	1,614
April 16	1,012	1,673
April 23	666	1,639
April 30	655	1,464
Total to April 30	15,507	19,114
Month of March	4,015	4,865
Month of April	3,108	6,854

*Outputs of these two columns are for the weeks corresponding to those in 1938, although these weeks do not necessarily end on the same dates.

Bituminous Coal Stocks

	(Thousands of Net Tons) April 1 1938	March 1 1938	April 1 1937
Electric power utilities	8,479	8,565	8,717
Byproduct coke ovens	5,231	5,823	9,638
Steel and rolling mills	837	919	1,898
Railroads (Class 1)	5,881	6,174	11,056
Other industrials*	9,852	10,802	13,844
Total	32,334	35,167	45,153

Bituminous Coal Consumption

	(Thousands of Net Tons) March 1938	Feb. 1938	March 1937
Electric power utilities	3,011	2,888	3,590
Byproduct coke ovens	3,795	3,539	6,453
Steel and rolling mills	787	725	1,374
Railroads (Class 1)	6,420	6,169	8,404
Other industrials*	9,236	9,102	13,472
Total	23,249	22,423	33,293

*Includes beehive ovens, coal-gas retorts and cement mills.

Combustion-Behavior Studies Continued by Battelle

Tests on samples of coals burned at the Battelle Memorial Institute laboratory in the domestic-stoker investigation made for Bituminous Coal Research, Inc., indicate that coals with an agglutinating index of 10 or greater may be expected to give trouble in coke-tree formations. Many more tests, however, would be necessary to confirm this conclusion and many coals, the institute points out, probably would be found out of line with this conclusion; the Sewell seam sample tested, for example, had an agglutinating index of 10.2, but the coke trees formed by this coal in the laboratory experiments gave no difficulty. The agglutinating tests were made in the preparation department laboratory of Pittsburgh Coal Co.

Results of field surveys on the use of coal industrially and the preference as to size for firing in pulverized form have been submitted in report form to the technical advisory committee of Bituminous Coal Research, Inc. The survey covered 43 industrial plants burning over 5,000,000 tons per year; individual plant consumption ranged from over 500,000 to less than 4,000 tons annually. Field surveys on oil-treating installations were completed early in April with visits to mines in Kentucky, Pennsylvania and West Virginia. The oil-treating investigation is sponsored jointly by Bituminous Coal Research, Inc.; Standard Oil Co. (New Jersey), Sun Oil Co. and Viking Manufacturing Co. (*Coal Age*, May, 1937, p. 228; November, p. 90).

New Preparation Facilities

LILLYBROOK COAL CO., Killarney, W. Va.: installation of a Menzies hydroseparator with a capacity of 100 tons per hour for cleaning 7x2-in. coal; completed by the Roberts & Schaefer Co.

MATHER COLLIERIES, Mather, Pa.: contract closed with Roberts & Schaefer Co. for modernization of coal-preparation plant, including: crushing, picking and loading facilities with a capacity of 400 tons of mine-run per hour; reinforced-concrete blending bin with a capacity of 1,500 tons; and a combination wet-and-dry cleaning plant of modernistic reinforced-concrete construction comprising Menzies hydroseparators for 3x$\frac{5}{16}$-in. coal and "Streamlined" Stump "Air-Flow" cleaners for $\frac{5}{16}$x0-in. coal. Total capacity of the wet and dry unit will be 300 tons per hour. The plant will be 100-per-cent dustproof within and no dust will be discharged to the atmosphere.

PURSGLOVE GAS COAL CORPORATION, No. 5 mine, Pursglove, W. Va.: contract closed with United Engineers & Constructors, Inc., for Chance sand-flotation washing equipment for 6x$\frac{1}{4}$-in. coal, comprising one

10-ft. Chance cone and all auxiliaries; capacity, 200 tons per hour. The cone is to be installed in a new plant by the Fairmont Machinery Co. with a capacity of 300 tons per hour, loading five sizes on four tracks and equipped with two sets of shaker screens.

Susquehanna Collieries Co., Pennsylvania colliery, Mt. Carmel, Pa.: contract closed with Wilmot Engineering Co. for Hydrotator equipment for recovering and preparing No. 4 and No. 5 buckwheat, including Hydrotator classifier for sizing fine coal, standard Hydrotator for cleaning No. 4 and the necessary dewatering screens, pumps, etc.; capacity, 40 to 50 tons of clean coal per hour.

Supreme Anthracite Coal Mining Co., Ontario colliery, Peckville, Pa.: contract closed with Finch Mfg. Co. for 7½-ft. Menzies cone separator for cleaning No. 4 buckwheat (⅜x⅜ in.); feed capacity, 80 tons per hour.

Truax-Traer Coal Co., Fiatt, Ill.: contract closed with McNally-Pittsburg Mfg. Corporation for drying and screening addition to present washery, including McNally-Pittsburg Vissac dryers for thermally drying ¾-in. x ½-mm. coal at a rate of 150 tons per hour and vibrating screens for separating the dried product into ¾x⅜-in. and ⅜-in. x ½-mm. sizes.

United States Fuel Co., Hiawatha, Utah: contract closed with McNally-Pittsburg Mfg. Corporation for preparation plant with a capacity of 300 tons per hour and making eight sizes and mixtures thereof, including a McNally-Norton automatic washer with a capacity of 250 tons per hour for cleaning the 5x0-in. size. The 1¼x⅜-in. size will be thermally dried in a McNally-Pittsburg Vissac dryer at a rate of 96 tons per hour and the minus ⅜-in. will be dewatered in two Carpenter centrifugal dryers. The plant is to be completed about Sept. 1.

New Equipment at Docena

New equipment estimated to cost about $200,000 is to be installed in the Docena (Ala.) mine of the Tennessee Coal, Iron & R. R. Co., early in June. This will include 600 new steel mine cars, a scale and rotary dump. The company announced that the mine would be closed ten days or more, beginning May 30, while the installation was taking place.

Hanna Enters Stoker Field

After four years of extensive research into the construction of stokers for anthracite, General Stokers, Inc., an M. A. Hanna Co. associate, announces that the "General" stoker line in all models is now in production and will be available to the public immediately. Besides the laboratory work involved, all sizes and models have been tested for the last four years in nearly a thousand homes, apartments and small commercial establishments. Headed by R. E. Chloupek, the new company has established headquarters in the Broad Street Station Building, Philadelphia, Pa., and plans an intensive advertising and promotion campaign emphasizing the heating economy, simplicity of design and moderate cost of the new line.

First Annual Anthracite Conference Staged at Lehigh University

ANTHRACITE as a mineral, as a fuel and as an industrial adjunct occupied the attention of 500 or more persons at the First Annual Anthracite Conference of Lehigh University, Bethlehem, Pa., April 29 and 30, with Howard Eckfeldt, professor of mining engineering, in the chair. Basing his deductions on the report of D. C. Ashmead for the U. S. Coal Commission in 1922, Dr. George H. Ashley, State geologist of Pennsylvania, concluded that the Northern anthracite field would continue to produce coal for 50 years; the Eastern Middle field for 16; the Western Middle field for 150; the Southern field for 500, and the entire region for 150 years, but transfers in production may readjust these figures.

In Dr. Ashley's opinion, the anthracite region, except possibly for a narrow neck passing through the northern counties of the State, probably was always separate from the bituminous; this judgment, not being deduced from characteristics of the two minerals but from geological evidences, which show the measures rapidly thinning round the field and the coarsest detritus (up to 6 in. diameter) drifting in from highlands that surround it.

When 65,000 tons of water drop over Niagara Falls, it develops less power than the combustion of a single ton of anthracite, according to H. J. Rose, senior industrial fellow, Mellon Institute. Anthracite's supremacy as a fuel is due to (1) the large percentage of its hydrogen which is uncombined with oxygen, which gives it on combustion 400 to 1,000 more B.t.u. per unit than coke and 500 more B.t.u. per unit than average bituminous coal; (2) its density, which makes it take less space than other fuels for a given calorific value; (3) its freedom on stoking from coking, caking or swelling and thus from forming objectionable "coke trees" (4) its strength; (5) its desirable ignition temperature freeing it from spontaneous combustion, but making it more ignitable than coke; (6) the little air required to keep it burning (0.63 cu.ft. per minute per square foot of grate area, as against 1.4 cu.ft. for coke); (7) its smokeless combustion and the high temperature at which its ash usually fuses.

Table I—Average Ash Content in Anthracite of Various Sizes

Size	1935	1923
Egg	9.2	13.7
Stove	9.3	13.7
Chestnut	9.7	16.2
Pea	11.3	15.6
Buckwheat No. 1	11.7	18.9

Table II—Pennsylvania Anthracite Uses

A filter medium	Carbon structural forms
Graphite manufacture	Acid-resisting vats
Foundry facing	Paint pigment
Ore reduction	Carbon brushes
Ore sintering	Carbon electrodes
Carbon refractories	Telephone granules
Carburizers	Activated carbon
Electric-furnace resistors	Paper-mill-digester blocks
Heat-transfer tubes	Explosives
Battery plates	Oil-refining desludgers
Flashlight batteries	Black concrete roads
Diaphragm plates	Gas manufacture

The quality of the product has improved, as will be seen in Table I, when the U. S. Bureau of Mines' analyses in 1935 from breakers producing about half the industry's total production are compared with those from 127 samples from dealers' yards in Massachusetts in 1923. Combustion efficiency of anthracite is about 70 per cent, declared Dr. Rose, in discussion, which is greater than that of bituminous coal.

The question: Has anthracite no other use than as a combustible for operating domestic and industrial steam furnaces? was answered by H. G. Turner, research engineer, Anthracite Equipment Corporation, by quoting Dr. C. L. Mantell, as in Table II.

Profit being far more important than tonnage, Dr. Turner urged that high prices may be obtained for coal if used for purposes less stereotyped than combustion. All coal sold for filtration has brought a profit. Anthrafilt for filtration is minus ⅜-in. anthracite, cleaned to minimum ash, though the exact size depends on material to be filtered. Three sizes will meet all conditions. Sales, still totaling only 3,000 tons yearly, are growing. Anthrafilt can be found in the filters of 36 states, of Monterey, Mexico, of London, England, and of places in Canada, sales about doubling every year. The breadth of opportunity for Pennsylvania anthracite is exhibited by the fact that New Jersey sand for filtration has been shipped to China and Colombia.

Radiance an Advantage

Radiance is one of the advantages of anthracite, asserted R. D. Hall, engineering editor, *Coal Age*. Oil and gas burn without radiance, and thus without lateral heat, producing only convective heat. This heat readily escapes up the stack unless a refractory or labyrinth of clean passes or pipes is provided. One cannot warm one's hands by holding them alongside the flame of a bunsen burner. An anthracite fire bed quite frequently does not burn at all at the top; thus there is then "black-body radiance" which travels to the water legs of the boiler and leaves no convective heat to escape to the stack. In an anthracite furnace, passes above the fuel bed are almost functionless.

In his address, Eric Sinkinson, associate professor of fuel technology, Lehigh University, declared that gas passed through 2 in. of anthracite burns flamelessly, emitting radiant heat. As soon as radiance appears, if the gas is cut off, radiance disappears, for the anthracite is not hot enough to continue combustion. Obviously, radiance comes from burning of the gas on the multitude of fine ash particles embedded in the surface of the anthracite. Ash, therefore, acts as a catalyst, and will ionize hydrogen as it leaves heated coal. If more gas is produced than the ash can cause to burn without flame, the rest merely flames above the fire. Because of flameless combustion below the surface in the fuel bed, little space need be left above it.

Space for combustion above the coal

bed with an anthracite furnace is almost, if not wholly, without value, as shown by actual tests at the Anthracite Industries Laboratory, agreed A. J. Johnson, its director. Production of fly ash when the boiler is set so that the crown sheet is near the fuel bed, is actually less than with increased combustion space, for, in the latter case, the stream carries the ash with it, whereas, with a high setting, the ash strikes the crown sheet and its heavier material falls. For all these reasons, anthracite does not need the high boilers demanded by bituminous coal.

Burned with the theoretical supply of air per 10,000 B.t.u. (7.7 lb.), temperature of combustion will be 5,270 deg. F., but with 60 per cent excess air, temperature will be 3,320 deg., still above the melting point of any ash. However, escape of heat by radiation to furnace walls will preclude any such temperature, except where the air is too near the theoretical supply or where water cooling surfaces are too remote. Such conditions rarely occur and usually only locally except when the fire is not banked, thus reducing air and its accompanying heat-convecting action. Even low-temperture-fusion-ash coals can be burned without clinker where, as in small furnaces, the jacketed surfaces are not too far from the heart of the fire. More air actually reduces clinkering, unless air increase opens cracks in the fire, diverting the air from the rest of the coal. Larger sizes, said Mr. Johnson, clinker more readily than nut.

