

COAL AGE

McGraw-Hill Company, Inc.
James H. McGraw, President
E. J. Mehren, Vice-President

Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

R. Dawson Hall,
Engineering Editor

Volume 26

NEW YORK, SEPTEMBER 11, 1924

Number 11

Our Modern Proconsuls

ANCIENT ROME sent its proconsuls to rule over its conquered provinces. Gradually a system was established by these men which perpetuated their terms of office. They discovered some breach of discipline in those they ruled. This gave them a reason for invading their territories and for taking of their substance. Part of it they kept for themselves and part they used to provide pageants, gladiatorial and animal fights, races and bread for the people at home who, thus bribed, voted for their continuance in office. This form of graft was eminently successful and became eventually almost a fixed custom.

Our modern proconsuls, called politicians, do not rob foreigners but prey on their own people. They regularize their actions by false charges of violation of the laws. La Follette is a sample of such people. He has just announced that the coal men and railroads had combinations in restraint of trade and were robbing the farmer. They must be put under severe control so that the most numerous body in the electorate, the farmers, shall have cheaper coal and transportation. He made this statement despite the fact that bituminous coal was selling at a price below the cost of production in all the union mines and that mines were daily being closed either by the sheriff or voluntarily.

That is what is meant by bringing coal and the railroads into politics. It is a modern form of proconsular graft, only, as already stated, it is our own people and not foreigners who are victims of the political ambitions of these politicians who seek by false charges and the power of the state to create and perpetuate their tenure of office.

"Be to Our Faults a Little Kind"

ON THE editorial desk lies a letter from an Englishman lately engaged, as he tells us, as superintendent in a mine in North America. He is having trouble in convincing his friends that the tales he has told about Orient, Zeigler and Lynch mines are not figments of a disordered imagination, and he wants some clippings from *Coal Age* to prove that his statements are justified. We remember receiving an inquiry for copies of the records made at Orient and Zeigler from an Australasian chief inspector. He was amazed at the hoisting performances described in our columns.

We say this of American mines not in pride but rather in defense. The coal industry in America has been generally condemned by those who do not know it, by its malicious, consistent, and unscrupulous enemies. They have declared it to be most deplorably inefficient. It should have some capable men, they say, enlisted in its improvement and development.

Every coal man in America knows that there are incapable coal men and inefficient coal mines in this country. That is not unnatural. There are village

smithies also, and there are big automobile plants. There are women knitting socks by hand, and there are big power-mills with many spindles. At the same time the average coal mine has an efficiency that averages well with other industrial operations, and some mines are noteworthy for their excellent management and the vastness of their activity. Coal mining is not perfected nor will it ever be perfect, but it is progressing, and these incredulous Englishmen are evidence that we have done something worth while.

When European engineers come over here they are disposed rather to wonder than to criticize. Nowhere in Europe are such tonnages produced per mine or per man. We do not have such elaborate plants and housing as France, Belgium, Germany, and probably Holland, but we *are* efficient. Yet that is the very quality which our skeptical fellow countrymen will not concede to us.

Every One's Job Is Easier Than Ours

REMARKABLY easy is every man's job. We could do it much better than he can. We are like the man who had never handled a fiddle but supposed he could play it offhand if only one were given him.

All the world believes there is no trick about coal mining—except perhaps the art of excessive charging for coal. We are told on all hands that we are the veriest dubs at an ancient art. But do not be mistaken, ours is *some* job. If others took hold of it, they would find that out. By the way, some have tried it and have found out already. We will not mention names though a lot occur to us—men who have burned their fingers at it.

Railroading is a sizable job especially the work of Class I roads, those having an operating revenue of over \$1,000,000 a year. In the first quarter of this year they originated 8,016,439 car loads of which no less than 2,327,481 were of coal or coke. That is 29 per cent of the whole. Seeing that this has been an off year for coal and coke, more coal being consumed than was being mined, and that coal cars have a larger weight capacity than other cars, that is quite a large proportion. Let us inquire therefore as to weights carried. The total number of tons "originated" in that period was 276,352,426 tons; of this 115,413,844 tons were coal and coke. That is 41.7 per cent.

It is clear therefore that the coal companies that have to haul this coal to the railroads have quite a large job on their hands especially as the cars run from less than one ton to more than eight tons capacity and have to be hauled over roads which conditions do not permit to be graded satisfactorily. This transportation job is larger than coal men themselves realize and one that men outside the industry utterly fail to comprehend. Some of the coal is transported as much as five miles. Much, it is true, is not carried nearly so far. No one

knows how far the average distance is. A wild guess might place it at two miles. But whatever the distance the job is immense. Imagine transporting 40 per cent of the traffic of the Class I railroads and much of the other classes underground in small cars averaging perhaps one-thirtieth the size of those used by the railroads.

One reason for the ease with which coal is gathered and transported is the use of electricity. If the railroads had been as forehanded as the coal companies they would be performing their heavier haulage functions with greater economy and despatch and less annoyance to the public. But there again, we are operating the railroads! If only we could!

Our Mine Shops

LARGE outputs, increasing use of machinery, long hauls and heavy cars are going to make mine shops increase in size and importance. They may become before long, wherever large companies concentrate the repair work of many operations as space-consuming and as imposing as the shops of some of the smaller Class I railroads.

The progress has been rapid. In the nineties a drill press, a forge, a bellows, an anvil, a few hammers, a quenching barrel, a paring knife, some spanners and wrenches, a hand grindstone, a box of taps and dies with hand pipe cutters, and a few carpenter's tools, not forgetting a two-man crosscut saw, together filled the need for tools at most bituminous mines. Today such mines have shops equipped with a lathe or two, a drill, pipe machine, hack saw, hammer, a bit shaper, grindstone and woodsaw all driven by power with perhaps a section serving as a foundry. In addition would be oxyacetylene and electric-welding equipment and conveniences for the winding and making of armatures—all these for one mine of moderate size. Ten years from now such equipment will be regarded as entirely inadequate. Steel cars, loading machinery, conveyors and perhaps steel props will make more and heavier equipment necessary.

Part of a Larger Program

STABILIZATION of the coal business is dependent on a larger undertaking that proposes to iron out the fluctuations of all industry. If the railroad business, the steel, cement and automobile industries, construction and all other activities were not seasonal the coal business would be less irregular. Some uses for coal, however, are so seasonal that they will never be corrected till we use power in the summer to cool by tempered artificial ventilation our homes and our offices. Perhaps the day will come when industrial activity will be uniform and when power will make our buildings cool, but both hopes appear a long way off. Still publicity might introduce some such development as the latter, giving regulated, dry, cool, dustless air in place of uncertain, humid, hot and dirty drafts from windows or a disk fan which cause colds and sweep the papers off desks.

And strange to say in a trifling degree the desire to keep at least our refrigerators and our drinks cool intensifies the difficulties of the coal producer, for the retailers would be more anxious to sell coal, more active in urging it, and more ready to reduce the price if they were not busy peddling ice, and if they had their motive power free to distribute coal. The retailers by taking

on the sale of ice have been doing a little stabilizing of their own to the disadvantage of the coal industry.

Another source of irregularity is not due to an unequal need for coal but to an inequality of the ability to pay for it. When business is slack, industry and individuals lack money to buy coal and both wait as long as they can or dare before buying.

A long, long road lies ahead. In 1924 we find ourselves farther than in 1923 from the happy consummation, despite reports and advice galore. The only real cure is an economic and not an ethical or altruistic one. Give an equal demand the year long and suppress the business cycle, and the coal man's trouble is solved.

The consumer caused the irregularity and not the coal man. He will only cease to cause it when he wants coal the year round. Every movement of the government to save him, when he is short of coal, from the consequences of his folly makes him less frugal and weakens his dependence on himself. The coal industry that has to take the blame of all the consumer's faults sincerely hopes that he will reform because the coal man must ever accept vicarious punishment for the consumer's misdoings. Still there is little expectation that the consumer will be regenerated.

International Courtesy

RECENTLY we were favored with a copy of a new publication entitled *The Colliery Engineer* published in London. It was a technical journal covering the coal industry. As *Coal Age* had purchased *The Colliery Engineer*, of Scranton, some years back, a paper with a long and honorable record, and had borne on the title page for years the legend "Coal Age with Which Is Consolidated The Colliery Engineer" we looked with some dismay on this new publication which tried apparently to obtain a glory that did not rightly belong to it.

The company which publishes this paper is also publisher of the "Railway Engineer" the *Power Engineer* and the "Marine Engineer," and it was only natural for it in entering the colliery engineering field to follow its former practice and add to its list of publications that of "The Colliery Engineer." An exchange of courteous correspondence, however, made the British publishing house decide that it would be an act of consideration to change its name to "Colliery Engineering" and in a letter dated Aug. 20 it inclosed an editorial of which we reprint the follow paragraph.

"It has been pointed out by the proprietors of our esteemed contemporary that they like to regard the whole of technical literature printed in the English language as a unity, whether the publication be in Great Britain, in one of the English-speaking British colonies or in the United States, and that consequently they believe that any duplication that leads to confusion is undesirable. With these sentiments we are in cordial agreement, and accordingly we have adopted the suggestion, so courteously made, that the title of this journal should in future be *Colliery Engineering* instead of that originally selected."

Coal Age wishes to thank *Colliery Engineering* on its kindly acceptance of the suggestion and anticipates for its contemporary the best of success, which, indeed, the character and appearance of its issues seem destined to assure it. In no other country than Great Britain, we believe, is a detestation of literary piracy in any of its many forms more heartily disapproved.



General View, Dudley Coal Co. Tipple

Dudley Mine's Unusual Dump and Picking Methods

Revolving Dump Drops Coal to a Boom That Feeds a Steel-Tube or Storage Bin—Each Carload Passes Over Boom Alone and Consequently Every Man's Product Gets Individual Inspection

BY W. R. COLE

Mining Engineer, Kentucky River Coal Corporation,
Hazard, Ky.

AT THE HEAD of Caudill Branch of Rockhouse Creek, a tributary of the North Fork of the Kentucky River, is located one of the best equipped coal operations in the Hazard field, that of the Dudley Coal Co.

In addition to 300 acres of No. 7 and 600 acres of No. 6 coal, this company also owns 2,325 acres of the No. 4 bed estimated to contain 16,000,000 tons. As the interval between the No. 4 and No. 6 measures at this mine is 330 ft. it was believed that it would not injure the upper bed to work the lower one first. Adequate equipment for operating the No. 4 bed could be installed for a smaller outlay than would have been necessary for the upper deposits. Furthermore, contrary to the conditions usually encountered, the No. 4 seam was here as thick as either of the upper beds and contained a better quality of coal.

The No. 4 bed is only 90 ft. above the railroad. As the hills are high in this vicinity, this measure contains a large area of coal lying in an unbroken body, not cut up by erosion like the coal beds at many operations in this field.

Openings into the coal were made on both sides of Caudill Branch. This stream, as shown by the accompanying map, extends about 3,000 ft. into the property. In order to provide for rapid development seven different openings were made, the coal produced being hauled around the hill to the tipple on outside tramroads. At present, however, the haulage has been concentrated inside the mine, loads being gathered to suitably located central points and brought out from the No. 1 mine opening on the east side of the branch and through the portal of the No. 4 mine on the west side.

Mining is conducted according to the panel system. On account of the erosion of Caudill Branch, it has not

as yet been possible to make all the panels of the same size either in length or width. When the outcrop stage of working has been passed, however, it is planned to make all panels 350 x 1,000 ft. with a 50-ft. pillar separating them. A 150-ft. barrier pillar will protect the entries.

PILLAR WIDTHS COMMENSURATE WITH OVERBURDEN

Near the outcrop, rooms were turned on 50-ft. centers and driven 22 to 24 ft. wide. Since the workings have been extended well under the hill, however, the centers have been increased to 60 ft., leaving an average pillar about 37 ft. wide. This is thought to be adequate, as the average overburden is only about 400 ft. and at the maximum 900 ft. thick. Should conditions appear to warrant it, however, the pillar width will be increased still more.

Pillars are robbed to within 50 ft. of the entry. When the last rooms are finished, the entry stump, chain pillar and 50-ft. panel pillar are drawn back. These pillars are robbed by machine on the butt-off system. If the roof conditions are favorable, which is generally the case, even the 6-ft. stumps produced in drawing back the pillar are cut with the machine. If, however, the roof is weak, these stumps are taken out with the pick. So far the pillar work has been highly successful and the total recovery of coal, including an estimated 4 per cent loss in handling and preparation, is 92 per cent of the merchantable coal in the bed.

On all main aircourses, brattices are made of cut stone. This is quarried from the nearby hillsides and plastered with cement. Though this may seem rather extravagant at first blush, it must be remembered that from the outcrop the mine will extend 8,800 ft. to the rear and about 5,600 ft. on either side before another

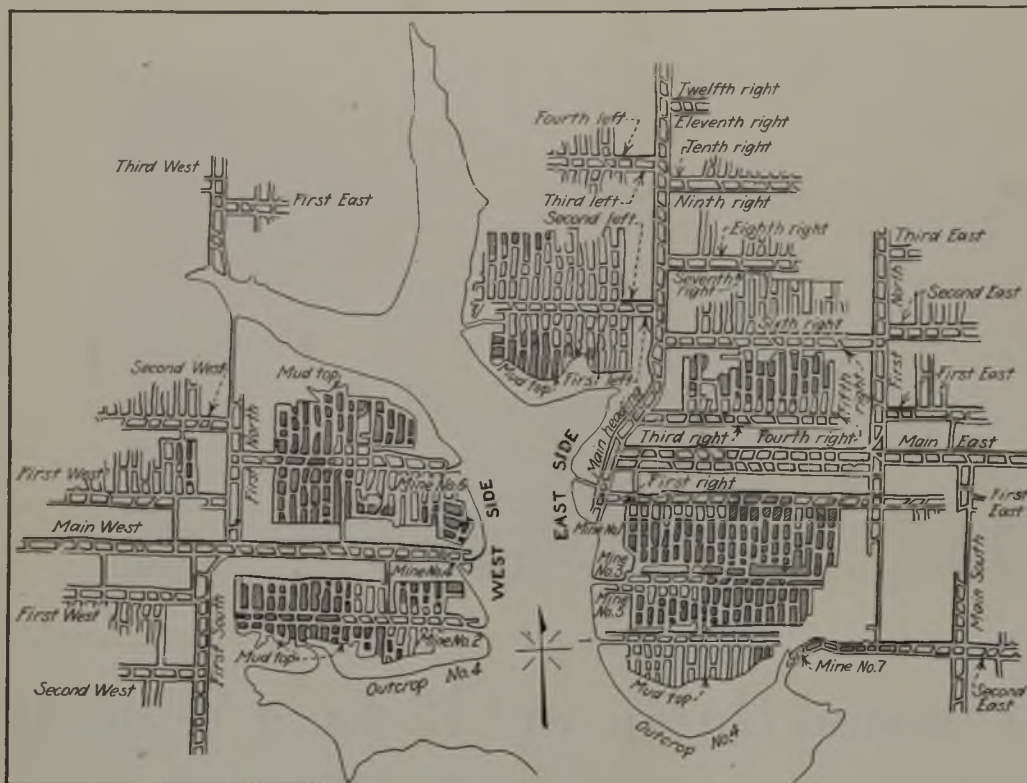


FIG. 1
**Map of Dudley Coal Co.
 Development**

In order to attain an output quickly drifts were driven into the bed at various points along the outcrop, the coal being hauled to the tippel over surface tramways skirting the hill. After a number of headings and rooms had been driven, however, the loads were assembled at partings underground and hauled out from two openings one on either side of "the hollow."

opening can be made to daylight. This shows the economy of building tight stoppings.

Entries are driven 15 ft. wide and the track placed close to one rib with a 3-ft. walkway along the other side. This enables employees to go in and through the mine without traveling on the track, except at cross entries.

Forty-pound steel is used on all main haulroads and 25-lb. rails in the rooms. All switch points both in entries and rooms are provided with switch stands. These are of the upright type and are easily operated. Though they hold the switch points rigidly in place when set, it is only necessary to throw the lever off center for the weight of the ball to carry it the rest of the way.

The use of the upright switch in mines has been much criticised. This is because a man is likely to trip over it while working or to have such difficulty in throwing it that when resting his weight on the handle he may be thrown by its decreased resistance in front of the locomotive.

At the Dudley mine plenty of clearance is maintained between the rib and the rail. Ample space thus is afforded for the snapper. As demonstrated by the manager, the trip rider can travel ahead of his trip and readily throw the switches from an upright position. With the ground throw type, on the other hand, he must first stoop down and lift the switch lever up, and then throw it down on the other side. In either case, should the switch stick or give way suddenly, he

FIG. 2
Room Face

Excellent roof conditions prevail in this mine, as may be judged from this picture. Note the band or parting of "jackrock" plainly visible in the coal at approximately the elevation of the hands of the man on the right. This is the only impurity found in this bed, and as it does not adhere to the coal, either above or below, it may be separated easily and gobbed. The upper bench of coal in this bed is quite uniform, variation in thickness being confined almost entirely to the bench below the parting.





Fig 3—Loads at No. 1 Driftmouth

Two things are noticeable in this picture—the blocky nature of the coal and the extreme length of the car-wheel hubs. The first is responsible for the large percentage of lump in the product shipped; the second affords a ready means of holding the car in the rotary dump when it is in the overturned position.

is likely to be thrown off his balance. Should this occur when he is in a forward-leaning position his head probably would be pushed across the rail in front of the car or locomotive, and should he slip or fall his whole body would be thrown directly in front of the trip. This very thing has occurred upon many occasions.

The No. 4, or Fireclay, bed yields an excellent all-purpose fuel. It is free-burning and practically clinkerless, low in sulphur, with a fusing point for its ash of 3,000 deg. F., or considerably above the maximum temperature attained in the average boiler furnace. Tests made with this coal in the metallurgical furnace have proved it to be clinkerless, the grate bars being left perfectly clean. It also has been proved by test to be an excellent gas and byproduct coal. A characteristic analysis of the bed is as in Table I.

Table I—Analysis No. 4 Bed, Dudley Mine

	Percentage
Moisture	1.64
Volatile matter	37.14
Fixed carbon	57.63
Ash	3.59
<hr/>	
Total	100.00
Sulphur	0.65
Thermal value	14,502 B.t.u.

With all the different markets available, this company has made elaborate preparations to size its product carefully and to free it from refuse.

VARIATIONS IN THICKNESS IN LOWER BENCH

The bed varies in thickness from 40 in. to 6 ft., having an average thickness of about 56 in. A 3- to 4-in. band of flint clay, locally known as “jackrock,” occurs from 6 to 24 in. from the bottom. It is characteristic of this measure in this vicinity to increase in thickness as the bottom dips, so that, though the bench above the parting is quite regularly about 42 in. thick, the thickness of the bench below the “jackrock” varies appreciably.

As this parting is too hard to be cut by a mining machine, the coal is mined below it and shot down in the usual manner. The upper bench is then loaded

off the parting, which does not adhere to the coal either above or below. The “jackrock” itself is then taken up, loaded out in the entries or gobbed in the rooms, leaving nothing but clean coal in the bottom bench.

The motive equipment in this mine consists of two 5-ton combination storage and trolley locomotives, and five 6-ton trolley and cable-reel machines. The mine cars are of the solid-box type equipped with roller bearings.

A headhouse has been built on each side of the branch, and the coal is discharged by a hand-controlled revolving dump. The car wheels have extended hubs which run under an angle bar on the dump and are thus held firmly in place. When the dump is empty the first car is run into it, and the entire device is turned off center by means of a large hand wheel. The dump then operates, the car remaining in an overturned position, where it is held in place by the angle bars.

CAR DISCHARGED ON REVOLVING TWIN DUMP

The opposite side of the dump is equipped with a similar arrangement of track and angle bars, and a car run into it is dumped in a similar manner. The dump moves through an angle of 180 deg., the weight of the loaded car bringing the empty to its original upright position. It is bumped off the dump by another loaded car, and the process is continued until an entire trip has been discharged, leaving an empty car hanging on the under side of the dump for the first car of the next trip to right. It requires but small effort on the part of the dumper to throw the first car over, and as there is but little machinery connected with this equipment, it has given splendid satisfaction ever since its installation.

From a small bin under the dump the coal is conveyed through an inclined steel tube 36 in. in diameter and 80 ft. long to a plate conveyer and thence to the shaker screens. A similar equipment is placed on the opposite hillside, and the coal is brought to a common point by the two conveyors, which together span the narrow valley.

On the east side of the branch a storage bin of about 300 tons capacity has recently been installed, being built over and around the steel tube. This is filled by means of a traveling feeder and loading boom so arranged as to allow the coal to go into the bin or



Fig. 4—One of the Horizontal Conveyors

These conveyors, of which there are two, furnish an excellent opportunity for picking extraneous material from the coal. Naturally some of the “jackrock” parting escapes the gob underground and finds its way to the surface.

FIG. 5

The Tipple

Coal is dumped into bins below the headhouses upon either side of the valley and slides gently down the tubular steel chutes to the horizontal conveyors, which transport it to the shaking screens in the tipple proper. Ordinarily three sizes are made, the two larger grades being lowered into the railroad cars by means of loading booms. Run of mine also may be shipped.



the tube at will. The rear end of this loading boom has no vertical movement and forms a picking table.

In operation each carload of coal is run over this picking table before another one is dumped and a man stationed there gives the coal its first cleaning. Though, of course, all the refuse cannot be removed at this point, yet this man can check up on each car that is dumped, and the management is able to tell exactly which men are loading dirty coal and make a fair estimate of the quantity of dirt loaded. A noticeable change for the better has been observed.

Again, the coal is let down to the bin with only a slight drop and slides down the sheet-iron bottom with small momentum. As a result there is no crushing or jamming of the coal at the bottom as is frequently the case when coal is dumped into a bin from a mine car direct. The bin can be loaded evenly from top to bottom and the coal slides freely throughout its entire length when it is being emptied from the bottom. As a result the product is transferred from the mine car to the shakers with little breakage. As soon as the business in sight demands it, similar equipment will be placed on the other side of the valley.

From the shaking screens the lump and egg sizes are delivered to railroad cars by loading booms. Four men are placed at each of these conveyors so that at this point the coal gets another picking. In addition two men are kept on each railroad car to remove whatever refuse has been overlooked by the others. An exceptionally fine product is the result.

By using different screen plates 2-, 4- and 6-in. lump, 2-in. and 2x4-in. egg, as well as screenings and mine run can be furnished. The egg coal is all rescreened before reaching the picking tables. Railroad cars are handled under the tipple by means of counterbalanced car retarders.

Power is furnished by the Kentucky & West Virginia Power Co. from its plant at Lothair, Ky. Current is transmitted at 3,300 volts to the local substation, where it is converted to 300-volt direct current by a 150-kw. Ridgway motor-generator set. This substation is built of cut stone and presents an extremely neat appearance, as do all the other buildings of this company.

The miners' houses are kept well painted and clean. All are supplied with running water and most of them have bathrooms. Consequently the dirt and disorder that make so many mining camps depressing are here conspicuous only by their absence.

Bulletin Board Conspicuous Feature at Donk Bros. Coal Co.

A MINE property is not usually considered a picturesque place. The nature of its product and the equipment employed does not always present a pleasing appearance. Nevertheless, one is often pleasantly surprised to find a mine yard filled with well-designed buildings, and the miner provided with every convenience found in modern manufacturing plants.

The illustration shows the design of a bulletin board at the Thermal Mine No. 4 of Donk Bros. Coal Co.,



Bulletin Board for Mine Yard

This board attracts the workman to it because it shelters him from the sun, rain, or wind. Notices are always kept clean and dry so that they can be easily read.

near Edwardsville, Ill. The structure is permanently located near the mine shaft, being erected on a concrete platform. Shelter for the board and the workmen while reading the bulletins is provided. During the night or on dark afternoons the whole structure is lighted by electric lamps shown under the eaves.

The shelter and lights around this board attract miners to it and impel them read the notices which have been posted.

Repairing a Broken Gear Tooth by Means of Studs

Several Ways Available for Repairing Broken Teeth—
Studding Is the Simplest—An Accurate Template Is
Necessary to Which Inserted Studs Must Be Fitted

BY G. H. RADEBAUGH

University of Illinois, Urbana, Ill.

GEARS of cast or malleable iron are often damaged by the imperfect meshing of their teeth. To prevent unnecessary wear all gears should mesh closely. This means that their working centers must be definitely established and accurately maintained. Teeth in gear wheels are broken from overloading of the drive, from the dropping of tools between the teeth or from the wedging of other objects or substances between them.

Broken gear teeth can be repaired by any one of several methods: (1) If a tooth broken from the gear is in one piece it can be welded back into place by means of the acetylene torch. Such a job can be done most conveniently in a commercial welding shop. (2) This same type of break can be brazed in the mine forge. (3) A new tooth can be made and dovetailed into the gear. This type of job also can be done most effectively in a commercial repair shop. (4) A new tooth

When gear teeth are worn appreciably and some of them are broken some consideration should be given to the problem whether it would be cheaper and more expedient to obtain a new gear than to patch up the old one. If the teeth are not worn too much the old gear can be used as a pattern and a new gear cast from it. In preparing an old gear for use as a pattern it should be thoroughly washed in gasoline (Fig. 3) which removes all grease. The worn teeth can then be built out to the proper contour by using beeswax. Teeth that are missing, as in the gear here shown, can be shaped from wood and correctly positioned on the gear. The proper shape of the teeth can be gaged from another gear of the same pitch. The finished pattern can then be taken to a foundry and a casting made from it.

If it is decided to make the repair in the mine shop by inserting studs, the uneven surface left by the



Fig. 1—Inspection of Wheel

Anything that will break one gear tooth may break or crack others. When the damaged wheel has been removed from its shaft it should be carefully inspected and the entire extent of the damage done should be ascertained.

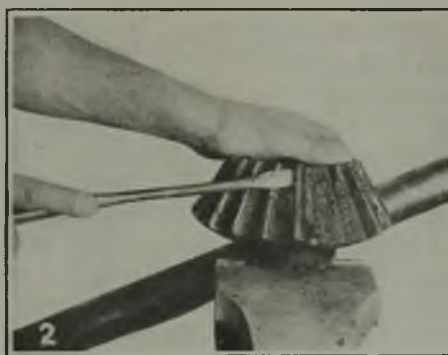


Fig. 2—Scraping off Adhering Dirt

Any exposed lubricated surface is a dust catcher. With a gear this material packs tightly between the teeth. A screw driver is an effective instrument for its removal, and it should be scraped away before repairs are begun.



Fig. 3—Removing all Grease

Before attempting to use an old gear as a pattern from which to cast a new one or before making other repairs, all grease should be removed from it. This may be done by washing the gear in gasoline which readily "cuts" grease.

may be thermit cast to the wheel. (5) A new tooth may be built up by acetylene or electric welding or (6) studs may be substituted for the broken tooth. This latter is the simplest method of repairing broken teeth in a spur or bevel gear. At best, however, it is only a temporary repair, but it can be made in the mine shop. The only equipment necessary is a drill and a few hand tools.

