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TM 5-8064

U.S. WAR DEPARTMENT TECHNICAL MANUAL

U.S. Dept. of Army
FEB 5 1946
375 DIV

CRANE, TRUCK-MOUNTED

BRIDGE ERECTOR, HYDRAULIC-

OPERATED, HEIL

MODEL M-11-A

WAR DEPARTMENT

• 6 MAY 1944

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WAR DEPARTMENT,
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TM 5-8064, Crane, Truck-Mounted, Bridge Erector, Hydraulic Operated, Heil, Model M-11-A, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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For explanation of symbols see FM 21-6.

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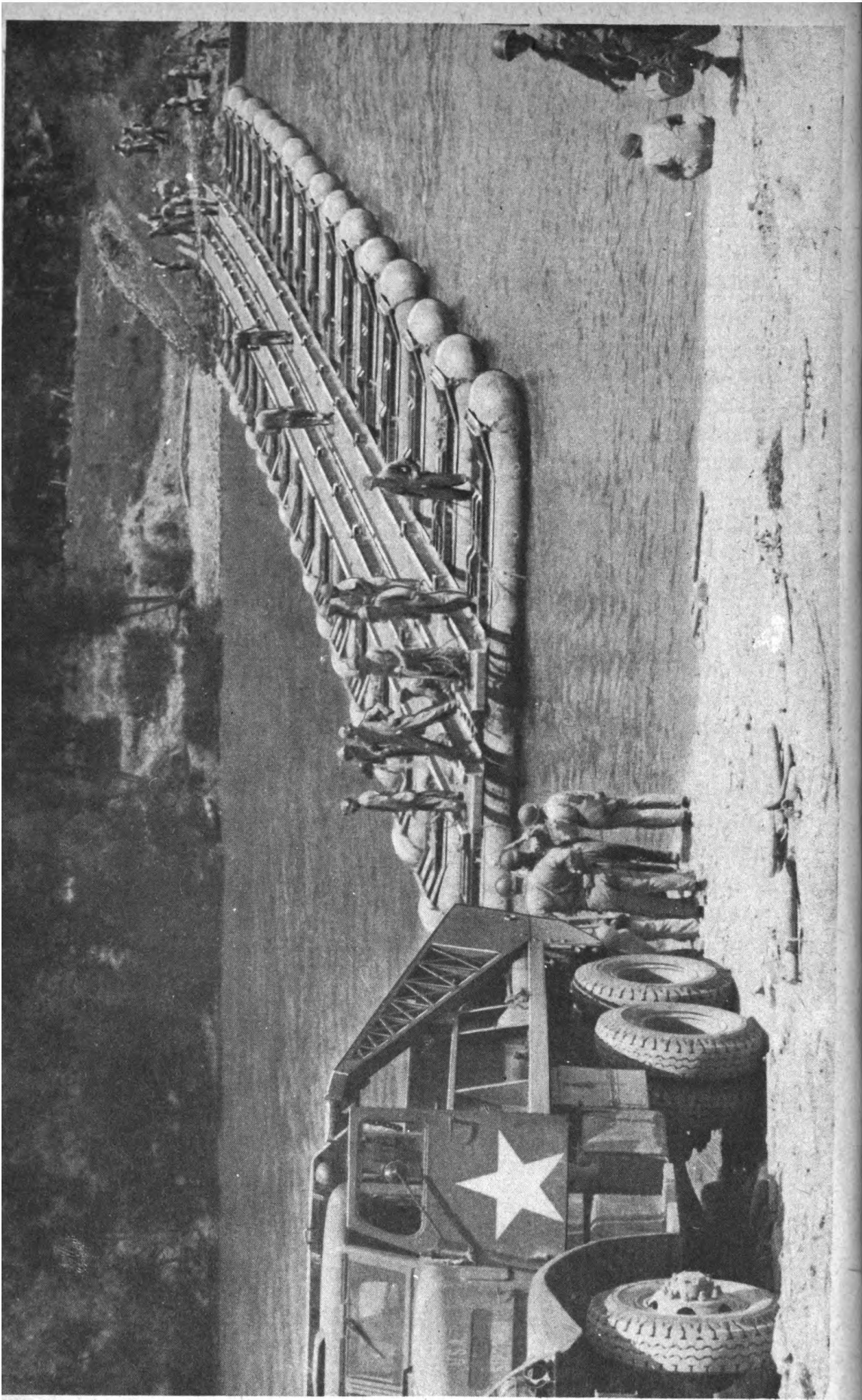
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OPERATION SECTION



Figure 1. Hydraulic Bridge Erecting Crane with Typical Load

1. DESCRIPTION OF TRUCK BODY AND HYDRAULIC CRANE M-II-A

a. PRELIMINARY INSTRUCTIONS

(1) This Operating and Maintenance manual has been prepared as a guide to the proper operating and maintenance procedure for the Steel Treadway Bridge Hydraulic Crane, M-II-A. Instructions in this manual do not apply to the truck chassis—consult the truck manual for information applying to the truck itself, and the front-mounted winch.

(2) The use of hydraulic cylinders to operate the crane gives smooth operation with simplified control. With practice and complete mastery of these instructions, this unit can be operated and maintained by anyone who can operate and maintain a truck.

(3) Proper lubrication and proper oil in the hydraulic system in sufficient quantity is vitally important. All oil leaks in the system must be promptly stopped. Before operating this unit be sure that it has been properly lubricated as explained by Figures 33, 34, and 35, Lubrication Charts. These charts show the location and type of lubricating fittings, the correct lubricating intervals, and the proper grade of lubricants for various operating conditions.

(4) The operator should study this manual carefully before attempting to operate a unit so that he is familiar with the operation of the crane.

OPERATIONS SECTION

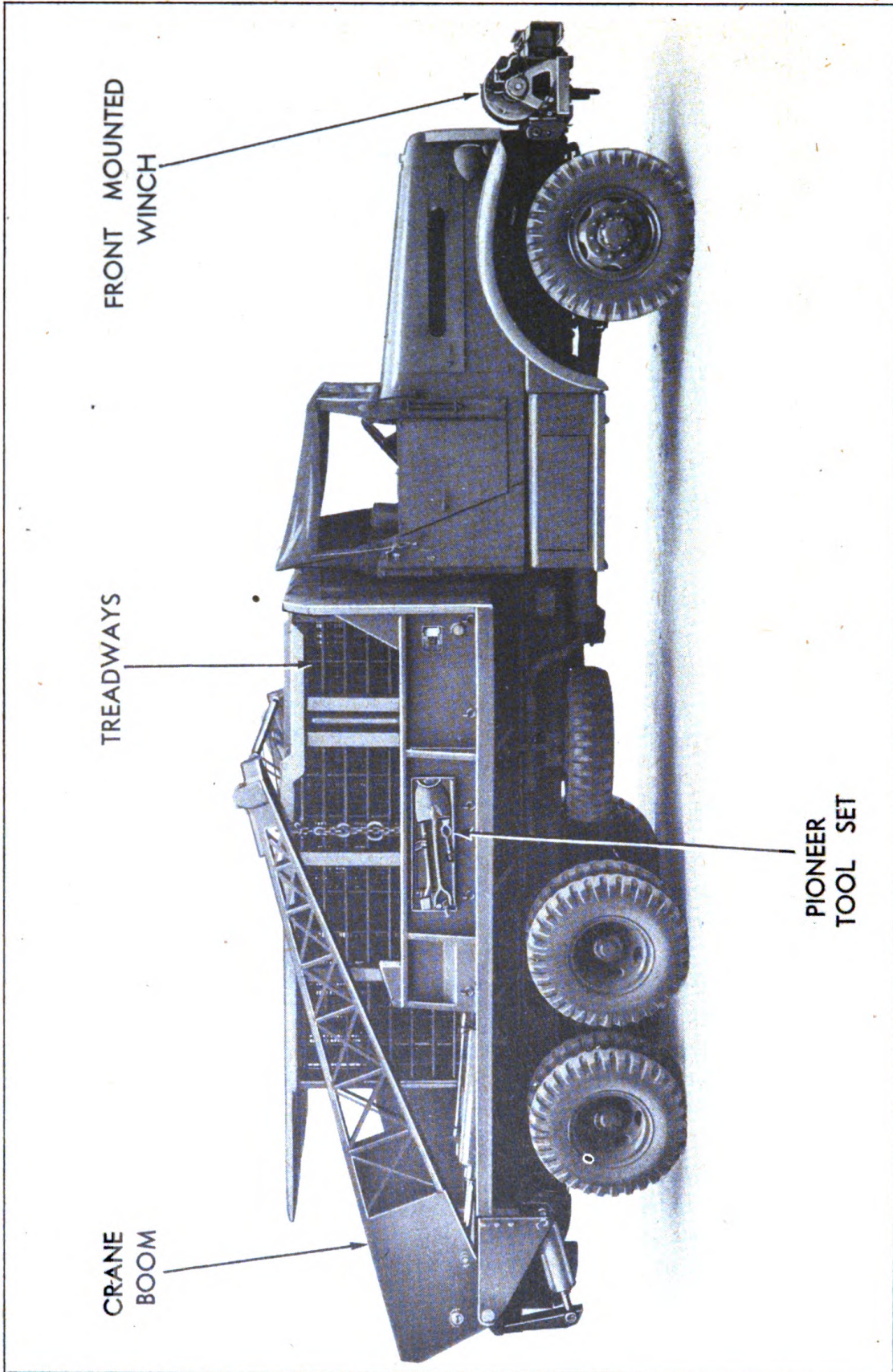


Figure 2. Side View of Hydraulic Bridge Erecting Crane

b. SPECIFICATIONS AND DIMENSIONS:

| | | |
|---------------------------------|-------------|---|
| | Approx. | |
| Gross Vehicle Weight | 38,500 Lbs. | Overall Truck and Crane: Length 374"; |
| Gross Weight on Bogie | 26,750 Lbs. | Width 102"; Height 110" |
| Net Wt.—Body & Crane | 6,500 Lbs. | Inside Body: Length 222"; Width 99"; |
| Cargo Capacity | 12,000 Lbs. | Panel Height 63" |
| Crane Capacity Normal | 8,000 Lbs. | Shipping (Not Boxed) 266 Sq. Ft. or 2,437 |
| Weight of One 45" Treadway .. | 2,400 Lbs. | Cubic Feet |
| Capacity Hydraulic System | 35 Gals. | Wheelbase |
| Use SAE 10 Oil (OE 10) | | Ground Clearance Min. |

c. GENERAL DESCRIPTION

(1) The M-II-A Truck Body and Hydraulic Crane is designed to carry four steel treadways and their supporting pontons, or 24 ft. of the Steel Treadway Bridge. Each unit is provided with a hydraulically operated crane to unload and position the steel treadways.

(2) A typically loaded unit is shown in Figure 1 and a partially loaded unit in Figure 2. The rubber pontons may be loaded either to the front or to the rear of the truck. For quick unloading of treadways, it is suggested that the pontons be placed at the rear of the truck to facilitate unloading.

(3) A tarpaulin is provided to cover the entire load and is shown, together with a method of fastening, in Figures 4 and 5.

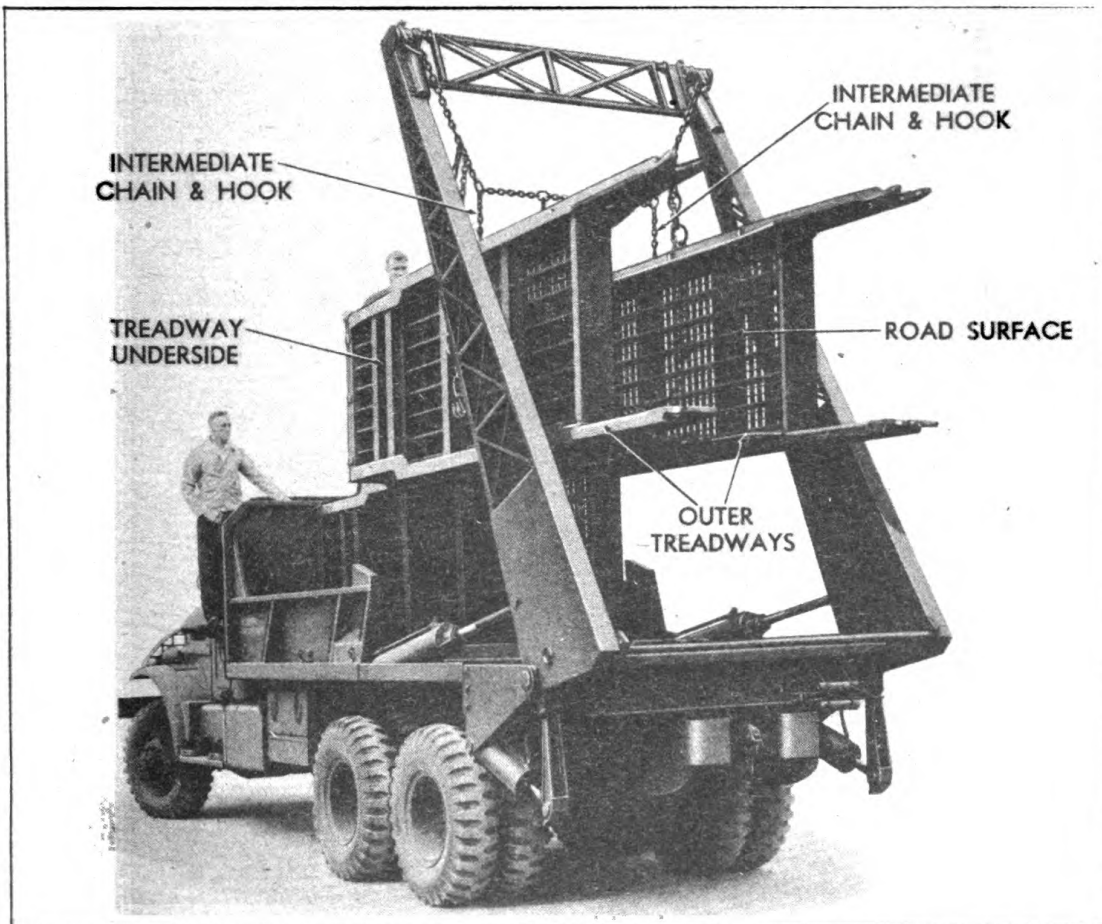


Figure 3. Hydraulic Bridge Erecting Crane in Operation

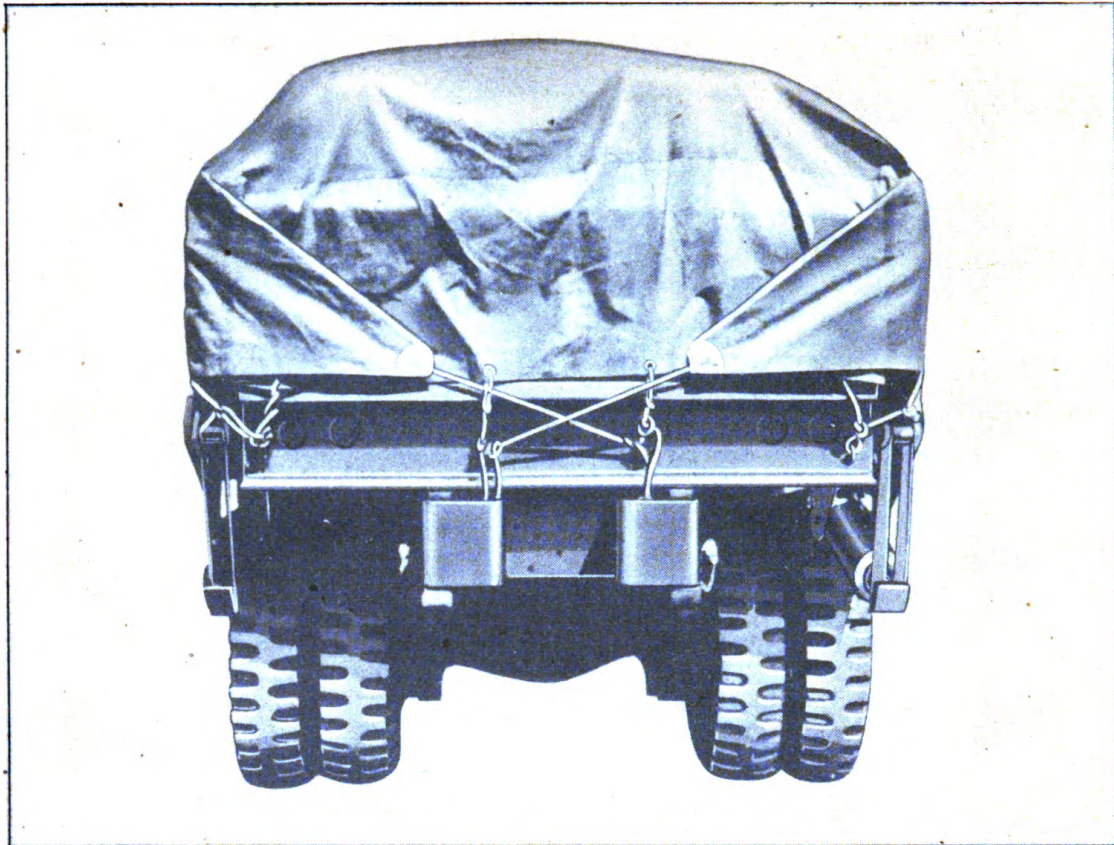


Figure 4. Rear View Showing Method of Attaching Tarpaulin

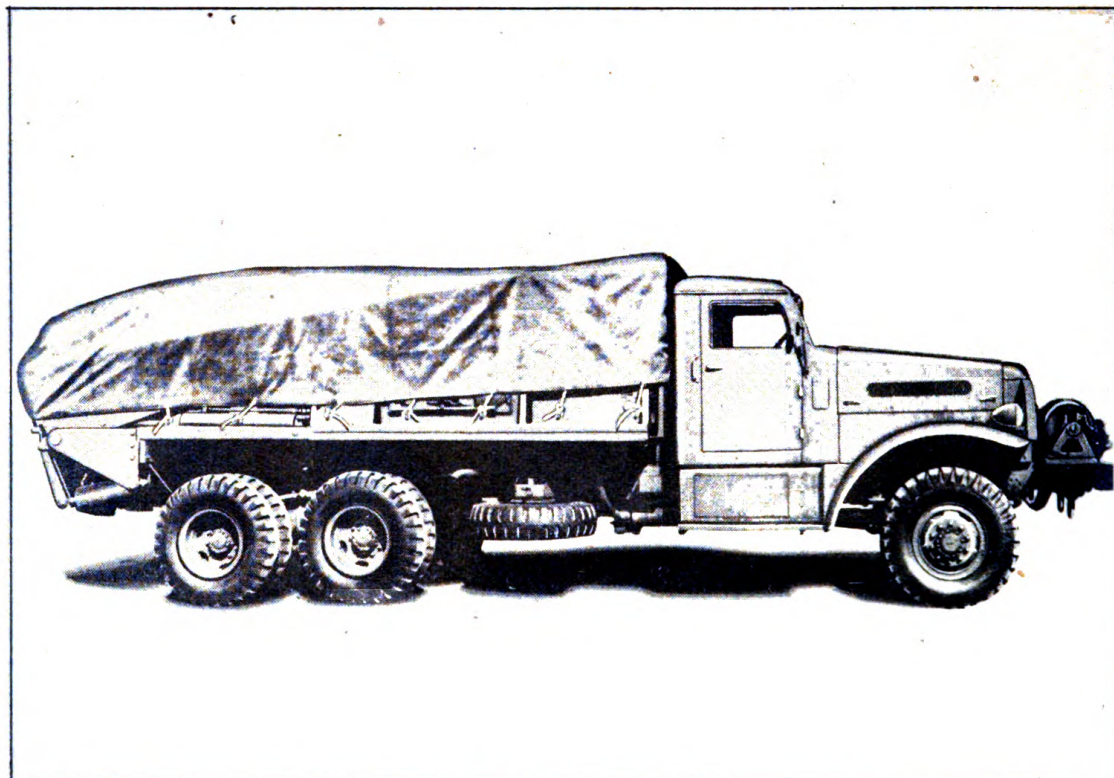


Figure 5. Side View Showing Method of Attaching Tarpaulin

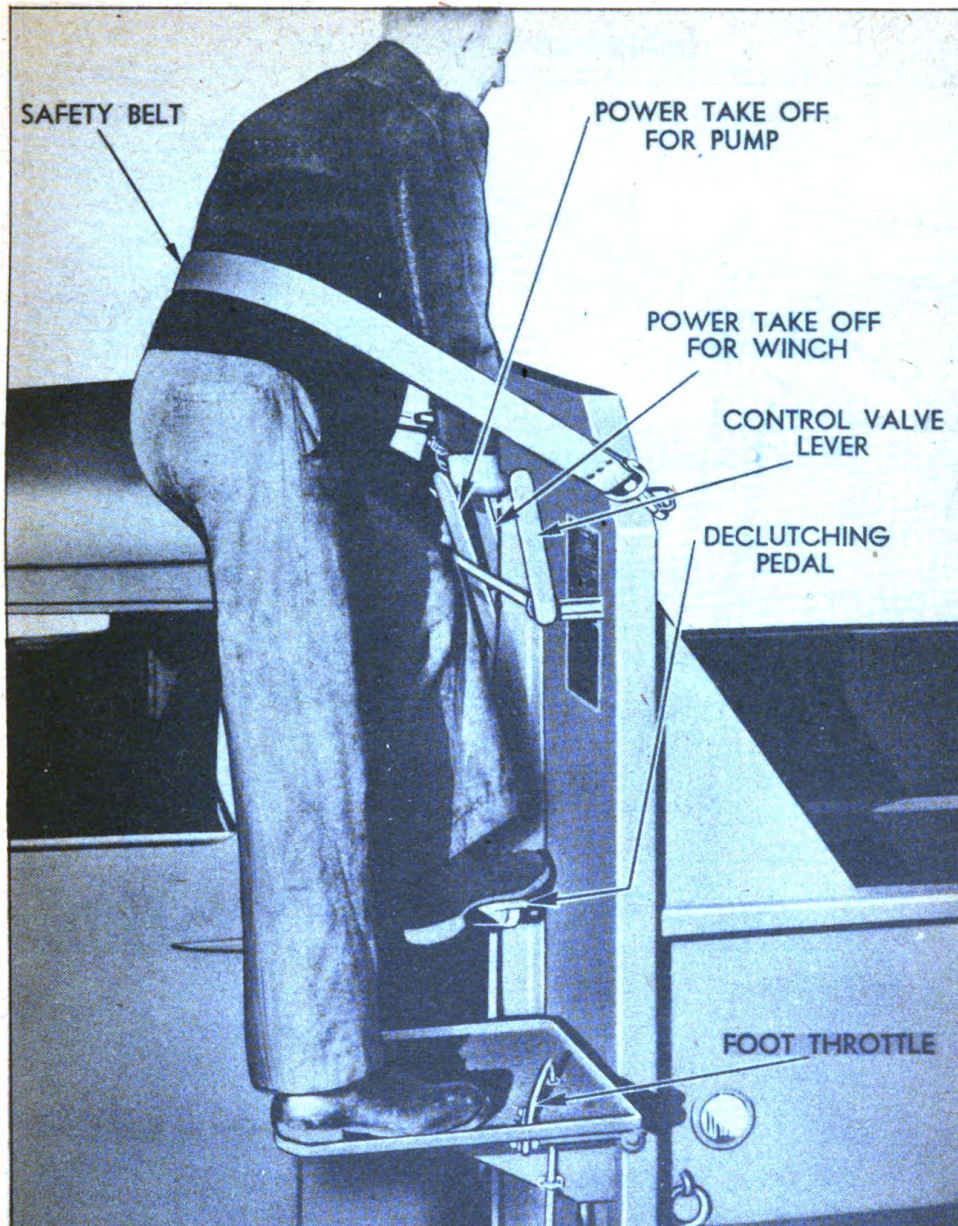


Figure 6. Operating the Crane Controls

(4) The crane is operated from a platform at the front of the body, Figure 6. With the truck engine running, the operator can control the entire operation of the crane from this platform. Arrangement of the controls is shown in Figure 13, Page 14.

(5) The hydraulic system which operates the crane is explained in Figures 7 to 10, inclusive. The hydraulic pump, which is driven by the truck engine through a power takeoff and drive shaft, forces the oil through the system to operate the cylinders. The flow of oil is controlled by one Main Valve and one Auxiliary Diversion Valve. (See Figure 11.) The function of the Diversion Valve is to permit the retraction of the piston rods in the Lower Cylinders. A reservoir (or reserve on tank) provides sufficient oil to replace that displaced by the piston rods when the pistons are retracted. This extra oil is required as the pistons are extended.

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HYDRAULIC FLO-DIAGRAMS

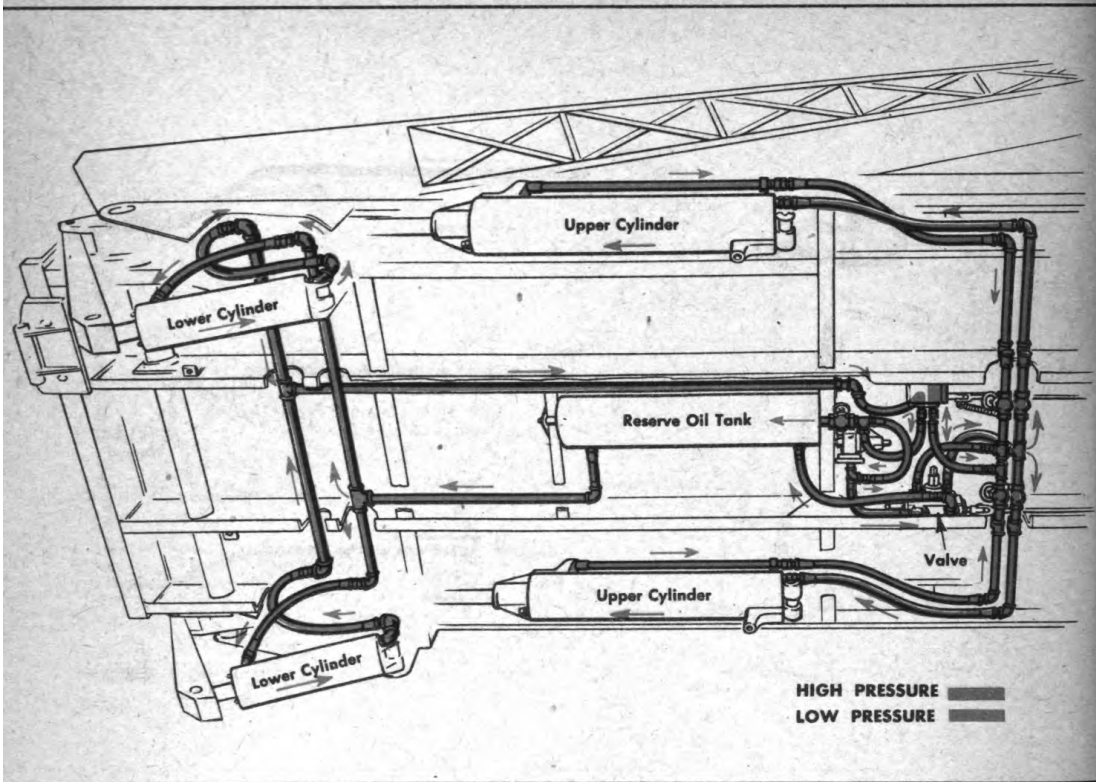


Figure 7. Valve Lever Toward Rear of Truck

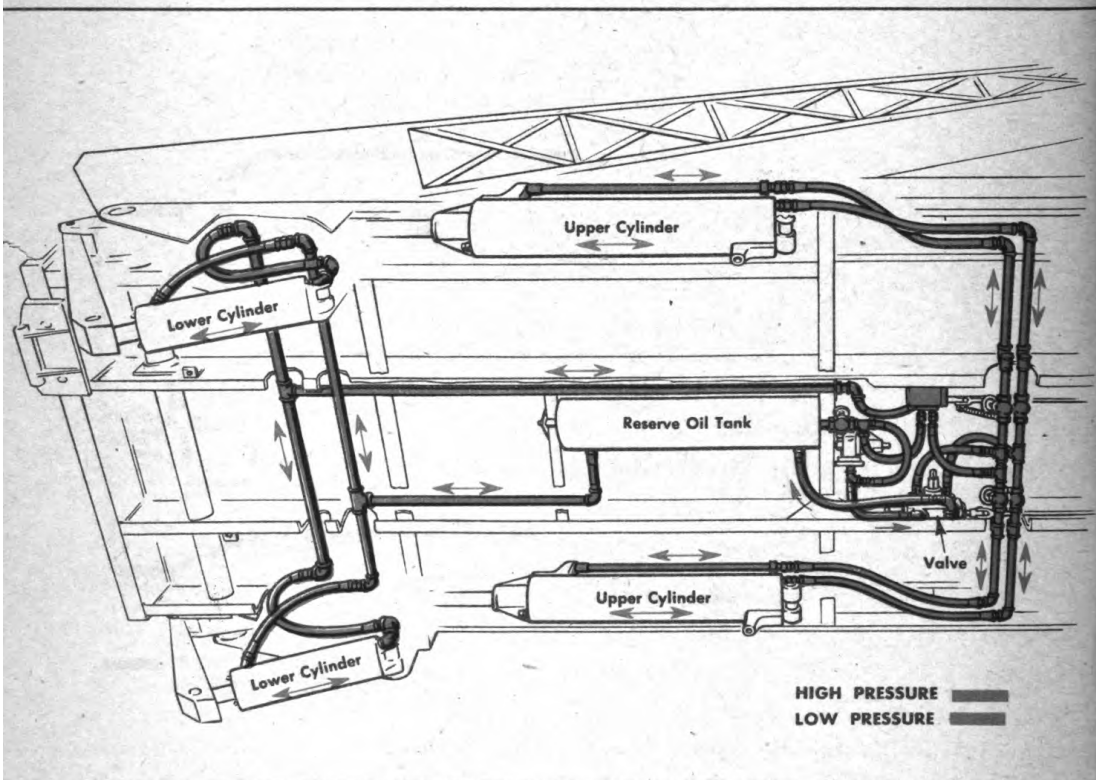


Figure 8. Valve Lever in Center or Neutral

HYDRAULIC FLO-DIAGRAMS

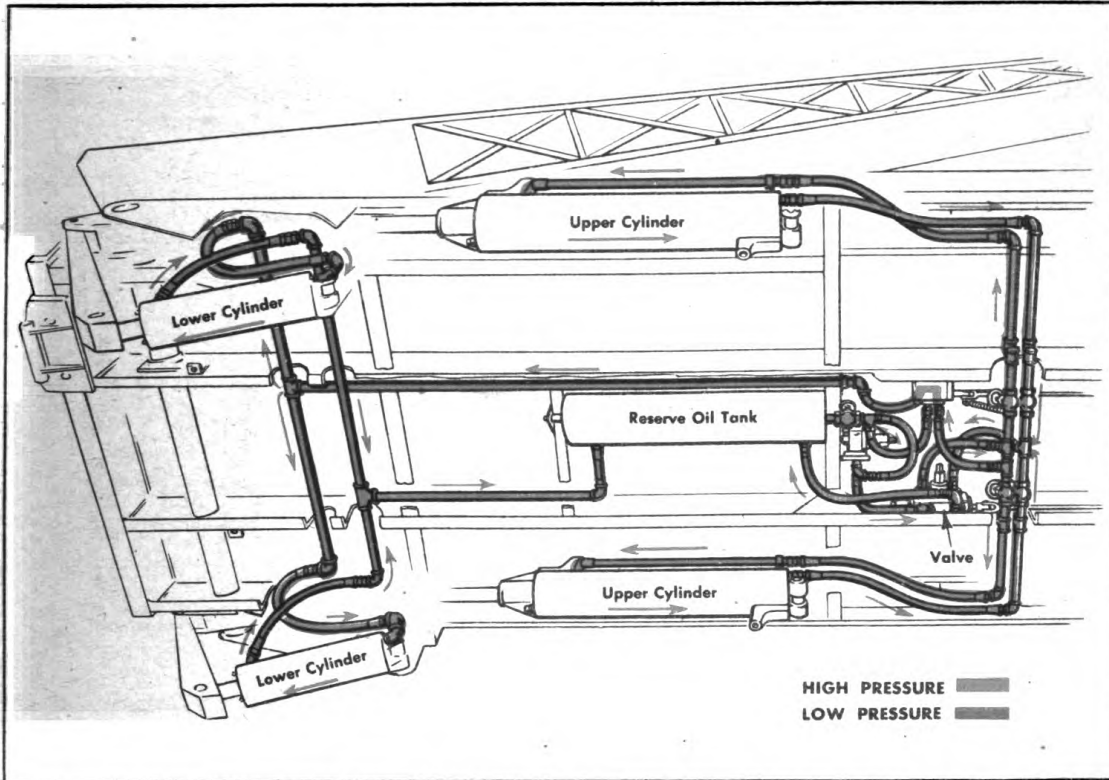


Figure 9. Valve Lever Toward Cab

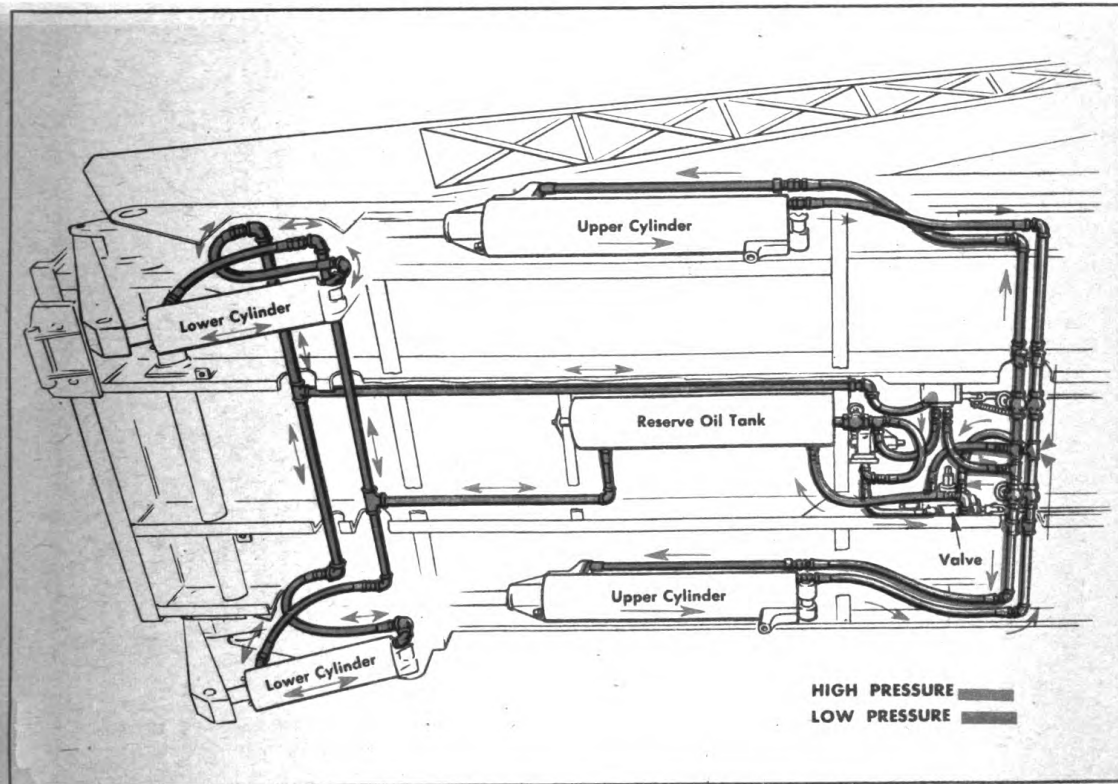


Figure 10. Valve Lever Toward Cab. Lower Cylinder Control Handle Pulled Toward Operator

OPERATIONS SECTION

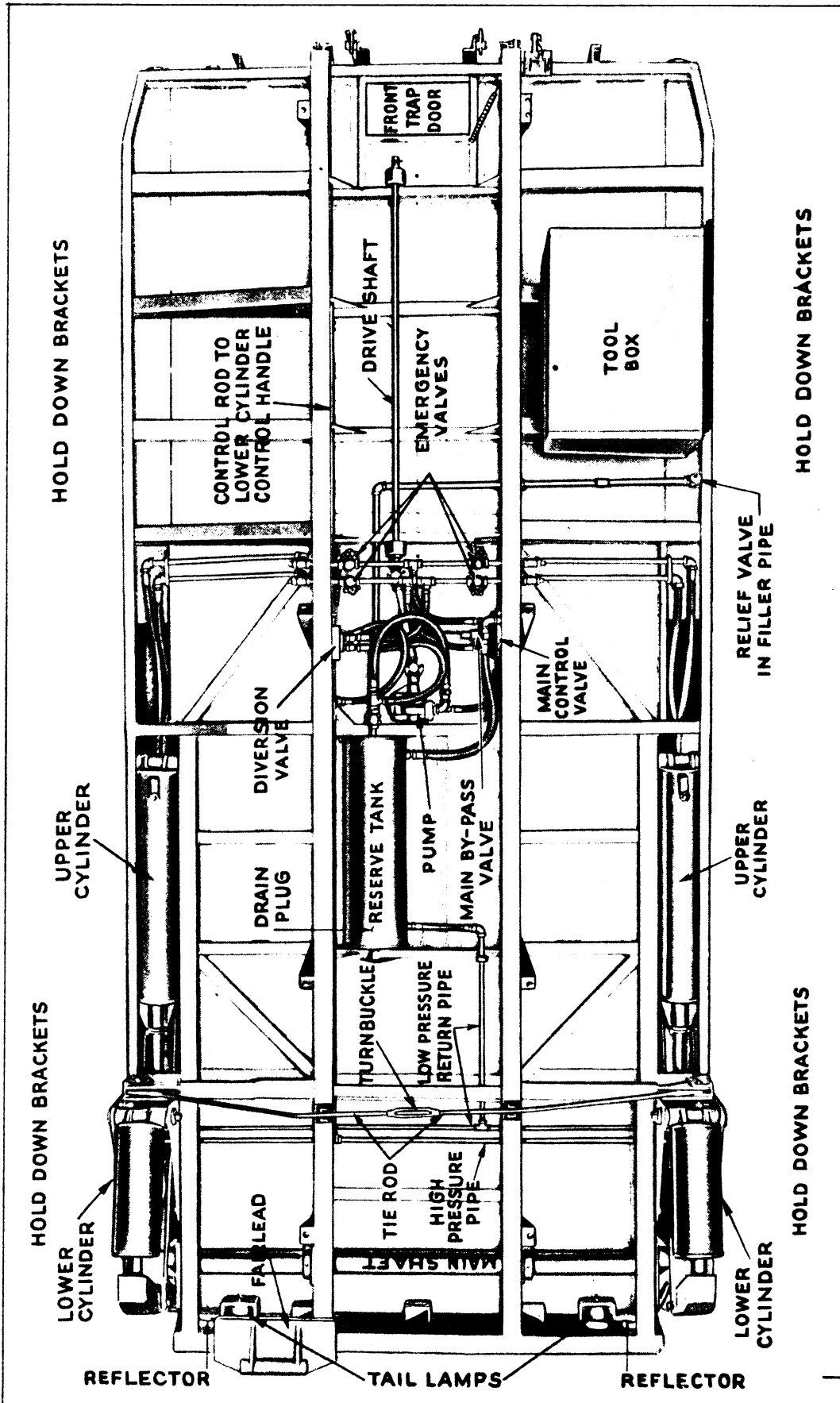


Figure 11. Understructure Showing Arrangement of Hydraulic System

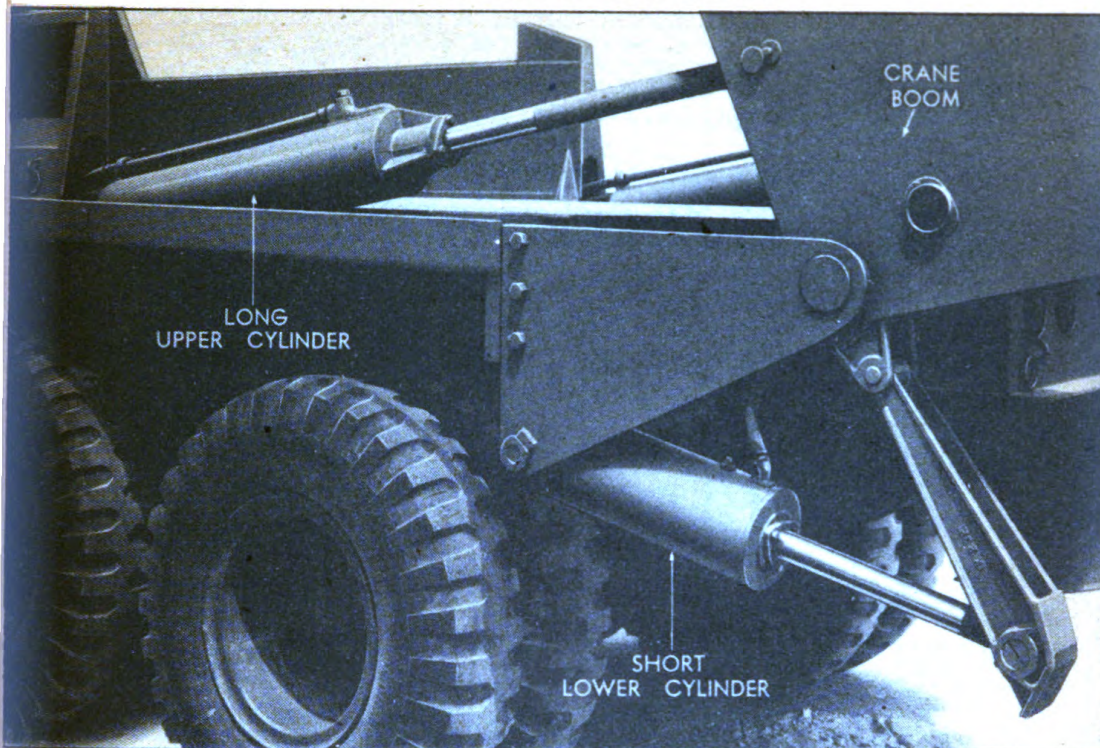


Figure 12. Long Upper and Short Lower Hydraulic Cylinders of Crane

(6) Four hydraulic cylinders operate the crane and are shown in Figure 12. The two long upper hydraulic cylinders control the boom while the two short lower ones act as boosters when the boom is in the extended position. The normal capacity of the crane with all four cylinders operating is 8,000 pounds.

(7) The unit is also provided with a fairlead at the right, rear corner, and a snatch block, so that treadways may be lowered beyond the normal reach of the boom by using the winch mounted on the front of the truck and threading the cable back through the fairlead—See Figure 31, Page 29.

(8) A Pioneer tool set consisting of a shovel, pick mattock and axe are mounted on the side of the body, see Figure 2.

(9) Tire chains, hydraulic jack and tools are carried in the tool box mounted under the left side of the body.

(10) The body and crane unit is held to the chassis with special hold-down brackets. The Repair Section of this manual shows these brackets.

2. GENERAL OPERATION OF UNIT

a. PREPARING THE UNIT FOR USE

(1) The first duty of anyone charged with the care and operation of a bridge erecting unit should be to give a detailed inspection and to lubricate all parts as explained by Figures 33, 34, and 35.

CAUTION: DO NOT use oil drained from these cylinders in the truck engine or for lubricating other machinery.
DO NOT fill the hydraulic system with crankcase drainings or other oil which is not absolutely clean.

