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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

MIXER, CONCRETE

GASOLINE DRIVEN

LIQUID COOLED

END DISCHARGE

TRAILER MOUNTED

16 CU FT

GILSON MODEL 16 S-SCE

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MIXER, CONCRETE, GASOLINE DRIVEN, LIQUID COOLED, END DISCHARGE, TRAILER MOUNTED, 16 CU FT, GILSON MODEL 16 S-SCE

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SAFETY PRECAUTIONS

Always wash the mixer drum after each day's operation.

Keep the exterior of the mixer clean.

In freezing weather, be sure that parts containing water is completely drained.

See that the mixer is located on firm, level ground and that the jacks are lowered before operation begins.

See that the tow hitch is securely fastened before towing the mixer.

Always keep the skip under control when lowering to the ground, so as to avoid sudden drops.

Always block mixer wheels when setting mixer in working position.

Do not overload the mixing drum.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual is for the personnel to whom this Gilson 16S Mixer is issued. It contains information on the operation and organizational maintenance of the mixer as well as a description of the major units and their functions in relation to other components of the material. It applies only to the Gilson 16S Mixer.

b. The following appendixes are included—

(1) Appendix I. References.

(2) Appendix II. Identification of Replaceable Parts.

2. Record and Report Forms

Maintenance record forms listed and briefly described in *a* through *b* below will be used in the maintenance of this equipment.

a. *DD Form 110, Vehicle and Equipment Operational Record.* This form is used by equipment operators for reporting the accomplishment of daily preventive maintenance services, and for reporting any equipment deficiencies observed during operation.

b. *DA Form 285, Accident (Report of Personal or Property Damage).* DA Form 285 is used by supervisors for reporting all accidents causing serious injury or death to personnel or damage to property and equipment, including Army aircraft accidents, non-Army motor vehicle accidents, and Army fires.

c. *DA Form 464, Work Sheet for Preventive Maintenance and Technical Inspection of Engineer Equipment.* This form is used by personnel of the using organization and higher echelons for reporting the results of preventive maintenance services and technical inspections.

d. *DA Form 460, Preventive Maintenance Roster.* This form is used for scheduling preventive maintenance services at prescribed intervals.

e. *DA Form 478, MWO and Major Unit Assembly Replacement Record and Organizational Equipment File.* Major repairs or

rebuilding, replacement of major unit assemblies, and accomplishment of equipment modifications are recorded on this form.

f. DA Form 468, Unsatisfactory Equipment Report. This form is used for reporting manufacturing, design, or operational defects in the material, with a view to correcting such defects; it is also used for recommending modifications of the material. Form 468 is not used for reporting failures, isolated material defects, or malfunctions of material resulting from fair wear and tear or accidental damage. Form 468 is not used to report issue of parts and equipment, or for reporting replacements and/or repairs.

g. DD Form 6, Report of Damaged or Improper Shipment. This form is used for reporting damages incurred in shipment.

h. DA Form 9-81, Exchange Part or Unit Identification Tag. This form is used to accomplish the direct exchange of unserviceable for serviceable parts.

i. DA Form 811, Work Request and Job Order. This form is used to request work done by higher echelon organizations.

j. DA Form 867, Status of Modification Work Order. This form is used to maintain records of all modification work performed on equipment.

k. DA Form 5-13, Spot Check Inspection Report of Organizational Maintenance of Engineer Equipment. Organizations having engineer field maintenance responsibility use this form for reporting the results of semiannual spot-check inspections.

l. DA Form 5-14, Annual Technical Inspection Report of Engineer Equipment. Organizations having engineer field maintenance responsibility use this form for reporting the results of annual technical inspection.

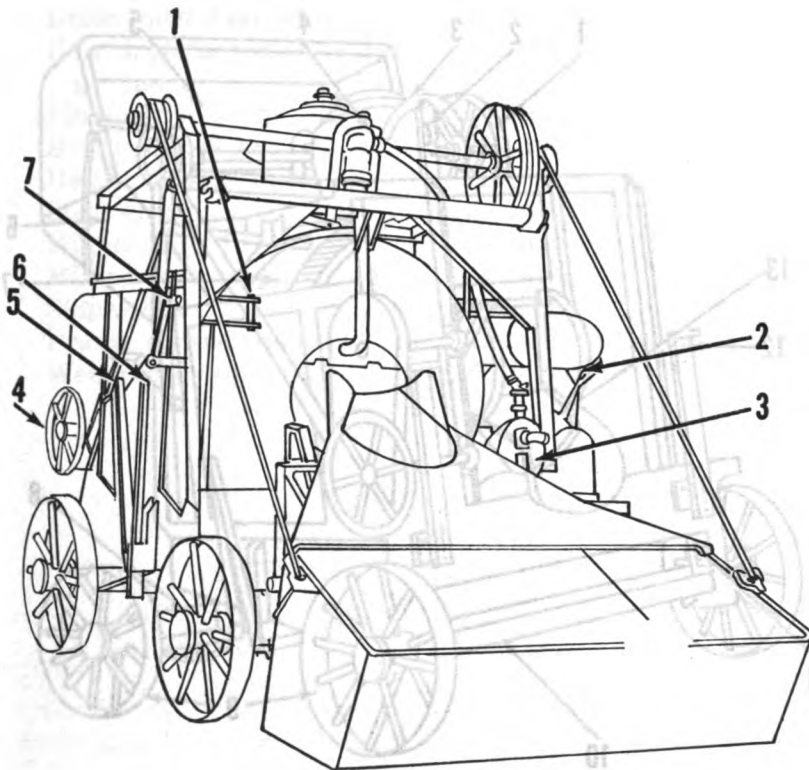
Section II. DESCRIPTION AND DATA

3. Description

The 16S Gilson (figs. 1 and 2) is an end-discharge concrete mixer, mounted on four steel-tired wheels equipped with a tow pole which can be removed when mixing concrete. The power unit is a 4-cylinder Leroi D-140 liquid-cooled engine, which is covered in TM 5-5203.

4. Identification

The mixer identification markings are stamped on a plate attached above the discharge end of the mixer. The identification markings of the engine are stamped on a plate attached to the right side of the block. When requisitioning spare parts for this



- | | |
|-------------------------------|-------------------------|
| 1 Clutch throwout lever | 4 Discharge chute wheel |
| 2 Engine clutch control lever | 5 Skip brake lever |
| 3 Water pump | 6 Skip clutch lever |
| 7 Water valve lever | |

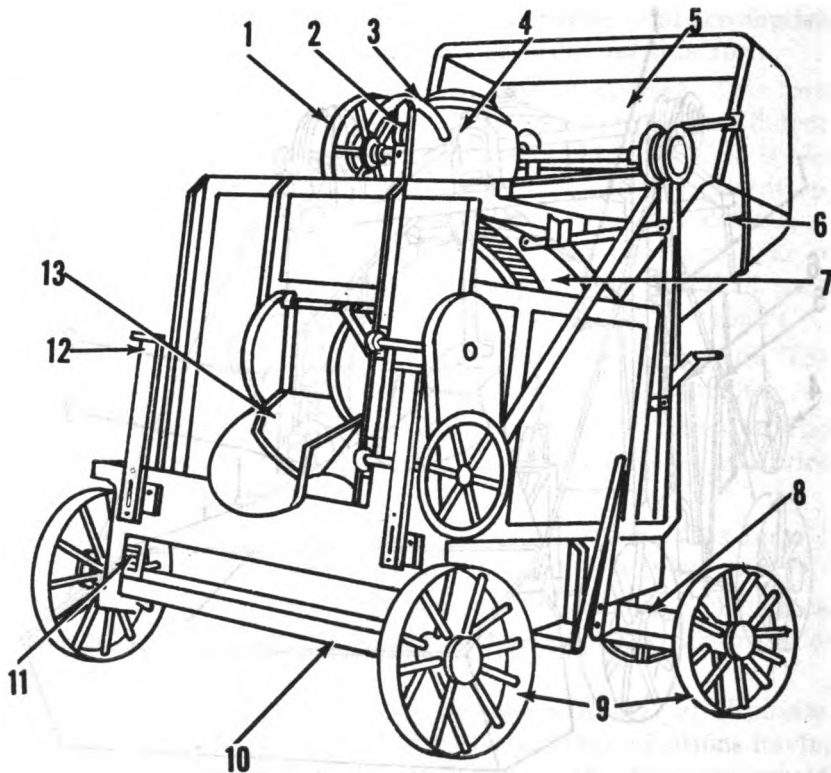
Figure 1. Gilson 16S Mixer, front view.

equipment, specify the official nomenclature, the model number, and the serial number shown on the nameplates.

5. Tabulated Data

a. Mixer.

| | | |
|---------------------|-------|---------------------------------------|
| Manufacturer | ----- | Gilson |
| Model | ----- | 16 S |
| Type | ----- | End discharge |
| Tracks | ----- | High carbon steel machined |
| Towing speed | ----- | 3 mph |
| Drum speed | ----- | 16 rpm |
| Power loader skip | ----- | Elec welded 12 gage high carbon steel |
| Skip shaker | ----- | Cam drive |
| Water tank capacity | ----- | 26 gallons |



- | | |
|-----------------------------|----------------------|
| 1 Bull wheel and skip shaft | 7 Mixing drum |
| 2 Water dial arm | 8 Front axle |
| 3 Water dial | 9 Steel wheels |
| 4 Water tank | 10 Rear axle |
| 5 Skip loader | 11 Coil springs |
| 6 Safety hook | 12 Stabilizing stand |
| 13 Discharge chute | |

Figure 2. Rear view, control side.

Batch meter ----- Discharge lock type
 Water pump ----- 20 gpm

b. Engine.

Manufacturer ----- Leroi
 Model ----- D140
 Type ----- Gasoline
 H P ----- 33.5
 Coolant ----- Liquid

c. Dimensions and Weight.

Mixer, overall, skip down ----- 155 inches
 Length towing ----- 171 inches
 Width ----- 96 inches

| | |
|--|----------------------------|
| Drum roller diameter | 10 inches |
| Height, discharge chute from ground | 32 inches |
| Pinion drive gear | 3½-inches |
| Height skip down | 112 inches |
| Height skip up | 127 inches |
| Steel wheels | 28 x 6 inches |
| Mixing drum I D | 60 inches |
| Mixing drum length | 41 inches |
| Skip width | 74 inches |
| Frame, electric welded | 12-inch 20.7 channel steel |
| Weight fully equipped | 6840 pounds |

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. New Equipment

a. General. For domestic shipment the mixer is shipped in accordance with military specifications. The axles are anchored with wooden braces at each of the four ends. Two wooden blocks are set close to each wheel and nailed to the conveyance flooring. The spare parts and tools are packaged in separate wooden boxes.

b. Unloading. Unload the mixer from the conveyance by use of a crane or a power winch and ramp. Attach a chain or cable sling to the upper part of the mixer structure angle beams, making sure the cable or chain is centered to avoid upsetting the mixer or snapping one of the four cables or chains making the sling. Then remove all the wooden braces and blocks and lift the mixer from the conveyance.

c. Removal of Preservative Compounds, Lubricants, and Devices. Use a steam cleaner or approved cleaning solvent to remove the corrosion-resistant compound on treated parts. Remove all outside grease from rollers, sheaves, and wheel bearings. Do not remove grease from the mixer drum ring gear or the shaker cam.

d. Inspection. Make a complete inspection of the mixer, visually checking for loss or damage which may have occurred in shipment or in unloading.

e. Service. Before the mixer is placed into operation, the following services must be performed:

- (1) Perform the lubrication services described in paragraph 26.
- (2) Perform the before-operation services described in paragraph 29c.

f. Installation and Setting-Up Instructions. Insert the tow pole in the position provided for it on the center of the main frame at the skip end of the mixer, and lock it in with the tow pole pin. Tow the mixer to the location where it is to be set up for operation. To set the mixer in a rigid and stable manner, lower the

stabilizer stands which are located on the main frame beams at the skip end. Lower the jacks until the weight is resting solidly on them. Block all the wheels.

7. Used Equipment

Services on receipt of used equipment are generally the same as for new equipment (par. 6). Used equipment may require additional cleaning, checking, or testing, but careful performance of before-operation services (par. 29c) and lubrication services (par. 26) will assure its satisfactory operation.

Section II. CONTROLS

8. General

This section describes, locates, illustrates, and furnishes the operator sufficient information about the various controls and instruments for the proper operation of the mixer.

9. Engine Clutch

a. Location. The engine clutch lever (2, fig. 1) is located at the flywheel end of the engine.

b. Purpose. Operation of this lever allows the engine to directly engage or disengage the mixer drum. It also supplies the power for the primary belt and chain drives to operate the skiploader and mixer water pump.

10. Skip Clutch Lever Controls

a. Location. The skip clutch lever (6, fig. 1) is located on the left side of the mixer. The other clutch control (1), the clutch throwout lever, is located on the front left side of the mixer drum.

b. Purpose. The two levers control the raising and lowering of the skiploader. It can be controlled from either position.

11. Skip Brake Lever

a. Location. The skip brake lever (5, fig. 1) is located on the left side of the mixer alongside of the skip clutch lever (6).

b. Purpose. This lever allows the skip brake to release the automatic mechanism, thus allowing the skip to return to the loading position.

12. Water Valve Lever

a. Location. The water valve lever (7, fig. 1) is located above the skip clutch lever (6) on the left side of the mixer.

b. Purpose. The water valve lever is used to close the water valve after the automatic valve mechanism has supplied the required amount of water to the mixer drum, thus enabling the water tank to refill.

13. Water Gage Dial Arm

a. Location. The water gage dial arm (2, fig. 2) is located at the rear of the water tank.

b. Purpose. The water gage dial arm is used to select the quantity of water required with each discharge of the water tank.

14. Discharge Chute Hand Wheel

a. Location. The discharge chute handwheel (4, fig. 1) is located at the rear left-hand side of the mixer.

b. Purpose. The discharge handwheel controls the discharge chute allowing it to swivel in and out of the mixing drum.