Controls Keep Fires Alive

Controls, asserted Arnold Michelson, vice-president, Minneapolis-Honeywell Regulator Co., have been developed to keep stoker fires alive in mild weather. These controls cause the stoker to operate at certain definite adjustable time intervals, even when the thermostat does not require it. A recent model will not permit operation if the room thermostat has called for such operation within the cycle. Another guard against fire extinguishment is an untimed switch designed for mounting in the stack or within the boiler itself. On starting the stoker, should the fire fail to respond, the stoker will be stopped automatically, thus preventing the filling of the firebox with unburned coal. Instruments also have been designed to check or stop the fire before stack temperatures become excessive. With modern controls, if the circuit is broken, the burner will stop.

In rating a stoker, the highest rate at which coal may be burned in the retort without excessive losses should be determined, declared P. A. Mulcey, assistant director, Anthracite Industries Laboratory. In domestic stokers with retorts between 11- and 24-in. diameter, a little less than 25 lb. per hour per square foot of projected retort area can be burned with satisfactory efficiency. But this requires a proportionately high fan capacity at relatively high static pressure as well as suitable means to adjust air flow. Hence, maximum burning rates 20 to 30 per cent lower than that stated are normally found in practice. However, true capacity for a stoker depends on size of fuel being burned. The distance from center to edge of retort should be such that, with the size of coal burned, each particle will be completely consumed before passing to the ashpit.

Reasonable quantities of slate and bone have been shown not to reduce anthracite combustion rate, which, however, depends vitally on rate of air flow. From tests made, it is clear that maximum combustion rate is obtainable only with a certain definite flow of air. Additional air reduces the combustion rate rather than increases it.

Tests run on a 13-in. underfeed stoker feeding buckwheat at a rate between 10.2 and 12.3 lb. per hour show that the average percentage of combustible in the refuse is independent of the ash content of the fuel and decreases to a minimum as air rate increases, after which it tends to rise again. Thus, for a given combustion rate and air-coal ratio, ashpit loss is directly proportional to percentage of ash in coal. Stoker stack losses rise with increasing rapidity as air flow increases. Ash content of fuel, however, exerts no appreciable influence. In answer to Mr. Lesser, Mr. Mulcey remarked that no effort should be made to reduce ashpit loss to a minimum, because such extreme of economy would result in more than countervailing stack losses.

Barley and rice anthracite can be hand-stoked into furnaces of apartment houses, offices, schools, hospitals, institutions and industrial buildings on flat grates at intervals of 24 or even 48 hours in cold weather and with but one firing a week under light loads, said H. L. Littell, Anthracite Institute. A comparatively low combustion rate per square foot of grate is used. A typical cycle of operation is as follows: At noon, furnace ashes are removed, and a ton or more of coal is placed on the grates until within a few inches of the crown sheet, depending on type and size of furnace. During stoking, and for 15 to 20 minutes thereafter, the blower is run at low speed to maintain ignition and propagate flame, which interval is regulated by a time switch.

The furnace is then left to its controls, and for the rest of the day a steady steam supply is maintained. At about 11 p.m. the clock turns a switch, throwing the pressurestat in series with the aquastat, which regulates the fire so as to maintain a given boiler temperature. Hence, for the rest of the night, the draft unit, controlled merely by the aquastat, maintains the boiler temperature at 190 to 200 deg. F. In the morning, at 6 o'clock, the clock once more reverses the switch, allowing the pressurestat to operate. By 12 noon, the original fuel charge largely is consumed, and the furnace is ready for cleaning and recharging. Frequently, the furnace is not cleaned at the end of the run, but the ashes are left until the end of the second or third daily cycle. Draft through the fuel bed must not be completely shut off, because temperature will rise and coal clinker. Answering Mr. Lesser, Mr. Littel declared that the blast protected the furnace against possibility of an explosion of carbon monoxide. The cost per room per year for heating was about $5.90.

Commercial establishments, owners of better homes and perhaps, even in a degree, every home owner can afford complete winter air conditioning, stated B. H. Jennings, associate professor, mechanical engineering, Lehigh University. Operating costs are low and investment outlay is not much higher than for any first-class heating system. Less than 30 per cent

Running the Show

Sessions of the First Annual Anthracite Conference at Lehigh University were presided over by the following:

W. H. Lesser, electrical and mechanical engineer, J. H. Pierce Management, Scranton, Pa.—technical session, morning, April 29.

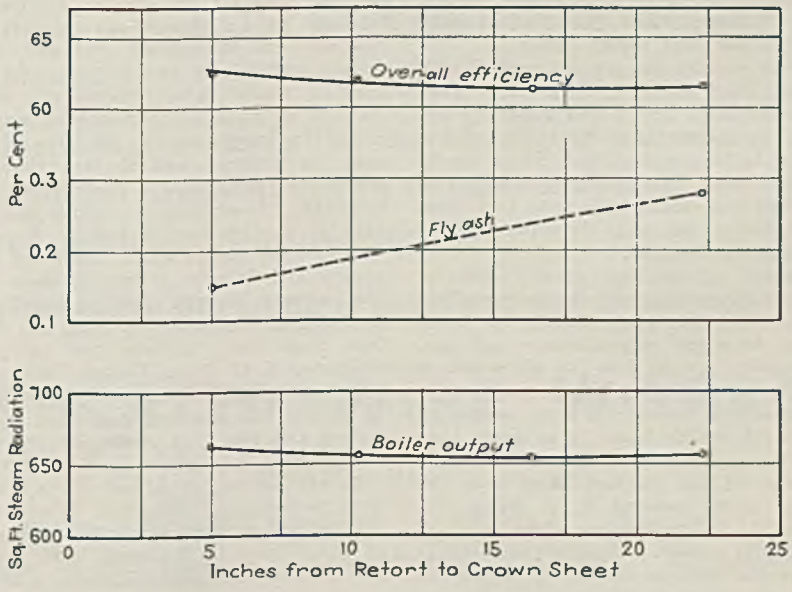
Donald Markle, president, Jeddo-Highland Coal Co., Jeddo, Pa.—afternoon, April 29, Part I.

H. D. Kynor, general manager, Wyoming Valley Collieries Co., Scranton, Pa.—afternoon, April 29, Part II.

J. H. Pierce, president, J. H. Pierce Management, Scranton, Pa.—banquet, April 29.

J. B. Warriner, president, Lehigh Navigation Coal Co., Lansford, Pa.—morning, April 30.

Fig. 1—Setting heights do not affect over-all efficiency or boiler output, but low setting decreases fly ash



humidity is undesirable, but humidity in non-humidified homes in winter drops as low as 5 to 15 per cent, stimulating evaporation and thereby cooling the body so that more heat is needed for comfort. Summer air conditioning can be obtained by installing a compression-type refrigeration unit in the duct, but for safety, chilled water (or brine), separately cooled by refrigeration, should be placed in the duct coils to cool the air, thus protecting the air current against leakage of the refrigerant.

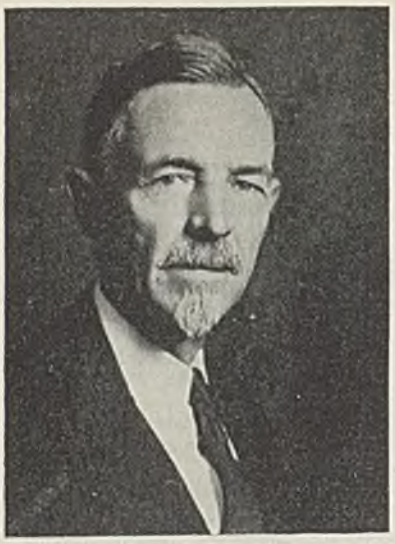
As the domestic stoker has a cup-shaped burning head, the larger the stoker, the less fuel in intimate contact with air. Hence, its size is limited, urged William Stein, chief engineer, Industrial Stoker Division, Combustion Engineering Co., Inc. Moreover, the larger boilers are not round and do not fit themselves to a circular burning head. New designs have been sought, therefore, for apartment-house and commercial installations. The Skelly stoker for this service has a wide and deep depressed center along its rectangular grate, which depression at one end of its bottom is fed by a screw with coal, which is then distributed along the depression by a pusher block. When filled, the coal rises to the top of the depressed area, which is shaped with flaring sides much like a retort. The coal burns, and the ash rolls over the lips of the retort on either side, down a slope and over the edge of a flat perforated grate, whence it falls into the ashpit.

Silt for Pulverizing

Within an area convenient to the anthracite region, silt or culm is often obtainable at prices making the use of such fuel by pulverization more economical than other fuels intrinsically better, asserted Martin Frisch, chief engineer, Boiler and Pulverizer Division, Foster Wheeler Corporation. Anthracite (volatile, 2½ to 8 per cent; moisture, 10 to 17 per cent; ash, 10 to 20 per cent) has been pulverized and burned without predrying. Total power consumption is about 35 kw.hr. per ton and cost of pulverizing about 20c. per ton, of which 2 or 3c. is for maintenance. In discussion, Mr. Frisch stated that anthracite should be pulverized so that 85 per cent of the product would pass a 200-mesh screen. With Pittsburgh and Pocahontas coals, 70 to 75 per cent would suffice.

In the anthracite region, said H. M. Warren, chief engineer, Glen Alden Coal Co., buckwheats Nos. 1 and 2 usually are stoked by hand; buckwheat No. 3 frequently is hand-stoked, but No. 4 rarely is so handled. The general practice with these two last-named fuels is to feed them with stokers and only infrequently are these fuels pulverized.

Removal of ash by gravity can be attained by putting an extremely shallow hopper below the grate, merely to direct the ash to a low large-diameter ash can. If the boiler setting does not allow this, a pit may be dug below the normal ashpit level, and the can may then be placed in the pit, which latter is so made that the can may be slid on skids to a covered extension of the pit and lifted onto the furnace floor, declared E. T. Selig, Jr., industrial fellow, Mellon Institute, at Saturday's session. This pit sometimes is provided with an incline up which the



Howard Eckfeldt
"Daddy" of the Conference

can may be drawn with the aid of a long hook.

To keep their customers, dealers should know just when each consumer supplied will be in need of coal, said A. F. Duemler, president, Household Fuel Corporation. This can be done by noting the product of the number of days and the average temperature above 65 deg. F. since coal was last delivered. Customer records are so tagged that when the number of degree-days has passed, calculated to exhaust the added coal, they will remind the dealer to seek another order. In any month effect of wind in increasing coal consumption may be ignored. As the customer was not actually entirely out of fuel when the earlier load was delivered, he will not be entirely lacking at the close of the period indicated by the degree-day calculation. Eighty per cent of the orders are given in the consuming period.

Anthracite, coke and gas may be considered practically smokeless, stated W. G. Christy, smoke abatement engineer, Hudson County, New Jersey. However, gas, though it rarely smokes, can be made to do so. The other two fuels will not smoke under any circumstance. When the Anthracite Institute designed an anthracite boiler unprovided with combustion space, the fuel still did not smoke. Anthracite, however, may discharge more solids into the air than bituminous coal and, with forced draft, cinder and fly ash may give trouble. Smoke measurements are essential. A windless wet atmosphere may so retain the smoke in the air over a city that its citizens will declare that all smoke-abatement efforts have proved of no avail. A continuous record will determine whether that is true.

Long-term trends which eliminate temporary and delusive influences show that the normal demand for anthracite is declining at least a million tons, but much less than three million tons a year, estimated E. C. Bratt, Lehigh University. This conclusion was vigorously questioned by several who asserted that the tide had turned and also that coal-stock decreases should have been given consideration.

In calculations of Albert Haring, associate professor of economics, Lehigh University, who was the expert in wholesaling of the Census of Business, 1935, wholesalers are defined as establishments selling 50 per cent or more of their product at wholesale. Selling agents are independent business enterprises operating on a commission basis, whose principal function is to sell the entire output for certain producers with whom they have contracts. Drop shippers neither handle product shipped, nor deliver it. They merely act as intermediaries; orders solicited from retailers and others are shipped directly from the production point to the drop shipper's customers.

