

**LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA****DETAIL SPECIFICATIONS****APRIL 20, 1955**
MODEL
HC-88
25-TON
ZEPHYRCRANE
SUPERSEDES SPECIFICATIONS DATED OCTOBER 20, 1954

* Indicates Revisions or Additions to Specifications Dated 10/20/54

GENERAL INFORMATION ONLY**CRANE CARRIER CHASSIS****6 x 4 DRIVE—STANDARD****6 x 6 DRIVE—OPTIONAL**

1. **FRAME and CAB**—Frame side rails, 15" x 50# channel with ample reinforcing and cross bracing to assure maximum strength. One-man cab, 32" wide, fully enclosed, offset to extreme left.
2. ***FRONT AXLE**—Timken #27463-N heavy-duty, drop forged, "I" section beam, heat-treated alloy steel. Anti-friction bearings, 75 $\frac{7}{8}$ " track. Springs, semi-elliptic. Overload spring standard. Front wheel drive axle is optional at extra cost.
3. ***REAR AXLE**—Timken #SW456-P tandem, double worm drive type. Positive drive to four full-floating dual wheels. Ratio 9.25 to 1.00. Bogie mounting. 72 $\frac{1}{4}$ " track. Oil capacity each axle 16 quarts.
4. **WHEELS AND RIMS**—Budd, pressed-steel disc. 20 x 7.5" R5° rims.
5. ***TIRES**—All wheels, 11:00 x 20, 12-ply, military type non-directional mud and snow tread. Dual tires on rear wheels and single tires on front wheels.
6. ***OUTRIGGERS**—Front: Double-beam sliding in fixed outrigger box. Rear: Double-beam sliding in removable outrigger box. Two 4" diameter x 2" wide rollers are mounted in each outrigger box to facilitate easy movement of beams. Screw jacks and pontoons are offered optional at extra cost as outrigger accessories.
7. ***SERVICE BRAKES**—16 $\frac{1}{2}$ " x 7", on four rear wheels, 17 $\frac{1}{4}$ " x 4", on two front wheels, Westinghouse air-applied. Alloy iron drums. 7 $\frac{1}{4}$ cu. ft. compressor. Six wheel brakes are optional at extra cost with 6 x 4 drive and standard with 6 x 6 drive.
8. ***EMERGENCY BRAKES**—16" dia., four-shoe, disc type, plus automatic application of all wheel air brakes simultaneously with application of emergency.
9. ***STEERING GEAR**—Ross TW-74, cam and twin lever, 22" dia. wheel. Oil capacity 5 $\frac{1}{2}$ pints. Power steering is optional at extra cost.
10. ***ENGINES — Standard**—Waukesha 140GK six-cylinder, 4-stroke cycle, 4 $\frac{1}{2}$ " bore, 5 $\frac{1}{2}$ " stroke, 525 cu. in. displacement, brake h.p. of stripped engine at maximum recommended governed speed of 2250 r.p.m., 142 h.p. Maximum torque 425 ft. lbs. at 1000 r.p.m., three-point support. Aluminum pistons.
Optional at extra cost—Waukesha 145GK six-cylinder, 4-stroke cycle, 5 $\frac{1}{4}$ " bore, 6" stroke, 779 cu. in. displacement, brake horsepower of stripped engine at maximum recommended governed speed of 2250 r.p.m., 186 h.p., maximum torque 585 ft. lbs. at 1000 r.p.m., three-point support. Aluminum pistons.
Optional at extra cost—General Motors 4058C Diesel, 4-cylinder, 2-cycle, 4 $\frac{1}{4}$ " bore, 5" stroke, 283.7 cu. in. displacement, brake horsepower of stripped engine at recommended governed speed of 2250 r.p.m. is 138, maximum torque 340 ft. lbs. at 1200 r.p.m.
11. ***CLUTCHES:**
With 140GK and GM4058C Engines: Lipe 15" dia, single plate, dry disc type, ball bearing throw-out.
With 145GK and GM4058C Engines: Lipe 14" dia. two-plate, dry disc type, ball bearing throw-out.
12. ***TRANSMISSIONS:**
With 140GK and GM4058C Engines: Main, Fuller 5A65, 5-speed, 12 quart oil capacity. Auxiliary, Fuller 2A92, 2-speed, 6 quart oil capacity.
With 145GK and GM4058C Engines: Main, Fuller 4A86, 4-speed, oil capacity 12 quarts. Auxiliary, Fuller 2A92, 2-speed, 6 quarts oil capacity.

**GENERAL INFORMATION ONLY**

- 13. *UNIVERSALS**—With 140GK and GM4058C Engines, Universals are Spicer 1700, needle bearing, heavy-duty type throughout.

With 145GK and GM4058C Engines, Universals are Spicer 1700 main to auxiliary transmission and between rear axles. Spicer 1800 auxiliary transmission to forward rear axle.

- 14. *SPEEDS**—(Engine speed 2100 r.p.m.)

WAUKESHA 140GK AND GM4058C

Gear	5-Speed Main Transmission Fuller 5A65	2-Speed Auxiliary Transmission Fuller 2A92	
		1.00 to 1.00	2.298 to 1.00
High	1.00 to 1.00	28.7 m.p.h.	12.5 m.p.h.
Fourth	1.38 to 1.00	20.8 m.p.h.	9.1 m.p.h.
Third	2.62 to 1.00	10.9 m.p.h.	4.7 m.p.h.
Second	4.67 to 1.00	6.1 m.p.h.	2.7 m.p.h.
First	8.08 to 1.00	3.6 m.p.h.	1.6 m.p.h.
Reverse	8.12 to 1.00	3.5 m.p.h.	1.5 m.p.h.

