MODEL HC-77
BOOK No. 209
SERIAL No. _____

MACHINE SERIAL NUMBER

The machine serial number is on the serial number or capacity plate, or on the Crane Rating Manual located inside the operator's cab. The serial number should always be furnished when ordering parts for the machine or when corresponding with the distributor or factory concerning the machine. Providing the serial number is the only way of ensuring the correct parts and/or information can be furnished.

In the event the serial number is not readable, a number is stamped on the upper revolving frame which can be used to identify the machine. On cable crane this number is located on the right hand boom foot mounting lug. On hydraulic cranes and excavators the number is stamped just below the boom hoist cylinder mounting lugs.

Warranty

Be it known that hereinafter Link-Belt Speeder Company of Cedar Rapids, Iowa is to be known as the Company.

The products manufactured by the Company, exclusive of used or re-built machinery or equipment, are subject to the following warranty:

"The Company warrants that its products are of good material and workmanship and agrees to replace without charge f.o.b. its factory any parts proving defective within six months from date of shipment from the factory, or within 1,000 hours of operation, whichever period shall expire first, or, at the option of the Company, the parts will be repaired; provided investigation by the Company shows such replacements or repairs are made necessary by inherent defect of material or workmanship, but it is agreed that the Company's liability under this warranty is limited to furnishing such parts f.o.b. factory or making such repairs. The Company will make no allowances for repairs or alterations unless the same be authorized in writing by the Company, and any claims of defective material or workmanship must be made within six months from the date of shipment from the factory. It is the intention of this paragraph to limit the Company's liability solely to the cost of the replacement parts f.o.b. factory, or, at the option of the Company, to its cost of repairing the defective parts, and no claim for damage, lost time, or anything else, will be recognized by the Company. It is understood that engines, motors, and any other accessories furnished with the Company's equipment, are not warranted by the Company, but are sold only with the standard warranty of the manufacturer thereof".

The Company reserves the right to make alterations or modifications in their equipment at any time, which, in their opinion, may improve the performance and efficiency of the machine. They shall not be obliged to make such alterations or modifications to machines already in service. Any operation beyond rated capacity, or the improper use, application, neglect or alteration of said product, or the substitution upon the product of parts not made or approved by the Manufacturer shall void such warranty.

LINK-BELT SPEEDER SERVICE MANUAL

QUICK REFERENCE SYSTEM

Use Only Genuine Link-Belt Speeder Parts – Always Give Machine Number When Ordering Parts

FORM NO. 1265-¾M-78-4 WPCO

PRINTED IN U.S.A.

PREFACE

The productive life of any machine depends largely on the care and consideration given it. This especially holds true of such equipment as cranes and excavators.

Link-Belt Speeder machines embody the best of engineering knowledge, years of experience, and construction in accordance with the high standards of the Company. The present machine age and universal use of the automobile has taught most people to appreciate that systematic, periodical inspection and maintenance will be repaid with a longer period of satisfactory service.

This instruction book was compiled to explain the adjustments necessary for proper operation of the machine. A study of this book will acquaint operator or serviceman with the construction of this equipment and enable him to readily diagnose and remedy most troubles which may arise. It is advisable to correct minor troubles before they develop into costly major shut-downs.

Right hand and left hand parts, as referred to in this book, are determined by facing boom from rear of machine. Operator's position is located on left hand side of machine.

We do not attempt to outline what part or parts of the cab it might be necessary to remove to perform your particular job as this will vary depending upon what equipment or tools are available.

Any questions pertaining to the care and upkeep of this equipment which have not been covered in this book should be directed to your nearest Link-Belt Speeder distributor, or Link-Belt Speeder Company.

Link-Belt Speeder Company reserves the right to make alterations or modifications in this equipment at any time, which in their opinion may improve the performance or efficiency of the machine. The manufacturer shall not be obliged to make such alterations or modifications to machines already in service.

