COAL AGE

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

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Unionization by Fiat

ONCE MORE a weary round of Congressional hearings threatens the bituminous coal industry. Senator Davis and Representative Kelly, of Pennsylvania, are in the forefront with proposals which have been hailed by organized labor with fervor equal to that displayed for the Watson bill in 1928. Representative Lewis, of Maryland, is working on another and more elaborate plan to promote stability in operations, guarantee existing legal rights to the workers and safeguard a "reasonable living wage."

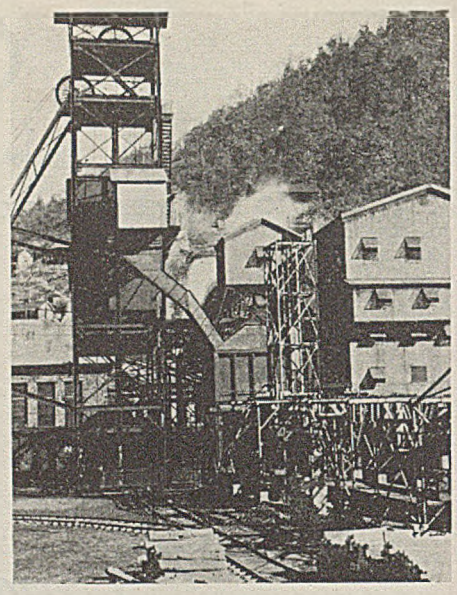
TO THE THEORY that any proposal indorsed by organized labor must automatically be rejected by the employers *Coal Age* cannot subscribe. That the union may sponsor a worthy measure is no more inconceivable than that selfish and short-sighted interests may range employers behind an unworthy one. Group indorsement may make a proposal suspect, but valid opposition should rest upon firmer ground than dislike of sponsorship.

THE Davis-Kelly bill would create a Bituminous Coal Commission empowered to grant dispensations for engaging in practices which otherwise might be construed as violations of the anti-trust statutes. The price of this tempting indulgence would be not only submission to an undefined supervision by the new federal agency (in itself highly objectionable, since it involves a further undesirable extension of government activity in the field of private enterprise) but also the definite surrender of the rights of the employing mine owner to operate open shop.

WITH THE RIGHT of the worker to organize for collective bargaining there can be no just quarrel. Such a right should be inherent in our industrial system. But the right of the prospective employer to refuse to deal with workers except as individuals is no whit inferior. This latter right the proposed bill would destroy, and offer the bribe of special privileges under the Sherman law to make destruction acceptable to the employer.

UNIONIZATION by legislative fiat is vicious in principle and dangerous in practice. Instead of economic penetration of unorganized fields, it invites industrial strife. Moreover, the bill as drawn affords no protection to the public. Enjoyment of the special privileges conferred is subject only to the finding of the commission that these are "not against the public interest as an unreasonable restraint of trade"; nowhere is any curb placed upon labor drunk with new power.

COSTS REDUCED; + Capacity Increased By Carswell Improvements



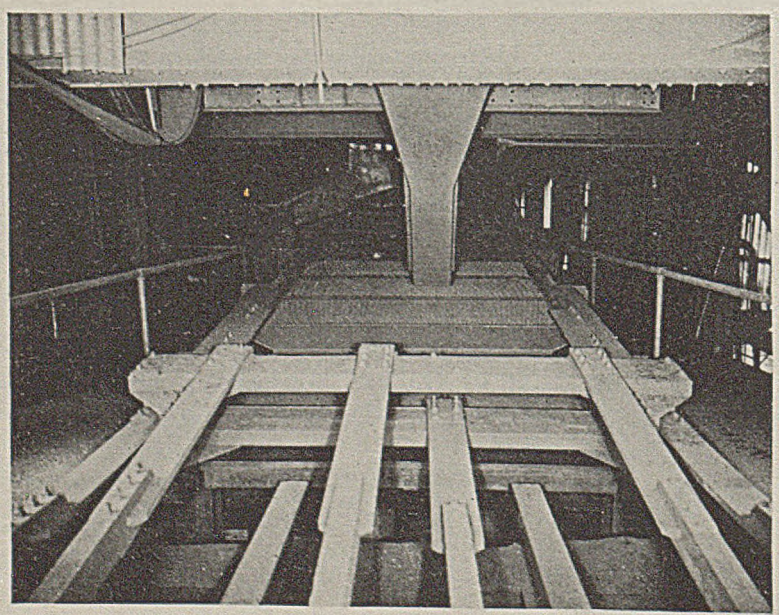
No. 3 Coal Shaft Has Been Converted to an Auxiliary. Mine Rock Hoisted on the Right-Hand Cage and Dumped Toward the Reader Slides Through the Diagonal Chute to the Tram Loading Bin

"KOPPERS is making Carswell its biggest mine," was the casual but expressive, remark which led *Coal Age* to seek first-hand information as to improvements being made following completion of the Rhéolaveur washer and aerial refuse tram put into service about two years ago. These later improvements preparatory to raising the daily production from 2,500 tons to 4,000 tons include installing at one sweep 475 new 5-ton cars of a design incorporating unique features; deepening and equipping one of the hoisting shafts for the exclusive handling of men, materials and mine refuse; and changing the main screen to raise its capacity from 350 to 800 tons per hour.

Carswell mine of the Houston Collieries Co. is located near Kimball, just off the main line of the Norfolk & Western R.R. in McDowell County, West Virginia. Two shafts, one 240 ft. deep to the Pocahontas No. 4 seam and another 300 ft. deep to the Pocahontas No. 3 seam, delivered coal to one tipple. Auxiliary shafts for handling men and materials were not included in the original layout.

The new plan, now completed, provided for shutting down the No. 4 workings, sinking that shaft 60 ft. deeper to the No. 3 seam, and making the No. 4 an auxiliary shaft. By relieving the No. 3 shaft of other duties this would increase its daily capacity for hoisting coal, and the change at No. 4 would provide a cheaper, more convenient, and a safer means of handling men and materials.

Parrish Screens Installed Directly Below the Main Screen Relieve the Latter of Separating Out the Slack



Work on the No. 3 shaft, which was sunk 60 ft. deeper, included replacing a wood lining that was sixteen years old. Untreated oak was used for the new lining. One of the two cages formerly used for coal hoisting was turned around so as to dump at the opposite side. Here a dump bin was erected and from it a chute was built leading directly to the refuse bin at the aerial tram loading station. Horns of the other cage were removed to make it a platform cage for hoisting men. Thus, one side is now used for hoisting mine refuse and materials, and the other side is reserved exclusively for men.

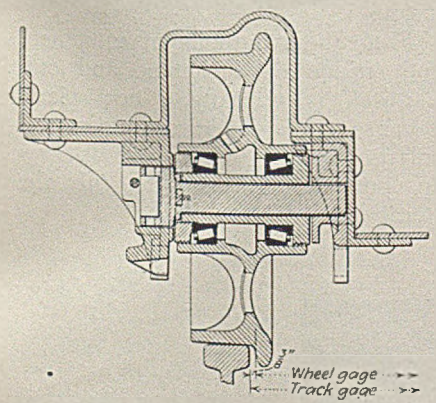
Although the haulage equipment consisted of cars averaging 3 tons, larger cars were desirable from the standpoints of lower mine cost and the increased capacity effected on the existing hoisting shaft. Dimensions of the shaft imposed fixed limitations of length and width, and the hand loading, which is the mine practice, imposed a practical limitation on height above rail. Accordingly it was of utmost importance to select a type of mine car which would have the maximum volume within the limitations of outside dimensions.

The old equipment consisted of 300, 76-cu.ft. cars—33½ in. high, and inside dimensions of 5 ft. 2½ in. x 10 ft. 9 in.; and 150 cars having the same length and width, but 39½ in.

Caging Time Was Reduced by Installation of Horn Preopening Equipment

high and having a proportionally larger capacity. The combined average loading for a day's run was 3 tons each. The new cars, with inside dimensions of 5 ft. 9¼ in. x 11 ft., have a level capacity of 135 cu.ft. and have been averaging over 4.5 tons. Their height is 35 in. above the rail. Over-all lengths of the old and new cars are the same.

The new cars, made by the Bonney-Floyd Co., are of stub axle construction and are equipped with a type of brake rigging of unusual design. Pulling up on the brake handle turns a narrow-face rope drum sufficient to



Method of Mounting Tapered Roller Bearing on Full Floating Removable Stub Axle

tighten two ⅜-in. wire ropes which, through the medium of revolving cams, force oak brake shoes apart and against the wheels. The brake pressure on all four wheels is equalized. Oblong holes for the camshafts equalize the two brakes of a pair, and the two pairs or sides are equalized by reason of the rope drum hanger bracket being pivoted so that the drum can swing to a position resulting in equal tension on the two ropes.

Adjustment to compensate for rope stretch and brake block wear is accomplished by changing the handle attachment bolts to a new set of holes in the drum flange. The oak blocks have 3x5-in. wearing faces and can be worn back 2 in. before they must be renewed. They are faced with steel at the cam end, and slide in guide channels which are perforated to drop out dirt that otherwise would accumulate. The ⅜-in. cables, which are 6x19 galvanized plow steel, pass over protected sheaves mounted each side of the bumper at the bottom corner of the car.

The cars are 44-in. track gage and 44-in. wheelbase, and are equipped with lift endgate front and vestibuled rear. Drawbar bumpers at the rear end are equipped with compression and tension springs allowing 2 in. of cushion each way. Car sills are two Z-bars, unbroken for housing axles, but strengthened at the center by cast-steel truck frames riveted thereto. The car bottom between Z-bars is thoroughly clean and the only projections in the entire bottom are the four cast-steel wheel hoods on the flares.

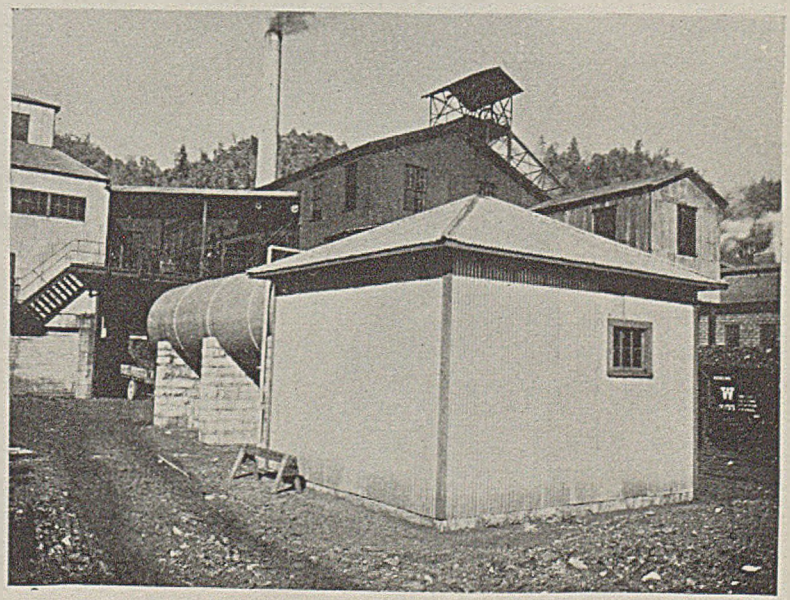
The 16-in. wheels, which are of cast molybdenum steel differentially heat-treated and equipped with Timken bearings, are mounted on an assembly of full-floating stub axle and axle sleeve, which permits quick removal without special tools. One large cotterpin locks the assembly. Wheel rims and flanges have a Brinell hardness of around 300, as compared to about 200 in the hubs which are machinable.

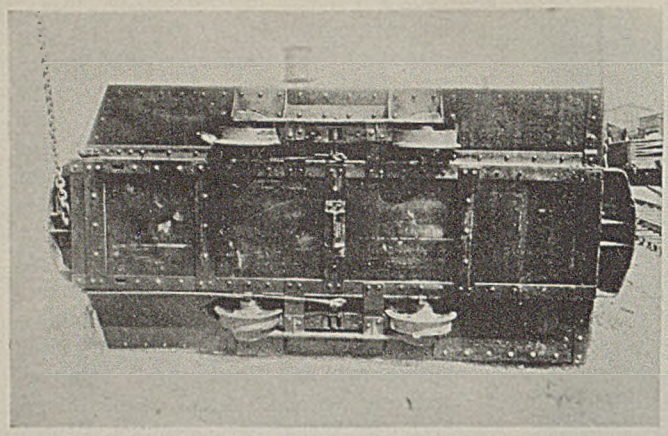
Outer frames of the trucks have integrally cast brackets which support the car bottom flares to the outer edge. The cast-steel wheel hoods serve also as a tie to stiffen the assembly of the two castings forming a side frame. The car body is of copper bearing steel. Stub axles, axle sleeves, wheel hoods, truck frames, bumpers, rope sheaves, cam, drum, handle, and endgate hook are cast steel.

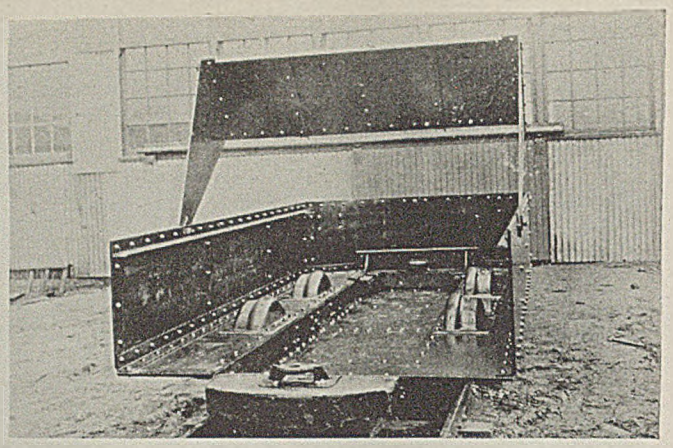
Another important transportation improvement was the driving of a diagonal haulway 4,500 ft. long to shorten the travel and eliminate a 3½-per cent grade against the loads. On this new stretch of track, the maximum grade was held to 0.75 per cent. During 1931, approximately 11,700 ft. of 40-lb. rail was replaced with 60-lb.

Installation of new cars averaging 50 per cent more tonnage per car, in itself increased the hoisting capacity.

Storage Tank and Building in Foreground Handle and Mix Liquid Calcium Chloride







Left—The Pair of Wheels on a Side Are Mounted Between Inner and Outer Truck Frames of Cast Steel. The Outer Frame Has Integral Brackets to Support the Flares, and the Inner Frame Is Riveted to the Z-Bar. Wire Ropes Are Attached to the Brake Application Arms. Right—No Pockets in the Bottom to Retard or Prevent Clean Dumping

A second advantage was gained by installing new caging equipment consisting of high-speed automatic gravity feeders with a horn preopening arrangement made by the Fort Pitt Mine Equipment Co. A third change under way is the installation of a new steam hoist of higher power to replace the original steam hoist which is too small. Steam is to be used instead of electricity because the large motor for an electric hoist would demand the installation of additional generating capacity. Existing boiler equipment should handle without difficulty the small additional steam load which will be imposed by reason of the larger steam hoist.

Tipple screening capacity was increased from 350 to 800 tons per hour without extensive changes or additions to the structure. The conventional type of shaker screen was rearranged to make but two separations. The upper section takes out all below 4 in. and the lower section divides the remainder into two sizes; 7-in. lump and 4x7 egg.

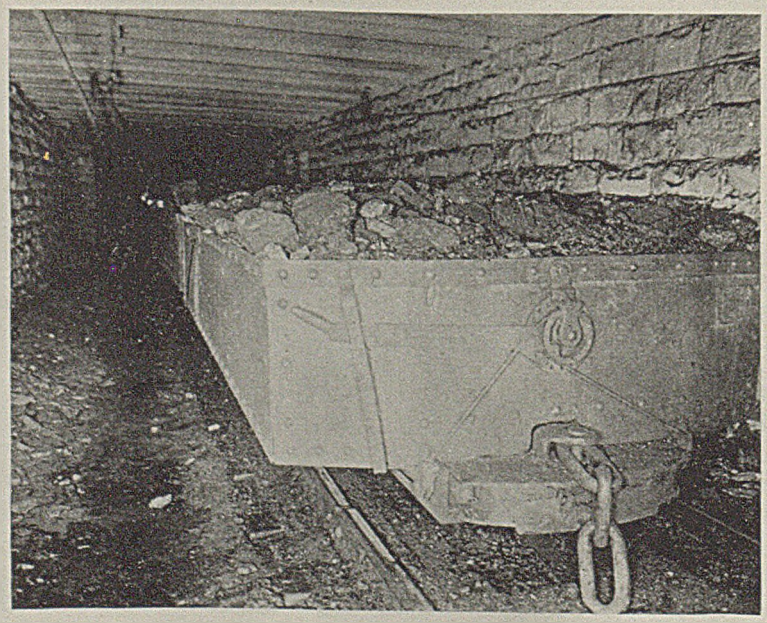
To remove the ½x0 slack from the "through-4-in." coming from the first section of the main screen, Parrish type screens were installed directly below the main screen. The 4½x0 product from these Parrish screens goes to the Rhéolaveur washing plant (described in *Coal Age,* Vol. 35, p. 224). A preliminary separation through 1-in. holes is made on the top deck of the Parrish screen. The two decks are driven from one eccentric shaft which in turn is driven by a 30-hp. 220-volt motor with multiple V-belt connection.

Another improvement at Carswell mine represents the first of its type in the Pocahontas field. It consists of storage and mixing equipment which enables the coal company to purchase calcium chloride in liquid form and in tank car lots. A 12,000-gal. storage tank has been installed for the concentrated liquid. In a building adjacent to it is a 6,000-gal. mixing tank where water is added to lower the gravity of the chemical before it is pumped to the sprays on the loading booms.

Other equipment in the building includes a small centrifugal pump for unloading from tank car to storage, a high-pressure reciprocating pump for delivering to the sprays, and a tank stirring mechanism. Mechanical stirring equipment is provided also in the outside storage tank and this is driven from a shaft extending out of the building from the motor drive located inside.

From the standpoint of equipment both inside of the mine and out, Carswell is virtually a new plant. Because of its modern equipment and enlarged capacity the mine is now an outstanding operation of the Pocahontas field.

Loading of the New Cars Is Averaging 4.5 Tons



61 PER CENT CUT + In Entry-Driving Costs With Mechanized Loading

By P. R. PAULICK

Engineer, Hanna Coal Co., St. Clairsville, Ohio

SINCE May, 1929, the No. 9 mine of the Hanna Coal Co., at Fairpoint, Ohio, has passed progressively from the first to the last stage of mine-plant mechanization. Prior to that all the coal was loaded by hand, and the hand also was used to pick those portions cleaned on the surface. The competitive set-up had so developed that these methods could be viewed only as an impasse to economic progress, with mechanization the only way out. So the company committed itself to a straight-line program of complete mechanization, beginning at Fairpoint.

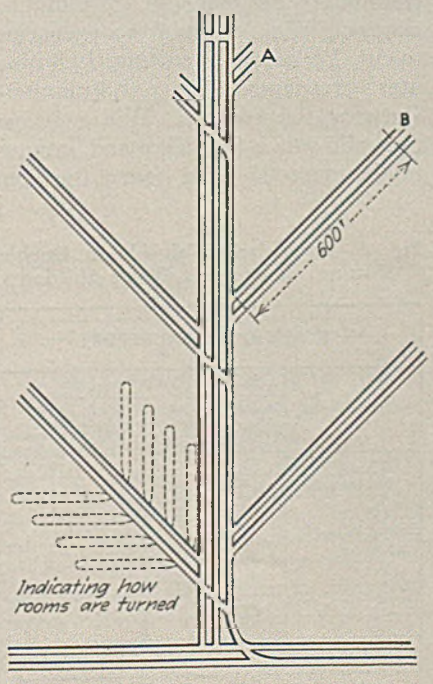
Several of the stages through which the work earlier passed have already been recounted. The first step was the installation of Duckbill shaking conveyors for entry driving (*Coal Age,* Vol. 35, p. 227). This equipment was operated in entries for more than a year, making an advance of over 29,000 lin.ft. Later the Duckbills were tried in room mining, but, after several months of experimentation, the work was abandoned and the units thenceforth were confined exclusively to entry driving, where experience had shown they reduced costs 29 per cent as compared with hand methods.

Development work having been mechanized with this degree of success, it was left to its own momentum for the time and attention directed to the use of loading machines for room mining. Details of this project are recorded in *Coal Age,* Vol. 36, p. 171, as also are those of equipment performance in the cleaning plant, which is no mere supplement to the mechanization plan (Vol. 36, p. 527).

A competitive test during the summer of 1930 led to the adoption of Myers-Whaley Automat loading machines. Three of these units are required for the mine's production from wide places. In view of what these machines had accomplished in wide places under conditions which are at best difficult, the management no longer continued satisfied with the cost improvement given by the conveyors in entries, and decided to try the loading machine in this work. Subsequently, performance records showed that mobile machines drove entry 61 per cent more cheaply than hand methods and ultimately led to the installation of two additional machines of the same type to replace the conveyors. The purpose of this article is to describe the approach to and development of methods for this phase of mine operation.

A brief review of conditions will give a broader appreciation of what is being attempted and accomplished.

Fig. 1—Entry Development Scheme for Mechanical Loading in the Fairpoint Mine



At first go, it is admitted that conditions in the Fairpoint workings are better than the average for the seam mined—the No. 8, or Pittsburgh. The coal averages 5 ft.; the slate seldom more, rarely less, than 12 in. thick. This slate, however, is such that part and sometimes all of it comes down with the coal, which is one reason for the Link-Belt Simon-Carves cleaning plant installation. In either event, the slate must be removed before each fresh cut is made and hauled to the outside. Incidentally, slate taken from the first three cuts in room necks is likewise taken to the surface for disposition.

To prove the feasibility of loading machines for entry work, one of the units operating in wide places was tried during the night shift in rooms narrowed to the width of a standard entry. This arrangement avoided interference with the regular day-shift operation. Along with these experiments, time studies were made and standards set up on the basis of full-time operation. These studies were not made haphazardly but in conformance with the best practice in industrial engineering. Included in this investigation were scientific and systematic determinations of labor crews.

Fig. 1 is a schematic sketch of a main entry showing room entries driven right and left from it. These entries are quartered; that is, they are driven at 45 deg. to the main. In turn, rooms are opened at 45 deg. to the entry from which they are turned. The idea of turning the places at this angle is to provide easy turnouts and thus to facilitate haulage.

One of the findings of the studies

was that at least five places must be made available in an entry under development if the loading machine is to perform efficiently. By reference to Fig. 1 it is seen that seven places are provided on the main entry, three on the main entry itself and two room-entry places on either side. The last turned room entries on the right and left are driven ahead by the mechanical loader until, and dropped when, the next succeeding room entries are turned, as at *A*. The time interval involved usually allows the main-entry loading machine to drive each room entry 600 ft., as measured from the main, or to *B*. No room necks are turned by this main-entry machine. That work is left to the second machine, which picks up the room entries and completes their driving from *B* on.

Following is the equipment used by each entry driving unit: one Myers-Whaley No. 3 Automat loading machine; one Oldroyd track-mounted cutting machine; one Goodman 5-ton cable-reel gathering locomotive; one Jeffrey A-6 post drill, which is carried on the cutting machine; one power-driven emery wheel, also carried on the cutting machine; and a number of small tools—picks, shovels, hammers, bars, etc.

An entry loading-machine crew consists of nine men and a foreman. The workers are: one loader operator; one loader operator's helper; two men on transportation; two men on cutting and drilling; one man on shooting coal and slate; two trackmen; and one foreman. This crew does all the work incident to putting the coal on the parting, including shooting, trimming and handling slate, and also the laying of track and switches.

The standard production set-up for this crew is nine complete entry cuts per shift of eight hours. This work yields 126 tons (74 cars) of coal and 20 cars of slate. Because of weak roof conditions, the entries are opened only 8.5 ft. wide. Cuts are made 9 ft. deep.

Standard times set for the loading machine in taking a cut of coal from an entry are: tramming, 5.5 minutes; loading coal (eight cars), 15.2 minutes; changing cars, 8.8 minutes—making a total of 29.5 minutes, actual working time. To this an allowance of 10 per cent was added for unavoidable delays and fatigue, making the total time per coal cut 32.4 minutes.

Standard times set for the loading machine in taking a cut of slate follow: tramming, 5.5 minutes; loading slate (two cars), 11 minutes; changing cars, 2.2 minutes. Adding to this the customary factor of 10 per cent for delay and fatigue makes the total time on slate 20.6 minutes. The combined time on coal and slate, therefore, is 53 minutes, and on this basis the loading machine should take at least nine entry cuts in eight hours.

When the loading machine was first placed in entry work, the cutting was done by a crew of two men, while the drilling and shooting were performed by two other men. Time studies revealed that the cutters worked only 67 per cent of the time cutting coal, and that the drillers worked only 66 per cent of the time drilling and shooting coal and slate.

By study the following time standards for cutting a place were set: tramming the machine, 5 minutes; changing bits, 3 minutes; preparing to cut, 1.8 minutes; cutting, 14.8 minutes; preparing to shear, 1.3 minutes; shearing, 4.5 minutes. With a 10 per cent allowance for delay and fatigue, total elapsed time for the cut amounted to 33.4 minutes, which would enable these men to cut 14.5 places in eight hours.

Standard times for drilling were: sharpening auger (four times), 1.6 minutes; preparing to drill (twice), 5 minutes; drilling coal (two holes), 8.4 minutes; drilling slate (two holes), 8 minutes; loading tools on cutting machine, 0.6 minute. Adding 10 per cent to this for delays and fatigue, the total time for drilling coal and slate per cut is 26 minutes. At this rate 18.2 places could be drilled in eight hours.

But as the loading machine would take only nine cuts in eight hours, whereas the cutting machine could cut 14.5 places and the drilling crew drill 18.2 places in that time, the combining of the cutting and drilling jobs was in order. In this new set-up only three men were required, who could both cut and drill a place in 59.4 minutes. This meant that the crew would have to work one hour overtime in order to prepare the nine places allotted to the loading machine, and a saving thereby was effected.

Recently a new method of cutting and shooting of entry cuts has been developed. The entries originally were cut on the bottom, sheared in the middle and two holes drilled in the coal, one on each side of the shear. Because of bad roof conditions, as already stated, the width of entry is limited to 8.5 ft. In an entry so narrow, it can readily be seen that neither sufficient nor regular clearance can everywhere be provided if sole reliance is placed on blasting to obviate tight places.

Because of this fact, it was decided to shear the entry places on the wide side, thus providing uniform clearance and a smooth rib on this side. With the type of cutting machine used in this mine, it is easy to do this. Furthermore, shooting of the coal is still accomplished with but two holes. One of the holes, drilled to a depth of 6 ft., is placed at the midpoint between ribs and just above the bearing-in bands which occur slightly above the middle horizon of the seam. The second hole is drilled on the tight rib to a depth of 9 ft.

