COAL AGE

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

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The Door Is Open

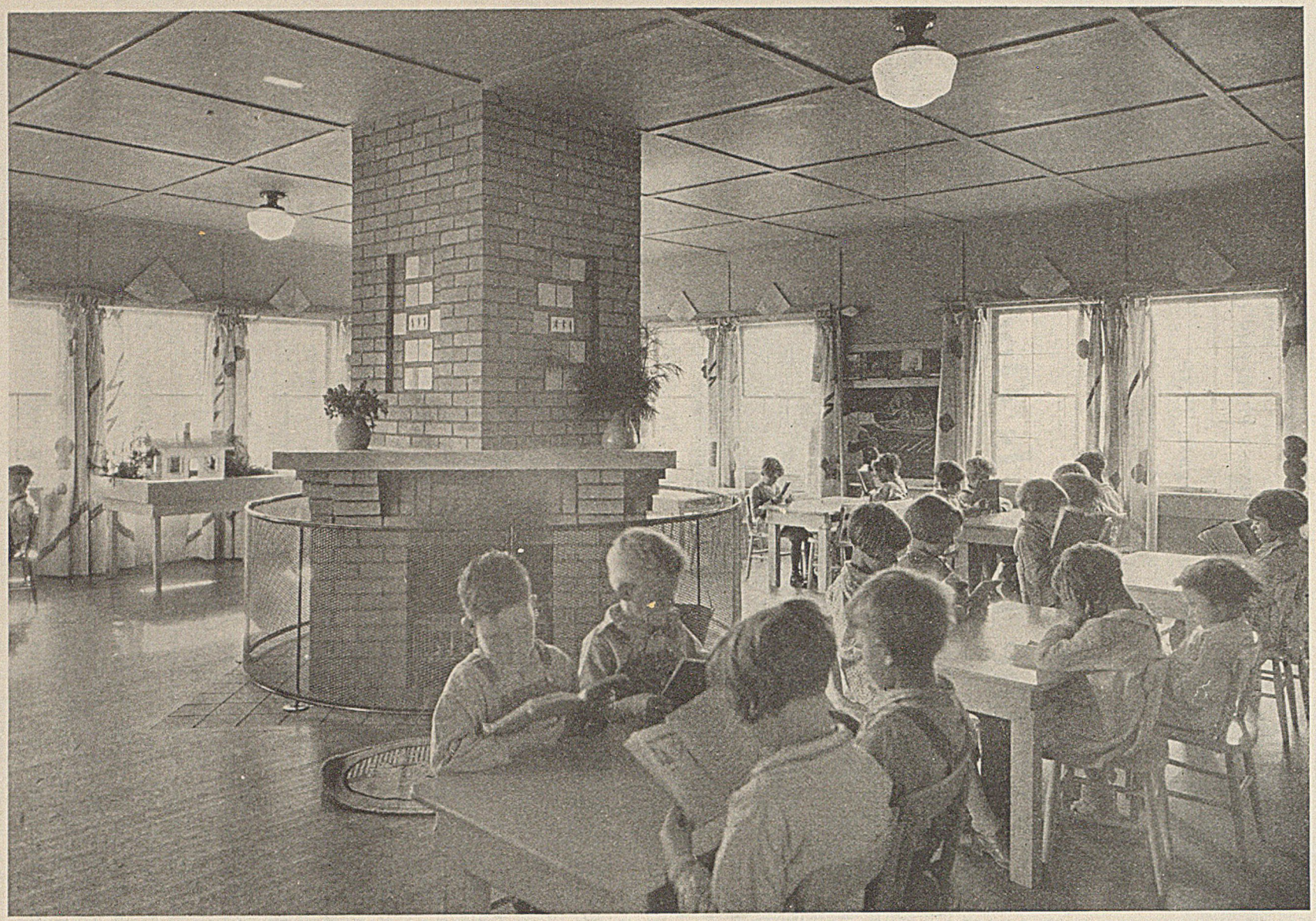
SPEEDY AGREEMENT on a new wage contract in the anthracite industry reveals a statesmanlike appreciation of economic realities which has not always blessed labor negotiations in the coal fields of this and other countries. That the new agreement would continue the existing basic rates of pay was a foregone conclusion. Howsoever much either party might have desired to change these levels, the situation in the industry was and is such that neither side dared risk contest over that issue.

THE SAME economic considerations which dictated this prompt removal of any possible public apprehension of an interruption to the free flow of hard coal next winter, however, also demands that the new period of peace written into the agreement be fruitfully employed. A truce which merely guarantees the preservation of existing conditions until the spring of 1936 is not enough. There must be active co-operative effort to eliminate the disadvantages under which the industry now labors.

SOME of these disadvantages are the heritage of an era of obsolete merchandising methods. Great progress has been made in recent years toward the correction of this situation, and the future holds promise of still greater achievement—if the industry refuses to be satisfied with half-measures and illusory victories. Other and more serious disadvantages, again reflected in diminished sales volume, are inherent in high production costs. Attack upon these latter handicaps can be made effective only through genuine co-operation between management, union officials, and men.

FORTUNATELY, the agreement of last month sets up machinery by which these ends can be reached. Representatives of the miners have openly set themselves against certain abuses long subject of complaint by the operators. In return, management concedes the union a modified check-off. Still more pregnant with possibilities is the provision for the creation of a permanent joint committee of six operators and six union officials with wide powers to work for increased efficiency.

THIS MACHINERY can carve the way to lower costs; it can give impetus to a far larger degree of mechanization than now commonly thought of in the anthracite region. Renewal of the old wage scale implies acceptance of a belief that costs can be reduced without shrinking the semi-monthly pay check. This belief must be justified by performance. Unless there is a continuous advance both in merchandising and production methods, the position of the industry will grow worse, not better. Peace not constructively employed can be as deadly as war.



Teaching the Young Idea How to Shoot

A Primary School Day Scene at the Muiga (Ala.) Home of the Woodward Iron Co.

DAILY ACCOUNTING

+ Assures Positive Cost Control At Indianola

By ALPHONSE F. BROSKY

Associate Editor, Coal Age

AT THE Indianola mine of the Inland Collieries Co., subsidiary of the Inland Steel Co., located near Pittsburgh, Pa., is installed a continuous system of cost-keeping designed to follow the natural divisions and subdivisions of operation and over-all processes in coal mining. This continuity of accounting gives daily costs in the progressive development of monthly costs. It enables the management to grasp the significance of cost trends and to correct the faults that cause needless growth of expense while they are in the making. Bracketing of items allows a positive cost control of each major process or activity without subverting the relation of one to another. A feature of the system is the use of time clocks in place of a timekeeper.

Errors in the distribution of cost items, for which the methods followed at many plants are notorious, have been reduced to a minimum in the Indianola system. A prime source of error in the system generally followed occurs in entering labor charges under general occupations instead of specific jobs. Where labor is closely confined to the work for which it was originally employed, a division along these lines might be satisfactory. Such was more the case in earlier days of mining, when operating methods were less subject to change, than now. In bringing about changes in methods and plans, modernizing influences constantly alter the scope of individual employment, most decidedly during the periods of large readjustments.

Safety The First Consideration

INLAND COLLIERIES CO.
INDIANOLA MINE

No.____ NAME____

PAY ENDING____

OCCUPATION____

Be Careful

Date	IN	OUT	Overtime IN	Overtime OUT	Total Hours	Daily Tonnage		Rate	Earning	
16										
1 / 17										
2 / 18										
3 / 19										
4 / 20										
5 / 21										
6 / 22										
7 / 23										
8 / 24										
9 / 25										
10 / 26										
11 / 27										
12 / 28										
13 / 29										
14 / 30										
15 / 31										

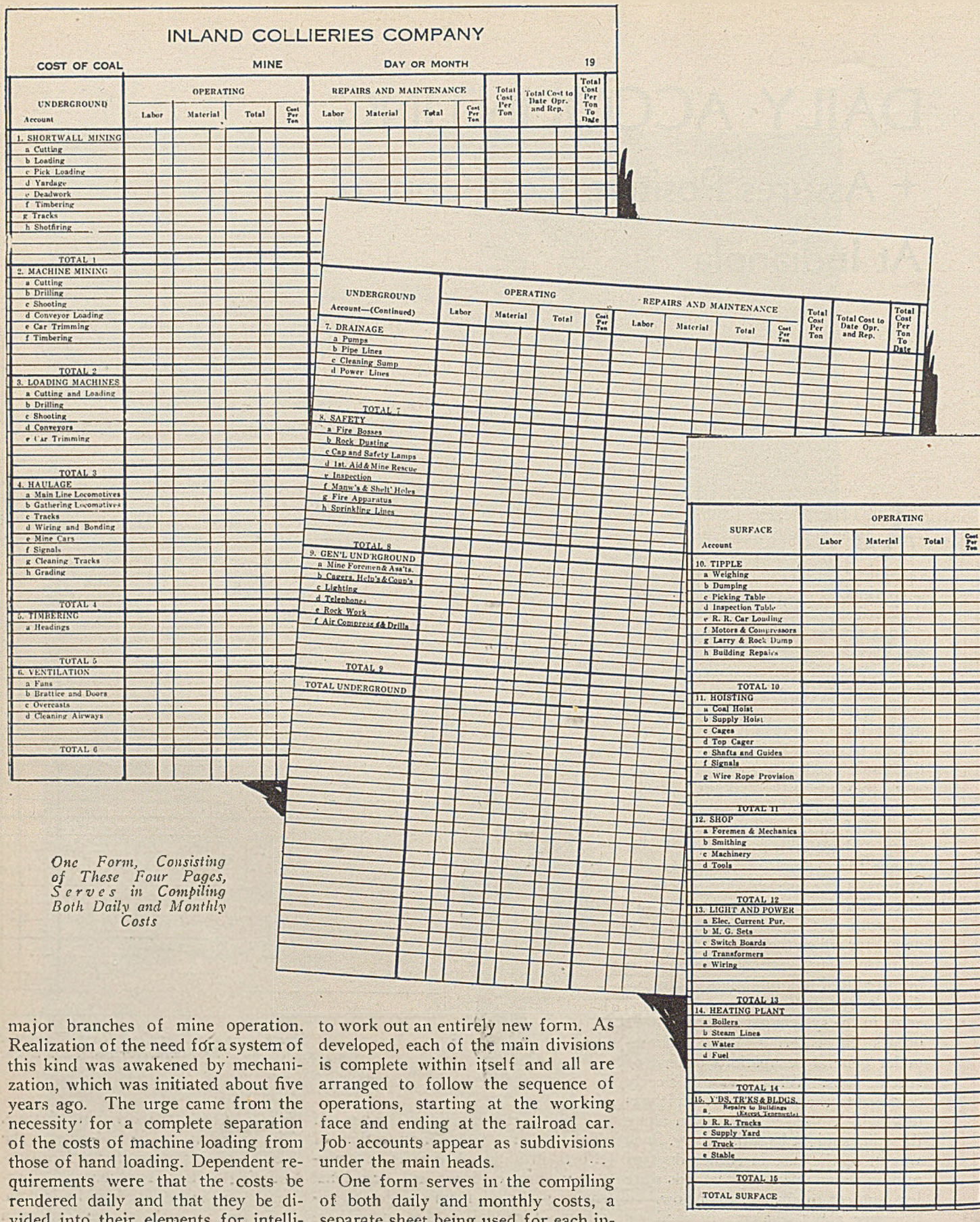
Remarks

HRS. @
HRS. @
TONS @
TONS @
YARD'S @
DEAD WORK
TOTAL EARNINGS

The Clocks and This Card Have Eliminated The Timekeeper and Time Books

Halting running time, absences of day workers, and concentration of efforts in single directions in emergency work require at least occasional shifting of men from one job to another. It is manifest that under these circumstances labor charges cannot be accurately charged to occupations. If a foreman shifts a man to a job other than his own for only a few hours he may unintentionally or deliberately fail to record the division of time. The omission can be laid only to the cost-keeping system, for a loose accounting structure encourages inaccuracy in the gathering of basic data.

A fundamental of the Indianola cost-keeping system is the charging of labor to jobs and not to occupations. This division of labor into its elements is the sole factor which enabled a split-up of the accounts into the



INLAND COLLIERIES COMPANY

COST OF COAL — MINE — DAY OR MONTH — 19

UNDERGROUND Account	OPERATING Labor	Material	Total	Cost Per Ton	REPAIRS AND MAINTENANCE Labor	Material	Total	Cost Per Ton	Total Cost Per Ton	Total Cost to Date Opr. and Rep.	Total Cost Per Ton To Date
1. SHORTWALL MINING											
a Cutting											
b Loading											
c Pick Loading											
d Yardage											
e Deadwork											
f Timbering											
g Tracks											
h Shotfiring											
TOTAL 1											
2. MACHINE MINING											
a Cutting											
b Drilling											
c Shooting											
d Conveyor Loading											
e Car Trimming											
f Timbering											
TOTAL 2											
3. LOADING MACHINES											
a Cutting and Loading											
b Drilling											
c Shooting											
d Conveyors											
e Car Trimming											
TOTAL 3											
4. HAULAGE											
a Main Line Locomotives											
b Gathering Locomotives											
c Tracks											
d Wiring and Bonding											
e Mine Cars											
f Signals											
g Cleaning Tracks											
h Grading											
TOTAL 4											
5. TIMBERING											
a Headings											
TOTAL 5											
6. VENTILATION											
a Fans											
b Brattice and Doors											
c Overcasts											
d Cleaning Airways											
TOTAL 6											

UNDERGROUND Account—(Continued)	OPERATING Labor	Material	Total	Cost Per Ton	REPAIRS AND MAINTENANCE Labor	Material	Total	Cost Per Ton	Total Cost Per Ton	Total Cost to Date Opr. and Rep.	Total Cost Per Ton To Date
7. DRAINAGE											
a Pumps											
b Pipe Lines											
c Cleaning Sump											
d Power Lines											
TOTAL 7											
8. SAFETY											
a Fire Bosses											
b Rock Dusting											
c Cap and Safety Lamps											
d 1st. Aid & Mine Rescue											
e Inspection											
f Manw's & Shelt' Holes											
g Fire Apparatus											
h Sprinkling Lines											
TOTAL 8											
9. GEN'L UND'RGROUND											
a Mine Foremen & Ass'ts.											
b Cagers, Hoin's & Coun's											
c Lighting											
d Telephones											
e Rock Work											
f Air Compress'rs & Drills											
TOTAL 9											
TOTAL UNDERGROUND											

SURFACE Account	OPERATING Labor	Material	Total	Cost Per Ton
10. TIPPLE				
a Weighing				
b Dumping				
c Picking Table				
d Inspection Table				
e R. R. Car Loading				
f Motors & Compressors				
g Larry & Rock Dump				
h Building Repairs				
TOTAL 10				
11. HOISTING				
a Coal Hoist				
b Supply Hoist				
c Cages				
d Top Cager				
e Shafts and Guides				
f Signals				
g Wire Rope Provision				
TOTAL 11				
12. SHOP				
a Foremen & Mechanics				
b Smithing				
c Machinery				
d Tools				
TOTAL 12				
13. LIGHT AND POWER				
a Elec. Current Pur.				
b M. G. Sets				
c Switch Boards				
d Transformers				
e Wiring				
TOTAL 13				
14. HEATING PLANT				
a Boilers				
b Steam Lines				
c Water				
d Fuel				
TOTAL 14				
15. Y'DS, TR'KS & BLDGS.				
a Repairs to Buildings (Except Tenements)				
b R. R. Tracks				
c Supply Yard				
d Truck				
e Stable				
TOTAL 15				
TOTAL SURFACE				

One Form, Consisting of These Four Pages, Serves in Compiling Both Daily and Monthly Costs

major branches of mine operation. Realization of the need for a system of this kind was awakened by mechanization, which was initiated about five years ago. The urge came from the necessity for a complete separation of the costs of machine loading from those of hand loading. Dependent requirements were that the costs be rendered daily and that they be divided into their elements for intelligent scrutiny.

Revision of the old system offered no satisfactory solution of the problem. It was decided, therefore, to abandon the then current system and to work out an entirely new form. As developed, each of the main divisions is complete within itself and all are arranged to follow the sequence of operations, starting at the working face and ending at the railroad car. Job accounts appear as subdivisions under the main heads.

One form serves in the compiling of both daily and monthly costs, a separate sheet being used for each individual day and month. This form is printed on a sheet that is folded once into a four-page folio measuring 9x11½ in. Accounts chargeable to the underground appear on the first and

second pages; those chargeable to the surface are grouped on the third page. The fourth page is devoted to general expense accounts, to a recapitulation, and to production records. Each item is split across the page into an operating element and a repairs and maintenance element, followed by columns given to daily and cumulative totals. The former are carried forward each day in arriving at the monthly cost totals, which are tied up with the total payroll at the end of the month.

Briefly, the procedures in arriving at daily and monthly costs are as follows: A daily cost is compiled by taking all foremen's abstracts, debiting the various accounts with the amount of labor and materials used for the day. These two operations plus overhead expenses, depletion, depreciation, taxes, fire insurance, and liability insurance give a total from which the daily cost is computed. The monthly cost sheet is a recapitulation of the daily cost sheets for the month with adjustments made where needed.

All workers above and below ground check in and out on Stromberg clocks. The cards are designed to take care of labor on the debit side of the ledger in conjunction with the time turned in on the foreman abstracts. In this connection the clock serves merely to check the time submitted by the foremen, but the cards are utilized to record all rate and time data covering day workers and men on loading machines. At the end of the pay period, the total time and rates on the card are figured and the earnings are posted in the payroll.

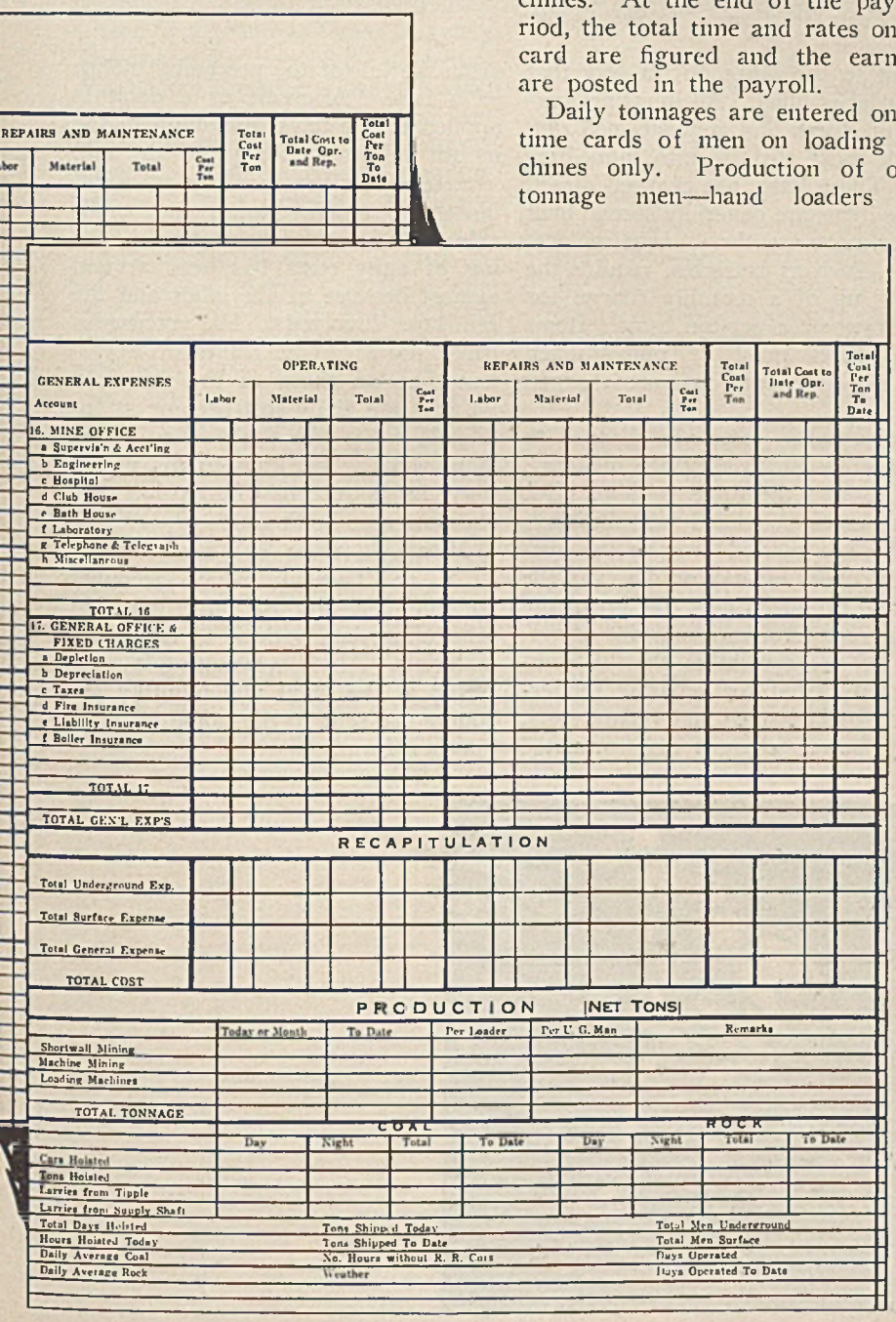
Daily tonnages are entered on the time cards of men on loading machines only. Production of other tonnage men—hand loaders and cutters—is gotten by recapitulation of daily accounts and checked by semi-weekly reports made by the foremen. These reports specify whether the tonnage was produced in wide or narrow places or by pick. In the computation of daily accounts covering cutters and hand loaders, consequently, a composite rate must be used, because actual rates are two or three in number. While these costs are estimated only in the daily bookkeeping, the results check within one mill of the actual cost per ton as determined for the month. Total earnings of all workers alike are entered on the card at the end of the pay period.

This system of time clocks and cards eliminated the timekeeper and the customary method of checking men in and out of the plant. Not only does it greatly simplify the work but it provides an accurate and quick check on the time turned in by the foremen. Together with the timekeeper, all office time books were eliminated. The only time books now used are those carried by the foremen.

No confusion ensues from the use of time clocks in the checking-in and checking-out process. After a man has received or tendered his lamp, he punches the clock. Sufficient time is available between turns to avoid waiting.

As two card racks are employed, a quick glance at the checking-out rack in the morning tells what men did not report for work. A company rule requires the workers to report the reason for their absence to their foreman. Absence of one day without reporting with a good excuse subjects the guilty party to a period of company-imposed idleness. The clocks and cards give a check on contract men who habitually leave the mine early without a legitimate excuse, and serve to curb this proclivity. When a man reports for work and finds a red card in his place on the rack instead of his time card, he knows he is not allowed to go to work. Inquiry will then reveal to him the nature of his offense and the penalty imposed.

Great stress is laid on accuracy in the rendering of the foreman abstracts. If a man is diverted from his regular duties to one or more other jobs during the day, an accurate division of his time must be made between those jobs. This demand, more than any other factor, is elevating the foreman to a higher executive plane. Closely-divided costs give a



INLAND COLLIERIES COMPANY

....., 192.....

WORK PERFORMED IN.....DEPARTMENT

	No.	NAME	OCCUPATION	RATE	DISTRIBUTION	ACCT.	HRS.	Amount		
					TOTAL					

.....FOREMAN

Labor Costs Are Charged to Specific Jobs

foreman an accurate measure of the expense involved in the doing of a job. In days past, much of the value of a foreman was gaged by his ability to determine either by intuition or experience what costs should be; and at best his calculations were mere mental estimates.

If supplies are not charged to specific jobs when issued, their costs must be spread from lump sums, and individual accounts are meaningless, even as labor costs are valueless when debited to occupations rather than to particular jobs. At Indianola supplies are handled in a somewhat similar manner as is the time; that is, they are charged off currently. The mine foreman has jurisdiction over supplies used underground; department foremen on the surface are vested with that same authority.

When requisitions are made, disposition of the called-for supplies is specified. A copy of the requisition is sent to the office on the day that the order is filled. All items are carried in stores and requisitioned out, except those that go into immediate use. These latter are charged direct. Large items are generally spread over one or more months. Large replacements, such as batteries, require the setting up of a monthly charge for settlement on a per-ton basis. Items from stores must be requisitioned out only as needed and are charged daily.

Maintenance costs are charged to the day on which they are incurred, even though the mine be idle. But repair costs sustained on idle days usually are carried over to the succeeding working day or days, as the tonnage produced gets the advantage of the repairs. An important advantage of the system is that it eliminates the need for separate rendering of maintenance and repair costs. Daily power charges are estimated from the bill of the preceding month as a base. A credit or a debit is applied to the days remaining in the month following receipt of the bill.

Safe arrival at monthly costs requires the stepping stones made available in daily cost accounting. Keeping of daily costs has been argued against because of the labor and the red tape involved. The excuse is based more on the faults of a system than on those of the principle. At any rate, daily cost-keeping at Indianola takes the time of only one man, who, in addition to his major duty, keeps records of machine performances and shipping.

Monday's costs are available by 11 a. m. Tuesday, which accounts for the necessity of punctuality in scheduling data both as to labor and materials. All the accounting is completed at the plant and monthly accounts are sent to the home office in voucher form.

CORRECT DRAFT GEAR DESIGN

+ Narrows Hazards in Mine Haulage

By C. E. WATTS

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Berwind-White Coal Mining Co.
Windber, Pa.

TO safeguard against breaking of the haulage chain constituted in a trip of mine cars, it is imperative that every link and pin joining the trip elements be of uniform composition and of a strength guaranteed by a generous factor of safety. The necessity for this precaution arises from the severe loads to which couplings joining mine cars and locomotives are subjected in normal service. Failure of a coupling, whether from inherent weakness, wear, incorrect usage, or any other cause, endangers lives. It may incur costly property loss by a dust explosion and, at the least, will require repairs to track, timbering, and mine cars.

All mining men will agree that conditions met in mine transportation are difficult, but few discern the real significance of the changes in these conditions. Mine haulage is bucking natural laws more and more as demands upon it grow. At best, roadbeds are not uniformly solid, nor tracks constantly level; severe grades are likely to be encountered; short-radius curves must be tolerated under certain conditions; numerous switches and turnouts cannot be eliminated. And withal, the lighting is poor. Not all of these conditions can be altered exactly to fit changes in the functioning of modern transportation.

Plainly, mine transportation is emerging as a new being. Trips ply the tracks at shorter intervals; they are longer, heavier, and at times attain a speed as high as 20 miles per hour. This rate of travel may be a snail's pace on the surface, but underground it gives a train the motion of a giant thundering down the track. These changes and advances in transportation methods of recent years call for increasing attention to the detail of trip couplings.

A review of the experience of the Windber district mines of the Berwind-White Coal Mining Co., in central Pennsylvania, should be helpful to those faced with a problem in car and locomotive couplings. During the last five years the company has replaced some 8,000 1-ton wooden cars with 2-ton cars of composite design, equipped with anti-friction bearings. Concurrent with this replacement of equipment, grades at many points in the haulage systems were modified, roadbeds were improved, and many miles of light-weight rails were relaid with 70-lb. steel. These and similar improvements in the transportation system are looked upon by the management as a continuing process.

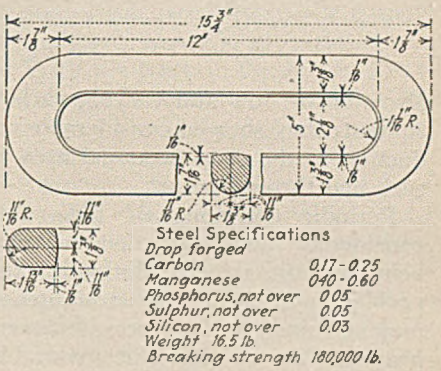
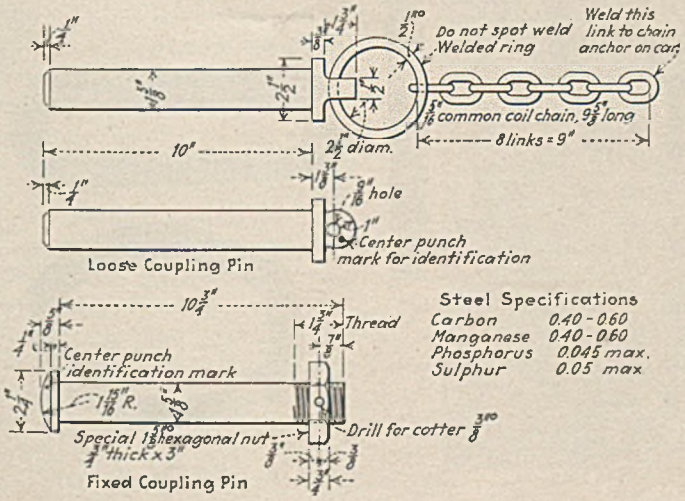


Fig. 2—Coupling-Link Design

The first lot of 800 cars of new design soon demonstrated points of advantage and disadvantage in service. All items of design were carefully considered and improvements made progressively to cars in all succeeding lots installed. The item of coupling pins and links came in for a full measure of close examination during this evolution of design.

In the plans and specifications covering the first few lots of cars, no details of design and manufacture for coupling elements were stipulated. Suggestions were of a general nature. After the cars constituting the earlier installations had been in service a few years, it was noticed that many of the pins showed readily apparent evidence of being bent. In a few instances link failure had occurred. A check-up disclosed that the pins were of low and varying carbon content and that practically all were more or less bent. The links, drop-forged and originally of uniform cross-section,

Fig. 1—Details of Coupling Pin



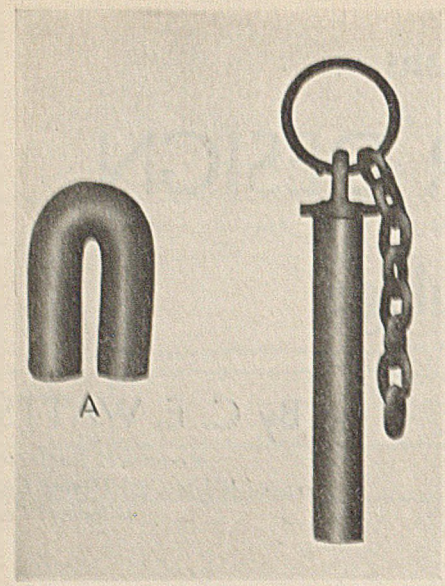


Fig. 3—Results of Testing Cold a Standard Pin in Service One Year

also were of low and varying carbon content; they showed considerable reduction in the cross-sectional area at each end through wear.

Periodic annealing of links was considered, and discarded, as not being a satisfactory solution to the problem. A bent pin straightened may be ruined in the process by overheating. At the least, it invariably loses some of its original stiffness. So, after study and testing, the pins shown in Fig. 1 and the link in Fig. 2 (notable for its increase of diameter at each end) were accepted as standards for the district. They have proved to be of suitable size, weight, and strength to withstand successfully, and without distortion, any load applied in normal service.

The bending load of the pin when in operating position is approximately equal to the breaking point of the link, which is 180,000 lb. As the normal drawbar pull of the heaviest locomotive in the district is 18,000 lb., a factor of safety of 10 is provided.

Within the past two years, all pins and links not conforming with these standards have been replaced. It is planned to discard the links when the ends wear to a cross-section equal to or slightly less than the cross-sectional area of the body. Replacement of pins will be similarly governed. This is considered to be the cheapest and surest way to maintain sufficient and continuously uniform strength in the car couplings.

Fig. 4 shows a few of the original low-carbon pins and links. Although they were fairly tough and strong, they were not equal to the stresses imposed upon them in service. Fig. 3 illustrates a new standard pin taken from a car after one year of service. Its head was cut off and the stem was tested cold by bending under a steam hammer, with results as shown at *A*. In Fig. 6 is presented a new standard link which also was tested cold. First it was stood on end under a steam hammer until distorted to the shape illustrated at *A*. Next it was sawed in two, one half, *B*, being flattened down on itself, and the other half, *C*, being straightened under the hammer. It should be noted that no fractures occurred, indicating the toughness of the steel of which these parts are made.

Car couplings should be of the shortest inside length which will allow coupled cars to pass freely around curves of minimum radius. The shorter the coupling, the less severe are the jerks and jars to which trains are subjected in starting and stopping.

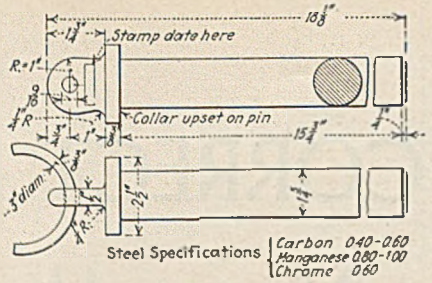


Fig. 5—Standard Locomotive Coupling Pin

Furthermore, with the short coupling there will be less spillage of coal from heavily topped cars.

Equally as important as the draft gear on cars is the coupling pin for locomotives, for the load on a locomotive coupling pin is greater than that on any pin elsewhere in a trip. After due testing and experimenting, Berwind chose as a standard for the Windber district, a locomotive pin of heat-treated alloy steel, of the design and specifications indicated in Fig. 5. On the head of this pin, a place is provided where the date of induction into service is stamped. The purpose of dating the pin is to systematize the replacement of them after a period of service determined as logical by experience. This practice will eliminate the dangers of pin failure from wear and crystallization.

Since these new standards were adopted, no wrecks caused by failure of pins or links have occurred. The steel specifications are believed to be about right, and unless, or until, the links and pins made according to the present standards prove incapable of successfully holding up in service, these standards will be continued in the district.

Fig. 4—This Draft Gear of Low Carbon Steel Did Not Withstand Distortion

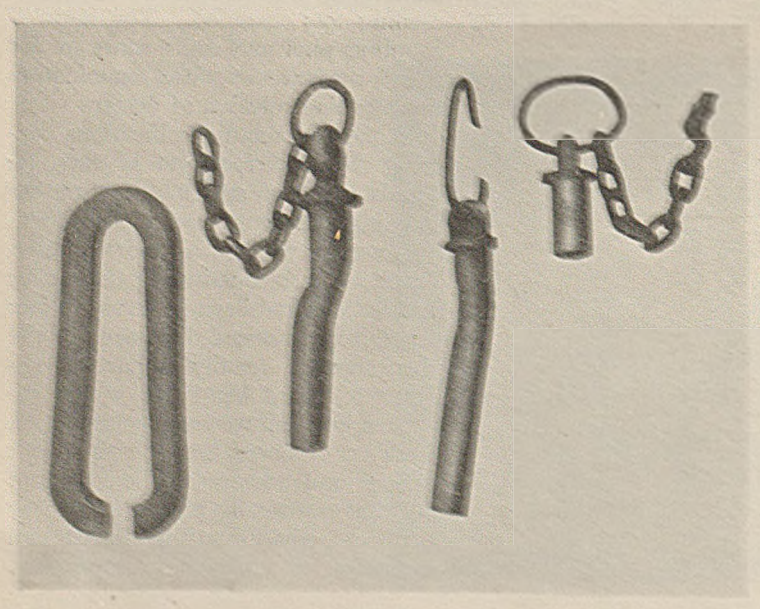
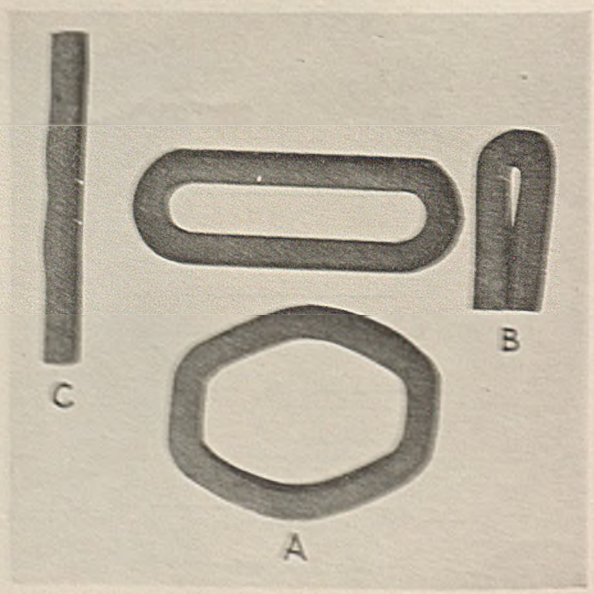


Fig. 6—Distortion Without Rupture in a Standard Link by Testing Cold



ARCWALL-TYPE MACHINES

+ Loading Coal

In Mid-West Mines

UP until about two years ago activities in mechanized loading were confined mainly to the operation of large mobile machines and various types of face and sectional conveyors. But these devices have not had the loading field to themselves since that time, for the planting of pit-car loaders has shown phenomenal growth. Now other interests are in the field, planning to cultivate it with machines of a new type which gathers coal as do the large mobile units. These are of less weight than the large mobile type but heavier than pit-car loaders. With this new type in the field, it can be said that mechanized loading equipment has entered into its fourth phase of diversification.

One of these comparatively new machines is the Jeffrey 44-C loader. This machine is really new only in refinements of design, however, being based on the principle of coal gathering incorporated in the old Hamilton loader. The latter was first introduced by the Jeffrey company in 1913, in the days when the industry was not ready for mechanical loading.

As indicated in Fig. 1, the machine is composed of two main elements: a discharge conveyor which is permanently supported on a track truck and a loading conveyor which is carried on a pony truck while the machine is being moved from place to place. Both these conveyors are pivoted on their respective trucks, for which reason the machine can negotiate curves of short radius.

Upon the machine reaching the face, the gathering conveyor is lifted with a power-driven hoist rope, the pony truck is removed, and the front end of this conveyor is dropped to the floor. The rear end of the gathering conveyor is pinned to and overlaps the front end of the discharge conveyor. In gathering coal this front conveyor is swung about this point of pinning as a center. Movement of the machine in loading, both for sumping into a cut and movement across the face, is accomplished by a power-wound steel rope attached to a jack.

After the machine is sumped in, the rope is led from the power drum, is passed around a snatch block on the jack placed at the rib, and is finally attached to a post on the front end of the gathering conveyor. This rope serves the same purpose as the rope on a shortwall cutter, pulling the machine into the coal. The sweep of the gathering conveyor traces an arc in exactly the fashion of an arcwall cutter and therefore is ideal for loading in places prepared by this type of cutter.

When loading in a squared face cut by a shortwall the entire machine is moved forward as the gathering conveyor is swung sidewise. This allows the front tip of the gathering element to reach into the corners. With the track in the center, the machine will load out coal in a 32-ft. room. The gathering conveyor is of the projecting-arm type. As it is reversible, it will load with equal facility when swung either to right or to left. After the machine finishes loading, no cleanup by hand shoveling is necessary, but the loading operation can be speeded up by face men with shovels. Usually, about 75 per cent of the coal is loaded mechanically.

Shooting of the coal need be no heavier than for hand loading. For best results, however, the coal should be snubbed. The shape of the gathering conveyor enables it to reach under and load out a snubbing cut. This is the practice followed at the

Though Only One Is Shown, Two Face Men Usually Are Employed With This Machine

Westland (Pittsburgh district) mine of the Pittsburgh Coal Co.

One of these units is in operation at the No. 15 mine of the Consolidated Coal Co. of St. Louis, at Mt. Olive, Ill. On June 11 this loader produced 162 tons in a shift. The per-shift average for this month was 152 tons. For the month of May, however, the daily average was only 137 tons.

Here the No. 6 seam is being mined, its thickness averaging 7½ ft. About 14 in. from the floor occurs the characteristic blue band, which is about 1½ in. thick. About 4 in. of bottom coal is left in place and the bed is cut with shortwall machines. In a 20-ft. place four snubbing holes are drilled; they are placed 30 in. above the floor and charged with permissible powder. The entire bench is loaded out in one operation. Much of the snubbed coal is pulled out from under the cut before the upper bench is blasted. Top holes, three in number, are drilled about 12 in. from the roof and charged with pellet powder.

Ample opportunity is given the loading crew to remove the blue band and other impurities. Two men are stationed at the front end of the machine. When they encounter a sizable piece of refuse, they pitch it to one side. The bulk of the cleaning, however, is done by a rear conveyor attendant. B. F. Meyer, district superintendent, asserts that this opportunity for cleaning coal offered by the machine allows the removal of 2 to 2½ per cent of refuse. Without this opportunity 5 to 5½ per cent of refuse would have to be removed in the tipple instead of only 3 per cent.

A machine operator, a driver—cars are shifted by a mule—two machine men who cut and drill, one trackman, and one timberman comprise the remainder of the working crew. Supervision takes one-fourth the time of a foreman. The attendance on the machine consequently is 9¼ man-shifts. These men put the coal on the parting.

Development by loading machines is more economical when entries are driven wide. In this mine entries are driven 20 to 22 ft. wide where the roof is sound. The loader has been working in 22-ft. entries in a battery of four places. Switches are laid in the crosscuts and the places are fairly closely timbered. However, the roof at the working face usually will stand unsupported during the taking of several cuts, so timber need not be set in the sector developed by the sweep of the front conveyor of the loader. About 12 tons of coal is mined for every prop set.

