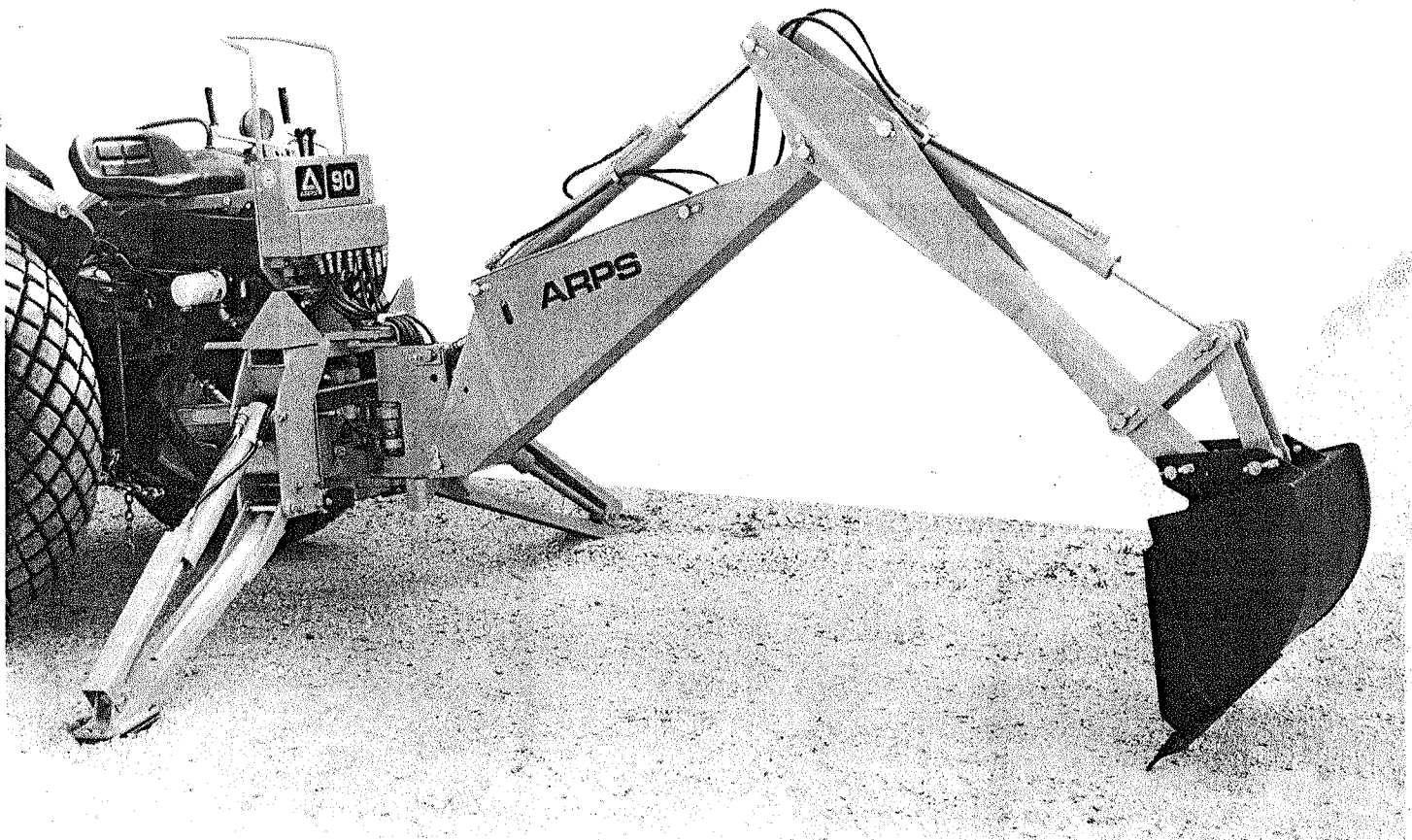


# model 90 backhoe

SERIAL NO. 1001 AND LATER

THIS MANUAL INCLUDES:  
W400 BASIC BACKHOE

- W35 - BUCKET, 12"
- W36 - BUCKET, 18"
- W37 - BUCKET, 24"
- W460 - BUCKET, 36"
- W461 - BUCKET, 40"
- OPTIONAL STABILIZER ACCESSORIES



THIS SAFETY ALERT SYMBOL IDENTIFIES IMPORTANT  
SAFETY MESSAGES IN THIS MANUAL.



# CONTENTS

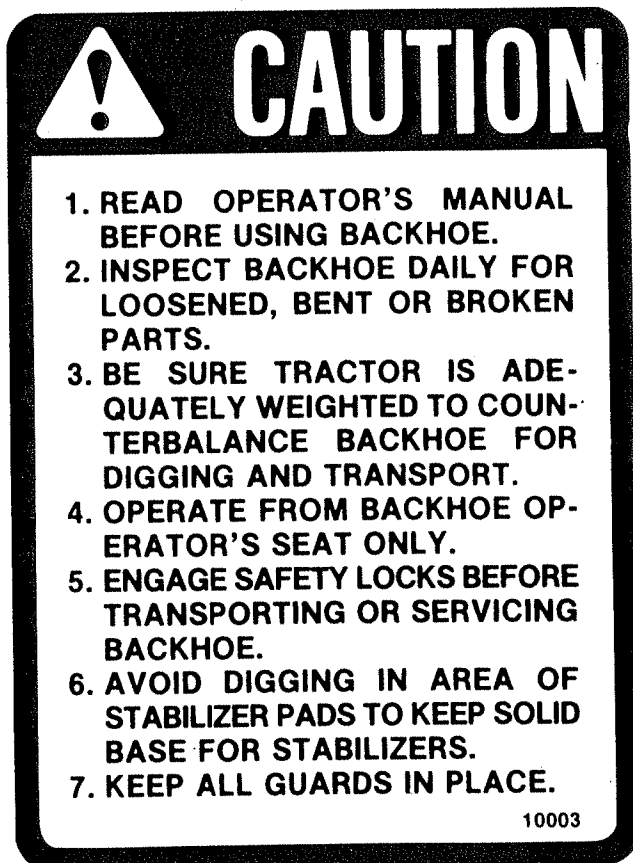
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Safety Precaution.....	1, 2
Basic Assembly Instructions.....	2 - 3
General Operation.....	4 - 6
Service.....	6 - 8
Hydraulic Trouble Shooting.....	9 - 12
Removal From Tractor and Storage.....	13
Valve Repair, Disassembly.....	14, 15
Control Valve.....	16 - 22
Optional Stabilizer Pads.....	23
Backhoe - Mainframe, Swing Frame, and Stabilizers.....	24, 25
Backhoe - Boom, Dipperstick, and Bucket.....	26, 27
Hose Diagrams.....	28, 29
Backhoe - Valve Mount, Controls, and Seat.....	30
Specifications.....	31
Hydraulic Cylinders.....	32, 33

# SAFETY PRECAUTIONS

**!** *The safety of the operator was a prime consideration in the design of this backhoe. Proper shielding convenient controls, simple adjustments, and other safety features have been built into this backhoe.*

The following decals are located on the top of the seat bracket:



## Preparation:

DO NOT operate the backhoe unless it is rigidly attached to the tractor.

KNOW YOUR controls. Read this operator's manual and the manual provided with your tractor. Learn how to stop the tractor, the engine, and the backhoe quickly in an emergency.

PROVIDE adequate front end weight to counter-balance the backhoe at all times.

BE SURE the area is clear of underground utilities or other hazards.

POSITION a barricade around the work area.

KEEP ALL bystanders a safe distance away.

## Operation:

DO NOT attempt to enter operators platform of backhoe by using stabilizers as a step.

OPERATE from the backhoe operator's seat only.

ALLOW only one person to operate the backhoe at any time.

DISENGAGE safety locks before attempting to operate the backhoe.

NEVER dig with the backhoe unless the stabilizers are properly set.

DO NOT dig under stabilizers or tractor-backhoe. Soft ground or sandy soil can cause cave-ins.

KEEP BUCKET away from stabilizer area to avoid possible stabilizer damage.

ALWAYS swing bucket uphill to dump when on a hillside and keep loaded bucket low.

SET BRAKES and block wheels when operating on hills and banks to avoid dangerous run-away.

WATCH for overhead wires. DO NOT touch wires with any part of the backhoe.

Accidents can be avoided if the following safety rules are observed:

## Safety Precautions - continued

NEVER allow a person to work under a raised bucket.

NEVER lift a person with the backhoe.

DO NOT use the backhoe bucket as a battering ram.

ALWAYS lower the bucket to the ground when not digging.

NEVER leave the tractor unattended with the engine running.

### Transportation:

ALWAYS engage safety locks before transporting backhoe.

DO NOT drive the tractor near the edge of a ditch or excavation.

ALWAYS use accessory lights and devices, when transporting on a road or highway, to warn operators of other vehicles. Check your local government regulations.

BE SURE that the SMV emblem is visible to the rear.

### Adjustments and Inspection:

CHECK pins that attach backhoe to tractor and all pivot pins for tightness several times daily. Replace any parts which are bent, broken, or missing.

ALWAYS engage safety locks before servicing backhoe.

DO NOT oil, grease, or adjust the backhoe while it is in motion.

DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.

ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system.

FLUID ESCAPING from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands - to search for suspected leaks.

SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

PROTECT YOUR EYES - WEAR SAFETY GLASSES.

GUARD AGAINST INJURY when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

DO NOT REMOVE ANY GUARDS on backhoe or tractor.

## BASIC ASSEMBLY INSTRUCTIONS

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### General:

The backhoe has been partially disassembled and strapped to a skid for shipping purposes. Initial installation on the tractor will require a hoist or other device capable of safely lifting the entire backhoe from the skid. Once the initial installation is complete the backhoe can serve as its own erecting hoist, by lowering stabilizers and bucket to the ground, and additional lifting devices will not be required for normal removal and reattaching.

### Assembly Procedure:

*IMPORTANT - Tighten all hardware to torque requirements specified in Torque Chart, Page 8, of this manual.*

1. Remove the stabilizer assemblies and any miscellaneous items which have been fastened to the skid and arrange conveniently. Remove corrugated packaging from dipperstick.

 **CAUTION - DO NOT** cut any strapping that fastens the backhoe mainframe and swing frame to the skid base at this time.

Basic Assembly - continued

2. Support boom (A) and dipperstick (B) with hoist and remove boom transport lock pin. Store lock pin in top of valve cover when not in use. Lower boom and manually extend dipperstick until dipperstick rests on ground and dipperstick cylinder can be attached at point (C) with hardware provided. Move control handle to "BOOM DOWN" position as required to aid movement. Note that the hydraulic hoses are routed under the cylinder rod bushing.

**⚠ CAUTION** - Be sure hoist being used is suitable, has sufficient capacity, and is in the proper position. Do not allow anyone under a backhoe member that is supported by the hoist.

3. Remove plastic bag containing bucket pins from footpad. Attach bucket (D) to dipperstick using one pin, two bolts, nuts, lockwashers, pin retainers, and washers as necessary.

4. Attach bucket link (E) to bucket using same hardware as listed for step #3.

5. Attach hoist to backhoe to prevent tipping. Remove all remaining strapping and attach stabilizers (F) to mainframe (G) using pins and hardware assembled to mainframe.

6. Attach stabilizer cylinders (H) to stabilizers using pins and hardware assembled to stabilizers.

7. Using caution to prevent tipping, raise mainframe with hoist to a height of approximately 11 inches, and remove skid. Block mainframe (G) and swing frame (I) securely.

8. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully making sure that all members are correctly installed and securely fastened.

9. Continue with the "GENERAL OPERATION" Section to familiarize yourself with the backhoe controls and with safe operating practices.

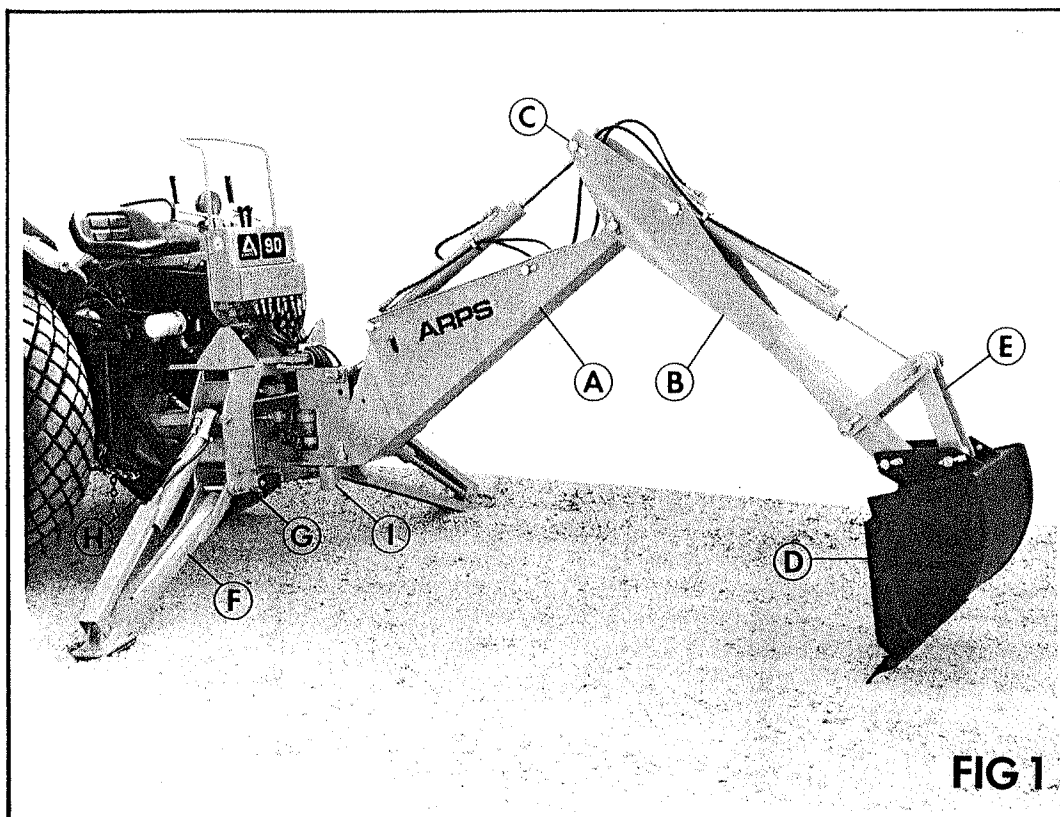


FIG 1

# GENERAL OPERATION

**⚠ CAUTION** - To avoid possible injury, observe the following safety rules BEFORE OPERATING the backhoe:

1. BE SURE area is clear of underground utilities or other hazards.
2. POSITION a barricade around work area.
3. PROVIDE adequate front end weight to counter-balance backhoe at all times.
4. KEEP bystanders a safe distance away.

