COAL AGE

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

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April, 1938

They Still Burn Coal

SUSPENSION of all minimum-price schedules coming on the top of a market which shows only languid interest in buying leaves most bituminous operators in an unhappy state of mind. Denied both the price protection of the Guffey act and the spurt in demand that many had anticipated would develop when that protection was withdrawn, a pessimistic view of the immediate future has become fairly common. The real danger, however, is not the effect of today's declining market but that the gloom thus induced may obscure certain fundamental objectives which must be pursued relentlessly if the coal industry is to build for a sound and expanding future.

Despite the hard buffetings by competitive fuels, coal still remains the chief source of energy. Whether its percentage contribution to the national energy total will diminish or increase in the coming years rests primarily with the industry itself. In the last analysis every industrial buyer and every household consumer is seeking just one thing: the greatest fuel value for his dollar. Standards of value may differ as between industries and as between domestic users, but, howsoever the standard may be determined, it is still the greatest fuel value that is the goal

Word sharps may draw nice distinctions between value and price but in a practical buying world the two merge. This should make the course of the coal industry plain. Success will not be found in maintaining a floor level of prices which will support the inefficient operation but in a continuous drive for lower costs which will enhance the fuel-value purchasing power of every dollar spent for coal. That means more mechanization of operations still on a hand-and-mule basis and greater efficiency in mines already mechanized. The need for such intensification is too pressing to justify delays while groggy producers recover from Washington political or recession shocks.

Happy Defeat

MISERY not only loves but frequently actively solicits company. So it should not be surprising that many coal men enthusiastically supported the proposals of Congressmen Boland and Flannery for a tax on fuel oil. Congress fortunately rejected the idea. "Fortunately" for two reasons which the industry seemed to have overlooked. First, a tax on fuel oil produced in the United States this year would have been an irresistible invitation for further taxes on coal next year. Second and more important, favorable action would have placed the coal industry in the unenviable position of having fostered a tax on a competitive fuel. And would competitors have driven that home in explaining higher prices to disgruntled consumers!

Cincinnati Beckons

WHILE WASHINGTON struggles with minimum-price problems, Cincinnati again invites progressive mining men to meet at the annual convention and exposition of

the American Mining Congress to consider methods of reducing costs. The contrast is both dramatic and significant. At best Washington is laboring to reestablish checks against ruinous competition within the industry; Cincinnati offers a forum for planning how coal may be marketed at a profit in competition with other fuels. Desirable as the Washington aim may be, the Cincinnati objective is broader in scope and more effective in execution.

As in the past, mechanization discussions and mechanical loading equipment will have the spotlight. But visitors who narrowly limit their interest to these particular features of the convention-exposition will be defeating the major purpose of their attendance. If mechanization experience has demonstrated one thing it is that success can be won only through complete coordination of every phase of the operating cycle. No investment in loading machines will yield full returns unless twice as much has been spent for complementary equipment. Interest in the convention, therefore, should be as broad as the program and the exhibits displayed.

Safety Administration

No ADMINISTRATION can rise higher than the personnel of the agency directing it. For that reason everyone committed to the cause of accident reduction in coal mining should give sympathetic consideration to the proposals for basic standards in State safety statutes suggested late last year by John B. Andrews. These proposals, advanced after a series of conferences with government, coal-operating and labor representatives interested in the subject, are concerned primarily with the selection, training and tenure in office of State mine inspectors. Only one of the eight standards advocated (*Coal Age*, January, 1938, page 81) touches upon the law in its relation to mine management.

To those who have not studied the subject it must be shocking to learn that in only three coal-producing States is the initial selection of inspectors based on an adequate system of competitive merit tests. That administration in other States has been as good as it is reflects no credit on the lawmakers but is a tribute to the genuine interest most appointees, whatever their political backgrounds, have had in their work. Safety, however, is too vital to trust so much to luck in its administrative personnel.

Political appointment naturally opens the door to political dismissal. The record is not free of cases of separation from service for no other cause than a change in political administration. Competent men properly chosen in the first instance for inspectorships should be given civil-service status; their tenure of office should not be endangered by pressure from any source; so long as they are able adequately to discharge their duties their jobs should be secure. And proper provision for their future when age or disability renders them unfit for active duty should be made. These, as well as other commendable reforms, are encompassed in Mr. Andrews' program.

Publicity

KING COAL, the monarch of the power realm, is periodically depicted by the popular press as a doddering and vacillating ruler of a decadent empire encircled by the progressively modern cohorts of oil, gas and electricity who eventually will dominate this vital force of advancing civilization. Too often the highly colored, and sometimes grossly exaggerated, reports from producing districts in reality are attributable to a woeful lack of coordinated publicity on the part of coal. As a result, the true status of current situations is withheld from the consuming public until unfavorable reactions toward the industry have been built up. Concerted action in fairly and accurately presenting the problems to a confused public that is weary of garbled explanations made by conflicting interests will do much to eliminate the too common impression that coal is an obsolete fuel produced by an internally unhealthy industry whose funeral is overdue.

MACHINE-LOADED COAL

+ Handled at 400-Tons-Per-Hour Rate

At Keen Mountain Mine

J. H. EDWARDS
Associate Editor, Coal Age

KEEN MOUNTAIN mine of the Red Jacket Coal Corporation, largest of the five new operain the recently opened Upper Buchanan low-volatile field of Virginia, is a full-mechanical mine and has been equipped with a 400-tons-per-hour plant which, from the mine-car dump high on the mountainside to the loading tracks in the valley, incorporates the latest in structure and machinery to assure careful handling and thorough preparation of the coal, uninterrupted operation and low-cost maintenance over a long period of years. Rescreening, mixing and blending in the six-track steel tipple are facilitated by the use of five retractile-type picking-table units which incorporate certain improvements over similar units installed by the same corporation early in 1936 at its new mine in Wyoming County, West Virginia (*Coal Age,* July 1936, p. 278). At Keen Mountain the investment in headhouse, mountainside conveyors and tipple, not including foundations, grading and tracks, exceeded $350,000.

At least 24,000,000 tons of low-volatile (approximately 22 per cent) coal from an irregularly shaped area in which the Cary seam varies from 48 to 67 in. in thickness is available to the Keen Mountain mine. The Cary seam lies practically level at an 1886.70-ft. elevation (top of rail at the Keen Mountain headhouse) and the total acreage available to the several mines probably does not exceed 16,000. The bed is free of dirt parting, the bottom is a hard sandstone and the top is a slate of medium to strong character. Projections indicate an ultimate underground haul of approximately 4½ miles in Keen Mountain mine.

This new plant is on the Levisa River and is served by a new extension of the Norfolk & Western Ry. branch joining the main line at Devon, W. Va. This branch itself is a comparatively recent construction, as the first coal from the new mines of what was then known as the Grundy Field (*Coal Age,* August, 1934, p. 302), but which is now designated as the Lower Buchanan Field, moved over it in May, 1932.

Keen Mountain tipple is 6¼ miles due southeast of Grundy, the county seat, but by rail the distance is 11 miles. Virginia State Highway No. 84 between Richlands and Grundy serves the mine as well as the new town, two miles farther up the river, where a limited acreage of valley floor was available. As a rule the mountainsides in this section of the county are quite steep and afford little chance for developing building sites.

At the headhouse, coal is dumped from 4-ton solid-body cars in a single-car rotary dump and from the hopper is fed by a reciprocating plate to a 400-tons-per-hour rope-and-button conveyor 1,242 ft. long, between centers, on an inclination of 24 deg. From the bottom of this conveyor and over the State Highway to the tipple, transportation is completed by a 48-in. belt conveyor 412 ft. long, between centers, inclined 5 deg. in favor of the load. The headhouse, car-feeding and

At the rate of 400 tons per hour the coal is dumped in the headhouse and transferred to a rope-and-button conveyor which discharges onto a belt conveyor to the tipple, where six grades are prepared.

dumping equipment and the rope-and-button and belt conveyors were built by Fairmont.

The tipple, of steel-and-concrete construction and constituting a complete six-track plant designed with particular attention to careful handling, close sizing, rescreening and blending and with equipment for crushing and resizing any grade, was built by Jeffrey. Primary screening is begun with shaking feeders between the main belt and the primary shaking screens. The surfaces are perforated with 1½-in. round holes and bottom plates are included to feed the through material to the bottom deck of the primary screens.

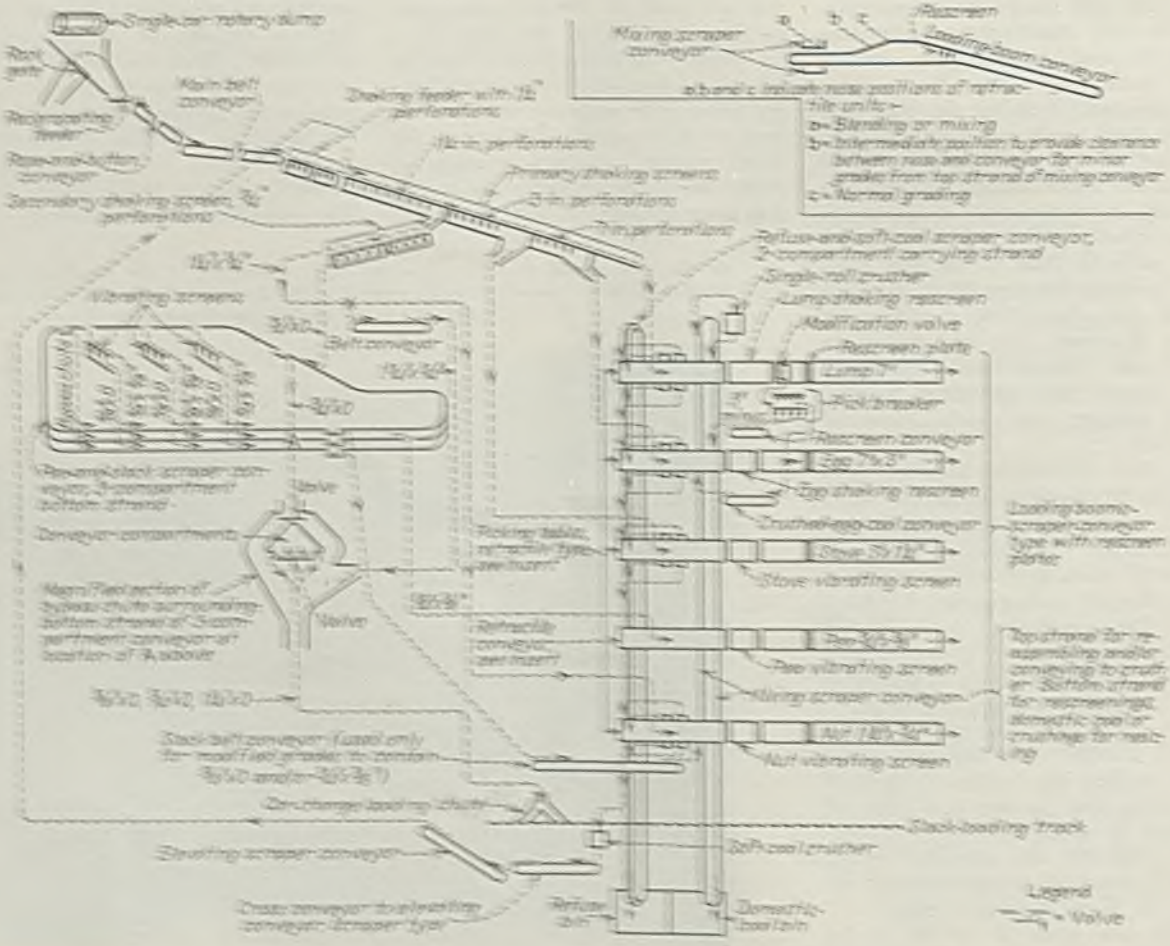
Secondary shaker screens make a separation into 3/4x6- and 1½x3/4-in. sizes, and the latter is again screened into 3/8x6- and 3/4x3/8-in. grades by a battery of three Jeffrey-Traylor electric vibrators. Lump (7-in.), egg (3x3-in.) and stove (3x1½-in.) from the primary shaking screens pass directly to the respective apron conveyors of the retractile picking tables. By a design providing greater than usual over-all length of the primary screens egg is delivered to the picking table without reversing the direction of flow, thus keeping degradation to a minimum.

The 1¼ 3/4-in. nut is deposited directly from the nose of the secondary shaker on the nut picking table, also of the apron-conveyor retractile type. From a three-compartment pea-and-slack conveyor which encircles the aforementioned vibrating screens the 3/4x3/8-in. pea is deposited on a fifth apron conveyor, also arranged as a retractile unit in a position similar to the picking tables.

Each of the five retractile units consists of an apron conveyor and a power-operated rescreen, both built into a steel frame which is wheel-mounted and can be moved 10 ft. along a horizontal track to discharge into a mixing conveyor instead of, as normally, directly to the respective loading booms. An improvement in the retractile design, as compared to the originals at the corporation's Wyoming plant, is that the movement to a different position to effect a change in preparation or mixing is accomplished in a few moments by an electric motor and remote control instead of by the slower process of manual ratchet wrenches.

Lump and egg tables have shaking rescreens, but the stove, nut and pea units have Jeffrey-Traylor electric vibrators. Loading booms are of the scraper type with rescreen surfaces in the top run utilizing the bottom strand to deliver rescreenings to the scraper mixing conveyor. By stopping the boom so that the conveyor flights are in correct position and by opening a modifying valve at the point where the lump normally lands on the top strand this lump may be diverted to a McNally-Norton pick breaker with built-in rescreen.

By moving any retractile unit to its extreme back position the respective size or sizes (normally stove or egg, or both) may be deposited in the scraper mixing conveyor for transportation to a Jeffrey single-roll crusher designed with pyramid-toothed fine segments for crushing to 1½-in. with a minimum of degradation. Each picking table has two sets of pockets, one for refuse and the other for soft coal. The former



The inset at the upper right-hand corner of the flowsheet shows how the retractile picking tables are positioned for changed preparation.

Cary seam area available to the Keen Mountain mine. The projections indicate a 4½-mile haul to the farthest boundaries.

is conveyed to a drive-under truck disposal bin and the latter to a Jeffrey standard single-roll crusher from which the crushed product is recirculated to the primary shakers. Valves throughout the tipple where conveyors or chutes, or both, cross, provide for making all mixtures and blends for which any demand is conceived.

At the "top of the hill," mine-car trips are moved through the dump by a chain-type trip feeder driven by a two-speed motor which is started by the dump operator but automatically slowed and stopped by limit switches mounted beside the track on pedestal brackets on the dump-house floor. A Thrustor brake on the motor shaft effects accurate stopping. The Nolan rotary dump (Mining Safety Device Co.) also is driven by a two-speed motor, and a motor-driven gate provides for shunting mine rock to the chute of a larry disposal track.

To avoid vibration and noise, the headhouse tracks are arranged so that locomotives do not pass through the structure but instead traverse an empty track around the hill back of the natural swag, of which advantage was taken in locating the headhouse. An outside haul of 2,300 ft. of double track on a ½-percent favorable grade forms the approach. The empty trips leave the dump on a favorable grade of 1½ per cent. All of these tracks were installed in strict accordance with a detailed engineering layout.

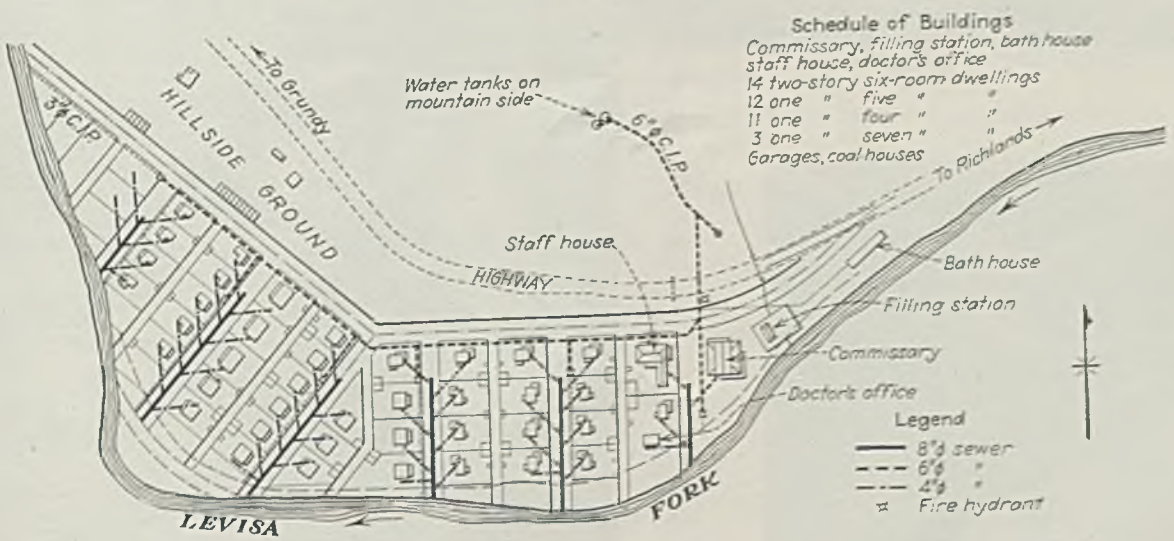
A 100-hp. motor drives the rope-and-button conveyor, which, if left standing an hour or so when fully loaded, requires a high starting torque and is power-consuming under practically all conditions. A V-belt reduction connects the motor to the conveyor gearing and the only brake on the unit is a Thrustor unit operating on the motor shaft. The conveyor has 12-in.-diameter buttons and the rope is 1¼-in. 6x19 alternate regular and Langlay American Steel & Wire construction.

The belt-conveyor drive is located in the tipple at the lower end of the conveyor, which position, although unusual, is satisfactory in this case because of the slight favorable grade and low power requirement. The motor is a 10-hp. unit and is equipped with Thrustor brake. A belt-cleaning brush is provided and its drive is an individual motor instead of gears from the belt pulley.

Jeffrey-Traylor electrical vibrating screens which separate pea and slack are Type FB-4 double-deck units, each with a rating of 85 tons per hour, of which approximately 50 tons is undersize. The rescreens mounted on the stove, nut and pea retractile units are 30x68-in. single-deck "Conveyanscreen" units. One motor-generator supplies direct current for modulating the a.c. feed to the six Traylor units.

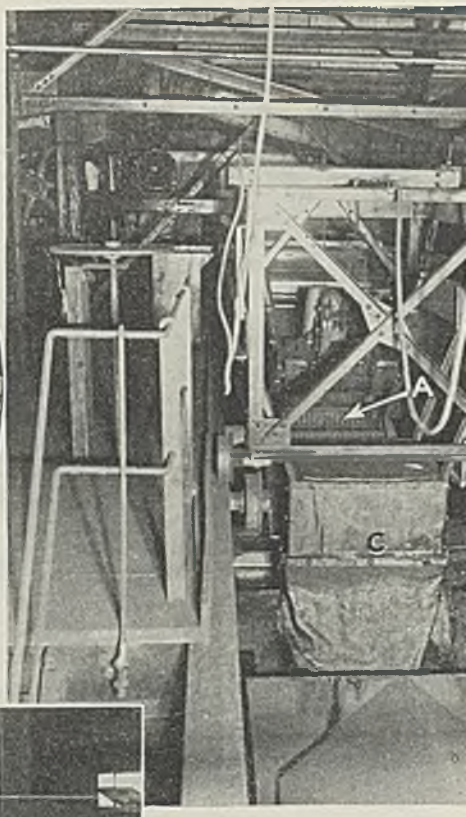
Loading booms are handled by Harnischfeger hoists, 3 tons on the lump and egg booms and 2 tons on

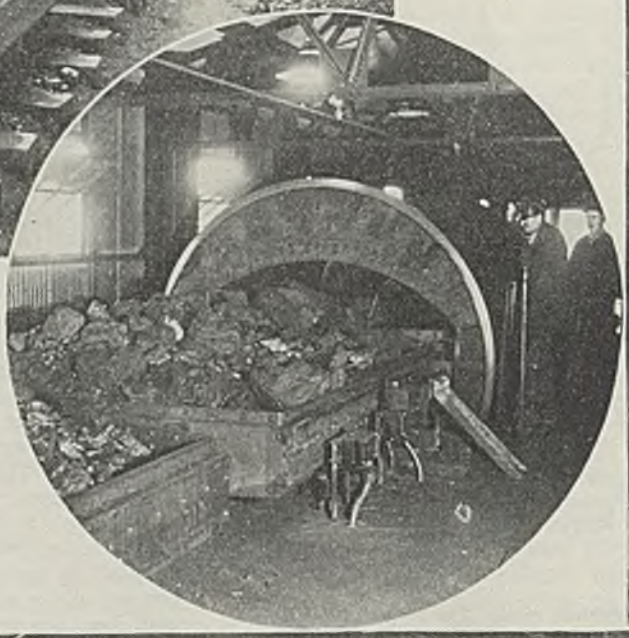
Keen Mountain town covers all of the available flat ground at a bend in the river about two miles upstream from the tipple.



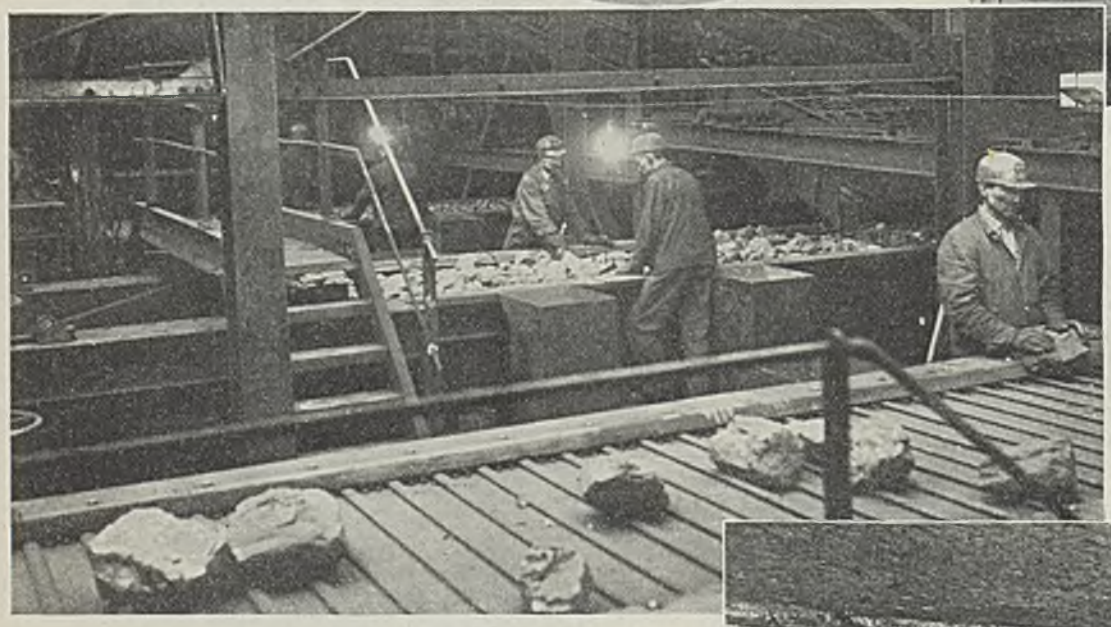
favorable grade

Stove retractile unit in full back positio
charge into the mixing scraper conveyor i
directly to the stove boom. Arrow "A"
the vibrating rescreen; "B," a track wh
"C," the oil-treating box

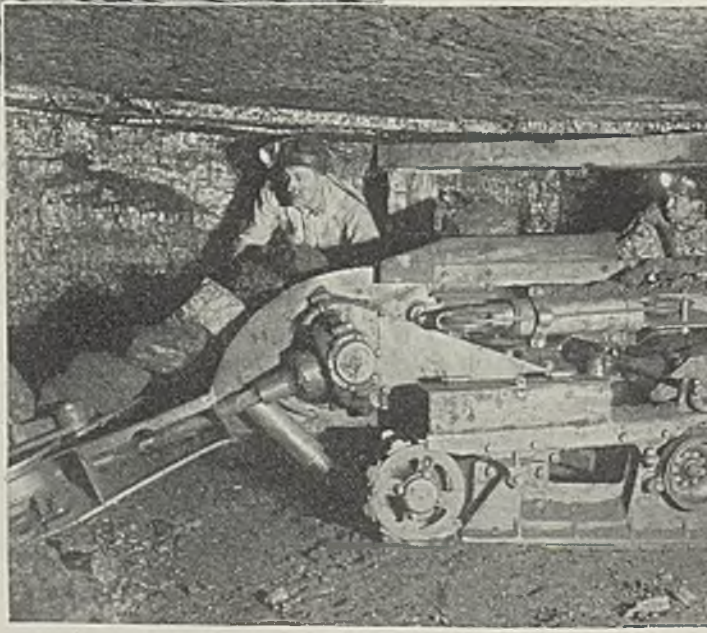




Dumping en train in a
single-car rotary dump



Picking includes the remo
of soft coal as well as
slate or bone that may app



All coal is loaded by mobile

Operating the

the stove, nut and pea booms. Brown-Fayro layer-loading hoists are installed to control cars on the lump, egg, stove and slack tracks.

Fifty-one electric motors totaling 682½ connected horsepower drive the headhouse equipment, conveyors and tipple. Practically all are equipped with ball bearings and those in dusty places are totally inclosed. All operate on 440 volts excepting a 2,300-volt 150-hp. motor on a crusher. The majority of the motors are Allis-Chalmers and in practically every case these are connected to the units by Falk "Motoreducers," which include a base for mounting the motor. Here General Electric motors are used on the trip feeder, rock gate, reciprocating feeder, belt conveyor, cleaning brush, shaking feeder, primary screen, secondary screen, lump rescreen, egg rescreen, soft-coal crusher, and pick breaker. The first five are used with Falk gears and the last eight with V-belts. Layer-loading hoists are driven by Westinghouse Type CS motors and the single-roll main crusher by a Westinghouse Type CW 2,300-volt motor.

How Motors Are Started

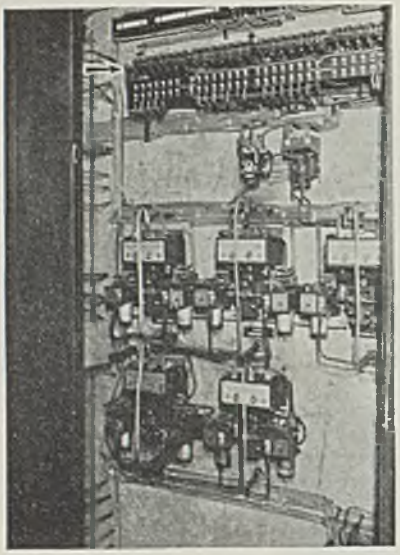
With the exception of the layer-loading controls, which consist of Westinghouse Deion linestarters and I-T-E circuit breakers, the tipple controls are Allen-Bradley linestarters housed in a centralized steel cabinet assembled by the Penn Electrical Co. All motors, beginning with the rope-and-button conveyor and following on through the tipple, are started by a synchronous clock motor which closes the control contacts of each motor starter in timed sequence. This system of control was worked out by Allen-Bradley engineers to conform with plans outlined by C. H. Price, chief electrician.

In the tipple operator's booth, located where a view of all loading booms is available, the control is a desk-type pushbutton panel with indicating lamps. Starting by the regular sequence method requires two steps: first a button is pushed which closes a contactor to apply power to the control circuits, then another button is pushed to start operation of the synchronous motor which completes the control circuits to the individual starters. Lock-out buttons are provided for modifying the sequence for unusual conditions or testing.

Headhouse controls are grouped in one location and consist of the following: an I-T-E circuit breaker for the main 440-volt incoming power, a General Electric two-speed reversing starter for the trip feed-

Machinery and Motor Drive Data, Keen Mountain Plant

Equipment	Speed, Feet or Strokes per Minute	Motors: Number	Motors: Horsepower	Motors: R.P.M.	Drive
Trip feeder	.....	1	30/10	1800/60	Herringbone reducer and chain.
Single-car rotary dump	.....	1	15/7½	860/430	Motoreducer and gears
Rock gate	.....	1	5	1,730	Motoreducer and gears
Reciprocating feeder	.....	1	10	1,160	V-belts and gears
Rope-and-button conveyor, 1,242 ft. c.c.	.....	1	100	1,165	V-belts and gears
Main belt conveyor, 48 in. x 412 ft. c.c.	.....	1	10	1,750	Motoreducer and chain
Belt-conveyor brush	.....	1	1½	1,750	.....
Shaking feeder to primary shaking screens, 5 and 6 ft. wide x 12 ft. long	150	1	7½	900	V-belts
Primary shaking screens, 400 tons per hour, 7 ft. wide x 65 ft. long	100	1	25	720	V-belts
Secondary shaking screens, 204 tons per hour, 7 ft., 7 in. wide x 26½ ft. long	150	1	15	900	V-belts
Lump picking table, apron conveyor, 60 in x 42 ft. c.c., 76 tons per hour	60	1	5	1,750	Motoreducer and chain
Egg picking table, apron conveyor, 60 in. x 40 ft. c.c.	60	1	5	1,750	Motoreducer and chain
Stove picking table, apron conveyor, 44 tons per hour, 48 in. x 40 ft. c.c.	60	1	5	1,750	Motoreducer and chain
Pea apron conveyor, 48 in. x 40 ft. c.c. (not used for picking but in same relative position as picking tables)	60	1	5	1,750	Motoreducer and chain
Nut picking table, 48 in x 40 ft.	60	1	5	1,750	Motoreducer and chain
Drive for moving picking-table units	.....	5	2	1,750	Motoreducer and chain
Lump shaking rescreens, 76 tons per hour, 5 ft. wide x 10 ft. long	150	1	5	900	V-belts
Egg shaking rescreens, 76 tons per hour, 5 ft. wide x 10 ft. long	150	1	5	900	V-belts
Lump loading boom, scraper conveyor, 400 tons per hour if handling r.o.m., 48-in., 32-ft. horizontal section, 42-ft. hinged section	90	1	15	1,200	Motoreducer and chain
Egg loading boom, scraper conveyor, 48-in., 29-ft. horizontal section, 42-ft. hinged section.	90	1	15	1,200	Motoreducer and chain
Stove loading boom, scraper conveyor, 36-in., 28-ft. horizontal section 42-ft. hinged section	90	1	10	1,200	Motoreducer and chain
Pea loading boom, scraper conveyor, 30-in., 28-ft. horizontal section, 42-ft. hinged section.	90	1	10	1,200	Motoreducer and chain
Nut loading boom, scraper conveyor, 30-in., 28-ft. horizontal section, 42-ft. hinged section.	90	1	10	1,200	Motoreducer and chain
Loading-boom hoists, 3-ton, one each for lump and egg booms.	.....	2	3	.....	Self-contained gearing
Loading boom hoists, 2-ton, one each for stove, pea and nut booms	.....	3	2	.....	Self-contained gearing
Modification valve of lump-loading boom	.....	1	1	1,800	Motoreducer and gear
Refuse and soft-coal scraper conveyor, 2-compartment, 24 in. wide, 116 ft. c.c., 25 tons per hour	100	1	7½	1,200	Motoreducer and chain
Soft-coal crusher, 18-in. x 18-in., standard single-roll, 15 tons per hour	.....	1	10	1,200	V-belts
Single-roll crusher with wedge-type fine-crushing teeth, 200 tons per hour, 30-in. x 60-in.	.....	1	150	900	V-belts
Pick breaker with shaker rescreen, Type B unit	.....	1	20	720	V-belts
Scraper mixing conveyor, 324 tons per hour, 48 in. wide, 129 ft. c.c.	100	1	25	1,200	Motoreducer and chain
Cross-scraper conveyor to elevating conveyor, 225 tons per hour, 30 in. wide, 43 ft. c.c.	100	1	15	1,200	Motoreducer and chain
Elevating-scraper conveyor, 196 tons per hour, 30 in. wide, 70 ft. c.c.	100	1	20	1,200	Motoreducer and chain
Pea-and-slack scraper conveyor, 3-compartment, 164 to 375 tons per hour, 60 in. wide, 79 ft. c.c.	100	1	30	1,200	Motoreducer and chain
Slack-belt conveyor, 108 tons per hour, 24 in. wide, 35 ft. c.c.	225	1	3	1,750	Motoreducer and chain
Crushed-egg scraper conveyor, 80 tons per hour, 24 in. wide, 23 ft. c.c.	100	1	3	1,200	Motoreducer and chain
Belt conveyor from secondary shaking screens to slack loading chute	.....	1	3	1,750	Motoreducer and chain
Rescreen conveyor from pick breaker to mixing conveyor.	.....	1	3	1,200	Motoreducer and chain
Generator for supplying mixed current to electric vibrators.	.....	1	4	.....	Direct-connected.
Four layer-loading hoists	.....	4	10	1,600	Self-contained gearing
Oil-spray pump, dustless treatment	.....	1	3	870	Geared
Totals	.....	51	682½	.....	



A look into a compartment of the control cabinet in the tipple. The arrow points to the long row of control contacts of the motor-driven sequence relay.

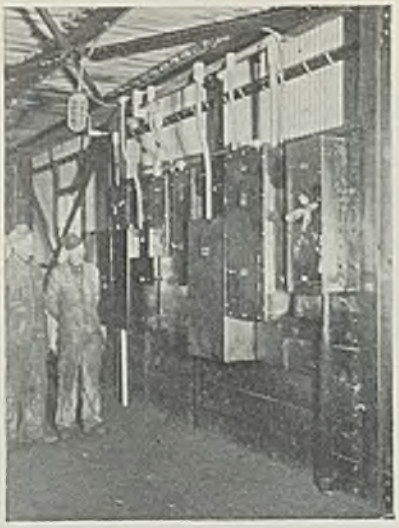
er, Allen-Bradley starters in a Penn Electrical assembly for the rope-and-button conveyor, rock gate and reciprocating feeder, and a Cutler-Hammer two-speed starter for the rotary dump. All power, control and light wiring in headhouse, conveyor galleries and tipple is in rigid conduit.

