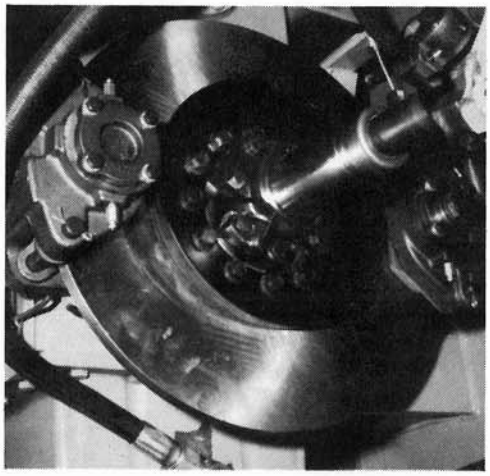
T.M.

STEIGER®

DUAL CALIPER, SINGLE DISC BRAKE SYSTEM

LATE ST +PT/PTA

SERVICE MANUAL



IMMEDIATE ACTION LETTER REFERENCE:

No/Date

1_____ 4_____ 7_____

2_____ 5_____ 8_____

3_____ 6_____ 9_____

SERVICE BULLETIN REFERENCE:

No/Date

1_____ 4_____ 7_____

2_____ 5_____ 8_____

3_____ 6_____ 9_____

SERVICE NEWS REFERENCE:

No/Date

1_____ 4_____ 7_____

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37-106 (5-82)

Contents

Suggested Safety Practices

The nature of every type of service that you do demands that you pay attention to your work all of the time. Unlike machines, you have the ability to think and reason to avoid serious risk you cannot afford. In the instructions that follow you should apply some of these standard precautions.

- Place the tractor in a properly equipped work area which has been furnished with the needed tooling. For example, overhead hoists and chains rated to lift and carry the components you work on.
- Clean the tractor before working on it. It will be safer and easier to service.
- Let the tractor cool if needed before working on it, or begin working on a non-affected area of the tractor.
- Keep your workspace organized. A cluttered shop is dangerous and will reduce your efficiency.
- Remove the key so the engine cannot be started accidentally. If you don't, you may be inviting trouble.
- Prevent tractor movement - block the wheels. Perform the following operations on a level surface only!
- Follow approved methods described herein for a successful job.
- Avoid wearing jewelry and loose clothing. They can cause you to have a serious accident.
- Always have a fire extinguisher available and in operating order. Know how to use it.
- Handle heavy parts with proper lifting fixtures and with a lot of respect!
- If cutting must be done with a torch, wear face, eye and clothing protection intended for such work. Remove and/or protect against any flammable materials.
- DO NOT work on the tractor with the engine running unless specifically instructed to do so.
- DO NOT allow bystanders to linger near your work. They may be unaware of hazards.
- Be sure someone can help in an emergency. On a very involved project it may be unwise to work alone.
- NEVER operate the tractor without brakes.
- DO NOT allow inexperienced personnel to operate, service or repair equipment.

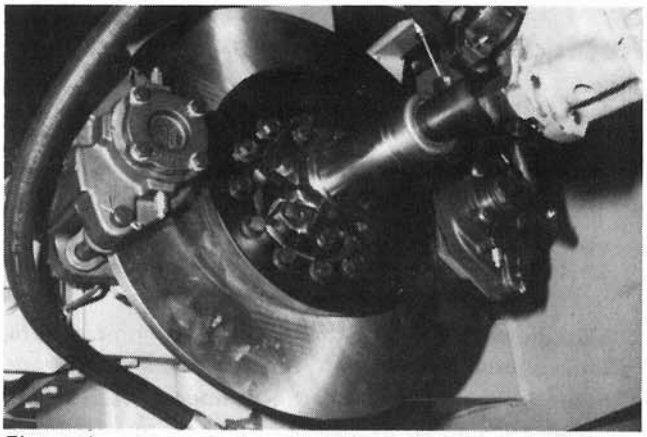

Figure 1:

"ST" PT/PTA Bearcat, Cougar & Panther Dual Caliper, Single Disc Brakes

General

Beginning with March, 1982 tractor production the subject model tractor brakes were changed from multi-disc brakes to the dual caliper single disc style brake.