Table III—Wholesale Anthracite Coal Trade, 1935

	Total	Selling Agents	Drop Shippers	Wholesale Merchants
Number	197	04 ·	64	69
Per cent of net sales...	7.1	6.6	4.8	14.8
Active proprietors ...	63	6	24	33
Employees (full and part-time)	1,807	742	334	731
Payroll per cent of net sales	2.2	1.5	2.3	6.1
Stocks on hand, Dec. 31, per cent to net sales	4.9	6.4	0.1	4.6

Sales of natural and manufactured gas increased from 14,000,000 cu.ft. in 1929 to 41,000,000 in 1936, quoted A. C. Fieldner, chief, technological branch, U. S. Bureau of Mines, at Friday's banquet. On the other hand, domestic stoker sales increased from 7,000 in 1932 to 93,500 in 1937 with an increase in sales of 23 per cent in the latter year over the year before—a larger gain than for oil-burner sales, which though 90,000 in 1934 and 200,000 in 1936, in 1937 did not gain over 1936, which is encouraging to the coal industry. F. W. Earnest, Jr., president, Anthracite Industries, Inc., said that progress in anthracite appreciation and use could be derivable only from a steady effort pursued over years. Addresses also were made by J. H. Pierce and Dr. Allen Stockdale.

Obituary Notes

Milton Everett Robinson, Jr., 47, head of the M. E. Robinson Coal Co. and four times president of the National Retail Coal Merchants' Association, died suddenly April 18 while waiting for a treatment in a Chicago osteopath's office. He was a graduate of the University of Chicago.

Thomas Hurst Wickham, 75, president of the Lillybrook Coal Co.; treasurer of the Raleigh Smokeless Fuel Co., and for 40 years prominent in the business life of Beckley, W. Va., died on May 5 from a heart ailment aggravated by a fall two weeks previous. With Prince E. Lilly, he organized the Princewick Mining Co. and also was part owner of the E. E. White Coal Co., both of which were taken over by the Koppers interests.

Rufus L. Lofton, 50, superintendent at No. 1 mine of the Diamond Coal Co., Providence, Ky., died late in April at the Evansville hospital. In point of service he was the oldest employee of the company.

Richard M. Mucklow, 77, a retired West Virginia coal operator, died April 19 in Charleston, W. Va. With three

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brothers he organized the Paint Creek Colliery Co. in 1900 and was active in business until about ten years ago.

Left U.M.W. Voluntarily

Testimony of defense witnesses that they didn't desire membership with the United Mine Workers and that they had withdrawn union affiliation of their own accord was written into the record of the Regional Labor Relations Board hearing against the Harlan Central Coal Co., of Totz, Ky., on May 4. John Hickey, former deputy sheriff and mine guard, whose name has figured conspicuously in the hearing, denied he had threatened union members or organizers for the U.M.W.

Red Arrow Work Progresses

Red Arrow, the new 300-ton-per-hour plant of the Red Parrot Coal Co., near Prenter, W. Va., (*Coal Age*, May, p. 100), is preparing to mine 1,000 acres of 5½-ft. No. 5 Block seam and later will serve an equal area of 4-ft. Lewiston seam which lies 40 ft. lower. The rope-and-button conveyor (Jeffrey type) is 1,200 ft. long and the pitch is 33 deg. The tipple has three loading tracks, shaker screens, picking tables and two loading booms. A rotary dump at the headhouse, rope-and-button conveyor and the tipple equipment were furnished by the Kanawha Mfg. Co. Structures, which are of wood, were built by the coal company force.

The plan is that development production will be 600 tons per day and the ultimate 2,000 to 2,500 tons per day. Mine cars are all-steel solid-body type of 3 tons capacity moved from No. 4 section of the company's Red Parrot mine, which is situated two miles farther up the C. & O. branch. Cutting machines and locomotives also will come from Red Parrot. The mining will be carried on by hand loading, at least until conditions are proved as to practicability for conveyors or other type of mechanical mining. J. A. Kelly, of Huntington, is general manager of the company.

When Miners Benefit, U.M.W. Unopposed To Mechanization, Says A. D. Lewis

TO THE MINERS must accrue their share of the benefits of the substitution of mechanical for human labor, on which basis it has been the policy of the United Mine Workers, ever since its organization in 1890, not to oppose the "installation and operation of labor-saving machinery in coal mines," said A. D. Lewis, assistant to the international president of the United Mine Workers, speaking May 3 at the international coal conference, held at Geneva, Switzerland. "By that it is meant," said Mr. Lewis, "that labor-saving machinery should save labor—that is to say, reduce the arduousness, hazards and length of working day—and if and when these conditions are met, the operator may receive fair compensation for his investment.

"The introduction of coal-cutting machines (80 per cent of tonnage today is machine-cut), improved mining technique, and the appearance of loading machines brought labor productivity up to 4.75 tons per man per day by 1928. Productivity per man-day, which in 1890, with a 10-hour workday, was 2.56 tons, had risen, on an average for the whole country, to 4.28 tons. With 40 per cent of the national coal output mechanically loaded, instead of the present 14 per cent, we can expect within a few years the displacement of 98,000 miners from this cause alone, even with the assumption that competing fuels will make no further encroachment and general economic conditions will not further deteriorate.

"Rational management and mechanical loading increase man-hour productivity over hand loading from 20 to 300 per cent, depending on equipment, mode of management and geology of the seam. Such an increase, with fixed daily rate of pay for the machine crews, results in a material reduction of cost of labor per ton produced. Even allowing for overhead burden, supplies and maintenance, the financial benefits of mechanization are ample to allow workers' participation in the form of increased wage rates and improved working conditions, such as shorter hours, safety appliances, hygiene at and in the mines and adequate recreational facilities, in addition to proper housing and living conditions.

"Only when the standard of living in all of its ramifications is improved will the labor-saving machine have justified itself. And not until this is accomplished can the operator claim any share in the benefits on his investment."

Outlining the position of the United States Government in regard to proposals for international regulations reducing hours of work in coal mines, Ralph J. Watkins, director of the Bureau of Business Research, University of Pittsburgh, summarized it thus: (1) for social and economic reasons is favorably disposed toward a reduction of hours of work; (2) has made it clear through repeated pronouncements and diverse legislative enactments that it intends, through all means within its power, to elevate the workers' standard of living; (3) adheres to the policy of peaceful collaboration in the solution of the world's great problems and recognizes that collaboration is especially important in the sphere of economics because of the basic character and bearing of economic questions; (4) in appointing representatives to take part in this meeting, accepted responsibility for doing all within its power to assure the success of this conference.

Cardox Maker Changes Name

The Safety Mining Co., Chicago, manufacturer of Cardox, has changed its firm name to the Cardox Corporation. The change became effective as of May 1.

April construction view of new Boone County (W. Va.) mine

Personal Notes

S. B. BARLEY, formerly chief chemist, Pittsburgh Coal Co., with which he was associated for the last ten years, has taken a posiiton with the Standard Oil Co. of Pennsylvania, with headquarters in Johnston, Pa. He takes over the duties of the late E. H. Dickie as lubrication engineer in the central Pennsylvania territory.

T. A. BECKLEY has been appointed foreman at Elk Creek No. 1 mine of the Elk Creek Coal Co., Emmett, W. Va.

W. P. BEVERIDGE has been appointed superintendent at Osage Nos. 1 and 2 mines of the Pioneer Coal Mining Co., Osage, W. Va.

JOSEPH BROWN has been made foreman at Bertland No. 1 mine of the Bertland Coal Co., Accoville, W. Va.

W. C. BROWN, assistant foreman at Wylam No. 8 mine of the Tennessee Coal, Iron & R.R. Co., Fairfield, Ala., was transferred to Hamilton mine, Pratt City, as night foreman, effective May 1.

WILLIAM D. BRYSON, who succeeded Lee Ott as general manager of the properties

of the West Virginia Coal & Coke Corporation, has relinquished this post and returned to the Utah Fuel Co. as general superintendent, effective May 1.

H. J. Connolly, vice-president and general manager, and W. E. Lewis have been elected to the board of directors of the Pittston Co., Scanton, Pa., succeeding Alva Bradley and John P. Murphy, of Cleveland, Ohio. Mr. Lewis is president of the Second National Bank of Wilkes-Barre, Pa. Directors reelected were: Michael Gallagher, D. S. Barrett, Jr.; Harvey D. Gibson, H. S. Marshall, C. R. Nash and L. L. White.

Charles Dorrance, vice-president in charge of operations, Consolidation Coal Co., with headquarters at Fairmont, W. Va., has been named to the board of directors.

Ernest Estep has been made superintendent at Omar No. 4 mine of the West Virginia Coal & Coke Corporation, Omar, W. Va.

John Fallon has been appointed superintendent at Norton No. 2, Junior No. 4 and Bower No. 12 mines of the West Virginia Coal & Coke Corporation, in central West Virginia.

W. R. Hands has been made foreman at No. 5 mine of the Pursglove Gas Coal Co., Pursglove, W. Va.

D. Harrington, chief, Health and Safety Branch, U. S. Bureau of Mines, has been elected chairman of the Mining Correlating Committee of the American Standards Association. He succeeds Dean E. A. Holbrook of the College of Engineering, University of Pittsburgh, who had held the position since the committee's organization in 1920.

P. D. Henry has been appointed coal inspector at the Merrill Coal Co. mine at Henlawson, W. Va.

Thomas J. Hoffman, sales manager of the West Kentucky Coal Co., Sturgis, Ky., has been made vice-president.

John Jones has been made superintendent of Mines Nos. 2 and 5 of the Mallory Coal Co., Landville, W. Va.

George Keith has been made superintendent of Leckie Nos. 1, 2 and 3 mines of the Leckie Smokeless Coal Co., Anjean, W. Va.

D. C. Kennedy, chairman of the Appalachian joint wage conference and secretary of the Kanawha Coal Operators' Association for the last 35 years, embarked on April 20 to attend the Technical Coal Conference, a section of the International Labor Conference, at Geneva, Switzerland. He appeared in the operators' interest at a discussion of working hours of miners throughout the world. A. D. Lewis, international representative of the United Mine Workers, is the employees' representative. The United States Government is represented by Dr. Ralph J. Watkins, professor of economics and director of the Bureau of Business Research, University of Pittsburgh.

J. W. Kercheval has been named foreman at Louise mine of the Premier Block Coal Co., Osage, W. Va.

John E. Kyle, former district mine inspector, has been made superintendent of Stirrat No. 19 mine of the West Virginia Coal & Coke Corporation, at Stirrat, W. Va., vice Thomas Steele, transferred.

Joseph H. Nuelle

Hooper Love, for many years manager of the St. Bernard Coal Co., Nashville, Tenn., has been made vice-president of the company.

William F. Masterton, B. S., has been appointed underground manager at the Chaokochwang colliery of the Kailan Mining Administration, Chaokochwang, Kuyeh, Hopei Province, North China. The colliery is a well-equipped modern operation producing 6,000-7,000 tons per day from seven seams at depths of from 900 to 1,800 ft. He was formerly at the same organization's plant at Tongshan, Hopei, North China.

D. L. McElroy has submitted his resignation as assistant director of the Mining and Industrial Extension Department of West Virginia University, effective July 31, to become head of the Mining Engineering Department of Virginia Polytechnic Institute. He has served in his present post for ten years.

H. B. Morgan, formerly assistant to J. T. Sydnor, has succeeded the latter as superintendent of the Red Parrot mine of the Red Parrot Coal Co., at Prenter, W. Va.

Joseph H. Nuelle resigned on April 28 as president and general manager of the Lehigh Coal & Navigation Co. effective May 15, to become president of the Delaware & Hudson Co. and its subsidiaries. He was elected to the latter position on May 11, effective as of May 16. He succeeds Leonor F. Loree, who resigned on March 30.

Paul W. Perkins, Chicago, has been appointed as a price examiner in the National Bituminous Coal Commission's bureau of industry relations to specialize in price and industry matters in and between Districts 10 and 11 (Illinois and Indiana).

Matthias Plum was elected president of W. J. Rainey, Inc., Uniontown, Pa., at a meeting of the board of directors. Other officers named are: Vice-president, E. W. Bratton; vice-president in charge of operations, Robert Wood; secretary-treasurer, Richard W. Reese.

J. W. Porter was reelected president of the Alabama By-Products Corporation, Birmingham, Ala., at its annual meeting. Other officers named are: H. L. Morrow, vice-president and treasurer; A. M. Shook, secretary; H. M. Cowart, assistant secretary and assistant treasurer. Erskine Ramsay continues as chairman of the board, and Mervin H. Sterne, of the banking firm of Ward, Sterne & Co., succeeds the late Albert Bush on the directorate.

