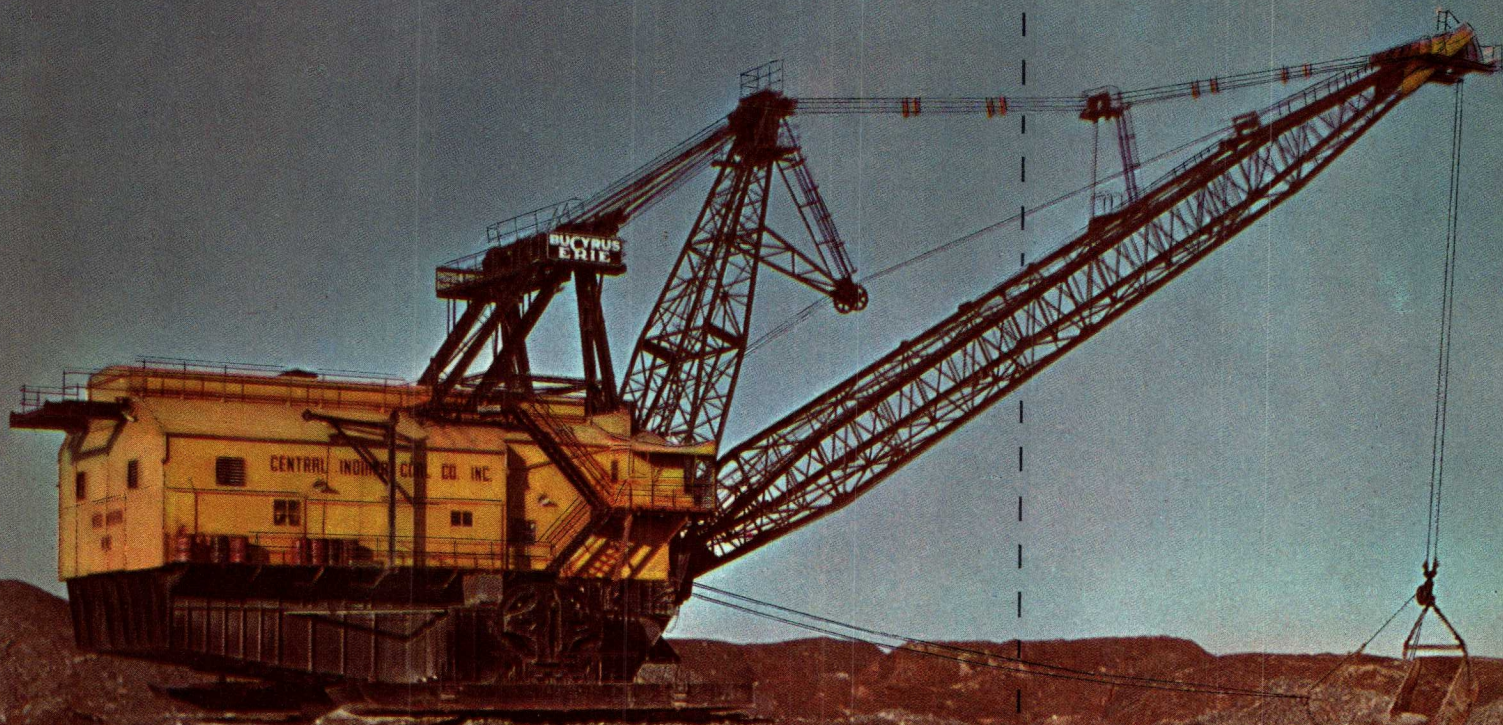


# BUCYRUS-ERIE



## STRIPPING SHOVELS and DRAGLINES

**BUCYRUS  
ERIE**

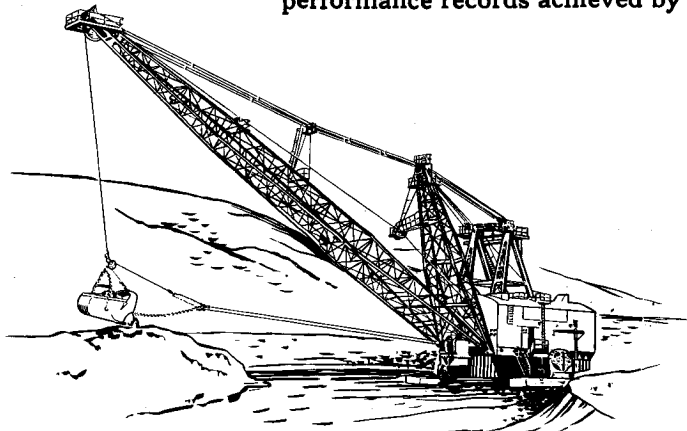
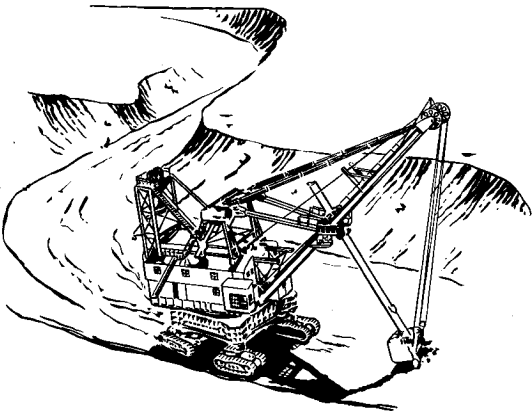
BULLETIN NO. STR-1



# LEADERSHIP

**T**HROUGHOUT its history the entire resources of Bucyrus-Erie Company have been devoted to the design and production of machines combining maximum long-time performance with minimum maintenance costs. This aim has been furthered by receptiveness to new ideas of merit and backed by facilities unmatched in their field for engineering design and manufacture.

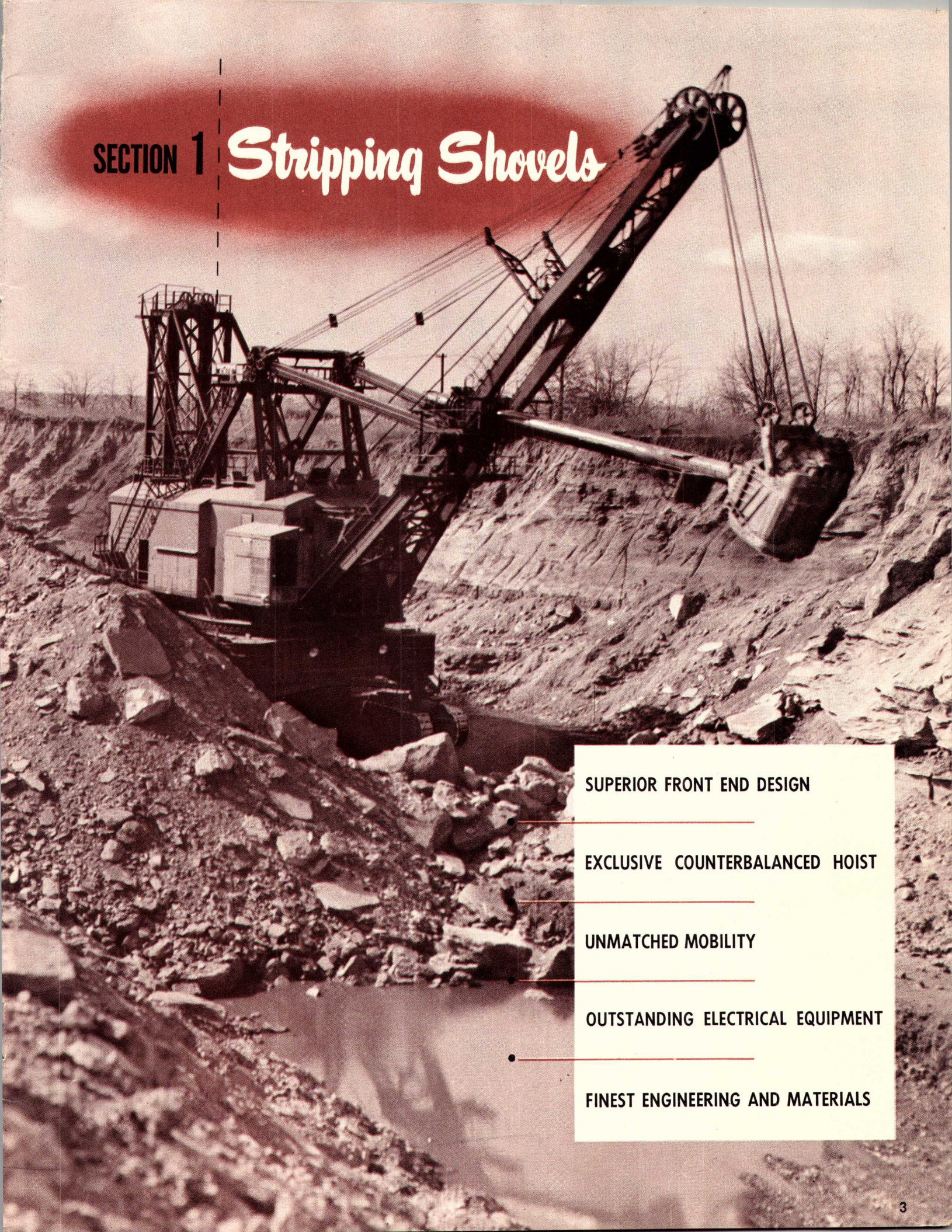
This book presents the unique features of our line of large stripping excavators and indicates the reasons for the consistently enviable performance records achieved by these machines.





**SECTION 1**

# Stripping Shovels



**SUPERIOR FRONT END DESIGN**

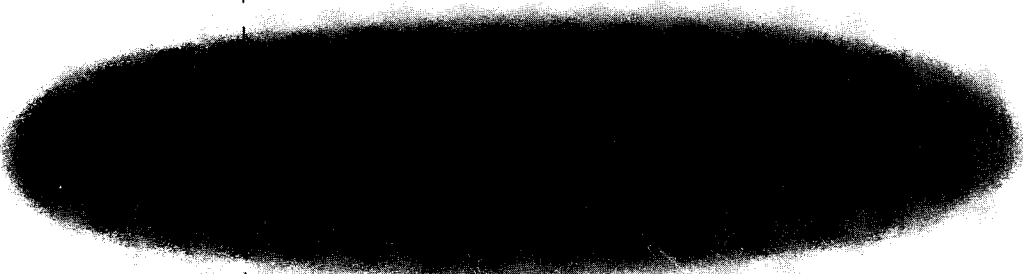
**EXCLUSIVE COUNTERBALANCED HOIST**

**UNMATCHED MOBILITY**

**OUTSTANDING ELECTRICAL EQUIPMENT**

**FINEST ENGINEERING AND MATERIALS**





Foley Brothers 1050-B shovel displays the unique Bucyrus-Erie front end design that provides strength without excess weight for outstanding performance records.