## Directions:

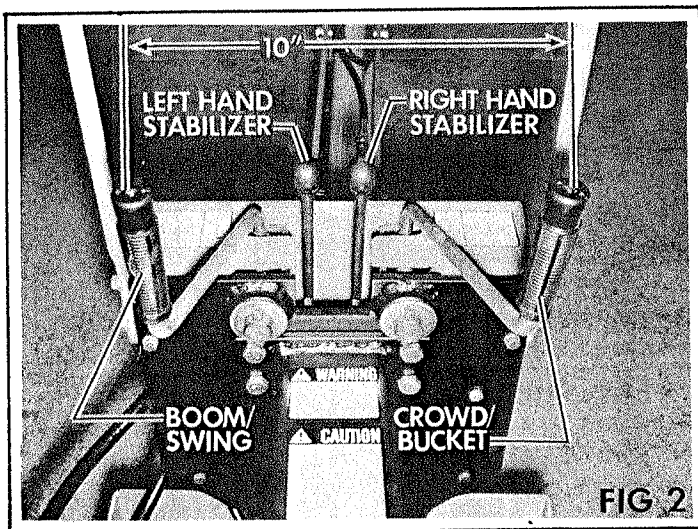
The terms right, left, front, and back shall be determined from the position of the operator when seated in the operating position on the backhoe.

## Engine Speed:

The speed at which the backhoe operates is partially dependent on engine RPM. Use a moderate engine speed to start and increase it as your experience permits. Refer to "SPECIFICATIONS" for hydraulic flow volume requirements. When powering from tractor systems with higher output, reduce engine RPM to obtain acceptable backhoe operating speed.

## Controls:

The backhoe has two major control levers plus the stabilizer control levers. These controls are located on the control panel directly ahead of the operator, see Fig 2. Following is a list of the controls, with the function of each, reading from left to right.



## 1. Boom/Swing:

Push lever forward, the boom moves down, away from the operator. Pull lever back, the boom moves up, toward the operator.

Move lever to left, the backhoe swings to the left. Move lever to right, the backhoe swings to the right.

By moving the lever to one of the intermediate positions, the boom can be swung left or right at the same time it is being raised or lowered, performing the two operations simultaneously.

SWING LEFT AND LOWER the boom by moving the control lever forward and to the left.

SWING LEFT AND RAISE the boom by moving the control lever back and to the left.

SWING RIGHT AND LOWER the boom by moving the lever forward and to the right.

SWING RIGHT AND RAISE the boom by moving the lever back and to the right.

## 2. Left Hand Stabilizer:

Push lever forward, the LH stabilizer lowers. Pull lever back, the LH stabilizer raises.

## 3. Right Hand Stabilizer:

Push lever forward, the RH stabilizer lowers. Pull lever back, the RH stabilizer raises.

## 4. Crowd/ Bucket:

Push lever forward, the dipperstick moves out, away from the operator. Pull lever back, the dipperstick moves in, toward the operator.

Move lever to left, the bucket curls in. Move lever to right, the bucket extends out.

By moving the lever to one of the intermediate positions, the dipperstick can be extended or retracted at the same time the bucket is being loaded or dumped.

EXTEND AND LOAD the bucket by moving the lever forward and to the left.

## General Operations - continued

RETRACT AND LOAD the bucket by moving the lever back and to the left.


EXTEND AND DUMP the bucket by moving the lever forward and to the right.

RETRACT AND DUMP the bucket by moving the lever back and to the right.

The two operations of the boom lever, combined with the two operations performed by the bucket and dipperstick control lever provide four simultaneous operations from the two levers, keeping cycle time at a minimum.

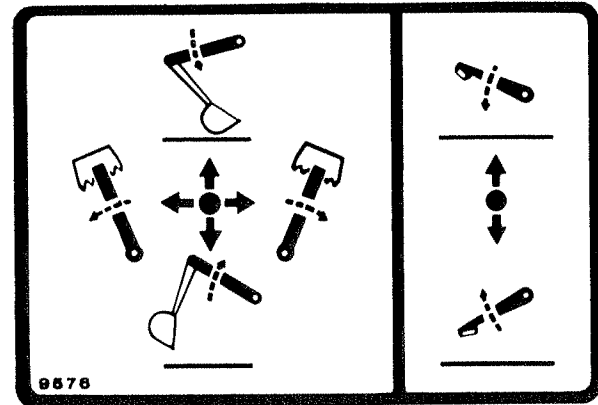
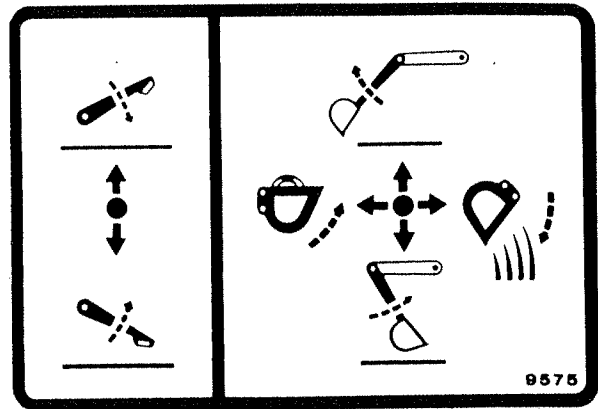
In general, the direction of movement of a control lever corresponds to the movement of the operating member.

### Operating The Backhoe:

 **CAUTION** - To avoid possible injury, observe the following safety rules WHEN OPERATING the backhoe:

1. DISENGAGE safety locks before attempting to operate the backhoe.
2. OPERATE from the backhoe operator's seat only.
3. LOWER the stabilizers until the rear of the tractor is totally supported by them.
4. DO NOT dig near the stabilizers.
5. DO NOT touch overhead wires with any part of the backhoe.
6. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.
7. DO NOT lose stability by swinging the bucket downhill when positioned on a slope.

It is not difficult to become an efficient operator. Control lever operating decals are located in front of the control levers. Study these decals; they will assist you in becoming familiar with the controls.



Smooth, light handling of the controls will result in the most efficient backhoe operation.

Operate the backhoe control levers to become familiar with their speed and movements. The engine speed and the size of the hydraulic system will determine the speed of cylinder operation. When powering from tractor systems with higher output than required, reduce engine RPM to obtain acceptable backhoe operating speed.

Swing the boom several times to practice controlling the speed of swing. Do not operate the swing more than 45 degrees each way for the first few times, then gradually increase the arc.

**IMPORTANT** - To avoid damage to the backhoe, do not slam swing unit into the rubber bumper pads.

Best results are obtained by digging near the center of the swing arc so material can be dumped on either side.

As the operator becomes more familiar with the operation of the backhoe, it will be common practice to operate two controls at one time. For example; with the bucket extended and the dipperstick




extended, the lift control and crowd control can be operated together to bring the bucket toward the operator with down pressure on it. As the dipperstick approaches the operator, the crowd and bucket controls can be operated to close the bucket and trap the material. At the end of the stroke, the lift and crowd controls are operated to move the load up and away from the operator to save time in clearing the excavation.

This dual operation of controls will speed and simplify the digging operation. Normally the two or more movements will not be equal or even simultaneous but as pressure within the cylinders change, and the resistance on an operating member of the hoe lessens, it will begin to move. It is balancing the force of one member against the other.

*NOTE - Actuating the bucket is the key to powerful digging. Operating the crowd and bucket controls simultaneously will insure a full bucket and prevent waste motion and time.*

### Transporting The Backhoe:


 **CAUTION** - To avoid possible injury, observe the following safety rules WHEN TRANSPORTING the backhoe:

1. ALWAYS engage safety locks when transporting backhoe.
2. TRAVEL SLOWLY over rough terrain, on hillsides, and around curves to prevent tipping.
3. DO NOT drive the tractor near the edge of a ditch or excavation.
4. USE accessory lights and SMV emblem when traveling on highways.

Before leaving backhoe operator's seat, position the backhoe for transport by raising boom, crowding dipperstick in, curling bucket in, swinging to center, and raising the stabilizers.

When transporting for long distances, periodically examine the backhoe and raise stabilizers and bucket back up to full transport height. It is normal for the hoe to slowly settle while being transported.

## SERVICE

 **CAUTION** - To avoid possible injury, observe the following safety rules WHEN SERVICING the backhoe:

1. ENGAGE safety locks before servicing the backhoe.
2. DO NOT oil, grease, or adjust the backhoe while it is in motion.
3. DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.
4. ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system.
5. FLUID ESCAPING from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands - to search for suspected leaks.
6. SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or reaction can develop if proper medical treatment is not administered immediately.
7. PROTECT YOUR EYES - WEAR SAFETY GLASSES. Guard against injury when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

### Beginning Of Season:

Remove all protective covering.

Check hydraulic hoses for deterioration and, if necessary, replace.

Lubricate all grease fittings and oil handle linkage.

Check hydraulic system for loss of fluid and, if necessary, fill to proper level.

Tighten all loose bolts, nuts, and set-screws.

Inspect bucket teeth and, if necessary, sharpen or replace them.



Service - continued

Operate the backhoe slowly for a short time before placing the unit under full load.

### Bleeding Backhoe-Hydraulic System:

If the hydraulic hoses have been disconnected from the backhoe or tractor, all trapped air must be removed after the hoses are connected. Start tractor engine and operate backhoe through all movements fully, several times, to purge the system of air.

### Hydraulic System Hoses:

Oil leaks in the pressure side of the system can be located by carefully inspecting the external area of the hoses and fittings.

Check the return side of the system for leaks by examining the oil in the reservoir. If air is being drawn into the system, the oil will contain air bubbles and appear to foam.

When tightening connections always use two wrenches.

*IMPORTANT - Do not over-tighten fittings. Make them just tight enough to eliminate leaks.*

NEVER use teflon tape on pipe thread fittings. Always use a paste type sealer.

Hoses on any backhoe are very severely worked and will fail in time. Examine them regularly and replace any that show signs of failure. Pay careful attention to the routing of hoses so they can move fully and freely, without kinking, and can not be pinched or cut by any part of the backhoe.

### Hydraulic System Reservoir:

On PTO pump self-contained systems, maintain the reservoir fluid level at 1 inch below the tank top when the bucket is extended to full reach, bucket rolled back for loading and resting on the ground, and stabilizers fully raised. Do not over-fill, fluid may be forced out of the breather filler cap.

Fill with:

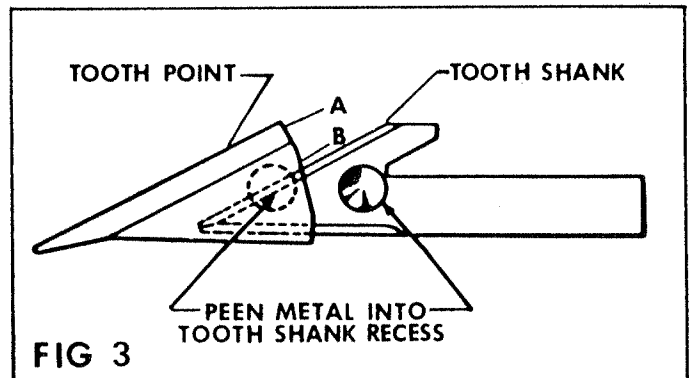
SAE 10W40 engine oil with API "SD" classification in northern climates.

SAE 40W engine oil with API "SD" classification in southern climates.

Change oil every 200 hours or more often if necessary.

If the tractor system supplies the hydraulic power, service according to the tractor instruction manual.

### Bucket Tooth Points:



The bucket tooth points are self-sharpening and will require little attention; however, these points on the bucket shanks can be replaced when they become badly worn or broken.

A tooth point can be removed from the welded tooth shank by hammering at "A" on the tooth point or by driving a chisel at "B", just between the tooth point box section and the tooth shank. Install the new point and anchor it to the shank by peening at the location shown.

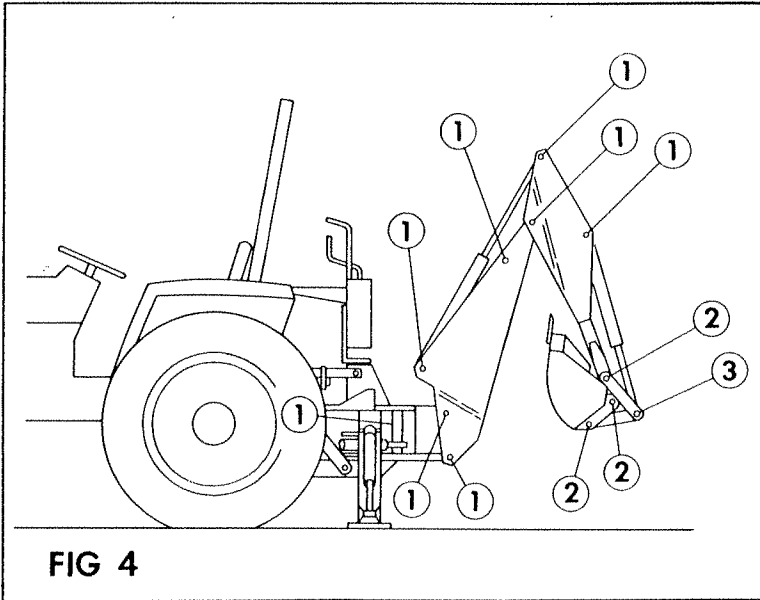
If a tooth shank breaks off, becoming lost or damaged so that it can not hold a tooth point, a new shank should be welded to the bucket in its place.

### Tightening Nuts And Bolts:

Periodically, check to be sure all bolts and nuts are tight, see Torque Chart, Page 8.

Check all pivot pins for cotter pins, washers, and retainers; if missing - replace.

## Lubrication:



Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant.

All parts provided with grease fittings should be lubricated with a good quality chassis lube type grease. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

Lubricate all grease fittings at least twice daily, once at the beginning of operation and again approximately half-way through the work day. See Fig 4, for the location of all grease fittings.

The following locations should be oiled with SAE 30 oil:




- A. Swing chains.
- B. Stabilizer pivot pins.
- C. Control valve handle linkage.
- D. Seat bracket pivot.

*IMPORTANT - Avoid excessive greasing. Dirt collects on exposed grease and increases wear greatly. After greasing wipe off excessive grease from fittings.*

## TORQUE VALUES

Common bolts and nuts.

Tightening Torque  $\pm$  20%

SIZE	GRADE 2 	GRADE 5 	GRADE 8 
1/4-20 NC	70 in lb	115 in lb	165 in lb
1/4-28 NF	85 in lb	140 in lb	200 in lb
5/16-18 NC	150 in lb	250 in lb	350 in lb
5/16-24 NF	165 in lb	270 in lb	30 ft lb
3/8-16 NC	260 in lb	35 ft lb	50 ft lb
3/8-24 NF	300 in lb	40 ft lb	60 ft lb
7/16-14 NC	35 ft lb	55 ft lb	80 ft lb
7/16-20 NF	45 ft lb	75 ft lb	105 ft lb
1/2-13 NC	50 ft lb	80 ft lb	115 ft lb
1/2-20 NF	70 ft lb	105 ft lb	165 ft lb
9/16-12 NC	75 ft lb	125 ft lb	175 ft lb
9/16-18 NF	100 ft lb	165 ft lb	230 ft lb
5/8-11 NC	110 ft lb	180 ft lb	260 ft lb
5/8-18 NF	140 ft lb	230 ft lb	330 ft lb
3/4-10 NC	150 ft lb	245 ft lb	350 ft lb
3/4-16 NF	200 ft lb	325 ft lb	470 ft lb

**NOTE - See tractor instruction manual or your tractor dealer for tightening of metric bolts.**

# HYDRAULIC TROUBLE SHOOTING

The trouble shooting material presented in this section is offered as a guide to diagnosing probable causes and remedies for general operational problems. Match your problem with the typical problem examples given, and note the numbers given in the possible cause column. These numbers correspond with the possible cause and correction paragraphs that follow.

