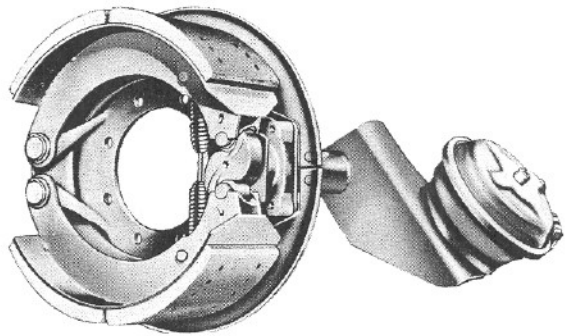


# Brakes



**Use Only Genuine Rockwell Parts**

# ROCKWELL

## BRAKES

### CARE AND MAINTENANCE

*IMPORTANT — Brake lining contains asbestos fibers. Caution should be exercised in handling and maintenance as described in OSHA Regulation (29 CFR PART 1910.1001).*

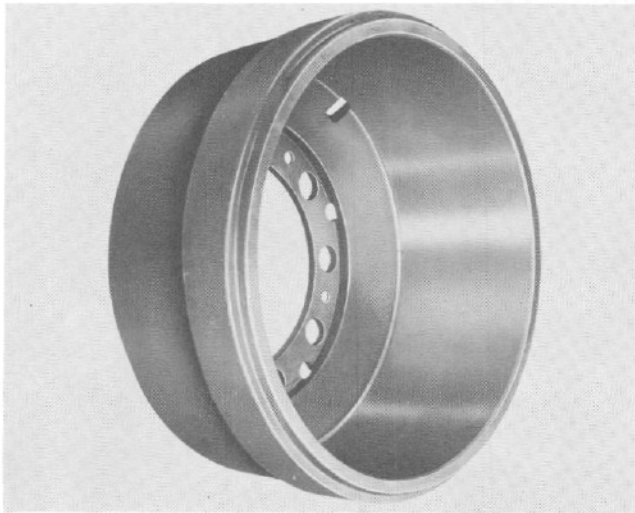
Different types of brake actuating systems are used. This equipment is applied by the vehicle manufacturer.

The following outputs must be maintained for satisfactory brake operation.

#### OPERATING PRESSURES

Vacuum .....	18 inches	
Air .....	85 PSI minimum	— reservoir
	60 PSI minimum	— wheels
Hydraulic .....	1500 PSI maximum	

## DRUMS

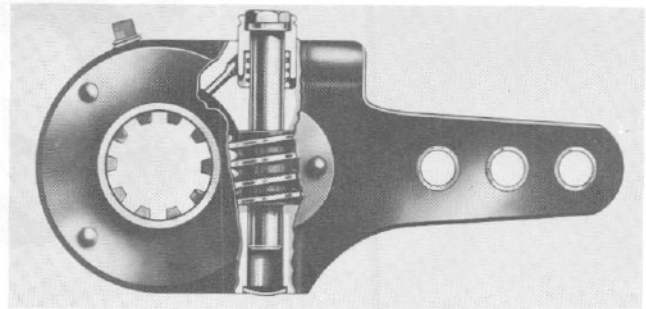


Rockwell does not encourage the reboring of brake drums due to the reduced strength of refaced drums. As an economy measure, in order to salvage drums, some operators do follow this practice.

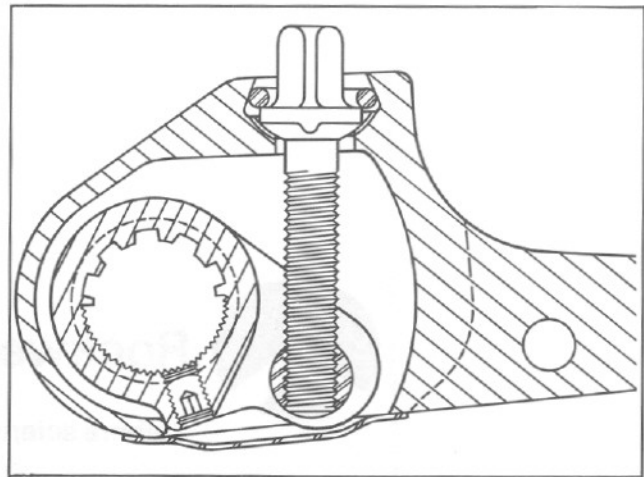
On the Cam-Master® “P” Automotive and Cam-Master® “P” Trailer series brakes, under circumstances where refaced drums and oversize linings are used, precautions regarding cam travel should be observed to prevent sticking cams or cam “roll over.” This condition prevails when the linings become worn. The service instructions relative to the use of oversize roller cam followers should be carefully followed. Drums which have been refaced should be installed on vehicles operating under the least severe conditions.

