

LINK-BELT SPEEDER CORPORATION

Cedar Rapids, Iowa

DETAIL SPECIFICATIONS

June 9, 1958

(Supersedes Specifications CRS7009-8-56)

* Indicates Revisions or Additions to Specifications Dated 8-10-56

MODELS

K-608

3-Yard Shovel
Crane-Dragline

K-608L

Crane-Dragline

CRAWLER MOUNTING

1. **LOWER FRAME**—All welded, stress-relieved unit — box section design of structural steel plate. Frame is 31 $\frac{1}{4}$ " deep through main body. Line bored for traction shaft. Travel gears run in oil—totally enclosed in lower frame.
- * 2. **CRAWLER SIDE FRAMES**—Removable, all welded, structural steel plate units, with cast-steel tread sprocket ends. Working gauge (center to center of side frames) is 9'7". Side frames may be moved inward to 8'7" centers for shipping.
- * 3. **TRACKS**—Two, lug driven self cleaning belts.
Track Shoes—Alloy cast steel, heat-treated, 12 $\frac{1}{16}$ " pitch, multiple hinged with 1 $\frac{1}{2}$ " diameter heat-treated full floating pins. Staggered drive lugs.

GROUND CONTACT AREA

K608

7-Roller Side Frames

Standard 36" Quarry Type—12,528 sq. in.

Optional 40" General Purpose—13,420 sq. in.

Shoes per side frame 34

K608L

9-Roller Side Frames

40" General Purpose—17,384 sq. in.

36" Quarry Type — 15,646 sq. in.

41

4. **TRACK ROLLERS**—Double-tread, forged-steel rollers, 15" diameter with rim induction-hardened. Each mounted on two bronze bushings. K-608 has seven rollers per side frame. K-608L has nine rollers per side frame.
Axles—4 $\frac{1}{4}$ " diameter.
5. **TRACK CARRIER ROLLERS**—12" diameter, double-tread, cast-steel roller on two bronze bushings. One on each 7-roller side frame. Three on each 9-roller side frame.
Axles—2 $\frac{1}{4}$ " diameter.
- * 6. **TRACK DRIVE ASSEMBLY**—One per side frame consisting of a track drive sprocket, chain sprocket and shaft welded integrally. Mounted on three bronze bushings.
Axles—6 $\frac{15}{16}$ " diameter.
Drive Sprocket—32" outside diameter, 9 cast-steel teeth, heat-treated.
Chain Sprocket—30.377" pitch diameter, 19 cast-steel teeth, heat-treated, 5" pitch for drive chain.
7. **TRACK IDLER ROLLER**—One per side frame. Cast-steel, 32" diameter, differentially heat-treated, double web design. Mounted on two bronze bushings.
Axle—4 $\frac{7}{8}$ " diameter.
8. **TRACTION SHAFT**—Single piece, steel shaft, 6 $\frac{3}{4}$ " diameter, heat-treated, mounted on bronze bushings.
Bevel Gear—Cast-steel, heat-treated, machine-cut teeth, 29.6" pitch diameter, 5" face. Splined to shaft. Fully enclosed—runs in oil.

Travel and Steer Machinery—Sliding jaw clutches, heat-treated, 12-tooth splined to the traction shaft, and inter-connected with two-way steer brakes, 28" diameter x 4½" wide. For steer or travel, hydraulic pressure releases either or both brakes when the respective jaw clutch is engaged. Spring-loaded brakes also serve as digging locks capable of holding the machine on any grade it can climb.

- 9. **TRACTION SHAFT DRIVE SPROCKETS**—One on each end of traction shaft. Cast-steel, 10 cast teeth, splined to brake drums, mounted on bronze bushings.
- 10. **DRIVE CHAINS**—Link-Belt XXS-1204, 5" pitch. Average ultimate strength 250,000#.
- *11. **CENTERPIN**—Forged steel, 15" O.D. x 7½" I.D. Integral flange provided for lower end and split threaded nut keyed to centerpin at upper end.
- 12. **TURNTABLE**—Alloy cast-steel, machined conical roller path, heat-treated, welded to lower frame.

External Gear—(Integral with roller path)—88.615" pitch diameter, 132 machine-cut teeth, 5" face.

13. **CRAWLER DIMENSIONS:**

	K-608 7 Roller Side Frames	K-608L 9 Roller Side Frames
Over-all Length	16' 9"	20' 2"
Ground Bearing Length	14' 2"	17' 11"
Center to Center, Sprockets	13' 4"	16' 9"
Over-all Width—36" Shoes	12' 7"	12' 7"
Over-all Width—40" Shoes	12' 11"	12' 11"
Center to Center, Tracks (Side Frames Extended)	9' 7"	9' 7"
Center to Center, Tracks (Side Frames Retracted)	8' 7"	8' 7"
Ground Clearance	18"	24"
Maximum Climbable Grade	35%	35%

- *14. **TRAVEL SPEEDS**—.8 m.p.h. with 1080 r.p.m. engine pinion speed.