WAUKESHA 145GK

Gear	4-Speed Main Transmission Fuller 4A86	2-Speed Auxiliary Transmission Fuller 2A92	
		1.00 to 1.00	2.298 to 1.00
High	1.00 to 1.00	28.7 m.p.h.	12.5 m.p.h.
Third	1.76 to 1.00	16.3 m.p.h.	7.1 m.p.h.
Second	3.27 to 1.00	8.8 m.p.h.	3.8 m.p.h.
First	6.54 to 1.00	4.4 m.p.h.	1.9 m.p.h.
Reverse	7.24 to 1.00	4.0 m.p.h.	1.7 m.p.h.

- 15. *ELECTRICAL SYSTEM**—12-volt starting, lighting and ignition. Two 6-volt batteries, 19 plate, 155 ampere hour capacity. Heavy-duty starter with Bendix drive. Self-cooling generator, 200 watt capacity. Voltage regulator. Sealed beam headlights, tail lights, highway lights and turn signals.

- 16. CENTERPIN**—Cast-steel, 10" diameter. Welded to chassis of truck.

- 17. TURNABLE**—Cast-steel, double flanged, machined. 63" O.D. Internal Gear, 51" P.D., 102 cast teeth, 5" face. Welded to truck chassis.

- 18. *WEIGHT**—Complete chassis, without centerpin and turntable, approximately 26,300 pounds.

- 19. DIMENSIONS:**

	WAUKESHA 140GK	WAUKESHA 145GK
Wheelbase	190"	200"
Over-all Width (over tires)	8'-0"	8'-0"
Over-all Length	24'-10½"	25'-8½"
Over-all Width (outriggers extended)	14'-5"	14'-5"
Turning Radius (to outside of outer front wheel)		
Right	35' 42"	38' 44"
Left	35' 42"	38' 44"
Maximum Grade Climbable	35%	45% ①

① Note: On concrete—ideal conditions.

- 20. *STANDARD EQUIPMENT**—One-man cab offset to the extreme left to allow crane boom to be lowered and carried in forward position. Removable panel in cab to get at left side of motor. Right hand window hinged at top. Steel cowl, ¼" diamond floor plate floor boards, running board of heavy-duty design and construction throughout. Heavy expanded grille protects radiator core from injury, forged tow hooks secured to each corner of the frame. Instrument panel provides full complement of instruments including speedometer, ammeter, fuel level gauge, engine temperature indicator, air pressure gauge, oil pressure gauge—also hand throttle, choke control and ignition. Loud two-tone electrical horn. Low air pressure warning buzzer. Foot accelerator. Rubber nipples on distributor and coil terminals to prevent shorting. Complete kit of high quality tools, 10-ton hydraulic jack. High pressure grease gun, spare wheel. Tire inflation hose 20'-0" long. Rear fenders—heavy diamond plate steel.

UPPER REVOLVING FRAME

- 21. UPPER FRAME**—All-welded, stress-relieved unit with main members of 12" x 35# ship channel.

- 22. CENTERPIN BEARING**—Bronze bushing, 10" inside diameter, 4½" long.

- 23. TURNABLE ROLLERS**—Four conical hook-type 4135 forged-steel rollers, two equally spaced in front and two in rear, 8½" diameter x 3½" face, heat-treated to 260-300 Brinell. Outside diameter flame-hardened. Two tapered roller bearings in each roller. Shims adjust rollers for wear.



GENERAL INFORMATION ONLY

24. *POWER UNITS:

