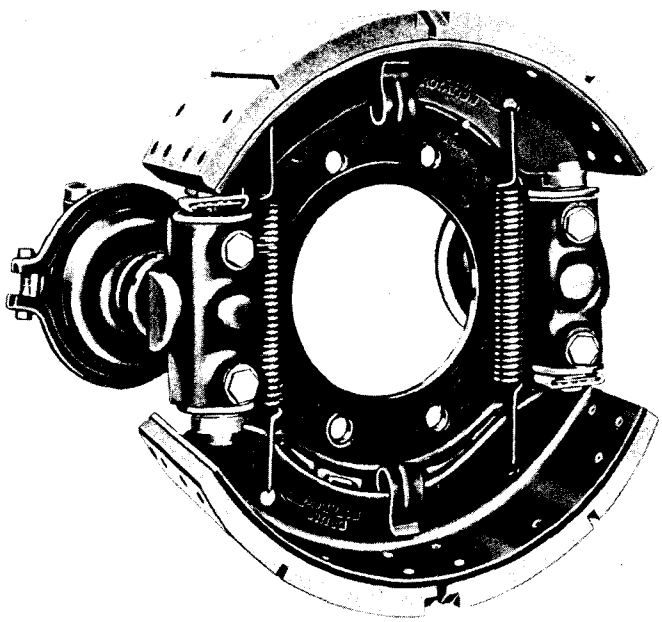
Field Maintenance Manual No. 4R

Stopmaster® Brakes

Manual-Automatic Adjustment Spring Brake Unit



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Rockwell International

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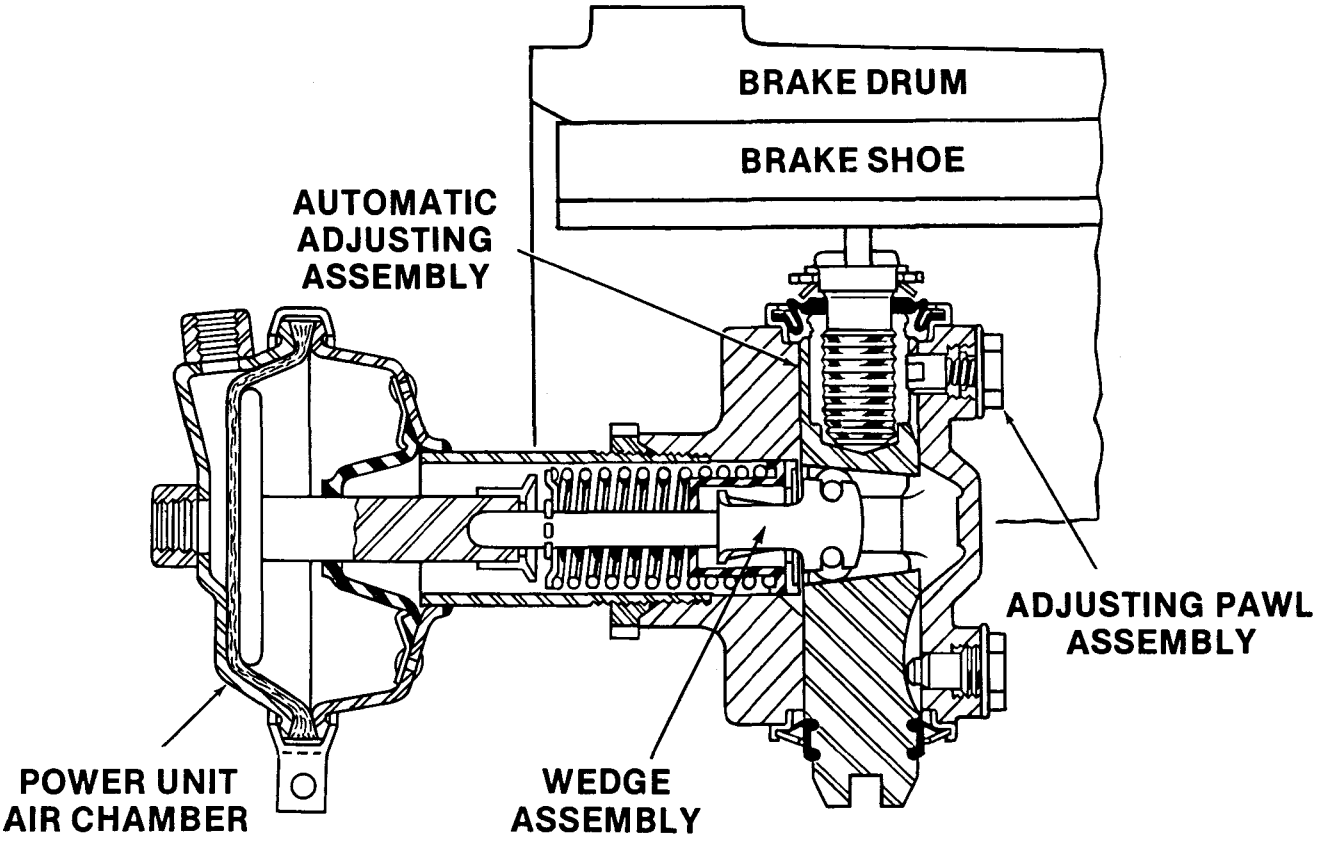
SERVICE NOTE: For safety purposes and to maintain the mechanical integrity of components being serviced, it is of utmost importance to follow completely all the procedures including all "caution" and "important" items throughout this manual.

IMPORTANT:
Brake linings contain asbestos fibers. Caution should be exercised in handling and maintenance as described on page 30 of this manual.

ROCKWELL STOPMASTER BRAKES

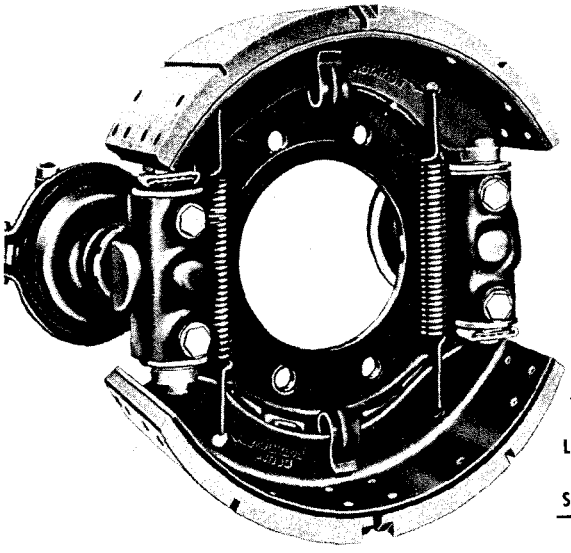


The Stopmaster Brake is wedge actuated. The brake power units can be either air chambers or hydraulic cylinders. They can also be equipped with spring brake units to provide parking and emergency braking. The brake power unit forces a wedge between two rollers and two plungers, which causes the plungers to spread apart and push the brake shoes against the brake drum.

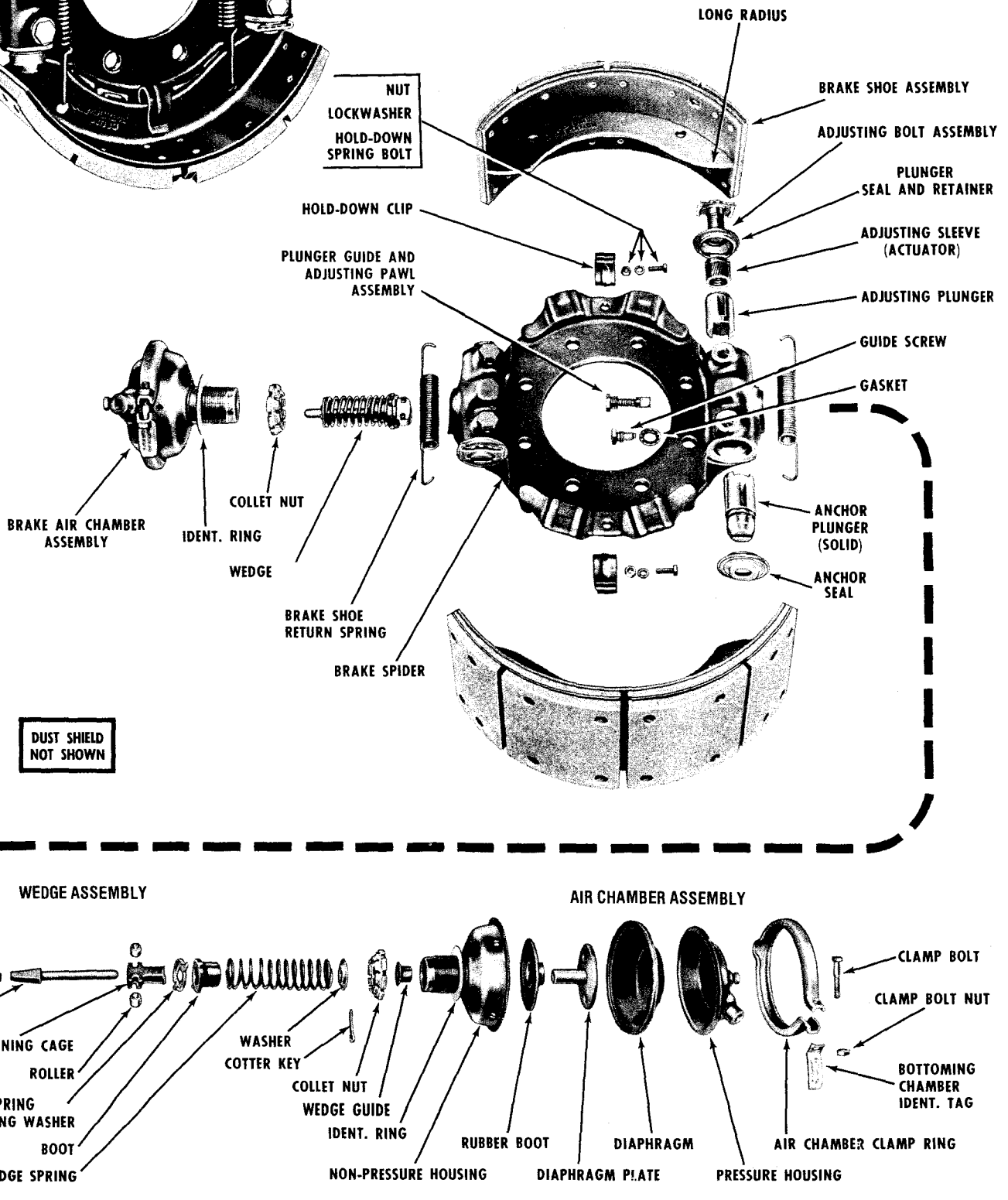
There are several variations of Stopmaster Brakes in use. Some have two power units per brake and others only one. Where two power units are used, there may be a spring brake unit on one or both. The brake support is either a cast spider or a stamped backing plate. On the cast spiders, the plunger housings are either integral or bolted on. Brake shoe adjustment may be automatic or manual. Other minor variations are also in use.

The various basic Stopmaster Brakes are identified as model RDA, RDH, RSA, or RSH with letters denoting the following: R—Stopmaster Brake, Wedge Actuated; D—Double Actuated; S—Single Actuated; A—Air operated; H—Hydraulic Operated.

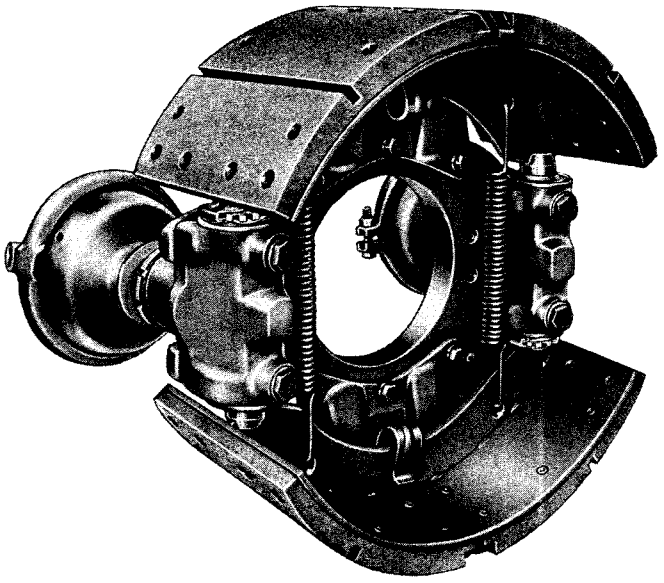
15" RDA Bolted On Spider With Integral Plunger Housings



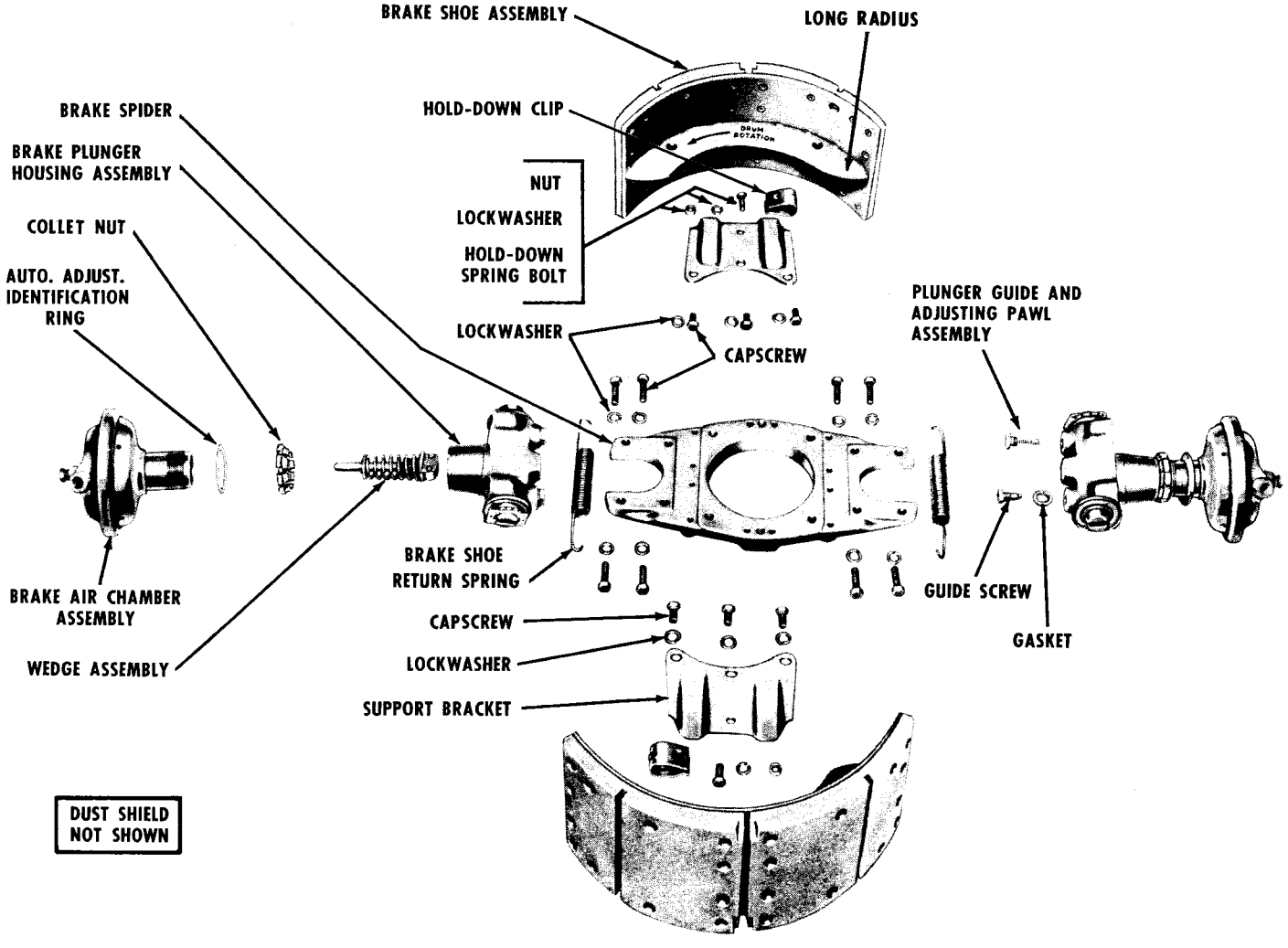
RDA — 15 inch diameter, bolted on spider with integral plunger housings. Cast spider bolts to flange on axle housing. Dust shields are one or two piece type. This bolted on spider brake is most commonly employed on rear axles with ratings of 18,000 lbs. or more. Also used on front axles with ratings of 12,000 lbs. or more. Adjusters may be manual or automatic (automatic shown).