The brake mounting is on the front lower transfer case shaft. One caliper is a dual function brake; "parking" and "service". The opposite caliper is "service" brake only.

Specifications

Type: Single Disc, Dual Caliper - Hydraulially activated and self-adjusting
Location: Transfer Case front lower shaft
Size: 3/4 inch (19.05 mm) x 20 inch (50.8 cm)
Park Brake: Foot operated, cable actuated
Brake Fluid: DOT 3 or 5
Torque Specifications: Caliper Mount Capscrews 165 ft lb (224 N.m) Disc to Mount Flange Capscrews 65 ft lb (88 N.m)

Routine Maintenance

The routine maintenance presented here is suggested to keep the brake system in good working order.

1. Check fluid level in actuation system reservoir. Maintain fluid level to within 1/8 - 1/4 inch of the top.
2. Check that caliper mounting floating parts move freely and all other parts are mounted securely. Tighten hardware as required.
3. Check for hydraulic leaks and repair any that are found.
4. Check disc surface condition. Replace if it is badly warped or pitted.
5. Check and replace friction pads if worn to less than 1/32" (0.80 mm). Always replace both pads at the same time.
6. Check the brakes to see that they do not have too much travel or feel spongy. Adjust actuator, replace pads, bleed or add fluid as required.
7. Check disc to see that total lateral runout is within 0.010". Correct or replace disc if required.

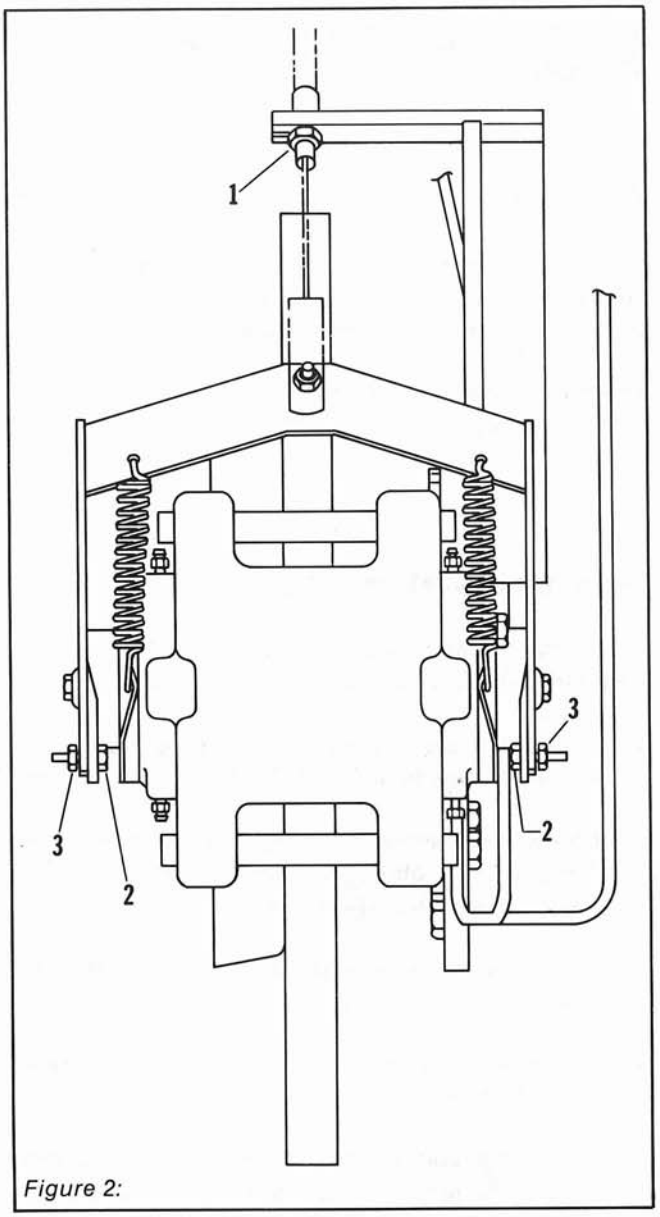

Figure 2:

Park Brake Adjustment:

Whenever new pads are installed or the calipers are removed and repaired, the brake must be cycled 20 times at a minimum 60 lb pedal force for initial parking brake adjustment. Adjust cable at cable mount (1) to allow levers to return to relaxed position when the brake is in the released position.

IMPORTANT: *Mating parts must move freely after lock nuts (3) are tightened. The capscrews (2) should be in the hole closest to the caliper lever pivot.*

Replacing Friction Pads

Friction pads are replaced in sets only. In the following paragraphs, the numbers in parenthesis correspond to callouts in the drawings. Refer to the drawings as the steps are performed.

1. Pull out both pad pins (2) and remove pad holders (1).

2. On the caliper without the integral parking brake, to make room for new pads, both pistons in the caliper must be pushed back into the cylinder bores. Remove reservoir cap so excess fluid can be removed and discarded as pistons are pushed back into the cylinder bores. Using a hardwood dowel, or the flat edge of a large screwdriver, work the pistons back into bores by carefully prying against old pads and disc.

IMPORTANT: *Take care not to mark face of disc or bend it.*

3. To replace the pads on the caliper with the integral parking brake will require the caliper unit be removed from the mounting surface.

4. After removal, to make room for new pads, each piston must be screwed back into its cylinder bore. Remove reservoir cap so excess fluid can be removed as pistons are being screwed back into the cylinder bores. Using a 1-5/16" socket wrench on hexagon boss in the end of the piston, rotate piston (20) clockwise until end of piston under extender is flush with dust boot (See Fig. 4).

NOTE: *The remaining two steps apply to both calipers.*

5. Install new pad holders (1).

6. With the unit(s) reassembled, apply brakes lightly several times to seat the new pads against the disc. Recheck reservoir fluid level.