SECTION 1 - PROTECTIVE MAINTENANCE AND LUBRICATION TRUCK CARRIER UNIT

BEFORE STARTING OPERATIONS

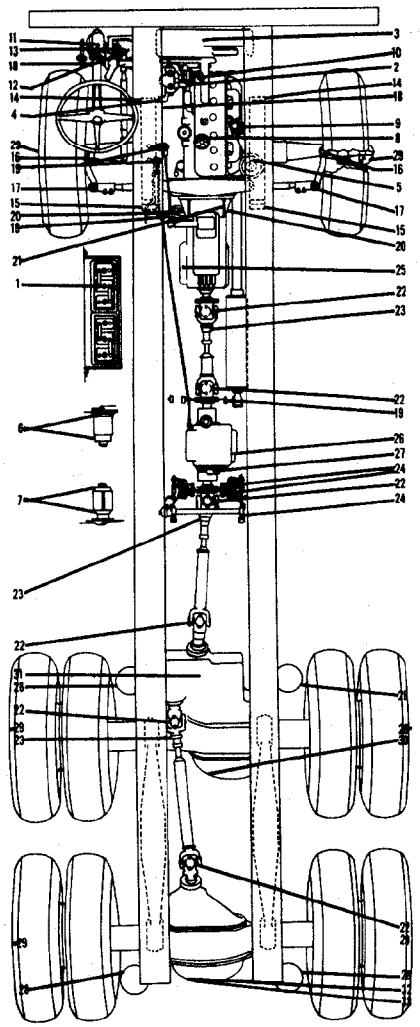
OPERATION	REMARKS
Fuel Tank	Check fuel supply and fill tank if necessary.
Engine	Check oil and water levels, and other items recommended by engine manufacturer.
	Check fan belt, compressor and power steering pump belts for proper tension.
Master Clutch	Observe operation of clutch and check the adjustment. The clutch should engage freely, hold when engaged and not drag when disengaged.
Tires	Test for proper inflation pressure for type of operating conditions.
Wheels	Check rim studs and tighten if necessary.
Brakes	Check air pressure 100-110 psi maximum. Check air warning buzzer for operation at 60 psi. Check hand emergency brake operation and adjustment. Check foot brake operation. Drain accumulated water from air reservoir tanks.
Steering	Check ease of turning. Number of revolutions of steering wheel from center to extreme right and left must be equal.
Electrical	Check head lights, clearance lights, turn signals, park lights, tail and stop light, windshield wiper, and horn. Check instrument panel gauges. Check battery water level and fill if necessary.
	Daily
Engine	Provide 8 hour lubrication and maintenance as outlined by manufacturer.
Radiator	Check coolant level. Test anti freeze in Winter.
Battery	Check water level.
Tires	Test for proper inflation pressure for type of operating conditions.
Brakes	Check air pressure 100-110 psi maximum. Check air warning buzzer for operation at 60 psi. Check hand emergency brake operation and adjustment. Check foot brake. Check hand air brake.
Air Reservoirs	Drain accumulated water.
Power Steering	Check oil level in reservoir. Change filter if oil discolored.
	Weekly
Main Transmission Auxiliary Transmission Rear Axles	Check lubricant level and fill if necessary with specified lubricant.
Crankcase Breather	Clean and oil breather.

PROTECTIVE MAINTENANCE AND LUBRICATION (Continued)

OPERATION	REMARKS
	Monthly or 1000 Miles
Crankcase Breather Air Cleaner	Clean and oil. Clean oftener under adverse conditions, dust, sand, etc.
Air Compressor	Place a few drops of oil on unloading valve mechanism.
Steering Gear	Check lubricant level and fill if necessary.
Cab Door Hinges, Latch	Lubricate with light oil.
Clutch Pedal Rod	Lubricate pillow bearings.
Spring Pins and Shackles Steering Linkage Steering Knuckles	When lubricating, force lubricant into the fitting until the old lubricant, dirt and water are expelled.
Brake Camshaft	Avoid overlubricating to prevent grease from entering brakes.
Shift Linkage	Use engine oil.
Emergency Brake Linkage	Use engine oil.
Carburetor Linkage	Use engine oil.
Clutch Release Bearing	Avoid overlubricating.
Generator	Engine oil. Avoid overlubrication.
Starter	Engine oil. Eight to ten drops each cup.
	Semi-Annually or 5,000 Miles
Wheel Bearings	Repack with grease. Refer to Section 2 for packing and reassembly instructions.
Distributor	Lubricate cam post.
Power Steering Reservoir	Drain, flush and refill. Change filter.
Universal Joints	Lubricate with low pressure grease gun to avoid damaging seals.
Front Rear Axle	Drain and refill.
Rear Rear Axle	Drain and refill.
Power Divider	Drain and refill.
Main Transmission	Drain and refill.
Auxiliary Transmission	Drain and refill.
	Annually or 10,000 Miles
Water Pump	Remove plug and lubricate with wheel bearing grease. Fill housing using short-fiber grease in low pressure gun.
Window Regulator	Remove door panel and lubricate regulator slide with light grease.
Air Compressor	Remove cylinder head and clean carbon from discharge and unloading valves. Adjust valve clearance .010" to .015" inches. Inspect governor for proper operation.

TRUCK LUBRICATION CHART

KEEP GREASE, OIL, CONTAINERS AND GUNS CLEAN. WIPE ALL FITTINGS BEFORE LUBRICATING.



No.	Description	No. Points	Daily	Weekly	Monthly or 1000 Mi.	Semi Annually or 5000 Mi.
1	Batteries	6	Check & Fill			
2	Crankcase	1	Check & Fill		Oil & Filter	
3	Cooling System	1	Check & Fill		Clean Breather	
4	Compressor Unloader Valve	1			EO	
5	Air Cleaner	1			Clean-EO	
6	Generator	2			EO	
7	Starter	2			EO	
8	Distributor	2			EO	
9	Carburetor Linkage	4			EO	
10	Power Steer Reservoir	1	Check & Fill			
11	Steering Gear	1			Check & Fill	
12	Steer Linkage	2			CG	
13	Drag Link	2			CG	
14	Spring Bolt	4			CG	
15	Spring Shackle	2			CG	
16	Steer Knuckle	2			CG	
17	Tie Rod	2			CG	
18	Clutch Pedal Rod	3			CG	
19	Control Linkage	5			CG	
20	Clutch Shaft	2			CG	
21	Clutch Release Brg.	1			CG	
22	Universal Joint	6			CG	
23	Slip Joint	3			CG	
24	Emergency Brake	6			CG	
25	Main Transmission	1		Check & Fill		Change
26	Aux. Transmission	1		Check & Fill		Change
27	Speedometer Adapter	1				CG
28	Brake Camshaft	4 or 6			CG	
29	Wheel Bearing	4				WG
30	Front Rear Axle	1		Check & Fill		Change
31	Power Divider	1		Check & Fill		Change
32	Rear Rear Axle	1		Check & Fill		Change
33	Axle Vents (Rear Axles)	2			Clean	

KEY

CG=Chassis Grease, WG=Wheel Bearing Grease } See Note 5
GL=Gear Lubricant
EO=Engine Oil

Note 1: A heavy duty refined petroleum product (with detergent and anti-oxidant additives) to meet or exceed MIL-O-2104A. Mobil Delvac Special, or equal.