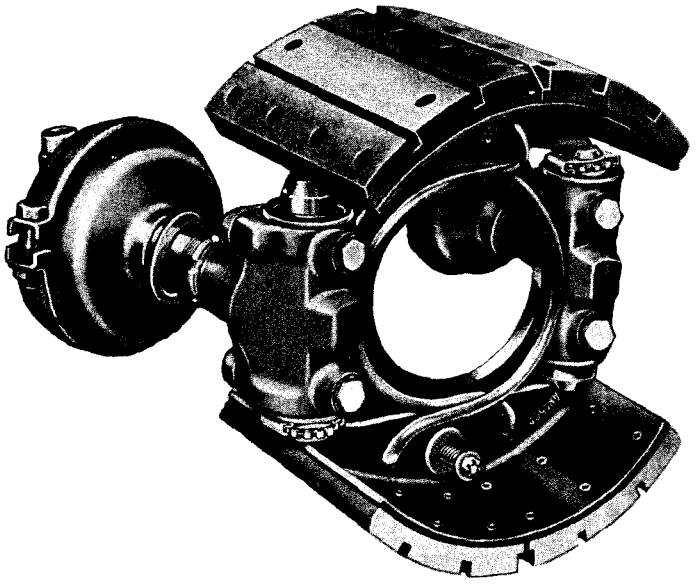
15" RDA Welded On Spider With Bolted On Plunger Housings



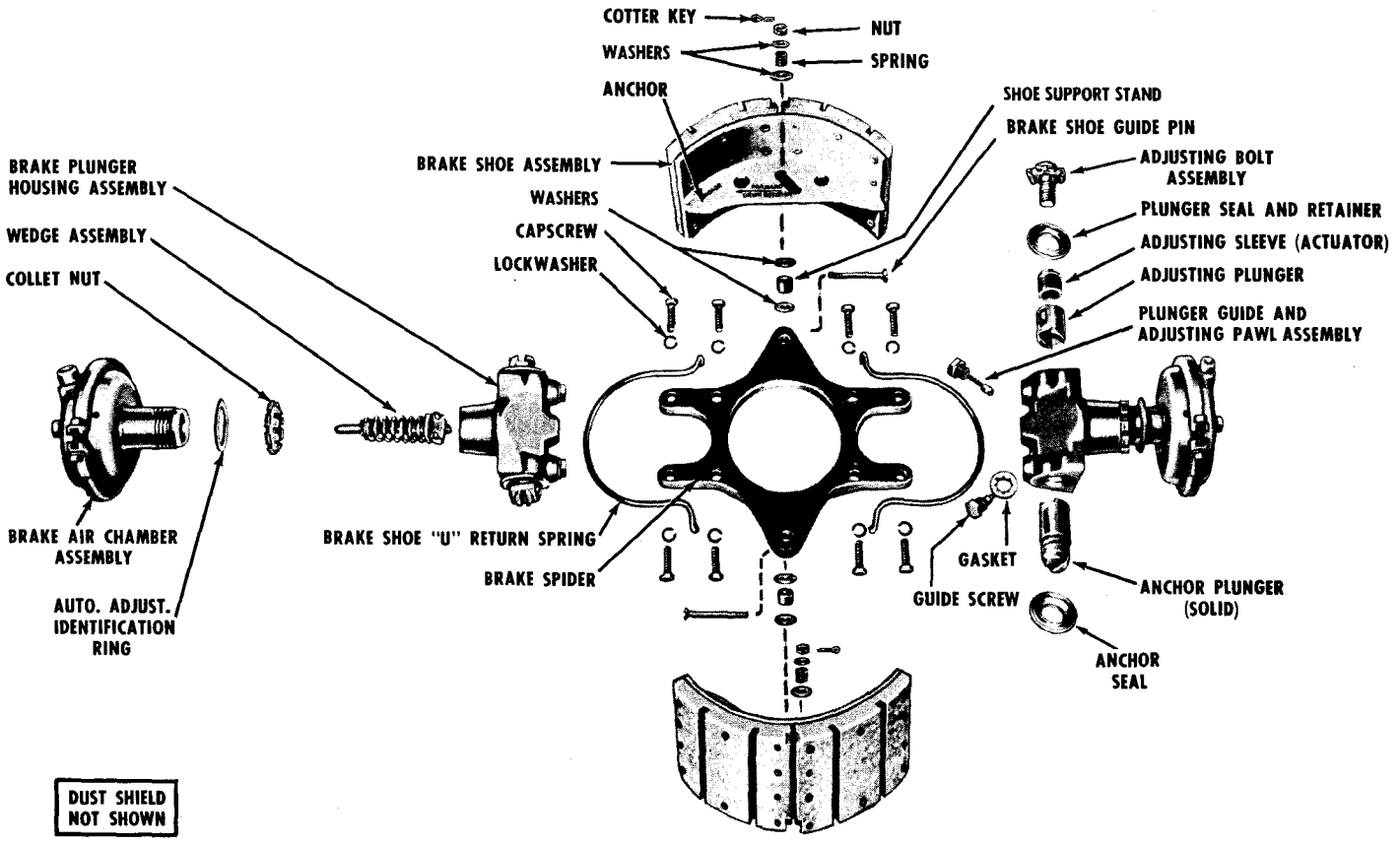
RDA — 15 inch diameter, welded on spider with bolted on plunger housings. Spider is welded to axle beams. Dust shields are the four piece type. Trailer axles employ this type of brake. Adjusters are automatic only. The open end spider type permits removal of the complete actuation system at disassembly.



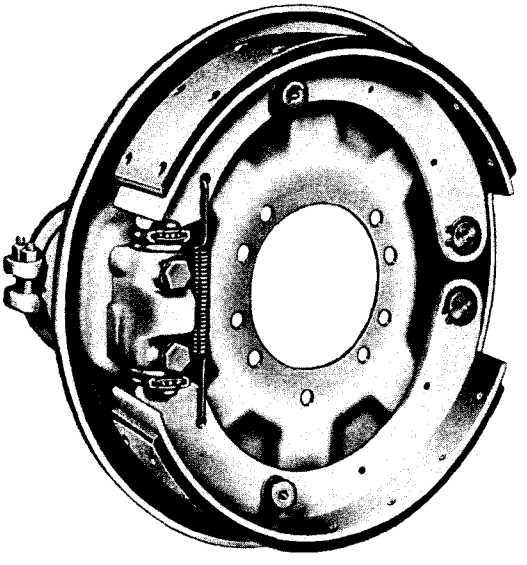
12¼" RDA Welded On Spider With Bolted On Plunger Housings



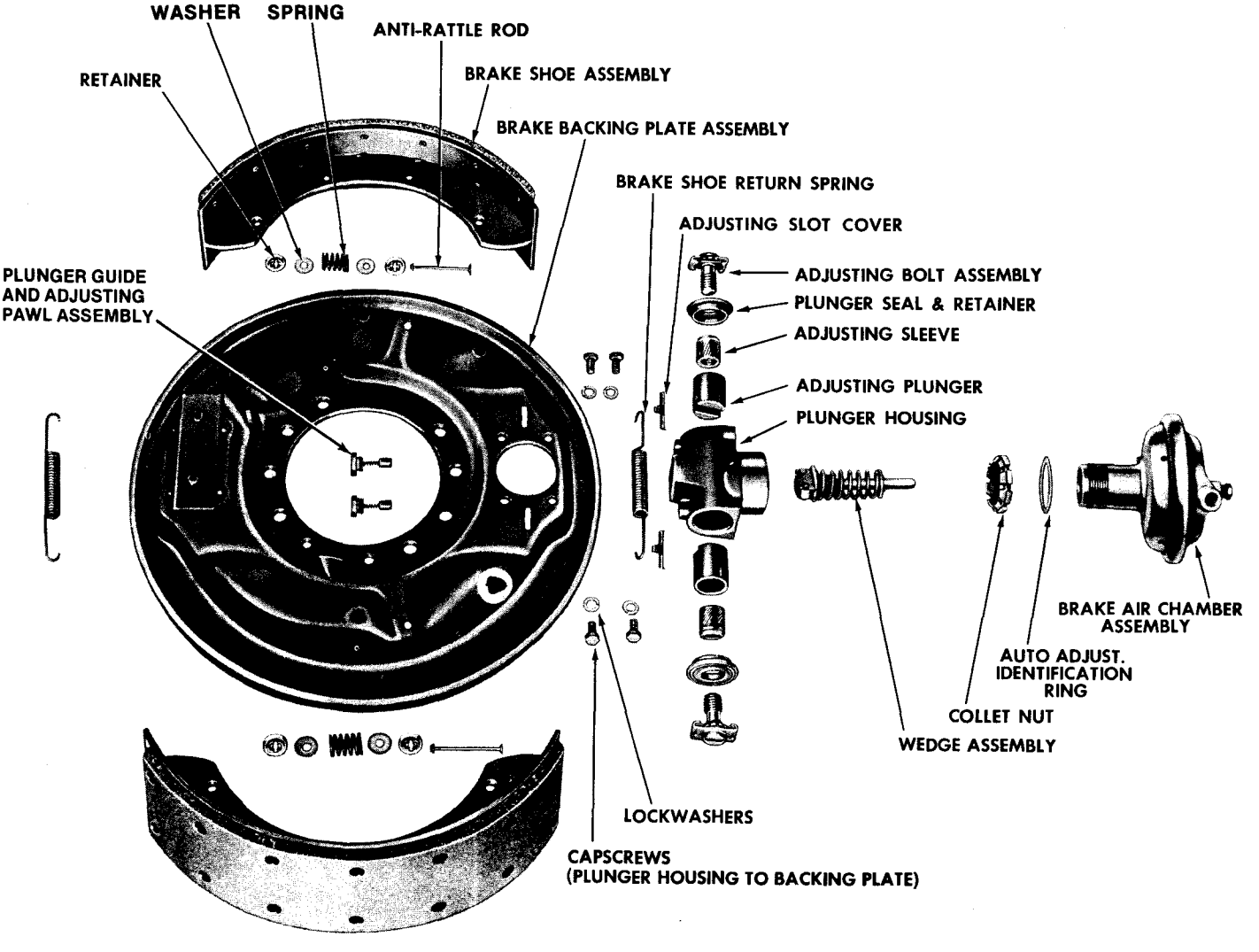
RDA—12¼ inch diameter, welded on open end spider with bolted on plunger housings. Spider is welded to axle beams. Dust shields are the four piece type. "Horseshoe" return spring shown. Trailer axles employ this type of brake. Adjusters are automatic only. The actuation system is removed by removing four attaching capscrews.



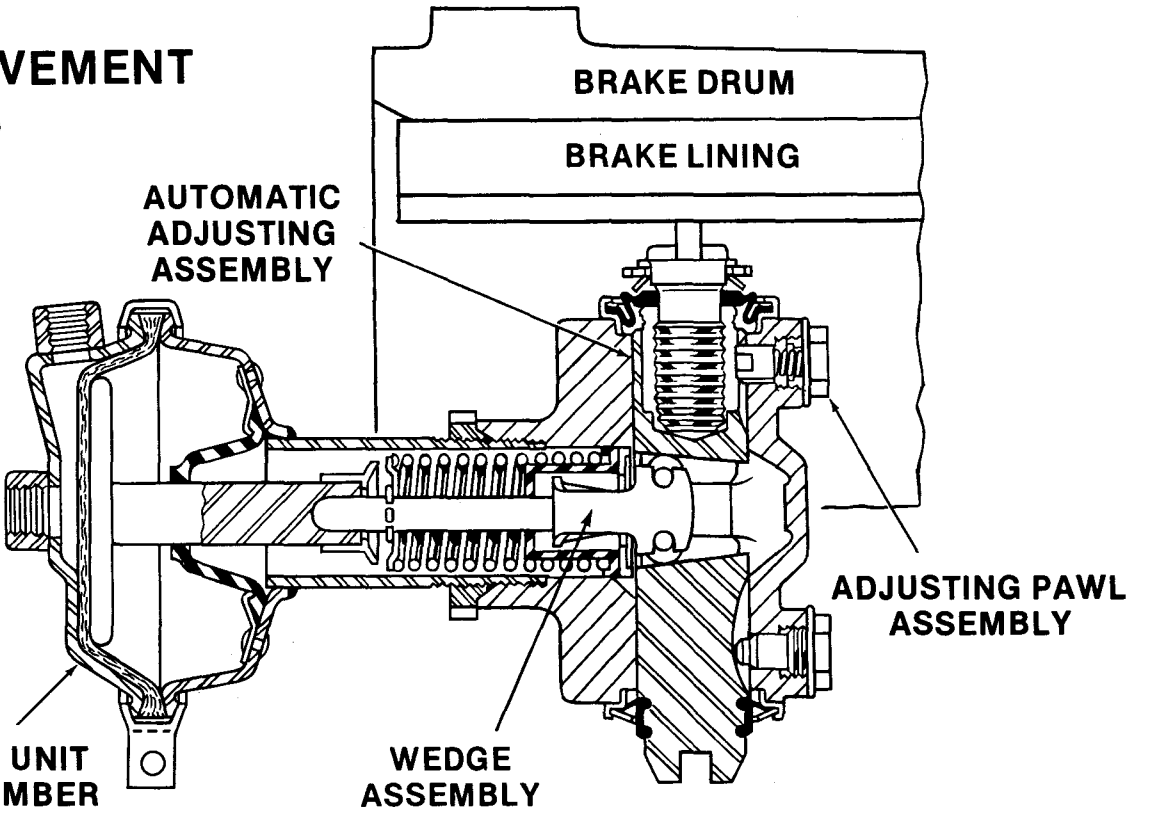
15" RSA Backing Plate Mounted, Bolted On Plunger Housing



RSA — 15 inch diameter, backing plate mounted with bolted on plunger housing. The backing plate bolts to the flange on the axle housing and also serves as the dust shield. Front axles, with ratings less than 12,000 lbs., usually employ backing plate mounted brakes of this type. Adjuster may be manual or automatic (automatic shown). Shoes may be floating (shown below) or pinned (shown above).



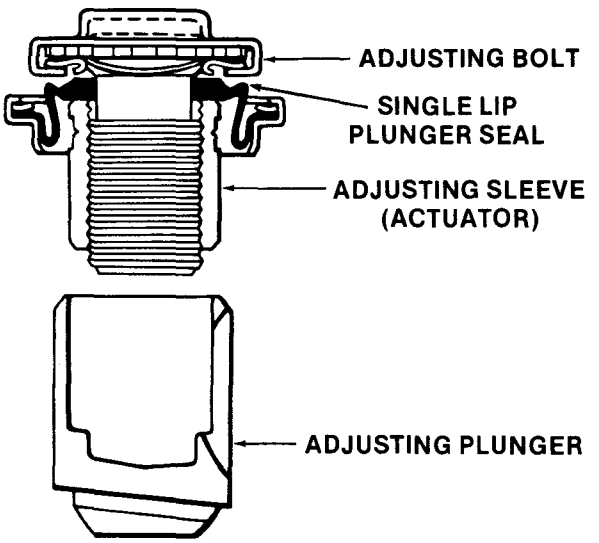
IMPROVEMENT AREAS



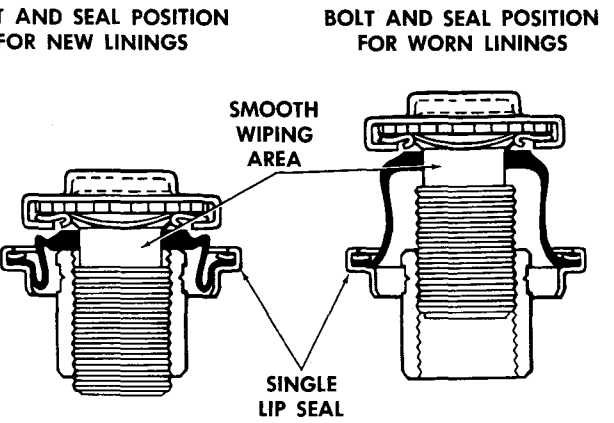
The Stopmaster wedge brake now incorporates a series of design changes based on the original and the current Stopmaster brakes.

Major design improvements have been made in four general areas of the brake: (1) The automatic adjusting assembly; (2) The adjusting pawl assembly; (3) The non-pressure half of the air chamber; and (4) The brake shoe and drum.

AUTOMATIC ADJUSTING BOLT ASSEMBLY



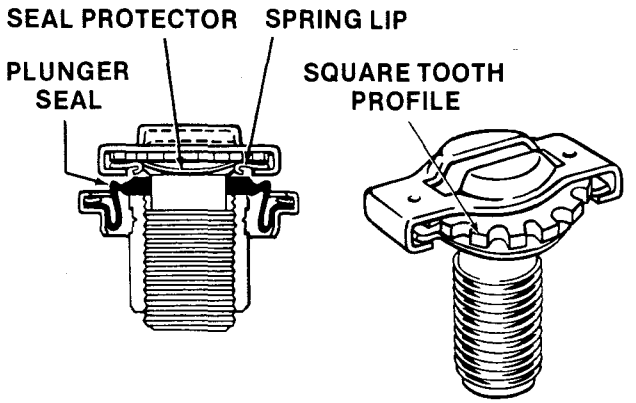
The adjusting bolt now has a machined smooth wiping surface under the head to accept a new single lip plunger seal.



The new single lip plunger seal provides more protection for the bolt threads and improved sealing for the actuation housing components. The lip of this seal wipes against the smooth machined surface beneath the head of the bolt. This seal is designed to allow more flexibility and will provide additional protection for the adjusting assembly when the bolt is extended outward in brake application. Thus, this will reduce the

possibility of the adjusting bolt freezing, due to any corrosion or dirt inside the actuation housing.

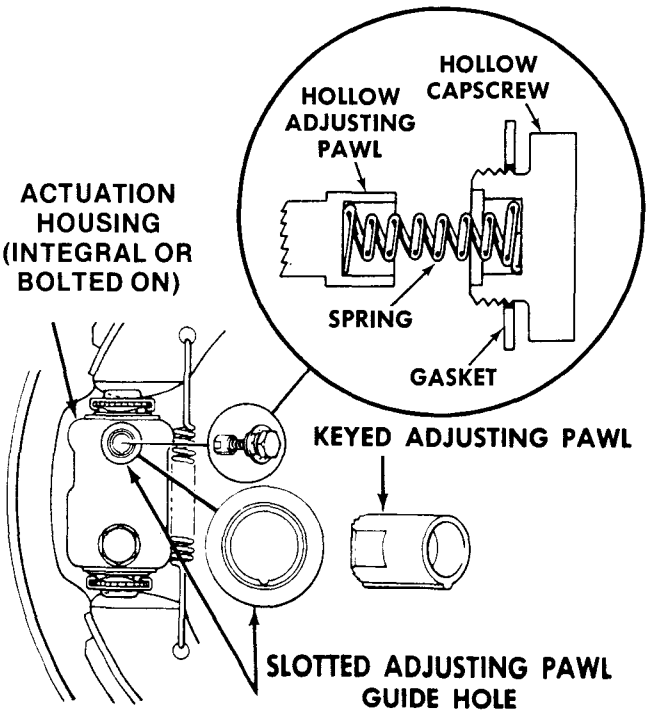
ADJUSTING BOLT



To protect the plunger seal, the head of the adjusting bolt incorporates a re-designed stamped seal protector and rolled spring lips. The seal protector is angled downward to act as a shield over the plunger seal. This prevents contact between the seal and the adjusting spoon when the brake is being adjusted manually. The spring lip serves to protect the plunger seal when the bolt is in the bottomed position.

To further facilitate the initial manual adjustment, the star wheel portion of the adjusting bolt head employs square teeth.

ADJUSTING PAWL ASSEMBLY



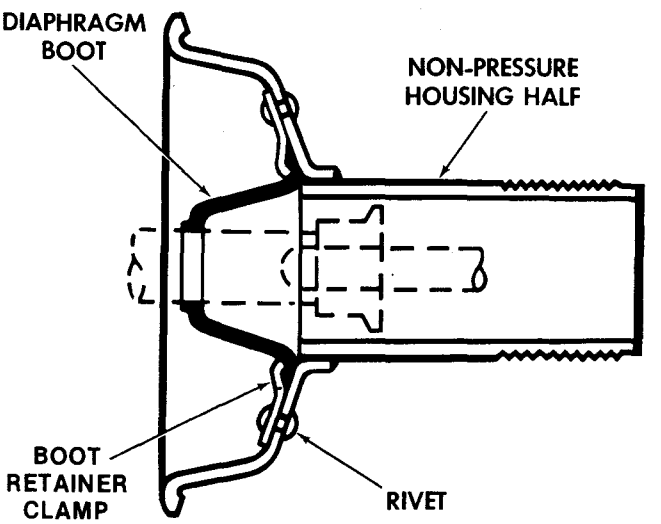
The adjusting pawl for the Stopmaster wedge brake employs an integral key, which mates with a slot in the adjusting pawl guide hole of the re-designed actuation housing (integral or bolted on).

The keyed pawl and slotted guide hole assures correct positioning of the pawl inside the plunger to allow the brake to adjust automatically. This design makes it necessary for the keyed pawl assembly to be used only with integral and bolted on actuation housings that employ slotted pawl guide holes.