*NOTE - When using the following chart if it is decided that overhaul of components or pressure adjustments are necessary, to correct malfunctioning, it is recommended that your dealer make these repairs. He is equipped to do this work.*

PROBLEM	POSSIBLE CAUSE
A. Machine fails to operate when started initially.....	1, 2, 5, 7, 16, 24
B. Machine loses power after operating satisfactorily initially.....	1, 8, 10, 14, 16, 24
C. Loss of power in lift or crowd cylinder, but other cylinders function properly.....	23, 25, 30
D. Loss of power in any one cylinder including lift and crowd.....	8, 9, 10, 11, 12, 13, 23, 25, 26
E. Loss of power or loss of cushioning action in swing cylinders, but other cylinders function properly.....	8, 9, 10, 11, 12, 13, 23, 24, 26, 27
F. Maximum swing action can not be obtained.....	12, 15
G. Slow operation of machine (lack of power) all cylinders.....	1, 4, 6, 14, 16, 24
H. Spongy or jerking action of cylinders and/or noisy operation.....	1, 3, 4, 5
I. Lift, crowd, or bucket cylinders drop under load when control spools are shifted from neutral.....	28, 30
J. Load drops or settles.....	8, 10, 13, 26, 28
K. Leaky cylinders.....	10, 11, 12, 13
L. Leaky valve.....	8, 16, 17, 29
M. Sticky valve spool.....	17, 20, 21, 22
N. Unable to push valve spool in.....	17, 18, 20, 21, 22
O. Spring centered spools do not return to neutral.....	17, 18, 19, 20, 21, 22

Hydraulic Trouble Shooting - continued

POSSIBLE CAUSE:

AND CORRECTION -

1. Low oil level in reservoir.....fill reservoir to proper level.
2. No oil supply to machine.....oil is not being diverted from the prime mover hydraulic system. Be sure that the proper controls are actuated on the prime mover.
3. Air in system.....bleed all circuits of air by operating machine at maximum oil flow and through full movements.
4. Oil viscosity too heavy, or oil is.....use recommended hydraulic fluid. Run not at operating temperature. machine until oil reaches operating temperature.
5. Pump not running.....check pump drive to be sure it is engaged.
6. Insufficient pumping.....advance engine throttle.
7. Improper hose connection.....*IMPORTANT - Be sure inlet and return hoses are hooked up correctly. Improper hook-up will result in damage to the backhoe valve.*
8. Loose oil line connections, leaks in.....tighten all hose connections and replace lines, or broken lines. any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
9. Restrictions in oil lines.....check and replace any damaged hoses and lines. Check for pinched hoses.
10. Oil is bypassing cylinder piston,.....replace or rebuild the cylinder; replace scored piston, worn piston packing, damaged parts. or defective piston assembly.
11. Scored piston rods and worn rod.....replace or rebuild the cylinder; replace guides in cylinder. damaged parts.
12. Bent piston rod in cylinder.....replace or rebuild the cylinder; replace damaged parts.
13. Worn or damaged rod seals on cylin-.....repack cylinder. Rebuild cylinder, re-der; external leaks. placing damaged parts as necessary.
14. Diverter valve on prime mover leak-.....diverter valve may need rebuilding or ing externally or bypassing oil in- replacing. ternally through valve to reservoir.
15. Something jamming the swing linkage.....remove interference.
16. Excessive back pressure.....relieve condition. May be restriction from outlet to reservoir.

Hydraulic Trouble Shooting - continued

POSSIBLE CAUSE:

AND CORRECTION -

- 
17. Paint on valve spool, sticking valve.....clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body, or tie rod bolt. If a plug or fitting in valve body is leaking do not over tighten in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug or fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 20 ft-lb. Never force spool, if binding occurs, see item 31 at the end.
18. Oil leakage past spool seal into.....remove cap, if it contains oil, replace spool seal O-rings. Check O-ring retainer to see if it is flat. If it has been "belled" check for restriction from outlet to reservoir of valve which would cause excessive back pressure, see item 31 at the end and Fig 7.
19. Broken return springs.....replace springs, see item 31 at the end and Fig 7.
20. Bent spool.....return for factory repair, or replace with new spool section. See item 31 at the end and Fig 8, 9, and 10.
21. Foreign particles.....clean system and valve.
22. Misalignment of control handle.....check linkage for binding condition. linkage.
23. Spool not moved to full stroke.....check travel, should be 5/16 inch either way or a total of 5/8 inch. See item 31 at the end.
24. Relief valve setting in backhoe con-.....relief pressure will have to be checked and corrections made. Backhoe system pressure is 1900 PSI. Relief valve may need cleaning and overhauling, or entire cartridge must be replaced. See item 31 at the end and Fig 11.
25. Overload relief valve in the control.....clean relief carefully but do not disturb its pressure setting as it can not be field calibrated, or replace cartridge. See item 31 at the end and Fig 8 and 9.
26. Worn control valve.....replace the control valve.

Hydraulic Trouble Shooting - continued

POSSIBLE CAUSE:

AND CORRECTION -

27. A cross over relief in swing circuit.....clean reliefs carefully but do not disturb their pressure setting as they can not be field calibrated, or replace the entire cross over relief assembly.  
is leaking or malfunctioning. Raise the machine on one side by fully extending the left or right stabilizer cylinder. Raise the bucket clear of the ground with the boom and dipperstick in transport position. If the boom swings toward the low side of the machine, oil is bypassing the cross over relief valve.
28. Check poppet in the control valve.....clean check poppet(s) carefully, being sure that it moves freely with good spring action and seats properly or replace. See item 31 at the end and Fig 8, 9, and 10.  
not holding.
29. Damaged or worn spool seals.....replace spool end seals, see item 31 at the end and Fig 8, 9, and 10.
30. Check ball in anti-cavitation check.....clean anti-cavitation valve carefully, being sure that checks move freely and seat properly, or replace cartridge. See item 31 next, and Fig 8 and 9.  
valve is stuck or not seating properly.
31. Problems involving the control valve proper.....

This valve is a precision device and is not intended for any extensive field adjustment or repair. Field replacement parts are limited to Seal Kits, Cartridges, Valve Sections, and Tie Rods. Anything beyond the replacement of these parts, the opening of check cavities and certain relief valve cavities to examine for trapped dirt, or the resetting of the main relief valve with the use of a good pressure gauge, should be referred back to the factory for an exchange. The malfunctioning valve must then be returned to its manufacturer for service.

Dirt and shreds of packing material are the usual causes of valve malfunction. Be sure that the reservoir oil supply is kept clean and only factory supplied packings are used in cylinder repair. Everything must be clean and free of dirt during the oil line removal and replacement and during any cylinder work.

Pages 14 and 15, Valve Repair - Disassembly, explain the procedure to follow for valve repair. Pages 16 through 22 illustrate various portions of the valve and list the part numbers.

PAY CLOSE ATTENTION TO ALL CAUTION AND WARNING NOTES SO THE VALVE WILL NOT HAVE TO BE RETURNED TO THE FACTORY AND THEN TO THE MANUFACTURER FOR RECONDITIONING.

Careful use of this information, after the warranty period, by qualified individuals with valve service training and experience, can correct minor problems which may develop.

THE INCLUSION OF THIS INFORMATION AND ITS USE DOES NOT IMPLY THAT THE WARRANTY WILL REMAIN EFFECTIVE ON THE VALVE IF IT IS TAMPERED WITH DURING THE WARRANTY PERIOD.

# REMOVAL FROM TRACTOR-STORAGE

The backhoe is self-assisting during the installation and removal procedures. For removal and storage follow these steps:

1. Put the stabilizers down and lift the hoe slightly.
2. Stretch out the boom, dipper arm, and bucket, as shown in Fig 5 and 6. Lower the bucket to the ground so that it rests there solidly.
3. Place suitable blocking under the backhoe frame to support it adequately, as shown in Fig 5 and 6.
4. Detach the backhoe from the tractor mechanically only, not hydraulically at this point, and move the tractor a few inches away from the backhoe.

*NOTE - To facilitate this procedure, the backhoe can still be hydraulically moved, raised or lowered, to release the connection points of the carrying forces.*

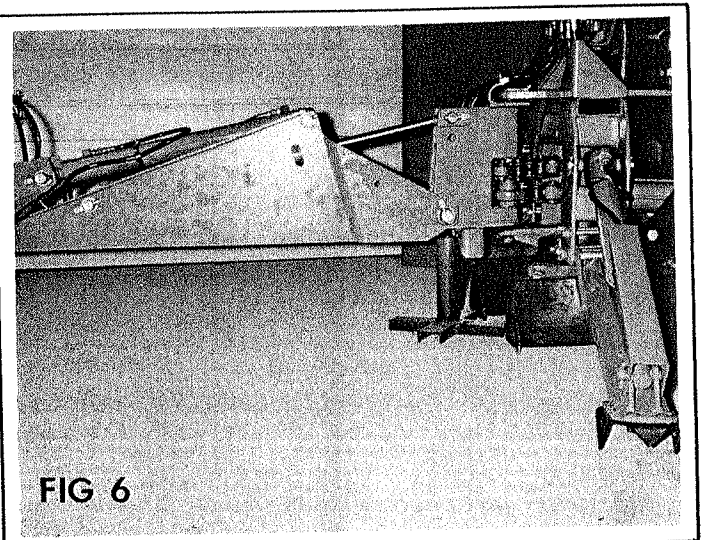
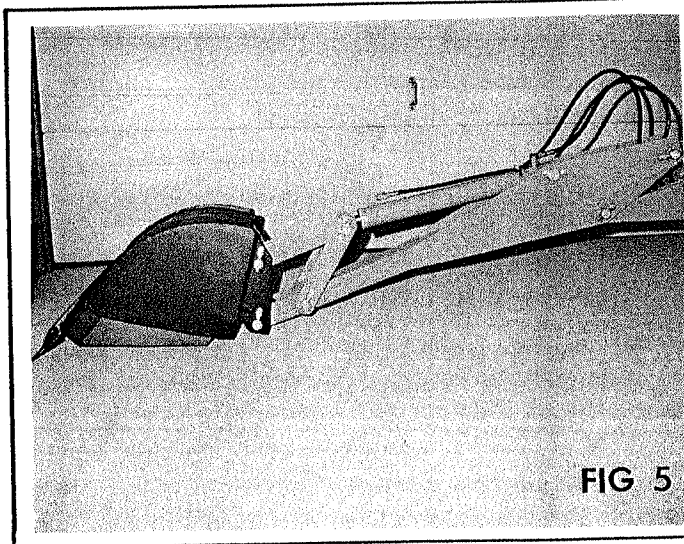
5. Gently lower the backhoe onto the blocking as shown in Fig 5 and 6. Leave the stabilizers outstretched and firmly in contact with the ground for added stability.
6. The hydraulic system can now be de-actuated.

- a. On PTO pump self-contained systems, the pump should be removed from the PTO shaft. The hydraulic system should always remain complete. No hoses or oil lines should be disconnected during correct removal and storage procedure.
- b. On systems that tap into the tractor for hydraulic power, these lines can be disconnected now.

*IMPORTANT - Be sure to mark the lines to prevent mix up, during hook-up, when the hoe is again attached to the tractor.*

*Be sure to cap the ends of the lines to keep clean while in storage.*

7. Now slowly drive the tractor forward and away from the backhoe. Be careful that all parts clear each other during separation.
8. Refer to the installation instructions for the attaching kit, this will help with the removal and reattaching.
9. For long term storage, coat exposed lift, swing, and stabilizer cylinder rods with grease.
10. Lubricate all grease fittings and oil swing chains, stabilizer pivot pins, and complete handle linkage.





# VALVE REPAIR - DISASSEMBLY

---

## Replace Center Section Assemblies:

*NOTE - For the purpose of these instructions, we will consider the section containing the MAIN RELIEF VALVE as the left side of the valve.*

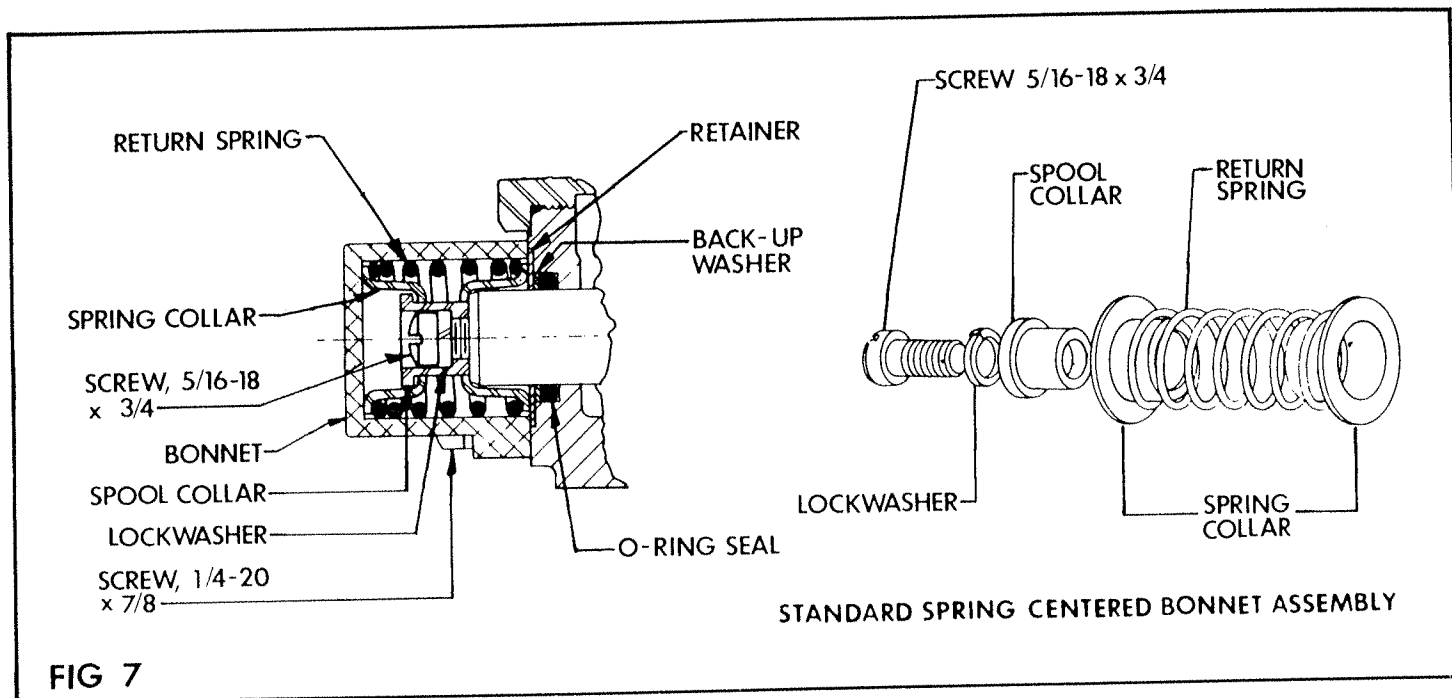
1. Remove control valve from the backhoe.
2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.
3. Since the valve will be assembled in the same order, each section should be marked numerically so that they can be reassembled in the same sequence.
4. Mount the valve vertically in a vise to facilitate disassembly and assembly.
5. Remove the three tie rod nuts from the right end section, using a thin-wall socket.
6. Valve sections can now be removed by sliding the sections along the tie rods.
7. Thoroughly clean the O-ring counter-bores and the ground surfaces of each section. Place O-ring seals; 10318 (exhaust) and 10317 (pressure) in proper counter-bores. For better sealing it is recommended that all O-rings, used in the counter-bores, are replaced with new parts.
8. Replace the sections on tie rods with the O-ring counter-bores facing the right end of the valve. Be careful replacing the sections so that the section O-rings are not moved from the counter-bores.
9. When all sections are assembled on the tie rods, tighten the tie rod nuts equally to 20 ft-lb torque, *NO MORE - NO LESS*, or spools may bind and stick.

