COAL AGE

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

McGRAW-HILL PUBLISHING COMPANY, INC.
JAMES H. McGRAW, *Chairman of the Board*
MALCOLM MUIR, *President*
H. C. PARMELEE, *Editorial Director*

SYDNEY A. HALE
Managing Editor

H. W. CLARKE
Publishing Director

Volume 34 NEW YORK, FEBRUARY, 1929 *Number 2*

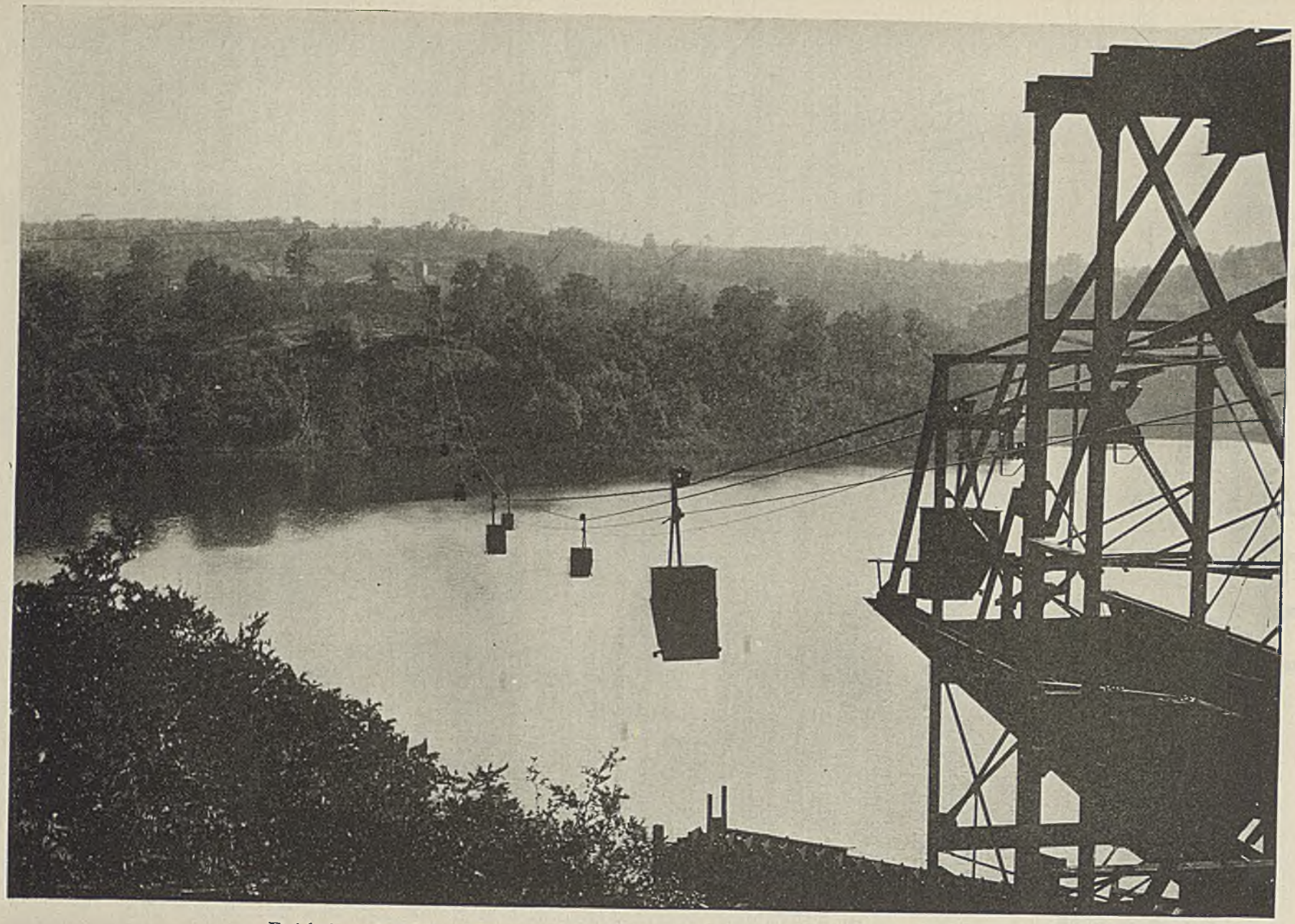
Combinations—1929 Model

LARGE-SCALE consolidations still seem to many the ideal, if not the only, way out of the destructive competitive situation sapping the strength of the bituminous industry. Prospects for an early realization of that ideal in the form commonly visualized, however, are not bright. The collapse of the merger movement in southern West Virginia last year demonstrated anew how difficult it is to reach a basis for combination acceptable to conflicting groups in a highly personalized business. The general disinclination on the part of investment bankers to underwrite soft-coal consolidations puts a definite check upon the probabilities of lessening ruinous competition by outright cash purchase.

RECENT FAILURES to effect major consolidations should invoke neither despair over the future nor indifference to present opportunities for progress toward greater stabilization. The fact that one door has been closed ought to be a challenge to leadership to find another way out. Obviously if the industry is to be denied the quick advantages inherent to mergers in their familiar guise, the problem before it is how the industry may best and most speedily win like benefits under its existing form of organization.

THERE ARE many ways in which individual companies may pool their interests without actual combination and still keep within the spirit and the letter of the law—if the industry will forego the pursuit of rainbow relief for the more prosaic but practical means of amelioration close at hand. Co-operative research to develop new uses for coal and to broaden present markets offers an attractive possibility as yet hardly touched. Development of fair-trade-practice codes, now under way in several districts, is another. Much work must be done on mechanizing coal burning in the homes. Through local and national associations opportunities are open for co-operative fundamental economic studies badly needed for the future guidance of the industry.

SUCH a movement, of course, can succeed only to the extent that individual operators also recognize their individual obligations and responsibilities to themselves and to their brother producers. If everybody waits for the other fellow to take the initiative, there will be no progress; leadership cannot spring from such sterile soil. Without this leadership there is scant hope for that fruitful development of co-operative effort and individual responsibility which makes for general stability and prosperity. With this leadership functioning effectively there will be revived interest in financial circles in working out actual consolidations in the bituminous coal industry—and less need for such assistance.



Bridging the Cheat River with an Aerial Tramway for Coal Transport

[See page 83]

Preparation Plant, Ernest Mine

Study of Coal Characteristics Is Weapon in Competitive Market

By Alphonse F. Brosky
Associate Editor, Coal Age

INTENSIVE study of the chemical and physical characteristics of its coals and their behavior during combustion has been made a major part of the merchandising program of the Rochester & Pittsburgh Coal Co. With this information the company, which operates in the Clearfield district of the central Pennsylvania field, feels it is in a better position to place its coals where and only where they will give satisfaction to the consumer. Instead of following the practice of expecting the buyer to fit his plant to the coal or else make the best of it, the Rochester & Pittsburgh company fits its coals to the equipment and conditions in the customer's plant. As a result, the business of this company has shown a healthy growth during the four years since the inception of this policy.

In arriving at this policy an analysis was made of the general economic situation in the coal business—unstable and shifting markets, brought about by price cutting and buying of coal without regard for its suitability. This analysis disclosed a lack of fundamental knowledge of the characteristics of coals and how they could best be applied to particular problems in use.

Studies were started simultaneously at the two extremities of coal distribution—in the mines and preparation plants at the one end and in the plants where the coals are used at the other. To facilitate this work two new departments were established: a preparation department in the operating division and a combustion servicing department in the sales division. These two groups interchange information and work together toward its correlation and application.

SOON after the studies were begun the fact became fully appreciated that in addition to its chemical composition, as measured by proximate and ultimate analyses, coal possesses other characteristics which must be reckoned with and utilized in determining its application. Within its columnar or vertical formation and within its horizontal limits of deposition, coal of any one seam is far from uniform in composition. The composition may differ in some degree as between adjoining mines or even the several sections of one mine, due to variations in the mode of deposition of coal-forming vegetation and in the degree of quakal disturbance and erosion, which phenomena also affect its structure. These facts do not, of course, constitute a new discovery, as they have been for a long time the common knowledge of geologists and men in the field of coal research. Neither are these facts in general new to men engaged in producing coal, but the discovery by coal men of the far-reaching possibilities in the application of these facts to the merchandising of coal *is new.*

The geological phase is not being neglected in these studies. The men in charge of investigations at the

Crushed and Quartered Automatically

mines are gathering all pertinent geological information. They realize that for some time scraps of such information have unconsciously been used to advantage, but that if applied directly this information may be of increasing value.

IN FITTING a coal to a particular set of combustion conditions an understanding of the structure of coal can be utilized more immediately and beneficially by the coal producer in today's market than perhaps any other factor. Structure, together usually with toughness or hardness as a lesser factor, determines the sizes into which a coal breaks when blasted down in the mine—a point well worthy of consideration, as proportions of sizes in the yield from blasting play a big part in the marketability of a coal. Structure governs the yield of various sizes when a coal is further broken down in a crusher. It is an influencing factor when related to the attritive quality of a coal intended for use as powdered fuel. Structure also is a factor in combustion, for it regulates the degree to which a lump of coal splits into smaller sizes on exposure to the heat of a furnace, which in turn influences the rate of flow of air through the fuel bed.

The combustion servicing department is so closely allied with the sales organization as to warrant considering both as one unit. At the head of the R. & P. combustion service department is a man of thirty-odd years' experience in steam-plant operation, whose hobby all these years has been the study and correlation of characteristics of coal with steam-plant practice. Included in the sales department are five sales engineers whose duties combine actual selling with study of the combustion performance of the coals of the company in the plants of old and new customers. These men have been trained for the job.

Boiler tests are constantly conducted in one of the power plants of the coal company as a means of learning more about the general operating characteristics of coals prepared at the company's mine plants. This plant is equipped with all the metering and analysis paraphernalia necessary for comprehensive tests. Thus the Rochester & Pittsburgh Coal Co. approaches sales from an engineering angle.

INVESTIGATIONS in the mining division quite naturally were started at the face and resulted in regulations and practices governing mining that assure clean coal. For example, in the Ernest mine center cutting machines are used for the removal of a laminated band of bony and coal which divides the seam into two benches. Fortunately, the roof and floor in the mines of this company (in the upper and lower Freeport seams) are good and therefore require the exercise of only moderate care to avoid the inclusion of rock during the loading operation. Inspectors are employed to check up on coal preparation at the face.

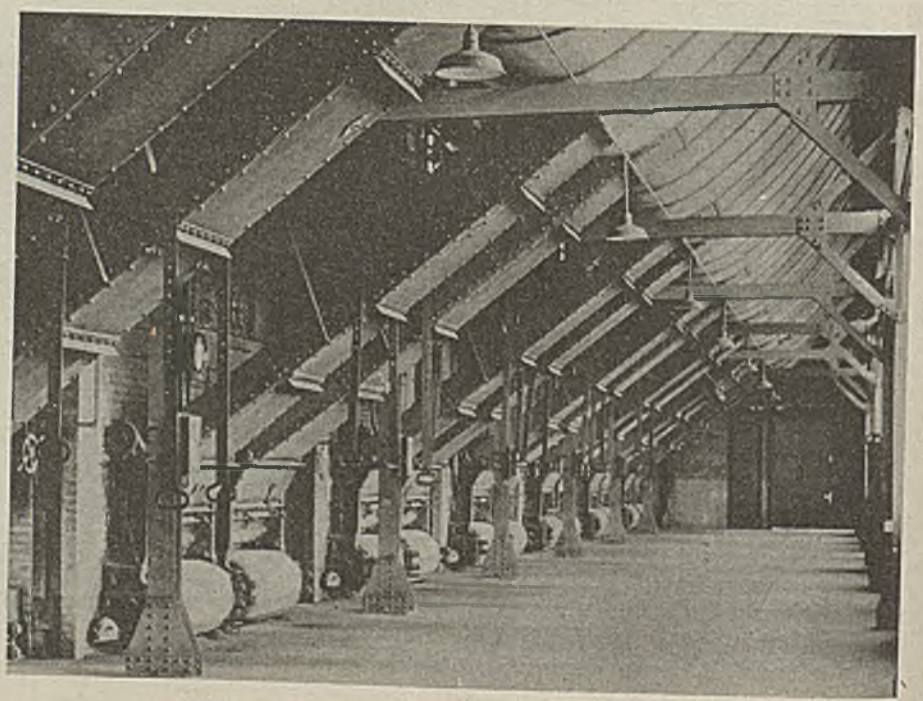
Face samples in advancing entries are taken and analyzed periodically in the company's own laboratory. Then, too, samples are constantly being taken of the coals as prepared for shipment at the several mines of the company. This work is facilitated by the use of an automobile truck equipped with a type of Sturtevant mill which automatically crushes and quarters the samples. The samples are taken by sizes and the analysis results of each are kept plotted by mines as a year-by-day graph. These graphs are checked up regularly with face analyses, thus making it possible to maintain a standard quality in the shipped coal.

A small ball mill is in use for testing the attritive qualities and horsepower requirements in the grinding of these coals and another is being installed.

One man in the preparation department devotes considerable time to studies of the physical properties of the coals. He pays particular attention to the manner in which the coal breaks into sizes as a result of being blasted in one case and of being subjected to the action of a crusher in the other.

Such studies assist in the control

The Objective—Efficient Combustion Here



of preparation in the tipples. These plants of necessity must be extremely flexible in order to prepare a multitude of products of predetermined characteristics, each product being designed for a particular use. Where some leeway as to the proportions of sizes is allowable the product is assembled directly by screening. But where the proportions of sizes in a product are to be kept within narrow limits the components are taken separately from the feed coal by screening and subsequently combined in the desired proportions through the medium of conveyors and wing gates. To assure accuracy and uniformity of the mix, great care is taken in the regulation of feeders and the speed of conveyors, as well as in the adjustment of wing gates.

There are many variations in the methods by which this is accomplished. Perhaps it may be desirable to send lump coal to a crusher for reduction to smaller sizes. At the Ernest mine plant the routing of sizes is further involved by a washery —with Campbell bumping tables having a capacity of 200 tons an hour.

As the needs of a steam plant in most instances can be met by a coal the size content of which is fixed by screening and thus controlling only the upper and lower size limits, it is not necessary that the practice of screening and recombining sizes be applied to the bulk of the output from these plants. The purpose of the company is to be in a position, from the standpoint of equipment, to supply, when required, a product that will meet exacting specifications.

SEVEN tipples of the company are designed to give flexibility in preparation, of which the Ernest mine tipple is the outstanding example. Four of these tipples, including the one at Ernest, originally were built with an eye for flexibility of preparation. Three of them were reconstructed. In this highly specialized preparation one or another of the details of tipple layout must be changed at intervals to keep pace with improvements in preparation technique. At the present time

Company's Laboratory at Indiana, Pa.

plans are under way for handling coal from other mines of the company in the Ernest plant. The coal will be shipped to this plant by railroad and treated during the night shift. The company also is considering the erection of a central plant which will incorporate features that will allow still further refinements in cleaning and sizing of coal from a group of mines.

The results of this pioneering into the heretofore untried field of matching coal to use have strengthened the Rochester & Pittsburgh Coal Co. in the conclusion that it is on the right track. By the application of constructive methods it has progressed to the point where the marketing of small sizes — from, say, 1 in. down to zero —is no longer a problem. Investigation of the characteristics and properties of its coals disclosed the fact that the smaller sizes are ideally suited for combustion in a powdered state, due to a happy combination of desirable physical qualities and comparatively low ash content, and that the intermediate sizes are entirely satisfactory for furnace coal when combined with still larger sizes. The company is specializing on these two grades of fuel, and so, if anything, large lump is a glut on its market and frequently is crushed to smaller sizes which are in greater demand.

THREE business policies which have been adopted deserve special emphasis: (1) Never sell to a prospective customer whose plant is of such character that no coal of the company will give satisfaction; in other words, the market is selected. (2) Put forth considerably more effort to retain customers than to sell prospects. (3) Tackle selling from an engineering angle.

While this company grants mechanical cleaning as a big step forward in the direction of increasing the steam yield of a coal and bettering the content for other purposes, it is convinced, in the light of its own experience, that close study of coals and their application will open up a vastly more promising field for improvement. By following its present methods it has, as already stated, eliminated the small-coal problem. It has proved in competitive tests that its coals, so prepared, will evaporate more water per pound than competing coals of higher B.t.u. and lower ash content, and that they can be burned with less smoke than competing coals of lower volatile content. Its coals have successfully entered the fields of byproduct coking, metallurgy and gas making, despite an earlier belief that they were unsuited for these purposes.

Officials of the Rochester & Pittsburgh Coal Co. believe these methods and policies have greater possibilities than has any other factor in stabilizing the coal industry.

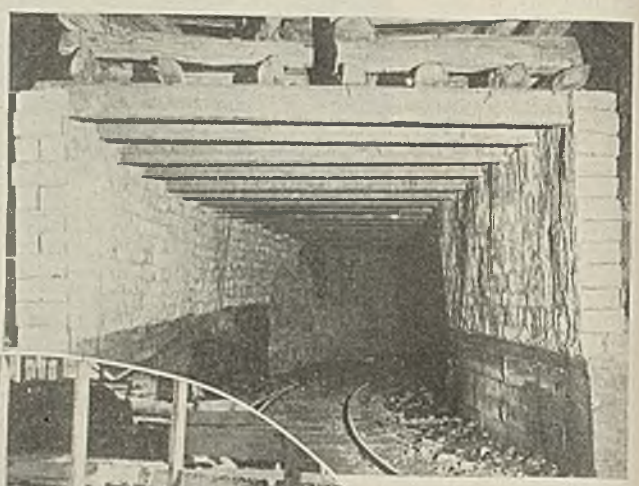
South America!

The recent good-will tour of President-elect Hoover has turned the eyes of many business men here toward the commercial developments and the commercial possibilities in the lands of our southern neighbors. And, naturally, the question of coal — the fuel resources of South America and the market it offers to coal producers in other countries—crops up.

Has the United States lost or won trade in South America in recent years? What are the probabilities of a substantial expansion in the exports of coal from this country to South America? John R. Bradley, chief of the coal section of the Bureau of Foreign and Domestic Commerce, answers these questions in an article beginning on page 80 of this issue of COAL AGE.

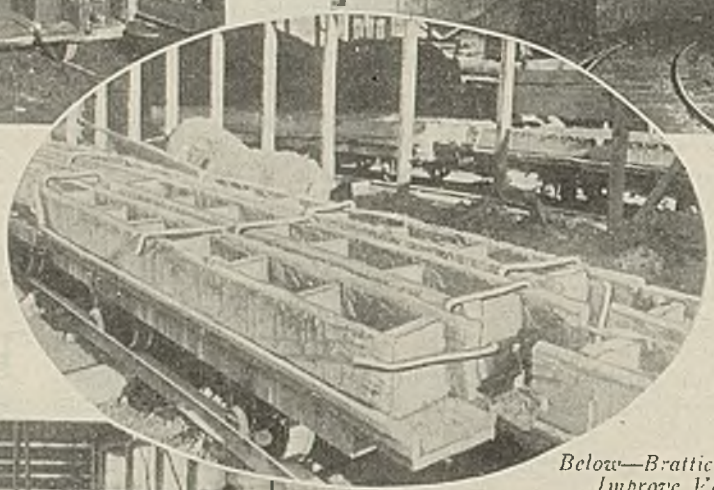
Solid Concrete Blocks Prove Effectiv

Above—Stripping Molds and Putting Day-Old Blocks in Stockpile

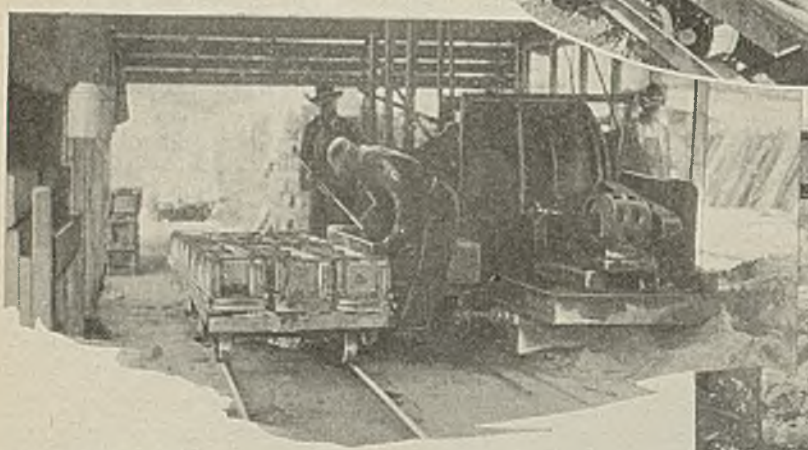


Above — Construction Photograph Showing Precast Blocks on Monolithic Base

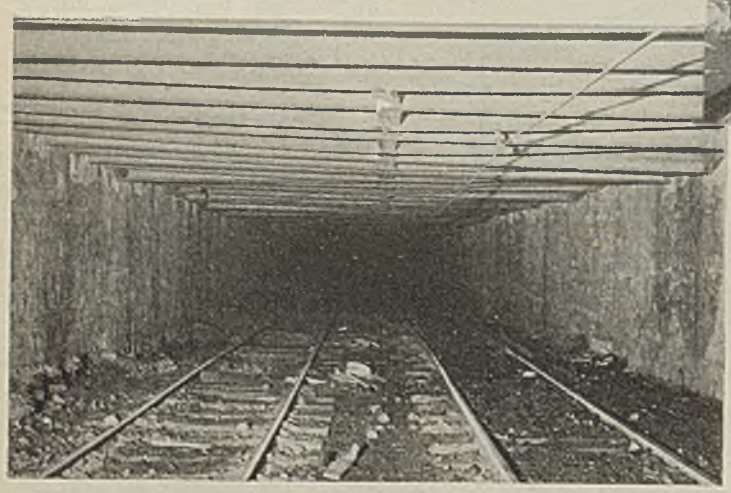
Right—Molds Held Together by Clips of ⅜-in. Round Steel



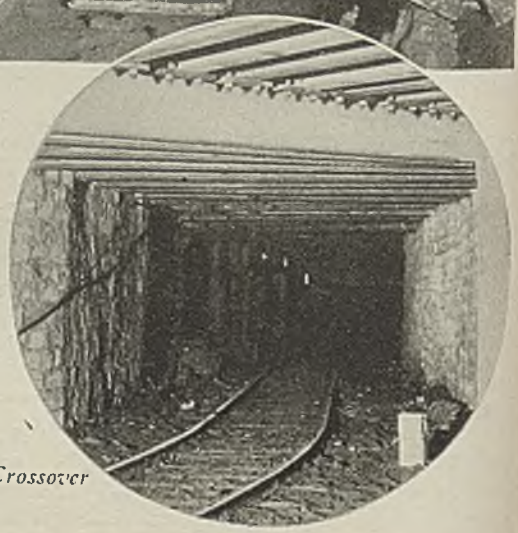
Below—In the Shed Filling the Molds



Below—Brattices Made From Blocks Improve Ventilation Efficiency



Above—Double-Tracked Entry Walled With Blocks



Right—Blocks Used in a Crossover

ınd Economical *for Mine Walls*

By L. T. Putman

General Manager
Raleigh-Wyoming Coal Co.
Beckley, W. Va.

AS LITTLE interference with production as possible was the goal of the Raleigh-Wyoming Coal Co. in reconstructing the shaft bottom at the Glen Rogers mine, in Wyoming County, West Virginia, and the use of masonry made of precast units was finally settled upon as promising the greater measure of fulfillment of this aim. With this method the work was handled satisfactorily at a saving in cost and the hoisting of coal was practically uninterrupted.

In planning the use of masonry made of precast blocks the wet cast process of manufacture was decided on rather than the tamped method, as the company already owned a number of flat-bottomed cars of the type used around brick plants on which the blocks could be cast. An outside plant with a double-track arrangement for handling these cars and equipped with a stationary mixer of the building type therefore was laid out at a convenient place adjacent to the cement and aggregate storage spaces.

The blocks are made solid without the usual air space found in machine-made units and are 6x6x12 in. in size instead of the usual 8x8x16 in., special molds being designed for this work. These molds are made of wood with metal fittings and are so constructed that they are easily assembled for casting, easily separated to remove the hardened block and easily cleaned and repaired. Each mold makes six blocks in a gang and three of the molds are placed on a car for casting, thus making the capacity of a single car 18 blocks. After the empty molds are set up on a car it is run into a shed and under the discharge chute of the mixer, where the molds are filled and puddled. The car is then run out on a storage track and the blocks allowed to harden until next day, when they are removed from the forms. One casting is made per day, the capacity of the plant being the number of molds and cars used.

Reassembling Molds on Cars

The mix used consists of one part cement and three parts aggregate, the latter being made up of sand and cinders from the mine power plant. This mix is a rich one, the ratio of water to cement giving a quick hardening concrete yet one with a workable plasticity for placing and casting in the molds. The blocks are hard enough in a few days to withstand rough handling, and blocks only two days old have been laid up when the production ran behind the demands of the work. Walls made of these blocks are giving entire satisfaction and no failures have resulted. Generally, however, after removing the blocks from the molds, they are allowed to cure in the stockpile about five days before use. The stockpile is beside a supply track, allowing the blocks on the mine supply cars to be transported directly to the shaft and down to the work.

THE size of blocks provides flexibility. They are light enough to be handled easily, large enough to be laid rapidly, and can be used in combinations to give any thickness of wall desired in multiples of 6 in. Where used for side walls along the rib, they usually are laid two blocks wide, making a wall thickness of 12 in. Frequent header courses give a good tie.

They have been found particularly desirable for brattice work and many old brattices of wood and other materials have been replaced with the blocks because of the resulting increase in efficiency of the ventilation system. Previous to this substitution of block brattices for other types the air efficiency of the mine, measured by totaling the currents at the faces and comparing with the fan output, was found to be about 30 per cent. The use of the concrete blocks in brattices shows an efficiency of 67 per cent, which in a gaseous mine is important.

As the lining work progressed blocks were substituted for use in many places where originally it was planned to use monolithic concrete. It was found that in the placing of monolithic walls underground the assembly of form lumber and the building of forms frequently involved the use of more labor than the laying of blocks to form a wall. Oftentimes the wood forms had to be built and braced in such a way that they interfered with haulage of coal and with other work.

IN THE beginning of the block manufacture enough molds were used for a production of 100 blocks per day. As the feasibility of the system became known and the use of blocks increased this plant was unable to keep up with the requirements although worked every day, so in November, 1927, the capacity of the plant was increased to about 600 blocks per day by the addition of more molds. Two men are employed steadily making the blocks.

Including the cost of materials, freight, labor to make the blocks and labor of laying the block walls underground, the cost is about 50c. per cu.ft. or $13.50 per cu.yd. For concrete cast in place underground the cost runs about $20 per cubic yard. This showing indicates the considerable advantage in the use of the precast cinder concrete blocks.

SOUTH AMERICA

Coal consumption fails to keep pace with commercial and industrial expansion*

By John R. Bradley

Coal Section
Bureau of Foreign and Domestic Commerce, Washington, D. C.

IF corroboration was needed of the fact that South America is not the land of "mañana" but the land of today, it was given by the recent visit of President-elect Hoover. Some idea of the importance of this region with an estimated population of 79,000,000 and an area of 7,458,889 square miles, is indicated by the fact that total imports in 1913 were valued at $1,116,100,000, of which the United States supplied $177,627,000, and exports $1,227,400,000, while in 1927 total imports were $1,174,000,000, of which the United States supplied $520,958,000, and exports $2,117,400,000.

In 1926 railway mileage was estimated at 56,704. Between 1913 and 1926 the trackage in the Argentine, Brazil and Chile increased 7,449 miles, of which 4,155 were laid in Brazil and 342 in Chile. The tonnage of foreign vessels entering and clearing ports of the Argentine in 1913 was 6,995,000; in 1927, 11,864,000 tons. That of coastwise and foreign vessels in Brazilian ports was 29,170,000 and 36,159,000 tons, respectively.

Large areas of fertile and undeveloped land with mild climatic conditions lie east of the Andes and south of lattiude 10 South, in a territory devoid of known high-grade coal resources, although with some important undeveloped water-power sites. The pressure of population continues to bear heavily on many European countries and it can hardly be doubted that the stream of immigration will continue to pour into South America and especially into this region.

Notwithstanding the commercial and industrial development implied by the foregoing, an analysis of South American markets reveals that coal consumption in 1927 as compared to 1913 has decreased remarkably, though the consumption of coal and fuel in terms of coal remains approximately about the same. The coal markets of the west coast are now insignificant, however, and American coal has practically been ousted from all of these markets, although the total exports of American goods and American investments have greatly increased.

DATA on coal reserves in South America are meager. It is probable that Colombia has the largest reserves and of the highest grade of the countries. Deposits are reported of widespread occurrence in the Cretaceous and Tertiary strata but they have been worked at but few points and are largely unexplored. Important deposits are said to lie in the foothills of the Montilones Mountains, about 270 miles from the mouth of the Magdalena River. In the better known regions reserves are estimated at 27,000,000,000 of tons. Mines are in operation near the railway between Cali and the Pacific port of Buenaventura.

In Chile the chief deposits are in the provinces of Concepcion, Arauco and Valdavia. Reserves in the first two provinces have been estimated at 2,082,000,000 tons. The coal is not suitable for the production of metallurgical coke but a blend of domestic and foreign coals gives a coke of fair quality. Generally speaking, Chilean coal is said to be about 20 per cent less efficient than English or American coals. Coronel and Lota are the leading coaling ports. Anthracite, bitiuminous coal or lignite is reported to be found in nearly every department of Peru, but especially in the departments of Lima, Ancache, Junin and Puno. Production is chiefly in Junin in the neighborhood of Cerro de Pasco and largely by an American company. Reserves of coal of commercial value in Peru have been estimated at a billion tons.

Brazil is the second largest producer of coal in South America, ranking next after Chile, notwithstanding the size of Colombia's undeveloped resources, but no estimate of its reserves are available. The principal

*Published by permission of the Director.

operations are in the southern states of Rio Grande do Sul and Santa Catharina far from the chief centers of consumption, although coal is reported in Parana and Pernambuco. Most, if not all, of the coal produced in Chile and Brazil seems to be lignite.

PRODUCTION of coal and lignite in South America in 1927 was 2,126,000 tons, an increase of 545,000 tons over that for 1913, the greatest increase having taken place in Brazil. The production record of that country in recent years, however, shows little change notwithstanding the encouragement of the industry by the Brazilian government. While developments in coal-dust firing and coal cleaning are favorable to increasing consumption of low-grade fuels, the distance of the centers of consumption from the mines is the drawback to the greater use of the domestic product.

Production in Chile has not varied greatly in recent years, the high point having been reached in 1924 with 1,539,000 tons. The Chilean industry is protected by a comparatively high duty on coal and fuel oil. Peru's highest record was made in 1920, when 352,000 tons was produced. The decline in Peruvian production probably is due to the displacement of coal by domestic petroleum.

While production in South America increased 34 per cent, or 545,000 tons, from 1913 to 1927, imports declined 31 per cent, or 2,799,000 tons, to 6,184,000. Perusal of the accompanying table giving production, total imports of coal, coke and briquets and the chief countries of origin in 1913 and 1927 shows that imports into Chile decreased from 1,541,000 tons in 1913 to 106,000 in 1927, and that the markets of the west coast of South America are now of but slight importance. Whereas 1,750,000 tons of coal, coke and briquets was imported into West Coast countries in 1913, only a little more than 10 per cent of that tonnage was imported in 1927. The nitrate and other mining industries of northern Chile formerly consumed important quantities of imported coal which has been displaced by oil fuel. Chile has no petroleum production and its tariff policy today is to substitute imported oil fuel by Chilean coal.

OF THE total imports into South America in 1913, 7,236,000 tons, or 80 per cent, went to the east coast; for 1927 the figures are 5,991,000, or 97 per cent. Of the leading importing countries the greatest percentage of reduction took place in Uruguay, where imports in the last few years, however, have remained fairly constant. Imports into Brazil are not notably less than in 1913 and the trend has been upward in the past several years as it has been in the Argentine. Imports into each of these countries in 1927 was the highest of any of the last eight years, which is accounted for in part perhaps by low imports in 1926, the year of the British coal strike.

Considering all of South America's production as lignite and converting it at the ratio of three to one, total coal, coke and briquet consumption in 1913 was 9,510,000 tons as against 6,856,000 tons in 1927, a decrease of 2,654,000 tons, or more than 27 per cent. The outstanding decline took place in Chile, amounting in terms of coal to 1,363,000 tons; Uruguay ranks next with a loss of 441,000 tons, followed by the Argentine with a reduction of 518,000 and Brazil with 126,000 tons less than in 1913. Imports plus production have been considered as consumption.

No present-day survey of a coal market can fail to consider the present effect and trend of fuel-oil consumption. The following data are based on imports of fuel and, in some cases, gas oils, and do not consider fuel oil made from domestic petroleum.

IMPORTS of fuel oil into the Argentine, Brazil, Chile, Uruguay and Peru in 1913 were equivalent to only 399,023 tons of coal, of which Chile accounted for 347,290 tons, used perhaps by American copper mining companies. In 1926 the coal equivalent of the oils imported into these countries and Bolivia was 2,817,177 tons, which further increased to 3,230,067 tons in 1927. In 1927 fuel oil apparently displaced coal in the countries mentioned as follows: Argentina, 1,036,000 tons; Brazil, 580,758; Chile, 978,734; Uruguay, 328,648; Peru, 272,911 (1926 data), and Bolivia, 33,008 tons. Increased imports occurred in all countries excepting Chile. In 1926 and 1927 imports of fuel oil were as follows: Argentine, 365,910 and 632,907 metric tons, respectively; Brazil, 217,598 and 358,427; Chile, 797,101 and 497,918; Uruguay, 155,883 and 200,774; Peru, 166,724 (1927 not available), and Bolivia, 17,823 and 20,165 metric tons. The decline in Chile may be accounted for by unsatisfactory conditions in the nitrate industry.

In 1913 only Peru and the Argentine of the South American countries produced petroleum, a total of 2,263,879 barrels. In 1927, according to the *Petroleum Register*, Venezuela produced 64,400,000 barrels (which figure will be greatly exceeded in 1928); Colombia, 14,600,000 barrels; Peru, 9,800,000 barrels; the Argentine, 8,700,000 barrels, and Ecuador, 450,000, or a total of 97,950,000 barrels.

Converting oil to coal, and ignoring fuel oil made from domestic petroleum, it thus appears that the coal requirements of the countries of South America in 1913 were 9,900,000 tons, of which oil represented 399,000 tons, and in 1927, 10,086,000 tons, of which oil represented 3,230,000 tons. In view of the industrial development in South America since 1913 the total for 1927 may appear to be low, but economy in the use of coal and hydro-electric development, especially in Chile and Brazil, must account for the difference.

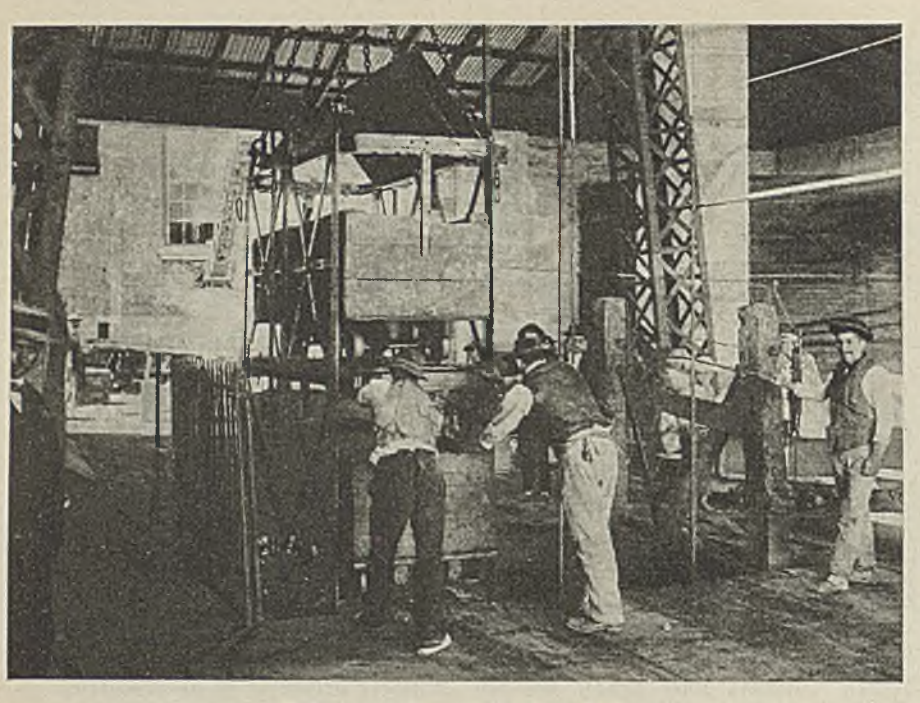
Unfortunately, data on the subject of hydro-electric development are incomplete. An estimate in Commerce Year Book, 1928, gives the potential and developed water power in 1926 in Brazil as 25,000,000 and 500,000 hp., respectively; in the Argentine, 5,000,-

Production and Imports of Fuel by South American Companies

(In thousands of metric tons)

	Argentina	Brazil	Chile	Uruguay	Peru	Ecuador	Bolivia	Guianas	Venezuela	Total
1913										
Production	3	15	1,283	...	274	....	...	...	6	1,581
Imports	4,046	2,262	1,541	865	151	25	30	38	25	8,983
Available	4,049	2,277	2,824	865	425	25	30	38	31	10,564
Imports from:										
United Kingdom	3,978	1,927	924	786	79	....	....	....	18	7,712
United States	57	275	99	77	11	....	....	....	4	523
Germany	10	4	45	....	33	....	....	....	....	92
1927										
Production	5	400	1,500	...	162	35	...	...	24	2,126
Imports	3,526	2,008	106	424	65	5(Est.)	16†	25‡	9*	6,184
Available	3,531	2,408	1,606	424	227	40	16	25	33	8,310
Imports from:										
United Kingdom	2,949	1,403	81	365	34	....	....	....	3	4,835
United States	211	580	22	26	18	....	....	....	3	860
Germany	174	3	3	20	5	....	....	....	1	206

*1926. †1925; mostly from Chile. ‡British Guiana only.



Entrance to Lota Coal Mine, Chile

000 and 25,000 hp., respectively, and the total for South America, 53,600,000 and 751,000 hp., respectively.

OF THE 6,184,000 tons of coal, coke and briquets imported into the Argentine, Brazil and Uruguay in 1927, Great Britain supplied 4,835,000 tons, the United States, 860,000 tons, and Germany, 206,000 tons. In 1926, the year of the last British coal strike, our exports to these countries amounted to 2,317,000 tons, but in 1928 they were but 183,000 tons, much less than half of our trade in 1913. Our exports of bituminous coal in 1927 and 1928 to the Argentine were 210,765 and 32,290 tons; to Brazil, 580,000 and 134,000, and to Uruguay, 26,493 and 17,238 tons, respectively.

The reason for Britain's important position in these markets is favorable ocean freights, to which may be added, especially in the Argentine, the control by British capital of coal-consuming industries and coaling depots. Tramp tonnage is used in the international coal trade and the factor of return cargo enters into the charter rate. South America is essentially an exporter of raw commodities required by the densely populated and highly industrialized countries of western Europe, which are the chief markets for wheat and other South American products; the United States, while highly industrialized, is more self-sufficient than Europe.

Aside from manganese ore and an occasional cargo of miscellaneous bulk stuff, our imports of raw commodities which carry a low freight rate are insignificant. The influence of two-way cargoes is illustrated by the rate early in January of this year from Cardiff to Rio de Janeiro of $2.92 and to Buenos Aires of $3.16 while the rates from Hampton Roads to these ports were approximately $3.80 and $4, respectively, although the mileage from Hampton Roads to Rio de Janeiro is less than from Cardiff.

THE situation with respect to ocean freights has changed relatively very little since 1913, and yet our coal exports to these countries in 1928 were far less than in 1913. It is true that there has been a shift in the character of freight carried in certain vessels. The cargo liner was developed largely in the period 1913-1928 and many commodities formerly transported in tramps are now being handled by liners but aside from the matter of ocean freights the chief reason for the decline in our trade is the keen character of British competition, brought about by increased coal production in Europe and the failure of world coal consumption to increase owing to the more efficient use of coal and to competition of oil fuel and hydro-electric power.

For comparable Welsh and American steam coals there is scarcely any difference in the f.o.b. Cardiff and Hampton Roads prices. Our pithead costs are much less than the British, our rail freight to tidewater much more. Owing to climatic conditions and the habits of the people coal is little used for heating purposes; wood and charcoal are used extensively for cooking. Coal for bunkering and for railway use make up the greater part of the imports. The railways of the Argentine and many other South American industries are largely British controlled. In this connection it is interesting to learn that American capital invested in Latin America has increased since 1912 around $3,725,000,000 to approximately $4,950,000,000. In the same period our investments in the Argentine increased from about $410,000,000 to say $450,000,000 and in Brazil from around $338,000,000 to $388,000,000.

Pittsburgh Plus—In March

THE first complete story of the new cleaning plants of the Pittsburgh Coal Co. will be published in the next issue of *Coal Age*. The story will be told by the men on the job—the men who conceived and carried through the project to its successful conclusion.

C. E. LESHER, executive vice-president of the company, will tell why the new preparation program was undertaken.

J. B. MORROW, preparation manager, will describe the Champion, Banning and Warden plants and also will tell how the older plant at Library fits into the picture.

F. C. CARSTARPHEN, consulting engineer, will discuss the aerial tramway being built to carry coal over 6,000 ft. from the Ocean mine to Banning; this tramway involves some entirely new engineering features.

R. M. GORDON, lubrication engineer, will have a story on the automatic lubrication system which the company has installed.

EDGAR J. GEALY, assistant to the superintendent of mechanical equipment and formerly electrical editor of *Coal Age*, will describe the electrification program involved in the construction of the new plants.

H. E. BOOTH, vice-president in charge of sales, will tell how the modernization in preparation fits into the modern merchandising program of the Pittsburgh Coal Co.

Coal That Meets the Test

Produced by

Mechanical Preparation

By Ivan A. Given

Editorial Staff, Coal Age

SIMPLICITY of construction and operation, accurate and exact control of product and careful attention to maintenance and cleanliness are features of the coal washer at the Pittsburgh North Side Works, Jones & Laughlin Steel Corporation, Pittsburgh, Pa. The washery is operated in conjunction with Koppers and Wilputte byproduct coke ovens, and cleans coal derived from mines along the Monongahela River, operated by the Vesta Coal Co., Pittsburgh, Pa., a subsidiary. Pittsburgh coal only is treated in the washer, and ash and sulphur are reduced 29 and 19 per cent respectively. The washed product is of such size as to lend itself readily to further crushing and mixing before charging into the ovens.

Ash and sulphur removal is accomplished in a Link-Belt-Simon-Carves washer using air as the pulsating medium. This is the first American installation of the system, which, originating on the Continent, has been in use in Europe and England for a number of years. An English plant using this method was described in *Coal Age*, Aug. 7, 1924, pp. 177-181.

As may be seen by reference to Fig. 2, the air compartment of the wash box is divided into five sections (four of which are shown), each equipped with an air piston valve. On the descending movement of the piston, air is admitted into the closed compartment under pressure, against the surface of the water. During the upward movement of the piston, ports open to the atmosphere, and the water in the washing compartment falls back gradually against the receding air pressure, thus eliminating the back suction effect present in plunger type jigs.

Another factor tending to eliminate back suction and maintain the coal bed in a loose condition on the sieve plates is the admission of water through openings below the bed during the exhausting of the air. On the pressure stroke the flow of water into the wash box is impeded, but on the back stroke it is resumed. This helps to keep the clean coal in suspension above the refuse and to supply water used in carrying away the coal.