The keyed adjusting pawl, spring, and hollow capscrew are pre-assembled to facilitate reassembly of these parts into the integral or bolted on actuation housings. To achieve this, both the capscrew and pawl have hollow ends, and the spring has one large diameter coil at each end which force-fits (pre-snaps) into the open ends of the pawl and capscrew.

The keyed adjusting pawl assembly is not interchangeable with the original adjusting pawl assembly because of the keyed pawl. However, the individual spring, gasket and hollow capscrew are interchangeable with original parts.

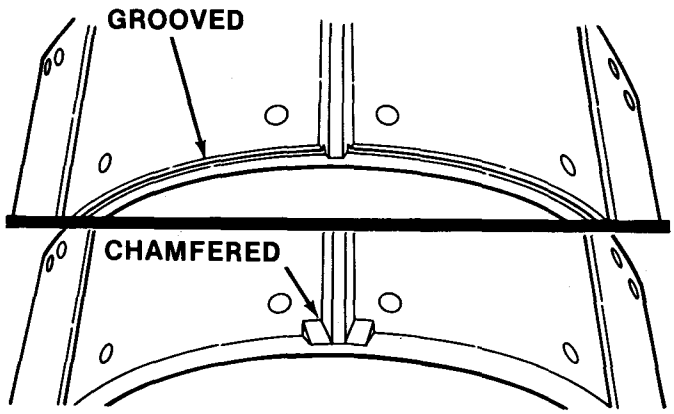
NON-PRESSURE HALF ASSEMBLY



The power unit of the Stopmaster employs a larger, and more flexible diaphragm boot seal. It also employs a boot retainer clamp which is riveted to the wall of the non-pressure half of the housing. The lip of the diaphragm boot is positioned beneath the boot retainer clamp, and is held tightly against the wall of the non-pressure housing. This provides improved sealing for the air chamber tube by preventing road contaminates

from entering the wedge area and contaminating the lubricant. Further, the mechanical attachment of the boot retainer clamp prevents possible separation of the diaphragm boot from the housing.

BRAKE LININGS

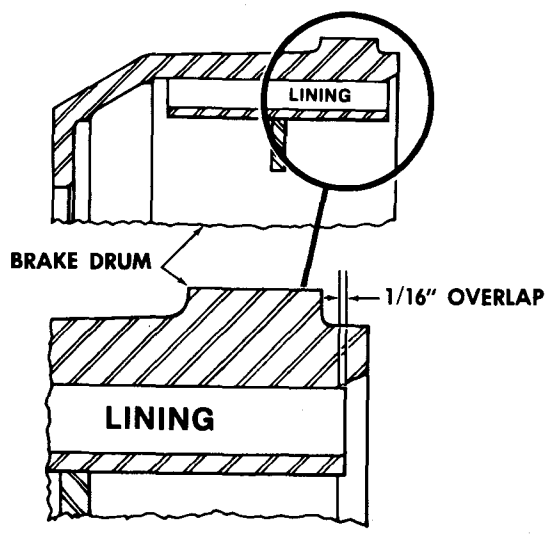


For visual inspection of the brake lining wear, the linings of the Stopmaster can be grooved on the side, or chamfered on the 4 inner corners.

This makes it easier to determine how much the lining has been worn, and when the vehicle should be scheduled for relining. When the lining has worn down to the groove, or when the chamfered corners have been worn away, replacement is necessary. A visual check may be made through the inspection holes in the dust shields.

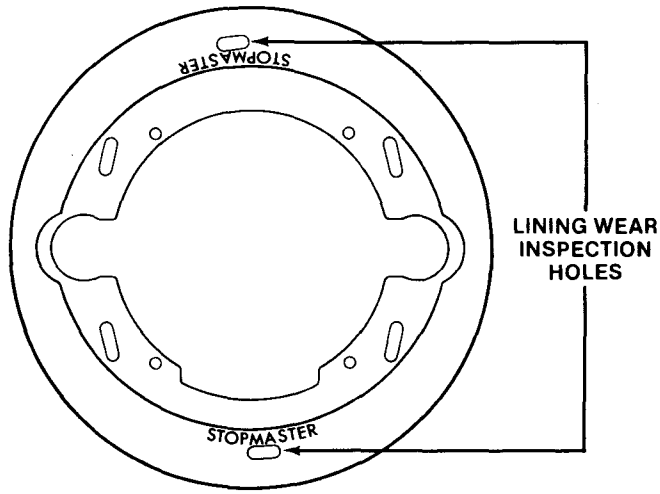
IMPORTANT: Brake linings contain asbestos fibers. Caution should be exercised in handling and maintenance as described in the General Maintenance Section.

CHAMFERED BRAKE DRUM



Other design improvements for the Stopmaster brake include a chamfer on the brake drum's inside outer edge to facilitate removal when brake service is necessary. The chamfer allows the brake lining to overlap the drum edge by approximately 1/16". This, in turn, prevents the development of scored wear rings on I.D. of the drum, which could interfere with disassembly.

DUST SHIELDS



To further facilitate visual inspection of brake linings, Stopmaster dust shields employ two inspection holes, as shown. This allows the linings to be inspected without removing the dust shields from the brake.

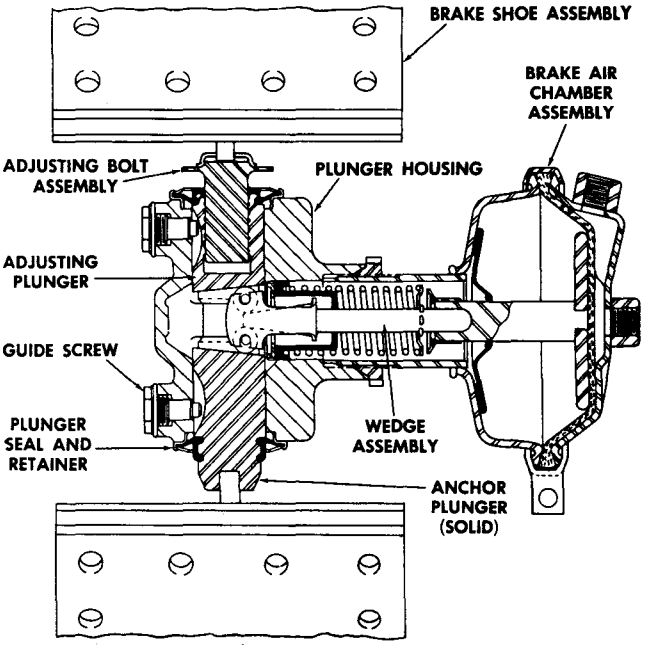
STOPMASTER ACTUATING SYSTEM

These pictures show one of the actuating systems of a double-actuated, air operated, Stopmaster Brake (RDA).

This system has an air chamber power unit threaded into the wedge bore of the plunger housing. The socket in the end of the diaphragm push rod connects the air chamber to the wedge rod. The wedge retracting spring acts as the return spring for both the wedge and the diaphragm. A pair of rollers are held in place on the wedge head by a retaining cage and are engaged in corresponding slots in the inner ends of the plungers. The unslotted protions of the inner ends of the plungers are resting on abutments in the plunger housing. The outer ends of the plungers are engaged with and supporting the brake shoes.

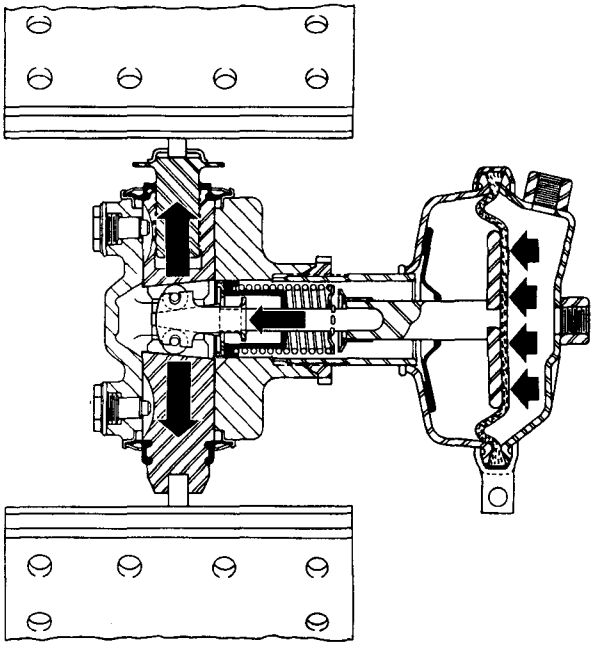
On a double-actuated brake, each of the two actuating systems has one anchor (solid) plunger and one adjustable plunger (as illustrated). On a single actuated brake the one actuating system would have two adjustable plungers. All of the plungers are retained in the housings and the roller slots are kept in proper alignment by means of guide screws which engage slots in the side of the plungers. The hydraulic brake would have a hydraulic cylinder threaded into the plunger housing (in place of the air chamber). The hydraulic piston would connect with the wedge rod.

When the brake is actuated, the air chamber pushes the wedge head deeper in between the rollers. This spreads the rollers and plungers apart and pushes the brake shoes outward. Initially, all the plungers are lifted off of the plunger abutments and momentarily suspended. As the shoes (linings) contact the drum, the drum drags the shoes and moves the suspended plungers with it. This causes the plunger at the trailing end of each shoe to reseat on its abutment and thus absorb and transfer the brake torque to the brake support. When the brake is released, the wedge spring returns the wedge and diaphragm to the off position. At the same time, as the shoes are pulled away from the drum by the return springs, the plungers are pushed back to their abutments.



MANUAL ADJUSTING—1¾" STROKE WEDGE ASSEMBLY

SHOWN IN OFF POSITION



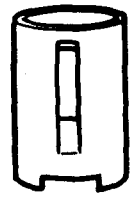
MANUAL ADJUSTING—1¾" STROKE WEDGE ASSEMBLY

SHOWN IN ON POSITION

ADJUSTING COMPONENTS DETAILS AND OPERATION

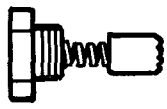
Two types of adjustable plungers are in use — manual and automatic. The manually adjusted plunger has an adjusting bolt threaded into the plunger.

MANUAL PLUNGER BOLT ASSEMBLY



AUTOMATIC PLUNGER

On the automatically adjusted plunger, the adjusting bolt is threaded into an adjusting sleeve, which in turn, is free-fitted inside the plunger. The plunger guide screw is replaced by a hollow capscrew, spring, and an adjusting pawl, which is pre-assembled and serves as the plunger guide. The end of the adjusting pawl has saw-tooth type teeth, which engage corresponding helical teeth on the outside of the adjusting sleeve.

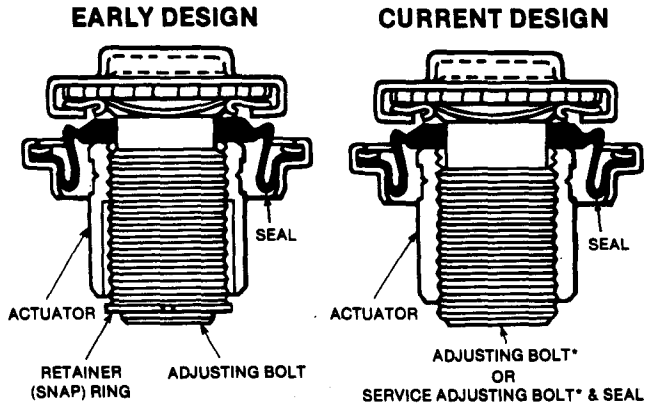


PAWL ASSEMBLY

ADJUSTING SLEEVE

As the brake is actuated; the plunger, sleeve, and bolt move outward and the sloping face of the teeth on the adjusting sleeve lifts the adjusting pawl (against the spring). When the brake is released, all the parts return to their starting points. As the lining wears, the plunger stroke and resulting pawl lift gradually increases until the pawl climbs over and drops into the next tooth space. This time, when the brake is released and the plunger is pushed back in its bore, the upright face of the pawl teeth causes the adjusting sleeve to rotate and advance the adjusting bolt. This reduces the lining clearance and the cycle starts over again. The automatic adjuster operates only in forward vehicle direction.

ACTUATOR AND ADJUSTING BOLT CHANGE

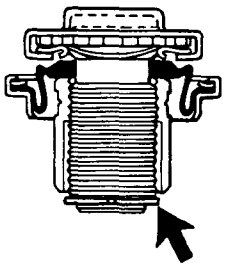


***NOTE: THE NEW ADJUSTING BOLTS CANNOT BE USED WITH THE EARLY DESIGN ACTUATOR**

IDENTIFICATION OF ADJUSTING BOLT AND SEAL

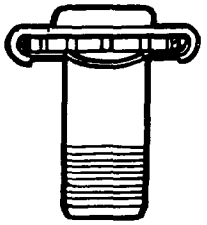
EARLY	RECENT	CURRENT	SERVICE
PHOTOSTATIZED (BLACK) WITH SNAP RING GROOVE	PHOSPHATIZED (BLACK) NO GROOVE	ZINC DICHROMATE (BLACK) NO GROOVE	ZINC DICHROMATE (GOLD) LARGE LETTER "S" ON BOTTOM

There are three types of adjusting bolts, two of which employ square teeth to facilitate adjustment and carry a detent arrangement, which engages the brake shoe web and prevents accidental rotation of the bolt; the third bolt, with round teeth, has been discontinued.



- Snapring on bottom, (round teeth)

  This bolt has been discontinued as a production and service item, however, if it is in good condition, it can be used to assure full lining wear on drums up to 15.120 inches diameter by removing the snapring. This bolt is replaced by a no snapring bolt.



- No snapring (original equipment and normal use) (square teeth)

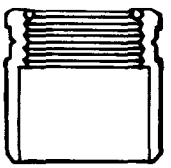
  This bolt has a longer smooth neck and no snapring allowing full lining wear on drums up to 15.120 inches diameter.

- No snapring (for oversized drums) (square teeth)

  This bolt is the same as above, except it is 0.100 inches longer overall allowing full lining wear with oversized (greater than 15.120 inches diameter) drums.

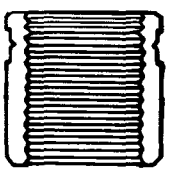
NOTE: Do Not thread bolt into adjusting sleeve until it bottoms. Automatic adjusters will not function. See General Maintenance Section.

There are two types of adjusting actuator sleeves.



- Use with snapring bolt

  I.D. of sleeve is partially threaded and partially smooth. This sleeve cannot be used with the current no snapring bolt.

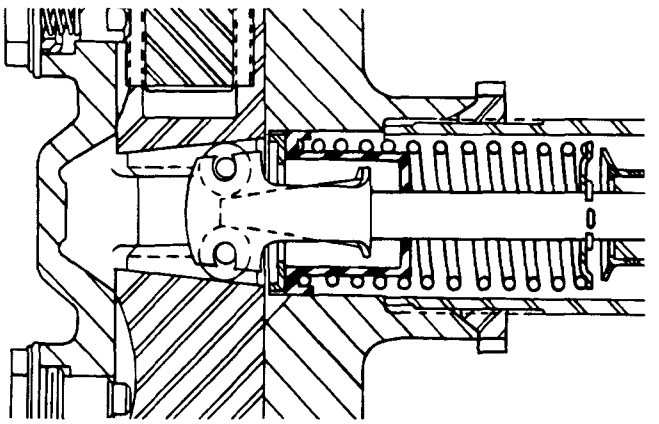


- Use with no snapring bolt

  I.D. of sleeve is fully threaded, and can be used with the current no snapring adjusting bolts and with the earlier designed snapring bolt, providing the snapring has been removed.

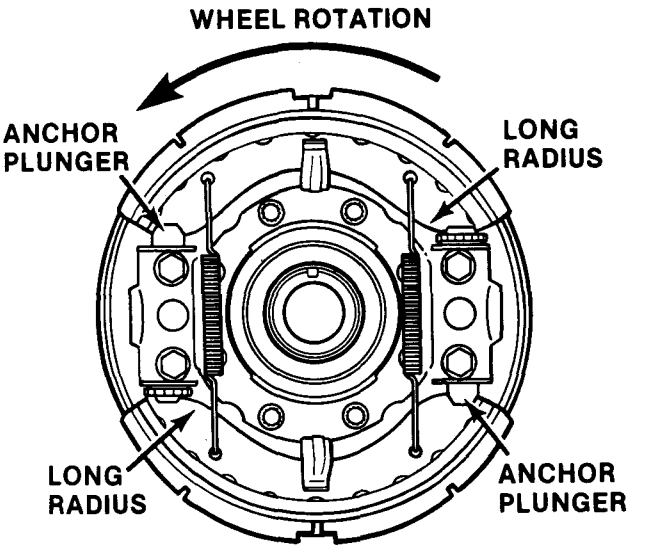
IMPORTANT: Rockwell International does not recommend the turning of brake drums. Further, certain states do not permit the use of drums with internal diameters exceeding 15.120 inches.

WEDGE ALIGNMENT



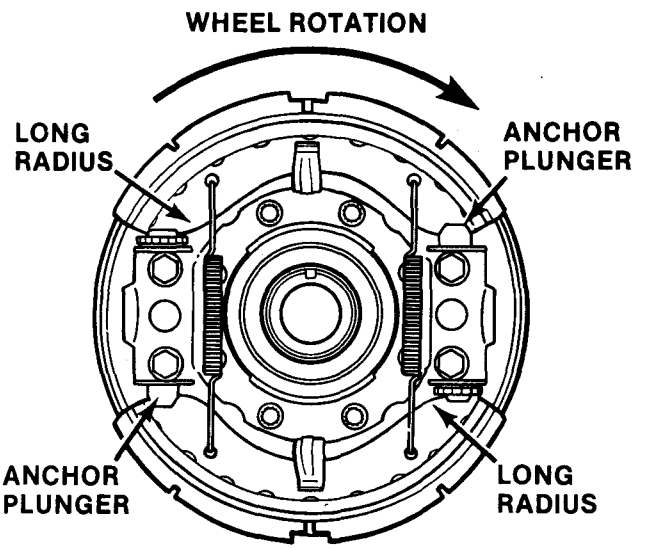
Whenever the power unit is removed from the brake, the wedge assembly may also become dislodged. Before reinstalling the power unit, reposition the wedge assembly so that the rollers and roller cage are engaged in the plunger slots. On newer brake assemblies, this is accomplished automatically by simply aligning the two ears on the wedge spring retainer with corresponding grooves in the wedge bore of the plunger housing. On older assemblies, the wedge head must be aligned manually so that the rollers engage the plunger slots properly. In either case, proper alignment can be checked by pushing on the wedge rod, while visually checking for shoe and plunger lift.