NOTE: *See Park Brake Adjustment*

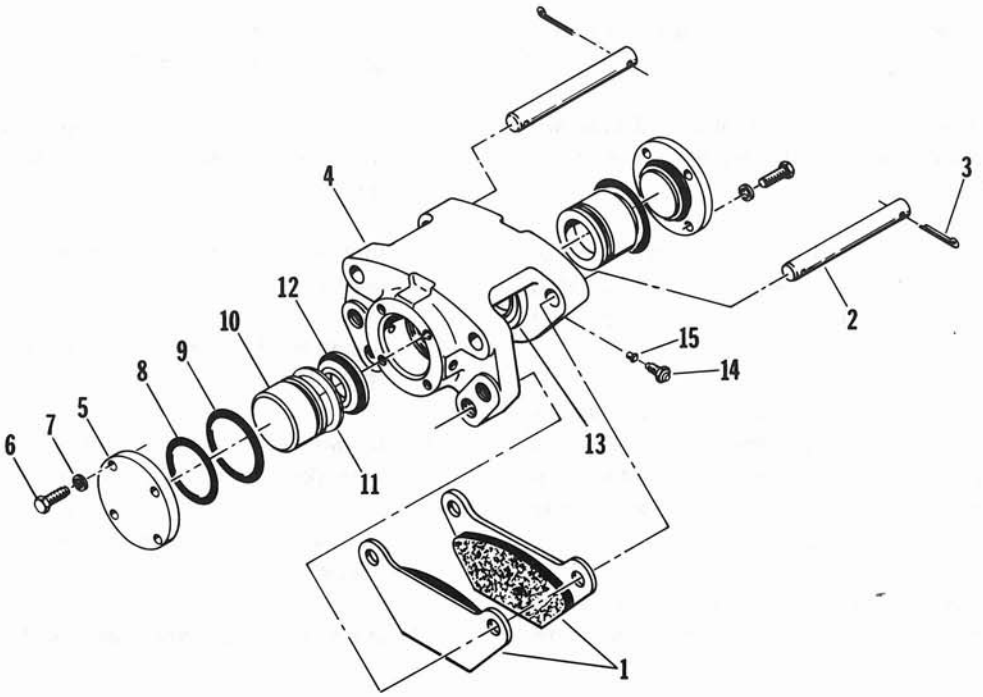

Figure 3:

FIGURE LEGEND — SINGLE FUNCTION

	Quantity
1. Pad Holder Assembly	2
2. Pin, Pad	2
3. Pin, Cotter	4
4. Casting, Caliper	1
5. Parking Brake Mount or End Cap	2
6. Hex Cap Screw	8
7. Washer	8
8. End Cap O-Ring	2
9. Piston Seal	2
10. Piston	2
11. Insulator	2
12. Insulator Retainer or Extender	2
13. Boot	2
14. Bleeder Screw	3
15. Tube Seat Insert	4

Caliper Disassembly

1. Detach hydraulic hoses and actuators from the brake unit(s) and remove the unit(s) from their mount.

2. Perform the disassembly on a clean work bench.

3. Open bleed screw (14) and drain brake fluid from caliper assembly.

CAUTION: When performing any work on the brake system always protect eyes from brake fluid.

4. Remove pad holders (1) by pulling out pins (2).

NOTE: *Disassemble parts from the mounting side of the caliper as follows. Note that the parts on the opposite side are similar and are taken apart the same way.*

Disassembly of Caliper Without Integral Park Brake

1. Detach end cap(s) by removing four screws (6) and lockwashers (7). Remove and discard O-ring (8).

2. Remove piston (10) from casting (4) by pushing it through to the center of the caliper. Remove dust boot (13).

3. Remove piston extender (12) (if used) by using a 2-3/4" hose clamp with hex head screw to compress extender. Remove and discard old insulator (11).

4. Using a small wood or plastic stick, work out piston seal (9) from its groove in the cylinder bore and discard.

IMPORTANT: *To avoid scratching cylinder or burring edge of seal groove, do not use a metal tool such as a screwdriver.*

5. Repeat same procedure to remove components from opposite side of caliper.

Cleaning and Inspection

Check all parts for wear or damage. Replace any found defective.

1. Clean all parts with denatured alcohol and wipe dry with a clean, lint free cloth. Using compressed air, blow out all passages and bores.

2. Inspect casting cylinder bores for scoring, pitting or corrosion. A corroded or deeply scored casting should be replaced; light scores and stains may be removed.

3. Polish any discolored or stained area with crocus cloth only. Use finger pressure and rotate the crocus cloth in the seal groove. Do not slide the cloth in and out of the groove under pressure. Do not use any other kind of abrasive or abrasive cloth.

4. Clean piston with denatured alcohol and wipe dry with clean, lint free cloth. Using compressed air, blow dry.

5. Check inlet and bleeder hole threads for damage.

6. Inspect seat insert (15) for damage and replace if necessary.

Assembly (Single Function Caliper)

Reassembly is basically the reverse of disassembly. Be sure that all parts are clean and serviceable before reassembling the unit.

1. Lubricate the dust boot (13) with clean brake fluid and install in groove in cylinder bore. Gently work into place with finger pressure until seated properly.

2. Lubricate cylinder bore and piston (10) with clean brake fluid. Install piston (10) from outside of caliper, into cylinder bore through dust boot (13) until parking end of piston is just past seal groove.

3. Lubricate and install piston seal (9) into its groove in cylinder bore.

4. Using a "C" clamp and spacer block, squeeze piston (10) the rest of the way back into the cylinder bore. The piston should be flush with the boot (13). Avoid cocking piston in bore and do not use excessive force.