## SLACK ADJUSTERS

### BENDIX-WESTINGHOUSE AND MIDLAND

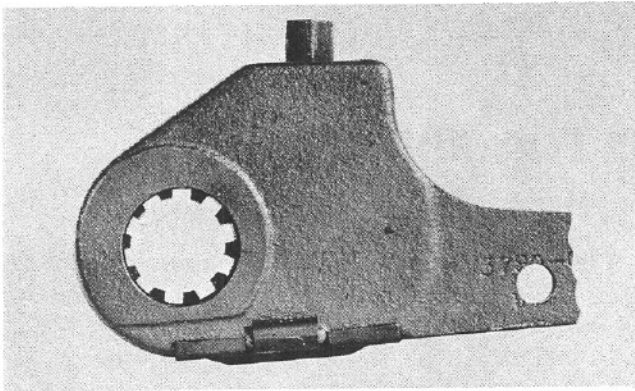


Bendix-Westinghouse and Midland levers permit 360° rotation. Later models of the B/W lever incorporate a self-locking device operated by the adjusting screw wrench.



Service on these units should be obtained through the vehicle manufacturers, Bendix-Westinghouse or Midland. Rockwell does not supply service or parts for these assemblies.

The Rockwell enclosed adjustable lever allows 69 degree rotation of the cam shaft from the initial position. This permits sufficient adjustment to compensate for approximately 5/16" lining wear. To obtain additional adjustment, the lever is moved 4 serrations or 1 spline and readjusted as required.

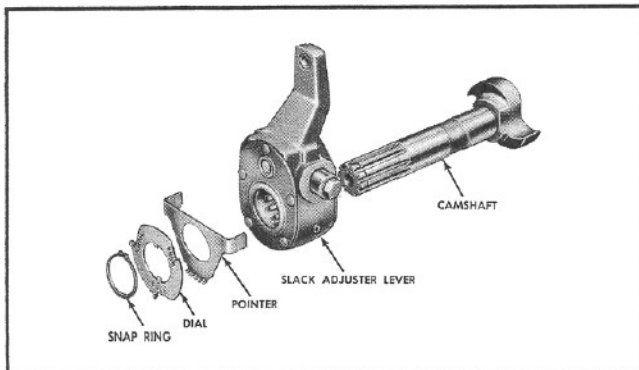


### ADJUSTMENT

Adjust bolt locks at 1/4 turn intervals. One notch, or 1/4 turn, provides .0025" movement at the shoe center. When the adjustment limit is reached, loosen clamp bolt and remove lever. Adjust lever to original position, and move back four serrations on shaft, or one full spline. Tighten clamp bolt and adjust as required.

## LINING WEAR INDICATOR

(DIAL & POINTER)



The use of a lining wear indicator (dial and pointer) on slack adjusters of cam actuated brakes will show the progressive degree of brake lining wear. The dial and pointer, when properly installed, will only give an approximation of lining wear. However, this is accurate enough to tell when lining replacement is necessary.

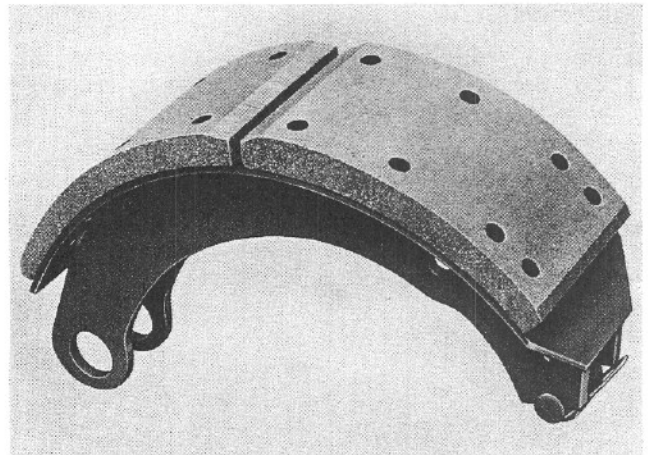
For further information on installing lining wear indicators refer to Rockwell Technic Aid — Section 6, Aid #42.

## ROCKWELL AUTOMATIC

For information on Rockwell automatic slack adjusters refer to advance manual "Automatic Slack Adjusters".