After the gear has been removed from its shaft a careful inspection (Fig. 1) should be made to see if other teeth have been broken or cracked. In the job illustrated it was found that grease and dirt had accumulated between the teeth and had become solidly packed there. This caused the gear to be crowded away from its proper working position. Power was then transmitted from a point near the tips of the teeth. This in all probability, was the cause of the teeth breaking. Packed dirt and scale should be removed. The best method is to loosen it up with a screw driver or some similar instrument, as shown in Fig. 2. After this has been done a much more thorough inspection can be made of the remaining teeth.

broken tooth must be removed. This can be done most expeditiously with a flat chisel and a square file as shown in Fig. 4. To assist in maintaining the location of the tooth the break should not be filed down too far; the outline of the tooth base should be left. Notice in Fig. 5 how prominently this tooth location appears. In succeeding operations the layout is gaged by this tooth outline. In determining what size of stud to use, the width of the tooth at its widest place should be measured. The stud should be of a diameter equal to this width or a little larger.

To obtain a good tooth layout, the surface may be chalked and a line drawn down the center of the tooth base. The dividers are then set to the required distance and the stud centers located. To provide for accurate drilling, the centers of the stud holes should be center-punched on the layout lines, as shown in Fig. 6. It always pays to take enough time to lay out the tooth correctly. If the hole centers are correctly located and properly drilled, the shaping of the studs is much easier than if the holes are drilled more or less at random. To patch a bevel gear is a much more difficult

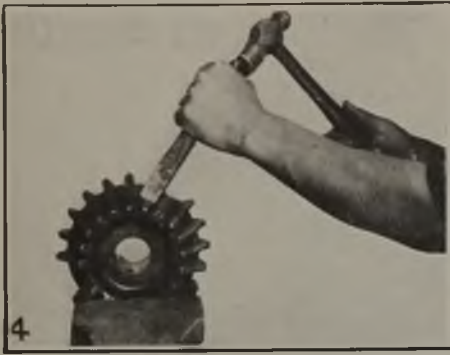


Fig. 4—Chipping the Tooth Base

The uneven surface left by the tooth break must be removed before repair operations proper can be started. This work is most readily performed by means of the flat chisel and square file.

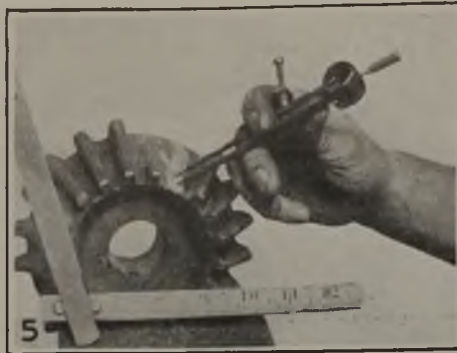


Fig. 5—Laying out Stud Holes

After the old tooth base has been smoothed off it should be chalked so that the stud-hole layout may be plainly marked. Attention to small details will often make subsequent operations easy.

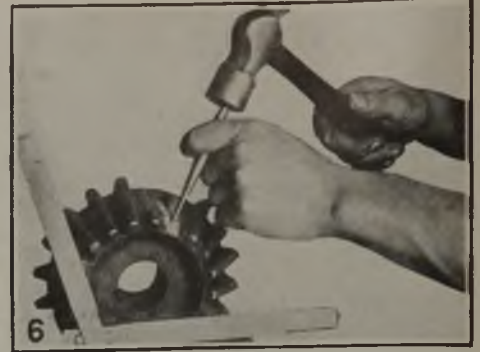


Fig. 6—Center-Punching the Holes

In order to obtain a good finished job it is necessary that the stud holes shall be drilled accurately and in line. A careful layout and deep accurate center punching of holes are essential.

job than to make a similar repair of a spur gear. In the patching of either type of gear, however, it is necessary to maintain the proper location of the teeth.

This can be done most accurately by using a template made from cardboard or tin. A good template can be cut from a piece of extra-thin tin that can be sheared easily with ordinary cloth scissors. This kind of tin can be found in the lids of paint cans. To obtain an accurate layout of the tooth shape, the template should be made to cover or embrace three or four teeth. In laying it out as shown in Fig. 7 the outline of the teeth can be transferred to the tin by using a scriber or scratch awl. The template is cut to the required layout as shown in Fig. 8, care being exercised in following closely the layout lines previously made with the scriber.

Lines can be followed much more easily with the scissors than with tinner's snips. This is the reason for using the extra thin tin, as it would not be permissible to cut tin of usual thickness except with the snips. The template may be checked on the good teeth, as seen in Fig. 9. When putting in two sets of studs, as was necessary in the job illustrated, they must not only be shaped properly but should have the correct pitch, that is, be set the proper distance from the center of one tooth to the center of the next. The template, then, must fit not only the shape of one tooth at a time, but must fit on all the teeth. If it does not fit accurately, the shape of its contour can be corrected by filing or by trimming with the scissors.

After the template is completed, the holes in the gear are drilled, their location having been previously laid out. In selecting the drill a size should be chosen that will permit the tap to cut a full thread. In threading holes of this kind it is advisable to use the complete set of machinist's hand taps. These are made in sets

of three, each set consisting of a taper tap, a plug, and a bottoming tap.

In Fig. 10 the taper tap is shown in the hole starting to cut the thread. This tap is tapered for about half its length. The next tap to use would be the plug tap. It is used to thread holes through which it is impossible to run the taper tap. It is tapered for a length of about four threads. The bottoming tap, which follows the plug tap, has a full thread to its point. It is used in threading a blind hole to its bottom. All of these taps are of the same diameter and each will cut a full thread. It is commonly supposed by many that they are of different diameters.

BREAKING TAPS MAY CAUSE MUCH TROUBLE

Tapping a hole, especially one of small size, is a somewhat delicate operation, as there is always danger of breaking the tap. If used correctly taps should never break in service. In use the pull on the wrench should be equal on both ends. A tap should never be turned with one end of a wrench, as the pull is unequal, and an excess stress will be placed upon the tap, which may cause it to break. This is one reason why the use of a monkey wrench for tapping is never recommended. A good tap wrench will more than pay for itself in a short time.

Breaking of taps can be reduced greatly by proper lubrication. For tapping steel or iron a mixture of 10 per cent graphite and 90 per cent tallow gives good results. Machine oil is a less desirable tapping lubricant. For cast iron, lard oil may be used; however, any oil has the disadvantage of causing the chips to stick to the tap flutes. This may cause the tap to bind and tear the threads. Kerosene is often used when tapping cast iron.

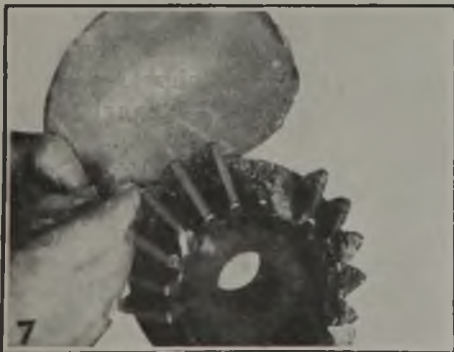


Fig. 7—Scribing a Template

A piece of soft tin makes the best template. This is laid against the ends of uninjured teeth and their outlines or contours carefully scratched upon it by means of a scriber. The template should embrace several teeth

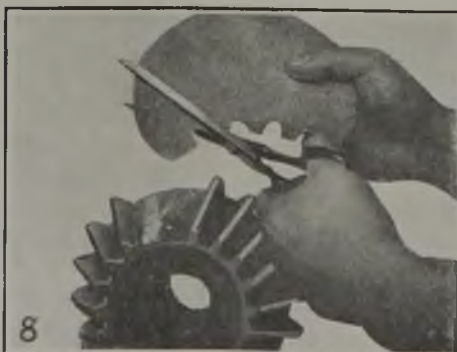


Fig. 8—Cutting the Template

Ordinary paper or cloth shears or scissors should be used in following the scribed lines upon the template. They will perform more rapid and accurate work than will common tin snips, but the tin used should be light.



Fig. 9—Trying the Template

In order to be of value a template must be accurate. After it has been cut out with the shears it should be tested on the gear teeth and any inaccuracies found should be corrected either with the scissors or with a file.

Removing a tap broken off in a hole is a job requiring much skill. In Fig. 11 is shown one of the best methods for removing broken taps. It often happens, however, that this scheme will not loosen the tap, and other methods must be employed. When trying to remove a broken tap with two punches as shown, most failures result from too strong and unequal blows from the hammers. It should be remembered that extremely light blows delivered simultaneously and with equal force generally will remove the stub; heavy unequal blows delivered separately accomplish little.

After the thread is well started, the die can be turned over, as shown in Fig. 12, and the threads cut to the desired length. This gives a full thread to a shoulder which, when screwed into the hole, will fit snugly the entire length of the thread. Lard oil should be used as a lubricant on a die when cutting steel. To prevent chipping the threads, the die may be cleaned periodically by turning it in a counter-clockwise direction through two or three degrees. This causes the chips to break and fall from the die. When making a stud from a rod it is a good scheme to saw the stock

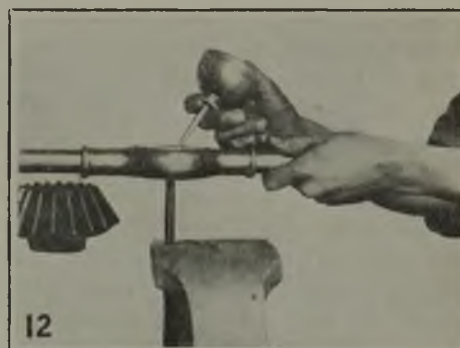
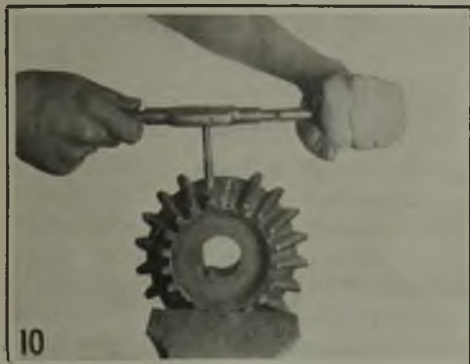


Fig. 10—Tapping the Stud Holes
If possible a tap wrench should be used, to either end of which an equal pressure should be applied. Using a monkey wrench or other means of turning a tap is liable to cause trouble.

Fig. 11—Removing a Broken Tap
Taps should be amply strong, but they sometimes break. In most cases they can be backed out by light simultaneous blows delivered to punches placed on opposite sides of the broken portion.

Fig. 12—Threading a Stud
Though commercial cap screws may be used, repair studs generally should be made from rod stock. After the thread has been well started the die should be reversed, cutting the thread to a shoulder.

Another method sometimes used to remove broken taps is that of annealing the tap stub and then drilling it out. This method involves heating the entire job and consumes much time. Dilute nitric acid, in the proportion of about one part acid to five parts of water, injected into the hole loosens the tap so it usually can be removed readily. The acid mixture, however, should be thoroughly washed out of the hole, as otherwise it will continue to eat the threads. Before re-entering a new tap, one should be absolutely sure that no fragments of the broken tap remain in the hole.

half in two, making the stud a little longer than required. This extra stock is left for finishing.

The ordinary method of cutting off metal is to use a hack saw. The blade is held in a frame deep enough to allow the severing of any ordinary thickness of metal. For most work the hand frame is used, the workman operating the saw with a back-and-forward stroke while the work is held in the vise or in some other convenient position, as shown in Fig. 13.

The hard service required of hack saws demands that the material of the blades be of the best and that the number, shape and set of the teeth be carefully con-

When the holes have been tapped, they are ready to

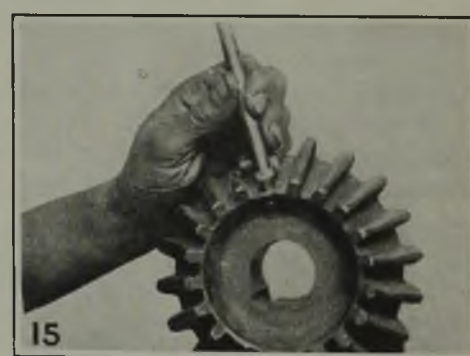
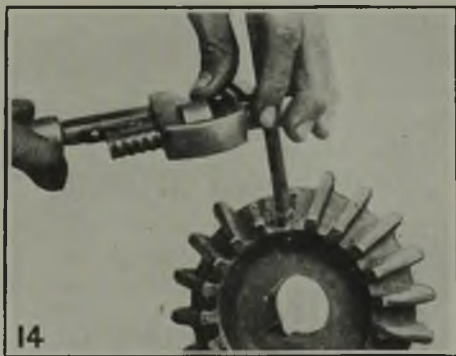
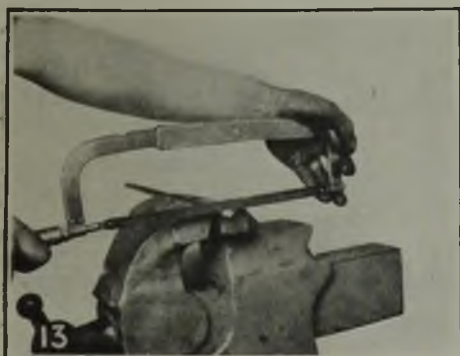


Fig. 13—Cutting Stud to Length
After the stud is threaded the rod may be placed in the vise and sawed partly in two. It should be cut slightly longer than needed for the finished tooth, the surplus length being removed by a file.

Fig. 14—Screwing in the Stud
A stillson or trimo wrench may be used on the partly sawn-off rod to force the threaded end home. When screwed to place it is absolutely necessary that the stud be tight and solid in the tapped hole.

Fig. 15—Breaking off the Rod
When the stud has been screwed home the rod may be broken from it by bending back and forth. It was to facilitate this severance from the stud that the rod was cut partly in two after it was threaded.

receive the studs. Standard cap screws can be used for these studs but are more expensive than studs made from a piece of round stock. The best way to make a stud so that it will fit into the hole already tapped, firmly and without play, is to cut the thread with the die matching the tap used. The thread should be started on the end of the rod, which previously has been rounded off on the grinding wheel or with a file, with the stock and die in the usual position, that is, with the taper down.

sidered. It is obvious that the best work cannot be done on all kinds of metals with the same saw. Some are adapted to cutting hard, brittle metals, whereas others are suited to soft ones. It is also apparent that some saws work most advantageously on thin sheets and others on heavy sections. The blade should be well stressed in the frame with the rake or the teeth forward. Downward pressure should be exerted on the forward stroke so that the blade will "take hold." A lighter pressure is applied on the return stroke. A

blade should never be bent sidewise and the saw should be operated at about fifty strokes per minute. By keeping the saw as nearly as possible in the plane of the cut and thus avoiding wrenching it, the number of blade breakages will be reduced.

After the saw cut has been carried half way through the rod the threaded end is screwed into position, as shown in Fig. 14. The rod is then broken from the stud, as shown in Fig. 15. Whenever possible, that is, if the stud is screwed through the wheel rim, the end should be riveted over. This makes a much stronger job.

The studs, however, can be rusted in place. This can be done by applying to each stud before it is started in the hole a rust cement. By using such a cement galvanic action sets in quickly and the iron swells, through the formation of iron oxide, thus securely fastening the stud and gear together. The most common of rust cements is made with 2 parts of sal ammoniac, 1 part sulphur, and 60 parts iron dust or filings. These ingredients are mixed and water containing $\frac{1}{2}$ part vinegar is added until a paste is formed.

The stud must screw into the tapped hole "good and tight." A loose fit will not do at all; if the stud fits loosely the die should be adjusted to cut a larger thread. Studs are screwed into all the holes and are then filed to the shape and position called for by the template, as shown in Fig. 16. The best file to use on a job of this kind is the half round, bastard cut. It is much easier to shape the studs with the half-round file than with other shapes, as, with it, it is possible to work on their sides as well as on their tops.



Fig. 16—Filing to Template

After all studs have been inserted they are filed to the proper contour. Frequent use should be made of the template during this operation to make sure that not only the contour but the pitch is correct.



Fig. 17—The Finished Job

When all studs have been filed to the correct contour and pitch and the template fits accurately, the job of repair is finished. The gear may now be returned to its shaft and be put again into service.

If the job checks with the template, it is ready to be put back in service. Attention is called to the finished job as shown in Fig. 17. In this case seven studs were required to make the patch. After the gear is re-mounted on the shaft and put in mesh with its running mate, the drive should be turned over by hand and the job checked to be absolutely sure the studs mesh properly with the gear. If they bind, the high spots will be clearly defined by friction marks. These should be filed off before power is applied.

Such a repair as has been described must of course be considered as being of a temporary nature only. In coal mining, however, where the attainment of output in large degree determines the cost per ton, and delays are consequently expensive, such a repair as has been described may be the means of keeping some important piece of machinery going until a new pinion or gear can be procured. Under such circumstances even the crudest of repairs, provided they keep the mine in operation, may be fully justified.

Cinderella Miners Build Swimming Pool

CO-OPERATION between employer and employee has rarely been better exhibited than by the Sycamore Coal Co. and its employees during the past three weeks of July. Early in July the employees of the Sycamore Coal Co., at Cinderella, asked the management for a swimming pool. They offered to furnish all labor necessary for the completion of the job if the company would furnish the necessary materials. This the man-



Dedication of Swimming Pool at Cinderella

After everyone had taken a swim the kiddies were given their fill of lemonade and ice cream and still later a picnic supper was served by the ladies to all those present.

agement agreed to do on July 8 and on July 9 actual construction started.

About seventy men and boys turned out to work on the pool, and hammers and saws were kept busy during the evenings and on idle days until the forms were completed.

On July 22 the concrete for the walls was poured and

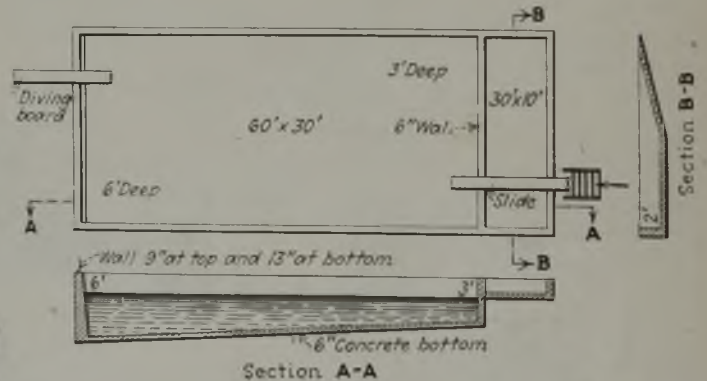


Diagram of Pool Showing Top and Slide Elevations

on the nights of July 25 and 26, the concrete for the bottom was placed, the actual construction work being finished just seventeen days after work was begun, quite an achievement when one takes into consideration that the men worked only in the evenings and on idle days.

The pool is built throughout of reinforced concrete and measures 32 x 72 ft. The main compartment is 30 x 60 ft., being 6 ft. deep at one end and gradually sloping up to 3 ft. at the other end. A novel feature of the pool is the separate compartment for the little tots. This part of the pool measures 10 x 30 ft. The deepest point in this compartment is 2 ft. and it slopes to a feather edge. This makes it possible for the little children to paddle around in the water just as well as the grown ups. The pool was formally opened on Aug. 2, before several hundred people



Beech Bottom Slate Dump

Aerial Tramway Solves Rock Disposal Problem

Tramway 3,200 Ft. Long—Dumping Point 200 Ft. Higher than Coal Bed—Little Power Required for Operation—Only Four Men Needed to Dispose of 400 Tons of Slate per Shift

BY ALPHONSE F. BROSKY
Assistant Editor, *Coal Age*
Pittsburgh, Pa.

OF ALL THE operations incident to bituminous coal mining, least effort, as a rule, is expended in the attempt to effect economies in the handling and disposal of mine rock on the surface by the use of labor-saving machinery. Were operators to give more consideration to better ways and means for transporting refuse from the mine mouth or tippie to the dumping ground, and stowing it there they doubtless could save at least a few cents on every ton of coal produced. At those operations where 100 tons or more of rock is handled above ground every working day no system that does not employ labor-saving machinery should be considered.

Mine cars filled with rock can be dumped into bins in or near the tippie. From thence this refuse can be transported by electrically propelled conveyances that automatically discharge their contents at some predetermined point. There is no excuse for tramping by man or mule power along any portion of the distance between the points of loading and discharge.

Hand-shoveling and the utilization of hand-operated cranes at the dump are expensive methods of removing rock from mine cars. In short, means in use for performing this work ten to 50 years ago should not be countenanced today. Aerial tramways are well-suited to this purpose whether the ground over which they operate is hilly or level. Typical layouts of such tramways installed at coal-mine plants are shown in Figs. 1, 2 and 3.

About four years ago, when the Windsor Power House Coal Co., a subsidiary of the West Penn Power Co. and the American Gas & Electric Co., took over and rebuilt the plant known as the Beech Bottom

mine, near Wheeling, W. Va., it was faced with the problem of disposing of large quantities of mine refuse. The roof in this operation which works the Pittsburgh No. 8 bed, is unsound; consequently much of it must be taken down, close timbering is required and cleaning up falls is part of the day's work. Much of this roof rock particularly that removed from entries, must be taken to the outside. Eleven tons of slate must be hauled to the surface for every 100 tons of coal mined. As this operation produces 3,300 to 3,500 tons of coal per day, an arrangement was sought that could dispose of 300 to 400 tons of rock per shift.

SLATE DUMP SOME DISTANCE FROM TIPPLE

The ground best-suited for use as a slate dump lies due south of the tippie, in the form of a wide valley sloping westward toward the Ohio River. The hills flanking this depression upon either side rise to an elevation of about 200 ft. above the coal bed. This topography favored the adoption of an air route to the dumping point, and accordingly an aerial tramway was selected for the disposal of mine refuse. A profile of the ground over which this line extends is shown in Fig. 1. The ground plan of the tramway also appears in this figure.

Prior to the installation of the aerial tramway, the rock was hauled in mine cars to the brink of the dumping ground and there discharged into side-dump, V-body slate cars. These were lowered by gravity to a dump in a ravine and pulled back by a hoist. This system required three shifts of five men each. The present method of slate disposal requires the services of only four men on one shift. One of these inspects the ropes and attends to their lubrication as well as that of other parts of the tramway. He also makes any minor repairs that may be needed. The other three men are employed in the loading terminal, receiv-

NOTE—In the headpiece is shown the dumping ground for the slate and rock removed from the Beech Bottom mine. The tram buckets pass around the tail terminal sheave located in the tower on the extreme right. In making this turn they are not detached from the traction rope. The tippie lies beyond the hill to the left.

ing, loading and dispatching the buckets. This saving in labor is in itself ample justification for the choice of the aerial tramway.

Aside from the labor required at the loading station, (which in reality is part of the tipple) the system is automatic. Chutes and gates under a two-car revolving dump are designed so that rock from either or

terminal. To negotiate successfully this change in horizontal direction without aid from an attendant, an angle station was built. This was arranged to give a change of 11 deg. 26 min. in a vertical plane. Because the greater angle is in a vertical direction the downward pull on the rope keeps the buckets from being derailed at this station. Rollers are set at the proper

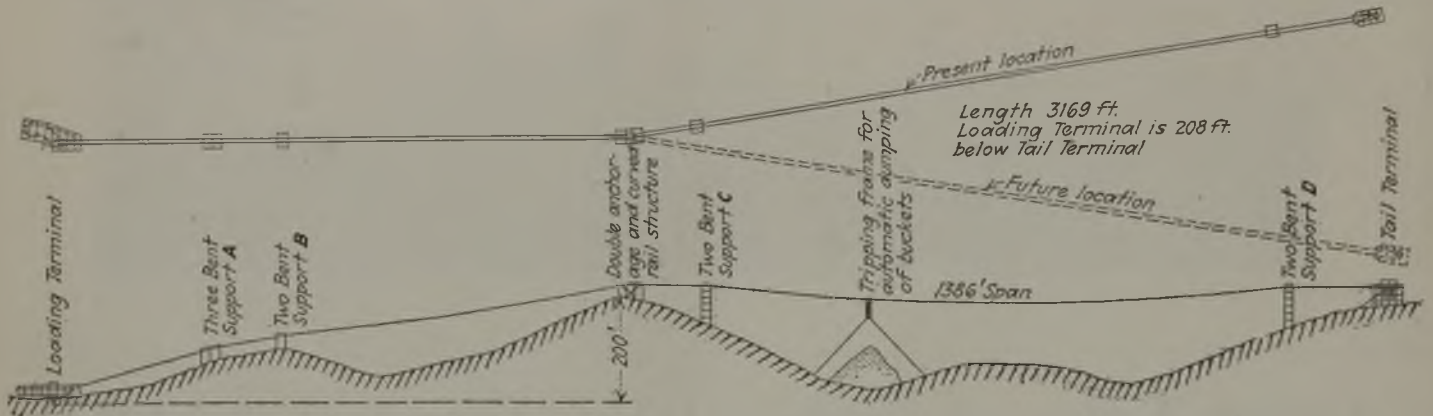


Fig. 1—Plan and Profile of the Beech Bottom Aerial Tramway Showing Present Dumping Point

Not only is the point of bucket discharge movable along the tramway, but as the valley is filled with mine refuse the course of the cableway may be changed as indicated. The capacity of such a dumping arrangement is thus large.

both cars can be bypassed into a rock bin. Adjoining this bin is the loading terminal of the aerial tramway. Buckets, running on track cable suspended from towers, are attached at intervals to an endless traction rope which pulls them from the loading terminal to the dumping point (where they are discharged automatically), thence to and around a tail terminal and back again to the loading point. This tramway is of

angle and elevation at this point to guide the traction rope around the curve in the absence of buckets. From the angle station the buckets travel out over a 1,400-ft. span of cable where the mine refuse now is being dumped.

In addition to the angle station four towers, three of two-bent and one of three-bent construction have been built, as shown in Fig. 1. The three-bent tower A is located about 400 ft. from the loading terminal whereas those consisting of two bents namely B, C and D are respectively 570, 1,600 and 3,000 ft. from the loading point. These structures are all of steel and supported on concrete piers carried down to a solid footing.

The main members of the sub-structures consist of heavy angles securely tied and braced with smaller ones. Corresponding members of the head-structures are fabricated from channels similarly braced. The beams on which the track-cable saddles rest are channels bolted to a supporting column. These uprights extend to the horizontal members of the sub-structure. Each tower is provided with a conveniently located ladder, used by the tramway crew when oiling traction-rope rollers, inspecting saddles or making repairs.

A $\frac{5}{8}$ in., 6x7 crucible-steel wire, Lang-lay traction rope is used. The track cables are of the locked-coil type. They have a diameter of $1\frac{3}{8}$ in. on the loaded

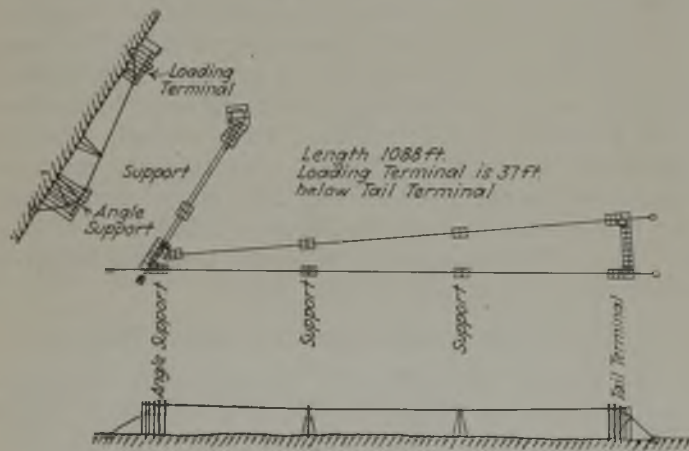


Fig. 2—Typical Level-Ground Aerial Tramway

It is easier to build up a rock bank by dropping material from buckets suspended from a cable above it than to grade up tracks from the ground level.

the Trenton-Bleichert type and was built by the American Steel & Wire Co.