Note 2: Type A-Suffix A (Armour Research Qualified) Aniline point must be between 200°-250°. (test method ASTM No. D611) Mobilfluid #200, or equal.

Note 3: Gear Lube Type: Use SAE-140 above 32°F. SAE-90 at 32°-0°F, SAE-80 Below 0°F.

Note 4: An extreme pressure lubricant containing defoamant additives. It must meet or exceed MIL-L-2105. Mobilube EP90, or equal.

Note 5: Mobilgrease Special (with Moly), or equal.

CAPACITIES		RECOMMENDATIONS
Fuel Tank	35 Gal.	
Cooling System		
IHC Engine with Radiator	28 Qts.	Clean and flush radiator and block.
GM Engine with Radiator	24 Qts.	Seasonally. Anti-freeze in winter.
Crankcase IHC engine & Filter	10-1/2 Qts.	Use
Crankcase GM Engine & Filter	12-1/2 Qts.	SAE 10W30
IHC Engine Air Cleaner	3-1/2 Pts.	Detergent engine oil.
GM Engine Air Cleaner	13 Pts.	See Note 1
IHC Power Steer Pump Reservoir	2 Qts.	Automatic Transmission Fluid
GM Power Steer Pump Reservoir	4 Qts.	See Note 2
Main Transmission	16 Pts.	Use SAE90 Gear Lubricant
Auxiliary Transmission Std. 6 X 4	7 Pts.	See Note 4
Transfer Case Optional 6 X 6	5 Pts.	See Note 3
Steering Gear	2.5 Pts.	Use
Front Rear Axle	24 Pts.	SAE 90EP Gear Lubricant
Rear Rear Axle	22 Pts.	See Note 4

STORAGE INSTRUCTIONS AND TOOLS

SPECIAL TOOLS - TRUCK	PART NO.
Wheel Wrench	8P90
Tire Lug Wrench	PC242
Tire Gauge	PC244
Tire Inflation Hose Assy.	PC245
Consisting of the following:	
Air Chuck	PC246
Air Hose	PC248
Hose Clamps	PC249
Service Plug	AC3692
Male Coupling	PC247

STORING A TRUCK

When a truck is not to be used for a period of time, it should be parked in a dry and protected place and the following procedure should be observed:

1. Wash the truck and completely lubricate the chassis (refer to lubrication chart).

2. Drain the engine oil and flush with flushing oil. Refill with new oil. Run the engine until the oil is thoroughly circulated.

3. CAUTION: Drain the fuel tank, fuel lines,fuel pump, and carburetor fuel bowl. Run the engine until the carburetor is dry. If gasoline is allowed to remain in the fuel system a gummy substance will form in the carburetor jets and passages, causing serious trouble. Be sure to drain the system thoroughly. The gum deposits can be dissolved with a mixture of 1 part alcohol and 1 part benzol, or with acetone.

4. Remove the battery and store in a dry place.

5. Drain and flush the radiator and cooling system. BE SURE all drains are open.

6. After the engine has cooled, remove the spark plugs and pour a small quantity of SAE-50 engine oil in each cylinder through the plug holes. Then turn the engine over by hand a few times to thoroughly distribute the heavy oil over the pistons and cylinder walls. BE SURE to replace the spark plugs. Remove the valve cover and flush the valves, rocker arms, and push rods with SAE-50 engine oil. Replace the valve cover.

7. Clean the air cleaner and refill to indicated level with new oil.

8. Block up the truck so that the weight is off the tires.

9. If the storage is to be less than thirty days and complete storage preparations are not made, the principle hazard is gum formation in the fuel system. If the fuel system is not drained, the engine should be run for short periods at operating temperatures during the storage interval. This will flush out the fuel lines and carburetor, reducing the danger of gum formation. CAUTION: Due to the formation of poisonous gases, make certain that the storage area is well ventilated before running the engine.

SERVICING A TRUCK AFTER STORING

When a truck is returned to service the following procedure should be followed:

1. Close the drains and fill the cooling system with clean water (use antifreeze if required). Inspect all hose and water pump connections for water leaks.

2. Fill the fuel tank and examine the condition of fuel filter glass bowl gasket. The gasket must form a good seal, otherwise the pump will not supply fuel to the carburetor.

3. Test and install the battery. IMPORTANT: Before starting the engine, see "Generator Polarity" instructions shown under Electrical System Maintenance in engine manufacturers manual.

4. Check the oil level in the air cleaner and refill if necessary.

5. Check the oil level in the engine. Remove the spark plugs and pour a small quantity of light engine oil in each cylinder through the spark plug holes. Turn the engine over by hand a few times and then replace the spark plugs. Remove the valve cover and flush the valves, and push rods with SAE-50 engine oil. Replace the valve cover.