Plant structures are covered with Armco-Ingot corrugated galvanized iron, No. 18 gage on roofs and No. 20 gage on sides. Railway tracks at the tipple were built to exact engineering specifications and the grades are as follows: empty tracks, 1.4 per cent; tracks under the tipple, 2 per cent; and loaded tracks, 1 per cent. Empty-car capacity is 116 cars—85 on the empty track and 31 on the delivery tracks. Below the tipple but above the outlet track is space for 27 loads, with 178 loads on the outlet tracks.

Mining and transportation equipment now at the property consists of the following: 400 American Car & Foundry all-steel cars, one Jeffrey 10-ton main-line locomotive, two Jeffrey 6-ton cable-reel locomotives, seven Red Jacket (Jeffrey equipment) 8-ton cable-reel locomotives, eight Joy 8BU loaders (six already in use), three Jeffrey 29U universal cutters, one Jeffrey 29C arcwall cutter, one Goodman 29AA cutter and eight Chicago Pneumatic electric drills.

To bring the property to full production at an early date (first coal was shipped late in September and present production is 2,000 tons per day) the mine is being developed from 21 drift openings, only a few of which are for permanent use. Twelve of the openings will be abandoned when the coal from a long, narrow outcrop-bound area has been extracted. As yet, practically all of the mining consists of developing 14-ft. headings. The few rooms being worked are 24 ft. wide and pillar recovery has not started. Shooting is done with permissible explosives and electric detonators. Places which are sheared (those cut with the Jeffrey universals) require but two shotholes with 1½ sticks of permissible in each hole. Edison electric cap lamps are used exclusively.

The Jeffrey 29U universal cutters are of the new type with hydraulic finger-touch control. Hydraulic motors rotate the head and bar to the various positions, do the sumping and also accomplish the other movements. One electric motor drives the cutter chain only and the other drives



Headhouse electrical controls are grouped on a floor beneath the track. James Tolbert, construction electrician (left), and C. H. Price, chief electrician (right), view the finished job.

the hydraulic pump, the cable reel and the tramming gear. An 8-ft. bar making a 6-in. kerf is being used and the cutter chain is the standard No. 9 unit with double setscrew lugs. The machine is 60 in. wide, stands 31 in. above the rail and is 26 ft. 10 in. long, including the cutter bar.

Cable-reel locomotives listed as "Red Jacket" were built by the corporation in its shops at Red Jacket, W. Va. All parts are new and the motors, controllers and other special parts were purchased from Jeffrey. Ground-potential control is employed.

Mine cars stand 20 in. above the rail and have a level-full capacity of 105 cu.ft. They are of the four-axle, 48-in. gage type. Bodies are built of Cor-Ten high-tensile corrosion-resistant steel and the total weight of the car is thus held to 3,825 lb. One bumper is rigid and the other has a buff-draft spring. The A.C.F. heat-treated chilled-tread wheels are equipped with Timken bearings.

Direct current at 275 volts for locomotives and underground equipment is generated in two outside substations, each containing one 200-kw. Westinghouse synchronous converter with Westinghouse semi-automatic control. The converters and their transformers are used, but the controls, which include two Westinghouse automatic-reclosing feeder breakers per substation, were purchased new. These substations, including transformers, are housed in Stefco steel buildings and the electric construction is designed to afford the utmost in reliability. Garton-Daniels arresters connected to the

Looking down the valley at the town from the hillside back of the store and office building

d.c. feeders are installed outside each substation. A Westinghouse automatic-reclosing tie-feeder breaker on the outside tramroad parallels the substations.

Thirty- or forty-pound steel rail supports the trolley wire on the outside tramroads. For individual supports the rail is notched and bent to form a right angle which is reinforced on the inside by a 3x3x3/8-in. clip angle welded or riveted on. Where crossbar supports are required for two or more tracks these also are of rail, and their span pieces are guyed from the tops of the poles, which in that case extend 3½ ft. higher than the crossbar.

Power to operate the mine is purchased at 4,000 volts from the Appalachian Power Co. and the metering point is on the hillside near the tipple. Reduction of voltage to 440 for tipple motors is made by three 100-kva. single-phase General Electric transformers, "Transil-oil" type, with clamp-type secondary terminals. The transformers are mounted on a rack, or platform, of steel rail 15 in. from the ground in a fenced inclosure adjacent to the tipple.

Main-line tracks are laid with 55-lb. rail and room tracks with 30-lb. A connection from the mine tramroad at the top of the hill to a supply yard on the floor of the valley near the tipple consists of a 48-in.-gage railroad track for a steam locomotive. This track winds around the hill and is 2.6 miles long on an average grade of 5 per cent. At the midway point the road includes a switchback where the locomotive is switched from the front to the back of the cars to push the trip the remainder of the way. The regular mine cars are used on this road.

The locomotive is a 40-ton Shay geared unit formerly used by the W. M. Ritter Lumber Co. The system obviates the transferring of materials, which would be necessary if they were hoisted up the incline. A temporary incline with a 50-hp. electric hoist which parallels the hillside conveyor line and was used during the construction period still is employed at odd times for emergency transportation of maintenance men and light supplies. Regular man-trips, using mine cars fitted with wood seats, are run over the steam road.

Buildings for the mining town at Keen Mountain post office were built by the corporation's own construction force. The group consist of a combination store and office, clubhouse, service station, bath house and forty dwellings in the following sizes: two-story six-room, fourteen; one-story five-room, twelve; one-story seven-room, three; and one-story four-room, eleven. All of these houses are fitted with tub baths, full plumbing and sewage. All labor employed at the mine is white and "American," that is, the payroll includes no colored persons nor any persons from non-English-speaking countries. The principal reason for this labor selection is local public sentiment persisting as a result of the comparative isolation of the county prior to construction of a main paved highway into Grundy and the opening of the mines.

Executives and officials of the corporation are: L. E. Woods, Huntington, W. Va., president; J. E. Parker, Columbus, assistant to the president; E. F. Smith, Red Jacket, W. Va., general superintendent; N. B. Gurley, Red Jacket, chief engineer; C. H. Price, Red Jacket, chief electrician; J. R. Kirby, Keen Mountain, superintendent; and H. F. Cook, Keen Mountain, general mine foreman. The mine was planned and built under the presidency of E. E. Ritter, who resigned about the time the plant began producing coal.

MOBILE LOADERS

+ Restore Nokomis Mine to Active List

After 11½-Year Shutdown

MECHANIZATION of loading, with its attendant cost-reducing possibilities, is credited with keeping numerous coal-mining operations in the running in late years. In addition, mechanization also has made it possible to reopen many mines which could not otherwise compete in present markets. An example of this rebirth of an old operation is furnished by the Nokomis (Ill.) mine of the Nokomis Coal Co., which came back into the producing picture in the latter part of 1936 and now is getting out 2,300 to 2,400 tons of coal per day with six mobile-type loading m chines.

The shafts serving the mine were sunk about 1912 by the Nokomis Coal Co. of that day, which later was succeeded by the Illinois Coal & Coke Co. and the Illinois Coal Corporation. The latter organization closed the mine on Feb. 5, 1925, and later part of the equipment was moved to another operation controlled by the same interests. In 1936, on the basis of advances in loading equipment and operating methods, the operation was taken over by Rice W. Miller, of Hillsboro, Ill., who, with his associates, formed the new Nokomis Coal Co. and began to hoist on Sept. 14, with Clint Richardson in charge as superintendent and mine manager. Nokomis tonnage now moves into the market under the "Reliance" trade name and is sold through the Rice Miller Coal Corporation, Hillsboro, and the Midvale Coal Co., St. Louis.

The Nokomis mine recovers the Illinois No. 6 seam, lying under 640 ft. of cover in the eastern part of Montgomery County. The bed at this point lies practically level. Local grades usually are less than 2 per

cent, with 4 per cent for short distances a rarity. This condition favored the retention of the original battery locomotives for gathering and relay service. In fact, the management, on the basis of experience with locomotives of this type, deem them the best possible units for the service. Coal thickness ranges from 7½ to 9 ft. as a rule, of which about 7 to 8½ ft. is recovered. The remainder, above a natural parting, is left in place to form a coal roof, except for a thin layer between the undercut and the fireclay bottom.

At this mine also, the seam is distinguished by the characteristic No. 6 "blue band," ranging from ¾ to 1¼ in. in thickness. Directly above the blue band is a layer, or bench, of soft coal, which tends to break out of the face when exposed. As a result, standing faces and ribs shell off and fall down to the blue band and the harder bench beneath it. Consequently, ribs usually must be lagged along long-lived entries, and faces and ribs must be watched in working places. The tendency to slough also requires extra labor in cleaning up ahead of the cutting machines, while the mixed nature of the seam, including as it does hard and soft benches, in addition to the blue band, required considerable experimentation before a satisfactory drilling and shooting system was evolved. The softer nature of certain of the benches also is reflected in the screenings fraction in the shipped coal, which averages 40 per cent of minus 1¼-in. material.

The present working area at Nokomis lies northwest of the hoisting shaft, with the distance from the bottom to the main parting now in use falling close to 1½ miles. In reopening the operation, the main entry serving the northwest territory, largely as a result of the use of steel crossbars in the earlier operating cycle, was found to be in excellent condition, comparatively speaking. As a result, only a few falls had to be removed, and only three days of three shifts each were necessary to take a locomotive from the bottom to the main parting. In fact, coal was being hoisted within fifteen days after work was started on the bottom. Main-line and bottom tracks were in fair to good condition, and subsequent work has been confined largely to reconditioning where necessary, including some grading, particularly on the bottom. This work was done while the mine was in operation, usually at night, over a period of some months.

Major new equipment purchased to place the mine on its present mechanical-loading basis comprised six Joy 7BU loading machines, seven Chicago Pneumatic post-mounted coal drills, about 75 used mine cars to bring the total up to 230 to 240 in service, one used 200-kw. motor-generator set and ten 48-cell Gould Kathanode KMD-29 batteries. An additional 200-kw. motor-generator set on the bottom was rewound on the a.c. side.

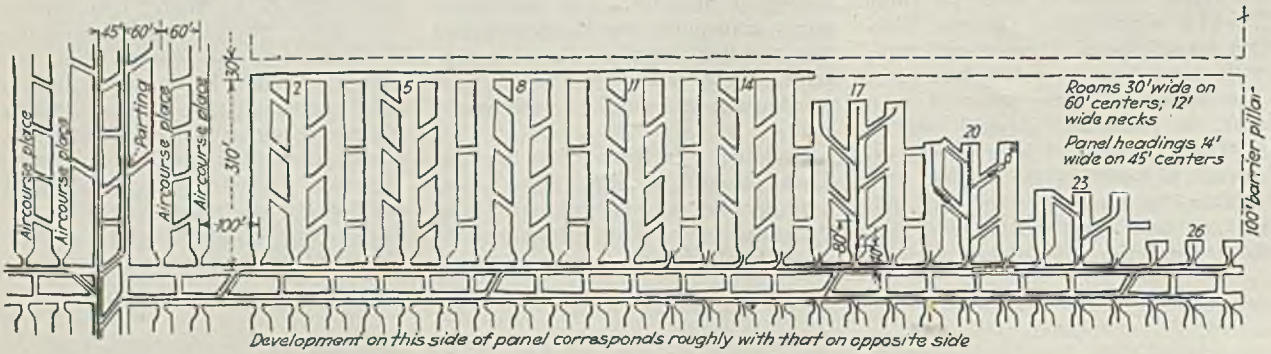


Fig. 1—Showing method of working a standard 27-room panel at Nokomis

The Whitcomb 7½-ton storage-battery locomotives used for gathering, relay, and supply and maintenance service originally were fitted with 1917-18 series Edison nickel-iron-alkali batteries, which were found fit for operation and consequently were employed in coal getting for about six months. Five sets of these Edison batteries still are in use at night—three regularly and two when required. As d.c. power is not available at night, these batteries also supply power for the operation of loading machines while they are checked and greased. Gould batteries total ten, nine in gathering and relay service and one spare.

Three Goodman trolley locomotives (15, 13 and 10 tons) were on hand. Only the 15-ton unit at present is required in main-line service, inasmuch as the arrangement of the working territory is such that only one parting is required. Consequently, this one locomotive is able to make 17 to 20 two-mile round trips and haul 2,300 to 2,400 tons of coal in seven hours. Before the end of the year, however, it is expected that a second main-line unit will have to be started, as future work will require pulling from a number of partings to be established between pairs of panel entries, as indicated in Fig. 1.

Nineteen a.c.-type Sullivan CE7 shortwall cutting machines with 7½-ft. bars were on hand when Nokomis was reopened. Seven of these now are in active service, with four more in reserve. Each loading machine normally is accompanied by a cutting machine, with the seventh for extra use wherever extra cutting is necessary. The six regular machines have been equipped with Cincinnati cutter chains accommodating Cincinnati "Duplex" bits for making a 6-in. kerf. The new chains were installed as the old ones were worn out, at which time the machine to be fitted was brought out and thoroughly overhauled. When operations started, eight machines were necessary to cut the production of around 1,800 tons. Now, seven machines cut 2,300 to 2,400 tons per day, and the money saving is placed at about $40 per day. An average of eight bits is required per place, giving an average output per bit of about 7 tons.

With battery locomotives for gathering, the original operators of the Nokomis mine selected alternating current for the operation of the cutting machines. D.c. equipment was selected by the new management, this applying particularly to loading machines, with the idea of eventually going entirely to direct current. In the meantime, continuance of the a.c. cutting equipment requires a dual transmission system. Under the Nokomis plan the a.c. units operate only at night and consequently the same wires are made to carry both a.c. and d.c., the transfer from one

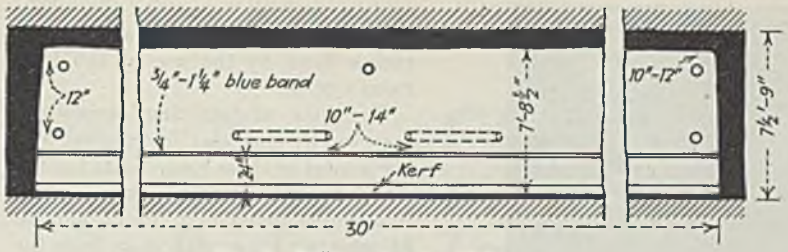


Fig. 2—Drilling plan for 30-ft. room

to the other being made by moving a three-pole double-throw switch from one set of contacts to the other.

Power to operate the underground equipment is generated at 2,300 volts in a mine power plant at the top of the hoisting shaft. From the power plant to the motor-generator sets and the cutter transformers the circuits consist of lead-armored jute-wrapped cables laid on the bottom. Cutter transformers—three or six in a bank, depending upon the number of machines being served—are 25-kva. units. Usually, one bank of three transformers serves two 35-hp. cutting machines.

Secondary distribution circuits—that is, circuits serving production equipment with low-voltage power—consist of braid-covered insulated single wires. Main circuits are made up of 4/0 wires. Double 2/0 wires are carried up the panel entries to the sixth to the tenth rooms, with single 2/0 wires from there on. Under this system all production equipment (cutting machines, drills and loading machines) taps directly into the secondary distribution system and therefore a trolley wire and rail return is necessary only in the case of the main-line locomotive.

Average 2,337 Tons Per Shift

With the facilities summarized in the preceding paragraphs, the Nokomis mine averaged 2,337 tons per shift in the month of February, 1938. On March 2, 1938, the six loading machines filled 607 cars for an output of about 2,520 tons on the shaft bottom. The low in recent months has been 2,200 tons in seven hours. Men employed underground on an average day total around 143 (Table I) for a production of 2,300 to 2,400 tons from 40 to 45 working places, plus about fifteen extra places kept in reserve.

Operation at Nokomis is based on the use of room panels consisting of two headings 14 to 15 ft. wide on 45-ft. centers, with rooms 30 ft. wide on 60-ft. centers turned both ways from the headings, as indicated in Fig. 1. Room depth is 310 ft. Necks are cut 12 ft. wide, with widening, as much as possible in the direction of advance, starting after the second cut. Main entries consist of two headings 12 ft. wide on 45-ft. centers. Two "aircourse places" 30 ft. wide on 60-ft. centers are driven parallel to the main entries on each side. These places serve the dual purpose of simplifying the ventilation problem and at the same time assure sufficient places to enable a development machine to produce a good tonnage. One of the 12-ft.-wide main headings serves as the haulageway. Partings are established on the parallel heading between every pair of panel entries, as indicated in Fig. 1, thus reducing relay-locomotive travel to a minimum.

To reduce the changing distance, the "key-room" system has been adopted at Nokomis. Shortening changing distance is not confined to rooms alone, however, as the practice of picking up places also is applied as far as possible in entry development. In Fig. 1, for example, the aircourse places are picked up from the headings at intervals of about 150 ft., this practice making a difference of about ten cars per shift in the performance of a development machine.

The key room at Nokomis is the middle of a group of three. Thus, in a standard panel of 27 rooms on a side there are nine key rooms. To pick up the room on one side, a frog is set 40 ft. in from the center line of the heading and a 45 is driven in to the room to be picked up. To pick up the place on the opposite side, a frog is set 80 ft. from the heading. As the places advance, additional frogs are set and pick-up tracks installed at 80-ft. intervals. Pillars between groups of key rooms are pierced with one 12-ft.-wide crosscut after the initial crosscut is driven, primarily to permit the loading machine to pass without coming out on the heading.

Table I—Normal Distribution of Underground Employees at Nokomis Mine

Classification	Number
Bratticemen	2
Cagers	1
Other bottom men	3
Electricians and maintenance men	9
Loader operators and helpers	12
Mine examiners	1
Mine managers and assistants	6
Motormen and tripriders	24
Machinemen	14
Drillers	12
Timbermen	16
Trackmen	14
Other underground	29
Total	143
Number cars usually dumped	565–590
Normal daily output, tons	2,300–2,400

Table II—Constitution of Loading-Machine Crews at Nokomis Mine

Classification	Rate	Number
Operators	$8.40	1
Helpers	7.68	1
Machinemen	8.40	2
Clean-up men, day shift	7.10	2
Clean-up men, night shift	7.10	1
Trackmen	6.00	2
Timbermen	6.00	2
Motormen	6.40	1
Tripriders	6.00	1
Relay motormen	6.40	½*
Relay tripriders	6.00	½*
Drillers	7.15	2
Foremen	....	½*

* One man to two loading machines.

Machines Paired Per Panel

When sufficient places are available, one loading machine works on one side of a panel and one on the other, each machine advancing one of the headings. Occasionally, however, where a loader operator adept in development is available, one machine will be used primarily to advance the headings and open up the rooms, working in wide places only just sufficiently to piece out its daily output and help the regular room machine keep the panel balanced. Then, when the development machine is required elsewhere, the panel is taken over by two regular room machines. With operators accustomed to the work, development machines frequently are able to produce nearly as much coal as room machines.

Mechanization crews at Nokomis comprise 16½ men, counting one foreman for two machines. Duties of the crew members are indicated in Table II. Cutting, drilling and shooting are done on the night shift, with loading and other operations on the day shift. When a loading machine cleans up a place, two clean-up men on the day shift come in and scale the face, load loose coal into a car, throwing back any excess, and otherwise make the place ready for cutting. The sloughing characteristic of the coal usually makes it necessary to handle a fairly substantial quantity of loose material.

Extension of the timbers and the track usually is the next step. Normally, trackmen and timbermen take care of any emergency conditions reported by the night men or mine examiner the first thing in the morning in order to clear the road of the

Left half of a typical room in Nokomis mine after the face is shot down. The large lumps are derived from the top round of holes

loading machine. They then drop back and handle the regular timbering and tracklaying behind the loading machine. Timbering standards call for at least two rows of round props on each side of the track in a 30-ft. place. Timbers are spaced 4 to 6 ft. apart and are extended to within 12 ft. of the face before it is cut. Movement and resetting of timbers while the loading machine is working are handled by the helper.

Third Clean-up Man at Night

Because of the sloughing action of the coal, a third clean-up man is employed at night, with the duty of going ahead of the cutting machine and clearing away any coal which may have come down since the day clean-up men completed their work. He also checks the places to make sure they are in a safe condition for cutting. The places then are undercut about 7 ft. deep. The drilling crew usually follows the cutting machine, although if a place is not ready it may drill ahead for one or two places.

Rooms at Nokomis are shot with seven holes placed about as in Fig. 2. Four of the holes are placed about 10 to 14 in. over the blue band and are shot first to break down this band and the underlying harder bench of coal. Three holes are used to bring down the rest of the cut. Three drill set-ups are required for the seven holes, and the two middle holes in the bottom row are angled out to each side the center line. Headings are shot with four holes, the drilling practice being substantially similar to that in the rooms except that the middle holes are omitted.

Both 1¾-in. Alton pellet powder and 1¾x6-in. Hercules Red H permissible are used in shooting at Nokomis. The permissible is used in the two middle holes over the blue band to facilitate getting the initial break in the lower bench. On the average, about eighteen to twenty sticks of explosive of both kinds is required for a 30-ft. cut. Holes are loaded by the drillers, who also fire them at the end of the night shift.

As indicated above, each loading machine is served by one gathering, or "snatch," locomotive. Consequently, for a production of 2,300 to 2,400 tons, the six service locomotives must handle an average of 95 to 100 cars each in 420 minutes, including actual loading, changing, moving loading machine and delays. Holding this average is made possible mainly by using a car with a capacity of slightly over 4 tons and keeping changing distances down by the use of the key-room system.

Each pair of gathering locomotives is served by one relay locomotive, giving a total of three relay units for the six gathering units in service. The relay units bring in trips of nine to fifteen cars, heading them in from the parting and usually placing them on the heading just above the point where the loading machine is working. The relay unit then assembles the loads and returns with them to the parting.

Pick Up Four To Five Cars

Gathering locomotives usually work with trips of four to five cars. As soon as the first car is loaded it is pulled out and kicked in on the nearest available empty track, which may be up the straight in the key room or onto a branch into a side room. This process is repeated with each car until the last, which is left under the loading machine while the locomotive goes out for another trip of empties. Fig. 1 shows graphically the car-changing system. It will be noted that three possible tracks for storing loads are available within a very short distance of the face, as a general rule. In making up trips, the relay locomotive comes into the place and picks the loads off the various tracks. To provide the maximum flexibility in relay service, prevent interference and facilitate travel between the two sides of the panel, four crossover tracks are installed in each panel, as indicated in Fig. 1.

Loading machine moving into the coal shown in the illustration above

COOLING INTAKE AIR

+ Reduces Talleydale Roof Deterioration In Summer Months

By IVAN A. GIVEN
Associate Editor, Coal Age

CHANGES in ventilating-air temperature are a factor in deterioration of mine roofs, and at a number of operations such changes immediately are reflected in the magnitude and number of falls. Such an operation is the Talleydale mine of the Snow Hill Coal Corporation, near Terre Haute, Ind., where cooling of the ventilating air in summer has been adopted to eliminate much of the hazard and expense growing out of roof deterioration from variations in the temperature of the intake air.

The Talleydale cooling equipment went into service in May, 1937, and ceased operation early in November. In that period, as compared with the same period in 1936, "rock rains" were substantially reduced, except when it was necessary to stop the cooling plant for a day or two. No major falls were experienced while cooling was done, and chipping, slabbing off and other minor roof disturbances were cut materially all over the mine.

Consider Water Heating

The efficacy of the system also may be judged in part from the fact that in the first two weeks of December, 1937, five big falls, the first since the spring of the year, followed sharp temperature drops. These falls ranged in size up to 35 cars (200 cu.ft. per car. level full), the latter requiring five man-shifts, using a loading machine, to clean up. In the light of this experience, mine officials incline to the opinion that it may be profitable to install heating equipment to bring the temperature of the ventilating air up to the normal rock temperature in the winter months, thus making conditioning an all-year activity.

Talleydale recovers the Indiana Third Vein, averaging 5½ ft. in thickness. Number of working places, both rooms and headings, is 108 to 110 on a normal day. The seam is overlaid in most sections by a gray slate 4 to 7 ft. thick. Over some areas, a brownish slate occurs, offering much the worst problem of the various types of top in the mine. In a few other localities, the slate cuts out, leaving a hard, steely sandstone. Where the brownish slate is found, the sandstone overlying it usually is laminated in character and peels off in layers when exposed. The top also shows sudden changes in character from, say, one heading to another.

One of the major features of the Talleydale roof is its lack of elasticity and tensile strength, rendering it much more susceptible to deterioration from temperature changes and subsidence in worked-out sections, so that, even though it looks good when uncovered, it tends to fall easily under either or both of these influences. The tendency toward subsidence also is more pronounced at Talleydale, inasmuch as the coal, while resting on about 18 in. of good fireclay, mainly is supported on a layer of unconsolidated material (clay, carboniferous matter, conglomerate, etc.), about 4 ft. thick immediately below the fireclay. Consequently, when the coal is mined out, the pillars tend to sink, creating tension in the roof. This condition was further aggravated, in preconditioning days, by temperature variations.

Falls, when they occur, usually run up 5 to 7 ft. into the top. If allowed to stand without attention, the top keeps chipping down, so the practice is to move in immediately,

Talleydale ventilating and air-conditioning units. At the left is the fan with the motor house in front of it. Next to the fan is the air conditioner, which connects into the housing over the air shaft. At the right is the room housing the service pumps and electrical apparatus and controls

clean up fallen material and secure the roof with timbering to suit. Maximum height of a fall to date has been 18 ft. to the top of the arch, but falls of much more than 7 ft. have been rare, even in the days before cooling, due to the practice of getting at them immediately.

The Talleydale top also has had a marked effect on room depth. The standard is 250 ft., as experience has shown that rooms much deeper are difficult to keep open until completed. Even with 250 ft., considerable trouble was encountered in the days before air conditioning. Standard room width is 24 ft., compared with 12 ft. for headings, and rooms were started with two rows of posts on each side of the track, supplemented by crossbars over the longer spans resulting from crosscutting, etc. But even with the relatively fast advance made possible by mechanical loading, it usually was necessary in the old days to go over the timbering in the first half of the room and install crossbars over the track before the room could be completed. This applied even under the gray slate, which, comparatively, is a much better top than the brown. With air cooling, however, it is possible to work out rooms with the standard single props and without auxiliary crossbarring, except in sections where the brown slate is encountered or the top is unusually bad for any other reason. Crossbars still are required, however, at crosscuts and other junctions where the width of opening is greater than normal.

Ventilation is supplied by a 6-ft. single-stage Jeffrey Aerodyne fan. At the time this article was prepared, the fan was operating at 751 r.p.m. and supplying 59,000 to 60,000 c.f.m. at a water gage of 1½ in. in the fan outlet. Mine water gage is 1 in., the difference representing the drop through the air cooler. Fan-motor demand on this basis was 19 hp. As the worked-out area increases and entries lengthen, fan speed and volume will be increased.

The present air shaft is the old hoisting shaft used by the Talley Coal Co. to mine the overlying Fourth Vein and start operations in the Third Vein. Inside dimensions are 10 ft. 8½ in. x 16 ft. 8½ in. Depth is 350 ft. In preparing the shaft for use, it merely was cleaned out, leaving the original wood cribbing, guides, etc., in place. The top of the shaft then was inclosed by a glazed-tile housing with explosion doors in the roof. An extension of the housing at right angles to the air conditioner forms a room for the necessary pumps and electrical equipment.

As indicated in Fig. 1, the air-conditioning, or cooling, unit is installed between the fan and the housing over the shaft. This cooling unit is a No. 862 special two-stage "Sirocco" air washer, consisting of a steel tank (20-gage top and sides) containing cold-water sprays and moisture eliminators, along with the necessary water-supply and drain connections. In operation, air is forced through two banks of sprays supplied with recirculated water and then through one set of moisture eliminators, followed by two banks of fresh-water sprays and a second set of moisture eliminators. The cooled air then goes down the shaft. The installation was designed by the Allen & Garcia Co.

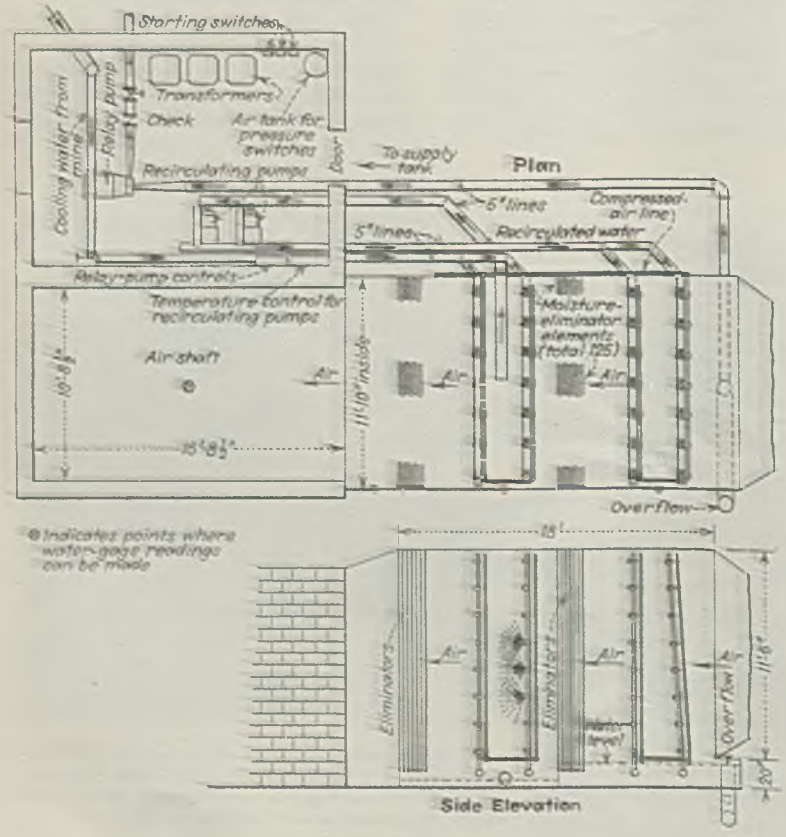
Tank Has 224 Spray Nozzles

The tank contains a total of 224 A.B.C. spray nozzles (eight nozzles per riser) in the four banks of seven risers per bank comprising the cooling system proper, as indicated in Fig. 1. Risers come up from 5-in. headers in the bottom of the tank, and each riser is paralleled by a compressed-air line for use in flushing out the spray nozzles. To facilitate this flushing, nozzles are fitted with a rubber diaphragm. Behind this diaphragm is an air chamber connected to the compressed-air line. When air is admitted to the line, the diaphragm in each nozzle is pushed forward, carrying with it the cone installed in the nozzle orifice to form a circular spray. As a result, the nozzle opening is increased, permitting the spray water to force out material collected in this opening. Adjusting screws make it possible to move the cones back and forth to vary the volume of water in the sprays. A two-way valve is installed in the compressed-air line to permit bleeding off the pressure and also any water which may find its way into the line.

Moisture eliminators consist of steel sheets crimped in zigzag fashion, as indicated in Fig. 1. As the air passes through the eliminators it is forced to change direction frequently and consequently drops the entrained water particles. A total of 250 eliminator elements are installed in the two banks. Water removed by the eliminators drops into chambers, or sumps, in the bottom of the tank for eventual disposal as outlined below.

As there is no supply in the immediate vicinity of the mine, cooling water is obtained from the Wabash River gravel bed about a mile away. At the mine location, however, the gravel bed is east of the river, while

Fig. 1—Diagrammatic sketch of the air-cooling installation at Talleydale mine



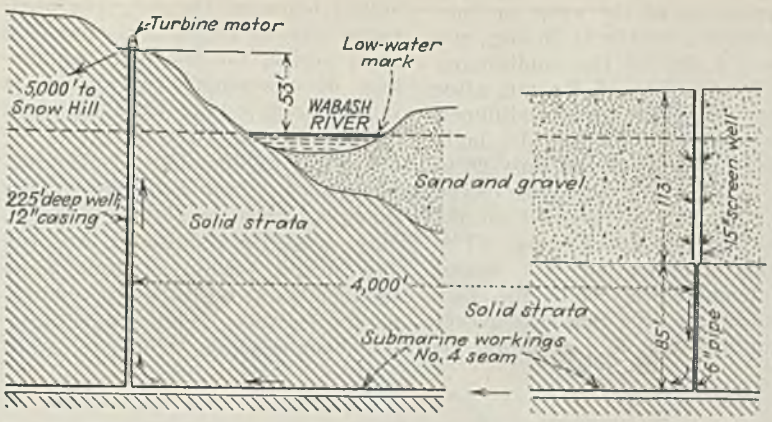


Fig. 2—Showing diagrammatically how cooling water is obtained at Talleydale

the mine is to the west. Consequently, to get a screen well into the gravel it would have been necessary, in the absence of some alternative, to lay a pipe line across the river or else go 4,000 ft. south on the west side, making a total distance of 8,000 ft., to where gravel was available on the same side as the mine. However, the workings of the old Submarine mine in the Fourth Vein extended about a mile across the river, and as these workings had filled from breaks into the gravel they offered the possibility of a supply.

It was believed that the Submarine breaks would supply sufficient water to operate the air conditioner and washery. Therefore a hole was drilled into the workings from a point on the west bank of the river, 5,000 ft. from the mine. Depth of the hole, fitted with a 12-in. casing, is 225 ft. In it was installed a Peerless 800-g.p.m. deep-well turbine pump driven by a 50-hp. motor. Rated pump head is 180 ft., requiring 49.7 hp. Actual input is about 48 hp. With this input, water delivery at the air conditioner is about 650 g.p.m.