	WAUK. 135GZ ^{①, ④}	WAUK. 140GK ^④	CATER- PILLAR D318 ^④	GENERAL MOTORS 3030C ^②	GENERAL MOTORS 4030C ^②	INTERNA- TIONAL UD525
Number of Cylinders	6	6	6	3	4	6
Cycle	4	4	4	2	2	4
Bore & Stroke—Inches	4.375 x 5	4.5 x 5.5	4.5 x 5.5	4.25 x 5	4.25 x 5	4.5 x 5.5
Piston Displacement— Cu. In.	451	525	525	212.7	283.7	525
Full-Load Speed—r.p.m.	1610	1440	1450	1655	1475	1470
Governed High Speed— r.p.m.	1780	1600	1600	1780	1600	1600
Piston Speed at F.L.S.— f.p.m.	1342	1320	1330	1380	1230	1345
Horsepower at Full- Load Speed with All Accessories						
Maximum Horse- power	92	101				
Intermittent Horse- power	87	91	91	85	91	91
A.M.A. or NACC Horsepower ^③	45.9	48.7	48.6	21.7	28.89	48.6
Peak Torque—r.p.m.	1000	800	1200	1200	1100	1000
Peak Torque—ft. lbs.						
Maximum	330	390				
Intermittent	297	351	336	290	335	358
Cooling	Water Pump and Fan	Water Pump and Fan	Water Pump and Fan	Water Pump and Fan	Water Pump and Fan	Water Pump and Fan
Cooling Capacity—Gal.	7.5	10.5	13.6	5.75	6.75	22.5
Clutch: Make	Twin-Disc	Twin-Disc	Twin-Disc	G.M.	G.M.	Twin-Disc
Model	B-111-HP2	B-211P-2	16167	Heavy-Duty	Heavy-Duty	B-114P-1
Plate Dia., in.	11½	11½	14	11½	11½	14
Plates, number	1	2	1	1	1	1
Shaft Dia., in.	2¼	2¼	2¼	2¼	2¼	2¼
Hydraulic Coupling ^④ — Make	Twin-Disc	Twin-Disc	Twin-Disc			
Model	175-HUC-1-1	175-HUC-1-1	175-HUC-1-1			
Shaft Dia., in.	2¼	2¼	2¼			
Air Cleaner	Donaldson Heavy-Duty Oil Bath	Donaldson Heavy-Duty Oil Bath	Donaldson Heavy-Duty Oil Bath	Donaldson Heavy-Duty Oil Bath	Donaldson Heavy-Duty Oil Bath	Donaldson Heavy-Duty Oil Bath
Fuel Tank Capacity, Gal.	50	50	50	50	50	50
Fuel Injection Pump	None	None	Caterpillar	G.M.	G.M.	International
Carburetor	Zenith	Zenith	-----	-----	-----	-----
Fuel Filter (Replaceable)		Screen	Absorbent	G.M.	G.M.	Purolator
Starting System	Electric 12-Volt Two 6-Volt, 19-Plate Batteries	Electric 12-Volt Two 6-Volt, 19-Plate Batteries	2-Cyl. Gas Engine 15 h.p. @ 3000 r.p.m. with 6-Volt Electric Starter	Electric 12-Volt Two 6-Volt, 19-Plate Batteries	Electric 12-Volt Two 6-Volt, 19-Plate Batteries	Electric 12-Volt Two 6-Volt, 19-Plate Batteries. Gasoline for Cold Starting
Ignition	12-Volt Distributor	Magneto	Magneto on Starting Engine	None	None	Magneto for Starting Only
Lubrication	Full Pressure	Full Pressure	Full Pressure	Full Pressure	Full Pressure	Full Pressure
Lubrication Oil Cooler	No	No	Yes	Yes	Yes	No
Lubrication Oil Filter	Yes	Yes	Yes	Yes	Yes	Yes
Crankcase Capacity— Quarts	12	10	22	15	17	18

① Standard

② Muffler is standard

③ H.P. = $\frac{(\text{number of cylinders}) \times (\text{bore in inches})^2}{2.5}$

④ Hydraulic coupling is optional at extra cost.



25. ***TRANSMISSION**—4"-wide, $\frac{3}{4}$ "-pitch Link-Belt Silver Streak silent chain, enclosed in case. Oil drip lubrication. 20-tooth engine pinion and 160-tooth chain wheel furnished for all engines except Waukesha 135GZ and General Motors 3030C which use 18-tooth engine pinion and 160-tooth chain wheel.
26. **REDUCTION SHAFT** — 1040 steel, $3\frac{1}{2}$ " diameter. Mounted on anti-friction bearings. Shaft speed: 179 r.p.m. @ full-load speed.
Two Drive Pinions—4140 steel with teeth flame-hardened to 52-60 Rockwell, 5.66" pitch diameter, 3" face, 17 cut teeth. Both pinions involute splined to shaft.
27. **CLUTCH SHAFT**—4140 steel, 4" diameter, heat-treated to 248-293 Brinell, mounted on anti-friction bearings. Shaft speed: 39 r.p.m. @ full-load speed.
Spur Gear, left side—Cast-steel, flame-hardened to approximately 400 Brinell. 27.00" pitch diameter, 3" face, 81 cut teeth.
Spur Gear, right side—Cast-steel, flame-hardened to approximately 400 Brinell. 25.66" pitch diameter, 3" face, 77 cut teeth.
Bevel Gear—Cast-steel, heat-treated to 260-300 Brinell, 14" pitch diameter, 3" face, 21 cast teeth. Fully enclosed and running in oil.
Clutches—Internal-expanding 2-shoe type, 20" diameter x 5" face, hydraulically operated.
28. ***FRONT DRUM**—12" between flanges with 27"-diameter $4\frac{1}{2}$ "-wide brake drum. Two-piece, removable cast-steel grooved lagging, either $13\frac{1}{4}$ " or $15\frac{1}{4}$ " root diameter.
Shaft—4140 steel, 4.33" diameter, heat-treated to 249-293 Brinell. Mounted on anti-friction bearings. Shaft speed: 38 r.p.m. @ full-load speed. Extended shaft for reversing clutch for retract or controlled load lowering is standard.
Gear—Cast-steel, flame-hardened to approximately 400 Brinell. 27.00" pitch diameter, 3" face, 81 cut teeth.
Brake—External-contracting band, 27" diameter, 4" face, mechanically operated.
Clutch—Internal-expanding 2-shoe type, 20" diameter x 5" face, hydraulically operated.
Retract Clutch—Internal-expanding 2-shoe type, 20" diameter x 5" face, hydraulically operated. Retract clutch also available for optional controlled load lowering.
Retract Gear—Cast-steel, heat-treated to 260-300 Brinell, 19" pitch diameter, 3" face, 57 cut teeth. Furnished for retract or controlled load lowering.
29. ***REAR DRUM**—12" between flanges with 27" diameter, $4\frac{1}{2}$ " wide brake drum. Two-piece, removable cast-steel grooved lagging, either $13\frac{1}{4}$ " or $15\frac{1}{4}$ " root diameter.
Shaft—4140 steel, 4.33" diameter, heat-treated to 249-293 Brinell, mounted on anti-friction bearings. Shaft speed: 38 r.p.m. @ full-load speed. Extended shaft for reversing clutch for controlled load lowering is standard.
Gear—Cast-steel, flame-hardened to approximately 400 Brinell. 27.00" pitch diameter, 3" face, 81 cut teeth.
Brake—External-contracting band, 27" diameter x 4" face, mechanically operated.
Clutch—Internal-expanding 2-shoe type, 20" diameter, 5" face, hydraulically operated. Optional two-shoe clutch available for controlled load lowering.
Lowering Gear—Cast-steel, heat-treated to 260-300 Brinell, 28.33" pitch diameter, 3" face, 85 cut teeth. Furnished for optional controlled load lowering.
30. ***THIRD DRUM** (Optional at extra cost)— $10\frac{3}{8}$ " between flanges with 18" diameter x $3\frac{1}{2}$ " wide brake drum. Two-piece removable cast-steel grooved lagging, either 9" or 11" root diameter. Unit is mounted in auxiliary housings and bolted to front legs of main side housings.
Shaft—4140 steel, 3.33" diameter, heat-treated 248-293 Brinell, mounted on anti-friction bearings. Shaft speed: 45 r.p.m. @ full-load speed.
Gear—Cast-steel, 22.667" pitch diameter, 3" face, 68 cut teeth.
Brakes—External-contracting band type, 18" diameter x 3" face, mechanically operated.
Clutch—Internal-expanding two-shoe type, $17\frac{1}{4}$ " diameter x 4" face, hydraulically operated.
31. ***INDEPENDENT RAPID BOOMHOIST**—Spur gear-driven with boom raising and lowering controlled by two-shoe Speed-o-Matic clutches for extra precision.
Shaft—1040 steel, 4" diameter, mounted on anti-friction bearings. Shaft speed: 44 r.p.m. @ full-load speed.
Drum—8" root diameter, 6" wide, with a 22" diameter, $3\frac{1}{4}$ " face brake drum. Integral safety locking ratchet manually controlled from operator's position.
Brake—External-contracting band, 22" diameter, 3" face. Spring-applied and hydraulically released.