6. Check the oil level in the transmission, in the rear axle, and in any auxiliary unit.

7. Check the air pressure in all tires and be sure to replace the valve caps.

PROTECTIVE MAINTENANCE AND LUBRICATION
UPPER MACHINE UNIT

IMPORTANT

Read the following instructions before attempting to operate a new machine:

1. Operate at half throttle during first 16 hours (two shifts) of operation - a "break-in" period under moderate loads will assist in providing long and trouble-free performance.
2. Inspect clutch and brake linings periodically during "break-in" period - poor lining contact or misadjustment will cause excessive heat which is detrimental to both lining and drum surfaces.
3. Lubricate bearings frequently. Intervals of lubrication for all bearings can be obtained from the lubrication chart.
4. Lubricate open gears at frequent intervals. A special molybdenum sulphide base grease has been applied at the factory, which, because of its special qualities, protects the tooth surfaces during the important "break-in" period. This grease should not be removed, but allowed to be absorbed by the normal gear lubricant being used.
5. Follow engine manufacturer's recommendations for proper engine care.

BEFORE STARTING OPERATIONS	
OPERATION	REMARKS
Hydraulic System	Check for correct operating procedures. Check for external leaks. Check Accumulator pre-charge on Hydraulic Gauge, use method outlined in Section 9.
Fuel Tank	Check fuel supply and refill if necessary.
Engine	Check oil and water levels, and other items recommended by engine manufacturer.

EVERY 8 HOURS	
OPERATION	REMARKS
Lubricate the following:	
Center Pin Bushing Open Gears	Maintain a film of clean grease on open gear teeth at all times.
Mast and Boom Hoist Bridle Sheaves Control Stand Lever Linkage	Use engine oil on all pins and sliding surfaces.
Attachments	Lubricate 8 hour fittings as specified on lubrication chart.
Chain Case	Check for proper oil level.
Speed-O-Matic Sump Tank	Check for proper oil level. Drain Accumulator of hydraulic pressure; or compensate for quantity which it may hold.
Engine	Provide 8 hour lubrication and maintenance as outlined by engine manufacturer.
Shovel Retract Cable	Check for proper tension, and keep well lubricated.
Dipper Stick	Open gear grease as necessary.

ENGINE SHUT-DOWN PROCEDURE

To help in prolonging engine life, idle the engine for 2 or 3 minutes before shut-down to allow coolant to reduce engine temperature.

PREVENTIVE MAINTENANCE AND LUBRICATION (Continued)

EVERY 40 HOURS

OPERATION	REMARKS
FIRST PERFORM ALL OPERATIONS LISTED UNDER "EVERY 8 HOURS"	
Lubricate the following:	
Conical Rollers Turntable Gear Control Linkage	Use No. 1 Grease and pump bearings full.
Check Clutch Lining and Adjustment	Greasy, aged, or worn clutch lining should be cleaned or replaced if necessary. Check lining for proper lining contact and adjust shoes if required.
Check Brake Bands	Inspect lining for wear and proper contact.
Turntable Roller Path	Keep path free of excess grease. Use "tacky" grease as necessary during break-in to prevent scuffing.
Pump Belt	Check for proper tension to prevent slippage.
Engine	Provide 40 hour lubrication and maintenance as outlined by engine manufacturer.
Check Boom Hoist Brake	Check boom hoist brake band adjustment to make sure that boom hoist brake cylinder piston is not bottoming in cylinder when band is fully applied.
Attachments	Lubricate 40 hour fittings as specified on lubrication chart.
Oildex on Waukesha Engines	Empty jar when half full. Keep oil in air filter at level mark.

EVERY 80 HOURS

OPERATION	REMARKS
FIRST PERFORM ALL OPERATIONS LISTED UNDER "EVERY 40 HOURS"	
Lubricate the following:	
Horizontal Shaft Bearings Vertical Shaft Bearings	Lubricate sufficiently to fill bearing with grease. Over-Lubrication could allow excess grease to collect on clutch or brake surfaces.
Drum Brake Controls	
Master Clutch Bearings	Follow manufacturers recommendations. Do not over-lubricate.
Boom	Inspect Boom Angles and Connections for damage or wear. Prevent rust and corrosion by proper maintenance.
Boom Cables	Check boom cables and connections for wear. Prevent rust and corrosion by proper lubrication.
Engine	Provide 80 hour lubrication and maintenance as outlined by engine manufacturer.

EVERY 250 HOURS

OPERATION	REMARKS
FIRST PERFORM ALL OPERATIONS LISTED UNDER "EVERY 80 HOURS"	
S-O-M Oil Filter	Change Filter Cartridge. Wash and clean housing in clean solvent and reassemble.
Chain Case Breather	Wash and clean Breather in clean slovent. Oil lightly and replace on chain case.
Fairleader Sheaves	Inspect grooving for wear. Replace broken or damaged sheaves.
Dipper Stick and Sheaves	Inspect for wear and need for adjustment.
Engine	Provide 250 hour lubrication and maintenance as outlined by engine manufacturer.
Oildex on Waukesha Engines	Replace filter element E-1812.