This installation is designed for an ultimate capacity of 80 tons per hour. To obtain this capacity the buckets are spaced 230-ft. apart or at a time interval of $40\frac{1}{2}$ sec. It is now, however, transporting 40 tons hourly, the intervals of time and distance between buckets being twice those given for the ultimate capacity. A 30-hp. slip-ring induction motor is required to operate the tramway at a rope speed of 340 ft. per minute when carrying 80 tons per hour. At half-capacity, however a 15-hp. motor is sufficiently large.

This tramway is 3,196 ft. long horizontally and rises 207 ft. to the tail terminal. It is unusual in that a change of 8 deg. 21 min. is made in the alignment at a point approximately 1,400 ft. from the loading

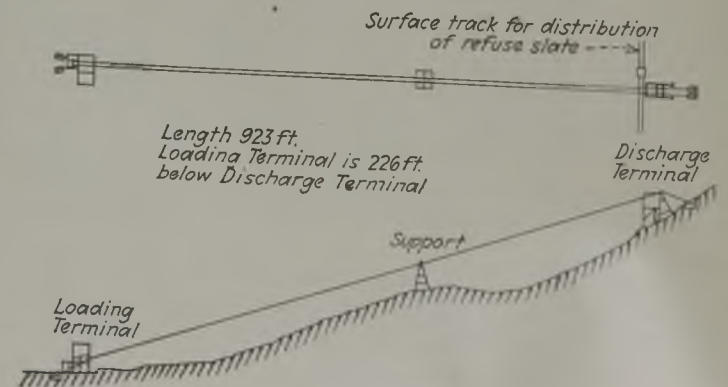


Fig. 3—Aerial Tramway Assists Electric Larry

At Jenkins, Ky., ropes and buckets are utilized to attain sufficient height on a hillside so that mine refuse may be wasted by means of an electric larry.

side and $\frac{1}{8}$ in. on the return side. The main advantages of this type of track cable for use on tramways are: It cannot unwind and should an outside wire break it cannot project to derail a bucket; its smooth exterior surface does not groove the carriage wheels as do other types of rope; a short section can be repaired by coupling in a new piece. This is a replacement that cannot be accomplished with ordinary rope.

The track cables are suspended from the towers by means of rocking saddles, each consisting of a cast-iron base supported by a beam. Upon this base the saddle proper is set, the design being such that the saddle can rock more or less. The saddle proper is a steel casting that provides a long easy curve for the cable to rest in, accommodating itself easily to the changing angle of the rope as the load approaches or recedes from the supporting tower.

The track cables are lubricated by an oiling machine that travels on the ropes in the same fashion as the buckets. Oil in a tank under a pressure of about 35 lb. per square inch is forced through a piece of flexible steel hose to a valve located between the two carriage

At the tail terminal the traction cable passes around a 12-ft. sheave built up of structural shapes. The rim of this sheave is channeled to allow the grips on the buckets to seat themselves properly without being detached as they move around.

In order to keep the traction rope at a tension that will prevent the rope from slipping on the grip sheave, as well as to compensate readily for any stretching of the cable a movable sheave is provided. This is supported in a frame to which a block of concrete is attached by means of a heavy steel tie-rod. Under this concrete block, cribbing is placed so that the position of the sheave may be varied somewhat up or down. With this arrangement the tension on the traction rope is fixed at all times by the position of the counterweight.

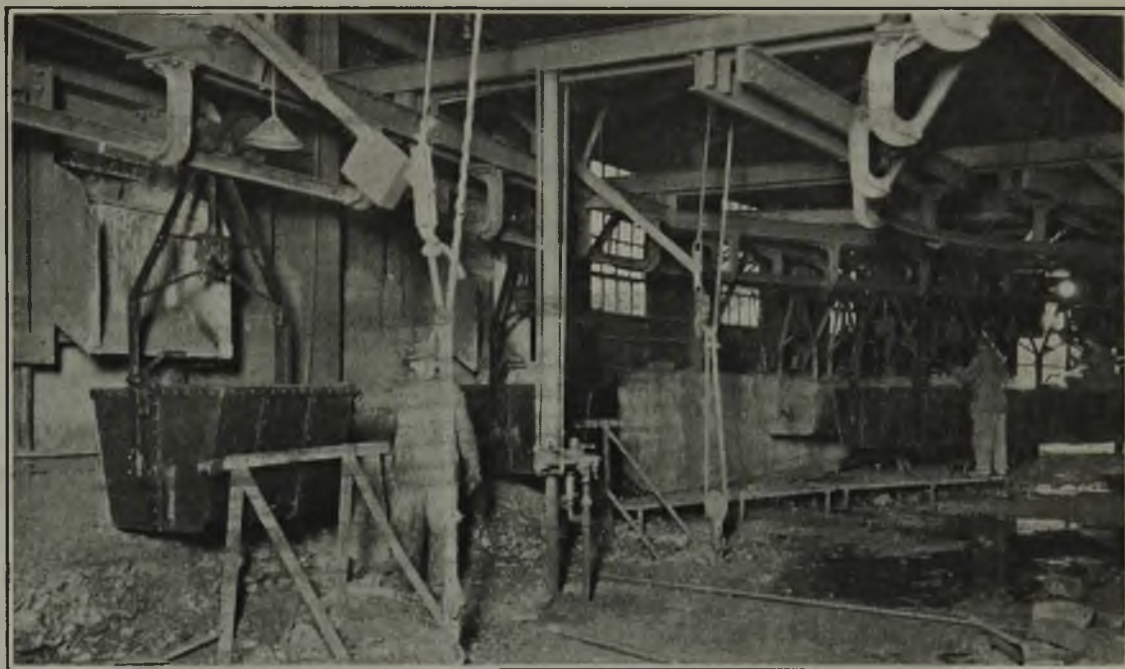
STATIONARY DEVICE ATTACHES BUCKET TO CABLE

Standard self-dumping 20-cu.ft. buckets are used on this tramway. The trunnions are placed below and slightly to one side of the center of gravity, causing the bucket to overturn upon release of a latch and to

FIG. 4

Loading Terminal

This is the only place where the buckets are detached from the traction rope. While passing through this station the buckets are pushed by hand, moving always in the same direction and traversing roughly a half circle from the ungridding to the gripping-on point. Three men can easily load and dispatch 400 tons of rock per shift. The buckets hold 20 cu.ft. of material.



wheels. As the oiler travels along the cable a knocker on the carriage wheel comes in contact with an arm which opens the valve. At each such opening a certain quantity of oil is squirted onto the track cable.

These oil ejections form practically a continuous stream when the machine moves at full rope speed, yet the flow ceases when the oiler comes to rest. The traction rope is kept well-lubricated at all times by running over a small vertical sheave that is partly immersed in a tank of oil. This sheave is located in the loading terminal.

Motion is transmitted to the traction rope by a 6-ft. drive sheave of the gripping type. This sheave is fitted with seventy-two pairs of cast-steel jaws that engage the traction rope making it impossible for it to slip. These jaws are of such shape that the rope is gripped without being damaged. The sheave is mounted on a vertical shaft fitted with suitable bearings and is driven by a train of bevel, pinion and spur gears through a countershaft and a silent chain from a motor. A 40-in. brake wheel is mounted on the pinion shaft.

remain in the capsized position until the loading terminal has been reached. Here it is righted by the crew in attendance at that point.

The hangers, on which the grips are mounted, are fabricated of flat steel. At the bottom of the hanger arms, the steel-casting trunnions are attached so that the buckets swivel or turn upon them. The carriages are equipped with steel-casting wheels fitted with bronze bushings which turn on mild-steel pins. These pins are provided with grease cups, and lock washers keep the nuts from coming off.

The grips are of a type that open on the top. They are designed to hold tightly against a horizontal pull of 1,600 to 1,800 lb. The main, or body, casting is made of iron, and the links, operating lever and movable jaw are steel castings. The movable jaw is equipped with a $\frac{1}{8}$ -in. flat steel liner spring and a back liner of tool steel mounted in the body casting. When necessary, these liners may be replaced easily.

The traction rope grips are applied by an operator who pushes the bucket past a device known as an attacher. This is a steel casting against which the roller of an

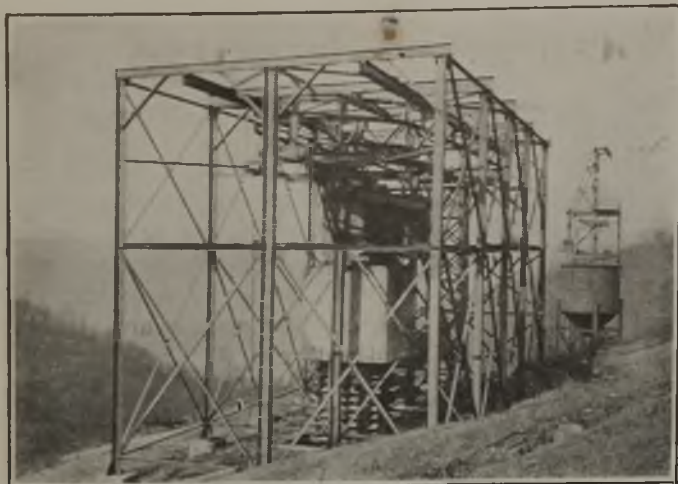


Fig. 5—Compound-Angle Station on Top of Hill

In passing this tower the direction of travel of the buckets is changed in two planes. The vertical angle is made the greater so that the traction rope cannot pull the bucket wheels off the track cable. Rollers guide the traction rope through this station.

operating lever bears. Because this casting is spirally shaped, it closes the grip by applying pressure to the operating lever that rides over it. The traction rope where it passes the attacher, being on a slope, is forced against the grip causing it to rotate in its trunnions and the rope to be seated properly before being gripped. The detacher is a somewhat similar device except that it moves the operating lever in the opposite direction, thus opening the grip.

A signal gong is provided to notify the operator when to attach the buckets in order to maintain an equal spacing on the line. This device consists of a base plate on which suitable gears, a knocker arm, cap, etc., are mounted. It is actuated from the main shaft of the grip sheave, and each sounding of the gong is the signal that a bucket is to be gripped on and sent out on the line. The buckets are discharged by a movable tripping frame mounted on the track cable. The latches that hold the buckets in an upright position are released by tripping arms and the buckets revolve on their trunnions emptying their contents into the ravine below, the buckets, of course, continuing to travel meanwhile at a uniform speed of 340 ft. per min. They pass around the 12-ft. sheave at the tail terminal and return to the loading point, where they are detached from the traction rope and pushed to the loading chutes. After being

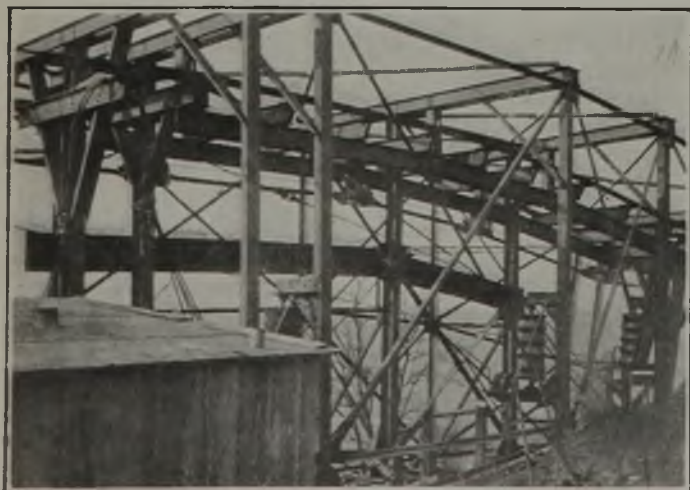


Fig. 6—Tail Terminal and Domestic-Storage Bin

Tension on the traction rope is regulated by raising or lowering the concrete counterweight block, and inserting or removing crib timbers below it. The tramway buckets are utilized for transferring domestic coal from the tippie to the cylindrical bin in the background. This supplies the company's town nearby.

loaded they are pushed to the attacher which closes the grips and another trip is begun. From the foregoing it will be noted that the buckets are detached from the traction rope only while passing through the loading terminal.

In addition to the disposal of mine refuse, this tramway serves another purpose: it conveys coal from the tippie to a large steel-tank storage bin located near the rail terminal. From this bin coal is drawn for domestic purposes in the company's town nearby. An additional tripping frame is attached to the track cable directly over this tank.

When correctly designed and installed an aerial tramway such as has been described is desirable for transporting and dumping mine rock chiefly for the following reasons: (1) The buckets run on rope track, which is more or less flexible because it is loosely strung from tower to tower. This eliminates the obvious difficulty encountered in keeping rigid and to gage a rail track on shifting slate banks. (2) Cables can be strung in the shortest distance between two points—over level ground, uphill or downhill—whereas ground systems or track rails are applicable to easy grades only. (3) Potential dumping capacity for a single set-up is many times that of other systems.

Parr Defines Conditions Favorable to Heating of Coal in Storage

S. W. PARR has furnished the American Chemical Society a summary of his findings on "Deterioration and Spontaneous Combustion of Coal in Storage" as a basis for the round-table discussion on that subject, Sept. 11, at the Ithaca meeting:

1. A high percentage of textural moisture in a coal indicates a high capacity for oxygen absorption. Such coals immediately upon breaking out from the seam begin to lose moisture until an equilibrium with the moisture of the atmosphere is established, thus making way for the accession of oxygen.

2. The larger the lumps of coal the slower the interchange as between the free or inherent moisture and oxygen. Conversely, the more finely divided the material the more rapid the interchange and also the greater the superficial area of the coal particles.

3. Any departure from normal temperature upward, unless checked or dissipated, is a vital factor, whether such increase of temperature arises from external sources or is the result of chemical combinations within the coal itself.

4. Accessibility of air within the coal mass, thereby augmenting the supply of oxygen beyond the quantity taken up by absorption, is essential for carrying the oxidation forward, thus bringing the temperature of the mass up to the point of ignition.

5. Accessibility of air involving ready circulation to an extent which will carry away the initial increments of heat as rapidly as formed will prevent a rise of temperature.

6. Complete prevention of an additional oxygen supply beyond that absorbed by the coal before entering the storage pile will insure against any appreciable or dangerous rise of temperature.

7. The oxidation of pyritic sulphur requires the presence of free moisture as well as oxygen. The augmenting of the heat in any manner greatly accelerates the oxidation processes for both the hydrocarbon and the sulphur components of the coal.

Latest Improvements in Locomotive Control

Developments of New Controllers Due to Use of Larger Currents and Necessity for Power Economy—Electro-Magnetic and Electro-Pneumatic Contactors on Large Locomotives—Field Control Provided for Storage-Battery Motors

BY H. H. JOHNSON*

FOR SOME fifteen to twenty years, control equipment for standard mine locomotives underwent practically no change. It is only in the last year or two that the design of the equipment has been modified. The long period of stagnation was not the result of complete satisfaction with the systems then developed but was due rather to the fact that the use of drum controllers on early types of locomotives became a precedent from which no one was ready to depart and also to the fact that power economy during acceleration and slow-speed periods had been given little consideration.

The power losses of railway equipment during the acceleration period were given consideration early in the art of electric traction. The first steps taken were to meet the necessity of getting the motor or motors directly on the line as soon as possible. This brought into use the rheostatic control system and the controller known as the type R, which partly answered the purpose. It was soon apparent, however, that a more efficient system than the rheostatic method of acceleration was necessary if greater economy in power was to be attained. With this in view, the series-parallel controller known as the K type, was adopted after much development. This type of control first employed the open-circuit system of transition and later employed the shunting method so as to effect smoother acceleration. Later the bridging system of transition was adopted for the purpose of obtaining still further improvement.

As railway equipments increased in size a still heavier and more economical type of control soon became necessary. The desire to operate cars in trains also required a system of remote control. Both of these conditions promoted the development of the two commonly known systems of electro-pneumatic and electro-magnetic control, which now are being used widely with all sizes of motor equipment.

Throughout this evolution of the railway control systems the development of mine- and industrial-locomotive control practically remained at a standstill. There are three reasons for this: first, the increase in mine locomotive motor capacities had not increased beyond the satisfactory limits of the drum controllers; second, the class of labor in mines had not been capable of handling more refined or complicated electrical equipment; third, the type R controller had been smaller than other types having the same rugged characteristics.

The more recent increase in locomotive sizes and capacities, and the general tendency toward the lower of the two commonly used voltage systems, namely, 500 volts and 250 volts, has made it necessary to develop suitable control equipment for handling the heavier currents at these voltages. Improvements in the caliber of the electrical staffs of mining companies has permitted, to a large extent, more refinement in locomotive

control, and a study of economy and maintenance has prompted the development of better control for larger motors.

Gathering and haulage types of locomotives are now defined by a relatively sharp line of demarcation. It is in the latter class of locomotives that the large increase in size has taken place. In some instances the increase has taken the form of large single-unit locomotives but in other cases tandem and multiple operation of small units accomplishes the same purpose. The general tendency will lead ultimately to multiple operation of small units rather than to operation in tandem.

With series-and-parallel control the motors may be accelerated either in series or in parallel at the will of the operator. It is evident that, when the starting resistor is designed to start the motors in parallel, the starting tractive effort will be approximately twice

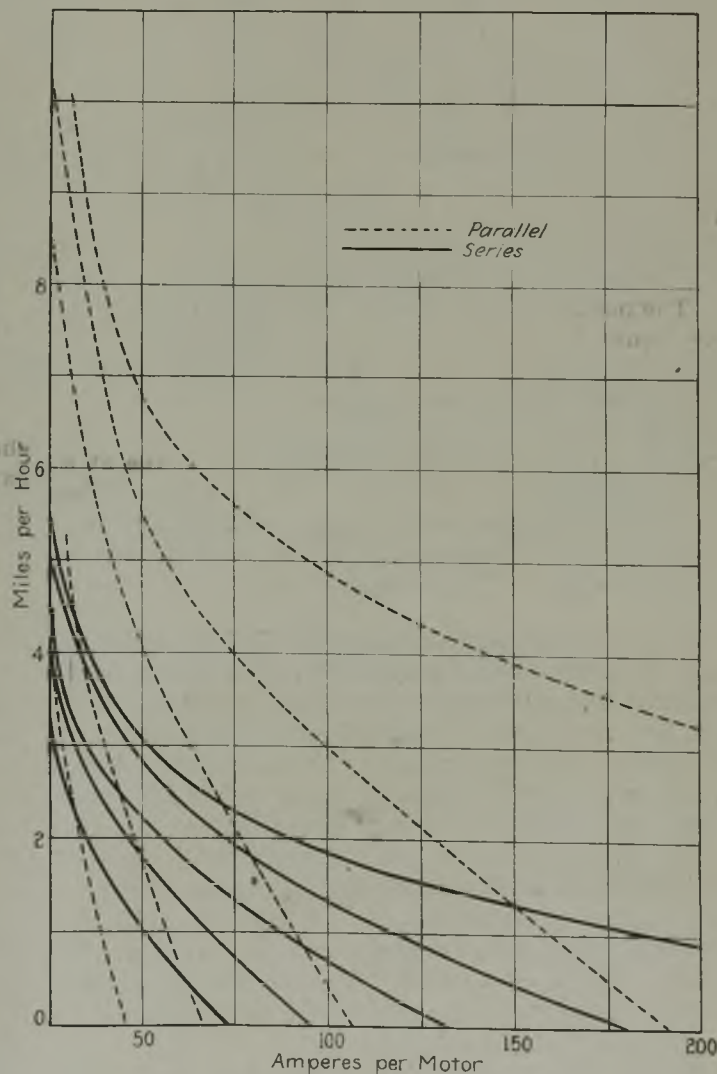


Fig. 1—Operating Curves of Series-and-Parallel Controller for Five-Ton Locomotive

This diagram shows the characteristic curves of a 5-ton locomotive equipped with two 250-volt motors when operated by a type R controller. It is the usual practice of the operator to start the locomotive with the motors connected in parallel instead of in series; consequently, the power used when accelerating the load is excessive.

*General Engineering Department, Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

as great when the connections are changed at the controller so as to start the locomotive with the motors in series.

On the other hand, if designed to start the motors in series, the number of effective notches when starting in parallel will be reduced, as unnecessary resistance must be cut out, before effective work is done by the locomotive. This condition makes it difficult to obtain satisfactory starting, with both connections when the resistor is designed to give the proper starting characteristic with either one of the two. This has practically resulted in straight rheostatic acceleration, and the operative usually leaves the connections so as to start always with the motors connected permanently in parallel. Fig. 1 shows the operating curves of the motors when connected in series and in parallel. The curves are based on the starting resistors being figured to start the motors in parallel.

In the series-parallel type of control the motors must

reduced, it becomes necessary to allow the current to drop after each notch has been taken so that the succeeding increase of current will not be sufficient to cause the wheels to slip. This reduces the average tractive effort during the acceleration period.

The application of manual control is limited to relatively small capacities, largely on account of danger to the operative and the difficulty of manually operating a large controller. Remote control is desirable for large capacities, that is, in general where the total capacity exceeds about 300 hp. at 500 volts, or 150 hp. at 250 volts.

Series and parallel controllers are obtainable, that are suited for operating two-motor equipments using two 85-hp. motors on 250-volt circuits. For four-motor equipments series-and-parallel controllers are available for four 65-hp., 250-volt motors. Four-motor controllers are usually required for tandem operation of two locomotives. For three-motor locomotive equipment, controllers are available

for capacities up to three 120-hp. motors at 500 volts or three 60-hp. motors at 250 volts.

The type K controllers are built for two- and four-motor equipments up to and including a maximum of four 110-hp. motors at 600 volts or four 45½-hp. at 250 volts. These controllers are used extensively in railway work and from the standpoint of safety it is usually considered desirable to limit their use to four-motor equipment of 50 hp. per motor at 500 volts. For larger sizes remote control is recommended.

Series-parallel connections are used with the type K controllers.

They also use the shunting method of transition from series to parallel. This type of controller has the advantage of the economy incident to the use of series-parallel control which results in more notches for the same controller capacity. Height limitations for railway applications were not of much importance, but in attempting to use this type of controller on mine locomotives height is usually a vital consideration and it is impractical in many cases to use a high controller of the K type.

Controllers designed for resistance braking or resistance and magnetic braking have been built for railway application for two- and four-motor equipments up to and including a total of 200 hp. at 500 volts. Series-parallel acceleration is provided, and the braking is secured by moving the operating handle in a counter-clockwise direction from the "off" position. This method of dynamic braking is the most desirable for mine locomotive service. Unfortunately this feature adds still further to the height of the controller and is largely the reason for not making use of the original

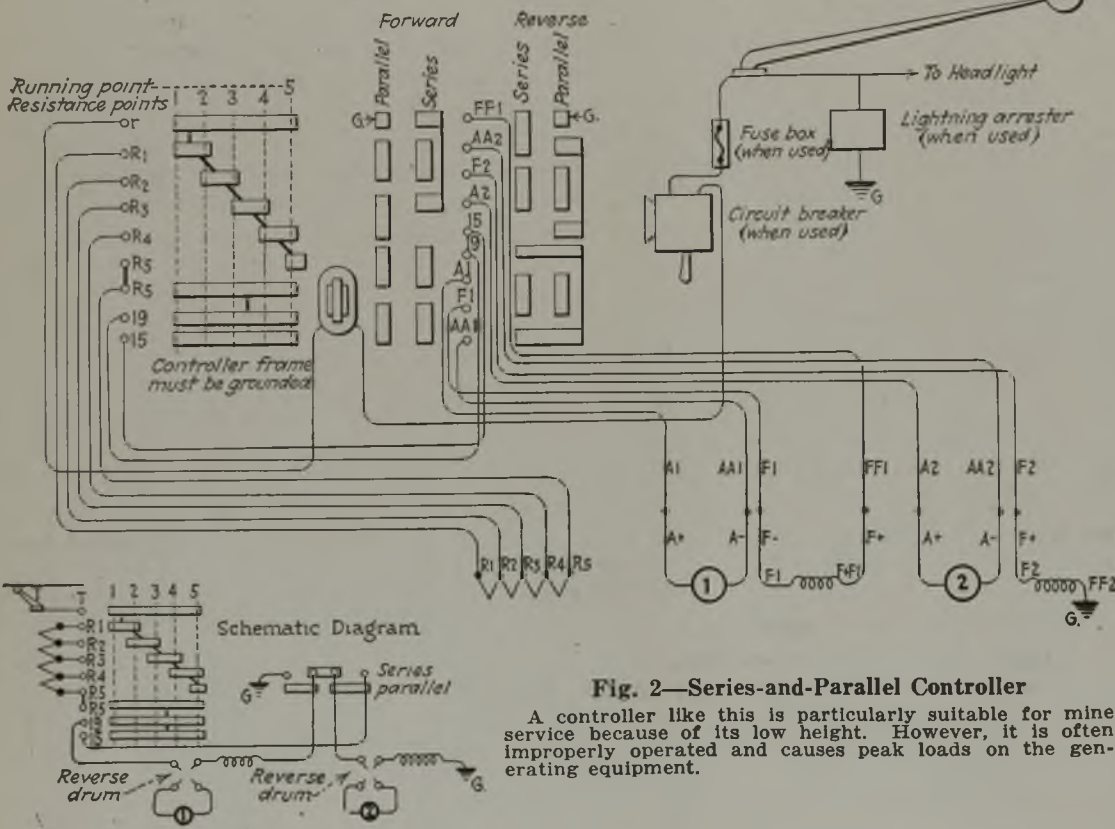


Fig. 2—Series-and-Parallel Controller

A controller like this is particularly suitable for mine service because of its low height. However, it is often improperly operated and causes peak loads on the generating equipment.

be started and accelerated in series until all resistance is out of circuit, then a portion of the resistance is re-introduced and the motors connected in parallel, after which the resistance is notched out. This results in lower power consumption during the acceleration period and allows economical running speeds below full speed.

Series-parallel control is very desirable from a standpoint of efficiency but it has not been widely used in mine-locomotive applications chiefly because of the increase in the controller height. A series-parallel controller of the same rated capacity as a series-and-parallel controller has more notches. The number of notches available on the controller affects the maximum weight of train which a locomotive can pull.

