

**BUCYRUS
MONIGHAN**

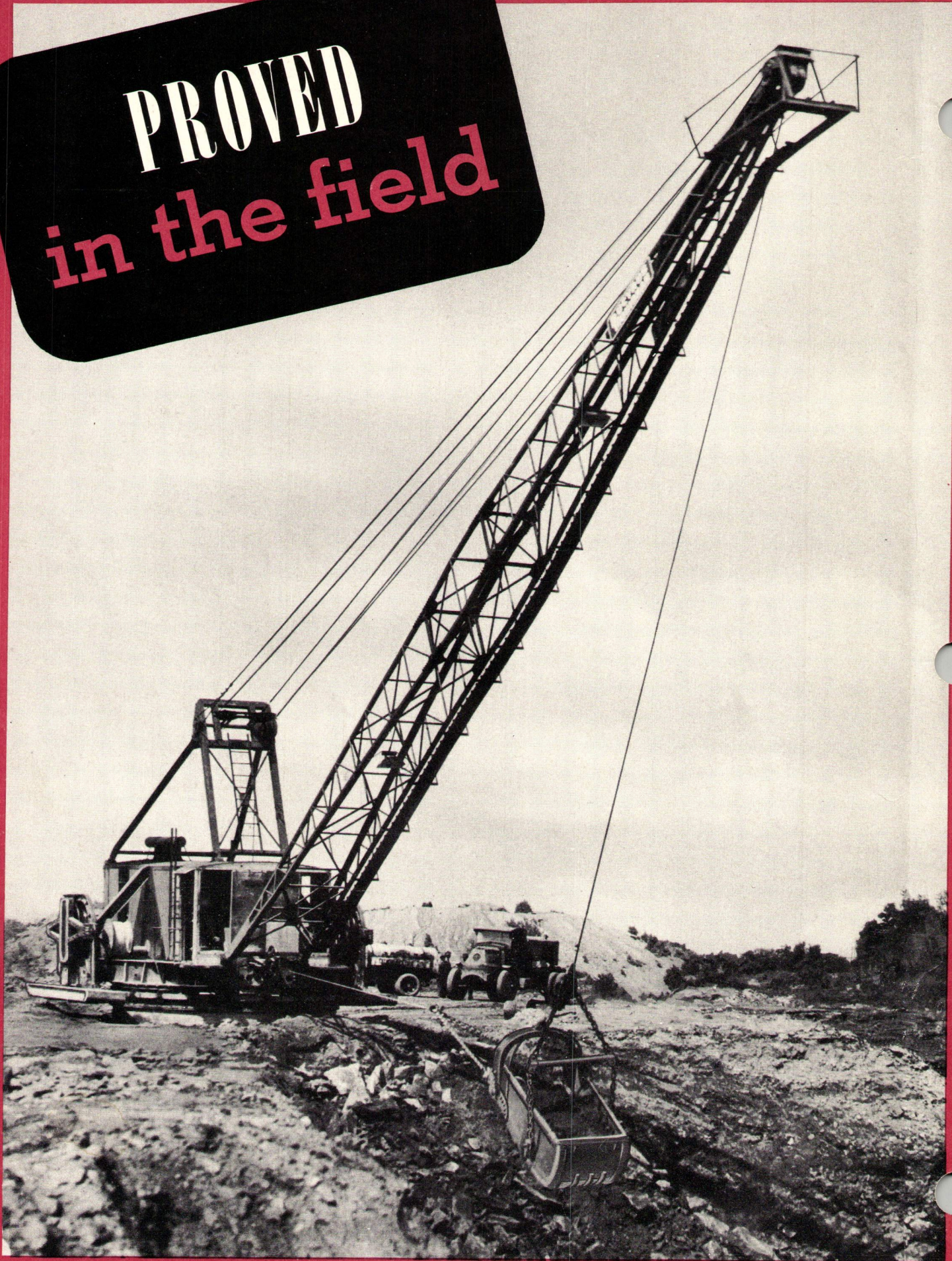
3-W

**WALKING
DRAGLINE**

**Fast Digging
Easy Moving**

BULLETIN No. 3-W-2

PROVED
in the field



MEMBER of the outstanding "family" of walking draglines, the Bucyrus-Monighan 3-W has proved in actual service its ability to deliver fast, steady, all-weather performance. It is a machine weighing a little over 100 tons, carrying an 80 to 90-foot boom, and handling a 3 or 3½-yard bucket in average dragline work. Its exceptional maneuverability, its large ground-bearing area and its many other mechanical features insure a maximum number of productive hours with big output each and every hour. . . . The exclusive Bucyrus-Monighan Rolling Cam gives the 3-W a walking action that is smooth, positive, and long lived. Built to the highest modern engineering and production standards, and based on experience gained from hundreds of predecessors, the 3-W is one of the famous Bucyrus-Monighans, known around the world for high-speed, low-cost output. . . . The following pages will show you some of the outstanding reasons for the remarkable field-proved success of the 3-W.

These 3-W FEATURES . . .

● long working-range . . . 3½-yard standard weight bucket on an 80-foot boom . . . 3 or 3½-yard standard weight on 90-foot boom depending on operating radius.

● effective digging . . . fast hoisting . . . positive controlled lowering . . . proper balance of speeds and pulls making machine applicable to a wide range of operations . . . quick moves . . . steady all-weather performance.

● motorized swing . . . positive smooth control . . . no swing clutch maintenance.

● exceptional maneuverability . . . steps off in any direction . . . easy to place machine in most effective digging and spoiling position.

● large bearing area . . . works and walks on any ground that will support a man.

● long life . . . simplicity and strength all through the machine.

● less maintenance . . . moving parts reduced to a minimum . . . less wear . . . big parts to take it.

● accurate machinery alignment . . . strong, rigid foundation.

● domestic shipment simplified . . . walks on and off U. S. railroad car . . . no need to disassemble main machinery unit.

● diesel drive with electric swing . . . 190 H. P. two-cycle diesel . . . economical . . . simple . . . minimum moving parts . . . heavy duty motors . . . all electric power also available.

● simple main machinery . . . enclosed transmissions running in oil . . . drums on single shaft . . . electric-powered swing with Ward Leonard control.

● Fast, easy pneumatic control . . . big area clutches and brakes . . . smooth operation.

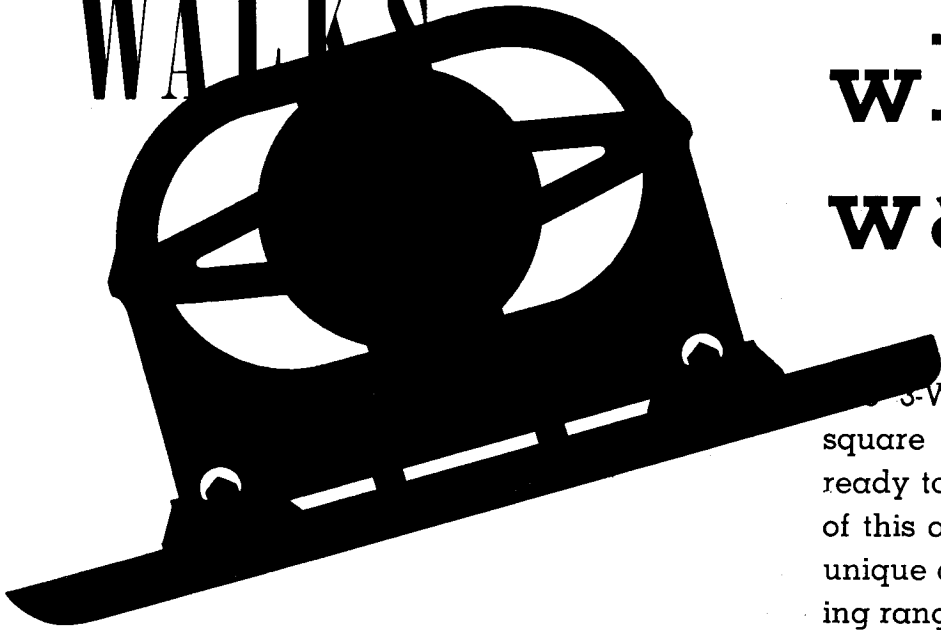
● all-welded boom . . . tubular braces . . . positive boom-hoist . . . worm-gear driven.

● Red Arch bucket . . . fast filling . . . fast dumping . . . inserted Tiger Teeth, easy to reverse, resharpen or renew.



...mean performance for you

WALKS

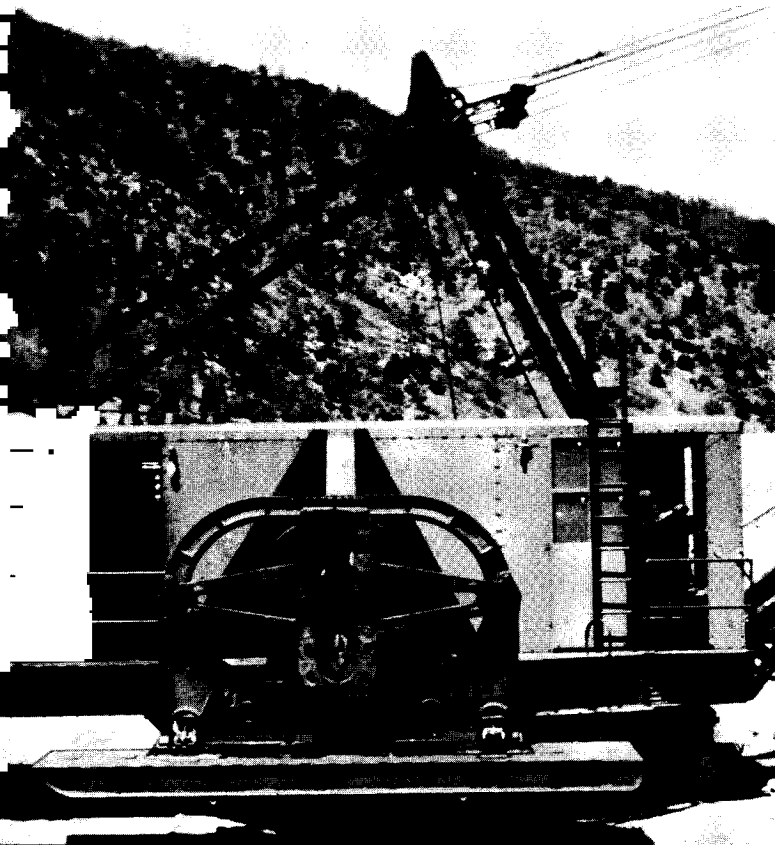


where you want it...

when you want it...

The 3-W digs while standing on the 227 square feet of circular base. It is always ready to step off in any direction. Because of this agility, a Bucyrus-Monighan has the unique ability to sidestep (adding to operating range of the machine), to get away from slides, to work or walk along the edge of a bank, and to make quick detours around any obstructions in its path. Because of its large bearing area and ease of mobility, it is the most desirable machine to operate on loose sands, along soft or muddy river banks, or during rainy weather (when any crawler type of equipment would be shut down). This, however, does not prevent it from walking over a hard terrain. Because of the simplicity, strength, and dependability of its traction mechanism (and of the entire machine), the 3-W is the ideal selection for jobs far from the facilities of large machine shops and factory service.

The two walking shoes work in unison. They are carried clear of the ground while the machine digs. When the 3-W moves, both shoes are lowered simultaneously, and part of the weight is transferred from the base to the shoes. The tilting lift breaks the suction of soft ground. Because the base rises before moving forward it is lifted over the rim where it has packed the earth, also over ordinary obstructions on the ground. The flexible pivoting of the shoes also adds to the Bucyrus-Monighan's easy moving ability over rough ground.



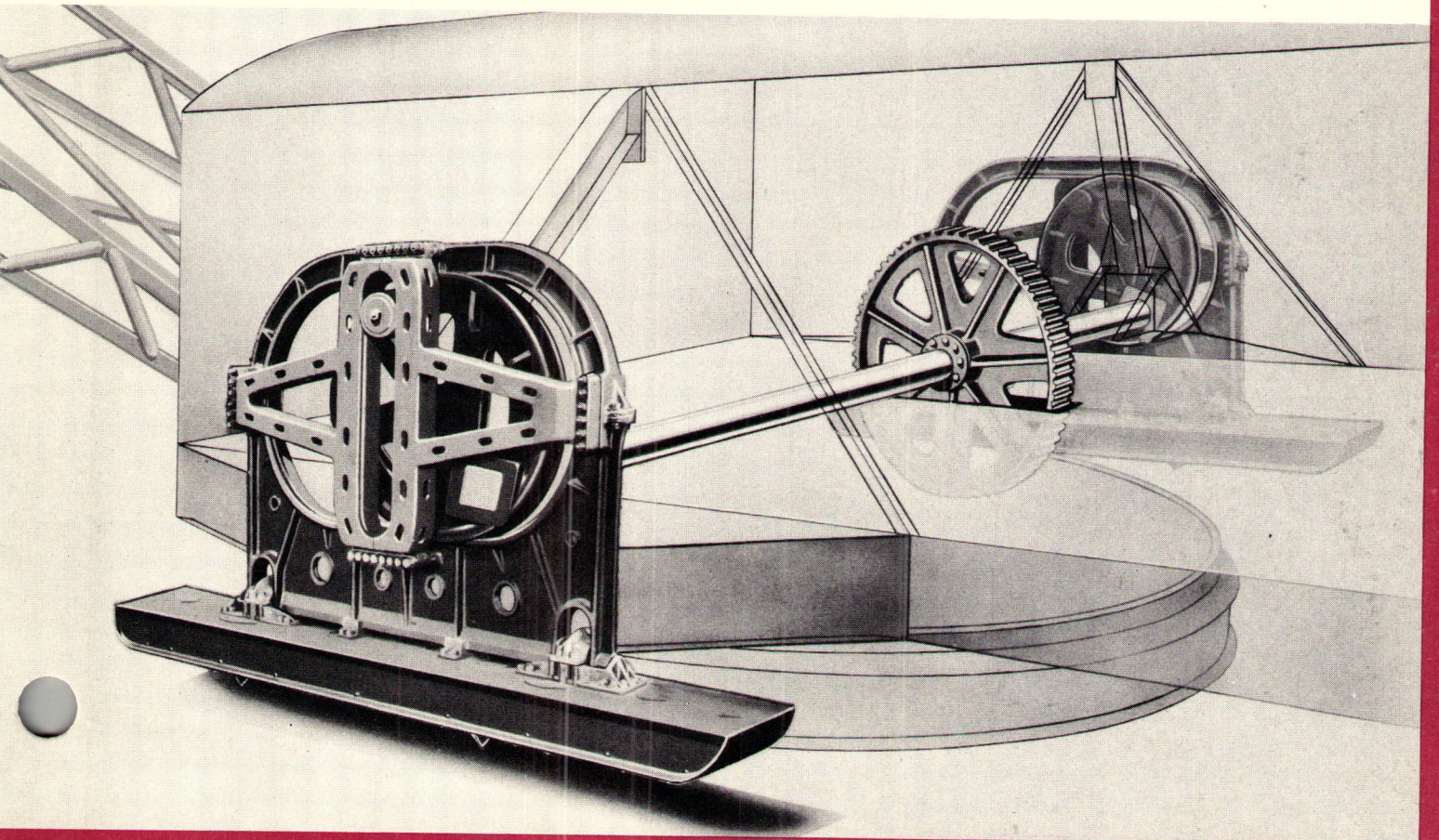
Shoes are carried high during digging.

