COAL AGE

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

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New York, September, 1936

The Other Half

KNOWLEDGE of how the other half lives quite frequently helps in the solution of our own problems. The Third World Power Conference, to be held at Washington, D. C., the week of September 7, will offer coal men of the United States an unusual opportunity to learn how other nations have organized their fuel resources and to what degree those resources have been nationalized or are privately owned and managed but are operated under government control. The American coal industry still faces the problem of regulation. If the conference debates are as full and as free as its sponsors hope and promise, coal men here should be able to get a first-hand picture of the advisability of federal supervision and of the pitfalls and opportunities inescapable in any system of government regulation.

Anthracite Steps Out

ORGANIZATION of Anthracite Industries, Inc., is signal proof of the determination of the hard-coal producers to present a united front in the battle to maintain present markets and recover some of the tonnage lost in recent years to competitive fuels. The avowed immediate purpose of the new agency is to launch a mass promotional campaign to sell the domestic consumer the inherent virtues of anthracite and to make him fully conscious of the many innovations in equipment and controls designed to put the burning of hard coal on a plane of convenience comparable with that claimed by the "laborless" fuels. Passive resistance and self-commiseration are to give way to aggressive merchandising.

The new program should put fresh courage and fight into a division of the coal industry which has suffered heavy reverses in the last decade. It should help the industry to capitalize more fully on the excellent fundamental research work it has been doing through the Anthracite Institute Laboratory. Those who have battled most persistently to unite the industry in the present three-year campaign probably would be among the first to deny that the program now under way is the complete answer to all the problems which beset anthracite. But cooperative concentration on merchandising will give the industry a sharper picture of what other steps may be necessary to restore hard coal to its pre-war eminence.

Sealed Reports

SO MUCH honest effort and unflagging enthusiasm have been put into the drive for accident prevention by the Bureau of Mines that no just observer would dream of denying that federal agency a large share of the credit for the recent improvements in the safety records of the coal-mining industry. In season and out, in good times and bad, Bureau officials have been untiring in instruction, encouragement and admonition. They have been eager to broadcast good safety practices and have not been unduly bashful in condemnation of unsafe methods. More power to them!

In one important respect, however, the Bureau policy may be contrasted unfavorably with that pursued by the safety section of the Interstate Commerce Commission. That is in the matter of public reports on specific fatal accidents. Interstate Commerce Commission reports of accident investigations cover not only the causes of the particular tragedy investigated but usually include specific recommendations for changes in operating practices to minimize the possibilities of a recurrence of an accident of that particular type. The Bureau of Mines also investigates specific accidents, but its reports are confidential and any recommendations it may make reach the mining field only in generalized form.

What is needed are reports and recommendations as specific and direct as those of the Interstate Commerce Commission. Nothing the investigating agency can do will restore life to the victims of an accident, but recommendations which make no concealment of the fact that they are based on that accident may prevent other fatalities. Recommendations of this character have a personalized appeal to action that is missing from the more generalized admonitions which lack the color of direct relationship to an actual accident still fresh in the mind of the industry. There should be no false squeamishness or reticences where the safeguarding of human lives is at stake.

Double Punishment

IF RAILROAD PROPOSALS for making existing surcharges a permanent part of the freight-rate structure seriously contemplate the inclusion of coal rates in the scheme, those responsible for the idea must be veritable gluttons for punishment. Unfortunately, however, their success would penalize not only the railroads but the coal industry as well. The growth both of trucking and of competitive fuels shows only too plainly what rates uneconomically high will do to railroad traffic. Where rail transportation charges are out of line, the mine also loses the railroad fuel tonnage which would be used in carrying the coal to the industrial or domestic consumer and, if the business goes to a competitive fuel, loses both the commercial and the railroad fuel tonnage. Under these circumstances, the growing resentment of the coal industry against penalizing transportation charges is not difficult to understand.

Conditioned Coal

HAS TOO MUCH emphasis been laid on clean coal and is it not time to inquire what ash constituents may be added that will increase the temperature of ash fusion when that is sought or to lower it where a clinkering coal or a slagging ash is desired? It may be that in the future "conditioned coal" will be more sought than clean coal, though the conditioning should not be such as will make the coal more ashy than that which the market is willing to receive. In fact, where the ash at present in the coal is low-fusion material it may have to be carefully removed prior to adding a material like alumina that will assure a higher fusion. Cleaning again may be necessary to take out high-fusion material and then a slagging material like iron oxide may be added.

Some may prefer to sell a natural coal merely cleaned for the market, but others may seek to serve varied types of burning equipment. One company, by adding a little rash from the roof, has been able to raise the fusion of a low-ash coal to a figure that otherwise it could not reach. Of course, just such an improvement is being effected with catalysts, it is said, but the suggestion here made is that perhaps a definite ash component be added to the coal that will change the nature of the ash. Conditioning of coal suggests appealing vistas which should be investigated. Some of the additions might enable the coal to be more readily suspended in oil in the formation of what is wrongly designated "colloidal fuel."

Cerebrations

WITH the increasing sale of fine coal comes the possibility of chemical treatment to remove the ash and improve the product. Treatments can be and are given that extract those metals the presence of which is undesirable in certain process industries, but others may merely reduce ash and make the coal more suitable as a filtration medium for metallurgical coke, as pulverized coal or for colloidal fuel. The extracted material may have a value because the chemical used may remove certain minerals in concentrated form that may be recovered.

Whether such further refinements are possible is not clear because they have not been tried. Some Missouri coals contain lead and zinc in commercial quantities, for the soluble sulphates were converted into insoluble sulphites and carbonates on coming in contact with peat bacteria. In a German mine a fault contains a tremendous quantity of lead and zinc which would appear to be minable. Whether their deposition was due to the presence of coal may be questioned, but it is known that the lead and zinc of the Joplin region occur where the measures lie in contact with carboniferous measures, and correlation is more than suspected.

FLOOD RECOVERY

+ In the Wyoming Buried Valley

To Displace Many Billion Gallons

By R. DAWSON HALL
Engineering Editor, Coal Age

WITH THE installation of most of the contemplated pumping units, recovery of the mining properties in the Wyoming Valley anthracite region inundated in the March flood got under way in earnest at the end of July. In the course of the flood, which reached its peak at 2 a.m., March 20, 1936, the Susquehanna River rose 33.07 ft. over the low-water datum of +511.03 ft. at Wilkes-Barre, Pa. The waters, unable to escape fast enough down the channel at Campbell's Ledge, backed up the Lackawanna River, which already had overflowed it banks. Later on March 20, when the waters were receding slowly, the roof over two crop workings, apparently weakened by pressure, broke and allowed the Lackawanna River water to enter the Hallstead colliery, formerly operated by the Glen Alden Coal Co. From Hallstead, the water in turn entered the Seneca and William A collieries, formerly operated by the Lehigh Valley Coal Co. All of these properties, now leased to the Kehoe-Berge Coal Co., are near Pittston, Pa.

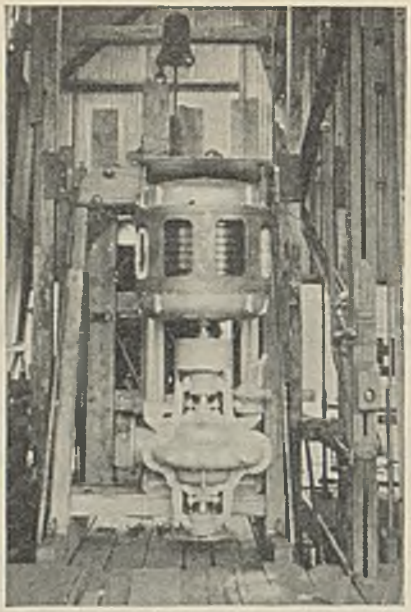
After the Lehigh Valley ceased operations at Seneca and William A, the Pittston Co. kept the water level in Seneca at +316 ft. above tide until the flood, the water being drawn through a passageway through a Clark bed barrier pillar between the Pittston No. 9 and Seneca collieries. When the level was raised by the flood, the excess promptly overflowed and filled the No. 9 workings, but was prevented from passing any further by barrier pillars separating Pittston's Ewen and Central collieries from No. 9. The Pennsylvania Coal Co. and the Hillside Coal & Iron Co. and their successor, the Pittston Co., have for many years been advocates of keeping each colliery a separate unit by such barrier pillars. Hence, in all the lower beds, the Central and Ewen collieries were isolated completely from Pittston No. 9, and the company now realizes to the full the advantages of this policy.

Ultimately, the water in the mines rose to a level of +493.65 ft. above tide and as +167.2 ft. is the lowest point in No. 9 (in the Red Ash or Dunmore No. 3 bed at Barnum No. 1 shaft, alongside the Ewen colliery line) the Ewen-No. 9 barrier had to withstand an unbalanced pressure of 326.45 ft. of water at its lower end. Intended only as a fire and ventilation barrier, with both collieries worked concurrently by the same company, it was not expected that any such burden of water ever would be laid upon the pillar. But despite this pressure, careful inspection has developed that the barrier is not leaking anywhere along its entire length. If it had not been for the resistance of this pillar, the flood might have closed the large number of mining properties between Pittston and Wilkes-Barre and even beyond, for the basin becomes much more profound in that direction.

It seems well established that there was a "crop hole" where the main breach occurred. This Kehoe-Berge crop hole, when heavy rains occurred, filled with water; in dry weather it was free of accumulations. Another similar crop hole at a distant point and containing 90 ft. of water is known to have been drained suddenly by a leak into the mine below. This incident, however, was much earlier and merely illustrates the instability of such crop holes.

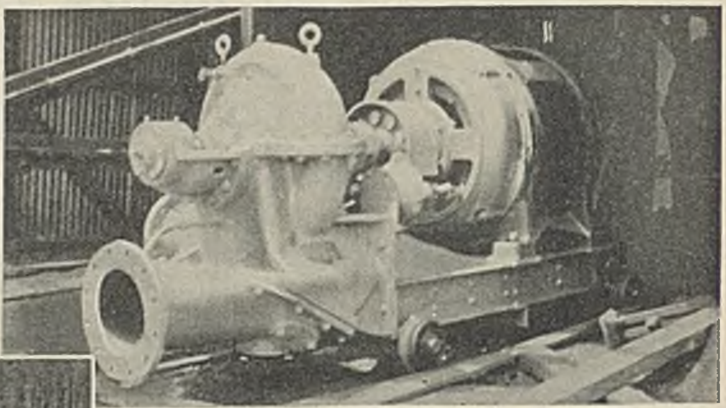
Apparently, the breaches made by the flood waters extended into Marcy bed crop holes. In the Wyoming Buried Valley region, the word "outcrop" has a rather modified meaning, for the coal does not come to the surface. The word simply expresses the point where the coal emerges from under the rock cover, but over this coal and rock may be as much as 200 ft. or more of buried valley débris—constituting a cover usually not wholly unconsolidated but which can easily be caused to run, yet is very heavy and, due to its make-up of sand and coarse, rounded boulders, passes water freely. At the point of

Crater around larger crop hole (Fig. 1), Hallstead colliery, looking east toward Austin branch, Lehigh Valley R.R. Part of a railroad car can be seen in the fill, top center



Mounted vertically, this pumping unit is about to go down the William A shaft

Pumping unit at William A colliery



Sand-and-gravel dike erected by Sweeney brothers for the Pittston Co.

First of three railroad cars dumped in main channel through Lehigh Valley roadbed to mine breaches, March 22

Bag dike, 450 ft. south of breach, March 22

the break, it is believed that this cover thickness was about 50 ft., of which about 4 ft. was surface dirt.

On March 20, in addition to the weight of water held in in the cover material, the roof was subjected to the additional burden of the 15 ft. of water which blanketed the almost level land along the valley bottom, as well as the burden of the free water in the hole. This weight it bore for a while without visible signs of distress, and it must have borne much of it several days, for before the winter's ice floated out of the river, March 13, the water rose in the Susquehanna and flowed over Kingston Corners to a depth of 3 ft., attaining a height of 28.85 ft. above datum, or within 4.23 ft. of the March 20 crest. After the ice went out, the water stage dropped to 17.27 ft. at 8 a.m., March 16.

Craters Formed in Deep Water

These two inundations proved too much for the strength of the roof over these particular crop holes. Many other holes existed in somewhat higher ground, but, being higher than the two major "craters," the water pressure was not so great and they were filled easily by the Kehoe-Berge Coal Co., usually not to the top but for some feet of this distance. But the larger holes, being under deep water, were not visible from the edge of the flood nor from boats. As no whirlpools gave evidence of their presence, nor did they suck air, the holes could not be identified for some time, so that when they were discovered they had developed considerably and were passing an immense volume of water. Later, however, when hay in bales was cast in by the Kehoe-Berge company to aid in blocking them, some of the loose hay traveled around their centers and offered effective testimony of the presence of the openings. Little, if any, of this baled hay was drawn into the holes, suggesting that they were not wide but were rather extensive. Though small, the holes through the rock caused abundant damage.

These major holes, *A* and *B* in Fig. 1, about 180 ft. apart, lay about 200 ft. north of the Austin branch of the Lehigh Valley R.R., connecting that railroad's main line with the Ontario & Western Ry. Water rose 6 or 8 ft. above the tracks and was eating its way under the ties, so on Saturday morning, March 21, the Lehigh Valley R.R. brought in a clamshell excavator and began to transfer material from a bank of coarse mine rock to the tracks for protection. Later, the roadbed was cut badly at *C* by a current which, passing where a culvert had drained the run-off from the near-by hill, found a weak spot in the sand-and-gravel drift through which to work its way from river to crop holes. Into this opening the railroad on Sunday dumped no less than three steel cars, covering them with slate.

The Pittston Co., realizing that the holes in letting water into the Kehoe-Berge collieries would flood its own workings, used thousands of sandbags to form a dike along the railroad and later brought in bulldozers to build an additional dike (*D*, Fig. 1), thereby cutting off the river from its flat. It was feared that the water might at any time open up further holes and further jeopardize the mines, even though these holes, like the others, occurred on Kehoe-Berge territory far away from the Pittston properties.

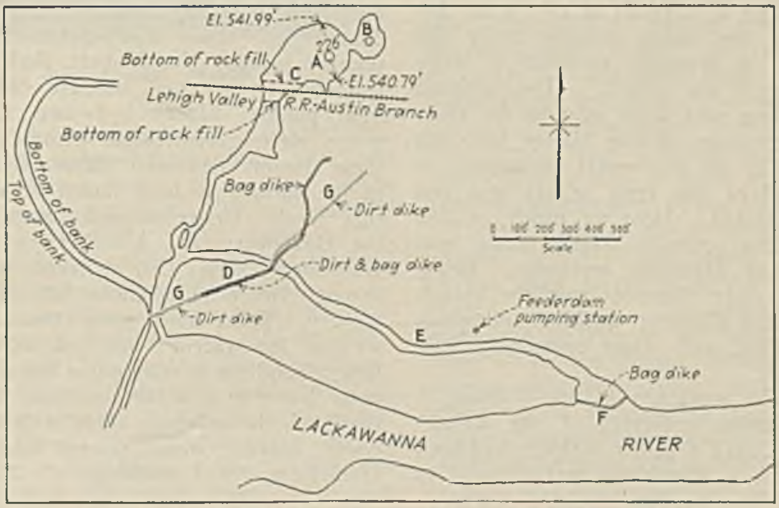


Fig. 1—Plan of the area around the Hallstead crop holes

The bulldozers brought sand and gravel across areas still wet but no longer covered with water to construct the dike at an angle of about 45 deg. to the river bank. To render this dike less subject to erosion, about 200 old mine cars were used as a core, into and around which sand and boulders were placed. The line of the dike was curved around to follow the highest contour available. The dike had to cross an old channel, *E*, which had been used to carry excess water from the Feederdam pumping station to the Lackawanna River, but, although this channel was passing water more slowly than the more direct channel from the river, it was filled with difficulty. Piles were driven 19 ft. into the sand and gravel, but this only caused the water to travel beneath them. At one time, no less than three bulldozers were being worked in series to bring dirt in in relays from distant points. In addition, many thousands of bags holding an average of 75 to 100 lb. of sand each were placed in the dike. Not until a bag dike had been built in the river bank at *F*, at the remote end of the Feederdam channel, was it found possible to construct the main dike across this inlet. This was done without much difficulty.

Although the Lehigh Valley R.R. was finding it almost impossible to block the wide cut made by the inflow under its tracks, no effort was made to shut off the water near the river in the main channel to the crop holes until the dike *D* over the smaller channel had been completed, as J. F. Johnson, preparation manager, Hudson Coal Co., who had offered his services and had the diking under his direction, advised delay in closing the main channel until the other dam was completed. His experience under similar conditions fully justified such delay. When the dike was finished to his satisfaction, the mouth of the main channel was closed by dumping in sand and gravel. This was done rapidly enough so that the opening was sealed. Work on the railroad opening probably slowed the waters and aided the sealing materially. In addition, the waters were receding, or the attempt to close the gap probably would have been unavailing.

On Sunday morning, Sweeney Bros. started a dike, *G*, to reinforce the sandbag and mine-car dike *D*, using sand and gravel brought in by tractors and trucks. This dike was constructed to engineers' levels and, as it was thoroughly compacted by the weight of the equipment and loads, it offered an even greater obstruction to the flow of water. This dike followed a straight line, extending the first dike, *D*, to higher ground, and completely cut off the secondary channel. In all, about 29,000 bags were used in shutting off the water. Action of the inflowing water on the glacial drift is evidenced by the fact that the width of the larger "crater" was 226 ft. and the depth at the center was 45 ft. The other crater was neither so deep nor so large, possibly because the first drew off most of the water.

It is only in recent years that anthracite companies have been leaving barriers between their several properties, and in the very early stages of mining no barriers were left, even between the holdings of different companies. A pillar had been left between the Hallstead and Seneca collieries of the Kehoe-Berge company when the mines had been worked by the previous owners, but after the lease was effected this pillar was breached for transportation, enabling water to pass from the Hallstead colliery to the adjacent William A and Seneca workings. Many years earlier, the Glen Alden Coal Co. had backfilled large areas of the Hallstead colliery behind permeable barriers (*Coal Age,* June, 1932, pp. 227-228), but Hallstead probably received further backfilling as a result of this water incursion, for, being directly under the breach, it probably received a large portion of the débris. The original backfilling was done only in the shallow workings of the Marcy bed, but not under the shallowest operations, as removal of the crop pillars was not contemplated. Most, or much, of this backfilling probably washed down into the lower Hallstead workings. Being at a greater distance from the breach holes, the Pittston workings doubtless were filled with water containing little sediment.

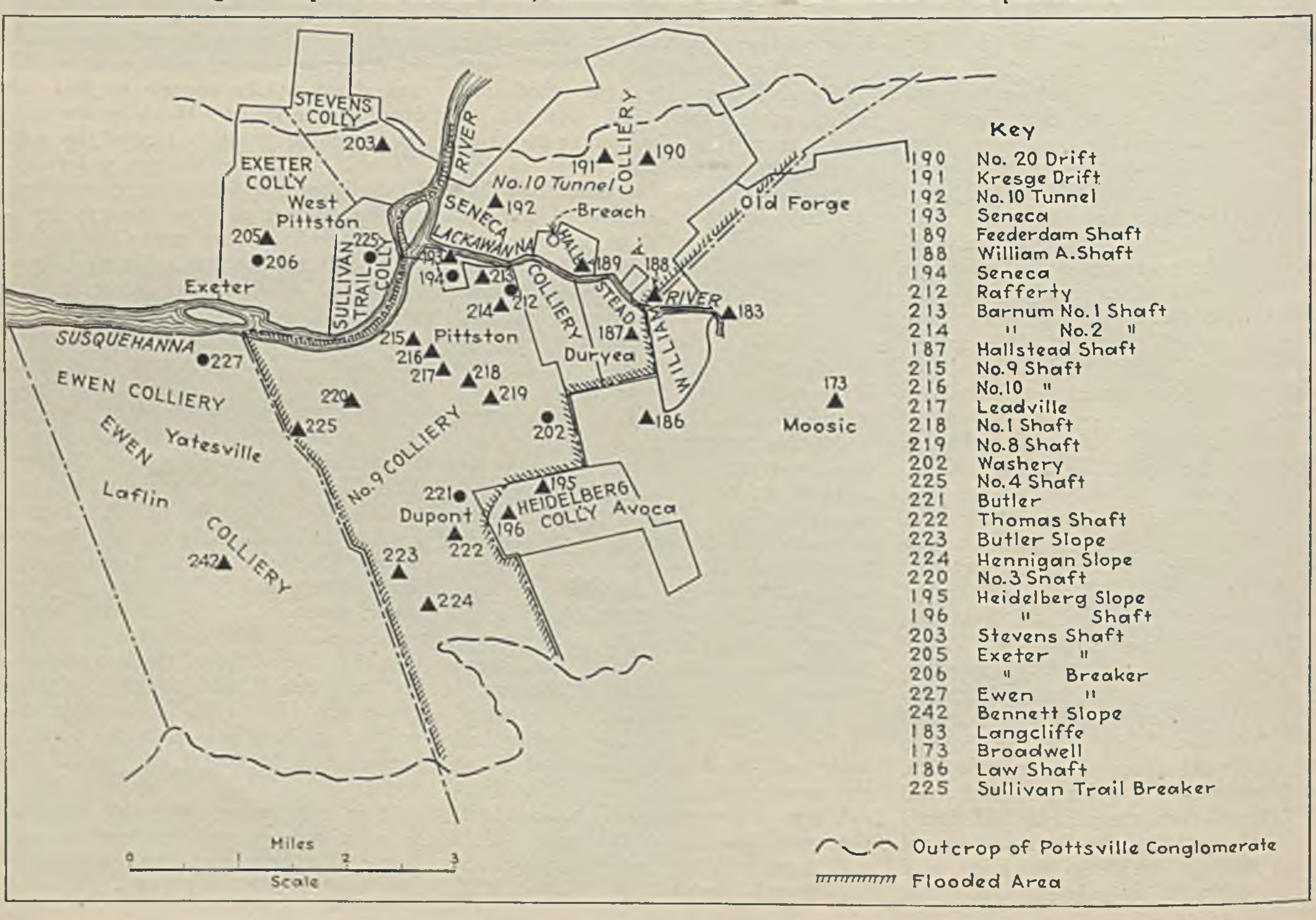
All the workings in the William A and Seneca collieries of the Kehoe-Berge Coal Co. below +316 ft. had been temporarily abandoned and allowed to fill with water long before the flood. Water was kept from rising further by four 2,500-g.p.m. pumps in No. 9 colliery of the Pittston Co., which pumped off only the excess. The workings of that colliery in the Middle and Lower Dunmores were extensive, though mostly in pillars. The basin dips toward the south end and, as stated, the lowest point is + 167.20 ft. at the foot of Barnum No. 1 shaft, where a 2,000-g.p.m. centrifugal pump —now submerged—was located to keep its workings free of water.

Other pumps were: Leadville shaft, Red Ash bed—two 1,700-g.p.m. plunger units and one 2,500-g.p.m. electric unit; Marcy bed—three 1,750-g.p.m. steam plunger pumps; No. 3 shaft, Red Ash bed—two 1,400-g.p.m. electric centrifugal pumps; Marcy bed—two 1,200-g.p.m. electric centrifugal pumps. All these pumps delivered either directly to the surface or to a tunnel at about that level. Under normal conditions, the Heidelberg No. 1 colliery of the Heidelberg Coal Co. delivers water through two 6-in. boreholes into No. 9 colliery. These holes were constructed so that the water would not have to flow around the barrier pillar but would enter No. 9 at a lower elevation. After the flood, the boreholes filled with flood water, part of which poured into the Heidelberg No. 1 workings.

The volume of water to be handled is variously estimated at between eight and eighteen billion gallons. It depends greatly on the time spent for removal, as the water was rising after the flood over 12 in. per day, which represented 15,000 g.p.m. for the Kehoe-Berge workings alone. None of this can be removed by the pumps in service before the flood, as they are submerged and will be useless, for some time at least, after recovery. Later, the water rose only 2 in. daily, and the inflow must have been smaller still in the drought period which followed. It may, however, increase later.

Because of the size of the dewatering job, it was certain that no one company would undertake the reopening of the flooded mines for a generation if it had to face the removal cost. In the Pittston mines named, little but pillars remained, and these at the lowest levels, making it necessary to remove all the water before any men could be employed. The Kehoe-Berge Coal Co., however, had some coal above water, which for a time has permitted restricted operation. To enable the 6,000 men employed to return to work and to save an estimated annual relief expenditure of $3,000,000, the State of Pennsylvania agreed to expend $700,000 to remove the water, paying for pumps, pipe, etc., and power, but not for any

Fig. 2—Map of the flooded area; Sullivan Trail and Stevens collieries are in part flooded



Sand-and-boulder dike, 500 ft. south of mine breach, March 26

labor connected with dewatering. This being accepted, the equipment shown in Fig. 3 was installed at No. 9 colliery.

The first Pittston Co. pump was started in the Leadville shaft on June 15. The water level at that time was +493.65 ft. On July 15 it had fallen 23.10 ft. to +470.55 ft. However, as two-thirds of the water is estimated to lie below the +316-ft. level, progress may not be rapid. Unlike many others in the anthracite region, basins are well developed in the No. 9 colliery and the workings in them cover a large area. At the Kehoe-Berge operations, two pumps have been placed in the Clark slope and two in the Manway slope, both leading away from No. 10 tunnel. Two have been stationed in the William A shaft and two in the Hallstead No. 1 slope, the latter two discharging up the Hallstead shaft.

All units in the Pittston and Kehoe-Berge collieries are Barrett-Haentjens 4,000-g.p.m. 350-ft.-head pumps driven by 400-hp., 4,000-volt, 3-phase, 60-cycle, linestart motors. The high voltage was chosen to reduce expenditures for shaft cables, which are of the 3-conductor 5,000-volt submarine type. The voltage selected also made it unnecessary to provide transformers, thus speeding up operation and reducing costs. Power is purchased from the Scranton Electric Power Co.

In each unit (see illustration), the pump extends over the end of the bedplate. All units are constructed so that they can be installed either vertically or horizontally. Motor mountings, of a new design, are fabricated of steel plates and channel irons so that the bedplate cannot be sprung or distorted. The pumps can be operated without being tied down or secured by props and there is no vibration. Impellers are non-overloading, so that the switch can be thrown in regardless of head. Pumps, including impellers and wearing rings, are of bronze, with a stainless-steel shaft and double-suction volutes with end suction. The discharge flange accommodates 10-in. pipe and the suction flange 12-in. pipe. Each pump is equipped with a manually operated primer. The Pittston Co., however, is using a separate priming pump stationed on the surface.

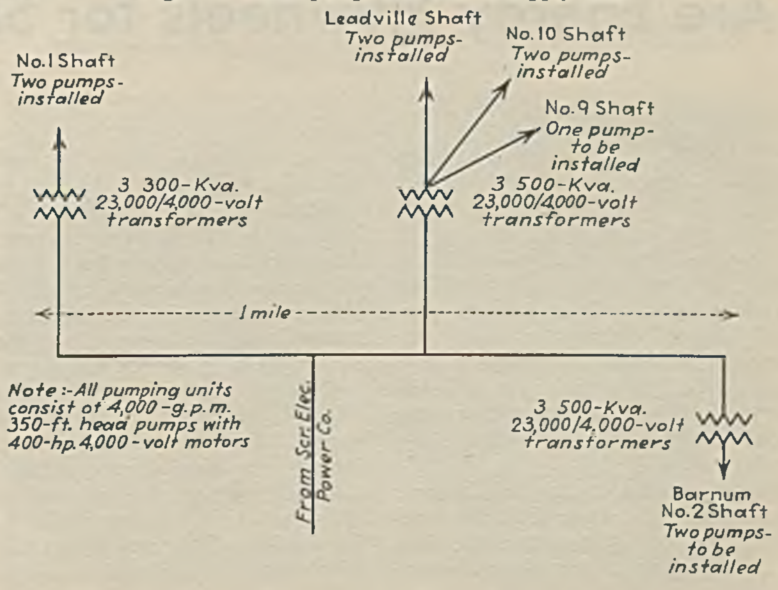
In the Kehoe-Berge slopes the two pumps are located one behind the other, with the 12-in. suction line of the upper unit passing the lower, using a 12-in. rubber hose for the necessary curvature. The lower pump discharges into a 10-in. rubber hose leading to the steel pipe past the upper pump. The two steel lines feed to a 16-in. wood line. The rubber connections greatly facilitate moving downward. In No. 10 tunnel, the two discharge lines from the four pumps are combined in a 20-in. wood line running 900 ft. overground to the old Lehigh Valley canal, which in turn discharges into the Lackawanna River. The canal had too easy a gradient, so it was dammed above the pipe-line discharge, after which the bottom began to cut toward the river. To limit this action, the bottom was covered with riprap near the river lest the latter, when rising, flood the canal and find its way into the cave holes. Discharges from the two William A pumps go into a 16-in. wood line 800 ft. long to the Lackawanna River.

At the Pittston operations, pumps are slung from the bottoms of the cages and lowered into place. The slings—two for each unit—consist of round steel bars resting on the cage rails. Two 1x6-in. straps hanging down from the ends of a sling bar support another round steel bar passed through the base on which the pumping unit rests. When the pumps are in place, they rest on 6x8-in. timbers set on the buntons, which are reinforced to carry the additional load. At the Kehoe-Berge operations, the pumps are lowered by chain hoists suspended by wire ropes from I-beams across the shaft collars. Men go down by cage in another compartment of the shaft.

