

SHOP MANUAL

BINDER

**ROLLER
GRADER**

GALION MANUFACTURING COMPANY, Galion, Ohio 44833, U.S.A.

a Jeffrey Galion Inc. Company

FILE

E

SECTION

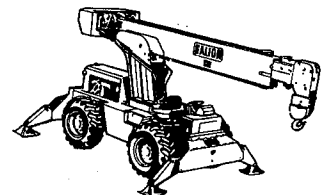
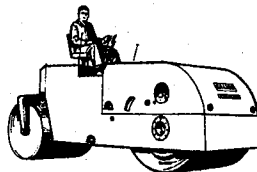
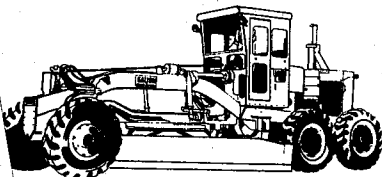
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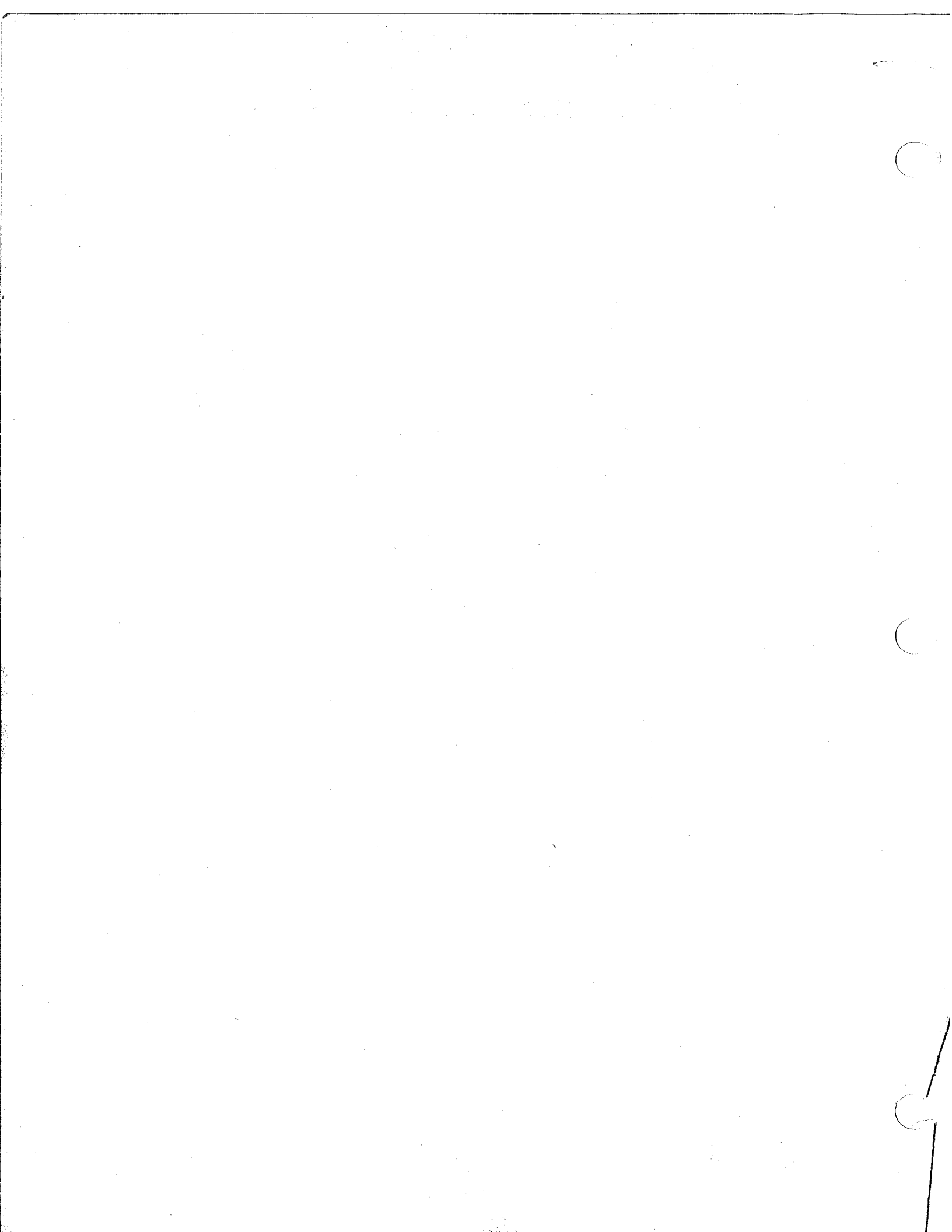
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THE INSTRUCTIONS APPLY TO THE HYDRAULIC CYLINDERS AS USED ON GALION GRADERS AND ROLLERS.

These Hydraulic Cylinders can be divided into six basic groups. They are listed and discussed individually in the approximate order they have been used on various models of graders and rollers.