15. Stabilizing Stands

a. Location. The stabilizing stands (12, fig. 2) are located at each corner of the mixer frame.

b. Purpose. The stabilizer stands are lowered to carry a certain amount of mixer weight while in operation; they will also prevent the mixer from rolling or shifting while in operation.

Section III. OPERATION UNDER USUAL CONDITIONS

16. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for the operation of this mixer.

b. It is essential that the operator know how to perform every operation of which the mixer is capable. This section gives instructions on starting and stopping the mixer, instructions on the basic motions of the mixer, and instructions on how to coordinate the basic motions to perform the specific task for which the mixer is designed.

17. Starting

a. Refer to paragraph 29c for before-operation services to be performed.

b. Place the engine clutch in neutral position.

c. Turn on the ignition switch.

d. Adjust the throttle lever and pull out the choke. If a magneto is used, adjust fuel levers and then crank the engine.

e. Push the starter button to start the engine, or use a crank handle.

f. Engage the engine clutch to start the mixer drum revolving.

18. Stopping

a. Disengage the engine clutch to stop the mixer drum.

b. Shut off the engine.

19. Operating Details

a. General. Before starting the mixing operation, make sure the four stabilizing stands are lowered, the tow pole removed, and the wheels blocked.

b. Loading the Skip. Place the stone or gravel in first, then the cement, and then the sand. This will keep the skip clean and polished and will insure a quick and uniform flow of each batch of aggregate into the mixer drum. After the skip is loaded, engage the levers which allow the skip hoist clutch to raise the skip and dump the load into the mixing drum. When the skip has reached an angle of 50°, the shaker automatically starts the vibration necessary to empty the complete load.

c. Water Valve. The water valve is opened automatically by the action of the skip. After the measured quantity of water has entered the mixing drum, close the valve by the lever (7, fig. 1). This allows the water tank to refill before the skip is raised with the next batch.

d. Water Volume Control. The amount of water desired for each batch is accurately controlled by a vertical syphon measuring tank and can be adjusted within a fraction of a pint by the dial arm (2, fig. 2), located on the water tank. Under actual working conditions the materials used do not always have the same moisture content, because of weather conditions or methods of stockpiling. Therefore, it is necessary to set the dial before each operation to compensate for the differences.

e. Discharging. After the proper mixing interval, open the discharge chute by turning the hand wheel (4, fig. 1). Swivel the chute into position, and discharge the concrete into the receptacle.

20. Movement to a New Location

Hoist the skip into the traveling position and fasten the safety hook (6, fig. 2). Loosen swivel pivot nut and turn stabilizer stands to the raised position. Then tighten the swivel nuts. Place

the tow pole in its towing position and slip the pin lock in place. Place all controls in the proper positions.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

21. Operation in Extreme Heat

Use heavier type grease when operating in extreme heat. Refer to the lubrication instructions (par. 26).

22. Operation Under Sandy and Dusty Conditions

Under dusty or sandy conditions, service and clean the engine air cleaner, radiator fins, and cables, chains, and drums more often than under normal conditions. Keep all lubrication points free of grit. Lubricate as often as necessary, referring to paragraph 26.

23. Operation in Salt Water Areas

Excessive rusting or corrosion may be encountered when the mixer is located in a salt water area. Paint the exterior and interior nonworking parts of the mixer as required by evidence of bare, rusting, or corroded parts. Lubricate and treat working parts according to the lubrication instructions (par. 26).

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

24. Special Tools

There are no special tools required for the maintenance of the mixer.

25. On-Equipment Tools and Spare Parts

All the on-equipment tools and spare parts issued with the mixer are listed in the Department of the Army supply manuals.

Section II. LUBRICATION AND PAINTING

26. Lubrication Information

a. Care of Lubricants. Lubricants are designed to reduce wear by reducing friction. For a lubricant to do its job properly it must be in its original state and not be contaminated with dust, dirt, water, or other foreign matter. All oils and greases must be kept in closed containers to protect them from contamination.

b. Care of Lubrication Equipment. Keep all oil cans and grease containers free from dirt, which tends to build up on greasy surfaces.

c. Drum Rollers. Each of the four rollers has a grease fitting, which requires regular lubrication.

d. Countershaft and Hoist Shaft Bearings. The countershaft and hoist shaft are mounted on bearings which require regular lubrication.

e. Cable Drum. The cable drum rotates on the drum shaft on bronze bushings. The oil cup for the bushings is located at the bottom of the drum, and can be reached by unwinding the cable with the skip in the down position.

f. Drive Chains. The drive chains are lubricated by oil placed between the chain side plates, which flows into the bushings.

g. Drum Ring Gear and Shaker Cam. These points are lubricated originally, and as often thereafter as necessary.

27. Painting

When the paint is deteriorated or damaged, remove the loose paint or rust by scraping or by buffing. Repaint the prepared area, using care not to paint over the identification plates, moveable parts, or lubrication fittings. Refer to TM 9-2851 for general painting instructions.

Section III. PREVENTIVE MAINTENANCE SERVICES

28. General

The operator of the mixer and the organizational maintenance personnel must perform their preventive maintenance services regularly to make sure the mixer operates well, and to lessen the chances of mechanical failure.

29. Operator Maintenance

a. Inspections. Inspections must be made before operation, during operation, at halt, and after operation, as described in this section. All inspections of assemblies, subassemblies, or parts must include all supporting members or connections and must determine whether the unit is in good condition, correctly assembled, secure, or excessively worn. A mechanical condition which may result in further damage to the unit must be corrected before the equipment is operated. See TM 5-505, Maintenance of Engineer Equipment, for definitions of inspection terms.

b. Reporting Deficiencies. The operator will report all deficiencies on DD Form 110.

c. Before-Operation Services. The following services will be performed to determine if the condition of the equipment has changed since it was last operated, and to make sure the equipment is ready for operation. Deficiencies must be corrected or reported to the proper authority before the unit is put into operation.

- (1) *Tampering and damage.* Check for tampering and damage which may have occurred since the unit was last operated.
- (2) *Equipment setting.* Check the location of the mixer. It should be on firm and level ground. See if the stabilizer stands are in the proper position to relieve the strain and stress on the springs and framework.

- (3) *Towing hitch.* See that the tow pole and connecting parts are in good condition. When the mixer is at the desired working location, remove the tow pole from the towing vehicle, detach it from the mixer, and hang it on its rack.
- (4) *Wheels.* Check the wheels for excessive wear, bent rims, broken spokes, and secure mountings on axles. Block the wheels to prevent shifting or rolling of the mixer while operating. Check the cage roller bearings with a pry bar for play or worn bearings.
- (5) *Fuel.* Check the fuel supply and see that the tank is full. Check reserve supply of fuel and replenish if necessary.
- (6) *Water.* Check the coolant level in the radiator and add coolant if necessary. When filling cold radiators containing antifreeze, allow room for expansion.
- (7) *Water tank.* Check the water tank for leaky hose, drain plug, and valve assembly. Check the tank shell for cracks and insecure mounting.
- (8) *Oil.* Check the engine oil level and add oil if necessary.
- (9) *Lubrication.* Refer to the lubrication information in paragraph 26.
- (10) *Leaks, general.* Check for fuel, oil, and coolant leaks.
- (11) *Visual inspection.* Make a visual inspection of the entire unit for loose or missing bolts, nuts, screws, loose connections, and broken wires.
- (12) *Control levers.* Start the mixer and give it a test run. This may show deficiencies in the operation of the control levers. If the water poppet lever does not supply the proper amount of water to the drum, or if the clutch and brake levers do not control the skip power loader, or if other mixer and engine control wheels, buttons, and levers operate sluggishly, too freely, or not at all, shut down the unit and report the condition to the proper authority.

d. During-Operation Services. The operator is responsible for correcting or reporting unusual sounds or odors, deficiencies in performance, or other signs of abnormal operation. He will perform the following specific services:

- (1) *Unusual operation.* Check for unusual operation, such as erratic operation of the skip hoist, mixing drum, and shaker cam. Check the engine for lack of power, irregular speed, or overheating. See if the cement mixture is clogging in the mixing drum and not discharging properly. Correct or report all irregularities noticed to the proper authority.

- (2) *Unusual noises.* Check for abnormal noises such as engine knocking, excessive squeaking or scraping noises in the hoist cables and drive chains, missing and back-firing noises in the engine clutch and brake chatter noises. If such irregularities are noticed, stop operation and report to the proper authority.

e. At-Halt Services. During halts, even for short periods, the operator should make a general check of the equipment and correct or report all deficiencies noticed, in addition to performing the following duties:

- (1) *Fuel.* Check the engine fuel supply; add fuel if necessary.
- (2) *Oil.* Check the engine crankcase oil. Add oil if necessary.
- (3) *Water.* Check the coolant level and add if necessary.

Caution: If the engine overheats because of lack of coolant, allow it to cool before filling the radiator; otherwise there is a danger of cracking the cylinder head and block. If it is necessary to fill the radiator before the engine has cooled, be sure to fill it very slowly with the engine running slightly faster than idling speed.

- (4) *Leaks, general.* Check for fuel, oil, and water leaks, and for signs of leaks under the engine and transmission.
- (5) *Visual inspection.* Inspect the entire unit for cracks, bent brackets, loose or missing bolts, nuts, and pins. Check cables for frayed or broken strands. Check the stabilizer stands for level and secure footing. Check for collected and hardened cement on the inside surfaces of the skip, mixer blades, and operating shafts.

f. After-Operation Services. To insure that the equipment is ready to operate at all times, the following services must be performed by the operator or crew immediately after an operating period of 8 hours or less. All deficiencies must be corrected or reported to the proper authority.

- (1) *Shutdown precautions.*
 - (a) Disengage the engine clutch and allow the engine to idle for a few minutes for even cooling.
 - (b) Place the skip in its correct traveling position and fasten the safety hook. Move the mixer to an area where there is the least danger of it being damaged. Close and fasten all panels for the engine compartment. Turn off all water connections. Place the operating levers in the neutral position. If freezing temperatures are expected, drain all the water.
- (2) *Fuel, oil, and water.* Check and refill the engine crankcase, fuel tank, and radiator. Check and refill the gear-

reduction case if necessary. Change contaminated coolant. Check antifreeze if used. If antifreeze is added, mix solution thoroughly by running the engine.

- (3) *Clean equipment.* Clean all accumulated cement on or in the mixer, skip, and shaker assembly. Scour the mixer drum with very wet gravel and flush the drum interior with water. Hose off the entire exterior of the machine. Blow out accumulated dust, dirt, or debris that may have settled on the radiator core fins of the engine.
- (4) *Tools and equipment.* See that all tools and equipment assigned to the mixer are in serviceable condition, clean, and properly stowed or mounted.
- (5) *Lubrication.* Lubricate the mixer as required.
- (6) *Air filter.* Remove the air filter element and clean if necessary.
- (7) *Visual inspection.* Check for broken or bent tie rod and connecting pins. Check the mixer for loose or missing bolts, nuts, screws, clevis pins, and cotter pins. Check cables, pulleys, chains, and sprockets for wear, or broken cable strands, sprocket teeth, chain links, or worn pulleys. Check for loose or broken water hoses, and fuel and oil lines. See if the engine and mixer control levers are in the correct positions for shutdown.
- (8) *Protection.* Close the engine hood covers. If the equipment is to be out of operation for a considerable length of time, cover all unpainted parts with a light coat of rust-preventive compound. Run the mixer up on planks in soft ground, or in freezing weather.

30. Maintenance and Safety Precautions

a. Report or correct all mechanical deficiencies which may result in further damage to the mixer if operation is continued.

b. Always lower the skip slowly to the ground; do not drop it abruptly.

c. Always lower the stabilizer stand and block the wheels when setting the mixer in working position.

d. Always keep the mixer level and stationary when operating.

e. Do not operate the mixer if the cables start to foul.

f. Do not overload the mixing drum.

g. Never start the engine with the engine clutch engaged.

h. Never leave tools or cloths on the rotating mixer assemblies or engine.

i. Never park the mixer on an incline, without adequate blocking.