Maximum tractive effort is determined by the slipping of the wheels. If the controller has an infinite number of notches, the accelerating current may be kept so that the variation from the maximum tractive effort is infinitely small when notching from one point to another. If the number of notches on a controller is

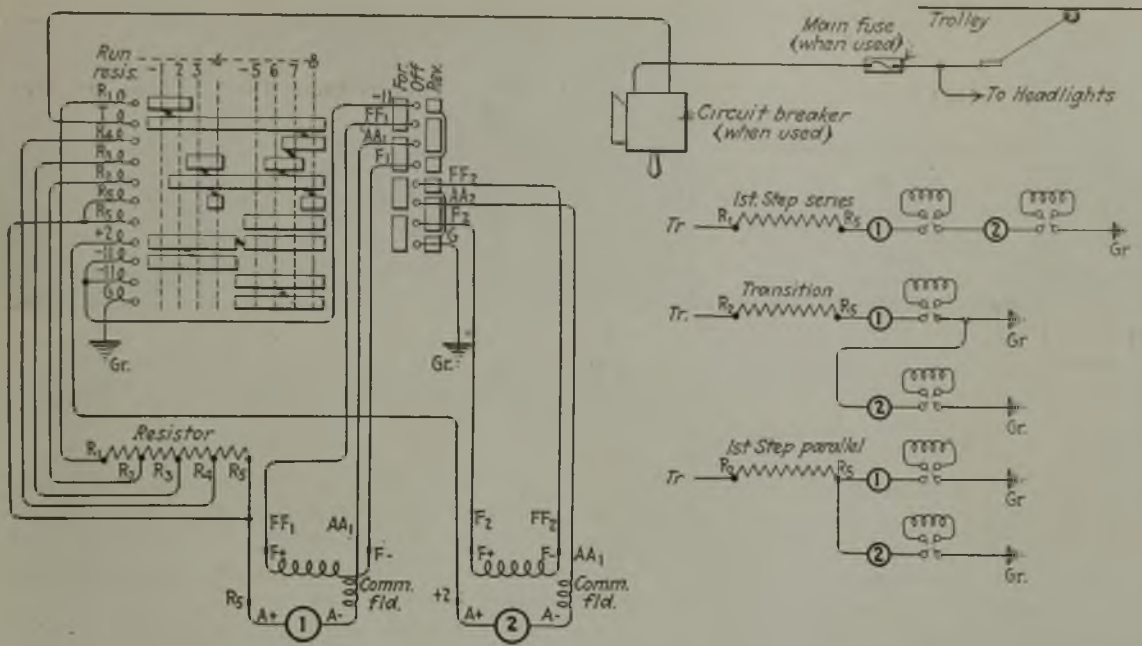


Fig. 3
Later Type Unit

The series-parallel controller gives better acceleration of the locomotive and train. The operative must start with the motors in series and pass over each consecutive notch until the motors are finally in parallel across the line. This saves power when the locomotive is being accelerated or is running at less than the speed for which it is designed.

features of the braking type of controller developed for street and interurban traction service.

Fig. 3 illustrates connections for a controller developed for, and in use on, storage-battery locomotives. When selecting controllers for storage-battery locomotive service it is of great importance to take into account battery economy. As many of the speed-control points as possible should be obtained without the resistance of the starting rheostat being in the circuit. The use of field control is of great economic value and permits greater speed variation which less battery consumption.

Line switches have been used effectively in conjunction with drum-type controllers to relieve the drum contacts and fingers of arcs when breaking the main circuits and returning the controllers to the "off" position. The line switch, when used in this manner, may also be made to provide for overload protection, used in conjunction with an overload relay. Line switches have been used extensively with street-railway equipment but not much on mine locomotives. Line switches are either made up of contactors which are of the electro-pneumatically operated type or the straight magnetic-

contactor type, usually depending upon the service.

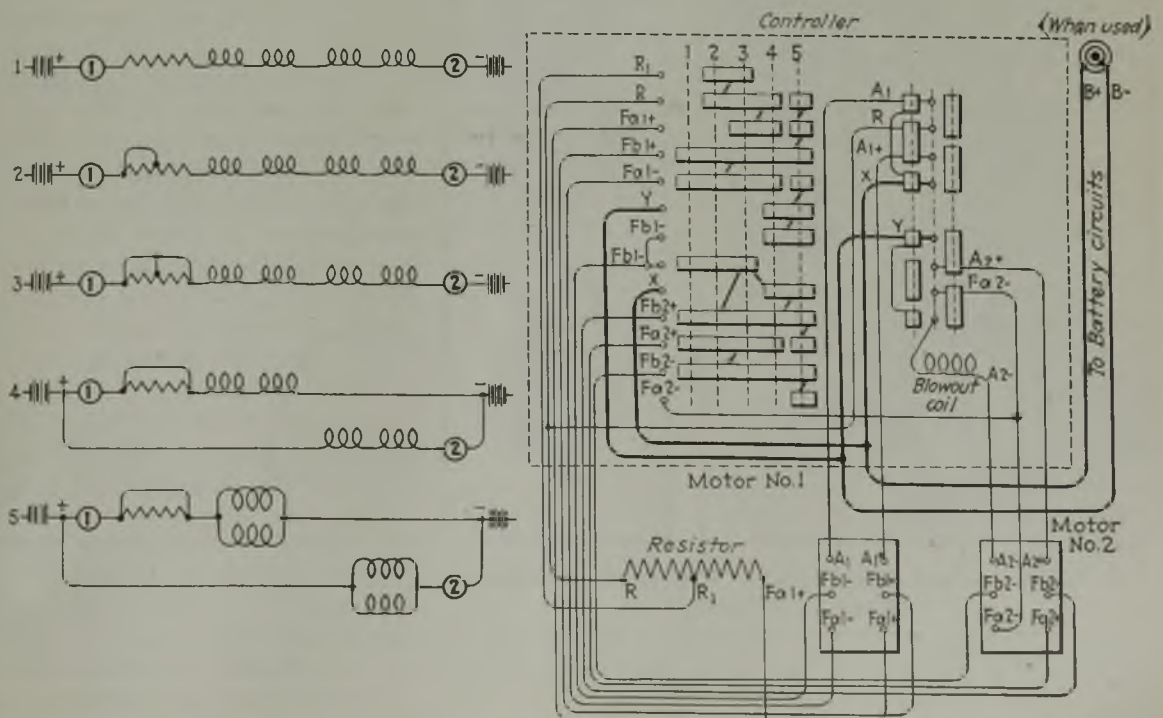
The electro-pneumatic unit switch differs from the energizing a solenoid from the control circuit. One of the main circuit contacts is carried on an extension of the armature, and as the armature is drawn upward by the solenoid it completes the main circuit through a stationary contact. When the solenoid is de-energized the armature drops by gravity. A magnetic blowout is provided for extinguishing the arc. The whole switch mechanism is mounted on a base and placed in a sheet-steel box.

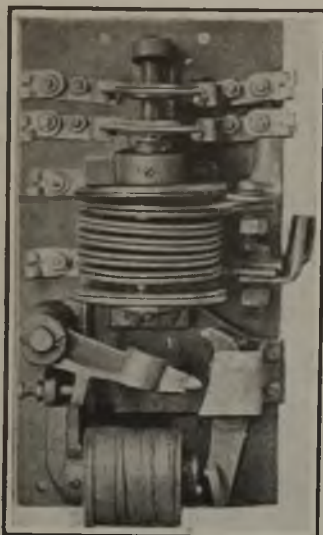
The electro-magnetic type of contactor is closed by magnetic contactor in the means employed for operating the switch contacts. High-pressure compressed air is admitted to a cylinder, the piston of which is attached to the moving contact arm. This piston moves against the action of a powerful spring. When the air is released from the cylinder, the spring forces the switch jaws apart with a force of over 100 lb. and an effective magnetic blowout extinguishes the arc. The circuit is quickly broken because the switch contacts open at high speeds.

FIG. 4

Storage-Battery Controller

Every possible means for obtaining the maximum of useful work from the storage battery should be incorporated in the controller used on a battery locomotive. By means of field control many resistance points are eliminated, and it is possible to vary the speed widely without undue draught on the power of the battery. Economy in power increases the length of time that the battery can be run, thus adding increased convenience to economical operation.





Improved Type Overload Relay

Such a device for use on a mine locomotive should be rugged and positive in operation. Locomotives of large size should invariably be provided with some means of preventing the controller fingers from seriously burning.



Fig. 7—A 35-Ton, 250-Volt Single-Unit Mine Locomotive

Each of the three axles is driven by a large motor. The control consists of electro-pneumatic contactors which are also used to provide dynamic braking. Mechanical braking is obtained by air brakes.

One hundred pound pressure at the contact surface insures positive action of the switch. Air is admitted to, or released from, the cylinder through a valve operated by a small solenoid. The whole switch mechanism is mounted on, and insulated from, a cast-iron framework and enclosed in a sheet-steel cabinet. The chief advantages for mining applications are powerful and positive action of switch movements; effective blowout; contact pressures independent of line-voltage fluctuations; low maintenance; and rugged construction.

With the recent increase in demands made on mine locomotives, drum control has been taxed to the limit and a more satisfactory means of governing the larger motor equipment was necessary. This has been the cause of the introduction of remote control for units of large capacity. Many satisfactory applications have been made and both magnetically-operated contactors and electro-pneumatically operated contactors have been used. Included among the many advantages of remote control the following are outstanding: 1. Greater motor capacity may be handled. 2. Maintenance cost may be reduced. 3. Controller manipulation is made

easier. 4. Danger to operative is reduced. 5. Multiple operation of two or more locomotives is made possible with slight addition of equipment. 6. Minimum headroom is required and 7. Overload protection is increased by the opening of the switches.

British Government Will Study Coke, Benzol and Gas Manufacture

The government of Great Britain, at the instance of the Secretary for Mines and the Department of Scientific and Industrial Research, according to advices received by the Bankers Trust Co. of New York from its English Information Service, has decided to provide at once for the rapid development of a chemical and physical survey of the coal seams of Great Britain, to determine the possibility of replacing some 140 million tons of raw coal at present burned every year in its natural state by other and smokeless fuels obtainable from coal by carbonization and gasification.

It is pointed out in this connection that if coal could be carbonized on a large scale in such a way as to yield a supply of fuel oil for the navy and mercantile marine, and an important share of motor spirit for use in motor cars and aircraft, the balance of foreign trade would be altered in favor of Great Britain. The abatement of the smoke nuisance in towns and manufacturing districts owing to the abandonment of raw coal as a fuel would have immediate and far-reaching effects upon the health and housing of the people.

SULPHUR IMPORTANT SOURCE OF HEAT IN SPONTANEOUS COMBUSTION.—S. W. Parr and E. R. Hilgard will say in the paper they will deliver at Ithaca, Sept. 11, before the American Chemical Society, that finely divided pyritic sulphur which may be even in microscopic sizes is more common in coal than has been supposed. A high percentage of sulphur is often associated with mother of coal and in Illinois sulphur in marcasite form is quite as abundant as in the pyritic form. As the oxidation of so small a quantity of sulphur as 0.5 per cent may raise the temperature of the mass 71 deg. it is evident that further attention should be given to sulphur and the rôle it may play in the starting of spontaneous combustion in stored coal.

In 1831 "John Samuel Dawes of Bromford, in the Parish of West Bromwich in the County of Stafford, Ironmaster," was granted a patent, No. 6,207, on the use of pulverized charcoal or any other fuel applicable to the purpose. The specification shows the fuel was to be used in the blast furnace.

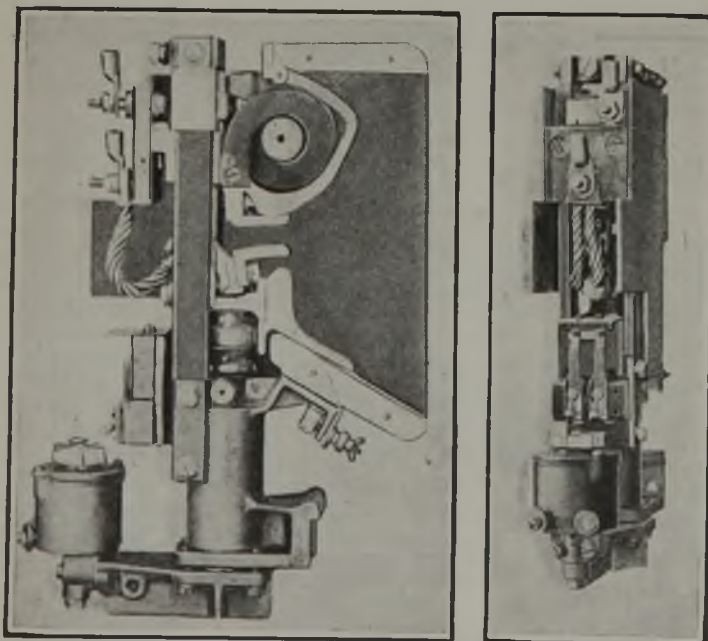


Fig. 6—Section and Rear View of Electro-Pneumatically Operated Contactor

The high currents necessary with locomotives of large capacity make it impossible to develop a practical manually operated controller. This contactor operates from a small control circuit. All heavy currents are broken between large contacts provided with arcing chutes and blowouts.



News Of the Industry



New Temple Anthracite Coal Co. Formed By Merger of Two Independents

Temple and East Bear Ridge Companies Consolidated—Organization Controls Seven Collieries and 40,000,000 Tons of Mineable Coal—Sproul Reticent on Plans

Special to *Coal Age*

Scranton, Pa., Sept. 9.—One of two anthracite company mergers reported in the progress of formation for some time past was effected over the weekend. The Temple Coal Co., of Scranton, and the East Bear Ridge Co., also with offices in Scranton, have consolidated, forming the new Temple Anthracite Coal Co.

For weeks rumors of combinations involving independent operations in the anthracite belt have been discussed in financial circles. Definite information was lacking until last Friday, when authoritative announcement was made. John H. Brooks & Co., of Scranton, members of the New York Stock Exchange, handled the merger.

The new Temple Anthracite Coal Co., through ownership of stocks of subsidiary companies and leases, will now control and operate the following seven hard-coal collieries: Northwest colliery, near Carbondale, with approximately 560 acres of coal land and a breaker having a capacity of 1,000 tons per day; the Lackawanna colliery, about six miles north of Scranton, with 1,080 acres of coal land and a breaker of 1,200 tons capacity; the Sterrick Creek colliery, near Scranton, with 748 acres of coal land and a breaker of 2,000 tons capacity per day; the Mount Lookout colliery, about 10 miles south of Scranton, with 632 acres of coal land and a breaker of 1,500 tons capacity; the Harry E. and the Forty Fort collieries, about 14 miles south of Scranton, with 1,074 acres of coal land and a breaker of 1,000 tons capacity per day, and the East Bear Ridge colliery, at Frackville, with 266 acres of coal land and a breaker having 1,200 tons capacity.

The estimated recoverable coal in these properties is in excess of 40,000,000 tons. Assets of the new company will consist of other mineable coal in various perpetual leaseholds, which at a conservative equity of 20c. a ton for coal in the ground has a value of over \$8,000,000; seven modern breakers with machinery and equipment, all necessary buildings for operation of the plants, eighty-three dwellings, fourteen barns, 3,343 mine cars, 267 mules, 8 horses, 39 electric and 14 steam locomotives, all of which are estimated to have a value in excess of \$4,000,000.

The officers and directors of the new Temple Anthracite Coal Co. are: Chairman of the Board, Thomas R. Brooks, Scranton; President, F. H. Hemelright, Scranton; Vice-President, Seward Button, Wyoming; Secretary and Treasurer, A. M. Bingham, Scranton; Directors, Thomas R. Brooks, F. H. Hemelright, George R. Brooks, G. T. Davis, all of Scranton; S. B. Thorne and B. A. Thompson, both of New York, and James B. Neale, of Pottsville.

Scranton, Pa., Sept. 9.—Former Governor W. C. Sproul, stopping in this city en route to Pike County, would not discuss details in connection with the reported merger of independent anthracite coal companies which he is said to be directing. He admitted that he was interested in the consolidation of a few of the independents in the hard-coal field, expressing the opinion that "the time is ripe for such a move." Details of the proposition, he stated, are under consideration.

Take Action to Boost Output In Central Pennsylvania

In an effort to put the central Pennsylvania bituminous-coal field in its former high place as a producer of coal, the Association of Bituminous Coal Operators of Central Pennsylvania and the Central Pennsylvania Coal Producers' Association, meeting jointly in Altoona, Pa., on Friday, Sept. 5, adopted a resolution instructing the board of directors and the executive committee of the association "to take such steps as they deem necessary and to perform such acts as may be requisite to restore the central Pennsylvania district to its proper place as a producer of coal."

The members of the associations pledged themselves to support any steps taken in pursuance of the object of this resolution.

Officers of both associations were re-elected, one group acting for both, as follows: President, B. M. Clark, Indiana; Vice-President, G. Webb Shillingford, Clearfield; Secretary-Treasurer, Charles O'Neill, Altoona; Statistician, W. A. Jones, Altoona; General Counsel, A. M. Liveright,

Three Railroads Place Big Equipment Orders

The Philadelphia & Reading R.R. is about to purchase 1,000 fifty-ton box cars and 1,000 seventy-ton gondolas, according to an announcement from Philadelphia Sept. 4. This follows closely an announcement by the Pennsylvania R.R. that it had placed an order for 10,000 all-steel box cars.

Details of the cost were withheld, but the steel trade estimates the value of the contract at \$20,000,000. According to an official announcement, the business went to the American Car & Foundry Co., the Standard Steel Car Co., the Pressed Steel Car Co. and the Bethlehem Steel Co.

W. J. Harahan, president of the Chesapeake & Ohio, has announced the closing of a contract with the Richmond (Va.) Car Works, Inc., for equipping 1,000 70-ton hopper-bottom gondola cars with new bodies. The railroad company also has placed with the Inland Steel Co. and the Illinois Steel Co. contracts for 5,000 tons each of steel rails.

Clearfield; Labor Commissioner, John C. Forsyth, Clearfield.

The Central Pennsylvania Bituminous Operators' executive committee includes B. M. Clark, Indiana; Rembrandt Peale, New York and St. Benedict, Pa.; J. R. Caseley, DuBois; S. J. Wills, DuBois; C. B. Maxwell, Morrisdale; H. B. Scott, Philipsburg; Thomas F. Kelly, Coalport; J. William Wetter, Philipsburg; G. Webb Shillingford, Clearfield; Edgar W. Tait, Pittsburgh; William Lamont, Elmora; I. A. Boucher, Beaverdale; Harry Boulton, Philadelphia; S. T. Brown, Indiana, and N. J. Bracken, Johnstown.

Following is the board of directors of the Central Pennsylvania Coal Producers' Association: J. William Wetter, Philipsburg; R. H. Sommerville, Winburne; M. J. Bracken, Johnstown; H. J. Meehan, Johnstown; James H. Allport, Barnesboro; S. J. Wills, DuBois; Edgar W. Tait, Pittsburgh; W. R. Craig, St. Marys; G. Dawson Coleman, Philadelphia; D. T. Price, Windber; Charles A. Owen, Johnstown; Rembrandt Peale, New York; B. M. Clark, Indiana; J. R. Caseley, DuBois; James B. Neale, Minersville; G. Webb Shillingford, Clearfield; W. S. Blaisdell, Punxsutawney; F. B. Kerr, Clearfield; C. B. Maxwell, Morrisdale; Harry Boulton, Philadelphia, and S. T. Brown, Indiana.

Sir Samuel Kelly Opens Mine In North of Ireland

At Coalisland, County Tyrone, a new mine, says *The Engineer* of London, England, has been opened by a native of Belfast, Sir Samuel Kelly, an owner of mines in Cumberland and of a coasting fleet in the British Isles. The mines are forty-four miles from Belfast, with which they are connected by rail and canal. The coal was struck at 433 ft., previous explorations not having been extended further than 300 ft. It is said that the coal is an excellent bituminous equal to the best Scotch. The shafts are 1,070 ft. deep, 12 ft. in diameter and 62 ft. apart. The seams exposed are 12 in number.

Seams at Newtownkelly

Depth in Ft.	Name of Seam	Thickness Ft. In.	Depth in Ft.	Name of Seam	Thickness Ft. In.
433	Kelly	4 9	761	Beltiboy	2 0
476	Crow	4 6	775	Monkey	0 9
542	Annagher	9 6	806	Two-Foot	6
570	Bone	6 3	898	Rock Coal	0 9
625	Shining	2 6	950	Ten-Inch	1 0
691	Bracksville	4 6	986	Ferry Five Foot	2 3

The shafts are fitted with double-decked cages each holding two cars capable of carrying 1,176 lb. apiece. The cages are kept in a vertical plane by six steel-wire guide ropes suspended from the headgear (headframe) and weighted at the bottom by 4½-ton cast-iron "cheeses" (circular weights). Probably 200,000,000 tons of coal are located in the coal basin contiguous. About 200 Scotch miners are at work at present. A town, Newtownkelly, has been erected, 100 houses are already built and 300 more will be added shortly. Each has parlor, kitchenette, scullery, three bedrooms, bath and wash boiler. The rent is 7s. 6d. (\$1.82) weekly. Belfast requires about 1¼ million tons and now imports it from across the Irish Sea.

May Reorganize Addy Co.

The Matthew Addy Co., of Cincinnati, one of the oldest pig iron, coal and coke concerns in the United States, will be reorganized in the event that a proposition submitted to its creditors Aug. 20 is accepted. It is proposed to supplant the Addy company and its branches with a new company, according to the suggestion of Benjamin N. Ford, William W. Hearne and A. Burt Champion, all vice-presidents of the company.

It is proposed to put \$250,000 into the new company, of which \$125,000 will go immediately to pay off some of the creditors' claims. The proposition stipulates that the creditors with claims under \$1,000 be paid in full and the remainder of the \$125,000 prorated among the larger creditors. In addition, the proposal specifies that the new company shall pay off the remainder of the debts at the rate of 1 per cent a month. These payments shall come out of the earnings of the company after it has been functioning six months.

About thirty creditors were represented. Following submission of the proposal the meeting adjourned until Oct. 10, when the creditors will meet to take final action.



John C. Maben

Former president and one of the organizers of the Sloss-Sheffield Steel & Iron Co., died at Atlantic City, N. J., Sept. 1, at the age of 85. Besides taking an active part in organizing the Sloss Iron & Steel Co. in 1887, and its successor, the Sloss-Sheffield Steel & Iron Co., in 1899, he was one of the organizers and directors of the Richmond-West Point Railway & Warehouse Co., now part of the Southern Ry.

Will Manufacture Fuel By Trent Process

A. B. Lansberry, operating a large bituminous mine at Clearfield, Pa., is constructing a SuperFuel plant which will use the Trent process and have a capacity of 500 tons per day. The plant will be used to convert his slack pile into SuperFuel as well as to operate on run of mine coal. Mr. Lansberry's plant is the first SuperFuel plant built in the Clearfield district.

Since the present coal depression began Mr. Lansberry has continued to operate his mine and has stored a large quantity of slack for which he has found no market.

M. J. McQuaide, president of the Ben Franklin Coal Co. of West Virginia, announces that the SuperFuel plant which the Pittsburgh Trent Corporation is constructing for him at his Panama mine at Moundsville, W. Va., will be in operation about Nov. 1, 1924. The Panama mine has long been one of the large operations in the Moundsville district, but has practically suspended operations during the present coal depression.

The company which will operate the SuperFuel plant at Moundsville is known as the West Virginia SuperFuel Co., with offices in the Park Building, Pittsburgh, Pa. M. J. McQuaide is president and R. J. Balph is secretary.

Arrangements have been made to market the SuperFuel in Pittsburgh through the purchase of a river frontage for storage, from which the SuperFuel will be distributed to consumers in Pittsburgh. Arrangements also have been made for storage in Cincinnati. The McQuaide interests have been operating a line of steamers and barges on the Ohio for some time and the product will be largely delivered by water.

Coal Shortage Unlikely Next Winter, Says Report Of Engineers' Committee

Unless there be a strike or suspension at the mines, there should be no coal shortage next winter, the report of the American Engineering Council's coal storage committee has announced as a result of an investigation carried on by 400 engineers in all parts of the country. The report was made public at the council headquarters, 29 West Thirty-ninth Street, New York City, by ex-Governor James Hartness of Vermont, president of the body.

While no shortage is anticipated, the "gorge or diet" tendencies of consumers, coupled with an extremely irregular market, are producing "feast or famine" conditions in the coal industry, the report continues. Runaway prices are said to be caused by the frantic bidding of purchasers against each other, to which some of the operators "are quite willing accessories."

The report insists that, through storage of coal, huge wastes, running into the millions each year, could be averted. There are about 90,000 carload-lot buyers, and to these storage of large quantities of coal is limited. The report adds that:

"The retailer supplies practically all the millions of householders with both anthracite and bituminous coal. He also handles some 30,000,000 tons of bituminous coal for industrial use and for small public utilities. Much of this is dependent on day-to-day deliveries from the yard. The aggregate storage capacity of the bunkers and bins of these small consumers is not known, though it probably runs into millions of tons.

"Storage of a winter's supply by these consumers may, indeed, be impossible, but it does not follow that larger bunker capacity would not be so desirable. If the economic incentive to storage is sufficient, even these small consumers will find means to increase their fuel reserve."

The committee found that, in addition to the retailers, there were about 52,000 consumers throughout the country who bought in carload lots, principally railroads, public utilities and large factories. In such cases the problem of storage becomes an important one, calling for construction of mammoth plants for that purpose. It is one that should be solved, the report urges, if the coal supply is to be stabilized.

After having spent three weeks in Belgium, northern France and in Paris, A. C. Fieldner, chemical engineer, in charge of the Pittsburgh station of the Bureau of Mines, will continue his investigations, with the following schedule: Sept. 7-14, Geneva, Berne and Zurich; Sept. 15-20, Mannheim and Frankfurt; Sept. 21-Oct. 6, Essen, Cologne, Dortmund, Düsseldorf and Geluenkirchen; Oct. 7-14, Berlin; Oct. 15-24, Halle, Dresden, Leipzig, Altenberge; Oct. 25-30, other points in Germany and several points in Holland; Nov. 1-14, Great Britain. Mr. Fieldner will sail for home on Nov. 15.

British Mining Discloses Methods That May Soon Be Seen in America

Time Near When Thinner and Deeper Seams Must Be Worked Here—
Difficult Workings, Labor Relations and Safety Aply Handled
by British—Stone Dusting Universal

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

Called to Great Britain by the Power Conference many Americans interested in coal took advantage of their presence in the British Isles to acquire some first-hand knowledge of the conduct of the coal industry there. Most of these observers were men in whom the American weakness of bragging is not pronounced. They looked over the British coal fields with the thought of learning something from their practice which could be applied profitably here. Some of the showy things like bigness, newness or pretentious external appearance of plants in this country cause some Americans to think that we have incorporated in our practice all that is worth while in the production of coal. The observers, however, who are now returning from overseas are not of that type. They attach significance to many of the things they saw. They realize, among other things, that there is an explanation of the fact that the American miner produces nearly four times as much coal per day as does the British miner. Our good fortune in having deposits of rich coal laid down in thick seams accounts in part for this and certain other comparisons which are not as adverse as they seem.