The maintenance and repair of these cylinders consists chiefly of replacing cylinder packing cups and piston rod packing.





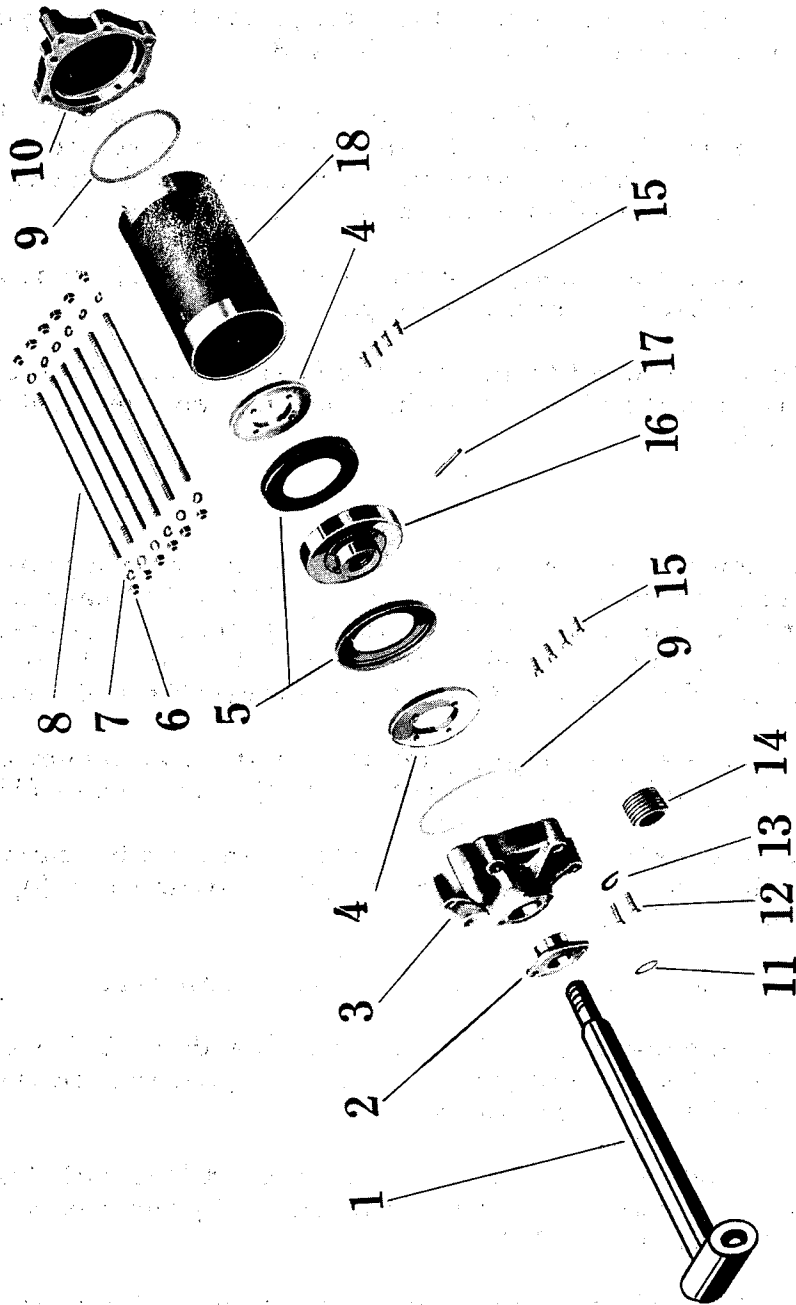
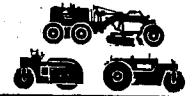


Plate I
Staybolt Type Cylinder



STAYBOLT TYPE CYLINDER

Two cast iron removable cylinder heads and threaded cast iron piston.

Disassembly:

1. Remove nuts (6) and washers (7) and staybolts (8) from cylinder head (3). Pull piston and rod assembly from cylinder (18).
2. Remove piston lock pin (17) from piston (16) and rod (1). Remove four wired capscrews (15) from piston (16). Remove piston cup retainer (4) and piston cup (5). Piston cup retainer and capscrews on piston rod (1) end of assembly may be loosened at this time and allowed to remain on piston rod.
3. Hold piston rod (1) securely and unscrew piston (16) from rod. Use care not to break off castellations used to lock piston to rod.
4. After piston is removed from rod, the gasket (11), cylinder head (3), gasket (9), packing (14), and gland (2) assembly may be removed and disassembled from cylinder head.