31. Organizational Maintenance

a. Organizational preventive maintenance is performed by organizational maintenance personnel, with the aid of the operator, at weekly and monthly intervals. The weekly interval will be equivalent to 60 hours of use. The monthly interval will be equivalent to 240 hours (4 weeks) of use, whichever occurs first.

b. The technical inspection column is provided for the information and guidance of personnel performing technical inspection, and constitutes the minimum inspection requirements for the equipment.

c. The preventive maintenance services to be performed at these regular intervals are listed and described below. The numbers appearing in the columns opposite each service refer to a corresponding number appearing on DA Form 464, and indicate that a report of the service should be made at that particular number on Form 464. These numbers appear in either second, third, or both columns, as an indication of the interval at which the service is to be performed.

| Technical inspection | Services | | |
|----------------------|----------|--------|--|
| | Monthly | Weekly | |
| 1 | 1 | 1 | <i>Before-operation services.</i> Check and perform the services listed in paragraph 29c. |
| 2 | 2 | 2 | <i>Lubrication.</i> Inspect the entire unit for missing or damaged lubrication fittings and for indications of insufficient lubrication. |
| | 2 | 2 | Replace missing or damaged fittings. Lubricate as indicated. |
| 3 | 3 | 3 | <i>Tools and equipment.</i> Inspect the condition of all tools and equipment assigned to the mixer. Check the condition and mounting of tool boxes and compartments. |
| | 3 | 3 | See that all tools and equipment assigned to the mixer are clean, serviceable, and properly stowed or mounted. See that tool boxes and compartments are in good condition and that they close and fasten properly. |
| 4 | 4 | 4 | <i>Fire extinguisher.</i> Check carbon tetrachloride type for full charge by removing filler plug. See that the operating mechanism is not corroded and that it is securely mounted. Inspect carbon-dioxide (CO ₂) type for insecure mounting, kinked or damaged hose, and missing or broken seal. If the seal is missing or broken, the extinguisher should be weighed to determine the amount of charge. The empty and full weights are stamped on the valve body. |

| Technical inspection | Services | | |
|----------------------|----------|--------|---|
| | Monthly | Weekly | |
| | 4 | 4 | See that all extinguisher deficiencies are corrected or reported to the proper authority. |
| 5 | 5 | 5 | <i>Publications.</i> See that a copy of this technical manual and DA Form 285 is on the equipment and in serviceable condition. |
| 6 | 6 | 6 | <i>Appearance.</i> Inspect the general appearance of the unit, paying particular attention to cleanness, legibility of identification markings, and condition of the paint. |
| | 6 | 6 | Correct or report all deficiencies noticed. |
| 7 | 7 | 7 | <i>Modifications.</i> See if all available modification work orders applying to this machine have been completed and recorded on DA Form 478, MWO and Major Unit Replacement Record—Organizational Equipment File. |
| 11 | 11 | 11 | <i>Cylinder head, manifolds, and gaskets.</i> Inspect the cylinder head, manifolds, and exhaust pipe for leaks, loose bolts and nuts, and defective gaskets. |
| | 11 | 11 | Tighten loose manifolds and exhaust pipe mounting bolts and nuts. Replace defective gaskets. On new or reconditioned engines, check all cylinder head bolts for tightness at the first weekly servicing. The correct torque-wrench pull is 40 to 60 foot-pounds on the D140 liquid-cooled engine. |
| 12 | 12 | 12 | <i>Valve mechanism.</i> Check the valve adjustment if tappet noise or loss of power is noticed. The correct clearance with engine cold is .012 inch for both intake and exhaust valves. |
| | 12 | 12 | Adjust the valve-tappet clearance if necessary. See that the valve-cover gasket is in good condition and that the cover fits securely. |
| 13 | 13 | 13 | <i>Compression test.</i> Test the compression of all cylinders and record the readings on DA Form 464. |
| 14 | 14 | 14 | <i>Crankcase, breathers.</i> Inspect the crankcase for leaks. Check the condition of crankcase breather and caps. |
| | 14 | 14 | Correct or report all oil leaks. Tighten oil pan cap screws if loose. Replace damaged or worn gasket. Change the oil and clean the breather if necessary. |
| 15 | 15 | 15 | <i>Oil filters.</i> Check the oil filter and connecting lines for leaks while the engine is running. |

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Service the oil filter as specified in the lubrication order. The purpose of the filter is to remove impurities, such as carbon, sludge, water, and dirt. Dirty oil on the oil level dip stick is an indication of a clogged filter, and a new element will be put in, even if the time for change indicated in the lubrication order is not due. Always replace the gasket before installing a new element. After changing the element, check for leaks while the engine is running.

Note. A clogged oil filter will do more harm to the engine than no oil filter at all. Be sure to clean the filter case when changing element.

Radiator. Inspect the radiator for leaks, obstructions in core air passages, and loose mounting bolts. Check all cooling-system hose for leaks, deterioration, or loose connections. Check operating temperatures and condition of coolant. If coolant temperature remains below 160°F. or rises above 180°F. during operation, the thermostats may be defective. If antifreeze is used, check the freezing point of the coolant.

Drain, flush, and refill the cooling system if coolant is contaminated with rust or dirt. See that core air passages are clean. Replace damage or defective cooling system hose, lines or gaskets. See that all mounting bolts and connections are tight. Protect the coolant from freezing and record its freezing point on DA Form 464.

Water pump, fan, and shroud. Inspect the water pump for leaks and for loose mounting and assembly bolts. Check the condition and mounting of fan blades and shrouds.

Tighten or replace loose or missing bolts and screws. If the pump leaks, replace it with a new or reconditioned pump.

Belts and pulleys. Inspect for worn, cracked, or frayed belts. Check the belt tension and alinement of the pulleys. Belts are properly adjusted when they can be deflected ½ to ¾ inch from normal position at a point midway between the pulleys.

Adjust the tension of the belts if necessary. Replace belts if frayed or badly worn.

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Oil pump, pressure relief valve (screens, lines, leaks). See that the oil pump and pressure relief valves are in good condition and secure, and that oil is not leaking from the oil pump or lines attached to the engine or crankcase. Under normal operating temperatures and speeds record the oil pressure in the space provided on DA Form 464.

If the oil pressure is below normal, clean and check the oil pressure relief valve and seat. If the oil pan is removed for inspection of the engine, or to investigate trouble, check the condition of the suction screens, lines, and pump. Clean or replace defective parts.

Governor and linkage. Check the governor adjustment. If the engine surges when running at top speed without load, the governor is out of adjustment.

Adjust the governor if necessary. Loosen control lever locknuts for spring and shaft, and adjust rod to desired speed within the limits of governor spring. Replace bent or broken rods and linkage. Check the engine speed by means of a tachometer or other speed indicator.

Fuel pump. Inspect the fuel pump and fuel lines for gasoline leaks. Check for oil leaks where the pump fastens to engine block. Check for loose mounting and assembly screws. Check the condition of the combination strainer and primer, and suction line.

See that all mounting and assembly screws are tight and that fuel lines are in good condition and all connections tight. If there is an indication of lack of fuel supply to the carburetor, remove the fuel pump sediment bowl cover and clean the screen. Remove sediment and water from the sediment bowl. Make sure the gasket is in good condition before replacing the cover. If the gasket is damaged, replace it with a new gasket. Run the engine and check for leaks after replacing the cover. Replace defective pump with a new or reconditioned one.

Carburetor and linkage. See if the carburetor and linkage are in good condition and correctly installed and assembled. See that the carburetor does not leak and that the control

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linkage, including the choke and throttle shaft, is not worn. See if the choke valve opens fully when the control is in its released position. Check for loose or missing screws or nuts holding the carburetor to manifold, or screws holding the throttle body to the bowl assembly.

See that all mounting and assembly nuts and screws are tight and that the linkage and connections are in good condition and secure. Clean the bowl drain strainer and adjust the idling speed if necessary. If the carburetor is defective and cannot be corrected, replace it with a new or reconditioned carburetor.

Filters. Check all filters for dirt and sludge. Check for leaks and loose connections. Clean the oil filter screen in dry-cleaning solvent; dry with compressed air.

Replace the oil filter element if necessary.

Air cleaner. Inspect the air cleaner for loose connections. Check the condition and level of oil in bowl.

Service the air cleaner if necessary. Make sure there are no air leaks between the air cleaner and carburetor.

Fuel tank, cap and gasket. See if the fuel tank is in good condition and securely mounted. Examine the caps for defective gaskets or plugged vents. See that filler necks are in good condition and caps fit securely.

Remove the fuel tank drain plug and drain off the accumulated water and sediment. Drain only until fuel starts to run clean.

Fuel lines. Check the fuel lines for leaks, loose connections, and damage.

Repair or replace damaged or collapsed fuel lines. Tighten loose connections.

Spark plugs. Inspect spark plugs for dirty or cracked insulators.

Clean dirt and oil from spark plug insulators. Replace defective plugs.

Remove and clean spark plugs and adjust point gap. Proper gap is .025 to .030 inch. Check the condition of the spark plugs and gaskets. If they are defective, replace them. Always use new gaskets when installing new plugs.

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| 47 | 47 | 47 | <i>Battery.</i> Inspect the battery for cracked and leaky case, for loose holddown clamps, and for dirt and corrosion on top of the battery. Check for loose, corroded, or damaged terminals, posts, straps, and cables. Check level of electrolyte. The electrolyte level should be above the top of the plates and may extend one-half of an inch above. |
| | 47 | 47 | Clean all dirt and corrosion off the top of the battery, posts, cables, and terminals. Replace damaged cables. Apply a thin film of chassis grease over terminals. Add distilled water if needed to bring the solution up to proper level. If freezing temperatures prevail the battery must be charged for a period long enough to mix solution thoroughly. Where possible, water should be added just before beginning operation. See that the battery is securely mounted, that filler caps are tight, and that vent holes are open. Test the specific gravity of each cell and record the readings on DA Form 464. |
| 48 | 48 | 48 | <i>Generator and starter.</i> Inspect the generator and starting motor for loose mounting bolts and wire connections. |
| | 48 | 48 | Inspect commutators and brushes for wear, dirt, and oil deposits. See if the brushes are free in their holders and if the brush wires are secure. |
| | 48 | 48 | Tighten loose mounting bolts and wire connections. Replace and free brushes, making sure there is sufficient spring tension to hold them in contact with the commutator. Clean commutators if necessary with grade 2/0 flint paper only. |
| | 49 | 49 | <i>Magneto.</i> Determine whether the magneto is in good condition and securely mounted. Note whether there is evidence of oil leaks at the mounting-pad gaskets. Remove the breaker-point inspection covers and see that the points are well alined, that the mating surfaces engage squarely, and that point gaps are correctly adjusted. |
| | 49 | | Replace unserviceable breaker points and adjust the magneto breaker-point gaps to an opening of 0.014 to 0.018 inch. The contact points must be free from oil or grease and in |

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proper alinement so that the full surfaces of both contacts meet flush. Clean pitted contacts on a suitable stone. Do not use a file.

Coil, wiring, switches. Check coil for loose mounting, cracked insulation, and other defects. Inspect wiring for oil-soaked, cracked, or frayed insulation, broken wires, and loose or corroded connections.

Replace defective coil, switches, and wires. See that connections are clean and tight. See that all switches and wiring conduits are securely mounted. Replace or report defective or damaged switches and external wiring.

Voltage regulator. Check the voltage regulator for proper operation and secure mountings. See that wire connections are tight. The regulator should allow an appreciable charge to go into the battery after the starter is used. After battery is fully charged, the ammeter should read only a slight charge.

Tighten or replace loose or missing mounting screws. Replace the regulator if it is defective.

Lever linkage. Inspect all control linkage for proper operation and adequate lubrication. See that rod pins, clevises, cable bushings, or bearings are properly adjusted, in good condition, and secure. Keeper, cotter pins, and bolts must be in place and secure.

Tighten or replace loose or missing bolts, screws, washers, cotter pins, and clevis pins. Replace worn, broken or rusted lever rods, ratchets, and springs.

Reduction gear case. Check the reduction gear case mounting studs and nuts for secure mounting, and notice whether oil is leaking from the seals, bearings, or gaskets. Check the bearing cover cap screws, inspection plate screws, oil pipe plugs, and clutch lever and shaft for secure mounting. Check level of oil.

Tighten or replace loose or missing mounting studs, bolts and nuts. Tighten or replace loose or missing bearing cover cap screws, oil plugs, lever nut and bolts, or inspection plate screws. Adjust clutch if necessary.

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| 68 | 68 | 68 | <i>Drum cables.</i> Inspect cable drums for loose mounting bolts, and for wear, damage, or misalignment. Check condition of drum guard. Inspect cables for wear, kinks, flat spots, and broken or frayed strands and for loose mounting at wedge sockets and anchor points. Check for loose drum keys. |
| | 68 | 68 | See that cable drums and guards are in good condition and securely mounted. Replace cables if they are worn or damaged. |
| 77 | 77 | 77 | <i>Tow hitch.</i> Check if the tow hitch is in good condition and secure. Check the hinge pin, hinge pin lock, and spring for wear or breaks. |
| | 77 | 77 | Replace worn or broken hinge pin, hinge pin lock, and spring. Reweld broken or cracked tow pole braces. |
| 78 | 78 | 78 | <i>Rear wheels.</i> Inspect the wheels for good condition. Inspect for looseness of the wheel bearing adjustment. Revolve the wheels and listen for indications of dry or damaged wheel bearings. |
| | 78 | 78 | Tighten loose spindle nuts, and fasten hubcap securely. |
| | 78 | 78 | Remove wheel with the single cage roller bearings and dust seals from spindle. Clean thoroughly with solvent and see if the bearings are in good condition and that the cups are secure. See if the machined surfaces of the bearings and spindles are in good condition. After the above inspections have been performed, lubricate the bearings before reinstalling them. After lubricating the wheel bearings, place on spindle and adjust the spindle nut. |
| 79 | 79 | 79 | <i>Front wheels.</i> Service as indicated in item 78. |
| 80 | 80 | 80 | <i>Frame.</i> Inspect frame, brackets, siderails, and cross members to see if they are in good condition, not cracked, and are secure and correctly aligned. If the frame appears to be out of line, report the condition to the proper authority. |
| | 80 | 80 | See that cracks, breaks, and broken welds in the frame structure are repaired before further damage results. Tighten or replace all loose or missing bolts and nuts. |

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| 81 | 81 | 81 | <i>Front axle assembly.</i> Check the axle assembly for worn or broken tow pole, pivot pin, cracked welds, and loose or missing axle mounting bolts on the mixer chassis. See if the axle is bent or misaligned. |
| | | 81 | Tighten loose or replace missing axle mounting bolts and nuts. Replace the axle if it is defective. Report deficiencies not corrected. |
| 82 | 82 | 82 | <i>Rear axle assembly.</i> Service as indicated in item 81. |
| 83 | 83 | 83 | <i>Springs and mountings.</i> Inspect rear axle coil springs for broken or weak coil action. |
| | | 83 | Replace broken and weak springs, and tighten loose center U-bolts. |
| 84 | 84 | 84 | <i>Stabilizer stand.</i> Check for loose or missing stabilizer stand mounting bolts and nuts. Check legs for cracks, bends, and missing foot plates. |
| | | 84 | Tighten loose bolts and replace missing bolts and nuts. Replace defective or damaged jack legs and foot plates. |
| 94 | 94 | 94 | <i>Drive sprockets and chains.</i> Check the mixer drum and skip sprockets and chains for wear, damage, misalignment, and improper adjustment. Chains should have one inch clearance between the top edge of the tread shoe and the bottom of the drive chain, with the top span of the drive chain tight. Observe whether the sprocket teeth are worn. If so, replace the sprocket. New chains should never be installed on worn sprockets, and vice versa. |
| | | 94 | Adjust chains if necessary. Be sure both of the sprockets adjusting nuts are turned the same amount. Repair or replace worn or damaged chains. Replace worn sprockets. |
| 95 | 95 | 95 | <i>Master clutch.</i> Check if the clutch grabs or chatters while being engaged or slips when fully engaged. The clutch lever on the mixer should have from $\frac{3}{4}$ - to 1-inch free travel when properly adjusted. Mixer clutch adjustment is correct when a reasonable firm lever action is required to engage clutch fully. |
| | | 95 | Adjust clutch by turning with a screwdriver the notched adjusting collar at the top of the clutch housing. Turn clockwise to increase, and counterclockwise to decrease pressure. |

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If the clutch has reached the limit of its adjustment, replace the clutch facing. Replace pipe plug after adjusting.