Dr. Charles J. Potter, Fairmont, W. Va., assistant to the president, Continental Coal Co., has been named by the National Bituminous Coal Commission as price examiner and general assistant to the director of the Commission's bureau of industry relations. He will specialize in price and other industry matters in and between Districts 1, 2 and 3 (Pennsylvania and northern West Virginia). In 1933 he was a technologist for the Northern West Virginia subdivision of the N.R.A. bituminous coal code authority and was a member of District 3 producers' board under the first National Bituminous Coal Commission.

Virgil Proudfoot has been named foreman at Barbour mine of the George Annese Coal Co., Flemington, W. Va.

Ray Robson has been appointed foreman at Omar No. 4 mine of the West Virginia Coal & Coke Corporation, Omar, W. Va.

William E. Russell, president, William E. Russell Coal Co., Denver, Colo., has been elected president of the Rotary Club of that city.

George J. Schaller has been made superintendent at Wyoming mine of the Red Jacket Coal Corporation, Wyoming, W. Va.

Jack Shaw has been appointed foreman at Golden Arrow No. 2 mine of the Detroit Mining Co., Gordon, W. Va.

George Hunter Smith, of Canon City, and John J. Roddy, of Trinidad, who received the highest averages in a State civil service examination, were permanently certified for deputy inspectorships in Colorado on April 24. The fact that their averages exceeded 85 makes them eligible for chief inspector. They were provisional appointees as deputies.

G. R. Spindler, instructor in the Fairmont district Mining and Industrial Extension Department, West Virginia University, has been appointed to succeed D. L. McElroy as assistant director of the department.

H. Sprouse has been made foreman at Thacker Nos. 1 and 2 mines of the Puritan Coal Corporation, Mingo County, West Virginia.

Thomas Steele, hitherto superintendent of Stirrat No. 19 mine of the West Virginia Coal & Coke Corporation, at Stirrat, W. Va., has been named superintendent of Omar No. 5 mine, succeeding Andrew Whitt, promoted.

W. G. Stepp has been promoted from assistant foreman to general mine foreman at the Rossmore mine of the West

Virginia Coal & Coke Corporation, Rossmore, W. Va.

J. T. Sydnor has been named general manager of the properties of the West Virginia Coal & Coke Corporation, vice William D. Bryson. Mr. Sydnor had been general manager of the Red Parrot Coal Co., Prenter, W. Va., until May 1, when he assumed his new duties.

J. E. Thomas, night foreman at Hamilton mine of the Tennessee Coal, Iron & R. R. Co., Pratt City, Ala., has been transferred to the Edgewater mine, Ensley, as night foreman in the lower level, effective May 1.

R. H. Tinsley has been named superintendent by the Dayton Coal Corporation, Sprosa, W. Va.

Samuel D. Warriner, for many years president of the Lehigh Coal & Navigation Co. and for the last year chairman of the board, again assumed the presidency on May 13. He was elected president pro tem on April 28 to succeed Joseph H. Nuelle, who resigned to become president of the Delaware & Hudson R. R. and the Hudson Coal Co.

Andrew White, who became superintendent of Omar No. 5 mine of the West Virginia Coal & Coke Corporation, at Omar, W. Va., not long ago, has been appointed general superintendent by the company. He was formerly assistant chief engineer.

R. L. Ireland, Jr., president, Hanna Coal Co. of Ohio, was elected president of the Ohio Coal Control Association at its annual meeting, held April 18 at Cleveland. Other officers chosen are: vice-president, William Emery, Jr., president, Cambridge Collieries Co.; executive vice-president, Ezra Van Horn; secretary-treasurer, D. F. Hurd; assistant secretary-treasurer, E. H. Miller. The name of the association was changed to the Ohio Coal Association.

J. L. Osborn, receiver, Blackwood Coal & Coke Co., was elected president of the Virginia Coal Operators' Association at the annual meeting on April 26. Other officers named are: vice-president, J. J. [illegible], vice-president, Virginia Iron, Coal & Coke Co.; secretary-treasurer, [illegible] H. [illegible]; assistant secretary-treasurer, R. H. [illegible].

[illegible] R. [illegible], vice-president, Union Pacific Coal Co., has been elected to succeed Glen A. Knox, superintendent of the Gunn-Quealy Coal Co., as chairman of the Wyoming Section, American Institute of Mining and Metallurgical Engineers. R. D. [illegible], superintendent, Colony Coal Co., has been elected vice-chairman, and [illegible] K. [illegible], safety engineer, Union Pacific Coal Co., has been named secretary-treasurer.

Illinois Institute Program Set

Safety, hoisting, shooting and dust treatment will feature the program of the summer meeting of the Illinois Mining Institute. Sessions will be held aboard the Steamer "Golden Eagle," which will leave St. Louis, Mo., at 10:30 p.m., June 10, and return at 8 a.m., June 12. Following an address of welcome by H. H. Taylor, Jr., president of the Institute and vice-president of the Franklin County Coal Co., Inc., the following papers will be presented: "Safety Practices and Accident Prevention From the Point of View of a State Mine Inspector," Joseph Firth, Jr., Illinois State mine inspector; "Caging and Hoisting and Increased Maintenance Due to Speed," John Abrell, superintendent, Peabody No. 7 mine, Peabody Coal Co.; "Blasting With Permissible Powders," F. W. Roman, explosives engineer, Hercules Powder Co.; "Dust-Treating of Coals," Lee Haren, chief chemist, Bell & Zoller Coal & Mining Co.

New tipple at Monarch mine

Name Open-Price Administrator

Stevenson, Jordan & Harrison, management engineering firm, of New York City, has been retained to administer the open price filing agreement of anthracite operators (Coal Age, March, 1938, p. 79), according to an announcement made on April 22 by a newly organized advisory committee headed by H. A. Smith, president, Delaware, Lackawanna & Western Coal Co. Administration of the pact is now under the guidance of the new committee, the coordinating committee having been dissolved. Other members of the advisory committee are: F. W. Leamy, senior vice-president, Hudson Coal Co.; A. E. Sloat, vice-president, Lehigh Valley Coal Sales Co.; H. A. Faville, of Weston Dodson & Co.; and G. R. Gabell, of Thorne, Neale & Co., Inc.

Permissible Plates Issued

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows:

Goodman Mfg. Co.: Type 1-12CL3 longwall mining machine; 50-hp. motor, 300 volts, d.c.; Approval 342A; April 1.

Jeffrey Mfg. Co.: Type 35-20 shortwall mining machine; 30-hp. motor, 250 volts, d.c.; Approval 344; April 27.

Expansion Program Proceeds In St. Charles Field

The St. Charles field of Virginia is completing a $500,000 expansion and improvement program. As part of the development the Blue Diamond Coal Co., at Bonny Blue, purchased more than 200 acres, costing over $15,000, built 37 new houses at a cost of $42,000, and bought 13 houses, costing $7,000, from the Kemmerer Gem Coal Co., whose property adjoins. The recent construction of a new headhouse and coal bins at the Bonny Blue mines cost $42,000. Turning the course of the creek, that once ran through the center of Blue Diamond's building property, to the rear, and filling up the channel after it had been changed, cost $5,000.

A modern tipple rated at 250 tons per hour of raw feed has been constructed at the Virginia Iron, Coal & Coke Co. Monarch mine, replacing the old one, which became inadequate to handle the increased output of coal. The new tipple, together with contributory appurtenances such as additional railroad track facilities, cost close to $75,000. It can load five sizes, including oil-treated domestic stoker coal. The coal loaded there bears the trade name "Old Virginia" and comes from the Black Mountain No. 5 seam. Additional improvements, costing $25,000, which have been made and are in the making at the Monarch mines include installation of underground substation, hillside slate dump, additional haulage locomotive, and new repair shop now being built. Superintendent George Rose says these improvements will increase the mine output better than 1,200 tons daily.

The Kemmerer Gem Coal Co. has just completed a new 200 tons-per-hour metal and steel tipple, headhouse and rope-and-button conveyor at an expenditure of $80,000. In addition, it has installed a Jeffrey Aerovane fan and discarded wooden mining cars for three-ton steel cars equipped with Timken roller-bearing wheels; the new cars cost $20,000. A number of smaller operations in the field also have made improvements.

Indorses Marketing Agencies

Regional marketing agencies were indorsed at a meeting of the Natural Resources section held in connection with the convention of the United States Chamber of Commerce, at Washington, D. C., during the first week of May. Resolutions presented at a round-table conference of the division cited the development and progress of such agencies in the bituminous coal industry, from which it was concluded that they afforded opportunity for bringing about more orderly production and distribution. A resolution adopted which set forth the position of the chamber on Federal anti-trust laws said: "The circumstances of the natural-resource industries warrant special treatment for them. A tribunal of officials of the Federal Government familiar with these industries should be authorized to permit agreement in curtailment of production during continuance of overproduction found by the tribunal to be injurious to the public interest. Through decision of the Supreme Court in 1933, there is now

(Turn to page 83)

opportunity for enterprise in natural resources, and in other industries, to join in marketing agencies through which they can take proper measures for self-help and common protection in solution of some of their problems."

In a brief address, R. E. Howe, president of Appalachian Coals, Inc., gave a résumé of the successful operation of the sales agency plan in the soft-coal industry. At a meeting of the chamber's National Council, Andrew B. Crichton, president, Johnstown Coal & Coke Co., spoke on present conditions in the natural-resource industries, with particular reference to coal. He urged conservation of coal as well as oil and, though deprecating government regulation, conceded that the coal industry must have some aid; if not through price fixing, then through control of production.

Explosion of Dust Kills 45 In Keen Mountain Mine

An explosion on the night of April 22 killed 45 men in the Keen Mountain mine of the Red Jacket Coal Corporation, 6½ miles southeast of Grundy, Va. A preliminary report by the U. S. Bureau of Mines said that Federal, State and mine officials agreed that the disaster "was caused by the firing of what is termed a 'bulldozing shot' for the purpose of breaking up an accumulation of roof rock which had fallen before the day shift left the mine. The blasting, which was done shortly after the night shift had gone into the mine, ignited coal dust in the immediate area, resulting in an explosion which killed every person in that part of the mine."

The firing of bulldozing shots (in which no hole is drilled, the explosive being simply laid on the material to be blasted), the report points out, "is recognized as being hazardous in the extreme in coal mines and violates the conditions under which the Bureau of Mines gives approval for the use of permissible explosives." Attention is called to a report issued by the Bureau in 1936 which warned that bulldozing shots "should not be permitted under any circumstances in any coal mine, as they are extremely dangerous even where no explosive gas is present. Shots of this type should be prohibited, it was emphasized, partly because they are inefficient but primarily because they ignite gas or dust so readily that even the use of rock dust or other incombustible material over the charge does not insure that degree of safety to which men and mine are entitled. Certainly no shots of this type should ever be fired with the working shift in the mine."

Rock-dusting had been done to some extent, the report said, but not thoroughly.

The Keen Mountain mine, which was only recently opened (*Coal Age*, April, 1938, p. 37), has an almost level, quite dry coal bed which gives off little, if any, explosive gas, says the report. "A haulage road follows the contour of the mountain along the coal outcrop, and from this about twenty different openings have been made from the surface into the coal bed. This layout probably saved many others from being killed because the underground workings off these numerous surface openings have not all been connected."

Dissatisfied with the report of State mine inspectors, Governor James H. Price of Virginia named a special commission to make a minute investigation into the cause of the explosion. Governor Price said the report submitted by Thomas B. Morton, newly appointed State Commissioner of Labor and Industry, was "lacking in essential details" to explain the disaster. The commission named includes: E. B. Norris, dean, engineering school, Virginia Polytechnic Institute; J. D. Rogers, vice-president, Stonega Coke & Coal Co.; John Saxton, president, District 28, United Mine Workers; W. H. Nickels, Virginia Industrial Commission; and Labor Commissioner Morton.

The Governor indicated not only that he wanted to fix responsibility for the disaster, if possible, but that he desired suggestions to prevent recurrence of such explosions. He also said he had written to members of the legislative commission named to investigate coal-mining conditions in the State and recommend safety laws to the 1940 General Assembly, suggesting that they sit in with the special group at the scene of the blast. He explained that this might help them in making their general survey of conditions later. Members of the legislative commission are: Delegates Scott Litton, H. M. Bandy and C. M. Hunter, and Senators R. R. Parker and C. E. Burks.

New Stokers Announced

New stoker models have been introduced by the Peerless Manufacturing Corporation, Louisville, Ky., and the Econ-O-Col Stoker Division of the Cotta Transmission Corporation, Rockford, Ill. The new Peerless unit, in a complete line of sizes and models, embodies the following features: continuous feed-gear transmissions, with three rates of coal feed; complete automatic controls; hood soundproofed with plastic material to prevent rumbling and vibration noises; automatic air control and specially adapted wind boxes to suit practically all furnace and boiler installations; sectional tuyeres to prevent smoke backing up in the hopper; completely sealed hoppers; and standard recognized makes of motors.