**31. *Independent Rapid Boomhoist (Continued)**

Hoist Clutch—Internal-expanding 2-shoe type, 20" diameter x 5" face, hydraulically operated.

Spur Gear, right side—Cast-steel, flame-hardened to approximately 400 Brinell. 24.00" pitch diameter, 3" face, 72 cut teeth.

Spur Gear, left side—Cast-steel, flame-hardened to approximately 400 Brinell. 22.66" pitch diameter, 3" face, 68 cut teeth.

32. *VERTICAL DRIVE SHAFT—4140 steel, 4½" diameter, heat-treated to 248-293 Brinell, mounted on anti-friction bearings. Shaft speed: 43 r.p.m. @ full-load speed.

Bevel Gear—Cast-steel, heat-treated to 260-300 Brinell. 12.66" pitch diameter, 3" face, 19 cast teeth.

Spur Gear—4140 forged steel with teeth flame-hardened to 52-60 Rockwell. 9.20" pitch diameter, 4" face, 23 cut teeth.

The bevel and spur gears are involute-splined to the shaft and are fully enclosed and run in oil.

33. *VERTICAL SWING SHAFT—4140 steel, 4½" diameter, heat-treated to 248-293 Brinell. Mounted on anti-friction bearings. Shaft speed: 25 r.p.m. @ full-load speed.

Spur Gear—Cast-steel, heat-treated to 260-300 Brinell, 16" pitch diameter, 4" face, 40 cut teeth, involute splined to shaft. Fully enclosed and running in oil.

Swing Pinion—Forged-steel, heat-treated to 230-270 Brinell, 8" pitch diameter, 5¼" face, 16 cut teeth. Pinion involute-splined to shaft; meshes with internal teeth of the ring gear.

34. *VERTICAL SWING BRAKE SHAFT—1040 steel, 4¼" diameter, mounted on anti-friction bearings.

Spur Gear—Cast-steel, heat-treated to 260-300 Brinell, 11.6" pitch diameter, 4" face, 29 cut teeth, involute-splined to shaft. Fully enclosed and running in oil.

Brake—Alloy cast-iron drum, 14" diameter x 2¼" face, involute-splined to shaft. Brake is a two-directional external-contracting band type. Speed-o-Matically applied and spring-released.

35. LUBRICATING PUMP—For lubrication of all enclosed gears in the upper machinery, a Brown and Sharpe rotary-gear pump is bolted to the upper frame and is driven by the right-hand reverse spur gear. Oil is pumped from the bottom of the transmission case into the bevel gear case. Two pipes leading from the bevel gear case transfer oil forward to the vertical travel shaft and to the rear to the vertical swing shaft and spur gears.**36. *SWING LOCK**—Two-tooth pawl mounted on the inside front of the revolving frame engages with the internal teeth of the ring gear. Mechanically operated from the operator's position. A hydraulically operated swing brake is standard equipment.**37. *GANTRY — High Gantry**—Standard equipment. Pipe front and bar and angle rear members. Recommended for booms over 55' long. May be retracted for shovel or hoe operation.

Low Gantry optional at reduced cost for shovel and hoe operation if desired. Pipe front and bar rear members.