In standardizing the work of the tracklayers detailed time studies were first made to determine what part of their work was actually necessary and how much of their time otherwise was wasted. It was discovered that these men could extend track in fifteen places in eight hours, which was six

(*Turn to page 103*)

PERFORMANCE AND DELAY REPORT

Company _____

Mine _____ Section _____

Date _____ Shift _____

Cuts Loaded _____ Cars _____

Loader _____ Hours Worked _____

DELAYS		MEN USED	
Cause	Min.	Operation	No. Men
Wait on empties			
Tight coal		Whaley operator	
Handle slate		" " helper	
Derailments		Motorman	
		Trip rider	
		Cutters	
		Trackman	
		" helper	
		Slatemen	
		Slate driller	
		Coal driller	
		Timberman	

Foreman _____

Fig. 2—Reasons for Low Production Are Spotted Through Use of This Report

Fig. 3—Particularly Valuable in Double-Shifting; It Prevents Blame Shifting

START AND STOP REPORT

Working Place	Condition of Working Face					
	Beginning of Shift			End of Shift		
	Cut of Coal	Cut of Slate	Cleaned Up	Cut of Coal	Cut of Slate	Cleaned Up
3 Face South	✓				✓	
4 Face South	✓					✓
25 East		✓			✓	
25 East crosscut			✓	✓		
26 East			✓	✓		

Foreman _____

AMERICAN MINING INSTITUTE

+ Studies Coal Types and Coal Property Valuations

Technical studies of coal, its value in the ground, preservation of the health of miners, roof support, and training of mine technicians kept coal-mining men busy during three days out of four of the 141st meeting of the American Institute of Mining and Metallurgical Engineers, held in New York City, Feb. 15 to 18

Scott Turner
Incoming President

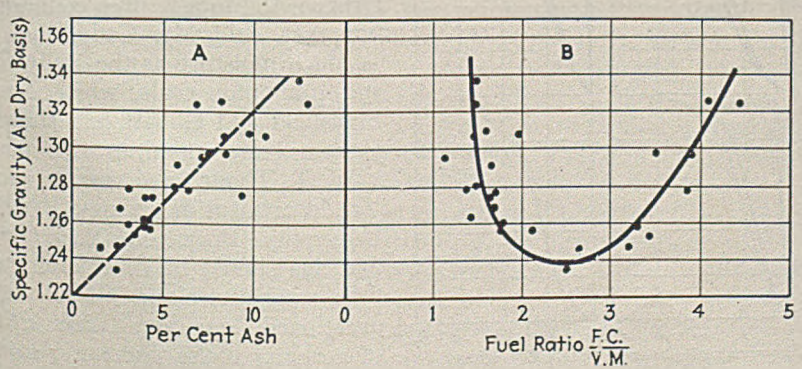
Physical Characteristics of Coals

MUCH aid in the classification of coals can be obtained from a study of their physical properties, declared C. E. Lawall, director, School of Mines, West Virginia University, Morgantown, W. Va., and C. T. Holland, research fellow in mining, of the same university, in a paper presented by the former. Their studies were limited to physical characteristics and to West Virginia coals. Friability studies had been made in a jar mill of 7¼ in. internal diameter and 7¼ in. deep, rotated 7,200 times at 40 r.p.m.

Crushing tests were made on blocks of coal cut by a crystolon grinding wheel. No. 5 block proved the strongest coal. Ten 3-in. cube blocks withstood an average of 4,893 lb. per square inch perpendicular to bedding and 4,208 lb. parallel to bedding. But some No. 5 block proved almost as weak under pressure as any. The weakest was the Freeport. Eight 3-in. cube blocks crushed at 1,682 lb. per square inch at right angles to bedding and 1,554 lb. per square inch parallel to bedding.

Specific gravities varied from 1.234, that of the Sewell, to 1.336, that of the Coalburg. Immersion in water did not change the order materially, the Sewell still being lightest, 1.290. Welch was the heaviest, 1.383 specific gravity. The authors point out that although the specific gravity increases approximately 0.01 for every per cent of ash, the relationship is so irregular that pure coal content cannot be determined from specific gravity. In general, the lightest coal has a fuel ratio of 2.5, but the point of divergence is not in any sense closely determined (see Fig. 1).

Fig. 1—Ash and Fuel Ratios of West Virginia Coals for Different Specific Gravities. *A* = Ash; *B* = Fuel Ratio



In discussion which followed, T. G. Fear, general manager, Consolidation Coal Co., Fairmont, W. Va., declared that powder shots shattered coal well beyond the depth of the shot. Those using the Joy saw had noted that until the working place was extended beyond the shot face at least three cuts (16 or 18 ft.), the coal still showed the effect of shattering.

That the Parr formula was as good as any for calculating "unit coal" was conceded by A. C. Fieldner, chief engineer, Experiment Stations Division; W. A. Selvig, chemist, Pittsburgh Experiment Station, and F. H. Gibson, assistant chemist of the same station, U. S. Bureau of Mines, in a paper on "Applications of Ash Corrections to Analyses of Various Coals."

To relate Washington coals to other coals of the United States, H. F. Yancey, acting supervising engineer, and K. A. Johnson, junior chemist, both of the Northwest Experiment Station, U. S. Bureau of Mines,

Seattle, Wash., have made tests of the friability, slacking, low-temperature distillation, agglutinating qualities, and chemical analyses of Washington coals and coals from other areas and plotted their results, thus relating friability to moisture content, calorific value and fixed-carbon content. These tests formed the subject of a paper presented for the authors by Mr. Fieldner. In discussion, H. G. Turner, Anthracite Institute, State College, Pa., declared that friability and hardness are separate qualities and should not be confused. A hard coal might be friable.

Moisture Studies for Coal Grouping

CERTAIN substances in coals are soluble in alkalis. Especially is that fact marked in those which contain much moisture. The substances extracted by alkalis are the same as those constituting the brown matter of the peat bog and are known as "ulmins." Coal that is low in moisture has little of such material, but even low-moisture coal will yield large quantities of ulmins after it has become oxidized.

Edgar Stansfield and K. C. Gilbart, Edmonton, Alberta, Canada, have been experimenting on this characteristic of coals and have found that quantity of ulmin dissolved depends on duration of heating process. A black coal of good storage quality, with 10 per cent moisture, a fuel ratio of 1.25 and a calorific value, with 9 per cent of ash, of about 11,000 B.t.u., yielded 6.9 per cent of soluble ulmins even when not subjected to heat. The same coal, heated for 2,712 hours at 105 deg. C. in air, gave up as much as 45.3 per cent of its substance as ulmins.

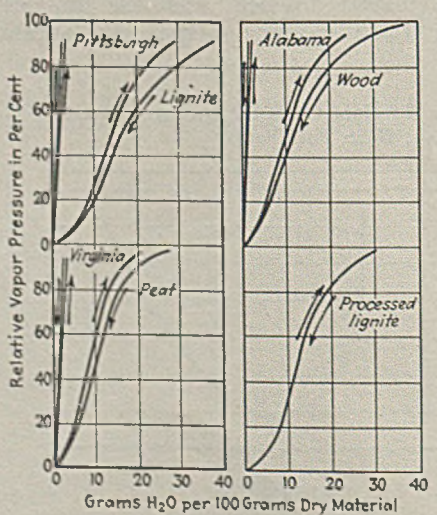
Where air is replaced by methane, the ulmin percentage does not increase as it does with air, because the coal is not oxidized. Thus the percentage, as already stated, is 6.9 without heating, but only 5.3 when heated for 72 hours, the temperature being 105 deg. C. This and the article by the same authors next considered were briefed at the meeting by F. E. Lathe, technical assistant to president, National Research Council, Ottawa, Canada.

"True moisture in coal," said Stansfield and Gilbart, in the second article, includes all the moisture the coal will retain in a saturated atmosphere, but excludes the free, underground water. The actual moisture in dry, well-ventilated mines may be less than the true or potential moisture, for some of the moisture of the coal substance may have been evaporated before the coal is mined. A study, therefore, was made to discover how a figure for the true moisture of any given coal can be obtained.

If the quantity of moisture retained for different humidities is plotted, and the curve extended to give the moisture retained at 100 per cent humidity, the figure for drying with 100 per cent moisture content can be deduced. The authors regard this extrapolated figure as measuring the true moisture content of the coal. They conclude that lower-rank coals should be classified on the moist-coal basis. For this, they add, the true moisture of coal in the seam must be ascertained.

Declaring that the present method of determination of moisture in coal may be satisfactory for all practical purposes, A. W. Gauger, professor of fuel technology, director of mineral industries research, Pennsylvania State College, State College, Pa., asserted that it represented nothing more nor less than loss of weight upon heating under certain conditions and not true water content. For scientific purposes it was not satisfactory.

Fig. 2—Water Retained by Organic Material at Various Vapor Pressures as Pressure Increases or Decreases



In heating coal, he said, (1) water may be given off; (2) gases such as methane, carbon dioxide and carbon monoxide may be lost; (3) coal may gain in weight due to sorption of oxygen and nitrogen; (4) loss of water or carbon dioxide from oxidation may cause coal to lose weight; and (5) moisture may still be retained by the coal.

Raw lignite, pulverized to between 80 and 100 mesh, said Mr. Gauger, had been exposed to atmospheres of carefully controlled relative humidities at constant temperatures until constant weight was attained. This weight was recorded, and the samples then were dried over concentrated sulphuric acid. Then the samples were exposed to the original relative humidities.

From these experiments the dehydration and rehydration curves shown in Fig. 2 were obtained. Zero moisture does not mean that all moisture has been removed from the coal but only that any which still remains is either combined water or adsorbed water possessing negligible vapor pressure. To remove the latter, the temperature must be increased sufficiently to raise the vapor pressure. To remove the former, its temperature must be raised to the decomposition point.

Mr. Gauger showed that, at any given vapor pressure, wood, peat and lignite had a positive lag—that is, they sorbed less water on rehydration than they had lost on dehydration. But the reverse is true of real coals like those from Alabama, Virginia, and Pittsburgh; after being dried, they have a thirst that makes them drink up more moisture than they possessed before being dried. Lignite processed by steam drying has no lag, the curves of dehydration and rehydration are identical. The colloidal mass in the processed lignite apparently has set.

No extractable ulmins can be dissolved from unoxidized Illinois coals, said G. H. Cady, senior geologist, Illinois State Geological Survey, Urbana, Ill., in a written communication, yet, said Mr. Cady, they had as much moisture as the Belly River and Edmonton coals, which Messrs. Stansfield and Gilbart had shown as yielding large quantities of ulmin.

W. T. Thom, Jr., associate professor, department of geology, Princeton University, Princeton, N. J., agreed that age should be considered rather than analyses alone. Mr. Gauger questioned Mr. Stansfield's manner of arriving at the true water content.

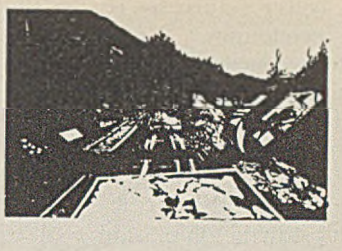
Coal in Reduction Industries

COALS in the ceramic, cement, and non-ferrous metallurgical industries need much the same qualities as coals for the ferrous metallurgical and gas industries, said Ralph H. Sweetser, consultant in blast-furnace practice, New York City, after listening to three papers discussing the needs of the several industries. As cement users in their specifications limit sulphate content to 2 per cent and as sulphate of lime is added to the clinker to control setting, there is a limit to the quantity of sulphur allowable in the coal; just what limit H. P. Reid, special engineer, Universal Atlas Cement Co., Chicago, did not specify.

W. E. Rice, associate fuel engineer, U. S. Bureau of Mines, Pittsburgh, Pa., put the sulphur percentage of the ideal coal for ceramic work at 1 per cent, but it was objected that 1 per cent should be a limit rather than a desideratum. Mr. Rice's declaration that a long-flaming coal was desirable was also questioned; convective heat gave more uniform values than a long flame. Mr. Turner said that anthracite, despite its lack of flaming qualities, which the author had commended as ideal for ceramic work, had proved at Hazleton, Pa., a most desirable fuel, making a clean, high-grade product at a cost that was reasonable within the anthracite market limits. Therefore, he would omit specifications favoring 36 per cent of volatile matter. A long reach of flame was unnecessary.

Coal of all kinds, said Clyde E. Williams, associate director, Battelle Memorial Institute, Columbus, Ohio, had been used hitherto for non-ferrous metallurgy; copper and zinc producers had to be governed in their selection by freight rates. Ash from coal settled on the copper in the furnace and destroyed efficiency. For lack of high-grade coal, specifications were almost unknown until natural gas and oil appeared. In general, ash content was limited to 8 per cent, and high-fusion ash coals were preferred.

For the manufacture of aluminum, low-volatile coal with a low ash is needed. Coke from coal is sometimes used, but coke from coal tar is preferable, because of low ash content. Some zinc refiners have used anthracite with an ash content up to 25 per cent. Poor coke also has been used by zinc furnaces, because the freight on the better article was excessive. It has been found, said Mr. Williams, in discussion, that pulverized coal gives a more uniform heat than oil.



Studies of American coals, said Mr. Thom, have made so much progress that soon it will be possible to agree on the basis for such classification.

Health for the Coal Miner

IN England, said R. R. Sayers, chief surgeon, U. S. Bureau of Mines, Washington, D. C., at the ventilation session, it had been noted that coal miners, after some years of exposure to coal dust, suffered from shortness of breath, but not from silicosis. It is believed that the cilia on the bronchi are destroyed. Where there is much coal dust, bronchitis follows.

In Fairfield Hospital of the Tennessee Coal, Iron & R.R. Co., the number of men who die from pneumonia, in proportion to the number employed by that company, is greater in the case of iron miners than in the case of coal miners, but, of those affected, the coal miners have the greater percentage fatality, said C. H. Kibbe, director of sanitation of the company.

A. S. Richardson, ventilation engineer, Anaconda Copper Mining Co., Butte, Mont., described a new fan with two pitch blades which, in the discussion, was said to give a 9.8-in. water gage, 290,000 cu.ft. of air per minute, and 83½ per cent efficiency. This fan is of the propeller type, from which it is not to be assumed that it has any close resemblance to the aeroplane propeller.

Though the ventilation code committee, with others, labored for some hours on the revision of the code, no action was taken, the work of completion being left to the newly formed health and safety in mining committee, or to some subcommittee later to be formed by that body. F. B. Dunbar, general superintendent, Mather Collieries, Pickands Mather & Co., Cleveland, Ohio, being chairman and J. T. Ryan, Mine Safety Appliances Co., secretary.

How Coal Properties Should Be Valued

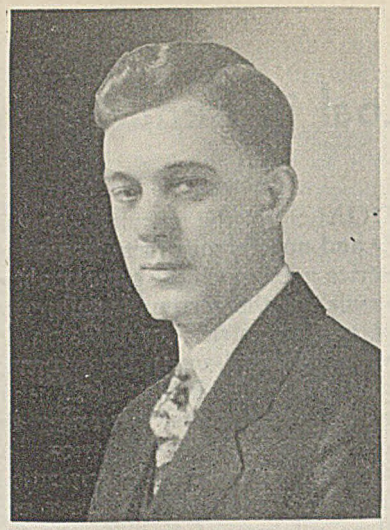
ENGINEERS, said H. N. Eavenson, consulting engineer, Eavenson, Alford & Hicks, Pittsburgh, Pa., at the valuation meeting, must abandon the idea that coal that will not yield a profit on mining is worth anything whatsoever. J. B. Dilworth, consulting mining engineer, E. V. D'Invilliers Engineering Co., Philadelphia, Pa., agreed that, if no profits reasonably were to be expected, the coal could have no value. Nevertheless, assets must be valued if only for insurance purposes, and stockholders are entitled to know that their money has been reasonably, if not profitably, expended.

A. T. Shurick, consulting engineer, New York City, declared that bankers would continue to rely on past returns on property rather than on any prospective profits that the engineer might see or think he sees, but the banker certainly desires to know whether the property is nearly worked out or faces a period of less profitable operation, or has not been kept in good condition or shows possibilities

of a better return by reason of further economies. Engineers should try to reconcile the physical with the earnings valuation. Eventually, of course, physical values are sure to be reestablished.

Discussing salvage, F. A. Jordan, Youngstown Sheet & Tube Co., Youngstown, Ohio, said coal equipment rarely had any salvage value, and F. F. Jorgensen, manager, Fairmont division, Consolidation Coal Co., Fairmont, W. Va., declared that man a wizard who could recover 5 per cent of real value in salvage, for by the time material was freed from its location, loaded and hauled to the surface, reloaded into railroad cars and shipped, what little value it has will have been absorbed in collection and transportation. S. A. Taylor, consulting engineer, Pittsburgh, Pa., agreed with Mr. Jordan as to the negligible value of salvage. He said he favored charging to assets everything used up to the date on which maximum production was attained and thereafter would charge all new material purchases, of whatever kind, to operating cost.

Reserves coming under discussion, Mr. Eavenson declared that all reserves in excess of 40 years were liabilities. Mr. Taylor said that coal lands around Pittsburgh must double in value every six years if they are to return to their owners what they cost them in taxes and interest, figuring the latter at 6 per cent. In considering what physical properties should be evaluated, Mr. Eavenson said that he did not regard rails as fixed assets. Others might, but many put all charges for rail into operating cost. Even some houses might have to be similarly absorbed. Houses which had been erected under his supervision had been charged off in that way, because they assisted merely in retaining the men who would otherwise have been disposed to move to larger communities. After the coal was extracted the houses would have no value.



T. G. Fear
Chairman, Coal Division

Support for Mine Roof

BACKFILLING is less general in American mines than in those of Europe, declared Lucien Eaton, consulting mining engineer, Roan Antelope Copper Mines, Boston, Mass., in discussing sand filling through pipes and boreholes, at the mining methods session. Mr. Eaton compared the merits of filling by hand, water, compressed air, and a combination of the two latter. Hand-filling is costly unless labor is cheap, and the fill usually is incomplete. Disadvantages of the hydraulic method are cost of pumping water to surface in deep mines and pipe wear.

Compressed air will handle coarse material up to one-third the diameter of the pipe, but has the disadvantage that pipe wear is excessive, especially at turns. Combinations of compressed air and water have the same disadvantages as either alone, but not to as great an extent. With compressed air the percentage of water can be reduced, thus lowering pumping cost and making possible a distribution of material through long lateral lines. Settlement of sand in low points of the line also is eliminated.

Local conditions govern the choice of the method to be used, Mr. Eaton declared. With shallow depths and adequate pumping facilities, the hydraulic system probably would be preferable, with the assistance of compressed air in long laterals. In a deep mine, compressed air should be used. Only with water, apparently, can sand be moved through boreholes, but if the mine is deep as little water as possible should be used. With a thick pulp of sand and water, compressed air may be needed to keep the sand mobile. Size of pipe usually is a compromise between first cost and maintenance. Size of material to be transported and cost of the pipe will determine upper limits, and velocity, with its attendant wear on the pipe, will determine the lower limit. Under most conditions, a comparatively thick pulp transported through rubber-lined pipe with pneumatic boosters at suitable intervals will give the best results.

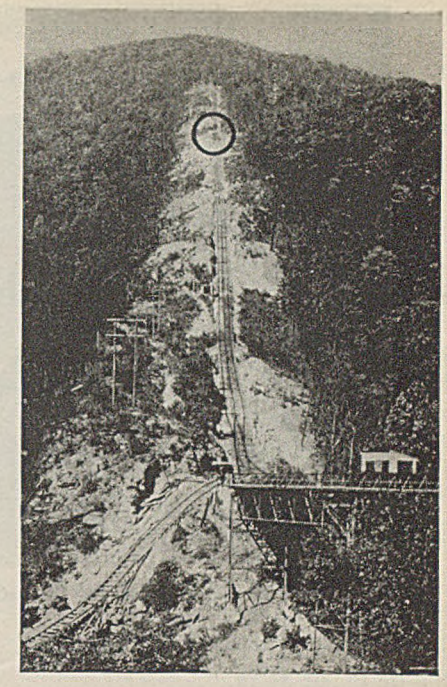
Recent research into roof subsidence and support was discussed by Geo. S. Rice, chief mining engineer, U. S. Bureau of Mines, Washington, D. C.

What Graduates Should Know

ABILITY to handle men is a prime requisite of the engineering graduate who in later life expects to fill an executive position, declared Eugene McAuliffe, president, Union Pacific Coal Co., Omaha, Neb., in an address presented at the session on engineering education. Consequently, the undergraduate should not only acquit himself well in his studies but should visualize himself as a potential manager called upon to distribute tasks, select men, and meet with banking and business leaders to discuss financial problems. Young engineers should be trained to follow production statistics and business indicators not only in their own industry and locality but in allied industries and in the country as a whole, or even in foreign countries.

A mineral industry education division of the A.I.M.E. was formed at a business meeting following the technical session. The division replaces the committee on engineering education. Officers of the new division were chosen, as follows: chairman, C. H. Fulton, director, Missouri School of Mines, Rolla, Mo.; vice-chairman, T. T. Read, professor of Mining, Columbia University, New York City; secretary-treasurer, A. E. Stevenson, Missouri School of Mines.

TOMORROW'S NEEDS + Visualized in Development Of New Tennessee Mine



Over a Mile From Top to Landing. In This Photograph the Passing Sidetrack at the Center (Shown in Circle) Appears as if It Were Near the Top

IN the early summer of 1931 the first coal was shipped from a new mine of Southern Collieries, Inc., in Tennessee with a tipple capacity of 2,000 tons per 8-hour day. At the end of last year, when the production had been brought to 500 tons per day and the purchase program for mine cars, locomotives, and mining machines had not been completed, approximately $365,000 had been invested in the new plant and mine development—and this includes no houses.

The mine, one of the Mahan-Ellison group, is at Coal Creek, on the Southern R.R., about 30 miles northwest of Knoxville. With the lease were acquired the houses of an old property where mining of the Coal Creek seam, which had been carried on since the "early days," was recently abandoned. The new operation is in a 3,000-acre tract of high-quality domestic red ash coal locally known as the Pee Wee seam. Although it lies high on the mountain, this large area of the coal is in one body.

The coal lies fairly level and the mining height is 4 ft. An undercut of 6-in. kerf in a rash leaves 3½ ft. of clean coal above. Over a part of the tract the top is slate and over the remainder it is sand rock.

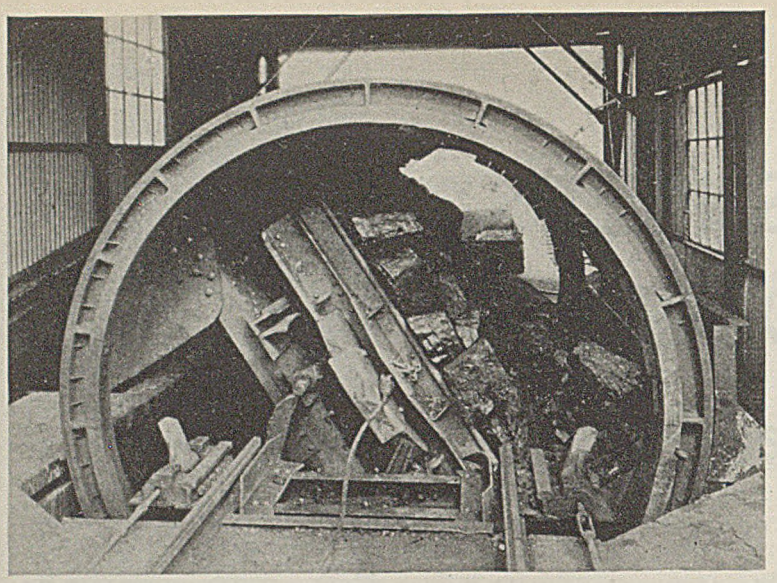
What method should be used in transporting the coal down the mountainside was the all-important question when considering the feasibility of opening the mine. Monitors operating on an incline were in disfavor because of degradation. A conveyor system, together with the man and material incline which, with its hoisting equipment would be necessary, would require a prohibitive investment because of the length of the haul.

The limitations of a mine-car plane with track, rope drum, and mine cars, all of the old standard, were recognized. Yet, with this type of haulage it would be possible to avoid the expense of a separate incline and its equipment for handling men and materials, and the breakage of coal would be held down to the minimum. Properly constructed track fitted with heavy steel, mine cars of large capacity with running gears of the highest type, an arrangement to prevent end spillage from the cars on the steepest grade, and the most efficient type of rope drum or incline machine and associated mechanism would eliminate most of the objections to this type of mountainside haulage.

Large-capacity cars appeared to be desirable from the standpoint of present standards for a hand-loading mine, and especially so from the standpoint of what might take place in the future as regards the possible adoption of some form of mechanical loading. Thus the question was settled: Use cars as large as possible and construct a car incline designed and fitted in the best possible manner.

The incline is one of the longest mine-car planes in use at a coal mine. Possibly it is the longest in this country or even in the world. It is 5,850 ft. long from top to landing, which is on a trestle leading to the tipple. Track grades, maximum and minimum, are 37 deg. and 15 deg., and the difference in elevation between top and landing is 1,600 ft. Where the grades change, vertical curves of long radius are necessary to prevent the ends of the cars dragging the ties. The normal level-track

The Screen Section B Operates at Higher Speed Than the Section A-C



Trips Are Not Uncoupled for Unloading in the Single-Car Rotary Dump

clearance of cars from the bottom to the tie is but 3½ in.

Regenerative braking with its inherent automatic speed control of the gravity plane incline machine is an important feature of the installation, principally because of the longer rope life that it affords as compared to speed control by hand-braking. Other advantages are saving of brake-band wear and the credit for power returned. The motor drive is necessary, of course, if men and materials are to be handled when cars loaded with coal are not available for lowering to the tipple. Regenerative braking is also a safety factor because of the less severe maximum strains on the rope and because of the speed-limiting feature.

The incline machine is a "Mill-holland" of the two-sheave horizontal axis type with the rear sheave geared without clutch to a 500-hp. Westinghouse 2,300-volt 443-r.p.m. slip-ring induction motor. Each sheave, which is 10-ft. in diameter, has seven grooves and the rope makes six loops or turns around the pair. There are two brake bands on the outside edges of sheave, a total of four brake bands in all. Brake drums and sheave are of one-piece cast steel. This integral construction should eliminate trouble from unequal expansion due to brake drum heating, as has been experienced in certain cases where the parts are bolted together. However, with normal use of the motor for braking, there should be little use of the brake bands.

The rope is American Steel & Wire 1⅜-in., 6x19 Lang lay plow steel, and the quantity required is 6,350 ft. The rated trip is six steel mine cars each loaded to approximately 5 tons. At the low capacity now required, but four cars are being handled per trip. Normal rope speed is 1,200 ft. per minute. The power regenerated when four loads are going down and four empties coming up varies between 100 and 300 kw. Assuming that the remainder of the mine power load is always large enough to absorb the regenerated power without any of it being returned to the power company line through a ratchet-equipped meter, then the regenerated power value amounts to approximately 1¼c. per ton of coal lowered on the plane.

Remote control of the incline machine is handled from an elevated station located 178 ft. therefrom. From this station the operative has a clear view of the track and of the landing, over a mile distant. The sheave brakes are operated through the medium of a steel cable terminating at a handwheel located beside the master control of the motor. If the operative lets go of the handwheel, the brakes set by gravity. Bumper posts at the knuckle also are controlled by means of a lever in the pilot house.