Mr. Meyer believes the use of a gathering locomotive behind but one of these machines is not economical at the present rate of output. A locomotive would be profitable when serving two of these machines if the latter were worked close together. While the driver is waiting for a car to be loaded, he puts in his time building the load.

Some idea of the potential loading capacity of this machine is given by the operation of a unit at the mine of the Little Betty Mining Co., located near Linton, Ind. Though a car with a capacity of only 1½ tons is used at this mine, on the fourteenth shift of operation the machine loaded 188 tons. This output required the shifting of 123 cars.

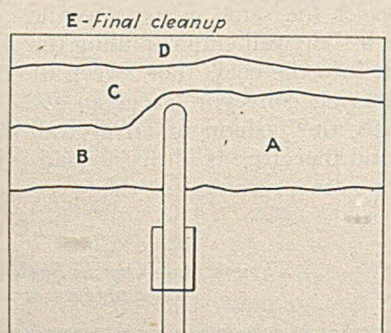
No. 4 bed coal, 6 ft. thick, is mined. Rooms are driven 200 ft. long and 26 ft. wide on 36-ft. centers. Cuts are made 6 ft. deep, using shortwall machines. Plans for future operation call for driving the rooms only 24 ft. wide on 34-ft. centers, cutting with an arcwall machine, the belief being that an arc cut will add efficiency to the loader. Roof conditions are only moderately good. As a rule, three rows of posts must be set on each side of the track in rooms.

One cut from each of three to four places usually gives the machine a day's tonnage, the average yield per place being about 40 tons. The machine crew consists of the following men: One operative; one helper; one face man; one conveyor attendant; one attendant; one motorman; two cutters who devote only half their time to cutting for the loader; one man (equivalent) for drilling and blasting; one man who lays track and timbers; and one foreman who devotes about six hours to the operation of this machine. Altogether, therefore, attendance on the machine amounts to 8¾ man-shifts.

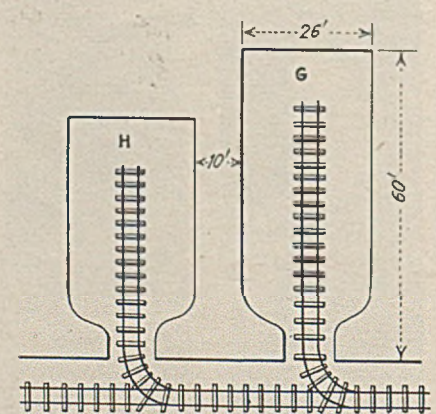
As the major demands of the markets absorbing the product are for lump, the coal is lightly shot. In consequence, the machine is up against no easy loading job. How this necessity for lump coal effects machine performance is best explained by reference to Table I. Incidentally, in the study from which this table was

Table I—Time Consumed in Loading Out a Room in the Little Betty Mine

Loading Time Seconds	Changing Car Seconds	Incidental Delays Seconds	
140	40		A
80	50		
75	70		
60	45		
65	60		
75	50		
95	45	20*	
130	50		B
155	80		
240	55	35*	
185	45		C
140	55		
165	55		
150	60		
180	40		
160	50		
145	155‡		
115	45		
120	45		
265	45	30†	D
260	55		
230	50		
230	50		
210	50		
230	50		
245	55	30*	E
195	75		
240			



Operating moves in accordance with grouping in table



Loading operations covered by the table were conducted in room G. The machine was moved to H

* Shifting rope jack
† Shear pin in front conveyor coupling replaced
‡ Time lost waiting for cars

derived time was clocked to the nearest 5-second increment, as 45 seconds when the actual time might have been 43 or 44 seconds. Facilities were not available to make a to-the-second study. Nevertheless, the results should be closely representative of the actual operation.

In the lower sketch to the right of Table I are shown the room, *G*, in which the loading operation was studied and the adjoining room, *H*, to which the machine was subsequently shifted. Twelve minutes was consumed from the time the machine stopped loading in room *G* until it commenced loading in room *H*. Loading in room *G* started at 11:35 a.m. and ended at 1:19 p.m., an elapse of 1 hour and 44 minutes. In cleaning up this room 42 tons was loaded into 28 cars.

It will be noted that wide variations are shown in the time taken to load individual cars. As with mechanical loading in general, these differences reflect difficulties in conditions and also in preparation. In the upper sketch to the right of Table I are indicated the large moves made by the machine. First, the machine was sumped into the middle of the cut as far as it would go without crowding and then fed to the right, sweeping over area *A*. As the coal in this area was loose, the machine loaded the first seven cars at the average rate of 84 2/7 seconds each, or slightly better than a ton a minute. The fourth car was loaded at the rate of 1½ tons per minute.

Blasting left the coal in the left half of the cut tighter than that in the right half. In being swept to the left over the area *B*, therefore, the machine loaded at a much reduced rate. This de-acceleration in the loading rate occurred progressively to the back of the cut. Zone *C* represents coal which, though standing, was worked down by the machine with the assistance loaned by men with pick and bar. Zone *D* represents tight coal at the back of the cut, which was brought down by hard digging with pick and bar. Little time was lost in shifting the feed rope and jack, the average being about 30 seconds.

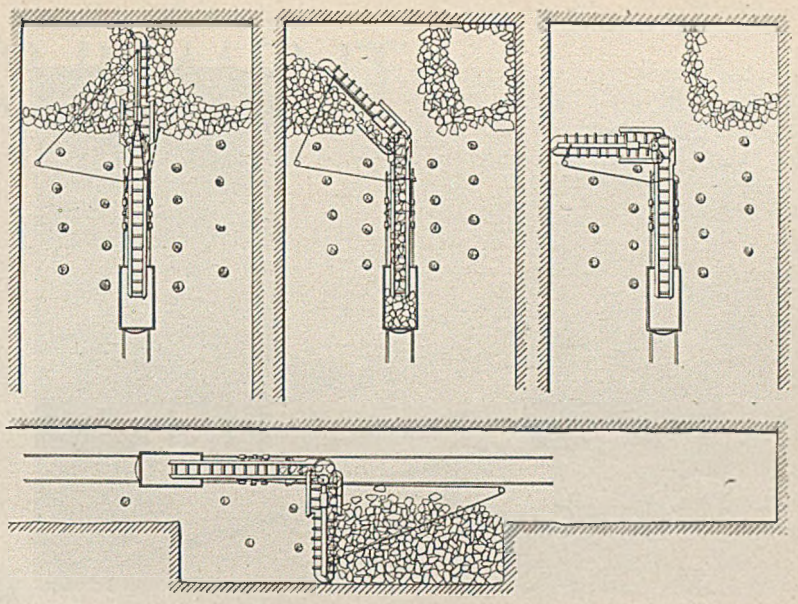


Fig. 1—Like an Arcwall Cutter, the Loading Bar Swings in a Half Circle; Like a Shortwall Cutter, It Is Pulled by a Rope

As the room in which operation of the machine was witnessed was in only 60 ft. cars were shifted from the entry. Usual practice is to drive two crosscuts through the rib on each side of a room and provide all four with a switch. These are staggered, so that the interval between crosscuts is 75 ft. maximum and 50 ft. minimum. This provision and the fact that cars are gathered by a locomotive (5-ton cable-reel) make obvious the reason why cars were shifted in as little time as 40 seconds, as the table shows, and in about 56.5 seconds on an average. This rapidity of car change in turn partly explains why comparatively large tonnages are gotten when using a small car.

Conditions somewhat similar to those in the Little Betty mine are encountered in the mine of the Ebbw Vale Coal Co. at Sullivan, Ind., where one of these machines is in operation. In the section in which this machine is in operation the coal (Glendora seam) is 6 ft. thick. Loaded cars of 2¼-ton capacity are pulled from the machine by a team of mules; empties are pushed in by hand. Roof conditions are only fair and places must be well timbered.

For the last fifteen days of operation of this machine the average daily output was 142 tons. The maximum output per shift during this period was 171 tons. On one other shift 167 tons was loaded, and on another 165 tons.

Division of the crew is as follows: One machine operative; one helper; one face man; one conveyor attendant; one mule driver; two cutters who devote half their time preparing coal for the loader; one man who drills and snubs; one man who lays track and timbers; and one foreman who devotes one-fourth of his time to the loader. Attendance on this machine is 8¼ man-shifts.

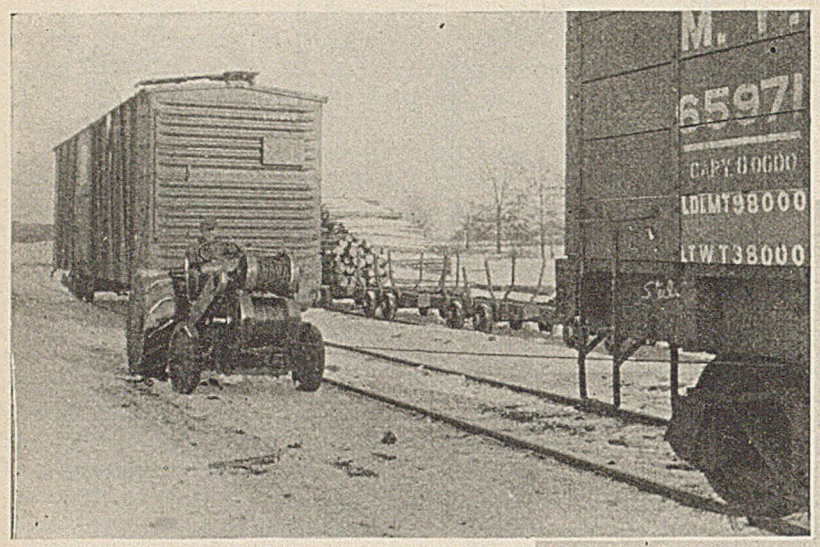
Observations, including an approximate time study similar to that for the Little Betty mine, were made covering the complete loading cycle in a room in the Ebbw Vale mine. A summary of the observed results at Ebbw Vale, in a comparison with the results observed at Little Betty, is presented in Table II.

Taking all factors into consideration, the results achieved at these two mines during the observed periods are fairly equal, by and large. What advantage the Little Betty mine gained in the speed of shifting cars, it lost in the size of its cars, compared with the operation at the Ebbw Vale mine. The respective rates of production in tons per minute of loading, including time for car shifting and time lost, are virtually equal as Table II shows.

Table II—Comparison of Loading Results at Two Mines in Which Conditions Are Similar

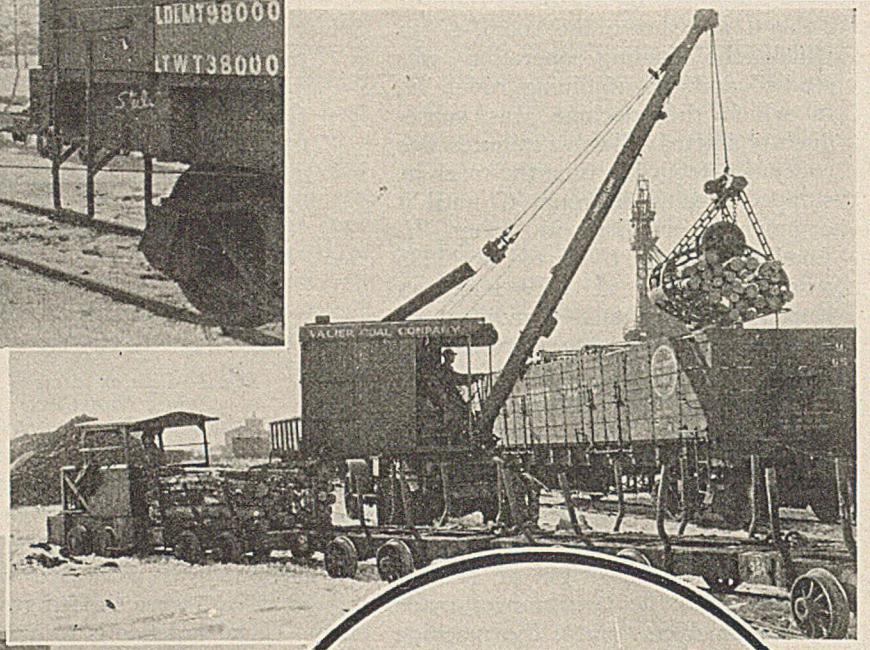
Mine	Tons per Place	Time in Place, Min.	Tons per Min. Including Delays and Shifting	Tons per Min. of Loading Time	Cap. of Car, Tons	No. of Cars Loaded	Haulage Method	Shifting Distance, Feet	Average Time, per Car Shift, Sec.	Loading Time, per Cent	Shifting Time, per Cent	Incidental Delays, per Cent	Attendance Man-Shifts
Little Betty..	42.00	104	0.404	0.55	1.5	28	Loco	60	56.5	73.63	24.52	1.85	8.75
Ebbw Vale...	47.25	117	0.403	0.51	2.25	21	Mules	55	69.3	78.20	19.60	2.20	8.25

MATERIALS-

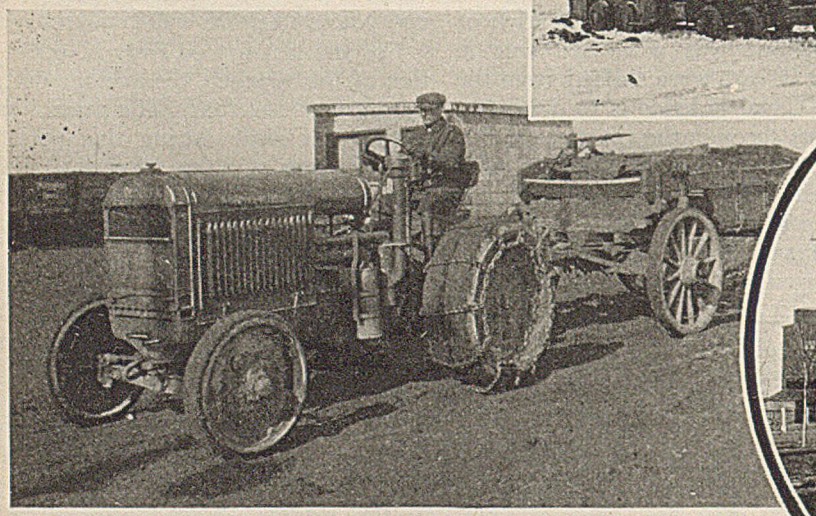


Railroad Cars Are Pulled Short Distance by an Automotive Two-Drum Hoist

This Crane Takes 25 Props at a Pass; Enough to Fill a Timber Truck

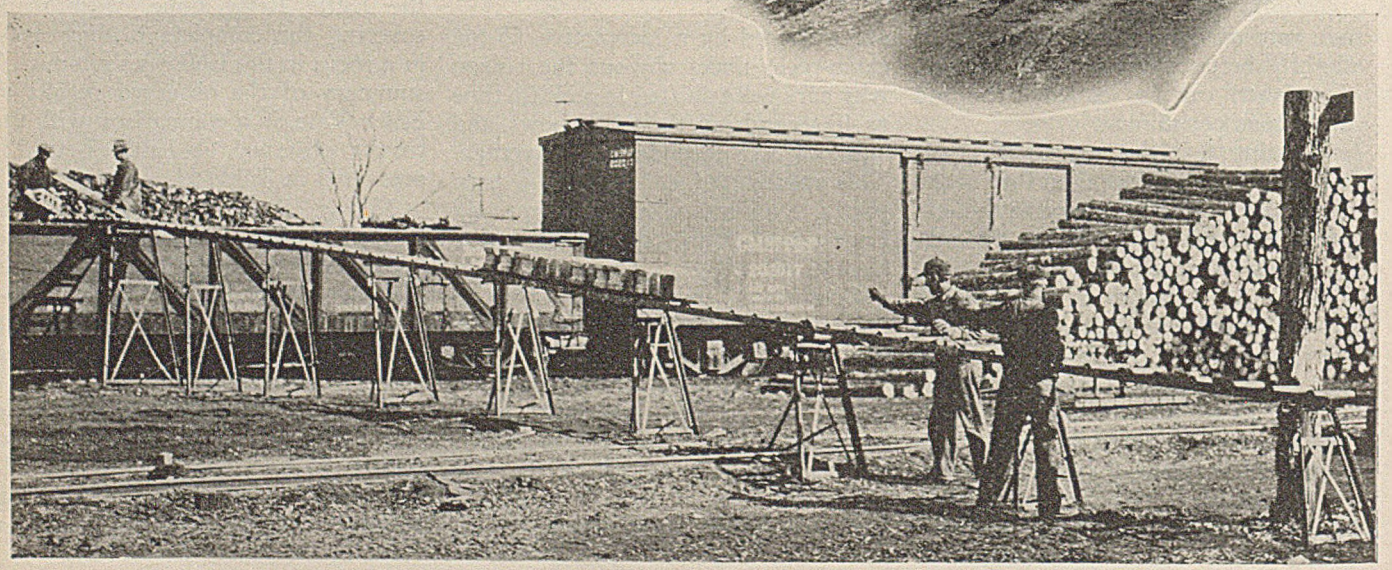


A 4-Ton Tractor Does the Work of a Team of Horses



Valier, With a Capacity of 7,000 Tons Is Producing About 5,000 Tons a Day

A Roller Conveyor Serves a Useful Purpose Handling Concrete Blocks



HANDLING EQUIPMENT

+ Saves 0.58c. per Ton

At Valier Mine

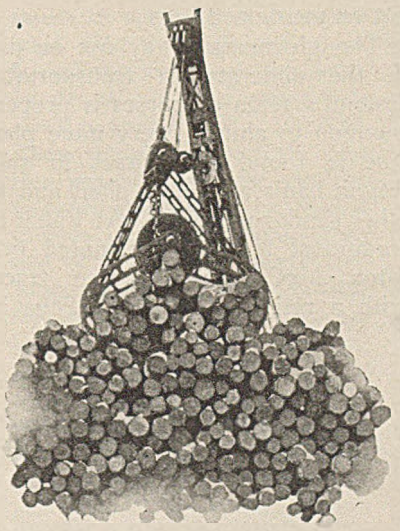
THERE is a wide field for the application of machines for handling materials and supplies at mine plants. This was proved by the last year-end survey of the buying power of the coal industry made by *Coal Age* (Vol. 35, p. 47). In 1929 the coal industry of the United States spent over $150,000,000 for materials and supplies. These commodities aggregated so mammoth a bulk as to leave no doubt as to the opportunities for savings which might be effected by handling them mechanically.

That labor-saving machines in actuality can be utilized successfully for handling these wherewiths of mining is illustrated by the experience of the Valier Coal Co. Rather completely equipped with these devices, mounted on trucks and tractors, the Valier mine, in southern Illinois, is now handling materials and supplies with a crew 40 per cent the size of that normally required when hand methods are employed.

Valier is now a completely mechanized mine. For handling mechanically the timbers, rails, and other supplies used in the production of 5,000 tons, which is the present daily rate of mining, six men are employed. Based on past experience in handling supplies without machines, fifteen men would be required for this job in the production of this tonnage.

A portion of this saving in wages goes to cover interest on the investment, maintenance, depreciation, and operating cost chargeable to the equipment. But the sum total of these charges against equipment is a small fraction of the savings in labor.

The first cost of the handling equipment was approximately $21,000. Yearly charges covering depreciation, interest and taxes amount to $3,560, and the yearly charges covering maintenance and operation amount to $500. These charges when combined amount to a total overhead of $4,060 per year, or $211.45 per month. On a basis of 16 working days per month, the daily charge is $21.15. With labor at $5.61 per day, the overhead on this equipment is equivalent to the wages of 3.8 men for one day. As the number of men required to handle the supplies without machines would be 15, as the total number of men now used is only 6, and as the overhead of the machines adds a cost equivalent to an enlargement of the crew by 3.8 men, a reduction in labor of 5.2 man-shifts is realized. This gives a net saving at $5.61 per man-shift of $29.17. When prorated to a daily production of 5,000 tons, the saving is 0.58c. per ton.



The Crane Will Unload and Stack a Carload of Props in 35 Minutes

Besides the saving in handling materials and supplies, yet another has resulted from the increased efficiency of the crew. Not all of the six men are constantly required for furnishing materials and supplies. One or two of them can be spared for handling freight to and from the station by truck.

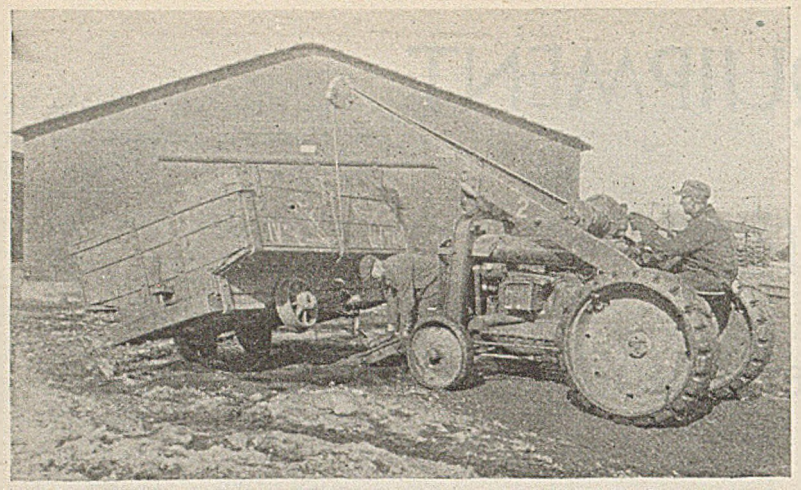
One of the biggest savings is in handling props and ties, unloading them from gondolas and loading them into mine cars. For this job a Universal crane, with a 24-ft. boom, mounted on a 5-ton truck with solid tires, is used. A grab bucket constructed from a clamshell serves in this operation. One lift takes twenty-five 5-in. round props, 8 ft. long, or enough to fill one timber truck. Two hundred props, or eight mine truckloads, are handled in about 13 minutes. A gondola holds 600 to 700 sticks of the size used at this mine; these can be unloaded and stacked in about 35 minutes.

All four men on the supply crew engage in this job. One man operates the crane; one works in the railroad car, guiding and steadying the grab bucket; one centers the prop-filled bucket over the timber truck; and one operates a 3½-ton Whitcomb gasoline locomotive attached to the supply trip. Normally this unit will handle 16 cars of supplies.

The grab bucket is used also in handling mine ties, whether they be square-sawn or finished on two sides only. Owing to the cross-sectional shape of the ties, the speed of the grab bucket in taking them is not as great as it is in handling props. The square-sawn ties naturally offer the most difficulty in this respect. Nevertheless, a distinct saving of labor is said to be realized.

Another boom-end gathering element for the crane is a clamshell bucket which is used for moving sand, gravel, cinders, refuse, and boiler-room coal. The clamshell sometimes is utilized for unloading concrete blocks when it is desired to store them near the unloading track without stacking them. In this case the clamshell is kept closed and serves merely as a bucket into which the blocks are stowed for moving.

Rails are handled and stacked by a 250-volt Cutler-Hammer magnet of 6-ton capacity which is attachable to the crane boom. Although the crane truck is equipped with a d.c. generator, this unit is not used. It has been found more satisfactory to plug in on the power supply of the plant. The magnet lifts four 56-lb. rails at



Replacement of Car Wheels Is Speeded Up by a Small Tractor Crane

one time. As a rail of this size weighs 560 lb., a large crew would be needed to move it by hand. What is more, the man-method is awkward and quite dangerous. Perhaps more injuries are sustained on this job than in handling any other supplies. The crane-magnet combination also serves in the handling of scrap, another task which, when done by hand, is fraught with hazards.

Materials-handling equipment wins a point in its favor as an agent influencing a reduction of accidents. Scratches and bruises sustained in materials handling frequently are a focus of infection, and the skin-breaks, at first inconsequential, may grow into lost-time accidents of a serious nature. Because the exposure of the individual worker to injuries is less and fewer men are employed, the job risk is considerably less when mechanical methods are followed.

Two Whitehead & Kales cranes are employed in lifting and moving heavy objects. These units are extremely useful for lifting crippled mine cars and for handling locomotive trucks. Their greatest merit lies in the fact that they can be taken direct to the job, whether it be inside the shops or outside. If a shopped mine car merely needs a new wheel, time is saved by taking a wheel and the crane to the spot where the car happens to be.

One of these cranes is equipped with an 8-ft. boom and the other with a 12-ft. boom. The only other difference between the two units is that the one with the greater boom reach is equipped with two 1-ton cast-iron wheels, while the other is provided with two ¾-ton wheels. On both units the wheels are tired with solid rubber.

Moving and spotting of railroad cars in the loads yard and in the supply yard are accomplished by the use of an Allison two-drum hoist of the automotive type, mounted on a Fordson tractor. This unit is particularly useful during the winter months when snow, iced rails, and stiff bearings impede the moving or pulling of cars. It is sometimes pressed into service for moving trips of mine cars in the supply yard. The character of this unit suggests a multitude of other uses about the mine plant which need not be mentioned here.

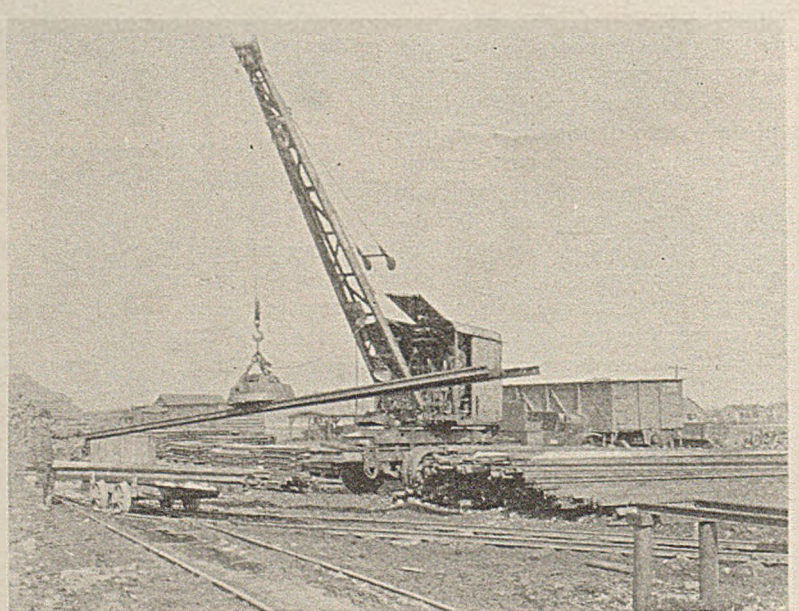
Though animals may not be used in the underground transportation system, a team of horses is property common to almost every mine plant. Use is found for horses in short wagon hauls about the plant and for other similar purposes. At Valier the traditional team is supplanted by a 4-ton McCormick-Deering tractor with a rating of 10 hp. Thus has been made a substantial saving in the elimination of animals and driver.

While the purchase price of a good industrial tractor is about four times that of a good team of dray horses, the mechanical unit is available for use at any time and requires no rest. It has greater utility, works faster and longer, and has considerably more power than a team of horses. It requires fuel only when in use and is not subject to disability due to sickness. Two steam-heated garages house the truck and tractor equipment. Being automotive, these units require shelter if they are to be started quickly during cold weather.

Not always is it convenient or desirable to handle by crane such bulky materials and supplies as cement, concrete blocks, or ties. If these are to be moved a distance beyond the normal reach of the crane, this unit cannot be used. For this exigency the mine is equipped with 160 ft. of Mathews roller conveyor. This conveyor comes in easily handled sections which can be quickly joined and supported by angle-iron bents. As the rollers revolve freely, a slight angle in the set-up of the conveyor will allow objects to move over it by gravity.

These rollers are on 12-in. centers. When objects too short to span two adjacent rollers are handled, a number of them are loaded on a ship-lap-board and thus transported by the conveyor. Concrete blocks, hollow tile, and brick are handled in this way when the moving distance will not permit the use of a crane and bucket. Concrete blocks are moved sixteen at a time in this fashion.

For Handling Rails and Scrap a 6-Ton Magnet Is Used



OUTBURSTS

+ How and Why They Occur

By F. C. CORNET

Mining Engineer, Mons, Belgium

A LIBERATION of 1,000 cu.ft. of pure methane per ton of coal mined is considered quite normal in southern Belgium and northern France. Some mines of the Crowsnest Pass coal field, in British Columbia, discharge as much as 8,000 cu.ft. of pure methane per ton of production (see "Bumps and Outbursts of Gas," Geo. S. Rice, Victoria, B. C., 1918). But if the coal was distilled eons ago, as the new theory has it, where are the empty spaces in which all this gas could await its liberation? And how could the gas have been evolved against pressures such as ruled in the great depths at which the measures, according to geologists, were then lying?

One's best judgment refuses to admit that the gas could be evolved or that spaces large or small could exist to receive it, for in seams thus deep the weight of the strata has been found to close any man-made opening unless it is ceaselessly brushed. However, although the coal was under a pressure so great as to make gas liberation impossible, it does not follow that the high temperatures had no effect on its condition, physical or chemical, or both.

On the contrary, it seems reasonable to suppose that, as a result of the heat to which they were subjected under pressure, the hydrocarbons in the coal underwent a change in their molecular arrangement which endowed them with the property of liberating, at mine temperature, a certain quantity of gas, as soon as the one condition making such a liberation impossible at that time should cease to exist. Such an occasion will come when the pressure to which the coal is submitted becomes sufficiently reduced—as it does, for example, when the seam expands as a result of either natural causes or of mining.

In other words, when the coal is heated while under a pressure high enough to prevent a normal distillation, the molecular equilibrium of its hydrocarbons will be unstable as soon as the pressure in the coal falls below a certain figure. On the equilibrium being thus lost, a certain quantity of gas is liberated, the emission ceasing when molecular stability is restored among the hydrocarbons in the coal—that is, when the hydrocarbons have yielded a quantity of gas proportionate to the fall of pressure in the seam. Thus in our time would be accomplished the final phase in a phenomenon the initial causes and first phase of which took place in long-past geological eras.

THAT METHANE in a mine is the result not of present-day chemical changes but of disturbances caused by upheavals of the earth's crust after the coal seams were formed was the theory expounded by the author in an article published in *Coal Age*, Feb. 17, 1927. These disturbances and the heat they generated subjected the coal to partial distillation. But, because pressure retards distillation, evolution of the gas could occur only where the covering was sufficiently thin and pervious to allow the gas evolved to escape to the outside of the seam or where the strata themselves contained empty spaces in which the gas could lodge. In the present article, Mr. Cornet further develops this theory, with particular reference to gas outbursts and the rôle of "latent methane" in these phenomena.

The quantity of gas thus tardily liberated may be less or greater than it would have been had distillation occurred normally. The gas also may have a different composition, but it may be supposed that its abundance and composition bear a certain direct relation to the degree of heat to which the seam was subjected at the time of the earth's movements that disturbed it. This would explain why the more a seam has suffered from geological disturbances, the more gaseous it is. It also would explain why in the same seam, the chemical composition of the gas liberated by the coal will vary from one place to another.

This gas, as we know, is a mixture in which methane may largely predominate but in which may also be found, in widely varying proportions, such other gases as ethane, olefiant gas, carbon monoxide, hydrogen, oxygen, nitrogen, and carbon dioxide. Publications of the U. S. Bureau of Mines show that the proportions in which these gases are evolved, in distilling a given coal, vary with the temperature at which the operation is conducted (see Bulletin 1, "The Volatile Matter of Coal, 1913"; also Technical Paper 140, "The Primary Volatile Products of the Carbonization of Coal, 1916").

In the light of what I have said above, it becomes at last possible to explain what "latent methane" really is. It is that product the final distillation phase of which is delayed until the pressure to which the coal is submitted falls below a certain figure. How temperature also influences the appearance of latent methane will appear later.

There is enough geological evidence to warrant the statement that all coal seems to have suffered more or less from heat-creating earth movements

and that at the time they did thus suffer they were under pressure conditions that made normal distillation impossible in them. Hence, all seams, at some period or other in their existence, were endowed more or less with a power of emitting methane. No gaseous product of any kind, methane or other, could originally exist in the seams.

Since those distant days, from one geological cause or other, the coal measures in many regions have been placed in such position, relatively to the surface and outside atmosphere, that they have completely lost their power of emitting methane, whereas others are in a more or less advanced stage of losing theirs. In the latter, methane is now found in both the latent and gaseous states. Expansion, made possible by a reduction in the thickness and pressure of the covering strata, has permitted cleavage joints, fissures, and pores to open in the coal, thus creating such a lowering of pressure that liberation of latent methane could begin.

As a result of this process, gaseous methane appears in the joints, fissures, and pores aforesaid. On the pressure in these reaching a certain figure, latent methane distillation stabilizes itself at the rate necessary to replace the gas finding its way to the outside through joints, fissures, and pores existing in the coal and covering strata.

This process may be a slow one—may last ages—but once started, it goes on unceasingly. It will stop only when the reserve of latent methane in the coal is exhausted. All gaseous operations in the United States at the present day probably are in seams that have been thus losing continuously for countless centuries their power to emit methane. Only in Europe, especially in Belgium, have mine workings reached, at considerable depths, what I will hereafter call "virgin seams"—that is, seams where pressure conditions have not varied since the remote days when the latent methane was created; seams which, but for the miner's pick, would remain forever untroubled by expansion.

When a lump of freshly mined coal is placed in an airtight chamber in which a vacuum is established, the coal distills and ceases to distill only when pressure in the chamber reaches a certain figure. For a given coal, this pressure depends on the temperature at which the test is made. If the temperature is raised, the pressure at which distillation stops is raised also. Until a better name is found for it, the absolute pressure at which a given coal ceases to distill at a given temperature may be called "the elastic force" of the coal at that temperature.

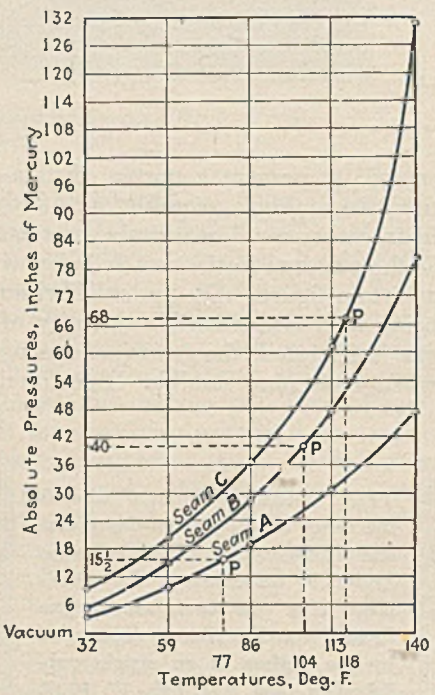


Fig. 1—Pressures Needed at Certain Temperatures to Prevent Coal From Distilling

Taking examples from actual practice, the elastic force, at five different temperatures of three different freshly mined coals, is given in Table I.

These coals are from mines at the Franco-Belgian border, ten or eleven miles to the west of Mons. Seam *A* is mined at depths between 1,100 and 1,400 ft., where the temperature of the strata averages 77 deg. F. No blowout ever occurred in this seam. No life has been lost in it from a gas explosion since 1898.

Seam *B* is mined at a depth of 2,800 ft., where the temperature of the strata reaches 104 deg. F. The blowouts in this seam have occasioned much trouble. Seam *C* is one of several in which miners now refuse to work, because blowouts have been so frequent in them. These beds, intersected by a tunnel driven across the measures at the depth of 3,700 ft., where the temperature of the strata is 118 deg., are not being mined for the time being.

After mining, the reserve of latent methane in a coal becomes exhausted more or less rapidly. It is a well-known fact that all gaseous coals retain the property of liberating methane for some time after falling under the miner's pick. This time may vary all the way from a few minutes to many weeks. The seams that liberate most gas are not necessarily those the coal from which stays gaseous longest after mining. The reverse quite often is the case.

The reason for this may be explained. Suppose two coal beds, the one soft, endowed with a considerable power of emitting methane, the other hard, possessed of little. The difference between soft and hard coal is one of cohesion, the first coal being more divided, more slacky—that is, more expanded—than the other. It is well known that the more expanded coal is, the more freely it emits the gas which, until that time, it has retained.

Hence, while the more slacky coal from the soft, very gaseous seam may lose all power of emitting methane shortly after being brought to daylight, it may well be that the more coherent, more lumpy coal from the hard, slightly gaseous seam will retain its methane so tightly that it will emit the last of it only after many days of exposure to the disintegrating influence of the atmosphere.

As heat aids distillation, storage in a warm place will make coal liberate the last of its latent methane more rapidly than storage in a cold place. For the same reason, coal that has ceased to distill in outside storage may again start doing so actively after being transferred to the bunkers of a ship, where the temperature is higher than that ruling where the coal had previously been stored. Examples of the latter kind have so often been reported that the case might be called classical. It has never hitherto, however, been declared to be a case of distillation.

Distillation also accounts for the fact that a coal whose reserve of latent methane is seemingly exhausted, may still be made to yield methane, sometimes in large volumes, by being submitted to pulverization—that is,

Table I—Pressures at Which Coal Ceases to Distill

	Seam A					Seam B					Seam C				
Temperature Deg. F....	32	59	86	113	140	32	59	86	113	140	32	59	86	113	140
Absolute Pressure, In. of Mercury	3	10	19	30½	47	5	15	28½	47½	79½	9½	20½	36½	61½	130½
Lb. per sq.in.	1.47	4.91	9.33	14.98	23.09	2.45	7.37	13.99	23.33	39.05	4.67	10.07	17.93	30.21	64.30

by being expanded thoroughly. By destroying cohesion, pulverization creates in the coal new pressure conditions under which the latent methane that the coal may still retain has greater freedom for distillation.

The data appearing in Table I have been used to draw Fig. 1, in which three curves enable one to realize at a glance the rapid rate at which the elastic force of gaseous coal increases as compared with a rise in temperature. The letter *P*, on each curve, marks the point where, in the case of the seam to which the curve applies, the elastic force of the seam corresponds to the temperature of its strata. Thus, absolute pressure, at point *P*, in the case of Seam *A*, is found equal to 15½ in. of mercury, whereas, in the cases of Seams *B* and *C*, absolute pressure at *P* reaches 40 and 68 in., respectively. The pressure ruling in a mine will not allow a coal like *A* to distill at all, but will permit such coals as *B* and *C* to distill freely.

It must be remarked here that the coals with which Table I deals are such as have been removed from the seam by mining, the elastic force of which, as measured in the laboratory, is no longer what it was when the coals were *in situ*, before mining operations began to influence or provoke their expansion. Taking these facts into account, it is obvious that the danger confronting the man at the face is greater than represented by Fig. 1. How much the figures in the pressure column, at the left of that figure, should be increased to show how great the danger really is, I am unable to say. That it is considerably greater than appears on Fig. 1, I hope to demonstrate, however, before I reach the end of this paper.

Between the face and that part of the seam, in the solid, where the expanding influence of mine work ceases to make itself felt, a so-called "draining belt" of varying width intervenes, with coal more or less expanded, throughout which distillation goes on at a rate decreasing, with some degree of regularity, from the face inward. As the face advances, so does the inside edge of the draining belt, the width of which remains practically constant. The faster the progress of the face the greater the volume of gas which the draining belt will discharge into the workings within a given time.

It has been shown earlier in this article how high are the pressures against which coals like those of seams *B* and *C* are still able to distill after losing a large part of their original reserve of latent methane. But such pressures seem like nothing when compared with those recorded in boreholes penetrating into the same coals beyond the inside edge of the draining belt. Boreholes thus drilled into Seams *A*, *B*, and *C* were stopped only when the gage had ceased to show any pressure increase for a distance of 5 ft. Using averages, the maximum absolute pressures recorded beyond the draining belts and the widths of these belts have been found to be as in Table II.

WHERE COAL is buried deep, as in Belgium, the coal faces move forward into the open area, entries close up, kerfs grip the cutting machines, and no cleat or other crevices can be found in the coal mass, which is dense and impermeable to gas even under natural pressures up to 700 lb. per square inch. Yet these pressures are such that up to five years ago they were regarded as about the limit for boiler operation. At the working face, movement under gas and roof pressure releases methane or carbon dioxide. The heat of this movement, if the motion be rapid, frees still more gas, and if the friction of roof, coal, and floor lacks braking power to stay the movement, an outburst occurs, general or local. These outbursts in some deep mines are so frequent that men cannot be induced to work in them.

Table II—Pressure Beyond Draining Belt

Seam	Pressure in Atmospheres	Pressure in Pounds	Depth of Belt, Ft.
A	2½	36.8	18
B	29	426.3	26½
C	46	676.2	28½

No pressure rise was recorded by the gage until the auger had reached a certain distance from the face into the coal, which distance averaged 9, 7½, and 6 ft. respectively, for Seams *A*, *B*, and *C*. This could not be otherwise, considering the greatly fissured (expanded) condition of the coals for a certain distance from the face. It does not mean, however, that the individual blocks of coal between the fissures and cleavages through which the auger made its way, were unable to distill gas. On the contrary, it must be assumed that the blocks were each endowed with a degree of elastic force at least equal to that corresponding, in Fig. 1, to the strata temperature, set forth in Table III.

