COAL AGE

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

SYDNEY A. HALE, *Editor*

New York, August, 1934

Bench-Mark

STATISTICS compiled by the demographical division of the Bureau of Mines show that 70 per cent of the 1932 bituminous output was produced by mines that operated that year without a single fatal accident. These mines employed 66.2 per cent of the total number of bituminous workers and accounted for 61.1 per cent of the total man-hours. During the preceding year, 53.6 per cent of the tonnage came from mines without a fatality, employing 60.9 per cent of the total workers and accounting for 55.3 per cent of the total man-hours. For 1930, the record for mines in this class was 49.8 per cent of the production, 55.5 per cent of the workers and 51.5 per cent of the man-hours. Completely accident-free operation of the industry may be an unattainable ideal, but the progressive improvement of recent years is making it increasingly difficult for indifferent management and careless workmen to justify poor safety records by glib references to the natural hazards of the mines.

Dynamite

STILL STRUGGLING with the complex problem of divisional and intra-divisional price correlation, NRA now proposes to reach a solution through an indirect allocation of tonnage. In keeping with this plan, subdivisional code authorities of Division I, with one exception, have agreed upon the percentage of the total commercial business of the division to which each is entitled. "Any significant departure, other than seasonal variations," from these percentages is to be checked by price revisions so that each subdivision will be able "to maintain its position in the market" on the basis of the agreed allocations.

Adoption of this scheme may give NRA a convenient formula for dealing with the troublesome question of correlation, but it is doubtful if the plan will contribute to the promotion of sane and sound recovery. Allocation as contemplated in the new agreement is primarily a freezing process in which existing inequalities and maladjustments are readily and quite firmly preserved. Districts with price levels fair alike to producer and to consumer are threatened with the arbitrary imposition of higher prices if they expand their share of the division tonnage. Under such a setup, the hope that, with fair wages pegged and unfair practices defined and outlawed, coals from competing districts would be permitted to find their natural economic levels in common markets is destroyed.

Concentration

NO SOONER was machinery introduced into industry, with its possibilities of concentration, than manufacturing was removed from homes to factories, where the needs of the workers could be better met and their work supervised. Similarly, with mechanical operation, work in the mine is being concentrated from an immense number of separate rooms to a few focal points, bringing the working area down to a minimum, and the rest of the mine being abandoned except for haulageways, escapeways, airways and waterways; "ingress and egress," as law scriveners would say.

The costliness of distribution on wide areas is well illustrated by the electrical industry, where the domestic consumer must pay several times the cost of generating current, because

his demand is so light that cost of laying, maintaining and supervising power lines greatly exceeds that basal cost. Even then the consumer has to provide distribution and maintain the mechanisms and lines within his own house, thus still further increasing the ratio of consumer to switchboard cost.

If mechanization did not save a dollar in cost of loading, it would abundantly justify itself in the other costs it eliminates by its adaptability to high concentration. Some put the saving as high as 20 or 30 cents a ton.

Breathing Spell

PASSAGE of a joint resolution by Congress authorizing the President to appoint boards to investigate controversies arising under Section 7(a) of NIRA and, at their discretion, to hold elections to determine employee representation in collective bargaining gives a needed opportunity for calm and dispassionate consideration of the issues raised by the Wagner industrial disputes bill. Except for the last-minute affirmation of the right to strike, which, incidentally, was not challenged by NIRA, the resolution of June 16 simply places the stamp of Congressional approval upon the policy inaugurated with the creation of the National Labor Board last August.

This action was frankly recognized as a purely temporary expedient taken to avoid prolonged debate on the Wagner bill in the closing hours of the Seventy-third Congress. The major question of whether a national labor policy for industry should be written into the federal statutes has been merely postponed—not eliminated. Both the temper of Congress and the activities of organized labor, supported by the so-called liberal groups of the country, seem to foreshadow a fixed determination to establish such a policy. If that be so, then the particular form that policy should take cries for deep and early consideration.

Industrial opposition to the particular form proposed in the Wagner bill is readily understandable; wholly aside from its pandering to the demands of organized labor, that form holds little promise of achieving its objective of promoting industrial peace except through the abject surrender of management. But opposition which depends solely on negation is dangerously weak. If industry seeks more than a few inconsequential concessions, it must be prepared not only to point out the defects of legislation as proposed but also to suggest what should be done to make that legislation desirable in the national interest.

The crux of any declaration of a national labor policy is whether collective bargaining should be made compulsory. Until NIRA, it was well understood that management was within its rights in refusing to recognize collective bargaining in any form. If that right is to be outlawed, then industry is on solid ground in demanding that those who claim the privileges inherent in such a denial should be required to abandon their right to impose their will upon management by the mass action of the strike. This would mean that, where management and labor were unable to agree upon questions of wages and working conditions, both sides would be compelled to submit their differences to impartial arbitration and to abide by the terms of the arbitration award.

In Time of Peace Prepare

COLD WINTERS do not come singly; they usually come in pairs or groups of three. Therefore, next winter probably will be long and cold. In the anthracite region, at least, there was some apprehension last year and early this year that enough coal would not be mined and shipped to provide for the winter's need. Stocks in the cities were low and a heavy snow might have cut off the supply.

As a result of the steady work a lot of development was completely used up, and during the summer that deficiency must be made good, even if coal costs more when prices are lowest. Every company should have a suspense account for additional yardage, to be charged off in the winter if production overruns development.

Yardage in anthracite mines should always be ahead of actual needs based on projected coal development, for no one can tell just how soon in future extensions coal may thin or be lost, or when the contours of the bed may be such as to reduce production. Where doubt exists, it is well to have a little excess yardage on which to draw. Some work only at development in the summer, leaving coal-getting as a winter objective. Even then the gangways must be advanced in the winter, if tonnage is to be maintained. Strippings also must specialize in the summer on uncovering the coal rather than on loading the coal into cars.

ANTHRACITE STRIPPINGS

+ Exemplify New Technique

As Practiced in Southern Fields

NEW METHODS which make stripping applicable to ever wider and deeper coal areas are well illustrated by several operations of Hill & Suender, with headquarters at Frackville, Pa. Engineers are keenly noting the rapid advance of technique and the certainty that before long it will make possible recovery of coal hitherto not susceptible to such treatment. Accordingly, they arrange that present-day strippings shall be so conducted as not to militate against extension hereafter when the ratio of overburden removed to coal recovered shall be radically revised. Indeed, many strippings are widened and deepened as soon as the development first planned has been completed; and many strippings abandoned in earlier years have resumed activity along lines more ambitious than before.

However, the first stripping to be described—that conducted for the Lehigh Navigation Coal Co., of Lansford, Pa., at Tamaqua—is an example of an operation where conditions are unusually favorable and where opportunities for extending the first layout downward are not readily apparent. This stripping lies to the north of the celebrated Panther Creek Valley and is known as the Tamaqua, or Five-Vein, stripping.

Here the Mammoth bed makes a steep and regular fold before it plunges headlong toward the Panther Creek Valley. At this point, the bed has already begun to split and four big "dividers," partings, intervals or lenses of rock are to be found in it, thus forming the "five veins" to which reference has been made, traces of which will be noted to the left of Fig. 1, where an electric Bucyrus-Erie 4-cu.yd. shovel is working. In the foreground, the pit eventually will be 75 ft. deeper than is shown at present.

It will be noted that coal and rock are transported entirely by gasoline trucks. Such trucks are said to have the following advantages over equipment hauled by locomotives over rails: (1) They can go up steeper gradients and can make much sharper turns; (2) no force of men is needed to throw over the tracks at the dump; one man will suffice, his duties being mainly those of a safety man to keep the trucks from backing too far; (3) trucks can be shifted on the job, or from job to job, with less preparation, because no rails, ties or locomotives have to be transported and no rails have to be laid; (4) roads can readily be kept in condition by bulldozers, and maintenance of highways with these is less expensive than the upkeep, as to alignment and gradient, of a railroad track, especially where it is placed on a heavy fill; (5) less expenditure need be sunk in equipment, because trucks can always be hired in the winter season; thus Hill & Suender will often add to its equipment 40 or 50 trucks at the peak of the demand for coal; (6) with gasoline trucks it is relatively easy to arrange that the shovel will have opportunity to work continuously, whereas with railroad cars, the trips usually are delivered to the shovel at inconveniently long intervals; (7) more space is needed near the shovel where railroad cars are used than will suffice for trucks.

In all, the firm has eight bulldozers at work performing all kinds of jobs at its fourteen strippings, the principal of which is the maintenance of roads, though they are used also for pushing back spoil from the dragline excavator where the boom of that unit is not long enough to deposit its load at the place desired. In general, bulldozers in the anthracite region are larger, and essay heavier tasks, than their counterparts at bituminous strippings.

At the same time, declares the quoted authority, tires of trucks are subject to much wear, especially where the Mammoth bed is being worked, for that bright, hard, glistening coal will cut like glass when first mined. It will cut the hands if not handled gingerly. On the other hand, coal from the Primrose bed and rock will do less harm to tires than coal from the Mammoth bed.

At the Tamaqua stripping, the dividers in the Mammoth beds are from 12 to 18 ft. thick. Coal is being hauled in trucks a half mile to a dumping ramp, where it is discharged into mine cars and hauled and hoisted by the Lehigh Navigation Coal Co. to its Tamaqua, or No. 14, breaker.

Equipment on the job includes not only the Bucyrus-Erie shovel mentioned but also one Lima 1½-cu.yd. shovel, one Bucyrus-Erie 2½-cu.yd. shovel and one ⅝-cu.yd. Pawling and Harnischfeger shovel, one Clipper and two Armstrong well drills (which sink 6-in. holes), two Ingersoll-Rand wagon drills, a jackhammer that will drill inclined holes (of great advantage because the bed pitches heavily), one Ingersoll-Rand electric compressor delivering 560 cu.ft. of air per minute, one Caterpillar bulldozer, six Boulder Dam type trucks and six Bulldog Mack trucks, all of which are larger than is at all customary on this side of the Mississippi; one Marmon-Herrington truck and an A. C. Mack truck. In addition, fifteen or sixteen A. C. Mack trucks are hired.

In a branch of the stripping, not visible in the illustration, a large breast has caved so tightly as to form a vertical pillar of rock, or "island," around which the stripping will proceed, thus saving the cost of removal. All the coal has been mined once, but most imperfectly. Like most strippings in the anthracite region, this stripping does not uncover "virgin coal."

To the east is the Lansford stripping (see Fig. 2), which is somewhat more typical of the general run of strippings in this region. Here the Mammoth bed is 55 ft. thick and lies at an inclination to the horizontal of 60 deg. The face uncovered is 6,000 ft. long. This operation also is on the property of the Lehigh Navigation Coal Co. and faces, across the valley, the village of Summit Hill and the dumps from that big stripping, where the aforesaid coal company

is excavating coal with its own men and equipment.

This stripping has reached its originally planned objectives, and without closing down has started, under the same contractors, a new lease of life, this being the first stripping on which this firm of contractors embarked. The coal was stripped with shovels and the material laid by casting back far enough that a wide road lies between the original location of the coal bed and the spoil bank. Afterward, the bed was excavated by shovel and dragline to a depth of about 65 ft., taking out enough top rock to make a slope on the lower side of the ditchlike excavation. The slope lies at about 60 deg. to the horizontal, which is adequate because the rock is tilted back down the hill, and to free itself a sliver of rock would have to be lifted against gravity and the pressure of adjacent layers.

This stripping ditch could be deepened in the coal without the removal of more rock, merely by using a dragline excavator in the coal to undermine the top rock. This is the usual practice on abandonment, and, while it seems unsafe, it is so only to the scraper and ropes, for nothing more goes into these profounder depths. No men are required to descend below the point on which the caterpillar of the excavator is standing. In this case, however, the stripping is to continue to a greater depth and trenching in the coal is, therefore, unnecessary. In this case, the footwall is strong, and in no place did it slump back, as in a stripping hereafter to be described.

With due foresight, all the excavated rock was piled far enough from the excavation to leave space for a further scaling back of the top rock or hanging wall without the necessity for rehandling the material already excavated. So nothing prevents the deepening of the excavation except rock, which, up to the present, has not been disturbed. Hence, the extension is now to be made.

But above the Mammoth bed and outcropping a few hundred feet below it on the steep hillside is the Primrose bed. The excavated rock has been dumped at no time down the hill far enough to cover the outcrop of this bed, and in further excavations of the Mammoth bed no rock must be dumped on this outcrop to interfere with its future stripping. The distance, if rock were dumped at the level of the present berm—occupied as it is with earlier dumpings—would be inadequate to hold all the material to be dumped, and might be inadequate even if the dumping level were greatly raised.

Consequently, some of the rock is being hauled to a ravine to the east, thus giving distance in which the trucks are enabled to surmount not only the elevation to the berm but also the increased elevation made necessary by the narrow limits of the dumping ground provided. The depth to which stripping will be conducted is not determined, for the cost must be regulated to suit the quantity of coal recovered, and recovery depends quite largely on the degree of completeness with which the virgin bed has been mined.

There are breasts in it—that is quite evident—but how far they extended and how incompletely they removed the coal is not so clear. A 2½-cu.yd. P. & H. shovel is working on the rock and a 1½-cu.yd. Lorain shovel is digging the coal. The rock which has been shot (with 6-in. holes drilled with a Cyclone drill to a depth of 65 ft., each hole charged with 600 lb. of Atlas dynamite without chambering) has fallen athwart the end of the "ditch" in which the 1½-cu.yd. Lorain shovel is working, blocking the exit, but that does not at all interfere with operations, for the trucks deliver their coal into two 360-ft. breasts (which later will be increased to three) and coal traveling down these will be loaded into 20-car trips standing in a level below them and thus will be transported to the breaker.

The relative positions of the rock and coal shovel will be reversed later as often as necessity dictates, and when the economic limit for shoveling shall have been reached, a dragline will be put in the "ditch" and coal will be removed for a further depth of 40 ft. The breasts appear completely filled with fallen rock, but where the holes are thus filled, the shovel resting on them is in a perilous position, and to consolidate them holes are drilled in the fallen rock and shots are fired. Eight A. C. Mack trucks handle the entire stripping, for the "lead" of both coal and rock is short. The trucks make light of the 15 or 20 per cent gradient they are compelled to climb in getting out of the stripping onto the dump.

A small and very different stripping is that under the shadow of Cranberry breaker. Large stockpiles accounted for this Mammoth coal being left. They have been moved away, but as the stripping proceeds, the area will be backfilled, giving support to the ground around, and the stockpiles will be reinstated. Here the Mammoth bed is only about 25 ft. thick and lies on pitches much less steep than those near by, forming a shallow basin—a part of a larger basin which has been almost wholly eroded. Cover is mostly a clayey sand.

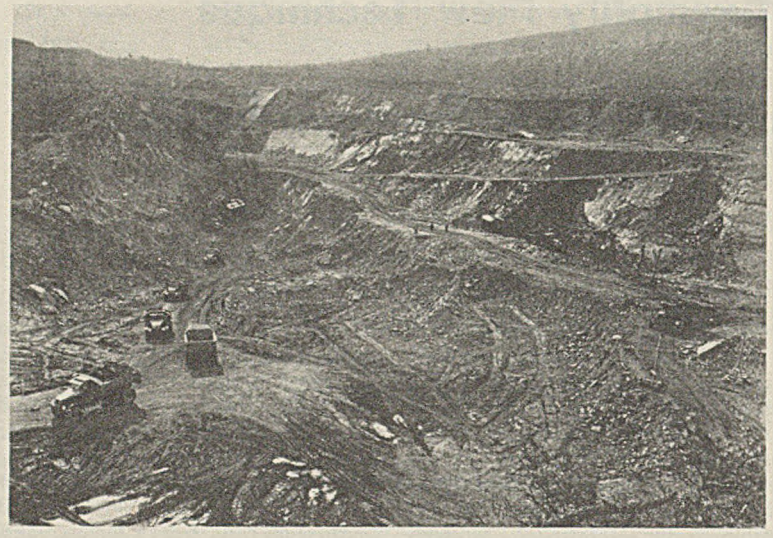

Fig. 1—Tamaqua Stripping, Where Five Splits of Mammoth Are Being Uncovered.

The contract is taken on what is known as an "unclassified rate," coal and rock being included together indiscriminately in the yardage. Overburden is being hauled away and dumped in a pit near the breaker. An expensive preliminary job was to transfer the water from a flume, which would have interfered with the operation of the stripping, to a large pipe laid for that purpose back of it. On the job are a 2-cu.yd. Marion shovel, three Linn tractors, three tractor wagon units, one A. C. Mack truck and two Loomis Clipper drills.

A "salvage stripping" is one where the contractor is paid per ton of coal recovered. Such contracts usually are made where the owner either does not know if the coal is present or prefers to take none of the risk associated with the payment for rock on a cubic-foot basis. The McTurck stripping near Girardville, Pa., is such a salvage operation, though here the geological conditions were simple enough. The question as to whether the coal has been much or little mined, however, is nearly always debatable. Many of the old maps show workings which do not exist and which are based solely on the allegations of the foreman, who declared to the map maker

that all the places were driven 200 or 300 ft., whereas they may have advanced only 50 or 100 ft.

This stripping is much like the Lansford stripping, though not perched, like it, way up on the mountain slope but down near water level. The Mammoth bed dips at 70 deg. and is 25 to 30 ft. thick. Above the Mammoth bed is the Holmes, at an interval of 40 ft. Its thickness is 9 ft. At the west end of the McTurck stripping, this Holmes bed is being recovered with the Mammoth. The top wall has been sloped back, but, not being of solid material, it is slumping toward the ditch. As a rule, as already stated, it holds well, because the rock, being pitched on its end, must lift itself out to get free of the wall; but in this case it is so rotted with atmospheric influences that it can break off.

Cover at the crop was only 10 to 25 ft. thick. Cover and coal have been removed by gasoline shovels, the coal being hauled by tractor trucks to the Reading R.R. and carried in railroad cars to the Lawrence breaker for preparation. The stripping is practically complete; the ratio of overburden to coal has been 4½ to 1 thus far. A dragline excavator can be put in the bottom of the ditch, and it can excavate another 25-ft. strip of coal without removing any overburden and without having to go any lower itself than the present bottom of the pit. In some places, perhaps, the slumping top rock may have to be smoothed off with a dragline. After this is done, the stripping will be left in proper condition for resumption, as the rock dumped already is far enough from the pit that a wider and deeper cut can be made without disturbing it.

In general, in the strippings described, heavily pitching slopes of a synclinal have been attacked where they emerge from the slopes of a deep valley, which, however, are not inclined at as heavy a pitch as the coal bed. Usually valleys and synclines are found together and roughly follow the same lines, though there are many marked exceptions. One of these is the syncline that runs along the top of Broad Mountain. The back of that elevated plateau is level, but the coal under it has a sharp synclinal fold known as the Morea basin, and the strippers are busy digging an artificial valley which will make conditions more in accord with the general rule. Looking at the work from a vantage point, one can hardly believe that it is the work of machines and not of nature, because of a certain patch of coal land covered with trees which has been lowered by undermining, and seems to the casual observer to be lying at its original level.

Some time back, A. C. Dodson & Co. stripped an area according to the recognized best practice of that time. Its purpose was to remove not only the sides of the syncline but all rock above the Mammoth coal in the bottom of the basin. The rock was brought by locomotives to the foot of an incline and the cars were then hauled up this slope to the top of the mountain plateau and then hauled out up a stiff gradient established by filling and there dumped.

After much experience with such planes, the anthracite region seems to have definitely soured on them. The small size of the cars used on such work and the many vexatious delays at the base and top of the incline have made contractors and coal companies favor the use of locomotives on a stiff gradient, even switchbacks if necessary. Summit Hill stripping, described in *Coal Age*, Vol. 34 pp. 203-205, is an example. It used to be plane-operated. It now uses locomotives on a switchback.

This operation, as now enlarged in scope, is known as the Shaft Pillar stripping. It removes a large basin of Mammoth coal, which, while level at the bottom, pitches at an angle of 55 deg. on the sides. When finished it will be 220 ft. deep. The basin is about 650 ft. wide from outcrop to outcrop. At its southwest corner is the Dodson breaker,

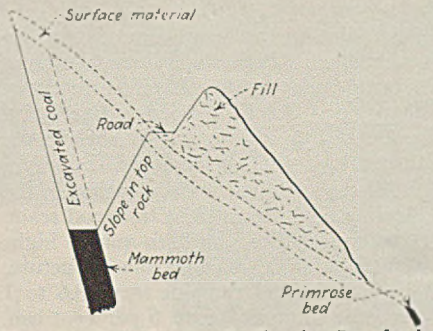

Fig. 2—Cross-Sectional Sketch, Lansford Stripping, Which Is to Be Deepened and Extended.

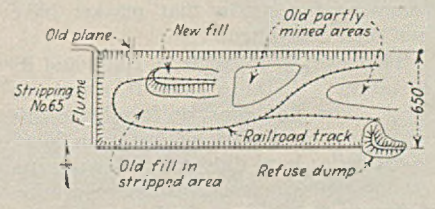

Fig. 3—Plan, Shaft Pillar Stripping in Morea Basin; Will Eventually Be 220 Ft. Deep.

of the Mill Creek Coal Co., which is still operating, and at the northwestern end is the plane by which the Dodson company elevated the rock to the mountain summit.

The western end of the basin, being the more shallow, was entirely removed, and operations of stripping are now at their height at the eastern end, the rock being hauled to the western end for dumping. At first, this was relatively easy, because the excavation in the western end was so deep that the trips of cars could be hauled thither on an easy upgrade, and at the end of the run found a pit profound enough for dumping. After dumping for some years, however, the ground was leveled off, and now the task is to raise the rock high enough to put another 45 ft. of material over that already in place. The rock from the north and south sides of the pit is brought in trips to a track about the center of the stripping and hauled up the southern side to the end of the stripping, around which the road turns on an angle of 180 deg., returning for a few hundred feet along the north side, where the dump is located (see Fig. 3). To raise the rock, 8-per cent gradients are necessary, and this, with the sharpness of the curve, makes the task of hauling the rock quite difficult.

Moreover, the slope of the bottom wall being 55 deg. and the material of the bottom wall being weak, that wall is showing a disposition to slide on the north side of the excavation, where the deepest stripping has been made. A thin seam of coal supplies the point of weakness, to which the wall tends to slide back. At one time 15,000 cu.yd. of rock was thus dislodged. One can imagine what this would have meant if a plane were being used to haul the rock out of the stripping. A big slide occurred when the Dodsons were stripping the upper area.

On the aforesaid north side, a 3½-cu.ft. Marion shovel is working removing this fall, and in a short time the loading of coal will be resumed; two side-dump rock cars hauled by a Vulcan locomotive constitute a trip, each car having a capacity of 16 cu.yd., but actually hauling only about 14½ cu.yd. because the material is large and the vacuities between the rock masses absorb much of the capacity. On the south side, which is near the breaker, a large refuse dump is being removed and the approach to the coal is thereby delayed. Here a 4-cu.yd. Bucyrus-Erie shovel is working, removing the refuse dump and some of the rock to be stripped. The cars used on this part of the stripping have a capacity of 10 and actually haul about 9 cu.yd. Here three 6-in. well drills of different types are used to prepare the solid rock for shooting. The holes are not sprung but are loaded with 40 to 60 per cent Atlas dynamite. Near the north side the solid rock is being broken by four 6-in. well drills.

In loading, the shovel turns through an angle of about 90 deg. In some cases, where the face of the rock is fairly plumb and more solid and has been properly shot so as not to fall into the pit, the shovel can perform its work with a swing of only 45 deg. The effort in shooting is to shatter the rock without displacing it, because the shovel does its best work when it is working

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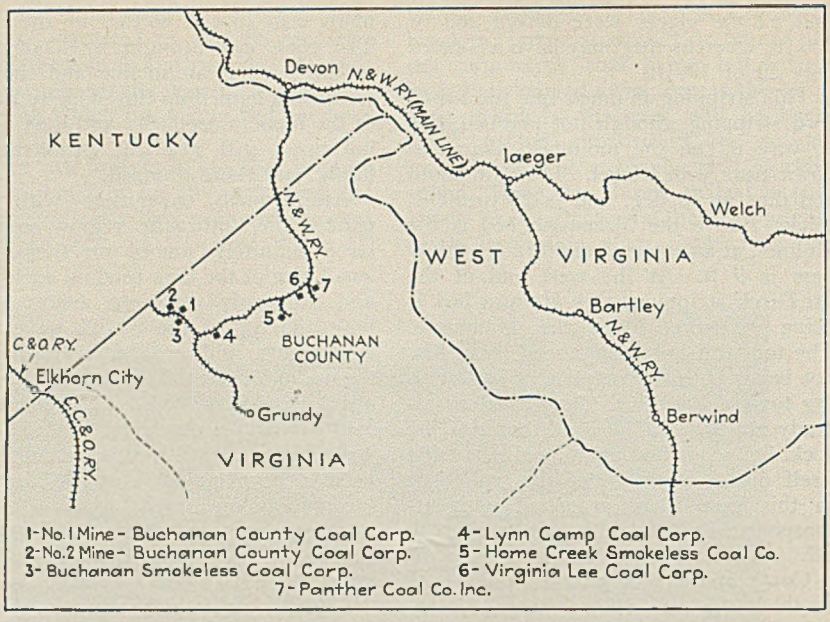
GRUNDY FIELD

+Adds New District

To Southern High-Volatile Region



Grundy Field and Location of Mines Now Operating.

FIVE to ten years ago few would have been bold enough to predict that this generation would witness the opening of a new coal field in southern Appalachian territory. And yet today the State of Virginia can boast of such a mining district. The first shipment of coal from this new development, popularly spoken of as the Grundy field, was made in May, 1932, and now seven mines are in production. Construction work has been started on a six-mile branch railroad to serve a large plant that has been planned, and other projects are under consideration.

The territory is in Buchanan County, the northern corner of which lies in the form of a wedge between McDowell County, West Virginia, and Pike County, Kentucky. It is served by a new branch of the Norfolk & Western Ry., joining the main line at Devon, about 18 miles from Williamson in the direction of Welch. The nearest mine of the new field is 17 miles by rail from Devon and the farthest is 31 miles.

For about 40 years the lumber industry of Buchanan County was served by the Big Sandy & Cumberland narrow-gage railroad, extending from Devon to Grundy, Va. After the timber was all cut and the mills ceased to operate, the Norfolk & Western Railway Co. purchased this road and proceeded to build a standard-gage line into the virgin coal territory. The new road follows the old right-of-way up Knox Creek to Hurley, and then turns up Lesters Fork. At the head of Lesters Fork is a tunnel approximately 5,000 ft. long carrying the road over to the Levisa River. From this point the railroad extends up the river about 10 miles and down the river about 4 miles to the Virginia-Kentucky State line. Much of the new line has a grade of 2½ per cent, and as a whole the railroad was expensive to build.

All seven mines now operating in the Grundy field are in the Clintwood seam. This coal classes as a high-quality high-volatile and is of a friable structure. Typical channel samples show 0.6 to 1 per cent sulphur, 4.5 to 6 per cent ash, 29 to 33 per cent volatile matter and 0.6 to 2 per cent moisture. The coal is said to be well suited to byproduct coke-oven use, but the first large-scale commercial tests in that market have not been completed.

The seam is 45 to 60 in. thick and its elevation is 1,700 to 2,000 ft. above sea level. The bed dips uniformly to the northwest on a pitch of not over 30 ft. to the mile; local dips and rolls are rare. At the mines now opened, the elevation differences between tipple tracks and drift portals fall in the range between 300 and 700 ft.

In places the coal vein is clean, but in other localities there are thin partings of slate or bone. Generally speaking, the top is a tender slate. In certain of the mines, 1 to 5 in. of slate comes down and bares a reasonably strong roof. In a mine last opened it is the hope that the slate can be held in position if pillars are taken immediately after the rooms are driven. The bottom is fairly firm, but it is the practice in some of the mines to leave a thin layer of bottom coal in rooms.

Only approximate information as to the total acreage of Clintwood bed is available. An engineer who has been employed in the field estimates that the acreage "on the railroad" and proved by outcrop prospect holes is well over 20,000. Large tracts distant from the railroad have been proved, and there are other large areas which are considered to contain workable coal. Two other seams, the Eagle and Splashdam, which outcrop below the Clintwood, offer possibilities for development after the Clintwood shall have been depleted.

