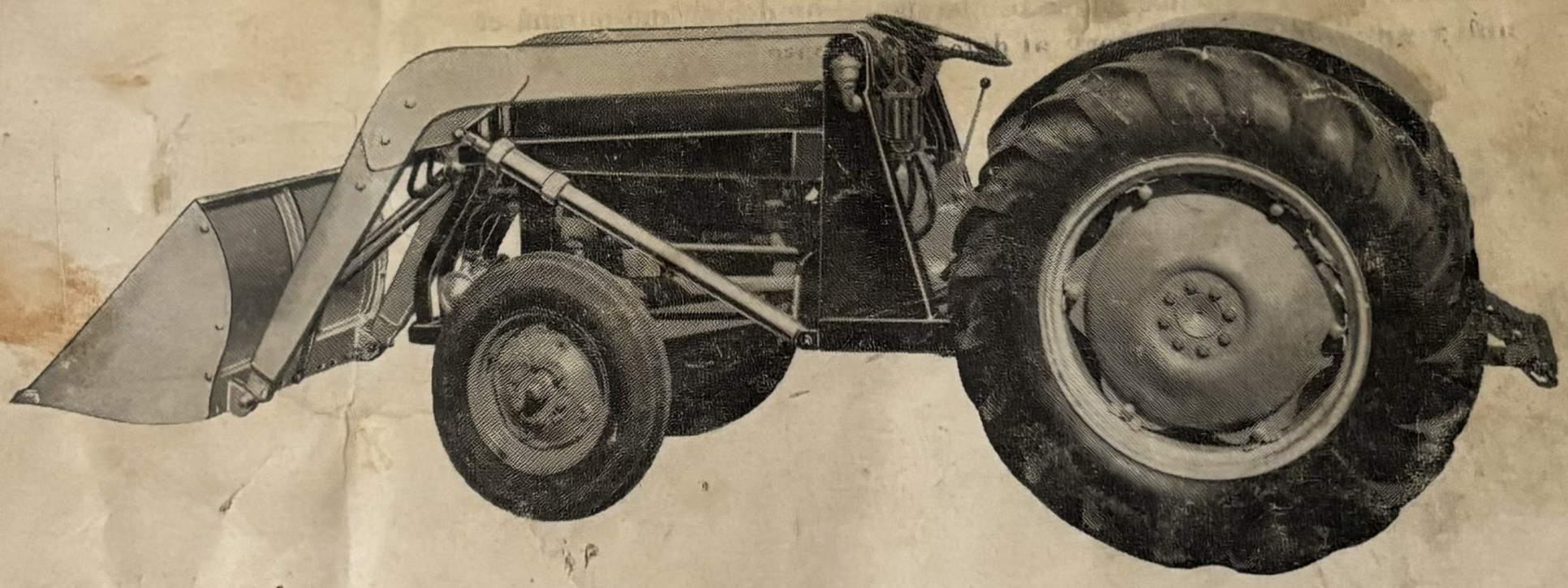
THE DAVIS MODEL 100 HYDRAULIC LOADER

OWNER'S MANUAL

INSTALLATION & OPERATING INSTRUCTIONS



MID-WESTERN INDUSTRIES INC.
MANUFACTURERS OF FARM MACHINERY
1009 SOUTH WEST STREET
WICHITA 15, KANSAS

DAVIS PRODUCTS WICHITA KANSAS 1ST QUALITY VERSATILITY APPEARANCE PERFORMANCE

This Manual

This manual contains two sections. Section One presents information for installation of the Davis Model 100 Loader. Section Two presents information on operation and service.

Because most of the parts and assembly procedures are common to all three tractors, reference is occasionally made to illustration drawings, photographs, and information already given rather than repeating unnecessarily. For example, the procedure for assembly and mounting the Basic Attachment is the same irrespective of tractor; hence this procedure is presented in detail on the Ferguson Model TO 30.

The Davis Model 100 Loader is shipped to you semi-assembled. The procedure given is based on mounting the loader on the tractor and assembling it at the same time. The work can easily be done by one man. However, where a suitable chain fall or hoist is available, or by using Special Davis Jacks which are available as an accessory, the loader may be completely assembled on the floor and then with aid of the hoist or jacks, be positioned for mounting on the tractor. In either case, certain work must be done on the tractor itself before the loader is mounted in place.

DEALER'S RESPONSIBILITY

It is the responsibility of the dealer to make original installation on the tractor and instruct the owner in its operation, care and maintenance.

NOTE — Unconditional Guarantee Not Valid Unless Dealer Installs Loader. The guarantee must also be signed by dealer and purchaser and returned to the factory at date of purchase.