OPERATIONS SECTION

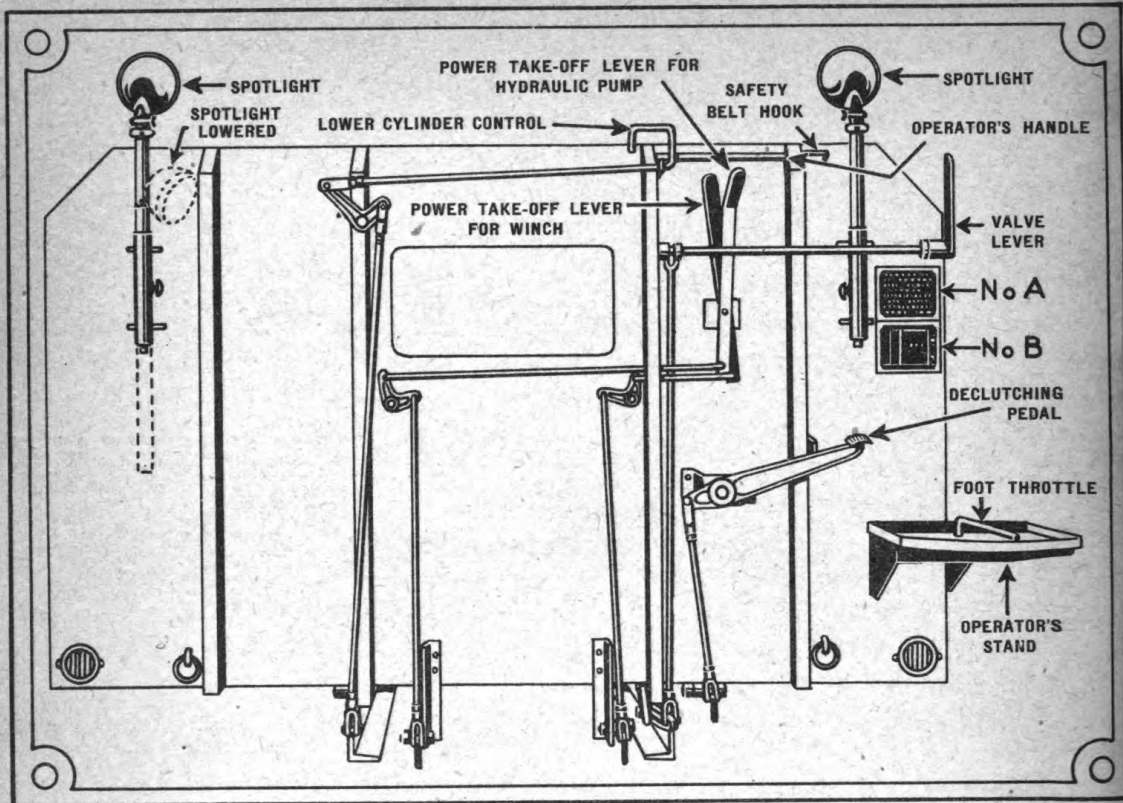
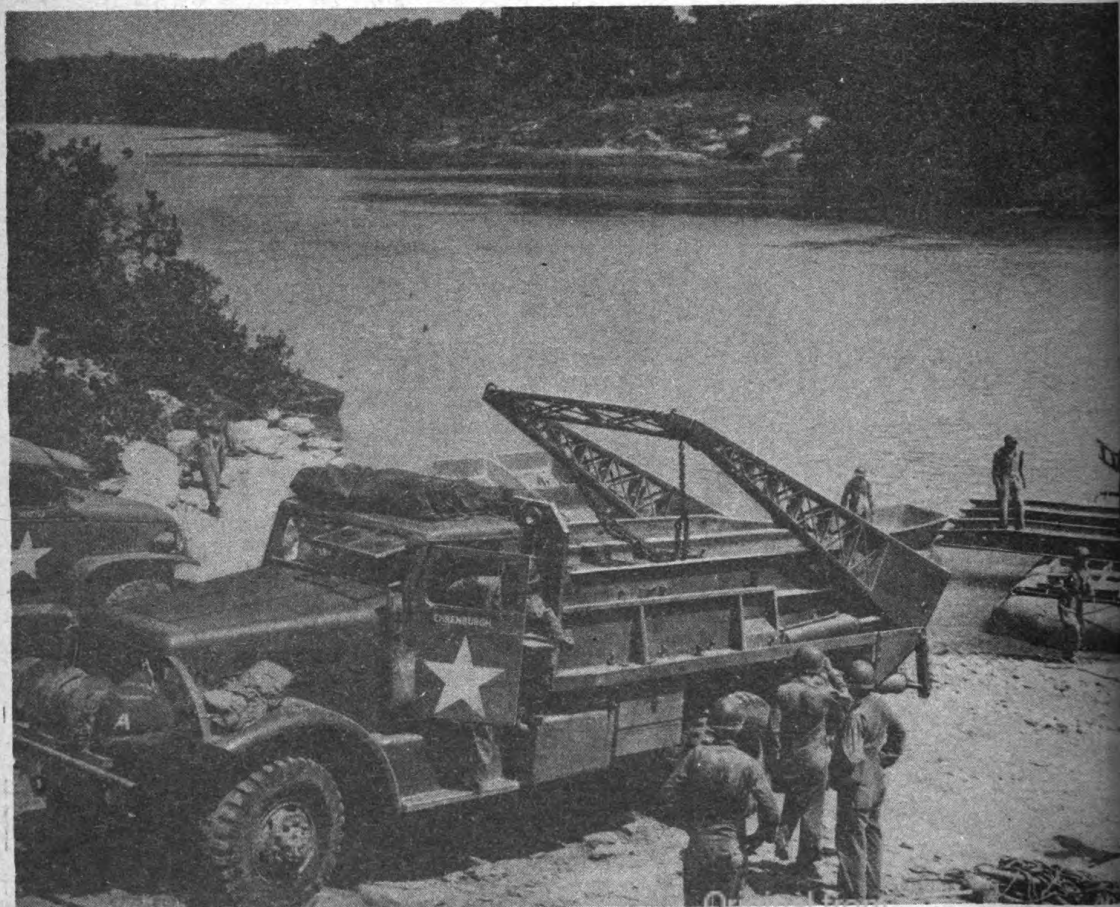


Figure 13. Instruction Plate "B"



(2) Should it be necessary to add oil or refill the hydraulic system, use any good grade of SAE No. 10 oil (OE 10). For operation at temperatures of zero or below, see Instructions on Page 32, Paragraph 5 "a".

b. INSTRUCTION PLATES

On the front of each unit will be found two metal instruction plates as shown in Figure 13 and 14.

Plate "A", a copy of which follows, outlines the complete operating instructions. If these instructions are followed in the sequence given, no difficulty should be encountered in the operation of the hydraulic bridge erecting crane:

HYDRAULIC BRIDGE ERECTING CRANE

OPERATING INSTRUCTIONS

1. Disengage clutch by pressing down on declutching pedal.
2. Engage Power Take-off by pulling outer lever to the right as far as possible.
3. Release clutch pedal which will operate hydraulic pump.
4. Extend piston rods in lower cylinders by pulling Valve Lever forward or toward front. Note: THESE RODS MUST ALWAYS BE EXTENDED BEFORE UNIT IS READY TO OPERATE WITH LOAD.
5. To unload or move boom in rearward direction—push Valve Lever toward rear of truck.
6. To load or return boom toward cab—pull Valve Lever toward front.
7. To hold boom in any position—place Valve Lever in neutral or center. (When released, lever will return to neutral position automatically.)

CAUTION

WHEN BOOM IS NOT BEING OPERATED—Piston Rods in lower cylinders must always be pushed in (or retracted) to prevent rusting.

- a. Force lower piston rods in by moving boom, UNDER NO LOAD, to extreme rearward position.
- b. Pull Lower Cylinder Control Handle as far as possible to right and hold. Move boom to riding position UNDER NO LOAD.

THE HEIL COMPANY

MILWAUKEE, WIS. U. S. A. HILLSIDE, NEW JERSEY

Figure 14. Operating Instructions, Plate "A"

Plate "B" is the Diagram of the Front Panel of the Body showing all controls and levers, etc., which are also shown in detail in Figure 13.

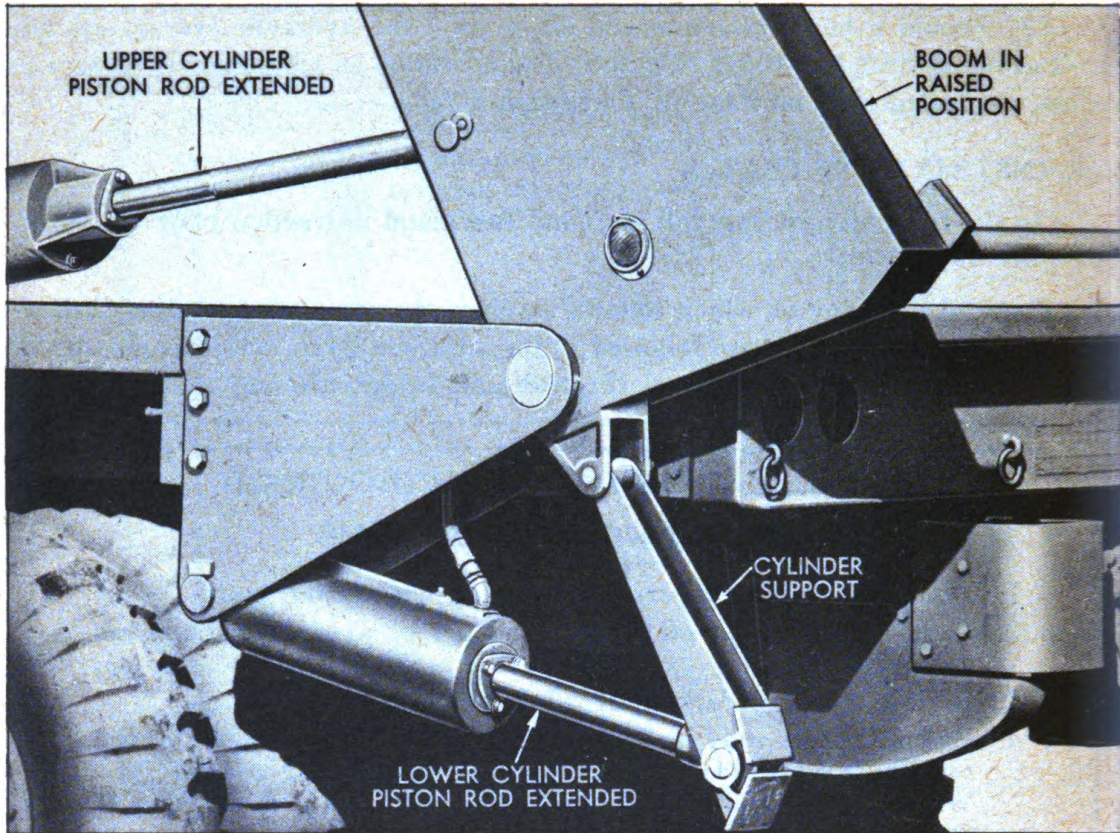


Figure 15. Piston Rods of Lower Cylinders Extended (Unit Ready for Operation)

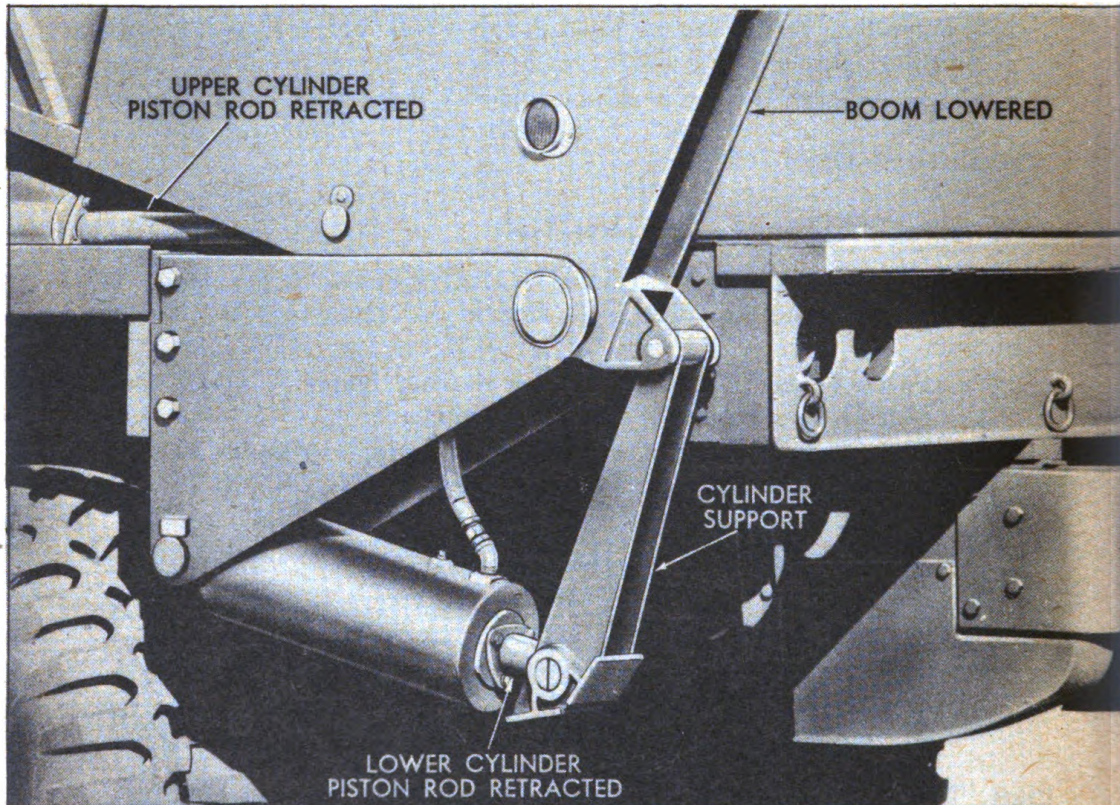


Figure 16. Piston Rods Retracted in Lower Cylinders (Unit Ready for Transit)

c. OPERATING PRECAUTIONS

Extreme caution should be used with regard to Procedure No. 4 to be sure that the piston rods in the lower cylinders are fully extended before lifting a load from the body of the truck. These rods must be extended so that after the boom passes beyond the vertical position, the piston rods of the lower cylinders will be in a position to receive the weight of the load at that point. Figure 15 shows the piston rods in the proper position ready to receive a load.

Figure 16 shows the piston rods fully retracted with the boom in riding position and the unit ready for transit or storage. In this position the piston rods are not exposed to the weather which would cause rusting. See "**CAUTION**" on Instruction Plate.

To retract or return the pistons in the lower cylinders for transit, or storage see Procedure "a" and "b" on Instruction Plate "A" under heading of "**CAUTION**", see Figure 14 on Page 15.

d. OPERATION OF POWER TAKE-OFF FOR WINCH

Also mounted on the front panel of the body is the power take-off lever for the winch which may be moved to the right as well as to the left, for reversing the direction of the winch. With the power take-off lever in center position, the power take-off will remain in neutral. See Figure 13. The front-mounted winch is used to operate the cable when raising or lowering the treadways with the snatch block.

e. EMERGENCY OPERATION

Provision is made to operate the unit with either of the upper cylinders, (i.e. one upper cylinder may be damaged and the crane may be still operated with a reduced load). To accomplish this, close the two emergency valves (Figures 11 and 17) in the high and low pressure lines on the side which is damaged. Remove the pin of the damaged cylinder, which attaches the end of the piston rod to the boom.

Closing the two valves, directs the flow of oil to the cylinders on the opposite sides, which will enable the boom to be operated with the two lower cylinders and the one upper cylinder.

CAUTION: When operating in this manner, no more than one treadway should ever be handled.

The emergency valves are located under the center trap door of the floor of the body and can be reached from the under side of the truck chassis. Metal caution tags will be found on each of these valves. The valves should NEVER BE CLOSED except in case of emergency. Valves should be checked periodically to see that they have not been closed accidentally.

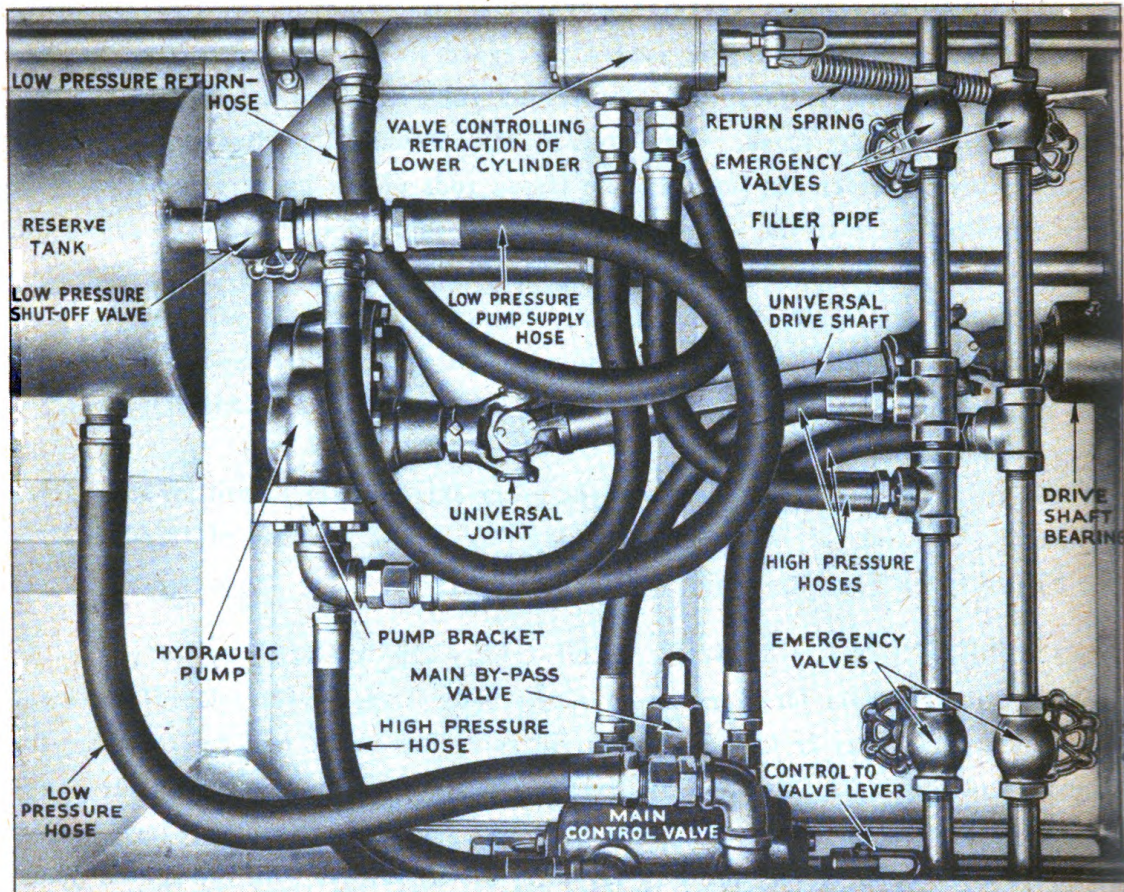


Figure 17. Hydraulic System Showing Emergency Valves

3. PROPER METHOD OF HANDLING 45 inch TREADWAYS

a. DESCRIPTION OF LOAD

Four bridge treadways, two ponton saddles, and two pontons are carried in the body of the bridge truck as shown in Figure 1. The four treadways are placed on edge in the truck body with the road surfaces of the two center treadways facing each other, and the road surfaces of the two outer treadways facing in toward each other. The long open ends of the four treadways face toward the rear so the pontons can be placed at the rear of the truck to facilitate unloading. The ponton saddles are carried on top of the four treadways. The crane boom rests on the saddles during transit.

b. HOW TO UNLOAD ON GROUND

(1) The treadways should be loaded and unloaded two at a time. Unload the outer two treadways first, with the road surfaces toward each other as shown in Figure 18. Use the slip hooks on the intermediate length chain of the upper cross chain assembly. Insert a slip hook in the center eye located on the side surface of each treadway as shown in Figure 19.

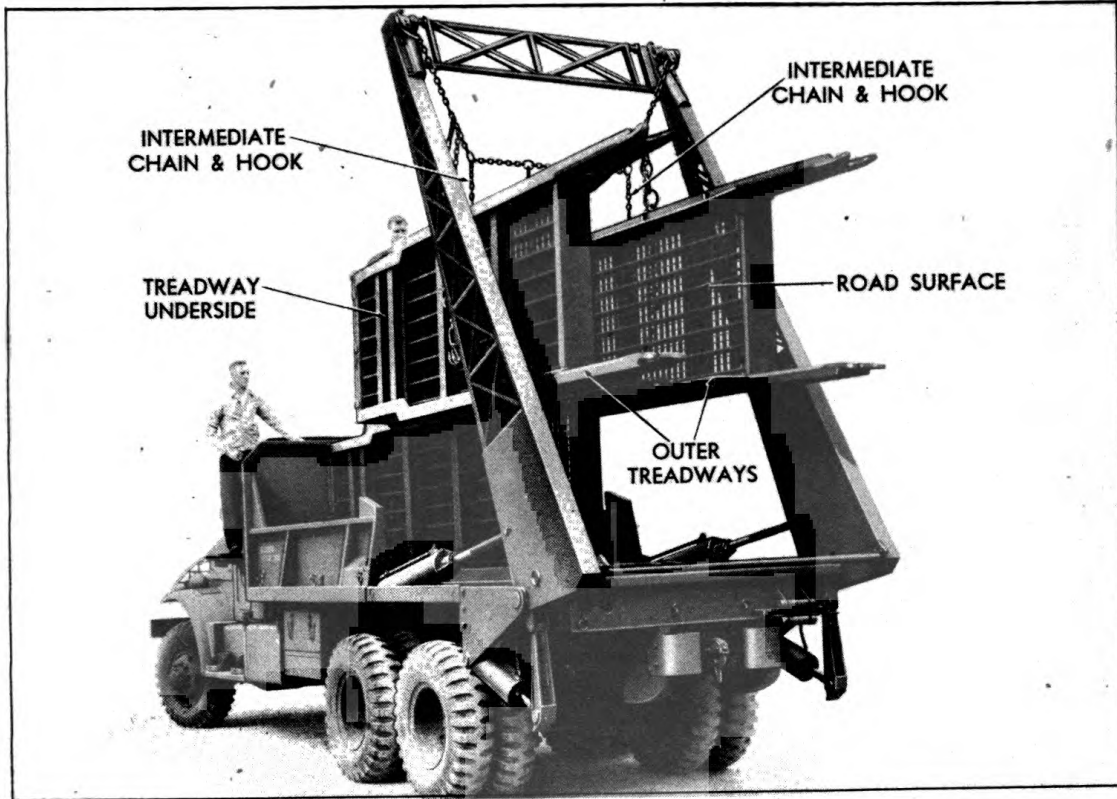


Figure 18. Unloading Two Outer Treadways First. Road Surfaces to Inside

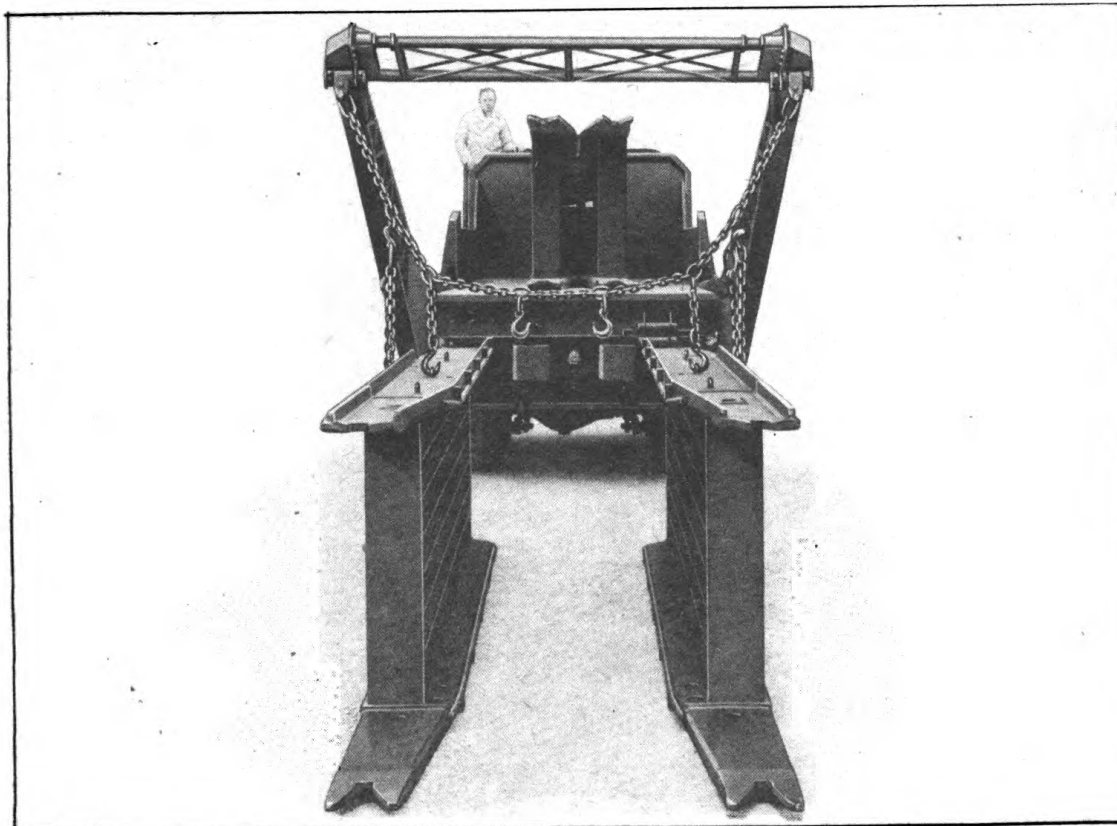


Figure 19. Method of Attaching Slip Hooks to Treadway Eyes for Unloading

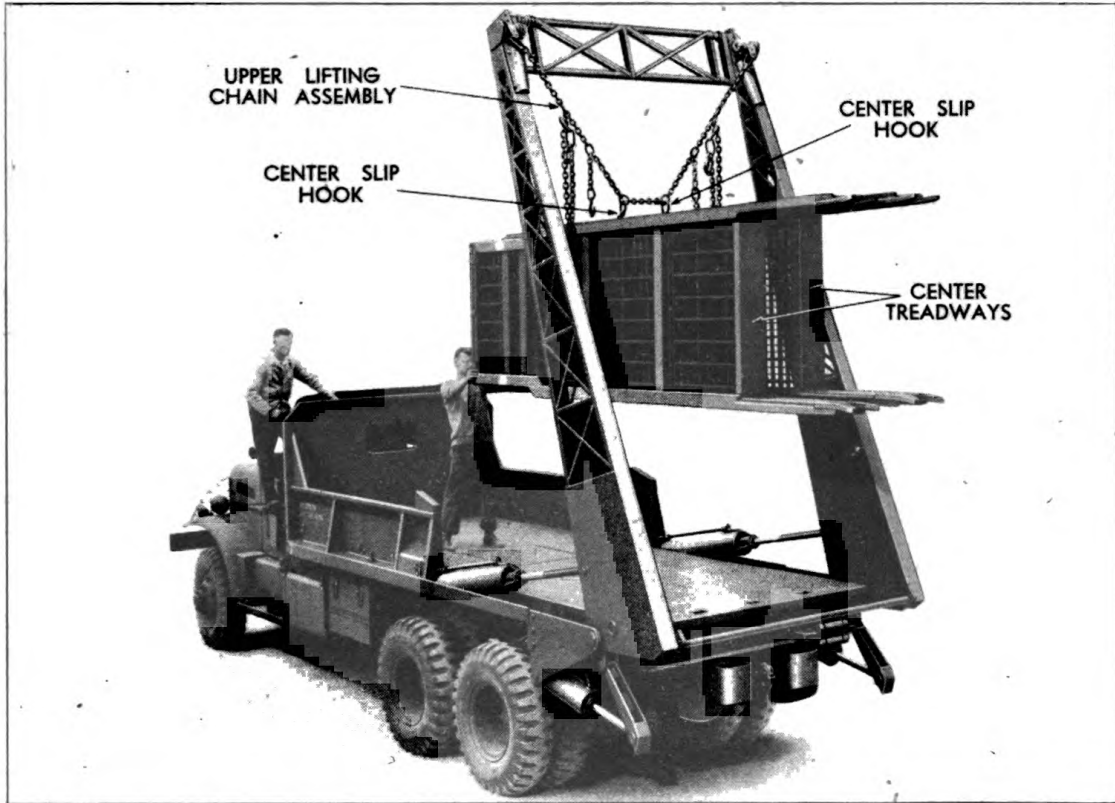


Figure 20. Removing Two Center Treadways with Center Slip Hooks

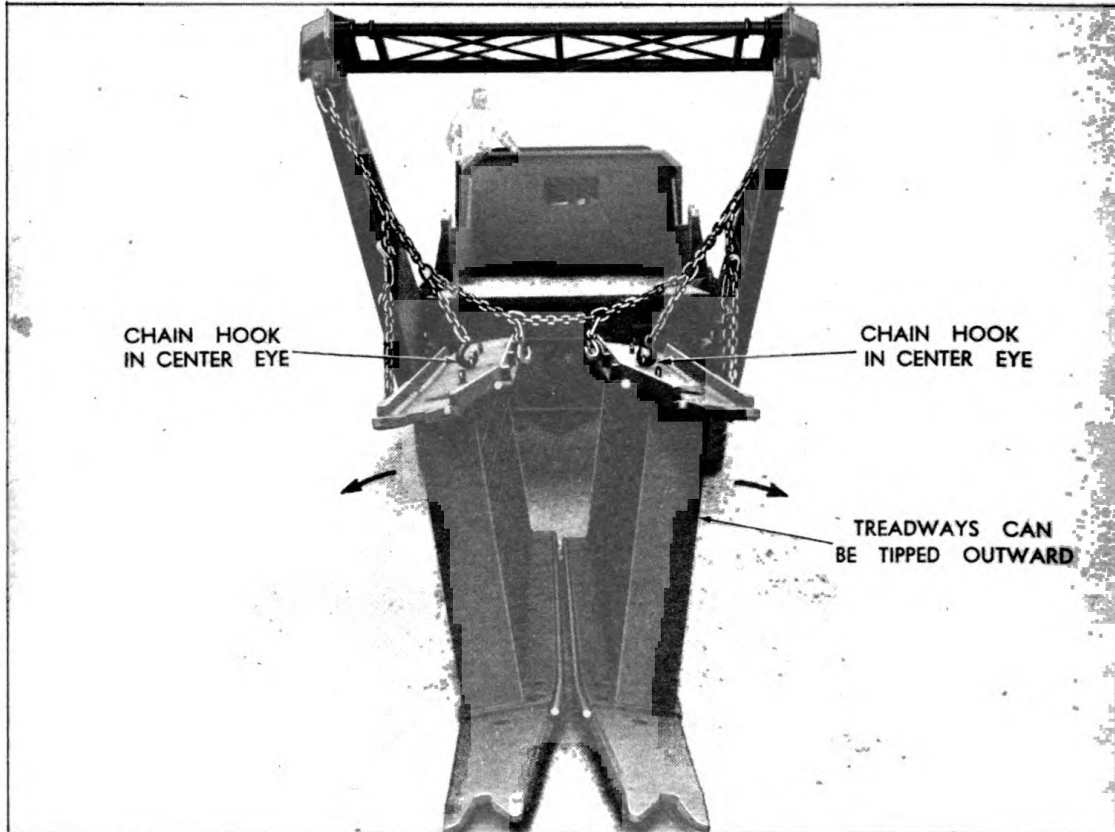


Figure 21. Tipping Center Treadways to Horizontal Position

(2) The inner two treadways are removed from the truck by using the two center slip hooks on the upper cross chain assembly. See Figure 20. The slip hooks are inserted in the center eye on the side of each treadway.

(3) Always load and unload the treadways with the road surfaces toward each other. By handling the treadways in this manner they can easily be laid over to the horizontal position by tipping them away from each other. See Figure 21.

c. HOW TO SPACE TREADWAYS

(1) To properly space the bridge treadways for the spacer bars, first attach the lower treadway hooks through the horizontal holes located about the center of the sides of the treadways. With the lower treadway hook in a horizontal position, insert it through the hole from the inside of the treadway side. Then twist it to the vertical position so the treadway hook bears against the side of the treadway as shown in Figure 22.

(2) Insert the outer lifting chains through the pear-shaped grab links of the lower treadway hook assemblies so the pear-shaped grab links lock on the outer lifting chain just above the large connecting links at the ends of the lifting chains as shown in Figure 22.

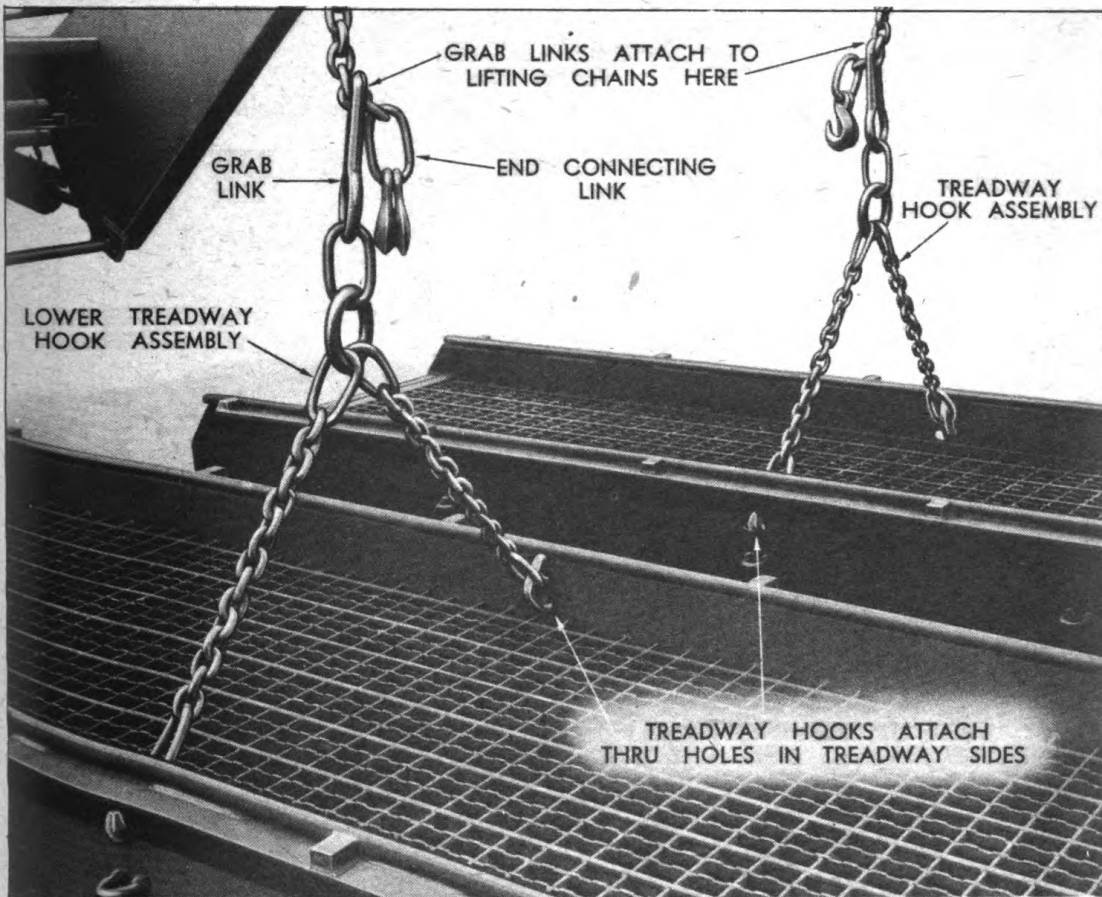


Figure 22. Proper Method of Attaching Lower Treadway Hooks

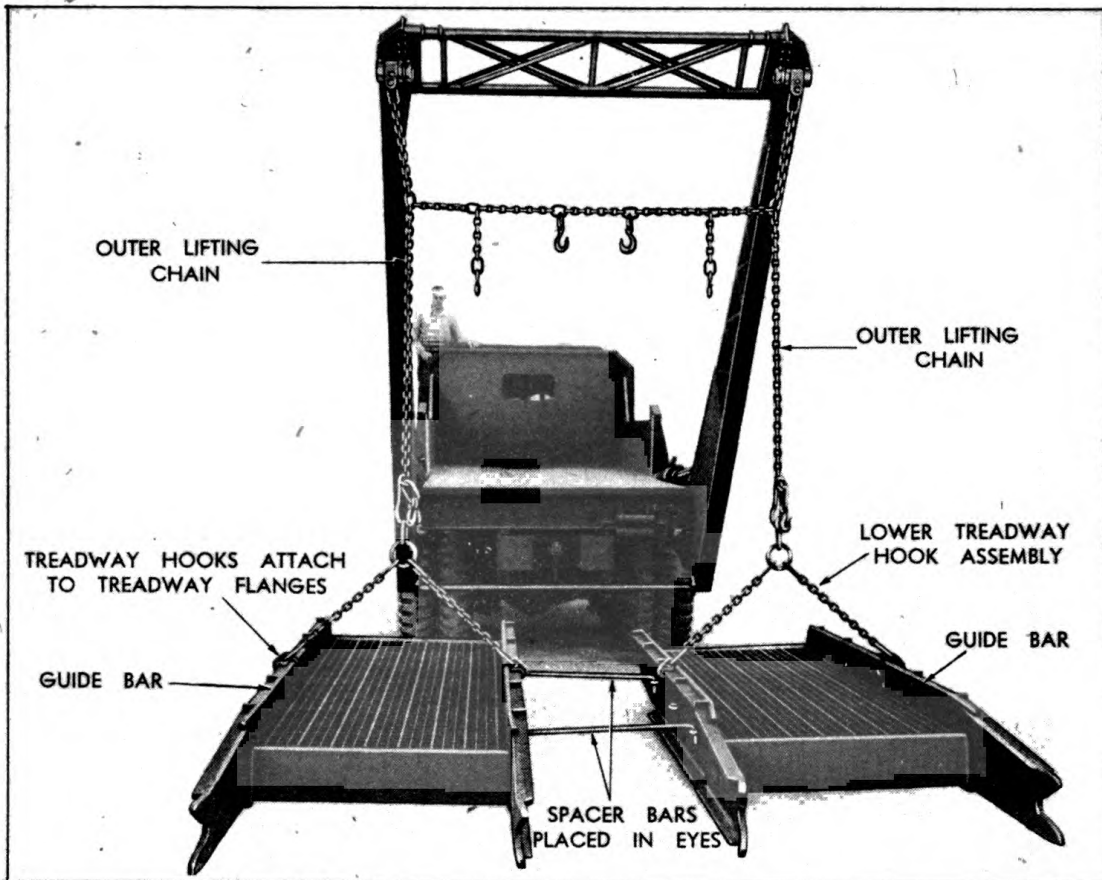


Figure 23. Treadways Properly Spaced with Bars. Note Chain Arrangement

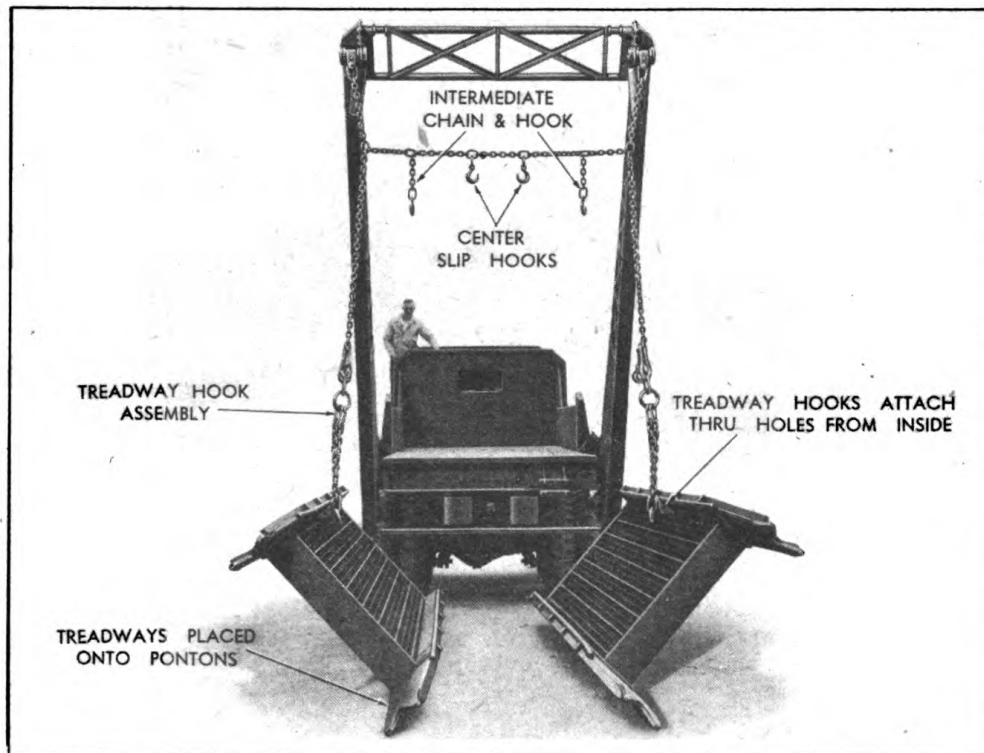


Figure 24. Method of Lowering Treadways onto Pontons

(3) Raise the boom until the treadways swing freely and they will hang in the proper position for inserting the spacer bars. Each pair of treadways are connected by two spacer bars. These bars are inserted through eyes located toward each end of the sides of the treadways. See Figure 23.

d. HOW TO UNLOAD ON PONTONS

(1) To unload the bridge treadways directly to the saddles on the pontons, use the procedure described in Paragraph *b.*, pages 18 and 21, with the following exception. It is necessary to lower the treadways to a horizontal position by **ATTACHING THE LOWER TREADWAY HOOKS TO THE INNER SIDES OF THE TREADWAYS** as shown in Figure 24. This permits lowering the treadway slowly to the saddle, thus preventing any damage.

(2) For properly spacing the treadways on the pontons, repeat the operation described in Paragraph C, Pages 21 and 23.

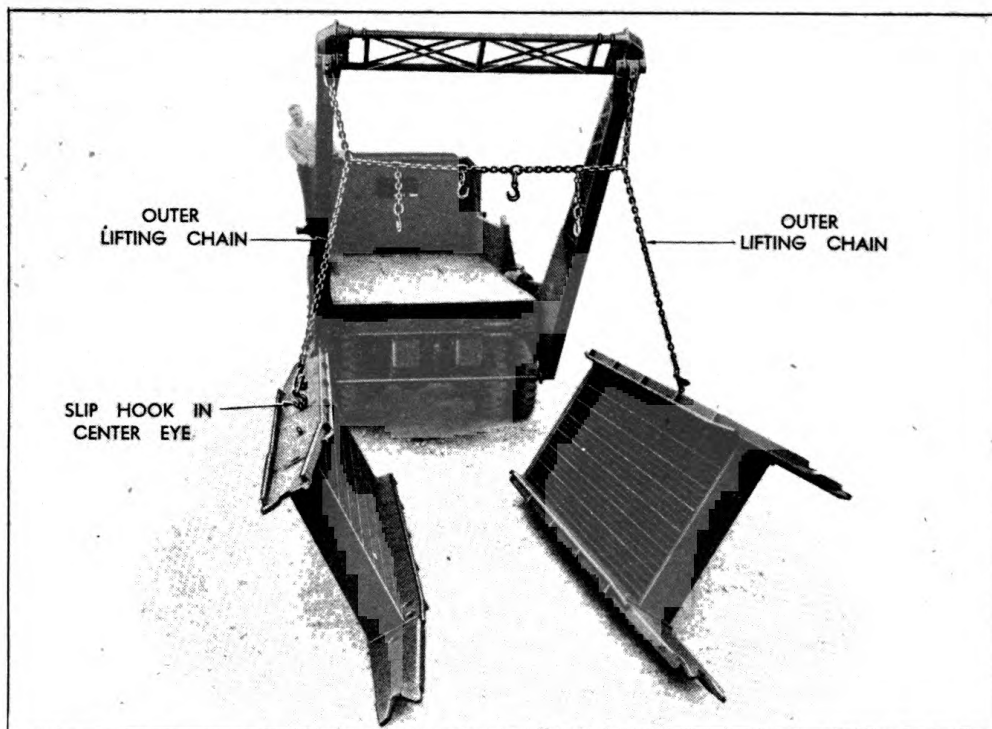


Figure 25. Using Slip Hooks to Stand Treadways on Edge for Loading

e. HOW TO LOAD TREADWAYS

(1) To load the treadways in the truck, remove the spacer bars, Figure 23, and attach the slip hooks on the outer lifting chains to the center eyes located on the outer sides of the treadways. Raise the boom to stand the treadways on edge. See Figure 25. **DO NOT** use the lower treadway hook assemblies for this operation!

(2) The first two treadways to be loaded should be moved to the extreme center in two operations as follows. First, attach the intermediate slip hooks to the center eyes after the treadways are standing on edge. Raise the boom and they will swing to the center. Secondly, attach the center slip hooks to the eyes and raise the treadways into place on the truck, Figure 20.

OPERATIONS SECTION

(3) Handle the second pair of treadways as in step (1) above, but load them into the truck when the intermediate slip hooks are attached. See Figure 18. Raise the treadways into place on the truck, Figure 20.

f. HANDLING THREE TREADWAYS IN LINE

(1) To handle three treadways in line, connect them together with the open ends away from the rear of the truck as shown in Figure 26. Insert the outer lifting chains through the rings of both treadway hook assemblies and fasten the GRAB HOOK on the end of each outer lifting chain to the opposite lifting chain at the position shown in Figure 27. This position permits maximum length of lifting chain.

CAUTION: DO NOT USE THE SLIP HOOKS AT THE END OF THE OUTER LIFTING CHAIN TO PERFORM THIS OPERATION. USE GRAB HOOKS FOR HOOKING TO LIFTING CHAIN.

(2) The hooks of each treadway hook assembly should be attached to the top flanges of the treadway and opposite each other, Figure 27. This prevents twisting of the chains when lifting. Figure 27 shows how the hooks attach just behind the second reinforcing block of the center treadway. Note also how the half-circle notch of the hooks lock over the guide bar on the treadway flange.

(3) The lifting chains are attached for maximum handling length. This permits raising the boom sufficiently to move the treadways forward under the truck so that lifting them will not overbalance the front end of the truck. It is obvious that the three treadways must be located in the center of the truck as in Figure 26. The end of the treadways which is under the truck must bear against the tie bar and frame skids as shown in Figure 28.