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## • TWIN HOIST

The twin dual hoist lines, leading directly from the drum to the sides of the bail, hoist the dipper through the bank with steady positive action. Dipper stability is provided by a wide-spread connection of the hoist lines to the dipper bail; these lines pass through equalizing sheaves located at each outside corner of the bail.

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## • UNIQUE TWO-SECTION BOOM

The unique two-section boom provides the great strength needed to withstand operating stresses, yet has the lightness required for fast cycles. The rugged lower section transmits directly to the revolving frame and A-frame the torsional loads, shock loads, and vibrations set up in digging and swinging. The principal loading on the relatively light upper boom section results only from the pull of the hoist ropes.

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## • TUBULAR HANDLE

The tubular dipper handle is noted for ruggedness, durability and simplicity. It is much lighter than an equivalent two-member handle, yet equally strong. Its ability to rotate in the saddle block permits digging with one corner of the dipper without introducing torsional strains. The saddle block provides a long bearing for the handle, and its spring-loaded bearing saddles at each end cushion the side loads resulting from swinging.

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## • POWERFUL EFFECTIVE ROPE CROWD

A simple quiet rope-crowd minimizes maintenance and provides powerful action under positive control. The conventional boom crowd machinery and racking are eliminated. The front end is lightened further because the crowd machinery is located on the main deck. A slipping disc clutch and a rubber cushion are important crowd machinery features. They cushion the impact blows which occur during crowding in almost every cycle, effectively absorbing them and preventing them from becoming dangerous.

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## • DIPPERS

Bucyrus-Erie stripping dippers are justly famous for their fast digging and filling qualities. Light weight and ample strength result from designs based on many years of experience in the use of alloy steel structural materials and castings. Each field application has demonstrated the ability of these long-life dippers to produce maximum output with minimum cost of repairs.





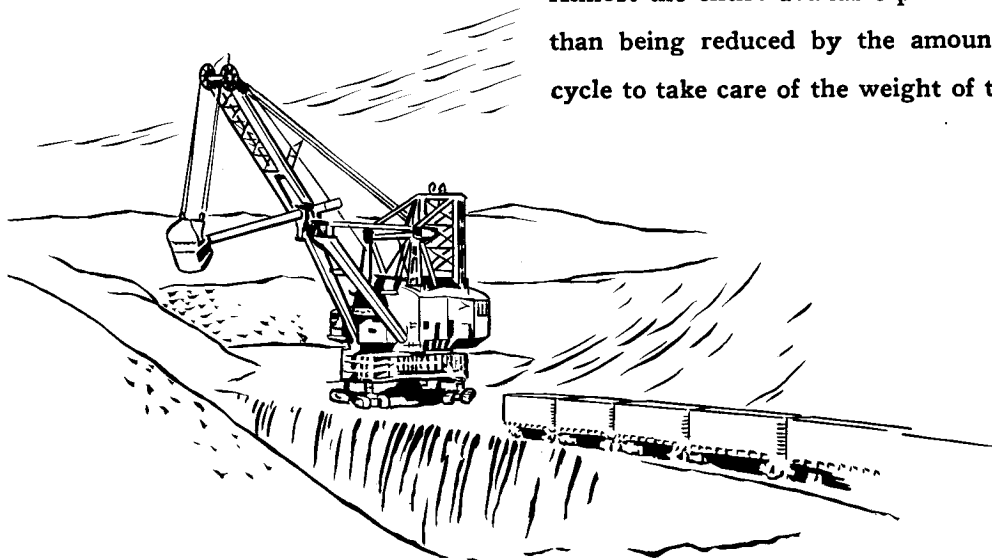


## **. PUTS COUNTERWEIGHT TO WORK**

One of the outstanding features of Bucyrus-Erie stripping shovels is the Bucyrus-Erie exclusive counterbalanced hoist. Counterweight, which on conventional shovels is dead load and consumes power for no profit, is put to work on these machines to cut operating costs. Electric power peaks are reduced, energy consumption per cubic yard is lowered, smaller electrical equipment is used than would be possible without the counterbalance, and these smaller motors operate with less fly-wheel effect.

Fast operating cycles are combined with smoothness and accuracy of dipper control. Rapid acceleration and deceleration of the dipper are available when required.

The dipper and counterweight hoist lines are reeved on the same hoist drum, but in opposite directions. Lowering the dipper raises the counterweight; hoisting the dipper lowers the counterweight. Almost the entire available power is used to fill the dipper, rather than being reduced by the amount needed and wasted on each cycle to take care of the weight of the dipper and handle.

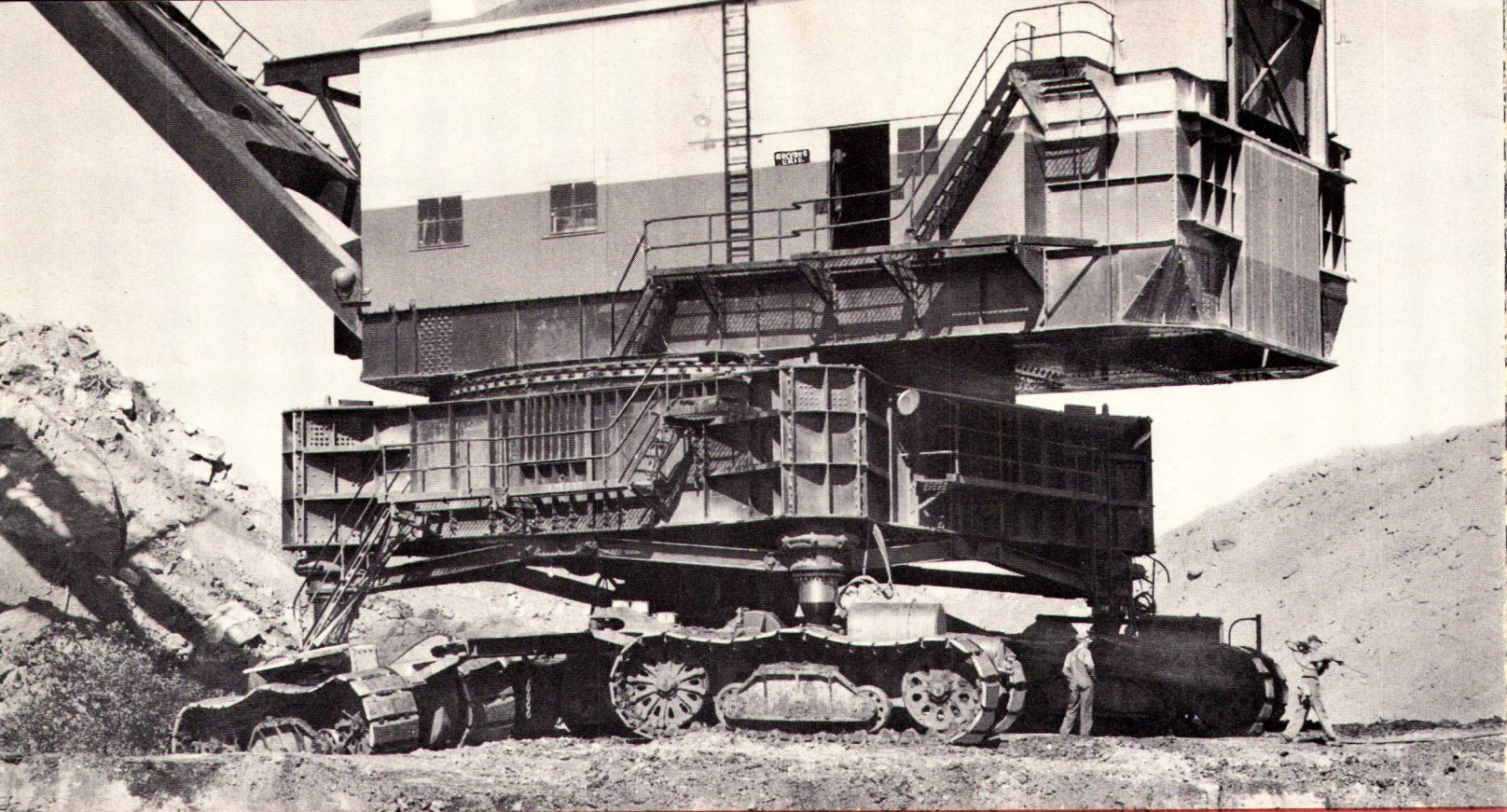


Homestead Coal Company's 1050-B starts a new cut in this Kentucky coal stripping operation. Bucyrus-Erie's exclusive counterbalanced hoist contributes to a fast, smooth operating cycle, cuts operating costs for greater economy.