## Replacing Spool Seals:

*NOTE - For the purpose of these instructions, we will consider the control handle side of the valve as the FRONT, and the opposite side the BACK.*

1. Remove control valve from the backhoe.
2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.
3. At the BACK of the valve remove all bonnet assembly parts which are connected to the spool, keep parts in the order of disassembly. See Fig 7 for the parts involved in the make-up of the bonnet assembly.  
  
*IMPORTANT - DO NOT remove the spool from the valve. The seals can be replaced externally. Prevent spool from turning or moving by inserting a screw driver through clevis slot, or by running a rod through the pin hole and using the rod as a handle. DO NOT hold the spool with a wrench. This will destroy the finish.*
4. At the BACK of the valve, remove seal retainer, back-up washer, and spool O-ring seal.

5. Thoroughly clean counter-bore.
6. Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counter-bore. Replace back-up washer and seal retainer.
7. At the BACK of the valve replace bonnet assembly parts, reversing the order in which they were disassembled in step 3. Use 12 ft-lb torque to tighten assembly screw.



8. At the FRONT of the valve remove all parts connected to the spool (handle, linkage, etc.).

9. At the FRONT of the valve remove seal plate retainer, seal retainer, back-up washer, and spool O-ring seal.

10. Thoroughly clean counter-bore.

11. Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counter-bore. Replace back-up washer, seal retainer, and seal plate retainer.

12. Reattach all parts connected to the spool (handle, linkage, etc.).

# CONTROL VALVE SECTION

TYPICAL SECTION FOR LIFT CIRCUIT

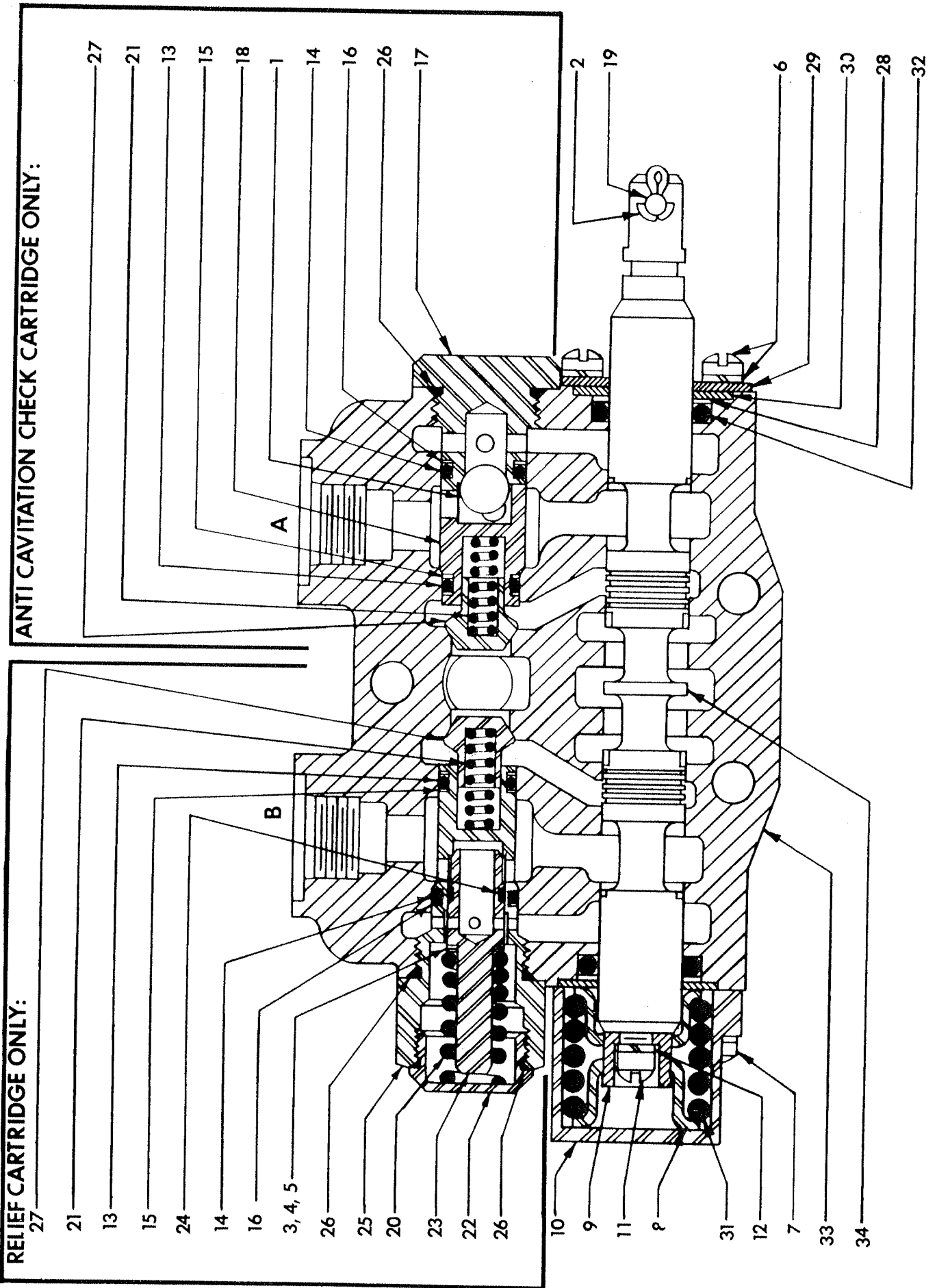


FIG 8

CONTROL VALVE SECTION - LIFT CIRCUIT

PARTS LIST - FIG 8

Index No.	Part No.	Description	Quantity Per Section
1	*	7/16" Steel Ball.....	1
2	*	Handle Pin Cotter.....	1
3	*	Shim, .040" Thick)	
4	*	Shim, .020" Thick).....	as required
5	*	Shim, .010" Thick)	
6	*	Machine Screw and Lockwasher.....	2
7	*	Bonnet Screw.....	2
8	*	Stop Collar.....	2
9	*	Spool Collar.....	1
10	*	Bonnet.....	1
11	*	Spool Assembly Screw.....	1
12	*	Spool Assembly Screw Lockwasher.....	1
13	**	O-Ring Seal (Inner).....	2
14	**	O-Ring Seal (Outer).....	2
15	**	Back-Up Washer (Inner).....	4
16	**	Back-Up Washer (Outer).....	2
17	*	Anti-Cavitation Check Body.....	1
18	*	Check Ball Retainer.....	1
19	*	Handle Pin.....	1
20	*	Spring (2201 - 3000 PSI Crack).....	1
21	*	Check Spring.....	2
22	*	Relief Cap.....	1
23	**	Relief Poppet.....	1
24	**	Piston Ring.....	1
25	*	Relief Body.....	1
26	**	O-Ring Seal.....	3
27	*	Steel Check.....	2
28	**	Back-Up Washer.....	2
29	*	Seal Plate Retainer.....	1
30	*	Seal Retainer.....	2
31	*	Centering Spring.....	1
32	**	Spool O-Ring Seal.....	2
33	*	Center Section Housing.....	1
34	*	Four-Way Spool.....	1
	10185	Control Valve Section - Lift Circuit, consisting of above listed parts.....	1
		<i>NOTE - One Orifice Plate (10312) must be added to "A" port to complete lift section.</i>	
	10315	Control Valve Section Seal Kit - Lift Circuit, consisting of:32 (quan-2), 13 (quan-2), 14 (quan-2), 15 (quan-4), 16 (quan-2), 26 (quan-2), pressure sec- tion seal (quan-2), and exhaust section seal (quan-2) ..	1
	10316	Spool Seal Kit; consisting of: 32 (quan-2) and 28 (quan-2).....	1
	10303	Relief Cartridge (2500 PSI), as shown.....	1
	10313	Relief Cartridge Seal Kit; consisting of: 13 (quan-1), 14 (quan-1), 15 (quan-2), 16 (quan-1), and 26 (quan-2).....	1
	10177	Poppet Seal Kit, consisting of: 23 (quan-1) and 24 (quan-1).....	1
	10304	Anti-Cavitation Check Cartridge, as shown.....	1
	10313	Anti-Cavitation Check Seal Kit, same as Relief Cartridge Seal Kit listed above.....	1

\* Not available as a separate repair part, order complete section or cartridge.  
 \*\* Not available as a separate repair part, order seal kit.

# CONTROL VALVE SECTION

TYPICAL SECTION FOR CROWD CIRCUIT

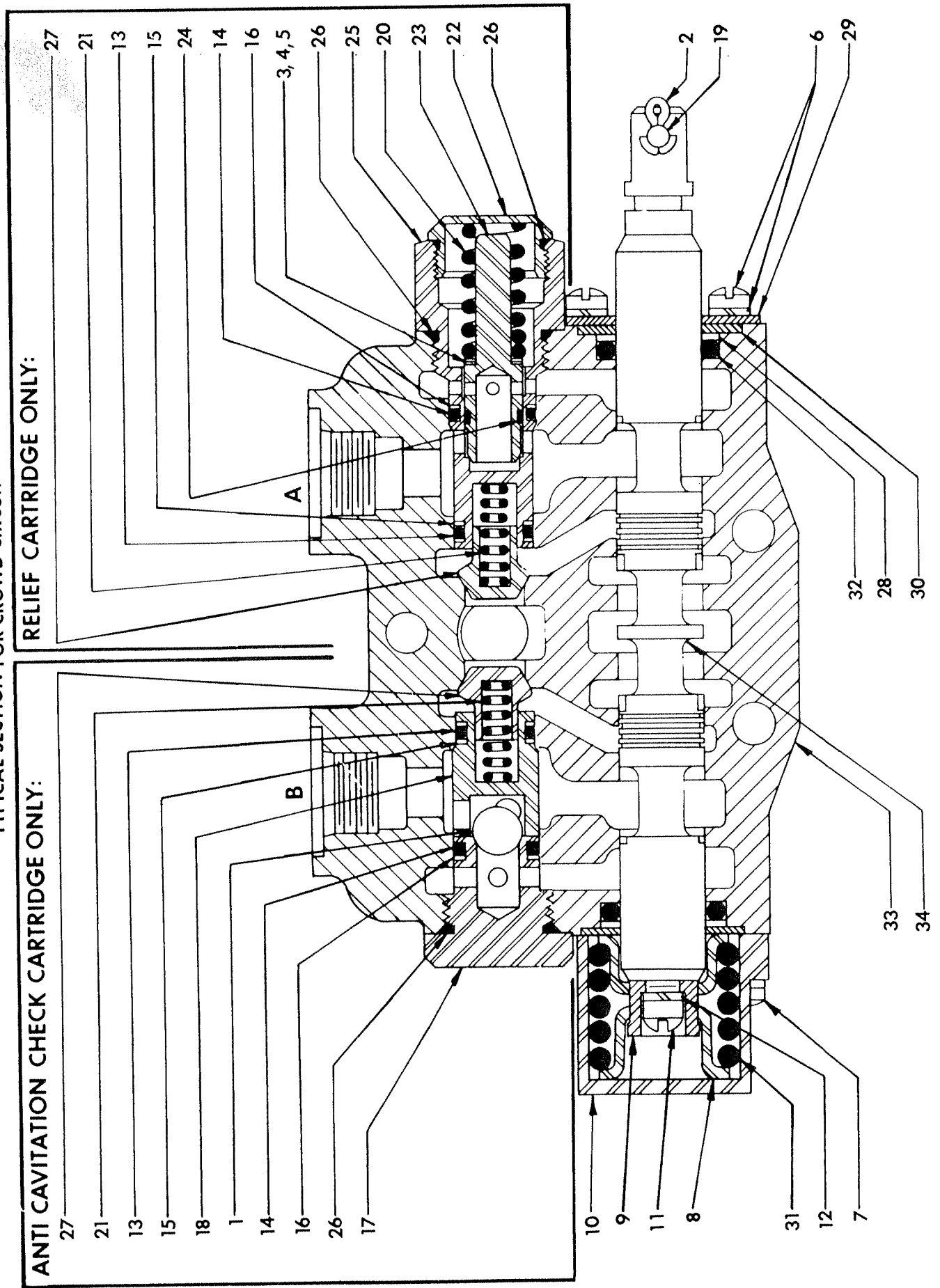


FIG 9

CONTROL VALVE SECTION - CROWD CIRCUIT

PARTS LIST - FIG 9

Index No.	Part No.	Description	Quantity Per Section
1	*	7/16" Steel Ball.....	1
2	*	Handle Pin Cotter.....	1
3	*	Shim, .040" Thick)	
4	*	Shim, .020" Thick).....	as required
5	*	Shim, .010" Thick)	
6	*	Machine Screw and Lockwasher.....	2
7	*	Bonnet Screw.....	2
8	*	Stop Collar.....	2
9	*	Spool Collar.....	1
10	*	Bonnet.....	1
11	*	Spool Assembly Screw.....	1
12	*	Spool Assembly Screw Lockwasher.....	1
13	**	O-Ring Seal (Inner).....	2
14	**	O-Ring Seal (Outer).....	2
15	**	Back-Up Washer (Inner).....	4
16	**	Back-Up Washer (Outer).....	2
17	*	Anti-Cavitation Check Body.....	1
18	*	Check Ball Retainer.....	1
19	*	Handle Pin.....	1
20	*	Spring (2201 - 3000 PSI Crack).....	1
21	*	Check Spring.....	2
22	*	Relief Cap.....	1
23	**	Relief Poppet.....	1
24	**	Piston Ring.....	1
25	*	Relief Body.....	1
26	**	O-Ring Seal.....	3
27	*	Steel Check.....	2
28	**	Back-Up Washer.....	2
29	*	Seal Plate Retainer.....	1
30	*	Seal Retainer.....	2
31	*	Centering Spring.....	1
32	**	Spool O-Ring Seal.....	2
33	*	Center Section Housing.....	1
34	*	Four-Way Spool.....	1
	10155	Control Valve Section - Crowd Circuit, consisting of above listed parts.....	1
	10315	Control Valve Section Seal Kit - Crowd Circuit, consisting of: 32 (quan-2), 13 (quan-2), 14 (quan-2), 15 (quan-4), 16 (quan-2), 26 (quan-2), pressure section seal (quan-2), and exhaust section seal (quan-2).....	1
	10316	Spool Seal Kit; consisting of: 32 (quan-2) and 28 (quan-2).....	1
	10303	Relief Cartridge (2500 PSI), as shown.....	1
	10313	Relief Cartridge Seal Kit; consisting of: 13 (quan-1), 14 (quan-1), 15 (quan-2), 16 (quan-1), and 26 (quan-2).....	1
	10177	Poppet Seal Kit, consisting of: 23 (quan-1) and 24 (quan-1).....	1
	10304	Anti-Cavitation Check Cartridge, as shown.....	1
	10313	Anti-Cavitation Check Seal Kit, same as Relief Cartridge Seal Kit listed above.....	1

\* Not available as a separate repair part, order complete section or cartridge.