Assembly:

5. Inspect all elements for serviceability. Starting with piston rod (1), assemble cylinder head components in this order: Gland (2), packing (14), cylinder head (3), gasket (9), cup retainer (4), cup (5), piston rod gasket (11), and piston (16) tightened on rod and with lock (17) inserted in rod. Do not back piston off to insert lock pin. If necessary to do so, disassemble and replace gasket (11).
6. After making the above setup, push piston and rod assembly through cylinder (18) and install cup packing (5), cup retainer (4), capscrews (15), and tie with wire.
7. Now lubricate packing cup and push into cylinder with care. Travel piston to rod end of cylinder and install second cup (5), cup retainer (4), and capscrews (15). Tie capscrews with wire.
8. Lubricate piston cup and push into cylinder with care.
9. Carefully place gasket (9) in both cylinder heads (3 & 10) and fit heads over cylinder. Insert staybolts (8). Install nuts (6) and lockwashers (7) and torque staybolt nuts 67 to 80 foot-pounds.
10. Install piston rod packing (14) in cylinder head (13) with lip of packing toward hydraulic oil pressure. Slide packing gland (2) against packing (14) and secure in place with capscrews (12).
11. After installation of cylinder on machine, adjust piston rod packing tension by use of capscrews (12) to a point of eliminating oil leakage at the piston rod. A light film of oil on the piston rod is beneficial. DO NOT OVER-TIGHTEN.
12. Tie each drilled capscrew (12) with wire. It is suggested that the wire be run under the ear of the gland and through the hole in the capscrew. Twist wire ends together to retain capscrew.

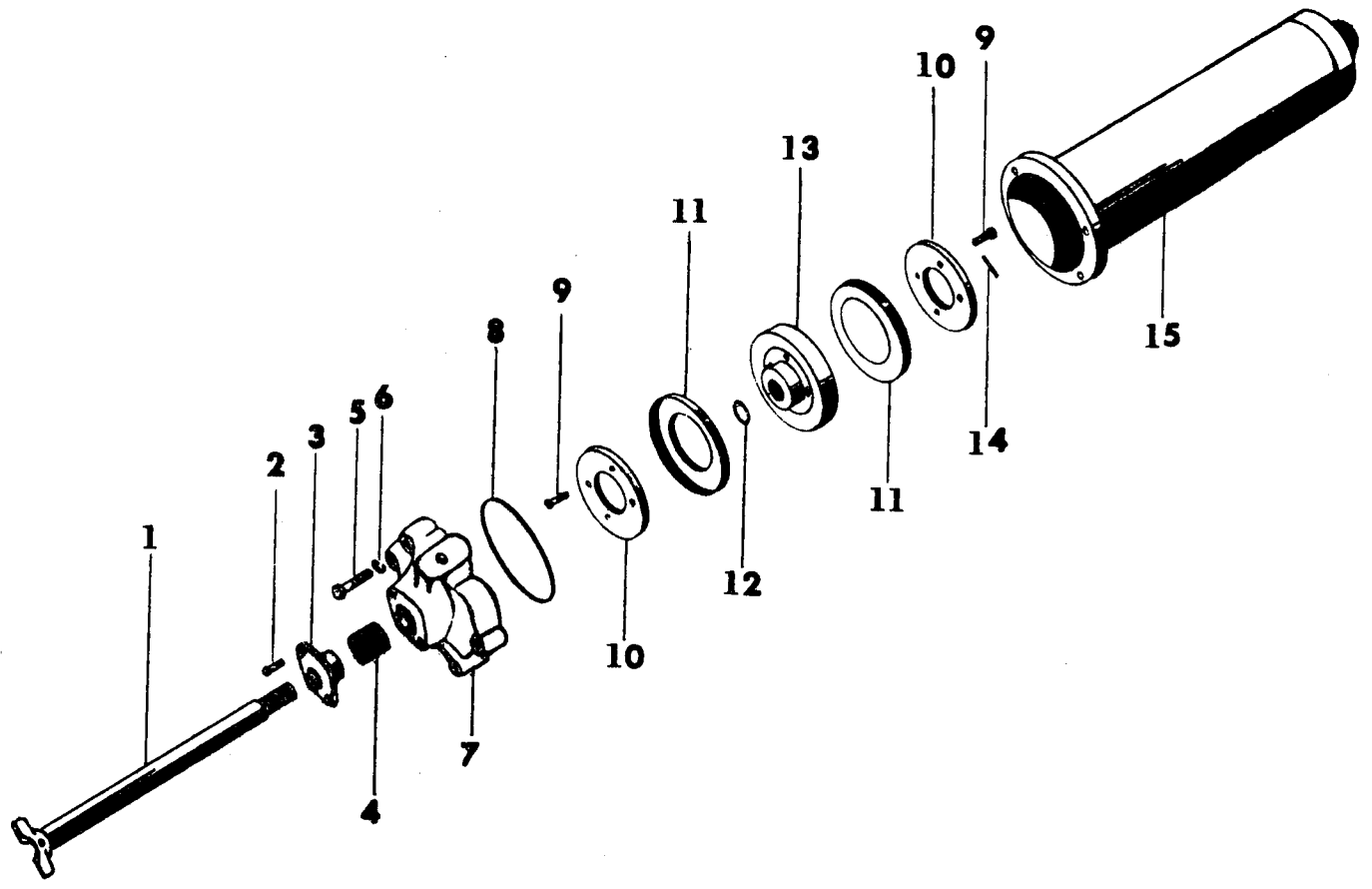


Plate II
Removable Single Cast Head Type Cylinder
With Screw Type Piston



REMOVABLE SINGLE CASE HEAD TYPE CYLINDER
WITH SCREW TYPE PISTON

Threaded cast iron piston.