PLUNGER AND SHOE POSITION



LEFT HAND BRAKE

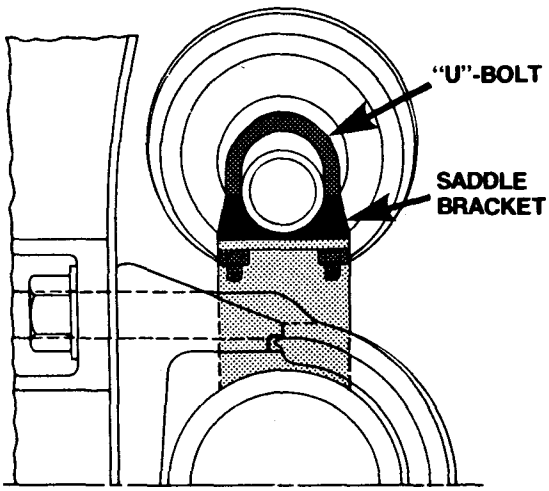
(Bolted on Spider Mounted Integral Plunger Housings)

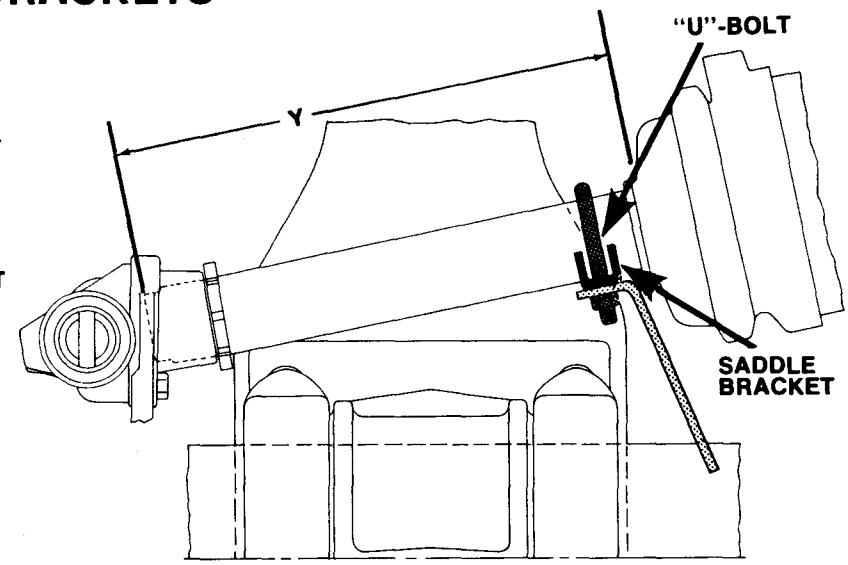


RIGHT HAND BRAKE

On double-actuated brakes, the anchor (solid) plungers should be positioned at the trailing end of each shoe (where they will absorb the brake torque during forward wheel rotation). This will position the adjustable plungers at the leading end of the shoes. Also note that the shoe web is unsymetrical. The long-radius end should be engaged with the adjustable plungers.

POWER UNIT SUPPORT BRACKETS





Support brackets must be used on all axles with Stopmaster Brakes having an air chamber tube standout, dimension "Y", equal to or greater than those listed below:

AIR CHAMBER TYPE	"Y" DIMENSION (TUBE STAND-OUT)
Standard Chamber	7.250"
Anchorlok Comb. Spring Brake 12-16	5.750"
MGM Comb. Spring Brake 12-16	5.750"

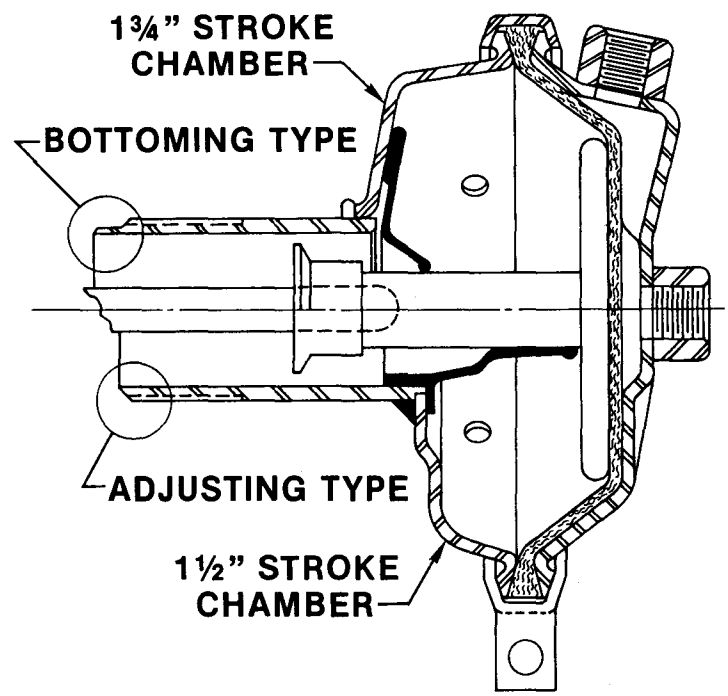
NOTE: Use the listed dimensions as a guide in determining when to use support brackets.

The support brackets are welded to the axle beam and attached to the non-pressure housing tube with a "U" bolt and saddle bracket, (round beam shown). The brackets are located as close as possible to the air chamber for maximum support.

POWER UNIT ADJUSTMENT

The Early Designed air chamber (or hydraulic cylinder) should be threaded into the wedge bore of the plunger housing to a depth such that the wedge is ready to lift the plungers off of the abutment seats at the first movement of the diaphragm (or piston). This provides the least lost motion and maximum useful chamber (or piston) stroke.

Current power units are designed to "bottom-out" in the wedge bore and provide this optimum adjustment automatically. (The bottoming type units have a short unthreaded portion on the leading end.) Earlier power units must be adjusted manually by threading the power unit into the wedge bore deep enough for the wedge to spread the plungers, so they can be pushed back and forth in the plunger housing. Then the power unit is backed out until the back and forth plunger movement disappears. The newer bottoming type units to obtain the bottoming feature. See General Maintenance Sections V-VIII for details.

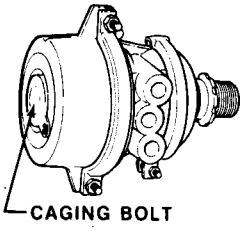


SPRING BRAKE UNITS

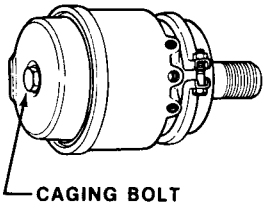
The spring brake unit is a spring powered brake actuator for emergency or parking, that assembles "piggy-back" on an air service chamber. When 70 psi or more air pressure is applied against the piston, the spring is held in a compressed position. When the air pressure is removed, the spring pushes the piston against the diaphragm plate and applies the brake.

Spring brake units are equipped with manual caging bolts to permit safe handling for service work. The spring brake unit should be caged before any maintenance is performed.

CURRENT DESIGN



EARLY DESIGN

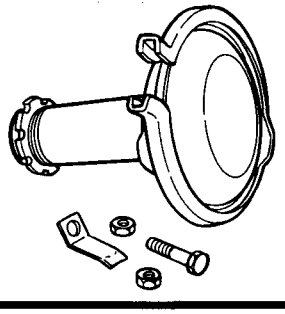


CAUTION

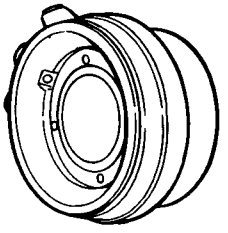
Brakes equipped with spring brake "piggy-back" units must be caged before starting any removal of wheels and drums or servicing the air chamber non-pressure half or hydraulic cylinder. After parts are reassembled and in place, uncage the power springs before returning the vehicle to service. When a vehicle is disabled due to low or lost air pressure, the wheels have to be blocked and the power spring caged before the vehicle can be moved.

Rockwell Internaional does not recommend disassembly of the spring brake "piggy-back" units during servicing. The sudden release of the power spring could cause serious personal injury to the mechanic. This unit should be replaced entirely if its functionability is in question. Only the breather cap and filter (if present) may be removed (for cleaning) after caging the spring unit. The non-pressure half, diaphragm, push rod and clamp ring should be serviced as described in "Air Chambers" or "Hydraulic Cylinders" sections. Refer to Index.

SERVICE CHAMBER



SPRING BRAKE UNIT



RECOMMENDED LUBRICATION

A high temperature water-proof grease in a number 1 NLG1 grade is recommended for lubricating the brake actuating system. It should be a smooth textured, corrosion resistant grease free of fillers and abrasives. It should maintain a satisfactory softness under normal parking and storage temperatures so the brakes can be applied and released.

The following greases meet all of these recommendations:

Texaco Thermotex EP #1	Sunaplex #1 EP
Shell Darina #1	Amdex #1 EP
Marathon 528 H.D.	Philube B #1

A suitable grease can also be obtained under Rockwell part number A-1779-W-283.

Vehicles operating in extremely cold weather (below —40°F) may require a grease conforming to MIL-G-25013C.

RECOMMENDED PREVENTIVE MAINTENANCE

I. Minor Inspection: 25,000 to 30,000 miles or every 2 months

A. Check lining wear to determine proper reline time.

B. When automatic adjusters are used, check lining to brake drum clearance. Adjusters are working properly if clearance at the inspection hole is between .010" to .060".

NOTE 1: For brakes utilizing one (1) spring chamber per wheel, clearance in excess of .035" may require manual adjustment to obtain optimum performance, until vehicle can be scheduled for maintenance.

NOTE 2: The above numbers are established as a guide to indicate a range only and are not precise. Specific situations may differ due to individual component combinations of drums and linings, etc.

C. Check service and spring brake air systems by cycling the respective application valves.

Check the service brake by actuating the treadle several times. Observe action to determine correct actuating system and lining to drum contact.

Check spring brake by actuating control valve on dashboard of cab.

II. Major Inspection: Every 100,000 miles or once yearly

Before inspection, cage all spring brake units manually or by air pressure. If early design Rockwell spring brakes are used, first remove the caging bolt retainer (DO NOT BEND THE RETAINER BACK), and cage the spring by rotating the caging bolt 18-21 full turns clockwise, then remove all wheels and drums. Other spring brake units may require caging bolt installation or breather cap removal prior to caging. Insure emergency line air pressure is exhausted prior to removing from chamber.

CAUTION: Do not force the caging bolt beyond its normal stop. If other makes of spring brake units are used, be sure to check the manufacturer's instructions.

A. Inspect plunger seals.

B. If seals are cut, torn, or leaking — disassemble and overhaul brake actuating components.

C. If seals are in good condition, remove pawl assembly and then remove the adjusting plunger and its seal to check internal condition.

D. If grease is contaminated or hardened, or if parts are dry — disassemble and overhaul brake actuating components.

If internal parts are satisfactory or overhauled, regrease the unit, reassemble the adjusting plunger, replace the seal using an appropriate seal driver, reassemble the pawl, and manually adjust the brake to the proper specification.

NOTE: Highly polished parts do not mean replacement is necessary. Only components that are scored or show other unusual signs of wear must be replaced. Refer to index for "Troubleshooting Guide".

III. At Each Brake Reline:
See General Maintenance Brake Adjustment Section, page 17.

CAUTION: Brakes equipped with spring brake "piggy-back" units must be caged before starting any removal of wheels and drums or servicing the air chamber non-pressure half or hydraulic cylinder. After parts are reassembled and in place, uncage the power springs before returning the vehicle to service. When a vehicle is disabled due to low or lost air pressure, the wheels have to be blocked and the power spring caged before the vehicle can be moved.

Rockwell International does not recommend disassembly of the spring brake "piggy-back" units during servicing. The sudden release of the power spring could cause serious personal injury to the mechanic. This unit should be replaced entirely if its functionability is in question. Only the breather cap and filter (if present) may be removed (for cleaning) after caging the spring unit. The non-pressure half, diaphragm, push rod and clamp ring should be serviced as described in "Air Chambers" or "Hydraulic Cylinders" sections. Refer to index.

I. BRAKE ADJUSTMENT

A. Manual Adjusters

1. Jack or hoist wheels free of ground.
2. Remove dust cover from adjusting slot — two places on each brake.

   On RS type brakes, the adjusting slots are above and below the single power unit.

   On RD type brakes, the adjusting slots are below the forward and above the rear power unit.

   If star-wheel adjusting bolts are not found at these positions, the brake had been assembled on the wrong side of the vehicle.
3. Adjusting bolts have right hand threads. With an adjusting spoon, turn the star-wheel until a heavy drum drag is developed. Then back off the bolt to a very light drag on the drum. Repeat for other shoe on the brake. Replace dust covers in adjusting slots. Repeat for other brakes.

   NOTE: Recommended adjusting spoons, are Snap-On-Blue-Point S-9523, Wizard 4-H-2530 and Proto 2006.

B. Automatic Adjusters —
New System or Complete Reline and Drum Reconditioning

1. Cage spring brake units manually or by air pressure. Check, clean, and re-grease actuator housing, and adjusting bolts, sleeves, and plungers.
2. Always follow manufacturer's recommendations on linings.

   DO NOT USE COMBINATION LININGS

   IMPORTANT: Brake linings contain asbestos fibers. Caution should be exercised in handling and maintenance. See page 31.
3. Manually adjust brakes for heavy drag. (Make periodic static brake applications to position floating shoes.)
4. Back-off adjusters to .020" — .040" clearance. Measure at the crown (center) of the shoe, using a long feeler gauge to permit checking the entire lining width. A light drum drag should be evident. If not, check for misaligned or bent shoes, improper lining grind, drum runout, etc.

   CAUTION: Do not rely on automatic adjusters to take up excessive initial clearance. Also, adjusters may not function if adjusting bolts are tight against the plunger. Dual actuated brakes will not adjust on stationary vehicle.

C. Adjustment Check

Record number of clicks off tight. All adjustments on any one brake, should be within 6 clicks of one another. If not, repeat procedure and/or re-examine components for damage.

II. REMOVING POWER UNIT (AIR OR HYDRAULIC) FROM BRAKE ASSEMBLY

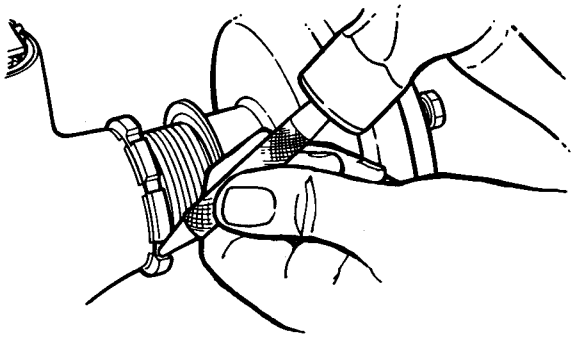
A. Cage the power spring. Remove brake lines and tag emergency line.

NOTE: Insure emergency line air pressure is exhausted prior to removing from chamber.

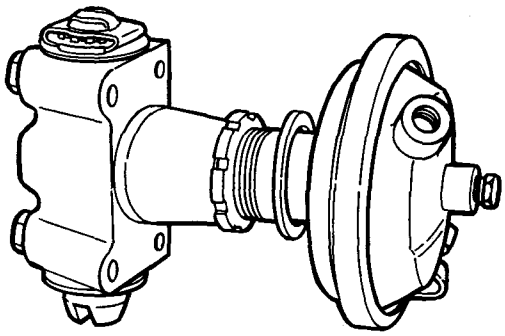
B. Determine the type of power unit used, bottoming or adjusting type. (Bottoming air chambers have an identification tag fastened to the clamp ring bolt and bottoming hydraulic cylinders have "bottoming" cast on housing.)

C. If adjusting type unit is used, carefully mark the position of the assembly on the first exposed thread of the housing tube with a scribe or punch to aid reassembly.

NOTE: If bottoming type is used, see section V, page 20.

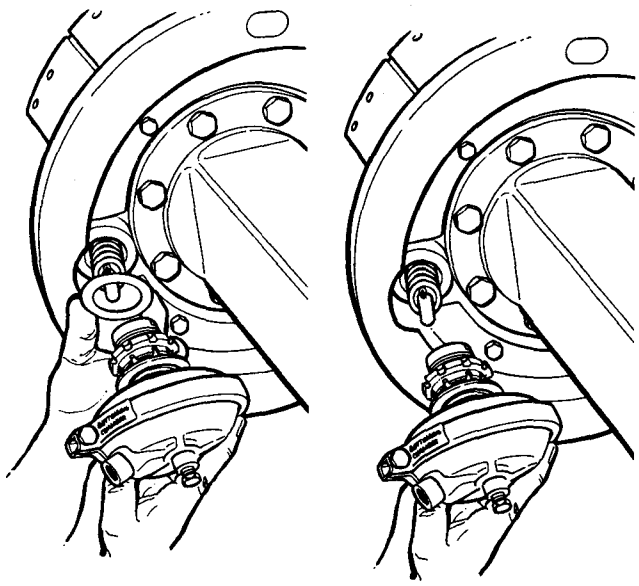


D. Using a drift or other blunt tool and hammer, loosen the collet nut.



NOTE: For welded-on spider mounted brakes with open ends, the entire actuation system can be taken off at this time, if desired, as one assembly by removing four spider to plunger housing capscrews. However, the hub and drum, and dust shield will have to be taken off before removing the actuation system.

E. Unscrew the air service chamber out of the plunger housing. Remove and inspect the wedge assembly. Service if necessary.



SERVICE CURRENT

III. SERVICING AIR CHAMBER

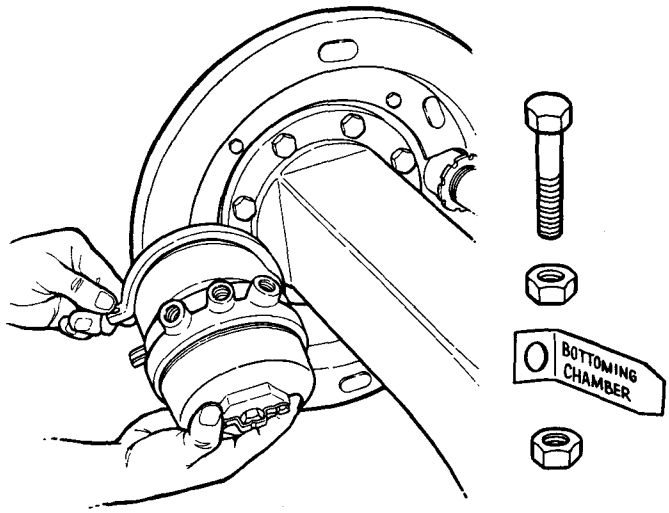
The following procedures are used to replace the diaphragm and boot of the non-pressure housing on the brake assembly.

A. Cage the power spring on the spring brake unit manually or by air, if used.

B. Remove air lines and tag emergency line.

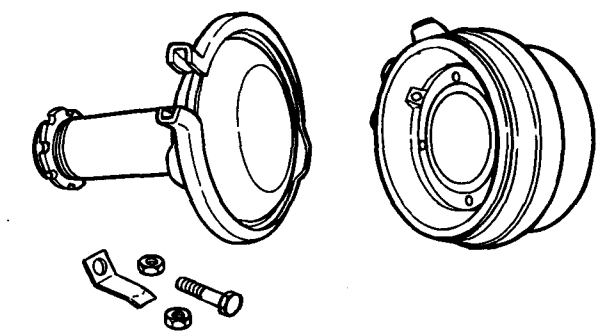
NOTE: Insure emergency line air pressure is exhausted prior to removing from chamber.