SECTION ONE

INSTALLATION INSTRUCTIONS
DAVIS MODEL 100
LOADER

FERGUSON – TO 20 & 30
FERGUSON – TEA 20-85
FORD & FORD FERGUSON

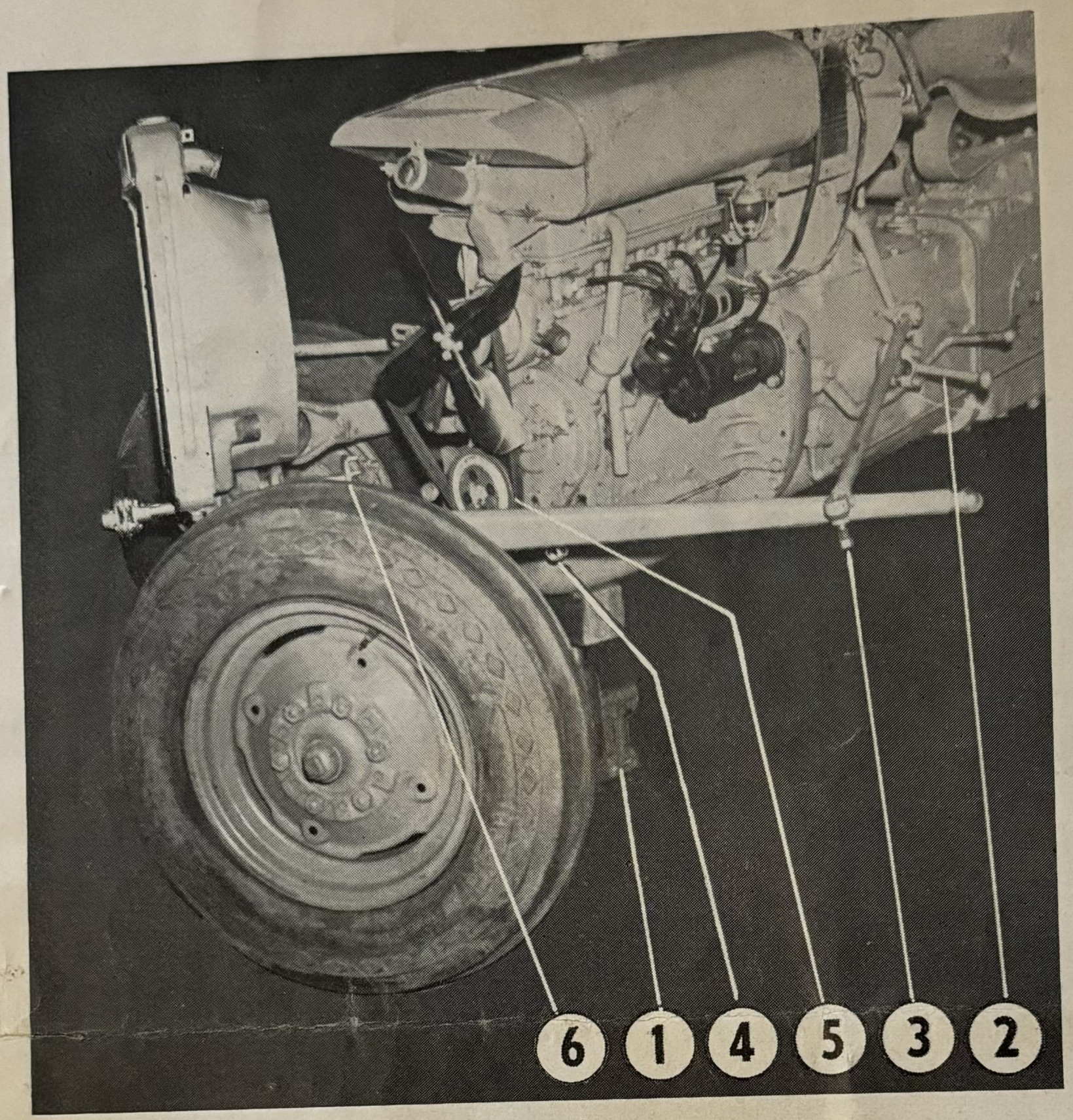


FIGURE 1

PREPARATION OF TRACTOR FOR DAVIS LOADER

STEPS 1, 2, 3, and 4 FERGUSON TRACTORS ONLY.
STEPS 5 and 6 FORD AND FORD FERGUSON ONLY.

1. Release hood latch.
2. Remove hood panel hinge bolts.
3. Remove hood and grill assembly.
4. Disconnect radiator hose.
5. Remove hood and grill assembly by removing four bolts at top of instrument panel, and two bolts on each side of hood panel.
6. Disconnect gasoline line.
7. Place jack (1) under crankcase approximately 4″ back from front end of crankcase. Raise jack just enough so that it touches crankcase.
8. Remove stabilizer bar bracket (2). Preferably left hand.
9. Remove radius rod pin (3) at front axle steering arm.
10. Remove bolts holding trunion housing to crankcase (4). Ford and Ford Ferguson, six bolts. Ferguson, four bolts.
11. Swing axle assembly to side leaving fan pulley in full view (5). Remove fan pulley.
12. Install special fan pulley on crankshaft. Secure with special cap screw, lock washer, and plain washer furnished. See (3, 4, and 5) Fig. 5.
13. Install flange assembly to rubber bushed holes in special fan pulley (6).

Note — Alternate procedure of fan pulley installation. Disregard steps 4, 5, and 6. Follow steps 7, 8, 9, and 10. Separate trunion housing from crankcase for sufficient clearance to remove standard pulley, and install special fan pulley.