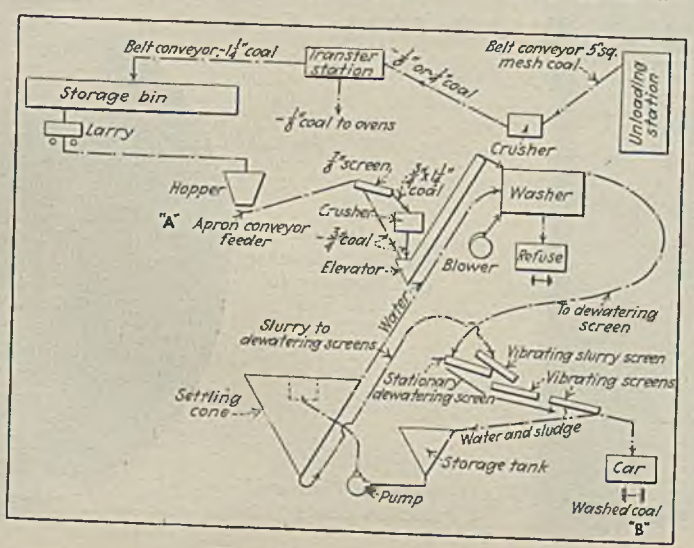
The major part of the separation of refuse takes place in the first section of the wash box (at the right in Fig. 2), which operates under an initial air pressure of $1\frac{3}{4}$ lb. The heavy refuse, which settles on the sieve plate, is separated and drawn off through a refuse gate immediately on entering the washer box. It passes directly into an elevator and is rejected. The coal and lighter refuse pass into the second part of the wash box, where the other sections operate under gradually reduced pressures.

In the second part the lighter refuse is removed and drawn off into a second elevator, while the clean coal flows over onto the dewatering screens. While about 80 per cent of the fine refuse passes out with the coarse at the ends of the box, a small portion of fine refuse passes through the sieve plates to the bottom of the wash box to be removed by screw conveyors and added to the rest of the refuse in the elevators.

THE coal required by the byproduct ovens of the North Side plant is crushed at the mines to pass a 5-in. square screen, is loaded on barges and transported to the unloading station. Here it is unloaded, the equipment used being rather unusual in that the familiar grab bucket is eliminated. Instead, a double-bucket elevator having a capacity of 1,000 tons per hour was designed at the plant and installed in a frame which can be readily raised or lowered to compensate for differences in water level in the river or coal level in the barge. A barge usually is unloaded in three cuts, the elevator being lowered into position and the barge pulled underneath it by a wire cable running to a double-drum hoist.

The double-bucket elevator discharges onto belt conveyors which transport the coal to an S15 Pennsylvania hammer mill, where it is crushed to either washer or byproduct size. When the coal is to be washed, the hammer mill reduces it to pass a $1\frac{1}{4}$-in. screen. From the crusher it is carried to the washer bin.

Fig. 1—Flow Sheet of Plant; Washer Addition from "A" to "B"



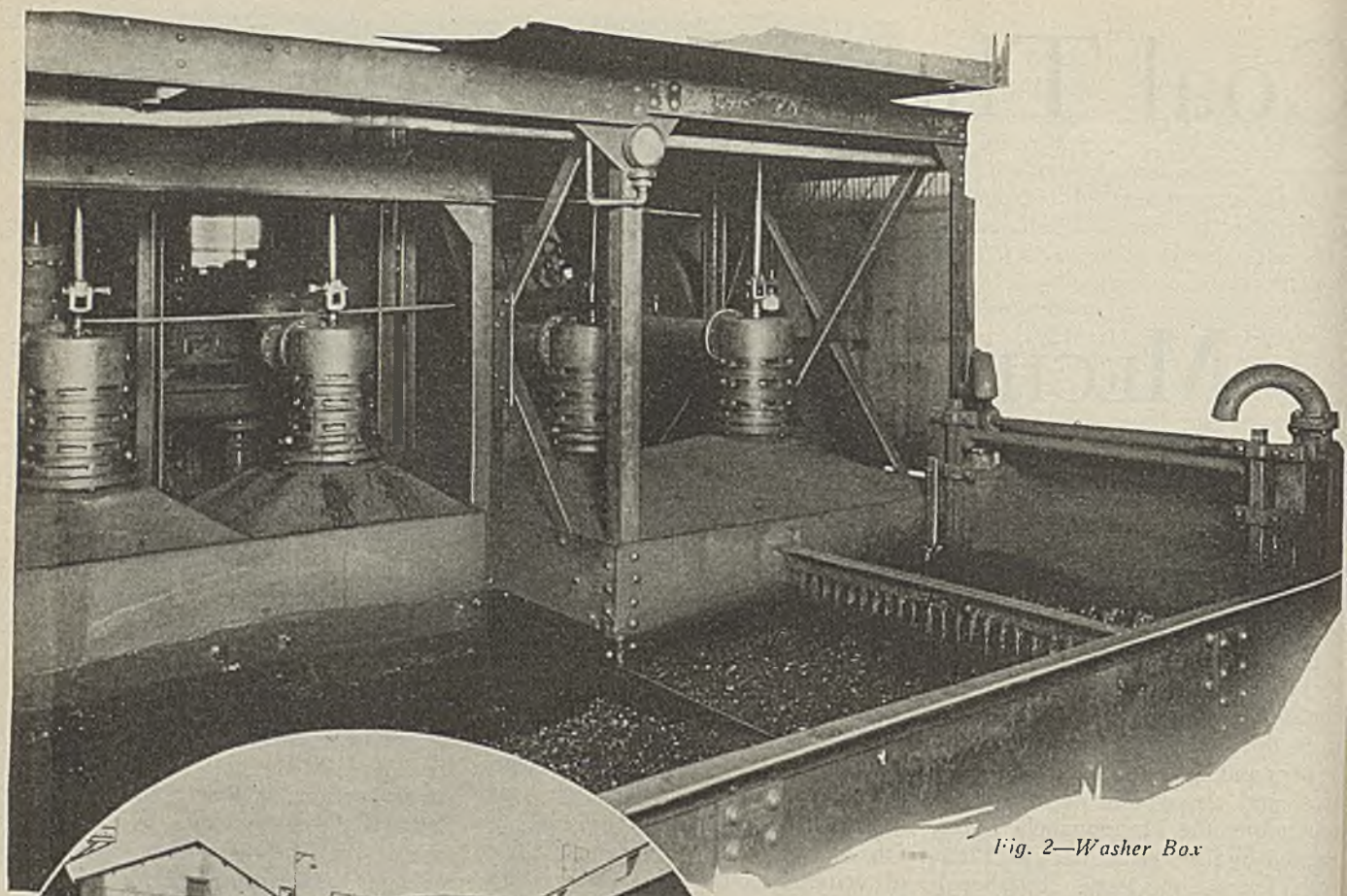


Fig. 2—Washer Box

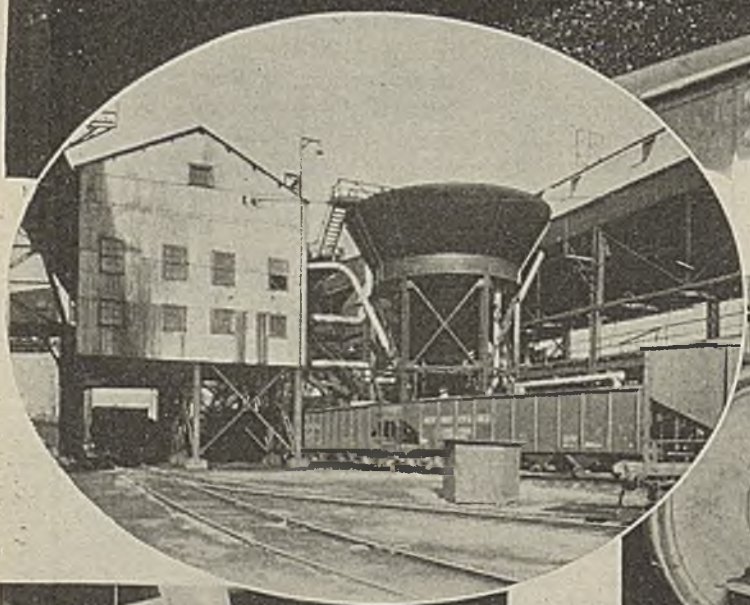


Fig. 3 (Left)—General View of Plant; Note Its Compactness

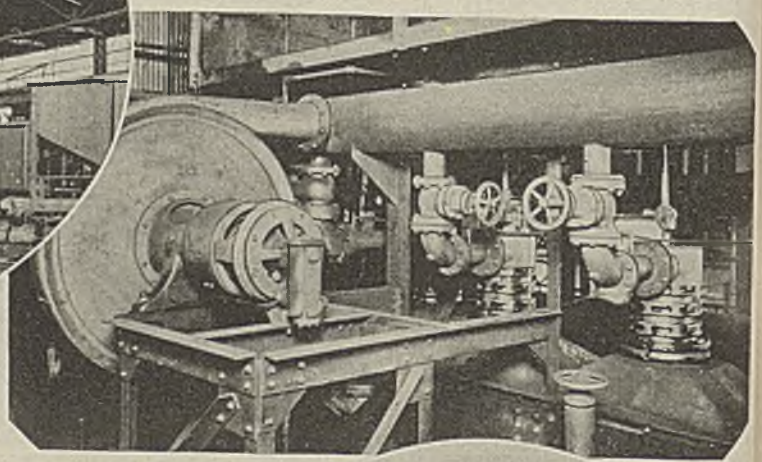


Fig. 4 (Above)—Centrifugal Blower

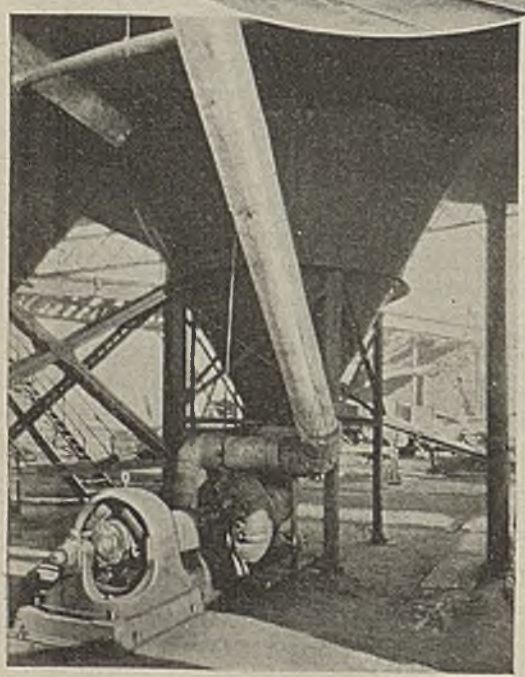


Fig. 5—Storage Tank and Circulation Pump

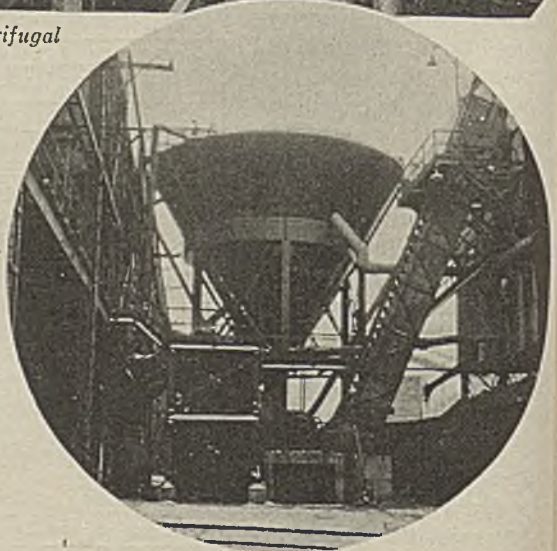


Fig. 6 (Right)—Settling Cone, Crusher and Elevator to Wash Box

If the coal is not to be washed it is crushed to —$\frac{1}{8}$ in. and transported to a mixing house, where it is combined with the washed coal or with other coal and goes on to the ovens. A simple device designed by one of the operating officials greatly reduces the time which would otherwise be lost by making it possible to change the crusher from one size of product to the other in 15 minutes.

Twenty-two hundred and fifty tons is the total capacity of the raw-coal bin, which was originally used to supply beehive ovens. Its presence greatly simplified the plant construction required for the washery and it furnishes a reservoir of coal sufficient to run the washer a full day of two shifts. From the bins the coal is dumped into a larry and transported to the bin and feeder shown in Fig. 1. Thence it is fed onto an apron conveyor which delivers it to a Link-Belt vibrating screen with a $\frac{7}{8}$-in. mesh. The material passing over the screen goes to a crusher, where it is reduced in size and mixed with that passing through the screen. The combination product (consisting entirely of —$\frac{3}{4}$-in. coal) is then elevated and discharged into the washer.

IN THE washer 75 per cent of the refuse reduction is effected in the first section, and the coal and lighter refuse pass into the second part of the washer, where the remaining 25 per cent reducton is made. The coal and water flowing out of the discharge end are then carried through two semicircular chutes to the dewatering screens. The refuse carried away by both elevators, together with the fine refuse from the screw conveyors located beneath the wash box, is discharged into a railroad car. It is then combined with that from the steel mill and sold to a refuse-disposal company.

Dewatering takes place on the two stationary and four vibrating wedge-wire screens having $\frac{1}{2}$-mm. openings. The four vibrating screens have a total net area of 160 sq.ft. The material passing over the dewatering screens goes direct to the railroad car. Water and slurry passing the screens flow by gravity to a storage cone or tank serving as an equalizer in the water system and feeding to a pump which elevates the water and slurry to a large settling tank. The slurry settling out in the storage tank is then gravitated back to a pair of dewatering slurry screens set over the stationary screens and discharging into the first pair of primary dewatering screens. The water goes back from the top of the cone to the wash box.

AS THE water required flows always in a closed circuit the problem of addition of make-up water is not serious. Two losses are of any importance—evaporation and water in the washed product—and the quantity absorbed may easily be replenished from time to time.

The washed coal from the system (—$\frac{3}{4}$ in.) is then recrushed before carbonizing, so that 60 per cent is less than $\frac{1}{8}$ in. in size. This is the standard size for charging and, if the coal is not to be washed, is made in the first crushing after unloading. Feed coal for the washery is crushed to $\frac{3}{4}$ in. or less, as outlined above, and 35 per cent of the total product is less than $\frac{1}{8}$ in. in size. The crushing before washing is primarily to free the sulphur and allow its removal in the washery, after which it is necessary to further reduce the size of washed coal before charging.

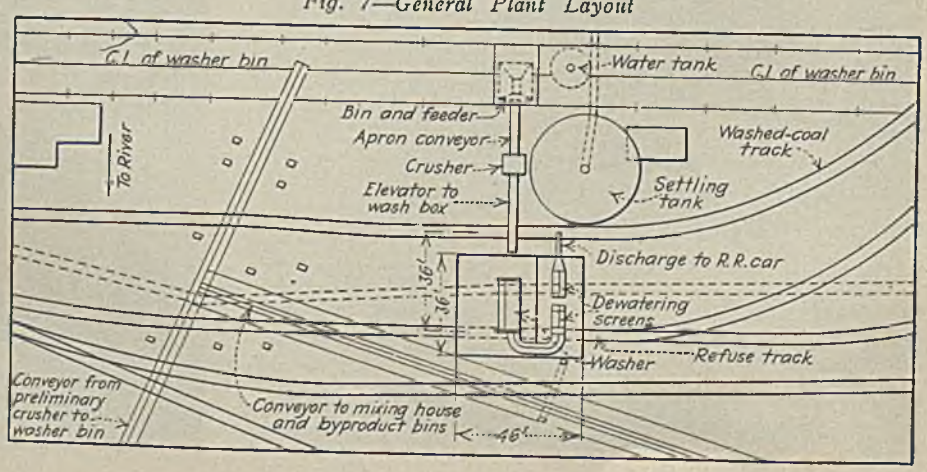
Only one man is required to operate the washery. The rated capacity of the washer at the North Side plant is 80 tons per hour, and the average capacity in daily operation is 100 tons per hour, or 2,000 tons per day of two 10-hour shifts. Washing is done to a gravity of 1.55. The coal from the mines during the month of September had an average ash and sulphur content of 10.29 and 1.72 per cent respectively. Theoretically, on the basis of float-and-sink tests, the impurities could be reduced to 6.92 per cent ash and 1.36 per cent sulphur. They actually were reduced by washing to 7.32 and 1.38 per cent.

Float-and-sink tests on washed material in the middle of September, which were somewhat poorer than the usual average, were 1.7 per cent sink on washed coal and 4.1 per cent float on refuse (which equals 0.2 per cent of feed coal). Three days after starting operations last summer, against theoretical float-and-sink figures of 6.92 ash and 1.32 sulphur, the following results were obtained: 7.3 per cent ash, 1.32 per cent sulphur, with 1.4 per cent sink in the washed coal and 1.6 per cent float in the refuse (equal to 0.1 per cent of feed coal). Immediately after this run the plant was put on double-shift operation in charge of an operating man with only three days' experience.

DAILY reports on washer performance are made and transmitted to the proper executive. These include the proximate and screen analysis and float-and-sink tests on the feed coal, washed coal and refuse. The qualitative and quantitative efficiency also are calculated and entered on the report. The results of the float-and-sink tests on feed coal, washed coal and refuse for the preceding day are posted every morning as a guide to the operator. Consequently, both the management and washery staff have the figures constantly at hand and any falling off in performance will be instantly noticed.

The space required for the plant is much smaller than usual. Crushers, conveyors, elevators and screens are of standard construction and easily procured. The Link-Belt-Simon-Carves washer itself requires a floor space of only 1,600 sq.ft., including wash box, screens and refuse bin, and has a minimum of driving machinery. Moving parts subject to wear are considerably reduced. Regular inspection and a strict maintenance program are relied upon to reduce the cost of upkeep and insure continuity of operation of the plant.

Fig. 7—General Plant Layout



INGENUITY..*plus*..SYSTEM *Fight Obsolescence*

AT RAILROAD MINE

By J. H. Edwards
Associate Editor, Coal Age

MINES containing valuable remaining coal acreage may be divided into three classes: (1) Those where the equipment is so old that much of it is obsolete and is about to be replaced, (2) those where the equipment is not of the latest type but does not warrant general replacement, and (3) those where practically all of the equipment is modern. Beards Fork mine of the Loup Creek Colliery Co., in Fayette County, W. Va., controlled by the Virginian Ry. and producing about 240,000 tons per year, falls in the second class. The local management there has displayed considerable ingenuity in modernizing equipment too old to be up to date and too new to be scrapped. Methods which have increased efficiencies with resultant cost reductions also have been installed.

Performance and cost records for each principal item of equipment are kept, yet it would be difficult to find a mine of its size where fewer office men are employed.

Fig. 1—Looking Through Old Scale House Toward Dump

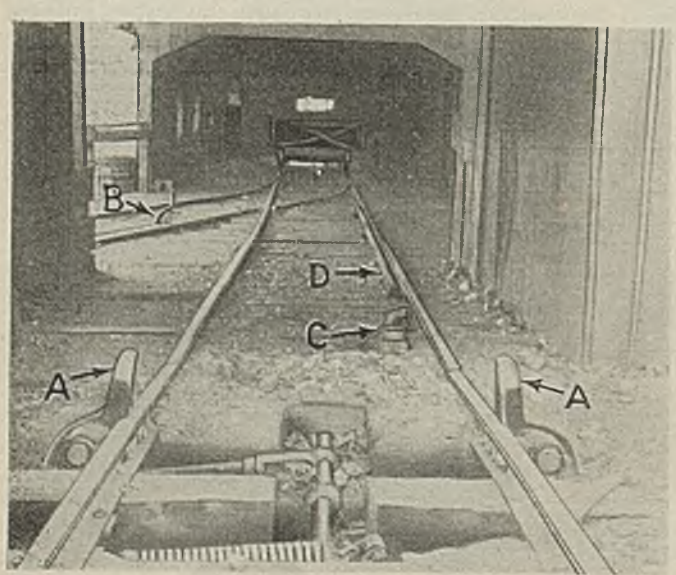
At the headhouse, on the north side of the valley, in which is located the tipple that is fed by two rope-and-button retarding conveyors, is an unusual dumping and weighing arrangement which dispenses with the services of two men and eliminates tare weights, and yet cost comparatively little to install. Formerly the cars, which vary widely in tare weight, were weighed on a track scale and fed by hand to the kick-back dump. The dump-house arrangement, unchanged so far as the track is concerned, is shown in an accompanying photograph.

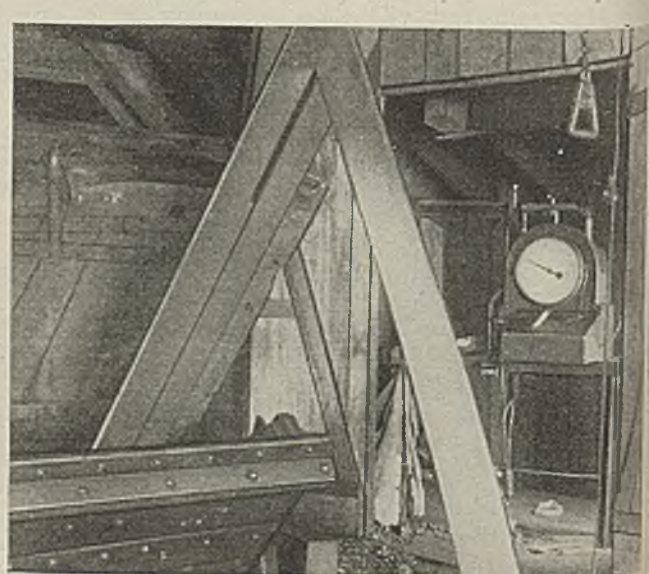
It was desired to install a weigh basket in order to get accurate weight and to arrange to feed the cars to the dump automatically, but certain men advised that an automatic weight indicating and recording attachment could not be applied to the weigh-basket method. This difficulty was overcome, however, by an arrangement of trips worked in connection with the dump, car feeder and weigh-basket gate.

The loaded cars are stopped by the dogs "A," Fig. 1. When the empty leaving the dump, rides over tripper "B" this action opens the weigh basket, releases the dogs and sets tripper "C" to a position above the rail. The weigh basket is held wide open during the time the empty is passing over tripper "B," then closes part way. The loaded car hits tripper "C," which resets the dogs, and then the wheels ride up on the auxiliary track rail "D," which is forced down and completes the closing of the weigh basket. The automatic recorder on the scale is tripped by the dump as it returns to level.

In the same headhouse is another unusual arrangement. An eccentric operating a reciprocating feeder to the rope-and-button conveyor was a source of difficulty because of a poor method of lubrication. The old-fashioned compression grease cup was replaced by a sheet-metal pan mounted below the eccentric and filled with oil so that the lower part of the eccentric dips in the lubricant.

Fig. 2—Basket Weight Indicated on Dial Is Stamped Automatically on Tape





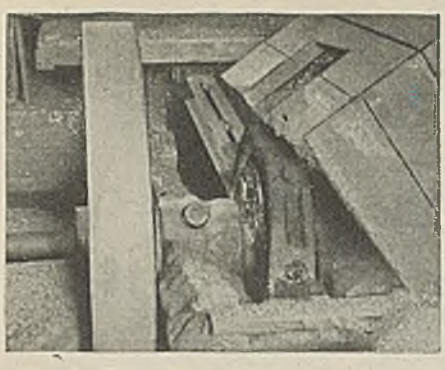


Fig. 3—Cover Tipped Sidewise to Show Eccentric and Oil Pan Below

Fig. 4—Old Car With Bumpers Sagged Close to Rail

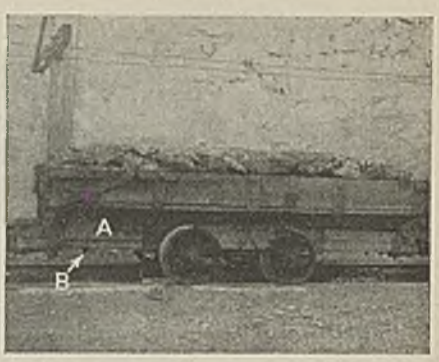


Fig. 5—New Car With Gunwale Boards Tapered to Raise Ends of Bottom

Occasional filling of the pan insures continuous lubrication of the eccentric. The last eccentric that was lubricated by grease lasted only a year but the present eccentric, which has been lubricated by the oil method, has been in use four years and still is in good condition.

Trouble in coupling mine cars due to sagging of bumpers was experienced with the old equipment. As the cars are rebuilt the gunwale boards, "A," as shown in Figs. 4 and 5, are changed from 1½-in. to 3-in. stock and the bottom edge is tapered 1 in. in the distance each way from the center to the end of the car.

With the new construction bolts "B"—in Fig. 5—extending through the height of the gunwale board, draw this piece and the bottom board together. The gunwale board is in a strain which acts to prevent sagging of the bottom board and bumper. Two additional binders are added as the cars go through the shop. The photographs show the difference in height of bumpers above the rail before and after rebuilding.

PASSING from mine cars to track, three unusual practices have been adopted. On the top of every second wood tie on main-line track a steel tie is used, which prevents spreading of the rails.

Switches are equipped with parallel spring throws made in the company shop. In many instances these are fitted with long pieces of pipe instead of the throw rod, so that the switches can be thrown from a place many feet from the switch points. Figs. 6 and 7 show two views of a switch that has a short throw rod and is used on an outside haul. As the handle is raised to dead center the coil spring is extended, but no movement of the switch points takes place until after the handle has passed dead center, when the spring flips the handle over and moves the points.

An accurate check of track bonding is made once a month by taking a bond welder resistance, ammeter, and voltmeter in a mine car pulled by a locomotive, and obtaining readings at stations at or near the ends of the trolley line in each section of the mine. The test is made when the mine is not working and takes but a few moments at each place.

At the points of test the line voltage is read at no load and then again while the welder resistance load is applied, at which time the current also is read. Subtracting the low-voltage reading from the high and dividing by the current gives the over-all resistance of positive feeder and negative return. A log is kept of the test results so that an increase of resistance at any test point will be plainly evident.

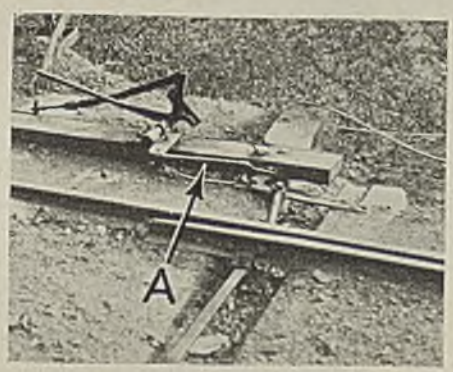


Fig. 6—Showing the Handle in a Normal Position

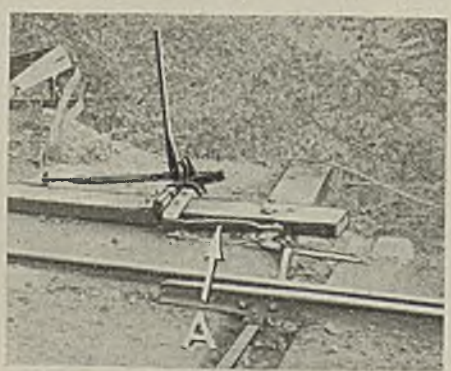


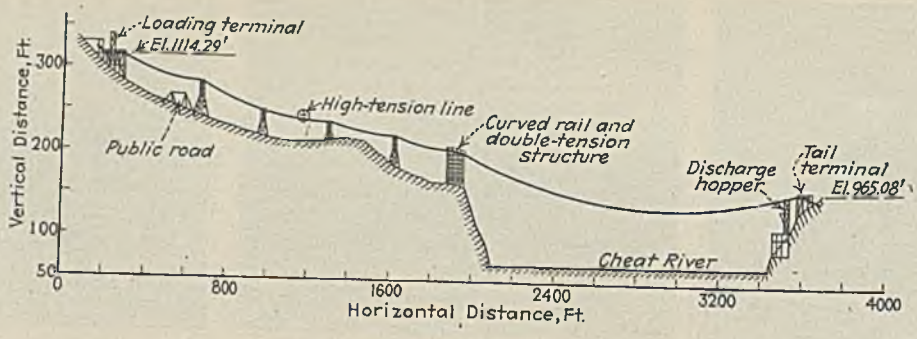
Fig. 7—Handle Balanced at Dead Center to Show Spring in Tension

It is the practice at the mine to eliminate weak points of equipment wherever possible and economical, instead of treating them as necessary evils and continuing to make repairs and replacements. The two photographs of a locomotive cable reel illustrates an example of equipment revised to give less trouble. The original current collector on this reel consisted of two brass disks, one stationary and the other moving, held in contact by a spring. This arrangement caused much trouble and expensive replacements was the experience.

This type of collector was replaced by a collector ring made from a worn-out mining-machine bearing bushing and a brush holder and brush from the a.-c. end of a synchronous converter. The brush has a contact area of 1 sq.in. All of the 5- and 6-ton gathering locomotives having this type of reel are equipped with the new collector. The first reel was equipped four years ago and when brought into the shop recently for repairs the collector ring was still in good condition. This particular reel is shown in one of the photographs.

During the past year the purchased-power demand at the mine has been cut 25.4 per cent. Up to September, 1927, the mine was on a 400-kw. contract demand. In October, with a changed schedule charging on the basis of a 15-minute metered demand, the maximum for that month was 480 kw. Beginning at that time the management concentrated on a hunt for ways to cut the demand without hampering production. It was discovered that a certain main-line locomotive encountered trouble in hauling its long trains over a grade and that this locomotive had considerable idle time at the terminals. Accordingly the trips were cut in two, resulting in a material decrease in demand. Other mine loads were re-

(*Turn to page 90*)



ONE-MAN AERIAL TRAMWA

Delivers 200 Tons Per Hour to Tipple 3,412 Ft. From Mine

By M. P. Morrison

Tramway Engineer
American Steel & Wire Co.
Worcester, Mass.

OPERATING labor has been reduced to a minimum on the thoroughly modern aerial tramway—the first of its kind—recently installed by the Canyon Coal & Coke Co. at its mine on Cheat River 8 miles from Morgantown, W. Va. Only one operator is required to deliver 200 tons of bituminous coal per hour to the tipple, which is 3,412 ft. distant from the mine. In this distance, as shown above, the tramway descends 150 ft., crosses a public highway, a high-tension transmission line and a wide stretch of Cheat River.

This tramway is of the so-called Trenton-Bleichert type, but is provided with many improved devices for reducing operating labor to a minimum and maintenance costs to a negligible quantity, and to insure uninterrupted operation and freedom from the uncertainties that were so largely responsible for the wrecks, rapid deterioration and other objectionable features that characterized some older types of tramways.

In the design of this tramway a great deal of thought was given to obtaining a maximum life for the track cables, which are expected to carry a large tonnage before replacements become necessary. The track, or carrying, cables on this tramway are of "locked-coil" construction, which presents a smooth cylindrical surface to the wheel treads of the tramway carriages and thereby practically eliminates wear on the cable and wheels.

Causes contributing to the early fatigue of tramway track cables are, in general, excessive bending over the carriage wheels, cable saddles of insufficient radius, and unknown stresses due to temperature changes and improper erection of cables. To minimize bending under the carriage wheels, four-wheel carriages are used, thus distributing the load over four wheels; the cable saddles used not only have an exceptionably large radius but also are made to rock in suitable bearings to accommodate the slope of the cable; the track cables, instead of being anchored in the ground at both ends, are counterweighted so that the tension always is a known quantity, determined by the weight of the counterweight, and does not vary with changes in temperature or loading. The sheaves that support these counterweights are large and respond readily to tension variations.

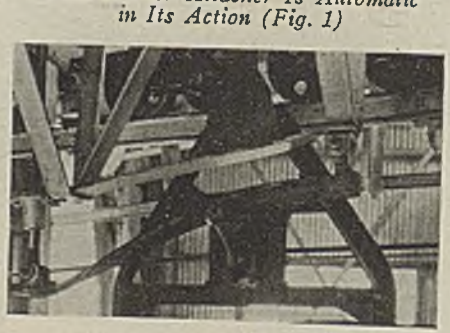
Fig. 4 shows the method of counterweighting the track cables. It will be seen that there are two sets counterweights, one for the section cable from the loading terminal this structure and one for the secti extending from this structure to t railroad tipple. Of course, the cables are anchored to concrete bloc in the ground at the two terminals the tramway. Both terminals, as we as all of the intermediate cable su ports, one of which is shown on Fi 3, are of structural steel and a erected on concrete foundations f permanency.

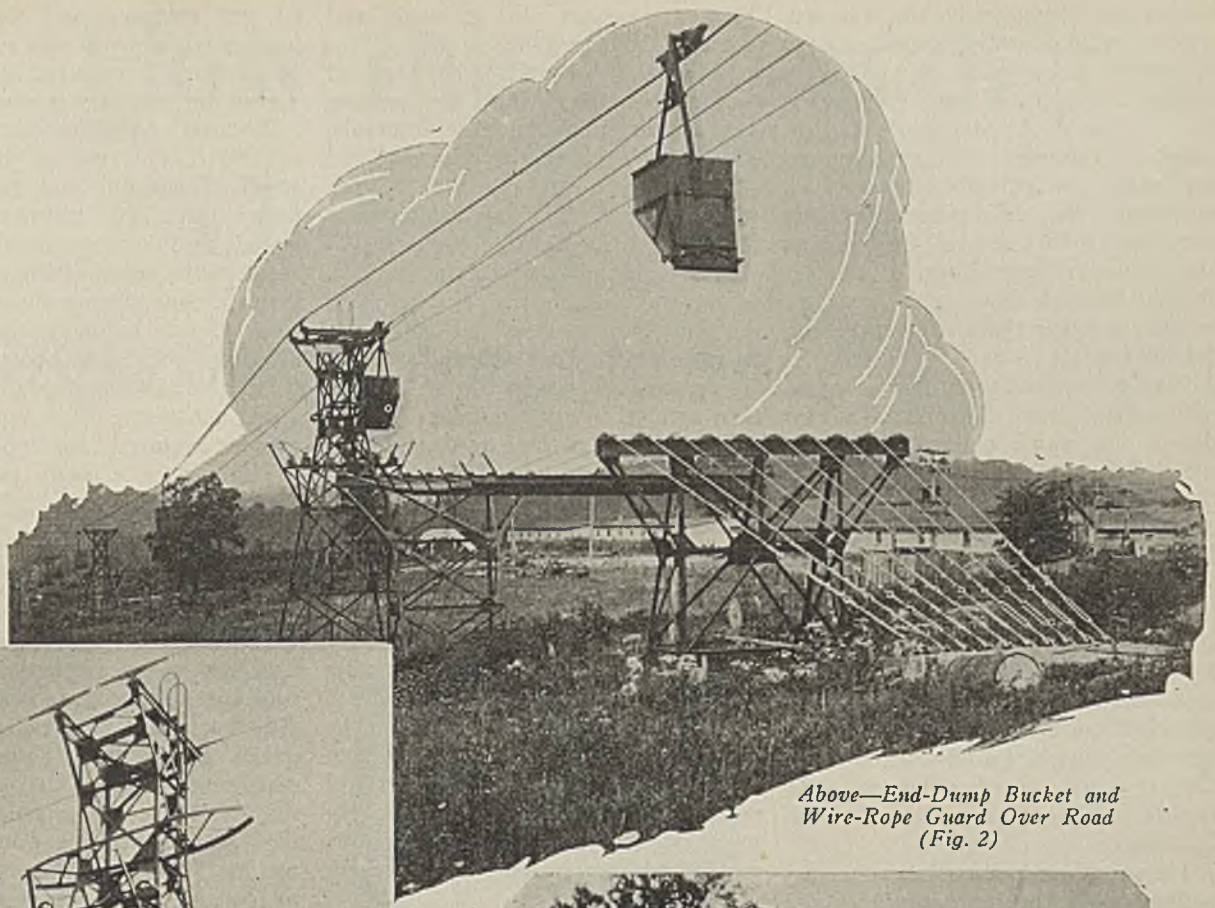
Cheat River is crossed with a clea span of 1,500 ft. The tramwa track cables negotiating this span ar anchored in the ground beyond th railroad tipple and are counter weighted in the "double-tension" structure shown in Fig. 4, which i on the opposite bank of the river.

At the loading terminal of the tramway the coal is delivered by the mine cars to a bin equipped with two air-operated bin gates for loading the coal into the tramway buckets. The empty buckets, returning from the railroad tipple after discharging their load there, run by gravity up to the operator, who stops the bucket in front of a bin gate and proceeds to load it. This loading operation occupies only a few seconds and consists merely of opening the air valve that actuates the bin-gate air cylinder and closing it when the bucket is full. The operator stands on a platform at the bin gates and does not leave this position either for the incoming or for the outgoing buckets.

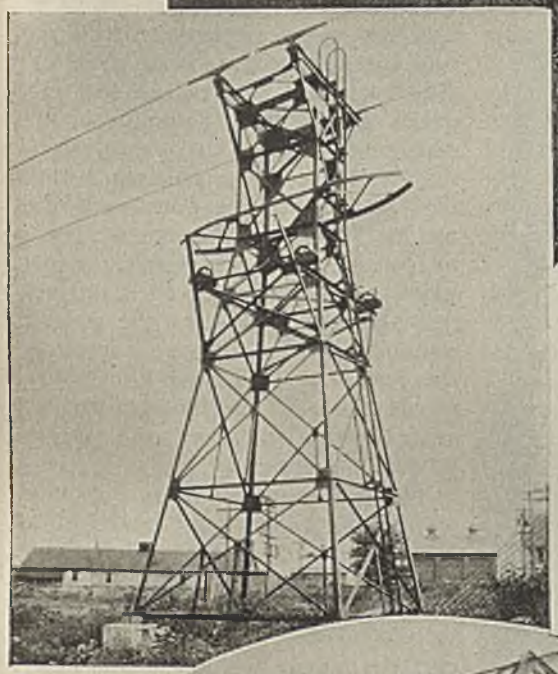
For reasons of safety, to relieve the operator at times and to assist him

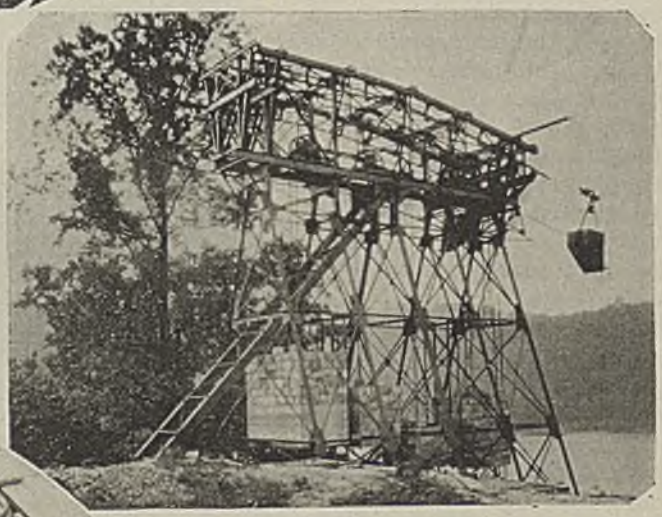
This Carrier Attacher Is Automatic in Its Action (Fig. 1)





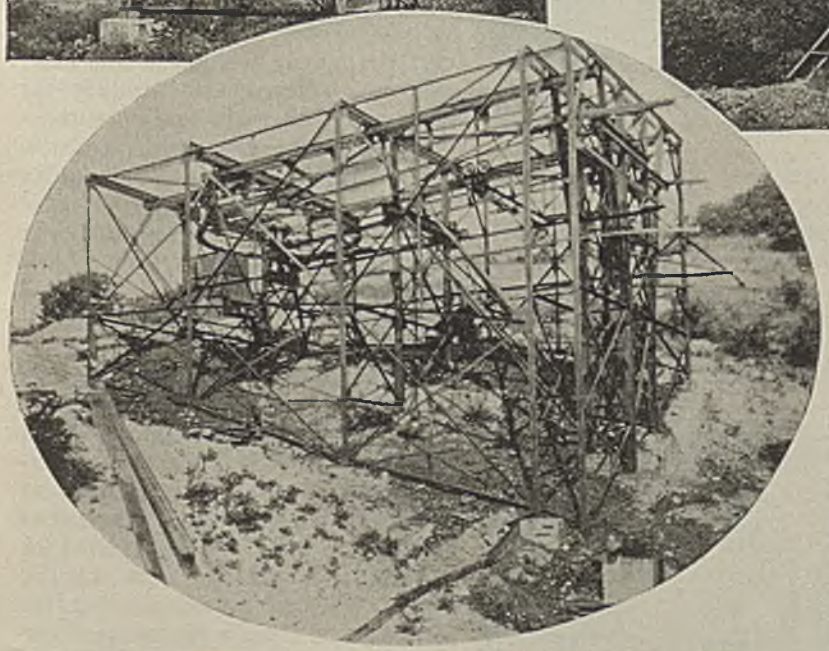
Above—End-Dump Bucket and Wire-Rope Guard Over Road (Fig. 2)





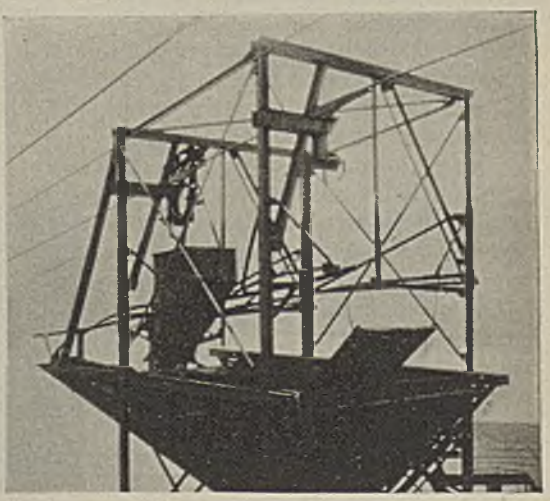
Above—Double-tension Structure (Fig. 4)

Below—Coal Receiving Hopper (Fig. 6)



Left Center—Intermediate Tower (Fig. 3)

Bottom Left—Tail Terminal (Fig. 5)



in starting and stopping the tramway when normal operating conditions are disturbed, a helper is provided, but neither the operator nor his helper is called upon to do any work in handling the tonnage. The air-operated bin gates are of the circular gate undercut type, affording extremely easy and perfect control; so much so that when a large lump of coal is coming through the gate the operator is able to lower the piece gently into the bucket.

Buckets are sent out by an automatic spacer and dispatcher—a new device for which patents are pending. After a bucket is loaded it travels by gravity along the tramway rail to this device, which is located far enough from the last bin gate to allow room for two or more carriers to be held in reserve. The spacing and dispatching device is connected by gearing to the endless moving traction or haulage rope and releases a bucket automatically every time the rope has traversed a distance equal to the required spacing between the buckets; only one bucket at a time can be released.

Having been released by the dispatcher, the bucket continues by gravity along the tramway rail to the automatic attacher shown in Fig. 1, which engages the closing lever of the tramway grip and thus attaches the carrier to the haulage, or traction, rope which carries it out on the cable. The tramway rail is so graded that at the instant of attaching the carrier to the traction rope both move with about the same speed.

It is not necessary with this device, to have a man stationed at the "attacher" to see that the traction rope enters the grip properly and to push the bucket out on the cable. Moving with the same speed as the traction rope at the instant of attaching itself to it, there is no violent jerk or swing to the bucket and, as a direct consequence, the traction rope does not saw through the grip jaws, requiring their constant renewal. Also, the spacing of the buckets is exact and does not depend on the alertness of the operator. Except at the bin gates, no hand touches the coal carriers from the time they arrive at the loading terminal empty until they leave, loaded.

The aerial tramway operates at a speed of 450 ft. per minute and is equipped with 37 buckets. The buckets are of the "end-dump" type, having a capacity of 62 cu.ft. and are particularly adapted to the handling of coal with a minimum of breakage. They are spaced 195 ft. apart and arrive at the receiving hopper at intervals of 26 seconds; they are, of course, dispatched from the loading terminal at the same time intervals. The buckets dump the coal onto the sloping sides of the receiving hopper shown in Fig. 6, from which it is conveyed to the shaker screens.

After passing this receiving hopper, where the buckets are dumped "on the fly" by means of an automatic tripping device, they proceed onto the tail terminal shown in Fig. 5, make a turn around a large-diameter sheave and continue on their return trip to the loading terminal. The operation of tail terminal and the receiving hopper is automatic; no manual labor of any kind is required at this end as far as the tramway is concerned.

Because of a difference in elevation of 150 ft. in favor of the loads between the loading and discharge terminal rails, the tramway runs by gravity and develops about 20 hp. To regulate the speed of the tramway the traction rope driving sheave is geared to a 25-hp. induction motor which acts as a generator, boosting the line voltage and keeping the tramway speed constant. Thus not only is no power required for operation but useful power actually is developed.