C. Remove service chamber non-pressure housing clamp ring nuts, bolt, spring brake warning tag and bottoming chamber tags, if used.



D. Spread the clamp ring. Hold the diaphragm on the non-pressure half and remove the pressure half or spring brake head.

SERVICE CHAMBER SPRING BRAKE UNIT



E. Carefully remove the diaphragm while holding diaphragm plate against the wedge rod. This will prevent the wedge assembly from coming out of engagement with the plungers.

NOTE: If wedge assembly backs out of plunger anytime during this entire procedure, remove non-pressure housing from brake to replace diaphragm.

F. Continue to hold plate and inspect boot. If boot is torn or not attached to housing, strip old boot free from housing and carefully remove plate assembly off wedge rod and out of non-pressure housing tube. (Boot and wedge guide will remain on plate-push rod.)

G. Remove wedge guide and old boot from push rod. Inspect guide for wear and replace, if necessary.

NOTE: Adjusting type non-pressure housing is interchangeable with bottoming type housing and may be converted at this time.

H. Install new boot on diaphragm plate-push rod and press wedge guide all the way onto end of push rod.

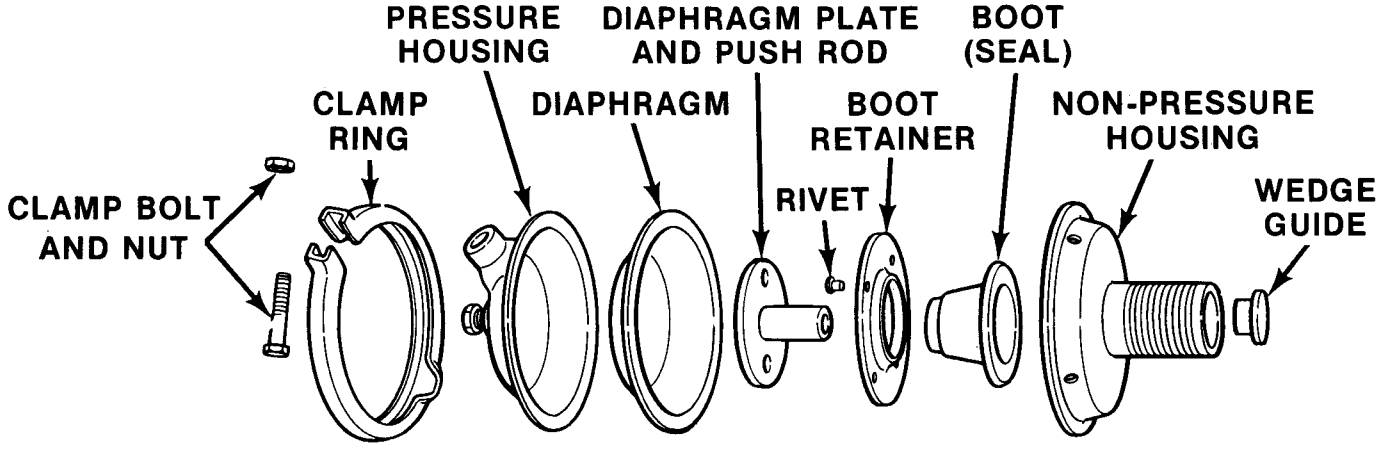
J. Clean non-pressure housing with cement thinner or similar material in area where boot is to be cemented.

K. Apply cement to housing around tube end. Position the plate-push rod assembly into tube. Carefully engage wedge rod so as to not pull it out of plungers.

L. While holding plate against wedge, press boot into position for cementing.

M. Install new diaphragm over plate and onto non-pressure housing, while pushing plate against wedge. Assemble pressure half and clamp ring in reverse manner of disassembly.

N. Connect air lines to proper chamber and spring brake ports. Make a full-pressure brake application and check for air leaks. Road test for brake performance.



IV. REASSEMBLE AIR CHAMBER USING RIVETS

(See previous exploded view)

A. Position the lip of new retainer clamp over lip of new diaphragm boot and place complete assembly into non-pressure housing so that rivet holes are in alignment.

B. Install appropriate size bolts and nuts in two rivet holes 180° apart and fasten retainer clamp and boot assembly to non-pressure housing.

C. Make certain clamp and boot assembly is firmly fastened to non-pressure housing and tap rivets from outside non-pressure housing squarely into remaining 2 rivet holes with a flat head drift.

D. Form the rivet head with correct rivet set.

E. Remove bolts and nuts and repeat riveting procedure for two remaining holes.

F. Install diaphragm plate-push rod through new boot and press wedge guide all the way onto end of push rod.

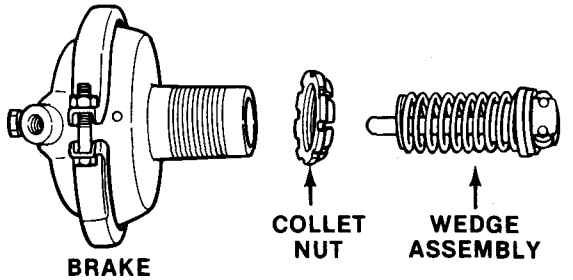
NOTE: Replace wedge guide if necessary.

G. Install diaphragm over plate and onto non-pressure housing. Assemble pressure half (or spring brake unit head) and clamp ring in reverse manner of disassembly.

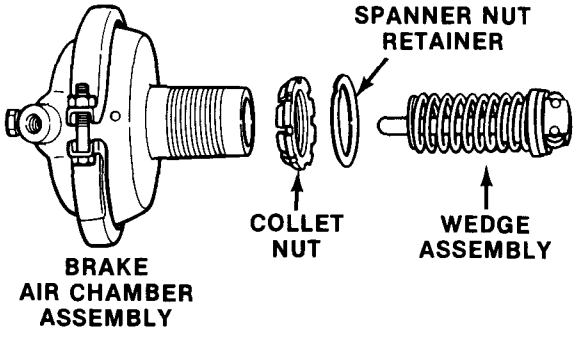
H. Test for leaks using soap and water solution.

V. INSTALLING BOTTOMING TYPE POWER UNIT

A. Check position of the wedge in plunger housing to make certain wedge assembly is properly seated. Then, thread collet nut onto power unit tube. Be sure to replace automatic adjusting identification ring (if used) on power unit tube.



This is the correct position of the collet nut when used with current brake spider having a conical counterbore.



This is the correct "reversed" position of collet nut and retainer when brake spider **does not** have a conical counterbore.

B. Apply a non-hardening sealer to the first three threads of the chamber tube.

C. Thread the power unit into the plunger housing until it bottoms (collet nut loose).

D. Align service chamber ports by either of the following:

1. Back off chamber no more than one turn to proper location.
2. Loosen clamp ring and rotate pressure housing to proper location. Retighten clamp.

E. Connect brake lines.

F. Make and hold a full brake application. Then, hand tighten collet nut.

G. Apply 100 psi.

H. Tighten collet nut with a drift and hammer 1½ teeth (or 3/16 turn, minimum of 125 lb. ft.), and release brake pressure.

J. Check for leaks at all connections.

K. Uncage spring brake unit before returning vehicle to service.

VI. INSTALLING ADJUSTING TYPE POWER UNIT WITH DEPTH MARK

A. Check position of the wedge in plunger housing to make certain wedge assembly is properly seated. Then, thread collet nut onto power unit tube so depth mark on threads is just exposed. Be sure to replace automatic adjusting identification ring (if used) on power unit tube.

B. Apply a non-hardening sealer to the first three threads of the chamber tube.

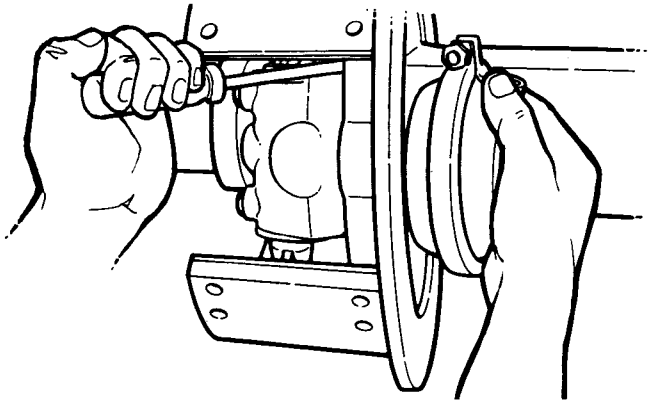
C. Thread power unit into the plunger housing until it bottoms on spanner nut and retainer. (Collet nut can be substituted for spanner nut when needed.)

D. Follow procedures D thru K, of Installing Bottoming Type Power Units.

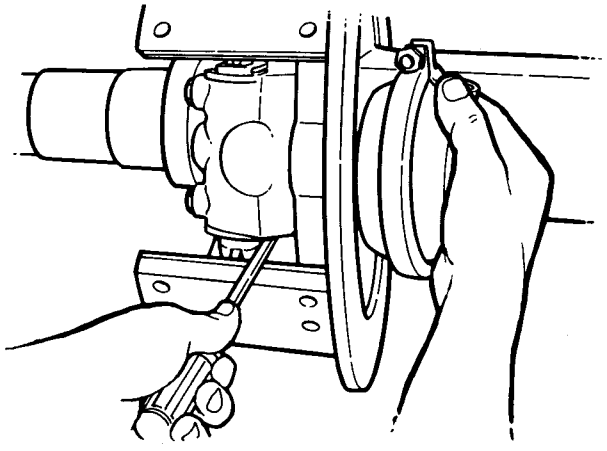
VII. INSTALLING ADJUSTING TYPE POWER UNIT WITHOUT DEPTH MARK

A. Check position of the wedge in plunger housing to make certain wedge assembly is properly seated. Then, thread collet nut onto power unit tube. Be sure to replace automatic adjusting identification ring (if used) on power unit tube.

B. Apply a non-hardening sealer to the first three threads of the chamber tube.



C. Thread the power unit into the plunger housing until it bottoms. This will push wedge assembly between plungers and lift them off their seats inside the housing. By pushing on one shoe or plunger, the second shoe or plunger will be seen to move.



D. Unthread the power unit one turn. Push on one shoe or plunger and then the other plunger. If there is movement of the opposite plunger, unthread the power unit another turn and continue this procedure until no plunger movement can be detected. This point is usually two or three turns from the bottomed position.

E. Follow procedures D thru K of Installing Bottoming Type Power Units, page 20.

VIII. INSTALLING POWER SPRING BRAKE CHAMBER

A. Assemble spring brake chamber (collet nut loose) until it bottoms in the actuator housing.

B. Tighten the collet nut finger tight.

C. Loosen service chamber clamp to align pressure housing port to proper location.

D. Retighten service chamber clamp.

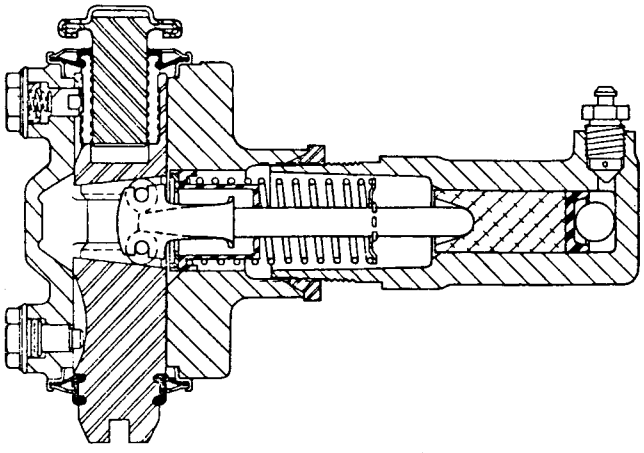
E. Apply 100 psi to service chamber.

F. Tighten collet nut 1½ teeth (125 lb. ft.) minimum.

G. Check chamber for air leaks using soap and water solution.

IX. HYDRAULIC CYLINDERS

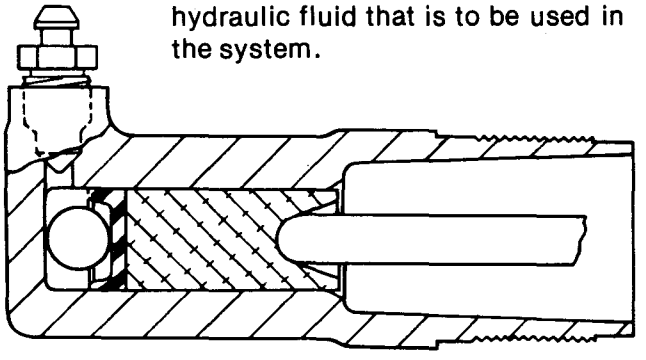
A. EARLY DESIGN



1. Disassemble
   a. After removing cylinder from brake, remove bleeder screw and drain all hydraulic fluid.
   b. Place threaded end of cylinder on a cloth or wood surface and push internal parts out with air pressure. If parts are frozen, hydraulic pressure may be necessary.
   c. Remove piston, cup seal and ball spacer from the cylinder. Earlier piston design used a post to retain the cup seal and act as a spacer. To service, remove the piston post extension.
2. Assemble
   a. Clean all parts in hydraulic fluid, all parts must be absolutely clean. If cylinder bore is corroded, scored or scratched, replace. Inspect piston for nicks, scoring or corrosion and polish with crocus cloth. Inspect

end of bleeder screw for marks that would prevent it from sealing.

b. Lubricate cylinder bore with clean hydraulic fluid that is to be used in the system.



c. Install ball spacer in bottom of cylinder.

d. Install cup seal into cylinder, carefully entering lip of cup seal into cylinder bore, flat end of cup out.

e. Install piston, flat end first, into cylinder and push piston and cup down to bottom of bore, and install bleeder screw.

B. INTERIM DESIGN

1. Disassemble

a. After removing cylinder from brake, remove bleeder screw and drain all fluid.

b. Place threaded end of cylinder on a cloth or wood surface and remove piston, cup, plug or ball, and spring from cylinder with air pressure or if parts are frozen, hydraulic pressure may be necessary.

2. Assemble

a. Inspect cup seal for wear marks.

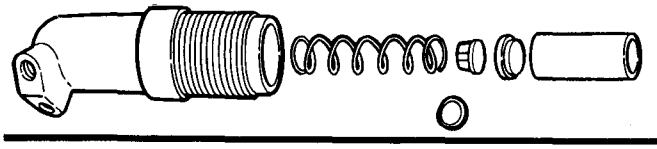
b. Lubricate cylinder bore with brake fluid only. DO NOT USE MINERAL OIL.

c. Install spring and plug or ball in bottom of cylinder.

d. Install cup seal into cylinder, flat end of cup out.

e. Install piston, flat end first, into cylinder and push piston and cup down as far as they will go.

f. Install bleeder screw.



C. CURRENT DESIGN

1. Disassemble

a. After removing cylinder from brake, remove bleeder screw and drain all fluid.

b. Place threaded end of cylinder on a cloth or wood surface and push guide piston, piston, back-up ring, and O-ring out with air pressure or if parts are frozen, hydraulic pressure may be necessary.

2. Assemble

a. Thoroughly clean all parts in hydraulic fluid. If cylinder bore is corroded, scored or scratched, replace. Inspect piston and guide piston for nicks, scoring or corrosion and polish with crocus cloth. Inspect end of bleeder screw for marks that would prevent it from sealing. Replace O-ring at each rebuild.

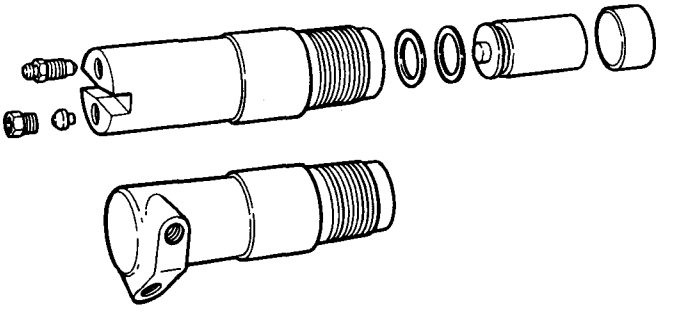
NOTE: If power steering system is the basis for the brake pressure, use mineral oil in place of hydraulic fluid in the cleaning process and lubrication. Be sure to obtain correct replacement parts for the system being used (hydraulic fluid or mineral oil).

b. Lubricate cylinder bore with clean fluid that is to be used in the system.

c. Install O-ring, back-up ring and piston into cylinder. Flat end of piston out.

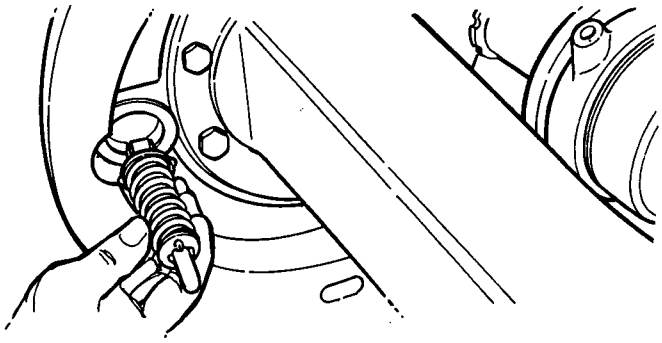
d. Install guide piston, flat end first.

e. Install bleeder screw.

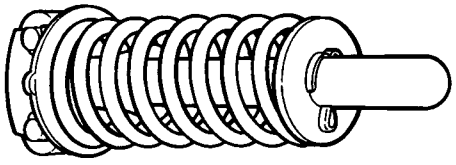


X. WEDGE ASSEMBLY

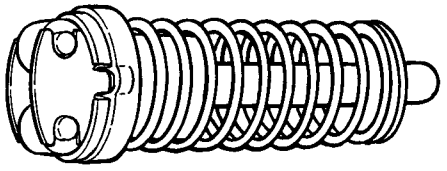
A. Disassemble



1. Remove wedge assembly from plunger housing by pulling it straight out of housing.

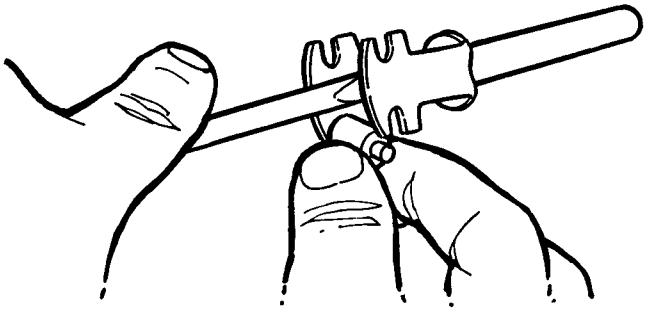


1 ½" STROKE WEDGE ASSEMBLY



1 ¾" STROKE WEDGE ASSEMBLY

2. Remove cotter or "E" washer (earlier design not shown) from wedge shaft while holding spring compressed by hand.
3. Remove wedge spring washer, wedge spring, rubber boot (1¾" assembly) and wedge spring retainer.