Two Econ-O-Col bin-feed models are announced for use in old or new homes with old or new type furnaces or boilers. The "Pull-thru" model, requiring two openings in the boiler, is recommended for new homes and comes with delivery tube either below or above floor level. The "Transfer" model, which requires only one entrance to furnace or boiler, also may be had with delivery tube either below or above floor level. Delivery tubes, incidentally, may be short or long.

Mechanization of Loading and Cleaning Registers Wide Gains in 1936-37

MECHANIZATION of loading and cleaning made rapid strides in the coal industry in the United States in 1936 and 1937, according to a report prepared by the National Bituminous Coal Commission in cooperation with WPA. During this two-year period, mechanically loaded bituminous tonnage increased 77 per cent and mechanically loaded anthracite tonnage, 13.1 per cent. At the same time, the tonnage of bituminous coal mechanically cleaned showed a growth of about 44 per cent.

Total bituminous coal loaded mechanically is estimated at 83,500,000 tons in 1937, an increase of about 24.7 per cent over the 1936 total of 66,961,848 tons, which in turn was an increase of 42.1 per cent over the 1935 figure of 47,177,224 tons. Mechanical-loading equipment handled 16.4 per cent of the total deep-mined output of the country in 1936.

Table I—Comparative Change in Tonnage of Bituminous Coal Loaded by Principal Types of Machines, 1935-36

	1935 Net Tons	1936 Net Tons	Increase or Decrease Per Cent
Mobile loading machines	24,675,248	40,961,321	+ 66.0
Scraper loaders	1,118,201	1,272,456	+ 13.8
Duckbills and other self-loading conveyors	2,594,564	3,240,411	+ 24.9
Total loaded by machines	28,388,013	45,474,198	+ 60.2
Pit-car loaders	11,098,466	10,537,707	− 5.1
Other hand-loaded conveyors	7,690,745	10,949,943	+ 42.4
Grand total	47,177,224	66,961,848	+ 41.9

Mechanically loaded output in the anthracite region, reflecting a decline in the total output of the industry, dropped to 10,490,728 tons in 1937, a decline of 4.8 per cent from the 1936 total of 11,019,235 tons, which in turn was an increase of 18.8 per cent over the 1935 total of 9,279,057 tons.

Conveyors and scrapers were responsible for all but a small part of the anthracite tonnage handled mechanically in the several years, while mobile loaders were the leaders in the bituminous industry, this latter equipment, together with scrapers and self-loading conveyors, accounting for about 60,000,000 tons in 1937, as compared with about 23,000,000 tons for pit-car loaders and hand-loaded conveyors. In 1936, self-loading equipment handled 45,474,198 tons, against 21,487,650 tons for pit-car loaders and hand-loaded conveyors. Corresponding figures for 1935 were 28,388,013 and 18,789,211 tons.

Sales Indicate 1938 Rise

Sales of mobile loaders and conveyors in 1937 (Table III) indicate a still further substantial increase in loader and conveyor output in 1938. Illinois, West Virginia, Indiana, Ohio, Pennsylvania (bituminous) and Kentucky led in the number of mobile loaders purchased in 1937, while Pennsylvania (anthracite), West Virginia, Kentucky, Pennsylvania (bituminous), Colorado, Alabama and Wyoming led in the purchase of conveying equipment. Pit-car loaders in use continued their drop in 1937.

"From what is known of new installa-

tions of mechanical-cleaning equipment in 1937, it is estimated that the total quantity of bituminous coal cleaned mechanically in that year was at least 65,000,000 tons." This compares with 61,040,539 tons in 1936 and 45,361,021 tons in 1935. Quantity cleaned at the mines rose from 39,511,176 tons in 1935 and 53,332,040 tons in 1936 to an estimated total of 57,000,000 tons in 1937. New 1937 capacity was scattered over the country. Of the total United States bituminous output, 14 per cent was mechanically cleaned in 1936, as compared with 12.2 per cent in 1935. Mines served by cleaning plants (not including those mines which ship to washeries operated by steel companies) accounted for 26.4 per cent of the total bituminous output in 1936. Average recovery of clean, merchantable coal in mechanical cleaning was 90.5 per cent, on the basis of available data.

Supreme Court to Rule on TVA

The United States Supreme Court consented on May 16 to review the test challenge of eighteen Southern utility companies to constitutionality of the Tennessee Valley Authority Act and TVA operations. The court agreed to hear argument for a review of a decision of a three-judge Federal Court of Appeals at Chattanooga, Tenn., on Jan. 21 which held that the companies were not immune from TVA competition "even if their business be curtailed or destroyed" (*Coal Age*, March, p. 79). Oral argument on the suit, acceptable to all parties as a general test of the legality of TVA, will not be held before the court convenes next October.

The complainants, most of them subsidiaries of the Commonwealth & Southern Corporation and the Electric Bond & Share Co., told the high court that: "The present and threatened acts of TVA threatened irreparable injury, if not destruction of the properties and business of each of them."

Senator James J. Davis (R., Pennsylvania) has been designated by Vice-President Garner as the fifth member of the TVA investigating committee, and Mr. Davis has accepted the assignment.

Correction

In an item on a method of suspending the vacuum tubes for five Syntron screen controllers to prevent transmission of vibration to the tubes, which appeared in the May *Coal Age*, p. 94, the make of screens erroneously was reported as Traylor. Actually, the screens are Tyler units supplied by W. S. Tyler Co., Cleveland, Ohio.

Table II—Preliminary Estimate of Mechanical Loading in 1937 Compared With 1935 and 1936

State	1935 [1]	1936	1937
Alabama	1,303,653	1,741,452	2,100,000 [2]
Arkansas	292,064	522,411	550,000 [2]
Colorado	197,319	357,548	1,018,039 [3]
Illinois	20,513,082	26,114,577	28,344,362 [4]
Indiana	5,767,696	7,143,267	7,426,306 [5]
Iowa	..... [6]	..... [6]	..... [6]
Kentucky	533,250	658,747	1,300,000 [2]
Maryland	..... [6]	..... [6]	..... [6]
Missouri	..... [6]	..... [6]	..... [6]
Montana	1,291,373	1,464,121	1,431,000 [2]
New Mexico	..... [6]	..... [6]	..... [6]
North Dakota	..... [6]	..... [6]	..... [6]
Ohio	1,488,303	2,038,515	3,204,102 [7]
Oklahoma	..... [6]	..... [6]	..... [6]
Pennsylvania	6,469,485	9,033,855	11,951,639 [8]
Tennessee	233,579	290,220	450,000 [2]
Utah	898,118	1,358,543	1,835,000 [2]
Virginia	651,807	779,232	1,500,000 [2]
Washington	429,617	608,488	838,000 [9]
West Virginia	2,059,322	8,706,785	15,490,863 [10]
Wyoming	4,530,032	5,189,263	5,300,000 [11]
Undistributed	518,524	754,824	760,689
Total bituminous	47,177,224	66,961,848	83,500,000
Pennsylvania anthracite	9,279,057	11,019,235 [12]	10,490,728 [12]
Grand total	56,456,281	77,981,083	93,990,728

[1] Bureau of Mines, Minerals Yearbook 1937, pp. 832, 887. [2] Estimated on the basis of sales of new equipment in 1937. [3] Thomas Allen, State Inspector of Coal Mines, Colorado. [4] James McSherry, Director, Department of Mines and Minerals, Illinois. [5] Jonas Waffle, managing director, Coal Trade Association of Indiana. [6] Included in "Undistributed." Data for 1937 are based largely on telegraphic reports from operators. [7] M. W. Hranilovich, Division of Labor Statistics, Department of Industrial Relations, Ohio. [8] M. J. Hartneady, Secretary of Mines, Pennsylvania. [9] Telegraphic reports from mine operators. [10] N. P. Rhinehart, Chief, Department of Mines, West Virginia. [11] Hugh McLeod, State Mine Inspector, Wyoming. [12] J. J. Walsh, Deputy Secretary of Mines for Anthracite, Pennsylvania.

Table IV—Bituminous Coal Cleaned by Classes of Equipment in Actual Operation, 1935-36

(Coal cleaned and plants operated by consumers at central washeries in Colorado and Pennsylvania included)

Type of Equipment	Number of Types in Use		Net Tons of Clean Coal		Increase	Per Cent Cleaned by Each Type	
	1935	1936	1935	1936	Per Cent	1935	1936
Wet methods:							
Jigs	138	154	15,735,039	23,432,628	48.9	34.7	38.4
Concentrating tables [1]	9	8	1,117,789	1,843,167	64.9	2.5	3.0
Jigs in combination with concentrating tables [1]	15	16	1,540,423	2,612,867	68.6	3.4	4.3
Launders and upward-current classifiers	93	97	18,454,238	22,615,929	22.6	40.7	37.0
Total wet	255	275	36,858,488	50,504,591	37.0	81.3	82.7
Pneumatic methods	65	65	8,504,533	10,535,948	23.9	18.7	17.3
Grand total	320 [2]	340 [2]	45,361,021	61,040,539	34.6	100.0	100.0

[1] A more representative figure for the use of wet tables is indicated by combining the totals for concentrating tables with the total for jigs in combination with concentrating tables. This shows a net gain of 1,788,823 tons (67.0 per cent) for 1936.
[2] Number of plants using both wet and pneumatic types — 32 in 1935; 30 in 1936.

Table III—Comparison of Mobile Loaders, Scrapers and Conveyors in Use in 1936 With Sales Reported in 1937, by Regions

	Mobile Loaders		Scrapers		Conveyors [1]	
	In Use in 1936	Sales in 1937	In Use in 1936	Sales in 1937	In Use in 1936	Sales in 1937
Bituminous						
Northern Appalachian States:						
Pennsylvania	92	23	31	...	366	105
Maryland	...	...	...	...		
Ohio	47	28	...	...	18	37
Southern Appalachian States:						
Alabama	10	7	27	5	64	64
Kentucky	5	18	11	...	35	106
Tennessee		+ 1		1	21	38
West Virginia	126	73		5	195	275
Virginia	9	8	...	1	70	16
Middle Western States:						
Illinois	431	81	...	...	7	
Indiana	146	31	...	...		
Trans-Mississippi States	114 [2]	22 [3]	37 [4]	1 [5]	393 [6]	175 [7]
Total bituminous	980	292	106	13	1,169	835
Anthracite						
Pennsylvania	...	...	483 [8]	16	1,679 [8]	260
Grand total	980	292	589	29	2,848	1,095

[1] Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads. [2] Includes Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming. [3] Includes Arkansas, Montana, Utah, and Wyoming. [4] Includes Arkansas, New Mexico, Oklahoma, and Wyoming. [5] Wyoming. [6] Includes Arkansas, Colorado, Iowa, Montana, Utah, Washington and Wyoming. [7] Includes Arkansas, Colorado, Iowa, Utah, and Wyoming. [8] Pennsylvania Department of Mines.

Table V—Bituminous Coal Mechanically Cleaned by Wet and Pneumatic Methods, by States, 1935-36

(Coal cleaned at central washeries operated by consumers in Colorado and Pennsylvania included)

State	Clean Coal in Net Tons		Increase or Decrease	Per Cent of State Output Mechanically Cleaned	
	1935	1936	Per Cent	1935	1936
Alabama	6,841,269	9,922,714	+45.0	80.4	80.9
Colorado	492,874	713,678	+44.8	8.3	10.5
Illinois	3,154,128	5,628,884	+78.5	7.1	11.2
Indiana	1,283,555	2,198,067	+71.2	8.2	12.6
Kentucky	351,568	514,647	+46.4	.9	1.1
Missouri and Kansas	1,169,351	1,771,870	+51.5	18.5	25.6
Ohio and Michigan	1,151,546	1,331,545	+15.6	5.3	5.5
Pennsylvania	17,844,642	21,584,404	+21.0	19.5	19.8
Tennessee	341,117	257,987	−24.4	8.3	5.1
Virginia	389,548	473,992	+21.7	4.0	4.1
Washington	614,771	1,203,783	+95.8	39.4	65.9
West Virginia	11,613,813	15,290,671	+31.7	11.7	13.0
Other States [1]	112,839	148,297	+31.4	.....	.....
Total	45,361,021	61,040,539	X34.6	12.2	14.0

[1] For 1935 and 1936 includes Arkansas, Maryland, Montana, and New Mexico

Anthracite Mine Explosion Kills 8, Injures 11

Eight men were killed and eleven seriously injured in an explosion on April 27 in the St. Clair colliery of the St. Clair Coal Co., St. Clair, Schuylkill County, Pennsylvania. An hour after 600 men started work the blast occurred about 500 ft. underground. It is reported that the coal pitched heavily (70 deg.) and that a breast leading up from a lower level to the East Buck Mountain gangway at Breast 65, where the first explosion occurred, had been stopped, many years earlier, 85 ft. below the gangway, because the coal seam had pinched. As the pillar was large, it was assumed that it could not slide down the pitch. Probably, this unapproachable breast contained methane, which the sliding of the pillar released.

