COAL AGE

McGRAW-HILL COMPANY, INC.
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Consumer Obligation

THE care-free consumer, as usual, is found to be the cause of high prices and coal shortages in the report of the coal-storage committee of the American Engineering Council. He lives through the summer like the grasshopper of the fable and laughs at the ants that prepare for the winter. The consumer by his numbers, his ubiquity and vociferousness has put the blame for shortage on the producer. The mine owner has been tried in the court of public opinion by a jury not one man of whom was unprejudiced.

The farmer must plow in the spring for the fall harvest, but the consumer must be served when, where and how he elects. Being so many, being spread in every state, the consumer's voice controls legislators and newspapers, so that what he wills he should have. Is it not written "The customer is always right" and that "The voice of the people is the voice of God"?

Who Is Sinning Now?

THE SANCTITY of contract between employer and employee ought to be respected by both parties equally. For this reason it is not possible for this paper to support the course of action followed by certain operators in Oklahoma who, as members of their operators' association, were definitely committed to the Jacksonville agreement, but who, in order to evade the obligation of the contract, withdrew from their association and opened their mines on a non-union basis with wages at the 1917 level. This withdrawal is an evasion and ought not to have been attempted.

These operators must have known in May, when their association signed the agreement, that the market situation would be about what it is now. The time for them to have foreseen the impossibility of operating under the Jacksonville agreement and to have withdrawn from their association was before they became parties to the contract. The thing for them to do now is rejoin their association and add to it all the strength possible. Then the futility of the Jacksonville agreement should be proven to the union miners of that district by the association so convincingly that adjustments be made, President Lewis' never-give-in ultimatum to the contrary notwithstanding. Hungry men, beaten by the operation of the irrevocable laws of supply and demand, cannot be blind for long in Oklahoma any more than in western Kentucky where unionism is a losing cause.

Let contracts be sacred, come what may.

Water as an Aid to Explosions

WATER helps to prevent explosions by keeping down the dust, and it may serve to extinguish explosions when not in the form of steam or vapor. It tends doubtless to cool the temperature of the blast when in the latter form, for water has a great capacity for heat or as it may be expressed, a high specific heat.

But Mr. Ashworth in his discussion is correct in saying that steam aids combustion of methane by assisting in the chemical change which is known as combustion. Those who believe that saturated air will prevent explosions are entirely at fault. It tends, instead, to aid them. The value of supersaturated air is that it drops moisture and so dampens down the dust and tends to keep it from rising and also protects the workings from explosions in the same way as any other water.

Such supersaturation of the air must be of long duration or the water deposited will be of insufficient quantity. Saturated air is of value because it prevents the drying of the mine when it contains moisture. But it must be always saturated. It will not retard but rather aid explosions if saturated only at the time of the explosion.

As has been repeatedly stated, 30 per cent of water is necessary for immunity. The dust must be so wet that water can be squeezed out of it by pressure in the hand. It is difficult, almost impossible, to assure oneself that the dust is thus wet. Consequently rock dusting is preferable, so much so that to rely on water is suicidal. But water has its place also, as Mr. Walls says in the discussion department of this week. It is needed where mining machines are used, when coal is broken by explosives at the face and where cars are dumped underground, not only for the good it does at those places but also because it prevents the dust from being carried into other areas, especially into those sections of the mine where rock dusting is extremely difficult because not being laid with track the machines for rock dusting cannot reach them.

Gas or Coal?

SO LONG HAVE we been rebuked by all and sundry about our wickedly irregular operation at coal mines that W. S. Blauvelt's article in this issue will be found exceptionally interesting. He assumes a 40 per cent capacity operation for the gas industry equivalent to 146 days in the year. Of course, the works run throughout the year but they have, except at steel plants, only that percentage operation as far as capacity is concerned. That is larger than the figure Mr. Orrock mentioned in his statement at the World's Power Conference. He put the figure at 30 to 35 per cent. It shows how grievously inefficient gas plants are and must be. No one is to blame. When inefficiency of this kind appears it is not considered to be objectionable and discreditable to the business in which it is discovered—unless it is the coal industry.

Mr. Blauvelt says that the interest maintenance depreciation and taxes cost of distribution are 22½ cents and the value of the gas 35 cents per thousand cubic feet. Adding to the distribution costs the costs of pumping and of gas losses the total is 27½ cents. That is 80 per cent of the value of the gas distributed. This

is a huge distribution cost, by no means discreditable to the gas industry, but one that the public would be prone to think heinous on the part of a coal company despite the long distances over which the coal might happen to be transported.

We begin to see why gas is made in the home in greater volume than at the gas works. However, we are disposed to believe and have been told that gas can be produced at far lower costs and is being so produced in Germany and we believe at one place in this country. We are informed that the pressures of distribution are too low and might be raised. It seems quite likely that even at higher pressures the losses might be made less. There are difficulties connected with both those suggestions. The same state and municipal authorities that are the Nemesis of the gas industry might interfere with either or both these means of cheapening gas. We wonder however whether an aggressive campaign of publicity might not aid the gas companies to get some relief from opressive legislation and ordinances, provided, of course, the new methods of making gas, the new gas mixtures, and the higher pressures in distributing it are desirable.

But to revert to the cost of distribution. The pipes are like the salesgirl at the store. They wait on the consumer, ready to serve, but the consumer is slow to buy. The salesgirl could sell ten times as much as she does in the course of the day, but the public is not ready and willing to make purchases. Payment must be made for her loss of time, and similarly the public must pay for idle gas lines. If people will buy gas only when they want to cook a meal or heat an iron, the pipes must be idle for hours at a stretch. The public must pay for that.

We have only just commenced to study losses. Coal has received an attention from the economists that in time must be expanded to take in all industries. When that inquiry is made, we have no doubt that coal will be vindicated. The searchlight has been directed so persistently on coal that we are blinded to all else. The question is whether knowing the truth we can do more than deplore it. Each industry has known it for years. Every industrialist has tried to eradicate waste from his own operation. When those who do not understand the industry start out to reform it, will they get any further than hopes, vain hopes? We expect that reform will be internal rather than external. The public more often hinders than helps and almost never reforms.

Meantime let the coal yard flourish!

Trip-Gathering Problems

THE PRACTICE described by Anthony Shacikoski in this week's "Problems in Underground Management" as the normal way of handling locomotive trips is, as he says, not conducive to large tonnage from the miner or maximum efficiency in locomotive operation. But is it indeed the normal way? In some mines the headings are kept well in advance of the working places. When that is done the locomotive can push the loads beyond the live rooms and bring the empties up behind it. As soon as these empties have been switched into the rooms the locomotive can bring out its train of loads, the time being occupied by the trip rider and motorman in the coupling of cars. Of course, the butt headings cannot be made indefinitely long, for the longer they get the more time is lost.

When they reach the property line, the outcrop or a length at which it is desirable to terminate them, the difficulties Mr. Shacikoski describes come into being. Then it is customary to put the empties ahead of the locomotive and with them forming a composite trip of loads and empties push the loads back. That duly done, all the empties as far as possible are stowed in working rooms, two or even more being run into rooms near the face so that they may be left near the end of the roadway and, in consequence, reasonably accessible to the inbye rooms.

This, however, though a common is not a safe practice, the pushing of a long trip of empties and loads in the presence of switches being quite liable to cause derailments. Furthermore, it frequently overtaxes the locomotive, especially if the grades are heavy and the power deficient, as is too often the case where the heading is long and both feed and rail return are none too effective owing to the distance that the current must travel. In some mines the working rooms are at all times near the end of the room entry and in that case, which is quite frequent, the empties almost always are pushed by the locomotive.

But perhaps Mr. Shacikoski is thinking of the practice in mines with thick coal where butt entries are usually short and cut off at frequent intervals by face headings, forming what are known as panels. There his method is not only convenient for the men and helpful to the locomotive but also safer as far as haulage is concerned than those described in the foregoing remarks.

However, it must be remembered that it presupposes the existence of an inbye face heading which may be actually only in contemplation. It often is not in existence but only laid off on the map. Development even in mines with thick coal is frequently thus far advanced, and sometimes it does not pay to advance it to such a degree.

Excessive development is often a cause in itself of low locomotive efficiency, for a locomotive in that case has to travel long distances between the ends of headings, gathering in the meantime only a small coal tonnage from the heading men. It is also a cause of low ventilation efficiency, for the current has to travel a long way merely for the heading men. A small current will serve if there is no gas, but if there is, a large current out of all proportion to the men engaged may be needed and the water gage must be high in consequence.

Granted, however, that there is such development the connections described will, in the absence of doors, make ventilation impossible, and doors are to be avoided especially where the coupling of trips is likely to compel them to be kept open for long periods. In some cases the grades might permit the actual coupling to be done beyond the door but the uncoupling of the empties even if done on a moving trip would make it necessary to move so slowly that the door would be open too long.

Oftentimes, even usually, the cars cannot be uncoupled while moving because, the grade being against the direction of travel, the couplings are stretched. Should the barrier pillar and chain pillar be thick the assembling might be done satisfactorily short of the door. Then the only trouble with the plan will be to regulate the air travel through the room entry so that the entries above will not be deprived of air. Where the mine is large that problem will be perplexing.

English Washery Cleans Coal Before Sizing

Slack Today Must Be Clean to Be Salable—Compressed Air More Efficient in Action Than Plunger—Fines Carefully Drained and Mixed with Larger Sizes

By C. H. S. Tupholme
London, England

In recent years British coal-mine operators have realized that slack coal could be disposed of readily only if reasonably clean and free from dirt. This is true whether the fuel is placed on the regular market or used in coke ovens. Several methods have been tried for cleaning the raw slack as brought from the mines, but the system that has given the best results and has shown itself to be the cheapest to operate is that in which the slack is washed by immersion in specially constructed tanks containing water, which is subjected to pulsations of short duration sufficient to cause the slack to be thrown momentarily into suspension. Because of its lower specific gravity, the slack coal is held in suspension for a longer period than the intermingled dirt, and is thus carried forward in the current of washing water and finally separated from the impurities.

The usual method of carrying out this process is by means of a tank equipped with a division plate as shown in Fig. 1. The raw slack passes through the tank over a fixed sieve or perforated plate on one side of the central partition. On the opposite side of this plate generally is an arrangement of plungers or bashes, operated by eccentrics. These exert pressure on the water on the downward stroke, forcing it up through the screen and raw coal on the other side. The separation of dirt from the coal occurs during the upward stroke of the plunger.

A washer of a somewhat different type, that has proved highly successful in Great Britain, is the Baum. In this machine the plungers are replaced by compressed air controlled by piston valves. Air at a pressure of about 2 lb. gage is admitted to the washing tank through these valves, which retain the air under pressure on the downward and release it on the upward stroke. The bed of coal is forced upward when the valve ports are closed,

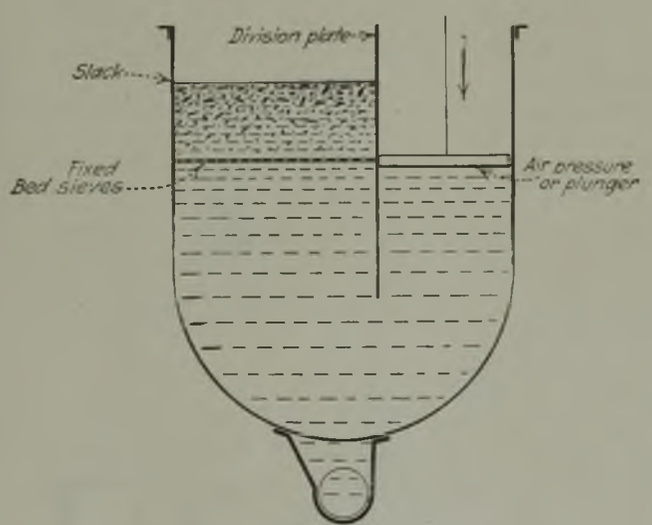

Fig. 1—Cross-Section of Simple Jig

This shows the division plate slightly off-center with the fixed screen on one side and the plunger or piston on the other. Reciprocation of the piston causes an upward and downward movement of the water through the screen and bed of material upon it. This causes the heavier particles to seek the screen and the lighter coal to rise to the top of the bed.

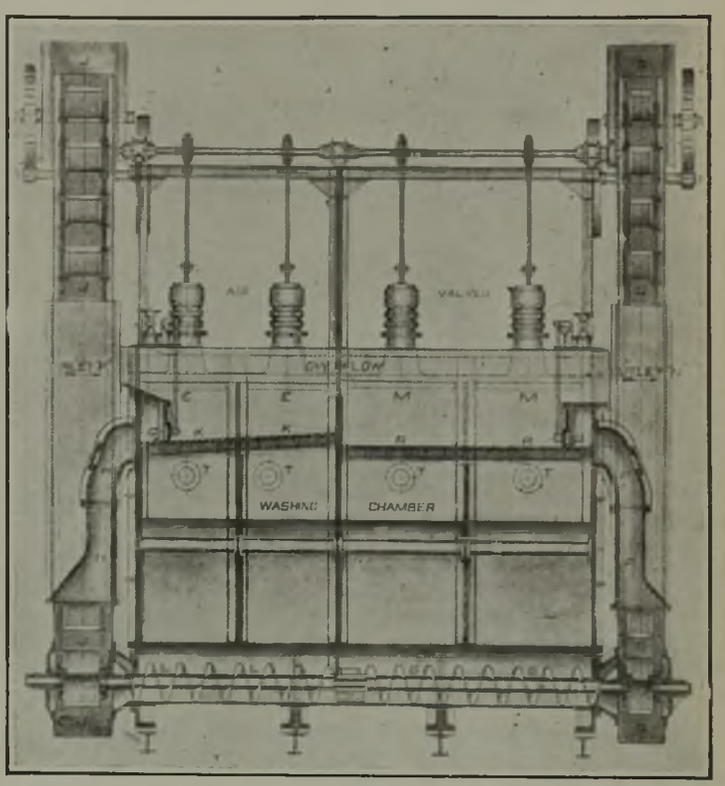

Fig. 2—Longitudinal Section of Baum Jig

In this machine the plunger of the ordinary jig is replaced by air under pressure. This is alternately admitted to, and released from, one side of the machine, causing water to surge upward through the screen and then settle back easily.

and separation of clean coal from the dirt occurs during the downward movement of the bed when the ports open and the air is released.

Compressed Air Acting Down Forces Water Up

A recent installation of this kind, shown in the accompanying illustrations is that at the Normanton Colliery of Pope & Pearson, Ltd.. It was built by Simon-Carves, Ltd., and is intended to treat 125 tons of coal per hour. In this plant the coal to be washed is brought in in railroad cars and discharged into an underground feed hopper from whence it is elevated into the building. The coal leaving the top of the elevator is flushed by water into the first washer box.

This washer box has a semicircular bottom, being divided longitudinally into two portions. One side is fitted with horizontal screens over which the coal is carried by the flow of water. The other side is provided with a set of air valves that allow puffs of compressed air to act on the surface of the water below. The pulsating movement thus set up brings the coal to the top of the bed, the dirt sinking to the screens, as explained before. Any small dirt falling through the sieves is taken to either end of the washer box by means of screw conveyors at its bottom.

Fig. 2 is a longitudinal and Fig. 3 a transverse section

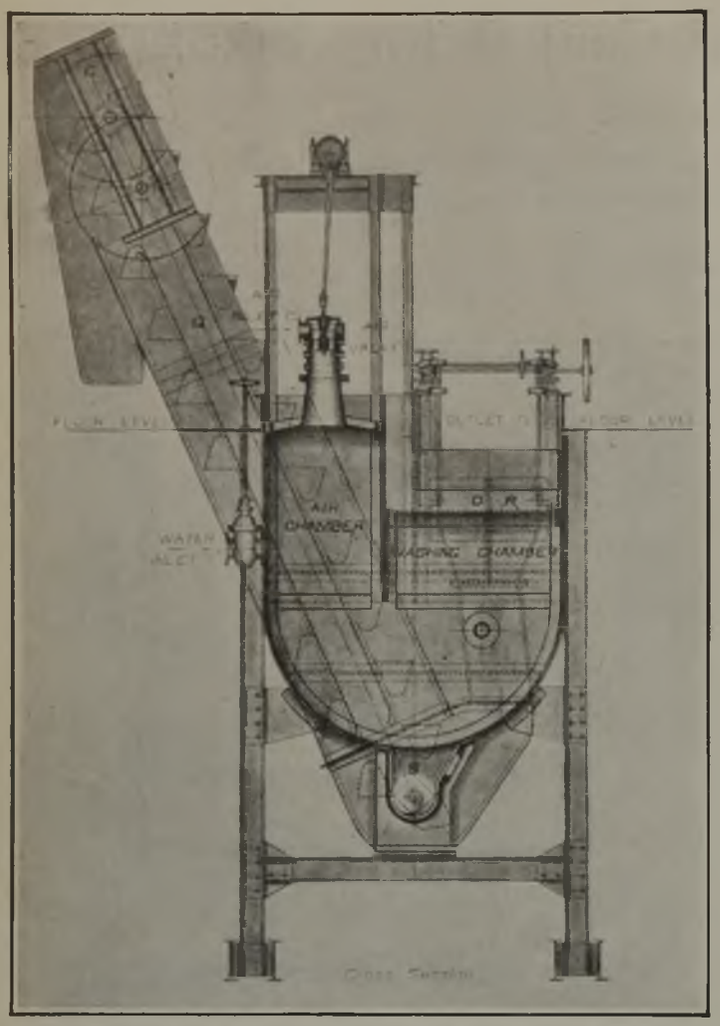

Fig. 3—Transverse Section of Baum Washer

The illustration shows clearly the air chamber and the air control valves operated from eccentrics on an overhead shaft. Inasmuch as air is perfectly elastic and as both upward and downward surges of the water through the screen are cushioned thereby, this washer is "easy" on the coal that it treats, and degradation within the machine is small.

of a four-valve Baum washer box. A single box of this type is capable of handling raw slack passing through a 3½-in. mesh at a capacity of about 75 tons per hour. For capacities up to 150 tons per hour an additional box is provided in which the fine coal is rewashed.

The operation of this machine is as follows: Compressed air enters the valves at *C* and passes directly through to the air chamber when the piston covers the valve ports. When the piston is at the opposite end of the stroke the ports are open, thus allowing the air to escape to the atmosphere. The continuous operation of the valve gives the required movement to the water in the washing chamber. The raw coal enters at *F* and is deposited on the screen *K* in the first section of the box *E*. The heavy dirt collecting on the screen is taken away continuously through the adjustable sluice gate *G*, passing down the chute *H* into the dirt elevator *J* by which it is elevated and drained before being discharged.

Coal, with any middlings product or light dirt, overflows into the second part of the washer box *M*. The dirt collects on the screen *R* and is passed continuously at a suitable rate through the adjustable sluice gate *O*, down the passage *P* and into the buckets of the dirt elevator *Q*, where it is treated exactly like that in the elevator *J*. The finest dirt collecting on the screens *K* and *R* passes through the perforations and settles to the bottom of the washer box. Thence it is conveyed by the worms *L* and *S* to the elevators *J* and *Q*.

Washed coal from the second compartment *M* overflows from the outlet *N* and passes to the classifying screens or to bins as required.

Experience has shown that the advantages of using compressed air to produce the pulsations in a washer, as compared with the ordinary direct-acting piston or bash, lies in the fact that the air acts as a cushion during the return stroke, and so eliminates all suction. The object of the transverse division of the washer by plates is to insure the proper pulsation of the water. Gates or sluices are fixed at either end of the screens and at the front end the raw coal passes over the gate into the box while the heavy dirt passes immediately under the gate into the dirt elevator. At the other end the washed coal passes over the gate while the remainder of the dirt is drawn out into the second elevator. These gates can be regulated to a nicety, thus obtaining an efficient separation. Once the machine has been adjusted for a particular kind of coal consistent results are obtained.

The washed coal flows with the water from the washer box into a set of large, revolving, classifying screens provided with mantles to size the coal into what in British parlance are known as nuts, beans, peas and fines. The three larger sizes pass over drain sieves where they are sprayed, and thence down spiral chutes into storage bins.

Should the raw slack contain a large percentage of interstratified rock, this material can be extracted as a separate product and collected in the dirt elevator *Q*. Thence it can, if necessary, be passed through a crusher, and back to the washer box for retreatment.

Wash water enters the box through the valves *T*, the supply of both water and air in each part of the box being regulated separately by the different valves shown.

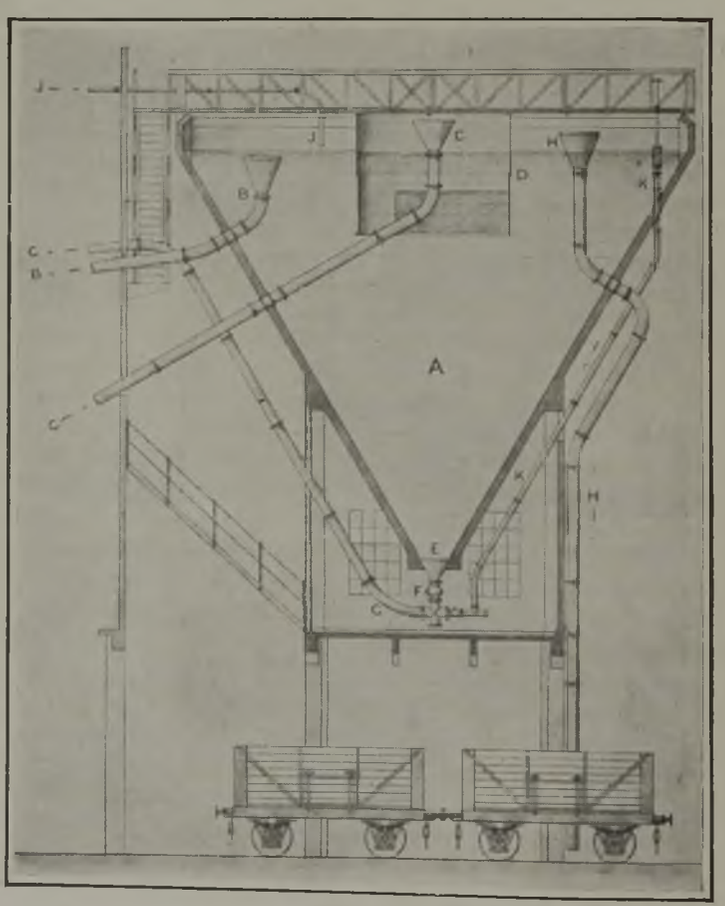

Fig. 4—Section of Water-Clarification Tank

The arrangement of this tank and the various pipes leading to and from it is such that, although its action is continuous, clear water is taken off at the top and sludge at the bottom. This latter is dewatered, mixed with the larger material and sold.

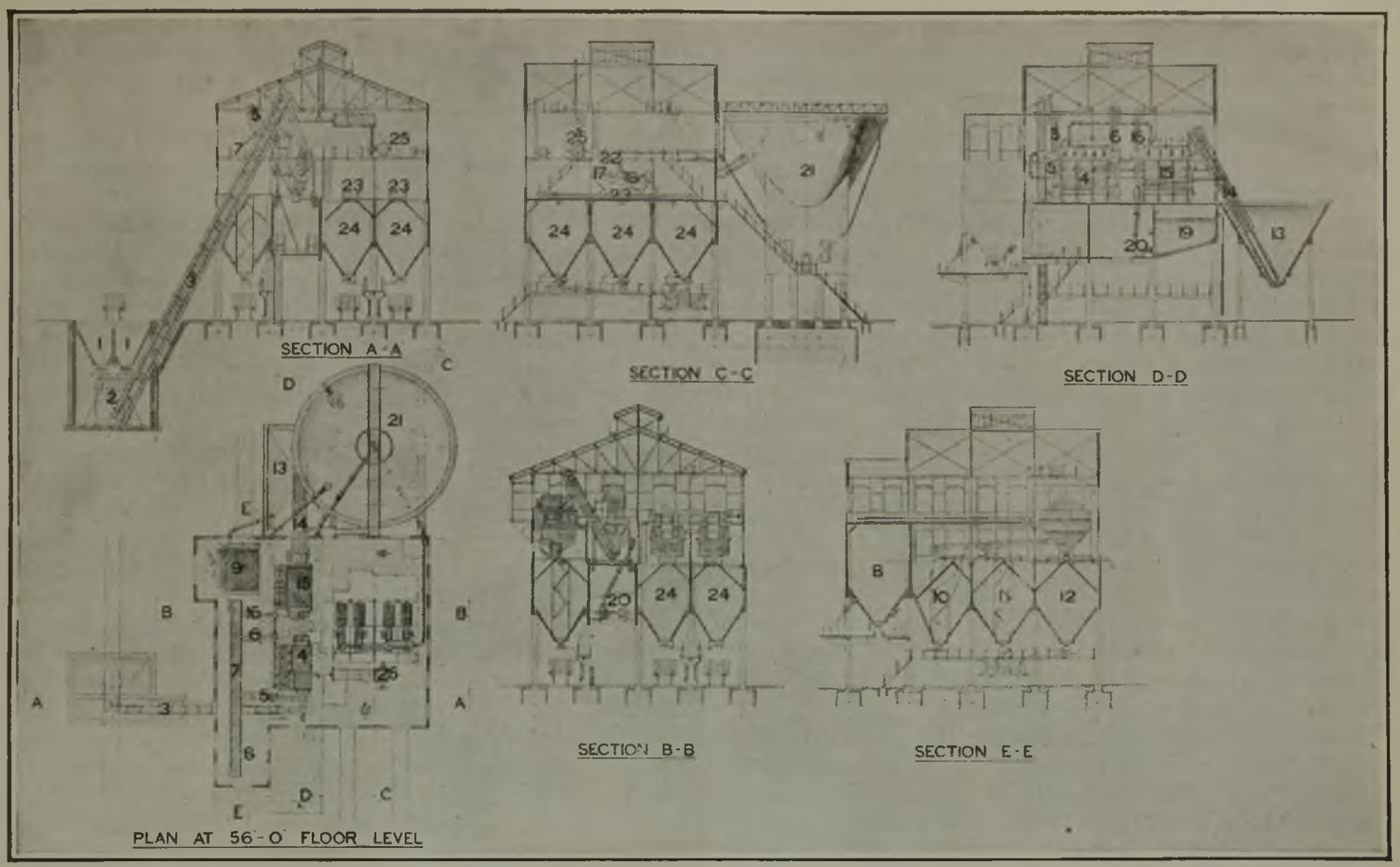

Fig. 5—Various Sections of a Large Capacity Washery

This installation is intended to prepare coal of 3½ in. and smaller at the rate of 150 tons per hour. After washing and screening the larger sizes are carefully lowered down spiral chutes into the storage bins. The finer sizes, naturally, are not treated so gently.

Water leaving the box at the outlet end together with the washed coal can be drained off and collected in the settling tank.

In this process it is found that an even pressure is obtained along the whole length of the washer. As on the return stroke the air acts as a cushion, the downward movement of the bed is retarded, and the maximum time is allowed the various materials for separation according to their respective specific gravities.