\*\* Not available as a separate repair part, order seal kit.

**CONTROL VALVE SECTION**  
 TYPICAL SECTION FOR ACTUATE (BUCKET), SWING, AND STABILIZER CIRCUITS

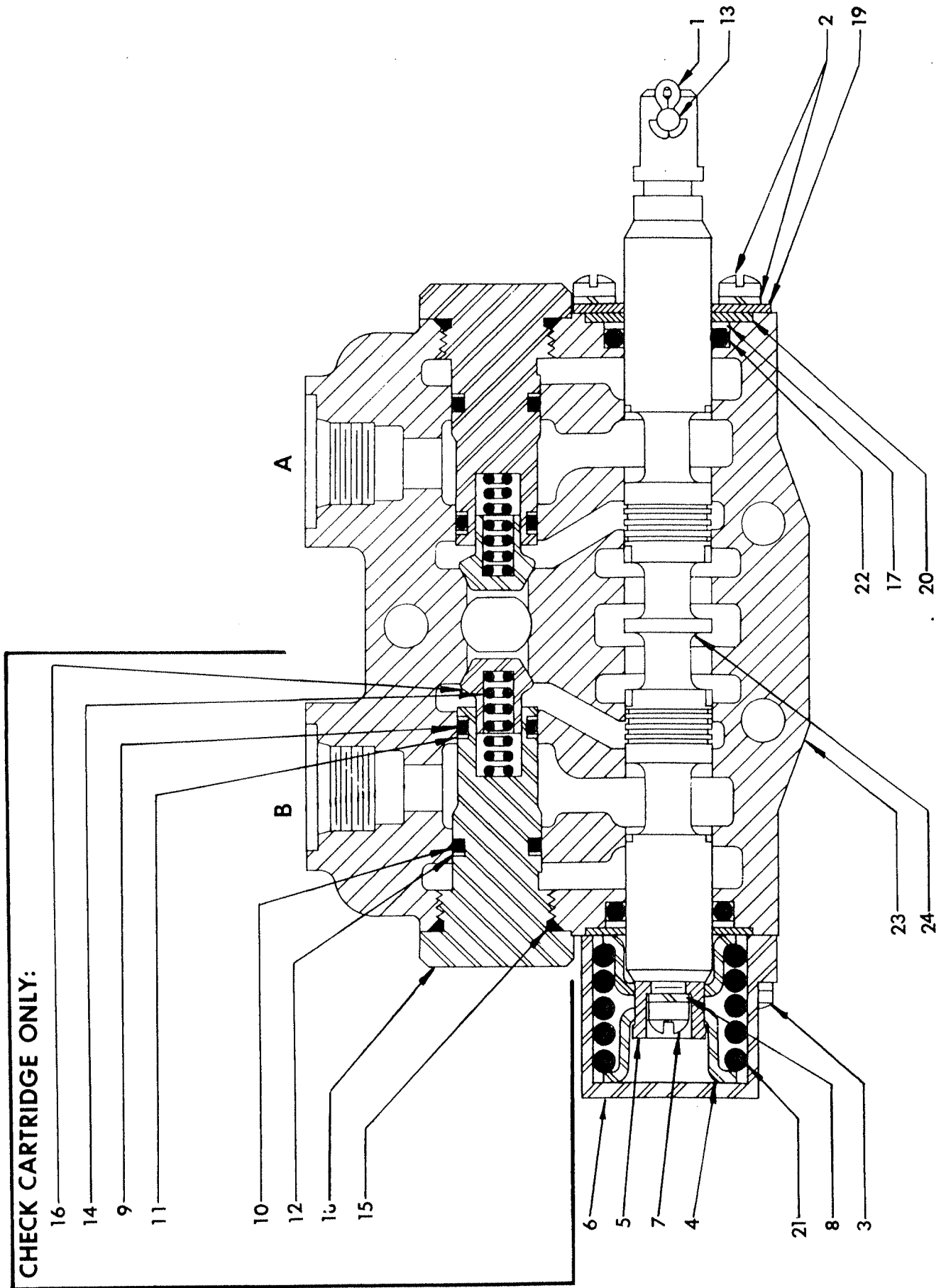


FIG 10



CONTROL VALVE SECTION - ACTUATE (BUCKET), SWING, AND STABILIZER CIRCUITS

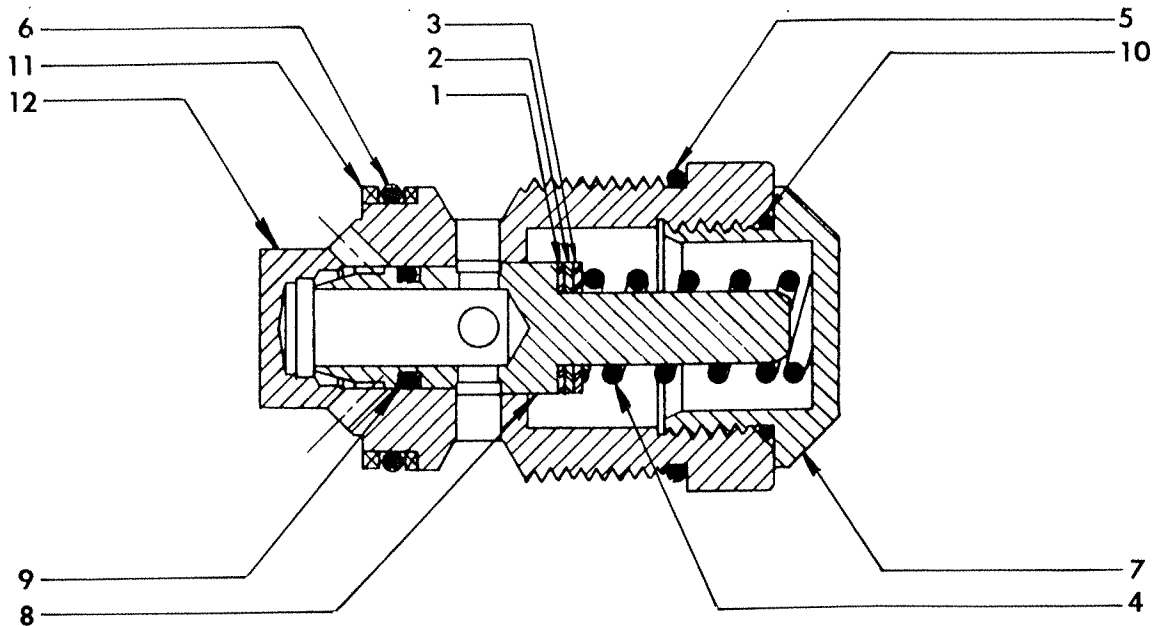
PARTS LIST - FIG 10

Index No.	Part No.	Description	Quantity Per Section
1	*	Handle Pin Cotter.....	1
2	*	Machine Screw and Lockwasher.....	2
3	*	Bonnet Screw.....	2
4	*	Stop Collar.....	2
5	*	Spool Collar.....	1
6	*	Bonnet.....	1
7	*	Spool Assembly Screw.....	1
8	*	Spool Assembly Screw Lockwasher.....	1
9	**	Check Plug O-Ring Seal (Inner).....	2
10	**	Check Plug O-Ring Seal (Outer).....	2
11	**	Back-Up Washer (Inner).....	4
12	**	Back-Up Washer (Outer).....	2
13	*	Handle Pin.....	1
14	*	Lift Check Spring.....	2
15	**	Lift Check Plug O-Ring Seal.....	2
16	*	Lift Check Poppet.....	2
17	**	Back-Up Washer.....	2
18	*	Lift Check Plug.....	2
19	*	Seal Plate Retainer.....	1
20	*	Seal Retainer.....	2
21	*	Centering Spring.....	1
22	**	Spool O-Ring Seal.....	2
23	*	Center Section Housing.....	1
24	*	Four-Way Spool.....	1
	10156	Control Valve Section - Actuate (Bucket), Swing, and Stabilizer Circuits, consisting of above listed parts.....	1
		<i>NOTE - Two Orifice Plates (10143) must be added to complete Swing Section.</i>	
	10315	Control Valve Section Seal Kit - Actuate (Bucket), Swing, and Stabilizer Circuits, consisting of: 22 (quan-2), 9 (quan-2), 10 (quan-2), 11 (quan-4), 12 (quan-2), 15 (quan-2), pressure section seal (quan-2), and exhaust section seal (quan-2).....	1
	10316	Spool Seal Kit; consisting of: 22 (quan-2) and 17 (quan-2).....	1
	10305	Check Cartridge, as shown.....	2
	10313	Check Cartridge Seal Kit; consisting of: 9 (quan-1), 10 (quan-1), 11 (quan-2), 12 (quan-1), and 15 (quan-2).....	2

\* Not available as a separate repair part, order complete section or cartridge.  
 \*\* Not available as a separate repair part, order seal kit.

# MAIN SYSTEM RELIEF VALVE (1900 PSI)

LOCATION: LEFT HAND VALVE COVER



**FIG 11**

MAIN SYSTEM RELIEF VALVE

PARTS LIST - FIG 11

Index No.	Part No.	Description	Required
1	*	Shim, .040" Thick)	
2	*	Shim, .020" Thick).....	as required
3	*	Shim, .010" Thick)	
4	*	Spring (1751 - 2200 PSI Crack).....	1
5	**	O-Ring Seal.....	1
6	**	O-Ring Seal.....	1
7	*	Relief Cap.....	1
8	**	Relief Poppet.....	1
9	**	Piston Ring.....	1
10	**	O-Ring Seal.....	1
11	**	Back-Up Washer.....	2
12	*	Body.....	1
	10142	Main System Relief Valve, consisting of above listed parts.....	1
	10172	Seal and Service Kit; consisting of: 5 (quan-1), 6 (quan-1), 8 (quan-1), 9 (quan-1), 10 (quan-1), and 11 (quan-2).....	1

\* Not available as a separate repair part, order complete Main System Relief Valve.

\*\* Not available as a separate repair part, order Seal and Service Kit.

ADDITIONAL REPAIR PARTS (NOT SHOWN)

Part No.	Description	Required
10141	Left Hand End Cover with Main Relief Valve.....	1
10160	Tie Rod Kit (Six-Spool) contains three Studs and three Stud Nuts.....	1
10176	Valve Seal Kit, containing all O-Rings and Back-Up Rings for a Six-Spool Valve.....	1
10140	Six-Spool Valve.....	1
10308	Right Hand End Cover.....	1
10317	Section Seal (Pressure).....	2
10318	Section Seal (Exhaust).....	2

# STABILIZER PADS - ACCESSORY ITEMS

The backhoe is supplied with bolt on stabilizer pads as standard equipment. They are suitable for most backhoe work and generally will be all that is ever required. However, accessory pads are available that pin to the standard pads to increase the versatility of the hoe. These items are shown below and are used in groups.

Group A - Basic flat plate that is pinned to the standard pad and has a limited amount of pivot action for leveling itself. It may be used as shown or have Groups B, B and C, or D added to it. It measures 9" x 10".

Group B - Four angles which may be bolted to Group A to form a soil engaging cleat in the form of a tee or a channel. The angles are 1-1/2" x 1-1/2" x 1/4" x 8-1/4" long.

Group C - A quantity of pierced belting strips and long bolts that can be added to Group B to form a rubber-fabric street pad.

Group D - A spike with two retaining nuts that can be attached to Group A in any quantity desired, up to six, per stabilizer. The spike will provide about 2" penetration.

## STABILIZER PADS - PARTS LIST

Index Description Part No.

### Group A:

- Turf Plate Kit (pair).....W41
- 1 Pivot Shaft.....601552
- 2 Turf Plate Weldment.....851260
- 11 Cotter Pin.....8602

### Group B:

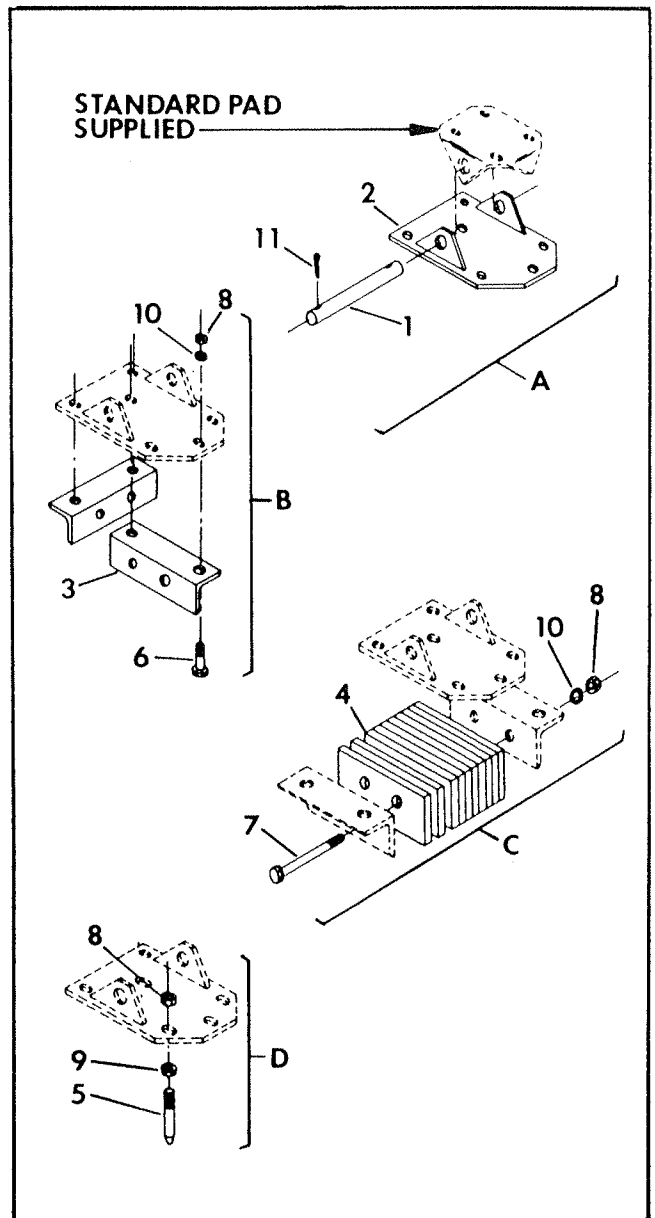
- Angle Kit (four Angles and four bolts).....W42
- 3 Angle.....851266
- 6 Bolt, 5/8 NF x 1-1/2.....7130
- 8 Nut, 5/8 NF.....7536
- 10 Lockwasher, 5/8.....8111