Ingenuity Plus System Fight Obsolescence

(Continued from page 87)

arranged wherever possible and now the monthly demand averages 358 kw. with the same production as when the demand was 480 kw. No devices were installed to open breakers to limit demand because the management believes that the interruptions would cost more than the saving in demand.

The system for charging supplies to the principal items of equipment is simple but effective. The warehouse

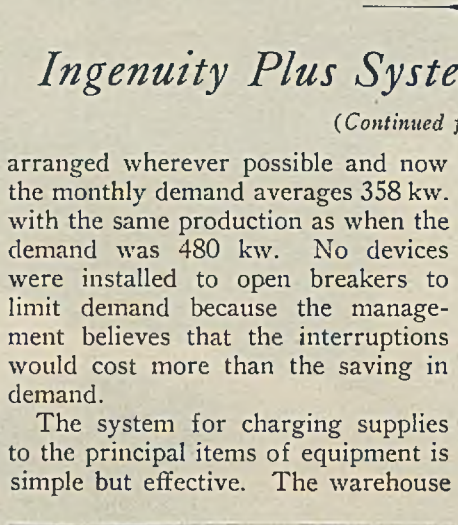
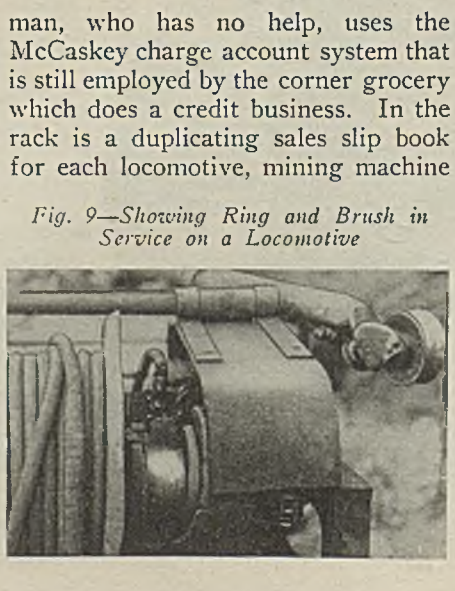


Fig. 8—Collector and End Rings in Good Condition After Four Years' Service

man, who has no help, uses the McCaskey charge account system that is still employed by the corner grocery which does a credit business. In the rack is a duplicating sales slip book for each locomotive, mining machine

Fig. 9—Showing Ring and Brush in Service on a Locomotive



and for other important items of equipment and certain mine accounts. No repair-part material is sent out unless the designating number of the machine or account has been given to the warehouse man. One slip listing the item and price goes with the material for the information of the man who is held responsible for low upkeep cost, and the other slip remains in the book. At the end of each month the warehouse man totals the items in each book — in other words, for each machine or account —and sends a summary to the superintendent's office.

The cost of repair parts is plainly marked on a tag on the bin or on a tag attached to the piece itself. No perpetual card inventory is kept. The warehouse man re-orders each item as he observes that a withdrawal cuts the supply too low. The management believes that sending the price slip with each item encourages economy on the part of the repairmen and machine operators. It also gives them a chance to check the office statement of total charge against their equipment if they care to go to that trouble.

An effect of the maintenance system is indicated by the following successively decreasing yearly costs of mining machine repair parts in cents per ton: 3.55, 1.85, 1.36, 1.27. A general increase in efficiency of operation is indicated by the mine-car turnover for the same successive years: 1.34, 1.39, 1.41, 1.71 and 1.91.

R. G. Stevens has been superintendent of the operation for the past six years and the modernization and improvement programs outlined have been under his direction.

How the Foreman Does His Part

To Make the Mining of Coal Pay a Profit

By Van B. Stith

General Superintendent
Black Diamond Coal Mining Co.
Drakesboro, Ky.

WHAT does the production foreman have to do with making the mining of coal pay a profit? The primary reason for any individual or company being in the coal business is to make money and in order to make money the selling price of the coal must be higher than the total cost of mining it. Profit, overhead, supply cost and depreciation must all appear in the final price to the consumer if the business is to be maintained in a healthy condition. In the overhead are included sales expenses, administrative expense and production cost, and these costs, together with the others, all come within the sphere of influence of the mine foreman—for better or worse, as the case may be.

As the situation is today there are quite a few coal-mining companies that are not showing a profit, and of those that do, many are prone to exaggerate it. Several companies, however, are able to maintain a margin of 50c. to $1 per ton over their neighbors in the same field and the same seam. The question is: "Who is responsible?" The reply is, "The management, of course," but is not the foreman a part of the management?

Many mine foremen discharge their supervisory responsibilities much as the night cop walks his beat after midnight and, in comparison with competent, efficient men, are as futile as the operator who is in the coal business for amusement. Foremen should be selected for their good judgment more than any other quality, and then, together with the rest of the production force, should be thoroughly sold the idea that their task is to ship nothing but clean coal. The first essential, then, in raising the price of coal above the general market level is superior production from a superior seam. The latter is a condition over which little control can be exercised but the former can confidently be expected if superior types of men are employed as foremen.

Van B. Stith

Born in the Clinton (Ind.) mining field, Mr. Stith entered the mines at the age of 13 during school vacation periods. His career as a foreman began with the old United Coal Mining Co., of southern Illinois, and includes service with various other companies in Illinois, Indiana, New Mexico and Kentucky. Besides his broad practical experience he has made a deep study of the duties and responsibilities of efficient foremanship.

The production of coal covers a multitude of sins and at times covers some of them so deep that it takes a mining engineer considerable time to uncover them. The major problems in producing coal are, however, to furnish a product of such quality and cost that it can be sold at a profit, and to maintain satisfied labor. There is an old proverb that one house is never big enough for two families, and the same thing applies to coal mining; there isn't room for two managements. The employees and the administration department must co-operate to achieve the best results.

COST of production is under the direct control of the foreman and a well-trained man can materially reduce the expense of mining. Among the items that might be mentioned where reduction is possible is the intelligent and economical use of supplies. Superior foremanship consists of the foreman selling the idea to the employees of getting 100 per cent value out of each piece of material used.

Depreciation is another item which the inefficient foreman will often claim is something with which he has nothing to do and that "the engineer has already figured out that it will go down so much each year anyway." That probably is what the engineer has done but his figures are based on past performance, which has little or nothing to do with what happens at the mine.

Unless the management has had the foresight to purchase modern equipment in no danger of becoming obsolete, new developments not subject to the foreman's control may make the use of existing machinery unprofitable. However, he can at least stop abuse of existing equipment and increase its capacity for service by that amount. Lack of bubrication, wrecking mining machines by

allowing them to cut hard substances, overloading locomotives, pulling derailed cars over the ties, stopping machinery by reversing the power and other bad practices can be prevented only by the foreman. And whether the bookkeeper or the engineer ever hear of it or not, the elimination of such practices will reduce the depreciation. Depreciated machinery does not mean loss of capital alone, but it also means that additional labor is required which could have been saved by careful foremanship.

LIABILITY insurance is becoming a big item in the mining industry, both in the high premiums demanded by the carriers and in the difficulty of procuring a carrier at all. The cost of carrying insurance is one that can be materially reduced by a good foreman, but no matter how efficient the safety engineering corps may be, there have been and will continue to be cases where an illiterate, stubborn mine foreman prevents the use of a safety device because he fears the effect on production. Invariably this increases the number of accidents. On the other hand, a foreman well versed in safety measures and who religiously practices them is worth ten thousand warnings tacked up around the mine and read by no one.

A good foreman can do much toward saving power, though many look on power as something to be used rather than something to be conserved. Armature shafts are allowed to operate after being bent, bearings are too tight, mining machinery and locomotives are overloaded, bearings unoiled, pumps are allowed to run on air long after water is pumped out, electric lights, trolley wire and feeder lines allowed to touch the roof and ribs of the entries and return lines and bonding are erected and maintained in a haphazard manner. Some of these are small items but the leeway between possibility and probability has put many a coal-mining corporation to using red ink.

Very important to the foreman and at first thought entirely out of his control are the two items of sales expense and administration expense. It would be a case of stepping out of character for a foreman to criticize his concern for paying the general manager or president too large a salary or for renting elaborate office rooms—say, in Chicago looking out over Lake Michigan—though plenty of that is going on behind the scenes. However, a very considerable part of the cost of both sales and administration is caused by poor foremanship. It falls to the lot of the sales force not only to sell coal but make it stay sold and get repeat orders.

THERE are and always will be occasional unreasonable purchasers of coal, but the bulk of the complaints about defective preparation are made by reasonable men, and many of these complaints are based on actual and preventable errors. The sales department not only has the problem of adjusting such claims but has an uphill and expensive job to make more sales in the same place. Even in the administrative department much money is spent because of the evident need of keeping a constant check on the activities of the foreman in control of the mines. Good foremanship may therefore save at every turn.

It seems safe to say that a large part of the prevalent poor foremanship is due to a lack of knowledge of what the management wants and expects of the foreman. Foremen for the most part look at themselves as expert miners who have been promoted because they are good miners, while the management made them foremen in the belief that they possessed managerial ability. If this so then the management at a great many mines had better set out at once to let its foremen know enough about its ways of doing business to enable them to give intelligent assistance in reducing costs.

Undoubtedly the greater part of the improvements in mining methods which have resulted in the saving of labor have come from intelligent, efficient mine foremen, but it is a lamentable fact that they have not come as freely and often as they might. There often is a noticeable lack of unity of purpose between the engineering department and production department. Many engineers seem to think that for them to accept a foreman's suggestion without first distorting it out of all semblance to its original shape is an admission of incapacity. Foremen who see their ideas garbled are reluctant about presenting more.

The management might profit greatly in reducing the cost of labor by encouraging foremen to make constructive suggestions and by acknowledging them either personally or in writing. Company after company has found its foremen growing more and more inclined to let well enough alone and to leave the making of suggestions for improvements to the "higher ups." The management thinks the foremen have gone stale when, as a matter of fact—which they will admit to an outsider—they have simply found themselves discouraged rather than encouraged.

MANY managers no doubt have attended the yearly meeting of mining men and manufacturers in Cincinnati and have listened to papers and discussion on the success or failure of different labor-saving and cost-cutting ideas; have had 100-per cent recovery, the conveyor system and the use of loading machines explained to them; have witnessed demonstrations on the proper use of timber in controlling the roof in concentrated mining and have heard discussions on preparation and every other item of any importance in producing coal and marketing it. Each year they receive the benefit of the accumulated experience of others, see the latest in labor-saving and cost-cutting machinery and leave full of enthusiasm and ideas. On their arrival home, however, no matter what ideas they have gathered, they must first sell them to mine foreman. Once this has been accomplished, they have made a long stride toward success for any improvements they put in use.

It seems, then, that a company should employ good foremen, demand of them scientific, detailed management and compensate them well. The president may then be able to enjoy his game of golf far more than in the past, for no one, be he ever so enthusiastic over a propostion, wants to be hooked up with a loser.

Safety First

Inspiring achievements in accident-prevention work are being made in the coal industry these days.

A few weeks ago the record was made public of a mine of the Colorado Fuel & Iron Co. which has run for more than twelve years without a fatality.

The O'Gara Coal Co., operating a group of mines in southern Illinois, closed 1928 with an output of 1,340,000 tons and a zero mark in the fatality list.

And in Alabama the state mine inspectors and the operators are staging an intensive campaign which is bringing results.

The how which is making these achievements possible will be treated in special articles in coming issues of Coal Age.

Method of Timbering Now Happily Superseded

Valier Introduces

Machine to Cut Crossbar Hitches

By T. J. Thomas

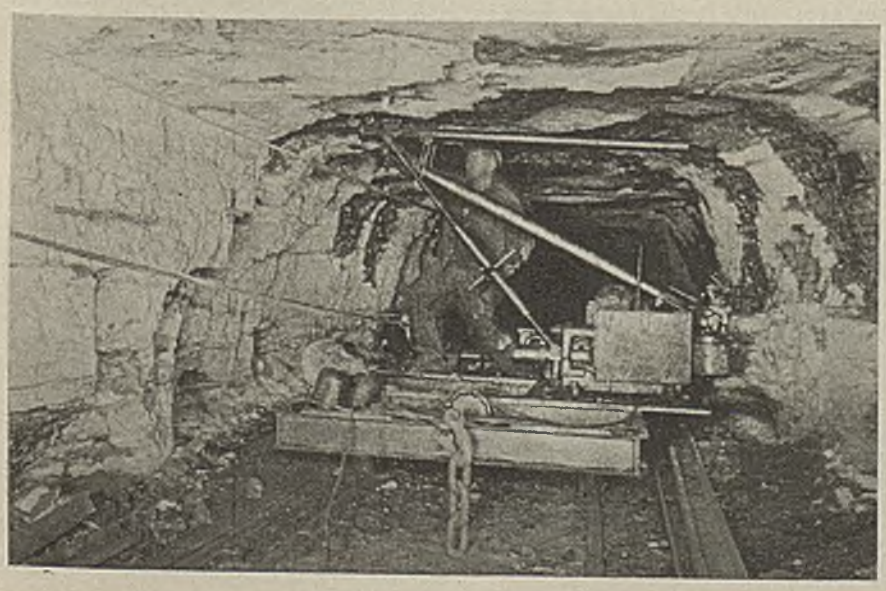
President, Valier Coal Co.
Chicago, Ill.

MECHANIZATION of Valier has made another step forward. Until recently, it has been the practice where the roof is tender to cut hitch holes in the ribs of coal by hand for the support of cross beams or to cut vertical slots in like manner where timber sets were used. At Valier hitch holes are now being made by a mounted drilling machine which makes a circular recess of 9-in. diameter using a motor-driven cutter head arranged for easy adjustment over a wide range of cutting positions.

Its drill mechanism and motor connections are mounted so as to rotate on a turntable. Thus holes can be drilled either to the right or the left of the truck. The turntable is itself carried on guides so that it can be slidden to right or left as the distance to either rib may require. The machine is self-contained and self propelled—a complete unit in itself.

All the haulage entries at Valier are protected against roof failures. In the past square sets of steel and timber have been placed by hand, making advancement slow, the steel crossbar being supported by timber legs, many of which had to be placed in slots in the ribs to maintain proper clearance on the heading. The coal was hard and the cutting of these many slots was slow and expensive work; two men would place an average of only about 2½ sets per day. On a 5½-ft. spacing, this permitted only about 14 ft. of progress per shift. Then too, because a man cannot work to advantage at a height much above 6 ft., much lagging was required between the crossbar and the roof.

Machine Cutting Hitch Hole Over Trolley Wire

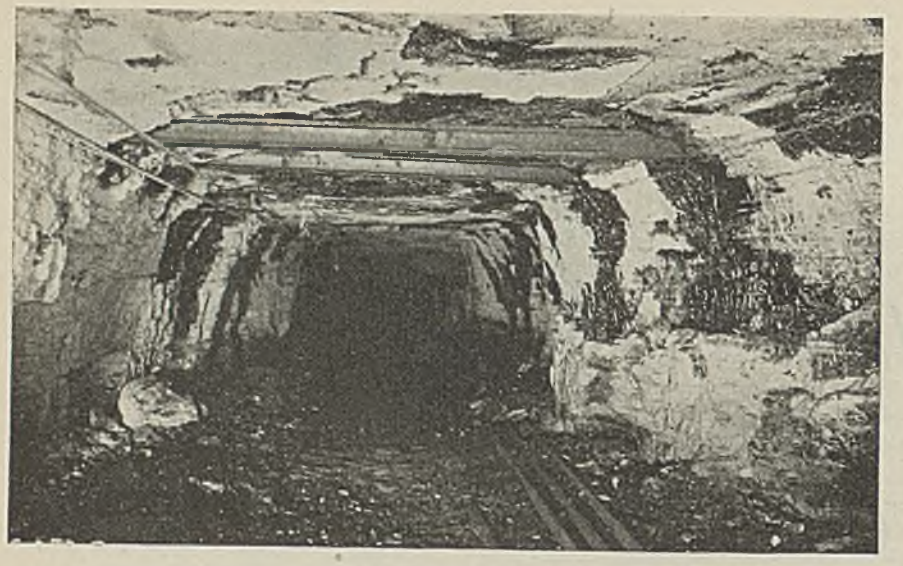


After the local management had given the matter careful study and test in co-operation with the equipment manufacturer, the Goodman Manufacturing Co.'s new drilling or hitch-cutting machine was put in operation. Instead of an entry set, a crossbar is now used without supporting posts, the ends of the bar being set into holes drilled into the ribs close to the roof.

One hole is drilled deeper than the other, and the crossbar, which is a steel rail, is put up by first inserting one end of the rail into the deeper hole and then sliding the rail back so as to place the other end in the shallower hole opposite. The rail is of such length that when set it is supported by 8 to 10 in. of solid coal at each end.

Two V-blocks of wood are then driven into each hole, between the web of the rail and the coal. This gives a permanent support without the expense or hazard of supporting legs at the ribs. Where the roof is uneven, lagging is used between the crossbar and the roof.

The machine used for this work will drill hitch holes at heights up to 7 ft. 9 in., measuring from the top of the rail to the bottom of the hole. This range makes it possible at Valier in all cases to drill holes flush with the roof or close up to it. One man suffices to operate the machine at all times, whether it is traveling, being set and adjusted or drilling its hole. In the illustration of the machine traveling the drill is in lowered position and the motor is thrown into driving



Crossbars Resting in Hitch Holes

connection with the travel mechanism.

From the illustration of the machine in operation its adaptability to various circumstances can be noted. The mounting of the drill mechanism and its motor on a sliding turntable enables the operator to cut in both ribs with one setting of the machine and the drill rod. He can cut in a near or far rib by a simple adjustment of the sliding platform.

In about 25 minutes the machine can be set to cut the first hole. Subsequent holes with no change of the drill adjustment itself can be made in 8 to 12 minutes.

For the first setting the turntable is revolved 90 deg. from the central or traveling position and fixed in that direction by the dropping of a locking pin. The drill is then raised to the proper height by a rapid screw adjustment, and the drill rod is set in horizontal position by tightening one nut. The cutter head is then advanced to the rib by sliding the platform, which is locked in proper position by tightening two nuts.

With this setting, a series of holes can be drilled along one rib, after which the unit is turned around to drill the corresponding holes on the opposite rib. In hard cutting the machine is made rigid either by blocking the drill head against the roof or by clamping the machine frame to the track rails at four points by special clamps that permit easy adjustment.

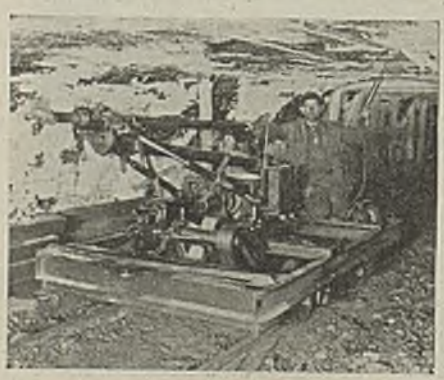
When holes are drilled close to the trolley wire, protection against accidental contact is provided by covering it with a split piece of garden hose, which is easily slipped into place. This, being of rubber, effectively removes all electrical hazard.

The 9-in. auger has proved an excellent as well as a safe cutter. It sumps without the creep which is common to large drills heretofore tried. The cutting blades can be sharpened and replaced in a few minutes. One set of cutters will drill four to six holes in hard coal. They are sharpened by grinding only, the forging which cutter-chain bits require being unnecessary.

The hitch holes are sunk about 27 in. deep on the trolley side and 36 in. deep on the other side. The actual drilling of the hole can be completed in about 8 minutes. The machine, though it requires only one man to operate it, has averaged sixteen holes per shift over a period of eleven consecutive shifts. It has driven almost double that average in a single shift. As the crossbar when placed in hitches provides full clearance across the heading and is permanent in every underground sense, it is another step toward safety in mines.

The cost of crossbar support thus attained is much less than with the old type of square set. Its advantages are: (a) It eliminates the legs of the timber set, thus increasing the working width of heading, eliminating the possibility of rolling a man between the trip and a post and other like accidents and obviating the damage to the roof that results from wrecks and derailments and the consequent displacement of posts; (b) it adds 4 or 5 in. to roof clearance because steel crossbars can be used with economy; (c) it saves in lagging because the crossbar can be set flush or close to the roof and (d) it assures permanance, for the crossbar will never come down unless it is purposely removed.

Going to Another Job on Its Own Power



Artificial Wood Produced From Coal in England

A substitute for wood when the world's timber shall have run short already is being found by industrial scientists in England, according to N. Tourneur, Thundersley, Essex, England. In the laboratories of the Imperial Chemical Industries, Ltd., artificial wood is being made from inferior coal. Out of it is produced a strong, heavy oak-like material at a cost one-third less than the present price of similar timber. Coal-oak is almost as heavy as teak and has no grain to allow it to "give," but it is as strong as concrete and almost inflammable. Furniture is now being made out of this new material, which sometimes is combined with coal ash and sawdust to lessen its weight. It takes a fine polish and the grain is painted in.

From coal the cellulose is being extracted for the manufacture of this artificial wood. A molecule of cellulose is composed of six atoms of carbon in combination with five of water. When this cellulose is partly nitrated it produces the basic material used for making the wood of the future. The necessary nitrogen is taken out of the air by fixation, and applied in the form of nitric acid, in baths of which the cellulose is treated. From the resulting product timber will be eventually turned out in long beams, etc., moulded in standard sizes.

In addition to coal any vegetable products can be used for conversion to nitrocellulose, and tropical vegetation could be freely harvested, vessels lacking cargo for return voyages fetching it at low cost. And, apart from this synthetic material serving to make timber for general purposes, attention is being given to its substitution for paper, yarns now obtained from wood pulp, vegetable textiles and other commercial products. With a small cost of production the future of this artificial wood appears to be far-reaching and somewhat revolutionary.

Speed-Current Characteristics

Determine Settings for Time Interlocks

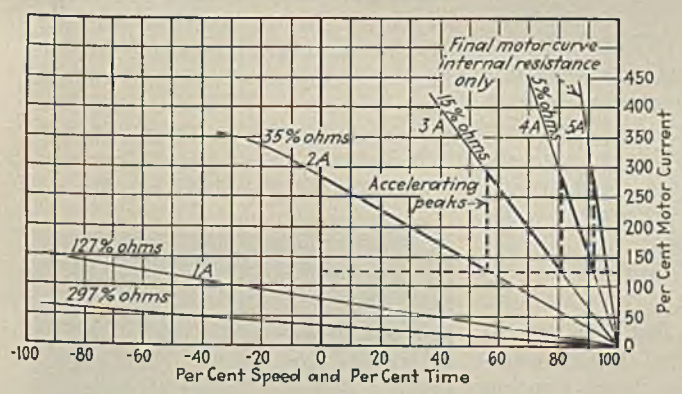
By L. C. Hardesty

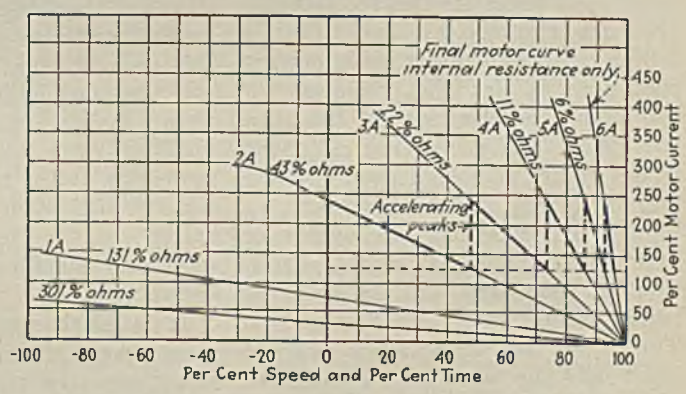
Industrial Control Engineering Department
General Electric Co.

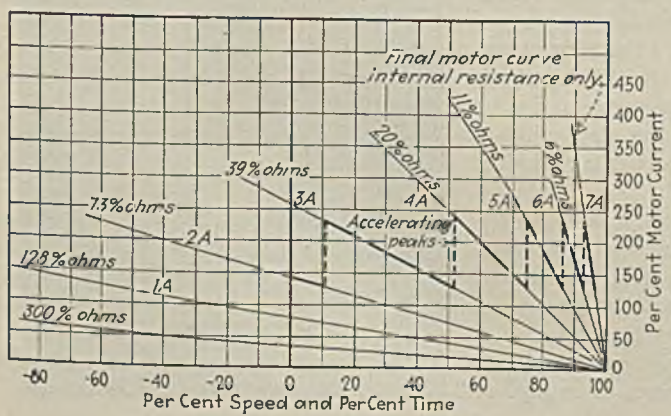
ON CURRENT-LIMIT mine-hoist control equipments the current-limit relays are set to operate at a certain current, usually about 125 per cent of motor full-load current, depending upon the load condition. On each step of acceleration, after the current has fallen to this value, the current-limit relay will operate and cut out a section of resistance in the motor circuit. This relay will operate, on each accelerating point, at the same current, and approximately the same accelerating peaks will be obtained on each point if the resistor is properly proportioned. If it is desired to speed up the hoist by reducing the time of acceleration it is necessary to set the current-limit relay to operate at a higher current. The accelerating peaks will be higher but will all be approximately equal. If it is desired to slow up the hoist or increase the time of acceleration it is necessary to set the current-limit relay to operate at a lower current. Then the accelerating peaks will be lower but will all be approximately equal.

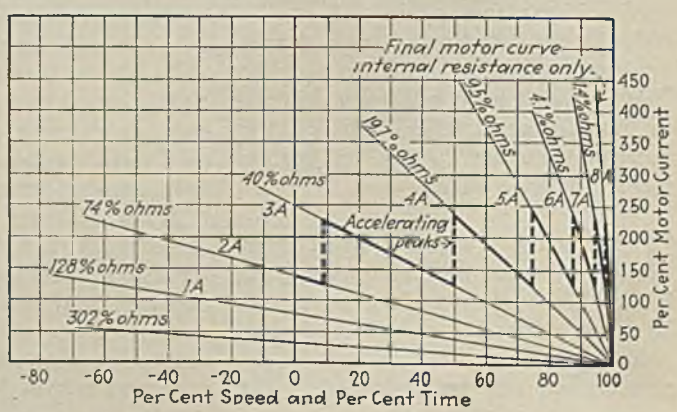
With time-limit control equipments it is desired to obtain the same operating characteristics as described for the current-limit equipments, assuming the same load conditions. Where there is a geared time interlock on each accelerating contactor, uniform accelerating peaks cannot be obtained by adjusting the geared time interlocks to operate at the same time. Fig. 1 shows an accelerating curve for an induction-motor mine-hoist equipment having five accelerating contactors; Fig. 2 shows six accelerating contactors; Fig. 3, seven accelerating contactors, and Fig. 4, eight accelerating contactors. From these curves, which are the speed-current curves of a wound-rotor type of induction motor, the percentage of time designates the percentage of total accelerating time for which each geared time interlock should be set to give the same current peaks that would be obtained if current-limit relays were used set at 125 per cent of full-load current and load conditions were the same.

With time-limit control the time required for all of the accelerating contactors to close, when the master switch has been thrown to the last running point, is dependent upon the time adjustment of the geared interlocks. In order that acceleration may be accomplished under approximately









Figs. 1 to 4—Proportions of Total Starting Time Are Fixed by Speed-Current Curves

uniform torque it is necessary that the adjustment of the time interlocks be for continually decreasing values as full speed is approached. Such adjustment is made by the manufacturer in accordance with the curves shown, and in general this adjustment is

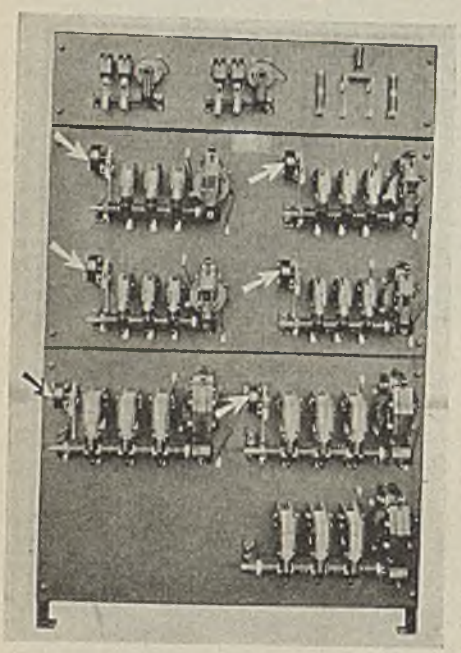


Fig. 5—Time-Limit Hoist Control; Arrows Indicate Geared Time Interlocks

based upon eight seconds' total time of acceleration. Readjustment may be necessary as required.

The curves show the maximum and minimum values of motor current upon closing of each accelerating contactor, assuming the load conditions are such that the average value of torque developed under these current conditions is just that required for completing acceleration in the time for which the relays are adjusted. These values represent good practice and are typical for the usual case.

If load conditions are lighter or greater, the ranges of current variation on each step will be lower or higher respectively than those shown. The time for acceleration will be practically the same for all load conditions. To obtain different times of acceleration, time setting of the interlocks can be adjusted for a shorter or longer time, as the case may be. For a given load condition a decrease in time for acceleration will result in increased current peaks on various steps, and vice versa.

THE factory adjustment of interlocks in the first secondary contactor (1A) should, in general, not be disturbed, and for eight- and nine-point equipments the interlock on 2A also should not be disturbed. The time adjustment of the others should be such that the same relation between consecutive interlock settings is obtained as with the standard setting. The sum of the individual interlock time setting should equal the total time desired.

For example, to change an eight-point equipment, shown on the curve in Fig. 3, to give six seconds, interlocks in contactors 3A, 4A, 5A and 6A should be adjusted for 2.2, 1.5, 0.5, and 0.5 seconds respectively. Further refinement in adjustment can be made by making the current peaks equal, as shown by the line ammeter.

Similar procedure should be followed for adjustment to give slower rate of acceleration; that is, longer time to attain full speed.

The following tabulation gives the time setting of the geared time interlocks when the panel is tested:

Curve	Total Points	Setting, in Seconds, of Interlocks on Contactors 1A	2A	3A	4A	5A	6A	7A	Total Time, Seconds
Fig. 1	6	0.5	4.5	2.0	1.0	...	...	...	8
Fig. 2	7	0.5	3.8	2.0	1.0	0.7	...	...	8
Fig. 3	8	0.5	0.8	3.3	1.9	1.0	0.5	...	8
Fig. 4	9	0.5	0.6	3.2	1.8	0.9	0.5	0.5	8

On all mine-hoist equipments there is furnished a resistor with a total ohmic value of approximately 300 per cent. This gives approximately 33 per cent torque at standstill and permits operation at slow speeds with light loads, which may be necessary for shaft or rope inspection, or changing ropes. When contactor 1A closes, a large portion of this resistance is cut out, leaving only enough resistance to allow the motor to be plugged or quickly reversed and keep the plugging peak approximately equal to the accelerating peaks. The remaining contactors are straight accelerating contactors.

Concrete Stoppings Tested To Point of Failure

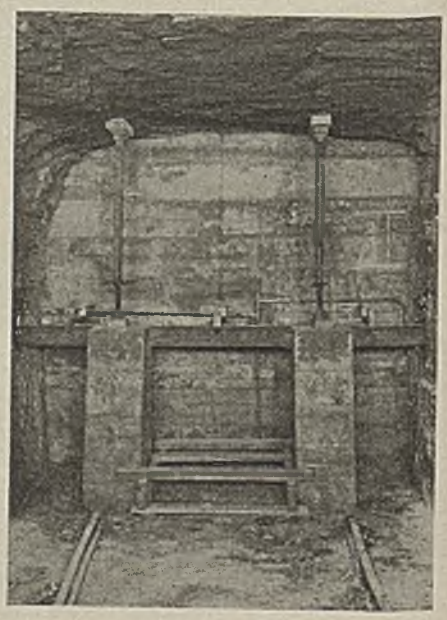
The hitherto indeterminate effect of explosive forces upon walls is being studied in connection with tests of mine stoppings at the Bureau of Mines experimental plant, Bruceton, Pa. Stresses induced by the impact of explosions, it has been found, are no greater in massive structures than stresses caused by an equivalent static pressure. Tests were made by setting off charges of black powder in a chamber excavated in the experimental coal mine and closed off by a slab wall of plain concrete. A time and pressure indicator was used to record the explosions, and deflection readings were taken by suitable instruments aplied to the concrete and coal. Maximum pressures were varied by the quantity of powder used and stoppings were tested to destruction.

It is emphasized that the experiments represent actual mine conditions not only due to their location but also because the explosive effect of black powder is similar to that of gas or coal dust. Preliminary results show that if the stopping is tightly fitted into keyways cut in the coal, an element of the slab will act as a rigidly supported beam and thus give greater strength.

It is believed that massive concrete is more adapted to mine construction conditions than reinforced concrete and the experiments were conducted on this basis. Failure occurred in compression on the inner face and not in tension, it is understood, the stopping breaking in the middle and opening up like a pair of doors. In the latest test the concrete failed and not the coal, which was very strong and elastic.

The purpose of this work is to determine standards for stoppings in leased mines on public domain. The act for leasing reads that resistance to a pressure of 50 lb. per square inch shall be provided to protect the mine and adjacent property from explosions in discontinued workings. Experiments are carried on slowly due to the time necessary for the setting of concrete, so that detailed results are not yet available.

Deflection Readings Are Taken in Tests to Determine Resistance of Concrete Stoppings to Explosion Force



...How and Why...

*The Bureau of Mines Gives Approval To Mining Equipment**

By E. J. Gleim
Associate Electrical Engineer
U. S. Bureau of Mines

In order to obtain permission to affix a seal to equipment showing that it meets the requirements for permissibility a manufacturer must present his product for certain tests prescribed by the Bureau of Mines. These tests are designed to insure that the equipment nas the minimum requirements for safety in use.

A complete list of all mining equipment tested and approved by the Bureau to July 1, 1928, was published in *Coal Age* last September, pp. 550-551. Changes and additions also are given monthly as issued.

THE U. S. Bureau of Mines issues approvals to cover complete machines. Approvals are not granted for separate motors, controllers, batteries, headlights and other electrical parts that may be assembled into complete machines. The reason for this policy is that a safe installation consists of more than a group of parts which in themselves may be safely constructed; there must also be adequate protection of the wiring between these devices and of the wiring to the source of power. A conveyor driven by a motor that may have passed inspections and tests prescribed by the Bureau of Mines is not necessarily a safe piece of equipment in the presence of gas if it is controlled through wiring and a starter that have not undergone rigid inspections and tests.

Before issuing an approval, therefore, the Bureau must see that *all* elements of the device approved are electrically safe. This statement should not be taken to mean that the purpose is to discourage the development of motors by one manufacturer and of controllers by another independently of the one who may assemble a machine for approval. For some time past the Bureau has been engaged in the inspection and test of motors, controllers and other electrical parts for independent electrical manufacturers so that they will be in a position to offer tested parts to firms that are engaged in the construction of loading or other machines which may be approved by the Bureau. Although this does not permit an approval plate to be attached to each motor and controller, it does give the assembler a variety from which to select according to his requirements.

In general the policy has been to grant approval to the manufacturer who assembles the mining machine, the rock-dust distributor or the loading machine even though he did not make any of its electrical parts. Under this policy the assembler is held responsible for the safe assembly and wiring of the parts. Although the assembler may not be classed strictly as an electrical manufacturer, the Bureau assumes that he has a certain knowledge of electrical matters before he can correctly apply, assemble and wire the electrical parts in his machine.

Some one person or organization must have a knowledge of the complete outfit and must be able to assure the Bureau and the purchaser that all the elements are of the same design as those tested and inspected for safety, that no parts of other design are included, and that features (such as proper overload protective devices, proper trailing cable, cable reels, etc.) necessary to safety are not omitted. Therefore, the Bureau holds that the assembler is the logical one to assume the responsibility for the safety of the whole. In granting him the approval he is charged with that responsibility. If this responsibility is not properly met, the Bureau may withdraw its approval.

For small mine pumps and concrete mixers the Bureau has found it desirable to deviate slightly from the policy just outlined. A pump does not present the intricate assembly and wiring problems that are met in the construction of larger equipment such as a permissible loading machine. It is chiefly a matter of applying the proper size of motor required for driving the pump. The motor and its starter as a unit already wired for service can be supplied by electrical manufacturers.

THUS the pump manufacturer need not be concerned with wiring problems already worked out by the electrical manufacturer, provided the electrical equipment as supplied is suitable for his pump. And since the pump manufacturer is not concerned with the details of electrical construction and assembly in which he takes no part, the responsibility for the safe assembly of the electrical unit properly belongs with the electrical manufacturer. For this reason approvals have been issued to the electrical manufacturer covering a "permissible electric motor and control for —— mine pump," the make

*Published by permission of the Director, U. S. Bureau of Mines (not subject to copyright).

of pump being definitely specified. This information must be given on the approval plate.

Approvals of motor-driven mine equipment, excepting storage-battery locomotives, are issued under the provisions of a "Schedule," 2B. Any manufacturer is free to submit his parts for test and inspection so long as he complies with those provisions. When those parts have satisfactorily met the Bureau's requirements the manufacturer can sell them to the builder of complete machines with the assurance that no further inspection or test of the individual parts is required. The builder then can apply for approval of a machine in which the tested parts are incorporated. It is, of course, necessary for him to furnish specifications and drawings covering the wiring and assembly of the parts so that the arrangement and protection of the whole may be placed on record in the Bureau's file.

A Peep Ahead

New standards are being set by the anthracite industry. COAL AGE *editors have been cruising that region obtaining some of the more outstanding of these, including the forestry practice of the Lehigh Coal & Navigation Co., the research laboratory at Lansford and the big new stripping operation at Summit Hill.*

Articles on these and other anthracite developments will appear in forthcoming issues.

Power-Factor Regulators Take Hold in West Virginia

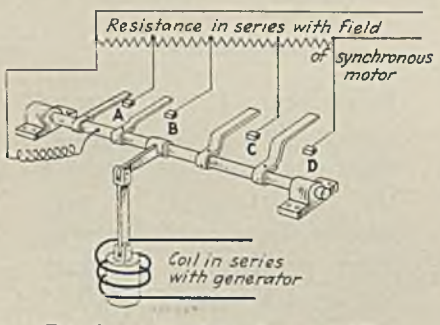
"IS THIS power-factor meter working?," asked a representative of *Coal Age* after noting that the pointer remained practically stationary at 99 lag while the output of the 300-kw. synchronous motor-generator varied 200 to 400 amp. "Yes," said an electrician helper, "they fixed up some kind of an automatic regulator in here a while ago."

This conversation took place in a substation near the portal of No. 4 mine of the Crozer Coal & Coke Co., Elkhorn, W. Va. Further inquiry resulted in this comment from R. A. Ruff, assistant manager: "Our chief electrician figured out the connection after reading an article in *Coal Age* last winter. We are saving power by it but cannot give convincing figures until next April, when a full year will be up. You know it is no use comparing a month in the summer with a month in the winter."

The substation contains but the one 300-kw. unit. It is an old type, and equipped with an exciter because it is wound for 600-volt service.

Allen Raup, chief electrician, said: "We put it into use last April, on the 13th. It took only about two hours to make the connections after I figured out what to do. You see, I had to do it in a different way than that shown in *Coal Age,* because our exciter is 125 volts and the mine voltage is 600. We have the 150-kw. set at Upland fixed the same way."

Mr. Raup explained that in making the change on their machines he did not disturb the connections of the shunt field of the exciter. All he did was to connect the series field of the exciter in parallel with about 12 in. of the compounding shunt of the generator. This causes the exciter voltage, and hence the synchronous

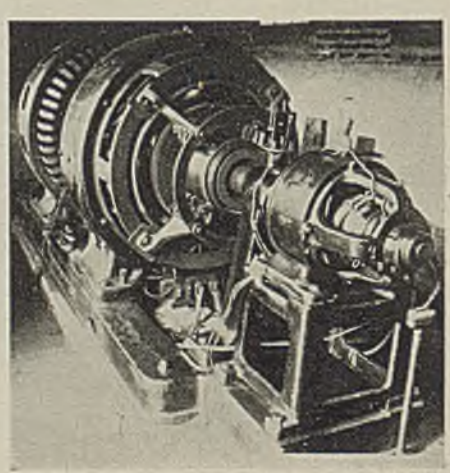


Regulator Used at Amherst Mine

field current, to increase as the motor-generator load increases.

As contrasted with this inherent regulation at Elkhorn, which was patterned after that developed by Sherman Melton and described in *Coal Age,* page 75, issue of February, 1928, an entirely different method was put into use July 1, 1928, by the Amherst Coal Co., at Braeholm, Logan County, W. Va. This regulator, indicated in principle by the accompanying sketch, was built or assembled by W. G. Nichols, chief electrician, who has applied for patents covering it.

300-Kw. Unit Which Was Reconnected for Automatic Regulation



Only one of the three 150-kw. 250-volt sets in the substation are equipped with the regulator. Observance of its operation revealed that at light load the synchronous field current in the set ran 5 amp. and that as the load increased to full rating the field current increased in four steps to a maximum of 7 amp. At average line voltage a field current of approximately 7.5 amp. is required for unity power factor.

Mr. Nichols explained that the regulator in use is only experimental, and that another with several more contacts is being assembled. This will provide a wider range of regulation.

To determine the power saved by the regulator, a.c. watt-hour meters were installed to total the inputs, and d.c. watt-hour meters to total the outputs, of the machine having the regulator and of a similar machine without the regulator. A. S. J. Hopkins, manager, states that the following results were obtained on a test extending from Sept. 30 to Oct. 17:

	Kw.-Hr. Input	Kw.-Hr. Output	Over-all Efficiency, Per cent
Without regulator	34,000	18,350	54
With regulator...	26,100	18,870	72

Obviously these results are too good to be representative of the true comparison. When this was called to the attention of Mr. Hopkins he admitted that none of the four meters involved in the test was calibrated after installation, hence plenty of chance for error existed. There is sure to be a power saving, however, because of the saving in field current and a decrease in wattless current. Mr. Hopkins stated that although the loads on the two machines were kept as nearly equal as possible, the regulated machine ran 4 to 6 deg. C. cooler than the other.

STRIP SHOVELS

Box Cut at Velva, N. D.

Invade Dakota Lignite Field

By R. Dawson Hall
Engineering Editor, Coal Age

THAT lignite has a definite and important place in the economic development of America both north and south of the international border between the United States and Canada is evidenced by three big strippings owned and operated by the Truax Traer Coal Co., of Minot, N. D. So much has been said about what should be done to convert lignite by carbonization into a different class of fuel, such as char, and to use it for producer gas that the generality does not realize how desirable it is as a fuel without treatment, but if one were to ask those in the great Northwest what should be done to improve the fuel they would be disposed to look at the questioner with some amazement, for they like lignite and even prefer it as a domestic fuel. Steam users also are finding it a suitable combustible with furnaces of the proper type. This is no place to discuss its many good qualities—its free-burning character, its cleanliness from dirt and smoke, its occasional low ash, etc., but much might be said in its favor, and those who use it are its strongest advocates.

In order to put it on the market at a low cost, the preferred plan is now to hunt a place where it may be found in a thick seam with a light cover of glacial drift, which can be readily removed. Not all of it is so located, but the strip pits of the Truax Traer Coal Co. have been chosen so as to give almost every desirable feature of open-pit operation.

The newest of these mines is in Ward County, not far from Velva, N. D., about 8½ miles from the line of the Minneapolis, St. Paul & Sault Sainte Marie (the Soo) R.R. The Truax Traer company has built a spur between Voltaire, in McHenry County, and this low-ash lignite deposit. The mines are located about 70 miles due south of the international boundary in a prairie region known as the Coteau de Missouri which is not absolutely flat but has a few inconsiderable gulleys or draws, one of them having been utilized as a location for the railroad spur just mentioned, which has altogether 14 miles of track.