The area of the base is so large that the machine can move and operate on any ground that will support a man. The 3-W diesel working weight is 207,000 pounds, including bucket. The 227 square feet of base area in contact with the ground provides bearing pressure of only 6.3 pounds per square inch. As the machine moves, a part of the load is transferred to the shoes which have liberal bearing area of 96 square feet.

In raised position, while the machine digs, the walking shoes swing free with ample clearance above the ground. When moving, the shoes are placed on fresh, untrodden ground and, where the "going" is extremely soft, if the shoes show a tendency to sink in too far, supporting material can easily be placed beneath them. The cleated shoes with their long, strong hinge to the track frame, hold position firmly, giving full 6-foot steps to each moving cycle.

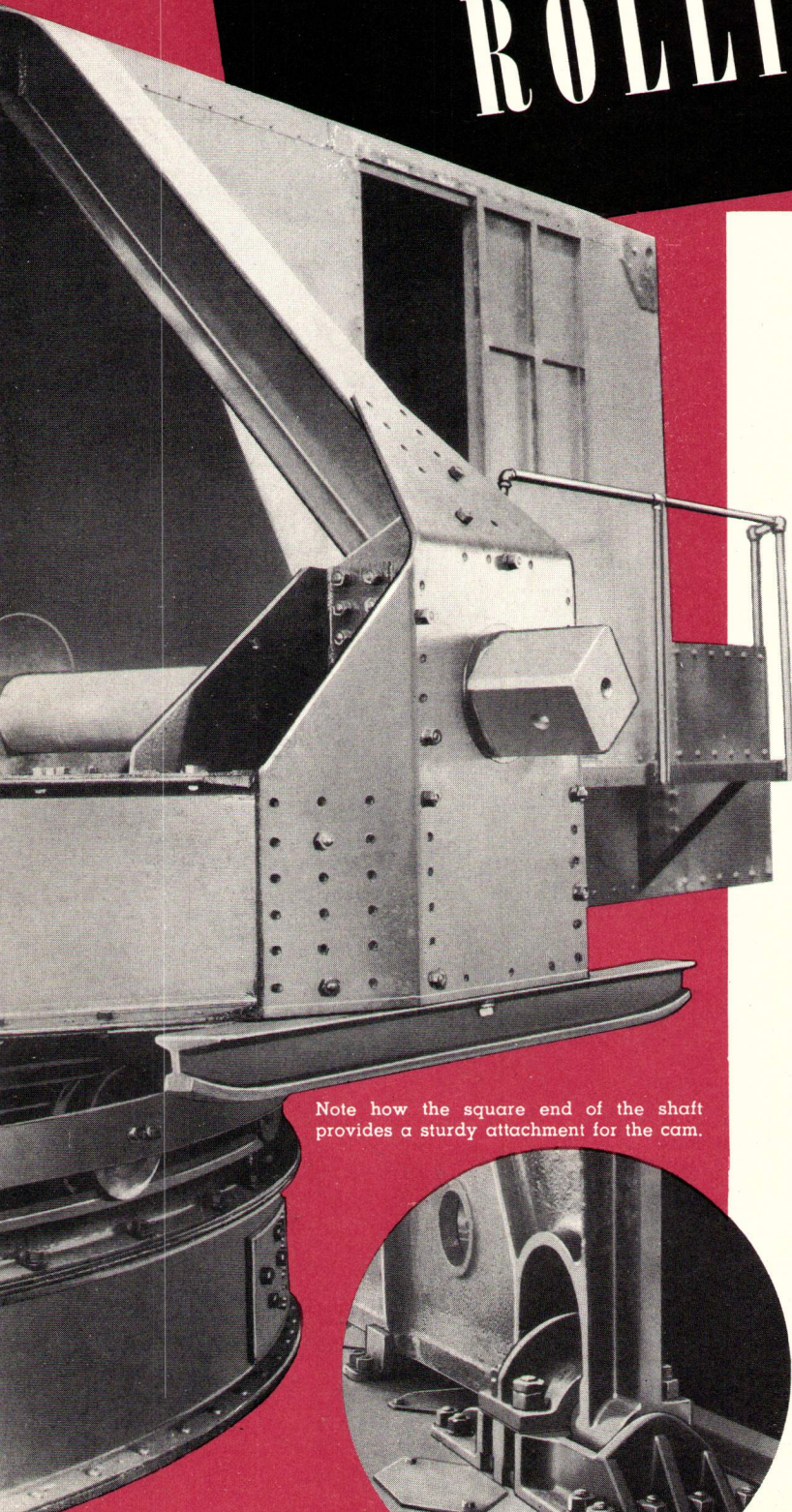


The 3-W needs no steering mechanism. The machine travels in whatever direction the walking shoes are pointed. The direction is changed simply by swinging the revolving frame. This is why Bucyrus-Monighans can sidestep and make abrupt turns around and away from obstacles or move back and forth across the work to complete extra wide cuts without waste of time or rehandling of material. This ability to sidestep also permits you always to work the 3-W in the most effective digging and spoiling position and to utilize the advantage of a short-angle swing.

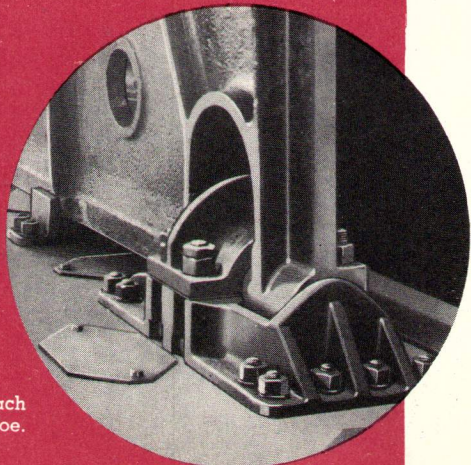


Smooth "Cushioned" Walking
with the

ROLLING CAM



Note how the square end of the shaft provides a sturdy attachment for the cam.

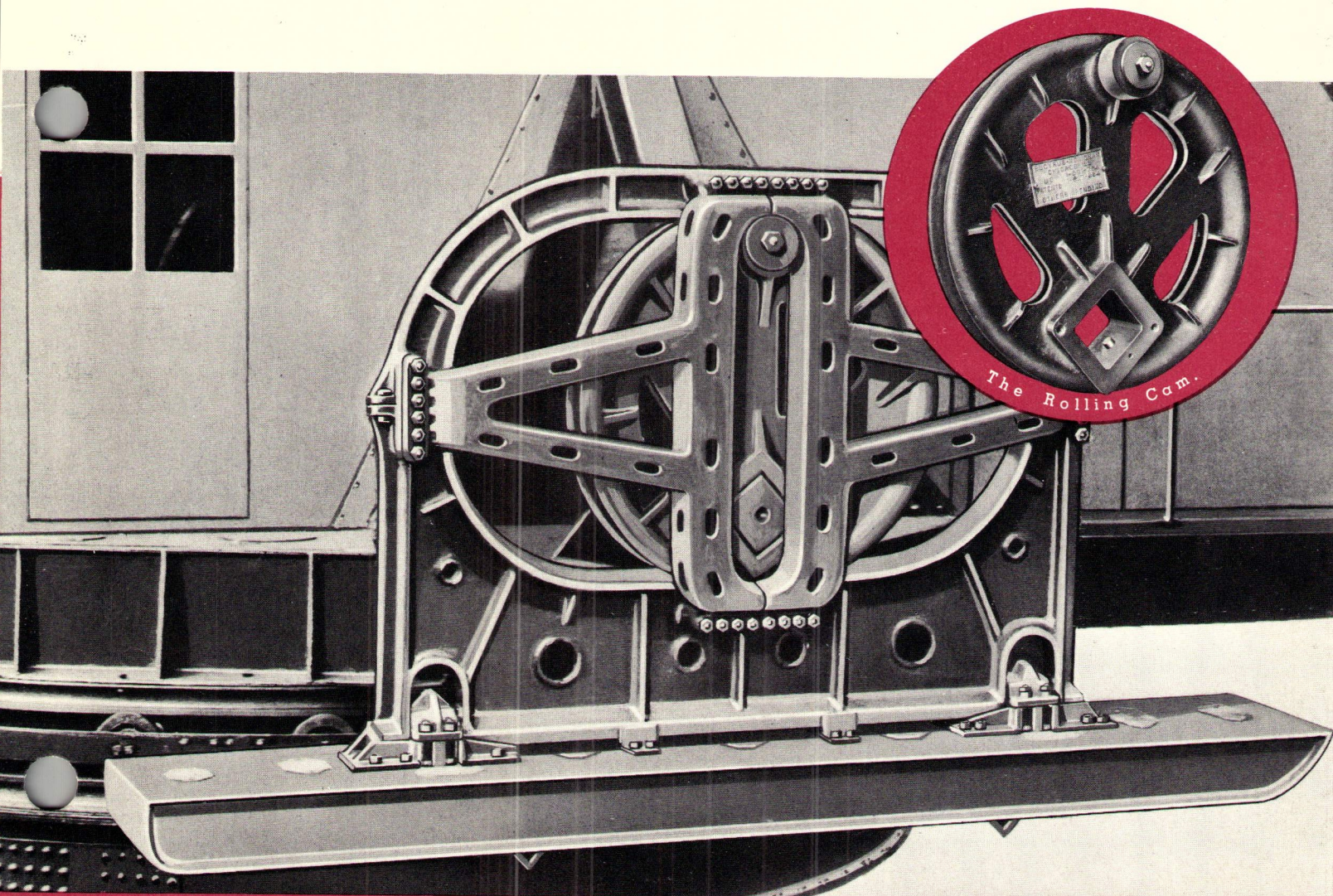


Strong hinges attach track frame to shoe.

The traction machinery of the Bucyrus-Monighan walker is extremely strong and simple. During walking, a positive jaw-clutch connects the driving pinion with the main drum-shaft. The pinion drives the large bull-gear of the walking-shaft which rotates the cams mounted on its squared ends. As the cam rotates in its track-frame it moves a guide roller (mounted on the cam diametrically opposite the shaft) up and down in a vertical slot in the frame. The combined action of the flanged cam on the track frame with the controlled position supplied by the guide roller gives the desired pick-up, idling-travel, lifting-action, and forward-carry of the shoes. The action of the eccentric cam on the track raises and lowers the shoe. The action of the cam and guide roller move the machine forward when the shoe contacts the ground, and the guide roller moves the shoe forward when in raised position. A spring-set friction brake on a large diameter housing integral with the driving pinion holds the shoes in raised position while digging, and is automatically released by air when the driving clutch is engaged.

Cam tracks and cams give smooth lifting and sliding action. The base-tilting lift at the beginning of the step is easily made without shock; the carry is made smoothly and without jerking; part of the weight of the machine is always carried by the base in contact with the ground; at the end of the step the machine is lowered gently, and the entire weight transferred gradually to the base. This smooth moving-cycle prevents shock in the traction machinery or main machinery. There is very little wear because no rotating or moving parts touch the ground. Note also the simplicity and close-coupled strength of this construction and the minimum of moving parts involved.