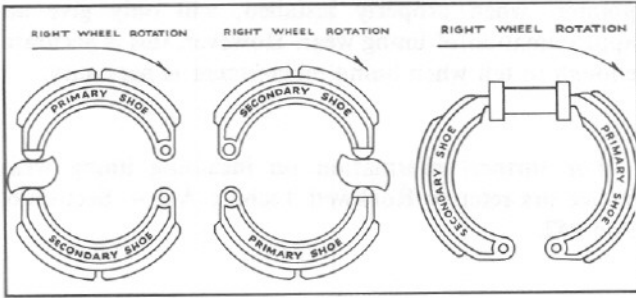
## BRAKE LINERS

*IMPORTANT — Brake lining contains asbestos fibers. Caution should be exercised in handling and maintenance as described in OSHA Regulation (29 CFR PART 1910, 1001).*



Brake liners vary considerably in both size and content. This is determined by the joint engineering departments of Rockwell and the vehicle manufacturer, depending on the vehicle and its prospective application. Consequently, liners should be replaced in accordance with the manufacturer's recommendations.

Combination liners with a different coefficient of friction for the forward (primary) and reverse (secondary) shoes are frequently used. On this type installation



the forward blocks must be installed on the forward shoe. It should be remembered, that following the rotation of the drum, the first shoe after passing the cam or

wheel cylinder is the forward shoe. Primary lining will be painted blue on the edge and the secondary, yellow.

If the cam is behind the axle the top shoe is the primary and the lower shoe the secondary acting shoe.

If the cam is ahead of the axle the lower shoe is the primary acting shoe.

On hydraulic brakes of the conventional type the front shoe is the primary or forward and the rear, secondary or reverse shoe.

While riveting or bonding is the general method of attaching liners, bolting is also used for certain applications. New liners should be attached in the same manner as the original installation. All liners on a vehicle should be replaced simultaneously to obtain the most desirable results.

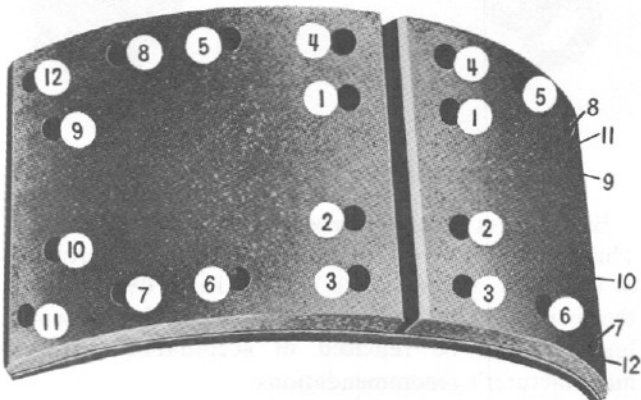
## SERVICE INSTRUCTONS FOR RIVETING

Liner and shoe contact faces should be clean before clamping liner in position. Rivets of the correct body diameter, head size and shape, length, and material should be used.

On the earlier pressed steel shoes rivet holes are slightly smaller than the present punched holes. It may be necessary to line drill the linings and shoes with a No. 5 drill (.2055" diameter). If replacing bonded liners with riveted liners use the No. 5 drill for new holes.

1. Clamp the lining to the brake shoe with "C" clamps so the rivet holes in both pieces are in alignment.
2. Drive the rivets squarely into the holes with a 7/16" flat head drift.
3. Make certain the lining is firmly clamped to the shoe, locating the "C" clamps as close to the rivet holes as possible.
4. Form the rivet heads with the correct tubular rivet set following the sequence shown in illustration below, working from heel to toe.

Liner installation should be checked with a .002" feeler gauge to assure liner and shoe contact.



## INSTALLING BOLTED LINERS

The same precaution should be taken with bolted liners as with riveted liners. New lock washers should be used and nuts tightened to the following 3/8" dia. Brass Bolt 220-280 lb. in. or 18-23 lb. ft 1/4" dia. Brass Bolt 80-100 lb. in. or 7-8 lb. ft.

## CIRCLE GRINDING

When liners are installed on brake assemblies not provided with adjustable anchor pins, the liners should be circle ground to provide the correct liner and drum contact. With the cam in the full release position, the liner should be ground .070" less than the drum diameter. If 80% of the liner has not cleaned up, the cam should be adjusted and the liners ground until 80% contact of the drum diameter is obtained. The 80% contact must be continuous and in the middle of the lining.

## USE OF OVERSIZE LINERS

### Automotive "P" and Trailer "P" Series

To compensate for material removed when refacing brake drums X (1/16" oversize) and XX (1/8" oversize) liners are furnished by the lining manufacturers. When oversize liners are used the drums should also be machined in increments of 1/16" (RADIUS increased 1/16").