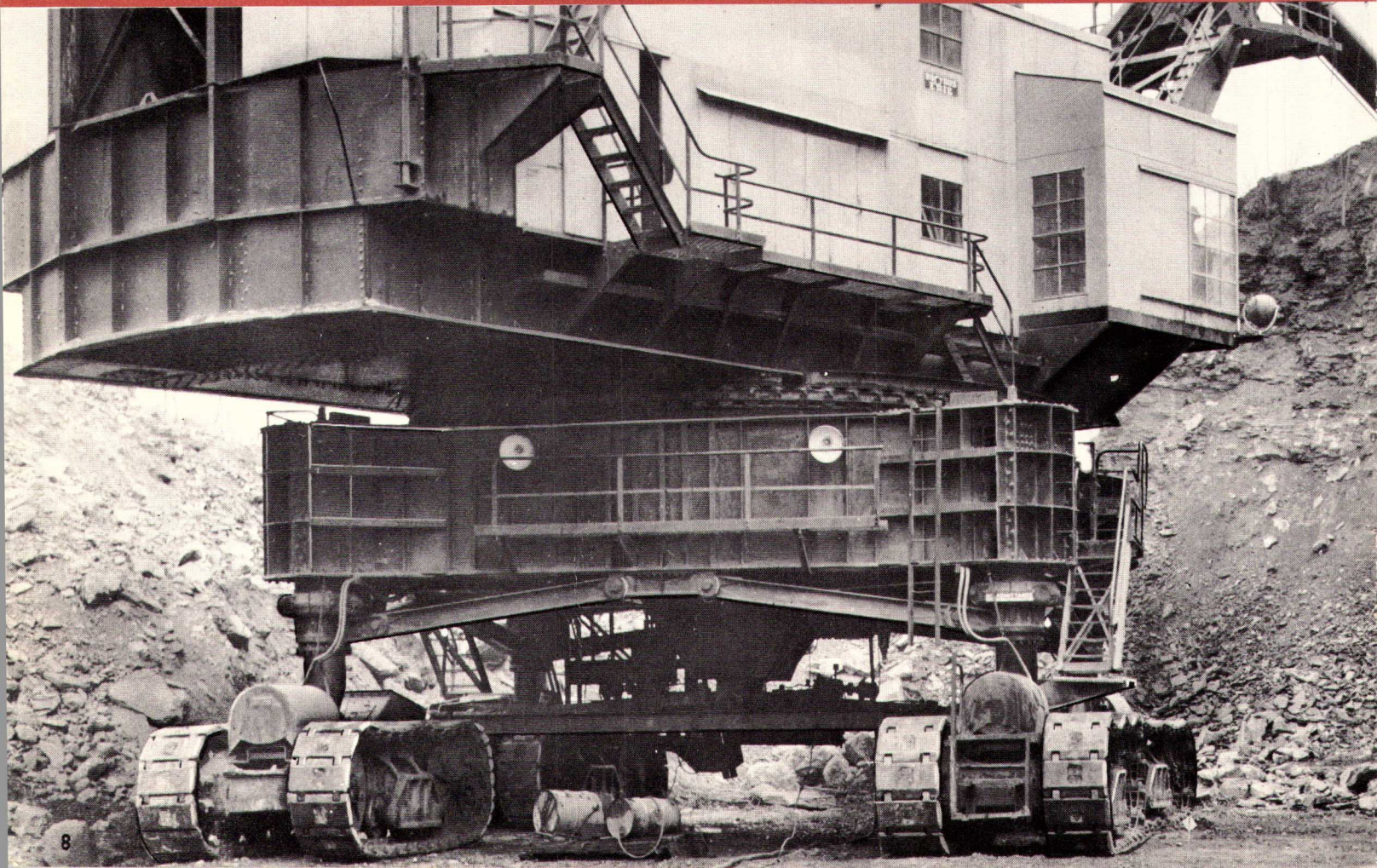






Hydraulic jacks, one at each corner of the base, controlled automatically by Mercury switches, keep the 1050-B shovel working on an even keel without loss of time.

Individual motor drive for each caterpillar unit increases ease of mobility, permits the 550-8 stripping shovel to propel while swinging.





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## • **INDIVIDUAL MOTOR DRIVE**

Bucyrus-Erie stripping shovels can propel while swinging, lose no time moving up. A simple efficient mounting provides quick easy mobility. Independent electrically-powered caterpillar mountings, one under each corner of the base, provide the moving means and power. Each of these four caterpillar units is driven by a specially insulated fully-enclosed AC motor.

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## • **HYDRAULIC STEERING**

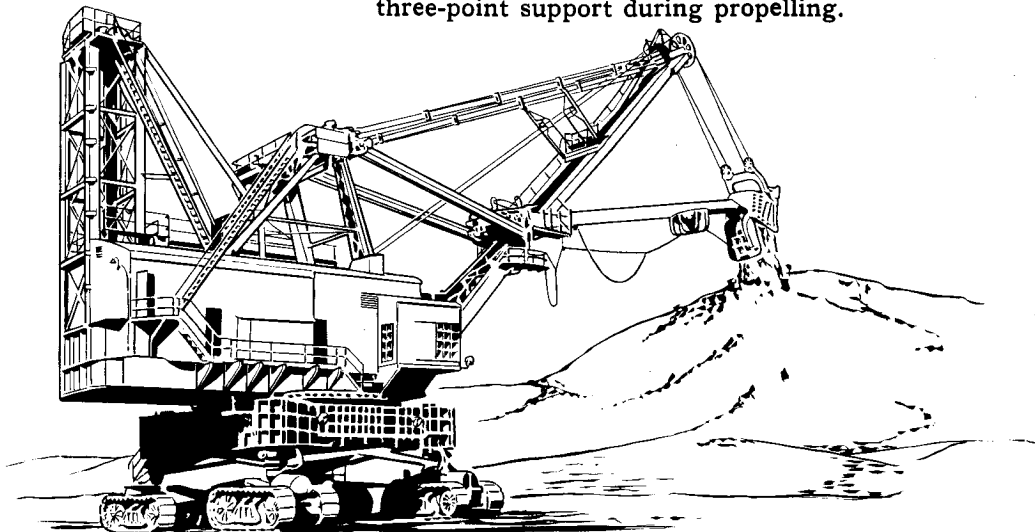
Steering is achieved by slewing the caterpillar units to the desired angle through the action of two double-acting hydraulic cylinders. Each of the two cylinders is connected to a steering arm of the forward or rear caterpillar units. These units are connected in pairs so that the forward and rear sets can be slewed in the same or opposite directions to permit traveling obliquely or in a curve.

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## • **AUTOMATIC LEVELING AND EQUALIZING**

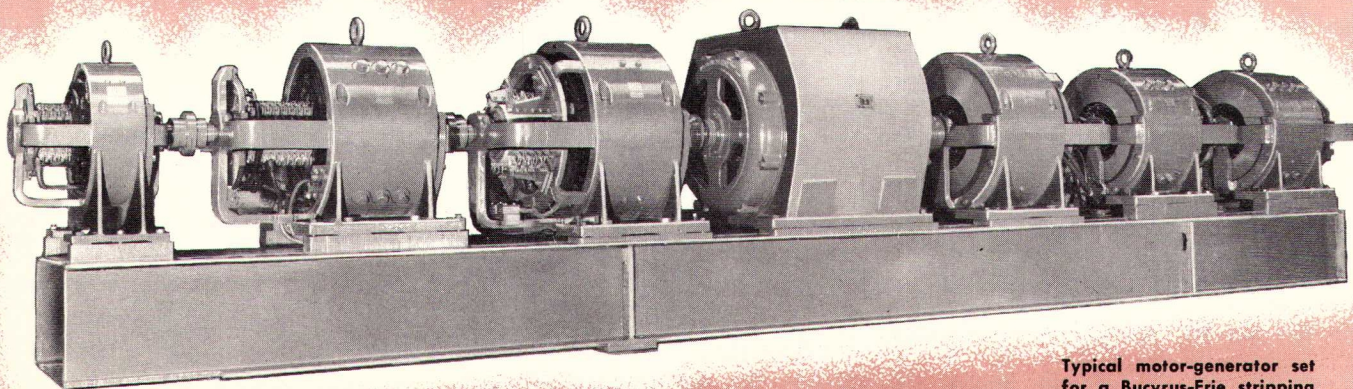
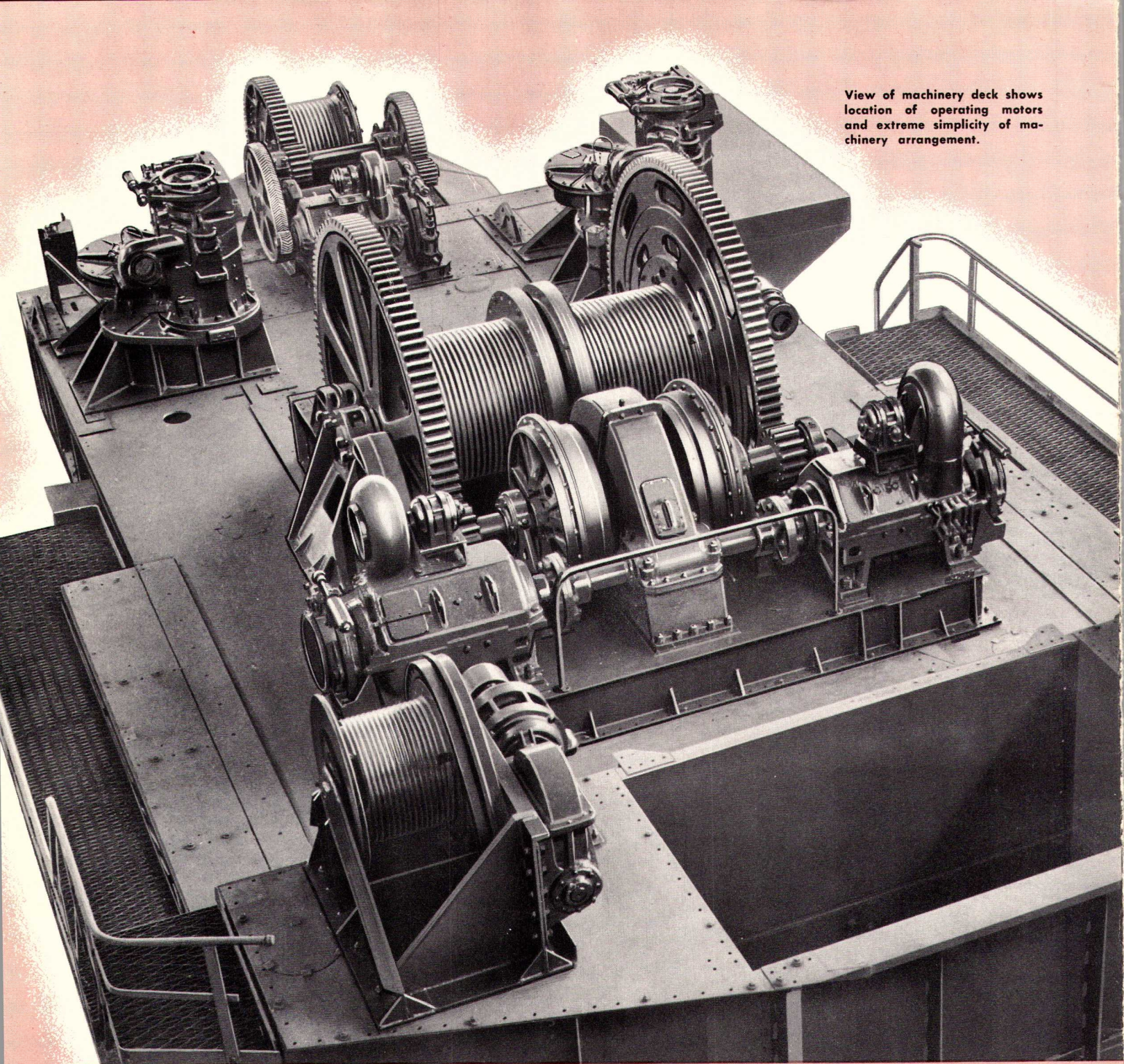
An ingenious automatic arrangement accomplishes leveling through the operation of mercury switches controlling hydraulic jacks located at each of the four corners of the base. For flexibility these jacks have ball and socket joints top and bottom. With the leveling device the necessity for swinging uphill is minimized, and maintenance on circle rails and base is reduced.