NOTE: *For brakes with piston extenders, install insulator over extender. Then, snap piston extender onto piston. In some cases a 2-3/4 inch hose clamp may be required to compress extender.*

5. Coat O-rings (8) with clean brake fluid and install in groove on end cap (5).

6. Install end cap (5). Use four screws (6) and lockwashers (7), torque screws to 30-35 ft lb (41-47 N.m) dry.

7. Install the four tube seat inserts (15) into the bleeder inlet holes.

8. Install the bleeder screws (14) and torque 6-15 ft lb (8-20 N.m) dry.

9. Install pad holders (1) and secure in place with pad pins (2) and cotter pins (3).

10. Remount brake assembly and connect hose or line to caliper.

11. Bleed brake system (see bleeding instructions).

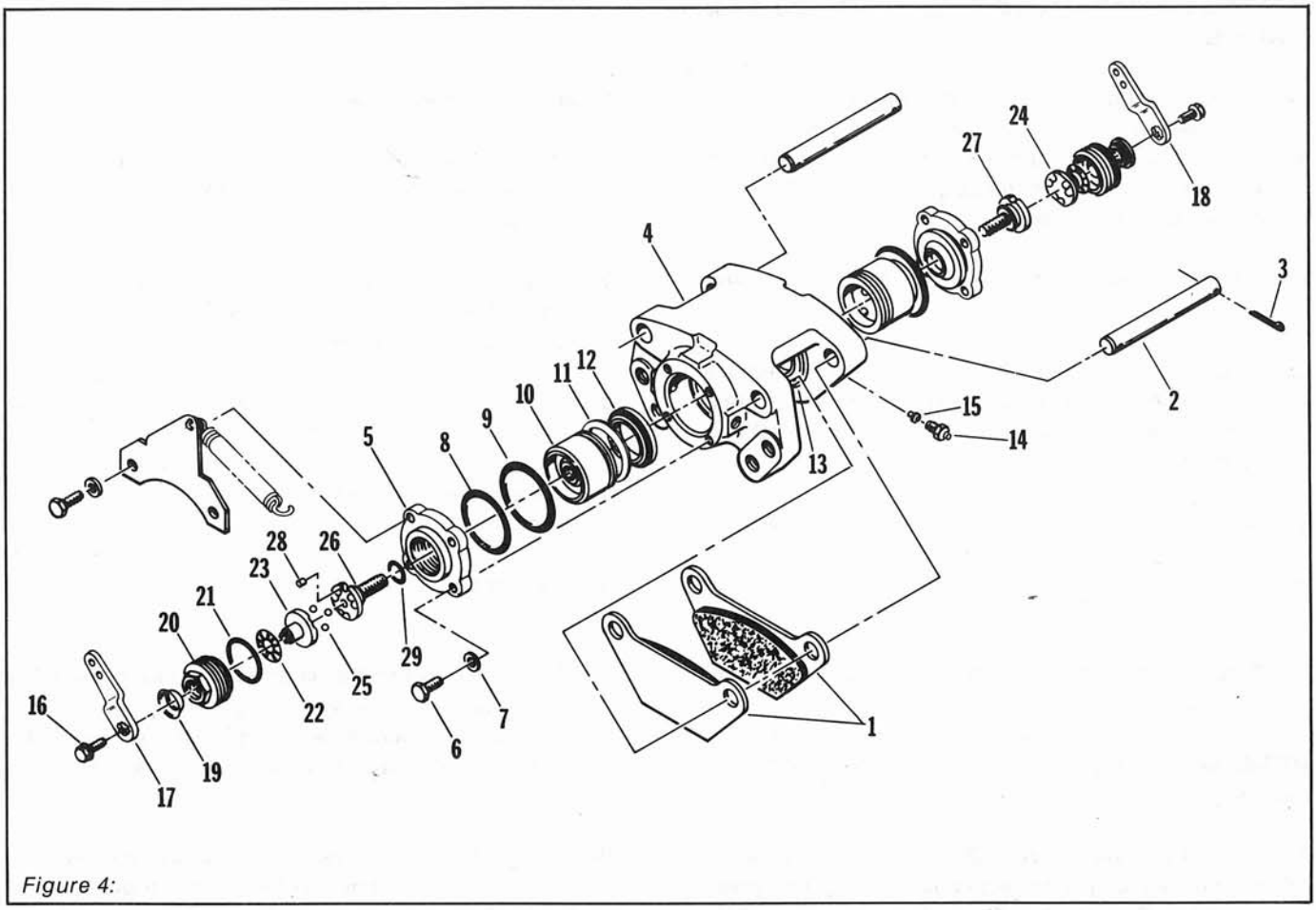

Figure 4:

FIGURE LEGEND — DUAL FUNCTION

	Quantity
1. Pad Holder Assembly	2
2. Pin, Pad	2
3. Pin, Cotter	4
4. Casting, Caliper	1
5. Parking Brake Mount or End Cap	2
6. Hex Cap Screw	8
7. Washer	8
8. End Cap O-Ring	2
9. Piston Seal	2
10. Piston	2
11. Insulator	2
12. Insulator Retainer or Extender	2
13. Boot	2
14. Bleeder Screw	3
15. Tube Seat Insert	4
16. Hex Screw	2
17. L.H. Lever	1
18. R.H. Lever	1
19. Seal	2
20. Retainer	2
21. Retainer O-Ring	2
22. Thrust Bearing	2
23. L.H. Actuator Shaft	1
24. R.H. Actuator Shaft	1
25. Ball	6
26. L.H. Thrust Screw	1
27. R.H. Thrust Screw	1
28. Pin	
29. Thrust Screw O-Ring	2

Disassembly (Integral Park Brake Caliper)

Before attempting to disassemble the integral brake caliper, make a note of the relationship between the pin mark on the mount (5) and the position of the parking brake levers (17) or (18) to the caliper mounting holes on casting (4), for reassembly.

1. Remove screw (16) to remove parking brake lever (17).