38. CAB—No. 12-gauge steel side and top. Sliding doors on ball-bearing rollers. Safety-glass panels in operator's compartment.**39. *COUNTERWEIGHT:**

Counterweight "A"
All Attachments

Waukesha 135GK and 140GK	10,300 #
General Motors 4030C and 3030C	9,700 #
International UD-525	8,500 #
Caterpillar D-318	8,500 #

Counterweight Removal Device—Optional at extra cost—Device consists of two power hydraulic jacks mounted on counterweight base slab and a control valve panel located inside of left rear door. The purpose of the device is to facilitate removal of counterweight necessary to meet highway travel requirements. Counterweight may be lowered into position for lifting aside with main crane machinery by simply inserting a pin under the counterweight and through an eye on the jack piston and then opening two valves. Raising of counterweight is accomplished the same as the lowering operation except that the lowering valves must be closed and two raising valves opened. Hydraulic power for the operation is obtained from the Speed-o-Matic control system.

40. *WEIGHTS: (Approximate)

Basic Machine, including carrier (no attachment)	57,100 pounds
Crane Boom Attachment (30' Boom plus laggings)	3,500 pounds
Shovel Attachment	10,000 pounds
Hoe Attachment	8,300 pounds
Piledriver Leads, Hammer, Struts, and Follower Cap	7,000 pounds
Dragline Attachment (no bucket)	4,000 pounds

**41. *DIMENSIONS:**

Rear Radius, Cab	9'-4"
Tailswing, "A" Counterweight	10'-5"
Radius, Boom Hinge Pin	3'-2"
Height, Boom Hinge Pin	6'-4"
Overall Height Retractable Gantry—Raised	15'-1"
Overall Height Retractable Gantry—Lowered	12'-4"
Overall Height with Low Gantry	12'-2"
Minimum Counterweight Clearance from Ground:	
Counterweight "A"	4'-8"
Cab Width	8'-0"

42. LAGGINGS—Root diameter given in inches:

	Front Drum	Rear Drum
Crane	13¼	13¼
Clamshell	15¼	15¼
Dragline	13¼	15¼
Piledriver	15¼	15¼
Shovel	Chain Sprocket	13¼
Hoe	13¼	13¼

NOTE: The above laggings will be furnished for each attachment unless the order specifies otherwise. For combination crane-clamshell or crane-dragline, the rear drum will be furnished with a 15¼" lagging. Front and rear drum laggings are not interchangeable for normal operation.

43. *CABLE CAPACITIES OF DRUMS:

13¼" Diameter Lagging		15¼" Diameter Lagging		Boomhoist Drum	
⅝" Cable	¾" Cable	⅝" Cable	¾" Cable	⅝" Cable	¾" Cable
829'	530'	663'	482'	410'	267'

44. *SPEEDS AND LINE PULLS (@ full-load speed):

Swing Speed	3.9 r.p.m.
Shovel Crowd	81.5 f.p.m.
Shovel Retract	115 f.p.m.
Boomhoist Cable Speed	101 f.p.m. on first wrap; 222 f.p.m. on eighth wrap (full drum)
Rear Drum Line Pulls and Speeds (1-part line)	
13¼" root diameter lagging	18,500# @ 139 f.p.m.
15¼" root diameter lagging	16,200# @ 159 f.p.m.
Front Drum Line Pulls and Speeds (1-part line)	
13¼" root diameter lagging	18,500# @ 139 f.p.m.
15¼" root diameter lagging	16,200# @ 159 f.p.m.

NOTE: Line pulls based on Waukesha 135GZ engine. For General Motors 3030C, multiply line pull by 93%; for Waukesha 140GK by 104%, General Motors 4030C and International UD525 by 102%, and Caterpillar D-318 by 103%.

SPEED-O-MATIC CONTROL SYSTEM

- 45. SPEED-o-MATIC** power hydraulic control system is a closed circuit and has the hydraulic lines filled with oil at all times. Operating pressure is transmitted through the oil to all operating cylinders. The system includes a pump to provide a constant flow of oil, an accumulator to maintain operating pressure, and valves to regulate this pressure to each operating cylinder. Oil pressure and flow to the operating cylinders is controlled through the operation of short levers actuating the variable pressure valves.

Pump—Vickers, Inc. Rated at 4.7 gallons per minute at 1200 r.p.m.

Oil Filter—Link-Belt Speeder. Replaceable Skinner ribbon-type filter element.

Relief Valve—Link-Belt Speeder. Set to operate at 1250 p.s.i.

Unloader Valve—Link-Belt Speeder. Set to unload the pump at a maximum of 1050 p.s.i. and to load the pump when accumulator pressure drops to 900 p.s.i.

Accumulator—Link-Belt Speeder. Piston-type, precharged with nitrogen gas to 650 p.s.i.

Sump Tank—Link-Belt Speeder. 7 gallon capacity with filter and strainer assembly to keep the oil clean.

Control Valves—Link-Belt Speeder. Variable-pressure type.

- 46. *MISCELLANEOUS STANDARD EQUIPMENT**—Signal horn, foot throttle in crane cab and hand rail at operator's door.