### Group C:

- Street Pad Kit (sufficient material for both stabilizers; includes four long bolts).....W43
- 4 Street Pad, order.....W43
- 7 Bolt, 5/8 NF x 6-1/2.....7196
- 8 Nut, 5/8 NF.....7536
- 10 Lockwasher, 5/8.....8111

### Group D:

- Spike Kit (eight spikes and sixteen nuts).....W53
- 5 Spike, order.....W53
- 8 Nut, 5/8 NF.....7536
- 9 Jam Nut, 5/8 NF.....7674



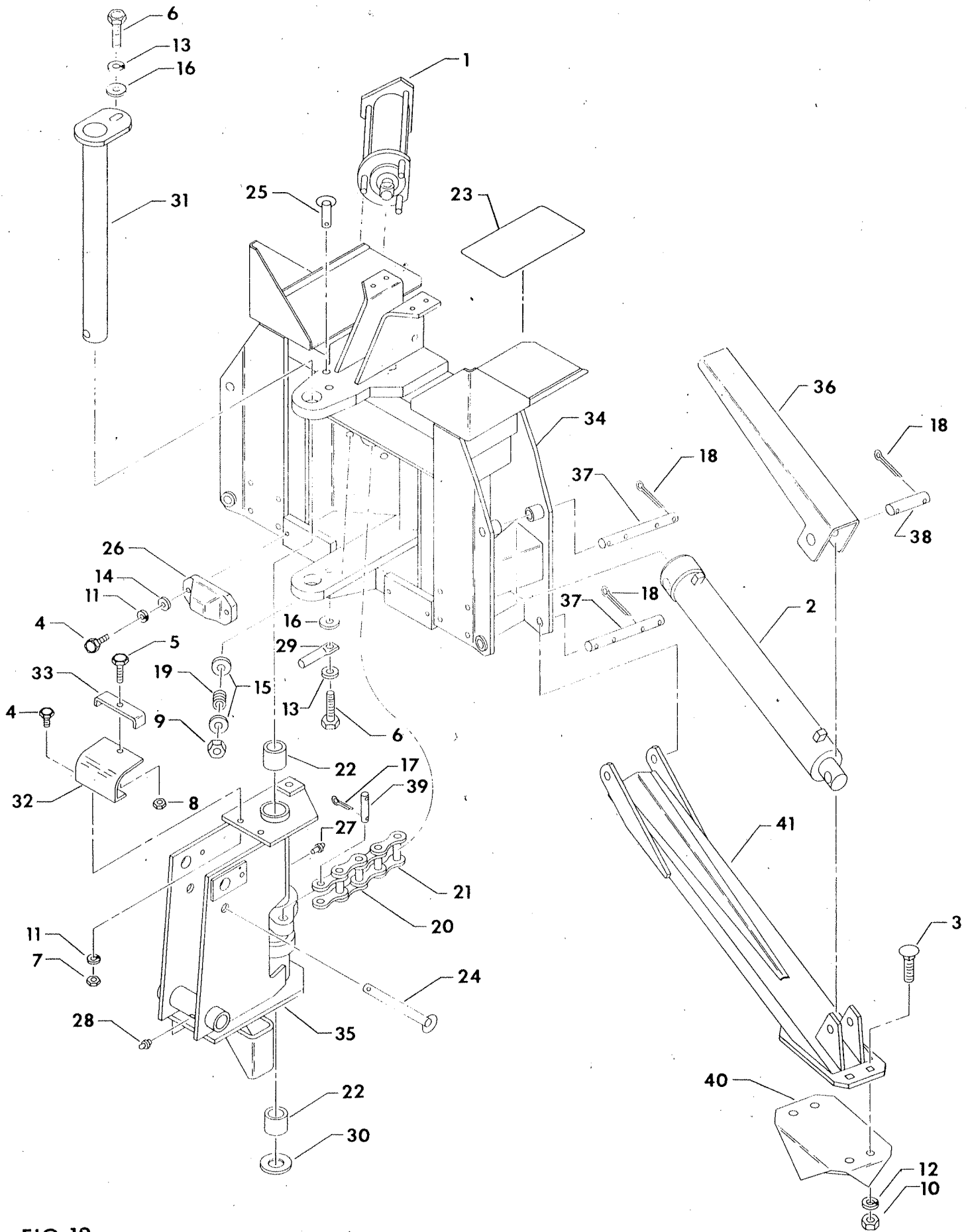


FIG 12

MAINFRAME, SWING FRAME, AND STABILIZERS

PARTS LIST - FIG 12

<u>Index</u>	<u>Description</u>	<u>Part No.</u>	<u>Index</u>	<u>Description</u>	<u>Part No.</u>
1	Hydraulic Cylinder - Swing....	098	21	Connector Link, extra	
2	Hydraulic Cylinder - Stabilizer.....	122		heavy 160.....	11433
3	Carriage Bolt, 1/2 NC x 1-1/4.....	6664	22	Bronze Bushing.....	11999
4	Bolt, 5/16 NF x 1".....	6795	23	Foot Pad Surfacing.....	12906
5	Bolt, 5/16 NF x 1-1/4.....	6799	24	Quick Release Pin, 5/8 Dia. x 7-1/4.....	13495
6	Bolt, 1/2 NF x 1".....	7012	25	Quick Release Pin, 5/8 Dia. x 2".....	13496
7	Nut, 5/16 NF.....	7436	26	Bumper.....	13681
8	Locknut, 5/16 NF.....	7437	27	Grease Fitting, 1/8 NPT.....	14500
9	Locknut, 7/16 NF.....	7487	28	Grease Fitting, 1/4 self tapping.....	14505
10	Nut, 1/2 NC.....	7501	29	Pin Retainer, large.....	851123
11	Lockwasher, 5/16.....	8071	30	Thrust Washer.....	851136
12	Lockwasher, 1/2.....	8101	31	Swing Shaft.....	854030
13	Lockwasher, 1/2 shakeproof.....	8103	32	Hose Bracket.....	856236
14	Flat Washer, 5/16.....	8151	33	Hose Strap.....	856237
15	Flat Washer, 7/16.....	8163	34	Mainframe Weldment.....	858150
16	Flat Washer, 1/2 SAE.....	8173	35	Swing Frame Weldment.....	857040
17	Cotter Pin, 3/16 x 1-1/4.....	8582	36	Stabilizer Shield.....	857121
18	Cotter Pin, 1/4 x 1-1/2.....	8602	37	Stabilizer Pin.....	857131
19	Spring, 1/2 ID x 1-3/4.....	8711	38	Stabilizer Cylinder Pin....	857132
20	Three-Link Section, extra heavy 160, less 17, 21, 39..	11424	39	Chain Pin.....	857133
			40	Stabilizer Pad.....	857138
			41	Stabilizer Weldment.....	857150

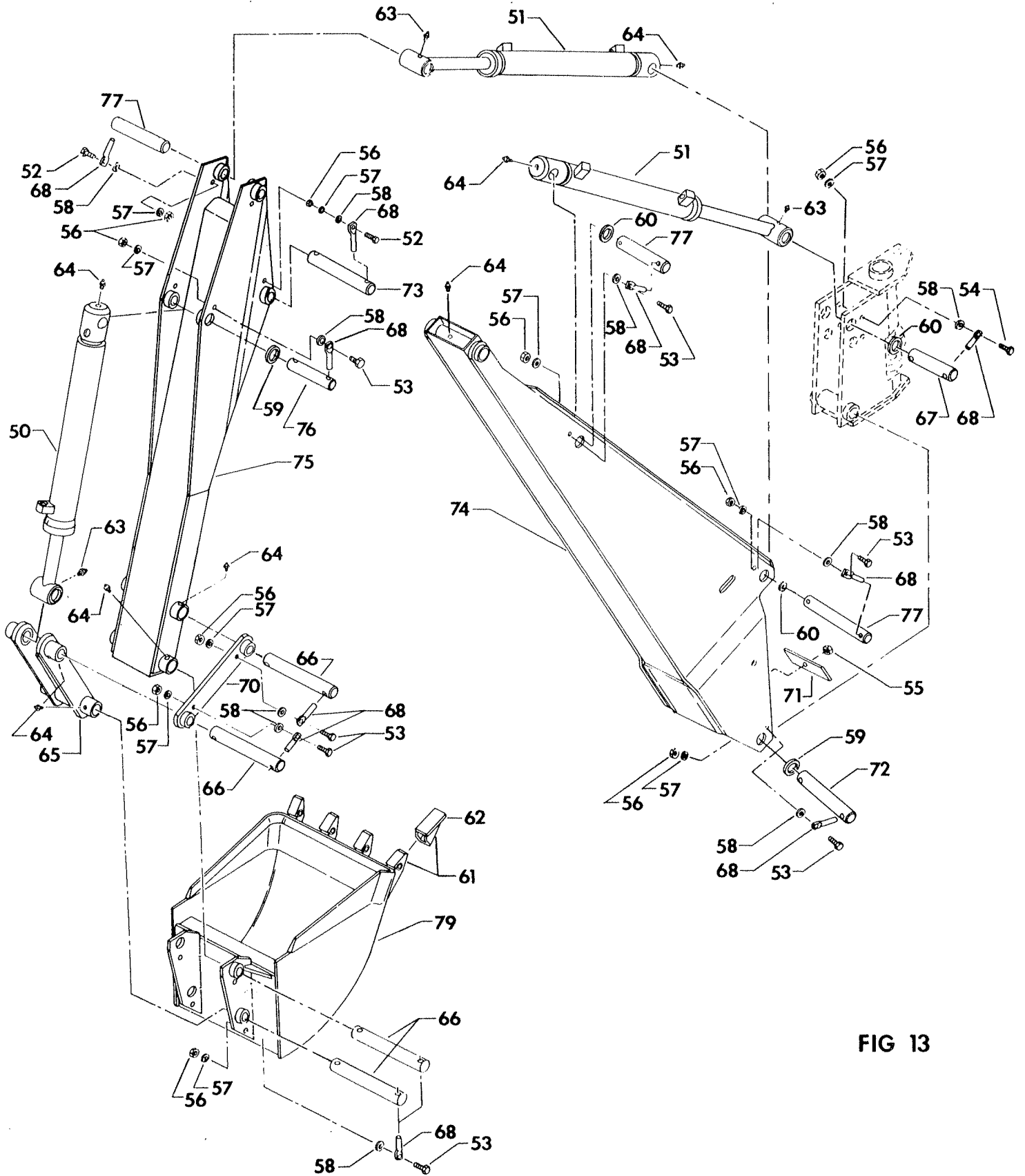


FIG 13

BOOM, DIPPERSTICK, AND BUCKET

PARTS LIST - FIG 13

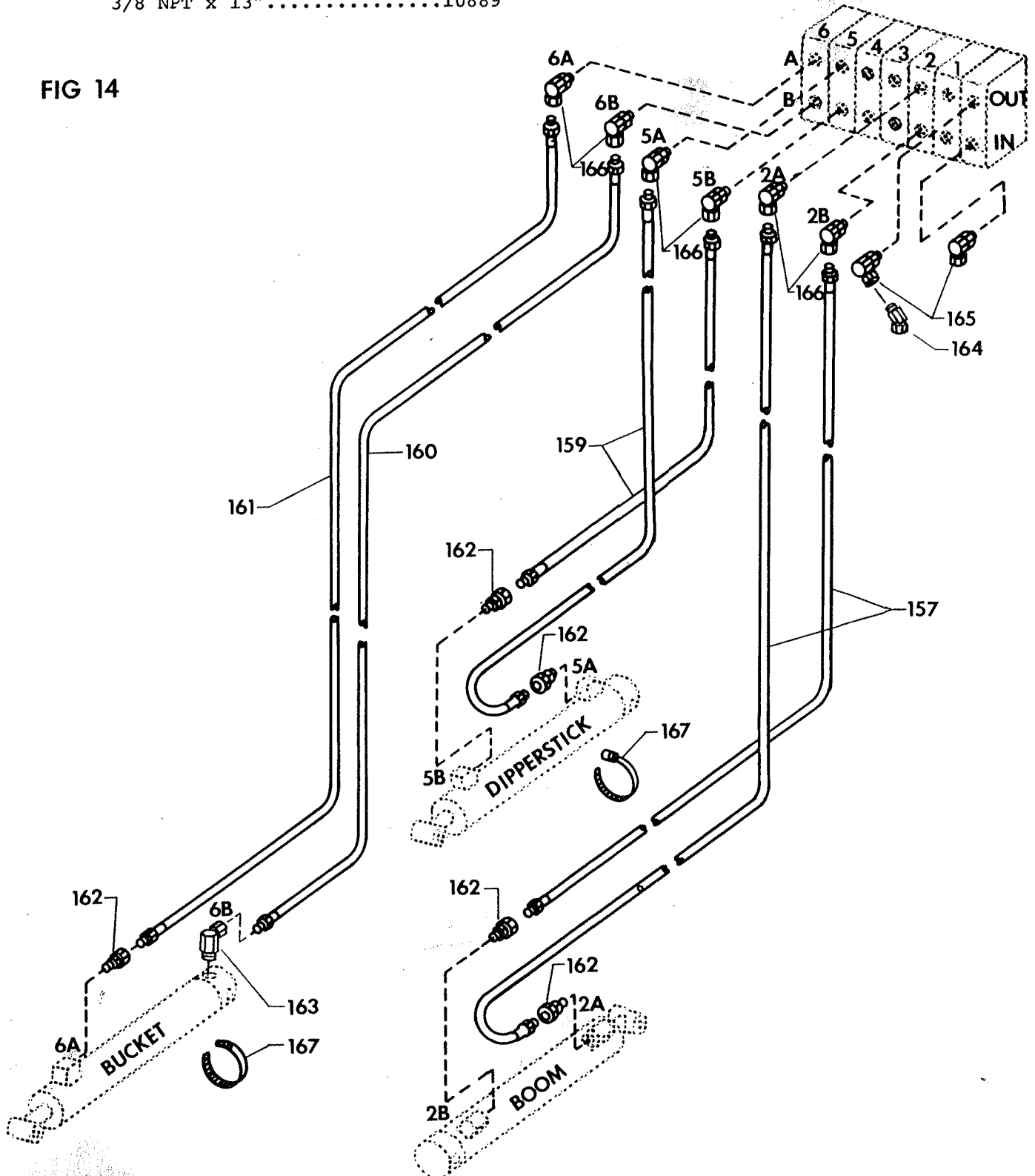
<u>Index</u>	<u>Description</u>	<u>Part No.</u>	<u>Index</u>	<u>Description</u>	<u>Part No.</u>
50	Hydraulic Cylinder - Bucket...	078	65	Bucket Link Weldment.....	851090
51	Hydraulic Cylinder - Boom/Dipperstick.....	097	66	Bucket Linkage Pin.....	851116
52	Bolt, 3/8 NF x 1".....	6851	67	Pivot Shaft.....	851118
53	Bolt, 3/8 NF x 1-1/4.....	6859	68	Pin Retainer, small.....	851122
54	Bolt, 3/8 NF x 1-1/2.....	6864	70	Guide Link.....	857315
55	Locknut, 3/8 NC.....	7458	71	Hose Strap.....	857124
56	Nut, 3/8 NF Gr 5.....	7461	72	Boom Pivot Pin.....	857126
57	Lockwasher, 3/8.....	8079	73	Dipperstick Pivot Pin.....	857128
58	Flat Washer, 3/8 SAE.....	8158	74	Boom Weldment.....	857155
59	Machine Bushing, 2-1/4 OD x 1-1/2 ID x 16 GA.....	8232	75	Dipperstick Weldment.....	857170
60	Machine Bushing, 1-7/8 OD x 1-1/4 ID x 18 GA.....	8290	76	Bucket Cylinder Pin.....	857301
61	Tooth and Shank Assembly....	13613	77	Cylinder Pin.....	857302
62	Tooth Point.....	13617	79	Bucket Complete - 12".....	W35
63	Grease Fitting, 1/8 NPT.....	14500	79	Bucket Complete - 18".....	W36
64	Grease Fitting, 1/4 self tapping.....	14505	79	Bucket Complete - 24".....	W37
			79	Bucket Complete - 36".....	W460
			79	Bucket Complete - 40".....	W461