Vertical Kerf Cutter in Columbus Pit

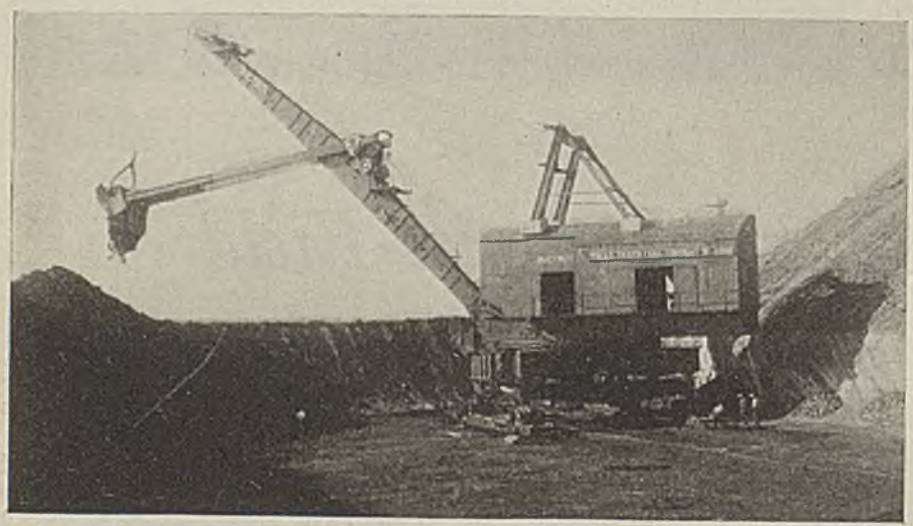
The thickness of the lignite bed averages 14 ft. and varies from 13 to 15 ft. The cover, which is glacial drift, runs from 20 to 40 ft. The bed is quite regular over the area being operated. There is a lower seam which, however, has a bad roof. For this reason and from the fact that over it is a quicksand that could be controlled only with difficulty it is likely that it will not be worked—at least, not for many years.

AT THIS strip pit there is only one working coal face which is being uncovered by a Bucyrus 320 electric shovel having a capacity of 6 cu.yd. and running on a track. The coal is loaded by two caterpillar-mounted shovels into cars that hold 3½ to 4 tons. One of these is a Diesel-engined 1½-cu.yd. shovel and the other an electric 2-cu.yd. shovel.

The cars have a gage of 36 in. Their inside length is 8 ft. 8 in., their inside width is 6 ft. and the depth inside is 34 in. They are discharged on a rotary dump into a bin and the coal lifted by a flight conveyor up a 30-deg. slope to the main structure. The coal is fed to the conveyor by a reciprocating feeder which has large bars which convert it into a huge grizzly; these bars, being adjustable and removable, may be set as far apart as 14 in. The coal that will span these openings is taken to a pair of rolls of 30 in. diameter and 6 ft. wide. The rolls can be set 4 in. or more apart. On the sides of the

reciprocating feeder are set pick points much like those on a Harrison punching machine. These move the larger lumps along in case they show a disposition to lag.

The product, whether true run-of-mine or that same size as reduced by the rolls so as not to exceed some specified size, is taken by the flight conveyor to screens. There it is separated into lump (above 4 in. or above 6 in., according to demand), stove or egg (2 x 4 in. or 2 x 6 in., according to the size of the lump), nut (1 x 2 in.) and screenings (all under either 1 or 2 in., depending on the ability to sell nut). Lump is loaded by Ottumwa scraper loaders and the other sizes by Ottumwa portable belt loaders. The tipple was erected by the Pittsburg Boiler & Machine Co., of Pittsburg, Kan.



Big Stripper Making Its Box Cut

The workings at this operation follow the circular system, which resembles a coiled snake. Power is bought from the Ottertail Power Co. at 2,300 volts and stepped down to 440 volts for the big shovel and 220 volts for the motors around the tipple and the coal shovel. Three 14-ton Plymouth gasoline locomotives are being used at this pit.

The new mine represents the accumulated experience of the company. The owners are fully convinced that the big shovel is more economical and effective in operation than the smaller units they have used and that the electric equipment is to be preferred, at least in the removal of glacial drift such as is found in North Dakota.

Just south of Columbus, Burke County, N. D., lie two other operations of the Truax Traer Coal Co.—the Whittier and the Truax. The village of Columbus is situated about seven miles south of the international boundary. The mines are connected by a switch of five miles, owned by the company, to the Great Northern R.R., so that the two mining centers, that at Velva, or Voltaire, and that at Columbus, do not trench on one another but have their own individual market, determined by the points reached by the two railroads. The coal from this Columbus mine goes into the northern half of North Dakota, over which the Great Northern has an immense number of railroad extensions, and into western Minnesota down as far as St. Paul and Minneapolis. The Velva coal goes to different points over part of the same area.

The Whittier and Truax mines, at Columbus, are not laid out as simply as the Velva mine because of earlier operations and because the many loading units and the inequality in cover made it possible to open up the stripping at more points. The coal was stripped in earlier years by a horse drag. These strippings were necessarily light and so were confined to the sinuous turns of a "coulée" or draft. (The first word, which is commonly used in North Dakota, doubtless is an interesting reminiscence of its early French occupation.)

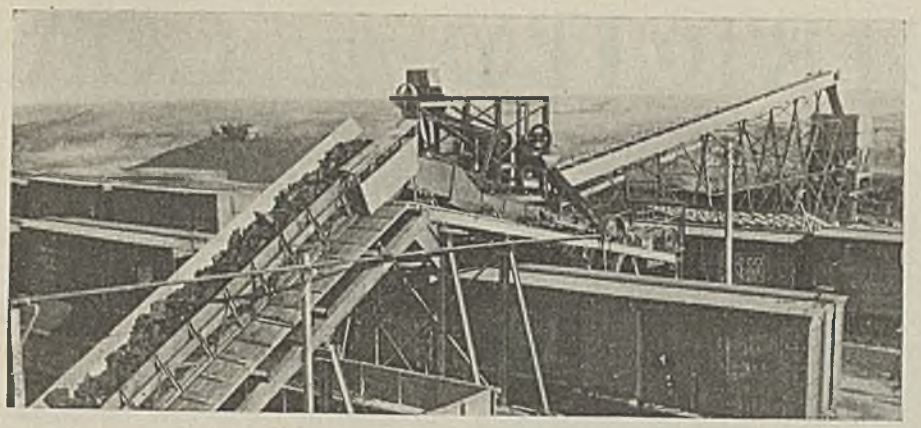
The Columbus mines, however, have been skillfully developed so that now they have the advantage of many working faces. At Voltaire there is but one, whereas at Truax there are four and at Whittier three. At the time the mines were visited, in the fall of 1928, 350,000 tons of coal had been uncovered and it was expected that 550,000 tons would be lying exposed by the time the winter demand developed. With seven separate coal faces the daily tonnage that can be developed is immense.

The user of lignite is disposed to delay his purchases because he likes to have blocky coal, whereas lignite weathers under long exposure. Then again he likes to haul the coal when there is less work to be done around the farm and when there is enough snow on the ground to make hauling easy. The snowfalls in North Dakota are not deep nor is the snow heavy, and the ground is swept clear by the strong wintry winds. Hence the roads are open all winter. For these reasons the shipper of lignite must be prepared to deliver a large tonnage when it is needed. The stripper can do this, but the man with an underground mine does not have that opportunity.

The coal at Columbus runs from 9 ft. to 12 ft. and averages about 10½ ft. The cover, which is of glacial drift, varies from 6 up to 40 ft. and averages about 25 ft. Above the coal is a clay suitable for pottery or brick. All this overburden is removed by a 3½-cu.yd. revolving steam shovel of Bucyrus 175-B make. The dipper, however, will hold as much as 4 or 4½ cu.yd. of material. The shovel has a 75-ft. boom. In summer the cover is readily removed without shooting, but in winter explosives have to be used. The coal also is loaded without shooting except when frozen, and then not because the shovels could not handle it but because the coal lumps would be unmanageably large.

AT THESE mines the coal is cut by Sullivan channelers along what will be later the edge of the excavated coal, and that is done not so much to lighten the work of the ex-

Where Kerf Is Cut Track Is Not Disturbed



Uncovered Tipple at Velva, N. D.

plosives or to ease the effort of the shovels in removing the coal as to give a neat edge to the excavation and to prevent the coal berm from being torn. This might seem rather a needlessly æsthetic provision but as a matter of fact it is anything but that. When the berm is not torn, track is more easily and satisfactorily laid on it, and dirt which rests against the berm finds a smooth surface with no torn and jagged edges in which to penetrate. As a result the coal is cleaner than it otherwise would be. The machine will cut about 35 ft. per hour and usually is operated for two hours at a time.

In other states the coal beds have a close structure and in strippings are cut by machine in order to reduce the quantity of explosive used and the quantity of slack made. In a bed of lignite of so open a structure that it forms natural drainage channels for the water that seeps through the ground the coal is cut largely to prevent the rough ripping action of the shovel from destroying the level of the berm and the smoothness of its vertical face.

At the Columbus operations the coal is loaded by four shovels. Two of these are of Bucyrus make and have 2-cu.yd. dippers. One of these is electric and convertible to dragline excavation. Another Bucyrus shovel has a 1¾-cu.yd bucket. A North West Engineering Works shovel with a ¾-cu.yd. bucket also is used. It has a Diesel engine and is convertible to dragline operation. The use of the Diesel equipment produces notable economies, according to Fred Truax, the general manager. All these shovels are caterpillar-mounted.

ANY dirt that may fall on the clay berm is removed by a horse-driven drag scraper. The stripping shovels work two 10-hour shifts and the coal shovel one shift also of 10 hours. The coal-loading shovels are laid idle in the summer for complete overhauling. The plant is provided with the most ample means for doing heavy welding work which the mining of lignite without preliminary shooting necessarily involves.

The coal is hauled by five 14-ton gasoline locomotives of the Plymouth J. L. C. type to tipples that are operated electrically. The cars hold 3 tons and dump to one side. They are discharged onto a screen 45 ft. long that passes all coal smaller than lump. The large coal is not crushed as at Velva but sold as it comes from the strip pit. The other sizes made are the same as at the Velva mine. Of 24 cars, sixteen, or 65 per cent, will be lump; four, or 17 per cent, egg; one, or 4 per cent, nut, and three, or 13 per cent, screenings, which at the present time meet with much selling resistance. The lump sells at about $2.25 and the slack at between 75c. and $1.

WATER is obtained from a coulée about two miles away. It comes to the ground about 50 ft. above the storage tank, to which it is conveyed by a long sewer line. The water from the tank is distributed by a 1¼-in. steel pipe. It is laid on top of the ground, but during the winter a slack fire is lighted every 6 to 8 rods to keep the water in the pipe warm. One man attends to these fires. The pipe is not buried at any point and is never emptied.

Power is obtained from the Montana & Dakota Power Co. at 2,300 volts and it is stepped down to 220 volts for every purpose except for the operation of the big shovel.

All the Truax Traer mines in North Dakota are operated under the immediate direction of Elmer Truax, who, with Harold Truax, was a pioneer operator of underground mines and the first to install and operate a stripping shovel in that state. Of these there are still many in the immediate region, though of smaller capacity than the strip pits mentioned. Velva is rated at 7,000 tons daily capacity and the two Columbus mines at an aggregate of 3,000 tons.

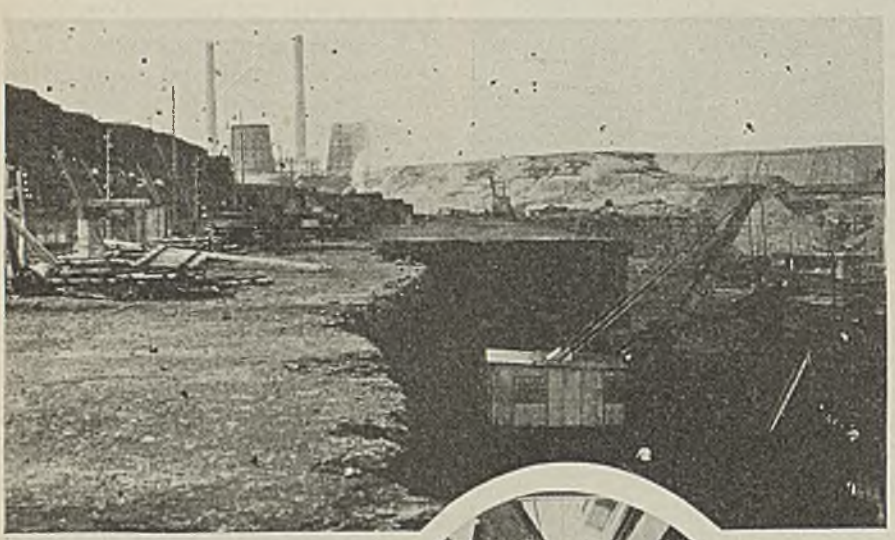
Safety Features of Mine Lamps Endangered by Meddling

According to the Holmes Safety Association, an author in the French publication *Annales des Mines* calls attention to the fact that workers in the mines—officials as well as miners—seem prone to tamper with locks on safety lamps, including those on flame types as well as those involving electric batteries. It is stated that "various dodges are used by workers to open the locks and gain access to the lamps and some statistics give the number of lamps thus tampered with as 1 in every 10,000 per annum with the electro-magnetic lock although other colliery companies assert that this figure should be multiplied by 10."

This practice to which the French writer calls attention exists in the United States to a far greater extent than the French figures would indicate. In some districts the permissible electric cap lamps are "doctored" by users to "improve" them, and this is done apparently with at least the acquiescence of the operating companies though this tampering almost inevitably impairs if it does not utterly destroy the safety features of the lamps. Similarly the magnetically locked flame safety lamps only too frequently have the safety locking feature removed or have modifications made to allow the user to open the lamp when and where he pleases.

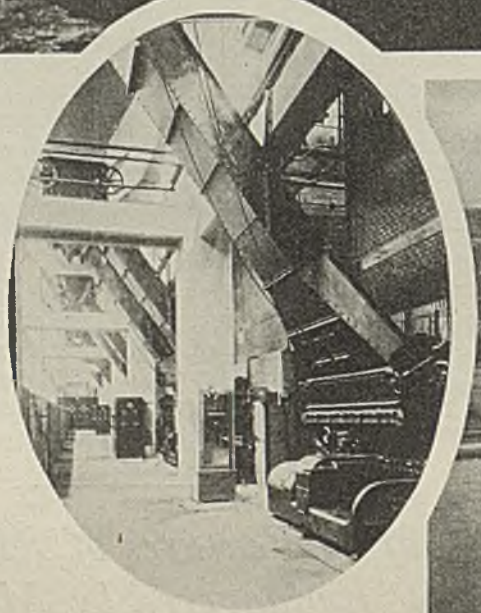
There should be adopted methods of inspection of all safety lamps—electric as well as flame—at intervals by responsible competent persons other than those who care for them or use them from day to day. This is a necessity if the personal equation is to be adequately taken into consideration in connection with safeguarding underground workers with permissible safety lamps.

ELECTRICITY *and* COAL

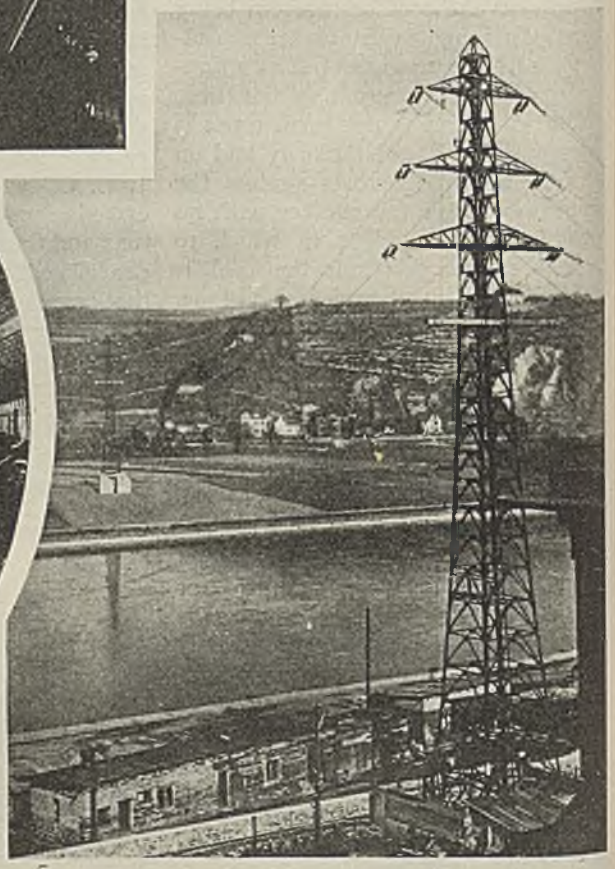


Coal Pit at Hedvika

RECENT years have seen a marked expansion in the generation of electrical power in Czechoslovakia together with a corresponding increase in the size of generating plants using both coal and water. One of the newest and most modern central stations was built at Ervenice in 1924. This station has a capacity of 45,000 kw. and will supply central Bohemia and particularly Prague.

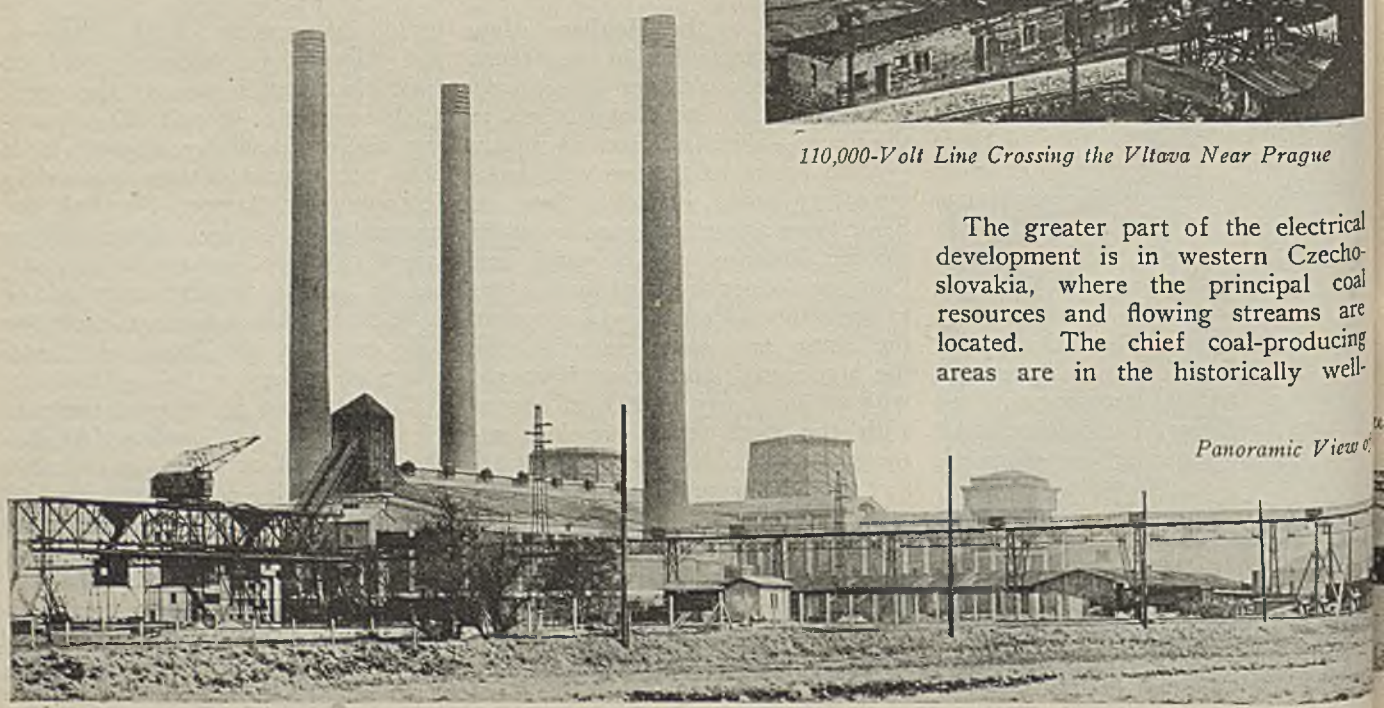


Stoker Feeding to Boilers, Ervenice



110,000-Volt Line Crossing the Vltava Near Prague

The greater part of the electrical development is in western Czechoslovakia, where the principal coal resources and flowing streams are located. The chief coal-producing areas are in the historically well-



Panoramic View of

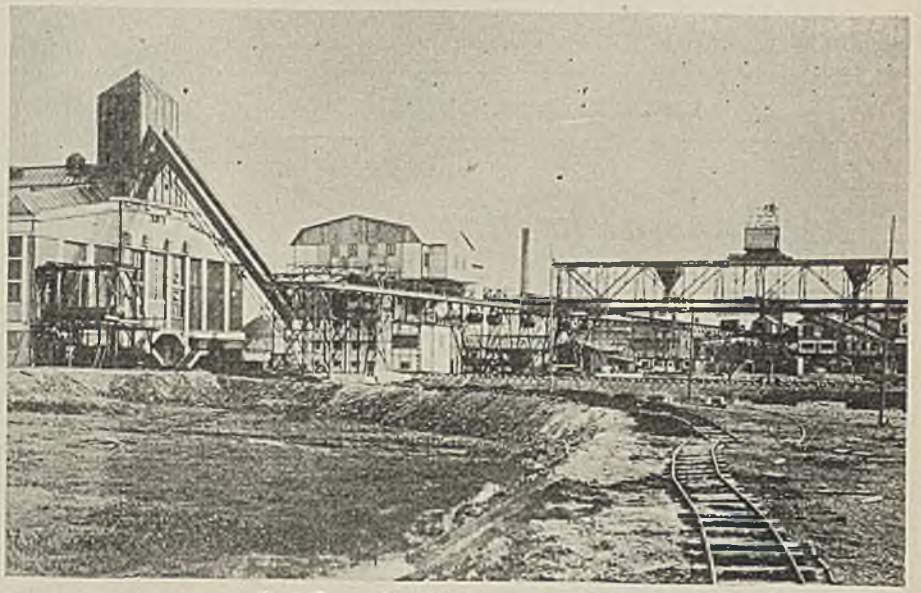
in CZECHOSLOVAKIA

known parts of Bohemia, Moravia and Silesia. The total profitable coal area contains 8,787,200,000 tons of pit (black) coal and 12,434,200,000 tons of lignite, or a total of 21,221,400,000 tons.

Pit coal having a thickness of 16.4 to 36.1 ft. and a heating value of 7,200–12,600 B.t.u. per pound occurs in Bohemia near the northern and eastern frontiers, with a small basin in the central and southern part. The ash content is from 1 to 5 per cent, though 27 per cent is known. In Moravia, pit coal is found in the north, with a second large field in the southwestern part. In the south, the thickness is 11.5 ft., and in the north the limit is 262.4 ft. Both fields produce an excellent fuel of 12,600 to 15,400 B.t.u. per pound. Other fields are less important.

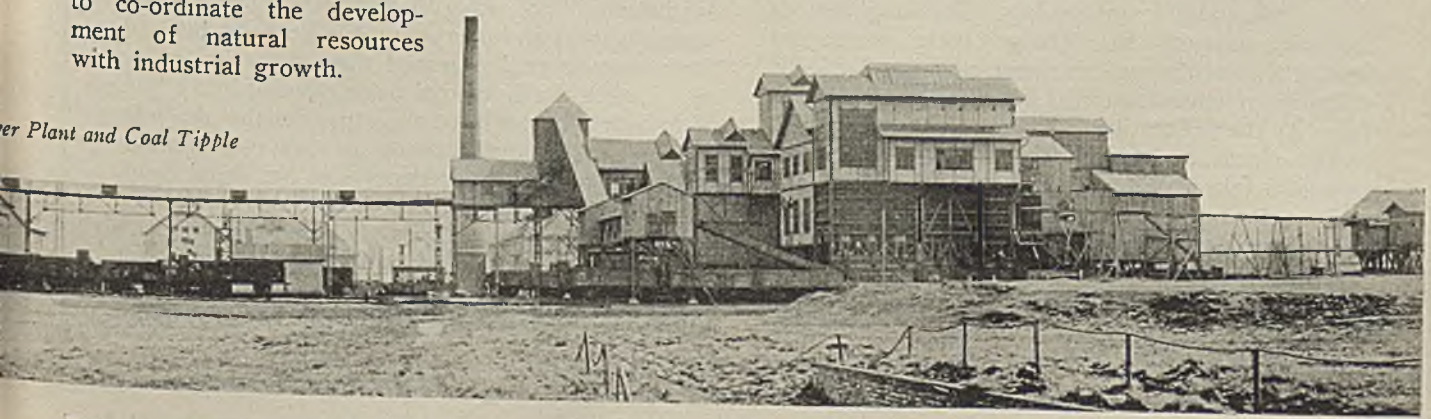
Lignite, which has found wide use for industrial and generating purposes, lies in northwest Bohemia (thickness, up to 98.4 ft.), south Bohemia and south Moravia. The heating value varies from 3,000 to 7,000 calories per kilogram, the average being about 4,000 (7,200 B.t.u. per pound). Ash may be insignificant or present up to 30 per cent. Other less important fields are scattered throughout the republic.

The Ervenice plant, illustrated here, is located in the lignite field in northwest Bohemia and receives its coal from an adjoining strip mine. The cover is 59 ft. of clay under which are a commercial bed 6.6 to 9.9 ft. thick, a mixed bed of eight layers of pure and impure coal 26.2 ft. thick and a lower commercial bed. Coal from the mixed bed, which would otherwise be wasted, is used in the power plant. This plant is a good example of the effort being made in this part of Europe to co-ordinate the development of natural resources with industrial growth.



Coal-Conveying Equipment at Ervenice

Burning Waste Coal at Hedvika



er Plant and Coal Tipple

COAL AGE

Published by McGraw-Hill Publishing Company, Inc.

SYDNEY A. HALE, *Managing Editor*

NEW YORK, FEBRUARY, 1929

Mechanized heating

ACCORDING to preliminary figures compiled by the Bureau of the Census there were 60,984 domestic oil burners manufactured in 1927. And yet there are coal men who can see no reason why they should get back of the movement to develop and push the sale of home coal-burning equipment which will mechanize both the firing of the fuel and the removal of ashes. Possibly they are genuinely satisfied with heating plants which may have been the last word in modernization two or three generations ago, but the number of householders who are equally content is daily diminishing.

Granted that this is primarily the problem of the manufacturer of heating equipment, the fact remains that it is the coal producer—not the manufacturer—who is the chief sufferer from the failure to speed up the design and construction of domestic coal-burning plants which are in harmony with present-day consumer ideas of comfort and convenience. The manufacturers of a general line of household heating equipment may say—and many of them do—that they are not concerned with the fuel the householder uses so long as they can sell him the boiler under which it is burned. But the coal producer is vitally concerned with what type of fuel is consumed: it is his business that is at stake and if the type of heating plant has an adverse effect upon his market that fact also should be his business.

Bleeding high-entry gas direct to return

IN SOME mines the coal pillars or roof strata bounding the haulage entry continue to give off gas for long periods following development. The gas which is released from the coal below the mean roof level of the entry is, of course, carried away and quickly diffused by the ventilating current; but the gas which escapes from coal or rock above the roof level, as where falls have occurred, tends to accumulate in dangerous quantities unless some means are provided for its continuous removal.

Upward-rising eddy currents set up in consequence of the increased perimetrical measurements of the entry at such points are not adequate for the complete removal of these accumulations of gas. Frequently the free passage of air into high roof recesses is obstructed by closely spaced timbers or cribbing. On these timbers the finest of coal dust is likely to settle as the atmosphere surrounding them is more or less quiescent. What an ideal combination of conditions is here provided for the initiation of an explosion—fine coal dust in a gassy atmosphere directly over a trolley wire!

The scheme usually employed to keep such places freed of gas accumulations consists of erecting an air deflector or boxing of wood, sheet steel or canvas, sloping upward from the normal roof line of the entry to the upper extremity of the cave. This construction is not entirely satisfactory in that it is not absolutely positive in operation, is not placed with facility and may present an obstruction which haulage men must dodge. Furthermore, the construction affords additional horizontal plane areas favorable for the accumulation of dust.

A much simpler arrangement suggests itself, which undoubtedly would accomplish the desired end more satisfactorily than the method described above. Extend a pipe line from the peak of the cave to and through a stopping and thus into the adjacent return airway. A flow of air then would be established in the pipe—from the haulage entry into the return airway—which would carry with it any gas that might accumulate under high roof on the haulage entry. Tests necessarily would have to be made to determine the correct size of pipe and the flow of air might be regulated by a valve.

The gas being thus led direct into the return airway would be kept out of the current of air entering working places to add its quota to the larger quantity of gas that is being evolved at the face.

Jobs for the industry's overplus

BOTH in the United States and Great Britain there is an overplus of labor in the coal fields and many solutions are being offered, not all of which are wise and permanent. In Great Britain, for instance, it is proposed that the miners be transported to Kent to construct a tunnel to France. That would provide a number with jobs for the period of construction, but what permanent solution would it offer? The men would be further from available jobs than they are now. They would have no opportunity to be absorbed into other industries. They are far more likely to find new occupations where they are, for wherever coal is mined there factories spring up. Unless the Kent coal fields develop into a hive of industry there will be no future for the men who dig the Channel tunnel except in some other tunneling job for which their experience has fitted them.

Similar suggestions have been made for the United States. It has been proposed that the surplusage of miners be used on the flood-control work on the Mississippi and other rivers and on the Boulder Dam, but these too are jobs that remove the

miner from industrial centers and consequently promise him nothing permanent. Moreover, they offer him for work that must be conducted under the hot sun a wage less than he has been in the habit of receiving. If the miner is to be permanently transplanted, he must be given a wage at least as high as he can get at the mines.

In Great Britain also the opportunities are somewhat severely restricted by the union. It has been jokingly remarked that it is easier to become a Chancellor of the Exchequer than to get a job in certain industries. In this country similar walls are being erected, though the opportunities are still broader than they are in Europe. Only when a new industry arises which will pay a high wage will work be found in abundance for the idle miner, and then only the more skilled men will be drawn away. The less skilled, finding no openings elsewhere, will remain with the coal industry so long as they can obtain employment.

Easy to keep warm; hard to get cool

SPEAKING about Labrador, Sir Wilfred Grenfell remarked "It is a cold country; but it is easier to get warm there than to get cool in the tropics." Some day it will be easy to get cool even in the torrid zone. It is strange that mankind is willing to swelter while refrigerating machinery is available for cooling purposes.

This is one big use for power that has never been duly exploited. When it is, a demand for coal will be created that will stimulate the coal industry; and a tolerance for the tropics will be developed that will mean new life to countries now only thinly populated.

In less civilized times man lived in the tropics because he could not endure the cold. Then warm dwellings, cosy yet light clothing and artificial heat enabled him to come north. Today artificial cooling will make it possible for him to trek back where the soil—or should it be the climate?—is more productive than in northern lands. As the out-of-doors will be hot and enervating he will arrange more completely than in the north to have his work done by machinery. He may even keep himself comfortable by surrounding himself with a cooled layer of air, after the manner suggested for miners working in hot mines.

The other side

CONDEMNATION of obstructionists to mechanization in the ranks of the workers ought not be a cloak to hide backward employees who give lip service to modernization and then work in devious ways to block its progress. That there are some who are not financially or temperamentally in a position to take advantage of the advances in production technique made possible by the employment of engineering skill in machine design and construction is privately admitted when operators talk frankly with their associates.

It is just as foolish for the producers as a group to permit this minority to hold them in check as it is dangerous for organized labor to allow certain of its spokesmen to put it in a position where it may be said that the unions are trying to stop the clock of time. As was said in these columns in November in commenting upon the attitude of some labor spokesmen: "No group, however strong, can long hope to oppose progress and survive." That statement is as true of employers as of employees.

Take it away!

IT IS a principle in loading-machine operation that the machine is for loading only and does not enter the field of transportation from the loading point to the tipple. Some conveyors, however, take over in a small degree the function of transportation, particularly in low seams, delivering the coal to cars or trips stationed in the entry. As a result of this condition the problem of getting the coal away after it is loaded often spells the difference between a successful and an unsuccessful machine-loading installation. The time required to change a car or trip may be so long as to obviate the advantages otherwise gained, and the larger car has been proposed as a remedy.

True, the adoption of a large car may mean revision of the entire haulage system, but it is admitted that machine loading will be a success only if conditions are right. This means, then, that transportation must also be expected to bear its fair share of the general revision. However, the heavier rails, larger ties, longer curves, better ballasting and, possibly, larger locomotives will, in the long run, prove to be a blessing in disguise, especially when the economies resulting from a generally efficient haulage system become apparent.

An evident economy must admittedly result where, for instance, a 4-ton car is substituted for one holding only 2 tons. The time required for loading it is not doubled by any means and the time required to change it, where a single car must be loaded at a time, is the same. Consequently, as it is admitted by all that changing uses up most of the precious minutes, the tonnage loaded may be expected to increase materially. Most operators using the smaller cars with machine loading will concede that they are working at a disadvantage, and many are forced to rely on an excessive amount of track work and complicated changing provisions to reduce the time loss. All this mental and physical effort may well be saved by the use of larger cars, which at one stroke eliminate the chief drawback to machine loading.

NOTES

From Across the Sea

THE story is told that the Research Board of Great Britain invited a number of mining men to Sheffield to show them that methane could not be ignited by a rain of brilliant sparks, and that the mining men were greatly impressed by the demonstration, for, contrary to all the expectations of the Mines Bureau and all its past experience, the methane actually did ignite. So what the Board expected to disprove to its guests, it abundantly and unexpectedly demonstrated to them, much to its surprise and confusion.

However, the officials declared that it was not the sparks, though brilliant, that ignited the gas but the material on which they lighted, which, being bombarded by such a multitude of hot particles and not cooling off as fast as it was heated, gradually reached a temperature at which methane could be fired. Probably the Board would favor another explanation today after its further experimentation.

Methane is an extremely conservative combustible. It does not flare up under every conceivable occasion, which is fortunate, for ventilate as one will, there will always be a certain percentage of it in a gassy mine. Fortunately, it will not flare or explode unless a relatively large concentration of it is present. It behaves far more conservatively than carbon monoxide or hydrogen.

Then again it takes some time to ignite if the temperature of the igniting body is low and, if it is too low the methane won't ignite at all. In fact it has been proved that it does not combine with oxygen direct but combines with the oxygen in water vapor, which, however, always is present in sufficiently generous measure in the driest of mine air and becomes positively prevalent as soon as any methane is burned.

CONVINCED by the demonstration at Sheffield that the operators and mining men were right in saying that methane might be ignited by sparks under exceptional circumstances, the scientists of the Mines Research Board started an investigation which has borne good fruit in Research Board Paper No. 46, by M. J. Burgess and R. V. Wheeler, in which is described the outcome of program F_A2 on the "Ignition by Falls of Roof and by Rock Striking Rock."

It is only a modicum of what is to be desired in this direction, for it endeavors to evaluate the dangers which the impact or attrition of rock on rock might create in certain mines with siliceous roofs. More mining men are interested in the effect of tools—hand or machine—in igniting methane when cutting through a pyrite ball or band or when struck against a pieces of quartzite or a nodule of iron carbonate.

The investigation shows that it is comparatively easy, under laboratory conditions, to ignite firedamp by rubbing together certain kinds of sandstone rocks. Firedamp can be ignited in this way more easily than by pressing a steel tool against a sandstone wheel. The reason apparently is that firedamp is not ignited by the sparks produced but by the glowing surface at the point of contact between the rock and the wheel.

Here it may be injected as a notion of the author of these remarks that the sparks are a sign that heat is escaping, for it is carried away with each infinitesimal particle of abraided material. If there were no abrasion the heat would remain except for radiation, conduction and convection through and by the air, and surely in that event there would be more heat for the ignition of the firedamp. The measure of a rock's ability to ignite methane through primarily the measure of its ability to hold the heat locally by reason of its low heat conductivity is also partly a measure of its inabradibility, for if it can be deprived of its material with sufficient rapidity, the abraded surface will not be able to gain heat nearly so rapidly.

THE sparks will act like particles evaporated from a liquid, with this difference: that the steam from a liquid is at the temperature of the liquid, but the particles thrown off by attrition are hotter than the body from which they are torn.

Another thought might be expressed. Might not the catalytic effect of iron in promoting the flameless or flaming combustion of methane be less than the catalytic effect of quartzite or, perhaps, pyrite? Might not flameless combustion aid in producing temperature conditions that would result later in flaming combustion? That is merely a thought thrown out for what it may be worth, either much or little.

One might also consider the specific heat, the specific weight and the size of the abraded particles. Quartz at a high temperature has a specific heat—that is, a capacity for heat per unit of weight—one-half greater than steel, and a specific weight a third that of that metal, so that a quartz particle would have about 4½ times as high a capacity for heat as a particle of steel of the same size. The particles of quartz are likely to be bigger than those of steel. All of these considerations would make them more likely to do damage, provided that by the rupture they were heated to an equal temperature. In fact with a lower temperature they might be more dangerous than steel particles at a higher degree of heat.

But, to return from these divagations to the monograph that serves as a text, it may be said that in the preliminary experiments a grindstone of 12 in. diameter and 2 in. wide was revolved at 250 r.p.m. and a piece of sandstone 2 in. wide was pressed into a contact with it. A leverage of 25 : 1 was used, and ignitions of various mixtures of methane and air were readily obtained with a load of not more than 50 lb. The load was applied slowly until ignition occurred, which generally was after a run of two or three minutes.

Bright yellowish-red sparks were produced which in some cases traveled a few inches from the wheel and in some were carried around its circumference. A yellow glow generally was observed on the stationary piece of sandstone where it made contact with the revolving wheel. A part of the surface of this rock afterward would be found to be glazed as if partially fused. Firedamp with from 5.9 to 12.8 per cent methane was ignited.

The sparks produced in these tests, say the authors, appeared to be at a much lower temperature than the very bright sparks which can be produced from steel and carborundum and which nevertheless do not ignite methane. The low conductivity of sandstone would help to cause the localization and the subsequent retention of this heat, and the heated surface, being stationary, would be much more likely than the transitory sparks to cause the ignition of firedamp.

OTHER tests were made with sandstones known as "Ackworth," "Derbyshire Grit" and "Normanton Blue" revolved at 240 r.p.m. and with 2 : 1 leverage. Ignitions were easily obtained with each. In every instance when ignition was obtained a bright glow appeared at the point of contact with the wheel and a small portion of the surface of the latter was glazed. Apparently no effort was made by the investigators to test the atmosphere for the presence of any carbon dioxide that might have resulted from flameless combustion in instances where the experiment was not continued long enough to cause ignition.

In later experiments the method of loading was made simpler and its application more rapid. Tests were made up to 450 r.p.m., and an edge of rock was used against the wheel. Ignitions were obtained in 0.4 to 0.6 seconds and in one or two instances the mixture seemed to ignite immediately on the application of the load. The energy needed to create ignition varied. That with "Derbyshire Grit" and "Maindy Rock" was sometimes less than 200 ft.-lb., the lowest figure being reached with the later attritant. The lowest figure obtained for the "Bulldog" rock was 252 ft.-lb.

The British Research Board appears to have struck an extremely fertile and practical vein of investigation. Everyone here and across the seas will be interested to hear what rich values are attained when and if exploration is carried further.

R Dawson Hall

On the ENGINEER'S BOOK SHELF

The Technology of Low-Temperature Carbonization, by Frank M. Gentry; 399 pp.; 6 x 9½ in.; Williams & Wilkins Co., Baltimore, Md.; price $5.

What a vast array of knowledge we are building up, entitled as is this large volume "The Technology of Low Temperature Carbonization!" Perhaps most of it will be jettisoned as soon as we know just which process we intend to adopt, but of this the author does not hold out any hope. He says it is likely that there always will be many different processes of coal distillation, some seeking good coke, others good tar and others gas. So the whole gamut of reactions at different temperatures may always have to be studied by the coal-distillation technologist.

For the present that would-be expert can do no better than to put himself in the hands of Frank M. Gentry, who in eight chapters, crammed with meat, will introduce him to low-temperature coal gas, coal tar and coke, the nitrogenous and other byproducts of such distillation, the processes of low-temperature carbonization, the operation, design and materials of construction and the economics of the subject. The publishers proclaim it as the first book in America to deal exclusively with low-temperature carbonization.

No matter whether the coal man ever expects to carbonize his coal or not he will be interested in this book, for the principles of carbonization are all of value in the study of combustion and in the elucidation of spontaneous ignition and gas emanation. Out of the study of carbonization may come much information on the behavior of coal in the hill and in the geological development of maturer fuel from the peat bog, subjects which are yet veiled in much mystery.

The reader will not fail to recognize the significance of the fact that it is an official of the New York Edison Co. who has written the book. The public utilities at the present writing seem as likely to be the people to process the fuel they use as the company from whom the fuel is purchased.

* * *

Undeveloped Mineral Resources of the South, by Henry Mace Payne; 368 pp., 6 x 9 in.; American Mining Congress, Washington, D. C.; price $5.

Part only of this book comes properly under the notice of the reviewer, though as *obiter dicta*—by one, moreover, not any too competent to judge—it might be said that the author appears to have uncovered more adequately than any other has done the mineral resources of the South. The geologists know the country well but are too much troubled by the "anise and cummin" of the professional man to write in short meaty sentences the full significance and nature of what the earth contains.

The author realizes that certain coal fields have been already overdeveloped. The only opportunities he cares to foster are those which are in undeveloped sections. He gives a brief statement of what has already been operated and of what remains. After treating of coal he goes to lignite and though he shows its many uses he fails to indicate where it can be readily mined except perhaps in Texas.

He says "Powdered lignite is used in summer to preserve eggs and as a mixture with cane juice for filtration, its colloidal properties serving to make it a decolorizer, the filtrate being bright or almost colorless and the residue from the filters being afterward used as fuel under the evaporating pans. Powdered lignite is also used as an ingredient of hollow tiles. The lignite, on burning out, imparts a certain porosity which is desirable. Carbonized lignite, when purified with hydrochloric acid, is superior to either animal carbon or rice-hull carbon and as a commercial proposition is a promising competitor of the various vegetable carbons used in sugar manufacture."

He makes other suggestions, including the manufacture of montan wax and oil-soluble dyes. Only in one or two places does he say how deep the deposits of lignite lie. If favorably located for hydraulicking or mechanical-shovel stripping it might be possible to mine it for the supply of local markets because of the favorable freight. The author also discusses peat. His book should be a highly stimulating factor in the development of the South.

* * *

A Study of Spontaneous Combustion in Storage Coal; 61 pp., octavo; by A. J. Hoskin, Research Associate, Engineering Experiment Station, Purdue University, Lafayette, Ind.; Bulletin 30 of that University.

Coal storage is giving little trouble now that consumers are learning the simple rules—not to store too high, to exclude air, not to mix sizes and not to pile near a source of heat. Reports coming to Mr. Hoskin show how less frequent now is the loss of coal in storage.

The North Indiana Public Service Co., he says, uses a stamper to consolidate its coal. This stamper is constructed of steel and weighs 2½ tons. The author mentions the tractor that is used by the Philadelphia Electric Co. for consolidation of its piles. One company places coal in piles with a dragline bucket and trims them by hand shoveling to form 17-in. layers. A few round trips of a roller reduce the thickness of these layers to 13 in.

Mr. Hoskin quotes unfavorable statements regarding ventilation of coal piles but adds that "it would seem that engineering talent will yet devise by adequate ventilation an inexpensive practical scheme for the prevention of spontaneous fires." He does not give the final word as to the causes of spontaneous combustion but gives the theories and leaves the reader the task of evaluating them, though he relegates pyrite to a modest rôle—an accomplice rather than a principal in arson. The author calls attention to the danger from stacking coals from different mines on the same pile and from disturbing coal or transferring it after long storage. Even passage of a workman on the top of a pile which left footprints, says the author, is believed to have started a fire.

* * *

Bituminous Coal Fields of Pennsylvania Part 1, General Information on Coal—241 pp., octavo; by George H. Ashley, Topographic and Geological Survey, Harrisburg, Pa.; price 50c.

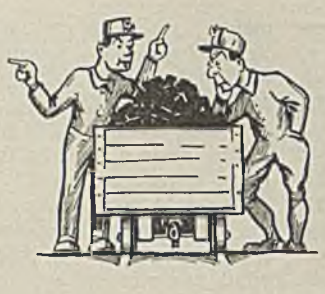
The Topographic and Geologic Survey of Pennsylvania purposes to produce in all, nine volumes on the bituminous coal fields of Pennsylvania. The introductory volume is in four parts. Of these one, which gives a detailed description of the coal fields, has already appeared and is out of stock, one on coal resources appeared this year, and one on coal analysis has had to be reprinted. This book is the fourth and final part of the first volume.