American coal operators, for instance, will find much of profit, some of these observers declare, in a study of the design of British mine workings. They have exhausted the thick and easily accessible seams. They now are forced to grapple with increased physical difficulties. They are winning coal with a profit from 30-in. seams, 24-in. seams, 20-in. seams, and even from seams of less thickness. They are digging coal through shafts that are 3,000 ft. deep. Some operations are carried on under 4,000 ft. of cover. They are working beds of coal which lie between other beds which long since have been removed. They are contending with bad roof and with bad floor and are removing coal that already was badly broken and fractured in its place. Despite these facts, they get an extraction of 90 per cent with a loss of life that is one-half the rate in this country. They operate successfully in mines so gaseous that no powder or electricity may be introduced.

Every coal mine in England now is making stone dusting a regular practice. The cost of dusting has been reduced to the point where it is less than a penny per ton. In one of the mines visited by the Americans, in South Yorkshire, there has been no fatal accident in five years. The property is over 3,000 ft. deep and employs 2,700 men. It is typical of many others. The Americans were amazed at the low

point to which mortality has been reduced. The methods employed in safeguarding workmen are not all directly applicable to the natural and competitive conditions which exist in this country, but their success in promoting safety is regarded as of the greatest significance and deserving of close study by American engineers.

The point is being reached in several of our coal fields where resort must be had to thinner and deeper seams. The development of such properties must be planned at this time along lines that will permit the future recovery of the remaining resources of the property. Many even now could profit from a study of the British practice in mining a series of beds which lie one above the other, so as to obtain the maximum coal at a minimum cost. Much was observed at British mines that would be of particular moment in the operation of certain properties in the Pittsburgh, Pocahontas, eastern Kentucky and Illinois districts.

In the matter of labor relationships the consensus of opinion is that we have much to learn. In certain respects wage disputes and other conditions of employment are handled much more effectively there than here. In Durham and Northumberland particularly the Americans were impressed with the friendly and businesslike methods employed and the wholesome respect the representatives of each group seemed to have for the other. Day-to-day adjustments were being handled with complete absence of friction. The Americans were much interested in their method of evening up the differences occasioned by a bad working place. Every three months in each mine the men draw lots for the working places and shift about so that those who have been working under difficulties have a chance to get a better place during the next quarter. This system, which is known as "caveling," may not be applicable elsewhere, but it is indicative that the inequality of opportunity in working places is recognized.

In Northumberland they seem to have worked out a means of readjusting the piece rate in different seams and in different mines without changing the general level of rates. If the miners in a given mine can show that they are making 5 per cent less than the "county average" they have an argument for an increase which may be taken up before the joint conference. In similar fashion, if the operator believes rates in his mine are out of line with rates in other mines and if he can show that the average earnings elsewhere are 5 per cent higher than his earnings, he has shown cause for the consideration of a reduction and can bring his case before the joint confer-

Governor Nestos Urges Coal Buying Now

Governor Nestos, of North Dakota, in a recent statement, urged citizens of the state to lay in a coal supply to assist in the rapid movement of North Dakota crops to market, by lightening the burden on the carriers.

"I have been just advised by the Northwest Regional Advisory Board that they have adopted a resolution urging all users of fuel, and especially the institutions that use a great deal of it, to lay in a stock now so as to relieve the railroads in the time of the peak movement of grain and other crops," said the Governor.

"While I realize that the users of lignite coal cannot lay in their supply for the whole year, nevertheless it would be wisdom to lay in supplies, both of lignite and in cases where the other coal is used, of that coal sufficient to last until the beginning of the new year so that in late September, October and November our freight cars may be free to carry our splendid crops to market."

ence. Under this system of bargaining the great inequalities of earnings, such as occur in our anthracite region, are eliminated.

Union Sued for \$100,000 When Woman Is Fired

Eight labor union locals and over a score of individuals, mostly officers of unions at Hurst and other portions of Williamson County, Illinois, are defendants in a suit for \$100,000 damages filed in the U. S. District Court, at Danville, by Isabel Russell, of Cape Girardeau, Mo.

She alleges she lost her position as manager of the Herrin Supply Co. because she had been blacklisted by the unions and a demand was made on her employers for her dismissal. Mrs. Russell asserts that she was unable to obtain other employment as a result of the blacklist, and was forced to go to another state. The complainant's husband, T. P. Russell, was foreman of the mine-riot grand jury, which returned the indictments in the killings of the non-union miners in the mine-riot cases at Herrin.

Anthracite Circular Prices For September, 1924

(Gross Ton, F.O.B. Mines)

	Broken	Egg	Stove	Nut	Pea
Lehigh & Wilkes-Barre.....	\$8.00	\$8.75	\$8.75	\$8.75	\$5.75
Pattison & Bowns.....	8.90	8.90	9.15	8.90	5.50
Phila. & Reading.....	9.15	9.15	9.40	9.15	6.00
Lehigh Valley.....	8.50	8.75	9.05	9.05	5.75
Lackawanna.....	8.00	8.75	8.75	8.75	5.75
Lehigh Coal & Nav.....	9.25	9.25	9.50	9.25	6.00
Del. & Hudson.....	9.00	9.00	9.00	9.00	6.00
Thorne, Neale & Co. (Temple Coal Co.).....		9.20	9.55	9.20	5.75
M. A. Hanna & Co.....	8.80	9.15	9.65	9.25	5.75

Prices for steam sizes, as quoted by companies are as follows: Buckwheat No. 1, \$3 @ \$3.15; rice \$2 @ \$2.25; barley, \$1.50; birdseye, \$1.60.

Further Losses in Union Field Unless Wages Are Equalized, Says O'Neill

The operators of central Pennsylvania have not at any time asked the United Mine Workers to take a permanent flat wage reduction," said Charles O'Neill, secretary of the Central Pennsylvania Coal Producers Association, in reply to John Brophy's comment on Mr. O'Neill's statement following the meeting of the operators at Altoona, Pa., Aug. 22. "They have pointed out to the United Mine Workers that the way to have central Pennsylvania return to a permanently prosperous basis is by giving it a chance to compete for the markets of the country during the period of liquidation, this being the time Mr. Brophy and other pseudo-economists tell us that the industry will be purged of 200,000 too many men and several thousand excess mines eliminated.

"In order to avoid having all the miners eliminated from the union mines and all the mines abandoned being union mines, the miners will have to make some sacrifices. If it is to be a competitive war between two sections of the industry, all parties in the unionized section of the industry will have to be willing to help make the fight. By courageous leadership this can be accomplished without surrender of one right, equity or price the miners enjoy under the so-called Jacksonville agreement."

O'Neill Presents Some Facts

Labelled as "facts" the following arguments are advanced in order by Mr. O'Neill:

(a) Over 200,000,000 tons of the coal accessible to the Eastern markets and competitive with our coal are being produced from 50c. to \$1 per ton lower cost than coal can be produced in our district under the union wage scale.

(b) The present wage agreement with the United Mine Workers, which fixes our cost, will not expire until April 1, 1927.

(c) The decline in production of coal in central Pennsylvania will be more rapid under the present differential in labor cost of 50c. to \$1 than it was before the Great War, when the differential in labor cost of coal in the union fields as compared with the non-union fields was but from 10 to 20c. per ton.

(d) The present policy means that the 200,000 men who must leave the industry will be union miners and the excess mines eliminated will be union mines.

(e) In 1924 to date the non-union fields of West Virginia have increased their production 11 per cent over the same time in 1923. In this period central Pennsylvania has lost 27 per cent in production.

(f) The figures quoted by me were correct in every instance. The lame attempt to label unpleasant truths 'Wage-adjustment propaganda' does not change the facts. Facts are stubborn things.

(g) If the 'prosperity' which we are assured by the miners is almost here, does arrive it will no doubt result

"Coal Barons" Have No Primrose Path

In analyzing the statistics of income for 1921 compiled by the Bureau of Internal Revenue the National City Bank, among other things, says:

"We have heard much in recent years about the 'coal barons,' and their ability to fix prices to suit themselves. The number of coal-mining companies making returns for 1921 was 3,656, of whom 1,079 reported net incomes aggregating \$82,654,787, upon which they paid taxes aggregating \$15,219,444. The remaining 2,577 coal-mining companies reported losses aggregating \$72,521,815. Subtracting the sum of the federal taxes from the aggregate earnings of the first group, it appears that the net results of the year's operations to the group lacked about \$5,000,000 of equaling the losses of the second group. The coal industry, as a whole, did not get an even break in that year, and when the figures for 1922, 1923 and 1924 are ready for publication it probably will be found that this has been the case also in at least two of these years. So much for the corporations engaged in 'warming the American people.'"

in an increase in wage schedules in the non-union fields. This would help restore proper competitive relations. We are only interested in securing fair competition. This we do not have at the present time."

Pledge Aid to President in Improving Engineering

President Coolidge received on Sept. 4 a delegation representing the American Association of Engineers, who called to pledge the support of the organization in connection with any effort of the government to improve engineering conditions throughout the country. The delegation was composed of Harold Almert, of Chicago, president of the organization; A. N. Johnson, F. H. Newell, Morris Bien and A. B. McDaniel. They told the President that their association has a membership of 16,000, with chapters in every important center of the population, devoting their energies to the welfare of professional engineers. They explained that the American Association of Engineers differs from the more technical engineering societies in that its first consideration is of the human element. Mr. Coolidge was told that the basic purpose of the association is to make the engineer a broader and more efficient man and to arouse his active interest in public service. They called his attention also to the fact that the association at this time is initiating a national program dealing with fuel conservation, railroad valuation, the proposed department of public works and the classification and compensation of engineers.

Canada Still Seeks Substitute For U. S. Anthracite

Various efforts made in Canada to obtain a substitute for American anthracite culminated in several plans being suggested at a recent meeting of the Montreal branch of the Engineering Institute of Canada. About a year ago, reports the Coal Division of the U. S. Department of Commerce, the Institute undertook to investigate the chances for procuring a substitute for anthracite in that market, and appointed a commission to do this work.

The committee decided it should confine its activities to the local fuel situation and reported that American anthracite has been almost exclusively used in the Province in the past for domestic purposes but the hardships and inconvenience due to strikes and coal shortages in recent years, and the probability of a gradual decrease in quality and increase in price of this coal in the future, made it advisable and necessary to carry out some educational work, in order to bring to the attention of the public the value of other fuels.

In the winter of 1922-23, says the committee, some Welsh coal was sold for household purposes, largely unscreened, but people had not found this coal satisfactory. Realizing this, the committee took the matter up with the British Trade Commissioner, who circulated the letter through trade journals in England and drew the matter to the attention of coal operators. At the same time local coal dealers were impressed with the advisability of better grading and screening, and the committee promised support in the way of educating the public.

As a result the committee reports increases in the sale and importation of Welsh and Scotch coal with greater care in grading and screening so that it has "given general satisfaction and proved its superiority over American anthracite."

A further increase in the importation of Welsh coal is expected next season, because Welsh operators have formed local connections with the intention of establishing complete unloading and screening plants in Montreal.

It was explained that coke could be obtained from Nova Scotia bituminous coal, but manufactured in Montreal, which would save the consumer money, as the coke would be much cheaper than American coal, with all economic and patriotic sentiments satisfied.

Labor difficulties play an important part both in the Nova Scotia coke industry and in the production of Welsh anthracite. Welsh and Scotch coal may be substituted for American anthracite, coke may be made from Nova Scotia bituminous, and the difficulties which have been encountered in all countries in making peat a suitable and satisfactory substitute for bituminous coal may be overcome, but it does not appear, says the Department of Commerce, as if labor difficulties either in Great Britain or Canada can be overcome any more readily than in the United States to such an extent as to seriously, for a long time at least, cut into the Canadian demand for American coal.

"Friendly" Receiver for St. Louis Coal Co.

A "friendly" receiver has been appointed for the St. Louis Coal & Iron Co. James Duncan, one of the directors of the company, was named as receiver. The St. Louis Coal & Iron Co. is the successor of the St. Louis Coke & Chemical Co. The plants are located at Granite City, Ill., and comprise eighty Roberts byproduct coke ovens and blast furnaces, which have an output of 180,000 tons of pig iron and 500,000 tons of coke.

The National Enameling & Stamping Co. for years has had a substantial interest in the company, and the balance sheet as of Dec. 21, 1923, showed the National company to have an investment of \$1,900,000 in the St. Louis company, which was represented by bonds and preferred stock.

In 1923 the company suffered financial reverses due to labor troubles and advancing costs of material, and a reorganization committee was named to try to put the company on its feet. The company has outstanding more than \$2,000,000 in common stock, a trifle over \$3,000,000 in preferred stock and \$6,404,000 in bonds.



A. F. Harper

Recently resigned as superintendent of Woodward Iron Co.'s Mulga mine, Mulga, Ala., to become engineer-superintendent of Flat Top (Ala.) coal mines of the Sloss-Sheffield Steel & Iron Co.

Is Ford Retailing Coal?

The announcement has gone forth to the 478 Ford agencies in the Northwest that the Ford dock in Duluth has 25,000 tons of coal on hand which will be sold to these dealers in carload lots. They may use it for their own purposes or may sell it in their communities, as they choose. This seems to offset the intimation formerly made that the Ford interests would go into the retail business.

gree. Although the increased trade of this period has been based on extremely low f.o.b. prices, it is possible that any necessary advance in the prices of American export coals will in a measure be compensated by advanced f.o.b. prices of British coals, due to the recent advance in wages of British miners.

Exports of anthracite during the fiscal year just ended amounted to 3,927,846 gross tons, an increase of 194,132 tons, or 5.2 per cent, from the preceding fiscal year. During the six months ended June 30, 1924, anthracite exports totaled 1,755,339 tons, compared with 2,172,507 tons for the preceding six months period, a decrease of 19.6 per cent.

Our Coal Shipments to South America and Egypt Grow

Comparing United States coal export figures for the fiscal years 1924 and 1923, slight change is noted in exports to Belgium, France, Greece, Canada, Mexico and Cuba. Exports to Germany decreased 204,628 tons. The following are the principal increases in tonnage noted: Italy, 396,971 or 127 per cent; Netherlands, 98,434 or 70 per cent; Panama, 53,543 or 68 per cent; Newfoundland and Labrador, 54,364 or 1,398 per cent; Jamaica, 29,788 or 178 per cent; Dutch West Indies, 34,496 or 113 per cent; French West Indies, 72,289 or 170 per cent; Argentina, 115,657 or 150 per cent; Brazil, 429,494 or 299 per cent; Chile, 42,284 or 362 per cent; Uruguay, 55,659 or 472 per cent; Egypt, 24,384 or 300 per cent; French Africa (other than Algeria and Tunis), 37,920 or none in the fiscal year 1923.

The trend of shipments of American bituminous coal and British coal of all kinds to some of the principal foreign markets in which our coal has competed in the fiscal years ended June 30, 1923 and 1924, is shown in the accompanying table.

Our increased shipments to Italy and South America during the twelve months ended June 30, 1924, are particularly noticeable. Though the total exports during the last half of this period declined, the same thing is true of British exports, though in a less de-

P. & W. V. to Segregate Coal Holdings

Directors of the Pittsburgh & West Virginia Ry., frequently mentioned as an ultimate participant in the gigantic new "Nickel Plate" group being organized by the Van Sweringens, voted Sept. 8 at a meeting in New York City to segregate their rail properties from their coal holdings, embraced in the Pittsburgh Terminal Coal Co.

It was decided to call the Pittsburgh & West Virginia Railway Co.'s entire issue of preferred shares, \$9,100,000, for redemption, in accordance with the by-laws of the company, and to offer common stockholders the right to purchase, pro rata, the capital stock of the Pittsburgh Terminal Coal Co. now in the railway treasury, amounting to 40,000 shares of preferred stock, par value \$100, and 80,000 shares of common stock, par value \$100, for the total sum of \$4,000,000. This figures that the holder of 100 shares of railway common stock may purchase thirteen shares of the coal company preferred and twenty-six shares of coal company common for \$1,300. It might, furthermore, be stated that dividends on the Pittsburgh Terminal Coal Co. preferred stock have been paid regularly since the date of issue, and in addition thereto dividends on the common have been paid into the treasury from time to time.

It has also been decided, subject to the approval of the Interstate Commerce Commission, to issue \$3,000,000 of 5 per cent equipment trust notes.

The Pittsburgh Terminal Coal Co. owns and operates 10,500 acres of bituminous-coal lands in Pennsylvania, with an estimated unmined reserve of 72,500,000 tons.

Utility Coal Consumption and Power Output Hit Bottom

Electric public-utility plants consumed 2,778,293 net tons of coal during July, according to a report by the U. S. Geological Survey. This compares with 2,691,891 tons consumed in June, according to revised figures. Fuel oil consumed by utility plants in July totaled 1,391,126 barrels, compared with 1,341,426 barrels in June.

The average daily production of electricity by public-utility power plants in July was 148,300,000 kw.-hr., about 2 per cent less than the revised figures for the daily output of the month of June. Average daily output has decreased uniformly each month from April to July.

Returns from the 1923 census of manufactures just compiled by the Department of Commerce show the coal consumption of various industries to have been as follows: Cane-sugar refining, 982,652 tons; card cutting and designing, 2,469 tons; engraving and die sinking, 2,783 tons; grass mats and matting, 6,796 tons; drug grinding, 75,198 tons; theatrical scenery and stage equipment, 240 tons; gold and silver leaf and foil, 767 tons; blacking, stains and dressings, 14,060 tons; lead pipe, bar and sheet lead, 19,799 tons; graphite, 7,071 tons; lithography, 46,341 tons.

Coal Exports from Great Britain and United States

Country	British Coal			U. S. Bituminous Coal				
	Fiscal Years	1923	1924	Percentage	Fiscal Years	1923	1924	Percentage
Belgium	5,582,623	4,661,600	-16	47,674	49,674	+3		
France	16,472,601	16,994,862	+3	553,289	570,792	+3		
Germany	13,487,187	10,768,038	-20	271,941	67,313	-75		
Italy	7,246,891	6,739,119	-7	313,057	710,028	+127		
Netherlands	6,239,241	5,692,723	-9	140,246	238,680	+70		
Sweden	2,959,499	3,289,022	+11	33,248	18,374	-45		
Argentina	2,320,642	2,779,451	+20	77,031	192,688	+150		
Brazil	1,134,989	1,015,581	-11	143,445	572,939	+299		
Chile	52,188	43,973	-16	11,683	53,967	+362		
Uruguay	457,999	364,987	-20	11,793	67,452	+472		
Egypt	1,670,329	1,678,620	+1	8,115	32,499	+300		
Greece	490,170	480,228	-2	25,344	22,477	-11		

New York Retailers Hold Big Convention

The fourteenth annual convention of the New York State Coal Merchants' Association, held at Stamford-in-the-Catskills, Sept. 4-6, was the best attended in the history of the organization. Business sessions were held each morning of the three-day meeting, the afternoons and evenings being devoted to recreation. The following papers were read: "Profitable Facts and Penny-wise Fallacies," E. A. Konzelman, Buffalo, general manager Konwald Engineering Co.; "Buckwheat Coal, and Appliances for its Economical Utilization," C. A. Connell, combustion engineer, Anthracite Economies Co., Philadelphia; "Business Ethics," Samuel B. Crowell, president, National Retail Coal Merchants Association; "Association Work in Chicago," L. W. Ferguson, late president, Chicago Coal Merchants Association; "The Modern Crook—A Menace to the Coal Merchant," F. W. Withey, vice-president, National Surety Co.; "What the Customer Thinks of the Coal Dealer," Robert W. Disque, business manager, *Syracuse Post-Standard*; "Advertising for the Retail Coal Merchant," by John E. Lloyd, Philadelphia, president of William M. Lloyd Co.

The officers of the association were

re-elected, as follows: Charles B. Staats, Albany, president; C. A. Elwood, Rochester, first vice-president; R. J. Wulff, Brooklyn, second vice-president; J. H. Murray, Waverly, third vice-president; J. M. Gaffers, Albany, treasurer; F. A. Eldredge, Auburn, recording secretary; G. W. F. Woodside, Albany, executive secretary.

New York Banks Give Credit To Aid Ruhr Coal Industry

The Equitable Trust Co., heading a syndicate of ten New York banks, completed arrangements Sept. 8 for a credit of \$5,000,000, to \$10,000,000 for German coal mines. Within these limits the amounts to be extended are indefinite. It depends upon how much the German coal mining trade needs. The advances are designed to facilitate the movement of German coal, either for export or for domestic consumption. The loan is secured partly by coal already in storage, and has the guaranty both of the German coal syndicate and a number of German banks.

While the credit is of the discount type and runs for approximately six months, the German coal mines obtained it on a 6½ per cent basis.

This credit is the latest of a series under negotiation for various trade interests in Germany.

Union Closes West Kentucky Branch Office

That the United Mine Workers are losing their grip in western Kentucky (District 23) was shown a few days ago, when a branch office of the union at Madisonville, Ky., was closed, due to the large number of union men who had deserted the union in going to work for the St. Bernard properties of the West Kentucky Coal Co., Hart Coal Co. and other companies that are operating non-union.

The stronghold around Central City, within a radius of nearly twenty miles in every direction, is as strong as ever in so far as actual operations are concerned, but the workers do not appear to be backing the union as seriously. On Labor Day a parade, which it was claimed would number 6,000 came out with but 1,002 marchers, by actual count made by operators' agents. A free dinner pulled only 1,200 all told.

Out of Central City as far as Beech Creek in one direction, sixteen miles to Nortonville, and 20 miles toward Louisville, there are practically no operating mines, but down in Hopkins County, around Earlington and Madisonville, the strike has been fairly well broken, and also in Henderson County. In Muhlenburg and Ohio counties things are about as they have been.

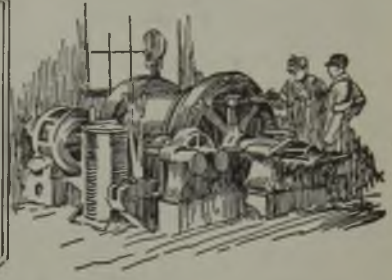
Tonnage and Value of Anthracite Shipped During 1923, by Regions and Sizes

Size	Lehigh Region			Schuylkill Region			Wyoming Region			Sullivan Co.	Total	Per Cent of Total
	Breakers	Washeries	Dredges	Breakers	Washeries	Dredges	Breakers	Washeries	Dredges	Breakers		
Lump												
Gross tons	0	0	0	7,082	0	0	0	0	0	0	7,082	0.0
Total value	0	0	0	\$59,123	0	0	0	0	0	0	\$59,123	.....
Average value	0	0	0	\$8.35	0	0	0	0	0	0	\$8.35	.....
Broken												
Gross tons	166,216	2,773	0	716,682	3,047	0	2,565,411	8,367	0	14,086	3,476,582	4.7
Total value	\$1,332,154	\$21,680	0	\$6,299,891	\$28,792	0	\$19,415,267	\$59,892	0	\$122,366	\$27,280,042	.....
Average value	\$8.01	\$7.82	0	\$8.79	\$9.45	0	\$7.57	\$7.16	0	\$8.69	\$7.85	.....
Egg												
Gross tons	1,405,101	16,305	0	2,544,068	7,295	0	6,912,353	39,918	0	27,954	10,962,994	14.9
Total value	\$12,221,643	\$136,044	0	\$22,609,583	\$65,185	0	\$57,435,625	\$305,408	0	\$253,300	\$93,026,788	.....
Average value	\$8.69	\$8.34	0	\$8.85	\$8.94	0	\$8.31	\$7.65	0	\$9.06	\$8.49	.....
Stove												
Gross tons	1,697,987	12,626	0	3,661,617	17,541	0	8,161,395	80,074	0	46,144	13,677,384	18.6
Total value	\$14,687,845	\$105,556	0	\$32,493,826	\$152,146	0	\$68,551,727	\$678,368	0	\$429,565	\$117,099,033	.....
Average value	\$8.65	\$8.36	0	\$8.87	\$8.67	0	\$8.40	\$8.47	0	\$9.31	\$8.56	.....
Chestnut												
Gross tons	2,425,775	46,856	0	4,756,618	259,318	206	10,472,092	333,278	0	61,112	18,355,255	25.0
Total value	\$20,851,822	\$388,127	0	\$42,136,250	\$2,395,854	\$1,825	\$87,469,766	\$2,856,871	0	\$582,140	\$156,682,655	.....
Average value	\$8.60	\$8.28	0	\$8.86	\$9.24	\$8.85	\$8.35	\$8.57	0	\$9.53	\$8.54	.....
Pea												
Gross tons	912,632	32,985	291	2,038,969	191,355	236	2,548,984	157,417	1,419	44,330	5,928,618	8.1
Total value	\$5,789,990	\$204,318	\$1,526	\$12,951,142	\$1,189,452	\$1,636	\$15,192,848	\$907,968	\$4,257	\$316,472	\$36,559,609	.....
Average value	\$6.34	\$6.19	\$5.24	\$6.35	\$6.21	\$6.93	\$5.96	\$5.77	\$3.00	\$7.14	\$6.17	.....
Buckwheat No. 1												
Gross tons	1,367,965	70,577	433	3,439,731	343,209	1,261	4,133,733	284,328	334	0	9,641,571	13.2
Total value	\$4,929,884	\$256,740	\$974	\$11,784,734	\$1,156,898	\$4,551	\$14,390,950	\$980,783	\$167	0	\$33,505,681	.....
Average value	\$3.60	\$3.64	\$2.25	\$3.43	\$3.37	\$3.61	\$3.48	\$3.45	\$0.50	0	\$3.48	.....
Buckwheat No. 2, Rice and Birdseye												
Gross tons	700,958	80,620	0	1,296,794	309,528	5,600	2,560,927	417,002	0	0	5,371,429	7.3
Total value	\$7,746,908	\$203,760	0	\$2,823,608	\$651,486	\$12,208	\$5,585,362	\$921,924	0	0	\$11,945,256	.....
Average value	\$2.49	\$2.53	0	\$2.18	\$2.10	\$2.18	\$2.18	\$2.21	0	0	\$2.22	.....
Buckwheat No. 3 and Barley												
Gross tons	731,739	219,449	59,876	1,735,007	411,960	156,428	1,507,814	295,312	0	0	5,117,585	7.0
Total value	\$1,134,835	\$327,431	\$81,088	\$2,350,249	\$540,244	\$158,152	\$2,111,229	\$446,836	0	0	\$7,150,064	.....
Average value	\$1.55	\$1.49	\$1.35	\$1.35	\$1.31	\$1.01	\$1.40	\$1.51	0	0	\$1.40	.....
Boiler												
Gross tons	14,426	0	34,125	2,710	14	12,043	85,529	17,554	3,839	0	170,240	0.2
Total value	\$5,511	0	\$40,950	\$948	\$5	\$11,026	\$142,051	\$24,242	\$1,052	0	\$225,785	.....
Average value	\$0.38	0	\$1.20	\$0.35	\$0.38	\$0.92	\$1.66	\$1.38	\$0.27	0	\$1.33	.....
Other b												
Gross tons	115,348	39,553	0	168,105	9,244	108,908	143,836	46,782	0	87,196	718,972	1.0
Total value	\$81,508	\$32,000	0	\$126,013	\$5,307	\$116,786	\$260,203	\$33,606	0	\$208,698	\$864,121	.....
Average value	\$0.71	\$0.81	0	\$0.75	\$0.57	\$1.07	\$1.81	\$0.72	0	\$2.39	\$1.20	.....
Total												
Gross tons	9,538,147	521,744	94,725	20,377,383	1,552,511	284,682	39,092,074	1,680,023	5,592	280,822	73,427,712	100
Total value	\$62,782,100	\$1,675,656	\$124,538	\$133,635,367	\$6,185,369	\$306,184	\$270,555,028	\$7,215,898	\$5,476	\$1,912,541	\$484,398,157	.....
Average value	\$6.58	\$3.21	\$1.31	\$6.56	\$3.98	\$1.08	\$6.92	\$4.30	\$0.98	\$6.81	\$6.60	.....