2. Unscrew end retainer (20) from mount (5). Remove and discard retainer O-ring (21) and seal (19). Disassemble balls (25), actuator shaft (23) and thrust bearing (22).

3. Using a magnet, remove anti-rotation pin (28).

4. Unscrew thrust screw (26) and remove and discard O-ring (29).

5. Remove mount (5) by removing four screws (6) and Lockwashers (7).

NOTE: *Keep appropriate thrustscrew, lever and shaft together.*

6. Remove piston extender (12), if used, by using a 2-3/4 inch hose clamp with hex head screw to compress extender. Remove and discard old insulator (11).

7. Remove piston (10) from casting (4) by pushing it through to the center of caliper.

8. Using a small wood or plastic stick, work out piston seal (9) from its groove in the cylinder bore and discard.

IMPORTANT: *To avoid scratching cylinder or burring the edge of seal groove, do not use a metal tool such as a screwdriver.*

9. Remove dust boot (13) and discard.

10. Repeat same procedure to remove components from the opposite side of the caliper.

Cleaning and Inspection

1. Perform steps 1-6 as outlined in single function caliper cleaning and inspection, in addition to the following.

2. Inspect ball sockets, threads, grooves, balls (25) and anti-rotation pin (28) for wear or pitting. Replace any parts found defective.

3. Inspect thrust bearing (22) for corrosion, pitting or wear. Replace if needed.

4. Inspect surface of retainer (20) for wear and replace if needed.

5. Inspect levers (17) and (18) for wear and replace if required.

6. Carefully examine the piston surface (10) for scoring, nicks, corrosion and worn or damaged chrome plating. If any defects are found, replace the piston. Black stains on the piston are caused by the seals and do no harm.