Mr. Ashley has a chance in this book to be interesting as well as instructive, and he avails himself of his opportunity. He is not required to tell to the nauseation of his readers how thick the coal is at this or that country bank or in such and such a stream bed.

His references to the faults in the Houtzdale Quadrangle will be found noteworthy by many. He shows faulting running from a few feet to 125 ft. and says that "Other faults not here shown make a displacement of 200 ft. or more." These faults, Mr. Ashley believes, are due to unequal pressure which folded one part of the field more than another or to the unequal resistance which had the same effect, causing a break between the areas thus unequally folded, this break running parallel with the direction of stress or at right angles to the axes of the folds. He instances scratches that show horizontal movement.

Mr. Ashley takes up coal in general, coal in Pennsylvania, the beds and their distribution, the tonnage and analysis of Pennsylvania coals, the history of coal mining, the methods of extracting coal and the uses to which it is put. He has included a geologic time scale that shows the various periods in which coal was deposited and the countries in which the coal of that period may be found.

The BOSSES *Talk It Over*



Getting Good Air to the Face

JIM came on the hill to find Mac trying to bring the light to a round dozen loaders. It was early in the morning and Mac faced the loss of quite a few tons that day.

"What's the matter?" asked Jim.

Mac turned away from the men to explain. "These boys are all off the same section. They say the smoke is so thick up there they can cut it with a knife. Half of them have headaches."

"Didn't I understand your reports to say that all the sections had plenty of air?" Jim inquired.

"They do have," replied Mac, "but we can't get it up to the face in those long rooms. It looks as if curtains and brattice lines are the only solution."

"But Mac," said Jim, "wouldn't that cost something?"

"Sure," retorted Mac, "but we avoid this," waving his hand at the group of loaders. "A good air current will clear up the rooms in no time and the men will feel better and load more. We'll eliminate a few accidents too, unless I'm badly mistaken."

WHAT DO YOU THINK?

1. *What system do you advise to secure good air at the face?*
2. *Are line-brattices in rooms sometimes advisable where no gas is encountered?*
3. *Who can present actual figures to show increased output, lower costs and greater safety in consequence of better air?*
4. *Where should doors go and how can they be kept closed?*

All foremen, superintendents, electrical and mechanical men are urged to discuss these questions. Acceptable letters will be paid for

How to Cut Power Losses Discussed

Longwall Urged to Eliminate Many Electrical Difficulties

MUCH of the trouble in power distribution and upkeep of equipment is due to the great spread of working places in our present most common layouts. The same factors causing difficulty in ventilation, haulage and supervision play havoc with the electrical system. For these reasons longwall mining must be applied in this country.

Failure of machine men to make known electrical troubles in need of attention often may be traced to their dislike of the electrician because of the superiority complex he exhibits in electrical matters. The observations of the humble trapper boy have been known to lead to well worth-while improvements in an electrical system.

What can the electrician do if his instructions are countermanded by the conflicting orders of the foreman or motor boss? What can he do if the management cancels his purchase orders for renewal parts needed to head off complete breakdown of a machine? He must have replacement parts, for though he may be able to minimize wear on machine parts he cannot altogether eliminate it. Failure of management to authorize necessary requisitions disgusts the electrician to the point where he *lets* the equipment break down.

Every mine should be provided with sectional overload breakers, so that the main breakers will not be kicked out quite so often as when none is provided. These auxiliary breakers indeed serve a very useful purpose in sectionalizing trouble and incidentally helping the electrical department to locate it quickly.

Regular inspection periods greatly reduce breakdown delays provided repairs are made immediately following detection of trouble. A good scheme is to have a competent man oil the machines at regular intervals and at the same time inspect for loose connections, arcing, low bearings and similar defects.

JOHN R. LUXTON,
Detroit, Mich. Electrician.

Diplomacy Goes a Long Way

THE average mine locomotive or cutting machine does not get as much attention as the family flivver. In particular they are neglected in the matter of proper lubrication and frequent examination of the controllers. It is for the want of oil that many of these machines find their way to the repair shop. The majority of the machine runners are foreign born, and so must be handled intelligently. Nothing is accomplished by jumping on or swearing at these men for omissions in the care of their machines when they complain of mechanical or electrical troubles. After they have once been treated in this manner they will never again inform the bosses about machine troubles until a serious breakdown occurs. The bosses and electricians must be civil and patient in teaching these men how to take care of the machines.

In my own work I insist upon attention to those details not directly pertaining to the machines themselves but which are complementary and influence the correct functioning of the machines. Thus I insist upon well-laid track, correctly designed as to curves, etc. The trolley and feed wires must be adequate and correctly hung and a good return provided. Nor is the safety factor neglected.

JOHN J. CLARK.
Muse, Pa.

Emphasizing Ventilation

Let's get down to brass tacks on this question of ventilation. Fresh air must be taken to the face for reasons of safety, health and production efficiency. But how?

Write down your own ideas and get the other fellow's by reading these pages. The effort will uncover the bugs in your system.

Give Equipment Attention Before There Is a Breakdown

ONCE a month a reliable man should be sent through the mine for the purpose of testing all bonds by lightly pounding them with a hammer. While this method may not reveal bonds that are only slightly defective, it will indicate the bad ones, the location of which can be indicated to the bonders by chalk marks on the rib. Put the bonds on the base of the rail and be sure to make them heavy enough. The roof along the course of trolley and feeder wires should always be freed entirely of coal. This precaution is necessary for two reasons: (1) If holes for wire hangers are drilled in coal, the hangers will work loose in no time at all and then the wires will sag; (2) if the wires come in contact with the coal, a fire will start. Furthermore, pumps and other underground machines may be stopped.

Cutters can be trained to save power and to take good care of their machines. I know whereof I speak, for I ran a cutting machine for thirteen years. During that time no other cutter in our mine took better care of a machine or was able to hold down upkeep expenses to as low a figure as mine. The upkeep account for cutting machines will always stay low if everything is kept properly adjusted, clean and well lubricated, paying particular attention to frequent greasing of controller fingers.

Careless and shiftless men should be put on a tonnage basis. It goes without saying that only careful and efficient men should be allowed to operate machines and locomotives. A motorman can save much power and avoid wear and tear on equipment by using just enough sand and easing trips instead of jerking them. The trouble on the upkeep end is that machines don't get enough attention until after they break down. Then they get too much of it for the good of the operator's pocketbook.

FRED GAUL.
Sagamore, Pa.

Progressive Technical Men Are Coming Into Their Own

TO UNDERSTAND thoroughly the principles applied to the installation and uses of equipment in mining one must have a fair amount of mathematical training. Right there is where the old-fashioned pick-and-shovel man falls behind his more progressive and technical brother. The efficiency of an electrical distribution system, technically and financially, depends upon the thought devoted to its design and installation. Unnecessary high-resistance causes in the distribution system should be eliminated and with them low voltage. In the larger operations electricians should be appointed to certain districts for regular inspections, the results of which should be embodied in a report to their chief. A good procedure which assists in reducing the resistance of the return current is to bond pipe lines which run parallel to the track and lead to the substation.

One of our largest problems in mechanized mining is to combine efficiency in operation and care in the handling of machines. The ordinary type of coal miner has no mechanical turn of mind and therefore we must be constantly on the lookout for the extraordinary type that has this flair. Even then we may be confronted with the problem of deciding whether to work the man on a contract or a day basis. If he works by contract he is likely to accomplish more work but with greater power consumption and machine abuse as against the day man who will accomplish not so much work but will take better care of his machine and use less power.

At one time or another all of us have heard operators argue that they have

found a solution to this problem through schools or classes for instruction of machine workers. In this they are right. However, personal supervision and a constant check of work accomplishment and care of machines is necessary in the solution of the problem.

J. F. MUSGROVE.
Vice-President and General Manager.
Frontier Coal Co.
Denver, Colo.

Survey of Power Distribution Will End Many Difficulties

I AM of the opinion that Mac and Shorty should immediately get to work and size up their power situation from power plant to working face by traversing the entire distribution system and using suitable instruments for testing for bad bonds and splices, grounds, overloads and low voltage. Low voltage at the working face may be attributed to undersized feeders, current leakage traceable to poorly installed feeder and trolley wires, bad bonding and overloading of locomotives and cutting machines, pumps and other electrical equipment. I further suggest that they closely question every motorman, machine runner and operative of other equipment as to his understanding of the functions and characteristics of the machine under his care.

After the survey has been made and the system put in first-class shape, no further trouble of any consequence should be encountered. If, after the improvement is made, the voltage is still low, the trouble obviously lies in the inadequacy of the generator capacity, and the matter should be called to the attention of the Old Man.

Among other important points to consider is the proper selection and installation of splices and supports for trolley and feeder wires. As most mines are quite damp, good splices should be made and insulators chosen which have large creepage surfaces, as on these details largely depends the degree of efficiency attained in the power-distribution system. Another matter worthy of consideration is the adoption of measuring meters as a means of apportioning power costs as between the several departments. The gang's troubles are due to downright negligence or a lack of initiative. C. T. GRIMM.
Adrian, W. Va.

Hats Off to Mine Electrician

THE problem of power losses is of utmost importance because it cuts down efficiency in nearly every phase of coal production. Poor equipment installation is the prime cause of power losses—trolley wire hung in such a manner that it comes in contact with the roof or steel crossbars when the motor passes under it; too many splices, poorly made; cutout swiches not adjusted to make close contact; poor hanger insulation, etc.

Track laid out of alignment and improperly ballasted, joined by half fishplates and inadequately bonded, will impair any system of power distribution and destroy any type of electrical equipment. The transmission system should be inspected periodically and any changes or repairs made when necessary. All haulage locomotives, cutting machines, pump motors, etc., should be given a daily inspection. This may eliminate serious and costly delays. As much care should be exercised in installing feeder lines as is used in installing the trolley.

Men can be trained to take good care of equipment in their charge. When a new man is placed in charge of mechanical equipment he should be trained as to what is expected of him. On a locomotive he can be taught how to handle the controller properly to prevent unnecessary burning of fingers and segments, how to examine the brakes and essential parts, also how to take care of the sand rigging. He should be taught how to remedy the many minor defects that may develop during the day. Similar training should be given to men placed in charge of other equipment. This, however, does not mean that they should be allowed to overstep their prescribed duties. The fact that they do overstep their duties in most cases indicates that their zeal has overcome their better judgment. We take off our hats to the mine electrician as one of the most practical and capable electrical workers of the day.

WM. W. HUNTER.
Mt. Hope, W. Va.

Let an Impartial Engineer Analyze the Power Situation

MAC, JIM and the Old Man show a lack of electrical knowledge as applied to haulage. The voltage could not have been far below normal and the return must have been good; otherwise the locomotive would not have pulled the circuit breaker as it did. Power costs can be run up rapidly by failure to provide sufficient copper and closed connections in the power system. I recall a mine which cut its power cost from over 8c. per ton to about 4c. per ton by improving its haulage and power-distribution system.

If a survey of a power situation is needed, it is best that the investigations be made by an outside electrical engineer, who should send his report direct to the general manager. In this way the manager is given the impartial opinion and recommendations of an expert.

Men can be trained properly to operate and take care of locomotives, cutting machines and other equipment. This is accomplished most easily and satisfactorily by establishing training classes taught by a man experienced in the handling of equipment. C. E. LIVELY.
Capels, W. Va.

Make Inspections Count and Don't Forget Human Element

THE incident described in the problem presentation in the last issue, of the futile attempts of a motorman to push a loaded trip around a curve and over a stiff grade with a poor return, is not uncommon in coal mines. My experience has taught me that where such conditions exist, the superintendent or operator is careless and fails to recognize that power requirements expand at the same rate as the workings. Good track is the bloodstream of a mine and therefore attention to its design, construction and maintenance should be a sort of religion with the foreman. A motorman not gifted with a choice and varied vocabulary is indeed in distressing circumstances while undergoing the agony of hauling coal over bad track.

I am a firm believer in periodical inspections of electrical equipment and power-distribution systems. These should be conducted every 30 or 60 days, depending upon the mine. A detailed report covering all conditions found and recommendations for improvement should be required. These reports should be presented at the regular meetings of the mine executives as the subject of discussion of details leading to comprehensive recommendations.

The hearty co-operation of the foreman and electrician is essential in these matters. Where they have confidence in one another and work together for the mutual advancement of themselves and the interest of the company, resultant reduction in power costs and increased efficiency in the general operation are certain to follow. In the gathering, hauling and cutting of coal the human element always is an important factor, in fact the most important factor. The motorman or machine runner who takes a lively interest in his work and is willing to assume responsibility for a given task always is receptive to advice. It is up to both the foreman and the electrician to sustain and increase this interest, as upon it depends the operative's efficiency. Show him that you are interested in him; listen to his problems; help him to work them out. Shorty and Jim and the company as a whole will derive genuine benefits from this sort of co-operation.

Huntington, W. Va. H. A. McCOY.

Good Supervision Necessary

WHEN men are left on the night shift, if a night foreman cannot be employed, one of the men should be appointed to supervise the work of his fellows. Leaving men totally without supervision is not advisable. In regard to preparing the mine for the day shift, the adoption of piece work may provide a remedy for slackness, but the best system is to make out a list of things and see that they are done.

There always is a tendency to slack on night work due to lack of super-

vision, but discharge provides only a partial and expensive remedy. If definite jobs are assigned and work in excess is paid for on the bonus plan, making it possible for the men to earn additional money for greater effort, the situation may be improved. Another possible cause of slackness is the fact that the necessity of obtaining rest in the day may adversely affect the health of the worker.

If the mine can bear the expense of a night-shift foreman, one should be employed. If not, the day foreman or superintendent should apportion the work of the night crew and appoint a workman to take charge, giving him a wage increase commensurate with his increased responsibility.

W. E. WARNER.
Brentford, England.

Tactful Supervision Assists Smooth Working of Night Crew

IF there is one single thing in the operation of coal mines that might be termed the despair of the modern efficiency hound it is the graveyard shift, to which is assigned the delivery of supplies and other work intended to expedite the smooth functioning of the daily hoist. Just when you flatter yourself that you have at last straightened out the kinks, and that the material will be delivered somewhere in the vicinity of where it is needed, you can think again. Coal mines just don't function that way.

There are several pertinent reasons for this. Not the least among them is the unpleasant hours, when all nature is fighting against the earnest ambition to do right, and the difficulty of obtaining the best class of workmen. In spite of this evident disadvantage, intelligent and tactful supervision can work wonders. Add to this a measure of systematized routine delivery and the results will be surprisingly efficient.

Take a coal mine from 3,000 to 5,000 tons capacity, with the property developed by main arteries running north and south, or east and west, and with the tonnage apportioned equally throughout the mine. Supplies should be delivered on alternate nights to each side of the mine, so that night crews can be bunched and supervision centralized—emergencies alone excepted. Go along with me and see what happens.

The day's run is over and, complying with the terms of the mining law, the closed receptacle containing the powder has just been lowered, and all power switches pulled. The powder goes south tonight, which leaves the north portion free for the delivery of room props. The number of cars necessary to convey the room timbers to their destination are hoisted immediately after the lowering of the powder. Top men take the cars off at the landing, and one man is assigned to load the room props in the cars, the number and destination of which are determined from slips handed the prop loader by the room bosses as they leave the mine. The mine manager makes out the list of "truck stuff," that is, timber varying from 8 to 12 ft. in length, which is loaded in trucks specially made for the purpose. Thus, all props and truck timber are standing, loaded at the landing ready to be lowered as soon as the starting whistle blows.

Immediately the starting whistle toots, the cars loaded with timber land on the bottom, are sorted out as to destination, and a train made up and speeded on its way for delivery, the room props unloaded in the rooms listed, the truck timber on the entry named; a good practical man making an examination for gas or dangerous top ahead of the delivery crew.

Thus all timber supplies are delivered during the first half of the shift, the second half being devoted to cleaning road coal, transferring rails, cleaning falls, hoisting bad-order cars, making up man-trips for the following morning and anything else on the roster of immediate needs.

Most mine managers have an approximate idea of the work that can be accomplished by a given crew, and the night order is made up accordingly. At the end of the shift, the night boss O.K.'s everything completed, and gives a reason for every task left undone. A parting report is left for the night boss, and he leaves a similar report at the end of his shift, so that night and day shift know where the cars are, if needed, and the day shift arranges motor haulage accordingly.

The prevention of scattering the night crew cannot be emphasized too strongly, for little can be accomplished when the men are spread in all directions. Get them bunched to simplify supervision and increase efficiency. A little common sense can eliminate the overtime habit, except in emergencies. Usually it is a habit that is shrewdly figured by many of the night hawks, who see much easy money in it. It's the old game of matching wits, and the real, successful night foreman is much more valuable than most figures indicate.

Panama, Ill. ALEXANDER BENNETT.

Give Night Worker Concessions

JIM and Mac have certainly uncovered an old bone of contention: What do the night-shift men do? Wherever coal is mined these men are blamed for everything that is wrongly done or is not done at all. Mac states the situation exactly when he says: "Every couple of months the night crew is fired." What other result can be expected when no satisfaction is shown for what they do? The whole trouble arises from lack of co-operation between the night-shift and day-shift bosses.

My experience has been that the day-shift management is to blame for many of the faults that are laid to the night men, by leaving for them certain work that might be accomplished in the day time more efficiently with less inconvenience and at less cost.

Night men should be worked in pairs and kept regularly in districts assigned to them. Much time is lost because of waiting for supplies; to avoid this the supplies should be routed systematically and delivered on time. As this job is accomplished during the regular working hours, the day-shift management alone should be blamed for time lost due to this cause. Night bosses should be more of the type of gang leaders, who, in addition to bossing, work almost as much as others of the crew. This arrangement will allow the delegation of authority to more than one man, which is necessary in a large mine.

Reports of the work done may cause many difficulties because they are often used inflexibly as the standard basis for measuring jobs. Conditions largely should determine how long it should take to do a job. Some inducements must be offered to attract good men to night work. Night men should not be allowed to go home after doing a specified amount of work. Rather the work should be so parceled out as to keep them regularly employed throughout the shift. To compensate for the inconveniences of working by night, these men should not be required to work as hard as the day men.

Linton, Ind. W. H. LUXTON.

Delivery Duties Well Defined

HAVING been acquainted for ten years with the operation of a low-cost hand-loading mine producing 3,500 tons per shift, I believe a part of the credit is due to the efficient night delivery system employed. In the first place, the two face bosses in making their rounds every other day in accordance with mining law carry a book in which they enter the orders for timber, rails, switches, ties, wire, etc., and the place where they are needed. From this book a report of supplies needed is made and transmitted to the night boss. Places needing bailing, bad top and falls of roof are also noted. In argument over failure to deliver supplies the night boss' report is checked against the book.

Each man or supply crew is given an order for the work to be done and must return it to the night boss with his "O.K." or with the incompleted work designated. In order to concentrate the work the mine is divided into four sections and supplies are delivered to only one section during one night. In this way the mine is covered in four days, though some special deliveries must be made at times. Delivery is thus restricted and road cleaning, pipe laying or track extension can go on without interruption.

The night boss receives his timber supply orders from the face bosses at 3 p.m. and immediately employs two top men to load the timber and mark the car to its destination. Powder is

loaded in an insulated car and marked with its destination and machine bits are placed in a special truck. The powder and bits are sent down first. One man takes the powder and bits as he must make the whole mine each night. The powder is delivered and noted in a book for the purpose. Bits are delivered to boxes at each crosscut where the machine runners leave their dull supply.

The rest of the night shift go down with the powder man and start their various tasks. Two men remain at the shaft to let down the supplies and afterward clean the sump. Another man takes the portable water box and does the necessary bailing and sprinkles the track as he travels. In his rounds he helps the night pumper by oiling pumps and stopping or starting them when necessary. One pumper with this help takes care of sixteen main and ten gathering pumps.

Recovery of steel from worked-out places requires the services of two men and two other are employed in cleaning roads. These four may be doubled up or used for other purposes. Two track men keep up the extensions required on the main-line track and work at other jobs as necessary. This brings the number of night shift men up to twelve, excluding the night pumper and boss. The powder man and supply delivery men get out in time to place the man trips for the day shift.

In addition to the supply men, four or six crews are used to drive entries. Two motormen take care of them and fill the side tracks or partings with cars to start the hoisting next morning. One repairman also is carried to take care of the night machines and repair the motors designated by the day electrician. He "O.K.'s" the reports or designates what has not been done and in turn leaves his report for the day man.

Dynamite caps are placed in locked boxes throughout the mine by the night boss himself, who reports on the number delivered and their location. A day man is designated to give out the caps and he returns a report which must check with that of the night boss.

THOMAS JAMES,
Superintendent, Mine No. 3,
Knox Consolidated Coal Co.
Vincennes, Ind.

Proposes Plan for Accurate Night Delivery of Supplies

NIGHT delivery of supplies may be costly as well as detrimental to the operation of the mine if not handled in a systematic manner. Quite a number of employees often take a delight in dragging out the hours of work with the object of collecting a few extra shifts. However, extra time is not only a direct loss to the company but the man who remains two or three hours overtime sacrifices his ability to work in an efficient and safe manner.

The system of delivering supplies at night, to my mind, should be as follows: Each assistant foreman should have a requisition calling for the supplies he will require for a week in advance. This requisition will include every working place on his section and should consist of three copies, one each for the foreman, the assistant and the supply crew, each countersigned by the foreman. Supplies should then be delivered to the places designated and checked off as delivered. For emergencies a few extras should be stored near the partings. This system should aid speedy and economical production as the motormen and brakemen would have nothing to do on the day shift but gather coal.

If there is no system the firing of the night crew will not bring it about, for in nine cases out of ten the next will be as bad or worse. The above plan also may be arranged on a semi-weekly basis, depending upon the size of the mine and the quantity of supplies required. When deliveries are made the night crew should turn in a complete report of their activities at the end of each shift, thus checking the requisitions. The assistant in making his rounds may corroborate these reports by personal observation.

Apportioning the work of the different crews would be difficult to do in a general way, as the conditions are likely to change at the different mines encountered. However, this system will automatically work itself out after each section has been gone over.

WM. W. HUNTER.
Mount Hope, W. Va.

Busy but Not Burdened Crew Does Best Work on Deliveries

SUPPLIES should be delivered throughout the mines at night so as not to interfere with the gathering of coal during the day. All accumulations of steel ties, timber, etc., should be taken out of dangerous pillar areas and distributed where needed at night and the water also should be pumped out of all working places.

Each assistant section boss, cut boss, trackman, timberman or other employee designated to order supplies should submit to the mine foreman each night an order stating what is needed that night and what has been done the preceding night. These orders should be checked carefully by the mine foreman and turned over to the night supply crew. All orders not filled should be returned to the foreman together with a written report on the reason for failure.

No supply crew should be given more work than they can do, for after ten hours at night a worker is of little value. However, the task should be large enough to keep them busy, for if they are allowed to stop and get sleepy at any time, but little work can be expected later in the shift. The number of hours and the amount of work should be laid out by the foreman, who then should check the reports to ascertain what has or has not been done and the reason for not completing any part of the job. It will sometimes be found necessary to allow part of the work to lapse to get the really important parts done.

Having had charge of night crews at several mines I find that each presents a problem of its own which can be solved by the man in charge. It is up to him to study his work and lay it out so that each crew will have just enough to keep it busy for a shift. I find that it is not necessary to have a boss over every supply crew if the foreman checks all requisitions and places the crew in charge of a responsible workman, paying him a little more than the regular rate. When he finds that he is being carefully checked he will do his work without being called into the office every day to explain why something was not done that should have been.

C. A. PEAKE.
Mine Foreman, Earlston Coal Co.
Kermit, W. Va.

Do's and Don'ts in Handling Cucting Machines and Runners

JIM, Shorty and Mac are putting out a good idea in suggesting that machine runners should be trained in the operation and care of their equipment. I venture to say that many of the men who cut a lot of coal in a day know little more than how to start and stop their machines. Just as soon as the machine breaks down, they are finished until the repair man comes along and straightens them out.

If the runners knew their machines they would not have to call on the repair man so often; neither would they neglect their machines. All new runners—and possibly some of the old ones—should be given instructions in the proper handling of machines. The best instructors are men who have had enough actual experience in the operation of machines to know "what it is all about." Such men, of course, should also be on the repair and inspection force.

Following are some rules for keeping repairs down to a minimum: (1) Keep the bits sharp and oil in every place; (2) oil the cutter chain immediately after pulling out from under cut, as the chain blocks take oil best when warm; (3) at all times keep the chain at proper tension, preventing unnecessary wear of the chain guides and allowing the machine to operate most efficiently; (4) there should be no dead blocks in the cutter chain, as these do no work; (5) keep all bolts, nuts and setscrews tight; (6) make frequent inspections of the electrical elements in the machine; (7) make all cable splices as good as a section of new cable from the standpoint of mechanical strength, electrical conductivity and insulation.

GEORGE DOBSON.
Martins Ferry, Ohio.

Among the Manufacturers

B. E. Schonthal & Co., Inc., Chicago, has opened a mechanical equipment department with mining engineers to co-operate in working out mechanical loading problems in coal mines.

* * *

The United States Electrical Tool Co., Cincinnati, Ohio, has appointed M. A. Gordy as Southeastern manager with offices at Atlanta, Ga.

* * *

The Mine Safety Appliances Co., Pittsburgh, Pa., has opened a Pacific Coast branch at 318 East Third Street, Los Angeles, Calif., in charge of H. E. Munn.

* * *

Arthur E. Blackwood, first vice-president, has been elected president of the Sullivan Machinery Co., to succeed Frederick K. Copeland, deceased.

* * *

In celebrating the 25th anniversary of the Roberts & Schaefer Co., engineers and contractors, Chicago, the fact was brought to light that five of the original 150 members of the organization are still actively engaged in the work of the company. These are Col. Warren R. Roberts, chairman of the board; John J. Roberts, president; Frank E. Mueller, first vice-president; Clyde P. Ross, second vice-president, and R. G. Lawry, construction engineer.

* * *

Frank R. Wheeler has been appointed manager of the condenser department of Elliott Co., with offices at Jeannette, Pa.

* * *

J. L. Tildsley, Jr., formerly with the American Cyanamid Co., is now identified with the tar products division of International Combustion Tar & Chemical Corporation.

* * *

Robert M. Gates, manager of the industrial department of the Superheater Co., has been elected vice-president.

* * *

Urquhart Service, M. B. Urquhart, manager, 509 Seventeenth St., Denver, Colo., has been appointed exclusive Intermountain representative by the Dot Lubricating Equipment Co.

* * *

The Brown Lipe Gear Co., Syracuse, N. Y., has been sold to William Schall & Co. of New York City for $3,400,000.

The Ladd Equipment Co., Farmers Bank Building, Pittsburgh, Pa., has been formed to act as sales engineering representative for these companies: C. W. Hunt Co., Inc., West New Brighton, Staten Island, N. Y.; Vacuum Ash & Soot Conveyor Co., Newark, N. J., and the Sterling Blower Co., Hartford, Conn. George T. Ladd is president and treasurer; Robert E. Chew, vice-president and general manager; George F. Bright, secretary, and James N. Burke, sales manager.

* * *

George E. Learnard, president, International Combustion Engineering Corporation, announces that a contract has been closed with the Lukens Steel Co. for building a low-temperature coal carbonization plant at Coatesville, Pa.

* * *

Purchase by the Johns-Manville Corporation of the assets and the entire line of products of the Celite Products Co. has been completed.

* * *

The Lincoln Electric Co., Cleveland, Ohio, has appointed J. E. Durstine as district sales representative for the Southeast with headquarters at Birmingham, Ala., and H. P. Egan as district sales representative for central Ohio with headquarters at Columbus.

* * *

H. L. R. Emmet has been appointed manager of the Erie (Pa.) works of the General Electric Co., and J. E. Brobst has been named manager of the Bloomfield (N. J.) plant. Matthew Griswold, at Erie, and C. D. Knight, at Bloomfield, retired from active service on Jan. 1 because of ill health.

* * *

The name of the Cutler-Hammer Mfg. Co., Milwaukee, Wis., has been changed to Cutler-Hammer, Inc., organized as a Delaware corporation.

* * *

Foote Bros. Gear & Machine Co., Chicago, has established a New York City branch office in the Woolworth Building, in charge of E. A. Phillips. This office will control New England territory, New York as far west as Rochester and northern New Jersey.

* * *

The Cincinnati Car Corporation, Cincinnati, Ohio, is now marketing a complete line of industrial locomotives.

The Shepard Electric Crane & Hoist Co., including its Sprague division, and the Niles Crane Corporation have combined under the corporate title of the Shepard-Niles Crane & Hoist Corporation. The main office will be at Montour Falls, N. Y.

* * *

The Wrought Iron Co. of America has been formed under the laws of Pennsylvania to consolidate manufacturers of wrought-iron products and build up a large organization specializing in this field. The company embraces the present consolidation of the Lebanon Iron Co. and the Scranton Bolt & Nut Co., which will form the nucleus for the proposed larger combination.

* * *

Andrew Wells Robertson, of Pittsburgh, Pa., president of the Philadelphia Co., was unanimously elected chairman of the board of directors of the Westinghouse Electric & Manufacturing Co. in a meeting of that board on Jan. 16. Mr. Robertson will withdraw from his other business activities and devote his entire time to the Westinghouse company. Henry Bedinger Rust, president of the Koppers Co., was elected a director of the Westinghouse company.

* * *

The Northern Equipment Co., Erie, Pa., has appointed Bradshaw & Co., 530 Fourth Avenue, Pittsburgh, Pa., to represent the Copes system of boiler feed control. Grant D. Bradshaw is president of this new firm.

* * *

H. D. Savage, president of Combustion Corporation of America, announces the election of Carl F. Weigel as vice-president and general manager of the subsidiary company, Hedges-Walsh-Weidner Co., Chattanooga, Tenn.

* * *

Wagner Electric Corporation, St. Louis, Mo., announces the addition of N. H. Spencer to its Dallas (Texas) sales force and of R. L. Matthews to the Chicago staff.

* * *

The Wayne Pump Co., Fort Wayne, Ind., has concluded negotiations for the acquisition of the Fry Equipment Corporation. Recently Wayne acquired the Boyle-Dayton Co., manufacturer of gasoline pumps.

OPERATING IDEAS *from* Production, Electrical *and* Mechanical Men

Turbine Balance Measured by Unique Method In Mine Power Plant

WHEN balancing the rotating element of a machine in its own bearings by running tests with cut-and-try shifts of weight positions, one difficulty is to determine whether slight shifts decrease or increase the vibration. For this purpose W. S. Schick, of Stearns, Ky., assistant to C. L. Larmee, master mechanic of the Stearns Coal & Lumber Co., devised a unique vibration indicator which was used successfully in balancing a 2,000-kw. turbine.

Last spring this turbine, purchased second hand, was installed to take care of increased load on the company power plant at Stearns, which plant supplies the coal mines, lumber mill and town lighting. Upon initial trial on its new foundation the turbine, an 1,800-r.p.m. unit operating at 140-lb. gage pressure, vibrated severely.

With the device the amount of vibration is indicated by the time in seconds that it takes a weight to travel a certain distance down an inclined path attached to the turbine frame. The first arrangement consisted of a flat piece of metal traveling in an open trough. Because of the effect of air currents and the fact that the piece would not travel in exactly the same path each time this arrangement would not give uniform indications on the same magnitude of vibration.

In the indicator which proved successful a $\frac{5}{8}$x16-in. water gage glass is the slide and a $\frac{1}{4}$x1-in. slug of monel metal is the traveler. The tube is sealed at each end to exclude air currents and the slug is rounded at the ends and polished. Apparently the slug travels in practically the same path each time, for repeated indications of an unchanging vibration vary but slightly.

The glass tube lies in knife-edged and curved yokes which in turn are fastened to a $\frac{1}{4}$x4-in. mild steel bar. This bar is clamped at one end to the turbine so as to form a reed. The angle of repose for the slug in the tube is 8 deg. when there is no vibration. Angles of from 4 to 12 deg. were used when balancing the turbine.

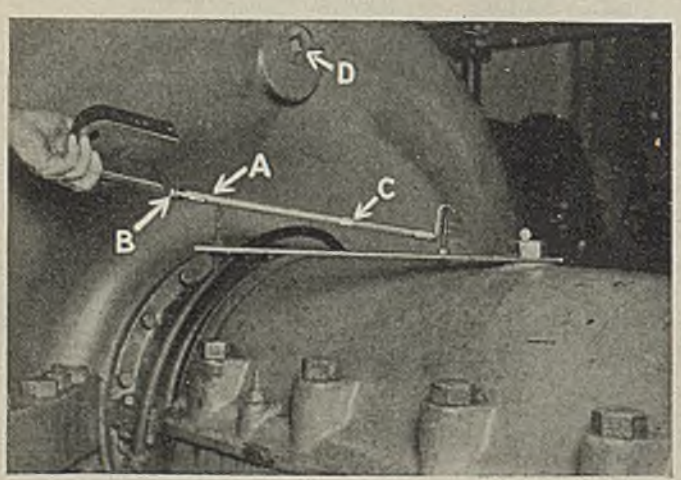
In the photographs "A" is the monel slug, "B" a cast-iron plug, "C" a sliding marker on the outside of the tube, and "D" a hand hole in the turbine casing through which balancing weights on the steam rotor are adjusted.

The monel slug is returned to the upper end by tipping the tube. A magnet held near the cast-iron plug keeps the slug at that end until the reed and tube have recovered normal vibration after being handled, and until the person timing the slug wants it to start the downward travel. Monel is used because it is only slightly magnetic and will not be held to the cast-iron plug by residual magnetism after the magnet is taken away.

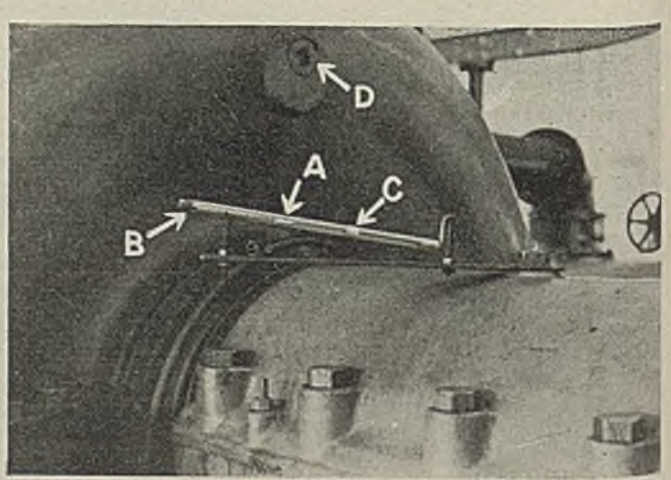
On the first trials the glass tube had to be leveled to within 4 or 5 deg. of horizontal in order to limit the speed of the slug travel so that the duration would be a convenient number of seconds. At the finish as much as 300 seconds was required for the slug to travel the length of the tube when inclined to 8 deg.

Trials were begun with 8-oz. weights, but the final balance took a total of 28 oz. distributed in four weights. The machine was divided into quadrants, and the positions, weights and degree of vibration recorded on diagrams for each trial. Because of the time required for the turbine to come to rest only six tests could be made in an eight-hour shift. That the final balance is good is attested by the dime balanced on edge on top of the main bearing dowell bolt. The turbine was operating while the photographs were made.

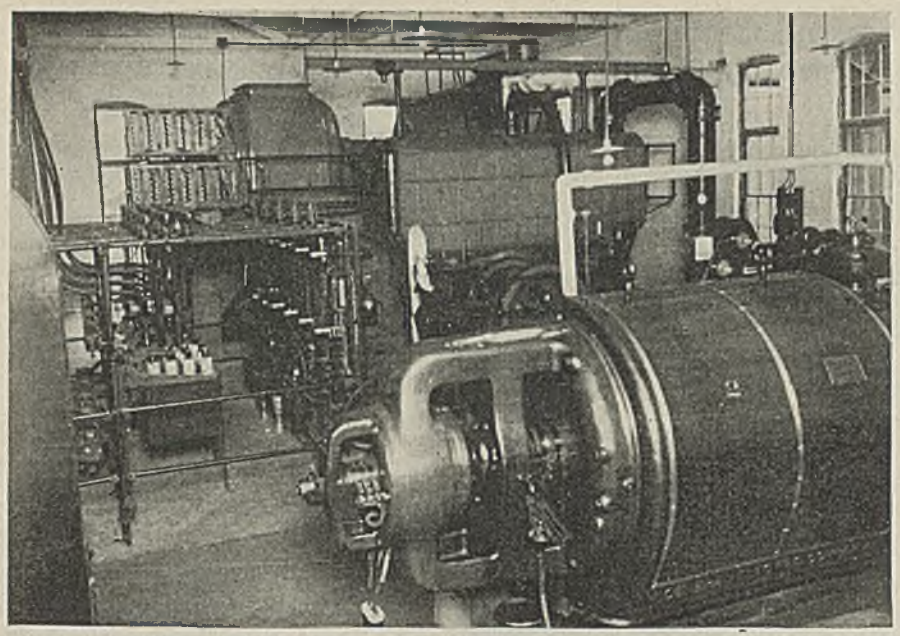
Perhaps the device should not be



Magnet Holding Slug "A" at Beginning of Test



Slug "A" Traveling Down the Tube



The 2,000-kw. Turbo-Generator Is in the Background

spoken of as an indicator, for it does not indicate the degree of vibration at a certain instant, but instead integrates the vibration over a certain period.

Test Dried-Out Motor for Insulation Resistance

The time required for complete drying-out of a motor that has been flooded or has stood idle in a damp place depends considerably on the size and voltage of the motor, according to C. W. Falls, industrial engineering department, General Electric Co. Insulation resistance measurements should be taken at intervals of four or five hours until a fairly constant value is reached. This value should at least equal the recommended A. I. E. E. Standard, which is

$$\text{Megohms} = \frac{\text{Voltage}}{\text{Kv—a.} + 1{,}000}$$

The insulation resistance of dry motors in good condition is considerably higher than this value.

The more convenient way to measure this resistance is through the use of a Megger, although if a 500-volt d.c. source is available, readings can be taken with a voltmeter. The ungrounded side of the system should be connected to all the motor terminals through the voltmeter, the opposite or grounded side being connected directly to the motor frame. The insulation resistance is found by

$$R = r\left(\frac{E}{V} - 1\right)$$

where R = insulation resistance in ohms
E = line voltage (d.c.)
V = voltmeter reading
r = resistance of voltmeter.

In using the voltmeter method the connection to the frame should always be made through a fuse of not more than 10 amp. in size. The circuit should be tested and the side showing a complete or partial ground then connected to the frame through the fuse.

Obviously, the insulation resistance varies over a wide range, depending upon moisture, temperature and cleanliness, but it is a good indication of the general condition of the insulation and its ability to stand the operating voltage. Such readings should be taken before a high-potential test, to determine whether the insulation is ready for such a test, and afterward to make sure that the high potential has not injured the insulation.

High-potential tests should be made after drying out, or after repairs, to determine the dielectric strength of the insulation. New windings should successfully stand a high-potential test of twice normal voltage plus 1,000. There is some disagreement as to the proper value to use for motors that have been in operation for some time, but it is reasonable to assume that, after thorough cleaning and drying, the winding of a used motor should stand 150 per cent of normal voltage for one minute.

Small high-potential testing sets are available for such work and are of such capacity that very little damage will result from a breakdown during the test.

Your Ideas

May Be Worth Money

Short cuts and labor-saving methods lighten the burden of producing coal; save time, temper and money. Incidentally *Coal Age* pays $5 or more for each idea described in these columns. Send in that new mechanical kink, electrical problem or short cut that you have worked out. Photographs or sketches will help to put it over.

Regular Check-Ups Promote Safety

Below is given a questionnaire which is placed before assistant foremen at a mine of one of the largest producing coal mining companies in the United States, according to D. Harrington in the Mining Section News Letter, National Safety Council, October, 1928. If questionnaires of this description were from time to time placed before all underground officials and definite answers were required, there would be much more familiarity with underground safety conditions among mine officials than is now the case.

(1) Time required to make an inspection of your section, under ordinary conditions.

(2) Time spent in rib and pillar falls. Give location of such places.

(3) Have you observed any dangerous practices on the part of any employee? If so, state fully the nature of same.

(4) Have you any material in your section that you do not or will not require in the near future.

(5) State the condition of your traveling roads and motor roads.

(6) Were any grievances reported to you by the workmen? If so, state fully the nature of such grievances.

(7) State any unusual conditions encountered and method employed to overcome them.

(8) Are your men amenable to discipline? If not, kindly furnish check number and location of said parties.

(9) Have you any suggestions to offer which in your opinion would tend toward increased safety, efficiency or economy in the operation of the mine?

(10) While giving due attention to the working faces do you watch carefully for such dangers as are due to: Nails projecting from boards, rails, canvas doors, etc. From careless handling, conveying, or storage of explosives. From careless handling or storage of carbide or from mining machines without guards or using defective cable.

(11) In fencing off places wherein danger has been discovered do you use proper danger boards?

(12) Have you any places driving toward boundary lines, old workings, etc.? If so, give the total distance to drive and the present distance.

(13) Are your day men as efficient

as they should be; if not, explain fully.

(14) Have you read anything during the week pertaining to mining that appealed to you as having a definite value? If so, name article and where found.

(15) Are all working places in your section properly and sufficiently posted?

(16) Are sight lines advanced regularly?

Interlock Would Provide Safer Operation

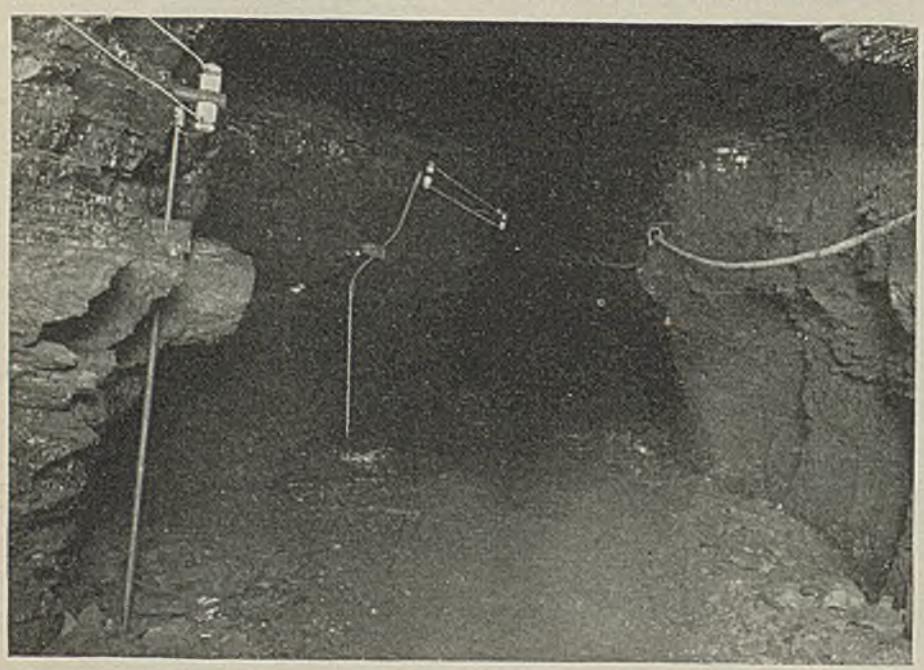
Regenerative braking of slope hoists with slip-ring induction motors could be made safer by adding to the control special equipment to prevent operation on secondary resistance after starting an overhauling load. With a motor of proper capacity this would prevent dangerous speeds and allow the ordinary overspeed device to be a second line of defense.

Telephone Line Put Into Conduit at Passage

There is no particular danger of shock from a telephone line, nevertheless the wires should be so placed that they will not be obstructions to walking and carrying materials. If a man must "duck" to get under the wires or even if they are close to a man's head they will be stretched and perhaps torn down at intervals.