UPPER REVOLVING FRAME

- 15. **UPPER FRAME**—All-welded, stress relieved, jig machined unit with main members of 21" x 62# wide flanged beams full length. All welded stress relieved machinery side housings bolted to main members.
- 16. **CENTERPIN BEARING**—Two 11½" inside diameter x 6" long bronze bushings, mounted in trunnion. Trunnion mounted on two 7" diameter shafts; thus permitting trunnion to align itself with the upper frame and centerpin bearings for uniform loadings.
- *17. **CONICAL ROLLERS**—Forged steel, heat-treated. Four conical rollers individually mounted in patented roller brackets, two in front and two in rear. Self aligning construction permits rollers to bear uniformly on full face of roller path under all conditions; also permits uniform loading of roller bushings.

Front Rollers—16" outside diameter x 6¼" tapered face with bronze bushings pressed in each roller. Axles, case-hardened, 5¼" diameter.

Rear Rollers—12" outside diameter x 6¼" tapered face with bronze bushings pressed in each roller. Axles, case-hardened, 4" diameter.

***18. POWER UNITS:**

	CUMMINS NHRIS—6 diesel engine ① with TORCON Torque Converter	CATERPILLAR D337F diesel engine with TORCON Torque Converter ③	GENERAL MOTORS 6- 110 Series, Model 62408 diesel engine with ALLISON Torque Converter
Number of Cylinders Cycle	6 4	6 4	6 2
Bore and Stroke Piston Displacement (cu. in.)	5½" x 6" 743	5½" x 6½" 805	5" x 5.6" 660
Governed Speed (High Idle) r.p.m. Full Load Speed—r.p.m.	1080 @ pinion 1850 Crankshaft	1080 @ pinion 1810 Crankshaft	950 @ pinion 1900 Crankshaft
Horse Power at Full Load Speed AMA or NACC Horse Power ②	260 (Stripped Engine) 63.1	264 (Net Engine) 63.1	263 (Net Engine) 60
Peak Torque ft. lbs. Peak Torque r. p. m.	1985 (Output) Stall	2060 (Output) Stall	2325 (Output) Stall
Lubrication—Type Lubrication Air Cooler Lubrication Oil Filter Crankcase Capacity— Quarts	Full Pressure Yes Yes 28	Full Pressure Yes Yes 45	Full Pressure Yes Yes 36
Starting System	24-Volt starter and generator	Gasoline Starting engine with 6-Volt electric starter	24-Volt Starter and generator
Air Cleaner	Donaldson Heavy Duty	Donaldson Heavy Duty	Donaldson Heavy Duty
Fuel Tank Capacity, Gallons Fuel Injection Pump Fuel Filter—Replaceable	118 Cummins Absorbent	118 Caterpillar Absorbent	118 General Motors Absorbent
Cooling System, Type Cooling System Capacity—Gallons	Water Pump and Fan 27	Water Pump and Fan 22	Water Pump and Fan 18
Clutch	TORCON Torque Converter with disconnect clutch Model 17CK Torque Ratio 2.83	TORCON Torque Converter with disconnect clutch Model 17CK Torque Ratio 2.83	ALLISON Torque Converter with disconnect clutch Model TCDA575 Torque Ratio 3.13
Governor	Output Shaft Governor	Output Shaft Governor	Output Shaft Governor

① Standard

② H.P. = (number of cylinders) x (bore in inches)²
2.5

③ Caterpillar D337F also available with NATIONAL Torque Converter

19. ELECTRIC MOTOR—Refer to factory.

20. TRANSMISSION—1¼" pitch x 6" wide Link-Belt Silent Chain, enclosed in a case and running in an oil bath.

Engine Pinion—Torcon Converter, 17 tooth, 6.808" pitch diameter x 7" wide.

—Allison Converter, 19 tooth, 7.600" pitch diameter x 7" wide.

Chain Wheel — 123 tooth, 49.027" pitch diameter x 7" wide, stress relieved, splined to reduction shaft.

21. REDUCTION AND CLUTCH SHAFT—Heat-treated steel, 5⅜" diameter, mounted on roller bearings.

Drum Drive Pinion—Forged steel, heat-treated, 10½" pitch diameter, 4¼" face, 21 cut teeth. Splined to shaft.

Bevel Gears—Alloy cast-steel, 11½" pitch diameter, 3" face. Mounted on two tapered roller bearings.

Clutches—Internal-expanding, two-shoe type, 30" diameter x 6" face, Speed-o-Matic operated. Clutch shells are alloy cast-iron bolted to bevel gears. Spiders are cast-steel, splined to shaft. Aluminum alloy clutch shoes.

22. **OPERATING DRUMS**—Dual drum design with center castings to receive laggings. Left drum is hoist, right drum is inhaul or crowd and retract.

Shaft—Steel, heat-treated, 7" diameter, mounted on flanged bronze bushings.

Drum Center Castings—Cast-steel. Mounted on tapered roller bearings.

Gear—Cast-steel, 62" diameter, 4" face. Right hand clutch spider integral with gear. Gear is splined to shaft.