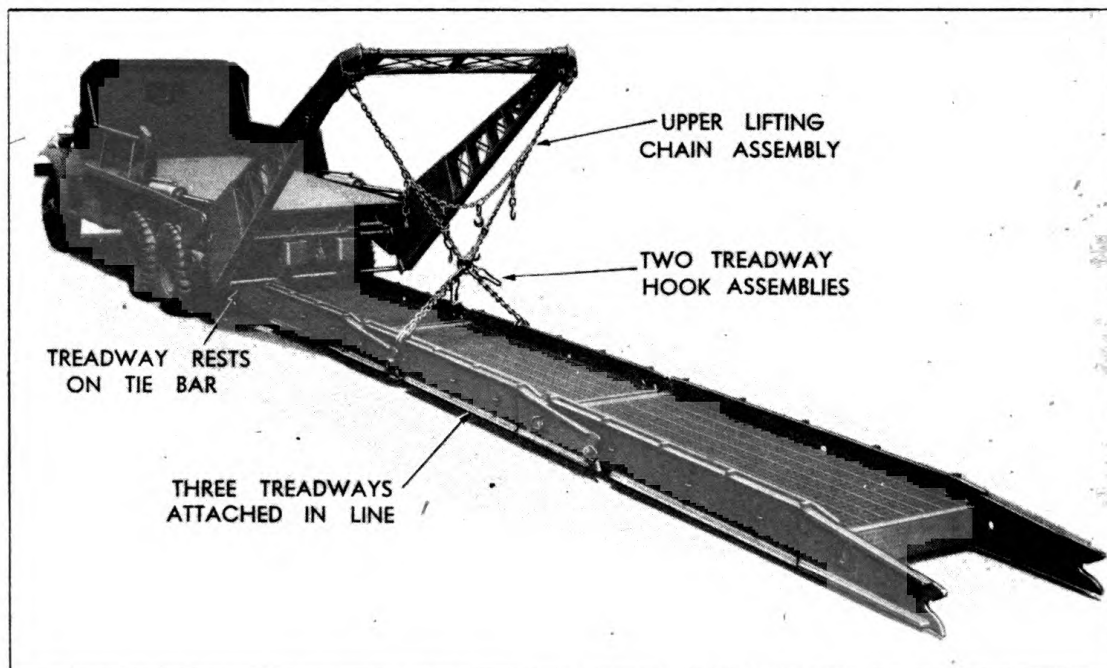


Figure 26. Handling Three Treadways in Line, Centered at Back of Truck

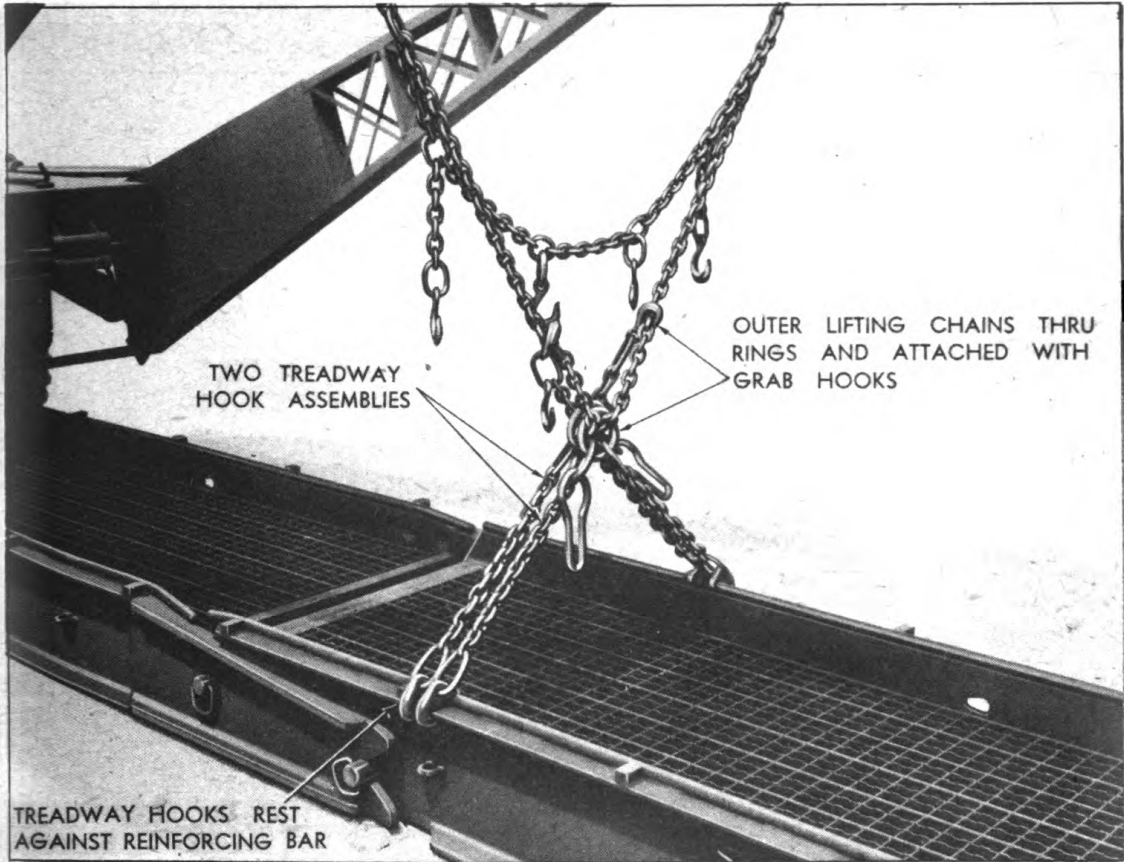


Figure 27. Treadway Hooks Attached to Flanges When Lifting Three in Line

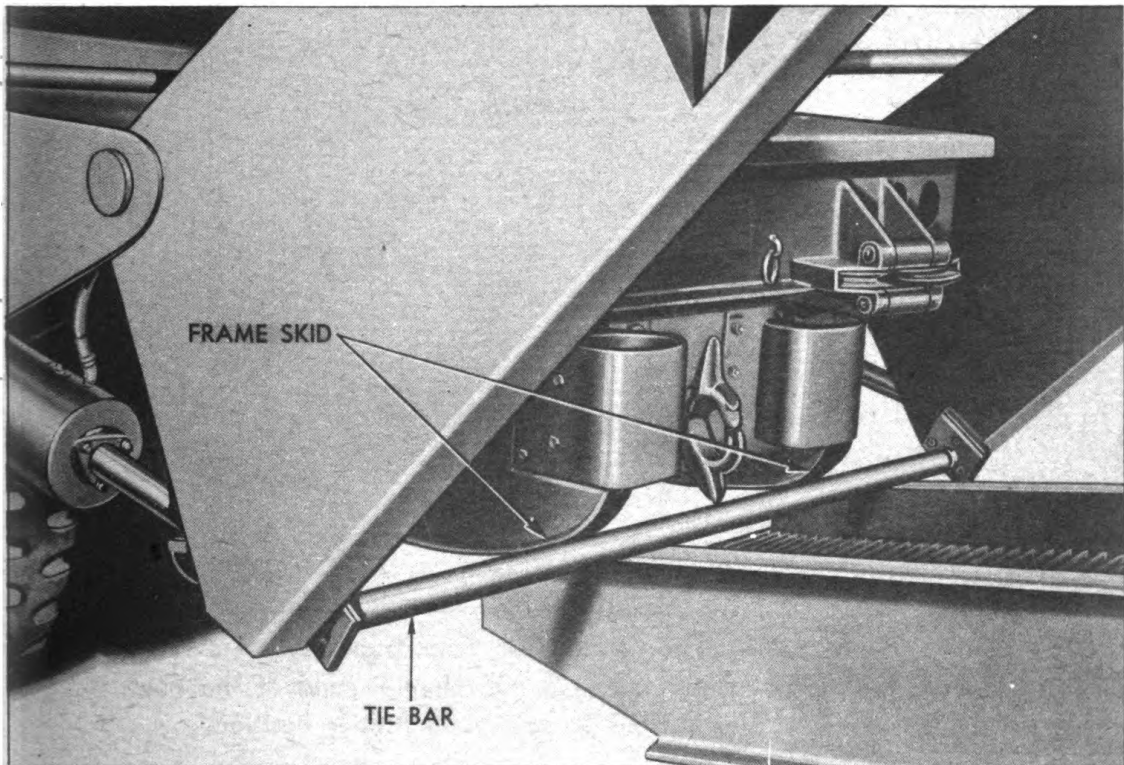


Figure 28. Treadways in Position Under Truck and Bearing Against Tie Bar

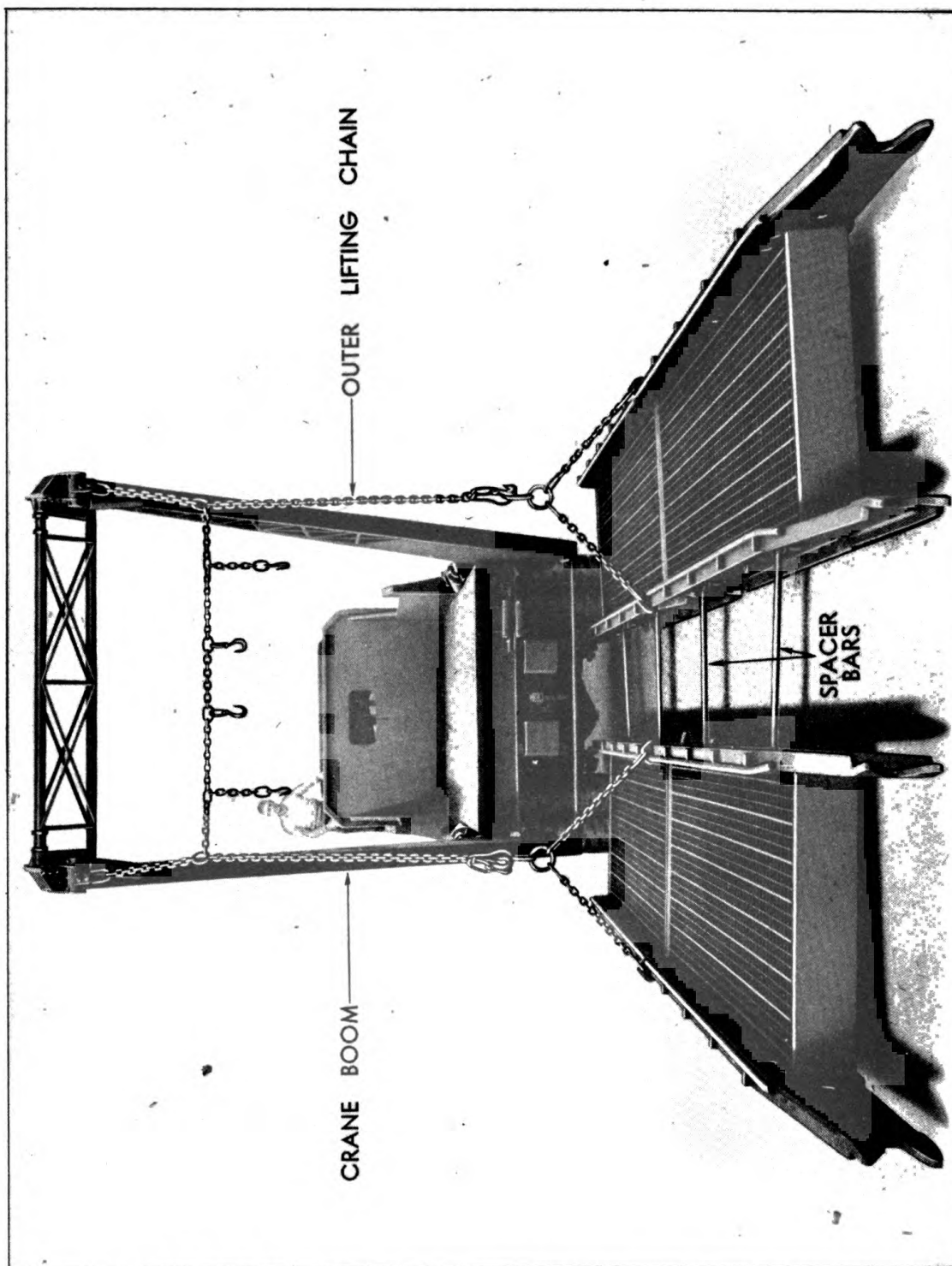


Figure 29. Proper Method of Handling Four Treadways at a Time. Boom Is Lifting at Full Rated Capacity. Note Placing of the Four Spacer Bars Which Hold Treadways in Proper Position.

g. HANDLING FOUR TREADWAYS AT A TIME

(1) To handle four treadways at a time, connected in pairs, attach the treadway hooks to the flanges of the treadways at the balance point as shown in Figures 29 and 30. The hook notches lock over the treadway guide bars. Insert the outer lifting chains through the pear-shaped grab links of the lower treadway hook assemblies. The pear-shaped grab link should attach to the chain just above the large, end-connecting link on the end of the lifting chain, see Figure 30.

CAUTION: DO NOT USE THE SLIP HOOKS AT THE END OF THE OUTER LIFTING CHAINS TO PERFORM THIS OPERATION.

(2) The maximum length of the outer lifting chain will permit the boom to raise to a vertical position sufficiently to prevent the front end of the truck being raised off the ground.

(3) To properly space the four treadways, raise the treadways so they hang freely in the correct position. Four spacer bars are used. Insert the hooked ends of the spacer bars through opposite eyes on the inner sides of the treadways as shown in Figures 29 and 30. Note that the center eyes are not used for spacing.

(4) When handling four treadways, the boom is lifting at its full rated capacity. The load is balanced and there is no appreciable distortion of the boom.

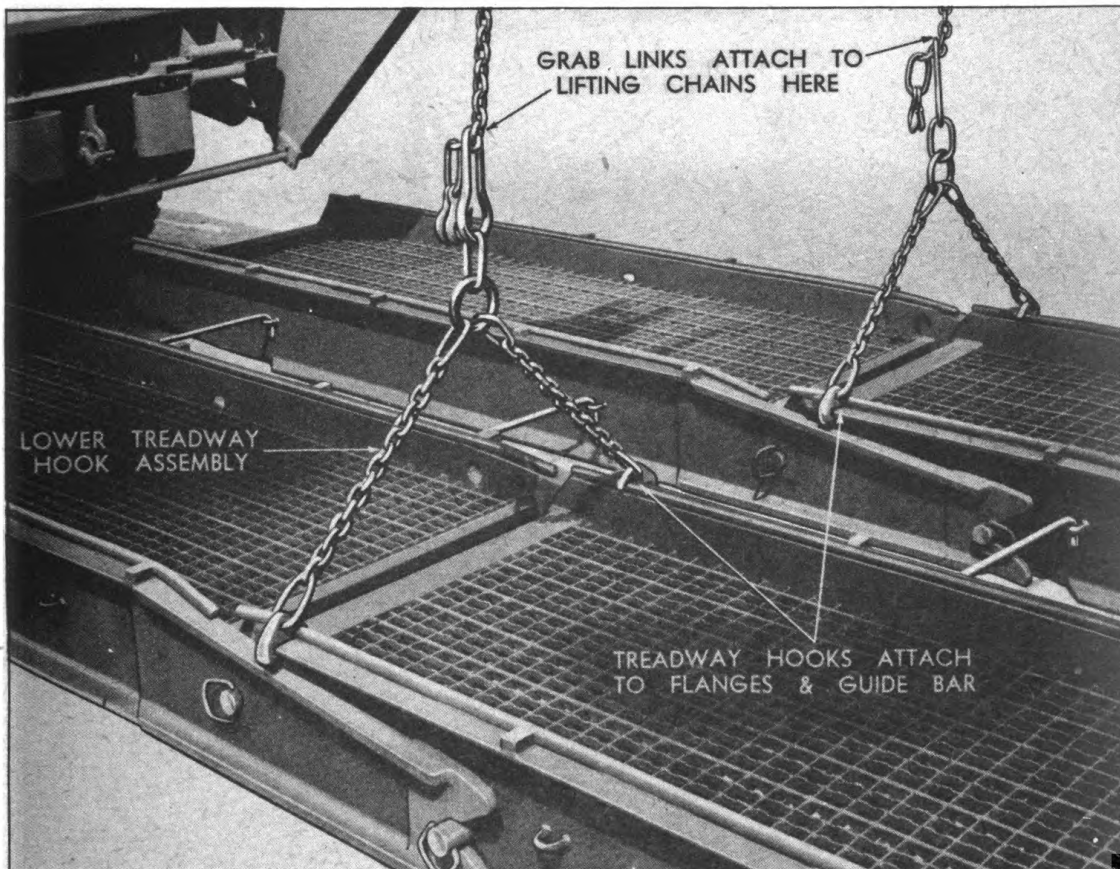


Figure 30. Treadway Hooks Attached Properly to Lift Four Treadways

b. HANDLING TWO TREADWAYS ON ONE SIDE

(1) An unbalanced load is detrimental to both the hydraulic mechanism and the truck chassis, and, it is therefore advisable, wherever practicable to balance the load, even if it is necessary to move the truck to one side or the other to eliminate any undue twisting of the chassis frame itself.

(2) There may be occasions where it will be necessary to handle only two treadways connected, end to end, on one side of the boom as shown in Figure 31. We call your attention to the distortion of the boom under this load when applied to one side of the boom assembly. **THIS ABSOLUTELY IS THE MAXIMUM LOAD THAT SHOULD EVER BE APPLIED TO ONE SIDE OF THE BOOM.** Any load greater than this may cause the upper boom support to bend or twist beyond its elastic limit and may damage the truck chassis.

(3) The correct chain hook-up for lifting two treadways on one side is shown in Figure 31. Attach a lower treadway hook assembly to the outer lifting chain, fastening it a link above the end connecting link. Attach the treadway hooks to the treadway flanges at the balance point as shown in the figure. Then bring the opposite outer lifting chain over and fasten it to the first lifting chain at the point shown, or about fifteen chain links below the large connecting link. **IMPORTANT: Use the GRAB LINK for fastening the opposite chain to the chain lifting the load.** The second lifting chain transmits part of the load to the opposite boom and prevents permanent boom distortion. **ALWAYS USE BOTH CHAINS.**

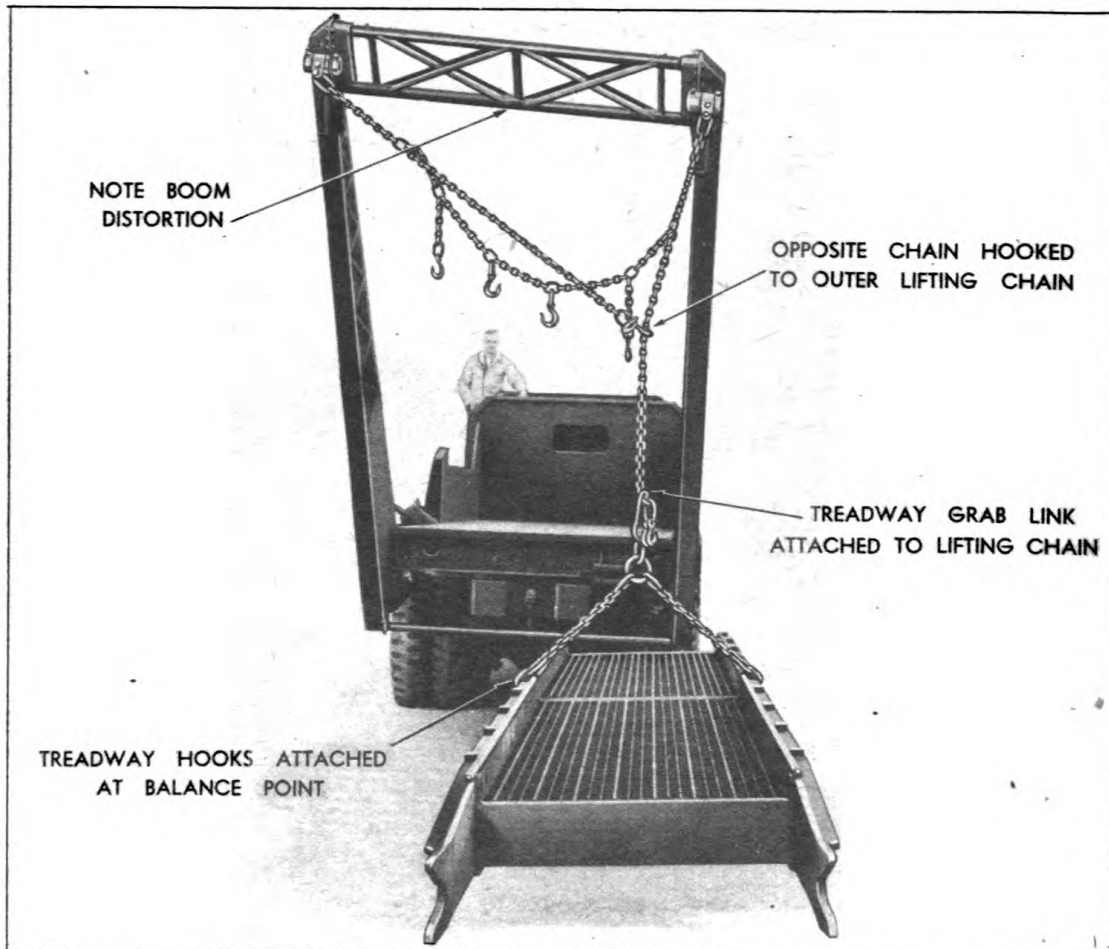


Figure 31. Handling Two Treadways on One Side. Note Boom Distortion

i. USE OF SNATCH BLOCK

(1) When it is necessary to lower treadways to a point lower than that attainable with the chains supplied, it is necessary to use the winch on the front of the truck and the snatch blocks carried in the tool box.

(2) Bring the ends of the outer lifting chains over to their opposite sides so they form an even loop with the center chain section and attach the GRAB HOOKS to the chains as shown in Figure 32. Attach the snatch block to the exact center of the chain loops, as this will distribute the load evenly to both booms.

(3) Install the hooks of the lower treadway hook assembly into the holes on the treadway sidewalls from the inside and lock in the vertical position as shown.

(4) Bring the cable from the small drum of the front-mounted truck winch back through the fairlead at the right rear corner of the truck. Thread the cable over the snatch block pulley as shown in Figure 32 and fasten suitably to the large round ring of the lower treadway hook assembly.

CAUTION: Never Attach Snatch Block Directly to Upper Boom Support

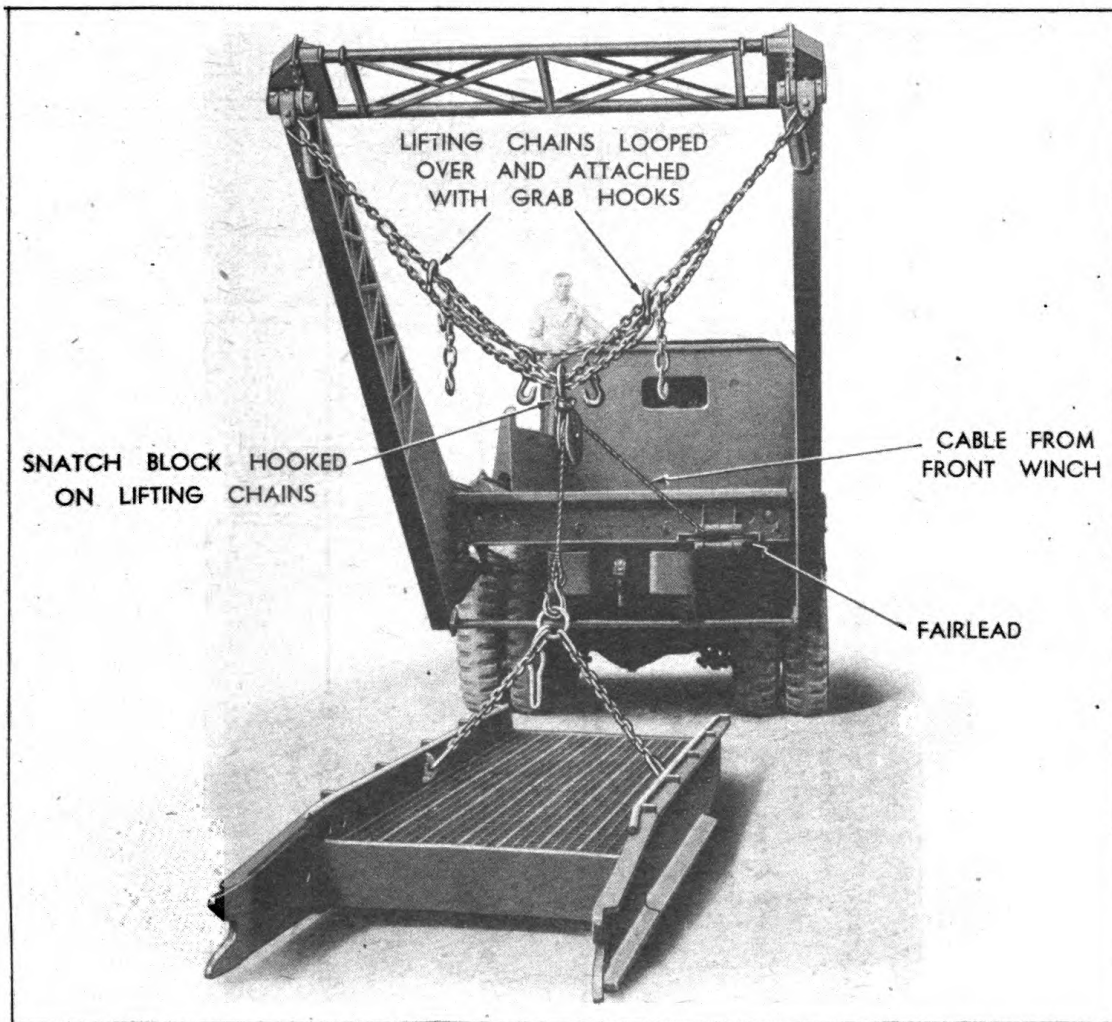


Figure 32. Using Snatch Block and Cable to Handle Treadways.

4. LUBRICATION OF MACHINE**a. GENERAL**

All grease fittings in the locations indicated on Figures 33 and 34 should be lubricated every 8 hours of operation. The universal joints and steady bearings on the drive line should be lubricated each 8 hours of operation. Use C.G. Grease General Purpose No. 1—(Above Plus 32° F.), No. 0—(Below +32° F.). Also see Figures 33 and 34, Lubrication Chart.

Special attention should be given to the lubrication of the flexible cable accelerator control, shown in Figure 33, Page 30.

CAUTION: DO NOT grease flexible cable accelerator control. Heavy grease will cause the accelerator to stick. Use OE-10 (OIL, engine SAE 10).

b. HYDRAULIC SYSTEM

(1)—Be sure at all times that there is sufficient oil in the reserve tank which is located between the body sills, Figures 11 and 17. Use OE-10 (OIL, engine SAE 10) oil for temperatures above 0° F. For lower temperatures use OE-10 (OIL, engine SAE 10) oil cut with OIL, fuel, diesel according to the following table. Capacity of the system is 35 gallons. The oil should flow freely to the pump at all times.

| | | | |
|---------------------------------|------|--------|--------|
| Minimum Temperature | 0° F | —20° F | —40° F |
| Oil—Gallons | 35 | 31 | 25 |
| OIL, fuel, diesel—Gallons | 0 | 4 | 10 |

CAUTION: DO NOT use oil drained from these cylinders in the truck engine or for lubricating other machinery.
DO NOT fill the hydraulic system with crankcase drainings or other oil which is not absolutely clean.

(2) FILLING THE HYDRAULIC SYSTEM is done through a fill pipe located at about the center of the left running board of the body, see Figure 35. On top of the reserve tank toward the rear is a small plug. If this plug is removed when filling the system, air in the tank will escape and the tank can be filled more quickly. After the tank has been filled, it is well to leave the pipe cap off the filler pipe and operate the boom WITH A LOAD, allowing the boom to lower by gravity. This will force out any excess oil. Be sure to replace the filler cap after operating the boom.

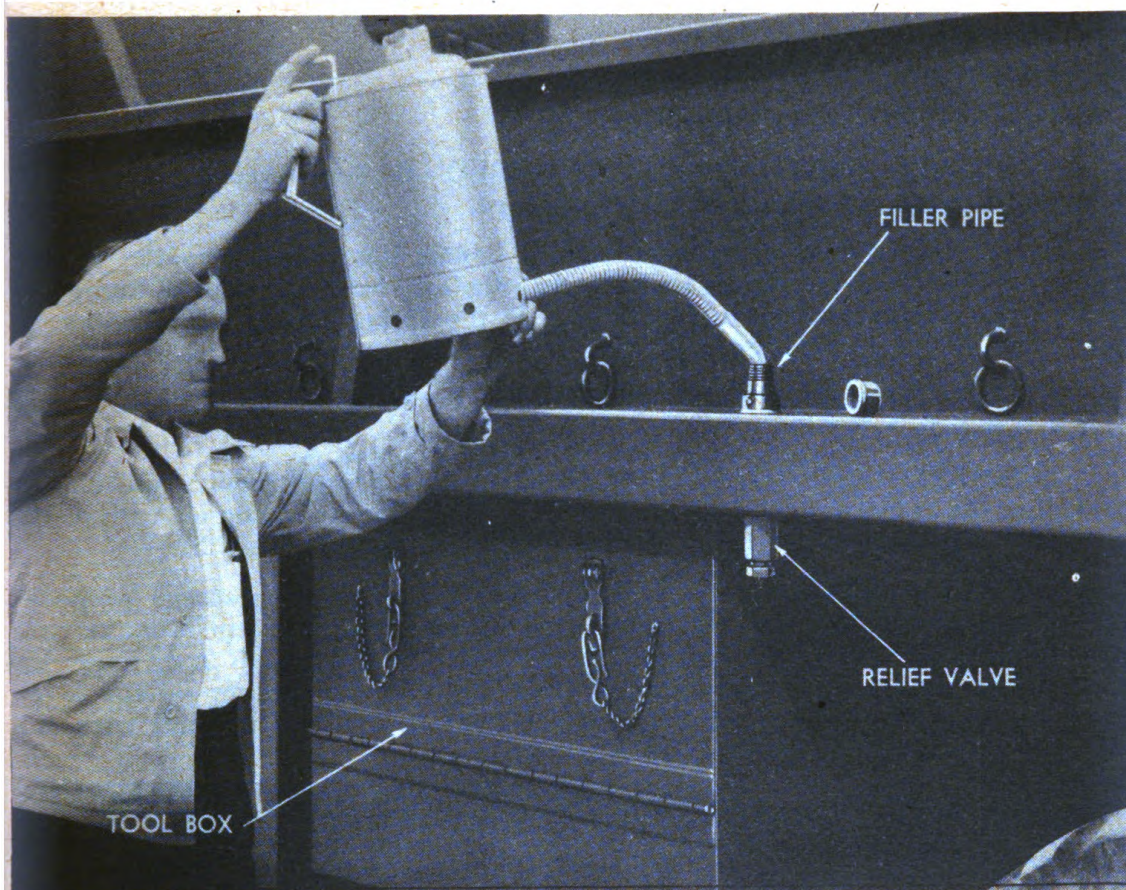


Figure 35. Adding Hydraulic Oil Through Filler Pipe. Note Relief Valve Beneath

(3) **RELIEF VALVE**—There is a relief valve in the filler pipe directly under the body running board, Figure 35, to relieve any pressure that might build up in the tank due to expansion of oil or excess oil that might be in the system. Pressure greater than this valve can handle, however, may be built up by excess oil in the system when operating under a load. For this reason it is recommended that the fill cap be left off until the operation in above paragraph has been completed.

(4) **OVER-SUPPLY OF OIL IN SYSTEM** may cause back pressure in the tank when a heavy load is being lowered by gravity to such an extent that the valve lever will not operate. The relief valve should take care of this—but if it should not function properly, carefully remove the filler cap to release the excess pressure. Use extreme care in doing this to prevent the cap flying off and injuring the operator.

(5) **SHORTAGE OF OIL IN SYSTEM** will cause jerky action. This is caused by air in the cylinder which is compressible. Another indication of oil shortage is the grinding noise created by the pump when it is being starved for oil. The oil shortage should be immediately remedied by adding oil or refilling as explained in paragraph 4 a, (2), page 32.

(6) **TO DRAIN THE SYSTEM**, drain the reserve oil tank first by removing the plug at the bottom of the tank. Drain the upper cylinders by removing the by-pass plugs at the bases of the cylinders. **BE CAREFUL NOT TO LOSE THE SPRING AND BALL WHEN REMOVING THE PLUG.**

5. Adjustment and Maintenance**a. IF UNIT WILL NOT OPERATE**

(1) **POWER TAKE-OFF NOT ENGAGED**—Be sure lever is all the way over, gears properly meshed and clutch engaged.

(2) Be sure the lower cylinder control handle has returned to the left as far as possible. A spring return is attached to the lower cylinder control handle to place it in proper position for operation. If the spring should fail, it may be pushed to the proper position manually.

(3) **OIL BY-PASSING IN PUMP**—See Paragraph *d* (1), Page 37, in Repair Section.

b. OPERATING IN COLD WEATHER. The only preparation required for operating the crane unit in cold weather is to dilute the hydraulic oil with OIL, Fuel, Diesel in proportions shown in table, Paragraph 5 *a* (1), Page 32.

c. PREPARING THE UNIT FOR STORAGE. There is no special preparation required for putting the bridge erecting unit into storage except to make sure the lower cylinder rods are retracted as instructed in Paragraph 2, *c*, Page 17. Lubricate as instructed in Paragraph 4, Page 32. Check hydraulic system to be sure it is completely filled (see Paragraph 4, Page 32). Cover the unit with the tarpaulin as shown in Figures 4 and 5.

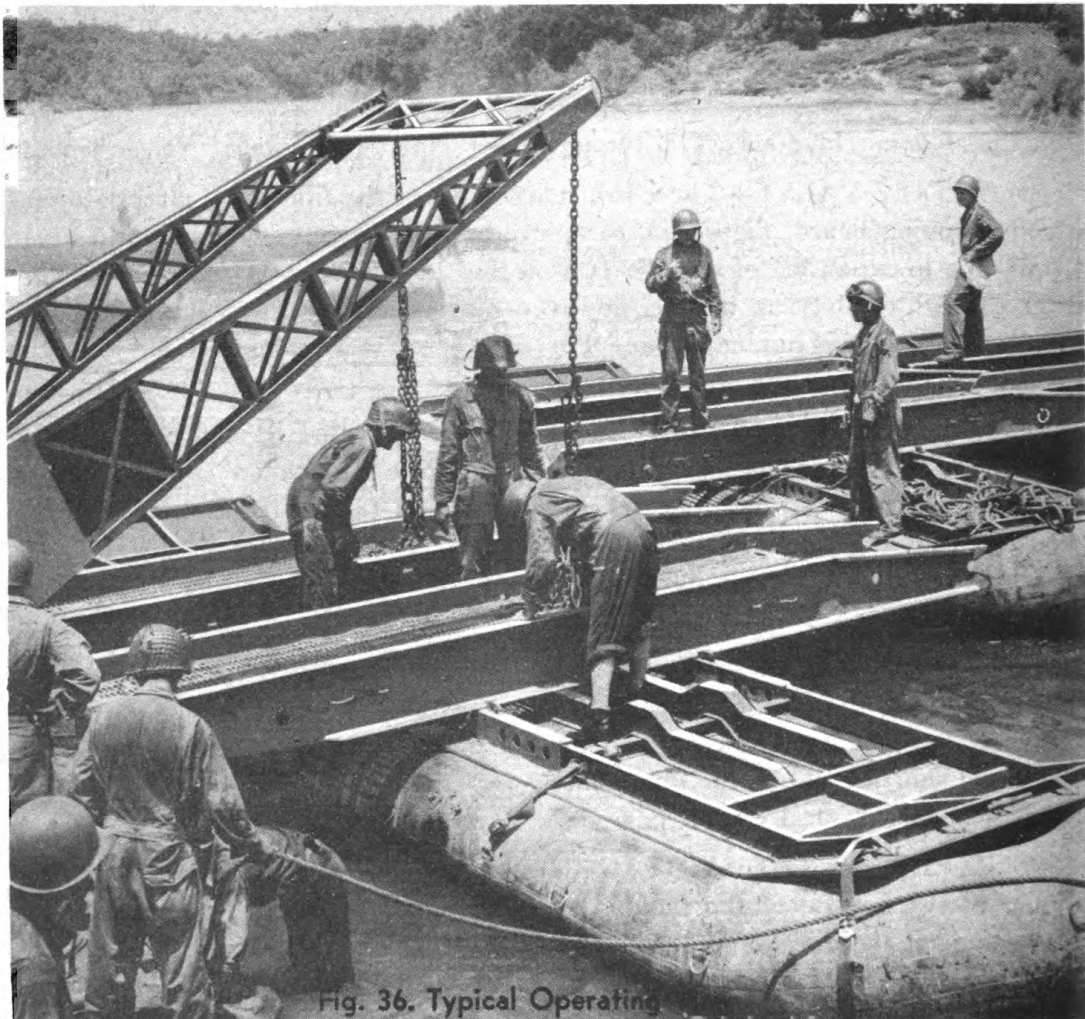


Fig. 36. Typical Operating

REPAIR SECTION

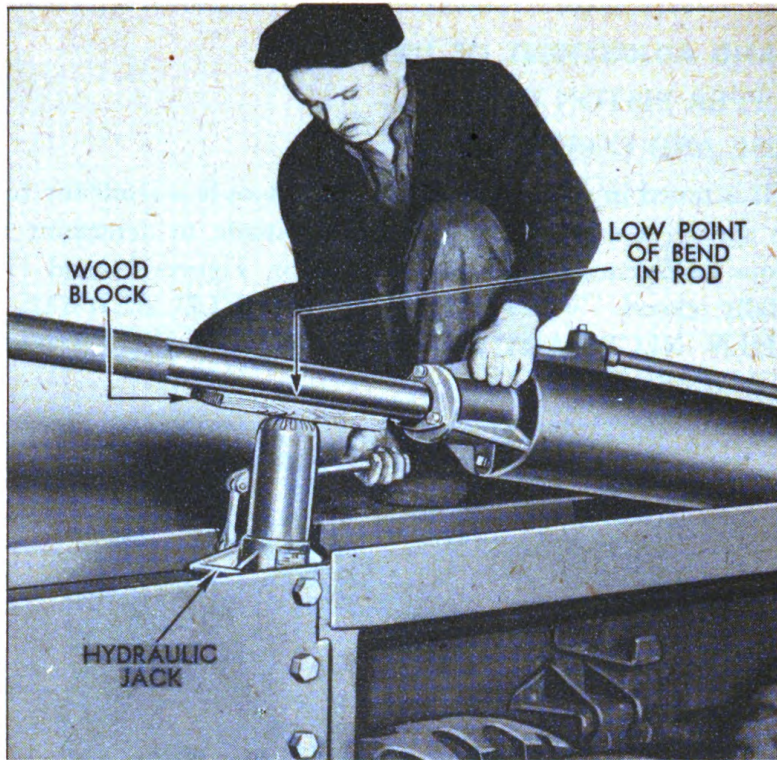


Figure 38. Straightening Rod From Below

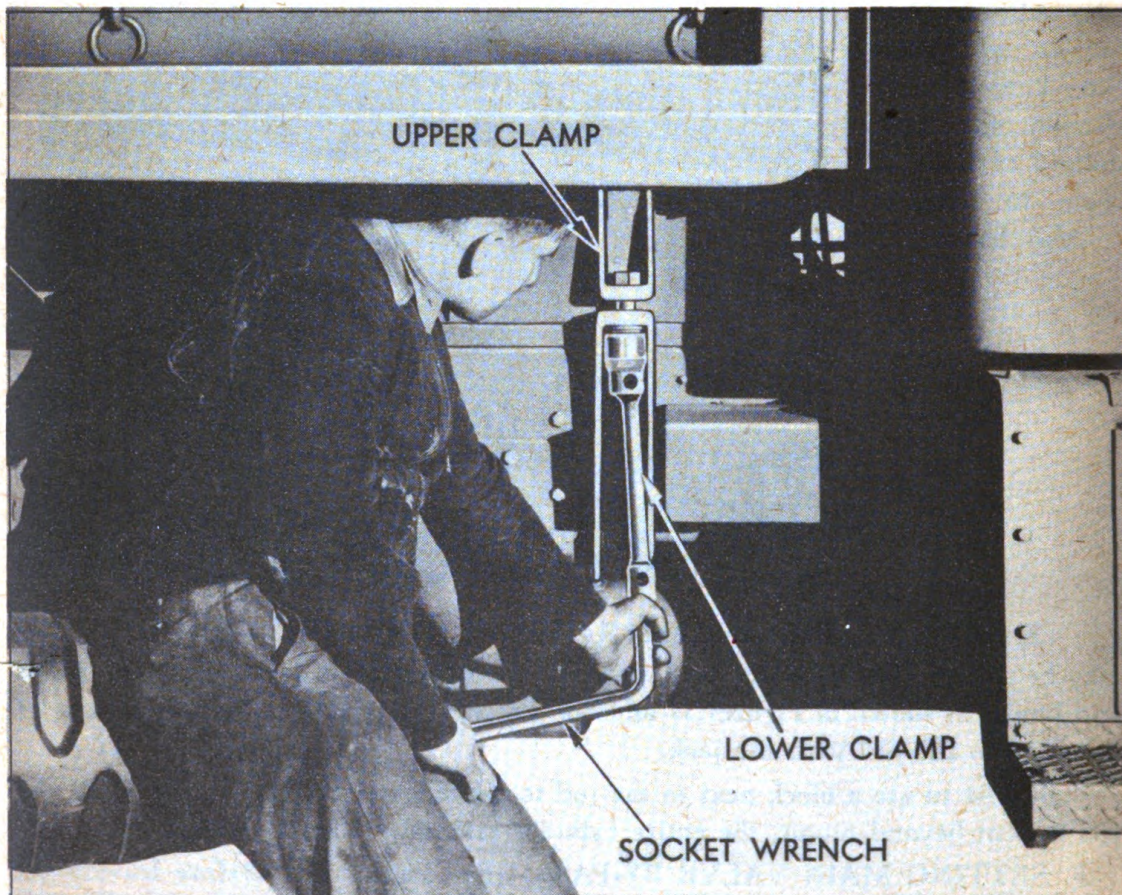


Figure 39. Tightening A Hold-Down Clamp Securing Body to Truck

ing spring breaks, it should not be necessary to readjust this part. If for any reason a new valve is installed in the field the by-pass valve can be adjusted satisfactorily by setting the by-pass spring to lift four treadways, then tightening the spring about two additional turns. This should provide a by-pass pressure of approximately 1,000 pounds.

c. HOLD-DOWN BRACKETS are provided on both sides to hold the body to the chassis frame. These brackets must be kept absolutely tight at all times. At regular intervals tighten the bolts holding the brackets to the chassis frame and also the bolts holding the brackets together as in Figure 39.

d. OIL PUMP AND HYDRAULIC SYSTEM

(1) OIL BY-PASSING IN PUMP

(a) Close shut-off valve at the tank, Figure 17.

(b) Remove pump cover plate, Figure 40. It is necessary to remove the pump drive shaft connection from the pump shaft first but it is not necessary to remove the pump from the body for minor adjustments.

(c) Inspect gears and wear plates for defects or excessive wear. If plates or gears are worn, replace them. If not excessively worn, the excess end play may sometimes be taken up by removing one or two layers of the laminated gasket. Care should be taken when replacing the cover plate that ample clearance is

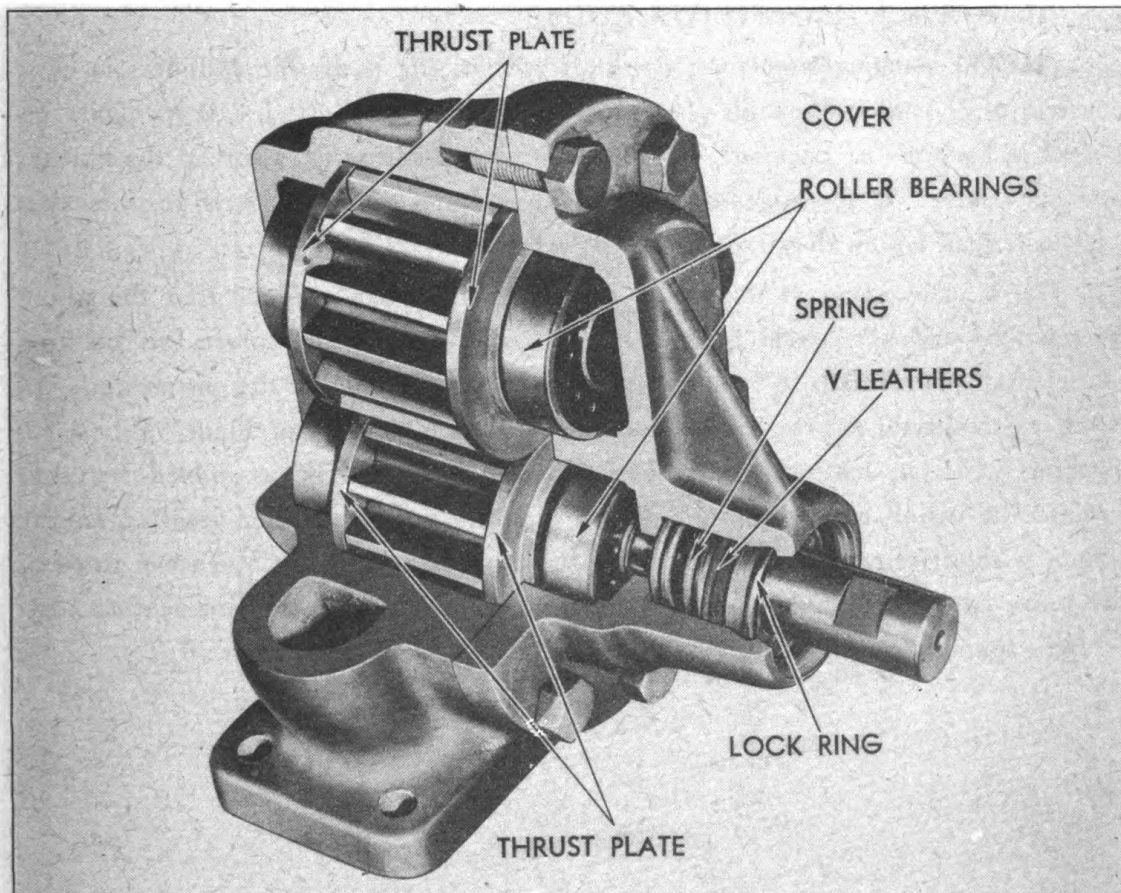


Figure 40. Cutaway View of Hydraulic Pump Showing Parts

allowed for free rotation of the gears which should turn with a very slight drag when the cover bolts are pulled down tight. Add or remove gasket layers until proper pump operation has been obtained.