Table III—Elastic Force Corresponding To Temperature

Seam	Pressure, In. of Mercury	Pressure, Lb. per Sq.In.	Atmospheres
A	15½	7.61	0.51
B	40	19.65	1.33
C	68	33.40	2.26

From the time the pressure in the boreholes began to show on the gage, it rose in a practically uniform manner until the maximum pressure was reached. From these different borehole data, Fig. 2 has been drawn.

When a borehole is drilled through the draining belt into unexpanded coal, the crossing by the auger of each cleavage joint or expansion fissure is signaled by a puff of gas, the strength of which, as well as the noise it makes, increases from cleavage to cleavage, from fissure to fissure, as the bore grows deeper, indicating that the pressure under which gas is confined in the open spaces of the draining belt increases as the distance separating the spaces from the face gets greater. Fig. 2 well substantiates this statement. Between the fissures or joints the auger advances noiselessly, distillation in these blocks taking place inaudibly. The intermittent puffs of gas cease completely after the auger reaches unexpanded virgin coal, for in the latter, cleavage faces are pressed tightly together and there are no fissures. No gas issues from this coal, except what results from distillation immediately around the narrow borehole. Such distillation is more marked in soft than in hard coal. The reason for this already has been given.

Be that as it may, never does the zone of coal affected by distillation around the bore, extend far from the latter, as the following test, a classical one, well demonstrates: In a seam subject to blowouts, two boreholes, 16 ft. apart, were driven through the draining belt, cased, and extended a distance of 10 ft. into the virgin coal. Both casings being then plugged and a gage placed on each plug, practically equal pressures were recorded: namely, 17¼ and 17 atmospheres (253.6 and 249.9 lb. per square inch), respectively. The holes were then unplugged and left open.

After 29 and 31 hours, respectively, no more gas could be detected issuing from either casing. Nothing more was done, this time for seven days, after which a third hole was drilled half way between the first two, penetrating, like these, 10 ft. beyond the draining belt. In this case also, a pressure of 17 atmospheres (249.9 lb. per square inch) was recorded at the

mouth of the casing. This caused the experimenters to conclude that the zone of influence of each of the first two bores did not, at best, extend more than 4 ft. in the direction of the intermediate hole.

Two more holes were then drilled, one on each side of, and 4 ft. from, the middle hole. The new holes, like the other three, were tightly cased through the draining belt and driven 10 ft. into unexpanded coal. In one of them, a pressure of 10½ atmospheres (154.35 lb. per square inch) was recorded. In the other, the gage showed 9¾ atmospheres (143.23 lb. per square inch). Thus, making bores as close together as 4 ft., the pressure of the methane in the seam between the successive holes remained high. Similar tests, made in similar conditions, in other seams subject or not to blowouts, gave similar results.

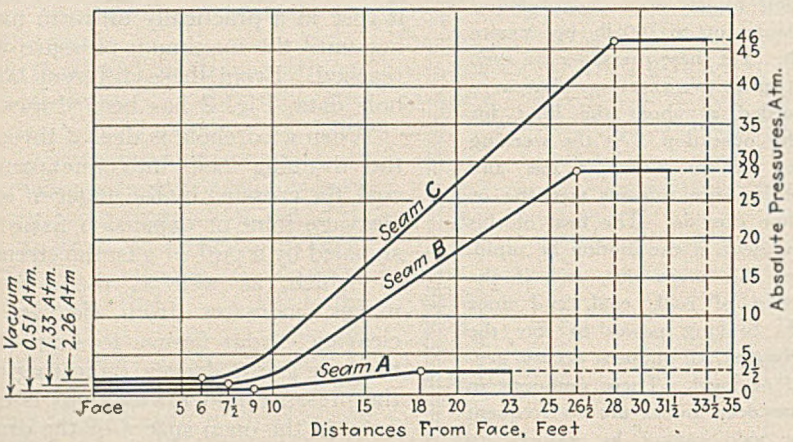


Fig. 2—Pressures Developed in Boreholes at Different Distances Within the Coal Face

I have previously said in *Coal Age* (March 1, 1923) that boreholes long ago demonstrated their uselessness for gas drainage. A little additional discussion of the subject may prove interesting.

Returning to Figs. 1 and 2: Eliminating Seam *A*, the operation of which presents no real danger, and Seam *C*, the operation of which has been discontinued as too dangerous, let us consider Seam *B*, which is like a hundred or more now being worked in southern Belgium and northern France.

Fig. 2 shows that between the man at the face and the virgin coal possessed of all its elastic force, is only the so-called draining belt, a meager 26½ ft. wide, the expansion of which toward the workings, under the enormous weight of overlying strata, is opposed by only the friction of the coal against both roof and floor. That this opposition is only a retarding or braking one is shown by the fact that, on coming to work in the morning, the miners generally find that the face has advanced, sometimes several inches, overnight. The men then say: "The seam has walked" (*La veine a marché*)—see my article of March 1, 1923.

This daily, progressive, advance (or walk) of the coal is so slow that its friction against the roof and pavement has no appreciable effect on its temperature. Things are different, however, when, as the result of an outburst, bump, or of a series of outbursts, expansion takes place suddenly, driving the seam into the workings not inches but feet. This occurs at a rate rapid enough to cause a considerable rise of temperature, not only in the coal squeezed out into the workings but in the seam itself as far into the solid as the hammering of the outburst or outbursts has made itself felt.

Fig. 1 shows the extremely rapid rate at which the elastic force of Coal *B* increases proportionately to its increase in temperature. Within the narrow limits of the diagram, it may be seen that a rise of only 36 deg. in strata temperature is enough to double the elastic force of Coal *B*. How many times would it be doubled and redoubled in case of a rise in temperature of several hundred degrees?

Has not the heat resulting from mine squeezes been known to cause even the most ungaseous kind of coal to liberate abundantly methane and other gases the distillation of which demands temperatures not inferior to 600 deg. F.? In case of an increase in temperature from 104 deg. to 600 deg. happening suddenly in Coal *B*, would not the elastic force of such a coal be immensely increased throughout the draining belt, beginning at and near the face, where the force is now 1.33 atmospheres (19.5 lb. per square inch), and ends 26½ ft. inward from said face, with an elastic force of 29 atmospheres (426.3 lb. per square inch)? And what would be the effect on virgin coal, beyond the draining belt, of a squeeze that would increase the temperature of the coal 400 to 500 deg.?

These questions I am unable to answer. I will point out only that a glance at Fig. 1 shows that the pressure curve for Seam *B* is bound to straighten itself and run practically vertically long before indicating pressures corresponding to 400 or 600 deg. F. In other words, elastic pressures so high that our minds are unable to conceive them, are bound to develop in Coal *B* long before its temperature reaches 400 or 600 deg. F.

Be that as it may, the effect of outbursts is (1) to increase expansion, thereby facilitating distillation, and (2) to raise the temperature of the coal considerably above strata temperature, thereby increasing tremendously the elastic power of the seam. It is not difficult to imagine that this double effect, combined with the weight of overlying strata, may overcome the friction of the seam against the roof and floor, thereby squeezing out into the workings part or all of the coal in the draining belt and sometimes also a more or less considerable part of the coal beyond that belt.

THE coal thus squeezed into the workings, accompanied as it is by an abundance of methane, always is in a very fine condition. This and its high temperature cause it to liberate instantaneously, and with a noise always terrific, practically all the gas it is able to distill against the low pressure ruling in the workings. At the same time, great quantities of fine coal are carried great distances in all directions by tremendous volumes of a gas that, but a short instant before, was held in the draining belt under control and in a sense was not existent. That is what an outburst really is.

This theory of delayed distillation, which for the first time emphasizes the great part played by heat in the creation of outbursts, has never, to my knowledge, been described before except in a paper I read before the Association des Ingénieurs de Mons on Dec. 31, 1926.

AIR-DRIVEN MACHINES

+ Used for Cutting

In Pittsburgh Seam Mine

By J. H. EDWARDS

Associate Editor, Coal Age

AS A MEANS of reducing the chance of ignitions, all electric cutting machines in a large mine in the Pittsburgh seam have been replaced by air-driven equipment. The first air-driven machine was installed in 1926. Now the equipment consists of nine machines, eight of which are in regular operation and which produce an average of 3,000 tons per day. All are Jeffrey type 29C arcwalls. Several improvements have been made on the machines since the first one was installed and changes have been effected bringing the earlier machines up to date.

Before changing over the local officials made an investigation of the "reputed inefficiency of air cutting." It was concluded that, if no leaks were allowed, the extra power cost over that for electric operation would be an item sufficiently small to have little effect on the consideration. Inspection and maintenance of pipe lines, therefore, were given first place in planning the new method of operation. Next it was concluded that a convenient means of air-power tramming would have to be devised. This proved an extremely difficult problem, but has now been whipped to the satisfaction of the officials.

This mine, like several others in the vicinity, continues to employ animal gathering. Coal drilling is now done with pneumatic self-rotating hand hammer drills. This means that no electrical equipment is used at the face. Trolley wire and electric motors are kept about 1,000 ft. from the working places.

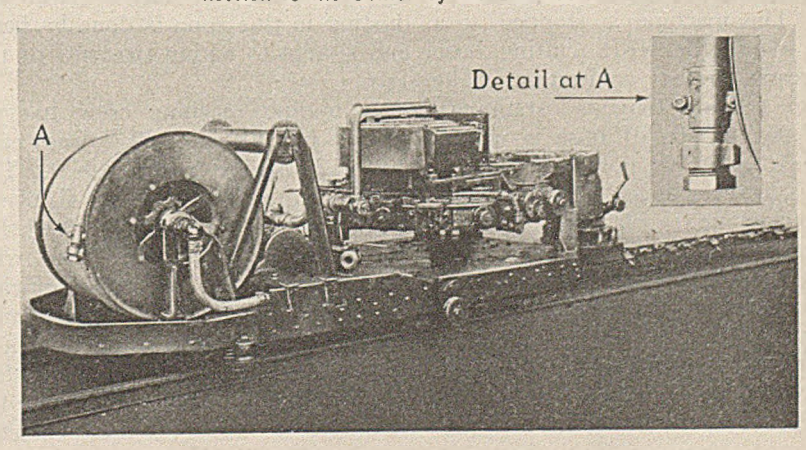
All of the compressed air is generated at one underground station located 4,500 ft. from the shaft bottom. Five motor-driven compressors with a total capacity of 4,700 cu.ft. are installed in this station. There are one 590-cu.ft. unit operated by a d.c. motor; two 888-cu.ft. units, one operated by d.c. and the other by a.c.; and two 1,190-cu.ft. units, both powered by a.c. motors. The station contains 800 connected horsepower. Compressors are equipped with automatic intake and discharge unloaders which unload at 90-lb. pressure and cut back in at 84 to 85 lb.

The station is served by two 300-ft. boreholes. One contains the 2,300-volt feeder cable and the other contains two pipes, one an intake and the other a discharge for the compressor cooling water, which is obtained from a creek. The main air line from the compressor station is 6-in., and the branches off it to each section of the mine are 4-in. Standard-weight steel pipe is used. The air is transmitted a maximum distance of about 2 miles. The first air receiver, a 5x16-ft. tank, is located 1,000 ft. from the compressor station. About 1,000 ft. farther is a 5x14-ft. receiver, and on each 4-in. branch line is a 50-in. x 8-ft. receiver.

Air pipes of 2-in. size are carried to within 50 ft. of each working place, so that a 50-ft. length of 2-in. cutting hose suffices. This is carried on the mining machine and remains connected, through a valve to a manifold to which a reel-mounted hose likewise is connected. The latter is of $1\frac{3}{8}$-in. inside diameter and is used for tramming only.

With the first machine, a truck-mounted air-storage tank coupled to the machine was tried for tramming. The capacity of the tank, however, which was as large as practicable, was inadequate to drive the machine from one place to another. The next experiment was with a friction-driven hose reel mounted directly on the machine. This promised a solution, but much difficulty was encountered by the hose connections catching on ties and other obstructions on the

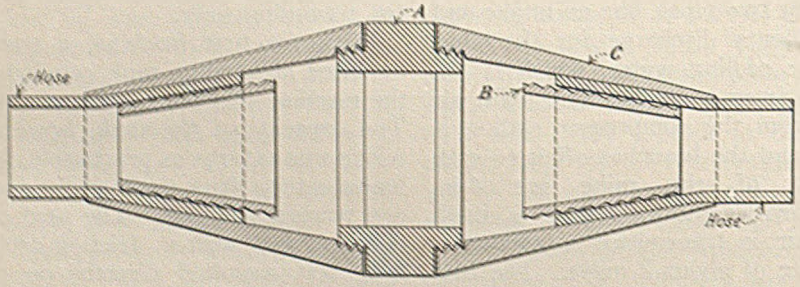
This Latest Machine Has a Roller Guide That Facilitates Use of the Tramming Hose in Either Direction, and a Swivel Joint Pipe Connection to the Center of the Turntable



mine bottom when the machine had trammed to an air-line connection, at which point the short hose was connected to the pipe line to furnish power while the disconnected tramming hose was being reeled in.

An extra expense was involved in purchasing in one piece the 400-ft. length of tramming hose, so as to be without the troublesome couplings. Finally, a coupling (see Fig. 1) was designed which would not catch, and this solved the last difficulty. Now the hose is furnished in 100- to 250-ft. lengths, as the factory may have available, and new pieces can be coupled into the length used on the reel.

Both halves of the coupling are female, so hose-end connections are interchangeable. A double-male filler, *A* (see sketch), connects the two. A tapered sleeve, *B*, with annular ridges on the outside, is forced into the end of the hose to make the airtight connection with the body, *C*. The parts are smooth on the outside and are screwed together by hand. The swivel effect is obtained by the hose and sleeve slipping around in the body. After the parts are screwed together the hose is given a jerk to wedge it into the body. Air pressure further tightens the fit.



Smooth Coupling Which Replaced the Type Shown on the Hose in the Halftone

The method of tramming is to connect the hose to the nearest pipe connection, then travel a maximum of 400 ft. by air power supplied through this hose as it is paid out from the reel. The machine is stopped at a point where the 50-ft. cutting hose will reach another connection. The machine then remains stationary while the 400 ft. of hose is wound on the reel by air power. The reel hose is again connected and paid out as the machine travels 400 ft. farther. When coming back out of a place where a cut has been made, the hose is reeled up as the machine travels backward.

Armored hose is used for the 50-ft. connection to the pipe line during cutting. The tramming hose is rubber inside and out, has four braids, $\frac{5}{16}$-in. walls, and measures 2.04 in. outside diameter.

Two air motors drive the machine. The cutter-chain motor, which is mounted on top of the turntable, is of the double rotor type. The length of these rotors is several times the diameter and they have teeth which run in mesh. This turbine motor will develop 50 hp. on 65 lb. pressure and is equipped with a governor which limits the rotor speed to 1,500 r.p.m.

The other motor, mounted beside the reel at the back end of the machine and which does the tramming and winds the reel, is a "Dake reversible engine with valve in cover." On the first machines these engines were rated 10 hp. at 400 r.p.m. Changes made later, widening the rectangular piston and valve to reduce maintenance, increased the horsepower to approximately 13. This engine is not equipped with a governor but is limited to 45 lb. pressure by a reducing valve between the hose-connection manifold and the throttle. The maximum tramming speed on level track is 4 miles per hour. A slow speed is provided for sumping.

The mine is developed on the block system and pillars are taken. At present an air-driven rock-dusting machine is being developed to dust the 1,000-ft. zones between the trolley wires and the faces. Now the dusting in this zone is done by hand and is kept to within two cuts of the face.

A mining machine crew has no trouble in cutting twenty places each 10 to 12 ft. wide during a shift. The maximum performance was 40 places in 13 hours. It is acknowledged that the tramming is slower than with electric machines. The mine officials are pleased with the low maintenance cost of the machines and believe it is less than if the machines were electrically driven. They declare that the maintenance cost of the perfected machines is running less than 1c. per ton.

As a precaution against air leaks, an inspection and report of the condition of air lines are made daily. The compressor station is purposely supplied with only sufficient capacity for operation on an efficient basis—that is, without air leaks. One compressor is held in reserve for emergency. This compressor is not to be started except when one of the other compressors is down for repairs. When there seems to be a lack of capacity, the inside men are responsible for regaining the normal capacity by more efficient maintenance of the pipe lines and equipment. Each mining machine requires 600 to 700 cu.ft. of air per minute while cutting a place, and the time of cutting averages about 7 minutes. Assuming twenty places as the average per shift, then each machine is using the maximum capacity of air for but 140 minutes per shift. Tramming and hose reeling, which demand considerably less air than for the cutting, total about twice the cutting time.

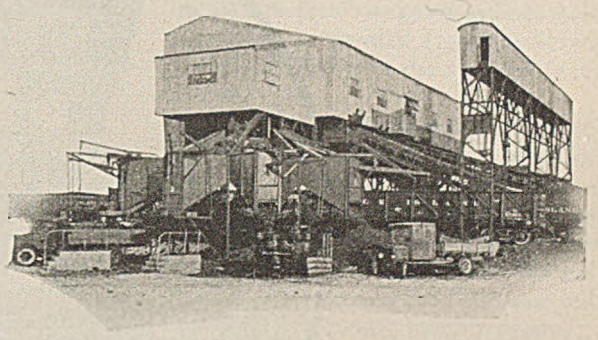
An advantage of the air-driven machine is the inherent protection against overload and breakage as compared to the use of fuses and circuit breakers on electrical equipment. Still another advantage lies in the fact that the machine exhaust increases the face ventilation.

BECAUSE only purchased power is used at the mine, data are available for comparison of power consumption and cost with that at mines where cutting and drilling are done with electric machines. During February, 1930, the mine produced slightly over 65,000 tons and the power invoice for the month indicated 453,500 kw.-hr. used at a net cost of approximately $3,825. The consumption was 6.95 kw.-hr. per ton and the power cost 5.84c. per ton. The character of the load is such that the power company rate is fairly low. It was 0.845c. per kilowatt-hour for the month, including the demand charge. Mine officials report power costs as low as 4.94c. per ton in some months.

To indicate the significance of the figures it is necessary to detail some of the conditions. Excepting for the animal gathering, the mine is completely electrified. No mechanical loading is employed. Hoisting is by cage and the lift is approximately 350 ft. Power consumed by the mine fan amounts to approximately 43,000 kw.-hr. per month.

MIDLAND STRIPPING

+ Mines 33-Inch Coal Under 25-Foot Cover



Tipple at Midland Stripping

By K. R. BIXBY

General Manager
Midland Electric Coal Co.
Atkinson, Ill.

STRIP-PIT operators in the past have looked askance at thin beds of coal lying near the surface as being economically unworthy of development. Their view in this matter was sensible. Why attempt to strip-mine thin coal when beds of considerable thickness suitable for removal by shovel are available? But that view cannot be extended far into the future, for the recent whirlwind growth of shovel operations has been responsible for wide inroads into the resources of this branch of coal mining.

Many improvements have been made in stripping, both in equipment and methods. These have gradually increased the practicable stripping ratio between the thicknesses of coal and cover. This progress, combined with the growing scarcity of strippable thick coal, is pushing ahead the time when shovel operators must look to thin coal measures for the continuance of their activities. In fact, that trend already has actually had a start.

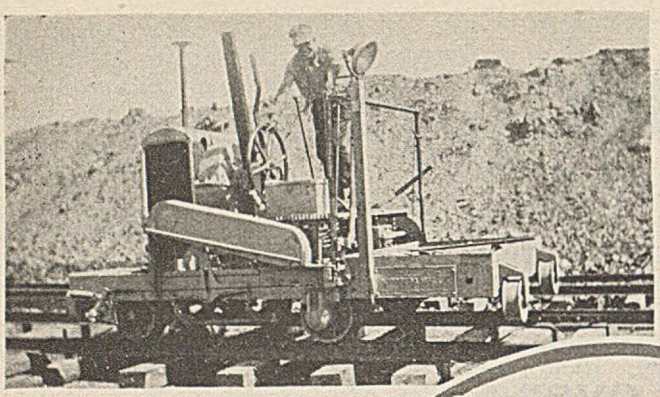
The Midland Electric Coal Co. is in the vanguard of this advance. It has in full operation at Atkinson, Ill., about 150 miles west of Chicago, a plant with a capacity of about 1,500 tons daily, which is stripping only 33 in. of coal under a cover of 25 ft. The mining of so thin a bed is made possible: first, by the lightness of the cover; second, by the use of modern equipment; and, third, by its proximity to a large market.

Those three factors are closely interrelated. Though the cover is comparatively thin, the coal also is thin; so the advantage of modern equipment in relation to the first factor was not sufficient to warrant the project. The overplus of advantage of this plant is largely one of pure economics involving favorable distribution of the product. The geographic location of this mine enables it to serve the northern portion of Illinois and also Iowa, Wisconsin, and Minnesota. Within a short radius of the plant are a number of industrial centers whose activities are largely dependent on fuel supply. About 20 per cent of the plant output goes by truck, over good roads, to nearby towns.

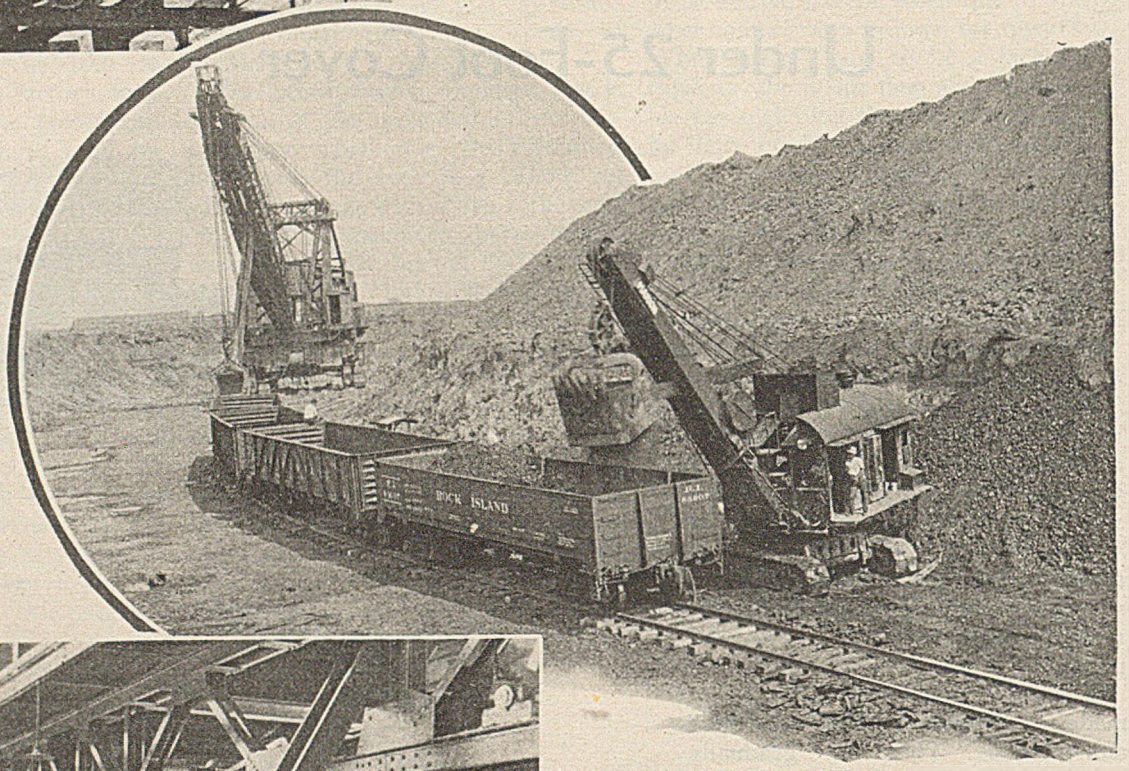
This plant was started in January, 1929. The property embraces an area which will give the plant a life of 30 years at the present production rate. There is a forced division of the property into two equal parts by the main line of the Chicago, Rock Island & Pacific R.R. and the stripping operation is confined to only one-half the area. The coal seam is the Illinois No. 3 and the overburden consists largely of a shaley clay which is separated from the coal by 2 ft. of black slate and covered by 8 ft. of surface loam. Because of the nature of this material, the stripping shovel can handle the overburden without blasting.

Midland is equipped with two Marion electric shovels, the stripping unit having a 13½-yd. dipper and the loading unit a 3-yd. dipper. The large shovel has stripped 18,900 cu.yd. of material in 24 hours when triple-shifted and the coal shovel has loaded a 50-ton car in less than 8 minutes. These figures are not unusual; they are given merely to show the potential capacity of modern stripping equipment. Memory is not taxed in recalling the time when 8,000 cu.yd. of material was considered a good 24-hour run for a stripping shovel.

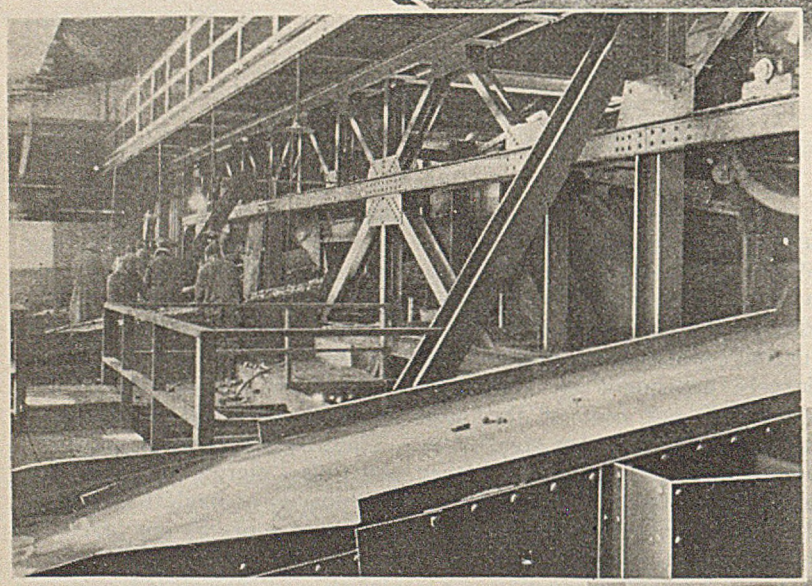
Incoming power at 33,000 volts is stepped down through the plant transformer to 4,000 volts, which is correct potential for the shovels. Ground cables in preference to overhead lines were selected for the distribution of power to the various field units. These cables, furnished by the Okonite Co. come in 1,000-ft. lengths. A small, portable wood-frame junction house, equipped with three sets of cutouts, is erected at the end of each cable length. All cables



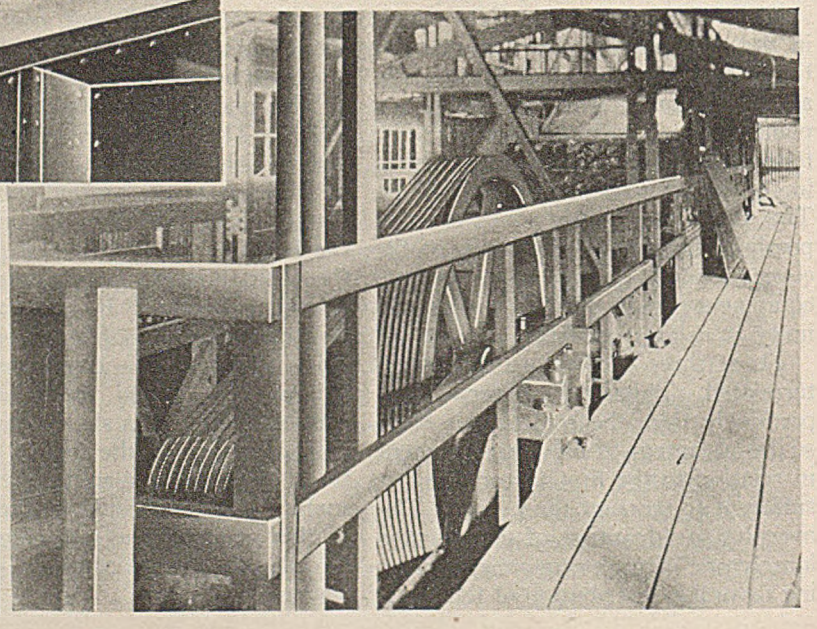
A Mechanical Track Shifter Is a Necessity Where Thin Beds Are Stripped



Strip Pit, Showing Shovels in Operation



Picking-Table Floor in Midland Tipple



Rope Drive on Main Shaking Screen

are joined by rubber-covered pull-type connectors made by the Mines Equipment Co.

The initial cost of these junction houses was low and the simplicity of their construction makes them foolproof. As one set of cutouts connects the live ground cable with the adjoining 1,000-ft. section, it is possible, when the operation is close to the main transformer end, to cut out and move the extensions without interfering with the shovel operation. A second set of cutouts is placed between the live line and the feeder for the stripping shovel. The third set is on the live line and the 440-volt transformer for the loading shovel, compressor, pumps, and other equipment.

A 1,000-ft. feeder cable furnishes the stripping shovel with power. This length of cable, which is greater than usual, has its advantages. It permits the location of ground cables and junction houses at least 400 ft. away from the face of the cut, allowing continued operation throughout the winter months without the necessity of transferring the transmission lines during inclement weather.

A paralleling type of overhead transmission line would have entailed a high maintenance cost, on account of the frequent shifting of the line by reason of the lightness of the cover and the thinness of the coal stripped. If a parallel line somewhat removed from the face of the cut, with lateral lines at regular intervals, had been used, the laterals soon would have been reduced to junk copper.

A thin bed of coal presents problems in stripping that are not met in coal of 5, 7, or 9 ft. thickness. In thick coal areas greatest effort usually is expended in removing the cover. But in stripping a thin seam, in addition to this problem, the operator is faced with the problem of constructing and maintaining the haulage track. A day's run of coal at this stripping will necessitate the side-shifting of a

K. R. Bixby

300-ft. track section a distance conformable with the taking of a 45-ft. cut. The track is shifted by a Nordberg track-shifter in conjunction with a caterpillar tractor.

For the present, standard railroad equipment is being used in haulage. Three 90-ton steam locomotives are in service and haul 50-ton drop-bottom cars of the gondola type. These cars are to be replaced later by specially built 40-ton automatic drop-bottom cars. Coal is dumped into a reinforced hopper and is elevated to the top of the tipple by a 42-in. belt conveyor which is 208 ft. long and inclined at 18 deg.

The tipple, designed and erected by Allen & Garcia Co., has a capacity of 300 tons per hour and is provided with facilities for the preparation and loading of individual and combination sizes on five tracks. Mine-run coal is separated by the main shaker screens into approximately 14.67 per cent of 6-in. lump, 13.75 per cent of 6x3-in. egg, 13.67 per cent of 3x2-in. nut and 48.18 per cent of 2-in. screenings.

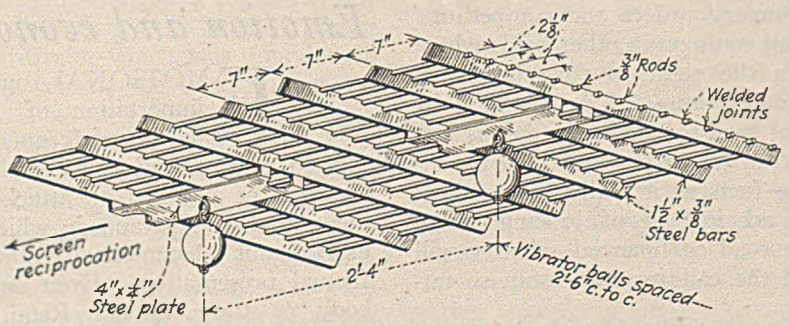
Screenings are further separated by an auxiliary shaker screen, located below the main screen, into 18.28 per cent of 2x1¼-in. nut, 23.47 per cent of 1¼x$\frac{3}{16}$-in. slack and 6.43 per cent of $\frac{3}{16}$-in. duff. The latter, composed of low-grade coal and impurities, is wasted with the refuse material picked from the lump, egg, and nut coal on the tables. It constitutes about 9.73 per cent of the mine-run.

This auxiliary shaker is a high-speed wire screen supported on round bars, on which not only is the screening area increased but the tendency of the fine moist particles to arch and consequently destroy the efficiency of the screen is lessened. The screen is agitated from the underside by numerous free-swinging rubber balls which are suspended from the screen frame, as shown in the accompanying sketch.

Another feature of this tipple is the gathering-mixing conveyors near the discharge ends of the tables and receiving ends of the booms. These conveyors provide an uncommonly convenient and efficient means of collecting, mixing, and loading into railroad cars various combinations of prepared sizes. The loading-boom hoist house is separated from the building proper in an arrangement which gives clear vision of the loading operation from the control room. Incorporated in the plant is a series of bins which receive lump, egg, nut, or combined sizes from the mixing conveyors for local trade requirements. The center lines of these bins radiate outwardly, as do the spokes of a wheel from their hub, giving a maximum of space for trucks under each bin in a minimum over-all area.

Both shaking screens and shaker picking tables are equipped with Texrope drives operating direct from the motors. This type of drive also has been applied to the various conveyors and loading booms whose motors are equipped with cut gears. The arrangement of these drives has minimized vibration of the structure and given quiet, efficient operation of the various units.

Self-Cleaning Auxiliary Shaking Screen



COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, AUGUST, 1930

Page Mr. Moses

APPEAL to Washington for government assistance by followers of Van A. Bittner in northern West Virginia seems likely at this time to invoke little more than sympathetic interest. Although, in referring to that appeal, the comments of Secretary of Labor Davis on the plight of bituminous coal and the search for a Moses to lead the industry out of the tangled wilderness of red competition encouraged some Washington correspondents to forecast an early conference under the auspices of the federal government, no official call for such a meeting has gone out, and close scrutiny of the Davis statement does not support the suggestion of immediacy. Indeed, except in the rôle of entrepreneur, it is difficult to see how Washington could help.

"Something ought to be done in the bituminous coal fields immediately," said Mr. Davis, adding the comforting thought that "the American people don't want coal at a price which will bankrupt the operators and starve the miners." Something ought to be done—certainly. Effective action, however, must start within the industry and with the cooperation of its present customers and bankers. The industry itself knows the real situation better than any outside agency; its customers, through educational efforts, and some of the bankers, through scorched fingers and frozen assets, are acquiring a close approach to first-hand knowledge. But none of these groups seems eager to face known facts and act upon them; rose-tinted hopes are so much more pleasant to contemplate.

"Find us a Moses!" is the common cry of a large section of the industry. The best training for leadership is a thorough course in subordination. Individualism—which is not necessarily the same as personal responsibility—has been a fetish in the coal industry. Too often the worship has been idolatrous. Many of the men who have boasted of their control of their own business destinies have been creatures of buyers' orders and competitors' prices to a degree not common in other fields where the insistence upon the right to run their own business without consideration of or dictation by anybody else has not been so vociferous. It is just another instance of not facing the facts. If the industry will face the facts as it really knows them and, facing them, act instead of looking for a wizard's wand, the road to financial security will not be so long and the call for leadership so unattractive.

High-pressure gas to be anticipated

NO ONE can fail to realize that with greater depths, outbursts are going to assume a larger importance in the United States in the future than in the past. Already they have attained an unenviable place in the operation of some Canadian mines. In writing his article, published in this issue, on the origin and nature of high-gas pressures and large gas volumes in coal seams, F. C. Cornet has laid his stress on outbursts, but his theory has great importance also for those who are faced with excessive gas emission even without physical violence. Where mines are below water level, some of the strata above the coal usually are so filled with water that the seam has not been able to rid itself of its gas.

After all, the pressures of which Mr. Cornet speaks—46 atmospheres—correspond only to a water column of 1,615 ft. or a rock column of 622 ft. Wherever the water fills the pores of the rock so that it cannot be expelled, the gas pressure may be raised to an equivalent to the rock pressure, but where there is a creviced condition, the gas pressure may be less than either the pressure of water or rock. Most coals in the United States are not as dense as those in Belgium; they probably have not been subjected to as much pressure. Consequently, when they are mined they give off their gas freely and, therefore, without outbursts. They may have pressures in the virgin bed that might justify such violent action, but when mined they may be so open that they surrender their gas quietly. Especially might this be expected where the coal is weak and, when mined, breaks down freely under pressure.

The recent big outburst in the Wenceslaus mine, in Silesia, again calls attention to the likelihood that such phenomena will exhibit themselves in America. In that mine the coal is of the less matured type such as is found in the western half of this country, and the gas which caused the outburst was carbon dioxide, not methane. Such carbon-dioxide outbursts may be expected when deposits like those found in the Uinta basin, of Utah, are exploited, and methane outbursts may be anticipated in many fields.

Emotion and economics

EMOTIONAL outbursts against the importation of Russian anthracite have been frequent in recent months. Not so long ago a former employee of the federal government fathered an attack upon Soviet shipments to New England, in which flag flapping and extravagant denunciation almost obscured the factual presentation. Even such an unemotional body as the National Retail Coal Merchants'

Association seemed unable to escape making condemnation of Soviet political and economic theories part of its whereases in a resolution supporting the movement to bar further importations.

Decision whether the powers of the federal government are to be involved to keep out the Russian coal must be based upon something more substantial than our like or dislike of the existing ruling group in the former land of the Romanoffs. Tariff duties presumably are laid or an absolute barrier against foreign goods is set up to protect American commerce and industry and the American workers from competition where foreign costs of production threaten our own standards of wages and living. On that score, superficially at least, a good case can be made out against Russian coal, inasmuch as statements from Soviet sources show that the earnings of Russian miners average less than $25 per month.

Harping on the antagonism between American and Russian political theories, however, is hardly sound strategy, because emphasis so placed may cause those who follow such attacks to discount or even forget the economic bases of the appeal for protection. It is encouraging, therefore, to learn that the House Committee on Ways and Means has asked the federal government departments most closely in touch with the situation to investigate and report in time for possible Congressional action at the December session. Such an investigation and report assure adequate presentation of the economic factors upon which decision must rest. To this investigation the anthracite industry and its allies can contribute much valuable information bedrocked in physical reality.

Technical training

NO INDUSTRY has a more consistent record for technical training than coal mining. From an early date it has not trusted to the job to teach the manager, superintendent, foreman, assistant foreman, or fireboss the technique of his profession, but has provided means whereby the knowledge of all mining men might be pooled and used.

First, to deal with higher training, reference may be made to the Founder Societies. The American Institute of Mining Engineers was the second of these to be formed, being started in Wilkes-Barre in 1871—59 years ago—largely as a coal-mining institute. As for organizations on a somewhat less erudite basis may be mentioned the Western Pennsylvania Mining Institute, which was founded in 1887 and ultimately became the Coal Mining Institute of America. The West Virginia, Kentucky, Rocky Mountain, Illinois, Pittsburgh, and a host of other institutes followed, some of which are so local that no one outside the region is cognizant of the large amount of good work being done by them.

Latterly, to their mining engineering curricula, the various colleges added shorter vacation courses and, later still, mining extension schools in which advantage was taken of the Smith-Hughes legislation for federal aid in such work. Nor should the Young Men's Christian Association be forgotten, for it started one electric society on its way and has co-operated with state organizations in developing several local institutes and training courses. Later an electrical society was started in another town under other auspices, and the mining show which it held was the progenitor of the larger show and convention of the American Mining Congress held year by year at Cincinnati.

Much of this educational work, it is true, has been fostered by the fact that the law required that foremen, assistant foremen, and firebosses pass an examination in the safe operation of mines. But, whatever the immediate cause, the result has been that the coal industry has for years had intensive technical training for foremen.

Regularizing rest periods

UNDER hand-loading methods and tonnage rates, the question of fatigue was one which seldom, if ever, entered into the calculations of either men or management. The delays too readily accepted as inevitable in daily operation gave ample opportunity for rest and physical recuperation from the arduous toil of the mine. Where these delays, so illuminatingly set forth in the Thompson study of underground management in his report to the U. S. Coal Commission, did not meet the situation, the independence of the individual worker could be counted upon to prevent physical exhaustion.

A different picture is presented with high-speed mechanization. Obviously, if the best use is to be made of the machine and a proper return received upon the heavier investment in equipment, the facilities installed must be used to the fullest reasonable extent. Each and every phase in the cycle of operations must be co-ordinated with every other phase so that costly interruptions may be reduced to a minimum. Successful conduct of a mechanized mine demands that the independence of the individual worker must give way to an interdependence which shall make each man conscious of his obligations to his fellow workmen and to management in the performance of the job as a whole.