Wear and tear on the various parts of the machine is small, the valve pistons operating at a speed of only 40 to 50 strokes per minute. The absence of direct-acting plungers does away with the liability to breakdown as no function of the air pistons is sufficiently strenuous to make this contingency possible. As a matter of fact, wear on the pistons is negligible so long as they are kept well lubricated. Power required for operating the valves is therefore practically nil.

It is possible to wash slack smaller than 3½ in. without initial classification into various sizes, thus eliminating dry screens. These are in many cases costly in maintenance and supervision, and also, are not always efficient.

It will be understood that the principle of classifying after washing prevents degradation of the various sizes produced. This is an inherent attribute of the Baum washer; another advantage is the avoidance of dust production.

The fines together with the water pass from the revolving screens into a "smudge" sump. Here the surplus water overflows into a collecting sump and the fines are removed by an elevator to a rewashing box. This machine is of similar construction to the first but is provided with a wider bed and the pulsations are much more gentle so as to separate fine dirt and coal. The washed fines after leaving this box flow with the water to the fine coal and slurry dewatering plant, which is simple in action and takes up little space.

In this type of washer a feldspar bed is not required. All the bed necessary is provided continuously by the dirt extracted from the raw slack.

The coal becomes cleaner as it passes along the first section of the box, the capacity thus being greatly increased. In other words, more can be accomplished in a small area than a large area where the coal and dirt are separated only at the outlet end of the washer.

The lighter products from the first section are again treated in the second section where the last traces of dirt are extracted. The complete separation of extraneous material is thus performed in one continuous operation. Large dirt particles are collected along with the finer material from each section in one elevator. The larger dirt thus acts as a filter for the smaller stuff. In this manner all the dirt is handled mechanically and is drained to a condition where it may be disposed of without further handling. The washing boxes themselves are constructed deep enough to allow the small dirt to settle without the possibility of its being carried away with the current of water and getting mixed with the coal.

Efficient Separation of Slurry

Temporary stoppages of this machine do not alter the quality of its products, as an air relief valve can be opened immediately stopping the action of the washer. Thus, there is no possibility of the whole bed being washed out of the box through the dirt gates, as is sometimes the case when plunger jigs are used.

The elevated conical tank (see Fig. 4) is the main water reservoir for the washery. It is here that the settlement of the slurry and the clarification of the dirty water takes place. This tank is located at such an elevation that the clean water can flow by gravity through the pipe *B* to the washer boxes. After doing its work in the washers, and finally being collected in a sump, it is pumped back to the tank through the return pipe *C*. The outlet of this pipe is surrounded by a steel curtain *D*, perforated at its lower edge. This guides the suspended material downward without disturbing or contaminating the clean upper layers of water from which the washing water is drawn. The velocity of the incoming water quietly decreases, thus allowing the fine solids to settle gradually to the bottom of the tank.

An outlet *E* is arranged at the bottom of the tank, provided with a cock *F*, so that all fine material or slurry can conveniently be allowed to pass by gravity through the pipe *G* back to the washery to be mixed with the fine coal. An overflow pipe *H* is provided to insure a constant head while the fresh water to replace that lost in the washed coal enters through the pipe *J*. An auxiliary water pipe *K* connects with the pipe *G* to regulate the consistency of the slurry. One circulating pipe serves the entire installation.

Where it is necessary to classify the washed coal for "sales" the latest plant is arranged for delivery of the nuts and beans by gravity from the screens direct to the bins, thus avoiding the introduction of water for conveying the larger material after it has been classified. The fine coal is delivered from the washer box or classifying screens, as the case may be, to shaker screens. The slurry recovered from the settling tank is also delivered to these screens along with the fine coal. In addition to being drained this material is intimately mixed with the fine coal, so that the smudge or fines has a good appearance when offered for sale.

In many cases the moisture is reduced sufficiently to enable the coal to be passed directly into a small bin of, say, 40 tons capacity, and from there to railroad cars. Where it is necessary to reduce the moisture still further for coking purposes the fine coal and slurry from the shaker screens can be delivered into drainage and storage bins. If a large storage is not required the mixture of fine coal and slurry can be delivered to a draining conveyor. The drainage water from the shaker screens is collected and sent back to the conical settling tank.

The washery at Normanton contains inclined drainage sieves taking the surplus water out of the fines, as well as shaking screens that agitate the fine coal and slurry together while draining them. The fines after travelling down the inclined sieves, which are fitted with brass wires of wedge-shaped section with fine slits between them, fall onto the shakers which are fitted with similar screens. As the fine coal is moved along these screens by the vibration, the slurry which has settled from the washery water flows by gravity to an upper set of inclined sieves. From these it falls on top of the fines which act as a filter bed and allow the slurry to be dewatered without getting back to the circulation water.

The fine coal and slurry leave the vibrating screens in a well-drained condition and are distributed by scraper conveyors to a set of three bins. These are equipped with perforated grids at their bottoms and their outlets are provided with special drip trays. The fine coal and slurry being uniformly mixed continue to drain in these bins until drawn off to cars.

The water-collecting sump is emptied by a centrifugal pump that discharges to the conical settling tank. The slurry settles to the bottom, passes through a mouthpiece and is transferred by a pipe to the drainage screens, the head of water in the tank forcing the slurry up to these sieves continuously. Thus there is no pumping or mechanical handling of the slurry, and in consequence the water in the tank is not disturbed, the settlement of the slimes being uniformly maintained.

The entire plant is operated electrically. Great care has been taken to provide easy access to all moving parts for inspection and lubrication.

The lower portion of the building at Normanton,

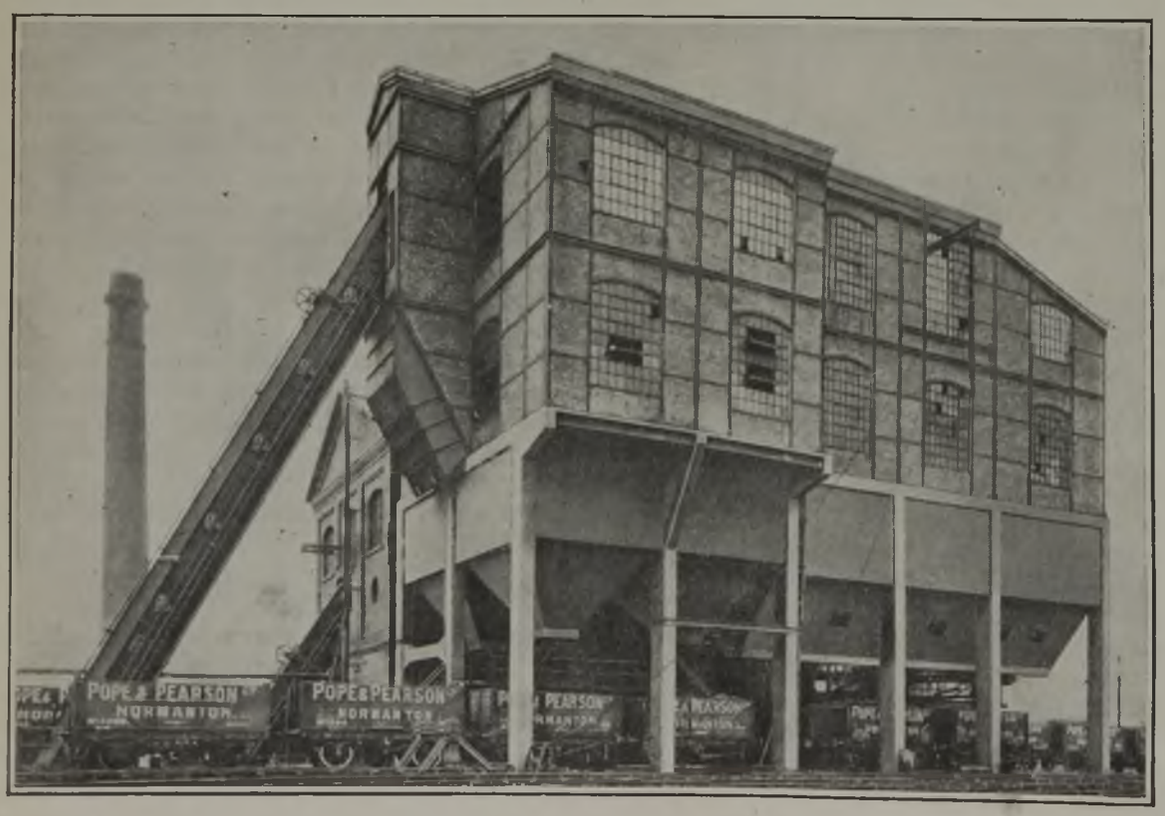

FIG. 6
Normanton Washery

In England, as in this country, coal preparation has become a science. That coal washing pays may be judged from the type of washery shown in this illustration. All parts of the building coming in direct contact with water or wet coal are of concrete, the rest of the structure being a steel framework filled in with brick paneling. Though such buildings are higher in first cost than the wooden structures of similar nature frequently built in this country, as they depreciate slowly the greater cost is justified.

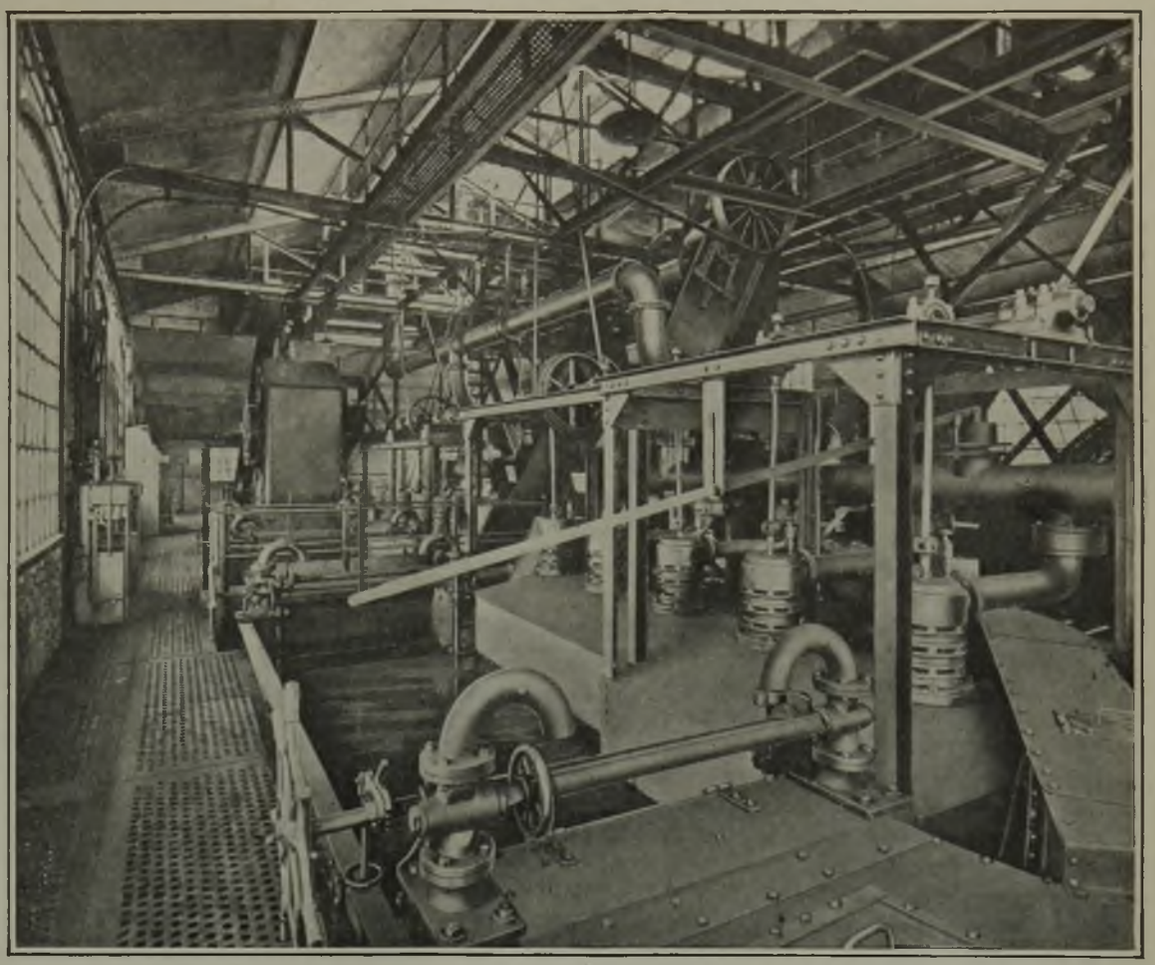

FIG. 7
Washery Interior
This reveals with unmistable clearness the extreme neatness of the interior of the Normanton washery. Few washeries in the United States can compare with it in this respect. One air-actuated washing unit can be seen in the foreground with its air valves and eccentrics. Another unit appears in the rear of the illustration. The air main can be seen at the back of the nearer washing unit. The lower parts of the washing chamber are hidden by water. This view, though not as broad in scope as section D-D in Fig. 5, is seen from about the same point. The various parts can be recognized by a glance at the horizontal section in the same figure.

including the storage bin, is constructed of reinforced concrete, and the settling tank and feed hopper are of this material throughout. The upper part of the main building has a steel framework which is filled in with brick panelling. The entire structure is covered by a reinforced-concrete roof. It is interesting to note, in passing, that the buildings comprising this plant are located upon made ground, particular care being necessary with the foundations. Both the washery building and the settling tank are supported on reinforced-concrete rafts extending under their whole area.

An earlier installation of the Baum washer intended to treat 150 tons per hour, is shown diagrammatically in Fig. 5. This is located at the Penallta Colliery of the Powell Duffryn Steam Coal Co., Ltd. The raw coal is delivered to the underground hopper (1) from the bottom of which it is withdrawn at a uniform rate by the chutes and revolving feed tables, (2). The coal is thus delivered to the boot of the elevator, (3). This elevator carries the whole of the raw product direct to the washer boxes, (4). The heavier dirt is drained in the elevator (5), and the lighter dirt in the elevator (6), both of which deliver to the scraper conveyor (7), which carries this material to the bin (8).

The washed coal is then separated into four sizes in the revolving screens (9). The nuts and beans are passed over drain sieves into their respective bins (10) and (11), which are fitted with spiral chutes. The peas pass direct into the bin (12). The fine coal collects with the wash water in the smudge sump (13) from whence it is removed by the smudge elevator (14) to the rewasher box (15). The dirt from this jig is lifted by the elevator (16) to the scraping conveyor (7).

The washed fine coal flows to the drain sieves (17), and from there to the shaker screens (18). The water and slurry drained from the coal pass into the smudge sump (13), from whence the water overflows to the pump sump (19). The centrifugal pump (20) lifts the water from this sump to the settling tank (21). The slurry from the settling tank returns by gravity to the washery, and after passing over the dewatering screens (22), is thoroughly drained and mixed with the fine coal on the shaker screens (18). The combined products pass to the scraper conveyor (23) which distributes the washed coal to the fine-coal bins (24). The washed coal is taken away in railroad cars, the larger sizes being loaded by means of special chutes. Dirt is removed from its bin in mine cars. Compressed air for the washer boxes is produced by the blower (25). The entire plant is operated by three electric motors.

North Carolina Mines Started in 1830

Across the State of North Carolina and parallel to its east and western boundaries runs what appears on the map as a narrow scar. It is the Triassic formation. In the center of this strip was an old plantation owned by Peter Evans and located in the great northward bend of the Deep River, including the village now known as Cumnock and the area known as Egypt. Mining started in 1830. In 1852 the Egypt shaft was sunk which reached the Cumnock coal bed at 430 ft. After the Civil War the name of the company was changed to "The Egypt Co." During that struggle it shipped coal part by railroad and part by barge to Wilmington, the coal being used extensively by blockade runners. The mine was closed in 1870 and remained flooded till 1888. In 1902 it closed down, having a bad reputation for gas explosions. Since 1922 the mine has been actively developed by the Erskine Ramsay Coal Co.

Why Gas Rarely Replaces Coal for House Heating

Municipal Standards Prevent Service at Minimum Cost — Small Consumer Does Not Pay Reasonable Price for Investment He Makes Necessary — Gas Company Has to Lay Distributing Pipes, Whereas Coal Goes Over Public Highway

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MANUFACTURED gas, in competition with anthracite and bituminous coal, for heating houses, is generally handicapped in two ways, and without exception is heavily handicapped in a third way.

One of these handicaps is the prevalence of city or state gas-quality standards which do not permit the distribtuion in each locality of the particular kind of gas which could be manufactured and distributed so as to give the maximum service at a minimum expense.

Another handicap is the general prevalence of inequitable gas rates. Commonly the consumer whose maximum hourly consumption is excessive compared with his average monthly bill, pays less than the cost of his service, whereas the consumer whose maximum hourly consumption is relatively small compared with his average monthly bills, pays far more than the cost of his service. The third and most serious handicap on gas consumption for house heating will be developed in the following discussion.

MANY have wondered why every householder must keep a gas plant in his cellar instead of using gas that is made scientifically by a gas company at a large plant with lowered cost. Mr. Blauvelt, who knows both mines and gas plants, tells why. The principal reason is that gas is distributed by privately owned pipes. The gas company has even to pay a tax for owning these public facilities, whereas the coal retailer uses the roads almost free of charge. Distribution of gas costs 22½c. per thousand cubic feet, equivalent to nearly $8 per ton of coal.

Gas with a heating power of 400 B.t.u. per cubic foot can be manufactured on a large scale, from coal costing $5 per ton delivered at the works, and sold profitably, *at the works*, for an average price of 35c. per thousand cubic feet, if the average rate of operation for the entire year approximates 40 per cent of the rated plant capacity. As the heating efficiency of gas appliances greatly exceeds that of coal-burning apparatus, and as gas consumption is automatically controlled to meet instantly varying requirements, in actual house-heating practice, 35M cu.ft. of 400 B.t.u. gas are the equivalent of 1 ton of anthracite or of high-grade bituminous coal.

Assuming that the costs per ton delivered on cars to a retail yard are $10 for anthracite and $5 for high-grade bituminous coal, and that yard expense, overhead charges and net profit combined, average 25 per cent of these costs, purchasers would pay, *at the dealer's yard*, $6.25 per ton for bituminous coal and $12.50 per ton for anthracite.

With the above prices at the seller's premises, the householder requiring 12 tons of anthracite or bituminous coal, or its gas equivalent, to heat his home satisfactorily through the heating season, would pay each year for fuel at the seller's premises as in Table I.

TABLE I—Cost of Fuel at Gas- or Coal-Yard

Anthracite	$150
Bituminous	75
Gas	147

This we will term Item I. The expenses on the consumer's premises, other than for fuel, vary greatly with the kind of fuel used, and many of these expenses with coal are often overlooked. When solid fuel is burned, storage room for coal, ashes, and kindling must be provided; the additional cost of this space in a house where 12 tons of coal are stored and burned each year will be not any less than $400, assuming a concrete floor and concrete or brick walls and may be much more. The yearly charges in such an investment—not required where gas is used—are as in Table II.

In the cost of delivery of fuel to his residence from the seller's premises, the gas consumer fails to get the same square deal from the public that the coal consumer enjoys. For the delivery of solid fuels, the public provides a free highway, generally paved, paid for and maintained by taxes, a share of which are paid by the gas merchant and collected from the gas consumer in every gas bill.

The coal consumer is required to pay the coal merchant only the actual costs involved in such delivery.

TABLE II—Interest on Cost of Cellar Space and Other Costs Accompanying Use of Fuel

	Anthracite	Bituminous	Ga
Interest on cost of cellar space at 6 per cent	$24 00	$24 00	0 00
Depreciation at 3 per cent	12 00	12 00	0 00
Taxes at 2½ per cent	10.00	10 00	0 00
Interest on cost of delivered coal at 3 per cent (6 months)	5 13	2 88	0 00
Total capiral charges per year on investment not needed with gas	$51 13	$48.88	0 00
Removal of ashes not needed with gas	4 00	4 00	0 00
Damage to property caused by smoke and soot	0 00	40 00	0 00
Item II, total of above items	$55.13	$92 88	0 00

As these costs seldom exceed $1.75 per ton from yard to consumer's cellar, this sum will be assumed as the delivery cost per ton for anthracite or bituminous coal. The corresponding average cost of the actual delivery of gas from seller's to consumer's premises may be safely estimated about as in Table III.

These delivery costs of each kind of fuel for the season are set forth in Table IV.

This we will term Item III. Tabulating the foregoing items we obtain the comparative costs of heating the home for the year contained in Table V.

Obviously, under such cost conditions, householders, whether they employed a janitor or not, would quickly turn from both anthracite and bituminous coal to the

cheaper, safer, cleaner and vastly more convenient gas. But, unfortunately for the gas consumer, these conditions do not exist. Instead of providing for the gas consumer a free highway for the delivery of his fuel, as we do for the coal consumer, a highway for gas is provided by private investors and this highway is heavily taxed by city, county and state.

In consequence the gas consumer is required to pay tolls for the passage of his fuel through the gas turnpike. These tolls, of neecssity with such a system, must pay all charges for interest, depreciation, taxes and maintenance. As the actual investment in a city gas distribution system may be safely estimated at $1.50 per thousand cubic feet of gas delivered and sold per year, the gas highway tolls will be as in Table VI.

Adding this expense for gas to the comparative costs previously stated, we obtain the comparative total costs given in Table VII.

From this analysis of the various items making up the total comparative costs of house heating with anthracite, bituminous coal and gas, it is quite obvious that unless the handicap of highway tolls borne by the gas consumer is eliminated or greatly reduced, house heating with manufactured gas will continue as at present, a convenience for those only who can and will pay for such a luxury.

This gas highway toll charge which is the greatest economic barrier against the general substitute of gas for coal in house heating, is unfair in the competition between gas and coal; it is unjust as between land owners and gas consumers; it is unnecessary and its elimination would tend to the rapid abatement of the smoke nuisance, which in many cities causes damages totalling from ten to twenty dollars per capita each year.

For the public to provjde a free highway for the delivery of coal, coke and oil from the merchant's to the consumer's premises while compelling the gas consumer to pay highway tolls for the delivery of his gas, is clearly to maintain an unfair competitive condition.

Equity requires that the land owner should pay for the financial benefit which he can, or does, receive from the presence of a gas distribution system through which gas may be delivered to the occupant or purchaser of his land; if he rents his property he collects higher rent where gas service is available than where such service is lacking; if he sells a lot where gas service is available, he gets a price higher than the sum of the price of a similar lot where gas service could not be obtained, and that part of the entire cost of the gas distribtuion system of the city which could equitably be charged against the lot in question.

As the gas company and not the land owner has paid for the gas highway, the gas consumer pays gas highway tolls twice; he pays them in higher rent to his landlord, or their capitalized value in a higher price if he buys the lot; then as the gas company has not received the money, he pays again in tolls on the gas he consumes. That the land owner should get something for nothing while the land occupier and gas consumer has to pay twice for the use of the gas highway is an injustice which becomes obvious upon consideration of the facts. If and when this injustice and its effects are clearly understood by gas consumers, gas distribution systems generally will be purchased from their present owners and the cost assessed against the land values benefited by their presence. Thus the tolls on the gas highways may be abolished, and manufactured gas will be enabled to assume its rightful place as the cheapest, cleanest, safest and most convenient fuel for house heating.

Incidentally also the elimination of the monopolistic feature of ownership and control of the gas highway, from the business of gas companies, would make unnecessary much of the political interference with the service functions of manufacturing and selling gas, and probably the danger of municipal ownership and consequent political mismanagement of the gas industry would disappear.

COALDEX is a pamphlet published by H. E. Friend, of 177 Church Street, New Haven, Conn. The subtitle of this little book is "A practical method for determining the value of bituminous steam coal." It gives charts for determining the relative value of competing coals from their specifications. It endeavors to answer the question: Which coal shall I buy? Paper cover, 20 pp., 9½x12½ in., $3.

TABLE III—Cost of Delivering Gas to Consumer

	Per M Cu.Ft.	Per ton of Coal Equivalent
Power for pumping gas	0 01	0 35
Unaccounted for (leakage, etc.)	0 03	1 05
Meter expense	0 01	0.35
Totals	0 05	1 75

TABLE IV—Delivery Costs of Twelve Tons of Fuel

Anthracite	$21
Bituminous	21
Gas equivalent	21

TABLE V—Actual Fuel Costs as Heretofore Considered

	With Anthracite	With Bituminous	With Gas
Item 1, cost of fuel at seller's premises	$150.00	$75.00	$147.00
Item 2, comparative costs on consumer's premises	55.13	92.88	0.00
Item 3, Actual delivery cost—12 tons coal or gas equivalent	21 00	21 00	21 00
Item 4, total of above items	226 13	188 88	168 00
Item 5, labor, if janitor is employed	60 00	60 00	0 00
tem 6, total	$286.13	$248 88	$168.00

TABLE VI—Highway Toll Gas Must Meet

	Per M. Cu.Ft.	Per Ton Of Coal Equivalent
Interest on $1.50 at 7 per cent	$0 1050	$3.675
Depreciation on $1 50 at 3 per cent	0 0450	1.575
Taxes on $1.50 at 2½ per cent	0 0375	1.3125
Maintenance at 2½ per cent	0 0375	1.3125
Total highway tolls	0 2250	7.8750
Item 5, Gas highway tolls on gas equivalent of 12 tons of coal		$94.50

TABLE VII—Complete Costs When Using Any One of Three Fuels

	Anthracite	Bituminous	Gas
Item 4, Previous total—no labor charge	$226.13	$188.88	$168.00
Item 5, Highway tools for gas			94 50
Item 6, total comparative costs without labor charge	$226 13	$188.88	$262.50
Item 3, labor firing	60 00	60.00	
Item 7, total comparative costs including labor	$286.13	$248 88	$262.50

Fitting Latest Switchboard Appliances to Mine Generators and Converters

Only Such Equipment as Gives Protection Against the Most Frequent Delays Is Needed — Simple Apparatus Requiring Few Adjustments Preferable — Thermal Relay Permits More Efficient Use of Generating Machinery

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CHIEF AMONG the requisites of automatic switching equipment for mine service are reliability and simplicity. Reliability of operation, particularly in the mining field, can be obtained only by the use of rugged and substantial apparatus which will function properly under mine conditions which unfortunately are always adverse to satisfactory service. The equipment must be positive in operation, as nearly trouble proof as possible, and should not be affected by external conditions such as heat and cold. Finally, the apparatus must be adequately protected against abnormal conditions by suitable protective devices. It is fairly simple to supply equipment which will automatically start a motor-generator set or synchronous converter under normal conditions, but it is not so simple to provide such equipment, with the addition of protective features, which will protect positively against any trouble which may occur.

However, continuity of service can be obtained without highly complicated or intricate apparatus. Once reliable operation and adequate protection are assured it is a mistake to add special features, particularly to mine equipment where simplicity is desirable. Additional protective apparatus means more possible places of failure, more expert maintenance supervision and complications not warranted in most mine operations.

As a rule, the single-unit substation, which has only one motor-generator set or converter, is the most desirable. By placing single units at various points inside or outside of the mine the voltage at all points can be kept well up to normal without investing heavily in copper for feeders. The equipment is also simpler than that of a two-unit station, as special apparatus for paralleling two machines in the same station need not be provided.