An equalizing feature in the hydraulic leveling system provides three-point support during propelling.





View of machinery deck shows location of operating motors and extreme simplicity of machinery arrangement.



Typical motor-generator set for a Bucyrus-Erie stripping shovel.



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## • POWERFUL MOTORS

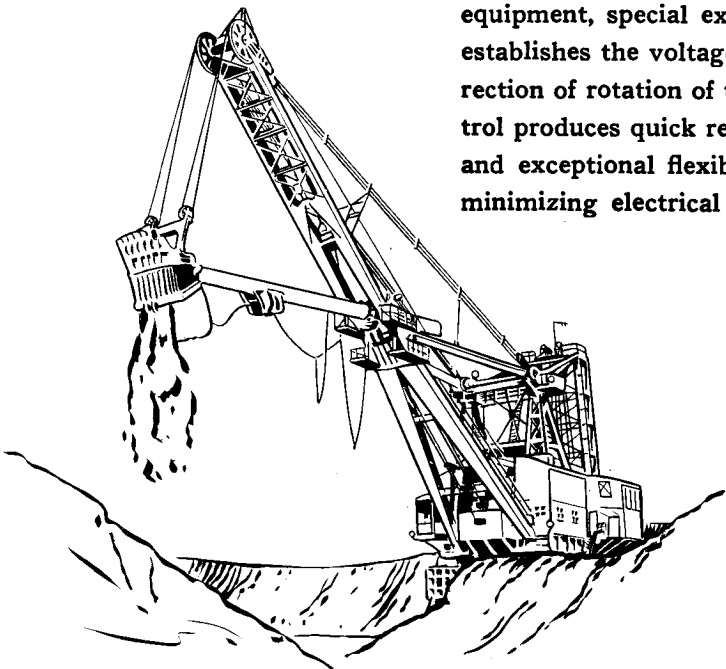
Rugged mill-type motors specially selected for excavator service are used exclusively in Bucyrus-Erie stripping shovels. Because of the low  $WR^2$  of the armatures, these motors produce rapid acceleration and deceleration. Powered by generators with Ward-Leonard rotating control, they have high torque values at slow speeds and high speeds at low torque. Hoist, swing, and crowd motors are of the power regenerative type, providing complete control of motion without operating brakes or clutches.

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## • WARD-LEONARD ROTATING CONTROL

This control, applied by Bucyrus-Erie with outstanding success, gives the operator of Bucyrus-Erie stripping shovels smooth efficient command over all digging operations. Average operating speed is high, yet power consumption per cubic yard is low. The operator can choose a range of speeds to accomplish the particular job to be done. Power adjustment remains stable, too—the effect of change in operating temperatures of electrical equipment is reduced to a minimum.

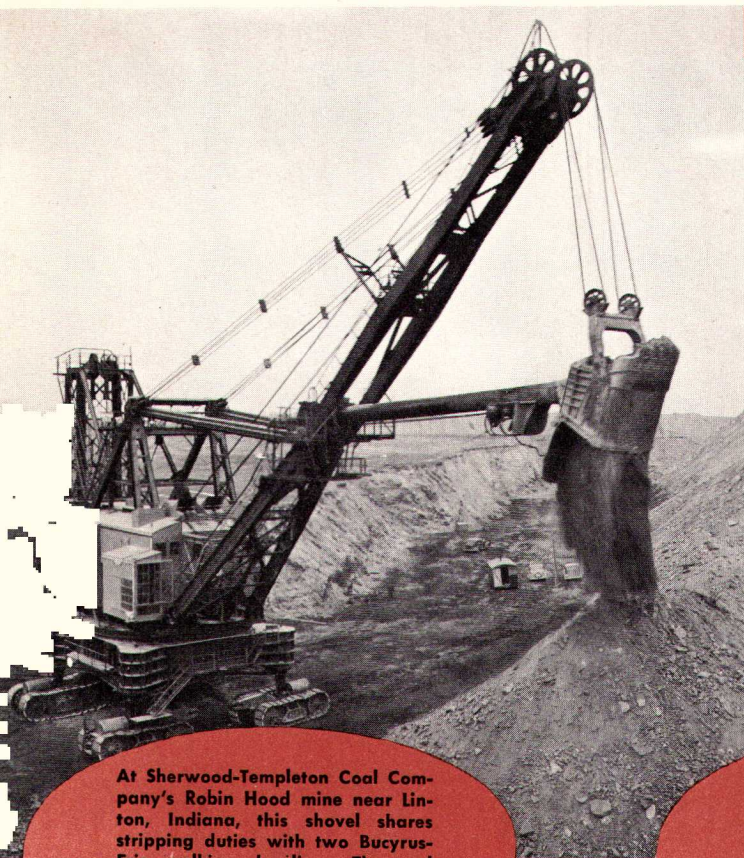
An improved form of Ward-Leonard rotating control for the DC generators is offered on Bucyrus-Erie stripping shovels. With this equipment, special exciters furnish and control the current which establishes the voltage of the DC generators and the speed and direction of rotation of the hoist, swing, and crowd motors. This control produces quick response, smooth acceleration and deceleration, and exceptional flexibility of operation. It also aids materially in minimizing electrical and mechanical maintenance.





# FINEST ENGINEERING AND MATERIALS

Over the years, Bucyrus-Erie stripping shovel records for high output and low maintenance are direct reflections of the advanced engineering, expert workmanship, and high quality materials employed. Unnecessary weight is eliminated, resulting in low ratios of dipper capacity to total weight. High-order workmanship results in maintenance costs being reduced to a minimum. Complete research and laboratory facilities make possible the use of the latest metallurgical developments and heat treatment, quenching, and tempering processes—each is used where it contributes most to strength, light weight, and long life. These facilities insure low-maintenance output through the useful lives of the machines.

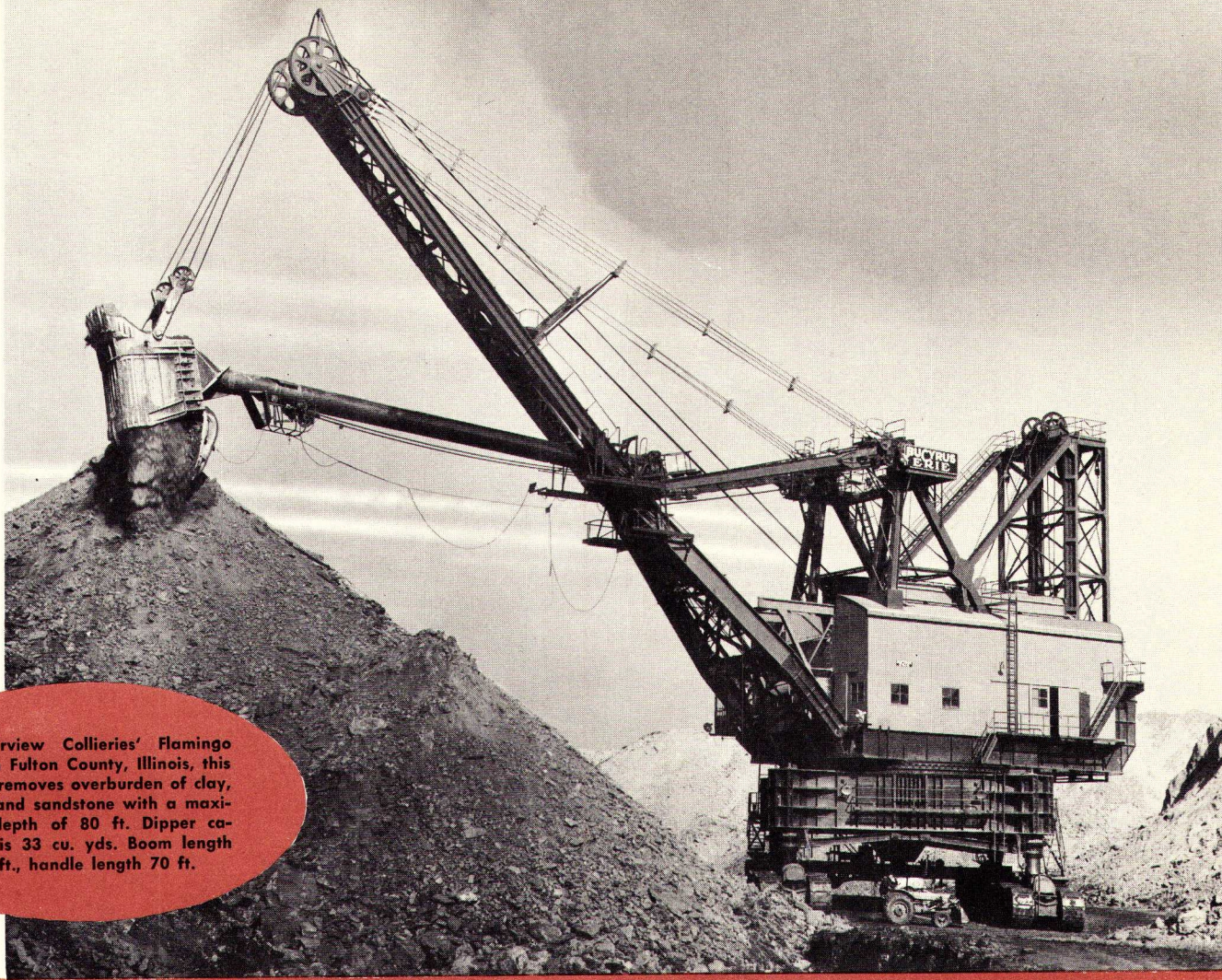


At Sherwood-Templeton Coal Company's Robin Hood mine near Linton, Indiana, this shovel shares stripping duties with two Bucyrus-Erie walking draglines. The coal is recovered at an average ratio of 1 to 8. The stripper has a 19-cu. yd. bucket, 63½-ft. handle, and 107-ft. boom.