Mechanization removes much of the drudgery of mining. At the same time, it naturally introduces a speeding up of repetitive effort which is not without its aspects of fatigue. To retain the advantages of co-ordination while guarding against both physical and mental fatigue, consideration might well be given to the establishment of a system of regular rest periods for those occupations in which the fatigue element is important. Many other industries in which mechanization plays a large part have found such regularization and systematization profitable. Such a system might have the added advantage of directing more managerial attention to the time now frequently lost in unrestful and irritating waiting.

NOTES

. . . from Across the Sea

IN GERMANY, as here, the mining of thin coal by means of a kerf cut in the seam itself has been found to produce an excess of fine coal, thus reducing sales realization. To meet this the kerf may be cut in the rock instead of in the coal itself, and an example of a longwall face so cut is described by *Eickhoff Mitteilungen* in a recent issue.

The mine workings under consideration are located in the Rhenish-Westphalian district. Here the cut, which is 5 ft. 11 in. deep, is made not in the floor nor in a binder but in the drawslate at a horizon immediately over the coal. I say "drawslate," though the actual word used in the publication is *nachfallpacken*, which in the British vernacular is rendered "following stone," or "ramble"—a stone, or rather rock, that falls freely when the coal is newly extracted. The drawslate at the workings being described is a peculiarly weak and breakable rock. It is streaked with coal partings that roll irregularly. Wherever the rock is free from coal, however, it is quite hard. A Marylander would be likely to term the "following stone" a "rashing."

Another feature of interest is the use of two machines of the chain-cutter type on a single longwall face. There is no need to make the machines extremely mobile, so each is mounted on a forged iron stand or sled of the correct height known as a *hochstellschlitten*, or "high-stand-sled." This moves past the longface carrying the machine with it. The face is 590 ft. from end to end—a fact which makes it quite plain that the objection to long unstepped faces in longwall, so often and so diligently urged by authorities some years back, no longer obtains universal acceptance.

Note also that here is a longface with heavy drawslate, no less than 28 to 30 in. thick and covered with 4 in. of coal. All this has to be thrown back into the goaf, and as the coal is only 30 to 32 in. thick, the drawslate which is pulled down and stowed supplies practically all the gob needed.

It will be noted that the props are pointed so as to penetrate the floor as the load falls on them, and a rail, bent into the shape of an automobile fender, is placed back of the machine. The props are set sufficiently far back—namely, 4 ft. 7 in. from prop center to face—that the fender, when in normal operation, will not touch them.

The seam mined is a low-volatile coal. Its gradients at the face are shown in Fig. 2. Air enters the face on the right and leaves it on the left. Two passageways at the face are kept clear of refuse; the one provides a lane for the machine, the other for the conveyor. Both are lined with timber sets, the posts being at 4 ft. 7 in. centers as measured at right angles to the face, and at 40 in. centers as measured parallel thereto. On pairs of timbers on the same side of any lane half-round beams 68 in. long are placed, which, of course, parallel the face.

In the lower road—that on the left—only the coal conveyor is installed. Consequently, it can be made of the same height as the longwall face, but the upper road that receives timber supplies is made higher, being brushed into the roof 12 in. Two Eickhoff coal cutters are used which cut the coal from the ends of the face toward the center.

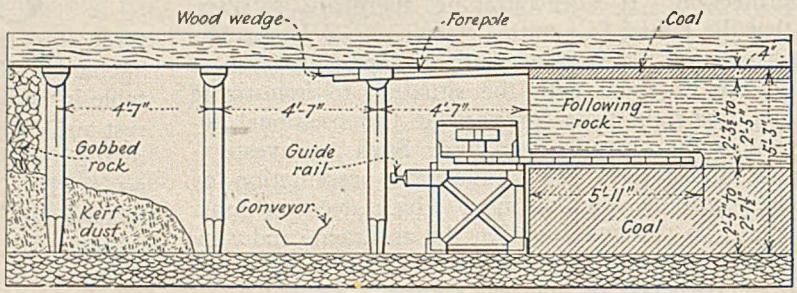


Fig. 1—Cutting a Kerf in the Rashing Over the Coal

When they have almost met, one is moved back a space and the other completes the cut.

To convey the coal along the face there are two conveyors, one which conveys the coal for 131 ft. (with an uphill grade of 1 deg., or 1¾ per cent) and also for a further 98 ft. on a level. This conveyor is 236 ft. long and is driven by an Eickhoff compressed-air drive with a return counter drive. On one stroke the conveyor pans are jerked from under the coal and on the return stroke, the pans are gently pulled back with their load by the counter drive, thus the coal is advanced. The other conveyor is in line with the first and is 361 ft. long, the gradient being in the same direction as the flow of coal and running from 0 to 5 deg., or from 0 to 8¾ per cent.

This latter conveyor discharges into another conveyor laid at right angles to it. The second unit also comprises two parts, the face end being extended as needed. Each of the two transport conveyors, to use the equivalent for the German name, *transportrutsche*, has its compressed-air engine and its counter-drive unit. Coal leaving the second of these conveyors falls into two chutes, which apparently are enabled to deliver the coal into mine cars because of the convenient presence of a fault that lowers the coal considerably below the level at which it is found at the working face. Had that freak of nature not been available a fifth conveyor would have been needed.

The rock is cut on the night shift. Fig. 3 shows the status at 9 p.m., the beginning of that shift. Then it is that the cutters commence work, using a machine that has been lubricated and conditioned during the afternoon shift. The other night-shift men do not arrive until the machines have cut 65 to 100 ft.

In consequence they can start immediately to move the conveyor forward into the next prop lane and to shovel the kerf dust into the goaf, also any of the "following rock" which, though efforts have been made to hold it, may have already fallen. The operator of the machine at the lower end lubricates it, places it in readiness for running, and, as far as he has time, commences to make the next cut.

Because the ventilating current sweeps the kerf dust along the face, this dust is shoveled back, beginning at the top and working back toward the bottom, and not simultaneously behind both machines, because that would subject the men to the inhalation of powdered-rock particles. The night shift includes two cutters, two timbermen, four shaker-conveyor movers, ten shovelers, and one supervisor—nineteen men in all. The timbermen do not start their work till 12 midnight, because until the kerf dust is removed there is no opportunity to set timbers. They follow the shovelers down the working face.

The morning shift is devoted to stowing. Two timbermen go down at 5 a.m. and complete the propping of the area cleared by the night shift. Four men pack the remaining kerf dust, working till 11 a.m., after which the following rock or drawslate, which is undermined and disposed to fall, is allowed to do so. Twenty men working as ten couples transfer this rock from the face to the gob.

Each couple is given a length of 4 m., or about 13 ft., on which to work, and each changes its place four times in the shift. Thus to every couple is apportioned 16 m. of face, or about 52½ ft. Of the 20 m., or about 65½ ft. remaining, 16 m., or about 52½ ft., is loosened and packed by the four men, already mentioned, whose matutinal duties were to backfill the kerf dust left

by the night force. The other 4 m., or 13 ft., remains still to be stripped.

With this exception the coal is now uncovered and ready for lifting. One shotfirer and one driller go down at about 8 a.m. and they strip these last 4 m., bore 80 to 85 shotholes 6 in. above the floor, and charge them with two or three cartridges, according to the hardness of the coal. These shotholes are evenly distributed along the 590 ft. of face.

Between 11 a.m. and noon, the supervisor, with a pipeman, pulls the machine to a distance of about 50 ft. from the top and bottom roads respectively, because without removing the coal standing there, the machines cannot be placed for cutting a new swarth. It is necessary, therefore, to place the machines so that they will be ready for work but still not in the way of the early loading. The pipe line, which measures 2½ in. inside diameter and has patent connections, is moved up a distance equal to the depth of two cuts every other day. The pipeman does this during the morning shift, being aided in his work by the supervisor. Thus on the morning shift are employed one supervisor, two timbermen, one shotfirer, one head driller, one pipeman, four kerf stowers, and twenty other men who remove the rock and stow it, or 30 men in all.

During the change of shift the coal is shot up by the shotfirers of the morning and afternoon shifts and the head driller. In the afternoon shift the coal is loaded out by fifteen men who are distributed along the coal face. The force is under a supervisor and has in addition one loader, one flitter, one shotfirer and one cutter, making 20 men in all. The cutter goes down about 4 p.m. and assists the others in breaking into the coal, then lubricates the upper machine, puts in new cutter bits, and pulls it into the machine lane, where it can cut a new swarth. He then goes to the second machine and prepares this for operation. Meantime the night shift cutters arrive and the cycle is complete.

From this face, 400 to 410 mine cars are loaded daily, each with a capacity of about 1,433 lb. With the total force of 69 men the output per man runs between 5.8 and 6 cars, or 4.15 to 4.26 net tons per head. It will be noted that the rock and rejected roof-coal tonnage is even greater than the commercial coal tonnage, though that waste material, of course, is not carried by the conveyors.

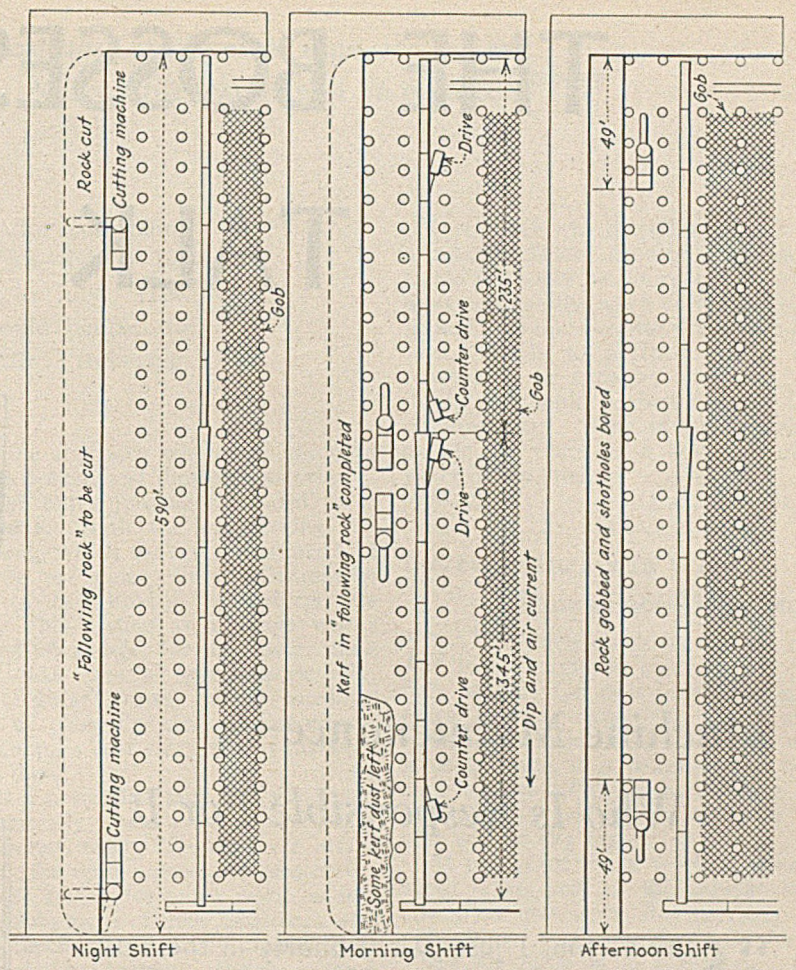


Fig. 3—Status of Long Face at Beginning of Periods Indicated

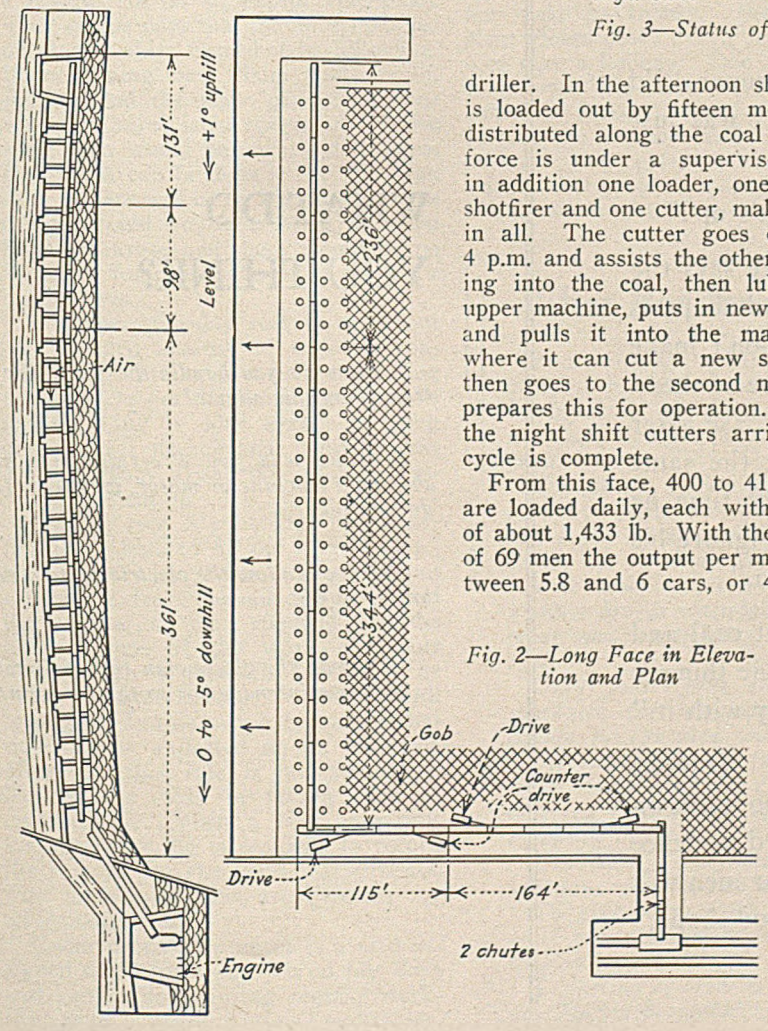


Fig. 2—Long Face in Elevation and Plan

R. Dawson Hall

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Safety Committees in the Coal Mines of the State of Washington, by S. H. Ash. Bureau of Mines, Washington, D. C. I. C. 6,283; 9 pp.

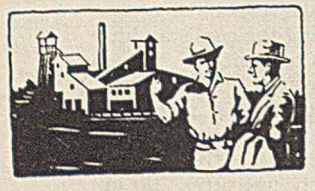
Coal in 1928, by F. G. Tryon, O. E. Kiessling, and L. Mann. Bureau of Mines, Washington, D. C. (Mineral Resources of the United States, Part II). 183 pp., illustrated. Price, 30c.

Check Determinations of Fusibility of Coal Ash With the De Graaf Electric Coal Ash Fusion Furnace, by W. A. Selvig. Bureau of Mines, Washington, D. C. R. I. 3,003; 17 pp., illustrated.

American Standards Year Book 1930. American Standards Association, New York City. Pp. 104. Reports progress in standardization work affecting mining, mechanical, electrical, and other major industries.

Automatic Power Releases for Shutting Off Power From Mine and Indicating by Signal Alarm When Fan Stops or Doors Are Left Open, by W. J. Fene and R. F. Dalrymple. Bureau of Mines, Washington, D. C. I. C. 6,288; 4 pp., illustrated.

THE BOSSES TALK IT OVER



Machine Maintenance— Who Is Responsible For It?

"SAY, Jim, I just passed Shorty in the hall and he looked pretty mad."

"Come in, Mac," replied the super, "I'd like to talk to you about that; in fact, I was just going to send for you."

"Yeah," rejoined the foreman, "what's up?"

"Shorty—he's threatened to quit. He says the only reason why our equipment is in bad shape is that he can't get your support. You don't make the men on motors and machines take care of them. He says its impossible for his crew to chase after breakdowns due to carelessness and at the same time keep up legitimate repairs. Every time he reports mistreatment of equipment, you ignore his information and say nothing to your men."

"Well, Jim, you know I can't get out coal and listen to the main electrical Gazabo. One thing is sure, he can't boss my men and get away with it."

"Not too fast, Mac," cut in the Super. "It looks like I'm for Shorty this time. You're too quick on your alibis. Shorty didn't squeal. I forced evidence out of him. From now on, you and your men will have to help him keep the machines in good shape."

WHAT DO YOU THINK?

1. How do you handle the chief electrician and his advice?

2. If he tells you a certain man is abusing a machine or motor, what course do you take?

3. Do you allow the electrician to give orders to the runner?

4. Should the electrician report direct to the superintendent or to the foreman?

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 484. Acceptable letters will be paid for ▶▶▶▶

WHAT IS THE BEST SYSTEM for controlling day-labor costs, especially on idle days? Jim put this problem up to Mac in July. How the readers of *Coal Age* would handle the problem is told in the letters following.

Budgeting Urged as Aid In Keeping Down Labor Cost

I KNOW just how Jim and Mac feel on the question of day labor, which comes up often enough when the mine is idle much of the time. I have been following them in their troubles on the bosses' pages for several months and feel that maybe I can help them on this particular problem.

Idle-day costs can be controlled by governing the amount of work performed on operating days and on nights following shifts that the mine runs. To cut down on the idle-day cost it is necessary to budget cost allowances on the assumption that there will be no idle days. That is exactly the way we do it at our operations. We make it a practice to do all except emergency work on the days that the mine operates or on the shift immediately following. Some mining men claim that certain jobs around the plant cannot be done while the mine is in operation. These same men would be surprised to learn how much can be done if the Old Man said, "There will be no idle days." Then things would be done when occasion for them arose and there would be no incentive for passing some of the work to idle days.

The operating-day cost is made out and charged against an expected tonnage, and this cost covers everything necessary to get that tonnage. On idle days nothing is done except pumping and general maintenance work, unless an emergency arises that requires immediate attention.

Idle-day cost is controlled by requiring every boss to fill out a cost allowance sheet when he wants to call out men for extra work. He must record the number of men engaged and the exact nature of the work he wants done. This requisition is O.K.'d by either the superintendent or the general manager. In this way it is known what cost can be expected on an idle day. However, this rule is not applied to hamper the boss in taking care of emergencies. When a boss over-runs his allowance, he is required to record the reasons for the additional expense. Too many over-runs are grounds for an investigation.

Under no circumstances is a man assigned to perform any job on idle days that can be done during regular working time. With a few exceptions, about the only men who work idle days are the bosses, and these are salaried.

Large extra jobs are attended to in conjunction with the engineering department, which makes an estimate of the cost of doing them. Ordinarily, work of this kind is pushed on idle days. This system as a whole works to good advantage, for the bosses must either take care of extra work with their regular crews during working hours or place the cost against excess allowances, a cost entry that is distasteful to them.

It is a noticeable fact that good men are generally found only at well managed mines, where idle days are infrequent. At these mines the men never think of asking for extra work on idle days, as do many of their neighbors who spend much of their time underground but make no money. When a good plant closes down for a few days, the men take a holiday. One way of cutting down idle days is to reduce the working force during dull seasons, keeping the best men and laying off the others. This gives better operating time, and if properly managed will be a benefit all around.

What Readers Say

That holiday spirit so frequently prevalent among men employed on company work on idle days signifies poor management.

Though the worker gains temporarily when his boss gives him a job on an idle day to increase his earnings, in the long run no benefit is derived. This practice breeds wasteful employment and contributes to high cost.

Only those jobs should be scheduled for idle days which cannot be executed without interferences on days of full operation. Extra work and extra jobs deferred to idle days lower the efficiency of labor.

Deadwork assignments on idle days soon become a habit.

To give extra work to company men and not to loaders is to play favorites.

Budgeting of labor is not only possible but profitable.

I can't see why discipline at any time should be below average. In fact, I think it should be more rigid on idle days because the work crew consists of picked men and because the bosses have fewer duties to perform. It is only reasonable to suppose, therefore, that discipline should be better under these circumstances. This is my experience during 12 years as a boss out of 22 years in the mines.

Mogg, Ky. OSTEL BULLOCK.

Necessity for Extra Work Shows Poor Management

DAY WORK on shifts that the mine is idle cannot be made to pay. It is only natural for men in putting in an extra shift to expect the work to be light, or to make it so. If extra work must be done, it is better to put in an hour or two of overtime on days that the mine is running. Otherwise, the cost will go sky high.

At our plant extra work is done by about 4 per cent of the regular crew, and their job is to fix anything and everything that might cause delays when the mine is in operation. Fortunately for us, due to the efficiency of our general mine foreman, we have very little of so-called extra work to do during overtime hours. When the need for such work arises, we set a few men to work on the job in the morning. Usually, they are finished by noon, and the remainder of the day is spent on regular work. We satisfy our men by giving them enough regular work to do. It is poor management to give a man an extra turn merely to keep him satisfied. S. J. HALL.

Stickney, W. Va.

Discipline Can Be Maintained On Idle and Work Days Alike

WHERE the management is properly guided, the cost on idle days should not add a single penny to the average operating cost. This result can be facilitated to some extent by loading at least a small tonnage of coal on idle days. Empty cars usually are available, so why not work one or two headings to offset the cost of the deadwork? By doing this you can add to the tonnage dumped on the following work day and in the long run lower the average cost. If considerable work must be done in a particular section of a mine, there is no reason why coal should not be produced in that section. This plan would give employment to foremen who might otherwise sit around the shaft bottom putting in their time. Inasmuch as these foremen are paid a monthly salary, they should pitch in and help the company to cut costs, even though it

means that they will have to work with their hands.

No clean-cut determination can be made as to when work should be done on idle days and when on operating days. But if a bad piece of roof is discovered, or a stretch of bad track is discovered, it should be attended to immediately, before a serious accident takes place. Many a fall of roof that required, say, twenty man-shifts to clean up might have been prevented by the labor of a timberman for a few hours at the right time. A bad piece of track that could be repaired in two man-shifts might cost a hundred cars of coal on the next working day.

As to the question of best men, all men should be best. Those who do not meet the qualifications of your best men should be removed from the payroll. If some section of a mine is working on an idle day, and a man wants to work, he can find someone who will be willing to take him into his place and let him load some coal. A man who is willing to do this is the man I call best, because he is not only making himself money but he is adding to the output.

Discipline should be equally well maintained on all days regardless of whether the mine is running or not. I never ask a man to do something unreasonable, but when I tell him to do a particular job I expect him to follow my instructions even if I cannot see the job done. I can see it the next day, and I expect him to explain why it was not done the way I asked him to do it. Any man who meets the high requirements of a foreman should be capable of telling his men how to do their work, knowing himself how long the job should take and how it should be done.

Pierce, W. Va. HOWARD LONG.

Day Work Is Best Done On Idle Shifts Sometimes

THE QUESTION of day labor on idle days is as old as the mines, and one that requires much thought and planning. There is a company operating near here that has a plan which can be applied to advantage at some mines. This company works the day men on idle days and when the mine is in operation it uses only a small crew of day men. This plan causes the bulk of the deadwork to be done on idle days and keeps the good men employed a greater percentage of the time. With all or most of the day work being done on idle days, to a great extent that holiday spirit is removed which under the circumstances is so prevalent among workers.

This scheme will not work out where conditions require daily attention and where roof conditions are bad. Where the roof is bad and much water is encountered, where slate men and timber men must be employed every day, the cost goes up regardless of what the super says. C. E. MONTGOMERY.

Edwight, W. Va.

Give Him a Lift

Shorty, the chief electrician, who has been working his head off trying to keep up the machines so that Mac can get out the coal, enters into the discussion for September. Of all jobs around the mine, his is perhaps the hardest. He plugs and he toils—in good weather and in bad, in daylight and in darkness—whenever the call comes. He needs your co-operation. Will he get it? Send in your letters early.

Determination of Labor Needs Is Key to Low Mine Cost

MY experience of twelve years as an assistant mine foreman convinces me that much of the labor employed on idle days is unnecessary. It is brought about by not getting a full measure of effort from your men on regular working days and by poor management on the part of the foremen and other company officials. I have often heard mine foremen ask for materials needed to make repairs and keep the mine in shape, only to be put off by the company on the excuse that the materials could be dispensed with until the following month. If the company says you can make out without the materials, you usually can; but when supplies are finally available, you will find your track, ventilation, and other elements of the operation in such bad condition that work on many idle days is required to overcome the neglect.

I also have seen foremen deliberately put off asking for supplies in order to show a good cost record for the month. They do not seem to realize that what appears to be a cost reduction one month may be added to the cost of operation on the following month, and they will have a lot of explaining to do. The foreman should know just how much material he will need each month. He should get together with his superiors and set a budget for his requirements. If this is done, you will soon notice that your supplies cost will be greatly cheapened, your men will get the materials needed to turn out a good day's work, and you will be in shape to eliminate gang work on days that the mine is not producing coal. There are some mine foremen who, regardless of the facilities at hand, do not plan their work to completion on days of operation. They usually look forward to idle days for doing odd-and-end jobs that could have been handled conveniently on tonnage days.

By close watching on the part of both the foreman and the higher management, the cost of the work can be greatly reduced. A certain percentage of good men will expect to get work on idle days, but most of them realize that work cannot be given to them when the mine is idle. Good men, of course, should be given preference in the assignment of jobs to be done on idle days. When you give easy-going men a chance to work on idle days, be sure to assign them to jobs that can be paid by piece rate. In case you are unable to provide extra work for your men, be sure to explain to them the reason why. B. S. VINCENT.

Mt. Gay, W. Va.

Extra Deadwork Assignments Are More or Less a Habit

COSTS on idle days can be controlled in only one way and that is to make every off day as much a day of rest as a Sunday. Allow no one to work except maintenance men. Inasmuch as many jobs in line of regular duty require less attention on idle days, some degree of doubling up is possible.

Above all things, do not assign men to deadwork on idle days, as this is more or less a habit. In case a motor or mining machine breaks down, it should be repaired on the night following the working shift even though the mine is not to operate on the following day. In most cases a job of this kind requires only two or three hours, but if it is put off until the following day an entire shift will be spent on it. Usually, it is the day man who makes the highest wages in the long run, and so no favors should be granted him that cannot be extended to the contract worker. The latter should receive at least equal consideration. Discipline should be and can be made as rigid on idle days as on working days. WILLIAM HAND.

Manor, Pa.

When the Foreman Is Between The Devil and the Deep Sea

IDLE DAYS are blue days for a foreman. He invariably has several good or needy men who ask for work tomorrow though the mine is scheduled to be idle. Some of them will put in a good shift; others will soldier on the job, thinking they should be allowed this privilege because they do good work when the mine runs. On the other hand, the company expects the boss to cut out all day labor and have no extra expense whatever on off days.

I try to keep my work up so that it will be necessary to work only a small number of men when the mine is idle, and then only do the jobs that can't be handled when the plant is in operation. When extra work is to be done, I pick out the men who try their best at all times—men who have families and need the work most. Sometimes I let my best men load a few cars of coal on

idle days or give them a contract to take top or bottom, reclaim materials, or any necessary jobs that will at the same time keep them employed.

If we are going to have a slow run for a long time, I cut my crew so there will be only enough men to run the mine on operating days. With the extra men eliminated, I divide the jobs, such as hanging wire, building stoppings, and deadwork, between the men, being sure that all get an equal share of the work. Discipline can be made as rigid on idle days as on work days only when the foreman makes his men understand that he is not giving money away; that they will have to work for their pay regardless of how much they do on operating days or how skilled they are in their line. WALTER HORNSBY.

Glo, Ky.

Most Successful Operators Are Practical Mining Men

IN THE Bosses pages of the May issue of *Coal Age,* Alexander Bennett, in his "Theory Must Come First," brings back the time when I was a boy of about eleven and thought I would try to get one of those bossing jobs. The desire behind that idea has been fully fulfilled many times since.

In those early days, my head against the wagon did the pushing. That is partly the reason I have to wear a night cap to keep the mosquitoes away. Since that time hand-pushing has gone its way, and pit wagons today are pushed to loaders by electric locomotives, just as hand-shoveling is now being replaced by machine loading. With competition in mining increasing over the years, I and others have been compelled to use our heads more and more. That gray matter that does my thinking has stood me well in both theory and practice; neither of which, I have found, can I get along without.

The practical man is indispensable to coal mining. When I am next to a fairly practical mining man I shall remain confident that when things go wrong in the operations he will not be at the bottom of the trouble. In this regard I feel a little differently than Mr. Bennett as to which should take precedence, theory or practice. I believe that most of our successful operators got most of their theory from long experience as practical men.

ROBERT W. LIGHTBURN.

Nemacolin, Pa.

Balance Day-Work Crews And Costs Will Be Nominal

THAT MAC should reduce his day-labor force and use only those men who are absolutely essential to tonnage production on working days is the best suggestion that I can offer him. This will enable him to work more men on idle days without increasing the cost. Only the best day men should be kept; those removed from day-labor jobs should be given a place loading coal. In this way the good men will have steadier employment and much of the labor on idle days will be more efficiently employed than when the mine is in regular operation.

Haulage repairs, moving pumps, laying pipe lines, cleaning up gob and refuse on headings can be accomplished without delay or interference from moving trips and other annoyances, such as occur when all the equipment and men are working. On idle days the foremen can give more supervision to the day work and materially increase the amount accomplished. Some advantage is attached to cutting off certain classes of day work entirely on the shifts devoted to the running of coal and doing these jobs on idle days alone.

Of course, it is unreasonable for the foreman to work a full crew of day men on the days the mine runs coal and then expect a large force on idle days also. The daily cost is bound to be prohibitive. He should parcel out the jobs between work days and idle days, for reasons of safety and efficiency. To allow falls and gob to accumulate on haulways, ditches to clog with refuse, mine tracks to deteriorate, timber to become unsafe, stoppings and brattices to be neglected, and equipment to run down is poor economy. Disorderliness of this sort results from cutting off too much of the day labor during slack periods. I believe the employment of balanced crews on both work days and idle days is a plan far superior to the use of a full crew on the days that the mine is in operation. The latter plan leaves the mine shorthanded on idle days.

The number of day men that can be worked throughout the month should be arrived at by an estimate of the tonnage required to fill the orders on hand. Labor estimates and the cost should be calculated on the first of every month. Then do not vary from the estimates unless some emergency arises.

Discipline cannot be maintained underground nor safety rules enforced on idle days if the numbers of men and bosses are not sufficient to keep up and supervise the work. Workmen soon notice bad conditions that are apparently permitted to go unaltered and they naturally become negligent and careless about their own jobs.

A coal mine is not quite like a factory or mill that can be closed down during a depression in business, when all employees can be cut off except a watchman. At those plants all that is necessary to resume operation is to blow off the dust, wipe away the cobwebs and oil up the machinery. A mine, with its many miles of underground passageway, roof that must be constantly watched and timbered to keep it from caving in, haulage roads that will be ruined if ditches are allowed to fill with refuse and acid water is permitted to run over the rails and be absorbed in the roadbed, is an entirely different proposition. Extreme cost-cutting in slack times is generally ruinous to the future successful operation of the mine. VICTOR Z. GANDY.

Hepzibah, W. Va.

Recent Patents

Flotation Apparatus; 1,760,916. Joseph P. Ruth, Jr., Denver, Colo. June 3, 1930.

Drilling Mechanism; 1,761,310. Charles F. Osgood, Claremont, N. H., assignor to Sullivan Machinery Co., Chicago. June 3, 1930.

Mining Machine; 1,761,670. Charles R. Hughes, Altoona, Pa. June 3, 1930.

Mine-Hoist Alarm Switch; 1,761,708. Thomas R. Cook and Donald N. Smith, Scranton, Pa., assignors to the Hudson Coal Co., Scranton, Pa. June 3, 1930.

Post Puller; 1,761,675. John N. Mick, Van Meter, Iowa. June 3, 1930.

Loading Machine; 1,762,060. James Elwood Jones, Norton A. Newdrick, and William E. Moody, Columbus, Ohio. June 3, 1930.

Mine Car; 1,762,667. Hugh W. Sanford and Perry S. McCallen, Knoxville, Tenn., assignors to Sanford Investment Co., Wilmington, Del. June 10, 1930.

Apparatus for Breaking Coal; 1,763,165. W. K. Liggett, Columbus, Ohio, assignor to Jeffrey Mfg. Co., Columbus, Ohio. June 10, 1930.

Coal-Washing Apparatus; 1,760,293. Andrew Witzal, Scranton; A. G. Rabel, Throop; and Harry F. Stevens, Dunmore, Pa. May 27, 1930.

Mine Cutter Chain; 1,760,816. Frank Cartlidge, Cincinnati, Ohio, assignor to Cincinnati Mine Machinery Co., Cincinnati, Ohio. May 27, 1930.

Method for Recovery of Surplus Preservatives in Treatment of Timber; 1,756,797. Ralph H. Rawson, Portland, Ore. April 29, 1930.

Coal Ball and Process of Manufacturing the Same; 1,756,896. Clarence B. Wisner, Canton, Ohio, assignor to Coal Process Corporation, Dover, Del. April 29, 1930.

Coal Carbonizing Apparatus for Extraction of Bituminous Materials; 1,756,969. Karl Bergfeld, Berlin, Germany. May 6, 1930.

Blasting Cartridge; 1,757,382. Erle Ormsby, St. Louis, Mo., assignor to Central Mine Equipment Co., St. Louis, Mo. May 6, 1930.

Miner's Drill; 1,757,725. Paul Lesko, Jessup, Pa. May 6, 1930.

Miner's Lamp; 1,757,887. Grant Wheat, Marlboro, Mass., assignor to Koehler Mfg. Co., Marlboro, Mass. May 6, 1930.

Process of and Apparatus for Washing Coal and Other Minerals; 1,758,035. Antoine France, Liége, Belgium. May 13, 1930.

Safety Blasting Powder Stick; 1,758,358. Henry E. Ennis, Thayer, West Va. May 13, 1930.

Method of Improving Flowing Characteristics of Coal; 1,758,631. Walter E. Trent, New York, assignor to Trent Process Corporation, New York City. May 13, 1930.

Coal and Refuse Tester; 1,758,756. Hopkin Morgan, Scranton, Pa. May 13, 1930.

Car-Retarding Device; 1,758,836. Grant Holmes, Danville, and Andrews Allen, Glencoe, Ill., assignors to Robt. Holmes & Bros., Inc., Danville, Ill. May 13, 1930.

Shaking Conveyer; 1,759,764. Karl Stroedter, Bochum, Germany, assignor to the Firm Gebr. Eickhoff Maschinenfabrik, Bochum, Germany. May 20, 1930.

Safety Block for Mine Cars; 1,759,791. Carl F. Keck, Pleasant Unity, Pa. May 20, 1930.

Concentrator Table; 1,759,960. Albert H. Stebbins, Los Angeles, Calif. May 27, 1930.

Aerial Tramway; 1,760,077. Max P. Morrison, Worcester, Mass., assignor to American Steel & Wire Co., New York City. May 27, 1930.

Drag Scoop; 1,760,116. Robert B. Coffman, New Alexandria, Pa. May 27, 1930.

OPERATING IDEAS

From PRODUCTION, ELECTRICAL

And MECHANICAL MEN

Automatic Power Releases Guard Against Dangers From Ventilation Failures

IF THE ventilation fan should stop or if a door should be left open at a gaseous mine, explosive gas will accumulate. An attendant may not always be near the fan and certainly a man is not kept stationed at every mine door. At some mines devices are installed that automatically open the underground circuits when the fan or a door ceases to function entirely or when the ventilating current is reduced to some predetermined velocity.

In information circular 6288, by W. J. Fene and R. F. Dalrymple, of the U. S. Bureau of Mines, a number of these automatic power cut-off devices are described. As the rate of gas accumulation may be rapid, reliance cannot be placed on human observation to detect an interruption in ventilation and cut off the power from the underground. For this reason, it is said, a device of this type should be installed at every mine that produces explosive gas, care being taken that the hoists or cages be put on a separate circuit. Mining laws of several states compel the use of such devices. These power releases are simple in design and operation and can be made in the mine shops.

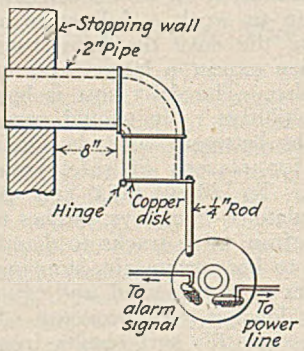
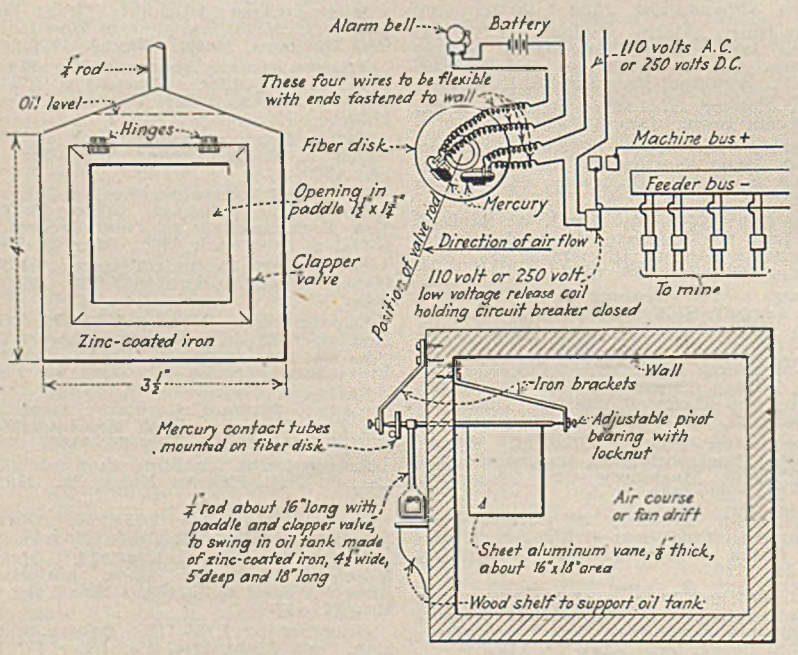


Fig. 2—Cross-Section of Hinged Disk, Suction Type

Fig. 1—Automatic Power Release of the Vane Type



Difference in ventilating pressures is relied upon to actuate the power release and signal devices described in the circular. With but one exception, the contacts in the release circuit are closed when the pressures on two sides of a wall are equalized.

In Fig. 1 is shown a power-release and signal device which is installed in the Colorado mines of the Victor American Fuel Co. With this type a fall of pressure against a vane operates the release contacts. No fixed size can be prescribed for this vane, as the dimensions are dependent on the velocity of the air in the fan drift where it is installed. The vane is mounted on a shaft which protrudes through the wall and is supported by conical end bearings on iron brackets. These bearings are of the adjustable screw type and are fitted with locknuts.

To that end of the shaft which protrudes into the motor room is fixed a steel rod, to which is attached a paddle. The latter is immersed in an oil bath and functions to prevent wide rotation of the shaft with slight variations of ventilation pressure. A clapper valve is hinged over an opening in this paddle. Ordinary engine oil is suitable for the bath under moderate temperatures. In extremely cold weather the oil should be thinned with kerosene.

On the engine-room side of the vane shaft also is fixed a round fiber disk on which are mounted two mercury contact tubes. Brass clips similar to those used on inclosed fuse blocks are suggested for mounting the tubes on the disk, as they allow adjustment of the level of the tube to the proper angle for submerging and closing the contacts. These tubes contain a gas that prevents corrosion of the contact points.

One tube makes and breaks current taken from 110-volt a.c. or 250-volt d.c.,

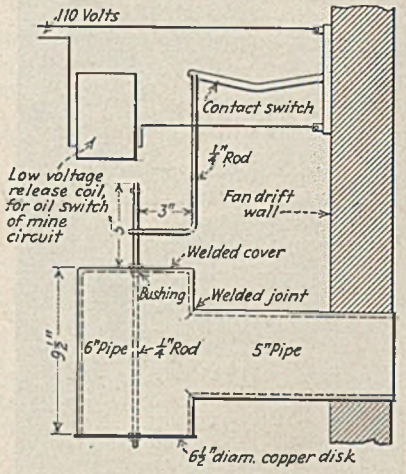


Fig. 3—Shaw Drop Disk, Suction Type

the contacts being in series with a low-voltage release coil which controls a circuit breaker between the machine busbar and the feeder busbars. The low-voltage release coil, of course, must be wound for the voltage sent through the contact tube.

The second tube is so positioned that the mercury flows toward the contacts and closes an alarm-bell circuit when the pressure vane returns to a vertical position. In the alarm circuit, one or more bells may be installed. This circuit may be powered through an a.c. bell transformer or by batteries.

In Fig. 2 is shown an automatic power release and alarm for use in an entry stopping or fan-drift wall which utilizes

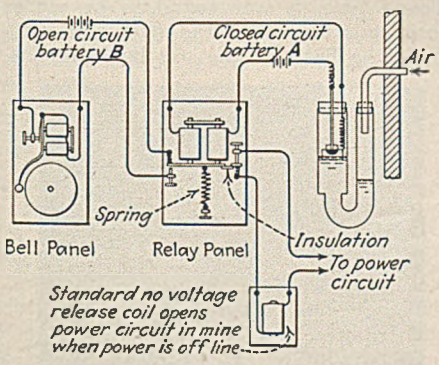


Fig. 4—Automatic Release, U-Tube Type

the effect of the release of suction to operate the mercury contact tubes. A pipe is inserted through the wall and to the projecting end is connected an L. The open end of this L is ground to make a tight seat with a light-hinged copper disk. Opposite the hinge on the disk is fastened a rod which serves to move the mercury tubes when the suction is released and the disk falls. The tubes are mounted in a manner similar to that illustrated in Fig. 1.