Remove cylinder assembly from unit.

Disassembly:

1. Remove capscrews (5) securing cylinder head (7) to lower cylinder head and barrel assembly (15).
2. Pull piston, rod, and head assembly from cylinder.
3. Remove piston lock pin (14) from piston and rod.
4. Remove piston cup retainer capscrews (9), retainer (10), and cup (11) from piston (13) (both sides of piston).
5. Hold piston rod (1) and screw piston (13) off. Use care and do not damage or break castellations from piston.
6. Slide piston rod (1) from cylinder head (7) and remove packing gland capscrews (2), packing gland (3), and packing (4).

Assembly:

7. Install the following items on the piston rod (1) in this order: Packing gland (3), piston rod packing (4), cylinder head (7), "O" ring (8), cup retainer (10) lip toward head, copper gasket (12) on threaded end of piston rod. Now, screw piston on rod, line up with lock hole, and install piston lock pin (14).
8. Assemble both piston cups (11), retainers (10) on piston and secure in place with capscrews (9). Tie each set with wire.
9. Using piston installing tool, part no. D-44224 for 5-1/2" cylinders or D-44223 for 4-1/2" cylinders, install piston assembly in cylinder.
10. Place "O" ring (8) in cylinder head and install on cylinder (s) with care. Hold in place with capscrews (5) and lockwashers (6).
11. Install packing (4) in head (7) and secure in place with packing gland (3) and capscrews (2).
12. After installation of cylinder on machine, adjust packing tension by use of capscrews (2) to a point of eliminating oil leakage at the piston rod. A light film of oil on the piston rod is beneficial. DO NOT OVER-TIGHTEN.
13. Tie each drilled capscrew (2) with wire. It is suggested that the wire be run under the ear of the gland (3) and through the hole in the capscrew. Twist wire securely to retain capscrew.

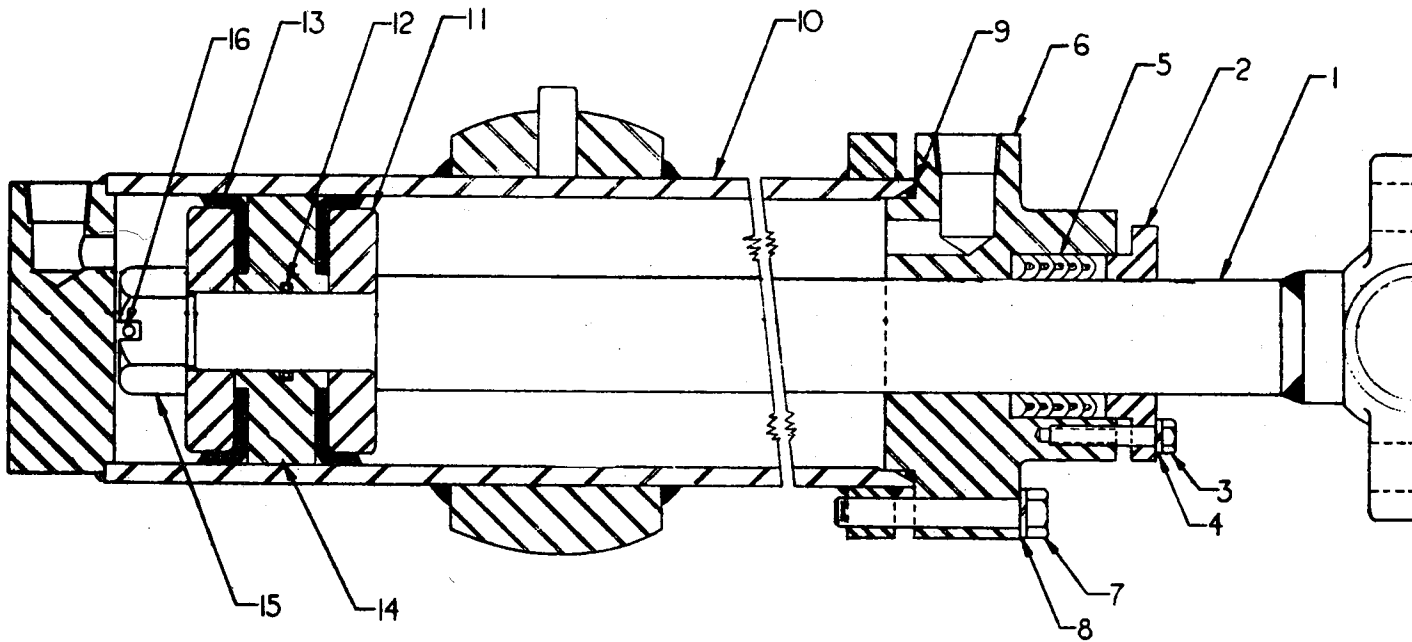
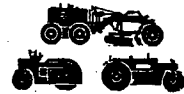


Plate III
Removal Single Cast Head Type Cylinder
With Nut Retained Piston



REMOVABLE SINGLE CASE HEAD TYPE CYLINDER
WITH NUT RETAINED PISTON

With steel piston retained by nut.