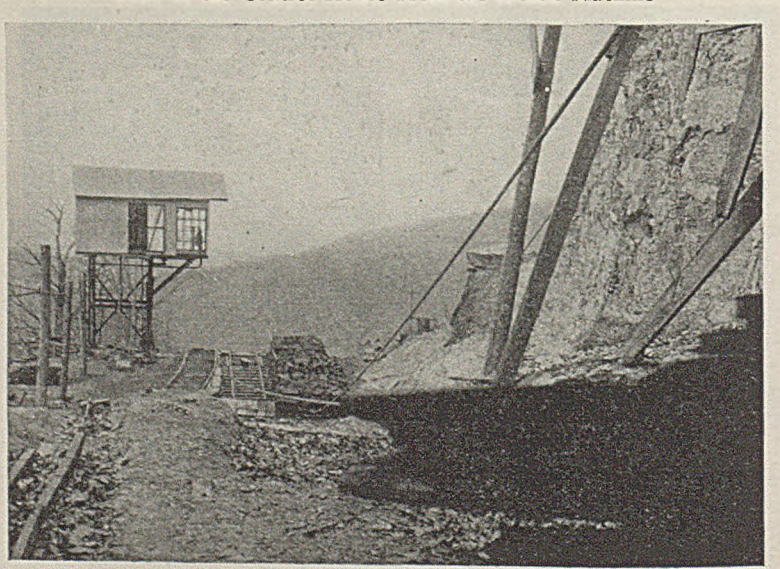
In front of the operative is a zero-center indicating wattmeter and an electric tachometer calibrated in feet per minute rope speed. In starting a trip the operative first releases the mechanical brake, then moves the master control a notch or so to the load lowering position. As soon as the loaded trip moves over the knuckle and begins to coast, the operative cuts the power off temporarily. When the tachometer indicates that the coasting has gained a rope speed of 1,100 ft. per minute, the operative quickly moves the master-control handle to full forward position, which connects the motor primary across the line and cuts out or short-circuits all of the rotor resistance.

The motor is equipped with a speed-limit device which will disconnect it from the line in case of a certain per cent of overspeed. This is not a safety device but rather is a protection to the rotor windings against excessive centrifugal force. In such an emergency, the operative must release the handwheel and allow the mechanical brake to bring the equipment to a stop. A magnetic brake is not included in the equipment.

Sixty-pound rail is used on the incline which is of the conventional three-rail type with passing tracks at the center. The incline complete cost approximately $44,700 and the incline machine, installed, with auxiliaries, cost approximately $29,800.

A steel trestle 384 ft. long leading

View of the Control House From the Incline Machine



from the incline landing to the tipple cost approximately $14,800. It is 80 ft. high where it crosses the creek. A single rope haul handles the trips over the trestle to the rotary dump and back over the same track to the landing.

The tipple, built by the Morrow Manufacturing Co., is of steel with concrete floors and is covered with Armco galvanized iron. It spans four loading tracks and is rated at 250 tons per hour. There are three 34-ft. hinge-end booms each with 16-ft. flat sections for picking. The block boom is 5 ft. wide; the egg boom, 4½ ft.; and the nut, 4 ft. The fourth loading track is equipped with a slack chute.

Screening is done on a unit divided into two sections operating at different speeds. The main and egg screen is driven at 108 r.p.m. and the nut-and-slack screen at 140 r.p.m., both from one 40-hp. motor. This, and two other motors, one 5-hp. on a refuse conveyor and one of the same size on a rescreened slack conveyor, have multiple V-belt drive connections. One 5-hp. and two 3-hp. motors operating the loading booms are equipped with flat belt drives. The tipple motors are 220-volt.

Mine cars are unloaded at the top of the tipple in a single-car Roberts & Schaefer rotary dump which is electrically driven and makes a complete revolution. The drive is a General Electric two-speed 7½-hp. induction motor with magnetic brake. High speed is 720 r.p.m. and low speed 350 r.p.m. By automatic switching of the motor to the low speed, near the end of the revolution, regenerative braking comes into play, slowing the dump ready for the final automatic cut-off of power and closing of the magnetic brake.

The cost of the tipple complete with foundations and grading was approximately $47,900.

That degradation of the coal is exceptionally slight is indicated by the following figures compiled from a record of shipments: 6-in. lump, 51 per cent; 6x2½ egg, 23 per cent; 2½x1½ nut, 8 per cent; 1½-in. nut and slack, 18 per cent.

Steel cars of essentially the same dimensions and capacity, designed and built by three different manufacturers, are being tried out. These cars are solid body, 7x12 ft. inside and are of the hooded wheel and hooded axle type. Sides and rear end stand 24 in. above the rail, but the front end has a 5-in. dashboard, making a total height of 29 in. The latter is to prevent spillage on the incline. The average capacity of the cars is about 124 cu.ft. and the loading of all cars is now averaging 4.6 tons. Cast-iron wheels, 16 in. in diameter and equipped with tapered roller bearings, are used. The cars have spring drawbars in the front end but are without brake. All cars are equipped with two safety chains for supplementing the swivel couplings when traveling on the incline.

Hooks were specified to be mounted on the ends of the cars for use in holding up the free ends of the chains after being unhooked from the other cars at the foot of the incline. It was found, however, that many of the chains came loose as the cars were rotated in the dump. As a result the original fitting has been replaced with a cast-steel "collar button" having the head flattened at a certain point on the circumference so that the safety chain hook can be slipped over the head only when held in one particular position.

The mine cars are held in the rotary dump by clamps which engage the top edges of the body. There are no angles or other fittings projecting from the car sides and, therefore, the outside width is greater than the inside width only by double the side-sheet thickness.

A rotary converter, and the few cutting machines and locomotives with which the mine has been equipped to date, were transferred from other mines. A new full-automatic control board was purchased for the converter. Disposal of mine rock is handled in a gravity-operated rotary dump mounted on a concrete foundation beside a short tramroad which leads from the mine portal to the top of the incline.

Mine workings are being developed for the room-and-pillar system, and when the rooms have been driven up on one side of the panel the pillars on that side will be brought back immediately.

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Mechanized Loading Cuts Entry-Driving Costs

(Continued from page 96)

places more than the loading machine required. The crew therefore was assigned the additional job of laying all the necessary turnouts and curves in the section, together with whatever miscellaneous trackwork might arise.

The work capacity per cut of the tracklayers follows: pushing truck from place to place, 5 man-minutes; cleaning slack off roadway, 8 man-minutes; taking off fishplates, 10 man-minutes; taking up track, 3 man-minutes; getting track material, 9.5 man-minutes; laying track, 10 man-minutes; blocking track (wood blocks), 7 man-minutes; taking sights, 5.5 man-minutes. These times, cumulative with 10 per cent for delays and fatigue, bring the total per cut to 64.3 man-minutes, or the work accomplishment per shift to fifteen places.

Rail used in mechanical loading places is of 30-lb. weight. The sections laid in extensions are of 9-, 18- and 27-ft. lengths. Room track turnouts (43-ft. radius) are of the standard ready-for-assembly type with thirteen interchangeable left and right steel ties. It takes only 4 man-hours of work to lay a unit of this type.

A daily performance and delay report which has been found to be quite useful at this operation is displayed in Fig. 2. It is the agency through which operating data are obtained and reasons for low production checked up. The start-and-stop report appearing in Fig. 3 has been developed to help the foremen on double-shift work in getting their men placed at the beginning of the shift. It avoids the need of the foreman to spend a half hour or so looking over the section to see where he should start his men. Alibis and blame shifting have been largely eliminated by this report. In the event that any question arises as to the responsibility of poor or improper work done on the section, left for the succeeding shift to clean up, a checking of the reports usually places the blame in the proper quarters. These two reports are likewise used in mechanical loading in rooms.

Results obtained from entry loading-machine units have been so satisfactory in the Fairpoint mine that a similar unit has been placed in operation for entry driving in the company's No. 6 mine, at Lafferty, Ohio. This move certainly was justified by the saving of 61 per cent over hand methods of driving entries which the loading machine has effected.

REFUSE DISPOSAL

At an Anthracite Mine

IN the piling of breaker refuse by conveyors, the shoulders of the dump cannot well be prevented from sloughing away after a rain, pulling the conveyor out of line and gradient. When this occurs, operation is delayed, parts of the conveyor soon become worn from misalignment, and the frequent necessity for realignment makes it necessary to have a number of men at call. It was to overcome this difficulty that The Hudson Coal Co. designed a refuse thrower consisting of a rotating impeller and casing which throws a continuous stream of breaker refuse.

From the highway between Scranton and Carbondale, Pa., which passes alongside the dump and under the conveyor which carries refuse to it, can be seen two refuse throwers delivering breaker refuse which, half hidden by the dump, look, from the distance, like two monitors throwing water for the hydraulicking of refuse. The discharge goes on hour by hour without a hitch, the breaker refuse flowing in a steady stream.

The material thus discharged has diameters ranging from 0 to $1\frac{9}{16}$ in. It is assembled at one end of the breaker and there discharged into what is known as a "pants weigher." This consists of a double pocket, each side of which resembles the trouser leg of a badly bow-legged man.

This weigher is balanced so that when one leg is filled with refuse it overbalances, bringing the other empty leg under the spout ready for filling. The first leg, in overbalancing, opens a large gate by which the contents of that leg is emptied onto a belt conveyor. The second leg, when filled, overbalances and brings the other leg under the spout. As soon as this side of the weigher is filled, its gate also trips, spilling its refuse on the conveyor just mentioned.

Thus the "pants weigher" rolls from left to right and right to left, each time taking on a load of refuse and each time discharging it on the belt, so that the quantity of refuse in weight can be determined by multiplying the determined weight of the refuse of one pants leg by the number of rockings, right or left, as measured by a counter.

The belt by which the refuse is carried to the dump is 30 in. wide and lies on a 17-deg. slope. It extends from the breaker across the highway to a 105-ft. tower near the edge of the field that is to be covered with breaker refuse. The belt can deliver approximately 300 tons per hour, if desired. The foot of the tower is already buried in the rock to a depth of 90 ft.

Up to and including the tower, everything is of a permanent character. The gantry is of steel, the roof of steel and amply high for travel. A walk-way is provided alongside the conveyor. At the tower this main conveyor dumps into a 200-ft. semi-portable conveyor, also 30 in. wide, that is supported on wheels. For this conveyor a substantial track has been provided. This track also is on a 17-deg. gradient, and the semi-portable conveyor resting on it can be pulled up the hill under power whenever that may be necessary.

Refuse dumped on this secondary conveyor is removed by two scrapers set at an angle to the belt. These scrapers are themselves strips of rubber belting. The first scraper takes much of the larger material, the second taking most of the rest. A little of the finest material falls off the end of the belt and extends the dump.

The refuse removed by the belting plows is arranged to fall on chutes on either side of the belt. Each chute discharges its refuse into the interior of the impeller of the refuse thrower, which resembles a small, narrow, but sturdy, radial-bladed, 30-in. diameter fan, with each blade 9 in. long, $3\frac{1}{2}$ in. wide, and $\frac{3}{4}$ in. thick. This impeller revolves within a scroll and has two side plates. The blades, where they tend to run on the scroll, are hardened by Stoodite, an alloy made by the Woodyear Co., Whittier, Calif. The refuse is thrown at an angle of 45 deg. and has a trajectory of 45 to 75 ft. depending on the speed.

The scroll naturally is subjected to some wear and, if there is any tramp iron, to breakage also. As the mine and railroad tramp iron is removed from the coal in the breakers by means of magnets, the only iron that would get into the thrower would be an occasional piece which got past the magnets. Consequently, there is little risk of breakage.

In order to take up wear, the plates, of which the scroll is composed, are made of chilled cast iron and relatively narrow. They are arranged so that they can be slipped around as desired with their ends in a groove which has been cut in the plates on either side of the impeller. It is a matter of a few minutes to slip out a worn or broken plate and put on a new one. They are so hard that little wear is experienced.

The impeller is driven through a Texrope by a 15-hp. carefully shielded alternating-current motor. The secondary conveyor, which runs out over the top of the dump, is covered by a large, half-round, galvanized, corrugated iron cover which protects it against heavy winds that would otherwise remove it from the troughing rollers.

The present conveyor system is arranged so that when the secondary conveyor has been advanced its full distance the permanent conveyor frame and belt can be extended, using the top of the pile as a support, leaving the drive machinery in the present location in the headhouse. The secondary can then be extended an additional 200 ft. There are three double conveyors in use altogether at the mines of The Hudson Coal Co., but so far only one of these is provided with refuse throwers.

The reference to the frequency converter at Loree colliery, on page 56 of the February issue should read: "At the Loree colliery frequency station purchased power at 60 cycles is used to supplement the 25-cycle alternating current generated at The Hudson Coal Co.'s stations. To do this it is necessary to change the cycle of the purchased power. A frequency converter has been installed to change 12,500-kw. at 60 cycles to 25-cycle current. The set is arranged for reversed operation.

NEW DRY CLEANER + At Virginia Mines Works Without Air

SMALL coal down to ½ in. is being cleaned without the use of air, water, or other separating mediums at two mines in Virginia. Separation of impurities is accomplished on a new type of mechanical cleaner which is constructed to take advantage of the fact that the refuse particles are flatter than the coal. The machines have mechanically operated gates which open and close according to a definite cycle of operation to allow the pieces of refuse to drop through the cleaning plate for removal. In addition, the regular opening and closing of the gates serves to clear the slots of wedged material.

In its simplest form, the new machine (Fig. 1) consists of a shaking plate with a series of large, rectangular openings. These openings extend across the full width of the plate and are fitted with pivoted gates that lie flush with the top of the cleaning plate when closed. When the gates are in a normal position, the lower edges are tipped down to leave slots through which the flat material slides before falling to the deck below. At the end of the downstroke of the shaking plate, the gates tip back momentarily to the closed position, thus clearing the slots of any material that may have been wedged therein.

The new picker was developed by W. W. Stevenson, superintendent of the Steinman Coal Corporation, to meet the need for a cleaner at the Steinman (Va.) mine. The machine

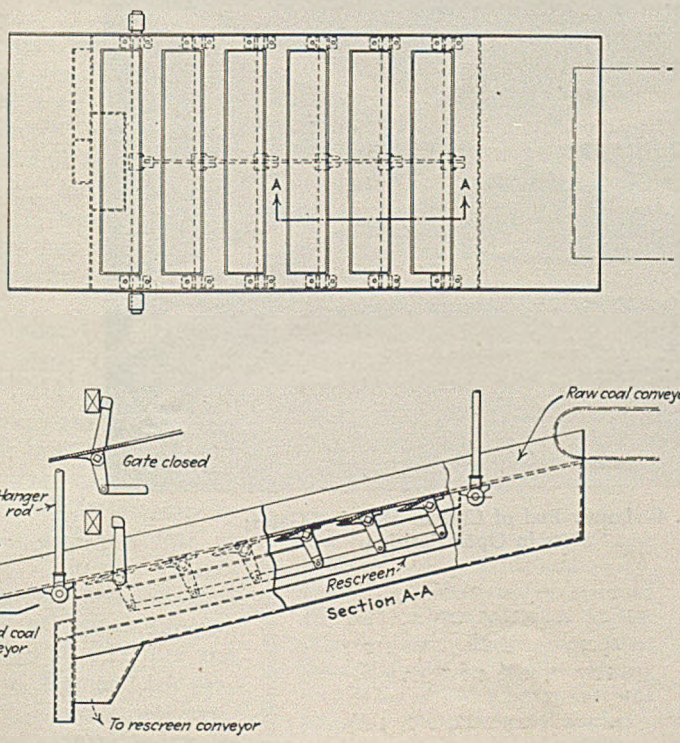


Fig. 1—The Simplest Form of Cumberland Cleaner

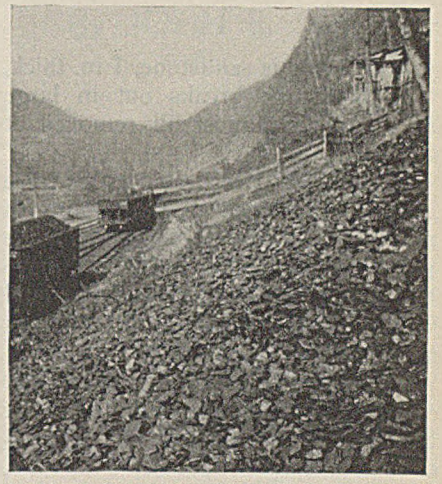


Fig. 2—Refuse From the Splashdam Cleaner, Showing the Flat Nature of the Material

at this mine, the first to be built, is employed in cleaning ½ x 2½-in. coal. Production of the mine, which is running at reduced capacity, is 500 tons per day. The 2½x½-in. feed is separated into 2½x1- and 1x½-in. coal for the actual cleaning process. Each size is cleaned on a separate section of the machine. According to the mine officials, the ash percentage of the 2x1-in. coal, which is cleaned on one section of the machine, is reduced 4.5, and the ash percentage of the 0x1-in. coal, of which the 1x½-in. portion is cleaned on the cleaning unit, is cut 1.5.

Steinman coal comes from the Upper Banner Seam, which contains three partings. One is a 1-in. slate binder of medium strength, while the second consists of 3½ to 7 in. of gray slate, also of medium strength; the

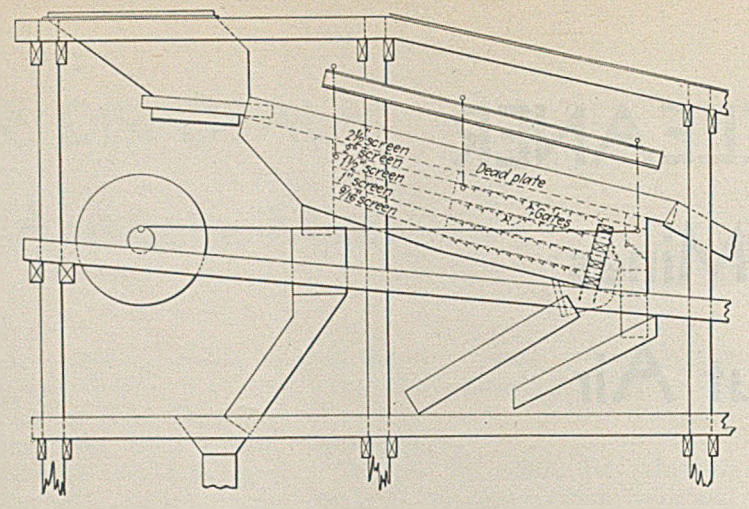


Fig. 3—Arrangement of Gate Areas on the Latest Cumberland Cleaner

third parting is sandstone, 1 in. thick. The sandstone breaks out in large slabs, and is almost all removed at the face.

Successful performance of the original machine at the Steinman mine induced Mr. Stevenson to make patent applications and these have been assigned to the Cumberland Coal Cleaning Corporation, Johnson City, Tenn.

The second Cumberland unit (Fig. 4) was put in operation at the Splashdam (Va.) mine of the Splashdam Coal Corporation, Sept. 15, 1931, and is cleaning 1½x½-in. coal from the Splashdam seam at the rate of 100 tons per hour. Actually, all the 0x1½-in. coal is fed to the machine, but the material under ½ in. is bypassed around the cleaning surface.

In discussing the installation of the cleaner at the Splashdam mine, Geo. J. Walker, manager of the company, said:

"Several competitors in the district installed cleaning plants, which naturally created a difficult situation in the sale of our coal. To meet this competition, we installed the Cumberland cleaner, and have retained our business without complaints. We have not made analyses to check the detailed performance, but by the simple test of catching and weighing refuse from the machine, we have determined that it is eliminating from the 0x1-in. slack approximately 600 lb. per 50-ton car. There is but little coal in the reject."

The Splashdam machine is 5 ft. wide and 20 ft. long, and weighs approximately 4,000 lb. It has a 5-in. throw, and is driven at 115 r.p.m. The equipment consists of a combination of screen plates and several gate areas. The lower gate area is shown in Fig. 4. To prevent damage to the machine in case a gate slot is clogged by tramp iron or several strong pieces of slate, heavy coil springs are added to the operating mechanism to relieve the individual gate until the obstruction is cleared by hand.

A multiple-deck arrangement designed to replace the original single-deck machine is shown in Fig. 3. Four gate areas arranged one above the other allow the cleaning to be done in four stages. Gate openings, which correspond to slot widths, are adjustable between approximately ¾ in. in the top deck down to $\frac{3}{16}$ in. in the lower deck.

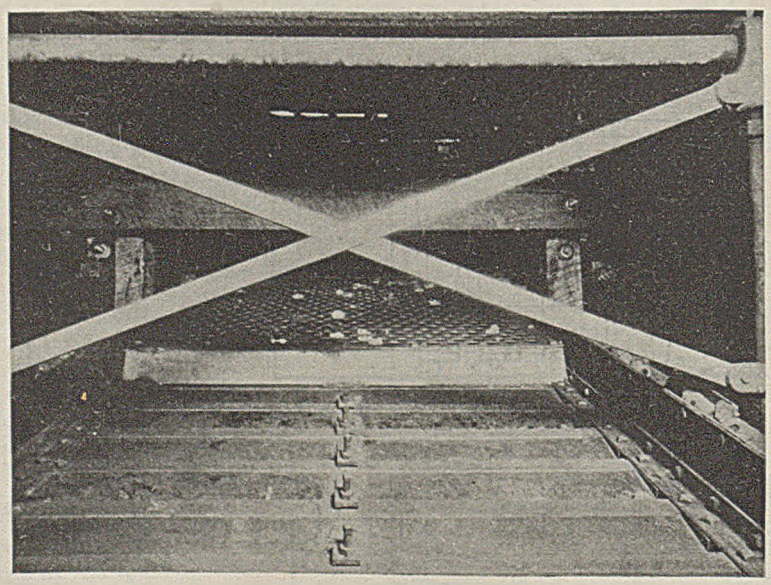


Fig. 4—Lower End of Cleaner Showing Gates; Slots in Open Position

MECHANIZATION + In Boiler Room Turns Waste Into Profit

By JOHN B. HARVEY
Assistant General Manager
Nelson Creek Coal Co.
Nelson, Ky.

COAL has been coming out of Nelson Creek for 25 years, and the mining community is a complete self-contained settlement of some 100 families and all it implies. The entire power requirements are met by the Nelson Creek Coal Co.'s own plant, with its rated capacity of 450 boiler horsepower, capable of producing 750 hp.; and 375 kw. in electrical generating capacity. Steam is used for the 145-hp. hoist, for the pumps and the various machines, hoists and car pullers scattered about the property.

Direct current, generated at 250 volts, is used for supplying a 6-ton main haulage locomotive, cutting machines, fans, picking tables, screens and floating boom. A 110-volt generator, operated at night, provides the street lighting and illumination for the miners' homes.

Ordinarily Nelson Creek brings out 1,000 tons of coal per 8-hour shift. Approximately 22 tons of coal per 8 hours is consumed in producing the electric power and operating the steam pumps, hoist, etc. When all three boilers were hand-fired, the company used mine-run coal which it could sell commercially for $1.20 per ton.

Five different sizes of coal are marketed from Nelson Creek: 6-in. lump, 3x6 egg, 3x1¼ nut, ¼x⅞ in. screenings, and mine-run. As these are all advertised brands, extremely close attention is given to sizing, with the result that there is a large quantity of bugdust, slack, and pea left as waste products. During certain months, however, the pea-and-slack can be marketed; at prices ranging from 15c. in winter to 75c. per ton during the summer. Demand for pea-and-slack, however, is extremely variable, and when no market exists, it often has been necessary to pay to have it hauled away.

About two years ago, the management at Nelson Creek faced a real problem. More steam was needed, and needed in the worst way. The mine had been operating two 8-hour shifts per 24 hours and all three 150-hp. horizontal return-tubular boilers were being forced to their limit for almost 16 hours per day. Three men were employed continuously in the boiler room during the 24 hours, one extra man a large part of the day, and seven extra men for a half hour a day for the dumping of boiler coal, equivalent in all to a monthly boiler-room labor cost exceeding $450.

The most obvious remedy for the demand for more steam was to install a fourth boiler. Unfortunately, the layout of the boiler room and its location with respect to the engine room made it impossible to do this without rearranging practically the entire engine room and part of the boiler room. The cost of the change would have been very high, and none of the equipment could be spared while the change was being made. It was decided, therefore, to develop the additional steam capacity by installing mechanical coal-burning equipment under two of the existing boilers. Pulverzone automatic coal burners were selected. The investment required for this equipment was $1,600 less than the cost of installing one additional boiler.

While the saving in first cost more than justified the mechanization of the boiler room, the installation made possible a still more profitable economy through plant consumption of pea-and-slack. As previously explained, commercial demand for this coal is highly unstable and, because the mine is not close to industrial centers where mechanical stokers are used, sales outlets for the smaller sizes have been limited. The company is now able to burn this pea-and-slack—much of which otherwise would be wasted—and release an equivalent tonnage of higher priced mine-run to the market.

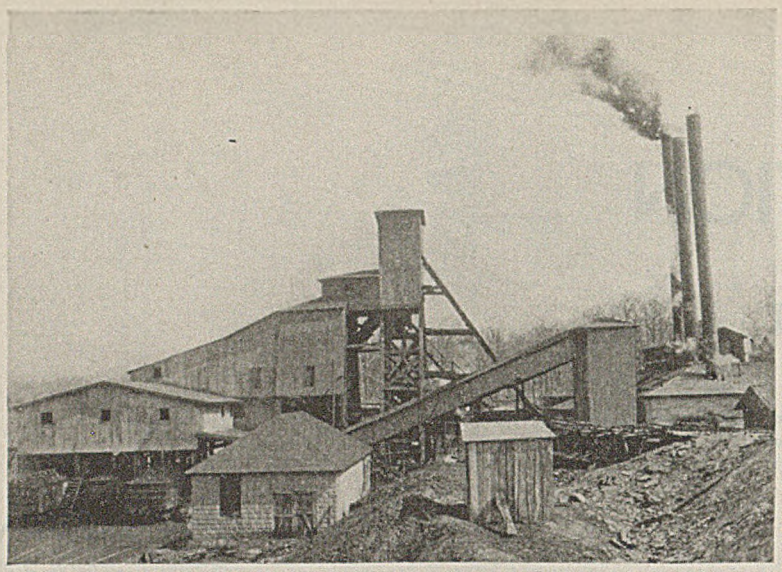
Soon after the new equipment was started up, it was found that the two

Problems and Profits

Two years ago, management at a mine in western Kentucky faced a problem—and discovered new profits.

The problem was one of an increase in power-generating capacity which seemed to demand the installation of another hand-fired boiler—until investigation disclosed that mechanization of the boiler room would give the required generating capacity at a lower capital investment.

But, as explained in Mr. Harvey's story, this adventure into mechanization did not stop there. In actual operation, the substitution of stokers for hand-fired boilers made it possible to use fuel for which no steady profitable commercial market had been developed and release an equivalent tonnage of more readily salable coal—a salvaging operation which returned the cost of mechanization in less than a year. Boiler-room labor costs fell sharply, tipple capacity was increased and a better coal was offered to the commercial market.



Topworks at Nelson Company Mine

The conveyor line which handles the fine coal from the tipple to the overhead coal bunker of the power plant is shown in the middle ground of the illustration. Contrast the appearance of the tops of the two nearer stacks with the third stack of the power house pouring out smoke from the hand-fired boiler.

boilers could be operated continuously at about 300 per cent of rating. With both boilers operating at three times their rated capacity, it was possible to develop practically all the steam required with the two mechanically fired boilers. The remaining hand-fired boiler is kept active, however, so as to help meet any unexpected peak demand. The two stokers are now able to accomplish what would otherwise require a fourth boiler.

The stokers start and stop automatically, depending upon steam pressure. When a stoker has stopped, the damper in the breeching automatically closes slowly. When the steam pressure drops to a predetermined value, the dampers automatically open and the stokers start up until the steam pressure rises above a predetermined value, when they shut down. It is no longer necessary for the fireman to stand by, waiting for a heavy load to occur. The only hand labor required is in the removal of ashes from the ash pit, which is performed with a steam-jet ash conveyor. Ash is removed only once a day at a time when the hoist engine is not operating. Mechanization of the boiler room also has eliminated smoke from the stacks except during the first few minutes when starting up a cold furnace.