For a period of about four months the water supply proved adequate, but after the trapped air in the old mine workings had been allowed to expand, it became evident that it was going to be inadequate. But, as there is an unlimited supply in the gravel bed, which is about 115 ft. thick, the management conceived the idea of sinking a screen well in the gravel on the east side of the river and then drilling a 6-in. hole down from the bottom of this well through the solid strata into the Submarine workings. Thus, as indicated in Fig. 2, water flows into the screen well, down the 6-in. pipe into the Submarine workings and through these workings and under the river to the deep well. Expectations were realized in practice, with the result that 650 g.p.m. can be taken continuously from the well without any appreciable drop in water level, which stands at approximately the river level.

The deep-well pump discharges into an 8-in. line leading to a standpipe in the pump and control room at the air shaft. From the standpipe two 5-in. lines lead to the headers serving the two banks of risers next to the air shaft, which form the second stage in the air-cooling cycle. Spray water from these two banks of risers is collected in a chamber beneath the second-stage compartment, in which a 10-in. horizontal suction pipe with the bottom sliced off is inserted. This suction pipe connects to a 6-in. line leading to the intakes of two Allis-Chalmers centrifugal pumps (about 300 g.p.m. each) driven by 10-hp. motors, which recirculate the water through separate 5-in. lines to the two banks of risers forming the first air-cooling stage (next to the fan outlet).

Water from the first-stage compartment flows into a 10-in. water leg with an outlet to the atmosphere just high enough to maintain the desired water level in the collecting chamber. Also connected to the leg is a 6-in. line leading back to a relay pump, which forces the recirculated water, as needed, to a supply tank feeding the Talleydale coal-washing equipment. Excess water flows to waste through the water-leg outlet. Operation of the relay unit, another Allis-Chalmers centrifugal pump (about 600 g.p.m.) with a 15-hp. motor, is controlled by a float switch which stops the motor when the water level falls in the collecting chamber, and also by a pressure switch operated by the water level in the washery-supply tank. At times when the cooling system is not in operation, the deep-well pump at Submarine, controlled by a switch in the engine room at Talleydale, discharges directly into the supply tank.

When the conditioner is operating, the sprays in the second stage are kept going all the time. Sprays in the first stage, using recirculated water, are cut in, however, only as needed, as indicated by a rise in the temperature of the air entering the shaft. This cutting in and out is performed automatically by a "Johnson System" automatic temperature regulator with auxiliary pressure switches operated by compressed air. The regulator includes a pan for recording the temperature of the air going down the shaft, the pen arm operating an air valve to operate the pressure switches for cutting in one and then the other recirculating pump, as necessary. Up to 62 deg. (shaft temperature), only the sprays on the two banks of risers constituting the second cooling stage are

Fig. 3—Temperature record, air entering the shaft, Talleydale mine, July 26 to Aug. 1, 1937, inclusive, with maximum and minimum day-time outside-air temperatures over the same period

Day-Time Air Temperatures*

	Low	High
Mon., July 26	61	78
Tues., " 27	62	82
Wed., " 28	64	86
Thurs., " 29	66	91
Fri., " 30	72	88
Sat., " 31	66	90
Sun., Aug. 1	66	86

* Range of readings each hour from 6 a.m. to 630 p.m.

operated. At 62 deg., one recirculating pump, supplying the second bank of risers in the first cooling stage, is cut in, followed by the second recirculating pump—first riser bank—when the air temperature in the shaft reaches 64 deg.

Each of the headers supplying the risers is equipped with a pressure gage, and header-line pressure normally is 30 lb. per square inch. Rising pressure, as indicated by gage readings, usually is a signal for flushing out the spray nozzles.

Temperature of the water in Submarine mine normally is 56 deg., rising to 57½ deg. at the conditioning unit. Temperature of the air, after passing through the conditioner, ranges from 60 to 62 deg., dry bulb, as a rule. For the period July 26 to Aug. 1, 1937, for example (seven days), the low, as recorded on the regulator chart, was 52 deg. (Fig. 3), this representing the lowest night temperature, while the high (excluding one brief period of power interruption) was 64 deg. during the hottest hours of the day. The usual range was 60 to 62 deg. Over this same period, the day-time temperature of the outside air (Fig. 3) ranged from a low of 62 deg. to a high of 91 deg.

Continuous operation of the cooling system is not a necessity. For example, when operation began in May, 1937, the conditioner was run only during certain day-time hours for some weeks until the average temperature reached heights warranting a 24-hour schedule.

ELECTRIC TRAINS

+ Cut Cost of Hauling Coal From Pit

At Enos Strip Mine

A DIFFERENT kind of haulage medium is the latest step toward improved efficiency and lower costs at the Enos strip mine of the Enos Coal Mining Co., near Oakland City, Ind. This company incorporated the advantages of tractor-trailer pit haulage into its operating set-up in January, 1935, but, in view of the distance from the pit to the preparation plant, retained steam locomotives and small side-dump cars for its main haul from a field transfer station.

Steam was continued on a provisional basis only, however, with the thought that it would be replaced if another medium could be found that would offer a reduction in cost, in which maintenance of steam locomotives and the small cars in use was no mean item. Electric haulage finally was chosen, such haulage involving the use of two-way-dumping trains each made up of a load-carrying electric locomotive and three additional cars. This equipment went into service in June, 1937, and has resulted in 50 per cent saving in main-haulage cost.

View of the No. 2 pit at Enos, showing stripping, loading, haulage and auxiliary operations.

Mining operations are carried on in one large pit by two equipment units (Nos. 2 and 3) about four to five miles southeast of the preparation plant. Stripping and loading equipment in the No. 2 unit consists of a Bucyrus-Erie 750B electric shovel with 22-cu.yd. welded alloy-steel dipper and counterweighted hoist and a 75B electric shovel with 5-cu.yd. coal-loading dipper. No. 3 unit comprises mainly a 750B electric shovel with a 17-cu.yd. dipper and a 50B loading shovel with 3½-cu. yd. dipper, but also includes a Marion 36 steam loader with 2-cu.yd. dipper for extra service when required. In addition, the 50B loader is moved from one part of the pit to another, as conditions warrant.

The Indiana Fifth Vein, averaging close to 5 ft. in thickness, is recovered. Average overburden thickness is 35 ft., with some more and some less as a natural corollary. Overburden nature varies from place

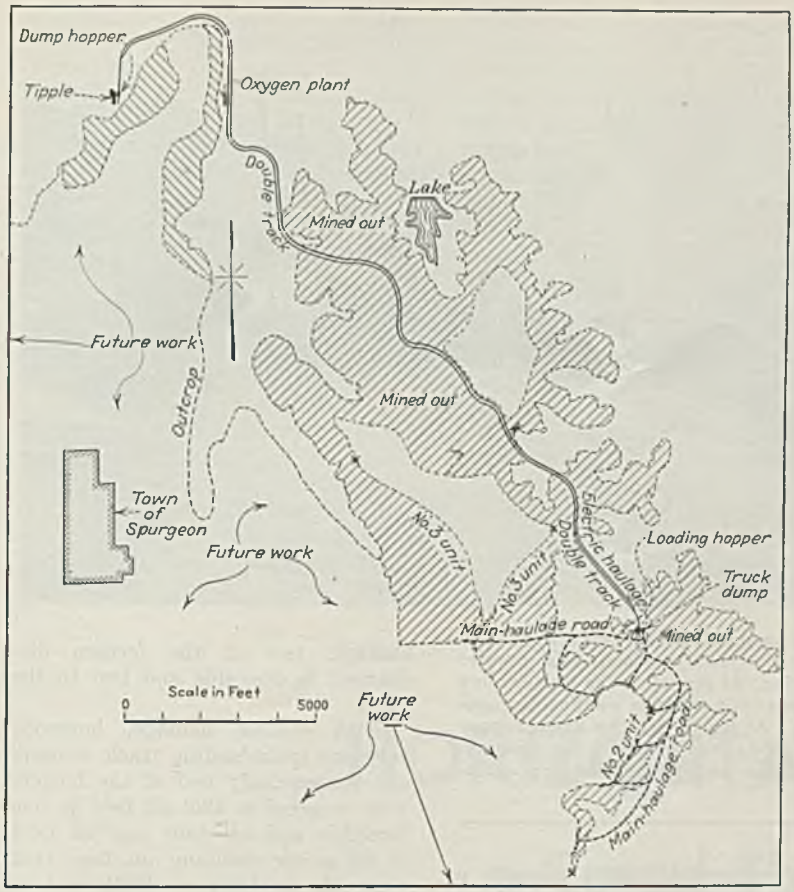


Fig. 1—Sketch of Enos stripping property, showing pit and electric haulage, with the transfer station between. Certain details are exaggerated in scale.

to place, but in practically all cases the coal is overlaid with 1 to 3 ft. of black slate, usually followed by 1 to 4 ft. of gray shale. Then, in places, a 6-in. band of very hard rock comes in, followed in some areas (where it occurs) by 18 in. to 4 ft. of limestone. Over the limestone is a shale layer of variable thickness up to a maximum of 10 ft. This is followed, in banks over 40 ft., by a rider seam, in turn overlaid by gray shale and surface material.

Constitution of the overburden, however, is subject to wide variations, as noted above. An as example, all the various types of material previously listed may be replaced by sandstone as thick as 30 ft. resting on the black slate over the coal. In other localities, the hard material may be made up of shales and sandstones and the limestone may be absent.

With the variations encountered, shooting of the overburden must be carefully watched. Consequently, to insure maximum results, an engineering control has been set up, under which a technical man lays out the drillholes and calculates the volume of the bank and the quantity of explosive required in advance of shooting. Occasionally, the horizontal drillholes employed are "double-decked"; i.e., the holes are staggered in two rows at different levels, with the top holes slanting upward to possibly a 10-deg. angle. If a hard seam of rock is present in the desired position, the second row of holes is drilled above this seam, if possible.

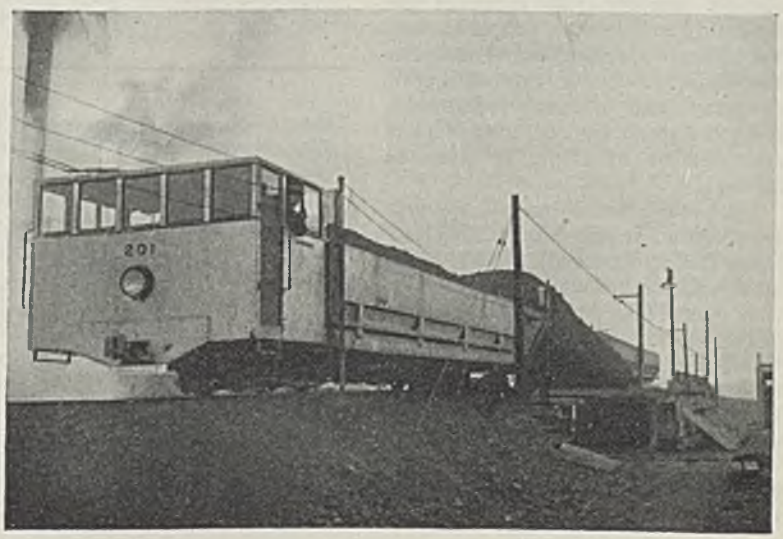
Enos was the first stripping operation of record to use a commercial-type horizontal overburden auger, and at present employs one Sullivan machine in each pit, with one spare in addition. These machines drill 6-in. holes, which are loaded with L.O.X., another stripping practice pioneered by Enos, which also was the first to install 12- and 18-cu.yd. strippers. L.O.X. cartridges as loaded, contain about 9 lb. of oxygen and 3 lb. of carbon, and the yield per cartridge is about 125 cu.yd. of bank material. The coal is drilled, where necessary, with Hardsocg vertical augers and is shot with granular dynamite or pellet powder.

Haulage Methods Vary

Transportation at the Enos mine, as indicated above, is divided into two stages: pit haulage, utilizing automotive tractor equipment, and main, or electric, haulage. Pit haulage in turn is divided into company and contract haulage. Company equipment consists of eight Autocar tractors pulling 20-ton Austin-Western trail cars, which are concentrated at the No. 2 unit about 90 per cent of the time. Contract equipment (four 10-ton Ford side-dump trucks and three International tractors pulling 10-ton Sanford-Day semi-trailers) generally serves No. 3 unit.

That part of the pit in which No. 3 unit is operating is roughly, as indicated in Fig. 1, in the shape of a V with a total length of approximately $1\frac{3}{4}$ miles. A truck road en-

One car of an electric train being dumped at the Enos tipple hopper. A push-button station, by which the operator controls the dumping cycle, is opposite the cab window, with another farther in the background.



The connecting link between pit and electric haulage — Enos field transfer station. At the left is the train-loading hopper with a trip in position for loading. At the right is the dump hopper for pit-haulage units with two openings for side- and bottom-dumping equipment.

ters the pit at the point of the V, from which point all haulage is done on the coal. No. 2 section of the pit, on the contrary, is served by runways through the spoil bank (Fig. 1) at intervals varying from 1,000 to 2,000 ft. These runways connect into a main truck road leading to the field transfer, or dumping, station.

Main truck roads are constructed on a subgrade on which "one-man rock" picked out of the bank is laid by hand about 12 to 15 in. thick. Six inches of gob is placed on the rock and covered with a layer of cinders to fill the voids in the gob. Finally, the road is surfaced with 3 to 4 in. of crushed limestone (about 1½x2½ or 3 in.). Cost of roads built in this fashion ranges from $6,000 to $7,000 per mile. Road width usually is 30 ft., measured on the top of the subgrade.

Average round-trip haul for company-owned haulage units was slightly less than 2½ miles at the time this article was prepared, and the mileage per gallon of gasoline was close to 2. A comparison of company and contract equipment, from the standpoint of tons handled and number of trips, is given in Table I.

Pit-haulage units dump at a transfer station (designed by H. N. Robinson & Co., Evansville, Ind.), located 4½ miles southeast of the preparation plant. This transfer station consists of dump train-loading hoppers. These hoppers are connected by a 60-in. pan conveyor, 1,100 tons per hour, driven by a 75-hp. motor. Capacity of the dump hopper is 40 tons on the basis of two Ford loads to one Austin-Western load. Both the Austin-Western and Sanford-Day equipment dumps through an opening in the bridge across the top of the hopper. To accommodate the Ford trucks, which dump to the side, one side of the hopper was extended on a slant up to the surface along the truck ramp to form an apron.

Coal is removed from the dump hopper by the apron conveyor, which elevates it to the train-loading hopper, holding 100 tons. Length of this hopper is 28 ft. and it originally was designed to load the side-dump cars employed with the steam locomotives. These cars were loaded in trips on tracks on both sides of of the hopper, which set in the center. Four reciprocating feeders are employed and originally, with steam haulage, two of the feeders discharged to one side and two to the other.

With electric haulage, however, only one train-loading track is used, and consequently two of the feeders were reversed so that all feed in one direction and all four can be used to fill a car standing on the track alongside the hopper. With coal on hand, the four feeders will load a train (three cars and the load-carrying locomotive) with 140 to 150 tons of coal in four to five minutes. All the feeders are individually controlled to facilitate putting the maximum load on the car and also to save time in changing from one car to the next.

From the transfer station to the tipple the coal is hauled in three electric trains, each consisting of a Differential electric locomotive, supplying the tractive power and also carrying a pay load, and three cars. Cars and locomotives each have a level-full capacity of 1,200 cu.ft., or 30 tons, although average loading in November, 1937, was 36 tons of raw coal. The electric transportation system (three trains in operation) was designed to haul an average of 5,000 tons (shipped coal) in seven hours over a one-way distance of 4.508 miles. At the time this article was prepared, the three trains had handled as much as 5,300 tons in one shift. Equipment displaced by the Differential units included one 40-, one 37- and four 31½-ton rod locomotives and 150 5-cu.yd. two-way side-dump cars (exclusive of spares).

Locomotives on the Differential trains are powered by two 125-hp. 600-volt d.c. motors with contactor control. Each motor drives a pair

Table I—Haulage Performance, Enos Mine, November, 1937 (22 Starts)

Pit Haulage:	Company Units	Contract Units
Miles operated	9,577	.....
Tons hauled	77,651	28,147
Round trips made	3,713	2,696
Miles per gallon of gasoline	1.904	.....
Electric Haulage:		**Company**
Tons hauled		105,798
Number of round trips		753
Trip-loading time, minutes		4.2-5.1*
Running time, loaded trip, minutes		10.5-10.6*
Average speed, loaded, m.p.h.		25.5-25.8*
Dumping time, minutes		2.77*
Running time, empty, minutes		9.9-10.2*
Average speed, empty, m.p.h.		26.6-27.3*

* Results of sample time observations on a few trips; one-way haul is 4.508 miles; maximum grade is about 2 per cent.

of wheels on one side of the front truck of the locomotive through a worm gear. Car length is 32 ft. from coupler to coupler; outside width is 10 ft. 8 in. Track gage is 36 in. Under Enos conditions, rated average speed over the 4½-mile route (both ways) is 30 m.p.h. Maximum speed is 40 m.p.h. Maximum grade on any stretch of track is about 2 per cent.

The three electric units started operation June 10, 1937, and observations on a few trips at the time this article was prepared showed a round-trip time, in the absence of waiting on coal or delays at the tipple hopper or elsewhere, of close to 28 minutes, including loading, dumping and running in both directions. Three derailments had been experienced to Jan. 1 as a result of switch trouble, and one car had been thrown into the hopper when a door failed to unlock in dumping.

Two tracks connect the transfer station and the dump hopper at the preparation plant, thus separating empty and loaded haulage between the single loading track at the transfer station and the single dumping track over the tipple hopper. The latter hopper was increased to a capacity of 200 tons by building up the sides. The dumping track is laid on a bridge over the hopper. On this bridge are mounted four compressed-air dumping cylinders, two on each side. Veed-out blocks on the tops of the pistons operating in the cylinders, which are vertical, engage rails along the bottom edge of the car and raise the body off the trucks. Meanwhile, the opposite side folds down, forming an apron on which the coal slides down into the hopper.

With the air cylinders on each side of the track, the body of the car can be lifted from either side to dump one way or the other. Dumping is controlled from pushbutton stations set up along the dumping track. When the locomotive cab is opposite a station a car automatically is positioned over the dump. Thereupon, the locomotive operator reaches out of his window and pushes a button to dump, following this by pushing a second button to release the air pressure and return the car to position. Automatic power control makes it impossible for the train to be moved as long as the dumping pistons are in contact with the car.

HORIZONTAL DRILLHOLE + Cored Through Rock Fault Completes Lillybrook Six-Mile Drainway

BY HORIZONTAL DRILLING through a rock fault the Lillybrook Coal Co., Lillybrook, W. Va., in the Winding Gulf field, has completed a drainway project eight years in the making which now provides gravity drainage over a distance of six miles along contours through the coal seam. Drilling a long horizontal hole proved a safe and low-cost method of tapping a 52-ft. head of water standing back of the rock fault, which is a "want," as distinguished from a displacement of the seam.

This drainage project pertains to the Sullivan and Lillybrook No. 3 mines in the No. 4 seam. The Sullivan property has not been operated since 1932 but the Lillybrook mine produced 1,000,000 tons in 1937. Another operating mine of the company, Killarney, which adjoins No. 3 mine but is in a lower seam (No. 3), produced 500,000 tons in that year. The No. 4 seam, in which the drainway is located, has an average

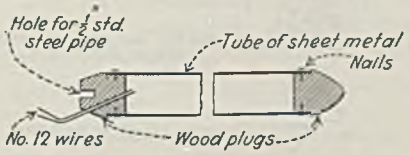


Fig. 1—The torpedo was loaded with sixty sticks of 60-per-cent dynamite.

thickness of approximately 44 in.

Eight years ago several centrifugal pumps discharging to the outside were in almost constant use draining the Lillybrook workings. Plans to effect natural drainage were formulated and gradually the mining sections were developed and connected to bring this about, with the result that now there is no pumping to the outside. Sullivan mine was abandoned in 1932 and was allowed to fill with water to the top of the 252-ft. shaft. High cost of pumping and the fact that only pillar coal remained were among the factors bringing about this abandonment.

Completion of natural drainage for Lillybrook No. 3, which is slightly lower in elevation than Sullivan mine, led to a decision to dewater Sullivan so that the remaining available pillar coal could be extracted and likewise the barrier coal between the two mines. This necessitated driving drainways from an active section of No. 3 to a pillared section. To decrease the head against which the connection hole between mines had to be driven, the Sullivan shaft was first pumped to the level of the top of the seam (at the shaft) by a 1,200-g.p.m. 100-hp. Pomona deep-well turbine pump, thus leaving a 52-ft. head of water to be tapped by the drilling operation.

Driving of the drainway headings in No. 3 mine was speeded by the use of chain-and-flight conveyors. A cross-connection entry heading was aimed at the 10-ft. face of a heading in the Sullivan mine which had been driven 90 ft. into the rock fault. This cross-connection heading on the

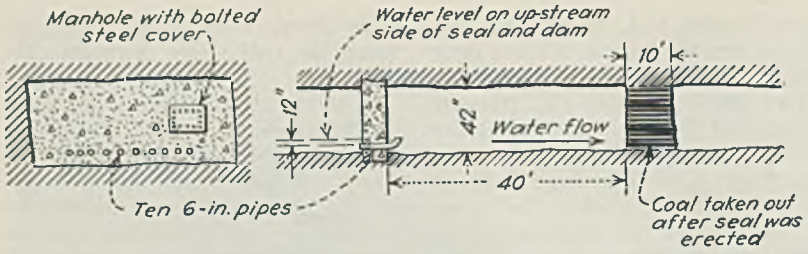


Fig. 2—The seal and dam were constructed before final cutting into the abandoned area through which the water drains.

No. 3 side was driven until the coal thickness had decreased to 20 in. and that point was calculated to be 150 ft. from the face of the Sullivan rock heading.

A 4-in. core drill was used to make this 150-ft. connection and the work was done by the Hoffman Bros. Drilling Co. The first step was to drill an 8-in. hole 12 ft. horizontally into the coal and into this hole for its full length cement a 6-in. pipe fitted with a gate valve at the outer end. A concrete-arch dam anchored into the ribs was placed across the face of the coal as a safety precaution to hold water and anchor the 6-in. pipe. Drilling of the 4-in. hole was done through the gate valve and pipe. The drill was started at an angle 2 per cent above calculated grade. Coal was encountered for only 21 ft. from the face of the heading. Rock persisted from then on and drilling was continued to a total depth of 153 ft., which is 3 ft. beyond the distance calculated to enter the Sullivan rock heading, yet no void was encountered and no water was tapped.

Drillhole Missed Heading

A rough check of hole alignment indicated a slight drooping had taken place so it was assumed that the hole had hit under the floor of the rock heading. It was possible, however, that the deviation was sidewise because the hole was placed 18 in. off center, thus leaving space for a second hole, which, however, has not been required.

Shooting the far end of the hole proved an effective means of opening it to the Sullivan heading, and the initial water flow through the 6-in. gate valve when wide open was 850 g.p.m. The flow started Dec. 15, 1937, and as of Jan. 20, 1938, the head, as indicated at no flow by a gage installed back of the gate valve, had dropped from the initial 52 to 42 ft.

The shooting was done with a torpedo loaded with sixty 1¼ x 8-in. sticks of 60-per-cent dynamite packed into the tube without being broken up. Construction of the torpedo is indicated in Fig. 1. Soap was used as a water seal at the ends where the wood plugs joined the metal and also around the shooting wires. For these wires No. 12 rubber-covered double-braid solid copper was used with the ends securely anchored to the wood plug so that the torpedo could be pulled out by these wires if it showed any tendency to bind when being inserted.

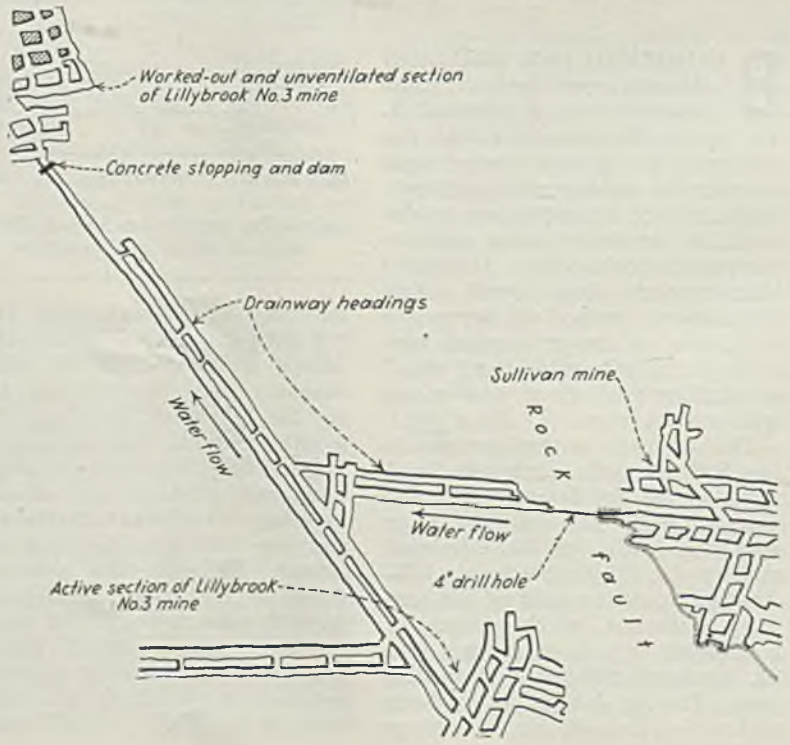
The rear plug was drilled to form a socket for the ½-in. standard steel pipe which was used in forcing home the charge. A dummy torpedo of wood had been tried in the hole to assure practically free passage of the loaded torpedo. Caps were placed at three points in the length of the charge. Water was poured into the hole to act as stemming.

Previous to the drilling of the 4-in. hole the job of breaking the new drainway heading into the pillared and unventilated gob area of No. 3 and erecting a stopping and dam with water-sealed drains had been completed. When 2-in. pilot holes showed that only 10 ft. of coal remained between the face and the abandoned area, driving was stopped and a permanent concrete seal erected 40 ft. back of the face. As indicated in Fig. 2, this seal, which has a manhole with a bolted steel cover, is fitted with ten 6-in. water pipes with discharge ends turned up to maintain a 12-in. water seal against passage of the mine atmosphere. After the seal had been completed, men using wooden wedges and wooden mauls cut through the final coal barrier to allow passage of water to the unventilated area through which it now drains.

Distance from Sullivan shaft to the 4-in. horizontal drain hole is 10,000 ft. and distance from this hole to the outside discharge at a crop opening of the old Pickshin mine is 21,000 ft. by way of the drainage path. Total discharge from No. 3 and the Sullivan mine to this Pickshin opening is 2,000 g.p.m.

J. W. Ailstock is general superintendent of the Lillybrook Coal Co., and T. T. Rees, Jr., is superintendent of the No. 3 mine. T. H. Wickham, of Beckley, is president of the company, and J. A. Hunt, also of Beckley, is vice-president and general manager.

Fig. 3—Half-mile section of the 31,000-ft. drainway which includes a 153-ft. horizontal borehole through a fault in the barrier between the two mines.



LOST DOLLARS FOUND

+ By Time-Study Analysis

In Completely Mechanized Operations

By WALTER M. DAKE
Research Manager, Coal Age

TIME IS MONEY when interruptions to the flow of coal from working face to main-line partings reduce production below a reasonably attained optimum. This is true whether operations are on a hand-loading or a mechanized basis. In the latter case, however, concentration of working places makes idle minutes much more costly because both the number of men per loading crew and the tonnage per mechanized unit are so much greater. Each non-productive minute is easily classified as avoidable or not, but only by analysis of carefully recorded time studies can cause and effect be accurately determined and necessary changes made to convert such losses into profits.

Although quantity production probably has developed such studies to a greater degree in manufacturing processes, the basic dollar value of time-study analysis is the same in all industry. Modern coal-mine management has rapidly applied this yardstick to uncover and eliminate losses where mechanization has been adopted to lower costs and meet intensive competition in rapidly widening fuel markets.

One of the first comprehensive studies of underground management problems in bituminous mines, where days' work is shown in relation to productive and idle time in terms of minutes and percentage of total shift, was the Sanford E. Thompson report made for the U. S. Coal Commission in 1923. That report declared that "the general scheme of handling work underground is quite uniform, perhaps even remarkably so; in fact, as uniform as that in many other large industries, although the opinion of many mining men is to the contrary." A review of the study after fifteen years in which many coal-production methods have been revolutionized proves that certain general principles of management then indicated and recommended are of even greater importance today.

Mine mechanization has been in progress from the first application of steam to pumping problems, but never in its history have such cost reductions been possible as with the introduction of mechanical-loading equipment. This important development permits the use of highly concentrated mining systems which require a constant balancing of auxiliary equipment cycles and man power with all production units to give maximum economic results. Coordination of men and machines can be attained only by detailed analysis of time-study records, followed by application of corrective measures for elimination of unnecessary losses.

Operating cycles are divided into three major groupings: (1) Face preparation, which includes cutting, drilling and blasting; (2) loading and transportation; and (3) the clean-up, timbering, track or conveyor extension and all other work which must be done before again returning to the first cycle of face preparation.

Mobile loader crews range from twelve to eighteen men for high production machines in thick seams to five or six men for small units in thin seams or under adverse mining conditions; the correct number required in each case is determined primarily by physical seam characteristics, mining methods employed, and the type of auxiliary equipment in relation to shift tonnage output of the various units making up the complete installation.

So much for the over-all picture.

When it comes to specific analysis, the dollar and time results, of course, will vary at each individual mine. Natural physical conditions, equipment and methods employed and the actual rates of pay all play a part. Most important of all, perhaps, in the ability to achieve a fairly determined optimum output is the aptitude of both management and men in adapting themselves to the conditions imposed by mechanization.

Profit possibilities of time-study analysis can be made most understandable by illustrations drawn from case histories. That method of presentation has been adopted in the paragraphs which follow. The data used are based on a composite of a number of studies of properties where conditions have been comparable with those set out below. While in a narrow sense no one operation is an exact duplicate of another, the conditions and results here cited can be approximated in a number of mines east of the Mississippi River.

Rates of pay per unit crew reduced to money expenditure per minute furnish the yardstick for measuring the dollar loss due to avoidable non-productive time. Obviously, the

Underground Management

In every industry certain organizations have surpassed others in the skill and initiative with which they have handled their management problems. The development of science and industry, moreover, has proved conclusively that certain general principles of management—principles recognized as fundamental only within the last few years—are of universal application in all industries. It is thus evident that it is practical and worth while to examine underground mine conditions both on the basis of the best managed mines and also in the light of the developments that have taken place in industry as a whole during the last fifteen years. The vital relation of such developments to harmonious labor relations lies in the elmination of causes of friction and the substitution of facts for opinions. —Sanford E. Thompson.

higher the basic rates the greater the loss when the flow of production is interrupted. In the examples used in this article the particular rates of pay set out are purposely a compromise: they represent neither the highest nor the lowest in effect in the area mentioned in the preceding paragraph. Management which seeks to apply the methods herein outlined, therefore, must compare the physical and operating conditions described, substitute its actual rates of pay for those here shown and make the necessary adjustments to compensate for variations in conditions and rates.

This particular composite case history deals with a mine with favorable operating conditions, including a good roof, mining a 5-ft. seam of coal. Output at the time it was decided to change from hand to mechanical loading was 2,500 tons per shift. The mine was operated on the triple-main double-entry panel, room-and-pillar system. This system was continued with mechanical loading. In order to maintain the same tonnage per shift, study disclosed that it would be necessary to operate two mobile-type loading machines in narrow work and four such machines in wide work. Crew make-up and the assumed rates of pay are given in Tables I and II. This setup called for the employment of 92 men to deliver the output to the mainline parting at a labor cost of $581.38 per shift—or $1.38 per minute.

Based on the average distribution of shift time for mobile-loader units working in good mining conditions after partial coordination has been effected, estimates of loading rates per minute and time safety factors projected for the operation of the narrow- and wide-work units were made. These estimates for optimum operations are shown in Tables III and IV, respectively. With 23.2 per cent (580 tons) of the total production from two unit crews on development and 76.8 per cent (1,920 tons) from four unit crews on room faces, an average output of about 27¼ tons per man-shift, at a cost of $0.2323 per ton, was expected.

Two weeks after installation, time studies were made on one wide-work machine for four consecutive shifts. The initial time studies (Table V) show that 86.43 per cent of total shift time, representing $92.06 in direct payroll charges, was spent in loading, car changing and moving machine from face to face, while 13.57 per cent of the shift, representinfi $14.46, is chargeable to time lost waiting for empty cars and to late starts at the face. Output was 8 tons less per unit crew and labor cost 9c. more per ton than had been forecast.

At first glance this breakdown indicates that conversion of unnecessary lost time into productive operation will give an additional 57 minutes for loading, car change and machine moves, or about 13½ more tons loaded per shift at the time-study ratio shown, for a total possible output still 124 tons below the average unit tonnage originally estimated. However, further analysis discloses that the actual loading rate is 2.0 tons per minute rather than 2.5, or 20 per cent less than estimated; that car-change time is exactly double that originally figured and that machine moves from face to face show 20 per cent more time consumed than is warranted by the distance covered.

Investigation of cutting, drilling and blasting practices revealed that machine men were not only "gripping" the cuts into the ribs in both sumping and pull-out operations to give "keyed" room corners when shotholes were placed to follow the kerf but also were pointing the cutter bar too far downward to create a step face, lower at the back than at the front of the cut, tending to further key the face and prevent proper preparation for rapid loading.