(d) Be sure to open shut-off valve or low pressure line at the tank (Figure 17) when the pump has been reassembled.

(2) ALL EMERGENCY VALVES NOT OPEN—The emergency valves must always all be open except as in Paragraph (e), Page 17, Emergency Operation.

(3) LEAKS IN HYDRAULIC SYSTEM—All leaks must be stopped without delay.

(a) Leaks at hose coupling: Remove coupling and apply sealing compound, then reassemble.

(b) Leaks back of coupling: Replace entire hose assembly.

(c) Leaks at piston rod: Replace gland packing in cylinder.

(d) Leaks at lower cylinder control valve: Replace oil seals.

(e) Leaks at main control valve: Replace oil seals.

(f) Leaks at pump: Replace packing.

e. TO REPACK THE PISTON RODS

(1) The packing used on the piston rods in the hydraulic cylinders is of a chevron or V-leather type. It also has an automatic take-up; i.e., a spring is installed in back of the packing. The function of this spring is to spread the leather as wear occurs. If the edges of the leather becomes damaged, it is possible that they may leak before they are completely worn out.

(2) If leaks occur at this point, therefore, it is recommended that the gland be removed and new packing leathers installed. In order to replace this packing as originally furnished, it is necessary to remove the end of the piston rod. In order to avoid this, these V-leathers may be cut with a razor blade. When repacking with cut leathers, at least three leathers should be assembled together around the piston rods with the cuts on opposite sides, and then inserted in the gland, without removing the rod end. Always replace as many V-leather rings as are removed when making repairs of this kind. Always leave the first leather next to the expander ring in place.

PARTS CATALOG

WARNING

SPARE PARTS can be supplied promptly and accurately only if positively identified by correct part number and correct part name.

FURNISH THIS INFORMATION ON ALL REQUISITIONS. WITHOUT FAIL, on all requisitions, give name of machine, name of manufacturer, model or size, manufacturer's serial number of each machine and subassemblies attached to machine, and components and accessories for which spare parts are required.

List spare parts for only one make or kind of machine on each requisition.

Requisitions must be double spaced to provide room for office notations when necessary.

PARTS CATALOG

PREPARATION OF REQUISITIONS

THIS IS WD AGO FORM NO. 445, AS DEvised BY ALTERING QMC FORM NO. 400 UNTIL SUCH TIME AS NEW PRINTED FORMS NO. 445 ARE AVAILABLE. THIS FORM IS TO BE USED BY POST, CAMP, STATION AND OVERSEAS THEATER DEPOT ENGINEER PROPERTY OFFICERS TO REQUISITION ENGINEER SPARE PARTS FROM THE ENGINEER FIELD MAINTENANCE OFFICE, P. O. BOX 1679, COLUMBUS, OHIO.

The marginal notes give instructions for preparing a requisition for spare parts for Engineer Equipment.

The revised WD AGO Form No. 445 has new column headings as shown below. Under revised heading "Nomenclature and Unit" list the article and the unit (ea. for each; lb. for pound; etc.). Under heading "Maximum or Authorized Level" list the authorized organizational allowances or depot stock levels given in ENG 7 and ENG 8 of the ASF Engineer Supply

Catalog (Superseding Part III, Corps of Engineers Supply Catalog). The total number on hand for each item is listed under "On Hand." In column headed "Due In" enter the total quantity previously requisitioned but not delivered. Column headed "Required" is to be changed to read "Quantity Desired" and column headed "Approved" is to read "Remarks." For "Initial" and "Replenishment" requisitions, the sum of "Quantity Desired," "Due In," and "On Hand" should equal "Maximum or Authorized Level."

State TYPE OF ISSUE designation by use of one of the following terms:

- (1) "INITIAL"—first requisition of authorized allowances.
- (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances. (State period covered, i. e., 1 Apr—31 Apr)
- ▼ (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances, or for repair of deadlined equipment.

Type "SPARE PARTS" in upper right hand corner of requisition.

Address requisitions to Engineer Field Maintenance Office, P.O. Box 1679, Columbus, Ohio.

Give complete shipping instructions. Special instructions for packing, marking, routing, etc., should be given at bottom of requisition.

State proper nomenclature of machine, also make, model, machine serial number and U. S. A. registration number.

State OCE stock numbers when available.

Prepare a separate requisition for each different machine.

State basis or authority and date delivery is required, immediately below description of machine. State number of Technical Manual or ASF Supply Catalog to which you referred.

Double Space between items.

Group parts required under group headings as shown in approved WD manuals.

State manufacturer's parts numbers and nomenclature accurately. Do not use abbreviations.

WAR DEPARTMENT
- 4-24-44 -
- Revised April 1944 -

(Sample)
REQUISITION

W.L., AGO Form No. 445
May 4, 1944

To: Engineer Field Maintenance Office No. of Sheets 1 Sheet No. 1
P.O. Box 1679, Columbus, Ohio

Requisition No. E-908-4-44 Date May 4, 1944 Period Replenishment

SHIP TO Engineer Property Officer, Fort Lewis, Washington

MARKED FOR: Supply Officer, 160th Engr. Regiment, Fort Lewis, Wash.

Organization and Address of Supply Officer
Signing Requisition if Different from "Ship To" Address.

Approved By: For the Commanding Officer:

John E. Doe
Major, C.E.
SUPPLY OFFICER

| Part No. | Nomenclature and Unit | Auth. Part No. | ON HAND | REMARKS | Quantity Due In | Quantity Desired | Remarks |
|--|---|----------------|---------|---------|-----------------|------------------|---------|
| PARTS FOR CRANE, HYDRAULIC, TRUCK MOUNTED, SPECIAL FOR BRIDGE TREADWAY HANDLING, MODEL -II-A - Serial Numbers HE356 and HE354 | | | | | | | |
| Basis: Repair of Disabled Equipment. | | | | | | | |
| Delivery is requested by May 21, 1944 | | | | | | | |
| LONG UPPER CYLINDER ASSEMBLY | | | | | | | |
| A178B | Long Cylinder Assembly, only, including all parts which are assembled and welded at factory | ea | 0 | | 0 | 4 | |
| X12A92 | V-Leather Packing | ea | 0 | | 0 | 32 | |
| Z3A187 | Bronze Packing Gland | ea | 0 | | 0 | 2 | |
| HYDRAULIC PUMP ASSEMBLY | | | | | | | |
| AA-157 | Hydraulic Pump Assembly | ea | 0 | | 0 | 1 | |
| X12A93 | V-Leather Packing | ea | 0 | | 0 | 8 | |
| MAIN SHAFT, MAIN BRACKETS AND MAIN BEARINGS | | | | | | | |
| 8B4588 | Main shaft-3-15/16" x 98-3/4" | ea | 0 | | 0 | 1 | |
| A3A910A | Main Bracket Bearing (Inner) | ea | 0 | | 0 | 2 | |
| * | | | | | | | |

*Nonexpendable items such as tools must be accounted for, when requisitioned, by a statement that they have been placed on REPORT OF SURVEY or STATEMENT OF CHARGES.

Emergency requisitions sent by telephone, telegraph or radio must be confirmed immediately with requisition marked: "Confirming (state identifying data)."

▼ Engineer Supply Officers within the Continental United States will use only this period designation.

PREPARATION OF REQUISITIONS

A sample requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

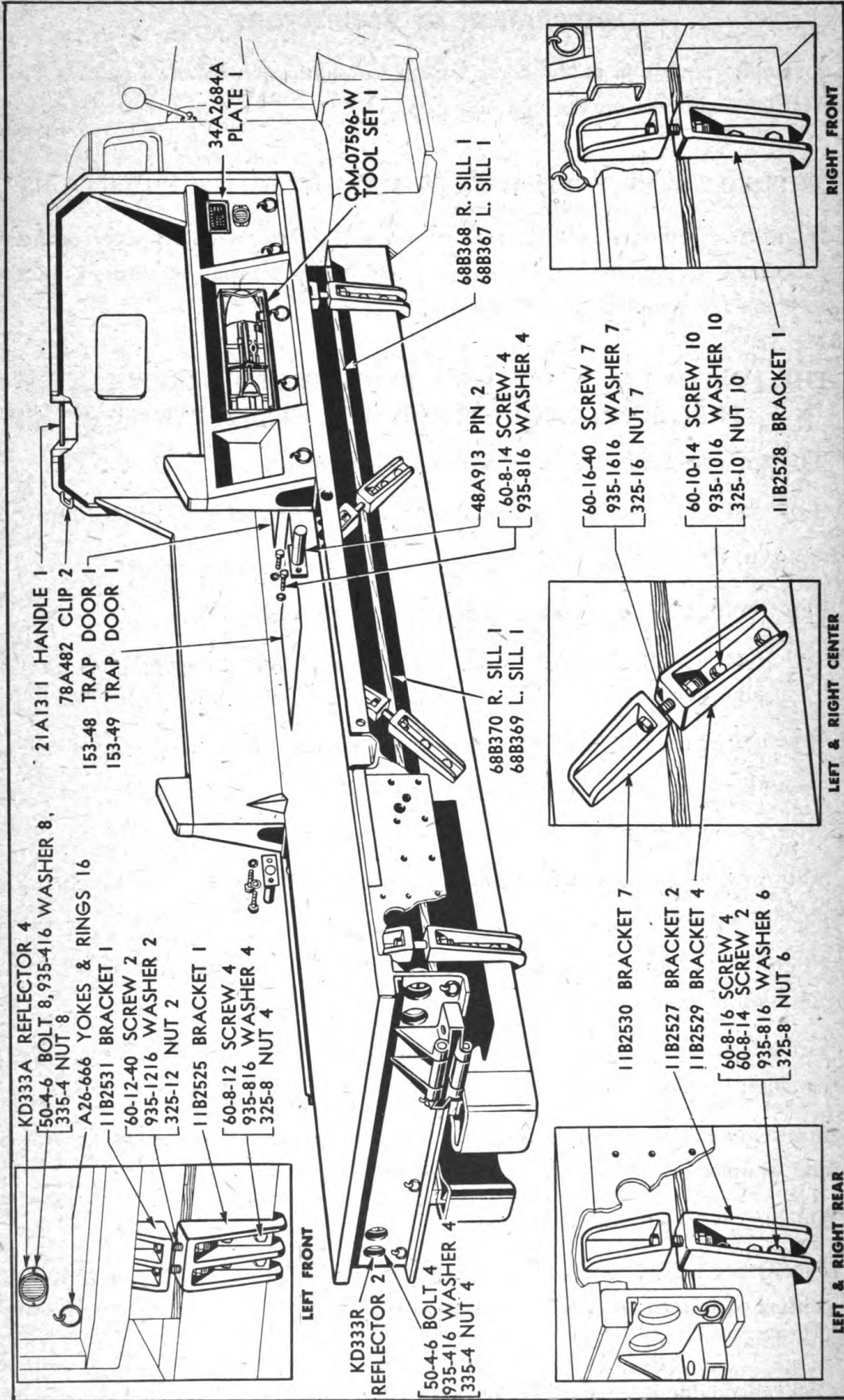
THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS

In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY IN PREPARING REQUISITIONS FOR SPARE PARTS:

- a. Prepare a separate requisition for each different machine.
- b. Type "SPARE PARTS" in upper right hand corner of requisition form.
- c. State PERIOD designation by use of one of the following terms:
 - (1) "INITIAL"—first requisition of authorized allowances.
 - (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.
 - (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.
- d. Give complete shipping instructions.
- e. State proper nomenclature of machine, and make, model, serial number and registration number.
- f. State basis of authority, and date delivery is required, immediately below description of machine.
- g. Group parts required under group headings as shown in manufacturer's parts catalogs.
- h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.
- i. Double space between items.
- j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)."
- k. Nonexpendable items must be accounted for.

PARTS CATALOG

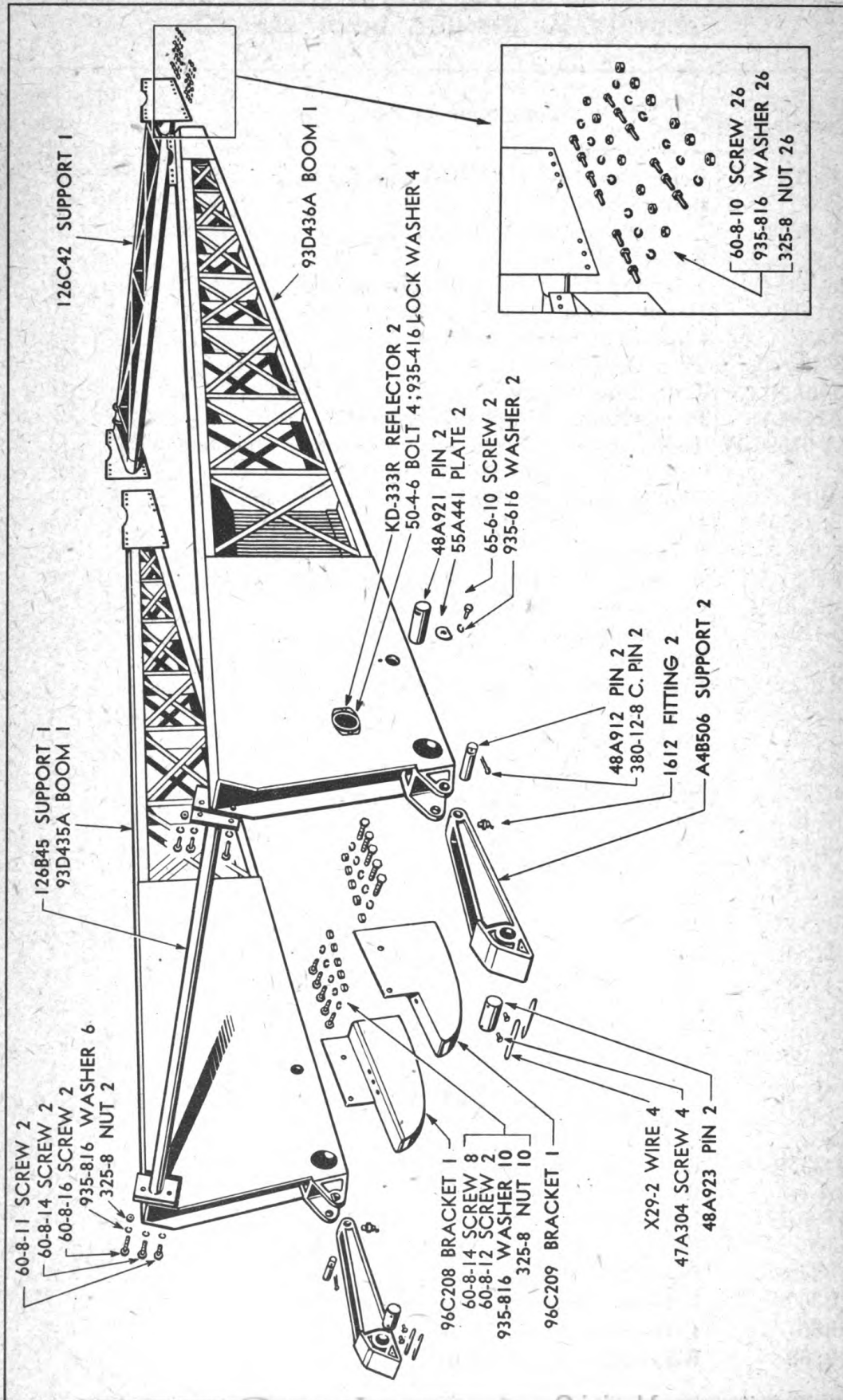


BODY, FRAME, AND HOLD DOWN BRACKETS

BODY, FRAME AND HOLD DOWN BRACKETS

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| KD333A | Reflector—Amber, (K-D Lamp Co.) | 4 |
| 50-4-6 | Bolt—Stove, $\frac{1}{4}$ " x $\frac{1}{2}$ " | 8 |
| 935-416 | Lockwasher— $\frac{1}{4}$ " | 8 |
| 335-4 | Nut— $\frac{1}{4}$ ", USS | 8 |
| A26-666 | Yoke and Ring—for Tarpaulin (welded to body) | 16 |
| 21A1311 | Handle—Rod (welded to body) | 1 |
| 78A482 | Clip—Belt, Safety (welded to body) | 2 |
| 153-48 | Trap Door—Front | 1 |
| 153-49 | Trap Door—Rear | 1 |
| 34A2684A | Plate—Name (Corps of Engineers) | 1 |
| QM-07596-W | Tool Set—(Furnished by Government complete with Tools) (See Page 90) | 1 |
| 48A913 | Pin—Support, Cylinder, Upper $2\frac{3}{8}$ " x $9\frac{7}{8}$ " | 2 |
| 60-8-14 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{2}$ ", SAE | 4 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 4 |
| 11B2531 | Bracket—Hold Down (Upper) (welded to body) | 1 |
| 60-12-40 | Capscrew— $\frac{3}{4}$ " x 4", SAE | 2 |
| 935-1216 | Lockwasher— $\frac{3}{4}$ " | 2 |
| 325-12 | Nut— $\frac{3}{4}$ " SAE | 2 |
| 11B2525 | Bracket—Hold Down (Lower Left Front) | 1 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", SAE | 4 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 4 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 4 |
| 11B2527 | Bracket—Hold Down (Lower Rear) | 2 |
| 60-8-16 | Capscrew— $\frac{1}{2}$ " x $1\frac{3}{4}$ ", SAE | 4 |
| 60-8-14 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{2}$ ", SAE | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 6 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 6 |
| 11B2530 | Bracket—Hold Down (Upper) (welded to body) | 7 |
| 11B2529 | Bracket—Hold Down (Lower Diagonal) | 4 |
| 60-10-14 | Capscrew— $\frac{5}{8}$ " x $1\frac{1}{2}$ ", SAE | 10 |
| 935-1016 | Lockwasher— $\frac{5}{8}$ " | 10 |
| 325-10 | Nut— $\frac{5}{8}$ ", SAE | 10 |
| 11B2528 | Bracket—Hold Down (Lower Front) | 1 |
| 60-16-40 | Capscrew—1" x 4", SAE | 7 |
| 935-1616 | Lockwasher—1" | 7 |
| 325-16 | Nut—1", SAE | 7 |
| KD333R | Reflector—Red, (K-D Lamp Co.) | 2 |
| 50-4-6 | Bolt—Stove, $\frac{1}{4}$ " x $\frac{1}{2}$ " | 4 |
| 935-416 | Lockwasher— $\frac{1}{4}$ " | 4 |
| 335-4 | Nut— $\frac{1}{4}$ ", USS | 4 |
| 68B370 | Right Sill—Wood, Rear | 1 |
| 68B369 | Left Sill—Wood, Rear | 1 |
| 68B367 | Left Sill—Wood, Front | 1 |
| 68B368 | Right Sill—Wood, Front | 1 |

PARTS CATALOG

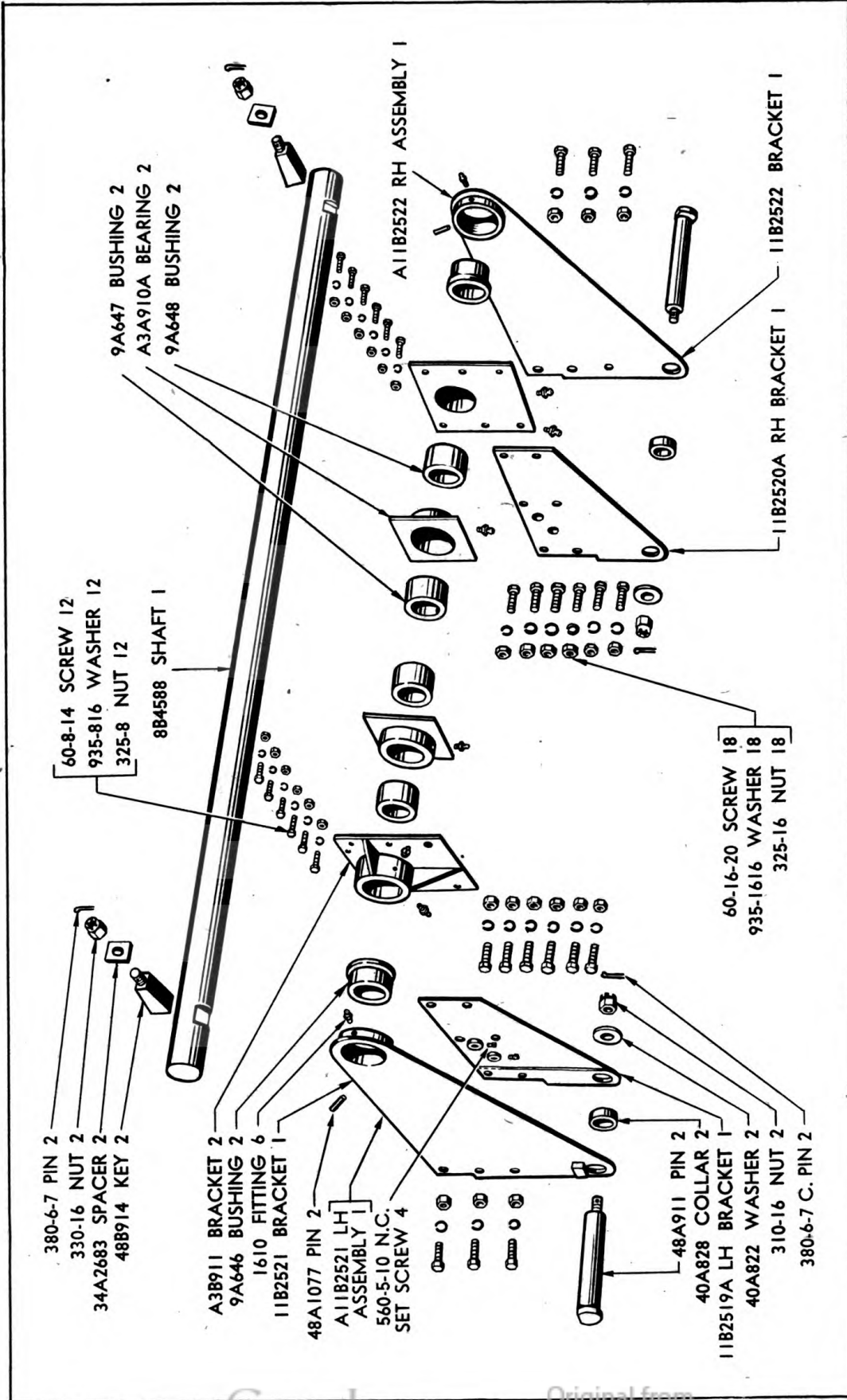


BOOM ASSEMBLY

BOOM ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 93D436A | Boom Assembly—Right | 1 |
| 93D435A | Boom Assembly—Left | 1 |
| 126B45 | Support—Shaft, Cross, Rear (for crane booms) | 1 |
| 60-8-11 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{8}$ ", SAE | 2 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", SAE | 2 |
| 60-8-16 | Capscrew— $\frac{1}{2}$ " x $1\frac{3}{4}$ ", SAE | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 6 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 2 |
| 126C42 | Support—Upper Boom | 1 |
| 60-8-10 | Capscrew— $\frac{1}{2}$ " x 1", SAE | 26 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 26 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 26 |
| KD333R | Reflector—Red, (K-D Lamp Co.) | 2 |
| 50-4-6 | Bolt—Stove, $\frac{1}{4}$ " x $\frac{1}{2}$ " | 4 |
| 935-416 | Lockwasher— $\frac{1}{4}$ " | 4 |
| A4B506 | Support—For Lower Cylinders A177 | 2 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ ", $67\frac{1}{2}$ °, No. 1612 | 2 |
| 48A923 | Pin—for A4B506 Support to Lower Cylinders | 2 |
| 47A304 | Setscrew— $\frac{3}{8}$ " x 1", Drilled Head | 4 |
| X29-2 | Wire—Locking | 4 |
| 48A912 | Pin— for A4B506 Support to Booms, $1\frac{1}{4}$ " x $5\frac{11}{16}$ " | 2 |
| 380-12-8 | Pin—Cotter, $\frac{3}{8}$ " x 2" | 2 |
| 48A921 | Pin—Piston Rod, 2" x $5\frac{13}{16}$ " (Upper Cylinders to Booms) | 2 |
| 55A441 | Washer—Retaining, $1\frac{3}{4}$ " | 2 |
| 65-6-10 | Capscrew— $\frac{3}{8}$ " x 1", USS | 2 |
| 935-616 | Lockwasher— $\frac{3}{8}$ " | 2 |
| 96C209 | Brackets—Skid, Right | 1 |
| 96C208 | Bracket—Skid, Left | 1 |
| 60-8-14 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{2}$ ", SAE | 8 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", SAE | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 10 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 10 |

PARTS CATALOG



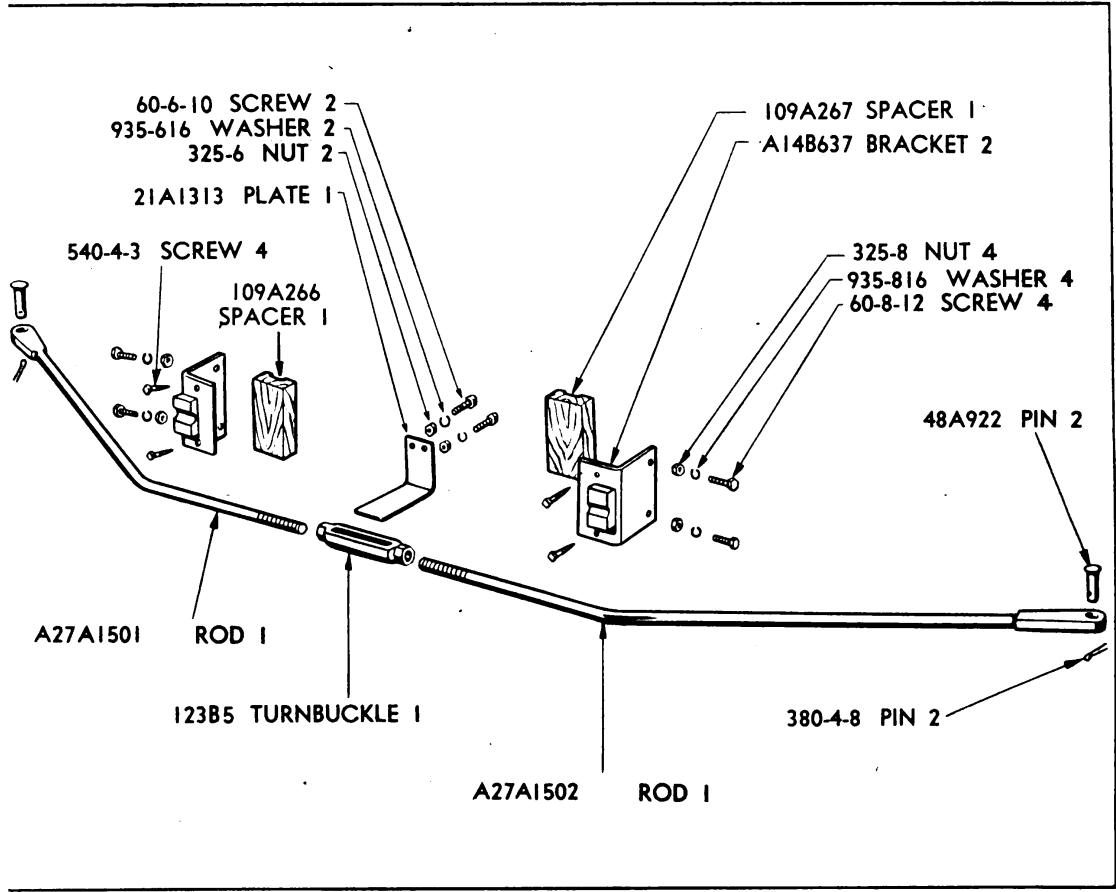
CYLINDER SUPPORT BEARINGS AND MAIN SHAFT

Serial No. HE-335 to HE-834

CYLINDER SUPPORT BEARINGS AND MAIN SHAFT

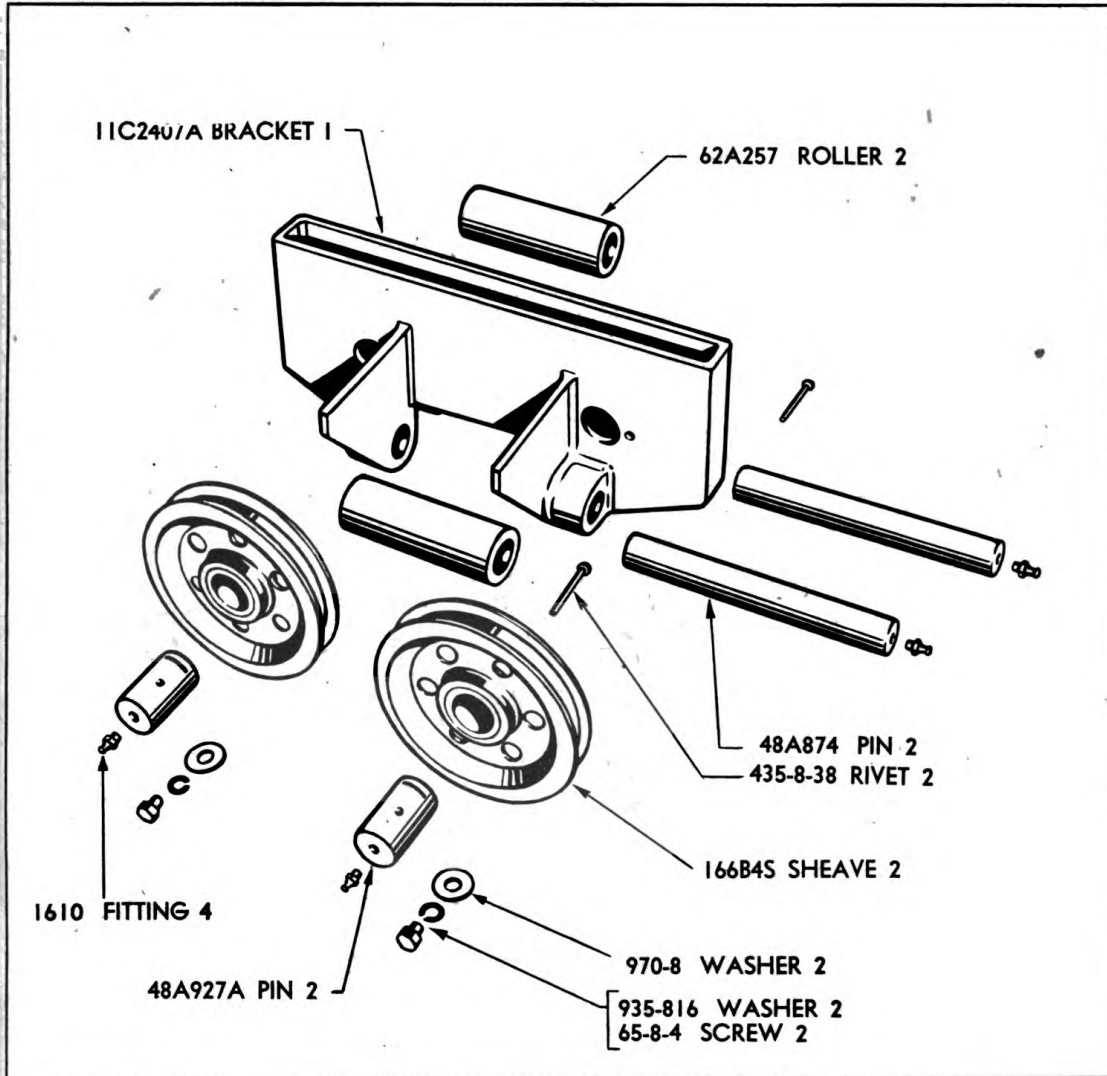
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| 8B4588 | Shaft—Main, 3 $\frac{1}{8}$ " x 98 $\frac{3}{4}$ " | 1 |
| 48B914 | Key—Wedge, Tapered 1 $\frac{5}{8}$ " | 2 |
| 34A2683 | Spacer—for 48B914 Key, 2 $\frac{1}{2}$ " x 3 $\frac{1}{4}$ " | 2 |
| 310-16 | Nut—Castellated, 1", SAE | 2 |
| 380-6-7 | Pin—Cotter, $\frac{3}{8}$ " x 1 $\frac{3}{4}$ " | 2 |
| A3B911 | Bracket—Bearing, Main (Outer) | 2 |
| 1610 | Fitting—Alemite, $\frac{1}{8}$ ", Straight, No. 1610 | 2 |
| 9A648 | Bushing—Bronze, (for A3B911 Bearing) | 2 |
| 60-8-14 | Capscrew— $\frac{1}{2}$ " x 1 $\frac{1}{2}$ ", SAE | 12 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 12 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 12 |
| A3A910A | Bracket—Bearing, Main (Inner) | 2 |
| 1610 | Fitting—Alemite, $\frac{1}{8}$ ", Straight, No. 1610 | 2 |
| 9A647 | Bushing—Bronze, (for A3A910A Bearing) | 2 |
| 11B2520A | Bracket Assembly, RH—for Lower Right Cylinder | 1 |
| 560-5-10 | Setscrew— $\frac{5}{16}$ " x $\frac{5}{8}$ ", USS | 2 |
| 11B2519A | Bracket Assembly, LH—for Lower Left Cylinder | 1 |
| 560-5-10 | Setscrew— $\frac{5}{16}$ " x $\frac{5}{8}$ ", USS | 2 |
| A11B2522 | Assembly, RH—Right Lower Cylinder Support | |
| | Bracket (Outer) | 1 |
| | 11B2522—Plate, only (for Lower Cylinder Support) | |
| | (Right) | 1 |
| | 9A646—Bushing, Bronze, for 11B2522 Plate | 1 |
| | 48A1077—Pin, Dowel, $\frac{3}{16}$ " x $\frac{3}{4}$ " | 1 |
| 1610 | Fitting—Alemite, $\frac{1}{8}$ ", Straight No. 1610 | 1 |
| A11B2521 | Assembly, LH—Left Lower Cylinder Support | |
| | Bracket (Outer) | 1 |
| | 11B2521—Plate, only (for Lower Cylinder Support) | |
| | (Left) | 1 |
| | 9A646—Bushing, Bronze (for 11B2521 Plate) | 1 |
| | 48A1077—Pin, Dowel, $\frac{3}{16}$ " x $\frac{3}{4}$ " | 1 |
| 1610 | Fitting—Alemite, $\frac{1}{8}$ ", Straight, No. 1610 | 1 |
| | Note: Manufacturer Recommends ordering | |
| | A11B2521 and A11B2522 already assembled. | |
| 60-16-20 | Capscrew—1" x 2", SAE | 18 |
| 935-1616 | Lockwasher—1" | 18 |
| 325-16 | Nut—1", SAE | 18 |
| 48A911 | Pin—2 $\frac{3}{16}$ " x 12", (for Lower Cylinder Support) | 2 |
| 310-16 | Nut—Castellated, 1", SAE | 2 |
| 380-6-7 | Pin—Cotter, $\frac{3}{8}$ " x 1 $\frac{3}{4}$ " | 2 |
| 40A828 | Collar—Spacer, Inner | 2 |
| 40A822 | Washer—3" (for 48A911 Pin) | 2 |

PARTS CATALOG



TIE ROD ASSEMBLY

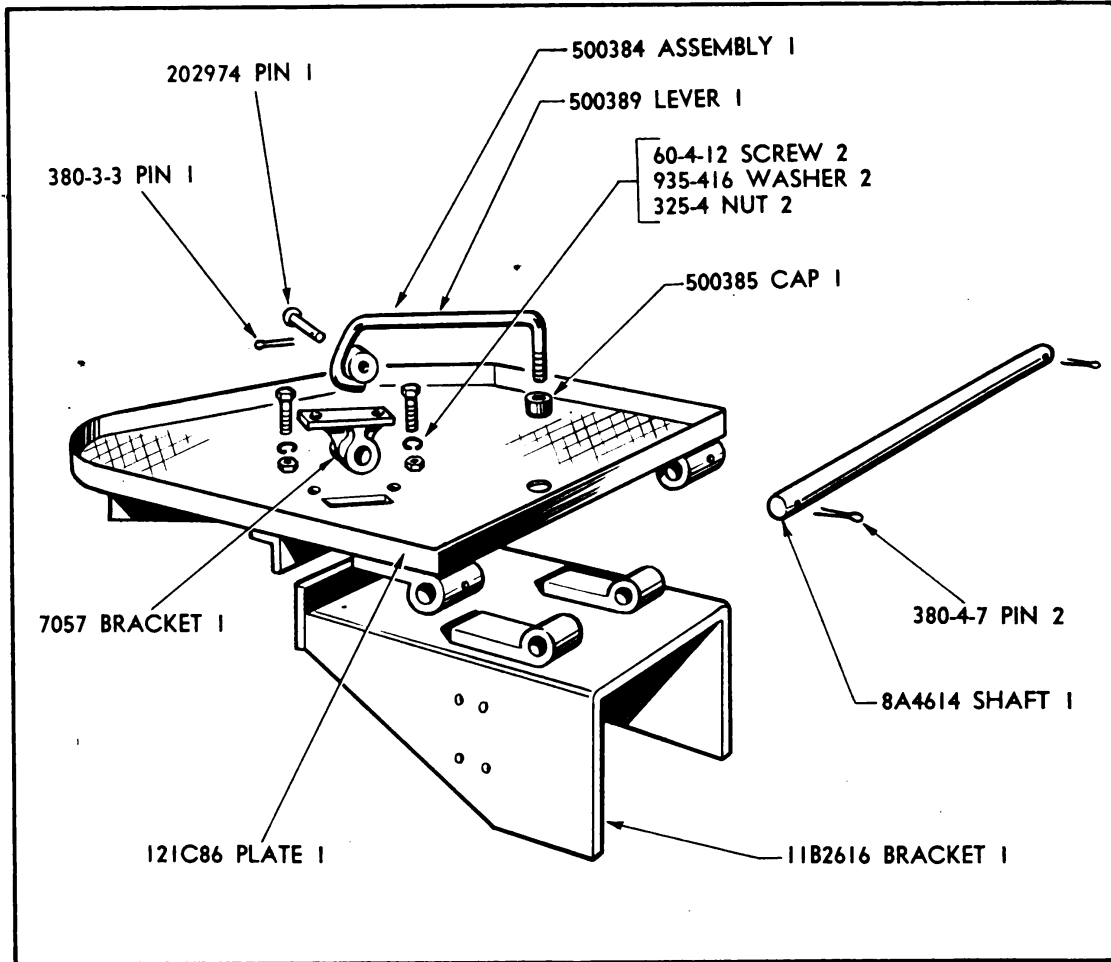
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| A27A1502 | Rod—Tie (Right) | 1 |
| A27A1501 | Rod—Tie (Left) | 1 |
| 123B5 | Turnbuckle— $\frac{7}{8}$ ", USS | 1 |
| 48A922 | Pin—1" x $\frac{3}{4}$ " (for A27A1501 and A27A1502 Tie Rods) | 2 |
| 380-4-8 | Pin—Cotter, $\frac{1}{8}$ " x 2" | 2 |
| 21A1313 | Plate—Lock, Turnbuckle | 1 |
| 60-6-10 | Capscrew— $\frac{3}{8}$ " x 1", SAE | 2 |
| 935-616 | Lockwasher— $\frac{3}{8}$ " | 2 |
| 325-6 | Nut— $\frac{3}{8}$ ", SAE | 2 |
| A14B637 | Bracket | 2 |
| 109A267 | Spacer—Wood, Right | 1 |
| 109A266 | Spacer—Wood, Left | 1 |
| 540-4-3 | Screw—Lag, $\frac{1}{4}$ " x $1\frac{1}{2}$ " | 4 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", SAE | 4 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 4 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 4 |



A11C2407 FAIRLEAD ASSEMBLY

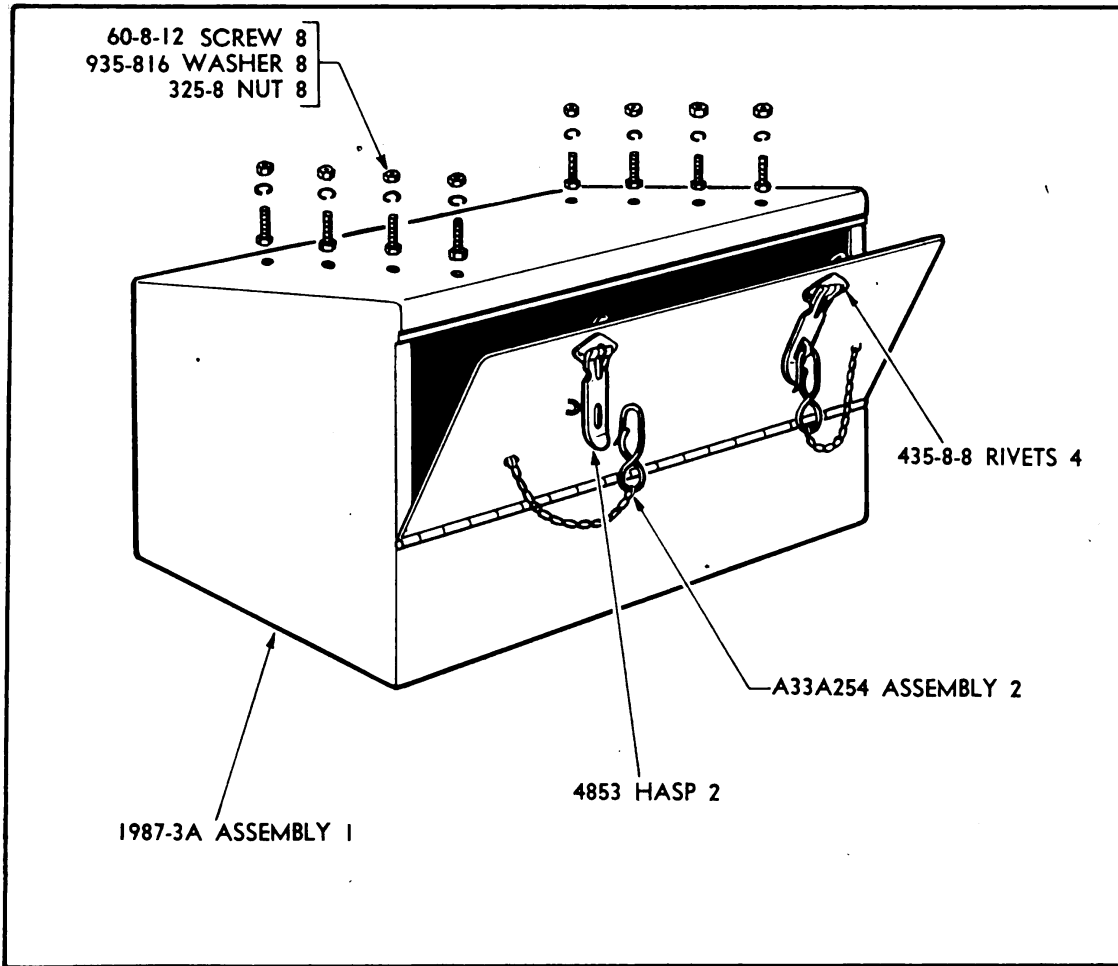
| Heil Part Number. | Description of Part | No. Per Unit |
|-------------------|--|--------------|
| 11C2407A | Bracket—Sheave, Fairlead (welded to body) | 1 |
| 166B4S | Sheave—Fairlead | 2 |
| 48A927A | Pin—2 ⁷ / ₈ " x 1 ³ / ₄ ", (for Fairlead Sheave) | 2 |
| 48A874 | Pin—Roller, 1 ¹ / ₂ " x 11 ¹ / ₈ ", Drilled | 2 |
| 62A257 | Rollers—Ex. Strong Pipe, 2" x 7" | 2 |
| 435-8-38 | Rivet—Head, Round, 1/4" x 2 ³ / ₄ " | 2 |
| 1610 | Fitting—Alemite, 1/8", Straight, No. 1610 | 4 |
| 65-8-4 | Capscrew—1/2" x 1/2", USS | 2 |
| 935-816 | Lockwasher—1/2" | 2 |
| 970-8 | Washer—Cut, 1/2" | 2 |