PREVENTIVE MAINTENANCE AND LUBRICATION (Continued)

EVERY 500 HOURS

OPERATION	REMARKS
FIRST PERFORM ALL OPERATIONS	LISTED UNDER "EVERY 250 HOURS"
Upper Transmission Case	Check Oil Level.
Master Clutch	Check and adjust if necessary.
Engine	Provide 500 hour lubrication and maintenance as outlined by engine manufacturer.

EVERY 1000 HOURS OR SEASONAL

OPERATION	REMARKS	1000 HRS.	SEASONAL
FIRST PERFORM ALL OPERATIONS LISTED UNDER "EVERY 500 HOURS"			
Oil Compartments	Drain and refill gear compartments. Make seasonal weight changes as required.		*
Sliding Jaw Clutches	Inspect jaw clutches on vertical shafts for proper engagement.		*
Reverse Bevel Gears	Inspect bevel gears for proper backlash.		*
Turntable Gear	Inspect turntable gear and swing pinion for normal wear.	*	
Engine Drive Chain	Check engine drive chain for correct adjustment and wear		*
Turntable Rollers	Inspect rollers and path for wear. Adjust if required.	*	
S-O-M Sump Tank	Drain, clean and refill. Make seasonal changes as required.	*	*
Cable Sheaves	Inspect sheaves for signs of wear and damage.	*	
Engine	Provide 1000 hr. lubrication and maintenance as outlined by manufacturer.	*	
Chain Case	Drain and refill. Make seasonal weight changes as required.		*
Oildex on Waukesha Engines	Clean entire unit.		*

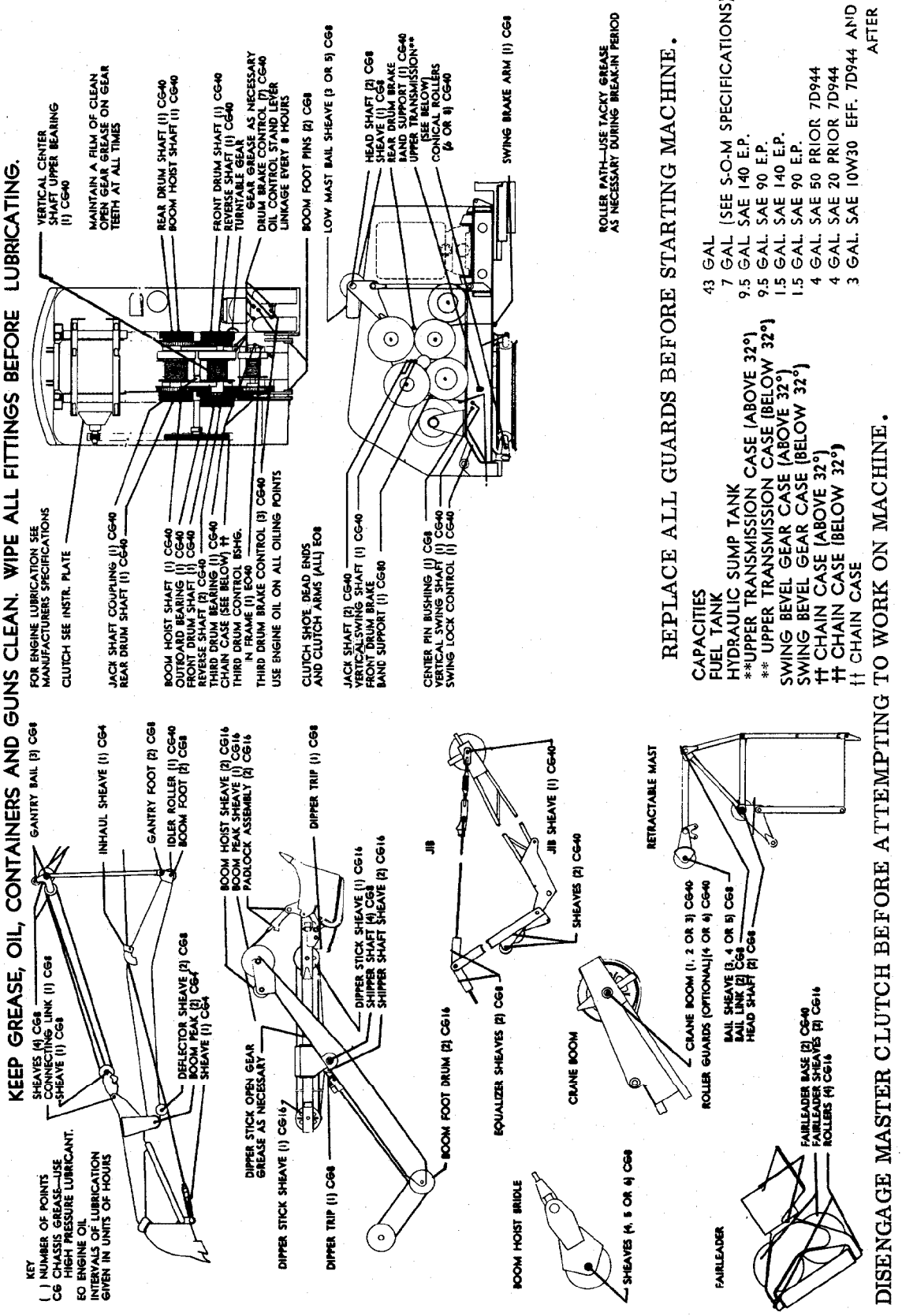
MACHINE STORAGE SUGGESTIONS

Listed below are a number of important points that should be followed when putting machine in storage. Machines stored outside must be thoroughly protected or serious deterioration will result.