Major servicing performed with cylinder assembly removed from grader or roller.

1. Remove capscrews (7) and lockwashers (8) from cylinder head (6). Separate head from welded cylinder assembly (10) and pull piston rod assembly from cylinder.
2. Remove cotter pin (16) from nut (15). Unscrew nut (15) and remove from piston rod assembly (1).
3. Remove packing cup retainer (11), packing cup (13), piston (14), and "O" ring (12), packing cup (13), and packing cup retainer (11) from piston rod (1).
4. Remove capscrews (3) and lockwashers (4) from cylinder head (6). Packing gland (2) and piston rod packing (5) may now be removed from cylinder head (6). Cylinder head may now be removed from piston rod assembly.

Assembly:

5. Inspect all elements for serviceability. Starting with piston rod assembly (1), install components in this order: Packing gland (2), piston rod packing (5), cylinder head (6), "O" ring (9), packing cup retainer (11), packing cup (13), piston (14) with "O" ring (12) previously installed. Install second packing cup (13) and packing cup retainer (11). Install nut (15). Tighten securely and install cotter pin (16).
6. After making the above setup, lubricate both packing cups (13) and carefully insert assembled piston in welded cylinder assembly (10).
7. Place "O" ring (9) in position on cylinder head and install head on cylinder assembly.
8. Install capscrews (3) in head with lockwashers (4) and tighten cylinder head evenly. Torque $3/8$ capscrews 26 to 32 foot-pounds.
9. Install piston rod packing (5) in cylinder head (6). Place packing gland (2) in position and install capscrews (2).
10. After installation of cylinder assembly on unit, adjust piston rod packing tension by use of capscrews (3) to a point of eliminating all leakage at the piston rod. A light film of oil in the piston rod is beneficial. DO NOT OVER-TIGHTEN.
11. If capscrews (3) are drilled for tie wire, it is suggested that the wire be run under the ear of the gland and through the hole in the capscrew head. Twist wire ends together to retain capscrew.