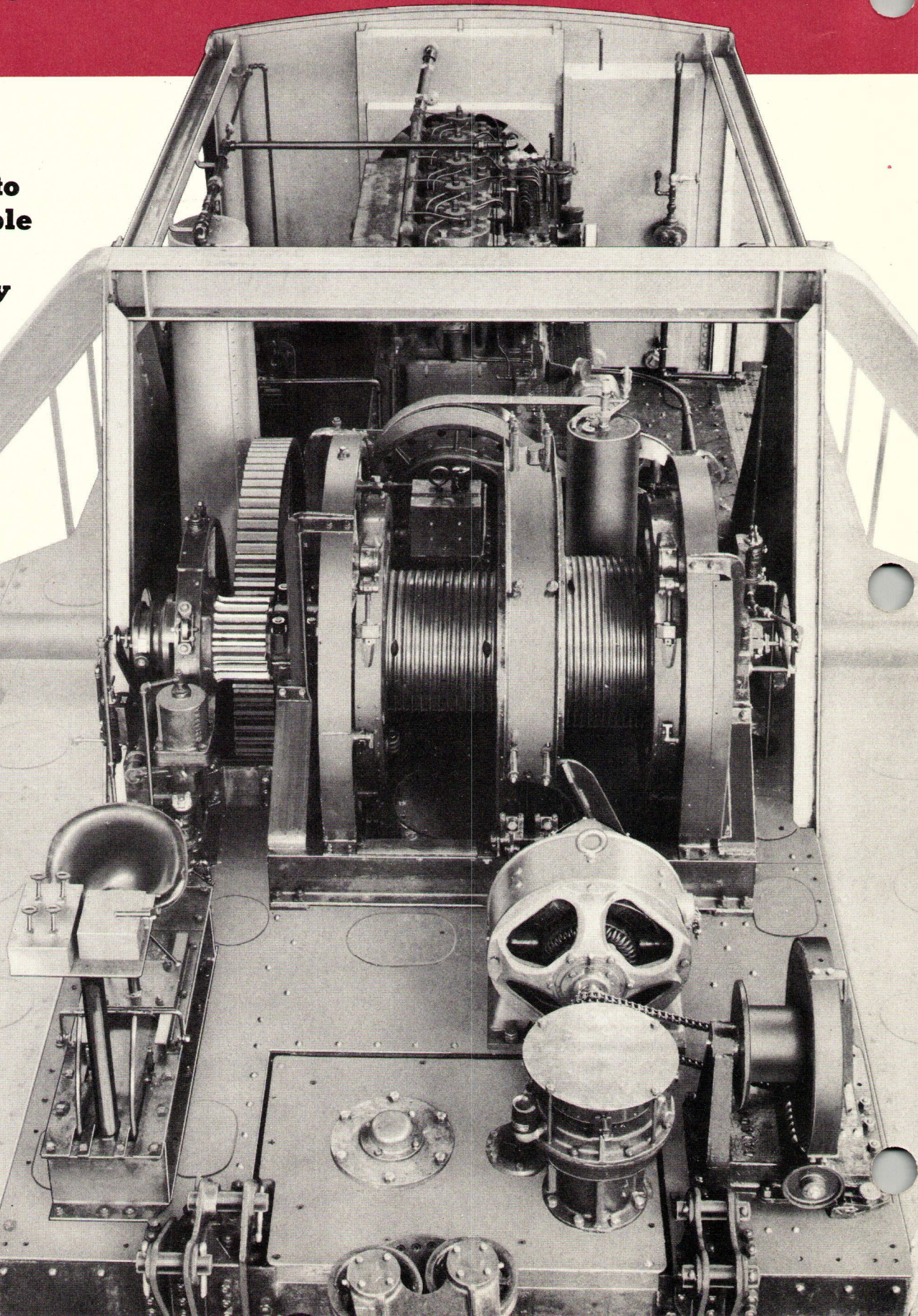
The shoe is hinged to the track-frame, permitting side-tip to conform to the ground surface. The shoes also tip from front to back on the cam as needed to make perfect contact. The long connections provide ample bearing area and hold the shoes in proper position in line with the cams and track frames and parallel to each other. The weight carried by the shoes is not concentrated at one point but is distributed safely through the entire structure of the shoe because of the length and strong construction of the hinge. The substantial nature of the connections, plus the excellent balance of the shoes, gives a strong, smooth-operating action far superior to any other type of walking device.



Note how this construction distributes walking weight along the shoe.

EASY TO SHIP . . .

**No need to
disassemble
main
machinery**



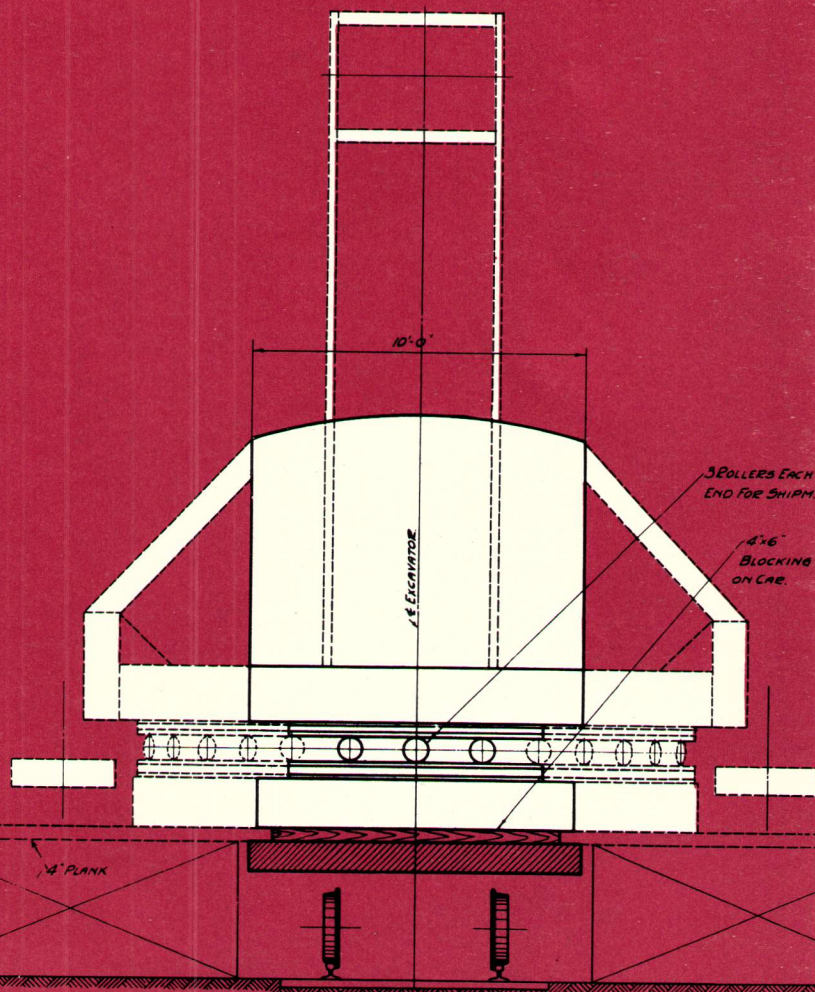
Main machinery
from front.

When one job is finished and you are ready to move on to the next, you walk the 3-W to the nearest railroad siding and up on cribbing to its shipping position on a flat car (U. S. A. railroad standard-gauge). The boom and bucket are lowered to adjoining cars (boom may be easily disjointed and stacked, if desired, for shipment on a single car). Side-sections are detached from base; revolving frame extensions and the walking traction units are disconnected at convenient joints, the A-frame is lifted out (if clearance requires); and you are ready to go. At destination the process is reversed and, when the machine is re-

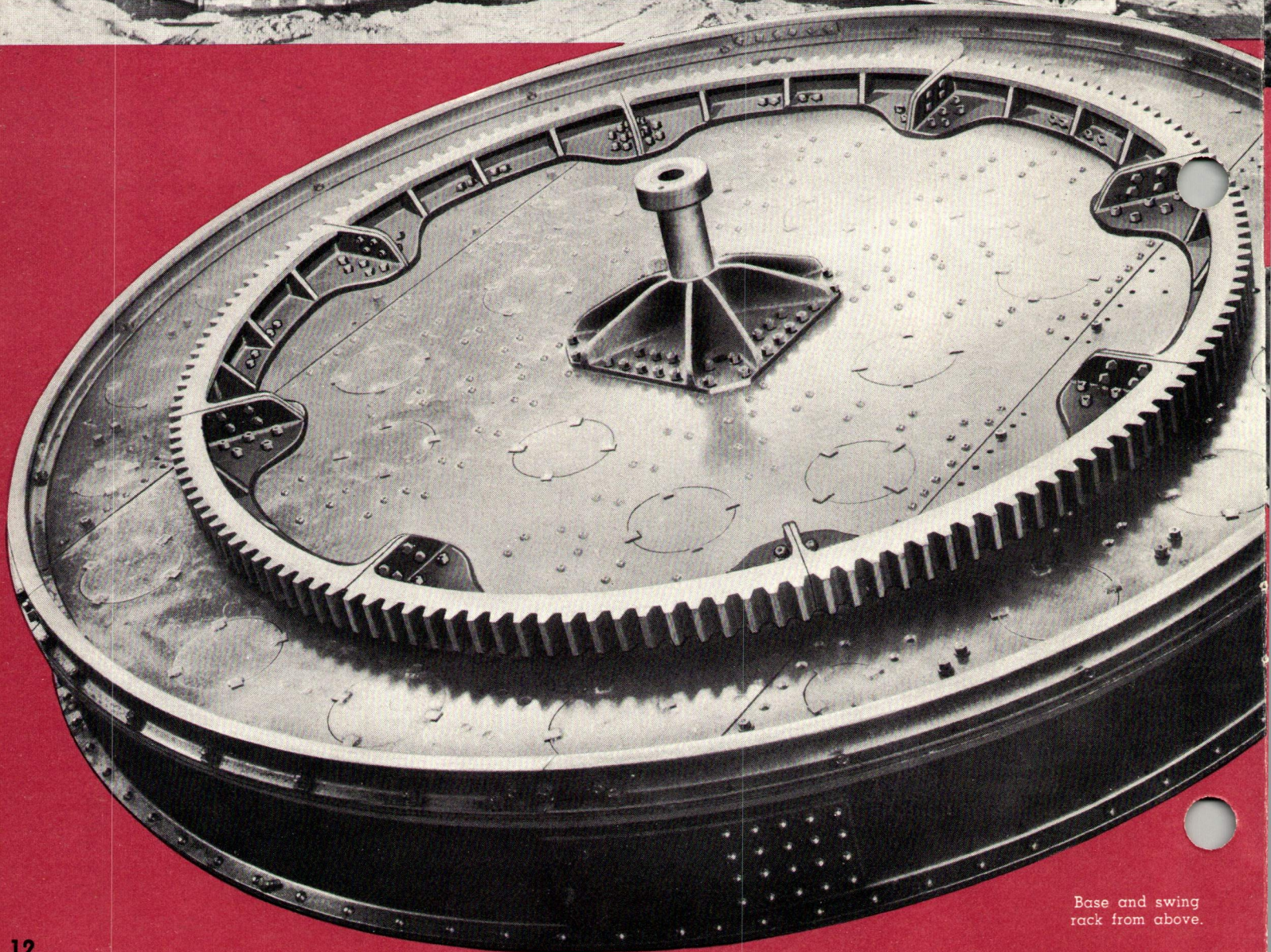
assembled, cribbing is used to walk it off the car on its way to your next job.

Note that no main machinery units need be disassembled. This speeds up the entire operation and helps keep machinery always in correct alignment and adjustment. Crane service is required for only small, comparatively light lifts. The 3-W is easily knocked down for safe long-distance land and sea transportation at minimum expense.

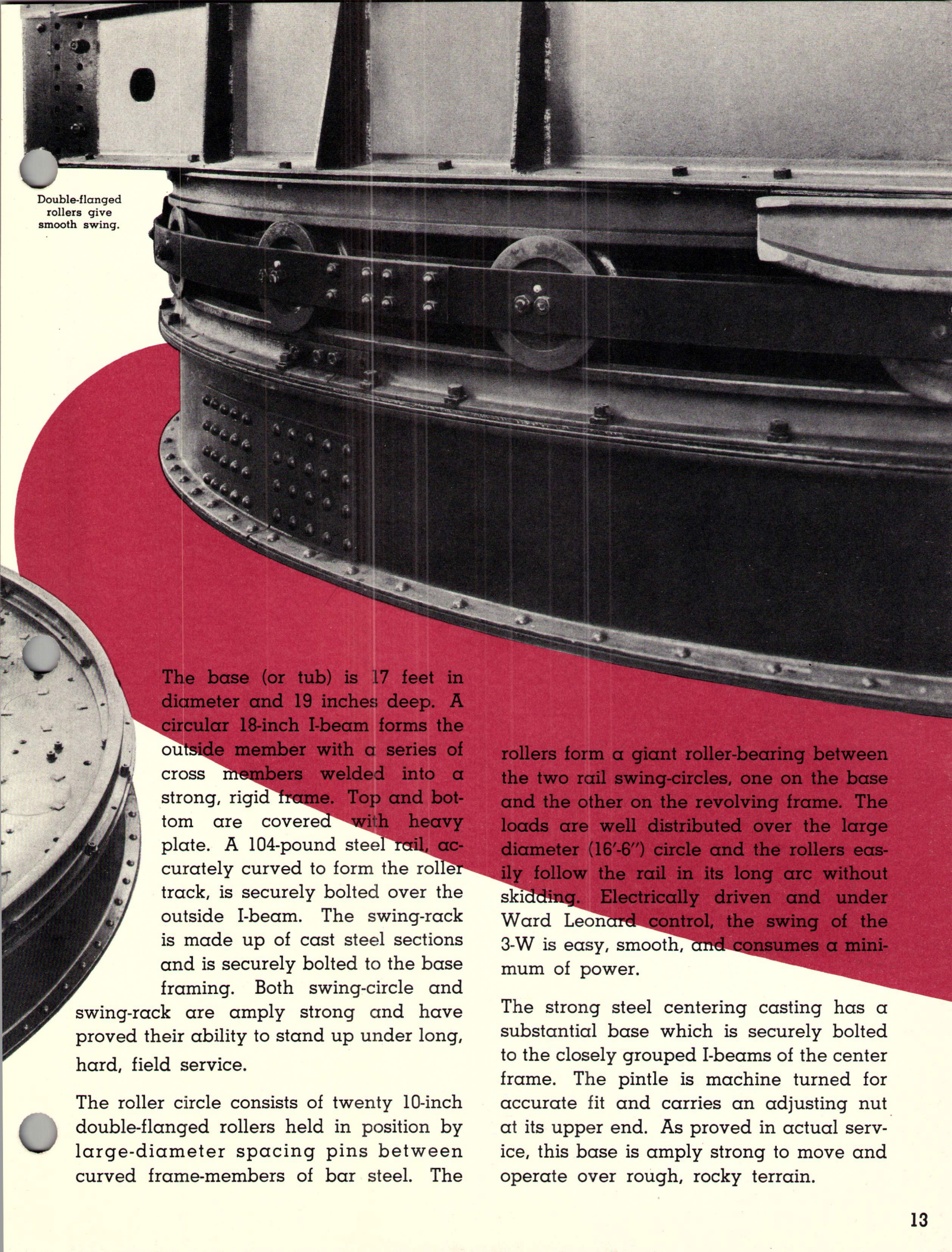
This shipping convenience is especially important for contract work and adds considerably to the resale value of the machine when and if you wish to dispose of it.