Six corporations representing five financial interests now operate in the field. The Buchanan County Coal Corporation operates two mines, one producing 1,000 tons per day and the other 500 tons. The same interests control the Virginia Lee Coal Corporation, which operates one mine producing 200 tons per day. These mines are owned principally by the same interests that control the Vera Pocahontas Coal Co., of Yeager, W. Va. The two Buchanan County mines are at Black Rock, Va., and the Virginia-Lee mine is located close to Roseann.

Roseann postoffice is the location of the newest and largest mine in the field, owned by the Leckie interests and operated as the Panther Coal Co., Inc. The capacity of the aerial tram and tipple is 2,500 tons per 7-hour shift. Coal shipments from this new plant were started April 5, 1934; present production is 900 to 1,000 tons per day, and it is planned to ship 1,500 to 1,800 tons per day by September. Further details of this mine and its equipment will be found on p. 304 of this issue.

The Lynn Camp Coal Corporation

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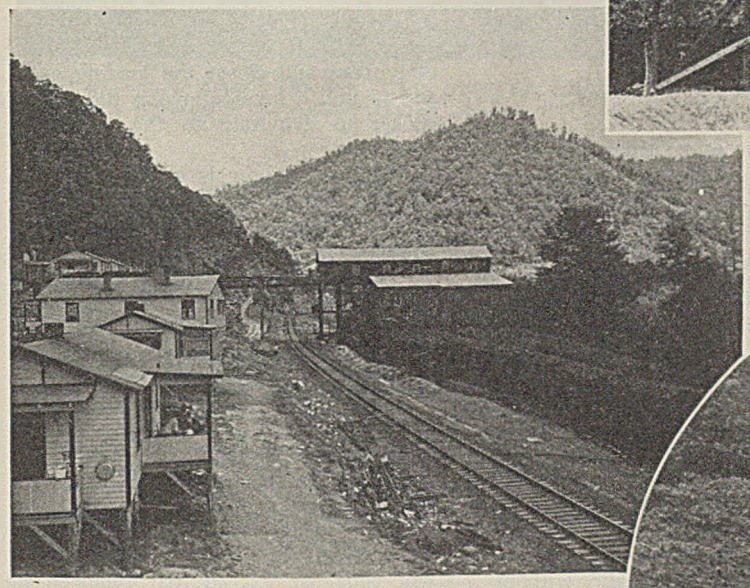
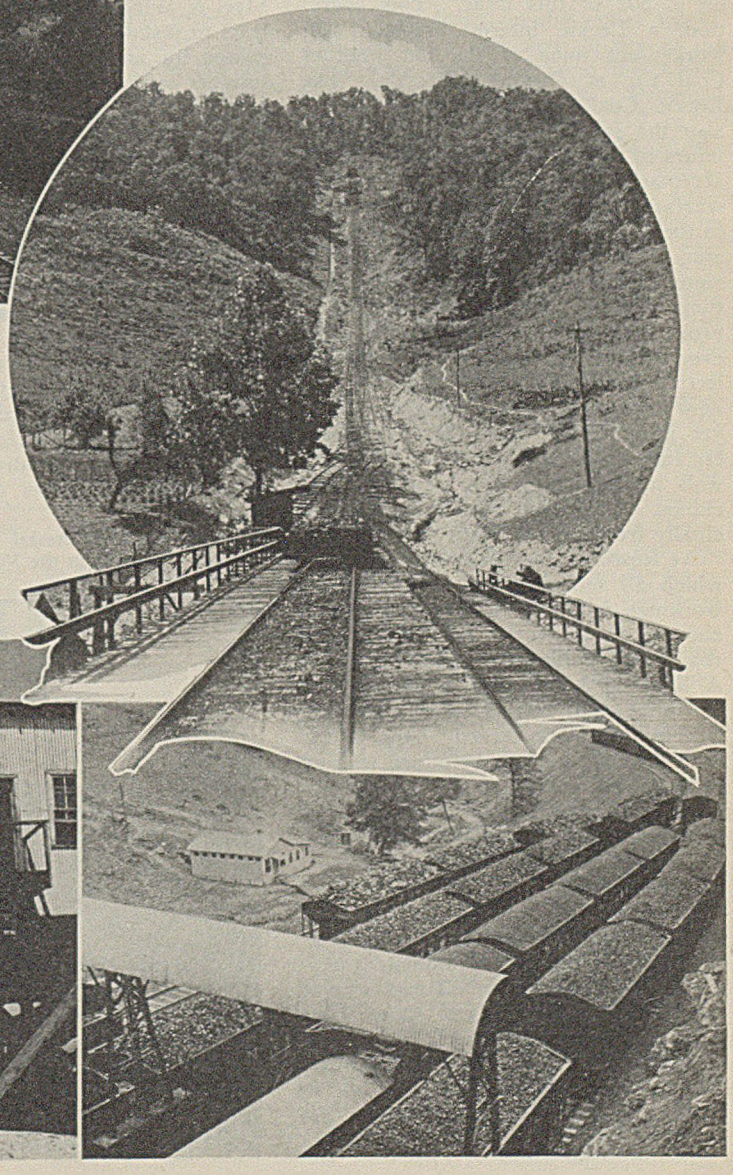
Home Creek Smokeless Coal Co. Plant and Retarding Rope-and-Button Conveyor. This Operation Shipped the First Coal From the Grundy Field

No. 2 Mine, Buchanan County Coal Corporation. As Yet, Only This Company Has Built Houses for the Miners.

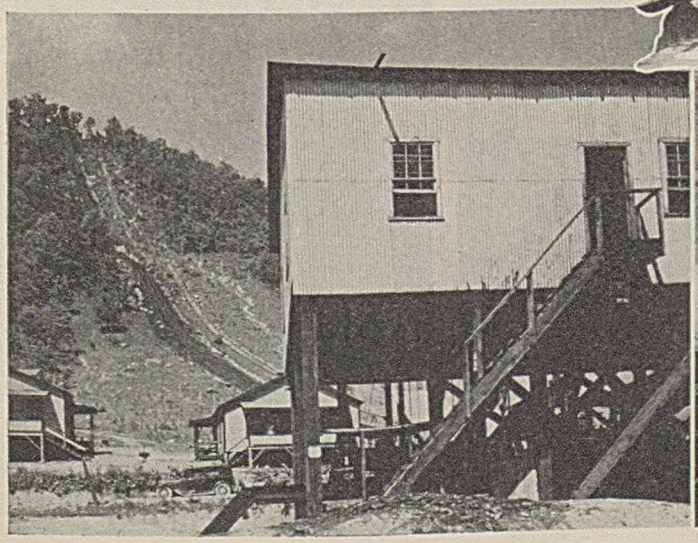


Mine-Car Plane, Buchanan County No. 2 Mine; to Be Changed to Monitor Plane



Tipple and Monitor Plane, Buchanan County No. 1 Mine (Lower Left)

A Day's Output From the Roseann Mine, Panther Coal Co., Inc. (Lower Right)



ROSEANN MINE

+ Leads Grundy Field

In Current Daily Capacity

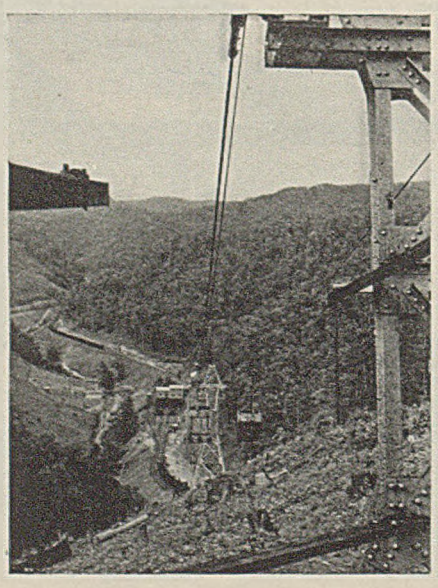
PANTHER COAL CO., INC., at Roseann, Va., has the distinction of having the largest and newest mine to go into operation in the recently developed Grundy field, described on p. 302 of this issue. This operation, a Leckie interest, replaces the worked-out mine of the old Panther Coal Co. at Panther, W. Va. The Leckie Coal Co., Columbus, Ohio, is also the sales agent for certain other mines in the Grundy field, and the ready acceptance of the coal by the markets warranted the confidence which resulted in the Leckies building a plant at Roseann, rated 350 tons per hour and designed for long-life, trouble-free operation. Pending sufficient development to prove the local mining conditions, however, caution is being observed in selecting inside equipment. One hundred new mine cars were purchased, but as yet other inside equipment comprises but four cable-reel locomotives, one arcwall machine and two shortwall machines. These are rebuilt units, principally from the old Panther mine.

At Roseann, the Clintwood seam—in which all mines in the field are now working—is 1,954 ft. above sea level and 476 ft. above the level of the railroad at the point selected for the tipple. A lease of 3,000 acres is available to the mine, and 600 acres of that area lies in one block directly back of the drift opening and can be mined without breaking to daylight and crossing hollows to adjacent areas. Outcrop prospect holes and mine development thus far indicate the coal thickness will average about 55 in. and will vary between the limits of 45 and 66 in. In some places 2 to 4 in. of bone occurs near the top. Results of a proximate analysis of a representative channel sample at a location free of bone shows (dry basis) 4.78 per cent ash, 32.18 per cent volatile matter, 63.04 per cent fixed carbon, 0.76 per cent sulphur, and 14,748 B.t.u. Ash-fusion temperatures are high.

As a means of transporting the coal down the mountain to the tipple a continuous-type automatic aerial tram was selected as the most economical for a long-life proposition. The American Steel & Wire Co. was awarded a contract to install a tram 1,975 ft. long, designed for an ultimate capacity of 350 tons per hour. Thirteen 80-cu.ft. buckets now operate on the tram, and an equal number, which will provide full capacity, are scheduled for delivery in September. Buckets ride a single cable, discharge automatically and remain clamped to the traction rope as they turn around the horizontal sheave at the tipple. Although the tram could have been made fully automatic without a large additional expense, coal company officials preferred to have an operator supervising the machinery at the loading terminal; control of the bucket-loading gate, therefore, is manual. The only duty of the operator is to push a button which controls a 3-hp. motor that opens and closes the loading gate, and to pull a lever allowing the loaded bucket to gravitate to the automatic dispatcher.

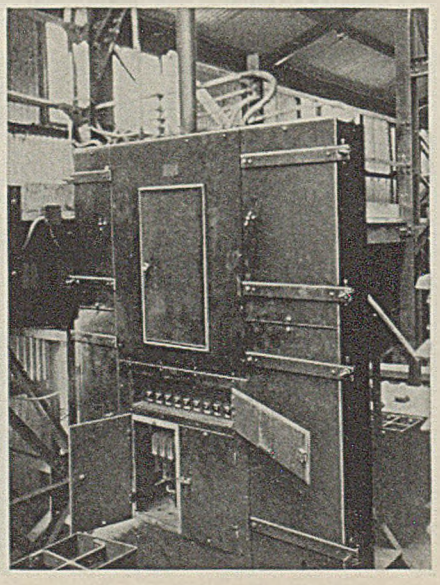
The drive motor is a Westinghouse 100-hp. 220-volt wound-rotor type and is equipped with G.E. thrustor brake. Because the coal is lowered approximately 400 ft. in its travel of over 1,900 ft., the motor functions for the most part as a regenerative brake. A test with the tram operating with the 13-bucket equipment, but made at a time when all buckets were not being filled to capacity, showed an average of 19.6 hp. regenerated to the a.c. distribution system. This test indicated that, with a full equipment of buckets, as much as 90 hp. will be generated by the tram motor, and the energy thus captured will equal or exceed that required to drive the 70-hp. connected load of the tipple.

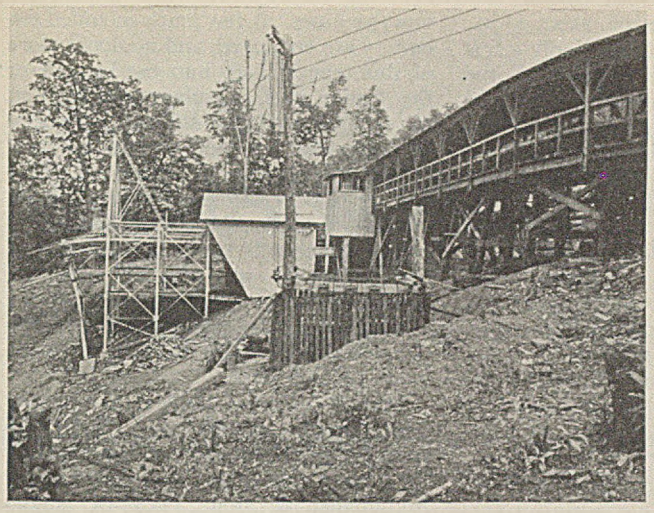
Looking Down the Aerial Tramway to the Tipple in the Valley.



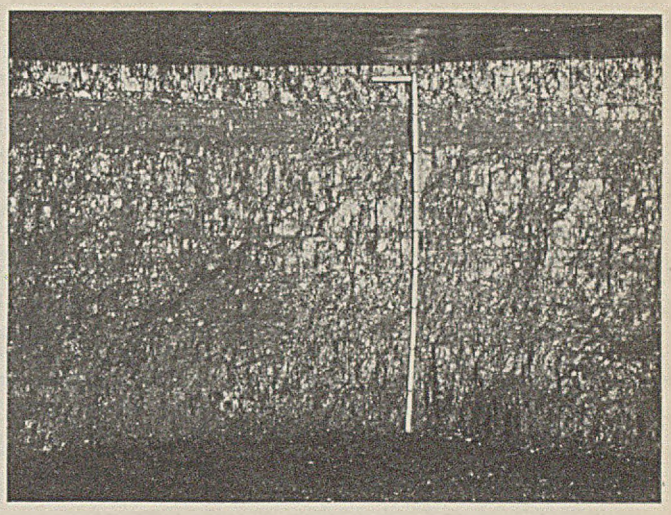
Motor and Lighting Circuits in the Tipple Are Controlled From a Factory-Assembled Dust-Tight Cabinet.

Lighting panel switches are accessible by opening the door in the upper center. Just below, with the door open, is the motor control button panel. Below that to the left a compartment door has been opened to show the magnetic starter and the sponge-rubber gasket.





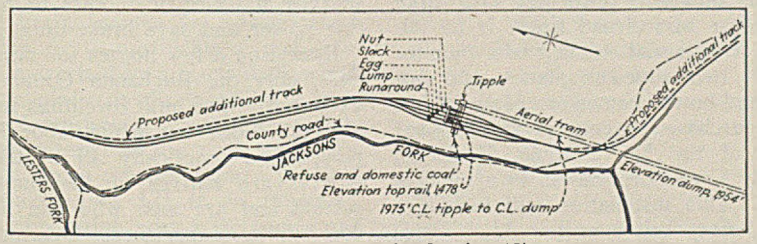
Mine-Car Dump. From a Bin Below This Dump the Coal Flows Directly to the Aerial Tramway Buckets.



59 In. of Clean Coal at the Face of a Room. Wide, Dull Band at the Top Shows Where Cutter Bar Passed.

One intermediate tower divides the tram into two spans, one of 345 ft. at the upper end and the other of approximately 1,600 ft. at the lower end. The loaded-side track cable is $1\frac{3}{4}$ in. in diameter, is locked-coil construction, plow-steel grade, and that of the empty side is the same excepting it is $1\frac{1}{8}$ in. Bucket traction is handled by a 1-in. rope, plow-steel grade, 6x19 construction.

The tipple, built by the Jeffrey Mfg. Co., is a four-track, all-steel structure equipped with three apron-type picking-table and loading-boom units, and is designed for the addition of a fourth boom. Rated capacity is 350 tons per hour, and the sizes being loaded at present are lump, egg, stove and $1\frac{1}{2}$-in. slack. When the other boom is added, the nut will be taken out of the slack. The main- and small-size screens are built as a unit. The top, or main, section operates at 102 r.p.m. and the lower at 160 r.p.m. A 25-hp. 220-volt Type CS induction motor drives both units. A mixing conveyor driven by a 10-hp. motor of the same type can be used to mix slack or nut with either egg or lump. Tipple motor-drive connections consist of Texrope V-belts. The building is covered with corrugated galvanized steel.



Arrangement of Tracks Serving Tipple.

Lessons of past experiences at other mines were not forgotten when specifying motor- and lighting-control equipment for the tipple. Overload relays of line-starters take the place of branch circuit fuses, and all starters are grouped in a partitioned and dust-tight cabinet. And this does not mean an ordinary steel cabinet, which is nominally a dust protection, but instead a specially constructed cabinet with hinged doors which bolt close against sponge rubber gaskets. The complete cabinet, with G.E. magnetic switches, internal connections and control buttons, was built by Penn Electrical Co. and shipped to the mine as an assembled unit. Wiring of the tipple was, therefore, a simple matter of installing BX cable to connect the designated terminals of the cabinet to the respective motors and lighting circuits. No rigid conduit was used.

Metal partitions in the cabinet isolate starters from each other so that a fire cannot spread and destroy the complete wiring. Controls are interlocked so that motors can be started only in proper sequence. Above each motor-control button, however, is a turn-button switch that provides for cutting out any motor so that it can be skipped in the sequence or for operating any one motor separately. The cabinet is so located that the control buttons are within reach of a man stationed at the lump picking table.

Delivery, tipple and outlet tracks are unusually well built. The rail is 100-lb. size and tie plates are used throughout. An experienced Norfolk & Western section foreman was hired to supervise the construction; hence the job conforms to railroad standards in all details affecting service and future maintenance cost. Present facilities provide space for 50 empties on delivery tracks and for 60 loads on the outlet tracks. The 100 mine cars now in use in the mine were purchased from the American Car & Foundry Co. Principal specifications are: all-steel, 119 cu.ft.; outside-type lift endgate; height, 26 in.; length inside, 12 ft. 8 in.; width inside, 6 ft. $8\frac{1}{2}$ in.; 48 in. gage; stub axle; Timken bearings; solid bumper; no brakes. The net loading of these cars is averaging 5 tons.

Advance-robbing, which will facilitate rapid increase of production to plant capacity, is the plan of mining. The first coal was shipped from the plant on April 5, 1934; by July 1 the daily production had passed 900 tons, and the development schedule calls for 1,500 to 1,800 tons per day by Sept. 1. The advance-robbing is dictated by tender roof rather than by an urge for attaining full production. If room falls are to be avoided, the pillar must be taken immediately after the room has been driven to the limit.

Until recently, both bottom and top cutting were being done in the mine, and the experience indicated it desirable to standardize on the latter in order to protect the tender roof. This top cutting is done in the coal, close to the roof and just above the bone stratum, which occurs irregularly. A few inches of bottom coal will be left in rooms to avoid the chance of loading floor material.

The seam lies on a uniform pitch of about 30 ft. to the mile and grades will be generally in favor of the loads. Main haulage tracks will be laid with 60-lb. steel. In rooms, steel ties will be used exclusively. Drainage and ventilation will present but minor problems and should entail but a small cost. Mine cars are weighed on a Fairbanks heavy-duty railroad-type scale equipped with

Streeter-Amet automatic weighing attachment and are dumped over a Phillips crossover dump.

Electric power is purchased from the Appalachian Power Co. and present conversion equipment consists of two 100-kw. 220-volt units moved from the old Panther mine. One is an induction motor-generator set and the other a synchronous converter. Control is manual except that a reclosing breaker is used on the d.c. feeder.

Below the Clintwood seam, but above the water level, are two other coal seams which may possibly be worked some day by the plant. One is the Eagle, said to average about 40 in., and the other is the Splashdam, about 48 in., thick. It is planned to build only a few houses, sufficient for officials, at the mine. Local white labor inexperienced in mining is being employed, and all applicants must qualify by passing a physical examination made by the company doctor.

Officials of the Panther Coal Co., Inc., are W. S. Leckie, president and general manager; A. F. Leckie, vice-president, and W. B. Beale, secretary-treasurer. All reside at Columbus, where is located the main office of the Leckie operating interests and of the sales organization, which is headed by A. F. Leckie.

Grundy Field Adds New District to Southern High-Volatile Region

(Concluded from page 302)

operates one mine producing 600 tons; the Home Creek Smokeless Coal Co. has one producing 400 tons, and the Buchanan Smokeless Coal Corporation one shipping 100 to 150 tons per day. The H. E. Harman Coal Corporation is working on the grading of a six-mile branch railroad to a location where it is planned to open a large mine. This corporation represents substantially the same financial interests as own the Warrior Coal Co., McDowell County, West Virginia.

In the initial development of the field the mines were equipped largely with rebuilt machinery, and daily capacities were relatively small. Now that the commercial possibilities of the seam have been proved, much of the original equipment is being replaced with machinery of greater capacity and/or of a type better suited to the duty. The No. 1 mine of the Buchanan County Coal Corporation, for example, has been equipped with 85 new stub-axle-type Enterprise steel cars of 4 tons water-level capacity, 30 in. high, 7x11 ft. inside, with Timken bearings. The No. 2 mine of the same company has 43 new cars of the same type. The Panther mine has 100 new A. C. F. cars.

A roster of methods employed at the various mines to lower the coal from headhouse to railroad tipple is as follows: two aerial trams, two monitor planes, two mine-car planes, and one rope-and-button conveyor. Material has been purchased to convert the mine-car plane of the No. 2 mine, Buchanan County Coal Corporation, to a monitor plane. This installation will include a new Jeffrey belt conveyor 42 in. wide and 225 ft. long to carry the coal from the monitor dump bins to the tipple screens.

Most of the cutting is done with bottom machines. A few track-mounted top cutters are employed, and no doubt more of this type will go into use because of the tender roof. Haulage distances at all of the mines are still so short that no main-line locomotives are yet employed. With the exception of three storage-battery locomotives used by the Home Creek Smokeless Coal Co., cable-reel equipment is the rule. Officials of this company are pleased with the maintenance-free performance of the battery types, but plan to use trolley locomotives for main haulage after the hauls become long.

Five of the seven tipples are equipped with shaker screens and three are equipped with crushers. Just recently the Lynn Camp Coal Co. installed a new McLanahan & Stone 24x32-in. single-roll-type crusher driven by a new 20-hp. G.E. induction motor and a V-belt transmission.

All mines are operated by purchased power and the substation equipment consists principally of 100-kw. synchronous converter units equipped with manual controls. Power costs per ton of coal should be relatively small as an average for the whole field, as all conditions, including the regeneration of power by lowering coal down the mountainsides, are favorable. As yet, however, only the Panther mine, which is equipped with the continuous-type aerial tram, regenerates power in this way, although certain monitor installations may later be equipped with geared drums or sheaves and electric motors to regenerate power and save brake-lining costs.

Excepting a few houses for mine officials, only the Buchanan County Coal Corporation has built dwellings for employees. None but white labor is employed and practically all of the employees are natives of the immediate section and are men who had had no coal-mining experience. Operators of the Grundy field are affiliated with the Williamson (W. Va.) association and wages are governed by the Williamson agreement.

Mine Cars Are Loaded to an Average of 5 Tons at Roseann Mine.

MECHANICAL LOADING

+ At Ingle Coal Co.'s Wick Mine

Reflects Attention to Principles

WITH complete mechanization of loading a fundamental objective from the start of operations four years ago, and with a background of experience at former operations as a guide, the Wick mine of the Ingle Coal Co., Little, Ind., six miles northeast of Oakland City, exemplifies the successful application of mechanical loading principles to southern Indiana conditions. Normal daily output averages 1,400 tons of raw coal, which is produced by four mobile loaders working seven hours in rooms and a fifth machine working fourteen hours in development work.

Operations at the Wick mine are carried on in the Indiana No. 5 seam, which averages 6 ft. in thickness and generally is overlaid by a black slate, which in some places is displaced by a gray slate. Niggerheads, or rolls, frequently are encountered in the roof, and occasionally occur in the floor. A light cover, averaging 125 ft. in thickness, permits operation with wide rooms and thin pillars, the latter being left in place.

The coal is reached by an 18-deg. slope, and the mine is one of the few employing a belt conveyor for elevating the coal from an underground dumping station to the preparation plant. This conveyor is 500 ft. between centers, 36 in. wide, and is driven by a 100-hp. motor. Maximum capacity is 300 tons per hour. Cars are dumped into an 80-ton hopper at the foot of the slope, and the coal is fed onto the conveyor by a reciprocating feeder equipped with a link motion which allows the capacity to be adjusted in several steps from 100 to 300 tons per hour.

The mining plan is based on dividing the coal into blocks, or panels, by means of cross and room entries. The panels are mined by driving rooms from adjacent room entries, as shown in the accompanying idealized plan. Rooms are driven approximately 32 ft. wide on centers averaging 40 ft., both width and center-to-center distance varying slightly in accordance with roof conditions and the type of cutting machine employed. Room pillars are left in place, and cross entries are protected by 40-ft. barrier pillars. An additional pillar is left in the center of each panel as a protection against any squeezes which might start in the area already worked out. Rooms are driven just short of 300 ft. deep, or half the distance between adjacent room entries, leaving a thin pillar midway of the panel (see figure). This dividing pillar confines the ventilating current to the proper section.

Loading equipment consists of four Joy 7BU loaders in rooms, one 5BU machine driving entries and one spare machine, also a 5BU. Cutting equipment includes one Jeffrey 29LE cutting and shearing machine, three Jeffrey 35BB shortwall machines and one Oldroyd cutter in entry-driving. Battery locomotives are employed for gathering. This type of locomotive, the management feels, gives steadier, more flexible and less troublesome operation, and also aids in reducing demand peaks, as they are charged on the off-shift. The coal is drilled with post-mounted electric drills.

In line with accepted practice, the unit system has been applied to mechanical loading at the Wick mine, each unit consisting of a loader, cutting machine, battery locomotive and drill. Room work is on the straight day-wage basis, while the main entry work is performed on contract by a syndicate crew, one for each shift. Members of syndicate crews receive the appropriate day scale. Four men comprise a syndicate crew and do all the work necessary to put the coal on the parting, including cutting, drilling, loading, hauling and incidental activities.

Standard crews for room units consist of ten men: two cutting machine men at $6.75 a day each; one loader operator, $6.75; one motorman, $5.14; two drillers, who also do the shooting, $6.15 each; one triprider and car trimmer, $4.57½; one clean-up man, $4.57½; and two trackmen, $4.57½ each. In addition to this direct labor, one or two "jerrymen," at $4.57½, may be employed at times for timbering, handling rock and slate, etc., and four electricians, at $5, are employed on the day shift to handle the necessary repair and electrical work on the machines and elsewhere in the mine. Two additional electricians work on the night shift.

Undercutting is standard practice, and is supplemented by shearing in one section where the 29LE machine is stationed. Depth of undercut is 7 ft. with the shortwall machines and 9 ft. with the combination cutting and shearing machine. Experience has demonstrated that shearing increases lump percentage somewhat, but, as the market for this

Operating Force and Production, Wick Mine, June 6, 1934
(Working Seven-Hour Shifts)

OPERATING FORCE

Underground—Day Shift	Number
Loader operators	4
Cutters	8
Drillers and shooters	9
Syndicate men	4
Motormen	6
Tripriders	5
Trackmen	4
"Jerrymen"	15*
Mechanics	4
Superintendents	1
Mine bosses	2
Underground—Night Shift	
Syndicate men	4
Mechanics	2
Oilers (including assistant also performing other work)	3
"Jerrymen"	5*
Night bosses	1
Total underground force	77
Total outside force	22
Grand total, all employees	99

MAN-HOURS WORKED

Outside force	165
Underground force	551
Total	716†

PRODUCTION

	Cars
Loader No. 1	74
No. 2	80
No. 3	78
No. 4	64
No. 5 (day syndicate)	46
No. 5 (night syndicate)	36
Total	378
Total tons hoisted	1,360
Total tons loaded for shipment	1,171

*Includes track helpers, timbermen, dumpers and other labor not classified.
†Includes time worked by three extra men on construction work this day.

size is limited, the faces usually are prepared with an eye to making the task of the loader easier. After cutting, or cutting and shearing, the places are drilled and shot, the men engaged in this task carrying the drill, post and augers from place to place, the light weight of the equipment allowing this to be done without difficulty. Detachable auger bits are used to reduce the transportation of auger steel.