Drillers were not placing holes horizontally, demanded after careful experimentation had proved their benefit over the upward or downward angling holes formerly used, and the breaker shot, added to the usual number of rib and top shots at the center of each room face to enable machines to work rapidly to the back of the cut, was not being placed high enough to accomplish desired results.

Excessive time in car changing and in moving machine from face to face was partly attributable to lack of crew experience in rapid load-and-empty shifting and in maneuvering the machine, and to the fact that only every other crosscut was tracked at the commencement of operations, with some switch installations still incomplete. Lack of empties on gathering parting was due to inefficient dispatching. Communication systems were recommended for each operating section, so that any interruption to loading could be immediately reported and cars routed to other points. Lost time starting work at the face was easily rectified by instituting unit-crew man-trips checked in by the section foreman.

Table VI shows average of three consecutive-shift time studies taken on one of the developing machines. Here face preparation was good enough to give a loading rate of 1.4 tons per minute, only 0.1 ton per minute less than estimated. Car change behind the loader, however, was 25 per cent slower than expected. This was traceable to the light type locomotive used in entry development, necessitating three two-car trips to load out the cut. Replacement by a locomotive heavy enough to handle three-car trips cut trip-change time one-third.

Machine moves from place to place were shown equal to the estimate. Faulty dispatching, with consequent lack of empty cars, called for placing additional loaded and empty storage partings near the working places in each developing section and the installation of adequate communication systems for reporting shortage or mine car surplus

TABLE I

Narrow work Classification	Number	Total cost per day
Foreman ($8.00 per day)	½*	$4.00
Cutting & drilling men ($6.86)	4	27.44
Shotfirers ($6.86)	½*	3.43
Loader operators ($6.86)	1	6.86
Loader helpers ($6.00)	1	6.00
Motormen ($6.16)	1	6.16
Brakemen ($6.00)	1	6.00
Track & Timbermnn ($6.00)	2	12.00
Facemen (laborers) $5.76)	1	5.76
Total	12	$77.65

TABLE II

Wide work Classification	Number	Total cost per day
Foreman ($8.00 per day)	½*	$4.00
Cutters ($6.86)	2	13.72
Drillers ($6.16)	1†	6.16
Shotfirers ($6.86)	1	6.86
Loader operators ($6.86)	1	6.86
Loader helpers ($6.00)	1	6.00
Motormen ($6.16)	2	12.32
Brakemen ($6.00)	2	12.00
Relay (swing) motormen ($6.16)	½*	3.08
Trackmen ($6.00)	2	12.00
Timbermen ($6.00)	2	12.00
Facemen ($5.76)	2	11.52
Total	17	$106.52

* One man for two loaders.
† Pro rata share of total number of men employed drilling.

TABLE III

Narrow Work	Minutes	Per cent of shift time
Loading, 1.5 tons per minute.	193	45.95
Car changing, 1.5 min. per car	90	21.43
Moving loader, 5 min. per move	60	14.29
Safety factor, (delays)	77	18.33
Total shift time	420	100.00

TABLE IV

Wide Work	Minutes	Per cent of shift time
Loading, 2.5 tons per minute.	192	45.72
Car changing, 1 min. per car	100	23.81
Moving loader, 4 min. per move	40	9.52
Safety factor, (delays)	88	20.95
Total shift time	420	100.00

TABLE V

Average time shift started	8 a. m.
Average time shift finished	3 p. m.
Average tons per car	4.4
Average cars loaded per shift	78.0
Average production per shift, tons	343.0

Operation	Minutes	Percentage	Direct cost
Loading	172	40.95	$43.62
Car change	156	37.14	39.56
Moving machine	35	8.34	8.88
Cars not available	27	6.43	6.85
Late start	30	7.14	7.61
Total	420	100.00	$106.52

at given points at any moment. The idle time of the development crew caused by car shortage during the three shifts studied cost $46.59, or 20 per cent of total payroll charge for that period. Unit-crew man-trips also were put in charge of the development-section foreman to eliminate lost time at start of each shift.

With time-study crews continually employed in recording four to eight consecutive shifts per unit, analyzing average results and recommending necessary changes in procedure before going on to the next machine, two standard records covering narrow- and wide-work machines were compiled for the first six months of mechanical loading. Table VII is an average of 108 time studies of production machines responsible for about 74 per cent of daily output.

This composite shows loading, car changing and moving machines from face to face accomplished in 6 per cent less time than originally estimated, with a total tonnage output of about 4 per cent less than originally figured. Avoidable delays, however, showed a corresponding percentage increase and totaled almost 109 minutes.

Classifying avoidable delays into the five general groupings in Table VIII and using the factor of direct cost given for each operating phase, accrued dollar losses shown for the 108 shifts were: faces not prepared, $687.96; transportation, $1,172.88; power, $306.72; supplies, $192.24; maintenance, $618.84; total $2,978.64. This 25.89 per cent avoidable lost time for one machine in 108 shifts indicates a total of $11,914.56 for the four wide-work units, or a little more than 111 lost working shifts. In order to reach definite conclusions for recommendations of specific changes benefiting wide-work units, avoidable lost time was broken down to the original 21 causes of delay recorded in the 108 studies, as shown in Table VIII.

As approximately 78 per cent of the "Preparation" losses were due to delays by cutters, drillers and shotfirers, while 22 per cent was caused by incompleted tracklaying and timbering, and as "Supplies"[1] also contributed a small proportion to the total, it was recommended that cutting, drilling and blasting, and the distribution of supplies be done on a night shift. Trackmen and timbermen were to be retained on the production shift, to follow immediately the loading-machine clean-up of wide faces, with the night crew completing track extension and any timbering necessary in any room loaded out just before the end of the day shift.

TABLE VI

Average time shift started	8.10 a. m.
Average time shift finished	3.00 p. m.
Average tons per car	4.5
Average cars loaded per shift	48
Average production per shift, tons	217

Operation	Minutes	Percentage	Direct cost
Loading	155	36.90	$28.66
Car change	96	22.86	17.75
Moving machine	45	10.71	8.32
Cars not available	84	20.00	15.53
Late start	40	9.53	7.39
Total	420	100.00	$77.65

TABLE VII

Average time shift started	7.30 a. m.
Average time shift finished	3.00 p. m.
Average tons per car	4.802
Average cars loaded per shift	96.312
Average production per shift, tons	462.500

Operation	Minutes	Percentage	Direct Cost
Loading	181.3	43.17	$45.98
Car change	86.7	20.64	21.98
Moving machine	43.3	10.30	10.98
Faces not prepared [1]	25.1	5.98	6.37
Transportation [2]	42.8	10.19	10.86
Power [3]	11.2	2.67	2.84
Supplies [4]	7.0	1.67	1.78
Maintenance [5]	22.6	5.38	5.73
Total	420.0	100.00	$106.52

[1] Delays due to cutting, drilling, blasting, track and timbering.
[2] Delays due to wrecks, derailments and lack of haulage coordination.
[3] Delays due to no power, low voltage, cable repairs and power-distribution system.
[4] Delays due to lack of supplies at faces and supply-distributing system.
[5] Delays due to mechanical failures of all equipment.

TABLE VIII

General Classification	Losses indicated per shift, by 108 time studies: Minutes	Percentage	Direct Cost
(1) Faces not prepared	25.1	5.98	$6.37
(2) Transportation	42.8	10.19	10.86
(3) Power	11.2	2.67	2.84
(4) Supplies	7.0	1.67	1.78
(5) Maintenance	22.6	5.38	5.73
	108.7	25.89	$27.58

Detail Operation	Average delays per shift: Minutes	Percentage	Direct Cost
(1) Preparation			
Delay by cutters	2.1	.0050	$0.53
Delay by drillers	4.6	.0110	1.17
Delay by shotfirers	13.0	.0309	3.30
Delay by trackmen	4.3	.0103	1.09
Delay by timbermen	1.1	.0026	.28
(2) Transportation			
Delay by main-line wrecks	4.7	.0111	1.19
Delay by derailments	16.0	.0381	4.06
Delay by no empties	16.2	.0386	4.11
Delay by blocked loads	5.9	.0141	1.50
(3) Power			
Delay by power off	1.3	.0031	.33
Delay by low voltage	.9	.0022	.23
Delay by loader cable	2.2	.0052	.56
Delay by locomotive cable	6.8	.0162	1.72
(4) Supplies			
Delay by lack of timber	1.2	.0029	.31
Delay by lack of rails	3.0	.0071	.76
Delay by lack of ties	2.0	.0048	.51
Delay by lack of lubricant	.8	.0019	.20
(5) Maintenance			
Delay by cutter failure	2.5	.0060	.63
Delay by drill failure	0.7	.0016	.18
Delay by loader failure	0.9	.0021	.23
Delay by locomotive failure	18.5	.0441	4.69
Total	108.7	.2589	$27.58

TABLE IX

Average time shift started	7:30 a. m.
Average time shift finished	3:00 p. m.
Average tons per car	4.7
Average cars loaded per shift	69.149
Average production per shift, tons	325

Operation	Minutes	Percentage	Direct cost
Loading	212.0	50.48	$39.19
Car change	110.6	26.33	20.45
Moving Machine	81.2	19.33	15.01
Transportation [1]	12.0	2.86	2.22
Miscellaneous [2]	4.2	1.00	.78
Total	420.0	100.00	$77.65

[1] Delays due to wrecks, derailments and lack of haulage coordination.
[2] Delays due to power, mechanical failures, etc.

As "Transportation"[1] losses accounted for a greater percentage of avoidable delays than any other operating procedure, it was recommended that all main-haul and secondary trackage be realigned, brought to gage, ballasted and that curve radii be lengthened and properly banked to give high-speed service without derailments. With an indicated loss of $5.25 per machine shift for the two items of "wrecks"[1] and "derailments",[1] a total approximating $2,168.00 would be saved in direct labor cost of the four wide-work machine crews in 108 shifts. Using the same method of calculation, $2,423.52 was available for lengthening and relocating main-line and gathering partings closer to the working territories, to eliminate losses due to lack of empty and blocking by loaded mine cars.

A complete survey of the power-distribution system was recommended to eliminate the $241.92 loss due to "power off"[1] and "low voltage", and the dollar value of interrupted operation from damaged loader and locomotive cables, amounting to $984.96 in six months, was carefully pointed out to the helpers on both types of equipment to reduce these time and material losses to the minimum.

With indicated "maintenance" losses approximating $2,475.36 for the six months, an inspection service was recommended so that all equipment would be tested and daily reports filed to show condition of each mechanical unit, to eliminate failures during operating shift time by substituting repaired and adjusted units before actual breakdown occurred.

Development-machine performance is shown in Table IX, made as a composite of 102 time studies for the first six months of mechanical loading. The study shows an almost perfect production cycle, with only 3.86 per cent of shift time lost by delays. This high efficiency is due to the concentration of working places given by the triple-entry system, where three heading and at least two crosscut faces are always available for the preparation and loading cycle on the advance, and two heading, two crosscut, and two room-neck faces are worked in panel development by one machine. Yet even with avoidable delays of less than 4 per cent, the value of lost time for the 102 recorded development shifts was $306.00, or $712.00 for the two machines.

[1] See detailed classification breakdown in Table VIII.

CRUSHING AND LOADING

+ Facilitated by New Addition

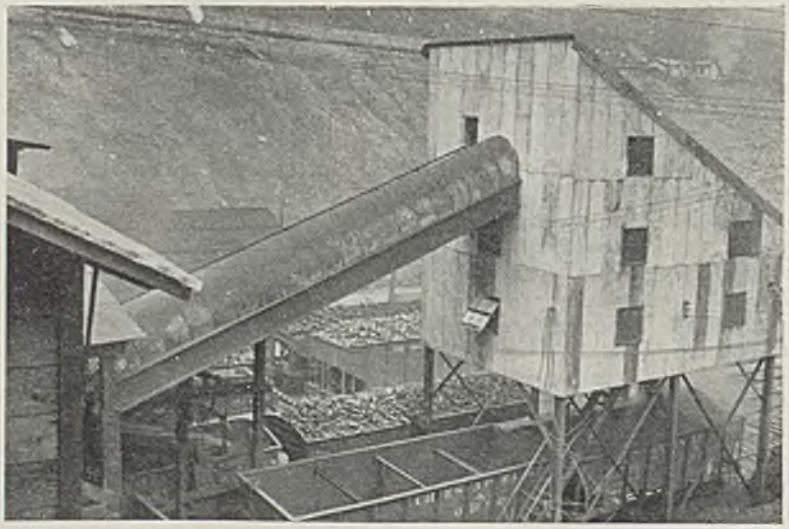
At Stirrat No. 19 Mine

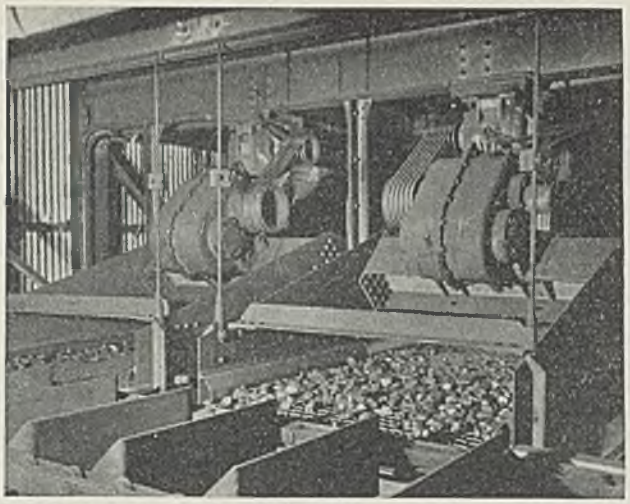
FURTHER evidence of the increasing demand for small coal is afforded by a recent investment of $30,000 by the West Virginia Coal & Coke Corporation to install 500-tons-per-hour crushing and fine-coal loading facilities at its Stirrat No. 19 mine, Logan County, West Virginia. Tramp iron is removed by chute magnets with automatic dumping—a new feature. This plant, one of six operated by the company in that county, loads 3,800 to 3,900 tons in seven hours; approximately 85 per cent is hand loaded, with 15 per cent from a mechanical unit consisting of two Joy loaders, chain flight conveyors and a mother belt. The mine is in the Island Creek seam.

Prior to the recent improvement, the tipple equipment consisted of double-deck gravity screens and two grate-bar-type rescreening picking table-loading booms. Normal loading consisted of lump, egg and nut-slack. Gas coal is picked out and loaded separately and lumps to which bone coal clings are diverted for use as fuel at the central power plant near Omar, four miles away.

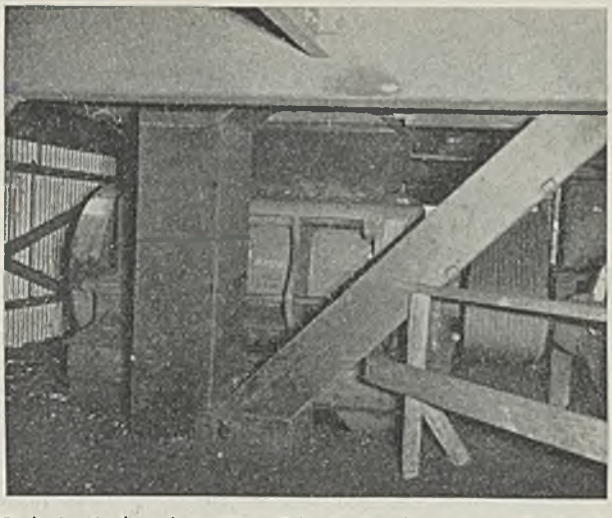
The object of the additional equipment is to reduce either nut or egg or both to slack by passing the coal through a Jeffrey single-roll crusher with special teeth and breaker plates.

This crushing and loading plant, designed to handle 500 tons per hour, increases the service range of the No. 19 tipple





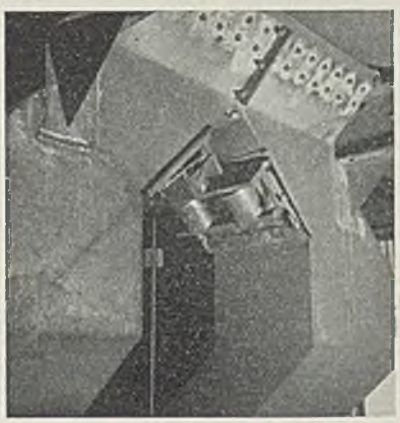
Two horizontal vibrating screens take out the undersize so it can bypass the crusher. The cross conveyor moves the oversize to the crusher chute



Reducing is done by a 30-in.x5-ft. single-roll crusher with special teeth and segments, which handles either nut or egg or both, brought in from the main tipple

Dimensions of the roll are: diameter, 30 in., length, 5 ft. Crusher and auxiliary equipment are housed in a 26x32-ft. three-floor steel building to which the feed from the tipple is elevated by a 48-in. belt on 90-ft. pulley centers inclined 20 deg.

Two 5x14-ft. Allis-Chalmers "Lo-Head" horizontal vibrating screens fitted with 1¼x2-in. Ludlow-Saylor wire cloth operate in parallel to remove the fines, which bypass the crusher and join the crushed product in the loading chute below. A short scraper conveyor is used to move the oversize discharged from one of the screens to the crusher feed chute, which is directly below the discharge of the other screen.



The magnets are in the fork of the dividing chutes below the belt-conveyor discharge

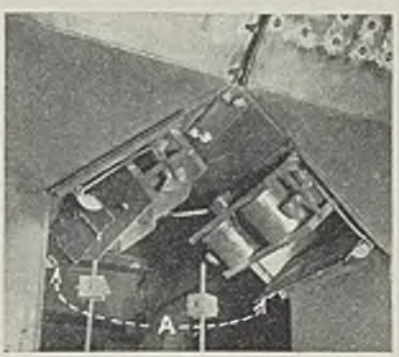
The magnets have pole pieces forming part of the bottom wear plate of the chute. One magnet is installed in each of the two chutes (22 in. wide) leading to the horizontal screens. The location is in the fork which divides the discharge from the 48-in. belt. A section of the wear plate just below the lower magnet pole is a hinged door normally held closed against gravity by a rod attached to a pivoted auxiliary armature at one end of the magnet. When current is applied to the magnet, this armature closes the door; at the end of the shaft, when the power is cut off, or if there is a power interruption, the door opens by gravity and drops any collected iron or steel out on the floor. Magnets operate on 72 volts d.c. furnished by two 110-volt copper-oxide rectifiers each rated at 3.2 amp. Both magnets and rectifiers were supplied by Dings Magnetic Separator Co.

All five plant motors operate on 220 volts a.c. The main belt is driven by an Allis-Chalmers 25-hp. Type AR 1,750-r.p.m. squirrel-cage motor mounted on a Falk "Motoreducer" (1,750-57.7-r.p.m.), which in turn is connected by roller chain to the head-shaft sprocket. The wound-rotor crusher motor (General Electric, 125 hp., 900 r.p.m.) drives the crusher through a Tex-rope reduction consisting of thirteen V-belts 1¼ in. wide. The short scraper conveyor is driven, through a gear reducer and chain, by a Wagner high-torque motor.

Each "Lo-Head" screen is driven by an Allis-Chalmers 10-hp. Type ART linestart induction motor, double-cage, 1,740 r.p.m. These motors are hung (rigidly) from the steel of the building structure and are connected to the vibrator units by Tex-ropes. The screens themselves, to which the vibrating units are rigidly attached, are supported entirely by wire ropes, which are effective in isolating the vibration from the structure. A weight is clamped to each wire-rope hanger at a point where it will suppress vibration of the rope itself.

Idlers, hangers and pulleys on the main belt are Webster equipment. The 48-in. Cincinnati Rubber belt is 5-ply 28-oz. duck with ⅛-in. rubber on the carrying side and 3/32-in. rubber on the pulley side. Kanawha Manufacturing Co. fabricated the steel for the structure and chutes; erection was handled by the coal company.

Two chute magnets remove tramp iron from the feed to the two horizontal screens. In the top view, power is on the magnets and the automatic doors, *A*, are closed. Bottom view shows doors open after power had been cut off



Notes... FROM ACROSS THE SEA

BY SPEEDING extraction, accidents have been decreased in the Barnsley seam of the North of England, declares the Ninth Progress Report of the Safe Working of Mines Committee, entitled "Falls of Ground on Mechanised Faces in the Barnsley Seam"—a record of mining practice and accident at six representative collieries extending over a period of twelve years.

A colliery where the coal was loaded by hand into cars at the coal face reduced accidents from falls at the face from 59.18 in 1925-29 to 36.25 in 1933-36 per 100,000 coal-face shifts without radical change in method of working or roof support but with an increase in rate of face advance consequent on the closing of sections of the mine and on reducing the total length of face open. All faces have been kept straight. Spaces between packwalls are narrower and spaces between props wider than in other mines inspected, but high standards are maintained.

In another colliery also with hand loading into cars, faces have been straightened, made of definite length, maintained at 45 deg. to the main cleat and advanced at three times the speed considered advantageous in 1925-29. Packing and timbering methods have been revised and close attention has been given to workmanlike operation. Accidents have fallen at the coal face per 100,000 shifts from 82.64 in the 1925-29 period to 45.93 during 1933-36.

Face conveyors, by increasing rates of advance and by compelling the use of straight faces and the systematic use of props and packs, actually enforce some of the first principles of safe working, declares the report. In a third colliery, subsequent to the 1925-29 period, the significant features have been the maintenance of straight faces at 45 deg. to the main cleat, the use of evenly spaced steel props at minimum intervals on all faces, and strict supervision of packing. These practices resulted in a 50 per cent increase in rate of face advance during 1930-32, which was accompanied by a large reduction in accidents from falls at the coal face. When, in 1933, face conveyors were introduced these practices were rigorously maintained, and a subsequent increase in rate of advance to about 400 yd. per year was accompanied by a further reduction in accidents from falls. In 1925-29 such accidents numbered 86.15 and in 1933-36 only 39.67.

In a fourth mine, all fully developed faces during 1925-29 were maintained at 20 to 30 deg. to the main cleat and were advanced slowly with gates 90 ft. apart and distances between packwalls of 75 ft. Late in 1934, conveyors were installed on faces maintained at about 25 deg. to the cleat, and steel props and strip packing, with distances between packwalls from 33 to 36 ft., were introdnced, but the roof is not controlled with entire success because of frequent patches of hard coal which, being difficult to remove by hand, interfered with the time schedule. Rate of advance is only 60 per cent as fast as in the previous mine and only 20 per cent greater than that in the second mine. At this mine, coal-face accidents per 100,000 coal-face shifts fell from 66.26 in 1925-29 to 56.44 in 1933-36.

At a fifth mine, the "buttock system" was in use, in which the coal is attacked not directly all along the face but by making an offset at one end of the face and advancing it by successive cuts across the entire length of the working. The advance of the face was only 180 ft. per year. In the 1930-32 period this was abandoned for the direct advance of the face, which advance accordingly doubled. Wood props and crossbars were replaced by steel props and hardwood caps, with a reduction in accidents of 20 per cent. When face conveyors were installed in 1933, the face line was changed from 26½ to 45 deg. to the cleat and the rate of advance from 360 to 1,080 ft. per year. Here also was hard coal, and the cutting machines, which also were introduced, insured the daily advance of the face. A further reduction of 26 per cent in accident falls resulted from this mechanization, but whether from introduction of conveyor or cutting machine, or both, is not clear. Accidents on the same basis as at the other mines fell from 88.00 to 47.82.

In yet a sixth mine, accidents at the coal face were reduced 27 per cent in the period 1930-32, though working, packing and timbering remained substantially unchanged. In 1933, mechanization with coal cutters and face conveyors was introduced, and accidents increased, but coal-face accidents per 100,000 coal-face shifts dropped from 68.85 in 1925-29 to 59.11 in 1933-36.

From this report one gathers that the current opinion that there is a definite tempo of advance suited for every working is not justified by Barnsley-seam experience and that speed of advance, such as it is, nowhere over 1,200 ft. per year, is accompanied by greater safety. Mechanization in all but one mine brought lower accident frequency per man-shift. In summation of the report the authors say: "It may be reasonably concluded that the distance a face in the Barnsley seam is advanced per year is subsidiary to other factors in accident rates; for example, systematic packing and timbering."

It will be seen that this comparison is based on man-shifts, but it relates only to falls and not to all classes of accidents and includes only accidents causing a loss of time of more than three days. Accident ratios per 100,000 tons decreased less in one non-mechanized mine than per 100,000 man-shifts and in two mechanized mines decreased more.

WILL SOAP be made from coal? German chemists, declares *Iron and Coal Trades Review*, of London, are said to have succeeded in manufacturing, from coal, technical fats and ultimately soap and lubricating fat; details of the process are not known. However, it appears to consist in isolating an acid from coal, which is then converted into a technical fat. A factory at Witten, Germany, is planned by Henkel and Persil interests, which have undertaken most of the research. The firm name will be the Fettsäure G.m.b.H.

INCREASED yields of oil from pitch are obtained when the latter is blown with superheated steam instead of air, according to G. Prüfer, in *Technische Mitteilungen Krupp*. This increases the oil product 6 per cent. Norddeutsche Kohlen- und Cokes-Werke A.-G. in the early part of 1935 introduced a new continuous tube-oven process of tar distillation to refine the tar from its coke ovens for use in its briquet plant, incorporating this feature.

OIL may be made from coal at pressures no higher than atmospheric, states *Iron and Coal Trades Review*. Coal is ground, then mixed with about half its weight of oil from previous runs and retorted at about 1,112 deg. F. Part of the oil resulting from distillation is passed through a catalyzer at atmospheric pressure, where it is converted into a crude oil; the unconverted portion is used in subsequent charges. This type of carbonization is said to make an improved coke with its volatile matter and hardness controllable within wide limits.

Oil yield varies according to the coal used, but with the catalyst more oil is produced than with dry low-temperature distillation. This fact was determined in a small experimental plant at Dartford, England, by Messrs. Catalysts, Ltd., which proposes to erect a full-size plant to carbonize 220 tons daily. The catalyst is said to have a long life and to be readily and cheaply revivified. Little fine coke is produced, and only oil from the process will be used in the operation of the plant. From 2,000 lb. of coal will be obtained, it is hoped, 15,500 lb. of smokeless fuel, 10.7 U. S. gal. of oil, 2.4 U. S. gal. of cresylic acid and about 3,730 cu.ft. of gas.

PETROLEUM will be produced abroad after all United States resources have been pumped dry, though the oil shales will lengthen the petroleum industry of this country. According to Ivan Gubkin, vice-president, Russian Academy of Sciences, speaking at the opening session of the International Geological Congress, held at Moscow, U.S.S.R., July 21, at which Philip S. Smith, United States Geological Survey, presided, the world reserves of oil are 7,799,072,000 short tons. Proved reserves in the Soviet Union the former estimated at 4,273,660,000 tons with possibly an ultimate supply of 7,028,667,000 tons. Those of the United States he estimated as 1,935,989,000 tons. Proved world reserves were: Europe, 4,427,000,000 tons; North and South America, 2,352,001,000 tons; Asia, 847,677,000 tons; Australia, 158,292,000 tons; and Africa, 3,687,000 tons.

Assuming American oil to have a specific gravity of 0.88 (based on five unweighted analyses that, while chosen over widely separated areas, may not be wholly representative), the average weight per barrel is 308.09 lb. The American reserve therefore would be 12,568,082,800 bbl. The U. S. Geological Survey estimated in 1934 that the oil in the ground of the United States totaled 13,000,000,000 bbl., and a committee of the American Petroleum Institute on Jan. 1, 1937, put the reserve at virtually the same figure. (The figures would be identical if the specific gravity were taken at 0.91). Oil shale in the Rocky Mountain States will give another 92,000,000,000 bbl., declared A. C. Fieldner, addressing the American Society for Testing Materials, June 28 of this year, making about 105,000,000,000 bbl., which dwarfs the figure for the Soviet Union. In both countries there doubtless are oil shales in the coal measures; certainly there are in the United States, and both countries in need can draw on coal itself.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case is in the review notice.

Geology of the Anthracite Ridge Coal District, Alaska, by G. A. Waring. U. S. Geological Survey. Bulletin 861, 57 pp., with pocket maps; paper. Price 70c.

With 24- and 34-ft. beds of anthracite and semi-anthracite (clean-coal measurement) available in this district, this report may seem likely to start a stampede of would-be operators, but the beds are folded, faulted, much shattered, interbedded with bone and shale, split by intrusions of igneous rock and confined to an area half a mile by a quarter of a mile, set high above the river bed (the Matanuska). Much deadwork would be necessary to obtain the 750,000 tons of hard coal available. Dikes and sills have carbonized this Eocene coal. The district "probably contains several million tons of bituminous coal."

Technology and the Mineral Industries, by F. G. Tryon, K. C. Heald, T. T. Read, G. S. Rice and Oliver Bowles. 63 pp., 7x10 in.; paper.

This publication is part of the National Research Project on "Reemployment Opportunities and Recent Changes in Industries Techniques" and was written in cooperation with the U. S. Bureau of Mines, which, with the Works Progress Administration, National Research Project, publishes the pamphlet. It shows that the average depth of anthracite mines increased from about 205 ft. in 1870 to about 425 ft. in 1930 and the average depth of Illinois mines from about 175 ft. in 1882 to about 350 ft. in 1934; also that the average thickness of the anthracite mined was about 13 ft. 9 in. in 1870 and only about 6 ft. 4 in. in 1930. This, it declares, shows the technological progress in the labor of extracting coal is counterbalanced in greater or lesser degree by increased depth and decreased coal thickness.

In so far as the volume concerns coal, F. G. Tryon contributes "Technology in Coal Mining," and G. S. Rice, "Technology and Mine Safety," with the first discussing "Social Effects of Pending Technologic Change."

Microdetermination of Carbon and Hydrogen in Compounds Containing Arsenic, Antimony, Tin, Bismuth and Phosphorus, by F. C. Silbert and W. R. Kirner. Contribution 43, 6 pp.

The Polymeric Character of a Bituminous Coal, by H. C. Howard. Contribution 44, 10 pp.

Mellitic Acid From Coals, Cokes and Graphites, by B. Juettner. Contribution 45, 12 pp.

Aromatization of Cellulose by Heat, by R. C. Smith and H. C. Howard. Contribution 46, 6 pp.

Oxidation of a Pittsburgh Seam Bituminous Coal and Low-Temperature Coke by Alkaline Permanganate by B. Juettner, R. C. Smith and H. C. Howard. Contribution 47, 13 pp.

The Chemical Constitution of a Bituminous Coal as Revealed by Its Hydrogenation Products, by B. S. Biggs and J. F. Weiler. Contribution 48, 7 pp.

Some Factors Affecting Combustion in Fuel Beds, by M. A. Mayers. Contribution 49, 18 pp.

All these are 6x9¼-in. paper-cover booklets issued by and recording the studies and results of the Coal Research Laboratory of the Carnegie Institute of Technology.

Layers of platinum gauze and of red lead in combustion-tube filling will remove metallic oxides, hence the correct percentages of carbon and hydrogen in compounds containing arsenic, antimony, tin, bismuth and phosphorus can be ascertained by microdetermination methods. Coal appears to be a polymer built up of units of moderate molecular weight, 250 to 350 units, which are yielded in significant quantity by thermal decomposition in the molecular still by the action of such solvents as benzine, tetralin or phenol at elevated temperatures, by hydrogenation and by mild oxidation.

Little mellitic acid, $C_6(COOH)_6$, could be obtained from Edenborn (Pa.) coal by oxidation with nitric acid followed by alkaline permanganate; yield is much greater from the coke made from this coal by carbonization at 700 to 1,000 deg. C. Coke made at these two temperatures and artificial and natural graphites yield about the same quantities of mellitic acid. C_6-ring structures are present in products of the pyrolysis of cellulose at temperatures up to 400 deg. C., as has been established by oxidation followed by decarboxylation and recovery of benzine and diphenyl. Presence of such structures does not make it impossible that such coals have been derived from cellulose.

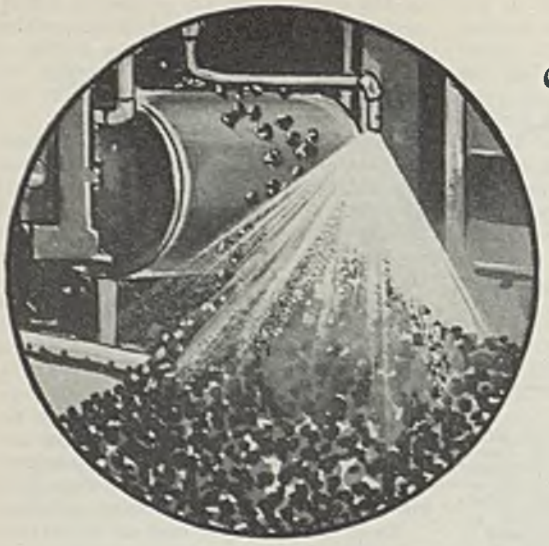
About 30 to 35 per cent of the carbon of coal and coke respectively is found as aromatic acids. From 90 to 95 per cent of the carbon in Edenborn coal can be recovered as the potassium salts of water-soluble non-colloidal acids by exhaustive oxidation with potassium permanganate.

By a double catalytic hydrogenation, first with one calalyst and then with another, about 80 per cent of the carbon of the extract and of the residue from the benzene extraction of Edenborn coal at 260 deg. C. is converted to hydroaromatic oils. Fractionation of these oils followed by grouping of the fractions by molecular weights, boiling points, refractive indexes and hydrogen-carbon ratios gives an approximate distribution of the various sized units in extract and residue. That is, the reviewer assumes, most of the compounds are aromatic and a definite knowledge has been obtained as to the proportion of groups having any given number of rings. Dr. Mayer's contribution is a reprint of Technical Publication No. 771 of the American Institute of Mining and Metallurgical Engineers.