Operating clutches (skip, drum). Check the condition, operation, and adjustment of the operating clutches.

Remove oil or grease from clutch lining by washing with cleaning solvent. Adjust clutches if necessary. Loosen locknut, turn adjusting hub clockwise to increase and counterclockwise to decrease pressure. Adjust clutch so it will lift loaded skip without slipping or grabbing. See that all connecting pins, springs, bolts, and locks are in place and secure.

Operating brakes (skip and drum). Inspect brakes for worn or oil-soaked lining. Check for proper adjustment. Inspect condition and mounting of operating mechanism, shafts, bearing blocks, and lever.

Remove oil or grease from lining and drum by washing with an approved cleaning solvent, and adjust brakes if necessary. Replace bands before lining is worn to the extent that rivets contact the drums. To adjust brakes, remove connecting tie rod. To relieve spring tension, remove adjustment eyebolt and turn right or left for desired adjustment. Replace eyebolt and connect tie rod to brake lever. See that all springs, bolts, pins, and locks in the operating mechanism are in place and secure.

Gears and pinions. Inspect the drum ring gear and pinion for wear or damage. Check for unusual noises during operation. Check for loose mounting studs and nuts for sectional ring gear.

Replace worn or broken pinion or drum gear. *Bearings and shafts*. Inspect bearing blocks for loose mounting bolts. Check for signs of worn bearings and misaligned shafts.

Tighten or replace loose or missing mounting bolts. Replace worn bearings, bearing blocks, or misaligned shafts.

Mixer drum. Inspect the drum and mixing blades for secure mounting and proper operation. Check the drum tires for secure mounting. See that the discharge chute functions properly and is securely mounted.

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| 178 | 178 | | See that drum tires and drum blades are securely mounted and working properly. Report all uncorrected deficiencies to the proper authority. |
| 179 | 179 | 179 | <i>Trunnion rollers and bearings.</i> Check the rollers for cracks, dirt, and wear. See that the rollers do not bind, and that they rotate freely on drum tires. Check the roller hangers for insecure mounting bolts. Adjust the roller collar if necessary. Check for worn or damaged bearings and see that the seals are not leaking. |
| | 181 | 181 | Tighten or replace all loose or missing tank mounting bolts and nuts. Correct or report tank deficiencies to the proper authority. |
| 182 | 182 | 182 | <i>Skip shaker.</i> Check to see that the skip shaker bracket mounting bolts and nuts are secure. |
| | 182 | 182 | Tighten loose or replace missing bracket bolts and nuts. |
| 185 | 185 | 185 | <i>Pump body.</i> Inspect pump body for cracks and damage. Check for leaks. See that all mounting and assembly bolts are in place and secure. With pump operating, check for unnecessary vibration and for leaks around impeller shaft seal and gaskets. See if the pump delivers the proper amount of water. |
| | 185 | 185 | Tighten or replace all loose or missing mounting and assembly bolts. Correct defective pump or report the deficiencies to the proper authority. |

Section IV. TROUBLESHOOTING

32. Use of Troubleshooting Section

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the mixer or its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

33. Engine Fails to Start

| <i>Probable cause</i> | <i>Possible remedy</i> |
|-----------------------|--|
| Lack of fuel | Open fuel shutoff valve, fill tank and prime carburetor. |

| <i>Probable cause</i> | <i>Possible remedy</i> |
|---------------------------------------|---|
| Overchoking | Allow engine to stand a few minutes. Open throttle beyond normal starting position and turn engine over until it starts. Set throttle back to normal idling position. |
| Defective fuel pump | Replace. |
| Dirt or grime in fuel lines | Clean lines and filter. |
| Carburetor out of adjustment | Adjust; see engine manual. |
| Dirty or damaged spark plug | Remove, inspect, clean, adjust, and replace. |
| Breaker points pitted or not adjusted | Clean, adjust, and replace. |
| Condenser open or shorted | Replace. |
| Coil open or shorted | Replace. |
| Grounded ignition cable | Locate ground, tape cable for temporary operation, or replace cable. |

34. Engine Misses or Operates Erratically

| <i>Probable cause</i> | <i>Possible remedy</i> |
|---|--|
| Sediment or water in the fuel system | Clean tank, line, and filter. To avoid water in system, keep tank filled. Check source of supply for purity. |
| Defective fuel pump | Replace. |
| Ignition line loose or shorted | Tighten connections, check for worn and damp installation, particularly about the breaker body. |
| Breaker pitted, worn, or incorrectly adjusted | Clean; adjust. |

35. Engine Overheats

| <i>Probable cause</i> | <i>Possible remedy</i> |
|-----------------------|--|
| Coolant level low | Check level. Level should be at overflow line. (D140 engine) look for leaky hoses and connections. |
| Defective water pump | Replace water pump. Refer to engine manual. |
| Defective thermostat | Replace thermostat. |
| Overload | Check load against operating capacity of equipment. |

36. Skiploader Fails to Operate Correctly

| <i>Probable cause</i> | <i>Possible remedy</i> |
|-----------------------------|---|
| Skiploader will not raise | Clutch too loose; adjust. Clutch lining coated with oil; remove with solvent. Skip brake too tight; adjust. |
| Skiploader will not lower | Adjust brake band or clutch disc. |
| Shaker cam will not operate | Worn cam or broken key. Replace. Remove caked cement in shaker. |

37. Mixer Drum Fails to Operate Properly

| <i>Probable cause</i> | <i>Possible remedy</i> |
|-------------------------------|--|
| Defective ring gear or pinion | Replace ring gear or pinion. |
| Caked cement on drive parts | Remove caked cement from trunnion rollers, ring gear, pinion, drive sprockets, and chain. |
| Mixer drum clogs | Water is not being discharged into drum at proper time. Adjust water valve or water volume dial. |
| Defective drive clutch | Adjust clutch. |

Section V. ENGINE

38. Engine Removal

a. Remove mixer water pump drive belt, and unscrew protective cover screws. Remove cable wedge and unwind cable from the skip pulley mounted on the engine reduction gear shaft. Remove drive chain from gear. Remove mounting bolts and nuts on engine bed. Remove mounting bolts and nuts on engine base.

b. Place hoist slings on the engine, being extremely careful not to damage the engine or components when hoisting. If no lifting device is available, the engine can readily be removed by using a strong timber as a skid.

39. Engine Maintenance Instructions

For instructions on the maintenance and service procedures for the Leroi D-140 engine, refer to TM 5-5203.

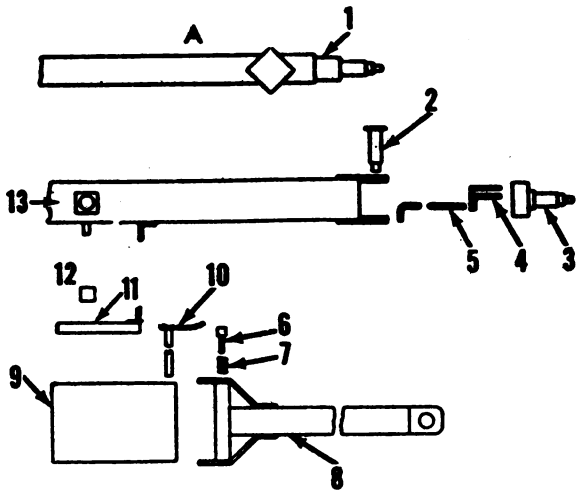
Section VI. WHEELS, AXLES, AND SPRING ASSEMBLY

40. Wheels

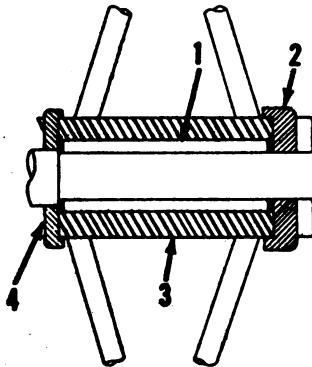
a. *Removal.* All four wheels (fig. 3B) are removed in the same manner. Place the mixer on level ground, jack up the corner of the mixer to be worked on, and place a block of wood under the axle, next to the wheel needing repairs or replacement. Remove the cotter pin from the cover, and take off cover (2, fig. 3B). Slide the wheel (3) and spindle bearing (1) out of the hub. If the bearing is to be used again, keep it protected from dirt. Replace defective bearings if necessary.

b. *Wheel Cleaning.* Wash the bearing thoroughly in an approved cleaning solvent. Wash spindles and wipe dry. Wash old grease out of wheel hubs and repack.

c. *Inspection and Repair.* Inspect the wheel bearing and spindle for wear or damage. Inspect the inner and outer dust seals for



B



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|---------------------------|------------------------------|
| 1 Rear axle | 7 Tow pole spring |
| 2 Front axle spindle bolt | 8 Tow pole |
| 3 Axle spindle | 9 Front axle tongue |
| 4 Tie rod spindle yoke | 10 Tow pole hinge pin |
| 5 Front axle tie rod | 11 Front axle tongue support |
| 6 Tow pole lock pin | 12 Front axle tongue spacer |
| 13 Front axle | |

(A) Front and rear axle assemblies

- | | |
|---------------------|---------------------|
| 1 Roller bearing | 3 Steel tired wheel |
| 2 Outer dust collar | 4 Inner dust collar |

(B) Steel wheel assembly

Figure 3. Axle and wheel assemblies.

leaks. Inspect steel wheels for bent spokes or rim, and other defects. Correct or report all deficiencies.

d. Wheel Assembly and Installation. Insert the bearing (1) into the wheel hub up against the hub flange. Put the special flat washer in position in the hub recess and drive it into place. Slide the wheel on the spindle, with the washer side of the hub on the outside. Place the dust collar (2) in position, place washer on spindle, lining up the recess in the washer with the hole in the spindle, and insert the cotter pin. Remove the block from under the axle.

41. Rear Axle Assembly

a. Removal. The rear axle (1, fig. 3Ⓐ) supports the mixer through two heavy coil springs which are removed when raising the frame with jacks sufficiently to slip springs out. The axle is removed by unscrewing the 1 inch bolts and nuts located at the base of the coil spring. Block the mixer with 4 x 4 inch wooden blocks and roll the axle assembly out in the open. Place the axle assembly on blocks high enough for the wheels to be clear of the ground, and remove wheels as described in paragraph 40.

b. Inspection and Repair.

- (1) Inspect for bent or worn spindles or defective axle.
- (2) Correct or replace defective axles if necessary.

c. Assembly and Installation.

- (1) Insert the axle spindle into the axle. Insert the bolt and tighten. Do the same on the other end of the axle. Replace wheels as described in paragraph 40d.
- (2) Roll the axle assembly in place under the mixer with the pads up; insert the two coil springs, and lower the mixer down on the axle. Line up the holes for bolts and insert the bolts and tighten the nuts.

42. Front Axle Removal

a. Removal. Remove the wheels as described under paragraph 40. Remove the steering rods by removing the pivot pin from the tow pole yoke. Then take out the bolt holding the ends of the steering links to each spindle. Next remove the spindle bolt pins used as kingpins, to free the spindles.

b. Inspection.

- (1) Inspect for bent axle, bent steering links, or worn pin holes at end of links.
- (2) Inspect for worn or bent spindles (3, fig. 3Ⓐ). Check bolts and pins for wear.

c. Assembly and Installation.

- (1) Place the tow pole yoke in position on the tongue (9) and insert the lock pin (6) as a pivot pin through center hole in the yoke. Place the washer on the pin; then insert cotter pin. Place the spindles (3) in position on each end of the axle with the arm toward the rear. Line up the holes in position; place the kingpin and bolts (2); draw the nuts up, allowing spindles free movement. Insert cotter pin and open. Place rear ends of both steering links in holes of drawbar yoke, and install the bolts. Draw the nuts up snug, but not too tight; allow sufficient clearance for steering links to be moved easily, and insert cotter pin.
- (2) Place the adjustable ends of the steering links between the clevis ends of the arms on the spindles, line up the holes, and place the bolts, but not the nuts. Assemble the wheels to the spindle shafts as explained in paragraph 40*d*. Adjust the wheels for a $\frac{1}{4}$ -inch tow-in. This adjustment is obtained by lengthening or shortening the steering links as required. The steering links can be adjusted by loosening the jam nut and turning the eye bolt in to shorten and out to lengthen the rod. Both steering links must always be kept at the same length. When proper adjustment has been made, tighten the nuts on the bolts and insert the cotter pins.
- (3) Roll the axle and wheel assembly into position. Lower the jacks and line up the chassis bolts. Insert bolts and lock-washers and tighten nuts. Lower the jacks, and remove from under chassis.

Section VII. MIXING DRUM AND PARTS

43. Mixing Drum Assembly

a. General. The drum consists of two pressed steel rounded heads welded to the center section. Lugs, with one hole in each, are welded to the inner surface of the shell and charging side of head. The blades (3, fig. 4Ⓟ) are fastened to the lugs with machine bolts. The ring gear (2) is bolted in sections around the center of the drum shell (1).

b. Removal of Drum and Parts. Lower the skip. Remove hoist cable from hoist drive drum; wrap it around the hoist differential and wire the end to the differential. Remove the drum splash

plate and hanger and the water inlet pipe. Remove the reach rod from the knockout arm to the clutch and brake lever, and then release the tension of the skip brake spring and remove it. Disconnect the water supply line that clears the skip side of the machine. On the opposite side, remove the hanger plate for the discharge chute. Then remove the chute. Remove the skip hoist shaft by removing the bolts and nuts holding the bearing mounting for the hoist assembly and lifting it off. Disconnect the water hose to pump and water pipe for mixer drum. Remove the water valve lever assembly and the bolts holding the structural braces for the watertank. Remove bolts and nuts from left side of mixer for braces and protective plate. Remove discharge chute wheel and sprocket cover then lift the mixer drum out of its position.

c. Removal of Drip Rings. Replace worn drip rings with new rings. While the drum is in place, detach the swivel chute at the discharge end to allow access to the drip rings. The drip rings are spot welded to the drum head. Knock them loose with a hammer and chisel, use a cutting torch if necessary. Split the rings with the cutting torch, and remove. If a torch is not available and the rings cannot be knocked loose, pry the rings out with crowbar.