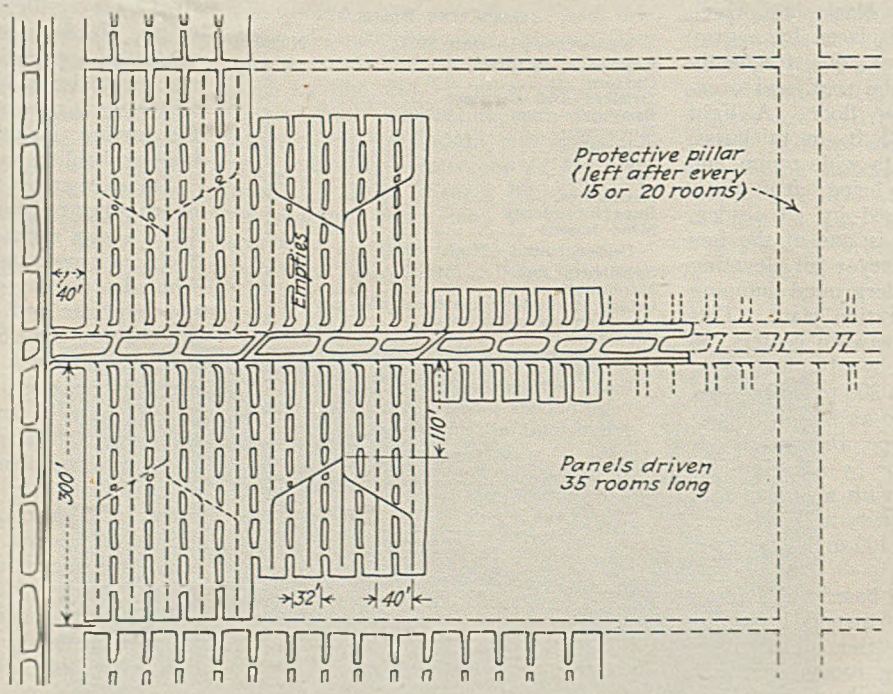
Rooms are shot with eight holes, four in the top and four in the bottom. Bottom holes are drilled 30 in. above the floor and parallel to it, and top holes are started 12 in. down and are angled to the roof at the back of the cut. Bottom holes are shot with 1½ sticks of pellet powder each, and 2½ sticks are used in each of the top holes. Entries, which are driven 14 ft. wide, are shot with five holes, two in each rib and one in the center at the top. Entry-driving in room sections is done by the regular loading crew assigned to the respective sections, only main and cross entries being handled by the syndicate crews.

Cars are brought to the loading units in 9-car trips, which usually are placed in a room adjoining that in which the machine is working. The battery locomotive takes three cars at a time to the loader. These are filled one at a time, the loads being pulled in order and spotted on the entry until the entire trip is made up, whereupon it is taken to the slope bottom by one of the two haulage locomotives, which leaves another trip of empties. To reduce the distance traveled by the gathering locomotives, five-room units are operated wherever possible, the center room (see figure) serving as the haulageway, with branching tracks to the two rooms on each side. The cut-off track is laid through breakthroughs about half way up the rooms, and the original track in the two places on each side of the center place is removed.

All room entry and room track consists of 30-lb. rail laid on steel ties. Switches are laid with special steel frog and switch ties designed by company officials, the remainder of the switch ties being the type ordinarily used on straight track and curves. The use of steel ties in room entries has been found entirely satisfactory in view of the relatively short life of the track in these openings. Rooms are necked on an angle, as shown in the accompanying illustration, to allow a curve radius somewhat larger than otherwise would be possible, thus facilitating the movement of cars and equipment at maximum speed.

Cars are of the bottom-dumping type with an over-all height of 40 in. above the rail and, as loaded by the Joy machines, average slightly under 4 tons of coal. To date, the normal daily tonnage has been secured with a total of 62 cars, supplied by Sanford-Day. The main-line haul, however, has increased to an average of 2,500 ft., and this fact, together with a desire to raise the hourly rate of production through better service to the loaders, has dictated the purchase of twenty additional cars of approximately the same dimension and capacity from the American Car & Foundry Co. The increasing haul and better service also have motivated a decision to install a 10-ton trolley locomotive for main haulage, relegating the two present haulage units (8- and 6-ton cable-reel locomotives) to relay service between the working sections and the main parting.

The operating record at the Wick mine for June 6, 1934, a typical day, is summarized in the table on the preceding page. The four loading machines in rooms accounted for a total of 296 cars, the syndicate output bringing the day-shift total up to 342 cars in seven hours of machine operation. The grand total for the day, including the 36 cars loaded by the night syndicate in 7 hours, was 378 cars, or a total of 1,360 tons of raw coal, making the average daily output per man employed both inside and outside, including the supervisory force, 13.75 tons. Total time worked by the 99 men employed outside and inside was 716 man-hours. This total includes the extra time worked by part of the crew to complete transportation, dumping, preparation and railroad-car loading, as authorized by the bituminous code. The advent of the seven-hour day, it was found, reduced per-shift output, although not quite in the same proportion as the cut in working hours, and it is expected that the purchase of additional service equipment in conjunction with other measures will bring the production in seven hours up close to the former eight-hour level.



Standard Plan of Mining at the Wick Mine, Showing Entry and Room Tracks and the Method of Picking up Outside Rooms in a Five-Room Unit.

BRIQUETTING

+ Offers Solution to Fines Problem

But Product Must Be Good

By E. J. TOURNIER
Mechanical Engineer
New York City

WITH IMPROVEMENTS in equipment and a better understanding of binders, much of the earlier prejudice against briquets and briquetting has disappeared. In view of the increased realization possible, expansion of this method of converting low-price fines into higher-priced domestic fuel seems assured. That the coal industry is beginning to appreciate the advantages thus offered is evidenced by the construction of plants in the past five years by the New River & Pocahontas Consolidated Coal & Coke Co., Winding Gulf Collieries and Raleigh-Wyoming Mining Co., in West Virginia, and the Covington Coal Co. and Superior Smokeless Coal & Mining Co. in Oklahoma.

Successful merchandising of manufactured fuel depends both upon the quality of the product offered and upon its size. Shape is an important factor in market acceptance. Demand for something approximating the familiar sizes of coal particularly in the East, was the prime reason for developing the overstuffed pillow-, egg- and barrel-shaped briquets, with their convenient size and quick ignition. In the West, where the consumer generally favors large lump coal, block briquets find a ready sale.

A marketable briquet must be harder and less subject to breakage than the prepared, or lump, coal; in fact, all briquets should be able to withstand as much handling, with no more breakage, as the best quality prepared sizes of anthracite. A briquet also must be able to resist deterioration due to weathering, must not absorb more than 2 per cent of moisture after long exposure, and must not soften or crumble in the fire, even when stirred. The essentials of a satisfactory product are simple: (a) an easily accessible supply of raw fuel; (b) a properly designed plant; and (c) a binder made of known, inexpensive ingredients. Any coal mine should supply the first; lack of the second and third have been responsible for whatever ills have befallen the briquetting industry.

Briquetting consists essentially of mixing finely divided raw fuel with a binder, which causes the particles to adhere to each other, and then subjecting the mixture to pressure to produce a solid, homogeneous product. The raw fuel may be bituminous coal, lignite or anthracite. Clean dust and screenings are conveyed to a storage bin, from which they are passed to a dryer. Pulverizing is the next step, though this and subsequent heating is omitted in some processes. The pulverized fuel is then preheated for mixing, in proper proportion, with the heated binder. After thorough mixing, the fuel is formed into briquets in a special press, and after cooling is ready for shipment.

Fundamentally, there has been little change in the basic briquetting process, major revisions having been confined largely to equipment. Binder mixers have been modified by the addition of an outer shell to form a steam jacket, steam-heated fuel dryers have largely replaced direct-heat units, and roll presses have almost entirely superseded the earlier plunger presses. Adoption of roll presses has been due primarily to the fact that they offered a simple and economical method of satisfying the demand for small sizes of domestic fuel, together wtih a high productive capacity. Where block briquets are in demand, plunger and block presses generally are used. With the former, a mold is filled with the desired quantity of prepared material, which is compressed and ejected, usually as a cylindrical-shaped briquet. Multiple molds are employed in the block press, such as is used at the Covington plant (*Coal Age*, July, 1933, pp. 228-229), each mold being filled with material for one briquet. Heavy tamps then drop into the molds to compress the material into hard, dense blocks. A number of plunger presses, usually consisting of a revolving platen and multiple plungers, are designed to make more than one briquet at a stroke. The principal operating difficulty with this type is to fill all the molds with an equal weight of material, so that the pressure on all the briquets is equal. A method of forming briquets that has found much favor is the use of a press made of two rolls revolving in contact (Winding Gulf Collieries plant, *Coal Age*, January, 1932, pp. 15-16). The molds are cast and machined on the faces of the rolls to produce the size of briquet desired.

Present-day practice and equipment in the roll-press type of plant are illustrated in the accompanying figure. From track hopper *A*, raw coal is transported by chain-and-flight conveyor *A-1*, operating in a steel trough, to the double-strand perfect discharge elevator *A-2*. From the head of the elevator, a short chain-and-flight conveyor, *A-3*, transfers the coal to bin *B*, which may be built in any desired capacity and is fitted with regulating gates to control the flow of material to preheater feeder *C*—one of the most important elements in plant

Table I—Estimated Cost of Making Briquets*

Coal, per ton	$2.00
Binder (7 per cent of briquet), per ton	10.00
Labor, per hour	0.50
Power, per kilowatt-hour	0.01
Steam, per 1,000 lb	0.30

Plant Capacity, Tons Per Hour	Cost of Briquets Per Ton
5–10	$3.42
10–18	3.32
18–25	3.25
25–35	3.19
35–50	3.17

*Based on production in a roll press and exclusive of interest and depreciation. These costs, of course, will vary with unit prices of the various elements entering into them and with freight paid on binder.

Table II—Approximate Cost of Briquetting Plants

Capacity, Tons Per Hour	Equipment	Building*	Horsepower Required
3–4	$14,000	$3,000	50
5–7	30,000	14,000	75
10–15	58,000	16,000	150
20–25	84,000	20,000	250
30–40	120,000	26,000	325
50	145,000	30,000	425

*All buildings steel except the first.

operation because it controls the quantity of material delivered to the press equipment.

The drying and pulverizing equipment comprises a steam-heated dryer, *D;* a bucket elevator, *E;* and a pulverizer, *F*. Moisture up to 10 per cent is removed in the dryer—a steam-jacketed revolving steel cylinder fitted with internal spirally attached lifting blades to lift the coal and propel it through the machine. In its course through the dryer the coal alternately is lifted and dropped on the steam pipes carried by the dryer shell. A screw feeder operated by the dryer shaft supplies a regulated quantity of material. Dry coal passes to the perfect-discharge elevator *E,* which delivers it to the pulverizer — a swing-hammer machine of special design which reduces the coal to 14- or 16-mesh. Pulverized coal is discharged into preheater *G*.

Mixing takes place in two stages: preheating and material mixing. In the first step, fuel and binder are brought to equal temperatures; in the second, the materials are mixed in equal proportions. Equipment comprises two steam-jacketed materials mixers, *I* and *J;* two tempering mixers, *K* and *L,* without heating arrangements; a bucket elevator, *M;* binder daily storage tank, *U;* and binder heating tank, *V*. In addition, binder reserve storage tanks, *T* and *T-1,* are installed.

In briquetting, much depends upon the proportioning and mixing of the fuel and binder. The quantity of binder used may vary from 6 to 10 per cent by weight of the fuel, depending upon the physical condition of the coal and the thoroughness of the mixing. Like the mixers, *I* and *J,* the tempering mixers, *K* and *L,* consist of a casing containing a central shaft on which mixing blades are mounted. The shell, however, is not steam-jacketed, and the blades are designed only for cooling and beating the mixture to the right consistency for briquetting.

Briquet pressing and handling equipment includes a mixed-material elevator, *M;* briquet press; belt conveyor, *O;* reject belt conveyor, *Y;* and a cooling table, *Q*. After the briquet mixture has been thoroughly tempered, it passes to the double-strand elevator, *M,* fitted with buckets especially designed to discharge the sticky mixture properly into the press feeder.

The two-roll briquet press consists of two parallel shafts, each of which carries a pressing roll. The roll shafts are mounted in heavy bronze bearings, one of which is slidably mounted on the side frames of the press. This arrangement, in conjunction with a coil-spring adjustment, permits horizontal movement of one roll, this allowing for changes in pressure from 2,000 to 5,000 lb. per square inch.

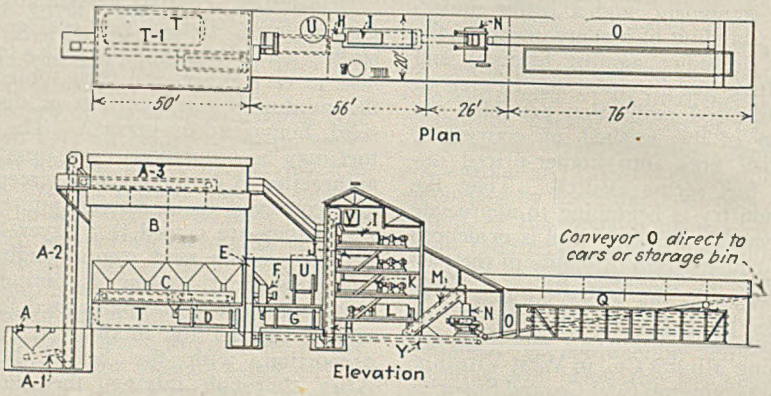
Below the press, the belt conveyor, *O,* receives the finished briquets and transfers them to the cooling table. Also below and to one side of the press is a belt conveyor, *Y,* which carries imperfect briquets to the elevator, *E,* for reprocessing. Briquets generally are cooled on a chain conveyor, constructed so that the chains are disposed in several superimposed loops, with pivoted plates between parallel chains. When the end of the loop is reached, the pivoted plates discharge the briquets onto the return strand of the same loop or the beginning of the next. Through this arrangement any desired cooling time may be obtained. The finished briquets are discharged into a storage tank by a belt conveyor, *O,* or, if local conditions permit, directly into the railroad car.

Nothing is more important in briquetting than the selection of the proper binder, for upon this depends the ash content, burning quality, hardness and weathering quality of the finished product. A good binder must be combustible and free from ash. Analysis of binders which have been used indicates that all contain one or more of the following basic ingredients: (1) minerals or cement; (2) coal tar, coal-tar pitch or lignite pitch; (3) flour, starch, oil compounds or sulphite pitch; (4) oil-residuum asphalt. Generally speaking, binders in the first group have not proved satisfactory, although the moderate cost and low ash content of sodium-silicate binders may make them of great value if briquets are waterproofed. The second group contains material formerly widely used and still employed at some Western plants. All coal tars and pitches have value as binders, although these binders are affected by the state of the carbon, many containing high percentages of fixed carbon, which has no binding qualities. A little smoke and fumes may be given off, but briquets made from these materials are weatherproof and stand well in the fire.

In the third group, binders made with oils containing coal tar pitch or other adhesive material can be used if they contain a sufficiently high percentage of the adhesive. Paste binders generally have been found unsatisfactory. Briquets made with a flour-oil binder, waterproofed with tar pitch or oil residuum asphalt burn well but require baking. Molasses with other ingredients makes an acceptable binder, but if used alone may generate offensive odors in storage. The use of sulphite pitch offers a good field for investigation.

Oil-residuum binders, however, form the most important group, and binders of this type are the most extensively used in present-day briquetting. The oil-residuum, a byproduct of oil refining formerly much used in asphalt products for road construction, is readily obtainable in all parts of the country at a reasonable price and generally is employed alone. Many refineries now make a prepared binder to dispose of an otherwise valueless byproduct. The quality of this binder is known and established, and a very desirable fact is the absence of any connection with secret formulas. Asphalt is now used in over 75 per cent of briquetting plants where other binders proved unsatisfactory. The binder is shipped in tank cars equipped with steam coils, which can be hooked up at the briquetting plant to allow the binder to be heated to a liquid state prior to pumping it to steam-heated storage tanks, from which it is piped to the mixing machines. Briquets made with an asphalt binder are of excellent quality, stand up well in the fire, resist weathering, withstand easily the ordinary shocks of handling and are practically smokeless and odorless without baking.

It is evident from the preceding that the binder is the only controversial element in briquetting. Mechanical and structural features are subject to engineering analysis, whereas the selection of a binder requires the evaluation of obscure factors often subject to manipulation. This has led to difficulties in the past because it has been assumed that briquetting is a chemical process. Such is not the case. There is sometimes need of a chemist to analyze the coal or binder, but there is no chemical action in the mixing of coal and binder. Consequently it is not the function of a briquet maker to develop a new binder, but to use it after it has been developed.



Typical Layout of Briquetting Plant Employing Roll Presses.

HOW APPALACHIAN COALS

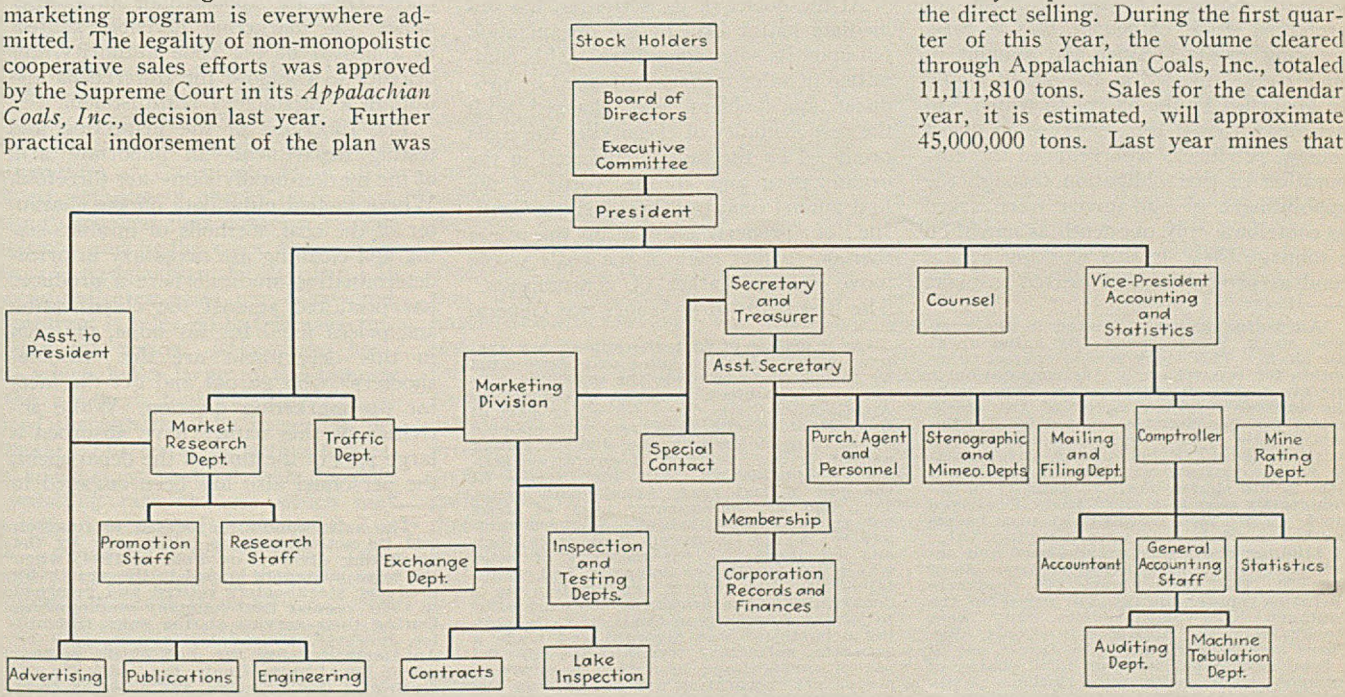
+ Works Today and Plans for the Future

WITH the reign of NRA as now constituted definitely limited by statute and its ultimate attitude on many fundamental questions of stabilization—notably price control—shadowed by uncertainty, industry at large is beginning to take keen stock of the future. In the bituminous coal-mining field, one major phase of this stock-taking is a renewed interest in district, or regional, selling agencies in areas where such group organizations do not now exist. Under the provisions of the bituminous code, despite the survival of interdistrict feuds, price control has been made effective throughout the industry; to many operators, establishment of district selling agencies seems the only insurance that may be taken out against a revival of cut-throat competition when the code in its present form becomes dead history.

The theoretical desirability of any system which promises to maintain sane and profitable order in what for years has been a disorganized and ruinous marketing program is everywhere admitted. The legality of non-monopolistic cooperative sales efforts was approved by the Supreme Court in its *Appalachian Coals, Inc.*, decision last year. Further practical indorsement of the plan was given by NRA in the bituminous code when regional sales agencies representing at least two-thirds of the commercial tonnage of a district were authorized to initiate code minimum prices for that district. Three such agencies are now functioning in the East, and producers in certain other areas are dusting off plans shelved months ago and are giving these proposals fresh consideration.

In the present study, therefore, both the desirability of the district sales agency plan in its basic conception and its legality are taken for granted. The exposition which follows will be concerned with the more prosaic, but extremely practical, questions of operation which must be worked out to make such an agency a success. Specifically, what is the internal organization, how does it function, what does it do and what services does it render to its stockholders? Although emphasis in current thinking centers largely around price-control mechanism after code support for such control has been withdrawn, the underlying theory of the district selling agency goes far beyond that function—important as it is. Moreover, the fact that, for the present, such control prevails broadly throughout the industry by virtue of the code makes inquiry into these collateral functions of the district selling agency still more pertinent.

Answers to these questions in the first instance will be sought in the organization and the experiences of Appalachian Coals, Inc., because it is the oldest and is the clearing house for the largest tonnage of any of the district sales groups now on an actual operating basis. Disregarding the lone sale and shipment in 1932 to furnish "the evidence" for the test suit then instituted by the federal government to determine whether the district selling agency plan was in conflict with the Sherman anti-trust law, Appalachian Coals, Inc., got under way as an operating organization on April 17, 1933. Between that date and the end of the year it sold 27,289,461 tons through the various sub-agents designated by its producer members to handle the direct selling. During the first quarter of this year, the volume cleared through Appalachian Coals, Inc., totaled 11,111,810 tons. Sales for the calendar year, it is estimated, will approximate 45,000,000 tons. Last year mines that



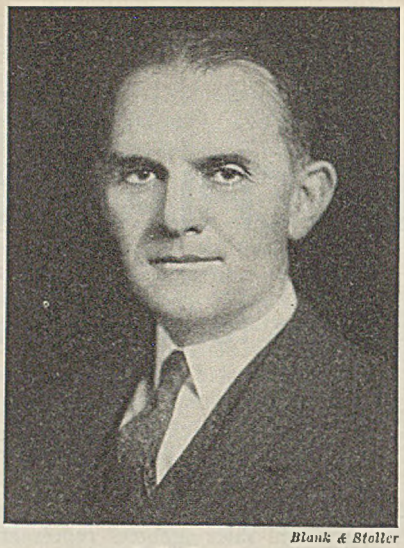
Staff Organization Chart, Appalachian Coals, Inc.

were stockholders in this agency shipped 73 per cent of the commercial output of the Southern high-volatile fields, or 1 per cent less than in 1932. Current data indicate that 1934 shipments will equal or exceed the 1933 percentage.

Although its Delaware charter puts no restrictions on the field or character of operations, as set up Appalachian Coals, Inc., confines itself to the Kanawha, Logan, Williamson, Big Sandy-Elkhorn, Harlan, Hazard, southwestern Virginia and southern Appalachian districts of West Virginia, Kentucky, Virginia and Tennessee. Under the corporation bylaws, stockholders in each of these eight fields constitute separate stockholder groups. Each group is entitled to designate a list of nominees for directors for the purpose of providing two directors from each of the eight fields. In addition, the present board also includes nine directors-at-large. In this way, adequate representation for each district by men intimately familiar with the problems of that district is assured.

Control of the corporation itself was further safeguarded by the basis fixed for stock allotments. Under the plan adopted, each producer participating was entitled to one share of common stock and, in addition thereto, one share for each 100,000 tons or major fraction thereof in excess of 100,000 tons produced by him in 1931. Where the producer covenanted not to appoint any sub-agents, he was also privileged to buy one share of preferred stock for each 66⅔ tons or major fraction thereof of his average monthly production in 1931; where the producer appointed a sub-agent, the basis of preferred stock subscriptions was one share for each 666⅔ tons or major fraction.[1] The primary purpose of the utterance of preferred stock, of course, was to raise working capital. Since the amount of such capital needed at the outset would be governed by the extent to which Appalachian Coals, Inc., engaged in direct selling, producers who relieved the corporation of that obligation through the appointment of sub-agents were asked to contribute only one-tenth as much, on a tonnage basis, to this working capital fund as producers who elected to make

[1]All voting power is vested in the common stock, which has a par value of $1 per share. This stock is sold subject to an option for repurchase by the corporation in the event that the corporation ceases to be the exclusive selling agent of the stockholder for the districts covered by Appalachian Coals, Inc., if the stockholder ceases to produce coal, if he violates any present or future contract with the agency, or if title to his shares shall voluntarily or involuntarily pass to a third party. Preferred stock (7 per cent cumulative) may be redeemed in whole or in part at its face value of $100 per share plus accumulated and unpaid dividends on any dividend date. As of Dec. 31, 1933, there were 146 producers operating approximately 250 mines in the Southern high-volatile fields who were stockholders in Appalachian Coals, Inc. These stockholders held 500 shares out of a total authorized issue of 1,000 shares of common stock, with subscriptions partly paid for 5,911½ shares out of an authorized issue of 9,000 shares of preferred stock.



Blank & Stoller

J. D. Francis
First President Appalachian Coals, Inc.

the corporation directly responsible for the selling job.[2]

The present internal organization of Appalachian Coals, Inc., reflects an evolutionary growth which is still continuing. Starting with 47 employees on its first payroll, including a number temporarily furloughed to the agency by producer stockholders, the personnel had grown to 121 by July 12, 1934, and further additions were contemplated. By far the greatest number of this force —56 employees—were in the accounting and tabulating departments; the executive division, including officials and clerical assistants, accounted for 10; the marketing division for 12; sales promotion, 6; traffic department, 5; inspection and testing department, 6; minerating department, 3; general stenographic and clerical, 23 employees.

At the outset of its activities, the immediate major load of the organization fell upon its sales committee. This committee of sales managers, loaned by producer stockholders, was charged with the responsibility of classifying the coals produced by the mines embraced in the organization and, in the words of the first annual report of Appalachian Coals, Inc., of "properly correlating the prices thereon so that each of the coals would move in the market of consumption." The first fruits of its labors was General

[2]As a matter of fact, the sub-agency system, under which a sub-agent designated by the producer is made the exclusive selling agent (subject, however, to control by Appalachian Coals, Inc.) for all or part of the output of the producer, was adopted by all stockholders in the district selling agency to the exclusion of any direct selling by Appalachian Coals, Inc., itself. At the end of last year, Appalachian Coals, Inc., had 130 sub-agents; most of these sub-agents represented one or more companies; a few producers had more than one sub-agent. In the majority of cases where the producing company had maintained its own selling organization as a department of the producing company prior to joining Appalachian Coals, Inc., the selling department was divorced and made a separate subsidiary organization of the parent corporation; in a few cases where a separate corporation was not created, the producer designated one of its officers or employees as sub-agent.

Price Circular No. 1, which became effective April 17, 1933. This circular carried over 3,500 specific prices, many of which applied to several mines.

Neither the sales committee nor its successor—the marketing division—attempted to use chemical and related analyses as the basis for the classification work. Instead, they applied the more pragmatic test of the ability of individual mines to market successfully on specific competitive price levels as developed by actual experience over a period of years. The test of experience also was controlling in making adjustments in comparative levels subsequent to the promulgation of the first price list. Wise in the ways of persuasive salesmen who are certain that they could have that fat order "in the bag" if they were permitted to shade the price a nickel or two to meet competition, the marketing division clings to the precept of Mr. Smith: "let us look at the record."

With the adoption of the bituminous code, the responsibilities of the marketing division have been increased. This division and its predecessor sales committee[3] were called upon to set up price schedules for Southern subdivision No. 2 of Division I, which, of course, includes the 25 to 27 per cent of the commercial tonnage of that area not members of Appalachian Coals, Inc. As a result, the marketing division has been called upon to justify its work to the Presidential member of the code authority when complaint has been made against prices by operators in the division who are not stockholders in Appalachian Coals, Inc., and also to handle complaints with the code authority where an Appalachian stockholder protests that code minimum prices unduly favor non-stockholder mines. Where the complaint involves only competing Appalachian stockholder mines, the marketing division, subject to approval of the code authority, endeavors to compose the differences and initiate a satisfactory readjustment.