(a) Includes 2,328,843 tons of "range" coal, valued at \$20,179,951. (b) Includes culm, No. 4 buckwheat, silt, and run-of-mine-coal. Statistics compiled by H. L. Bennet, U. S. Geological Survey.



Practical Pointers For Electrical And Mechanical Men



Blowpipe Renews Mine Machinery

When Equipment Fails Under Stress or Is Damaged by Accident, Welding Puts It Again Promptly in Service—Locomotive Frames and Pump Easily Repaired

“SORRY, but we have discontinued that pattern.” This was the answer to efforts of a mine superintendent attempting to secure a new cast-steel frame for an electric locomotive, which had been in a smash. Not only had the frame been broken, but the electrical equipment was somewhat damaged. It was decided that if a new frame could be obtained at a reasonable cost or the old one repaired it would pay to rebuild the locomotive, otherwise not. So the remark meant that new patterns would have to be made in order to cast a new frame. And the price of this was prohibitive.

This is the sort of circumstance that is liable to lead many a good machine to the scrap heap unless it is known that welding makes possible practically

any repair. The mine superintendent in this case was one of those well-informed men, for he knew the casting could be satisfactorily repaired, but had no man available who could handle a job of this size, so a competent welding shop doing business in the neighborhood got the job.

There were five breaks on the frames. One end frame was broken through the center and both side frames had their ends broken off. These ends were so badly shattered that new sections were cast for welding to the frame.

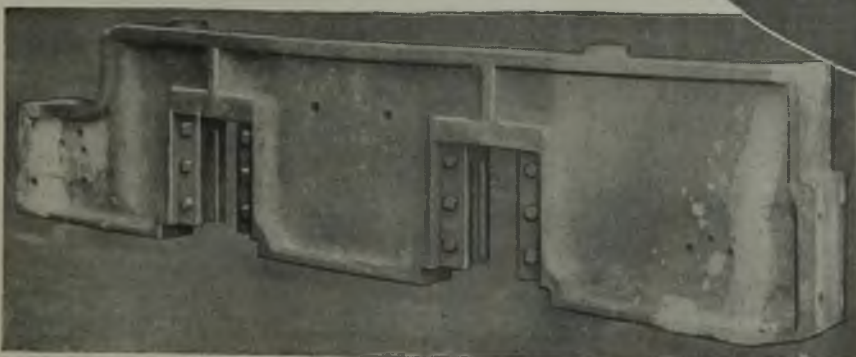
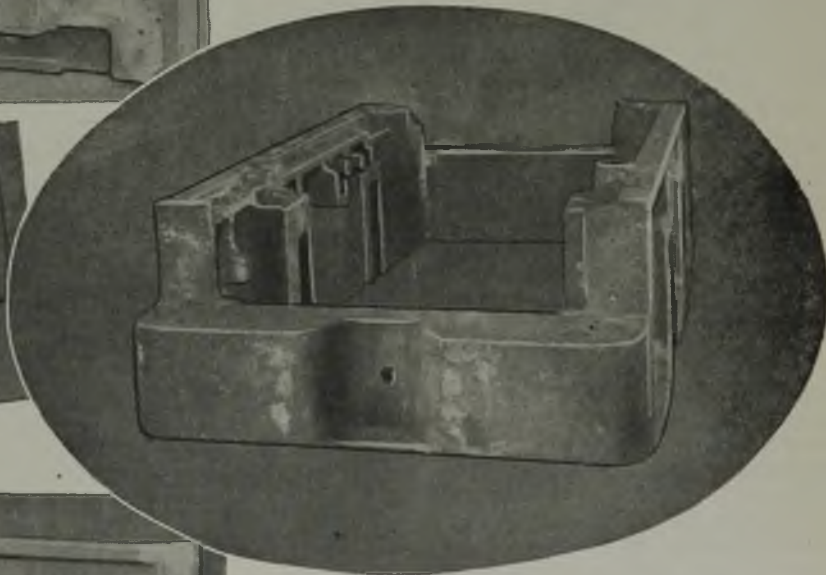
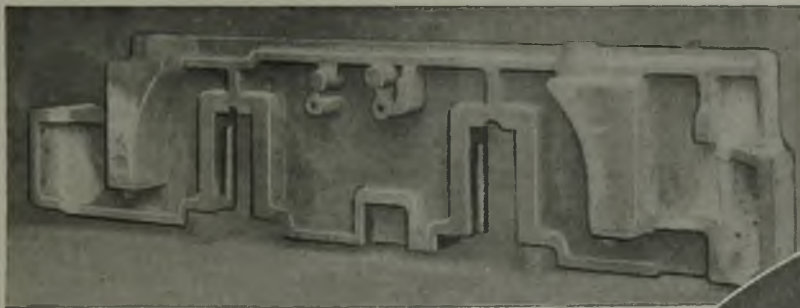
Preparation of these frames for welding was handled in the usual manner except that they were not preheated. Breaks were chamfered and the castings carefully lined up. Pre-

heating was unnecessary because the breaks were through metal free to expand; furthermore, the material was cast steel. The magnitude of the job readily can be judged by the time required to weld the five breaks—174 hours. Even so, the cost of the repair by welding was only one-twentieth of what a new frame would have cost.

MINE PUMP REBUILT

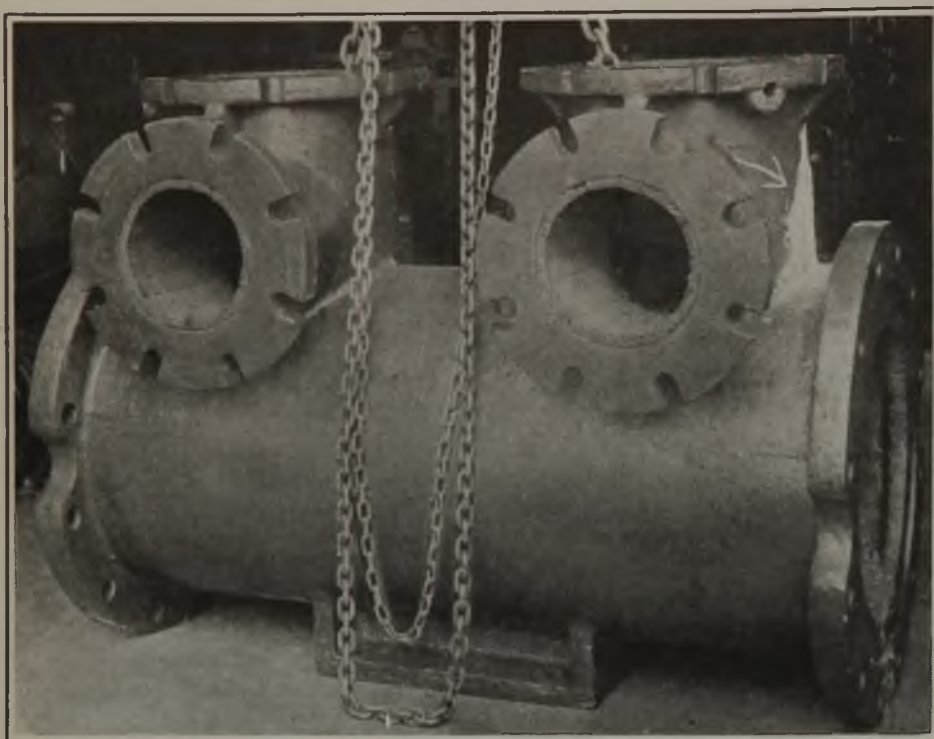
The locomotive frame was not the only large piece of mining equipment being handled by the welding shop at the time. The water end of a mine pump had been left to be reclaimed. One of the top outlets had cracked and one of the large end flanges was full of blowholes. Owing to its complexity this casting was preheated. After welding and finishing the casting, the wood lining was replaced. Here again the total cost of repairs was only a fraction of what a new casting would have cost and the delay in obtaining a new one obviated.

Both the locomotive and the pump head have been in use some time since they were welded and have given a full measure of service. Without question welding is the most practical as well as the most economical method of making such repairs.



Welded Sections of Locomotive

Many a mine locomotive bumps along from day to day and causes high maintenance charges because some part of its frame is cracked or out of alignment. Worn parts may be easily welded and refinished so as to fit like new. Old-style frames must be repaired because, in many cases, the patterns have been destroyed or replacements are few and consequently expensive.



Reclaimed Pump

This cast-iron water end of a plunger pump was preheated before being repaired. Worn spots, cracks and blow holes were filled, and the pump was again placed in service.

Some coal mining companies are now equipping their shops with welding apparatus which often saves money where large wastes formerly ate prof-

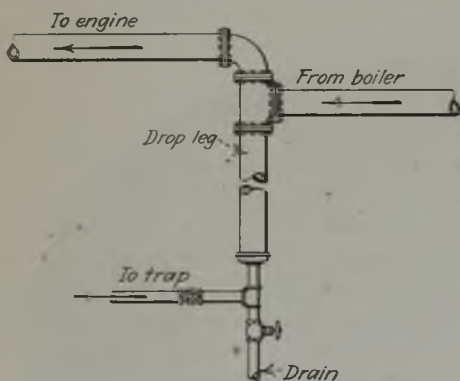
its. Continual progress is being made along these lines at modern mining plants.

Oxy-Acetylene Tips

through the eliminator is made to turn a sharp corner, usually at fairly high velocity. In other words the steam "plays crack-the-whip" with the globules of water held in suspension by it. The same principle is utilized in the arrangement of piping here shown. Steam coming from the boiler is given a quick turn upward. The water, being many times heavier

Inexpensive Device Removes Water from Steam Line

At coal-mine power plants it often happens that it becomes desirable to extend the steam line, either temporarily or permanently, beyond the terminus originally intended. If satu-



Improved Steam Line Drain

rated steam is used, as is usually the case, the longer the line is made the damper will be the steam at the end, whether the line is covered or bare.

The usual method of removing water from steam is by means of an eliminator connected to a trap. Neither of these devices may be available, however, for temporary work, in which case the device shown in the accompanying illustration can be used. Although the results obtained with it may not be comparable with those obtained from an eliminator nevertheless this contrivance made from pipe and fittings, odds and ends, in many instances may save much trouble from water in the steam.

As is well known, steam in passing

volume for volume than the steam, cannot make this sharp turn and strikes the side of the tee, whence it runs down into the drop leg.

From this leg the water may be either conducted to a trap or blown off periodically by hand. The trap works automatically and requires no attention. If the drop leg must be hand-drained it is well to connect a gage glass to its side so that the height of water in it may be visible at all times. The water then need not be eliminated more often than is necessary.

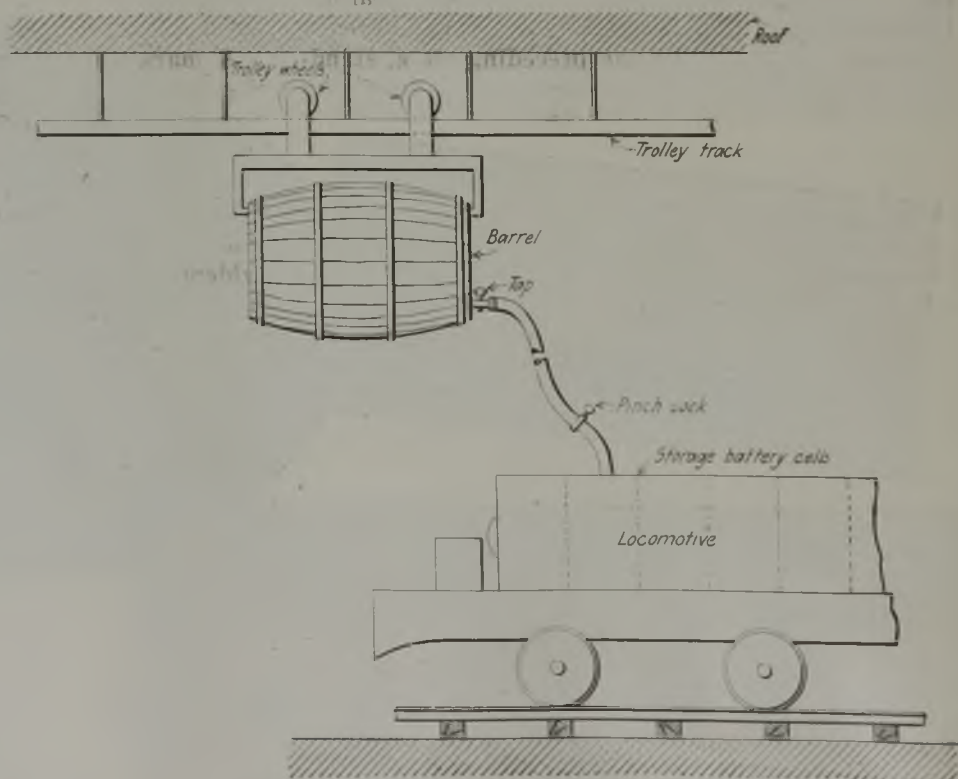
Barrel on Trolley Track Used To Fill Battery Cells

The job of putting water into the storage-battery cells used on the locomotives of the Donk Bros. Coal & Coke Co. at Thermal Mine No. 4, near Edwardsville, Ill., is no small undertaking. Twelve battery locomotives are charged in one station at the foot of the shaft.

Some of these locomotives are quite large and consequently are operated from high-capacity batteries which at the end of each day must be carefully inspected, refilled with distilled water and charged.

Both lead and iron-nickel cells are used in these batteries, the total number of cells being about 750. Every night when the locomotives arrive at the charging station each cell is opened and inspected.

To facilitate the work of filling the cells with distilled water an overhead trolley track has been mounted on the roof above the locomotives. A barrel provided with trolley wheels and bracket is suspended from the trolley and a hose with a pinch cock enables the workman quickly to fill any of the cells. All the water used in these batteries is distilled outside the mines in an electrically operated still.



Barrel on Trolley Track For Filling Cells

Distilled water in the barrel flows through the rubber tubing to a pinch cock at the end. All the cells in the twelve storage-battery locomotives in this mine are quickly filled by this labor-saving device.



Production And the Market



Coal Market Reflects Increasing Strength in Inquiries, Output and Prices

Abiding faith of the coal industry in an autumn revival in business is in process of fulfillment. A touch of cool weather served to inject the needed stimulus to trade, which seems to be gradually but steadily gaining in headway. While buying in many instances continues to be mostly for immediate requirements, consumption is increasing and current needs are mounting. The stockpiles of those foresighted consumers long absent from the market, having made ample preparation for a possible protracted strike last spring, are approaching the vanishing point at a rate that brings additional encouragement to the coal producer. The iron and steel industry continues on the upgrade, operations, output and orders showing a steady gain. Freight-car loadings by the railroads also are climbing at an encouraging rate. Meanwhile the volume of inquiries is increasing to a degree that would indicate that the upturn is not to be evanescent.

Idle Mines Resume Operations

A number of mines that have been idle in various fields since the depression set in have reopened, many more are preparing to resume and most of those that have been operating on reduced schedules are increasing their working time. Distress coal has ceased to be a market factor in most fields.

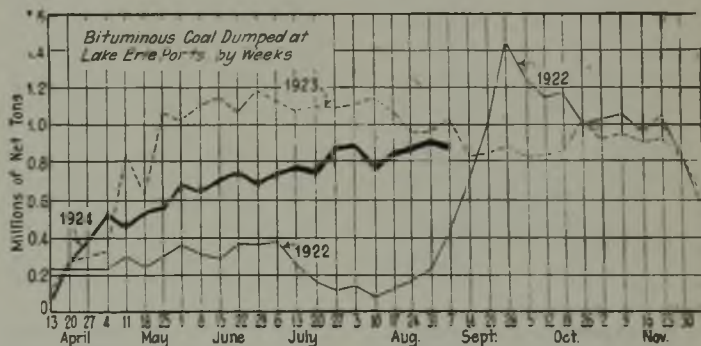
Coal Age Index of spot prices of bituminous coal not only regained the point lost last week but advanced a point beyond the figure for the preceding week, standing on Sept. 8 at 166, the corresponding price being \$2.01, compared with 164 and \$1.99 on Aug. 30. This is the highest level reached since June 30.

Activity at Hampton Roads slowed down somewhat last week, dumpings of coal for all accounts for the seven-day period ended Sept. 4 totaling 327,133 net tons, compared with 364,227 tons in the previous week.

Movement of coal up the lakes is heavy, though still far short of the volume of a year ago, as well as of

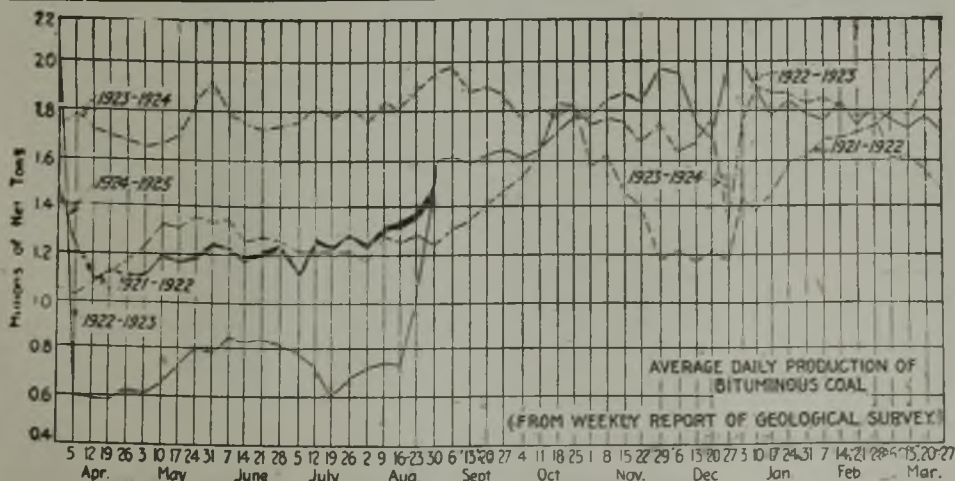
1921, which was an active season on the lakes. Dumpings during the week ended Sept. 7, according to the Ore & Coal Exchange, were as follows: For cargo, 850,865 net tons; for fuel, 47,228 tons, compared with 871,500 and 44,956 tons respectively the week before.

Production of bituminous coal took another big jump during the last week in August, almost reaching the eight and three-quarter million ton mark. The total output for the week ended Aug. 30, according to the Geological Survey, was 8,773,000 net tons, an increase of 420,000 tons over the preceding week, when 8,313,000 tons was produced, according to revised figures. Anthracite output likewise increased slightly during the



week ended Aug. 30, 1,720,000 net tons having been produced, compared with 1,711,000 tons during the previous week.

A marked improvement is observable in the anthracite market, demand being much stronger and prices notably firmer. Independent quotations in fact have increased in some instances 50c. per ton. Except for a few mines affected by local strikes, all the company collieries are working full time. Stove coal, as usual, heads the list in demand, though a steady call is in evidence for egg and chestnut and pea is not far behind. A slight stiffening in call for steam sizes also has appeared and prices are holding close to the circular.



Estimates of Production

(Net Tons)

BITUMINOUS

	1923	1924
Aug. 16.....	10,843,000	7,909,000
Aug. 23 (a).....	11,383,000	8,313,000
Aug. 30 (b).....	11,737,000	8,733,000
Daily average.....	1,956,000	1,456,000
Cal. yr. to date (c).....	366,349,000	294,629,000
Daily av. to date.....	1,785,000	1,431,000

ANTHRACITE

Aug. 16.....	1,858,000	1,386,000
Aug. 23.....	2,165,000	1,711,000
Aug. 30.....	1,893,000	1,720,000
Cal. yr. to date.....	64,485,000	60,670,000

COKE

Aug. 23 (a).....	327,000	108,000
Aug. 30 (b).....	333,000	109,000
Cal. yr. to date (c).....	13,133,000	6,981,000

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

Midwest Pick-up Runs On

The Sept. 1 pick-up in the Midwest coal business has been running along fairly well. Most of the business, however, is in orders signed up just before the Sept. 1 increase in southern Illinois prices. It is expected to run out about the 15th and be followed by a low period until toward the end of the month, when another rise is expected in demand if not in price. Cool weather around the Lakes and North-west territory has added its modicum, enabling many retailers to start moving domestic sizes out of their yards. Other business, however, is still slow. Steam from all Midwest mining regions is very sluggish and nut and egg still stand unbilled at almost every mine that is trying to run. Some additional properties opened up early in the month, but these were few in Illinois and fewer still in Indiana, except for mines on the Chicago, Terre Haute & Southeastern which have resumed after a week's strike over miners' trains.

As viewed from the Illinois fields, there is little business except in Franklin and Williamson County lump and egg. All other sizes in those regions are sluggish. Slow but steady increase in business has caused several properties

to prepare for reopening late this month. The increase from two to about three days a week in running time of the average commercial mine is greeted with joy in those communities whose mines actually are operating. Duquoin and Jackson County mines also feel the lump pick-up, but the Standard district still is decidedly in the dumps. The Mt. Olive field is firing a little of the domestic market and continues to move out a reasonable volume of railroad mine run and of contract screenings. There, too, a few more mines are preparing to open up.

St. Louis Domestic Trade Better

Domestic business is picking up at St. Louis, especially on the higher grades of Illinois coal. There is some movement of anthracite, smokeless and coke, but up to the present there is no activity in Mt. Olive or Standard coals, excepting for apartment houses, which are filling up their bins. Wagonload steam is practically stopped and carload steam is slow. Country domestic demand is fairly good for lump. Other sizes are heavy. Local retail prices have not changed, although the price of Franklin County and Carterville lump advanced 25c., on Sept. 1.

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

Table with multiple columns: Low-Volatile, Eastern; Market Quoted; Sept. 10 1923; Aug. 25 1924; Aug. 30 1924; Sept. 8 1924; Midwest; Market Quoted; Sept. 10 1923; Aug. 25 1924; Aug. 30 1924; Sept. 8 1924; South and Southwest; Market Quoted; Sept. 10 1923; Aug. 25 1924; Aug. 30 1924; Sept. 8 1924. Includes items like Smokeless lump, Pool 1, Pool 9, etc.

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

Table with columns: Broken, Egg, Stove, Chestnut, Pea, Buckwheat No. 1, Rice, Barley, Birdseye; Market Quoted; Freight Rates; Sept. 10, 1923 (Independent, Company); Aug. 30, 1924 (Independent, Company); Sept. 8, 1924 (Independent, Company). Includes items like Broken, Egg, Stove, Chestnut, Pea, etc.

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

Northwest Trade Is Slow

The coal trade in the Northwest is dissatisfied with the slowness of buyers. The weather has not been such as to start a drive for anthracite and domestic, and industrial bituminous business has been none too brisk. Movement off the docks is slow. The tendency at Duluth and the Twin Cities is to maintain prices firmly at present levels, however. There is enough business to halt serious undercutting. The Ford flurry seems to have passed, now that the intentions of that concern have been declared. Mr. Ford appears to be moving into retail trade through his dealers only a stock which was on his new dock at the time he bought it. Thirty cargoes of coal reached the Head-of-the-Lakes during the week, including six of anthracite.

The coal trade at Milwaukee nears the season for lower temperatures without change in the unsatisfactory conditions that have prevailed for some time. Consumers of anthracite are not apprehensive as to supply, and consequently are not filling their bins early. A slowness is noted in the soft-coal trade also, due to the fact that industrial establishments are not compelled to force their power plants, and probably also to the general disinclination to purchase until the need of fuel becomes urgent. There was an increase in receipts of anthracite by lake during the latter part of August. The total Milwaukee receipts for the month were 107,685 tons of anthracite and 353,296 tons of bituminous coal, making the season's receipts 497,223 tons of anthracite and 1,314,004 tons of bituminous coal.

Western Business Not Rushing

While some Kansas City dealers advanced the retail price of Arkansas semi-anthracite 50c. on Sept. 1, others, who had announced their intention of so doing, postponed the move until the middle of the month. There was no advance in wholesale prices of any coal of the Southwestern district. Demand has improved, but not enough to affect prices, which now run thus: Arkansas semi-anthracite lump, \$5.50@7; mine run, \$3.50, and screenings, \$2. Oklahoma lump is \$4.50; nut, \$4; mine run, \$3.25; screenings, \$2. Kansas lump, \$4.50; nut, \$4; mine run, \$3.50; screenings, \$2.50.

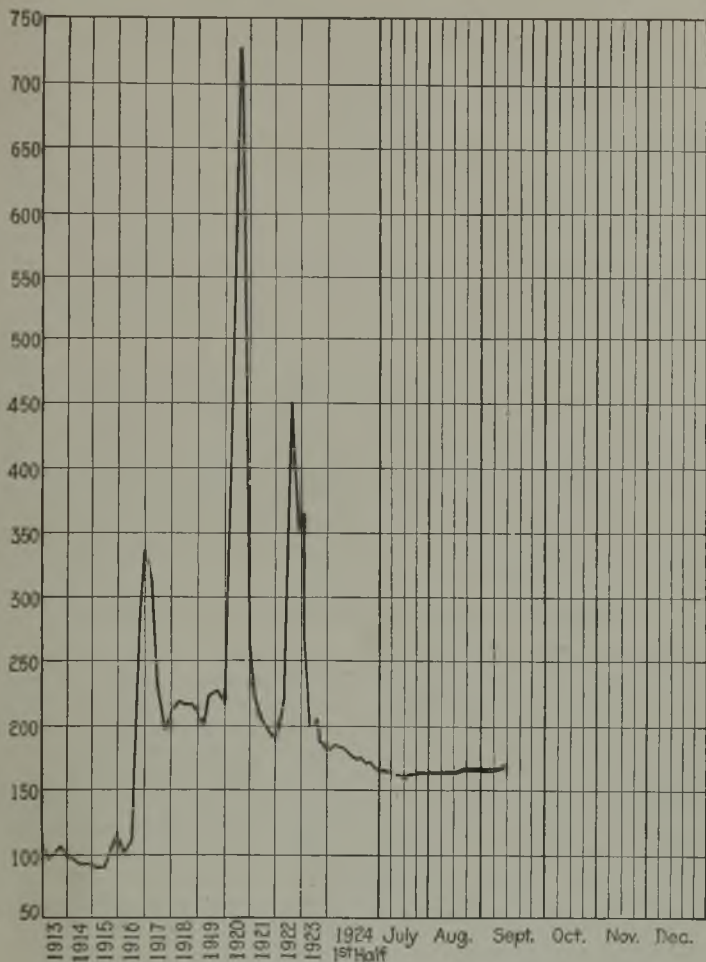
The Colorado market shows a slight stimulation both in the sales and production of bituminous coals, but conditions are still abnormally slow. Colorado mines worked on an average of twenty-three hours last week with 40 per cent of the working time lost on account of "no market." A slight advance in the prices from southern Colorado fields became effective Sept. 1. Walsenburg and Canon City lump, nut and slack are \$5, \$4.25 and \$3.50 respectively, Trinidad lump is \$4 and Crested Butte high-grade anthracite \$7@8.75.