PARTS CATALOG



**OPERATOR'S PLATFORM
FOOT THROTTLE ASSEMBLY**

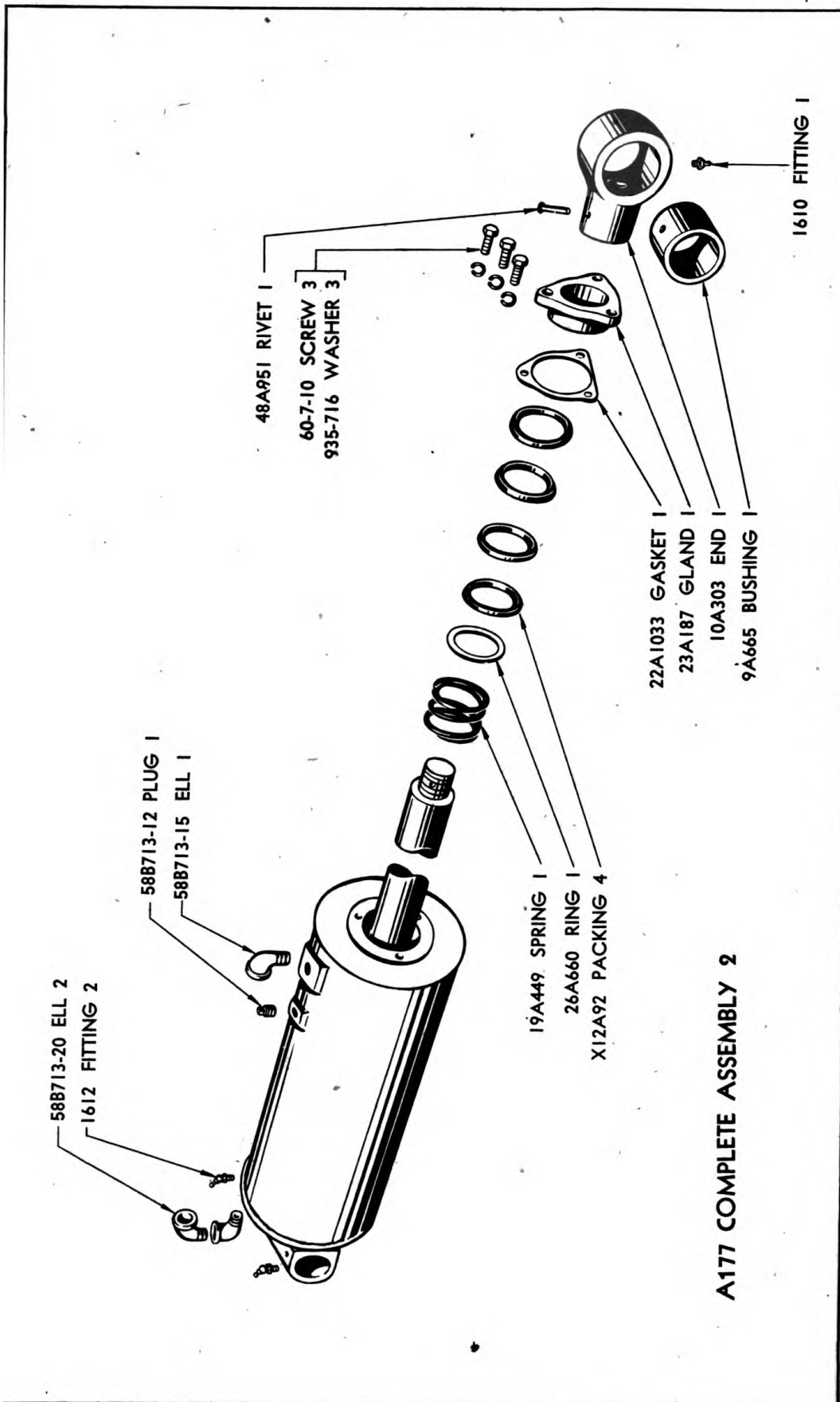
| Heil Part Number | Description of Part | No. Per Unit |
|--|--|--------------|
| 11B2616 | Bracket—Plate, Step (welded to body) | 1 |
| 121C86 | Plate Assembly—Step, Complete | 1 |
| 8A4614 | Shaft—Hinge, 7/8" x 16 1/2" | 1 |
| 380-4-7 | Pin—Cotter, 1/8" x 1 3/4" | 2 |
| Following Parts Manufactured by Brockway Motor Co., Cortland, N. Y. | | |
| 500384 | Assembly—Throttle, Foot, (Brockway No. 500384) | 1 |
| 7057 | Bracket—Bearing, (Brockway No. 7057) | 1 |
| 500389 | Lever—Throttle, Foot, (Brockway 500389) | 1 |
| 500385 | Cap—Throttle, Foot, (Brock'y 500385) | 1 |
| 202974 | Pin—3/8" x 1 5/8", (Brockway No. 202974) | 1 |
| 60-4-12 | Capscrew—1/4" x 1 1/4", SAE | 2 |
| 935-416 | Lockwasher—1/4" | 2 |
| 325-4 | Nut—1/4", SAE | 2 |
| 380-3-3 | Pin—Cotter, 3/32" x 3/4" | 1 |



TOOL BOX ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| 1987-3A | Assembly—Box, Tool | 1 |
| | 4853 Hasp—Latch | 2 |
| | 435-8-8 Rivet —Head, Round, 1/4" x 1/2" | 4 |
| | A33A254 Assembly—Chain and Clip (welded to tool box)..... | 2 |
| 60-8-12 | Capscrew—1/2" x 1 1/4", SAE | 8 |
| 935-816 | Lockwasher—1/2" | 8 |
| 325-8 | Nut—1/2", SAE | 8 |

PARTS CATALOG

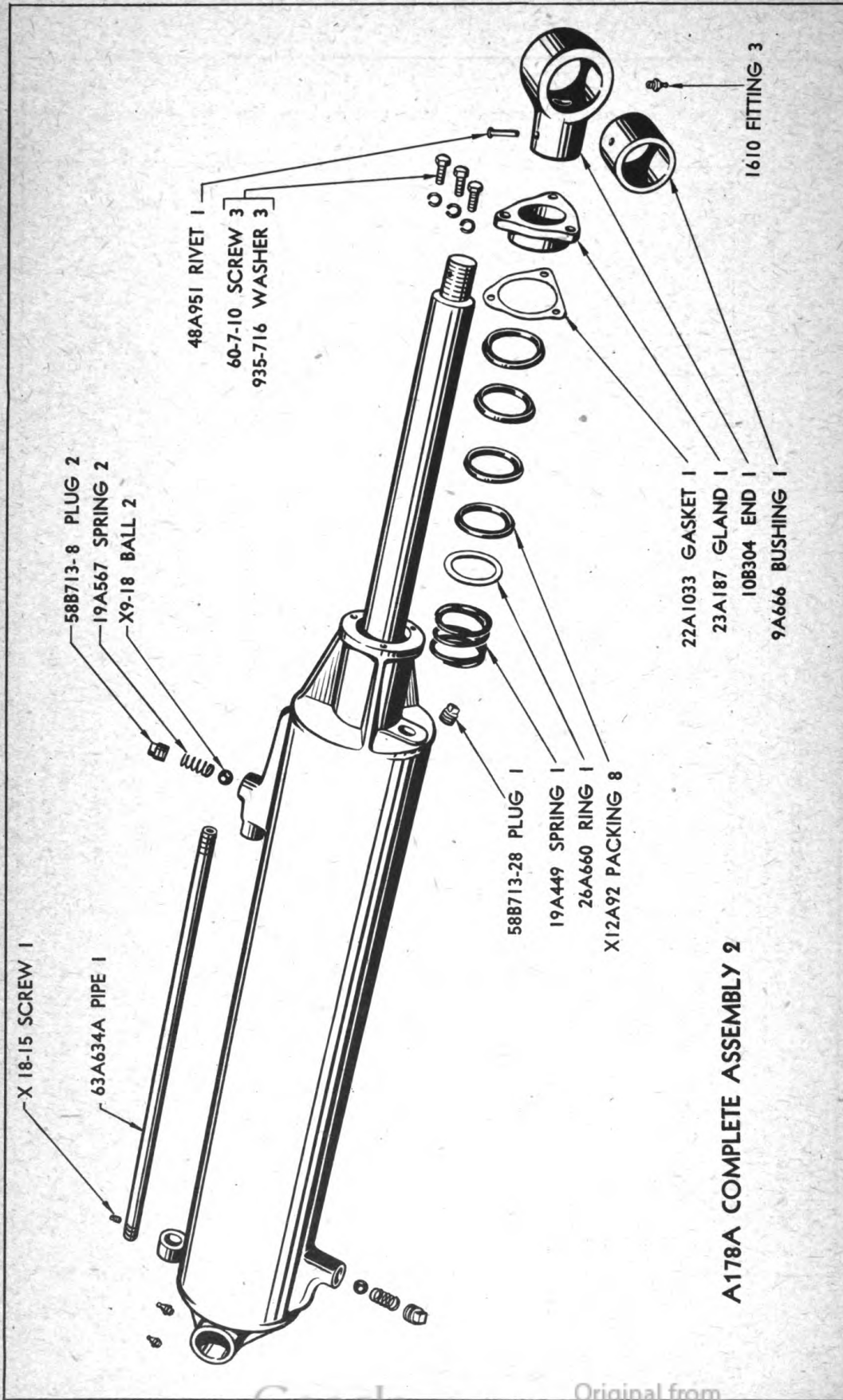


A177 SHORT LOWER CYLINDER ASSEMBLY

SHORT LOWER CYLINDER ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| A177 | Complete Assembly—Cylinder, Lower, Short | 2 |
| 1612 | Fitting—Alemité $\frac{1}{8}$ " , 67 $\frac{1}{2}$ ° No. 1612..... | 4 |
| 19A449 | Spring—Cylinder Head | 2 |
| 26A660 | Ring—Packing (for Cylinder Head) | 2 |
| X12A92 | Packing—V-Leather (for Piston Rod) | 8 |
| 22A1033 | Gasket—Rod, Piston | 2 |
| 23A187 | Gland—Packing, Bronze | 2 |
| 60-7-10 | Capscrew—7/16" x 1" , SAE | 6 |
| 935-716 | Lockwasher— $\frac{7}{16}$ " | 6 |
| 10A303 | End—Rod, Piston | 2 |
| 48A951 | Rivet—Head, Round 5/16" x 2 $\frac{5}{8}$ " | 2 |
| 9A665 | Bushing—Bronze, (for Piston Rod End) | 2 |
| 1610 | Fitting—Alemité, $\frac{1}{8}$ " , Straight, No. 1610 | 2 |
| 58B713-15 | Ell—Street, $\frac{1}{2}$ " , 45° | 2 |
| 58B713-12 | Plug—Pipe, $\frac{1}{4}$ " | 2 |
| 58B713-20 | Ell—Street, $\frac{3}{4}$ " , 90° , Ex. Strong | 4 |

PARTS CATALOG



A178A COMPLETE ASSEMBLY 2

A178A LONG UPPER CYLINDER ASSEMBLY

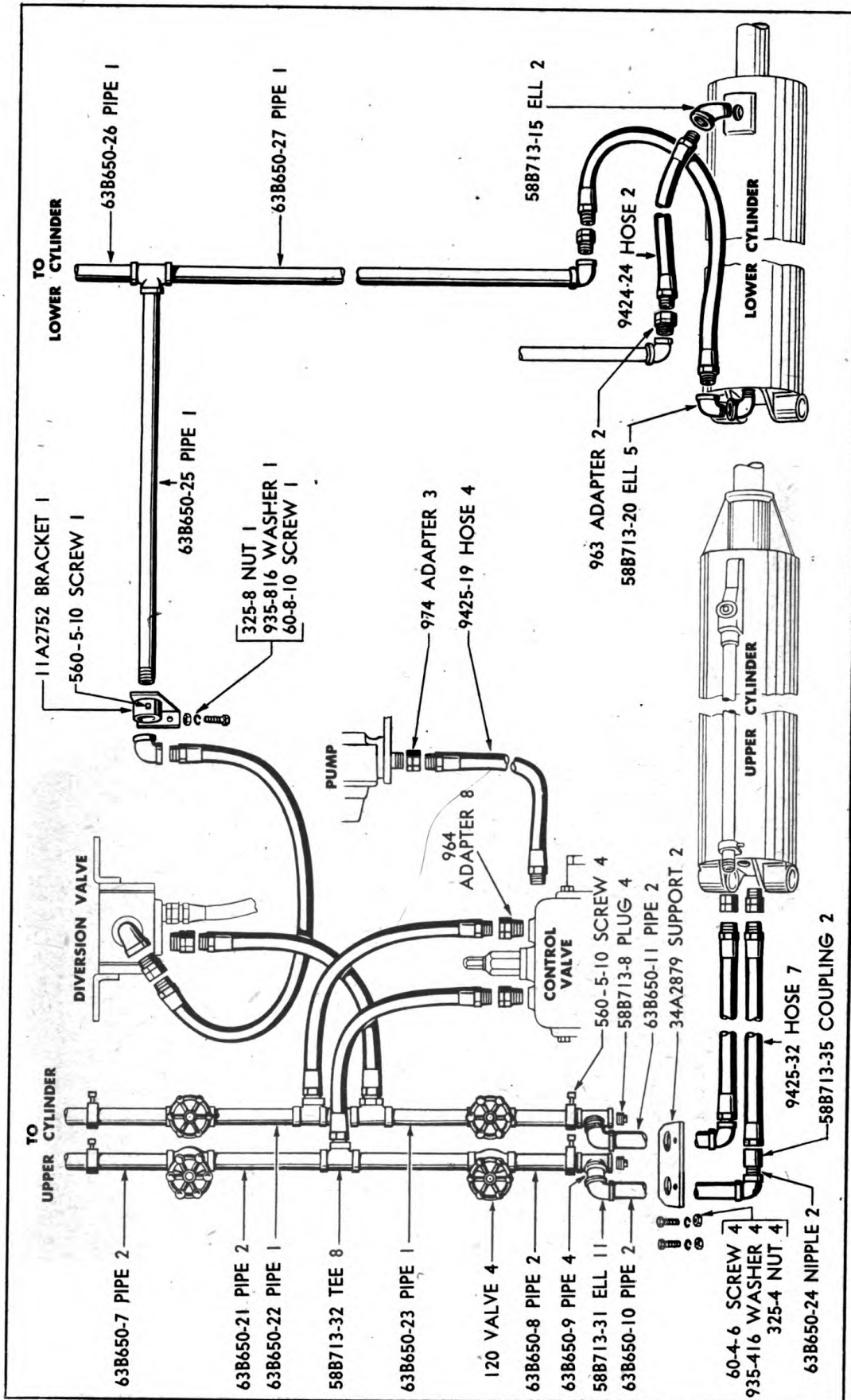
LONG UPPER CYLINDER ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|---|
| A178A | Complete Assembly—Cylinder, Upper, Long 58B713-28 Plug—Pipe, 1/2", Standard 1610 Fitting—Alemitite, 1/8", Straight, No. 1610 19A449 Spring—Head, Cylinder 26A660 Ring—Packing (for Cylinder Head) X12A92 Packing—V-Leather (for Piston Rod) 22A1033 Gasket—Rod, Piston 23A187 Gland—Packing, Bronze 60-7-10 Capscrew—7/16" x 1", SAE 935-716 Lockwasher—7/16" 10B304 End—Rod, Piston 48A951 Rivet—Head, Round, 5/16" x 2 5/8" 9A666 Bushing—Bronze, (for Piston Rod End) 1610 Fitting—Alemitite, 1/8", Straight, No. 1610 X9-18 Ball—7/8", Steel 19A567 Spring—Ball, Check 58B713-8 Plug—3/4", Steel, Forged, Standard 63A634A Pipe—Ex. Strong, Upper Return, 3/4" x 32" X18-15 Setscrew—Allen Head, 5/16" x 3/8", USS Wrench—Allen Head, 5/16" | 2 4 4 2 2 16 2 2 6 6 2 2 2 2 4 4 4 2 2 1 |
| 44-85 | Wrench—Allen Head, 5/16" | 1 |

RESERVE TANK, RETURN LINES, AND RELIEF VALVE

| Heil Part Number | Description of Part | No. Per Unit |
|---|---|--------------|
| RESERVE OIL TANK AND BRACKET | | |
| 20C635 | Tank—Oil, Reserve | 1 |
| | 58B713-12 Plug—Pipe, 1/4" | 1 |
| | 58B713-23 Plug—Pipe, 3/4" (Drain) | 1 |
| 60-8-12 | Capscrew—1/2" x 1 1/4", SAE | 2 |
| 60-8-16 | Capscrew—1/2" x 1 3/4", SAE | 2 |
| 935-816 | Lockwasher—1/2" | 4 |
| 325-8 | Nut—1/2", SAE | 4 |
| 11B2518 | Bracket—Tank, Oil, Reserve | 1 |
| 60-10-12 | Capscrew—5/8" x 1 1/4", SAE | 2 |
| 935-1016 | Lockwasher—5/8" | 2 |
| 325-10 | Nut—5/8", SAE | 2 |
| RETURN LINES, VALVE AND FITTINGS | | |
| 63B650-20 | Pipe—Ex. Strong, 1/2" x 30" | 1 |
| 63B650-19 | Pipe—Ex. Strong, 1/2" x 52 1/4" | 1 |
| 63B650-13 | Pipe—Standard, 3/4" x 32 1/2" | 1 |
| 63B650-2 | Pipe—Standard, 1" x 10" | 1 |
| 63B650-3 | Pipe—Standard, 1" x 27" | 1 |
| 63B650-4 | Pipe—Standard, 1" x 51 1/2" | 1 |
| 9425-10 | Hose—High Pressure, Hydraulic, (with Fittings), 3/4" x 10" | 1 |
| 9425-32 | Hose—High Pressure, Hydraulic, (with Fittings), 3/4" x 32" | 1 |
| 9426-33 | Hose—High Pressure, Hydraulic, (with Fittings), 1" x 33" | 2 |
| 964 | Union—Adapter (Male to Female) 3/4" | 2 |
| 965 | Union—Adapter (Male to Female) 1" | 2 |
| 58B713-10 | Tee—Standard, 1/2" x 1/2" x 3/4" | 1 |
| 58B713-34 | Ell—Standard, 1/2", 90° | 2 |
| 58B713-31 | Ell—Ex. Strong, 3/4", 90° | 1 |
| 58B713-33 | Tee—Standard, 1" x 1" x 3/4" | 1 |
| 58B713-1 | Ell—Standard, 1", 90° | 2 |
| 58B713-4 | Union—Standard, 1" | 1 |
| 58B713-5 | Cap—Pipe, 1" | 1 |
| 58B713-2 | Tee—Standard, 1" | 2 |
| 63B650-18 | Nipple—Ex. Strong, 1" Close | 1 |
| 58B713-21 | Ell—Street, Standard, 1" | 1 |
| 63B650-5 | Nipple—Standard, 1" x 4" | 1 |
| 58B713-3 | Plug—Pine, Head, Recessed, 1" | 1 |
| 63B650-1 | Nipple—Standard, 1" x 3" | 1 |
| 650 | Valve—Globe, Shut-off, 1", (Powell Co. No. 650) | 1 |
| 560-5-10 | Setscrew—Sq. head, 5/16" x 5/8", USS | 7 |
| RELIEF VALVE ASSEMBLY | | |
| A31A310 | Assembly—Valve, Relief | 1 |
| | 31A310 Body—Valve, Relief (only) | 1 |
| | X9-18 Ball—7/8", Steel | 1 |
| | 19A388 Spring—Check, Ball | 1 |
| | 82A360 Plug—Pipe, Special, 3/4" | 1 |

PARTS CATALOG

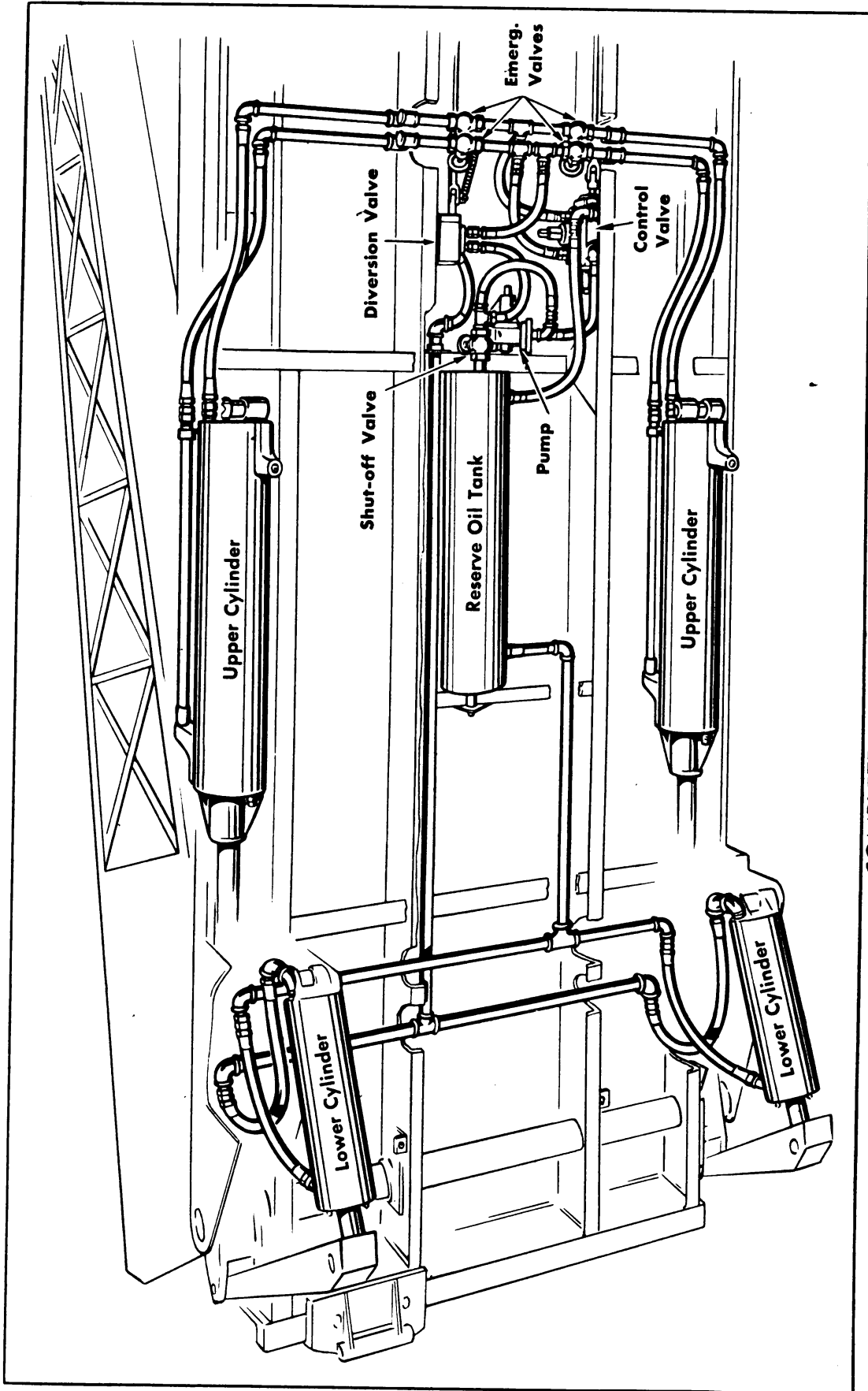


HYDRAULIC SYSTEM

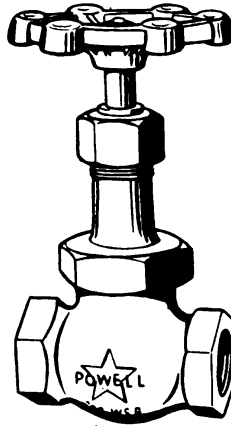
HYDRAULIC SYSTEM

| Heil Part Number | Description of Part | No. Per Unit |
|--------------------------------|---|--------------|
| HOSE, UNIONS AND VALVES | | |
| 9424-24 | Hose—High Pressure, (with Fittings), 1/2" x 24" | 2 |
| 9425-19 | Hose—High Pressure, (with Fittings), 3/4" x 19" | 4 |
| 9425-32 | Hose—High Pressure, (with Fittings), 3/4" x 32" | 7 |
| 963 | Union—Adapter, 1/2" (Male to Female)..... | 2 |
| 974 | Union—Adapter, 3/4" (Female to Female)..... | 3 |
| 964 | Union—Adapter, 3/4" (Male to Female)..... | 8 |
| 120 | Valve—Globe, 3/4" (Powell Co. No. 120)..... | 4 |
| PIPE | | |
| 63B650-9 | Pipe—Extra Strong, 3/4" x 3 1/4" | 4 |
| 63B650-7 | Pipe—Extra Strong, 3/4" x 6"..... | 2 |
| 63B650-23 | Pipe—Extra Strong, 3/4" x 6 1/2"..... | 1 |
| 63B650-8 | Pipe—Extra Strong, 3/4" x 7"..... | 2 |
| 63B650-22 | Pipe—Extra Strong, 3/4" x 7 3/4"..... | 1 |
| 63B650-21 | Pipe—Extra Strong, 3/4" x 8 3/4"..... | 2 |
| 63B650-11 | Pipe—Extra Strong, 3/4" x 22 3/4"..... | 2 |
| 63B650-10 | Pipe—Extra Strong, 3/4" x 24 7/8"..... | 2 |
| 63B650-26 | Pipe—Extra Strong, 3/4" x 28"..... | 1 |
| 63B650-27 | Pipe—Extra Strong, 3/4" x 56 1/2"..... | 1 |
| 63B650-25 | Pipe—Extra Strong, 3/4" x 74"..... | 1 |
| FITTINGS | | |
| 58B713-15 | Ell—Street, 1/2", 45° | 2 |
| 58B713-31 | Ell—Extra Strong, 3/4", 90° | 11 |
| 58B713-32 | Tee—Extra Strong, 3/4" | 8 |
| 63B650-24 | Nipple—Extra Strong, Close, 3/4" | 2 |
| 58B713-35 | Coupling—Extra Strong, 3/4" x 1 5/8" | 2 |
| 58B713-8 | Plug—Pipe, Steel, Forged, 3/4" | 4 |
| 58B713-20 | Ell—Street, Extra Strong, 3/4" | 5 |
| BRACKETS | | |
| 34A2879 | Support—Bracket, Pipe (Bolted to Body) | 2 |
| 60-4-6 | Capscrew—1/4" x 3/4", SAE..... | 4 |
| 935-416 | Lockwasher—1/4" | 4 |
| 325-4 | Nut—1/4", SAE | 4 |
| 560-5-10 | Setscrew—5/16" x 5/8", USS..... | 4 |
| 11A2752 | Bracket—Support, Pipe (Bolted to Body) | 1 |
| 60-8-10 | Capscrew—1/2" x 1", SAE | 1 |
| 935-816 | Lockwasher—1/2" | 1 |
| 325-8 | Nut—1/2", SAE | 1 |
| 560-5-10 | Setscrew—Sq. head 5/16" x 5/8", USS | 1 |

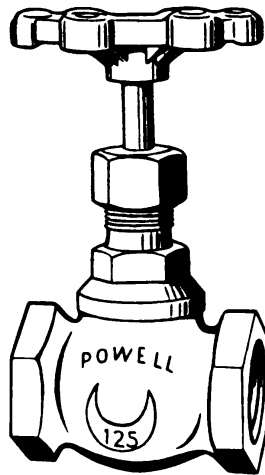
PARTS CATALOG



COMPLETE PIPING SYSTEMS



120 POWELL 3/4" VALVE 4



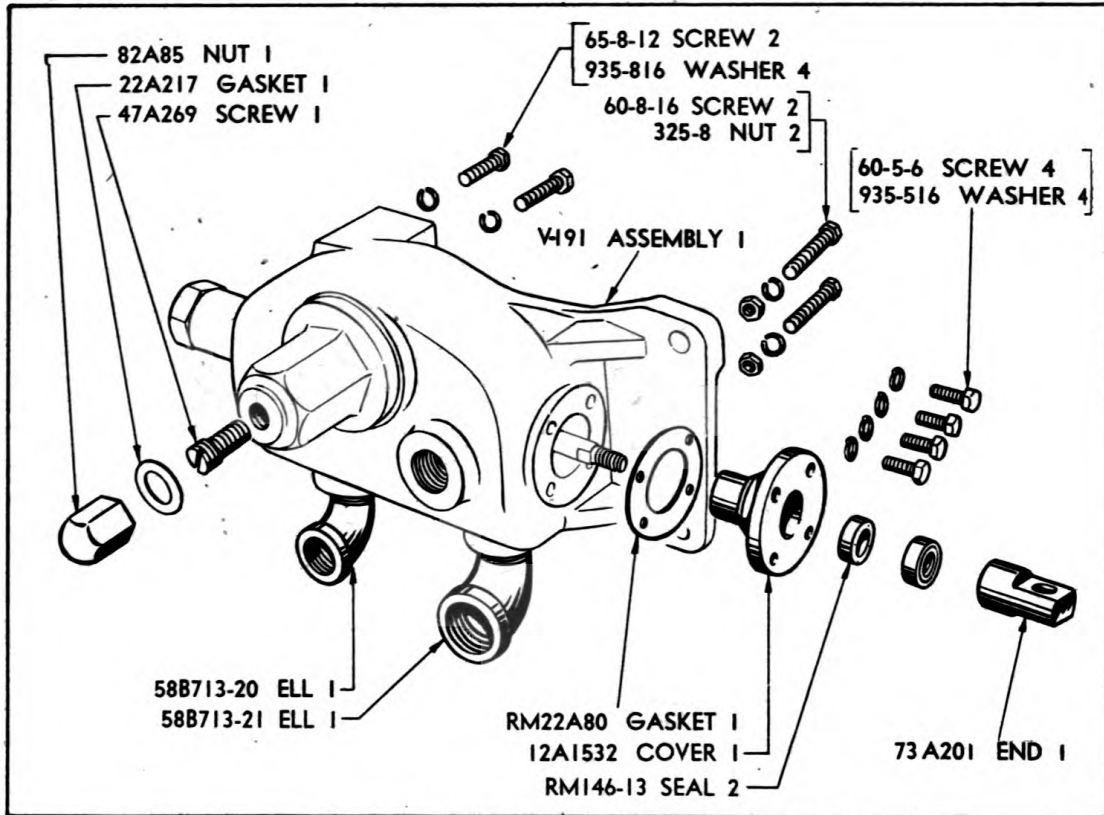
650 POWELL 1" VALVE 1

POWELL VALVES

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| 120 | Valve—Globe, Emergency, 3/4", (Powell Co. No. 120).... | 4 |
| 650 | Valve—Globe, Shut-off 1", (Powell Co. No. 650) | 1 |

648024 O - 45 - 5

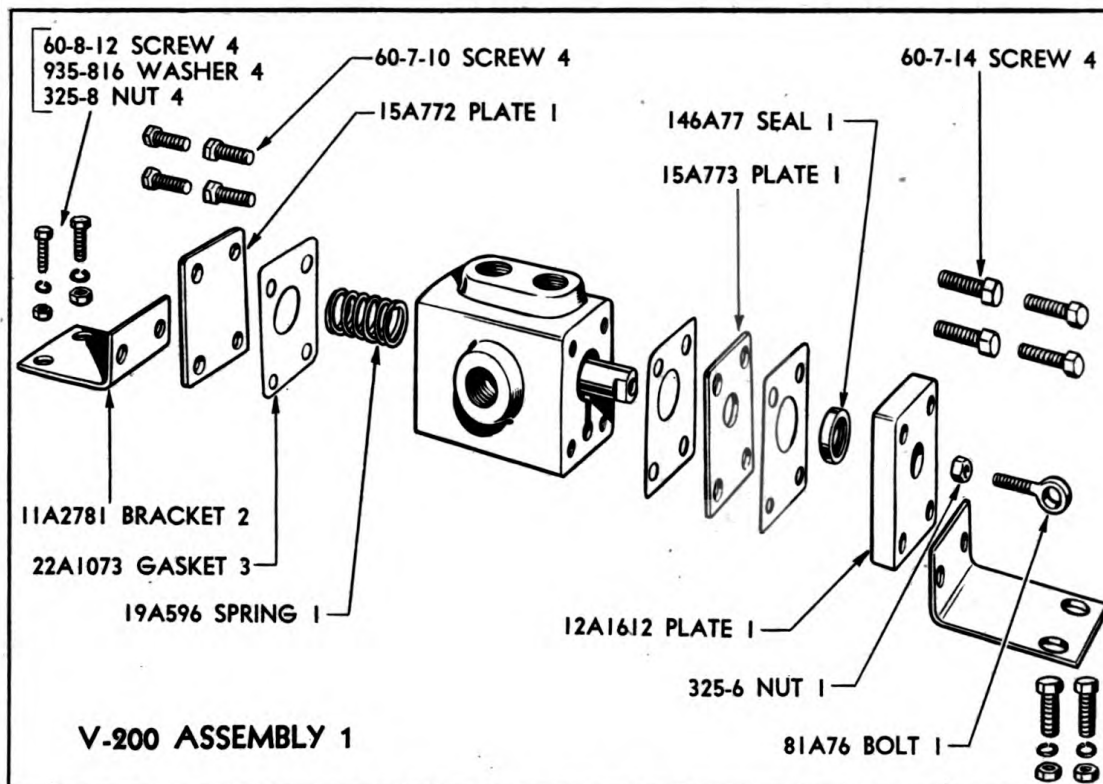
PARTS CATALOG



V-191 MAIN CONTROL VALVE

VALVE SPOOL AND VALVE HOUSING ARE NOT SOLD SEPARATELY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| V-191 | Valve Assembly—Control, Main | 1 |
| 82A85 | Nut—Acorn | 1 |
| 47A269 | Screw—Adjusting | 1 |
| 22A217 | Gasket—Copper | 1 |
| 60-5-6 | Capscrew— $\frac{5}{16}$ " x $\frac{3}{4}$ ", SAE | 4 |
| 935-516 | Lockwasher— $\frac{5}{16}$ " | 4 |
| 73A201 | End—Rod | 1 |
| RM146-13 | Seal—Oil | 2 |
| 12A1532 | Cover—Gland, Packing | 1 |
| RM22A80 | Gasket—Cover | 1 |
| 58B713-20 | Ell—Street, Extra Strong, $\frac{3}{4}$ " | 1 |
| 58B713-21 | Ell—Street, Standard 1" | 1 |
| 65-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", USS, (To Bolt Valve to Frame) | 2 |
| 60-8-16 | Capscrew— $\frac{1}{2}$ " x $1\frac{3}{4}$ ", SAE, (To Bolt Valve to Frame) | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 4 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 2 |

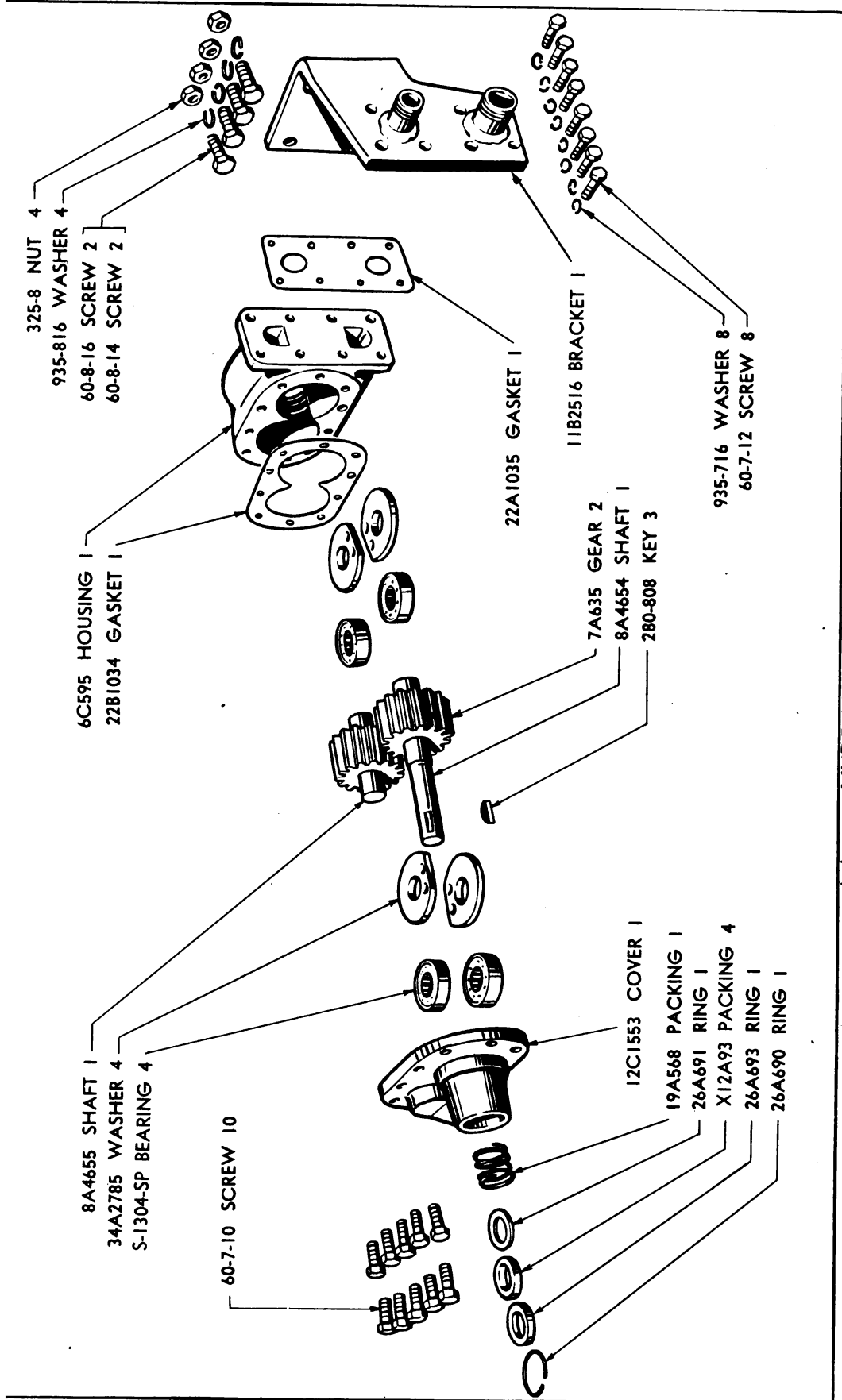


V-200 DIVERSION VALVE

VALVE SPOOL AND VALVE HOUSING ARE NOT SOLD SEPARATELY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| V-200 | Valve Assembly—Diversion, (for Lower Cylinders Control) (Port Clinton Marine Garage, No. 15033) | 1 |
| | 146A77 Seal—Oil | 1 |
| | 12A1612 Plate—Cover (Outside) | 1 |
| | 15A773 Plate—Cover (Inside) | 1 |
| | 15A772 Plate—Cover, Rear | 1 |
| | 19A596 Spring | 1 |
| | 22A1073 Gasket | 3 |
| | 11A2781 Bracket | 2 |
| | 81A76 Bolt—Eye (with 17/32" Hole) | 1 |
| | 60-7-10 Capscrew— $\frac{7}{16}$ " x 1", SAE | 4 |
| | 60-7-14 Capscrew— $\frac{7}{16}$ " x 1½", SAE | 4 |
| | 325-6 Nut— $\frac{3}{8}$ ", SAE | 1 |
| 60-8-12 | Capscrew—½" x 1¼", SAE (To Bolt to Body) | 4 |
| 935-816 | Lockwasher—½" | 4 |
| 325-8 | Nut—½", SAE | 4 |

PARTS CATALOG

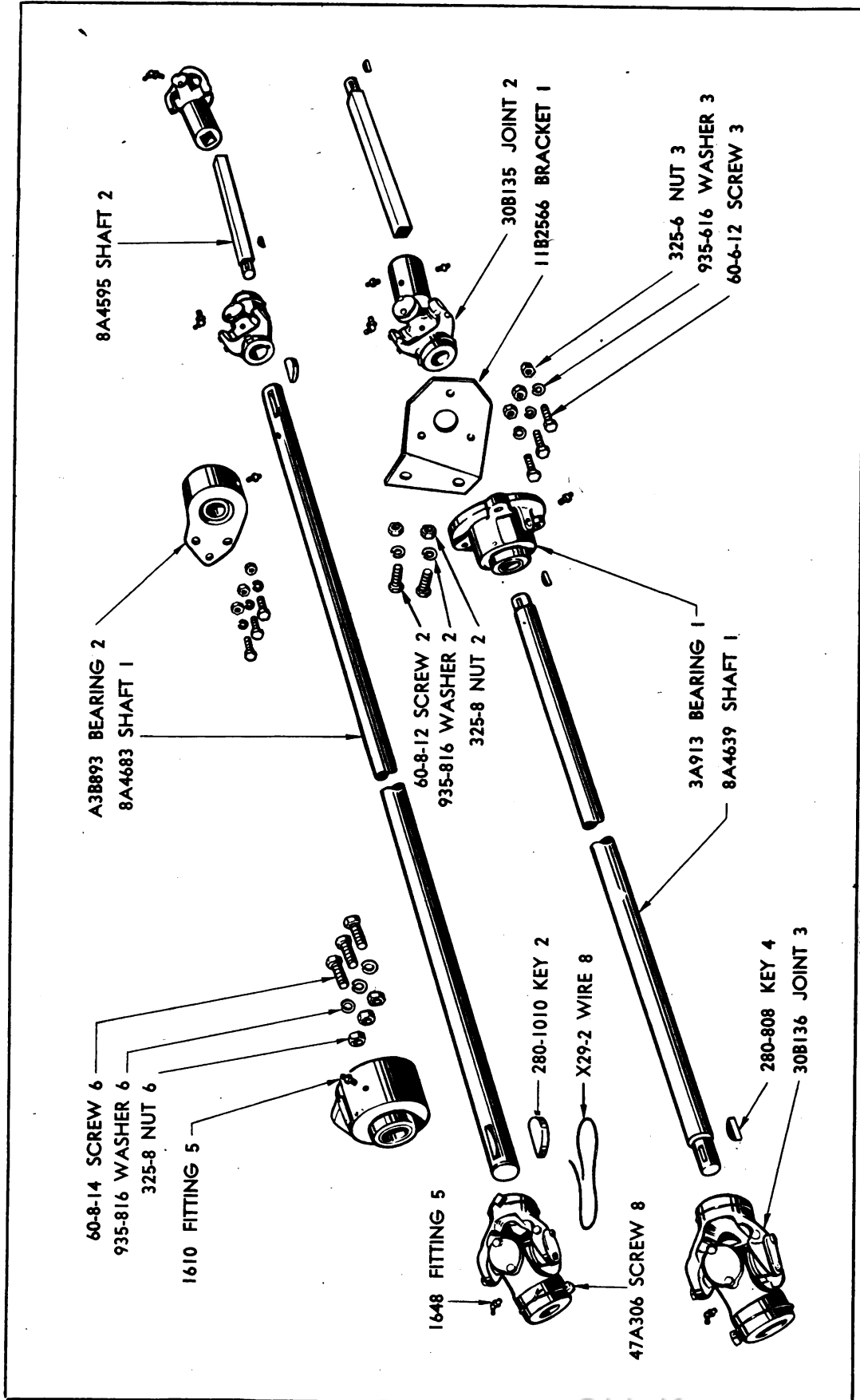


AA-157 HYDRAULIC PUMP
11B2516 PUMP BRACKET

HYDRAULIC PUMP

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--|
| AA-157 | Pump Assembly—Hydraulic, Complete 6C595 Housing—Pump 12C1553 Cover—Pump 7A635 Gear—Pump 8A4654 Shaft—Pump (Long) 8A4655 Shaft—Pump (Short) 280-808 Key—Woodruff, 1/4", No. 15 34A2785 Washer—Thrust S-1304SP Bearing—Roller (Bower, S-1304SP) 60-7-10 Capscrew—7/16" x 1", SAE 19A568 Packing—Spring 26A691 Ring—Packing, Inner (Male) 26A693 Ring—Packing, Outer (Female) X12A93 Packing—V-Leather 26A690 Ring—Lock 22A1035 Gasket—Pump to Pump Bracket 11B2516 22B1034 Gasket—Pump Cover to Housing Bracket—Pump 60-7-12 Capscrew—7/16" x 1 1/4", SAE 935-716 Lockwasher—7/16" 60-8-16 Capscrew—1/2" x 1 3/4", SAE 60-8-14 Capscrew—1/2" x 1 1/2", SAE 935-816 Lockwasher—1/2" 325-8 Nut—1/2", SAE | 1 1 1 2 1 1 3 4 4 10 1 1 1 1 4 1 1 1 1 8 8 2 2 4 4 |