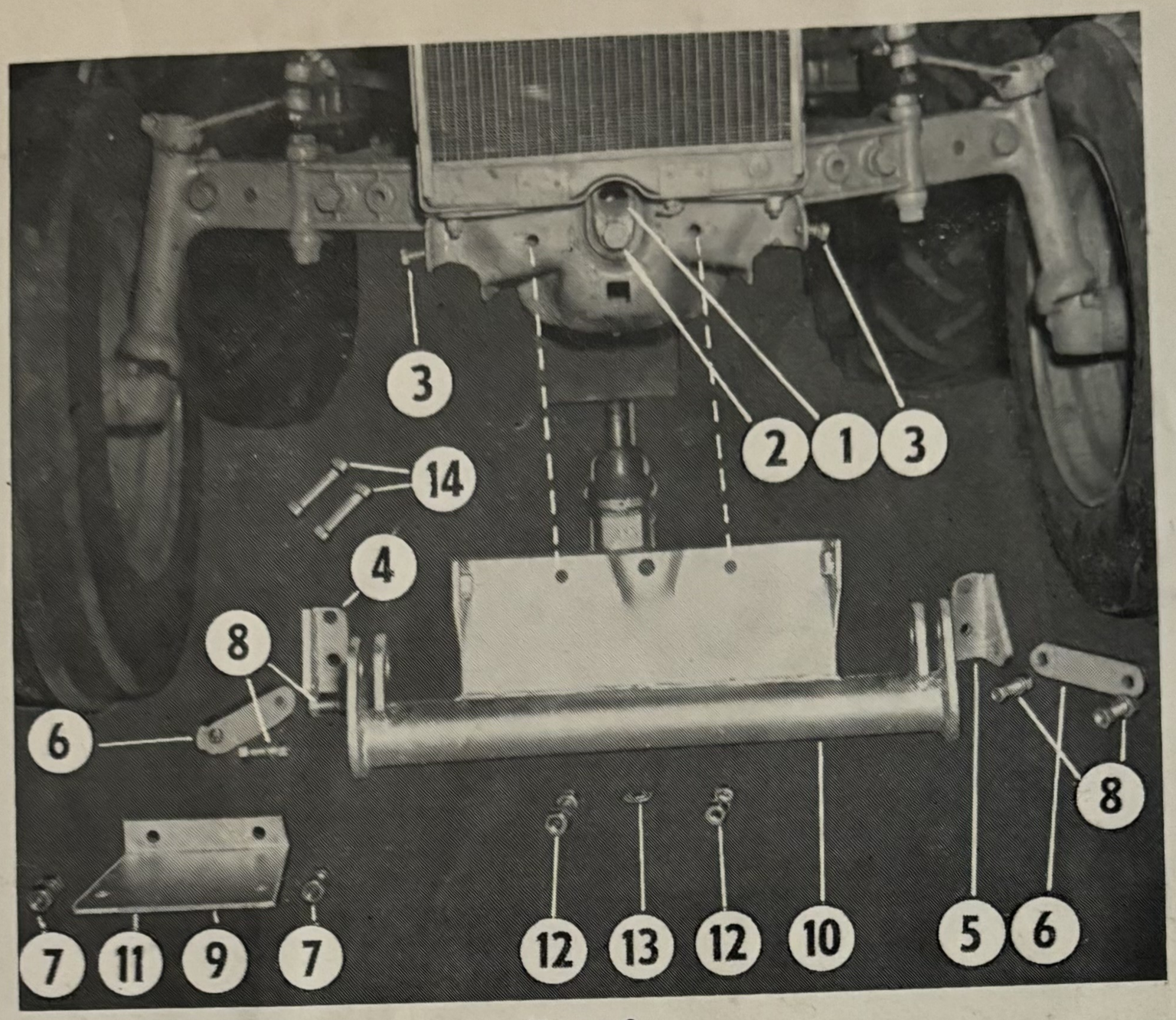


FIGURE 2

INSTALLATION FRONT HANGER BRACKET

1. Enlarge crank access hole to 1″ by machining or other method (1).
2. Remove trunion tube bolt (2) and spot welded nuts on each side of trunion housing. Locate front hanger bracket (10). CAUTION — Be sure it is perfectly level and on the same plane with top of trunion housing.
3. Center punch and drill two $^{17}/_{32}$″ holes. Secure with two ½″ x 1¼″ N.F. Hex Hd cap screws, nuts, and lock washers (12). Center hole, use trunion tube bolt furnished with tractor (2). On R/L side, use original hood panel bolts (3).
4. FORD TRACTOR use step washer in center hole (13).
5. Reassemble. Follow steps in reverse (Fig. 1).
6. FERGUSON TRACTORS TO 20 and 30 ONLY. Install stabilizer hanger brackets R/L (4 and 5). Use two ⅝″ x 4″ N.F. Hex Hd cap screws, nuts and lock washers (14) on right side of trunion housing and crankcase. Left side, use bolts removed from right hand side, size ⅝″ x 3½″ N.F. Hex Hd cap screws, nuts and lock washers.
7. FERGUSON TRACTORS TO 20 and 30 ONLY. Install stabilizer brackets (6) with four ½″ x 1¼″ N.F. Hex Hd cap screws, nuts, and lock washers furnished (8).
8. FORD TRACTORS ONLY. Install stabilizer bracket (9) to trunion housing and crankcase using same bolts furnished with tractor. Install other end to front hanger bracket (10) with two ½″ x 1¼″ N.F. Hex Hd cap screws, nuts, and lock washers furnished (7).
9. FERGUSON TEA 20-85. Install stabilizer bracket (11). Follow procedure as in Step 8.

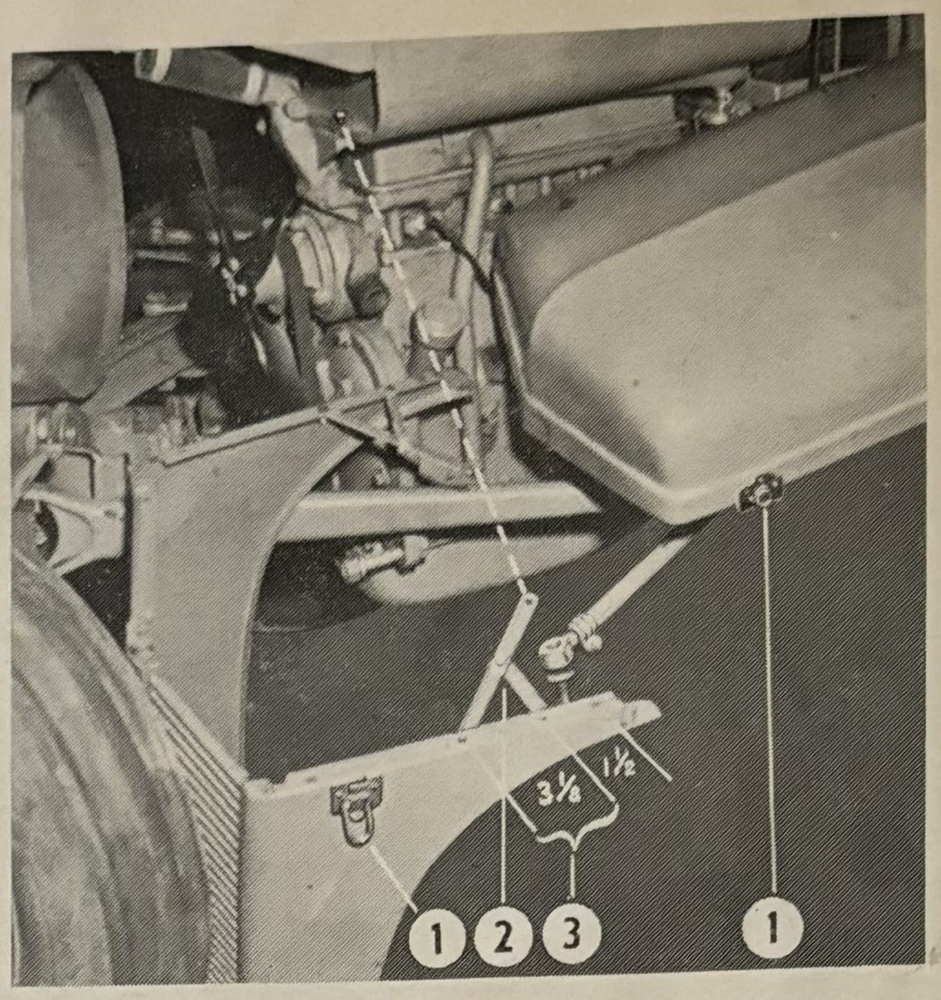


FIGURE 3

GRILL BRACE INSTALLATION

1. Install hood latches one on each side (1). Locate and drill corresponding holes before disassembling hood and panel sections.
2. Drill two 7/32" holes (3) on each side of hood panel flange holding dimensions shown (3).
3. Install grill and panel braces as shown with 3/16" flat head stove bolts furnished.
4. Install grill and panel section to tractor by attaching grill braces with two 5/16" bolts furnished with tractor to secure front section of gasoline supply tank.
5. Reassemble. Follow steps in reverse (Fig. 1).