Strong... RIGID FOUNDATION



Base and swing rack from above.



Double-flanged
rollers give
smooth swing.

The base (or tub) is 17 feet in diameter and 19 inches deep. A circular 18-inch I-beam forms the outside member with a series of cross members welded into a strong, rigid frame. Top and bottom are covered with heavy plate. A 104-pound steel rail, accurately curved to form the roller track, is securely bolted over the outside I-beam. The swing-rack is made up of cast steel sections and is securely bolted to the base framing. Both swing-circle and

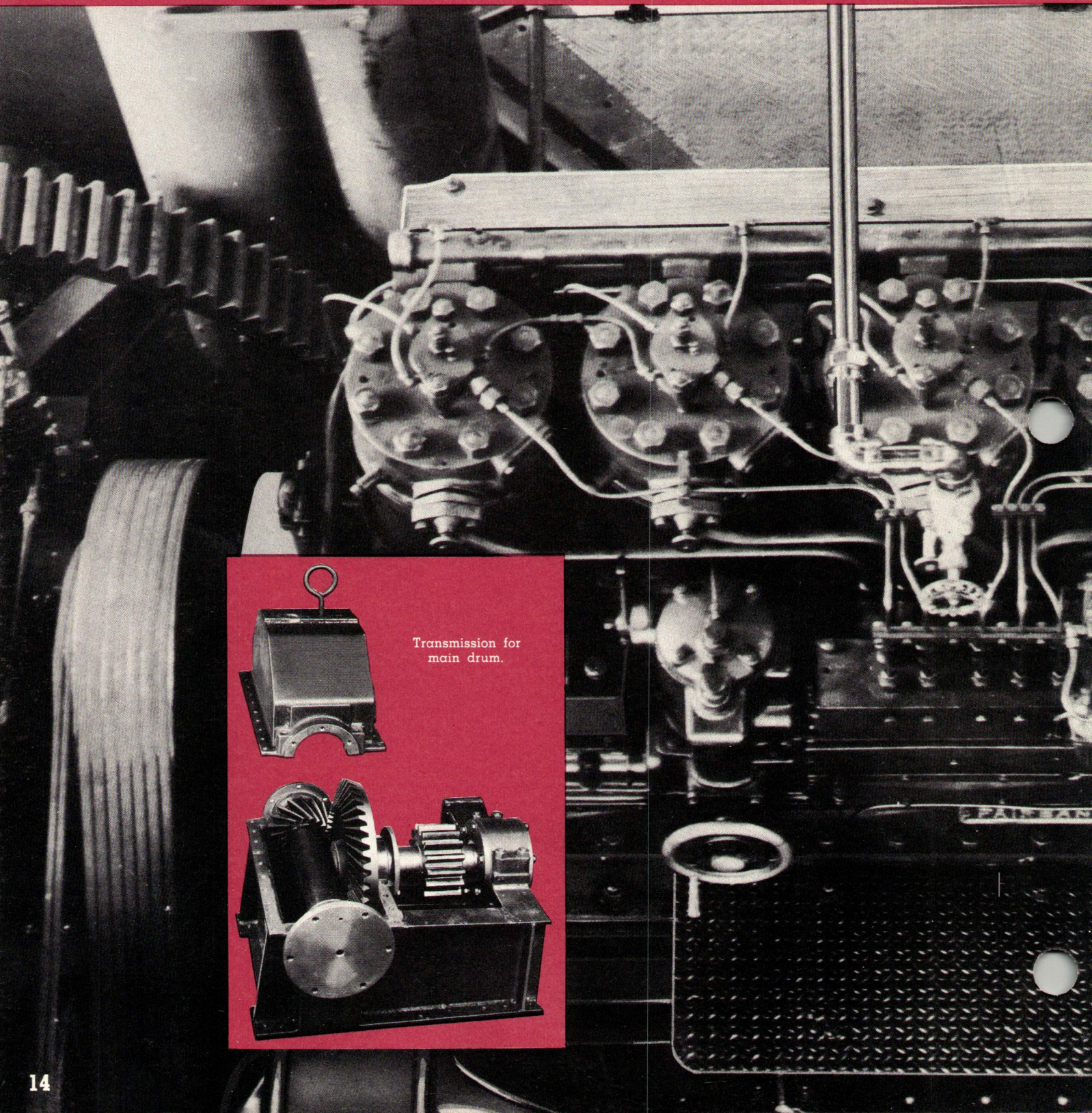
swing-rack are amply strong and have proved their ability to stand up under long, hard, field service.

The roller circle consists of twenty 10-inch double-flanged rollers held in position by large-diameter spacing pins between curved frame-members of bar steel. The

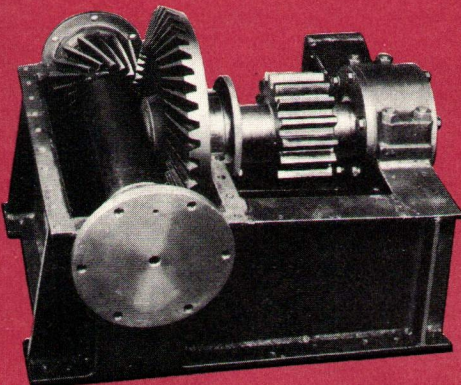
rollers form a giant roller-bearing between the two rail swing-circles, one on the base and the other on the revolving frame. The loads are well distributed over the large diameter (16'-6") circle and the rollers easily follow the rail in its long arc without skidding. Electrically driven and under Ward Leonard control, the swing of the 3-W is easy, smooth, and consumes a minimum of power.

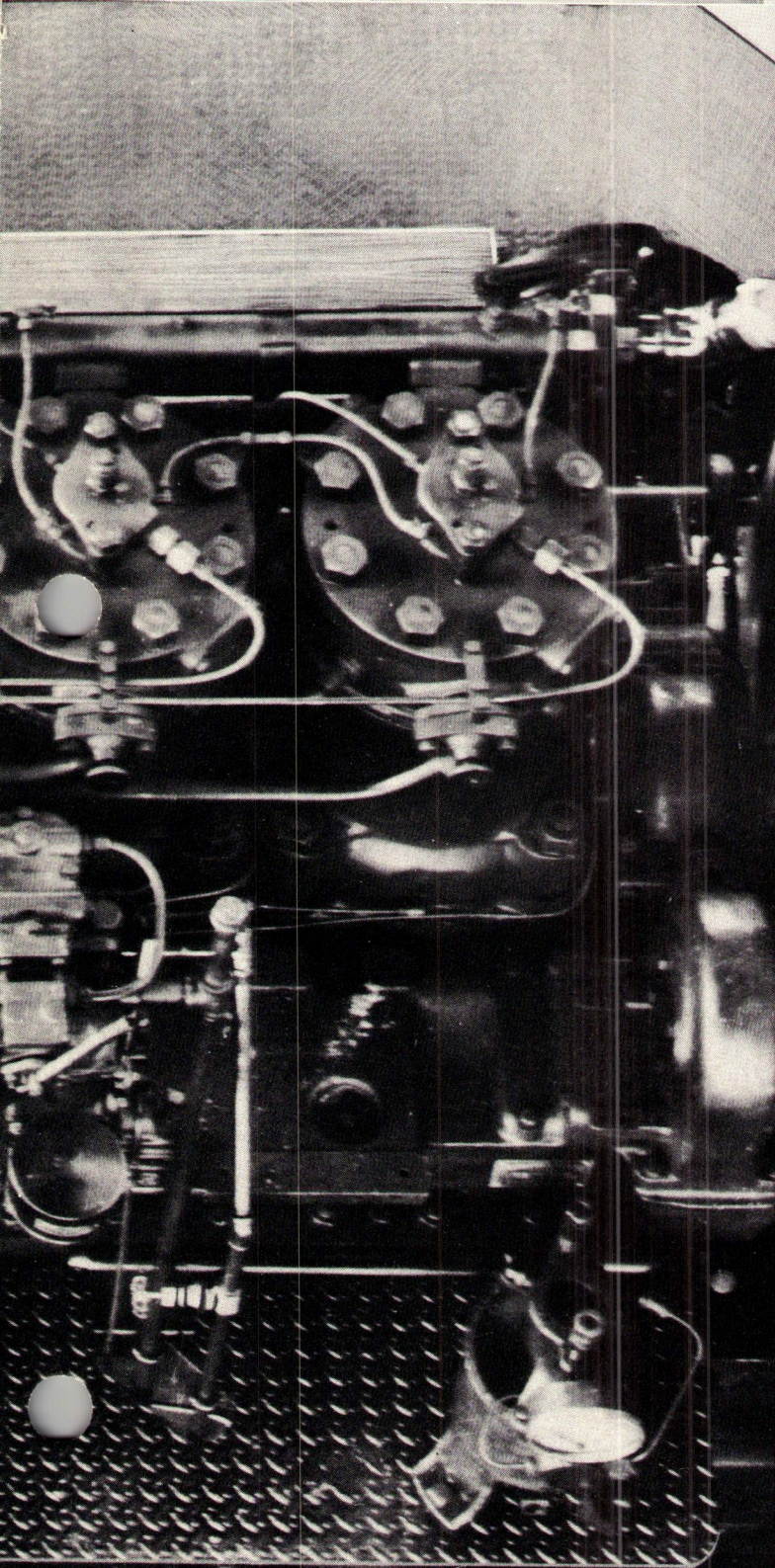
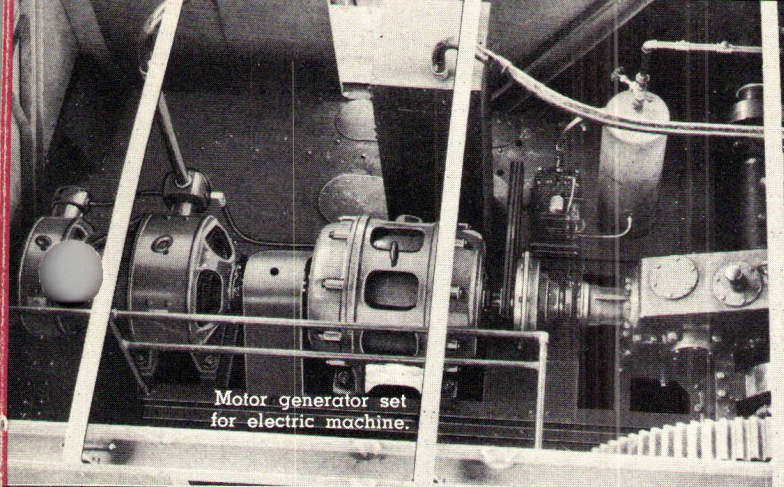
The strong steel centering casting has a substantial base which is securely bolted to the closely grouped I-beams of the center frame. The pintle is machine turned for accurate fit and carries an adjusting nut at its upper end. As proved in actual service, this base is amply strong to move and operate over rough, rocky terrain.

POWER Diesel or Electric



Transmission for main drum.

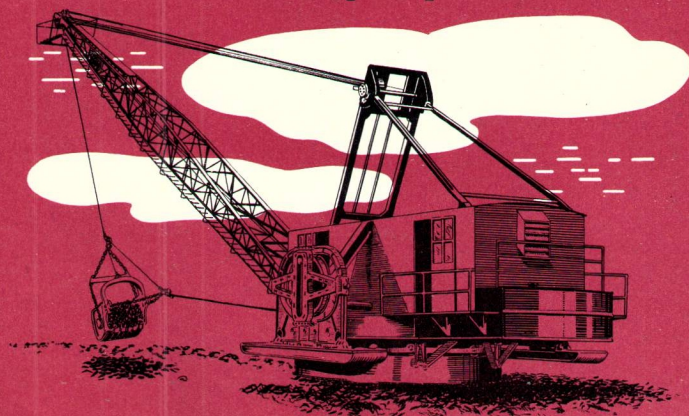




The 3-W diesel is regularly powered by a dependable, full-diesel engine developing approximately 200 H.P. The remarkable simplicity of this diesel, which is of the two-cycle, airless injection, single-stage combustion type, assures steady, dependable and economical performance in dragline service. Starting is by compressed air admitted to the cylinders in firing order. A small auxiliary gasoline engine-driven compressor and storage tank furnish the air.

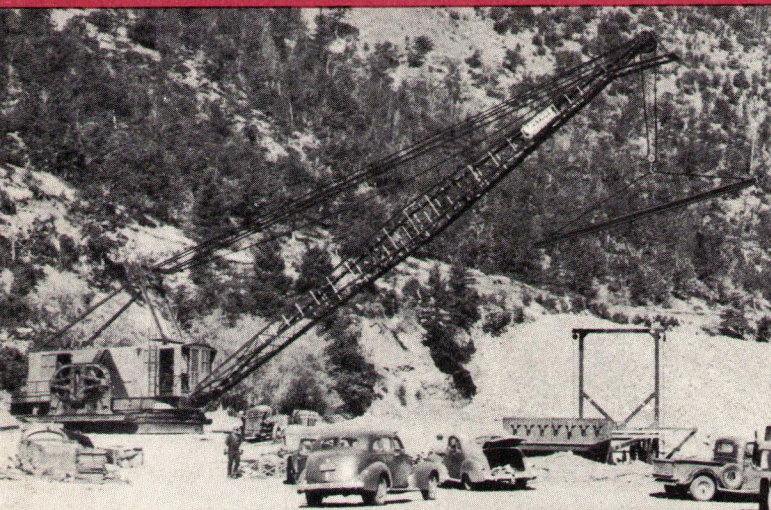
Diesel fuel passes through pressure-tight filters before reaching the simple cam-operated injection pumps and also must pass through an edge-type filter at each injection valve. Scavenging air is injected through oil-bath type filters attached to the ports in the lower cylinder walls at the end of each stroke to clean the burnt gases out of the cylinder thoroughly. Cylinders cast separately provide easier cooling and more economical repairs or replacement. All parts of the entire engine are easily accessible. Lubrication is completely automatic, the only attention required being inspection and replenishment of the supply. Surplus and returned oil is collected in a sump in the lower base and forced through a pressure-tight filter to a separate reservoir from which it is recirculated by a force-feed system. This not only assures clean lubricating oil, but also secures effective circulation while operating on grades.