**SHOVEL ATTACHMENT (CHAIN CROWD)**

47. **BOOM**—All-welded steel box-section construction. Boom length, 18' from center of boom foot pins to center of boom peak shaft.
Shipper Shaft—4140 steel, 3½" in diameter, heat-treated to 248-293 Brinell. Shaft speed: 46 r.p.m. crowd speed @ full-load speed; 65 r.p.m. retract speed @ full-load speed.
Crowd Pinions—Two pinions, 6.8" pitch diameter, 17 cast alloy-steel teeth.
Chain Sprocket—14.8" pitch diameter, 15 cast teeth.
Main Sheave—Cast-steel, 22¾" pitch diameter. Bronze bushing, 2½" diameter x 2¾" long.
Boomhoist Sheaves—10" pitch diameter, bronze-bushed.
48. **DIPPER STICKS**—All-welded box-section design, 5¼" wide, 9" deep. Alloy-steel racks. 14'-4" effective stick length.
49. **DIPPER (STANDARD)**—81-yard Link-Belt Speeder, 35¾" wide inside front, 36¾" wide inside back. Cast-steel head, AMSCO manganese front. Four removable manganese-steel teeth.
OPTIONAL DIPPERS: ¾-yard AMSCO, all-manganese steel, general purpose. ¾-yard AMSCO, all-manganese steel, heavy duty.
50. **PADLOCK BLOCK**—Sheave 16½" pitch diameter. Mounted on a bronze bushing, 2½" inside diameter x 3" long.
51. **DIPPER TRIP**—Power hydraulic cylinder, 2¼" diameter, mounted near base of boom actuates a cable running over a sheave on the shipper shaft to a latch on the bucket door. Bucket is dumped by a slight side movement of the hoist lever on the control panel.
52. **CROWDING ACTION**—An 18-tooth split sprocket on the front drum shaft is driven in the crowd direction by a spur gear and clutch on one end of the drum shaft and is retracted by a spur gear and clutch on the opposite end of the shaft. Crowd and retract chains are 3.075" pitch, heavy-duty type with alloy-steel bars and pins. The front drum sprocket drives to a double sprocket at the base of the boom and then to the shipper shaft. Both drives have take-ups. The shipper shaft has two pinions engaging with the crowd racks on the dipper sticks. Crowd and retract is actuated by the same lever.

53. *CABLES:

Line	Parts Line	Gantry	Cable Diameter	Cable Length
Boomhoist	4	Low	¾"①	115'
	4	High	¾"①	130'
Hoist	2	-----	¾"①	77'
Dipper Trip	-----	-----	5/16"②	29'

NOTE: ① 6 x 19, Improved plow steel, hemp center, regular lay, preformed.

② 6 x 37, Improved plow steel, wire rope center, regular lay, preformed.

CRANE, CLAMSHELL AND DRAGLINE ATTACHMENTS

54. ***BOOM**—Two-piece 30' all-welded box-lattice, with 13' upper and 17' lower sections 26" deep x 27½" wide at connection. 2½" x 2½" x 5/16" alloy-steel corner angles both sections. Latticed with 1¼" x 1¼" x 3/16" angles. Each boomfoot is 1½" thick; 38" boomfoot centers. Boomfoot pins, 2" diameter, 4140 heat-treated steel.
Head Shaft—4140 heat-treated steel, 2½" diameter. Two bronze-bushed sheaves, 18¾" pitch diameter. Third sheave for head shaft optional at extra cost.
Connections—Sections bolted with eight 1" bolts as standard. Pin connections to permit folding or easy removal and replacement of sections available at extra cost.
55. **BOOM EXTENSIONS**—Available in 5', 10', 15' and 20' lengths. All-welded box-latticed type, 26" deep with 2½" x 2½" x 5/16" alloy-steel corner angles latticed with 1¼" x 1¼" x 3/16" angles.
56. **BOOM BACKSTOP**—Rigid type standard.
57. **JIB BOOMS**—All jibs are of all-welded steel construction and are available in the following lengths:
15' Jib Boom—One-piece box-lattice type similar to the main boom, 14" deep x 15½" wide at the center with corner angles 2" x 2" x ¼" and lattice angles 1" x 1" x 1/8". Jib strut is 4' high—main members 3" x 3" x ¼" angles with cross bracing of 3" x 3" x ¼" angles.

**57. Jib Booms (Continued)**

20' or 30' Jib Boom—Basic jib is in two sections, bolted together with four 1" bolts. 10' section is available to make a 30' jib. Box-lattice type similar to the main boom. 16" deep x 16" wide at center, with corner angles $1\frac{1}{2}" \times 1\frac{1}{2}" \times \frac{3}{16}"$ and lattice angles $1" \times 1" \times \frac{1}{8}"$. Jib strut is 7' high—main members $3" \times 3" \times \frac{1}{4}"$ angles with cross bracing of $3" \times 3" \times \frac{1}{4}"$ angles.

Peak Sheave—Cast-steel, 19" outside diameter x 15" root diameter, bronze-bushed.

Peak Shaft—4140 steel, $2\frac{1}{2}"$ in diameter.

58. FAIRLEADER—Full-revolving type with barrel, sheaves and guide rollers mounted on anti-friction bearings. Sheaves $11\frac{3}{8}"$ pitch diameter, mounted on a 2" diameter shaft.

59. *DRAGLINE BUCKET, CLAMSHELL BUCKET AND MAGNET—For general clamshell, lifting magnet, or similar work, capacities as shown on standard lifting capacity table should be reduced at least 20%. Weight of bucket or magnet plus load should not exceed the resulting net rated capacity at the maximum desired operating radius, or the following, whichever is least: in clamshell or magnet work, 7,500#; in dragline work, 6,000#. These loads are maximum values for this service, and allowances must be made when operating under unfavorable conditions. Boom length for dragline, clamshell, magnet, or similar work should not exceed 50 feet. In general the machine will handle a general-duty $\frac{3}{4}$ -yard dragline bucket, a $\frac{3}{4}$ -yard clamshell bucket or any circular 45" or smaller 230 volt D.C. magnet.