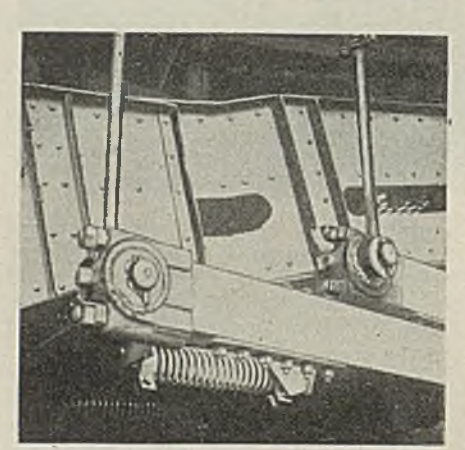
The accompanying photo, taken on the manway slope in Lewisburg No. 2 mine of the Sloss-Sheffield Steel & Iron Co., shows how the telephone line is taken under the bottom at a passageway leading to the left. The wires are carried in a ½-in. rigid iron conduit terminated at each end with condulets.

Telephone Line Carried Along Rib at Left



Springs Cushion Reversals Of Shaker Screens

Heavy reciprocating equipment has been superseded generally by rotary machinery. Examples of the new type are the centrifugal pump, steam turbine and rotary air compressor. But so far no satisfactory substitute has been found for the heavy reciprocating screens commonly used in tipples for separating the larger sizes. Mechanical shock to the drive parts and vibration imparted to the building are among the disadvantages. According to the experience at Mine No. 11 of the West Virginia Southern Coal Co., Birchton, W. Va., coil springs properly attached are a help in reducing these effects.



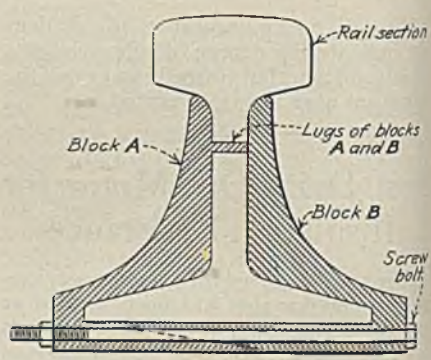
Screens Stopped at Centers of Strokes Where Springs Are Neutral

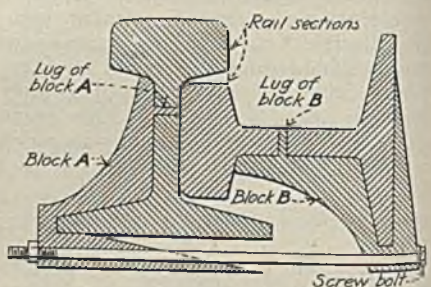
The springs are of the spaced-coil type, suitable for compression and tension service. On the 6-ft. screens at Mine No. 11 four of these heavy springs are attached between, and connect, the two sections of the screen. As the sections move away from each other the springs are stretched, cushioning the reverse. At the end of the come-together stroke the springs are compressed, again cushioning the reverse.

Apparently the springs are quite effective. Although the tipple is a wooden structure of rather light proportions, the vibration when the screens are operating is slight. D. E. Cornutt, superintendent of the mine, believes that the springs are responsible for the unusually smooth operation.

Convenient Clamp Used On Slide Rails

A clamp for fastening slide rails to track, which also can be used as a fishplate or to hold guard rails in place, has been devised by H. F. Dabney, of the O'Gara Coal Co., Harrisburg, Ill. Fig. 1 shows the clamp connecting rails and Fig. 2 shows it in place on a slide rail. The shape of the clamps is shown in each of the figures. Each of the pair of clamps is fitted with pins or lugs which fit in the boltholes in the ends of the rails.





Joins Rails in a Hurry

To use as fishplates the clamps are put on as in Fig. 1, the pins fitting in the holes in the rails and the whole assembly tightened by a bolt passing under the bottom of the rail. When used in holding a guard rail in a certain position in relation to the main rail one clamp is put on the main rail and the other on the guard rail on the opposite side. A bolt of the necessary length is used and the clamps tightened as before. If it is desired to lay slide rails the clamps are put on as shown in Fig. 2. The pins or lugs pass through the rail holes and the bolt passes underneath the rails.

These clamps can be made in any size to fit from 8-lb. to 150-lb. per yard rails. Only one bolt is necessary and its size is governed by the size of the rail. The whole assembly consists of three pieces and is easily transported and quickly put on.

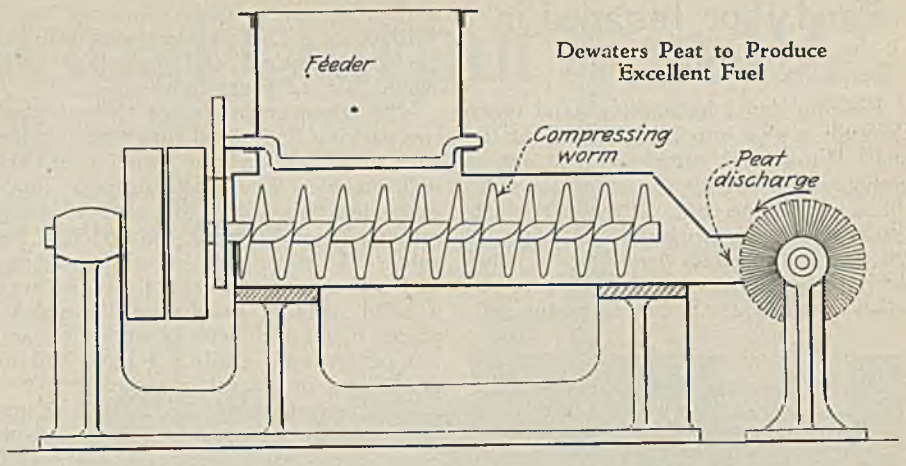
Fire-Fighting Hose Kept Connected

A coal company in Alberta, Canada, has placed on the surface, against the possibility of fire, large wooden hose boxes set on posts. Each of these is 3 ft. wide, 6 ft. long and 2 ft. deep and will hold at least 100 ft. of 2-in. hose. The box has both an end and an upper door. The hose can be pulled out of the end opening ready for use and replaced by opening the lid in the top of the box.

The hose is kept connected to a branch from a 4-in. surface pipe line ready for immediate use as soon as the valve under the box is opened. The

Water Available With Twist of Wrist

4-in. line is maintained under water pressure at all times during non-freezing weather but in the winter the pipe is filled only when the water is needed. The line is connected, says Moses Johnson, Blairmore, Alberta, Canada, with a pressure supply from a reservoir and also with a pump which can be started up at need. Extra lengths of hose are kept on a reel. These can be used whenever the hose in any of the boxes needs to be extended. The hose boxes are placed at intervals of about 150 ft.



Dewaters Peat to Produce Excellent Fuel

German Invention To Dry Peat

Two processes for drying peat which result in a hard, black material that can be burned or coked like coal have been patented by B. Jirotka, Berlin, Germany, according to Alfred Gradenwitz. Doctor Gradenwitz cites Wo. Ostwald's investigations which distinguish between water that can be removed by slight pressure, water contained in open or closed hairlike tubes and water which by combination with cellulose, humus and other substances can be removed only with difficulty, and states that no efficient drying methods have been previously used because of lack of knowledge of the forces retaining the water in the peat.

The water content of recent peat may be reduced from 80-90 per cent to about 50 per cent by air drying from three to eight days. According to B. Jirotka a uniformly dried peat is obtained by reducing the material to small pieces and mixing it like dough on a waterpervious platform. Its own weight dries it to 50 per cent moisture in four to twenty days in midsummer in Germany and a 25 per cent product is obtained in from one to two months.

Another process invented by Jirotka is intended to accelerate the drying. The moist material is introduced into a rotating worm where it is crushed and compressed, eventually breaking up the structure and liberating all the water contained in the peat. The residual torn mass assumes a brownish color which soon turns black. Recent tests have shown the water loss in four days to be 70 per cent. The output was 63,840 kg. (14.5 tons) of peat containing 25 per cent water in a shift of eight hours.

New Bearings Applied as Cars Go Through Shop

Officials of the Crozer Coal & Coke Co., Elkhorn, W. Va., are believers in good equipment and the proper maintenance that will insure many years of service from a piece of equipment. When, however, they have convincing evidence that a highly improved type is available and will earn its way, they are not slow to make a change.

The mine-car equipment is an example. Plain bearings were the standard at Crozer mines until three years ago, when the officials became convinced that Timken tapered-roller bearings would effect a substantial saving.

Accordingly the old cars are being rebuilt steadily into new cars equipped with the Timken bearings. At this time about 300 cars, which is one-half of the Crozer equipment, are on roller bearings. The best of the old plain-bearing wheels have been saved as a replacement stock for those old cars which are still in good condition.

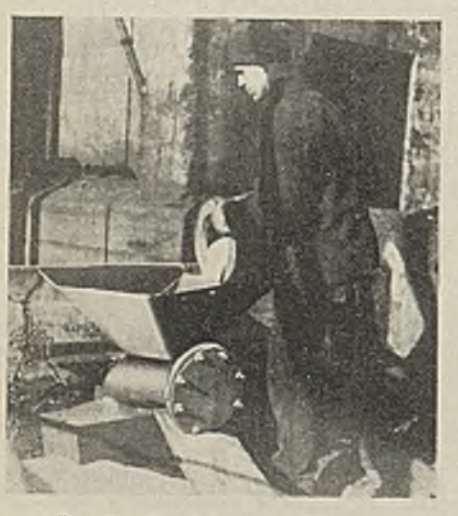
After three years' experience with the new equipment the company officials are well pleased with their decision to adopt the tapered-roller bearings.

Saved as Spares for Plain-Bearing Cars Still in Service

Same Irons but New Trucks; Car at Right Ready to Enter Shop and That At Left Just Out

Sand Pipe Installed in Hoisting Shaft

Feeding dried locomotive sand down through a pipe into a bin or car at the shaft bottom has certain advantages as compared to taking the sand down on the cage in mine cars. If the coal hoisting equipment is worked to full capacity the method permits handling of sand during the regular working hours instead of at night. It also saves the calling of several men to help cage the cars loaded with sand.



Pouring Sand Into the Hopper

Drilling of a special borehole for a sand pipe is not necessary in many cases. If the sand house can be located close to the shaft, and the mine bottom arrangement is favorable, a sand pipe can be installed to advantage in the hoisting shaft.

This was done at the Shamrock mine of the West Kentucky Coal Co., Providence, Ky. Five-inch steel pipe was used for all but a few feet at the upper end. A short piece of 7-in. pipe, bent to pass at an angle through a hole in the wall and to receieve sand from a hopper, was welded to the upper end of the 5-in. pipe. With this arrangement the top man who tends the sand dryer also delivers the sand to the shaft bottom.

Lasting Metallic Packing Need Not Be Removed

In talking to a chief engineer not long ago, W. F. Schaphorst, mechanical engineer, Newark, N. J., mentioned a metallic packing which is giving very good service in the United States and Canada. A point in its favor is that it needn't be removed very often, if at all. An installation was inspected lately, for example, where a plunger equipped with this packing had been in operation for six years, against 160 lb. pressure, 212 deg. heat, for 12 hours a day, and the plunger was not worn 1-1000 in. The packing was still in perfect condition, and looked as if it would last 12 years more.

The engineer in charge thought that the packing had saved him considerable time and labor and the owner considerable money. The chief engineer, however, had his mind already made up and was not open to conviction. He said: "I have tried metallic packing and will never try it again. It becomes a solid metallic mass, and if used in places that are difficult of access it cannot be removed easily. I have had to chip it out in several instances."

With any packing, however, whether it be fabric or metallic, there are some cases where inaccessibility in design of stuffing boxes makes the packing very hard to remove. And the engineer's statement with reference to the metallic packing is true to the extent that it is more difficult to remove than the fabric, but it is the claim of this manufacturer that his packing needn't be removed. In other words, if you get the right packing, you can leave it in, and removal troubles are eliminated.

In case it is necessary to remove such metallic packings as are made of babbitt foil, spirally wound, it is not very difficult to screw into the packing itself with packing hooks made for the purpose, and pull the packing out. With separate individual rings, which do not amalgamate with the other rings because of the laminated construction and lubricant between all sheets, the removal operation is performed with still greater ease.

Lumber Well Cared For At Virginia Mine

There are many reasons for protecting the stock of lumber from the weather. Warped lumber is wasteful and difficult to work; cracked and checked lumber is more susceptible to decay; wet lumber is more costly to handle and work, and is objectionable for certain uses where shrinkage is a factor.

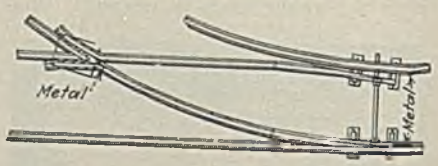
In line with its policy of taking the best of care of materials and equipment and of keeping the plants tidy, the Gulf States Steel Co., of Alabama, uses at the Virginia mine the lumber shed shown in the photograph. The lumber is piled in perfect order on a ventilated platform that is well protected by a projecting roof.

At the right in the same picture is a lean-to where castings and similar materials are arranged neatly on a platform and where pipe and bar stock is stored on racks.

Orderliness and Neatness Are Enemies of Waste

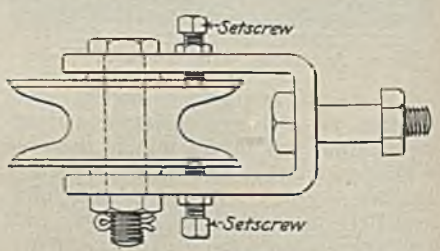
Switch Protection by Arc Welding

Much switch trouble in gathering-locomotive territory has been eliminated in a West Virginia mine, according to C. T. Grimm, Adrian, W. Va., by use of a simple arc welder. Additional metal is placed in the switch, as shown in the accompanying illustration. This metal, when properly applied, eliminates the necessity for a guard rail and prevents splitting of switches.



A Safe Switch

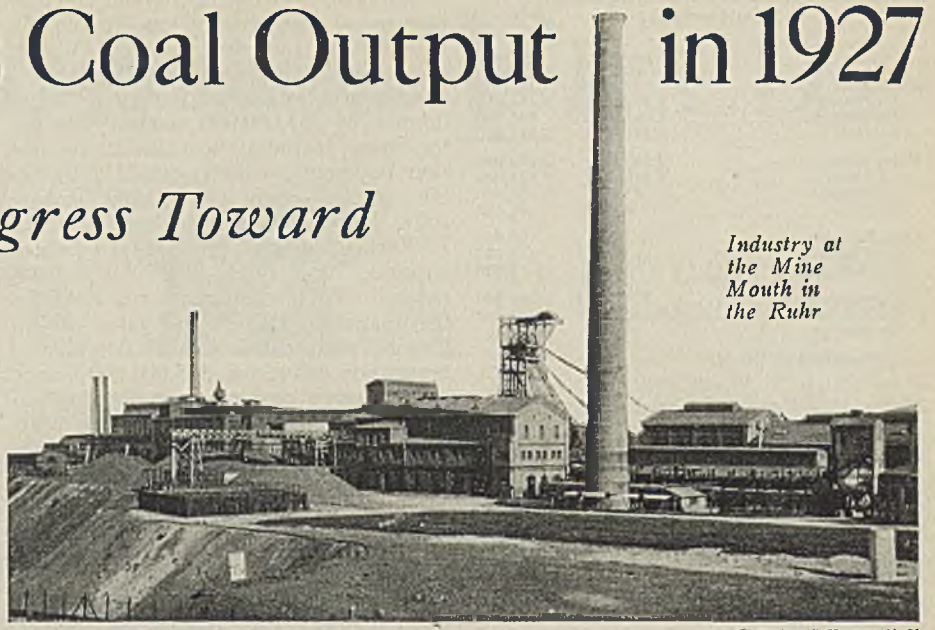
The same company saves considerable money by using trolley wheels which would ordinarily be thrown away. These are locked with setscrews as shown and the wheels then glide instead of rolling. The contact surface is much larger than when the wheel is turning and sparking is eliminated.



New Life for Trolley Wheels

Germany's Coal Output in 1927

Shows Progress Toward Pre-War Level



Industry at the Mine Mouth in the Ruhr

© Ewing Galloway, N. Y.

By Dr. Ernst Jüngst

Secretary, Bergbau-Verein, Essen, Germany

JUDGED by production figures for 1927, the coal industry of Germany appears in a very favorable light. Output of coal shows an increase of 8,300,000 tons and of lignite 11,700,000 tons over that of 1926. Compared with the extraction in 1913, the last pre-war year, in Germany proper—not including the Saar district—there were increases of 12,800,000 and 63,600,000 tons respectively. The production of lignite, which in 1913 was only 87,200,000 tons, was almost doubled. As the lignite industry suffered no loss through the provisions of the Versailles Treaty the figures remain the same if the territory of pre-war Germany is considered, whereas in the case of coal there still exists a loss of 36,500,000 tons.

Not less favorable was coke production, amounting to 32,250,000 tons, an increase of almost 5,000,000 tons over 1926 and of 600,000 tons over the 1913 output within the boundaries of pre-war Germany. Less marked was the expansion of production of lignite briquets: 2,100,000 tons more than in 1926. The output of coal briquets, on the other hand, continued to decrease and was approximately 1,000,000 tons less than in 1926 and 1,500,000 tons less than in 1913 within the boundaries of post-war Germany, and 2,000,000 tons less than in 1913 within the boundaries of pre-war Germany.

The greater part of the increase in coal production came from the Ruhr mines, where the output in 1927 was 118,000,000 tons as compared with 112,200,000 tons in 1926. This figure surpassed the total for 1913 by 3,500,000 tons. Production in Upper Silesia increased approximately 2,000,000 tons. Of the increase in lignite production, 5,400,000 came from central Germany and 4,250,000 tons came from Rhineland. Table II shows production in 1926 and 1927 according to administrative districts and states respectively:

The tonnage of 1927 was attained with considerably fewer workers than in the preceding year. At the end of 1927 the number of workmen in the districts of Aachen and Upper Silesia increased 807 and 3,048 respectively, but these increases were more than offset by decreases of 3,162 in Saxony, 2,121 in Lower Silesia and 14,660 in the Ruhr District. The individual efficiency rose, as indicated in table III.

In every district, with the exception of Saxony, the output of the total workers, excluding management, was considerably higher than before the war, although the shifts were shorter. In 1913 a shift was 8½ hours in the Ruhr, Lower Silesia, and Aachen; 9 to 10 hours in Upper Silesia, and 8 to 9 hours in Saxony. At present all districts have an 8-hour shift for the miners. In Upper Silesia the time was 8½ hours until March 1; later it was reduced to

Table I—Production of German Coal Mines

(In Thousands of Tons)

Year	Coal	Lignite	Coke	Coal Briquets	Lignite Briquets
1913—All provinces	190,109	87,233	34,630	6,992	21,977
1913—Provinces remaining	140,753	87,228	31,668	6,490	21,977
1926	145,279	139,151	27,297	5,902	34,358
1927	153,597	150,806	32,261	4,971	36,463

Table II—Coal Production According to Districts

(In Thousands of Tons)

District	1913	1926	1927
Dortmund	110,765	107,906	113,549
Breslau	48,963	23,042	25,222
Bonn	19,399	9,473	10,036
Clausthal	725	580	571
Halle	8	55	56
Prussia	179,861	141,056	149,435
Saxony	5,445	4,151	4,032
Other Germany	4,803	156	130

Lignite Production by Districts

(In Thousands of Tons)

District	1913	1926	1927
Halle	46,647	64,647	70,308
Bonn	20,339	40,028	44,250
Breslau	1,960	9,435	9,837
Clausthal	1,106	1,675	2,221
Prussia	70,052	116,075	126,616
Thuringia	6,310	10,054	10,751
Saxony	2,185	3,372	3,537
Anhalt	1,485	1,185	978
Hesse	398	423	427
Bavaria	1,896	2,212	2,503

Table III—Production Per Worker and Shift in Coal Mines

(In Kilograms)

Year	Per Miner per Shift	All Workers per Shift (Excluding Management)	Per Miner per Hour
Ruhr District			
1913	1,161	943	136.6
1925	1,182	946	147.7
1926	1,374	1,114	171.8
1927	1,385	1,132	173.1
Upper Silesia			
1913	1,707	1,139	179.7
1925	1,588	1,154	185.7
1926	1,677	1,270	197.3
1927	1,729	1,339	210.1
Lower Silesia			
1913	928	669	116.0
1925	907	661	113.4
1926	986	735	123.2
1927	1,034	784	129.2
Saxony			
1913	.....	709	.....
1925	.....	562.8	.....
1926	.....	587.8	.....
1927	.....	638.1	.....

Table IV—Fuel Imports by Germany

(In Thousands of Tons)

	1925	1926	1927
Coal	7,608	2,867	5,334
Lignite	2,295	2,015	2,560
Coke	69	51	146
Coal briquets	.....	.....	4
Lignite briquets	189	122	151

Fuel Exports by Germany

Coal	22,509	38,035	26,878
Lignite	33	79	27
Coke	7,574	10,363	8,794
Coal briquets	.....	1,587	751
Lignite briquets	2,041	1,607	1,643

Table V—Reparation Shipments of Fuel by Germany

(In Tons)

	1926	1927
Coal, total	9,181,000	9,116,000
To France	4,392,000	5,282,000
To Belgium	2,067,000	802,000
To Italy	2,721,000	3,031,000
Coke, total	3,903,000	2,897,000
To France	3,816,000	2,826,000
To Belgium	83,000	53,000
To Italy	4,000	18,000
Coal Briquets		103,000
To France	*	192,000
To Belgium	*	11,000
Lignite Briquets	518,000	341,000
To France	488,000	341,000
To Belgium	30,000	.....

*Included with coal.

Table VI—Value of German Imports and Exports of Fuel in 1927

(In Marks)

	Imports	Exports
Coal	112,329,000	605,832,000
Lignite	27,388,000	620,000
Coke	3,561,000	230,562,000
Coal briquets	97,000	18,783,000
Lignite briquets	2,103,000	34,067,000
Total	145,478,000	890,454,000

8¼ hours and on Sept. 1 to 8 hours.

It was only natural to expect that the German coal trade with foreign countries in 1927 would show a considerably different picture than in 1926, when its development was strongly influenced by the British miners' strike. Coal exports, in comparison with 1926, show a marked decline; imports greatly increased. Table IV shows imports and exports for the last three years, including shipments under the reparation agreements.

Deliveries by Germany under the provisions of the reparation agreement, which were included in table IV, are shown in detailed form in table V.

The value of exports exceeded that of imports by 755,000,000 marks. The latter figure includes the value of reparation payments, which totaled 273,000,000 marks—coal, 190,000,000 marks; coke, 73,000,000 marks, and briquets, 10,000,000 marks. The actual value of exports, therefore, was 607,000,000 marks. This compares with 774,000,000 marks in 1926. The value of fuel imports that year was 84,000,000 marks; reparation deliveries, 305,000,000 marks.

Germany's coal consumption in 1927 was higher than in any previous year; the monthly average of 12,800,000 tons surpassed the rate of the previous year by 1,750,000 tons and that of the year before the war by 500,000 tons. In bituminous coal and anthracite alone, the rate reached in the last year before the war was higher by 432,000 tons a month than in 1926. This reflects the increasing importance of lignite in German fuel consumption.

Table VII—Fuel Consumption in Germany Before and After the War

(In Tons)

Monthly Averages:	Total Fuel Consumption Expressed in Coal	Coal Consumption; Coke Included as Coal
1913 (in present boundaries)	12,325,000	10,388,000
1925	11,335,000	8,683,000
1926	11,053,000	8,467,000
1927	12,809,000	9,956,000

Trade Literature

Vertical Feather-Valve Compressors. Worthington Pump & Machinery Corporation, New York City. Bulletin No. L-620-Bl.

M. W. M. Benz Diesel Engines, Type RH 40. Chicago Pneumatic Tool Co., Chicago. Bulletin 774.

Crystalite Water Softeners. International Filer Co., Chicago. Bulletin 183.

The equipment for a complete mine rescue station is illustrated and described in Bulletin No. 25 of the Mine Safety Appliances Co., Pittsburgh. Pa.

Allis-Chalmers Co., Milwaukee, Wis., has issued the following: Polyphase Induction Motors, types "AR" and "ARY" motors, bulletin 1118-E; Texrope Drives, bulletin No. 1228-H.

Distribution Transformers. Wagner Electric Corporation, St. Louis, Mo. Bulletin 160.

Herringbone Speed Reducers. Falk Corporation, Milwaukee, Wis. Bulletin No. 190.

Groundulets Make Electrical Circuits Safe is the title of bulletin G-9, recently issued by the Crouse-Hinds Co., Syracuse, N. Y.

General Electric Co., Schenectady, N. Y., has issued bulletin GEA-881A, illustrating and describing its Arc Welder, gas-engine driven, and bulletin GEA-569B, illustrating and describing its Constant-Potential Arc-Welding Sets.

Packless Pressure Lubricated Valves. Milliken Valve Corporation, New York City. Bulletin No. 1.

Elliott Company, Jeannette, Pa., has issued the following bulletins: Induction Motors, 20 to 200 hp., two or three-phase, for continuous duty; bulletin L-1. Engine-Type Commutating-Pole Generators—Type K, from 15 to 1,000 kw., both two- and three wire, bulletin J-1. Twin Strainers, for Diesel-engine injection valves, lubricating systems, etc.; bulletin AA.

Large Polyphase Induction Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin 1087-F.

Type XG Gas Engine Driven Compressors. Ingersoll-Rand Co., New York City. Bulletin 3149.

Rotary Car Dumpers. Roberts & Schaefer Co., Chicago. Bulletin No. 103.

Carnegie Beam Sections—Addition to New Series. Carnegie Steel Co., Pittsburgh. Pa.

Manual of Electrical Testing. Wagner Electric Corporation, St. Louis, Mo. Bulletin 138.

Saving and Making Money with Rol-man Screens. Manganese Steel Forge Co., Philadelphia, Pa. Bulletin 120.

Centrifugal Pumps. Deming Co., Salem, Ohio. Catalog C8. Pp. 24.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has issued the fifth edition of a chart showing the brand of explosives best suited for each of the chief kinds of blasting.

Electric Arc Welding With Alternating Current. Martindale Electric Co., Cleveland, Ohio. Pp. 44.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in a 24-page bulletin covers its engineering achievements in 1928.

Threadless Condulets, Connectors and Couplings. Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2126; pp. 8.

Ohio Brass Co., Mansfield, Ohio, has issued supplement No. 2 to Catalog No. 20, superseding and replacing supplement No. 1. Contains information on new products of this company announced since issuance of Catalog No. 20. Pp. 61.

Small Vertical Motors. Wagner Electric Corporation, St. Louis, Mo. Bulletin 158.

Torsion, Impact and Other Mechanical Properties of SAE-3130 Nickel-Chrome Steel. International Nickel Co., Inc., New York City. Bulletin No. 13.

General Electric Co., Schenectady, N. Y., recently issued the following bulletins: Atomic-Hydrogen Arc-Welding Equipment, GEA-823B; Type AW Resistor Arc Welders, GEA-1031A; Type WD-400A Arc Welder, GEA-876B; Type WD-200A Arc Welder, GEA-874C.

Publications Received

Pyritic Oxidation, with Special Reference to the Ravine Seam, by H. Macpherson, N. Simpkin and S. V. Wild. Safety in Mines Research Board. Paper No. 47. Price, 1s. 6d. net. H. M. Stationery Office, Adastral House, Kingsway, W.C. 2 London, England.

Five Hundred Tests of Various Coals in House-Heating Boilers, by P. Nicholls, S. B. Flagg and C. E. Augustine. Bureau of Mines, Washington, D. C. Bulletin 276. Price, 15c.

Coke and By-Products in 1926, by F. G. Tryon, H. O. Rogers and H. L. Bennit. Bureau of Mines, Washington, Price, 15c.

Analysis of West Virginia Coals. Bureau of Mines, Washington, D. C. Technical paper 405. Price, 20c. Pp. 343; tables.

Annual Report of the Director of the Bureau of Mines for fiscal year ended June 30, 1928.

Geology of the Area Between North Saskatchewan and McLeod Rivers, Alberta, by Ralph L. Rutherford. Report No. 19 of the Scientific and Industrial Research Council of Alberta. Price, 50c. University of Alberta, Edmonton, Canada.

The Ignition of Firedamp by the Heat of Impact of Rocks, by M. J. Burgess and R. V. Wheeler. Safety in Mines Research Board Paper No. 46. Price 9d. net. H. M. Stationery Office, Adastral House, Kingsway, W.C. 2, London, England.

The Support of Underground Workings in the Coal Fields of the South Midlands and the South of England. Safety in Mines Research Board Paper No. 45. Price, 2d. net. H. M. Stationery Office, Adastral House, Kingsway, W.C. 2, London, England.

A Study of the Failure of Concrete Under Combined Compressive Stresses, by Frank E. Richart, Anton Brandtzaeg and Rex L. Brown. Bulletin No. 185. Price, 55c. Engineering Experiment Station, University of Illinois, Urbana, Ill.

The Relative Inflammability and Explosibility of Coal Dusts, by T. N. Mason and R. V. Wheeler. Safety in Mines Research Board Paper No. 48. Price, 3d. net. H. M. Stationery Office, Adastral House, Kingsway, W.C. 2, London, England.

A.S.T.M. Tentative Standards, 1928. American Society for Testing Materials, Philadelphia, Pa. Price, $7 in paper and $8 in cloth binding. Pp. 932, containing 185 tentative standards, 7 of which relate to coal and coke.

Manufacturing—A volume of "Industries of America," by Malcolm Keir. Ronald Press Co., New York City. Price, $5.

Investigations of Fuels and Fuel Testing. Testing and Research Laboratories, Mines Branch, Department of Mines, Ottawa, Canada. Pp. 132; illustrated.

Production of Explosives in the United States during the Calendar Year 1927, by William W. Adams. Bureau of Mines, Washington, D. C. Price, 10c. Pp. 49.

Standards of the Hydraulic Society, New York City. Fifth edition. Price, 50c. Pp. 80; illustrated. The principal changes from the preceding edition are a revision of the extracts taken from the A.S.M.E. Test Code for Centrifugal and Rotary Pumps and changes in materials recommended for the construction of special service pumps.

Trade Standards Adopted by the Compressed Air Society, New York City. Third Edition. Price, 50c. Pp. 47; illustrated. New material includes a description of the A.S.M.E. standard air receivers, with list of standard sizes of these receivers; pneumatic tool standards; a section on portable compressors, and additional information relating to installation and care.

WORD *from the* FIELD

Industrial Coal Stocks Fall 13,000,000 Tons in Year

Total industrial stocks of anthracite and bituminous coal in the United States and Canada on Jan. 1 had fallen off approximately 1,000,000 tons from the reserves on the first of the preceding month, according to the monthly report of the National Association of Purchasing Agents. Stocks on hand Jan. 1 were 39,934,000 tons as against 41,010,000 tons on Dec. 1.

Consumption of coal during December showed an increase of 2,700,000 tons as compared with the preceding month, while output of hard and soft coal decreased about 3,700,000 tons. Stocks on hand in industries decreased approximately 13,000,000 tons during 1928. The number of day's supply on hand on Jan. 1, based on the current rate of consumption, was 32, as against 34 on Dec. 1.

DAYS' SUPPLY OF BITUMINOUS COAL IN VARIOUS U. S. INDUSTRIES

		Change
Byproduct coke	26	—1
Electric utilities and coal-gas plants	53	—1
Railroads	26	—2
Steel mills	28	...
Other industries	26	—5
Average total bituminous stocks throughout the United States	29	—3

ESTIMATES OF OUTPUT, CONSUMPTION AND STOCKS
(In Net Tons)

1928	United States Production	Industrial Consumption	On Hand in Industries
February	46,933,000	36,301,000	50,595,000
March	49,452,000	38,588,000	48,388,000
April	39,081,000	35,230,000	47,432,000
May	44,748,000	34,844,000	43,670,000
June	41,264,000	32,784,000	40,890,000
July	41,785,000	33,527,000	40,700,000
August	48,598,000	33,890,000	39,415,000
September	48,332,000	34,223,000	40,090,000
October	58,914,000	36,500,000	40,778,000
November	53,498,000	35,879,000	41,520,000
December	49,606,000	38,575,000	41,010,000
Jan. 1, 1929	.....	.....	39,934,000

Engineering Council Studies Industrial Developments

The American Engineering Council at its recent annual meeting in Washington, D. C., voted to appoint a committee "to study and report to the Council on the activities and performances of the Corps of Engineers."

The Council, at the request of the American Society of Mechanical Engineers, will seek to have the number of man-hours worked in manufacturing plants of the United States reported in future censuses of manufactures. Such a record, it is suggested, will be of value in estimating industrial efficiency and the extent of employment, as well as guide executives and investors in gaging the soundness of industries.

This data, it is thought, also will be useful in developing safety programs by revealing the number of hours that workers are exposed to hazard.

The Council opposed the Cramton patent bill as "vicious" and "class legislation." This measure provides "that it shall be unlawful for any person who has not complied with the rules and regulations of the Commissioner of Patents to aid or assist, directly or indirectly, in the preparation, presentation, or prosecution of any patent application." Members of the Council believed that this bill, if passed, would interfere with the advisory capacity of engineers, preventing them from giving technical assistance, even in a non-professional way, on matters affecting patents, without being subjected to the danger of fine or imprisonment.

The American Institute of Consulting Engineers was elected to membership in the Council. O. H. Koch, representing the Technical Club of Dallas, and L. P. Alford of New York, representing the American Society of Mechanical Engineers, were named vice-presidents of the Council. Dr. Harrison E. Howe, of Washington, representative of the American Institute of Chemical Engineers, was re-elected treasurer. Lawrence W. Wallace, of Washington, was re-elected executive secretary, a post he has held since 1920, when the Council was organized under the presidency of Herbert Hoover.

George B. Hadesty

George B. Hadesty Retires; J. R. Sharp Is Successor

George B. Hadesty, of Pottsville, Pa., general manager of the Philadelphia & Reading Coal & Iron Co., with which he had been continuously associated since 1905, resigned during the second week in January. He has been succeeded by J. R. Sharp, formerly general superintendent of the Mahanoy division.

Mr. Hadesty's career in the anthracite industry began in 1883, when he joined the engineers' corp of the Ashland division of the Philadelphia & Reading company. He worked in the engineering departments of the Ashland, Shamokin, Shenandoah and Mahanoy divisions in various positions until 1899, when he accepted the post of division engineer at Audenried with the Lehigh & Wilkes-Barre Coal Co., becoming superintendent of the division a year later.

In 1905 he returned to the P. & R. as superintendent of the St. Clair division. Nine years later he was promoted to general superintendent of the Shamokin, Mount Carmel, Ashland and St. Clair divisions. When W. J. Richards was elected president of the company in 1921 Mr. Hadesty succeeded him as general manager, retaining the position until his retirement. He will be placed on the company's honor roll, which will put him on the pension list.

Jeddo-Highland to Control Coxe Properties

The properties of Coxe Bros. & Co., one of the oldest anthracite operating companies in the Hazleton (Pa.) district, will come under the management of the Jeddo-Highland Coal Co. on April 1 as a result of negotiations which have been in progress for some time.

In announcing the change in management Donald Markle, president of the Jeddo-Highland company, said that his company will take over the direction of all the Coxe properties except that at Stockton. The Coxe breakers at Drifton and Beaver Meadow will continue to prepare Coxe coal exclusively and the output of these breakers will be sold by the General Coal Co., Philadelphia, and the Fuel Service Co., New York.

Coxe Bros. & Co. was formed in 1865 by Eckley B. Coxe and the first shipment of coal was made in that year from Drifton. Eleven years later a second breaker was constructed. The output of the mines is estimated at about 3,000,000 tons annually. For some years this production has been handled by the Lehigh Valley Coal Co.

Washington Letter

By Paul Wooton
Special Correspondent

RAPID advance in the mechanization of the bituminous coal industry is shown in an analysis of reports on types of screening given in the current issue of the Keystone Coal Catalog. The analysis was made by H. O. Rogers and F. G. Tryon of the Bureau of Mines, as an incident to the study of sizes of coal shipped, published in the last issue of *Coal Age*.

The shipment of screened coal over the country as a whole now amounts to about one-half of the total. The other half still is run-of-mine. The mines equipped with screens, and able to ship prepared coal when called for, account for 80 per cent of the shipments.

The percentage of the mines equipped with screens varies from district to district, depending upon the character of the coal and the demands of the market. In Illinois practically every commercial mine is screen equipped. In the eastern Appalachians, where anthracite is the standard domestic fuel, the installation of screens has been slower, but even there a surprisingly large part of the tonnage is now equipped with screens. In Maryland, for instance, 30 per cent of the shipments come from mines with screens. In the Somerset field it is 21 per cent and in central Pennsylvania 35 per cent. Not only are more and more mines being equipped with screens, but the old-fashioned bar screen is giving place rapidly to the more modern shaker variety.

The bar screen lingers in many districts, however. It still is important in southern Wyoming, in the Trinidad field of Colorado and here and there in the Mississippi Valley. Its last great stronghold is in the older fields participating in the lake cargo trade. In Ohio probably one-half of the coal from the mines with screens is handled over bar screens. In the Pittsburgh district the proportion is around 40 per cent. In northern Virginia it is still higher.

In southern West Virginia and eastern Kentucky the bar screen is much less frequently found. The lingering of the bar screen in the lake coal trade is not surprising when consideration is given the demands of the market and the breakage in handling coal over the piers.

So rapid has been the installation of the shaker screen, especially in late years, that today the vast majority of the shipments from screen-equipped mines is contributed by the properties employing that type. Out of the total shipments from mines that have screens of one kind or another, 62 per cent came from those with shaker screens, while an additional 7 per cent came from those using both shaker and bar screens.

The areas in which shaker screens have been adopted most widely are the eastern interior (Illinois, Indiana and western Kentucky), Middle Appalachians (southern West Virginia and Eastern Kentucky); southern Rocky Mountains and the State of Washington. For example, in southern Illinois 95 per cent of the shipments now come from mines that use shaker screens, either exclusively or in combination with bar screens. Many other districts in Illinois, Indiana, Kentucky, southern West Virginia, Utah, New Mexico and elsewhere are not lagging.

These figures are averages for states and districts and most notable of all is the action of the individual company in installing the most modern equipment in some districts where the older methods are still found. The traveler in Maryland, Kansas, northern West Virginia, Pennsylvania and Ohio, although finding many mines still equipped with bar screens, is struck with the growing number of brand new tipples containing screen equipment, picking tables and loading booms of the most modern type.

James Denounces Anthracite Tax as Engineers Dine

That the tax on anthracite was unjust and unconstitutional and should be lifted from the shoulders of the operators, miners and residents of the anthracite region was the principal purport of the speech of Lieutenant-Governor Arthur H. James at the 35th anniversary banquet of the Engineers' Society of Northeastern Pennsylvania, held in the Hotel Casey, Scranton, Pa., on Jan. 31. The assemblage unanimously voted a resolution opposing the anthracite tax.

Other speakers were Abram Salsburg, Bradley Stoughton, president, Engineers' Club of the Lehigh Valley; Charles Dorrance, the outgoing president; B. A. Musser, his successor; Rufus J. Foster and J. E. Parrish, who were made honorary members, and "Senator" Edward Ford.

A. B. Jessup and E. H. Suender were made vice-presidents for two years and P. G. Rimmer for one year. Mr. Musser is president and manager of the Anthracite Bridge Co.

Anthracite Shipments Climb

Shipments of anthracite during December, 1928, as reported to the Anthracite Bureau of Information, Philadelphia, totaled 4,844,050 gross tons. This is an increase of 285,205 tons over the same month last year, when the shipments were 4,558,845 tons. The holiday season, of course, is reflected in the low production for December of both years.

Shipments by originating carriers for December were as follows:

Railroads	December, 1928	December, 1927
Reading	1,041,471	939,741
Lehigh Valley	686,070	698,244
Central of New Jersey	461,454	481,594
Del., Lackawanna & West.	744,547	677,620
Delaware & Hudson	650,993	613,789
Pennsylvania	439,011	443,078
Erie	488,677	389,839
N. Y., Ontario & Western	124,752	119,517
Lehigh & New England	207,075	195,423
Total	4,844,050	4,558,845

Personal Notes

Van B. Stith, formerly superintendent of the Green River Fuel Co., Mogg, Ky., has severed his connection with that company to become general superintendent and chief engineer of the Black Diamond Coal Mining Co., Drakesboro, Ky.

Scott Turner, Director of the Bureau of Mines, has been appointed by Secretary of Commerce William F. Whiting as representative of the Department of Commerce on the four-man advisory committee of the Federal Oil Conservation Board. The other members of the committee are Maj. Gen. Edgar Jadwin, War Department; Rear Admiral Harry H. Rousseau, Navy Department, and George Otis Smith, Geological Survey.

George C. Magee, formerly assistant to the sales manager, W. H. Warner & Co., Cleveland, Ohio, has moved to Wilkes-Barre, Pa., to become sales manager, Morris Run Coal Mining Co., succeeding B. H. Keller, now assistant general agent, Lehigh & Wilkes-Barre Coal Co., New York City.

Telford Lewis, formerly vice-president of the Knickerbocker Fuel Co., of New York City, was elected president of the company, effective Jan. 10, to succeed James A. Hill, retired.

LeBaron Smith has been appointed general manager of the Morrisdale Coal Co., Cunard Coal Co., Maxton Coal Co. and the Miller Coal Co., succeeding C. B. Maxwell, deceased.

Commissioner Edgar A. McCulloch, formerely Chief Justice of the Supreme Court of Arkansas, has been appointed chairman of the Federal Trade Commission, succeeding Abram F. Myers, who recently resigned.

John W. Harrison, formerly superintendent of the Heisley Coal Co., Nanty Glo, Pa., has been appointed general superintendent of the Logan Coal Co.

Arthur Roeder of New York City, has been elected president of the Colorado Fuel & Iron Co. to succeed Jesse F. Welborn, who was elected chairman of the board, and the resignation of J. B. Marks, as executive vice-president has been accepted.

The Appointment of E. W. Smith, of Guernsey County, to be chief deputy of the Ohio Department of Mines and Mining was announced Feb. 5. He succeeds Jerome Watson.

Paul Weir, of Chicago, vice-president, Bell & Zoller Coal & Mining Co., has been appointed chairman of a committee to prepare the program for the sixth annual Convention of Practical Coal Operating Men and Exposition of Coal Mine Equipment, to be held under the auspices of the American Mining Congress, Cincinnati, Ohio, May 13-17.

Frank Haas, formerly consulting engineer with the Consolidation Coal Co., and H. F. McCullough, recently director of engineering for the same company, have opened offices as consulting engineers at 1601 Chestnut St., Philadelphia, Pa.

Watson Bill Rouses Storm of Opposition; Union Adherents Urge "Advantages"

THAT the production of bituminous coal is not interstate commerce and that therefore Congress is without power to legislate respecting ownership, production or prices, was practically the unanimous contention of opponents of the Watson bill (S. 4490), at hearings before the Senate committee in interstate commerce last month. Scarcely less emphatic was the opinion of the opposition that there was no economic justification for intervention by the government. Objection was especially violent against the sections providing for marketing pools, cooperative selling associations, licensing subject to acceptance of provisions of the act and the fixing of maximum prices.

Henry Warrum, general counsel, United Mine Workers, in urging that the bill be reported out, painted a dark outlook for the industry if it were deprived of such "constructive legislation." Violence in labor disputes was one of the problems which he said the measure would do away with. He stresses the advantage to the operators in being allowed to form marketing pools and agree upon prices, subject to recognition of the right of collective bargaining.

IN A statement before the committee Dec. 14 John L. Lewis, international president of the union, charged that the whole sales policy of bituminous coal revolves on an uneconomic basis and that nothing short of complete government regulation could establish "an industrial code of practices governing production and distribution that would stabilize the industry." He declared that "it was utterly absurd even to entertain the thought that the time will ever come when the bituminous coal industry can establish sane business relations through corrective measures brought about of its own free application."

The trade-practice movement was referred to by E. L. Greever, attorney for the National Coal Association, as an important development in self-government in industry. That this movement has taken firm root in the bituminous industry, said Mr. Greever, "is evidenced by the fact that codes are now in process of being formed in the eastern Ohio district, in Illinois and Indiana. Committees have been appointed and the subject is being studied in the New River, Kanawha, Harlan, Southern Appalachian, western Kentucky, central Pennsylvania and several other districts. The dock operators in the Northwest have taken steps to bring about a frank agreement as to what are fair and what are unfair trade practices."