The functions of the inspection and testing department—an important arm of the marketing division—are threefold. Where factual mine data on the character of the coal, methods of mining, sizing and cleaning are necessary in price-determination studies where a producer has protested against the classification and prices fixed for his mine, the men in this department are the "trouble-shooters" who go out and get the facts for the marketing division. While activities of this nature have absorbed a large part of the time of the department, the personnel also has been engaged in

[3]The sales committee ceased to function and its activities were taken over by the marketing division on Feb. 1, 1934, when the sales managers loaned to the agency by producer stockholders retired and returned to their regular coal-company employment. During their service on the sales committee, however, their salaries were paid by Appalachian Coals, Inc. All of the personnel of Appalachian Coals, Inc., with the exception of the directors, are divorced from all personal connection with any producing company.

gathering data of the same character where no question of classification is immediately in issue. In this way, the marketing division gradually is building up an accumulation of facts with respect to the physical characteristics and operating methods of all the mines that are stockholders in Appalachian Coals, Inc. The third major function of the department is to advise stockholder mines how they may improve their operating methods—particularly on the preparation side. Work along this line and in gathering basic data for the marketing division will be expanded as personnel is increased and the pressure for inspection involving specific complaints diminishes.

When the district selling plan was first under discussion, one of the attractive possibilities suggested was that such an agency could help materially in preventing dumping by transferring orders for sizes upon which a particular producer was short or loaded up to a mine that was long on those sizes at that particular time. In Appalachian Coals, Inc., this work is handled through the exchange department. The exchange, of course, involves securing the consent of the buyer to the substitution of coal from one mine for shipment from another mine and, in some cases, an adjustment in price, which, under the present setup, must be approved by the code authority. Since time is the essence of success in these changes, opportunities to effect exchanges where questions of price intrude are limited. During the four months preceding the effective date of the code, the exchange department was able to move 2,088 cars of coal which might otherwise have cluttered up mine sidings or have been dumped on the market at demoralizing subcellar bargain-counter prices. During the eight months ended May 31, 1934, the department cleared 5,760 cars.

Copies of all contracts made by subagents must be filed with Appalachian headquarters at Cincinnati, Ohio. The contract department checks these documents to see that they conform to code provisions and to the rules and regulations of Appalachian Coals, Inc. In case any discrepancies are discovered, the contract is referred to the marketing division for action. Lake-cargo business, which bulks large in the tonnage of the Southern high-volatile fields, is policed through the lake inspection department. The traffic department, a recent addition, is charged with the duty of watching rate changes which may affect the interests of stockholders and with compiling distribution data. Monthly reports covering the movement of bituminous coal from all fields east of the Mississippi River except Alabama and Michigan to the principal markets north and west of the Ohio River will be a regular feature of this service. The first report, issued June 14, gave comparative tonnages and percentages for the first quarters of 1932-1934.

Harris & Ewing

C. B. Huntress
Elected President ACI, May, 1934

The market research department, still very much in its infancy, is planning a detailed study of movement of coal into the States which now furnish the Southern high-volatile fields with their chief outlets. This study, which only a few of the largest producers could afford to make, will cover individual industrial consumers and retail distributors, their sources of supply, how they buy and when, the tonnage, grade of coal and sizes. Where a consumer or retailer is not purchasing any coal from producer stockholders of Appalachian Coals, Inc., the detailed information on the consumer and his requirements will be made available to all sub-agents.

Through the development of data by this department and other sections of the organization, Appalachian Coals, Inc., expects to be able to provide its stockholders with current sales information which will show the percentage participation of the ACI group in total sales, consumption of fuel and trends indicating movements away from and toward ACI coals. In this way, in the absence of direct selling by the corporation itself, Appalachian Coals, Inc., hopes to be able to make a real contribution to the furtherance of the markets for the Southern high-volatile fields. Contacts with retail distributors are maintained through the field force of the promotion staff of the market research department while the research staff gathers market data. Owing to the fact that the department is still in its early organization stages and that men who will fit into this particular class of work are not easy to find, at present there is considerable "doubling in brass."

In a larger sense, however, this close interrelationship of departmental sections, dictated by necessity while the department is being built up, has been continued by choice as the organization has expanded. As personnel grows and departments multiply, it is inevitable that the lines of division will become more sharply defined. But, as the organization chart on page 311 shows, there is still a close tie-in between related groups. In other words, although Appalachian Coals, Inc., is becoming more and more highly departmentalized, departments and divisions do not operate in insulated compartments.

General publicity activities and fuel engineering are only just getting under way, so that their record must be written in terms of planning for the future. During the last calendar year, expenditures by the corporation for advertising and public relations work, including salaries and traveling expenses allocated to that account, totaled less than $13,250. No public forecasts on expenditures for the current year have been made, but the increase undoubtedly will be substantial because of projects already approved.

Last month, for example, the organization started the publication of the "ACI Letter," a mimeographed bulletin to be issued at irregular but frequent intervals for circulation among stockholders and sub-agents. The announced purpose is to keep these groups "posted on the highlights of the activities of ACI and those of the code which particularly concern" the Southern high-volatile fields. This month the corporation plans to launch a monthly house organ for distribution to the same groups and to retail coal merchants handling ACI coals. No advertising, it is stated, will be carried in this publication, which was yet unnamed at the time this story was written.

Announcement also was made last month of the appointment of the first member of the fuel engineering staff. As at present outlined, the engineering staff will have two main functions. It will be prepared to give advice and assistance to producer stockholders and their sub-agents in meeting combustion problems arising in the sales of specific industrial tonnages. As its second main function the engineering staff will give specific attention to ways and means for combating the inroads of hydro-electric power, which is an important competitive factor in many of the States burning Southern high-volatile coals, and to fuel oil and natural gas.

Except for a few announcements in the coal trade press and allied media, Appalachian Coals, Inc., has engaged in no advertising campaign. The value of such promotional effort is freely recognized by the organization, but no decision as to the extent of such a campaign, the media to be used and the character of the campaign has been reached.

[Under present operating conditions, the heart of the control system of Appalachian Coals, Inc., lies in its statistical organization. This organization will be described in the second article of this series, to be published next month.]

CRUSHING RESULTS

+ In Bituminous Coal Preparation

Reflect Attention to Details

(Why crushing is coming more into the picture in bituminous preparation was one of the major subjects of the first article in this series, which appeared in the July Coal Age, pp. 269-271. That article also discussed the characteristics of various types of crushers, set up certain general specifications for crusher selection and made the point that capacity should be ample to take care of future expansion.)

PURCHASERS' requirements and cost usually determine whether chilled iron, cast steel or alloy steel shall be used for roll segments and solid rolls in both single- and multiple-roll crushers. Chilled iron should never be used for these purposes where much tramp iron or pyrites is present in the coal, for iron is much more subject to fracture than alloy steel. Single-roll crushers should be provided not only with a renewable shoe, the part most subject to wear, but also with breaker plates of alloy steel. The first cost may be higher, but the ultimate cost will be less, because the breaker plate will not have to be replaced during the life of the crusher. Use of alloy-steel breaker plates is a good rule to follow, no matter what type of metal has been chosen for the rolls. A further precaution is to have the sides of single-roll crushers lined with plates highly resistant to abrasion. Similar care should be taken in specifying hammer and ring mills to assure that the parts subject to heavy abrasive action will be protected by highly resistant metals, notably the hammers, rings, grinding plates and grate bars.

Wide observation has disclosed that the crushing teeth on rolls often are kept in service long after they have worn down to a point where they can no longer produce uniform sizes. This results not only in oversize but in increased power consumption. As cast teeth, the type most generally employed in bituminous crushing, wear much faster than the inserted forged teeth commonly used in the anthracite field, the former should be carefully watched and more frequently replaced if the crusher is constantly used at capacity or the coal is hard. Under these conditions, it would be better to use inserted teeth in turned rolls, though only one manufacturer makes this recommendation to the bituminous industry.

Present practice is defended with the argument that no operating economy results from the use of inserted teeth. There are instances, of course, where cast teeth clearly are indicated, as in the case of rolls in part-time service and particularly where the rolls are equipped with many teeth for size reduction to, say, 1¼ in. or less. In this case, the cost of inserted teeth might be twice that of cast teeth. Obviously, the fewer the teeth on a roll, the less is the difference in cost between these two tooth types.

Incidentally, quite satisfactory results have been obtained by the use of corrugated rolls in a double-roll machine to reduce small sizes to still smaller dimensions. A specific example is the crushing of machine cuttings preparatory to treatment on air tables where the cuttings have been loaded out separately. Where elaborate cleaning facilities are not available and the cutting horizon in the coal seam contains hard impurities, rotary breakers with small screen openings have been used to clean the cuttings.

No theory covering the design and spacing of roll teeth has received general acceptance; these details have been a matter of individual judgment, so that, today, every manufacturer has his own standards. Too frequently, these standards have been fixed without any great regard for the character of coal treated. Tooth spacing and its relation to roll adjustment is a problem in itself deserving close study. Patently, from the standpoint of undersize and oversize, a certain spacing will give best results when the rolls are set to yield one definite size—the setting of greatest sizing efficiency lying, say, midway between the extremes of adjustment. The farther away in either direction the setting is from this point, the lower will be the crushing efficiency with respect to size. Consequently, in considering the purchase of a crusher which will be adjusted for the making of a number of sizes, it is well to look for a tooth spacing which will give the highest efficiency when the rolls are adjusted to the size likely to be in greatest demand.

For machines assigned to the crushing of hard-structure coal, particularly where large reductions are made, rigid gear specifications, covering both design and materials, are advisable, not only because of the magnitude of the load but because of the possibility of shocks through variations in the load, which may crystallize the steel. In crushing the softer coals, however, the strain on the gears will not be exceptional.

In centrifugal-type machines, impact of the hammers and rings on the coal varies according to the work at hand, for which reason high synchronous speeds may be employed. In turn, this regulation of speed allows the use of a flexible coupling in the drive, with motor or crusher mounted on a common bedplate if desired, providing the usual advantages identified with a drive of this type. Where, because of limitations in machine layout or other reasons, a flexible coupling is not applied, choice lies among V-belt, plain belt and silent chain.

Pulley and V-belts or plain belts are customarily used for the driving of roll crushers, except where space limitations necessitate the use of gears. Inquiry has shown a decided preference for V-belts for the driving of crushers. In accord with general practice, belts should be connected as nearly horizontal as possible, and the lower strand of the belt should be the pulling side.

To decrease maintenance trouble, all crushers, regardless of type, should be given a solid foundation. Undue vibration and sway directly affect the functioning of the drive, disturb the sur-

rounding structure and lower the over-all efficiency of the installation. For crushers installed at ground level, concrete piers afford the best foundation. But if the crusher is placed on an upper story, the use of steel or timber sills will, in general, be inevitable. Wood furnishes a desirable cushioning effect. Rarely can the crusher mooring be isolated from contiguous structures, but in the installation of large units this arrangement is preferable, if it can be arranged, particularly in the case of old, weakened structures. In modern, properly designed plants, such precautions are not necessary, unless convenient.

Installation of a crusher in an existing preparation plant in which no provision for such addition was made in the original design sometimes presents a difficult problem but one not impossible of solution, as crushers can be fitted to a wide variety of conditions. One manufacturer, for example, offers a recently patented suspension which avoids the conventional "setting." The crusher frame is built up and flanges are added at the top. These flanges rest on beams, thus carrying out the suspension idea. Advantages claimed include: decreased headroom, fewer alterations, greater flexibility in installation and reduced cost, in some cases half the usual figure.

Interruptions in the normal flow of coal through a preparation plant, merely for the accommodation of a clumsy placement of a crusher, should be assiduously avoided. This fault is encountered most frequently in a revamped plant, and usually can be avoided if provision is made for future crusher installations when designing the plant.

Crushers should not be placed at the end of a railroad-car loading boom, for when thus located subsequent preparation usually is complicated and difficult. Where large coal is to be broken down and great flexibility in subsequent treatment is desired, no better position can be found for crushing equipment than at the head of the main screens.

Although many crushers are designed to be chokeproof, best all-around results are obtained with some type of mechanical feeder (reciprocating, plate or conveyor). This applies to roll and rotary units, and especially to swing-hammer and ring crushers, where uniformity of feed is absolutely essential. By and large, control of the rate of feed is conducive to better crusher performance, and is advisable, not only for the correct functioning of the crusher but also because it provides a regular flow of coal from the crusher to subsidiary equipment, such as bucket elevators, conveyors, screens or tables.

Frequently, the discharge chute from a crusher is made too small to handle the output of the unit. It is good practice to provide a chute of section equal to the entire discharge opening of the crusher. With slopes much less than 50 deg., fine coal tends to adhere to the chute.

Choice between the two motor types generally applicable to the driving of crushers, namely, the squirrel-cage and the wound-rotor, largely is a matter of economics. Of the two, the squirrel-cage motor is by far the more popular, not only because this type costs less and provides a simpler and sturdier installation, but also because crusher equipment generally has been built strong enough to withstand the strains imposed upon it by a squirrel-cage motor. This sturdiness has allowed the squirrel-cage unit to win broad preference over the once more popular wound-rotor motor, despite the more desirable operating characteristics of the latter.

When coal is fed to a crusher mechanically, starting torque usually is not excessive, provided the crusher is not left filled with coal as a result of power failure, breakdown or other interruption. Prior to the introduction of the new high-torque squirrel-cage motor, these occurrences made overmotoring essential and resulted in low efficiency and poor power factor. Properly chosen for continuous rating, the new high-torque squirrel-cage motor will provide sufficient starting torque without overmotoring. A motor should provide ample overload capacity if it is rated on an ambient temperature of 40 deg. C.; usually the peak temperature reached is less than this, but, even if not, the motor will operate at 50 to 55 deg. without damage.

The usual load increase with roll crushers growing out of tooth wear is no reason for favoring any marked degree of overmotoring, for simultaneously with this wear, the capacity of the crusher is reduced. Considering these two changes together, the most logical solution is to choose a crusher with a capacity somewhat in excess of requirements and select a motor of correspondingly greater horsepower. If there is any doubt as to the ability of a crusher in hard service to stand the strains imposed by inordinately high starting torques, selection of a wound-rotor motor is indicated. Easy, gradual starting compensates for the higher first cost of this motor by offering greater insurance against breakdown and high maintenance cost.

In general, the application of totally inclosed motors to crushers, especially the larger sizes, has been considered prohibitive from an economic viewpoint, though these motors undoubtedly would have a longer and less troublesome life than the open type. However, there is a growing tendency to favor the use of the smaller totally inclosed motors, particularly the fan-cooled type, which have a cost more in line with allowable expenditure. The larger units are prohibitively expensive because, with increases in motor size beyond a certain point, the cost of total inclosure mounts rapidly.

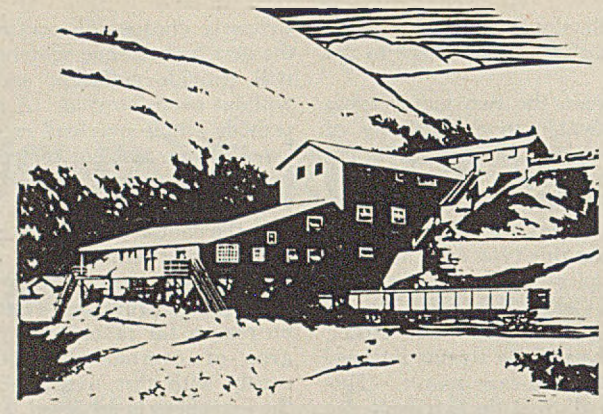
Wound-rotor motors can be partially protected by totally inclosing the slip rings to prevent current leakage from one ring to the other, an action which takes place in the presence of grease or coal dust. Dry dust has no harmful effect on modern insulation in open motors, but if allowed to collect and pack into the windings, it will restrict ventilation and cause overheating, and therefore should be blown out with air at intervals.

The fact that crushers rarely require constant attendance, coupled with the desirability of a uniform feed and uniform removal of the crusher product, makes their inclusion in the interlock system desirable. In the modern preparation plant, where attendance is reduced to a minimum, correct sequence in starting and the prevention of piling up in case of breakdown is indispensable.

Bituminous mines, with some exceptions, have not made a regular, or even sporadic, practice of conducting screen tests and charting results as a guide to crusher adjustments and as a measure

Highlights in Crusher Selection and Operation

1. Size yield should be the prime consideration in choosing a crusher, because uniformity of sizing, with minimum undersize and oversize, is essential to stoker-coal quality.
2. Screening before and after is the last word in preparation practice based on crushing. Screening and mixing according to formula should be the ultimate objective.
3. An adjustable crusher cannot be expected to give equally satisfactory percentages of undersize and oversize at all settings.
4. Crusher capacity should be greater than present requirements unless there is reasonable assurance that future demands will not exceed design capacity.
5. Crusher parts subject to heavy strain or abrasion should be made of cast steel.
6. Dull roll teeth increase power consumption, reduce capacity and depreciate size quality.
7. Tooth spacing is important in crusher selection.
8. V-belts are the preferred drive in crushing service.
9. Location of a crusher at the end of a loading boom generally is a makeshift arrangement precluding subsequent preparation of the crushed product.
10. Mechanical feeders increase crusher efficiency.
11. Interlock control of crusher equipment is desirable in modern plants.
12. Maximum crushing results are impossible without regular tests and analysis of results.
13. Specific standards should be established for comparing and indicating results from various types of crushers.



of size-producing efficiency. That this phase of crushing supervision is invaluable may be judged by the thoroughness with which many anthracite and public-utility operating managements make these studies. The latter interests have learned how vitally combustion results are related to the control of sizing, and the former recognize the value of such control in affording maximum price realization. Bituminous operations cannot afford to ignore these examples.

Both manufacturer and operator should cooperate in a more orderly approach to crushing problems. Among the things on which manufacturers should come to some agreement, most urgent perhaps is the setting up of some basis for comparing or indicating results from various types and makes of crushers. Their tabulations of capacity and power requirements should be based on results obtained in the crushing of coal from definite seams. Engineers should not be satisfied with statements which vaguely define the coal crushed as hard, soft or medium-hard. Definite standards also should be established for specifying the size yield in the crushed product. At present, there is no semblance of uniformity; some manufacturers base screen yield on square openings; others, on round; still others, on ring measurement; and the remainder specify no basis.

That, in ore dressing, certain relations have been found to exist between roll diameter and roll speed and size characteristics of the crushed product gives reason to believe that similar relations might be derivable from roll performance in bituminous crushing, even as they are derivable from roll performance on anthracite. Price considerations sometimes have led to the use of crusher rolls of the smallest diameter that will grip the coal in order to meet competition. Obviously, the smaller the roll diameter, the less the manufacturing cost; the smaller the roll diameter, the greater the roll speed for a given capacity and therefore the faster the wear on roll teeth. Finally, speed has its direct effects on yield size.

This problem is but one among many upon which the future progress of bituminous crushing technique depends. The present is none too early to tackle their solution in preparation for the new day in small-size utilization. And, inasmuch as the operator has the biggest stake in derivable benefits, he cannot sit back, with finger tips joined, and wait for others to undertake such much-needed research.

Anthracite Strippings Exemplify New Technique As Practiced in Southern Fields

(Concluded from page 301)

upward and not when it is being filled from a level, and because when the rock is broken down into the stripping it falls on the track and covers it. Both the shovels are working double shift.

While the trips are away, the shovel is kept busy preparing the rock for loading. When filling cars some time is lost in arranging the load on the cars, so that heavy rock masses will not overbalance the load and will fill the cars adequately. The bucket gives the rock a jab here and a jab there so that it will fall into its appropriate place. The coal is taken up to a railroad track in an adjacent stripping, where it is loaded into railroad cars and brought back to the Dodson breaker for cleaning. The seam was covered at the crop by 6 to 30 ft. of clayey material under which was about 3 ft. of bloom, or blossom, coal of no value.

In the center of the pit is an area of coal where about 40 per cent of the bed has been removed. Rock has caved into the breasts, crevicing the overburden considerably. The rock over the pillars looks as if it could be shoveled without shooting, but experience shows that such material is difficult to handle and less desirable than solid rock to shoot, for the crevices prevent the shots from doing their work. It will be stripped when its time comes. This coal was mined by underground methods because at that time it was believed that so deep a hole could not be stripped with profit.

This stripping adjoins on the west another known as Job 65, and between the two has been built a big flume to carry surface and ground water from the north brink to the south. In Job 65, the coal has been uncovered along both the north and south sides by dragline excavators, and the rock deposited over the coal basin. To obtain the coal from the center of the syncline a slope with a rude headframe was constructed through the rock, the coal being brought out with a steel skip, but this work has been discontinued. This entire basin may later be stripped, as in the Shaft Pillar stripping, in which case the piles of rock will have to be rehandled. Both these strippings are on the property operated by the Mill Creek Coal Co., a subsidiary of Madeira, Hill & Co.

Near Morea is a small salvage stripping known as the New Boston operation. It lies in the same basin and uncovers the Mammoth bed, which is here quite shallow, but the coal is 55 ft. thick. Just how far it will continue is not clear. It is obviously spooning out toward the east, but it may go down again in that direction and afford further opportunity for operation. This basin is only 150 ft. wide but the coal is covered at the crop by only 8 ft. of cover. It is being removed by a 1¼-cu.yd. Lorain gasoline shovel and by a 2-cu.yd. Marion steam dragline excavator, the rock and coal being removed from both by 5-ton A. C. Mack trucks, the coal going to a chute breast in the mines, where it drops into mine cars and is hauled underground and elevated to the Morea breaker.

Another stripping, known as the Whippoorwill, and named from the Whippoorwill breaker, now removed, lies not far from Frackville and to the west of the other three, but in the same Morea basin. The Mammoth is believed to be thinning and certainly is lifting itself out of the terrain. As to its extent, not much is known except at the western end, where the basin appears to be about 80 ft. deep in its central portion. Indications are that at the eastern end of the property, the coal, hard and brittle, as if buried under hundreds of feet of cover, is not over 6 or 8 ft. below the surface, part of the cover being fine coal from the old Whippoorwill Colliery and the rest the sandy clay with which Broad Mountain is covered.

A Harnischfeger electric dragline excavator with a 110-ft. aluminum boom is being used for casting purposes. This boom carries a 3½-cu.yd. scraper bucket. It is said the aluminum boom is 80 per cent as strong as if of steel and is only 40 per cent as heavy. It is more heavily reinforced than the ordinary steel boom.

MINE FOREMAN

+ Faces Added Responsibilities

Under NRA Régime

By DR. J. J. RUTLEDGE

Chief Mine Engineer, Maryland Bureau of Mines

FEW, if any, salaried employees of corporations must shoulder the heavy load of responsibility placed on the foreman of the average large bituminous mine. His burdens, never light, have been greatly increased in recent months by codes and working agreements. Although, for the most part, he has had no voice in the formulation of these documents, nevertheless the mine foreman is faced with the job of making the new rules of the game work in so far as they apply to mine labor.

Many of the terms of the joint working agreements are somewhat vague, yet it is up to the harassed mine foreman to interpret and enforce the provisions of the contract—one foreman against scores of mine employees. In recently unionized areas, the foreman is called upon to deal with many workers who have no background of labor organization experience and who are undisciplined and unfamiliar with the methods of enforcing joint working agreements. Almost always the newcomer into the labor organization is young and aggressive and his mind is filled with the ideas of license rather than liberty. He takes advantage of the liberty afforded him through his membership in the labor organization and advances outrageous, unheard of and impractical suggestions. When these are not favorably received by the more conservative members of his local, he is likely to become unmanageable.

Joint agreements should be made to cover all possible items of mine labor and provisions should be set up for covering emergencies as they arise. A printed copy of the agreement, attested by representatives of both operators and miners, should be in the possession of the mine foreman and his assistants at all times. All mine foremen and assistant mine foremen should make themselves thoroughly familiar with every detail of the agreement in order that they may avoid non-compliance with its terms. Workers experienced in labor organizations will respect the joint agreement and will not want or ask for anything that is not contained in the contract.

Much of the friction between mine foremen, superintendents and the mine employees would be avoided if both parties to the agreement gave undeviating adherence to its terms. In many instances, however, crafty mine foremen have endeavored to sidestep compliance with some provision in order to reduce their costs of production. Then, when some member of the organization discovers the evasion and brings it to the attention of the mine committee and other members of his local union, resentment naturally is created and attempts at reprisals are sure to follow.

The mine foreman of today should never lose control of discipline for a single moment. Experienced labor men realize that discipline is necessary, practice it in their own organization and respect it in the mine in which they are employed. This is particularly true of the older and more experienced miners.

One of the earliest recollections of the writer is the sight of an old Scottish miner—one of the first in America to head a coal-mine labor union—standing at the mouth of a small gin-pit on a cold day, a shawl about his shoulders, suggesting in a quiet voice that the impulsive young miner whom he was addressing should leave the mine where he had been employed and obtain work in another and distant coal field. The old Scotsman said that, in his opinion, this was the best way to bring to an end a bitter local strike. The young man finally conceded the wisdom of the old man's logic and immediately left the region; the miners returned to work and all was peace once more. The old Scotsman had come to realize that settlement of the strike was impossible while the young firebrand was in the neighborhood and, therefore, used his discipline on him in order to get men with families back to work again.

As Abraham Lincoln remarked when aroused from sleep in the old sleeping car—ancestor of the modern Pullman—by a newcomer who claimed to have paid for the accommodations which Mr. Lincoln was enjoying: "A contract's a contract, and I paid for this bed." Likewise, a working agreement is a contract, and the mine foreman should see to it that the rights of his company are maintained as well as those of the mine employees. Only by such a course can the foreman maintain his own self-respect, fulfill his duty to the company which employs him and retain the respect of the mine employees under him.

"In a Tough Spot"

While top management has been struggling with the drafting of codes and wage contracts, little conscious thought has been given to the additional burdens these new arrangements under NIRA have loaded upon the mine supervisory force. "No wonder," exclaims Dr. Rutledge, "mine foremen and mine superintendents are tempted to strong drink!"

Whether the reader is in accord with all the statements made, there is no question that the author does a real service in spotlighting a neglected phase of the situation by emphasizing the foreman's position and responsibilities under the new deal. His plea for strict observance of every provision of the working agreement and for contracts that definitely cover every operating contingency is a plea for the promotion of harmonious industrial relations on a sound basis.

NOTES

. . . from Across the Sea

TESTS on the strength of packwalls have been made by L. J. Barraclough, Prof. S. M. Dixon and M. A. Hogan the results of which were reported at a meeting of the South Wales Institute of Engineers held in Cardiff recently. These tests were made to study resistance of packwalls similar to those used underground. The walls were built in the 400-ton testing machine at the Imperial College of Science and Technology, London, England, and, except the first of these, which was 5 ft. square and built to give some indication of the loads likely to be encountered, the packwalls were 12 ft. 6 in. long, 5 ft.

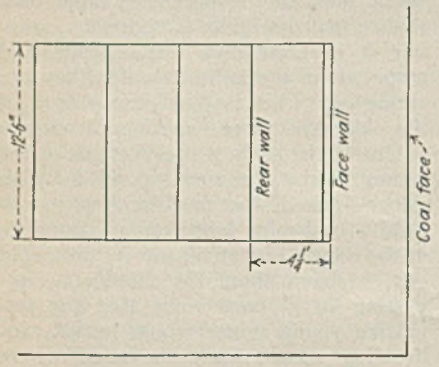


Fig. 1—Arrangement of Packwalls at Working Face.

wide and 5 ft. high. In the machine a "roof" of steel plate was set 5 ft. above the floor, which consisted of a reinforced-concrete slab. On this slab the pack was built and rammed tight to the roof.

The packwalls were built of two kinds of hard blue roof shale from Bedwas Colliery, in Wales. One kind of shale, *A*, was a fairly homogeneous sand shale with an average specific gravity of 2.685. When made in a 4-in. cube, with a power hacksaw and a Carborundum wheel working dry, the average crushing strength of the shale was 4,700 lb. per square inch, or 338.4 tons per square foot. The other shale, *B*, contained more clay, though it had streaks of sand, as well as some coaly matter. Its specific gravity was 2.72. A 4-in. cube, prepared in the same manner as the other, crushed at an average of 4,250 lb. per square inch, or 306 tons per square foot. Unless otherwise stated, the interior of each pack was filled with small material and finished by ramming, and the walls were tightened by hammering rock of suitable size into the pack, but, although all care was taken to build solid packs, each proved to have 40 per cent of voids.

The results were as in Table I. To understand the description, certain facts must be borne in mind. The packwalls represented are built in the mines in 5-ft. sections, 12 ft. 6 in. wide, so the wall nearest the working face is termed the face wall, as marked in the top of the illustration.