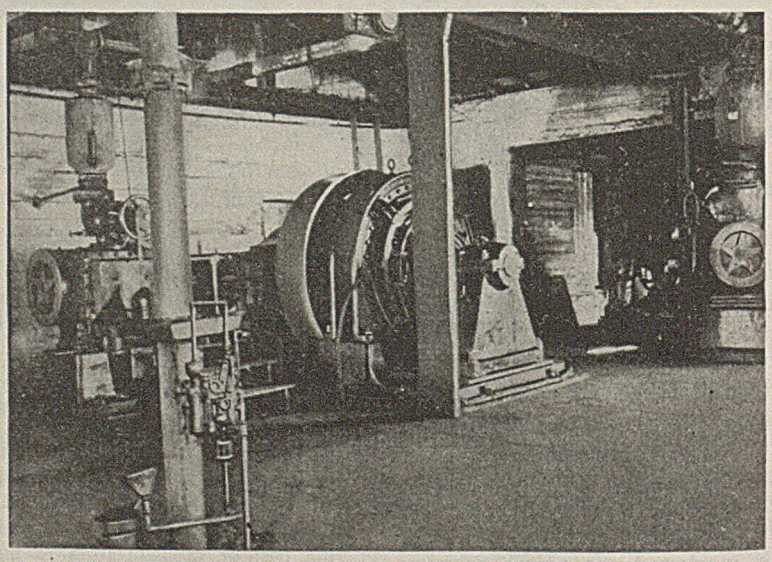
Still another saving has resulted from the mechanization of the boiler room—and one which from the company's viewpoint, perhaps, is even more important than the saving in cost of fuel: It has been possible to increase the capacity of the mine tipple, hence the capacity of the mine.

An average output is 1,000 tons a day per 8-hour shift. The hoist brings up the coal in 1½-ton cars, handling three cars per minute, 180 cars per hour, or 270 tons per hour. When the three boilers were fired by hand, 30 to 60 minutes per 8-hour shift was required to hoist and dump the coal required for the boilers for 8 hours' operation. As the capacity of the hoist was correspondingly reduced, extra men were put on this work, seven men being required to handle this coal. Getting the coal for the boiler room out of the mine reduced the output of marketable coal by 90 cars per 8 hours, or 135 tons of marketable coal at $1.20 per ton. To this should be added, of course, the wages of the seven men when massed in the effort to minimize the time required to put the coal in the boiler room.

Since using the pea-and-slack which falls through the screens, no work whatsoever is involved so far as the hoist is concerned. This is equivalent, of course, to an extra half hour's operation of the tipple per 8-hour shift, so that the capacity of the mine has been increased 135 tons of coal per shift.

By burning coal which was formerly a waste product, it has become possible to market a coal with a lower sulphur content. This is achieved automatically and incidentally. Sulphur balls were removed by hand at the picking tables and, of course, some of the smaller ones would slip past the pickers, to reach the consumer. These now automatically pass to the stoker bunker, where they are burned without trouble.

When the coal passes over the screen in the tipple, the pea, slack, and bugdust fall through the screen openings onto a horizontal belt conveyor which transports them a distance of 97 ft. to the boiler room. Here the coal is elevated 30 ft. at an angle of 35 deg. by another belt conveyor from which it is dumped by gravity into the boiler-room coal bunker. This bunker has more than sufficient capacity to furnish the coal for 24 hours without replenishment. Each Pulverzone is equipped with its own individual hopper, supplied by spout from the main overhead storage hopper.



Interior of Nelson Creek Power Plant

Two direct-connected engine-driven d.c. generators take care of the power and lighting requirements of the mine and the mining community at Nelson, Ky. All the power used is generated from coal for which the mine has no normal, steady market and its use releases an equivalent tonnage of a more salable size.

Suggestions on the Repair Of Coal Mining Machinery

By GRADY H. EMERSON

Birmingham, Ala.

IN my experience of the last fifteen years, repairing electrical machinery around industrial plants and mines, I have seen some of the best and some of the poorest jobs of assembly, found coal cutters, locomotives, pumps, and various other machinery assembled after repairs, with dirt, grease and old oil left on the machined places where the various parts are bolted together; bolts left loose, or one or more of them broken off or left out altogether; parts binding against the flanges, and frames or motor heads broken or warped; motor heads and bearings of the halved or split type assembled with the dirt or grit between halves; ball bearings and heads assembled without cleaning.

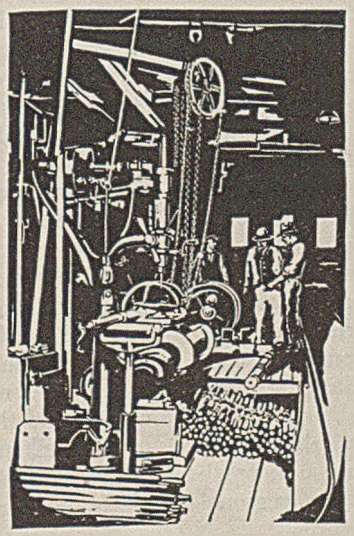
Of course, there are various reasons for this: The lighting is often poor; time is nearly always limited. No kerosene or gasoline is available, or perhaps rags and waste are not to be had. Sometimes this is the mechanic's fault, in that he doesn't order these cleaning materials, but as a general rule the management will strike these "useless" materials from the order and, after a few cancellations, they cease to be ordered.

Where at all possible to make a complete repair of a machine, it pays to fix every part, even the minor parts, such as oil covers, felts around shafts, leaky oil plugs, etc. If nothing else is available, try to get the old piece out and put in a pipe plug so that the bearing will not run dry when least expected.

Douse the places to be cleaned with a kerosene-saturated rag and wipe or scrape the excess grease and dirt off, the machined joints especially. Then wipe clean with a dry rag. If any bolts are broken, drill them and back-cut with an "easy-out," or chisel out with a gouge. New bolts should be made or purchased; remember that the machine designer does not put useless bolts in a machine.

Align and weld broken parts. After welding, check the piece, and if it is not true, machine it. If the price is reasonable, purchase a new part. Where the break is so complicated that welding is uncertain, purchase the new part. Often the welder can work wonders, however.

If a journal is scored or has been turned down until it is a $\frac{1}{4}$ in. or more below standard, it is advisable to replace the shaft. Frequently the shaft may be built up to standard by the electric welding process. But in this case, machining after welding is necessary. Where the load is not heavy, often the shaft can be turned down and the bearings bored to fit, if the bearings are of the sleeve type. Shafts holding loose ball bearings require building up and machining to standard. A sleeve may be fitted to the shaft and pinned or shrunk on and then turned to fit. Where a ball bearing is found to be spinning in the housing, if the bearing does not work in a motor, or close adjustment is not needed, possibly the bearing may be shimmed tight with thin metal. This is possible in a motor, but is not advisable for a permanent repair. In some types of coal-cutting machinery a ball bearing is placed in a detachable housing, which often works loose in the main frame. The housing may be built up and resurfaced to fit the frame, but when worn too much, the frame may have to be bored and the housing turned to the new fit.



In the assembly of ball bearings use care that they are not damaged, as months of wear can be lost by rough treatment when installing them. These bearings are made a press fit on the shaft and what is called a push fit in the housing. The safest way to assemble them is to place the bearing in boiling oil for about 5 minutes and then tap them in place on the shaft with a hardwood block large enough to catch the whole of the stationary ring. This will give an even drive. Be sure to remove all grease and dirt and file any burrs off the shaft with a mill file. When the bearing is cool, run the nut up tight, drill it, and place a locking spring into hole in the shaft. Some nuts have other means of locking; in any event be sure that the nut is locked. Not a few armatures on mine locomotives have had the coils torn off on the rear end because the locknut came off the bearing.

In making repairs to electrical machinery, if the bearings are worn and the shaft scored, why have new bearings made without truing up the shaft? If the shaft has to be trued up, perhaps the standard bearings on hand will not do. In this case new bearings will have to be made to fit the shaft. Motors often are found with windings scrubbed out, because somebody tried to use standard bearings on an old shaft.

Mining machinery is often burned out because of misalignment caused by dirt being caught between the machined surfaces during assembly. The motor may be subjected to much frictional horsepower and still run. When the machine strikes a heavy load, the operator, who is paid to get coal, drives it until it smokes or quits. Then a rewind or repair of the motor is necessary. In any event, the life of the winding is shortened.

Coal dust being highly abrasive, when gearing and chains operate in it, they are subjected to hard service. Give them an even break; lubricate and keep them as clean as possible. A help to gear trains is to see that all dirt is kept from machined surfaces when assembling, as this will insure proper meshing.

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, MARCH, 1932

A united industry

THE impossibility of any broad union and associated activity upon the part of the coal industry always has been one of the stock arguments hurled at the operators by unfriendly critics. It has echoed in legislative halls and blared from public forums. And yet today the coal industry can boast of an organization which not only embraces representatives of the anthracite and the bituminous producers, the wholesalers and the retail distributors, but the allied heating equipment interests as well. Coal men have proved that they can and will cooperate on major problems of common interest.

This organization, of course, is the Committee of Ten, which started in a very modest way less than two years ago and has grown in influence at a rate which many older associations well might envy. It has given a coordination and a cohesion to the battle to maintain the position of solid fuel which could have been achieved in no other way and at a time when competitive inroads made such organized effort imperative. Producers of solid fuels and the manufacturers of equipment for burning such fuels have been able to join on common ground with an effectiveness which has wrung grudging recognition from the oil and gas interests.

But the fight has just begun. The oil-burner groups had the initial advantage of several years' activity which has not yet been wholly overcome. The gas industry is bringing up its reserves on a wide front which touches every major market for anthracite and bituminous coal. Any lessening in the cohesion of the solid-fuel groups, any sectionalizing of these groups, would be a victory for the competitors of solid fuels.

The pressure grows

AS THE emergency legislative program for breaking the depression by liquefying frozen credits nears completion, discussion of the anti-trust laws claims a larger place in the Washington limelight. Several bills proposing modifications have been introduced in Congress, and further serious study of the question is promised. Although action during the present session seems unlikely, the accumulating evidence of dissatisfaction with the existing statutes is impressing Capitol Hill.

Those who center their attack upon the uncertainties of the application of these laws find fresh ammunition in the present status of the regional sales agency plan of the bituminous coal industry—pronounced legal by a former assistant to the Attorney General of the United States and questioned by his successor in office. That "small" business needs relief was made known last month when representatives of over 100 small independent industries appeared at the White House with a proposal for a two-year moratorium on destructive competition.

While, as shown in the Davis-Kelly bill, many Congressmen seem unwilling to grant legislative relief except upon terms which make that relief unacceptable, more skeptics are being convinced that something must be done to permit reasonable cooperative efforts within an industry without the menace of criminal action by the government. What business has a right to demand is not a blanket immunity to violate the letter and the spirit of this body of legislation but a modification of the law which will either affirmatively authorize some existing government agency to give advance approval or condemnation of plans submitted to it, subject, of course, to appeal, or an amendment which will so clarify the law itself that intelligent men may not be in hopeless disagreement as to what can and what cannot be done under these statutes.

Make them heat-conscious

MARKETS for coal are not made by wishing. Anyone who would sell a product must create a demand for it, if the demand does not already exist. Ideas must be sold to the public by advertising. As it is generally conceded that cooling in summer, by creating a demand for electricity, will create the largest market for coal of any thus far suggested, it would seem logical that herein lies the most profitable field for advertising.

Air-conditioning machinery has hitherto been provided by firms which, in the main, have not been large advertisers and which have been disposed to wait for business to come to them. Why should not their efforts be subsidized by the industries almost equally interested, the companies that produce coal, the railroads which are more interested in coal than the coal men themselves, the electric power companies that will supply the current, the boiler manufacturers who will supply the steam-raising equipment and the manufacturers of the air-conditioning apparatus itself? These five groups, in a joint advertising campaign, should be able to create a desire on the part of the public to be provided with clean, dry, cool and adequate ventilation in the hot summer months. For at least three of the participants is the incentive that it will smooth out the curve of demand and thus ease the most difficult of all the problems now faced: irregular operation.

Here is a movement that the National Coal Association and the Anthracite Institute, either or both, might well initiate, and other operators unaffiliated with either should be willing to assist them financially. Cooperation of the other industries would

seem more than probable. The project has the advantage that there is no uncertainty of the efficiency of the equipment to be used for the accomplishment of the objects sought; all the research work is already done and the project is large enough to be well worthy of the effort. Some believe that in this development lies one of the major possibilities for the restoration of national activity.

No air, no health

NO EVIDENCE is more convincing as to the expense of house-heating in cold and blustery weather by oil and gas than the effort of those interests to foster the building of houses in which every crevice and cranny are carefully closed. A house thus hermetically sealed may save heat and certainly will conserve moisture, but will it be healthy? Coal heat has the advantage that it leaves the air fresh and dry, and the walls free from dampness.

Owners of weather-stripped and purlin-stuffed houses who use the air over and over, and who can get fresh air only by opening windows and doors, are not enthusiastic as to the result of their questionable frugality. Some years back a few houses were made of a completely airtight material—furnace slag, if memory serves. Their constructors had great hopes of their heating economy, but, finding that they stifled the occupants, the designers inserted small holes in later blocks, so as to give the house air as well as heat. One cannot afford to economize at a risk to health. "Stiflingly hot" is often not merely an expression but the enunciation of a disagreeable truth.

Axes and pruning knives

WITH the federal government struggling to balance the national budget, ruthless economy easily becomes as popular as some of the log-rolling extravagances of earlier lush years. Under the pressure to save, the enthusiastic budgeteers may strike blindly at appropriations without adequate understanding of the service carried by the particular items assailed. Appropriations for government agencies engaged in activities which, for the most part, lack the dramatic front-page appeal are specially vulnerable to such attacks.

This was demonstrated on Washington's birthday when the House accepted amendments offered by Representative Douglas, of Arizona, reducing the appropriations for the Bureau of Mines already pruned by the House committee, the Secretary of Commerce, and the Bureau of the Budget. If the reduction stands, drastic curtailment of the economic studies of the Bureau are inevitable. This curtailment may involve the abolition of four field statistical offices, impairment of the annual canvasses of mineral production, discontinuance of all studies of coal consumption and distribution, as well as research work in coal and other minerals. Even the weekly coal report is endangered.

No coal man familiar with these activities should be ready to acquiesce in their elimination. An appeal for restoration is still possible through the Senate Committee on Appropriations, to which Mr. Douglas, later convinced he had gone too far in his amendments, wrote suggesting that officials of the Bureau of Mines be heard "in order that there may be repaired any substantial impairment of necessary and requisite functions of the Bureau." The mineral industry is the direct beneficiary of the Bureau's work: the mineral industry should make its voice heard before the Congressional appropriation committees and should not leave the burden of defense to the Bureau. Quick protest and action are demanded.

When winter comes

THOUGH two mild winters have followed in close order, it is likely that the future will bring winters just as snow-laden as in the past. For this reason it behooves the coal industry to provide for coming heavy snowfalls by solving the problem of how much steam it takes to heat sidewalks and how best such heating can be done. Pipe spacing, how to prevent the steam pipes by their expansion from tearing up the sidewalk, at what level in the sidewalks to place the pipes, how to keep gutters open so as to prevent the water from freezing in them, are important matters for research. It may be well to use an aluminum alloy for curb and gutter, and perhaps the sidewalk itself should be constructed of some material more conductive than cement.

Sidewalks should be laid preferably at some college or research institution, where experiments can be made, and where the snowfall is heavy and winters long. Then, when the facts are known and published, a sidewalk should be laid in the most prominent part of a big city where it would attract the attention of the man on the street. Doubtless the owner of the adjacent store would be glad to draw attention to the heated sidewalk in his windows and in his newspaper advertising.

Such a new public accommodation would have general appeal, and the heat itself would add a lure to the store windows, for when people are suffering from chilled feet a moment's delay on the warm dry pavement would afford a solace that would well recompense the stay. One can hardly conceive of people standing in slush to view the triumph of the window dresser, or even to price the merchandise exhibited.

Plans should be laid early so that a campaign can be arranged, plans drawn, sidewalks laid, and instruments purchased or borrowed for conducting the experiment. The present may seem inauspicious, but the very mildness of the last two winters presages cold winters in the years succeeding. Is the coal industry again to be found late in forecasting the future?

NOTES

. . . from Across the Sea

PROBLEMS arising from operations in seams located one above the other have troubled anthracite engineers for many years, without developing much in the way of technique. These same problems are beginning to vex bituminous operators also. British engineers, in general, seem to have advocated mining the upper seam first, but H. M. Maskrey, in addressing the North Staffordshire branch of the National Association of Colliery Managers of England, recently, challenges their conclusions. The seams, he thinks, usually should be worked together, but sometimes the order should be reversed.

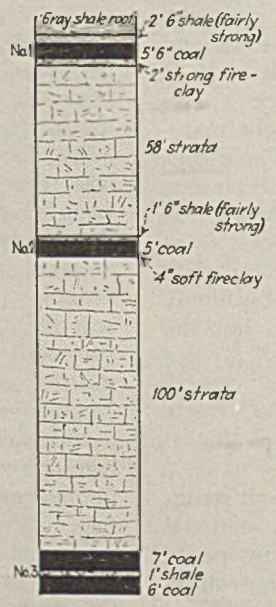
Mr. Maskrey detailed his experiences with the mining of the seams shown to the right and numbered downward from 1 to 3. When seams Nos. 1 and 2 were worked with either of the two seams ahead of the other, the leading seam could be worked without difficulty, but the trailing seam was mined under many disadvantages, the coal being "set on," an expression which Mr. Maskrey and the glossaries do not explain, but which appears to mean that the pressure on the coal makes it difficult to cut it or to pick it free from the face. The roof in the trailing seam also was controlled with difficulty.

When the upper of the two seams was worked first, gas was liberated from the lower seam despite the 61 ft. of rock interval, the gas escaping through crevices in the rock in such a degree that when the lower seam was mined, the operation was made easy by the relative absence of gas. The author of the paper does not say so; but he seems to suggest the question, Why save trouble in mining the lower seam by increasing the ventilation problems of the upper seam? Even when the lower of the two seams had been worked first, gas from the workings below issued from the floor of the upper seam. When both seams were worked together, the best results were obtained, but roadways close to faces were badly affected by settlement.

Seam No. 3, the lowest seam, introduced more complications, for it was subject to spontaneous combustion. This seam was generally laid out in panels and mined with a large percentage of extraction by "pillar-and-stall"—very narrow rooms, probably, with wide pillars, as is the Staffordshire method. These panels were about 72,000 sq.ft. in area, and they were isolated by stoppings after the pillars were drawn.

On one occasion when the workings of the mediate seam, No. 2, approached the coal area over a completed panel on the lowest seam, No. 3, which panel had been sealed, gas rose from the cracks in the floor. This was assumed to come from the goaves in seam No. 3. Cementation of these cracks shut off the gas only temporarily. Eventually it was thought best to shut off this section of the work in seam No. 2, because if the gas were removed from the goaves in the workings in the lower, or No. 3, seam, spontaneous combustion might result.

In this case seam No. 3 was mined ahead of seam No. 2, but in another case seam No. 3 lagged behind, and a



Three Seams—Which of the Three Should Be Mined First?

panel in that seam was sealed by two stoppings. It was expected that gas would be found after a time, but, on opening these stoppings, no gas appeared. Leakage was feared. It was found that the water gage at the stoppings was minus 1 in., and that the main return airway in seam No. 2 was connected by crevices with the panel in seam No. 3 and was drawing air through them. Stoppings were erected in the dip headings leading to the return airway in No. 2 seam, so as to shut off all leakage except that which might come to that airway directly through the rock.

Mr. Maskrey is of the belief that seams Nos. 1 and 2 should have been entirely extracted before starting to work seam No. 3. Seams liable to spontaneous combustion, he believes, should always be worked last, and main roads should not be driven above or below goaves of seams liable to spontaneous combustion.

Seams Nos. 1 and 2, as stated, should be worked concurrently, with one exception, however: namely, when there is any likelihood of the water in the upper seam passing through crevices into the seam below, then the bottom seam should be worked first, or at least kept in advance of the seam above. In this case the water generally could be removed before it reaches the faces of the seam below. Perhaps, however, Mr. Maskrey would not have been so insistent on this provision had his faces been advancing to the rise instead of to the dip, as was the case in his mine.

STUDIES of the Fuel Research Board of Great Britain have developed interesting facts as to sedimentation. The director of fuel research draws attention to the fact that at most washeries, slush from the clean-coal screening plant is pumped into a conical tank, where the fine suspended material gravitates toward the bottom, but only, unfortunately, with aggravating slowness. The reason for this dilatory action is that the falling particles interfere with each other, and the thicker the slurry the greater this interference. After a while there is a partial separation into clear and turbid water. The clearer water has, in effect, a lower specific gravity than that which contains more suspended matter, and, if the settling tank is suitably constructed, the liquids can be caused to develop a natural circulation, the clear water traveling up and the slurry descending, thus greatly increasing the speed of separation.

This effect, he adds, can be best demonstrated by the following experiment: Take a glass tube about 3 ft. long and 1 in. internal diameter and fill it with a suspension of coal dust in water. If the tube be held vertical, the coal dust slowly separates itself from the water. If it be held at an angle of 45 deg., the suspended matter everywhere begins to settle to the lower side of the tube; as soon as this occurs, the effective specific gravity of the liquid in the lower side of the tube is increased, as compared with that of the upper, the hydrostatic balance becomes upset, and the liquid on the low side begins to move downward toward the lower end of the tube, while the clearer liquid on the upper side moves upward toward the top of the tube.

The rapidity of this circulation in the inclined tube increases with the length of the tube, the concentration of the slurry and the inclination of the tube from the vertical, though too flat a slope causes the slurry to stick to the side of the tube. In a tube of 2-in. diameter and 22 ft. long, filled with a slurry containing 30 per cent of solid matter, the water is clarified 70 times as fast when the tube is placed at 30 deg. to the horizontal as when it is placed in a vertical position. The ordinary conical settling tank used with the British Baum washer at the Fuel Research Station is being adapted to work in

this way, but it is too early to give any definite results of the tests.

Here it may be suggested that the difference in specific gravity causes relative movement throughout all strata in the tube, causing the lighter sediments to move downward as fast as the heavier sediments are withdrawn, the movement being greatest near the side of the tube. Instead of each particle of sediment having to make its own individual way a distance of 22 ft., it would travel only 2.3 in. and then would be in the zone of greatest circulation, which would carry it down to the lower end of the tube, but even this travel would be only in small part individual, for on its way it would be deflected from the vertical path by the slower but measurable circulation in the other parts of the tube.

The report also describes the work of the Elmore vacuum froth-flotation plant. Coal (under $\frac{1}{8}$ in.) is mixed with about six times its weight of water, together with 4 lb. of oil, or less, per ton of coal. The mixture is introduced into the plant, which is, in effect a water barometer, the pressure at the top of the column being 24 to 27 in. below atmospheric.

Under the action of reduced pressure, air bubbles are formed in the pulp from three sources: air dissolved in the water, air drawn out of the structure of the coal particles, and air which has attached itself to the oil-wetted coal particles during mixing. These air bubbles become attached to the oiled coal particles and float them to the surface in the form of a froth. The water-wetted dirt is left in suspension in the water.

On discharge to atmospheric pressure, the froth tends to collapse, and the products can be recovered with comparative ease from the water streams carrying them. At present, the clean coal pulp and the dirt suspension are being passed into tanks having filter-bed bottoms. Weirs take off the surface water.

To avoid choking the filter mats, the filtering arrangements are not used until the tanks are fairly full of solid material, the greater part of the water being removed over weirs by a system of surface decantation. The filters can be arranged to operate by either vacuum or natural drainage.

A clean and easily dewatered concentrate is readily obtained. The tailings up to $\frac{1}{32}$ in. are quite free of coal. The losses of coal in the tailings between $\frac{1}{32}$ and $\frac{1}{8}$ in. are not quite so satisfactory, but there is no reason why all the clean coal of that size should not be floated.

Raw coals containing 20 per cent of ash have been cleaned so as to carry only 5 to 7 per cent ash, with tailings running from 50 to 60 per cent of ash.

Efforts are being made at the Richmond Gas Works of the Gas Light & Coke Co. of England to use brick in place of cast-iron retorts in its low-temperature carbonization installation, thus saving the necessity for frequent repairs.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Labor Agreements in Coal Mines, by Louis Bloch. Russell Sage Foundation, New York City. Pp. 513, 5¼x7 in. Price, $2.

With labor conditions in the coal industry now so much in the forefront of discussion, this latest volume in the series on industrial relations sponsored by the Russell Sage Foundation has a timeliness even greater than that which attended its publication last summer. The book is a case study of the administration of contracts between miners' and operators' organizations in Illinois. From this case study Mr. Bloch deduces what Mary Van Kleeck, director of the Foundation's industrial studies, says may be characterized as "the accepted code of practice under the [union] agreement in that state."

The studies are based primarily upon documentary material recorded in Illinois from 1909 to 1925. Short field investigations were made by the author in 1920, 1921, 1925, and in 1929. Part of the data was originally published in April, 1922, under the title "The Coal Miners' Insecurity." These interrupted studies are mentioned because they help to explain the sketchy treatment of certain developments in the old Central Competitive Field between periods of intensive investigation. They may also explain such slips as the statement that the Jacksonville agreement was an extension of the award of the United States Bituminous Coal Commission. Broadly speaking that was true, but the day wage basis of $6 set by the Commission was increased to $7.50 as a result of the wildcat strikes in the summer of 1920. In a work of reference, the record should be kept straight. Another such slip is the statement that contractual relations lapsed in Indiana in 1927.

These peccadillos of omission and commission, however, do not detract from the essential value and solidity of the book. Whether or not the reader agrees with all the conclusions set forth—and some who have struggled with outlaw strikes may question them—this gathering together and classification of decisions reached and precedents established upon the many questions of relationship in employment and discharge, mine management, wages, legislation, and contractual enforcement constitute a real contribution to the data available to students of this major question in American industry. S. A. H.

* * *

Ohio Coal Investigation, Part 1, An Economic Study of the Use of Hocking Valley Coal With Underfeed Stoker Equipment, By B. M. Faust, Research Engineer, Ohio State University. Bulletin No. 63; Engineering Series. Ohio State University, Columbus, Ohio. 57 pp., 6x9 in.; paper. Price, 50c.

The University at Columbus is trying to rationalize the use of the coals of the State of Ohio. It has already studied not only the coal from the Hocking Valley but that from the Cambridge district. Quite exhaustive experiments were made on a 600-hp. water-tube boiler fired with an underfeed stoker having seven retorts of 127 sq.ft. of total projected grate area, with dump and agitator. The furnace was constructed with refractory walls.

Conclusions reached were that Hocking nut-and-slack coal can be burned on equipment of the type and size used with entire satisfaction and with efficiencies equaling those to be expected with the average coal, regardless of origin. The maximum burning rates maintained were comparable to those that may be obtained with coals of the highest quality and were ample to satisfy the demands of the plants, even though the boiler was crowded more than is customary at normal industrial plants of a size burning 10,000 to 50,000 tons of coal per year. Many data derived from the study are tabulated and plotted.