An automatic power release developed and used at the Harmarville (Pa.) mine of the Consumers Mining Co. is detailed in Fig. 3. A 5-in. pipe is concreted into the fan-drift wall so as to project from it on the pressure side. To this pipe is welded a 6-in. pipe which serves as a suction chamber. One end of this 6-in. pipe is closed and the other end is fitted with a copper suction-valve disk. The latter is suspended from a chain of two rods which connect with a switch.

This switch may be of the contact or float type. It is connected in series with a low-voltage release coil which controls an oil switch for the mine circuit. When the fan is running, the disk is held flush against the bottom of the T by suction. If the fan should stop, the disk will fall of its own weight and operate the switch.

An automatic power release and signal arrangement, which is somewhat similar to that appearing in Fig. 1, except that a U-tube is substituted for the vane and relay panel, is employed by the Colorado Fuel & Iron Co. As shown in Fig. 4, the U-tube has one large and one small leg, an arrangement which causes maximum travel of the float for small pressures and short travel for greater pressures. The float carries a cup of mercury which is covered with transformer oil to extinguish the arc. Salt water, glycerine, transformer oil, or any liquid that will not freeze is used in the tube.

A simple fan signal consists of a U-shaped pipe, a cork float with a mercury cup, copper contacts, and lead wires. In this case (see Fig. 5) the U is connected to an open pipe which projects through the wall of the fan house and into the intake. When the fan stops or slows down, the liquid in the float leg of the tube rises, closes the contacts, and rings a bell.

Mine doors should be eliminated wherever possible, but, as this is not always feasible, the doors should be protected by a signal and a power release device. The latter is intended to cut off the power from the section of the mine in which a door is left open.

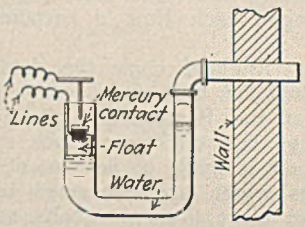


Fig. 5—Simple U-Type Release Device

Any of the devices already described can be adapted to this purpose. In Fig. 6 is illustrated an adoption of the device covered by Fig. 1. Where the vane might interfere with the mine activities, any of the U-tube releases can be used instead. To avoid the possibility of gas or dust being ignited, the circuit breaker should be of the inclosed type and installed in pure air on the main entry. Underground installations of this kind should, of course, be protected from damage from falls of roof.

A Hard Job Made Easy

Not long ago the chief of mechanical and electrical maintenance at a large mining plant said to an editor: "I have a good job here, thanks to *Coal Age*." An explanation was in order, of course, and he gave it. "There's a lot of work attached to this job," he added. "First it's one thing, then another; sometimes it's two or three things together. A fellow has to be on his toes constantly, or the job will bury him. However, my work isn't nearly as hard as it was before I learned to use operating ideas. I go over them every month and pick out those that look useful to me. Some I apply immediately; others I hold in reserve." Accepted operating ideas, by the way, are paid for at the minimum rate of $5. Send one in today.

Portable Turnout Can Be Laid Right or Left

Mechanized mining methods have accentuated the necessity for a simplified track turnout of light section for temporary purposes at or near the working face. The turnouts heretofore used in rooms and crosscuts and on pillars have been the cause of delay and expense in the extension of track chiefly because the units were made up

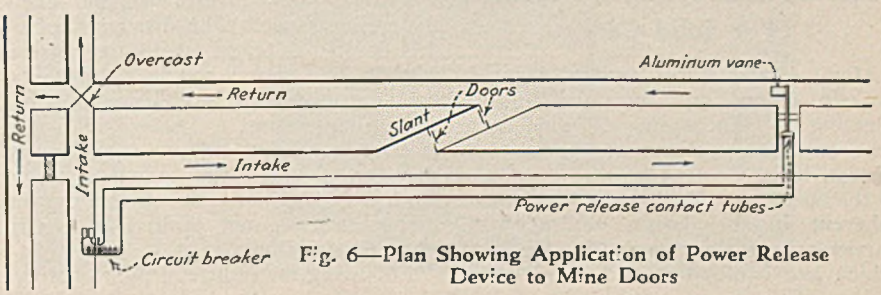
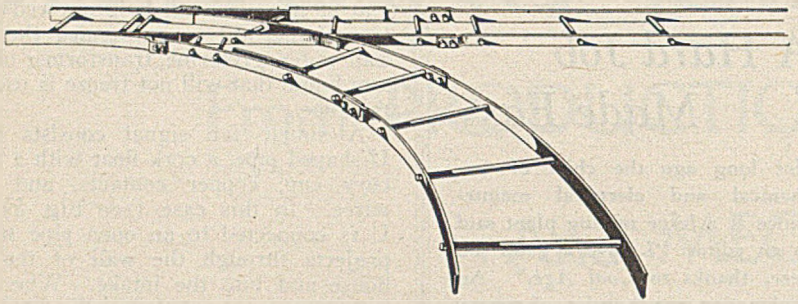


Fig. 6—Plan Showing Application of Power Release Device to Mine Doors



Bars, Pipes and Bolts Comprise This Portable Turnout

of a large number of separate pieces. These have had to be matched, joined, and gaged each time a turnout was laid.

From England come the details of an "arcwall" turnout developed and used at the Broomhill Collieries in workings laid out on a block system. This unit is made of permanent, rigid sections which are connected by one and not more than two bolts at each joint. Its construction is such that no fitting is required in the laying operation, no ties are needed, and it may be used with equal effectiveness on either a rigid or a left turn. Furthermore, it can be laid by unskilled hands.

As indicated in the accompanying sketch, the running rails consist of steel bars which, when laid on edge, stand as high as the ball of the standard section track rails to which the turnout is connected. These bars are pre-curved to the desired radius and are held to gage by pipe spacers and through tiebolts. Joints are lapped and drilled with bolt holes at standard fishplate centers. Consequently, ordinary rails can be joined to any section of the turnout. By reason of this construction, it is possible to insert straight rails in place of the curved bar section and thus produce a turn at a 45-deg. angle as readily as at a right angle.

Guard rails, also constructed of bar steel, are provided with vertically slotted holes, which permit these pieces to project above the track surface whether the turnout is laid right or left. Ordinarily, this turnout section is laid directly on the bottom and is leveled where necessary by wood wedges. In soft bottom, it is laid on bearing boards of wood. Major Morison, of the Broomhill Collieries, is the patentee of this device.

Automatic Coupling-Pin Holder For Solid Cars

Many minor, if not serious, injuries to trip riders are sustained in the coupling and uncoupling of mine cars. Two factors contribute to the latitude of this hazard. One is the frequency of the operation; the other is the danger inherent in the design of hitchings, particularly with respect to mine cars which are emptied in a rotary dump. On cars with swivel couplings, which are passed through the dump without uncoupling, a retaining device must be used to hold the coupling pin in place while the cars are being turned over. Unless the retainer is foolproof, it adds to the danger faced by a trip rider in making up his trips.

At the Nemacolin (Pa.) mine of the Buckeye Coal Company three systems

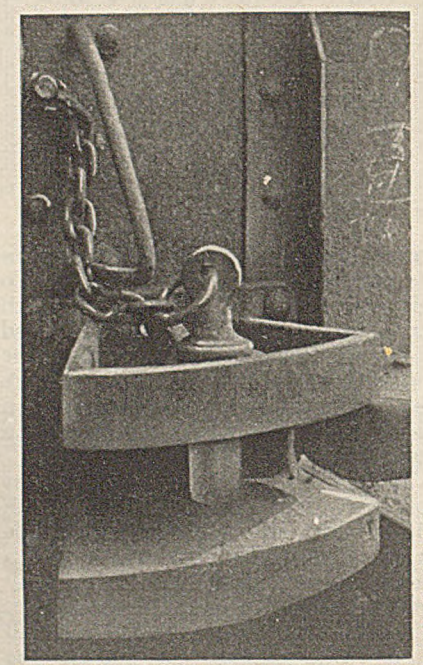


Fig. 1—When the Car Is Overturned the Pin May Fall Out

of holding mine-car coupling pins in place were tried before a standard was decided upon. One was the arrangement shown in Fig. 1. This scheme, which upon trial proved unsatisfactory, is used to a certain extent at some coal mines. It consists merely of a downwardly protruding bracket made of iron rod, which engages the coupling chain when the car is overturned and holds the pin in place. The disadvantage of this device, as borne out by experience, is that the bracket rod is likely to be bent out of line in a collision and become inoperative. Another difficulty is that the chain and pin may become threaded through the bracket. Aside from these two specific objections, the arrangement is not positive acting in normal operation.

Following the failure of this coupling-

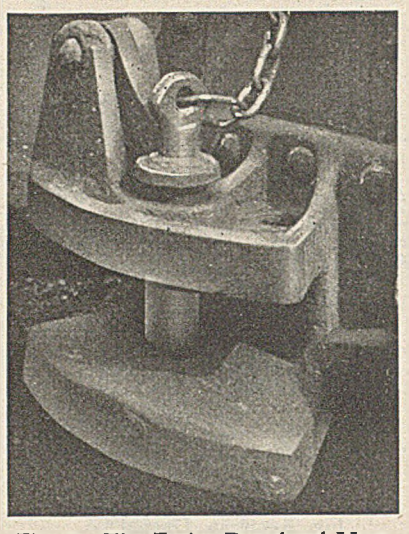


Fig. 2—The Entire Drawhead Must Be Replaced if the Latch Is Broken

pin retainer, a second type (see Fig. 2) was tried. In this case the pin is held home when the car is turned by a free-swinging latch. Normally this latch hangs vertically, but when the car is turned the latch swings over the collar of the pin and keeps it from falling out. This device had its disadvantages. For one thing, as the shoulders between which the latch was suspended were cast integral with the drawhead, if any part of the latch was broken the entire head had to be replaced. Because of its design, the latch was susceptible to clogging and to freezing. A third disadvantage was the possibility of a hand being mashed in the coupling.

Despite the shortcomings of this second type, it was found to be more positive acting than the first and was made the basis of the pin latch shown

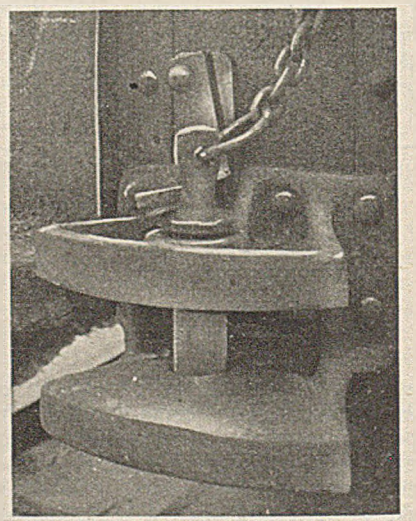


Fig. 3—Standard Pin Holder at Nemacolin

in Fig. 3. This last type has been chosen as standard. It is removable and easily replaced if necessary. It is backed by a smooth-surfaced facing plate and is pinned on a vertical line through its center of gravity. The horizontal arm engages the collar of the

pin when the latter is in coupled position. It is cut away to about half the width of the piece from which the latch is made and throws the center of gravity to one side, allowing the latch to hang on a slant when at rest. A feature of the design is that the pin can be dropped into place or pulled without touching the latch.

Caution Urged in Fitting Gears to Shafts

Modern manufacturing methods, particularly heat treating and other phases of metallurgy, have locked up in the gear of quality long life and smooth running. It is unfortunate, therefore, that so many high-priced machine gears are ruined by the uneven heat applied to them in mine shops, observes David Williams, Youngstown, Ohio, who contributes the following practices that should be followed and the precautions that should be taken in fitting gears to shafts of mining equipment.

Good gears, he says, are expensive because they represent the best materials formed by careful machining and processing from exact design. The potential life of these gears in service can be greatly shortened by misguided mine electricians, mechanics, and blacksmiths who believe the only care that must be taken in heating a gear is to prevent warping. They do not seem to be aware of the fact that there is the danger of a gear being overheated. In earlier days, Mr. Williams confesses, he also was guilty of maltreating gears until he was awakened by correspondence from a gear manufacturer, dealing with troubles from gears which had not been giving the service warranted by the price paid for them. The manufacturer said:

"Heating a gear by the method which you follow is decidedly bad practice and is likely to lessen its life greatly or even ruin it. Our gears will stand being heated up to 300 deg. F. without ill results. From there to 400 deg. the temper begins to draw slightly. Over 400 deg., the temper is rapidly drawn, and far below the color heat the gear is completely softened. After this deterioration, the gear will not last more than one-fifth as long as it would if the temper had not been drawn from it."

According to Mr. Williams, the best method of getting a good press fit without the application of heat is through the use of a hydraulic press. The latter device soon pays for itself in the saving of time and materials. Except for modern plants, few mines are equipped with a hydraulic press, and therefore, other methods are followed.

Heating a gear by hot water or steam gives an expansion of 0.001 in. for each inch of bore. This expansion will take care of ordinary fitting requirements, but is not sufficient for a press fit. It is a good method to follow in heating pinions for tapered armature shafts, as on mine locomotives, in which application it is almost universally used on electric railways. A few blows imparted through a block of wood by a sledge will give the pinion an excellent fit.

Immersion of a gear in a hot oil bath will give it an expansion twice as great as that imparted by hot water or steam and will solve many of the expansion problems of this nature. A good tempering oil, an oil with a high flash point, should be used for this purpose. It can be heated to 300 to 350 deg. F. The heat should be controlled through a thermometer.

When it is necessary to use a torch or dry heat for expanding gears, the work should be done by someone who thoroughly understands what he is doing. If heat is applied to the bore and the teeth are kept reasonably cool—say, to the sizzling point—by the application of wet waste or some similar method, the bore can be given ample expansion. But at best this method invariably involves putting a strain on the gear, because of the uneven distribution of heat. But, if care be taken, it is possible to do the fitting job in this way in an emergency. In all cases, the danger quoted above from the manufacturer should be borne in mind.

Full-Size Coal Face Built On Wall Near Office

For instruction of new loaders, for calling attention to the danger zone, and at times to act as an illustration in discussing face problems, a working place of the Keystone (W. Va.) mine, of the Koppers interests, has been "transplanted" to the outside near the mine office.

A wall of coal the same height as the thickness of the seam has been built with black mortar. In this the veins of bone and rash have been included at the proper elevations. In front of the wall is a short section of track and a dummy mine car. At about the center of the seam is painted a white mark labeled the "Danger Line." On a white surface at the side, the veins to be loaded, and not to be loaded, are plainly labeled. On the other side in large letters is stated, "80 Per Cent of All Accidents Are Caused From Falls of Coal and Slate From Above the Danger Line." The exhibit is on an outside wall of the shop which is close to the office and mine portal.

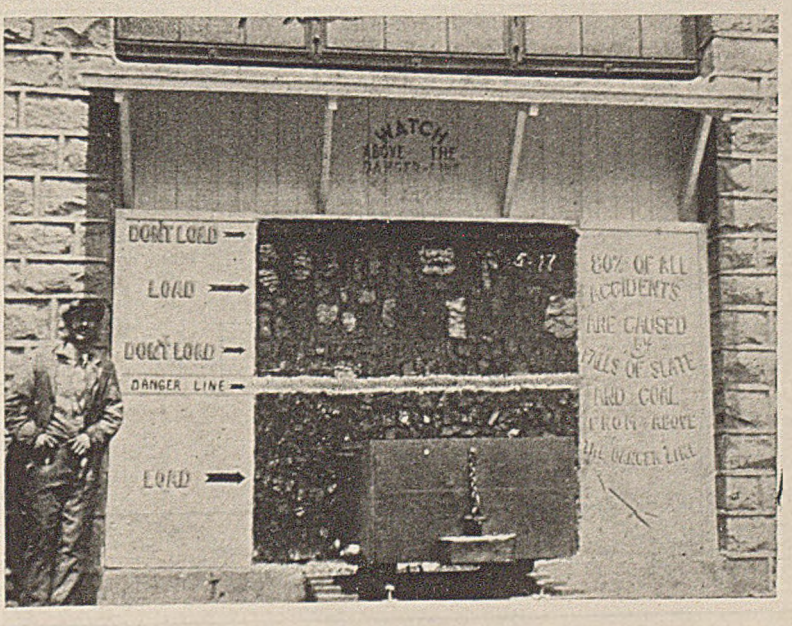
How to Make Chain Drives Last Longer

Chains for various drive purposes can be made to give longer life by following certain fundamentals in their adjustment and maintenance. When Charles R. Weiss, chief engineer, Link-Belt Co., was asked to outline the procedure in this maintenance job, he contributed the suggestions which follow:

Be sure that socket wheels are in line on the shafts. If the sockets are not exactly in line, a side pull is developed which concentrates the load on one side of both the socket teeth and the chain. Faulty alignment, of course, results in extensive wear on both chains and sockets.

Attention should be given to the adjustment of the chain on the sockets. It is well to run the chain with a little more slack than is given a belt in most cases. Too much tension causes undue wear on the chain and wasteful friction on the bearings. On the other hand, if the tension is not sufficient, the chain may jump the sockets or ride the teeth and break.

To Promote the Loading of Clean Coal and Doing It Safely



Frequent lubrication is a necessity, using a good grade of light cylinder oil. A paint brush is a convenient tool for applying oil to the chain joints. Paint the open joints on the open or upper side. Oil the closed joint chains on the inside (upper side of lower run) while the drive is running slowly.

For best results it is necessary to clean the chain frequently; especially is this true of open drives. Take the chain off and rid it of old lubricant and dirt by soaking and dipping in kerosene. Dry the chain and oil it thoroughly before starting it again. Before shutting down a machine for any period of time, clean the chain and cover it with grease or an oil heavier than that which is used for lubrication purposes. Before the chain is put back into service again, the protective coating should be removed and the customary light oil applied.

Last, but not least, be sure that the sockets fit properly. Look at them from time to time to make sure that the teeth are not so worn that they injure the chain. Before the teeth become worn to a hook shape the wheels should be replaced with accurately made and close-fitting socket wheels. If only ordinary attention is given to chain drives, they can be made to last longer and to run better. Careful maintenance reduces the chances of a breakdown.

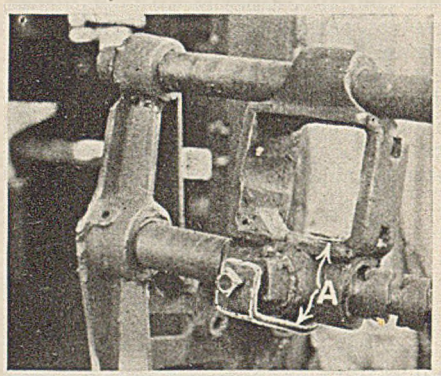
Scrap Rail Can Be Used As Timber Legs

Scrap rails ranging in sections from 25 lb. to 90 lb. can be utilized as timber legs and crossbars for the support of mine roof. After two bars are cut from a 30-ft. length of rail, ordinarily there is a 6-ft. length left over, which can be used as a timber leg when prepared according to the sketch. This contribution is made by C. H. Farmer, mining engineer, Green River Fuel Company, Mogg, Ky.

The short lengths of rail are cut and prepared in the shop during spare time. A short piece of angle is used as a bearing plate on each end of the rail used as a timber leg. This angle is held in place by a single rivet and should be at least as wide as the height of the rail section. A foot sill may be placed under the leg if desired. If made from a reasonably large rail section, one of these legs will support a greater roof load than a wood post of much larger size. Naturally, the life is much longer. A supply of these timber members should be kept in stock and issued by requisition from the mine foreman.

Forged Clamp Saves Cost Of New Carriage

Repair expense on old type YR2 locomotive cable reels of the Lillybrook Coal Co. has been reduced by use of a forged clamp to hold the tongue plug when threads are stripped, according to



Holds Stripped Plug in Place

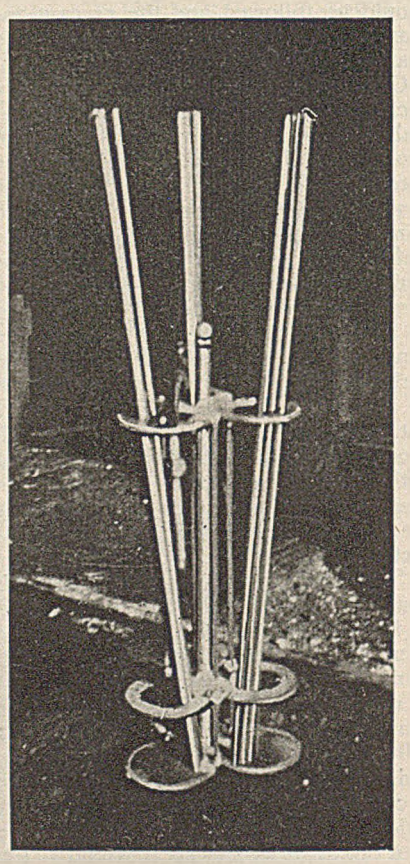
J. L. Chambers, chief electrician, Lillybrook, W. Va.

The photograph shows one of these clamps, *A*, in place. It is applied by hooking around the back of the carriage and tightening a setscrew against the plug. Stripping the thread of this plug is caused by allowing the tongue to become worn to a point where it fouls in the thread bar. Use of the inexpensive clamp saves buying a complete new carriage, and repetition of the tongue trouble does nothing then but bend the forged clamp, a trouble quickly remedied.

Holder Keeps Welding Rods Within Easy Reach

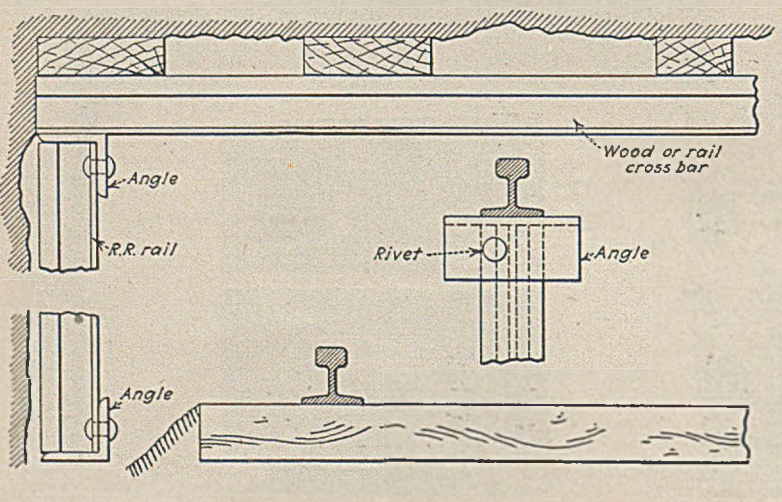
With torch in hand during the progress of a job, nothing will cause a welder to become exasperated quicker than to find that he cannot immediately lay a hand on the particular welding rod he wants to use. A convenient and easily made welding-rod holder, which keeps the rods where they belong, is in use at the mine of the Dunedin Coal Co., Concho, W. Va., and its use is suggested as an operating idea by C. F. Burdette.

In general design, this holder resembles the old-fashioned open-type umbrella stand. As the accompanying illustration shows, the holding rings, of which there are two sets, are made by weld-joining three mine-car axle washers. Space is left between theme for the insertion of a ½-in. pipe which serves as the upright. The rings and a baseplate of sheet iron, cut to conform with the outline of the rings, are welded to the pipe.



Reach for a Bronze Instead of an Iron

Another Way to Utilize Scrap Rail



AMONG THE MANUFACTURERS

CUMMINGS C. CHESNEY, vice-president and chairman of the manufacturing committee of the General Electric Co., Schenectady, N. Y., has been relieved at his own request, and will be succeeded by VICE-PRESIDENT WILLIAM R. BURROWS.

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HERBERT HOOVER, formerly general distribution engineer of the Potomac Electric Power Co., has been added to the Philadelphia (Pa.) sales office of the Wagner Electric Corporation, St. Louis, Mo. H. W. PETTY, salesman in the Detroit (Mich.) territory, has been made branch sales manager of the Pittsburgh (Pa.) territory. The Wagner company has combined its Atlanta (Ga.) sales office and service station, with new headquarters at 14-20 Alexander St., N. W.

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FULLER LEHIGH CO., Fullerton, Pa., has opened a sales office in the Candler Building, Atlanta, Ga.

•

PREST-O-LITE CO., New York City, has opened a new plant at Casper, Wyo., for the manufacture and distribution of dissolved acetylene.

•

JAMES R. WHITE has been elected vice-president of Jenkins Bros., New York City, and has been appointed director of sales.

•

JOHN J. SOMES has been appointed manager of the Chicago office of the Terry Steam Turbine Co., Hartford, Conn. The office has been removed to 20 North Wacker Drive Building.

•

ROBBINS & MYERS SALES, INC., Springfield, Ohio, has removed its Chicago office to 1133 Palmolive Building.

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OHIO BRASS CO., Mansfield, Ohio, has removed its Philadelphia (Pa.) offices to 1164 Broad Street Station Building.

ARTHUR D. KUNZE, for several years secretary, Rubber Manufacturers' Association, has joined the United States Rubber Co., Cleveland, Ohio, as assistant to the general manager, mechanical goods department.

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J. L. VAN NORT has been promoted to sales manager of the Boston (Mass.) office of the Reliance Electric & Engineering Co., Cleveland, Ohio.

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WILLIAM STRINGHAM, assistant general superintendent of the East Works plant of the American Rolling Mill Co., Middletown, Ohio, since 1923, has been made assistant vice-president.

H. V. CHASE, superintendent of the Kenvil (N. J.) explosives plant of the Hercules Powder Co., Wilmington, Del., has been made assistant director of operations, explosives department. W. S. BRIMIJOIN, assistant superintendent at the Kenvil plant, succeeds Mr. Chase. CHARLES B. SPICER, resident manager of the St. Louis (Mo.) office, has retired after 43 years' service.

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STUART R. IVES, vice-president and general manager, Lyle Culvert & Pipe Co., Minneapolis, Minn., has been appointed general manager of the Armco Culvert Manufacturers' Association, with headquarters at Middletown, Ohio.

•

HAROLD S. FALK, vice-president and works manager, Falk Corporation, Milwaukee, Wis., has received the honorary degree of Master of Science from Marquette University in recognition of work done in the promotion of the apprentice training movement in American industries.

Trade Literature

Copperweld Wire Tables. Copperweld Steel Co., Glassport, Pa. Leaflet giving revised standards for 1930 and folder of wire tables.

Economizer. Combustion Engineering Corporation, New York City. Catalog EC-1; 11 pp., illustrated. Describes the Fin-Tube economizer.

Locomotives. Brookville Locomotive Co., Brookville, Pa. Bulletin B-4-AA-1; 8 pp., illustrated, describing the advantages of the Ford "AA" powered locomotives.

Multi-V-Drive for Power Transmission. Worthington Pump & Machinery Corporation, Harrison, N. J. Bulletin L-400 B-1; 8 pp., illustrated.

Long Service From Armco Ingot Iron Pipe. American Rolling Mill Co., Middletown, Ohio. Pp. 32, illustrated. Covers the uniformity, rust resistance, and weldability of Armco pipe, and also gives information and engineering data on pipeline systems.

Rope-Feed Ironclad Coal Cutters and Self-Propelling Electric Coal Drill "CD-4" are the titles of two bulletins recently issued by the Sullivan Machinery Co., Chicago. The former, Bulletin No. 82-G, 7 pp., illustrated, describes both the standard and low-vein models; and the latter, Bulletin No. 82-F, 7 pp., illustrated, describes the features and advantages of this "CD-4" drill.

Electrically Wound Time Switch. Sangamo Electric Co., Springfield, Ill. Pp. 7, illustrated.

Little Giant Electric Tools — Universal, Alternating and Direct Current. Chicago Pneumatic Tool Co., New York City. Catalog No. 898.

Instructions for Installation and Care of Brown Electric Flow Meters. The Brown Instrument Co., Philadelphia, Pa. Book No. 214; 40 pp., illustrated.

Weston Testing Screen for Coarse Materials. Hendrick Mfg. Co., Carbondale, Pa. Folder illustrating and describing its construction, assembly, and operation.

Coal Crushers. Vulcan Iron Works, Wilkes-Barre, Pa. Pp. 6, illustrated. Describes the durability and adaptability of high-speed and low-speed crushers; specifications are included.

Roller Sheaves for Scraper Loading Service With Sullivan Hoists. Sullivan Machinery Co., Chicago. Bulletin No. 76-K, illustrating and describing construction and use of these sheaves in scraper loading.

Centrifugal Pump. Goulds Pumps, Inc., Seneca Falls, N. Y. Bulletin 401; 48 pp., illustrated, explaining theory, characteristics, operation, and installation of the centrifugal pump.

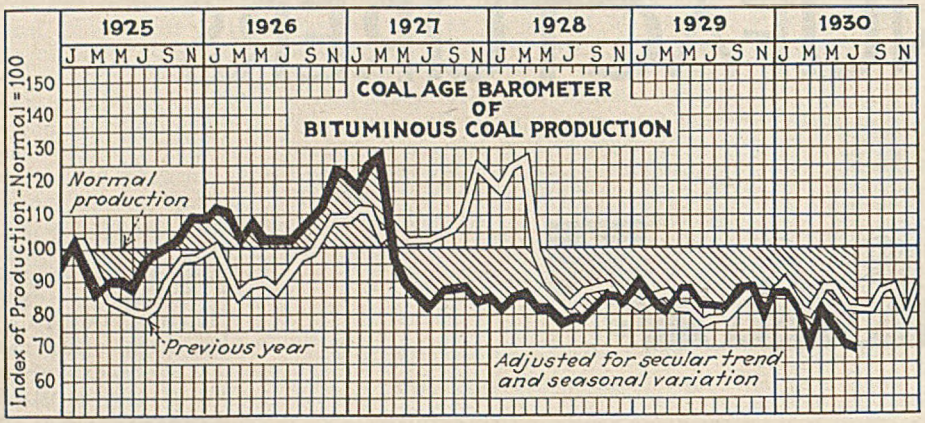
Industrial Control. General Electric Co., Schenectady, N. Y. Catalog GEA-606B, a reprint of pp. 825 to 985 of General Catalog 600A. Material on the care and operation of control devices, wiring diagrams of standard controllers, push buttons, etc., is included.

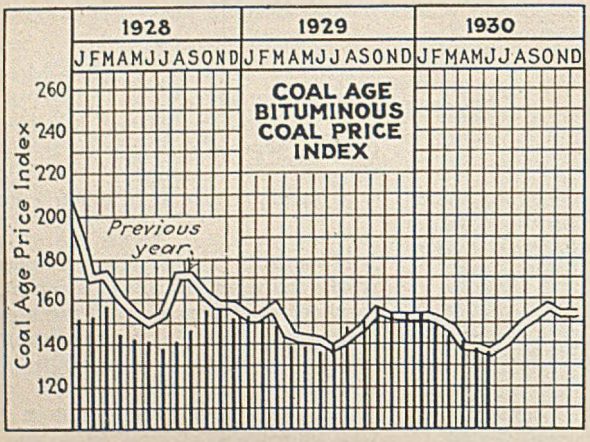
"Behind the Pyramids." National Carbon Co., Cleveland, Ohio. Pp. 16, illustrated. A story on the manufacture of National Pyramid brushes.

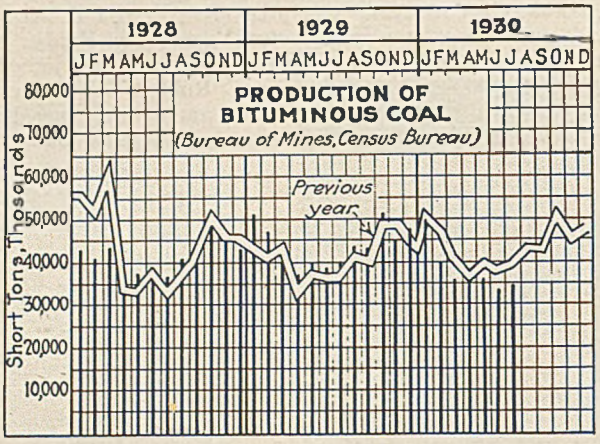
Portable Air Compressors. Sullivan Machinery Co., Chicago. Bulletin No. 83-R; 40 pp., illustrated. Both portable gasoline engine-driven compressors and portable electric-driven units are covered.

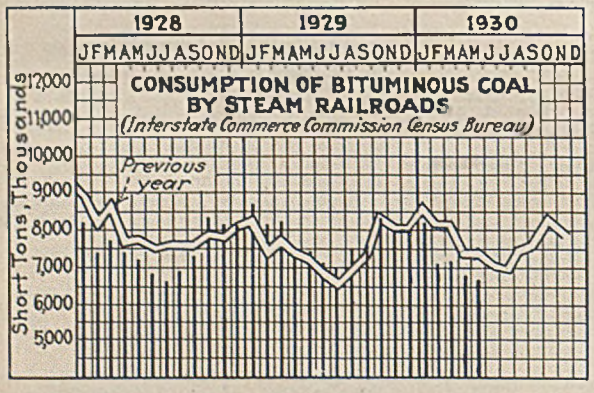
General Electric Co., Schenectady, N. Y., has recently issued the following bulletins: Synchronous Converters for Mine Service, Type HCC, GEA-1270. Incandescent Headlights—Stationary Type for Mine Locomotives, GEA-1271. Armature Coils for Mine-Locomotive Motors, GEA-1272. Improved Fingers and Segments for Mine Type Controllers, GEA-1273. Synchronous Motor-Generators for Mining Service, GEA-792A. Automatic Transfer Switch, GEA-952A. These are all in leaflet or folder form and illustrated.

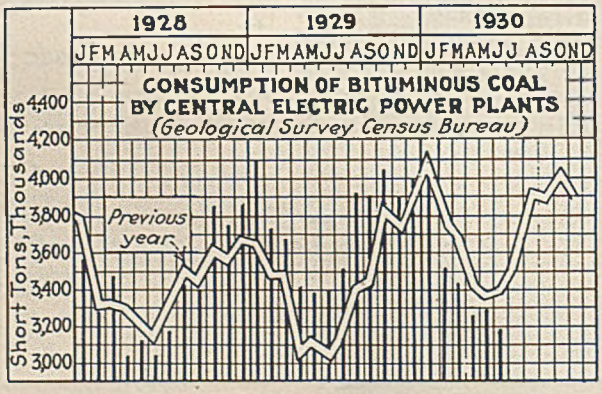
Indicators of Activities in the Coal Industry

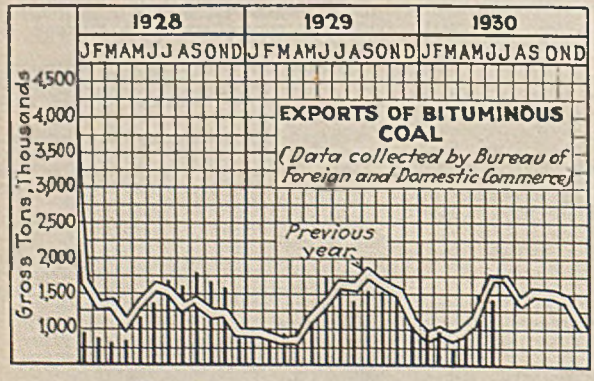


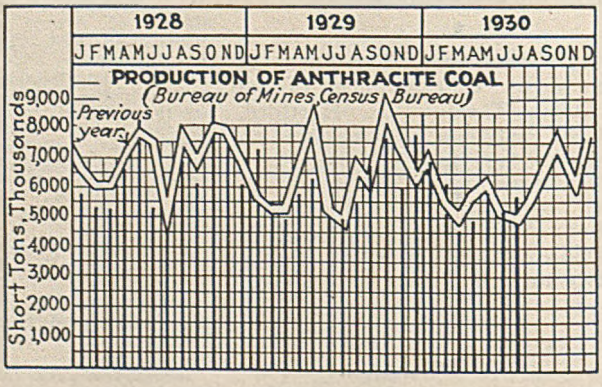












MARKETS in Review

AN IMPROVEMENT—spotty, it is true, but still an improvement—was noticeable in the coal markets of the country in July, and was accompanied by a marked advance in the price level. Domestic sizes were the only ones affected, however, as the steam business continued to languish. Price advances scheduled for August initiated the buying movement in those markets where improvement was apparent. However, retailers bought to protect themselves, rather than from the fact that they were selling any coal to their customers.

Industrial depression continued to exert an adverse effect on steam coals. Stocking was conspicuous by its absence, and contracting was still held in abeyance. A further threat to the stability of the steam sizes, particularly slack, was contained in the increased production of domestic coal, coupled with the inability and unwillingness of the industrial market to absorb any additional coal over that taken in the past few months.

July production of bituminous coal is estimated by the U. S. Bureau of Mines at 33,634,000 net tons, an increase of 920,000 tons over the June production and a decrease of 7,541,000 tons from July, 1929. Anthracite production is estimated at 5,662,000 net tons for July. This compares with 5,183,000 tons in June and 4,993,000 tons in July, 1929.

Coal Age Index of spot bituminous prices (preliminary) was: 141, July 5; 140, July 12; and 142, July 19 and 26. The corresponding weighted average prices were: $1.71, July 5; $1.70, July 12; and $1.72, July 19 and 26. Revised Index figures for June were: 137, June 7; 138, June 14 and 21; and 137, June 28. Corresponding weighted average prices were: $1.66, June 7; $1.67, June 14 and 21; and $1.66, June 28. The monthly Index for June was 137½, as compared to the unrevised figure of 141¼ for July.

Dumpings at the lower lake ports continued in slightly higher volume than for the same period last year. Total dumpings for the season to July 28 were 18,877,107 tons, of which 18,224,553 tons was cargo coal and 632,554 tons was bunker fuel. In the same period of 1929 dumpings were as follows: cargo, 17,918,557 tons, and bunker coal, 684,336 tons, or a total of 18,602,893 tons.

The anthracite markets of the country were a study in contrasts in the month of July, with some reporting no demand for either steam or domestic sizes and others reporting a fair call from householders desirous of filling their bins before prices advanced in the fall. However, production at the mines was materially curtailed, and all sizes were in good supply, with some more so than others, the steam grades in particular. A slight tendency toward the replenishment of stocks became apparent in some sections, though stocking as a whole was down.

A WELL-DEFINED demand for domestic sizes in the last half of the month was the feature of the Chicago market in June. Both smokeless and high-volatile coals shared in the increased business, which followed announcements of price advances in August. Smokeless producers were sold ahead on prepared sizes at the end of the month, and even mine-run, which had been a problem for some time, began to perk up. High-volatile operators in the southern and central Illinois, and western Kentucky fields shared in the domestic business which followed announcements of price advances. High-volatiles from eastern Kentucky failed to take part in the spurt, though they were in fair demand over the month. Steam business, contrary to that in the domestic division, fails to emerge from the sloth in which it was gripped. Increased industrial activity, it was held, will be the only thing that will awaken its activity.

Heat in St. Louis in July militated against anything but a mild activity in the coal trade. Screenings, as in June, were rather scarce, but never in demand. Prepared sizes picked up slightly in anticipation of price advances in August, but the movement was lacking in force and the tonnage was considerably below last year's figures.

JULY proved to be a hectic month for dock operators at the Head of the Lakes. Volume of sales and contracts entered into was limited and dock men held their commitments down to a minimum. Shipments from the docks in July are believed to have fallen considerably below the low June figures of 12,380 cars. Interest in spot contracting was below par, as the larger consumers preferred to stand pat in expectation of a plentiful supply of coal later in the season. Buying for steel-plant consumption showed signs of picking up, forecasting a revival in the fall. Pocahontas prepared sizes were the feature in demand, with prices strong. Bituminous varieties from all fields managed to hold their own.