PARTS LIST - FIG 14 and FIG 15

Index	Description	Part No.	Index	Description	Part No.
150	Bolt, 5/16 NC x 2-1/2.....	6813	157	Hydraulic Hose, 1/4 ID x 3/8 NPT x 70".....	10892
151	Nut, 5/16 NC.....	7431	158	Hydraulic Hose, 1/4 ID x 3/8 NPT x 45".....	10893
152	Street Elbow, 3/8 NPT x 90° ..	11179	159	Hydraulic Hose, 1/4 ID x 3/8 NPT x 109".....	10894
153	Lockwasher, 5/16.....	8071	160	Hydraulic Hose, 1/4 ID x 3/8 NPT x 115".....	10896
154	Cross-Over Relief, 1075 psi..	10530			
155	Hydraulic Hose, 1/4 ID x 3/8 NPT x 20".....	10885			
156	Hydraulic Hose, 1/4 ID x 3/8 NPT x 13".....	10889			

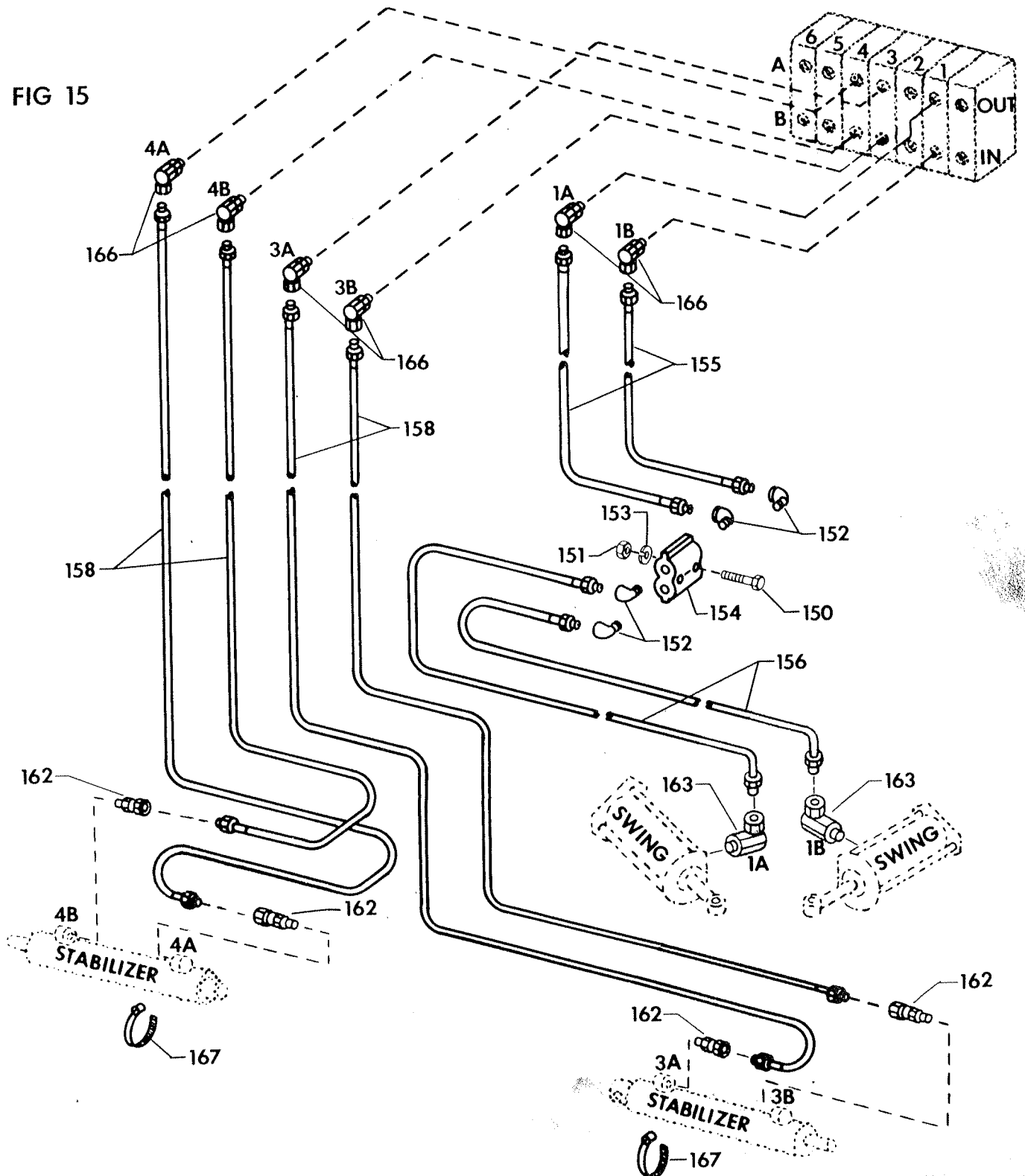
FIG 14



PARTS LIST - FIG 14 and FIG 15

Index	Description	Part No.	Index	Description	Part No.
161	Hydraulic Hose, 1/4 ID x 3/8 NPT x 135".....	10941	165	Adapter Union, 7/8-14 M x 1/2 NPT F x 90°.....	11142
162	Adapter Union, 3/8 NPT M x 3/8 NPT F.....	11109	166	Adapter Union, 3/4-16 M x 3/8 NPT F x 90°.....	11143
163	Adapter Union, 3/8 NPT M x 3/8 NPT F x 90°.....	11127	167	Hose Clamp, 2-13/16 to 3-3/4.....	14157
164	Adapter Union, 1/2 NPT M x 1/2 NPT F x 45°.....	11131			

FIG 15



VALVE MOUNT, CONTROLS, AND SEAT

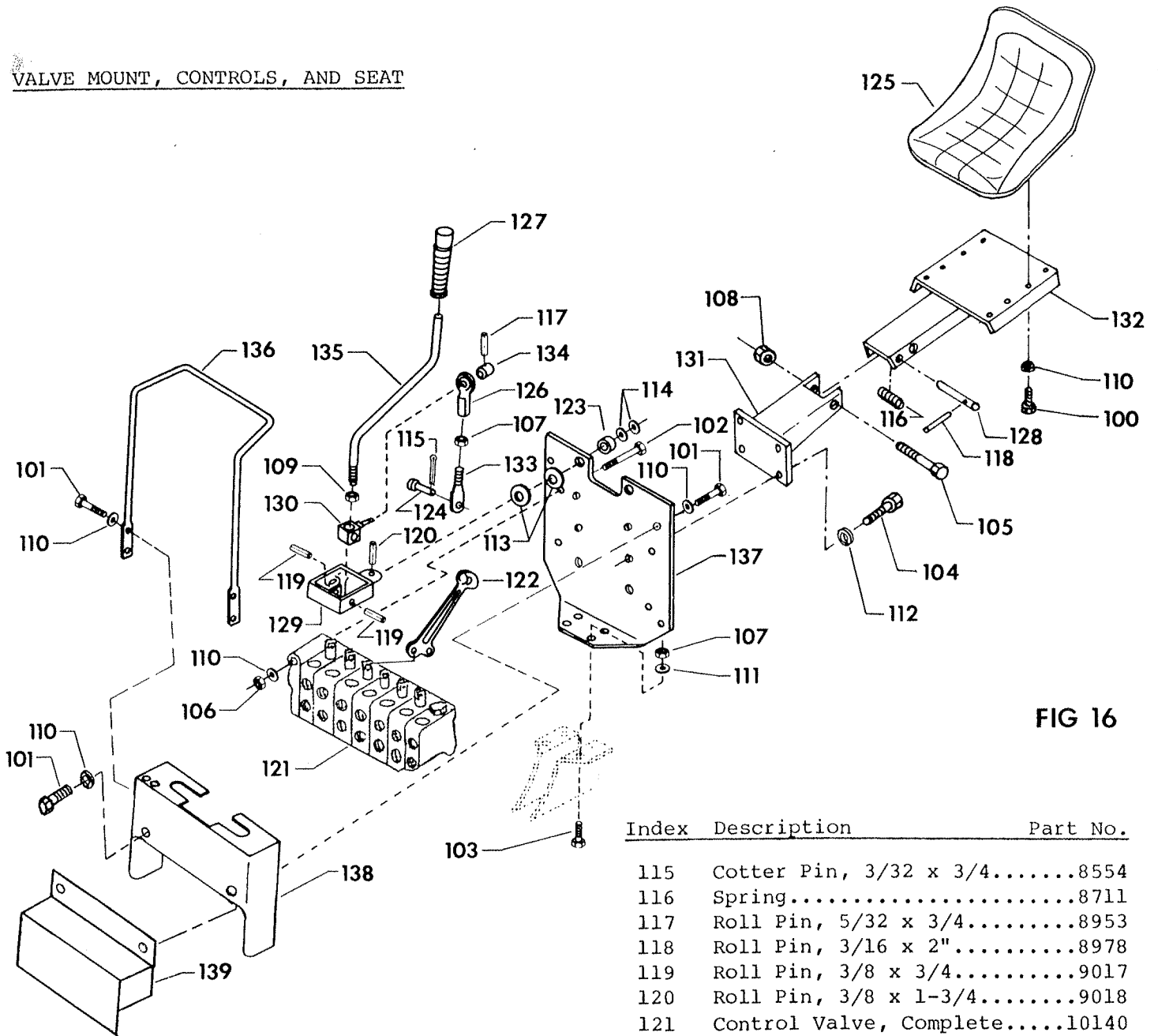


FIG 16

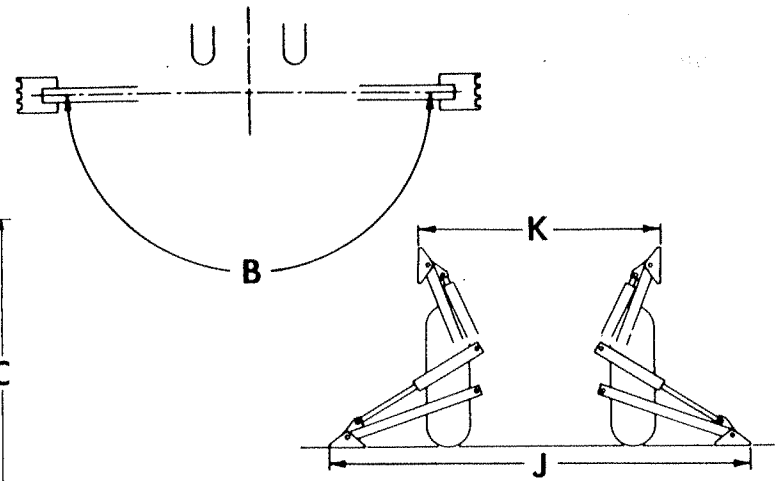
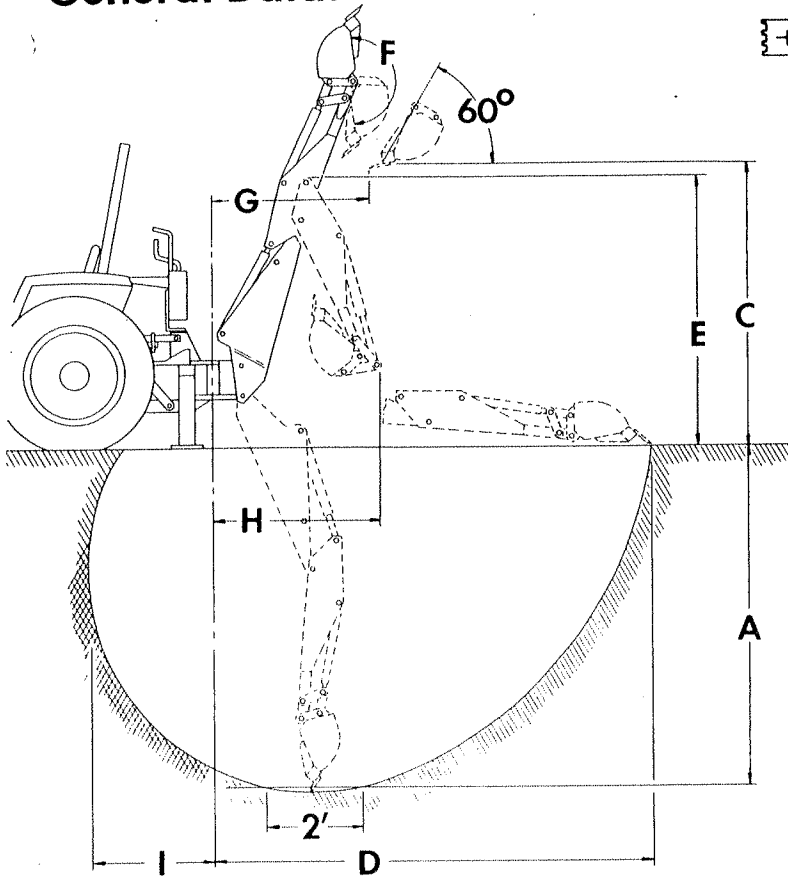
PARTS LIST - FIG 16

Index	Description	Part No.
100	Bolt, 5/16 NC x 3/4.....	6787
101	Bolt, 5/16 NF x 1".....	6795
102	Bolt, 5/16 NC x 2-3/4.....	6819
103	Bolt, 3/8 NF x 1-1/4 Gr 8....	6860
104	Bolt, 1/2 NF x 1".....	7012
105	Bolt, 5/8 NC x 5".....	7184
106	Nut, 5/16 NC.....	7431
107	Nut, 3/8 NF Gr 5.....	7461
108	Locknut, 5/8 NC.....	7532
109	Jam Nut, 1/2 NC.....	7666
110	Lockwasher, 5/16.....	8071
111	Lockwasher, 3/8.....	8079
112	Lockwasher, 1/2.....	8101
113	Flat Washer, 1" SAE.....	8203
114	Machine Bushing, 1-1/2 OD x 1" ID x 18 GA.....	8283