To accommodate the 10-in. discharge columns in the Pittston shafts, the end of the cage platform is cut off the proper distance. Consequently, the cages can be run up or down in the shaft above the pumps without interference. Pittston pumps are lowered whenever the water level drops 17 ft. At the Kehoe-Berge operations, lowering will take place with each 19-ft. drop.

Cages are used only for the transportation of the men who work on or around the pumps. No coal is coming from the workings which they serve. When a pump must be lowered, the buntons on which the pumping unit is to rest are stiffened, requiring 6 or 7 hours. Then the pumps are lowered, requiring approximately another 7 hours. During this time, the other pump, if two are in service, is kept idle so that the men can work in relative silence. Pipe joints are flanged,

Fig. 3—Pittston pumps and electric supply lines



although, on the surface, welded joints have been used because of the irregular angles the line has to assume.

No one working around the shaft, above or below, is permitted to smoke, carry matches or use anything but an electric lamp, and no one is allowed to descend unless a fireboss has visited his place of work and has tested for methane within the hour. These precautions also are observed at the Kehoe-Berge operations. As dewatering progresses, it is feared that workings will release large quantities of methane. No difficulty with methane has been experienced so far, but carbon dioxide from the water has caused trouble at the Pittston operations through refusal to leave the shaft. Consequently, it has been necessary to drill through the shaft partitions and let air pass to the return.

Eruption of gigantic bubbles, throwing air and water violently up the shaft upon release of compressed atmospheres through dewatering, is another hazard for which provision has been made. To protect men working in the shaft from such eruptions, two 12x12-in.x9-ft. balks of timber have been connected and covered by 2-in. planks nailed thereto. This stage floats on the water and the men stand on it when working. The stage is held down by cleats and chains attached to the shaft guides to limit upward movement. However, it is expected that there will be ample room for such atmospheres to escape within the mine without coming to the shaft, and that their release will be gradual rather than rapid.

Thus far, the water has not been very acid, but it is expected that at greater depths extremely acid water will be encountered, as mine water seems to stratify according to its acidity. The new steel lines are merely extra-strength pipe, but they probably will serve for the life of the job.

Sullivan Trail colliery lies on the far side of Stevens colliery, which connects with Seneca, and water has seeped through the clay bed under the barrier. Efforts have been made to drive wedges to keep this water out, but so much water has passed and is passing that two pumps of the above type will be provided to remove water from that operation. Some water also is believed to have entered Exeter colliery of the Lehigh Valley Coal Co. from Stevens colliery. Also, some of the Exeter water may have come from No. 9 colliery, as a large area of the Exeter workings has been completely pillared and water may be leaking through crevices in the rock over the No. 9 barrier, which rock probably has been broken by this complete extraction.

Pumping is being conducted by Willmon Keiser, electrical engineer, for the Pittston Co., and by O. E. Kenworthy, consulting engineer, for the Kehoe-Berge Coal Co. The rapidity with which the work has been conducted has aroused much favorable comment. Governor Earle visited the mines March 28, and on March 31 a meeting of officials of the several coal companies of the section was held under the chairmanship of J. J. Walsh, Deputy Secretary of Mines. Two days later, specifications were prepared and received the approval of M. J. Hartneady, Secretary of Mines, and Mr. Walsh.

The first pump was tested at the shops on May 5 and was delivered May 12, but work was held in abeyance awaiting the arrival of more units, as it was feared that if a single pump could not handle the inflow it would be drowned and withdrawal might be difficult if a sudden rise of water occurred. Dewatering actually started June 11 at the Kehoe-Berge operations and June 15 at Pittston Co. workings. At the close of July, fourteen of the eighteen pumps were in operation.

It will be noted that the elevation of the subterranean flood waters at their highest was +493.65 ft. and that the low-water datum at the Wilkes-Barre Memorial Bridge is +511.03 ft. Hence, if a water tunnel started at Wilkes-Barre at datum and rose 13 ft. per mile, or $\frac{1}{4}$ per cent, the bottom of the tunnel at Seneca colliery would be 148 ft. above the highest point the subterranean flood reached and many feet above the Kehoe-Berge shaft collars. Before pumping commenced, the water level in Seneca colliery was only 78.4 ft. below the top of the shaft. The gradient of the Susquehanna River is, of course, much less than that of any workable water tunnel and to start the tunnel at a lower point in the river would give a large fall only at the expense of a decreased gradient, which would only accentuate the difficulty.

FLOATING BATTERIES

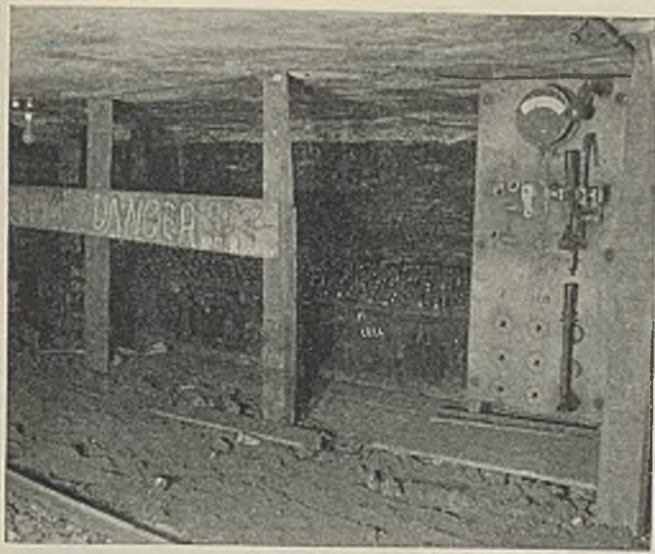
+ Are Energy Flywheels for Sahara D. C. System

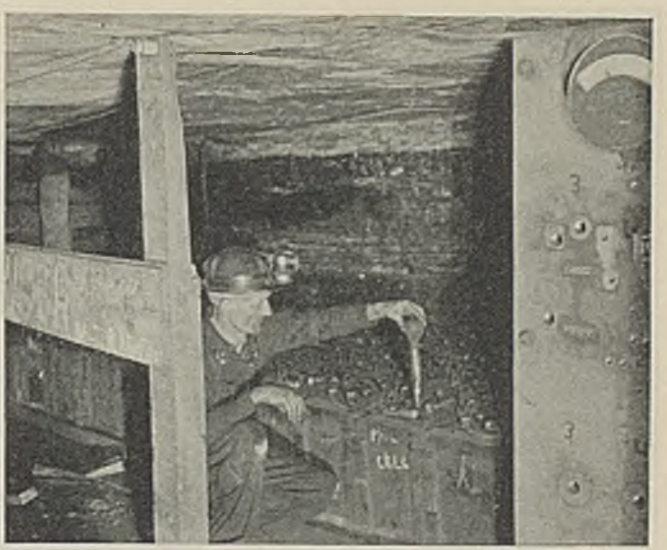
INSTALLED underground at two mines of the Sahara Coal Co. in Saline County, Illinois, stationary batteries are being used as energy reservoirs to improve d.c. voltage regulation. Holding down peak loads on substation units and saving on purchased power demand charges are secondary benefits. Mine-locomotive batteries which no longer have sufficient capacity for car-gathering service are utilized for this less exacting "flywheel" duty.

The batteries are installed at distances approximating one mile from the substations and are floated on the line, thus storing power when the mine load in the respective section is small and delivering power when the load exceeds predetermined peaks. Although a power loss occurs due to the inherent characteristic of storage-battery chemical and electrical action, the loss is balanced more or less by reason of transmitting the power from the substation at a lower average current.

This use of floating batteries in coal mining originated in Illinois in the early 1920s. At that time a stationary battery was applied successfully to the duty of raising the average voltage delivered to a 13-ton main haulage locomotive. This was coincident with, or perhaps followed, the use of locomotive batteries to drive the pumps and a fan at a mine which was shut down for a long period. Instead of operating the power plant every day it was run but one day per week and the batteries were charged on that day.

In 1925 an installation of outstanding success was made at the Big Four mine, in McDowell County, West Virginia. This consisted of a 31-plate 110-cell lead battery which in seventeen months effected a power demand saving equaling its first cost. For the few years of remaining life of the mine, the battery served its intended purposes of improving voltage regulation and of making it possible to increase production at





Left—A silent servant standing ready to cut 500 to 600 amp. from the peak load. Right—Mine Electrician Walker Renfro finds testing a few cells and adding water a simple task considering voltage benefit gained

the mine without relocation of the substation and without buying an additional unit (*Coal Age*, Vol. 29, p. 561; Vol. 39, p. 344).

The Sahara Coal Co. uses two batteries in the Sahara No. 10 mine, at Eldorado, and one in the Sahara No. 12 mine, near Harrisburg. The illustrations shown and the following description refer to the one installation in No. 12 mine, which is typical of the other two. Cells that have served in mine locomotive batteries constitute the stationary battery. When a locomotive battery drops in capacity to 80 per cent of normal, which is the guarantee limit and is the approximate point below which the battery will not serve for a full day of gathering duty, it is traded for a new battery. The old battery, however, is rented from the new owner for a nominal monthly fee and held at the mine as long as it has sufficient capacity to be useful in stationary service.

This battery in Sahara No. 12 mine is a lead-acid type and consists of 108 cells of 33 plates each. The number of cells was determined by experiment and is that number which allows the battery to regain full charge during the off-peak period and yet not overcharge to a degree that would waste power.

Distance from the shaft bottom to the battery is 6,400 ft. and the substation is situated on the surface near the shaft. Three No. 4/0 copper wires constitute the positive conductor and the return is the bonded track, consisting mostly of 40-lb. rail but including some 30-lb. size. Installation is at a wide place on the haulway at 3d and 4th east, 9th south, main west. A floor of loose boards and a wood fence form the battery room. The mine has a strong and reliable roof; therefore no structural ceiling is required over the battery.

Connection between the positive terminal of the battery and the trolley is through a single-pole knife switch and a single-pole manual-reset circuit breaker having an overload trip which is adjusted to 600 amp. An ammeter with its hand adjusted to a zero position part way up the scale to indicate charge and discharge, and mounted on the panel, completes the control equipment. Occasional checking of the gravity of a few pilot cells and adding water as required are the only attentions given the battery.

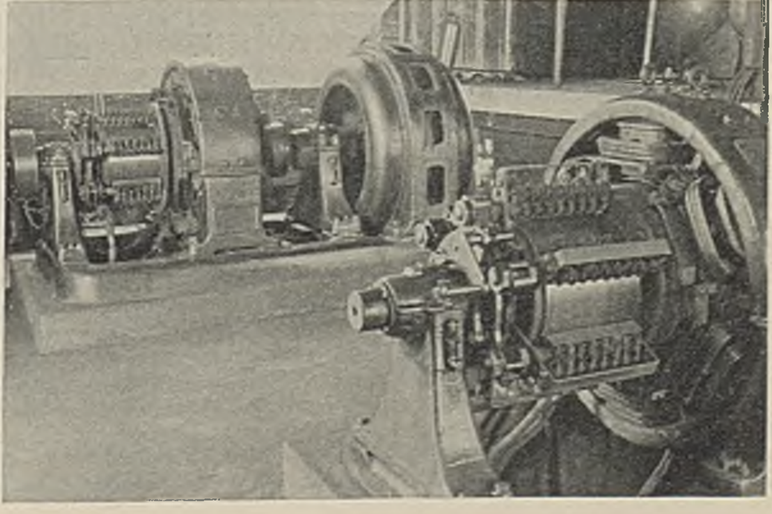
The one substation which furnishes all of the 275-volt d.c. power to the mine is situated in the hoist house and includes two units operated in parallel, one a 200-kw. synchronous motor generator and the other a 200-kw. synchronous converter. Installation of the battery relieved these machines of peak loads which were beyond their capacities for satisfactory operation.

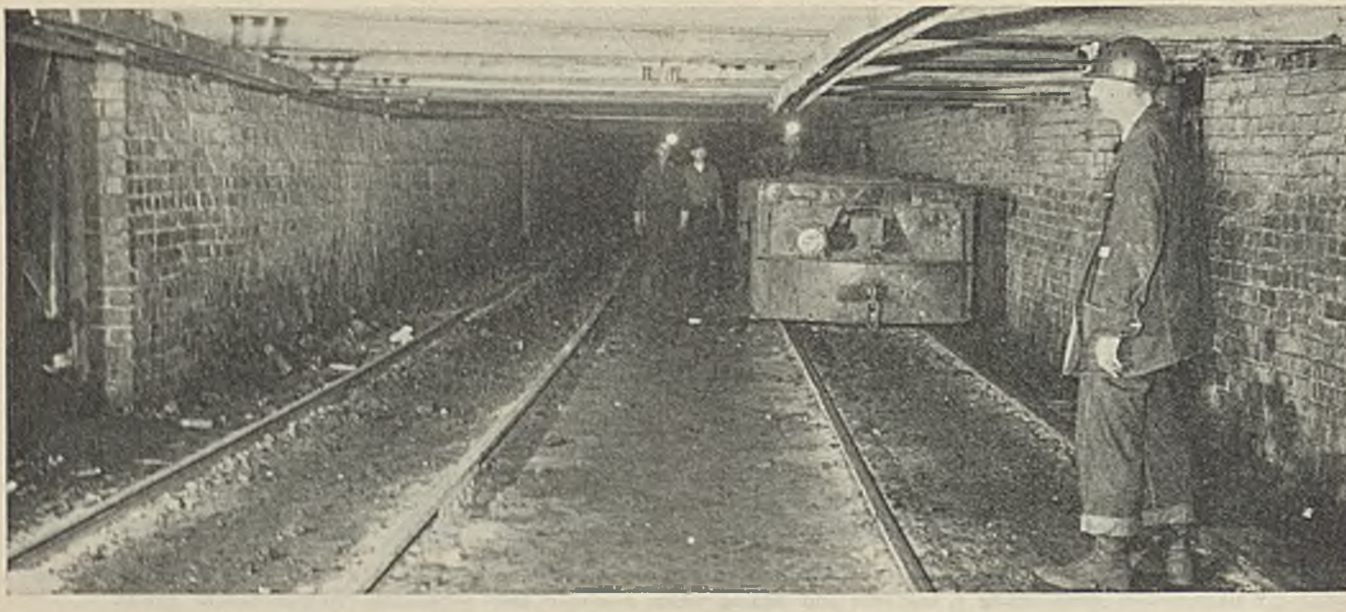
Ten shortwall machines, ten breast machines and seven locomotives constitute the d.c. load on the underground distribution. Two of the locomotives are 10-ton haulage type, two are 8-ton of the same type and three are 6-ton cable reel. The mine is worked one shift and the cutting is done on that shift.

Seven battery locomotives all equipped with lead-acid type 48-cell batteries gather a large part of the daily tonnage: four are General Electric 6-ton, two are Mancha 3½-ton and one is an Ironton 6-ton locomotive. Cell sizes in the batteries of these three types of locomotives are 49-plate, 29-plate and 33-plate, respectively. These batteries are charged by a motor generator situated at the shaft bottom.

Coal thickness in Sahara No. 12, which mines the No. 5 seam, averages 60 in., and the production is 2,000 tons per day. Cutting this quantity of coal from a 5-ft. seam and hauling it an average of 1½ miles, all by power from a 400-kw. substation situated on the surface near the hoisting shaft, speaks for the efficient flywheel effect of the battery on the d.c. generating and distributing system.

The peak-limiting action of the stationary battery lightens the duty on the two substation units





Inbye end of the double-tracked haulway at No. 1 mine. Roof support consists of steel I-beams on brick walls. At the left is the 80-lb. loaded track and at the right is the 60-lb. empty track with a haulage locomotive in the background and O. J. George, mining engineer, in the foreground. The creosoted ties have been in service since 1930 without a replacement.

PERMANENT HAULWAYS

+ Plus Trip Control by Dispatching

Mark Transportation at Clyde Mines

HAULWAYS constructed for permanency and freedom from trouble, and accurate control of equipment movement are relied upon to keep tonnage up to the mark at the Clyde Nos. 1 and 3 mines of W. J. Rainey, Inc., Fredericktown, Pa., where distances are measured in miles rather than in fractions. The Clyde mines together dump an average of 1,300 to 1,400 mine cars per shift (both mines work two shifts per day), the major part of which are hauled 3½ to 5 miles. A connection between the two mines permits adjustment of haulage schedules to secure the maximum benefit from the installed dumping capacity of both operations.

Clyde No. 1, a drift operation, and Clyde No. 3, a shaft mine, are both opened in the Pittsburgh seam, averaging, in the territory now being worked, about 6 ft. in thickness. In accordance with the general practice in Pittsburgh seam territory in western Pennsylvania and northern West Virginia, top coal is left up as a measure of protection against the characteristic Pittsburgh drawslate and "Rider" coal. About 5 in. of bottom also is left in place.

The initial steps leading to the present smooth-functioning transportation system were taken soon after the company acquired the present Clyde operations, now the Nos. 1, 2 and 3 mines. These properties were acquired during the latter part of 1928 and were consolidated with the company's holdings in Greene and Washington counties. Clyde No. 2 coal at present is mined from No. 1 and No. 3, although a haulway is maintained to No. 2 tipple for use when desired.

With the passing of the three mines to the Rainey organization, the practice of driving relatively wide rooms and leaving narrow rectangular pillars was abandoned in favor of the block system under which all major openings, both entries and rooms, are driven to produce blocks approximately 68 ft. square, which are extracted by opening from two sides (Fig. 1). Both entries and rooms are driven 12 to 13 ft. wide on 80-ft. centers. The same centers also apply in driving crosscuts.

The first step in transportation at Clyde No. 1 was the construction of a permanent haulway through the old workings to reach the reserves beyond. After study of the factors involved, the company decided on a double-tracked roadway laid to grade in an 18-ft. heading properly timbered to reduce roof trouble to a minimum. The new heading, it was contemplated, would be constructed on sights along the general line of the old entry, using one heading of this entry where possible but otherwise cutting through the pillars or crossing from one original heading to the other where necessary to secure a straight line. One track, laid with 80-lb. steel, was designed for loaded trips. The other track, laid with 60-lb. steel, was designed for empty trips, thus separating outgoing and incoming traffic.

Length of this haulway through the old workings is 8,700 ft. General dip of the seam is away from the pit mouth on the Monongahela River. Gradient on the various sections of the haulway, starting at a point just inside the mine portal and excluding a short stretch from there to the outside, is as follows: 2,210 ft., level; 500 ft., —0.12 per cent; 550 ft., —0.18 per cent; 550 ft., —0.13 per cent; 650 ft., +0.34 per cent; 350 ft., —0.28 per cent; 425 ft., +1.29 per cent; 275 ft., +0.07 per cent; 300 ft., —0.80 per cent; 450 ft., —1.51 per cent; 300 ft., level; 600 ft., —1.51 per cent; 550 ft., —0.89 per cent; 450 ft., —0.40 per cent; 220 ft., —1.46 per cent. In constructing the haulway, very little cutting was done in the top, the major operation on the roof consisting of removing the material necessary to permit it to be made safe. Maximum depth of cut in the bottom was 24 in., this sufficing to bring most of the grade down on the slate.

As a base for the track a subgrade of 8 to 9 in. of red dog, or burnt shale, was laid on the bottom. On this the ties were laid. The track was ballasted with red dog tamped with shovels. To keep water off the haulway, ditches were established in adjacent headings, with laterals through crosscuts at intervals. Three sumps receive the water from the ditches, from which it is pumped to the surface. In all, 10,000 5x6-in.x6-ft. creosoted oak ties and 13 creosoted switch sets were required for the job—a forerunner of construction involving, to date, the purchase of a total of 34,703 treated ties for Clyde No. 1 mine alone. In fact, treated ties are now standard at both Clyde No. 1 and No. 3 for permanent or semi-permanent track with a life of seven years or more.

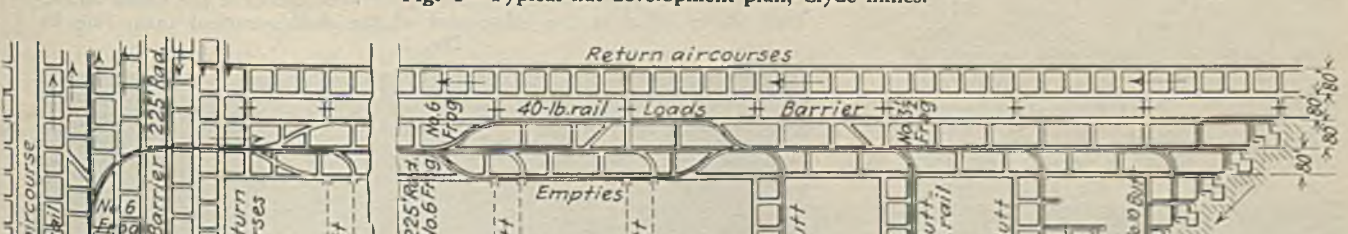
Treatment specifications, applied in all subsequent purchases, called for a minimum of 6 lb. of 80/20 creosote per cubic foot. Ties were supplied from the plant of the Keystone Wood Preserving Corporation. Construction of the haulway was started in February, 1930, and was completed within the year. To date, according to mine officials, no tie replacements have been made and the ties in place still are in good condition. Life of corresponding oak ties untreated, available information indicates, is three to five years.

Henry Livingston, general mine foreman, No. 1 mine, inspects H-beams mounted in hitch-drill holes to protect a new stretch of 80-lb. loaded track. The 1,000,000-circ.mil feeder wire is suspended alongside the trolley wire on the right.

Type of roof support on the haulway was varied to meet conditions encountered. Consequently, in certain places, no support at all is installed, in others, the support consists of a single row of posts set between the tracks. Where spans were long and the roof was bad, however, brick walls were constructed as supports for 15-in. steel I-beams set on 4-ft. centers. All turnouts, laid with No. 6 frogs leading into 225-ft. radius curves onto the various "flat" or other entries, are protected by brick construction, including brick points, and I-beams. In places where the roof had fallen or was taken down to some height, heavy creosoted planks were laid on the I-beams, these planks serving as bearings for locust posts or brick pillars located over the beams.

Since construction of the original haulway, sufficient additional double track has been laid to bring the total close to two miles. In the newer installation, however, the tracks were placed in separate headings, thus reduc-

Fig. 1—Typical flat development plan, Clyde mines.



Steel beams and brick side walls and points are employed to protect main-line turnouts in the Clyde mines.

inging the width of opening to be timbered and maintained. Construction and engineering on this stretch and on additional single-track main line serving advanced workings are similar to those on the original haulway, including brick turnout protection, except that timbering on straight stretches is now done primarily with a hitch drill developed by the company and 6-, 8-, 10- and 12-in. H-beams, the latter largely for turnout protection.

Construction at Clyde No. 3 follows the basic principles applied at No. 1, except that single-tracked main lines are used instead of double-tracked. Also, at No. 3 the grade follows the bottom, but in spite of this the grade rarely exceeds a maximum of 2 per cent against the loads, which is the same as the limiting grade in the new workings in No. 1 mine. This year, 9,400 ft. of 85-lb. track on creosoted ties was laid at No. 3 mine, supplemented by 11,000 ft. of trolley wire. Ties used in laying this stretch of track totaled 2,955 at an average cost of 72c. each. Average cost of a corresponding untreated tie is 25c. Track gage in both mines is 44 in. Construction standards call for a trolley-wire location 6 in. outside the right-hand rail, with the feeder line paralleling it on the outside. Ohio Brass clamps, hangers, etc., are used throughout.

In building the new haulways, 6/0 trolley wire is used exclusively, with 1,000,000-circ.mil feeder lines. Trolley wire is lubricated with an O-B lubricator, the job in either mine taking a crew of two men approximately one shift. Consumption for the entire No. 1 operation is approximately 10 gal. of lubricant; consumption for No. 3 is approximately 6 gal. for the mine. Shoes, or gliders, are used on all main-line locomotives to insure maximum current-collecting effectiveness.

Flat entries in both mines, from which the room development takes place, are laid with 40- or 60-lb. steel, as conditions may dictate, and, if the prospective life of all or a part of a flat heading warrants it, creosoted ties are employed. Rooms are laid with 30-lb. rail on wood ties.

Gathering at Clyde No. 3, which hoists 450 to 500 cars per shift at present, although the total can be increased to 900, is done by eight cable reel gathering locomotives and some stock. Part of the cars gathered in No. 3, as will be explained later, go to the No. 1 tipple for preparation. Haulage in No. 3 is handled by four 13-ton trolley locomotives. Main-line trip size in both No. 3 and No. 1 mines is limited to 35 cars to avoid running up demand peaks. Gathering locomotives generally average 10-car trips. Gathering at No. 1 mine is handled by ten locomotives and fourteen mules. These gathering units are served by one 10-ton and two 20-ton relay locomotives, which haul to a sidetrack near the end of the double-tracked main line. Trips between the latter point and the tipple are handled by a 30-ton trolley locomotive originally used at the Allison mine of the company. Average coal dumpings over the No. 1 tipple are 850 to 900 cars per shift, of which a part are derived from No. 3. Minimum haul at No. 3 is at present one-half mile from a pillar section near the shaft. When this is completed, in about two years, all coal will come from a distance of 5 miles—the present maximum—or more. Minimum haul at No. 1 is now 3½ miles. The maximum is 4½ miles. Maximum haul from No. 3 to the No. 1 tipple is at present close to 6 miles.

Distances to be covered and the number of units to be kept in constant operation without interference or loss of time naturally dictated the use of dispatchers. In No. 1 mine, the dispatcher's office is at the inbye end of the double-tracked haulway; in No. 3 mine, the office is near the shaft bottom. Each dispatcher controls haulage operation in his own mine and the two of them work together in directing loads from No. 3 to No. 1 tipple, this cooperation being made possible by telephone connection between the two offices. Loads from No. 3 to No. 1 are brought out about half way of the connecting road between the two mines by the No. 3 haulage unit. Sidetracks are maintained at this point to facilitate interchange of loads and empties, and here the No. 3 locomotive is met by a unit from No. 1, which leaves empties and takes the loads.

Transportation control centers in the dispatchers' offices at the Clyde mines. View shows office at the inbye end of the double-tracked main line in No. 1.

ROLLED-STEEL WHEELS

With "Balloon" Tread Last 8 Years At Berwind West Virginia Operations

By J. H. EDWARDS
Associate Editor, Coal Age

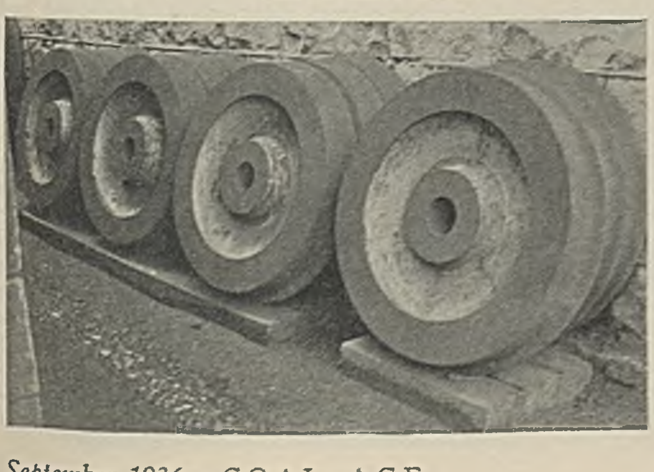
ALTHOUGH more than one large operation has found by experience over long periods that locomotive-wheel maintenance costs are less with rolled-steel wheels than with wheel centers and tires, the number of companies using rolled-steel wheels is distinctly in the minority. Outstanding in this minority, however, is the New River & Pocahontas Consolidated Coal Co. of West Virginia. This company has used rolled-steel wheels constantly since 1913 and has developed a "balloon" wheel practice which completely answers the stock objection that pressing wheels on and off soon reduces the fit to a diameter below standard.

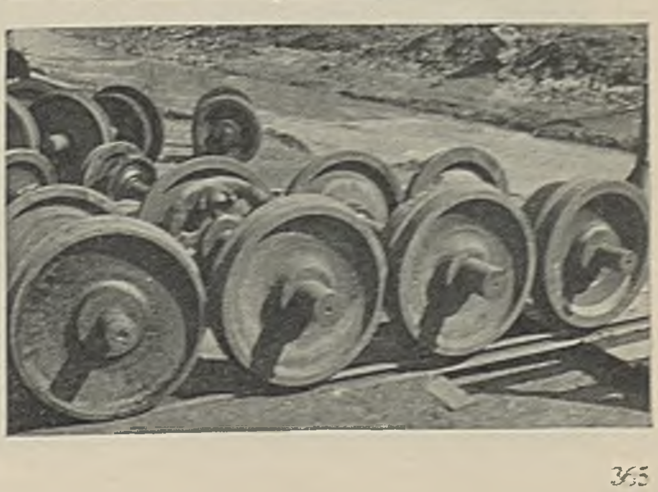
Two methods for truing worn treads are employed by the New River & Pocahontas company. At the Berwind shop, the wheels are turned without annealing and thus without being removed from the axle. Hard spots caused by electric arcs are reduced by a small grinder fastened to the lathe tool post. No difficulty has been encountered from wear of the fitting surfaces due to pressing on and off for changing wheels at the end of their life. At the Minden shop, truing is accomplished by pressing the wheels off cold, annealing, pressing on cold and turning the tread in a lathe. Despite this additional pressing on and off for annealing, no trouble from loose wheels is reported. According to the mechanics, annealing appears to produce a permanent shrinkage in bore diameter which is enough to compensate for press-fit wear.