The service requirements of an automatic substation are not always the same. One operator may want a highly flexible and complicated control, requiring perhaps one machine to operate all the time and a second to start up, on load demand, with provision for interchanging machines, etc.; while another may go to the other extreme and require the elimination of protective features which never should be omitted in an unattended station. Undoubtedly there are applications where double-unit stations with low-voltage and load-demand starting, etc., should be supplied. However, it will be found that in the majority of cases the single-unit stations with the following features of control and protection will be the most satisfactory:

(1) Remote control by means of a push-button station which may be located as far as several miles away from the substation and connected to it by two control

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FIG. 1

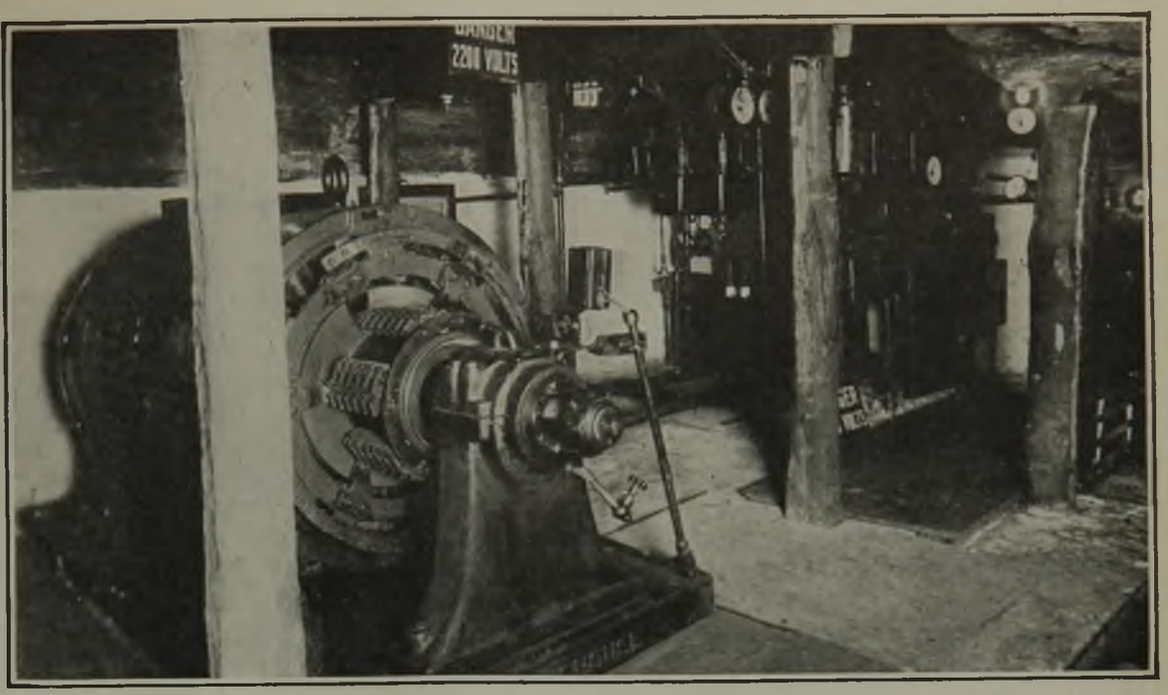
Automatic Panels

This outfit controls a 150-kw., 2,200-volt, three-phase, 60-cycle, 275-volt direct-current motor-generator set. The alternating-current oil circuit breakers are mounted directly behind the left-hand and center panels. All that can be seen of these breakers are the clapper control mechanisms for starting and running them. The direct-current circuit breaker automatically opens and recloses. The thermal relays are in the upper part of the middle panel.

FIG. 2

Underground Station

Automatic equipment for use at mines must be reliable and simple. Power delays are always of serious consequence to the mine operator, therefore he must be well equipped with apparatus which will rarely fail. Mine conditions are such that complicated devices cannot always be given necessary care and supervision, hence, protection against troubles which rarely occur should not be indiscriminately provided.



wires of sufficient capacity to carry only the small current required to actuate the starting relay.

(2) Full automatic control by means of a time switch which will start the station at a predetermined time each day and will shut it down at another predetermined time. The time switch may be equipped with the Sunday cutout attachment which will prevent operation of the substation one day a week. Such a clock need be wound only once a week. The station runs continuously, regardless of load during the period the control circuit is energized.

The source of control for operating the various relays is obtained from a small operating transformer energized from the incoming alternating-current line. The direct-current circuit breaker is of the service-restoring or automatic reclosing type which opens on overload and recloses when the circuit resistance to the load rises to a limiting value.

A station is "locked out" when its equipment is not only shut down but prevented from restarting until an inspection is made and the trouble cleared. Motor-generator sets are usually provided with the following protective features which "lockout" the station in case of trouble: (1) Heavy alternating-current overload not quickly relieved by the opening of the direct-current circuit breaker, (2) failure of the set to start properly or continued operation of the starting auto-transformer or compensator, (3) overheating of machine bearings and (4) reversed polarity of the generator especially if it is feeding into a system also fed from some other source.

The motor-generator set is only temporarily disconnected in case of the following: (1) Alternating-current supply failure or low voltage, (2) phase failure or phase reversal, (3) overheating of windings due to long continued moderate overload, (4) loss of generator or motor field and (5) reverse current. When any abnormal condition causing the disconnection of the set is removed, the equipment is automatically made ready for service or restarted.

Fig. 1 shows a typical mine substation equipped with an automatic switchboard for controlling a motor-generator set. The apparatus is mounted on a switchboard 76 in. high with a total width of 80 in. On the left-hand and center panels are mounted the clapper control mechanisms for the starting and running alternating-current oil circuit breakers, the breakers being mounted directly behind the panels. At the top of the first panel are the two alternating-current, induction-type overload relays. At the extreme top of the panels is the control relay for the breaker mechanism.

On the upper part of the second panel are the two

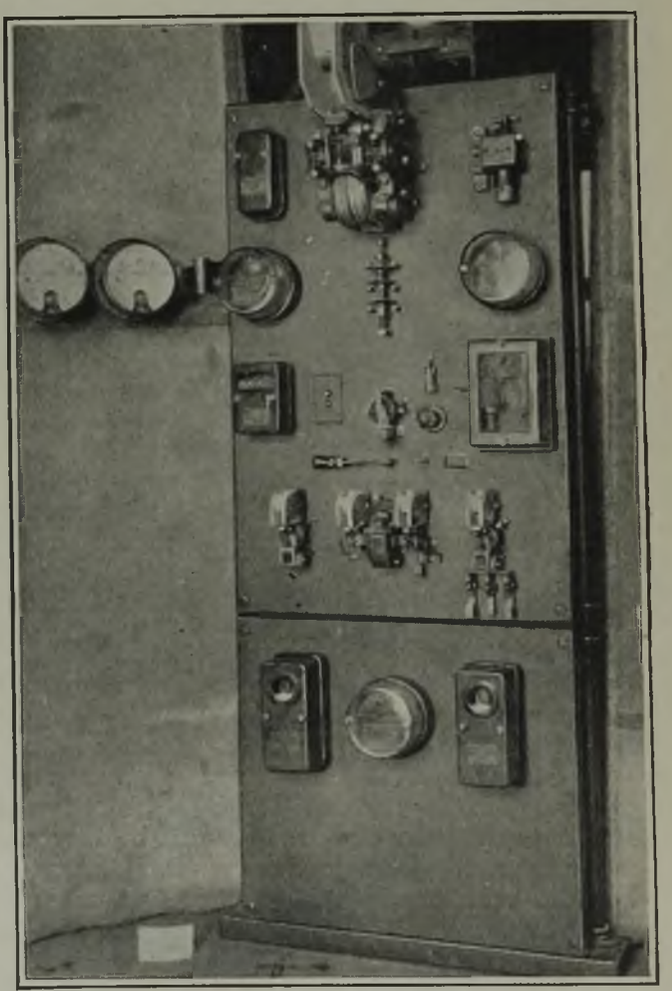


Fig. 3—Mine-Service Type Automatic Panel

Compact types which can be set up in small rooms are popular in some regions. This panel shows the complete alternating-current and direct-current switchboard equipment. The oil circuit breakers are isolated on a separate pipe-frame structure.

thermal relays, the starting-phase-balance-reverse-phase relay and alternating-current induction-type low-voltage relay. Near the larger control clapper is a control relay for the running breaker mechanism.

The panel on the right is the direct-current and sequence relay board. At the top can be seen the main direct-current contactor with overload and time delay relays on either side. The time-delay relay prevents the direct-current contactor from reclosing until a definite period has elapsed after it has opened. The direct-current voltmeter and ammeter are the round instruments. Below the meters, on the left, are the direct-current reset relay for measuring the feeder-load resistance, the master-control relay which is actuated by the distant-control push-button switch, the starting timing relay for protecting against excessive running on the auto transformer or failure to start properly, the field failure relay which prevents operation in case of field failure, and, on the right, the lockout relay which is actuated by the protective devices to lockout the station. The push-button switch on the left may be used to open the direct-current contactor without shutting down the set, while the voltmeter switch permits reading either the generator or feeder voltage. The single-pole double-throw selector switch in one position controls the set directly from the switchboard; in the other position it permits its control from the distant push-button switch.

The three relays at the bottom of the panel are respectively, the auxiliary master relay, the transfer relay and the auxiliary transfer relay which causes the transfer from the starting to the running breaker when the motor has reached synchronous speed.

When the generator is to feed into a system which also receives power from another source the sub-base section is added to the right-hand panel on which is mounted a direct-current polarity relay and reverse-current relay.

Apart from these panels is a small control transformer for supplying power for the control circuits. Also a push-button station is supplied for the control of the substation from a distant point.

A still more compact design is shown in Fig. 3. The oil circuit breakers are mounted on a separate switchboard on a simple pipe structure. Thus all the high-tension equipment easily may be isolated. This switchboard consists of only a single panel with all the necessary relays, etc. The apparatus is substantially the same except that the auxiliary transfer relay has been eliminated. This arrangement greatly simplifies the switchboard and wiring. The lockout relay, shown on the left of the panel, has annunciator dials which indicate which device has shut down the station when a lockout occurs. The reverse-current and polarity relays, not shown, when required, are added on the sub-base panel.

The sequence of operation is quite simple and may be understood by referring to the schematic diagram, Fig. 4. Ordinarily the selector switch is thrown to the left, so that the station is controlled by the push-button switch. The closing of this switch energizes the master relay 3A which in turn closes auxiliary master relay 3. When 3 closes, the starting breaker 6 is closed by its control relay 4. The motor now being connected through the auto transformers to the line, starts on reduced voltage and comes up to speed. The motor field is connected directly across the armature of the generator, and the induced current in the field tends to prevent the generator voltage from building up. As the motor comes up to speed this effect is lessened, and the generator voltage slowly increases. The generator voltage does not increase proportionately with the speed, therefore it may be used as a safe indication for transfer of the motor to the full alternating-current pressure. The direct-current voltage relay 36, connected across the generator, is set to operate at approximately 80 per cent normal voltage and causes the starting breaker relay 4, and the starting breaker 6, to open, also the running breaker relay 5, and the running breaker 11 to close. The running breaker 11 is

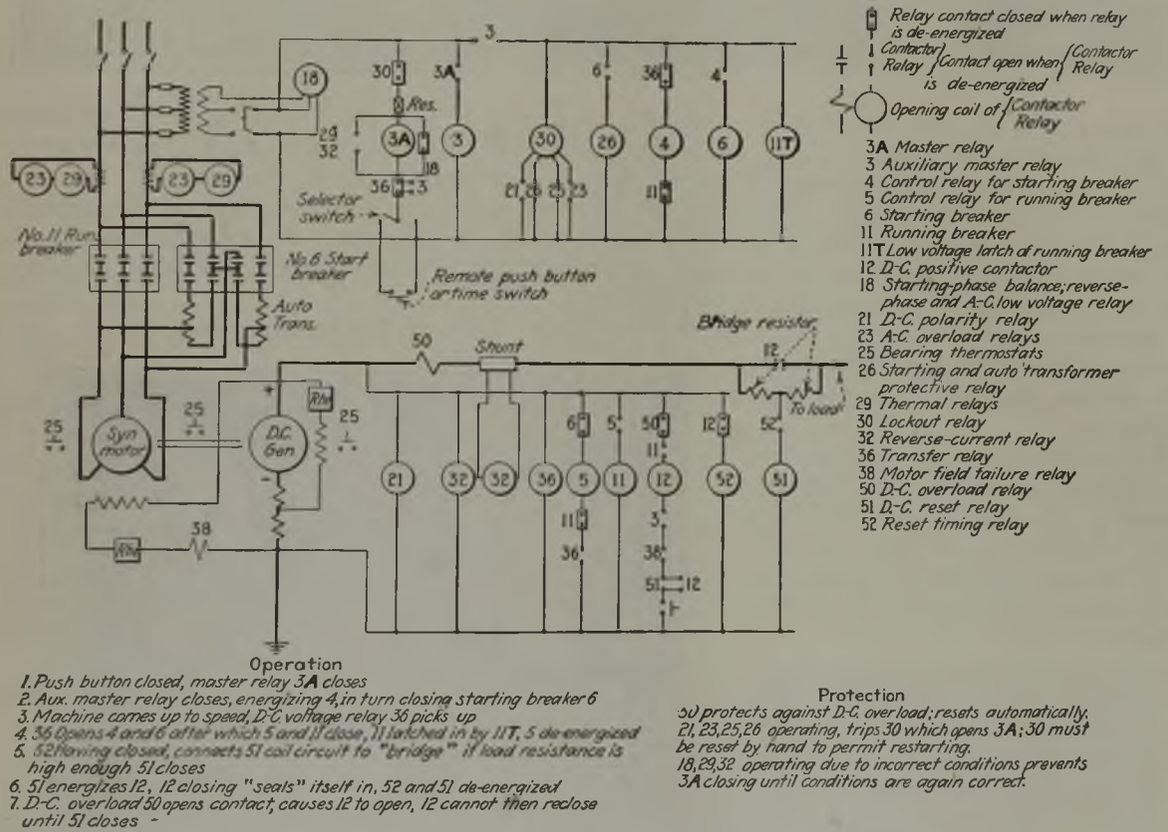


FIG. 4.

Simplified Diagram

This schematic drawing shows the operating sequence of the equipment illustrated in Fig. 3. By closing the push-button switch the master relay, 3A, closes and starts the necessary preliminary operations for bringing the motor-generator set up to speed. Rotary converters require slightly different control and protective features.

Operation

1. Push button closed, master relay 3A closes
2. Aux. master relay closes, energizing 4, in turn closing starting breaker 6
3. Machine comes up to speed, D-C. voltage relay 36 picks up
4. 36 Opens 4 and 6 after which 5 and 11 close, 11 latched in by 11T, 5 de-energized
5. 52 flowing closed, connects 51 coil circuit to "bridge" if load resistance is high enough 51 closes
6. 51 energizes 12, 12 closing "seals" itself in, 52 and 51 de-energized
7. D-C. overload 50 opens contact, causes 12 to open, 12 cannot then reclose until 51 closes

Protection

50 protects against D-C. overload; resets automatically.
21, 23, 25, 26 operating, trips 30 which opens 3A; 30 must be reset by hand to permit restarting.
18, 29, 32 operating due to incorrect conditions prevents 3A closing until conditions are again correct.

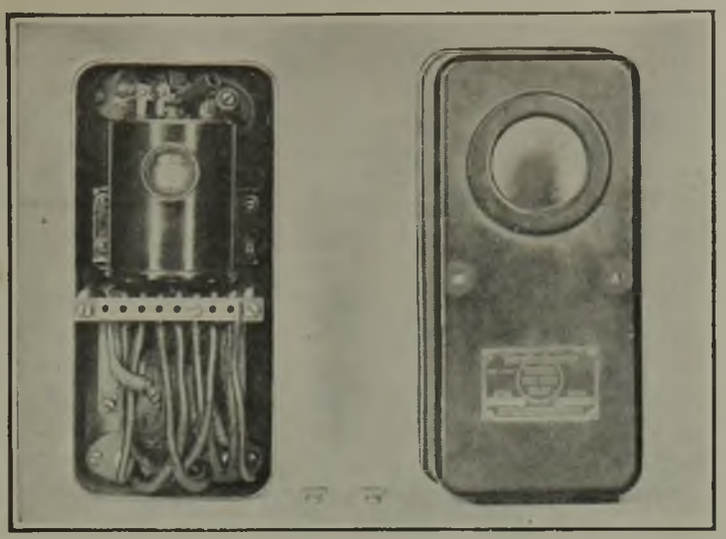


Fig. 5—Thermal Overload Relay

This device is one of the most important protective instruments used on automatic panels. The ordinary overload relay often shuts down a mine substation too frequently. Rarely is the all-day load near the full heating capacity of the generator.

held closed by the low-voltage release 11T; relay 5 and closing coil 11 being de-energized.

When the running breaker is closed and the motor field current is normal the direct-current contactor 12 will close if the feeder resistance is high enough to limit the load to a safe value. This is indicated by the closing of the reset relay 51. If, however, the load resistance is too low this relay prevents the closing of the direct-current contactor.

Should a direct-current overload occur contactor 12 opens by the operation of overload relay 50. A timing relay 52, then closes its contacts after a definite time, bringing into action the reset relay 51 which, in turn, closes or holds open contactor 12 as already explained.

As stated, an automatic switchboard and its accessories not only has the ordinary alternating- and direct-current overload protective relays but also low-voltage and reverse-current protection and other special protective features, which give to the automatically operated station better protection than those which are manually operated. Many of these relays anticipate trouble, they shut down the equipment before serious damage occurs. A short description of the design and operation of the more special relays will be of interest.

The starting-phase-balance-reverse-phase and low-voltage relay is a polyphase induction-type instrument with the windings so designed that (1) the voltage on the three phases must be approximately balanced, (2) the phases must be of the correct rotation and (3) the voltage on the three phases must be at least 80 per cent of normal to cause the relay to function. It is so connected with the automatic control wiring that the motor-generator set cannot start unless these conditions are correct.

One quite common misapplication of this type of relay has been made in the past. An attempt has been made to use it to protect a polyphase motor from single-phase operation when the motor is running. It ordinarily will not give this protection for the reason that a phase failure on an incoming line will not unbalance the voltages of the three phases of the motor winding appreciably. The motor will operate from a single phase and act as a generator on the other two phases, thus holding up the voltage to nearly normal on the open phases. The relay, naturally, under these conditions cannot detect the phase failure. Its function is to prevent starting or attempting to start under improper conditions. Positive protection against single-phase operation is provided by the use of two thermal relays as explained below.

The thermal overload relay, shown in Fig. 5, is connected in the secondary circuit of the incoming line current transformers. It consists of several spiral bimetallic springs attached to a shaft so that, as they heat and twist, due to unequal expansion, they turn the shaft and close the contacts. The heating is proportional to the current in the line wires and therefore proportional to the load on the motor-generator set. The whole element is immersed in oil and sealed in a brass case, which is surrounded by a heat-insulating sleeve. The design is such that a certain amount of current flowing for a given length of time causes the contacts to close.

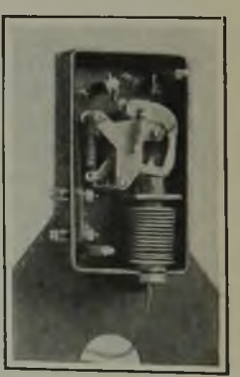


Fig. 7 — Thermostat Switch and Bellows

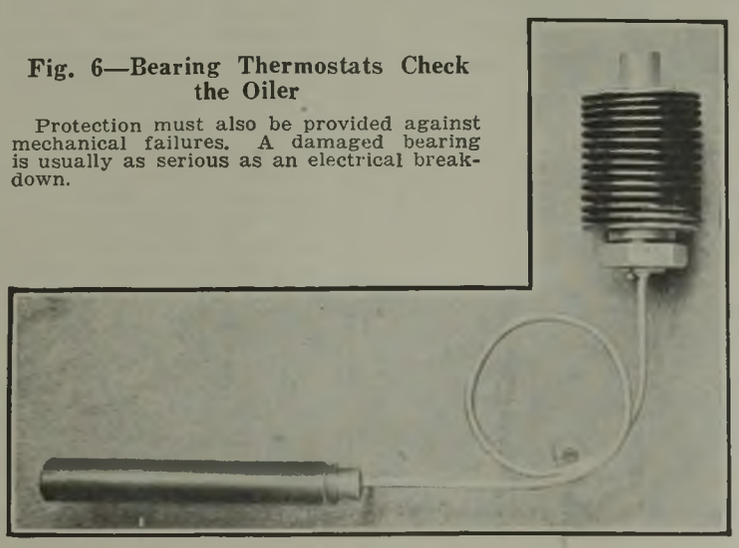
The heat generated in a bearing is transmitted to a bellows which expands and causes a small switch to open the control circuit.

If a motor is operating on a single phase, and the loaded phase is beyond the capacity of the winding, the relay in this phase quickly shuts down the machine and saves the winding. The thermal relay also has an advantage over an instantaneous acting phase-failure relay in that a momentary phase failure, which will not harm the machine, will not cause the motor-generator set to shut down. After the relay and motor windings cool the set will restart automatically if the three phases are again balanced.

Just below the babbitt at the bottom of each bearing is located a bearing-thermostat bulb. In this bulb is a liquid which vaporizes and exerts pressure at a fairly low temperature. This pressure is transmitted through a copper tube to a copper bellows which is expanded by the increasing pressure. The elongation of the bellows operates the contacts of the relay which in turn causes the station to shut down. The thermostat, once operated, must be reset by hand so that the maintenance man can see at once which bearing has overheated. The thermostat is designed to operate at about 100 deg. C. which is high enough to prevent it from shutting down the equipment in normal service but low enough to insure operation before there is danger of the bearing being destroyed.

Fig. 6—Bearing Thermostats Check the Oiler

Protection must also be provided against mechanical failures. A damaged bearing is usually as serious as an electrical breakdown.



By Continuous Flow of Water Coal Is Freed of Slate

Only Moving Parts Are Impeller and Chain That Removes Slate—Three-Horsepower Motor Furnishes All Water Needed

IN ORDER to secure a coal-cleaning machine of large capacity in comparatively small space, the device shown in the accompanying illustrations has been developed. For want of a better designation this has been called the Hydro-Separator, although this name is somewhat misleading. The construction of this machine is extremely simple, the only moving parts being the impeller of the pump and the chain that withdraws the refuse. In Fig. 1, which is a cross-section of the device, the mixture of coal and slate as it comes from the screens is fed into the machine behind the feed-gate *A* much as it is in the ordinary jig. Passing under the gate *A* the material enters the compartment *B*. Here it is supported on the curved, slanting, perforated plate *C*, where it is subjected to the action of an upwardly-moving current of water from the compartment *D*. This water is furnished by the pump *E*, the direction of the discharge being altered somewhat by the baffleplate *F*.

The flow of water is so adjusted as to buoy up particles of a certain specific gravity while allowing those of a higher gravity to sink. Thus a mobile bed of rock and bone is formed immediately above the screen with the coal contained in the original mixture rising with the water above it. The slate bed passes under the adjustable gate *G*, and is withdrawn by the conveyor *H*. The clean coal, on the other hand, passes over the top of the partition *I*, and out of the machine through the adjustable coal-discharge gate *J*. Here it slides down the perforated screen *K*, by which it is freed from water. The water, free from both coal and slate, passes over the top of the partition *L*, and into the tank to which the pump suction is connected. Gates *M* and *N* furnish ready means of cleaning out any sediment that may find its way into the lower compartments of the machine.

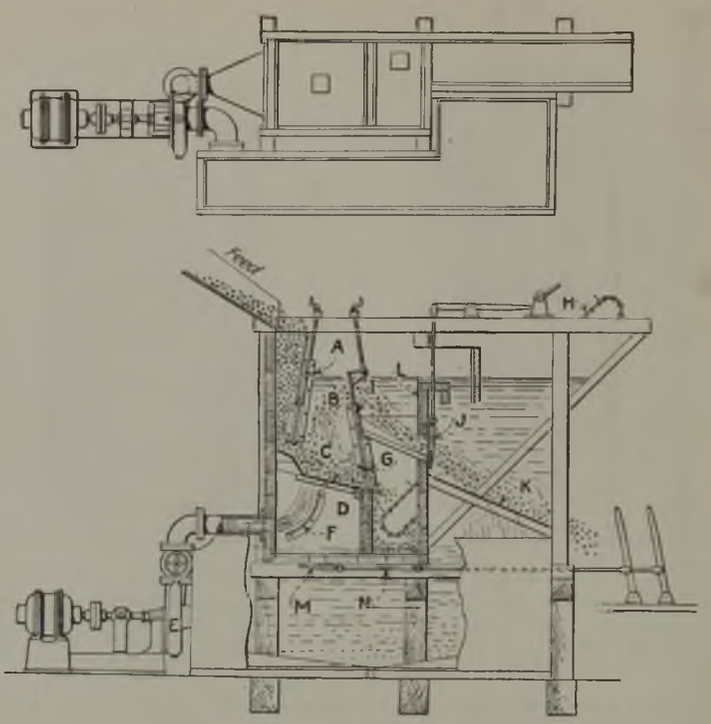


Fig. 1—Cross-Section of Hydro-Separator

With a screen only 18½x24 in., this machine cleans up to 15 tons per hour of coal and slate. The only moving elements in this device are the pump impeller and the refuse conveyor.