Senator Hawes called attention to the fact that as several amendments to the bill had been suggested it was not in perfect form; "it ought to go in right or not at all," lest it be laid on the table or its constitutionality questioned. Mr. Warrum replied that he felt "that the committee is not without its own interest in the matter and that in the committee suggestions will be made, or a subcommittee appointed, language of the bill clarified and the bill will be recommended by the committee, not because we have introduced it but because after investigation the Senators have made them feel there can be proper exercise of Congressional authority."

So much evidence was accumulated in the hearings, according to Senator Sackett that each side of the controversy was requested to go over the arguments and prepare a digest of them for the benefit of the committee. The members will then meet in executive session and consider these digests. Senator Sackett does not believe that there will be much of an opportunity to take the measure up on the floor because of the crowded state of the calendar.

Roderick Stephens, vice-president, Stephens Fuel Co., New York City, and chairman of the government relations committee of the National Retail Coal Merchants' Association, took issue with the proposal to create a bituminous commission without similar provisions for anthracite, oil or numerous other commodities. He said the retailers were "opposed to any legislative program, generally on the grounds that it is paternalistic, unsound, uneconomic and will substitute a federal bureaucracy for individual initiative, and specifically because, as proposed, it is unwarranted class legislation, preferential and unfair."

THE licensing and price-fixing provisions were characterized by Mr. Stephens as an attempt to remedy conditions arising out of war-time stimulation of demand by legislation, which would in effect amount to an agreement between the government and the United Mine Workers in a program of higher prices to be paid by the public to enable producers to support a surplus of mines and of labor, working part time for full profits and full wages. The broad powers granted the proposed bituminous coal commission, he added, would bring the retailer now doing business in intrastate commerce into competition with direct-selling agencies under government patronage.

Conditions confronting the retailer in the New England States were described by W. A. Clarke, president, New England Coal Dealers' Association. He said that competition must be met not only from oil but from coal imported from Wales and Scotland, and that an attempt was being made to bring in coal from Russia. Any increase in the price of coal, which would undoubtedly result from such legislation as was proposed, he said, would further complicate the situation in New England and might make necessary a tariff on coal.

The production of coal is not a public utility; it is a privately owned enterprise, according to William P. Belden, general counsel, Ohio Coal Operators' Association, who appeared before the committee Jan. 15. The Watson bill, he said, is unsound and unconstitutional. The unsound feature, he thought, was that it introduced the element of divided responsibility. Either the coal companies should be entrusted with the management of the mines and the working out of the ills of the industry, like others, or else the government should purchase the mines and operate them. If this was done, however, it would not be long, he said, before the government would be struggling with the same problems that now confront the operators. He quoted Secretary of Labor Davis to the effect that consolidations and mergers were the only way out for the coal industry, and said that the Watson bill would have the effect of preventing mergers except under special conditions.

Mr. Belden contended that the secondary license clause of the Watson bill made it necessary to surrender the right to employ non-union labor in order to continue in business. Comparing conditions in the mining fields of Ohio on the present open-shop basis with the strife existing a year or so ago, he said that results had shown that the operators had taken "the right course."

THAT the bill is too "sketchy," leaving too much to "luck and the bituminous coal commission" proposed in the measure was the contention of Alfred M. Liveright, counsel for the Central Pennsylvania Coal Producers' Association, who faced the committee Jan. 16. He quoted sections of the bill which he said disclosed its primary purpose to be the safeguarding of the rights and position of the union.

Mr. Liveright argued that the coal business was not affected with public interest nor was there any emergency that warranted such action. In that connection he cited the case of *V. L. Highland vs. Russell Car & Plow Co.*, now before the Supreme Court, wherein the right of the President of the United States to fix the maximum price of coal during the emergency created by the World War is under challenge. The clause providing that "no licensee shall make it a condition of employment that the employee shall not join a labor union" was declared to be in conflict with rulings by the Supreme Court, particularly in the *Hitchman Coal & Coke Co. case.*

Dr. C. S. Duncan, economist, Association of Railway Executives, said the bill would interfere with the continuity of supply of railroad fuel, increase railroad operating costs and constituted an invalid invasion of the carriers' freedom of contract. He pointed out that transportation and car shortages belong to

past history and added that interference with purchases of coal, as contemplated by the measure under consideration, would imperil the standard of service.

Spokesmen for the Chamber of Commerce of the United States had their day on Jan. 17, the witnesses comprising Felix M. McWhirter, president, Peoples State Bank, Indianapolis, Ind.; Charles F. Conn, president, Giant Portland Cement Co., Philadelphia, and Charles H. MacDowell, president, Armour Fertilizer Works, Chicago, as well as Gus W. Dyer, professor of political economy, Vanderbilt University, Nashville, Tenn., who appeared by invitation from E. C. Mahan, president, National Coal Association.

While admitting that the coal industry had had years of distress the Chamber witnesses reiterated the stand of their organization for the principle of self-government in industry and business and expressed confidence that if left to itself the coal industry would discharge its obligations to the public and work out a satisfactory solution of its vexing problems. No sound solution of these problems, according to their testimony, could be had through the type of governmental control which the Watson bill would provide; such control would add to the confusion rather than correct it.

Professor Dyer said it would be difficult to exaggerate the disastrous economic effect that would be likely to result from such political control of the coal industry as was proposed in the Watson bill. The American system of government, he said, is pre-eminently a system of regulation by natural laws. It is only in fields that cannot be kept open to these natural laws, as monopolies, that the government is justified in exercising additional regulation.

A. M. Belcher, counsel for the West Virginia Coal Association, cited *Delaware & Lackawanna R.R. Co.*, 238 U. S. 439, that "the making of goods and the mining of coal are not commerce, nor does the fact that these things are afterwards to be shipped in interstate commerce make their production a part thereof. . . . Over interstate commerce or its incidents the regulatory power of Congress is ample, but the production of articles intended for interstate commerce is a matter of local regulation." Therefore, said Mr. Belcher, all attempts of Congress to legislate upon any matter relative to the ownership, production, cost of production, the quantity produced or sales price of bituminous coal would fail for lack of authority.

Replying to a question by Senator Sackett of Kentucky as to whether the government could not take control of the method of mining in order to prevent the waste of a natural resource, Mr. Belcher insisted that the government would be powerless to interfere, as it was purely a local matter and one for the state to handle. "If there is a public use, or public health involved, which would entitled the pure food act to operate," inquired Senator Sackett, "might not there be an act to preserve the article itself?" "Yes," replied the witness, "if it is impressed with public use."

Detailing some of the events leading up to the present plight of the coal industry, Mr. Greever said that competitive conditions—the inexorable law of supply and demand—had driven coal prices to their present low level. He blamed much of the price cutting on efforts to get business from particular individuals. The industry should be left to work out this problem itself in accord with economic laws, he said, as other industries were doing; the drastic form of governmental intervention contemplated by the measure under discussion would tend to destroy private property without due process of law.

Fred M. Livezey, attorney representing the State of West Virginia, emphasized the powers reserved to the states by the Constitution and made frequent reference to rulings by the Supreme Court as precedents for his argument. In closing he said: "The State of West Virginia does not propose to surrender its constitutional control over the mining of coal within its own borders. She challenges the authority of the federal government to make an agreement with individuals or corporations by which the state is ousted from a jurisdiction which has never been delegated to the federal government."

THE closing argument for the National Coal Association was presented Jan. 21 by Karl D. Loos, whose brief attacked the pending bill as unconstitutional and held that any other bill that might be framed for the accomplishment of like objects also would be unconstitutional. The objects sought in the Watson bill of subjecting to federal control the mining of coal and the employer-employee relations in that industry, he held, are beyond any federal power; such federal control cannot be constitutionally imposed on these subjects directly nor can it be accomplished by the indirect method employed in the pending bill.

The method of price determination sought to be imposed by the measure seems to violate the rights of the consuming public was the contention of the brief filed Jan. 22 by the American Wholesale Coal Association. The bill seems to assume, according to the brief, that the members of the merger or association and the mine workers are the only persons entitled to any consideration whatsoever in the fixing of prices at which the public may buy coal. No provision is made for any consumer to be heard in person or by counsel at any hearing having for its purpose the determination of maximum prices to be charged by such merger. The National Association of Manufacturers also filed a brief in opposition to the bill on Jan. 22.

Bureau of Mines Issues Permissible Plates

Two approvals of permissible mining equipment were issued by the U. S. Bureau of Mines during January, as follows :

(1) Type HDE-4 hoist; Westinghouse 10-hp. motor and control, 250 or 500 volts, d.c.; approvals 164 and 164A; Sullivan Machinery Co., Jan. 4, 1929.

(2) Type HE-5 hoist; Westinghouse 10-hp. motor and control, 250 or 500 volts, d.c.; approvals 165 and 165A; Sullivan Machinery Co., Jan. 4, 1929.

Present Two Bills for Repeal Of Anthracite Tax

Two bills providing for repeal of the anthracite tax made their appearance in the Pennsylvania Legislature at Harrisburg on the first day when bills could be introduced in the session of 1929. These measures came from Representative Benjamin Jones, Luzerne County, and Representative C. W. Staudenmeier, Schuylkill County. The former's measure would abolish the tax at the time the Governor approves the bill. The latter's would abolish the tax but not until after the 1929 tax is collected.

What will happen to the tax during the present session is problematical. Governor Fisher in his message to the Legislature suggested the abolition of the tax if the Legislature could trim its appropriation bills to a point where the $10,000,000 collected biennially from anthracite would not be missed.

Two bituminous mine bills have been introduced which propose to amend the act of 1911 by providing for rock-dusting mines and to change a rule in reference to gaseous mines so that it will apply to all mines.

Coming Meetings

Midwest Power Conference and Exhibition, Feb. 12-16, 1929, at Chicago, Ill.

National Conference of Business Paper Editors; Cleveland, Ohio, Feb. 15-16.

American Institute of Mining and Metallurgical Engineers; annual meeting, Feb. 18-22, 1929, at Engineering Societies Building, 29 West 39th St., New York City.

Chicago Coal Merchants' Association; 23d annual coal trade banquet, Stevens Hotel, Chicago, Ill., Feb. 21.

Canadian Institute of Mining and Metallurgy; annual meeting, March 6, 7 and 8 at Royal Alexandria Hotel, Winnipeg, Canada.

Second Annual Indiana Fuel Conference, April 4-5, at Lafayette, Ind.; under direction of Engineering Extension Department and School of Mechanical Engineering, with School of Chemical Engineering, Purdue University.

New England Coal Dealers' Association; annual meeting, April 17 and 18, at Springfield, Mass.

National Foreign Trade Convention; Baltimore, Md., April 17-19.

American Mining Congress; annual convention and exposition of mining machinery, May 13-17, at Cincinnati, Ohio.

Illinois and Wisconsin Retail Coal Merchants' Association; annual convention, June 11, 12 and 13, at Oshkosh, Wis.

West Virginia Operators Approve Safety Bills

The Monongahela Coal Operators' Association and operators in the Fairmont and Preston county field have approved three bills designed to further safety in mining, which are sponsored by the West Virginia Department of Mines. This statement was made by George R. Goodwin, secretary of the association, after a conference of operators' committees with Chief Lambie in Charleston.

One of the bills proposes that in mines liberating ½ per cent of gas or more, as determined by analysis, closed lamps shall be used. The second bill calls for the addition of five inspectors to the force of 25 now authorized, to assure more efficient and more frequent mine inspection. Use of blasting fuses except by special permission will be banned under terms of the third bill.

Broaden Safety Training Of Virginia Miners

According to plans now going forward, 2,000 miners in Virginia will receive training in mine safety and accident prevention during the coming year, the work being carried on under the supervision of the State Department of Vocational Education and the Virginia Coal Operators' Association. Each man is required to complete 30 hours of work satisfactorily, after which he receives a certificate from the state. This training was inaugurated in 1927 and was an outgrowth of another major educational effort among the miners—that of the foremanship training conferences. Seven hundred and sixty-seven men completed the evening classes in mine safety and accident prevention in that year, and the number trained in 1928 was 1,262.

Foremanship training conferences—as contrasted to the evening classes in safety and accident prevention—are designed more to reach the supervisory forces and men of sufficient intelligence and educational background desirous of improving their efficiency and broadening their education in mining subjects. These conferences were started in 1921, by J. C. Wright, of the Federal Department of Education, who came to Virginia to conduct a conference in better foremanship at the request of the association. From 1921 to 1926 the Virginia Department of Vocational Education organized and conducted similar conferences in the field. The work accomplished was regarded by the coal operators as well worth broadening; therefore, beginning March, 1926, through a co-operative arrangement with the Virginia Department of Vocational Education, the services of a full-time man were obtained.

In financing this work the coal operators and the state and federal departments of vocational education each contribute one-third. Since the inception of the movement 43 conferences have been held and 1,597 employees completed the 30 hours of training, as follows:

Year	Number of Conferences	Employees Receiving Certificates
1921	3	52
1922	4	59
1925	10	669
1926	7	225
1927	10	318
1928	9	274
		1,597

In the meantime B. H. Van Oot, supervisor, Trade and Industrial Education of Virginia, had decided to extend the system of evening classes to the workers in the coal industry. At the same time it was the desire of the operators that the workmen receive every possible opportunity for development. Consequently, as a result of a study of accident figures and the mounting cost of compensation, it was felt—aside from safety committees, safety police, etc., maintained by the individual coal companies—that a separate and distinct movement to reach the workers directly would be necessary. Mine safety and first aid therefore were selected as topics for the evening classes mentioned above. These classes are financed one-third by the operators and two-thirds by the State Department of Vocational Education.

From their beginning it was recognized that one of the real problems was to obtain men capable of teaching the fundamentals of accident prevention and safety. From consideration of the plan developed the idea of taking capable men from the various collieries and putting them through an intensive course of teacher training in the subjects to be taught the miners. This course was developed with the aid of J. J. Forbes, U. S. Bureau of Mines; B. H. Van Oot, E. H. Graff, Norton Station, U. S. Bureau of Mines, and a committee of operators headed by G. M. Thorn, general manager, Blackwood Coal & Coke Co.

The work of the teacher training classes extended over a period of fifteen days, six hours a day, and covered the subjects of underground and surface hazards, mine gases, ventilation, mine rescue and apparatus, explosives, electrical hazards and machinery, mining law, organization of safety work and evening classes, and first-aid training.

The first of these teachers' training classes was held at Norton, Va., March 14-April 2, 1927, and was composed of 23 men from eleven operating companies. The second also was held at Norton, Feb. 6-18, 1928, with 24 men attending. The courses of instruction remained practically the same though more time was given to the organization and conduct of evening classes to fit those attending the conference for the job of later instructing the men at their own mines. All the expenses connected with the conduct of these conferences were defrayed by the operators, who also reimbursed the employees for the time spent in attendance.

During the year 1928 substantial additions were made to the Norton station of the Bureau of Mines and, under the management of E. H. Graff, a definite plan of training in mine-rescue work has been adopted for 1929. It is expected that more than 200 men will be trained in the conduct of mine-rescue work and the use of apparatus and will be available in case of serious trouble in any of the mines in the Virginia field.

In addition to other activities, training in first aid to the injured, in which more than 6,000 men have heretofore received certificates from the U. S. Bureau of Mines, will go forward apace. Several substantial operating companies have signified their intention of adopting a policy of 100-per cent first-aid trained employees.

New Plants and Equipment To Be Installed

New contracts for topworks and construction under way at various coal operations reported last month include the following:

American Coal Company of Allegany County, Piedmont mine, McComas, W. Va. Contract closed for new cleaning plant. Seven air tables will be supplied by the American Coal Cleaning Corporation.

Ashland Coal & Coke Co., Ashland, W. Va. Peale-Davis table, capacity 125-150 tons per hour of §-in. slack, being installed by Pittsburgh Coal Washer Co. Scheduled for completion March 1.

Detroit Mining Co., Gordon, W. Va. Order placed with the Roberts & Schaefer Co. for coal-washing equipment embodying the use of Menzies Hydro-Separators and Arms screens; capacity 100 tons per hour. To be completed April 1.

Empire Coal & Coke Co., Landgraff, W. Va. Order placed with the Roberts & Schaefer Co. for coal sizing and cleaning equipment for preparing pea, stove and egg sizes. Embodies Menzies Hydro-Separator; capacity 50 tons; per hour. To be completed May 1.

Gauley Mountain Coal Co., Ansted, W. Va. Screening plant and crusher for the production of foundry coke from beehive ovens now under construction; capacity 30 tons per hour. Scheduled for completion March 1.

Koppers Coal Co., Carswell, W. Va. Contract closed with the Koppers-Rhéolaveur Co. for plant to treat coal over 5-in. by the Rhéolaveur process. The plant, which will be completed Aug. 1, has a capacity of 250 tons per hour.

Lehigh Coal & Navigation Co., Cranberry plant, Hazleton, Pa. Contract closed with the Koppers-Rhéolaveur Co. for Rhéolaveur of 75 tons per hour capacity to wash No. 2 and No. 3 buckwheat. Installation to be completed May 1. The Navigation company also is installing a Hydrotator at the Coaldale breaker to treat barley coal.

Potter Coal & Coke Co., Greensburg, Pa. New tipple with shaking screens, loading booms and other modern machinery now being erected by the Link-Belt Co. To be completed Feb. 25.

Scranton Collieries Co., Scranton,

N. D. Existing briquet plant is being reconditioned in expectation of resuming production. A special lignite dryer (Evesmith process) is being installed.

Sharon Coal & Coke Co., Sharondale, Ky. Order placed with the Roberts & Schaefer Co. for four-track Marcus coal tipple of steel construction, capacity 250 tons of mine-run coal per hour. To be completed June 1.

Valley Mining Co., Nelsonville, Ohio. Order placed with the Roberts & Schaefer Co. for coal-washing equipment embodying the use of the Menzies-Hydro-Separator and Arms screen; capacity 50 tons per hour. To be completed April 1.

Wacomah Coal Co., Amigo, W. Va. Order placed with the Roberts & Schaefer Co. for Menzies Hydro-Separator coal washery equipment; capacity 50 tons per hour. Construction to be completed March 1.

Philadelphia Coal Men Dine

More than 800 coal men attended the 12th annual dinner of the Coal Club of Philadelphia held on the evening of Jan. 24 in the Bellevue-Stratford Hotel in that city. J. W. S. Holton, president of the Sterling Coal Co. of that city, was the toastmaster. The guests were welcomed by Chauncey H. Peacock, president of the club. Rev. Dr. Floyd W. Tomkins, of Philadelphia, and Captain Irvin O'Hay, U. S. A., retired, were the speakers. The entertainment part of the program was furnished by a miners' quartet and Noah H. Swayne, 2d.

Among those at the guest table were Andrew J. Maloney, president, Philadelphia & Reading Coal & Iron Co.; Dr. E. W. Parker, Anthracite Bureau of Information; J. W. Searles, president, Pennsylvania Coal & Coke Co.; Charles H. Jacobs, president, Whitney & Kemmerer; Joseph O'Toole, vice-president, National Retail Coal Merchants' Association; H. F. Baker, vice-president, Lehigh Coal & Navigation Co.; Richard F. Grant, president, Lehigh Valley Coal Corporation; R. W. Clarke, vice-president and general sales agent, Hudson Coal Co.; James Tattersall, Trenton; Donald Markle, president, Jeddo-Highland Coal Co., and A. C. Dodson, president, Weston Dodson & Co.

Report Earnings and Losses

The Island Creek Coal Co. reports for the quarter ended Dec. 31, 1928, net profit of $878,700 after depletion, depreciation, federal taxes and other charges. Net profit for 1928, compiled from quarterly statements, was $2,889,991, comparing with $3,611,408 in 1927.

The preliminary report of the Pennsylvania Coal & Coke Corporation for 1928 shows deficit of $510,152, after depreciation, depletion, ordinary taxes, etc., as compared with deficit of $789,877 in 1927. Net income for the fourth quarter of last year was $37,214, after above charges, against a deficit of $477,555 in the same quarter of 1927. December net income amounted to $7,380, against a deficit of $130,234 in December, 1927.

The preliminary statement of the Virginia Iron, Coal & Coke Co. for 1928 shows net loss of $61,735, after taxes, interest, depreciation and depletion, but subject to inventory and other annual adjustments. This compares with net loss of $182,436 in 1927.

Retailers Realize Necessity For Better Merchandising

That the retail coal merchants of the country are not blind to the necessity for improvement in the merchandising of fuel is humorously illustrated in a cartoon appearing in the January issue of *The Retail Coalman*. Commenting upon that cartoon, which is reproduced here, the editor of the retail dealers' publication said:

"It is popular in communistic circles these days to refer to the right and left wings of the party or the movement. Think of a conservative group in a radical movement! The cartoonist in this issue of *The Retail Coalman* sees two groups in the retail end of the distribution of coal. One group, the progressives, is going to extremes in the way of service and the other group, the reactionaries, insist upon giving as little as possible for the most that can be gotten out of it. It is no laughing matter, however. The United States is passing to days of harder competition, days when the buyer is in the saddle and he is ofttimes a ruthless buyer.

"There are two classes of buyers, one insisting upon every kind of service and threatening to turn to some competing fuel, the other obsessed wholly by price. The average retailer who lives in the past, who refuses to meet modern conditions and competes solely on the basis of cut prices, will be wiped out of existence. Here and there, because of peculiar conditions, an occasional retailer of this type will continue to exist. On the other hand, it is a time for caution; there is danger of increasing the overhead with forms of alleged, not real, service. It is well to save; likewise it is well to invest for the sake of improving your goods and your service. Local conditions may govern, but it will be wise for the old men to meet the young men with modern ideas more than half way."

Rhéolaveur and Koppers Form New Company

Affiliation of the Koppers Co., of Pittsburgh, Pa., with the American Rhéolaveur Corporation, of Wilkes-Barre, Pa., and New York City, is announced, in the formation of a new company to be known as the Koppers-Rhéolaveur Co. The new organization plans broader service in providing equipment for the cleaning and preparation of coal and the concentration of ores.

The American Rhéolaveur Corporation was formed in 1925 to develop the use of the Rhéolaveur process in the United States, Canada and Mexico and to co-operate in the design of plants and mills using the process. The process was patented by Antoine France, of Liége, Belgium. The design, manufacture and sale of the Carpenter drier were taken over by the company about two years ago as a supplement to wet-washing plants.

The Koppers Co. and its subsidiary, the Koppers Construction Co., are well known as engineers and constructors of byproduct coke ovens. The newly affiliated companies will carry forward all these activities.

Buys Grand Tunnel Holdings

The Glen Alden Coal Co., Scranton, Pa., has purchased the holdings of the Grand Tunnel Coal Co. at West Nanticoke, Luzerne County, Pa., for about $200,000. The coal mined at the Grand Tunnel colliery will be prepared at a Glen Alden breaker. The Grand Tunnel workings, which have been idle since Nov. 28, employ about 400 men when in full operation.

Approximately 600 men will be thrown out of work with the abandonment of the Mt. Lookout mines in Wyoming, Luzerne County. The Temple decided to suspend operations because of failure to obtain a modification of the royalty payments from two trust owners of the property.

Blast in West Virginia Kills Fourteen Men

An explosion on Jan. 26 in the No. 5 mine of the Kingston-Pocahontas Coal Co., Kingston, W. Va., resulted in the death of fourteen miners; 55 men escaped. The explosion occurred during the night shift. Rescue efforts were hampered by disarrangement of the fan and the outbreak of several fires as a result of the explosion.

Obituary

LUTE HORNICKEL, president and general manager of the Anchor Coal Co., died Jan. 13 at his home in Cleveland, Ohio. He had been connected with the coal industry for many years, having been associated with the Pittsburgh Coal Co., the River Coal Co. and the Hazel-Kirke Coal Co. At one time he was general manager of all properties of the M. A. Hanna Co. He purchased the Anchor Coal Co. in 1912.

ROBERT A. QUIN, 65, vice-president of the Susquehanna Collieries Co., Wilkes Barre, Pa., died on Jan. 23 in consequence of a fractured skull sustained in a fall. Mr. Quin was born in Pottsville and first engaged in mining in 1881. In 1898 he was appointed superintendent of the Shamokin colliery and in 1903 was made manager of all the collieries of the Susquehanna company. Last year he was appointed vice-president in charge of operations.

JAMES EDWARD STRONG, retired industrialist and mineralogist, died from a heart attack at Birmingham, Ala., Jan. 9, aged 65. Coming from England in early manhood, he entered Lehigh University and on graduation was engaged for some time in mine study in South America. He was connected with the Republic Iron & Steel Co. for a time as superintendent of Sayreton mines, later joined the Gulf States Steel Co., Sloss-Sheffield Steel & Iron Co. and the Alabama Company in executive capacities in connection with coal mining operations. He was operating vice-president of the Alabama Company at the time of its absorption by the Sloss-Sheffield company, at which time he retired from active business.

New Inspector Ruled Out

The refusal of the mine inspector of Madison County, Illinois, to vacate his office has been sustained by Attorney General Oscar E. Carlstrom at Springfield, who ruled on Jan. 22 that the office could not be held by a "second-class" mine manager. When the Board of County Supervisors sought to replace the county mine inspector the old incumbent refused to turn over the office on the ground that his successor was not qualified to serve.

Mines Reopened

With resumption of operation of the No. 22 shaft mine of the Island Creek Coal Co. late in January, after a suspension of about six months, all the mines of this company are now being worked except those on Mud Fork. Production of the Island Creek company in 1928 was 5,474,546 tons, which is nearly two million tons less than was produced in 1927.

Operation of the Himlerville mine, Himlerville, Ky., formerly owned by the Himler Coal Co., has been resumed by the new owner, the Martin County Coal Corporation. This mine has a potential capacity of 40,000 tons a month.

After a shutdown of many months the American No. 1 mine of the Knox Consolidated Coal Co. was started up on Jan. 29. Three hundred men have been employed and are being paid a basic wage of $5 a day, as of the 1917 scale. The company contended its inability to reopen the mine at the $6.10 scale established by state-wide agreement and therefore obtained a court writ authorizing opening at the lower wage rate.

National Company Sold

The National Coal & Coke Co., which handles the sale of coal from a number of large coal mines in Jefferson and Walker counties, Alabama, has been sold to the Consolidated Coal Co., R. T. Daniel, president. The Consolidated company is largely owned and controlled by A. D. Geohegan, president, Southern Cotton Oil Co., New Orleans; R. S. Hecht, president, Hibernian Bank, New Orleans, and A. Q. Peterson, also of the Southern Cotton Oil Co.

New Orleans interests have for some time owned the Bankhead and Summit mines, in Alabama. Many new developments will be made in this property in the near future, it is announced.

Plan District Safety Meet

A district safety field meeting will be held in Williamson, W. Va., next June under the auspices of the Operators' Association of the Williamson Field. All of the operators of the Kenova-Thacker district are expected to unite in this event.

King Coal's Calendar for January

Jan. 2—Management of Temple Coal Co. announces decision to abandon Mt. Lookout colliery, Wyoming, Pa., because "cost of operation has been too high, royalty being the main factor."

Jan. 5—J. M. G. Brown named receiver for Soper-Mitchell Coal Co., owner of two mines in the Scotts Run field of West Virginia.

Jan. 8—West Kentucky Coal Bureau, at annual meeting, re-elects Brent Hart president.

Jan. 9—Rev. Charles O'Donnell, president, Notre Dame University; Dr. R. J. Aley, president, Butler University, and Dr. Edward C. Elliott, president, Purdue University, selected by scale committees of the United Mine Workers and the Indiana Coal Operators' Association as conciliators to settle difficulties that may arise between miners and producers in district 11.

Jan. 10—Unification of Lehigh Valley Coal Co. and Lehigh Valley Coal Sales Co. under name of Lehigh Valley Coal Corporation, completed, with Richard F. Grant as president.

Jan. 10—A. E. Hewitt, Huntington, W. Va., buys plant of Himler Coal Co., Himlerville, Ky., at receivers' sale, for $65,000.

Jan. 14-23—Hearings on Watson bill held by Senate committee on interstate commerce. The measure, sponsored by the United Mine Workers, would give Congress power to control the production and marketing of coal through the issuance of licenses. Nearly a score of witnesses presented briefs attacking the bill as unconstitutional and uneconomic.

Jan. 16—Rose Coal & Mining Co. property at Millstadt, near Belleville, Ill., is purchased by S. J. Fowler, East St. Louis, Ill., for $42,500.

Jan. 17 — Fairmont-Lowesville Coal Co., Fairmont, W. Va., files voluntary petition in bankruptcy.

Jan. 18—House of Representatives at Washington passes independent offices appropriation bill containing an item of $1,500,000 for U. S. Shipping Board to recondition and operate ships in foreign coal trade. Similar action taken by Senate Feb. 1.

Jan. 18—J. R. Sharp, newly appointed general manager of the Philadelphia & Reading Coal & Iron Co., chosen as a member of the Anthracite Conciliation Board to succeed George B. Hadesty, resigned.

Jan. 19—New wage scale signed by Southwest Operators' Association and Southwest Miners of America, effective for two years beginning April 1. The contract eliminates machine crew day wage and raises the tonnage rate from 22c. to 25c.

Jan. 19—Joseph Hitt, Northern Illinois Coal Corporation, acquires properties of Willis Coal & Mining Co. at Willisville, Sparta and Percy, Ill., at a price reported to be close to $1,000,000.

Jan. 21—Pittsburgh Coal Co. $20,000,000 issue of 20-year 6 per cent sinking fund gold debentures offered through the Union Trust Co. of Pittsburgh and Mellon National Bank.

Jan. 22—Fire breaks out in Suffolk colliery of Philadelphia & Reading Coal & Iron Co., at St. Nicholas, Pa.

Jan. 24—Negotiations are completed whereby the Jeddo-Highland Coal Co. will take over management of Coxe Bros. & Co. properties except that at Stockton.

Jan. 24—Edgar S. Phillips, Fairmont, and Carl L. Horner, Clarksburg, named receivers for Delmar Coal Co., Fairmont, W. Va.

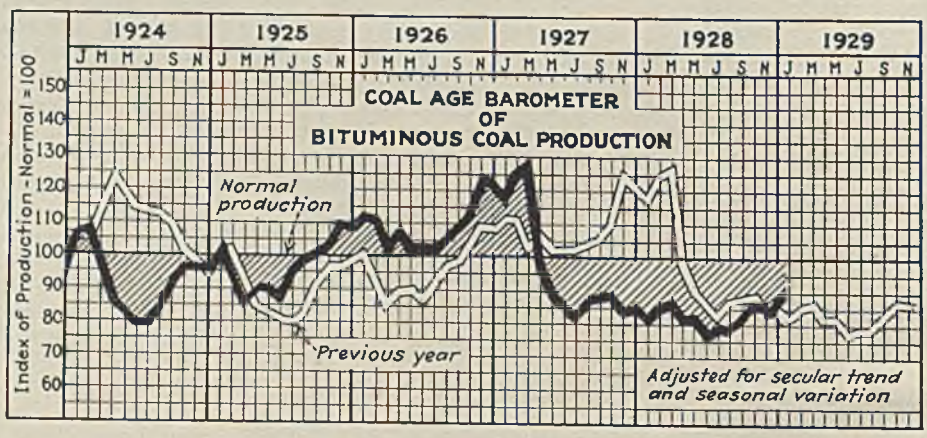
Jan. 25—Thirty men prominent in the coal industry from the western and central Pennsylvania soft-coal fields and the anthracite region named on three advisory boards of School of Mines and Metallurgy, Pennsylvania State College. They will assist the college in working out educational and research problems.

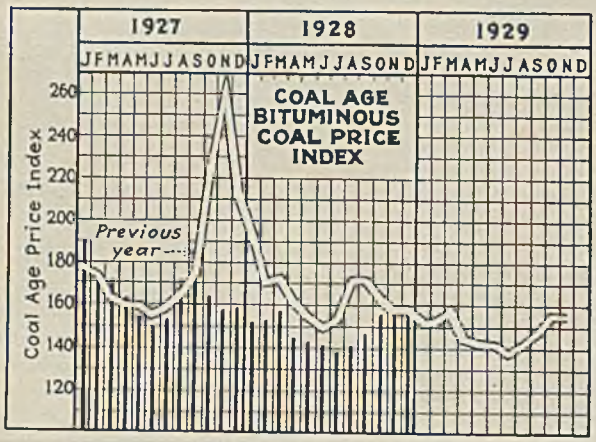
Jan. 26—Explosion in Kingston mine of Kingston Pocahontas Coal Co., at Kingston, W. Va., kills 14 miners.

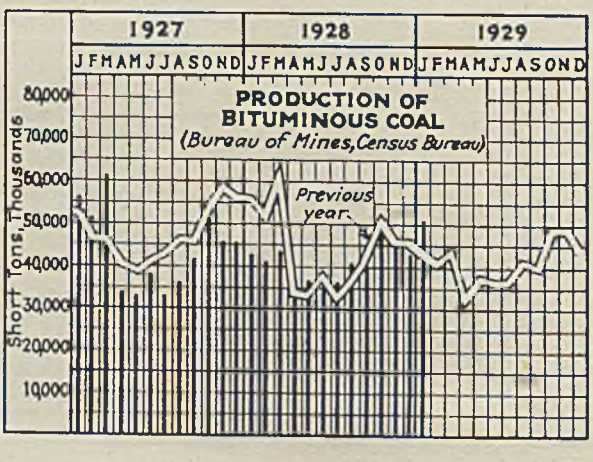
Jan. 29—American No. 1 mine, Bicknell, Ind., owned by the Knox Consolidated Coal Co., reopens with 300 men after long shutdown. Miners accept basic wage of $5.

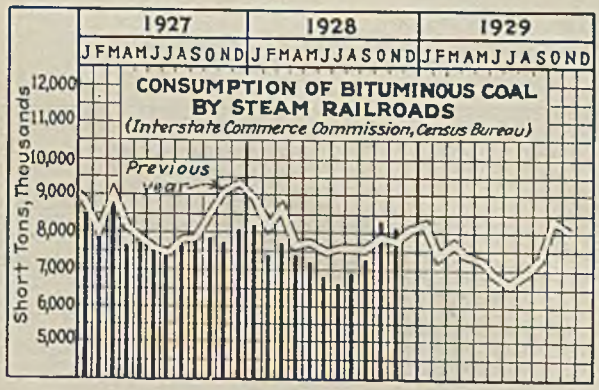
Jan. 30—Bill introduced in Ohio Legislature provides for emergency coal commission having for its purpose the education of the people of the state to use Ohio coal.

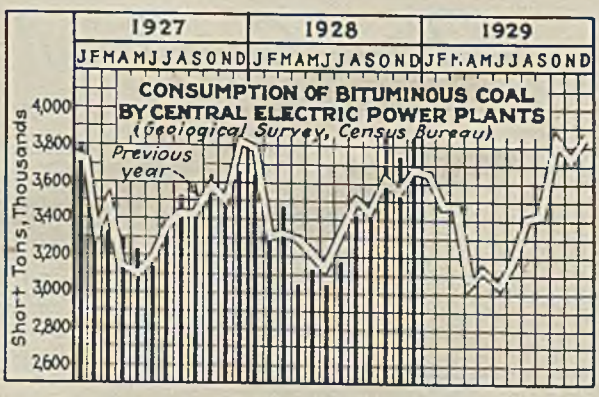
Indicators of Activities in the Coal Industry

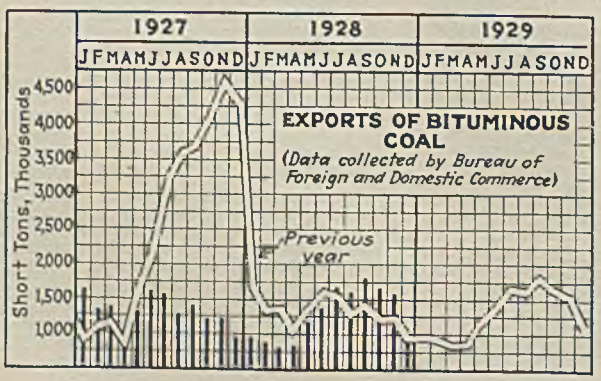


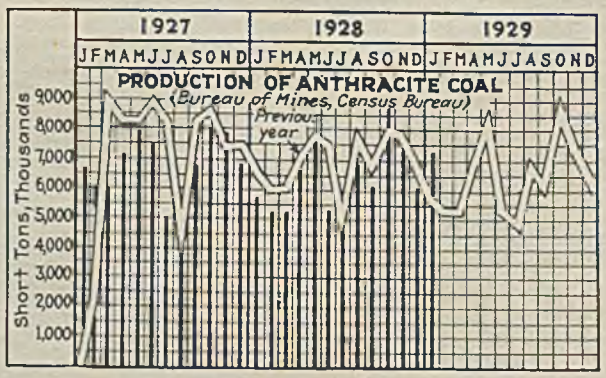












MARKETS *in Review*

BITUMINOUS coal markets enjoyed a measure of improvement during the first month of the calendar year. Frequent—and in some instances prolonged—visitations of real winter temperatures throughout a large portion of the country had the effect of moving tonnage more freely than at any time hitherto this winter. As usually happens when weather is the controlling factor, the increased momentum was most marked in the grades of coal used for heating purposes, in which category the consumer is more immediately responsive to current developments.

The effect on the industrial market, though less evident on the surface, was none the less important in that it served to lessen to an appreciable extent the "no bill" evil. While there was no general advance in prices, the fact that there was no notable recession in the face of increased output is a fair index of steadiness.

Bituminous production last month, according to preliminary estimates of the U. S. Bureau of Mines, was 51,485,000 net tons, compared with the revised total for December of 43,380,000 tons. The average output per working day increased from 1,735,000 to 1,950,000 net tons, which was higher than the daily average for any month during the last year. A year ago the output was 44,208,000 tons and the daily average 1,747,000 tons.

INDUSTRIAL consumers' stocks, as indicated by the estimate of the National Association of Purchasing Agents for Jan. 1, showed a total of less than 40,000,000 tons. This indicates a shrinkage of approximately 13,000,000 tons in reserve piles during 1928. Taken in conjunction with the promising industrial outlook the situation gives grounds for optimism.

Coal Age Index (preliminary) of spot bituminous prices in January was 152, holding steadily at that figure throughout the month. The revised December figure was 153 2/5—by weeks: 154, Dec. 1 and 8; 152, Dec. 15; 154, Dec. 22; 153, Dec. 29. The corresponding weighted average prices were $1.86, $1.84, $1.86 and $1.85.

January saw an appreciable quickening in the anthracite trade. Not only was there an improvement in demand in the well established markets for hard coal but there also was an encouraging revival of interest in areas where its use had been on the wane, such as Chicago and the Head of the Lakes. January production totaled 7,268,000 net tons, as against 6,226,000 tons in the preceding month and 5,690,000 tons in January, 1928. The January daily average this year was 280,000 tons; for the corresponding month a year ago it was 228,000 tons. Chestnut was in better demand than stove; egg was rather sluggish; the steam sizes showed marked improvement.

OLD-FASHIONED winter weather last month created a sharp demand for all grades of coal in the Chicago market. Accumulations of "no bills" at Illinois, Indiana and western Kentucky mines were practically cleaned up except for occasional unsold cars on track due to increased running time. In most cases the mines were behind on good quality lump and egg. Prices on domestic were strong. Screenings were slow and off 5@10c. on middle grades. Mine-run also was quiet because of the low prices for screenings. Buying was mostly for current requirements, but this called for fairly steady shipments from the mines.

Of the Eastern coals entering the Chicago market smokeless was the most active. Shippers were two to three weeks behind on egg and stove, three days to a week on mine-run and as much as four days on lump. Lump sold at $3@$3.25; egg, $3.50@$3.75; stove, $2.75@$3.25; and mine-run, $2.15@$2.25, with some thin stuff to be had at $2. Slack was firm at $1@$1.25.

EASTERN high-volatile coals moved more freely, especially premium grades. Easy quality block was at a top of $3.50, with egg $2.75; ordinary grades were in better position at $2.25@$2.50 for block, although there were a few offers as low as $1.70. Mine-run was somewhat tighter than in December at $1.30@$1.60. Anthracite and coke were in fair demand. Hard-coal shipments increased 20 per cent over December. Coke ovens in the Chicago district were running 100 per cent and were barely able to keep up with demand.

The mining fields reported an unusually good month with an active movement of all sizes except steam. There was no cutting of prices on any grades. Business in the St. Louis area was the best for any month since 1918; the weather was severe enough to stimulate

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

		Week Ended							
		Jan. 5, 1929		Jan. 12, 1929		Jan. 19, 1929		Jan. 26, 1929	
	Market Quoted	Independent	Company	Independent	Company	Independent	Company	Independent	Company
Broken	New York	.....	$8.25@$8.50	.....	$8.25@$8.50	.....	$8.25@$8.50	.....	$8.25@$8.50
Broken	Philadelphia	.....	.....	.....	.....	.....	.....	.....	.....
Egg	New York	$8.50@$8.75	8.25	$8.50@$8.75	8.25	$8.50@$8.75	8.25	$8.50@$8.75	8.25
Egg	Philadelphia	8.50@ 8.75	8.75	8.50@ 8.75	8.75	8.55@ 8.75	8.75	8.55@ 8.75	8.75
Egg	Chicago*	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75
Stove	New York	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82
Stove	Philadelphia	9.10@ 9.25	9.25	9.10@ 9.25	9.25	9.10@ 9.25	9.25	9.10@ 9.25	9.25
Stove	Chicago*	9.10@ 9.35	9.10	9.10@ 9.35	9.10	9.10@ 9.35	9.10	9.10@ 9.35	9.10
Chestnut	New York	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13
Chestnut	Philadelphia	8.55@ 8.75	8.75	8.60@ 8.75	8.75	8.65@ 8.75	8.75	8.65@ 8.75	8.75
Chestnut	Chicago*	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75	8.75@ 9.00	8.75
Pea	New York	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82
Pea	Philadelphia	4.50@ 5.00	5.00	4.50@ 5.00	5.00	4.65@ 5.00	5.00	4.65@ 5.00	5.00
Pea	Chicago*	5.00@ 5.25	5.00	5.00@ 5.25	5.00	5.00@ 5.25	5.00	5.00@ 5.25	5.00
Buckwheat	New York	4.45	4.45	4.45	4.45	4.45	4.45	4.45	4.45
Buckwheat	Philadelphia	2.65@ 3.00	†3.00@ 3.25	2.75@ 3.25	†3.00@ 3.25	2.85@ 3.25	†3.00@ 3.25	2.85@ 3.25	†3.00@ 3.25
Rice	New York	3.00@ 3.25	3.00	3.00@ 3.25	3.00	3.00@ 3.25	3.00	3.00@ 3.25	3.00
Rice	Philadelphia	1.50@ 2.00	2.25	1.50@ 2.00	2.25	1.75@ 2.00	2.25	1.75@ 2.00	2.25
Barley	New York	2.25@ 2.50	2.25	2.25@ 2.50	2.25	2.25@ 2.50	2.25	2.25@ 2.50	2.25
Barley	Philadelphia	1.00@ 1.50	1.70@ 1.75	1.15@ 1.50	1.70@ 1.75	1.30@ 1.50	1.70@ 1.75	1.30@ 1.70	1.70@ 1.75
		1.75@ 2.00	1.75	1.75@ 2.00	1.75	1.75@ 2.00	1.75	1.75@ 2.00	1.75

*Net tons, f.o.b. mines. †Domestic buckwheat, $3.75 (D., L & W.)

demand but not interfere with the movement of tonnage. February prospects were good; prices showed no change.

Sub-zero temperature over the Northwest during a large part of January kept the dock operators exceptionally active, so that deficiencies in shipments in the late fall and early winter were largely made up. Stocks on the docks on Jan. 15 were estimated at 5,500,000 tons of bituminous and 495,000 tons of anthracite. With iron mining and other industrial activities showing promise there is confidence that the carryover of stocks next spring will not be as heavy as seemed probable earlier this winter.

THERE have been liberal shipments from the docks to the Twin Cities and operators are sanguine that they can hold this trade against the competition of all-rail movement from the mines. Except for a decrease of 25c. on smokeless lump, egg and stove and of 50c. on eastern Kentucky stove, effective Jan. 26, prices are unchanged at Duluth and Superior.

Shovel lump and nut advanced 25c. in the Kansas market in January, due as much to curtailment of production by severe weather as to improved demand. Low temperature gave a firm tone to the general market and cleaned up "no bills" of prepared sizes. Late in the month the mines were a week behind on orders. Kansas shovel lump sold at $3.50 after the first week of the month and deep-shaft varieties up to $4.50. Screenings were irregular, selling mostly at $1.75 on the open market, though deliveries are still being made at the old contract price of $1.50. Retail trade fell behind a year ago in the first week but in the following two weeks picked up and put the total for the coal year slightly in advance of the corresponding period in the preceding two years.