4. Insert a thin bladed screwdriver between one flat of the wedge head and roller retainer cage. Spread the cage open just far enough to remove the rollers.

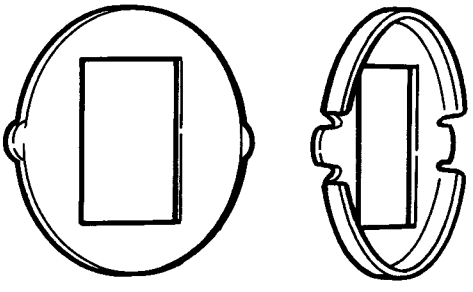
   IMPORTANT: Do not attempt to drive the wedge through the rollers and cage or force the rollers through the slightly closed slots of the cage. This will permanently damage the cage.

5. Remove the roller retainer cage by sliding it off the wedge shaft.

   NOTE: Do not mix components from 1½" and 1¾" stroke wedge assemblies.

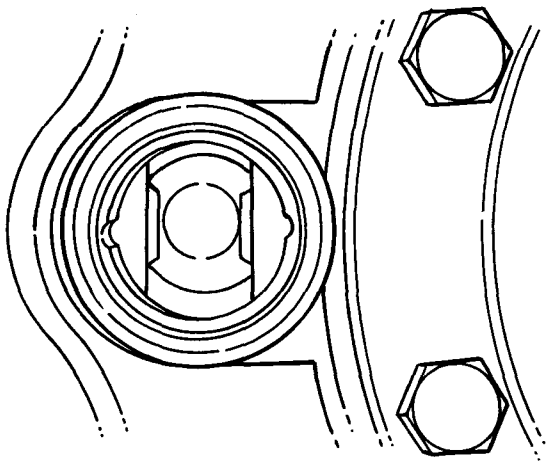
B. Assemble

1. Clean all parts thoroughly and inspect. Check angled faces of wedge to see that they are free from pits or marks. If "E" washer type lock is used, inspect wedge shaft lock groove to see that it is sharp and clean. Inspect roller retainer cage to make sure it will contain rollers properly and inspect the spring for marks that would cause breakage. Replace parts if necessary.
2. Insert wedge shaft into roller retainer cage so angled faces of the wedge head are exposed.
3. Insert a thin bladed screwdriver between flat of the wedge head and roller retainer cage. Spread cage open just far enough to insert roller (journal hub into cage slot). Tip roller into cage and position other journal hub into slot of retainer. Install other roller in same manner and remove screwdriver. DO NOT force rollers thru ends of the cage slots.
4. Install spring retainer over wedge shaft and position centrally over cage and roller assembly. Install rubber boot when used.



1½" ASSEMBLY 1¾" ASSEMBLY

NOTE: Current production and service replacement use a spring retainer that has two tabs or protrusions on the O.D.



These tabs serve to align the wedge assembly as it is installed into the plunger housing by engaging grooves in the wedge bore. If the plunger housing is not equipped with such grooves, remove the tabs at the breakoff marks and file O.D. of the retainer smooth.

5. Install wedge spring over wedge shaft, large coil diameter first. Add spring washer and compress spring by hand far enough to expose cotter key hole or "E" lock groove and install lock (cotter key or "E" washer).
6. Install the wedge assembly into the plunger housing. Check for correct roller-plunger engagement by (1) pushing on wedge rod by hand, while checking for plunger and shoe lift, and (2) measuring the standout of the wedge rod from the end of the threaded housing bore. When properly assembled, the wedge standout is 2¼".

XI. SERVICING DUST SHIELDS

A. Welded on spider brakes have dust shields of the four-piece type attached to the spider with capscrews and lockwashers. Either one or all of the sections can be removed directly from the brake by removing the capscrews and lockwashers.

B. Most bolted on spider brakes with two-piece dust shields can be serviced as described in paragraph A after removing wheels, drums and brake shoes.

C. Bolted on spider brakes with one-piece dust shields will have to be taken off the vehicle for servicing. To remove dust shield from brake, first remove power units, then remove shield to spider capscrews and lockwashers. The shields can be replaced with a one or two piece dust shield.

D. On backing plate mounted brakes, the backing plate serves as a support for the plunger housing and anchor block, as well as a dust shield. For servicing, the complete backing plate will have to be taken off the vehicle by removing the plate to spindle flange bolts, nuts and lockwashers.

XII. SERVICING BRAKE SHOES

A. Remove Shoes

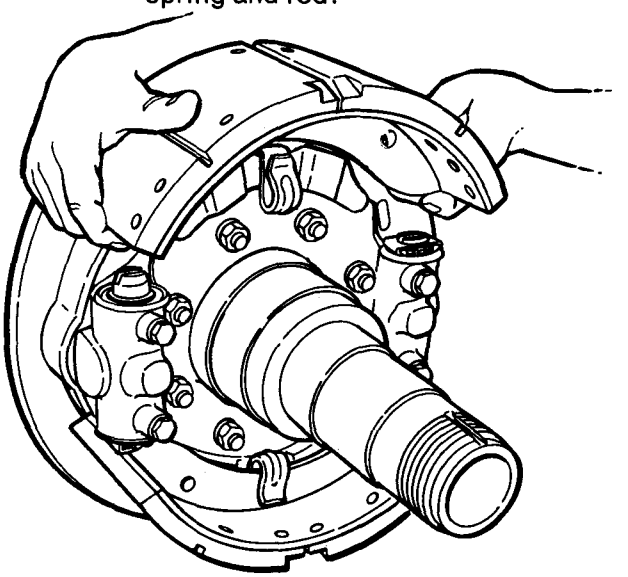
1. Cage the power spring on the spring brake unit, if used.

   NOTE: If necessary, back-off shoes away from drum manually by turning adjusting bolt assemblies.

2. Remove wheel, hub and drum assemblies.
3. Remove brake shoe return springs, using one of the following two methods:

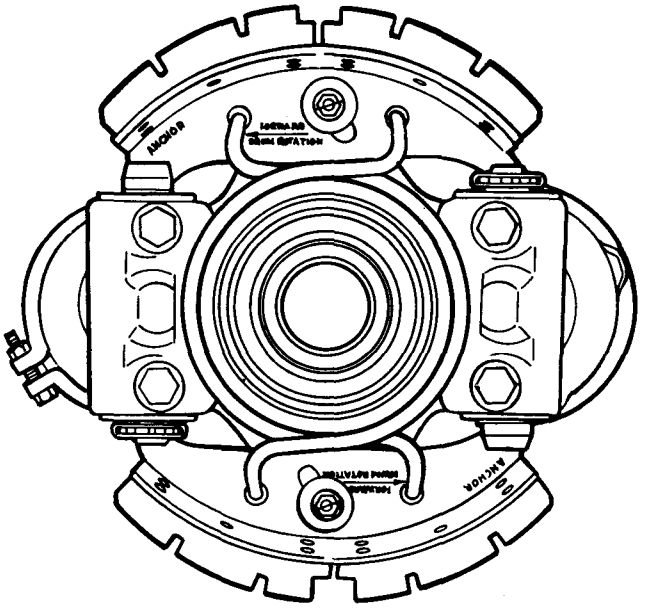
   a. "Coil" Return Spring

      (1.) Use brake spring pliers. (DO NOT use screwdriver.) On backing plate mounted brakes, remove the anti-rattle rod assembly by pushing on rod head on back side, while depressing spring and cap. Turn cap ¼ turn and remove caps, spring and rod.



      (2.) Remove brake shoe assemblies. DO NOT remove brake shoe hold down clip, support bracket, lockwashers and capscrews, or wear buttons unless in need of service.

b. "Horseshoe" Return Spring



Remove dust shield, cotter key and nut from brake shoe guide pin. Remove guide pin, spring and washers. Lift brake shoe out of plunger slots, and tilt brake shoe to unhook the return springs.

B. Assemble Shoes Onto Brake:

1. If necessary, reline brake shoes. Apply film of grease to the shoe rest pads and the plunger and bolt slots.

   CAUTION: Do not use combination linings. Use only the recommended Rockwell STOPLINE® , GG or GH friction linings.

   IMPORTANT: Linings contain asbestos fibers. Caution should be taken in handling and maintenance. Page 30.

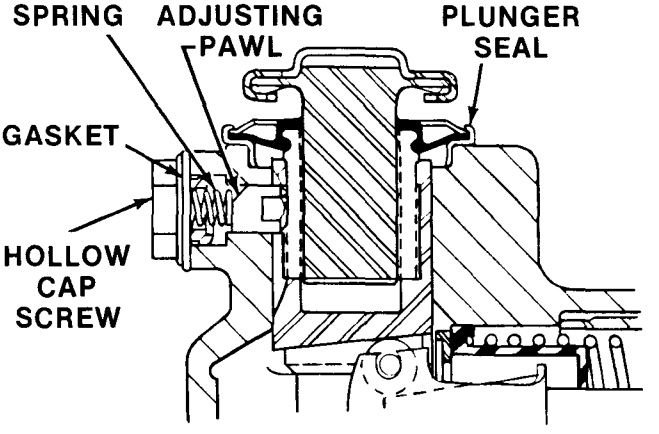
2. Rotate adjusting bolts to align slots in bolt retainer with brake shoe webs, being certain that bolts are not bottomed in adjusting plungers.
3. Assemble brake shoes in reverse manner in which they were disassembled. Be sure that the long radius of the shoe web fits into slot in adjusting bolt retainer, and that the arrow stamped on the brake shoe web points to the anchor plunger in forward wheel rotation.

   Care should be taken with horseshoe return springs, that the long hook overlaps the short hook on both springs. See page 13 for correct position of brake shoes and plungers.
4. Install brake drums and adjust brakes. Uncage power spring units.

XIII. SERVICING PLUNGER HOUSING COMPONENTS

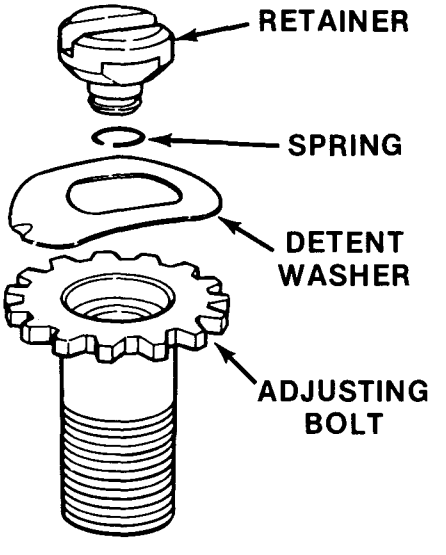
A. Disassemble

1. With brake shoes removed, remove guide screws and gaskets from the plunger housing.



If brake is automatic adjusting, remove pawl assembly or hollow capscrew, gasket, spring, and adjusting pawl. Use a small magnet to remove pawl, if necessary.

2. Pry plunger seals loose and remove anchor (solid) plungers, adjusting plungers, adjusting sleeves (actuator), and adjusting bolt.



If a four-piece adjusting bolt assembly is employed, it should also be disassembled.

B. Assemble

1. Thoroughly inspect and clean all parts including the housing plunger, seal bores and shoe rest pads. DO NOT solvent clean any rubber parts (plunger seals or gaskets). Wire brush plunger parts and adjusting bolt threads to remove caked on dirt and corrosion.

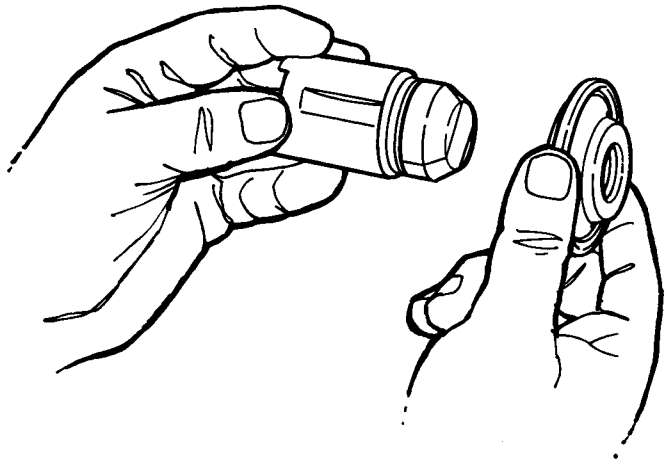
2. Carefully inspect plunger seals and gaskets for tears, cuts or deterioration, and replace if necessary. Also check the angled plunger roller faces for pits, grooves or nicks and replace if necessary. Refer to Troubleshooting Guide.

NOTE: RD spider mounted brakes have one adjusting plunger and one anchor (solid) plunger per plunger housing. The anchor plungers are marked on the shoe slot end, "R" for right hand brakes and "L" for left hand brakes. DO NOT mix at reassembly.

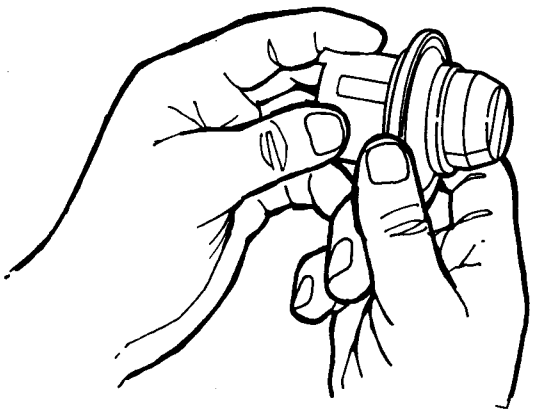
a. Assemble Seals Onto Plungers

IMPORTANT: Do not assemble seals into plunger housing first. This will result in complete lack of sealing of internal plunger housing components.

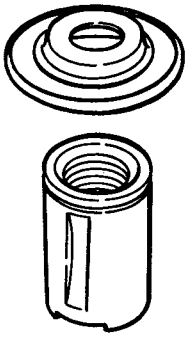
(1.) Apply film of grease to inside surfaces of seals.



(2.) On anchor (solid) plungers — inspect nose for burrs. Mask brake shoe web slot on the plunger nose with masking tape to protect seal.



(3.) Carefully push the double lip seal onto the plunger, stretching the outer seal lip over the plunger nose end, until the inner seal lip is completely in the second plunger groove and the outer seal lip is in the first plunger groove. Remove masking tape. (Brakes employing single grooved plungers and single lip seals should be assembled in the same manner except masking tape is not used.)



(4.) On manual adjusting plungers — push the inner seal lip over the threaded hole end of the plunger until the lip completely enters the plunger seal groove.

b. Install Plungers Into Plunger Housing.

NOTE: For RS brakes (single plunger housing) follow installing adjusting plungers sections.

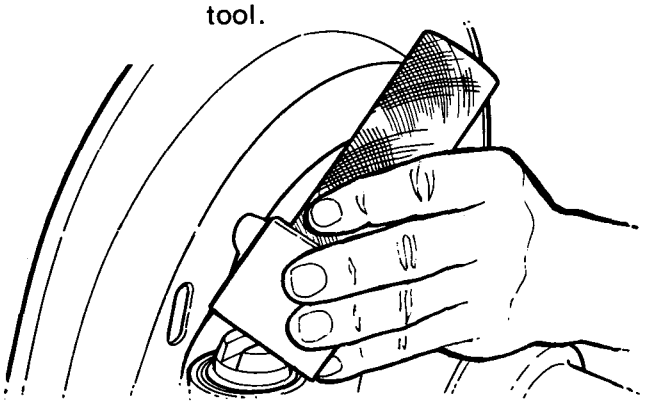
(1.) Coat all plunger bores with grease.

(2.) Anchor (solid) plungers — make sure anchor plungers marked "L" are installed in left hand

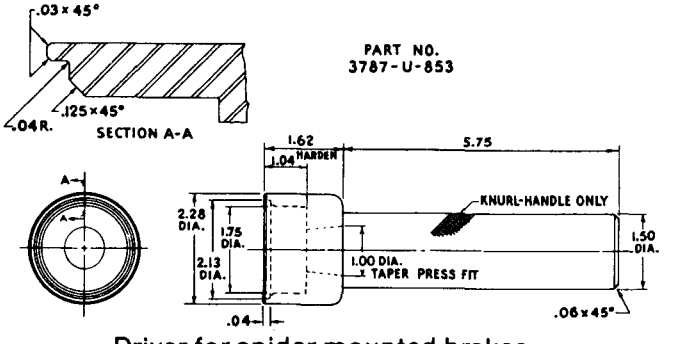
brake and anchor plungers marked "R" are installed in the right hand brake. See page 13 for correct location of anchor plungers in the plunger housings.

(a.) Coat entire anchor plunger with grease, packing cavity behind seal, and insert plunger and seal into housing with plunger key-way slot aligned with guide screw hole. Make certain the plunger goes all the way into the plunger bore and seats on bosses at the bottom.

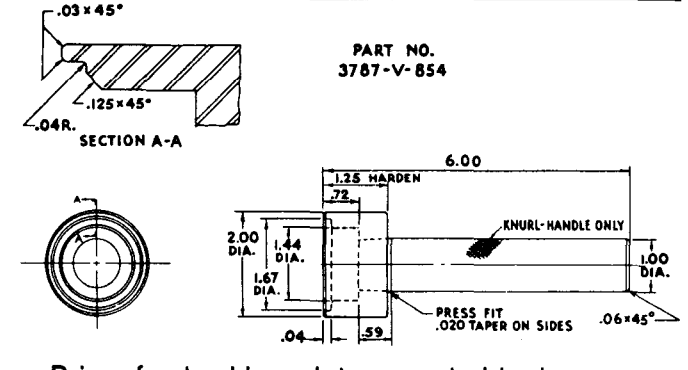
(b.) Seat plunger seal in plunger housing with correct seal driver tool.



Driver must be centered over seal retainer to prevent damage to seal assembly.

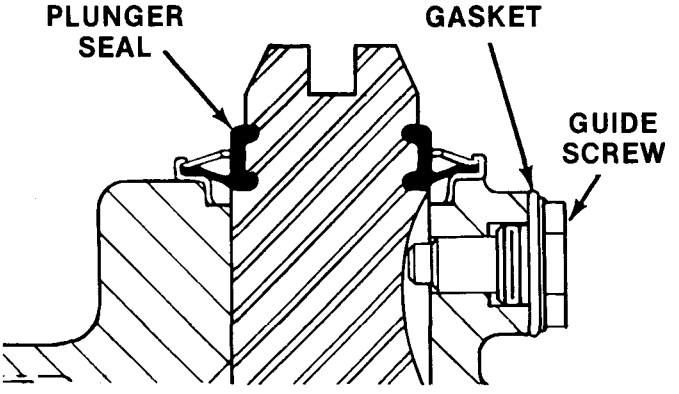


Driver for spider mounted brakes



Driver for backing plate mounted brakes

If seal driver is not available, a 1-3/4" wrench socket can be used for spider mounted brakes and 1-3/8" wrench socket can be used for backing plate mounted brakes.