Being Submerged Coal not Removed by Weir

It should be noted in considering this machine and its action, that the coal never reaches the surface of the water. The cleaned material is not washed over the edge of a plate or weir, as coal slate and water take three separate courses, neither of the solids coming to the surface of the liquid. Although the volume

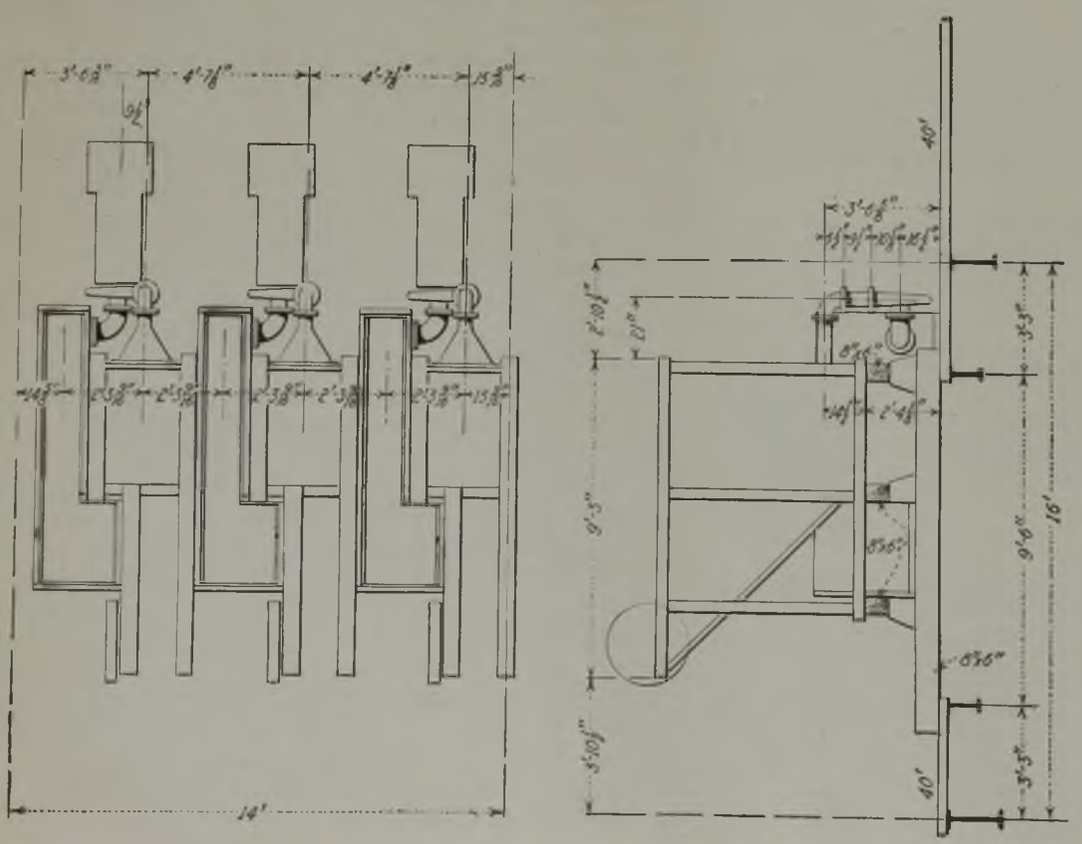


FIG. 2

Battery of Separators

In this installation each separator is served by its own individual pump, thus making each machine a separate unit. With equal facility so far as the machine and its operation are concerned a single pump might be employed serving the entire group. From the operating standpoint, however, certain advantages are obtained by the use of individual pumps for each separator, for under this plan any mishap occurring to one of the pumps affects only the machine to which it is attached. It will be observed also that capacity sufficient to treat approximately 45 tons of coal per hour is obtained in a floor space of roughly 14x16 ft.

of water used is comparatively large the head is small. Fig. 2 shows an actual installation of three of these machines in the No. 1 breaker of the Pennsylvania Coal Co. at Dunmore, Pa. In this installation each pump is driven by a 3-hp. motor and handles about 320 gallons of water per minute against a head of approximately 4¾ ft., or a pressure of about 2 lb.

The screens in these machines measure about 18½x24 in. and about 15 tons of buckwheat No. 1 are fed to them per hour. This gives, on the average, about 12¾ tons of clean coal and 2¼ tons of slate and rock. A long series of tests gave the following results on the separation performed:

Average coal in slate.....6.7 per cent
Average slate in coal.....7.4 per cent

The coal carried over with the slate and comprising the percentage given above consists of two products, namely, pure coal and heavy but burnable bone. Separating the cumbustible material in the slate into these two constituents gives the following results:

Average pure coal in slate.....3.7 per cent
Average heavy bone in slate.....3.0 per cent

The results given represent average practice with these machines. By changing the adjustments and making them such that a slightly larger percentage of combustible material would be carried into the refuse it would be entirely possible to secure a cleaner coal product. Conversely, adjusting the machines to give a cleaner rock product would put more slate in the coal. In this connection, however, it should be remembered that any small coal containing less than 5 per cent of refuse is today called a "special" product and commands a premium over the regular market price.

Simplicity, Low Cost and Space Economy

The chief advantages of this machine, aside from the excellent work done as has already been enumerated, are its small size, large capacity, great simplicity, and low first cost. From Fig. 2 it will be noted that a battery of three of these machines occupies a floor space of only 12 ft. 1½ in. x 14 ft. When it is considered that each of these machines handles approximately 15 tons of coal per hour the significance of these figures becomes apparent. The simplicity of the device needs no comment, as this is self-evident from the drawings. And naturally, small size and simplicity mean low first cost.

The chief disadvantage of the machine is the large quantity of water that it uses. This is, however, more apparent than real. As previously stated this machine uses approximately 320 gallons of water per minute. This quantity of water is circulated rather than consumed as it is used over and over again, only the makeup water necessary being added. Actual consumption is thus small, as are also the power requirements, each pump being supplied with only a 3-hp. motor as previously stated.

Gasoline-Driven Generator Runs Hoist And Fan in Emergency

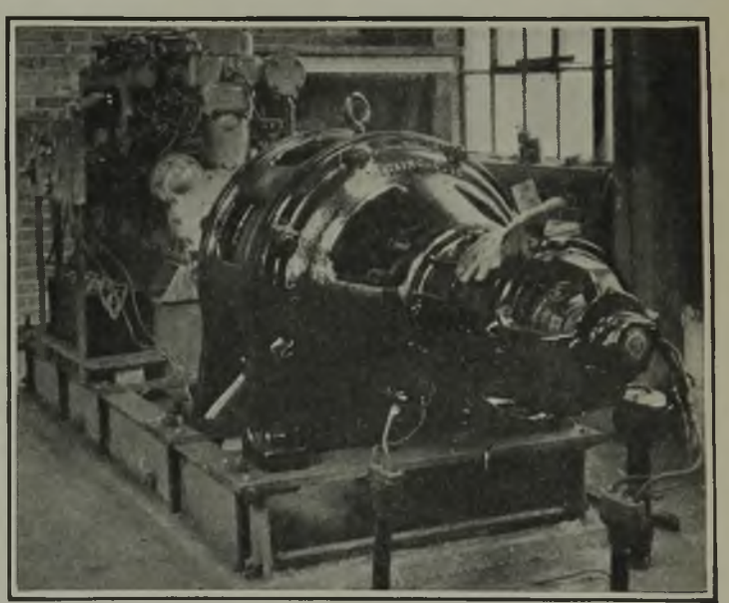
By Ed Gunia
Master Mechanic, Monarch Fuel Co.,
Rural Ridge, Pa.

THE present-day reliability of self-starting and ignition equipment on gasoline engines recommends them for emergency use when there is a protracted interruption in the flow of current from central power stations. For that matter a steam-driven standby unit also might be kept available for immediate use, but it has the distinct disadvantage of being expensive to maintain, especially where there is no bathhouse or central heating system to utilize the steam pressure that must be maintained continuously.

Having in mind a twofold purpose, first to get its men out of the mine and secondly to keep the fan going when the purchased power is interrupted for any great length of time, the Monarch Fuel Co., at Rural Ridge, Pa., recently installed a 100-kva., 2,400-volt generator driven by a 225-hp. gasoline engine. The power generated by this unit can be used to operate the cage in the supply shaft until all the men are out of the mine, and then it can be switched to run the fan. The change in power is readily effected after the emergency generator is in motion, merely by throwing out the main switch and throwing in an auxiliary switch on the plant end of the bus-bar.

Only one motor is required to drive the fan, whether the latter be operated by purchased power or that coming from the gasoline-driven generator. The 5x11-ft. fan is driven by a two-speed motor, which has a capacity of 37.5 hp. at 430 r.p.m. and 100 hp. at 870 r.p.m., usually developing 110,000 cu.ft. of air.

Normally the hoist is driven by a 150-hp. induction motor with a speed of 440 r.p.m. As the capacity of the standby generator is not sufficient to drive the main motor of the hoist, a 50-hp. auxiliary induction motor with a speed of 870 r.p.m. is provided. The latter drives the hoist by a chain and a sprocket on the shaft-coupling between the hoist and the main motor. This sprocket is idle when the main motor is in operation and can be bolted in a few minutes to one flange of the shaft-coupling when purchased power for any reason is interrupted.



Gasoline Engine Replaces Purchased Power When Current Fails

Hoist, normally driven by 150-hp. induction motor, is operated by 50-hp. motor when purchased power is not available. Fan cannot be driven till men are all hoisted. Then fan is operated by gasoline engine using same motor as is in use when purchased power is being used.

News Of the Industry

Need of Fundamental Coal Information Emphasized During Present Depression

Lack of Government and Association Data Responsible for Guesswork Statistics—Benefit Expected from Elimination of Uneconomical Mines—Export Trade Offers Big Opportunity

By Paul Wooton
Washington Correspondent of *Coal Age*

Economists, public and private, are giving an unusual amount of study to the problems of coal. The industry is passing through its worst depression. Foundations are being laid for fundamental changes. It is recognized that tests by fire are productive of some good. The hope is that the destructive forces of the present situation can be meliorated to the greatest extent possible.

An example of the benefits to the industry which are resulting from the depression is the elimination of uneconomical mines. They are being eliminated with all the ruthlessness that characterizes the direct application of the irresistible force of economic law. These mines are going on the bargain counter in increasing numbers at prices which thoroughly justify the statement that they are being sold for a song. In that connection, however, it is pointed out that there is nothing strange in the sale of coal mines at such sacrifices when the spot price is lower than at any time since 1916.

When account is taken of the various wage advances which have taken place since 1916, the unremunerative character of the present coal price is accentuated. Crushing as are the losses which individuals in the industry are suffering, the coal industry is not unfamiliar with these periods when only the fittest survive. The spirit of the industry is strengthened by the necessity of surmounting new obstacles.

Statistical Guidance Much Needed

One of the great difficulties in meeting these obstacles is the lack of fundamental information. A large amount of the data which have been gathered by the local associations and on a national scale are not now available. The situation is serious because there never was a time that the coal industry had the statistical guidance essential to its thoroughly intelligent conduct, but the volume of statistics formerly available constituted a veritable plethora of essential data as compared with that obtainable now.

The outstanding, crying need of the industry, however, is for a stock report. Among the operators the feeling is that stocks are very much lower than is indicated by the various guesses being made. When the fundamental importance of coal is considered it would seem, many point out, that the greatest industrial nation in the world would have available information of this importance. Statistics are most needed in troublesome times. In actual practice, however, the coal industry produces its greatest amount of statistics when they are least needed, and when they are greatly needed the available figures are almost negligible.

Better Utilization Is Important

Enough data are available, however, to determine the fact that the state of industry is not alone responsible for the decrease in the volume of consumption. Better utilization of coal is a more important factor than is generally realized. No small amount of coal has been displaced by fuel oil and some reduction in the amount of coal required has resulted from the elimination of small isolated power plants with the growing availability of electricity. Some further losses of coal market are attributable to the development of hydropower.

There are many who think that a portion of our surplus capacity could be occupied were determined efforts made to expand our foreign trade in coal. Much more American coal could be exported were the exporter to expand his business beyond trade in coal alone. It is pointed out that the companies that are making the greatest success of foreign trade are importers as well as exporters. To be assured of return cargoes they invest in foreign tonnage-producing enterprises. In this way and by becoming general traders they are in the position to insure a steady and dependable market for the exported commodity, which constitutes the concern's major interest. It will be recalled that F. R. Wadleigh, formerly Federal Fuel Distributor, for years has been urging return cargoes for ships taking American coal to foreign ports. In his opinion our failure to export more coal has been due to failure to give proper attention to obtaining return cargo.

Ford's Road Pays 12 per Cent To Employee Investors

The Detroit, Toledo & Ironton R.R., Henry Ford's road, earned 6 per cent on the investment during the first half of 1924, or at the rate of 12 per cent annually, according to an announcement on July 29 to employee stockholders.

Since Nov. 1, 1923, when the railroad launched the plan, the employees have purchased $162,994 of investment certificates of the road from their earnings.

Federal Suit for Demurrage At Hampton Roads Piers A Surprise to Operators

The action of the Railroad Administration in making a new attempt to collect bills for demurrage at Hampton Roads during the period of the Fuel Administration comes as a complete surprise to the coal operators who participated in those pools. The matter was gone into thoroughly during the administration of Director General Hines and the bills against the individual operators were withdrawn definitely. Now, after three years, counsel for the Norfolk & Western, the Chesapeake & Ohio and the Virginian Ry., on behalf of the Railroad Administration, are beginning suits to recover some $500,000 of war-time demurrage charges.

At the time the demurrage was assessed, control of the movement of the coal was in the hands of the Fuel Administration. Car movements were in the hands of the Railroad Administration. The movement of boats was in the hands of the Shipping Board. While the operators were compelled to put their coal in the pools, they had no control over the situation which resulted in the assessment of the demurrage.

It happens that the last thing E. J. McVann did before resigning as secretary of the Smokeless Operators' Association was to convince Director General Hines that the operators were not responsible for this demurrage. Now that he has resumed the office of secretary, his first duty is to go over the whole ground again with James C. Davis, the present Director General. The whole question involved is whether or not one government agency can compel the payment of penalties incurred under compulsion of other government agencies.

Anthracite Operators to Teach Public How to Heat Homes with Small Sizes

A program of public education on the economy and usefulness of anthracite is to be set in motion by anthracite operators. It will consist of four permanent service stations, one each in New York, Philadelphia, Boston and Washington, where coal consumers may go for definite information on the proper methods of heating a home. These permanent clearing houses of information will be known as Anthracite Economy Service, with every indication that "service" will be rendered with unusual completeness.

A further step in the campaign of public enlightenment will be a traveling exhibit, known as the Anthracite Economy Service Exhibit, with the same broad purpose as its keynote. It will be shown in twenty different cities, a week in each, starting at Portland, Me., the first week in September.

The Anthracite Economy Service will build upon and extend the scope of past efforts to educate the public also in the wider use of smaller sizes, particularly buckwheat. A convincing into-the-home message will be carried to every part of the anthracite-consuming territory special attention being given to encourage the housewife to visit the Service and Service Exhibits. Both dealers and appliance manufacturers have agreed to co-operate.

The first step will be the opening of the four permanent information bureaus, each one showing complete installations of standard devices for the use of buckwheat coal. The personnel of the demonstrating force retained by the operators is the highest; men equipped by experience and training to prove the economy and efficiency of both the coal and the appliances, will be in constant attendance.

The unique traveling exhibit, like the permanent service stations, will be given plenty of publicity and with the dealers co-ordinating it should make a direct appeal to the great body of consumers. As in the case of the permanent service, considerable effort will be spent in showing the home owner and the housewife how to get a maximum of heat in the furnace or the boiler. This will apply particularly to buckwheat, although the broad idea is to show the public how to use anthracite to the best advantage. The extension of the use of buckwheat coal in the small home, however, is the objective directly aimed at.

All of the approved equipment designed for the average dwelling will be shown at all the exhibits. It will include the very newest device, a moderately priced, compact and most efficient unit, including a special grate, blower and automatic control, for burning buckwheat in the smaller size home. Friends of this new device for attaching to the average heater believe that it will play a large part in promoting the sales of small-size anthracite.

Nothing will be sold at either the permanent Anthracite Economy Service Exhibits, their purpose being purely educational. The service will be free to the public.

Who Dirtied Up This Coal?

Mine 18 of the Western Coal & Mining Co., in Southeastern Kansas, is shut down after a set of rather interesting events. The mine has been delivering coal to the Missouri R.R. on contract. The railroad refused coal because it was too dirty. The mining company could not remedy the situation by placards and requests, so it shut down the mine. This brought some thoughtful miners to their feet, so to speak. They offered to discipline those of their number who were considered responsible for the dirt. But the district union officials wouldn't hear of this. They demanded that Commissioner W. L. A. Johnson, of the Southwest Interstate Coal Operators Association, compel the company to pay each miner $1 a day for the shutdown. Mr. Johnson refused. So the mine is still down and the argument goes merrily on, while the miners go hungry and the railroad gets coal elsewhere. It is merely one of these occurrences the union mine operator faces every now and then.

British Miner Worse Off Than American, Kennedy Finds

Writing from Dublin, Ireland, Thomas Kennedy, of Hazleton, Pa., president of District 7, United Mine Workers, describes the results of his investigation of conditions, wages, etc., in England, Scotland and Wales.

"The Miners' Federation of Great Britain, which includes Wales and Scotland," he writes, "has about one-third less members at this writing than it had immediately following the war and up to the strike of 1921. The disastrous ending of the 1921 strike is given by miners' officials as the cause of the decline in membership. The wages of the miners today are about 10s. less than the wages received during the war, or about $2.50 per day in American money. The wages now being received in Scotland and Wales and generally in England by the mine workers are as follows: Outside top laborers, $9 per week; inside day laborers, $2 per day; tonnage miners, which corresponds to our contract miners, are earning on the average of $3.50 per day. And all time is not being worked by any means. . . .

"We met Hugh Crankshaw, formerly general manager of the Lehigh Coal & Navigation Co., who also was at Cranberry and Harwood. Crankshaw designed and constructed the coal mine at the British Empire Exposition at Wembley, which is a marvelous piece of work and which attracts more attention than any other exhibit. He is located at South Wales, but not now in the operating business, although he is soon to take charge of the largest coal-mining property in Great Britain which will be known as the Anthracite Consolidated Collieries, all situated in South Wales."

Davis Denies Owning Stock In Any Coal Mine

John W. Davis, Democratic candidate for President, denies that he is interested in non-union coal mines in West Virginia, or that he was one of Charles G. Dawes' "minute men," in a letter printed by a Sullivan (Ind.) newspaper July 29. The letter was sent in reply to a communication from the newspaper made at the request of union coal miners in Indiana. The letter, in part, is as follows:

"I own no stock whatever in any coal mine, union or non-union, or, for that matter, any coal or coal lands. I was never one of Charles G. Dawes' 'minute men.' I have never been opposed to labor unions, and thoroughly believe that they are necessary to the welfare not only of the laboring man but the community as well."

The Rev. Norman Thomas, the Socialist candidate for Governor of New York, launched an attack on Mr. Davis July 30 for his alleged silence on "the continued denials of civil liberty and the right to organize" in West Virginia.

"It seems to me to be an extraordinary state of affairs," said Mr. Thomas, "when it is recommended to labor organizations that a Presidential candidate should not be opposed because he favors the existence of labor unions and does not happen to own stock in a non-union coal mine. Coal stock in bituminous mines is very unprofitable anyway, and Mr. Morgan's attorney probably has better investments.

"The labor complaint against Mr. Davis is that he has never used his great ability constructively for the interests of the people. He accepted without a word of protest the support of the West Virginia delegation, which contained Sheriff Don Chafin, of Logan County, the most autocratic tool of absentee ownership in America.

"As a nominal West Virginian Mr. Davis never protested against the continued denials of civil liberty and the right to organize which has made West Virginia's record a blot on the American escutcheon. In the face of these facts Mr. Davis' letter is ridiculously inadequate."

New Kentucky-Indiana Railroad May Be Built

The newest railroad project in the Midwest is the proposed Owensboro, Rockport & Chicago Ry., to run 84 miles from Owensboro, Ky., across the Ohio River and north to Elnora, Ind., making a connection with the Chicago, Terre Haute & Southeastern, which is a part of the Chicago, Milwaukee & St. Paul Ry. If this line is built it may offer a new outlet northward for Kentucky coal, especially from the western Kentucky field. The company is now capitalized at $20,000 with expectations of increasing this to $2,500,000 if the Interstate Commerce Commission grants the petition filed this summer for the right to build. The officers of the company are: President, E. T. Franks; Vice-President, D. C. Stimson; Secretary, E. W. Smith, all of Owensboro.

Coal-Mine Accidents in June Kill 161 Miners; Six Months Toll Is 1,302

Accidents at coal mines in the United States during June, 1924, resulted in the death of 161 men, according to information received from State mine officials by the U. S. Bureau of Mines. The output of coal during the month was 38,151,000 tons; hence the fatality rate was 4.22 deaths per million tons of coal mined, as compared with 3.36 for the previous month, 3.73 for June last year and an average fatality rate of 4.22 for the month of June during the 10-year period 1914-1923. For anthracite mines alone the number of fatalities in June was 53 and the fatality rate was 6.88 per million tons, as compared with 6 for the same month last year and 7.06 for June during the 10-year period. For bituminous mines alone the June rate for 1924 was 3.55 per million tons, as against 3.30 for June last year and 3.68 average for June during the 10 years.

Records for 1924 to the end of June show that 1,302 men have lost their lives in accidents at coal mines. Of this number, 1,049 men were killed at bituminous mines and 253 at anthracite mines. The 1,302 fatalities indicate a death rate of 4.76 per million tons, which may be compared with 3.91 for the first six months of 1923. For bituminous mines alone the 1924 rate for six months was 4.61, as compared with 3.59 for the same period of 1923. For anthracite mines alone the rate for the first half of 1924 was 5.51 per million tons, as compared with 5.61 for 1923.

William C. Atwater

President of the New York coal company bearing his name, who was recently elected president of the Pocahontas Operators' Association, succeeding I. T. Mann.

A comparison of the causes of accidents in the first half of 1924 with those for the first half of 1923 shows that explosions of gas or coal dust continue to be the only class of accidents with increased fatality rates. The comparative rates per million tons for the two half-year periods were:

	January to June 1923	1924
Falls of roof and coal	1.821	1.846
Haulage	.644	.607
Gas and coal-dust explosions	.601	1.587
Explosives	.197	.143
Electricity	.117	.120

Power Show Exhibitors Rush for Space

Over 260 exhibitors have been assigned space at the Third National Exposition of Power & Mechanical Engineering, which will be held in the Grand Central Palace, New York City, Dec. 1-6. As this is more than twice the number that had engaged space on Aug. 1 a year ago, the indications are that this year's show will be of tremendous interest and importance.

As usual, the exposition will parallel the meetings of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers. The A.S.M.E. meeting will be held in the Engineering Societies Building, 29 West 39th St., New York City, and the A.S.R.E. meeting will be held at the Hotel Astor, New York City. Plans also are under way by the American Society of Heating and Ventilating Engineers to have a gathering of local sections during the time of the exposition. The co-operation of the various engineering societies has been valuable, as it enables members to attend the meetings and at the same time see the interesting exhibits at the power show.

Chesapeake & Ohio May Acquire Three Small Roads

The Chesapeake & Ohio Ry. on July 25 asked permission from the Interstate Commerce Commission to acquire the properties of the Ashland Coal & Iron Ry., Long Fork Ry. and the Millers Creek R.R., and also authority to assume outstanding obligations of the companies in order to acquire them.

Coal-Mine Fatalities During June, 1924, by Causes and States

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1924	1923
Alabama	4							1					5													5	10
Alaska																										0	0
Arkansas	1												1													1	1
Colorado	1	2											3													3	1
Illinois	4		2										6	1				1								7	16
Indiana	5												5													5	7
Iowa	2												2													2	2
Kansas	1												1													1	0
Kentucky	6		1	1									8													8	16
Maryland		1											1													1	0
Michigan																										0	0
Missouri																										0	1
Montana																										0	2
New Mexico	1		1										2													2	2
North Dakota																										0	1
Ohio	2												2													2	9
Oklahoma																										0	1
Pennsylvania (bituminous)	10	1	5			2		2				1	21													21	35
South Dakota																										0	0
Tennessee	2												2													2	2
Texas																										0	0
Utah																										0	3
Virginia	1												1													1	3
Washington	1										2		3													3	4
West Virginia	18		12			2		3					35						1	1				2	4	39	33
Wyoming	3	2											5													5	1
Total (bituminous)	62	6	21	1		4		6			2	1	103	1				1	1	1				2	4	108	150
Pennsylvania (anthracite)	15	4	4	19		3	2	1				3	51	1				1	1						1	53	52
Total, June, 1924	77	10	25	20		7	2	7			2	4	154	2				2	2	1				2	5	161	
Total, June, 1923	95	9	42	15		12	2	5				7	187	1		1		2	1	1	1		6	4	13		202

Lee Says Coal Mines Disrupt Railroad Industry

Interdependence of railroads and mines was emphasized by Elisha Lee, vice-president of the Pennsylvania R.R., at the second annual banquet of the Fayette-Greene Coal Producers' Association, July 31, at the Summit Hotel in the mountains near Uniontown, at which M. D. Cooper, of the Hillman Coal & Coke Co., of Pittsburgh, presided. Mr. Lee said both mines and railroads were subject to wide variations in activity, the carriers even more than the producers of coal. When the coal business is depressed coal operators can close down or stimulate trade by lowering prices. The railroads are so strictly regulated that they cannot do the first at all and the second only when granted permission by the Interstate Commerce Commission.

Coal Traffic Important Item

The importance of coal traffic to the railroad is immense. That traffic on the Pennsylvania R.R., said Mr. Lee, is three times that of its nearest rival, sand and gravel, and six times that of iron and steel. On the Pennsylvania Railroad, 38 per cent of the traffic is in bituminous coal and 6 per cent anthracite. Of every 10 tons of coal produced 3 tons are consumed by the railroads.

G. W. Galloway, vice-president, Baltimore & Ohio R.R., said that in his forty-one years of railroading he had never seen so friendly a feeling between railroads and the public. Last year the railroads decided to spend 1.4 billions of dollars for better transportation facilities. The program was fairly under way when the volume of business began to decline. At present 300,000 freight cars valued at $2,500 each and 7,000 locomotives worth fifty to sixty thousand dollars apiece were standing idle, the equipment being worth one and a quarter billion dollars.

Much Invested in Idle Equipment

Mr. Galloway asserted that the B. & O. R.R. alone has 42 million dollars invested in idle equipment that is in running order and that a non-union territory had shipped 800,000 tons of coal to markets which formerly were supplied by union mines on the B. & O. The average production cost per ton at the open-shop mines is $1.40 and the freight rate $1.91. a total of $3.31. The cost per ton at the union mines is $2.20 and the freight rate $1.60, a total of $3.80, leaving a wide differential on the delivered coal. Coal from this particular field has been shipped all rail to Nebraska. His railroad has a tidewater dock idle in a southern port that cost over $3.000.000.

Harry L. Gandy, secretary, National Coal Association, said that one-fourth of the revenue of the railroads came from coal traffic and urged that the railroads should not try to "beat down" the price of coal. The gain, said he, from such practices is only temporary and is certain to reflect on the industry by which the railroads largely earn their living.

Fuel, he declared, is no burden on the manufacturer. In 1913 it represented only 2.6 per cent of the total cost of the finished products, and today it should be far less. Overproduction was due to an excessive demand for coal during the war. Walter Barnum, treasurer of the Pacific Coast Co., said the Washington Coal Producers' Association had given careful engineering study to the use of oil and when new buildings and houses were erected the association got in touch, chiefly by letters, with the owners urging the use of coal-burning equipment for heating.

No Evidence Anthracite Operators Violate Law

In answer to J. J. Rogers, representative from Massachusetts, Attorney General Stone declares that the Department of Justice has failed in its investigation to find any evidence that anthracite operators are violating the law in the prices they are charging for coal to New England purchasers, and that no immediate action would be taken toward the prosecution of the operators unless damaging evidence is revealed. The Department could find no evidence of a combination or a monopoly to cause a coal shortage or raise the prices of anthracite. The investigation was made at the request of Representative Rogers.

Utility Coal Consumption and Power Output Drop Again

Electric public-utility plants consumed 2,701,106 net tons of coal during June, according to a report by the Geological Survey. This compares with 2,816,352 tons consumed in May, according to revised figures. Fuel oil consumed by utility plants in June totaled 1,306,140 barrels, compared with 1,207,473 barrels in May.