PARTS CATALOG

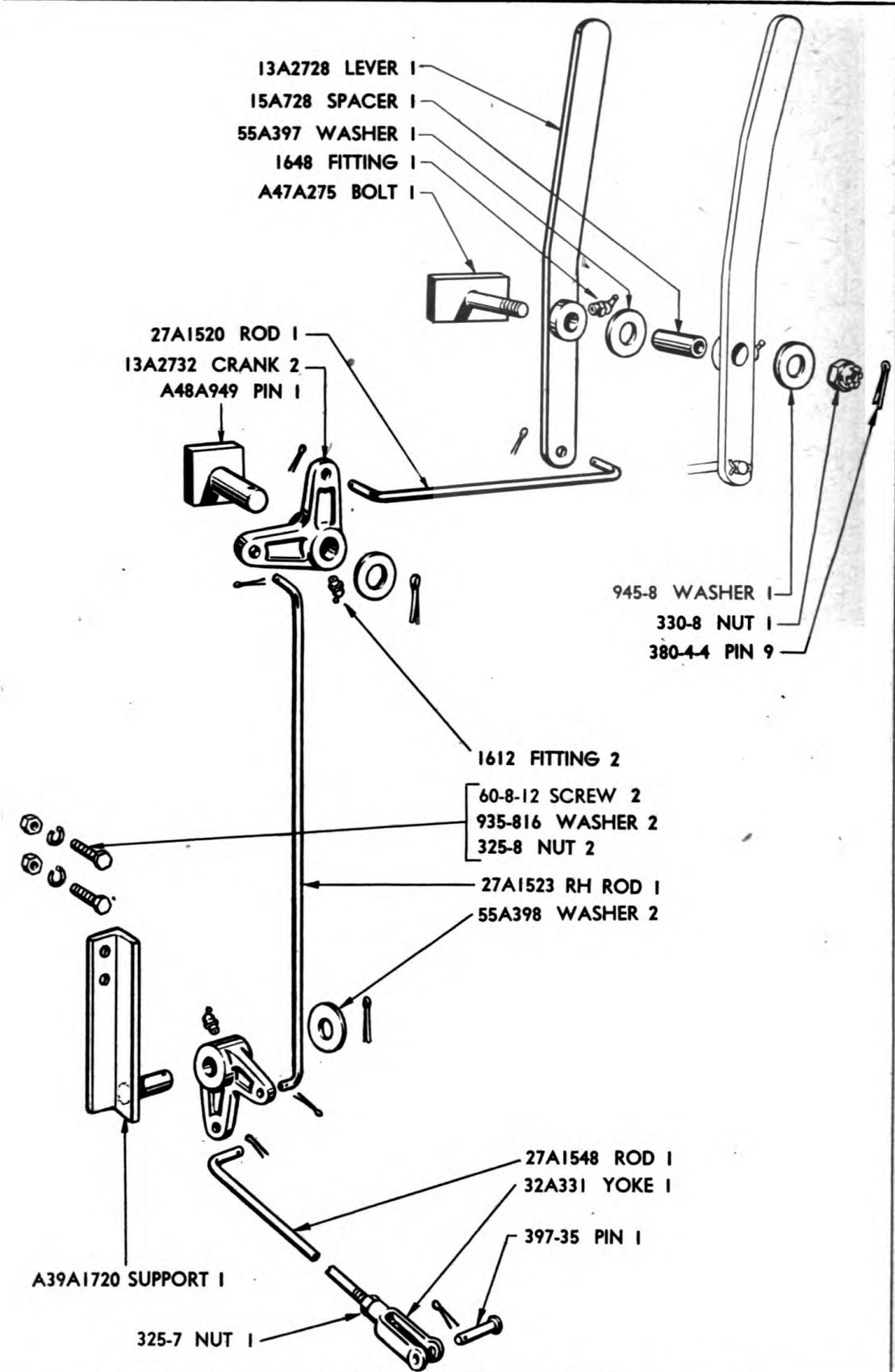


UNIVERSAL PUMP DRIVE SHAFT GROUP

UNIVERSAL PUMP DRIVE SHAFT GROUP

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 8A4683 | Shaft—Drive, Round, 1 1/4" x 70 3/4" | 1 |
| 280-1010 | Key—Woodruff, 5/16" x 1 1/4", No. D | 2 |
| A3B893 | Bearing—Hanger Type (Link-Belt No. S-205973) | 2 |
| 60-8-14 | Capscrew—1/2" x 1 1/2", SAE | 6 |
| 935-816 | Lockwasher—1/2" | 6 |
| 325-8 | Nut—1/2", SAE | 6 |
| 1610 | Fitting—Alemite, 1/8" Straight, No. 1610 | 2 |
| 8A4639 | Shaft—Universal, 1" x 36 1/2" (PTO to Bearing) | 1 |
| 3A913 | Bearing—Flanged Type (Link Belt No. F-416) | 1 |
| 1610 | Fitting—Alemite, 1/8", Straight, No. 1610 | 1 |
| 11B2566 | Bracket—Support, Shaft, Universal (for 3A913 Bearing) | 1 |
| 60-6-12 | Capscrew—3/8" x 1 1/4", SAE | 3 |
| 935-616 | Lockwasher—3/8" | 3 |
| 325-6 | Nut—3/8", SAE | 3 |
| 60-8-12 | Capscrew—1/2" x 1 1/4", SAE | 2 |
| 325-8 | Nut—1/2", SAE | 2 |
| 30B135 | Joint—Slip, Universal | 2 |
| 1610 | Fitting—Alemite, 1/8", Straight, No. 1610 | 2 |
| 30B136 | Joint—Universal | 3 |
| 1648 | Fitting—Alemite, 5/16", 67 1/2°, No. 1648 | 5 |
| 47A306 | Setscrew—Sq. head 3/8" x 3/4", USS, (Drilled for Lock Wire) | 8 |
| X29-2 | Wire—Locking | 8 |
| 8A4595 | Shaft—Square, 7/8" x 13" | 2 |
| 280-808 | Key—Woodruff, 1/4", No. 15 | 4 |

PARTS CATALOG

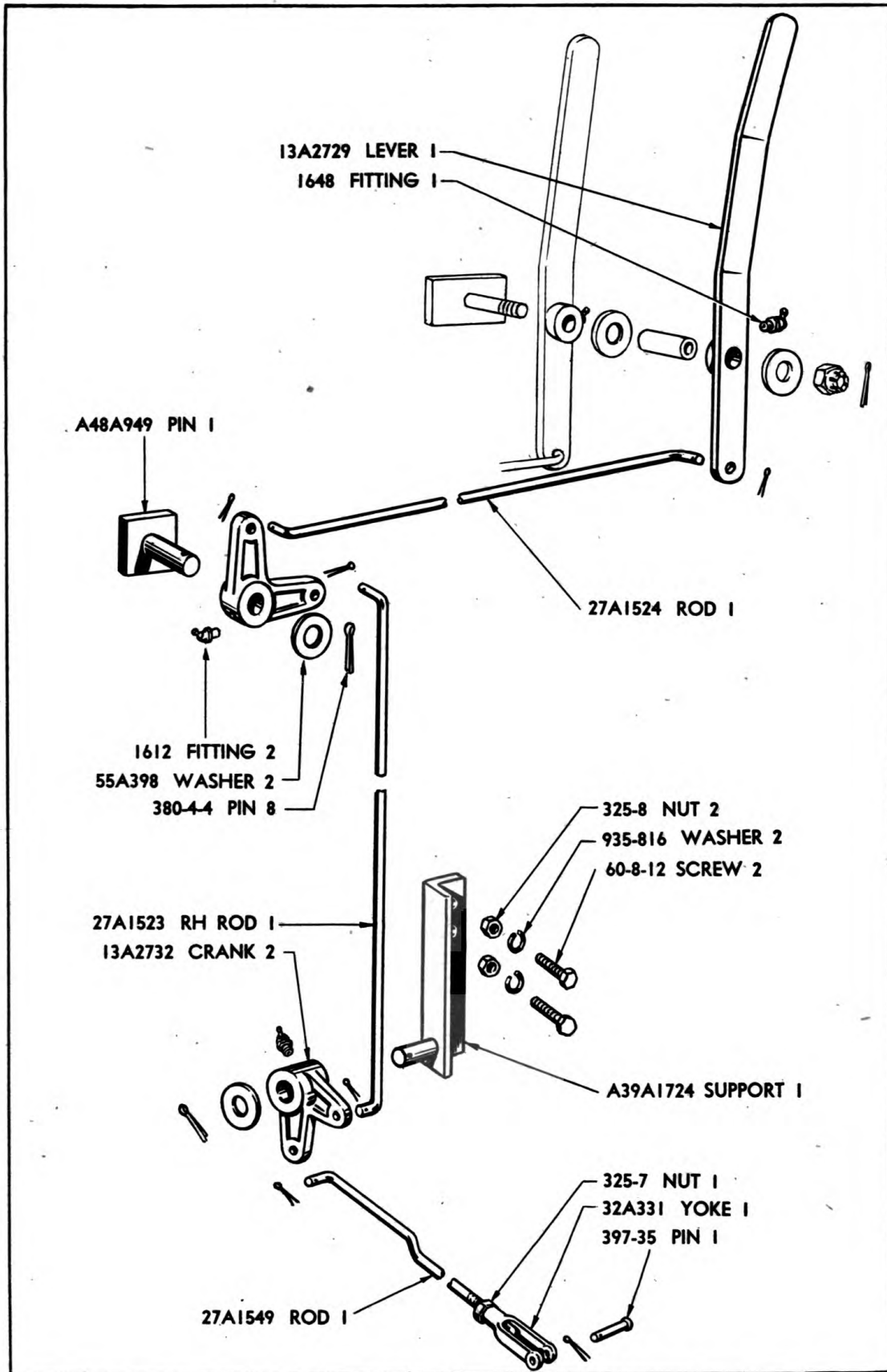


LEVER CONTROL FOR POWER TAKE-OFF FOR WINCH

LEVER CONTROL FOR POWER TAKEOFF FOR WINCH

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 13A2728 | Lever—for Winch (Lever Only) | 1 |
| 1648 | Fitting—Alemite, $\frac{5}{16}$ " SAE, 67 $\frac{1}{2}$ °, No. 1648 | 1 |
| A47A275 | Bolt—Bearing | 1 |
| 55A397 | Washer—Special, Drilled to $\frac{11}{16}$ ", I.D. | 1 |
| 15A728 | Spacer—Pipe, 1 $\frac{3}{8}$ ", Long | 1 |
| 945-8 | Washer—Cut, $\frac{1}{2}$ " | 1 |
| 330-8 | Nut—Castellated, $\frac{1}{2}$ ", SAE | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 27A1520 | Rod—Control, $\frac{7}{16}$ " x 9 $\frac{3}{4}$ ", (for Winch) | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| A48A949 | Pin—Bearing, for 13A2732 Bell Cranks (Welded to Body) | 1 |
| 13A2732 | Crank—Bell | 2 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ ", 67 $\frac{1}{2}$ °, No. 1612 | 2 |
| 55A398 | Washer—Special, Drilled to $\frac{25}{32}$ " I.D. | 2 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 27A1523 | Rod—Control, $\frac{7}{16}$ " x 34 $\frac{1}{4}$ ", (for Winch) | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| 27A1548 | Rod—Control, $\frac{7}{16}$ " x 36 $\frac{1}{4}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 32A331 | Yoke— $\frac{7}{16}$ ", SAE | 1 |
| 325-7 | Nut—Yoke, $\frac{7}{16}$ ", SAE | 1 |
| 397-35 | Pin— $\frac{7}{16}$ " x 1 $\frac{1}{4}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| A39A1720 | Support—Angle, Left, (for 13A2732 Bell Crank) | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x 1 $\frac{1}{4}$ ", SAE | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 2 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 2 |

PARTS CATALOG

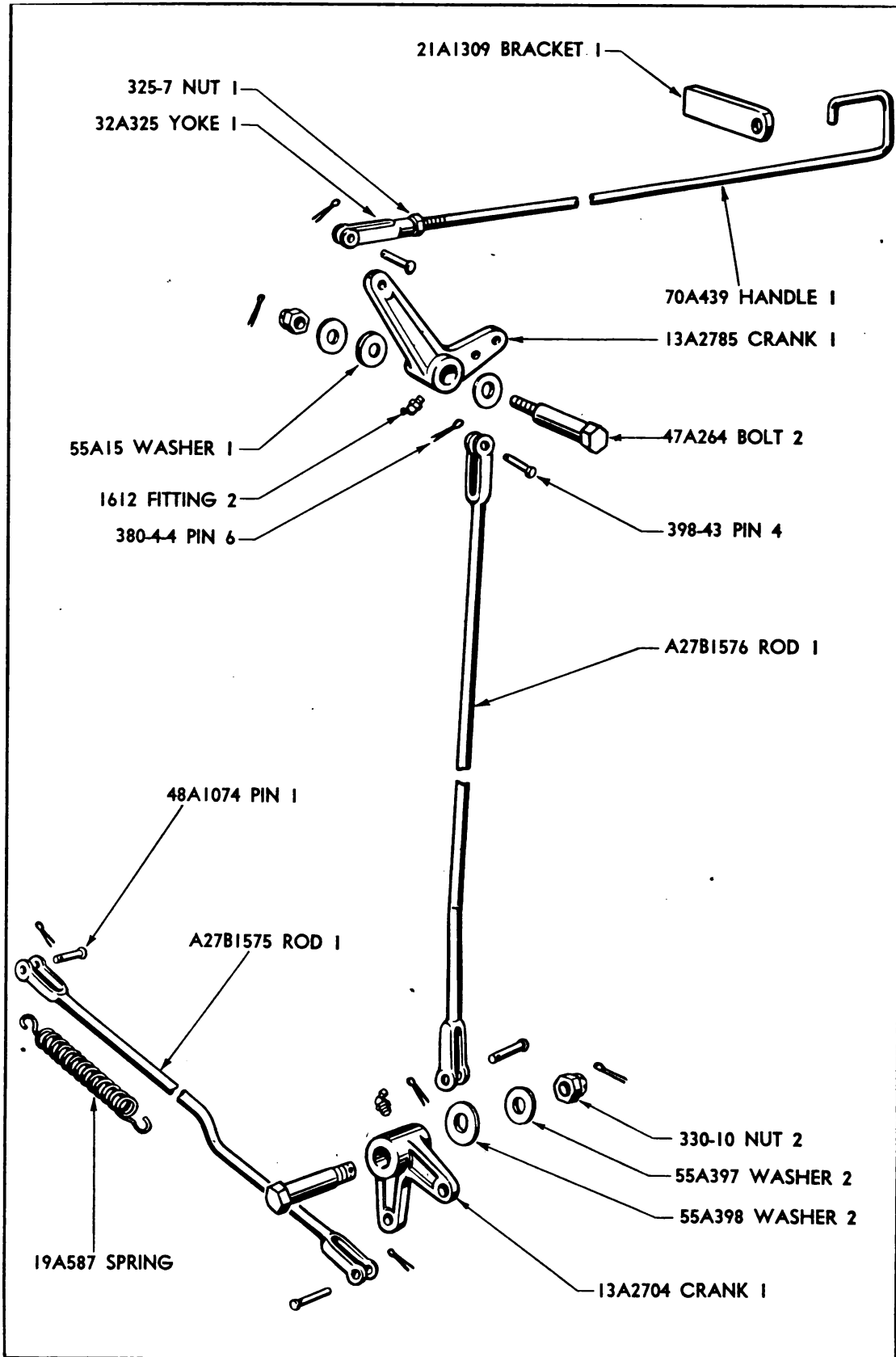


LEVER CONTROL FOR POWER TAKE-OFF FOR PUMP

LEVER CONTROL FOR POWER TAKEOFF FOR PUMP

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 13A2729 | Lever—for Hydraulic Pump Control | 1 |
| 1648 | Fitting—Alemite, $\frac{5}{16}$ " , 67 $\frac{1}{2}$ °, No. 1648..... | 1 |
| 27A1524 | Rod—Control, $\frac{7}{16}$ " x 35", (for Pump) | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1"..... | 1 |
| A48A949 | Pin—Bearing, for 13A1732 Bell Crank (Welded to Body) | 1 |
| 13A2732 | Crank—Bell | 2 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ " , 67 $\frac{1}{2}$ °, No. 1612 | 2 |
| 55A398 | Washer—Cut, $\frac{3}{4}$ " I. D., $1\frac{3}{8}$ " O. D. | 2 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| 27A1523 | Rod—Control, $\frac{7}{16}$ " x 34 $\frac{1}{4}$ ", (for Pump) | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| 27A1549 | Rod—Control, $\frac{7}{16}$ " x 37 $\frac{1}{2}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| 32A331 | Yoke— $\frac{7}{16}$ " , SAE | 1 |
| 325-7 | Nut— $\frac{7}{16}$ " , SAE | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 397-35 | Pin— $\frac{7}{16}$ " x 1 $\frac{1}{4}$ " | 1 |
| A39A1724 | Support—Angle, Right, (for 13A1732 Bell Crank) | 1 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x 1 $\frac{1}{4}$ " , SAE | 2 |
| 935-816 | Lockwasher— $\frac{1}{2}$ " | 2 |
| 325-8 | Nut— $\frac{1}{2}$ " , SAE | 2 |

PARTS CATALOG

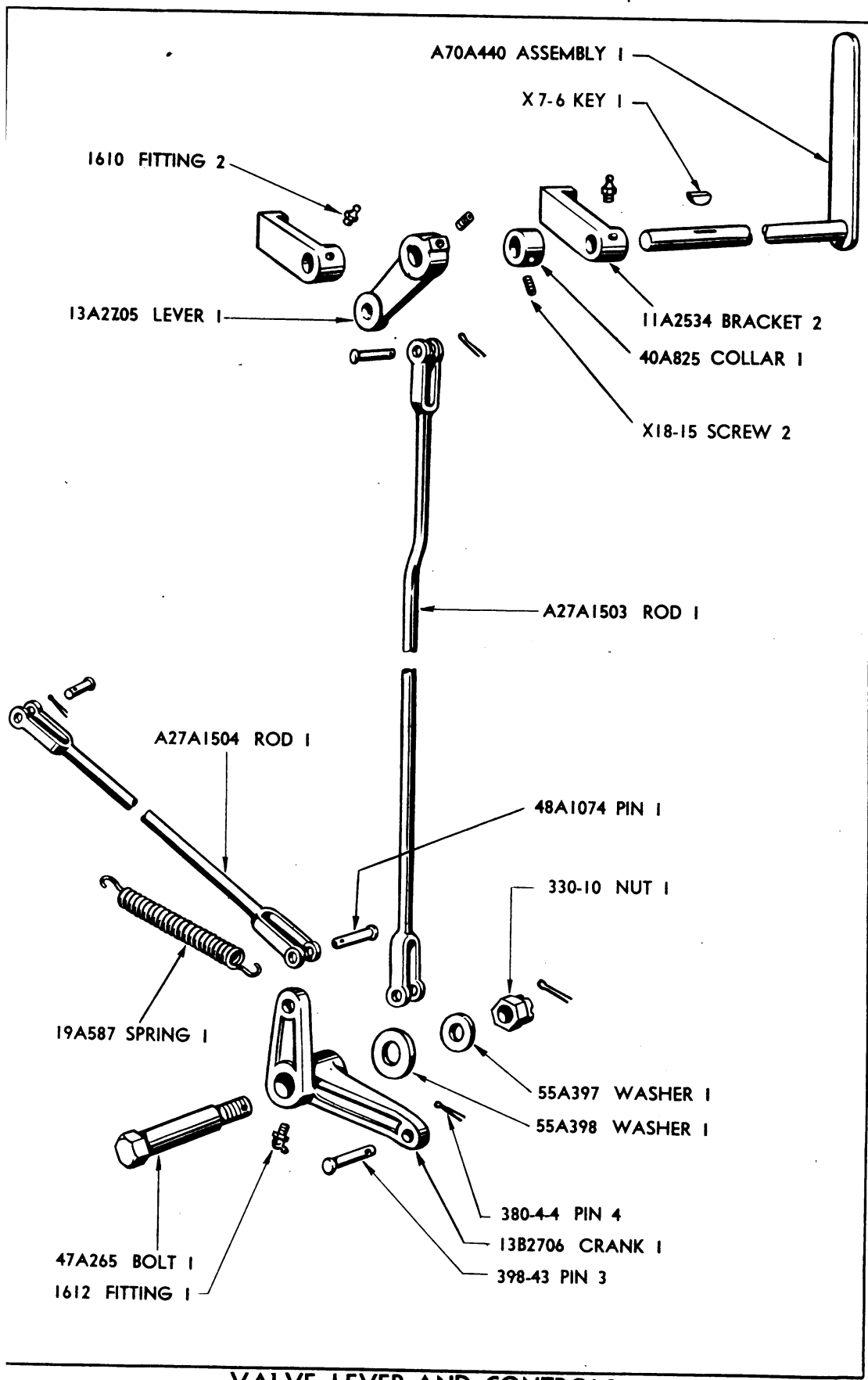


LOWER CYLINDERS CONTROLS

LOWER CYLINDERS CONTROLS

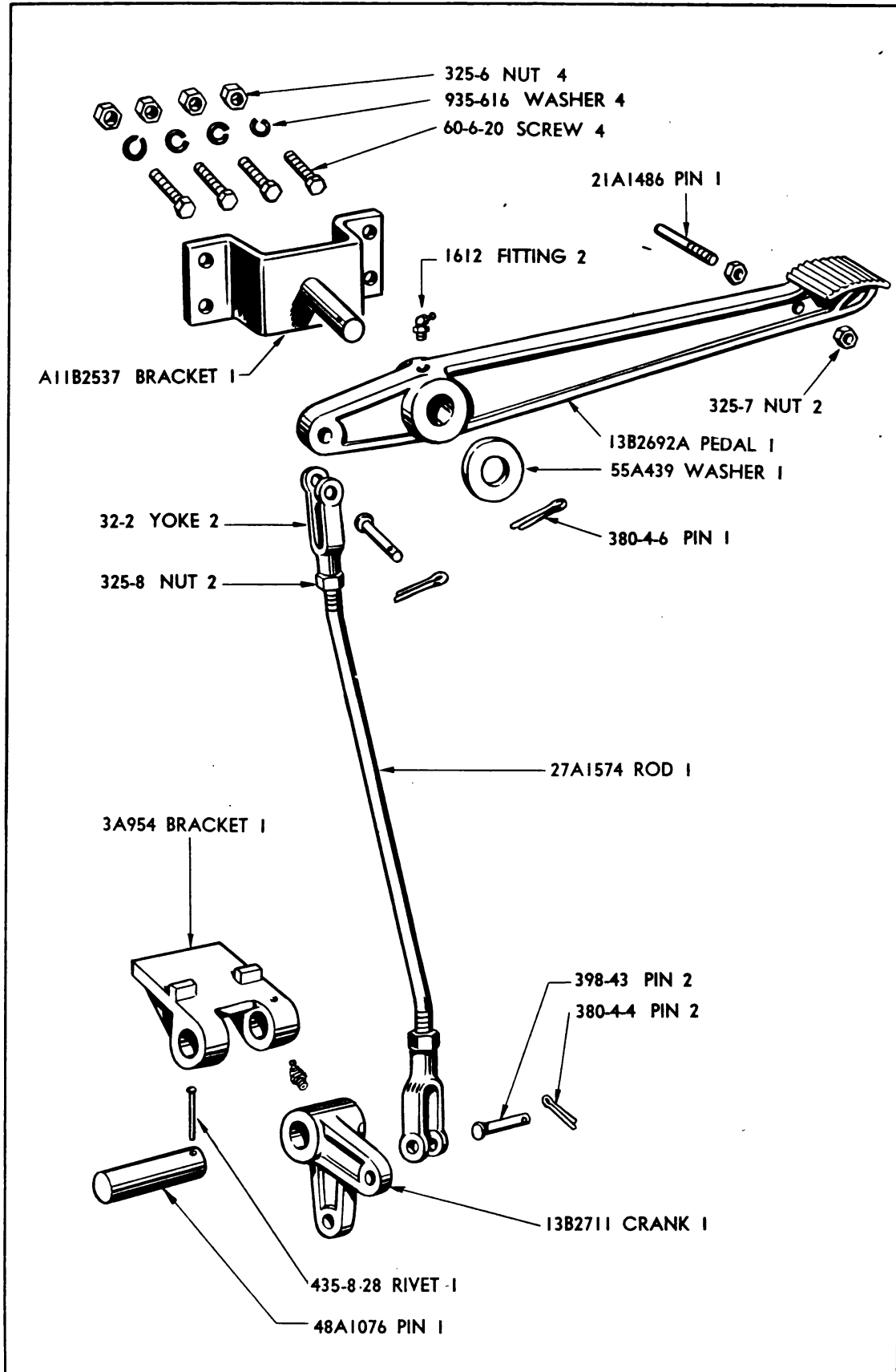
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 70A439 | Handle—Control, Cylinder, Lower | 1 |
| 32A325 | Yoke—Adjusting, $\frac{7}{16}$ " , (for $\frac{1}{2}$ " Pin) | 1 |
| 398-43 | Pin— $\frac{1}{2}$ " x 1-27/64", Drilled to $\frac{1}{8}$ " | 1 |
| 325-7 | Nut— $\frac{7}{16}$ " , SAE | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 21A1309 | Bracket—Support (Welded to Body) | 1 |
| 13A2785 | Crank—Bell (Upper Front) | 1 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ " , 67 $\frac{1}{2}$ °, No. 1612 | 1 |
| 47A264 | Bolt—Shoulder, $\frac{5}{8}$ " x 3" | 1 |
| 330-10 | Nut—Castellated, $\frac{5}{8}$ " , SAE | 1 |
| 55A15 | Washer—Beveled, $\frac{1}{2}$ " , Drilled to $\frac{5}{8}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 55A398 | Washer—Cut, $\frac{3}{4}$ " I. D., $1\frac{3}{8}$ " O. D. | 1 |
| 55A397 | Washer—Cut, $\frac{5}{8}$ " I. D., $1\frac{3}{8}$ " O. D. | 1 |
| A27B1576 | Rod—Control Assembly (Front) | 1 |
| 398-43 | Pin— $\frac{1}{2}$ " x 1-27/64", Drilled to $\frac{1}{8}$ " | 2 |
| 380-4-4 | Pin—Cotter, $\frac{1}{4}$ " x 1" | 2 |
| 13A2704 | Crank—Bell (Lower Front) | 1 |
| 47A264 | Bolt—Shoulder, $\frac{5}{8}$ " x 3" | 1 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ " , 67 $\frac{1}{2}$ °, No. 1612 | 1 |
| 55A397 | Washer—Cut, $\frac{5}{8}$ " I. D., $1\frac{3}{8}$ " O. D. | 1 |
| 55A398 | Washer—Cut, $\frac{3}{4}$ " I. D., $1\frac{3}{8}$ " O. D. | 1 |
| 330-10 | Nut—Castellated, $\frac{5}{8}$ " , SAE | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| A27B1575 | Rod—Control, 97 $\frac{1}{2}$ " Long | 1 |
| 48A1074 | Pin— $\frac{1}{2}$ " x 1-27/64", Drilled to $\frac{3}{16}$ " | 1 |
| 398-43 | Pin— $\frac{1}{2}$ " x 1-27/64", Drilled to $\frac{1}{8}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 19A587 | Spring—Return, 1" x 7" | 1 |

PARTS CATALOG



VALVE LEVER AND CONTROLS

PARTS CATALOG



CLUTCH CONTROL PEDAL ASSEMBLY

CLUTCH CONTROL PEDAL ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 13B2692A | Pedal—Control, Clutch | 1 |
| 1612 | Fitting—Alemite, 1/8", 67 1/2°, No. 1612 | 1 |
| 21A1486 | Pin—7/8" x 3" | 1 |
| 325-7 | Nut—7/16", SAE | 2 |
| A11B2537 | Bracket—Pedal, Declutching | 1 |
| 380-4-6 | Pin—Cotter, 1/8" x 1 1/2" | 1 |
| 55A439 | Washer—Cut, 3/4", Drilled to 1-1/32" | 1 |
| 60-6-20 | Capscrew—3/8" x 2", SAE | 4 |
| 935-616 | Lockwasher—3/8" | 4 |
| 325-6 | Nut—3/8", SAE | 4 |
| 27A1574 | Rod—Control, 1/2" | 1 |
| 325-8 | Nut—1/2", SAE | 2 |
| 398-43 | Pin—1/2" x 1-27/64", Drilled to 1/8" | 2 |
| 32-2 | Yoke—1/2", SAE, (for 1/2" Rod) | 2 |
| 380-4-4 | Pin—Cotter, 1/8" x 1" | 2 |
| 13B2711 | Crank—Bell | 1 |
| 1612 | Fitting—Alemite, 1/8", 67 1/2°, No. 1612 | 1 |
| 3A954 | Bracket—Crank, Bell, for 13B2711 (welded to body).... | 1 |
| 48A1076 | Pin—1" x 4 1/4" | 1 |
| 435-8-28 | Rivet—Head, Round, 1/4" x 1 3/4" | 1 |

646024 O - 45 - 6

PARTS CATALOG

**CORPS OF ENGINEERS
U. S. ARMY
STEEL TREADWAY BRIDGE EQUIPMENT
TRUCK BODY & HYDRAULIC CRANE M-IIA**

| | |
|-------------------------------|-------------|
| TOTAL GROSS VEHICLE WT. | 38,500 Lbs. |
| GROSS WT. ON BOGIE | 26,750 Lbs. |
| NET WT. - BODY & CRANE | 6,500 Lbs. |
| CARGO CAPACITY LBS. | 12,000 Lbs. |
| CRANE CAPACITY LBS. - MAX. | 8,000 Lbs. |
| U.S. VEHICLE REGISTRATION NO. | |
| CONTRACT NO. | |
| DELIVERY DATE | |

MFRS. MODEL NO. MFRS. SERIAL NO.

THE HEIL CO.

MILWAUKEE, WIS. U. S. A. HILLSIDE, NEW JERSEY

34A2684A PLATE I

CAUTION: DO NOT CLOSE THIS VALVE. IT IS FOR EMERGENCY USE ONLY.

WHEN CLOSED, REMOVE PIN WHICH ATTACHES UPPER CYLINDERS TO THE BOOM ON THE DAMAGED SIDE. BOOM MAY BE OPERATED WITH OPPOSITE CYLINDERS.

CAUTION: WHEN OPERATING IN THIS MANNER, NO MORE THAN ONE TREADWAY SHOULD EVER BE HANDLED.

SEE INSTRUCTION BOOK
The HEIL COMPANY, MILWAUKEE, WIS., U. S. A.

34A3173 PLATE I

**HYDRAULIC BRIDGE ERECTING CRANE
OPERATING INSTRUCTIONS:**

- Disengage clutch by pressing down on declutching pedal.
- Engage Power Take-Off by pulling outer lever to the right as far as possible.
- Release clutch pedal which will operate hydraulic pump.
- Extend piston rods in lower cylinders by pulling Valve Lever forward or toward front. Note: THESE RODS MUST ALWAYS BE EXTENDED BEFORE UNIT IS READY TO OPERATE WITH LOAD.
- To unload or move boom in rearward direction - - push Valve Lever toward rear of truck.
- To load or return boom toward cab - - pull Valve Lever toward front.
- To hold boom in any position - - place Valve Lever in neutral or center. (When released, lever will return to neutral position automatically.)

CAUTION

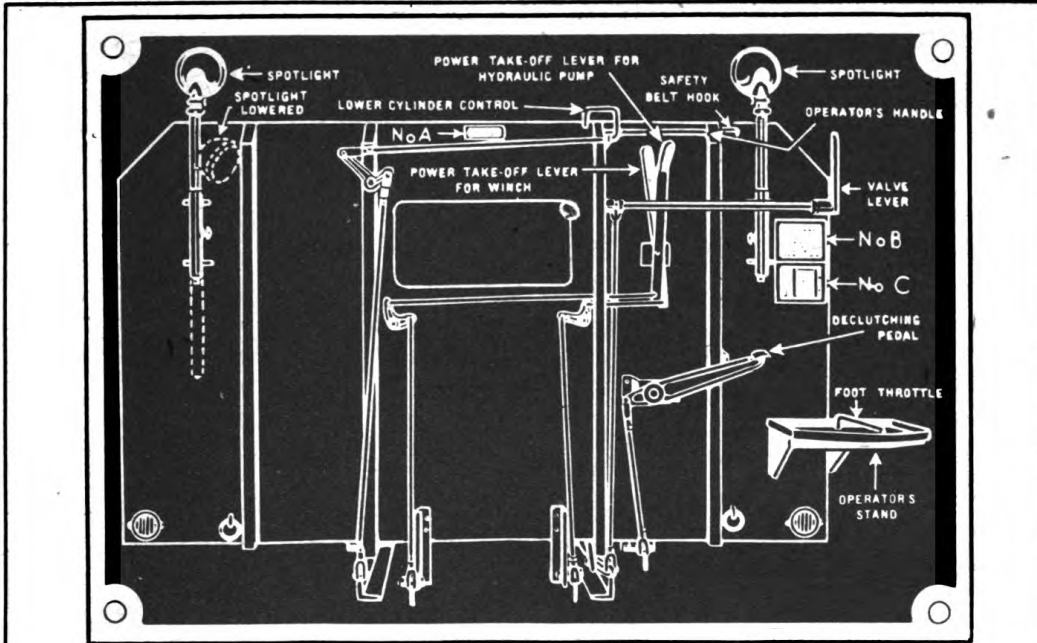
WHEN BOOM IS NOT BEING OPERATED - - Piston Rods in lower cylinders must always be pushed in (or retracted) to prevent rusting.

- Force lower piston rods in by moving boom, UNDER NO LOAD, to extreme rearward position.
- Pull lower Cylinder Control Handle as far as possible to right and hold. Move boom to riding position UNDER NO LOAD.

THE HEIL CO.

MILWAUKEE, WIS. U. S. A. HILLSIDE, NEW JERSEY

34B3131 PLATE I



34B3129 PLATE I

TRANSPORTATION DATA
FOR
TRUCK, HYDRAULIC CRANE
M-11-A

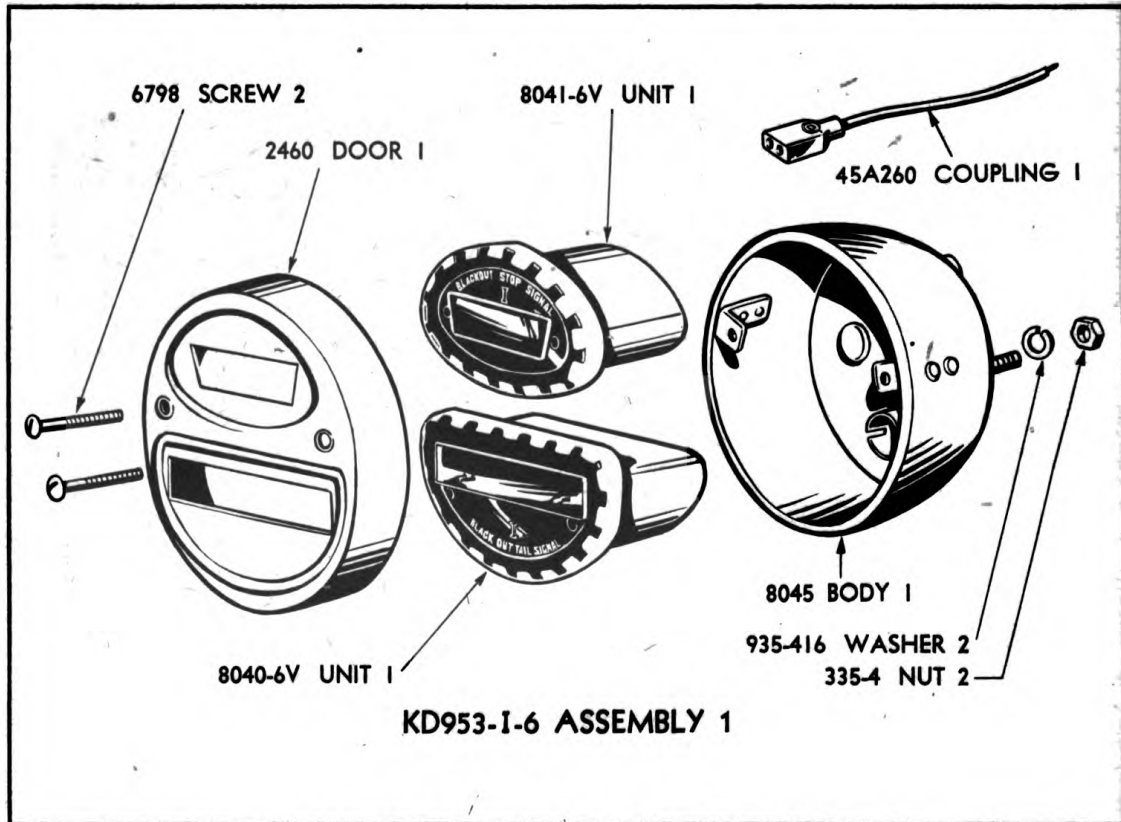
| | |
|--|---|
| OVER ALL LENGTH <input type="text"/> | OVER ALL WIDTH <input type="text"/> |
| OVER ALL HEIGHT <input type="text"/> | LOWEST CUT DOWN HEIGHT THAT VEHICLE CAN BE REDUCED AND STILL OPERATE <input type="text"/> |
| LIFTING RINGS NO. <input type="text"/> | WEIGHT ON EACH <input type="text"/> |
| SHIPPING CUBAGE <input type="text"/> | |
| SHIPPING WEIGHT <input type="text"/> | SHIPPING TONNAGE <input type="text"/> |

34A4875 PLATE I

NAME PLATES

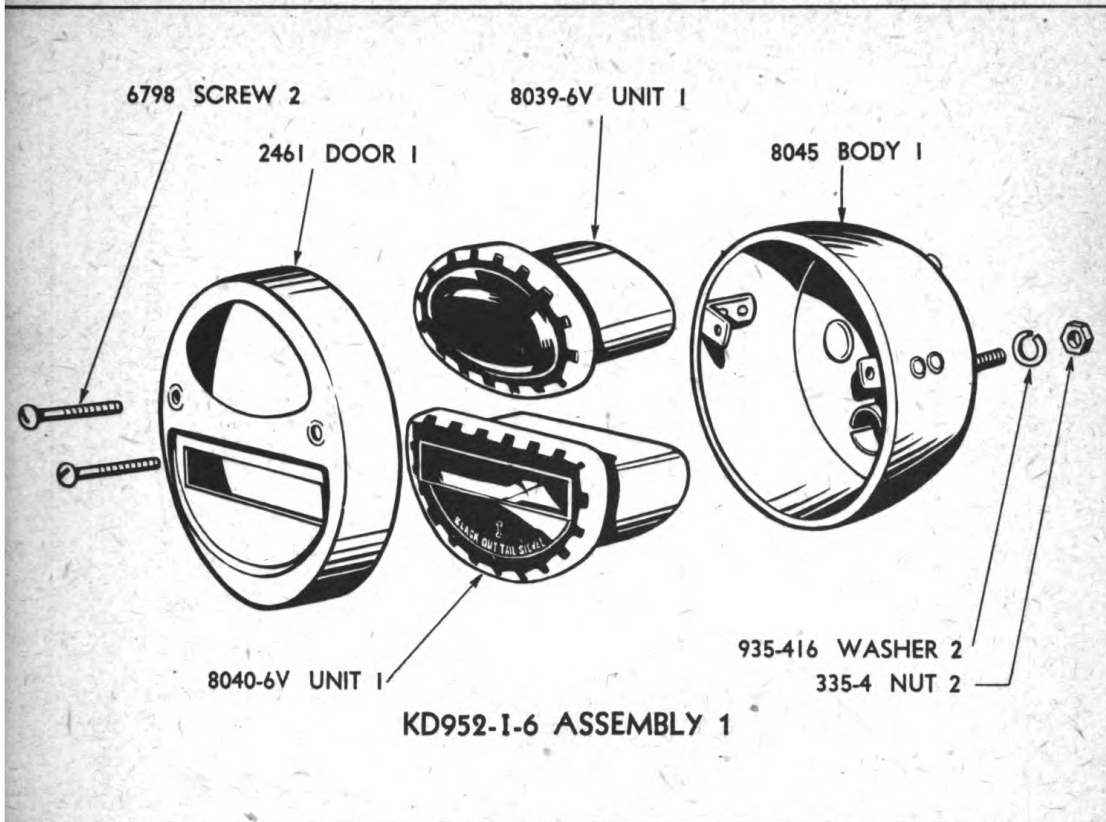
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| 34A2684A | Plate—Name (Corps of Engineers and Weights)..... | 1 |
| 34A3173 | Plate—Caution, (for No. 120 Emergency Valves) | 4 |
| 34B3131 | Plate—Instructions, Operating | 1 |
| 34B3129 | Plate—Diagram, control, Front | 1 |
| 34A4875 | Plate—Data, Transportation | 1 |

PARTS CATALOG



BLACKOUT TAIL AND STOP LIGHT

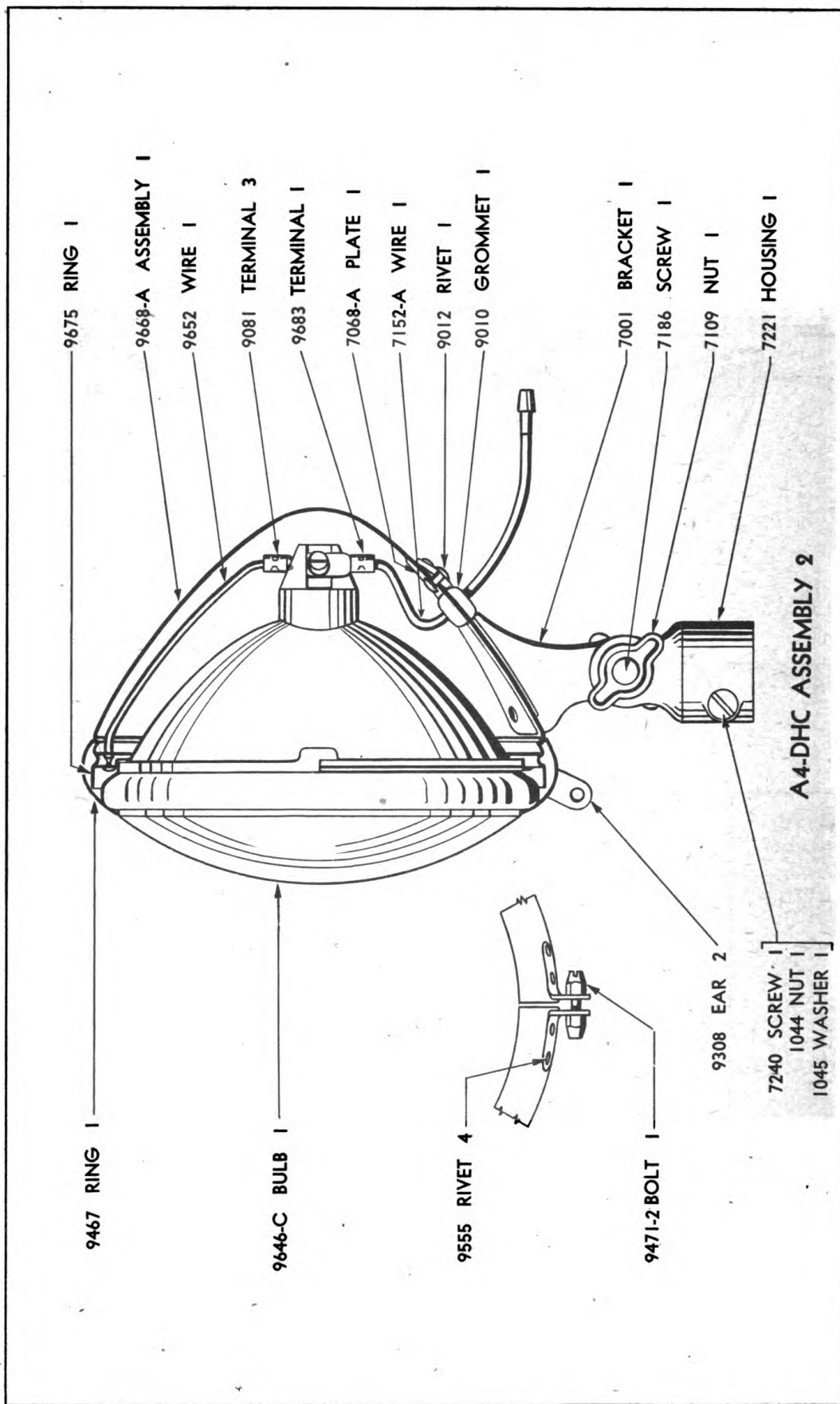
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| KD953-I-6 | Assembly—Light, Stop, and Tail, Blackout, (QM No. 08243X) | 1 |
| 2460 | Door | 1 |
| 8041-6V | Unit—Lamp, Stop, Blackout, Upper..... | 1 |
| 8040-6V | Unit—Lamp, Tail, Blackout, Lower | 1 |
| 8045 | Body Assembly—Complete With Connector Tubes, Bolts and Inner Pad Clinched Into One Assembly | 1 |
| 6798 | Screw | 2 |
| 935-416 | Lockwasher— $\frac{1}{4}$ " | 2 |
| 335-4 | Nut— $\frac{1}{4}$ ", USS | 2 |
| 45A260 | Coupling—Light, Blackout | 1 |



SERVICE TAIL AND STOPLIGHT AND BLACKOUT TAIL LIGHT

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| KD952-I-6 | Assembly—Light, Tail, Blackout, and, Light, Stop, and, Tail, Service (QM No. 08242X) | 1 |
| 2461 | Door | 1 |
| 8039-6V | Unit—Lamp, Tail, and, Stop, Service, Upper | 1 |
| 8040-6V | Unit—Lamp, Tail, Blackout, Lower | 1 |
| 8045 | Body Assembly—Complete With Connector Tubes, Bolts and Inner Pad Clinched Into One Assembly | 1 |
| 6798 | Screw | 2 |
| 935-416 | Lockwasher—1/4" | 2 |
| 335-4 | Nut—1/4", USS | 2 |