Enlarging the drum diameter will permit the cam to rotate beyond its maximum lift when the lining becomes worn. This can result in sticking cams or cam roll-over.

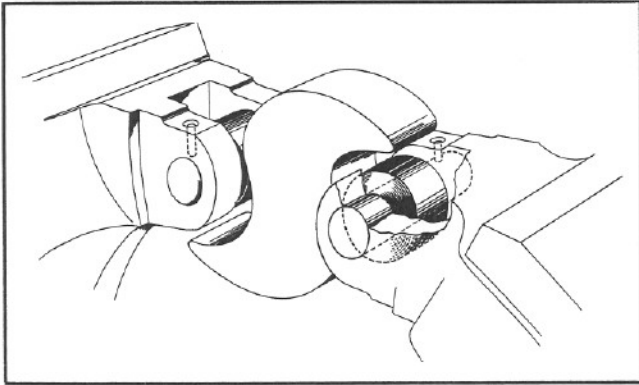


## Cam Roll-over

To avoid this condition and obtain maximum lining wear, oversize roller cam followers, thicker wear plates or wear plate shims (depending on brake design) should be installed when the liners become approximately 50% worn.

## ROLLER CAM FOLLOWERS

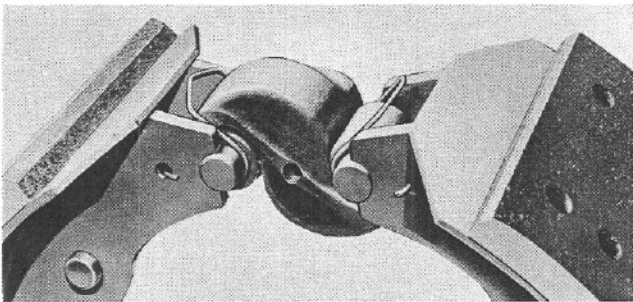
### "S" Head Cam — Cast Shoes



Part No.	Size	O.D.
1199-A-625	Standard	1.250"
1199-M-937	Plus $\frac{1}{8}$ " (.125")	1.375"
1199-Z-910*	Plus $\frac{1}{4}$ " (.250")	1.500"
1199-A-911*	Plus $\frac{1}{2}$ " (.500")	1.750"

\*Install when liners are approximately 50% worn.

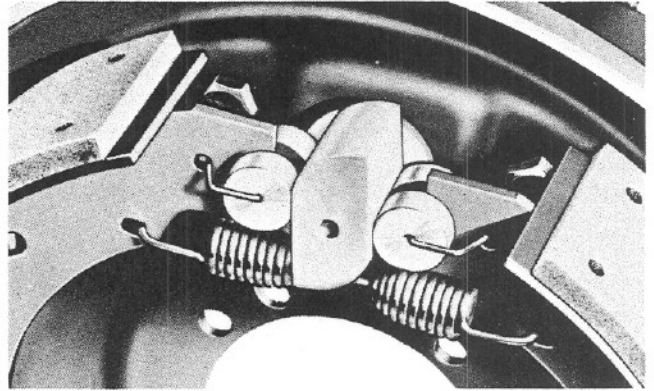
### "S" Head Cam — Pressed Shoes



Part No.	Size	O.D.
1779-R-18	Standard	1.250"
1779-C-81	$\frac{1}{8}$ " Oversize	1.375"
1779-D-82	** $\frac{1}{4}$ " Oversize	1.500"
1779-E-83	** $\frac{1}{2}$ " Oversize	1.750"

\*\*Install when liners are approximately 50% worn.

## Flat Head Cam



Part No.	Size	O.D.
1779-K-63	Standard	1.245"
1779-X-102	$\frac{1}{16}$ " Oversize	1.307"
1199-A-3563	$\frac{1}{8}$ " Oversize	1.370"

Roller cam followers are available in four sizes, each having been designed for a specific purpose.

### Standard (1.250")

Standard rollers are used when installing standard lining with standard drums, "X" lining with  $\frac{1}{16}$ " oversize drums and "XX" lining with  $\frac{1}{8}$ " oversize drums.

If the drums were previously refaced and oversize rollers later installed, the oversize rollers must be removed and standard rollers installed.

### $\frac{1}{16}$ " Oversize (1.307") — Flat Head Cam Only

$\frac{1}{16}$ " oversize rollers are to be used when original standard liners are not worn enough for change but are used with worn or trued drums  $\frac{1}{16}$ " oversize.