The average daily production of electricity by public-utility power plants in June was 152,600,000 kw.-hr., or about 1 per cent less than the daily output in May. The seasonal decline during May and June has been greater this year than usual, due to the general industrial depression.

Erskine Ramsay Donates $100,000 to Dormitory

To the million-dollar fund being raised for Alabama College at Montevallo, Erskine Ramsay has given $100,000 to be used toward the construction of a Woman's Dormitory which is to be known as "Janet Ramsay Hall" in memory of his mother. The dormitory will cost about $220,000. Mr. Ramsay has made his fortune in the operation of mines in the State of Alabama and in the sale of his rights to valuable inventions made by him for the construction of mine machinery. Two years ago he gave an equal sum for the construction of the Erskine Ramsay Engineering Hall.

Unionization Drive on Again In West Virginia

Another union ultimatum, which may presage disturbances in West Virginia coal mines on a wide scale, has been issued by Van A. Bittner, who was appointed by John L. Lewis, president of the United Mine Workers, to direct union affairs in northern West Virginia. In addressing a crowd of miners at Scotts Run, Bittner stated that West Virginia would be unionized—peacefully if possible, but unionized at any rate.

"We must make union men out of all the scabs on Scotts Run in the regular manner, or by stronger methods if necessary—you know what I mean," he said. Amid the ensuing excitement in the crowd, which numbered close to 6,000, there were loud denunciations of local police officials, coal-mine owners that held out against the union's demands, and even a former Governor of the state.

"We will not stop until Monongalia County—and West Virginia—is 100 per cent union," continued Bittner. "We must preach the gospel of the United Mine Workers. We all know that to spare the rod is to spoil the child. But it is not necessary to try violence. I hope that none of you will attempt violence. We can unionize this field if we will. What group of non-union men is there anywhere that would refuse to join the union if they were pressed to do so by thousands of union members?"

It is reported that similar plans are in the making for the other West Virginia fields lost to the union in the last two years.

Scotts Run has been the center of much violence during the last few weeks. An intensive campaign to unionize the district has been in progress, during which men have been shot down, buildings have been burned and men have been beaten on their way to work. The Scotts Run meeting, however, was not entirely a local affair, for, according to the mine owners, the union officials brought in a large number of union men from Taylor, Harrison and Marion counties, in order to muster a large crowd.

Export Shipments for Fiscal Year Advance 8 per Cent

Bituminous coal exports during the fiscal year 1924 amounted to 17,203,193 long tons, compared with a total of 15,953,879 tons during the preceding fiscal year, an increase of 7.8 per cent. For the six months, July-December, 1923, bituminous exports were 9,984,305 and for the six months, January-June, 1924, the total was 7,218,888 tons. Exports for the corresponding periods of the fiscal year 1923 were, respectively, 6,783,203 tons and 9,170,676 tons. During the first half of the fiscal year 1924 (July-December, 1923) exports were stimulated by the low production in the Ruhr coal fields, which increased the demand for our coal in Western Europe and South America in particular. This stimulus did not exist during the last half of the fiscal year (January-June, 1924) and exports were 2,765,417 tons or 27.7 per cent less than for the first half of the fiscal year.

Practical Pointers For Electrical And Mechanical Men

Simple Tool for Resurfacing Seats of Tube-Hole Covers in Boilers

Square Piece of Board Is Set on Bit-Brace Shank—It Is Covered with Sandpaper or Emery Cloth and for Grinding Headers Has a Circular Pilot Block

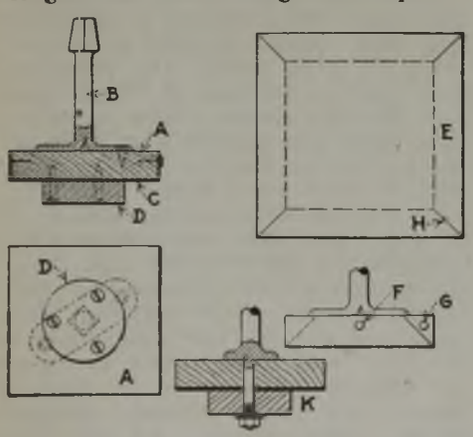
Those who have had charge of water-tube boilers at mine power plants well know the difficulty sometimes experienced in grinding in tube-hole caps on the headers. Unless the cap fits the header almost perfectly the joint will leak when pressure comes upon it. Various machines have been devised to perform this work, most of which give excellent results. The mine power plant engineer, however, is often "up against" the proposition of making a tight joint of this kind when no grinding machine is available.

To facilitate performing this operation, the tool shown in the accompanying illustration has been devised. This may be built in any mine shop. It consists of a square piece of 1¼ to 1½ in. plank *A*, surfaced at least on one side. It should be large enough so that it will a little more than cover a tube-hole opening and the cap seat surrounding it. On one side of this piece is fastened a shank *B* terminating in a square tapered head suitable for holding in a bit brace. On the other side of the block a sheet of sandpaper or preferably emery cloth, *C*, may be attached either by glueing or tacking. For grinding on headers a circular pilot block *D* may be screwed on over the sandpaper or emery cloth.

A convenient way of attaching the emery cloth is shown at *E*. A square piece of cloth is first cut or torn, its length and width being made equal to that of the block *A* plus twice its thickness. The block is then placed upon this square piece of cloth, approximately centered, and diagonal or miter cuts made from the corner of the block to the corner of the emery cloth. The edges of the cloth are then carefully folded up along the edges of the block and a tack driven in the middle of each side as shown at *F*. The mitered corners may now be folded over and tacked as shown at *G*.

For grinding tube-hole caps the pilot block *D* is left off. In this operation a drill press, a boring machine or any other means of holding and spinning the grinder block may be used with advantage. If covers are held in the hand while being surfaced, however, care should be taken that too much pressure shall not be exerted between the cover and grinding block, because if much pressure is applied the cover is liable to be jerked out of the hand.

Although grinding the cover seats on headers with a block of this kind revolved in a brace is by no means as rapid as facing them by means of a grinder designed for the purpose, it is much faster than facing with a wooden block and wet sand or with a hand block and sand paper. A variation of the scheme here shown would be to turn and face the block *A* in a lathe, and forge a collar on the shank, against which the back of the grinding block seats. The shank, however, extends through the pilot block as well as a washer and nut, this arrangement being shown at *K*. A sandpaper disk with a hole in its center may then be clamped between the grinding block and the pilot, the paper needing no other fastening. This answers every purpose for surfacing cap seats on headers, but for surfacing the caps a thin washer for holding the sand paper is necessary. Other variations in design will doubtless occur to those operating this tool.



Emergency Seat Resurfacer

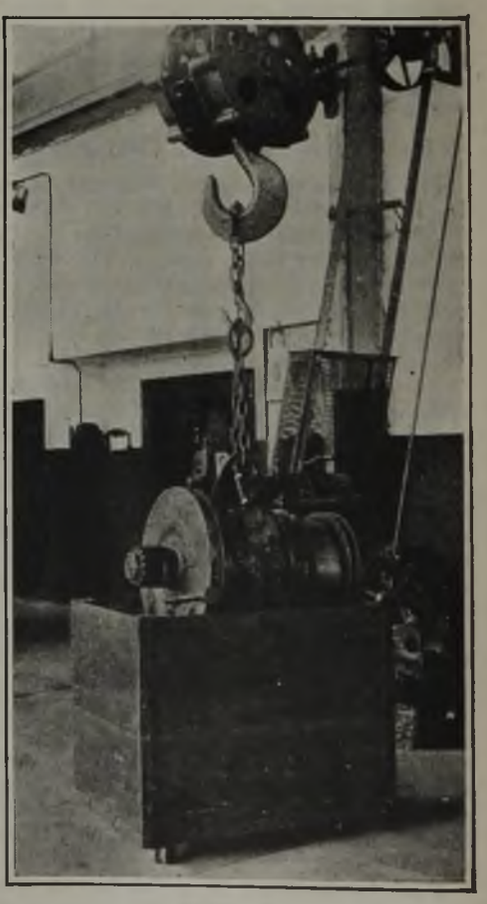
This shows the simplicity of construction—a shank to fit a bit brace, a piece of plank, a sheet of sandpaper, a circular block to serve as a pilot and a few tacks and screws are all the materials necessary.

Box on Casters Facilitates Handling of Armatures

By C. E. Reynolds
Superintendent, Allegheny Pittsburgh Coal Co., Logans Ferry, Pa.

The Springdale mine of the Allegheny Pittsburgh Coal Co., Logans Ferry, Pa., has a way to handle heavy armatures, that ought to be adopted by all coal companies having electrical equipment. Spare armatures are kept in wooden boxes on ball-bearing casters, by which means they can be moved by one man from the storeroom to any part of the shop, providing the floor is smooth, as it should be. Faulty armatures are placed in the box from which the spares are removed. It is just as easy, by means of a crane, to lower an armature into the box or to lift it out, as it is to raise it from or lower it to the floor. The scheme eliminates all the labor involved in handling armatures by trucks and also provides a receptacle for storing them.

The bottom of the box is made of 1½-in. boards, and the sides, which are nailed to 2-in. inside corner posts, are of 1-in. stuff. Two iron straps are screwed to the sides and the bottom of the box on the outside of the corner posts. The inside of the box may be arranged to allow the armature to rest on its shaft in two end supports or it may be lowered to the bottom.



Castered Box Supports Armatures

Anneal Your Boiler Tubes Before You Roll Them

Boiler tubes are fastened in place by being expanded into the header or sheet. The ordinary type of expander consists of three rollers held in a hollow cage through which a tapered mandrel passes. The cage with its rollers is inserted in the tube, the mandrel driven lightly and then revolved by means of levers passing through its upper end or head. This stretches the tube and forces it against its seat in the header or drum sheet.

In order to roll a tube properly and make a tight joint it is necessary to crush the metal of the tube against the metal of the boiler sheet or header. Dirt or grease between the tube and the surface against which it seats is fatal to a good joint. For this reason it is necessary to clean thoroughly both the end of the tube and the inside of the hole into which it is expanded.

Most tube holes in boiler sheets and headers are reamed to size at the factory, and the reamed surface protected from rust, by means of a coating of heavy grease or paint. This must be removed thoroughly before a tube is inserted if a tight joint is desired. The end of the tube, likewise, should be cleaned with a file and all rust and scale scraped or filed off. It is not necessary to polish the end of the tube, but it is essential to secure clean bright metal. In other words, it matters little how rough may be the end of the tube so long as bright metal is exposed.

As sent out from the factory most boiler tubes are merely cut to length and bent to the proper shape if bending is necessary. Particularly if they are to be expanded into a thin sheet —one ¼ in. thick or less—it is advisable to anneal them before expanding. This may be done in an ordinary blacksmith's forge, or if such a forge is not available their ends may be heated in the furnace of another boiler or even in an open fire.

In this annealing process it is necessary to heat only the end of the tube as this is the only portion that is acted upon by the expander. To do this is quite simple. First stuff a piece of waste, a handful of rags or even a wad of old paper into one end of the tube. Build up a good-sized fire or one big enough to thoroughly cover the end of the tube for a distance of about 4 in. Insert the open or unplugged end of the tube and turn it slowly until it shows an even cherry red over its entire circumference. The tube may now be removed from the fire and laid to one side, but so supported that its hot end touches nothing. When cool the other end may be treated in a similar manner.

This simple process is ordinarily all that a boiler tube needs in the way of an anneal. If, however, a particularly soft tough tube is desired, proceed as before but upon removing it from the fire, bury the hot end in air-slaked lime. This will greatly prolong the period of cooling and render the metal soft, tough and ductile.

The object of the plug in the cool end of the tube is to prevent the circulation of air. If it is not used the entire tube will become too hot to be handled with the bare hand. Again, if the end of the tube is buried in lime the plug should not be removed until the end is cold as otherwise the tube will cool faster than is desirable.

Hows and Whys of Processes For Tempering Steel

Every blacksmith knows how to temper ordinary high-carbon or tool steel in the ordinary way, that is, in water. As usually practiced this process consists in heating the tool to be tempered to the required cherry red, plunging it in water, polishing and then "drawing" it to the required color in a muffle or by some other means of heat application. When tempering in oil the process is substantially the same but variations may be introduced.

Certain tools, such as knives and wood-cutters, require what is known as a "spring temper." This corresponds to drawing to a blue color after chilling and polishing. Metal-cutting tools should be drawn to a "straw" tint. Of course, this color may be obtained in the ordinary manner, but sometimes the person doing the tempering is in a hurry or the tool is needed quickly. In such a case the method of tempering about to be described may be employed to advantage.

Quick Method of Tempering

It is applicable only to oil tempering and for best results fish oil should be used. The sequence of operations is as follows: Heat the tool to the usual cherry red and plunge in the oil. Next return the tool direct to the fire and heat again, watching it closely. When the oil adhering to the tool begins to burn, plunge again, but this time in clear cold water.

This method of tempering is more suitable to work of fairly thick cross-sections than to those that are drawn to thin edges, as in this latter case the edges become appreciably hotter than the body of the tool, resulting in either a hard brittle edge and a soft center or a soft edge and a brittle center.

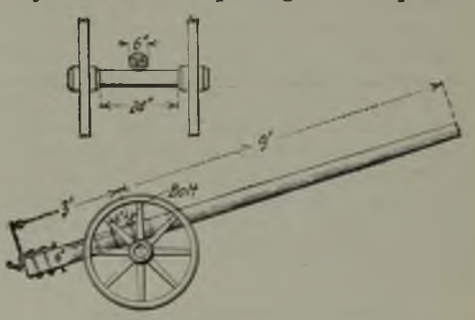
The reason that this procedure is successful is because the burning or ignition temperature of the oil is approximately the same as that at which the blue color appears when the temper is drawn in the ordinary manner. A little practice will soon give fairly satisfactory results with steel of uniform quality or carbor content.

Another short cut or "stunt," where a medium hard but tough point or edge is desired on a tool, is to add soap to the water in which the tempering is done. The action of the soap is, of course, to make a suds, or in other words, to make a tough skin surrounding the steam bubbles which form when the heated steel is plunged in water. This performs a dual function. First, the more or less effective screen or protection of steam around the hot metal retards chilling somewhat and renders the steel softer and tougher than it would be if cooled in plain water. Second, when the end of a piece of heated steel is dipped in water there is a well defined line between the water and the air, with the result that a flaw is liable to be "thrown into" the steel at this point. This may result in a fracture of the steel later on. Soap in the tempering water, by forming the screen of steam already alluded to, protects the steel from flaws at the surface of the water, as in this case the surface of the chilling fluid is not distinct or clearly defined.

The result is that the line between hot and cold metal is likewise indefinite. In other words, instead of having a definite line around, or rather plane extending through, the metal being tempered, on one side of which the metal is hot and on the other cold, a transition zone is introduced. Thus the metal grades gradually from hot to cold throughout an appreciable distance. This graduation in temperature is unfavorable to the formation of flaws.

Telephone Pole Puller for Surface Work

In the accompanying sketch are shown the essential features and construction of a simple and easily constructed device for which a number of uses will be found about the mine property such as the "pulling" of telephone and trolley poles and fence posts, and the lifting of cars. In constructing this device discarded wagon-wheels, cast-iron pulleys or any other wheels of suitable diameter and construction may be used.



Lifts Poles and Posts out of Their Holes

It will also lift mine cars. The axle and wheels act as a movable fulcrum and the long pole furnishes the leverage. This puller can be used to lift light loads whenever it is possible to move it on its wheels to the point of application which, unfortunately, cannot always be done.

When wagon-wheels are used a piece of well-seasoned hickory or oak is used for the axle, the ends being turned down to fit the wheels and left long enough to provide for washers and cotter-pins to hold the wheels in place.

For a lever a pole of well-seasoned wood 6 in. in diameter and about 12 ft. long is provided and furnished at the lifting end with a good strong iron hook of suitable design. Several ⅝ in. holes should be drilled about 6 in. apart to provide for the adjustment of the lever to suit the work to be done. The lever is fastened to the axle by a bolt passing through one of these holes and through a hole of the same size in the axle.

In pulling poles with this device a couple of half hitches are taken around the pole with rope or chain the ends of which are fastened to the iron hook on the end of the pole.

Problems In Underground Management

Why Not Connect Butt with Inbye Face Heading and Speed Up Haulage?

Practice of Leaving Empties in One Entry and Taking Loads from Another Makes the Turn Slow and Wastes the Effort of the Locomotive

By Anthony Shacikoski
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COAL MINING today is a dual problem consisting of two distinct operations—the actual production of coal and its transportation from the working face to the tipple or shipping point after it has been mined. In many instances getting loads away from and empties to the face is quite as difficult a task as actual coal extraction.

In many mines, after a trip is loaded, the men must wait while the locomotive takes it away and returns with a trip of empties. Time lost in this manner sometimes runs from 30 to 50 per cent of the entire working day. In many cases also, this causes a corresponding loss in output. A suitable track layout in rooms and headings might do much to obviate this loss.

Serving Headings in Pairs

Fig. 1 is an imaginary mine map illustrating the track layout at present used in many mines. With the track system shown loaded cars are pulled, and the men wait until empties are brought back and placed.

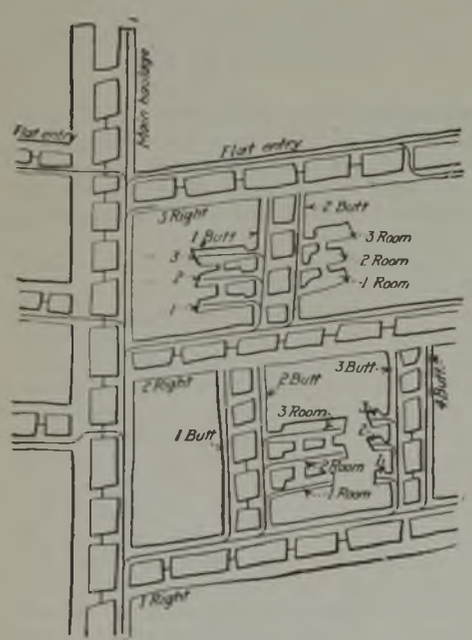

Fig. 1—Haulage System Usually Employed

This shows a portion of the map of a short wall mine and the trackage layout usually used. Much delay is encountered in switching loads and empties to and from the working faces.

The motor enters the butt entries light, pushes the loads back until the trip is complete and together. The cars are then coupled, and the locomotive pulls the trip away. If, however, there is any appreciable grade on the entry the locomotive will be unable to push the cars together, in which case they will be dropped down to the locomotive. This will cause a further loss of time.

For purposes of illustration let us assume that in No. 2 butt entry off No. 1 right there are 10 rooms with two men working in each. In order to give each man one car each trip, the locomotive must haul trips of 20 cars. Suppose also that in No. 2 butt entry off No. 2 right similar conditions prevail.

Now, in accordance with the layout, the locomotive serving these entries must either pull the cars into them and these cars must be switched into the rooms by hand in order to let the locomotive out, or the locomotive must push the cars into the rooms. If the cars are pushed and there is even a slight grade, the work of the locomotive is difficult. Again, the pushing is done against the room switches, and if these are even slightly defective more time is liable to be lost by derailments.

Revised Plan Affords Mobility

A layout only slightly different but much more efficient is shown in Fig. 2. All butt entries are here connected at both ends with the flat entries. It is thus possible for a locomotive to enter any butt entry from either end. Accordingly, when a motor starts to make up a loaded trip and pull it from any butt entry it takes with it as many empties as it will gather loads. It enters the butt from one end pushing the loads before it and placing the empties behind it. The entry may be approached from either end and thus advantage can be taken of any grades that may exist.

Suppose that a trip is to be gathered in No. 2 butt off No. 1 right. The locomotive comes up the main haulage road pulling the empties, turns into No. 2 right, then down No. 2 butt off No. 1 right. When the loads are reached the locomotive uncouples from the empties, gathers and pushes the loads up the butt entry. When all the loads are together the motor returns to the empties and places them. Thus the men do not have to wait any great length of time for empties as these are placed at the faces soon after the loads are withdrawn. After the empties are placed, the locomotive returns to the loads, pushes them out into No. 1 right and from there hauls them to the parting or tipple.

Should Save Much Time

A system of haulage such as this greatly decreases the lost motion of gathering loads and placing empties. It is estimated that it will increase the output by from 30 to 50 per cent and the output per man per day in a like proportion. This, however, depends upon conditions, that is, all considerations of grades and the like must be kept constantly in mind in laying out the trackage system above outlined.

It should be remembered that the success of any system such as this will depend largely upon the skill with which it is laid out, and how fully the designer takes into account the conditions encountered.

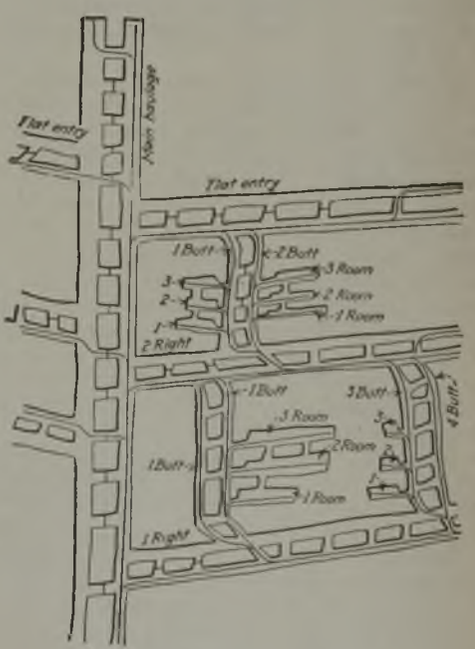

Fig. 2—Revised Mine Layout and Haulage System

Arrangement of entries and rooms is practically the same as shown in Fig. 1, but the track arrangement is such as to facilitate gathering and haulage. It is estimated that large savings can be made where this track plan is adopted.

Discussion

Should We Be Content with Ten per Cent Of Rock Dust in Our Mines?

Not Only Should Rock Dust Be Used in Quantity but the Workings Also Should Be Wetted Down Where Machines, Shooting of Face and Dumping of Coal Underground Make Coal Dust

THE DISCUSSIONS of safety problems, in connection with the lectures of the British safety expert, Doctor Wheeler, and the joint meeting of the several mining engineering societies and the Coal Mining Institute of America, as reported in *Coal Age* March 20 and 27 and April 3, were certainly both instructive and interesting. There are a few important statements, however, that in my opinion require further explanation; statements which, without qualification, I am sure must have mystified the average reader of *Coal Age* as they did myself.

The first statement to which I would draw attention to is this: "In the United States the mines may not have to maintain so large a percentage of incombustible matter to obtain an equal immunity (from coal-dust explosions) with that of British mines. An addition of 10 per cent of rock dust is well worth striving for." Now, what does this statement mean? Does it infer that we already have a large percentage of incombustible matter mixed with the rock dust in our mines and that an addition of only 10 per cent of rock dust is now required to give us the same immunity from dust explosions that English mines have with 50 per cent of rock dust?

Mr. Rice says, as quoted on page 463 of the issue of March 27. "The coal-dust hazard is more serious in this country than in England." Our own Bureau of Mines, experimenting on the fine dust of Pittsburgh coal, has found that a mixture containing 60 per cent of fine shale dust free from combustible matter or 60 per cent of limestone dust is necessary to prevent the ignition of the mixed dust by a blownout shot and that 75 per cent of either of these kinds of dust was required to prevent the propagation of an explosion that was once started.

This percentage would have to be maintained as a pretty general protection in nearly all the bituminous, lignite and lignitic coal districts of the United States. It seems now to be general knowledge that the explosiveness of coal dust depends, other conditions being the same, upon the ratio of the volatile matter to the total combustible matter, and Mr. Rice and Mr. Conner emphasized this point strongly in answer to Mr. Fear's question.

That being so, the Pittsburgh coal dust which has a ratio of 0.40 requires to be mixed with 60 per cent pure rock dust to be 100 per cent immune to explosion. In widely scattered sections of the United States we find this ratio equalled and in some sections surpassed. The ratio of the volatile matter to the total combustible in coal in a few representative districts may be interesting in this connection. These are given in the accompanying table.

Ratio of Volatile Matter to Total Combustible in Various Bituminous Coals

Pittsburgh, Pennsylvania	0.40
Upper Freeport seam, Pennsylvania and Ohio	0.42
Hocking Valley, Ohio	0.42
Thacker, West Virginia	0.38
Vanderpod, Kentucky	0.38
Scott County, Tennessee	0.40
Jefferson County, Alabama	0.36
Streator, Illinois	0.45
Rose Hill, Iowa	0.49
Brazill, Indiana	0.41
Osage, Kansas	0.49
Rocky Fort, Montana	0.48
Rock Springs, Wyoming	0.40

The ratio of the lignite and lignitic coals of Wyoming, Utah, Oregon, Texas, and California range from 0.48 to 0.56.

In view of the data in the table why should we even suggest that an addition of 10 per cent to our coal dust would serve a useful purpose when we know well that 60 per cent is necessary? Would it not be better to boost for 100 per cent protection for our lives and property than to run the risk of the partial protection that 10 per cent of rock dust might give?

With reference to the advantage gained by the use of 10 per cent of rock dust in the dust mixture which is said to give a flame traveling at 425 ft. per minute, I may say that I presume I should be as dead after being caught in such a flame as if it were traveling at a higher velocity, and in any case the afterdamp would be, to say the least, embarrassing.

The second statement I have in mind relates to the economic comparison between the different systems of humidification and rock dusting. Now how can rock dusting be compared with the different systems of humidification for the purpose of selection when all of the authorities in the discussions contend that water should continue to be used in connection with the application of rock dust?

Doctor Wheeler admits that he would like to see a limited quantity of water added with the rock dust, and Mr. Rice says that water should continue in use, for thereby the air currents will be prevented from carrying coal dust. He refers to the fact that cutting machines in Alabama are equipped with spraying devices. To supplement my argument that a combination of watering and rock dusting is considered essential to safety, I would instance the Utah State Industrial Commission which has adopted a safety code requiring among other safety measures: Rock dusting in all mines, use of water for cutting and loading machines, sprinkling at every face, etc. So that in a great many cases where rock dusting is established in the future it will not be a reduction but an increase in safety expense.

I do not wish for a minute to give the impression that I am opposing rock dusting, but I think it is better to know what conditions we have to meet before we rush into the use of any single dust explosion preventive, to learn later that water is also necessary. Undoubtedly water is needed as a dust preventive in machine mining and where rotary or any type of dump is used inside a mine. In my opinion, the first line of defense is water on the machines in machine mining.

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Leave Four Inches of Bottom Coal to Support Machine

In regard to the "Difficult Problem" proposed by a West Virginia operator on page 22 of the issue of *Coal Age*, July 3, I would suggest cutting within the upper 48-in. body just high enough that the underlying coal would have sufficient strength to support the machine. Possibly a very thin "scrapping" will do this. Perhaps it need not be any thicker than 4 or 5 in. This scrapping should always be left one cut back of the face to hold the machine at the proper elevation for a second cutting and to permit of the shoveling being done free of the top of the soft slate below it.