The 3-W electric for use on permanent or semi-permanent installations has full Ward Leonard control and is powered with modern electric units especially suited for excavator service and built by one of the world's best known quality manufacturers.



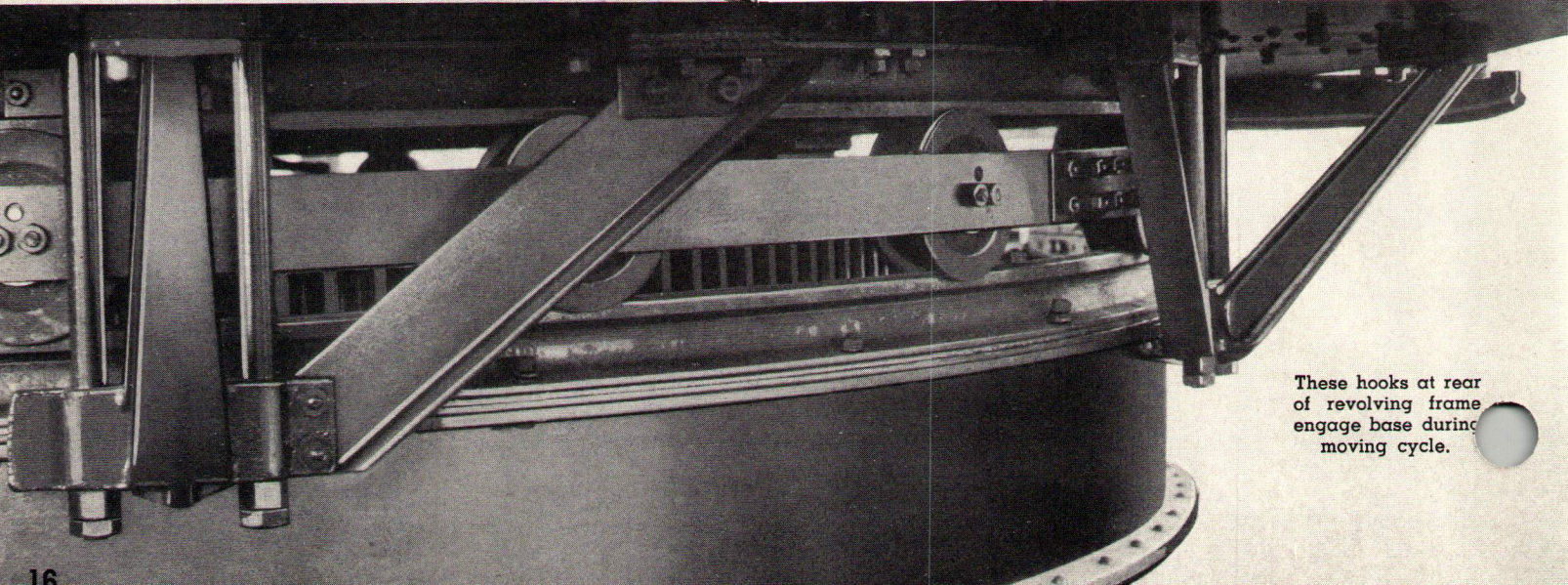
FIRM FOUNDATION

for machinery

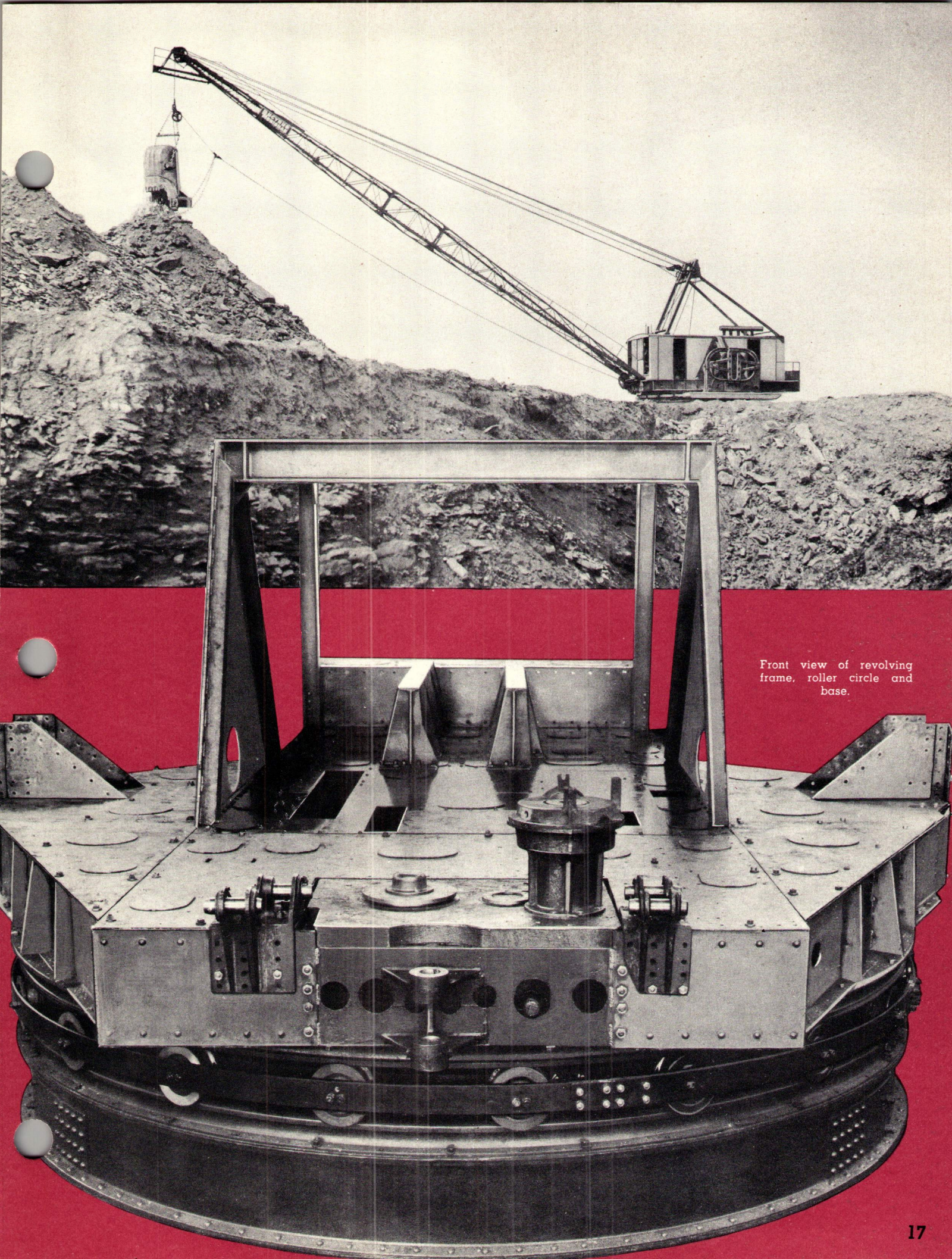


The strong, simple revolving frame is made up of heavy I-beams securely welded together in rectangular and diagonal panels that provide strength where strength is needed. Dead weight is eliminated. Strong plating is securely fastened to the top and bottom, adding to the box-section rigidity of the entire unit. The upper swing-circle of 104-pound rail is also securely fastened to the bottom of the frame and adds further strength to this secure and rigid foundation for the machinery.

At the rear corners of the revolving frame are two hooks, one at either side, which reach down to engage the upper flange of the base during the moving cycle. During normal digging operations these hooks are not in contact, giving free swinging action. The hooks are only engaged when moving, or when it is desirable to relieve the center pintle of abnormal stress.

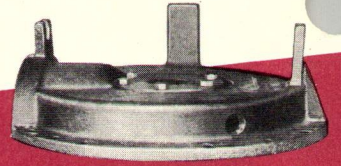
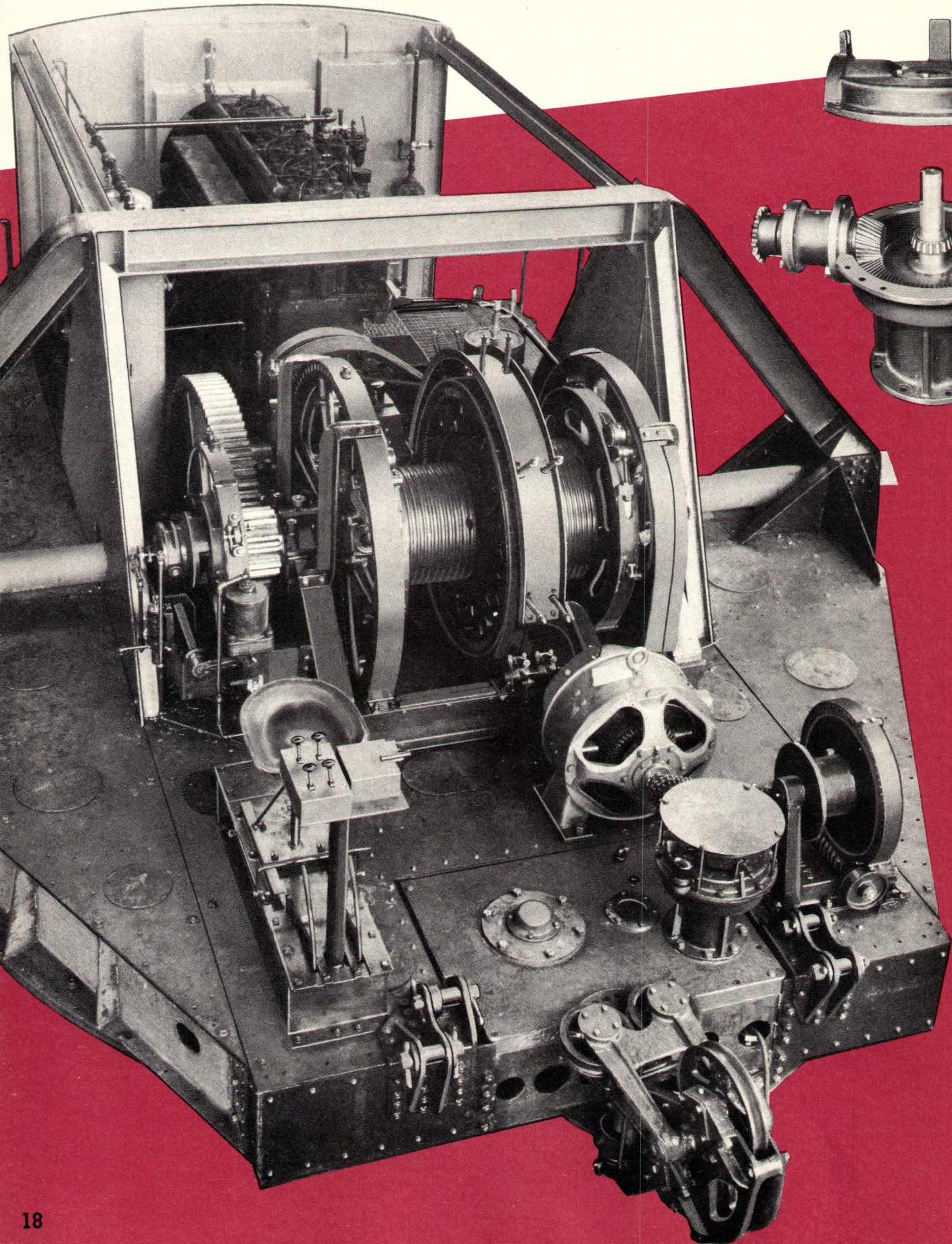


These hooks at rear of revolving frame engage base during moving cycle.

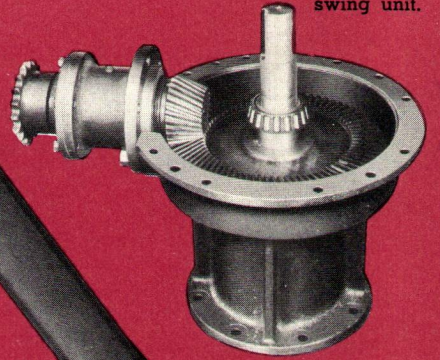


Front view of revolving frame, roller circle and base.

SIMPLE, accessible machinery



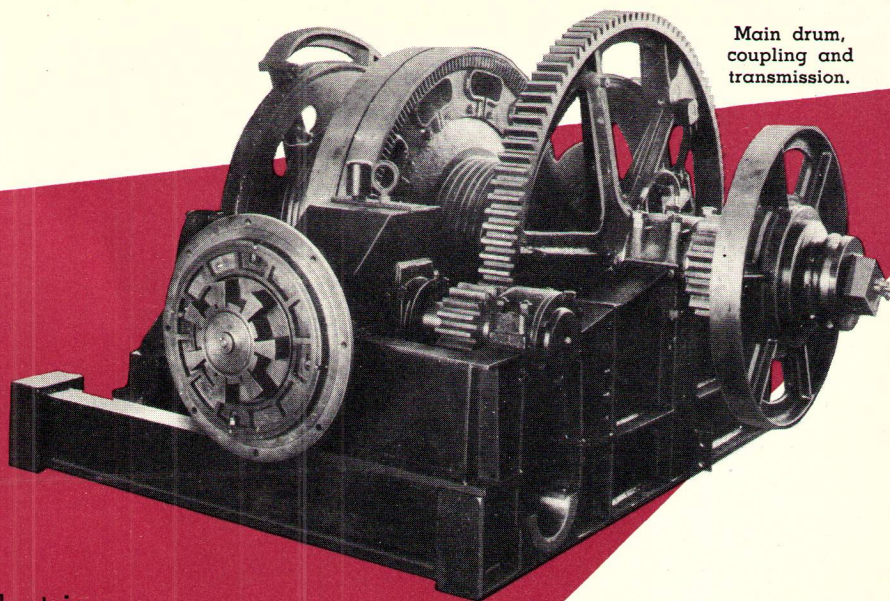
Vertical swing unit.