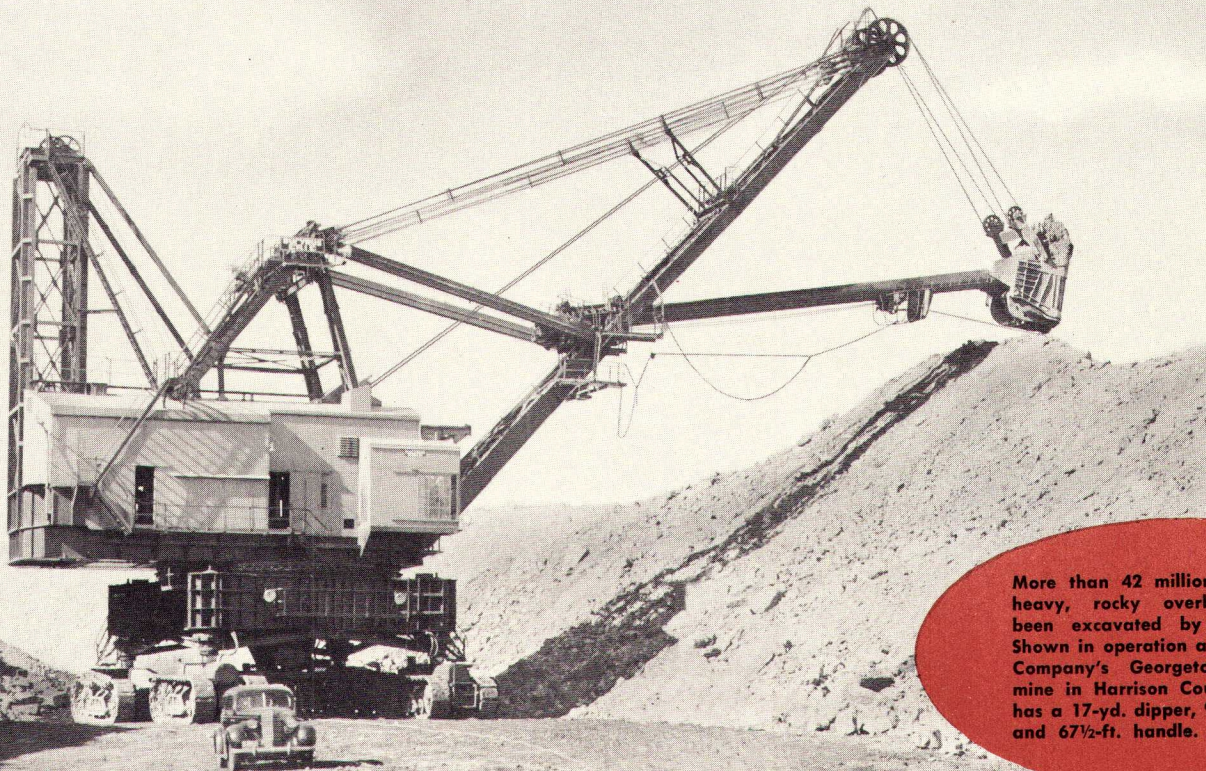


Hard sandstone and shale overburden, averaging 40-ft. thick, is stripped by this shovel at Blackfoot Coal and Land Corporation's mine in Pike County, Indiana. This machine is equipped with a 21-yd. dipper, 56½-ft. handle, and 95-ft. boom.





At Fairview Collieries' Flamingo mine in Fulton County, Illinois, this shovel removes overburden of clay, shale, and sandstone with a maximum depth of 80 ft. Dipper capacity is 33 cu. yds. Boom length is 113 ft., handle length 70 ft.



More than 42 million cu. yds. of heavy, rocky overburden have been excavated by this shovel. Shown in operation at Hanna Coal Company's Georgetown No. 12 mine in Harrison County, Ohio, it has a 17-yd. dipper, 99½-ft. boom, and 67½-ft. handle.





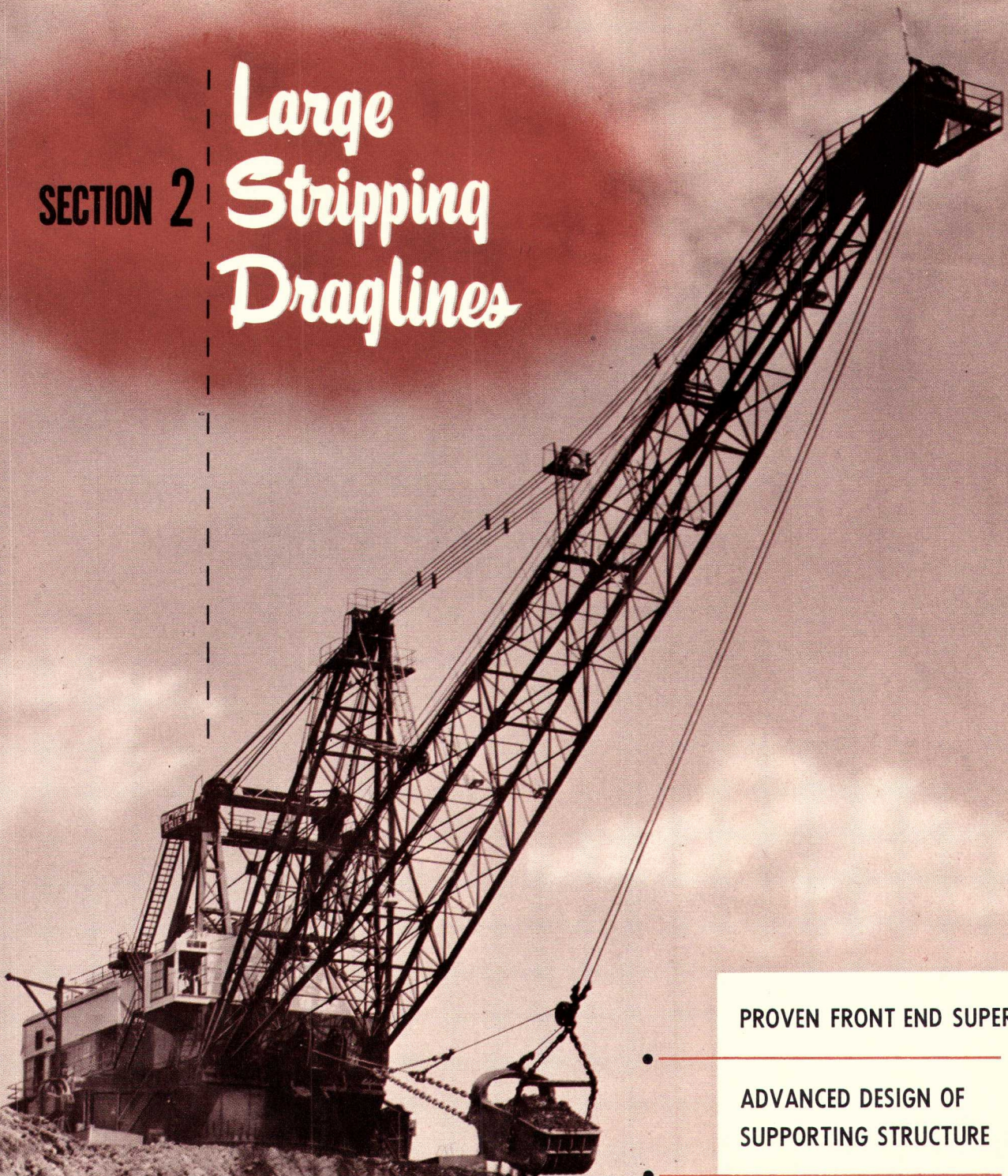
*Condensed Specifications*  
**STRIPPING SHOVELS**

Model	STANDARD EQUIPMENT						MOTORS				Approx. Working Weight Pounds
	Dipper Cu. Yds.	Boom	Handle	45° Angle			Driving M. G. Set H.P.	Hoist H.P.	Swing H.P.	Crowd H.P.	
				Height of Cut Max.	Dumping Height Max.	Dumping Radius Max.					
<b>550-B</b>	22	95'0"	56'6"	86'9"	64'9"	101'0"	650	2-187½	2-75	1-75	1,760,000
	20	95'0"	61'6"	88'6"	68'0"	106'0"					
	18	99'6"	67'6"	89'6"	71'9"	112'0"					
<b>1050-B</b>	36	113'0"	64'0"	94'6"	73'3"	114'6"	1000	2-250	2-125	1-125	2,885,000
	33	113'0"	70'0"	97'9"	77'6"	120'0"					



**SECTION 2**

# Large Stripping Draglines



PROVEN FRONT END SUPERIORITY

ADVANCED DESIGN OF  
SUPPORTING STRUCTURE

EXCLUSIVE SIMPLE WALKING TRACTION

FINEST ELECTRICAL EQUIPMENT

HIGH SPEED AND AMPLE POWER



## • **STRONG LIGHT-WEIGHT BOOM**

The all-welded, tubular-laced Bucyrus-Erie boom has made dragline history. Its strength and type of construction permit faster handling of pay loads. Its widespread feet withstand the high stresses accompanying fast swinging. Its light weight reduces swing inertia and roller loads, adding materially to the speed of the operating cycle. The superior boom design typifies the advanced engineering which has made Bucyrus-Erie draglines acknowledged stripping leaders.

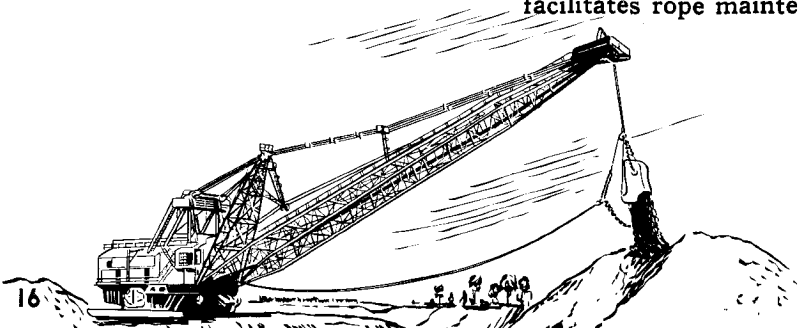
The light simple suspension is a Bucyrus-Erie exclusive design. It consists of bridge strands supporting the point of the boom from the top of the mast. An auxiliary rope vertically suspended from these strands supports the center of the boom. The outstanding feature of this suspension is that when more load is suspended, which would ordinarily cause more downward bending of the boom, the higher suspension load exerts a corresponding greater uplift and automatically avoids harmful boom deflection.

## • **SWIVELING BOOM-POINT SHEAVES**

Another outstanding front end feature of Bucyrus-Erie stripping draglines is the swiveling boom point sheaves. The proper lead for the hoist ropes is maintained in all digging, swinging, and dumping positions, and excessive rope wear is prevented. The sheaves are mounted in a cast yoke which swivels to follow the lead of the hoist lines to the bucket.

## • **TWIN DRAG ROPES**

The positive action of the twin drag ropes keeps the bucket stable in digging, and permits fast filling for big pay loads. Because the drag drum pull applied to each rope shifts as necessary to overcome resistance met by the corresponding corner of the lip, the bucket tends to cut through or dislodge obstacles rather than detour them. The twin-rope design also allows use of smaller size cable. This provides better rope-sheave ratios, means easier field handling, facilitates rope maintenance and prolongs rope life.