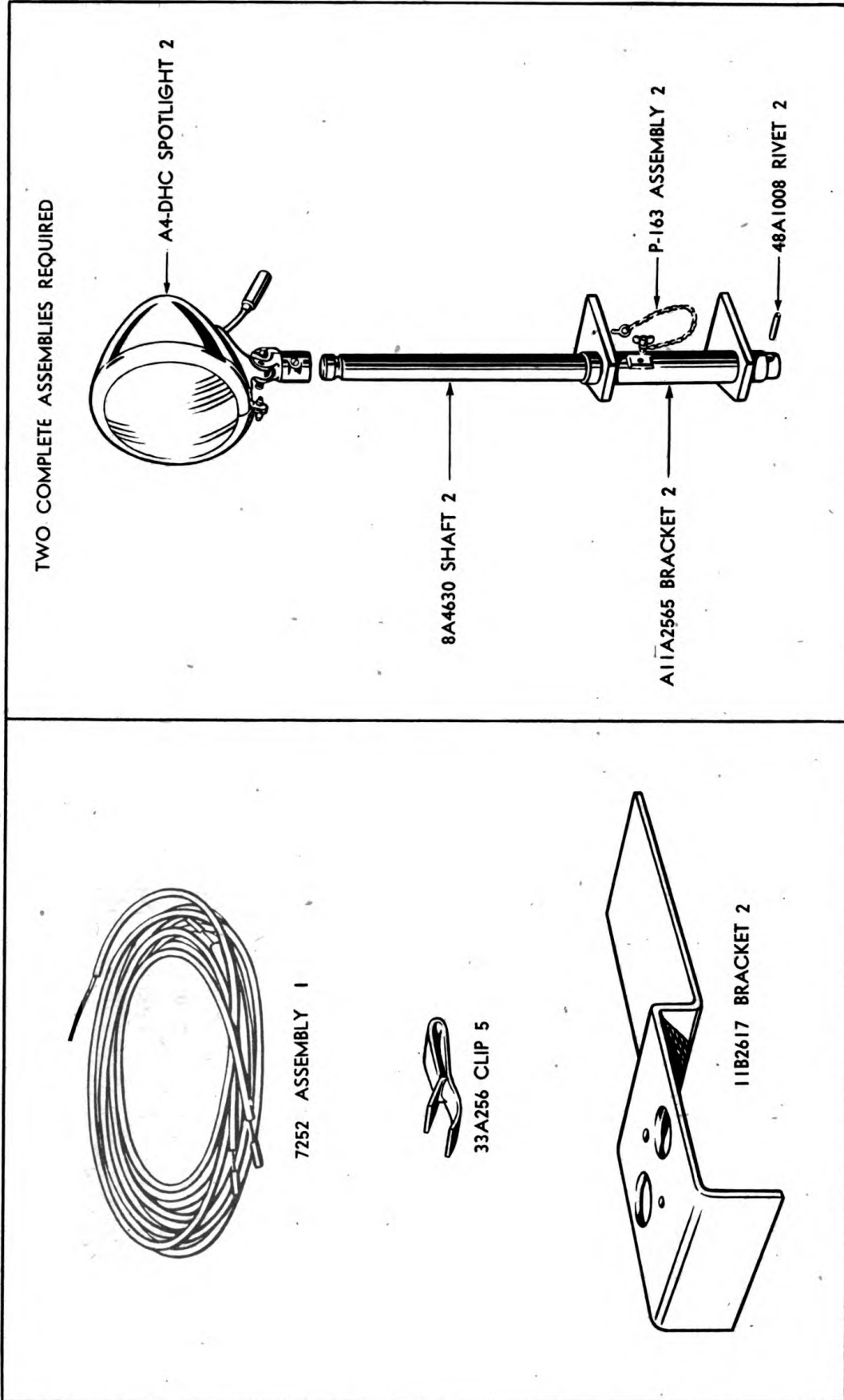
PARTS CATALOG



SPOTLIGHT ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| A4-DHC | Spotlight Assembly—(Unity Mfg. Co.) | 2 |
| 9646C | Bulb—Mazda Glaseal | 2 |
| 9467 | Ring—Includes No. 9308, 9555 and 9471-2 | 2 |
| | 9308 Ear—Ring | 4 |
| | 9555 Rivet—Ring | 8 |
| | 9471-2—Bolt and Nut | 2 |
| 9675 | Ring—Adapter | 2 |
| | 9652 Wire—Ground | 2 |
| 9668A | Assembly—Shell | 2 |
| | 7001 Bracket—for Shell | 2 |
| | 7068A Plate—Reinforcing, for Shell | 2 |
| | 9012 Rivet—for Shell | 2 |
| | 9010 Grommet—Rubber | 2 |
| 7152A | Wire—Shell | 2 |
| | 9081—Terminal | 6 |
| 9683 | Terminal—Bulb | 2 |
| 7186 | Screw—Wing, $\frac{5}{16}$ " x $1\frac{1}{2}$ " | 2 |
| 7109 | Nut—Wing, $\frac{5}{16}$ " | 2 |
| 7221 | Housing—Pivot | 2 |
| 1044 | Nut— $\frac{5}{16}$ ", SAE | 2 |
| 1045 | Lockwasher— $\frac{5}{16}$ ", Shakeproof | 2 |
| 7240 | Screw— $\frac{5}{16}$ " x $1\frac{1}{2}$ ", SAE | 2 |

PARTS CATALOG



TWO COMPLETE ASSEMBLIES REQUIRED

A4-DHC SPOTLIGHT 2

8A4630 SHAFT 2

A11A2565 BRACKET 2

P-163 ASSEMBLY 2

48A1008 RIVET 2

SPOTLIGHT AND BRACKET

7252 ASSEMBLY 1

33A256 CLIP 5

11B2617 BRACKET 2

WIRING SYSTEM PARTS

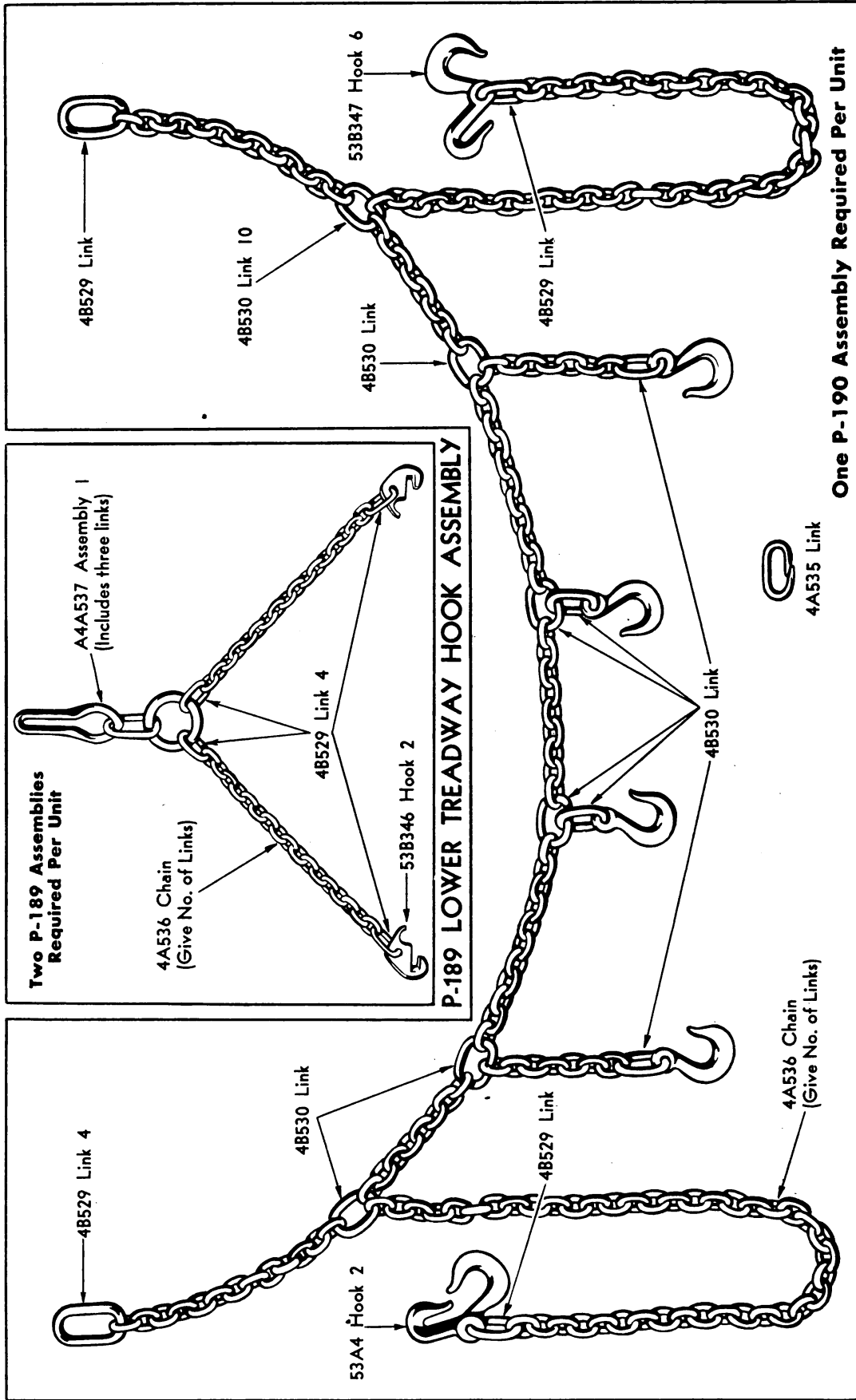
SPOTLIGHT AND BRACKET

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| A4-DHC | Spotlight Assembly—Complete (Unity Mfg. Co.) | 2 |
| 8A4630 | Shaft Only | 2 |
| A11A2565 | Bracket Only—(welded to body) | 2 |
| P-163 | Assembly—Screw, Winged, and, Chain | 2 |
| 48A1008 | Rivet—Head, Round, 5/32" x 1/8" | 2 |

WIRING SYSTEM PARTS

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| 7252 | Assembly—Loom, and, Wiring, (for A-4-DHC Spotlights) | 1 |
| 33A256 | Clip—Cable | 5 |
| 11B2617 | Bracket—Reflector, and, Light, Tail | 2 |

PARTS CATALOG



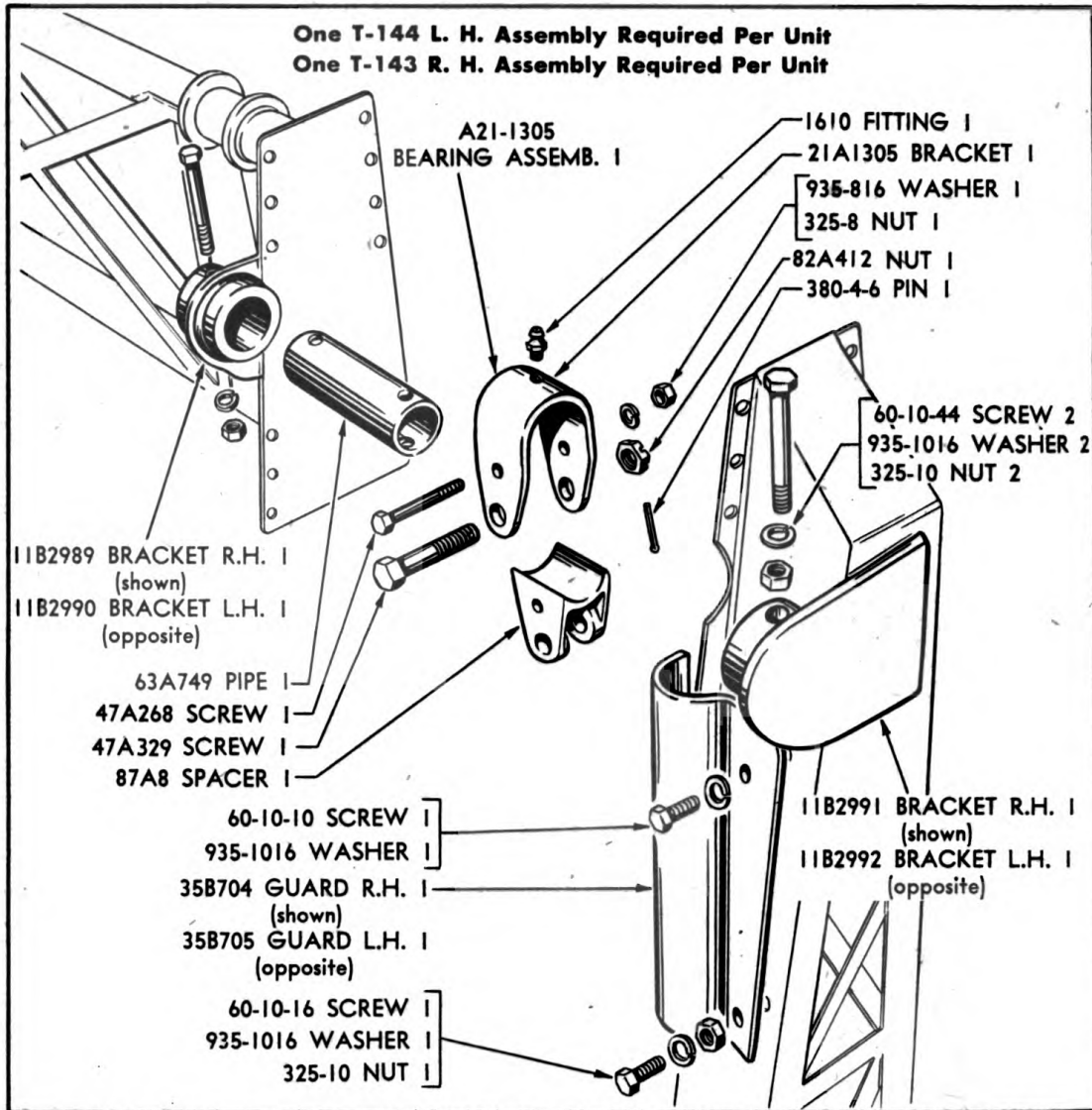
P-190 MAIN CROSS CHAIN ASSEMBLY

| Heil Part, Number | Description of Part | No. Per Unit |
|-------------------|---|--------------|
| P-190 | Chain Assembly—Cross, Main, Complete (171 links) | 1 |
| | 4B529 Link—Connecting, 5/8" x 5 1/2" | 4 |
| | 4B530 Link—Connecting, 5/8" x 3 3/4" | 10 |
| | (Note: When repairing 4B529 or 4B530 Connecting Links, use 4A535 Cold Shut Link.) | |
| | 4A535 Link—Repair, or, Shut, Cold | 6 |
| | 53B347 Hook—Slip, Standard, 1/2" | 2 |
| | 53A4 Hook—Grab, 1/2" | |
| | 4A536 Chain—Coil, 1/2" Proof (give number of links) | |

P-189 LOWER TREADWAY HOOK ASSEMBLY

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| P-189 | Hook Assembly—Treadway, Lower, Complete | 2 |
| | A4A537 Link Assembly—Grab (includes three rings) | 1 |
| | 4B529 Link—Connecting, 5/8" x 5 1/2" | 4 |
| | (Note: When repairing 4B529 Links use 4A535 Cold Shut Link.) | |
| | 4A535 Link—Repair, or, Shut, Cold | |
| | 53B346 Hook—Treadway | 2 |

PARTS CATALOG



T-143 R. H. PIVOT BRACKET ASSEMBLY (shown)
T-144 L. H. PIVOT BRACKET ASSEMBLY (opposite)

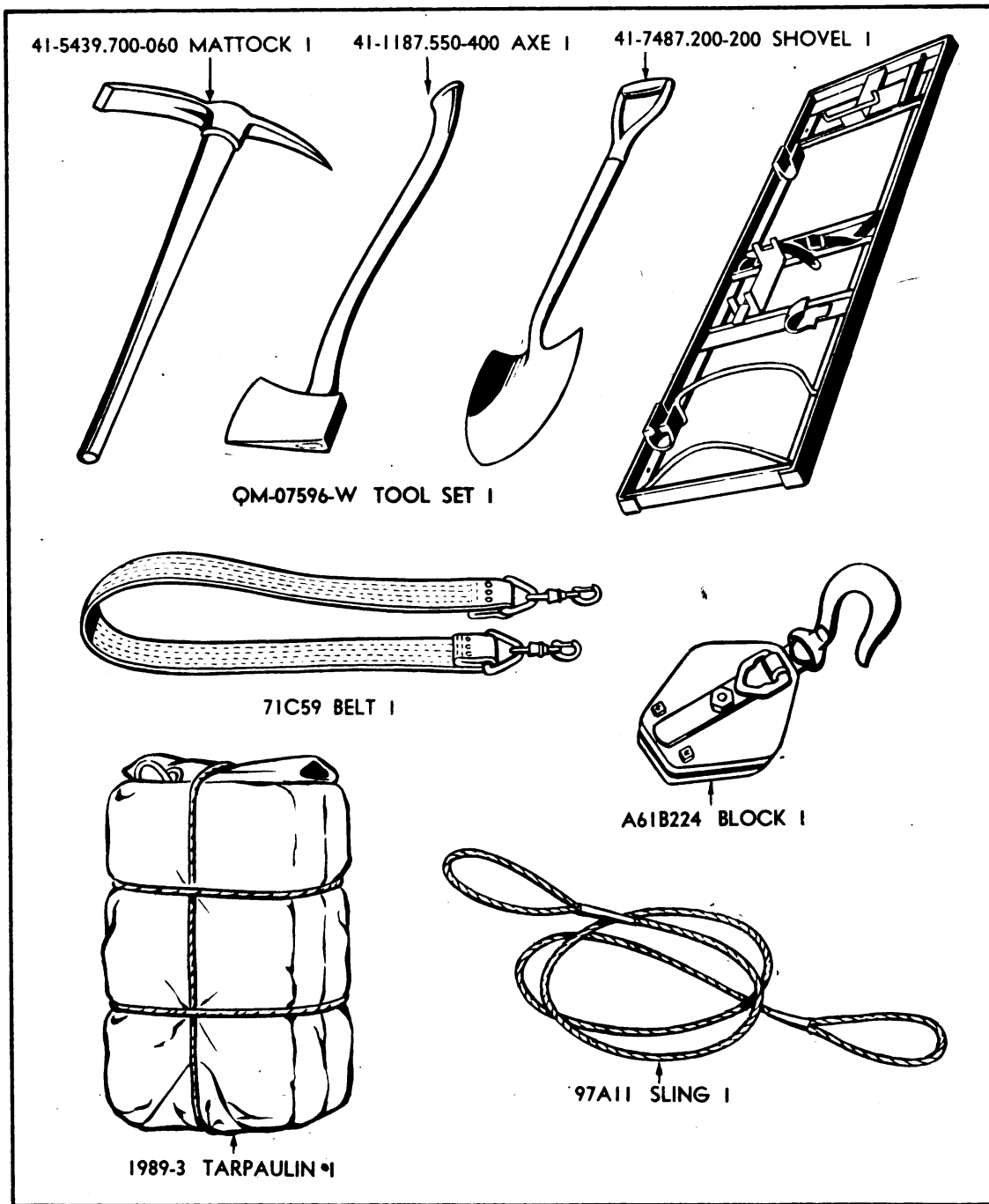
| Heil Part Number | Description of Part | No. Per Unit |
|------------------|--|--------------|
| T-143 | Bracket Assembly R.H.—Pivot, Chain (welded to boom) | 1 |
| | (Note: Right or Left Assembly is your Right or Left when sitting in Cab of Truck.) | |
| 11B2989 | Bracket R.H.—Support, Inner | -1 |
| 11B2991 | Bracket R.H.—Support, Outer | 1 |
| 63A749 | Pipe—Shaft, Support, Ex. Heavy, 2 ³ / ₈ " x 7 ³ / ₄ " | 1 |
| 60-10-44 | Capscrew— ⁵ / ₈ " x 4 ¹ / ₂ ", SAE | 1 |
| 935-1016 | Lockwasher— ⁵ / ₈ " | 1 |
| 325-10 | Nut— ⁵ / ₈ ", SAE | 1 |
| 35B704 | Guard R.H.—Chain | 1 |

PARTS CATALOG

T-143 R.H. ASSEMBLY & T-144 L.H. ASSEMBLY continued

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| | 60-10-10 Capscrew— $\frac{5}{8}$ " x 1", SAE | 1 |
| | 60-10-16 Capscrew— $\frac{5}{8}$ " x $1\frac{3}{4}$ ", SAE | 1 |
| | 935-1016 Lockwasher— $\frac{5}{8}$ " | 2 |
| | 325-10 Nut— $\frac{5}{8}$ ", SAE | 1 |
| | A21-1305 Bracket Assembly—Bearing, Chain | 1 |
| | 21A1305 Bracket—Chain, Outer | 1 |
| | 87A8 Spacer—Bracket, Chain | 1 |
| | 47A268 Capscrew— $\frac{1}{2}$ " x 4", SAE, Special | 1 |
| | 935-816 Lockwasher— $\frac{1}{2}$ " | 1 |
| | 325-8 Nut— $\frac{1}{2}$ ", SAE | 1 |
| | 47A329 Capscrew— $\frac{7}{8}$ " x 4", SAE, Special, (drilled $\frac{5}{32}$ " hole).... | 1 |
| | 82A412 Nut—Jam, Slotted, $\frac{7}{8}$ ", SAE | 1 |
| | 380-4-6 Pin—Cotter, $\frac{1}{8}$ " x $1\frac{1}{2}$ " | 1 |
| | 1610 Fitting—Alemite, Straight, $\frac{1}{8}$ ", No. 1610 | 1 |
| T-144 | Bracket Assembly L.H.—Pivot, Chain (welded to boom) | 1 |
| | 11B2990 Bracket L.H.—Support, Inner | 1 |
| | 11B2992 Bracket L.H.—Support, Outer | 1 |
| | 63B749 Pipe—Shaft, Support, Ex. Heavy, $2\frac{3}{8}$ " x $7\frac{3}{4}$ " | 1 |
| | 60-10-44 Capscrew— $\frac{5}{8}$ " x $4\frac{1}{2}$ ", SAE | 1 |
| | 935-1016 Lockwasher— $\frac{5}{8}$ " | 1 |
| | 325-10 Nut— $\frac{5}{8}$ ", SAE | 1 |
| | 35B705 Guard L.H.—Chain | 1 |
| | 60-10-10 Capscrew— $\frac{5}{8}$ " x 1", SAE | 1 |
| | 60-10-16 Capscrew— $\frac{5}{8}$ " x $1\frac{3}{4}$ ", SAE | 1 |
| | 935-1016 Lockwasher— $\frac{5}{8}$ " | 2 |
| | 325-10 Nut— $\frac{5}{8}$ ", SAE | 1 |
| | A21-1305 Bracket Assembly—Bearing, Chain | 1 |
| | 21A1305 Bracket—Chain, Outer | 1 |
| | 87A8 Spacer—Bracket, Chain | 1 |
| | 47A268 Capscrew— $\frac{1}{2}$ " x 4", SAE, Special | 1 |
| | 935-816 Lockwasher— $\frac{1}{2}$ " | 1 |
| | 325-8 Nut— $\frac{1}{2}$ ", SAE | 1 |
| | 47A329 Capscrew— $\frac{7}{8}$ " x 4", SAE, Special, (drilled $\frac{5}{32}$ " hole).... | 1 |
| | 82A412 Nut—Jam, Slotted, $\frac{7}{8}$ ", SAE | 1 |
| | 380-4-6 Pin—Cotter, $\frac{1}{8}$ " x $1\frac{1}{2}$ " | 1 |
| | 1610 Fitting—Alemite, Straight, $\frac{1}{8}$ ", No. 1610 | 1 |

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| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| QM-07596W | Tool Set (Furnished by Government)..... | 1 |
| | 41-5439.700-060 Mattock (GFE) | 1 |
| | 41-1187.550-400 Axe (GFE) | 1 |
| | 41-7487.200-200 Shovel (GFE) | 1 |
| 71C59 | Belt—Safety | 1 |
| A61B224 | Block—Snatch | 1 |
| 97A11 | Sling—Cable | 1 |
| 1989-3 | Tarpaulin | 1 |

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| Heil Part No. | Description of Part | Quan. Per Unit | Page No. | Daybrook Part No. | Weight | | Price |
|------------------|--|----------------------|-------------|----------------------|--------|-----------------|--------|
| | | | | | Lbs. | Oz. | |
| AA-157 | Pump Assembly—Hydraulic, complete | 1 | 64 | 76 | 28 | .... | 30.00 |
| 3B893 | Bearing—Type, hanger (Link- Belt, Chicago, Ill., No. S-205973) | 2 | 66 | X272 | 6 | .... | 6.80 |
| A3A910A | Bracket—Bearing, main, inner | 2 | 46 | X203 | 12 | 4 | 7.00 |
| A3B911 | Bracket—Bearing, main, outer | 2 | 46 | X205 | 27 | 4 | 8.30 |
| A4-DHC | Spotlight Assembly—(Unity Mfg. Co., Chicago, Ill.) | 2 | 82, 84 | A4-DHC | 2 | 8 | 3.85 |
| A4B506 | Support—Cylinder, lower | 2 | 44 | X232 | 21 | 12 | 12.00 |
| A4A537 | Link Assembly—Grab | 2 | 86 | X641 | 10 | .... | 3.50 |
| A11C2407 | Fairlead Assembly—Complete | 1 | 49 | X286 | 78 | 8 | 44.00 |
| A11B2521 | Bracket Assembly L. H.— Support, cylinder, lower | 1 | 46 | X657L | 40 | 8 | 18.75 |
| A11B2522 | Bracket Assembly R. H.— Support, cylinder, lower | 1 | 46 | X657R | 40 | 8 | 18.75 |
| A11B2537 | Bracket—Pedal, declutching | 1 | 76 | X346 | 2 | 12 | 2.10 |
| A11A2565 | Bracket—Shaft, spotlight | 2 | 84 | X469 | 1 | 12 | 3.00 |
| A14B637 | Bracket—Rod, tie | 2 | 48 | X560 | 4 | 7 $\frac{1}{3}$ | 2.20 |
| A21-1305 | Bracket Assembly—Bearing, chain, complete | 2 | 88 | X276 | 7 | 8 | 4.25 |
| 26-666 | Yoke and Ring—(for tarpaulin) | 16 | 42 | X367 | .... | 5 | .25 |
| A27A1501 | Rod—Tie, left | 1 | 48 | X229L | 9 | 8 | 4.00 |
| A27A1502 | Rod—Tie, right | 1 | 48 | X229R | 9 | 8 | 4.00 |
| A27A1503 | Rod—Control (bell crank to layshaft lever) | 1 | 74 | X348 | 3 | 10 | 2.00 |
| A27A1504 | Rod—Control (bell crank to V-191 valve) | 1 | 74 | X360 | 5 | .... | 2.50 |
| A27B1575 | Rod—Control (bell crank to diversion valve) | 1 | 72 | X658 | 4 | 14 | 2.75 |
| A27B1576 | Rod—Control, front (for lower cylinders controls) | 1 | 72 | X655 | 3 | 8 | 2.00 |
| A31A310 | Valve Assembly—Relief | 1 | 56 | X490 | 1 | 4 | 3.00 |
| A33A254 | Chain and Clip Assembly— Box, tool | 2 | 51 | X610 | .... | 2 | .25 |
| A39A1720 | Support—Angle, left | 1 | 68 | X484L | 3 | .... | .25 |
| A39A1724 | Support—Angle, right | 1 | 70 | X484R | 3 | .... | .25 |
| A47A275 | Bolt—Bearing, lever, control | 1 | 68 | X466 | 1 | 5 | .50 |
| A48A949 | Pin—Bearing, crank, bell | 2 | 68, 70 | X474 | .... | 10 | .60 |
| A61B224 | Block—Snatch (H. Channon Co., Chicago, Ill.) | 1 | 90 | X423 | 28 | .... | 10.00 |
| A70A440 | Lever Assembly—Valve, and, layshaft, control | 1 | 74 | X500 | 3 | 10 | 1.35 |
| A177 | Cylinder Assembly—Lower, short, complete | 2 | 52 | X680 | 112 | .... | 90.00 |
| A177B | Cylinder Assembly—Lower (welded parts only) | 2 | 52 | X642 | 95 | | 68.50 |
| A178A | Cylinder Assembly—Upper, long, complete | 2 | 54 | X683 | 215 | | 124.00 |

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|------------------|---|-------------|-------------|----------------------|--------|-------|--------|
| | | Per Unit | Page No. | | Lbs. | Oz. | |
| A178B | Cylinder Assembly—Upper (welded parts only) | 2 | 54 | X643 | 195 | | 101.50 |
| KD333A | Reflector—Amber (K-D Lamp Co., Cincinnati, Ohio) | 4 | 42 | KD333A | .... | 5 1/3 | .38 |
| KD333R | Reflector—Red (K-D Lamp Co., Cincinnati, Ohio) | 4 | 42, 44 | KD333R | .... | 5 1/3 | .38 |
| KD952-I-6 | Light Assembly—Tail, black- out, and, light, stop, and tail, service (QM-08242X) (K-D Lamp Co., Cincinnati, Ohio) | 1 | 81 | 952-I-6 | 1 | 6 | 1.75 |
| KD953-I-6 | Light Assembly—Stop, and, tail, blackout (QM-08243X) (K-D Lamp Co., Cincinnati, Ohio) | 1 | 80 | 953-I-6 | 1 | 4 | 2.25 |
| P-163 | Chain and Winged Screw Assembly | 2 | 84 | X668 | .... | 8 | .90 |
| P-189 | Hook Assembly—Treadway, lower, complete | 2 | 86 | X678 | 31 | .... | 9.75 |
| P-190 | Chain Assembly—Cross, main, complete | 1 | 86 | X696 | 88 | .... | 19.25 |
| QM-07596W | Tool Set—(furnished by Govt.) | 1 | 42, 90 | QM-07596W | 21 | .... | .... |
| RM22A80 | Gasket—Cover | 1 | 62 | X662 | .... | 1/3 | .02 |
| RM146-13 | Seal—Oil (National, No. 50119) | 2 | 62 | X660 | .... | 1 | .35 |
| S-1304SP | Bearing—Roller (Bower Roller Bearing Co., Detroit, Mich.) | 4 | 64 | 93 | .... | 5 1/2 | .75 |
| T-143 | Bracket Assembly, R. H.— Pivot, chain, complete | 1 | 88 | X697R | 37 | .... | 13.25 |
| T-144 | Bracket Assembly, L. H.— Pivot, chain, complete | 1 | 88 | X697L | 37 | .... | 13.25 |
| V-191 | Valve Assembly—Control, main (The Heil Co., Milwaukee, Wis.) | 1 | 62 | X592 | 40 | .... | 71.00 |
| V-200 | Valve Assembly—Diversion (Port Clinton Marine Garage, No. 15033) | 1 | 63 | X580 | 15 | 8 | 46.80 |
| X7-6 | Key—Woodruff, No. 6, 5/32" | 1 | 74 | 244 | .... | 1/4 | .03 |
| X9-18 | Ball—Steel, 7/8" | 5 | 54, 56 | 127 | .... | 1 1/2 | .15 |
| X12A92 | Packing—V-leather (for piston rod) | 24 | 52, 54 | 123 | .... | 1/4 | .15 |
| X12A93 | Packing—V-leather (for pump) | 4 | 64 | 74 | .... | 1/16 | .15 |
| X18-15 | Setscrew—Head, Allen, USS, 5/16"x3/8" | 4 | 54, 74 | X488 | .... | 1/12 | .15 |
| X29-2 | Wire—Locking | 12 | 44, 66 | X636 | .... | 1 | .05 |
| 3A913 | Bearing—Flanged type (Link- Belt Co., Chicago, Ill.; No. F-416) | 1 | 66 | X385 | 4 | 8 | 5.00 |
| 3A954 | Bracket—Crank, bell, lower | 1 | 76 | X302 | 1 | 12 | 1.35 |

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|---------------|--|----------------|----------|-------------------|--------|--------|--------------------------------|
| | | | | | Lbs. | Oz. | |
| 4B529 | Link—Connecting, 5/8" dia. x 5 1/2" | 12 | 86 | X452 | 1 | | See 4A535 |
| 4B530 | Link—Connecting, 5/8" dia. x 3 3/4" | 10 | 86 | X454 | | 15 | " " |
| 4A535 | Link—Repair, shut, cold (use for repairing 4B529 and 4B530 connecting links) | 13 | 86 | X639 | 1 | 1 | .55 |
| 4A536 | Chain—Coil, 1/2" proof (give number of links) | | 86 | X559 | .... | .... | { per link .04 per foot .40 |
| 6C595 | Housing—Pump | 1 | 64 | 66 | 12 | 8 | 7.00 |
| 7A635 | Gear—Pump | 2 | 64 | 70 | 2 | .... | 4.55 |
| 8B4588 | Shaft—Pivot, boom, main, 3 15/16"x98 3/4" | 1 | 46 | X209 | 338 | 8 | 32.00 |
| 8A4595 | Shaft—Square, 7/8"x13" | 2 | 66 | X388 | 2 | 12 | .60 |
| 8A4614 | Shaft—Hinge, platform, operator's | 1 | 50 | X427 | 2 | 12 | .85 |
| 8A4630 | Shaft—Spotlight | 2 | 84 | X471 | 4 | .... | 1.50 |
| 8A4639 | Shaft—Universal, 1"x36 1/2" | 1 | 66 | X479 | 7 | 12 | 1.60 |
| 8A4654 | Shaft—Pump (long) | 1 | 64 | 68 | 1 | 6 | 3.20 |
| 8A4655 | Shaft—Pump (short) | 1 | 64 | 69 | .... | 13 1/2 | 1.40 |
| 8A4683 | Shaft—Drive, round | 1 | 66 | X459 | 24 | 8 | 3.50 |
| 9A646 | Bushing—Bronze (for 11B2521 and 11B2522 plates) | 2 | 46 | X211 | 1 | 4 | 6.00 |
| 9A647 | Bushing—Bronze (for A3A910A bearing) | 2 | 46 | X204 | 2 | .... | 6.00 |
| 9A648 | Bushing—Bronze (for A3B911 bearing) | 2 | 46 | X206 | 2 | 4 | 6.00 |
| 9A665 | Bushing—Bronze (for short cylinder rod end) | 2 | 52 | X23 | 1 | 5 | 2.90 |
| 9A666 | Bushing—Bronze (for long cylinder rod end) | 2 | 54 | X12 | 1 | 12 | 3.15 |
| 10A303 | End—Rod, piston, cylinder, short | 2 | 52 | X241 | 4 | 3 | 12.50 |
| 10B304 | End—Rod, piston, cylinder, long | 2 | 54 | X242 | 7 | .... | 12.50 |
| 11C2407A | Bracket—Sheave, fair lead | 1 | 49 | X289 | 40 | 8 | 13.50 |
| 11B2516 | Bracket—Pump | 1 | 64 | X50 | 7 | 14 | 8.40 |
| 11B2518 | Bracket—Tank, oil, reserve | 1 | 56 | X215 | 4 | 3 1/2 | 2.20 |
| 11B2519A | Bracket Assembly L. H.—Support, cylinder, lower, inner | 1 | 46 | X629L | 21 | .... | 13.10 |
| 11B2520A | Bracket Assembly R. H.—Support, cylinder, lower, inner | 1 | 46 | X629R | 21 | .... | 13.10 |
| 11B2521 | Plate L. H.—Bracket, support, cylinder, outer | 1 | 46 | X210L | 39 | .... | 12.75 |
| 11B2522 | Plate R. H.—Bracket, support, cylinder, outer | 1 | 46 | X210R | 39 | | 12.75 |
| 11B2525 | Bracket—Hold-down, front, left, lower | 1 | 42 | X340 | 15 | 4 | 3.60 |

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| | | | | | Lbs. | Oz. | |
| 11B2527 | Bracket—Hold-down, rear, lower | 2 | 42 | X337 | 9 | 8 | 2.55 |
| 11B2528 | Bracket—Hold-down, front, right, lower | 1 | 42 | X336 | 10 | | 2.55 |
| 11B2529 | Bracket—Hold-down, diagonal, lower | 4 | 42 | X338 | 7 | 12 | 2.25 |
| 11B2530 | Bracket—Hold-down, upper | 7 | 42 | X335 | 5 | 7 | 1.90 |
| 11B2531 | Bracket—Hold-down, front, left, upper | 1 | 42 | X339 | 7 | 4 | 2.15 |
| 11A2534 | Bracket—Bearing, layshaft | 2 | 74 | X327 | .... | 14 | 1.20 |
| 11B2566 | Bracket—Support, shaft, universal | 1 | 66 | X475 | 2 | 8 | 1.50 |
| 11B2616 | Bracket—Plate, step | 1 | 50 | X297 | 8 | .... | 2.75 |
| 11B2617 | Bracket—Reflector, and, tail light | 2 | 84 | X268 | 2 | 8 | .80 |
| 11A2752 | Bracket—Support, pipe | 1 | 58 | X614 | 1 | .... | 1.35 |
| 11A2781 | Bracket—Support, valve, diversion | 2 | 63 | X590 | .... | 10 | 1.25 |
| 11B2989 | Bracket, R. H.—Support, bearing, chain, inner | 1 | 88 | X698R | 8 | 8 | 2.55 |
| 11B2990 | Bracket L. H.—Support, bearing, chain, inner | 1 | 88 | X698L | 8 | 8 | 2.55 |
| 11B2991 | Bracket R. H.—Support, bearing, chain, outer | 1 | 88 | X703R | 7 | 3 | 2.15 |
| 11B2992 | Bracket L. H.—Support, bearing, chain, outer | 1 | 88 | X703L | 7 | 3 | 2.15 |
| 12A1532 | Cover—Gland, packing | 1 | 62 | X661 | .... | 12 | 4.70 |
| 12C1553 | Cover—Pump | 1 | 64 | 67 | 4 | 8 | 3.25 |
| 12A1612 | Plate—Cover, outside, valve, diversion | 1 | 63 | X584 | 1 | 5 | 3.20 |
| 13B2692A | Pedal—Control, clutch | 1 | 76 | X344 | 5 | 4½ | 2.00 |
| 13A2704 | Crank—Bell, (lower, front) | 1 | 72 | X294 | 1 | .... | 1.60 |
| 13A2705 | Lever—Layshaft, (with ½" hole) | 1 | 74 | X507 | .... | 5 | .70 |
| 13B2706 | Crank—Bell, control, valve | 1 | 74 | X278 | 2 | 8 | 1.90 |
| 13B2711 | Crank—Bell, lower | 1 | 76 | X303 | 1 | 8 | 1.75 |
| 13A2728 | Lever—Control, winch (lever only) | 1 | 68 | X465 | 2 | 2 | 1.00 |
| 13A2729 | Lever—Control, pump, hydraulic | 1 | 70 | X464 | 2 | 5 | 1.00 |
| 13A2732 | Crank—Bell | 4 | 68, 70 | X473 | 1 | .... | 1.50 |
| 13A2785 | Crank—Bell, (upper, front) | 1 | 72 | X593 | 1 | 7 | 2.00 |
| 15A728 | Spacer—Pipe | 1 | 68 | X467 | .... | 3 | .10 |
| 15A772 | Plate—Cover, rear | 1 | 63 | X586 | .... | 8 | .75 |
| 15A773 | Plate—Cover, inside, valve, diversion | 1 | 63 | X585 | .... | 7 | 1.60 |
| 19A388 | Spring—Check, valve, relief (Heil Co. only) | 1 | 56 | .... | .... | ¼ | .10 |
| 19A449 | Spring—Head, cylinder | 4 | 52, 54 | 114 | | 5 | .10 |
| 19A567 | Spring—Ball, check | 5 | 54 | X380 | | ¼ | .10 |

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| | | | | | Lbs. | Oz. | |
| 19A568 | Packing—Spring | 1 | 64 | 71 | | 1 | .04 |
| 19A587 | Spring—Return, 1" x 7" | 2 | 72, 74 | X499 | | 7 | .14 |
| 19A596 | Spring—Valve, diversion | 1 | 63 | X587 | .... | 1¾ | .10 |
| 20C635 | Tank—Oil, reserve | 1 | 56 | X216 | 70 | .... | 24.75 |
| 21A1305 | Bracket—Bearing, chain | 2 | 88 | X277 | 3 | 11½ | 2.15 |
| 21A1309 | Bracket—Support, handle, control | 1 | 72 | X353 | .... | 5 | .25 |
| 21A1311 | Handle—Rod, safety | 1 | 42 | X433 | 1 | 3 | .10 |
| 21A1313 | Plate—Lock, turnbuckle | 1 | 48 | X428 | 1 | 3 | .50 |
| 21A1486 | Pin—Stop, pedal, clutch, (7/16" x 3") | 1 | 76 | X569 | .... | 3 | .15 |
| 22A217 | Gasket—Copper | 1 | 62 | X664 | .... | ½ | .10 |
| 22A1033 | Gasket—Gland, cylinder, hydraulic | 4 | 52, 54 | 169 | .... | 1/12 | .02 |
| 22B1034 | Gasket—Pump cover to housing | 1 | 64 | 170 | .... | 1/12 | .05 |
| 22A1035 | Gasket—Pump to pump bracket | 1 | 64 | 168 | .... | 1/12 | .02 |
| 22A1073 | Gasket—Valve, diversion | 3 | 63 | X589 | .... | 1 | .05 |
| 23A187 | Gland—Packing, bronze | 4 | 52, 54 | X83 | 1 | 9 | 3.60 |
| 26A660 | Ring—Packing (for cylinder head) | 4 | 52, 54 | 124 | .... | 2 | .42 |
| 26A690 | Ring—Lock | 1 | 64 | 75 | .... | ¼ | .15 |
| 26A691 | Ring—Packing, inner (male) | 1 | 64 | 72 | .... | ½ | .15 |
| 26A693 | Ring—Packing, outer (female) | 1 | 64 | 73 | .... | 1 | .15 |
| 27A1520 | Rod—Control, upper, (for winch) | 1 | 68 | X496 | .... | 7¼ | .80 |
| 27A1523RH | Rod—Control, (for winch and pump) | 2 | 68, 70 | X498 | 1 | 7 | .90 |
| 27A1524 | Rod—Control, upper, (for pump) | 1 | 70 | X497 | 1 | 7½ | .90 |
| 27A1548 | Rod—Yoke, control, to winch | 1 | 68 | 697 | 1 | 9 | .99 |
| 27A1549 | Rod—Yoke, control, 7/16" x 37½", (to pump) | 1 | 70 | X633 | 1 | 10 | .90 |
| 27A1574 | Rod—Control, pedal, clutch, ½" | 1 | 76 | X513 | 1 | .... | .60 |
| 30B135 | Joint—Slip, Universal (Blood Bros. Machine Co., Allegan, Mich., No. 1FS-9023) | 2 | 66 | 249 | 4 | 12 | 7.35 |
| 30B136 | Joint—Universal (Blood Bros. Machine Co., Allegan, Mich., No. 1FS-9024) | 3 | 66 | X290 | 3 | 4 | 5.25 |
| 31A310 | Body—Valve, relief (not interchangeable with Daybrook part) | 1 | 56 |  | .... | 14 | 2.20 |
| 32A325 | Yoke—Adjusting, 7/16", SAE | 1 | 72 | X354 | .... | 4 | .35 |
| 32A331 | Yoke—7/16", SAE | 2 | 68, 70 | 257 | | 6 | .35 |
| 33A256 | Clip—Cable (Electric Auto- Lite Co., Toledo, Ohio, No. T-183) | 5 | 84 | X434 | | ⅓ | .05 |