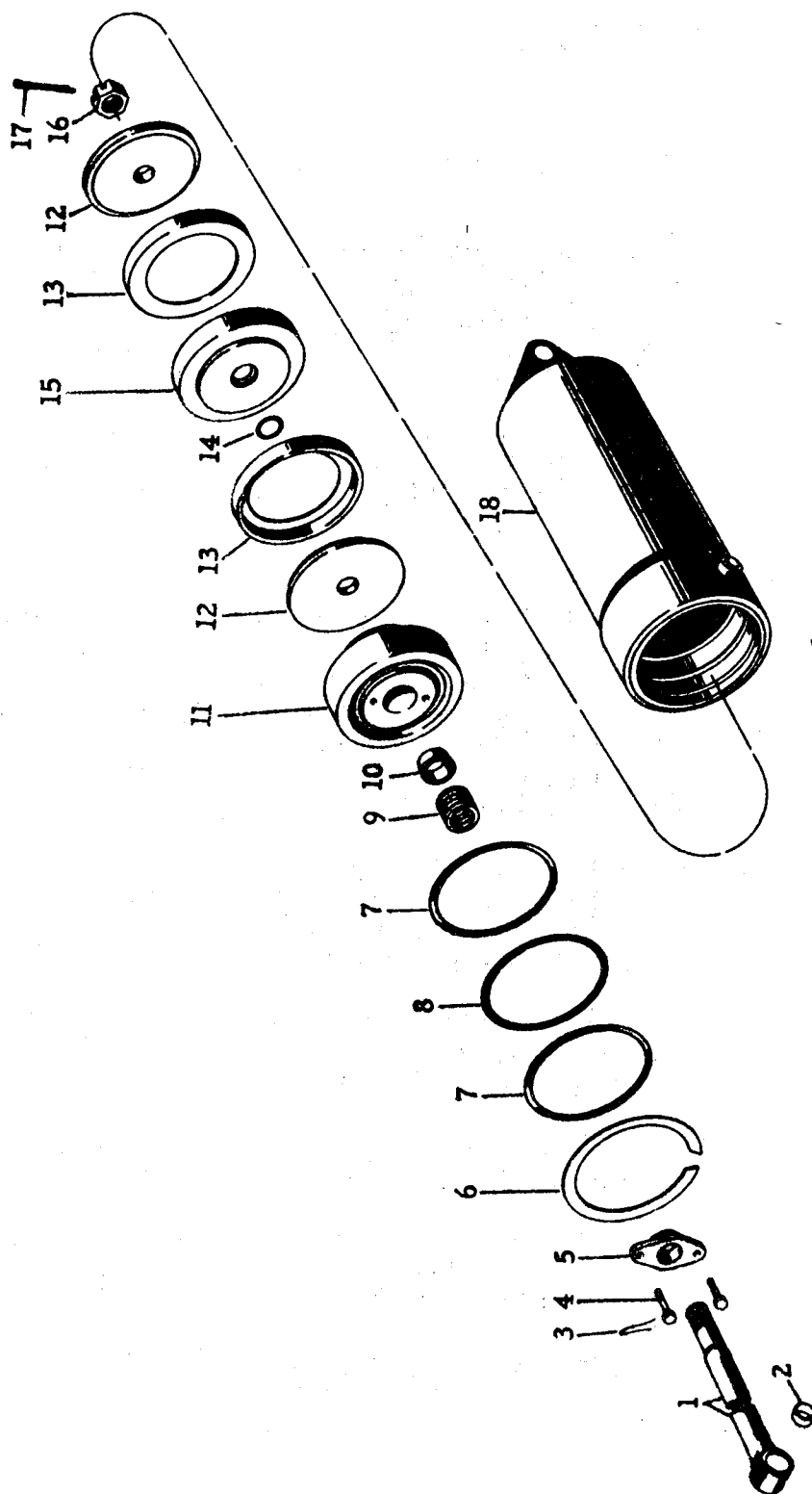


Plate IV
Welded Type Cylinder



WELDED TYPE CYLINDER

With head retained by snapping.

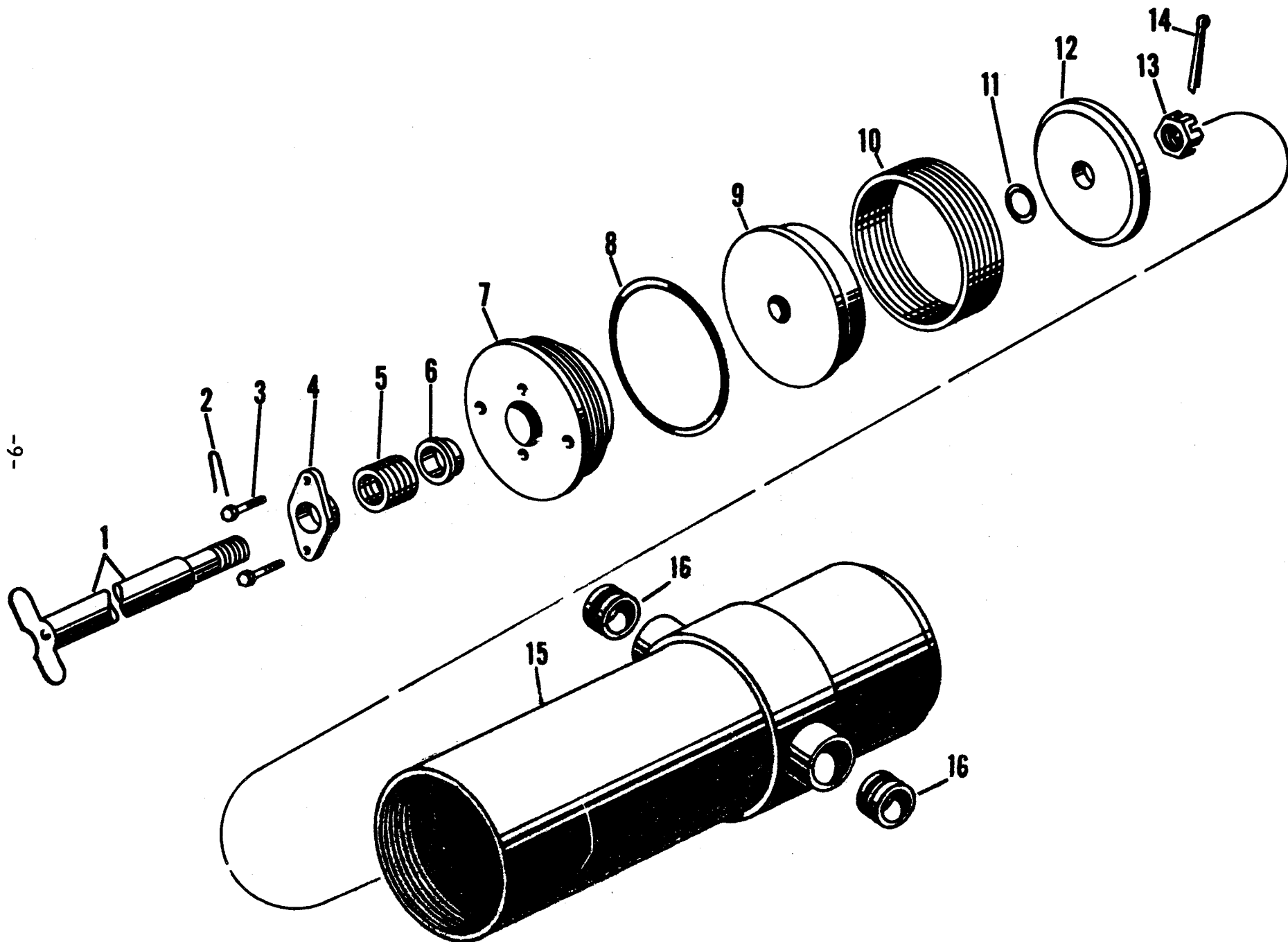
Remove cylinder assembly from unit.