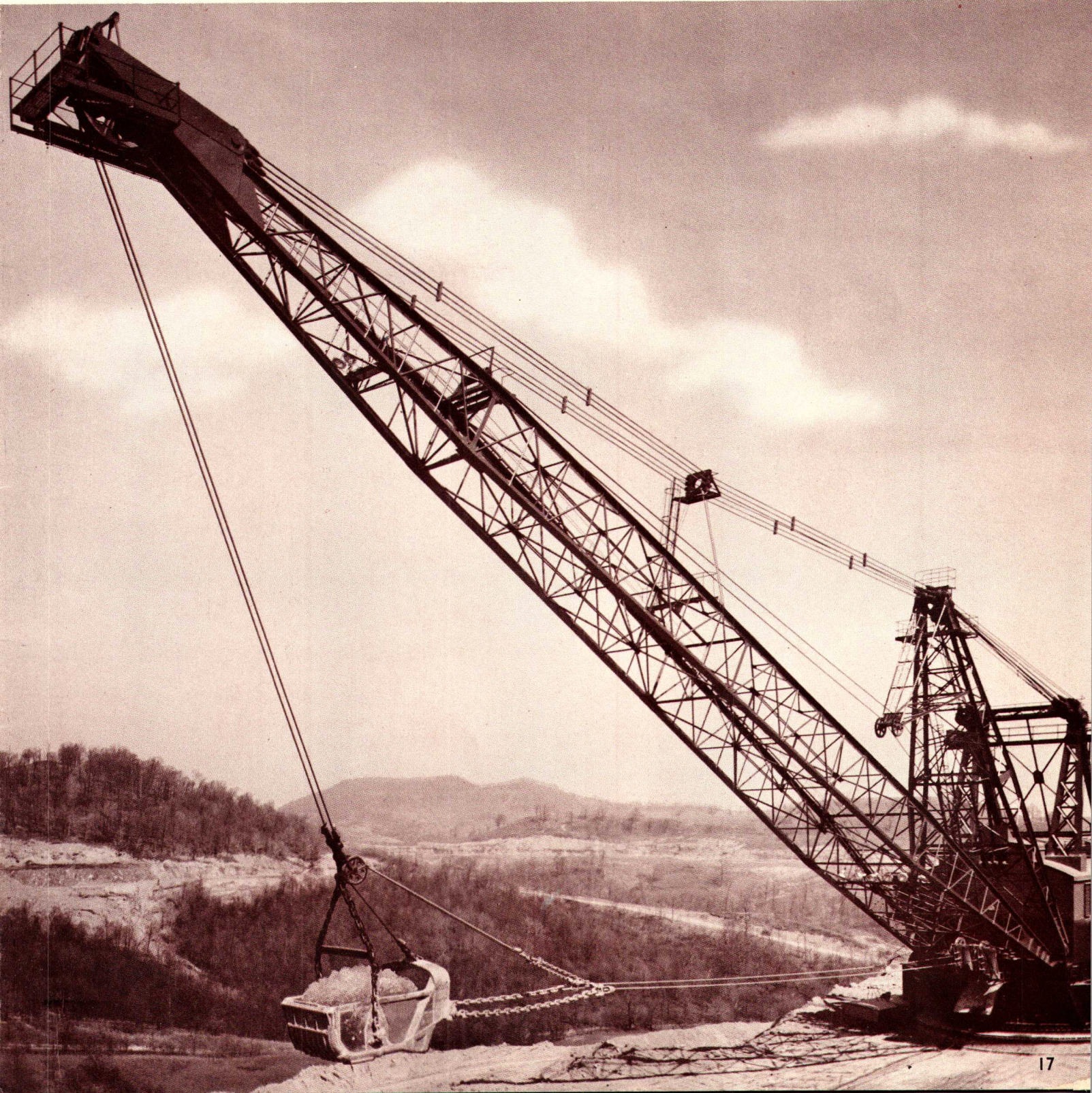


Near Clarksburg, W. Va., A. E. Dick Contracting Company's 1150-B gets heaping bucket loads on this coal stripping operation. Rugged strength for dependable, long-life service is an important characteristic of Bucyrus-Erie Red Arch buckets.



## • TOUGH FAST-FILLING BUCKETS

Fast filling, smooth carrying, quick clean dumping, and long life—this is the combination of advantages which Bucyrus-Erie buckets offer for greater dragline output with the added feature of exceedingly low maintenance. The alloy steel body is arc welded to form a single unit with all the strength needed to stand up in hard service. Teeth and cutting edge are set at the correct angle for most effective digging. The high arch keeps the bucket rigid, permits loads to flow in or out freely for heaped filling and quick dumping. Balanced design permits fast smooth swinging.





## • DEEP-SECTION REVOLVING FRAME

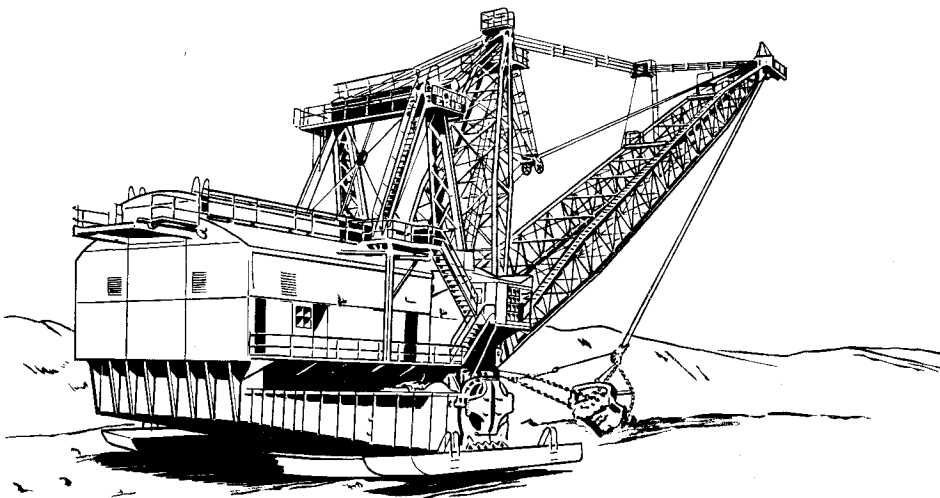
The deep-section revolving frame on Bucyrus-Erie stripping draglines represents the most advanced design available in dragline construction. It provides the firm support necessary to maintain machinery alignment and reduce maintenance. Shock loads are successfully resisted and stresses properly distributed. It has the ruggedness to withstand stresses the machine may encounter during digging or walking.

## • LOW WORKING CENTER OF GRAVITY

Bucyrus-Erie deep-section revolving frame design contributes to low working center of gravity and to easy accessibility because the heavy structural members are located below the machinery deck. The combined depths of the revolving frame and the sub frame place the boom feet and the fairleads at the proper height above the ground.

## • BIG CIRCULAR BASE

Among the outstanding features of the large circular base is the wide-face steel circle rail, made in accurately-curved sections. The rail section provides a wide surface of contact for the rollers and substantial bearing on the supporting tub. This circular structural-steel base in turn furnishes the firm working foundation essential to high-output walking dragline performance. The size of the base is carefully determined so that rim pressures are held within suitable limits. The horizontal shift of the machine center of gravity during operation is such as to impart maximum stability under working conditions. Ground coning under the base is eliminated.



A solid base for fast, high output production... a firm foundation that maintains machinery alignment, keeps maintenance costs low — these are some of the features that keep Bucyrus-Eries out front in performance. Here an 1150-B strips overburden for The Little John Coal Co. at Victoria, Ill.









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## **• SIMPLE ROLLING CAM MECHANISM**

Strength, simplicity, smooth operation, and freedom from pin-connected linkage place the Bucyrus-Erie walking device in a class by itself. There are only three major parts on each side of the machine: walking shoe, cam, and cam frame with elliptical track. These assemblies operate simultaneously through the walking shaft mechanism.

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## **• CUSHIONED WALKING ACTION**