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| | | | | | Lbs. | Oz. | |
| 34A2683 | Spacer—for 48B914 key | 2 | 46 | X429 | | 10½ | .50 |
| 34A2684A | Plate—Name (Corps of Engineers and Weights) | 1 | 42, 78 | X673 | | 4 | .55 |
| 34A2785 | Washer—Thrust | 4 | 64 | 80 | .... | 7 | 1.25 |
| 34A2879 | Support—Bracket, pipe | 2 | 58 | X264 | .... | 9½ | .30 |
| 34B3129 | Plate—Diagram, control, front | 1 | 79 | X595 | .... | 3 | .55 |
| 34B3131 | Plate—Instructions, operating | 1 | 78 | X596 | .... | 3 | .55 |
| 34A3173 | Plate—Caution (for emergency valves) | 4 | 78 | X674 | .... | ½ | .18 |
| 34A4875 | Plate—Data, transportation | 1 | 79 | .... | .... | 9 | .... |
| 35B704 | Guard R.H.—Chain | 1 | 88 | X705R | 9 | 4 | 2.50 |
| 35B705 | Guard L.H.—Chain | 1 | 88 | X705L | 9 | 4 | 2.50 |
| 40A822 | Washer—3" (for 48A911 pin) | 2 | 46 | X37 | 1 | .... | 1.90 |
| 40A825 | Collar—Stop, layshaft | 1 | 74 | X350 | .... | 4 | .60 |
| 40A828 | Collar—Spacer, inner | 2 | 46 | X247 | .... | 7 | .50 |
| 44-85 | Wrench—Allen Head, ⅝" | 1 | 55 | X675 | .... | 1½ | .05 |
| 45A260 | Coupling—Light, blackout, and tail | 1 | 80 | 7252B | .... | ½ | .25 |
| 47A264 | Bolt—Shoulder | 2 | 72 | X296 | .... | 7 | .85 |
| 47A265 | Bolt—Shoulder, bearing, bell-crank | 1 | 74 | X324 | .... | 8 | .85 |
| 47A268 | Capscrew—Special, ½" x 4", SAE | 2 | 88 | F8-4 | .... | 4 | .11 |
| 47A269 | Screw—Adjusting, valve control, main | 1 | 62 | X665 | .... | 2 | .75 |
| 47A304 | Setscrew—Sq. head, ⅜" x 1", drilled | 4 | 44 | X638 | .... | 1 | .12 |
| 47A306 | Setscrew—Sq. head, ⅜" x ¾", USS, drilled | 8 | 66 | 536 | .... | ½ | .10 |
| 47A329 | Capscrew—Special, ⅞" x 4", SAE (drilled 5/32" hole) | 2 | 88 | X522 | .... | 13¼ | .25 |
| 48A1008 | Pin—Rivet, rd. head, 5/32" x 1½" | 2 | 84 | X566 | .... | ½ | .02 |
| 48A1074 | Pin—Yoke, ½" x 1 27/64" (drilled 3/16" hole) | 2 | 72, 74 | X527 | .... | 1 | .15 |
| 48A1077 | Pin—Dowel | 2 | 46 | X656 | .... | 3/16 | .02 |
| 48A911 | Pin—Pivot, cylinder, lower | 2 | 46 | X245 | 11 | 4 | 7.90 |
| 48A912 | Pin—Pivot (for A4B506 support) | 2 | 44 | X304 | 3 | 12 | 2.00 |
| 48A913 | Pin—Pivot, cylinder, upper | 2 | 42 | X221 | 11 | 12 | 7.90 |
| 48B914 | Key—Wedge, tapered, 1⅝" | 2 | 46 | X18 | 3 | 12 | 4.50 |
| 48A874 | Pin—Roller, fairlead, 1½" x 11⅝" | 2 | 49 | X287 | 5 | 4 | 4.00 |
| 48A921 | Pin—Rod, piston | 2 | 44 | X269 | 5 | 4 | 3.00 |
| 48A922 | Pin—Rod, tie, 1" x 3¾" | 2 | 48 | X33 | 1 | 14 | 1.60 |
| 48A923 | Pin—Pivot (for A4B506 support) | 2 | 44 | X233 | 4 | 4 | 3.00 |
| 48A927A | Pin—Sheave, fairlead | 2 | 49 | X308 | 1 | 10 | 2.50 |
| 48A951 | Rivet—Head, round | 4 | 52, 54 | X413 | | 1 | .03 |
| 48A1076 | Pin—Crank, bell | 1 | 76 | X421 | 1 | | .50 |

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| | | | | | Lbs. | Oz. |
| 53A4 | Hook—Grab, 1/2" | 2 | 86 | X455 | 1 | 12 |
| 53B346 | Hook—Treadway, lower | 4 | 86 | X676 | 2 | 14 |
| 53B347 | Hook—Slip, standard, 1/2" | 6 | 86 | X695 | 1 | 12 |
| 55A15 | Washer—Beveled (drilled 5/8" hole) | 1 | 72 | X510 | .... | 1 |
| 55A397 | Washer—Special (drilled 11/16" hole) | 4 | 68, 72 74 | X567 | .... | 1/2 |
| 55A398 | Washer—Cut (3/4" I.D.— 1 3/8" O.D.) | 7 | 68, 70 72, 74 | X509 | .... | 2/5 |
| 55A439 | Washer—Cut, 3/4" (drilled 1 1/32") | 1 | 76 | X514 | .... | 1 |
| 55A441 | Washer—Retaining | 2 | 44 | X270 | .... | 2 |
| 58B713-1 | Ell—Standard, 1", 90° | 2 | 56 | X533 | .... | 9 1/2 |
| 58B713-2 | Tee—1" | 2 | 56 | X528 | .... | 13 1/2 |
| 58B713-3 | Plug—Pipe, head, recessed, 1" | 1 | 56 | X536 | .... | 2 1/2 |
| 58B713-4 | Union—Standard, 1" | 1 | 56 | X534 | .... | 13 |
| 58B713-5 | Cap—Pipe, 1" | 1 | 56 | X461 | .... | 6 |
| 58B713-8 | Plug—Pipe, forged steel, 3/4" | 8 | 54, 58 | X551 | .... | 4 |
| 58B713-10 | Tee—Standard, 1/2" x 1/2" x 3/4" | 1 | 56 | X518 | .... | 7 1/2 |
| 58B713-12 | Plug—Pipe, 1/4" | 3 | 52, 56 | X414 | .... | 1/2 |
| 58B713-15 | Ell—Street, 45°, 1/2" | 2 | 58 | X486 | .... | 3 1/2 |
| 58B713-20 | Ell—Street, extra strong, 3/4" | 10 | 52, 58 62 | X598 | .... | 11 |
| 58B713-21 | Ell—Street, standard, 1" | 2 | 56, 62 | X548 | 1 | 10 |
| 58B713-23 | Plug—Pipe, 3/4" | 1 | 56 | X419 | .... | 1 1/2 |
| 58B713-28 | Plug—Pipe, standard, 1/2" | 2 | 54 | X485 | .... | 1 |
| 58B713-31 | Ell—Extra strong, 3/4", 90° | 12 | 56, 58 | X599 | .... | 12 |
| 58B713-32 | Tee—Extra strong, 3/4" | 8 | 58 | X597 | 1 | .... |
| 58B713-33 | Tee—Standard, 1" x 1" x 3/4" | 1 | 56 | X626 | .... | 12 |
| 58B713-34 | Ell—Standard, 1/2", 90° | 2 | 56 | X637 | .... | 4 |
| 58B713-35 | Coupling—Extra strong, 3/4" x 1 3/8" | 2 | 58 | X627 | .... | 6 |
| 62A257 | Rollers—Fairlead | 2 | 49 | X288 | 4 | 12 |
| 63A634A | Pipe—Extra strong, upper return, 3/4" x 32" | 2 | 54 | X622 | 3 | 6 |
| 63B650-1 | Nipple—Standard, 1" x 3" | 1 | 56 | X546 | .... | 5 1/2 |
| 63B650-2 | Pipe—Standard, 1" x 10" | 1 | 56 | X545 | .... | 5 1/2 |
| 63B650-3 | Pipe—Standard, 1" x 27" | 1 | 56 | X538 | 3 | 12 |
| 63B650-4 | Pipe—Standard, 1" x 51 1/2" | 1 | 56 | X540 | 7 | 10 |
| 63B650-5 | Nipple—Standard, 1" x 4" | 1 | 56 | X544 | .... | 7 1/2 |
| 63B650-7 | Pipe—Extra strong, 3/4" x 6" | 2 | 58 | X539 | .... | 11 3/4 |
| 63B650-8 | Pipe—Extra strong, 3/4" x 7" | 2 | 58 | X547 | .... | 13 3/4 |
| 63B650-9 | Pipe—Extra strong, 3/4" x 3 3/4" | 4 | 58 | X543 | | 6 1/4 |
| 63B650-10 | Pipe—Extra strong, 3/4" x 24 7/8" | 2 | 58 | X541 | 3 | |

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|------------------|--|----------------------|-------------|----------------------|--------|-------|--------|
| | | | | | Lbs. | Oz. | |
| 63B650-11 | Pipe—Extra strong, 3/4" x 22 3/4" | 2 | 58 | X542 | 2 | 13 | .60 |
| 63B650-13 | Pipe—Standard, 3/4" x 32 1/2" | 1 | 56 | X517 | 3 | 1 | 1.10 |
| 63B650-18 | Nipple—Extra strong, 1", close | 1 | 56 | X616 | 1 | 4 | .15 |
| 63B650-19 | Pipe—Extra strong, 1/2" x 52 1/4" | 1 | 56 | X621 | 4 | 8 | .85 |
| 63B650-20 | Pipe—Extra strong, 1/2" x 30" | 1 | 56 | X620 | 3 | 4 | .60 |
| 63B650-21 | Pipe—Extra strong, 3/4" x 8 3/4" | 2 | 58 | X623 | 1 | 10 | .30 |
| 63B650-22 | Pipe—Extra strong, 3/4" x 7 3/4" | 1 | 58 | X625 | .... | 15 | .26 |
| 63B650-23 | Pipe—Extra strong, 3/4" x 6 1/2" | 1 | 58 | X624 | .... | 12 | .24 |
| 63B650-24 | Nipple—Extra strong, close, 3/4" | 2 | 58 | X632 | .... | 2 1/2 | .12 |
| 63B650-25 | Pipe—Extra strong, 3/4" x 74" | 1 | 58 | X607 | 8 | 8 | 1.70 |
| 63B650-26 | Pipe—Extra strong, 3/4" x 28" | 1 | 58 | X618 | 3 | 2 | .75 |
| 63B650-27 | Pipe—Extra strong, 3/4" x 56 1/2" | 1 | 58 | X619 | 6 | .... | 1.40 |
| 63A749 | Pipe—Shaft, support, 2 3/8" x 7 3/4", ex. heavy | 2 | 88 | X704 | 3 | 2 | .75 |
| 68B367 | Sill—Wood, front, left | 1 | 42 | X603 | 6 | .... | 1.00 |
| 68B368 | Sill—Wood, front, right | 1 | 42 | X604 | 6 | .... | 1.00 |
| 68B369 | Sill—Wood, rear, left | 1 | 42 | X602 | 6 | .... | 1.00 |
| 68B370 | Sill—Wood, rear, right | 1 | 42 | X601 | 6 | .... | 1.00 |
| 70A439 | Handle—Control, cylinder, lower | 1 | 72 | X359 | 1 | 12 | .90 |
| 71C59 | Belt—Safety | 1 | 90 | X635 | 1 | 6 | 2.00 |
| 73A201 | End—Rod, plunger, valve | 1 | 62 | X659 | .... | 5 | .75 |
| 78A482 | Clip—Belt, safety | 2 | 42 | X431 | .... | 2 | .10 |
| 81A76 | Bolt—Eye, valve, diversion | 1 | 63 | X594 | .... | 1 3/4 | .35 |
| 82A85 | Nut—Acorn, valve, diversion | 1 | 62 | X663 | .... | 4 | 2.00 |
| 87A8 | Spacer—Bracket, bearing, chain | 2 | 88 | X279 | 2 | 12 | 1.40 |
| 82A360 | Plug—Valve, relief, 3/4", spe- cial (not interchangeable with Daybrook part) | 1 | 56 |  | .... | 2 | .30 |
| 82A412 | Nut—Jam, slotted, 7/8", SAE, special | 2 | 88 | X524 | .... | 1 | .10 |
| 93D435A | Boom Assembly—Left | 1 | 44 | X207L | 550 | .... | 172.00 |
| 93D436A | Boom Assembly—Right | 1 | 44 | X207R | 550 | .... | 172.00 |
| 96C208 | Bracket—Skid, left | 1 | 44 | X237L | 28 | 12 | 6.50 |
| 96C209 | Bracket—Skid, right | 1 | 44 | X237R | 28 | 12 | 6.50 |
| 97A11 | Sling—Cable | 1 | 90 | X381 | 12 | 12 | 10.50 |
| 109A266 | Spacer—Wood, left | 1 | 48 | X562L | 1 | .... | .25 |
| 109A267 | Spacer—Wood, right | 1 | 48 | X562R | 1 | .... | .25 |
| 121C86 | Plate Assembly—Step, complete | 1 | 50 | X292 | 19 | 8 | 9.00 |
| 123B5 | Turnbuckle—7/8", USS | 1 | 48 | X246 | 1 | 4 | 1.25 |
| 126C42 | Support—Boom, upper | 1 | 44 | X613 | 132 | | 31.20 |

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| | | | | | Lbs. | Oz. | |
| 126B45 | Support—Shaft, cross, rear | 1 | 44 | X357 | 52 | | 7.50 |
| 146A77 | Seal—Oil | 1 | 63 | X583 | | 1 | .40 |
| 166B4S | Sheave—Fairlead | 2 | 49 | X325 | 6 | 14 | 6.00 |
| 32-2 | Yoke—1/2", SAE | 2 | 76 | X382 | .... | 4 | .35 |
| 50-4-6 | Bolt—Stove, 1/4" x 1/2" | 16 | 42, 44 | X552 | .... | 1/4 | .01 |
| 120 | Valve—Globe, emergency, 3/4" (Powell Co., Cincinnati, Ohio, No. 120) | 4 | 58, 61 | X415 | 2 | 12 | 3.75 |
| 153-48 | Trap Door—Front | 1 | 42 | X447 | 18 | 12 | 3.60 |
| 153-49 | Trap Door—Rear | 1 | 42 | X448 | 39 | 12 | 5.10 |
| 280-808 | Key—Woodruff, 1/4", No. 15 | 7 | 64, 66 | 246 | .... | 1/4 | .03 |
| 280-1010 | Key—Woodruff, 5/16" x 1 1/4", No. D | 2 | 66 | X558 | .... | 1/2 | .04 |
| 397-35 | Pin—7/16" x 1 1/4" (for 32A331 yoke) | 2 | 68, 70 | 358 | .... | 7/8 | .07 |
| 398-43 | Pin—1/2" x 1 27/64" (drilled 1/8") | 9 | 72, 74 76 | X281 | .... | 1 | .10 |
| 435-8-8 | Rivet—Head, round, 1/4" x 1/2" | 4 | 51 | X521 | .... | 1/3 | .01 |
| 435-8-28 | Rivet—Head, round, 1/4" x 3/4" | 1 | 76 | X512 | .... | 3/4 | .01 |
| 435-8-38 | Rivet—Head, round, 1/4" x 2 3/4" | 2 | 49 | X561 | .... | 3/4 | .02 |
| 540-4-3 | Screw—Lag, 1/4" x 1 1/2" | 4 | 48 | X489 | .... | 1/3 | .02 |
| 650 | Valve—Globe, shut-off, 1" (Powell Co., Cincinnati, Ohio, No. 650) | 1 | 56, 61 | X425 | 2 | 2 | 2.38 |
| 963 | Union—Adapter (male to female) 1/2" | 2 | 58 | X408 | .... | 3 | .40 |
| 964 | Union—Adapter (male to female) 3/4" | 10 | 56, 58 | X405 | .... | 7 | .50 |
| 965 | Union—Adapter (male to female) 1" | 2 | 56 | X403 | .... | 10 1/2 | .80 |
| 974 | Union—Adapter (female to female) 3/4" | 3 | 58 | X406 | .... | 7 | .55 |
| 1044 | Nut—5/16", SAE (for A4-DHC spotlight) | 2 | 82 | 1044 | .008 | .... | .04 |
| 1045 | Lockwasher—Shakeproof, 5/16" | 2 | 82 | 1045 | .008 | .... | .02 |
| 1610 | Fitting—Alemite, 1/8", 100 straight, No. 1610 | 27 | 46, 49 52, 54 | 236 | .... | 1/4 | .08 |
| 1612 | Fitting—Alemite, 1/8", 67 1/2°, No. 1612 | 15 | 44, 52 68, 70 72, 74 76 | 237 | .... | 1/2 | .14 |
| 1648 | Fitting—Alemite 5/16", 67 1/2°, No. 1648 | 7 | 66, 68 70 | 589 | | 1/4 | .21 |
| 1987-3A | Box Assembly—Tool | 1 | 51 | X284 | 117 | 8 | 22.00 |

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|------------------|---|----------------------|-------------|----------------------|--------|------|-------|
| | | | | | Lbs. | Oz. | |
| 1989-3 | Tarpaulin | 1 | 90 | X366 | 78 | 12 | 67.50 |
| 2460 | Door—Lamp (for 953-1-6 light) (K-D Lamp Co., No. 2460) | 1 | 80 | 2460 | | 4 | .21 |
| 2461 | Door—Lamp (for 952-I-6 light) (K-D Lamp Co., No. 2461) | 1 | 81 | 2461 | .... | 4 | .21 |
| 4853 | Hasp—Latch, box, tool | 2 | 51 | X343 | .... | 10 | .60 |
| 6798 | Screw—For stop lights | 4 | 80, 81 | 6798 | .... | 1/4 | .03 |
| 7001 | Bracket—Shell, spotlight (Unity Mfg. Co., Chicago, Ill., No. 7001) | 2 | 82 | 7001 | .333 | .... | ** |
| 7057 | Bracket—Bearing (purchase only Brockway Motor Co., Courtland, N. Y., No. 7057) | 1 | 50 | X504 | .... | 3 | .30 |
| 7068A | Plate—Reinforcing, shell, spot- light (Unity Mfg. Co., Chi- cago, Ill., No. 7068A) | 2 | 82 | 7068A | .031 | .... | ** |
| 7109 | Nut—Winged, 5/16", spotlight (Unity Mfg. Co., Chicago, Ill., No. 7109) | 2 | 82 | 7109 | .031 | .... | .04 |
| 7152A | Wire—Shell, spotlight (Unity Mfg. Co., Chicago, Ill., No. 7152A) | 2 | 82 | 7152A | .003 | .... | .07 |
| 7186 | Screw—Winged, 5/16", spot- light (Unity Mfg. Co., Chi- cago, Ill., No. 7186) | 2 | 82 | 7186 | .063 | .... | .07 |
| 7221 | Housing—Pivot, spotlight (Unity Mfg. Co., Chicago, Ill., No. 7221) | 2 | 82 | 7221 | .328 | .... | .56 |
| 7240 | Screw—5/16" x 1 1/2", spotlight (Unity Mfg. Co., Chicago, Ill., No. 7240) | 2 | 82 | 7240 | .031 | .... | .07 |
| 7252 | Wiring Assembly—Loom, spotlight (Unity Mfg. Co., Chicago, Ill., No. 7252) | 1 | 84 | 7252 | .450 | .... | 2.10 |
| 8039-6V | Unit—Lamp, tail, and stop, service, upper (K-D Lamp Co., Chicago, Ill., No. 8039-6V) | 1 | 81 | 8039-6V | .... | 5 | .75 |
| 8040-6V | Unit—Lamp, tail, blackout, lower (K-D Lamp Co., Chicago, Ill., No. 8040-6V) | 2 | 80, 81 | 8040-6V | .... | 4 | .90 |
| 8041-6V | Unit—Lamp, stop, blackout, upper (K-D Lamp Co., Chi- cago, Ill., No. 8041-6 V) | 1 | 80 | 8041-6V | .... | 5 | .90 |
| 8045 | Body Assembly—Lamp, tail (K-D Lamp Co., Chicago, Ill., No. 8045) | 2 | 80, 81 | 8045 | | 9 | .40 |

**(Part of Assembly—not sold separately)

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| | | | | | Lbs. | Oz. | |
| 9010 | Grommet—Rubber, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9010) | 2 | 82 | 9010 | .002 | | ** |
| 9012 | Rivet—Shell, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9012) | 2 | 82 | 9012 | .001 | .... | ** |
| 9081 | Terminal—Wire, bullet (Unity Mfg. Co., Chicago, Ill., No. 9081) | 6 | 82 | 9081 | .002 | .... | ** |
| 9308 | Ear—Ring, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9308) | 4 | 82 | 9308 | .006 | .... | ** |
| 9424-24 | Hose—Pressure, high, 1/2" x 24" (with fittings) (Eastman Mfg. Co., Manitowoc, Wis., No. 9424-24) | 2 | 58 | X470A | 2 | 3 1/2 | 2.10 |
| 9425-10 | Hose—Pressure, high, 3/4" x 10" (with fittings) (Eastman Mfg. Co., Manitowoc, Wis., No. 9425-10) | 1 | 56 | X404A | 1 | 11 | 2.00 |
| 9425-19 | Hose—Pressure, high, 3/4" x 19" (with fittings) (Eastman Mfg. Co., Manitowoc, Wis., No. 9425-19) | 4 | 58 | X404B | 2 | .... | 2.60 |
| 9425-32 | Hose—Pressure, high, 3/4" x 32" (with fittings) (Eastman Mfg. Co., Manitowoc, Wis., No. 9425-32) | 8 | 56, 58 | X404C | 2 | 3 1/2 | 3.50 |
| 9426-33 | Hose—Pressure, high, 1" x 33" (with fittings) (Eastman Mfg. Co., Manitowoc, Wis., No. 9426-33) | 2 | 56 | X402 | 3 | 12 | 4.40 |
| 9467 | Ring—Spotlight (Unity Mfg. Co., Chicago, Ill., No. 9467) | 2 | 82 | 9467 | .187 | .... | .70 |
| 9471-2 | Bolt and Nut—Spotlight (Unity Mfg. Co., Chicago, Ill., Nos. 9471 and 9472) | 2 | 82 | 9471-2 | .007 | .... | .07 |
| 9555 | Rivet—Ring, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9555) | 8 | 82 | 9555 | .001 | .... | ** |
| 9646C | Bulb—Crystal, Glaseal, Mazda, G-E (General Electric Co., No. 4012, Mazda) | 2 | 82 | 9646C | .875 | .... | .77 |
| 9652 | Wire—Ground, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9652) | 2 | 82 | 9652 | .003 | .... | ** |
| 9668A | Shell Assembly—Spotlight (Unity Mfg. Co., Chicago, Ill., No. 9668A) | 2 | 82 | 9668A | .813 | .... | 2.10 |
| 9675 | Ring—Adapter, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9675) | 2 | 82 | 9675 | .034 | | .35 |

** (Part of Assembly—not sold separately)

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| | | | | | Lbs. | Oz. | |
| 9683 | Terminal—Bulb, spotlight (Unity Mfg. Co., Chicago, Ill., No. 9683) | 2 | 82 | 9683 | .002 | | .04 |
| 202974 | Pin—Pivot, throttle, foot (purchase only Brockway Motor Co., Courtland, N. Y., No. 202974) | 1 | 50 | X505 | .... | ¾ | .30 |
| 500384 | Throttle Assembly—Foot (pur- chase only Brockway Motor Co., Courtland, N. Y., No. 500384) | 1 | 50 | X501 | .... | 14½ | 2.25 |
| 500385 | Cap—Throttle, foot (pur- chase only Brockway Motor Co., Courtland, N. Y., No. 500385) | 1 | 50 | X503 | .... | 3¾ | .75 |
| 500389 | Lever—Throttle, foot (pur- chase only Brockway Motor Co., Courtland, N. Y., No. 500389) | 1 | 50 | X502 | .... | 7 | .75 |
| 41-5439.700-060 | Mattock (GFE) | 1 | 90 | 570600-200 | 7 | 8 | .... |
| 41-1187.550-400 | Axe (GFE) | 1 | 90 | 135800-367 | 5 | 4 | .... |
| 41-7487.200-200 | Shovel (GFE) | 1 | 90 | 761700-250 | 4 | 8 | .... |
| * | Body—Valve, relief (not inter- changeable with Heil Co. part) | 1 | | X491 | .... | 14 | 2.20 |
| | Plug—Pipe, special, ¾" (not interchangeable with Heil Co. part) | 1 | | X515 | | 2 | .46 |
| | Shield—Valve, relief (not used on Heil Co. type relief valve) | 1 | | X492 | | 2 | .30 |

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|---|---|-------------|---------------------|-----------------------|-------|
| ALEMITE FITTINGS | | | | | |
| 1610 | Alemite Fitting— $\frac{1}{8}$ ", straight, No. 1610 | 27 | 236 | $\frac{1}{4}$ oz. ea. | .08 |
| 1612 | Alemite Fitting— $\frac{1}{8}$ ", $67\frac{1}{2}$ °, No. 1612 | 15 | 237 | $\frac{1}{2}$ oz. ea. | .14 |
| 1648 | Alemite Fitting— $\frac{5}{16}$ ", $67\frac{1}{2}$ °, No. 1648 | 7 | 589 | $\frac{1}{4}$ oz. ea. | .21 |
| SETSCREWS | | | | | |
| 47A306 | Setscrew— $\frac{3}{8}$ " x $\frac{3}{4}$ ", USS drilled | 8 | 536 | $\frac{1}{2}$ oz. ea. | .10 |
| X18-15 | Setscrew— $\frac{5}{16}$ " x $\frac{3}{8}$ ", USS, Allen head | 3 | X488 | 1/12 oz. ea. | .15 |
| 47A304 | Setscrew— $\frac{3}{8}$ " x 1", drilled | 4 | X638 | 1 oz. ea. | .12 |
| 560-5-10 | Setscrew— $\frac{5}{16}$ " x $\frac{5}{8}$ ", USS | 6 | CS5- $\frac{5}{8}$ | 1/6 oz. ea. | .04 |
| NUTS, HEX., COARSE THREAD, USS | | | | Per 1000 | |
| 335-4 | Nut— $\frac{1}{4}$ ", USS | 16 | CN4 | 7.7 | .01 |
| CUT WASHERS—PLAIN | | | | | |
| 945-8 | Washer—Cut, $\frac{1}{2}$ " | 1 | CW8 | $\frac{1}{4}$ oz. ea. | .01 |
| 970-8 | Washer—Flat, $\frac{1}{2}$ " | 2 | | $\frac{1}{4}$ oz. ea. | .01 |
| CAPSCREWS, HEX. HEAD, COARSE THREAD, USS | | | | Per 100 | |
| 65-6-10 | Capscrew— $\frac{3}{8}$ " x 1", USS | 2 | C6-1 | 4.53 lb. | .03 |
| 65-8-4 | Capscrew— $\frac{1}{2}$ " x $\frac{1}{2}$ ", USS | 2 | C8- $\frac{1}{2}$ | 7.8 | .05 |
| 65-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", USS | 2 | C8- $1\frac{1}{4}$ | 10.13 | .06 |
| CAPSCREWS, HEX. HEAD, FINE THREAD, SAE | | | | | |
| 60-4-6 | Capscrew— $\frac{1}{4}$ " x $\frac{3}{4}$ ", SAE | 4 | F4- $\frac{3}{4}$ | 1.55 | .02 |
| 60-4-12 | Capscrew— $\frac{1}{4}$ " x $1\frac{1}{4}$ ", SAE | 2 | F4- $1\frac{1}{4}$ | 2.18 | .03 |
| 60-5-6 | Capscrew— $\frac{5}{16}$ " x $\frac{3}{4}$ ", SAE | 4 | F5- $\frac{3}{4}$ | 2.55 | .04 |
| 60-6-10 | Capscrew— $\frac{3}{8}$ " x 1", SAE | 2 | F6-1 | 4.53 | .03 |
| 60-6-12 | Capscrew— $\frac{3}{8}$ " x $1\frac{1}{4}$ ", SAE | 3 | F6- $1\frac{1}{4}$ | 5.31 | .03 |
| 60-6-20 | Capscrew— $\frac{3}{8}$ " x 2", SAE | 4 | F6-2 | 7.63 | .04 |
| 60-7-10 | Capscrew— $\frac{7}{16}$ " x 1", SAE | 26 | F7-1 | 6.25 | .03 |
| 60-7-12 | Capscrew— $\frac{7}{16}$ " x $1\frac{1}{4}$ ", SAE | 8 | F7- $1\frac{1}{4}$ | 7.21 | .03 |
| 60-7-14 | Capscrew— $\frac{7}{16}$ " x $1\frac{1}{2}$ ", SAE | 4 | F7- $1\frac{1}{2}$ | 8.26 | .04 |
| 60-8-10 | Capscrew— $\frac{1}{2}$ " x 1", SAE | 27 | F8-1 | 9.00 | .05 |
| 60-8-11 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{8}$ ", SAE | 2 | F8- $1\frac{1}{8}$ | 9.56 | .06 |
| 60-8-12 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{4}$ ", SAE | 30 | F8- $1\frac{1}{4}$ | 10.13 | .06 |
| 60-8-14 | Capscrew— $\frac{1}{2}$ " x $1\frac{1}{2}$ ", SAE | 36 | F8- $1\frac{1}{2}$ | 11.50 | .06 |
| 60-8-16 | Capscrew— $\frac{1}{2}$ " x $1\frac{3}{4}$ ", SAE | 12 | F8- $1\frac{3}{4}$ | 12.88 | .07 |
| 60-8-40 | Capscrew— $\frac{1}{2}$ " x 4", SAE | 2 | F8-4 | 25.25 | .11 |
| 60-10-10 | Capscrew— $\frac{5}{8}$ " x 1", SAE | 2 | F10-1 | 16.67 | .08 |
| 60-10-12 | Capscrew— $\frac{5}{8}$ " x $1\frac{1}{4}$ ", SAE | 2 | F10- $1\frac{1}{4}$ | 17.56 | .09 |
| 60-10-14 | Capscrew— $\frac{5}{8}$ " x $1\frac{1}{2}$ ", SAE | 10 | F10- $1\frac{1}{2}$ | 18.45 | .10 |
| 60-10-16 | Capscrew— $\frac{3}{4}$ " x 4", SAE | 2 | F10- $1\frac{3}{4}$ | 19.34 | .11 |
| 60-10-44 | Capscrew— $\frac{5}{8}$ " x $4\frac{1}{2}$ ", SAE | 2 | F10- $4\frac{1}{2}$ | 52.45 | .19 |
| 60-12-40 | Capscrew, $\frac{3}{4}$ " x 4", SAE | 2 | F12-4 | 59.65 | .23 |
| 60-16-20 | Capscrew—1" x 2", SAE | 18 | F16-2 | 64.25 | .36 |
| 60-16-40 | Capscrew—1" x 4", SAE | 7 | F16-4 | 102.85 | .33 |
| NUTS, HEX., FINE THREAD—SAE | | | | Per 1000 | |
| 325-4 | Nut— $\frac{1}{4}$ ", SAE | 6 | FN4 | 7.2 | .01 |
| 325-6 | Nut— $\frac{3}{8}$ ", SAE | 10 | FN6 | 15.3 | .02 |
| 325-7 | Nut— $\frac{7}{16}$ ", SAE | 5 | FN7 | 21. | .02 |
| 325-8 | Nut— $\frac{1}{2}$ ", SAE | 103 | FN8 | 36. | .03 |
| 325-10 | Nut— $\frac{5}{8}$ ", SAE | 16 | FN10 | 69.2 | .05 |
| 325-12 | Nut— $\frac{3}{4}$ ", SAE | 2 | FN12 | 99. | .07 |
| 325-16 | Nut—1", SAE | 25 | FN16 | 245. | .14 |

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| NUTS, HEX., CASTELLATED—SAE | | | | | | |
| | | | | Per 1000 | | |
| 330-8 | Nut—Castellated, ½", SAE | 1 | FCN8 | 38.3 | .04 | |
| 330-10 | Nut—Castellated, ⅝", SAE | 3 | FCN10 | 71.1 | .06 | |
| 330-16 | Nut—Castellated, 1", SAE | 4 | FCN16 | 253. | .16 | |
| LOCKWASHERS | | | | | | |
| | | | | Per 1000 | | |
| 935-416 | Lockwasher—¼" | 26 | LW4 | 1.9 | .01 | |
| 935-516 | Lockwasher—5/16" | 4 | LW5 | 3.50 | .01 | |
| 935-616 | Lockwasher—⅜" | 11 | LW6 | 6. | .01 | |
| 935-716 | Lockwasher—7/16" | 20 | LW7 | 10. | .01 | |
| 935-816 | Lockwasher—½" | 113 | LW8 | 15. | .01 | |
| 935-1016 | Lockwasher—⅝" | 18 | LW10 | 25. | .02 | |
| 935-1216 | Lockwasher—¾" | 2 | LW12 | 45. | .03 | |
| 935-1616 | Lockwasher—1" | 25 | LW16 | 92. | .07 | |
| COTTER PINS | | | | | | |
| | | | | Per 1000 | | |
| 380-4-4 | Pin—Cotter, ⅛" x 1" | 29 | P4-1 | 3.77 | .01 | |
| 380-3-3 | Pin—Cotter, 3/32" x ¾" | 1 | P3-¾ | 1.58 | .01 | |
| 380-4-6 | Pin—Cotter, ⅛" x 1½" | 3 | P4-1½ | 5.31 | .01 | |
| 380-4-7 | Pin—Cotter, ⅛" x 1¾" | 2 | P4-1¾ | 6.08 | .01 | |
| 380-4-8 | Pin—Cotter, ⅛" x 2" | 2 | P4-2 | 6.85 | .01 | |
| 380-6-7 | Pin—Cotter, 3/16" x 1¾" | 4 | P6-1¾ | 13.86 | .02 | |
| 380-12-8 | Pin—Cotter, ⅜" x 2" | 2 | P12-2 | 65.4 | .03 | |
| WOODRUFF KEYS | | | | | | |
| | | | | Each | | |
| X7-6 | Key—Woodruff, 5/32", No. 6 | 1 | 244 | ¼ oz. ea. | .03 | |
| 280-808 | Key—Woodruff, ¼", No. 15 | 7 | 246 | ¼ oz. ea. | .03 | |
| 280-1010 | Key—Woodruff, 5/16" x 1¼", No. D | 2 | X558 | ½ oz. ea. | .04 | |
| RIVETS | | | | | | |
| | | | | Each | | |
| 435-8-8 | Rivets—¼" x ½" | 4 | X521 | ⅓ oz. ea. | .01 | |
| 435-8-28 | Rivets—¼" x 1¾" | 1 | X512 | ¾ oz. ea. | .01 | |
| 435-8-38 | Rivets—¼" x 2¾" | 2 | X561 | 1 oz. ea. | .02 | |
| STOVE BOLTS | | | | | | |
| | | | | Each | | |
| 50-4-6 | Bolts—Stove, ¼" x ½" | 16 | X552 | ¼ oz. ea. | .01 | |
| PIONEER TOOL SET | | | | | | |
| Heil Part No. | Part Name | Total Quan. | Page No. | Daybook Number | Weight Lbs. Oz. | Price |
| QM-07596W | Tool Set (furnished by government complete with tools) | 1 | 39 | QM-07596W | 21 | |
| 41-5439.700-060 | Mattock (GFE) | 1 | 39 | 570600-200 | 7 8 | |
| 41-1187.550-400 | Axe (GFE) | 1 | 39 | 135800-367 | 5 4 | |
| 41-7487.200-200 | Shovel (GFE) | 1 | 39 | 761700-250 | 4 8 | |

OPERATIONS SECTION

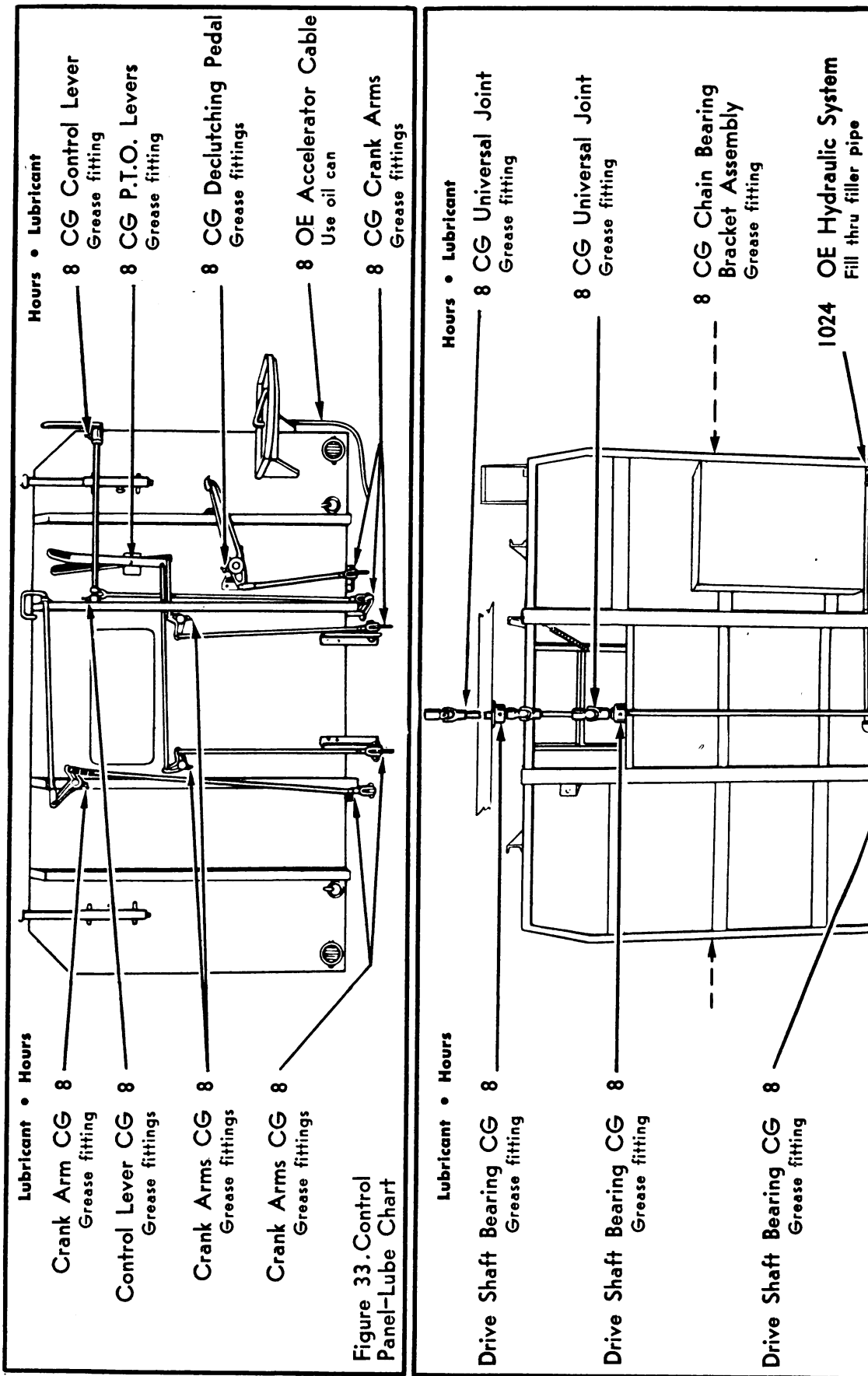
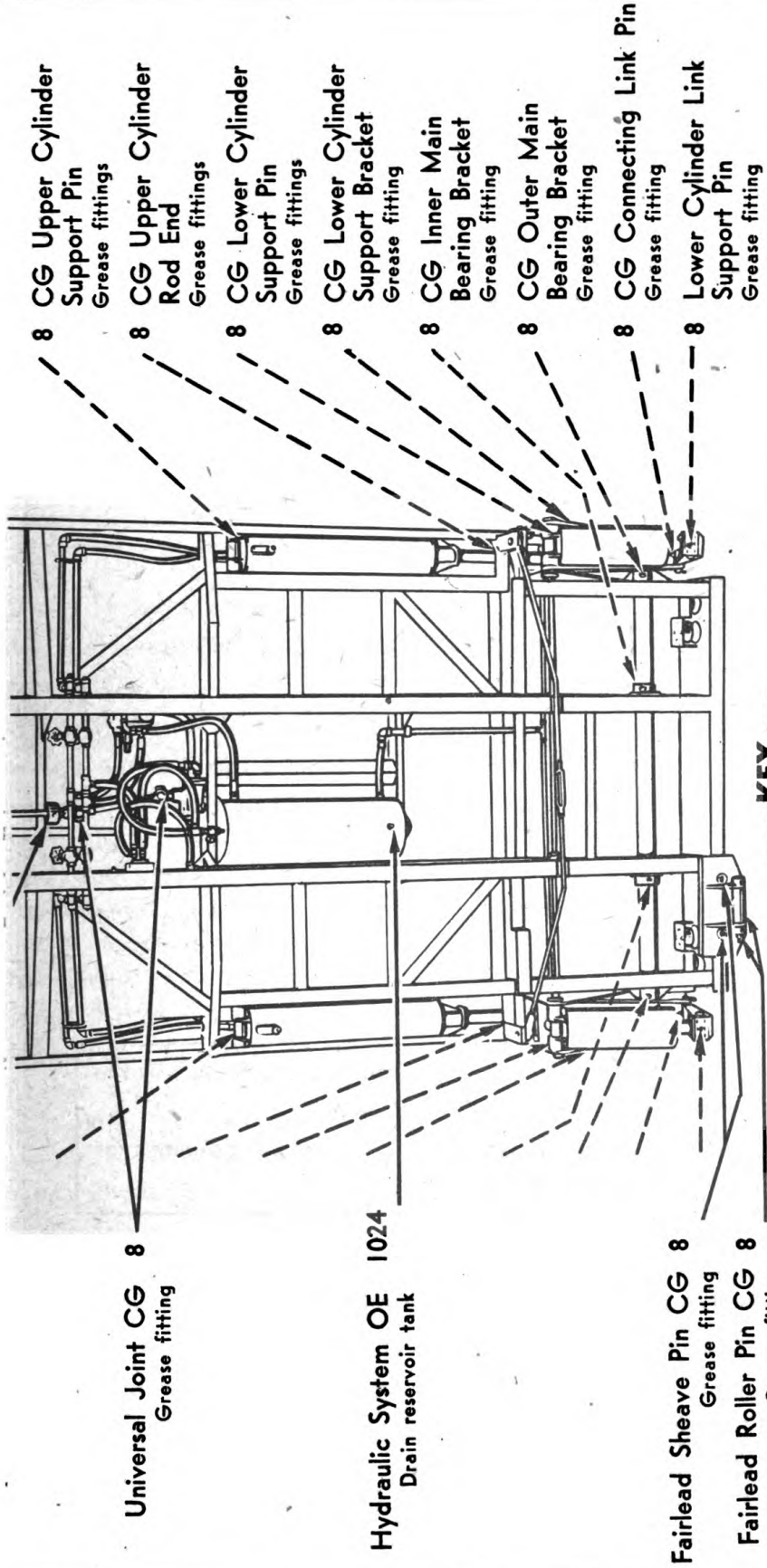


Figure 33. Control Panel-Lube Chart



— KEY —

| LUBRICANTS | LOWEST ANTICIPATED AIR TEMPERATURE | | | INTERVALS |
|----------------------------|------------------------------------|------------------|--------------------------------|-----------------------|
| | Above +32° F. | +32° F. to 0° F. | 0° F. to -20° F. | |
| CG—GREASE, general purpose | No. 1 | No. 0 | No. 0 | 8 — 8 hr. shift |
| OE—OIL, engine | SAE-10 | SAE-10 | Add 4 gals. Oil, fuel, diesel | 1024—Every 1024 hours |
| | | | Add 10 gals. Oil, fuel, diesel | |

REPAIR SECTION

1. REPAIR AND ADJUSTMENT OF UNIT

a. BENT UPPER PISTON RODS

(1) CAUSE AND CORRECTION

(a) If it is noted in raising the boom that there is a tendency for the upper piston rods to spring, a careful check should be made to determine that one or more of the four emergency valves under the floor, Figures 11 and 17, may have been accidentally closed. **THESE VALVES SHOULD ALWAYS BE OPEN EXCEPT WHEN NECESSARY TO OPERATE AS EXPLAINED UNDER EMERGENCY OPERATION.**

Figure 37.
Straightening Rod from Above. Note Position of Wood Block to Prevent Marring the Rod. Method of Securing Chain to Body is Also Shown.



(2) **HOW TO STRAIGHTEN UPPER PISTON RODS.** Bent piston rods may be straightened by using the hydraulic jack furnished with the unit and chains and blocks as shown in Figures 37 and 38. Pressure is applied to the high point of the bend in the rod with the jack.

Be sure to use a block next to the rod to prevent marring or scoring it. If the rod is bent beyond repair, the entire cylinder assembly must be replaced.

b. **SETTING MAIN VALVE BY-PASS.** (See Figure 17.) Before leaving the factory, each unit is tested with a load of four treadways. A gauge is inserted in the line and the by-pass is adjusted to operate at 1,000 pounds. Unless the adjust-

VALVE LEVER AND CONTROLS

| Heil Part Number | Description of Part | No. Per Unit |
|------------------|---|--------------|
| A70A440 | Lever Assembly—Control, Layshaft, and Valve Lever | 1 |
| 40A825 | Collar—Stop, Layshaft | 1 |
| X18-15 | Setscrew—Allen Head, $\frac{5}{16}$ " x $\frac{3}{8}$ ", USS..... | 2 |
| 13A2705 | Lever—Layshaft, with $\frac{1}{2}$ " Hole for 398-43 Pin..... | 1 |
| X7-6 | Key—Woodruff, No. 6, $5/32$ " | 1 |
| 11A2534 | Bracket—Bearing, Layshaft (welded to body) | 2 |
| 1610 | Fitting—Alemite, $\frac{1}{8}$ ", Straight, No. 1610..... | 2 |
| A27A1503 | Rod—Control, (Bell Crank to Layshaft Lever)..... | 1 |
| 398-43 | Pin— $\frac{1}{2}$ " x $1-27/64$ ", Drilled to $\frac{1}{8}$ "..... | 2 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 2 |
| 13B2706 | Crank—Bell, (to Valve V-191) | 1 |
| 1612 | Fitting—Alemite, $\frac{1}{8}$ ", $67\frac{1}{2}$ °, No. 1612 | 1 |
| 47A265 | Bolt—Shoulder, Bearing, Bell Crank | 1 |
| 55A397 | Washer—Cut, $\frac{5}{8}$ " I. D., $1\frac{3}{8}$ " O. D..... | 1 |
| 55A398 | Washer—Cut, $\frac{3}{4}$ " I. D., $1\frac{3}{8}$ " O. D. | 1 |
| 330-10 | Nut—Castellated, $\frac{5}{8}$ ", SAE | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| A27A1504 | Rod—Control, (for V-191 Valve to Bell Crank 13B2706) | 1 |
| 398-43 | Pin— $\frac{1}{2}$ " x $1-27/64$ ", Drilled to $\frac{1}{8}$ "..... | 1 |
| 48A1074 | Pin— $\frac{1}{2}$ " x $1-27/64$ ", Drilled to $\frac{3}{16}$ " | 1 |
| 380-4-4 | Pin—Cotter, $\frac{1}{8}$ " x 1" | 1 |
| 19A587 | Spring—Return, 1" x 7" | 1 |