THE simple units of the 3-W main machinery are well arranged for convenience of operation and to give maximum counter-balance effect. Heavy units are concentrated at the rear, back of the center of rotation. Complications involved in long mechanical transmission systems are avoided by generating electric power at the engine to drive swing and boom-hoist with an electric motor. The simple mechanical gear transmission that drives the big hoist and drag drums is fully enclosed and operates in oil. Both drums are grooved and mounted on a single drum-shaft driven through a large gear. Big outside band-brakes, operated from foot-pedals at the operator's stand, give smooth, cool, braking action.

The transmission unit consists of a bevel gear and pinion mounted on anti-friction bearings contained in an oil-tight housing. The single-disc, dry-plate clutch is controlled from the operator's stand. The bevel-gear shaft, mounted in anti-friction bearings, is extended beyond the housing and carries the transmission pinion which meshes with the drum-shaft gear. The bevel-gear and pinion run in oil, and all bearings except the outboard bearing are lubricated from the gear case.

Not only does the electric-powered swing greatly simplify the transmission of power to the swing and boom-hoist units located at the front of the revolving frame, but it also simplifies the swing machinery and eliminates most of the adjustments and maintenance usually required on swing units. No clutches or brakes are required.



Main drum, coupling and transmission.

The 25 H.P. swing motor with its independent generator under Ward Leonard control gives the operator positive and accurate control of the swing with fast acceleration and quick plugging.

The swing machinery is contained in a unit base built into the front end of the revolving frame. The unit consists of bevel and spur-gear reductions from the motor to the vertical rack-pinion shaft. Gears are enclosed, run submerged in oil, and, with the exception of the rack-pinion shaft, are mounted on taper roller bearings. With the exception of the motor and first gear reduction, which is enclosed in a separate cast case, the entire swing machinery is contained within the base where it is completely protected.

Strength all through the machinery contributes to the Bucyrus-Monighan's remarkable reputation for trouble-free performance. This freedom from most of the breakdown delays usual in dragline work, plus the all-weather traction, not only means steady output that adds very materially to profits but also takes a great deal of the "grief" out of the dragline business.

FAST, EASY control.

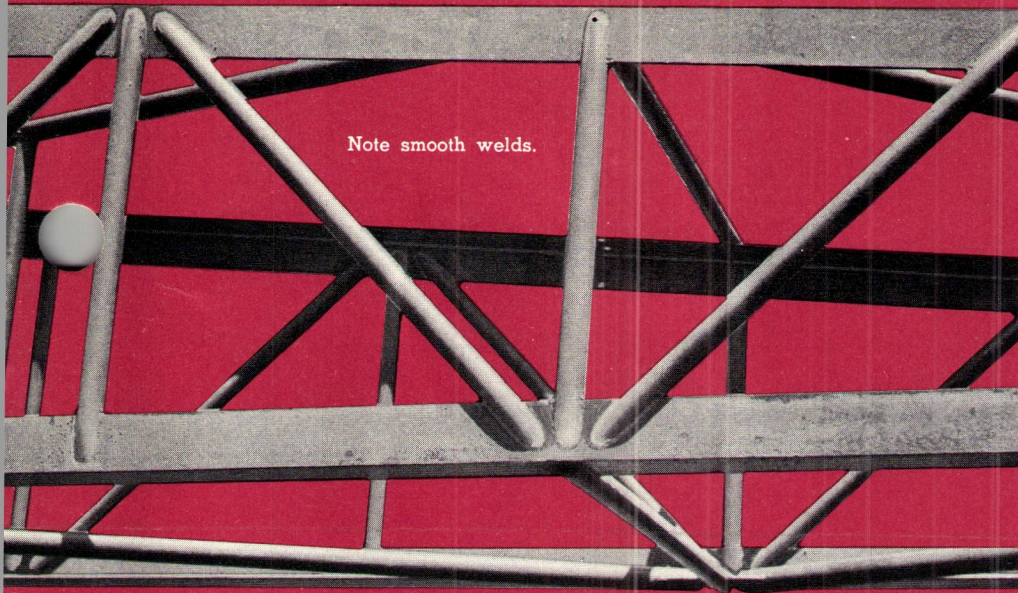
Full vision, easy, air clutch-control, strong smooth-working linkage, and adjustments that "stay put," make it easy for the 3-W operator to apply all the speed built into the machine. Electric-switch hand levers control electrically-operated air valves that actuate the clutches. The control action is quick, positive, smooth, and dependable.

All parts of the control system are simple and easy to keep in accurate adjustment. Lubrication is largely automatic, the principal operating units being fully enclosed and running in oil. The swing is powered by an independent electric motor with Ward Leonard multi-voltage control. There is minimum "operator-fatigue" on the 3-W.

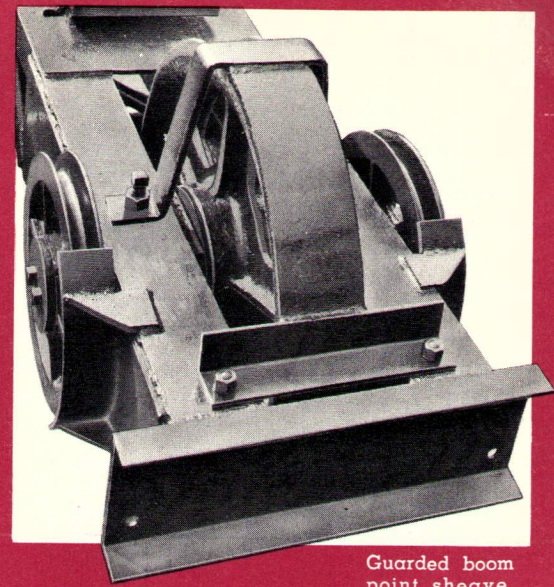


Seat is roomy, comfortable, and easily adjustable. Controls are simple and operate easily.





Note smooth welds.



Guarded boom point sheave.

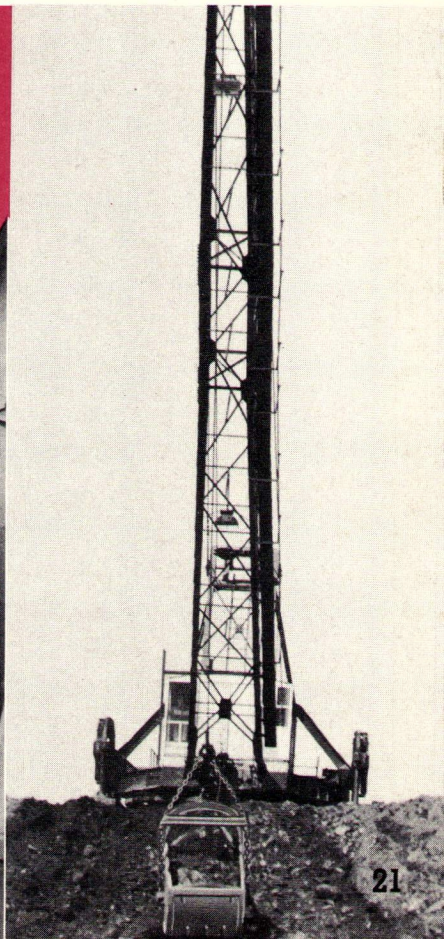
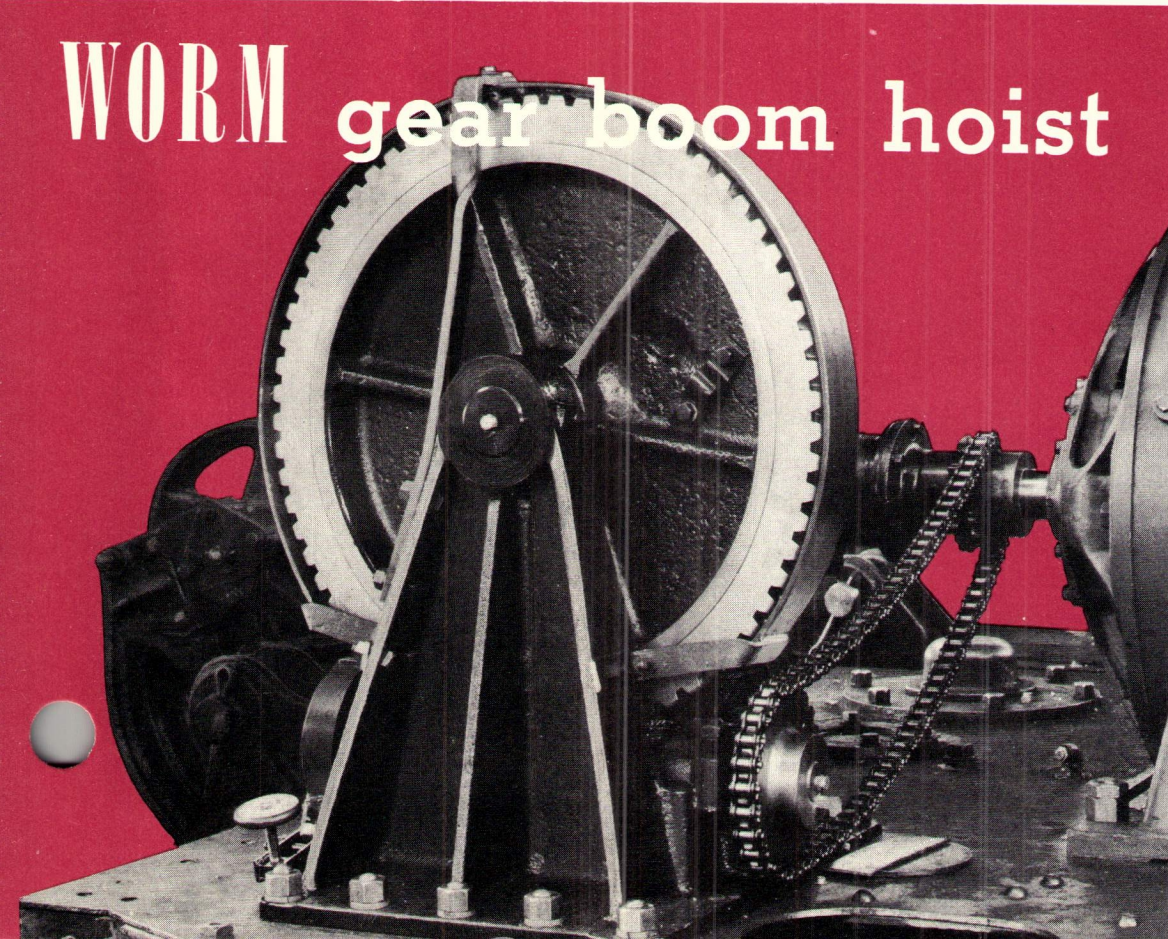
WIDE, STRONG BOOM

The boom, of all-welded construction, consists of four L-shaped chord members, latticed on the four sides with steel tubing. The wide lower end is plated with heavy steel and is pin-connected to the strong cast-steel brackets on the frame. This wide based, tubular latticed, specially welded boom is top quality throughout and has

proved its exceptional lasting ability on hundreds of Bucyrus-Monighan installations.

The boom hoist is operated by a self-contained worm-gear-driven drum. The unit is operated by a roller chain from a sprocket on the swing motor shaft. The boom hoist is reversible and a safety band-brake prevents creeping. Both raising and lowering are under power control at all times.

WORM gear boom hoist



EASY ON MAINTENANCE

Free Swinging Fairlead

The 3-W universal fairlead saves rope wear. It consists of two horizontal and two vertical sheaves in a strong swivel-frame that swings laterally in line with the lead of the drag rope. The sheaves, of heat-treated alloy steel, have turned grooves for the rope. All bearings are protected against dirt. Renewable guards align the sheaves and protect them from contact with the drag-rope socket and from material adhering to the rope.