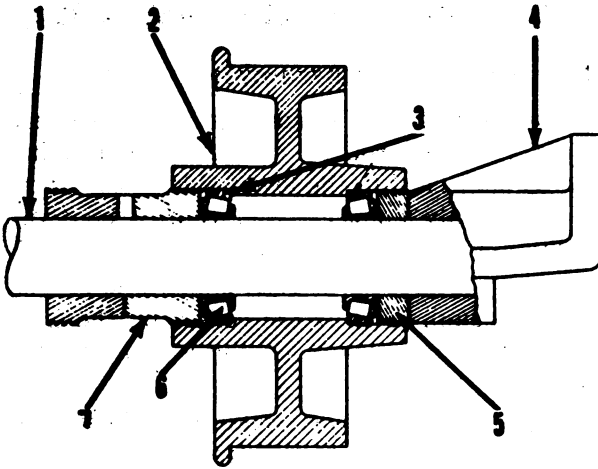
d. Installation of Drip Rings. Start one end of the split ring on the edge of the drum opening. Then work the ring around the inside of the drum opening until it snaps into place. Butt-weld the ends and spot-weld the ring to the drum head.

e. Removal of Buckets and Blades.

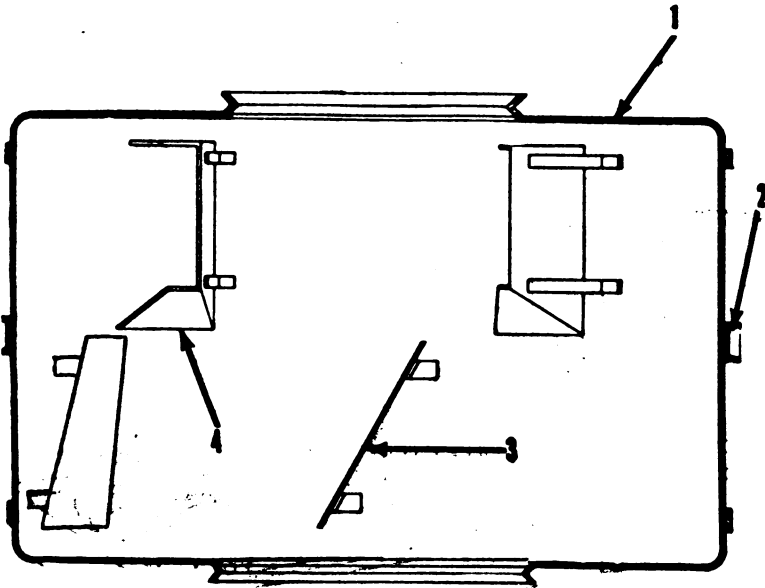
- (1) The buckets (4, fig. 4Ⓟ) and blades (3) should be replaced when wear at the edges exceeds $1\frac{1}{2}$ inches or when the edges have been damaged.
- (2) When installing new blades, use new bolts. The blades are located on the charging side of the bucket. One end of the blade fastens to the bucket with the same bolts used to hold the bucket to the lug. The other end of the blade fastens to a similar lug on the head of the drum on the charging side.

44. Drum Ring Gear Removal

The ring gear (2) is mounted and bolted around the drum shell (1) in six sections. When it is necessary to replace the ring gear, rotate the drum so that the gear section needing repair or replacement is in a removable position. Remove the nuts holding the gear section, replace the section and tighten the nuts.



A



B

- | | |
|---------------------------------|------------------------------------|
| 1 Drum roller shaft | 4 Drum roller shaft hanger |
| 2 Drum roller | 5 Drum roller gear grease retainer |
| 3 Drum roller bearing cup | 6 Drum roller bearing |
| 7 Drum roller adjustment collar | |

(A) Drum roller cross-section

- | | |
|--------------------------|---------------------|
| 1 Mixing drum | 3 Mixing blades |
| 2 Drum rear gear section | 4 Discharge buckets |

(B) Mixing drum

Figure 4. Drum roller and mixing drum.

Section VIII. DRUM ROLLER ASSEMBLY

45. Removal of Drum Roller Assembly

a. There are two drum roller assemblies, (fig. 4A), each consisting of a shaft (1), two rollers (2) and two bearings (6). These assemblies are attached to the lower side of the frame. The mixer drum rests directly on them and rotates on them. The drum roller assembly with the drum removed is shown in figure 5.

b. Place a jack on the ground directly under the drum. Raise the drum just high enough to clear the rollers on the side of the drum opposite the drum drive shaft. Using a jack will cause the drum to be raised.

c. Loosen and remove the two bolts holding the bearing on each end of the drum shaft assembly to the frame. Slip end bearing mounting off and lower the roller assembly. Place assembly on suitable blocking.

d. Unscrew grease retainer (5, fig. 4A), unscrew drum roller adjustment collars, and pull off roller bearing (6) with a bearing puller.

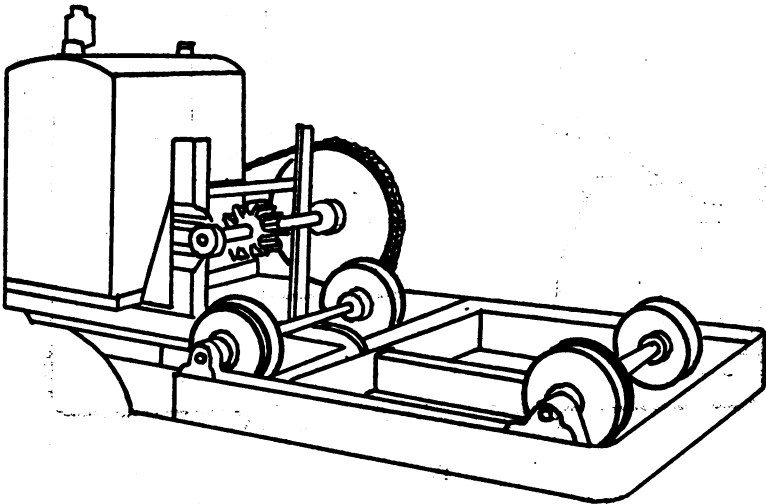


Figure 5. The drum roller assembly with the drum removed.

46. Roller Assembly Inspection, Repair, and Reassembly

a. Check bearings for wear or damage. Carefully clean them in a cleaning solvent, and repack with grease. Wrap in clean oil paper or cloth until ready to use again. Discard leaky grease seals. Replace defective bearings.

b. Check roller surface for wear or flat spots. Replace worn or defective rollers.

c. Check roller drum shaft for burrs and ridge cuts caused by bent or misaligned shaft. File ridges and burrs. Straighten the shaft if necessary.

d. Check the bearings for a light press fit on shaft.

e. After making necessary repairs or replacement, reassemble roller and parts on shafts by tapping or pressing bearings in roller. Be sure that the bearings are equally pressed against the face of the shoulder. Replace adjustment collars on the shaft. Then press the roller flush with the shoulder on the shaft; screw in the grease seal, and screw the collars into the roller. Put end bearing brackets on the shaft and lift it into position on the frame; tighten nuts. Be sure the rotating surfaces are in line with the drum rollers. Check and adjust the collars.

f. Remove blocking used between drum shell and frame; release jack from under drum. Release drum drive clutch.

Section IX. COUNTERSHAFT ASSEMBLY

47. Drum Drive Shaft Assembly Removal

a. The pinion gear (11, fig. 6) and countershaft (10) are turned by a sprocket-and-chain system. This propels the mixing drum and skip hoist. To remove the drive shaft, first loosen the engine channel bed nuts. Pry engine toward the countershaft. Release the engine clutch and rotate the chain (14). Then drive out the connecting master pins and chain links, using hammer and drift pin, to remove the chain.

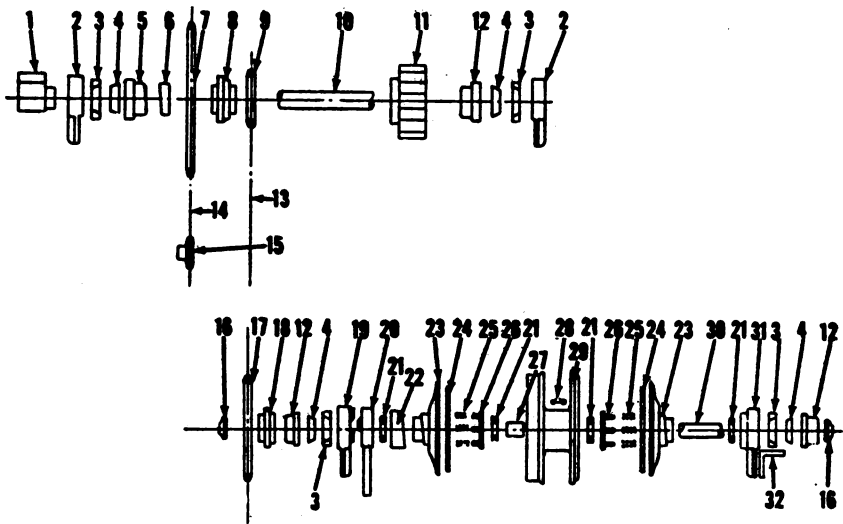
b. Loosen and remove nuts and bolts holding countershaft bearing blocks (2) on the frame. Remove the countershaft assembly and place on wooden blocks or horses.

c. Tap the inner surface of the sprocket with a lead hammer, mallet, or block of wood until the sprocket slides clear of the key. Slide bearing blocks (2) off the shaft (10). Remove the tapered bearings (3). Clean all parts with a cleaning solvent. Wipe dry.

d. Replace worn or damaged bearings (3), sprockets (7 and 9), pinion gear (11), and chains if necessary. Replace defective shaft, worn sprocket, and pinion gear keys if necessary.

48. Drum Drive Shaft Reassembly and Installation

Clean out key slots. Make sure keys fit firmly in their slots. Slide the pinion gear onto shaft, and line up the slot in the gear with the shaft center key. Tap with lead mallet until outer gear



- | | |
|--|------------------------------------|
| 1 Shaker cam | 16 Clutch lock plate |
| 2 Countershaft bearing block | 17 Hoist shaft sprocket, 24 tooth |
| 3 Roller bearing cup | 18 Hoist shaft sprocket hub |
| 4 Roller bearing | 19 Hoist shaft left bearing block |
| 5 Bearing adjusting set collar | 20 Clutch arm and dog |
| 6 Bearing adjusting anchor collar | 21 Thrust bearing |
| 7 Countershaft sprocket, 40 tooth | 22 Clutch adjusting hub |
| 8 Countershaft sprocket hub | 23 Clutch plate |
| 9 Countershaft sprocket, 14 tooth | 24 Clutch lining disc |
| 10 Countershaft | 25 Clutch lining spring |
| 11 Drive pinion | 26 Clutch pressure plate |
| 12 Bearing set collar | 27 Cable drum bushing |
| 13 Countershaft to hoist shaft drive chain | 28 Cable clamp |
| 14 Engine to countershaft drive chain | 29 Cable drum |
| 15 Engine sprocket | 30 Skip hoist shaft |
| | 31 Hoist shaft right bearing block |
| | 32 Clutch and brake drum frame |

Figure 6. Drive assembly.

faces are flush with key. Tighten set screw in hub of pinion gear (11). Place drive sprockets and divider hub in their positions on the shaft. Use the same procedure used for the pinion gear. Slide the bearings (4) and bearing blocks (2) on shaft. Tap the shaker cam (1) in key on end of shaft. Place counter shaft assembly in its position on the frame. Use drift pins through holes in each of the bearing blocks. Aline holes with holes in frame structure and replace and tighten mounting bolts.

Section X. SKIP HOIST DRIVE SHAFT ASSEMBLY

49. Skip Drive Shaft

a. *General.* The skip hoist drive shaft (30, fig. 6) is located above the pinion gear drive shaft (10) in a horizontal position. The skip hoist drive shaft is driven by a chain from the pinion

drive shaft sprocket (9) to the skip drive shaft sprocket (17). The skip drive shaft operates the drum shaft shown in figure 7©, at top of the mixer for raising or lowering the skip loader.

b. Removal. Disconnect skip clutch and brake lever clevis pins. Be sure all rods are clear. Remove cable by unwinding, and remove cable wedge from skip drive drum (29).

- (1) Hook a rope sling around skip hoist drive shaft assembly. Lift the sling with a crane just enough to apply a slight tension on sling. Loosen the mounting cap screws and remove the cap screws at each end of shaft block mounting. Insert a drift or tapered pin in each hole. Use these pins to move the block mountings to prevent the cap screws from binding. This will eliminate sudden drops that may damage threads or cause stripping of threads.
- (2) Lift the skip drive shaft assembly out and away from the mixer and place in a suitable spot for disassembling the parts.

c. Disassembly.

- (1) Remove the clutch lockplates (16) located at the ends of the skip drive shaft (30). Pry or tap drive sprocket (17) off the shaft. Be sure to apply an even pressure or the key may cut the sprocket hub (18) slot or drive shaft. Remove the key; slide the bearing set collars (12) and bearings (4) off the shaft. Slip the right and left shaft bearing blocks (19) and (31) off the shaft. Remove the skip brake hinge pin and eyebolt; take brake bands off. Release disc clutches, loosen setscrews in adjusting collar, and use a gear puller to pull clutches and drum off the drive shaft.
- (2) Unscrew the setscrews in the cam adjusting collars. Remove the collars and bearings as a unit. Slip the clutch plates (23) clutch lining disks (24), pressure plates (26) and the inner thrust bearings (21) off the drive shaft.
- (3) Inspect for worn thrust bearings, weak clutch spring (25) warped clutch plates, and greasy or worn clutch lining disks. Inspect cable drum (29) for worn bushings and bent drive shaft.

d. Reassembly and Installation. Reassembly and reinstallation of the skip drive shaft is the reverse of the disassembly procedures.