60. TAGLINE WINDER—Rud-o-Matic Model No. 648. Spring-wound drum type, mounted on lower section of crane boom. Cable pull off drum—60' to 75' from neutral.

61. *BOOMHOIST BRIDLE—Serves as a connection between extender cables and boomhoist line. Bridle (for 8-part line) consists of a single fabricated frame having four cast-steel bronze-bushed sheaves, $9\frac{1}{2}"$ root diameter. With high gantry a straight through spreader forms main bridle body. With low gantry an arched spreader forms main bridle body.

62. *CABLES:

Attachment and Lines	Cable Diameter	Parts Line	Gantry	BOOM LENGTH			
				30	35	45	55
DRAGLINE							
Boomhoist	$\frac{5}{8}"$ ①	8	High	220	220	220	220
	$\frac{5}{8}"$ ①	8	Low	215	215	215	215
Hoist	$\frac{3}{4}"$ ①	1	-----	75	85	105	125
Inhaul	$\frac{3}{4}"$ ②	1	-----	33	40	55	70
CLAMSHELL							
Boomhoist	$\frac{5}{8}"$ ①	8	High	220	220	220	220
	$\frac{5}{8}"$ ①	8	Low	215	215	215	215
Closing	$\frac{5}{8}"$ ①	1	-----	120	130	150	170
Holding	$\frac{5}{8}"$ ①	1	-----	85	95	115	135
Tagline	$\frac{5}{16}"$ ①	1		Furnished with Tagwinder			
CRANE							
Boomhoist	$\frac{5}{8}"$ ①	8	High	220	220	220	220
	$\frac{5}{8}"$ ①	8	Low	215	215	215	215
Hoist	$\frac{5}{8}"$ ①	1 - 6	-----	See Chart #1			
JIB							
Hoist	$\frac{1}{2}"$ ①	1	-----	} See Chart #2			
Boom Guy	$\frac{5}{8}"$ ①	-----	-----				
Jib Guy	$\frac{5}{8}"$ ①	-----	-----				

NOTE: ① 6 x 19, Improved plow steel, hemp center, regular lay, preformed.

② 6 x 19, Improved plow steel, wire rope center, lang lay, preformed.

Chart #1, Hoist Cable Lengths:

BOOM LENGTH IN FEET	CABLE LENGTH FOR GIVEN PARTS OF LINE					
	1	2	3	4	5	6
30	75	110	145	180	215	250
35	85	125	165	205	245	285
45	105	155	205	255	305	355
55	125	185	245	305	365	425
65	145	215	285	355	425	495
75	165	245	325	405	485	565

**62. Cables (Continued)****Chart #2, Jib Line Lengths:**

BOOM LENGTH IN FEET	HOIST LINE (1 Part)			HOIST LINE (2 Part)			JIB GUY LINE			BOOM GUY LINE		
	15'	JIB 20'	30'	15'	JIB 20'	30'	15'	JIB 20'	30'	15'	JIB 20'	30'
30	105	115	135	155	170	200	33	43	65	55	56	58
35	115	125	145	170	185	215	33	43	65	65	66	68
45	135	145	165	200	215	245	33	43	65	85	86	88
55	155	165	185	230	245	275	33	43	65	105	106	108
65	175	185	205	260	275	305	33	43	65	125	126	128
75	195	205	225	290	305	335	33	43	65	145	146	148

63. *EXTENDER CABLES: (Standard for all crane boom attachments)

1" diameter, improved plow steel, wire rope center, zinc-fitted sockets at each end. Basic cables 10'-3½" long connect the boomhead anchor to the boomhoist bridle. For each extension added to the basic boom an extender cable of the same length as the extension is furnished.

HOE ATTACHMENT

- 64. BOOM**—All-welded box section of formed plates. Gooseneck design, 20'-0" center-to-center of pins.
- 65. BOOMFOOT IDLER ROLLER AND PIN**—4140 steel boomfoot pin, 3" diameter x 39¼" long, heat-treated to 248-293 Brinell and bolted in a fixed position to boomfoot adaptors. Boom oscillates in bronze bushings in the boomfoot.
Deflector Roller—Cast-iron, 10¾" outside diameter x 8" long. Greased through hub.
- 66. INHAUL CABLE SHEAVES ON BOOM**—Cast-steel sheaves, 16" root diameter, grooves flame-hardened. Mounted on bronze bushings, 2½" inside diameter x 3½" long. Greased through hub.
Sheave Pin—1040 cold-drawn steel, 2½" diameter x 23½" long.
- 67. BOOMPEAK SHAFT FOR ARM**—1040 cold-drawn steel, 3½" diameter x 21" long, secured from turning by a bolt through the hub. Arm rotates on two bronze bushings, 3½" inside diameter x 4" long.
- 68. ARM**—All-welded box section of formed steel plates. 8'-2" effective length.
- 69. ARM MACHINERY**—Cast-steel hoist sheave, 19" outside diameter x 16" root diameter, groove flame-hardened, bronze-bushed and greased through hub.
Shaft—1040 cold-drawn steel, 2½" in diameter.
Bridle—Welded plate construction, mounted on two bronze bushings and connected to the arm with a 1040 cold-drawn steel pin, 2" diameter.
- 70. BUCKETS AND CONNECTIONS (Standard)**—Pettibone-Mulliken solid bottom, 39½" cutting width, .75-yard capacity, 32" wide inside, one-piece manganese-steel, solid bottom with four removable cutting teeth. Double lugs connected to arm with a 1040 cold-drawn steel pin, 2" diameter x 18½" long.
Optional — Link-Belt Speeder, 36" cutting width—.55-yard capacity, 29" wide inside, four removable cutting teeth. Same connections to arm as above.
Optional — Link-Belt Speeder, 31" cutting width—.45 yard capacity, 24" wide inside, four removable cutting teeth. Same connections to arm as above.
Pitch Brace—Double channel, reinforced welded construction secured to bucket with 1040 cold-drawn steel pins, 2" diameter x 4⅞" long. Both arm and pitch brace connections to bucket have case-hardened steel bushings.
- 71. BUCKET BAIL**—Horizontal sheave type of welded reinforced plate construction. Connected to bucket through link with 2" diameter case-hardened steel pins.
Sheave—Cast-steel, 16" root diameter, groove flame-hardened, bronze-bushed.
Shaft—1040 steel, 2½" diameter.
- 72. MAST**—9'-0" long from peak shaft to foot pin. Main members are 3½" standard pipe, pin-connected to boomfoot adaptors.
- 73. MAST BACKSTOP**—Dual telescoping type; offered as optional equipment at extra cost. Outer member 3" standard pipe; inner member 2½" extra-heavy pipe. Three gantry positions available: vertical, 5° forward, 5° rear. Adjustable sleeve stop located with ⅞" bolts.