1. Machines should be stored under cover to reduce possibility of rust and deterioration.
2. If stored outside, certain procedures should be followed to protect machine as much as possible from weather elements.
   (a) Turntable roller path and roller machined surfaces should be protected with heavy oil.
   (b) All clutch and brake machined facings must be protected with covers of waterproof paper or suitable material to protect these surfaces from rust.
   (c) Open spaces around mast struts and boom hoist cables should be covered with waterproof paper to eliminate water coming in on machinery parts.
   (d) Levers should be neutral position; foot brakes in off position.
   (e) Refer to engine and clutch manual for instructions on storage of power unit.
   (f) Grease all points of lubrication with grease gun. Oil other points, levers, linkage etc., with oil before storing machine.

PROTECTIVE MAINTENANCE AND LUBRICATION (Continued)

LUBRICATION CHART



REPLACE ALL GUARDS BEFORE STARTING MACHINE.

CAPACITIES	
FUEL TANK	43 GAL
HYDRAULIC SUMP TANK	7 GAL (SEE S-O-M SPECIFICATIONS)
**UPPER TRANSMISSION CASE (ABOVE 32°)	9.5 GAL SAE 140 E.P.
** UPPER TRANSMISSION CASE (BELOW 32°)	9.5 GAL. SAE 90 E.P.
SWING BEVEL GEAR CASE (ABOVE 32°)	1.5 GAL. SAE 140 E.P.
SWING BEVEL GEAR CASE (BELOW 32°)	1.5 GAL. SAE 90 E.P.
‡‡ CHAIN CASE (ABOVE 32°)	4 GAL. SAE 50 PRIOR 7D944
‡‡ CHAIN CASE (BELOW 32°)	4 GAL. SAE 20 PRIOR 7D944
†† CHAIN CASE	3 GAL. SAE 10W30 EFF. 7D944 AND AFTER

DISENGAGE MASTER CLUTCH BEFORE ATTEMPTING TO WORK ON MACHINE.