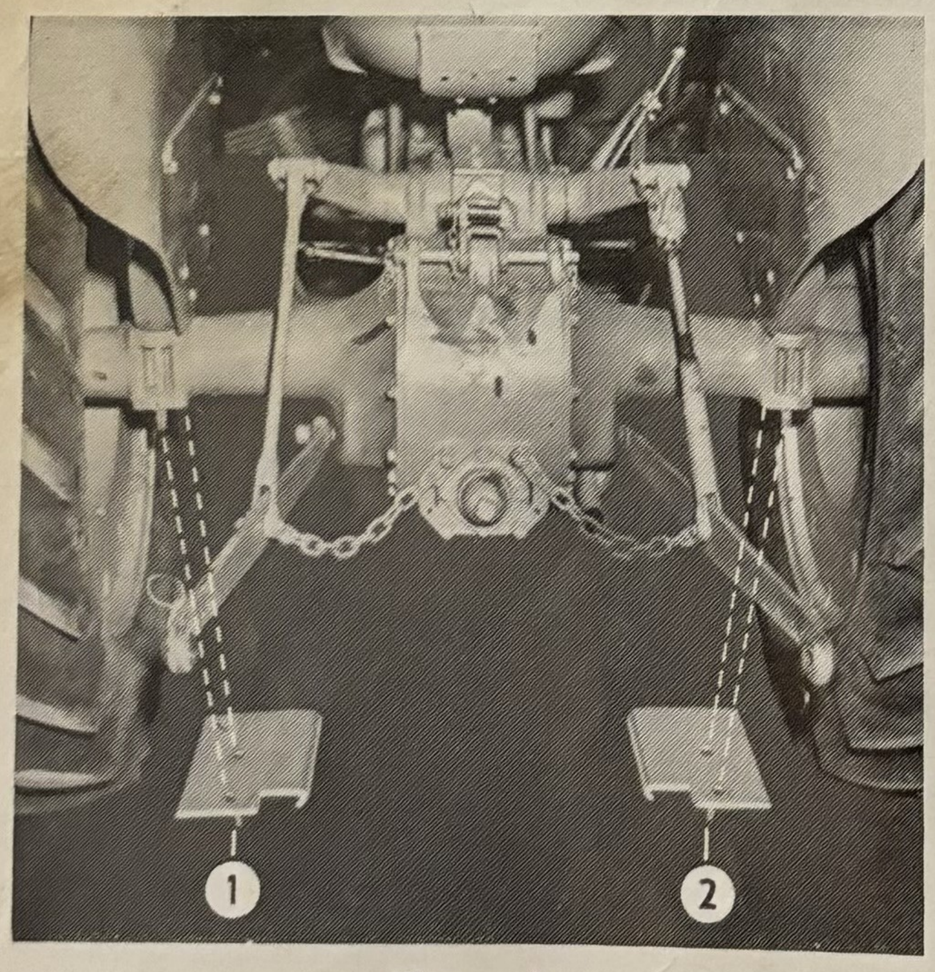


FIGURE 4

INSTALLATION REAR MOUNTING BRACKETS

1. Install rear mounting brackets (1 and 2) R/L as shown, using fender bolts furnished with tractor.

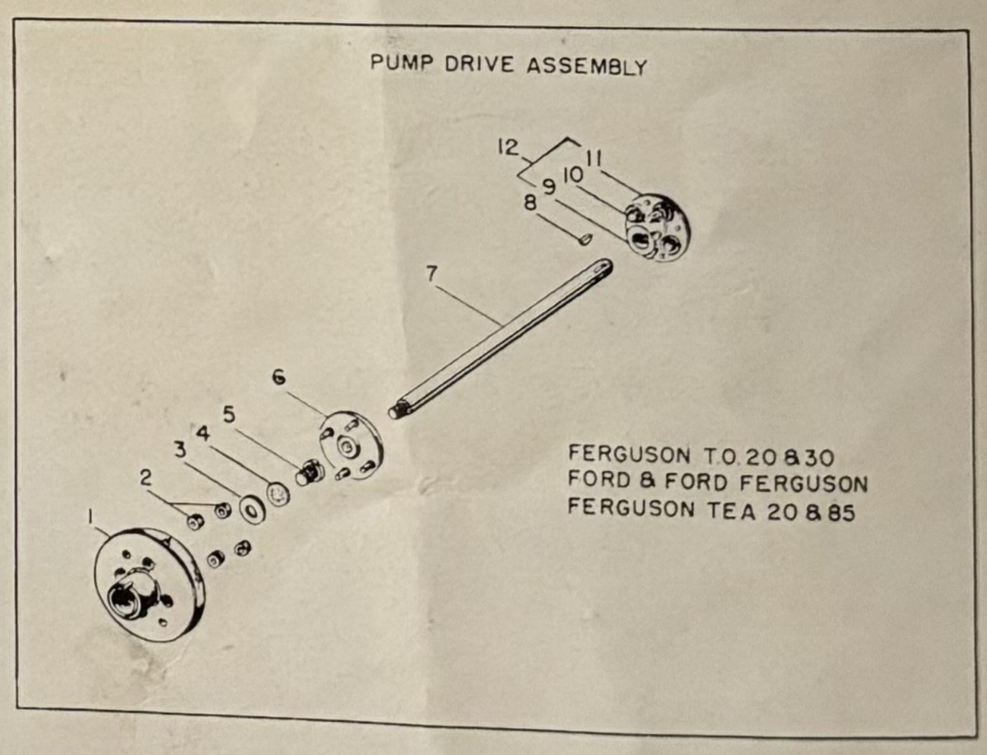


FIGURE 5

INSTALLATION PUMP DRIVE

1. Install pump drive assembly in order as shown.

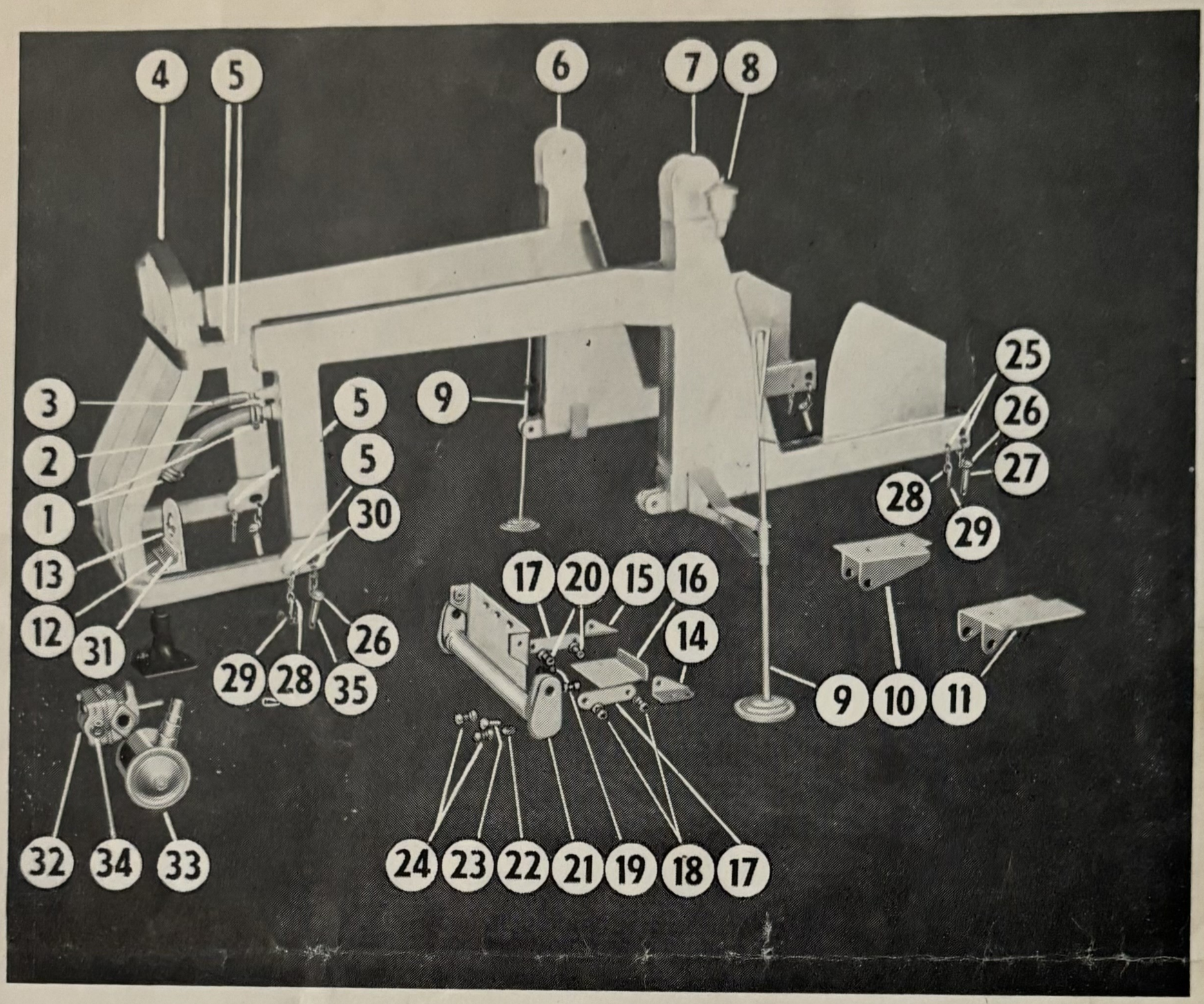


FIGURE 6

INSTALLATION ATTACHING FRAME

1. Install R/L side frames (6 and 7) with special pins attached to rear mounting brackets R/L (10 and 11) and front hanger bracket (21).
2. Install grill guard (4) to R/L side frames with four ¾″ x 2½″ N.F. Hex Hd cap screws, nuts and lock washers furnished (5).
3. Loosen adjusting bolts on pump bracket and install pump with two ⅜″ x 1½″ N.F. Hex Hd cap screws, nuts and lock washers furnished.
4. Install oil filter (33) to pump at 1″ suction port.
5. Align pump and drive shaft assembly with tractor crankshaft as near perfect as possible. Tighten adjusting bolts in pump bracket (31). **Note** — three way adjustment.
6. Attach 1″ ID x 12″ pressure hose (2) to 1″ suction line inside frame and 1″ nipple on oil filter with two $1^{11}/_{16}$″ hose clamps (1).
7. Install ½″ x 90° St. Ell (34) in ½″ pressure port in pump (32).
8. Attach ½″ x 24″ Hydraulic Hose (3) to ½″ pressure line in side frame and ½″ pressure port in pump (32).
9. Install oil bath air cleaner (8) to reservoir left side frame (7).