Clutch Shells—Alloy, cast-iron, stress-relieved, bolted to drum center castings. Outside diameter machined for brake bands. Inside diameter machined for clutch shoe bands.

Clutch Shoe Bands—Integral expanding band, 42" diameter x 4" wide. Heavy-duty woven lining. Cast steel clutch spiders are splined to shaft. Clutches are Speed-o-matic controlled and spring released.

Brakes—External contracting band, 48" diameter x 5" wide, woven lining. A direct mechanical brake with Speed-o-Matic power hydraulic booster.

- *23. **REVERSE CLUTCH AND HOIST BRAKE COOLING SYSTEM**—Blower unit mounted to the left rear of reverse shaft. Centrifugal blower cools reverse clutches and/or hoist brake via ducts. Blower driven from reverse shaft by combination chain and Vee belt drive.

Blower Paddle Wheel—10 $\frac{5}{8}$ " diameter x 2 $\frac{1}{2}$ " wide. standard.

All Attachments—Hoist brake and/or reverse clutch cooling system with adjustable air flow standard.

24. **BOOMHOIST**—Standard boomhoist is non-independent, self-locking, worm gear type, driven through engagement of sliding pinion with spur portion of combination gear on combination gear shaft. Housing is integral part of revolving frame except for top bearing on worm shaft which is bolted to the frame.

Worm Shaft and Gear—Forged integral, case-hardened. Worm gear 7.16" pitch diameter, 1 $\frac{3}{8}$ " lead, single R. H. thread. Bronze-bushed.

Sliding Pinion—Cast-steel, 11 $\frac{1}{2}$ " pitch diameter, 23 cut teeth, 2" face, keyed to worm shaft.

Brake—External contracting band type, woven lining, 9" diameter x 2" face, spring applied, cast-iron drum keyed to worm shaft.

Cable Drum Shaft—4 $\frac{7}{16}$ " diameter, mounted on bronze bushings.

Worm Wheel—Bronze, 12.69" pitch diameter, cut teeth, splined to shaft and running in oil.

Drum—Cast-steel, 11 $\frac{1}{2}$ " root diameter x 8 $\frac{3}{4}$ " face, keyed to shaft.

- *25. **INDEPENDENT RAPID BOOMHOIST**—Optional extra. (Not available for shovel operation). Boomhoist drum is powered up and down by independent, internal shoe-type clutch arrangement, powered through spur gear drive from main drum gear. Raising and lowering clutch shafts mounted on ball and roller bearings. Drum shaft mounted on bronze bushings. Automatic spring applied, hydraulically-released band brake operates on separate brake drum splined to raising clutch shaft. Cast-steel cable drum is provided with ratchet and pawl to provide a positive lock.

Hoist Clutch Shaft—Heat-treated steel, 3 $\frac{3}{4}$ " diameter, mounted on roller bearings.

Drive Pinion—Cast-steel, heat-treated, machine cut teeth. 12 $\frac{1}{2}$ " pitch diameter, splined to shaft.

Clutch Drive Gear—Cast-steel, heat-treated, machine cut teeth 14 $\frac{1}{2}$ " pitch diameter bolted to clutch drum, mounted on ball bearings.

Clutch Drum—Cast-iron 20" I.D. x 5 $\frac{1}{2}$ " face bolted to clutch drive gear, mounted on ball bearings.

Clutch—Internal expanding, two-shoe type, power hydraulic (Speed-o-Matic) applied and spring released. Cast aluminum alloy heat-treated shoes.

Lowering Clutch Shaft—Steel, 3 $\frac{5}{8}$ " diameter, mounted on roller bearings.

Drive Pinion—Cast-steel, machine cut teeth, 14 $\frac{1}{2}$ " pitch diameter, splined to shaft.

Clutch Drive Gear—Cast-steel, heat-treated, machine cut teeth, 12 $\frac{1}{2}$ " pitch diameter, bolted to clutch drums, mounted on ball bearings.

Clutch Drum—Cast-iron 20" I.D. x 5 $\frac{1}{2}$ " face bolted to clutch drive gear, mounted on ball bearings.

Clutch—Internal expanding, two-shoe type, power hydraulic (Speed-o-Matic) applied and spring released. Cast aluminum alloy heat-treated shoes.

Drum Shaft—Steel, 4 $\frac{1}{2}$ " diameter, mounted on bronze bushings.

Drum Shaft Gear—Cast-steel, heat-treated, machine-cut teeth, splined to shaft.

Hoist Cable Drum—Cast-steel, 10" wide face x 10" diameter, splined to shaft. Ratchet teeth for safety pawl cast into right flange.

Safety Pawl—Engages teeth of drum ratchet flange. Hand operated from cab. Linkage mounted to boomhoist base and spring energized for positive locked or unlocked positions.

Optional Extra—Boomhoist Lever Kick-out Device—Safety mechanism activated by boom at minimum radius. Automatically kicks out boomhoist lever and disengages boomhoist clutch.