Extraction Methods for Determining Tar Acids and Bases and Variables Affecting Their Accuracy, by C. H. Fisher and Abner Eisner. U. S. Bureau of Mines. R. I. 3310; 34 pp.; mimeograph.

Amines are strongly basic substances derived from ammonia by replacement of hydrogen by one or more univalent radicles; thus, in ethylamine, NH_3 has become $(C_2H_5)NH_2$ by replacement of H by the univalent radicle C_2H_5. In extraction of tar acids, an alkali is used and neither dilute nor concentrated alkali will extract appreciable quantities of the amines which are basic, assert the authors, but concentrated alkali having large quantities of phenol sodium salts may extract large quantities of amines and small quantities of neutral oil. Obviously, it cannot be used for analytical extraction of tar acids.

Dilute alkalies form emulsions with the tar distillates and so are undesirable. The authors find that aqueous solutions with about 10 per cent of sodium hydroxide extract under favoring conditions only negligible quantities of non-acidic material and have little tendency to form emulsions. Hence they are suitable means for extracting tar acids. Tar bases cannot be extracted conveniently in the presence of tar acids.



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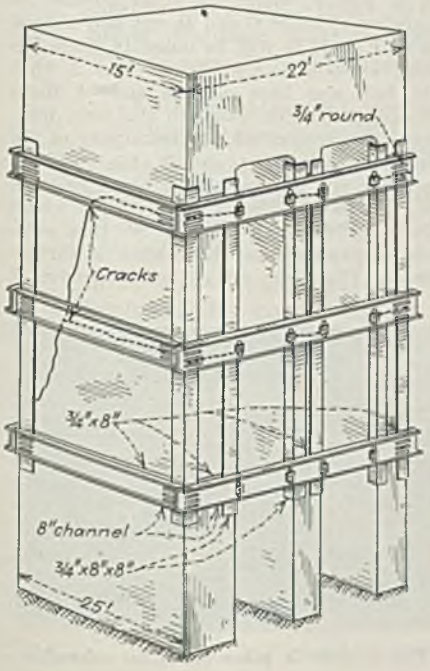
Concrete Pier Salvaged By Reinforcements

Welded-steel reinforcements were employed to salvage a concrete pier supporting two shaking picking tables (Roberts & Schaefer manufacture), thus saving the Pennsylvania Coal & Coke Corporation nearly $4,000, as compared with complete replacement, in addition to idle-time expense and loss of production. E. J. Lynch, Gallitzin, Pa., furnishes a description of the application of the reinforcement, which was designed by J. F. MacWilliams, electrical engineer, Cresson, Pa.

The pier in question developed several cracks, as a result of which a forward motion of ⅜ and vertical motion of ¼ in. appeared. In addition, a twisting motion also appeared shortly before the repairs were made. This twisting motion was encountered at times when the strokes of the two tables were 180 deg. apart, due to the fact that the tables were driven by separate induction motors with slightly different percentages of slip. Thus the tables at times would operate in step, gradually changing to 180 deg. apart.

Details of pier, showing cracks and reinforcements



How the pier looked after reinforcing was completed

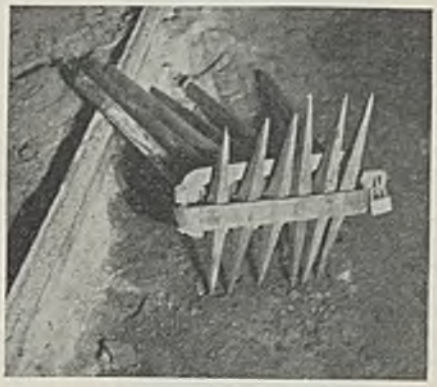
Preparations for reinforcing the pier consisted of rounding off the corners so that the ¾x8x8-in. angles shown in the accompanying drawing would fit snugly to the concrete. Next, the angles were blocked up into position and the ¾x8-in. flats were welded to them, leaving two diagonal corners open to be later drawn into position for welding.

To obtain the maximum time for the repair job, it was started immediately after quitting time Friday night. Temporary bolts were put in and the flats and angles were pulled into position and welded. After the 8-in. channels were placed in position the temporary bolts were removed and permanent ones were placed through the channels, drawing them tightly into position. Oval boltholes were used so that the massive reinforcement could slide down the tapered concrete a distance of 1 in., the idea being that if there was any motion in this reinforcement the tendency would be to tighten up. Then the corners of the channels were welded, after which reinforcements of 1¼-in. rounds, bent to right angles, were placed and welded as shown in the drawing.

Approximately 210 cu.yd. of concrete is contained in the pier. Cost of replacement at the present price of $20 per cubic yard without reinforcement, along with the expense of removing and replacing tipple machinery, blasting out the old pier and carting away debris, and forms and reinforcement, would amount to approximately $4,750. Total cost of the reinforcement job, including labor and materials, was $920, resulting in a direct saving of $3,830, not including a production loss of about 16,500 tons of coal plus idle-time expense.

Tool Loss Prevented By Locked Holder

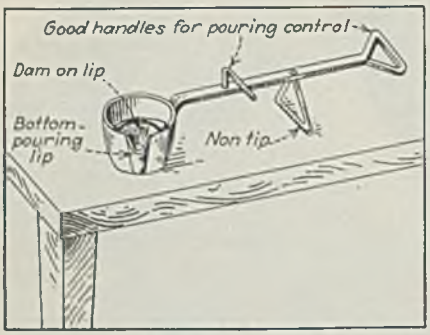
To prevent loss of company-owned picks in transporting them to and from the outside for sharpening, the holder shown in the accompanying illustration is used at the Crescent Nos. 1 and 6 mines of the Crescent Mining Co., on LaMarsh Creek, near Peoria, Ill. As shown, the pick handles are passed through a yoke, after which the hinged strap is closed across the eyes and fastened with a padlock, to which only the shop men and the foremen to which the tools are charged have the keys. Electric welding the foreman's name on the strap prevents confusion in the return of the picks from the shop.



Locked in the holder, these picks are difficult to mislay

Pouring Ladle Facilitates Handling Molten Metal

It is desirable and should be required for safety that a good pouring ladle be provided when handling molten babbitt metal or any heated sealing compound, writes Charles H. Willey, Penacook, N. H. The sketch shows a ladle that provides



Details of pouring ladle

all the elements of ease and safety in handling and efficient pouring. The ladle shown, of the bottom-pouring type with the metal leaving through a hole in the bottom, is provided with a dam welded across the lip as indicated. Three things feature the flat handle: The hand grip at the end is big enough to provide a firm grasp, while a second grip about midway of the handle makes for coolness and provides additional control in tipping the ladle for pouring. A triangular rest underneath the handle makes it possible to set the ladle down near the scene of operations without danger of spillage. All these features, Mr. Willey states, can be added to a ladle of the ordinary type if one can do a job of welding.

Service

"I HAVE READ plenty of good time-saving articles in Coal Age and have gained a lot by using some of the ideas," declares a contributor to the Operating Ideas section. This section is designed to help Coal Age readers, and the editors naturally take pride in finding that it is of service. However, our job primarily is passing on the ideas developed by operating, electrical, mechanical and safety men in the industry. By thus serving as an intermediary, we aim to present time- and money-saving material in its most convenient form. The Operating Ideas section is open to all who have something which may benefit a man with a problem. So if you have an idea which has helped you out of a difficulty, send it in, along with a sketch or a photograph if it will help to make it clearer. For each acceptable idea, Coal Age will pay $5 or more.

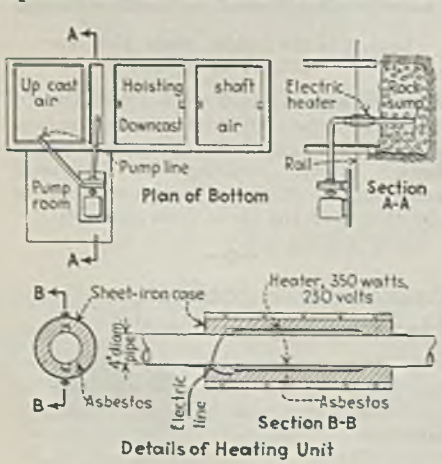
Pump-Line Freezing Stopped By Electric Heater

Freezing of the pipe line between the sump at the bottom of the shaft and the centrifugal pump resulted in considerable trouble in the operation of a small mine, states K. N. Banthin, mining engineer, LaSalle, Ill., in describing the application of an electric heater to remedy the difficulty. The shaft, as indicated in the accompanying sketch, was of the three-compartment type, with the two hoisting compartments downcast and the third compartment upcast. The sump was constructed in the rock just beneath the center compartment of the shaft with the intake pipe to the pump out in the downcast air and the discharge pipe in the upcast air. As the mine did not make much water, pumping was necessary for only about two hours out of every 24. During cold weather, consequently, the line would freeze between sump and pump when the latter was not in operation.

Drilling and blasting the rock to extend the sump into the upcast shaft was considered to place the pump intake in the warm upcast air, but was not advisable during the current season on account of the expense and interruption of operations. An attempt was made to insulate the line with ordinary asbestos pipe covering, but this was not satisfactory for over a day of freezing temperatures. Therefore, the electric-heating arrangement shown in the sketch was adopted.

Two General Electric Calrod 350-watt 230-volt strip heaters were placed next to the pipe just above the water level in the sump. Heaters and pipe then were covered with asbestos pipe covering in a sheet-iron case. To regulate the operation of the heaters, a small thermostat was placed in the downcast-air stream with its electric circuit in series with the heaters and the power supply. This thermostat was set to start the heaters when the temperature in the downcast compartments dropped to 34 deg. F. or lower. No trouble has been encountered since the installation, and the power cost is about 1¢ per hour of operation. Approximate installation cost (labor and material) is itemized below.

Two G. E. Calrod strip heaters, No. 2A152G2, 350 watts, 230 volts, 750 deg. maximum sheath temperature	$4 20
Thermostat (type used on electric chick brooders)	3 10
Asbestos pipe covering	0 80
Conduit, fittings, wire, etc.	3 40
Sheet-metal work	2 00
Labor	5 00
Total	$18 50



Details and method of applying heating units.

Hints From a Shopman's Notebook: Bending Mine-Car Irons

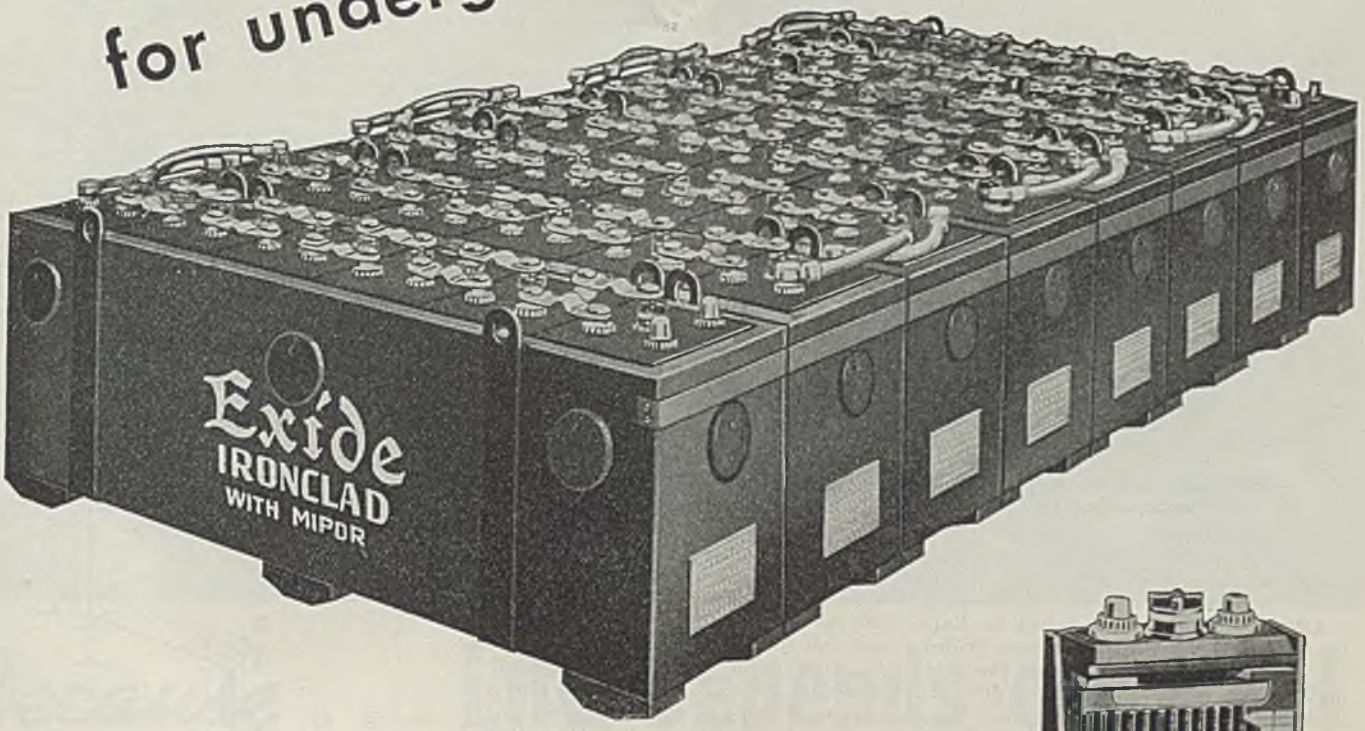
By WALTER BAUM
Master Mechanic, Perry Coal Co.
O'Fallon, Ill.

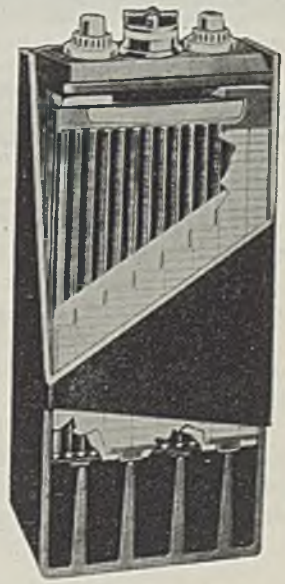
TO REBEND the irons on 50 mine cars too high for use with Joy loading machines at the St. Ellen mine and thus make it possible to reduce the car height, I used the method described herein. Each car had five irons, to be changed as shown in Fig. 3, and I decided to make the two bends on each side of each iron in one heat. To heat the irons, I employed an oil heater with two burners built as indicated in Fig. 4. Made with a cover which could be lifted up, the heater was arranged with the openings in each end offset so that the irons could be laid in from the top. Burners, one on each side, were placed so that the flame would be just below the bends in the irons. Set on a cast-iron plate, the heater was made of firebrick held together by angles and tiebolts.

Bender parts were made of 55-lb. rail, using as a base a welding table made as in Fig. 5, using an old bearing plate and some short pieces of 2½- and 1½-in. pipe. Two main members are used in the bender. Each of these members consists of two pieces of 55-lb. rail hinged together as shown in Figs. 1 and 2. One member comprises Rails *A* and *B*, cut and shaped as in Fig. 6, while the other member is made up of Rails *C* and *D*, cut and shaped as in Fig. 7. It will be noted in these figures, as well as in Figs. 1 and 2, that the ball and base on one end of Rails *B* and *C* are cut away to the web, leaving a flat tongue which forms part of the hinge. On Rails *A* and *D*, the ball and web are cut out to permit these rails to be bent as in Figs. 6 and 7, after which the split is electric welded. In this welding, allowance must be made for shrinkage of the weld metal, as otherwise it

Fig. 1—Iron in place ready for rebending

WHY Exide-Ironclads are the most widely used batteries for underground haulage





WITH a few isolated exceptions, there is no tougher form of battery service than underground haulage. Getting coal out of a mine takes power, takes stamina and endurance in the equipment. Haulage must be speedy, uninterrupted, and *definitely dependable.* This is especially the case with mechanized operations.

The Exide-Ironclad meets these conditions so well that it is the most widely used battery in underground haulage service today, there being more Exide-Ironclad Batteries used in storage battery locomotives than all other makes of batteries combined. There are good reasons why this is so. One of them is the positive-plate construction unique with Exide-Ironclad. Slotted rubber tubes retain the active material, while exposing it freely to the electrolyte. In combination with Exide Mipor separators, this is an exceedingly durable construction which goes far to account for the long, trouble-free life and dependable service these batteries deliver.

Another important reason is their performance. Exide-Ironclads have the high power ability needed for unusual loads and grades, along with the sustained voltage to assure good haulage speeds all day long. Operators find Exide-Ironclads long-lasting, economical and definitely dependable. These are batteries that can improve your haulage service and cut costs. Write for free booklet, "The Storage Battery Locomotive for Underground Haulage."

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will change the angle of the bends when it cools.

To complete the hinges for each of the two members, hinge plates made as in Fig. 8 were bolted to one end of the Rails *A* and *D*, as shown in Figs. 1 and 2. Two hinge plates were used on each rail. To hold Rails *B* and *C* vertical on the welding table, blocks were bolted underneath them as in Fig. 9. Length of these blocks varies in accordance with the length of each rail. Blocks also may be used under Rails *A* and *D*, which are movable, if desired. Countersunk-head ½-in. bolts hold the blocks to the rails. After the blocks were in place, Rails *B* and *C* were drilled as shown in Figs. 6 and 7 to accommodate the 1-in. bolts used to hold these rails to the welding table. To obtain

Fig. 2—Second and final bend completed to reshape iron

more leverage, handles of flat iron were bolted to the ends of Rails *A* and *D*. The handle on Rail *A* is seen in Figs. 1 and 2.

After the blocks were bolted to Rails *C* and *D* and the 1-in. holes were drilled, the rails were laid on the top of the welding table in such a way as to give the loose end of the car iron as much bearing surface as possible on top of the table. Then the two rails were spaced with a piece of iron the same thickness as the car irons, allowing 1/32 in. of play, after which they were clamped to the table top with C clamps. The table top then was picked up with chain blocks and moved to the drill press, where it was drilled with 1-in. holes, using the holes in the rails as guides. The hinge plates then were drilled with 5/32-in. holes and the plates bolted on Rails *A* and *D*. These rails then were placed in position with the hinge plates dovetailing with the tongues on Rails *B* and *C*, after which *A* and *D* were spaced the same as previously described for *C* and *D* and clamped together. The tongues on *B* and *C* then were scribed and drilled with 5/32-in. holes. Using these 5/32-in. holes as guides, the hinges then were drilled with 1½-in. holes to accommodate the hinge bolts.

With the hinge bolts in place and Rails *B* and *C* bolted to the table top, the rail lock, *E*, Figs. 1 and 2, was made and a 1-in. hole was drilled in the table top so that Rail *A* could be locked in position after making the first bend. Fig. 1 shows the car iron in place before bending, with the rail lock resting on top of Rail *A*; it drops down as soon as the rail is moved to make the first bend. Fig. 3 is a view of the iron after the final bend is made and shows the lock holding Rail *A* in position for this operation. The flat piece of iron shown bolted to the base of Rail *A* in these views takes care of the irons used on the door end of the car, which have a slight bend in the top end to let the car door pass. The pin holding the rail lock in place is merely a tight-fitting bolt driven into the 1-in. hole in the lock. The end of the bolt is ground to a loose fit in the 1-in. hole in the table top. The top of the pin is used to lift the lock.

With this bender and four men to handle the irons in and out of the forge

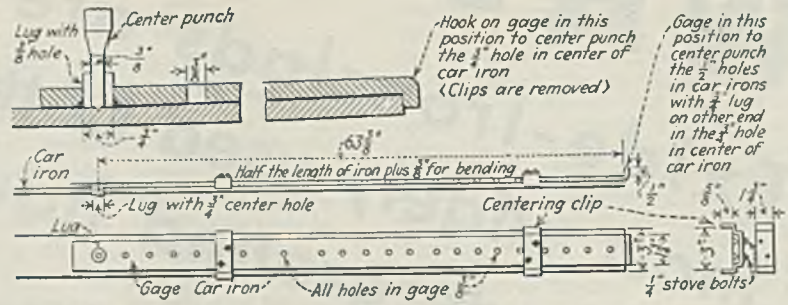


Fig. 10—Details of gage for center-punching irons prior to bending

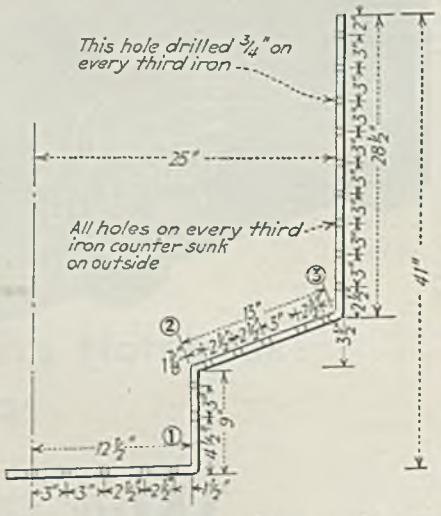
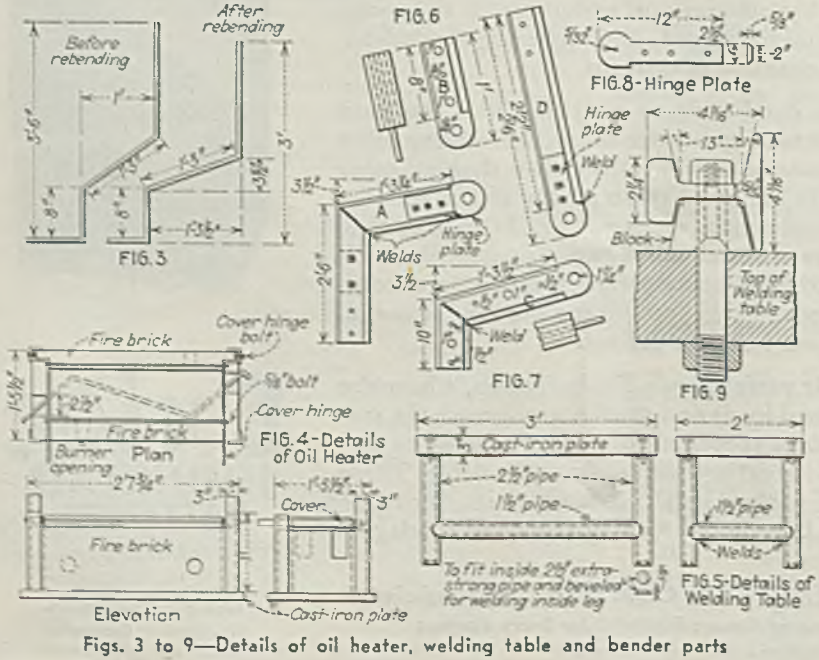


Fig. 11—Drawing of new irons for mine cars. All three bends were made in one heat. Holes were drilled before bending



Figs. 3 to 9—Details of oil heater, welding table and bender parts

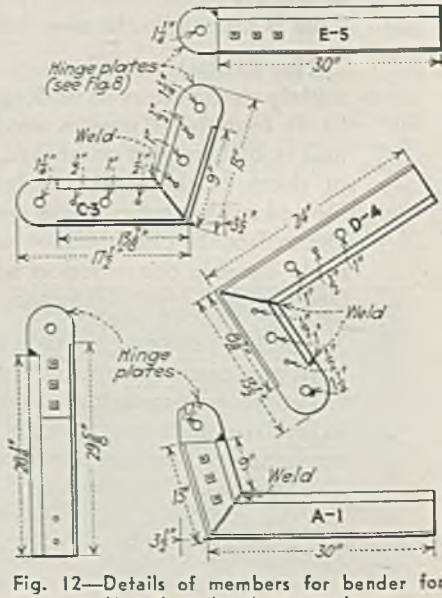


Fig. 12—Details of members for bender for making three bends in one heat

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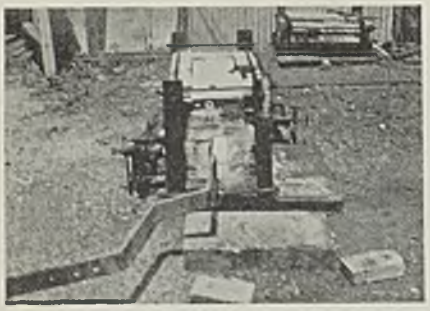

Fig. 13—Oil heater in action

Firebrick used in building the heater are not laid in mortar but are held in place by clamping angles and bolts, as the forge was dismantled after heating the irons. Air was furnished by a No. 5 positive-pressure blower.

Fig. 14—Four of the five-man bending crew

Note C clamp holding flat plate under the iron at the first bend to keep the iron from bending edgewise. The outer end of the iron is supported on an adjustable stand.

Fig. 15—Bender bolted on the welding table, with hinge plates cut off to permit the iron to be placed in the bender while still straight

and the bender, both sides of 200 of the car irons were rebent in fifteen hours. Irons were removed from the bender by using a small pinch bar at the square bend and the first bend (Fig. 2) without disturbing the bends, which were very hot.

Following the above job, I was requested to make a number of new irons for mines of the Perry and Gillespie coal companies. The shape of these irons is shown in Fig. 11, which also gives details of hole location. For this purpose, I used the bender shown in Figs. 15 to 17, and a heater somewhat similar to that previously employed, except that three burners, instead of two, were used, two on one side and one on the other. This heater is shown in Fig. 13.

Holes were marked and drilled in the irons prior to bending, using the half-iron-length gage detailed in Fig. 10, which is drilled with ¾-in. holes to make a snug fit for a ¾-in. center punch. One end of the gage is made with a hook to use in locating the ¾-in. hole drilled in the center of all the irons, which should all be of the same length. For this task the centering clips are taken off the gage. To mark the rest of the holes in one end of the iron the clips are put on the gage and it is turned over so that the lug on the gage fits in the ¾-in. hole in the center of the iron. With one end of the iron punched, the gage is placed on the other end. Using this method, all the holes in all the irons will be in the same position and the irons thus will be interchangeable.

Details of the bender members are given in Fig. 12. Dimensions given are for the bends which I had to make and may be varied to suit conditions. The various steps in making a bend are illustrated in Figs. 15 to 17. To position the iron properly in the bender, the stop gage shown in Figs. 18 and 19 is employed.

With this equipment, three minutes is required to heat the irons and 45 seconds to make the three bends in one end after the iron is placed in the bender. With four men working the bender and one man placing the irons in the heater, 93 irons were bent in about nine hours. Irons were removed from the bender by placing pinch bars under Bends 1 and 2 (Fig. 11) and lifting at both points simultaneously. After the iron was lifted up, two of the men laid it out on the ground, being careful to pick a level place so that it would not bend under its own weight, being still very hot.

Fig. 16—Showing Bend No. 2 completed and Rail Lock *F-6* against Rail *A-1* ready for Bend No. 3, which is followed by Bend No. 1

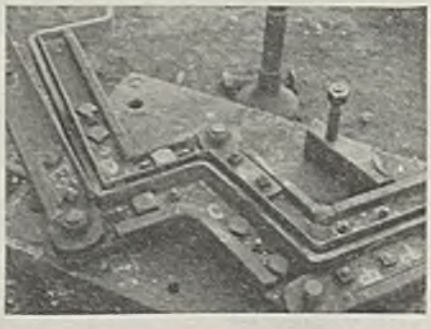

Fig. 17—Showing all three bends completed. The C-clamp shown in Fig. 14 has been removed, and the base of the stand supporting the end of the iron appears in the background

Fig. 18—Showing use of the stop gage (Fig. 19) to position the iron for bending

In using the gage, the ¾-in. pin is placed in the ¾-in. hole in the center of the iron used to bolt the drawbar in place. After the pin is placed, the iron is moved toward Rail *D-4* until the hook on the gage can be placed over the base of the rail, as shown. The gage is left in place until Bend No. 2 is made. To remove the gage, the iron is bent toward the back of the photo until it clears the pin.

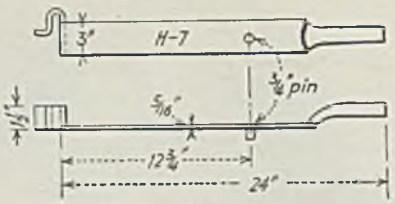

Fig. 19—Details of stop gage

Making a Neat Wiring Job On Wound-Rotor Motor

With an open wound-rotor motor it is not always easy to make a neat job of connecting all of the six leads when rigid conduit is used. The accompanying illustration from the new Zeigler central preparation plant of the Bell & Zoller Coal & Mining Co., Zeigler, Ill., shows how such a job was secured in wiring the 150-hp. 440-volt 875-r.p.m. General Electric motor which drives the mine-run belt bringing coal to the preparation plant. Because the automatic starter of this motor is located some distance away in the control room with the motor fuse panel both the three 440-volt stator leads and the three low-voltage slip-ring leads had to extend the full distance. A 2½-in. conduit is used, with an LB fitting with three-hole porcelain cover where the slip-ring leads are taken out in loop formation.

Neatness assured in wiring this wound-rotor motor.

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A Borehole Cable is a vital artery. It "pipes" electrical energy to the inside workings at a convenient load center.

This most important circuit should be carried through the most reliable cable obtainable.

Hazard Borehole Cables by their performance over a period of more than a quarter century prove their reliability.

Hazard rubber jacketed and steel wire armored cable is in many cases the most efficient for deep holes. Because the rubber jacket takes the place of a lead sheath, the cable weight is light and it is low in cost.

Our Engineering Department will gladly check your conditions with you and make specific recommendations.

HAZARD INSULATED WIRE WORKS

DIVISION OF THE OKONITE CO.
WILKES-BARRE PENNSYLVANIA

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brings down larger, firmer *lumps*

THIS PHOTOGRAPH tells the whole story of LUMP COAL C*, the Du Pont Permissible used in more than sixty modern bituminous mines.

LUMP COAL C* brought down this coal—still in large, firm lumps after loading. Minimum degradation, maximum profit.

Even more striking is the illustration of the slow, heaving action of LUMP COAL C*.

For the drill marks are still there—proving that this outstanding permissible does not shatter coal. Its action more nearly approximates the slow heave of black powder than any other permissible.

LUMP COAL C* is well adapted for mechanical loading. Because of its maximum spreading action, it shears ribs clean, practically eliminating tight or hanging shots.

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WORD FROM THE FIELD

To Cover Variety of Subjects At Cincinnati Meeting

Topics to be considered at the technical sessions of the fifteenth annual convention of Practical Coal Operating Men and National Exposition of Coal-Mining Equipment, to be held at Cincinnati, Ohio, May 2–6, will include mine safety, personnel training, responsibility of mine officials in personnel management, conveyor mining, power problems, surface preparation, mine ventilation, coal cutting and blasting. The program committee, headed by R. L. Ireland, Jr., president, Hanna Coal Co. of Ohio, has nearly completed whipping into shape a schedule covering practically every important phase of the industry. More than 140 manufacturers will be represented in the exposition.

The program includes the following papers: "Methods of Breaking Down Coal at the Face," C. F. Connelly, general manager, Kemmerer Gem Coal Co.; "Factors Affecting Choice of Cutting Bits and Chain Lacing." W. D. Ingle, Jr., vice-president, Ingle Coal Co.; "Modern Ventilating Installations," William Norris, Jr., safety director, Carter Coal Co.; "Washing, Blending and Drying of Coal," E. C. Carris, in charge of preparation department, Island Creek Coal Co.; "Practical Limits of Slate Removal," D. B. Baird, chief inspector, Philadelphia & Reading Coal & Iron Co.; "Methods of Drying Washed Coal," K. R. Bixby, general manager, Midland Electric Coal Corporation; "Automatic Mine-Car Couplers," Peter F. Loftus, consulting engineer; "Hydraulic Brakes on Mine Cars," F. K. Day, general mine superintendent, Pardee & Curtin Lumber Co.; "Mine Locomotives," Carl Lee, electrical engineer, Peabody Coal Co.; "New Equipment and Methods in Strip Mining," Ira Clemens, president, Commercial Fuel Co.; "Pumping Large Volumes of Water," Cadwallader Evans, Jr., general manager, Hudson Coal Co.

"Problems to Be Considered Before Installing Conveyors," R. G. Pfahler, mining engineer, Berwind-White Coal Mining Co.; "Problems in Gathering, Loading and Moving Conveyor Equipment," M. A. Sharp, mining engineer, Union Pacific Coal Co.; "Power Distribution for Conveyor Installation," L. C. Schnerr, division manager, Consolidation Coal Co.; "Mining 24-In. Seams With Conveyors," W. C. Chase, general superintendent, Alabama By-Products Corporation; "Problems to Be Considered Before Installing Mechanical Loaders," D. D. Wilcox, general superintendent, Superior Coal Co.; "Transportation Problems With Mechanical Loading," J. W. Woomer, chief mining engineer, Hanna Coal Co.; "Problems in Mining Thin Seams With Mechanical Loading," William Cunningham, superintendent, Linton-Summit Coal Co.

Safety papers are: "Latest Developments in Rock-Dusting," J. E. Jones, safety engineer, Old Ben Coal Corporation; "Reducing Haulage and Machine Accidents," David W. Jones, superintendent, Princeton Mining Co.; "Underground Power Distribution," C. C. Ballard, master mechanic, New River Co.; "Modern Shaft Sinking," Percy G. Cowin, Salmon & Cowin, Inc.; "Successful Adjustment Between Management and Labor," J. R. Sharp, director of public relations, Philadelphia & Reading Coal & Iron Co.; "Personnel Training." A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association.

Keeping Step With Coal Demand

Bituminous Production

Week Ended	1938 (1,000 Tons)	1937* (1,000 Tons)
February 5	7,530	9,903
February 12	6,750	10,173
February 19	6,500	10,840
February 26	6,412	11,194
March 5	6,415	11,105
Total to March 5	62,334	92,711
Month of February	27,000	42,110

Anthracite Production

February 5	1,118	972
February 12	836	981
February 19	768	769
February 26	855	646
March 5	1,031	663
Total to March 5	9,183	7,981
Month of February	3,525	3,368

* Outputs of these two columns are for the weeks corresponding to those in 1938, although these weeks do not necessarily end on the same dates.