In Utah business is slowing up a little following a spurt caused by the rising market. Prices, however, cannot be said to be settled. Mines are working less than three days a week now. Industrial requirements for this time of the year are normal. An interesting development in Utah retail circles is the increasing demand for domestic lump, a 3x8-in. size. H. F. Fernstrom, president of the retail coal dealers' association, said it was gaining on straight lump. The price usually is 50c. a ton less than straight lump.

Business Quickens in Ohio Markets

The quickening pulse to business at Cincinnati seems to hold. Lake buyers are more active and not so much inclined to haggle over prices. Domestic buyers also are awakening, but the most favorable sign is word from the Norfolk & Western that the supply of gondolas being set out at the mines had dwindled to a 25 per cent reduction and on the Louisville & Nashville it was 10 per cent below that of the preceding week. Movement through the gateways increased 1,255 loads last week; of the 11,521 cars, 2,013 were destined for the lakes. West Virginia coals sell a shade under Kentucky offerings. There has been little change in the smokeless market, but orders and inquiries are increasing.

A better tone is developing at Columbus, domestic demand being the best feature. Preference is shown for Pocahontas, smokeless and splints. A fair tonnage from the southern Ohio field is moving. Owing to the restriction in lump production there is a growing scarcity in screenings and small advances in the small sizes have been reported.



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

Index	1924			1923
	Sept. 8	Aug. 30	Aug. 25	Sept. 10
Index	166	164	165	205
Weighted average price	\$2.01	\$1.99	\$2.00	\$2.49

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.

Kentucky Prices Stiffen

Demand for western Kentucky coal has been improving somewhat, and operators have advanced prices about 15 to 20c. a ton on block, lump and egg over the week, but small nut, mine run and screenings show no change. Operators are now asking a peak price of \$2.65 for best 6-in. block coal, with best lump quoted as high as \$2.50; and egg at \$2.25@2.35, with some houses asking \$2.50. Nut, which comes in numerous sizes, is \$1.75@2.25 according to size; mine run, \$1.40@1.85; screenings, \$1.20@1.35.

Although several mines in strike-bound western Kentucky have resumed in the past few weeks, the increased production, as well as from new strip mines, has been quite well absorbed, and mines are operating on better schedules. The strike situation within a radius of twenty miles of Central City, headquarters of the district union, gives the operators no encouragement.

Feeling in Louisville coal circles has improved as a result of better demand and stiffening prices. In eastern Kentucky the eastern and northeastern sections are busy on Lake and Central States movement, while the southeastern section is shipping to the South and Southeast. The northern and eastern sections in competition with West Virginia haven't been able to advance prices, but the southeastern section has been forcing prices, and some operators are refusing offers of less than \$2.50@2.75 a ton, while a few are reported quoting \$3 on best grades of fine block coal. No differential is being shown in eastern Kentucky between gas and non-gas grades of domestic, but on mine run the gas coal men are holding for around \$1.50@1.75, whereas non-gas coal should be had as low as \$1.25 a ton.

Steam trade is slow. Railroads are taking a fair tonnage while public utilities are good buyers. School coal is moving in considerable quantities. In the southern field the output is between 18 and 20 per cent and is still going up.

The Cleveland market is not especially keen, but with the noticeable pick-up in general business, buying for current requirements has become more widespread, hence the situation has afforded a stimulant to bring about enlarged operations as compared with the summer months. Even so, there are no reports of additional mines opening up, but many mines which have been operating have increased their output, due to the improved situation. The railroads continue to report increase in traffic, and many feel that the roads will soon be taking more coal to safeguard against weather emergencies and also to provide for their heavier requirements during the winter season.

Gradual Gain in Pittsburgh Market

The gradual trend to heavier output in the Pittsburgh district continues and the spot market shows increased activity. Prices are unchanged except that steam slack is up about 10c. and gas slack about 5c. Movement of domestic coal continues to increase week by week but is still rather light. There is less shading than 30 days ago, the shading now on domestic 1½-in. lump rarely going below \$2.50, while \$2.75 is the objective of leading operators as a minimum, it being felt that the market ought to be \$2.75@\$3, according to quality.

The feeling at Buffalo is better, the trade expecting general business to pick up soon and carry coal with it. It looks as if certain sorts of soft coal would soon be put into the regular anthracite trade, opening a new market for all bituminous. Improvement in slack is reported and some shippers have advanced prices slightly. Quotations are \$2.25@\$2.50 for Yougiogheny gas lump, \$2@\$2.25 for Pittsburgh and No. 8 steam lump, \$1.75@\$2 for all mine run and \$1.10@\$1.30 for slack.

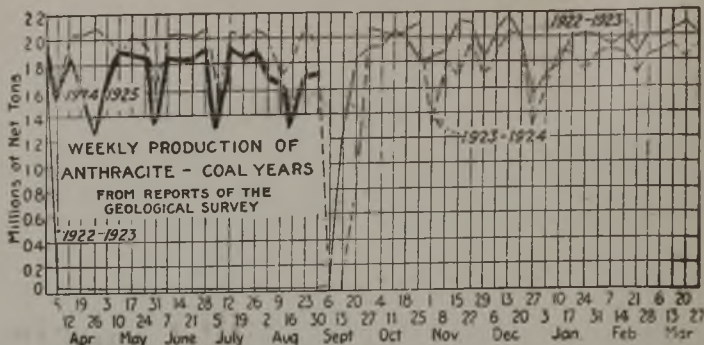
Atlantic Markets Improving Gradually

A gradual but steady improvement is apparent at New York. Inquiries are increasing and large consumers are more in evidence. The biggest improvement is noticeable in the line trade, the situation at tidewater continuing dull but not inactive. There was a spurt during the middle of the week due to a couple of days of cool weather but the activity, while not so pronounced, continued throughout the six days. "Sold-up" is what some producers of high-volatile coals say when asked about September business and the better grades of low-volatile coals also are ordered well ahead. The improvement has not yet been sufficient to affect prices.

A slight betterment is noted at Philadelphia, the bulk of the business consisting of seasonal buying by small consumers. Spot prices are holding firm and very little coal is to be had at sacrifice prices. At the piers, business is so light that there is very little coal standing. The only coal in active demand is slack, and this continues short at times.

Not only is the domestic market at Baltimore very flat and prices low but the export situation continues extremely unsatisfactory. There are many rumors of coming improvement in local industrial sales and in export charters, but much of the prospective business seems contingent upon other developments. Only one manifest of clearance of a coal-carrying ship has been filed so far this month.

Gradual betterment is shown in inquiry and bookings at



Birmingham. Movement to the ports for bunker and export trade shows no improvement. The wholesale market is rather sluggish. Steam prices are stationary, domestic advancing to the September schedules on the medium and better grades, which are quoted: Big Seam lump, \$3@\$3.25; Carbon Hill, \$3.35; Cahaba, \$4.75@\$6; Corona, \$4; Black Creek, \$5@\$5.25; Montevallo, \$6@\$6.50 f.o.b. mines. Operating conditions are unchanged, output for the week of Aug. 23 being 325,000 tons.

Anthracite Shows Cool-Weather Stimulus

Considerable improvement is noted in the hard-coal trade at New York over last week. Demand is stronger and quotations for independent coals increased as much as 50c. A few days of cool weather stimulated the trade to such an extent that some of the smaller independent operators withdrew their prices temporarily. September price lists of the larger producing companies as well as the larger independents for the larger domestic coals show increases ranging from 10c. to 15c. The prices for pea coal and the smaller sizes were not changed. Stove coal continues to top the list in point of demand but there is a steady call for egg and chestnut, while pea coal does not lag. Steam coals also are in better demand and No. 1 buckwheat, which has been the slowest to move for several weeks past, is much stronger. Rice and barley hold up, the better grades of the latter size bringing full circular price.

The Philadelphia market is getting a fair amount of trade. All company collieries are now making full time, except a few affected by local strikes. The demand for stove still holds up and at times appears to have grown stronger. The independent shippers, however, insist on a proportion of nut and pea to get stove, while the companies also are asking for balanced orders. Demand is so light that prices have not been increased. The steam trade still lags.

Prices at Baltimore have been advanced about 50c. above those for July and August, except for pea and buckwheat. Purchasers continue slow in ordering, despite a recent spurt to take advantage of August prices.

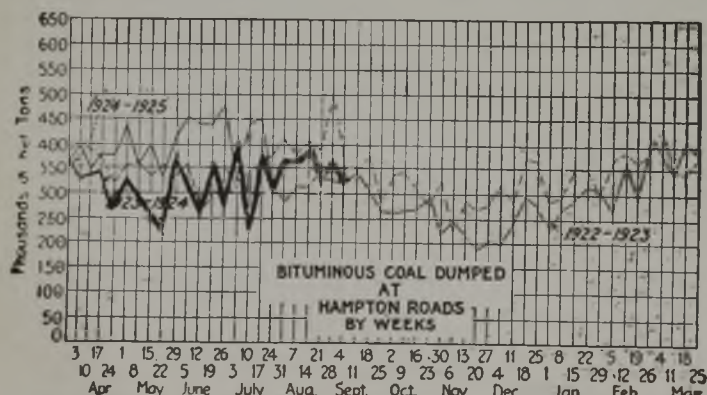
Marked improvement is reported at Buffalo. With autumn here the consumer is beginning to be interested in coal. Many empty bins are to be filled, for summer buying was so light that a spurt to catch up is due soon.

Coke Price Recedes Slightly

The spot furnace-coke market at Connellsville has partly lost its advance of 10c. reported a week ago. In the past week there has been some coke offered at \$3 for spot or prompt shipment, and it is rumored that a September tonnage was recently offered at this figure. However, it seems \$3.10 has been paid occasionally and in one exceptional instance, in a sale not to a blast furnace, \$3.15 was paid. The market is quotable at \$3@\$3.10 against \$3.10 a week ago and \$3 for several weeks preceding. Foundry coke continues dull but the market range is unaltered at \$4@\$4.50. The *Courier* reports coke production in the Connellsville and Lower Connellsville region in the week ended Aug. 30 at 17,900 tons by the furnace ovens, a decrease of 1,300 tons, and 32,570 tons by the merchant ovens, an increase of 1,290 tons, making a total of 50,470 tons, a decrease of 10 tons.

Car Loadings

	Cars Loaded	
	All Cars	Coal Cars
Week ended Aug. 23, 1924.....	982,248	159,814
Previous week.....	952,888	144,549
Week ended Aug. 25, 1923.....	1,069,915	202,817



Foreign Market And Export News

British Market Stronger but Irregular; Output Still Climbing

The south Wales coal market is strong, shipments are heavier and many vessels are awaiting berths, but supplies are curtailed and the general situation is unsatisfactory. Orders are unevenly distributed and prices are irregular. There is little likelihood of idle mines resuming operations at an early date.

The Continental demand is weaker, causing mine owners to feel dubious as to the effect of the Dawes plan. The Miners Federation of Great Britain is against the plan, fearing depression in the industry from reparation payments in coal. Coal owners are less pessimistic and are awaiting the usual autumn upturn, but there is no spirit of confidence throughout the industry. Newcastle prices are a matter of bargaining according to berths. Freight from Wales to west Italy are 8s. 6d. All rates are weak on account of the excess tonnage offering.

The output of the British collieries during the week ended Aug. 23, a cable to *Coal Age* states, was 5,279,000 tons, according to the official reports. This compares with 5,193,000 tons produced during the week ended Aug. 16.

French Coal Market Quiet; New Business Scarce

Calm prevails in the French market, little new business being in sight. The output of industrial coals from the Nord and Pas-de-Calais mines sells easily and no appreciable quantities are put in stock, even of dry duffs, which are in least demand.

The strike in the Mons coal basin is expected to increase the sales of the neighboring French coal fields, though its effect probably will be limited. Efforts are being made by the French collieries to stimulate buying in the region of Rouen. In the North, the sugar-making plants are replenishing their coal supplies, which will be fully covered soon.

In house coals the current of orders is sufficient to absorb production.

The rolling-stock situation is satisfactory and freight has been lowered by 1 f. to 19 f., Bethune-Paris.

Deliveries of indemnity fuels to France and Luxemburg for the first eighteen days of August were 179,800 tons of coal, 173,200 tons of coke, and 8,000 tons of lignite briquets.

Deliveries of coke to the O.R.C.A. continue to be light. During the first twenty-six days of Aug. only 237,172 tons was received.

The strike of Belgian miners in the district of Borinage continues, recent reports being to the effect that ministerial intervention might lead to a meeting of conciliation between employers and miners. It is feared, however that the strike may extend to other Belgian fields.

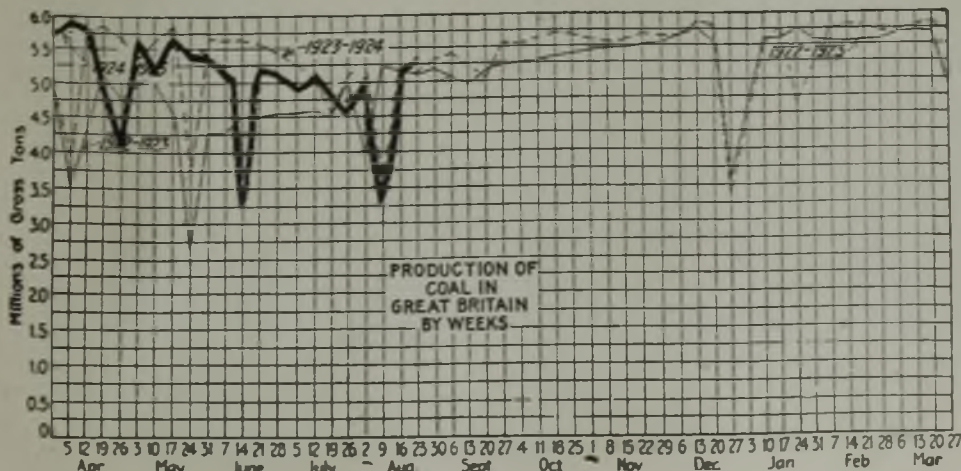
United States Coal and Coke Exports During July

(In Gross Tons)

	1923	1924
Anthracite.....	455,370	290,097
Bituminous.....	2,278,241	1,630,849
Exported to:		
France.....	97,028	26,752
Italy.....	69,723	115,055
Netherlands.....	124,021	
Other Europe.....	83,288	15,350
Canada.....	1,698,896	1,202,400
Panama.....		12,049
Mexico.....	11,190	4,299
Br. W. Indies.....	9,114	11,641
Cuba.....	57,530	44,337
Other W. Indies.....	15,003	10,101
Argentina.....	25,802	19,104
Brazil.....	42,508	104,959
Chile.....	5,459	6,905
Egypt.....	2,425	4,191
French Africa.....	12,379	21,992
Other countries.....	23,875	31,714
Coke.....	60,462	48,983

IMPORTS

Anthracite.....	4,665	8,416
Bituminous free.....	12,211	730
Bituminous dutiable.....	49,645	20,696
Imported from:		
United Kingdom.....	4,945	120
Canada.....	49,652	20,696
Japan.....	570	600
Australia.....	6,229	
Other Countries.....	460	10
Coke.....	3,486	6,578



Hampton Roads Market Quiet; Prices Stiffen

The market at Hampton Roads is quiet, with a slight stiffening in prices, due more to a somewhat depleted surplus rather than to any extra demand. Business in all lines is holding its own with a few scattered cargoes for Brazil and Italy providing the only activity in foreign trade.

Coastwise trade has not picked up to any great extent, although a few cargoes have been moving North. Bunkers remain fair with a slight increase in general shipping having a tendency to increase business in this channel.

Export Clearances, Week Ended Sept. 6, 1924

FROM HAMPTON ROADS

	Tons
For Africa:	
Dan. Str. Kina, for Dakar.....	7,606
For Brazil:	
Dan. Str. Ellen Jensen, for Rio de Janeiro.....	4,540
Br. Str. Wearpool, for Rio de Janeiro	7,272
For Newfoundland:	
Nor. Str. Betty, for Humbermouth..	3,557
For Canal Zone:	
Amer. Str. Ulysses, for Christobal..	12,026
For Cuba:	
Br. Str. Silverway, for Havana.....	3,480
Ital. Str. Stella, for Havana.....	3,927
For India:	
Amer. Str. Crisfield, for Calcutta....	5,533
For Italy:	
Ital. Str. Columbia, for Trieste.....	4,695
For West Indies:	
Br. Str. Berwindmoor, for Fort de France.....	9,453

FROM BALTIMORE

For Newfoundland:	
Dan. Str. Nordhavet, Corner Brook..	4,854

Hampton Roads Pier Situation

	Aug. 28	Sept. 4
N. & W. Piers, Lamberts Pt.:		
Cars on hand.....	1,082	1,537
Tons on hand.....	67,931	93,619
Tons dumped for week.....	124,903	100,851
Tonnage waiting.....	10,000	9,000
Virginian Piers, Sewalls Pt.:		
Cars on hand.....	1,372	1,285
Tons on hand.....	100,100	92,400
Tons dumped for week.....	110,879	101,362
Tonnage waiting.....	7,300	22,048
C. & O. Piers, Newport News:		
Cars on hand.....	1,521	1,895
Tons on hand.....	80,875	104,430
Tons dumped for week.....	89,221	90,763
Tonnage waiting.....	225	2,815

Pier and Bunker Prices, Gross Tons

PIERS

	Aug. 30	Sept. 6†
Pool 9, New York.....	\$4.50@ \$4.85	\$4.60@ \$5.00
Pool 10, New York.....	4.35@ 4.65	4.50@ 4.75
Pool 11, New York.....	4.00@ 4.35	4.25@ 4.50
Pool 9, Philadelphia.....	4.90@ 5.25	4.90@ 5.25
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.....	4.05	4.10
Pool 2, Hamp. Roads.....	3.95	4.00
Pools 5-6-7 Hamp. Rds.	3.85@ 4.00	3.85

BUNKERS


Pool 9, New York.....	4.75@ 5.10	4.90@ 5.30
Pool 10, New York.....	4.60@ 4.90	4.80@ 5.05
Pool 11, New York.....	4.25@ 4.60	4.55@ 4.80
Pool 9, Philadelphia.....	4.90@ 5.25	4.90@ 5.25
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.....	4.15	4.20
Pool 2, Hamp. Roads.....	4.05	4.10
Pools 5-6-7 Hamp. Rds.	3.85@ 4.00	3.95

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


Quotations by Cable to *Coal Age*

	Aug. 30	Sept. 6†
Cardiff:		
Admiralty, large....	28s. 6d. @ 29s.	28s. 6d. @ 29s.
Steam smalls.....	17s.	17s.
Newcastle:		
Best steams.....	20s. 9d. @ 24s.	18s. @ 18s. 6d.
Best gas.....	22s. 6d. @ 23s.	22s. 6d.
Best bunkers.....	20s.	20s.

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



News Items From Field and Trade



ALABAMA

The Corona Coal Co. is making preparations to open up some new mines at Mount Valley, near Oakman. A new railroad is to be constructed to the openings.

The Bankhead Coal Co. is constructing a tippel at its new openings near Jasper, Walker County, and it is stated will be in position to produce coal from these mines by the middle of October.

An increase of \$775,000 has been made in the capital stock of the Pratt Fuel Corporation, making the capitalization \$1,000,000. This company, of which Walter Moore, of Birmingham, is president, by reason of the taking over of numerous smaller coal mining operations, principally in the Walker County field, is now one of the largest commercial and domestic producers in Alabama.

During 1923 Alabama's coal production was 20,919,303 tons from 208 mines, an increase of 2,161,622 tons over 1922, according to the official report of C. H. Nesbitt, state mining inspector, made to Governor Brandon. A similar increase in coke output also is shown. In 1923 4,689,641 tons of coke was produced, as against 3,760,064 tons in 1922, an increase of 919,577 tons. Inspector Nesbitt declares that the beehive oven is fast disappearing in Alabama, being replaced by the byproduct type. In 1923 168 ovens were erected in Alabama and all were of the byproduct type. Mr. Nesbitt says that Alabama is increasing its production of coke every year. Last year 6,895,294 tons of coal was burned to produce 4,698,641 tons of coke.

ARKANSAS

Coal Mines Nos. 2 and 6 operated by the Western Coal & Mining Co., near Altus have been closed indefinitely.

E. W. Hogan, superintendent of the Bernice anthracite mines, announces that mine No. 3 will be opened for operation soon. No. 3 is a slope mine, but it has the same vein and quality of coal as the original Bernice anthracite. An undercutter and other modern machinery will be used and the coal will be hauled by a narrow-gauge railroad, which is completed, to the tippel at mine No. 2 for crushing and sizing. About 20 men will be employed and the force will be increased as the working space becomes larger.

CALIFORNIA

The Darling and Morris Brothers, of Kennedy Flat, have opened up a small coal mine near Buena Vista, in Amador County, 40 miles west of Sacramento. They expect to produce about 50 tons a day. This is an operation which was worked many years ago for awhile.

COLORADO

During the month of July Colorado mines produced 616,186 tons of coal. This is a decrease of 73,068 tons as compared with the corresponding month last year. The total number of men employed in and about the mines in July was 12,317.

IDAHO

H. F. Samuels, who forced the Oregon Short Line to supply rail service on the discontinued branch line from Tetonia Junction to his reopened Brown Bear mines in the Teton basin, has won another battle with the road. He has obtained from the state Public Utilities Commission an order cutting 10 to 20 per cent from the rates on coal which the road fixed to Idaho points when the mines began producing, during the summer.

ILLINOIS

The McLean County Coal Co. has opened its Bloomington mine, which had been closed since last April.

A new wagon mine has been opened on the farm of E. I. Blevins, in the vicinity of Galesburg.

Coal has been found on the Fred Wallbaum farm, just north of the city limits of Ashland. The vein is 4 ft. thick and has a substantial slate and sandstone roof. The vein was struck at about 200 ft., but drilling will be continued.

The Peabody Coal Co., of Chicago, has bought outright the mines of the Springfield District Coal Mining Co. in and around Springfield. To do this an additional \$1,000,000 of Peabody stock was issued, raising the total from \$8,000,000 to \$9,000,000, and the mines were paid for by transferring Peabody stock to the estate of the late F. S. Peabody, which owned the Springfield District Coal Mining Co. The Peabody Coal Co. has been operating the mines and selling the coal ever since the formation of the Springfield company.

Frank Farrington, state union president, comes out in a public statement

denying a news story printed in the *Illinois Miner* to the effect that there are 2,000 non-union miners working in the small mines of the Fulton-Peoria district, and that the 2,000 are causing great union anxiety. He said that the state coal report of 1923 showed only 383 men working in the wagon mines of Peoria County and declares that everything but wagon mines has long been solidly organized and still is. Therefore he denies flatly that there are 2,000 non-union men mining coal there. He admits many of the little wagon operations are not organized but that steady effort is being made to get them into line.

INDIANA

Two Indiana coal companies are trying to collect \$160,000 from the Southern Ry. because of alleged discrimination against them in the distribution of cars between September, 1922, and March, 1923. The two companies are the J. I. Wooley Coal Co. and the Warrick Coal Co., both of Evansville. They filed their complaint with the State Public Service Commission.

A number of mines in the Terre Haute district have reopened within the last fortnight. The Bardyke mine, the property of the Fort Harrison Mining Co., has reopened with 400 men employed. The Pine Ridge mine, belonging to the Binkley Coal Co., also has begun operations with 300 men employed. The Pine Ridge mine is near the Bardyke mine, in the vicinity of New Goshen. The Bardyke mine has been closed for about eight weeks for extensive repairs. With the reopening of these two mines, more than twelve mines in the Terre Haute vicinity have been reopened, re-employing more than 1,200 miners.

KENTUCKY

The Gatliff Coal Co., of Williamsburg, which recently increased its capital stock to \$375,000, has 3,000 acres of coal land under development, and will have daily output of 15,000 tons.

It was reported from Frankfort on Aug. 22 that Thomas P. Middleton, of the "blue sky" department, State Banking Commission, had authorized the Clay County Coal Co. to sell \$75,000 worth of bonds in Kentucky.

The Mayking Coal Co. has been bought by the Imperial Elkhorn Coal Co., of Detroit, Mich., at a price not made public. The capacity of the mine at Mayking has been only 10 cars a

day but the new owners expect to increase this.

MISSOURI

Supply Commissioner Gus Oetting of St. Louis, has let contracts for coal to be used in city institutions, municipal buildings and the water works during 1924-25 totaling approximately 126,000 tons. The Lake & Export Sales Corporation was awarded the contract for water works coal at \$2.75 per ton delivered on screenings from its mine at Marion, Ill. Other contracts let were: City Hall, wagon delivery, to Berry-Bergs Coal Co., \$3.40 per ton; City Hospital, washed No. 4 coal, Union Fuel Co., \$4.01; Court House and City Infirmary, mine-run coal, Berry-Bergs Coal Co., \$3.73; City Hospital No. 2, Inland Valley Coal Co., \$3.68, and for other buildings and institutions, Union Fuel Co., \$4.06.

MONTANA

The new Northern Pacific Ry. strip mine at Coalstrip, 40 miles south of Forsyth, began loading coal Sept. 1 and may soon attain an output of 50,000 tons a month. The coal lies under cover varying from 35 to 75 ft.

The Gilbert-Crawford Coal Co., with a mine near Roundup, has been reorganized after a bitter struggle by the officers to retain control. Walter Gilbert and Charles A. Crawford, president and secretary, have withdrawn. The property has been taken over by a concern known as the M & M Coal Co., which has as its officers Fred Buck of Helena, president; Ben Deinard, of Minneapolis, Minn., vice-president, and Henry Unschuld, of Minneapolis, secretary-treasurer. The directorate consists of the three officers and Percy Gaw, of Helena, and David Phillips, of Minneapolis. Headquarters will be in Helena. A change of capitalization from \$100,000 to \$500,000 was made.

OHIO

The New York Coal Co.'s mine, No. 26, at Nelsonville, resumed operation Aug. 29 after a long period of idleness. More than a hundred men are at work.

Jerome Watson, chief inspector of mines of Ohio, and six deputies have started an inspection of the Blue Rock Mine, in Belmont County, which was flooded in 1913 and abandoned at that time. The workings have been filled

with blackdamp and deadly gases. The inspection will be made with a view of opening the mine after the necessary repairs are made. The chief inspector and his deputies also will inspect the Lincoln Mine of the Lorain Coal & Dock Co., also in Belmont County, which was sealed Aug. 22 because of a fire. If this is found to be extinguished the mine will be opened and repairs will be made by the owner. The same inspectors have arranged to inspect the Doanville mine at Doanville, Hocking County, which was sealed in December, 1920, following a gas explosion. This will be thoroughly explored and if conditions warrant it also will be opened.

OKLAHOMA

There has been an increase in the Henryetta district coal output. The Crowe Coal Co., having obtained the Frisco R.R. contract, has for some time been loading 400 tons per day at its Whitehead mine. Other mines nearby also are reopening.