SECTION 2 - LOWER FRAME

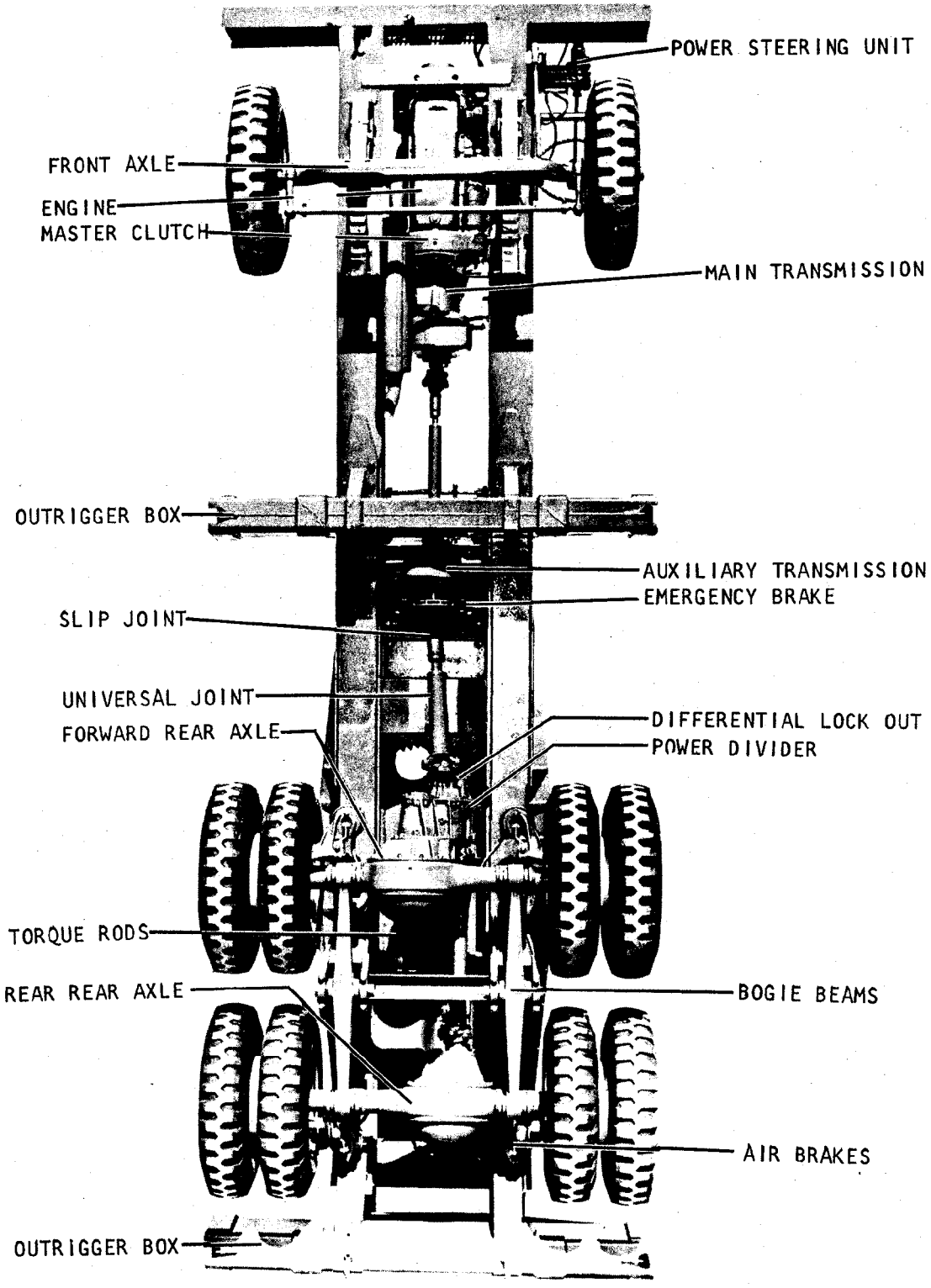


FIG. 1 LOWER FRAME (BOTTOM VIEW)

SECTION 2 - LOWER FRAME

Before attempting to start the carrier, you, the driver should thoroughly familiarize yourself with the operation, points of lubrication, maintenance and periodic adjustments outlined in this manual.

The brake system air pressure must be at least 60 lbs. before attempting to move truck. The sliding outrigger beams should be locked in the retracted position and pontoons removed before moving the truck.

TIRE INFLATION

The tires should be checked daily for proper inflation pressures for type of operating conditions. Air outlet connections are provided on both sides of the truck. A tire inflation hose and testing gauge are furnished with the original truck tools.

The chart below lists tire inflation pressures recommended for different operating conditions. Check tires daily with tires cold.

To assure the best vehicle performance and increased tire life, use highway pressures as much as possible. When making maximum lifts on tires without outriggers, use static maximum lift pressures shown.

TIRE INFLATION CHART

TIRE SIZE:	PLY:	STATIC MAX. LIFTS ON RUBBER:	5MPH:	HIGHWAY TRAVEL:
11:20	12	90	80	75

The eight rear tires must all be maintained at the same inflation pressures to eliminate roll and to assure even tire wear.

FRONT AXLE

Correct "toe-in" adjustment is an important factor on obtaining maximum vehicle control, steering ease and tire life. The toe-in of the front wheels is set at the factory so the tires are closer together at the front than at the rear. The standard specification is 1/8". The maximum allowable tolerance is plus or minus 1/16" from this standard.

Toe-in adjustment can be checked as follows:

(1) Jack up front of truck so tires clear ground.
(2) Rotate wheel and make a chalk line on the circumference of the tire at its centerline.
(3) Measure the distance between the chalk lines on the tires across the front and across the back at the horizontal centerline of the wheel.
(4) The measurement taken across the front should be 1/16" to 1/8" shorter than the measurement taken across the rear.

Toe-in correction may be made by loosening tube end clamps and adjusting the cross tube as necessary to obtain the proper adjustment. End clamps are R.H. and L.H. thread.

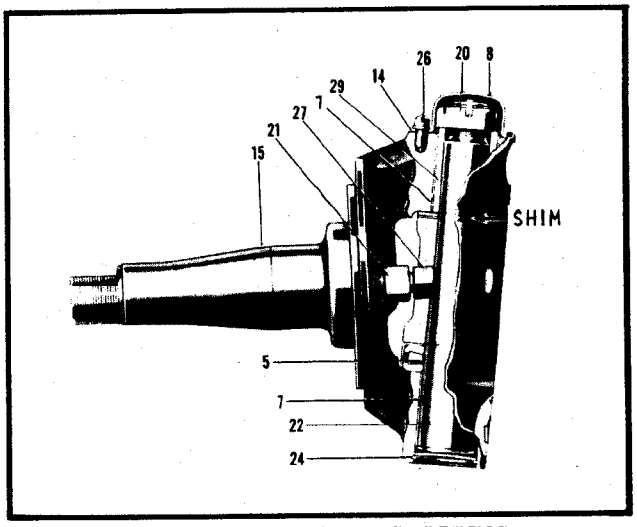


FIG. 2 FRONT AXLE STEERING

The wheel turning angle for maximum turning radius is set at the factory by stop bolt (21) (27) adjustment. No further adjustment is required except in cases of axle repair, installation of new wheels or a change to larger size tires, where the turning radius is affected. Care should always be exercised when making this adjustment so there is no tire interference with the chassis.

STEERING KNUCKLE

The tapered steering knuckle pin as shown in Figure 2 may be removed as follows:

(1) Jack up front of truck so tires clear ground. Block up under truck and remove jacks.
(2) Remove wheel and hub assembly.
(3) Disconnect tie rod (31) from steering arm.
(4) Remove knuckle pin cover, cotter and nut.
(5) Remove lower snap ring (24) and expansion plug.
(6) Drive out knuckle pin (22) using a bronze drift to avoid damaging the threads. The knuckle pin can be removed from the bottom side of the knuckle only.

Replace nylon bushings (7) bearing (5) and sleeves if worn or damaged. A knuckle repair kit is available and consists of the necessary parts to effect normal knuckle repairs.