Index	Description	Part No.
115	Cotter Pin, 3/32 x 3/4.....	8554
116	Spring.....	8711
117	Roll Pin, 5/32 x 3/4.....	8953
118	Roll Pin, 3/16 x 2".....	8978
119	Roll Pin, 3/8 x 3/4.....	9017
120	Roll Pin, 3/8 x 1-3/4.....	9018
121	Control Valve, Complete.....	10140
122	Stabilizer Handle, Complete.	10144
123	Bronze Bushing, 1-1/4 OD x 1" ID x 1".....	11993
124	Clevis Pin, 1/4 Dia. x 7/8...	13436
125	Seat.....	13918
126	Ball Joint, 3/8 NF Female...	14029
127	Handle Grip.....	14071
128	Slide Pin.....	851988
129	Linkage Pivot Weldment.....	856160
130	Pivot Block Weldment.....	856165
131	Seat Bracket Weldment.....	856175
132	Seat Plate with pins and spring.....	856180
133	Handle Link.....	856226
134	Retainer Bushing.....	856227
135	Control Handle.....	856228
136	Handle Loop.....	856229
137	Valve Plate, less bearings.....	857115
138	Shroud Weldment.....	857185
139	Fitting Cover Weldment.....	857190

# SPECIFICATIONS

## General Data:



- E. Transport Height (maximum).....6' 9"
- F. Bucket Rotation.....180°
- G. Loading Reach.....3' 7"  
(bucket at 60°)
- H. Transport Overhang.....4' 0"
- I. Undercut.....2' 10"
- J. Stabilizer Spread,  
down position.....8' 3"
- K. Stabilizer Spread,  
up position.....4' 6"
- Maximum Lift Capacity -  
full reach.....400 lbs.
- Bucket Roll Force.....3200 lbs.
- Bucket Pry-Out Force.....  
.....in excess of 6000 lbs.
- Shipping Weight  
(less bucket).....1000 lbs.
- Hydraulic Volume  
Requirements.....5 to 7 GPM
- Hydraulic Pressure  
Requirements.....1900 psi

- A. Digging Depth.....8' 6"  
(two foot flat bottom)
- B. Swing Arc.....180°
- C. Loading Height.....6' 10"  
(bucket at 60°)
- D. Reach from Center Line of  
Swing Pivot.....11' 1"

## Bucket Data:

BUCKET	WIDTH	SAE STRUCK CAPACITY	HEAPED CAPACITY	SHIPPING WEIGHT
W35	12 in.	1.14 cu.ft.	1.74 cu.ft.	78 lbs.
W36	18 in.	1.75 cu.ft.	2.68 cu.ft.	97 lbs.
W37	24 in.	2.42 cu.ft.	3.71 cu.ft.	113 lbs.
W460	36 in.	3.77 cu.ft.	5.76 cu.ft.	150 lbs.
W461	40 in.	4.22 cu.ft.	6.41 cu.ft.	166 lbs.

## Cylinder Data:

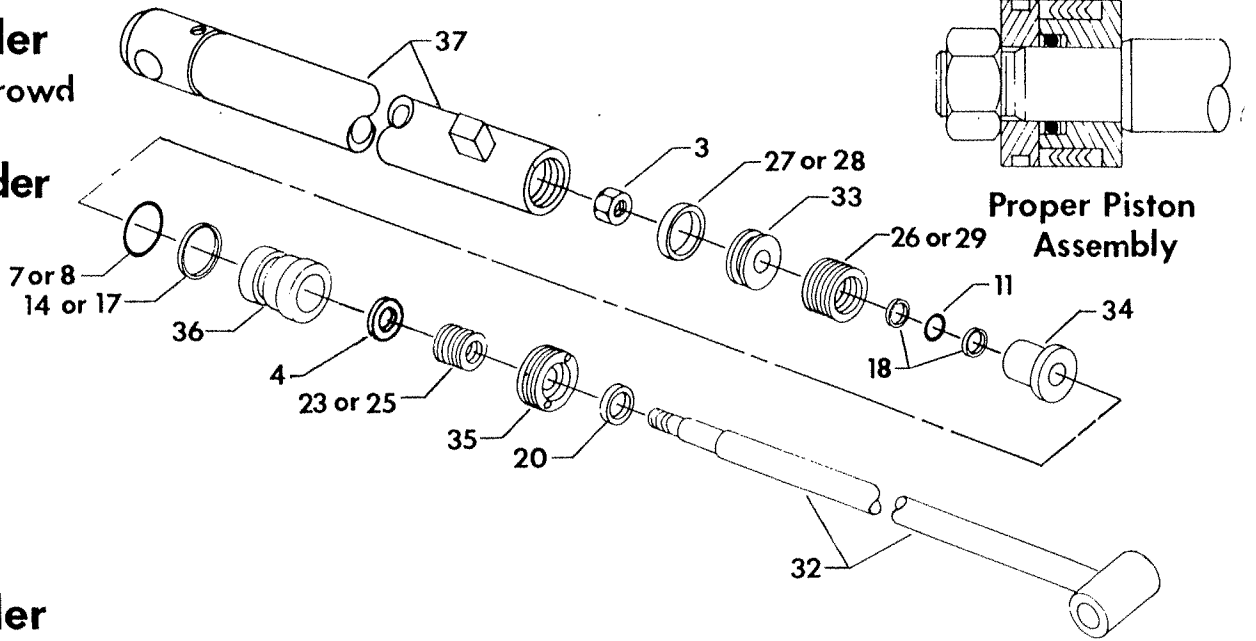
CYLINDER	PISTON DIA.	STROKE	RETRACTED LENGTH	EXTENDED LENGTH	ROD DIA.	PIVOT PIN DIA.	TYPE OF ACTION
097 - BOOM/DIPPER	2-1/2	21	31	52	1-1/4	1-1/4	DA
078 - BUCKET	2-1/4	18	26	44	1-1/4	1-1/2 Base 1-1/4 Rod	DA
122 - STABILIZER	2-1/2	15	22-1/16	37-1/16	1-1/2	7/8	DA
098 - SWING	3**	8-15/16	DNA***	DNA***	1	DNA***	SA

\*\* Effective area is 3" diameter less 1" diameter for rod, or 6.28 sq. in. (pull type cylinder).

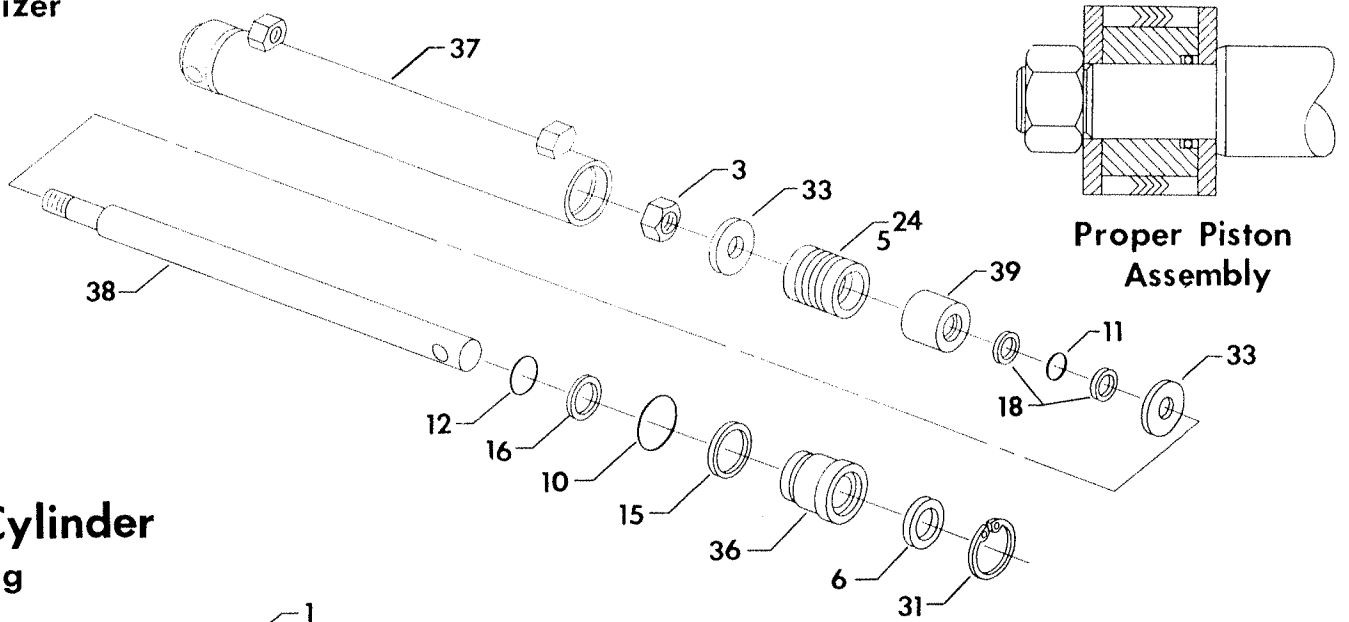
\*\*\* Spherical socket mounted cylinder.

**097 Cylinder**  
Lift and Crowd

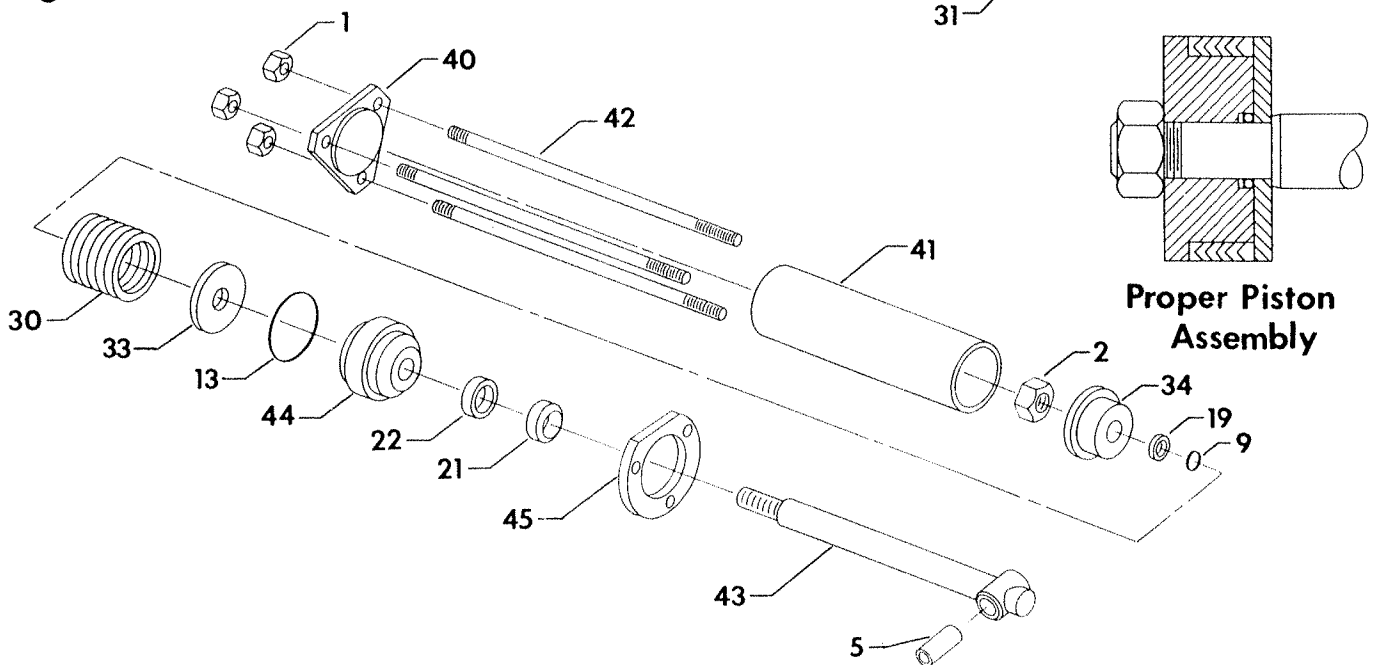
**078 Cylinder**  
Bucket



**122 Cylinder**  
Stabilizer



**098 Cylinder**  
Swing



# HYDRAULIC CYLINDERS - PARTS LIST

Index	Description	078:	097:	098:	122:
1	Lock Nut, 7/16 NF.....			7487	
2	Lock Nut, 3/4 NF Nyloc.....			7574	
3	Lock Nut, 7/8 NF Nyloc.....	7609	7609		7609
4	Washer, 1-3/4 OD x 1-1/4 ID Wavy Spring.....		*		
5	Chain Pin Bushing.....			11427	
6	Oil Seal, 1-7/8 OD x 1-1/2 ID.....				*
7	O-Ring, 2-1/4 OD x 2-1/16 ID.....	*			
8	O-Ring, 2-9/16 OD x 2-3/8 ID.....		*		
9	O-Ring, 1" OD x 3/4 ID.....			*	
10	O-Ring, 2-1/2 OD x 2-5/16 ID.....				*
11	O-Ring, 1-1/4 OD x 1" ID.....	*	*		*
12	O-Ring, 1-3/4 OD x 1-1/2 ID.....				*
13	O-Ring, 3" OD x 2-3/4 ID.....			*	
14	Back-Up Ring, 2-1/4 OD x 2-1/16 ID.....	*			*
15	Back-Up Ring, 2-1/2 OD x 2-5/16 ID.....				*
16	Back-Up Ring, 1-3/4 OD x 1-1/2 ID.....				
17	Back-Up Ring, 2-1/2 OD x 2-3/8 ID.....		*		
18	Back-Up Ring, 1-1/4 OD x 1" ID.....	*	*		*
19	Back-Up Ring, 1" OD x 3/4 ID.....			*	
20	Oil Seal, 1-5/8 OD x 1-1/4 ID.....	*	*		
21	Oil Seal, 1-3/8 OD x 1" ID.....			*	
22	Rod Seal, 1-3/8 OD x 1" ID.....			*	
23	Packing Assembly, 1-3/4 OD x 1-1/4 ID.....	*			*
24	Packing Assembly, 2-1/2 OD x 2" ID.....				
25	Packing Assembly, 1-3/4 OD x 1-1/4 ID.....		*		
26	Packing Assembly, 2-1/4 OD x 1-3/4 ID.....	*			
27	Wear Ring, 2-1/4 OD x 2" ID.....	*			
28	Wear Ring, 2-1/2 OD x 2-1/4 ID.....		*		
29	Packing Assembly, 2-1/2 OD x 2" ID.....		*		
30	Packing Assembly, 3" OD x 2-1/2 ID.....			*	
31	Retaining Ring, Internal.....				*
32	Piston Rod Weldment.....	904910	905405		
33	Washer.....	904916	905179	906229	905126
34	Piston with O-Ring and Back-Ups.....	904920	905175	906225	
35	Gland Cap.....	904918	905178		
36	Gland with O-Rings and Back-Ups.....	904925	905220		905420
37	Cylinder Tube Weldment.....	904935	905395		905410
38	Piston Rod.....				905421
39	Piston Spacer with O-Ring and Back-Ups.....				905425
40	End Plate.....			906088	
41	Cylinder Tube.....			906216	
42	Bolt.....			906217	
43	Piston Rod Assembly with Bushing.....			906220	
44	End Cap.....			906226	
45	Nut Plate.....			906228	
	For Complete Cylinder, order.....	078	097	098	122
	Seal Repair Kit (includes all Packings, Wear Rings, O-Rings, Back-Up Rings, and seals for one cylinder).....	904930	905045	906230	905430

\* Not available as a separate repair part - order seal repair kit.



**ARPS MANUFACTURING, INC.**

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