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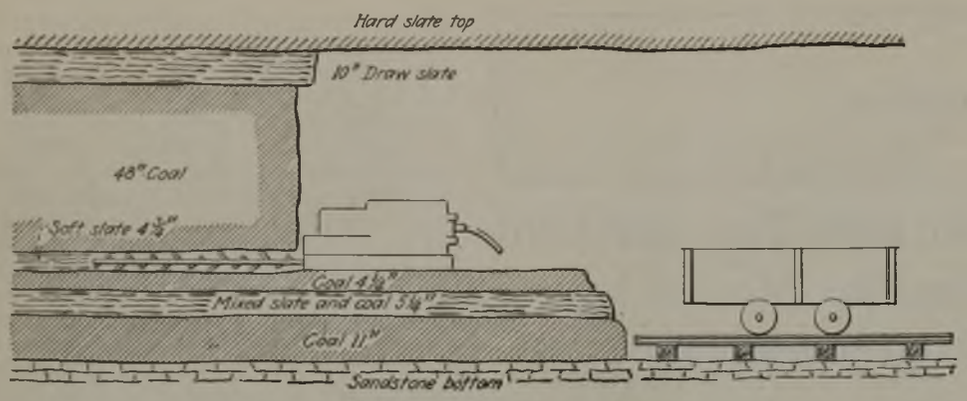
Makes His Cut in Soft Slate

Our soolution of the "Difficult Problem" propounded on page 22 of the present volume of *Coal Age* is, of course, tentative because it is impossible to describe all the conditions so clearly that a definite plan of operation can be made without a physical investigation, and this the writer seemed to realize for the details he supplies are scant.

We suggest that he try cutting the band of soft slate which is 4½ in. thick, amply thick to accommodate the average cutter bar of standard shortwall mining machines. This method of mining would allow the machine to rest on the 4½-in. band of coal which it is presumed is not like the coal in the main seam, so weak that it will not support the machine without skids, but if they are needed they could be used. An attempt should be made to use only chisel bits in cutting the coal as by this means the kerf will be better cleaned. This much would have to be removed as fast as it accumulated. It should be shoveled back into the gob. A long straight-handled shovel could be used to remove the muck from under the coal before it is drilled and shot down. If the machine did not work satisfac-



Method of Working Coal with a Soft Slate Floor

Coal is undercut in soft slate using chisel bits which clean out the cut effectually, the machine resting on the solider coal below the slate. The thin coal and rash is gobbed or loaded out and the thicker coal below it is "pop-shotted" and sent to the tipple.

torily with only chisel bits in the cutting-chain, they could be used in large proportion or perhaps in every other position along the chain. By thus cutting in the shale practically all of the 48 in. of good coal could be saved. Even if the machine cut up into the bed of coal above or into the band of coal below little if any damage would be done.

It is not clear from the information given whether the operator intends to mine the 11 in. of coal, but if it is to be saved we presume the 4½ in. coal and the 5½ in. of slatey coal will be stripped and gobbed and perhaps some of it loaded out as waste. We would suggest that this be tried and that the labor costs be carefully balanced to ascertain if the mining of this coal would be profitable. It might pay in some localities and not in others. Of course the 48-in. coal would be cut, shot and loaded before any attempt was made to remove the lower coal because with this arrangement the coal floor can be used to shovel on. The diagram shows the track on the sandstone bottom. If the 11-in. band is saved it probably can be lifted by light "pop shots." If it is not saved the coal and slate probably will support the room track and machine. This would have to be determined by experience. In entries this method of removing the bottom seam would leave little if any top to be taken.

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Does Water Add to Violence Of Dust Explosions?

Some years ago a paper on the rates of explosions in gases was prepared by Professor H. B. Dixon, then of Manchester College, England, who was a noted authority on explosives. This was contributed to the North of England Institute of Mining Engineers. In this paper he epitomized the results of a long series of experiments proving how much moisture it was necessary to add to various explosive gases and air in order to make them exert their maximum destructive velocity and force.

He proved that it was necessary to add no less than 5 per cent of moisture per cubic foot of air and that as this heavy content of moisture could not be mixed with air by any of the usual means of dampening it he would be compelled to use steam. Incidentally, therefore, he proved that in coal mines where explosives were in use the dampening of the mine air could not possibly exert any restraining influence on the flame of the explosive, but would, on the contrary, tend to increase its force.

This important paper does not appear to have caused any notable discussion among the members of the Institute, and the facts as stated appear to have been accepted as incontrovertible and as leaving no loophole for discussion.

In view of the great emphasis that has been laid on the watering of coal mines during recent years, and still is laid on it, this becomes a remarkable fact not easily explained. But it will be noted that when the British Government concluded its report on the "Prevention of Explosions from Coal-dust," it had no alternative but water in some form to suggest as a remedy, and therefore it became a question of the quantity of water to be used, which practically led to great laxity in the way the law was enforced. In deep collieries there was another material reason for not using large quantities of water, namely, that for the comfort and efficiency of the miners the ventilating air current should be kept as dry as possible in order to carry off the perspiration from their bodies and give them a sense of coolness.

Where it was practicable to observe the law strictly, it was observed but without favorable result. For instance, after the Clydach Vale explosion it was found that the haulage roads had been saturated with water, yet it had not exercised any controlling influence on the explosion.

The use of water sprays, dampening and steam, however, has been continued on the American continent until the present day, and has been considered the preferable method of preventing explosions. The Castlegate disaster awakened the mining public to a sense of the inability of water alone as a cure. The Utah Commission advocated the use of local watering with stone dust, distributed in the roadways and airways of the mine.

Engineers are now firmly of opinion that if the new regulations requiring rock dust are enforced with the use of only permitted explosives and electric safety lamps, the recent explosions in coal mines will not recur, and thus my long effort to point out the uselessness of water as a preventive of colliery explosions, which commence about the year 1902 in *Mines and Minerals*, when H. H. Stoek was editor, has now found its reward and recognition.

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Longwall Perhaps but Why Day Men with Picks?

In answering the question of West Virginia operator in the issue of *Coal Age*, July 3, Mr. Barlow suggests that the soft slate be cut out by day-wage men and by picks. I wonder why he suggests this work should be done by hand? If it can be cut by picks it surely can be cut by machine and with greater speed. The modern shortwall machine is so arranged that the feed can be adjusted to meet varied cutting conditions.

In many coal fields slaty partings are being cut out. In one mine I recall a 7-in. streak being cut out in that way. After the slaty streak was removed the loader shoveled the slate back into the gob so that the floor was clean when the shot was fired. This slate would loosen from the coal. If the machine did not bring out all its cuttings a long-handled shovel was used to clean up the loose slate. A practically clean coal was produced.

DIFFICULT TO GET SUCH MEN

Just imagine hiring day men to put in a cut under a face 100 or 150 ft. wide, with some of the undercut slaty. Few miners would want the job, even if the regular day wage scale were paid for the cutting. A machine would do the work, cheaper, quicker and better. If used, the bottom should be left for a length of two cuts so that the machine could be loaded and unloaded without difficulty. The longwall might work, but the hand picks never.

Where hard labor is required in a standard operation payment should be by the work performed or the work will be done in a dilatory manner. The job of cutting out an undercut on a longwall face is a standard operation of that kind, and the work is hard. It would be a mistake to do it by day men but why do it by hard labor with machines available? Today men insist either in having a machine or powder do the work. Undercutting is nearly a dead art.

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Moundsville, Pa.

Why Glycerine Is Used for Tempering Steel

Glycerine and its water solutions, as well as oil-water emulsions, have been examined by the U. S. Bureau of Standards to find quenching media to span the gap between water and oil. From experimental quenching curves giving the rate of cooling at the center of a 1-in. cylinder of 32 per cent nickel steel, it was found that glycerine-water solutions accomplish this purpose effectively and that, moreover, they have characteristics distinctive from those of oil and apparently in their favor.

Production And the Market

Mathematics of Anthracite- and Bituminous-Coal Market Convincing But Demand Is Nil

Coal men have proved to their own satisfaction a hundred times that the contracts must begin soon to roll in. At first they set July as the time, and then August, now it is September, but the buyer has been amazingly reluctant. He listens to no one. He has abounding faith in the power of the mines to produce and in the railroads to haul all the coal he needs when he needs it. And just now he wants to reduce his inventories, so he is waiting. Sales are small and for prompt delivery. But the game of procrastination cannot continue much longer without the consumer being pinched. Even now the railroads are questioning their ability to handle the coal that will be needed just when equipment is in insistent demand.

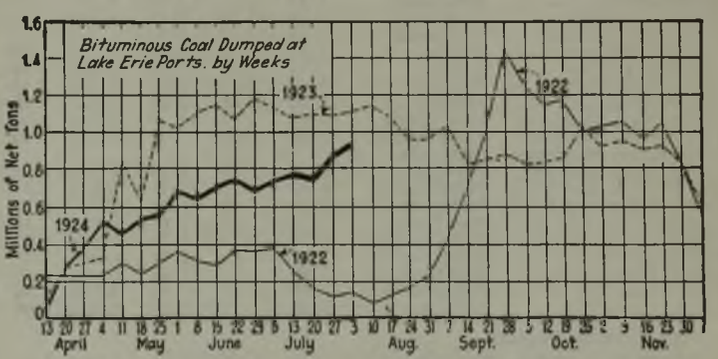
The undertone of the market is good. In Arkansas the regular retail increase of 50c. a ton was made August 1, despite slack business. One operating company in Utah made a similar increase. In Alabama domestic sizes were raised 20c. a ton. The company and some independent anthracite-producers raised their schedules on an average 10c. a ton. Evidently these increases were anticipatory of a better market, of which at present hardly a shadow can be seen. The mathematics of the market is convincing, but demand is nil.

The railroads know the condition better than other consumers. They recognize their inability to meet the situation, but the consideration that has been shown them has convinced them that no matter what happens they will be allowed to take care of themselves. Why should they take a place at the distributing window when they know that they can at any time force their way to the front when the line begins "to form on the right," and so far it has not even begun to form.

Coal Age Index of spot prices of bituminous coal showed no change during the past week, standing on August 4 at 163, the corresponding price being $1.98.

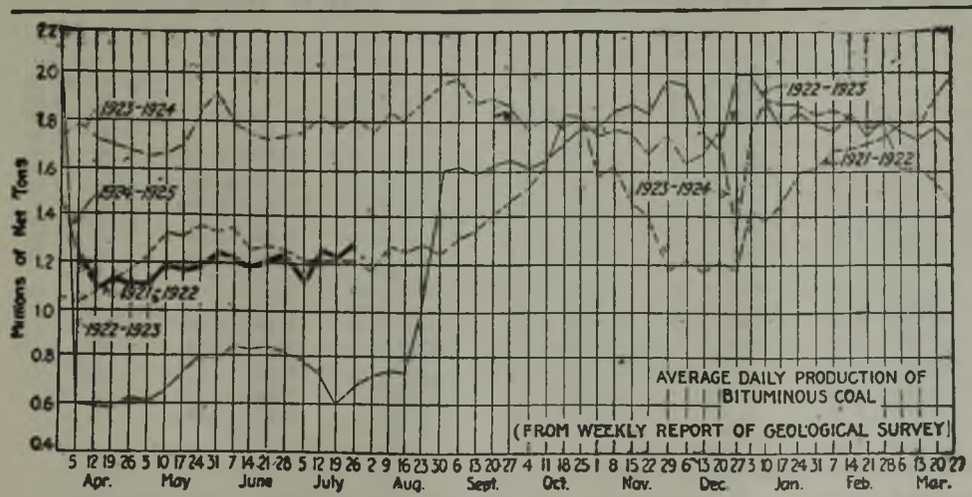
Hampton Roads dumpings for all accounts during the week ended July 31, totaled 352,000 net tons, an increase of 8,940 tons from the week preceding but the tonnage failed to reach that of the week ending July 17, when 373,600 net tons were handled. The movement of coal at the Lakes made a further advance, being for the week ending Aug. 3, according to the Ore and Coal Exchange: For cargo 830,915 net tons and for fuel 44,066 net tons as against totals of 785,317 and 43,443 net tons respectively the week before.

The production of bituminous coal for the fourth week of July improved slightly, the output according to the Geological Survey totalling 7,564,000 tons, an



activity that has not been exceeded since March 29 of this year. The previous week showed an output of 7,401,000, according to the revised figures. Anthracite production decreased, being 1,837,000 net tons in the week ending July 26 and 1,840,000 in the previous week.

Anthracite shows a stagnation closely paralleling that of bituminous. The Canadian retailers have large stocks of it which no one seems anxious to buy. Buffalo is proposing to use bituminous in place of anthracite to heat its public schools. The combined effect of dilatory buying and substitution threatens to put anthracite operation on slow time.



Estimates of Production

(Net Tons)

	1923	1924
BITUMINOUS		
July 12	10,925,000	7,502,000
July 19	10,676,000	(a) 7,401,000
July 26	10,817,000	(b) 7,564,000
Daily average	1,803,000	1,261,000
Cal. yr. to date (c)	311,971,000	254,420,000
Daily average to date	1,773,000	1,446,000
ANTHRACITE		
July 12	2,051,000	1,871,000
July 19	2,005,000	1,840,000
July 26	2,080,000	1,837,000
Cal. yr. to date	58,885,000	52,469,000
COKE		
July 19	361,000	(b) 103,000
July 26	363,000	(a) 99,000
Cal. yr. to date (c)	11,468,000	6,484,000

(a) Revised from last report. (b) Subject to revision. (c) Minus one day's production to equalize number of days in the two years.

Midwest Recovers Slowly

It is still difficult for the Midwest coal trade to feel the market rebound. There is a distinct pick-up in inquiry and without doubt buying is getting a little stronger every week, but there is nothing even faintly resembling a rush for any grade of coal. Steam coals from the principal Illinois and Indiana fields are in slightly better demand but that doesn't mean much, for storage piles are still supplying most wants except for those railroads and industrials which made short-time contracts during the summer at ridiculously low prices. Strip pits are busy on steam business. Deep mines must give their coal away to place any tonnage.

Illinois and Indiana mine running time was increased by a narrow percentage during the past week due to the slight domestic betterment. However this very increase had a tendency to further demoralize quotations. It is hard work for the strongest operators to maintain prices in the face of the cutting that goes on regularly.

In the Duquoin and Jackson County fields of Illinois conditions are much the same as in the Carterville district, with practically nothing doing and no market and no prices. In the Mt. Olive district things are practically at a standstill excepting mines working on contracts and railroad coal.

The Standard district still continues to lag. There is no demand for any kind of coal and all sizes remain on track unbilled. The problem of the future is the steam market. With the mines working scarcely two days a week there is an overproduction of steam sizes. When the domestic demand gets good the disposal of the steam coal will worry the operator.

Kentucky Feels Encouraged a Little

Louisville coal men report that July business closed somewhat more active than June business. The outlook is more promising, as the demand for domestic sizes is steadier and will improve after the vacation season ends. Utilities and steam consumers also are taking a little more fuel for immediate use and may start stocking a little coal shortly. Railroads also have been placing more coal in storage. Lake movement from eastern Kentucky has been improving a trifle.

Generally speaking utility consumption has been off, as longer days have cut down consumption of current, and some of the smaller industries have been running slow reducing their consumption of power. Street-car companies in some cities have been having light travel and have reduced their running schedules.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Aug. 6 1923	July 21 1924	July 28 1924	Aug. 4 1924†
Smokeless lump	Columbus	$5.85	$3.85	$3.85	*$3.50@$3.75*
Smokeless mine run	Columbus	3.00	2.20	2.10	2.00@2.25
Smokeless screenings	Columbus	2.35	1.30	1.30	*1.15@1.30*
Smokeless lump	Chicago	5.75	3.85	3.85	3.75@4.00
Smokeless mine run	Chicago	2.75	1.85	1.85	1.75@2.00
Smokeless lump	Cincinnati	5.75	3.75	3.85	*3.50@4.00*
Smokeless mine run	Cincinnati	3.25	1.80	1.85	1.75@2.00
Smokeless screenings	Cincinnati	2.85	1.35	1.35	*1.10@1.50*
*Smokeless mine run	Boston	5.35	4.30	4.30	4.25@4.40
Clearfield mine run	Boston	2.35	1.85	1.85	**1.45@2.35**
Cambria mine run	Boston	3.00	2.15	2.30	2.00@2.60
Somerset mine run	Boston	2.60	2.00	2.00	**1.75@2.40**
Pool 1 (Navy Standard)	New York	3.25	2.70	2.70	2.50@2.90
Pool 1 (Navy Standard)	Philadelphia	3.40	2.80	2.80	2.60@3.00
Pool 1 (Navy Standard)	Baltimore				
Pool 9 (Super. Low Vol.)	New York	2.55	2.05	2.05	1.90@2.25
Pool 9 (Super. Low Vol.)	Philadelphia	2.60	2.15	2.15	1.95@2.35
Pool 9 (Super. Low Vol.)	Baltimore	2.45	1.90	1.95	1.90@2.00
Pool 10 (H.Gr. Low Vol.)	New York	2.25	1.80	1.80	1.65@2.00
Pool 10 (H.Gr. Low Vol.)	Philadelphia	2.25	1.75	1.75	1.65@1.90
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.25	1.70	1.70	1.65@1.75
Pool 11 (Low Vol.)	New York	1.80	1.55	1.55	*1.35@1.70*
Pool 11 (Low Vol.)	Philadelphia	1.95	1.45	1.45	1.35@1.60
Pool 11 (Low Vol.)	Baltimore	2.00	1.55	1.55	1.50@1.60
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.80	1.50	1.50	1.35@1.65
Pool 54-64 (Gas and St.)	Philadelphia	1.80	1.50	1.50	1.40@1.60
Pool 54-64 (Gas and St.)	Baltimore	1.70	1.45	1.45	1.40@1.50
Pittsburgh so'd gas lump	Pittsburgh	2.65	2.40	2.40	2.30@2.50
Pittsburgh gas mine run	Pittsburgh		2.10	2.10	2.00@2.25
Pittsburgh mine run (St.)	Pittsburgh	2.05	1.85	1.85	1.75@2.00
Pittsburgh slack (Gas)	Pittsburgh	1.55	1.25	1.20	**1.25@1.40**
Kanawha lump	Columbus	3.00	2.10	2.10	2.00@2.25
Kanawha mine run	Columbus	1.85	1.45	1.45	*1.30@1.60*
Kanawha screenings	Columbus	1.05	1.00	1.10	*1.00@1.15*
W. Va. lump	Cincinnati	3.10	2.10	2.10	**2.00@2.50**
W. Va. gas mine run	Cincinnati	1.60	1.35	1.40	*1.25@1.50*
W. Va. steam mine run	Cincinnati	1.60	1.35	1.40	*1.25@1.50*
W. Va. screenings	Cincinnati	1.05	.95	.85	**.75@1.10**
Hocking lump	Columbus	2.75	2.45	2.45	2.25@2.65
Hocking mine run	Columbus	1.85	1.70	1.70	*1.45@1.65*
Hocking screenings	Columbus	1.10	1.15	1.15	*1.00@1.15*
Pitts. No. 8 lump	Cleveland	2.55	2.40	2.40	2.00@2.85
Pitts. No. 8 mine run	Cleveland	1.90	1.80	1.35	1.80@1.90
Pitts. No. 8 screenings	Cleveland	1.25	1.00	1.05	**1.00@1.25**

Midwest	Market Quoted	Aug. 6 1923	July 21 1924	July 28 1924	Aug. 4 1924†
Franklin, Ill. lump	Chicago	$3.65	$2.85	$2.85	$2.75@$3.00
Franklin, Ill. mine run	Chicago	2.85	2.35	2.35	2.25@2.50
Franklin, Ill. screenings	Chicago	1.65	1.70	1.70	1.60@1.80
Central, Ill. lump	Chicago	2.60	2.50	2.50	2.50
Central, Ill. mine run	Chicago	2.10	2.10	2.10	2.00@2.25
Central, Ill. screenings	Chicago	1.35	1.60	1.60	1.60@1.65
Ind. 4th Vein lump	Chicago	3.35	2.60	2.60	2.50@2.75
Ind. 4th Vein mine run	Chicago	2.60	2.35	2.35	2.25@2.50
Ind. 4th Vein screenings	Chicago	1.60	1.70	1.70	1.60@1.80
Ind. 5th Vein lump	Chicago	2.85	2.35	2.35	2.25@2.50
Ind. 5th Vein mine run	Chicago	2.10	2.10	2.10	2.00@2.25
Ind. 5th Vein screenings	Chicago	1.45	1.55	1.55	1.50@1.65
Mt. Olive lump	St. Louis	3.00	2.85	2.85	2.75@3.00
Mt. Olive mine run	St. Louis	2.00	2.50	2.50	2.50
Mt. Olive screenings	St. Louis	1.50	2.00	2.00	2.00
Standard lump	St. Louis	2.30	2.15	2.15	2.00@2.35
Standard mine run	St. Louis	1.85	1.80	1.80	1.75@1.85
Standard screenings	St. Louis	1.05	1.45	1.45	*1.15@1.25*
West Ky. lump	Louisville	2.25	2.10	2.10	2.00@2.25
West Ky. mine run	Louisville	1.60	1.60	1.60	*1.40@1.65*
West Ky. screenings	Louisville	1.05	1.25	1.15	1.10@1.25
West Ky. lump	Chicago	2.10	2.05	2.05	1.90@2.25
West Ky. mine run	Chicago	1.30	1.60	1.60	1.50@1.75
South and Southwest					
Big Seam lump	Birmingham	3.50	3.20	3.20	**3.30@3.50**
Big Seam mine run	Birmingham	2.00	1.75	1.75	1.50@2.00
Big Seam (washed)	Birmingham	2.35	2.00	2.00	1.75@2.25
S. E. Ky. lump	Chicago	3.10	2.10	2.10	2.00@2.25
S. E. Ky. mine run	Chicago	1.85	1.50	1.50	1.25@1.75
S. E. Ky. lump	Louisville	2.85	2.10	2.10	2.00@2.25
S. E. Ky. mine run	Louisville	1.75	1.55	1.55	1.35@1.75
S. E. Ky. screenings	Louisville	1.00	.95	.95	.85@1.10
S. E. Ky. lump	Cincinnati	3.10	2.50	2.25	**2.00@2.75**
S. E. Ky. mine run	Cincinnati	1.55	1.45	1.50	*1.25@1.65*
S. E. Ky. screenings	Cincinnati	.90	.90	.90	.75@1.10
Kansas lump	Kansas City	4.00	4.50	4.50	4.50
Kansas mine run	Kansas City	3.25	3.50	3.50	3.50
Kansas screenings	Kansas City	2.60	2.50	2.00	2.50

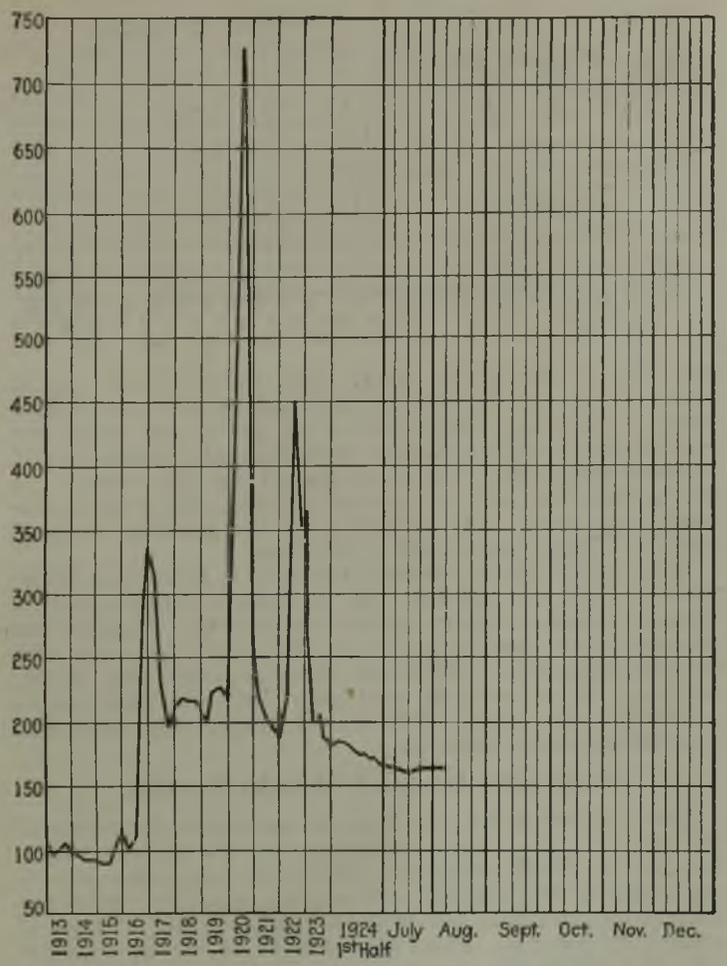
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Aug. 6, 1923 Independent	Aug. 6, 1923 Company	July 28, 1924 Independent	July 28, 1924 Company	Aug. 4, 1924† Independent	Aug. 4, 1924† Company
Broken	New York	$2.34		$7.75@$8.35		$8.00@$8.95		**$8.00@$9.05**
Broken	Philadelphia	2.39		7.90@8.10		8.80@8.95		**8.90@9.05**
Egg	New York	2.34	$8.50@$12.75	8.00@8.35	$8.50@$8.75	8.55@8.95	*$8.40@$8.65*	**8.65@9.05**
Egg	Philadelphia	2.39	9.25@11.00	8.10@8.35	8.90@9.60	8.90@8.95	**9.00@9.70**	**9.00@9.05**
Egg	Chicago*	5.06	8.50@12.00	7.25@7.45	7.99@8.10	7.94@8.00	**8.10@8.25**	**8.02@8.12**
Stove	New York	2.34	8.50@13.00	8.00@8.35	9.00@9.25	8.55@9.20	9.00@9.25	**8.65@9.30**
Stove	Philadelphia	2.39	9.25@11.00	8.15@8.35	9.25@9.90	8.95@9.10	**9.35@10.00**	**9.05@9.10**
Stove	Chicago*	5.06	8.50@12.00	7.25@7.45	8.30@8.40	8.24@8.34	**8.40@8.60**	**8.30@8.45**
Chestnut	New York	2.34	8.50@12.75	8.00@8.35	8.50@8.75	8.55@9.05	*8.30@8.55*	**8.65@9.05**
Chestnut	Philadelphia	2.39	9.25@11.00	8.15@8.35	8.75@9.70	8.90@8.95	**8.85@9.80**	**9.00@9.05**
Chestnut	Chicago*	5.06	8.50@12.00	7.25@7.45	8.08@8.23	8.18@8.24	**8.20@8.32**	**8.24@8.38**
Range	New York	2.34		8.30		8.80		**8.90**
Pea	New York	2.22	6.75@8.00	6.00@6.30	4.50@5.25	5.50@6.00	*4.25@5.25*	5.50@6.00
Pea	Philadelphia	2.14	7.00@7.50	6.15@6.20	5.75@6.25	5.75@6.00	5.75@6.25	5.75@6.00
Pea	Chicago*	4.79	7.00@8.50	5.30@5.65	5.13@5.45	5.36@5.91	**5.15@5.60**	5.36@5.91
Buckwheat No. 1	New York	2.22	3.00@3.50	3.50@4.15	1.75@2.50	3.00@3.15	1.75@2.50	3.00@3.15
Buckwheat No. 1	Philadelphia	2.14	2.75@3.50	3.50	2.50@3.00	3.00	2.50@3.00	3.00
Rice	New York	2.22	2.25@2.50	2.50	1.50@2.15	2.00@2.25	*1.50@2.00*	2.00@2.25
Rice	Philadelphia	2.14	1.75@2.50	2.50	2.00@2.25	2.25	2.00@2.25	2.25
Barley	New York	2.22	1.25@1.50	1.50	1.00@1.50	1.50	**1.15@1.50**	1.50
Barley	Philadelphia	2.14	1.15@1.50	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	1.25@1.60	1.60		1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	Aug. 4	July 28	July 21	Aug. 6
Index	163	163	163	195
Weighted average price	$1.98	$1.98	$1.98	$2.36

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

Prices continue steady on all sizes and grades, even screenings holding firmly, whereas it had been expected that some breaks would show, as a result of the Lake movement of prepared coal and increased general movement of domestic sizes. Collections are a little slow but somewhat better than they were.