Reassembly of the knuckle (15) may be made as follows:

(1) Make sure knuckle pin hole is clean and dry.
(2) Position steering knuckle on axle center and slide thrust bearing between the lower face of the axle center and lower steering knuckle yoke. Thrust bearings not marked "top" to indicate proper installation position must be assembled with the retainer lip down.
(3) Align steering knuckle with yoke holes and place a jack under lower side of yoke raising knuckle so all clearance is taken up.
(4) Check clearance between top face of upper axle center and lower face of the upper knuckle pin boss. Clearance must not exceed .015". Washers and shims are available to hold clear-

LOWER FRAME (Continued)

ance at this point to the recommended .015" tolerance. Avoid shimming.knuckle too tight as steering recovery problems will result.

(5) Inspect knuckle pin and nut, making sure nut turns freely on pin threads. Insert knuckle pin from bottom of knuckle and drive into seat of axle center with a bronze drift.

(6) Install knuckle pin sleeve (29) over pin and tap into place. Install nut (20) and tighten initially to 600-700 ft. lbs. Torque to draw pin into axle.

(7) Back off nut and tighten to 390 ft. lbs. Align cotter pin hole with nut and install cotter.

(8) Install lower expansion plug and snap ring.

(9) Assemble remaining parts in reverse order from which they were removed.

TORQUE REQUIREMENTS

LOCATION	DIA.	TORQUE FT. LBS. MIN.	MAX.
Tie Rod End Nut	7/8	165	180
Tie Rod Clamp Bolt	5/8	60	80
Steering Arm Ball Nut	7/8	165	180
Steering Arm Nut	1-1/8"	350	390
Knuckle Pin Nut	1-1/8"	350	390
Spring Studs	3/4"	300	325
Steering Wheel	-	55	65

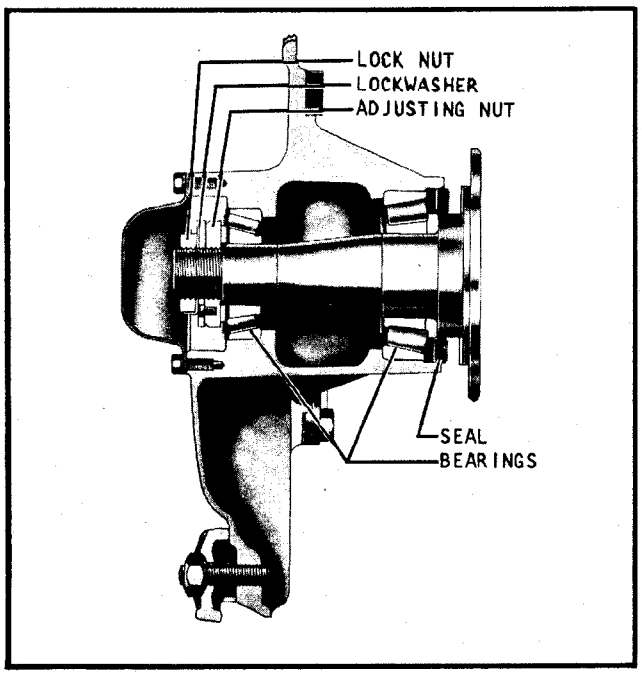


FIG. 3 FRONT WHEEL ASSY.

WHEEL BEARINGS

The wheel bearings should be closely inspected whenever the wheel is removed for knuckle or wheel repairs. Remove all old grease from the wheel bearings, spindle, hub cavity and hub cap. Replace any worn or damaged parts. Pack, assemble and adjust the bearings as follows:

1. Remove burrs from adjusting nut, lock ring and jam nut. Clean units to remove dirt, metal chips, etc.
2. Pack wheel bearings so grease is forced between rollers, cone and case. Grease must be grade 2.
3. Fill wheel hub reservoirs with grease to inside diameter of outer races (leaving sufficient air space for expansion of components due to friction). Fill hub caps with grade 2 grease.
4. Assemble wheel hub and components to axle spindle using adjusting nut only to take up end play.
5. While tightening adjusting nut, rotate wheel to force bearing rollers to lips of race path.
6. When adjusting nut is tight, check end play and wobble with dial indicator from hub to spindle end. End play should be nil at this point.
7. Back adjusting nut 1/6 to 1/4 of a turn to nearest point where lock ring will engage. Rotate wheel to see if it is free.
8. Dial wheel again. End play must be between .001" to .010".
9. Install lock ring and jam nut, tighten with 12" wrench to seat components.
10. Recheck with dial indicator while rotating and attempting to wobble wheel. End play must remain within .001" to .010".
11. Lock nuts in this position.

HYDRAULIC POWER STEERING

The hydraulic steering unit incorporates a hydraulic control valve on a cam and lever mechanical steering gear. Steering effort applied to the steering wheel actuates the valve which, in turn, directs hydraulic fluid from the pump to the power cylinder connected with the steering linkage.

The operation of the steering gear is both manual and hydraulic. When the cam is turned to the left or right through operation of the steering wheel, the stud of the inner lever is moved through the groove of the cam shaft, rotating the levershaft and in turn moving the double ball steering gear arm. When turning effort at the steering wheel exceeds the preload of the centering springs within the actuator, the control valve is actuated and hydraulic power is applied to provide power steering.

The centering springs in the actuator serve to center the actuator and valve spool. Whenever the turning effort at the steering wheel overcomes the centering effect of the springs, the valve spool is moved resulting in restriction of one of the return passages to the outlet port, causing an increase in pressure at one end of the power steering cylinder. At the same time, the other return passage is enlarged, allowing oil from the discharging end of the cylinder free passage to the outlet port and return to reservoir.