Section XI. BULL DRUM HOIST SHAFT AND SKIP LOADER ASSEMBLY

50. Hoist Shaft Assembly

a. Removal. Lower skip loader to the ground. Remove cable and wedges from the end cable spools (2, fig. 7©). Engage the

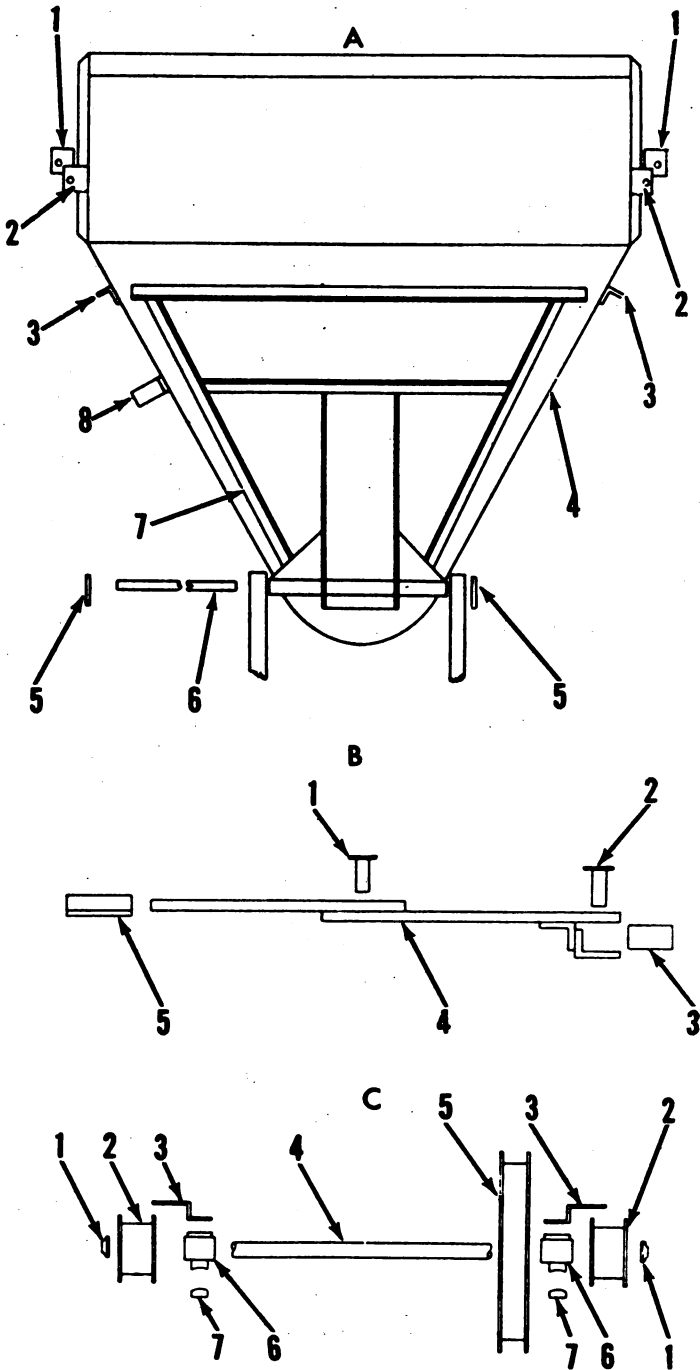


Figure 7. Skip assembly, shaker, and bull drum hoist shaft.

- | | |
|----------------------|--------------------------|
| 1 Top cable guide | 5 Skip hinge pin covers |
| 2 Bottom cable guide | 6 Hinge pin |
| 3 Hook eye | 7 Saddle skip |
| 4 Skip with saddle | 8 Clutch throwout bumper |

(A) Skip assembly

- | | |
|------------------------|-----------------|
| 1 Shaker arm hinge pin | 3 Shaker roller |
| 2 Shaker roller pin | 4 Shaker arm |
| 5 Shaker hammer | |

(B) Skip shaker

- | | |
|-----------------------------|--------------------|
| 1 Lock plate | 4 Hoist shaft |
| 2 Cable spool | 5 Large cable drum |
| 3 Cable guide | 6 Babbitt bearing |
| 7 Alining block for bearing | |

(C) Bull drum hoist shaft

Figure 7—Continued.

skip clutch and drive the cable running from the drive drum to the bull large cable drum (5); when cable has wound itself on bull drum so the wedge is clear on the drive drum, enabling it to be removed, apply the skip brake. Shut down; remove wedge. Place a cable or rope sling around the shaft and apply slight tension with a crane. Remove mounting bolts on bearing blocks located at each end of the shaft. Remove the drive drum cable wedge. Hoist the shaft assembly high enough to clear the water tank and valve. Place the assembly on a sturdy platform or on blocks and disassemble the parts on the shaft.

b. Disassembly. Remove the cable spool drums (2) at the ends of hoist shaft (4) by taking the lock plates (1) off the shaft ends. Tap the bearing blocks (7) off the shaft. Be careful not to damage the babbitt bearings (6). Remove the bull drum (5).

c. Inspection. Inspect the babbitt bearings for excessive wear or damage. Check keys, cable drums, and shaft for excessive wear. Check for bent hoist shaft.

Note. When removing parts or disassembling units, it is advisable to place tags on each part describing its purpose and location.

d. Reassembly and Installation. Place parts on shaft in the original order and position. Hoist the assembly in position, and screw the mounting bolts into the frame. Connect the cables for the skip loader and drive drum. Be sure to attach cable guides on

bearing blocks for the spool drums. After assembly is in place, lubricate according to the lubrication instructions given in paragraph 26.

51. Skiploader Assembly Removal

a. Removal. Lower skiploader on blocked rollers and remove cables from spool drums (2). Remove the hinge pin covers (5) (fig. 7A) by unscrewing cap screws fastened to skip pivot stanchion. Knock out the hinge pin (6) with a hammer and drift pin. Roll skiploader away from mixer. Check hinge pin and stanchion bushings for wear caused by lack of lubrication. Replace with a new hinge pin and bushing if necessary.

b. Reassembly and Installation. Roll skip in place; insert hinge shaft; screw hinge covers in place. Connect cables to drum spools.

Section XII. DISCHARGE CHUTE ASSEMBLY

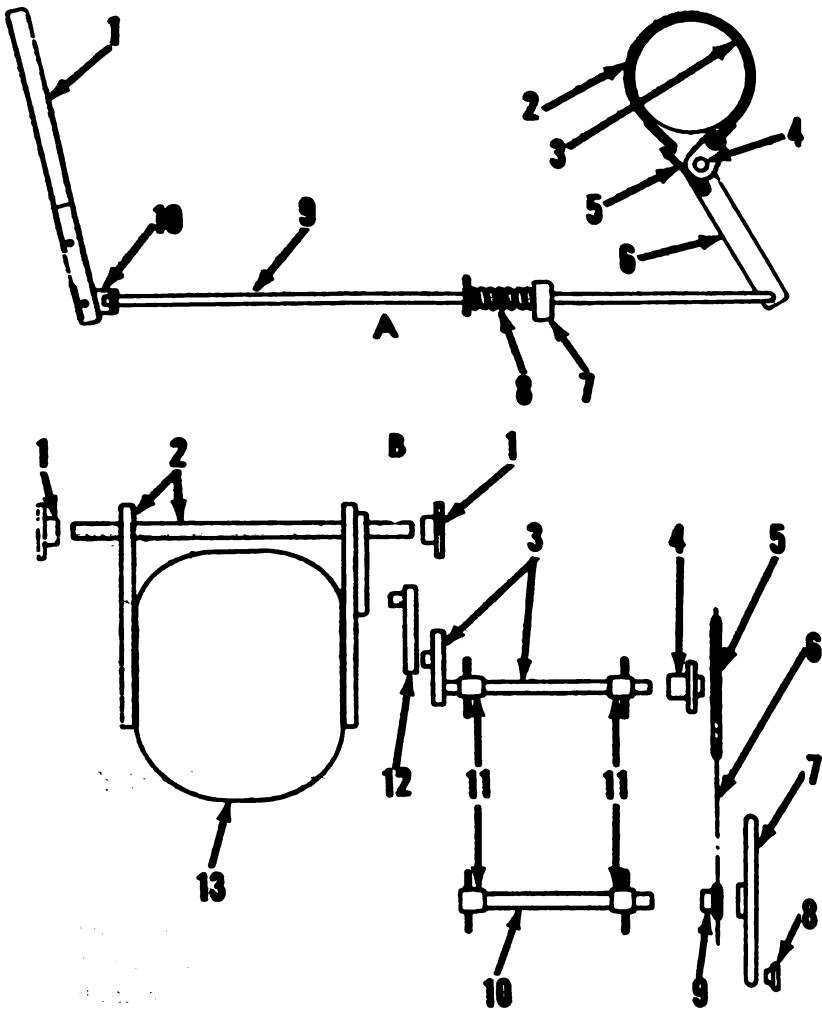
52. Discharge Chute

a. Removal. To remove the discharge chute, knock out the dowel pin holding hand wheel (7, fig. 8B) on shaft (10). Remove cap screws and lockwashers holding sprocket (5) and chain cover. Knock out connecting pin for chain (6). Unscrew the eight nuts and bolts holding bearing mounts for the hand wheel shaft (10) and upper sprocket shaft. Remove and place in convenient spot. Unhook splash plate for chute. Unscrew the four bolts and nuts holding the bearing mounts (1) for the discharge chute shaft (2). Slide the whole assembled unit out and place in convenient spot to disassemble. The chute mounted to swivel arms is replaceable by removing 10 nuts and bolts located on each side of chute. This can be done without removing the swivel shaft. The bottom stationary chute (13) can also be removed by unscrewing the bent sheeting which is spot welded around the chute and screwed to the side of the mixer.

b. Inspection. When the discharge chute assembly is completely removed from mixer, check for worn, or bent shafts (2) and (10), worn sprockets (5) and (9), and chain and bearing mounts, (1). Roll bent shaft on a flat plate. If shaft is bent, it can be noticed as it is being rolled. Check if light shows between bottom of roller and plate. Straighten the shaft if possible, or replace it. Replace damaged or worn parts.

c. Reassembly and Installation.

(1) After making necessary repairs and replacements, lift discharge chute and place on the bottom chute. Tie sling



- | | |
|-------------------------|--------------------------------|
| 1 Brake lever | 6 Brake arm |
| 2 Brake band | 7 Brake tie rod set collar |
| 3 Brake lining | 8 Brake tie rod spring |
| 4 Brake arm hinge pin | 9 Brake tie rod |
| 5 Brake adjustment bolt | 10 Brake lever connecting link |

(A) Brake control assembly

- | | |
|---------------------------------------|-------------------------------|
| 1 Discharge chute bearings and mounts | 6 Discharge chain |
| 2 Discharge chute shaft and arms | 7 Hand wheel |
| 3 Discharge sprocket link and shaft | 8 Hand wheel spinner |
| 4 Discharge sprocket hub | 9 12 tooth discharge sprocket |
| 5 60 tooth discharge sprocket | 10 Hand wheel shaft |
| | 11 Discharge shaft bearing |
| | 12 Discharge inter-link |
| | 13 Discharge chute |

(B) Discharge assembly

Figure 8. Brake control and discharge assembly.

around frame directly over the discharge opening and fasten to center of discharge shaft. Lift chute (13) until shaft bearing (11) block holes are in line with frame holes. Use rod or drift pin to aline holes, and insert mounting bolts. Tighten nuts and lockwashers.

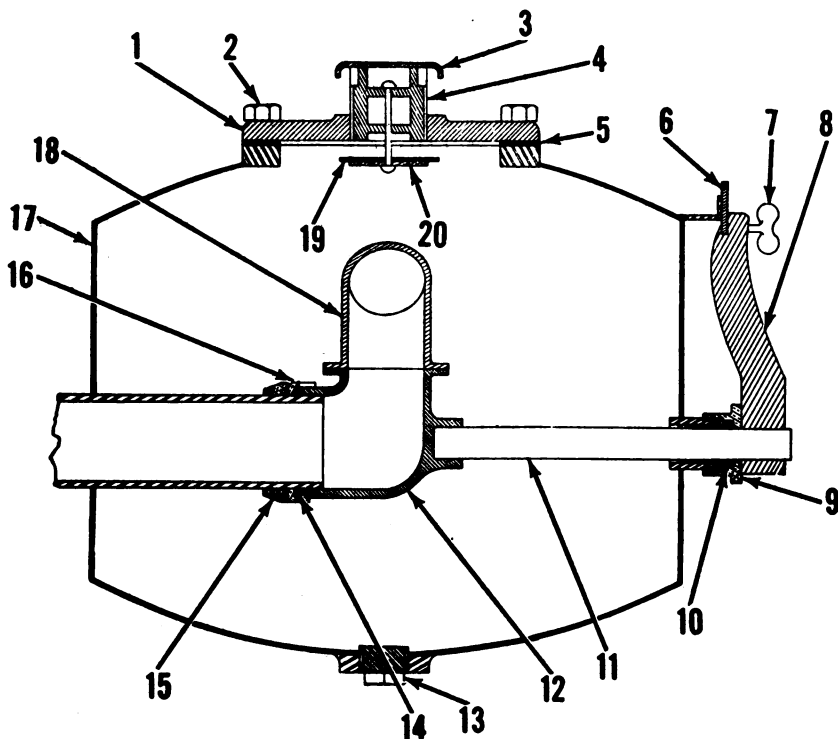
- (2) Insert the link machined stub shaft in the "V" link arm (12) hole. Lift the upper sprocket shaft (3), and before placing in its position, insert shaft end in the link arm hole. Aline holes in frame angle iron with shaft mounting holes. Insert bolts and tighten nuts and lockwashers. The upper sprocket (5) should be bolted against shaft shoulder and the key in the slot. Connect sprocket chain (6) and loop the roller links over upper sprocket.
- (3) Place the shaft (10) with the hand wheel sprocket (9) in the chain roller links. Place shaft assembly in position. Aline holes in bearing mounting and frame angle iron. Insert a bolt in each mounting block. If chain prevents alinement of mounting bolts, disconnect the snap ring or apply downward pressure with a crowbar until holes aline, and insert bolts, replace lockwashers and tighten nuts.