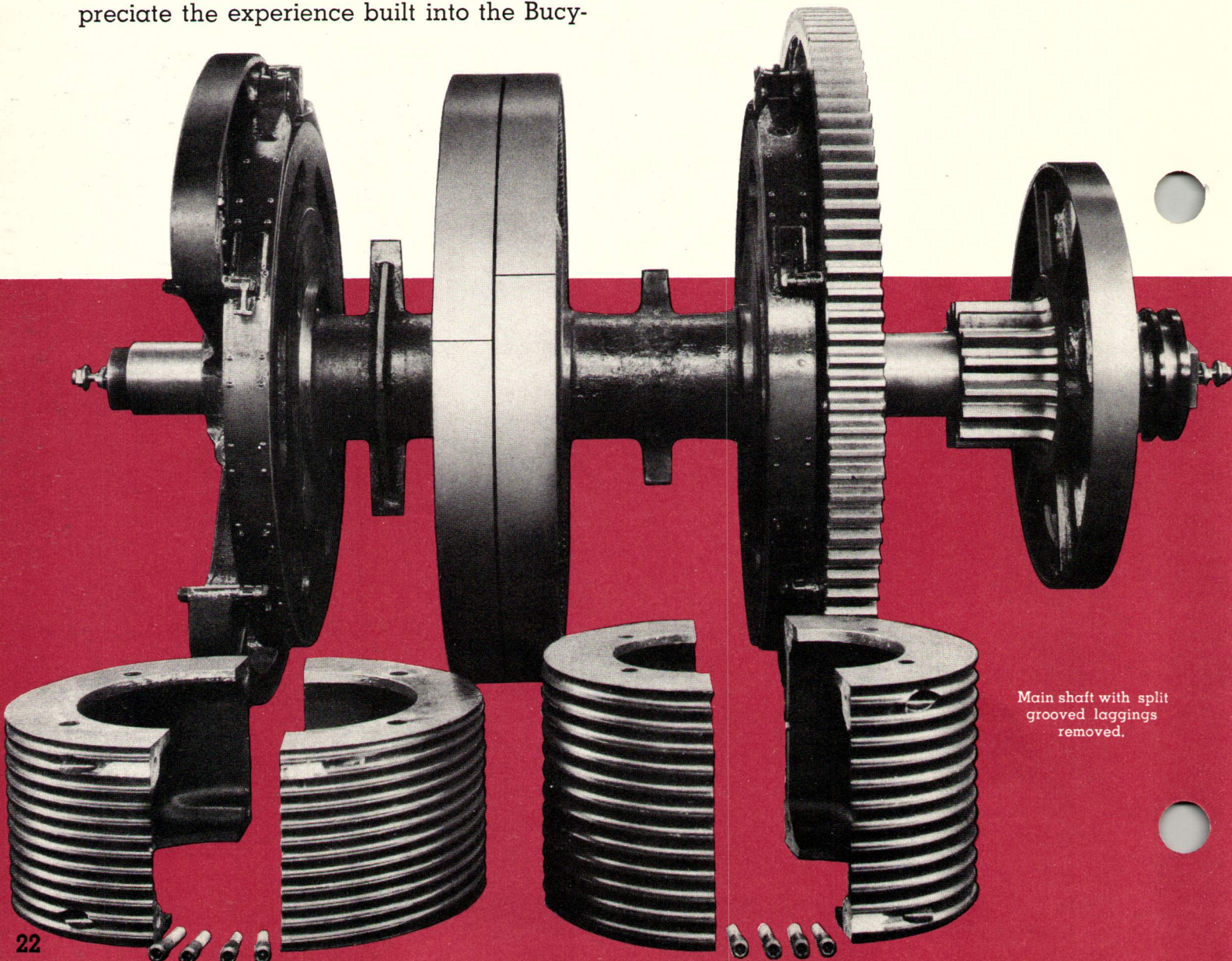
Convenient Drums

Experienced dragline operators quickly appreciate the experience built into the Bucy-

rus-Monighan drum unit. Strong, substantial construction of special alloy steels gives these units extra long-wearing life. The drums are of split construction and can be easily removed without disturbing the housing or removing the shaft.

Handy Red Arch Buckets

Standard equipment on the 3-W includes a fast-digging Bucyrus-Erie Red Arch dragline bucket of size and type selected for the digging to be handled. Red Arch buckets provide low-cost high-output performance that goes with the 3-W's splendid digging



Main shaft with split grooved laggings removed.

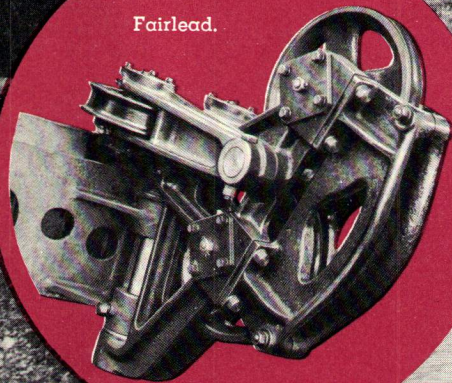
ability. They carry big heaping loads, waste no power or speed on dead-weight, and give excellent, dependable service.

All parts give proven long life and low maintenance. The quickly renewable and reversible inserted Tiger Teeth of forged high-carbon steel, annealed and heat-treated, are easily resharpened. Many owners order an additional light (and therefore larger) bucket for use where digging permits. Its greater capacity makes it well worth while to carry this extra bucket on hand and to change over to it whenever light material is encountered.

Red Arch chains are an important factor in the exceptional economy of Red Arch buckets. They provide greater increased strength with less weight. Made of solid alloy-steel hot-rolled round sections, incandescent-arc butt welded, they contain no defects in metal or welds. Snagging and link breakage is prevented by the free movement of the rounded short links.

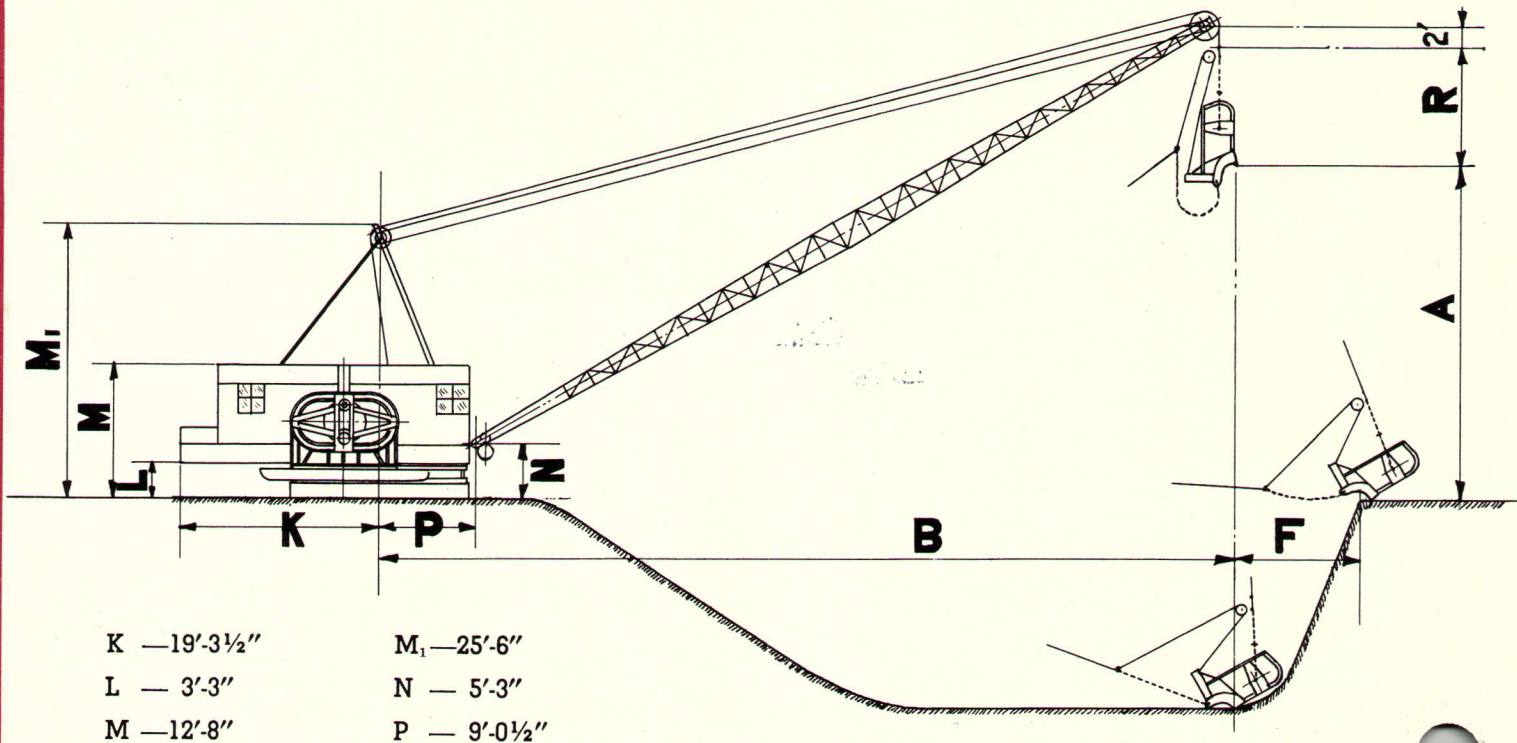


Fairlead.



SPECIFICATIONS

3-W



- K — 19'-3½"
- L — 3'-3"
- M — 12'-8"
- M₁ — 25'-6"
- N — 5'-3"
- P — 9'-0½"

A—Dumping Height = Height of boom point sheave minus (R + 2 ft.). See Table.

B—Dumping Reach — Operating Radius. See Table.

F—Throw of bucket — ⅓ to ½ Dumping height A, depends on ability of operator.

R—Length of bucket—varies with size and type of bucket. See bucket dimensions. (Buckets usually used on this machine have length R of from 12'-0" to 12'-6".)

WORKING RANGES AND LOADS

Length of Boom	Operating Radius B	Angle of Boom	Allowable Dragline Load See Note	Digging Depth		Height of Boom Point Sheaves
				Std. Ropes Allow	Maximum No Overwind on Drums	To obtain dump height—deduct R + 2 ft.
80 Feet	68'-0"	40°	18,000	30'-0"	35'-0"	56'-9"
	73'-0"	35°	18,000	35'-0"	40'-0"	51'-3"
	77'-0"	30°	18,000	40'-0"	45'-0"	45'-3"
	80'-0"	25°	18,000	45'-0"	50'-0"	39'-3"
90 Feet	76'-0"	40°	18,000	27'-0"	27'-0"	63'-3"
	81'-0"	35°	17,100	33'-0"	33'-0"	57'-0"
	85'-0"	30°	16,300	39'-0"	39'-0"	50'-3"
	89'-0"	25°	15,500	45'-0"	45'-0"	43'-6"

The type of dragline bucket used depends on the nature of the material being handled and upon operating conditions.

The size of the bucket depends on the weight of the bucket and contents.

For normal fast operation the allowable dragline load should not be exceeded.

WEIGHTS

	Electrical	Diesel
*Net weight, domestic, including bucket, approximate.....	172,000 lbs.	177,000 lbs.
Working weight, including bucket, approximate.....	212,000 lbs.	207,000 lbs.
Ballast required, furnished by purchaser, maximum (varies with boom length).....	40,000 lbs.	20,000 lbs.
Shipping weight, prepared for export, including bucket, approximate.....	187,000 lbs.	192,000 lbs.
Ships option tons.....	190	196

* Add 4,000 lbs. blocking on cars, when estimating freight for domestic delivery.

WALKING TRACTION MOUNTING:

Width and length of shoes..... ^{20'-0"} 3'-0"x ^{16'-0"} 16'-0"	Length of step.....6'-0"
Area of both shoes..... ^{120.96} sq. ft.	Overall width over shoes.....24'-0"
Diameter of cam.....4'-4"	Diameter of walking shaft.....8"-(at towers 9")

Walking speed, normal engine speed .0.27 mi. per hr.

BASE:

Outside diameter.....17'-0"	Size and weight of roller rail per yard..5"—104 lbs.
Bearing area.....227 sq. ft.	Number and diameter of rollers.....20—10"
Diameter rail circle.....16'-6"	Pitch diameter swing rack.....12'-8 ³ / ₄ "

REVOLVING FRAME:

Width and length (shipping center section).....	Depth, outside sill members.....20"
.....10'-0"x27'-11 ¹ / ₂ "	Depth, inside sill members.....20"

MACHINERY:

Hoist drum, grooved.....30" P. D.	Speed of drag.....157 f.p.m.
Speed of hoist, 1 part.....188 f.p.m.	Diameter of hoist rope, 1 part.....1"
Drag drum, grooved.....25" P. D.	Diameter of drag rope.....1 ¹ / ₄ "
Diameter of boom hoist rope, 4 part.....1"	

DIESEL POWER:

Fairbanks-Morse Type ³⁶ 44 H.—5 cylinder.	Horsepower rating (Excavator Service).....190
Bore and Stroke.....8 ³ / ₄ "x10 ¹ / ₂ "	Capacity of fuel tank..... 200.130 U. S. Gals.
Normal speed.....450 r.p.m.	Capacity of water system.....50 U. S. Gals.