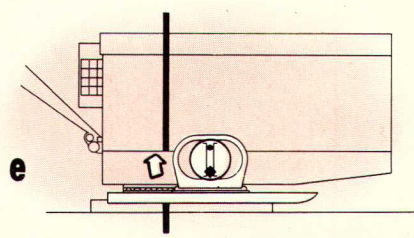
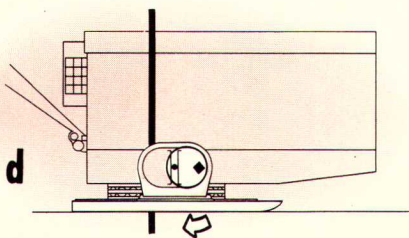
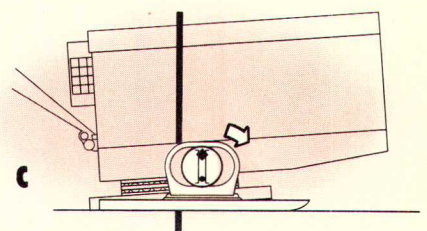
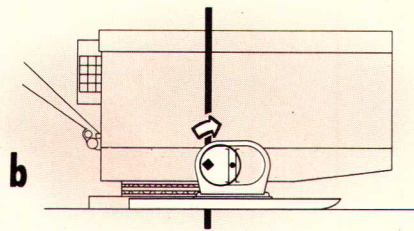
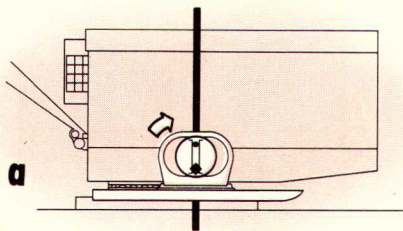
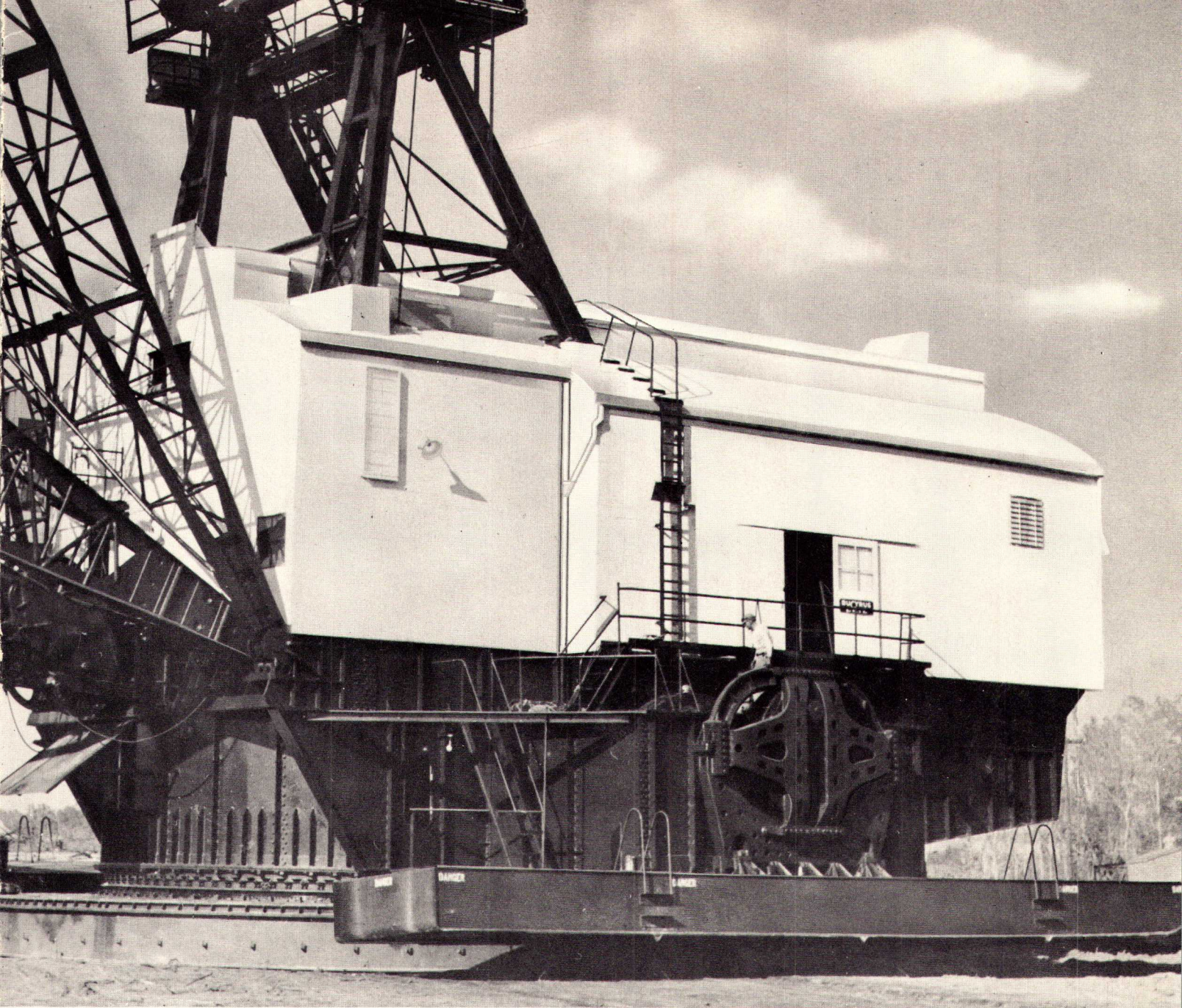
With the Bucyrus-Erie device, the walking cycle is executed without jerking or shock to the machinery—the massive weight of the machine is cushioned down with almost unbelievable ease. In good weather or bad, over ground that is even or irregular, hard or soft, the machine walks when and where you want it. It will step out in any desired direction. It turns sharply, steps around trouble, walks near the edge of a bank in a manner impossible with other types of mounting.

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## **• SMOOTH CONTROL, AMPLE POWER**

With Bucyrus-Erie stripping draglines, move-up delays are minimized because transfer of power and control to the walking machinery is quick and easy. On the smaller machine, it functions through jaw clutches operated by electrically-controlled air cylinders. The larger machine has independent walking motors always engaged with the walking machinery. The operator transfers control to propelling merely by pressing a switch button.





- a. Shoes are up. Note position of cam and guide roller pin at this stage of cycle.
- b. As cam rotates, shoes are advanced and placed on ground.
- c. Cam action lifts leading edge of base and skids it along.
- d. Base is lowered as cams continue to rotate.
- e. Further cam rotation lifts shoes back to original position, completing walking step.





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## • **WARD-LEONARD ROTATING CONTROL**

This modern type of electrical control provides a means of forcing the DC generators. It produces fast response with quick acceleration and deceleration of the driving motors, effectively speeding up the over-all operating cycle and providing exceptionally smooth operation of the digging, hoisting, swinging, and walking functions. It also helps materially to reduce electrical and mechanical maintenance. With this equipment, master controls at the operator's stand regulate the output of small exciters which in turn vary the intensity and direction of the exciting current supplied to the DC generators. Bucyrus-Erie's exclusive improvements have brought this type of control to near perfection for the specific uses to which it is put in Bucyrus-Erie machines.

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## • **HEAVY DUTY MILL-TYPE MOTORS**

The operating motors for hoist, drag, swing, and walking are mill-type units particularly suited for the intermittent high-peak service of dragline operation. Because of low flywheel effect, they accelerate and decelerate rapidly for a fast cycle. Forced ventilation and proper insulation permit high temperature operation.

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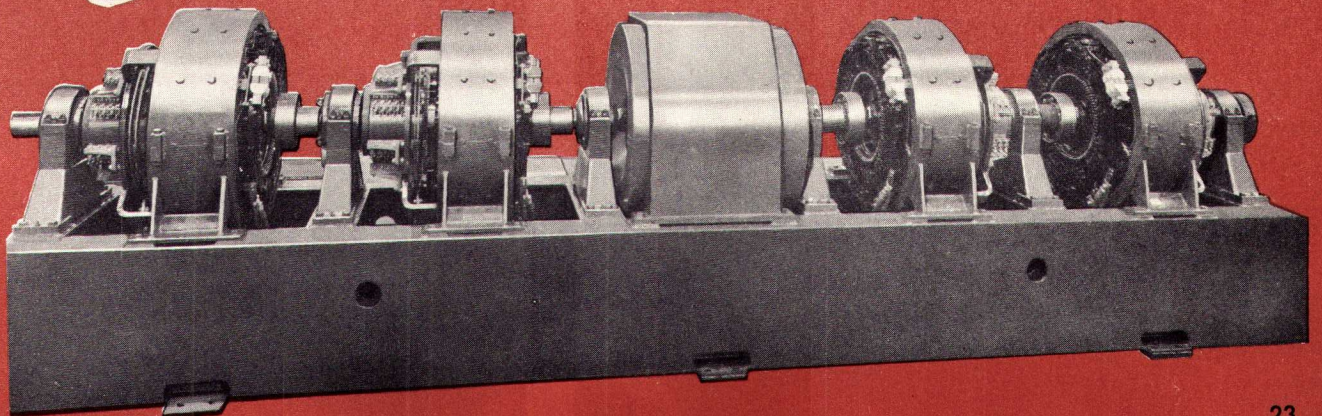
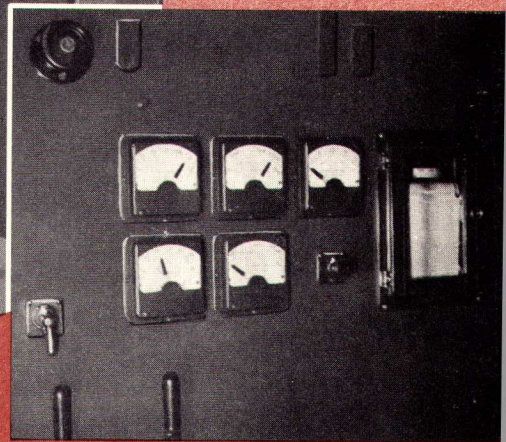
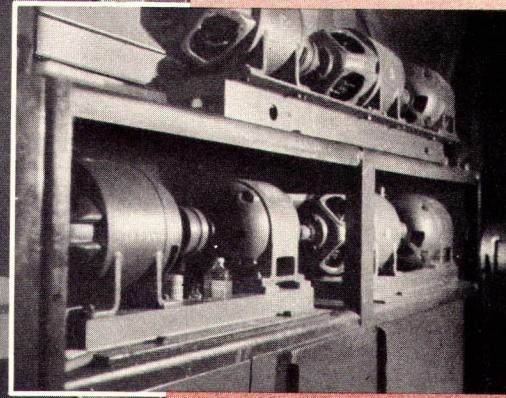
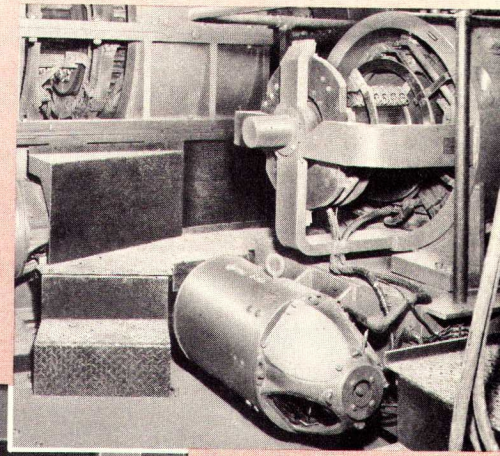
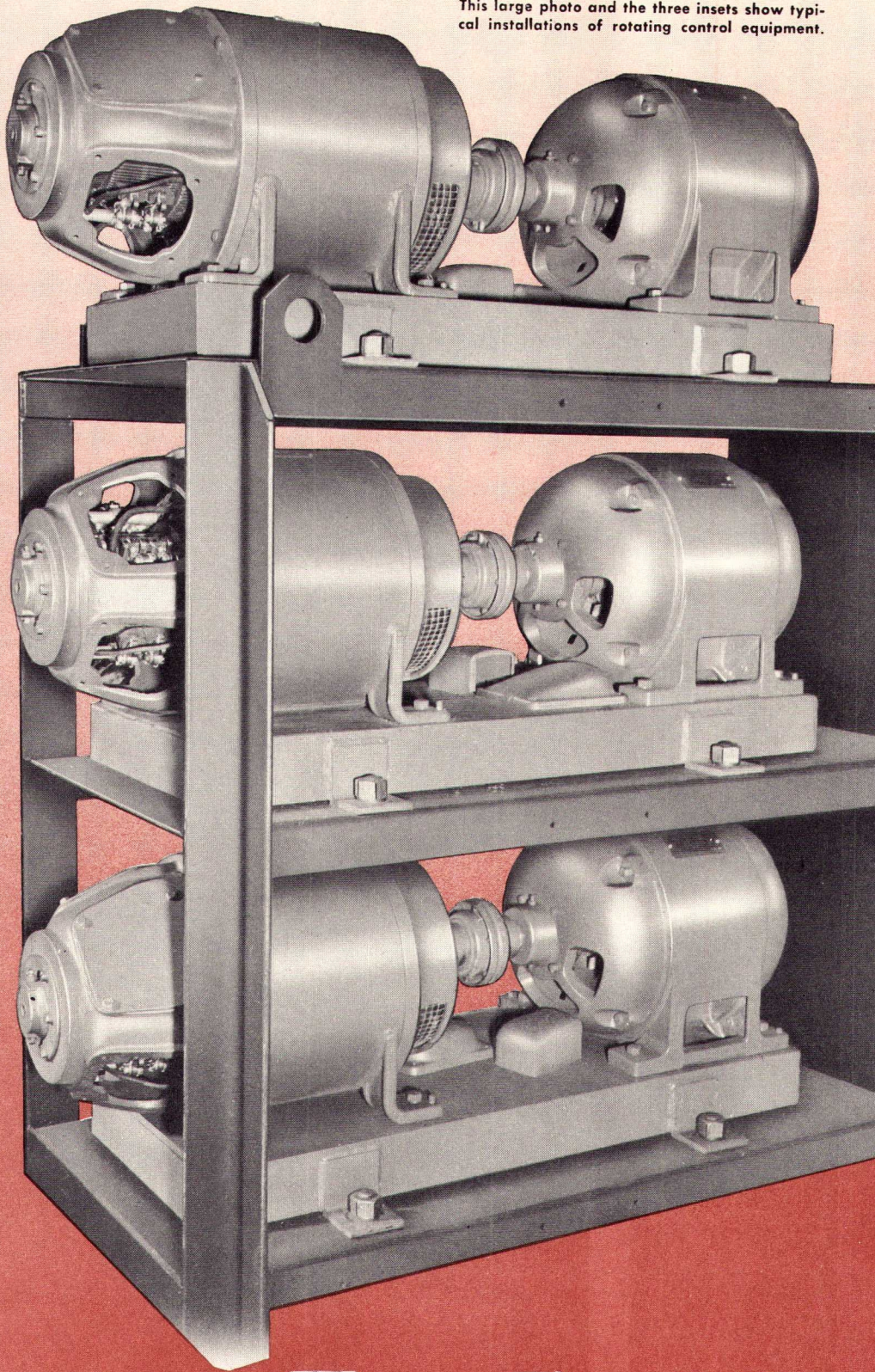
## • **EFFICIENT MOTOR-GENERATOR EQUIPMENT**