Bituminous Coal Stocks

	(Thousands of Net Tons) Feb. 1 1938	Jan. 1 1938	Feb. 1 1937
Electric power utilities	8,612	9,075	7,415
Byproduct coke ovens	6,469	7,273	8,031
Steel and rolling mills	1,050	1,109	1,368
Railroads (Class 1)	6,410	7,573	7,332
Other industrials*	12,168	14,144	11,031
Total	34,709	39,174	35,177

Bituminous Coal Consumption

	(Thousands of Net Tons) Jan. 1938	Dec. 1937	Jan. 1937
Electric power utilities	3,338	9,075	3,477
Byproduct coke ovens	3,923	4,014	6,262
Steel and rolling mills	790	783	1,231
Railroads (Class 1)	7,114	7,352	8,121
Other industrials*	10,168	10,698	12,187
Total	25,333	26,424	31,278

* Includes beehive ovens, coal-gas retorts and cement mills.

Bituminous Coal Untouched In Freight-Rate Boost

Bituminous coal escaped an advance in rates, although an increase of 5 to 10 per cent in freight rates was allowed by the Interstate Commerce Commission on other commodities, including anthracite. The decision, delivered March 8 in Ex Parte 123, allows no alteration in rates on bituminous coal, lignite or coke but provides for an increase of 10c. a ton on anthracite, making an average of about 5.9 per cent.

Other increases granted are: 5 per cent for agricultural products except tropical fruit; animals and animal products, except horses and mules; lumber, shingles, lath, cottonseed oil and vegetable oils, except linseed oil. An advance of 10 per cent was allowed on all other items, except that "heavy loading" commodities (such as steel) which received increases last autumn must include the earlier increases in the 10 per cent.

Officials of the Association of American Railroads stated on March 15 that the increases would be put into effect on March 28. A master tariff providing for the advances was to be filed within a few days, the I.C.C. approval of the boosts specifying that they could be made effective upon ten days' notice.

The Commission was almost unanimous on the main phases of the decision, Commissioner Charles D. Mahaffie alone contending that the increases were insufficient. The majority opinion said: "The present revenues of the applicants are inadequate, whether the simple common-law tests be applied or if they be judged by the statute with reference to their sufficiency, under honest, economical and efficient management, to provide in the public interest adequate and efficient railway transportation service at the lowest cost consistent with furnishing such service." It was contended in the opinion, however, that the flat 15 per cent advance asked by the carriers was larger than was reasonably necessary and would be such a deterrent to traffic as to stifle movement.

"The attempt to state a particular sum as measuring the deficiency, or which will result from our authorization," the decision proceeded, "would be futile because the amount must necessarily depend upon the future course of both earnings and expenses, the one being dependent upon the unpredictable future volume of traffic and the other upon the course of prices of materials, wages and taxes—all of which are subject to change.

"From the generality of this conclusion it is possible to segregate one compact body of rail carriers—namely, those comprising the Class 1 roads in the Pocahontas region—and their revenues, mainly derived from the transportation of bituminous coal, are on the whole adequate or more than adequate, but nothing indi-

cates that the revenues or return of such lines other than from bituminous coal are above the average of other lines."

Commissioner Eastman, former Federal Coordinator of Transportation, said that the increases would be sufficient to compensate the carriers for advances in wages and other costs and also for the failure of past increases to come up to expectations. He added, however, "it is unnecessary to say that an increase in railroad rates cannot furnish an adequate answer to our transportation problem. At best it is only a palliative, and whether it is even that remains to be seen. There are other steps which I believe will in the long run prove more efficacious and to which I hope that effective consideration may elsewhere be given. I shall not undertake to go into these matters here."

The Pennsylvania Public Utilities Commission issued an order on Feb. 25 reducing freight rates on anthracite from the mines to points in the eastern part of the State, effective March 28. The cuts, which were asked by the Pennsylvania Retail Coal Merchants' Association to meet truck competition, affect towns mostly within 40 miles of the mines and range from 7 to 37c. per ton. No change was made in the rate to Philadelphia. The Commission said it revised the rates to "help improve conditions generally" in the hard-coal trade and in the mining areas.

Fit Machine to Decent Living, Urges Dr. Polakov

A permanent department of engineering research has been set up by the United Mine Workers with Dr. Walter N. Polakov as its first director. In an exclusive interview for *Coal Age* the new director said "technologic progress cannot be stopped, annulled or circumscribed. Mechanization of mines, and specifically mechanization of loading, as a permanent phase of coal mining is bound to grow. Hence the task of paramount social importance is to fit the machine into the picture of decent living and healthy, safe working conditions. The machine, instead of being a destroyer of homes and health, should do what it ought to do: namely, help the worker in his work, increase his pay and give him leisure; in short, it ought to enhance his economic welfare.

"Heretofore," declared the new director, "the benefits gained from mechanization have accrued largely, if not exclusively, to the owners; yet the economic advantages are large enough for the workers to enjoy ample participation." In the coal areas of the former Central Competitive field, where the United Mine Workers was active for about 35 years, he pointed out, the productivity of miners is 66 per cent higher than in the more recently organized Appalachian region. Consequently, the cost of labor per ton is 46 per cent lower; yet the miners' day wages are from 10 to 36 per cent higher. The old adage that cheap labor spells high cost is thus well demonstrated, he asserted. The influence of the union upon mine management, he maintained, also works to mutual benefit. "Thus, participation by mine workers in the benefits of mechanization is, in practice, proved to be of advantage to all concerned."

Harris & Ewing

Dr. Walter N. Polakov

"The coal industry," said Dr. Polakov, is working in a continually shrinking market; improvements in combustion, substitution of competing fuels, and restriction of general economic activities—all tend in the same direction. This tendency means, Dr. Polakov emphasized, that, together with the introduction of labor-saving machinery, less labor is needed, both per ton and for the total national demand. That fact puts a new task before society.

"Labor is measured in terms of man-hours of work. If less labor is needed to produce the requisite results, this saving of labor does not mean that fewer men should be employed but that the same number of men should work fewer hours. Carefully calculated," Dr. Polakov maintains, "a five- to six-hour day, or a 30-hour week, is more than adequate to produce all the coal that may be needed, even if full resumption of national industrial activities be attained.

"While industry operates on a restricted market, management still strives to obtain an optimum of financial returns," Dr. Polakov continued, "and this necessity and others led to the creation of the National Bituminous Coal Commission." With a large number of miners already unemployed or working on part time, price-fixing encourages further mechanization. In the last two years, the process of mechanization has been much accelerated; and, if it continues at the same pace, Dr. Polakov estimates, by 1939 some 120,000 bituminous coal miners will have been dismissed through the introduction of these machines. This impact may be allayed in a measure both by participation in financial benefits and by reduction of working hours.

"Under such conditions," Dr. Polakov concludes, "the National Bituminous Coal Commission can hardly be of any constructive help to the miners, consumers and operators unless it is broadened not merely to regulate one phase of our national power resources—coal—but to coordinate men and materials in the petroleum, gas and water-power fields as well. The situation, therefore, must be viewed as a whole; for no adjustment of one part singly can be made adequately without considering the interrelation of all fuels."

Dr. Polakov is a graduate of the Saxon Royal Institute of Technology of Dresden. Since coming to the United States he has served as a management engineer with the American Locomotive Co.; with Harrington Emerson; H. L. Gantt, and with the Board of Estimate of the city of New York. For several years he was in consulting practice, serving about ninety firms. During the War, he was employed as power specialist for the U. S. Shipping Board with the rank of commander. Early in the Franklin D. Roosevelt administration he served as a consulting engineer for the Tennessee Valley Authority, later doing research work for the Works Progress Administration and for the Labor Department.

Paul E. Anderson, an economist who served with the labor advisory board of NRA and with the Railroad Retirement Board, will be Dr. Polakov's assistant in the conduct of the United Mine Workers' research program.

Lehigh Anthracite Conference To Be Annual Event

Six general subjects dealing with scientific and technical phases of anthracite will be considered during the first annual anthracite conference to be held April 29 and 30 at Lehigh University, Bethlehem, Pa. The purpose of the conference, which, according to plans, is to be an annual affair, is to survey recent engineering developments in the mining and utilization of anthracite and to bring engineers, educators, members of the industry and the general public up to date on technological progress in Pennsylvania's hard-coal industry.

The conference chairman, Howard Eckfeldt, professsor of mining engineering at Lehigh, has arranged for eighteen technical papers to be presented, including such topics as progress in production, distribution, automatic burning and consumer economy of anthracite, as well as utilization of ash and the non-fuel uses of anthracite. The papers will be presented by outstanding authorities on the various subjects treated, and at the conclusion of the conference the papers will be published in a single report to be made available for general reference.

Honorary chairmen of the conference include Frank W. Earnest, Jr., president, Anthracite Industries, Inc.; Alan C. Dodson, president, Weston Dodson & Co.; S. D. Warriner, chairman of the board, Lehigh Navigation Coal Co., and Dr. C. C. Williams, president of Lehigh University. The committee on arrangements is composed of: vice-chairman, Allen J. Johnson, director, Anthracite Industries Laboratory; W. H. Lesser, electrical-mechanical engineer, Pierce Management; J. K. Groundie, Prof. F. V. Larkin, P. A. Mulcey, Dr. H. J. Rose, Prof. B. H. Jennings, J. R. Ray, Prof. Eric Sinkinson and Dean Bradley Stoughton, of the College of Engineering, Lehigh University.

The tentative program follows: "Pennsylvania Anthracite Reserves," Dr. George H. Ashley, State Geologist of Pennsylvania; "Inherent Characteristics of Anthracite," Dr. H. J. Rose, Mellon Institute; "Non-Fuel Uses of Anthracite," Prof. H. G. Turner, Pennsylvania State College; "A New Theory Concerning the Combustion of Anthracite," E. S. Sinkinson, asso-

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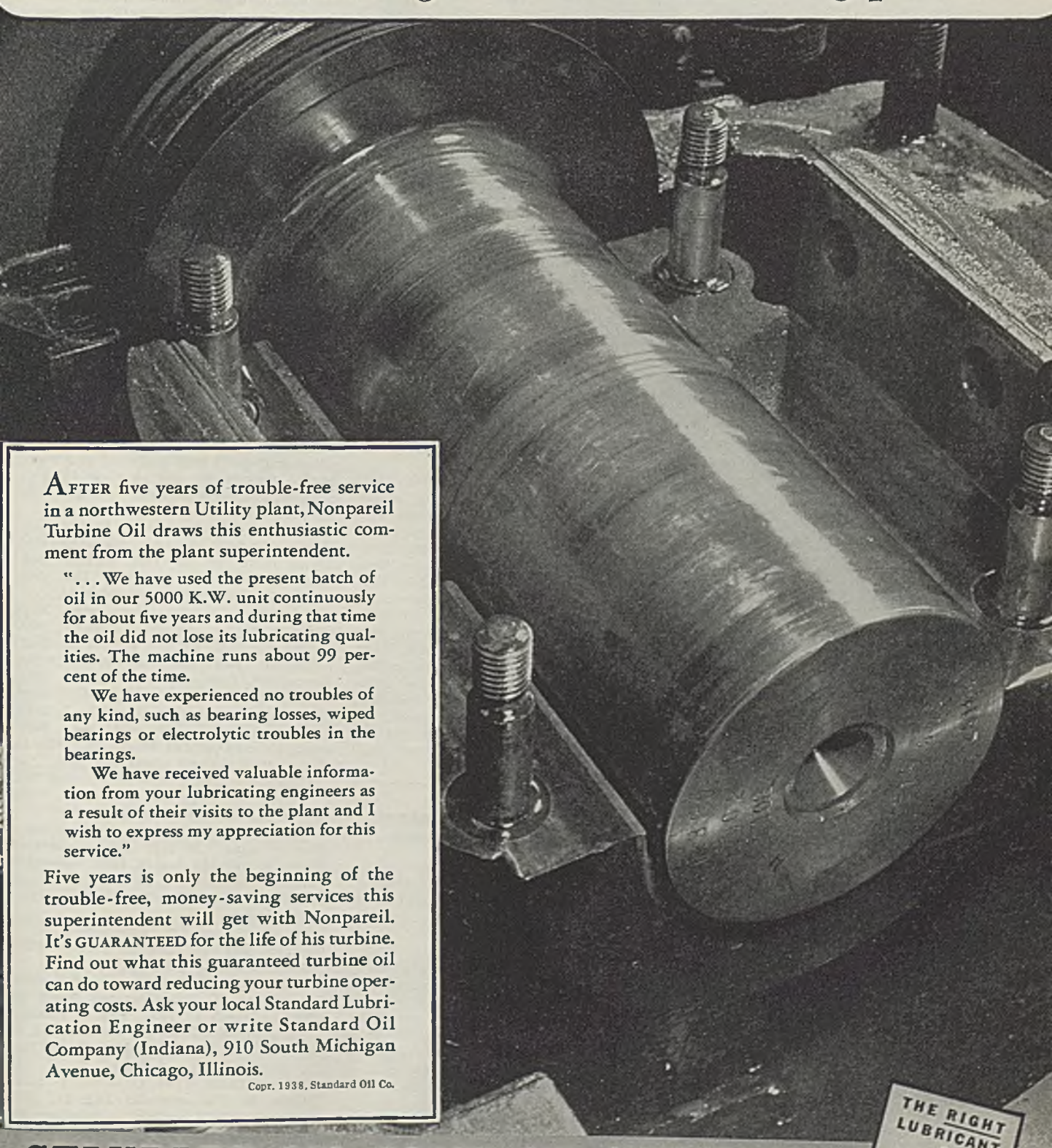

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We have experienced no troubles of any kind, such as bearing losses, wiped bearings or electrolytic troubles in the bearings.

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ciate professor of fuel technology, Lehigh University; "Some Practical Considerations in Connection With Combustion," A. J. Johnson; "The Application of Thermostatic Controls to Various Types of Anthracite Equipment," Arnold Michelson, vice-president, Minneapolis-Honeywell Regulator Co.; "Magazine or Self-Feeding Boilers for Coal," William Anderson, Spencer Heater Co.; "Domestic Burners (or Stokers) for Anthracite," P. A. Mulcey, Anthracite Industries Laboratory; "An Improved Method for Hand Firing Pennsylvania Anthracite in Commercial Installations," H. J. Littell, Anthracite Institute; "Air Conditioning and Refrigeration," B. H. Jennings, associate professor, mechanical engineering, Lehigh University; "Equipment for the Use of Anthracite in Apartment Houses and Semi-Industrial Purposes," William Stein, Combustion Engineering Co.; "The Pulverization of Anthracite for Commercial Use," Martin Frisch, Foster-Wheeler Corporation; "Anthracite for Power Generation," H. W. Warren, chief engineer, Glen Alden Coal Co.; "The Distribution of Anthracite," A. Haring, associate professor of economics, Lehigh University; "Domestic Ash Handling," E. T. Selig, Jr., Mellon Institute; "The Use of the Degree Day Calculations in the Retail Coal Industry," A. F. Duemler, Household Fuel Corportation; "The Relation of the Type of Fuel to the Cleanliness of Communities," W. G. Christy, Hudson County (N. J.) smoke abatement engineer; "Statistical Analysis of the Growth of Pennsylvania Anthracite," E. C. Bratt, assistant professor of economics, Lehigh University.

At the dinner meeting to be held in the evening of April 29, J. H. Pierce, president, Pierce Management, will be toastmaster, and the speakers will include Dr. A. C. Fieldner, chief, technologic branch, U. S. Bureau of Mines, and Frank W. Earnest.

Coal Fellowships Offered

Four fellowships for research in coal and non-metallics are offered by the University of Washington, Seattle, Wash., in cooperation with the Northwest Experiment Station of U. S. Bureau of Mines. Beginning July 1, these fellowships are for one year, being open to graduates of universities and technical colleges who are qualified to undertake investigations. The purpose of the fellowships is to undertake the solution of various problems being studied by the Bureau of Mines that are of especial importance to the State of Washington, the Pacific Northwest, and Alaska.

The coal problems to be studied will relate to the treatment and utilization of coal and coke. The investigations consist principally of laboratory work directed largely by the Bureau's technologists, the work being performed in Mines Laboratory, a large modern building equipped with the newest types of machinery and apparatus. Applications, which should be addressed to Milnor Roberts, dean, College of Mines, University of Washington, will be passed upon late in April.

Fellowships in mining and metallurgical research are offered also by the School of Mines of the College of Engineering of the University of Alabama in cooperation with the Southern Experiment Station of the U. S. Bureau of Mines. The fellowships are for nine months, beginning Sept. 1, and coal-washability studies have been selected for investigation for 1938–9. Applications, due not later than June 1, should be addressed to J. R. Cudworth, director, School of Mines, University of Alabama, University, Ala.

Anti-freeze made from coal

Zerone, an anti-rust and anti-freeze made from a coal base, is shown in action in an automobile motor and radiator in comparison with plain water. This is part of the Du Pont exhibition at the Museum of Science and Industry, Rockefeller Center, New York City.

Bootleg Miners on Strike

Bootleg miners in west Schuylkill County, Pennsylvania, went on strike March 15 as a protest against rates paid them for their coal by breaker operators. P. J. Brennan, president of the free-lance miners' association, said more than a thousand workers quit, and added that the association had signed an agreement a year ago with breaker operators setting a rate of 5c. per cubic foot for all raw coal bought from association miners. Many of the mine operators, according to Mr. Brennan, have failed to abide by the agreement. The operators, however, maintain that the demand for bootleg coal has decreased because of bans in neighboring States.

LARGE BLOCK OF ANTHRACITE TO BE PERMANENT EXHIBIT

A place of honor at the City Hall plaza, Philadelphia, as a permanent exhibit is to be accorded an eight-ton piece of anthracite which was a feature of the observance of Anthracite Week in Pottsville, Pa., early last October. This was decided upon following a conference between Russell Bevan, of the Pottsville Chamber of Commerce, and the secretary of Mayor S. Davis Wilson of the Quaker City. A suitable plaque will be placed on the coal and unveiling ceremonies will be held when the exhibit is ready. The coal was provided by Robert Bazley, president of the Pottsville Chamber of Commerce.

New Preparation Facilities

Cranberry Improvement Co., Cranberry Colliery, Hazleton, Pa.: Contract closed with Deister Concentrator Co. for Deister-Overstrom "Diagonal-Deck" coal-washing equipment to handle 24 tons per hour feed of rice, barley and No. 4 buckwheat.

Franklin County Coal Corporation, Royalton No. 7 mine, Franklin County, Illinois: Contract closed with Koppers-Rheolaveur Co. for cleaning plant equipped with Menzies cone separator to clean 3x5/16-in. coal, two Koppers-Battelle launder units operating in parallel to clean 0x5/16-in. coal, and two Carpenter dryers to dry the latter product; provision will be made to produce 0x3-in. coal screened into sizes standard in southern Illinois, with arrangements to make combinations as desired; capacity, 270 tons per hour; to be completed Aug. 1. Plant to be added to existing tipple.

Lehigh Valley Coal Co., Hazleton Shaft Colliery, Hazleton, Pa.: Contract closed with Wilmot Engineering Co. for Hydrotator complete with dewatering screens to handle 30 tons per hour of clean pea coal. Equipment represents additional facilities and is now in operation.

Holmes Safety Awards Made

Certificates in recognition of meritorious safety records were awarded to 21 coal-mining companies and to 42 coal-mine employees by the Joseph A. Holmes Safety Association at its annual meeting on March 5. In addition medals and certificates of merit were conferred on a number of workers for risking their lives to save fellow workmen from death. The companies cited are:

Alabama By-Products Corporation, Bradford mine, Dixiana, Ala.—Operated March 18 to Dec. 31, 1937, without lost-time accident and completed full year with only three lost-time accidents.

Arkwright Coal Co., Mona mine, Morgantown, W. Va.—Operated June 27, 1930, to Dec. 27, 1937, without a fatal accident.

Caliente Coal Co., Ravenwood mine, Ravenwood, Colo.—Operated Jan. 1, 1935, to Jan. 1, 1938, with nine lost-time accidents; no fatal accident since May 1, 1929.

Calumet Fuel Co., Somerset mine, Somerset, Colo.—Operated March 20, 1923, to Jan. 1, 1938, without a fatal accident.

Clinchfield Coal Corporation, mine No. 3, Dante, Va.—Operated March 12, 1930, to Jan. 1, 1938, without a fatality.

Colorado Fuel & Iron Corporation—Morley mine, Morley, Colo., operated March 4, 1930, to Jan. 1, 1938, without a fatality; Kebler mine, Kebler, Colo., operated Sept. 20, 1932, to Jan. 1, 1938, without a fatality.

Diamond Coal Co., Providence, Ky.—Operated Jan. 16, 1925, to Jan. 1, 1938, without a fatality.

Elm Grove Mining Co., Mobley mine, Elm Grove, W. Va.—Operated March 10, 1932, to March 31, 1937, without fatality.

Industrial Collieries Corporation, No. 43 mine, Dakota, W. Va.—Operated since May 20, 1936, without a fatality.

Island Creek Coal Co.—No. 1 mine, Holden, W. Va., operated Aug. 21, 1931, to April 5, 1937, without a fatality; No. 11 mine, operated May 22, 1926, to Dec. 31, 1937, without a fatality; No. 20 mine

operated April 12, 1932, to March 30, 1937, without a fatality; also operated a group of mines from March 7, 1936, to March 30, 1937, without a fatality.

Koppers Coal Co.—Had 184 employees who worked 20 or more years without a lost-time accident; of these, 76 worked more than 30 years, 38 more than 40 years, and 14 more than 50 years.

Monroe Coal Mining Co., Revloc mine, Revloc, Pa.—Operated March 16, 1932, to March 27, 1937, without a fatality.

National Mining Co., National No. 1 mine, Morgan, Pa.—Operated Oct. 23, 1929, to Dec. 31, 1937, without a fatality.

W. J. Rainey, Inc., Clyde Nos. 1 and 3 mines, Uniontown, Pa.—Worked during 1937 without a fatality.

Rochester & Pittsburgh Coal Co., Indiana, Pa.—Had 196 employees who worked 30 or more years without a lost-time accident; of these, 17 worked more than 50 years and 39 more than 40 years.

Shamrock Coal Co., Shamrock mine, Erie, Colo.—Operated Jan. 1, 1935, to Jan. 1, 1938, with only six lost-time accidents, one in 1936 and one in 1937; no fatality since Jan. 31, 1933.

Union Pacific Coal Co., Rock Springs, Wyo.—Mines B, C, D and E operated from Dec. 11, 1935, to Dec. 31, 1937, without a fatality; mines B and C had previously worked more than a year without a lost-time accident; Reliance mines operated Jan. 25, 1933, to Dec. 31, 1937, without a fatality; company improved its accident record as follows: 1923-27, 444,776 man-hours per fatality and 15,617 man-hours per accident; 1933-37, 731,205 man-hours per fatality and 61,165 man-hours per accident.

United States Coal & Coke Co., mine No. 7, Elbert, W. Va.—Operated April 4, 1933, to April 30, 1937, without a fatality.

United States Fuel Co., King No. 2 mine, Mohrland, Utah—Operated Feb. 2, 1932, to Oct. 23, 1937, without a fatality; worked more than a year without a lost-time accident.

Valier Coal Co., mine No. 1, Valier, Ill. —Operated July 6, 1934, to Jan. 1, 1938, without a fatality.

Youghiogheny & Ohio Coal Co.—Charleroi mine, Charleroi, Pa., operated Feb. 3, 1931, to Dec. 31, 1937, without a fatality; Osborne No. 1 mine, Wyano, Pa., operated May 2, 1930, to Jan. 1, 1938, without a fatality.

Coal Moves More Freight

Railroads of the United States moved 8 3/5 tons of freight and equipment one mile for each pound of coal consumed during 1937 by freight locomotives, according to J. J. Pelley, president, Association of American Railroads. This, which set a new record in the efficient use of coal by the carriers, compares with 8.37 tons in 1936, 8.31 in 1935 and 5¾ tons in 1920.

Alabama Roads Ask Rate Cut

Railroads of Alabama have petitioned the State Public Service Commission for authority to establish a carload rate of $1.40 per ton on coal shipped from mines on their lines to Mobile, to meet barge-line competition. The present railroad rate is $1.90, including a 10c. surcharge; the water rate is 75c., with handling charges raising the cost to $1.40.

Coal Commission Prepares New Schedules; Hosford Announces Retirement

WASHINGTON, D. C., March 23—Although Chairman Charles F. Hosford, Jr., has announced his resignation, the National Bituminous Coal Commission is proceeding to clear the way for the establishment of new minimum prices and marketing rules and regulations to replace those suspended on Feb. 25 (*Coal Age*, March, p. 90). Following a White House conference March 14, Senator Guffey said that President Roosevelt will accept the Hosford resignation as of April 30, the chairman having stated that he wished to return to his private law practice. Commissioner Percy Tetlow, formerly president of District 6, United Mine Workers (Ohio), was unanimously chosen temporary chairman to succeed Mr. Hosford on Tuesday.

Charles F. Hosford, Jr.

Orders 231, 232 and 233, issued by the Commission on March 12, revoked previous orders respectively determining the average costs of bituminous coal, establishing classification of coals of code members, and requiring district boards to propose minimum prices for tonnage produced in their respective districts for the consideration of the Commission. Thus the way was opened for the submission of new minimums by all the district boards. Order 323 also revoked a previous order on maximum discounts or price allowances made by code members and set a public hearing for April 25 to submit evidence upon which to base new discounts or price allowances.

An order was issued by the Commission on March 16 calling upon each code member to forward by April 15 replies to questionnaires concerning coal analysis and preparation, methods of mining, and other data to be used in a renewal of its efforts toward stabilization of the industry.

In starting the groundwork for reestablishment of prices and regulations the marketing division of the Commission made a complete study of proposed rules to be used in promulgating new schedules. The legal division is analyzing this study with a view to preparing an outline, designed to conform closely to the mandate of the courts, for use as a model for future procedure. With the cooperation of other Commission bureaus steady progress has been made in the assembling and preparation of material for the guidance of the Commission in preparing new schedules. For instance, a close study is being made of complete reports from the industry regarding operations between Dec. 16 and Feb. 25, when minimum prices were in effect, with a view to learning the effects of Federal regulation.

This study reveals that code memberships have continued to increase since the revocation of minimum prices, the total on March 9 being 7,506, representing an annual tonnage of 414,435,374, or approximately 96 per cent of the industry. From these data the Commission is preparing a directory of all coal mines in the country, arranged alphabetically for each producing district as well as for the entire United States.

Marketing Agencies Perk Up

Growing interest in the marketing-agency selling plan was shown with the decision on March 8 by a majority of Southern high-volatile operators to market their output through Appalachian Coals, Inc. Under this arrangement, 72 per cent of the tonnage of the field will be distributed through A.C.I., which received approval as a marketing agency by the Commission on Jan. 28. Smokeless Coals, Inc., also has experienced an impetus since the revocation of Commission prices, unofficial estimates of its share of low-volatile distribution ranging from 65 to 70 per cent of the total tonnage.

In orders issued on March 12, the Commission ruled that bituminous coal mined in Kansas and Arkansas is in direct competition with coal in interstate commerce and will be subject to regulation under the Coal Act, effective April 12. Four days later, a similar decision was announced regarding New Mexican coal, regulation becoming effective on April 15. In the case of intrastate transactions in bituminous coal in North Carolina, however, it was decided that they do not affect interstate commerce and that therefore they are exempt from the provisions of Sec. 4 of the Guffey-Vinson Act.

Urgent pleas that Montana coals be adjudged subject to regulation under the Coal Act were made by a procession of witnesses, including government representatives, coal operators of Montana and neighboring States, miners, mining officials and others, at a hearing held at Billings beginning Feb. 17. The picture of growing demoralization presented by witnesses was almost a replica of that shown at a hearing held at Seattle, Wash., during the preceding week, when similar pleas were voiced.

Appointment of Ray Edmundson, district president of the United Mine Workers, as a member of District 10 board (Illinois) was upheld on March 7 by an examiner for the Commission. The ap-

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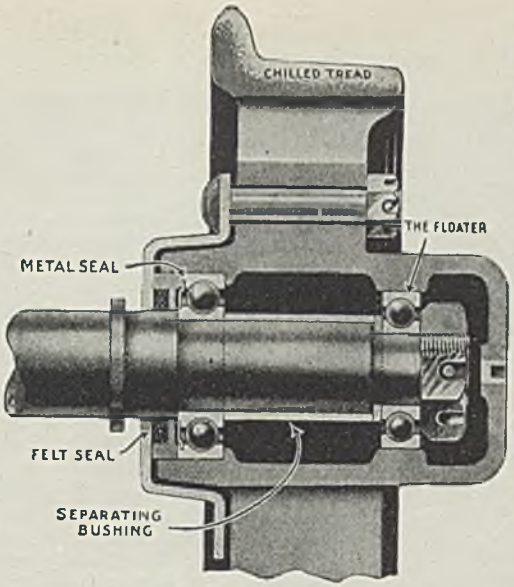
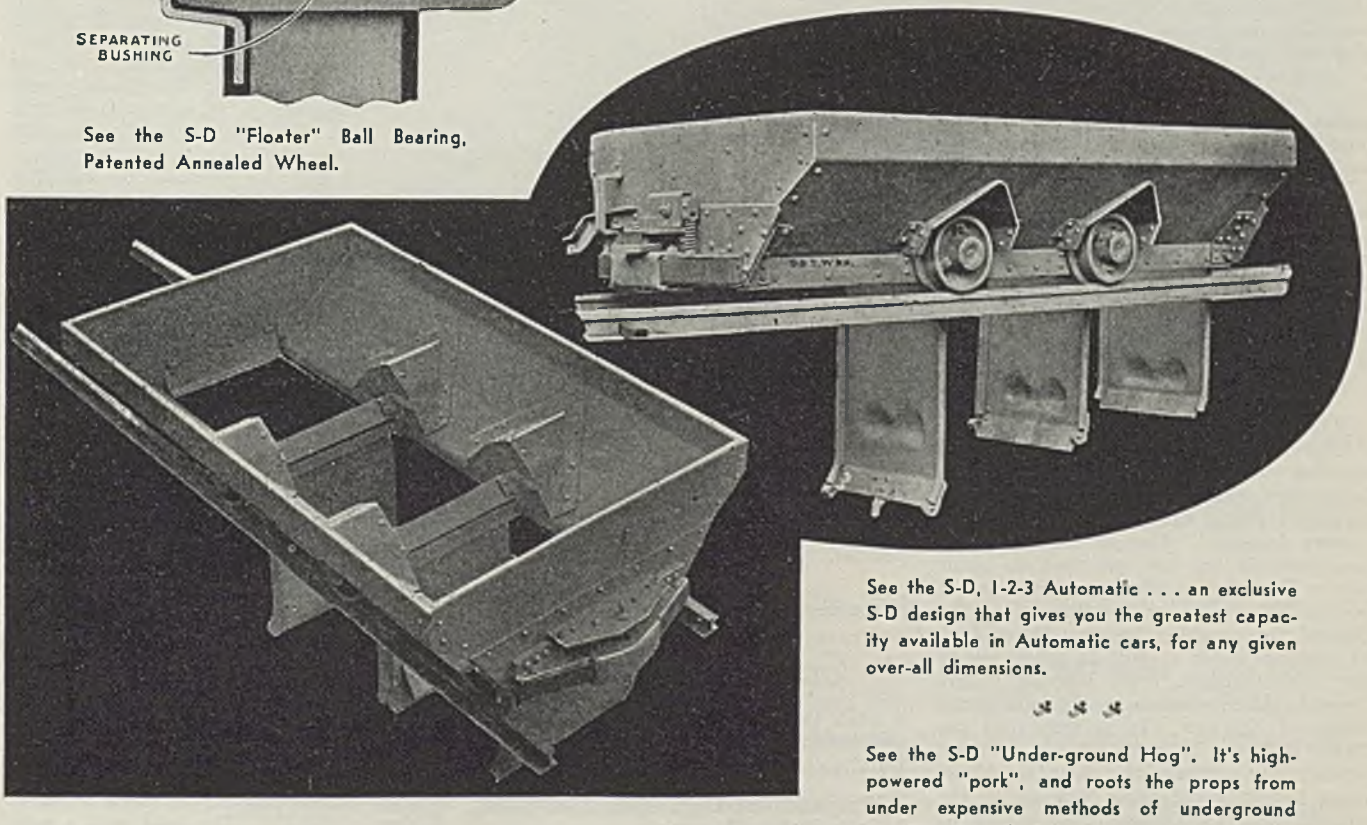


See the S-D "Floater" Ball Bearing, Patented Annealed Wheel.

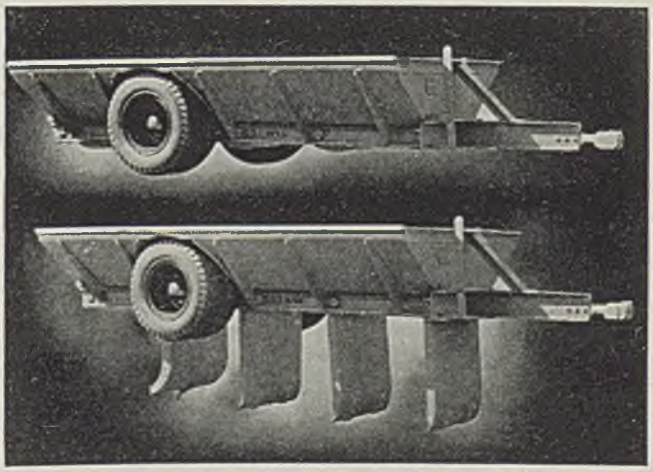
Seeing is Believing . . . meet us in Cincinnati, May 2-6, at the American Mining Congress. Throughout the mining Industry, S-D Equipment is being discussed. See some of it on display . . . it's 1938's highway to new business . . . new profits, in an ever increasing mechanized field.