Production in western Kentucky shows small increase, a few of the mines that were strike-bound having resumed operation under non-union agreements, and the demand for coal having slightly increased. However, there has been some slight trouble reported around the non-union mines, where radicals have been endeavoring to scare off negro and other labor, through intimidation. Recent visits of International President John L. Lewis and of miners from Indiana and Illinois, have put fresh "pep" into the radicals of western Kentucky.

The district, is stirred up, and production of the non-union mines cannot be heavy under such conditions. Prices are firm, with the exception of mine run, which has been showing a slight weakness.

Northwest Buys Slowly

Movement to the docks from lower lake ports continues to improve, and forty-one cargoes were landed last week of which seven were hard coal. There are twenty-four cargoes on the way of which eight are reported as anthracite. It looks as if the docks will get as much as they want before freeze up, although an early winter is predicted.

Present indications are that the docks will take practically the same quantity of coal as last year—that is 1,400,000 tons of anthracite and nine or ten million tons of soft coal. This will supply the needs of the northwest. The difficulty will be to find storage for the coal, as the docks are well crowded at present for this time of year, and the buying movement has not as yet materialized.

Extreme dullness still pervades the Milwaukee coal market. Dealers in the interior are beginning to evince some interest in future supplies, and there is a dribble of deliveries to private consumers, but the volume of the sales is small. Anthracite was advanced 10c. per ton on Aug. 1, but prices of other grades of coal remain unchanged. Arrivals of coal by Lake are quite brisk, but receipts are far behind those of last year. Coal receipts of anthracite to date aggregate 386,538 tons, and the soft coal 960,708 tons. Last year at this time the record was 444,572 tons of anthracite, and 1,509,946 tons of soft coal.

West Feels Temporary Flurry

Little summer storage has been reported through the Southwest. The advances of 50c. in the retail price of Arkansas semi-anthracite July 1 and Aug. 1 stimulated the demand from householders a few days before the announced increases became effective, with a corresponding increase of mail orders for operators and jobbers. But the market quickly returned to virtually its former monotonous level.

Arkansas semi-anthracite lump is now listed at $6@$7 a ton; semi-anthracite mine run, $3.50@$4; screenings, $2. No change has yet been made in the price of Kansas coal, although one is imminent. Kansas lump still is quoted at $4.50, nut at $4, mine run at $3.50 and screenings at $2.50. Henryetta (Okla.) coal is quoted at $4.50 for lump, $4 for nut, $3.25@$3.50 for mine run and $2 for screenings.

A slight stimulation was noted in the Colorado coal market during the week inasmuch as the average working time of the mines picked up to 20 hours. This, however, is still far from encourageing but the operators expect to be fairly busy as soon as the farmers begin to realize from their crops. Prices remain unchanged.

Business in Utah is brisk. Storage orders are coming in in good volume since the increase in prices a few weeks ago. Lump is in greatest demand, but other sizes also are selling. Production is up to a little more than 40 per cent now and increasing. One operating company raised its prices 50c. a ton on Aug. 1, and a general increase is expected not later than Sept 1.

Cincinnati Scents Better Trade

More optimism but no advances in price summarizes market conditions in Cincinnati during the week past. Better inquiry from domestic coal buyers in Indiana and northern Ohio has followed the rise in the price of grains. Lake buyers are now nearly 4,000,000 tons short of the normal movement. These two factors soon must move this sluggish market to action. Nevertheless the mines are loading less coal than usual as car records prove.

There is a wide divergence between the asked and sales prices. Steam slack and mine run seem to have reached rock bottom. They surely cannot be pounded below 75c. and $1.25 respectively. On the other hand the positions of egg and 2-in. coal have been slightly bettered, the latter being the preferred size for heavy lake shipments. A number of the dealers and direct mine representatives here are turning down business where deliveries a month hence are specified. This is taken to indicate that they have high hopes of a betterment in price. Collections are slow.

While trade in Columbus is still dull, signs of improvement are discernible. Buying on the part of dealers has increased slightly and there also is a better steam trade. Consumers, however, continue to play a waiting game. Retail prices are fairly steady at the levels which have prevailed for some time. Utilities are buying fairly well, but owing to unsettled industrial conditions, consumption is not at a high point. Boards of education are asking for bids on school coal and some municipalities also are looking around. Lake trade is steady and the congestion of cars between Columbus and Toledo has been relieved. Bottoms are more plentiful.

The output in the eastern Ohio field for the week ended July 26 is approximately the same as that of the preceding week. Operators and jobbbers say that more inquiries are being received. The increased production is attributable to a general demand for steam coal. One or two steel com-

panies in this vicinity having placed good-sized orders for fuel. Spot quotations on slack and nut and slack have stiffened 5 to 15c. per ton. This is due, largely, to the stronger demand for this auxiliary steam fuel and its reduction in quantity. Less fuel is being loaded for the lakes so less slack remains to be disposed of.

Coal production in the Pittsburgh district has increased slightly in the past two or three weeks, but one searches the market in vain for evidences of any concurrent increase in sales activity. There is no demand in the district for lake coal.

Trade at Buffalo is light and promises to remain so awhile. Consumers have on the average six weeks' supply and demand will be light till conditions change.

Midsummer dullnes still prevails in the Toronto market. The yards are well stocked, with shipments coming forward in moderate quantities.

New England Market Sluggish

In New England the trade shows almost no change. Both all rail and by water the tone is extremely sluggish, and aside from scattering purchases for relatively small tonnages there is little doing in any direction. Neither in textiles nor in shoes is there any optimism over the near future, and under such conditions buyers are not likely to be much interested. Reserves of coal are reasonably large, and at the present rate of consumption it will be months before they are depleted.

Receipts by water have somewhat increased during the past week, but this is more an indication of oversupply than any favorable turn to the market. The result is a depression in prices to a point below any of the quotations of two to three months ago. Few factors now pretend to get more than $4.25 per gross ton f.o.b. vessel at Hampton Roads, or $5.50 on cars at Boston or Providence. There are active rumors that sales have been made under these levels, but they are not easy to verify.

All rail from central Pennsylvania there is no better outlook than a month ago. The lower range of prices on Pocahontas and New River tends naturally to restrict the area open to deliveries all rail, and even on the quality coals the tonnage moved is very light.

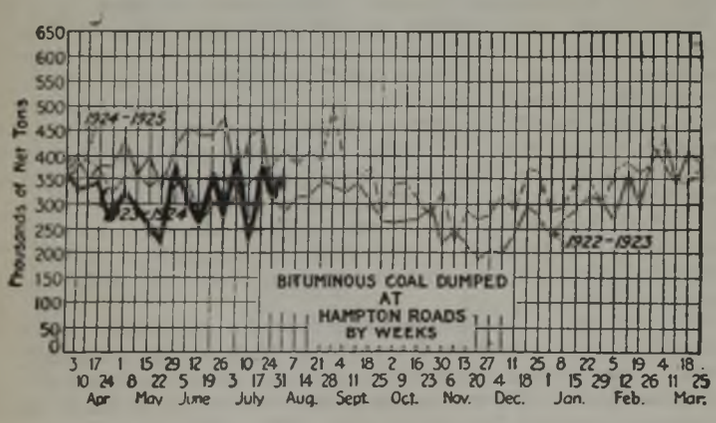
At the Philadelphia and New York piers the dumpings continue very small and confined to specialties. Gas-producing coal seems to be moving in fair volume, but this is staple business and is applied on contracts that call for somewhat heavier shipments at this time of year in order to begin accumulation for the winter.

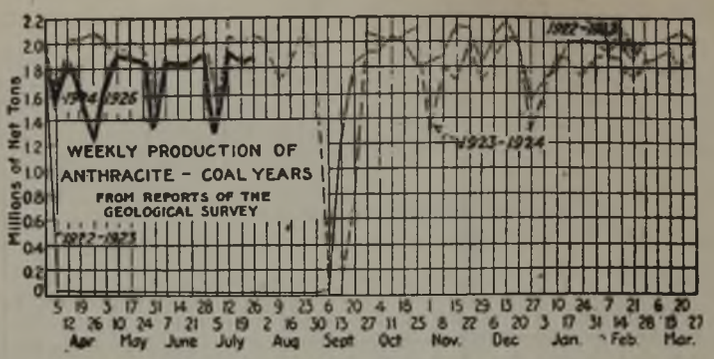
Atlantic Seaboard Dull but Hopeful

Little life is visible in the New York market. Nevertheless there are indications that the slump has about reached its end. A slightly better tone is evident, although it has not taken the form of new orders, consumers continuing to depend on reserve stocks. Receipts at the tide water piers were smaller last week, averaging between 1,200 and 1,300 cars daily. This, however, was more than sufficient to take care of current business, and bargain hunters frequently were able to get cheap cargoes.

Nothing in the Philadelphia bituminous trade encourages the belief that a better demand for coal is in sight. There is, however, growing evidence of greater industrial activity. Plants which had been working on short time are adding more hours to their week but the railroads will not buy.

The Baltimore market is dull indeed. Demand is lacking





and that is the whole story. The railroads are urging that coal be laid in now as cars and locomotives will be needed later for transportation of grain, but since the excitement of war days, when men did many things simply because they were told it was good for the country to do it, there has been a reversal of form, and even intelligent propaganda that is backed by the soundest of good sense has lost a large part of its force.

Some Birmingham interests report that there is a better undertone in the market, but no actual improvement is claimed in either inquiry or business booked. Trade is still dependent on scattering orders for small tonnage and prompt shipment. Consumers have scarcely any stocks, and they do not seem to want any. Domestic sales are at a low ebb. The retail trade is slack and contract deliveries are held up almost entirely.

Anthracite Demand Shrinks Further

Less demand and a slight cut in quotations for many of the independent domestic coals featured the hard-coal market at New York last week. The large companies, including some of the biggest independent operators, advanced mine-price schedules for domestic coals on an average of about 10c. per ton. Stove continues to be the most sought size and commands a premium over the other sizes when taken separately. There is a fair demand for egg and chestnut, with the former a little stronger and quotations higher than for chestnut. Forced sales of chestnut bring less than current quotations. Considerable pea coal is reported in storage, quotations for the independent product going as low as $4, except for the best grades. Steam sizes are moving under pressure. There is considerable storing in progress and many retail yards are filled to the limit.

In Philadelphia, August is living up to expectations. Retailing is extremely sluggish. It is difficult to see, how suspension of mining can be avoided. The company operators probably will store the surplus, if any, in their big yards, but this the independents cannot do.

Producers seem to have confidence that they will get through August without extraordinary difficulty, as evidenced by the fact that most of them have added 10c. a ton to their prices. Some did not increase nut, and others let stove stay, but all in some way made increases. This is true both of companies and independents. Baltimore dealers have considerable stocks on hand.

The Connellsville coke market, taken as a whole, is very quiet. Furnace coke is practically stagnant, and there is scarcely any buying in smelter coke. In heating coke and in foundry coke there is a moderate movement. Furnace coke is steady at $3. Good-grade medium-sulphur coke is $2.75 to $2.85, with oridnary heating coke at $2.60 to $2.75, and first drawings sometimes going down to $2.50. Foundry coke has been gradually softening for several weeks and is now definitely quotable down 25c., at a range of $4. to $4.50. Occasionally $4.75 is obtained on small lots for choice brands. In the Birmingham district another furnace stack has been laid idle during the past week. Foundry coke quotations range from $4.50 to $5.50 per ton at ovens.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended July 19, 1924	930,284	145,986
Previous week	910,415	146,177
Week ended July 19, 1923	1,029,429	190,826

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
July 22, 1924	344,892	158,606		
Previous week	355,720	169,697		
July 21, 1923	79,710	5,167	7,891	3,676

Foreign Market And Export News

British Market Weak Save for Best Steams; German Competition Reappears

There is practically no change to record in the Welsh coal market. Best steam coals are going a little better, but there is a considerable surplus of all other kinds. Inquiry from Europe is poor, and considerable competition is being experienced from Germany now that the Ruhr collieries are again in working order. Many of the collieries are working short time and several more of the older pits have been closed down. Miners are now offering to work on a piecework basis in some collieries to prevent shutting down. There is occasional acceptance of these offers by producers. Some operators are making heavy cuts to effect clearances, and buyers are fairly successful in "bearing" prices.

There is no improvement in the Newcastle market and German competition is playing its part here also. The domestic and industrial markets have declined a little owing to the recent spell of very warm weather and the general slackness of trade. There are no con tracts to report.

Production by British collieries during the week ended July 19, according to a cable to *Coal Age*, totaled 4,904,000 tons, compared with 5,002,000 tons during the week ended July 12.

Hampton Roads Trade Picks Up; Prices Stiffening

Business is showing a tendency to pick up at Hampton Roads, with prospect of substantial increase around the middle or latter part of August. Dumpings for July at the piers kept well up to the average, though they were slightly below the record for the corresponding month of last year.

The tone of the market is slightly stronger, with reports of activity in the textile fields in this territory soon to bring a bigger demand.

Some distress coal is being bought in small cargoes at prices well below the market, but prices generally are stiffening.

Destination of Coal Exports from United States During June

(In Gross Tons)

	1923	1924
Anthracite	418,594	349,134
Bituminous	2,418,769	1,513,899
Exported to:		
France	135,849	65,615
Italy	116,529	71,848
Netherlands	24,766	.....
Other Europe	116,447	3,943
Canada	1,822,996	1,186,172
Panama	.....	19,312
Mexico	11,560	7,212
Br. West Indies	17,815	9,938
Cuba	39,929	27,356
Other West Indies	21,987	22,167
Argentina	11,632	5,059
Brazil	54,818	66,078
Chile	7,468	11,229
French Africa	27,778	.....
Other countries	9,195	17,970
Coke	63,841	48,238

United States Imports of Coal During June

(In Gross Tons)

	1923	1924
Anthracite	5,716	4,490
Bituminous	45,320	31,200
Imported from:		
United Kingdom	10,207	.....
Canada	35,113	15,113
Japan	.....	9,500
Australia	.....	6,587
Coke	8,779	2,771

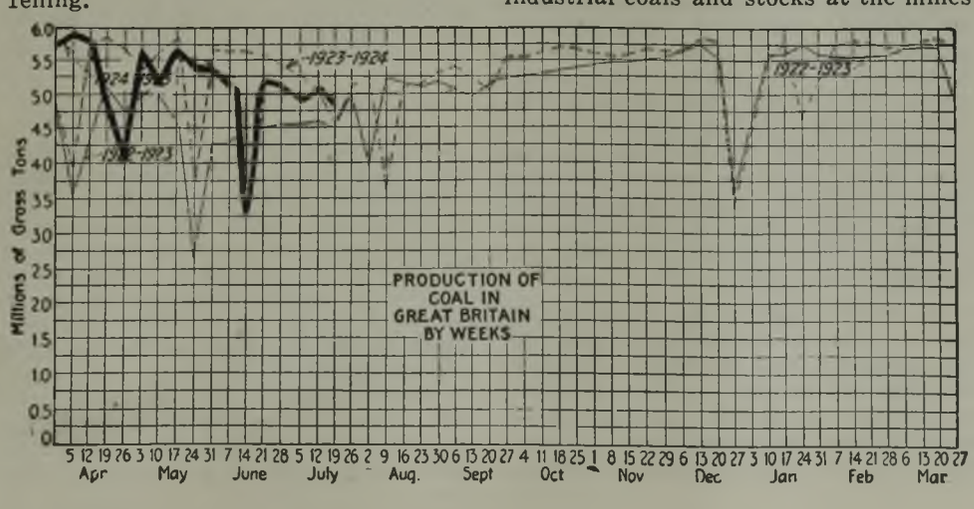
Demand for Industrial Coal Shrinks in French Market

Inquiry for industrial coals in the French market has shrunk and stocks are increasing. The household coal situation is favorable, except for bituminous coals and ovoids. Disposal of industrial grades in the East and Lorraine regions is difficult owing to the stocks accumulated at the end of winter in the fear of British and German strikes and increased since by the Sarre mines through liquidation of their formidable arrears in deliveries during the winter.

In the Ruhr, coal and coke have been lowered 20 per cent in price. Nevertheless indemnity fuels are actually dearer than Belgian, British and French coals.

The Belgian market is quite weak in industrial coals and stocks at the mines are accumulating as arrivals from the Ruhr increase. On the other hand, as the French Government is about to suppress fuel export permits, a recrudescence of French competition is expected, notably in the regions of Borinage and Tournaisis.

During the first fifteen days of July the O.R.C.A. was supplied with 218,992 tons of coke, or a daily average of 14,600 tons.



Export Clearances, Week Ended Aug. 2, 1924

FROM HAMPTON ROADS

	Tons
For Brazil:	
Br. Str. Nilemede for Rio de Janeiro	5,648
Br. Str. Homer City for Rio de Janeiro	6,752
Br. Str. Barbacena for Pernambuco	5,490
For Chile:	
Br. Str. Ascot for San Antonio	92
Br. Str. Mount Berwyn for Antofagasta	3,863
For Porto Rico:	
Nor. Str. Cissy for Guayabal	3,000
For Uruguay:	
Br. Str. Dumfries for Montevideo	5,011
For Germany:	
Ger. Str. Hannover for Hamburg	5,987
For France:	
Nor. Str. Hektor for Marseilles	7,190
For West Indies:	
Nor. Str. Jacob Christensen for Fort de France	5,475
For Malta:	
Ital. Str. Lucia	3,660
For Panama:	
Nor. Str. Fram for Guanico	3,921
For——	
Br. Str. Bata Seccondee	1,009

FROM BALTIMORE

For France:	
Belg. Str. Carlier	10,009
For Porto Rico:	
Am. Str. Delfina	30

FROM PHILADELPHIA

For Cuba:	
Nor. Str. Gunny for Havana	——

Hampton Roads Pier Situation

N. & W. Piers, Lamberts Pt.:	July 24	July 31
Cars on hand	1,228	1,812
Tons on hand	73,424	107,606
Tons dumped for week	124,979	107,939
Tonnage waiting	5,000	5,000
Virginian Piers, Sewalls Pt.:		
Cars on hand	1,516	1,296
Tons on hand	107,100	90,950
Tons dumped for week	75,513	106,858
Tonnage waiting	2,500	5,111
C. & O. Piers, Newport News:		
Cars on hand	1,947	1,928
Tons on hand	97,353	77,884
Tons dumped for week	105,811	108,415
Tonnage waiting	7,430	11,330

Pier and Bunker Prices, Gross Tons

PIERS

	July 26	Aug. 2†
Pool 9, New York	$4.75@$5.00	$4.75@$5.00
Pool 10, New York	4.50@4.75	4.50@4.75
Pool 11, New York	4.25@4.50	4.25@4.50
Pool 9, Philadelphia	4.70@5.00	4.70@5.00
Pool 10, Philadelphia	4.45@4.70	4.45@4.70
Pool 11, Philadelphia	4.30@4.50	4.30@4.50
Pool 1, Hamp. Roads	4.20@4.25	*4.15*
Pool 2, Hamp. Roads	4.10@4.15	*4.05*
Pools 5-6-7 Hamp. Rds	4.00	4.00

BUNKERS

Pool 9, New York	5.00@5.25	5.00@5.25
Pool 10, New York	4.75@5.00	4.75@5.00
Pool 11, New York	4.50@4.75	4.50@4.75
Pool 9, Philadelphia	5.00@5.30	5.00@5.30
Pool 10, Philadelphia	4.75@4.95	4.75@4.95
Pool 11, Philadelphia	4.50@4.70	4.50@4.70
Pool 1, Hamp. Roads	4.20@4.25	*4.20*
Pool 2, Hamp. Roads	4.10@4.15	*4.10*
Pools 5-6-7 Hamp. Rds	4.00	4.00

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations by Cable to *Coal Age*

	July 26	Aug. 2†
Admiralty, large	28s.@28s.6d.	**28s.@29s.**
Steam smalls	16s.6d.@17s.	*16s.6d.*
Newcastle:		
Best steams	20s.6d.@21s.	*20s.3d.@20s.6d*
Best gas	21s.6d.@22s.6d.	**22s.6d.**
Best bunkers	21s.@21s.6d.	*20s.*

† Advances over previous week shown in heavy type, declines in *italics*.

News Items From Field and Trade

ALABAMA

The Corona Coal Co., of Corona, is reported to be preparing to open a mine at Mount Valley that will necessitate some railroad building.

COLORADO

The Moffatt Coal Co. is reported making preparations to open the Elkhead mine, an anthracite property on Cottonwood Creek, near Steamboat Springs.

The Colorado Fuel & Iron Co. reports a deficit of $27,304 for the quarter ended June 30, after all charges and reserves, compared with a surplus of $498,057, or $1.34 per share earned on the common stock outstanding, in the corresponding quarter last year. The gross receipts for the three months totaled $10,851,978, as against $12,103,515 for the June, 1923, quarter.

During the month of June Colorado mines produced 565,336 tons of coal. This is a decrease of 191,221 tons as compared with the corresponding month last year. The total number of men employed in and about the mines that month was 12,417. In addition to this being a decrease under 1923 it also is the lowest June production reported since 1909 with the exception of 1921, when 547,473 tons was produced.

ILLINOIS

Two more coal mining companies in the Peoria field have dissolved. They are the Clarke Coal & Coke Co., of which Horace Clarke was president, and the Logal Coal Co., of which W. R. Coleman was the head.

The "Never Seen" coal mine, at Matherville, which was closed following the death in the mine of George Bugos, its owner, has been reopened and put in operation.

The strike of mining machine men in Orient No. 2 mine at West Frankfort continues with no sign of a break in spite of the fact that the state union officials including Vice-President Harry Fishwick, declare the men have no case. The strike started when the new $10.07 day wage for loading machine runners was supposed to take effect July 16. No coal has been mined in Orient No. 2 since.

Joe M. Cravens, who owns a slope mine six miles south of Herrin, was found dead with his son Claude at the bottom of the slope on July 23. It is believed they were asphyxiated, possibly by gas fumes from a gasoline engine, which they had entered to inspect. The younger Cravens had been married three weeks and was on a visit at Herrin from his home in Freeburg.

The Mars, a large lake collier, has delivered 7,000 tons of Fairmont (W. Va.) coal at the Hussey docks, Waukegan. This is the second coal boat of the season to dock at Waukegan, the first one having brought 8,000 tons of anthracite.

The Brewerton Coal Co. announced it would reopen its mine No. 3, at Lincoln, Aug. 1. Clean-up work was started July 28. The mine was closed for the last four months. A force of 250 men will be employed. Mine No. 2 of this company, also located at Lincoln, has been operating most of the time this summer.

No definite settlement has ever been made of the affairs of the defunct Southern Gem Coal Co., which last winter failed to pay off employees at more than seven mines in southern Illinois. Receiver W. S. Wilson denies recent reports that Mine No. 1, at West Frankfort, is to soon reopen and that the Peabody Coal Co. had bought the "West" mine at West Frankfort, and would soon reopen it.

A building and loan association has been organized at Mason, the new mining town which has been laid out by the Illinois Coal Corporation. The town is located 11 miles from Mt. Vernon. The object of the association will be to assist miners and others to erect or to buy their own homes. There are now 250 houses in the town and it is hoped that one hundred more will be erected this fall. H. D. Fischer is president of the association and C. E. Anderson secretary.

The St. Louis Coke & Iron Co. will soon move its main offices from St. Louis to Chicago, according to an announcement of Wm. C. Maguire, president. The company, which is a $20,000,000 corporation, has its main plants at Granite City, Ill., near St. Louis, and cokes southern Illinois coal almost exclusively. The offices in Chicago probably will be located in the Continental and Commercial National Bank Bldg., where a branch office has been maintained in the past, and the former main office in the Planters' Building, St. Louis, will be made into a branch office only.

George B. Spitler, Mt. Zion, acting for a committee of the stockholders of the Lovington Coal Mining Co., Lovington, has bid in the property at bankruptcy sale for $5,000. Included in the property are fourteen acres of land and about four thousand acres of leaseholds. The buildings of the mine are valued at between $40,000 and $50,000. Several claims have been filed against the property, most of which are payrolls, which will have to be adjudicated. The amount of these claims is uncertain. With the passing of the mining property of the pool of old stockholders represented by Mr. Spitler, a new corporation will be formed at once, with capital of $100,000, and steps will be taken immediately to put the mine in operation for hoisting coal for the fall trade. The mine has a rich vein of coal from 7 to 9 ft. thick. The monthly payroll under normal conditions is about $30,000 and from 200 to 250 men are employed.

INDIANA

The Indiana Coal Merchants Service Bureau, of Indianapolis, has changed its principal place of business to Anderson.

The Big Ben Coal Co. of Center Point has changed its name to the Big Ben Coal & Clay Co.

KANSAS

District 14, United Mine Workers, recently levied its first assessment against the miners who worked the first half of June, for the benefit of those who have been unemployed during the summer. Some 2,000 men, members of forty-one locals, were said by union officials to be eligible to assistance.

KENTUCKY

It is reported that coal traffic on the Ohio River has been materially curtailed as a result of a considerable amount of river equipment going aground, principally above Cincinnati, as a result of government engineers having raised dam wickets at points around Wheeling and Pittsburg, resulting in the lower river dropping 10 ft.

MASSACHUSETTS

The Philadelphia & Reading Coal & Iron Co.'s lease of the Mystic Wharf coal pier of the Boston & Maine R.R., at Boston, is being terminated as of Sept. 1, a contract having been let to G. P. Carver, coal-plant engineer, to remove the superstructure of the wharf for the P. & R. It has been rumored that H. N. Hartwell & Son were to take over the plant for receiving anthracite, but confirmation of the report is lacking. The plant measures 435x125 ft., has two large discharging towers and other equipment in proportion. The

P. & R. at one time stored 35,000 tons at this wharf.

MISSOURI

A new and larger shovel will be installed before autumn by the Liberal Coal & Mining Co., which has been operating a strip mine near Liberal for two years.