Pack 2 resembled a section of packwall, except that it was not part of any system of packwalling and so did not have any end support, such as these sections invariably have in a longwall working. It was built beginning at the west end and proceeding toward the east, making it difficult to lay the rock satisfactorily at the latter end.

Pack 3 had its ends completed first and the center of its face walls last; also it had two interior walls at about 4-ft. centers, tying the structure together in the middle; furthermore, it was strengthened by steel and timber against bulging at the rear, where it would be normally protected by the preceding pack. Note that with these provisions the pack stood almost four times as much pressure as Pack 2.

Apparently the skill of the miner was of value in building Pack 3, for the board's mechanics who built Pack 4 were successful in obtaining a pack only 84 per cent as strong. Pack 5 was built of the weaker stone, *B*, and that fact is reflected in its lower strength. Pack 6 was built of the same material, but fine river sand was used between the beds of stones, each stone being bedded, however, to have contact with the stone on which it rested. The result, however, was not good. The pack shrank more under compression and had less strength, despite these provisions, though otherwise built in a similar manner. The stone seemed to float around under pressure.

Pack 7 *A* was built, as J. S. Carson had recommended, with the walls carried within 2 in. of the roof, but with the interior filling rammed up tightly to it. Mr. Carson had stated that the fine material would take the load before the walls and would, therefore, not push them out into the roadway and into the goaf and that the initial resistance of the pack would not be impaired. However, the results were not good. The pack compressed more rapidly than Pack 6 in the early stages, which is not desirable, and its ultimate strength was less.

Apparently therefore, in the packs tested (and these largely are the commentator's own conclusions) failure commenced at the point where the building of the packwalls finished; the building of the packwall therefore should be completed in the middle of the long face wall which will be supported by the next pack unit when added; building of intermediate walls is advantageous, as it gives greater strength and more even compression before failure; use of an excessive quantity of fine material and finishing of walls short of the roof and ramming the center of the pack tight to the roof with fine material did not give satisfactory results; fairly flat stones which bed well should be selected for the walls, which should be well wedged to the roof. The strength of the roof, other things being equal, depends on the strength of the constituent material and varies inversely with its height. Even in well-built packs, voids up to 40 per cent were present, indicating that under great pressure consolidation of like percentage will occur.

In discussion of the paper, Mr. Dixon remarked that it was distressing to find that the strength of the rock was about 120 times that of the packs made from it. W. O'Connor declared that, in his belief, the strength of the packwall lay in its filling, because, being held by the walls, it could not escape the pressure. As the rock used in the tests was un-

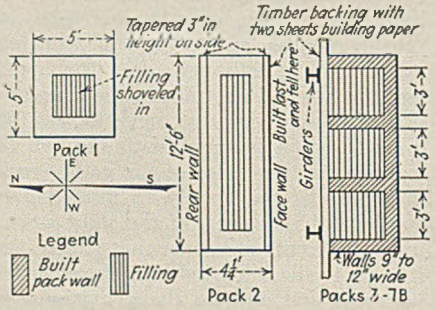


Fig. 2—Packwalls Tested in Machine.

Table I—Tests on Packwalls of Sandy Shale

Pack Number	Failure	Rock	Max. Comp. on whole Pack. Tons per Sq.Ft.	Comp. in Per-centage of Original Height
1*	One edge fell	A	0.66	3.3
2†	Rock fell in S. E. corner	A	0.61	3.9
3†	East end fell	A	2.63	10.0
4*	.....	A	2.20	6.2
5†	Corner E. end fell	B	1.87	9.2
6*	.....	B	1.10	10.3
7A*	.....	B	0.68	5.5
7B*	.....	B	0.45	9.3

*Built by Board mechanics. †Built by skilled miner.

Pack 1—Preliminary test to ascertain resistances likely to be encountered

Pack 5—Each stone bedded in fine material, small stones hammered into interstices; interior filling rammed to roof.

Pack 6—A layer of sand 2 in. deep laid on floor and stones well bedded in this to touch floor. Each large stone bedded in fine material but with stones in contact, the fine material filling interstices. Walls packed tight to roof.

Packs 7A and B—Walls clear of roof. Interior filling rock rammed tight to roof.

usually strong, packwalls in most cases would show less strength. He was inclined to the belief that time was an important element in developing resistance.

Prof. W. N. Thomas believed that the load should first fall on the walls, so that their positions would be consolidated before the lateral pressure of the filling could force them out. With high packs, the lateral pressure might be so great that the filling would be a detriment rather than a help, and perhaps a tensile layer of quick-setting portland cement and sand might be put at mid-height of the pack so as to hold the rock in place.

Major H. M. Hudspeth declared that though an excess of fine material might be harmful, it was equally important that enough small material be used to make the pack as nearly solid as possible. W. F. Brown believed that with timber-supported headings it would be well that the packs should as soon as possible reach their final shrinkage under pressure so as to shorten the agony of adjustment. With steel-arched headings, on the other hand, perhaps all the support possible should be given by the packs.

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. 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.

Miners and Management, by Mary Van Kleek. Russell Sage Foundation, New York City. 392 pp. Price $2.

This book is a sad illustration of what happens when a research worker turns propagandist. Starting out ostensibly as an impartial study of the results of labor relationships under union contract at the Rocky Mountain Fuel Co., the author uses that study as a springboard from which to plunge into an advocacy of socialization—Russian style—of all American industry. To support her plea for a communistic state, Miss Van Kleek puts herself in the position of discounting the achievements in industrial relationships which the earlier chapters of her book praise. Commendation is subtly flavored with the suggestion that still more might be accomplished under a different setup. The setup the author has in mind is revealed in the closing pages when socialization is offered as the panacea for the evils and mistakes of the capitalistic system.

As groundwork for this argument, the author repeats the old clichés about disorganization and mismanagement in the coal industry which constant reiteration has given a spurious currency of accepted fact among those unfamiliar with all the details of mine operation and the interrelationships of American industry. Leadership in organized labor is denounced as ineffective or worse. Apparently nothing less than a revolution which will sweep away our present industrial and political structure will satisfy Miss Van Kleek. If she is conscious of the fundamental differences between the American and the Russian scene, her present work successfully conceals that knowledge. Most of us, less enamoured with the Russian scene, probably will prefer to blunder along in our own crude capitalistic way in the hope of reaching Donald Richberg's "halfway house" between communism and fascism—at least until time has given us a more convincing demonstration of the soundness and superiority of the infant Soviet experiment.

If the reader will remember the author's particular bias (which, incidentally and inferentially, is repudiated by the Foundation itself in the preface to the book), he will find much of value in the setting down of the story of the Rocky Mountain Fuel Co.'s brave acceptance of collective bargaining at a time and in a State where such relationships were looked upon with suspicion and mistrust. And yet this unfavorable background was not without its advantages, for it was largely responsible for welding organized labor throughout Colorado into a selling organization that helped to push the distribution of Rocky Mountain Fuel Co. coal. Had union recognition been general at that time, this hardly could have happened.

Aside from this, however, the book reveals many other important contributions which the new relationship made to more efficient management. The union felt called upon to justify its acceptance and the record shows clearly that it accepted its new responsibilities in drawing upon the experience and knowledge of the workers for the purpose of bettering operating conditions and reducing production costs. There is no reason why these resources should not be tapped in every organization. Herein lies the real value of the volume for students of economic and social relations. Because of this regret is deepened that the telling was colored by the attempt to make it an argument for socialization. Miss Roche and her associates in the management and operation of the Rocky Mountain Fuel Co. deserved better at the hands of the author.—S. A. H.

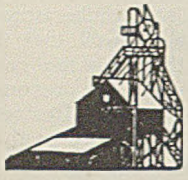
America's Capacity to Produce, by Edwin G. Nourse and Associates. Brookings Institution, Washington, D. C. 608 pp. Price, $3.50.

During recent years much has been said and written on the subject of overcapacity. In the effort to check the depression and its deflationary processes, government and industry have deliberately adopted programs which have as their immediate objective either the withdrawal of "surplus" productive capacity, as in agriculture, or the prohibition against the creation of any new capacity through operation of many of the codes. The battle between the school of thought that demands that capacity be cut down to existing demand and the school that insists the answer to our problem is to be found in increasing demand to take care of existing surplus capacity and support new productive facilities still rages.

"America's Capacity to Produce" is the first of a series of four volumes in a Brookings study of the distribution of wealth and income in relation to economic progress. Many of the current theories in regard to productive capacity, it declares, cannot be supported by the facts. On the contrary, the authors find that there was no undue expansion of idle plant capacity either in agriculture, mining (except for dislocations caused by the war), manufacturing or public utilties between 1900 and 1930. Transportation facilities, the authors feel, were overexpanded, and this increase was due to the advent of the automobile, the government's rehabilitation program for waterways and the greater efficiency of the railroad machine.

The chapters on mineral productive capacity are the work of F. G. Tryon. To coal men that authorship is sufficient warrant of knowledge, clear thinking and scrupulous honesty of presentation. Mr. Tryon confirms the accepted conclusion that the bituminous industry was overdeveloped in 1929, but finds that overdevelopment, on the basis of an operating year of 265 days, only 17 per cent of the capacity (excluding mines that did not work at all, but had not been permanently abandoned) was excess. In the case of anthracite, he points out, the decline in utilized capacity has been due not to increase in productive facilities but to a shrinkage in market. —S. A. H.

OPERATING IDEAS



From Production, Electrical and Mechanical Men

Truing of Cylindro-Conical Drums in Field Facilitated by Rope Grinding System

MOST drums designed for hoisting with round wire rope are constructed of cast iron or semi-steel. Whether these be hard or soft, brittle or tough, the constant contact with the rope causes wear, which is accentuated by grit or other abrasive material which collects on the rope. Ropes also are worn for the same reasons. Where the duty is severe, as is commonly the case, the net result is a very rough drum after a time. Diagonal grooves roughly corresponding to the stranding of the rope are cut in the main groove for a distance approximating the acceleration period, due to the heavy strain of acceleration combined with the fact that near the fixed end of the rope there can be very little slippage forward or backward to

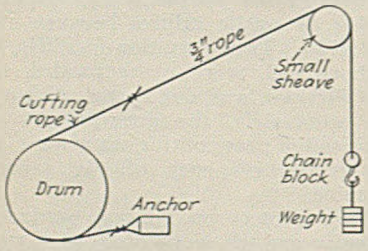


Fig. 1—Method of Smoothing Grooves With Cutting Rope at One End of Cylindro-Conical Drum.

equalize wear and keep the surface smooth. Also, near the fixed ends, the rope is free to rotate to a limited extent only, so that wear is concentrated more on one side than on the other.

Once the surface of the drum groove has become rough, moving the old rope or installing a new one results in a situation where the strands will no longer fit into the diagonal grooves that wear has created, and the rope may be cut or badly damaged by being tightly drawn over the ridges.

Straight cylindrical drums readily can be turned or smoothed, but a similar turning or smoothing of a double cylindro-conical drum requires a set-up very difficult to make in the field. To meet this objection, Carl Lee, electrical engineer, Peabody Coal Co., Chicago, offers a method developed at one of the mines of that company, which it is believed can be used for a drum of any shape. At the Peabody operation it was employed to smooth a double cylindro-conical cast-iron drum having cones on either end running from 6 ft. in diameter to a central diameter of 10 ft., with about 28 grooves for 1¼-in. diameter rope. The drum was installed in 1923. Since that time, the first active turn has worn down ½ in., the second turn 7/8 in., and the third turn ⅛ in.; the other turns, being on the cone, could not be measured, but six or seven on each end were badly scored diagonally.

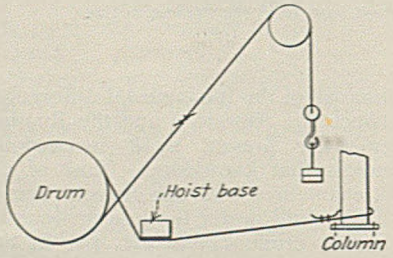


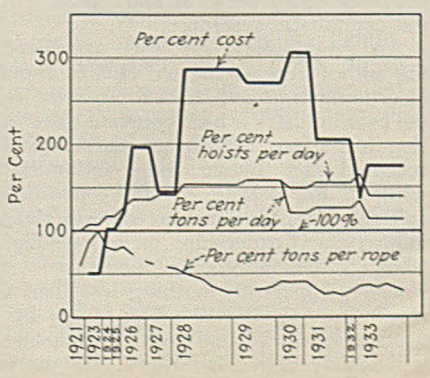
Fig. 2—Method Used on the Opposite End of Drum.

As one rope hole was for the top and one for the bottom, two set-ups were required. Fig. 1 shows one of these. Both hoisting ropes were removed, so that the drum would be free to run for any desired number of turns. A piece of old hoisting rope was secured to the bedplate by a loop and clamps. Then one-half turn was placed around the drum and the other end was fastened to a ¾-in. rope for ease in handling. This was run over a large snatch block in the tipple approximately in line with the sheaves. On the lower end, a chain block was fastened to which was attached a weight of about 2,000 lb., which was raised so as to clear the ground about a foot.

In the first trial, a mixture of sand and oil was fed to the drum and rope while the drum was being turned about nine turns forward and then nine turns in reverse. The cutting was found to be slow, so dry sand was added, with better results. About an hour was required to smooth the grooves on this end of the drum. Then the same old rope was placed on the opposite end, but, because of the positon of the rope holes at this end, the arrangement shown in Fig. 2 was adopted. Here the rope was in contact with the drum for about eight-tenths of a turn. The loading weight was about 1,000 lb. Dry sand was used, and cutting proceeded faster than before, because the increased angle of contact on the drum gave the rope a tighter grip and more pressure.

Toward the end of the cutting operation the resistance to movement increased rapidly. In truing the grooves at the first end the load was about 55 hp., and toward the end of the operation it increased to about 160 hp. A check on the rope tension indicated, roughly, 14,500 lb. pull on the dead-ended rope. The drum speed was not checked, but it was less than full speed, which would correspond to 330 ft. per minute under the rope. It is believed that, near the last, the old rope—one strand of

Fig. 3—Record of Rope Performance in Tonnage Hoisted and Cost.



which wore through—gave the effect of numerous small cutting tools and that the sand then played little part in the smoothing process.

When finished, the grooves were as smooth as new, although not of the exact shape desired. In service, as well as in cutting, the wear was mostly in the bottom of the groove, so the side clearance of the rope was hardly sufficient. A standard rope-groove gage, minimum limits, lacked about $\frac{1}{32}$ in. of bottoming as it should. An oversize rope of special stranding might be used to cut the sides of the groove, which would then be of the shape recommended by rope manufacturers. In hoisting, some means should be arranged to provide a small degree of frequent lubrication to the drum grooves, so that the rope would slip on the drum enough to prevent the cumulative cutting of diagonal grooves. Another suggestion is the twisting of the rope a half turn at intervals so as to spread the wear along the surface of the rope.

Data covering ropes used since 1921 are given in the accompanying table. The new drum was installed in 1923. The data are plotted in Fig. 3, and show a rapid decrease in tons per rope per year after the new drum was installed. Part of the reduction was due to an increase in the number of hoists per day, but how much is not clear from the data available. A new rope has been installed on one end of the drum and service records of the future may disclose some improvement in rope life now that the grooves have been smoothed.

Rope Performance in Terms of Tonnage Hoisted and Cost

Rope No.	Year	Relative Average Tons per Rope*	Average Tons per Day for Year 1921 = 100	Hoists per Day 1921 = 100	Rope Cost 1921 = 100
1	1921	60†	100	100	100
2	1923	87†	107	107	50
3	1923	100†	107	107	50
4	1924	83†	116	116	102
5	1924	79	116	116	102
6	1925	82	128	128	120
7	1926	74	135	136	196
8	1926	....‡	135	136	196
9	1926	63	135	136	196
10	1927	....‡	141	141	124
11	1927	59	141	141	124
12	1927	57	141	141	124
13	1928	51	154	154	286
14	1928	49	154	154	286
15	1928	45	154	154	286
16	1928	37	154	154	286
17	1928	34	154	154	286
18	1928	30	154	154	286
19	1928	30	154	154	286
20	1929	....‡	158	158	270
21	1929	33	158	158	270
22	1929	34	158	158	270
23	1929	37	158	158	270
24	1929	43	158	158	270
25	1930	41	122	150	306
26	1930	41	122	150	306
27	1930	41	122	150	306
28	1931	34	127	157	206
29	1931	28	127	157	206
30	1931	29	127	157	206
31	1931	26	127	157	206
32	1931	30	127	157	206
33	1932	36	135	167	138
34	1933	38	114	141	170
35	1933	36	114	141	170
36	1933	38	114	141	170
37	1933	35	114	141	170
38	1933	31	114	141	170

*Figures in each case are the average of the last five ropes expressed in terms of the maximum tonnage hoisted by an individual rope, or 100.
†Individual rope.
‡Excluded on account of wreck.

Over the Hill

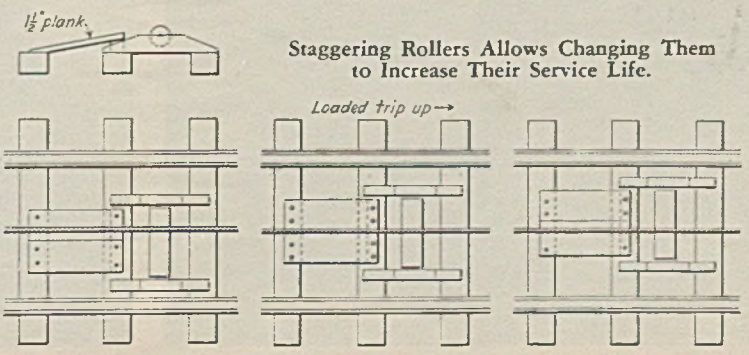
"Over the hill" may not always precede "to the poorhouse." In many cases it may be the first step to new experience or broader knowledge. Opportunities for visiting other mines to observe methods and gather data that can be used at home are relatively limited. These pages, therefore, offer a substitute which regularly apprises operating, electrical, mechanical and safety men of the latest developments at other operations and in other fields. Likewise they offer you an opportunity to make widely available your practical ideas for increasing efficiency, promoting safety and cutting costs. Send them in. A photograph or sketch may help in making them clearer. *Coal Age* will pay $5 or more each for those that are acceptable.

Mine Air Cools M.-G. Set

By means of a blower and galvanized tubing, cool air from the mine outlet is used to keep down the temperature of the motor-generator set supplying current to the Wick mine of the Ingle Coal Co., Little, Ind. The set is installed in a building close to the slope mouth where the blower is located, and the large-diameter tubing is carried into the substation room just under the eaves, and then is extended downward to a hood over the converting equipment. A branch is led into the machine shop in the same building to direct a cooling current toward the forge and the blacksmith. The mine is non-gaseous and is worked with open lights.

Prolonging Roller Service

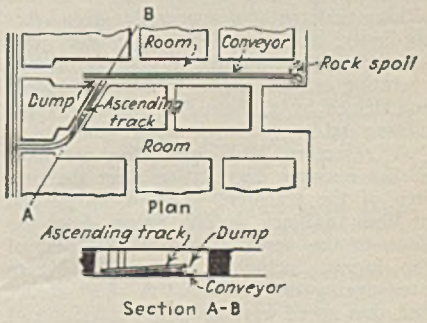
Staggering wooden rope rollers on slopes is suggested by Arnold Curry, Wyano, Pa., as a means of lengthening their service life. With this system, shown graphically in the accompanying illustration, a roller worn in one spot may be shifted to another place until grooves are worn clear across the face, thus reducing the cost of rollers for a given tonnage. Where drags are used on the back ends of trips, Mr. Curry recommends the use of wood blocks and planking in front of each roller, as shown. These are nailed to the ties and throw the drag over the rollers, thus guarding against the breakage of the latter.



Staggering Rollers Allows Changing Them to Increase Their Service Life.

Rock Dumped Underground At Anthracite Mine

To avoid the extra expense which would have been involved in hoisting rock to the surface, an anthracite colliery has adopted the underground dumping method shown in the accompanying illustration. A roadway was constructed in a chamber located in an area of thick coal, and a road was built from this chamber to the next, taking coal in the pillar at such a height as to provide an even gradient from place to place. The crosscut was constructed at an angle of 45 deg. to the direction of the chambers.



Sketch of Underground Rock-Disposal System.

Being constructed on an ascending gradient, the track at the end of the crosscut was elevated high enough above the floor of the adjacent chamber to allow installation of a dump by which rock could be discharged onto a shaker conveyor for transportation to the end of the chamber. By elevating the conveyor from the floor, which dipped to the face, the discharge end was raised sufficiently to allow the rock by itself or with a little assistance to spread across the entire width of the place, thus giving ample spoilage area. By packing

the face tightly, pillars on either side could be drawn from the chambers next to the one filled, and these chambers in turn could be filled with rock, relying on the support of the fills thus made and their own pillars to the point of withdrawal. Thus all chambers could be filled and coal pillars withdrawn.

Auxiliary Shaker Transfers From Screen to Conveyor

Right-angle transfer of coal from a sloping shaker screen to a horizontal conveyor prevents an inherent design difficulty if the transfer is to be accomplished with a minimum of breakage and in such a fashion as to distribute the coal evenly across the conveyor. Such even distribution is particularly essential where the conveyor is used as a picking table.

When installation of a new shaker screen was planned with other improvements at the tipple of the Anchor Coal Co., Highcoal, W. Va., the management insisted on a design which would transfer lump from the discharge end of the screen to the picking table without appreciable drop. Accordingly, the screen manufacturer proposed the use of an auxiliary shaker screen operating at right angles to the main screen and driven by a chain from the conveyor picking table.

A rescreeen built into this auxiliary shaker removes degradation after the first step of the transfer. The discharge end of the auxiliary screen drops down so close to the apron conveyor that few of the lumps, including the smallest, turn over during the transfer. A short stroke and slow speed were necessary attributes of the shaker to enable the conveyor when traveling at normal speed to carry the lumps out of range before they were struck by the lip of the shaker. Because of the slow speed, power and maintenance are small items. The shaker is suspended on boards, and the equipment was furnished by the McNally-Pittsburg Mfg. Corporation.

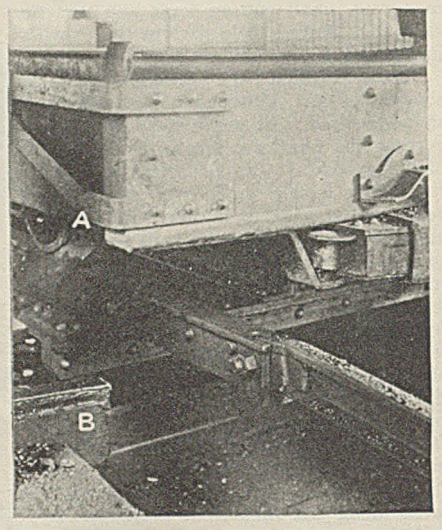
Car Endgates Are Lifted Without Use of Hooks

Most installations of Phillips crossover dumps are not considered complete without the usual wood or steel frame supporting a bail hook or U-bolt to engage a hook on the endgate and thus open it as the car drops down to dumping position. If outside-type endgates are used, however, the apparent necessity for such equipment may be eliminated, thus saving the cost of hooks on cars and reducing the labor connected with the routine operation of the dump, provided some automatic means of moving the bail hook is not in use. In the latter case, however, some expense would be incurred in building and maintaining the automatic equipment.

A crossover dump that operates without a bail hook is shown in the accompanying illustration. As the car tips downward to the dumping position, point *A* of the endgate hinge strap strikes the stationary projection *B*. While the car end continues its downward movement, the endgate is held on the projections, one on each side of the dump, thus allowing the coal to flow out of the car. The illustration was made from a photograph taken at the Roseann (Va.) mine of the Panther Coal Co., Inc., where the transportation equipment includes 100 all-steel, stub-axle cars supplied by the American Car & Foundry Co.

This method of endgate lifting did not come to the attention of company officials until after the cars had been ordered and delivered; otherwise they would have been specified "less endgate hooks," according to W. S. Leckie, president of the company. But one other example of this method of lifting endgates has come to his attention—at a mine of the same interests at Fireco, Raleigh County, W. Va. The success of the Fireco installation led to its adoption at Roseann.

Successful operation with this method is dependent on three conditions: outside-type endgates; the same design for all cars in service; and cars with reasonable rigidity and strength. A further advantage at times



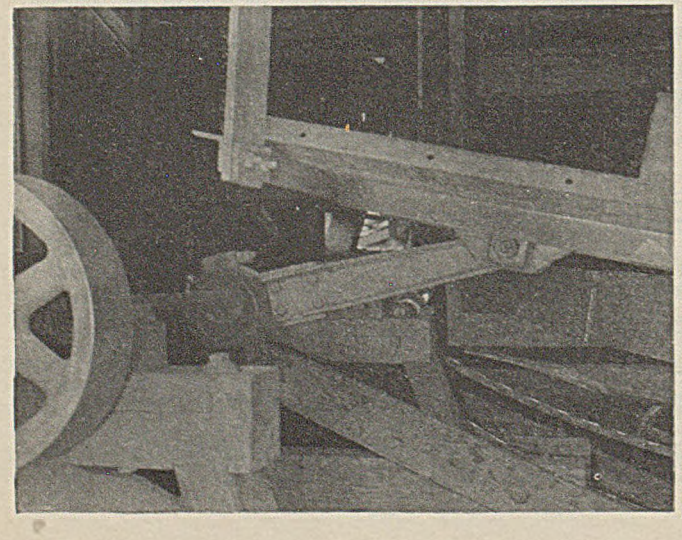
Endgate Is "Lifted" by Striking Projection *B*

is the fact that trips or cars out of control can ride over the dump without an endgate being caught in the bail hook.

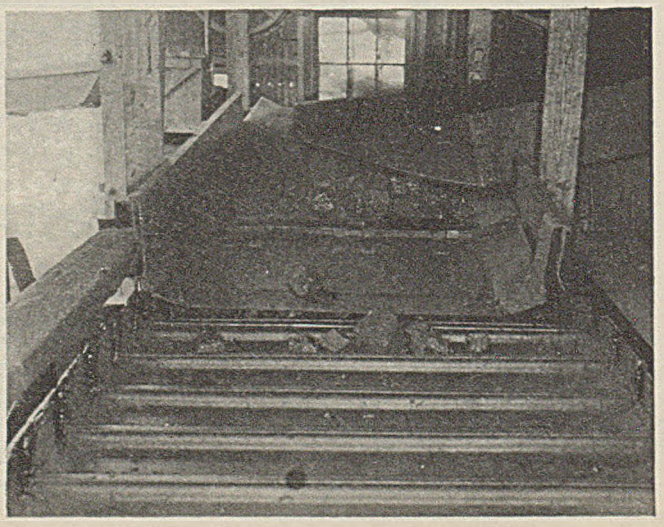
Trolley Wire Guard

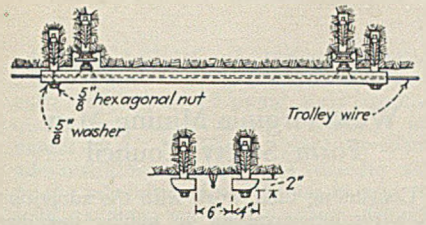
Lloyd G. Fitzgerald, Diablock, Ky., offers the following description of a trolley-wire guard employed in low places in the Four Seam Coal Corporation mine. As the roof is a hard sandstone, it was impossible to channel the top with the equipment available at the mine, which led to the development of the guard shown in the accompanying illustration. This guard is constructed of two oak 2x4's, four expansion bolts 4 in. long, four ⅜-in. washers and an equal number of ⅜-in. hexagonal nuts. Where men and trips are required to pass under the trolley wire, the insulator bells are countersunk into the roof so that the wire when fastened in the clamp is only 1 in. below the top. The ends of the

A Single Eccentric and Rod Attached Under the Center of the Shaker Drive the Auxiliary Equipment.



Showing the Relation of the Auxiliary Shaker to the Main Shaker Discharge and Conveyor Picking Table.





Construction Details, Trolley Wire Guard.