74. *MAST MACHINERY FOR 3-PART HOIST—Head shaft 1040 cold-drawn steel, 2½" diameter, secondary shaft 1040 cold-drawn steel, 2½" diameter.

Sheaves—Head shaft sheave, cast-steel, 16" root diameter, bronze-bushed, groove flame-hardened. Secondary shaft sheave, cast-steel, 11½" root diameter, bronze-bushed, groove flame-hardened. Deflector sheave, cast-iron, 5½" root diameter.

75. MAST SHEAVES FOR 4-PART LINE TO BOOMHOIST DRUM—Two cast-steel, bronze-bushed, 9½" root diameter.

76. *CABLES:

Line	Parts Line	Gantry	Cable Diameter	Cable Length
Mast	4	Low	⅝"①	90'
	4	High	⅝"①	95'
Hoist	3		¾"①	110'
Inhaul	2		¾"②	72'

NOTE: ① 6 x 19, Improved plow steel, hemp center, regular lay, preformed.
② 6 x 19, Improved plow steel, wire rope center, lang lay, preformed.

PILEDRIVER ATTACHMENT

77. *LEADS—Extendible—35 ft. basic, extendible to 55 ft.

Base Section—29 ft. long. Main members (hammer guides) two 8" x 11.5# channels, 20" between guides. Framing for guides, two 2" x 2" x ¼" angles with 1½" x 1½" x ¼" brace angles. Cross ties formed with 6" x 8.2# channels across the back with 3" x 4.1# channels for side members. ¾" diameter steel reinforcing rods on 15" centers welded to framing angles to form ladder.

Head Section—6 ft. long. Main members (hammer guides) two 8" x 11.5# channels, 20" between guides. Framing for guides, two 2" x 2" x ¼" angles. Connected to boom head shaft with two ⅝" diameter U-bolts. Connected to base section or extension section with four ⅞" and six ¾" cap screws.

78. *LEAD EXTENSIONS—5 ft. and 10 ft. extensions optional. Main members (hammer guides) two 8" x 11.5# channels, 20" between guides. Framing for guides, two 2" x 2" x ¼" angles with 1½" x 1½" x ¼" brace angles. Cross ties formed with 6" x 8.2# channels across the back with 3" x 4.1# channels for side members. Extensions fit between, and bolt to, the head and base section with four ⅞" and six ¾" cap screws at each splice section.

79. *TELESCOPIC STRUTS—Optional lengths available. (1) Adjustable from 9'-8" to 17'-8" in steps of 2". (2) Adjustable from 12'-6" to 23'-8" in steps of 2". Outer members 2½" standard pipe with single lug at one end for ¾" diameter pin. Inner member 2" standard pipe with single lug at one end for ¾" diameter pin. Struts connect to double lugs mounted on each side of boom and leads.

80. *HAMMER—3000 lb. semi-steel. 52" high x 23" wide x 18½" deep. Hammer has non-removable pins to support the sling used to raise follower cap.

81. *FOLLOWER CAP—860 lb. semi-steel. 15" high x 23" wide x 18¾" deep. Ends of follower cap hook around guide channels to prevent spreading. Pile socket is 7½" deep, 9" diameter at top and 13¼" diameter at bottom. Follower cap plug socket is 3" deep, 14" diameter and tapers to 13" diameter.

82. *FOLLOWER CAP PLUG—Hardwood, 14⅜" diameter x 8" long. Steel band 2" wide x ¾" thick, 19" inside diameter pressed on plug.

83. *CABLES:

BOOM LENGTH	LEAD LENGTH	HAMMER LINE	PILE LINE
35	35	95	130
40	40	105	140
45	45	115	150
50	50	125	160
55	55	135	170
40	35	105	140
45	40	115	150
50	45	125	160
55	50	135	170

NOTE: All cables shown on chart are ⅝" diameter—6 x 19 improved plow steel, hemp center, right lay, regular lay, preformed.

* Indicates revisions or additions to specifications dated 10/20/54.

WE ARE CONSTANTLY IMPROVING OUR PRODUCTS AND THEREFORE RESERVE THE RIGHT TO CHANGE DESIGNS AND SPECIFICATIONS