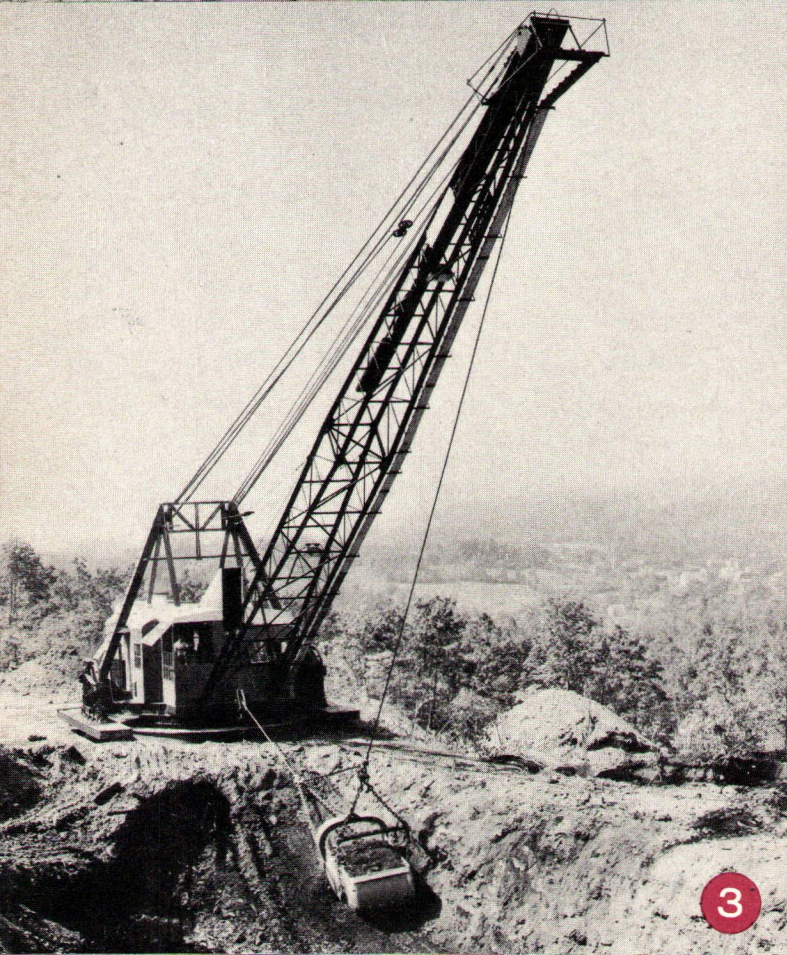
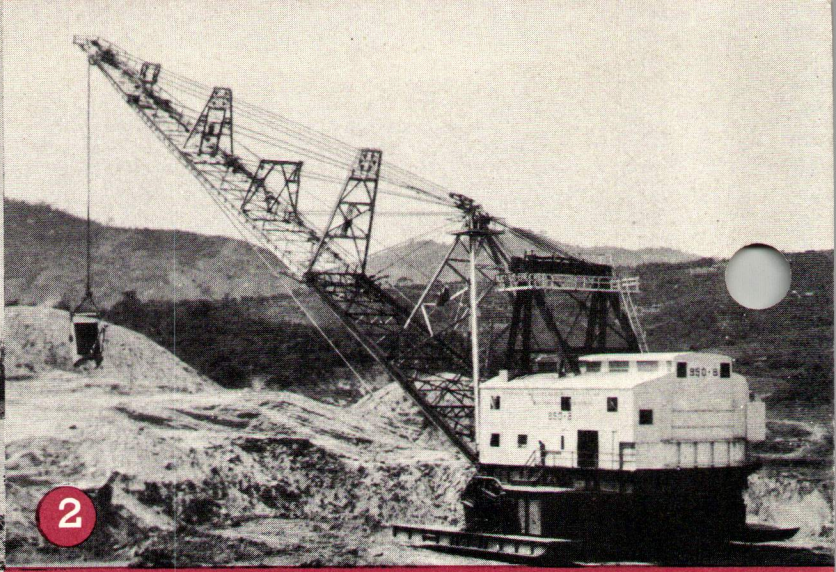
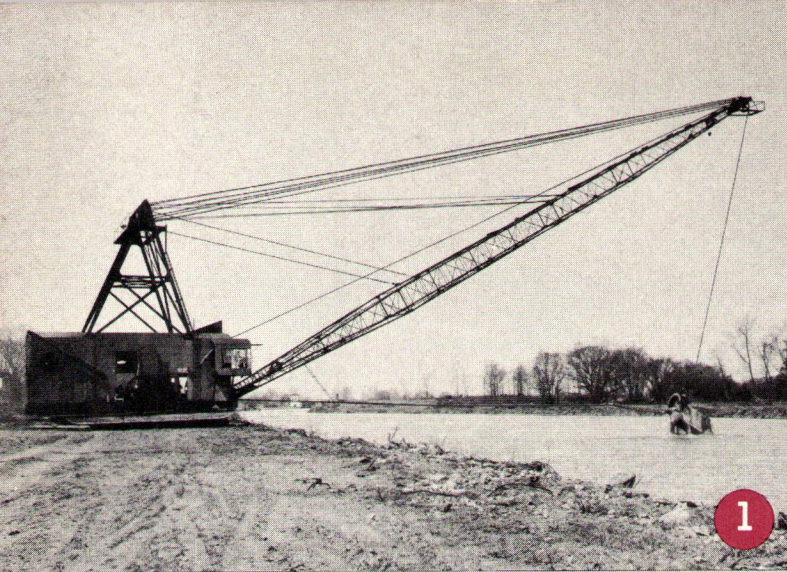
ELECTRIC POWER:

Driving motor, motor generator set.....125 h.p.	Hoist motor, Cont. rating 75° (blower).....75 h.p.
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ELECTRICAL EQUIPMENT

Diesel or Electric

Swing motor, Cont. rating 50° C.....25 h.p.	Generators, W. L. control..Capacities to suit motors
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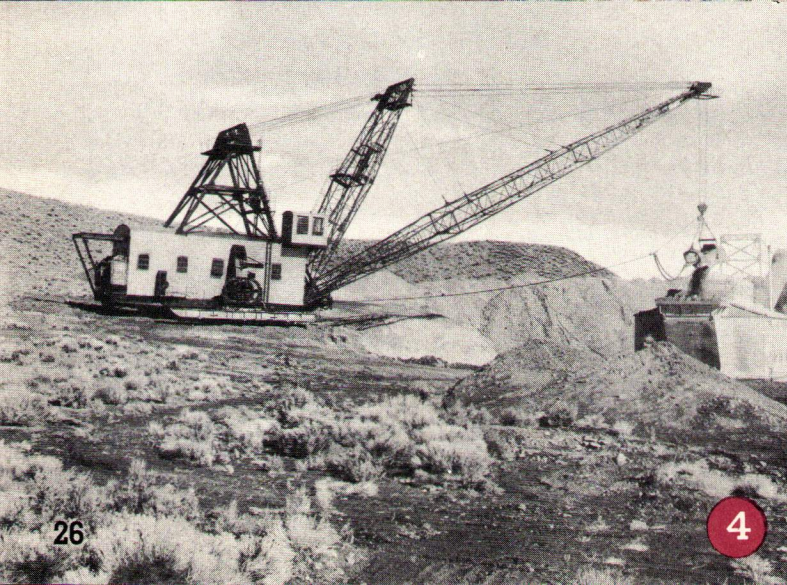


A line of walking draglines field-proved in world-wide service . . .

1 Shown working on the New York State Barge Canal near Little Falls, this 9-W is owned by Morrison-Knudsen of Boise, Idaho.

2 Stripping overburden in a Brazilian cement quarry, this Bucyrus-Erie 950-B dragline uses Bucyrus-Monighan walking traction.

3 This 5-W strips coal for the Corredale Construction Co. in Pennsylvania. The 5-W usually carries 4 to 6 yard buckets on 100 to 135-foot booms.





4 Largest of the standard Bucyrus-Monighan machines, the 15-W carries 14 and 12 yard buckets on 160 and 215 foot booms respectively. Owned by the Dayton Dredging Company, this 15-W is excavating gravel, sand, and clay near Dayton, Nevada.

5 Bucyrus-Monighans uncover many million tons of coal a year. This 10-W, owned by Maumee Collieries, strips bituminous coal near Terre Haute, Indiana.

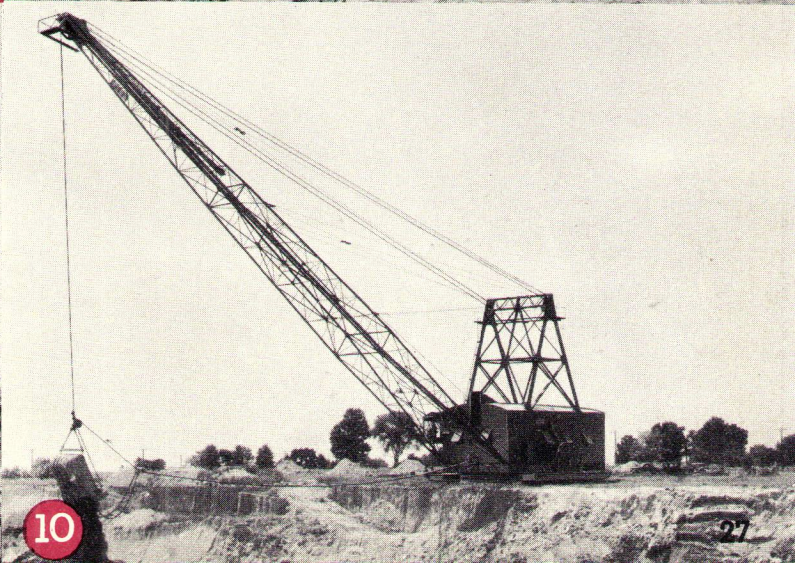
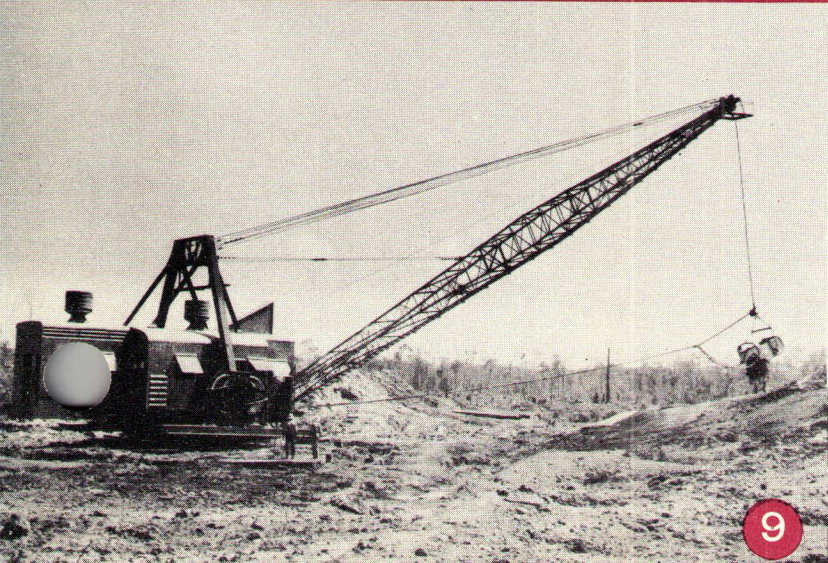
6 This 10-W is stripping a placer gold deposit in Alaska for the United States Smelting and Refining Co.

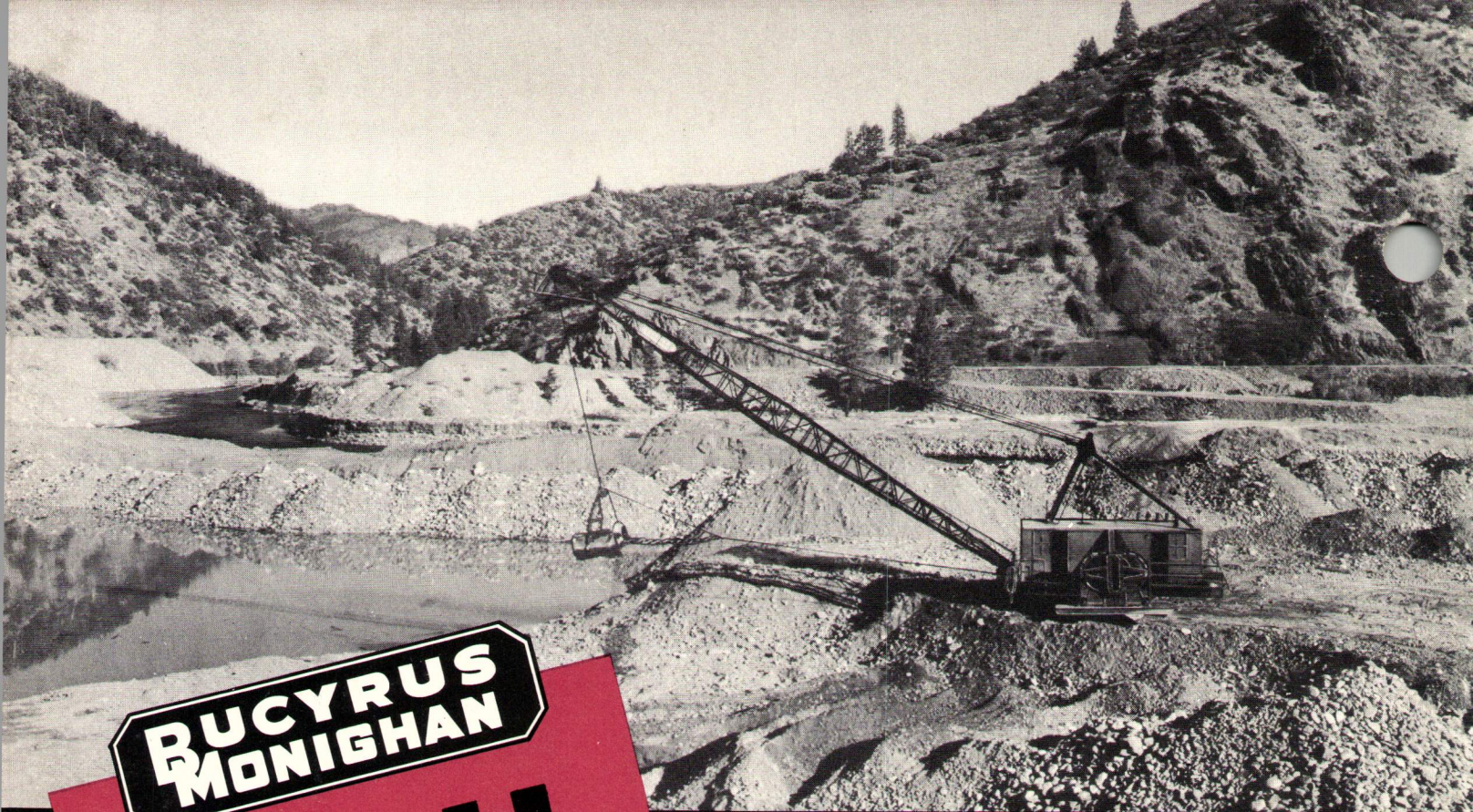
7 Owned by William Von der Hellen Mines, with headquarters at Medford, Oregon, this 3-W is mining placer gold near Hornbrook, California.

8 Henry J. Kaiser Co. uses this 5-W to strip overburden from a gravel deposit at the Radum gravel plant, 30 miles east of Oakland, California.

9 Malayan Collieries, Inc., use this 5-W to strip overburden from a coal deposit in the Federated Malay States.

10 This 9-W, owned by Big Bend Collieries, is stripping coal in Indiana. The 9-W carries 7 to 10 yard buckets on 100 to 200-foot booms.





**BUCYRUS
MONIGHAN**

3-W

**BUCYRUS-MONIGHAN
COMPANY
CHICAGO, ILLINOIS, U.S.A.**

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It is the policy of Bucyrus-Monighan Company to improve its products continually; accordingly 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 are necessary because of the unavailability of materials.