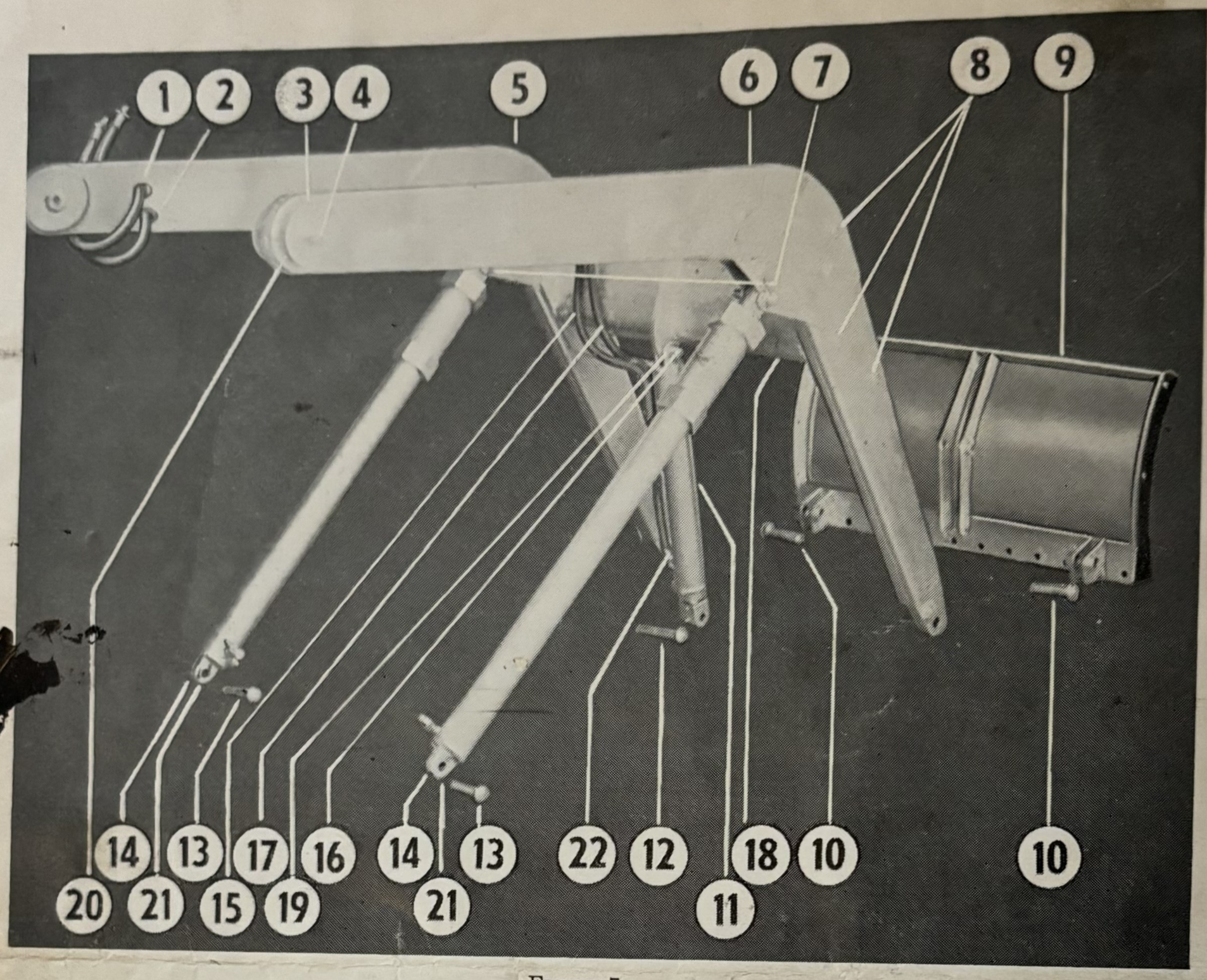


FIGURE 7

INSTALLATION BASIC ATTACHMENT

1. Install R/L lift arms (5 and 6) with two ¾″ x 4½″ N.F. Hex Hd cap screws (with Zerk fittings) nuts, lock washers (4) and four each spacers (3) to side frames at rear pivot points. See Fig. 6.
2. Install bridge plate (18) to R/L lift arms with six ⅝″ x 3¼″ N.F. Hex Hd cap screws, nuts, and lock washers furnished (8).
3. Install basic back (9) to arm pivot points using 1″ x 3 13/16″ pin and ¼″ cotter pins furnished (10).
4. Install double acting ram (11) to bridge plate with ¾ [illegible] ⅛″ pin and 3/16″ cotter pin furnished (16).
5. Attach lower pivot end of double acting ram (11) to basic back (9) using ¾″ x 4½″ pin and 3/16″ cotter pin furnished (12).
6. Install single acting side rams (14 or 21) to arm pivot points using 2 each ¾″ x 3¼″ pins and 3/16″ cotter pin (7).
7. Attach lower pivot point of single acting side rams (14 or 21) to R/L side frames (Fig. 6) using two each ¾″ x 2¾″ pins and 3/16″ cotter pins furnished (13).
8. Install ½″ x 42″ hydraulic hose (15) to lower end of double acting ram (11) and lower oil line in left lift arm (5). One ½″ St. Ell is required in ram nut for hose installation (22).
9. Install ½″ x 18″ hydraulic hose (17) to upper end of double acting ram (11) and upper oil line in left arm (5).
10. **Note** — Hydraulic hose shown (1 and 2) attach to valve. See Fig. 8.