The quantity of clinker decreased with percentage of coal that would pass through a ¼-in. round hole, clinker being defined as ash refusing to pass through a hole of 4-in. diameter. The graphs show roughly that 27 per cent of the ash will refuse to pass through such a hole when 20 per cent of the coal passes through a ¼-in. round hole, but that only about 13 per cent of the ash is coarse clinker when 45 per cent of the coal is of the fineness described. The fusion temperatures of the ash from the finer coal are higher than those of the ash from the coarser material.

Publications Received

Electricity for Coal-Mining Students, by J. Stevenson and W. Miller. Crosby, Lockwood & Son, London, England. Pp. 250, illustrated. Textbook for students preparing for the Mines Department examination for colliery managers' certificates of competency.

Application of a Gasometric Method for the Determination of Oxygen in Coals, by Walter A. Dumke. Quarterly of School of Mines, Golden, Colo. Vol. XXVI, No. 2; 21 pp., illustrated.

THE BOSSES TALK IT OVER

WASTE ELIMINATION

"Here's a big idea that looks good to me," began Jim, the super, as he settled himself on a spike keg in the foreman's shanty below ground. "It didn't come from the Old Man, either. Shorty put it up to me. He believes we could save a peck of money by setting up and carrying through a waste-elimination program."

"That is hardly a new idea, Jim," answered Mac. "We've been at waste elimination for a long time. Our inventory on supplies is low. We keep using materials over and over again. We salvage and save every time we see the chance."

"Right you are, Mac. And Shorty admits that. What he suggests is that we organize our hit-or-miss methods into a well-defined system. He thinks we should work up a plan on paper—call it a manual if you like—and start a campaign to include every man on the job. He wants it to cover every step in the operation of the mine—methods, machine operation, power, etc. Shorty says the trouble with our present procedure is that it is not planned. And I agree with him."

WHAT IS YOUR METHOD?

1. Do you follow a definite paper plan in the elimination of waste?

2. What are the main elements of your program?

3. How do you conduct your campaign and otherwise create and maintain interest?

4. How do you clear suggested ideas and take action on them?

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

Does car cribbing pay? The bosses, Jim and Mac, discussed this problem in February. What the readers think is told in the letters following:

You Might Slow Up Haulage

It doesn't pay a miner to load big cars when he is assured of an ample supply of cars. If cars are coming out light, it shows that more loaders should be placed on the section. Then the haulage crew will handle the same number of cars, but the tonnage on each will be greater. It is all right to tell a motor crew not to pull a car until it is fully loaded, but those instructions have their dangers in that they slow up the speed of transportation. That method should not be tried until all others have failed. If any instructions should go to the motor crew, they should take the form of an admonition that care be exercised not to bump or carelessly handle cars during movement.

The boss has to keep up his tonnage whether the miner is paid by the car or by the ton. I find it best always to tell a man when he is loading a good car, especially after I have been after him to get more coal on each car. Constant harping on the question has a negative effect; so much so that the tendency will be toward a falling off in the tonnage. Going into John's place, I found a car well loaded. I said, "You have a nice car of coal there, John, and if we can get them all like that our tonnage will stay up, and we will be able to compete in these hard times." He told me he would try, and thereafter I found no trouble with this man, who was transferred to my section because he would never load heavily. Care should be taken never to crib a car beyond the safe load it will carry.

Plymouth, Pa. F. C. HELLER.

Example of How Cribbing Paid

Does it pay to crib mine cars? Most emphatically, yes. At a particular mine I have in mind the car yield hovered about 1.87 tons. While the management had been urging the foremen to have the cars loaded heavier there were plenty of reasons advanced why it couldn't be done, and, needless to say, with this frame of mind there was little improvement shown.

As the first step to correct this condition, an inspection was made of the underground workings and conditions noted which might have any bearing on the loading of heavier cars. On several of the headings where pillaring was well advanced, fireclay bottom had heaved to some extent, but as there was but very small tonnage coming off these sections it had little bearing on the general condition. The check numbers on each heading were obtained and from the weigh sheet the car yield for each particular heading was estimated. Each section boss was notified by letter what the car yield on each of his headings was and informed that an improvement was expected at once. As there were three different types of mine cars, it was impossible with any degree of accuracy to tell from the weigh sheet just what loads were light.

To overcome this the cars were checked as they came out of the mine and the check numbers of all light cars noted. This was simplified by the fact

that the checks are hung on the outside of all loaded cars. At the end of each day the foremen were given a list of all light cars coming from his section, with instructions to go after the individuals and have this condition corrected. The yield showed improvement immediately, and in the course of a few weeks had jumped to 2.11 tons per car.

The coal at this mine is of a very soft nature and one of the reasons advanced by the foremen for light cars was that the loaders had no lumps to use for cribbing. However, as no excuses were accepted, this soon proved to been fallacy. Every week the yield from each heading was checked, a comparison made, and all foremen were informed of the result.

In addition to the foregoing, all cars were equipped with hinged sideboards, 6 in. high, which eventually brought the car yield to 2.17 tons, an increase of 0.3 ton per car; as the average number of cars dumped was 850 this made an improvement of 255 tons per day. The only additional expense was for labor and material necessary to equip the cars with sideboards. This gain of 225 tons per day with practically no increase in expenditures certainly paid. THOMAS QUINN.

Sonman, Pa.

Hold Haulage Men Responsible

It is evident that someone was asleep at the switch on Section 2. Of course, Mac and the assistant on the section may not have realized what heavier cars meant in tonnage over the course of a day's run. Letting such faults slip by causes the many costly leaks to which most men get calloused. A car cribbed, I have always felt, is the same as that last trip: It is these that show up well on the cost sheet. I remember well a remark from an old mine foreman I worked under as motorman years ago. As I left the bottom for my last trip one night with just sufficient time to get to the sidetrack and leave with my loaded trip ahead of the man trip, he said: "Be off, Tommie lad. That's the trip that pays the piper." Many times since I have been in position to understand just what he had in mind, for, as we all know, at that time of the shift, the day labor cost from trapper to general manager is paid whether that trip is pulled and dumped, or whether it is left standing. This is true also with regard to the cribbing of cars. It requires no longer to haul a trip of cribbed cars than to haul a trip of part loads.

Cribbing of cars within reason does pay at any operation. Fewer transportation men are required to obtain the same tonnage in a given time; gathering and flat road motors make fewer trips between the working face and shaft bottom, which effects a saving not only in the rolling stock but in consumption of power also. I happen to know of a mine that is producing 50 to 75 tons of coal a day more on a car output which is 50 cars a day less than the number two years ago. This is also being produced with at least three haulage men and one trapper less than were used two years ago. Figure it out: It has effected a saving of over $15 a day at this mine on haulage cost alone. This, plus the saving in power, and the wear and tear on the rolling stock, means a lot in a year's time.

The best method I have found to obtain proper and uniform loading of cars is to hold the drivers or gathering motormen responsible for any cars arriving at the dumping point not properly loaded. You may try other methods, but to obtain the best results, instruct the haulage men that they will be called in to explain why cars are being pulled away from the working face half loaded. To most miners a car is a car whether he is loading by the car or ton. High count is what counts with them. J. T. REYNOLDS.

Moundsville, W. Va.

The Miner Learns Quickly

Nothing is more futile than hauling a string of half-loaded mine cars, or "straw hats," as our coal mine vernacular has it, to the tipple. It is poor mine economics for both loader and management. Where loaders are paid by the car, it comes in the same category as being short-weighted by the corner grocer who may also be an elder of the church. Even where miners are paid by the ton, poorly cribbed or bed-loaded cars can be accounted for only by laziness on the part of the loader or lack of time to do an adequate job of it.

No. 2 motor haul has about one-third more cars than No. 3 motor haul, and yet the latter puts out more tonnage. And this startling information makes the super mad and relays his truculent ultimatum. Which is about as true a picture as any artist can design. The conditions are identical and one-third more cars are placed in one section than in another, and the super wonders why the cars "ain't" chunked to the sky. Gosh!

It is evident that the haulage force are crowding the loaders on No. 2 motor haul—"pulling 'em green" with the admonition to "knock up your cotton, Jack; I'm coming right back!" Let's not forget that we have one-third more cars costing perhaps two hundred dollars apiece buggy riding into a section where they're not needed, haulage power used uselessly, haulage men and hoisting men and equipment running around in circles, and the best brains in our unhappy industry are in a huddle striving manfully to "dope" a way out. Reminds me a lot of Thompson's colt which swam the Mississippi to drink out of a mudhole on the other side.

Where men are paid by the car, the management must exercise continuous supervision till the loader sees that nothing but an honest return is ever acceptable, when it will cease to be a problem. Maximum tonnage compatible with the hoisting equipment is always desirable and this cannot be accomplished unless mine cars are loaded to capacity. Loaders have their limitations and cannot do the impossible, and the turn should be limited to allow ample time to load the car to capacity. Then it will never be necessary to tell the loaders that chunking the cars means so many more dollars to them.

ALEXANDER BENNETT.

Panama, Ill.

Leaky Cars Discourage Cribbing

The first objection to cribbing that the foreman meets is that coal loaders as a general rule argue the weight is the same for each car cribbed. Does it pay? is a question to be settled at the mine of which you are in charge. Other factors are the character of coal seam, whether it will produce lump coal enough to lump cars, height and length of haulage roads, grades, kind of motive power in use, number of cars in service frequency of car turn and method of loading, by hand or mechanical.

If conditions are favorable with hand loading, it pays to crib cars. It does not pay to crib cars with all types of mechanical loading equipment. Have scales tested at frequent intervals and post notice of test where loaders can see it. Impress them that there is a difference between a big and a little car. Instruct transportation men to refuse to pull cars that are not loaded, except when they have a good reason for doing so. After they have gathered trips, see that they handle them properly, keeping in mind that loaders get paid only for the amount of coal in the car. Badly handled trips, especially on cars that have end gates fastened with a chain, cause losses all along the line which are expensive and cannot be recovered.

Indianola, Pa. LLOYD BUSH.

Weight, Not Number, Counts

If we are speaking of hand loading mines, then, without a doubt, cribbing pays. In mechanical operations, where the machine is capable of loading from one to three tons per minute, obviously it does not pay to stop the machine in order to build the car. Yet, even there, while in mechanical mines it does not pay to take time to build the cars, it pays to load the cars as full as possible, for it takes just as much time to haul a small car to the bottom as it does a big one.

In hand loading where the miner is paid by the ton and gets an equal turn with the rest of the men, then it is to his advantage and to the company's to get as big a tonnage on each car as possible. Certainly this is so when conditions are such that the loader is kept waiting between cars from ten minutes to an hour between car changes.

In a mine where the loading is done by hand, but paid by the day, as in conveyor work, the car should be loaded as large as possible without

wasting any time. If the mine is being run efficiently, the car change will be so arranged that the men have no time to build the cars. However, if it so happens that the car change gives the men idle time, this can best be utilized by building the cars.

I have resorted to various methods to get big cars. In one mine where the cars averaged three tons, I opened up a new section where there was exceptionally high coal. The men were used to building to a certain height and I knew we could build higher in this section. So I told the men I would pay a shift to the man who loaded the biggest car by the end of the pay. The men sure went after that shift, and the man who got it loaded a car weighing four tons four. The average of the section stayed around seventy hundred.

Here is another method I have used to good advantage where I have had high and low coal: If a man on a high run persistently loaded small cars I told him that I had coal just to suit him, and if he did not change his ways he usually ended on a low run. This method, while rough, is effective.

In mechanical loading operations, I find it helps wonderfully to let each crew know what the other crew or crews are doing. For instance, I heard a motorman bragging that he had pulled five more cars than the other machine had loaded. I told him that was fine, but the other machine had loaded bigger cars and had loaded ten more tons. I explained to him why it paid to load bigger cars, and the results were all that could be desired.

I keep check on each unit, of the cars loaded, the tonnage, and keep the men informed. This creates a friendly rivalry and produces good results. I instruct my haulage men and crew bosses that it is tonnage in the flat and not cars on the bottom that counts.

Vincennes, Ind. THOMAS JAMES.

Loading Increased 20 Per Cent

All companies do not believe in the practice of cribbing cars. However, there is no doubt that it pays to follow this practice, sometimes in mechanical mines, too. Some time ago I was placed in charge of a mine where the management thought it should get more coal on each car, but was unable to do so. When I set the average weight per car at three tons, the miners threw up their hands and even the management said it could not be done. My quota was five of these cars for each man. After each shift the results were posted on the bulletin board, and every man who did not average three tons per car had his check flagged on the following day so as to give me an opportunity to talk to him in person.

In this way I learned a lot about the mine and what was necessary to correct the conditions which militated against better loading. After less than two months, the average was up to 3.2 tons per car, and considerable rivalry had sprung up between the several sections. In four months the average was up to 3.4 tons per car, and no extra money had been spent to obtain this increase of over 20 per cent. I believe the important thing is first to decide exactly how much coal can be loaded safely and economically on a car, and then to stick to that standard.

OSTEL BULLOCK.

Central City, Ky.

Cribbing Generally Pays

From the operators' standpoint the practice of cribbing cars gives results so much more favorable than unfavorable that the answer to the question, Does it pay to crib? is almost self-evident. In the first place, it helps to correct that very prevalent inadequacy of car capacity which in the past has been the almost universal fault of mine cars. Mine management of former days was slow to grasp the idea that the correct capacity of a mine car is that which is the largest for the conditions met in the mine for which the car is designed.

Because of other features of mining practice, such as light rails, small gage track, narrow haulageways, small shafts, etc., mine cars had to be smaller in earlier days. Nevertheless, they were not correct for economic haulage then, and are not so now. Many of these conditions still prevail and many of these inadequate cars are still in service. The only way to increase their capacity is to build the coal up to the roof. An added advantage of this practice is the greater percentage of pay load compared to tare weight of the car itself. This advantage continues even with the larger cars and more modern equipment of the present day.

It seems obvious that the same functions of hauling, caging, hoisting, coupling, weighing, etc., are required whether a car weighs more or less, and certainly such operations are performed at a lesser cost per ton when the coal per car weighs more. There are, admittedly, some disadvantages. Cribbed cars are the cause of more spillage and consequent dirty roads. They are more likely to spill coal down the shaft in the dumping process too. Even so, when the motive power is adequate, the cribbed car is a definite factor for efficiency because it increases the pay load, which is the goal that all transportation mediums strive for whether they be mine car, motor truck, railroad car, or airplane.

Whether the practice of cribbing benefits the loader depends upon the mine management. If loaders are paid by the ton and the turn is frequent enough to provide sufficient cars for a good earning capacity, why should loaders crib? There is no gainsaying the fact that cribbing is a waste of labor. The loader cannot handle as many pounds per minute above the car as he can inside it. But if he already has the inside filled, wouldn't he profit by adding a cribbing rather than remain idle till the car is replaced by an empty? It may seem unfair to some for the operator to gain this efficiency at the expense of the loader. They may argue that the proper thing for the operator to do is to provide the cars and haulage crews necessary to enable the loaders to work most efficiently. In mines where this has been tried the result was that the last two hours of the day were featured by idle haulage crews. Many of the loaders had loaded their self-prescribed tonnage and left the run early, calling it a day.

One other advantage to the operator results from cribbing: It encourages the production of lump coal, as the loader appreciates the lumps to crib with. These lumps have to be clean, too, for they are conspicuous.

WALTER E. BUSS.

Vincennes, Ind.

Other Reasons for Light Cars

Against Jim's suggestion of cribbing cars where the clearance of mine cars permits it, nothing much can be said except that more coal and dust accumulates on the haulages. The extra tonnage on the same number of trips, however, more than compensates the cost of cleaning the haulages. Since haulages accumulate dirt regardless of car cribbing and have to be continually cleaned and maintained, the extra coal hauled represents nearly a clear saving.

Of course, cribbing pays where it is at all practicable. It pays the miner and the operator. In these times with the average mine working one, two and three days per week, but little urging is needed to obtain the maximum cribbing, and where it is not practicable, the fault generally lies with local conditions, such as low timbers or rolls in the roof.

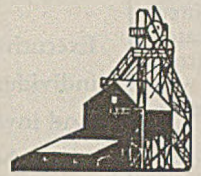
Assuming that from 100 to 500 more pounds of coal per car is hauled on a trip of 30 or more 2-ton cars, several thousand feet, figure for yourself the cost per ton you have reduced your haulage in a single day's run. This is effected with absolutely no investment. Where cars have a capacity of 3, 4 or 5 tons, the costs are even further lowered.

Some coal seams present a local difficulty in the inherent breakage of the coal. Other thin-seam mines have an obsolete type car with little or no overhead clearance. In the former case closer attention to shooting and inside preparation has made considerable headway in getting coarser coal. In the latter case there is no remedy except changing to a lower and a larger type car. But this is not Jim's present problem.

There are other conditions that will not permit cribbing, such as low timbers and local rolls. Low timbers should never be permitted except temporarily for safety and where a cave is inevitable. It is usually cheaper to remove such timbers and shoot down the rolls than lose extra tonnage day after day.

Davis, W. Va. W. H. NOONE.

OPERATING IDEAS



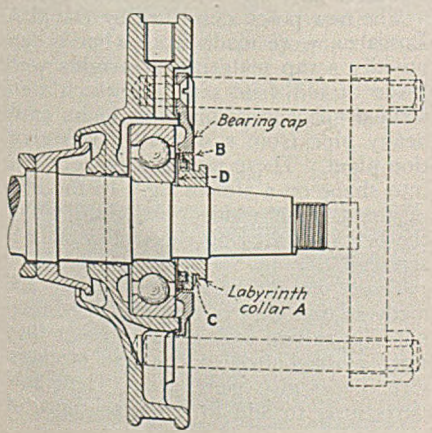
From Production, Electrical and Mechanical Men

Labyrinth Seals Add to Life Of Armature Bearings

Dirt and dust are the greatest enemies of bearings used on mine-locomotive armatures. Even a small quantity of coal dust mixed with the bearing lubricant will act as a grinding compound and soon wear the races and balls or rollers so that there is radial play in the bearing, and then the bearing is on the road to failure. Sometimes a mixture of dirt and grease is fed to the bearing when it is lubricated, because the grease supply has not been properly covered in the store room. More often, however, the dirt gets into the bearing through an inadequate seal between the stationary and rotating parts at the pinion end of the motor.

On some of the older types of motors, the only protection against the entrance of dirt at this point was a felt ring inserted in a groove in the bearing cap and pressing against the outside of the bearing nut. An improved type of labyrinth seal construction which can easily be applied to the older type of motors having the less adequate bearing seal, however, has been found effective in keeping the lubricant in the bearing chamber and in keeping dirt and dust out. This construction, writes C. A. Atwell, Westinghouse Electric & Manufacturing Co., consists principally of a labyrinth collar, *A*, which has a light press-fit on the armature shaft, and is machined to run in a circular groove in the bearing cap. A circular disk of sheet steel is placed between the inner race of the ball bearing and the collar, and acts as an additional seal on the inside of the bearing cap. The dirt which tries to enter the bearing inclosure starting at the point *B* must pass around several right-angle turns through close running clearances, and experience has shown that such a shaped path effectively prevents dirt from entering the bearing and also keeps the lubricant from leaking out.

Improved Labyrinth Seal for Mine Locomotive Armature Bearings

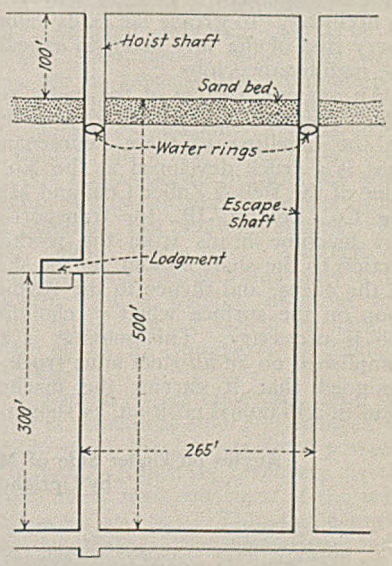


Another advantage of this type of construction is the elimination of threads on the shaft near the bearing. The threaded construction just outside of the bearing has been the cause of many shaft breakages because of the tendency of fatigue cracks to form at the bottom of the V of the threads. The labyrinth collar, *A*, needs only to be a light press or shrink fit on the shaft, as there is no armature shaft end thrust on the bearing at this end, the armature end thrust being taken care of at the commutator end bearing.

The labyrinth collar can easily be removed from the shaft by pulling it by means of the circular groove, *C*, or both it and the bearing may be pulled from the shaft at the same time by means of the arrangement which is provided for bearing and housing removal. This pulling device, indicated in the illustration by dotted lines, consists of a plate or bar placed across the end armature shaft and two studs passed through the plate and threaded into tapped holes in the bearing housing. By alternately tightening the two nuts on the outside of the plate, the complete housing with bearing and labyrinth collar is pulled from the shaft all at the same time. In the re-assembly of the motor, the collar is pressed or driven into position by the same method that is usually used for assembling ball bearings on the shaft.

Handling Water From Two Shafts in Balanced System

Several features of a water handling system installed in the shafts of the Junction City (Ill.) mine of the Marion County Coal Co., when that mine was first opened up a number of years ago, suggest solutions of today's problems of a similar nature. Both the hoisting and the escape shafts were 600 ft. deep to coal. In sinking these shafts a bed of loose water-bearing sand was encountered at a depth of 100 ft. from the surface. It was the economical handling of this water in the two shafts that constituted the problem. How it was solved is told by W. E. Coxe, of Doniphan, Mo., as follows:



Pumping Through One Shaft to Dispose of Water From Two

Referring to the sketch, rings were installed just below the sand in both shafts, and a lodgment was made in the hoisting shaft for accumulation of the water from the rings above. From there the water was discharged by pumps to the surface. As it was considered advisable to keep the escape shaft wet, the rings in this shaft were allowed to over-

flow a portion of the water made at this point. On reaching the bottom this overflow water was drained to the sump of the hoisting shaft, where it was lifted to the surface. The bulk of the water in the escape shaft was collected from the rings by a 2-in. standpipe which was connected underground to a similar pipe discharging by gravity into the lodgment at the 300-ft. level in the hoisting shaft.

This gravity or head flow pipe was utilized for yet another purpose. The workings were fairly dry and much dust, consequently was released from the coal faces during mining. A more than sufficient supply of water for wetting down the working places being available at the shafts, pipe lines and hose connections at intervals of 100 ft. were installed to wet down the dust.

Truck for Moving Loader Head In Limited Clearance

Maintenance counts at least as much as any one other factor in the success of a loading-machine operation. For unless the machines are constantly kept up, large tonnages cannot be obtained, the machines depreciate more rapidly than they should, and the mechanism is blamed for a fault which lies largely with management. That is why it is so necessary "to grease the skids" along every step of the way taken to expedite the maintenance jobs.

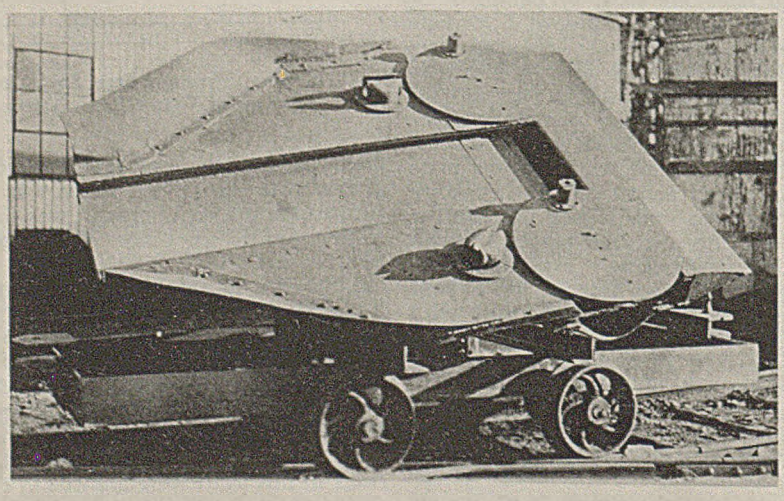
An example of one of the many aids which might be improvised for speeding up the handling of these maintenance jobs is a truck developed at the No. 1 mine of the Bell & Zoller Coal and Mining Co., Zeigler, Ill., for transporting Joy machine heads from the working section to the shaft bottom, up the shaft in the cages, and thence to the welding shop on the surface when a rebuilding job is necessary. This moving is accomplished on an all-steel mine truck so designed that it carries the machine head in a diagonal position, as shown in the two accompanying illustrations. If the head were loaded flat on the truck, it would have to be lifted from the truck for loading onto the cage, the reason being that it is too wide for the cage. With this special truck, the head can be taken anywhere that a pit car is taken and without rehandling.

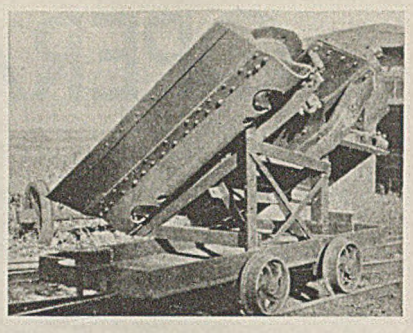
In submitting this operating idea, John Lyons, safety engineer of the coal Company, gives also the important details of design and construction. The supporting frame is made of angle iron electrically welded together and to the truck base. The design is such that the angles on the underside of the loading machine head will fit between the truck framework, a feature which prevents movement of the head in the line of truck travel. Two lugs welded to the lower end of the inclined frame keep the head from slipping off the truck.

Executive Example

Executives frequently give their individual formulas for success. And invariably their key answers when boiled down to a few words resolve into the delegation of details. They do everything the easiest way. If you are in charge of equipment maintenance, if you are responsible for devising new schemes and methods of operation—you, too, can save time by following short cuts. You meet a problem; you seek a solution. But where? From your head? That's the wrong approach, for it is the tedious time-consuming way. Why not search for the already worked-out solution? These pages are examples of how much time can be saved by this approach. Incidentally, if you have any original ideas on operating problems, send them in, accompanied by sketch or photograph. Accepted ideas are paid for at the minimum rate of $5 each.

Angles on Under Side of Machine Head Are Held Motionless by Uprights of Truck Frame





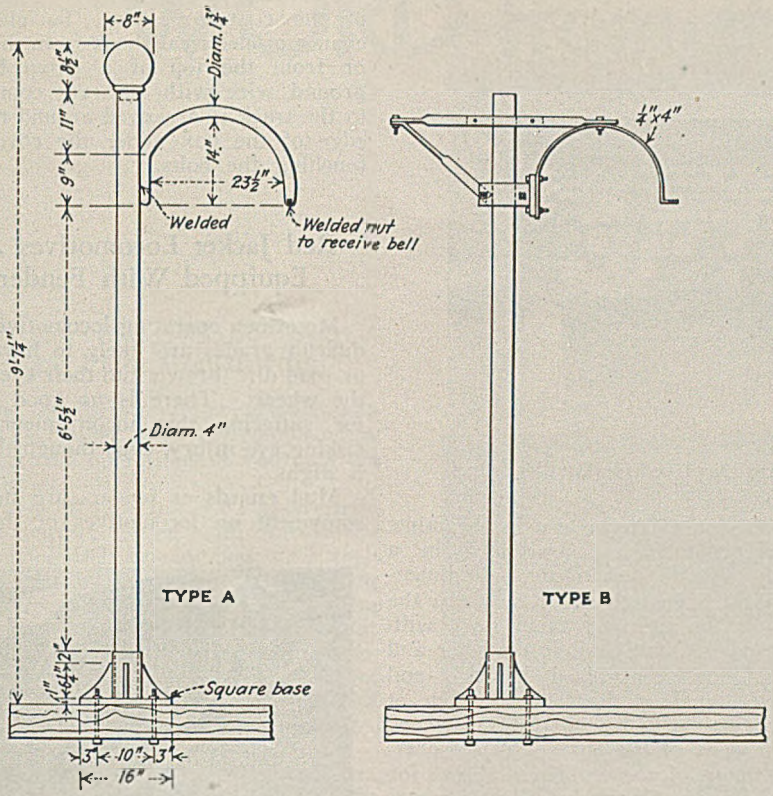
Two Lugs, Only One Is Shown, on Truck Base Keep Machine Head From Slipping Off

Welded Trolley Pole for Outside Tram Has Fewer Parts

With the completion of a tramway 1¼ miles long which brought coal from three Raleigh (W. Va.) mines of the Raleigh Coal & Coke Co. to a common tipple, there arose the necessity of devising a sturdy trolley pole from materials at hand. P. M. Anderson, master mechanic of the company, undertook to do this. The pole design by him is shown in detail under *A* in the sketch. The type indicated by *B* is the pole formerly used. It will be noted that the new type of pole has fewer parts and is more pleasing in design. Actually, it is more economical and more easily constructed.