26. **COMBINATION BEVEL GEAR AND SPUR PINION SHAFT**—Cast-steel, non-rotating. Upper end housing mounted on clutch shaft with a spherical roller bearing.

Integral, cast-steel bevel gear and spur pinion:

Bevel gear—14" P.D. x 3" face, rotates on cylindrical roller bearing about combination shaft.

Spur pinion—9 $\frac{1}{2}$ " P.D. x 4 $\frac{1}{4}$ " face, rotates on spherical roller bearing about combination shaft.

27. **VERTICAL SWING SHAFT**—Forged steel, heat-treated. Shaft and pinion forged integrally, mounted on bronze bushings. Pinion: 7.3846" pitch diameter, 5 $\frac{1}{2}$ " face. Shaft: 5 $\frac{5}{16}$ " diameter.

Spur Gear—Cast-steel, 37" pitch diameter, 3" face, bronze-bushed to shaft. Swing is accomplished by Speed-o-Matic lowering an alloy cast-steel, sliding jaw clutch into engagement with jaws cut in upper hub of swing gear.

Swing Brake—Optional extra. Alloy cast-iron 18" diameter x 5 $\frac{1}{2}$ " face, brake drum mounted on upper end of swing shaft. Brake is external contracting band type, Speed-o-Matic applied and spring released. Two-piece, rolled steel brake band with welded end connections, lined with $\frac{3}{8}$ " thick 5" wide woven brake lining.

28. **TRAVEL IDLER GEAR SHAFT**—4 $\frac{7}{16}$ " diameter.

Idler Spur Pinion—Cast-steel, 12 $\frac{1}{2}$ " pitch diameter x 4 $\frac{1}{4}$ " face. Mounted on tapered roller bearings. Pinion is either completely or partially engaged with the swing gear at all times and is raised by Speed-o-Matic control into engagement with the travel gear; spring released.

29. **VERTICAL TRAVEL SHAFT**—Heat-treated steel, 5 $\frac{5}{16}$ " diameter, mounted on roller bearings.

Spur Gear—Cast-steel, 34" pitch diameter, 3 $\frac{1}{4}$ " face. Splined to shaft.

Bevel Pinion—Forged steel, heat-treated, 12" pitch diameter, 5" face. Splined to shaft.

30. **SWING LOCK**—Cast-steel, positive pawl type, spring engaged with swing pinion and Speed-o-Matic released, controlled from operator's position.

*31. **GANTRY**—**Low Gantry**—Standard equipment for shovel operation. 4" double extra-heavy steel pipe front struts and heavy bar rear backstays anchored to revolving frame.

High Fixed Gantry—Standard equipment for crane, clamshell and dragline service. Uses front and rear members, shaft and sheaves of low gantry plus additional gantry shaft and 4" double extra-heavy front struts and heavy bar rear backstays.

Retractable High Gantry—Optional extra. 4" double extra-heavy upper and lower front struts and heavy steel bar upper and lower rear backstays—anchored to revolving frame.

Hoe Gantry—Optional Extra for hoe only. Provides low overhead clearance. 4" x 13.8# box section front struts and horizontal struts. Heavy bar rear backstays and diagonal struts.

32. **CAB**—Number 12 gauge sides and roof. Back and rear corner $\frac{3}{8}$ " curved one-piece plate. Number 14-gauge rear doors. Sliding doors and windows of operator's compartment mounted on anti-friction bearings. Operator's compartment enclosed with safety glass panels.

*33. **COUNTERWEIGHT:**

Power Unit	Counterweight "A" (All Attachments)	Counterweight "AB" (Crane Boom Attachments Only)	Counterweight "ABC" (Crane Boom Attachments Only)
K-608			
Cummins NHRIS-6	35,670 #	38,400 #	....
General Motors Series 6-110, Model 62408	34,260 #	37,500 #	....
Caterpillar D-337F	35,670 #	38,400 #	....
K-608L			
Cummins NHRIS-6	....	38,400 #	41,150 #
General Motors Series 6-110, Model 62408	....	37,500 #	40,250 #
Caterpillar D-337F	....	38,400 #	41,150 #

*34. WEIGHTS: (Approximate in pounds)	K-608	K-608L
Basic Machine (Standard)	132,600#	142,000#
Crane Attachment—60' boom—less hook block	11,200#	11,200#
Shovel Attachment (Standard)	34,500#	....
Dragline Attachment—60' boom—less bucket	12,500#	12,500#
Hoe Attachment with bucket	30,200#	30,200#

***35. DIMENSIONS:**

Cab—	K-608	K-608L
Width	10' 2"	10' 2"
Clearance Height	12' 8"	13' 1"

Tailswing—

Low or Fixed Gantry, Counterweight "A", "AB" or "ABC"	14' 6"	14' 6"
Retractable High Gantry, Counterweight "A", "AB" or "ABC"		
Raised	14' 6"	14' 6"
Lowered	15' 2"	15' 2"

Ground Clearance—

Counterweight "A" or "AB"	3' 11"	4' 4"
Counterweight "ABC" .....	..	4' 4"

Gantry Over-all Heights—

Low Gantry	17' 2"	..
Fixed High Gantry	20' 8"	21' 2"
Retractable High Gantry—Raised	20' 9"	21' 3"
Retractable High Gantry—Lowered	13' 9"	14' 3"

Boom Hinge Pin—

Radius	4' 8"	4' 8"
Height	7' 1"	7' 7"

36.