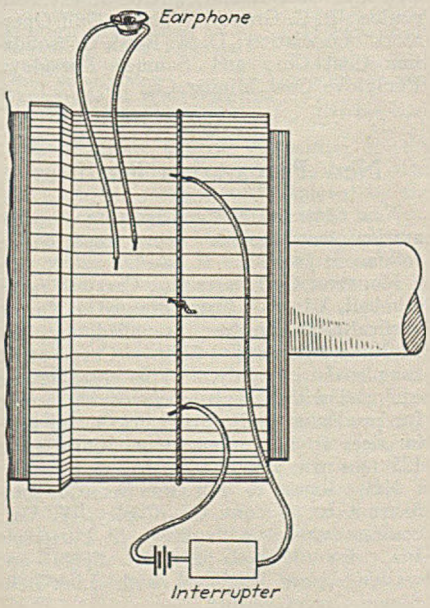
oak pieces are fastened to the top with the expansion bolts. Edges opposite the wire are beveled so that the guard will ride down into the loose coal on top of the cars and thus relieve it of pressure which might break it. A guard so constructed, says Mr. Fitzgerald, will drag over a loaded trip and withstand as much or more pressure as the unguarded wire 1 in. below the top.

Cord Holds Terminals for Separate-Unit Testing

When the simple arrangement based on a telephone receiver and a dry-cell battery with interrupter is used for testing armatures in a mine repair shop it is not uncommon to see two men making the test, one holding the battery circuit terminals on commutator bars some distance apart, while the other, wearing the earphone, determines the conditions when holding the phone contact points on adjacent bars.

The effective one-man test arrangement shown in the illustration was observed recently in the central repair shop of a large bituminous company. The battery circuit terminals are held in contact with the commutator bars by means of a stout cord tied tightly around the commutator. As exploration continues around the commutator the battery circuit terminals are moved from time to time by sliding them around under the cord. This simple method is more effective than having a man hold the points, as the contact is not varied or broken by unsteady hands.

Requires One Hand Instead of Three.



Drilling and Blasting Governed By Safety Standards

Safety standards for drilling, blasting and handling explosives included in the paper on face preparation methods at a Clinton (Indiana) district mine presented at the June meeting of the Indiana Coal Mining Institute (July *Coal Age*, p. 272) by S. M. Cassidy, mining engineer, Allen & Garcia Co., Terre Haute, Ind., are reproduced in full below.

DRILLING STANDARDS

1. Drill all holes according to the standard plan, unless otherwise directed by the foreman, or in places with unusual conditions.
2. No driller shall drill any hole without a duster, tamper or somebody else being present in the same place, who has been instructed in how to stop the drill in case of emergency.
3. The driller must keep strictly away from the front end of the drill while the power is on.
4. Gloves, long sleeves, and loose or ragged clothing are dangerous and should not be worn by any driller.
5. The driller shall test the roof and for loose coal on the face and ribs before beginning in any place.
6. On coming into any place the driller shall set the switch so that no cars will be accidentally pushed into his truck while he is at work.
7. When pushing the drill truck from place to place, be careful to keep out of the way of trips. Keep the truck under control at all times, especially when coasting down hills.
8. Keep the push truck properly oiled or greased.
9. No explosives shall ever be permitted on a truck.
10. No misfires are to be drilled out, or otherwise removed from the hole, under any circumstances. A new hole is to be drilled not less than 12 in. from the old hole, and shot. The loose coal shall then be removed by hand until all sticks of powder and the cap are recovered.
11. No holes shall be drilled ahead of the cutting machine.
12. Use new bits on the 3-ft. auger, medium worn bits on the 6-ft. and old bits on the 9-ft. auger. Return all broken bits, auger heads and augers to the shop.
13. If the threadbar feeds through the boxing, shut power off before attempting to put threadbar back in guide.
14. When one drill bit fails to follow the other, keeping boxing from closing, do not try to feed by hand—reset the post.
15. Never set the post in, or near, pots or slips in the roof.
16. If your drill works improperly or needs attention, report the condition to the electrician or foreman in your section.

SHOOTING STANDARDS

1. Charge all holes according to the standard plan, unless otherwise directed by the foreman, or in places with unusual conditions.
2. Nothing but solid wooden tamping bars are to be used for tamping shots.
3. Clay, earth, or other incombustible material is to be used for dummies. Bug dust is not to be used under any circumstances.
4. Three (3) or more dummies shall be used in each hole.
5. All bug dust must be removed from under cuts before shots are fired. All dirty cuttings must be shoveled back into the gob before the shots are fired.
6. Powder and caps shall be carried by the shotfirer from place to place in the bags and boxes provided for that purpose—never on a driller's truck.
7. Tampers must make certain that no hole is drilled on the solid; if too deep, correct by filling in the excess depth with dummies before placing the powder, or have another hole drilled.
8. In charging a hole, all sticks of powder must be pushed to the back of the hole together.
9. In case a part stick of powder is used it shall be placed at the back of the hole with the opened end against the back of the hole.
10. Detonators shall be placed in the outside stick of powder (primer) and pointing toward the bulk of the explosive charge. These detonators are to be placed as nearly parallel to the length of the stick and kept as nearly in the middle of the stick as possible.
11. No misfire shot shall be drilled out, or otherwise removed from the hole, under any circumstances. The place shall be marked out for one hour, then another hole shall be drilled not less than twelve (12) in. from the misfired shot, and fired. The loose coal shall then be removed by hand until all the unexploded sticks of powder and the cap are found.
12. No place shall be entered after shot, until it has been examined for gas. If shot during a working shift the shotfirer shall mark it out until the foreman can make his examination.
13. No shots shall be fired during working shifts except when fired electrically, one shot at a time, and not over four (4) sticks of powder at a time.

When firing shots electrically the shotfirermen shall observe the following precautions for their own safety and the safety of others:

14. The shotfirer shall make certain that all persons are out of the place to be shot and that nobody can walk into the place through an unguarded breakthrough inby the shotfirer's position, while he is shooting.
15. When shooting a breakthrough or any place approaching another place, the shotfirer shall make certain that nobody is in either place, and shall take any other necessary precautions.
16. When connecting the lead wires to the battery the shotfirer shall cry out the customary warning, "FIRE IN THE HOLE" and again cry "FIRE IN THE HOLE" about five (5) minutes before firing the shot.
17. Connecting wires on electric caps shall be left shunted (twisted together on the ends) until connected to the shooting cable. Likewise, the wires on the battery end of the shooting cable shall be kept twisted together at all times when not connected to the battery.
18. The shooting cable shall never be left connected to the battery when the shotfirer goes to the face to prepare the next shot.
19. Shotfirers shall take every precaution to keep the wires on caps and the shooting cable from coming in contact with rails, pipe, wires, cars, trucks, etc., which might contain stray electrical currents.

STANDARDS FOR DELIVERING AND STORING EXPLOSIVES UNDERGROUND

1. Powder is not to be transported in any manner except inside the regular powder car with the doors closed, and no other cars are to be in the trip.
2. No machine bits, augers, or any material except powder and tamping bags shall be carried in or on the powder car.
3. Caps are to be taken into the mine on idle shifts by a foreman or fireboss. The caps are to be carried in an insulated wooden box, with a cover, in an empty mine car; and never on a mine locomotive.
4. Nobody but the delivery crew shall ride on trips carrying either powder or caps. This crew shall go at a moderate speed and shall never closely precede or follow other trips. A red tail light shall be placed on the powder box at all times when below ground.
5. The delivery crew shall thoroughly clean up all paper, wood, pieces of fuse and other combustible trash around each inside powder station, each night. This trash is to be loaded into a car and sent outside for disposal.
6. Delivery crews shall remove all boxes of powder from the storage box at a station and replace these last, on top of the new powder. All boxes of powder taken from the magazine on the surface are dated; use old powder first.
7. The inside powder stations are to be located in rooms, cross cuts or entries, from which track and wire have been removed, at least 20 ft. from any trolley wire or tracks. Caps shall be stored in an insulated box in a cubbyhole cut in the rib, with a ledge sufficiently deep to safely hold the cap box. This cubbyhole cut in the rib must be at least 20 ft. in by the powder box and on the same rib, or otherwise shielded.

WORD from the FIELD

"B" and Stillwater Mines Win Safety Trophies

"B" mine of the Union Pacific Coal Co., Superior, Wyo., and the Stillwater mine, Hudson Coal Co., Vandling, Pa., received the "Sentinels of Safety" trophies awarded by *The Explosives Engineer* for the best bituminous and anthracite safety records respectively, in the 1933 national safety competition. "B" mine was in operation 271 days during the contest period, and worked a total of 187,888 man-hours without a lost-time injury. Stillwater rolled up a record of 372,304 man-hours of exposure with an accident-severity rate of 0.618 per thousand man-hours, as compared with a rate of 10.473 for all anthracite mines combined.

Honorable mention was given to the following operations which worked a minimum of 30,000 man-hours without a lost-time injury or were among the best five mines in their group: anthracite—Highland Nos. 2 and 6 mines, Jeddo-Highland Coal Co., Freeland, Pa.; Tomhicken mine, Coxe Bros. & Co., Sugarloaf, Pa., and the Salem Hill mine, Haddock Mining Co., Pottsville, Pa.; bituminous—Arno (Va.) mine, Stonega Coke & Coal Co.; Alloy (W. Va.) mine, Electro-Metallurgical Co.; Princewick mine, C.C.B. Smokeless Coal Co., Beckley, W. Va.; Vulcan (W. Va.) mine, Norfolk & Western Ry. fuel department, and the Somerset (Colo.) No. 1 mine, Calumet Fuel Co.

Committee Studies Legislation

Suggestions as to possible future legislation occupied the attention of a special committee named by C. E. Bockus, president, National Coal Association, last month, at two meetings held in New York in July. The outlines of one definite plan of action were reported to have been established, and will be the object of further study by individual members prior to a session around Aug. 1. Personnel of the committee is as follows: J. D. A. Morrow, president, Pittsburgh Coal Co., Pittsburgh, Pa. (chairman); O. L. Alexander, Pocahontas Fuel Co.; J. D. Francis, Island Creek Coal Co.; W. J. Jenkins, Consolidated Coal Co. of St. Louis; Charles O'Neill, Peale, Peacock & Kerr, Inc.; W. L. Robison, Youghiogheny & Ohio Coal Co.; and Grant Stauffer, Sinclair Coal Co.

TVA to Foster Coal Use

Experiments looking toward the development of new uses for coal—including a solid, smokeless fuel from soft coal—have been under way for some time by the Tennessee Valley Authority, in line, according to Arthur E. Morgan, TVA chairman, with its duty to make studies, experiments and demonstrations designed to promote utilization of the natural resources of the region for the general purpose of "fostering an orderly and proper physical, economic and social development" of the area.

TVA also has been investigating possible uses for coal byproducts, including not only physical research but also a study of marketing and transportation. Experimental work has progressed to the point where TVA directors feel justified in earmarking up to $100,000 to start its second series of tests to develop further uses for coal, in which the Authority is seeking the cooperation of operators and miners.

Mines Director Still Unselected

The holding up of the appointment of James Wellington Finch, dean of the Mining School, University of Idaho, leaves the question of a new director of the U. S. Bureau of Mines still in doubt. Prof. Finch, whose qualifications met with the approval of Secretary of the Interior Ickes, presented himself at the Department on July 7 to be sworn in, but found that his commission had been returned by the President with the notation "Held up temporarily because of political objections by P.M.G." Since that time, administration officials have evidenced no preference for any particular candidate, and the early weeks of July brought about a boom for the appointment of Francis Feehan, for fifteen years associated with the Pittsburgh Experiment Station of the U. S. Bureau of Mines and prior to that president of District 5, United Mine Workers, in western Pennsylvania. No action is expected on an appointment, however, until the return of the President from his vacation cruise.

Permissible Plates Issued

Two approvals of permissible coal-mine equipment were granted by the U. S. Bureau of Mines in June, as follows:

Jeffrey Mfg. Co., Type 59B power-truck-operated arcwall mining machine; 50-hp. motor, 250 volts, d.c.; Approval 267; June 27.

Jeffrey Mfg. Co., power truck; Approval 1524-C; June 25.

The Bureau also has added the following to its list of "Specially-Recommended Cables:"

BM-24 Amerclad No. 3 twin cable (19x7 stranding).

BM-25 Habirshaw No. 2 twin cable (19x7 stranding).

BM-26 Habirshaw No. 3 twin cable (19x7 stranding).

West Virginia Mining Men Form Safety Council

Concluding their work with the adoption of a resolution calling on mining men in the State to assist in organization of district councils and local chapters, 150 representatives of coal operators, miners and safety men organized the West Virginia Council of the Joseph A. Holmes Safety Association at a meeting in Charleston, W. Va., June 29, under the auspices of the State Department of Mines and the U. S. Bureau of Mines.

State council officers were elected as follows: president, N. P. Rhinehart, chief, West Virginia Department of Mines; vice-presidents—George Watson, State Compensation Commissioner; P. C. Thomas, vice-president, Koppers Coal Co.; W. J. German, general superintendent, Pocahontas Fuel Co.; Van A. Bittner, United Mine Workers; Raymond Salvati, vice-president, Pond Creek Pocahontas Co.; Frank Miley, United Mine Workers; Charles E. Lawall, director, School of Mines, West Virginia University; and J. J. Forbes, U. S. Bureau of Mines; secretary-treasurer, P. D. McMurrer, director of safety, West Virginia Department of Mines.

The executive committee is composed of the following: J. V. Sullivan, West Virginia Coal Operators' Association; William Blizzard, United Mine Workers; S. C. Higgins, New River Coal Operators' Association; W. E. E. Koepler, Pocahontas Coal Operators' Association; J. J. Ardigo, Operators' Association of the Williamson Field; D. C. Kennedy, Kanawha Coal Operators' Association; J. W. Colley, Logan Coal Operators' Association; T. E. Johnson, Northern West Virginia Subdivisional Coal Association; C. F. Davis, United Mine Workers; L. T. Putman, Raleigh-Wyoming Mining Co.; W. G. Crichton, Greenbrier Coal Operators' Association; P. C. Graney, Winding Gulf Operators' Association; D. A. Reed, Consolidation Coal Co.; and Samuel Pursglove, Pursglove Coal Mining Co.

New Preparation Facilities

New contracts and construction of preparation-plant facilities were reported as follows in July:

Houston Collieries Co., Carswell mine, Kimball, W. Va.; installation of a Norton vertical-pick breaker, supplied by the McNally-Pittsburg Mfg. Corporation, completed in July. The breaker is equipped with a built-in classifying screen for producing 7x2½, 2½x1¼, 1¼x½ and ½x0-in. sizes from crushed lump. Capacity is 125 tons per hour.

New River & Pocahontas Consolidated Coal & Coke Co., Caples, W. Va.; contract closed with Heyl & Patterson, Inc., for 350-tons-per-hour tipple and washing plant equipped with Link-Belt-Simon-Carves washer.

NRA Approves Tonnage Allocation Scheme To End Correlation Squabbles

ALLOCATION of tonnage, coupled with the threat of price revisions to curb districts overshipping their monthly quotas, was approved for Division I last month by C. E. Adams, NRA divisional administrator, as the first definite step in the administration program to end the long-standing and multiplying disputes over the correlation of interdistrict prices under the bituminous code. Production for the five-year period 1929-1933 was taken as the basis for the allocations. Ohio representatives declined to subscribe to the agreement and the high-volatile fields embraced within Southern subdivision No. 2 signed under protest.

The agreement, dated July 12 and "entered into at the suggestion of NRA" to protect the interests of producers and employees, provides:

> The subdivisions of Division I signatory hereto agree that the proportions set forth below shall be used as a measure in determining the relationship of prices between said subdivisions during the period from the date hereof to Dec. 31, 1934. It is distinctly understood that these proportions are neither to be taken as a precedent nor to be binding on any parties hereto in any future proceedings.
>
> It is understood that 70.6 per cent of the national production (exclusive of wholly captive tonnage) is the normal proportion of the national tonnage produced by the subdivisions listed below. The percentages listed below state the several proportions of the above calculated tonnage to be produced by these subdivisions, after excluding therefrom the original captive tonnage produced by each subdivision.
>
> Each subdivision agrees to file with the deputy administrator for coal, NRA, on or before the 25th of each month, a statement of the tonnage produced in such subdivisions during the preceding month, showing wholly captive tonnage separately. Such tonnage reports shall be checked against U. S. Bureau of Mines reports.
>
> Any significant departure, other than seasonal variations, from the annual proportions set forth below, indicating a diversion from one subdivision to another or others, shall call for a revision of prices by the subdivisions so that the total shipments from each subdivision shall be such as to enable each subdivision to maintain its position in the market on the basis of the following percentages:

Southern subdivision No. 1	18.25 per cent
Southern subdivision No. 2	30.10 per cent
Western Pennsylvania subdivision	17.75 per cent
Eastern subdivision	15.30 per cent
Northern West Virginia subdivision	8.50 per cent
Ohio subdivision	8.40 per cent
Panhandle of West Virginia subdivision	1.70 per cent

Aside from general opposition to the principle of allocation and the belief that price control such as contemplated by the agreement would disrupt orderly marketing arrangements, Ohio operators feel that the whole scheme is unfair to them since the base period selected represents one in which producers in that State were still struggling to overcome the handicaps placed upon their ability to sell coal by the higher wage scales of earlier years when districts not under union contract could invade Ohio markets at will. Protesting Southern high-volatile producers assert that the inclusion of 1933 in the base period deprives them of several million tons of business that is rightfully theirs. A meeting of the code authority for Southern subdivision No. 2, at Norton, Va., July 20, unanimously condemned the plan as illegal, impractical and unworkable.

Other divisions also held meetings last month to consider the price correlation question, but announcement of any definite decisions was withheld pending submission of the proposals to Washington. Representatives of Illinois, Indiana and western Kentucky conferred at Chicago July 9 and Illinois operators met again on July 17 to consider the proposals worked out at the earlier joint conference, but deferred any final action. Following meetings of representatives from Illinois, Iowa, the Southwest and the Rocky Mountain States late in June, it was announced that Iowa and the Southwestern groups would meet again for the purpose of signing agreements on interdistrict market relationships.

An injunction against the enforcement of NRA minimum wage scales was sought in a suit filed in the U. S. District Court at Kansas City, Mo., early last month by the Kansas City Midland Coal & Mining Co., Riverside Coal Co. and the Chariton River Coal Co., operating in Adair County, Missouri. Petitioners allege that the wage scales and hours established by the NRA "emergency" order of March 31 as amended April 22 and June 4 would so increase the cost of production at these mines that it would be necessary to suspend operations. In addition, petitioners also raise the contention that mining is wholly intrastate and as such is not within the regulatory powers of the federal government.

The NRA Compliance Council "cracked down" on the Lumaghi Coal Co., with operations in Illinois, on June 26 when it found that company guilty of violating code provisions with respect to truck sales. The council recommended that the company be compelled to surrender all Blue Eagle insignia, that the Code Eagle be withheld and that the case be referred to the litigation division unless the operator signed a certificate of future compliance and agreed to cancel all existing sales contracts at prices not in harmony with code provisions by July 5. In the event that the company followed the council's recommendations, the council pledged its best efforts to work with the code authority in clarifying existing differences and to reach an early decision on the problem of classification and truck differentials. The Lumaghi company, it was reported, accepted the decision and truck price differentials in the Belleville district subsequently were readjusted in line with the council's suggestion.

Fixing minimum "floor level" prices under the emergency provisions of the code for the retail solid-fuel industry resulted in attacks on a wide front. In the St. Louis area the attack came from two directions. The Attorney General for Missouri announced an investigation to determine whether prices fixed by the divisional code authority in that area conflicted with the State anti-trust law. On July 22, less than two weeks after the announcement of the State investigation plans, NRA disapproved the minimums established. In taking this action, the first of its kind, Washington asserted that the costs used in determining the lowest cost for the St. Louis area were not representative, that the method of projecting costs was improper and that insufficient notice had been given by the divisional code authority of the hearing at which an emergency was declared. The divisional code authority was authorized to redetermine a proper cost basis on more nearly complete and definite information. The cost margins condemned averaged $2.70 per ton.

In the metropolitan New York area, an order directing the divisional code authority to show cause why it should not be enjoined from attempting to fix prices for the Scranton & Lackawanna Coal Co. was issued on July 20 by State Supreme Court Justice Kenneth O'Brien. The order was made returnable July 30. Another dealer, Newtown Creek Coal & Coke Co., publicly announced that it would observe the code wage and hour provisions but would not be bound by the prices fixed by the divisional code authority. Five Cleveland (Ohio) retailers appealed to the State courts for an injunction against the divisional code authority in that area to permit them to continue sales at prices below those established by the divisional code authority. Hearing on this petition was set for July 26.

Whether cotton-textile mills selling coal to their own employees should be bound in those transactions by the provisions of the retail solid-fuel code comes before NRA for decision as the result of an application by the Cotton Textile Institute, Inc., for exemption from the retail code on behalf of 359 mill companies. Most of the plants involved are in the Southeast, but exemption also is sought for scattered operations in New England, New York, New Jersey, Maryland, Kentucky, Mississippi and Texas. The petition has been set for hearing at Washington on Aug. 6 before Deputy Administrator Wayne P. Ellis.

Following a storm of protest against an Executive Order of June 29 which provided that sales could be made to all governmental agencies—national, State and municipal—at prices 15 per cent under the standard code minimums, operation of the order in so far as it might apply to the bituminous coal industry, coal dock, wholesale coal and retail solid-fuel industry codes was stayed by NRA on recommendation of Divisional Administrator Adams. In urging this exemption, Philip Murray, acting president of the United Mine Workers, told the President that the application of the original Executive Order would restore vicious price-cutting practices in the mining industry.

In addition to the budgets for code administration expenses reported in the preceding issue (*Coal Age*, July, 1934, pp. 291, 292), proposed budgets have since been submitted by Division III; by the

No Anthracite Code in Sight

There is "not much hope" for an anthracite code at the present time, declared General Hugh S. Johnson, NRA administrator, at a press conference on July 3. General disagreement on terms within the industry is the chief stumbling block, he pointed out. Labor difficulties are not a point at issue, as working conditions and wages are covered by contract.

Eastern, western Pennsylvania, West Virginia Panhandle, Ohio and Michigan subdivisions of Division I; and by the Illinois and Indiana subdivisons of Division II. The amounts asked and period covered are summarized below:

Division	Amount	Period Year Ending
Division I		
Eastern subdivision	$201,050	Dec. 31, 1934
Western Pennsylvania	249,840	Apr. 30, 1935
Ohio subdivision	200,000	May 31, 1935
Michigan subdivision	8,250	Mar. 31, 1935
West Virginia Panhandle	25,520	Mar. 31, 1935
Division II		
Illinois subdivision	105,000	Dec. 31, 1934
Indiana subdivision	64,087	Oct. 31, 1934
Division III	44,556	Apr. 30, 1935

A trade practice complaints committee has been created by the smokeless code authority (Southern subdivision No. 1 of Division I) with the following personnel: O. L. Alexander, Pocahontas Fuel Co.; W. G. Caperton, Scotia Coal & Coke Co.; and W. G. Crichton, full-time chairman of the executive committee of the subdivisional code authority. NRA has approved the appointment of A. D. Carlton, Cleveland Cliffs Iron Co.; J. S. Manuel, W. S. & J. S. Manuel; and W. K. Bromley, Pickands, Mather & Co., all of Cleveland, Ohio, as members of the code authority for the vessel-fueling division of the coal-dock industry.

Creation of an NRA Industrial Appeals Board to hear complaints against the operation of codes was announced at Washington July 14. The new board, which is expected to give special attention to charges that code operations discriminate against small businesses and promote monopolies, is headed by Amos J. Peaslee, who has been acting chief of the compliance division of NRA.

Electric Furnace-Man Holds Seventh Annual Meeting

With more than 300 distributors, retailers and guests in attendance, the seventh annual convention of the Electric Furnace-Man, Inc., was held at the Hotel McAlpin, New York, July 16. In addition to displays built around equipment and utilization of anthracite, the two sessions were featured by a discussion of automatic heat prospects by Oscar F. Ostby, vice-president of the company; domestic boilers for stokers, Wm. R. Zulke, engineer, American Radiator Co.; controls, by Arnold Michelson, Minneapolis-Honeywell Regulator Co.; application of the Electric Furnace-Man to bakery equipment and restaurant ranges, by C. H. Hall, chief engineer for the company, and A. L. Altenbrand, Bramhall, Deane Co., respectively; proper blocking and baffling, Fred Hilder, company engineer; domestic hot-water supply, Joseph Murphy, vice-president, Taco Heater, Inc.; the problem of the junior sizes of anthracite, F. W. Saward, editor, *Saward's Journal*; direct-mail work for the season 1934-35, John F. Barteau, Wilson H. Lee Co.; dealer merchandising methods, Elmer Martin, sales manager for the retail firm of Robert Howarth's Sons, Inc.; and selling, Charles E. Redfield, American Radiator Co.

Bituminous Labor Boards Continue Activity, Umpire Proposes Anthracite Peace

WITH strikes and kindred labor disturbances at a relatively low ebb, interest in labor developments in the bituminous industry centered on labor board decisions covering a wide variety of cases and on an umpire's ruling in northern West Virginia that individual requests for check-off are not necessary in the collection of union dues. In the anthracite region, hearings on grievances before James A. Gorman, sitting as a representative of the National Labor Board, whose activities have been taken over by the new National Labor Relations Board created by a joint resolution of Congress, came to an end in July, although investigation of conditions at a number of collieries was continued.

With the settlement of labor troubles causing a shutdown on June 14, the No. 3 mine of the Blue Diamond Coal Co., Perry County, Kentucky, employing approximately 500 men, reopened on July 16. Friction over the question of union recognition at other operations still continued. A rearrangement of officers in the Virginia district of the United Mine Workers early in July resulted in the resignation of Dale Stapleton as provisional president to take up new duties in District 21, in the Southwest. J. T. Saxton succeeds Mr. Stapleton in District 28. The strike at the Carbon Hill and Warrior mines of Moss & McCormack, Alabama, continued into July, but with negotiations under way looking toward a settlement of differences.

Submission to the employer of a check-off list each half month by the secretary of the local union shall constitute sufficient notice for the payment of union dues for all employees not exempt from union membership, according to a ruling by E. S. McCullough, umpire under the agreement between the United Mine Workers and the Northern West Virginia Subdivisional Coal Association. Mr. McCullough rejected the contention of some operators that individual signed requests must be submitted before union dues could be checked off.

A total of 203 complaints and petitions have been filed with the Division II Labor Board since Dec. 1, 1933, and formal hearings have been held in 59 cases, resulting in the issuance of 35 formal decisions, according to a report of John A. Lapp, chairman, on July 6. Early in July, as a result of a complaint preferred by the Progressive Miners of America, the board ruled that the No. 2 mine of the Dorthel Coal Co., Peoria, Ill., had not entered into a contract with the Progressives, and that it was still operating under an agreement with the United Mine Workers. As a result of a joint request by the Progressives and the Illinois Coal Producers' Association, the board ruled that the price of coal to employees had been fixed by special contract in full force and effect.

In a case brought by the United Mine Workers against the Black Jewel Coal Co., Peoria, it was alleged that all employees had been discharged on Nov. 6, 1933, other labor being employed on the open-shop basis since that time, although the mine continued to fly the Blue Eagle. The operator contended that he was unable to pay the wage scale and had closed down to avoid violence, and that the mine had been reopened on Nov. 10, 1933, all men complying with a request to return being reemployed on that day. The board found that the facts had been confused; that while the operator was willing to negotiate with the union the owner was not; that former employees should be reinstated; and that the company should enter into collective-bargaining arrangements with the men when informed representatives had been selected to speak for them.

Union Charges Discrimination

Several other cases of alleged discrimination against members of the United Mine Workers were decided in July, as follows: Cusack & Kirkman mine, Peoria, Ill.—three miners alleged to have been discharged left because of misunderstanding; company had not refused to bargain collectively; adoption of a wage agreement recommended when it is shown that a majority of the men belong to a union; union activity shall not subject men to discharge and membership shall not be prevented; South Side Coal Co.—complaint that eight men were discharged for joining union and that operator continues non-union operation while flying the Blue Eagle dismissed with recommendation that when mine reopens men formerly employed shall have first chance at jobs, to which operator agreed; Peters Coal Co., Tell City, Ind.—contention that employee was discharged for union activity upheld; ordered reinstated; Owls Glory mine, Williamsport, Ind.—discharge of employee justified because his union-promotion activities interfered with the work of other men, but offense not serious enough to keep him from further employment; company directed to refrain from efforts to prevent men joining the union.

In the case of three members of the Progressive Miners of America expelled from the local union at the Rex mine, Eldorado, Ill., and subsequently discharged by the operator, the board recommended that the union give them a full and adequate hearing and that they be reemployed pending a decision. The men attended a previous hearing on the Rex case before the labor board.