In 1925, P. P. Kerr, at that time a new man with the company and now general superintendent, saw the possibility of buying the rolled-steel wheels with treads of extra thickness, so that, after the wheels were worn and turned to a diameter too small for track clearance, they could be reinstalled on a locomotive built for a smaller wheel. The following year, the Bethlehem Steel Co. manufactured the first of these balloon-tread wheels for use at Berwind. The idea proved so successful that it soon was adopted at other mines of the company. As a result, the balloon wheels now save between eight and ten thousand dollars per year, depending on the tonnage. Many of the balloon wheels last for eight years and in that time may be used on three different types of locomotives. This probably means eight services and six or seven turnings. After each turning the wheel-tread diameter is ⅜ to ½ in. smaller than it was at the previous turning. Four inches is the maximum thickness of tread specified in purchasing the wheels.

At Berwind, the 4-in. tread is practical only for the gathering locomotives, which are built for 28-, 26- and 24-in. wheels. Thus when the 28-in.-diameter 4-in. tread (original size) goes into its third locomotive-type service, it has been machined to a wheel of 24-in. diameter and 2-in. tread. The two inches of extra metal specified in the tread adds approximately $3 to the first cost of a wheel. The main-haulage locomotives have wheels of 36-, 33- and 30-in. diameters, respectively, and for these the tread-thickness specification is 2½ in. The 36-in. wheel is not transferred to a smaller-wheeled locomotive, but many of 33-in. wheels finish their service on 30-in. wheel locomotives. At Minden, wheels originally 33 in. in diameter find their second service on locomotives requiring 28-in. wheels. Service steps in the other

The life of the 30-in. balloon wheels with treads 4 in. thick, shown in the illustration at the left, will be eight years or more at the Berwind mines. The right-hand illustration, taken at the Berwind shop, shows, left to right, 30-in. wheels worn to 1-in. tread thickness, to be removed and junked; four wheels ready to go back into service with treads reduced to 1¼ in. in thickness and able to stand one or two more turnings; new 30-in. wheels with 2½-in. treads

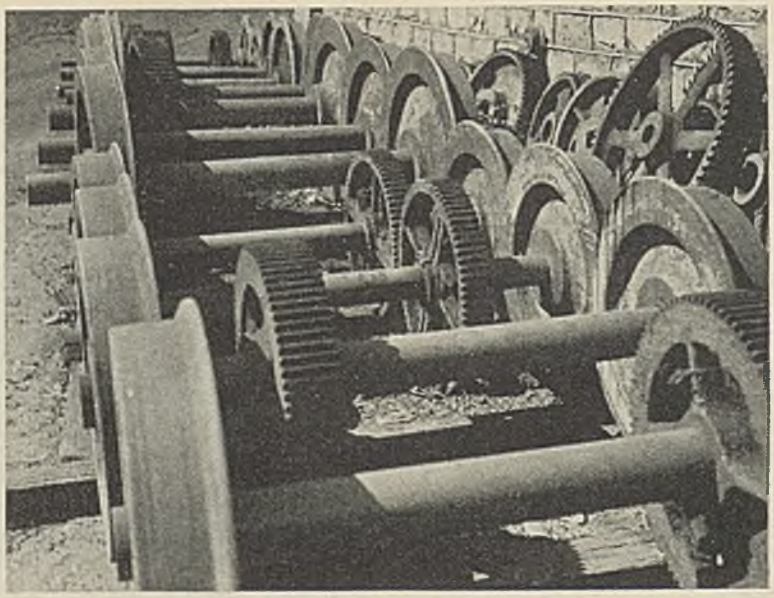




sizes are 30 in. to 26 in. and 28 in. to 24 in.

In most cases, transfer to smaller-wheel locomotives requires adapting the wheels to smaller axles; this is done by shrinking bushings onto the axles. Bushings usually are made with a thickness of ⅜ in. or more; holding these in place is effected either by turning the axle to a smaller diameter, which will provide a shoulder, or by spotting a few electric welds at the ends of the bushing. The first method is in use at Minden where wheels are removed for annealing preparatory to turning and, in about three cases out of four, the bushing comes off with the wheel.

Both split and solid gears are used; the choice depends on the service and upon the location of the mine with respect to a shop equipped with a wheel press. Solid gears are standard at Berwind, but one set of split gears is kept in stock for emergency repairing. In the case of an axle made in the mine shop with a wheel-fit diameter larger than standard and on which axle a solid gear is used, a wheel-fit bushing is provided in one end to accommodate the installation of a gear of standard bore.



Twenty-three years of experience is back of this assembly of rolled-steel wheels at the Minden shop

The New River & Pocahontas company has found that the use of rolled-steel wheels is advantageous from the standpoint of maintaining gears and pinions in an alignment which insures even wear over the whole length of the teeth. The cost of wheel-center renewals also is eliminated and axle-liner and gear-renewal costs are reduced. In addition, rolled-steel wheels have high safety and reliability ratings, and those features, together with a long-term cost advantage, account for their exclusive use at the mines of this company. Indicative of the stress laid upon maintenance is the record of a 15-ton locomotive operating at Minden mine: the total time lost through mechanical and electrical delays to this locomotive during one year of normal operation was only 40 minutes.

BIT-SHARPENING COST

+ Cut to Less Than One-Half

By HECTOR HALL

Chief Electrician, Mine No. 2
Bell & Zoller Coal & Mining Co.
Zeigler, Ill.

REDUCTION of the labor and material cost of bit sharpening per ton of coal produced to less than one-half the former figure has followed the adoption of hard-facing and the installation of a complete bit-sharpening and facing plant at the Zeigler No. 2 mine of the Bell & Zoller Coal & Mining Co., Zeigler, Ill. No. 2 mine normally produces 4,500 to 5,000 tons of coal in seven hours. In the past, our records show, we have used one cutter bit per ton of coal cut. These bits were formed in a Sullivan bit sharpener and were of the type commonly known as the "Standard Pittsburgh 30-deg. pick-point bit," generally used in southern Illinois.

To resharpen the 4,500 to 5,000 bits needed each operating day required 21 man-hours of labor. The only treating process in use was a soap-water bath. This bath, we found, did not give us uniform bits, as in many cases water strains occurred in the steel, with the result that when hard cutting was encountered the bits quite often would break. Labor cost for sharpening the bits was approximately $0.0032 per bit, or per ton of coal produced. To service our sixteen shortwall machines, we had to keep on hand approximately 20,000 bits, equivalent to 5 tons of bit steel. This stock was replenished at the rate of 1 ton per month to take care of worn-out, lost and broken bits. Even then there were occasions when cutting was delayed because of lack of sharp bits.

Table I—Tons Cut per Bit and Sharpening Cost Before and After Installing Bit-Sharpening and Hard-Facing Plant

	Old Method	New Method
Tons cut per bit	1.0	4.0
Tons cut per bit rerolled	1.0	10.2
Labor cost of sharpening, per ton	$0.00316	$0.00113*
Material cost, exclusive of bit steel, per ton	....	$0.0002
Labor and material cost, exclusive of bit steel, per ton	$0.00316	$0.00133
Number of bits in daily service	20,000	5,000

* Including regrinding and hard-facing, in addition to rolling, counting and loading and unloading bit truck.

The new bit-sharpening and hard-facing plant, supplied by the Sullivan Machinery Co., consists of the more modern roller-type sharpener, an automatic oil-fired bit heater, an oil-fired preheating furnace with blower for heating the bits in preparation for hard-facing, a rotating bit-facing table mounted on ball bearings with bit-holding blocks, small service tables and wheeled trucks, special hard-facing torch and a floor-type two-wheeled grinder. The equipment went into service on June 5. Between that date and Aug. 1, the mine operated 32 days. Initial instruction in the operation of the plant was provided by a Sullivan engineer, and in a few days the installation was taken over by the mine staff, which has since operated it satisfactorily.

At the start, each of the sixteen cutting machines were provided with 250 sharpened and hard-faced bits. Since that time, a careful record of the results on each operating day has been kept, showing (Table II) the date, mine tonnage, total bits used, bits reground and placed back in service without resharpening, number of bits resharpened and refaced and the average tons cut per bit, based on the total number of bits used. It will be noted that after the first four days the number of bits reground and placed back in service increased, while the number resharpened and refaced decreased. We attribute this partly to an improvement in the shape of the bit with each successive resharpening and partly to better technique in applying the hard-facing material.

Experience to date indicates that we can reasonably expect one man to regrind bits at the rate of 500 per hour, resharpen bits at the rate of 300 per hour and hard-face at the rate of 500 bits per hour. Accordingly, if we can continue to maintain our present average of 692 regrinds and 451 sharpenings and refacings per day, our labor cost will run approximately $0.00115 per ton, as compared to the previous average of $0.00316 per ton. It also is reasonable to expect that our investment in bit steel will be reduced to about 25 per cent of the former figure. Thus far, the number of bits faced per pound of hard-facing material averages 2,200. The preheating furnace consumes ½ gal. of oil per hour and consumption of oxygen and acetylene in facing runs 17½ cu.ft. per hour each. Material cost arising out of hard-facing, on the above basis, therefore should be approximately $0.0002 per ton.

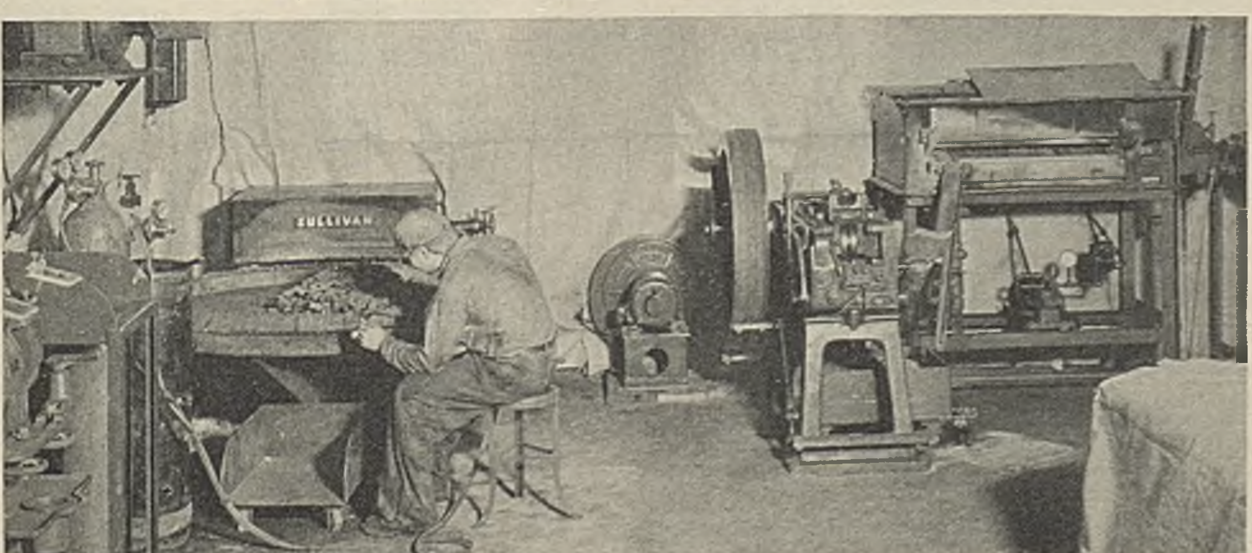
Table II—Tons Cut and Bits Used, Zeigler No. 2 Mine, by Days, June 5 to July 31

Date	Mine Tonnage	Number of Bits Used	Number Bits Reground	Number Bits Rerolled and Tipped	Tons Cut per Bit Used
June 5, 1936	4,401	1,224	520	704	3.6
June 6	4,416	1,335	778	557	3.3
June 9	4,611	1,206	784	422	3.8
June 10	4,460	971	710	261	4.1
June 12	4,615	1,408	1,050	358	3.3
June 13	4,337	1,299	883	416	3.3
June 15	4,832	1,355	868	487	3.6
June 16	4,092	1,085	752	333	3.7
June 18	4,873	1,106	760	346	4.4
June 19	4,936	1,182	758	424	4.2
June 20	2,242	472	267	205	4.7
June 22	4,706	1,206	541	665	3.9
June 23	3,962	1,040	536	504	3.8
June 24	5,344	1,360	759	601	3.9
June 25	4,654	1,206	784	422	3.8
June 26	4,296	1,283	870	413	3.3
June 27	4,819	1,132	810	322	4.2
June 29	4,130	1,416	944	472	2.9
June 30	4,864	1,292	874	418	3.7
July 1, 1936	4,750	818	518	300	5.8
July 2	4,952	1,073	692	381	4.6
July 3	4,732	794	432	362	5.9
July 6	4,840	1,013	587	626	4.7
July 7	4,692	1,082	580	502	4.7
July 8	4,706	1,212	680	532	3.8
July 9	4,900	1,516	772	744	3.2
July 10	4,950	778	417	361	6.3
July 13	4,647	1,320	840	480	3.8
July 15	4,825	1,070	636	434	4.5
July 22	4,848	915	550	365	5.3
July 23	4,741	1,132	674	458	4.2
July 24	5,030	1,060	512	548	4.7
Total	147,203	36,361	22,138	14,423	....
Daily average	4,600	1,137	692	451	4.0*

* Average tons cut per bit rerolled and tipped in the above period was 10.2

Installation of the sharpening and hard-surfacing plant also has been reflected in a substantial improvement in cutting-machine performance. A time study conducted with a stop watch shows an increase of 4 to 6 in. per minute in the feed speed of the machines in cutting across the face, as compared with the former type of bit. Cuttings are coarser and the usual cloud of fine dust practically disappeared while cutting. We feel that the machines will average one more place per shift through a reduction in bit setting time to about 25 per cent of the former figure, to say nothing of the increase in cutting speed. It is reasonable to believe that the load on the machines is less, which should result in decreased power consumption and lower repair costs.

Bit-sharpening and hard-facing plant at Zeigler No. 2 mine. The bit sharpener and heater are at the rear right. At the left are the preheating furnace and facing table in the rear of the gas tanks and grinder.



COAL DOMINATES

+ Fuel Selection for Home Heating For Urban Communities of Nation

ONE of the favorite pastimes of the little brothers of gloom is to lament—sometimes, it is suspected, with more fervor than grief—the crumbling of the vast empire of King Coal. Their jeremiads have been so persistent and so persuasive that not a few coal men who have lost a choice piece of business to a competitive fuel have joined them at the wailing wall. That oil and gas have made real inroads on markets once considered the exclusive domain of solid fuels is too well known. But gleeful arrangements for the final obsequies of King Coal are, to say the least, slightly premature.

Despite the losses suffered on the domestic front in recent years, coal is still the dominant fuel for house heating. Striking evidence of this fact is revealed in the figures gathered in the housing survey made in 64 selected cities by CWA workers under the direction of the Department of Commerce. Field work on this project, officially known as the "Real Property Inventory," was done in 1934. The general statistics later made available by this survey now are being supplemented by a special series of studies on "Consumer Use of Selected Goods and Services by Income Classes," published by the Bureau of Foreign and Domestic Commerce and edited by Ada Lillian Bush, chief of the consumer market section of the marketing research and service division.[1]

Analysis of consumer choice between the three major domestic fuels in the 64 cities covered by the survey (Table I) shows approximately 78.6 per cent using coal, 13.6 per cent using gas and 7.8 per cent using oil. In the regional groupings of these cities (Table II), coal had the greatest percentage of users —96.1 per cent—in the Middle Atlantic area; the North Central area came next with 91.1 per cent and the Middle Central area was third with 87.9 per cent. The New England and northern New York-Pennsylvania group—Northeastern area—reported 80.4 per cent of the units covered using coal. The lowest percentage—55.7—was credited to the Southwestern and Pacific Coast group. Figures given apply only to the number of families or dwelling units—not to relative tonnages; no data on actual consumption are included in the summary reports.

When all fuels are included, the figures (Table I) show that coal was the choice of more than 80 per cent of the consumers in 33 of the 64 cities and of from 59.8 to 98.7 per cent of the users in 45 cities. According to

Table I—Domestic Fuel Preferences in 64 Cities

City and State	Population (1930 Census)	Percentage of Families Using: Coal	Wood	Gas	Oil	Other Fuels
Albuquerque, N. Mex. (7)*	26,570	72.0	6.1	20.4	1.2	0.1
Asheville, N. C. (6)	50,193	97.8	1.4	....	0.3	0.2
Atlanta, Ga. (6)	270,366	96.4	0.2	2.2	0.3	0.3
Austin, Tex. (6)	53.120	1.6	38.3	58.5	1.1	0.2
Baton Rouge, La. (6)	30,729	22.6	21.7	46.8	0.8	0.7
Birmingham, Ala. (6)	259,678	96.0	0.6	0.6	0.1	2.5
Binghamton, N. Y. (1)	76,662	96.4	0.1	0.8	2.5	0.2
Boise, Ida. (3)	21,544	89.2	5.7	0.1	0.8	4.1
Burlington, Vt. (1)	24,789	69.5	6.0	0.1	17.5	6.0
Butte, Mont. (3)	39,532	67.9	1.7	27.7	0.2	2.1
Caspar, Wyo. (3)	16,619	44.0	0.6	52.6	0.2	1.8
Charleston, S. C. (6)	62,265	26.6	58.7	1.5	3.2	7.1
Cleveland, Ohio (2)	900,429	89.9	0.1	9.2	0.1	0.2
Columbia, S. C. (6)	51,581	65.9	31.2	0.1	0.7	0.6
Dallas, Tex. (6)	260,475	0.4	17.2	81.9	0.1	0.2
Decatur, Ill. (5)	57,510	96.8	0.2	1.4	0.9	0.2
Des Moines, Ia. (5)	142,559	92.4	0.3	1.9	5.1	0.2
Erie, Pa. (2)	115,967	83.9	0.4	3.8	0.7	11.0
Fargo, N. D. (3)	28,619	86.3	0.5	....	12.6	0.2
Frederick, Md. (4)	14,434	96.3	2.4	....	1.0	0.1
Greensboro, N. C. (6)	53,569	95.6	3.1	....	0.5	0.5
Hagerstown, Md. (4)	30,861	97.0	0.2	0.1	2.5	0.1
Indianapolis, Ind. (5)	364,161	96.1	0.1	....	1.8	1.6
Jackson, Miss. (6)	48,282	21.5	24.9	53.5	....	0.1
Jacksonville, Fla. (6)	129,549	24.3	64.5	1.9	1.5	7.2
Kenosha, Wis. (2)	50,262	96.7	....	0.1	2.8	0.2
Knoxville, Tenn. (6)	105,802	98.7	0.4	....	0.1	0.7
Lansing, Mich. (2)	78,397	97.3	0.1	0.2	1.7	0.6
Lincoln, Neb. (5)	75,933	72.9	3.1	12.5	10.2	0.6
Little Rock, Ark. (6)	81,679	1.4	26.6	71.2	....	0.1
Minneapolis, Minn. (2)	464,356	88.7	0.6	0.3	9.9	0.3
Nashua, N. H. (1)	31,463	48.5	14.8	0.5	20.8	13.7
Oklahoma City, Okla. (6)	185,389	5.0	5.3	88.1	0.2	0.3
Paducah, Ky. (5)	33,541	97.9	0.6	....	0.1	0.1
Peoria, Ill. (5)	104,969	93.5	0.1	2.1	2.9	1.2
Phoenix, Ariz. (7)	48,118	34.9	47.2	3.1	6.9	6.9
Portland, Me. (1)	70,810	81.2	1.8	0.3	10.7	5.4
Portland, Ore. (3)	301,815	5.7	68.4	3.1	16.7	5.9

* The figures in parentheses show the group into which each city is included in the regional group data shown in Table II.

[1]Separate reports so far issued in this series cover Austin, Texas; Birmingham, Ala.; Columbia, S. C.; Fargo, N. D.; Portland, Me.; Racine, Wis.; Salt Lake City, Utah; San Diego, Calif.; and Trenton, N. J. A consolidated report covering Burlington, Vt.; Caspar, Wyo.; Des Moines, Iowa; Erie, Pa.; Frederick, Md.; Lansing, Mich.; Oklahoma City, Okla.; Paducah, Ky., and Portland, Ore., is now in process of preparation.

the 1930 census, the combined population of these cities that year was 7,711,380. This was approximately 11.2 per cent of the total urban population (68,954,823) of the country in 1930. Knoxville, Tenn., led the field in the percentage of consumers using coal; Shreveport, La., in the heart of the Louisiana-Texas gas belt, reported only 0.1 per cent of its dwellings heated by coal.

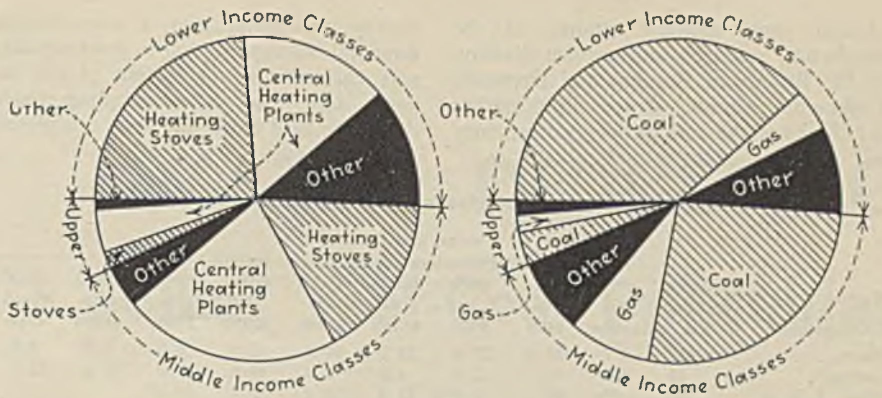
This same Louisiana city, however, topped the gas list with 92.4 per cent of the consumers using that fuel. Oklahoma City, Okla., ranked second in that category with 88.1 per cent of the consumers listed as burning gas; Wichita Falls and Dallas, Texas, reported 84.4 per cent and 81.9 per cent, respectively, of their families heating with gas. Oil showed its greatest percentage popularity in the New England cities included in the survey; Waterbury, Conn., was first with 32.5 per cent of the consumers covered using oil; Worcester, Mass., followed with 28.9 per cent and Providence, R. I., was third in that group with 25.3 per cent. Seattle, Wash., however, was second among individual cities in oil preference with 30.8 per cent of its families using that fuel. First place in choice of wood for home heating went to Portland, Ore., where 68.4 per cent of the families relied on that fuel; Jacksonville, Fla., was a close second with 64.5 per cent, followed by Charleston, S. C. (58.5 per cent), and Sacramento, Cal. (45.0 per cent).

As stated in a preceding paragraph, the field work upon which the survey figures are based was made in 1934. For that reason, some of the more recent changes in the competitive picture are missing. Lansing, Mich., for example, where coal was used by 97.3 per cent and gas by only 0.2 per cent of the consumers, is now in the throes of a natural-gas invasion which threatens to raise the percentage of dwellings using gas at the expense of coal. Gas also is very active in a number of the larger cities not included in the government survey. On the other hand, the rising sales of domestic stokers (*Coal Age*, August, 1936, p. 330) give evidence that the tide of battle is not all running in one direction. In view of these counter currents, therefore, it seems reasonable to assume that the broad outlines of the picture show no material change from those revealed in the survey figures.

Heating Modernization Needed

The survey and the supplementary studies, however, suggest many avenues worth exploring in the fight to hold present markets and to win new customers to coal. Not the least attractive are the possibilities for modernization inherent in the fact that in more than 1,250,000 cases consumers in these 64 cities still rely upon stoves and allied equipment for home heating. This is true not only in areas where climatic conditions generally are so mild that stove heat may be sufficient but also in sections of the country where heating demands are heavy. The nine cities in the Northeastern area, for example, reported 172,271 stoves and allied heating devices; many of these dwellings should be prime prospects for a stoker-operated central heating plant.

In analyzing these sales possibilities, the relation of equipment and fuel preferences to income groups given in the



Domestic Commerce

Consumer Use of Heating Apparatus and Fuels

These charts are based on combined figures from the studies of "Consumer Use of Selected Goods and Services by Income Classes" for Austin, Texas; Birmingham, Ala.; Columbia, S. C.; Fargo, N. D.; Portland, Me.; Racine, Wis.; Salt Lake City, Utah; San Diego, Calif., and Trenton, N. J.—one city for each census district. The lower income class (below $1,000 per annum) accounted for 51.1 per cent of all the families covered; the middle group (between $1,000 and $3,000) for 42.9 per cent, and the upper group (above $3,000) for 6.0 per cent of the families.

Table I—Domestic Fuel Preferences in 64 Cities—Continued

Providence, R. I. (1)	252,981	67.1	0.1	0.3	25.3	6.8
Pueblo, Colo. (7)	50,096	93.6	0.6	4.1	0.3	0.2
Racine, Wis. (2)	67,542	95.3	0.1	0.2	4.0	0.1
Reno, Nev. (7)	18,529	62.2	17.1	....	18.9	0.7
Richmond, Va. (4)	182,929	94.6	2.9	0.1	1.8	0.2
Sacramento, Cal. (7)	93,750	7.2	45.0	41.2	3.7	1.0
St. Joseph, Mo. (5)	80,935	84.1	1.6	8.0	5.5	0.6
St. Paul, Minn. (2)	271,606	89.2	0.6	....	9.8	0.3
Salt Lake City, Utah (7)	140,267	83.0	....	16.2	0.5	0.1
San Diego, Cal. (7)	147,995	1.0	33.8	47.0	3.5	12.3
Santa Fe, N. Mex. (7)	11,776	34.6	34.7	30.1	0.4	....
Seattle, Wash. (3)	365,583	39.0	28.2	0.6	30.8	1.1
Shreveport, La. (6)	76,665	0.1	6.3	92.4	....	....
Sioux Falls, S. D. (3)	33,362	85.3	1.1	7.9	5.1	0.5
Springfield, Mo. (5)	57,527	59.8	30.5	4.5	3.5	0.4
Syracuse, N. Y. (1)	209,326	97.7	0.1	0.6	1.2	0.3
Topeka, Kan. (5)	64,120	62.0	9.0	26.8	1.3	0.6
Trenton, N. J. (4)	123,356	94.4	0.4	0.2	4.3	0.4
Waterbury, Conn. (1)	99,902	63.8	1.3	0.2	32.5	1.9
Wheeling, W. Va. (5)	61,659	63.4	....	34.8	0.1	0.1
Wichita, Kan. (5)	111,110	43.0	4.9	49.3	2.0	0.6
Wichita Falls, Tex. (6)	43,690	0.2	13.0	84.4	0.3	1.3
Williamsport, Pa. (1)	45,729	96.8	0.3	0.6	1.9	0.1
Wilmington, Del. (4)	106,597	90.7	0.2	0.4	7.3	1.0
Worcester, Mass. (1)	195,311	67.3	0.5	0.2	28.9	2.3
Zanesville, Ohio (5)	36,440	91.8	....	7.6	....	0.6

Table II—Heating Equipment and Fuel Preferences

Regional Group	Number of Dwelling Units	Heating Equipment: Central Heating Plant†	Heating Equipment: Stoves and Others	Fuel Burned: Coal	Fuel Burned: Gas	Fuel Burned: Oil
1. Northeast Area	413,860	237,466	172,271	308,343	1,392	73,805
2. North Central Area	633,794	475,583	156,391	563,862	31,492	23,463
3. Northwest Area	270,409	177,895	111,823	86,212	10,637	54,367
4. Middle Atlantic Area	148,714	84,534	63,610	135,705	247	5,300
5. Middle Central Area	400,041	230,059	168,756	337,615	35,928	10,225
6. South Atlantic and Gulf Area	554,093	74,831	476,469	270,134	175,069	2,414
7. Southwest and Pacific	192,224	48,230	140,866	71,509	51,199	5,766
Total	2,613,135	1,328,598	1,292,186	1,773,380	305,964	175,340

† Includes furnace, hot-water and steam-heating plants; the number of furnaces reported was 817,387; the number of hot-water and steam plants, 511,211.

special supplementary studies of the marketing research and service division of the Bureau of Foreign and Domestic Commerce should prove illuminating. At the time the real property inventory survey was undertaken, a more limited financial survey of urban housing also was carried on. Collection of the income data was on a sampling basis. After the field work had been completed, certain identifying family data on the field schedules used in the real property inventory were matched with similar data on the schedules used in the sample financial study. In this way it was found possible to obtain information covering the incomes of 10 to 23 per cent of the families who also reported their consumption of the durable goods covered by the supplementary studies.[2]

The combined figures with respect to types of heating apparatus and the choice of fuels in the first nine cities[1] covered by these supplementary studies are shown graphically in the pie charts on page 369. While, as might be expected, heating stoves predominated with the income groups below $1,000 per annum, there was a substantial percentage of the middle income classes (between $1,000 and $3,000 per annum) who also used that type of heating apparatus and no small percentage of the lower income groups that had central heating plants. In the selection of fuel, coal, it will be seen, led by a wide margin in all income class groups.