SPEEDS		Shovel Only	Other Attach-	INDEPENDENT (3/4" Cable)
		1" cable	ments 7/8" cable	
Boomhoist Cable (f.p.m.)		11	11.2	129
First Wrap		15	14.9	201
Last Wrap, full drum		13	13	165
Average speed				
Shovel Crowd (f. p. m.)		87		
Retract		135		
Crowd } with boom double		71		
Retract } sprocket reversed		111		
Swing Speed (r. p. m.)		2.6		2.6
Booming Speed [Ⓢ]		BOOMHOIST	FIXED HIGH GANTRY	RETRAC. HIGH GANTRY
BOOM LENGTH	60'	Standard	330	412
	80'	Standard	320	415
	60'	Independent	54	67
	80'	Independent	50	70

Above figures are based on NHRIS-6 engine @ 1080 r.p.m. full load speed, 17 tooth pinion.

Ⓢ Time required (in seconds) to raise boom from ground to minimum radius—no extender cables.

***37. LINE SPEEDS AND PULLS (AT 1080 R.P.M. FULL LOAD SPEED):**

ATTACHMENT	LAGGING Root diameter in inches	LAGGING Pitch diameter in inches	DRUM		Cable Size inches	LINE	SINGLE LINE SPEED f.p.m.	SINGLE LINE PULL (lbs.)
			L.H.	R.H.				
Shovel [ⓐ]	24 ⁷ / ₈	26	X		1 ¹ / ₈	Hoist	85 [ⓐ]	68,600 [ⓐ]
Dragline	25- ¹ / ₁₆	26	X		⁷ / ₈	Hoist	170	36,200
	21- ¹³ / ₁₆	23		X	1 ¹ / ₈	Inhaul	148	41,100
Clamshell	25- ¹ / ₁₆	26	X		⁷ / ₈		170	36,200
	25- ¹ / ₁₆	26		X	⁷ / ₈	Holding	170	36,200
Crane	25- ¹ / ₁₆	26	X		⁷ / ₈	Hoist	170	36,200
	25- ¹ / ₁₆	26		X	⁷ / ₈	Hoist	170	36,200
Hoe	29	29- ⁷ / ₈	X		⁷ / ₈	Hoist	196	31,300
	24 ⁷ / ₈	26		X	1 ¹ / ₈	Inhaul	170	36,200
Alternate [ⓑ]	20 ⁷ / ₈	22	X					
Lagging	29 & 29 ¹ / ₈	30		X				

ⓐ Speeds shown are bail speed and pull based on 2-part line.

ⓑ Furnished only if order so specifies.

38. CATWALK—Optional extra. Catwalk consists of red oak planking mounted on all-welded steel supports which are bolted to the bottom of cab. The walk-way is level with the operator's platform and is provided with a handrailing of pipe. The catwalk can be supplied for the left side and rear or may be extended around right side. The catwalk extends approximately 24' beyond cab.

SPEED-O-MATIC CONTROL SYSTEM

39. 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 are controlled through the operation of short levels actuating the variable-pressure valves in the control stand.

Pump—Vickers, Inc. Approximate rating: 5 gallons per minute.

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 approximately 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.

SHOVEL ATTACHMENT (CHAIN CROWD)

NOTE: We do not normally recommend the use of this attachment on the K-608L because of possible bucket interference with the long crawler.

***40. BOOM**—All welded, stress-relieved, box section design, 27'0" from center of boom foot pins to center of peak shaft. Boom foot-pins—4" dia. Hardwood bumper unit bolts to underside of boom.

Shipper Shaft—7⁷/₁₆" dia. on right end, 6¹¹/₁₆" dia. on left end, heat-treated, bronze-bushed.

Crowd Pinion—12.73" pitch diameter, 7⁵/₈" face, alloy cast-steel, heat-treated. Splined to shaft.

Chain Sprocket—Alloy cast-steel, 27.260" pitch diameter, 4.073" pitch for Link-Belt LXS1245, roller chain. Splined to shaft.

Boom Peak Fixed Sheave—Cast-steel, 34³/₄" root diameter.

Boom Peak Live Sheave—Alloy cast-steel, 37⁷/₈" root diameter, mounted on ball bearings, 4¹⁵/₁₆" diameter head shaft.

Boomhoist Sheaves—15" root diameter, cast-iron

Dipper Stick Yoke—All welded, stress-relieved, steel, bronze-bushed to shipper shaft. Provided with bronze guide plates for dipper stick.

41. DIPPER STICK—Single member, all welded, stress-relieved, box section design, 13³/₄" x 13³/₄" x 18'10" long from center of pin to centerline of shipper shaft with dipper stick fully extended. Rack, four section alloy cast-steel, heat-treated. Each section has 16 teeth, 2¹/₂" pitch. Rubber loaded dipper buffer mounted on extreme end of stick limits excessive forward movement of stick and absorbs impacts.