Disassembly:

1. Remove snapping (6) from cylinder assembly (18). Pull piston rod (1) assembly from cylinder assembly (18).
2. Remove cotter pin (17) from piston rod (1) and unscrew nut (16) from piston rod. Packing cup retainer (12), its packing cup (13), and the piston (15) may be removed. Note position of "O" ring (14) in piston at time of removal. Piston packing cup (13) and piston packing retainer (12) may be removed at this time. Remove back up rings (7) and "O" ring (8) at this point.
3. Remove cylinder head (11) from piston rod (1). Disassemble head by removing packing gland tie wire (3), capscrews (4), packing gland (5), and packing (9) from head. Inspect bushing (10) and if not serviceable, press out of cylinder head.

Assembly:

4. Inspect all elements for serviceability. Renew bushing (1) in cylinder head if necessary. Starting with the piston rod, install components in this order: Place packing gland (5) on piston rod (1), then piston rod packing (9). Install cylinder head (11), back up leather (7), "O" ring (8), second back up leather (7), packing cup retainer (12), packing cup (13), piston (15) with "O" ring (14) installed in recess on piston. Next, place the second packing cup (13) on the rod and follow with packing cup retainer (12). Install nut (16). Tighten securely and install cotter pin (17).
5. This piston assembly is quite difficult to install in cylinder assembly due to shoulders and snapping grooves in the mouth of the cylinder. It is recommended that cylinder tool D-44227 be used. Insert tool in mouth of cylinder, lubricate piston packing cups and push piston assembly into cylinder assembly.
6. Install one back up leather (7) against deepest shoulder. Install "O" ring (8) against backup leather. Install second back up leather (7) against "O" ring and push cylinder head in place with care. Install snapping in its groove behind piston.
7. Piston rod packing is now installed in cylinder head. Packing gland (5) is moved into position and secured in place by drilled capscrews (4).
8. After installation of cylinder assembly on machine, adjust piston rod packing tension by use of capscrews (4) to a point of eliminating oil leakage at the piston rod. A light film of oil on the piston rod is beneficial. DO NOT OVER-TIGHTEN.
9. In lacing tie wire through capscrews, it is suggested that the wire be run under the ear of the packing gland and through the hole in the capscrew head. Twist wire ends together to retain capscrew.



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Plate V
Screw Head Type Cylinder

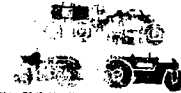
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SHOP



MANUAL





SCREW HEAD TYPE CYLINDER

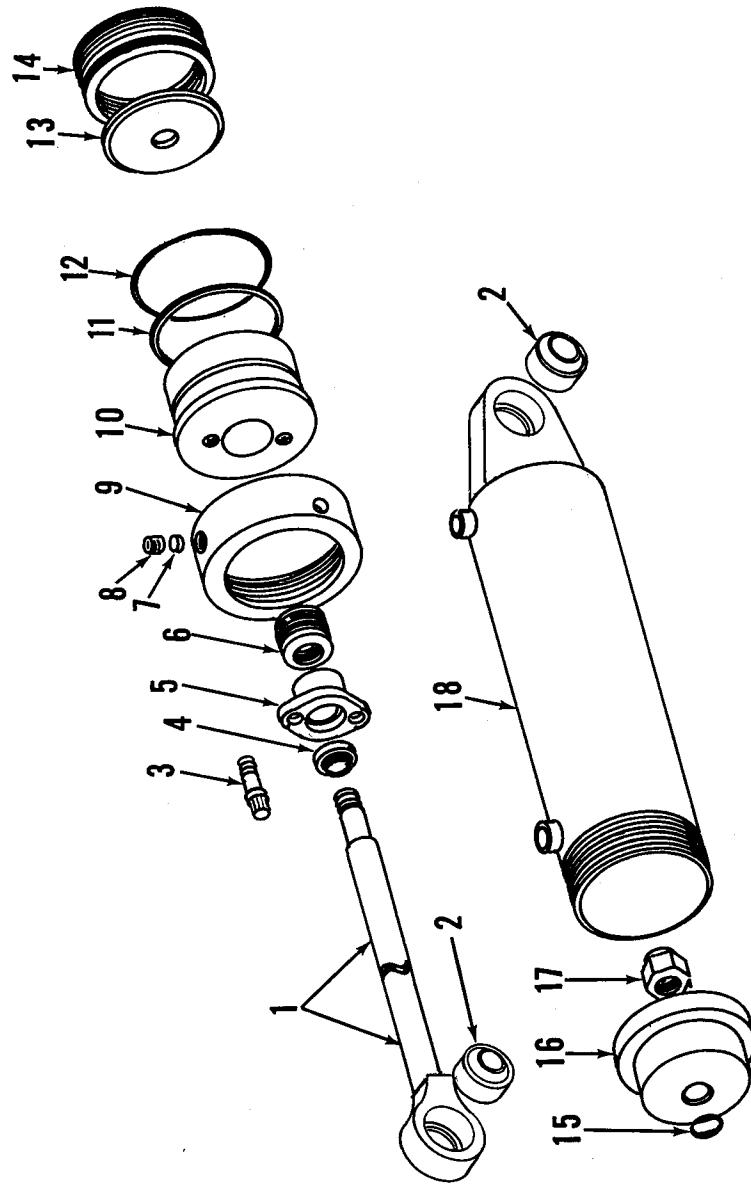
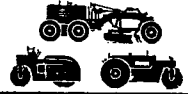
With multiple ring piston packing.