Table III—Types of Heating-Plant Equipment Used

Equipment	Number of Families	No Income	$1 to $490	$500 to $999	$1000 to $1499	$1500 to $1999	$2000 to $2999	$3000 to $4999	$5000 to $6999	$7000 and Over
		Percentage Distribution by Income Classes								
Austin, Texas										
Stove	1,612	2.7	23.0	23.8	18.1	12.2	11.0	6.9	1.7	0.6
Central*	46	2.2	....	2.2	4.3	4.3	19.6	37.0	17.4	13.0
Other	39	....	23.1	25.6	17.9	15.4	7.7	10.3	....	....
Birmingham, Alabama										
Stove	2,402	5.7	32.3	24.8	19.1	10.9	6.1	0.9	0.2	....
Furnace	1,402	3.1	8.1	16.4	20.4	19.0	18.8	10.6	2.6	1.0
Steam	744	2.0	5.9	11.3	20.8	22.6	20.0	11.2	4.7	1.5
Hot-water	251	4.0	6.0	17.1	22.3	21.5	20.7	8.0	0.4	....
Other	4,320	5.9	55.4	21.0	9.2	5.0	2.5	0.8	0.1	0.1
Fargo, North Dakota										
Stove	128	4.7	32.8	37.5	17.9	5.5	0.8	0.8	....	....
Furnace	845	3.5	10.3	17.1	21.8	19.3	18.2	8.3	1.1	0.4
Steam	46	4.4	8.7	23.9	34.8	17.4	4.3	4.3	....	2.2
Hot-water	383	3.4	9.4	15.4	20.6	16.2	20.6	10.2	3.4	0.8
Other	1	....	....	....	....	....	....	100.0	....	....
Racine, Wisconsin										
Stove	589	19.0	42.4	24.4	10.4	2.9	0.5	0.2	....	0.2
Furnace	2,662	8.9	25.4	24.3	19.3	12.0	7.5	1.9	0.5	0.2
Steam	152	8.5	19.1	22.4	18.4	11.2	13.8	5.9	....	0.7
Hot-water	439	8.0	25.7	25.1	17.1	10.9	8.9	2.5	0.9	0.9
Other	9	11.1	55.6	22.2	....	....	....	....	....	11.1
Trenton, New Jersey										
Stove	1,070	13.7	31.0	32.2	18.9	2.6	1.2	0.4	....	....
Furnace	1,318	6.8	19.5	31.3	20.4	12.1	8.1	1.4	0.2	0.2
Steam	626	2.7	9.3	18.2	26.5	15.0	18.9	7.8	1.3	0.3
Hot-water	681	6.0	11.4	21.6	18.8	16.9	14.1	7.2	3.1	0.9
Other	12	16.8	33.3	33.3	8.3	8.3	....	....	....	....

* Includes furnace, steam and hot-water central heating plants.

Table IV—Fuel Selection for Domestic Heating

Fuel	Number of Families	No Income	$1 to $499	$500 to $999	$1000 to $1499	$1500 to $1999	$2000 to $2999	$3000 to $4999	$5000 to $6999	$7000 and Over
		Percentage Distribution by Income Classes								
Austin, Texas										
Coal	38	2.6	23.7	7.9	7.9	10.5	15.8	23.7	2.6	5.3
Wood	597	3.5	45.5	31.1	11.4	5.2	1.7	1.2	0.2	0.2
Gas	1,042	2.2	9.0	19.2	21.9	16.3	16.6	10.6	3.0	1.2
Other	20	....	20.0	25.0	5.0	....	5.0	30.0	15.0	....
Birmingham, Alabama										
Coal	8,725	5.1	37.8	20.7	14.9	10.4	7.4	2.9	0.7	0.1
Wood	41	19.5	73.2	7.3	....	....	....	....	....	....
Gas	62	3.2	6.5	17.7	12.9	14.5	9.7	19.4	12.9	3.2
Oil	15	6.6	....	6.7	20.0	6.7	6.7	20.0	20.0	13.3
Other	276	1.8	5.8	13.8	14.9	18.1	25.4	13.0	3.6	3.6
Fargo, North Dakota										
Coal	1,223	3.7	13.1	20.4	22.6	17.6	15.8	5.9	0.8	0.1
Wood	11	9.1	45.4	18.2	27.3	....	....	....	....	....
Oil	166	3.0	2.4	6.6	12.7	14.5	25.9	24.7	6.6	3.6
Other	3	....	....	....	33.3	33.3	....	....	33.4	....
Racine, Wisconsin										
Coal	3,727	10.4	28.4	24.6	17.8	10.3	6.6	1.4	0.3	0.2
Oil	96	7.3	8.3	20.8	13.6	15.6	17.7	8.3	4.2	4.2
Other	28	3.6	25.0	3.6	7.1	10.7	3.6	39.2	3.6	3.6
Trenton, New Jersey										
Coal	3,596	8.0	19.9	27.9	20.7	10.7	8.9	2.9	0.8	0.2
Oil	86	2.3	4.7	17.4	22.1	15.1	14.0	17.4	3.5	3.5
Other	25	28.0	32.0	16.0	4.0	....	8.0	8.0	4.0	....

Must Analyze Each City

But, as explained by Miss Bush in a brief review of the "Consumer Use of Selected Goods and Services by Income Classes" series in *Domestic Commerce* (Vol. XVII, No. 12), "the degree of difference between income ranges varies, naturally, among the individual cities—due to differences in climate, racial groupings, etc. In a study of the market for stoves, for instance, the analyst, of course, would want to consider the data for each type of city within his area. Average figures would not apply to a city that is unlike the average in its need for house heat."

Some indication of these variations is given in Tables III and IV. The supplementary reports mentioned furnish much additional data. Thus, although Austin ranks near the bottom of the list in percentage popularity of coal for heating, the greatest number of coal consumers in any one group in that city are in the $3,000-$4,999 income bracket and the highest percentage of users in any one income group is found in the top income bracket. In Birmingham, both the greatest number of consumers and the highest percentage of users in any one group are in the $1-$499 bracket. The greatest number of coal consumers in Fargo is in the $1,000-$1,499 bracket; the highest percentage of users in the $500-$999 group. In Trenton, the highest percentage of coal users was found in the $1-$499 bracket; the greatest number of consumers in the $500-$999 class.

[2]The Austin income study, for example, covered approximately 10 per cent of the families included in the real property inventory for that city; Birmingham, 14 per cent; Fargo, 20 per cent; Racine, 23 per cent; Salt Lake City, 20 per cent; San Diego, 17 per cent; Trenton, 14 per cent.

WATER DEDUSTING

+ Solves Wet-Coal Difficulties At Enos Strip Mine

WATER DEDUSTING with electric vibrators has been adopted at the Enos mine of the Enos Coal Mining Co., Oakland City, Ind., for removing fine dust from stoker-coal shipments. Selection of this method of dedusting was an outgrowth of a wide variation in the moisture content of the coal fed to the dedusting screens. As a consequence of extraction by the stripping method, the entire mining and haulage cycle is exposed to the weather, with the result that the coal frequently reaches the preparation plant in a condition making the necessary fine-mesh separations by dry screening impossible.

By using water as the dedusting medium, the wide variations in screening efficiencies that otherwise would accompany variations in moisture content are avoided. Wet screening also eliminates a considerable percentage of the sulphur and ash, thus improving the shipped product, and the coal as loaded in the railroad cars is in a more free-draining condition than would be wet non-dedusted coal directly from the pit; therefore it reaches the purchaser with a lower moisture content.

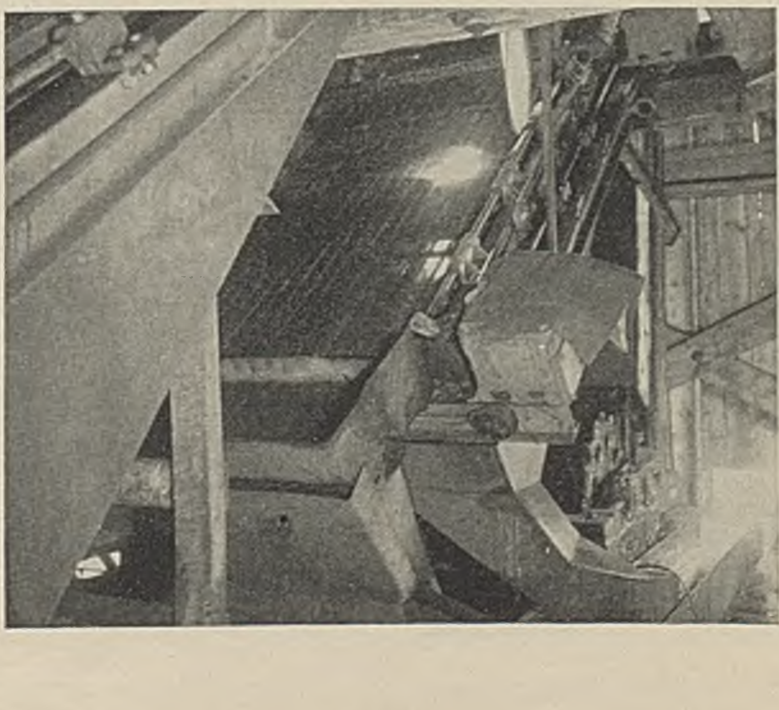
The Enos dedusting installation consists of three 4x8-ft. single-deck Type 400 Tyler electric screens equipped with Tyrod screen cloth with a width of opening of 0.095 in. The screens are operated by Tyler Thermionic power units. Supplementing the dedusting units is a 4x16-ft. single-deck Tyler-Niagara screen equipped with 28-mesh Ton-Cap cloth for recovering and dewatering the major portion of the fine material through the dedusting screens. The Tyler-Niagara screen is operated on an upward inclination of about 2 deg. from the feed to the discharge end.

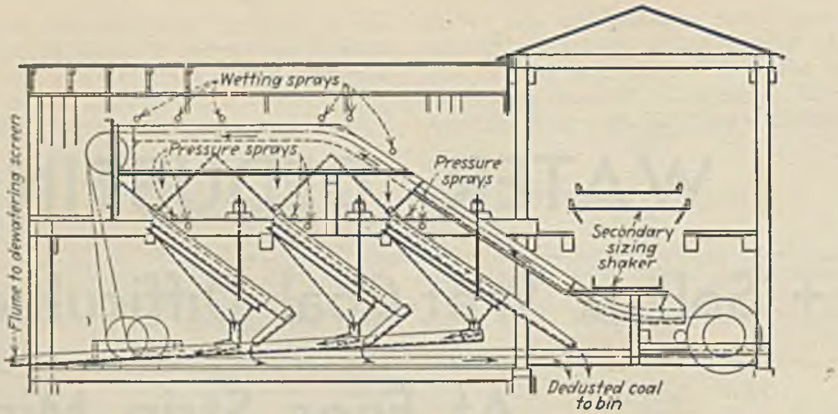
Operating in parallel, the three Type 400 dedusting screens are mounted between the strands of a chain-and-flight conveyor receiving screenings from the secondary sizing screen in the main tipple, which handles 3x0-in. material. When dedusting is desired a gate is opened diverting the screenings—usually ¾x0-in.—to the top flight of the conveyor. Provision also is made so that, when desirable, 1½x0-in. screenings may be dedusted, in which case the total feed to the three screens may run as high as 330 tons per hour, or 110 tons per hour per screen. When dedusting ¾x0-in. coal, feed to the dedusting screens normally runs about 200 tons per hour.

Water consumption is 300 g.p.m. per screen, or a total of 900 g.p.m. for the three screens. About 100 g.p.m. of the total for each screen is added by the wetting sprays above the feed hopper and the remaining 200 g.p.m. through ten ⅜-in. "Concenco" spray nozzles mounted on two headers over the upper half of the screen. Water and dust flow to a flume leading to the dewatering screen. Dedusted coal from two of the screens is discharged into the bottom strand of the feed conveyor, which is fitted with 16 ft. of Ryerson abrasive- and acid-resisting plate with ⅛-in. perforations; dedusted coal from the third screen discharges directly into the screenings bin.

When dedusting either 1½x0- or ¾x0-in. screenings, approximately 30 tons of dust is washed through the three dedusting screens per hour. Composition of this dust (primarily minus 8-mesh material), as well as of the overscreen product, is shown in Table I. Water and dust flow to the Tyler-Niagara recovery and dewatering screen described above. On this screen, all visible water disappears within the first 8 to 9 ft., and dewatering is completed on the remaining 7 to 8 ft., the coal moving off the high, or discharge, end in a continuous stream 4 to 5 in. thick, which can be run either to the

One of the three vibrators in the Enos water-dedusting plant. One of the two spray headers appears near the head of the screen





General arrangement of equipment in the Enos dedusting plant

railroad car as a separate product or diverted to a storage bin and, if desired, remixed with the 1½- or ¾-in.x8-mesh coal from the dedusting screens.

Approximately 25 per cent of the feed of 30 tons of minus 8-mesh coal per hour passes through the 28-mesh cloth of the Tyler-Niagara screen with the water and is wasted, as it contains about 8¾ per cent sulphur and 40 per cent ash. Screen analyses of the 8x28-mesh dewatered product show from 15 to 20 per cent minus 28-mesh material remaining which could be washed through by adding water sprays over the screen deck. This, however, is not desirable, as it has been found that the simple flushing action of the water on the screen carries through the high-gravity impurities and most of the minus 28-mesh material in the overscreen product is coal of a good grade.

Table I—Size Composition of Over- and Through-Screen Products When Dedusting ¾x0-In. Screenings

Size Fraction	Over-Screen Product, Per Cent	Through-Screen Product* Per Cent
¾-in.x4-mesh	78.8	....
4x8-mesh	14.6	....
Total	93.4	....
Plus 6-mesh	....	1.0
6x8-mesh	....	5.7
8x10-mesh	2.9	13.4
10x14-mesh	1.7	24.2
14x20-mesh	0.8	16.3
20x28-mesh	0.4	11.9
Minus 28-mesh	0.8	27.5
Grand total	100.0	100.0

*This product to Tyler-Niagara screen for dewatering and recovery of 8x28-mesh material.

AIR-DRIVEN SHAKERS

+ Give 8 to 9 Tons per Man-Shift At Kemmerer Mine in Wyoming

By IVAN A. GIVEN
Associate Editor, Coal Age

AIR-DRIVEN room and face conveyors of the shaker type are employed at the No. 5A mine of the Kemmerer Coal Co., Frontier, Wyo., in the extraction of the Willow Creek seam, varying from 4 to 5 ft. in thickness. With the system in use at this mine, maximum output per man-shift, all men employed underground, has reached 11 tons; the average, under normal market and running conditions, is 8 to 9 tons per man-shift.

The Willow Creek seam at Frontier is slabby in nature and consequently chunks roughly 2x2x4 to 5 ft. must be handled. Over the seam and between the coal and the shale roof is about 4 in. of laminated coal and slate. Except in spots, the top is good. General dip of the seam is 15 to 20 deg. to the west, and the coal is reached by a rock slope with a pitch of 14 deg. 30 min. east. From a parting at the bottom of the slope, the seam is developed by auxiliary slopes which follow the seam down the pitch. At various levels along the slopes, entries made up of two headings 15 ft. wide on approximately 55-ft. centers are turned to the right and left far enough apart to give a room length of approximately 350 ft., varying somewhat with local conditions.

The upper heading on each level constitutes the loading and haulage opening. To facilitate the movement of loaded and empty trips, a parting is established at the mouth of this heading by widening it sufficiently to accommodate two tracks. Headings normally are driven by hand, and rooms are necked two or three cuts, or enough to allow the conveyor drive to be set up, as the entry advances.

Extraction on the advance is the rule at No. 5A mine, as indicated in Fig. 1. Rooms, necked 10 to 12 ft. wide, are driven up the pitch; the neck in each case is extended through to the first crosscut, which is driven to leave a 30-ft. protective stump above the haulage heading. Room centers are 80 ft. and the standard width is 40 ft., leaving a 40-ft. pillar.

Rooms are driven in units of two each, and the pillars are robbed back immediately upon completion. Driving and robbing operations also include as much of the chain pillars and stumps on the upper level as it is possible to get. Operations normally are completed on the upper level before mining on the next lower level is begun, thus making possible the extraction of the pillars and stumps in question from below. Equipment for a two-room unit includes one Goodman or Sullivan shortwall cutter with 7½-ft. cutter bar equipped with Bowdil chains and bits; two Eickhoff or Vulcan of Denver room conveyors, each with extension; two 30-ft. face conveyors, each with extension; and one Chicago Pneumatic portable electric coal drill. All conveying equipment is air-driven; electrical equipment is supplied with 220-volt alternating current by 2,300/220-volt transformer stations on each entry. Circuits from the surface to the transformers consist of armored cables; connections from the transformers to mining equipment are made by rubber-covered trailing cables. Red HC, L.F., and electric detonators are employed for breaking down the coal.

Crews for a two-room unit consist of one car trimmer, two machine men, who also drill and shoot; one timberman; and four loaders. All crew members, however, are available for other than their regular tasks, when necessary. Cutter, drill and crew members alternate between the two places, keeping both going abreast. When a place is cleaned up, the cutting machine moves in and cuts across to the right-hand corner, after which the face is drilled with six holes at the top. Holes then are loaded with not over three sticks of explosive per hole. The face conveyor then is moved up, using the cutting-machine tail rope and a jack and sheave at the face, as in Fig. 2, after which the room conveyor is extended, if necessary.

With the face conveyor in position and room conveyors extended, the timbers are extended to the back of the face conveyor, which is held in place by posts at either end and in the center. The room conveyor is laid on the sight line of the room, which is carried 6 ft. from the left-hand rib, and four rows of posts on 6- to 8-ft. centers are set in the center of the place. The row of posts to the right in the place also supports a brattice line from the face back to the last open crosscut, to which air from the preceding place is directed by a curtain across the room.

Shooting follows completion of the preliminary work at the face, and in this operation as high as 25 per cent of the coal is thrown on the face conveyor, which is made with a backboard only and is designed for this system of breaking down the coal. Next, the roof is examined and any loose material is taken down and the place made safe, after which the conveyors are started and the loading begins. Extension members used on the room and face conveyors consist of a length of trough with a flat "duckbill" receiving end. The extension member is laid in the conveyor trough and is fastened with screw clamps over the lips on either side. When extension is required, the clamps are loosened and the extension member is pulled forward.

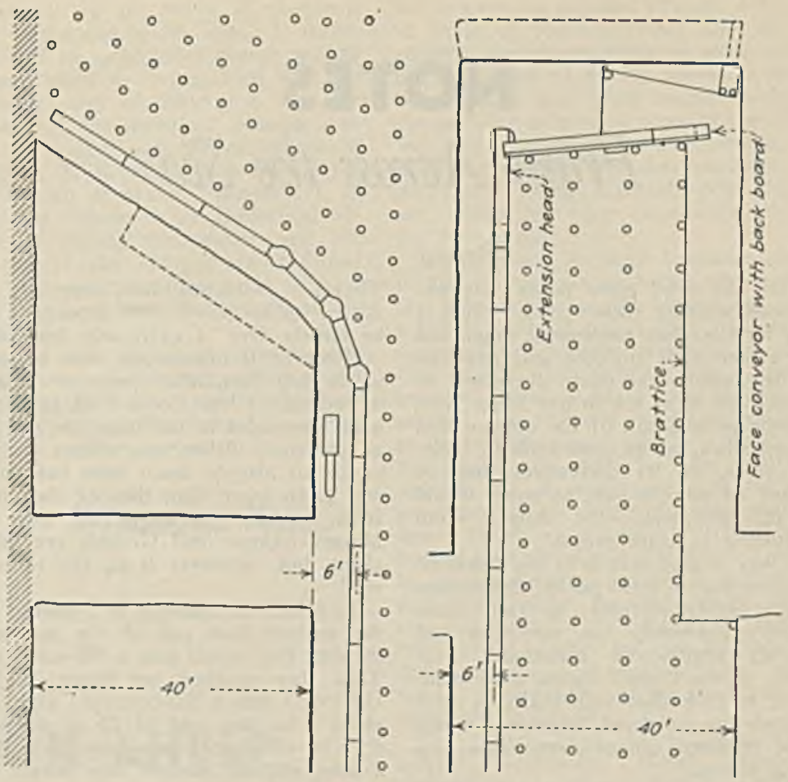
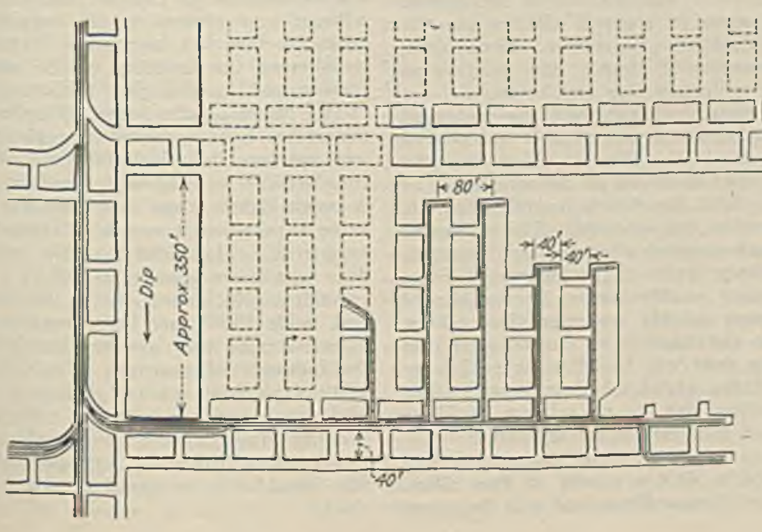


Fig. 2—Left, method of mining pillars open-ended; right, details of room operation, showing how face conveyor is moved up with cutting machine

Usually, only one line of room pillars is pulled back at a time to avoid too large an open space, as the roof usually stays up until extraction is completed. A crew on pillars usually is made up of a trimmer, two machinemen and drillers with a longwall cutter, one timberman and four loaders. Pillars are brought back open-ended, and the conveyor is turned across the pillar, using two swivel joints, on a 30-deg. angle. If weight is not present, the pillar is cut all the way across; otherwise, it is cut about two-thirds of the way, the upper end being left solid and removed by pick. Breaks along the pillar face seldom are encountered, but, if one seems likely, the pans are pulled out at the end of the shift and moved back down the room where they are safe from falls. Upon completion of pillar removal, a row of breaker posts is set across the room neck and the place is left to cave. Normally, caves choke themselves before they reach the surface.

Conveyors on a level are served by a battery locomotive, which pulls in an empty trip from the parting and cuts off the required number of cars under each conveyor discharge, where they are attached to a wire rope wound on a hoist controlled by the trimmer. When all the cars are loaded, the locomotive moves out toward the parting, assembling the trip and pushing it along ahead. Supplies are delivered to the room face by a small four-wheeled truck, or buggy, which runs in the conveyor line and is pulled up by a manila line attached to a feed drum on the cutting machine.

Fig. 1—Rooms are driven and pillars are recovered on the advance at No. 5A mine



NOTES
From Across the Sea

FROM the first, some doubt was expressed whether rock-dusting, which is a cure for coal-dust explosions, might not prove a source of silicosis, and from an early date effort was made, therefore, to use dusts that were low in free silica. Now that some persons are of the opinion that combined silica, or, as some term it, feldspathic silica, or its derivatives may be causative of silicosis—or, as some would term it, "silicatosis"—the danger from rock-dusting is again raised.

One way to play safe is to use limestone or gypsum dust of great purity. Shales usually are highly silicious; in fact, some are really extremely fine sandstone and not truly argillaceous materials. Fortunately, in the United States, after commencing to rock dust with shales, a shift was made to powdered limestone, which can be obtained almost free from any form of silicon.

Chosen largely because it is a commercial article readily obtained and because it is white and so aids in the illumination of roadways, limestone also is available because it is relatively free from silica, is more efficacious than shale, and has a neutralizing effect on acid water. Gypsum, though more efficacious than even limestone, has countervailing disadvantages, caking when it is in a damp atmosphere and becoming so damp that when it coats porcelain insulators it will pass electricity and cause leakage of current. In the British inquiry, later to be discussed, 25 samples were of shale dust, 10 were of limestone dust, 2 of precipitated calcium carbonate, 2 of gypsum and one of a substance known as Pixie powder. Apparently in Britain, shale is more generally used for rock-dusting than in the United States.

Recently, D. G. Skinner and J. Ivon Graham, of the Mining Research Laboratory, the University, Birmingham, England, addressed the Institution of Mining Engineers on this subject. Recognizing that only the finest of the dust, that under 5 microns (0.005 mm.), was dangerous to the lungs, they endeavored to ascertain how much of this is to be found in the dust used in the mines for rock-dusting.

The statement made is not exactly clear; the tests seem to have been made on stone dust such as had been provided for use rather than on the dust after its application. Later in the article, reference is made to a sample obtained from an underground roadway "which shows the lowest proportion of very fine dust of any of the samples." So perhaps this was the only positioned dust tested; all the rest was bag dust.

Obviously, when dust is thrown into the air under pressure, the fine dust becomes suspended, and the finest of this dust is carried away by the air. That which is so fine as to be below 5 microns may be carried out of the mine or into unventilated sections or pockets in the workings. Thus the positioned dust, especially dust stirred up by travel after deposition, may be largely free of extremely fine dust.

However, if microscopic dust is present in the bag dust, it is important to know it, because, at least for a time, it may remain suspended in the mine air and have an extremely deleterious effect; the dust in the air may be much more harmful for any given count than the bag dust itself. It is important to know just what dust Messrs. Skinner and Graham are talking about, but, whatever it is, the facts are vital.

To obtain the quantity of 5-micron dust, the authors took out of the sample all the dust that would pass a 325-mesh sieve. Then they weighed out about 2 grams (0.07 oz.) into a flat-bottomed glass dish, about 2 in. deep and of 2¾ in. diameter; 6 cu.in. of alcohol was added a little at a time, and the mixture was stirred with a glass rod.

When all the alcohol had been added and the suspension had been made as uniform as possible by stirring, the depth of the liquid was measured. Then the time was figured by Stokes' law to determine just how long it would take the 5-micron dust to fall from the top of the liquid to the bottom of the dish.

When this interval had passed, the top liquid was decanted into a similar dish of known weight; care was taken not to disturb the bottom layer of settled dust, which was assumed to be larger than 5 microns diameter or it would not have had time to settle. The dust on the bottom of the vessel was quite coherent, so a clean separation was obtained.

This was repeated 36 times, and the material that still continued to float was regarded as 5-micron diameter or less. When a dust, ostensibly not greater than 5 microns was elutriated—that is, lifted by a current of air—and given 20 opportunities for settlement after the same treatment, it was found no sediment was formed, so it was felt the 36 settlements should serve to separate all the plus 5-micron dust from the minus 5-micron dust, and examination under the microscope seemed to justify this conclusion.

The minus 5-micron dust was recovered by allowing the liquid, after it was poured off, to stand all night, at which time the alcohol was decanted off as completely as possible, and the dishes heated in an air oven, cooled and weighed. The sediments also were weighed after each settlement to check the progress of the separation. Some dusts more readily wetted by the alcohol were more quickly separated than others. Dust so elutriated as to remove all minus 5-micron dust was found to have 17.4 per cent of the elutriated dust greater than the limiting size, so no reliance could be placed on that method of separation.

It was found that the shale dusts had from 7.4 to 41.4 per cent of free silica. However, it was determined that the minus 5-micron dust usually had less free silica than the dust as a whole. Thus in one case where the 5-micron dust and lower had 31.9 per cent of free silica, the minus 200-mesh dust had 39.7 per cent.

Powdered limestones had a free silica content between 0.2 and 17.5 per cent. One might inject the suggestion that the latter limestone must have been of poor quality; limestones in the carboniferous measures usually are. Gypsum free-silica content ran from 0.5 to 1.3 in the 200-mesh dust. Feldspar, as has been said, may be deleterious. One 200-mesh dust with 38.2 per cent of free silica had also 12.5 per cent of feldspar. Another dust of the same size had 41.2 per cent of free silica, but only 4.3 per cent of feldspar.

To show how fine a minus 5-micron dust is, a 60-micron dust will just pass a 200-mesh sieve and one of 40-microns will slip through a 325-mesh sieve. It was found that the ratio of the percentage below 5 microns to that passing through a 60-mesh sieve ran from 0.112 to 0.362 and to that passing through a 200-mesh sieve from 0.123 to 0.485.

The authors quote U. S. Bureau of Mines Bulletin 353, p. 51, as saying that "fine grinding is desirable up to a certain point," that "very fine dusts are difficult to disperse and tend to cling together in aggregates even when disturbed by strong air currents," and that "the available surface is then that of the aggregate and not that of the individual particles." They add that correspondence with G. S. Rice, chief mining engineer, U. S. Bureau of Mines, reveals that the bureau discourages exceedingly fine grinding, because this causes the dust to pack and makes it undesirable for rock barriers.

The authors declare also that their own experience shows that when minus 5-micron dust is eliminated, the rest of the dust is readily lifted by air and does not tend to aggregate. All of which suggests that perhaps it would be well in manufacture to remove this finer dust if deleterious, and even if not deleterious, if it should prove not peculiarly helpful in flame extinction, for it appears to interfere with the lifting of such dust as is slightly coarser. The studies recorded were made for the British Colliery Owners' Research Association.

DETAILING the improvement made in explosives and accessories, William Cullen, told the Institution of Mining and Metallurgy, in London, England, that, without any change in its outward appearance, fuse has been made less smoky by altering the fusibility of the asphaltic coating and by changing the composition of the black-powder core. Cordeau détonant has been improved by replacing the lead envelope by which the core of trinitrotoluene is inclosed with Cordtex, which is much lighter than lead and less likely to be torn when it comes in contact with hard rock. He added that the new cordeau was more readily set off.

Azides, which are metal nitrides, as lead, azide PbN^6, are being used in detonators because they are less susceptible to the influence of moisture than fulminate. With 4 to 5 per cent of moisture, azides give good service, whereas with a like quantity fulminate is rendered useless. Nevertheless, even the new-type detonators should not be stored in damp magazines.