42. **DIPPER**—3 cubic yard AMSCO, plug-welded manganese dipper with 4 replaceable manganese steel tooth points. Dipper is 4'9½" wide inside front, 4'11" wide inside back.
43. **PADLOCK BLOCK**—Sheave 19" root diameter, mounted on bronze bushing, on 3¹⁵/₁₆" diameter pin in all welded padlock frame provided with case hardened steel bushings.
44. **DIPPER TRIP**—Located on shovel boom forward of shipper shaft, Speed-o-Matic tripped and spring returned. Trip sheave, cast-iron, 12¹/₄" root diameter, mounted on extended hub of cast iron 12¹/₄" root dia. dipper trip drum. Two 6" pitch dia. cast-iron dipper trip cable sheaves—one mounts on pin welded to the boom—the other mounts in the dipper trip lever. Bucket is dumped by a slight side movement of the hoist clutch lever on the control panel.
- *45. **CROWDING ACTION**—Positive chain crowd type. Crowding and retracting are accomplished by chain drive to double sprocket at boom foot and up to shipper shaft. Two crowd speeds are available either of which may be obtained by reversing the double sprocket on countershaft at boom foot. Pinion on shipper shaft engages with teeth on dipper stick rack, crowding or retracting stick. Crowding is performed by normal rotation of double drive on drum shaft. To retract or reverse this sprocket, a retract unit is located in front of and in mesh with the drum gear and by means of a chain drive, reverses the direction of the drive sprocket. Both actions are performed with one lever. Crowd chain is Link-Belt steel strand roller chain LXS1245, 4.073" pitch. Retract chain is Link-Belt steel strand roller chain, SS40 Hyper, 3.075" pitch.

*46. **CABLES:**

SHOVEL CABLES — 27' BOOM	
Boomhoist—	4 Part—1" x 185' ④ Low Gantry 4 Part—1" x 230' ① Retractable High Gantry 4 Part—1" x 315' ① High Gantry
Hoist—	2 Part—1 ¹ / ₈ " x 120' ② Low, Retractable High Gantry, or High Gantry
Dipper Trip—	7 ¹ / ₁₆ " x 31' ③

- ① Improved plow steel—-independent wire rope center—right lay, lang lay—preformed 6 x 19 modified seale.
- ② Roebling Royal Blue—Type 1105 wire rope or equal—right to lay, lang lay, Code 01356, preformed—6 x 25 filler wire.
- ③ Improved plow steel—-independent wire rope center—right lay, lang lay—preformed 6 x 36 filler wire.
- ④ Roebling Royal Blue—Type 1105 wire rope or equal—right lay, lang lay, Code 01349, preformed—6 x 21 filler wire.

CRANE, CLAMSHELL AND DRAGLINE ATTACHMENTS

- *47. **BOOM**—Type "GA", three piece 60' all welded, box-lattice, with upper and lower sections each 25' long and one 10' center section, 48" deep x 48" wide at connection. 4" x 4" x 3³/₈" alloy steel chord angles for all sections. Upper boom section and all extensions latticed with 2" x 2" x 3¹/₁₆" angles and lower boom section latticed with 2¹/₂" x 2¹/₂" x 1¹/₄" angles. Each boom foot is 2³/₄" thick, 54¹/₂" boom foot centers.

Head Shaft—Heat-treated, 3 1⁵/₁₆" diameter.

Single Point Sheave for Dragline Operation—One bronze-bushed, 24" root diameter cast steel sheave, roller type lower guards.

Double Point Sheave for Crane and Clamshell Operation—Two bronze-bushed 24" root diameter cast steel sheaves, roller type lower guards.

Triple Boom Point Sheaves for Crane Operation—Three bronze-bushed 21¹/₈" root diameter cast steel sheaves, roller type lower guards.

Boomhoist Machinery:

Standard boomhoist, no extenders—2 sheaves, cast-iron, 13" root diameter, bronze-bushed mounted one each side of boom on peak shaft.

Independent rapid boomhoist, no extenders—4 sheaves, cast-steel, 15¹/₄" root diameter, bronze-bushed, mounted 2 each side of boom on peak shaft.

Extender links for either standard or independent rapid boomhoist, optional extra with extender cables. Links are all welded steel units and replace boomhoist sheaves on boom peak shaft.

Connection—Section bolted with twelve 1¹/₈" steel heat-treated bolts.

48. **BOOM EXTENSIONS**—Available in 5', 10', 15', 20' and 30' lengths—all welded box latticed type, 48" deep, 48" wide with 4" x 4" x 3³/₈" alloy-steel chord angles latticed with 2" x 2" x 3¹/₁₆" steel angles.