The new poles, described by David A. Loscalzo, were made from what is supposedly scrap material. Uprights were made of old 4-in. pipe, to which were welded goosenecks made of 1¾-in. extra heavy pipe from a discarded refrigeration plant. These goosenecks were bent into shape on a simple jig. In the ends of them were welded nuts into which the bell for carrying the trolley wire is screwed.

Bases were cast in the foundry and made so that they could be screwed temporarily to two 6x8-in. ties. Later they were to be bolted to concrete footings. Cap pieces also were cast. Their sole purpose is to add to the appearance of



The Gooseneck on Pole "A" Carries the Wire Without Distortion

the pole, which was painted black after being assembled.

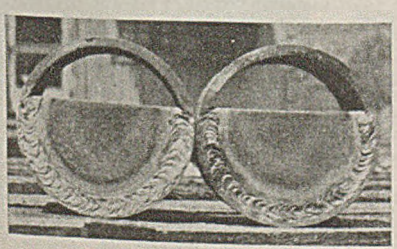
Labor cost to produce these poles was about $1 each. This, however, does not include the cost of the scrap material, nor the cost of installation. This cost compares advantageously with locust or any other type of poles when life is considered. The goosenecks have proved to be strong and are carrying the load without distortion.

Anchor Pockets for Shaft Guides Welded From Pipe

In the construction of a new 2,200-ft. shaft at a copper mine in the Southwest, oxyacetylene welding and cutting served in the making on the job of anchor pockets for attaching the skip guides. These, as described in *Oxy-Acetylene Tips*, were devised in the shape of short cylinders cut from scrap pipe of the required diameter.

The ends were two-thirds covered with a face of steel plate welded in place, using high-test steel rods. After the anchor pockets were inserted solidly in the concrete, a hole was drilled in each exposed faceplate on the line of the guide sight. In place, the anchor provided a hollow into which the erectors could insert a hand for putting home the bolts to the guide brackets. At every fourth pocket, at intervals of 20 ft., or where the guide-rail ends met, two anchors were used. Two men, a cutter and a helper, turned out about 100 pieces in eight hours and the two welders finished about 25 anchor pockets in the shift.

Finished Anchor Pockets



Calling Attention to Accidents In a New Way

At the end of the main bulletin station at the Keystone (W. Va.) mine of the Houston Collieries Co., a Koppers interest, a 30x45-in. bulletin board is hung sidewise on which are posted 3x5-in. cards describing recently occurring lost-time accidents. Only those accidents are posted, writes G. E. Daugherty, which were severe enough to keep the victims from work the day following.

Over the board is a green and a red light. After an accident is posted the red light flashes for 24 hours, calling the attention of all to the details of this most recent accident. Thereafter and until another accident occurs, the green light burns.

Recent accidents are posted in the center of three card columns. As others occur, those replaced in the center column are moved to the sides and by steps downward until they are finally taken from the board. This scheme is said to be highly effective.

An Animated Accident Board

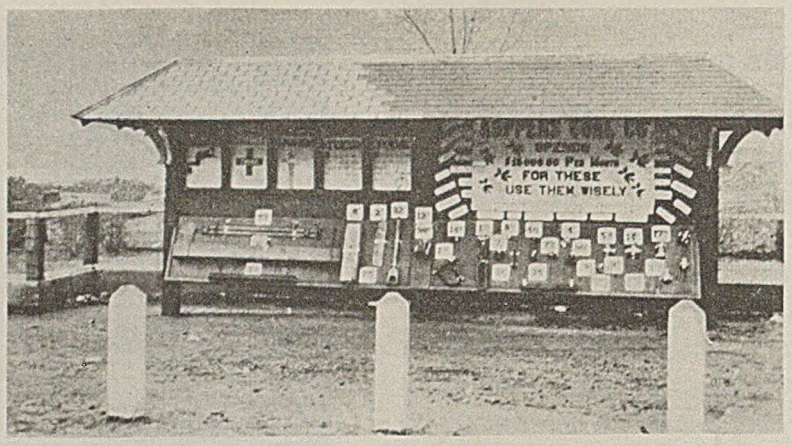
Board Display Helps Campaign Of War on Waste

At the mines of the Koppers Coal Co. and affiliated interests a "War on Waste" campaign is under way which has for its purpose the elimination of waste of time, energy, and materials in the many ramifications of their use at a mining operation. The broad scope of this program also includes the elimination of waste through improper or lack of planning, lost motions, loafing, visiting, delays, safety, etc. Although the campaign was inaugurated only a few months ago, a number of steps have been taken, one of which is here set forth by G. E. Dougherty, of Elkhorn, W. Va.

Waste of time, materials, and supplies is something that practically every employee on the job has some power to eliminate. But it is necessary first to make every man conscious of the waste and what it costs. This the company has been doing by an educational bulletin board display at each of the mines.

In the accompanying photograph is shown the display at the Carswell mine, Kimball, W. Va. On the notice, or left, side of the board are posted stories of waste and how it might be avoided. On the right side of the board appears a large sign which reads: "Koppers Coal Co. Spends $15,000 Per Month for These—Use Them Wisely." Around this sign are tacked cards on which appear the items most likely to be wasted.

The lower half of the board is used for displaying actual samples of the various items. Each is tagged with its per-unit cost to the company. Thirty or more items are listed, the cost of any one of which may be as much as $4.50,



Samples of Wasted Items With Their Cost Are Displayed for Workers' Eyes

as for a mine-car coupling. More costly items are placarded when not shown; for example, a gear costing $100 or a pinion costing $12.36. There also is posted an example of the right and wrong way of making a splice in a trailing cable.

Adjustment Is Automatic in Track Switch Contactor

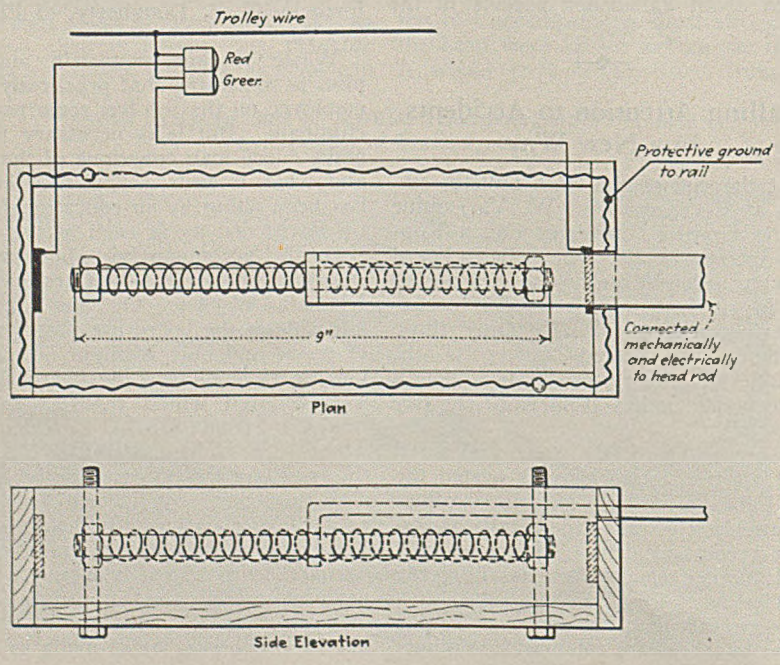
Investigation of a fatal haulage accident at a large mine in the Pocahontas field indicated that it would not have happened if the track switch involved had been equipped with lamps to show the position of the switch points. The superintendent began to cast about for a suitable contactor device to be operated from the track switch mechanism. In the meantime, a contactor box built in the shop was tried in the mine. It proved satisfactory in service and was inexpensive to build, so its type was adopted for extensive use in the mine.

The contactor is assembled in a sturdy wooden box of over-all dimensions small enough to set between the ends of the ties and about flush with the tops. A bolt ½ in. in diameter and 9 in. long, centralized by two coil springs, makes electrical contact at either end with metal plates fastened in the ends of the box. The compression range of these springs allows for a wide range of wear, bending, or movement of track switch parts without readjustment of the box or contactor rod position.

The indicator is a two-compartment box with red and green lenses and it usually is mounted on the mine roof above the switch throw. The contactor box lights one lamp or the other by making a negative or ground connection to the track through the switch head rod.

Two bolts with nuts at the top hold in place the one-piece flat wooden cover of the contactor box. To eliminate chance of electrical shock from the bolts or from the top of a damp box, a ground wire with separate connection to the track is arranged around the top edge of the box under the cover and touching the bolts.

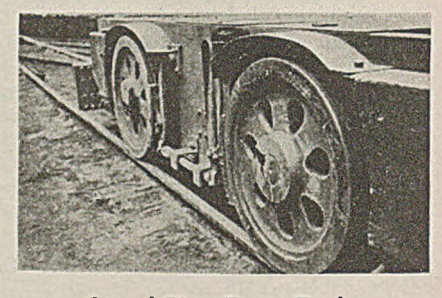
Used Extensively in a Pocahontas Mine



Red Jacket Locomotives Are Equipped With Fenders

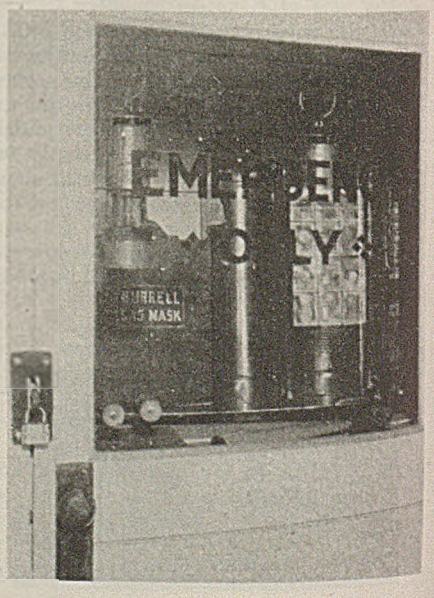
Motormen operating locomotives over difficult grades are likely to have sand or road dirt thrown into their eyes from the wheels. There is no good reason for suffering this inconvenience and risking eye injury, even though the risk is slight.

Mud guards or fenders are standard equipment on locomotives of the Red Jacket Consolidated Coal & Coke Co., Red Jacket, W. Va. The accompanying illustration shows how these guards are applied to a cable-reel gathering locomotive.



Curved Plate Forms Fender on Mine Locomotives

This Fire-Emergency-Equipment Cache Is Kept Under Lock and Glass. It Is Located in the Motor Barn, a Short Distance From the Mine Mouth, at the No. 9 Plant of the Wheeling & Lake Erie Coal Mining Co., Fairpoint, Ohio



WORD from the FIELD

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations in February are as follows:

Beaver Run Coal Co., Beaverdale, Pa.; contract closed with the Robins Conveying Belt Co. for new steel tipple equipped with "Gyrex" vibrating screens, mixing conveyor, and lump and nut booms for preparing lump, nut, mine-run, slack, and special fuels for pulverized coal burners, stokers, and hand-fired equipment; capacity, 200 tons per hour; to be completed March 15.

Hastings Fuel Co., Hastings, Pa.: contract closed with the Robins Conveying Belt Co. for new steel tipple equipped with "Gyrex" vibrating screens, mixing conveyor, and lump and nut booms for preparing lump, nut, mine-run, and special fuels for pulverized coal burners, stokers, and hand-fired equipment; capacity, 200 tons per hour; to be completed March 15.

Philadelphia & Reading Coal & Iron Co., St. Nicholas central breaker, St. Nicholas, Pa:: contract closed with the Hydrotator Co. for one Hydrotator unit to clean No. 4 buckwheat; capacity 65 tons per hour; to be installed by the end of March.

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Taylor Heads Penn Anthracite

Harry N. Taylor, New York City, chairman of the board and general manager of the United Electric Coal Cos., was elected president of the Penn Anthracite Collieries Co. last month and took office March 1.

Mr. Taylor's election to the presidency of the Penn Anthracite organization is the latest step in a career which began 40 years ago and has since included wide experience in the mining and distribution of both anthracite and bituminous coal. After a long career as a sales and operating executive in the Middle West and Southwest and a term as Western and Southwestern district representative of the U. S. Fuel Administration, he came to New York in 1923 to succeed Governor Alfred E. Smith as head of the United States Trucking Corporation. He also became president of the United States Distributing Corporation and vice-president of Pattison & Bowns, Inc., at the same time, and was responsible for the first 100 per cent mechanized operations in the country, those of the Sheridan-Wyoming Coal Co. Mr. Taylor disposed of his interests in the U. S. Distributing Corporation in 1931 upon his election to the office of chairman of the board of the United Electric Coal Cos., which position he will retain.

Harry N. Taylor

Coincident with Mr. Taylor's election to the presidency, Charles Dorrance, consulting mining engineer, Scranton, Pa., was chosen vice-president of the Penn Anthracite Collieries Co.

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Oil Tariff Favored

A tariff of 2c. per gallon on imported fuel oil is favored by the House Ways and Means Committee, according to a poll taken on Feb. 5. Hearings on the question were closed a week before, with C. B. Huntress, executive secretary, National Coal Association, appearing before the committee in favor of a tax. The Hoover administration, on Feb. 5, through the medium of a letter from Secretary of the Interior Wilbur to Senator Hiram Johnson, chairman of the Senate Committee on Commerce, went on record in favor of an oil tariff, provided a more systematic proration and conservation program can be worked within and among the states.

Appropriation Cuts Threaten Bureau of Mines Service

A successful drive against appropriations for the work of the U. S. Bureau of Mines was made in the House on Feb. 22 under the leadership of Representative Douglas, Arizona. No voice was raised against amendments providing for a further reduction of $194,615 in the budget for the coming fiscal year. This cut was in addition to a slice of $186,253 previously made by the Appropriations Committee. With reductions made by the Secretary of Commerce and the Bureau of Budget, the two reductions, if concurred in by the Senate, would mean that total allowance for work in the mining industry would be decreased $420,430 from the amount allowed for work in the present fiscal year.

Representative Douglas, after criticism a few days later, had a change of heart and wrote the Senate Appropriations Committee suggesting that it hear officials of the Bureau of Mines in order that overly drastic cuts would not impair the necessary and vital function of the bureau. If the Senate fails to restore the funds cut out in the House, the present statistical offices in Denver, Salt Lake City, San Francisco, and Joplin, which are devoted to the study of the economics of the mineral industries, will have to be closed, and the regular issuance of reports on production, value, and other features of processing and distribution will be stopped or seriously delayed in publication. Study of synthetic fuels and the testing of coal will be seriously cut.

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Central Cleaner Proposed

Plans for the installation of a central cleaning plant to handle all of the coal in the Broad Top field of Pennsylvania have been launched by the Broad Top Coal Operators' Association. According to tentative plans, the proposed plant will have a daily capacity of 4,000 tons and will produce five sizes of coal. Saxton has been tentatively chosen as the site of the plant. The type of mechanical cleaning equipment is yet to be decided.

Coincident with the erection of the cleaner, the Broad Top operators plan the formation of a sales agency to handle the output. A committee is planning the

details of financing the project. Coal men on the committee include Banks Hudson, Everett-Saxton Co.; R. H. Kay, Kay Coal Mining Co.; Chester J. Langdon, Langdon Coal Co.; and George P. Pilling, Pilling Coal Co.

Cincinnati Convention Plans Go Forward

The economics of practical coal-mine operation, covering administration, economies to be derived through mechanization, costs and maintenance with mechanical mining, accident prevention as an economy measure, and realization to the industry through cleaning are slated for discussion at the annual coal convention to be held at Cincinnati, Ohio, May 2-7, under the auspices of the Manufacturers' Division of the American Mining Congress. A national exposition of mining machinery, equipment, and supplies will be held in connection with the convention. More than a hundred companies will show the latest types of equipment with an estimated value of $3,000,000.

The program is being whipped into shape by a committee of coal operators from the various producing fields of the country under the chairmanship of George C. McFadden, Chicago, vice-president of the Peabody Coal Co., in cooperation with J. F. Callbreath, secretary, American Mining Congress; Charles C. Whaley, Myers-Whaley Co., of Knoxville, Tenn., chairman of the Manufacturers' Division; and L. W. Shugg, General Electric Co., Schenectady, N. Y., director of exhibits.

Nine separate convention sessions are planned, including one on the position of coal in the industrial life of the country, one on the anthracite industry of Pennsylvania, and others on the general stabilization problems of the bituminous industry. Meetings of the program committee have been held at Pittsburgh, Pa.; Chicago, and Washington, D. C.

Sales Agency Formed

The Cherokee Coal & Coke Co., specializing in the distribution of coal from five stripping operations in the Pittsburg district of Kansas, was formed at Kansas City, Mo., last month. G. L. Parson, for 28 years with the Central Coal & Coke Co., Kansas City, heads the new agency. Producing companies participating are: Kelley Coal Co., Apex Coal Co., Mulberry Coal Co., Peerless Coal Co., and the Alston Coal Co.

Coal Stocks Rise

Commercial stocks of bituminous, used largely for industrial purposes, totaled 35,500,000 net tons on Jan. 1, 1932, according to the quarterly estimate of the U. S. Bureau of Mines. This compares with 34,500,000 tons in storage on Oct. 1, and 37,200,000 tons on Jan. 1, 1931.

James H. Pierce

Pierce Elected President Of East Bear Ridge

James H. Pierce, vice-president, Stuart, James & Cooke, Inc., New York City, has been elected president of the East Bear Ridge Colliery Co., Mahanoy Plane, Pa., formerly a part of the Temple anthracite holdings. Mr. Pierce began his mining career as a transitman for the Lehigh Valley Coal Co. in 1910, and later was division engineer of the Maryland division of the Consolidation Coal Co., general superintendent of the Paint Creek Collieries Co., general superintendent of the East Bear Ridge Collieries, and, beginning in 1919, assistant to the president of the Buck Run Coal Co. A few years later he resigned his position with the Thorne-Neale anthracite interests to join the staff of Stuart, James & Cooke, which connection he will retain.

Organize Coal Division

A Coal Mining Division of the American Mining Congress was organized at a meeting of coal operators held at Pittsburgh, Pa., last month. The division has for its objective the eventual stabilization of the coal-mining industry through the development of practicable and economical methods of operation based on cooperative surveys, supplemented by an annual convention of practical coal-operating officials, and a national exposition of coal-mining machinery and supplies, and will consolidate and coordinate activities hitherto carried on by the national committee on mechanized mining, the Cincinnati convention, and the Manufacturers' Division of the American Mining Congress.

Coal operators attending the organization meeting were: E. J. Newbaker, Berwind-White Coal Mining Co., Windber, Pa.; Dr. L. E. Young, Pittsburgh Coal Co., Pittsburgh, Pa.; Paul Weir, Bell & Zoller Coal & Mining Co., Centralia, Ill.; P. C. Thomas, Koppers Coal Co., Pittsburgh; F. R. Lyon, Consolidation Coal Co., Fairmont, W. Va.; R. L. Ireland, Jr., Hanna Coal Co., Cleveland, Ohio; and R. E. Taggart, Stonega Coke & Coal Co., Philadelphia, Pa.

Personnel of the new division is as follows: chairmen and executive committee—Messrs. Taggart, Weir, Ireland, and Chas. C. Whaley, Myers-Whaley Co., Knoxville, Tenn.; board of governors—R. M. Shepherd, Allegheny River Mining Co., Kittanning, Pa.; C. E. Abbott, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala; David Ingle, Ayrshire Coal Co., Evansville, Ind.; Otto Herres, United States Fuel Co., Salt Lake City, Utah; Robert G. Worthington, National Fuel Co., Denver, Colo.; and Messrs. Newbaker, Young, Thomas, and Lyon.

Urge Private Operation Of Muscle Shoals

The position of the Muscle Shoals Commission that those properties should be devoted to private industry and operated under a lease from the government for the primary purpose of manufacturing fertilizer and other chemicals was supported by Milton H. Fies, vice-president, DeBardeleben Coal Corporation, Birmingham, Ala., speaking for the Alabama Mining Institute at a hearing of the Senate Committee on Agriculture last month. Mr. Fies told the committee that such operation would mean a direct increase of nearly 1,000,000 tons in coal consumption.

Loans to Mining Companies

Mining companies desiring aid through the Reconstruction Finance Corporation created by Congress must make applications to banks and other financial institutions, offering such collateral security as they possess. The corporation states that no special instructions have been issued about loans to the mining industry, and that such advances as banks desire to make to mining companies from funds advanced by the corporation would have to come within the provisions of the law and be covered by adequate collateral.

Anthracite Standards Adopted

Standard specifications for oversize and undersize and for the maximum allowable percentages of slate and bone were adopted by the Anthracite Institute on Feb. 10, as follows:

	Through, Inches	Over, Inches	Oversize, Maximum Per Cent	Undersize, Maximum, Per Cent	Undersize, Minimum, Per Cent	Slate, Maximum Per Cent	Bone, Maximum Per Cent
Broken	4⅜	3¼	5	15	7½	1½	2
Egg	3¼	2 7/16	5	15	7½	1½	2
Stove	2 7/16	1⅜	5	15	7½	2	3
Chestnut	1⅜	¾	5	15	7½	3	4
Pea	¾	7/16	10	15	7½	5	5
Buckwheat	7/16	7/16	10	15	7½	..	..
Rice	7/16	7/16	10	15	7½	..	..
Barley	7/16	7/32	10	20	10	..	..

Appalachian Coals, Inc., Organizes; Sales Agency Plans Pressed

COAL producers in general, while carrying on efforts to form district sales agencies in a number of the producing fields of the country, were disposed to defer final action until the pending legal test in the Appalachian Coals, Inc., case is decided, according to information collected and compiled by *Coal Age*. Producers interested in Appalachian Coals, however, continued their efforts to form an organization so that the case may be carried to the courts as soon as possible. At a meeting in Cincinnati, Ohio, March 1, it was announced that 70 per cent of the tonnage in the eight Southern high-volatile fields participating had been signed up, and that another 10 or 12 per cent would come in in the near future.

Officers were chosen at the Cincinnati meeting as follows: president, J. D. Francis, vice-president, Island Creek Coal Co., Huntington, W. Va.; vice-president, E. C. Mahan, Southern Coal & Coke Co., Knoxville, Tenn.; secretary-treasurer, R. E. Howe, secretary, Southern Appalachian Coal Operators' Association, Knoxville. That the Appalachian Coals case will soon reach the courts, was the opinion of Attorney General Mitchell, as stated on March 3. Mr. Mitchell indicated that the organization had reached the stage where a suit could be brought.

Another bill for the stabilization of the coal industry (H. R. 9924) was introduced in Congress Feb. 29 by Representative Lewis, of Maryland, who spent some time abroad last summer studying the situation in Great Britain. According to its author, the cardinal objectives of the bill are: maintenance of reasonable minimum prices fair alike to operator, miner and consumer; equitable allocation of markets to natural producing districts; guaranty of existing legal rights of workers; and safeguarding a reasonable living wage.

The bill provides for: (1) Appointment of a Coal Commission of five members to determine maximum coal prices for each district and hear complaints as to their reasonableness; pass upon freight rates, subject to review by the Interstate Commerce Commission; study imports and exports and make necessary regulations; conduct research in coal consumption, safe and economical operation of mines, sales and marketing, development of new uses for coal, and in labor welfare.

(2) Establishment of a coal operators' council consisting of one representative of the operators in each of 27 bituminous districts and three anthracite districts with one additional representative for each district for 15,000,000 tons of production. The council will allocate tonnages between districts, collect penalties for exceeding allocated tonnages, and review the work of district boards, including established minimum prices.

(3) Establishment of district boards of five operators in each district, to allocate the district tonnage between the various mines; fix minimum prices, which shall not be less than the weighted average cost of production for the district, plus 25c., and which shall provide for a reasonable scale of wages; and collect penalties of 60c. a ton for each ton a mine produces in excess of its allotment.

Under the Lewis measure all corporations mining and shipping coal in interstate commerce must secure a federal license. National and district committees of investigation are proposed to investigate any complaint made under the workings of the act. Employees are permitted to deal through representatives of their own choosing, organize and maintain a labor organization, and no licensee shall make it a condition of employment that the employee shall not join a labor union.

The American Federation of Labor threw its weight behind the Davis-Kelly bill last month, while John L. Lewis, president, United Mine Workers, called on the President to urge that he use his influence in securing prompt enactment. A sub-committee of the Senate Committee on Mines and Mining was appointed late in the month to hold hearings on the bill. The departments of Justice, Labor, and Commerce failed to respond to invitations for comments, while the Interstate Commerce Commission asked that several provisions of the bill be clarified.

Summary of Progress in the Formation of District Sales Agencies up to March 1, 1932*

District	Summary of Progress
Alabama	No information available.
Southern Appalachian, Hazard, Harlan, Big Sandy, Ky.; Kanawha, Logan, Williamson, W. Va.; Southwest Virginia	Joint meeting of operators and committeemen tentatively approves sales agency plan at Cincinnati (Ohio) meeting, Dec. 10; charter granted Appalachian Coals, Inc., early in January, and stock subscription campaign is started; U. S. Department of Justice indicates (Feb. 6) that it will cooperate in the prosecution of a test case to determine the legality of the plan; organization plans go ahead, with 70 per cent of the tonnage in the eight fields signed up by March 1 and 10 to 12 per cent additional promised; officers chosen on March 1; Attorney General Mitchell (March 3) indicates that test suit will be started in near future.
West Kentucky	Joint meetings of operators and committee held on Jan. 5 and Feb. 3; plan approved in principle and committee appointed to prepare organization plan to be submitted at future meeting of operators; final action probably will await decision in Appalachian Coals case.
West Virginia Smokeless	Operators approve plan at Washington (D. C.) meetings, Jan. 19 and 20, and instruct committee to obtain charter for agency; action later postponed pending Appalachian Coals decision.
Northern West Virginia	Operators approve plan at Fairmont (W. Va.) meeting, Jan. 6, and appoint committee to draw up organization plan; this committee completes drafts Feb. 9, and these will be discussed at future meeting of operators.
Central Pennsylvania	Committee holds a number of meetings to consider procedure; definite action to be deferred pending Appalachian Coals decision.
Broad Top (Pa.)	Operators consider plan on Jan. 22 and appoint committee to work out organization details.
Freeport (Pa.)	No information available.
Western Pennsylvania	Operators approve plan in principle at Pittsburgh (Pa.) meeting, Jan. 7, and appoint committee to work out organization details; organization plan later evolved and submitted for legal advice; formation of agency deferred pending Appalachian Coals decision.
Ohio	Committee at Cleveland (Ohio) meeting, Dec. 15, votes to form agency and appoints subcommittee to get legal opinions; favorable opinions were submitted at Dec. 22 meeting, and subcommittee was continued to prepare organization plan; this committee later employed legal counsel to prepare necessary documents; these documents were approved at Feb. 23 meeting, and were scheduled for presentation to operators in Ohio and the northern Panhandle of West Virginia at meeting on March 8; plans will be advanced until agency can begin to function immediately if Appalachian Coals case is decided favorably.
Illinois	Operators favorable but no formal meetings have been held pending negotiations of new wage contract and decision on legal questions in other districts.
Indiana	Operators consider plan at meeting in December.
Kansas, Missouri, Arkansas, Oklahoma	No information available.
Montana	No information available.
Colorado, New Mexico	Four meetings held by committee to discuss application of plan; operators respond favorably, committee inquiry shows, but express the opinion that definite action should be deferred until Appalachian Coals case is decided.
Southern Wyoming	Two meetings held by committee; report of committee findings presented at Southern Wyoming Coal Operators' Association meeting, Feb. 25; no action was taken, pending Appalachian Coals decision.
Nort'n Wyoming	No information available.
Utah	No information available.
Washington	No information available.