The inspectors' committee reported on May 1 that on the morning of the day of the accident, the workmen in the gangway began to prepare timber for their breasts, when one man felt the bottom of the road sinking under him and jumped to safety. Under the assistant foreman's instructions, the men began to leave the working through Chute 66 and the return airway.

One man with an open light ignited methane and was killed. Later, a second pillar ran away, liberating a large volume of methane, which exploded about 15 minutes after the first blast. This methane was ignited, the inspectors believe, by a flame arising from the first explosion. All the men involved but one had electric lamps, but the mine was not operated under closed-light regulations. On inspecting the mine, the inspectors found no fire, methane or afterdamp. Though an overcast was damaged, 3,400 cu.ft. of air per minute was still passing through the return airway.

Industrial Notes

SULLIVAN MACHINERY CO. has made J. F. Joy special consulting engineer on all problems relating to coal mining and the development of machinery used in coal mining; he has been general manager of the company's coal-mining machinery division. Charles H. Tipping, previously district manager in the St. Louis (Mo.) office, becomes general manager of the coal-mining machinery division, of which William R. Jarvis is sales manager, and R. A. Lehner, chief engineer.

FUEL ENGINEERING CO. OF NEW YORK has removed its offices and fuel-testing laboratories to 215 Fourth Ave., New York City.

BLACK & DECKER MFG. CO. has opened a factory service branch at 935 North Illinois St., Indianapolis, Ind. H. F. Linder is service representative and M. D. Mooers, sales department, will have his headquarters at this branch.

WESTINGHOUSE ELECTRIC & MFG. CO. has placed Vice-President Ralph Kelly in charge of sales with headquarters in Pittsburgh. Vice-President R. B. Mildon has been transferred from Philadelphia to assume management of the East Pittsburgh division. Vice-President N. G. Symonds, long associated with sales operations, will

take care of specific customer activities, association work and special duties as assigned. Andrew H. Phelps has been appointed general manager of purchases and traffic. R. F. Krueger has been appointed sales manager of the switchgear division, with headquarters at East Pittsburgh. He succeeds W. R. Swoish, who was transferred to the Northwestern district as head switchgear specialist, with headquarters in Chicago.

CARNEGIE-ILLINOIS STEEL CORPORATION has appointed William P. Andrews as manager of sales for the Cincinnati (Ohio) district, effective May 1. Formerly assistant manager of sales, Chicago district, Mr. Andrews assumes the position made vacant recently by the death of Lawrence K. Slabach. T. Lane Watson has been advanced to the position of assistant manager of sales, Chicago district.

UNION WIRE ROPE CORPORATION has appointed M. D. Carrel as manager of sales, central territory, with headquarters in Chicago.

RICHARD E. DOWNING & ENGINEERING CO. has moved its Pittsburgh (Pa.) office to 355 Fifth Ave.; its New York office to 170 East 42d St.

ARMSTRONG MFG. CO. has appointed William Archer as Philadelphia (Pa.) district office manager to succeed the late J. E. Wray.

EASTON CAR & CONSTRUCTION CO. has moved its New York office to 30 Church St., under the management of Alfred L. Schaffer.

ROBERT GARDNER CO. has appointed the following distributors in their respective territories: Columbia Equipment Co., Portland and Baker, Ore.; Seattle and Spokane, Wash.; Boise, Idaho; W. T. Jones Co., Deseret Building, Salt Lake City, Utah; and A. E. Peel, 2135 Burnaby St., Vancouver, B. C.

GENERAL CABLE CORPORATION has changed the address of its Chicago office from 20 North Wacker Drive to 310 North Canal St., where it has been consolidated with the company's warehouse.

WEST VIRGINIA ENG. CO. has appointed Roger Ewing as general sales manager. Born and educated as an engineer in Pittsburgh, Mr. Ewing was formerly associated with the International Derrick & Equipment Co., Mount Vernon Bridge Co., American Bridge Co. and Canadian Bridge Co.

OHIO BRASS CO. has made J. T. Lustig, Jr., executive engineer, in which capacity he will supervise all engineering activities of the company. He formerly was engineering assistant to the vice-president.

When Floods Hit Equipment

How to recondition flooded electric equipment is told in a booklet—GEA-3813—issued by the General Electric Co., Schenectady, N. Y. In sixteen closely printed pages, details are given on how to remove oil, grease and sludge, as well as instructions on the cleaning and rehabilitation of various units. A two-page supplement supplies additional information.

Validity of Guffey Act Again Attacked; Tetlow Made Permanent Chairman

WASHINGTON, D. C., May 17—Attacking the constitutionality of the Bituminous Coal Control Act, the Sunshine Anthracite Coal Co., which operates in Johnson County, Arkansas, filed suit in Federal Court at Little Rock, Ark., on May 9 to restrain Internal Revenue Collector R. M. Adkins from attempting to collect a 19½ per cent excise tax levied by the act against producers who are not members of the code set up by the measure. The plaintiff asserted that its product is not bituminous coal and that, therefore, it is not subject to the provisions of the act. The petition also stated that the act as applied to this plaintiff is invalid on the following grounds, among others: It deprives the plaintiff of property without due process of law; it constitutes an invasion of States' rights; is an arbitrary and unreasonable classification and attempts to regulate sale and distribution in interstate commerce of bituminous coal produced by code members only, and that it attempts to levy an unequal excise tax as between code members and non-code members, all in violation of constitutional provisions. The company has not accepted the provisions of the code.

Harris & Ewing

Percy Tetlow

A meeting has been set by the National Bituminous Coal Commission to be held at its office here on May 25 to take evidence on a ruling established on March 30 under which the Commission construed the control act as empowering it to introduce "into data of individual producers obtained for the establishment of minimum prices fair evidence as a Commission hearing or in a court. A petition asking the Commission to vacate the ruling that information previously held in confidence by the various statistical bureaus might be made public was filed by the Mallory Coal Co., Atlantic Smokeless Coal Co., Ashland Coal & Coke Co., Buena Coal Co. of Ohio, Jamison Coal & Coke Co., Pittsburgh Coal Co., Westmoreland Coal Co. and Wheeling Coal Co.

The Commission issued a ruling on May 11 that the underlying coal in the following counties of Texas is lignite within the meaning of Sec. 17 (b) of the Coal Control Act and therefore is exempted from the provisions of the act: Anderson, Atascosa, Bastrop, Brazos, Burleson, Camp, Cass, Cherokee, Franklin, Freestone, Frio, Gonzales, Gregg, Harrison, Henderson, Houston, Karnes, LaSalle, Lee, Leon, McMullen, Madison, Marion, Montgomery, Morris, Nacogdoches, Panola, Rains, Robertson, Rusk, Sabine, Shelby, Smith, Titus, Upshur, Van Zant, Wilson, Wood, Zapata, Angelina, Bee, Bexar, Bowie, Caldwell, Delta, DeWitt, Duval, Falls, Fayette, Goliad, Grimes, Guadalupe, Hopkins, Hunt, Jim Hogg, Jim Wells, Kaufman, Lamar, Lavaca, Limestone, Live Oak, Medina, Milam, Navarro, Red River, San Augustine, Starr, Travis, Trinity, Walker, Washington and Williamson.

Texas Coal Classified

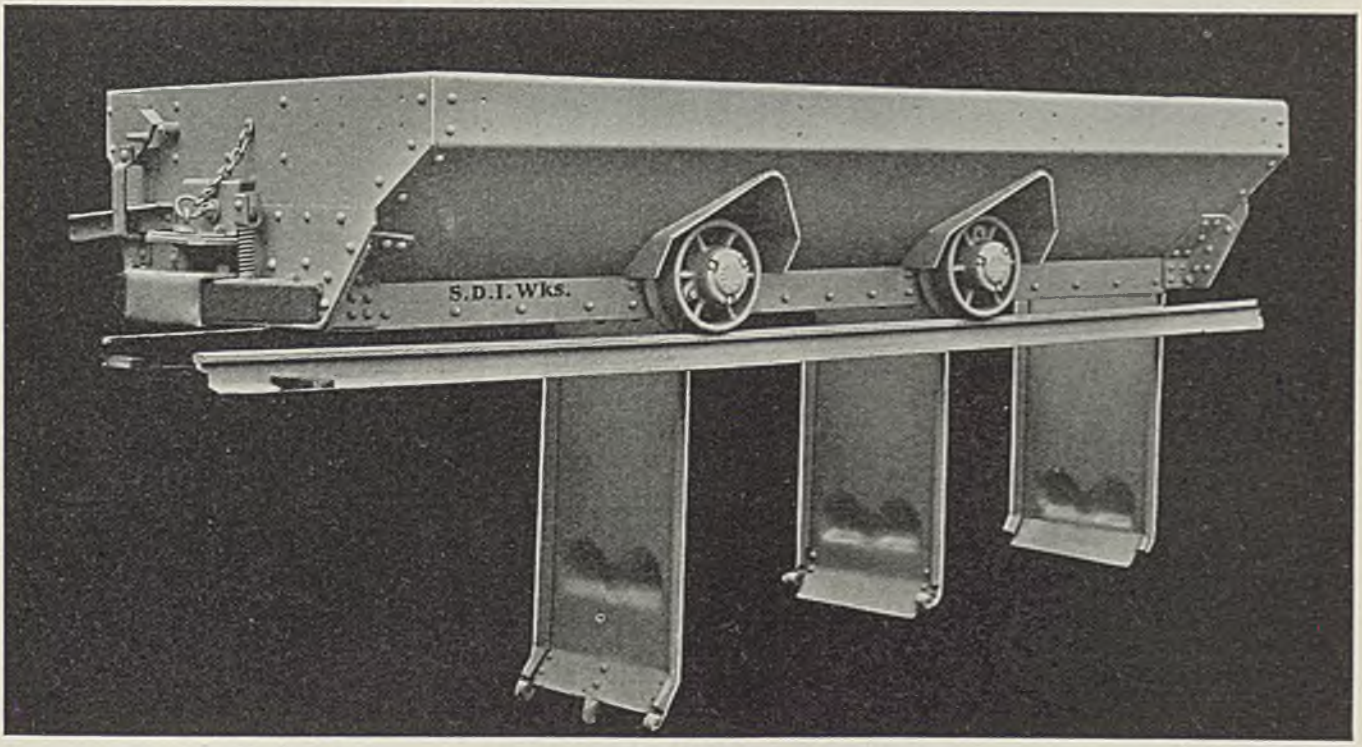
The ruling also held that the underlying coal in the following counties of Texas is bituminous within the meaning of the act and therefore is subject to its provisions: Brown, Coleman, Eastland, Jack, Palo Pinto, Stephens, Archer, Brewster, Callahan, Clay, Comanche, Concho, Erath, Hamilton, Hood, Kinney, Lampasas, McCulloch, Maverick, Mills, Montague, Parker, Presidio, Runnels, San Saba, Shackelford, Taylor, Throckmorton, Wise, and Young. Also that the underlying coal in the following counties is bituminous within the meaning of Sec. 17 (b) and therefore subject to its provisions: Dimmit, Uvalde, Webb and Zavala. "In these counties in which the line of demarcation between lignite and bituminous coals areas is not definitely known," says the Commission, "the lignite, if any, in said counties cannot be exempted except upon application in conformity with Order No. 28 of the Commission."

The hearing on distributors' discounts and maximum price allowances being held by the Commission since April 25 was recessed May 5 until June 27 in order that sufficient time might be available to review the volume of statistical and other data that was introduced during the nine full days of the hearing.