In three cases involving relations between the Universal Coal Corporation and the Associated Miners of Indiana, the board ruled: (a) that checkweighmen have the right to return to their original occupation when this post is eliminated; (b) that the question of equal division of labor, which came up as a result of a change to mechanical loading, be settled between the operators and miners, in view of the unusual

circumstances prevailing in this particular instance; and (c) that the board has no function to interfere in the internal workings of a labor union, although it recommended that the Associated Miners give a hearing to five men claiming to have been expelled without a fair trial.

Upon complaint of the Fountain County (Indiana) Unemployed and Temporarily Unemployed League, the board decided that employees of the Armstrong Coal Co. are not obligated to pay compensation premiums and that such assessment is a violation of the code; also that the operator has the right to require limits on mine-car loading and to establish them himself in case of failure to agree with representatives of employees.

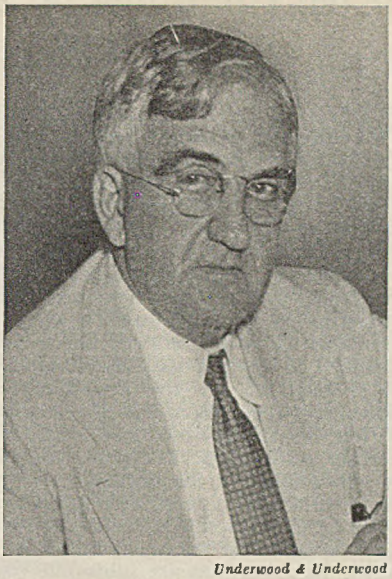
Construction of a tipple, transfer of machinery and the building of the necessary tracks in the opening of a new mine do not constitute coal mining and therefore are not subject to the code, the board declared in deciding an application of the Sunlight Coal Co. for an interpretation. It further held that removing the overburden in stripping is not coal mining until the shovel reaches merchantable coal, but stipulated that the decision was not to change any agreements covering these activities already included in contracts.

The fan house at the No. 57 mine of the Peabody Coal Co., Springfield, Ill., was destroyed by dynamite July 7 after the watchman had been kidnapped, the explosion filling the airshaft with débris. Approximately 300 men were at work at the time, but were brought to the surface without injury. Operations were resumed on July 13.

The Central Coal & Coke Co., for which J. M. Bernardin, Kansas City, Mo., is receiver under a federal court order, was directed to refrain from "intimidating" employees at its Bevier (Mo.) mine and refusing them the right of collective bargaining in accordance with the provisions of the bituminous code by the Division IV Labor Board on July 21 in a decision which upheld in toto the charges included in a formal complaint filed by the United Mine Workers on Dec. 7, 1933. UMW charges included allegations that individual contracts had been collected and assembled by the receiver to form the Southwestern Miners of America, and that employees had been discharged for affiliation with the United Mine Workers. Reinstatement of these employees was directed in the decision.

Urges Anthacite Peace

The future prosperity of the anthracite region and its workers "requires that an honorable peace be made between the two unions — Anthracite Miners of Pennsylvania and the United Mine Workers—now before us, to the end that there may ensue an era of industrial peace, with a consequently increasing demand for anthracite and with work instead of idleness for thousands of miners now without jobs," declared Mr. Gorman in opening the last of a series of hearings on grievances offered by the Anthracite Miners' organization at Wilkes-Barre, Pa., July 9. "The finding of the umpire now made is referred to the representative of the two unions in the hope that it may have their thoughtful consideration."



Underwood & Underwood

Willard E. Hotchkiss

Who is president of Armour Institute of Technology, Chicago, has been put in charge of NRA research and planning division's fact-finding investigations into disputed interdistrict wage differentials left unsettled by the wage agreements of last spring and the code wage minimums. Mr. Hotchkiss was secretary of the President's Industrial Commission in 1920; headed the industrial relations research staff of the U. S. Coal Commission in 1923, and was war-time secretary of the Shipbuilding Labor Adjustment Board. Announcement of his present appointment was made on July 6.

The July 9 hearing brought to an end the presentation of evidence in 1,036 docketed grievances filed by the new union. Agents for the umpire immediately began an inspection of actual conditions under which certain men who filed complaints worked in conjunction with the men themselves and representatives of the companies involved and the new union. Both organizations received the umpire's peace proposal in silence, which was officially unbroken in succeeding days.

State police were forced to the use of tear gas to stop an attack on miners employed by the Humbert Coal Co., an independent operation with a mine at Jessup. The clash took place on July 6, and the strike was called off on July 9. Employees at the Harry E. and Forty Fort collieries on July 6 voted to return to work on July 9 after being on strike since June 20 over the alleged discharge of older men and their replacement with younger miners. Alleging that two wage committee members were discharged as a result of their activities in a controversy over reputed violations of the wage agreement, 700 employees of the Locust Gap colliery of the Philadelphia & Reading Coal & Iron Co. struck on July 9. As a result of a strike of employees in the No. 5 section over the alleged violation of an agreement governing employment, the No. 7 colliery of the Susquehanna Collieries Co., Nanticoke, Pa., was thrown idle on July 10. The men returned July 16.

Personal Notes

HOBART B. BAIRD, formerly vice-president and sales manager, Berwind-White Coal Mining Co., New York, has been elected vice-president of the Koppers Coal & Transportation Co., Koppers Coal Co., Inc., and Castner, Curran & Bullitt, Inc., with headquarters in Pittsburgh, Pa.

ALPHONSE F. BROSKY, a member of the editorial staff of *Coal Age* in various capacities since 1921 and lately consulting editor, has resigned the latter position to become special engineer for the Jeffrey Mfg. Co., Columbus, Ohio. Last winter, Mr. Brosky acted as assistant fuel adviser to the Federal Surplus Relief Corporation.

JOHN M. CARMODY, chief engineer, Federal Emergency Relief Corporation, impartial member of the Division I—North Labor Board and formerly editor of *Coal Age* and *Factory and Industrial Management*, has been appointed a member of the National Railway Mediation Board.

FRANK H. CROCKARD, for many years president of the Woodward Iron Co., Woodward, Ala., has been appointed deputy administrator, Division IV, NRA, handling codes for the wholesale trade.

H. A. GLOVER, whose eighteen-year connection with the coal business includes the positions of vice-president in charge of sales, Knox Consolidated Coal Co., Indianapolis, Ind., and general manager of sales, Consolidation Coal Co., New York, has been appointed assistant to the president of the Island Creek coal and coal sales companies, with headquarters in Cincinnati, Ohio.

ROY P. HUDSON, chief chemist for the Elk Horn Coal Corporation since 1930 and for six years before that connected with the coal and blast-furnace departments of the American Rolling Mill Co., has resigned to enter consulting work, with headquarters at Wayland, Ky. Mr. Hudson plans research work in fuel technology problems, including coal preparation, stoker coals and metallurgical coal and coke.

W. E. E. KOEPLER, secretary, Pocahontas Coal Operators' Association, Bluefield, W. Va., has been elected first vice-president of the Smoke Prevention Association of America.

MCKINLEY W. KRIEGH, specialist in the taxation, tariff, corporate reorganization and industrial problems of the natural-resources industries, has resigned his position in the Interpretive, Appeals and Civil Divisions of the Office of the General Counsel, U. S. Bureau of Internal Revenue, to return to private practice in association with the law firm of Edward Clifford, Washington, D. C.

JOHN P. LAFFERTY, superintendent, northern division, Pittston Co., Scranton, Pa., has been made general superintendent of mines and his former position abolished.

O. O. MALLEIS, formerly in charge of the Koppers laboratory, Pittsburgh, Pa., where he acted as chief chemist and specialized in coal research work, has joined the staff of Appalachian Coals, Inc., Cincinnati, Ohio, as manager of inspection and laboratory work.

A. B. MCGARY, personnel manager for the Pennsylvania and Maryland divisions

of the Consolidation Coal Co., has resigned that position to become commissioner for the Northern West Virginia Subdivisional Coal Association, with headquarters in Fairmont, W. Va. Mr. McGary is succeeded as personnel manager by EARL KREITZBURG, Frostburg, Md.

K. U. MEGUIRE, president, Dawson Daylight Coal Co., Louisville, Ky., has been named a member of the National Advisory Council of the Crusaders, an organization interested in representative government.

R. J. OLDHAM, general superintendent, has been made general manager of the Centralia Coal Co., Centralia, Ill.

J. E. TOBEY, mechanical engineer, South Bend, Ind., whose experience includes positions as senior engineering officer, U. S. Navy and chief engineer of power plants, Studebaker Corporation of America, as well as consulting work in power-plant problems and coal application, has joined the staff of Appalachian Coals, Inc., Cincinnati, Ohio, as fuel engineer.

Research Funds Offered

To promote the program of Bituminous Coal Research, Inc., the Battelle Memorial Institute, Columbus, Ohio, has agreed to contribute funds up to 25 per cent of the total put up by the bituminous industry, but not to exceed $25,000, provided the work is carried on at the institute. The purpose of the offer, according to the institute, is to make possible a broader and deeper research program than would be possible otherwise.

Coal Utilization Course Held

With coal characteristics, preparation and application; combustion and combustion equipment; the dealer's problems and relations with producers and consumers, and industrial fuel purchases as the major topics of discussion, the Short Course in Coal Utilization sponsored by the College of Engineering, University of Illinois (July *Coal Age*, p. 288), was held at Urbana, Ill., July 12-14. Registration totaled 148, representing fourteen States, and the course was featured by six complete lecture and discussion sessions participated in by members of the university staff and leaders in the field of utilization, and a dinner meeting. Much sentiment for a similar course in 1935 was in evidence.

Association

A. F. McElhenie, vice-president, Pittsburg & Midway Coal Mining Co., was elected president of the Midwest Coal Traffic Bureau at the annual meeting in Kansas City, Mo., last month. Other officers are: executive vice-president, A. P. Rudowsky, vice-president, McAlester Fuel Co.; vice-president and counsel, Thomas L. Philips; and executive secretary-treasurer, H. J. Goudelock.

T. J. O'Brien, president, Kemmerer Coal Co., Salt Lake City, Utah, was elected president of the Southern Wyoming Coal Operators' Association at the annual meeting in July. L. W. Mitchell, Rock Springs, Wyo., was reelected executive secretary.

Coal Continues War on Competitive Fuels; Steffens Offers Plan to Fight Gas

WHILE the setting of a date for a hearing on the application of Alabama producers, supported by the ice industry of the Southeast, for a federal court injunction against the power program and kindred activities of the Tennessee Valley Authority (July *Coal Age*, p. 293) was being held in abeyance, the coal and ice men lost a round in the battle on July 14, when the Alabama Public Service Commission declined to rescind its June 1 approval of a contract for the interchange of power between TVA and the Alabama Power Co. and the purchase by TVA of certain utility properties of the company in six counties in the northwestern part of the State. The commission, as a result of the petition, did decide, however, that where the authority acts as a utility its operations are subject to regulation by the State, and rate schedules and regulations must be filed.

Opposition to further expenditure of government money for hydro-electric plants continued to gather force in July. Both the National Coal Association and the National Job Saving and Investment Protection Bureau for the Coal Industry intensified their efforts. The National Coal Association, it was reported, will soon fire a broadside of printer's ink at government expenditures for unsound power projects, opening the attack with a "pamphlet of enlightenment" in the fall for general distribution. Unexpected assistance in the industry's campaign was received from Duke University, Durham, N. C., which filed a vigorous protest against a PWA grant of approximately $3,000,000 to Greenwood County for a hydro project on the Saluda River. One textile plant will be benefited, the university claimed, and federal funds should not be used for this purpose.

Oil involved several city officials of Middlesboro, Ky., in difficulties with the Court of Appeals early in July. The Mayor and two commissioners were fined $10 each for violating an injunction restraining these officials from taking any further steps toward the construction of an oil-fired municipal power plant without authorization from the court. Further developments in the oil-fuel field included the scheduling of a thorough investigation into prices for fuel and heating oils on July 30 by Secretary of the Interior Ickes, who also is Oil Administrator. The investigation grew out of a study of increases undertaken by the Petroleum Administrative Board, and is considered necessary by the Oil Administration to protect the interests of household and industrial consumers, and also to check the growth of reported monopolistic practices.

To meet the competition of other fuels, the Oil Administrator late in July approved a reduction in top price from the posted price in contracts for the sale of range oil, diesel oil and domestic and industrial fuel oils in Regions 1 and 3, including Eastern States south to Virginia, the Middle West, most of the Northwestern States and part of the Southwestern States.

Natural-gas developments in July included the failure of the bituminous industry to agree with the gas industry on fair trade practices for inclusion in the natural-gas code, which is still hanging fire, and the development of a national program for combating gas by A. B. Steffens, president, Indiana & Illinois Coal Corporation, and chairman, Illinois Coal Operators' Committee on Natural Gas. Coal operators of the United States must present a united front if headway is to be made against natural gas, Mr. Steffens declares, and must enlist the support of all individuals and organizations whose interests are affected by the well-being of the industry. "It is fairly apparent that neither Washington nor our various State legislatures show any particular zeal to take action upon the coal operators' appeal in their complaint against natural gas," and, therefore, the support of organized labor, with its mass voting power, is essential.

Two classes of remedies should be sought by the industry:

1. Legislative action against so-called "dump prices" for natural gas, including: (a) inclusion of terms of fair competition equivalent to those under which the coal industry operates in the natural-gas code (in association with the NRA); (b) the placing of natural-gas transportation under the jurisdiction of the Interstate Commerce Commission; (c) acceptance of the industry's contention that all delivered prices for natural gas must be based on the average cost of all such gas delivered at the city gate (in association with the President, State governors and all proper federal and State commissions and officials); and (d) introduction and support of national and/or State excise taxes, provided the other three recommendations are not adopted.

2. Businesslike action to offer stronger competition to natural gas in its campaign for the space-heating market.

Organization to secure the first group of objectives should be based on the formation of a national committee, with a paid secretary and headquarters in Washington, D. C., on which each State taking part in the movement would be represented. Similar committees should be set up in each State with sufficient coal production, each with a paid secretary who would report to the national secretary. It would be the duty of the State committees to secure sufficient organizers, possibly all or half miners, and, with the support of union officials, send these organizers out to arrange mass meetings in all mining communities for the introduction and adoption of resolutions addressed to federal and State officials and legislative bodies. "The expense of this organization probably should be borne by the operators in each State and eventually by the railroads, but it should not be excessively high." An early start, however, is essential if results are to be expected by the time Congress convenes.

Intelligent and active advertising is the best method of carrying out the second line of activity. Natural gas leans heavily on this merchandising staff. Coal is not only cheaper than gas, except in certain localities close to the point of production, but also is just as automatic, convenient and clean, and money to bring these facts before the public as effectively as gas presents its message must be raised by the combined efforts of operators, distributors, stoker and mining machinery manufacturers and, "it is to be hoped, the railroads." Chicago retailers have been allowed 1c. per ton by the operators as their contribution to advertising coal heat. "A 5c. per ton contribution by the operators for this purpose would by no means be too heavy a price to pay, and other interests should gage their contributions accordingly." The resulting advertising and sales campaign should be managed jointly by the State committees and a committee representing retailers and related interests.

Submission of Mr. Steffens' program to the general code meeting in Washington, D. C., July 25, was voted by the Illinois Subdivisional Code Authority at its last meeting.

Steam Truck on Tour

A high-speed, heavy-duty English steam truck is now being demonstrated in the Eastern States by the Sentinel Waggon Works, Ltd., which has established headquarters at Greensboro, N. C., during the demonstration period. A tour of several Southern States, including the southern West Virginia coal field, was completed in July, and Ohio, Pennsylvania, New York, Connecticut and Massachusetts will be covered in August, it is announced.

The Sentinel steam truck is propelled by a 4-cylinder, single-acting glandless steam engine rated at 120 b.hp. Steam is generated in a boiler built for a working pressure of 225 lb. per square inch, which can be either hand- or stoker-fired. Flow of steam to the engine is controlled by a foot-operated throttle valve. Two feedwater tanks located on each side of the boiler at the rear of the seats have a capacity of 165 gal., said to be sufficient for 40-60 miles of normal running, and the coal bunkers, filled through hatches in the cab roof, hold 725 lb. of fuel, sufficient for 150-180 miles.

Capacities without trailer, depending upon the body type, are: 4-wheel, 5 to 7 tons at 20 m.p.h.; 6-wheel, 10-11 tons at 20 m.p.h.; 8-wheel, 13 tons. With trailer, capacities are considerably increased. In 275 miles from Newport News to Greensboro, consumption of Pocahontas coal averaged 3 lb. per mile, or 0.9c. on the basis of $6 per ton for the coal, compared with 4c. per mile with gasoline at 20c. per gallon.

To Push Iowa Coal

Use of Iowa coal in tax-supported institutions within the State is the objective of a campaign announced by the Iowa Coal Institute, Albia, to increase the working time of Iowa mines. The program, it is reported, includes the use of all advertising mediums and special promotional facilities.

Tentative Rank and Grade Classifications Offered for Bituminous Coal

TWO proposed systems of coal classification were recommended to the American Society for Testing Materials for publication as tentative and submission to the American Standards Association for approval as "American Tentative Standards" in a report of the Sectional Committee on Classification of Coals, presented at the 37th annual meeting of the A.S.T.M., Atlantic City, N. J., June 25-29. The recommendations were: "Proposed Tentative Specifications for Classification of Coals by Rank," offered by the Technical Committee on Scientific Classification, incorporating names proposed by the Technical Committee on Nomenclature, and "Proposed Tentative Specifications for Classification of Coals by Grade," offered by the Technical Committee on Use Classification.

The basic scheme of classification by rank (Table I) is according to fixed carbon and B.t.u. calculated to the mineral-matter-free basis. The higher-rank coals are classified according to fixed carbon on the dry basis; lower rank, on the moist basis. Agglutinating and slacking indices are used to differentiate between certain adjacent groups. Position of a coal in the scale of rank may be expressed in condensed form as, to say, (62-146), in which the parenthesis signifies that the contained members are on the mineral-matter-free basis. The first number represents the nearest whole per cent of fixed carbon on the dry basis, and the second the B.t.u. content on the moist basis to the nearest 100. Where agglutinating or weathering properties enter into the classification, they must be added outside and immediately following the last parenthesis, using the following symbols: ag = agglutinating; na = non-agglutinating; we = weathering; and nw = non-weathering.

Symbols describing the grade of coal, as developed by the Committee on Use Classification (Table II) shall be placed after the last parenthesis, as follows: (62-146) 132-A8-F24-S1.6, in which 132 indicates a B.t.u. content of approximately 13,200, an ash content of 6.1 to 8 per cent; an ash-softening temperature of 2,400 to 2,590 deg. F. and a sulphur content of 1.4 to 1.6 per cent, all expressed on the basis of the coal as sampled.

Classification of a coal bed, or part of a coal bed, in any locality according to rank shall be based on the average analysis and calorific value (and agglutinating and weathering index, where required) of not less than three, and preferably five or more, face samples taken in different and uniformly distributed localities, either within the same mine, or closely adjacent mines, representing a continuous and compact area not greater than approximately four square miles in regions of geological uniformity. In regions where conditions indicate that coal probably varies rapidly in short distances, spacing of samples and grouping of analyses to provide average values shall not be such that coals of obviously different rank will be used in calculating average values. Samples shall

Table I—Classification of Coals by Rank

Legend: F.C. = Fixed Carbon. V.M. = Volatile Matter. B.t.u. = British thermal units.

Class	Group	Limits of Fixed Carbon or B.t.u. Mineral-Matter-Free Basis	Requisite Physical Properties
I. Anthracite	1. Meta-anthracite	Dry F.C., 98 per cent or more (Dry V.M., 2 per cent or less)	Non-agglutinating[1]
	2. Anthracite	Dry F.C., 92 per cent or more and less than 98 per cent (Dry V.M., 8 per cent or less and more than 2 per cent)	
	3. Semianthracite	Dry F.C., 86 per cent or more and less than 92 per cent (Dry V.M., 14 per cent or less and more than 8 per cent)	
II. Bituminous[3]	1. Low volatile	Dry F.C., 77 per cent or more and less than 86 per cent (Dry V.M., 23 per cent or less and more than 14 per cent)	
	2. Medium volatile	Dry F.C., 69 per cent or more and less than 77 per cent (Dry V.M., 31 per cent or less and more than 23 per cent)	
	3. High volatile *A*	Dry F.C., less than 69 per cent (Dry V.M., more than 31 per cent); and moist[2] B.t.u., 14,000[4] or more	
	4. High volatile *B*	Moist[2] B.t.u., 13,000 or more and less than 14,000[4]	
	5. High volatile *C*	Moist B.t.u., 11,000 or more and less than 13,000[4]	Either agglutinating or non-weathering[5]
III. Subbituminous	1. Subbituminous *A*	Moist B.t.u., 11,000 or more and less than 13,000[4]	Both weathering and non-agglutinating
	2. Subbituminous *B*	Moist B.t.u., 9,500 or more and less than 11,000[4]	
	3. Subbituminous *C*	Moist B.t.u., 8,300 or more and less than 9,500[4]	
IV. Lignitic	1. Lignite	Moist B.t.u., less than 8,300	Consolidated
	2. Brown and	Moist B.t.u., less than 8,300	Unconsolidated

[1]If agglutinating, classify in low-volatile group of the bituminous class.

[2]Moist B.t.u. refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

[3]Pending the report of the Subcommittee on Origin and Composition and Methods of Analysis, it is recognized that there may be non-caking varieties in each group of the bituminous class.

[4]Coals having 69 per cent or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of B.t.u.

[5]There are three varieties of coal in the High-volatile *C* bituminous coal group, namely, Variety 1, agglutinating and non-weathering Variety 2, agglutinating and weathering; Variety 3, non-aggultinating and non-weathering.

Table II—Symbols for Grading Coal According to Ash, Softening Temperature of Ash, and Sulphur (Analyses Expressed on the Basis of the Coal as Sampled)

Ash[1]		Softening Temperature of Ash[2]		Sulphur[1]	
Symbol	Per cent, inclusive	Symbol	Deg. Fahr., inclusive	Symbol	Per cent, inclusive
A4	0.0 to 4.0	F28	2,800 and higher	S0.7	0.0 to 0.7
A6	4.1 to 6.0	F26	2,600 to 2,790	S1.0	0.8 to 1.0
A8	6.1 to 8.0	F24	2,400 to 2,590	S1.3	1.1 to 1.3
A10	8.1 to 10.0	F22	2,200 to 2,390	S1.6	1.4 to 1.6
A12	10.1 to 12.0	F20	2,000 to 2,190	S2.0	1.7 to 2.0
A14	12.1 to 14.0	F20 minus	less than 2,000	S3.0	2.1 to 3.0
A16	14.1 to 16.0			S5.0	3.1 to 5.0
A18	16.1 to 18.0			S5.0 plus	5.1 and higher
A20	18.1 to 20.0				
A20 plus	20.1 and higher				

[1]Ash and sulphur shall be reported to the nearest 0.1 per cent by dropping the second decimal figure when it is 0.01 to 0.04, inclusive, and by increasing the percentage by 0.1 per cent when the second decimal figure is 0.05 to 0.09, inclusive. For example, 4.85 to 4.94 per cent, inclusive, shall be considered to be 4.9 per cent.

[2]Ash-softening temperatures shall be reported to the nearest 10 F. For example, 2,635 to 2,644 F., inclusive, shall be considered to be 2,640 F.

be taken in accord with U. S. Bureau of Mines method, or its equivalent, and shall be placed in moisture-tight containers in mine. Samples from outcrops or from weathered or oxidized coal shall not be used for classification by rank.

In case coal is likely to be classified on "moist" basis, that is, containing natural bed moisture, samples shall be taken at freshly exposed surfaces, which are free from visible surface moisture if possible. Samples of low-rank coals which appear dry at time of collection frequently give off moisture, which condenses on inner surface of sample containers before they are opened for analysis. With coals which were free of visible surface moisture when sampled, but which show moisture on inner surface of containers when opened, both container and coal shall be weighed before and after air drying and total loss in weight shall be reported as air-drying loss.

Sampling Cautions

If the coal cannot be sampled without including visible surface moisture, and the coal is likely to be classified on the "moist" basis, sampler's description shall state "sample contains surface moisture." Samples so marked shall not be used for classification on a moist basis unless brought to a standard condition of moisture equilibrium at 30 deg. C. in a vacuum desiccator, using saturated solution of potassium sulphate (96 per cent humidity), as suggested by Stansfield and Gilbart—Transactions, A.I.M.E., Coal Division, p 125 (1932). Analyses of such wet samples as have been treated in this manner shall be dosignated as "wet samples equilibrated at 30 deg. C. and 96 per cent humidity."

Run-of-mine coal and prepared sizes of coal shall be classified on representative samples taken in accord with Standard Method of Sampling Coal, A.S.T.M., Designation: D21, 1933 Book of A.S.T.M. Standards, Part II, p. 318. If coal is likely to be classified on "moist" basis, samples shall be taken at tipple or preparation plant and protected against moisture loss as specified in Sects. 8 and 9, Standard Method D21. Samples which appear dry at time of collection shall be handled as already described for bed samples, to insure correct determination of total air-drying loss. Samples which have visible surface moisture when taken, and which are likely to be classified on "moist" basis, shall be marked by sampler, equilibrated and analysis designated as already described for bed samples.

Pending adoption of a method by American Society for Testing Materials, weathering or slacking characteristics briefly shall be determined as follows: From 500 to 1,000 grams of approximately 1- to 1½-in. lumps shall be air-dried 24 hours at 30 to 35 deg. C. with humidity of 30 to 35 per cent, and lumps immersed in water for 1 hour, water drained off and sample again dried for 24 hours. Disintegration shall be determined by sieving on 8-in. wire-mesh screen with 0.263-in. square openings and weighing the quantity of undersize. Percentage of undersize, after deducting a blank sieving test, shall be weathering or slacking index of coal.

Agglutinating index, pending consideration of an agglomerating test now being investigated, shall be determined in accordance with "Tentative Method of Test for the Agglutinating Value of Coal of the A.S.T.M." Parr or approximation formulas are to be used in calculating fixed-carbon and ,B.t.u. to the mineral-matter-free basis, the former in case of litigation. In case of controversy, samples containing more than 1 per cent of carbon dioxide occurring as carbonates shall be either (1) crushed to pass an 840-micron (No. 20) sieve and floated on a heavy liquid of such specific gravity as to reduce the carbonate to 1 per cent or less on a dry basis, recovery of float coal to be more than 75 per cent, or (2) analyzed for mineral matter in accordance with the Parr method for coals of high calcium-carbonate content. Method 1 is to be used in case of litigation.

In the classification of coals by grade, separation is made according to calorific value, ash and sulphur content, and ash-softening temperature. Other properties, such as resistance to breakage, screen size and caking properties, are under consideration.

Mines Block Lumber Restrictions

Proposals to force the purchase of lumber for use at coal mines through retail dealers initiated some time ago by the lumber code authority were turned down by the NRA in July over the recommendation of the Deputy Administrator in charge of the lumber code. It is understood that the lumber industry will attempt a revision of its suggestions to remove the discriminatory provisions objected to by the bituminous industry and other consumers, particularly building contractors.

The Late S. D. Dimmick

S. D. Dimmick Dies of Infection

Shelby DuValle Dimmick, 47, vice-president and general manager, Glen Alden Coal Co., Scranton, Pa., died at the Wilkes-Barre (Pa.) General Hospital, July 14, of blood poisoning resulting from leg injury received in an automobile crash. Born at Bowman's Creek Sept. 21, 1886, Mr. Dimmick started his coal-mining career in 1902 as a pegboy at the Pettebone colliery, Forty Fort, operated by the Delaware, Lackawanna & Western R.R.'s coal division. In 1903, he became a chainman on the engineering corps, and was promoted to assistant transitman and later draftsman and assistant engineer in 1906; district engineer in 1908; chief engineer in 1915; assistant to the general manager in 1916; general superintendent for the Glen Alden Coal Co., which took over the railroad properties, in 1920; and vice-president and general manager in 1921.

Obituary

Samuel Dixon, 77, president, Price Hill Collieries Co., died at his home at Price Hill, W. Va., July 7 of a cerebral hemorrhage following a paralytic stroke. A prominent figure in the New River field for nearly 50 years, Colonel Dixon came over from England in 1877, starting his mining career as bookkeeper and later as mine foreman in Fayette County. In 1893, he went to Macdonald as president of the Macdonald Collieries Co., which he merged with a number of other coal and railroad properties in 1906 to form the New River Co., retaining the offices of president and general manager until his resignation in 1912. He continued to operate the Price Hill company, which was organized in 1899, until his retirement about a year ago as a result of ill health.