The Kalin-Inla mine, near Wilburton, which was raided by a band of men on July 18, and a number of non-union workers forced to quit work in the shaft, resumed operations Aug. 26 under a heavy guard of state troops and state police. Approximately fifty men reported for duty and the full crew of 150 is expected to be at work in a few days. Eight coal mines now are operating in Latimer County under open-shop conditions.

PENNSYLVANIA

H. B. Douglas, assistant to F. E. Herriman, president of the Clearfield Bituminous Coal Corporation, with headquarters at Indiana, Pa., has resigned after eleven years service with the corporation, and the position has been abolished.

Cranberry local 1434, of the United Mine Workers, Hazleton, is making an effort to have Senator LaFollette, independent candidate for President, address the members on a date to suit his convenience.

As a consequence of the lull in the hard-coal market 417,000 tons of anthracite is now stored in plants of the Pennsylvania Coal Co. and the Lehigh Valley Coal Co. in the Pittston field. At the present time the storage plant of the Lehigh Valley company at Ransom, Pa. contains 122,000 tons of pea coal alone. The Ransom plant can han-

dle 360,000 tons. An average of 10,000 tons has been dumped there for the past four or five weeks. The Pennsylvania company is storing most of its coal at Coaldale. At the present time it has 200,000 tons there. At the Dunmore storage plant of the same company 80,000 tons is stored while 15,000 tons is to be found at No. 9 mine in Pittston. The Glen Alden company also is storing thousands of tons of anthracite.

Joseph J. Walsh, of Wilkes-Barre, state chief of the Bureau of Mines, has decided to open a new file in the state offices in promotion of mine safety work. The new file will carry the records of the work done in all coal-company operations in the anthracite field in first-aid work. Mr. Walsh told the officials of the Hazle Brook Coal Co. at the first-aid outing of that corporation at Hazle Park, Hazleton, that he would open the new file at once.

The property of the Schuylkill Valley Coal Co., which operation has been suspended for months, has been sold for \$184,100 to the Randolph Coal Co., a Delaware concern recently organized for the purpose of bidding in this property and operating it.

The Lincoln Gas Coal Co., of Pittsburgh, has closed down its mine at Lincoln Hill, in Washington County, about a mile and a half from Washington, in order to build a new steel tippie and a new fan. The new tippie will be thoroughly modern, with shaking screens, picking tables and loading booms. The installation probably will be completed in six weeks.

The Orient Mine, in the Connellsville region, recently acquired by the Hillman Coal & Coke Co., of Pittsburgh, at the sheriff's sale of the American Coke Corporation properties, has resumed coal shipments, after being idle for several months. The Buckeye Coal Co., subsidiary of the Youngstown Sheet & Tube Company, has started up the Brier Hill mine, which had been idle for about a year.

One of the largest contracts for coal from central Pennsylvania in years was closed on Sept. 2, when John C. Cosgrove, of Cosgrove & Co., closed with the Staten Island Edison Corporation for 700,000 tons over a period of five years. The Edison plant was recently purchased by new interests and will be greatly enlarged. The Baltimore & Ohio R.R. is one of the largest consumers of Staten Island current, much of which will be used in the proposed electrification plans for the Staten Island division of that road.

Steps have been taken by the Cosgrove-Meehan Coal Corporation at its Thermal mine No. 10, at Foustwell, Somerset County, to put on the market for domestic use three sizes of bituminous coal, lump, egg and slack, to compete with anthracite. A Marcus shaker screen is being installed and steam shovels are at work and the new equipment will be in operation within a few weeks. Three cars may be loaded at the same time with the various grades of coal.



Typical Wyoming Coal Tippie with Characteristic Surroundings

This is at a Union Pacific mine, Winton, Wyo., a mine where adobe dusting by hand started four years ago at a time when only two or three other mines in the country were trying to reduce coal-dust explosion dangers by spreading inert dust.

TENNESSEE

The Cambria Coal Mining Co., Briceville, of which H. M. Stokes is superintendent and general manager, has acquired the properties and equipment of the Cross Mountain Coal Co., which includes 12,000 acres of undeveloped coal land, about 200 miners' houses, three commissaries, office building and equipment.

TEXAS

The Texas Pacific Coal & Oil Co. reports for the quarter ended June 30, 1924, net income of \$686,254, after expenses, but before depreciation and depletion, equal to 81c. a share (\$10 par value) on the \$8,448,048 capital stock, compared with net income of \$581,604, or 69c. a share, in the preceding quarter. Income account for six months ended June 30, 1924, showed net income of \$1,267,858, before depreciation and depletions, or \$1.50 a share, compared with net income of \$1,759,014, or \$2.08 a share in the corresponding period of 1923.

UTAH

H. H. Calvin, former sales manager for the United States Fuel Co. and the Utah Coal Sales Agency at Salt Lake City, has been made special sales representative of the company. A. K. Bell is now general sales manager.

Dr. A. L. Murray, surgeon for the U. S. Bureau of Mines, with headquarters in Salt Lake City, has been assigned to make an inspection and instruction tour of all mine rescue cars and stations throughout the United States.

L. F. Rains, president of the Carbon Fuel Co., Salt Lake City, is chairman of the committee in charge of that city's Defense Day plans.

Beginning Sept. 1 all coal moved from mine yards in Utah to distributing points will come under demurrage rules after 24 hours' free time. Also, in the allotment of cars loads will count the same as empties. This, it is stated, will be the first time demurrage rules have applied in this state.

WASHINGTON

The Koltop Coal Co., Mt. Vernon, has increased its capital stock from \$95,000 to \$395,000.

Tax valuations have been reduced in Tacoma on the properties of the Wilkeson Coal & Coke Co. by 25 per cent and of the Carbon Hill Coal Co. from \$341,420 to \$245,000. These reductions were made in response to the pleas of the companies that they have not been able to make any money.

The Lisco mine, at Renton Junction, shut down since June 1 for repairs, has resumed operations with much new equipment installed, including an electric hoist, shaker screens and a washing plant.

In the western Washington mine-rescue and first-aid meet, Aug. 9, the Bellingham team won first place. Newcastle second, Carbonado third and

Black Diamond fourth. The first-aid contest was won by Newcastle with Burnett second and Black Diamond third.

Mine No. 3 of the Northwest Improvement Co., at Ronald, near Roslyn, has shut down indefinitely, throwing 325 men out of work. There is no immediate plan of reopening until the coal market improves.

WEST VIRGINIA

The Tunnelton Freeport Coal Co., operating at Blaser, near Tunnelton, in which Cumberland people are extensively interested, will resume operations within a short time.

The purchase of 800 acres of Pittsburgh coal in Cass district of Monongalia County, by W. K. Hatfield, of Morgantown, has been confirmed by Mr. Hatfield, but he said that he was "acting for other interests whose identity he could not disclose now." The consideration involved, it is reported, is about \$400,000.

In order to avoid causing an outbreak such as occurred in the Mingo field, the operators in the Kanawha field, who had determined to evict those tenants who had refused to return to work, have reconsidered their decision at the instance of Governor Morgan and will institute suits and obtain judgment for possession, costs and rent.

The Allied Coal Co. has purchased a complete mining plant and 79.56 acres of coal in Clay district of Harrison County. The purchase covers the mining equipment on the premises and all the mining rights. The property was sold by Chester G. Shinn, C. M. Tarleton, Mary C. Tarleton, L. A. Riggs, Tusca Morris, Harriet B. Morris, Harry B. Crane, Edna D. Crane, Boyd S. Fleming and Eva B. Fleming, all of Fairmont.

J. O. Caldwell, secretary of the Northern West Virginia Coal Operators Association, has severed his connection with that organization to become identified with the traffic department of the various Hutchinson coal companies including the Hutchinson Coal Co., Hutchinson Island Creek Coal Co., Logan Mining Co., and the Rich Creek Coal Co. Mr. Caldwell became chief clerk of the Northern West Virginia Association in August, 1920, and in February, 1922, was made secretary of the association after George S. Brackett had been made executive vice-president.

One of the largest single orders for mine cars ever given by a West Virginia mining company was placed recently by the American Coal Co., having operations on the Norfolk & Western R.R. in the Tug River and Pocahontas districts, the order calling for \$110,000 worth of new cars for immediate delivery. All of the cars will be of the most modern type now in use.

Eight miles of concrete roads, representing an expenditure totaling \$650,000, have been formally presented to the County of Logan by the Island Creek Coal Co., of Holden. The Island Creek company purchased the right of

way, graded and paved the roads at its own expense and without any contribution by the county. The roads are in three sections—the Trace Fork, Whitman Creek and Coperas sections.

Fire believed to have been of incendiary origin partly destroyed the tippie of the Arnettsville plant of the Fort Grand Coal Co. late in August, causing a loss estimated at about \$20,000 and suspension of operations. The mine, which is located on the Indian Creek & Northern R.R., has been operating open shop and paying the 1917 wage scale for several years. The mine has been producing about 500 tons a day, much of which is for railroad fuel purposes. The county court of Monongalia County has indicated that it will offer a reward in addition to that offered by the coal company for the capture of the person or persons implicated.

CANADA

Control of the lignite plant at Bienfait, Sask., is now in the hands of the Saskatchewan government, which is negotiating with one or two firms to take over the plant and operate it as a commercial utility, according to an announcement made at Regina, Sask., by J. C. Gardiner, Minister in charge of industries, who says that the plant has served its purpose in demonstrating the possibility of making briquets from carbonized lignite.

The plant of the Phenix Briquette & Coal Fuel Co., Ltd., has been sold under chattel mortgage in Toronto for \$6,000. W. T. Pember, president of the company, has taken over the plant on a fifteen-year lease from the Toronto Harbor Commission. The total liabilities of the company are \$32,000.

Sir Thomas Tait, president of the Grand Lake Coal & Ry. Co., has been elected a vice-president of the Detroit United Rys. He has been identified with the Canadian Pacific Railway for many years and was one of those instrumental in developing the Grand Lake bituminous coal properties. Sir Thomas headed the company that built the railroad line from Chipman to Fredericton. Previously there had been no railway connections with Minto, which is the chief Grand Lake mining center. The line is about 45 miles long.

At the annual general meeting of the Crow's Nest Pass Coal Co., held at Fernie, B. C., recently, the following officers were elected: President and general manager, W. R. Wilson; first vice-president, H. B. McGiverin; second vice-president, A. H. McNeill; secretary, J. S. Irvine; treasurer, A. A. Klauer; and Comptroller, G. H. Hess. The report for 1923 was tabled. During the year the company produced 775,366 tons of coal and 65,990 tons of coke and made an operating profit of \$471,679 from coal mining and \$61,497 from timber and other sources, enabling the payment of four quarterly dividends of 1½ per cent, aggregating \$372,690, and leaving a credit at the profit and loss account of \$14,276, at the end of the year.

New Companies

The **Continent Coal Co.** has been incorporated at Birmingham, Ala., by T. S. Abernathy, J. M. Donaldson and G. G. Tait.

The **R. L. Brown Coal Co.**, Middlesboro, Ky., capital \$20,000, has been chartered by R. L., C. O. and L. I. Brown, all of that city.

The **Jennie Wilson Coal Co.**, Owensboro, Ky., in the western Kentucky district, has been chartered with a capital of \$10,000, by Jennie Wilson, Russell Wilson Land George S. Wilson.

The **Weissenborn Coal Co.** has been incorporated in St. Louis, Mo., with a capital stock of \$60,000, by J. E. Weissenborn, Rosalia Weissenborn and S. A. Weissenborn, 3632 Hartford St.

The **San Bois Coal Mining Co.** has been incorporated in McCurtain, Okla., by G. W. Shields, McCurtain; Earl Cobb, Amarillo, Tex., and L. E. Turner, 517 N. 21st St., Fort Smith, Ark.

The **Wayne Coal & Mining Co.** has been incorporated in Tulsa, Okla., with a capital stock of \$50,000, by R. D. Leydig, Edmond Boydston, Chas. A. Holden and others.

The **Hatfield Coal Co.** has been incorporated in Covington, Ky., with a capital stock of \$25,000, by J. T. Hatfield, Chas. A. Hunt and M. H. McLean.

The **Sharon Pond Creek Co.** has been incorporated in Sharondale, Ky., with a capital of \$100,000, to develop coal land, by Wm. York, A. B. Yor and others.

The **Mammoth Coal Mining Co.**, 1519 American Trust Bldg., Birmingham, has been organized with C. Cooper, president, and J. M. Donaldson, secretary and treasurer. Eighty acres of coal land is under development, with a possible daily output of 200 tons.

The **Solar Coal Co.**, of Freeburg, Ill., has been capitalized at \$180,000 by John White, W. C. Wolf, Robert White, Samuel White and John Mackie.

The **Pennsylvania Coal Co. of Canada Ltd.**, with headquarters at Toronto, has been granted Ontario incorporation with power to carry on business as coal operators. The authorized capital is \$100,000.

Prudence Coal Co., Inc., Brooklyn, has been organized with \$150,000 capital to manufacture coke and byproducts. Henry Casali, New York City, Constantine Bergamini, Brooklyn, and Harry Aronoff, Brooklyn, are directors and subscribers. A. H. Kurland, 50 Court St., Brooklyn, is attorney for the corporation.

The **Manufacturers Gas Coal Co.**, capitalized at \$50,000, has been organized to operate in Brooke County, West Virginia. Headquarters of the company are to be at Wellsburg. Among those identified with the new company are J. J. Arnold, Washington, Pa.; John W. Conwell, Pittsburgh; W. H. Conaway, Fairmont; E. E. Carter, Wellsburg, W. Va. One of the incorporators, W. H. Conaway, has been attorney for the Josiah Thompson interests in West Virginia for some time.

The **Diamond Coal Co.** has been organized in Provo, Utah, with a capital of \$100,000, fully paid. The company will develop property in American Fork Canyon, Utah County. According to the promoters, the company's property in the canyon has a vein showing at least 6 ft. thick, with a fair promise of an increase as the tunnel is driven into the mountain. Incorporators are: T. E. Nicolodimos, John Blathran, Daniel Odysseis, Nick Tumburas and Chas. G. Y. Higgins, the latter an attorney. All of the men are residents of Provo.

Publications Received

Twenty-Fifth Annual Report of the Mining Industry of Idaho for 1923. Pp. 221; 6x9 in.; illustrated.

The Geology and Mineral Resources of Wise County and the Coal Bearing Portion of Scott County, Virginia, by J. Brian Eby, with chapters by M. R. Campbell and G. W. Stose. A chapter on **The Forests of Wise County, Virginia,** by Fred C. Pederson, also is included. Virginia Geological Survey, in co-operation with the U. S. Geological Survey and the Office of State Forester, Charlottesville, Va. Bulletin No. XXIV. Pp. 617; 6x10 in.; illustrated. This is the seventh of a series of detailed reports on the coal resources of southwest Virginia

under the co-operative agreement of the state and federal surveys. The report is accompanied by county topographic and geologic maps.

Eleventh Annual Report for Colorado, by James Dalrymple, Denver, Colo., state inspector of coal mines. Pp. 94; 6x9 in.; tables.

The **American Rolling Mill Co.**, Middletown, Ohio, has recently published a book of 185 pages entitled **Making Letters Talk Business.** It is a revision of two earlier books on correspondence produced by the company. The price is \$1.25 and the book measures 6x9 in.

Economic and Geologic Papers for the State of Illinois, comprising **Geology and Mineral Resources of the La Harpe and Good Hope Quadrangles,** by T. E. Savage and M. L. Nebel; **Geology and Mineral Resources of the Morris Quadrangle,** by Harold E. Culver; **Geology and Mineral Resources of the Kings Quadrangle,** by J. H. Bretz; **Geology of Northeastern Adams County,** by Louis W. Currier. Illinois State Geological Survey, Urbana, Ill. Bulletin No. 43. Pp. 338; 7x10 in.; illustrated.

Recent Patents

Coal Cutter; 1,485,801. Matthew S. Moore and Herbert Jubb, London, England, assignors to Cowlshaw, Walker & Co., Ltd., London, England. March 4, 1924. Filed May 26, 1922; serial No. 563,970.

Automatic Feeder; 1,486,105. James A. Nolan, Bowerston, Ohio. March 4, 1924. Filed April 25, 1923; serial No. 634,618.

Coal Cutter; 1,486,529. Nils D. Levin, Columbus, Ohio, assignor to The Jeffrey Manufacturing Co., Columbus, Ohio. March 11, 1924. Filed March 31, 1921; serial No. 457,363. Renewed Aug. 6, 1923.

Chain-Grate Stoker Link; 1,486,987. John P. Polster, Toledo, Ohio. March 18, 1924. Filed Sept. 2, 1921; serial No. 497,872.

Mining-Machine Bit; 1,487,198. Newton K. Bowman, North Lawrence, Ohio. March 18, 1924. Filed Aug. 17, 1920; serial No. 404,108.

Mining-Machine Bit; 1,487,217. James F. Dillon, Crown City, Ohio, assignor to Newton K. Bowman, Bowdill, Ohio. March 18, 1924. Filed Sept. 16, 1920; serial No. 410,593.

Mine-Car-Loading Device; 1,487,573. Harry Ingram, Marion, Ill. March 18, 1924. Filed Feb. 9, 1922; serial No. 535,375.

Tunneling or Mining Machine; 1,488,066. Alexander Schmidt, Dorog, Hungary, assignor to Maschinenbau-Aktiengesellschaft H. Flottman & Co., Herne, Germany. March 25, 1924. Filed Dec. 30, 1921; serial No. 525,963.

Obituary

Clarence D. Boyd, manager of the joint traffic office supported by the Southern Appalachian Coal Operators' Association, Harlan Coal Operators' Association, and Hazard Coal Operators' Exchange, at Louisville, died Aug. 29, following a ten-day acute illness of Bright's disease. He had been in poor health for several months. After many years connection with various roads Mr. Boyd resigned as general coal and coke agent of the Louisville & Nashville R.R. May 1, 1919, to establish the joint traffic bureau.

Coming Meetings

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.

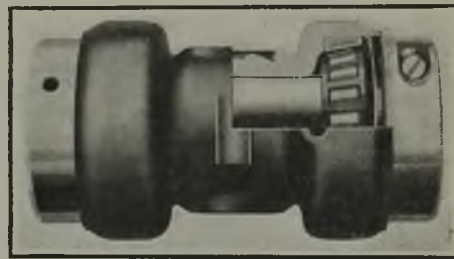
American Institute of Electrical Engineers. Fall convention, Pasadena, Calif. Oct. 13-17. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

New Equipment

Hanger Bearing Has Rollers Tapered to Meet Thrust

A new lineshaft bearing embodying the Timken tapered roller bearing, as well as several new features, recently has been placed on the market by the Dodge Manufacturing Corp., Mishawaka, Ind.

The bearing is a simple unit. There are only five parts to the complete assembly. It consists of two tapered roller bearings mounted on a ground and slotted steel tube and fitted to an accurately machined housing. The ends of the steel tube are threaded to receive clamping collars designed to afford accurate adjustment of the bearings on the tube. This adjustment is



Lineshaft Anti-Friction Bearing

Full utilization of the two bearings for radial and thrust loads is obtained by tapered races housed in this unit.

made at the factory and need not be altered by the user.

The mounting of the tapered roller bearings, as described, assures full utilization of the bearings for both radial and thrust loads. It also adds to the ruggedness of the assembly and is of particular value in resisting the side weave of heavy driving belts.

The method of fastening the steel tube or sleeve to the shaft permits of its use on any commercial shafting. This fastening is accomplished by simply setting up the screws in each of the two clamping collars.

The dustproof feature of this bearing is also of importance. The sleeve on which the bearings are mounted extends from end to end of the housing. Liberal grease compartments are provided inside the housing and outside the tube. The outer ends of the bearings are protected against dust by special metallic grease seals which eliminate friction at this point and positively prevent dust from working in or the lubricant from working out. These grease seals take the place of felt washers or packing.

The tapered roller bearing is constructed on the cone principle which insures a true rolling action. The bearing itself comprises four parts, a cone or inner race with outside taper, tapered rollers, a cage or roll retainer and a cup or outer race.

The cone, rollers and cups are made of electric steel. The rollers and races are heat-treated and each roller is precisely checked for size and accuracy

by magnetically operated automatic machines. The taper of the roller, which has to carry and adjust the end thrust is constantly checked during production by extremely accurate gages.

The assembly of this new lineshaft bearing is simple. It is only necessary to slip the bearing over the shaft and set up the clamping screw in each of the split clamping collars. It is easily removed by loosening the screws in the collars and slipping the bearing off the shaft.

Moistureproof Siren

A new electric siren for indoor and outdoor service recently has been developed by the Inter-State Machine Products Co., Inc., Rochester, N. Y.

The fan or rotor is protected by a waterproof housing and a screen placed in the sound projector keeps out all foreign matter. The siren is positively



Work and Emergency Electric Signal

This device is provided with a waterproof housing and conduit connection to exclude all moisture and dust.

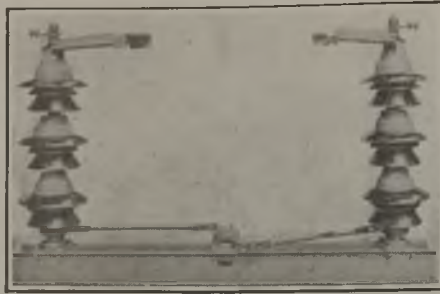
waterproof and weatherproof and can be used outdoors without additional protection. The motor is inclosed in a substantial housing fitted with a conduit connection so that all wiring may be done in the most improved manner, leaving no exposed wires. The horn projector and waterproof housing are made from heavy gauge metal and finished with several coats of red enamel. A specially designed bracket of the swivel type is mounted at the base of the signal so that it can be located in any position and still exclude moisture.

This siren has been improved by the use of a large and more efficient motor, the bearings of which are lubricated by two accessible oil cups.

Improved Pole-Top Switch

A new disconnecting switch for outdoor service has been developed by the Delta-Star Electric Co., Chicago. This unit is for multi-pole service where two or more elements are to be interlocked and operated either manually or by motor.

The switch consists of two rotating pillars with copper contact blades reinforced by heavy T-iron. One blade is provided with a sleet shield and the other a self-aligning contact. When the switch is closed these two parts are held together by contact springs.



High-Voltage Line Switch

Both the insulator pillars on this switch rotate when the switch is either opened or closed. By this means the contact blades come together between self-aligning contacts under a sleet shield.

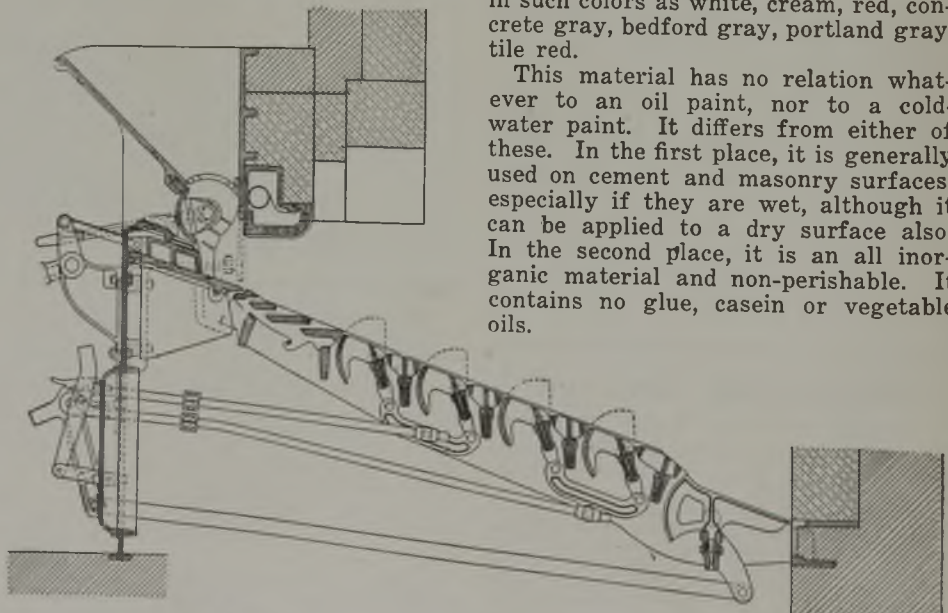
The blades of the switch rotate when being closed. This is accomplished by levers controlled from a special bearing mounted in the center of the switch base. Line wire connections are made to lugs fastened to a small bearing which easily rotates with the blades of the switch. All bearings are fitted for Alemite high-pressure lubrication.

Hopper-Feed Hand Stoker Has Many Advantages

The McClave-Brooks Co., Scranton, Pa., recently announced a hopper-feed hand stoker suitable for application to hand-fired boilers in the mining field. This stoker has been designed for boiler plants where the owner is disposed to avoid the expense of mechanical stokers but nevertheless needs smokeless, efficient combustion.

The equipment consists of heavily designed hopper-feed fronts and heavily constructed divided kicker-movement grates, as well as extra heavy cut-out bars for the removal of the ash and special clinker shear plates. The specially designed pre-heated air arch is a distinct feature of this stoker.

Extending across the front of the furnace are coal magazines or hoppers of large capacity into which fuel may be introduced by chutes from overhead



Side Elevation of Hopper-Feed Hand Stoker

The heavily constructed stoker arch is cooled by air driven through the arch. Consequently, this air is also pre-heated before passing through the coking area where it provides an extra supply of oxygen to help complete the combustion of the gases rising from the green coal.

bunkers, a traveling lorry or, if necessary, by hand. The large capacity of these hoppers is a distinct advantage in case the fuel supply should suffer a temporary interruption by clogged chutes or other causes. At the bottom of these magazines are located the coking plates which also extend across the front of the furnace and directly under the main arch.

Coal is deposited on the coking plates from the bottom of the hoppers or magazines and then is fed on to the inclined grates by plungers or pushers that always feed the same quantity at a push, thereby assuring a bed of correct thickness for various capacities. This action, which takes place with each movement or throw of the pushers, underfeeds fresh fuel to the fire.

Paint for Wall Already Wet

Many people want to paint damp basements, damp concrete and masonry walls, damp building interiors, such as laundries, power-plant walls, etc., where there is an excess of moisture.

Every painter knows one cannot successfully paint a wet or damp surface. If the surface is thoroughly dry and the paint is good and the work is done in a workmanlike manner, a good job of painting, varnishing or enameling will stand much moisture. But it is different when an attempt is made to cover with an oil paint a surface already damp or wet.

The Truscon Laboratories, Detroit, Mich., have brought out a product for coating damp or wet masonry. In fact, it can also be used on wood, although it is preferable for masonry. This material is not an oil paint, as we all know that no oil paint has ever been made which can be applied to a damp surface. This material is known as a hydraulic paint. It contains no oil whatever. It is produced in powder form and mixed with water much after the manner of calcimine or cold water paint.

This material is known as Stuccotex. It is put up in convenient size packages in such colors as white, cream, red, concrete gray, bedford gray, portland gray, tile red.

This material has no relation whatever to an oil paint, nor to a cold-water paint. It differs from either of these. In the first place, it is generally used on cement and masonry surfaces, especially if they are wet, although it can be applied to a dry surface also. In the second place, it is an all inorganic material and non-perishable. It contains no glue, casein or vegetable oils.