See the S-D, 1-2-3 Automatic . . . an exclusive S-D design that gives you the greatest capacity available in Automatic cars, for any given over-all dimensions.

See the S-D "Under-ground Hog". It's high-powered "pork", and roots the props from under expensive methods of underground transfer of coal.

• Don't think we're kidding you, Mister, when we tell you how vital the need is for modern cost-cutting S-D equipment. Never before has proper mechanization been so necessary to profitable operations. Never before, have wide awake mine operators given as much serious thought to reducing costs. Our records show these facts. Wise operators are junking out-of-date cars . . . installing S-D Automatics . . . and at great savings. It's time you were investigating.



SANFORD-DAY IRON WORKS, Knoxville, Tenn., U.S.A.

pointment had been protested by the Progressive Miners, which alleged that Edmundson did not represent a preponderance of union miners in the district. It was indicated that the Progressives might appeal from the examiner's decision to the Commission.

Undue Pressure Is Blamed for Breakdown in Price Control

By PAUL WOOTON

(Coal Age Washington Correspondent)

By yielding to the pressure brought upon them by the President and others to hurry out the schedule of coal prices, the members of the National Bituminous Coal Commission delayed for nobody knows how long the time when the minimum price plan will go into effect. All prices and all rules and regulations relating to prices were revoked. This action was taken voluntarily before the court had an opportunity to complete the study it was making under a temporary injunction.

No complaint was made to the court as to the constitutionality of the law or as to reasonableness of the prices fixed. The whole case was based on the claim that the Commission had not followed the letter of the law in giving those concerned an opportunity to be heard in connection with any of the tentative findings of the board.

Schechter Case Caused Caution

When the Guffey act was under consideration in Congress the Schechter case decision was fresh in everyone's mind. The lawmakers leaned over backward in prescribing limits and conditions for any powers delegated. One of the conditions mentioned in the law was that no order of the Commission affecting prices should go into effect without hearings. Had the Commission provided for even fifteen days of hearings after it got its prices ready for announcement, some lawyers believe there would have been compliance with the letter of the law. It is true that the 20,000 different interests affected by these prices could not have been heard in fifteen days, but it would have been up to the complainants to combine their objections so that they could make their protest within the time alloted. The Interstate Commerce Commission constantly is faced with situations where large numbers want to be heard. The I.C.C., however, declines to listen to the same argument from scores of different speakers. It requires cooperation among those desiring to be heard, so that the same ground is not covered repeatedly.

The Coal Commission thought the many hearings it had held prior to its final agreement on prices would be sufficient, but, when the court said it wanted to study the law to see if hearings should have been held after the prices were agreed upon, it was decided to revoke everything and proceed with the hearings on the 450,000 individual prices that make up its schedule. As this decision probably means a further delay of some months before the prices can be put into effect, another period of heavy coal buying is in prospect. Even with the depression, the coal business promises to be good as a result of the buying that will be done before higher prices go into effect.

Mechanical Stoker Sales Recede Further

SALES of mechanical stokers in January last totaled 2,423 units, according to statistics furnished the U. S. Bureau of the Census by 112 manufacturers (Class 1, 61; Class 2, 35; Class 3, 34; Class 4, 24; Class 5, 14). This compares with sales of 4,609 units in the preceding month and 2,080 in January, 1937. Sales by classes in January last were: residential (under 61 lb. of coal per hour), 1,905 (bituminous, 1,612; anthracite, 343); small apartment-house and small commercial heating jobs (61 to 300 lb. per hour), 203; apartment-house and general small commercial heating jobs (301 to 300 lb. per hour), 161; large commercial and small high-pressure steam plants (301 to 1,200 lb. per hour), 72; high-pressure industrial steam plants (over 1,200 lb. per hour), 22.

No government agency has traveled a stonier road than has the Coal Commission. Not only have some of the appointments to the Commission itself been criticized on administrative grounds but, to make matters worse, the Commission had to work with a personnel forced on it by politicians. Persons familiar with the coal business generally were not able to secure political indorsements. Experts which the Commission specifically requested could not be hired because the county chairman or some other party official refused indorsement. A row among members of the Commission was precipitated by patronage policies.

Coming Meetings

- Utah Coal Operators' Association: annual meeting, April 6, Ezra Thompson Building, Salt Lake City, Utah.
- Midwest Power Conference: April 13-15, LaSalle Hotel, Chicago.
- Virginia Coal Operators' Association: annual meeting, April 14, Norton, Va.
- First Annual Anthracite Conference: April 29 and 30, Lehigh University, Bethlehem, Pa.
- American Mining Congress: 15th annual coal mining convention and exposition, May 2-6, Music Hall, Cincinnati, Ohio.
- American Wholesale Coal Association: annual convention, May 18-21, Cavalier Hotel, Virginia Beach, Va.
- Mine Inspectors' Institute of America: 29th annual convention, St. Nicholas Hotel, Springfield, Ill., June 6, 7 and 8.
- American Retail Coal Association: annual convention and coal exposition, June 6-12, Hotel Sherman, Chicago.
- Illinois Mining Institute: twentieth annual boat trip and summer meeting, June 10-12, aboard Str. "Golden Eagle," leaving St. Louis June 10 and returning June 12.

Rival Unions Still Struggle For Power in Illinois

A working agreement with the United Mine Workers was signed by officials of the Williamson County (Illinois) Truck and Wagon Mine Association late in February, according to Hugh White, district board member, U.M.W. The contract, covering a period of one year, became effective on March 1. The association claims to represent 80 per cent of the off-rail tonnage in the county, with a total of about one thousand employees.

The agreement provides that the wage scale stipulated in the State-wide agreement between the U.M.W. and the Illinois Coal Operators' Association less $1 per seven-hour shift shall prevail as the minimum rate. It also is provided that tonnage payment shall be at the same proportionate rate, with the operator having the option of paying on either a tonnage or day-rate basis. The tonnage-rate clause, however, provides that men employed in loading coal on day rates shall be entitled to a minimum of $6.10 per day. Signing of the pact marked the end of a long fight to unionize the wagon mines. U.M.W. officials asserted that they planned to extend organization efforts into Saline, Jackson and Perry counties.

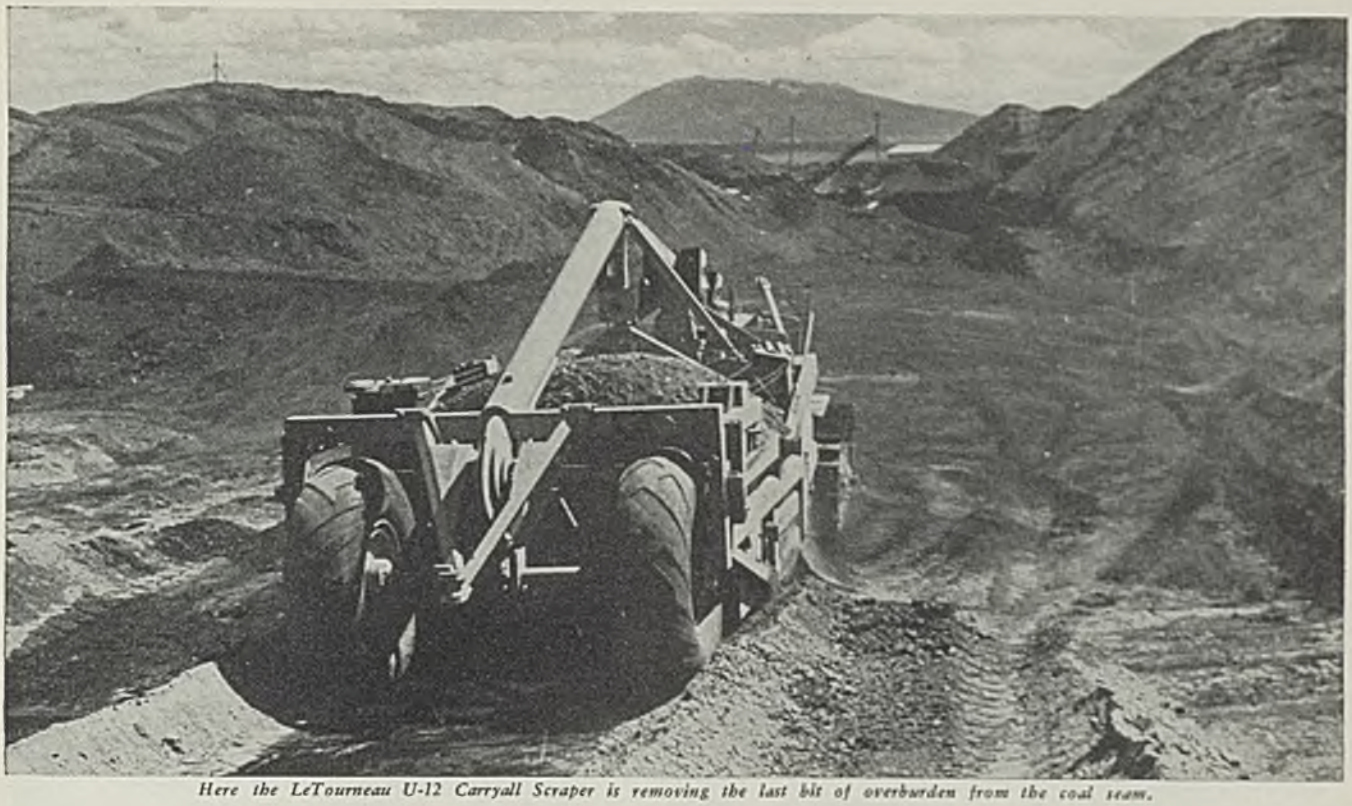
The Progressive Miners emerged victorious in a consent election held Feb. 26 under the auspices of the National Labor Relations Board for the right to represent 146 miners employed at Eureka No. 2 mine, Tilden, Ill. With all of the workers voting, P.M.A. came out ahead by 77 to 69 for the United Mine Workers. The mine, which is in Randolph County, had been operated with Progressive workmen until last June, when the Jones Bros. Coal Co., owner of the mine, entered into a contract with the U.M.W., which claims to represent 105 workers. Since then there has been a struggle for supremacy between the rival organizations. Under the terms of an agreement between the unions, members of the losing group may join the victorious unit without prejudice.

Eureka No. 1 mine of the same company, in St. Clair County, Illinois, employing U.M.W. members, was sold Feb. 26 at a foreclosure sale to the First State Bank of Tilden for $49,500. The bank held a note for $44,000 against the owner of the mine, which had been closed for some time.

Joe Ozanic, president of the Progressives, has given notice that his union is going to put on an organization campaign in every coal-producing district in the country. In Charleston, W. Va., during the second week in March, for the reorganization of the State Federation of Labor, he said: "As soon as the American Federation of Labor grants us an international charter, we are coming into West Virignia. And we expect to receive that charter any day now."

Anthracite Classes Launched

A six-weeks series of night-school classes started in Philadelphia on Feb. 22 under the auspices of Anthracite Industries, Inc., with 104 retail coal dealers in attendance. The session, which was held at the Broad Street Suburban Station Building, was one of a series during which the distributors will study the various phases of their business which have been affected



Here the LeTourneau U-12 Carryall Scraper is removing the last bit of overburden from the coal seam.

NUGGET COAL COMPANY

MAKES A LOW-COST CHANGE FROM SHAFT TO OPEN PIT

When shaft mining of its lignite coal deposits at Hanna, Wyoming, proved uneconomical, Nugget Coal Co., changed to the open-pit method, opened the first box cut with a dragline, now uses a LeTourneau U-12 Carryall Scraper and "Caterpillar" RD8 tractor for stripping overburden and removing spoilbanks. The overburden varies from 6 to 30 feet in depth, consists mainly of soil and clay and covers a 24- to 30-foot coal vein. The tractor-scraper rig removes this overburden right down to the coal. On a 600-foot round trip, it averaged a load every four minutes, moved more than 100 cubic yards hourly and thus made the change-over from shaft to open pit a low-cost one. In addition, the use of the LeTourneau Carryall Scraper enabled the company to keep its dragline constantly employed on the productive work of loading coal.

ACTUAL JOB DATA

Many another coal operator has found LeTourneau equipment a low-cost method of handling overburden.

Tractor and Scraper load down a 5% grade, pick up heaping loads in 1.2 to 1.5 minutes over a distance of 100 to 125 feet.

Ask your "Caterpillar" dealer what it can do for you.

Job observed and data certified by our Field Engineering Dept. You are invited to call on this department for aid in estimating and planning the best methods of handling your overburden problems.

R. G. LeTOURNEAU, INC.

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LETOURNEAU

N. P. Rhinehart

by competitive fuels. They will consider such subjects as new automatic devices for fuel and ash handling; radiation; humidification, air conditioning and various other factors which affect the comfort of home-owner customers. The course was laid out by J. Morgan Kipe, of Anthracite Industries, Inc., in cooperation with the Anthracite Industries Laboratory at Primos, Pa., and with the advice of leading educational institutions in the East. Instruction is given by laboratory engineers and other authorities from the anthracite equipment field.

At the Buffalo (N. Y.) home show, which was held March 7-12, two anthracite model basements were shown with central heating plants in actual operation. One showed the latest automatic stoker feeding the coal from bin to burner through a conveyer tube and automatically disposing of the ash. The other exhibit demonstrated the remarkable degree of cleanliness obtainable with modern hand-fired equipment using anthracite as fuel.

Personal Notes

JESSE BAILEY has been appointed foreman at the Ella mine of the Miller-Todd Coal Co., Adrian, W. Va.

A. B. BROOKE, superintendent, No. 28 mine, Elk Horn Coal Corporation, Wayland, Ky., was chosen president of the Big Sandy-Elkhorn Coal Mining Institute at the February monthly dinner-meeting of the mine-safety organization, held at Pikeville.

W. R. CAMPBELL has been made foreman at Powellton No. 4 mine of the Koppers Coal Co., Kimberly, W. Va.

GEORGE COFFEY has been named foreman at Prudence mine of the New River Co., Macdonald, W. Va.

JOHN T. FALLON, superintendent at Omar mine of the West Virginia Coal & Coke Corporation, Omar, W. Va., for the last ten years, has been named superintendent in charge of operations of the company's mines in the Elkins division at Bower, Junior and Norton. He took up his new duties on March 1, succeeding W. S. WILSON, resigned.

MICHAEL GALLAGHER, Cleveland, Ohio, has been elected a director of the Fidelity Investment Association, of Wheeling, W. Va. Mr. Gallagher also is chairman of the board of the Pittston Co. and the United States Distributing Corporation and is a director of M. A. Hanna Co., Pattison & Bowns, Inc., the Sheridan-Wyoming Coal Co. and the Jagels Fuel Corporation.

J. R. HUNTER has been appointed foreman at the McKeefrey mine of the Mound City Coal Co., McKeefrey, W. Va.

LOUIS C. MADEIRA 3d, executive director of the Anthracite Institute, New York, has been reappointed as a member of the advisory committee of the U. S. Bureau of Mines, according to an announcement by John W. Finch, director of the Bureau.

FRED MOONEY has been made superintendent at the Rosemont mine of the Green Valley Coal Co., Rosemont, W. Va.

L. M. PLATT has been named foreman at the Hugheston mine of Kanawha Coals, Inc., Hugheston, W. Va.

ROGER N. QUIRK, of the British Mines Department, is making a study of the coal industry in the United States. He is on leave from the British department, serving under a Commonwealth fellowship.

W. B. REED, sometimes called the dean of the cost accounting profession specializing in bituminous coal, has been placed in charge of the cost and sales realization division of the National Bituminous Coal Commission, where his appointment is expected to do much toward establishing confidence among operators in the integrity of the cost-finding work. With 38 years of experience as an accountant and auditor, he has worked for producers both north and south of the Mason and Dixon line. Few others have had as wide experience in the actual problems and methods of coal-mine adminstration. When the National Coal Association was formed in 1917 he was selected to head its cost work. He became nationally known as an authority on costs and income taxation. In recent years he has been in consulting practice. He was called in by NRA officials for important work in connection with the coal code. More recently he has been in charge of cost and statistical work for operators in District No. 7.

N. P. RHINEHART was officially reappointed for another four-year term as chief of the State Department of Mines of West Virginia on March 15. His previous term expired Dec. 21, his latest appointment dating from then.

C. J. SLUSHER has been elected secretary-treasurer of the Panhandle Mining Institute to replace A. E. Morgan, resigned.

J. MOLTEN SMITH, JR., formerly purchasing agent of the Little Gem Coal Co., Birmingham, Ala., has been elected president and treasurer, succeeding O. M. CROSS, retired. Other officers named are: MRS. W. P. YEATMAN, vice-president, and O. G. ROBINSON, secretary. The company operates the Dogwood mine, in Shelby County.

W. E. STAFFORD has been appointed superintendent at Wendel No. 2 mine of the Maryland Coal Co. of West Virginia, Wendel, W. Va.

Harris & Ewing

W. B. Reed

MILLARD STEEL has been made foreman at the Shamrock mine of the Logan Eagle Coal Co., Logan, W. Va.

F. A. TAYLOR, president, Maryland-New River Coal Co., was elected president of the Smokeless Coal Operators' Association of West Virginia at its annual meeting, on March 9 at White Sulphur Springs, W. Va. Other officers chosen are: first vice-president, H. D. EVERETT, president, Smokeless Fuel Co.; second vice-president, JOHN J. ATWATER, president, William C. Atwater & Co.; treasurer, H. R. HAWTHORNE, vice-president, Pocahontas Fuel Co.; secretary, HOLLY STOVER.

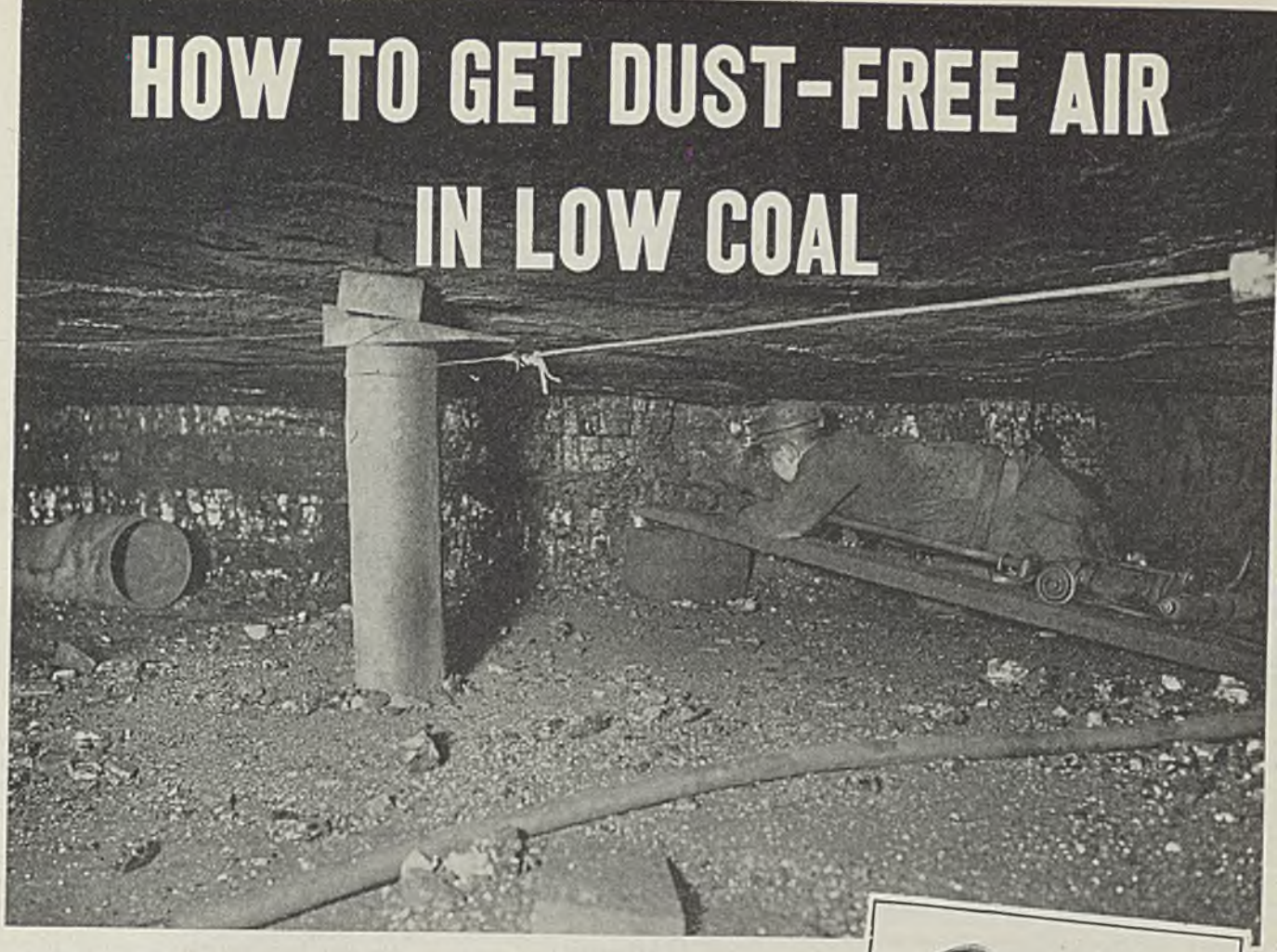
JACK WRIGHT has been named foreman by the Whitesville Mining Co., Whitesville, W. Va.

Tentative Standard Approved

A scheme of sampling coals classed according to ash content was approved for presentation to the American Society for Testing Materials for publication as a tentative standard at a meeting of Committee D-5 on Coal and Coke held in Rochester, N. Y., during committee week, March 7-11. This method is intended to apply to average commercial sampling of coal and is designed to give results so that 95 per cent of the test results fall within 10 per cent of the true ash content of the coal samples.

The method also gives instructions for sampling for purposes requiring special accuracy, such as classification of coals by grade or rank and for performance test work. Coals are divided into groups according to size and each group is subdivided according to ash content. For each size and range of ash content, the method specifies the minimum number of increments to be taken in collecting gross samples; also the minimum weight of each increment is given, together with the minimum weight of gross samples. This method of sampling is the result of a number of years' intensive investigation by producers and consumers to develop a practical method of sampling, scientifically sound in principle, whereby coals can be sampled at a minimum cost and yet with

HOW TO GET DUST-FREE AIR IN LOW COAL



"VENTUBE" *keeps the air clear of dust, smoke, and powder fumes*

THAT jackhammer is going to kick up plenty of dust in this low coal working. But dust won't slow down the job—because "Ventube," rubberized ventilating duct, keeps the atmosphere clear.

Low coal is the toughest test for any ventilating system—and "Ventube" is made tough to stand such severe treatment. The extra-heavy, long-fibered Hessian cloth is *both coated and impregnated with rubber* to make "Ventube" resistant to acid water, damp or dry rot, moisture and fungus. Concussion won't rip or tear it. And "Ventube" is as strong in tear-resistance in the warp direction as in the filler.

"Ventube" takes up little space. It weaves in and out of narrow, crooked passages—turns sharp corners—goes where other ventilating systems won't go. "Ventube" eliminates costly break-throughs, thereby saving time and money.

Give "Ventube" a trial in your deepest working—where you have had the most trouble with dust and foul air. Watch how quickly "Ventube" clears out the dust and gets fresh air circulating in the room. There's a "Ventube" distributor located near your mine. He will be glad to help you solve your ventilation problems and save you money. Write for complete information.

You are cordially invited to visit the du Pont exhibit at the
15TH ANNUAL COAL CONVENTION
Cincinnati, Ohio **May 2 to 6**

HEAVY DUTY POWDER BAG

This roomy, serviceable powder bag is made of the same type of durable rubberized material as is "Ventube" ventilating duct. This powder bag will give you long, economical service under toughest conditions. Write for sizes, prices and complete information.

DU PONT
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THE FLEXIBLE VENTILATING DUCT

E. I. du Pont de Nemours & Co., Inc., "Fabrikoid" Division, Fairfield, Conn.

satisfactory accuracy for commercial purposes.

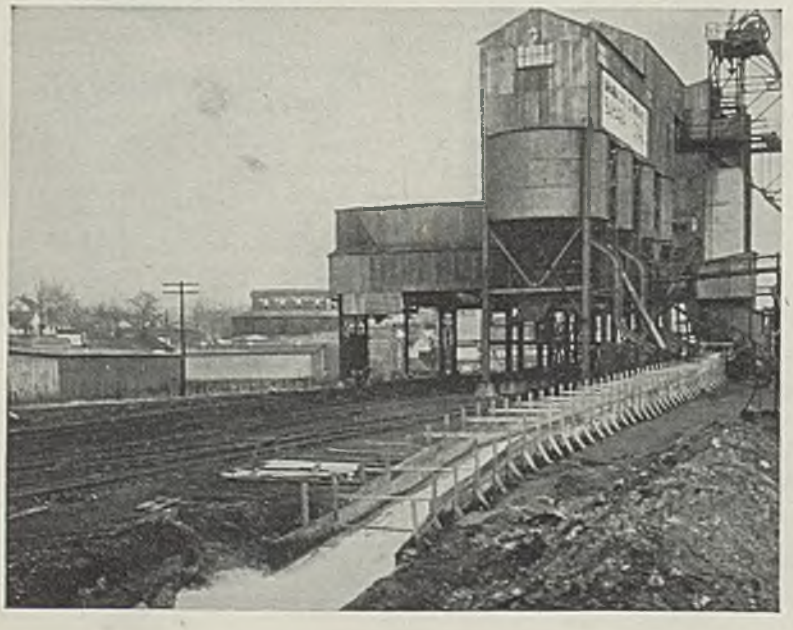
The committee also approved a revision of the procedure for determination of coal-ash fusibility, covered in the Methods of Analysis of Coal and Coke (D 271), which will permit the use of either gas-fired or electrically heated furnaces which meet specified requirements. This revision is necessary because of the development in recent years of a number of furnaces suitable for the determination of coal-ash fusibility. Furnaces which have been tested by the committee and found satisfactory are listed. A. C. Fieldner, chief, Technologic Branch, U. S. Bureau of Mines, is chairman of the committee.

The subcommittee on plasticity and swelling of coal reported gratifying progress on experimental work being conducted to standardize methods for determining the swelling or expanding characteristics of coals when carbonized for manufacture of coke. Coal expansion during coking is very important in the selection of coals for coke manufacture, as strongly swelling coals cause damage to the coke-oven walls. The subcommittee recently held a meeting at Johnstown, Pa., and inspected the equipment used by the Bethlehem Steel Co. for testing coal expansion, when plans were made for testing different ranks of coking coals by different methods as used in various laboratories in this country and Canada. These cooperative tests will be of much value in the standardization of a suitable method of testing expanding characteristics of various coals during carbonization.

Pumps Reclaim Flooded Mine

Work on the job of removing three billion gallons of water from an Illinois mine inundated in the flood of 1937, which started in December (*Coal Age*, January, p. 88) with a battery of three pumps removing 12,000 gal. per minute, is well under way. The swollen waters were disastrous to the town of Harrisburg, Ill., as the flooded workings, owned by the Sahara Coal Co., had been a major source of employment. With the help of WPA funds, the State Department of Mines and Minerals bought three 3,000-gal. Pomona deep-well pumps driven by 500-hp. Westinghouse motors. The contract called for delivery of the machinery in 93 days, but Director James McSherry, of the State Mines Department, started the pumps to work two weeks before the time was up. In the first twenty days the water level dropped 46 ft. and at that time 345,600,000 gal. of water had been removed.

Flume conveying water removed by three deep-well pumps in Sahara No. 3 mine



Plan New Ritter Mine

A new coal operation is to be opened by the Ritter Lumber Co. at Red Jacket, in Wyoming County, West Virginia, between Daileysville and Pineville, on the Guyan Valley extension of the Virginian Ry. Though close to another mine of the company now in operation, the new mine will have its own tipple, preparing mine-run exclusively.

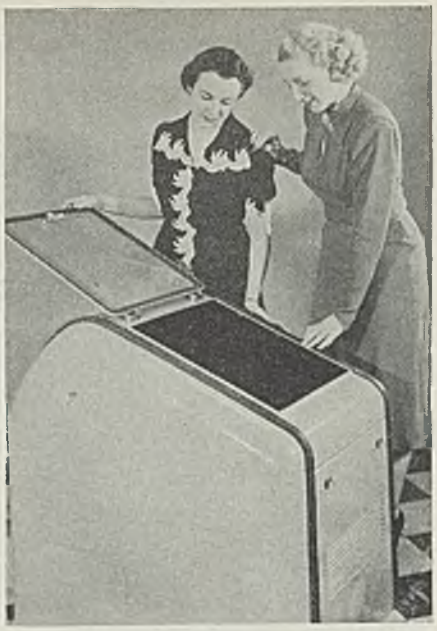
New Delco Stokers Coming

Three automatic coal stokers will be added to the General Motors (Delco-Frigidaire Conditioning Division) line in May. Designed to burn bituminous coal, two of the three models are for service in homes using not more than eighteen tons of coal annually; the third is for residences where not more than 30 tons is consumed per year. Automatic air controls provide combustion efficiency and a heavy-duty transmission insures an agitated fuel bed with a minimum of electric power consumption.

Obituary

THOMAS SIMPSON, 84, Illinois deputy State mine inspector, died Feb. 19 at his home in O'Fallon, Ill., after a lingering illness. He had been engaged in the coal industry more than 60 years.

FRED T. BAKER, for many years superintendent of the Colorado Fuel & Iron Corporation mine at Morley, Colo., died on Feb. 26. He had been with the company 35 years and also was a member of the Morley school board.



Insures ease for women fire tenders

COOK M. WALDRAN, 59, inspector for the National Bituminous Coal Commission in Birmingham, Ala., and associated with the coal industry in that city for 30 years, died March 4 in a local hospital.

JOHN N. CRICHTON, 51, vice-president in charge of sales, Johnstown Coal & Coke Co., died suddenly of coronary thrombosis on Feb. 27 at his home in Westfield, N. J. He had been secretary-treasurer of the company for nearly twenty years, with offices at the mining headquarters in Johnstown, Pa., before coming to New York. He was a brother of Andrew B. Crichton, president of the company.

THOMAS R. JONES, 64, general manager, Colonial Colliery Co., Frackville, Pa., died Feb. 22 in Pottsville. He had previously been general superintendent for 21 years of the Madeira-Hill anthracite operations, and preceding that was with the Lehigh Valley Coal Co.

ELMER A. ANTHONY, 56, vice-president and general manager of the McCall Coal Co., Christian, W. Va., died March 4 in Marting Hospital, Ironton, Ohio, after a gradual failing in health which began three months ago.

JOSEPH F. KLANER, 61, a pioneer Kansas stripping operator, died March 10 at a hospital in Pittsburg, Kan., of peritonitis following an operation. He was president of the Mulberry, Alston, Kelly-Carter, Windsor and Pittsburg Block coal companies, with operations in Kansas and Missouri. His connection with the coal industry began in 1910 in southeastern Kansas, when the Ellsworth-Klaner Construction Co. entered the field.

Financial Reports

American Coal Co. of Allegany County—Net loss for 1937, $116,590, against $189,929 loss in 1936.

Clinchfield Coal Corporation—Net op-

erating loss for 1937, $175,217, exclusive of credit of $11,000 from purchase of preferred stock at less than par. This compares with net operating loss in preceding year of $210,139, exclusive of $1,629 credit from purchase of preferred stock. Accrued dividends on preferred stock on Dec. 31 amounted to $297,313, or $46.67 a share on outstanding stock, exclusive of treasury shares.

Consolidation Coal Co. and subsidiaries —Net profit for 1937, $89,524 after interest accrued in preceding year on 5 per cent bonds. This contrasts with net loss of $73,280 in 1936.

Elk Horn Coal Corporation—Net loss for ten months to Dec. 31, $426,883.

Hatfield-Campbell Creek Coal Co.—Net income for 1937, $76,403, after $10,394 surtax. This compares with net income of $48,044 in 1936.

Lehigh Navigation Coal Co.—Loss for eleven months ended Nov. 30, 1937, $1,-789,706 after allowance for depletion, depreciation, expenses and fixed charges. This compares with $759,530 loss in 1936.

Lehigh Valley Coal Corporation and subsidiaries—Net loss for 1937, $938,854 after minority interest and $15,900 surtax, compared with net profit in 1936 of $824,919.

New River Co.—Net profit for 1937, $269,559, against $357,701 profit in 1936.

Pennsylvania Coal & Coke Corporation —Net loss for 1937, $232,263 before federal taxes, compared with net loss of $28,188 in 1936.

Pittsburgh Coal Co.—Net loss for 1937, $1,036,330 after all charges, including depletion, depreciation and provision for Federal taxes. This compares with loss of $1,684,955 in 1936.

Pittsburgh Terminal Coal Corporation and subsidiaries—Net loss for 1937, $423,-730 after surtax on undistributed profits of its subsidiary, compared with net loss of $526,432 in 1936.

Pond Creek Pocahontas Co.—Net profit for 1937, $165,966, compared with $238,020 profit in 1936.

Truax-Traer Coal Co. and subsidiaries —Consolidated net profit for quarter ended on Jan. 31, $224,455, based on interim figures subject to audit. This compares with consolidated net profit in the corresponding quarter a year ago of $340,469.

United Electric Coal Cos.—Net profit for twelve months ended Jan. 31, $251,-918, compared with $210,068 profit for twelve months ended Jan. 31, 1937.