Inert primers have been manufactured that have a part of the detonator in line with the fuse and part diagonal, so that the fuse can be laid alongside the cartridge without bending it and the diagonal portion will enter the cartridge. This prevents the fuse from being damaged in bending. J. A. S. Ritson objected to this, saying that Dr. Payman and others, in a paper on "Explosion Waves and Shock Waves," presented to the Royal Society of London, had shown that the initiating effect of the detonator was most marked along its axis. The authors of that paper had suggested that this was because a large solid particle, presumably metal, was sent off at high speed from the base of the detonator. If that was so, the diagonal detonator was in principle theoretically at fault. The detonator should be set axially in the inert primer or in the priming cartridge, if an inert primer is not used.

Much is to be said, declared Dr. Cullen, in favor of the placement of the inert primer at the end of the hole. It makes certain that no unexploded charge will be left there when a shot is fired, but the only correct way of doing it is with the active end of the detonator pointing outward. In support of the contention of Dr. Cullen, J. B. Richardson quoted the U. S. Bureau of Mines, Bulletin 311, in stating that "whatever the theoretical advantage of placing the primer near the outer end of the charge, the practical one . . . indicates that the primer should be placed near the bottom of the drillhole."

With the new lead mononitrateresorcinate matchheads 0.7 ampere suffices to set off six shots in series, whereas with low-tension copper-acetylide detonators a current of 1.1 amperes is needed.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case is in the review notice.

Section des Mines, Congrès International des Mines, de la Métallurgie et de la Géologie Appliquée, VII Session, St. Etienne, France. Two volumes, 9x11⅛ in., 330 and 666 pp.; paper. Price, 56 fr. and 110 fr. postpaid.

These volumes furnish much information about French and Belgian mining methods. In the first volume are 58 pages on mine problems in general, 167 on specific colliery methods, 72 on mineral, salt and phosphate operations and 29 on petroleum operations. The second volume has 99 pages on general mine problems, 409 on specific colliery methods, 111 on mineral, salt and phosphate operations and 39 on petroleum operations. A few articles are contributed by United States, Canadian, Czechoslovakian, German, Dutch, Italian, Roumanian, Hungarian and Polish authors. Of particular interest are studies of the effect of pressures in a thick coal bed, methods of fighting coal fires underground, sudden outbursts, lighting of workings in French mines, outbursts in Belgian mines, an article on cleaning of coal pneumatically and by flotation by a Polish engineer, all in Vol. 1.

In Vol. II, J. Kersten, whom some readers will recall, writes on the cause of openings in horizontal joints of shaft linings. Other articles in this volume describe the sinking of a slope for the introduction of backfilling in a Roumanian mine, use of skips in Europe, metallic supports in development headings, guniting in the McIntyre (Ontario) mine, use of bichloride of mercury for timber preservation in a Czechoslovakian mine, mine management by two French companies, pneumatic backfilling in a Roumanian mine using a free chute for its conveyance from the surface.

Coal Friability Tests, by R. E. Gilmore, J. H. H. Nicholls and G. P. Connell. No. 762, Department of Mines, Canada, Ottawa, Canada; 102 pp., 6½x9¾ in., paper. Price, 25c.

Described as "a comparative study of methods of determining the friability of coal and suggestions for tumbler and drop shatter test methods," this book affords much information for which standardization physicists and indeed chemists have long been waiting in both Canada and the United States. The senior author starts with a series of definitions which show what the several designations—friability, size index, size index reduction, unbroken coal, size stability index A and B and size stability per cent—actually mean. The purchasing and indeed the selling and producing public may never understand these terms with any more exactitude than they do fixed carbon, volatile matter and ash, but they will furnish a reliable basis on which scientists, if they accept any or all of them, will be able to work and give a reliable determination of certain coal characteristics.

Percentage size stability is the difference between 100 and friability per cent, and Mr. Gilmore is of the opinion that producers and distributors of coal would prefer to have the physical strength described in terms of stability rather than as friability. Studies are made of seven recognized methods of testing for these qualities, but two were given special consideration as being as good as some of the others and more generally in use: namely, the small jar tumbler and the American Society for Testing Materials coke shatter test, which has been extensively adopted for testing coal.

Nearly twice as much breakage occurs in tumbler tests as in shatter tests and, in Mr. Gilmore's belief, the shatter test gives a better index of the relative stability, or resistance to breakage, of single or mixed sizes prior to plant crushing than a tumbler test, and therefore has a more commercial aspect. The reviewer would suggest that as the stability figure usually is larger for the shatter test than for the small jar tumbler test, it would not give the coal purchaser such a severe shock as would a figure based on a usage severer than is normal between mine and market. It would be easy to design a grievously severe test that would show the stability of almost any coal ground 1 or less per cent, and the friability 99 or more per cent, but it would differentiate coals inadequately and would not be determinative of the conditions encountered in practice.

Seven coals were tested labeled Pennsylvania anthracite, Welsh anthracite, Pennsylvania, Nova Scotia, Alberta, Crowsnest and Nicola bituminous with friabilities varying from 18 to 57 by the A.S.T.M. shatter test and from 27 to 70 by the small-jar tumbler test. A large number of variations in methods are detailed, with the results obtained.

Minerals Yearbook, 1936. U. S. Bureau of Mines 1136 pp., 5¾x9¼ in.; cloth. Price, $2.

A valuable and authoritative report of the minerals production statistics of the United States and in a degree of the world is the "Minerals Yearbook." The fuels' producer will be principally interested in Part III of this volume, which refers to non-metals, with coal, coke and byproducts, fuel briquets, peat, crude petroleum and petroleum products, natural gas and natural gasoline as leading subjects. These fuels occupy 217 pages. F. G. Tryon, W. H. Young, L. Mann and J. R. Bradley cooperate on "Coal"; "Coke and Byproducts" fall to W. H. Young, H. L. Bennit and L. N. Plein; "Development in Coal Preparation and Utilization" to A. C. Fieldner, and "Fuel Briquets" to L. N. Plein and J. B. Clark; "Peat" to F. M. Shore. W. W. Adams covers "Mine Safety" in 15 pages. Particularly complete is Dr. Fieldner's report on preparation and utilization of coal with references to the publications during the year on these subjects. It covers not only high- and low-temperature carbonization but hydrogenation and liquefaction, and synthetic products from gases. His study demands the close attention of all who are interested in new uses for coal and in synthetic fuels. The world's production of coal shows a slow increase from 1,258,000,000 metric tons in 1931 to 1,327,000,000 metric tons in 1935. Coke has traveled a downward course from 144,766,000 metric tons in 1929 to 105,413,000 in 1934. The 1935 figure is not given.

OPERATING IDEAS

From Production, Electrical and Mechanical Men

Shims Stop Spooling Trouble When Rope Is Turned

Spooling troubles encountered when turning ropes end for end on an ungrooved straight-drum slope hoist at the No. 8 mine of the Union Pacific Coal Co., Rock Springs, Wyo., were eliminated by the use of shims in the first wrap to compensate for the decreased diameter of the worn end of the rope placed on the drum. Because

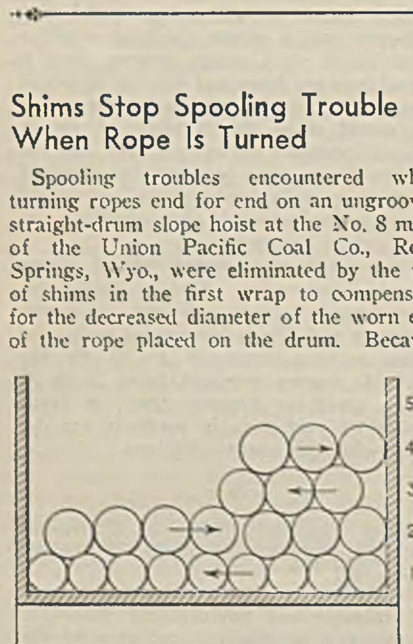


Fig. 1—Diagrammatic sketch (rope size exaggerated) showing effect of decrease rope diameter on spooling when shims are not used

of this reduction in rope diameter, the spaces for the coils making up the second wrap, consisting of rope with a larger diameter, are reduced, with the result that as the rope travels across the face of the drum the coils are displaced farther and farther from the grooves between the coils in the first wrap and eventually one groove is skipped entirely, as indicated in Fig. 1. Then, as the rope moves across the face on the third wrap, it drops into the gap in the previous wrap and frequently, instead of continuing across the drum, starts to spool in the opposite direction.

The solution, in the opinion of A. T. Henkell, general master mechanic, was the introduction of some form of shim, or spreader, in the first wrap on the drum to compensate for the reduction in rope diameter resulting from wear. Hemp cord was among the several shimming materials tried, but experience showed that it crushed down so that the desired effect was lost. This led to the adoption of the metal shim shown in Fig. 2, which consists of a piece of sheet iron $\frac{1}{16}$ in. thick and long enough to go one-third of the way around the drum. Width of the shim is just sufficient to bring the top when in place on the drum just slightly above the center of the rope. Three cuts are made in the shim at approximately the points indicated in Fig. 2 and the fins of metal thus produced are bent outward in opposite directions to make legs, or supports, for the shims when placed in position on the drum. As the rope is coiled onto the empty drum, one of the shims is fed in by hand and when engaged by the rope snaps into place. When the rope reaches the end of the first shim, the second is inserted, and in the same fashion the third, thus giving a continuous line of shims all around the drum. Six to eight coils later and similarly thereafter the process is repeated until the first wrap is completely on the drum. Spooling then continues in the usual manner for the remaining wraps.

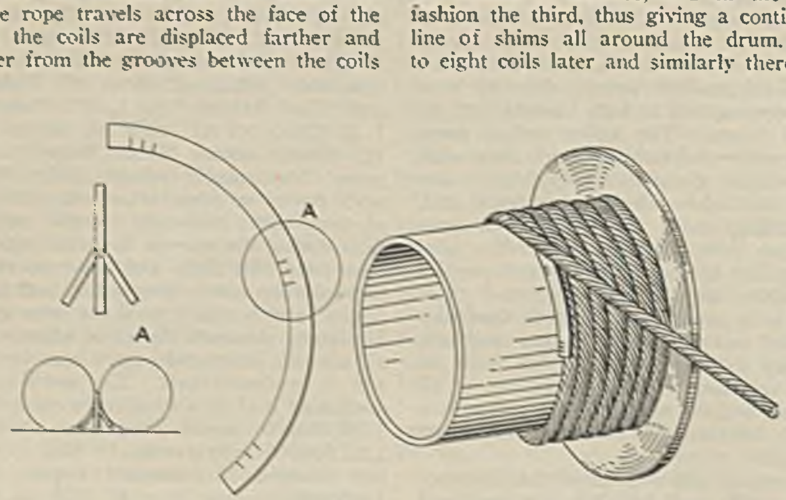
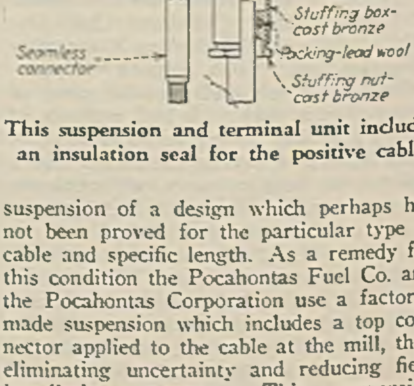


Fig. 2—Left, details of shim; right, method of applying shim in spooling on first wrap on drum

The No. 8 slope hoist, to which these shims were first applied is equipped with a 6-ft.-diameter drum with a 7-ft. face accommodating 10,700 ft. of $1\frac{1}{8}$-in. rope in seven wraps. Since installation on the No. 8 hoist the shims have been applied to two additional units. When a new rope is installed, the shims are removed and stored away until the rope is turned end for end.

"Tailor-Made" Borehole Cables Serve Pocahontas Mines

Uncertainty and undue field expense only too often attend the installation of a shaft or borehole cable. With a company which previously has used few or no vertical riser cables it may be due to lack of experience, but usually the difficulties result in large measure from the use of a shop-made



This suspension and terminal unit includes an insulation seal for the positive cable

suspension of a design which perhaps has not been proved for the particular type of cable and specific length. As a remedy for this condition the Pocahontas Fuel Co. and the Pocahontas Corporation use a factory-made suspension which includes a top connector applied to the cable at the mill, thus eliminating uncertainty and reducing field installation expense. This suspension method does not strain the insulation.

In the last two years cables and suspensions of this type have been intalled at the

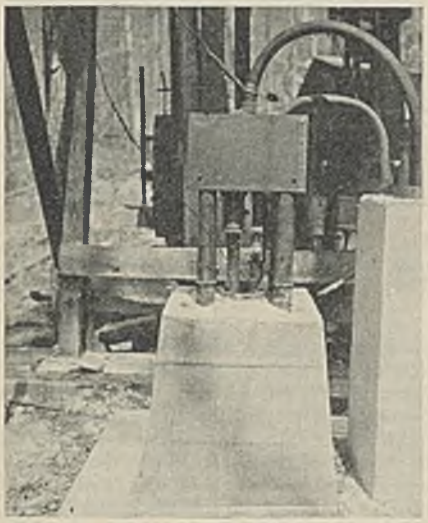
Bishop, Faraday and Jenkinjones mines of the Pocahontas Fuel Co., Pocahontas, Va., and W. J. German, general superintendent, states that the practice represents a decided improvement over rigging the suspension in the field. All substations are located on the surface, hence the mine power cables transmit direct current. The voltage is 550 at all except the newer mines at Faraday and Bishop.

The drawing and halftones illustrate a 275-volt installation at a 479-ft. borehole off Horsepen Creek feeding the advance workings of the Bishop and No. 3 seams in mines No. 34 and No. 35, Bishop, Va. Both cables are 1,500,000-circ.mil and the negative is bare. The positive is tinned and has rubber insulation protected by a heavy sheath.

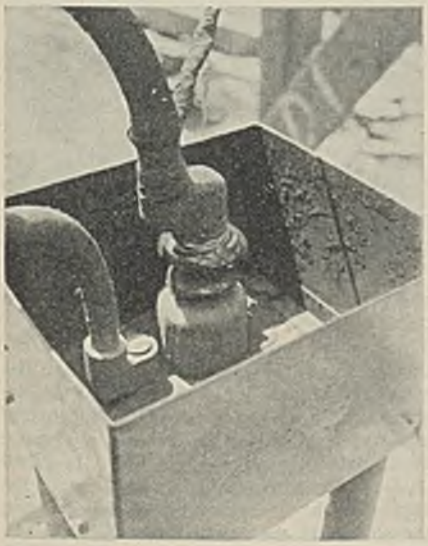
Field construction at the top of the borehole consists only of a concrete pier which surrounds the casing and has four scrap car axles cast into it as support for the 1-in. "Everdur" plate of the cable terminal assembly. Applying and tightening the hood nuts was the only work connected with attaching the cables to the suspension unit except that a stuffing nut had to be tightened to seal the insulation of the positive cable. The negative cable terminal is grounded to the top of the borehole casing by a short length of 4/0 copper.

The longest cable is in a borehole 723 ft. deep in Abbs Valley feeding the advanced workings in a drainway section of Jenkinjones mine, which is in the No. 3 seam.

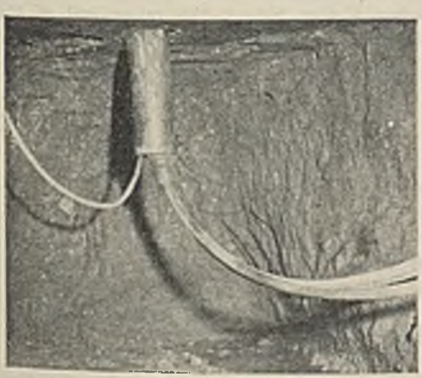
Both the cables and suspension units of these Pocahontas Fuel installations were manufactured by the Anaconda Wire & Cable Co.



Between the car axle posts and below the guard can be seen the stuffing box and nut of the positive cable, also the seamless connector of the negative cable



Suspension terminals rest on an Everdur plate. Metal sides were added as mechanical protection to the insulator

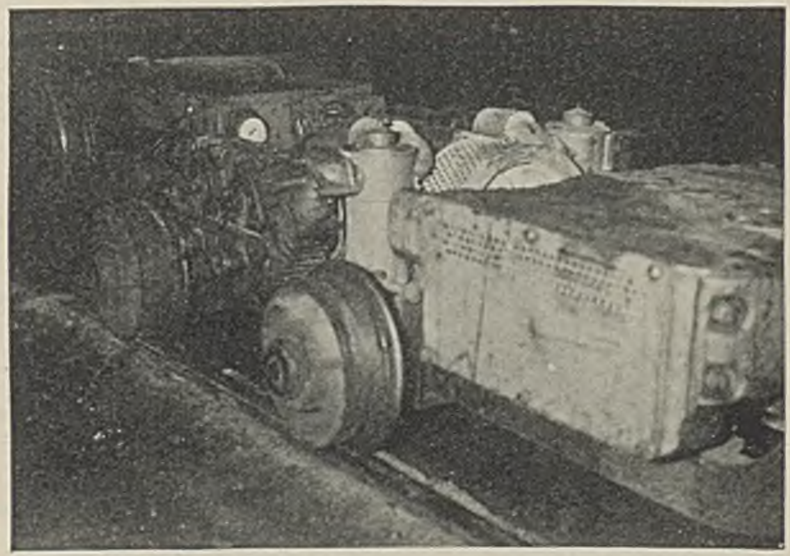


Casing and cables at the bottom of the borehole in No. 35 mine, No. 3 seam

Drop Axle Imparts Flexibility To Low-Type Compressor

Extension of operations into lower coal and the urge for machinery of greater reliability and lower maintenance cost resulted in the purchase of a portable mine compressor of a new design for use in the Summerlee (W. Va.) mine of the New River Co. This compressor, built by the Ingersoll-Rand Co., utilizes the Long Super Mine Car Co.'s drop-axle design similar to that on the 500 new cars with which the mine is equipped (*Coal Age*, January, 1936, p. 20).

Use of the drop axle made it possible to design the 120-cu.ft. unit to a height requirement not exceeding 26 in. and yet provide the axle flexibility which is required for staying on tracks. The compressor, which is air-cooled and has cylinder dimensions of 5½x4 in., is direct driven at 1,000 r.p.m. by a Jeffrey 35-hp. (1-hour rating) 550-volt compound-wound motor of the explosion-tested type.



Capacity, 120 cu.ft.; height, 26 in.; and the wheels have 1 in. of vertical play to insure better tracking

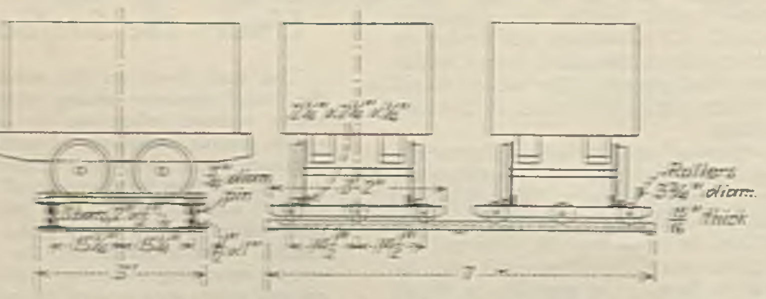
Under the Surface

The duck floats on the pond, to the casual observer getting where it wants without effort or, in other words, getting something for nothing. But such is not the case. Under the surface, its feet keep going all the time. The moral of this homely illustration is: An active mind gets results. Active minds are the rule among operating, electrical, mechanical and safety men around the mines. And for those active minds this department is maintained, presenting the new ideas constantly originated to meet the problems arising out of the day's work. Such ideas receive a warm welcome here, so if you have one, send it along, with a sketch or photograph if it will help to make it clearer. For each acceptable idea, *Coal Age* will pay $5 or more when printed.

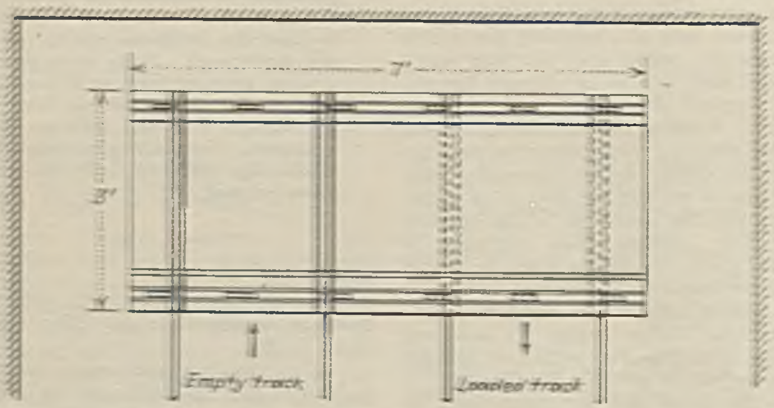
★ ★

Transporter Aids Car Changing

To facilitate changing cars at the face, W. J. Leonard, Broomhill colliery, North Broomhill, Morpeth, England, calls attention to the transporter shown in the accompanying illustrations, also recommended for transferring cars quickly from the



Construction details of car transporter



Transporter in use in a heading underground

loaded to the empty track after dumping. When used underground, the empty car is pushed up to the face on the empty track, and when filled is shunted across to the loaded track, thus permitting another car to be brought up for loading.

Working Hints From a Shopman's Notebook; Improving Hydraulic Jack on Loader

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

To eliminate trouble resulting from oil leakage and from the plunger falling out of the cylinder, a Joy 5 BU hydraulic jack with cup leather instead of packing and a nut and chain instead of a limit bolt as a limit stop has been changed to the packing type. No difficulty has been encountered with the rebuilt jack in more than nine months' service. In rebuilding the jack it was necessary that the cylinder be bored out for the packing and threads cut on the inside for the nut. The nut, with threads cut on it, was made first so that standard packing could be used. Measurements were taken from the nut on a later-type jack. This allowed use of the packing simply by cutting it off.

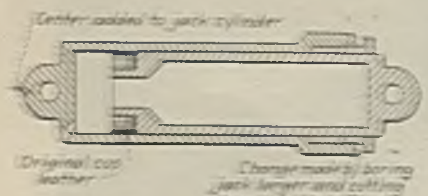


Fig. 1—Showing changes made in jack cylinder

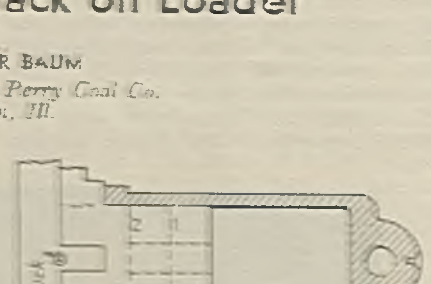


Fig. 2—Method of holding jack cylinder true while drilling center in cylinder end

Changes made are shown in Fig. 1. Fig. 2 shows how the jack cylinder was centered so that it could be held in the lathe as in Fig. 3, which shows boring done and threads cut to fit the threads on the nut, shown on the tailstock of the lathe. The nut also is shown on the tailstock of the lathe. The boring bar was bent to get it inside the cylinder so that it would clear the mandrel that held the jack true. In order to hold the jack cylinder true while drilling the center in the end where the pin goes through, a piece of 6-in. shafting 8 in. long was placed in the lathe chuck. After getting the shaft to run true enough for turning, the chuck jaws were tightened as much as possible and the center was drilled in the end of the shaft. Then the tailstock was moved up to hold the shaft while turning it down to the same size as the cylinder. The cylinder was then carefully slipped over the shaft and the center drilled.

Fig. 3—Cylinder in place on the lathe, with boring completed and threads cut. The nut appears on the tailstock at right

After removing the cylinder, the shaft was bored out to 2⅞ in. for a distance of 4 in. and then cut off with a cutting-off tool along Lines 1 and 2 (Fig. 2), making two collars, one 1⅞ and the other 1⅝ in. wide. These collars were used in the construction of the mandrel shown in Fig. 4. The mandrel was made of a piece of 2 15/16-in. shafting 22⅝ in. long, which was centered and turned down to 2⅞ in. for a distance of 1⅝ in. to receive Collar No. 1. Two 5/16-in. holes were drilled in the end of the shaft so that one half of each hole was in the shaft and the other in the collar. The holes were tapped to receive ⅜-in. safety set screws, which hold the collar to the shaft and prevent its loss at the bottom of the jack cylinder while fitting it. To receive Collar No. 2, the other end of the shaft was turned to 2⅞ in. for 9⅞ in. Two

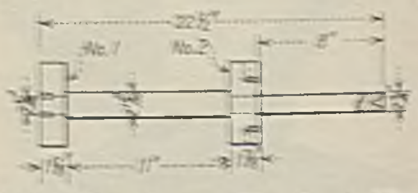


Fig. 4—Mandrel assembly for holding cylinder true during boring and threading

Fig. 5—Details of adjustable collar for use on mandrel

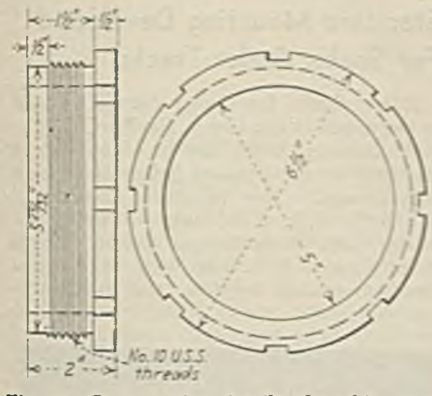


Fig. 6—Construction details of packing nut

set screws hold this collar on the shaft. They were first screwed down to mark the shaft, which was then drilled at the marks to receive the ends of the set screws.

As the inside diameter of the jack cylinder had been enlarged at the open end by wear, it was necessary to have some means of adjusting Collar No. 2 to a tight fit. Three ½-in. holes were drilled around the collar to accommodate ½-in. round heat-

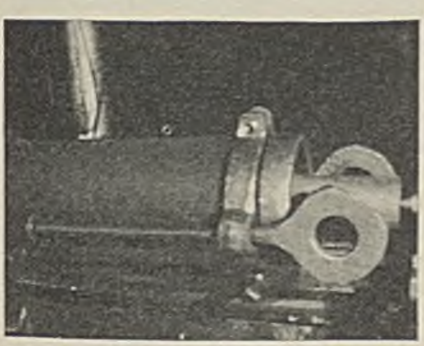


Fig. 7—Limit stop (made to replace chain) in place on cylinder

treated pins, which were pushed outward by the ⅜-in. pointed screws shown in Fig. 5. Collar No. 1 had to be turned off before it would go to the bottom of the cylinder. With the mandrel completed, the back end of the cylinder with the center previously made was placed on the center in the head of the lathe. Likewise, the center in the mandrel was placed on the tailstock center.

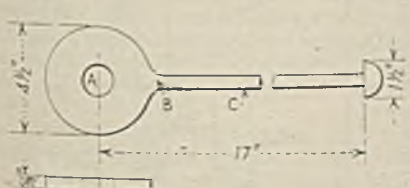


Fig. 8—Showing construction of stop member

The chuck jaws were tightened down on the cylinder end to turn it.

The nut, Fig. 6, was made of machinery brass similar to the nut used on a jack with the packing and nut on it when new. Outside and inside measurements, however, were different.

Fig. 7 shows in place on the cylinder the

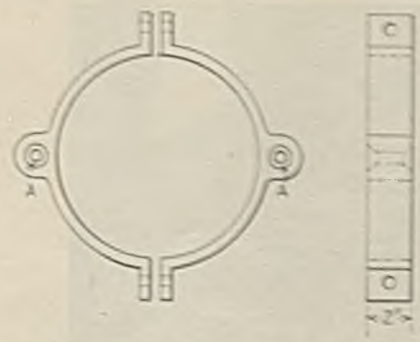


Fig. 9—Guide and stop used on hydraulic jack

limit stop made to replace the chain. Two stop members (Fig. 8) were required, one on each side of the jack. Hole *A* in each member was made to fit the pin holding the plunger to the loader frame. A new pin 1¾ in. longer had to be made. The round part, *C*, was made of steel that could be heat-treated after the bead was made. After this round part (*C*) was placed through one of the holes *A* in the guide member (Fig. 9) it was welded to the flat part of *B* (Fig. 8). The guide (Fig. 9), which also serves as the stop, is made to fit around the cylinder just back of the shoulder on the open end. Holes *A* are ⅞ in. in diameter to allow the stop members to slide freely.

Wire Breakage Stopped By Spring Support

Breaking of the wire while banding armatures is a difficulty of the past, practically speaking, at the central shop of the Sahara Coal Co., Harrisburg, Ill. The improvement was achieved when a spring anchor and support was made for the fiber clamp by which the tension of the wire is regulated.