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- 49. BOOM BACKSTOP**—Optional extra. Rigid type for high gantry only. Retractable type for retractable gantry.
- *50. JIB BOOMS**—All jibs are of all-welded alloy steel construction and are available in the following lengths:
20', 30' or 40' Jib Boom—Basic jib is in two 10' sections, bolted together. 10' sections are available to make a 30' or 40' jib. Box lattice type 20" deep x 24" wide at connections.
Jib Strut—10' high
Jib Strut Equalizer Sheaves—Cast iron, 5 $\frac{1}{8}$ " root diameter.
Jib Strut Deflector Sheave—Cast ductile iron, 15 $\frac{7}{8}$ " root diameter mounted on needle bearings.
Peak Sheave—Cast ductile iron, 15 $\frac{7}{8}$ " root diameter, mounted on needle bearings.
Peak Shaft—Heat-treated steel, 2 $\frac{1}{2}$ " diameter.
- 51. FAIRLEADER**—Full revolving type with barrel, sheaves and guide rollers on bearings. Sheaves, 17 $\frac{7}{8}$ " root diameter mounted on 2 $\frac{5}{8}$ " diameter shaft.
- 52. DRAGLINE BUCKET, CLAMSHELL BUCKET AND MAGNET**—For normal dragline work, on firm level ground, the capacities shown in the standard lifting capacity table should not be exceeded; for clamshell, lifting magnet and similar work where the outward swing of the load in rotation adds to the load imposed on machine, these capacities should be reduced at least 10%. Weight of bucket or magnet plus load should not exceed the resulting net capacity at the maximum desired operating radius, or the following, whichever is least—dragline 16,000#—clamshell or magnet 18,000#. These are maximum values, and allowance must be made for soft or uneven footing, bucket suction and other unfavorable conditions. Boom length for average dragline, clamshell, magnet, or similar work should not exceed 90 ft.
- 53. TAGLINE WINDER**—Spring wound drum type, mounted on lower section of crane boom.
 Rud-O-Matic Model 1248 for up to 80' booms and up to 4 yard buckets.
 Rud-O-Matic Model 1248 Plus for booms 80' to 100' long and up to 2 yard buckets.
 Rud-O-Matic Model 1848 Plus for booms over 80' long and up to 5 yard buckets.
- 54. BOOMHOIST BRIDLE**—Optional at extra cost, serves as a connection between extender cables and boomhoist line.
Standard boomhoist—Bridle (4 part line) consists of fabricated frame having 2 cast-iron sheaves, bronze-bushed 13" root diameter.
Independent Rapid Boomhoist—Bridle (8 part line) consists of fabricated frame having 4 cast-iron steel bronze-bushed sheaves, 15 $\frac{1}{4}$ " root diameter.
- *55. EXTENDER CABLES**—Optional at extra cost for all crane boom attachments, 1 $\frac{1}{2}$ " diameter, 6 x 19 improved plow steel, independent wire rope center, right lay, regular lay, preformed, modified seale, with connector ends. Basic cables 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. Basic standard extender cable 30' 0" long.
- *56. CRANE—CRANE, CLAMSHELL, DRAGLINE E;**

TYPE OF CABLE	CABLE Dia. (Inches)	LAGGING			TYPE OF Boom-Hoist	TYPE OF GANTRY	CABLE LENGTH WITH EXTEND. CABLES	BOOM AND CABLE LENGTHS (Without Extenders) Lengths shown in feet							
		Root Dia.	L.H.	R.H.				60	70	80	90	100	110	120	
4-part line BOOMHOIST	7/8 [Ⓛ]	11 $\frac{1}{2}$			Std.	Fixed High	160'	335	375	415	455	495	535	575	
	7/8 [Ⓛ]	11 $\frac{1}{2}$			Std.	Retrac. High	175'	350	390	430	470	510	550	590	
8-part line	3/4 [Ⓛ]	10			Indep.	Fixed High	295'	650	730	810	890	970	1050	1130	
	3/4 [Ⓛ]	10			Indep.	Retrac. High	310'	665	745	825	905	985	1065	1145	
DRAG hoist	7/8 [Ⓛ]	25 $\frac{1}{16}$	X					150	170	190	210				
	1 $\frac{1}{8}$ [Ⓛ]	21 $\frac{3}{16}$		X				85	95	105	115				
CLAM holding	7/8 [Ⓛ]	25 $\frac{1}{16}$		X				150	170	190	210				
	7/8 [Ⓛ]	25 $\frac{1}{16}$	X					180	200	220	240				
TAGLINE	5/16" or 3/8" [Ⓛ] furnished with Rud-o-Matic tagline winder														
CRANE -Hoist	7/8 [Ⓛ] [Ⓛ]	25 $\frac{1}{16}$	X	X	NOTE—All lengths shown										
Parts of Line	1				at right can be used with			140	160	180	200	220	240	260	
	2				20 $\frac{7}{8}$ " root dia. lagging. All			200	230	260	290	320	350	380	
	3				lengths below heavy lines			260	300	340	380	420	460	500	
	4				cannot be used on:			320	370	420	470	520	570	620	
	5				29" root dia. lagging $\ggg \rightarrow$			380	440	500					
	6				25 $\frac{1}{16}$ " rt. dia. lagging $\ggg \rightarrow$			440	510						