OHIO

The Clay County Coal Co., with operations at Hima, Ky., has purchased the Buchanan interests in the Furnace Gap Coal Co.'s properties and those of the Morning Glow Mining Co., all of which will be consolidated under the one management. The Clay County Coal Co. is made up largely of those associated with the Kentucky Fuel Co., of Cincinnati, of which John Hoffman and L. F. Korning are the directing heads.

The Brady-Tucker Coal Co., with offices in the Dixie Terminal, in Cincinnati, has liquidated as of Aug. 1. Heavy losses sustained through the failure of an Indiana wholesale company are given as the cause of the determination to quit business. Larry Tucker, moving spirit in the corporation since the death of Jake Brady, will devote all of his time to the management of his father-in-law's estate. J. C. Shelly will carry over the live accounts until further arrangements to this end have been completed.

PENNSYLVANIA

Governor Gifford Pinchot has appointed John F. Bevan, of Pottsville, as a member of the Anthracite Mine Inspectors' Examing Board.

Work on the construction of a large reservoir capable of holding approximately 2,000,000 gallons of water, has been started by the Glen Alden Coal Co. at its Taylor breaker. The reservoir is to be utilized in an effort to decrease the amount of water used in the preparation of coal, by using the same water several times. Timothy Burke, Scranton contractor, is working on the project.

The Cayuga tower, coal pockets and engine house, located in North Scranton and owned by the Glen Alden Coal Co., are soon to give way to more modern mining methods. The equipment has lain idle for many months, the fresh-mined coal being handled through nearby, more modernly equipped coal preparing plants. Morris Sullivan, of Bellevue, one of the best-known contractors in the anthracite field, has been given the contract to raze the Cayuga workings. It was Mr. Sullivan who tore down the old Bellevue breaker, now the site of the Baker breaker; the Dodge breaker; the Sloan breaker, the Hampton tower and other buildings discarded by the Glen Alden company in its advance toward greater efficiency.

A committee on mining methods, machinery and power, of the Central Pennsylvania Coal Producers' Association, composed of William Wetter (chairman), Richard Peale, L. W. Householder, E. K. Davis and Andrew B. Crichton, met in the association rooms in Altoona recently and recommended a detailed study by the association of special machinery for loading coal and laying track.

The Schuylkill Valley Coal Co. an operation near Port Carbon, in which ex-Governor Sproul is interested, is to resume soon. The mine was closed because of the default of payment of bills and has been idle for several months, but Judge Koch, of Pottsville, has entered a decree of foreclosure in favor of the bondholders, who will operate the plant again.

James Boyle, of Freeland, has leased the old Harleigh culm and debris banks of the former Madiera, Hill & Co.'s Black Creek Coal Co. workings on the west side of the Harleigh road. The workings are now part of the operations of the Jeddo-Highland Coal Co.

Alfred Kauffmann

Newly elected president of the Link-Belt Co. under the recent scheme of reorganization. Mr. Kauffman was named to succeed Charles Piez and, with Mr. Piez, is a member of a newly created executive committee of four members. Before his accession to the presidency Mr. Kauffmann was second vice-president of the company.

Announcement is made by the officials of the Lehigh Coal & Navigation Co., that Edward Hughes, of Philadelphia, has been named controller of that concern to succeed E. M. Reynolds, deceased. Mr. Hughes, who formerly held the position of purchasing agent, is succeeded by J. R. Bennington, his assistant. F. T. Swain has been appointed assistant purchasing agent.

Mrs. Julia Sarasin, of Dupont, Pa., has tied up the Volpe colliery. Mrs. Sarasin recently purchased five lots extending 250 ft. along a main street in Dupont and including a roadway to the Volpe colliery, the only entrance. She immediately had her land fenced, which blocked the roadway. The company protested and Mrs. Sarasin suggested she would let coal trucks cross her property at the rate of $1 each. The company is now in court seeking an injunction against the woman realtor.

Two more big strippings are to be started in Schuylkill County. One will be at Buck Run, where work has already begun on the opening of the veins on the north side of the mountain near the Crystal Water Co.'s dam at Rohresville. Many thousands of tons of coal are expected to be removed. The Philadelphia & Reading Coal & Iron Co. is getting ready to strip on a large scale and the largest shovel ever seen in the section is being taken up the side of the Broad, or Gordon Mountain, above Heckscherville. Another shovel is expected to be placed in service at Pine Knot soon.

The mines of the Argyle Coal Co., located at Gallitzin, after being idle for three weeks, resumed operations on July 23. This concern supplies fuel to the Pennsylvania R.R. at a coaling station for engines on the Pittsburgh division.

The Lehigh division of the Lehigh Valley Coal Co., held first-aid team contests at Hazleton last week for the first time in several years, the Oneida No. 3 team winning first place. Fourteen teams took part. The Hazleton division contest was held later. A cup is contested for by the various divisions.

The River Pollution Committee of Reading has a report on the possibility of cleansing the Schuylkill River, which is little more than a sulphur creek all the way from Shamoking to Norristown due to the many mines and washeries draining into it. The committee has received authoritative data declaring that the river can be cleaned of pollution in five years if proper measures are taken and the authorities enforce them.

Central Pennsylvania coal operators are deeply interested in a hearing being conducted by the Public Service Commission in Harrisburg on the complaint of the Rainey-Wood Coke Co., which is seeking proportionl freight rates on inbound bituminous coal from the Connellsville field and outbound byproducts from its Swedeland plant, near Philadelphia. The gist of the request is that the rate on coal for use in by-products be reduced about 32c. below the rate on coal for other uses. Beehive coal producers and the railroads are opposing the rate reduction. The hearing promises to be long drawn out.

On July 26 a fall of rock in the main heading of the Lamont mine of the H. C. Frick Coke Co. near Uniontown fell on the main trip as it was passing, injuring more or less seriously thirteen employees, two of whom sustained broken backs.

Every employed mine worker in District 1, United Mine Workers, must pay an assessment of 25c. a month for the support of the unemployed miners of the district as a result of a decision reached by the members of the district executive board. The assessment is effective immediately and will be continued until further notice.

A syndicate headed by McLaughlin, MacAfee & Co., of Pittsburgh, and Schibener, Boenning & Co., of Philadelphia, is offering an issue of $1,250,000 Shamokin Coal Co. first mortgage 6½ per cent sinking-fund gold bonds, due Aug. 1, 1944, at 100 and interest, to yield 6.50 per cent. The company owns in fee simple a tract of anthra-

cite located within the borough of Shamokin and Coal township, Northumberland County. Sixteen veins of coal estimated to contain over 24,000,000 tons of virgin anthracite are located within the property. Prominent anthracite operators of New York and Philadelphia are interested in the company.

Five miners from Jerome, Someret County, were sent to the Western Penitentiary for from 18 months to 10 years, having been convicted of dynamiting the Baltimore & Ohio R.R. bridge leading to the Hillman Coal & Coke Co. mines at Jerome during the 1922 strike in an endeavor to interrupt the operation of these mines.

WASHINGTON

Local engineers at Bellingham have been making tests between the surface and the interior of the Bellingham mine of a radio communication system which has been worked out by W. A. Germain, a local radio expert. Mr. Germain, recently held an exhibition for the benefit of the Bellingham chapter of the American Association of Engineers.

WEST VIRGINIA

Designating T. F. Henritze as commissioner in chancery to make an examination of the affairs of the Tarney Collieries Co. and E. C. Bralley as receiver, Judge I. C. Herndon, in the Circuit Court of McDowell County, directed a full accounting of the affairs of the company, following charges of mismanagement and juggling of funds made by George W. Lambert, wealthy coal operator and a large stockholder in the Tarney concern. Mr. Lambert asserts that he has been unable to find out just what the assets of the company are and that recently a number of judgments aggregating a large amount have been awarded against the collieries company.

The Island Creek Coal Co. reports total net profit of $1,436,874 for the six months ended June 30, 1924, against $1,361,230 in the corresponding period last year. After common and preferred dividends the company reported a surplus for the half year of $574,488, against $23,653 in 1923. The net profits for the first half of 1924, after allowing for the dividends on the preferred stock, were equal to $10.83 a share on the 118,801 shares of common stock outstanding, against $10.20 a share in the corresponding period last year. The net profit for the June quarter totaled $438,643, or $3.07 a share on the common as compared with net profit of $622,954, or $4.72 a share reported for the same quarter in 1923. The company produced 2,050,907 tons of coal in the six months ended June 30, 1924, against 1,278,818 tons produced in the first half of 1923.

The Tidewater Coal Inspection Bureau has been opened at Norfolk in charge of H. B. Tarrant, chief inspector, for the purpose of sampling coal in yards, cars and cargoes. Mr. Tarrant, who has been engaged in similar work at Norfolk for several years, formerly was with the U. S. Fuel Administration. A new method of handling coal at the piers to decrease the percentage of slack and dust is being demonstrated by M. Tarrant, who asserts that he can practically guarantee 10 per cent more lump in cargoes.

CANADA

The Toronto Wholesale Coal Dealers' Association has been adding a number of new members lately, and is arranging to resume its luncheon meetings.

Output of bituminous coal in Alberta for the first five months of 1924 was 1,133,568 tons as against 1,576,046 tons for the same months of the previous year. Sub-bituminous coal production was 409,330 tons for the 1924 period as against 244,561 tons during the early part of 1923.

Production of coal in British Columbia for the month of June shows an improvement. The mines on Vancouver Island now are working almost full time. Those of the Nicola-Princeton field also are feeling the effects of the improved trade. The Crows Nest Pass Collieries are idle because of the strike.

Roy Wolvin, president of the British Empire Steel Corporation and other officials recently made a visit of inspection to the Picton County plants of the company. After conferring with T. J. Brown, Deputy Minister of Mines, it was decided not to reopen the Allan mine, in which the recent explosion occurred, until at least the end of August.

The Dominion Coal Co. has made a general cut in the pay of all officials, affecting all salaried men from President Wolvin down to the lowest paid clerk. The cut in the pay of the highest salaried officers is 25 per cent, the reduction in the case of the smaller salaries being 10 per cent, and between the two extremes the reductions are proportionate to the salaries paid.

Charles Piez

As the result of a reorganization of the administrative force of the Link-Belt Co., Mr. Piez has retired as president of the company and has been elected chairman of the board. He also has been named as chairman of a newly created executive committee of four members, who will act in an advisory capacity. He held the office of president of the organization for eighteen years and has been succeeded by Alfred Kauffmann.

New Companies

The Goldville Mining Co., a coal company, has been incorporated in Spiro, Okla., with a capital stock of $60,000, by R. L. Redwine, J. R. Redwine and J. S. Sorells.

The Old Cato Coal Mining Co. has been incorporated in Henryetta, Okla., with a capital stock of $25,000, by C. E. Downs and Ben Meyers, both of Los Angeles, Cal., and G. L. Smith, of Henryetta.

The **Blue Goose Coal Co.** has been incorporated in Knoxville, Tenn., with a capital stock of $75,000, by C. L. Peterson, L. A. Bible and C. A. Bowen.

A charter has been issued to the **Anthracite Fuel Corporation**, of Wilkes-Barre, Pa. It has a capital stock of $15,000, and Ralph P. Thomas, 18 East Pettebone Street, Forty-Fort, is treasurer. The incorporators are: Treasurer Thomas, Walter W. Harris, Scranton, and James P. Harris, Kingston, Pa.

The Normandale Coal Co. has been formed to take over the Normandale property, two miles from Nicola, B. C., on which a 12-ft. seam of good bituminous coal has been opened. The property will be developed under Edward Floyd, managing director of the company, who has had wide experience in the Newcastle fields, England, and the Westville fields, Nova Scotia.

The Dick Coal Co. has been organized to mine coal in Lewis County, West Virginia. The company is capitalized at $25,000 and will have its principal office at Weston. Interested in the new concern are Charles P. Darlington, J. W. Marsh, J. W. Eakin, J. E. Griffin and P. D. Marsh, all of Weston.

The Alma Pond Creek Coal Co. has been organized to operate in the Thacker field of West Virginia. The company is capitalized at $150,000. It is to operate near Sprigg, W. Va. Among those active in organizing the new company were H. L. Ducker, R. C. Pforr, P. P. Gibson, D. G. Hughes and M. F. Breslin, all of Huntington, W. Va.

The following bituminous-coal companies were recently incorporated at Harrisburgh, Pa.: **Viaduct Coal Co.**, Summerville, Pa.; capital, $10,000; incorporators, I. W. Carrier, Baxter, treasurer; H. L. Carrier, Summerville, and H. A. Corbett, Summerville. **Campudas Coal Co.**, Carnegie, Pa., capital, $50,000; incorporators, Charles H. Campman, Seventh St., and Doolittle Avenue, Carnegie, treasurer; John Tudas, Carnegie, and S. E. Wentley, West Elizabeth.

Publications Received

Pumps, Centrifugal. The De Laval Steam Turbine Co., of Trenton, N. J., has just issued a new booklet on single-stage and multi-stage centrifugal pumps. This booklet covers manufacturing methods and materials, testing, and pump details. Other sections are devoted to speed reducing gears, drives, pump applications, characteristics and engineering data.

Efficiencies in the Use of Bituminous Coking Coal as Water-Gas Generator Fuel, by W. W. Odell, Bureau of Mines, Washington, D. C. Technical Paper 274. Pp. 39; 6x9 in.; illustrated. This paper is one of a series of publications dealing with an investigation relating to the manufacture of water gas. This investigation was conducted under a co-operative agreement between the Bureau of Mines, Department of the Interior, State Geological Division of Illinois and the Engineering Experiment Station of the University of Illinois.

Shape Book (9th edition), published by the Carnegie Steel Co., is now off the press and available to users of steel. The new edition is the result of a thorough check and revision of all the sections rolled by Carnegie Steel Co. on its shape, rail, bar and plate mills, and though no important changes have been made in the regular sizes of structural and bar-mill sizes of beams, channels, angles, tees and zees, a number have been made in the large number of special sections rolled by that company, such as concrete reinforcement bars, window and casement sections, automobile rim sections and other miscellaneous bar-mill sections.

Traffic News

Roads May Appeal to High Court Against Indiana Rate Cut

As a result of the ruling of Federal Judge Alschuler, with that of Judges Wilkerson and Carpenter, of Chicago, in denying an injunction to the Baltimore & Ohio and other railroads which sought to restrain the Indiana Public Service Commission from reducing coal freight rates within the State of Indiana, the roads may appeal their case to the Supreme Court, according to unofficial statements of officials of the coal-carrying roads of Indiana.

The ruling of the federal court means that beginning Aug. 1, coal shipped from Indiana mines to points within the state will benefit by a carrier rate from 5 to 28c. lower.

The railroad companies sought to obtain a temporary restraining order pending a decision of the Indiana Supreme Court on a permanent injunction.

Producers Prepare to Fight Lower Rates Into Indiana

Indiana coal operators are preparing for their fight against reduction of freight rates on coal from Ohio, West Virginia and Kentucky fields to points in Indiana. This follows the filing of the petition by R. B. Capstick, traffic manager of the Indiana State Chamber of Commerce, with the Interstate Commerce Commission against 56 railroads, comprising the Central Freight Association. At the same time the Chamber of Commerce of Terre Haute sent a protest against the state chamber explaining that such a petition was unfair because it would hurt not only Terre Haute but all parts of the state in which coal mining was a main industry.

The hearing on the petition will be held in Indianapolis early in September.

Commerce Commission to Expedite Lake Cargo Coal Case

In an effort to expedite the Lake cargo coal case, the abstracts of evidence are to be filed Aug. 18, in advance of the argumental portion of the briefs, which are to be in the hands of the Interstate Commerce Commission Sept. 15. Since the chances are that there will be exceptions to the tentative report, time must be allowed for final oral argument. It is known that the commission is anxious to render its decision as early as possible so as not to delay negotiations for coal to move by way of the lakes on the opening of navigation next spring.

Coal-Rate Hearings Announced

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, will hold a hearing in Room 606, Chamber of Commerce Building, Pittsburgh, Pa., Thursday, Aug. 14, at 10 a.m., daylight saving time, on a proposal to change the rate on bituminous coal, carloads, to 76c. per net ton from Coaldale Mine and Mineral Siding on the B. & O. R.R. in the Cambridge (Ohio) district to the following stations in Ohio: Lore City, Cambridge, Cassell, New Concord, Sundale, Bridgeville and Sonora. At the time the rate, of which the present 63c. rate is the outgrowth, was first established to Cambridge, there were no mines on the Baltimore & Ohio in the Cambridge district west of Cambridge, and it was the intention to limit the reduced rate to mines between Lore City and Cambridge. Through oversight when mines were opened west of Cambridge, the reduced basis was extended to all main-line mines in the Cambridge district. It is desired now to correct this situation.

A hearing also will be held at the same time and place on the following proposed change in the rate on coke, except byproduct coke, carloads, from ovens in Chesapeake & Ohio Ry. districts to Niagara Falls, Ont.: Rate of $5.01 per net ton to be cancelled, leaving through rates to be made on the sums of locals via Detroit. This is proposed to meet the demand of Canadian lines for cancellation of all joint through rates on coke from United States points to destinations in Canada that represent the through charge less than that available, under the combination of local or proportional rates, and from the national boundary via which handled.

Proposed increases in the rates on coal in carload lots from certain stations in Oklahoma to various Southwestern States have been ordered suspended by the Interstate Commerce Commission until Nov. 25.

Obituary

John H. Dunlap, secretary of the American Society of Civil Engineers, died July 29 as a result of injuries received in a railroad wreck a month ago, when he was returning with some other engineering professors from the meeting of the Society for the Promotion of Engineering Education at Boulder, Col. President McNair of the Michigan School of Mines and Professor Ives of Ohio State University, also were killed in this wreck.

Coming Meetings

Rocky Mountain Coal Mining Institute. Summer meeting, Aug. 7-9, Rock Springs, Wyo. Secretary, Benedict Shubart, 521 Boston Bldg., Denver, Colo.

New York State Coal Merchants Association, Inc., 14th annual convention, Sept. 4-6, Stamford-in-the-Catskills, N. Y.; headquarters Churchill Hall. Executive secretary, G. W. F. Woodside, Arkay Building, Albany, N. Y.

American Chemical Society. Fall convention Sept. 8-11, 1924, at Ithaca, N. Y. Secretary Gas and Fuel Section, O. O. Malleis, the Koppers Co., Pittsburgh, Pa.

Oklahoma Coal Operators' Association. Annual meeting Sept. 11, 1924, McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Association of Iron and Steel Electrical Engineers. Annual meeting and exposition at Duquesne Garden, Pittsburgh, Pa., Sept. 15-20. Secretary, John F. Kelly, 1007 Empire Bldg., Pittsburgh, Pa.

National Safety Council. Thirteenth annual safety congress Sept. 29 to Oct. 3, Louisville, Ky. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

American Institute of Mining and Metallurgical Engineers. Fall meeting, Birmingham, Ala., Oct. 13-15. Secretary, F. F. Sharpless, 29 West 39th St., New York City.

American Institute of Electrical Engineers. Fall convention, Pasadena, Calif., Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Miner's Lamp Made of Aluminum

A new acetylene miner's lamp is made of cast aluminum, with walls ⅛ in. thick and seamless. The water tank and carbide cup are ribbed, as may be seen in the accompanying illustration. This feature adds strength and permits a firm grip for unscrewing the cup. Construction is simple and

Of Light Weight But Durable

Corrugations in carbide and water container stiffen these parts and make both stronger than the nature of the metal would suggest.

the lamp can be taken completely apart and put together again in a few minutes. Every part in it is replaceable. In spite of its solid metal walls and great strength, it weighs less than brass lamps of the same size. The new lamp is made by the Fred R. Belt Co., Inc., 355-361 W. Ontario St., Chicago, Ill. It is named the "Lu-mi-num" lamp.

Continuous-Tread Shovel Has Broad Operating Base

Continuous tread equipment has been adapted by the Osgood Co., Marion, Ohio, to its standard shovels, supplementing the railroad truck and traction mountings. Continuous-tread mountings which are made for shovels of dipper capacities ranging from 1½ to 6-cu.yd., can be easily put on in the field to replace other mountings and are readily removed when it is necessary to ship the shovel by rail.

With the new continuous-tread mounting the track and accessories are eliminated and the pit crew dispensed with or greatly reduced; the shovel can be kept in the most effective digging position, can back away from blasting and can travel and work in water; and the location of the shovel can be changed in minimum time.

These results are obtainable with either heavy traction or continuous-tread mounting. The main difference in

Continuous Tread Shovel

For relatively soft ground. To steer the shovel a transverse screw with a traveling nut slews the rear truck. The screw is operated by a small engine near the boiler firebox.

the two is in the nature of the ground that each can negotiate. The traction wheels are most successful on hard bottoms, have greater simplicity and are lower in cost. The continuous-tread mounting, at somewhat greater cost, enables the shovel to travel and work on a comparatively broken, faulted and moderately soft surface.

Belt Treads Replace Side Jacks

The mounting consists of two continuous-tread belt units carried on side brackets, replacing the jack arms at the forward end of the machine, and a narrow, double-belt truck occupying the same position as the rear railroad truck. The side brackets are somewhat similar in shape to the jack arms used with the railroad mounting and occupy the same position but are much heavier. They are rigidly attached and braced.

The front tread-belt units are mounted on journals at the outer ends of the jack arms and can rock to accommodate themselves to uneven ground surfaces. The rear truck furnishes a third point of support for the shovel and has a universal action so as to rest firmly on uneven surfaces. To steer the shovel the rear truck is slewed by means of a transverse screw shaft carrying a traveling nut.

The shovel is propelled through the front units only or through both front and rear trucks by power derived from the hoisting engines. The tractive effort is suitably increased by a series of heavy cast-steel spur gears with teeth cut from the solid. These gears with their shafts are assembled in a sub-frame which can be put on or removed as a unit.

Provisions Made for Rocking

From the ends of the forward shaft in the sub-frame the power is continued out to each front unit by a universal jointed propeller shaft. As the continuous-tread units are free to rock, these shafts must be provided with means to enable them to work at varying angles.

Power for steering is provided by a small double reversible engine mounted on the deck beside the boiler firebox. The drive from engine to steering screw is direct and without shafts, bevel gears or clutches. The spread of the mounting at the front is approximately the same as the jack screw spread on the railroad mounting. This, with the weight of the forward units, makes the shovel stable under all conditions.

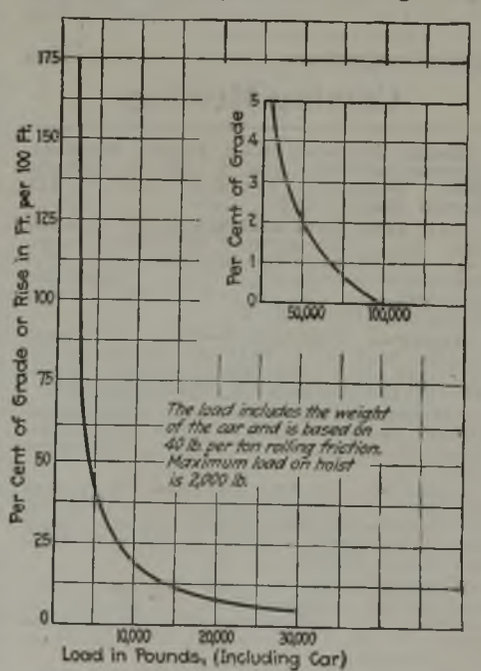
Light Electric Hoists Pull Cars and Scrape Coal

Single-drum and double-drum electric portable hoists have been designed by the Sullivan Machinery Co. and are now in successful use in different parts of the country.

As in the air hoist, the motor of the electric machine is contained entirely within the drum, a fact which makes for compactness, simplicity and ease of handling.

In the single-drum hoist, the motor is supported at one end of the frame or base, and supplies power, through reduction gears to the hoisting drum, which is of 11⅛ in. diameter and 8¼ in. long. This relatively large drum diameter reduces strain and wear on the hoisting rope, which is a $\frac{5}{16}$-in. wire cable. The drum holds 500 ft. of rope.

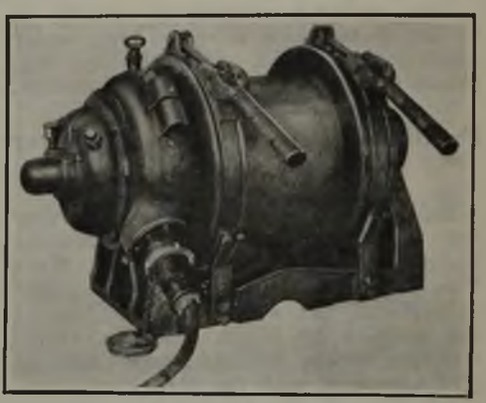
The horsepower and rating of the hoists are similar to those of the compressed-air machine, namely: 6½ hp. with a capacity of 2,000 lb. dead load vertically, at a speed of 110 ft. per minute on single lines. When hauling cars, for example, on moderate grades or on the level, the pulling power is much greater. The accompanying curve sheet shows the ability of the hoist in this direction, and applies to both the single- and double-drum machines.



Capacity of Single- or Double-Drum Hoist

For heavy inclinations use the larger, lower, left-hand graph. For lighter grades use the graph in the upper right-hand corner. Thus the hoist will pull 20 tons on a level track.

For example, the Steubenville Coal & Mining Co., Steubenville, Ohio, which is using one of the single-drum hoists to pull trips of loaded cars into the bottom as a relief measure for the haulage motor, reports that trips of forty cars with a gross weight of 96,000 lb. are handled satisfactorily. The grade averaged about 1½ per cent and was on a slight curve. In this case the hoist was bolted to timbers between the tracks, but the location or position of the hoist has no effect on its operation. It may be mounted on a crossbar or column in a shaft handling timbers; bolted to a timber or a girder, or to a tree, or to a wall or floor, for pulling cars, piling timber, or odd jobs of hoisting and hauling. The single-drum hoist weighs 480 lb. The double-drum can be used also for pulling a coal scraper instead of a hoist on a foundation. This machine weighs 770 lb., is 38 in. long by 15 in. wide, and stands 19 in. high.



Single-Drum Hoist for Pulling in One Direction Only

Used at Steubenville to pull trips of forty loaded cars weighing 48 tons into shaft bottom.

In the double-drum hoist the electric motor is mounted between the two drums on a central standard, carrying a pinion at each end of its armature shaft, and thus furnishing power through reduction gears, to the two drums, each of which is 11⅛ in. in diameter by 6¼ in. in length, with a capacity of 250 ft. each of $\frac{5}{16}$ in. wire rope. The right-hand or haulage drum has an operating speed at full load (2,000 lb. vertical lift) of 110 ft. per minute. The gearing of the left hand or tail rope drum provides for 160 ft. per minute for handling the empty scraper.

The 6½-hp. motor, built especially for this hoist draws about 25 amp. when running the hoist at full capacity. It is a compound-wound motor. It is totally inclosed, so that dust and dirt are excluded. The temperature rating is ten minutes full load, with a 55-deg. centigrade rise. The motor will run continuously at no load without overheating. The above ten-minute period, of course, is longer than any during which the hoist will be called upon to deliver its full-load rating under any ordinary conditions. This machine is constructed with compound windings.