*Compiled from reports submitted *Coal Age* by various committee members, supplemented by other available information in the absence of committee reports.

Willful Negligence Voids Compensation Payment

Willful negligence on the part of the employee voids payment of compensation for injuries received as a result of this negligence, the West Virginia Court of Appeals ruled last month in a case brought by the Red Jacket Consolidated Coal & Coke Co. The decision of the compensation commissioner was reversed, and the case dismissed. In handing down its opinion, the court stated that the dependents of a miner fatally injured by using short fuse in violation of the state mining law are not entitled to collect compensation and that an employee assumes full responsibility for anything that may happen to him if he indulges in practices known to him to be dangerous and which violate the instructions of his foreman.

Coal-Mining Problems Discussed By Indiana Institute

Safety was the major theme of the first annual meeting of the Indiana Coal Mining Institute, held at the Hotel Deming, Terre Haute, Ind., Feb. 18. In addition, coal men in attendance discussed other operating problems and measures for the stabilization of the bituminous industry. Speakers and their subjects were as follows: "What Has Been Done and What Can Be Done in Accident Prevention?" W. C. Argust, division superintendent, Peabody Coal Co., Taylorville, Ill., with discussion led by A. C. Dally, chief mine inspector for Indiana, Indianapolis; "What Can Mine Officials Do to Improve the Quality of Indiana Coal and Make It More Easily Salable?" J. T. Reid, sales manager, Sterling Midland Coal Co., Indianapolis, with discussion by P. L. Donie, vice-president, Little Betty Mining Co., Vincennes, Ind.; "Controlling the Acidity of Mine Water by Sealing," Wesley Harris, president, Bicknell Coal Co., Bicknell, Ind., with discussion led by Robert Templeton, general superintendent, Templeton Coal Co., Sullivan, Ind.; and "Efficiency in Mine Ventilation," H. G. Conrad, general manager, Knox Consolidated Coal Co., Bicknell, with discussion led by B. H. Schull, superintendent, Binkley Mining Co., Clinton, Ind.

Question box discussion, which was presided over by W. H. Forbes, associate engineer, U. S. Bureau of Mines, Vincennes, revolved around the questions of regulation to prevent accidents from falls of roof and coal, prevention of explosions, adoption of safety standards, and methods of educating miners and operators in safety.

Competitive conditions facing the bituminous industry and proposed regulations with which it is threatened were outlined by C. B. Huntress, executive secretary, National Coal Association, Washington, D. C. Mr. Huntress stated that coal producers are now working out their own plan for stabilization, and urged that those present lend their efforts to the program. Other speakers voiced opposition to the Davis-Kelly bill.

One of the major portions of business engaging the attention of institute members was the presentation of the U. S. Bureau of Mines certificate to John A. Templeton, president, Templeton Coal Co., Terre Haute, for attending a class in accident prevention one night a week for nine months. Mr. Templeton, according to reports, is the only man to receive a certificate at his age, 73.

Permissible Plates Issued

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

(1) Sullivan Machinery Co.; Type CR-3 mining machine; 30-hp. motor, 250-500 volts, d.c.; Approvals 238 and 238A; Jan. 13.

(2) Sullivan Machinery Co.; Type CR-3 mining machine; 50-hp. motor, 250-500 volts, d.c.; Approvals 239 and 239A; Jan. 14.

The following cable was added to the list of "Specially Recommended Cables" during December:

BM-15, Rome "Super-Service" No. 8 twin cable (7x7 stranding).

Glen Alden Moving Power Plant

Removal of the Pettebone colliery power plant, Forty Fort, Pa., to the Lance No. 11 colliery, Plymouth, Pa., was started by the Glen Alden Coal Co. last month. Transfer of the equipment will involve an expenditure of $100,000, according to reports. The Pettebone operations have been closed down in accordance with the company's policy of discontinuing high-cost properties.

Personal Notes

HORACE HAMMOND, vice-president of the Alabama By-Products Corporation, Birmingham, Ala., was elected president of the company last month, succeeding the late M. W. Bush. Mr. Hammond was associated with Mr. Bush in the coal and coke industries for a long period of years.

R. TEMPLETON SMITH, general manager, Poland Coal Co., Pittsburgh, Pa., has been elected vice-president of the Pittsburgh Coal Co.

R. V. CLAY has been made vice-president and general manager of the Hanna Coal Co. and the Jefferson Coal Co., with headquarters at St. Clairsville, Ohio. Mr. Clay formerly was assistant general manager of the Hanna company. R. L. IRELAND, JR., relinquishes his former title of general manager of these operations, but remains as vice-president, with headquarters in Cleveland, Ohio.

JOHN I. THOMAS, Phillipsburg, Pa., Deputy Secretary of Mines in charge of the Pennsylvania bituminous division, retired from active service on Feb. 22 after fourteen years of service as a mine inspector and deputy secretary.

Norris Bill Passed by Senate

The Norris anti-injunction bill, outlawing "yellow dog" contracts and curbing the power of the federal courts in labor disputes, was passed by the Senate on March 1 by a vote of 75 to 5. The five senators opposing the bill were from Connecticut, New Hampshire, Vermont, and Maine. The House Judiciary Committee held hearings on the bill on Feb. 25, and on March 2 voted unanimously to press for prompt passage in the House. Testimony in opposition was offered by representatives of the Association of Railway Executives, League for Industrial Rights, National Association of Manufacturers, and the National Coal Association.

Thirty-eight Killed in Explosion

An explosion at the Boissevain mine of the Pocahontas Fuel Co., Boissevain, Va., on Feb. 27, killed 38 men on the night shift. Twelve other members of the night-shift crew escaped. The mine is non-gaseous, and the cause of the explosion has not yet been determined, though opinions were expressed that it was due to the ignition of a large quantity of blasting powder. Four hundred men are employed on the day shift.

Associations

R. L. Ireland, Jr., vice-president, Hanna Coal Co., Cleveland, Ohio, was elected president of the Eastern Ohio Coal Operators' Association at the annual meeting last month. Other officers were chosen as follows: vice-president, Wm. Emery, Jr., president, Cambridge Collieries Co., Cleveland; treasurer, Elliott Willard, general manager, United States Coal Co., Cleveland; and secretary, D. F. Hurd, Cleveland (re-elected.)

E. S. Wade, superintendent, Windsor Power House Coal Co., Windsor Heights, W. Va., was re-elected president of the Panhandle Coal Mining Institute for the thirteenth time at the annual meeting held in Wheeling, W. Va., last month. A. M. McConnell, Wellsburg, was elected to his tenth term as secretary-treasurer. Vice-presidents were chosen as follows: George Caldwell and Matthew Kendo, West Virginia-Pittsburgh Coal Co.; Charles Aitken, Wheeling Coal Co.; D. M. Ryan, engineer, Wheeling; A. B. Pryor, Elm Grove Mining Co. of Ohio; and Clinton Osborn.

C. B. Ross, retired state mine inspector, was again elected president of the Chauncey B. Ross Mining Institute at the quarterly meeting held in Latrobe, Pa., Feb. 19. The other officers also were re-elected, as follows: vice-president, State Mine Inspector I. F. Roby, Latrobe; treasurer, Robert Sterret, superintendent of the Forbes Road, Luxor, and Hannastown plants of the Jamison Coal & Coke Co.; secretary, H. Clyde Elkins, superintendent, Seger Bros. Coal Co., Derry, Pa.

United Mine Workers' Convention Ends; Ohio Strike Spreads

EACH district was authorized to make the best wage and working agreements possible in the report of the scale committee of the United Mine Workers approved by the international convention of the organization at its closing session at Indianapolis, Feb. 5. The scale committee also urged that each district press for a six-hour day and five-day week, and also that they attempt, as far as possible, to conclude agreements with uniform wage scales and which would expire at the same time. Further recommendations of the scale committee included more satisfactory adjustments of wages as between classes of labor, reforms in connection with mechanical loading rates and practices, and elimination of discrimination because of age and other unfair requirements of employment. The scale committee also recommended that the international officers renew their appeal to the President for a conference between operators and miners to consider stabilization of the industry on a national or readjusted competitive field basis.

District 12 delegates, refusing to exhibit a chastened spirit at the Illinois scale meeting held in Springfield, Ill., which convened on Feb. 23, declined to lift the injunction against Lewis and his aides, on the ground that it would invite interference by the international officers. Considering proposals for a new agreement to replace the one expiring March 31, the conference voted approval of recommendations for a six-hour day and a five-day week, a tonnage instead of a day basis for loading machines, a reduction of 20 per cent in the price of explosives, an increase of from $6.10 to $7 per day for day labor, a wage of $10.07 per day for electricians, mechanical repair men, and welders, time and one-half for overtime, and a new wage scale for all classes of labor at strip operations.

The Illinois operators, it is indicated, will request a reduction in wages at the coming negotiations, though no figures as to the extent of the proposed cut have been mentioned. The reduction, they contend, is necessary to allow them to meet competition from non-union fields.

Indiana operators, at a meeting in Terre Haute, Ind., Feb. 19, voted to request a lower scale of wages for District 11 at the coming negotiations for a new agreement. The miners, on the other hand, are expected to propose that the present scale be continued. No date for the joint meeting has yet been set.

A further wage reduction of approximately 10 per cent went into effect in the New River and Winding Gulf fields on Feb. 16. General conditions within the industry, the increase of 6c. in coal freight rates, the inroads of foreign oil and other substitute fuels, and wage reductions in neighboring fields were given as the reasons for the move. According to reports, machine runners will receive $4 a day, against $4.64; motormen, $3.60 against $4; outside labor, a minimum of $2.64, compared with $3.20; loaders, 28½ to 33c. per ton.

The strike which started in the Hocking Valley (Ohio) field when wages were reduced on Feb. 1 spread to the Pomeroy bend field on March 1, when 300 men employed by Syracuse Mining, Inc. and the Stalter & Essex Coal Co. walked out in sympathy with the miners in the Hocking field. The stoppage followed a mass meeting at which many of the men strenuously objected to the move, but were overruled. Additional operations closed in the Hocking field included these of the Ohio Collieries Co. and the Carrow Mining Co.

Miners rejected a plan for settlement drawn up by business men in the Hocking field, insisting that they would not return to work until the union was granted recognition. Operators were firm in their refusal to consider closed-shop operation. Several attempts to assault workers have been made by strikers in recent weeks.

The strained relations in eastern Kentucky and Tennessee were aggravated in February by investigations by outside parties under the sponsorship of the National Miners' Union, threats of inquiries by Congress, demonstrations by miners, arrests for criminal syndicalism, and the fatal shooting of Harry Simms, National Miners' Union organizer, on Feb. 10 by a mine guard at Brush Creek.

Early in the month, a committee of New York writers made an attempt to investigate conditions in the region and deliver food to the miners, but the party was broken up after peace authorities arrested part of its members on criminal syndicalism charges and ejected the rest from the region. Charges of assault were made by two of the members sent out of the field, and their statements resulted in proposals in Congress for an inquiry in eastern Kentucky. Representative Finley, Kentucky, suggested that the scope of any such investigation be broadened to include an inquiry into communistic activities in New York City. Ten strike leaders arrested after the writers' committee was broken up were indicted on criminal syndicalism charges at Pineville, Ky., March 1.

After several months of quiet in western Kentucky, the substations at the Diamond Coal Co. and Duvin Coal Co. plants were dynamited on Feb. 20. A second Diamond plant escaped injury when a sack of explosive failed to go off. The Diamond loss was reported to be $3,500 and put 300 men out of work for a week; the Duvin loss was estimated at $150.

The W. H. Hughes & Co. mine at Lilly, Pa., resumed operations on a limited scale at the end of the month, after being idle for over a month when 600 miners walked out in protest against laying off the night shift because of slack demand. Minor disturbances featured the shutdown, but no serious trouble was encountered.

A recommendation for a reduction of 10 per cent in the wages of day men, with a minimum of $3.25, and a decrease of 12.5 per cent in all contract rates, effective March 15, was made last month by the Duncan Commission, formed to investigate the coal industry in Nova Scotia after the Dominion Steel & Coal Corporation, Ltd., and the United Mine Workers had clashed over proposed wage cuts and closing down of high-cost mines. The commission also recommended the formation of machinery and the appointment of an umpire to settle disputes over wage and working conditions, and allowed the Dominion company to shut down three mines this year and one in 1934. Closing of an additional operation by the company was opposed.

Anthracite Operators and Miners Argue Wage Reductions

Anthracite operators and miners have ranged themselves into two opposing camps in the past few weeks on the question of a reduction in wages. Among the operators who have suggested a decrease is L. F. Loree, president of the Hudson Coal Co., who, in his annual report to the stockholders, asserted that the rates are unduly high in relation to wages paid in other industries, and that they militate against any substantial reduction in anthracite prices, which he gives as one of the major causes for the decline in anthracite sales, along with mild weather and the nation-wide depression in industry and business. "A reduction in wage rates," Mr. Loree declared, "would permit a substantial reduction in the selling price of anthracite and undoubtedly would result in an accelerated market demand, more opportunity to work, and higher annual earnings for the employees."

Union leaders issued a strong denial last month of reports that the miners might sanction a reduction. All were in agreement that a cut would not increase consumption of anthracite or assist in stabilizing the industry.

Obituary

JOSEPH LINCOLN MURPHY, 55, president of the New York Coal Co., died at his home in Columbus, Ohio, Feb. 20 of a heart attack. Mr. Murphy went with the New York Co. in 1903 directly after graduating from Ohio State.

WARD M. AMOS, 50, assistant secretary-treasurer of the Lorado Coal Mining Co. and the Lorain Coal & Dock Co., Columbus, Ohio, died last month at a hospital in Chillicothe, Ohio, of injuries sustained in an automobile wreck. Mr. Amos had been associated with the Lorain Coal & Dock Co. for 25 years.

Financial Reports Issued

M. A. Hanna Co., for the year 1931, reports a net profit of $1,377,925 after interest, depreciation, and other charges, equal, after preferred dividends, to 39c. a share on 1,016,961 shares of common stock. Earnings in 1930 were $2,266,-814, or $1.26 a share.

Westmoreland Coal Co., for the year 1931, reports a net loss of $7,315 after taxes, depletion, and depreciation, against net profits of $270,967 in 1930, equal to $1.35 a share on 200,000 shares.

Westmoreland, Inc., reports net profits of $252,057 in 1931 after taxes and other charges but before depletion, equal to $1.26 a share on 200,000 capital shares. This compares with net profits of $299,740 in 1930, or $1.50 a share.

Hatfield-Campbell Creek Coal Co., for the year 1931, reports net profits of $5,035 after interest and reserves, equal to 25c. per share on 19,553 shares of 8 per cent preferred stock. Net profits in 1930 were $100,407, or $5.13 per share of preferred stock.

Virginia Iron, Coal & Coke Co., for the year 1931, reports net profits of $105,948 after interest, depreciation, depletion, and other charges, equal to $5.32 a share on 19,908 shares of 5 per cent preferred stock. This compares with a net loss of $34,625 in 1930.

St. Louis, Rocky Mountain & Pacific Co. reports net profits of $16,238 in 1931 after interest, federal taxes, and depreciation, equal to $1.62 a share on 10,000 shares of 5 per cent preferred stock. Net profits in 1930 were $151,-910, equal, after preferred dividends, to $1.02 a share on 100,000 shares of common stock.

United Electric Coal Cos., for the quarter ended Jan. 31, reports net income after all deductions, of $114,763, against $48,834 in the corresponding quarter a year ago. Net income for the six months ended Jan. 31 was $175,887, compared with $59,714 in the corresponding period a year ago.

Colorado Fuel & Iron Co. and subsidiaries report a consolidated net loss of $3,363,207 in 1931 after interest, depreciation, depletion, and federal taxes. Net income in 1930 was $298,649, equal, after dividends on the 8 per cent preferred stock, to 41c. a share on 340,505 shares of $100 par value stock outstanding.

Pittsburgh Coal Co. and subsidiaries report a net loss of $2,300,418 in 1931, after interest, depletion, depreciation, proportion of net loss of subsidiary companies accruing to minority interests, and federal taxes of subsidiary company. Net loss in 1930 was $1,078,196.

Glen Alden Coal Co. reports a net income of $7,391,409 in 1931 after depreciation, depletion, interest, federal taxes, and other charges, equal to $4.01 a share on 1,844,537 shares of stock outstanding. Net income in 1930 was $12,245,907, or $6.64 a share.

Philadelphia & Reading Coal & Iron Co., for the year 1931, reports net profits of $1,360,295 after interest, depletion, depreciation, and reserves, equal to 90c. a share on 1,400,000 shares. Net profits in 1930 were $1,026,055, or 73c. a share.

Hudson Coal Co. reports a net loss of $729,777 in 1931 after interest, depletion, and depreciation, against a net profit of $1,166,929 in 1930.

Lehigh Valley Coal Corporation, for the year 1931, reports net profits of $957,321 after federal taxes, depreciation, and depletion, equal, after requirements of preferred and minority stocks, to 21c. a share on 1,202,698 shares of common stock. Net profits in 1930 were $714,336.

Lehigh Coal & Navigation Co. reports for 1930 a net income of $2,360,-209 after expenses, interest, and taxes. This includes income from its direct operations and from railroad rentals, dividends, and income from other sources, but excludes the company's share of undistributed losses and earnings of subsidiaries. Including undistributed losses and earnings, the consolidated net income of the company in 1931 was $2,062,977, equal to $1.07 a share on 1,930,065 shares of stock. This compares with a consolidated net income of $2,189,729 in 1930, or $1.13 a share. Consolidated net income statements, however, do not include the company's proportion of undistributed earnings of other companies in which it has a substantial but not controlling interest.

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To Open Strip Mine in Ohio

Opening of a strip mine on what formerly was the land of the Superior Coal Co., near Jackson, Ohio, is planned by David Armstrong, Mayor of the city, and Stanley Thomas, it is reported.

Coming Meetings

Anthracite section, American Institute of Mining and Metallurgical Engineers; Westmoreland Club, Wilkes-Barre, Pa., March 12.

Canadian Institute of Mining and Metallurgy; annual meeting, Windsor Hotel, Montreal, Canada, April 5-7.

Engineers' Society of Northeastern Pennsylvania; thirty-eighth anniversary banquet, Hotel Casey ballroom, Scranton, Pa., April 7.

Fifth Midwest Bituminous Coal Conference; Lafayette, Ind., April 14 and 15.

Virginia Coal Operators' Association; annual meeting, Norton, Va., April 16.

American Mining Congress; annual coal convention and exposition of coal-mining machinery, Cincinnati, Ohio, May 2-7.

Mine Inspectors' Institute of America; annual meeting, May 9-11, Mallow-Sterling Hotel, Wilkes-Barre, Pa.

National Association of Purchasing Agents; annual meeting, June 6-9, Book-Cadillac Hotel, Detroit, Mich.

Illinois Mining Institute; annual boat trip and summer meeting on S.S. "Cape Girardeau," leaving St. Louis June 10 and returning June 12.

Colorado and New Mexico Coal Operators' Association; annual meeting, Boston Building, Denver, Colo., June 15.

American Society for Testing Materials; annual meeting, June 20-24, Atlantic City, N. J.

American Institute of Electrical Engineers; annual summer convention, Cleveland, Ohio, June 20-24.

Industrial Notes

General Electric Co., Schenectady, N. Y., has added a distribution department to its commercial department, which will be headed by J. V. Anthony, formerly of the San Francisco office, as manager, and Hancock Griffin, former supervisor of district stocks and warehouses, as assistant manager. The distribution department will handle, warehouse, ship, and bill all finished stocks of all products exclusive of incandescent lamps, electric refrigerators, merchandise, and plastics.

Seabury S. Gould, second vice-president, has been appointed to the additional position of secretary of Goulds Pumps, Inc., Seneca Falls, N. Y. Mr. Gould succeeds H. S. Fredenburgh, resigned. Hamilton Garnsey, Jr., has been made assistant to the president.

W. A. Rosenberger, for twenty years a specialist in blast cleaning and dust-collecting problems, has been promoted to the position of chief engineer for the Pangborn Corporation, Hagerstown, Md.

R. Feuss, Steglitz, Germany, manufacturer of instruments for scientific research and industrial control, has established a branch office at 245 West 55th St., New York City, under the name R. Feuss, Inc.

Simplex Wire & Cable Co. has removed its general office to 79 Sidney St., Cambridge A, Boston, Mass.

Harold B. Ressler, Chicago, has taken over the management of the St. Louis (Mo.) plant of Joseph T. Ryerson & Son, Inc. Mr. Ressler is vice-president. In his absence, R. B. Wilson, manager of sales for the St. Louis plant, will be senior resident executive.

J. F. Mehlhope, formerly with the Central Alloy Steel Corporation and the Newton Steel Co., has joined the sales force of the Chicago Steel Service Co., Chicago, warehouse distributor for the Republic Steel Corporation, Youngstown, Ohio.

C. E. Wilson, formerly general sales manager, has been made vice-president in charge of industrial relations for the Worthington Pump & Machinery Corporation, New York City. Clarence E. Searle, for seventeen years general representative of the Allis-Chalmers Mfg. Co., has been made vice-president in charge of sales.

John F. Maurice, for more than four years a sales engineer with the American Coal Cleaning Corporation, has accepted a similar position with the Pennsylvania Mining Machinery Corporation. Mr. Maurice will continue at Huntington, W. Va.

Coal Mine Fatality Rate Rises in January In Spite of Anthracite Reduction

ACCIDENTS in the coal mines of the United States during January, 1932, caused the death of 90 men, according to reports received from state mine inspectors by the U. S. Bureau of Mines. This was a 50 per cent reduction from the number reported for January last year, while the output of coal decreased only 29 per cent, or from 44,699,000 tons in January, 1931, to 31,789,000 tons in January, 1932. The January record also showed fewer fatalities and a smaller production of coal than in the preceding month of December, 1931, when there were 93 fatalities and 34,931,000 tons of coal mined. Comparative death rates per million tons of coal produced were 2.83 for January of the present year, 2.66 for December, 1931, and 4.03 for January, 1931.

Considering bituminous mines alone, the January, 1932, rate was 2.76, based on 77 deaths and 27,892,000 tons, as compared with 3.61 for January a year ago, when there were 139 deaths and a production of 38,542,000 tons, and with 2.25 in December, 1931, resulting from 68 deaths in producing 30,260,000 tons.

In the anthracite mines of Pennsylvania 13 men lost their lives during the month; the production was 3,897,000 tons, resulting in a death rate of 3.34. This figure indicates a remarkable improvement when compared with both the rate of 6.66, based on 41 deaths and 6,157,000 tons, in January, 1931, and 5.35, based on 25 deaths and 4,671,000 tons in December, 1931.

There was one major disaster—that is, a disaster in which five or more lives were lost—during January, 1932. This was an explosion in a mine at Parrott, Va., Jan. 18, in which 6 men lost their lives. During January, 1931, three major disasters, all caused by gas or dust explosions, resulted in 41 deaths. Based exclusively on these disasters, the death rates per million tons were 0.189 for 1932 and 0.917 for 1931. The single major disaster in January, 1932, represented a rate of 3.15 separate disasters (as distinguished from the number of deaths resulting from the disaster) for each hundred million tons of coal produced, as compared with a rate of 6.71 resulting from the three disasters during the corresponding month in 1931.

A comparison of the accident rates for January, 1932, with those for January, 1931, shows a reduction in all of the principal causes of fatal accidents in coal mines with the exception of haulage and electricity.

Fatalities at United States Coal Mines and Death Rates Per Million Tons in January, 1931 and 1932, by Causes of Accidents

Cause	Bituminous: Number Killed	Bituminous: Killed per 1,000,000 Tons	Anthracite: Number Killed	Anthracite: Killed per 1,000,000 Tons	Total: Number Killed	Total: Killed per 1,000,000 Tons
January, 1931*						
All causes	139	3.606	41	6.659	180	4.027
Falls of roof and coal	60	1.556	26	4.223	86	1.924
Haulage	22	.571	3	.487	25	.559
Gas or dust explosions:						
Local explosions	...	.....	3	.487	3	.067
Major explosions	41	1.064	..	.....	41	.917
Explosives	...	.....	2	.325	2	.045
Electricity	3	.078	..	.....	3	.067
Miscellaneous	13	.337	7	1.137	20	.448
January, 1932*						
All causes	77	2.761	13	3.336	90	2.831
Falls of roof and coal	40	1.434	7	1.796	47	1.478
Haulage	15	.538	3	.770	18	.566
Gas or dust explosions:						
Local explosions	1	.036	..	.....	1	.032
Major explosions	6	.215	..	.....	6	.188
Explosives	1	.036	..	.....	1	.032
Electricity	5	.179	..	.....	5	.158
Miscellaneous	9	.323	3	.770	12	.377

*Preliminary figures.