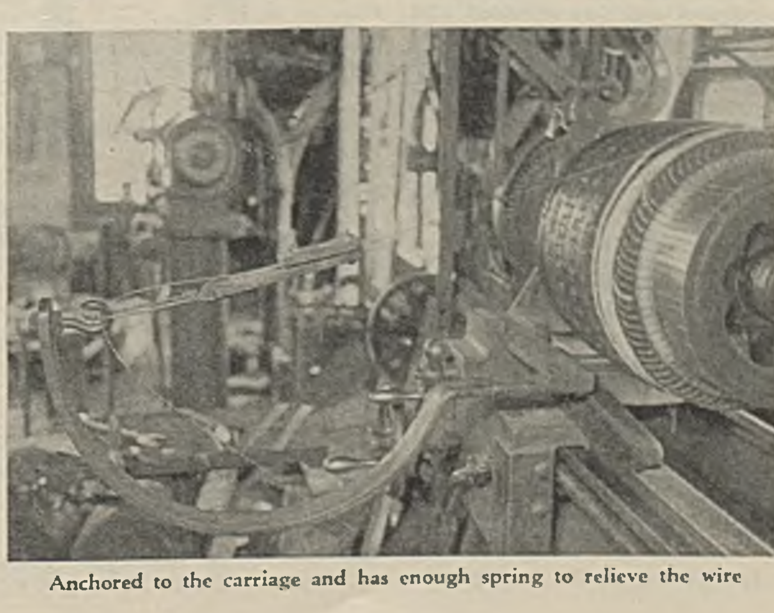
In order to use the lathe carriage in guiding the wire as well as to anchor the fiber clamp, it was necessary to fashion the extension shown in the illustration. It is made of ¼x2-in. bar-steel stock and is welded to a base which slides into the groove of the tool post. This curved extension has sufficient stiffness to provide ample tension for the largest banding wires used and, although not made of spring steel, it does have enough spring to relieve the wire of shock when it passes through the clamp by jerks.

Individual Drives Installed In Shop Changes

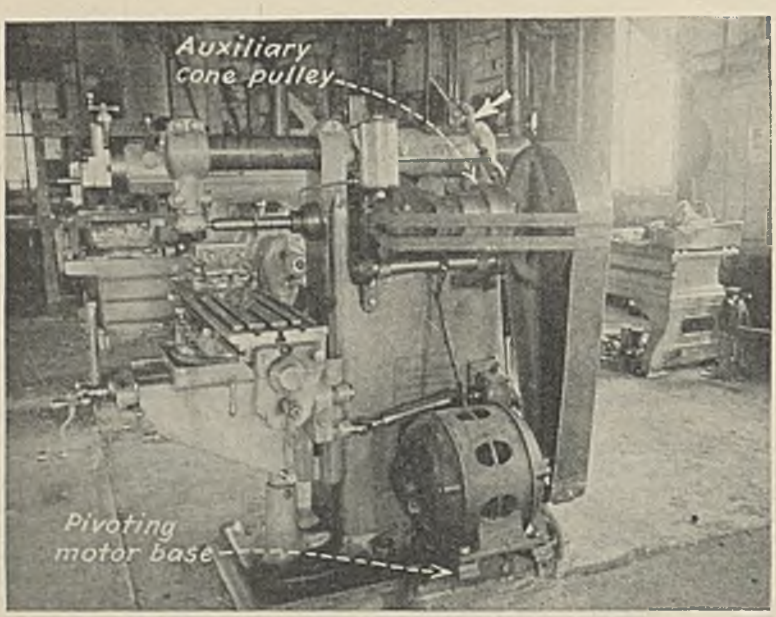
In adding a crane for handling heavy equipment to the facilities at the Rock Springs (Wyo.) machine shop of the Union Pacific Coal Co. it was necessary to remove the line shafts formerly used to operate the various machine tools to make room for the crane rail. This brought up the problem of providing individual drives for the various tools which were purchased for lineshaft operation. A typical solution to this problem is shown in the accompanying illustration. In this case the motor was mounted on a pivoting base bolted to the base of the machine and drives an auxiliary cone pulley mounted on the side of the machine above the motor.

The auxiliary cone pulley, carried on roller bearings, is mounted on a shaft supported on two arms which pivot on a third shaft mounted in a frame bolted to the machine frame. A short belt transmits power from the auxiliary to the main cone pulleys and provides for operation of the tool at the various speeds within the range of the pulleys. The weight of the motor keeps the belt to the auxiliary cone pulley tight and in turn puts tension on the short cone belt. When a change of speed is desired, the auxiliary cone pulley is raised up and pulled inward toward the machine frame by the lever and toggle shown in the illustration. This lever and toggle also allow the cone belt to be slacked off to permit the main cone pulley to be turned by hand when desired. An eyebolt and chain are provided to keep the motor from falling to the floor if the main driving belt should break.

On lathes and other equipment mounted



Anchored to the carriage and has enough spring to relieve the wire

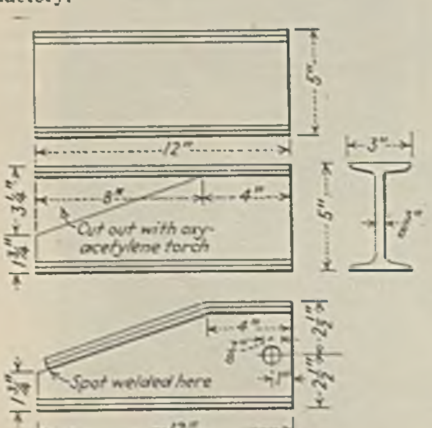


Individual drive applied to machine tool in Union Pacific machine shop. Lever and toggle used to raise and lower the auxiliary cone pulley is indicated by arrow

close to the wall, substantially the same method of providing tension in the driving belts was employed. In these cases, the motors and pivoting bases were mounted on the wall above the machines, and the length of the belts to the pulley shafts above the machines was adjusted so that the motors were swung slightly out from the wall, thus providing the necessary tension. A. T. Henkell, general master mechanic, developed the method of installing the individual-drive units.

I-Beam Makes Coal Sprag

Light weight and low cost are the chief advantages of the coal sprag shown in the accompanying illustration, according to W. J. Leonard, Broomhill colliery, North Broomhill, Morpeth, England. The sprag is constructed of old lengths of I-beam cut out as indicated and then rewelded. Of the several types of sprags used at Broomhill colliery, Mr. Leonard reports, the one described herein has been the most satisfactory.

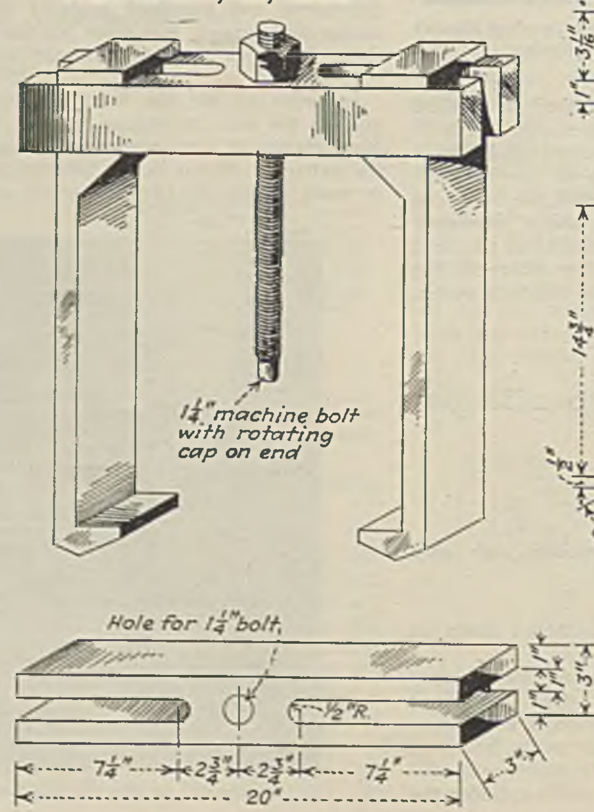


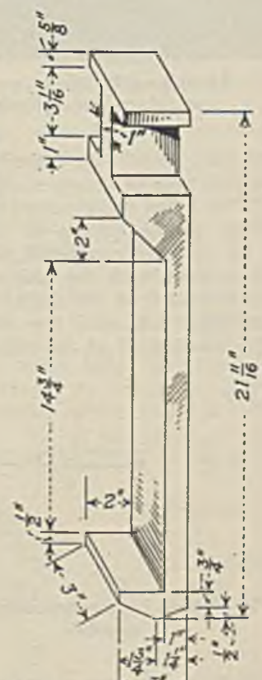
Construction details of sprag

Heavy-Duty Puller For Pinions and Housings

For use where more than normal duty is encountered in pulling pinions or housings, R. L. Murray, chief electrician, Hutchinson Coal Co., Macbeth, W. Va., suggests the puller shown in the accompanying figure, which gives the necessary design information and dimensions.

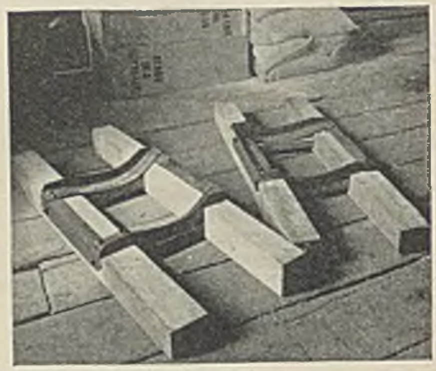
Puller for heavy-duty service





Standard Mounting Developed For Shaker Roller Tracks

Roller tracks for shaker conveyors used in the mines of the Union Pacific Coal Co., Rock Springs, Wyo., are provided with a standard wood mounting before being sent underground. This mounting consists of two 4x5's 4 ft. 8 in. long, to which the roller track is bolted as shown. Each roller track is backed up by a 1½x3 cross-piece toe-nailed between the two main members. When placed in the mine, a prop is set between the main members on each side of the conveyor. The 4x5 on the upper side rests against these two props and thus the roller track is prevented from sliding down the pitch.



Two roller-track mountings ready for service

WORD FROM THE FIELD

Obtains Restraining Order Blocking TVA

The Tennessee Electric Power Co., a subsidiary of the Commonwealth & Southern Corporation, has obtained a temporary restraining order prohibiting the sale of $8,000,000 in public power bonds and any move to begin a municipal power-distribution plant by the city of Chattanooga, Tenn., or the Chattanooga Public Power Board. The order, which was signed on Aug. 11 by Chancellor J. Lon Faust, halts the plan to serve Chattanooga with power from TVA. The plea for the order was part of the campaign to freeze TVA activities and extensions pending final court decision on the constitutionality of TVA.

The motion alleged that TVA is proceeding with construction of a complete network of transmission and distribution lines which have no economic use except to distribute power in direct competition with the property and business of the operating utilities, and that TVA is appropriating the customers and markets of these utilities and interfering with their present business relationships, on the basis of unfair, confiscatory rates made possible only by subsidies from Federal and State taxpayers.

Lytle Colliery Has New Lessee

Lytle colliery of the Lytle Coal Co., at Minersville, Pa., in the lower anthracite region, has been leased by Hartwell & Lester, Inc., of New York City, who took possession on Aug. 1. The mine has heretofore been operated by the Susquehanna Collieries Co.

New Preparation Facilities

Coxe Bros. & Co., Inc., Drifton (Pa.) colliery: contract closed with the Deister Concentrator Co. for Deister-Overstrom "Diagonal-Deck" coal-washing table for No. 1 buckwheat; capacity, 15 tons per hour.

Drifted Anthracite Coal Co., Bowmanstown, Pa.: contract closed with the Deister Concentrator Co. for Deister-Overstrom "Diagonal-Deck" coal-washing table for No. 2 buckwheat; capacity, 12 tons per hour.

Gap Coal Co., Bowmanstown, Pa.: contract closed with the Deister Concentrator Co. for Deister-Overstrom "Diagonal-Deck" coal washing table for No. 2 buckwheat; capacity, 12 tons per hour.

Hanna Coal Co., Dun Glen, Ohio: contract closed with the Morrow Mfg. Co. for four-track tipple with a capacity of 250 tons per hour. Equipment will include primary and secondary screens, loading booms, main incoming belt and Link-Belt-Simon-Carves coal-washing equipment to be moved from another of the company's mines.

Knife River Coal Mining Co., Beulah. N. D.: to replace tipple recently destroyed by fire with modern all-steel four-track plant with facilities for loading five preparations at once. Equipment will include coal breakers to reduce the larger sizes, other crushers for eight different preparations, if desired, and picking tables and scraper-line box-car loaders with tilting frames for all preparations. The plant is expected to be in operation by Sept. 15, and will have a capacity of 250 to 300 tons per hour.

Keeping Step with Coal Demand

Bituminous Production

Week Ended:	1936 (1,000 Tons)	1935* (1,000 Tons)
July 4	6,507	2,561
July 11	6,846	4,582
July 18	7,058	5,485
July 25	7,312	6,311
Aug. 1	7,402	5,338
Aug. 8	7,592	4,922
Aug. 15	7,700	5,569
Total to Aug. 15	247,979†	222,372†
Month of June	29,300	30,117
Month of July	32,113	22,339

Anthracite Production

July 4	830	711
July 11	761	635
July 18	752	724
July 25	777	838
Aug. 1	1,100	839
Aug. 8	550	433
Aug. 15	591	446
Total to Aug. 15	32,155†	33,125†
Month of June	3,958	5,642
Month of July	4,127	3,536

* Outputs in these columns are for the weeks corresponding to those in 1936, although these weeks do not necessarily end on the same dates.

† Adjusted to make comparable number of working days in the two years

Bituminous Coal Stocks

(Thousands of Net Tons)	July 1 1936	June 1 1936	July 1 1935
Electric power utilities	5,548	5,645	6,662
Byproduct ovens	4,565	4,064	6,446
Steel and rolling mills	874	874	1,471
Railroads (Class 1)	4,351	4,521	8,621
Other industrials*	7,615	7,469	10,627
Total	22,953	22,573	33,827

Bituminous Coal Consumption

(Thousands of Net Tons)	June 1936	May 1936	June 1935
Electric power utilities	3,153	2,801	2,478
Byproduct ovens	5,325	5,408	3,763
Steel and rolling mills	1,045	1,077	793
Railroads (Class 1)	6,255	4,521	5,796
Other industrials*	8,270	8,560	6,915
Total	24,048	24,442	19,745

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

Railroads Seek to Perpetuate Emergency Surcharges

Rebuffed by the Interstate Commerce Commission on their plea to freeze into permanent rates the emergency freight rate surcharges that are to expire on Dec. 31, the railroads are reported to be planning to go about the job of perpetuating the rates piecemeal. The petition denied by the Commission would have vacated outstanding orders which fix the reasonable maximum of 85 per cent of all rates in the absence of an emergency. This would have enabled the railroads to translate the surcharges into permanent rates merely by publishing a conversion table.

Refusal by the Commission to approve this blanket operation will force the carriers to publish and file individually all tariffs incorporating the surcharges. When the Commission refused, on July 1, to permit extension of the surcharges for more than six months, the roads were informed that they are not debarred from adopting this more cumbersome procedure. However, all rates so filed will be subject to suspension, pending investigation.

Unless the Commission consolidates such suspension proceedings into one case for disposal once and for all, its docket will be cluttered up for several years. Judged by the tone of finality with which the Commission rejected the carriers' original petition for indefinite continuance of the surcharges, a reversal of its position, regardless of the form in which the issue is presented, is uncertain.

Arrest Truckers and Dealers In Bootleg Coal Drive

A vigorous drive against the flow of illicit anthracite into Eastern markets resulted in the arrest of ten drivers of alleged "bootleg" trucks and two dealers, charged with receiving stolen goods, in New York City on Aug. 7 and the sentence to a fine of $10 or ten days in jail on Aug. 11 of a truck driver in Philadelphia charged with obtaining money under false pretenses and giving short weight.

Frank L. Nowasatka, proprietor of the Shamokin Coal Lines Co., New York City, and William Slutsky, of the W. & S. Coal Co., Brooklyn, N. Y., after an examination by Assistant District Attorney John C. McDermott, of New York County, were held and the drivers locked up as material witnesses. Judge Allen, in General Sessions Court, held nine of the drivers in $10,000 bail each pending their appearance before the grand jury. The tenth driver, a resident of Brooklyn, was held in $2,500 bail. The trucks had been trailed from Schuylkill, Northumberland and Columbia counties in Pennsylvania for more than eight hours by private detectives in automobiles. The detectives were employed by mine operators, who are cooperating with the local authorities.

District Attorney William C. Dodge

began an investigation of the bootleg coal traffic into New York before a grand jury on August 19, at which three of the arrested drivers testified. Mr. McDermott said they gave valuable evidence. Following a habeas corpus proceeding, Justice Frankenthaler reduced the bail of seven of the drivers to $250 each, while that of three others, residents of the southern anthracite region, was cut to $2,000 each. Edward Kuntz, of counsel for the truck drivers, told the court that the Independent Miners' Association of Pennsylvania, which is behind the shipment and sale of the coal in New York, would defy the District Attorney and Police Commissioner by transporting into the city more coal than had ever before been sent.

To familiarize himself with the situation, Mr. McDermott, accompanied by two members of the New York Police Department, spent three days in the Southern anthracite field recently and traced the route of bootleg coal from its source to New York. Since that time he has been collecting evidence to prove that illicit coal should be kept out of the New York market. Assistance in collecting bootleg anthracite data has been given by L. C. Madeira 3d, executive director, Anthracite Institute; Roderick Stephens, coordinator of the retail solid fuel industry of New York City, and T. T. Toole, Philadelphia & Reading Coal & Iron Co.

To Observe Anthracite Week Beginning Oct. 5

Observance of the second annual anthracite week will begin on Oct. 5, it was decided at a meeting of the committee in charge of arrangements held Aug. 7 at the Westmoreland Club, Wilkes-Barre, Pa. Plans were laid for extending the celebration into the principal consuming centers of the East besides taking in the hard-coal region itself. The date was set following a conference with Frank W. Earnest, Jr., president of Anthracite Industries, which is in charge of the $3,000,000 merchandising campaign to be instituted as a means of recovering lost markets (*Coal Age*, August, 1936, p. 345). The latter agency will set up a cooperative movement, distribute literature and devise means of spreading the anthracite gospel through dealers in sections remote from the producing region. Committees are to be set up in nearly every community in the hard-coal region.

Air-Conditioning Drive Begun

A nation-wide campaign on air conditioning has been started by the American Radiator Co. simultaneously with the introduction on the market of a new unit which makes air conditioning possible without resort to duct heating. Furnished in two sizes to meet all conditions and sold as an integral part of the complete systems, the manufacturer asserts that the new conditioner will operate with any of the established types of radiator heating to provide all the advantages of previous types in addition to intrinsic advantages of its own.

Heat-distribution control, radiator heating, ventilation, air cleansing, air circulation, humidification and a summer and winter domestic hot-water supply, obtained through a single integrated system, are listed as advantages offered by the systems. Cooling and dehumidification may be added, if desired. The campaign to introduce the systems will be directed particularly toward new homes to be built during the coming year, and an intensive effort will be made to induce prospective home owners to demand the new conditioning systems in homes that they may purchase.

Coming Meetings

- American Chemical Society: annual meeting, Sept. 7-11, Pittsburgh, Pa.
- World Power Conference. Sept. 7-12, Washington, D. C.
- International Railway Fuel Association: annual meeting, Sept. 16 and 17, Hotel Sherman, Chicago, Ill.
- National Safety Council: 25th annual safety congress and exposition, Oct. 5-9, Atlantic City, N. J.
- West Virginia Coal Mining Institute: annual meeting, Oct. 9 and 10, Logan, W. Va.
- American Institute Mining and Metallurgical Engineers, Coal Division: annual meeting, Oct. 21-22, Pittsburgh, Pa.
- Illinois Mining Institute: forty-fourth annual meeting, Oct. 23, Hotel Abraham Lincoln, Springfield, Ill.

New Stoker Units Announced

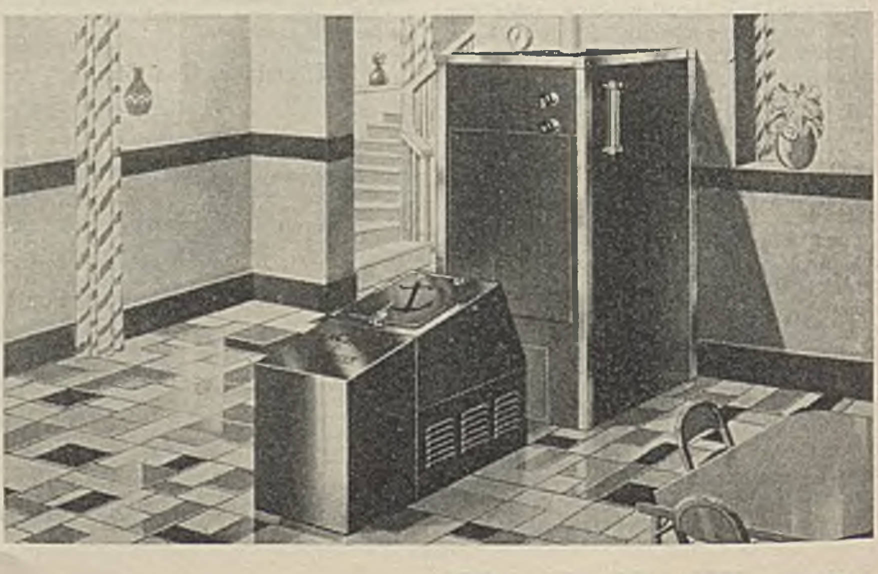
New stoker units are being introduced by the American Radiator Co. of New York and the Anchor Stove & Range Co., New Albany, Ind., and Combustion Engineering Co., Inc., New York. The Anchor-Arco Kolstoker-boiler unit, designed and perfected by the two first-named companies, is described by the makers as a complete automatic heating plant with the functions of the Anchor Kolstoker and the Arco boiler coordinated for maximum efficiency in the feeding and burning of coal, and the conversion of heat energy into steam or hot-water heat. While the automatic coal burner can be expected to deliver greater efficiency and economy with any boiler, experience has proved, the makers point out, that still greater efficiency can be obtained if the automatic burner is installed in a boiler designed and built especially for the requirements of automatic coal firing. To secure this greater efficiency, ARCO engineers have developed special features in the boiler part of the unit to meet the particular demands of the Kolstoker.

Combustion Engineering Co.'s CE-Skelly stoker unit, according to the manufacturer, is a stoker of advanced design for burning all grades of bituminous coal and applicable to all types of boilers in sizes ranging from small heating units to power boilers up to 400 hp. It is available with either electric or steam drive in three types: center retort, moving grate; side retort, moving grate; and side retort, stationary grate. Hopper, fuel feeding and distributing mechanism, grate windbox, driving mechanism and forced-draft fan are combined in a compact unit. The hopper, made of rust- and corrosion-resisting metal, is non-clogging and easily removable; does not interfere with access to the furnace doors, and is located at a convenient height for filling with shovel.

For coal feed, a screw conveyor, located entirely outside of the retort and protected from heat, advances the coal from the hopper to the entrance of the retort. A reciprocating ram in the retort continues the feeding and provides agitation of the fuel bed in the retort zone. The grate surface, composed of alternate fixed and moving grate bars, is designed for correct air distribution and is made of a special heat-resisting metal. Distribution of the coal is accomplished by a reciprocating ram in the retort and by lateral movement of alternate grate bars. Underfeed action aids in proper combustion of the fuel and in advancing the ashes onto the dump grates. The integral forced-draft fan, with inlet damper control, supplies air to the windbox under the stoker. The volume of air may be regulated by a control lever to suit the rate of coal burning.

The drive mechanism consists of a constant-speed motor which drives an integral

Anchor-Arco Kolstoker-boiler Unit



Blank & Stoller
George B. Harrington
Delegate to World Power Conference

variable-speed transmission, the mechanism being completely inclosed and protected from injury by a shearing key. Coal feed may be cut off by means of a clutch so that the fan may continue to operate for burning out the fuel. Automatic control is furnished as standard equipment.

The unit is applicable for new boilers or for existing boilers having obsolete or inefficient firing equipment. The small clearances required permit installation with only slight alterations in most cases.

Coal Association Secretaries Discuss Industry Problems

Problems of pressing importance to the coal industry were freely discussed at a two-day meeting of association secretaries from most of the bituminous-coal producing fields of the country, held Aug. 20 and 21 at the Edgewater Beach Hotel, Chicago, under the auspices of the National Coal Association. Presided over by J. D. Battle, executive secretary of the National Coal Association, the sessions covered discussion of the Robinson-Patman anti-price discrimination act and the outlook for legislation on such matters as stream pollution and oil and gas regulation.

Other features of the meeting included an outline of the Social Security act by Vincent Miles, a member of the board, with a crossfire of questions and answers. Ray Goddard, president, Stoker Manufacturers' Association, and Thomas Marsh, Iron Fireman Mfg. Co., narrated the development of the stoker and the progress being made in holding coal in homes and plants against competitive fuels. The work being done by the Illinois Reciprocal Trade Association in restoring coal to use as fuel was described by James Bristow, executive vice-president of that organization. R. E. Howe, Appalachian Coals, Inc., charted the progress being made by that concern and expressed confidence in the foundation for its new set-up. Representatives were present from Pennsylvania, Ohio, West Virginia, Virginia, Kentucky, Tennessee, Illinois, Colorado, New Mexico, Wyoming, Washington, the Southwest and the Northwest docks.

Coal Will Play Important Part in Program Of Third World Power Conference

WASHINGTON, D. C., Aug. 24—Coal topics will have an important part on the program of the Third World Power Conference, which opens here on Sept. 7 and will continue throughout that week. About 3,000 delegates, including 700 to 800 representatives from foreign countries, are expected to be present. Some of them will come here after having taken part in the pre-conference study tours (*Coal Age*, August, 1936, p. 339); others will come directly to Washington. A number of the foreign delegates have made arrangements to participate in either the pre- or post-conference coal study tour which takes in Pittsburgh and Cleveland, while some will later go on private inspection trips to visit mining operations farther west.

The organization of the production, processing and distribution of coal and coal products in the United States will be presented to the conference at the first day's session in papers by J. P. Williams, Jr., president of the National Coal Association and of the Koppers Coal & Transportation Co., and Isadore Lubin, of the U. S. Department of Commerce. Organization of the production and distribution of British coal will be covered in a joint paper by the Mines Department of Great Britain and the Mining Association. Processing will be treated in a separate paper by the Mines Department and J. G. King, chief chemist, fuel research station, Department of Scientific and Industrial Research; E. C. Evans, secretary, British Iron and Steel Industrial Research Council, and T. Westthorp, president, Coke Oven Managers' Association.

Germany will offer a paper on production, processing and distribution by Dr.-Ing. E. h. G. Knepper; another on the brown-coal industry and the conservation of the brown-coal resources by Dr.-Ing. E. h. Heubel; and a third on the "Industrial Production of Motor Fuels From Coal in Germany" by Oberberghauptmann Schlattmann and Dr.-Ing. E. h. Koppenberg. The picture of French production and distribution will be given by H. de Peyerimhoff, president of the Central Committee of French Collieries

J. P. Williams, Jr.
Will present United States coal report

and Coal Mines. Prof. Dr. Ir. F. K. Th. van Iterson, director, Dutch State Mines, is the author of papers on the power resources of the Netherlands and on the set-up of the coal industry. The Hungarian coal situation will be covered in a paper by J. Muller and Prof. Dr. J. Varga; conditions in Czechoslovakia are reviewed by the Association of Mine Owners of that country. Operations at Svalbard will be reviewed by the Norwegian Scientific Exploration of Svalbard and Arctic Regions. E. Gorkiewicz has prepared a paper on "Changes in the

Harris & Ewing
Ralph E. Taggart
Delegate to World Power Conference

Working and Haulage of Coal in Polish Collieries During the Last Ten Years."

Conditions surrounding the organization of the production, processing and distribution of coal and coal products in the Union of South Africa have been reviewed by Dr. P. N. Lategan. The Bureau of Mines, Ministry of Industry, National Government of China, handles the Chinese situation. Among the Japanese papers submitted to the conference are: "Use and Transport of Coal by the Japanese Government Railways," by T. Yamada, chief, research office, Japanese Government Railways; "Tendency of Coal Demand and Supply and Control of Coal Industry in Japan," by Keizo Furuta, managing director, Showa Coal Co.; and "Utilization of South Karafuto Coal by Low-Temperature Carbonization," by E. Katsumata, chief engineer, Mitsubishi Mining Co., Ltd.

Some of the countries participating in the conference have submitted special papers on the conservation of fuel and power resources, while others, as indicated in preceding paragraphs, have treated the subject in connection with broader reviews of the organization of the industry. British conservation policies with respect to coal are covered in a separate paper by Mr. Sinnatt. Hungarian conservation by Dr. A. Erdély and Sz. Hankiss, and Czechoslovakian policies by the Association of Mine Owners of Czechoslovakia. M. de Peyerimhoff treats the situation in his country in a paper entitled "Rational Utilization of French Coal Reserves." Coal and oil resources of China are covered in a paper by the National Geological Survey of China. There will be two papers by the U. S. Bureau of Mines on the conservation of coal, oil and natural-gas resources; among the authors will be George A. Rice, A. C. Fieldner and F. G. Tryon.

A number of other coal papers also will be on the program. The papers mentioned in the preceding paragraph include only those available at the time this story was written. Papers submitted to the World Power Conference are not read at the meetings which are devoted to oral discussion of the subjects treated. General reports summarizing the papers in the coal and other sections of the conference will be prepared in advance of the opening of the sessions on Sept. 7 and made available to the delegates. These general reports will call attention to matters of special interest in the papers and suggest topics for oral discussion.

Charles Dorrance, president, Penn Anthracite Collieries Co.; George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co.; and Ralph E. Taggart, president, Philadelphia & Reading Coal & Iron Co., have been appointed delegates to the conference by the American Mining Congress. In addition to the conference proper, American power interests have arranged a series of exhibits for the entertainment and instruction of the visitors. The National Coal Association has a booth at the National Museum, where, through charts and pictures, it emphasizes the importance of the bituminous coal industry in the creation of power. The exhibit opened Aug. 15 and will be open until Sept. 12.