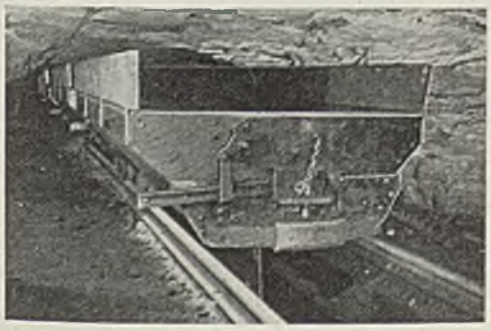
Testimony was presented by witnesses representing bituminous coal producers in the largest producing areas; by experts in marketing, research and distribution; by government economists, and by representatives of wholesale organizations, farmers' cooperatives and other interested parties. Upon this data and that which will be added to the record when the hearing is continued in June, the Commission will base its action in promulgating rules and regulations, discounts and maximum price allowances governing distributors. Including those who testified for the various producers' boards were: Floyd E. Pool, Denver; Charles O'Neill, New York; James S. Kemper and T. M. Reeder, Seattle; Charles W. Subnamon, Fairmont, W. Va.; T. J. Hudson, Sturgis, Ky.; Walter F. Nuckamp, Cincinnati; J. A. Lane, Washington, D. C., U. S.

Built to do an UNUSUAL JOB...for WASSON COAL CO.

—and they're "S-D 1-2-3 Automatics"



S-D 1-2-3 large capacity cars in the WASSON Mine about to be unloaded automatically.



This photo shows some of the cars with side boards to increase capacity where roofs are of sufficient height to use them.

Conventional type cars were impractical for servicing loaders. So Wasson Coal Co., Harrisburg, Illinois, turned to Sanford-Day for large, Automatic drop-bottom cars, to increase loader production. The car shown above was the answer and has almost 3 times the capacity of the conventional cars formerly used back of the loaders. These new cars are S-D 1-2-3 Automatics . . . a Sanford-Day exclusive design with the largest capacity available, for any given over-all dimensions, in automatics.

With this new and unusual Wasson system, these cars never see daylight. They are loaded with loading machines, and automatically unloaded into small transfer hoppers.

The coal is then transferred from hopper to their conventional wood cars for transportation to the dump.

This car does not DUMP the coal . . . it doesn't DROP it . . . this unusual design LAYS the coal down gently, in 1-2-3 order — one door at a time. No other car in existence handles coal as gently — with so little breakage as the "S-D 1-2-3 Automatic."

Sanford-Day's engineers can assist you in solving your coal transportation problems. They do it often for others, and usually at great savings in production cost. Write us at once.

SANFORD-DAY IRON WORKS, Knoxville, Tenn. U. S. A.

Richards, Bluefield, W. Va.; George W. Reed, Chicago; J. N. Terrio, Washington, D. C., and Frank M. Eviston, Kansas City Mo.

Some of the producers' proposals incorporated maximum discounts on a cents-per-ton basis and others on a percentage basis for specified types of coal. Many of them suggested a maximum discount of 10c. per ton on railroad locomotive fuel. A discount range from 10c. to as high as 35c., 50c. and 75c., depending upon location of the district, size of coal and marketing areas, was presented by the various producers' boards covering most of the bituminous-coal-producing areas.

W. W. Bayfield, executive secretary, American Wholesale Coal Association, suggested to the Commission rules and regulations proposed by his organization to govern discounts and allowances together with suggestions as to definitions of these various agents. He also proposed a discount and allowance rate of 10 per cent of the price per net ton as being satisfactory and suitable to his association.

Cost Data Introduced

Representatives of the legal staff of the Consumers' Counsel were present at every session and cross-examined the witnesses on the testimony they presented. On the final day of the hearing, Dr. Ralph Ilsley, chief, Consumers' Counsel Research and Statistical division, introduced the following three exhibits into evidence: (1) the weighted average selling cost per ton for 23,016,821 tons of coal handled by 73 distributors in 1936, (2) relationship between officers' salaries and net income to sales margin and total expenditures of the 73 distributors, and (3) the proportion of the average discount per ton that went for salaries.

The Coal Commission, which was represented by Robert W. Knox, general counsel, and members of the legal staff, called F. G. Tryon, chief, and Dr. W. H. Young, statistical expert, Bureau of Research and Statistics, to the stand as witnesses.

District producers' boards began submitting cost figures during the latter part of April in preparation for the public hearings which the Commission will hold prior to the establishment of bituminous coal prices. Cost determination figures have been received from districts Nos. 1, 3, 4, 7, 8, 10, 12, 13, 14, 15, 16, 17, 19, 22 and 23. The boards based their figures upon data the Commission's statistical bureaus had compiled from individual reports collected from all producers in each district.

The Commission is analyzing the boards' cost determinations and is discussing the date and arrangements for a public hearing to obtain information upon which final cost figures can be based for each marketing area set up by the act. It will call for minimum price proposals based upon these final area cost figures.

John Carson, Consumers' Counsel, has submitted to the Commission a request for information on the approximate dates for public hearings to be held prior to reestablishment of minimum prices. Mr. Carson purposes arranging for a series of consumer conferences prior to or at the same time that hearings are being held. If the need arises and there is sufficient demand, a series of consumer conferences also may be arranged in purely consuming areas, such as New England, where considerable tonnage is used.

A standard plan for the classification of coals, intended to speed price establishment, also has been proposed by the Counsel. In submitting his plan, Mr. Carson declared that consideration should be given to "producing districts, seams and those characteristics that are definitely determinable," but no standard plan should "include any intangibles which would involve the question of personal judgment. It is suggested that a base plan be adopted which would indicate only those factors that are considered to be the predominant ones in each district. The values of each of these factors should be broken down into all ranges that would constitute the maximum allowable ranges for all districts. Then for each district any additional factor that was predominant in that district should be added to the base factors. In any district where the maximum range allowed in the base plan was believed to be too great it could be lessened."

This plan is suggested as a first step to prevent loss of valuable time in establishing valid prices, but it is pointed out that the Consumers' Counsel is committed to the standards prepared by the Committee on Coal and Coke, American Society for Testing Materials. This sounder method, Mr. Carson added, can be taken later, as can other steps to improve the administrative machinery.

Percy Tetlow, acting chairman of the Commission since the resignation of Charles F. Hosford, Jr., was unanimously elected permanent chairman on May 11, his term expiring in December, 1938. Mr. Tetlow began work in an Ohio coal mine in 1887 at the age of twelve, became president of the Ohio district union, U.M.W., 1900-10; member of Ohio Coal Commission, 1909, drafting new mining laws for the State; special representative, international union, U.M.W., 1911-15; appointed statistician, U.M.W., 1912; served as member of Fourth Constitutional Convention of Ohio, 1912; elected to Ohio House of Representatives, 1913; Director of Industrial Relations in Ohio, with supervision over State Mining Department. 1921-2; attended International Mining Congress, Paris, 1926, and visited mining countries of Europe, making special studies of economic conditions and mining methods dealing with safety, conservation and marketing; appointed to National Bituminous Coal Commission in 1935 and reappointed in 1937. He also fought in the Spanish-American War, and served as captain in a machine-gun battalion in the World War.

Coming Meetings

- Indiana Coal Mining Institute: summer meeting, June 4, Hotel McCurdy, Evansville, Ind.

- Mine Inspectors' Institute of America: 29th annual convention, St. Nicholas Hotel, Springfield, Ill., June 6, 7 and 8.

- American Retail Coal Association: annual convention and coal exposition, June 6–12, Hotel Sherman, Chicago.

- Big Sandy-Elkhorn Coal Operators' Association: annual meeting, June 7, Ashland, Ky.

- Illinois Mining Institute: twentieth annual boat trip and summer meeting, June 10–12, aboard Str. "Golden Eagle," leaving St. Louis June 10 and returning June 12.

- Stoker Manufacturers' Association: annual meeting, June 16 and 17, Homestead Hotel, Hot Springs, Va.

- Mining Society of Nova Scotia: annual meeting, June 21 and 22, Sydney, N. S., Canada.

- Rocky Mountain Coal Mining Institute: 36th annual meeting, June 23–25, Shirley-Savoy Hotel, Denver, Colo.

- American Society for Testing Materials: annual meeting, June 27 to July 1, Atlantic City, N. J.

- Greenbrier Smokeless Coal Operators' Association: annual meeting, July 12, Pioneer Hotel, Rainelle, W. Va.

- Southern Wyoming Coal Operators' Association: annual meeting, July 12, Cheyenne, Wyo.

- Pocahontas Electrical and Mechanical Institute: annual meeting, Aug. 18–20, Bluefield, W. Va.

Jessup Made Scranton Trustee

Albert B. Jessup, formerly an executive with the Jeddo Highland Coal Co., was named trustee of the Scranton Coal Co., Scranton, Pa., in an order signed on April 14 by Federal Judge Albert L. Watson. The appointment to supervise reorganization proceedings of the company was made on the recommendation of counsel for the Reconstruction Finance Corporation, a creditor.

Enlarges Stoker Display

Marking a further step in the growth of its anthracite stoker division, Link-Belt Co. opened a new and enlarged stoker display room on May at Broad St. and Lycoming Ave., Philadelphia. On display are the company's 1938 model hard-coal unit, as well as three others, one of which is an industrial size stoker.

May Lift Anthracite Bar

Representing 500 established fuel dealers in Ontario, the Canadian Retail Coal Association, Inc., has recommended to the Canadian Government that Pennsylvania anthracite be "permitted to move across our borders without restriction," it was announced on May 14. A petition from the directors of the association, which has been received by the Department of National Revenue, at Ottawa, is expected to have some bearing on a revision of the trade agreements between the

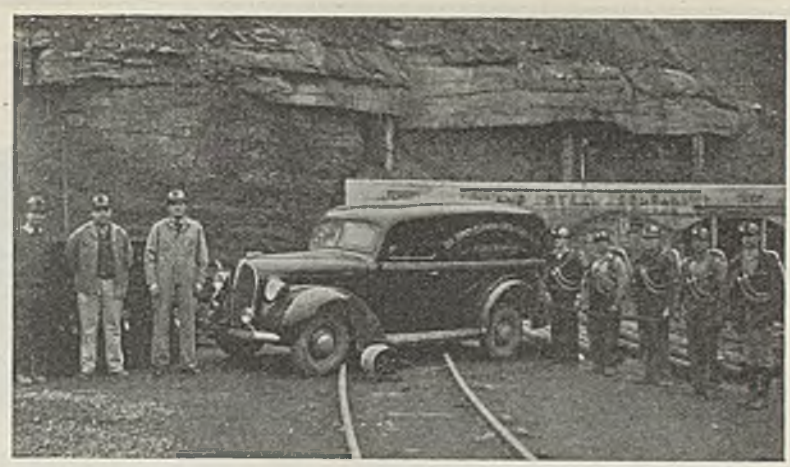
United States, Canada and the United Kingdom.

This action by Canadian coal retailers is in harmony with representations filed in Washington by anthracite producers with the Committee for Reciprocity Information last January (*Coal Age*, February, p. 104), it was pointed out by Louis C. Madeira, 3d, executive director of the Anthracite Institute.

Mine-Rescue Training Gains in Big Sandy-Elkhorn Area

Plans are being developed to build a modern station at Pikeville, Ky., provided with a special room for training in mine-rescue and first-aid work and to house the rescue truck and equipment provided by the Big Sandy-Elkhorn Coal Operators' Association and already in use. Courses are now in operation and others contemplated for the purpose of making the district second to none in the Southern Appalachian area in the matter of mine-rescue and first-aid preparedness. Rescue service is to be available 24 hours per day.

Training in such work was begun in the district in 1936 under the direction of A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association, and encouraging progress has been made. Since the installation of complete equipment during the last summer, mine-rescue teams have been organized at many of the mines, and training is being given as fast as it is possible to complete a course at one operation and move to another.



Left to right: G. C. Sutherland, safety director, Inland Steel Co.; Lawrence Runyon, district mine inspector, State of Kentucky; A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association, and mine-rescue team of Inland Steel Co. mine at Wheelwright, Ky.

To Coordinate Fuel Research

The American Society of Heating and Ventilating Engineers has appointed a new technical advisory committee for coordination of research on solid fuels and development of standardized test methods and performance specifications for heating equipment. Lt. Col. W. A. Danielson, formerly chairman of the research committee, has accepted the chairmanship of the committee, marking re-entrance of the society into this type of research.

Other members of the advisory committee are: H. N. Eavenson, president, Clover Splint Coal Co.; A. J. Johnson, director, Anthracite Industries Laboratory; P. Nicholls, U. S. Bureau of Mines, Pittsburgh, Pa.; H. J. Rose, Mellon Institute for Industrial Research; J. E. Schoen, Marquette University; L. E. Seeley, professor of mechanical engineering, Yale University; E. T. Selig, Mellon Institute; R. A. Sherman, Battelle Memorial Institute; R. T. Smith, consulting engineer, Pittsburgh; and C. Tasker, Ontario Research Foundation.