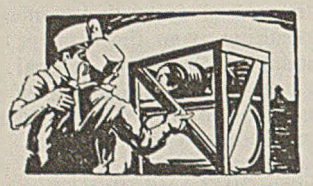
Coal-Mine Fatalities During January, 1932, by Causes and States

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

State	Underground: 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	Underground: Total	Shaft: Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip, or bucket	Other causes	Shaft: Total	Surface: Mine cars and mine locomotives	Electricity	Machinery	Boiler explosions or bursting steam pipes	Railway cars and locomotives	Other causes	Surface: Total	Total by States: 1932	Total by States: 1931
Alabama	1	....	....	....	....	....	1	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	2
Alaska	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Arkansas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Colorado	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	4
Illinois	1	....	1	....	....	....	....	....	1	....	....	3	....	....	....	....	....	....	....	....	....	....	1	1	4	9
Indiana	1	....	2	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	3	31
Iowa	2	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	1
Kansas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Kentucky	2	....	1	....	....	....	....	....	1	....	....	4	....	....	....	....	....	1	....	....	....	....	....	1	5	6
Maryland	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	1
Michigan	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	0
Missouri	....	....	....	....	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	3
Montana	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
New Mexico	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
North Dakota	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Ohio	2	....	1	....	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	3	9
Oklahoma	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Pennsylvania (bituminous)	6	....	4	....	....	2	....	....	....	....	....	12	....	....	....	....	....	....	....	....	....	....	....	....	12	20
Tennessee	2	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	3
Texas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Utah	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	2
Virginia	2	1	....	6	....	....	....	....	....	....	....	9	....	....	....	....	....	....	....	....	....	....	....	....	9	1
Washington	....	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	2
West Virginia	14	5	6	....	....	....	2	....	....	....	....	27	....	....	....	....	....	1	....	....	....	1	1	3	30	44
Wyoming	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	1
Total (bituminous)	34	6	15	7	1	2	5	....	2	....	....	72	....	....	....	....	....	2	....	....	....	1	2	5	77	139
Pennsylvania (anthracite)	4	3	3	....	....	....	....	....	....	....	2	12	....	....	....	....	....	....	....	....	....	1	....	1	13	41
Total, January, 1932	38	9	18	7	1	2	5	....	2	....	2	84	....	....	....	....	....	2	....	....	....	2	2	6	90	....
Total, January, 1931	66	20	25	44	2	....	3	1	3	....	5	169	3	1	....	....	4	2	....	2	....	....	3	7	....	180

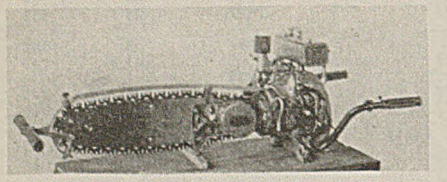
WHAT'S NEW

IN COAL-MINING EQUIPMENT



Portable Timber Saw

Reed-Prentice Corporation, Worcester, Mass., now offers the new Wolf gas-engine-driven portable timber saw, developed primarily for cutting heavy timber in the woods as well as for other applications in the working of timber. This model supplements other air- or electric-motor-driven saws manufactured by the company. Standard models



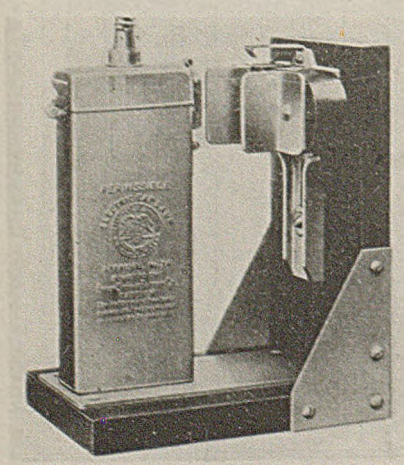
Wolf Portable Timber Saw With Many-Purpose Gasoline Engine

have a capacity of 24 in., and special models can be secured with capacities varying from 16 to 48 in. The engine used on the latest machine was specially developed for this service, the company declares, and embodies light weight, high capacity, and aircraft design. This engine, the manufacturer suggests, is applicable to other industrial uses, including pumping and operation of other industrial machinery.

New Electric Cap Lamps

Mine Safety Appliances Co., Pittsburgh, Pa., has introduced two companion lamps to the Edison Model H electric safety cap lamps. The new models are known as the Model J and Model K miners' electric safety cap lamps and both are officially approved by the U. S. Bureau of Mines. The Model J lamp was developed, it is declared, to meet certain demands from the mining industry for a light weight, compact, efficient storage-battery cap lamp primarily for use in thin seams and low working places. The complete lamp weighs 63 oz., yet furnishes 26-candlepower illumination. Battery dimensions are $7\frac{3}{4}$x$3\frac{1}{4}$x$1\frac{1}{2}$ in. It is the lightest weight mine lamp battery, of its kind, available today, the company asserts.

Three-Cell, Model J Battery and Unlocking Magnet



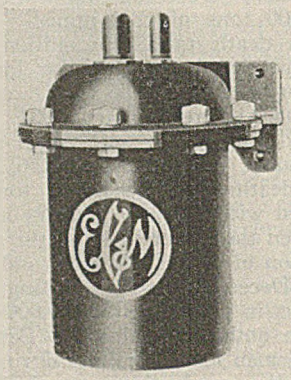
The Model K lamp develops a maximum of 55 candlepower, said to be greater than any portable safety lamp before offered to the mining industry. This lamp, the company says, introduces a new departure in the design of electric cap lamps, in that the battery is made up of three cells instead of two. Both models, it is stated, are equipped with light-weight Bakelite headpieces and highly efficient, double-filament, gas-filled bulbs. Both employ Edison nickel-iron alkaline batteries which are magnetically locked to prevent tampering.

Welding Gas Regulators

Linde Air Products Co., New York City, has brought out a series of new and improved "Purox" oxygen and acetylene regulators, superseding its former line of "Purox" Metal Master regulators. All "Purox" welding or cutting outfits now include these new regulators where formerly Metal Master regulators were supplied as part of the regular equipment. The new series comprises six regulators, designated as Nos. 33 and 34, for acetylene; Nos. 13, 14, 23 and 24, for oxygen. All regulators in this series have the same general external appearance, the company says, and are all-metal, simple, compact, rugged and workmanlike in appearance, and thoroughly reliable in performance. The required volumes of oxygen and acetylene essential for maintaining a neutral flame at the blowpipe tip are delivered to the welding or cutting blowpipe at uniform pressure.

Explosion-Proof Starter

Electric Controller & Mfg. Co., Cleveland, Ohio, offers the "No. 1, Type ZEO, Across-the-Line, Explosion-Proof Starter," which has been approved officially by the Underwriters' Laboratories for use in Class 1, Group D hazardous locations. The inclosing case is declared to be strong enough to prevent transmission of flame to the surrounding atmosphere, and the flanged joint in the case is sufficiently wide to cool off any gases before they get to the outside.



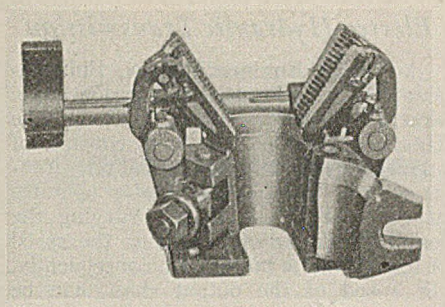
E C & M Explosion-Proof Starter

Contactor mechanism and overload relays are mounted on a removable slate base, and the main contacts and relays are immersed in oil. Terminals are located above the oil level to prevent deterioration of the insulation on the wires. Maximum ratings are: 110 volts, 5 hp.; 220, 440, and 550 volts, 10 hp.

Core-Drilling Aids

Sullivan Machinery Co., Chicago, has developed new "Bulldog" safety clamps for handling diamond drill rods in the hole. Advantages of the clamp, according to the company, are: greater strength, security, and safety for the operative; increased speed and ease in setting up and releasing the clamp because of decreased tendency for the working parts to stick; prevention of injury, distortion, or wear on the drill rods; increased ease of movement and operation because of decreased weight; and gate design which allows the clamp to be placed over the hole or removed while the rods are in position.

The Sullivan company now offers a new service to users of diamond drills. This service consists in the maintenance of stocks of "Ready-set" bortz bits for the convenience of those who wish to avoid employing the services of a skilled diamond setter or carrying an excess stock of bortz. These bits are set with small South African bortz, which the company declares is much lower in first cost and in the cost of diamonds used per foot of hole than carbon. South



"Bulldog" Safety Clamp

African bortz is recommended by the company for drilling in all consolidated or solid formations, whether hard or soft, and in such formations bortz bits, it is said, often will cut faster than those set with carbon.

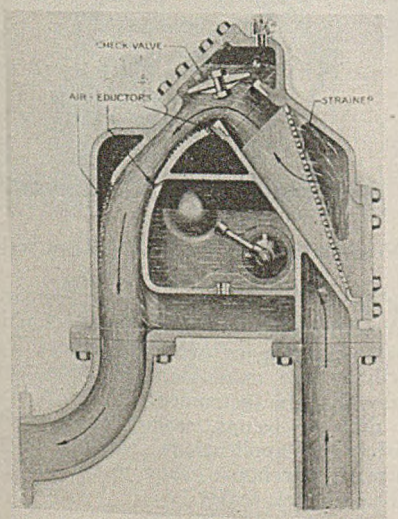
Two types of "Ready-set" bits—square shoulder and round shoulder—are available. Round-shoulder bits are a new development and are said to avoid the excessive wear on the outside diamonds which characterizes the square shoulder bit. Round-shoulder bits, it is asserted, will drill two or three times as many feet in the same formation, while the bortz wear per foot is approximately one-half that encountered with square shoulder bits.

Suction Line Primer

Barrett-Haentjens & Co., Hazleton, Pa., have announced a new priming device for centrifugal pumps, which they declare combines in one compact casting a check valve, strainer, and air-removing device. In operation, the pump and primer are filled with water and the pump is started. Water is then drawn from the priming chamber, with the result that air from the suction line flows through the check valve into the chamber. When the water level is lowered sufficiently, the float throws a mercoid switch, stopping the pump. Water from the pump then rushes back into the chamber and, as the check valve is closed, forces the air out through an opening in the top of the primer into the discharge line. The float rises, again operating the mercoid switch and restarting the pump. This operation is repeated until the air is exhausted from the suction line, whereupon pump operation is continuous, air being removed by the eductors. Operation of the equipment for removing air from the suction line automatically stops when a continuous flow of water is obtained.

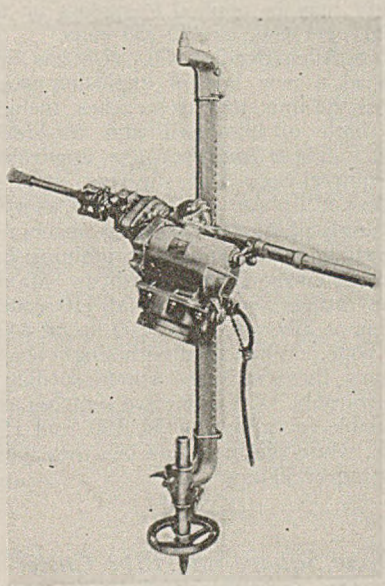
The Hazleton primer, it is said, is adaptable to both manual and automatic operation, and when furnished with a special control panel, allows automatic operation of the pump with complete protection against loss of water, air leaks, breaks in the column line, etc. The primer is built in various sizes, with a maximum capacity of 1,500 g.p.m. and a maximum operating head of 200 ft.

Hazleton Suction-Line Primer



Permissible Coal Drill

Chicago Pneumatic Tool Co., New York City, announces its new "Little Giant" permissible coal drill, No. 574, which is said to give safety in gaseous or dust-laden atmospheres, as well as fast drilling speed, light weight, and accessibility. Portability also is a feature emphasized by the company, which stresses, in addition, the post mechanism. The latter consists of a notched post and a ratchet on a turntable. A ratchet dog engages the notches on the post. Use of this post mechanism, it is asserted, eliminates awkward or muscle-straining positions on the part of the operative, and obviates the necessity of supporting the weight of the drill while adjusting it to position.

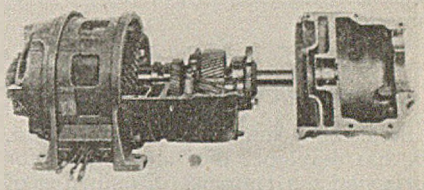


Chicago Pneumatic Permissible Coal Drill

Drills are available for operation on either 250 or 500 volts, d.c., or 220 or 440 volts a.c. Drilling speeds, in inches per minute, are as follows: 250-volts, d.c., 35; 500 volts, d.c., 28; 220 and 440 volts, a.c., 30. Weight of motor assembly is 109 and 113 lb., for the d.c. and a.c. machines, respectively. Feed bar weight is 12 lb., and weight of 5-ft. column is 60 lb.

Motor and Reducer Combined

"Gearmotors," said to be an extremely simple, compact, and efficient arrangement for powering various kinds of motor-driven equipment operating at reduced speeds, are offered by the Nuttall Works of the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa. The drives consist of a motor with a pre-wound primary core, which is separable from the motor frame, combined with a speed reducer in a single unit, said to be only a few inches longer than the motor alone. Type CS general-purpose induction motors are used in combination with double-reduction, non-planetary-type, helical-gear speed reducers. The unit is supported by the motor feet.



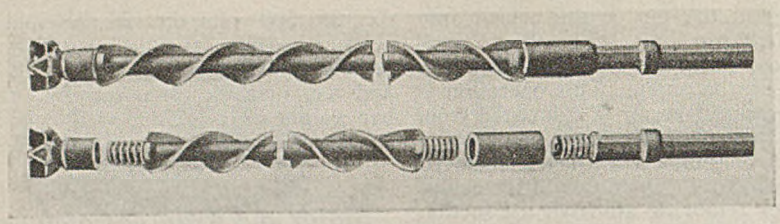
"Gearmotor"

Advantages outlined by the manufacturer are: reduced space requirements; easy and simplified installation; reduced number of drive parts; high efficiency of operation; low maintenance; easy accessibility by removing the top section of the housing; simple splash lubrication; and quick and inexpensive change of motor speed, voltage, and phase through the use of the separable, pre-wound primary core. "Gearmotors" are built in sizes ranging from ½ to 15 hp., with output speeds varying from 69 to 1,550 r.p.m. A change in the output of any unit speed can be easily made at a small percentage of the initial cost, the company declares.

Removable Bit for Air Drills

Howells Mining Drill Co., Plymouth, Pa., has developed the "Spry Spiral Jack Hammer Removable Coal Bit" for use with standard pneumatic rock drills in drilling coal. Four parts comprise the new bit, as follows: removable cutting bit equipped with threads for attachment to the spiral; left-hand twisted spiral threaded at one end to receive the bit and at the other to receive the coupling; the coupling itself; and the shank, which fits any of the standard drills.

Use of this coal bit, the company declares, eliminates the danger of the miner inhaling the coal dust and eliminates the necessity for carrying drill

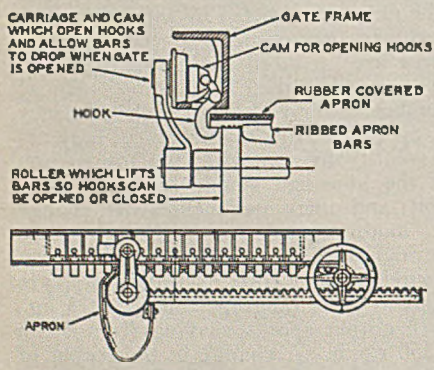


"Spry Spiral Jack Hammer Removable Coal Bit"

rods out of the mine and back again after resharpening, as the miner can easily replace a dull cutting bit from a supply in his tool box. The bits also can be used for drilling shale, slate, and rock by turning a thread on the regular drill steel, thus allowing the steel, according to the company, to be used three times as long.

"Apron Gate" for Bins

Stephens-Adamson Mfg. Co., Aurora, Ill., has developed the "apron gate" for horizontal bin bottoms. Elimination of sliding friction is one of the major advantages stressed by the company, which declares that the gate can be opened easily by one man. The gate opening, as shown in the figure, is closed by a series of reinforced crossbars covered with a wear-resisting rubber apron which prevents spillage and water leakage. A rack and pinion, driven by a hand or chain wheel, moves the operat-

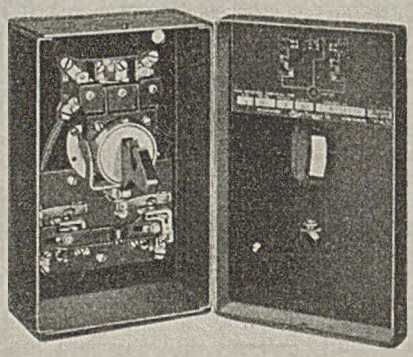


"Apron Gate," Showing Method of Operation and Gate Partly Opened

ing carriage back and forth to open or close the gate by releasing the bars from hooks at the side or by lifting them back into place. Operation is shown in the figure. Advantages stressed by the company, in addition to the above, are: simplicity, durability, light weight, low headroom, reduced first cost, and decreased tendency for material to bridge over the opening.

Starter Has No Fuses

Allen-Bradley Co., Milwaukee, Wis., has developed the Bulletin 609 starter for a.c. motors up to 5 hp. at 220 volts, which it claims allows hand-operation at a price comparable with fused or thermal plug starters. The starter is equipped with overload circuit breakers, and has no fuses or thermal plugs to burn or blow out. The overload breakers work on the soldered ratchet principle. Setting of the breakers is accomplished



Bulletin 609 Starter

by a small switch in the starter cover. In addition to the 220-volt types, the starter may be applied to motors up to 7½ hp. operating on 440-550 volts.

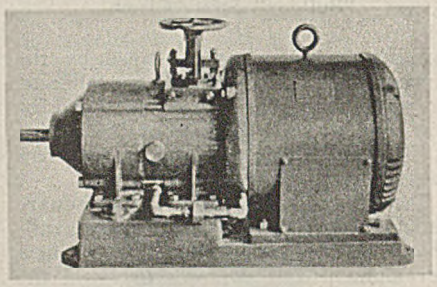
The Allen-Bradley Co., also has developed a new line of explosion-proof across-the-line starting switches, including both oil-immersed and air-break types. These switches are applicable to squirrel-cage and slip-ring motors, 3-phase or 2-phase 3-wire systems, as well as single-phase, self-starting machines operating in atmospheres containing inflammable vapors, gases, or dusts. Maximum ratings are: 25 hp. at 110 volts; 50 hp. at 220 volts; and 100 hp. at 440-550 volts. When used with single-phase motors, these switches are for primary control only. Oil-immersed switches are available in ratings of 50, 100, and 150 amp., while the air-break switches have a rating of 50 amp.

New Square-End Pipe Cutter Has Self-Feeding Knives

Simplicity is one of the features claimed for the Beaver 2½- to 4-in. square-end pipe cutter of the Borden Co., Warren, Ohio. The tool, according to the company, has self-feeding knives, is gear-driven, and has a driving pinion in front, thus facilitating changes between pipe cutter and die-stock when used with power drives. The company says that with the Beaver power drive, the tool will cut off 4-in. pipe in approximately 2½ minutes.

Electro-Hydraulic Transmission

American Engineering Co., Philadelphia, Pa., has brought out a new 5-hp. electro-hydraulic transmission of the Hele-Shaw type. The unit consists of an electric motor, a pump, and a hydraulic motor. The electric motor operates at constant speed, but by varying the length of stroke of the pump, the speed of the hydraulic motor and, consequently, the speed of the output shaft, can be

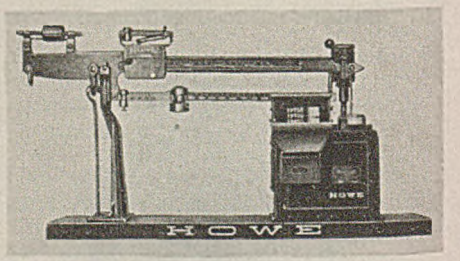


Electro-Hydraulic Transmission

varied from 1 to 1,000 r.p.m., the company declares. Speed changes are made through a handwheel. Since the torque is constant, the horsepower output varies with the speed of the hydraulic motor, the company points out. At maximum speed, the transmission will deliver 5 hp. continuously.

Weight Indication Is Automatic

Howe Scale Co., Rutland, Vt., has developed the "Weightograph," which it recommends for converting dial or beam scales into automatic reading instruments. The "Weightograph" is attached to the free end of the weighbeam in place of the beam stand. The unit, according to the company, is self-contained. One moving part, carrying a weight chart negative, is attached to the weighbeam. Back of the chart negative, a stationary light is mounted for illuminating the figures, which are projected on a ground glass by a magnify-



"Weightograph" in Place on a Beam Scale

ing lens. In addition to the standard "Weightograph," models with double chart capacity or with double-reading facilities are available. The company states that the instrument can be applied to dial or beams scales for a wide variety of applications, ranging from dormant warehouse scales to the largest railroad track scales.

COAL AGE

Established 1911—McGraw-Hill Publishing Company, Inc.

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

New York, April, 1932

Volume 37 . . . . Number 4

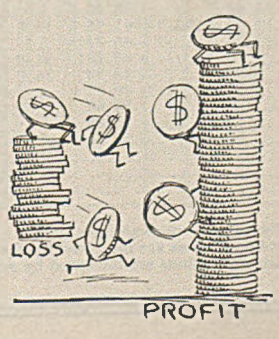
The Highway to Profits

WHILE the stuffed shirts of industry sit with folded hands waiting for conditions to change, progressive management is busy changing conditions and bending circumstances to advance its fortunes. The highway to profits is still open for traffic—even in these dark days of depression.

MORE THAN sterile desire, however, is needed to set ambitious management firmly on this uncrowded highway. Business must analyze its own operations more critically than ever before and then have the high courage to take the steps which that study dictates if the journey is to be successful.

SUCH ANALYSIS necessarily starts with existing cost and performance records. In many cases, unfortunately, present operating and accounting records are in such shape that it requires deep mining to uncover the facts vital to a thorough-going, scientific survey within an individual company.

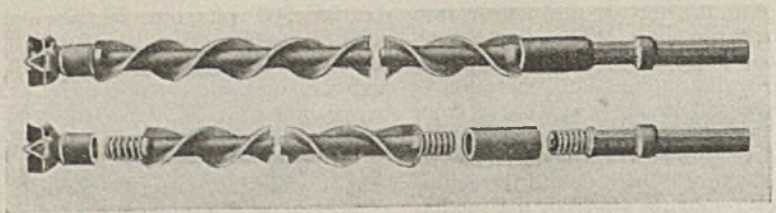
THAT these facts are embedded in the records is not enough. Accounting systems which do not facilitate the easy segregation, grouping, combination and regrouping of cost and operating data for executive study fall far short of the requirements of good management. Embalmed figures suggest mummified methods.



ADEQUATE cost records matched against accurate performance records give progressive management a true perspective on the changes in personnel, methods, equipment, and capital structure and investments which must be made if the red line of loss is to be squeezed out of the profit column. They open the way to action.

MANAGEMENT so buttressed does not shrink from scrapping good equipment and good methods for better ones because it knows that investing capital to buy greater net profits always is good business. It knows, too, that tomorrow's profits flow to those who anticipate tomorrow's demands today.

TO MANAGEMENT of this type the difficulties which confront the coal industry are a stimulus to fresh endeavor—not an alibi for inaction. Ample evidence of this statement will be found in the pages which follow. And yet the story there told of specific achievements of companies on the highway to profits only scratches the surface of actual accomplishments and future possibilities.



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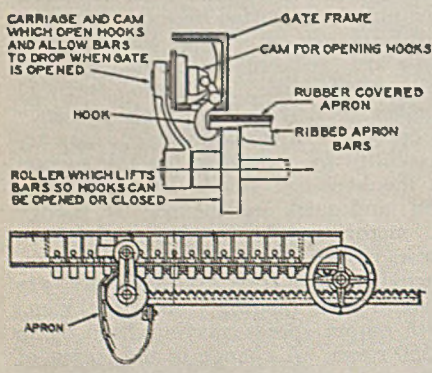

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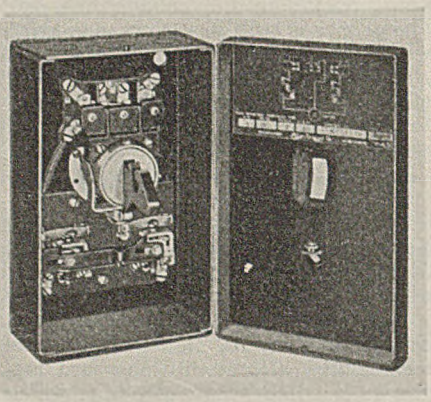
ing carriage back and forth to open or close the gate by releasing the bars from hooks at the side or by lifting them back into place. Operation is shown in the figure. Advantages stressed by the company, in addition to the above, are: simplicity, durability, light weight, low headroom, reduced first cost, and decreased tendency for material to bridge over the opening.

Starter Has No Fuses

Allen-Bradley Co., Milwaukee, Wis., has developed the Bulletin 609 starter for a.c. motors up to 5 hp. at 220 volts, which it claims allows hand-operation at a price comparable with fused or thermal plug starters. The starter is equipped with overload circuit breakers, and has no fuses or thermal plugs to burn or blow out. The overload breakers work on the soldered ratchet principle. Setting of the breakers is accomplished



Bulletin 609 Starter

by a small switch in the starter cover. In addition to the 220-volt types, the starter may be applied to motors up to 7½ hp. operating on 440-550 volts.

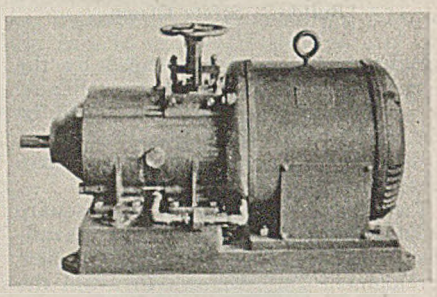
The Allen-Bradley Co., also has developed a new line of explosion-proof across-the-line starting switches, including both oil-immersed and air-break types. These switches are applicable to squirrel-cage and slip-ring motors, 3-phase or 2-phase 3-wire systems, as well as single-phase, self-starting machines operating in atmospheres containing inflammable vapors, gases, or dusts. Maximum ratings are: 25 hp. at 110 volts; 50 hp. at 220 volts; and 100 hp. at 440-550 volts. When used with single-phase motors, these switches are for primary control only. Oil-immersed switches are available in ratings of 50, 100, and 150 amp., while the air-break switches have a rating of 50 amp.

New Square-End Pipe Cutter Has Self-Feeding Knives

Simplicity is one of the features claimed for the Beaver 2½- to 4-in. square-end pipe cutter of the Borden Co., Warren, Ohio. The tool, according to the company, has self-feeding knives, is gear-driven, and has a driving pinion in front, thus facilitating changes between pipe cutter and die-stock when used with power drives. The company says that with the Beaver power drive, the tool will cut off 4-in. pipe in approximately 2½ minutes.

Electro-Hydraulic Transmission

American Engineering Co., Philadelphia, Pa., has brought out a new 5-hp. electro-hydraulic transmission of the Hele-Shaw type. The unit consists of an electric motor, a pump, and a hydraulic motor. The electric motor operates at constant speed, but by varying the length of stroke of the pump, the speed of the hydraulic motor and, consequently, the speed of the output shaft, can be

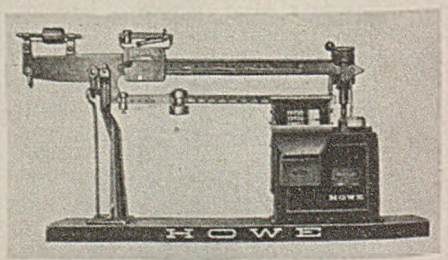


Electro-Hydraulic Transmission

varied from 1 to 1,000 r.p.m., the company declares. Speed changes are made through a handwheel. Since the torque is constant, the horsepower output varies with the speed of the hydraulic motor, the company points out. At maximum speed, the transmission will deliver 5 hp. continuously.

Weight Indication Is Automatic

Howe Scale Co., Rutland, Vt., has developed the "Weightograph," which it recommends for converting dial or beam scales into automatic reading instruments. The "Weightograph" is attached to the free end of the weighbeam in place of the beam stand. The unit, according to the company, is self-contained. One moving part, carrying a weight chart negative, is attached to the weighbeam. Back of the chart negative, a stationary light is mounted for illuminating the figures, which are projected on a ground glass by a magnify-



"Weightograph" in Place on a Beam Scale

ing lens. In addition to the standard "Weightograph," models with double chart capacity or with double-reading facilities are available. The company states that the instrument can be applied to dial or beams scales for a wide variety of applications, ranging from dormant warehouse scales to the largest railroad track scales.