Pittston Blast Kills Five

A cave-in following an explosion in the Clear Spring colliery of the Sullivan Trail Coal Co., at West Pittston, Pa., on Aug. 24 resulted in the deaths of five miners, four from black damp and one from a slide. The explosion occurred about a half hour after the men had reported for work. The region affected was 200 ft. below the surface on a spur about 1,000 ft. from the shaft. Another man in the affected area was pulled through an opening to safety before the section was shut off.

Two Killed in Mine Cave-in

Two miners died and two were rescued alive Aug. 21, three days after a cave-in in a coal mine at Moberly, Mo., owned by one of the rescued men and one of the dead men. The rescued co-owner of the mine is Demmer Sexton, who was unconscious when removed from the mine. His live companion was A. W. McCann. Mr. Sexton's partner, who succumbed to carbon monoxide, was Edward Stoner, Jr. A negro miner and a pony also succumbed. The cave-in followed a fire which began near the ventilating fan and consumed a thousand new mine props. The mine had been in operation about three weeks under lease when the fire broke out.

STOKER SALES STILL CLIMBING

Sales of mechanical stokers in June last totaled 4,898, of which 4,381 were small residential-size units, according to statistics furnished the U. S. Bureau of the Census by 108 manufacturers. This compares with sales of 3,913 units in the preceding month and 2,823 in June, 1935. Figures for the first six months of this year show that 19,763 units of all types and sizes were sold, compared with 10,233 in the corresponding period a year ago. Sales by classes in the first six months of this year were as follows: residential (under 100 lb. of coal per hour), 17,456; apartment house and small commercial heating jobs (100 to 200 lb. per hour), 936; general heating and small high-pressure steam plants (200 to 300 lb. per hour), 375; large commercial and high-pressure steam plants (over 300 lb. per hour), 996.

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Central West Virginia Meet Brings Perfect Scores

Perfect scores were made by two teams in the fifth annual safety day contest of the Central West Virginia Coal Mining Institute, held Aug. 1 at Jacksons Mill, W. Va., under the sponsorship of the West Virginia Department of Mines. Forty-one mining, industrial and junior teams competed, Carolina No. 86 team of the Consolidation Coal Co. taking first place in the first-aid contest with a perfect score of 1,500 points. The winning team was composed of H. T. Kelly (captain), Lowell Kelly, William Buszak, A. B. Price, R. L. Stalnaker, Toney Larry and Joe Baerdon. Second honors went to Consolidation's No. 32 team, from Owings, with 1,498 points. Both teams won the right to compete in the State meet on Oct. 17 in Beckley, as also did the Grant Town colored team of the Koppers Coal & Transportation Co., which repeated its victory of last year in that division, with a perfect score.

Other white teams among the first ten, all of which scored 1,489 or more points and all of which received prizes, were, in order: Watson No. 26, Consolidation Coal Co.; Mine No. 1, Pardee-Curtin Lumber Co.; Carolina mine, Consolidation Coal Co.; Meadowbrook mine, Hutchinson Coal Co.; Flemington mine, Reppert Coal Co.; Owings mine and Pinnickinnick mine, Consolidation Coal Co.; Webster Springs mine, Pardee-Curtin Lumber Co. The colored team from Consolidation's Carolina mine captured the remaining prize in that division. Prizes in the junior division went to the following teams, in order: Consolidation Coal Co. No. 32 boys; Webster Springs girls of the Pardee-Curtin Lumber Co.; Consolidation Coal Co. No. 25 girls; No. 32 boys; and No. 86 boys.

A record crowd estimated at about fifteen thousand persons witnessed the competition and heard addresses by Governor H. G. Kump, N. P. Rhinehart, chief, State Department of Mines; C. E. Lawall, director, school of mines, West Virginia University; J. H. Nuzum, president of the institute; State Attorney General Homer A. Holt; Frank Miley, president, District 31, United Mine Workers, and others. L. S. McGee, district mine inspector, Shinnston, was director of the meet, and J. J. Forbes, U. S. Bureau of Mines, Pittsburgh, Pa., was chief judge.

113-Mile Gas Line Planned

A natural-gas line 113 miles long is to be constructed to extend from a point near Limestone, Clarion County, Pennsylvania, to connect with the western end of the New York State Natural Gas Co. line in Hebron Township, Potter County. The Peoples Natural Gas Co., Pittsburgh, Pa., has awarded a contract for 12,000 tons of 12-inch seamless tube for the line to the Jones & Laughlin Steel Corporation.

Broadens Research Facilities

Because of the increasing interest in its research studies in coal and related equipment at Battelle Memorial Institute, Columbus, Ohio, Bituminous Coal Research, Inc., has decided to make its laboratory available to coal producers and stoker manufacturers for the study of individual problems which are not included in its general program. In carrying out investigations of a general character, intended to be of the greatest possible benefit to the industry as a whole, the

Consolidation's Carolina No. 86 team, winner of Central West Virginia Coal Mining Institute first-aid contest

corporation has developed a laboratory capable of handling a greater volume of work than the corporation is conducting. Therefore the surplus capacity is being offered to individual producers and manufacturers for the study of specific problems concerning their products. Those desiring to avail themselves of these facilities are invited to communicate with Clyde E. Williams, director of the institute.

Second Pocahontas Exhibit Held at Bluefield

Over sixty nationally known manufacturers displayed their products at the Pocahontas Industrial Exhibit, held at Bluefield, W. Va., Aug. 20, 21 and 22. In addition more than twenty booths were occupied by local supply and sales companies, which exhibited numerous other well-known products used by coal mines. Held under the sponsorship of the Pocahontas Electrical and Mechanical Institute, of which S. S. Cooper, electrical engineer, American Coal Co., is president, the exhibit was directed by A. F. Marshall, of the Pocahontas Operators' Association.

No meetings were held in connection with the exhibit. Open hours for the first two days, Thursday and Friday, were 1 p.m. to 9 p.m. and on Saturday 9 a.m. to 5 p.m., thus suiting the large number of mining men who drove in and out each day from the surrounding coal fields. Operating men from greater distances—for example, from the Harlan, Hazard and Big Sandy fields of Kentucky—were well represented among those in attendance.

The following list omits exhibitors of materials such as household furnishings and appliances and does not include mention of the numerous manufacturers represented by the supply companies.

Air Reduction Sales Co., Alhberg Bearing Co., American Brattice Cloth Corporation, American Cable Co., Inc.; American Car & Foundry Co., American Mine Door Co., Anaconda Wire & Cable Co., Appalachian Power Co., Banks Miller Supply Co., Barlow & Wisler, Beckley Machine & Electric Co., Bethlehem Steel Co., Bluefield Hardware Co., Bluefield Supply Co., Brown-Fayro Co., Chicago Pneumatic Tool Co., Citizens Coal & Supply Co., Coal Age, Dayton Rubber Mfg. Co., Diamond Chain & Mfg. Co., Joseph Dixon Crucible Co., Dustlix Systems, Inc.; Electric Railway Equipment Co., Electric Railway Improvement Co., Enterprise Wheel & Car Corporation; Fairbanks, Morse & Co., Fyr Fiter Sales & Service, General Electric Co., General Shale Products Corporation, Goff Mine Tie & Switch Co., B. F. Goodrich Co., Goodman Mfg. Co., Griffith Lumber Co., Inc.; Gulf Oil Corporation, Hartzell Propeller Fan Co., Hewitt Rubber Corporation, Ideal Commutator Dresser Co., Ingersoll-Rand Co., Jeffrey Mfg. Co., Johns-Manville, Kanawha Mfg. Co.

Linde Air Products Co., Link-Belt Co., Manhattan Rubber Mfg. Division, Mine Safety Appliances Co., Benjamin Moore & Co., Mosebach Electric & Supply Co., National Electric Coil Co., Penn Machine Co., Persinger Supply Co., Phillips Mine & Mill Supply Co., Portable Lamp & Equipment Co., Post Glover Electric Co., Princeton Foundry & Supply Co., Racine Tool & Machine Co., Rockbestos Products Corporation, Safety First Supply Co., Safety Mining Co., Sanford-Day Iron Works, Inc.; Simplex Wire & Cable Co., SKF Industries, Inc.; Southern Oxygen Co., Inc.; Standard Oil Co. of New Jersey, Stephens-Adamson Mfg. Co., Sun Oil Co., Superior-Sterling Co., Timken Roller Bearing Co., Tyson Roller Bearing Co., United States Steel Corporation, Van Dorn Electric Tool Co., Viking Mfg. Co., Virginia Polytechnic Institute, Wadsworth Electric Mfg. Co., Weinman Pump Mfg. Co., Westinghouse Electric & Mfg. Co., Westinghouse Lamp Co., West Virginia Armature Co., West Virginia Rail Co., West Virginia University, Williams & Co., Inc., and Williamson Supply Co.

How American Industrial Progress Promotes Steadily Rising Standards of Living

HOW American industry, largely through a steadily increasing use of the machine, has opened up new and greater employment opportunities at higher wages and has made possible constantly rising standards of living is dramatically presented by the McGraw-Hill Publishing Co. in a special issue of *Factory Management and Maintenance* published last month and dedicated to a graphic exposition of "What Industry Means to America." Industry in this country, states the editorial epilog to the presentation, "was created by the American people. In return, industry has created for the American people the highest standard of living in history." The real hope for further gains lies in raising that standard to still higher planes.

Restoration of 1929 standards of living, it is pointed out, would swell the number of factory workers from approximately 9,000,000 to 10,500,000. An increase of 25 per cent over the 1929 standards would require the employment of 13,125,000 workers, while an increase of 50 per cent would provide jobs for 15,750,000. Such increases are by no means fantastic when consideration is given to present obsolescence in equipment in many industrial plants, the need for new building and the job still to be done in effecting a more widespread distribution of comforts and conveniences. In fact, as a starter, the editors offer a nine-point improvement program which, it is estimated, would mean the expenditure of approximately $41,000,000,000 for manufactured products and, if spread over a ten-year period, would add 900,000 workers to the factory payrolls.

High spots in this nine-point program are:

1. Since 1929 the decline in building has created a residential and industrial housing shortage which, it is estimated, will cost $29,000,000,000 to make up. Catching up on this deficit would create an $18,000,000,000 market for manufactured products that would provide jobs for approximately 1,000,000 factory workers for 3½ years.

2. If the homes now wired for electricity had their proper complement of electrical appliances, such as refrigerators, washing machines, irons, toasters, percolators and clocks, manufacturers would have a new $16,000,000,000 market. And this estimate takes no account of the 10,000,000 homes that are still unwired.

3. Wiring and electrical appliances such as milk coolers, feed grinders, incubators, brooders, separators, milking machines, portable and shop motors for 2,260,000 farms would consume another $5,000,000,000 in factory production.

4. A 10 per cent expansion of home, farm and factory markets for electricity in two years would require an expenditure of approximately $3,000,000,000 by central stations in generating and distribution equipment and offices. More than $2,500,000,000 of this sum would be spent for factory products. This $23,500,000,000 market for electrical goods and services would keep more than 1,000,000 factory workers busy for 4½ years.

5. With 65 per cent of the machine tools in the nation's metal-working shops more than ten years old, modernization in that field represents a replacement market for $1,000,000,000 in new tools and would provide work for nearly 50,000 people for four years.

Power Plants—$4,000,000,000

6. Modernization of industrial power-plant equipment, much of which is now more than 20 years old, would provide a $4,000,000,000 market for factory products and give jobs to 100,000 workers for nearly eight years.

7. Air-conditioning of homes, factories, stores, offices, theaters, public buildings and railroad equipment opens up the possibility of another $1,000,000,000 market for factory products in the next few years.

8. Approximately 60 per cent of the machinery in the textile industry is more than 10 years old. Its replacement would call for an expenditure of approximately $1,200,000,000 and provide jobs for 25,000 workers for more than nine years.

9. Annual replacement business in the automotive industry the next fifteen years will range from $1,600,000,000 to $2,100,000,000 and should mean an increase of 1,000,000 workers in the automotive manufacturing and service branches. In addition, many of the 10,000,000 American families that own no cars today will be in the market long before 1950 if living standards rise.

While the *Factory Management and Maintenance* presentation deals primarily with employment opportunities in the manufacturing industries and makes no specific mention of the effect of rising standards of living and industrial modernization on the mining industry, it is obvious that any attack upon the nine-point program offered will mean increased production and consumption of coal for power to manufacture the new products and to service them after they have been installed in the factory or the home. Iron and steel products, for example, enter largely into the fabrication of industrial equipment—and the steel industry, from the standpoint of tonnage produced, is one of the important consumers of coal. The assembling of the raw materials at the various processing and fabricating

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LAKE COAL LOADINGS SET RECORD

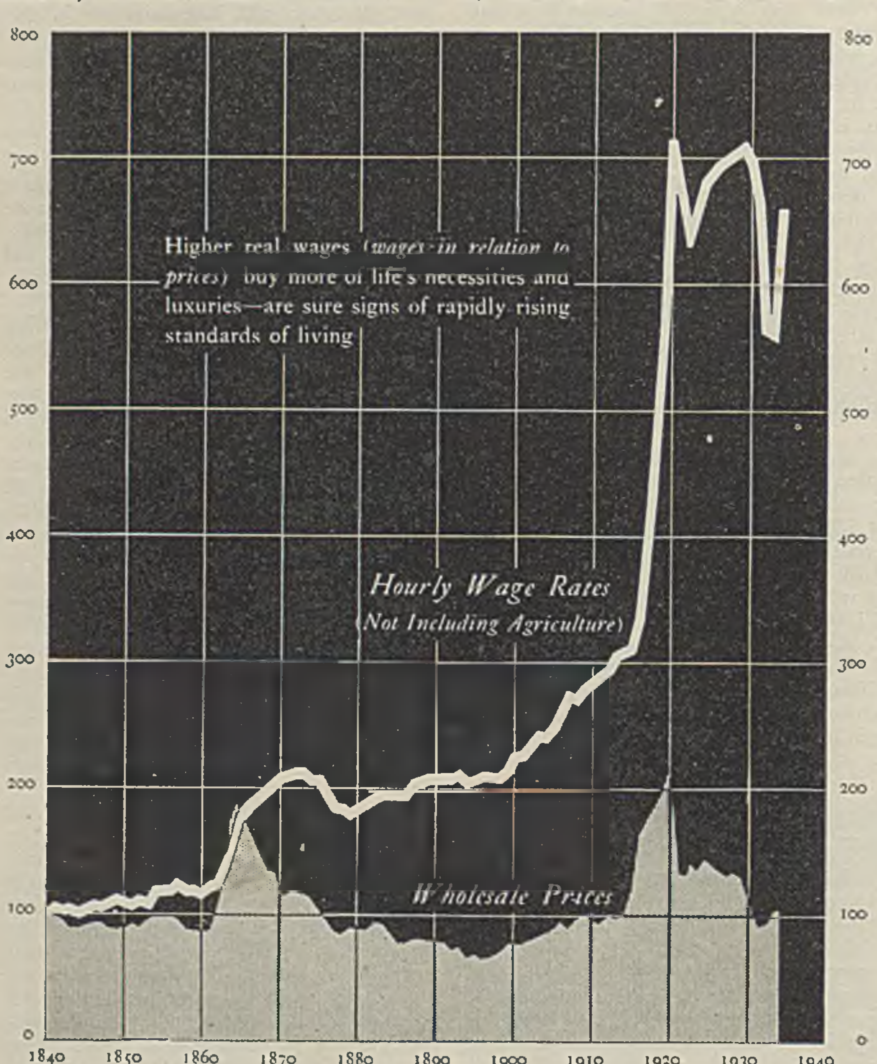
Loadings of bituminous coal at Lake Erie ports for shipment up the Great Lakes set a new record in July, according to H. M. Griggs, manager of the Ore & Coal Exchange, Cleveland, Ohio. Dumpings for the month totaled 6,629,851 tons, consisting of 6,412,476 tons of cargo coal and 217,375 tons for fuel. This is an increase of 56 per cent over the total for July, 1935, when 4,239,386 tons were dumped. Loadings for the season to the end of July were 20,663,190 tons, a gain of 11 per cent over the 17,698,989 tons loaded in the corresponding period of last year.

points and the transportation of the manufactured products to the points of ultimate consumption would mean more railroad service and, consequently, more coal to be fired in freight-train locomotives.

The change of this country from an agricultural to an industrial nation is less than a century old; indeed, large-scale industrialization as we now know it did not really begin to leave its mark until after the Civil War. In 1820, for example, there were 6 at work on the farm and 1 1/3 people doing other work for each worker employed in industry; in 1930, for each worker in the manufacturing and mechanical industries there was ¾ worker on the farm and 1¾ workers gainfully employed in other occupations. This latter group included mining, forestry and fishing, transportation and communications, trade, public service, professional service, domestic and personal service, and clerical occupations. Population increased 13 times in these 110 years, the number of agricultural workers quadrupled, but the number employed in industry increased 32 times and the number in other occupations, many of which are dependent upon industry for their existence, increased 41 times.

Increasing employment has brought increasing national wealth, increasing compensation to the workers and higher standards of living. For this evolution the machine has been largely responsible. Between 1879 and 1929 the installed horsepower in factories—the yardstick for measuring the mechanization of the manufacturing industries—increased 12½ times; the amount of power available per worker rose from 1.25 to 4.86 hp. During that same period the number of factory workers was increased 3¼ times and factory wages were increased 12¼ times, rising from $948,000,000 per annum to $11,607,000,000. Population in that 50-year period, however, increased only 2½ times.

As is shown in the chart entitled "Wage Rates Advance Faster Than Prices," wholesale price levels have shown much more modest advances than hourly wage rates during the evolution of the United States into a highly industrialized nation. The spread in the rate of increase between the two began to become marked about the time mechanization started and has widened with the increasing use of the machine. Mechanization has contributed toward holding down price levels by enabling the worker to produce more. And because wages were rising, the worker could buy more goods, enjoy more comforts. In other words, "machines make products at low cost; they are offered at low prices, are bought. Many more people want them, more have to be made, new jobs are created, more workers have money to buy with."



Wage Rates Advance Faster Than Prices

Increasing use of the machine has brought increase in output per worker and made it possible to raise wages higher and higher, without having prices go up as fast. The chart, based on data prepared by the National Industrial Conference Board and the Bureau of Labor Statistics, is one of the series presented by *Factory Management and Maintenance* in its exposition of "What Industry Means to America."

Ten years ago, when the average retail price of a domestic refrigerator was approximately $400, the number sold was around 200,000; last year, with the average retail price $200 or less, sales were approximately eight times as great. Less than 2,000,000 cars were sold in 1900 when the average wholesale price was between $1,000 and $1,250; but in 1929, with an average wholesale price of $622, sales totaled 4,794,898 cars. Phonographs, washing machines, radios and hundreds of other articles have passed through the same cycle of rising sales as prices declined. And the lower costs which made lower prices possible were largely the result of increased productivity brought about by machine aid to the human worker.

Is it possible to solve our present unemployment problem by an arbitrary nationwide shortening of hours and still maintain existing rates of pay and preserve present standards of living? "No!" declares the *Factory Management and Maintenance* presentation. Had the 30-hour week been adopted in 1929 instead of the average of 48.4 hours then in effect, the number of factory workers would have been increased from 8,822,000 to 14,233,000. But, if the total annual wage bill of the manufacturing industries had been kept at the 1929 figure, the annual average wage per worker would have dropped from $1,316 to $815. This would have been merely another variant of the "share-the-work" scheme.

Had the manufacturers maintained the $1,316 average for 30 hours' work with no change in prices, the wages of the salaried workers would have been forced down to $735.87 and nothing would have been left for dividends or a rainy-day surplus. "If weekly wages came down, workers would be merely trading income for leisure. If prices went up, they would be trading higher incomes for higher prices. Higher prices mean lower sales. Lower sales mean fewer jobs. There would be new unemployment."

This does not mean, it is emphasized, that no further reduction in hours is possible. The machine already has done much to shorten hours while the standard of living rose. Nobody knows how much further this process can be continued. "This we do know, however. The shortening of hours has taken place gradually over a long period of years. It has taken place industry by industry. Never has the entire working population cut hours at one time. Another thing we know: we can have a higher standard of living only as we produce the things that make it possible."

Morganfield Strike Settled

Officials of the United Mine Workers and R. D. Holt, operator of the Bluegrass mine at Morganfield, Ky., announced on Aug. 14 that a wage agreement had been reached ending an eleven months' strike at the mine. Mr. Holt said that under a year's contract the miners will get an increase in pay, and added that by Aug. 17 100 men would be put to work. Jesse Lovelace, district secretary-treasurer of the union, at a meeting with local union members, urged the miners to cooperate with the Bluegrass management in carrying out the new agreement.

Dismantling of the tipple and other property at Morganfield belonging to the Kington Coal Co., which recently went into bankruptcy, has been started. This mine also has been idle since last September, except for a few weeks' operation by "independent" union labor, during which one miner was wounded fatally.

Cranberry and Tomhicken Resume Operations

Two anthracite collieries near Hazleton, Pa., resumed operations on Aug. 17 after varying periods of idleness. Cranberry colliery started up with 750 men at work after being idle since July 1, when the Lehigh Navigation Coal Co's 15-year lease expired. The Cranberry Coal Co. has taken over operation of the property. Work also was started afresh at the Tomhicken colliery of Coxe Bros. & Co., where Carey, Baxter & Kennedy began on a stripping contract.

Seek Rate Cut to East Ports

The Interstate Commerce Commission has set Sept. 21 as the date for filing briefs in the case wherein the Pennsylvania Coal & Coke Corporation seeks a reduction in railroad freight rates from the Clearfield coal region of Pennsylvania to the port of New York and all ports in New England. The rate cut is asked on the plea that it is needed in order that Clearfield producers can compete with Southern coal producers. Various Southern railways and shoppers oppose the proposed reduction.

To Make Study of Dusts

A more intensive study of atmospheric dusts than ever before has been undertaken is being begun by the U. S. Bureau of Mines. Particle concentration, composition and size will be studied. Dust particles will be magnified to 2,000 diameters in the investigation of the character of dust created by various operations in the mineral industry. The shape, hardness and density of dust particles will be studied. Among the methods that will be tried to control particulate matter in the atmosphere will be the ionization of air as a means of settling dust and the use of flocculent material to sweep dust from the air as does snow.

British Mine Blast Kills 58

An explosion of undetermined origin on August 6 caused the death of 58 miners in a mine of the Wharncliffe Woodmoore Co. near Barnsley, England. The force of the blast was so great that an engineman working three-quarters of a mile from the scene was fatally injured. Dr. James Henderson, leader of one of the rescue groups, said many of the men had been killed by the violence of the explosion and that others were lying about in attitudes that suggested they had been suffocated by gas.

PERMISSIBLE PLATES ISSUED

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

Jeffrey Mfg. Co.: Type 41-B shortwall mining machine; 35-hp. motor, 500 volts, d.c.; Approval 273A; July 14.

Joy Mfg. Co.: Type 7-BU loading machine; 35-hp. motor, 250 volts, d.c.; Approval 300; July 30.

Jeffrey Mfg. Co.: pit-car loader (Type 58-D); 3-hp. motor, 415 volts, a.c.; Approval 305-A; July 9.

Goodman Mfg. Co.: Type 512-CJ shortwall mining machine; 50-hp. motor, 210-500 volts, d.c.; Approvals 306 and 306-A; July 17.

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Plan Hard-Coal Boosting Trip

An anthracite boosting tour is planned by the Scranton (Pa.) Chamber of Commerce. In the effort to spread good will for hard coal as the ideal domestic fuel, arrangements are being perfected for a trip by special train to Buffalo, N. Y., on Sept. 28, whence the boosters will travel by lake boat to Cleveland, Ohio, to visit the Great Lakes Exposition, returning by boat to Buffalo. Before returning home they will stop off at Rochester and Syracuse, N. Y. The tourists will be the guests of chambers of commerce and anthracite retailers along the route.

Missouri Stripping Scheduled

A new stripping with a daily capacity of 2,500 tons is now going in at Bevier, Mo., for the Binkley Mining Co. of Missouri. To be served by the Bevier & Southern and the Chicago, Burlington & Quincy railroads. the new operation will recover approximately 15,000,000 tons of Bevier-seam coal averaging 4 ft. in thickness under an average cover of 45 ft. The coal will be uncovered by a Bucyrus-Erie 950-B shovel with 30-cu.yd. dipper and loaded by an 85-B shovel with 5-cu.yd. dipper. All coal below 3 in. will be washed in a new preparation plant (*Coal Age*, August, 1936, p. 344) with a capacity of 400 tons per hour. Company officials are as follows: president, Hubert E. Howard; vice-president in charge of operations, C. F. Hamilton; secretary-treasurer, G. A. Merchant; general manager, B. H. Schull; superintendent, W. R. Brown.

Plymouth Breaker Being Razed

Dismantling of Nottingham breaker of the Glen Alden Coal Co., at Plymouth, Pa., was begun on Aug. 22, according to Edward Griffith, vice-president and general manager. The structure, which was erected in 1905, has fallen short of requirements in recent years and is not sufficiently substantial to stand the installation of new machinery. Removal of the old structure, the company states, will affect less than 50 employees, who will be given other employment as soon as possible. Nottingham production hereafter will be prepared in either the Loomis or Woodward breaker.

Personal Notes

T. A. Beckley, formerly associated with the Mallory Coal Co., Logan County, West Virginia, has been appointed superintendent of Mine No. 2 of the Detroit Mining Co., in Boone County.

Pat Coldwell has been appointed superintendent of the Buffalo Eagle Coal Co., Braeholm, Logan County, West Virginia.

George W. Craft has been named superintendent of the Little War Creek Coal Co., Litwar, McDowell County, West Virginia.

C. S. Crouse, hitherto head of the department of mining and metallurgy, University of Kentucky, has been appointed acting chief of the State Department of Mines and Minerals, Kentucky.

Philip S. Davis, superintendent of the Cassville (W. Va.) operations of the Continental Coal Co., has been named to fill the same position at the Rivesville mine, where he succeeds John A. Clark, Jr., resigned. Operating management of both mines has been consolidated.

Howard Ellis, superintendent of Castle Gate mine of the Utah Fuel Co., at Castle Gate, Utah, has left that position and is now associated with a Kansas operating company.

Wayne P. Ellis, Presidential appointee to Division I Code Authority under NRA and later deputy administrator, Bituminous Coal Code, has been added to the staff of Appalachian Coals, Inc., where he will specialize in handling ACI coals over the lake docks. In his long association with the coal industry Mr. Ellis' connections have included the following: zoning committee, National Fuel Administration; secretary, Logan County (W. Va.) Coal Operators' Association; secretary, Davis Coal & Coke Co.; assistant to the president, Pittsburgh Terminal R.R. & Coal Co.; secretary and manager, Northwestern Coal Dock Operators' Association and the Ellis Coal Bureau; Northwest sales manager, Berwind Fuel Co.

John Gray has resigned as face boss at Zeigler No. 2 mine of the Bell & Zoller Coal & Mining Co., at Ziegler, Ill., and has become mine manager at the Vinegar Hill mine of the Vinegar Hill Coal Co., Lenzburg, Ill.

H. O. Hale has been made foreman by the Amigo Coal Co., Amigo, W. Va.

Joseph E. Hitt, formerly president of the Northern Illinois Coal Corporation, will be placed in charge of the new office to be opened in St. Louis, Mo., by Walter Bledsoe & Co.

J. M. Holbrook has been promoted from mine foreman to operating superintendent of No. 4 mine of the Pond Creek Pocahontas Co., at Raysal, McDowell County, West Virginia.

Jesse Hughes was appointed safety engineer of the Enos Coal Mining Co., a newly created position, on Aug. 1. He has been an employee of the company since it opened the Enos mine and served seven years as president of the United Mine Workers local.

L. F. Koring, sales manager of East Kentucky Sales, Inc., has been elected vice-president of the Buchanan Mining Co., operating in Perry County, Kentucky.

W. M. LACEY, formerly superintendent at the Aldrich mine of the Montevallo Coal Mining Co., has been appointed superintendent of the Praco mine of the Alabama By-Products Corporation, in Jefferson County, Alabama, where he succeeds J. W. TURNER, transferred to the superintendency at Samoset mine of the same company. The changes went into effect on Aug. 17.

E. C. LAMBERT has been appointed superintendent of the Merrill Coal Mines, Inc., operating in Logan County, West Virginia.

A. F. MARSHALL has been appointed general manager and assistant to the president of the Davis Coal & Coke Co., with headquarters at Thomas, W. Va.

WILLIAM MOORHEAD, formerly general superintendent of the Utah Fuel Co., has been appointed safety engineer for that company, a newly created position.

D. A. NEWHALL, vice-president in charge of operations, New River & Pocahontas Consolidated Coal Co., has been appointed a representative of the National Coal Association on the coal classification committee of the American Society for Testing Materials.

G. J. SCHAEFER has been appointed superintendent of the Mallory Coal Co., operating in Logan County, West Virginia.

GEORGE A. SCHULTZ, for a long time general superintendent for the Liberty Fuel Co., operating in Carbon County, Utah, has become superintendent of the Hi-Heat Coal Co.'s mine at Rains, Utah.

HERBERT N. SMITH has been elected vice-president of the Maryland New River Coal Co., an affiliate of the Maryland Coal & Coke Co., vice Medford J. Brown, deceased. CLAUDE E. MARVIN has been made treasurer of the first named company.

GLEN SORENSON, for a long time foreman with the Kemmerer Coal Co. in Lincoln County, Wyoming, has been appointed general superintendent, succeeding Gomer Reese, resigned.