Two motors drive generators furnishing direct current power for the drag, hoist, swing, and walking motors, and for excitation. The motor-generator units are located at the rear of the revolving frame to secure maximum counterweight effect. They are mounted laterally to provide a more favorable position of the bearings with respect to digging vibrations.

(Right) Motor-generator equipment is mounted at the rear of the revolving frame for maximum counterweight effect.



This large photo and the three insets show typical installations of rotating control equipment.





# BALANCED SPEED AND POWER

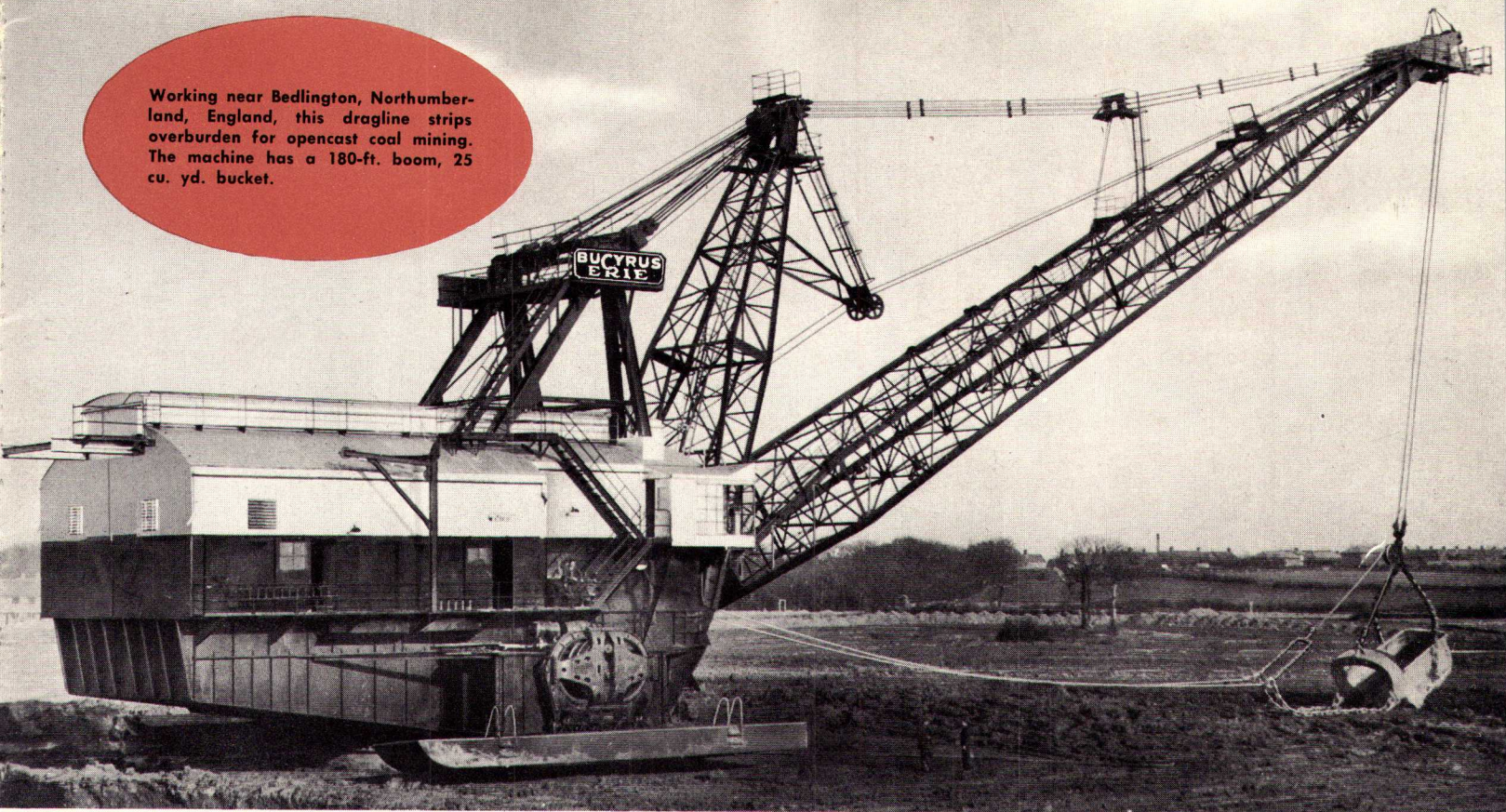
Not only do Bucyrus-Erie walking draglines develop high operating speed and impressive power; even more important, speed and power are balanced to attain greatest working efficiency. Power is coordinated with strength to avoid excessive stress and strain, reduce wear, and lengthen the useful life of the machine. Strength is ample, without excess weight to waste power and cut down speed. Fast responding control coordinates the powerful working motions into speedy operating cycles.



A new method for stripping overburden from ore deposits on the Mesabi range is being used at Hanna Iron Ore Company's South Agnew mine near Hibbing, Minnesota. This Bucyrus-Erie walking dragline loads overburden into caterpillar-mounted screening plant, from which it is conveyed by belt 1¾ miles to the dump area. The machine has a 180-ft. boom and a special 30 cu. yd. bucket.



Working near Bedlington, Northumberland, England, this dragline strips overburden for opencast coal mining. The machine has a 180-ft. boom, 25 cu. yd. bucket.



At International Mineral and Chemical Corporation's Noralyn mine in Polk County, Florida, a 16-yd. walking dragline recovers phosphate matrix from a 20-ft. bed, first removing sand and clay cover averaging 20 to 30 ft. deep. The walker has a 175-ft. boom.







A ten-foot bed of phosphate rock plus sandy overburden averaging 22 ft. thick is excavated by this 16-yd. walking dragline at American Cyanamid Company's Saddle Creek mine in Florida. The unit is equipped with a 175 ft. boom.



This walking dragline made coal stripping history when it went into action for Correale Construction Co. in anthracite stripping near Minersville, Pa., in 1944. Bucket size is 25 cu. yd.; boom length is 180-ft.

In the middle-eastern anthracite field of Pennsylvania, this walking dragline strips coal. The 25-ft. seam is covered by sandstone and clay overburden as deep as 120 ft. Owned by A. E. Dick Contracting Co., the dragline swings a 22-yd. bucket on a 200-ft. boom.

Stripping for recovery of bituminous coal at Truax-Traer Coal Company's mine near Elkhart, Ill., this 1150-B walking dragline is equipped with a 23 cu. yd. bucket. Boom length is 200 ft.





# Condensed Specifications

## LARGE STRIPPING DRAGLINES

Model	Boom	Suspended Load	* Normal Bucket Capacity Cu. Yd.	30° ANGLE			MOTORS					Approx. Working Weight Pounds
				Digging Depth Approx.	Dumping Height Approx.	Dumping Reach Approx.	Driving M.G. Set H.P.	Hoist H.P.	Drag H.P.	Swing H.P.	Walking H.P.	
650-B	175'	82,000	16	105'	75'	168'	2-650	2-250	2-250	3-75	Chain Drive from Drag Mach'y	1,600,000
	195'	72,000	14	115'	88'	185'						
	215'	62,000	12	130'	100'	203'						
1250-B	200'	153,000	30	120'	76'	191'	1-1250	2-425	2-425	4-125	2-100	2,910,000
	235'	120,000	23	140'	98'	222'	1-600					

\*Depends On Digging Conditions.

**BUCYRUS  
ERIE**

## BUCYRUS-ERIE COMPANY

General Offices: South Milwaukee, Wisconsin, U. S. A.

Plants In South Milwaukee, Wis.; Erie, Pa.; Evansville, Ind.; Chicago, Ill., U. S. A. District Offices in principal cities of U. S. A. Representatives and service throughout the U. S. A. Distributors in all other principal countries of the world.

In British Isles: RUSTON-BUCYRUS, LTD., Lincoln, England

It is the policy of Bucyrus-Erie Company to improve its products continually. The right is reserved to make changes in specifications or design which in the opinion of this company are in accord with this policy, or which are necessitated by the unavailability of materials. The description herein is for the purpose of identifying the type of machine, and does not limit or extend the express warranty provisions in any contract of sale.

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