Under the stimulus of protracted cold weather the demand for domestic coal, particularly lump and nut, in Colorado and New Mexico during January exceeded that of a year ago. The mines are running at about 70 per cent of capacity. The steam trade, however, has shown a serious falling off, due to the inroads of natural gas. January mine quotations were: Walsenburg-Canon City lump, $5.75; washed chestnut, $4.75; fancy chestnut, $3.25; Trinidad coking lump, $3.75; lump-and-nut, $3.50; fancy chestnut, $3.25; Crested Butte large anthracite, $9.50; brooder mixture, $7.25; chestnut, $5; northern Colorado 6-in. lignite lump, $3; 2½-in., $2.75; Rock Springs-Kemmerer lump, $4.50; nut, $3.75; steam coal, $1.35.

Both steam and domestic coals in the Kentucky market responded to the impetus of colder weather in January, with prices higher than in December. Producers held out for better quotations on prepared sizes and offerings of screenings were not sufficiently larger to cause a sag. Industrial demand has been satisfactory, railroad consumption has been fair, but utility demand not so good. Production was retarded for a while by influenza among the miners, but the situation has materially improved.

EASTERN Kentucky screenings of good quality sold at $1@$1.20, with low-grades at 60c.; mine-run, $1.35@$1.75; western Kentucky screenings, 75c.@$1; mine-run, 90c.@$1.40. Car supply has been excellent, the weather not having been sufficiently severe to interfere with traffic.

The Cincinnati market took heart with the advent of cold weather about the middle of the month and trade for the month as a whole was encouraging. Demand has kept pace with increased shipments in good style except in the case of steam screenings and slack.

Smokeless again fared the best on the list, though prices were lower than in the preceding two months, which was expected. Mine-run was exceptionally strong, and so too were stove and nut—the former aided by shipments to the West and the latter to the East. Quotations on eastern Kentucky coals regained December losses through the influence of heavier shipments to the South and Southeast. High-volatile lump from West Virginia showed a wide price range, but mine-run from that state and eastern Kentucky held an even tenor. Screenings and slack from both fields were too much for the market to absorb, and were neglected. Retailers have been handling a large tonnage in restocking consumers, but there have been no changes in the quotations ruling for the last few months.

DOMESTIC trade attracted the bulk of the attention in the Columbus market last month. There were several falls in temperature but not of sufficient duration to have a far-reaching effect on the trade as a whole. The steam trade was rather quiet and little contracting was reported. Those who had contracts arranged minimum deliveries and took advantage of bargain opportunities in spot offerings. There was little distress coal, which served to clarify the situation.

Smokeless was a good mover and splints and Ohio varieties are fairly active, though there was no material increase in output at Ohio mines. Toward the end of the month screenings were stronger and prices advanced moderately. Other grades were quiet, except egg, which was slightly firmer. Retail prices were fairly steady at the levels which have prevailed for several months.

An encouraging improvement in the situation took place in the Pittsburgh district during the latter half of the month with the prevalence of low temperature. There was a marked increase in demand for domestic grades and industrial inquiries were more numerous. The mines have had better working time, the increases extending to the Connellsville district. Captive workings are on full time and producers of byproduct coal also are going at a high rate.

There was no advance in prices, however, because of the large quantities of lump available. The market for slack, which was woefully weak in December, has steadied; the average price of steam slack in January was 80c.@90c.

CENTRAL Pennsylvania had one of the busiest months in a long time. Cold weather caused consumers to restock and retailers ordered heavily.

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

LOW-VOLATILE EASTERN	Market Quoted	Week Ended— Jan. 5, 1929	Jan. 12, 1929	Jan. 19, 1929	Jan. 26, 1929
Smokeless lump	Columbus	$3.00@$3.50	$3.00@$3.50	$3.00@$3.25	$3.00@$3.25
Smokeless mine-run	Columbus	1.75@ 1.95	1.75@ 1.90	1.70@ 1.90	1.70@ 1.90
Smokeless screenings	Columbus	0.85@ 1.00	0.85@ 1.00	0.85@ 1.00	0.90@ 1.10
Smokeless lump	Chicago	2.75@ 3.50	2.85@ 3.50	3.00@ 3.75	3.00@ 3.75
Smokeless mine-run	Chicago	1.85@ 2.25	2.00@ 2.25	2.00@ 2.25	2.15@ 2.25
Smokeless lump	Cincinnati	3.00@ 3.50	2.75@ 3.50	2.75@ 3.50	2.75@ 3.50
Smokeless mine-run	Cincinnati	2.25	2.00@ 2.25	2.10@ 2.25	2.15@ 2.25
Smokeless screenings	Cincinnati	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
*Smokeless mine-run	Boston	4.25@ 4.40	4.30@ 4.45	4.35@ 4.50	4.35@ 4.50
Clearfield mine-run	Boston	1.60@ 1.95	1.60@ 1.95	1.60@ 1.95	1.60@ 1.95
Cambria mine-run	Boston	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10
Somerset mine-run	Boston	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00
Pool 1 (Navy Standard)	New York	2.25@ 2.50	2.25@ 2.50	2.35@ 2.65	2.25@ 2.65
Pool 1 (Navy Standard)	Philadelphia	2.30@ 2.65	2.30@ 2.65	2.30@ 2.65	2.30@ 2.65
Pool 9 (super. low vol.)	New York	1.70@ 1.95	1.70@ 1.95	1.75@ 1.95	1.75@ 2.00
Pool 9 (super. low vol.)	Philadelphia	1.80@ 2.15	1.80@ 2.15	1.80@ 2.15	1.80@ 2.15
Pool 10 (h. gr. low vol.)	New York	1.55@ 1.80	1.55@ 1.80	1.65@ 1.80	1.65@ 1.80
Pool 10 (h. gr. low vol.)	Philadelphia	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80
Pool 11 (low vol.)	New York	1.30@ 1.50	1.30@ 1.50	1.45@ 1.60	1.45@ 1.60
Pool 11 (low vol.)	Philadelphia	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
HIGH-VOLATILE, EASTERN					
Pool 54-64 (gas and st.)	New York	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40
Pool 54-64 (gas and st.)	Philadelphia	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40
Pittsburgh sc'd gas	Pittsburgh	1.90@ 2.00	1.90@ 2.00	1.90@ 2.05	1.90@ 2.10
Pittsburgh gas mine-run	Pittsburgh	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Pittsburgh mine-run	Pittsburgh	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.50@ 1.75
Pittsburgh slack	Pittsburgh	.90@ 1.00	.90@ 1.10	.90@ 1.00	.90@ 1.10
Kanawha lump	Columbus	1.75@ 2.15	1.75@ 2.10	1.75@ 2.10	1.75@ 2.10
Kanawha mine-run	Columbus	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60
Kanawha screenings	Columbus	.80@ .90	.80@ .90	.80@ .90	.80@ .90
W. Va. lump	Cincinnati	2.00@ 2.75	2.00@ 2.75	2.00@ 2.75	1.85@ 2.75
W. Va. gas mine-run	Cincinnati	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
W. Va. steam mine-run	Cincinnati	1.25@ 1.40	1.15@ 1.40	1.25@ 1.40	1.20@ 1.50
W. Va. screenings	Cincinnati	.60@ 1.00	.60@ 1.10	.65@ 1.00	.50@ 1.00
Hocking lump	Columbus	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Hocking mine-run	Columbus	1.40@ 1.65	1.40@ 1.65	1.35@ 1.60	1.30@ 1.60
Hocking screenings	Columbus	.65@ .85	.70@ .90	.70@ .90	.80@ .90
Pitts. No. 8 lump	Cleveland	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pitts. No. 8 mine-run	Cleveland	1.25@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.50
Pitts. No. 8 screenings	Cleveland	.65@ .90	.85@ 1.00	.75@ 1.00	.70@ .90

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

Business was more brisk during the first three weeks than thereafter, but the mines worked more steadily and some that had been closed reopened. Loadings for the month to Jan. 26 exceeded those for the corresponding period of the preceding month by nearly 7,000 cars. Month-end quotations at Altoona were: Pool 1, $2.40@$2.60; pool 9, $2.20@$2.30; pool 10, $1.90@$2.10; pools 11 and 18, $1.75@$1.85.

The New England steam coal trade was more optimistic at the month end with inquiry better and spot prices much firmer than early in January. Accumulations were the exception at the Virginia terminals, and there was practically no forcing of coal on reluctant "down East" buyers. Rather it was a case of coal reaching the piers in season for boats to load promptly, but dispatch was slowing up to such an extent that marine freights are expected to be easier during February.

Spot Navy Standard is being held at $4.50 for mine-run and $4 for nut-and-slack per gross ton f.o.b. vessel. Coal to be mined and assembled for later dates is being offered down to $4.35, but nothing less than this figure has been heard now for more than a fortnight. Shipments on contract are moving in usual volume.

For inland delivery from Boston, Providence and Portland there is now a steady demand. First-grade Pocahontas and New River are quoted firmly at $5.75 for mine-run and $5.25 for stoker coal. Signs of tightening supply at Hampton Roads lead factors to anticipate higher prices before March. A spell of stormy weather would be enough to advance figures another 25c.

A LARGE tonnage of coal moved in the New York market last month, although new business was not conspicuously heavy. In the early part of the month there was a shortage of mine labor due to the prevalence of "flu," but the situation improved in the latter half, when there was an increase in production. Contract making is talked of at last year's prices.

Better buying has been in evidence in the Philadelphia area following several cold snaps, and as a result producers of pool 1, 9 and 10 coals have had active demand for their entire output. Prices remain at the same level that has prevailed for several months. There was only a minimum of contracting at the beginning of the year, but there are indications of improvement in the general industrial situation, which lends hope of fairly good business between now and spring.

The Birmingham commercial coal market recuperated gradually during January from the slump prevailing at the beginning of the new year and at the close of the month the volume of business was about on the normal pre-holiday basis, possibly slightly better. The railroads and some industrial interests stocked some coal prior to Christmas and consequently took their requirements partially from this surplus for several weeks, shipments from the mines showing the effects of this accumulation. While there was no material increase in the amount of new business actually booked, the tone of the trade toward the close of the month was healthier and the outlook for increased consumption more encouraging, based on inquiries, and the apparent general trend toward more active industrial conditions. Quotations on commercial coal continued low and unstable.

Periodical periods of real winter weather during the month resulted in a fairly good average demand for domestic fuel, especially for the better grades of lump and other sizes, and the call for medium and lower quality was also somewhat better than it had been. Some domestic mines closed the month several weeks behind on orders, due in part to lack of ready disposition of screenings accruing in the preparation of lump and other sizes.

Anthracite moved rapidly in the New York market in January, when for the first time during the present winter there was constant buying. Although orders were small, all sizes, with the exception of pea, were bought heavily. Of the larger domestic coals stove moved slowest, chestnut leading throughout the month. The steam sizes were much stronger, with buckwheat short in many quarters toward the end of the month.

WHILE the Philadelphia consuming public sticks to the habit of buying coal only as needed, orders were plentiful throughout January, when the temperature took several sizable dips. The mines have been working on a fairly steady schedule throughout the month and orders, as a rule, have been filled promptly.

Chestnut enjoyed the best demand; stove, which eased up early in the month, again took on new life. Pea also showed improvement after a long dull spell, but egg continued slow. The steam sizes have braced notably; many shippers had orders far in advance for buckwheat to take care of production for the month. Rice and barley were plentiful, but even here there was a marked improvement.

The Boston trade has been muddling along with very light tonnages. So much mild weather has had its effect, and even lower temperatures in the latter half of January stimulated buying only on the part of small hand-to-mouth consumers. The retailers have good stocks and are beginning to be anxious about carrying coal over into spring.

EXPORTS of bituminous coal from the United States during December —the latest month for which figures are available—were 1,093,485 gross tons, as compared with 1,617,468 tons in the preceding month and 832,408 in December, 1927. Anthracite exports in December, 1928, totaled 258,637 gross tons, as against 306,271 tons in the preceding month and 226,421 tons in December, 1927. Coke exports fell from 120,604 tons in November to 97,996 tons in December, but exceeded by 35,160 tons the total for December, 1927. Total exports for the year were: Bituminous, 14,432,376 tons; anthracite, 2,979,714 tons; coke, 980,059 tons.

Canada continued to lead the way as a customer for American coal in the export field in December, of soft coal shipments, totaling 881,251 tons. Cuba was second, with 50,170 tons; Italy was third, with 27,753 tons, followed by the British West Indies, with 21,461 tons.

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

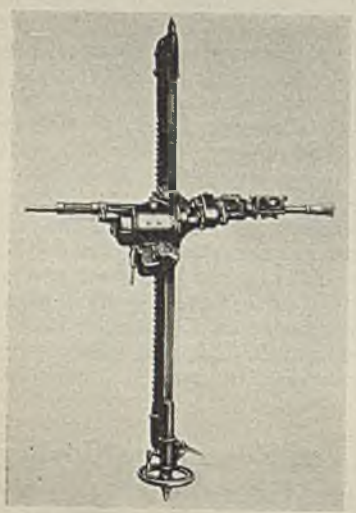
		Week Ended			
MIDDLE WEST	Market Quoted	Jan. 5, 1929	Jan. 12, 1929	Jan. 19, 1929	Jan. 26, 1929
Franklin, Ill. lump	Chicago	$2.85@$3.00	$2.85@$3.00	$2.85@$3.00	$2.85@$3.00
Franklin, Ill. mine-run	Chicago	2.15@ 2.25	2.15@ 2.25	2.15@ 2.25	2.15@ 2.25
Franklin, Ill. screenings	Chicago	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.30@ 1.60
Central, Ill. lump	Chicago	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65	2.40@ 2.65
Central, Ill. mine-run	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Central, Ill. screenings	Chicago	1.10@ 1.30	1.10@ 1.30	0.90@ 1.25	0.85@ 1.10
Ind. 4th Vein lump	Chicago	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00	2.50@ 3.00
Ind. 4th Vein mine-run	Chicago	1.30@ 2.25	1.50@ 2.25	1.50@ 2.25	1.50@ 2.25
Ind. 4th Vein screenings	Chicago	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.25@ 1.65
Ind. 5th Vein lump	Chicago	2.10@ 2.50	2.10@ 2.50	2.10@ 2.50	2.10@ 2.50
Ind. 5th Vein mine-run	Chicago	1.20@ 1.90	1.25@ 1.90	1.25@ 1.90	1.25@ 1.90
Ind. 5th Vein screenings	Chicago	1.00@ 1.10	1.00@ 1.20	1.00@ 1.20	.90@ 1.10
Mount Olive lump	St. Louis	2.35	2.35	2.35	2.35
Mount Olive mine-run	St. Louis	2.00	2.00	2.00	2.00
Mount Olive screenings	St. Louis	1.25	1.25	1.25	1.25
Standard lump	St. Louis	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15
Standard mine-run	St. Louis	1.75	1.75	1.75	1.75
Standard screenings	St. Louis	.45@ .60	.45@ .60	.45@ .60	.45@ .60
West Ky. block	Louisville	1.75@ 2.25	1.75@ 2.25	1.85@ 2.25	1.75@ 2.25
West Ky. mine-run	Louisville	.90@ 1.49	1.00@ 1.35	.90@ 1.35	.90@ 1.40
West Ky. screenings	Louisville	.85@ 1.00	.75@ 1.00	.75@ .90	.75@ .85
West Ky. block	Chicago	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00
West Ky. mine-run	Chicago	.90@ 1.25	.90@ 1.25	.90@ 1.25	.90@ 1.25
SOUTH AND SOUTHWEST					
Big Seam lump	Birmingham	$2.25@$2.50	$2.25@$2.50	$2.25@$2.50	$2.25@$2.50
Big Seam mine-run	Birmingham	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Big Seam (washed)	Birmingham	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
S. E. Ky. block	Chicago	2.00@ 2.50	1.70@ 2.50	1.70@ 2.50	1.70@ 2.50
S. E. Ky. mine-run	Chicago	1.15@ 1.65	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60
S. E. Ky. block	Louisville	2.25@ 2.75	2.25@ 2.75	2.50@ 3.00	2.50@ 3.00
S. E. Ky. mine-run	Louisville	1.35@ 1.75	1.35@ 1.75	1.35@ 1.75	1.35@ 1.75
S. E. Ky. screenings	Louisville	.70@ 1.25	.50@ 1.20	.60@ 1.10	.60@ 1.20
S. E. Ky. lump	Cincinnati	2.25@ 2.50	2.15@ 3.00	2.25@ 2.75	2.00@ 2.75
S. E. Ky. mine-run	Cincinnati	1.25@ 1.60	1.15@ 1.60	1.25@ 1.60	1.15@ 1.65
S. E. Ky. screenings	Cincinnati	.60@ 1.00	.60@ 1.00	.65@ 1.00	.50@ 1.00
Kansas shaft lump	Kansas City	3.50@ 4.50	3.50@ 4.50	3.50@ 4.50	3.50@ 4.50
Kansas strip lump	Kansas City	3.00@ 3.25	3.25@ 3.50	3.25@ 3.50	3.25@ 3.50
Kansas mine-run	Kansas City	2.75	2.75	2.75	2.75
Kansas screenings	Kansas City	1.75@ 1.85	1.65@ 1.75	1.75	1.75

WHAT'S NEW

In Coal-Mining Equipment

One Man Can Operate Mounted Coal Drill

Improvements in the post mechanism make the new 472 "Little Giant" mounted coal drill a one-man machine, according to the Chicago Pneumatic Tool Co., New York City. A notched post and a ratchet on the turntable with a ratchet dog to engage the notches in the post make it unnecessary for the



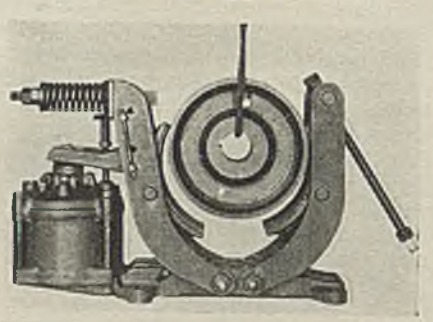
Lightens the Operative's Burden

operator to hold up the weight of the drill when adjusting it to drilling position. Drills are carried in stock for 240-d.c. and 220-volt 60-cycle 3-phase alternating current.

Severe Service Met by New Solenoid Brakes

Simplification is the keynote of a complete new line of solenoid brakes now offered by the General Electric Co. The line, bearing the designation CR-9516, includes brakes for operation on alternating and direct current, and involves in its construction the use of a spring setting device—a new feature for alternating-current applications.

The brakes are especially designed for severe service in connection with mill, crane and hoist motors. The manufacturer claims smooth operation for making quick stops in either direction of rotation, with a dependable holding value. The brake mechanism is held in the "off" position by a coil and plunger; when power is applied to the motor, the coil is energized and the brake released; when the power is shut off, the spring setting device forces the mechanism into the closed or braking position.



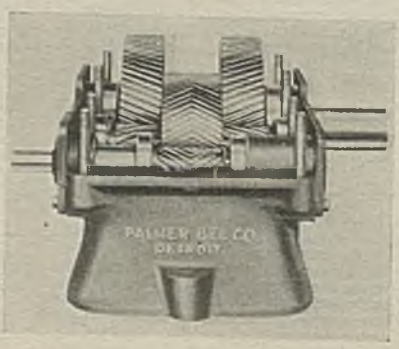
Solenoid Brake Showing Wheel Being Removed

Both alternating- and direct-current brakes use the same brake mechanism and frame, the solenoids being interchangeable. Further flexibility is obtained by making the floor-mounted brake the basic unit of the line; by adding a mounting bracket, it becomes a motor-mounted brake. The brakes, being spring-set, can be mounted in any position. They have adjustable torque, allow no sudden jar from falling armature and have a simple and accessible overhead lever construction.

Efficient Speed Reducers

Palmer-Bee Co., Detroit, Mich., has just placed on the market an entirely new line of herringbone speed reducers. This series has been added, according to the manufacturer, to meet the demand for still stronger, more modern and efficient inclosed gear-reduction units.

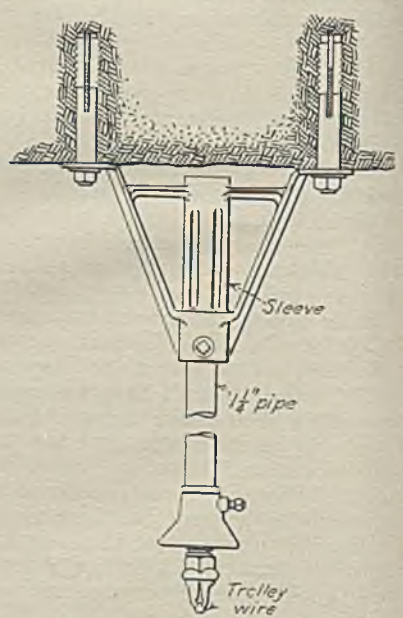
Sturdily Built



Anti-friction bearings are used throughout; ball bearings on the high speed, Hyatts on the intermediate and Timkens on the slow speed shaft. Gears are continuous-tooth herringbone, with silent Kysor tooth form, producing more rolling and less sliding action than heretofore has been obtainable. The slow speed gears in the double and triple series are divided in the center, permitting a more symmetrical arrangement of the gearing and a uniform load on each bearing.

Trolley Support Designed For High Roofs

In some mines where the roof is high and irregular it is necessary to support the trolley wire some distance below the roof to compensate for these irregularities and support the trolley wire in a horizontal position. To meet this



Allows Vertical Adjustment of Trolley Wire

condition a new support has been devised by the Ohio Brass Co., Mansfield, Ohio. It is shown in the accompanying sketch.

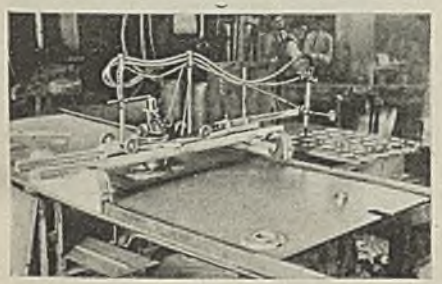
The fitting is made of "Flecto" malleable iron, hot-dip galvanized and attached to the mine roof with expansion bolts. Pipe of the approximate length desired is fastened in the fitting by set-

screws and allows some latitude of adjustment in height to bring the trolley wire to the correct position. A standard insulated pipe hanger on the lower end carries the wire. The pipe bracket also may be mounted horizontally and fastened in the rib if desired.

Oxyacetylene Machine Now Cuts Shapes

An automatic oxyacetylene shape-cutting machine designed to cut shapes of any sort from steel plate, sheet, forgings, billets or ingots is being introduced by the Linde Air Products Co., New York City. In this machine the cutting blowpipe is mounted on a carriage which is moved in any direction by means of an electric motor. For routine production it will operate automatically from templets. In cases where only a few parts are to be cut out a hand-tracing device can be attached and used to follow the outline of a sketch or blueprint.

The Oxweld shape-cutting machine requires but one operator. Little machining is necessary in most cases



Turning Out the Stuff

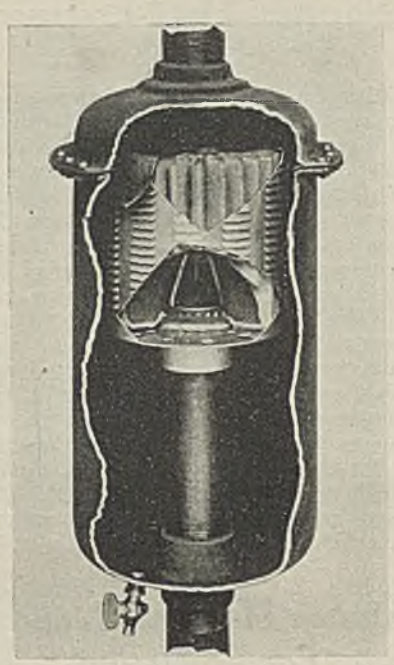
after cutting because the parts are produced with straight corners and smooth faces. The speed of cutting is very high and, according to the manufacturer, ranges from 3 to 20 in. per minute, depending on the thickness of the metal. Accurate and smooth cuts can be made in stock up to 1 ft. and more in thickness.

New Filters Purify Air

In endeavoring to eliminate the damage to equipment and health resulting from bad air, the Staynew Filter Corporation, Rochester, N. Y., has designed two new types of air filters. One is to remove oil, rust, water scale and dust from pipe lines and the other filters large volumes of air for building ventilation, turbo-generators, blowers and dryers.

The first, or Model CP pipe-line filter, provides a positive high-efficiency filter in addition to the inertia or centrifugal principle of separation. It may be easily cleaned by reversing the flow of air.

The second type is built in the form of panels which are supported in heavy



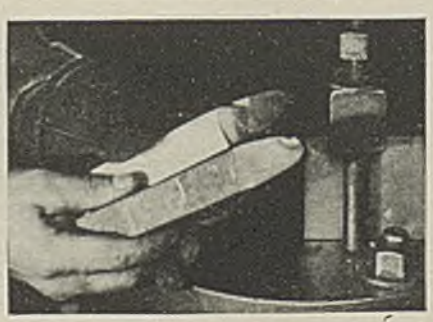
Pipe Line Filter Cleans Air

pressed steel frames. The panels consist of pressed steel or aluminum frames which support a series of hollow fins or pockets of rustproof wire cloth. Each row of fins is covered with a single piece of special filter material. This filter may be easily cleaned by use of a high-suction cleaner with a special nozzle.

Tool Material Cuts Glass And Hardest Steel

Cutting a screw thread in a glass rod, boring a smooth hole in a block of concrete, handling porcelain on a lathe and cutting the hardest of steels—things difficult or even impossible with present-day machine tools—are among the things that can be done easily with a new kind of machine tool material, according to an announcement by Dr. Samuel L. Hoyt, of the research laboratory of the General Electric Co., at the annual convention of the American Society for Steel Treating, Philadelphia, Oct. 11. The new material, named Carboloy, is composed of tungsten carbide and cobalt, the carbide being extremely hard and the cobalt giving it the necessary strength for cutting tools.

Nickel Steel Burns High-Speed Steel Bits, Does Not Affect Carboloy



Removes Dust and Cinders From Flue Gases

The question of removing cinders and dust from chimney gases has become a matter of vital importance. The Prat-Daniel Corporation, New York City, has announced the Thermix stack, Type 4, for removing cinders, dust and fly-ash from stoker and pulverized-coal-fired furnace flue gas.

It is asserted that this device possesses the following advantages: high efficiency of cinder removal with low power consumption; effectiveness at all boiler ratings; small space required; degree of elimination can be controlled, and no resistance is encountered when using natural draft.

The principle of operation of the Type 4 Thermix stack is: (a) Concentration of the dust by means of the long involute of the fan; (b) continuous withdrawal of 5 to 15 per cent of this dust-laden gas; (c) precipitation of dust in a cyclone; (d) return of the cleaned gas from the cyclone to the suction side of the fan.

Compressor Combined With Tractor

Heavy loads may be hauled by a new self-propelling air compressor announced by the Pontiac Tractor Co., Pontiac, Mich. The compressor is a Quincy type W-4 of 124 cu.ft. displace-

Hauls a Load or Furnishes Air

ment, with radiator for cooling the air from the compressors. The unit is controlled by a Penn unloader with hand unloader attachment. The compressor with air tank and tool box is mounted on a frame which attaches to either the McCormick-Deering or Fordson tractor.

Chemical Heat Warms Accident Victims

Heat application in the practice of first aid is considerably simplified when the "Torridaire Hot Pad" is used, according to the Mine Safety Appliances Co., Pittsburgh, Pa., who are the sales agents. The pad consists of a canvas bag containing the heating chemical and a rubber pouch in which the bag is inserted during use. To use, two tablespoonfuls of water are poured into the bag after which it is shaken for a few

Aid to First Aid

minutes. It will then heat to the required temperature. The life of the heating element, according to the manufacturer, is at least 80 hours, after which the bag may be charged with fresh chemical.

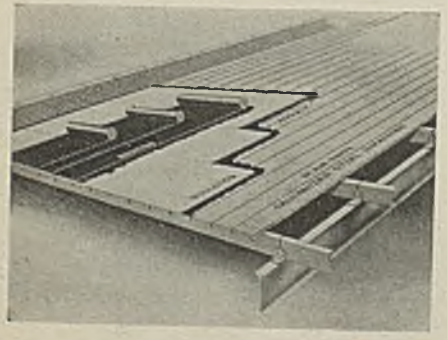
Fire Extinguisher Works Below Zero

A new type fire extinguisher for all-round use, known as the "Instant Fyr-Fyter," is now being produced by the Fyr-Fyter Co., Dayton, Ohio. It is claimed that wood and all general fires may be extinguished instantly, as well as those resulting from gasoline, oil or grease. It will operate at 40 deg. below zero, according to the makers, and is approved by the Underwriters' laboratories. The capacity of the unit is 1¾ gallons.

Flat Roofs Protected By Steel Sheathing

A roof sheathing for flat roofs has just been announced by the Blaw-Knox Co., Pittsburgh, Pa. It is claimed that it features light weight, strength and resistance to fire and dampness. Neither, it is said, will it shrink or crack. The product is made of galvanized steel and may be insulated against heat loss or penetration to any degree desired.

Applying Blawsteel Roof Sheathing



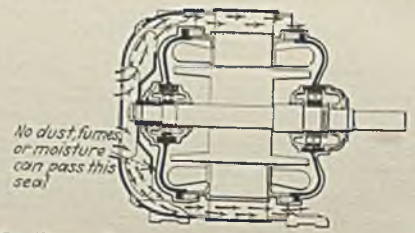
Noiseless High-Pressure Drill-Steel Forge

A new high-pressure drill-steel forge, designated as model DF-1, is announced by the Gardner-Denver Co., Denver, Colo. The principal feature of this new oil forge, according to the manufacturer's announcement, is its practically noiseless operation. When the furnace is running at a forging temperature of 2,200 deg. F., conversation in an ordinary tone of voice can be carried on directly in front of it. The operator is protected from the intense heat by a water-cooled shield and air screen. The lining of the furnace is composed entirely of standard dimension firebrick with the exception of the ten top bricks forming the throat, which can easily be cut from standard brick or can be supplied molded to dimension.

Motors Have Air Jackets For Protection

A motor with an air pocket, for service where dust, fumes and moisture are present in sufficient quantities to necessitate protection to motor and property, has been developed by the Wagner Electric Corporation, St. Louis, Mo. The entire motor is surrounded by a jacket open at both ends. Fan blades on the shaft extension force air around the sealed motor at all times.

The motors are new in external construction only, no changes being made

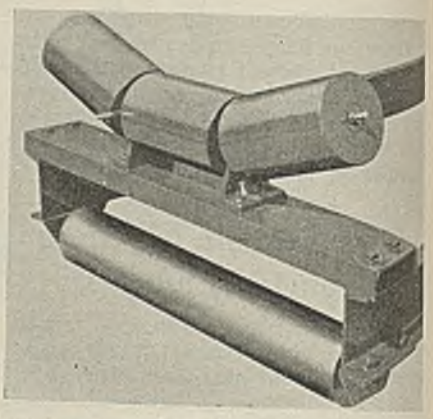


No Dust, Fumes or Moisture Can Injure This Motor

in the construction of the motor itself with the exception of stator. The exposed outer rim of the stator is deeply grooved to increase radiation surface. Single-phase repulsion-induction motors may be had in sizes from one to twenty horsepower and polyphase squirrel cage motor in sizes from 2 to 30 hp. These motors are designed for a temperature rise of 50 deg. C.

New Belt Conveyor Idler Eliminates Dust

An improved ball-bearing belt-conveyor idler in which the pulleys are spaced ½ in. apart to prevent belt creasing and are made from heavy steel tubing with electrically welded steel heads flush with the ends to eliminate dust pockets is a new product of the Chicago



Electrically Welded Throughout

Automatic Conveyor Co., Chicago, Ill. Alemite or other high-pressure fittings for lubrication are among the advantages claimed by the manufacturer.

Coal and Rock Drill Is Easily Handled

One man may attach the mounting and motor to the post of the 700 type "Superior" mounted electric coal drill made by Dooley Bros., Peoria, Ill. A locking device is furnished with the holding lug on the top side of the mounting instead of the bottom. Motor and mounting are merely lifted up and hung on the turntable. The lock can then be set and the drill revolved to any desired angle for drilling. The ratchet type post enables the operator to drill a hole within 3 in. of the top or bottom.

Pulley Compound Halts Belt Slippage

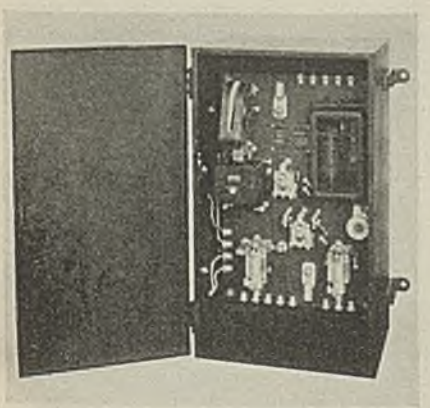
Elimination of belt slippage results from the use of "Pulleystone"—a plastic material applied to the pulley—according to the Chicago Belting Co., Chicago, Ill. It is applied to the small pulley of pro-

Smooth Surface; Slippage Halted

ducing machines and to motor pulleys, being spread over them by hand and then smoothed off with the back of the hand dipped in warm water. Pulleystone is sold as a device for increasing the output of present machines without changing the regular equipment. A smooth surface results from an application and, according to the manufacturers, increases the output of all types of belting—leather, rubber, canvas or others.

New Control Eliminates Arc Crater

An improvement in the control equipment used with automatic arc welding heads which stops the feed of electrode wire a short time before shutting off the welding current at the end of the weld is announced by the General Electric



Automatic Panel for Arc Welding

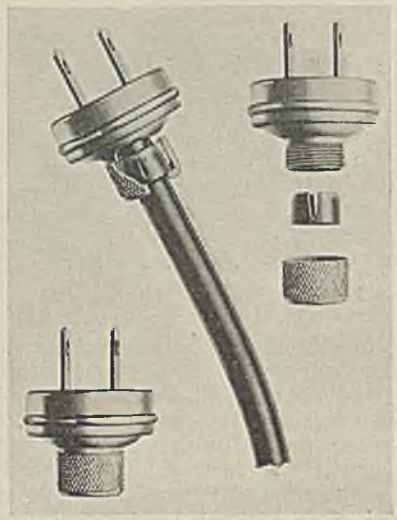
Co., Schenectady, N. Y. This clears the electrode from the weld and fills in the crater which is left at the end of the weld when the arc is cut off short.

Short-Circuit Hazards Reduced by Cord Grip

An unbreakable attachment plug cap with an improved type of cord grip is announced by The Cutler-Hammer Mfg. Co., Milwaukee, Wis. The cord grip acts as a positive strain relief and is designed particularly to lessen short-circuit hazards. Fastening the cord grip consists of screwing down the knurled collar. The collar wedges a fiber bushing tightly against the cord. The parts are so designed that a natural pressure from the inside prevents loosening of the knurled collar and insures a firm grip at all times.

A fiber grip bushing serves to insulate the cord from metal parts and results in less damage to the cord because it prevents contact between cord and metal. This bushing also acts as the clamp and is the only part that actually touches the cord.

A rustproof armored shell, made of heavy brass, prevents breakage when



Cap with Cord Grip and Strain Relief

dropped on cement floors, etc. Sheet bakelite is used to hold the blades firmly in place.

Fight Fire With Inert Gas

An inert gas known as "Alfite Gas" is employed in the new system of carbon dioxide protection against fire now being marketed by the American-La France and Foamite Corporation. The system may be used manually, semi-, or full automatically and operating devices are available enabling the system to be applied to a variety of operating conditions.

The Alfite system is especially adapted to use in the electrical field, according to the manufacturers, as it displaces water and most chemicals, except carbon tetrachloride, which are conductors of electricity. The gas cannot harm the equipment. It is claimed that the gas does its work in a few seconds and will penetrate any place that air will reach. This system is not recommended for all fire risks but has special applications.

Expands Shovel Line

The Marion Steam Shovel Co., Marion, Ohio, announces the addition of the "450" and "480" lines of shovels to those already being made. The members of the "450" group have a capacity of 1¼ yd. and of the "480" group 2 cu.yd. Shovels in either line may be obtained with steam, gas-electric or Diesel power.

Type 480 Marion Shovel

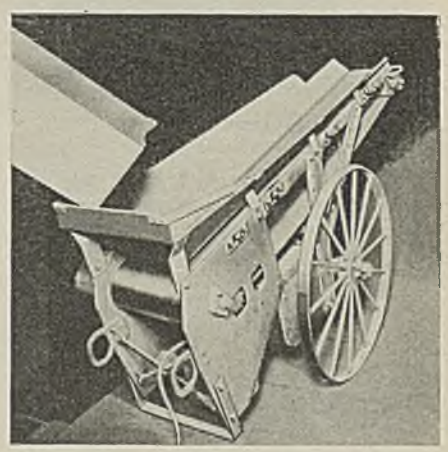
Conveyor Chain Insures Continuous Operation

Careful choice of material, drop-forged construction and efficient patented design are the advantages claimed for the Morco drop-forged conveyor chain manufactured by the Moore Drop Forging Co., Springfield, Mass. These chains are made in both open- and closed-link types for general use on draglines, bucket or floor conveying or monorail installations. Either malleable or drop-forged attachments, such as scrapers, pushers, trolley extensions, car hauls and bucket attachments, are furnished. The malleable attachments are secured to the center links by means of bolts; the drop-forged attachments are formed integrally with the side links.

Other advantages claimed are ease of disassembling as a result of patented construction, greater strength with lighter weight, a saving in power, elimination of loose pins, better bearing on the teeth of the driving sprocket and resistance to the action of acids.

Box Car Loader Features One-Man Control

Cost reduction, lessened power consumption, ease of movement, simplicity of inspection and repair and long life have been built into the new Ottumwa portable handy belt loader, according to the Ottumwa Box Car Loader Co., Ottumwa, Iowa. The belt element is 18 in.



Large Capacity, Easy Operation

wide, heavy rubber covered on both sides and is furnished with or without cleats. The belt speed is 500 to 1,000 ft. per minute and the manufacturers assert that a box car can be loaded at the rate of 40 cu.ft. per minute. Power requirements are said to be between 2 and 3 hp.

Greasing Done Quickly

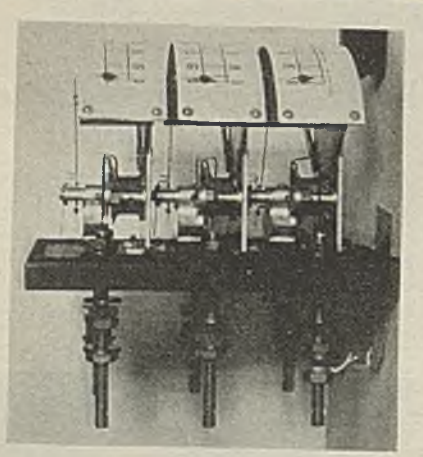
According to the Dot Lubrication Division, Carr Fastener Co., Cambridge, Mass., the use of the new "Nozzle-Fil"

equipment allows grease to make a sealed and dustless journey from the original container to the bearing. The grease is pumped out of the barrel through the barrel pump into the hand-filling tank. The operator then takes the hand filling tank—which holds 25 lb. of grease—and the "Nozzle-Fil" hand gun and starts upon his rounds.

To grease a bearing, the hand gun is hooked to the Dot nipple on the hand filling tank and is pumped full of grease. The operator then engages the hand gun in the pressure nipple in the bearing and fills it to capacity. The advantages claimed for the use of these three pieces of equipment are a sealed journey to the bearings and a saving in the time required for greasing.

Readings Simplified With Ammeter

Roller-Smith Co., New York City, announces a new product known as the type HEA-3 polyphase ammeter. The

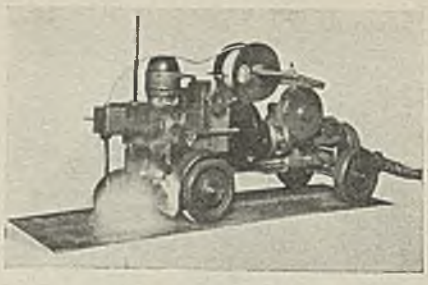


Saves Time and Space

specific application of this instrument is for three-phase alternating-current circuits. With this ammeter it is possible, according to the makers, to take readings simultaneously in each of the phases of a three-phase circuit and to determine instantly whether the phases are properly balanced. A relatively long scale and small space requirements are other features of the instrument.

Electronic Tornado Is Welding Feature

An automatic tractor type arc welder utilizing the electronic tornado principle for making lap welds and butt welds on large tank bottoms and roofs, large pipe and similar work has been placed on the market by the Lincoln Electric Co., Cleveland, Ohio. The machine consists of an electronic tornado head mounted on a self-propelled four-wheel-drive carriage. Power is supplied through a flexible cable and all that is necessary is to line up the machine over the seam to be welded



Uniform Welds at High Speed

and to start the arc. The electrode and fibrous autogenizer are fed automatically as the tractor travels forward.

In making lap welds with this machine no additional filler metal is required. The heat of the carbon arc fuses the edge of the top plate into the lower plate, making a leak-proof joint. A filler strip is laid over the seam to be welded when a butt weld is desired. The chief advantages claimed for this machine are high welding speeds and smooth, uniform welds. Speeds varying from 50 to 75 ft. per hour are obtained on ¼-in. lap joints.

Large Capacity Boring And Turning Bars

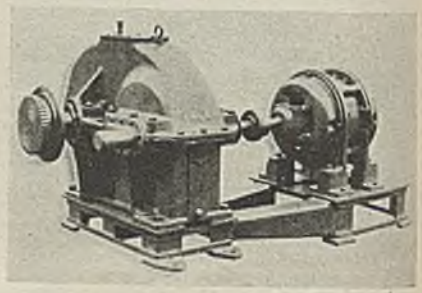
Something new in boring and turning bars known as the "Scully Adjustable Boring and Turning Bars" for lathes are being offered by the Scully Steel & Iron Co., Chicago, Ill. In addition to boring and turning these bars can be used for both external and internal threading. The bars are one-piece construction, made of special alloy steel with ends heat-treated.

The holders are so made that the bars can be adjusted over a large range. The large bearing surface in the holder for the bars insures the bars being held very rigidly. By reversing the holder, the largest piece that the lathe will swing can be turned and the bars are always held parallel with center of lathe. These bars can be obtained in several different sets, ranging from extremely small tools to very large bars, to fit over tool posts or into cross slides.

Small Boring Tool Set and Heavy Tools Used in Large Set

Line of Speed Reducers Is Improved

Several new sizes have been added to the speed reducer line of the Falk Corporation, Milwaukee, Wis. These

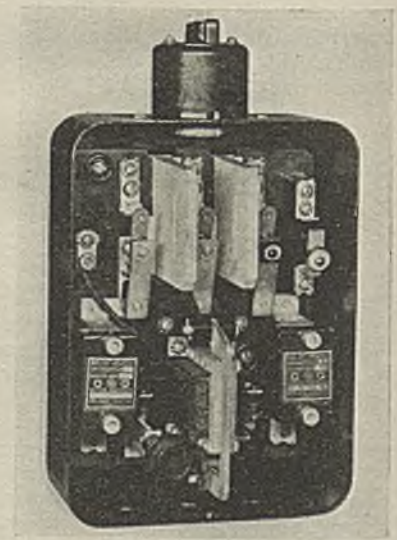


Double-Reduction Unit, Welded Motor Bed

include four new single-reduction, three double-reduction and three triple-reduction units, plus nine sizes of single-reduction units with vertical centers. The company is now prepared to ship any of 48 sizes, any of which has the same series of standard ratios.

New Hand-Control Switch Mounts on Any Starter

For application where it is desirable to control a magnetic switch at the switch itself, the General Electric Co. has designed two small control switches. These may be mounted in the knockouts of the inclosing case of any starter and are held rigidly in place by a conduit bushing which forms part of the switch.



Mounts on Any Starter

Both switches are equipped with leads ready to wire and have sufficient capacity to handle any magnetic starter up to 75 amp. capacity. The new switches can be used on 600-volt circuits with safety, as their insulation is designed for maximum safety to the operator.