WILLIAM YATES, superintendent of Eastgulf No. 2 mine of the C. H. Mead Coal Co., in Raleigh County, West Virginia, has been appointed general superintendent of the Mead interests.

Obituary

MEDFORD J. BROWN, 52, vice-president in charge of operations and sales, Maryland New River Coal Co., with operations in Fayette County, West Virginia, and president of the Maryland Coal & Coke Co., Philadelphia (Pa.) selling company, died July 24 at his home in Merion, Pa., a suburb of Philadelphia, after an illness of about a month. At an early age he entered the employ of the Cumberland Coal Co., later becoming secretary of the Maryland Coal & Coke Co., of which he became president in 1925. He helped organize the Maryland New River Coal Co.

ALBERT D. LAWTON, 63, an official of the Greenwood Coal Co., operating in Fayette County, West Virginia, of which his brother, George Lawton, is president, died Aug. 4 at his home in St. Albans, W. Va. He had formerly been an operator on his own account.

GEORGE A. MURPHY, 68, formerly superintendent for the Spring Canyon Coal Co., and the Independent Coal & Coke Co., both operating in Utah, and at one time with the Union Pacific Coal Co., died of a heart ailment during the second week in August while staying at a hotel in Yellowstone National Park. He had retired some years ago.

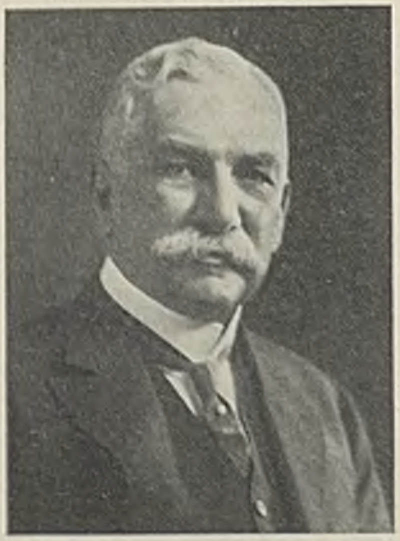
FRANK H. WIGTON, 79, formerly president of the Morrisdale Coal Co., operating in Clearfield County, Pennsylvania, and with offices in Philadelphia, died Aug. 11 of a heart attack at his home in Ardmore, a suburb of Philadelphia. Previous to his connection with the Morrisdale company he had been associated with other coal interests. He retired from active business two years ago.

ANDREW S. POW, SR., 58, consulting civil and mining engineer, died suddenly Aug. 10 in Birmingham, Ala. During the last 25 years he had held responsible executive positions with the Tennessee Coal, Iron & Railroad Co. and other large operators in the Alabama field.

FRANK M. GRAFF, president of the Westmoreland Mining Co., Seils Mills Coal Co. and Conemaugh Coal Co., with offices in Blairsville and operations in Indiana and Westmoreland counties, Pennsylvania, died Aug. 15 in a Philadelphia hospital after a long illness. He also had banking interests in Blairsville, his home town, where he was born.

Union Officials Reelected

In the biennial referendum election of District 7, United Mine Workers (Pennsylvania anthracite field), held Aug. 18, the following district officers were reelected without opposition: Hugh V. Brown, president; Peter Flysick, vice-president, and John Yourishin, secretary-treasurer.



Pach Bros.

The Late Edward J. Berwind

E. J. Berwind Is Dead at 88

Edward J. Berwind, 88, chairman of the board of the Berwind-White Coal Mining Co. and of the New River & Pocahontas Consolidated Coal Co., as well as a director in many other corporations, died Aug. 18 at his home in New York City after a long illness. Although he had extensive interests in railroads, steel, utilities and other industrial activities, his primary business interest was in the production and marketing of bituminous coal.

Born in Philadelphia, Pa., he was appointed to the U. S. Naval Academy by President Lincoln in 1865. After his graduation he was commissioned as an ensign and served in the navy until 1875, when he was retired for physical disability incurred in the line of duty. After leaving the navy, Mr. Berwind, with his brother Charles and the late Judge Allison White, founded Berwind, White & Co. This firm was dissolved in 1886 and the business incorporated under its present name by the two Berwind brothers, who later took into the company two other brothers.

For many years the Berwind-White and affiliated companies dominated the steamship bunker business in the New York and Philadelphia harbors. In addition they supplied much coal to the U. S. Navy and exported it to the West Indies, South America and Europe.

During the World War Mr. Berwind served as an adviser to the U. S. Fuel Administration and also to other Allied countries, notably France. In recognition of his services, the latter country made him a Chevalier of the Legion of Honor in 1930. For some years he also was chairman of the board of the Interborough Rapid Transit Co., of New York.

Shirley Stripping Operating

The Shirley Gas Coal Corporation, of which H. B. Salkeld is president, reports that operations have been started at its Shirley mine. The new property, a strip operation, has a capacity of 600 tons per day. It is located on the Baltimore & Ohio R.R. in Beaver County, Pennsylvania, near Zelienople. The mine is equipped with a four-track tipple with shaker screens and loading booms.

Financial Reports

Consolidation Coal Co. and subsidiaries—Loss for three months ended June 30, subject to year-end adjustments, $220,175 after interest on 5 per cent secured notes, depreciation, depletion and federal income and excessive profits taxes, but exclusive of possible federal surtax on undistributed net income, against adjusted profit of $311,531 in preceding quarter.

Crows Nest Pass Coal Co., Ltd.—Net profit for three months ended June 30, $81,942 after depreciation, depletion and other charges, but before federal income taxes, compared with $97,568 in March quarter this year and with $38,475 in the second quarter of 1935.

Pennsylvania Coal & Coke Corporation, including income from allied companies through Clearfield Bituminous Coal Corporation lease—Loss for quarter ended June 30, $71,805 after ordinary taxes, depreciation and depletion, but before federal income taxes, compared with profit of $26,691 in preceding quarter and revised profit of $15,864 in second quarter a year ago. Latest statement does not include $22,368 undistributed earnings of allied companies, compared with $2,844 in preceding quarter and $3,572 in second quarter of 1935.

Pittston Co. and subsidiaries—Net loss for three months ended June 30, $656,988 after depreciation, expenses, depletion, interest, taxes, minority interest and other charges, compared with net income of $75,660 in the first quarter of this year and net loss of $750,193 in the second quarter of 1935.

West Virginia Coal & Coke Corporation—Net loss for three months ended June 30, $44,171 after interest, depreciation, depletion and federal income taxes, against $22,977 loss in first quarter and net profit of $77,115 in second quarter of 1935.

Arkansas Miners Strike

Mining operations practically ceased in the Spadra (Ark.) coal field on Aug. 20, when 500 miners started picketing in protest against what United Mine Workers officials described as breach of contract by the Miners Coal Co. It was alleged that the company paid a wage much lower than is called for in the contract.

Industrial Notes

Link-Belt Co., Chicago, has transferred A. W. Holmes from its Chicago engineering department to the post of sales engineer at the company's Pittsburg (Pa.) office.

Lincoln Electric Co., Cleveland, Ohio, has appointed Industrial Supply Co. as its distributor at Salt Lake City, Utah. Lincoln's San Francisco office has been moved to larger quarters at 866 Folsom St.

American Radiator Co. has placed W. B. Hughes in charge of its newly created automatic coal burner division. For the last seven years Mr Hughes has been connected with the Iron Fireman Mfg. Co.

Westinghouse Electric & Mfg. Co. has appointed J. M. McKibbin manager of its newly created sales promotion department. All apparatus sales promotion operations except those of the company's merchandising department will be coordinated under the new department's management and the activities of district office sales promotion will be directed by Mr. McKibbin.

A. R. Ellis, associated with the Pittsburgh Testing Laboratory since 1905, when he was graduated from Cornell University, has been elected president of the company.

Republic Steel Corporation has appointed Frank C. Miller manager of sales, tin plate division. Mr. Miller, who formerly was associated with the company's Detroit sales office, succeeds George E. Totten, resigned. P. H. Hubbard has been named assistant manager, as also has J. B. DeWolf, formerly district sales manager of the Philadelphia (Pa.) territory.

Dayton Rubber Mfg. Co. has transferred R. L. Boger to the company's industrial division in charge of cog-belt sales in Philadelphia territory, with headquarters at 928 City Centre Building, 121 North Broad Street.

Sues to Block Platte Project

A suit to enjoin further operation of the Platte Valley public power and irrigation district was filed Aug. 17 in Keith County (Nebraska) District Court by F. Q. Feltz, retired lawyer and farmer of Keystone, Neb. The district, a PWA project, has nearly completed its hydro-electric plant. Mr. Feltz, who says he has owned the riparian rights on land just below the Platte Valley's diversion dam at Keystone for 48 years, alleges that his land is being destroyed by the project's diversion of water from the North Platte watershed to the South Platte watershed.

Smoke Study Approved

The plan and scope of activity recommended by the subcommittee appointed by the St. Louis (Mo.) Medical Society fact-finding committee on air pollution and smoke for determining the sources, causes and factors of air pollution and smoke in the St. Louis metropolitan district has been adopted by the society. James W. Bristow, executive vice-president of the Illinois Reciprocal Trade Association and chairman of the subcommittee, reports that plans have been made to get the project actively under way, the scope of the study to include St. Clair and Madison counties, Illinois.

Black Diamond Strike Ends

A strike that had been in effect since May 1 at the mines of the Black Diamond Coal Mining Co., Whitwell, Tenn., ended July 29, when approximately 500 men reported for work. Settlement of the differences between the company and the strikers took place on July 28 after a conference between United Mine Workers representatives and company officials held at Chattanooga. There were concessions on both sides.

Sues Progressive Union

Suit for $400,000 damages has been filed against seven local unions and 66 individual members of the Progressive Miners' Union in the U. S. District Court at East St. Louis, Ill., by the United Electric Coal Cos., which operates the Red Ray mine, near Freeburg, Ill. Previously the company had sought $350,000 damages because of interference beginning in April, 1933, when it attempted to operate with miners affiliated with the United Mine Workers, but Judge Wham overruled that petition, granting leave to file an amended suit. The mine reopened last spring under the protection of a federal injunction against the Progressives.

Carbon Monoxide Kills Nine

Clarence Cawvey, chief electrical engineer, and eight other employees were overcome by carbon monoxide and died late Aug. 2 in Kathleen mine of the Union Colliery Co., at Dowell, Ill. When three of the men were overcome, the other six tried to drag them to safety, but all succumbed. The men were helping to fight a fire which broke out in the mine when a new transformer, installed earlier in the day, exploded.

Mine Fatality Rate Increases

Coal-mine accidents caused the deaths of 50 bituminous and 25 anthracite miners in June last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 29,415,000 tons, the bituminous death rate in June was 1.70 per million tons, compared with 1.54 in the preceding month, when 28,541,000 tons was mined, and 2.26 in June, 1935, in mining 30,067,000 tons. The anthracite fatality rate in June last was 6.32, based on an output of 3,958,000 tons, as against 3.06 in the preceding month, when 4,577,000 tons was produced, and 4.96 in June, 1935, when production was 5,642,000 tons. For the two industries combined, the death rate in June last was 2.25, compared with 1.75 in the preceding month and 2.69 in June, 1935.

Comparative fatality rates for the first six months of 1935 and 1936, by causes, are given in the following table:

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

January–June, 1935 and 1936

	Bituminous				Anthracite				Total			
	Number killed		Killed per million tons		Number killed		Killed per million tons		Number killed		Killed per million tons	
Cause	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935	1936
Falls of roof and coal	250	261	1.321	1.303	76	73	2.653	2.677	326	334	1.496	1.468
Haulage	108	66	.571	.330	15	9	.524	.330	123	75	.565	.330
Gas or dust explosions:												
Local explosions	10	8	.053	.040	7	11	.244	.404	17	19	.078	.083
Major explosions	...	8	.....	.040	13	...	.454	.....	13	8	.060	.035
Explosives	16	15	.084	.075	9	10	.314	.367	25	25	.115	.110
Electricity	14	10	.074	.050	...	5	.....	.183	14	15	.064	.066
Mining machines	13	8	.069	.040	1	...	.035	.....	14	8	.064	.035
Other machinery	...	5	.....	.025	...	2	.....	.073	...	7	.....	.031
Miscellaneous:												
Minor accidents	14	14	.074	.070	7	12	.244	.440	21	26	.096	.114
Major accidents	6	...	.032	.....	...	...	.....	.....	6	...	.027	.....
Shaft:												
Minor accidents	5	3	.026	.015	2	6	.070	.220	7	9	.032	.040
Major accidents	...	...	.....	.....	7	...	.244	.....	7	...	.032	.....
Stripping or opencut	2	6	.011	.030	6	4	.210	.147	8	10	.037	.044
Surface	18	13	.095	.065	17	10	.594	.367	35	23	.161	.101
Grand total	456	417	2.410	2.083	160	142	5.586	5.208	616	559	2.827	2.457

* All figures subject to revision.

WHAT'S NEW

In Coal-Mining Equipment

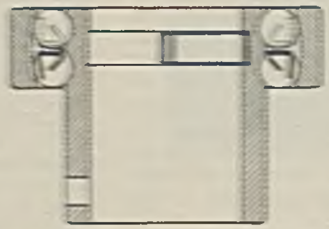
CAR PULLERS

To facilitate economical movement of railroad cars in yards, Fridy Hoist & Machinery Co., Mountville, Pa., has developed a special vertical capstan car puller which in the "Junior" 7½- and 10-hp. size will handle a load of 150 to 250 tons on a slight grade at slow rope speed. The "Heavy-Duty" model, 15 and 20 hp., will handle loads of 350 to 500 tons on slight grades. Both types are supplied with extra large vertical capstans, thus largely eliminating slipping of the manila ropes when handling

heavy loads. Complete protection from weather and maximum safety are secured, it is stated, by use of a cast-iron housing totally inclosing the working parts. The complete unit is mounted on a steel subbase to facilitate installation on a concrete foundation.

GRIP-LOCK BEARING

The SKF "Grip-Lock" bearing has been added to the line of SKF Industries, Inc., Philadelphia, Pa. The Grip-Lock principle, the company states, offers the advantage of quick, simple bearing application without tools of any kind and insures the user of a bearing positively locked to the shaft. Essentially, the bearing is the conventional SKF self-aligning extended-inner-race bearing with an eccentric groove machined in the bore of the inner race. Fitted in the groove is a piece of spring steel, known as the Grip-Lock shoe. When the shoe is in the deepest part of the groove the bearing may be readily slipped on the



shaft. Then, by holding the inner race of the bearing while the shaft turns in the direction of operation, the knurling at the ends of the Grip-Lock shoe grips the shaft, causing the shoe to wedge in the shallow part of the eccentric groove, thus securely locking the bearing on the shaft. No radial slippage can occur, the company states, for the more the load the tighter the grip locks.

TRACTOR TRUCK

A new 40,000-lb. gross-capacity tractor-truck designed to meet the requirements for a compact high-speed unit for heavy-duty hauling is announced by the Four Wheel Drive Auto Co., Clintonville, Wis. Weight distribution is 40 per cent on the front axle and 60 per cent on the rear. With semi-trailer, the makers state, the new unit is designed for a gross load of 40,000 lb. distributed as follows: front axle of tractor, 10,000 lb.; rear axle of tractor, 15,000 lb.; semi-trailer axle, 15,000 lb. Bearing the designation T-40, the new unit is equipped with a 125-hp. motor and five-speed sliding-gear transmission with overdrive reduction of 7.3:1 in direct. Maintained road speed of 32 m.p.h. on the level is claimed by the company, which points to better hill-climbing ability due to four-wheel traction. Short over-all length and standard 130-in. wheelbase provide short turning radius and ease of maneuverability. Tires are 9.75-20, singles in front and duals rear.

EXCAVATORS

A new series of Ward Leonard electric excavators in capacities up to 4 cu.yd. is announced by the Harnischfeger Corporation, Milwaukee, Wis., which points to one-man control of all operations, faster speeds, decreased weight and greater electrical horsepower per pound. These have been secured, the company states, through the use of new alloy steels and arc-welded construction to cut down inertia losses and conse-

quently speed up operations. Hoisting, crowding, swinging and traveling are powered by separate motors, all synchronized for proper coordination and each separately controlled by pushbuttons from the operator's station. Swing speeds, the company states, are increased to 3½ r.p.m. and travel speeds to 1½ m.p.h. Worm gears are

used in the crowd mechanisms and are said to eliminate brake wear and give a faster, smoother crowding action, which in turn makes it possible to shake the dipper without strain. Shovels and draglines are offered in capacities from 2 to 4 cu.yd.

CABLE ACCESSORIES; REGULATORS

General Electric Co., Schenectady, N. Y., announces a line of portable cable accessories which includes high-voltage cable couplers and molded terminals for all voltages, both designed for safety, long wear and convenience. The high-voltage couplers, the company states, can be used as a satisfactory method of connecting

apparatus or connecting lengths of portable cable together. Rated at 100 amp., the couplers are particularly adapted for use with G.E. 2,500-, 3,500- and 5,000-volt Types SH and G portable cables.

Provision is made in the coupler socket so that the shielding tapes or ground conductors of the cable can be brought out for grounding purposes. Both socket and plug are equipped with a cover to prevent entrance of dirt and moisture when the coupler is disconnected. Coupler socket and plug are made of a malleable-iron frame with a bolted-on malleable-iron end bell. Current-carrying contacts are of the sliding-spring type inclosed and shielded by Herkolite tubing. Four contacts are included, three for the conductors of a three-conductor cable and the fourth for the shielding braid or ground wires. To permit the coupler to be used as a cable connector, end bells are interchangeable so that the plug end bell may be put on the socket end in place of the socket end bell and flexible connections made at each end of the coupler.

The new molded-rubber terminal, the company states, will prove well adapted where it is desirable to terminate a trailing cable at the energy source or at the load by a terminal which will hold the single conductors firmly together as a unit. The terminal is made of G.E. R-387 tellurium compound and provides means of properly terminating ground wires and braided shields so that they can be correctly grounded. Additional cost of applying terminals is slight.

General Electric also offers two new Type GDA generator-voltage regulators in lower ratings for a.c. machines up to 375 kva. at 3,600 r.p.m. and lower ratings at correspondingly lower speeds. Type designations are GDA-1M and GDA-1. As in previous GDA regulators, vibrating contacts are eliminated, the voltage-sensitive element being a torque motor balanced against a spring and controlled by the generator voltage. The rheostatic element in both new regulators is an integral part of the regulator unit and is actuated directly by the voltage-sensitive regulating device. Only six leads are required: two for the potential circuit, two for the exciter shunt-field circuit and two for the stabilizer. A small full-wave copper-oxide rectifier supplies d.c. current for the torque motor.

INSULATOR; CLAMP

Ohio Brass Co., Mansfield, Ohio, offers a new, exceptionally strong suspension insulator for use on lines where rock-throwing and shooting are experienced. Made without petticoats, the smooth lower surface tends to deflect a rock or bullet with less damage to the insulator and also makes cleaning easier. A thicker porcelain sec-

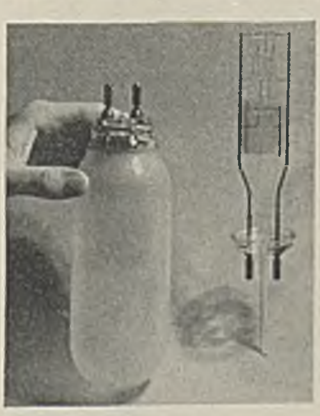
tion is said to increase resistance to breakage in transportation. Mechanical values are the same as the regular O-B 15,000-lb. suspension insulators, as are dry flashover values. Wet flashover values, however, are slightly lower, due to the absence of petticoats. The new insulators are furnished with 10-in. disks in both 5- and 5¾-in. spacing, the latter with either ball-socket or clevis attachment. The 5-in.-spaced unit is available with only the ball-socket attachment.

Ohio Brass also offers a light and simple clamp to carry the neutral wire at tangent points on farm and similar lines. A through bolt used to support the clamps also tightens the clamp without contributing to conductor vibration and fatigue. Provision for grounding the neutral at any pole is made by a groove in the upper half of

the keeper piece. With this new clamp, says the manufacturer, an additional connector is not necessary. The clamp also may be used for supporting ground wires at the tops of poles.

LAMPS

Westinghouse Lamp Co., Bloomfield, N. J., announces radical changes in the design of its 1,000-watt Mazda lamp. An outstanding change, the company states, is the new T-24 inside-frosted Pyrex bulb, tubular in shape and about half the size of the 1,000-watt PS-52 bulb Mazda lamp now used for general industrial and commercial illumination, thus permitting the use of smaller reflectors and accessories. The Pyrex bulb, it also is stated, will better resist breakage by moisture and water, thus eliminating the need for costly waterproof equipment. The lamp also incorporates a structural member to collect and

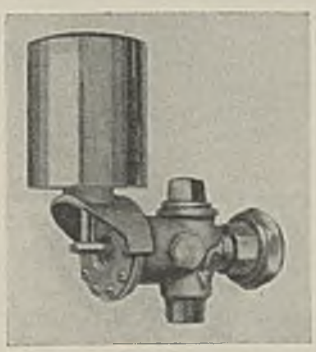


localize tungsten blackening, thereby maintaining light output and efficiency throughout the operating life. Of the bi-post type and designed for base-up burning only, the new lamp is offered for 110-, 115- and 120-volt service. Over-all length is 9½ in. Rated life is 1,000 hours.

Westinghouse Lamp Co. also offers a new 85-watt mercury-vapor lamp, said to produce illumination practically equal to that of the conventional 200-watt incandescent lamp. The new lamp must be operated in conjunction with a transformer of sufficient voltage to start the lamp and regulate the flow of current to the proper value. Two types are available for horizontal and base-up burning. Over-all length is 5⅝ in. Base is medium screw.

CONTROL VALVE

Lammert & Mann Co., Chicago, offers the Lammert liquid-control or automatic shut-off valve in sizes from ⅜ in. up, in which the following features are noted: few parts, extreme compactness, large capacity, simple design and construction, and adaptability to the use of interchangeable elements for air, steam-pressure, water-pres-



sure or electrical control, any one of which is connected by merely screwing it into the standard valve-body mechanism. The valves, it is stated, can be adapted to automatic operation, remote control or to automatic operation plus an interlock with manual-reset device.

BRUSH HOLDERS

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offers redesigned brush holders for mine-locomotive motors with two insulated mounting pins instead of one, which, it is asserted, overcomes loosening of the mounting pin resulting from overheating under increased loads when only one insulated pin was employed. Illustrated is a new brush holder with new blocks required for mounting in the motor frame for Type 902 motors. Designs also are available for Types 904 and 909 motors. In addition to the new mounting, the latest type of twin-washer-finger construction is incorporated. The new

mounting blocks, it is stated, were designed to simplify mounting of brush holders and to locate brushes properly in the correct neutral position.

PERMISSIBLE

E. I. duPont de Nemours & Co., Inc., Wilmington, Del., offers "Lump Coal A," which is describes as the slowest permissible explosive yet to meet the specifications of the U. S. Bureau of Mines, "Performing like black powder, 'Lump Coal A' heaves the coal out in large lumps and does not shatter it, as might be the case with fast explosives."

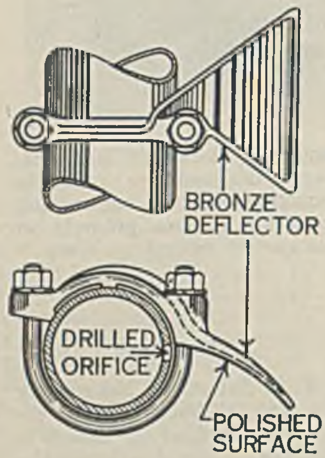
CONVEYOR

A new self-loading conveyor for coal and coke, bearing the designation "Selflo," is announced by the Barber-Greene Co., Aurora, Ill. Complete self-loading performance and crawler-mounted maneuverability are major features stressed

by the company. The unit is available in 25-, 30- and 35-ft. lengths with wheels or crawlers, gas or electric drive, gravity or vibrating screen, breaking bolt or B-G automatic load release and belt or chain-and-flight (drag-type) conveyors.

SPRAY NOZZLE

Link-Belt Co., Chicago, has developed what it terms a simple, effective, non-clogging spray nozzle for various applications. It is described as a scientifically shaped, smoothly polished, curved bronze deflector held securely by a U-bolt to the water pipe, in which a plain drilled hole is made for an orifice.



Deflector width permits a comparatively large water jet and thus allows fairly large particles of dirt to pass the orifice without clogging.

SLIP-RING STARTER

J. P. Madden, Bethlehem, Pa., offers the Bethlehem "Slip-Ring" starter (Bethlehem Steel-Nieman patents) primarily for use with constant-speed motors or other prime movers driving apparatus with a high starting torque. The starter is a mechanical unit which, like a coupling, connects the motor to the driven machinery "and, by means of a slipping friction, automatically starts the machinery smoothly and with absolutely uniform acceleration. It is thus somewhat like a centrifugal friction clutch, except that its horsepower capacity is constant and is not affected by the usual changes in the coefficient of friction. . . . The motor is kept free of load until it has had time to pick up speed. It is therefore possible to use squirrel-cage motors with across-the-line control instead of slip-ring motors with expensive control. The slip-ring starter is inherently a limit-torque coupling; it will not transmit to the driven machine, nor impose on the motor, more than the maximum load for which it is made. So long as the motor is operating it will exert its maximum torque, and will continue to slip until the motor is stopped or the cause of the trouble is removed."

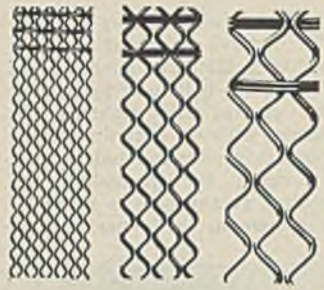
Major applications cited by the manufacturer include: apparatus where high inertia loads make starting load frequently five or six times running load—permits use of motor that will just handle running load; where starting load

is high due to a combination of bearing friction and weight—permits motor to come up to nearly running speed before load is placed upon it; where sudden running or stalling overloads may be encountered—starter permits motor to continue running until the relay functions to cut it off the line; where maximum running loads can be closely calculated—permits motor selection just equal to running conditions; where heavy loads prevail—permits use of two-speed motor for gradual starting, with the slip-ring starter handling acceleration up to the low-speed setting of the motor and the motor rheostat from low to high speed; where high-inertia loads are encountered—sometimes permits reducing size of synchronous motors without affecting pull-in.

Slip-ring starters are available in the coupling type for direct connection and the pulley type for use with belt, chain or gearing to the driven machine. Starters can be made reversible, if desired.

SCREENS

For screening coal, gravel, coke and similar materials where jamming of the grains tends to blind the screen, Abbe Engineering Co., New York City, offers the "Snake-Screen." The mesh of this screen, the company states, is square but diagonally opposed to the flow of the material. Instead of a fixed rigid mesh, the design pro-



vides enough play so that jammed grains will work themselves out of the mesh without difficulty. Large increases in screen capacity are noted by the company, which is offering the "Snake-Screen" in a number of wire diameters and openings.

Abbe also offers "D" slotted screens, which it describes as an efficient long-slot screen in lighter weights than "Rima"

wedge-wire slotted types. Rigid, with accurate slot and lighter weight than Rima screens, which they are not designed to replace in many cases, the new screens are said to be especially adapted where lightness and low first cost are primary considerations.

DRAGLINE

Marion Steam Shovel Co., Marion, Ohio, offers the new Type 39-A clutch-type dragline, said to give an extra-long working range in the 2½- to 3-cu.yd. class. With an 85-ft. boom, the unit, it is asserted, will readily handle a 2½-cu.yd. Page R.C. bucket, digging 2,000 cu.yd. in eight hours. With an 80-ft. boom, the machine can accommodate a 3-cu.yd. bucket. Either gas or diesel power is available.

WELDING ELECTRODES

A new line of coated rods for d.c. welding is offered by the Harnischfeger Corporation, Milwaukee, Wis., under the designation "Smootharc." The present line includes five different types with both high and low rates of fluidity for various types of flat, vertical and overhead welding with ferrous and non-ferrous metals. Service tests, it is asserted, show tensile strengths of welds varying from 55,000 to 75,000 lb. per square inch with various types of rods from 3/32 to ⅜ in. Faster welding with a smoother, more easily handled arc and reduction of spatter losses were objectives in developing the rods.

BEARINGS

Norma - Hoffmann Bearings Corporation, Stamford, Conn., announces that all its wholly inclosed sealed "Precision" bearings are now being packed with a grease pretested for maximum stability, supplemented by wrapping with aluminum foil to prevent grease oxidation. These measures, the company states, are taken to prevent difficulties resulting from oxidation and premature hardening of greases.

OILING UNITS

Alemite Division, Stewart-Warner Corporation, Chicago, announces the expansion of its manufacturing activities to include the production of oiling devices. It first offers two types of oil cups said to combine the best principles of the sight-feed oiler with new features. Affording more reliable and economical bearing protection where a constant slow flow of oil is desired, the Alemite "Thermatic" oil cup is said to require no other attention than filling. The cup operates by the expansion of air resulting from the normal increase in temperature of a running bearing. A rise of 1.8 deg. F. is said to be sufficient to start the flow of oil. Even when machines are standing, changes in room air temperature start an occasional flow of oil, keeping machines always ready for operation.

The second new Alemite oil cup—the "Microflow"—is stated to be particularly adaptable to bearings which require a continuous flow of oil in small adjustable quantities. This cup is fitted with a new resistance unit which permits finer adjustment of oil flow and assures positive operation by preventing clogging.