IMPORTANT: *The adjuster assembly (parts inside the piston) must be bottomed in the piston to be properly seated and provide consistent brake function. If the adjuster assembly is loose in the piston, appears high, is damaged, or if brake adjustment is either too light, too loose or non-functioning, replace the piston. DO NOT ATTEMPT TO SERVICE THE ADJUSTER AT ANY TIME; when repair is necessary, replace the whole piston.*

NOTE: *Check the adjuster operation by first assembling the thrust screw (26) into the piston assembly, pulling the two pieces apart by hand approximately 1/4 inch and then releasing them. When "pulling" on the pieces, the brass drive ring must be stationary and the drive ring must rotate. If action of the components does not follow this pattern, replace the whole piston.*

Reassembly of Integral Brake Caliper

1. Repeat steps 1-10 as outlined for single function caliper assembly; then proceed as follows -

2. Using clean brake fluid, fill piston (10) to top edge of thrust screw bore.

3. Coat O-ring (29) with clean brake fluid and install in groove in thrust screw (26).

IMPORTANT: *Thrust screw (26) and (27) are not interchangeable from side to side. Each has a different ramp direction in the ball pockets. The pocket surface of the operating shaft and the thrust screw are stamped with either an "L" or an "R" to indicate which side it is to be used on.*

4. Install mount (5) with index mark on mount positioned as previously recorded at disassembly. Use four screws (6) and lockwashers (7), torque screws to 30-35 ft lb (41-47 N.m) dry.

5. Install the appropriate thrust screw by turning it into piston assembly (10) with a 1/4 inch hex wrench. Screw in until the top surface of the screw is flush with or just below the bottom of the threaded bore. Take care to avoid cutting the O-ring (29). Index the thrust screw so that the notches on the screw and mount (5) are aligned. Install pin (28).

6. Apply a liberal amount of silicone grease to all components of the parking brake mechanism. Place a ball, item (25), into each of the three pockets of the thrust screw (26).

7. Install appropriate actuator shaft (23) in this example, on the balls.

8. Coat thrust bearing (22) with silicone grease and install on actuator shaft (23).

9. Install seal (19) and O-ring (21) on retainer (20).

10. After coating seal (19) and O-ring (21) with a light film of silicone grease, install retainer (20) into mount (5).

NOTE: *Hold the operating shaft firmly seated against the internal mechanism while installing retainer (20) to prevent mis-location of the balls (25). If seal (19) is pushed out of position, re-seat. Torque retainer (20) 75-125 ft lb (102-170 N.m) dry. The operating shaft must rotate freely after torquing.*

11. Install the correct parking brake lever (17) in this example, on its keyed spline with stamped letter positioned as noted at the beginning of disassembly. Torque lever retaining screw (16) 16-22 ft lb (22-30 N.m) dry.

12. Install the tube inserts (15) into the bleeder inlet holes. Install the bleeder screw (14) and torque 6-15 ft lb (8-20 N.m) dry.

13. Install pad holders (1) and secure in place with pad pins (2) and cotter pins (3).

14. Remount brake assembly, connect hoses or line to caliper, connect park brake mechanism and bleed system (See Park Brake Adjustment).

Bleeding Instructions

1. Remove cap from reservoir, check fluid level, fill as required.

2. Attach a flexible tube to the nipple of the bleeder valve (top valve if there is more than one).

3. Place the other end of the flexible tube into a jar containing a small amount of clean fluid. Assure that the end of the tube is below the fluid surface to prevent breathing air back into the system. Loosen breather valve one turn.

NOTE: *Bleed both sides of each caliper.*

4. Slowly operate brake and check for air bubbles rising in the fluid, indicating air is being forced out of the system.

5. Retighten bleeder valve as the pedal is being depressed, and reaching end of stroke.

6. Repeat steps 4 and 5 until air bubbles stop, adding new fluid to the reservoir as needed.

7. Add new fluid to brake reservoir to within 1/8 inch from top and replace cap.

8. Recheck the system for proper operation and for leaks.