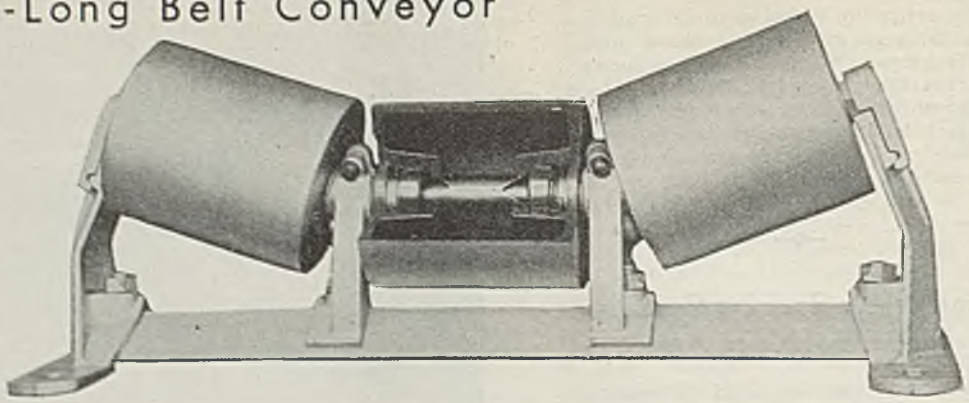
(Turn to page 92)

Third Heating Showroom Opened

Simplicity marks the attractive new anthracite exhibit opened on May 6 at 2204 Walnut St., Philadelphia. This—the third—permanent showroom opened by Anthracite Industries, Inc., shows how the home owner may sit in his living room and obtain complete heat comfort, humidification, and air conditioning with Pennsylvania hard coal without ever going into his cellar to put coal in the furnace or remove the ashes.

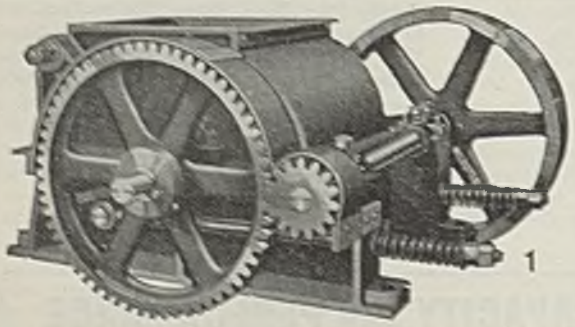
WEBSTER Life-Long Belt Conveyor

● The durability and low-cost operation of all WEBSTER Conveyors depend on the perfected performance of their carrying units. For instance: the troughing idler pictured to the right. It embodies the newest developments in anti-friction design . . . tapered roller bearings, simple but thorough lubrication system, and equalized weight distribution. Furnished either with chilled face cast iron rollers or heavy tubular steel rollers. Note the clamps that keep rollers in the brackets.



WEBSTER *is on the Job*

. . . and HAS been for more than 60 years!



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● Exclusive features of the coal preparation and reduction equipment shown on this page are due to WEBSTER'S three-score years of specilization in this field! During that time our engineers have concentrated on developing machinery of advanced design, efficient performance and economical operation. How well these men have succeeded is being demonstrated in the tipples and preparation plants of coal mining companies all over the country!

Yes . . . WEBSTER products are on the job! And so are WEBSTER *men!* Call one in to talk over *your* problems. He will survey your plant, make recommendations, and estimate costs without obligation. Just drop us a line—TODAY!

THE WEBSTER MANUFACTURING CO.
Established 1876 **TIFFIN, OHIO**

Branch Offices: New York City, Chicago, Philadelphia, Pittsburgh, Cincinnati, Buffalo, Detroit, Cleveland, Bloomington, Ill.

1 WEBSTER Coal Crusher—a model built to fill the most rigid requirements in coal reduction operation. Heavily constructed for durability . . . designed for uniform sizing . . . and geared for greater strength at less power consumption.

2 Tipples built by WEBSTER are proving their value with outstanding performance and endurance for leading coal mining companies in all parts of the United States. Each installation is designed especially to fill the particular layout and needs of the property.

3 This is a WEBSTER Car Retarder. Its money saving operation has repaid this company's investment several times. And it is just as efficient today as it was during its first months of operation.

Call in the WEBSTER MAN...
for BELT CONVEYORS and other MATERIAL HANDLING EQUIPMENT!

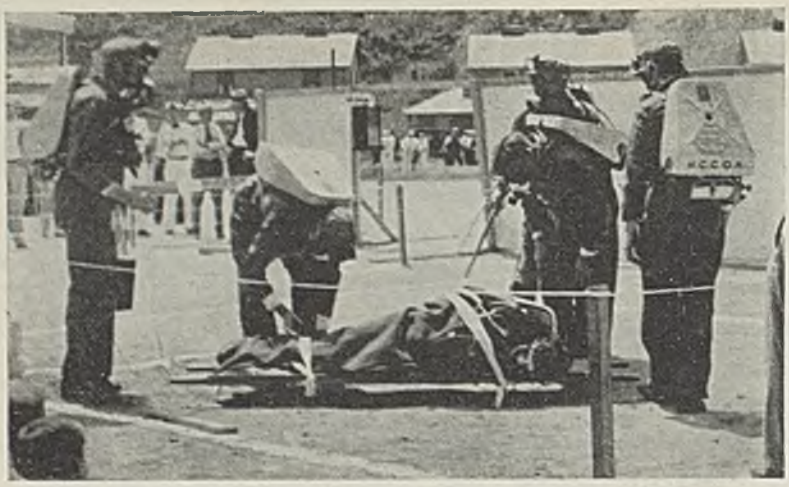
BE SURE YOUR CONVEYOR BELTS ARE *MINE-PROVED!*

TO REALIZE the full advantages of continuous conveyor belt haulage from working faces to tipple it is essential that belts be specially constructed to withstand the severities of mine service.

The truly sensational service of Goodyear Conveyor Belts throughout the coal industry—records running up as high as THIRTY MILLION TONS carried on a single belt—is evidence of their mine-proved construction.

Goodyear belts wear longer, carry more tons at lower cost because of their exclusive mildew-inhibiting friction—their covers of tire-tread toughness—their rubber-riveted carcass construction. And because every installation is individually specified by the G.T.M.—Goodyear Technical Man.

The G.T.M. will be glad to give you the benefit of his experience in helping many leading mines cut production costs. To bring him to your office, write Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.



Harlan rescue team simulates bringing out injured man after mine disaster

(*Continued from page 89*)

Cooperation rather than competition with existing fuel-research bodies now functioning at various government bureaus, colleges, trade associations and by manufacturers is to be the keynote of the program of the new group. Chairman Danielson said he foresaw in the committee "an excellent oportunity to assist in the development of data which should form the basis of a more scientific approach to heating processes."

Safety Work Makes Strides In Harlan Field

Marking in tragic fashion the completion of a decade of effort toward improvement in mine-rescue and safety work in the Harlan coal field of Kentucky, the Black Mountain fire in March, in which two men lost their lives, caused the safety department of the Harlan County Coal Operators' Association to take note of progress in its work. Under the direction of James F. Bryson, the department has expended $100,000 for development and equipment to meet any emergency.

Self-contained oxygen breathing apparatus on hand is sufficient to keep 100 men supplied for 200 hours of immediate rescue work. Other equipment includes detectors for carbon monoxide, methane, and hydrogen sulphide. Since the department was inaugurated it is estimated that instruction has been given in safety work to 75,000 men, including superintendents, mine foremen, cut bosses, machine men and coal loaders. The engaging of nationally prominent authorities to lecture at the safety classes has kept the men alert to the causes of fire, explosion and slate fall, serving to minimize these hazards and almost eliminate such tragedies. Since 1930 the operators' association has sponsored an annual safety and rescue exhibition for the Harlan Mining Institute.

Mechanical Stoker Sales Register Upturn

Sales of mechanical stokers in March last totaled 2,882 units, according to statistics furnished the U. S. Bureau of the Census by 112 manufacturers (Class 1, 54; Class 2, 33; Class 3, 28; Class 4, 22; Class 5, 11). This compares with sales of 2,502 units in the preceding month and 2,785 in March, 1937. Sales by classes in March last were: residential (under 61 lb. of coal per hour), 3,393 (bituminous, 2,993; anthracite, 400); small apartment-house and small commercial heating jobs (61 to 100 lb. per hour), 237; apartment-house and general small commercial heating jobs (101 to 300 lb. per hour), 146; large commercial and small high-pressure steam plants (301 to 1,200 lb. per hour), 55; high-pressure industrial steam plants (more than 1,200 lb. per hour), 51.

Exide Has Golden Jubilee

Observation of the golden anniversary of its founding begins this month by the Electric Storage Battery Co., manufacturer of Exide batteries. Founded in 1888 in a tiny one-story structure near Gloucester, N. J., the company now has a plant comprising more than 30 acres of floor space at Crescentville, on the northeastern edge of Philadelphia, Pa.; has branches in 19 strategically located cities; and numbers more than 30,000 dealers among those handling its products and service.

Coal-Mine Fatality Rate Shows a Decline

Accidents at coal mines of the United States caused the deaths of 52 bituminous and 17 anthracite miners in March last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production totaling 26,800,000 tons, the death rate among bituminous miners was 1.94 per million tons, compared with 2.70 in the corresponding month of last year.

The anthracite fatality rate in March last was 4.26, based on an output of 3,995,000 tons, as against 3.91 in March a year ago.

For the two industries combined, the death rate in March last was 2.24, compared with 2.80 in March, 1937.

Fatalities during March last, by causes and States, as well as comparable rates for the first three months of 1937 and 1938, by causes, are given in the accompanying tables.

COAL-MINE FATALITIES IN MARCH, 1938, BY CAUSES AND STATES

State	Underground										Open-cut and Surface				
	Falls of roof	Falls of face	Haulage	Gas or dust explosions	Explosives	Electricity	Mining machinery	Other machinery	Other causes	Total underground	Mine cars	Machinery	Other causes	Total surface	Grand total
Alabama	..	..	3	...	..	..	...	...	..	3	..	..	..	..	3
Arkansas	1	..	..	...	..	..	...	...	..	1	..	..	..	..	1
Colorado	1	..	..	...	..	..	...	...	..	1	..	..	..	..	1
Illinois	1	..	2	...	..	1	...	1	..	5	..	..	..	..	5
Kentucky	5	..	..	...	..	1	1	...	..	7	..	..	..	..	7
Missouri	2	..	..	...	..	..	...	...	..	2	..	..	..	..	2
Ohio	2	..	..	...	..	..	...	...	..	2	..	..	..	..	2
Pennsylvania (bit.)	4	1	1	...	..	1	...	...	..	7	..	..	..	..	7
Tennessee	1	..	..	...	..	..	...	...	..	1	..	..	..	..	1
Virginia	2	..	..	...	..	..	...	...	..	2	..	..	..	..	2
Washington	..	..	1	...	..	..	...	...	..	1	..	..	..	..	1
West Virginia	13	2	2	...	1	..	...	...	..	18	1	..	1	2	20
Total (bituminous)	32	3	9	...	1	3	1	1	..	50	1	..	1	2	52
Pennsylvania (anthracite)	9	..	4	1	1	..	...	...	1	16	..	1	..	1	17
Grand total	41	3	13	1	2	3	1	1	1	66	1	1	1	3	69

FATALITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES*

January–March, 1937 and 1938

Cause	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
	1937	1938	1937	1938	1937	1938	1937	1938	1937	1938	1937	1938
Falls of roof and coal	169	117	1.252	1.382	28	43	2.260	3.493	197	160	1.336	1.650
Haulage	63	40	.467	.472	9	9	.727	.731	72	49	.488	.505
Gas or dust explosions:												
Local	2	5	.015	.059	..	1	.....	.081	2	6	.014	.062
Major	27	15	.200	.177	..	..	.....	.....	27	15	.183	.155
Explosives	8	1	.059	.012	2	3	.161	.244	10	4	.068	.041
Electricity	13	8	.096	.094	1	..	.081	.....	14	8	.095	.082
Machinery	8	7	.059	.083	..	..	.....	.....	8	7	.054	.072
Shafts	10	2	.074	.024	1	..	.081	.....	11	2	.075	.021
Miscellaneous	8	3	.059	.035	8	3	.646	.244	16	6	.109	.062
Stripping or open-cut	8	1	.059	.012	3	8	.242	.650	11	9	.075	.093
Surface	22	8	.163	.094	3	1	.242	.081	25	9	.170	.093
Total	338	207	2.503	2.444	55	68	4.440	5.524	393	275	2.667	2.836

*All figures subject to revision.