Section XIII. WATER TANK ASSEMBLY

53. Water Tank

a. General. The water tank (fig. 9) is of the siphon type. It receives water from an outside water source through the water pump, located at the right side of the skip end of the mixer, to the valve assembly mounted on side of the upper water tank. This valve assembly allows water to enter the tank, and the check valve automatically cuts the volume of water when the tank has reached its capacity. The water lever, located above the skip clutch and brake levers, operates the water valve in furnishing the interior of the drum with water for mixing purposes. Changing the setting of the arm indicator (8), located on the side of the water tank, reduces or increases the volume of water desired to enter the mixing drum.

b. Removal. Remove drain plug (13) located at the bottom side of the tank. Allow the water and dirt to drain out completely. Replace drain plug. Disconnect the water hose from the water pump and the water pipe at the drum mouth. Remove water valve hinge pin. Unscrew water tank leg bolts mounted on structural



- | | |
|------------------------------------|--------------------------------|
| 1 Tank cover | 11 Gage adjusting shaft |
| 2 Tank cover cap screws | 12 Discharge suction elbow |
| 3 Air valve cover | 13 Drain plug |
| 4 Air valve body | 14 Discharge ell gasket |
| 5 Tank cover gasket | 15 Retainer on discharge pipe |
| 6 Gage dial | 16 Discharge ell gasket holder |
| 7 Gage dial arm wing nut | 17 Tank shell |
| 8 Gage dial arm | 18 Discharge suction spout |
| 9 Gage adjusting shaft packing nut | 19 Air valve shutoff gasket |
| 10 Gage adjusting shaft packing | 20 Air valve |

Figure 9. Water tank.

braces at the top of the mixer. Tie rope sling around water tank and lift it off by crane.

c. Disassembly.

- (1) To remove the arm indicator (8), loosen the wingnut (7) at the dial (6). Turn indicator arm on shaft (11) until it is clear of the curved groove. Unscrew the nut holding the arm on shaft, remove flat washers, and pull arm off. If water has been leaking around shaft, tighten graphite packing nut (9) or remove old packing (10) and replace it.

- (2) To remove the air valve cover assembly at the top side of the tank, unscrew the six cap screws (2, fig. 9) holding the cover (3). Do not remove cover gasket (5) unless it should be replaced. After removing cover from tank, check shutoff gasket (19) for deterioration and the pin valve for improper opening or closing.
- (3) After removing the tank cover, it is possible to check the interior of the tank for rust scales, dirt, and leaky discharge gasket (14) located at the discharge elbow (12). This gasket can be replaced by unscrewing the retainer (15). Pull dial arm shaft out and slide off the elbow from the discharge pipe. Place gasket on pipe, slide elbow on pipe, and screw retainer on the elbow. Reinsert the shaft. Clean all parts when disassembled.

d. Reassembly and Installation.

- (1) Place dial arm on shaft. Rotate arm until it enters the groove in the dial. Place flat washer on shaft end and tighten the nut. Replace cotter pin.
- (2) Place tank cover on tank collar. Insert the six cap screws. Tighten them with equal pressure.

54. Removal and Disassembly of Water Valve Assembly (fig. 10)

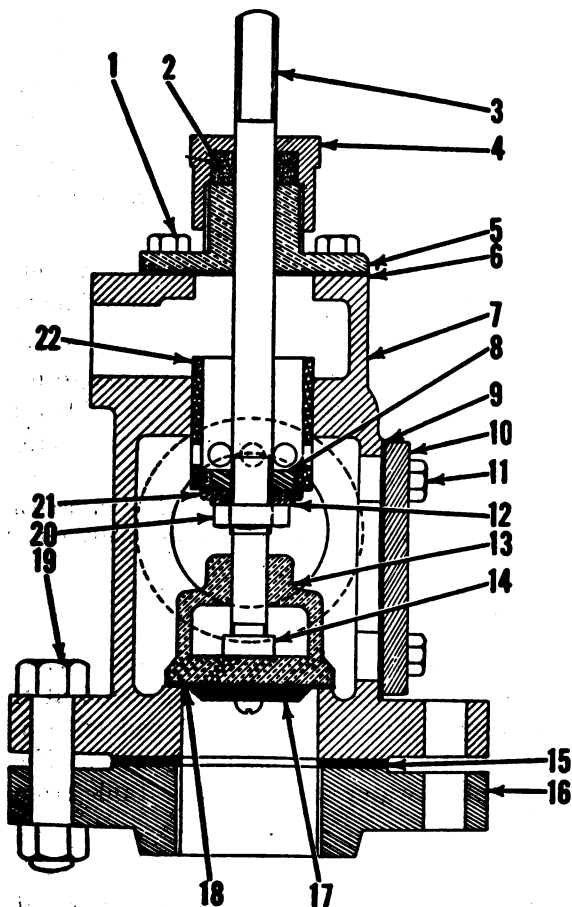
a. Removal. Disconnect the valve lever hinge pin. Remove the two bolts (19) and nuts holding the discharge water pipe flange (16) and valve body (7) flange together. Be sure not to damage gasket (15) between flanges. Replace gasket if necessary. Remove cap screws holding valve body to water tank.

b. Disassembly.

- (1) Unscrew the three cap screws (1) holding valve guide bushing. Slide the valve guide assembly from valve stem. Remove packing gland on valve guide and check packing if it has been leaking when in operation. Check the condition of the rubber gasket (6) between valve guide (5) and valve body (7).
- (2) Unscrew and remove the four hand hole cover cap screws (11) located on the side of valve body. Check condition of the rubber gasket (9) between the cover (10) and valve body (7). Reach into the interior of valve body and unscrew cup nut (20) holding sliding brass cylinder (22) in the center of valve stem (3). Unscrew valve stem out of the bridge nut (14) located in the bottom of the interior of the valve bridge (13). Slide the valve stem and brass cylinder assembly through the opening located at

the top of valve body. The valve bridge can then be removed through the side hand hole. Check the condition of the valve bridge rubber gasket (18). Replace if deteriorated or damaged. Remove the bridge nut (14) and cup nut (20).

Note. After removal of parts, tie name tags on each part, place in containers, and store in a convenient place until reassembly.



- | | | | |
|----|----------------------------|----|-----------------------|
| 1 | Valve stem guide cap screw | 12 | Cup washer |
| 2 | Valve stem packing | 13 | Valve bridge |
| 3 | Valve stem | 14 | Bridge nut |
| 4 | Valve stem packing nut | 15 | Discharge pipe gasket |
| 5 | Valve stem guide | 16 | Discharge pipe flange |
| 6 | Valve stem guide gasket | 17 | Valve gasket washer |
| 7 | Valve body | 18 | Valve bridge gasket |
| 8 | Cup head | 19 | Discharge pipe bolts |
| 9 | Hand hole cover gasket | 20 | Cup nut |
| 10 | Hand hole cover | 21 | Leather cup |
| 11 | Hand hole cover cap screws | 22 | Brass cylinder |

Figure 10. Water valve.

55. Water Valve Assembly and Installation

a. Flush out with water and blow out with air to clean interior of valve body before assembly.

b. Place the valve bridge assembly in the bottom of the valve body interior. Slip the valve stem and brass cylinder through the opening at the top of the valve body. Aline the shaft into bridge nut (20). Check the valve bridge action to see that it opens and seats properly on the discharge mouth. Replace the valve guide bushing and assembly on top side of valve body and screw in three cap screws (1) with equal pressure. Do the same with hand hole cover (10) and four cap screws (11).

c. Mount the valve body (7) in its position on the water tank facing the skip end of the mixer. Tighten the cap screws holding it to tank flange.

d. Connect and tighten the hose clamps on water pump hose and pipe nipple screwed to the upper opening of the valve body.

e. Replace hinge pin for the water valve lever assembly. Insert cotter pin. Place discharge outlet pipe and flange on the bottom of the valve body flange. Be sure that the rubber gasket is in position and in good condition. Replace the two flange bolts and nuts. Tighten them evenly.

Note. If the valve does not work properly after inspection, repair, and replacement of parts, install new valve stem assembly, especially if valve stem is bent.

56. Water Pump

a. *General.* The water pump is of the impeller type. It is driven by a V-belt from the engine shaft pulley located at the reduction gear and clutch end. The pump is equipped with a sheave and shaft connected to the impeller blade. The centrifugal force of the impeller supplies water to the water tank from an outside source.

b. *Removal.*

- (1) Unscrew hose clamp on pipe nipple at top side of pump. Remove the suction hose and strainer from side of pump. Clean the strainer before placing it in hose. Remove the protective cover for V-belt. Loosen and remove bed nuts located at the base of pump and mounted on slotted channel beams, and then remove the V-belt.
- (2) To remove pump sheave, knock out the tapered pin in hub and pry pulley from key with a puller or by tapping with mallet. The pulley and impeller shaft assembly can be removed by unscrewing six cap screws holding

the shaft flange to the pump body. Check the impeller blades for wear, nicks, or a broken blade.

- (3) To remove the impeller, place a hard wood block on the end of one of the impeller vanes and strike the block a sharp blow with a hammer. After unscrewing the impeller from the shaft, the grease seal parts may be removed from the housing by means of a stiff piece of wire bent on the end. Pull out grease seal parts. Be sure to replace parts in correct order.

Section XIV. LIMITED STORAGE AND SHIPMENT

57. Limited Storage

a. Inspection. Refer to organizational preventive maintenance services (par. 31).

b. Cleaning and Painting. To clean the mixer wash it well with hose pressure water. Scrape or knock off portions of concrete not affected by the washing action. Scour the mixing drum with gravel or stones and water for at least 5 minutes. Apply a thin coat of prime paint to all rusted and pitted spots. Apply several coats of prime filler and sand them, so the finished coat of paint will be smooth and level with the area not painted.

c. Lubrication. Refer to the lubrication information in paragraph 26.

d. Protection in Storage.

- (1) Disconnect the hose leading from the water pump to outside source. Drain the water tank by removing drain plug at the bottom of the tank. Disconnect the hose at the pump end and drain. Take out drain plug in water pump. After draining completely, replace hose and drain plug.
- (2) Clean and dry the interior and exterior of the mixing drum, the skiploader, and the discharge chutes. Coat exposed driving and pinion gears, exposed chains, including sprockets, and adjustment mechanism with type P-1 preservative. Brush all control lever linkage and pins with type P-4 or P-5 preservative. Coat cables and pulleys with P-1 preservative.
- (3) Be sure all hinged mixer panel and hood covers and tool box are securely shut, taped, and fastened. When mixer is placed in desired parking spot, lower stabilizer jacks and block the wheels. If available, place under a suitable cover. Block mixing drum with tapered wooden blocks.

58. Domestic Shipment

a. General. Refer to paragraph 57 for the method of preparing for shipment.

b. Hoisting and Handling. Raise the packed crate with a crane and slings or grabhook to a height sufficient to allow the mixer to be placed on a truck, trailer, or rail flatcar. All cross members or braces should be located at an angle that will prevent mixer from moving or shifting out of its spot. The crate should be mounted on skids, so that if hoist crane is not available, it can be loaded or unloaded by truck winch; with skids placed on rollers, use the ramp in this operation. If the mixer is transported without crating, refer to paragraph 6*a* and *b*.

c. Packaging and Blocking. The usual procedure in domestic shipment is to anchor the axles, block the wheels, and tie, block, or fasten securely all swivel or moving parts on the mixer. Spare parts and tools are placed in the toolbox in individual wrapping or bags, and the toolbox cover is fastened and taped shut.

APPENDIX I

REFERENCES

1. Accessory Equipment

TM 5-5203 Engine, Gasoline, Leroi Model D-140.

2. Dictionaries of Terms and Abbreviations

SR 320-5-1 Dictionary of U. S. Army Terms.

SR 320-50-1 List of Authorized Abbreviations.

3. Preparation for Export Shipment

TB 5-9711-1 Preparation of Corps of Engineers Equipment for Oversea Shipment.

TB 5-9713-1 Preparation for Export, Spare Parts for Corps of Engineer Equipment.

4. Preventive Maintenance

TM 5-505 Maintenance of Engineer Equipment.

TM 9-2851 Painting Instructions for Field Use.

5. Publications Indexes

SR 110-1-1 Index of Army Motion Pictures, Kinescope Recordings, and Film Strips.

SR 310-20-3 Index of Army Training Publications.

SR 310-20-4 Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.

SR 310-20-5 Index of Administrative Publications.

SR 310-20-6 Index of Blank Forms.

6. Training Aids

FM 21-8 Military Training Aids.