August prices are: Pocahontas egg, $7; lump and egg, $7.25; stove, $6.75; mine-run, $5; slack, $4.35; Kentucky block, $6.55; egg, $6.40; stove, $6.15; mine-run, $4.75; slack, $4.10; Youghiogheny block, $5.55; lump and egg, $5.10;

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

		Week Ended							
		July 5, 1930		July 12, 1930		July 19, 1930		July 26, 1930	
	Market Quoted	Independent	Company	Independent	Company	Independent	Company	Independent	Company
Broken	New York	.....	$8.30	.....	$8.30	.....	$8.30	.....	$8.30
Egg	New York	$8.35	8.35	$8.35	8.35	$8.35	8.35	$8.35	8.35
Egg	Philadelphia	8.35@ 8.70	8.35	8.35@ 8.70	8.35	8.35@ 8.70	8.35	8.35@ 8.70	8.35
Egg	Chicago*	7.23	7.23	7.23	7.23	7.23	7.23	7.41	7.41
Stove	New York	8.60@ 8.85	8.85	8.60@ 8.85	8.85	8.60@ 8.85	8.85	8.60@ 8.85	8.85
Stove	Philadelphia	8.85@ 9.10	8.85	8.85@ 9.10	8.85	8.85@ 9.10	8.85	8.85@ 9.10	8.85
Stove	Chicago*	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.86
Chestnut	New York	8.10@ 8.35	8.35	8.00@ 8.35	8.35	8.00@ 8.35	8.35	8.00@ 8.35	8.35
Chestnut	Philadelphia	8.35@ 8.70	8.35	8.35@ 8.75	8.35	8.35@ 8.75	8.35	8.35@ 8.75	8.35
Chestnut	Chicago*	7.23	7.23	7.23	7.23	7.23	7.23	7.41	7.41
Pea	New York	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
Pea	Philadelphia	4.70@ 4.95	4.70	4.70@ 4.95	4.70	4.70@ 4.95	4.70	4.70@ 4.95	4.70
Pea	Chicago*	3.93	3.93	3.93	3.93	3.93	3.93	4.11	4.11
Buckwheat	New York	3.00	3.00†	3.00	3.00†	3.00	3.00†	3.00	3.00†
Buckwheat	Philadelphia	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	New York	1.60@ 1.85	2.00	1.65@ 1.85	2.00	1.65@ 1.85	2.00	1.65@ 1.85	2.00
Rice	Philadelphia	2.00@ 2.10	2.00	2.00@ 2.10	2.00	2.00@ 2.10	2.00	2.00@ 2.10	2.00
Barley	New York	1.15@ 1.40	1.50	1.15@ 1.40	1.50	1.15@ 1.40	1.50	1.15@ 1.40	1.50
Barley	Philadelphia	1.50@ 1.60	1.50	1.50@ 1.60	1.50	1.50@ 1.60	1.50	1.50@ 1.60	1.50

*Net tons, f.o.b. mines †Domestic buckwheat, $3.50 (D.L. & W.).

stove, $4.85; mine-run, $4.75; slack, $3.75; splint block, $5.60; lump, $5.35; egg, $5.55; dock-run, $4.75; slack, $3.85; anthracite egg and chestnut, $12.50; pea, $8.90; buckwheat, $7.45.

IN THE Southwestern field, the reopening of the Spadra anthracite mines was the outstanding event in July. The larger deep-shaft mines in Kansas and Oklahoma remained closed, however, with current production largely confined to the strip pits. Only a moderate accumulation of summer storage orders was reported by operators. Kansas shovel lump was advanced 25c. to $2.75 in July, with another advance to $3 scheduled for August.

Hot weather in July demoralized the Colorado market, already suffering from the competition of oil and gas. Dealers refused to be interested in storage coal and confined their orders to immediate needs. Mine operation, as a result, was curtailed to two days a week. Prices were unchanged from those prevailing in June.

Dullness pervaded the Louisville market in July, with the trade looking pessimistically to August. A slight improvement was felt in the domestic business, but steam sales were still a problem. Industrial concerns were quite cold to the purchase of coal for stocking, even at prevailing low prices. Railroad and industrial contracting was slower than usual, but a number of state and municipal institutions signed up, the only bright spot in the whole situation. Screenings were a trifle weaker over the month, and only the light demand for domestic sizes kept them at comparatively high levels. Prices on all grades from both eastern and western Kentucky were about the same as in June.

With the exception of slack and screenings, all sizes of high- and low-volatile coals closed the month of July in the Cincinnati market in a much stronger position. Stagnation at the first of the month forced a curtailment in production, which brought the tonnage below low figures for several years past and caused even contract takers to cut their requirements to the bone. These conditions, resulting in an unusually small turnover, held until smokeless producers announced that orders for August delivery precluded the taking of any further business. Forecasts of a price advance on domestic sizes on Aug. 1 brought orders in large numbers, some of which, at an advance of 25c., were turned down at the end of the month. Screenings, however, finished the month weak, largely because of lake demurrage settlements as of Aug. 1, though high-grade byproduct varieties still continued to sell at $1.35.

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

LOW-VOLATILE, EASTERN	Market Quoted	Week Ended July 5, 1930	July 12, 1930	July 19, 1930	July 26, 1930
Smokeless lump	Chicago	$2.50@$3.00	$2.50@$3.00	$2.50@$3.00	$2.50@$3.00
Smokeless egg	Chicago	2.50@ 3.25	2.50@ 3.25	2.50@ 3.25	2.50@ 3.25
Smokeless stove	Chicago	2.25@ 2.75	2.00@ 2.75	2.00@ 2.75	2.00@ 2.75
Smokeless pea	Chicago	2.00@ 2.25	2.00@ 2.25	1.90@ 2.25	1.90@ 2.25
Smokeless mine-run	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless slack	Chicago	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
Smokeless lump	Cincinnati	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Smokeless egg	Cincinnati	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.25
Smokeless stove	Cincinnati	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Smokeless nut	Cincinnati	1.90	1.90	1.90@ 2.00	1.90@ 2.00
Smokeless mine-run	Cincinnati	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless slack	Cincinnati	1.25@ 1.35	1.25@ 1.30	1.15@ 1.30	1.00@ 1.75
*Smokeless nut-and-slack	Boston	3.64@ 3.69	3.64@ 3.69	3.64@ 3.69	3.64@ 3.69
*Smokeless mine-run	Boston	3.95@ 4.05	3.95@ 4.05	4.00@ 4.10	4.05@ 4.15
Clearfield mine-run	Boston	1.55@ 1.80	1.55@ 1.80	1.55@ 1.80	1.55@ 1.80
Clearfield mine-run	New York	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Cambria mine-run	Boston	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Somerset mine-run	Boston	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90
Pool 1 (Navy Standard)	New York	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Pool 1 (Navy Standard)	Philadelphia	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Pool 9 (super low-vol.)	New York	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10
Pool 9 (super low-vol.)	Philadelphia	1.80@ 2.10	1.80@ 2.10	1.80@ 2.10	1.80@ 2.10
Pool 10 (h. gr. low-vol.)	New York	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Pool 10 (h. gr. low-vol.)	Philadelphia	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00
Pool 11 (low-vol.)	New York	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pool 11 (low-vol.)	Philadelphia	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65
HIGH-VOLATILE, EASTERN					
Pool 54-64 (gas and st.)	New York	$1.10@$1.25	$1.10@$1.25	$1.10@$1.25	$1.05@$1.25
Pool 54-64 (gas and st.)	Philadelphia	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30
Pittsburgh sc'd gas	Pittsburgh	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90
Pittsburgh gas mine-run	Pittsburgh	1.60@ 1.70	1.60@ 1.70	1.60@ 1.70	1.60@ 1.70
Pittsburgh mine-run	Pittsburgh	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60
Pittsburgh slack	Pittsburgh	.90@ 1.10	.90@ 1.10	.90@ 1.00	.90@ 1.00
Connellsville coking coal	Pittsburgh	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Westmoreland lump	Philadelphia	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Westmoreland egg	Philadelphia	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Westmoreland ¾-in. lump	Philadelphia	1.83@ 1.90	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90
Westmoreland mine-run	Philadelphia	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Westmoreland slack	Philadelphia	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25
Fairmont lump	Fairmont	1.40@ 1.75	1.40@ 1.75	1.35@ 1.75	1.45@ 1.90
Fairmont egg	Fairmont	1.35@ 1.55	1.35@ 1.55	1.40@ 1.55	1.35@ 1.60
Fairmont ¾-in. lump	Fairmont	1.10@ 1.45	1.10@ 1.45	1.15@ 1.40	1.20@ 1.45
Fairmont mine-run	Fairmont	1.05@ 1.35	1.05@ 1.40	1.10@ 1.40	1.10@ 1.40
Fairmont slack	Fairmont	.90@ 1.00	.90@ 1.00	.90@ 1.00	.90@ 1.00
Kanawha lump	Cincinnati	1.65@ 2.00	1.65@ 2.00	1.65@ 2.25	1.60@ 2.25
Kanawha egg	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.65	1.40@ 1.65
Kanawha nut-and-slack	Cincinnati	1.00@ 1.25	1.00@ 1.25	1.00@ 1.15	1.00@ 1.15
Kanawha mine-run (gas)	Cincinnati	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
Kanawha mine-run (st.)	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Williamson (W. Va.) lump	Cincinnati	1.60@ 2.00	1.60@ 2.00	1.60@ 2.25	1.60@ 2.25
Williamson (W. Va.) egg	Cincinnati	1.40@ 1.60	1.35@ 1.60	1.35@ 1.65	1.35@ 1.65
Williamson (W. Va.) nut-and-slack	Cincinnati	1.00@ 1.25	1.00@ 1.25	1.00@ 1.15	1.00@ 1.10
Williamson (W. Va.) mine-run (gas)	Cincinnati	1.40@ 1.60	1.35@ 1.60	1.40@ 1.60	1.40@ 1.60
Williamson (W. Va.) mine-run (st.)	Cincinnati	1.10@ 1.40	1.10@ 1.40	1.10@ 1.35	1.15@ 1.40
Logan (W. Va.) lump	Cincinnati	1.60@ 1.75	1.60@ 1.75	1.65@ 1.85	1.65@ 1.85
Logan (W. Va.) egg	Cincinnati	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
Logan (W. Va.) nut-and-slack	Cincinnati	.90@ 1.25	.90@ 1.15	.90@ 1.15	.90@ 1.10
Logan (W. Va.) mine-run	Cincinnati	1.10@ 1.40	1.10@ 1.40	1.10@ 1.40	1.10@ 1.35
Logan (W. Va.) slack	Cincinnati	.85@ 1.00	.85@ 1.00	.85@ 1.00	.75@ 1.00
Hocking (Ohio) lump	Columbus	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15	2.00@ 2.15
Hocking (Ohio) nut-and-slack	Columbus	.90@ 1.05	.90@ 1.05	.85@ 1.00	.85@ 1.00
Hocking (Ohio) mine-run	Columbus	1.40@ 1.65	1.40@ 1.65	1.35@ 1.60	1.35@ 1.60
Pitts. No. 8 (Ohio) lump	Cleveland	1.35@ 1.50	1.35@ 1.65	1.40@ 1.70	1.40@ 1.65
Pitts. No. 8 (Ohio) ¾-in. lump	Cleveland	1.20@ 1.40	1.30@ 1.40	1.35@ 1.40	1.25@ 1.40
Pitts. No. 8 (Ohio) mine-run	Cleveland	1.30@ 1.65	1.30@ 1.65	1.35@ 1.65	1.20@ 1.65
Pitts. No. 8 (Ohio) slack	Cleveland	.80@ .90	.80@ .90	.85@ .90	.80@ .85

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

HIGH-VOLATILE coals, particularly the cheaper varieties, scored an advance in the last days of the month. Block and 4-in. and 6-in. coals were most favored in inquiries. Egg was still inclined to be dull, even with a slightly better price. Mine-run, with the exception of gas and byproduct grades, moved only in seasonal quantities. Slack and screenings, reflecting the increased production of large sizes, tended to be soft throughout the month. The last of the month saw some of this tonnage crowded on a non-receptive market at as low as 50c. Retail deliveries were light over the month, due to the torrid weather and adverse credit conditions. Prices were unchanged.

With smokeless coals showing considerable strength and high-volatile varieties looking up somewhat, the Columbus trade showed definite progress in July. Activity, however, was confined to the domestic sizes, as steam business failed to show any life during the month. Smokeless lump and egg advanced 50c. in July, followed by a slight increase in the stove quotation. Steam business was slow and featureless, reflecting the business depression. Large users operated with smaller reserves than usual and showed no disposition to increase their stocks. Slack quotations, because of the increased production of domestic sizes, dropped sharply, the level at the last of the month being 25c. lower than at the beginning.

The apathy pervading the Cleveland market for the past few months continued in July, with dark prospects for the immediate future. About the brightest spot of the month was the lake movement of coal to the Northwest, which continued in good volume. Some dealers put in inquiries for domestic sizes, but as interest seemed to stop with the inquiries, shipments failed to show any gain. The decreased tonnage moved by the railroads was reflected in a drop in the coal used for locomotive fuel. Industrial consumers apparently were satisfied with buying coal as they needed it, and showed little interest in stocking for future needs.

July proved to be even duller than June in the Pittsburgh market. Railroad consumption was slightly less, and takings by industrial consumers were at a minimum. Lake coal shipments also decreased somewhat from June.

Some indications that retailers were stocking up on domestic sizes appeared at the end of the month. Lump stood at $2, though the August price was expected to be about $2.35. Prices showed no change over the month.

The Connellsville district passed through an unsatisfactory month in July. Coke output was curtailed to such an extent that little was available for the spot market, yet the demand was so small that there was no change in the spot price.

No improvement could be discerned in northern West Virginia in July. Buying was limited to current needs, and the general business depression, coupled with the usual seasonal slump, held both production and prices at a low level. Slack was steadiest over the month, with mine-run a poor second. Credit conditions were bad, and production was mostly applied to earlier sales and to contracts.

Appearance of a domestic demand at the last of the month was the feature of the central Pennsylvania market in July. Other than that, things were dull, with railroad and industrial consumption lagging. Contracting also continued in abeyance. Quotations at the end of the month were: Pool 1, $2.25@$2.40; Pool 71, $2.05@$2.20; Pool 9, $1.90@$2.05; Pool 10, $1.75@$1.90; Pools 11 and 18, $1.60@$1.75.

NO MATERIAL change from conditions prevailing in June was noticeable in the New England market in July. Some signs of improvement were reported, but these were not sufficient to affect prices. Tonnage accumulations were smaller at the end of the month, with a corresponding decrease in price shading. Navy Standard smokeless was quoted at $4.05@$4.15, f.o.b. vessel, Hampton Roads, with stoker coal at $3.64. Movement was light, however, and production seemed under better control. All-rail business from central Pennsylvania declined to almost nothing. Only a few specialties were shipped—at rock-bottom prices.

Terrific heat, poor prospects for crops, bad credit conditions, and industrial depression combined to make July one of the worst months the Birmingham trade has ever experienced. Domestic business was practically paralyzed. Mine prices were advanced for August, as follows: Black Creek lump, $4.25@$4.50; nut, $3.35; Cahaba lump, $3.80@$4.55; nut, $2.65@$3.35; Corona lump and egg, $3.10; nut, $2.65; Carbon Hill lump and egg, $2.40; nut, $1.95@$2.40; Big Seam lump and egg, $2.15; nut, $1.95; Aldrich lump and egg, $5.55; nut, $3.35; Dogwood lump, $5.30; Straven lump, $4.55; nut, $3.10. Steam demand showed little improvement over June, with prices unchanged.

Growing exhaustion of stocks forced more buyers into the New York market in July, thus offsetting vacation shutdowns and reduced operating schedules at industrial plants. Tonnage, as a result, receded but little from the June movement. Consumers bought in small lots, but usually insisted that the coal be shipped in a hurry, as their reserves were at the vanishing point. At the end of the month, buyers began feeling out the market in larger numbers. Inquiries increased in number and purchasing agents began to lend a more receptive ear to salesmen. Prices on all coals were practically unchanged over the month.

The Philadelphia market showed little change in July from the dullness pervading in June. Favorable signs of activity in other lines and the low point to which reserves had sunk resulted in an optimistic attitude toward the future. Little change could be noted in prices, except that the fabric as a whole was somewhat stronger.

Anthracite operators shipping to the New York market were of the opinion that July business was good for a month which normally marks the low point of the summer depression. Most of them reported sales exceeding those of June and July, 1929, largely because retail dealers were engaged on bin-filling orders that usually are taken care of earlier in the season. This year, however, bad credit conditions and delay in making spring price reductions delayed the movement. Some dealers also made moderate additions to their stocks. Demand for egg and buckwheat was fully equal to the supply. Pea was only a step behind the leaders and stove improved its position as the month wore on. Chestnut, rice, and barley were in oversupply, despite curtailed production.

July, in the opinion of the Philadelphia anthracite trade, marked the point of lowest demand for the summer season. An advance of 25c. in the retail price of coal failed to stimulate household buying, and storage on the part of the consumer continued below normal. Pea was best in demand, with nut, egg, and stove running well behind. Steam sizes moved well over the month, with buckwheat leading the list.

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

	Market	Week Ended			
MIDDLE WEST	Quoted	July 5, 1930	July 12, 1930	July 19, 1930	July 26, 1930
Franklin (Ill.) lump	Chicago	$2.70	$2.70	$2.70	$2.70
Franklin (Ill.) egg	Chicago	2.50@ 2.65	2.50@ 2.65	2.50@ 2.65	2.50@ 2.65
Franklin (Ill.) mine-run	Chicago	2.15	2.15	2.15	2.15
Franklin (Ill.) screenings	Chicago	1.60@ 1.85	1.60@ 1.85	1.60@ 1.85	1.60@ 1.85
Central Ill. lump	Chicago	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90
Central Ill. egg	Chicago	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90
Central Ill. mine-run	Chicago	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Central Ill. screenings	Chicago	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
Ind. 4th Vein lump	Chicago	2.40@ 2.50	2.40@ 2.50	2.25@ 2.50	2.25@ 2.50
Ind. 4th Vein egg	Chicago	2.25@ 2.30	2.25@ 2.30	2.25@ 2.50	2.25@ 2.50
Ind. 4th Vein mine-run	Chicago	1.50@ 2.10	1.50@ 2.10	1.65@ 1.90	1.65@ 1.90
Ind. 4th Vein screenings	Chicago	1.25@ 1.50	1.25@ 1.50	1.10@ 1.40	1.10@ 1.40
Ind. 5th Vein lump	Chicago	2.00@ 2.10	2.00@ 2.10	1.75@ 2.25	1.75@ 2.25
Ind. 5th Vein egg	Chicago	1.80@ 1.90	1.80@ 1.90	1.75@ 2.00	1.75@ 2.00
Ind. 5th Vein mine-run	Chicago	1.30@ 1.65	1.30@ 1.65	1.50@ 1.60	1.50@ 1.60
Ind. 5th Vein screenings	Chicago	.85@ 1.15	.80@ 1.10	.80@ 1.00	.80@ 1.00
Mt. Olive (Ill.) lump	St. Louis	1.75@ 2.00	1.75@ 2.00	1.85@ 2.25	1.85@ 2.25
Mt. Olive (Ill.) egg	St. Louis	1.75@ 2.00	1.75@ 2.00	1.75@ 2.15	1.75@ 2.15
Mt. Olive (Ill.) mine-run	St. Louis	1.65@ 1.75	1.65@ 1.75	1.75@ 2.00	1.75@ 2.00
Mt. Olive (Ill.) screenings	St. Louis	.85@ 1.10	.85@ 1.10	.85@ 1.10	.80@ 1.10
Standard (Ill.) lump	St. Louis	1.65@ 1.80	1.65@ 1.80	1.75@ 2.00	1.75@ 2.00
Standard (Ill.) egg	St. Louis	1.65@ 1.80	1.65@ 1.80	1.65@ 1.90	1.65@ 1.90
Standard (Ill.) mine-run	St. Louis	1.50@ 1.65	1.50@ 1.65	1.60@ 1.75	1.60@ 1.75
Standard (Ill.) screenings	St. Louis	.70@ .90	.70@ .90	.65@ .90	.65@ .90
West Ky. lump	Louisville	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
West Ky. egg	Louisville	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
West Ky. mine-run	Louisville	.85@ 1.25	.90@ 1.25	.90@ 1.25	.85@ 1.25
West Ky. slack	Louisville	.55@ .75	.60@ .75	.50@ .75	.45@ .65
West Ky. lump	Chicago	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
West Ky. egg	Chicago	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
West Ky. slack	Chicago	.60@ .70	.55@ .65	.55@ .65	.55@ .65
SOUTH AND SOUTHWEST					
Big Seam lump	Birmingham	$2.05	$2.05	$2.05	$2.05
Big Seam mine-run	Birmingham	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Harlan (Ky.) block	Chicago	1.85@ 2.25	1.85@ 2.25	1.75@ 2.25	1.75@ 2.25
Harlan (Ky.) egg	Chicago	1.50@ 1.85	1.65@ 1.85	1.30@ 1.75	1.30@ 1.75
Harlan (Ky.) slack	Chicago	.90@ 1.25	.90@ 1.25	.90@ 1.15	.90@ 1.15
Harlan (Ky.) block	Louisville	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
Harlan (Ky.) egg	Louisville	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Harlan (Ky.) nut-and-slack	Louisville	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
Harlan (Ky.) mine-run	Louisville	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Harlan (Ky.) block	Cincinnati	1.80@ 2.25	1.85@ 2.50	1.85@ 2.50	1.85@ 2.50
Harlan (Ky.) egg	Cincinnati	1.40@ 1.65	1.40@ 1.65	1.40@ 1.75	1.40@ 1.75
Harlan (Ky.) nut-and-slack	Cincinnati	1.10@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.15
Harlan (Ky.) mine-run	Cincinnati	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60
Hazard (Ky.) block	Chicago	1.85@ 2.00	1.85@ 2.00	1.75@ 2.25	1.75@ 2.25
Hazard (Ky.) egg	Chicago	1.65@ 1.85	1.65@ 1.85	1.30@ 1.75	1.30@ 1.75
Hazard (Ky.) slack	Chicago	.85@ 1.15	.85@ 1.15	.90@ 1.15	.90@ 1.15
Hazard (Ky.) block	Louisville	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Hazard (Ky.) egg	Louisville	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75
Hazard (Ky.) nut-and-slack	Louisville	.75@ 1.00	.75@ 1.00	.50@ .75	.50@ .75
Hazard (Ky.) mine-run	Louisville	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Hazard (Ky.) block	Cincinnati	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Hazard (Ky.) egg	Cincinnati	1.40@ 1.60	1.35@ 1.65	1.40@ 1.65	1.35@ 1.65
Hazard (Ky.) nut-and-slack	Cincinnati	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Hazard (Ky.) mine-run	Cincinnati	1.15@ 1.35	1.10@ 1.40	1.10@ 1.35	1.10@ 1.35
Elkhorn (Ky.) block	Chicago	1.85@ 2.35	1.85@ 2.35	2.00@ 2.50	2.00@ 2.50
Elkhorn (Ky.) egg	Chicago	1.50@ 1.85	1.50@ 1.85	1.60@ 2.00	1.60@ 2.00
Elkhorn (Ky.) slack	Chicago	1.15@ 1.65	1.15@ 1.65	1.15@ 1.65	1.15@ 1.65
Elkhorn (Ky.) block	Louisville	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Elkhorn (Ky.) egg	Louisville	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75
Elkhorn (Ky.) nut-and-slack	Louisville	.80@ 1.10	.75@ 1.10	1.00@ 1.10	.75@ 1.10
Elkhorn (Ky.) mine-run	Louisville	1.25@ 1.50	1.25@ 1.50	1.25@ 1.60	1.25@ 1.50
Elkhorn (Ky.) block	Cincinnati	1.75@ 3.00	1.75@ 3.00	1.75@ 3.20	1.75@ 3.25
Elkhorn (Ky.) egg	Cincinnati	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Elkhorn (Ky.) nut-and-slack	Cincinnati	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.15
Elkhorn (Ky.) mine-run	Cincinnati	1.15@ 1.60	1.10@ 1.60	1.10@ 1.60	1.10@ 1.60
Kansas shaft lump	Kansas City	3.50	3.50	3.50	3.50
Kansas strip lump	Kansas City	2.75	2.75	2.75	2.75
Kansas mine-run	Kansas City	2.50	2.50	2.50	2.50
Kansas screenings	Kansas City	1.85	1.85	1.85	1.85

WORD from the FIELD

Coal Supplanting Water In Power Industry

Widespread drought in May of this year curtailed the output of hydro-generated electrical current about 250,000 kw.-hr., according to estimates prepared by the U. S. Geological Survey. Coal burned to supply the deficiency cost the power industry in the neighborhood of $1,000,000 in that month alone. May was not an isolated month, as the deficiency in rainfall extends over a long period and the trend toward subnormal hydro production started in May of last year. When figures for production in May and June become available, it is expected that they will show a still greater decline in hydro-generated current, with relief not yet in sight.

Records compiled by the U. S. Weather Bureau, *The Business Week* of Aug. 6 says, show that over a considerable area, including much of Ohio, West Virginia, western Virginia, Kentucky, southern Indiana and Illinois, and southeastern Missouri, there has been only one-third to one-half of the normal precipitation for the last five months. "Sections adjoining this area, including Maryland, parts of Virginia, Tennessee, and the northern Ohio Valley from Missouri southward, have fared slightly better, with 50-70 per cent of normal rainfall."

"These conditions are forcing power companies to the conclusion that ample steam reserves must be provided, even for the most favorably situated hydro systems; are causing hydro costs, already trending upward, to increase sharply; are increasing the use of fuels —oil, natural gas, and coal. Use of natural gas and fuel oil in the power field increased more than 40 per cent each last year; is increasing to an even greater degree this year." The ratio of hydro to fuel power output was 40:60 in 1928 and dropped to 36:64 in 1929; expenditures for hydro development fell from $113,000,000 in 1928 to $95,000,000 in 1929, while those for steam plants increased from $182,000,000 in 1928 to $196,000,000 in 1929, and in the Pacific states, the hydro stronghold, "the percentage of power produced by hydro dropped from 86 per cent in 1928 to 74 per cent last year, while fuel-generated output increased from 14 per cent to 25 per cent."

The Business Week quotes A. H. Markwart, vice-president, Pacific Gas & Electric Co., as follows: "'Because of the cheapness of steam-electric power, few hydro-electric projects are economically justified. It is apparent that the whole economic trend is toward 100 per cent steam for new installations, unless some very favorable hydro presents itself.'" Steam-plant economy has increased 28 per cent in the last ten years, he was reported as saying.

Business Improvement Seen For August

Business will take the upward path in August, according to *The Business Week* of Aug. 6, which says: "Exactly one year after business scaled the peak of its 1929 boom it is reaching its low in the subsequent depression. Our index has dropped again, from 94.4 per cent of normal to 91.1 per cent, as compared with the high point of 114.6 per cent a year ago, and will probably fall farther next week. August will bring definite signs of improvement, beginning with the basic industries, and as we move further into the last half, the paralyzing pessimism of recent months will find less to feed on in the comparative records of this year and last.

"Although the usual seasonal decline in building contracts has set in rapidly, abundant security issues for public and private work in the past quarter will cushion the decline, and the contracts placed so far will carry over into the business activity during the rest of the year. While general trade is beginning to sag under the pressure of months of impaired purchasing power and business confidence, industrial activity and railroad movement of merchandise show signs of revival under the stimulus of depleted stocks, and non-agricultural commodity prices are strengthening. At this crucial turning point, emergency Farm Board support of farm prices against the weight of temporary wheat and cotton surpluses, and further Federal Reserve support of the bond market are vitally necessary and wholly justifiable."

Colorado & New Mexico Group Adopts Trade Code

A trade-practice code similar to that in force in Utah was adopted by the Colorado & New Mexico Coal Operators' Association at its annual meeting held in Denver, Colo., July 22. Eighteen rules were included in the code, defining terms used in the coal business and condemning the giving of secret rewards of rebates of any kind to purchasers, misrepresentation of products as to price or quality, false or deceptive statements about a competitor, the use of a competitor's trade names or advertising, selling coal below cost to injure a competitor or reduce competition, and the cancellation of contracts except by mutual consent. The code provides that members publish and circulate price lists individually and that such lists be posted and a copy sent to the secretary of the association.

Officers were elected for the coming year as follows: president, B. W. Snodgrass, Denver, president, Victor-American Fuel Co.; vice-president, H. H. Bubb, Cokedale, Colo., general superintendent, Cokedale plant, American Smelting & Refining Co.; secretary-treasurer, F. O. Sandstrom, Denver (re-elected).

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Industrial Relations Meeting To Be Held in August

The Thirteenth Annual Silver Bay Conference on Industrial Relations will be held at Silver Bay on Lake George, N. Y., Aug. 27-31, under the auspices of the industrial department of the Young Men's Christian Association. Sectional conferences will be the chief feature of the meeting, and will be supplemented by individual addresses. Among the topics scheduled for group discussion are: "Incentives for Wage Earners," "Industrial Training of Employees," "Employee Stock Ownership," "Railroad Problems," "Mechanization and Its Effect Upon Employment," "Mechanization and Its Effect Upon Social and Economic Conditions," "Avocational Activities and Their Effect Upon Industrial Relations," "Age as a Factor in Employment," "Measures Being Used to Stabilize Employment," and the "Significance of a Continuous Training Program."

New Anthracite Wage Agreement Signed; Bituminous Labor Unrest Spreads

A NEW anthracite contract continuing the present wage scale was approved by representatives of the operators and miners on July 19 at the conclusion of the group conference which began at the offices of the anthracite Institute, New York City, June 30. The new contract, which is to expire on March 31, 1936, continued the old agreement ending Aug. 31, with additional provisions designed to assist the miners and achieve greater efficiency in production.

The miners were successful in incorporating a modified "check-off," for which they have been fighting since 1902, in the new contract. Under the proposed system, the operators, not oftener than once a month, will collect $1 on a pay day at a point convenient to the pay office and turn it over to the union. In return, the miners agreed to take positive action to eliminate, as far as possible, strikes and shut-downs in violation of the agreement; to eliminate group action designed to restrict output; to restrict general mine committees to their constitutional functions within the union, recognizing that such committees have no power under the agreement; to co-operate with the owners for the promotion of efficiency and the production of an improved car of coal, with the understanding that existing practices and payments covering refuse shall be continued; and to make effective all the terms and provisions of this contract. Demands made by the miners for the equalization of working time at all collieries were waived.

Both parties to the contract agreed to the formation of a committee of six miners' representatives and six operators' representatives to discuss all questions arising under the contract in relation to co-operation, efficiency, the performance of the contract and the relations of the parties thereto. Meetings of the committee may be called by either the miners or the operators. Provisions for the appointment of the group were inserted in the new contract at the request of the operators, who were dissatisfied with the old arbitration clause, on the ground that it was too ambiguous to be of any value.

Operators and miners agreed that employees might be paid by check in communities where banking facilities were available, the local unions to make agreements to that effect. Another departure in the new contract was the expiration date, which was set for May 31, the close of the coal year. This step prevents a stoppage of operations in the winter season, when it would do the most damage. The full text of the agreement follows:

This agreement made this 18th day of July, 1930, between districts 1, 7, and 9, United Mine Workers of America, parties of the first part, and the undersigned anthracite operators, acting severally and not jointly, parties of the second part, witnesseth:

Whereas, the parties hereto, under date of Feb. 17, 1926, entered into an agreement covering wages and conditions of employment in the anthracite coal fields of Pennsylvania, which agreement, under its terms, expires Aug. 31, 1930; and

Whereas, the parties hereto have deemed it expedient to enter into a new agreement extending the provisions of said agreement of Feb. 17, 1926, for a further period, subject to certain modifications, as hereinafter more specifically provided;

Now Therefore, in consideration of the foregoing and in consideration of the mutual benefits and advantages to be derived therefrom, the parties hereto do covenant and agree, each with the other, as follows:

1. The provisions of said agreement of Feb. 17, 1926, except as hereinafter modified and amended, shall be in force and effect for the period beginning Sept. 1, 1930, and ending April 1, 1936.

2. Except as modified or more specifically provided herein, the terms and provisions of the Award of the Anthracite Coal Strike Commission and subsequent agreements made in modification thereof or supplemental thereto, as well as the rulings and decisions of the Board of Conciliation, are hereby ratified, confirmed and continued for and during the full term of this contract, beginning Sept. 1, 1930, and ending April 1, 1936.

3. The principle of paying employees by check is recognized in communities having banking facilities reasonably accessible, and the mine workers agree to make local agreements permitting such practice where practicable and reasonable.

4. The mine workers have requested the operators to assist them in the collection of union dues, stating that such assistance will not only be an accommodation to them but will substantially lessen their cost of operation as an organization. The mine workers have also stated their desire and intention to take active and affirmative steps to eliminate, as far as possible, strikes and shut-downs in violation of this agreement; to eliminate group action designed to restrict output; to restrict general mine committees to their constitutional functions within the union, recognizing that such committees have no power under this agreement; to co-operate with the operators for the promotion of efficiency and the production of an improved car of coal, with the understanding that existing practices and payments covering refuse shall be continued; and to make effective all of the terms and provisions of this contract. With these requests and declarations in mind, and in consideration thereof and conditioned upon the full, complete and continuing performance thereof to the mutual satisfaction of the contracting parties, the operators agree as follows:

The parties of the second part, upon request of any employee, will receive from such employee on pay day, at a point convenient to the pay office, and transmit to the district treasurer of the United Mine Workers of America, an amount not in excess of one dollar per month. The operators shall be under no obligation to solicit or compel contributions, but shall fulfill their entire obligation hereunder when they receive and transmit the foregoing payments, as and when tendered by the employee. It is understood that payments shall not be tendered or received more than once in any month, and that the operator will provide some suitable record of payments, showing from whom received.

5. The parties agree to promptly form a permanent committee of twelve men to serve and function during the period of this agreement. The membership of said committee shall be as follows:

Six officials of the United Mine Workers of America, to wit, the president, vice-president, secretary-treasurer, and the presidents of districts 1, 7, and 9.

Six officials of the operating companies to be duly appointed by the operating companies, and one of which operating company officials shall be designated by the operating companies to act as chairman of said committee of twelve, with the right to vote.

The operators shall determine their own personnel on said committee and shall fill such vacancies as may occur.

As soon as convenient after the ratification of this agreement, the members hereinbefore specified shall meet and organize in permanent form said committee of twelve.

The committee shall meet from time to time on call of the chairman, either at the discretion of the chairman or on written request of any five members of the committee.

The committee shall consider and discuss all questions arising under this contract relating to co-operation and efficiency and performance of the contract by the parties and the relations of the parties which either party may present for consideration and discussion.

The committee may employ such skilled and expert assistance from time to time as the committee shall deem advisable, in order that the committee may be informed and advised as to any facts or information which the committee may desire to have determined.

All expenses of the committee shall be paid one-half by each party thereto.

In witness whereof, the United Mine Workers of America through their accredited representatives, and the anthracite operators, through representatives and respective operating companies, have caused this agreement to be properly executed the date and year first above written.

For the United Mine Workers of America, in guarantee of the full and faithful performance of all the terms and conditions of the above recited agreement by the parties of the first part, to be kept and performed: John L. Lewis, president; Philip Murray, vice-president; Thomas Kennedy, secretary-treasurer; John Boylan, Michael Hartneady, Mart. Brennan.

For the anthracite operators: W. W. Inglis, president, Glen Alden Coal Co., Scranton; Richard T. Grant, president, Lehigh Valley Coal Co., New York; A. J. Maloney, president, Philadelphia & Reading Coal & Iron Co., Philadelphia; Michael Gallagher, president, Pittston Co., New York; E. H. Suender, vice-president, Madeira, Hill & Co., Philadelphia; J. B. Warriner, general manager, Lehigh Navigation Coal Co., Lansford, Pa.

In the conflict between the regular and insurgent United Mine Workers in the bituminous fields, John L. Lewis, international president of the regular organization, was fined $500 by Circuit Judge Charles Briggle, Springfield, Ill., on July 23, for violation of the terms of an injunction granted officials of District 12 last October, restraining Lewis from setting up a provisional government or interfering in the affairs of the district. Judge Briggle's action followed a decision of Master in Chancery Frank Trutter, Springfield, July 9, that Lewis and fourteen of his aides were guilty. Trutter recommended, however, that Lewis not be fined, as he had "unintentionally" violated the terms of the injunction. Lewis contended that the action of District 12 in going over to the insurgents had nullified the restraining order, and announced that he would appeal from the decision.

Charges and countercharges were hurled by opposing factions in the United Mine Workers, following the issuance of a circular by District 11 officers affiliated with the Lewis organization stating that representatives of the insurgent group had signed a contract with Arch Spears, representing the Vermilion Coal Co., Clinton, Ind., based on a wage scale of $4 for inside labor, instead of the present scale of $6.10. The circular also represented that the insurgents and William Johnson, and his associates, of the Liberty mine, Oakland City, Ind., had signed an agreement based on a wage scale of $4.50 for inside day labor. Both these moves, District 11 officials stated, were made in a campaign to reduce wages in the Indiana field. In addition, the circular charged that certain District 11 officials were conspiring with the insurgents.

Prompt denials followed the issuance

of the circular. *The Illinois Miner* of July 19 stated that insurgent officials had never met with the two companies or any others for the purpose of discussing wage contracts. Spears and Johnson also publicly denied that they had ever entered into any contracts or that they had participated in any negotiations with insurgent officials. Among the union officials which the circular accused of conspiracy with the insurgents were William Jardine and John Thompson, both of Terre Haute, Ind. Jardine and Thompson immediately added fuel to the fire by stating that countercharges of conspiracy with the insurgents would be filed against Michael Ferguson, president, District 11, and William Mitch, secretary-treasurer, two signers of the circular. Both sides will present their cases to the executive board of the regular organization.

Aside from the union squabble in Indiana, the action of A. D. Spears and W. M. Warner, receivers for the Vermilion company, in advertising for men to work at "competitive wages," attracted the most attention. The basic wage scale mentioned was $4 for inside day work and 60c. a ton for loading. The advertisement also stated that wages would be based on a "seven-hour work day."

Illinois miners should embrace the machine rather than fight it, in the opinion of Adolph Germer, vice-president of the Reorganized United Mine Workers, as expressed in a statement at the end of July. Opposition to loading machines and conveyors, when it takes the form of wildcat strikes, said Mr. Germer, only results in mines in other states producing the tonnage, with consequent loss to the Illinois miners.

Government intervention in the bituminous industry was asked of President Hoover on July 17 in a letter addressed to him by district executives of the United Mine Workers, meeting in conference at Fairmont, W. Va., at the call of Van A. Bittner, chief representative. President Hoover was asked to call a conference of miners and operators in the bituminous fields as soon as possible "for the purpose of taking such action as will stabilize this basic industry and put the 'house of coal' in order."

Following the receipt of the letter, Secretary of Labor Davis, after a Cabinet meeting on July 18, stated orally that the administration had no intention of calling a conference such as suggested in the miners' letter, as little could be accomplished. In a later amplification of his statement, Secretary Davis said that the bituminous industry needed a leader to bring the two groups together and stabilize the industry. "I am sure," he added, "that the government will give all the help it can and that Congress will pass any legislation which may be necessary."

Sporadic strikes in the northern West Virginia field were largely at an end by the middle of July, in part because the National Miners' Union, which brought them about, was unable to furnish relief to the miners. The Brock mine of the Continental Coal Co., Cassville, W. Va., which was closed by a walkout on July 1, resumed approximately normal production by the middle of the month, and workers at the Sands mine were given a few more days to return to their jobs. A strike at the No. 2 mine of the Pursglove Coal Co., Pursglove, W. Va., also was practically terminated by July 15. The National Miners' Union, in a statement on the situation, said that the strikes had been called before relief machinery had been set up, but that as soon as it could be accomplished, a general strike in the Scotts Run region would be called.

The National Miners' Union held its annual convention at Pittsburgh, Pa., July 26. Circulars were distributed throughout the bituminous fields of the East and Middle West, attacking the United Mine Workers in the anthracite region and closing with the statement: "Prepare for a strike when the Lewis slave contract expires Aug. 31." At the convention, plans were made for a move against the anthracite, oil, copper, and other extraction industries. According to the leaders, decision to extend the scope of the union would result in its name being changed to the "Mine, Oil, and Smelter Workers' Industrial Union." Demands will be made, leaders stated, for a six-hour day, a five-day week, and a minimum wage of $35 a week for all mine workers.

Steady conflict between operators and miners in the Providence-Clay section of Webster County and in Hopkins County, western Kentucky, featured the month of July. Violence on the part of strikers resulted in the Providence Coal Co. and the Ruckmann Coal Co. securing injunctions against certain workers on July 14. Prior to this action troops had been requested of Flem D. Sampson, Governor of Kentucky, to keep order, but the request was refused on the ground that the trouble was not serious enough.

On the night of July 23, twenty poles of the Kentucky Utilities Co. power lines were dynamited at six locations, leaving part of the district without light and the mines without power. Two bridges of the Illinois Central R.R. also were blown up to prevent shipping. The same night 300 shots were fired into miners' homes, and one house was dynamited. The power company was able to replace its lines with one day's delay, while the railroad bridges, though damaged, did not fall. On July 26, Governor Sampson again refused to send troops, stating that the sheriff should be able to take care of conditions. The same day, a third injunction, placing 38 miners under orders not to interfere with company operations, was granted the Meador, Young & Holt Coal Co., Providence. Five strike-bound mines were in operation at Providence at the end of the month.