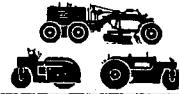
Remove cylinder assembly from machine. Grader moldboard left cylinder shown.

1. With spanner wrench SA-53377, unscrew cylinder head assembly (7) from the cylinder assembly (15). NOTE: In using spanner wrench SA-53377, use pin furnished with wrench to insert in opposite hole so wrench will not bear against packing gland (4).
2. Remove piston rod assembly (1) from cylinder assembly (15) and disassemble. Remove cotterkey (14) from nut (13) and piston rod. Remove piston plate (12) and piston (9) from piston rod. Note position of "O" ring (11) prior to removal. Piston packing (10) may now be removed from piston (9).
3. Remove cylinder head (7) with "O" ring (8) from piston rod (1). Disassemble cylinder head at this time. Remove tie wires (2) from drilled capscrews and remove capscrews and packing gland (4). Now packing (5) can be removed. Inspect bushing (6) if worn, remove and replace.
4. In the case of the moldboard left cylinder shown, inspect bushing (16) for wear. Replace at this time if required.

Assembly:

5. Inspect all elements for serviceability. Renew bushing (6) in cylinder head if not previously done. Starting with piston rod assembly (1), install components in this order: Packing gland (4), piston rod packing (5), cylinder head assembly (7) with bushing (6) installed, "O" ring (8), piston (9) with packing (10) installed. With care, install "O" ring (11) in recess in piston (9). Replace piston plate (12) and nut (13). Tighten securely and install cotter pin (14).
6. Lubricate packing (10) and install piston assembly in cylinder assembly.
7. Lubricate "O" ring (8) on piston. Inspect piston and cylinder for burrs or nicks in the area of the "O" ring (8) seat. Remove burrs, etc. if present. Screw piston into cylinder assembly and tighten with spanner wrench.
8. Piston rod packing is now installed in cylinder head. Packing gland (4) is moved into position and secured in place by drilled capscrews (3).
9. After installation of cylinder assembly on machine, adjust piston rod packing tension by use of capscrews (3) to a point of eliminating oil leakage at the piston rod. A light film of oil is beneficial. DO NOT OVER-TIGHTEN.
10. In lacing tie wire through capscrews, it is suggested that the wire be run under the ear of the packing gland and through the hole in the capscrew. Twist wire ends together to retain capscrew.





EXTERNAL SCREW HEAD CYLINDER

Remove cylinder from machine, leaning wheel cylinder shown.

1. Remove two 3/8" x 3/8" N.C. flat point socket head set screws item (8) and two brass plugs item (7).
2. With spanner wrench, AH 53377-A, unscrew cylinder head item (9) from cylinder assembly item (18). Note in using spanner wrench insert pin D 53375 (found in tool kit) in opposite hole. Remove cylinder head.
3. Remove piston rod assembly item (1) from cylinder item (18) and disassemble. Remove selflocking nut (17), piston (16), packing (14), piston plate (13), "O" ring (12), backup washer (11) and ring (15).
4. Remove packing gland screws (3), gland (5), packing (6), wiper (4) and remove head (10).
5. Inspect spherical ball bushing (2) in piston rod (1) also ball bushing (2) in cylinder (18). If worn remove and replace.

Assembly:

6. Inspect all components for serviceability. Install wiper (4) in gland (5), install on rod (1), install new rod packing (6), install head (10), new rings (11) & (12) piston plate (13). A new "O" ring (15) should be installed. With new packing (14) mounted on piston (16) install on rod. Examine nut (17) if not serviceable, replace. Install and tighten adequately.

Lubricate with hydraulic oil and install in cylinder (18), install head (9) and tighten adequately with spanner wrench. Install brass plugs (7) and setscrews (8) and tighten. Install screws (3) in gland (5). Only tight enough to hold in place.

7. After installation on machine adjust piston rod packing by use of screws (3) to the point of elimination of oil leakage. A film of oil is beneficial. Do not over-tighten.