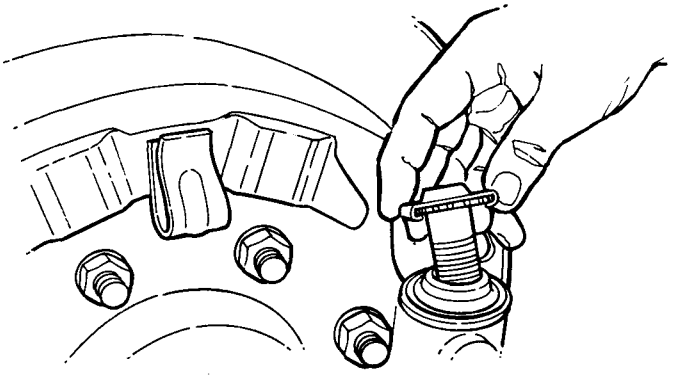


(c.) Assemble gasket and guide screw into plunger housing.

Make certain guide screw end enters the plunger key-way slot so plunger can slide freely in housing bore. Tighten guide screws to 15-25 ft. lbs. torque.

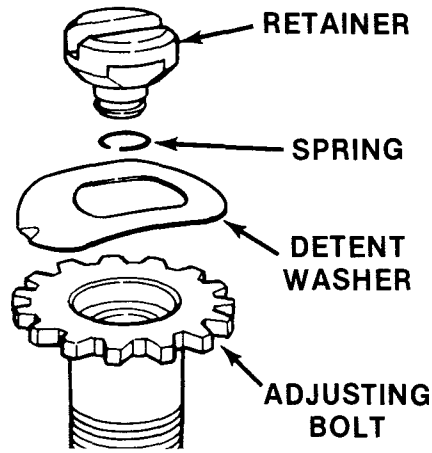
(3.)Manual Adjusting Plungers

(a.) Apply grease to outside of plunger and install plunger and seal into plunger housing as described in paragraph (2a.), for anchor plungers. Also follow procedures in paragraph (2b.) and (2c.) for seating plunger seal and assembling gasket and guide screw.



(b.) Coat adjusting bolt threads with grease and turn bolt into the adjusting plunger by working it through the hole in the outer seal flap. Be careful not to pinch the seal on the threads. Turn adjusting bolt in just short of the seal. DO NOT bottom bolt on the seal.

NOTE: If the original design four-piece adjusting bolt assembly is used, assemble parts in following manner after the adjusting bolt has been installed into the plunger.



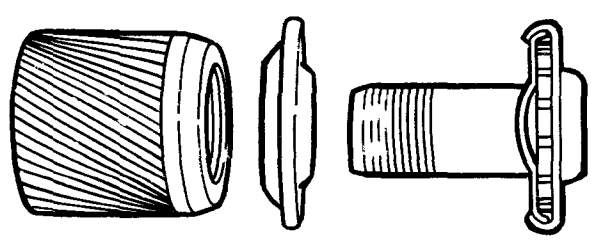
(c.) Install detent washer on retainer, making sure flats are aligned, then install spring ring in groove in retainer.

(d.) Turn open end of spring so it faces the dimple in the detent washer.

(e.) Install detent and retainer so that open end of spring ring and detent dimple engages the bolt last. Push assembly into bolt with thumb pressure only. DO NOT FORCE as it will damage the spring ring.

(4.) Automatic Adjusting Plungers-New Design

(a.) Grease coat the inside and outside surfaces of the adjusting plunger. Place the plunger into the plunger housing aligning plunger key-way slot with the guide hole. Grease the seal and adjusting bolt threads and carefully assemble the seal on the bolt making sure the seal is not damaged. Grease the adjusting sleeve and thread it into the bolt.



Insert sleeve, bolt, and seal into plunger already in housing. IMPORTANT: ADJUSTING SLEEVE MUST BOTTOM ON SHOULDER INSIDE OF PLUNGER. IF BOLT IS THREADED TOO FAR INTO SLEEVE, BOLT WILL BOTTOM IN PLUNGER AND AUTOMATIC ADJUSTER WILL NOT FUNCTION. Coat pawl with grease and insert into housing.

NOTE: The original design adjusting pawl has teeth and flats on one end and a chamfered edge on the other end. New design adjusting pawl has a key with a corresponding key-way in the spider.

NEW DESIGN PAWL ASSEMBLY

(b.) Tighten pawl capscrew to 15-25 ft. lbs. torque.

(c.) Using proper tool, seat seal into plunger housing.

(5.) Automatic Adjusting Plungers - Early Design

(a.) Grease coat the inside and outside surfaces of both the adjusting plunger and the adjusting sleeve. Place the plunger into the plunger housing aligning plunger key-way slot with the guide hole. Coat pawl with grease and insert it into the guide hole, teeth first, and — IMPORTANT — with chamfer toward the brake shoe. This aligns the pawl and sleeve teeth and the flats with the key-way slot.

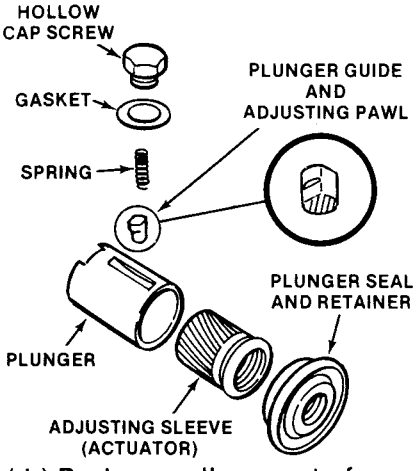
(b.) Push pawl back flush with inside of plunger and hold in this position with a small screwdriver while installing grease coated adjusting sleeve.

(c.) Proper meshing of non-keyed pawl and sleeve teeth can be checked at this point. Do not use following procedure on assem-

blies using keyed pawls. Grease coat adjusting bolt threads and thread it into the adjusting sleeve until it bottoms.

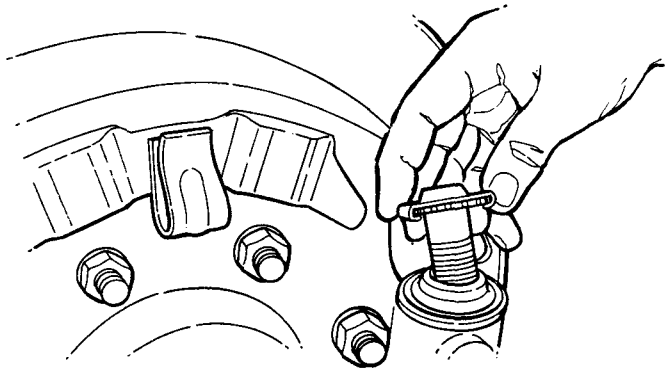
NOTE: This is done without seal installed. A clicking sound and a ratcheting feel will indicate proper meshing of the teeth. Turn the bolt out three turns, if there is no clicking sound or ratcheting feel in a counter-clockwise rotation, this indicates proper meshing. Remove adjusting bolt after check. Tighten hollow capscrew to 15-20 ft. lbs. torque.

EARLY DESIGN PAWL

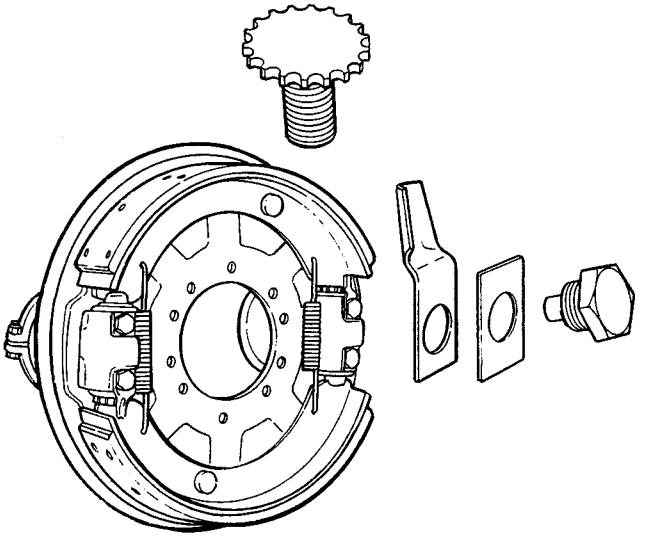


(d.) Pack a small amount of grease into underside of seal and seal lips. Assemble the plunger seal over the adjusting sleeve in the plunger housing by pushing the seal over end of adjusting sleeve so the inner lip enters seal groove. Check by lightly pulling up on seal.

(e.) Using the proper tool, seat the seal into the plunger housing as in paragraph (2b.) on page 27.



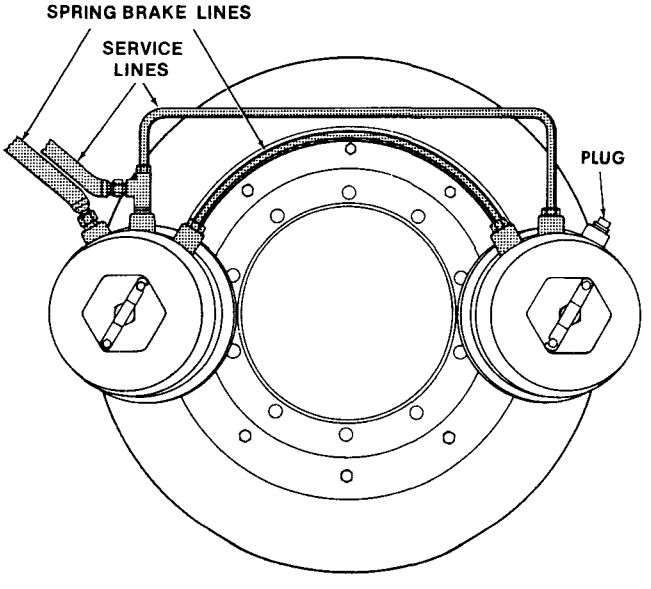
(f.) Coat adjusting bolt threads with grease and thread it into the sleeve after working it through the seal flap hole, being careful not to pinch the seal on the threads. Turn bolt in to just short of the seal. DO NOT bottom it on the seal.



NOTE: On earlier models of front brakes (backing plate mounted) a finger spring type of adjusting bolt lock was used.

To assemble, first install plunger parts, press in seal, turn bolt into plunger or adjusting sleeve and then install finger spring and guide bolt. Lock guide bolt by peening lock plate to bolt boss and head.

XIV. MANIFOLDING



For all tandem axle applications,we recommend four spring brake chambers on one axle of the tandem OR four spring brake chambers located one (per brake) at each corner of the tandem.

Any single spring brake chamber configuration, requires automatic shoe adjustment to work within the range of the lift provided by single wedge.

Before operating the vehicle, the caging bolt must be turned counter-clockwise as far as it will go (approximately 18 to 21 turns) to release the spring brake spring. This allows the spring brake unit to function in the event of air pressure failure. Do not force bolt beyond normal stop.

XV. RECOMMENDED PROCEDURE FOR REDUCING ASBESTOS DUST DURING BRAKE SERVICING

1. Because studies have indicated that exposure to excessive amounts of asbestos dust may be a potential health hazard, OSHA has set maximum limits of levels of airborne asbestos dust to which workers may be exposed. Since most automotive friction materials normally contain a sizable amount of asbestos, it is important that people who handle brake linings understand the nature of the problem and know the precautions to be taken.

2. Areas where brake work is done should be set aside if possible, and entrances should be posted with an asbestos exposure sign as follows:

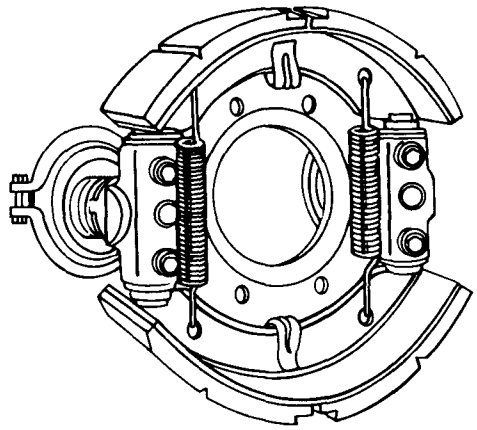
ASBESTOS DUST HAZARD
AVOID BREATHING DUST
WEAR ASSIGNED PROTECTIVE EQUIPMENT
DO NOT REMAIN IN AREA UNLESS YOUR WORK REQUIRES IT
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH

The amount of asbestos in the dust from brake lining wear is normally at an extremely low level because of chemical breakdown during use, and if machining of friction material does not take place, simple procedures will minimize exposure. During brake servicing, the mechanic should wear an air purifying respirator, either a throwaway or one with replaceable particulate filter(s), as approved by the Mining Enforcement and Safety Administration of NIOSH. It should be worn during all procedures starting with the removal of the wheels and including reassembly.

3. During disassembly, all parts should be carefully placed on the floor to minimize the possibility of creating airborne dust. Dust should first be cleaned from the brake drums, brake backing plates and brake assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system. After vacuum cleaning, any remaining dust should be removed by using a rag soaked in water and wrung until nearly dry. Under no circumstances should compressed air or dry brushing be used for cleaning.

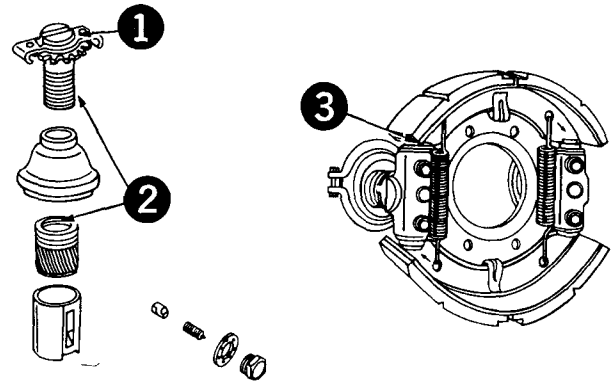
4. Of extreme importance are the precautions which must be taken during machining of friction material. This is the operation in brake servicing when exposure to asbestos dust is at its highest. In addition to the approved respirator, there must be local exhaust ventilation such that the worker exposures are maintained at least below the 1976 OSHA asbestos standards. If there is any question as to the efficiency of asbestos dust removal by the machine, the lining manufacturer should be contacted.

STOPMASTER BRAKE TROUBLESHOOTING



To help keep your Stopmaster wedge brake stopping like new . . . and your maintenance down time to a minimum, the Automotive Operations of Rockwell International has devised this "Stopmaster Brake Troubleshooting guide". In it we pinpoint many of the most common wedge brake problems and show you the most probable causes.

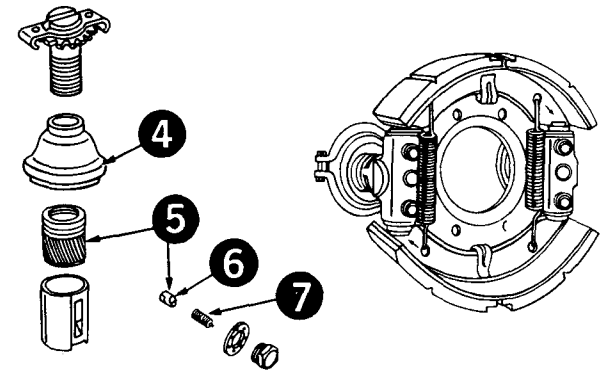
AUTOMATIC ADJUSTERS NOT WORKING



First, let's examine the problem of automatic adjusters not working. The mechanic can quickly isolate this condition by the following:

1. Check to see if the detent spring is damaged or broken.
2. Check the bolt threads and make a determination if they are too tight in the actuator. The bottom of the adjusting bolt must not extend beyond the bottom of the actuator, and the actuator must seat on the abutment shoulder in the adjusting plunger.
3. Check the adjusting plunger to be certain it is at the leading or toe end of the shoe. The rotation arrow stamped on the shoe should point away from the adjusting plunger.

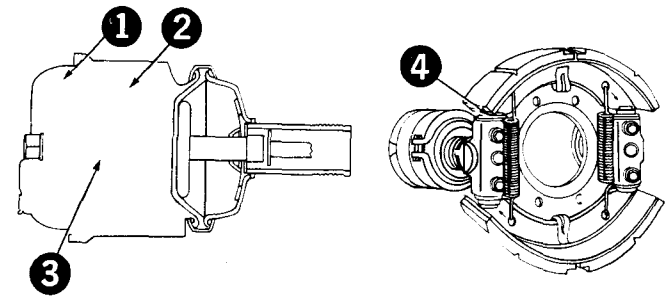
AUTOMATIC ADJUSTERS NOT WORKING



Additional probable causes for automatic adjusters not working are:

4. Seals not installed correctly (for example, seal element jammed into threads causing binding).
5. Damaged pawl or actuator teeth due to improper lubrication.
6. Adjusting pawl in backwards or upside-down (the chamfer on the outer end of pawl must face brake shoe). Later models of the pawl assembly have a raised key on the pawl, which permits only proper insertion into the actuation housing.
7. Adjusting pawl springs collapsed or missing (the tension on the spring should check-out at approximately 7 1/2 lbs. compressed to 9/16" of an inch.).

SPRING BRAKE NOT HOLDING



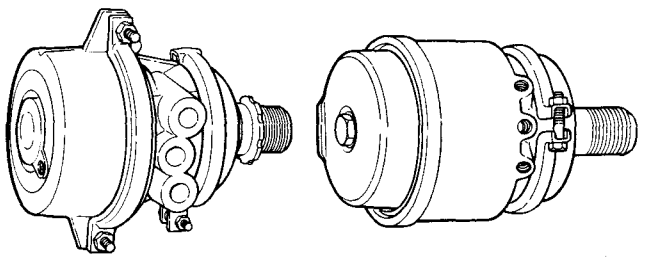
Another possible problem area is the Spring Brake unit not holding. The mechanic should look for the following:

1. Power springs broken or not fully uncaged, resulting in a not fully applied spring force.
2. Hold-off air not fully releasing because the lines may be plugged or the application valve may be malfunctioning.

3. Caging bolt damaged. (Caging bolt should turn freely approximately 18 to 22 turns in either direction.) Always refer to the Spring Brake manufacturers' instructions before servicing the brakes.
4. Brakes not properly adjusted. Refer to Minor Inspection Procedure in Preventive Maintenance section.

ROCKWELL SPRING BRAKES

CURRENT DESIGN EARLY DESIGN

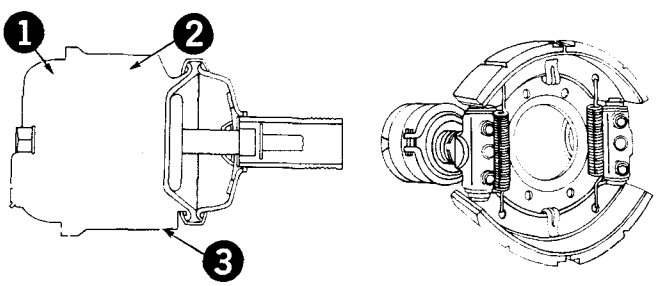


CAUTION: When the brakes are equipped with Spring Brake units, cage the power springs before starting any troubleshooting or removal of wheels and drums.