Out in the Rocky Mountain region, a new wage contract between the Rocky Mountain Fuel Co. and the United Mine Workers was ratified by the local unions affected. Becoming effective Sept. 1, the agreement provides for a base wage of $7 a day, and the general scale is identical with that under which four of the company's mines are now working. Equalization of working time in slack periods was one of the provisions, and another clause specified that a committee of miners shall investigate serious mining accidents.

Permissible Plates Issued

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

(1) Sullivan Machinery Co., Type CR-3 shortwall mining machine; 30-hp. motor, 250-500 volts, d.c.; Approvals 192 and 192A; June 3.

(2) Jeffrey Mfg. Co., Type 35-L shortwall mining machine; 50-hp. motor, 250-500 volts, d.c.; Approvals 193 and 193A; June 3.

(3) Jeffrey Mfg. Co., Type 44-C loading machine; two 7½-hp. motors, 250-500 volts, d.c.; Approvals 194 and 194A; June 6.

(4) Jeffrey Mfg. Co., Type DM-15 locomotive; Approval 1521; June 13.

Industrial Coal Reserves Rise To 30 Days' Supply

Stocks of anthracite and bituminous coal in the hands of industrial consumers in the United States and Canada on July 1 were 31,500,000 net tons, according to the monthly report of the National Association of Purchasing Agents. This figure is equivalent to 30 days' supply, based on the June consumption of 31,613,000 tons. Stocks in industries increased slightly over the preceding month, due to an increase in reserves in Canada, where winter supplies were being built up. The fall in consumption in June resulted in an increase in the number of days' supply on hand from 28 to 30 days.

Day's Supply of Bituminous Coal in Various U. S. Industries

By-product coke	26	Railroads	20
Electric utilities	42	Steel mills	34
Coal-gas plants	51	Other industries	30
Average total bituminous stocks throughout the United States			28

Estimates of Output, Consumption and Stocks, in Net Tons

	United States Production	Industrial Consumption	On Hand in Industries
June, 1929	42,969,000	34,485,000	31,282,000
July	45,635,000	35,040,000	31,415,000
August	49,843,000	34,886,000	32,712,000
September	51,307,000	35,960,000	34,289,000
October	59,567,000	39,482,000	36,107,000
November	51,719,000	38,747,000	37,313,000
December	53,858,000	38,581,000	37,512,000
January, 1930	56,816,000	38,512,000	39,007,000
February	45,712,000	35,195,000	37,078,000
March	40,324,000	37,083,000	36,544,000
April	40,776,000	36,230,000	31,535,000
May	41,901,000	34,685,000	30,700,000
June	38,897,000	31,613,000	30,824,000
July 1	.....	.....	31,500,000

Propose Car Distribution And Demurrage Rules

Consideration of the car distribution plan and demurrage rules for application to bituminous and lignite coals devised by a special committee of the American Railway Association was completed July 15 by a special committee of the National Coal Association, which met in Chicago. Three of the provisions submitted by the railway association were revised by the coal association committee. In regard to the per cent of unbilled loads to the mine rating that should prevail during periods of full car supply, the coal association committee agreed on the following:

> Whenever the available car supply in any region or district is such that all orders for cars can be filled, cars shall be placed at each mine in accordance with its daily order, except that whenever a mine holds on mine tracks or mine sidings for one or more railroads unbilled coal loads equal in number to two days' rating, it shall not be furnished additional cars.

The railway association proposed one day's rating.

One additional rule to those proposed by the railway association committee, pertaining to the per cent of unbilled loads to mine rating that should prevail during periods of car shortage, was approved by the coal association committee:

> Whenever the available car supply in any region or district becomes such that all orders for cars cannot be filled, each mine shall be given its pro rata share of cars and all unbilled loads then held on the mine tracks or mine sidings must be promptly billed, and pending such disposition shall be charged to the mine.

No change was made in the proposed American Railway Association car distribution rule dealing with the holding of unbilled loads beyond a reasonable period, such period to be determined by investigation by the railway association. This rule was as follows:

> When an unbilled coal load or a partly loaded car is held in excess of 30 days, the contents of such car may be unloaded at the expense of the mine operator and at his risk either on mine property or carrier property and the car recovered for further service.

To the general definition of the term "mine siding," proposed by the railway association committee for incorporation in the demurrage tariff, which was:

> Mine track or mine siding is a track which the mine owns, leases, or otherwise controls, or which in the usual course of business is devoted exclusively to traffic at the mine (or mines, if more than one owned and controlled by the same interests and operated substantially as a unit) and which track is a part of the mine layout, constructed and operated by the mine company or by the carrier especially to serve the mine or mines in question, and which can be reached without switching over tracks that are not mine tracks within the contemplation of this definition,

the coal association committee added the following amendment:

> Provided that this shall not be construed to prevent a railroad, with permission from the Interstate Commerce Commission, from making modification of this rule to meet special conditions, such as lack of sufficient mine-track capacity or inconvenient switching situation; but this shall not permit exceptions to the uniform car distribution rules.

To the proposed demurrage rule that

A. W. Dickinson

Has been made chief of the tax division of the American Mining Congress, Washington, D. C., vice McKinley W. Kriegh, resigned. For the past six years, Mr. Dickinson has been general superintendent for the Union Pacific Coal Co., Rock Springs, Wyo., and prior to that time served as mining engineer for the U. S. Coal Commission; valuation engineer in the income tax unit of the Internal Revenue Bureau; and later in various capacities with operating companies in Illinois, Kansas, and Missouri.

> Cars loaded with coal or coke at the mines, mine sidings or coke ovens will be moved therefrom only on written order from mine owners, operators or shippers, and when so moved or held at weighing stations, classification yards or elsewhere 24 hours (one day) free time will be allowed for forwarding instructions.

the coal association committee added the amendment that the rule be "subject to harmonization" with the rule defining "mine sidings."

J. D. Francis, Huntington, W. Va., vice-president, Island Creek Coal Co., acted as chairman of the meeting. C. B. Huntress, executive secretary, National Coal Association, who acted as secretary, was authorized to advise the American Railway Association committee that an operators' committee would be pleased to hold a joint session with them to discuss the matter. It is expected that the proposed joint session will be held in Washington, D. C., in September, when the full committee of the American Railway Association meets.

West Virginia Southern Sold

Mining properties of the West Virginia Southern Coal Co., Huntington, W. Va., located in Kanawha, Boone, Raleigh, and Cabell counties, West Virginia, and leaseholds comprising 12,100 acres of coal land were sold at Charleston, W. Va., July 19, for approximately $112,000. All sales were made subject to confirmation by the referee in bankruptcy. Company liabilities were listed at $3,200,000, while the properties were appraised at $618,000.

U. S. Imports of Soviet Coal Increase in 1930

When Representatives from the Pennsylvania anthracite district failed to have Soviet coal excluded from the United States under the provisions of the forced labor clause of the new tariff bill, the matter was referred to the Commerce, State, and Treasury departments for further study. The section of the tariff act relating to goods or commodities produced by convict labor is already effective. The restrictions as to goods produced by forced or indentured labor, however, cannot be imposed until Jan. 1, 1932. Alarmed at the increase in the importation of Russian anthracite, Pennsylvania interests sought to have the restrictions concerning forced labor imposed immediately.

Meanwhile, the Department of Commerce has been studying the matter. As far as the records show, none of the Russian anthracite imported into the United States originates in Siberia but comes from the Donetz Basin, in the Ukraine. All of the coal imported is believed to have come from the mines of the Donugol Coal Trust, which is controlled by the Soviet government.

Since about 1924 Russia has been trying to build up an export trade in coal, without much success until recently. Even now the trade is not very large. Total exports in 1925-26 were 247,000 metric tons, of which anthracite amounted to 114,202 tons. Exports of anthracite in 1928-29, however, jumped to 423,488 metric tons, or slightly more than 4 per cent of production and nearly four times the exports of the previous year. It is reported that 113,169 tons of Russian anthracite was shipped into the United States in 1929 and that 69,481 tons was imported during the first three months of this year.

First-Aid Contests Held

Warming up with the summer sun, company and district first-aid teams swung into the contest season with a vim last month. At Middlesboro, Ky., July 4, 2,500 people attended the Sixteenth Annual Miners' Day and First-Aid Contest for Tennessee and Southeastern Kentucky, sponsored by the Southern Appalachian Coal Operators' Association, Tennessee Department of Mines, Kentucky Department of Mines, Southern Appalachian Efficiency Association, and the U. S. Bureau of Mines. Team No. 1, Pruden Coal & Coke Co., Pruden, Tenn., took first honors in the first-aid competition, while the Coalfield Coal Co. team, Coalfield, Tenn., and the No. 2 team of the Cambria Coal Co., Coal Creek, Tenn., were second and third, respectively. Team No. 1, Premier Coal Co., Middlesboro, Ky., won the cup for the new team making the highest score.

Twenty-six teams competed in the Twelfth Alabama First-Aid Contest, held in the Municipal Auditorium, Birmingham, Ala., July 12, under the auspices of the Alabama Mining Insti-

Bureau of Mines Approves Explosives

One change in the active list of permissible explosives was made by the U. S. Bureau of Mines in July. Details are given below.

Change in the Active List of Permissible Explosives During the Month of July*

	Vol. Poisonous Gases	Characteristic Ingredient	Weight of 1¼x8-In. Cartridge, Grams	Smallest Permissible Diameter, Inches	Unit Deflective Charge, Grams	Rate of Detonation in 1¼-in. Diameter Cartridge, Ft. per Sec.
Big Red No. 9[1].....	B	In	101	1¼	224	9,380

*Class designations are fully explained in *Coal Age*, July, 1930, p. 426. [1]Equitable Powder Mfg. Co.

tute, U. S. Bureau of Mines, Alabama State Board of Mine Inspectors, Joseph A. Holmes Safety Association, and the American Red Cross. In the white men's group, the Empire (Ala.) team of the DeBardeleben Coal Corporation carried off first honors with a score of 99.4 out of a possible 100. Second prize was won by the Sipsey (Ala.) team of the same company, with a score of 98.9. First in the colored group was the Majestic (Ala.) team of the Alabama By-Products Corporation, while the Coal Valley (Ala.) team of the DeBardeleben Coal Corporation took the second prize.

The West Virginia Division of the Consolidation Coal Co. carried off first honors in the annual company first-aid meet, held at Fairmont, W. Va., July 12, when the Mine No. 86 team, Carolina, W. Va., scored a total of 96.24 points out of a possible 100. Teams from the other five divisions of the company finished in the following order: Elkhorn division—Mine No. 204, Jenkins, Ky.; Maryland Division—Mine No. 1, Ocean, Md.; Pocahontas-New River division—Mine No. 251, Coalwood, W. Va.; Pennsylvania division—Mine No. 123, Gray, Pa.; Millers Creek division—Mine No. 154, Van Lear, Ky. A feature of the meet was the presentation of the Joseph A. Holmes Safety Association award to the West Virginia division for mining 1,358,586 tons of coal per fatality in 1929. F. F. Jorgenson, general manager of the division, accepted the award, which was presented by J. J. Forbes, Pittsburgh (Pa.) station, U. S. Bureau of Mines.

The Grant Town (W. Va.) team of the New England Fuel & Transportation Co. won first place in the first-aid contest featuring the Second Annual Monongahela Valley Safety Day, held at Riverside Park, Morgantown, W. Va., July 19, under the auspices of the Monongahela Valley Coal Mining Institute. Second place went to the team representing Mine No. 26, Bethlehem Mines Corporation, Masontown, W. Va., and third honors were captured by the Sands mine team of the Continental Coal Co., Rivesville, W. Va.

On July 23, the No. 1 mine team of the Lincoln Coal Co., Napier, Ky., took first place in the first-aid contest featuring the Fifth Annual Safety Day of the Hazard and Elkhorn Coal Fields, held at Hazard, Ky., under the auspices of the Kentucky River Mining Institute, U. S. Bureau of Mines, Kentucky Department of Mines, Hazard Coal Operators' Exchange, and the Hazard Chamber of Commerce. A Consolidation Coal Co. team from Jenkins, Ky., won second place, while the Harvey mine team of the Harvey Coal Corporation, Harveyton, Ky., came in third.

Anthracite Loses Ground In Massachusetts

Anthracite lost ground in Massachusetts in the coal year ended April 1, 1930, as compared with the previous year, according to a survey of the Division on the Necessaries of Life of the Department of Labor and Industries. Total deliveries of anthracite in 1929-30 were 4,694,000 net tons, compared with 5,051,000 net tons in the preceding year. Buckwheat sizes of anthracite, on the contrary, increased from 138,000 tons in 1928-29 to 160,000 tons in 1929-30. Bituminous coal and coke deliveries increased slightly in 1929-30, while briquet deliveries fell off 3,000 tons to 190,000 tons. Deliveries of fuel oil showed a marked increase, jumping from 80,000,000 gal. in 1928-29 to 100,000,000 gal. in 1929-30. Gas installations moved ahead with fuel-oil deliveries, the total increasing from 2,925 to 4,344. Comparative figures for all fuels are:

	1928–29	1929–30
Anthracite, net tons.....	5,051,000	4,854,000[1]
Domestic sizes, net tons..	4,913,000	4,694,000
Buckwheat sizes, net tons	138,000	160,000
Bituminous coal, net tons...	495,000	500,000
Coke, net tons.....	637,000	650,000
Briquets, net tons.....	193,000	190,000[2]
Oil, gallons.....	80,000,000	100,000,000
Gas installations.....	2,925	4,344

[1] Includes some 390,000 tons imported from Great Britain and Russia. [2] Includes some 81,000 tons imported from Germany.

Sales of coke by retail coal dealers, the division says, have been showing a gradual increase in the last few years, and amounted to 30 per cent of the total deliveries reported last year. Reports received from oil companies showed a substantial jump in deliveries of light fuel oil and furnace oil. Forty coal dealers reported that they now sell oil in addition to various kinds of solid fuels. Light fuel oil, which sells 3c. to 4c. under furnace oil, appears to be in growing demand for central heating plants, and the use of furnace oil in burners that fit in the kitchen stove is a factor of increasing importance. Gas heating, the division remarked, was still restricted to those able and willing to pay for this convenience. Increase of nearly 50 per cent in the number of central heating plants indicated, however, that this fuel was emerging from the experimental stage.

Joy Company Wins Suit

The Joy patent on loading machines has been sustained as valid and infringed by the Herzler & Henninger Machine Works, manufacturer of the Wilson loader, according to a decision of the Circuit Court of Appeals for the Seventh Circuit in the suit of the Joy Mfg. Co. Initial trial of the Joy suit took place in East St. Louis, Ill., Nov. 1, 1928, and the District Court decided in favor of the Herzler & Henninger company. The Circuit Court of Appeals reversed the decision of the lower court and denied, on May 29, 1930, the Herzler & Henninger petition for a rehearing. A final injunction restraining further infringement will issue in accordance with the decision.

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations reported for the month of July are as follows:

Baukol-Noonan Lignite, Inc., Noonan, N. D.; contract closed with the Pittsburg Boiler & Machine Co., for four-track timber-frame tipple for lignite coal equipped with crusher, apron feeder, and shaker screen for making four sizes; no picking tables or loading booms will be installed; provision made for loading all sizes in box cars only; capacity, 400 tons per hour.

Harlan Collieries Co., Brookside, Ky.; contract closed with the Morrow Mfg. Co. for tipple equipped with reciprocating plate feeder, four-track shaking screen, rescreen conveyor, three combination picking tables, and loading booms; capacity, 300 tons per hour.

Indiana & Illinois Coal Corporation, Nokomis, Ill.; contract closed with the Morrow Mfg. Co. for steel tipple equipped with weigh pans, two apron feeders, two four-track shaking screens, six picking tables, three loading booms, two rescreen conveyors, three refuse conveyors, one slack scraper conveyor, and one mixing conveyor; capacity, 900 tons per hour.

Ingle Coal Co., Littles, Ind.; contract closed with Roberts & Schaefer Co. for complete tipple equipped with loading booms and Menzies hydro-separator coal-washing equipment to prepare egg, stove, nut, and slack; capacity, 150 tons per hour.

Johnstown Coal & Coke Co., Bellburn, W. Va.; contract closed with the Kanawha Mfg. Co. for wood tipple equipped with shaking screens, picking tables, loading booms, belt slack conveyor, and mixing conveyor; capacity, 250 tons per hour.

Leccony Smokeless Coal Co., Besoco, W. Va.; contract closed with Roberts & Schaefer Co. for Menzies hydro-separator coal-washing equipment to clean stove and pea; capacity, 50 tons per hour.

Milburn By-Product Coal Co., Milburn, W. Va.; contract closed with the Kanawha Mfg. Co. for wood tipple equipped with trip feeder, rotary dump, apron feeder, belt conveyor, and gravity screen; capacity, 250 tons per hour.

Panther Creek Mines, Inc., Auburn, Ill.; contract closed with Roberts & Schaefer Co. for four-track Marcus tipple of steel construction, equipped to load lump, egg, nut, and slack; capacity, 300 tons per hour.

Weyanoke Coal & Coke Co., Arista, W. Va.; contract closed with Roberts & Schaefer Co. for Menzies hydro-separator coal washing equipment to clean egg coal; capacity, 75 tons per hour.

Youghiogheny & Ohio Coal Co., Meadowland, Pa.; contract closed with Roberts & Schaefer Co. for four-track steel Marcus tipple, equipped with loading booms and rock-disposal machinery for preparing lump, egg, nut, and slack; capacity, 325 tons per hour.

Coal and Heating Committee Outlines Program

Steps toward acquainting the coal and heating industries with the objects of the newly-formed Committee of Ten—Coal and Heating Industries were taken at the second meeting of the organization, held in Chicago, July 21. Plans for meetings in August in Cincinnati, Ohio; Peoria, Ill.; Scranton, Pa.; Racine, Wis.; and Minneapolis, Minn., to be organized by the national representatives on the committee, were drawn up. Every individual merchant and contractor in the coal and heating industries, regardless of membership in any national organization, will be invited to attend and acquaint himself with the aims of the Committee of Ten.

At the Chicago meeting, the committee moved to assemble all available data on apparatus which will burn solid fuel smokelessly. As an initial service, all data available on flue construction are to be assembled for compilation and future distribution through architects and the construction industry. Representatives of the American Farm Bureau Federation appeared before the committee and gave the details of the tie-up between their home modernization program and the coal and heating equipment industries. The federation plans to take up the problem with each of the industries represented on the Committee of Ten, and a representative of the committee will appear on the program of the annual meeting of the federation, to be held in Boston, Mass., in December.

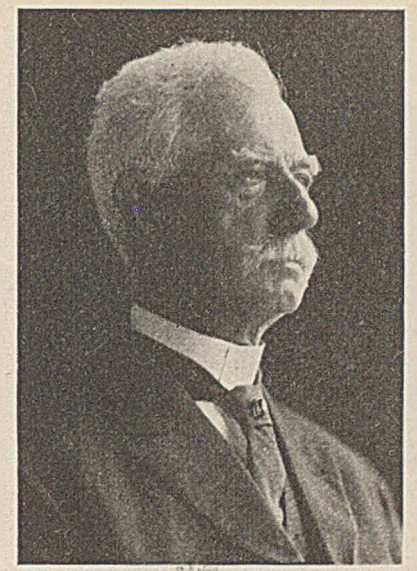
The next meeting of the Committee of Ten was scheduled for Oct. 16, at the Book-Cadillac Hotel, Detroit, Mich., in connection with the annual meeting of the National Coal Association. A representative of the committee will appear before the delegates to the association meeting to elaborate on the program of the committee.

Obituary

JOHN BARNES, 54, president of Barnes & Tucker and the Barnes Coal Co., operating mines in central Pennsylvania, died July 3 at his home in Philadelphia, Pa. He was a descendant of Thomas Barnes, the founder of Barnesboro, Pa.

C. E. BERGENDAHL, chief engineer of the C. C. B. Smokeless Coal Co., Mt. Hope, W. Va., died of peritonitis in a Beckley (W. Va.) hospital, July 12. Mr. Bergendahl, who was 47, had been chief engineer of the C. C. B. company for five years at the time of his death, and prior to that time had held similar positions with the Gulf Smokeless Coal Co., Helen, W. Va., and the New River Co., Macdonald, W. Va.

CHARLES SHIRLEY GOLDSBOROUGH, Oxford, Md., president of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co., Dunmore, Pa., until his retirement in 1927, died at the Union Hospital, Baltimore, Md., July 23. Mr. Goldsborough started as a clerk with the Erie R.R. 41 years ago.



James Ashworth

James Ashworth Dies

James Ashworth, English mining engineer and mining expert, died July 25, at his home in Jacksonville, Fla. Mr. Ashworth, who was born at Bolton, England, Aug. 10, 1844, started his mining career in the deep Lancashire mines. He became interested in the development of safety lamps, and was the inventor of the Ashworth flame safety lamp, for which he was awarded the only gold medal given by the Newcastle-upon-Tyne Royal Mining Engineering and Industrial Exhibition, in the Queen's Jubilee year, 1887. In 1893, Mr. Ashworth was awarded two bronze medals by the Royal Cornwall Polytechnic Society for improvements in safety lamps.

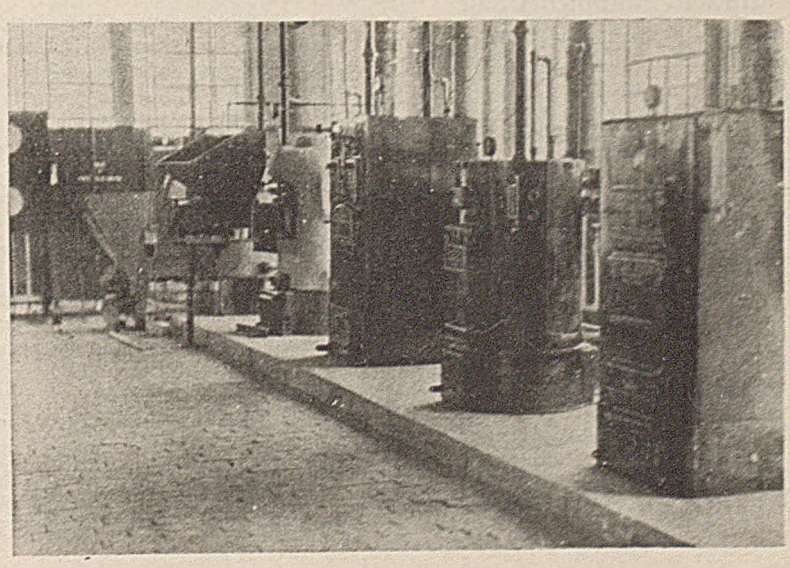
After the disastrous explosion at the Fernie (B. C.) mine of the Crows Nest Pass Coal Co., in 1904, Mr. Ashworth was called in as the leading mining expert in the investigation to determine the cause. Following the investigation, he was appointed general manager of the company and charged with the reconstruction of its mining properties. He remained in British Columbia, investigating and reporting on mining properties, until 1924, when, his health failing, he went to Florida to reside. Mr. Ashworth was interested in mining problems until his death, and during his lifetime was the author of a number of books and pamphlets on mine gases and explosions.

Anthracite Laboratory Opened

Anthracite producers, to supplement service to retail merchants and consumers, have established a testing and development laboratory at Primos, Pa., under the direction of Anthracite Coal Service. Equipped with a complete battery of boilers and recording instruments for testing every type of fuel, heating equipment, and accessories, the plant will be operated to provide the retail dealer with information on the characteristics of coal and also to assist him in answering any question which the consumer may raise in regard to the efficiency and practicability of equipment utilizing the coal which the retailer is selling.

Among the problems to be studied in the laboratory are: increasing the efficiency and convenience of equipment designed to burn all sizes of anthracite; new uses for hard coal; standardization of anthracite installations; and the relative value of various methods of combustion. Research on standardization and combustion methods will include: consideration of mechanical ash-removal systems; and investigation into the practicability of using the main house heater for furnishing hot water in the summer months; thorough test of several inventions for feeding large coal both automatically and by magazine; experimental work with a device for coaling the fire and shaking the ashes; complete tests of various types of thermostatic control; and investigation of the feasibility of chemically removing scale and dirt from boiler tubes.

A Corner of the New Anthracite Laboratory



Oldroyd Company Sued

A temporary injunction restraining Cyrus S. Oldroyd, Fred Oldroyd, and the Oldroyd Machine Co., Cincinnati, Ohio, from disposing of certain stocks or contracting with other companies than the Webster Mfg. Co. for the manufacture of Oldroyd cutting or loading machines has been issued by the Hamilton County (Ohio) Court of Common Pleas in the suit of A. Hunter Willis, treasurer and general manager of the National-Erie Co., Erie, Pa. Willis, through his attorney, alleges that on Nov. 5, 1929, Cyrus Oldroyd, president of the Oldroyd company, and T. F. Whalen, treasurer, gave the National-Erie Co. an order for the manufacture of 50 of its cutting machines at a cost of $1,200,000, to be filled on orders from the Oldroyd company.

At the same time, Willis states, a permanent agreement was considered, contingent upon the purchase by the National-Erie Co. and subsequent transfer to the Oldroyd brothers of 200 shares of preferred and 633 shares of common stock of the Oldroyd company, held by George B. Taylor, Erie, Pa., the National-Erie Co. to be reimbursed from profits of the Oldroyd company. The stock was purchased for $92,171.37, Willis states, and turned over to Oldroyds in consideration for an exclusive contract for the manufacture of Oldroyd machines, but the Oldroyds notified him on May 21 that they did not intend to carry out their agreement, and would continue to have their machines manufactured by the Webster Mfg. Co., which had an exclusive contract.

Alleging that he had no knowledge of the existing contact, Willis then demanded possession of the stock or the return of the money put up for it with interest. This was refused, he says, so he seeks judgment for the stock or $92,171.37, with interest, and asks that the Oldroyds be enjoined from transferring the stock and also from entering into any manufacturing contract with concerns other than the Webster company. Judge Stanley Struble issued a temporary injunction.

Anthracite Shipments Fall

Anthracite shipments in June, 1930, as reported to the Anthracite Bureau of Information, Philadelphia, Pa., were 4,052,939 gross tons, a decrease of 697,429 tons from the preceding month, and an increase of 274,260 tons over the total for June, 1929. Shipments by originating carriers for the month of June, 1930, as compared with the preceding month of May and with June, 1929, are as follows:

	June, 1930	May, 1930	June, 1929
Reading	889,662	948,406	677,888
Lehigh Valley	735,639	824,997	663,481
Central R.R. of N. J.	330,125	452,568	295,117
Del., Lack. & Western	565,882	718,898	646,158
Delaware & Hudson	558,520	656,786	585,948
Pennsylvania	332,605	446,334	337,460
Erie	396,044	400,809	328,000
N. Y., Ontario & Western	80,754	80,942	78,177
Lehigh & New England	163,708	220,628	166,450
	4,052,939	4,750,368	3,778,796

Packaged for Consumer Appeal

Coal in Packages Offered Southwestern Trade

Packaged coal is now being offered the Southwestern trade by the McAlester-Edwards Coal Co., Pittsburg, Okla., under the name "Boxkol." The new product consists of 90 lb. of hand-picked and mechanically cleaned nut coal, packed in a specially designed, patented carton, and sealed with a steel strap. A feature of the package is the "Scuttlebox," which permits the user to cut and fold one corner, thus making a coal scuttle out of the box. The steel strap also may be pressed into service as a handle.

"Boxkol" was first placed on the market in April, 1930, and the company states that it has already shipped five cars of the product and has booked orders for 40 more cars for fall delivery in Kansas, Oklahoma, and Texas. Dealers in sections where small quantities are bought at a time, it is declared, can furnish their "cash and carry" trade with a standardized quality coal. And, as the usual loss in transit and waste in handling are eliminated, they can do so at a profit. The company asserts that in communities where the product has been placed on sale, consumers have bought the coal despite the summer weather and have come back for more.

Efforts will be made to nationalize the idea, according to Jack J. Drew, sales manager of the company, because of its popularity in the immediate territory of the company. A national advertising campaign is being worked out, Mr. Drew stated, together with a license plan by which producers in other sections of the United States, may use the patented cartons and the trademark on a royalty basis.

Reparations Awarded

Reparations totaling about $650,000, with interest, were awarded six coal companies in the Greenbrier field of West Virginia by Judge Nevin, of the federal court for the southern district of Ohio, western division, in the case of *Nelson Fuel Co. et al. vs. Chesapeake & Ohio R.R. et al.* Judgment was based on awards of reparation made by the Interstate Commerce Commission, before which litigation was begun in 1921. The Commission was called upon to decide on coal rates from points on the Greenbrier & Eastern R.R., which was connected to the companies' mines by the Sewell Valley R.R., and held that rates from points on the short-line railroad should not be higher than those from the New River district.

Judgment, given on shipments made between March 2, 1922, and April 18, 1925, inclusive, was as follows: Imperial Smokeless Coal Co., Quinwood, W. Va., $113,590.08; Meadow Creek Coal Co., Crichton, W. Va., $69,018.19; Nelson Fuel Co., Leslie, W. Va., $171,162.29; Greenbrier Smokeless Coal Co., Crichton, W. Va., $61,790.22; Frances Coal Co., Marfrance, W. Va., $40,189.15; and the Margarette Coal Co., Marfrance, $124,135.78.

Clearfield Key Men Dine

"Key men" in the 100-per cent first-aid training campaign of the Clearfield Bituminous Coal Corporation, Indiana, Pa., were the guests of honor at a banquet held July 17 in that city, where their services as instructors received official recognition. In addition to the "key men" from Clymer No. 1, Barr Commodore, Cooper No. 2 mines and the general office representatives of the official family of the company, the U. S. Bureau of Mines, the Pennsylvania Department of Mines, and the doctors from each of the mining communities were present.

Maurice L. Coulter, head of the safety and inspection department of the company, acted as toastmaster and explained that "key men" were selected for each twenty employees and were trained by the U. S. Bureau of Mines in first aid. They in turn acted as instructors to their fellow workers. Mr. Coulter stated that through the efforts of the staff of Bureau of Mines Car No. 6 and the "key men" over the preceding month, Clymer No 1, Barr, and Commodore mines were eligible for 100-per cent first-aid training certificates, one of which had previously been issued to Cooper No. 2 mine.

Other speakers were A. J. Musser, vice-president of the company; H. J. Hinterleitner, general superintendent; Dr. B. F. Coe, head of the medical department; T. F. McCarthy, assistant general superintendent; Franklin E. Griffith, Car. No. 6, U. S. Bureau of Mines; Walter Glasgow, Harrisburg, Pa., Secretary of Mines of Pennsylvania, and state mine inspectors T. J. Lewis, Punxsutawney, Pa., and T. S. Lowther, Indiana, Pa.

Personal Notes

D. A. THOMAS, Birmingham, Ala., president, Montevallo Coal Mining Co., was on July 10 elected president of the Birmingham Chamber of Commerce, one of the most influential commercial organizations in the South.

ROBERT J. EDMISTON has been appointed superintendent of the Reliance colliery of the Philadelphia & Reading Coal & Iron Co., with headquarters at Mt. Carmel, Pa. Mr. Edmiston went to the Reading company from Illinois, where he had been connected with bituminous companies as mine manager and superintendent for a number of years.

S. W. BLAKSLEE, since 1929 general manager of the Pennsylvania Coal & Coke Corporation, Cresson, Pa., has resigned to join the Philadelphia & Reading Coal & Iron Co. Mr. Blakslee will be stationed at Pottsville, Pa., as production manager for all collieries.

WILLIAM H. HOWARTH, Brownsville, Pa., for 31 years inspector in the sixteenth Pennsylvania bituminous district, has retired on a pension. His place has been taken by his son, FRED W. HOWARTH, formerly superintendent of Mines No. 1 and 2 of the Tower Hill Connellsville Coke Co., Republic, Pa.

A. L. HUNT, general superintendent of the Pennsylvania Coal & Coke Corporation, Cresson, Pa., has been made general manager, vice S. W. Blakslee, resigned to go with the Philadelphia & Reading Coal & Iron Co.

WILLIAM C. SMITH, for eight years manager of the Louisville (Ky.) district office of the Brown Coal Co., Memphis, Tenn., has been elected president of that organization and its two subsidiaries, the Gibraltar Coal Co. and the Mercer Coal Co., operating in western Kentucky, vice R. L. Brown, who becomes chairman of the board of directors.

J. B. BURNS, safety inspector for the Routt County (Colo.) Coal Operators' Association, has been appointed a deputy coal mine inspector, with headquarters at Grand Junction, Colo.

A. J. MALONEY, president, Philadelphia & Reading Coal & Iron Co., Philadelphia, Pa., has been elected to the newly created office of chairman of the board of directors of the Reading Iron Co., a subsidiary. Mr. Maloney also assumes the executive duties of the Reading Iron Co., pending the election of a successor to Leon E. Thomas, who resigned as president.

JOHN HOWE, Ehrenfeld, Pa., mine foreman for the Pennsylvania Coal & Coke Corporation, has been made superintendent to fill the vacancy made by the promotion of A. L. Hunt to general manager.

J. L. KNIGHT, for the past two years service engineer for the Beckley Machine & Electric Co., Beckley, W. Va., has joined the Hillman Coal & Coke Co. as superintendent of the electrical and mechanical departments at Jerome, Pa. Prior to his connection with the Beckley company, Mr. Knight was employed by the E. E. White Coal Co., Glen White, W. Va.

King Coal's Calendar for July

July 4—Twenty-five thousand Belgian miners strike against old-age pension rates. Demands of foreign miners who had been recently laid off from work intensified the bitterness of the affair.

July 7—Central Pennsylvania Coal Producers' Association files with the Public Service Commission of Pennsylvania a companion complaint to that presented to the Interstate Commerce Commission May 7, attacking rates on coal from the Clearfield district to destination territory in Pennsylvania east of Johnsonburg, Lock Haven, and Lewiston as unjust and unreasonable.

July 9—John L. Lewis, president, United Mine Workers, and fourteen other union officials held guilty of violating an injunction issued by the Sangamon County circuit court, last October restraining them from attempting to set up a provisional union government in Illinois or interferring in the affairs of District 12. Frank Trutter, master in chancery, Springfield, Ill., recommended that no fines be assessed against Lewis and his associates, holding that they had "unintentionally" violated the terms of the injunction.

July 9—Western Pennsylvania Coal Traffic Bureau files with the Interstate Commerce Commission a complaint attacking rates on coal from the Westmoreland district to practically all Eastern and New England destination territory as unjust and unreasonably high. Complainants do not seek, however, to have the differentials between different mines in the Westmoreland district or between various districts in Pennsylvania changed, but assert that "within the capes" and "without the capes" tidewater rates should be equalized. No unjust discrimination was complained of in the maintenance of lower rates on coal for export.

July 9—Pocahontas operators win an important victory when the U. S. District Court for the Southern District of Indiana grants a permanent injunction against sixteen retail dealers and one jobber in Indianapolis, Ind., forever enjoining them from selling any coal other than that produced in the Pocahontas coal field as "Pocahontas coal," either separately or in mixtures.

July 9—Outburst of carbon dioxide in the Wenceslaus mine, near Neurode, a town in the Lower Silesian coal field of Germany, kills 151 miners.

July 10—Western Pennsylvania Coal Traffic Bureau files with the Public Service Commission of Pennsylvania a companion complaint to that presented to the Interstate Commerce Commission July 9, attacking rates on coal from the Westmoreland district to destination territory in eastern Pennsylvania as unjust and unreasonable.

July 14—Explosion of gas in the Warrior Run mine of the Lehigh Valley Coal Co., Warrior Run, Pa., kills two men and severely injures three others.

July 17—Representatives of the United Mine Workers from West Virginia, Pennsylvania, Ohio, Kentucky, Maryland, and Tennessee, at a meeting at Fairmont, W. Va., address a letter to President Hoover requesting him to call a meeting of bituminous operators and miners "for the purpose of taking such action as will stabilize this basic industry and put the 'House of Coal' in order."

July 18—Secretary of Labor James J. Davis, following a Cabinet meeting at Washington, D. C., states that the administration has no intention of calling a conference of bituminous coal operators and miners to discuss conditions in the soft-coal industry. Secretary Davis said that such a conference could accomplish nothing, as the problem of the bituminous industry was the same as that of agriculture—namely, overdevelopment.

July 19—Representatives of the anthracite operators and the United Mine Workers, meeting in New York City, reach an agreement on a new wage contract to go into effect upon the expiration of the present agreement, Aug. 31. Continuance of the old wage scales and working conditions; a modified form of the check-off system; a pledge of cooperation for the promotion of efficiency by the miners; and a new arbitration clause were embodied in the agreement, which is to be taken up by the miners for ratification Aug. 4.

July 21—Labor government accepts House of Lords amendment twice rejected by the House of Commons, thus saving what remained of the British Coal Mines Bill. The amendment proposed by the House of Lords embodies a working fortnight of 90 hours, with eight-hour days, thus giving a longer week end to the workers. The original clause in the bill provided for a 7½-hour working day.

July 22—District 12, United Mine Workers, comprising the State of Illinois, and the Illinois Coal Sales Association make formal protest to the Illinois Commerce Commission against the introduction of natural gas into central Illinois, as proposed by the Panhandle Eastern Pipe Line Co., which has applied for a certificate of convenience to construct and operate a pipe line across the state.

July 22—Colorado and New Mexico Coal Operators' Association, at a meeting in Denver, Colo., adopts a code of fair-trade practices, condemning misrepresentation of product as to size, quality, or price, the secret giving of rewards of any kind, and the selling of coal below cost to injure a competitor or lessen competition. The code becomes effective Aug. 1 and has been submitted to the Federal Trade Commission for approval.

July 23—John L. Lewis, president, United Mine Workers, fined $500 and all remaining defendants in the trial for contempt of court arising out of an alleged violation of the terms of an injunction granted last October in the Sangamon County (Ill.) circuit court restraining Lewis and his aids from attempting to set up a provisional government in District 12 (Illinois) found guilty by Circuit Judge Charles Briggle, Springfield, Ill., after considering the findings of Master in Chancery Frank Trutter, also of Springfield.

July 23—House of Lords finally approves British Coal Mines Bill and the measure, the center of parliamentary storms for seven months, needs only the Royal assent to become a law. One of the outstanding features of the final draft is that both the Miners' Federation and the Mine Owners' Association are given national legal status and are invested with legal obligation in adjusting the hours of work.

Confer on Coal Heating Service In Rural Communities

Opportunities for furnishing an efficient heating service through the use of coal were brought to the attention of the American Farm Bureau Federation, which has launched a home modernization campaign in co-operation with the National Lumber Manufacturers' Association and the Portland Cement Association, by C. B. Huntress, executive secretary, National Coal Association, at a meeting in Washington, D. C., last month. Bearing in mind that there is a large and undeveloped field for the sale of improved coal-burning equipment in rural communities, Mr. Huntress directed the attention of the federation to the newly organized Committee of Ten—Coal and Heating Industries as an excellent vehicle through which reliable information on coal-heating service could be obtained.

Officials of the federation shared the opinion that a heating program was an essential part of any home-modernization program and moved to have representatives attend the Committee of Ten meeting to be held in Chicago, July 21, and tell of the manner in which the modernization campaign will be carried out through 1,837 county units and with the help of 30,000 "project leaders" of the organization.

Westmoreland Rates Attacked

Track-delivery and tidewater transshipment rates on bituminous coal from the Westmoreland district to Eastern destination territory are declared to be excessive in a complaint filed with the Interstate Commerce Commission, July 9, by the Western Pennsylvania Coal Traffic Bureau. The complaint also charges that the relationship of track-delivery rates to, at, and between various Eastern destinations is discriminatory; and that the relationship of tidewater transshipment rates to New York, Philadelphia, and Baltimore creates undue prejudice as between such ports, and that the maintenance of tidewater transshipment rates to New York harbor piers applicable upon all transshipped coal regardless of ultimate destination beyond the piers and the contemporaneous maintenance of rates to Philadelphia and Baltimore piers, with application of same conditioned upon ultimate destination "within the capes" or "without the capes" gives rise to discrimination.

Western Pennsylvania operators contend that the service performed by the carriers in hauling coal for domestic delivery within the capes is the same, although the rates are higher on coal hauled for domestic delivery without the capes. No discrimination is alleged in the maintenance of a lower rate on coal hauled to transshipment piers for foreign delivery.

The western Pennsylvania operators' complaint has been consolidated with the similar complaint of the Central Pennsylvania Coal Producers' Association *(Coal Age,* June, 1930; p. 397) and assigned for hearing at Washington, D. C., Sept. 8; Concord, N. H., Sept. 22, and Washington, Nov. 3, before Examiner C. H. Peck. On Sept. 8, it is expected that the companion complaints of the Central Pennsylvania and Western Pennsylvania operators, filed with the Public Service Commission of Pennsylvania, July 7 and 10, respectively, also will be heard. The operators request a reduction in the intrastate rates from the Clearfield and Westmoreland fields to that part of Pennsylvania East of Johnsonburg, Lock Haven, and Lewiston.