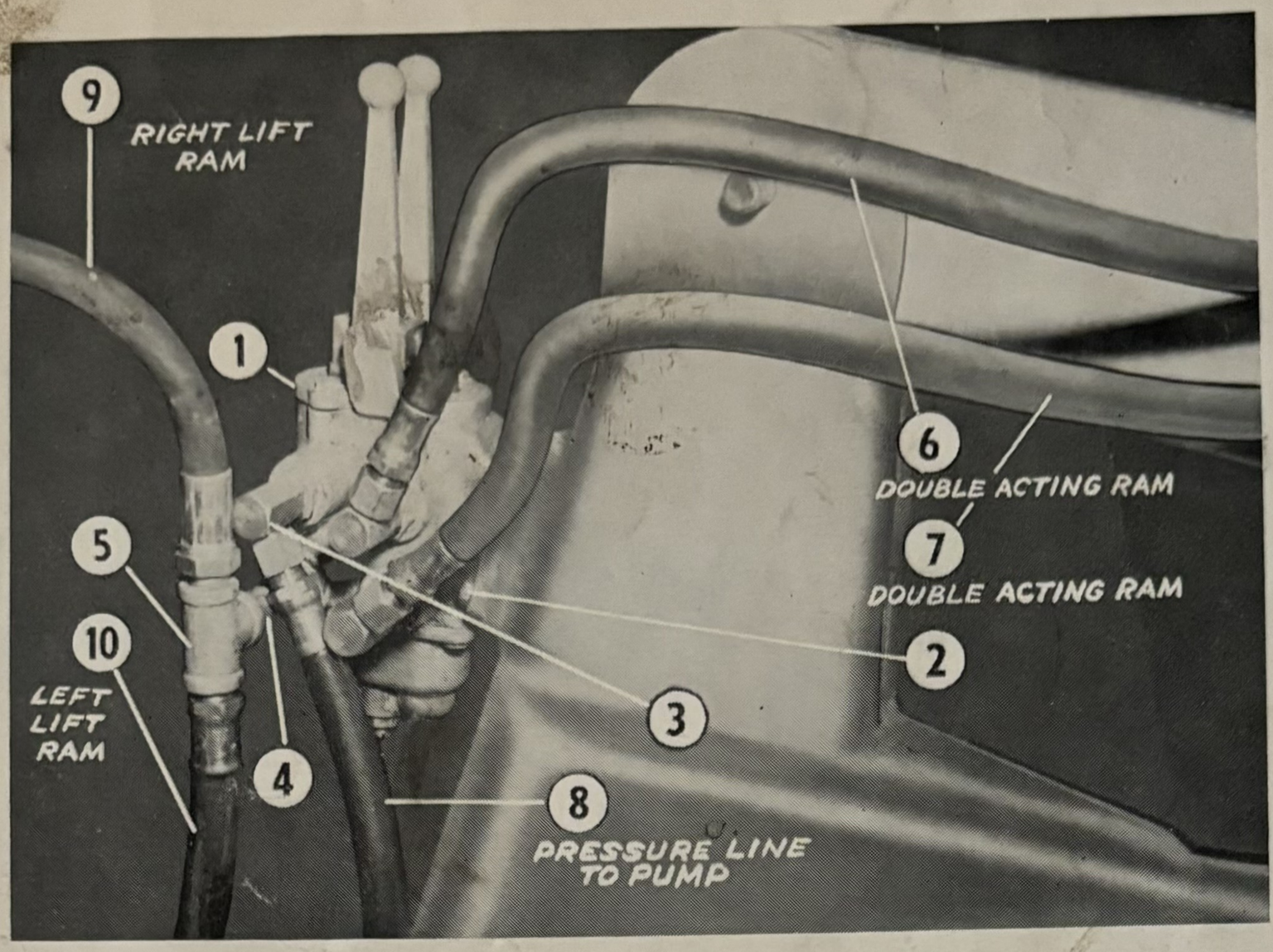


FIGURE 8

INSTALLATION VALVE AND HYDRAULIC HOSE

1. Remove shipping cover plate from reservoir and install valve (1) using 5/16" x 1" N. F. Hex Hd cap screws, furnished (2).
2. Install ½" x 90° St. Ell's in valve ports (marked 1 and 2 and "pump" on valve).
3. Install ½" x 2" nipple (4) and ⅜" x ⅜" x ½" Tee (5) in valve port (marked lift).
4. Install ½" x 18" hydraulic hose (6 and 7) to valve port (marked 1 and 2). Attach other end to ½" oil line in left lift arm as shown.
5. Install ½" x 12" hydraulic hose (8) to valve port (marked pump). Attach other end to ½" oil line in left side frame. (See 7) Fig. 6.
6. Install ⅜" x 54" hydraulic hose (9) on one end of ⅜" Tee (5). Attach other end to right lift ram using ⅜" x 90° St. Ell.
7. Install ⅜" x 24" hydraulic hose (10) to other end of ⅜" Tee (5). Attach other end to left lift ram using ⅜" x 90° St. Ell.
8. Fill reservoir with Davis Special Hydraulic Oil or equivalent to oil level. Capacity 3 gallons.
9. After filling reservoir start tractor motor and run at idling speed for a few minutes to prime pump and fill system.
10. Lower lift arms and refill reservoir to oil level.

NOTE: A. Check and clean oil filter after the first 10 to 15 hours of operation, then service as directed on decal.

B. Check oil periodically. Keep oil to plug level. Keep oil clean.

SECTION TWO

OPERATION & SERVICE

Operating Instructions

LIFT ARMS

1. Lift arms are raised by pulling back on left hand control lever of valve. If necessary work lever back and forth until oil replaces air in the rams.
2. Lever returns automatically to neutral when released. In lowering lift arms slowly, the valve control lever is pushed only slightly forward. Notice that more tension is encountered as you push the lever forward a short distance. For faster lowering push the lever farther forward under the heavier tension. The drop of the loader is speeded as release port is opened.

   CAUTION — NO NOT USE FAST DROP WHEN BUCKET IS LOADED. THE SLOW DROP IS ALWAYS USED FOR LOWERING THE LOADED BUCKET. THE SAFETY VALVE CUSHIONING THE LOAD UNDER FAST DROP IS FOR THE PROTECTION OF YOUR TRACTOR ONLY.

BUCKET

3. Use the right hand valve control lever to set bucket in proper pitch for loading, digging or dumping. Use of the twin finger-tip controls to the highest efficiency will be understood by the operator after a short period of practice. Operator should release the lever before extending rams full length. After rams hit full length, the relief (safety) valve opens up. When this occurs, a "squealing" noise is quite plainly heard. Do not allow the machine to stay in this position for long periods. This squealing signal is a safety factor. Continued operation in this position lowers efficiency of your pump because of excessive heating.

   Caution — Do not use the bucket as a dozer.
   Dozer blade assembly is available for this operation.

MAINTENANCE

Bolts and Connections

1. Keep all bolts and connections tight. Under normal daily operation check bolts and connections at least once a week.

Reservoir

2. Keep reservoir full. Fill reservoir only when loader is down and arms are at ease.

Original Installation

3. When original installation is made do not start tractor motor until reservoir is full of oil. Raise and lower loader several times or until hydraulic system is full. Check and bring oil up to the proper level. Oil level is checked by removing ¼" pipe plug directly below oil bath air cleaner, breather and filler.

   Caution — Loader arms must be in down position when oil level is checked.

Oil Filter

4. Check and clean oil filter after the first 10 to 15 hours of operation, then service as directed on decal. The Wix CW-10 is standard equipment and essential when operating in extreme dusty conditions. The Wix CW-10 cartridge may be purchased from any reliable auto supply dealer.

Oil Bath Air Cleaner, Breather, and Filler

5. Designed to keep dust and foreign matter from entering system. Service as directed on decal.

Pump and Valve

6. For long life of the pump and valve, it is essential to observe strictest principles of cleanliness in handling oil for the hydraulic system.

   Note — TREAT THE HYDRAULIC SYSTEM OF YOUR LOADER THE SAME AS YOU WOULD THE MOTOR IN YOUR TRACTOR.

   Keep oil up to level, keep oil clean, and change periodically.

Hydraulic Oil

1. Oil supply must be adequate and reach the pump immediately after starting.
2. Take all precautions when filling oil to assure a clean system.
3. Use Davis Special compounded hydraulic oil or equivalent. Davis hydraulic oil is approved by the manufacturer of the pump. (Specifications furnished upon request).

(50° F. to 120° F.)	(—15° F. to 50° F.)	(—25° F. to 0° F.)
Summer Grade or Equivalent SAE. 20 to 10W	Winter Grade or Equivalent SAE. 10W to 5W	Dilute Winter Grade with 25% Kerosene Mixture

GENERAL INSTRUCTIONS VICKERS PUMP

Description

The Vickers V210-5-C-12 pump used on the Davis Model 100 Loader is a single cartridge balanced vane type having a constant rate of delivery per revolution.