Virginia Iron, Coal & Coke Co. and subsidiaries—Net loss in 1937, according to pamphlet report, was $91,175, against $91,950 loss in 1936.

West Virginia Coal & Coke Corporation and subsidiaries—Net loss for 1937, $260,715 before special charges of $83,135 for estimated loss on proposed disposition of certain assets. This compares with net loss of $79,981 in 1936.

M. A. Hanna Co. and subsidiaries—Net profit for 1937 (exclusive of security transactions), $3,048,462 after depreciation and depletion, Federal income tax, and surtax on undistributed profits. This compares with net profit in 1936 of $2,834,336.

Westinghouse Holds Forum

A group of 22 executives, engineers and maintenance men of the Hanna Coal Co. met on Feb. 23 with engineers of the Westinghouse Electric & Manufacturing Co. in a forum on electrical operation and maintenance of coal-mining equipment. The Hanna representatives came from the Willow Grove mine, St. Clairsville, Ohio; Piney Fork No. 1 and the Dun Glen mine. They heard two addresses, one on direct-current motors and the other on alterating-current motors, presented by Westinghouse engineers R. W. Owens, motor division manager, and C. B. Hathaway. After the lectures the visitors toured the East Pittsburgh works of Westinghouse, where they inspected a new mercury-arc rectifier soon to be installed in the Dun Glen mine.

Industrial Notes

Simplex Wire & Cable Co., Cambridge, Mass., has elected W. S. Davis, formerly sales manager, to the vice-presidency, after 41 years' association with the company. G. L. Roberts, assistant sales manager since 1927, has been appointed to succeed Mr. Davis as sales manager, and G. A. Grauer has been made assistant sales manager.

Westinghouse Electric & Manufacturing Co. has elevated George H. Bucher, formerly executive vice-president, to the presidency. Frank A. Merrick, president since 1929, has been elected vice-chairman. J. K. B. Hare, long a well-known sales executive, has been appointed central district manager. The industrial department also has been realigned, three new departments, industrial, resale and industry engineering, having been formed. C. B. Stainback, formerly assistant manager of the industrial department, is manager of the new industrial department; Bernard Lester, also assistant manager of the former industrial department, heads the resale department; C. A. Powel is manager of the industry engineering department, which also will embrace the activities of the central station engineering department, previously headed by him. J. S. Parry, Jr., has been made manager of the mining section, under Mr. Stainback.

Bucyrus-Erie Co. has designated the Ray-Ewbank Co., 101 Chandler St., Montgomery, Ala., as distributor for county sales in the southern half of Alabama.

Fairbanks, Morse & Co. has moved its general offices to the modernized structure, renamed the Fairbanks-Morse Building, at 600 South Michigan Ave., Chicago. In the ground-floor display room are shown a variety of products manufactured in the company's factories throughout the country.

USL Battery Corporation has appointed H. A. Harvey as vice-president, in full charge of activities at its Niagara Falls plant. After more than 25 years' association with the organization he succeeds R. T. Pierson, resigned.

Mercoid Corporation has elected Hugh Courteol as president; I. E. McCabe, who has been chief engineer since the inception of the company, has been made chairman of the board; J. W. Owens is executive vice-president in charge of sales; R. H. Chadwell has been named treasurer, and Thomas P. Crawford, secretary.

Midwest Stoker Association, Chicago's local organization of leading stoker sales agencies, held its annual meeting on March 3 and elected the following officers: president, W. J. O'Neil, Iron Fireman Mfg. Co.; vice-president, Mount Burns, Link-Belt Co.; secretary-treasurer, F. W. Barnholt, Illinois Iron & Bolt Co. The board of directors includes the foregoing officers as well as E. M. May,

Modernized Basement Wins $1,000 Prize

Ingenuity and practicability were effectively utilized in making this basement outstanding in livability, extent of usefulness for the whole family, and the assimilation of new, modern ideas on basement arrangement. It was awarded first prize in a contest conducted by the Chicago Coal Merchants' Association. As modernized it comprises two large rooms—a library and card room—with walls of knotty pine. Important features are a coal-heating plant employing a bin-fed-type stoker and a shower-bath compartment.

Steel Products Co., and J. J. Hayes, Auburn Stoker Sales Corporation.

R. G. Le Tourneau, Inc., has promoted Denn M. Burgess from the position of Eastern sales manager to that of domestic sales manager. J. W. Le Tourneau, formerly general sales manager, is now general manager, a newly created office. Louis D. Le Tourneau has been promoted from district representative in the Pacific Northwest to central sales manager, and Gordon S. McKenty, from district representative in the North Central States to Eastern sales manager.

Consolidation to Pay on Bonds

Full 2½ per cent interest for the six months ended on Dec. 31 last will be paid on April 1 by the Consolidation Coal Co. on its 25-year convertible 5 per cent bonds due July 1, 1960, out of available net earnings, according to a notice sent on March 2 to bondholders. Interest due on Oct. 1 next will be paid only to the extent earned, but thereafter it will become a fixed obligation of the company at the rate of 5 per cent annually until maturity. No payment was made for the six months ended Dec. 3, 1935; 1 per cent was paid for the first half of 1936, but since then the regular rate has been met out of earnings.

Tractor and Bulldozer Make Piling Area for Coal

The Bethlehem Steel Co. utilizes at its Bethlehem (Pa.) plant a 15-ton tractor and bulldozer to extend the piling area for coal, doing the job in about one-quarter the time it would take with a traveling crane. With the aid of a platform the bulldozer is used also to reload the coal for consumption.

Permissible Plates Issued

APPROVALS of permissible equipment issued by the U. S. Bureau of Mines during February were as follows:

Goodman Mfg. Co.: Type 260-C loading machine (redesigned); three motors, 50-, 7½- and 3-hp., 220 volts, a. c.; Approval 289; Feb. 9.

Goodman Mfg. Co.: Type G-20-B-77 shaker conveyor; 20-hp. motor, 230 volts, d. c.; Approval 319; Feb. 3.

Goodman Mfg. Co.: Type G-20-B-77 shaker conveyor; 20-hp. motor, 220 volts, a. c.; Approval 325; Feb. 2.

LaDel Conveyor & Mfg. Co.: pillar cutting machine; 35-hp. motor, 500 volts, d. c.; Approval 338-A; Feb. 12.

Goodman Mfg. Co.: Type 87 mobile conveyor; 3-hp. motor, 500 volts, d. c.; Approval 339-A; Feb. 12.

Carnegie-Illinois Steel Co.: Type 9 chain drag conveyor; 10-hp. motor, 230 volts, d. c.; Approval 340; Feb. 17.

Carnegie-Illinois Steel Co.: Type 12 sectional cross conveyor; 5-hp. motor, 230 volts, d. c.; Approval 341; Feb. 21.

Carnegie-Illinois Steel Co.: Type 20 sectional conveyor; 2-hp. motor, 230 volts, d. c.; Approved 342; Feb. 21.

Mine Safety Appliances Co.: M.S.A. dry-cell type blaster; Approval 1213; Feb. 21.

Davis Instrument Mfg. Co.: Davis No. 3 generator-type multiple-shot blasting unit; Approval 1600; Feb. 18.

To Build Boone County Spur

The Chesapeake & Ohio Ry. received authorization from the Interstate Commerce Commission on March 10 to construct and operate 9¾ miles of branch lines in Boone County, West Virginia. The railroad company informed the I.C.C. that "a responsible coal-mining company plans to develop the region," which the carrier estimated contains 67,000,000 tons of high-grade high-volatile coal.

Scranton Mine Fire Now Out

A mine fire in the Von Storch colliery of the Penn Anthracite Mining Co., at Scranton, Pa., was officially pronounced out on March 2 after a battle lasting four months. P. H. Dever, in charge of the fire-fighting program, said the burned area would be reventilated in order to permit the workings to cool.

Trade Literature

Automatic Mine-Car Couplers—Ohio Brass Co., Mansfield, Ohio (Bulletin No. 646-AM, 12 pp., illustrated). Gives operating and technical description of the O-B automatic mine and industrial car coupler. Illustrations show design and construction of unit, types of anchorage construction and operating views.

Air Circuit Breakers—General Electric Co., Schenectady, N. Y. (Bulletin GEA-2450A, 12 pp., illustrated). Describes uses and advantages of Type AE-1 air circuit breakers for protecting low-voltage electric circuits in central-station, industrial and building-equipment service; includes numerous diagrams.

Auxiliary Ventilation—E. I. duPont de Nemours & Co., Inc., Fairfield, Conn. (40 pp., illustrated). Describes the "Ventube" system of auxiliary ventilation for coal mines, tunnel construction and metal mines, telling what Ventube is, what it does, and how it does it.

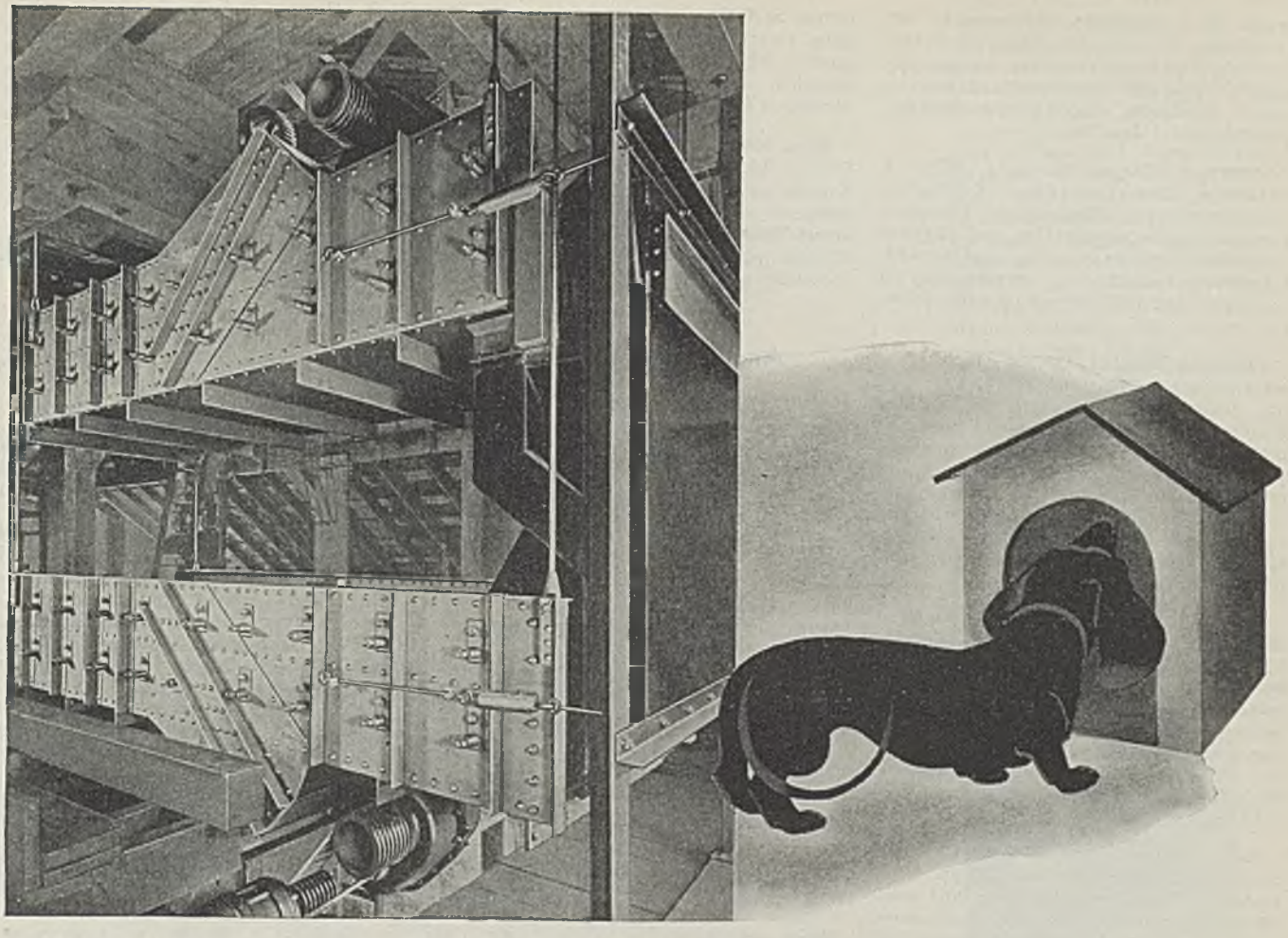
Crawler Hoist—Harnischfeger Corporation, Milwaukee, Wis. (Bulletin X-39, illustrated). Describes in detail the features of the P&H multi-service crawler hoist, explaining its uses in the construction and maintenance fields. Job photos and line drawings are included, as well as condensed specifications.

Frame Heads With Labyrinth Grease Seals—General Electric Co., Schenectady, N. Y. (1-p. bulletin). Describes and pictures unit on G-E locomotive motors designed to prevent escape of lubricant and exclude dirt and other abrasives.

Insulation—Okonite Co., Passaic, N. J. This company's new book, entitled "Okonite Insulation," not only describes how Okonite rubber insulation is made but also gives tables on resistance, thicknesses, diameters and installation data pertinent to rubber-insulated cables for service up to 5,000 volts.

Metal Hose and Couplings—Packless Metal Products Corporation, Long Island City, N. Y. (Bulletin No. 100, 26 pp., illustrated). Descriptive matter and specification data sheets covering Packless seamless flexible metal hose, detachable self-sealing couplings, vibration absorbers for pipe and copper tube lines, combination tube and hose coupling, and flex-control self-draining hose.

Motor Selection and Maintenance—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Booklet B. 2130, 12 pp., illustrated). Arranged particularly for the non-technical or the plant-maintenance man, this pamphlet describes and illus-



WHERE HEAD ROOM COUNTS YOU NEED LOW-HEAD SCREENS

The new Allis-Chalmers Low-Head Horizontal Vibrating Screens give you greater screen area in less space . . . greater tonnage of accurate size product at lower cost than older, slower moving type of screens.

Low-Head Screens, as the name suggests, take very little head room. They operate in a horizontal plane and can be installed one right under another as illustrated. This often saves expensive remodeling to obtain greater screen capacity.

Low-Head Screens are built with single, double or triple decks from 3′x6′ to 6′x14′ or larger. They are described in Coal Screen Bulletin 1476-A. Write for your copy. Or better still, let an Allis-Chalmers Engineer show you how these screens can save you money and produce cleaner coal.

CRUSHING · CEMENT AND MINING DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

trates the requirements that must be met in selecting a motor. Maintenance section discusses hints on preventive maintenance such as planned inspection and maintenance, insulation cleaning and checking, locating power loss, etc.

PARKWAY CABLE—Anaconda Wire & Cable Co., New York City (Publication No. C-40, 16 pp., illustrated). Discusses the construction, application, and physical properties of parkway cable, together with information relating to current-carrying capacities and instructions on cable jointing.

PRESSURE-TREATED TIMBER—Wood Preserving Corporation, Pittsburgh, Pa. (20 pp., illustrated). Sets forth the need for treating timber and the kinds of preservatives employed, and discusses pressure processes, preparation of timber before treatment, its economy and uses in coal mines, industrial plants, for wharves, bridges and other under-water construction, as well as railroad and residential utilization.

ROAD MACHINERY—Austin-Western Road Machinery Co., Aurora, Ill. (Catalog 1706, 24 pp., illustrated). Pictures and describes outstanding features and uses of motor graders, road graders, hydraulic scrapers, tractor scrapers, rippers, elevating graders, power shovels, rollers, crushing and washing plants, sweepers, bituminous distributors, dump cars and trail cars.

ROCK DRILLS—Ingersoll-Rand Co., New York City (Catalog No. 4201, 80 pp., illustrated). Describes rock drills and associated equipment, including jackhamers, paving breakers, drifters, stopehamers, wagon drills, jackbits, drill steel, sharpeners, furnaces and blacksmith equipment.

SHOE-TYPE THRUSTOR BRAKES—General Electric Co., Schenectady, N. Y. (4-pp. folder). Sets forth distinctive features, description and dimensions of CR9516 units for alternating-current motors.

SYNTHETIC RUBBER PRODUCTS—E. I. DuPont de Nemours & Co., Wilmington, Del. (4 pp., illustrated). The *Neoprene Notebook* (Vol. 1, No. 1), launched in January, is a monthly publication planned to provide engineering information, laboratory data, and application reports on neoprene.

TWO-STAGE CENTRIFUGAL PUMPING UNIT—Fairbanks, Morse & Co., Chicago (Bulletin 5592, 6 pp., illustrated). Describes characteristics, features, sizes and dimensions of Figure 5592 two-stage built-together pumps for various applications.

VARIABLE SPEED REDUCERS—Stephens-Adamson Mfg. Co., Aurora, Ill. (Catalog 68, illustrated). Presents descriptions with phantom and detail views, of the J.F.S. unit. Four types are described, including motorized and differential units.

WIRE ROPE—American Cable Division, American Chain & Cable Co., Inc., Wilkes-Barre, Pa. (32 pp., illustrated). Bearing the title "Greater Dollar Value," tells how to save time when installing new lines; how the preforming process delivers a rope that is pre-broken-in; and gives informative data on how to overcome or minimize such rope-life-destroying elements as fatigue, uneven spooling, whipping, reverse bending, twisting in sheave grooves, kinking, porcupining, jerking and abrasion. It gives specific constructive information to individual industries.

WIRE ROPE—Broderick & Bascom Rope Co., St. Louis, Mo. (56 pp., illustrated). Known as the Riggers' Handbook, this brochure contains extensive information about Yellow Strand wire-rope slings and fittings, with directions for splicing and socketing wire rope.

Amending the Record

In describing the gravity-type rotary dumps at the D. O. Clark slope of the Union Pacific Coal Co. on p. 52 of the February, 1938, *Coal Age* this equipment should have been credited to the C. S. Card Iron Works Co., which, with these two working, will have seven of these drums in operation at Union Pacific mines.

Lincoln Award Board Named

A board of awards to have charge of selecting the recipient of the Lincoln gold medal for 1938 has been appointed by the executive committee of the American Welding Society. The board consists of H. L. Whittemore (chairman), G. T. Horton and A. G. Oehler. The medal, of which J. F. Lincoln, president, Lincoln Electric Co., Cleveland, Ohio, is the donor, is offered to encourage the presentation before the American Welding Society of papers which are effective in promoting the use of welding (*Coal Age*, September, 1937, p. 36).

Coal-Mine Fatality Rate Shows Slight Change

Accidents at coal mines of the United States caused the deaths of 80 bituminous and 24 anthracite miners in January last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production totaling 30,173,000 tons, the death rate among bituminous miners was 2.65 per million tons, compared with 2.87 in the preceding month and 2.66 in January, 1937.

The anthracite fatality rate in January last was 5.01, based on an output of 4,790,000 tons, as against 4.42 in the preceding month and 4.72 in January, 1937.

For the two industries combined, the death rate in January last was 2.97, compared with 2.93 in the preceding month and 2.27 in January, 1937.

Fatalities during January last, by causes and States, as well as comparative rates for January 1937 and 1938, are given in the accompanying tables.

FATILITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES*

January 1937 and 1938

	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
Causes	1937	1938	1937	1938	1937	1938	1937	1938	1937	1938	1937	1938
Falls of roof and coal	58	45	1.417	1.492	13	16	3.230	3.340	71	61	1.579	1.744
Haulage	19	14	.464	.464	3	1	.746	.209	22	15	.489	.429
Gas or dust explosions:												
Local explosions	1	2	.024	.066	..	..	....	....	1	2	.022	.057
Major explosions	..	10	....	.332	..	..	....	....	..	10	....	.286
Explosives	2	..	.049	....	1	1	.248	.209	3	1	.067	.029
Electricity	4	2	.098	.066	..	..	....	....	4	2	.089	.057
Machinery	3	3	.073	.099	..	..	....	....	3	3	.067	.086
Shaft	5	1	.122	.033	..	..	....	....	5	1	.111	.029
Miscellaneous	3	1	.073	.033	1	..	.248	....	4	1	.089	.029
Stripping or open-cut	2	..	.049	....	..	5	....	1.043	2	5	.045	.143
Surface	12	2	.293	.066	1	1	.248	.209	13	3	.289	.086
Grand total	109	80	2.662	2.651	19	24	4.720	5.010	128	104	2.847	2.975

* All figures subject to revision.

COAL-MINE FATALITIES IN JANUARY, 1938, BY CAUSES AND STATES

	Underground								Shaft		Open-cut and surface		
State	Falls of roof	Falls of face	Haulage	Gas or dust explosions	Electricity	Mining machines	Other causes	Total underground	Objects falling down shafts	Mine cars	Machinery	Other causes	Total surface	Grand total
Alabama	1	..	2	..	..	..	..	3	..	..	..	..	..	3
Alaska	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arkansas	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Colorado	2	..	..	..	..	..	..	2	..	..	..	..	..	2
Illinois	7	..	1	2	..	..	..	10	..	..	1	..	1	11
Indiana	1	..	1	..	..	..	..	2	..	..	..	..	..	2
Iowa	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kansas	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kentucky	8	..	..	..	..	..	..	8	..	..	..	..	..	8
Maryland	1	..	..	..	..	..	..	1	..	..	..	..	..	1
Michigan	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Missouri	1	..	..	..	..	..	..	1	..	..	..	..	..	1
Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..
North Dakota	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ohio	2	..	1	..	..	..	..	3	..	..	..	..	..	3
Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pennsylvania (bituminous)	7	..	3	10	..	..	1	21	1	..	..	1	1	23
Tennessee	..	..	..	..	1	..	..	1	..	..	..	..	..	1
Texas	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Utah	..	..	..	..	..	1	..	1	..	..	..	..	..	1
Virginia	..	2	..	..	..	..	..	2	..	..	..	..	..	2
Washington	1	..	..	..	..	..	..	1	..	..	..	..	..	1
West Virginia	11	1	6	..	1	2	..	21	..	..	..	..	..	21
Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total (bituminous)	42	3	14	12	2	3	1	77	1	..	1	1	2	80
Pennsylvania (anthracite)	15	1	1	..	..	..	..	18	..	1	..	5	6	24
Total	57	4	15	12	2	3	1	95	1	1	1	6	8	104

WHAT'S NEW

In Coal-Mining Equipment

ELECTRIC TOOLS

Black & Decker Mfg. Co., Towson, Md., offers a "completely new 7-in. portable electric saw" making a cut with a maximum depth of 2⅜ in. and handling all popular lumber sizes. Depth of cut is adjustable. The saw table may be adjusted for angle and bevel cutting and locked at any angle from 0 to 45 deg. A detachable adjustable rip fence accurately measures and guides rip cutting up to 6 in. in width.

A "sight" notch is provided at the front of the saw table. Various types of blades and abrasive disks are available to adapt this tool to rip sawing, cross cutting, metal cutting and slotting marble, asbestos, Transite, tile and porcelain.

Black & Decker also offers a new ¼-in. low-speed ball-bearing electric drill for use on stainless steel, Monel and other very hard metals. Steel capacity is ¼ in.; hardwood, ½ in. Net weight is 6½ lb. and the over-all length is 13 in. The lower speed, according to the company, best suits the metals, for which the drill is designed, and reduces bit burning.

Black & Decker also offers the "Utility Power-Drill Line" of ⅝-, ¾- and ⅞-in. drills designed for heavy-duty service. Features cited by the company are: power for any drilling job met and a spindle speed adapted to utility service, such as drilling with carbon bits, driving wood augers, cutting with hole saws, powering cylinder hones and grinders, drilling in hard alloy metals and performing heavy-duty and precision work in a bench-drill stand.

The portable "Lectro-Shear" in 18- and 16-gage sizes is another Black & Decker product which can cut on a radius as small as ¾ in. As compared with rated capacity in steel, galvanized iron, Monel metal and stainless steel, the tool will cut at least 50 per cent faster, according to the company, in copper, tin, aluminum, lead and other non-ferrous metals.

ANTI-FREEZE

Supplementing "Tanner Gas," Sullivan Machinery Co., Michigan City, Ind., offers an additional and improved system of air-line and air-tool freeze preventive bearing the name "Frosto." This product, according to the company, has been developed particularly for industrial applications and wherever electric current is available. Current consumption, controlled by a thermostat, is low, and only about 1 qt. of "Frosto" is required to treat 100,000 cu.ft. of air under the worst conditions of temperature and humidity, it is stated.

ELECTRODE HOLDER

Remarkably light weight for the capacity is the principal claim made for the new "Type ST" arc-welding electrode holder anounced by the Lincoln Electric Co., Cleveland, Ohio. Weight of the holder is 14 oz.; continuous current capacity is 250 amp. An important feature of the holder, it is stated, is an extremely simple type of positive connection which eliminates loose contacts, a more or less common cause of over heating of holders. Other advantages listed by the company include: reduced over-all width to facilitate use in tight places; rounded corners at important points to lessen the likelihood of holder contact and consequent arcing; heavier copper jaws; jaw grooving for vertical and overhead as well as flat welding; correctly proportioned hollow fiber handle; and a fully insulated thumb lever with non-groundable spring. The "Type ST" holder will accommodate any size of electrode up to and including ¼ in.

WELDING HOSE

The highest safety feature available in a welding hose is claimed for the Style HD type developed by the Goodyear Tire & Rubber Co., Akron, Ohio. This hose combines fire-resisting compounds with fabric and asbestos insulation, and construction is said to be such that spontaneous explosion is minimized to the utmost. It will resist the action of molten metal or accidental exposure to the torch flame long enough for the operator to get to a place of safety. Other features include a non-kinking carcass that will not flatten permanently even under severe impacts and a high-quality tube that does not flake off and clog the torch.

FIBER LAGGINGS

Rockwood Mfg. Co., Indianapolis, Ind., offers a new line of fiber laggings for increasing the diameter of pulleys and flywheels. Increasing driven-pulley diameter, says the company, permits increasing the size of the motor pulley, with the result that belt speed is higher, the belt need not be operated so tightly and life is increased. Higher belt speed also increases the capacity of the driven machine, and the company points out that in comparison with cast iron the fiber surface will transmit at least 50 per cent more power and often increase the output of driven machines 10 per cent or more. Laggings are supplied in any width for rims up to 72 in. in diameter. They are applied with a very simple clamp, it is said. The laggings also are offered for use in place of pulley coverings where an increase in diameter of 3 to 5 in. is not objectionable.

BIT PUNCH

Ingersoll-Rand Co., Phillipsburg, N. J., offers the new Model 45SP shank-and-bit punch, stated to be the fastest and most powerful of all of the company's punches. It handles bits and shanks on all commercial sizes and sections of drill steel. Features include: punch lever which returns to neutral position automatically when released; safety guard on the hammer-cylinder assembly backhead; easily removed bracket cap, making it unnecessary to take the punch apart for inspection; feed piston in line with the hammer and punch pin, reducing pin breakage; and a strong one-piece steel bracket making the punch adaptable to I-R Models 4, 5, 40, 50 and 54 sharpeners.

BEARINGS

Norma-Hoffmann Bearings Corporation, Stamford, Conn., offer two new types of "Precision bearings—"WIR Series" ball bearings and "WIR-L Series" roller bearings. The feature of these bearings, according to the company, is the use of a wide inner ring of double-row-bearing width in combination with an outer ring of single-row width. The bearings have been designed primarily for opposed mounting in electric motors and similar equipment, with the wide in-

ner ring insuring better sealing on the shaft and in many cases avoiding threading of the shaft and the use of locknuts or other locking devices. WIR bearings are available in the medium-metric series, 25 to 55 mm. WIR-L cylindrical roller bearings with one-lipped outer ring also are available in the medium-metric series, 30- to 130-mm. bore.

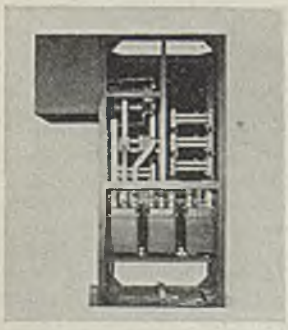
SAFETY HAT

E. D. Bullard Co., San Francisco, Calif., offers the new "Hard-Boiled Tuff-Nut" safety hats and caps, which it states have been approved by the Coal Mining Section of the Pennsylvania Compensation Rating and Inspection Bureau. Seven features are claimed by the company: ventilation all around the crown; non-brittle moisture-proof crown; crown sizes each fitting three different sizes of sweatbands, thus reducing crown stocks for complete size

coverage; snap-in, snap-out sweatband, eliminating lacing; and exceptionally light weight with maximum head protection.

CONTROLS

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offers a new medium of motor control through the use of a three-breaker combination containing forward, reverse and braking oil-circuit breakers.



Each breaker is electrically operated with an independent solenoid mechanism. Forward and reverse breakers are arranged to close their contacts when the solenoid is energized, while the braking-breaker contacts are opened. Brake contacts are spring closed when the mechanism is tripped by means of a mechanical cross trip from either one of the other two breakers. All three breakers are mechanically and electrically interlocked and have a rupturing capacity of 25,000 kva. at 7,500 volts and 600 amp. Both potential-trip coils and undervoltage-release tripping devices are used to assure positive tripping under all conditions.

Type HD pushbuttons for heavy-duty service in both a.c. and d.c. control circuits where

dependability is essential are another Westinghouse offering. Eight different units are available, including lamp-receptacle and rotary-selector switches, which may be grouped together in desired combinations to meet practically all application requirements. Interchangeable mounting is provided, and the units are suitable for either built-in control or panel applications. Each unit is entirely self-contained and requires no additional insulation when mounted, it is stated. Stations of one to seven units are offered.

For transfer cars, scale cars and all locomotive-type materials-handling cars, Westinghouse has developed a control providing automatic "step-by-step" acceleration with current-limit "plugging." Control is accomplished by a simple single-handle master controller which may be moved to either side of the "off" position to correspond to the direction of motion desired. The master controller operates switches which are in turn controlled by a limit relay. Advantages are listed by the company as follows: rate of acceleration depends upon load; motors and mechanical equipment are relieved of excess strains; currents drawn by the motors are limited, and motors can be plugged with safety; car operation is rendered more flexible; and the equipment is adaptable to operation from a remote control station.

HYDRAULIC PRESS

A new portable hydraulic press that can be used either as a puller, press or jack is announced by the Bucyrus-Erie Co., South Milwaukee, Wis. This "BECO" press, acording to the company, is made expressly for use on heavy machinery, including shovels, and also can be used as a jack with a capacity of up to 150 tons in addition to pressing and pulling. As a jack, the compact press cylinder, or ram, is used to lift and can be set up in any position, it is stated. The unit includes a frame for press work, 310 lb.; 4-speed pump, 75 lb.; press cylinder, or ram, 75 lb., with a capacity of 150 tons; four alloy-steel frame rods; a back plate; and high-pressure hose and valve connections. Special auxiliary equipment is available for special work.

EXCAVATOR

Bucyrus-Erie Co., South Milwaukee, Wis., offers the new "Speedlined" 29-B 1-cu.yd. power excavator which is convertible to dragline, clamshell, crane or dragshovel operation. The machine is equipped with the new speed-type, cast-V-front welded dipper, said to be light, strong, easy-filling and quick-dumping. Gasoline, electric or diesel power is available.

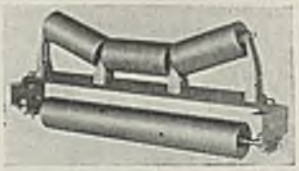
MINE COMPRESSOR

Acme Compressor Co., Williamson, W. Va., offers the Acme "Lowboy" mine-car compressor, which it describes as the lightest, lowest, most compact unit ever built. The unit is an adaptation of the Schramm "Fordair" compressor built from the latest Ford V-8 engine block, to which have been applied such modern accessories as mechanically operated intake valves and a specially designed compressor head for the discharge of air from the cylinders. The compression unit is provided with a compact radiator cooling system, and the car is fitted with two stub axles at one end and a pivoted axle at the other to take care of track irregularities.

Specifications include: air delivery at 100 lb. per square inch, 92 c.f.m.; motor, General Electric Type CD compound-wound; operating speed, 1,140 r.p.m.; over-all length, 110 in.; over-all height, 27 in.; rail clearance, 2½ in.; wheel diameter, 12 in.; wheelbase, 42 in.; weight, with motor, 3,370 lb.; track gages, 42, 44 and 48 in.

BELT IDLER

Jeffrey Mfg. Co., Columbus, Ohio, announces a new belt idler which it describes as an inexpensive unit for carrying moderate loads of semi- and non-abrasive materials. This idler is of the conventional 3-pulley 20-deg.-troughing type made for 14-, 16-, 18-, 20-, 24-, 30- and 36-in. belts. Commercial-type ball bearings are employed with a cork seal within a pressed-steel labyrinth dust



cap. Pulleys are made of 4-in.-diameter welded-steel pipe with formed-steel gudgeons welded into the ends. Gudgeons are connected within the pulley by steel tubing which prevents the loss of grease into the pulley proper. Shafts are §-in. seamless tubing and are held by setscrews within machine-bored holes in the stands. As these shafts are hollow, the entire idler may be lubricated from either end through pressure fittings. Base angles are inverted to shed material.

VACUUM CLEANER

United States Hoffman Machinery Co., Air Appliances Division, New York City, offers what it terms a "radically new type of portable vacuum cleaning unit," bearing the designation "Hoffco No. 5 Super-Duty Portable." It is described as a completely equipped super-duty cleaner designed to remove large accumulations of dust economically. The dust collector is said to have a storage capacity of 3½ to 4 times that of the average portable cleaner and is mounted on a separate set of wheels. Another feature is carrying space on the unit for the hose and all of the cleaning tools and accessories. The unit has capacity to operate two lines of 1½-in. hose of different lengths simultaneously, or one line of 2-in. hose.