Earnings and Employment Decrease in May

Employment in coal mining—anthracite and bituminous combined—decreased 0.2 per cent in May, as compared with April, and payroll totals increased 7.2 per cent, according to the monthly *Labor Review* of the U. S. Department of Labor. The 1,529 mines reporting had in May 307,529 employees, whose earnings in one week were $7,736,465. In anthracite mining in May there was an increase of 11.5 per cent in employment, as compared with April, and an increase of 31.7 per cent in payroll totals. Employment in May, 1930, was 9.5 per cent lower than in May, 1929, and payroll totals were 0.2 per cent smaller.

Employment in bituminous coal mining decreased 4.2 per cent in May, as compared with April, and payroll totals decreased 5.1 per cent, according to reports from 1,376 mines, in which there were in May 210,768 employees, whose combined earnings in one week were $4,560,650. Employment in May, 1930, was 6.4 per cent lower than in May, 1929, and payroll totals were 15.7 per cent smaller.

Fire Destroys Tipple

Seven buildings comprising the surface plant of the Superior mine of the Perry Coal Co., Belleville, Ill., were destroyed by fire July 21, with an estimated loss of $200,000. The fire spread to the hoisting shaft, forcing eighteen miners to make their way underground to another exit a mile away. Before leaving the mine, however, five of the men, headed by William Bolt, assistant superintendent, succeeded in extinguishing the blaze in the shaft before it spread to the coal.

Coming Meetings

Thirteenth Annual Conference on Human Relations in Industry at Silver Bay on Lake George, N. Y., Aug. 27-31.

Canadian Institute of Mining and Metallurgy; annual Western meeting, Sept. 2-4, at Flin Flon, Sherridon, and The Pas, Manitoba, Canada.

Coal Division of the American Institute of Mining and Metallurgical Engineers, Sept. 11-13, at the William Penn Hotel, Pittsburgh, Pa.

International First-Aid and Mine Rescue Contest, Sept. 16-18, at Jefferson County Armory, Louisville, Ky.

National Safety Council; annual Safety Congress, Sept. 29 to Oct. 4, inclusive, at Pittsburgh, Pa.

Kanawha Coal Operators' Association; annual meeting, Oct. 2 at Charleston, W. Va.

National Coal Association; annual meeting, Oct. 15-17, at Book-Cadillac Hotel, Detroit, Mich.

Illinois Mining Institute; annual meeting, Oct. 31 at Centralia, Ill.

Southern Appalachian Coal Operators' Association; annual meeting, Nov. 20, Knoxville, Tenn.

West Virginia Coal Mining Institute; annual meeting, Dec. 2 and 3 at Huntington, W. Va.

Employment and Payrolls in Identical Bituminous Coal Mines In April and May, 1930

	Mines	Number on Payroll — April, 1930	Number on Payroll — May, 1930	Number on Payroll — Per Cent Change	Payroll in One Week — April, 1930	Payroll in One Week — May, 1930	Payroll in One Week — Per Cent Change
Middle Atlantic	406	64,864	62,719	−3.3	$1,503,592	$1,418,420	−5.7
East North Central	183	30,753	27,707	−9.9	639.745	585,610	−8.5
West North Central	57	4,953	4,631	−6.5	102,674	79,588	−22.5
South Atlantic	337	56,371	56,341	−0.1	1,237,800	1,216,933	−1.7
East South Central	238	44,859	43,561	−2.9	879.165	863,573	−1.8
West South Central	30	1,998	2,021	+1.2	42,740	36,455	−14.7
Mountain	115	14,614	12,303	−15.8	356,418	318,372	−10.7
Pacific	10	1,538	1,485	−3.4	43,685	41,699	−4.5
All divisions	1,376	219,950	210,768	−4.2	$4,805,819	$4,560,650	−5.1

Per Cent Change in Each Line of Employment, April and May, 1930

	Establishments	Employment — April, 1930	Employment — May, 1930	Employment — Per Cent Change	Payroll in One Week — April, 1930	Payroll in One Week — May, 1930	Payroll in One Week — Per Cent Change
Manufacturing	13,853	3,412,506	3,362,565	−1.6*	$91,894,663	$89,863,530	−2.4*
Coal mining	1,529	306,767	307,529	−0.2	7,217,858	7,736,465	+7.2
Anthracite	153	86,817	96,761	+11.5	2,412,039	3,175,815	+31.7
Bituminous	1,376	219,950	210,768	−4.2	4,805,819	4,560,650	−5.1
Metalliferous mining	351	55,696	54,608	−2.0	1,654,620	1,603,032	−3.1
Quarrying and non-metallic mining	747	37,627	39,105	+3.9	974,328	1,028,502	+5.6
Crude petroleum production	176	21,555	22,278	+3.4	797,144	786,147	−1.4
Public utilities	10,850	758,355	767,907	+1.3	23,004,566	23,075,077	+0.3
Trade	9,172	315,011	313,310	−0.5	8,014,030	7,991,779	−0.3
Wholesale	2,154	67,731	67,410	−0.5	2,137,599	2,127,072	−0.5
Retail	7,018	247,280	245,900	−0.6	5,876,431	5,864,707	−0.2
Hotels	2,018	164,726	161,235	−2.1	2,820,235†	2,765,477†	−1.9
Canning and preserving	726	39,712	34,879	−12.2	700,911	646,223	−7.8
Total	39,422	5,111,955	5,063,416	−0.9	$137,078,355	$135,496,232	−1.2

*Weighted per cent of change for the combined 54 manufacturing industries; the remaining per cents of change, including total, are unweighted. †Cash payments only.

June Fatality Rate Declines From May And Same Month a Year Ago

ACCIDENTS in the coal-mining industry of the United States in June, 1930, resulted in the death of 119 men, according to information received from state mine inspectors by the U. S. Bureau of Mines. Of this number, 25 men were killed in the anthracite mines of Pennsylvania and the remaining deaths were in bituminous mines in various states. The death rate per million tons of coal produced during the month was 3.06, based on an output of 38,897,000 tons of bituminous and anthracite coal; that for bituminous mines alone was 2.79, with the production of 33,714,000 tons. Anthracite production during the month was 5,183,000 tons, giving a fatality rate of 4.82.

The record for June is more favorable than that for the corresponding month in 1929, when there were 123 deaths in bituminous mines and a production of 38,580,000 tons, resulting in a fatality rate of 3.19. In anthracite mines in June, 1929, there were 37 deaths with a production of 5,069,000 tons, giving a rate of 7.30 per million tons. For bituminous and anthracite mines combined, the rate for June last year was 3.67, based on a production of 43,649,000 tons and 160 deaths. The month of June, 1930, also showed an improvement over the preceding month, when there was a total of 140 deaths, of which 108 occurred in bituminous mines and 32 occurred in anthracite mines. During May, 1930, 35,954,000 tons of bituminous coal and 5,947,000 tons of anthracite were mined, the death rates per million tons of coal produced being 3 for bituminous, 5.38 for anthracite, and 3.34 for the industry as a whole.

Reports for the first six months of 1930 showed a total of 979 deaths from accidents in coal mines, as compared with 1,013 for the same period of 1929. The production of coal thus far in 1930 totals 264,426,000 tons, showing a death rate of 3.70; that for the period January to June, 1929, was 293,445,000 tons, with a fatality rate of 3.45. Separated into bituminous and anthracite groups, the rates for the six-month period of 1930 were 3.33 and 6.21, respectively, while those for the same period of 1929 were 3.08 and 6.02, respectively.

There were no major disasters during June—that is, there was no disaster in which five or more lives were lost—but there were seven major disasters during the preceding months of 1930 which caused the death of 88 men. During the corresponding six-months period of 1929, there were four major disasters with a total of 75 deaths. Thus the death rate from major disasters was 0.333 per million tons of coal produced in 1930 and 0.256 in 1929.

Comparing the accident record for the first six months of 1930 with that for the same period of 1929, a reduction is noted in fatality rates for haulage and explosives, but increased rates are shown for falls of roof and coal, gas or dust explosions, and electricity. The comparative rates for the six-month periods of 1930 and 1929 are as follows:

Cause	1929	—Jan.-June,— 1929	1930
All causes	3.581	3.452	3.702
Falls of roof and coal	1.934	1.837	2.004
Haulage	.675	.678	.613
Gas or dust explosions:			
Local	.082	.075	.140
Major	.238	.235	.321
Explosives	.145	.143	.125
Electricity	.133	.116	.136
Miscellaneous	.374	.368	.363

Pocahontas Operators Win Trade Name Suit

Operators in the Pocahontas field of West Virginia won an important victory when the U. S. District Court for the Southern District of Indiana, on July 9, granted a permanent injunction against sixteen retail dealers and one jobber in Indianapolis, Ind., forever restraining them from selling any coal other than that produced in the Pocahontas coal field as "Pocahontas coal," either separately or in mixtures.

The decision is expected to be far-reaching in its effects, as it places in the hands of coal operators a powerful weapon for use in the protection of the trade name "Pocahontas" and establishes a precedent for the guidance of operators in the other coal fields of the country.

Coal Mine Fatalities During June, 1930, by Causes and States

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

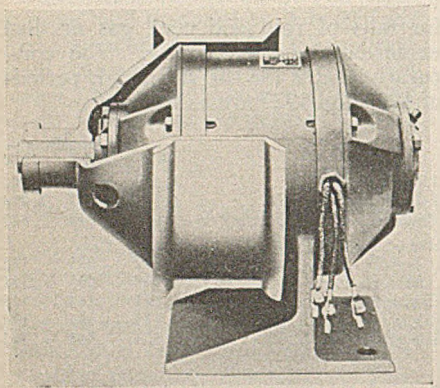
State	Underground												Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal	Mine cars and locomotives	Explosions of gas or coal dust	Explosives	Suffocation from mine gases	Electricity	Animals	Mining Machines	Mine fires (burned, suffocated, etc.)	Other causes	Total	Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip or bucket	Other causes	Total	Mine cars and mine locomotives	Electricity	Machinery	Boiler explosions or bursting steam pipes	Railway cars and locomotives	Other causes	Total	1930	1929
Alabama	1						3					4													4	3
Alaska																									0	0
Arkansas	1											1													1	1
Colorado			1									1													1	1
Georgia and North Carolina																									0	1
Illinois	7		2									9													9	11
Indiana																									0	4
Iowa																									0	2
Kansas	1											1													1	2
Kentucky	5		1									6													6	16
Maryland	1											1													1	0
Michigan																									0	0
Missouri																									0	0
Montana																									0	0
New Mexico																									0	1
North Dakota																									0	1
Ohio	1		1									2							1				1	2	4	4
Oklahoma	1	1	1									3													3	1
Pennsylvania (bituminous)	16		5	1					2		1	25										1		1	26	26
South Dakota																									0	0
Tennessee	2											2													2	0
Texas																									0	0
Utah																									0	2
Virginia	3		1									4													4	7
Washington	1											1													1	1
West Virginia	15	7	3									25						1	1					2	27	36
Wyoming	1	1							1			3											1	1	4	3
Total (bituminous)	56	9	15	1			3		3		1	88						1	2			1	2	6	94	123
Pennsylvania (anthracite)	12	3	2	2	2						3	24						1						1	25	37
Total, June, 1930	68	12	17	3	2		3		3		4	112						2	2			1	2	7	119	
Total, June, 1929	74	21	23	4	11		6		1		2	142	4		2	1	7	3	3				5	11		160

WHAT'S NEW

IN COAL-MINING EQUIPMENT

Motors Designed for Conveyors

The Reliance Electric & Engineering Co., Cleveland, Ohio, now offers the Type M motor for conveyor work. These motors, the company says, are provided with a single, heavy, welded-steel support so located that a pulley-type roller keyed to the motor shaft can rotate around the body of the motor.



Type M Motor for Conveyor Work

Various shaped rollers to suit the material to be conveyed can be used, and it is stated that the motors with rollers can be lined up in tandem, the distance between them being governed by the material conveyed.

Features of the motor, as set forth by the maker, are: full inclosure, preventing injury; Class B insulation of asbestos and mica, which will stand very high temperatures; and large ball bearings. Conveyors consisting of individual rollers and motors have the following advantages, according to the company: they can be changed or moved quickly without effort; motor acts as an idler roll in case of failure, thus allowing production to go on; motors can easily be replaced; maintenance is low, because of the absence of external parts or supplementary equipment; power consumption is low, since the only bearings are the anti-friction ones in the motors.

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New Conveyor Chain Said to Have Great Strength

A new line of cast chains said to show remarkable strength and durability in comparison with malleable chains has been placed on the market by the Link-Belt Co., Chicago. These chains are sold under the name of "Promal." Compared with malleable iron, the new metal used in the chains, is said to have an average yield point of 45,000 lb. against 36,000 lb.; an average ultimate strength of 65,000 lb., compared to 54,000 lb.; an average elongation of 14 per cent, against 18 per cent; and a Brinell hardness of 170-190, as against 110-130. Compared with cast mild steel, the average yield point, the company says, is 45,000 lb., against 34,000 lb.; the ultimate strength is 65,000 lb. against 60,000 lb.; average elongation is 14 per cent, compared to 26 per cent; and the Brinell hardness is 170-190, against 120-140.

Features claimed for "Promal" are: great toughness to resist tension without permanent stretch; high strength in proportion to weight and size; and hardness that offers great resistance to abrasive wear. "Promal" chains are recommended by the manufacturer for the following classes of service: chain drives, elevators and conveyors operating under gritty or abrasive conditions; chain drives where greater strength is required than the corresponding size of malleable iron provides; drag, scraper, and flight conveyors where the chain drags and is subject to abrasion; heavy-duty drives of comparatively high speed, short centers, and large sprocket ratios.

The Link-Belt Co. also offers a new Timken anti-friction bearing ball-and-socket pillow block to fit any good grade of commercial shafting from $1\frac{7}{16}$ in. in diameter up to the largest sizes, without special fittings or the use of other appliances. Pressure lubrication, the company says, makes the pillow blocks practically dust-tight. Grease is forced in at the center and out at the shaft openings.

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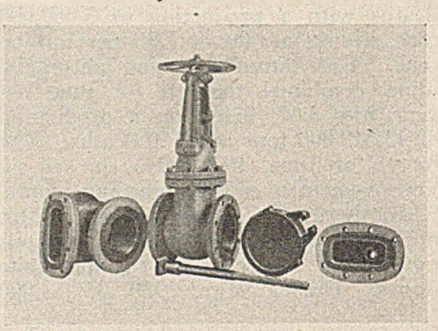
New Pump Lined With Rubber

Acid-resisting qualities, says the American Hard Rubber Co., New York City, are built into its solid rubber and rubber-lined pipe and fittings. The company now offers standard hard-rubber pipe in fittings up to 4-in. diameter, iron pipe sizes, and extra-heavy hard rubber pipe and fittings in sizes up to 6 in. Among the features of this equipment, the following are stressed by the company: ability to withstand pressures up to 50 lb. per square inch in the standard, and up to 80 lb. per square inch, in the extra-heavy types; particular adaptability to mine-water gathering problems in all bituminous and anthracite mines; less weight than aluminum; is easy to handle; can be cut and threaded on the job and bent by heating and using the ordinary bending methods; will not absorb moisture; stays in the same condition without swelling, waterlogging or cracking, regardless of whether it is in use or not; will give a lifetime of service if properly handled; and is cheaper in general than acid-resisting bronze or alloys.

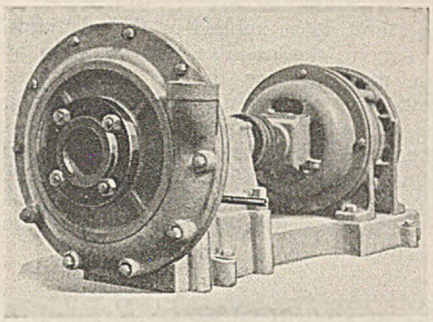


Rubber-Lined Valve and Fittings

The company also offers rubber-lined equipment said to handle the same pressures for which iron pipe itself is designed. This equipment is available with either a hard-rubber or soft-rubber lining. The soft-rubber lining, it is claimed, not only takes care of corrosion but resists abrasion as well, as solid particles passing over the lining are thrown off without cutting the rubber, giving a longer life than extra-heavy iron equipment. Rubber-lined pipe and fixtures should be used in main pumping systems, the company recommends, and it further states that the lining is so perfectly bonded to the steel that the equipment can be used on both suction and discharge lines. The lining is so applied as to protect all the inside surfaces. Rubber-lined pipe and fittings, the company asserts, are, in general, cheaper than lead-lined pipe.

Rubber-lined gate valves have been developed by the Hard Rubber company and the Crane Co., working in collaboration. The lining, it is claimed, protects all the inside surface of the valve, and, it is said, is, in general, cheaper than good grades of bronze valves and gives much longer service.

Among the specialties offered by the Hard Rubber company is the new W.E.M. hard-rubber-lined pump, said to be as efficient in operation as metal



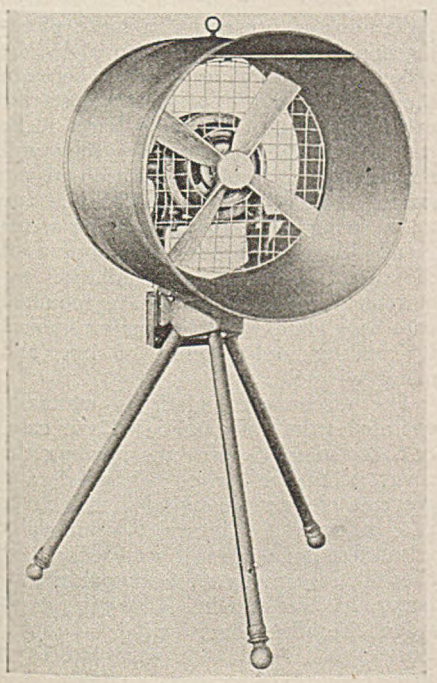
Type W.E.M. Hard-Rubber-Lined Gathering Pump

pumps. This fact, together with the protection afforded by the lining, greatly increases the usefulness of the machine in places where corrosion normally takes place, the company says. The pump is equipped with a 3-in. suction and a 2-in. discharge. Capacities range between 100 and 240 g.p.m. depending on the head and the speed of the motor.

Industrial Cooling Object Of New Blower

For improving air circulation, the Coppus Engineering Corporation, Worcester, Mass., offers the Aeroplane Heat Killer, which is said to eliminate heat, foul air, dust, gases, fatigue, and discontent. This equipment, made in two sizes, is designed, the company states, for moving a large volume of air with the velocity of a breeze. The No. 1 model (weight, 250 lb.) circulates 10,500 c.f.m. at 4,200 f.p.m., and the No. 2 model (weight 270 lb.) moves 15,600 c.f.m. at 3,850 f.p.m. Both are designed for covering a comparatively large area, the company states. Recirculation of air, it is declared, is entirely eliminated by the use of a diffuser, an outlet thimble for accurately guiding the incoming and outgoing air currents, and a baffle plate to keep the flow from rising above the place where it is needed.

Aeroplane Heat Killer No. 1



New Screen Tests Material Of Large Size

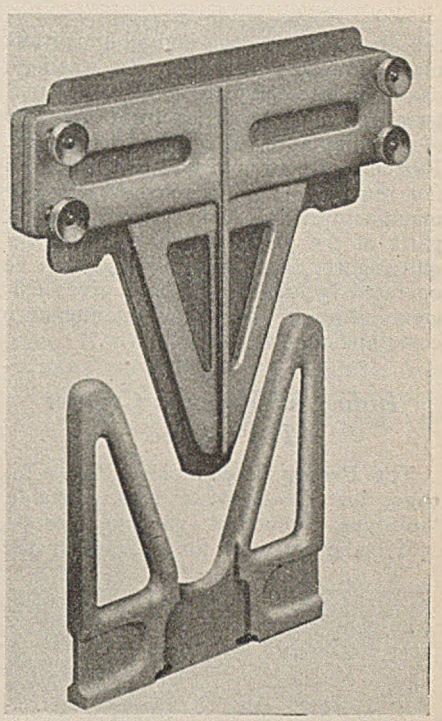
For testing large samples of coarse aggregate, the Hendrick Mfg. Co., Carbondale, Pa., offers the new Weston testing screen. The standard machine

Weston Testing Screen

is made to hold four sieves, each 30 in. in diameter and with sides 4 in. high. Any combination of size openings from ¼-in. round up to the very large sizes may be obtained, the manufacturer states. Bottoms of the sieves are cone-shaped, and each one weighs about 15 lb. when empty and will hold about 25 lb. of material. They can easily be handled by one man, it is claimed. Speed of the machine is approximately 13 r.p.m. Accuracy compares favorably with the hand method of testing, the company points out, and runs may be made in 2 to 3 minutes. Having each size of material in a separate screen is said to facilitate a visual inspection.

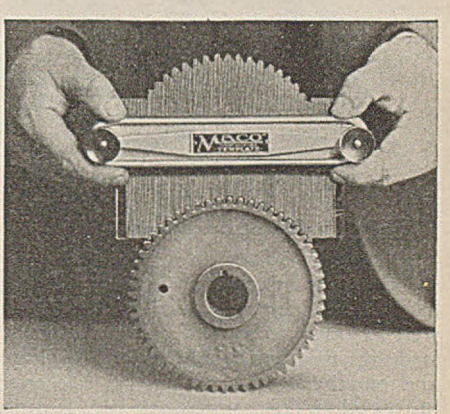
New Testing Instrument For Making Profiles

Accurate profiles may be taken in a few seconds with the "Maco" templets, the American Maco Template Co., New York City, declares. This instrument is composed of a number of very fine strips of hard-drawn brass, each 0.007 in. in thickness, which are held in position by two clamps fitted with sections of corrugated rubber to prevent the laminae falling out. When an exact



"Maco" Templet and Master Section for Recording Wear on Sheave Wheels

templet of any profile is desired, the company explains, the screws are loosened and the device is pressed against the contour. The laminae take the outline of the surface against which they



American "Maco" Templet

are pressed, the extreme thinness of the strips, it is claimed, materially assisting in the facility and precision of the process. After pressing the templet against the surface to be tested, the screws are locked, holding the laminae in position. From the templet thus produced, other and permanent templets may be made, or a record of the section of the profile may be filed.

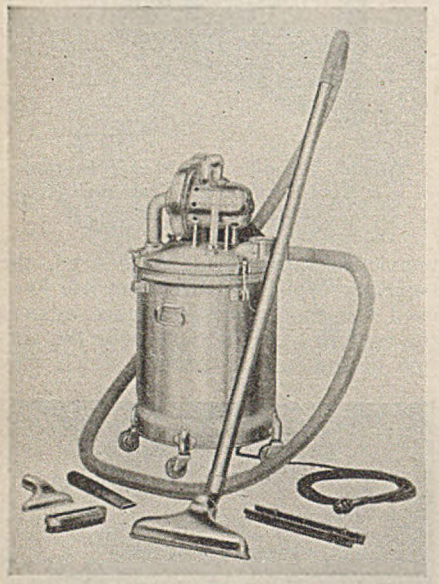
Ash Conveyed by Air

The "Nuveyor," a new pneumatic conveyor, is offered by the United Conveyor Corporation, Chicago, for conveying stoker ash, powdered fuel

ash, fly ash, soot, coal, and all dry, granular, abrasive materials. In a single operation, the company declares, the material is drawn by suction from its places of accumulation directly to storage. Furthermore, an airtight storage tank is not required. Features stressed by the manufacturer are: ash collected from all parts of the plant; minimum space requirements; clean and noiseless; can be operated by unskilled labor; gives efficient storage; has low maintenance cost; and requires little power.

Industrial Vacuum Cleaner Is Portable

The Breuer Electric Mfg. Co., Chicago, has developed a new, portable, tank-type, industrial vacuum cleaner, said to be designed for heavy-duty use

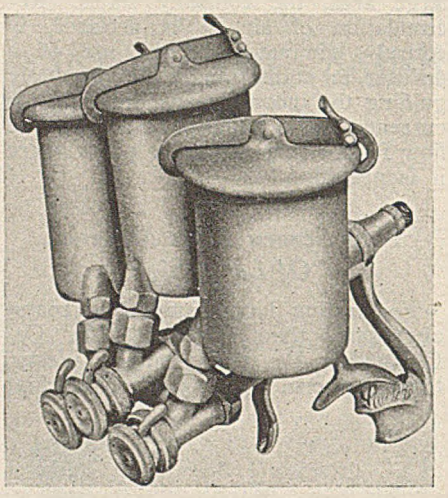


Model 70 Industrial Vacuum Cleaner

in cleaning machinery motors, overhead pipes, girders, walls, floors, as well as other industrial applications. It is designated as the Model 70 Tornado, and employs a ¾-hp., General Electric, universal motor, mounted on Norma precision ball bearings. The motor is mounted on a cast aluminum cover, which fits over a steel tank finished in aluminum. A complete set of attachments is furnished, according to the company, which further declares claim that the machine has ample power, is easily moved, and operates at low cost. The motor may be removed from the cover for use as a portable blower.

Airbrushes Apply Four Colors At One Time

Two, three, or four colors may be applied at one time with the new universal, multiple-head, convertible, "Multi-color" airbrushes, according to the Paasche Airbrush Co., Chicago. Each color is controlled independently,



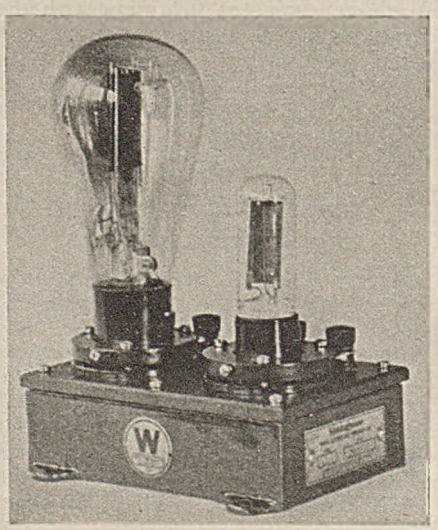
Paasche Airbrush

it is said, so that all colors may be applied at the same time or shut off at will. Multiple-heads in 40 different combinations, it is stated, provide a wide coating range. The airbrushes may be used as single units or expanded into gang units for either manual or air operation.

Photo-Electric Cell Offered With Amplifier Unit

A photo-electric cell with an amplifier is now sold as a unit by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This equipment is a light-sensitive device. When light falls upon it, voltage having been applied to the cathode, a current passes, by means of electron emission, from the cathode to the anode. This current is very small but, when amplified, will operate commercial relays. For some applications, the company says, complete apparatus has been developed and applied as a unit, but for the most, where no standard apparatus is available, the photo-electric cell with its amplifier is sold as a unit, to be applied by the customer.

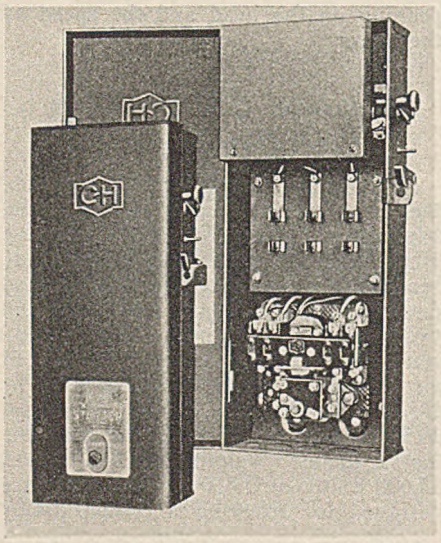
Photo-Electric Cell Mounted on Amplifier Unit



Among the possible uses detailed by the manufacturer of the device are: initiating operations, such as ringing an alarm on a paper machine when a break occurs in the paper; turning on and off artificial lights according to the intensity of natural light, and acting as a position indicator for showing the position of doors, moving cars, etc.

A.-C. Motor Starter Developed For Across-the-Line Work

Cutler-Hammer, Inc., Milwaukee, Wis., has developed an a.c. across-the-line automatic motor starter, combined with a fusible disconnect switch. The whole equipment is inclosed in a steel case. This new starter, the company states, may be used in place of the separate starter and fusible disconnect switch, saving space, simplifying installation and presenting a more pleasing appearance. Features noted by the maker are: a wiring channel between the back of the case and the starter panel allows the connecting wires to be run behind the panel where they will not interfere with the operation of the starter; ample room is provided at the top to bring all of the connecting wires in at either the top or the bottom of the case, according to installation requirements; and all parts are mounted on a back plate, which is easily removed for pulling and placing of line and motor wiring.



Cutler-Hammer A.C. Motor Starter

The disconnect switch is manually operated from the outside of the case. A cover interlock prevents opening the cover when the switch is closed, and prevents closing the switch if the cover is open, unless the interlock is manually released. An electrical interlock, it is claimed, insures that the magnetic contactor of the starter is always open when the disconnect switch is open. Fuse clips are mounted on a slate base, just below the disconnect switch.

Protective Hat Offered For Mine Use

The Mine Safety Appliances Co., Pittsburgh, Pa., has placed on the market a safety helmet designed to protect the wearer against head injuries from falling materials. The hat is said to be light in weight and durable and the company states that it is particularly

Mine Safety Appliances Protective Hat

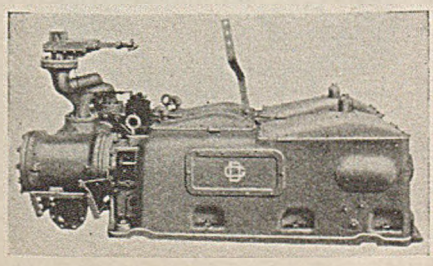
valuable for use in coal mines. Other features claimed are that it is absolutely waterproof, well ventilated and strong enough to withstand heavy blows. It is manufactured in standard hat sizes.

Twin Rotary Drilling Engine Has Roller Bearings

A 12x12-in., twin, roller-bearing, rotary drilling engine, designated as Model DEB and designed to operate with a steam pressure of 350 lb. per square inch, has been developed by the Gardner-Denver Co., Quincy, Ill. Dimensions are: length, 9 ft. ½ in.; width, 6 ft. 5 in.; height, engine proper, 3 ft. 11⅝ in.; over-all height, 4 ft. 7¾ in. Total weight of the engine installed is 14,000 lb. The equipment is designed, the company states, so that it is light and compact for its high steam pressure.

Features claimed are: all moving parts inclosed in a dirtproof case; access to the interior provided by dirtproof covers on the top and hand holes inside

Gardner-Denver 12x12-in. Twin Rotary Drilling Engine

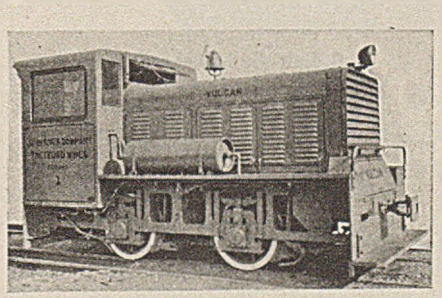


the case; base is cast integrally with the case, and rigidity is added by toe pads at the crank ends; special-analysis semi-steel is used in the steam end; crankshaft, 6½ in. in diameter, is made of a special alloy-steel forging ground to size and mounted in heavy-duty roller bearings supported by pedestals cast in the base; shaft expansion is taken care of by bearing mountings which allow one end of the shaft to be stationary while the other end floats; moving parts are counterbalanced; reciprocating parts are made as light as possible, allowing rapid acceleration from rest or when the direction of drive is reversed; balanced valves aid frictionless movement; splash system lubricates moving parts; pressure system lubricates main bearings, and a mechanical lubricator oils the steam end proper.

Gas-Electric Locomotives For Industrial Use

A new line of gas-electric locomotives has been brought out by the Vulcan Iron Works, Wilkes-Barre, Pa. The 12-ton type illustrated is powered with a 120-hp. Buda six-cylinder gasoline engine, direct-connected to a 250-volt d.-c. shunt-wound generator for furnishing current to two Westinghouse mine haulage motors geared to the axles. The Vulcan company states that it is prepared to furnish locomotives of the 4-wheel type in sizes from 10 to 40 tons, and in the 8-wheel types in sizes ranging from 20 to 80 tons. All practicable gages may be had.

Locomotives are supplied with a combination throttle and motor control. The speed handle of the controller controls



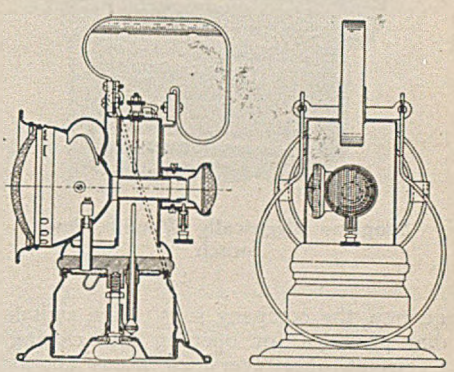
Vulcan 12-Ton Gas-Electric Locomotive

the electro-magnetic switches, operates the engine throttle, regulates the field excitation, and the starting acceleration and speed of the locomotive. A separate reverser handle is provided for connecting the motors in series or parallel positions and for reverse or forward directions. Movement of the speed handle from the "off" to the "pump" position speeds up the engine for operating the air compressor without running the locomotive.

Under dynamometer tests, the company says, the 12-ton locomotive has developed a drawbar-pull of 8,000 lb. at 3 m.p.h. Maximum speed of the machine is 18-20 m.p.h. Advantages claimed for the gas-electric locomotives are: unlimited mobility and availability; uninterrupted transmission of the power to the drawbar at all times; more rapid and steadier acceleration of the load; automatic adjustment of the speed to the load; simple control; low maintenance, and long life.

Signalman's Lantern Offered

The National Carbide Sales Corporation, New York City, now offers a lantern equipped with a double rear signal for the use of maintenance men on track. Construction of the rear



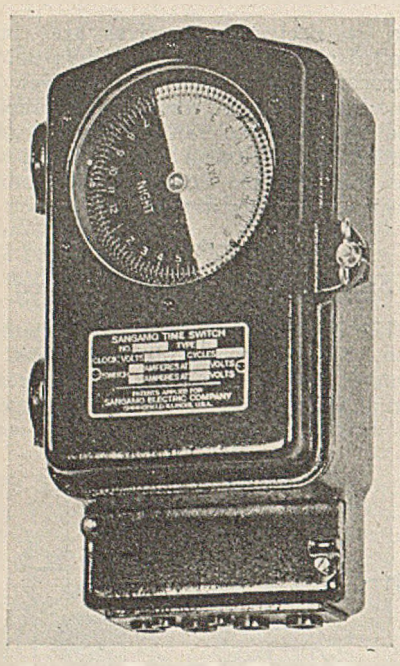
Side and Rear Views of the Signalman's Lantern

lenses is such that they can be seen for long distances, the company asserts, and the rear light may quickly be changed from red to green, or vice versa, thus allowing its use in the replacement of any signal which may be out of use temporarily. A safety locking device is provided which prevents either of the colors, when once set, being changed by an accidental blow or movement of the lantern. The lantern shows at the front a white beam of light, said to average 75 to 80 candlepower over a period of eight hours.

Time Switch Electrically Wound

An electrically wound time switch is now offered by the Sangamo Electric Co., Springfield, Ill. Among the features set forth by the company are: accuracy in time keeping; ability to operate through current interruptions; independence of frequency and voltage variations; adaptability to either a.c. or d.c. operation, and reasonable first cost. Electric winding, the company asserts, insures correct time and means entire independence of voltage or frequency variations on a.-c. circuits, as the induction motor serves only to wind the mainspring of the switch. The reserve power in the mainspring, it is claimed, is sufficient to operate time and switching mechanisms through current interruptions up to 18 or 20 hours, if only two switching operations are necessary.

Sangamo time switches are available for any commercial voltage and fre-



Sangamo Electrically Wound Time Switch

quency, the company says. The switch dial provides for opening and closing a circuit once every 24 hours or as often as every 15 minutes over a 24-hour period, depending upon the number of pins placed in the time dial.

Speed Reducers Announced

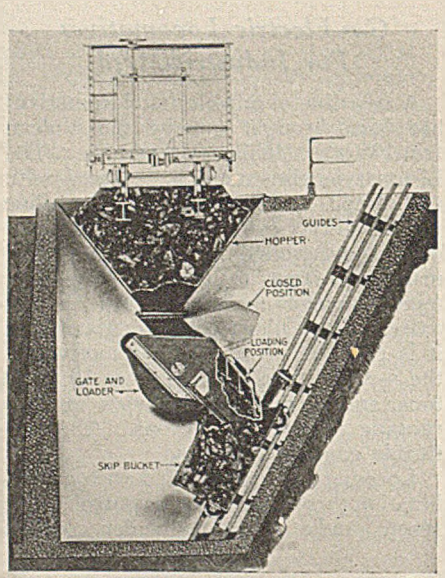
A new line of anti-friction speed reducers, known as the IXL "Titans," has been placed on the market by the Foote Bros. Gear & Machine Co., Chicago. The reducers, available with either herringbone or helical gears, as desired, are said to be sturdy, durable, quiet, free from vibration, and to transmit power smoothly and with high efficiency. Ability to stand up under severe operating conditions where shock and overload are present also is claimed for the equipment. Both types, it is stated, are identical in design, with the exception of the gears and slight bearing modifications. The helical reducers, however, have some advantages over the herringbone type, according to the manufacturer. Helical gears may be heat-treated, so that it is possible to obtain horsepower ratings 25 per cent higher than with herringbone reducers of the same sizes.

"Titan" reducers are made in both single- and double-reduction types. With herringbone gears, the types are "SB" and "DB." Helical types bear the designations "SX" and "DX." General features of the line, as noted by the company, are: close-grained, gray iron cases, treated to prevent flaking; bearings ribs for rigidity; ribbed upper case to prevent longitudinal vibration; accurate machining between halves to eliminate gaskets; splash lubrication; oil return grooves; SKF bearings on high-speed shaft and Hyatt roller bearings on slow-speed shaft; and standard ratios, applying to all sizes for each type of reducer, thus reducing parts.

Ratios of 2.87 to 9.9 are available on the single-reduction units, and on the double-reduction types, ratios may be obtained from 9.95 to 96.2. Efficiencies, according to the company, range as high as 98 per cent for low ratios in the single-reduction units, and go up to 96 per cent for low ratios in the double-reduction types.

Full-Bucket-Control Skip Type Added to Loader Line

The full-bucket-control type loader has been added to the line of automatic loaders for use with skip hoists of the Link-Belt Co., Philadelphia, Pa. In



Link-Belt Full-Bucket-Control Skip Loader

principle, the machine consists of a swinging plate so arranged that unless material is flowing through the chute in sufficient depth to maintain electrical contact, the skip hoist will not operate. In other words, there must be sufficient material in the hopper to fill the bucket.

When the bucket reaches the loading position, the loader permits the material to flow from the hopper until the bucket is full, whereupon the mechanism causes the bucket to be hoisted and moves the loader into its closed position. Here the loader stays while the bucket travels to the emptying point and returns to the loading position. The bucket continues to load and empty automatically as long as there is sufficient material to fill it.

Tools for Small Pipe

A new pipe threader—the No. 001 "Chip Chaser"—for ¼- to 1¼-in. pipe, and a new "Chip Chaser" reamer have been announced by the Oster Mfg. Co. and the Williams Tool Corporation, Cleveland, Ohio. The new threader is said to include the improved open-type die head, which allows unusual chip clearance and makes it easy to oil the pipe. Four die heads—½-, ¾-, 1- and 1¼-in.—accompany the threader, and the ratchet, the makers state, is built into the handle where it will be out of the way and at the same time allow the operative to reserve it or put it in neutral position with a flick of the thumb.

The new reamer is said to fit the No. 00 ratchet handle made by the company. It is fitted with three reaming blades. Sturdiness and instant removal from or attachment to the ratchet handle are features claimed for the device.

New Pressure Regulator Is Small in Size

A new, single-pole, pressure regulator, said to be exceptionally small in size, is now being made by Cutler-Hammer, Inc., Milwaukee, Wis. This device, designated as Bulletin 10,006, can be used as a starting switch for motors up to 1 hp., the company remarks, or as a pilot switch in the control circuit of automatic starters for larger motors. The regulator closes the circuit at low pressure and opens the circuit at high pressure. It can be adjusted, it is said, to open the circuit at any pressure from 30 to 100 lb. per square inch.

It can be used, according to the makers, for maintaining pressure on systems containing water, air, gas, and other similar fluids. For air compressor service, a small unloader at the side of the case removes back pressure. The inclosing case is black japanned to withstand moist atmospheres, and metal working parts are cadmium plated. Double brake, silver contacts are said to prevent pitting and insure good contact. The diaphragm is of rubber. Conduit knockout holes in the case are designed to facilitate wiring.

Cutler-Hammer Pressure Regulator