All Spring Brake units have a warning imprinted on either a metal tag or on the unit's housing stating that the spring is pre-loaded.

This unit should be replaced entirely if its functionability is in question. DO NOT DISASSEMBLE.

BRAKES DRAGGING

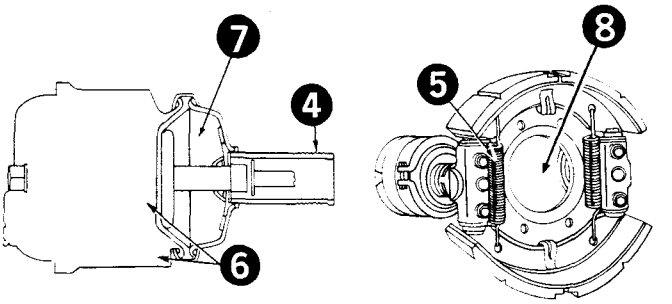


Another common problem is brakes dragging. To determine the cause, check the following conditions:

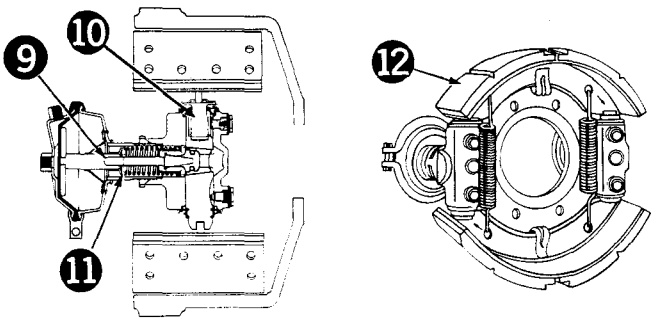
1. Spring Brake power spring not releasing fully, which may be caused by item #2, which is.
2. Low Spring Brake hold-off pressure.
3. Improper connection of service lines (this may result from improperly identified service and Spring Brake lines).

CAUTION: If Spring Brake unit's functionability is in question, replace the unit in its entirety.

BRAKES DRAGGING

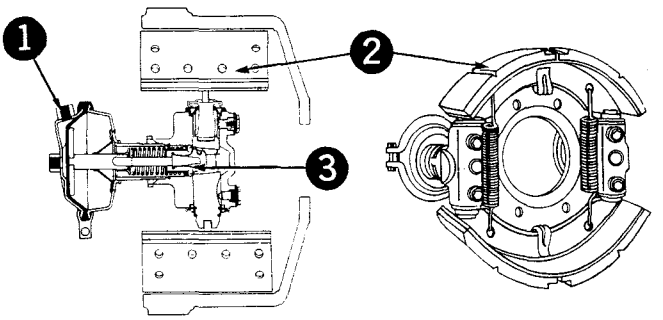


4. Chambers threaded too deeply into plunger housing. (This pertains to early design equipment.) Current chambers are designed to bottom in the housing.
5. Brake shoe return springs not fully returning. The spring tension on all 15" Stopmaster return springs should check out at approximately 75-90 lbs. pull at 9½" inches. On 12 ¼" dia. brake — long hook must overlap short hook on both springs.
6. Leaking air lines or leaking seals.
7. Trapped air behind spring brake unit piston in "standard" brake units.
8. Loose wheel bearings.



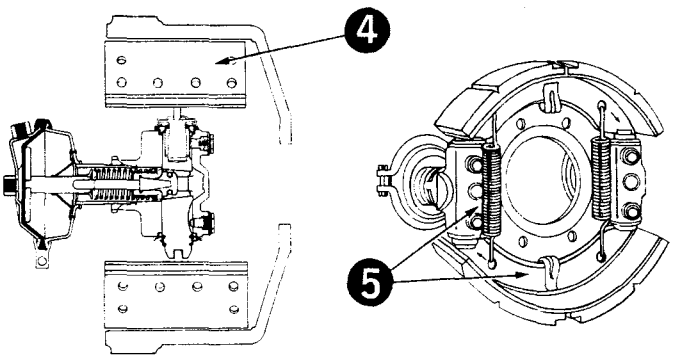
9. Wedge shaft out of push rod socket because of improper assembly or because wedge guide is missing or broken.
10. Plungers too tight or sticking (may be caused by corrosion due to seal failure or inadequate lubrication).
11. Broken wedge return spring and/or cotter pin.
12. Grease or dirt on lining (due to bad wheel seals or lack of dust shield usage).

BRAKES GRABBING



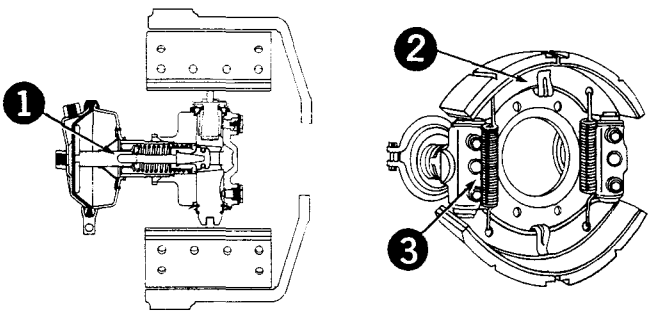
If the problem is brakes grabbing, check for the following conditions:

1. Poor delivery of service air to brakes.
2. Grease or dirt on linings.
3. Misalignment of wedge and plunger parts.



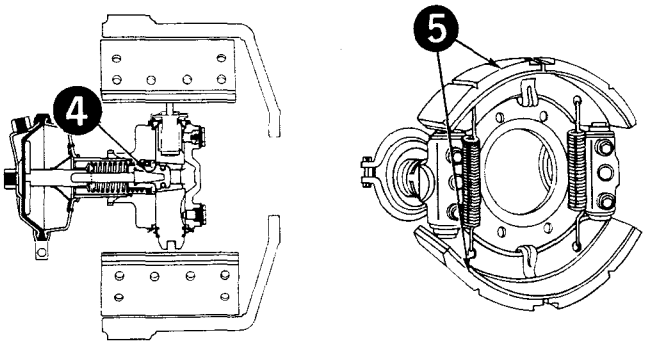
4. Improper brake lining.
5. Binding of brake shoes due to improper assembly or worn out shoes or return springs.

UNEVEN LINING WEAR



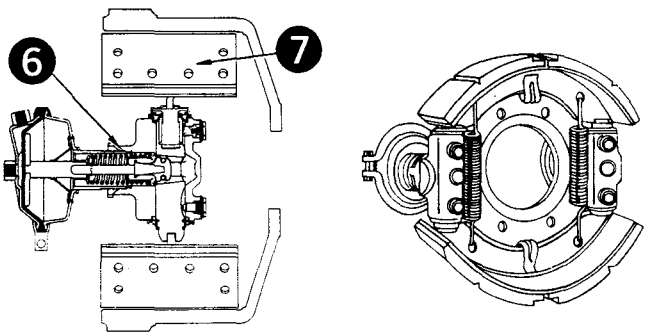
Moving to another area . . . if the problem is uneven lining wear, probable causes might be one of the following . . .

1. Wedge shaft out of push-rod socket because of improper assembly, or because wedge guide is missing or broken.
2. Brake shoes installed backwards.
3. Weak brake shoe return spring not fully releasing brake shoe.

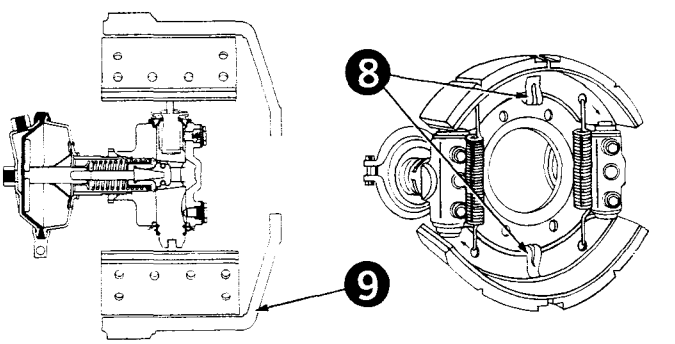


4. Wedge and roller assembly not engaged with plunger slots.
5. Brake linings are not same mix.

Remember this CAUTION for all Stopmaster Brakes — Do not use combination linings.

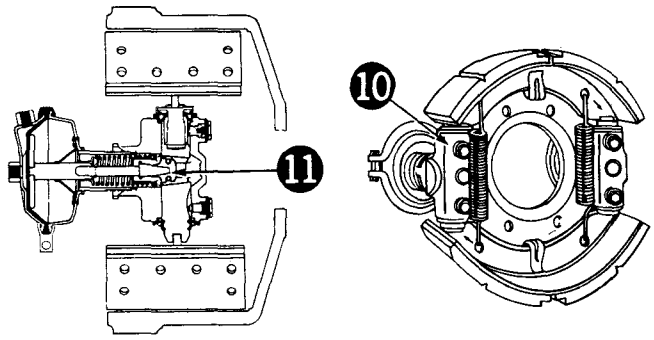


6. Power chambers threaded too deeply into plunger housing (again, this pertains to early design equipment).
7. Check for grease or dirt on lining.



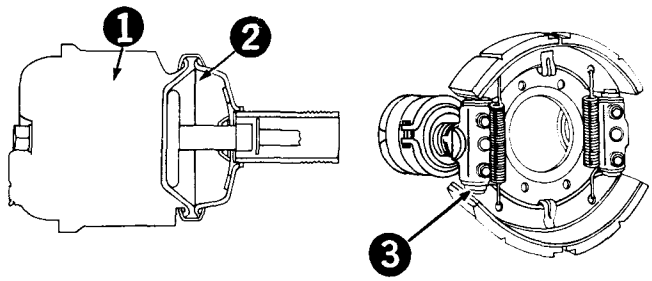
8. Shoe hold down clips not properly holding shoe against shoe support pads.
9. Lightweight brake drums which allow ex-

cessive deflection and bell mouthing when brakes are applied.



10. Automatic adjuster not functioning properly.
11. A roller out of its cage.

BRAKES FROZEN OR LOCKED

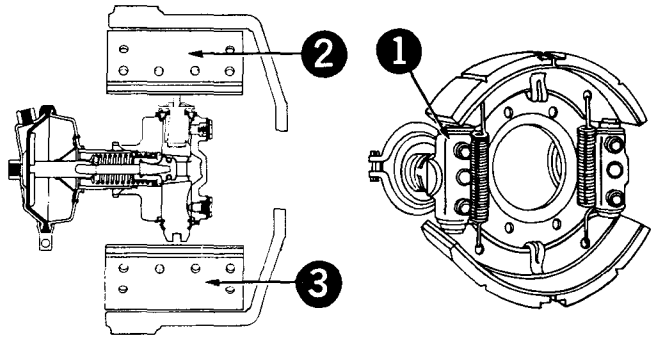


Another common brake problem area is that of frozen or locked brakes. The mechanic should check for these conditions:

1. Spring brake units not releasing.
2. Air not released from brake chamber because of malfunction of air system service lines.
3. Seized plungers.

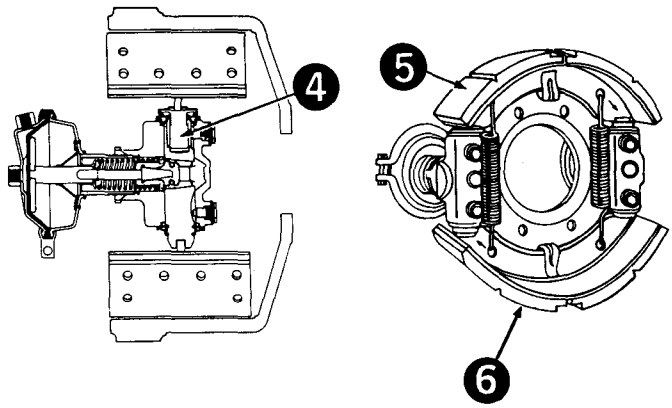
CAUTION: The spring brake unit should be replaced in its entirety if its functionability is in question.

INSUFFICIENT BRAKE TORQUE

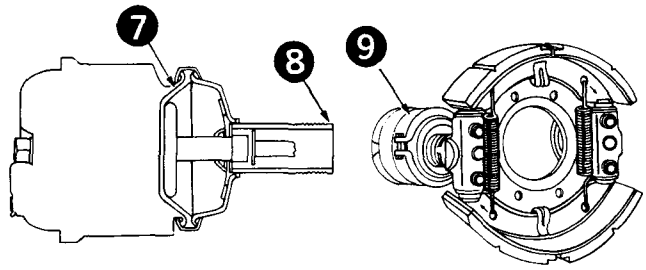


Finally, if the brakes are not developing sufficient torque to stop the vehicle, probable causes may include:

1. Automatic adjusters not functioning.
2. Linings worn out.
3. Low friction linings used at reline.



4. Plungers frozen in spider.
5. Grease on lining.
6. Low friction linings.

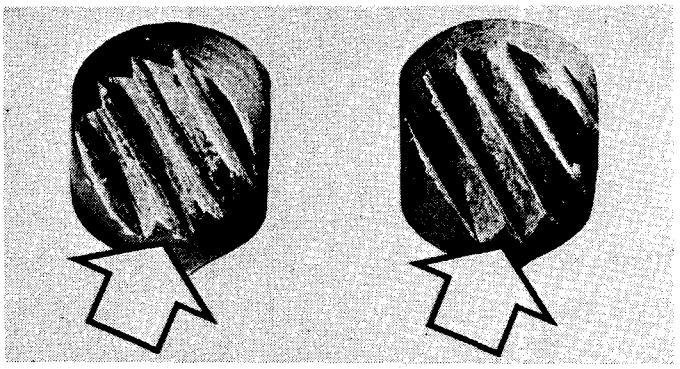


7. Ruptured air chamber diaphragm.
8. Spring Brake chambers not fully threaded into plunger housing. (This pertains to current design equipment).
9. Leaks in the air system.

CAUTION: Spring brake units should be replaced entirely if their functionability is in question.

PLEASE NOTE . . . During inspection and/or overhauling, highly polished parts do not automatically mean that replacement is necessary. Only components that are scored or show other signs of wear must be replaced. For example. . .

ADJUSTING PAWL

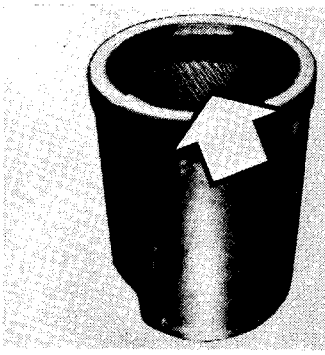


SCOURED ROUNDED TEETH (REPLACE PART)

STRAIGHT UNDAMAGED TEETH (RE-USE PART)

The scored, rounded teeth of the adjusting pawl on the left are unacceptable and the part must be discarded and replaced, while the teeth of the pawl on the right are still undamaged. This part may be re-used. However, if you have any doubts, always replace the pawl.

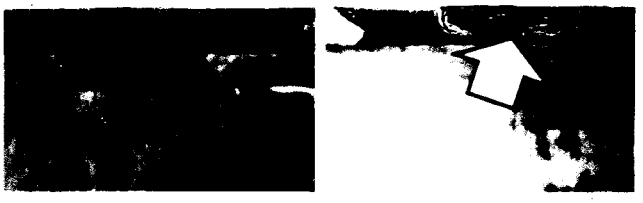
INTERNALLY SCORED PLUNGER



- IF ONLY LIGHT MARKINGS (RE-USE PART)
- IF RIDGES ARE ROUGH (REPLACE PART)

If the internal scoring of an adjusting plunger consists of only light markings the plunger may be re-used. However, if the scoring is rough replace the part.

ADJUSTING PLUNGER

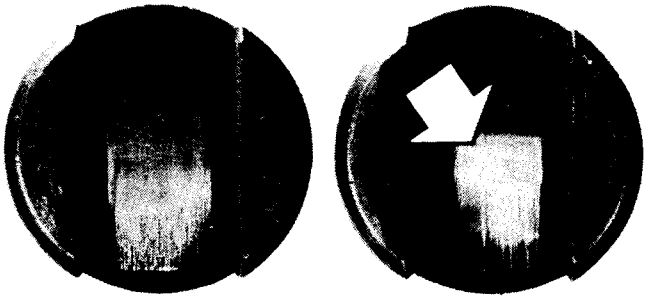


LIGHT CONTACT MARKS (RE-USE PART)

SCORED PAWL GUIDE SLOT (REPLACE PART)

The light contact marks on the pawl guide slot in the adjusting plunger shown on the left are acceptable and will not hamper performance. The deep scoring shown in the photo on the right is unacceptable and this plunger must be replaced.

ADJUSTING PLUNGER

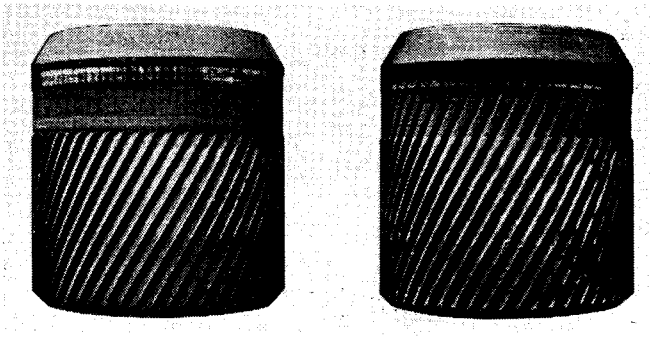


NORMAL ROLLER CONTACT PATCH (RE-USE PART)

BRINELLED ROLLER RAMP (REPLACE PART)

Shown here on the left is a normal roller contact patch on the ramp of an adjusting plunger and this part may be re-used. On the right we see the rectangular indentation of a brinelled roller ramp. This plunger must be replaced.

ACTUATORS

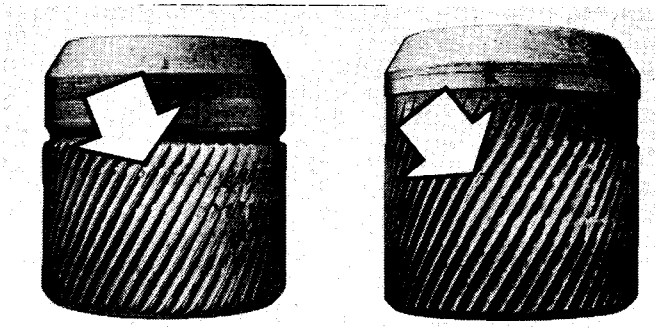


NORMAL WEAR (RE-USE PART)

NORMAL WEAR (RE-USE PART)

Both of these actuators show normal signs of wear and are re-usable.

ACTUATORS



METAL DISPLACEMENT ALONG TOOTH AXIS (REPLACE PART)

DAMAGED TEETH (REPLACE PART)

While the abnormal wear or damage shown on these actuators is unacceptable and these parts must be replaced.

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