***56. CABLES, CLAMSHELL, DRAGLINE: (Continued)**

JIB CABLE

BOOM LENGTH IN FEET	HOIST LINE (1-Part) 7/8" ①			HOIST LINE (2-Part) 3/4" ①			BOOM GUY LINE 3/4" ①			JIB GUY LINE		
	JIB			JIB			JIB			JIB		
	20'	30'	40'	20'	30'	40'	20'②	30'②	40'②	30'②	30'②	40'②
60	180	200	220	265	295	325	123			Basic Jib Cable 40' 11"		
70	200	220	240	295	325	355	143					
80	220	240	260	325	355	385	163					
90	240	260	280	355	385	415	183					
100	260	280	300	385	415	445	203					
110	280	300	320	415	445	475	223			Extender Cables 9' 7"		
120	300	320	340	445	475	505	243					

- ① Improved Plow Steel non-rotating cable. Hemp center. Six inner strands—Lang lay—left lay, 12 outer strands—regular lay—right lay—18 x 7.
- ② Roebling Royal Blue Type 1105 wire rope or equal—right lay, lang lay—Code O1349—preformed 6 x 21 filler wire.
- ③ Improved plow steel—hemp center—right lay, regular lay—preformed 8 x 19.
- ④ 7/8" cable furnished if 30 ton, or larger, hookblock is specified—3/4" cable is furnished with 25 ton, or smaller, hookblock or in the event no hookblock is specified.
- ⑤ Improved plow steel—hemp center—right lay, regular lay—preformed, 6 x 19.

***HOE ATTACHMENT**

- 57. **BOOM**—All-welded stress relieved box section of formed plates. Gooseneck design.
Standard Boom—30' from center of boomfoot pins to center of boom peak shaft.
- 58. **INHAUL CABLE FAIRLEAD**—All-welded steel bracket bolted to top side of boom, forward of boomfoot. Serves as guide for inhaul cable.
Sheaves—Lower—cast steel, 17 1/8" root diameter, bronze-bushed.
Upper—cast steel, 14 1/8" root diameter; bronze bushed.
Shafts—Lower—3" diameter
Upper—2 1/2" diameter
- 59. **INHAUL CABLE SHEAVES ON BOOM**—Two, cast steel, 24" root diameter bronze-bushed.
Shaft—steel, 4 3/8" diameter.
- 60. **BOOM PEAK SHAFT FOR ARM**—Steel, 5" diameter, heat-treated. Shaft floats and is retained by end caps bolted to arm bushings.
- 61. **ARM**—All-welded box section design, 12'0" from center of bucket pins to center of boom peak shaft on bronze bushings.
- 62. **ARM MACHINERY**—
Deflector Sheaves—Two—cast iron, 13" root diameter, bronze-bushed.
Deflector Sheave Pins—Steel, 2 15/16" diameter.
Hoist Padlock—All-welded steel construction.
Hoist Padlock Sheaves—Two cast-alloy steel, 21 1/8" root diameter, bronze-bushed.
Sheave Pin—Alloy steel, 3 15/16" diameter, heat-treated.
Padlock Shaft—Alloy steel, 3" diameter, heat-treated.
- 63. **BUCKET AND CONNECTIONS**—ESCO, 60" cutting width with side cutters 3 cu. yd., 5 replaceable cutting teeth. Double lugs connected to arm with steel pin.
Pitch Brace—Reinforced welded box construction of steel plate. Connected to bucket lugs by 2 1/2" diameter x 7" long steel pins.
- 64. **BUCKET BAIL**—Horizontal sheave type of welded reinforced plate construction. Connected to bucket through cast-steel link with heat-treated steel pins.
Sheave—Cast-steel, 24" root diameter, bronze bushed with oil seals.
Sheave Pin—Heat-treated alloy steel, 4" diameter, fixed by lock plate.
- 65. **MAST**—Welded reinforced steel construction, 13'0" long from peak shaft to foot pins.
Foot Pin—Steel, 3 3/16" diameter.
Head Shaft—Heat-treated alloy steel, 5" diameter.
Hoist Sheaves—Two—cast steel, 24" root diameter, bronze-bushed.
Boomhoist Sheaves—Two—cast iron, 15" root diameter.

66. CABLES

Boomhoist—4 part $\frac{7}{8}$ " x 123' ① Hoe Gantry
4 part $\frac{7}{8}$ " x 117' ① Low Gantry
4 part $\frac{7}{8}$ " x 157' ① Retractable High Gantry
4 part $\frac{7}{8}$ " x 130' ① Fixed High Gantry
4 part $\frac{7}{8}$ " x 210' ①

Inhaul —2 part $1\frac{1}{8}$ " x 93' ②

- ① Improved Plow Steel—Independent Wire Rope Center, right lay, lang lay, preformed 6 x 19 modified seale.
- ② Roebling Royal Blue—type 1105 wire rope or equal, right lay, lang lay, code O1356, preformed 6 x 25 fillerwire.

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