Principles of Operation

The slotted rotor is driven by a splined shaft, a vane in each slat slides radically as the rotor revolves. Centrifugal force and oil pressure causes the vanes to follow the inside contour of the hardened and ground ring which is so shaped that two opposing pumping chambers are formed between the body and pressure plate.

Caution — BECAUSE THE VANES ARE INITIALLY EJECTED BY CENTRIFUGAL FORCE, IT IS ESSENTIAL WHEN STARTING THAT THE MINIMUM DRIVE SPEED BE HELD TO 600 RPM UNTIL THE PUMP IS PRIMED.

Drive Connection

Care should be exercised in the alignment of the Mor-Flex Drive used on Ford, Ferguson and several other tractors to prevent side loads imposed upon the pump drive shaft. Chain and sprocket drives must also be correctly aligned to prevent wear.

Overload Protection

The Control Valve limits the hydraulic system pressure to a maximum of 1500 PSI, ample to perform the required work of the loader with a reasonable margin of safety.

Changing From Counterclockwise to Clockwise Rotation

The pump must be driven in the direction indicated by the arrow stamped on the side of the ring, part number 114173.

Rotation is left hand or counterclockwise when the arrow points to the left when facing the shaft end. To reverse rotation to clockwise remove outlet cover, part number 121343 and pressure plate, part number 131317. Pull ring off its respective location and invert; that is, turn face to back with arrow pointing to the right or clockwise rotation when facing the shaft end.

At reassembly make certain the two large sealing rings are retained in their respective grooves and the spring for the pressure plate is correctly located. **Caution** — To drive a pump in the wrong direction of rotation may ruin the pump within a matter of minutes due to the lack of oil.

OVERHAUL INSTRUCTIONS FOR VICKERS PUMP

Disassembly

Disassembly of the high pressure end of the pump is accomplished by removing the four cap screws holding cover in place. This will release cover, pressure plate and ring. In addition to screws, the ring is held in place by two locating pins. Note the relative position of the rotor, vanes and ring. Return to this same location at reassembly.

Disassemble the low pressure end of the pump by removing the snap ring holding the outer bearing in place, tap on the splined or rotor end of the drive shaft. The same action may be accomplished by standing the unit on the splined end of the shaft and pressing downward on a soft block. The outer bearing and shaft will be removed by this action. This bearing is a press fit. To remove, use an arbor press. The oil seal is also a press fit. Its removal may be accomplished by tapping it out with a drift punch from the ring side of the body.

Reassembly

Make certain the bearings and oil seal are firmly seated in their respective locations. Drive oil seal in place with a tool that contacts only the OD of the seal. Make certain the sealing lip of the seal faces the large bearing. The large bearing should be pressed onto the shaft with a bearing driver that will contact only the inner race of the bearing. Make certain the ring, vanes and rotor are correctly assembled for a given direction of rotation. Make certain the pressure spring is retained in its correct location. Use new seals.

SERVICE HINTS

Pump Breakage and Wear

1. Pressure line installed to blind port in valve.
   Note — See installation instructions on pressure line in this manual. Fig. 8.
2. Pump operated without oil.
3. Pump operated low on oil.
4. Wrong grade of oil. Under no circumstances use a heavier grade of hydraulic oil than SAE 20.
5. Foreign matter entering the hydraulic system upon installation.
   Note — See general operating instructions on Vickers pump in this manual.

Pump Overheating

1. Oil seal in pump damaged or defective.
2. Break in suction line.
3. Contaminated oil.
4. Hydraulic oil too heavy for existing temperature.
5. Oil level low in reservoir.
6. Obstruction in suction line.
   Caution — Use recommended Davis Special hydraulic oil or equivalent.

Loader Fails to Raise

1. Oil level low in reservoir.
2. Screen clogged in oil filter.
3. Obstruction in hydraulic lines.
4. Ports in valve clogged, usually caused by a heavy base pipe sealer used excessively when installing fittings in valve.
   Caution — When using a sealer take extra precaution that none will enter the hydraulic system.
5. Key on pump or flexible coupling sheared.
6. After checking the above steps and the loader still fails to raise the pump is worn out and requires overhauling or replacing.

Bucket Not Holding Position

1. Spool in valve sticking.
2. Nut loose on ram shaft holding cup leather packing.
3. Leather cups packing worn, or cut by foreign matter in the hydraulic system.

Loader Arms Not Holding Position

1. Spool in valve sticking, usually caused by excessive use of pipe sealer upon installation of fittings in valve.
2. Snap ring broken or loose on end of spool.
3. Dirt and grit in the valve clogging ports.
4. Excess wear in sleeve and spool caused by dirt and grit in the system.
5. Disassemble valve and clean thoroughly. Install new gaskets and oil seals if necessary.

Arms Not Lifting Equally

1. The packing nut on one side ram too tight.
2. Air in one hydraulic side ram.
3. Obstruction in oil line.

Note — To remove air from hydraulic side ram, loosen hydraulic hose at ram inlet and bleed air from line. If this fails to remove all air from ram anchor bucket under a heavy object, loosen packing nut and engage valve lever intermittently while pump is running approximately 1000 RPM. Care must be exercised in aligning packing after air is forced from the ram.

The *First*
Unconditionally Guaranteed Loader

Unconditional Guarantee
Davis Model 100 Hydraulic Loader

This Certificate is issued to_____

and covers Davis Model 100 Hydraulic Loader, Serial No._____.

The Davis Model 100 Hydraulic Loader has been manufactured from the very finest materials by skilled workmanship. Every part has been pre-tested and declared worthy. Therefore, the manufacturer hereby makes an unconditional guarantee for a period of 90 days from date of purchase (excepting pump which the manufacturer's warranty covers material and workmanship). In the event of failure dealer is authorized to replace parts, and return defective parts to factory for credit. Guarantee registration card must be signed by dealer and purchaser and returned to factory on date of purchase.

MID-WESTERN INDUSTRIES INC.
WICHITA 15, KANSAS

THIS GUARANTEE NOT VALID UNLESS DEALER INSTALLS EQUIPMENT

The Davis Loader is the first hydraulic loader to carry an unconditional guarantee. No manufacturer of similar equipment has seen fit to express such confidence in his product, but along with many other firsts, Davis is first to bring you a guaranteed loader.