APPENDIX II

IDENTIFICATION OF REPLACEABLE PARTS

Note. The parts are listed in this appendix for information only. This listing will not be used as a basis for requisitioning spare parts.

| Fig. No. | Index No. | Manufacturer's part No. | | Description | Quantity per unit |
|----------|-----------|-------------------------|------------|-------------------------------------|-------------------|
| | | Code No. | Part No. | | |
| 3Ⓐ | 1 | | 45-AX-325 | AXLE, rear----- | 1 |
| | 2 | | 45-BK-319 | BOLT, front axle spindle----- | 2 |
| | 3 | | 45-DU-304 | SPINDLE, axle----- | 2 |
| | 4 | | 45-DU-303 | YOKE, tie rod spindle----- | 2 |
| | 5 | | 45-AS-309A | ROD, front axle tie----- | 2 |
| | 6 | | 45-BC-303 | LOCK, tow pole hinge pin----- | 1 |
| | 7 | | 45-BL-307 | SPRING, tow pole----- | 1 |
| | 8 | | 45-AT-309 | POLE, tow----- | 1 |
| | 9 | | 45-AT-308 | TONGUE, front axle----- | 1 |
| | 10 | | 45-BK-320 | PIN, tow pole hinge----- | 1 |
| | 11 | | 45-AX-322 | SUPPORT, front axle tongue----- | 1 |
| | 12 | | 45-BB-316 | SPACER, front axle tongue----- | 1 |
| | 13 | | 45-AX-340 | AXLE, front----- | 1 |
| 3Ⓑ | 1 | | 45-CA-301 | BEARING, roller wheel----- | 4 |
| | 2 | | 45-1 1/2W | COLLAR, wheel outer dust----- | 4 |
| | 3 | | 45-CH-320 | WHEEL, steel tired, 28" x 6"----- | 4 |
| | 4 | | 45-BB-311 | COLLAR, wheel inner dust----- | 4 |
| 4Ⓐ | 1 | | 45-C-330 | SHAFT, drum roller adjusting----- | 2 |
| | 2 | | 45-R-305 | ROLLER, drum----- | 4 |
| | 3 | | 45-362 | CUP, drum roller bearing----- | 8 |
| | 4 | | 45-B-321 | HANGER, drum roller shaft----- | 4 |
| | 5 | | 45-BB-313 | RETAINER, grease, drum roller rear. | 2 |
| | 6 | | 45-308 | BEARING, drum roller----- | 8 |
| 4Ⓑ | 7 | | 45-BB-315 | COLLAR, drum roller adjusting----- | 12 |
| | 1 | | 45-BJ-303 | DRUM, mixing----- | 1 |
| | 2 | | 45-CX-302 | SECTION, drum ring gear----- | 6 |
| | 3 | | 45-U-314 | BLADES, mixing----- | 6 |
| | 4 | | 45-U-313 | BUCKETS, discharge----- | 6 |
| | 1 | | 45-BF-303 | CAM, shaker----- | 1 |
| | 2 | | 45-S-159-A | BLOCK, countershaft bearing----- | 2 |
| 6 | 3 | | 45-362 | CUP, roller bearing----- | 4 |
| | 4 | | 45-368 | BEARING, roller----- | 4 |
| | 5 | | 45-BB-321 | COLLAR, bearing adjusting set----- | 1 |
| | 6 | | 45-BB-322 | COLLAR, bearing adjusting anchor. | 1 |

| Fig. No. | Index No. | Manufacturer's part No. | | Description | Quantity per unit | |
|----------|-----------|-------------------------|-----------|------------------------------------|---|---|
| | | Code No. | Part No. | | | |
| 6 | 7 | | 45-S-305 | SPROCKET, countershaft (40 tooth). | 1 | |
| | 8 | | 45-H-307 | HUB, Countershaft sprocket | 1 | |
| | 9 | | 45-S-306 | SPROCKET, countershaft (14 tooth). | 1 | |
| | | 10 | | 45-C-327 | COUNTERSHAFT | 1 |
| | | 11 | | 45-G-303 | PINION, drive (15 tooth) | 1 |
| | | 12 | | 45-BB-320 | COLLAR, bearing set | 3 |
| | | 13 | | 45-DT-308 | CHAIN, countershaft to hoist shaft drive. | 1 |
| | | 14 | | 45-DT-307 | CHAIN, engine to countershaft drive. | 1 |
| | | 15 | | 45-S-309 | SPROCKET, engine | 1 |
| | | 16 | | 45-BC-304 | PLATE, clutch lock | 2 |
| | | 17 | | 45-S-307 | SPROCKET, hoist shaft (24 tooth). | 1 |
| | | 18 | | 45-H-310 | HUB, hoist shaft sprocket | 1 |
| | | 19 | | 45-B-326 | BLOCK, hoist shaft bearing (left) | 1 |
| | | 20 | | 45-AN-302 | ARM with dog, clutch | 1 |
| | | 21 | | 45-AB-302 | BEARING, thrust | 4 |
| | | 22 | | 45-AM-302 | HUB, clutch adjusting | 1 |
| | | 23 | | 45-AL-303 | PLATE, clutch | 2 |
| | | 24 | | 45-BG-302 | DISC, clutch lining | 2 |
| | | 25 | | 45-BL-301 | SPRING, clutch lining | 6 |
| | | 26 | | 45-BS-303 | PLATE, clutch pressure | 2 |
| | | 27 | | 45-BX-302 | BUSHING, cable drum | 1 |
| | 6 | 28 | | 45-ED-301 | CLAMP, cable | 1 |
| | | 29 | | 45-D-304 | DRUM, cable | 1 |
| | | 30 | | 45-C-328 | SHAFT, skip hoist | 1 |
| | | 31 | | 45-B-325 | BLOCK, hoist shaft bearing (right). | 2 |
| | 7A | 32 | | 45-F-326 | FRAME, clutch and brake drum | 1 |
| | | 1 | | 45-BD-304 | GUIDE, top cable | 2 |
| | | 2 | | 45-BD-305 | GUIDE, bottom cable | 2 |
| | | 3 | | 45-BD-303 | EYE, hook | 2 |
| | | 4 | | 45-BM-304 | SKIP, with saddle | 1 |
| | | 5 | | 45-AD-307 | PLATE, skip hinge pin cover | 2 |
| 6 | | | 45-BK-318 | PIN, hinge | 1 | |
| 7B | 7 | | 45-BN-304 | SADDLE, skip | 1 | |
| | 8 | | 45-BO-303 | BUMPER, clutch throwout | 1 | |
| | 1 | | 45-BK-316 | PIN, shaker arm hinge | 1 | |
| | 2 | | 45-BK-317 | PIN, shaker roller | 1 | |
| 7C | 3 | | 45-R-306 | ROLLER, shaker | 1 | |
| | 4 | | 45-X-302 | ARM, shaker | 1 | |
| | 5 | | 45-X-303 | HAMMER, shaker | 1 | |
| | 1 | | 45-BC-304 | PLATE, lock | 2 | |
| | 2 | | 45-D-303 | SPOOL, cable | 2 | |
| | 3 | | 45-BD-309 | GUIDE, cable | 2 | |

| Fig. No. | Index No. | Manufacturer's part No. | | Description | Quantity per unit |
|----------|-----------|-------------------------|-----------------------------------|--|-------------------|
| | | Code No. | Part No. | | |
| 8A | 4 | | 45-C-329 | SHAFT, hoist..... | 1 |
| | 5 | | 45-D-306 | DRUM, cable, large..... | 1 |
| | 6 | | 45-B-309 | BEARING, babbitt-type, 2"..... | 2 |
| | 7 | | 45-CB-301 | BLOCK, bearing alining..... | 2 |
| | | | 45-EV-305 | CABLE, skip, ½"..... | 35 ft. |
| | | | 45-EV-306 | CABLE, hoist, ½"..... | 42 ft. |
| | 1 | | 45-E-316 | LEVER, brake..... | 1 |
| | 2 | | 45-K-304 | BAND, brake..... | 1 |
| | 3 | | 45-BR-304 | LINING, brake..... | 1 |
| | 4 | | 45-BK-315 | PIN, brake arm hinge..... | 1 |
| 8B | 5 | | 45-I-307 | BOLT, eye, brake adjustment..... | 1 |
| | 6 | | 45-DZ-301 | ARM, brake..... | 1 |
| | 7 | | 45-BB-323 | SET COLLAR, brake tie rod..... | 1 |
| | 8 | | 45-BL-302 | SPRING, brake..... | 1 |
| | 9 | | 45-AS-310 | ROD, brake tie..... | 1 |
| | 10 | | 45-L-322 | LINK, brake lever connecting..... | 1 |
| | 1 | | 45-CD-37 | BEARING, discharge chute..... | 2 |
| | 2 | | 45-CW-302 | SHAFT with arms, discharge chute..... | 1 |
| | 3 | | 45-L-318 | LINK, discharge sprocket..... | 1 |
| | 4 | | 45-H-311 | HUB, discharge sprocket..... | 1 |
| | 5 | | 45-S-308 | SPROCKET, discharge (60 tooth)..... | 1 |
| | 6 | | 45-DT-309 | CHAIN, discharge..... | 1 |
| | 7 | | 45-W-303 | WHEEL, hand..... | 1 |
| | 8 | | 45-CN-302 | SPINNER, hand wheel..... | 1 |
| | 9 | | 45-S-310 | SPROCKET, discharge (12 tooth)..... | 1 |
| | 10 | | 45-C-343 | SHAFT, hand wheel..... | 1 |
| 11 | | 45-B-328 | BEARING, discharge shaft..... | 4 | |
| 12 | | 45-L-317 | LINK, discharge inter..... | 1 | |
| 13 | | 45-AW-306 | CHUTE, discharge inter..... | 1 | |
| | | 45-V-313 | PLATE, discharge chute wear..... | 1 | |
| 9 | 1 | | T-5 | COVER, tank..... | 1 |
| | 2 | | T-21 | BOLT, water tank cover..... | 6 |
| | 3 | | T-2 | COVER, air valve..... | 1 |
| 9 | 4 | | T-3 | BODY, air valve..... | 1 |
| | 5 | | T-20 | GASKET, tank cover..... | 1 |
| | 6 | | T-8-A | DIAL, gage (18 gallon tank)..... | 1 |
| | 7 | | T-10 | NUT, wing, gage dial arm..... | 1 |
| | 8 | | T-9 | ARM, gage dial..... | 1 |
| | 9 | | T-13 | NUT, gage adjusting shaft packing..... | 1 |
| | 10 | | T-12 | PACKING, gage adjusting..... | 1 |
| | 11 | | T-11-A | SHAFT, gage adjusting..... | 1 |
| | 12 | | T-15 | ELBOW, discharge suction..... | 1 |
| 13 | | T-19 | PLUG, drain..... | 1 | |
| 14 | | T-16 | GASKET, discharge ell..... | 1 | |
| 15 | | T-18 | RETAINER, discharge pipe..... | 1 | |
| 16 | | T-17 | HOLDER, discharge ell gasket..... | 1 | |

| Fig. No. | Index No. | Manufacturer's part No. | | Description | Quantity per unit |
|----------|-----------|-------------------------|-------------------------------------|--|-------------------|
| | | Code No. | Part No. | | |
| 10 | 17 | | T-1-A | SHELL, tank (18 gallon) ----- | 1 |
| | 18 | | T-14 | SPOUT, discharge suction ----- | 1 |
| | 19 | | T-4 | GASKET, air valve shut-off ----- | 1 |
| | 20 | | T-22 | VALVE, air ----- | 1 |
| | 1 | | TV-25 | BOLT, valve stem guide ----- | 3 |
| | 2 | | TV-3 | PACKING, water valve stem ----- | 1 |
| | 3 | | TV-1 | STEM, water valve ----- | 1 |
| | 4 | | TV-2 | NUT, water valve stem ----- | 1 |
| | 5 | | TV-6 | GUIDE, water valve stem ----- | 1 |
| | 6 | | TV-7 | GASKET, water valve stem ----- | 1 |
| | 7 | | TV-8 | BODY, water valve ----- | 1 |
| | 8 | | TV-10 | HEAD, water valve cup ----- | 1 |
| | 9 | | TV-27 | GASKET, water valve hand hole cover. ----- | 1 |
| | 10 | | TV-17 | COVER, water valve hand hole ----- | 1 |
| | 11 | | TV-26 | CAP SCREW, water valve hand hole. ----- | 4 |
| | 12 | | TV-14 | WASHER, cup, water valve ----- | 1 |
| | 13 | | TV-16 | BRIDGE, water valve ----- | 1 |
| | 14 | | TV-18 | NUT, water valve bridge ----- | 1 |
| | 15 | | TV-22 | GASKET, discharge pipe ----- | 1 |
| | 16 | | TV-20 | FLANGE, discharge pipe ----- | 1 |
| | 17 | | TV-19 | WASHER, valve gasket ----- | 1 |
| | 18 | | TV-21 | GASKET, valve bridge ----- | 1 |
| | 19 | | TV-24 | BOLT, discharge pipe ----- | 2 |
| | 20 | | TV-15 | NUT, cup ----- | 1 |
| | 21 | | TV-13 | CUP, leather ----- | 1 |
| | 22 | | TV-9 | CYLINDER, brass ----- | 1 |
| | | | 45-DC-302 | BLOCK, water valve hinge ----- | 1 |
| | | | 45-L-321 | LINK, water valve vertical inter ----- | 1 |
| | | | 45-CN-301 | HANDLE, water valve ----- | 1 |
| | | | 45-E-313 | LEVER, water valve ----- | 1 |
| | | | 45-L-320 | LINK, water valve horizontal ----- | 1 |
| | | | 45-L-319 | LINK, water valve connecting ----- | 1 |
| | | 45-R-308 | ROLLER, clutch throwout ----- | 1 | |
| | | 45-E-314 | LEVER, clutch throwout ----- | 1 | |
| | | 45-AS-312 | ROD, clutch lever tie ----- | 1 | |
| | | 45-AS-311 | ROD, clutch throwout tie ----- | 1 | |
| | | 45-E-315 | LEVER, clutch ----- | 1 | |
| | | 45-F-328 | FRAME, main ----- | 1 | |
| | | 45-F-329 | FRAME, top ----- | 1 | |
| | | 45-BB-317 | SPACER, rear axle ----- | 1 | |
| | | 45-BI-316 | GUARD, drive chain ----- | 1 | |
| | | 45-BI-317 | GUARD, discharge chain ----- | 1 | |
| | | 45-BI-318 | GUARD, lever side, large drum ----- | 1 | |
| | | 45-BI-319 | GUARD, lever side, small drum ----- | 1 | |
| | | 45-BI-320 | GUARD, engine side, rear drum ----- | 1 | |
| | | 45-BI-321 | GUARD, lever side, rear drum ----- | 1 | |

**TM 5-1143—Mixer, Concrete, Gasoline Driven, Liquid Cooled, End Discharge
Trailer Mounted, 16 Cu Ft, Gilsen Model 16 S-SCE—1954**