Herbert A. Thomas, 76, pioneer Alabama operator and for many years associated with his brother Peter B. Thomas in the operation of the Montevallo Coal Mining Co. prior to his retirement some years ago, died at his home in Boothton, Ala., July 14.

No Appeal on Import Tax

The decision of the U. S. Court of Customs and Patent Appeals that coal and coal products from Great Britain and Germany should be exempted under the provisions of "most-favored-nation" treaties from the tax of 10c. per 100 lb. provided in the Revenue Act of 1932 will not be appealed, according to the Department of Justice. The decision was handed down on April 2.

Reorganizations Proposed

Hearing on the application of the Franklin County Coal Co., Inc., operating mines at Herrin and Royalton, Ill., for reorganization under the new federal bankruptcy act has been scheduled before U. S. District Court at East St. Louis, Ill., in August. Pending hearing, present officers are authorized to continue business. Book value of the corporation's assets was set at approximately $5,000,000, including fixed assets of $4,250,000; liabilities total $7,041,731.

Reorganization of the capital structure of the Old Ben Coal Corporation was approved by Federal Judge Wham in East St. Louis on July 12. The corporation scheduled assets of $27,500,000 and liabilities of $11,595,356. The approved plan of reorganization follows the proposed plan reported in July *Coal Age*, p. 293.

A petition for reorganization under the new act was filed in the federal court at Birmingham, Ala., July 20, by the DeBardeleben Coal Corporation, which scheduled assets of $8,414,081.29. The court ordered operations continued for the benefit of the creditors and set the hearing on the petition for Aug. 13.

Kentucky Mine Law Signed

After being killed, due to the failure of the Lieutenant Governor to sign, the Kentucky mine law adopted during the regular session ended in March was passed at the special session of the Legislature ended July 2 with the addition of a revenue and emergency clause, and was signed on the same day. The revenue feature added was a charge of $7.50 for each mine-scale inspection and the declared emergency was the employment of some 4,000 persons in mines without safety supervision, as well as the inapplicability of many of the original clauses in the old mine law.

The new law applies to all commercial coal mines, a commercial mine being defined as "any coal mine from which coal is mined for sale or exchange," and major provisions include: training of all employees in first-aid; compulsory checking of employees in and out of the mine; placing of responsibility for his individual safety, particularly while at the working face, directly on the workman; and limiting the checkweighman's duties to checkweighing.

Forecast Higher Coal Shipments

An increase of 3.9 per cent in shipments of coal and coke is forecast for the third quarter of this year by Shippers' Regional Advisory Boards. Prospective loadings are estimated at 1,721,649 cars, as compared with 1,656,939 cars actually shipped in the third quarter of 1933.

Fatalities in Coal Mines Show Sharp Decline

Coal-mine accidents caused the deaths of 48 bituminous and 11 anthracite miners in June, 1934, according to information furnished the U. S. Bureau of Mines by State mine inspectors. This compares with 72 bituminous and 13 anthracite fatalities in June, 1933. Based on a production of 26,424,000 tons, the bituminous fatality rate for June was 1.82 per million tons, the lowest recorded thus far this year. The anthracite death rate dropped from 4.95 in May to 2.63 in June, based upon the mining of 4,184,000 tons in the latter month. The June anthracite rate compares with 3.31 for the same month in 1933, and is the lowest recorded in the first six months of 1934. For the two industries combined, the death rate was 1.93 per million tons, against 2.88 in May and 2.91 in June, 1933.

Comparative fatality rates for the first six months of 1934 and 1933, by causes, are given in the following table:

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

Cause	Bituminous: Number killed	Bituminous: Killed per million tons	Anthracite: Number killed	Anthracite: Killed per million tons	Total: Number killed	Total: Killed per million tons
January—June, 1933						
Falls of roof and coal	196	1.350	55	2.457	251	1.498
Haulage	68	.468	13	.581	81	.483
Gas or dust explosions:						
Local explosions	10	.069	8	.357	18	.107
Major explosions	...	...	...	...	...	...
Explosives	10	.069	3	.134	13	.078
Electricity	18	.124	2	.089	20	.119
Machinery	7	.048	...	...	7	.042
Surface and miscellaneous	24	.165	16	.715	40	.239
Total	333	2.293	97	4.333	430	2.566
January—June, 1934						
Falls of roof and coal	238	1.303	76	2.317	314	1.457
Haulage	72	.394	17	.518	89	.413
Gas or dust explosions:						
Local explosions	5	.027	10	.305	15	.070
Major explosions	...	...	...	...	...	...
Explosives	15	.082	7	.213	22	.102
Electricity	20	.110	3	.092	23	.107
Machinery	7	.038	2	.061	9	.042
Surface and miscellaneous	52	.285	28	.854	80	.371
Total	409	2.239	143	4.360	552	2.562

*All figures are subject to revision.

Scrip Committee in Alabama

Hearings on the use of scrip in Alabama were conducted by the scrip committee appointed under the provisions of the retail jewelry, food and grocery codes during the week of July 7. Its use was defended as a convenience by the Alabama Mining Institute, representing the operators, which also cited State Supreme Court decisions to the effect that making scrip a negotiable instrument payable in cash within one month of the date of issue, as required by the retail food and grocery code, would be a criminal offense in Alabama. While few miners' representatives appeared, spokesmen for organized labor in general vigorously advocated abolition of scrip as a reform measure.

Freight Increase Proposed

A decision to request a 10-per cent freight rate increase was reached at a meeting of leading railroad executives in Atlantic City, N. J., July 13. This decision, however, is subject to approval by all the carriers of the country, and is made necessary, it was explained, by recent legislation increasing the annual expenses of the railroads about $350,000,000.

Industrial Notes

W. S. Tyler Co., Cleveland, Ohio, has acquired all United States patent rights on the vibrating screens and washing and scrubbing apparatus manufactured by the Niagara Concrete Mixer Co., Buffalo, N. Y., and hereafter will handle all business on these items.

Louis Allis Co., Milwaukee, Wis., has removed its Pittsburgh (Pa.) office to the Oliver Building, with J. F. Rodgers in charge.

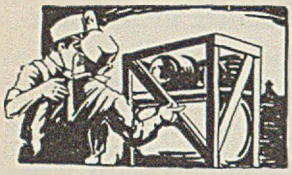
Stanley A. Knisely, Cleveland, Ohio, has been made advertising and sales promotion manager for the Republic Steel Corporation, Youngstown, Ohio, vice L. S. Hamaker, recently made vice-president and general manager of the Berger Mfg. Co., Canton, Ohio, a Republic subsidiary.

Delta-Star Electric Co., Chicago, has been granted a patent license by the General Electric Co. to manufacture oil-blast circuit-breakers.

American Cyanamid & Chemical Co., New York City, has acquired the plant, properties and business of Burton Explosives, Inc., Cleveland, Ohio, which will continue the manufacture and sale of explosives and blasting supplies as the Burton Explosives Division of the Cyanamid company.

Atlas Powder Co., Wilmington, Del., and its totally owned subsidiary, Giant Powder Co., have been combined and Giant business will be conducted under the name of the Atlas Powder Co., Giant Division, with headquarters at San Francisco, Calif.

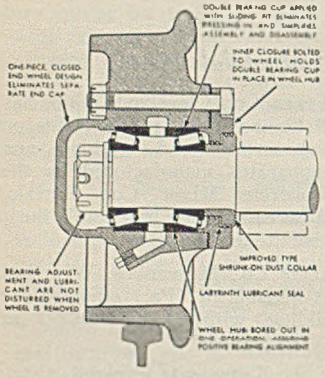
Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed W. R. Judson, previously managing director of Allis-Chalmers (France), as manager of the Salt Lake City (Utah) district office. Mr. Judson succeeds H. E. Weiss, transferred to the Kansas City (Mo.) office.



WHAT'S NEW
IN COAL-MINING EQUIPMENT

Roller-Bearing Mounting

Timken Roller Bearing Co., Canton, Ohio, announces a new type of bearing mounting for mine car service employing a double-cup bearing, instead of two single cups. The shrunk-in-place steel dust collar has been retained, but is modified so that it provides a labyrinth seal in conjunction with the inner closure. This, in conjunction with the fact that outer sealing is insured in the new design by the elimination of separate end caps on the wheels, the unit being cast in one piece, effectively prevents loss of lubricant in service or the entrance of foreign matter, according to the company. To remove the new type wheel, the three bolts which clamp the inner closure and wheel in place are loosened.



In the new mine-car mounting the wheel hub is bored out in a single operation. This, it is said, insures positive, correct bearing alignment and long life. When wheel replacement is necessary or when it is desired to inspect the bearings the wheel may be slipped off easily without disturbing the bearing adjustment. The bearing remains on the axle as a complete unit, the hub being machined for a slip fit over the bearing cup. This feature greatly facilitates wheel removal and decreases the cost of wheel replacement, the company says. It is not necessary to bring a car into the shop to replace a wheel, as a change, according to the company, can be made on the track in less than 15 minutes, using no tools other than a car jack and a wrench.

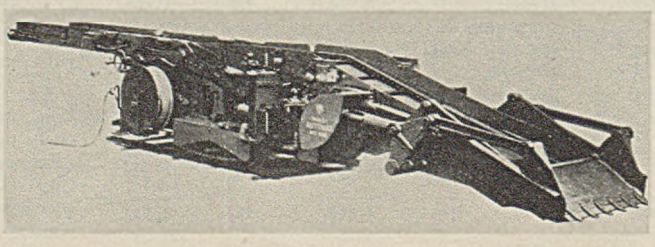
Like present mine-car types, the company points out, the new bearing provides for inspection and easy adjustment for wear, as well as even distribution of radial and thrust alloy steels and is designed to give long life under heavy loads and severe operating conditions. The new Timken mine-car-bearing mounting can be furnished in the closed-end-wheel, stub and extended-axle types.

Mobile Loader

Myers-Whaley Co., Knoxville, Tenn., offers the new low-type Whaley No. 3 size "Automat" coal loader with an over-all operating height of 44 in., a maximum loading capacity of 7 tons per minute and an average loading rate of 2 to 3 tons per minute. Height of the new machine is 4 in. less than any previous Automat loader; machines previously offered had a maximum capacity of 6 and an average capacity of 2 tons per minute.

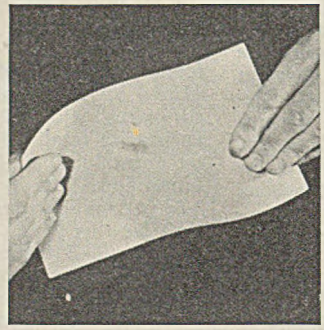
The new machine is track-mounted, is driven by one 25-hp. motor, equipped with parallel-lift rear conveyor for adjusting loading height, and weighs 17,500 lb. in working order. Controls are grouped on one side of the machine for convenient operation. Over-all width is 5 ft. 8 in., and the maximum reach is 11 ft. on each side, enabling the loader, according to the makers, to clean up places 24 ft. wide from a track in the center of the room.

Actual operation, it is stated, has demonstrated that the quick vertical adjustment of the shoveling end makes it possible to load even on a rolling bottom close to the pavement without taking up dirt, making possible an almost perfect clean-up; that the smooth and easy action of the shovel results in even less breakage of the coal than in hand shoveling; that, as jacks and bars are unnecessary, the machine easily can be operated in a 8-ft. entry and at the same time load out a 24-ft. room; and that no clean-up man is required, a full crew consisting only of an operator and car trimmer.



Battery Separator

Electric Storage Battery Co., Philadelphia, Pa., is now equipping Exide-Ironclad batteries with separators of "Exide Mipor," said to be an entirely new material. Exide Mipor is a form of vulcanized rubber in sheets, according to the company, and is permeated with



countless microscopic passages permitting free diffusion of the electrolyte. So small are these passages that the most minute solid particles of active material are prevented from passing through, it is said.

These separators are not affected by the electrolyte solution in a battery. Because they are vulcanized with heat during manufacture, they also are immune to heat. Necessary mechanical strength to withstand vibration and the rough conditions of service to which a battery frequently is subjected is another feature stressed by the manufacturer.

Both in the laboratory and field, tests, the company declares, have shown that Exide Mipor lasts indefinitely, functioning as a permanent electrical insulator, yet always permitting complete diffusion of the electrolyte, a long-sought combination of qualities. Among the advantages offered to Exide-Ironclad users are longer life, reduced maintenance, outstanding economy and freedom from trouble.

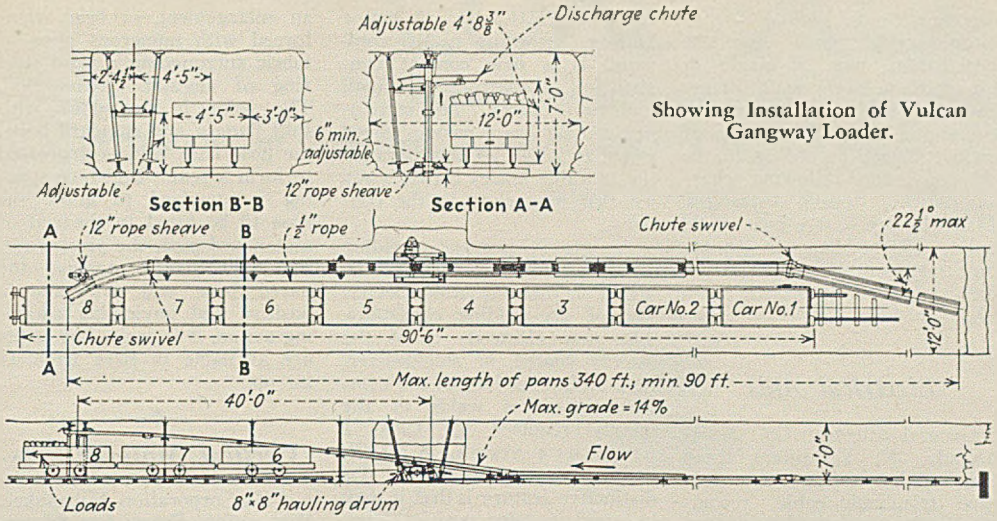
Bronze Bar Stock

Magnolia Metal Co., Elizabeth, N. J., offers Magnolia bronze bar stock to meet S.A.E. 64 specifications in lengths up to 12, 13 or 14 in. and diameters from ½ to 7 in. Both solid and cored stock is available with the following characteristics: tensile strength, 25,000 lb.; elongation in 2 in., 8 per cent; Brinell, 60. Features stressed by the company include the following: semi-finished internal diameter to show up imperfections; skinned outside to assure clean surface; cleaned-up ends to assure freedom from shrink-porosity and maximum usability from each bar; and a machining process which shows up all imperfections under the skin of bars.

Gangway Loader

Vulcan Iron Works, Wilkes-Barre, Pa., offers a new gangway or entry development loader, described as a self-contained unit performing the functions of a shaker conveyor, pit-car loader and car-spotting hoist. The drive is designed to operate a conveyor line with a maximum length of 340 ft., the inclined portion of the line beginning at the drive with a maximum gradient of 14½ per cent, gradually leveling off to the discharge chute approximately 50 ft. away. Thus, the coal is brought from the face and elevated a distance of approximately 5 to 5½ ft. for discharge into the car.

Cars are spotted by an 8x8-in. hauling drum with a maximum rope pull of 5,000 lb. The drum is remotely controlled from the operator's station at the discharge chute. A locomotive is not required



Showing Installation of Vulcan Gangway Loader.

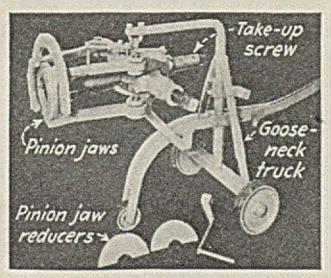
after the trip is brought to the loader. The elevated portion of the conveyor is supported on rollers attached to jacks by clamps, and this type of mounting also may be employed on the remainder of the conveyor line to allow the rollers to be raised or lowered to compensate for irregularities in the bottom.

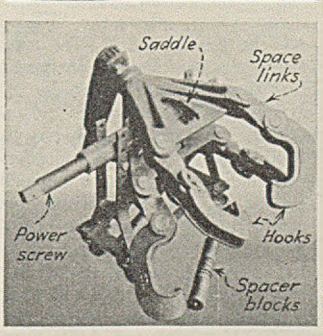
The new loader, according to the company, has the further advantage that it may be installed close to one rib, thus facilitating the installation of permanent track. One motor operates the conveyor and auxiliaries, and is mounted with the controller on a common skid plate. The controller, developed by Westinghouse, accelerates the motor from 400 to 1,000 r.p.m. and retards it from 1,000 to 400 r.p.m. 65 times per minute. The loaders, according to the company, are operating in gangways pitching 5 to 10 per cent, this in addition to the pitch of the inclined portion of the conveyor.

Mechanical Aids

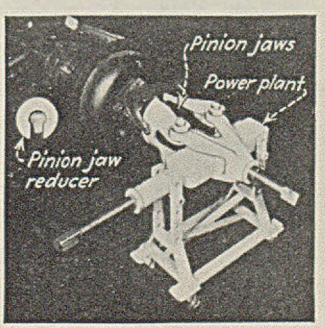
Smith Devices, 2245 North 12th St., Philadelphia, Pa., offers for shop and field use a flexible gear and pinion puller in capacities from 35 to 300 tons. It is furnished with pinion jaws as standard equipment, or with a set of four adjustable hooks for various types of gears and pulleys. The puller is carried in a goose-neck truck with a raising and lowering device for shop use. The power plant, which rests in a saddle and consists of a screw, wedge and rollers mounted in a housing, is adjusted by a take-up screw to take up the slack before removing the gear or pinion after it has been loosened by the power plant. With a 20-in. leverage, it is asserted, one man can develop a pull of 100 tons, depending upon puller capacity.

Somewhat similar equipment is the "Two-Power Strongback" for pulling gears, pinions, pulleys, propellers, etc., with capacities ranging from 25 to 500 tons. Weight of the 25-ton unit is 45 lb.; 50-ton unit, 60 lb.





Smith Devices Gear and Pinion Puller—Top, as Pinion Puller Mounted on Goose-Neck Truck; Bottom, as Gear and Pulley Puller.

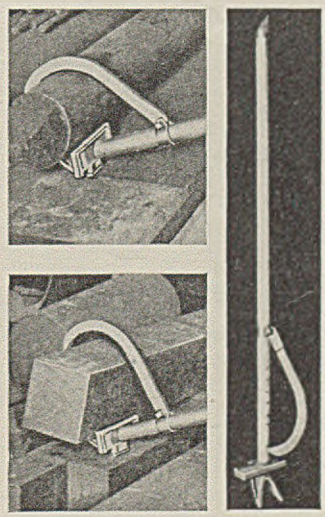


"Two-Power Strongback."

Smith Devices also offers the spike puller shown in the accompanying illustration, which is fitted with claws at both ends. One claw is shaped so that it can be thrust under a spike driven close to the rail, thus, it is said, eliminating hammering. After the spike is started, the bar is reversed, giving a two-step lift said to permit pulling the tightest spike without bending or the use of a heel block.

Another product of the company is a hook-and-roller bar for handling heavy timbers, pipe or steel, including raising them for attaching a chain or sling or moving them a short distance where the floor is solid. The bar, shown without rollers in the accompanying illustration, is said to handle material up to 7 in. without blocking and has an adjustable hook. Lift is adjustable by turning the handle.

Smith Devices Spike-Pulling Bar.



Smith Devices Hook-and-Roller Bar.

Fireless Locomotive

Heisler Locomotive Works, Erie, Pa., calls attention to the fireless locomotive as a transportation medium. In this type of locomotive, the firebox is eliminated and the boiler is replaced by a welded-steel tank with about three times the capacity. The tank is heavily insulated to prevent loss of heat and is filled with water to about four-fifths of capacity. Then, by means of a steam pipe entering the tank below water level, the water is heated until the pressure and temperature are the same as in the stationary boiler from which the charge is taken. The locomotive is driven by large, low-pressure cylinders from steam collected in the space above the water in the tank. As this steam is drawn off, the pressure and temperature in the tank are reduced and more water is converted into steam, this process continuing until atmospheric pressure and a temperature of 212 deg. F. are reached.

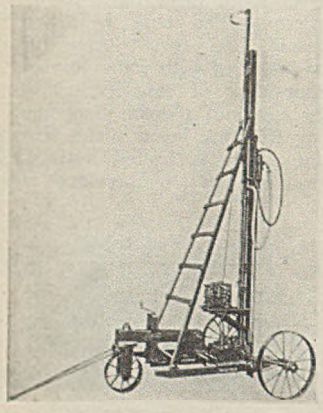
Heisler 42-Ton Fireless Locomotive.

The engine, it is said, can be charged from any stationary boiler carrying a pressure of 100 lb. or more, usual charging time requiring 10 to 30 minutes. One charge may last from 2 to 10 hours, depending upon the service. Little danger of the locomotive being stranded away from the charging station exists, it is said, as the tank will contain sufficient steam to return long after the pressure drops too low for useful work. Water need never be replaced and the locomotive can stand several days without losing sufficient pressure to render it inoperative, it is said. Other features pointed out by the company include: one-man operation; low depreciation and repair costs, due to the elimination of much of the equipment necessary on the usual type of locomotive; first cost approximately the same as or-

dinary steam locomotive and lower than other types; no auxiliary equipment required; direct use of steam without wasteful transformation.

Wagon Drill

An improved wagon drill has been added to the rock-drill line of the Worthington Pump & Machinery Corporation, Harrison, N. J., for quarry work and general rock excavation. Features noted by the company include: adjustable drill-steel centralizer to reduce time and labor in



collaring holes; a leveling device for bringing the tower to a vertical position without blocking up the wheels; and a drilling engine that can be removed from its detachable feed slide and the slab-back guide by loosening two bolts and without disturbing the slab back.

The drill may be furnished with either an air hoist or a hand winch for raising and lowering the drilling engine, and with either a hand winch or a block-and-fall for handling the drill steel. The standard type is supplied with three wheels, but it also can be obtained with four wheels for operation on a transverse track. Either machine may be equipped with skids. Drilling engines are available for either light or heavy, wet or dry drilling.

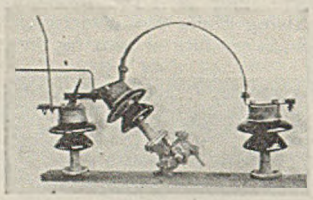
Welding Electrode

Metal & Thermit Corporation, 120 Broadway, New York, offers the new "Murex Special A" heavy coated electrode, which, it asserts, overcomes the difficulty in arc-welding steels containing more than 0.20 per cent carbon. The new electrode, it is said, hinders the migration of carbon from the parent metal to the deposited weld during the welding process, thus assuring a more ductile deposit. Sound, dense, X-ray-clean welds, with excellent penetration, can be made in high-carbon steels with perfect ease, it is asserted. The deposit, containing a small quantity of nickel, shows, according to the company, the following characteristics: tensile strength, 73,000 lb. per square inch; yield point, 59,000 lb. per square inch; elongation in 2 in., 31 per cent; and the reduction in area, 63.5 per cent.

Electrical Aids

General Electric Co., Schenectady, N. Y., offers three new mining cables: armored-type telephone cable, recommended by the company for use where sharp rocks and heavy blows offer hazards; G-E tellurium-compounded all-rubber mining cable for 600-volt service; and G-E Glyptal-cloth insulated cable for low- and medium-voltage motor leads, apparatus cable; transformer leads, leads for coils and control devices, etc.

The new telephone cable employs a galvanized-steel interlocking armor similar to that of the G-E BX armored cable. Asphalt and jute cloth both over and under the armor protects it from deterioration. A lead sheath protects the cable from moisture and a specially developed rubber compound with a low electrostatic capacity



Type TC-1 Switch, Horizontal Mounting.

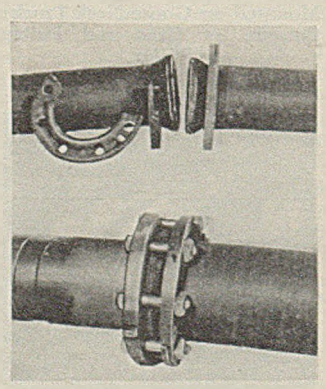
facilities its use in telephone communication, it is said. The new 600-volt mining cable is available in all standard types and sizes, and is jacketed with rubber similar to the tread of an automobile tire, thus enabling the jacket to resist abrasion and rough usage in cable-reel service and when dragged after mining machinery and electric shovels. The Glyptal-cloth cable, according to the company, is unaffected by oil or gasoline, withstands high temperatures, is tough and flexible and resists mechanical abuse, such as bending, compression and abrasion.

General Electric also offers a new line of outdoor triple-pole air switches, Types TC-1 and TC-6, employing NEMA standard 3-in. bolt circle insulators and rated at 200 amp., 7.5 through 34.5 kv. A major feature, according to the company, is a new contact construction employing a small number of parts. The stationary contact has a wedge-shaped end that forces its way between the movable blades through any ice that may cling to the contacts.

A general-purpose welding electrode, Type W-22, has been added to the General Electric line of arc-welding electrodes. The new electrode is of the heavily coated, or shielded-arc, type, and, according to the company, produces welds of the quality required for Class I pressure vessels, A.S.M.E. boiler construction code. Its distinctive feature is that it may be used in any position—flat, vertical or overhead—and at the same time has deep penetrating properties, making it equally suitable, it is asserted, for butt and fillet welds. Any-position use makes it unnecessary to move the work to accomplish welding. Average results are: tensile strength, 65,000-75,000 lb. per square inch; elongation in 2 in., 20 to 30 per cent; impact resistance, 30-45 ft.-lb. (Charpy). In addition, welded joints are said to average 35- to 60-per cent elongation when tested by the free-bend method and X-ray, Class I.

Hose Joint

B. F. Goodrich Rubber Co., Akron, Ohio, offers the "Flex-seal" hose joint as a substitute for nipples and flanges in coupling the larger diameters of suction and discharge hoses handling acid or other corrosive or abrasive fluids. Low cost, greater flexibility and a perfect seal in suction and discharge service up to a working pressure of 125 lb. per square inch are features emphasized by the company, which points out that the success of the joint is dependent on the end built into the hose. This end consists of

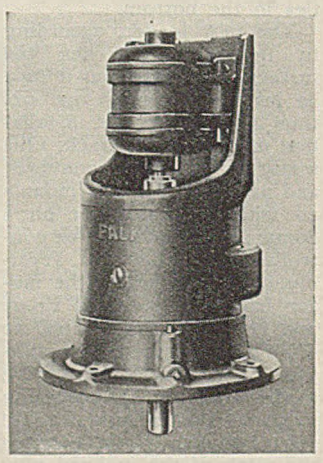


Top, Details of Hose End and Clamp; Bottom, Hose Clamped to Standard Pipe.

an enlargement, or bead, reinforced with numerous plies of fabric surrounding a rigid steel ring of angular cross-section. The joint is assembled with split flanges and standard bolts, the hose ends being compressed to form a seal. Bolt-hole spacing is standard to allow the hose to be fitted to the end of a standard pipe, the pressure of the split flange against the flared hose end providing a positive and unyielding clamping action, it is said. The joints are available in sizes from 1½ in. up.

Vertical Motoreducers

Falk Corporation, Milwaukee, Wis., offers a new line of vertical "Motoreducers" in three types. Special design and the development of positive pressure lubrication system made these combination units possible, according to the company. The ZX Type, it is said, possesses all the outstanding features of the Falk Z or U horizontal Motoreducers, and uses any stand-



Falk ZX-Type "Motoreducer" for Standard Horizontal Motor.

ard horizontal ball-bearing-type motor (with feet) without change. Resilient connection is made to the gearing through a Falk Bibby coupling. Ratios are: double-reduction, 9.7 to 41.9; triple reduction, 45 to 288. The IX vertical unit (double or triple reduction) is an integral unit corresponding to the I-Type horizontal unit. One motor end bell is removed and the stator close-coupled, through an adapter, to the gear case. The LX Type is for single-reduction only (1.5 to 9.0) and corresponds to the "geared-head" L-Type horizontal unit. Vertical Motoreducers are available from ¾ to 75 hp. Ordinarily, 1,750-r.p.m. motors are considered standard, but other speeds may be specified. The units are for downward extension only.