### $\frac{1}{8}$ " Oversize (1.375")

$\frac{1}{8}$ " oversize rollers are to be used with the installation of standard liners with worn or trued drums which are  $\frac{1}{32}$ " oversize.  $\frac{1}{8}$ " oversize rollers should be installed and the liners circle ground a few thousandths less than drum diameter.

### $\frac{1}{4}$ " Oversize (1.500")

Where "X" liners have been installed with  $\frac{1}{16}$ " oversize drums and standard rollers, these rollers should be removed and  $\frac{1}{4}$ " oversize installed before the lining becomes worn to a point where the brake cam is no longer effective with the standard rollers.

### $\frac{1}{2}$ " Oversize (1.750")

Where "XX" liners and  $\frac{1}{8}$ " oversize drums have been used, the standard rollers should be removed when the liners become approximately 50% worn and  $\frac{1}{2}$ " oversize rollers installed.

### CAM PLATE SHIMS

When standard liners are installed with worn or trued drums, or "X" or "XX" liners have been installed and are approximately 50% worn, shims or a combination of shims should be installed under each of the cam wear plates to permit the cam to be returned to the full release position.

<i>Thickness</i>	<i>Part Number</i>
$\frac{1}{64}$ " (.015625")	2203-P-432
$\frac{1}{32}$ " (.03125")	2203-Q-433
$\frac{1}{16}$ " (.0625")	2203-R-434

### PREVENTIVE MAINTENANCE

A schedule for the periodic adjustment, cleaning, inspection and lubrication of brake equipment should be established by the operator on the basis of past experience and severity of operation. Linings and drums are parts particularly subject to wear depreciation. To compensate for this wear, brakes should be adjusted as frequently as required to maintain satisfactory operation and maximum safety. Adjustments should provide uniform lining clearance, correct travel of levers and proper equalization.

Brakes should be cleaner, inspected, lubricated and adjusted each time the hubs are removed.

During a major overhaul, the following parts should be carefully checked and replaced with Genuine Replacement Parts as required:

1. Backing plates for distortion, and backing plates or spiders for looseness or sheared rivets.
2. Anchor pins for wear or misalignment.
3. Brake shoes for wear at anchor pin holes, wear pads or lever contact areas.
4. Cam shafts and cam shaft bearings or bushings for wear.
5. Shoe return springs should be replaced at the time of overhaul.
6. Brake linings for grease saturation, wear and loose rivets or bolts.
7. Drums for cracks, scoring or other damage.

Prior to reassembling, the following parts should be LIGHTLY COATED with brake lubricant, Specification 0-615 or the equivalent:

1. Adjustable anchor pin bearing surface.

2. Cam or shoe abutments.
3. Cam shaft needle bearings and nylon bushings.
4. Cam roller follower shafts and journals and hardened wear pads.

Excessive lubricant should be avoided as grease soaked lining cannot be salvaged or cleaned.

The use of meter type fittings which have a maximum 40 lb. pressure relief or shut off is recommended for all fittings on camshafts.

Wheel cylinders should be checked for leaks and damaged boots replaced.

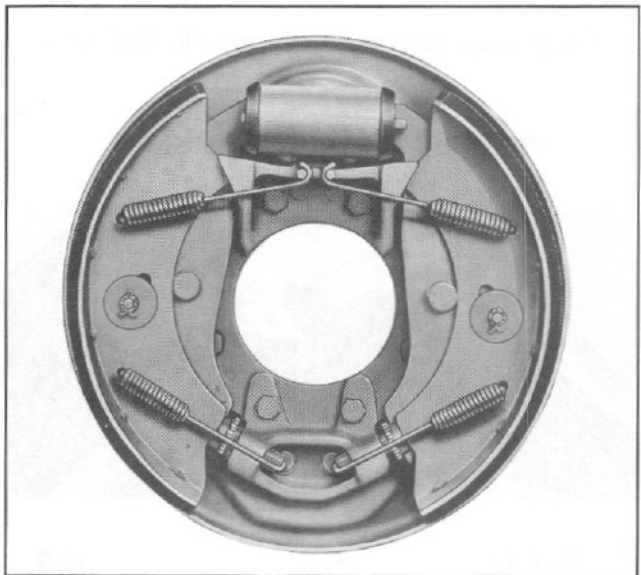
It is recommended that all new lock rings be installed where used.

Wheel bearings should be properly adjusted before making brake adjustments.

Linings should not be allowed to wear to the point where rivets or bolts may contact brake drums.

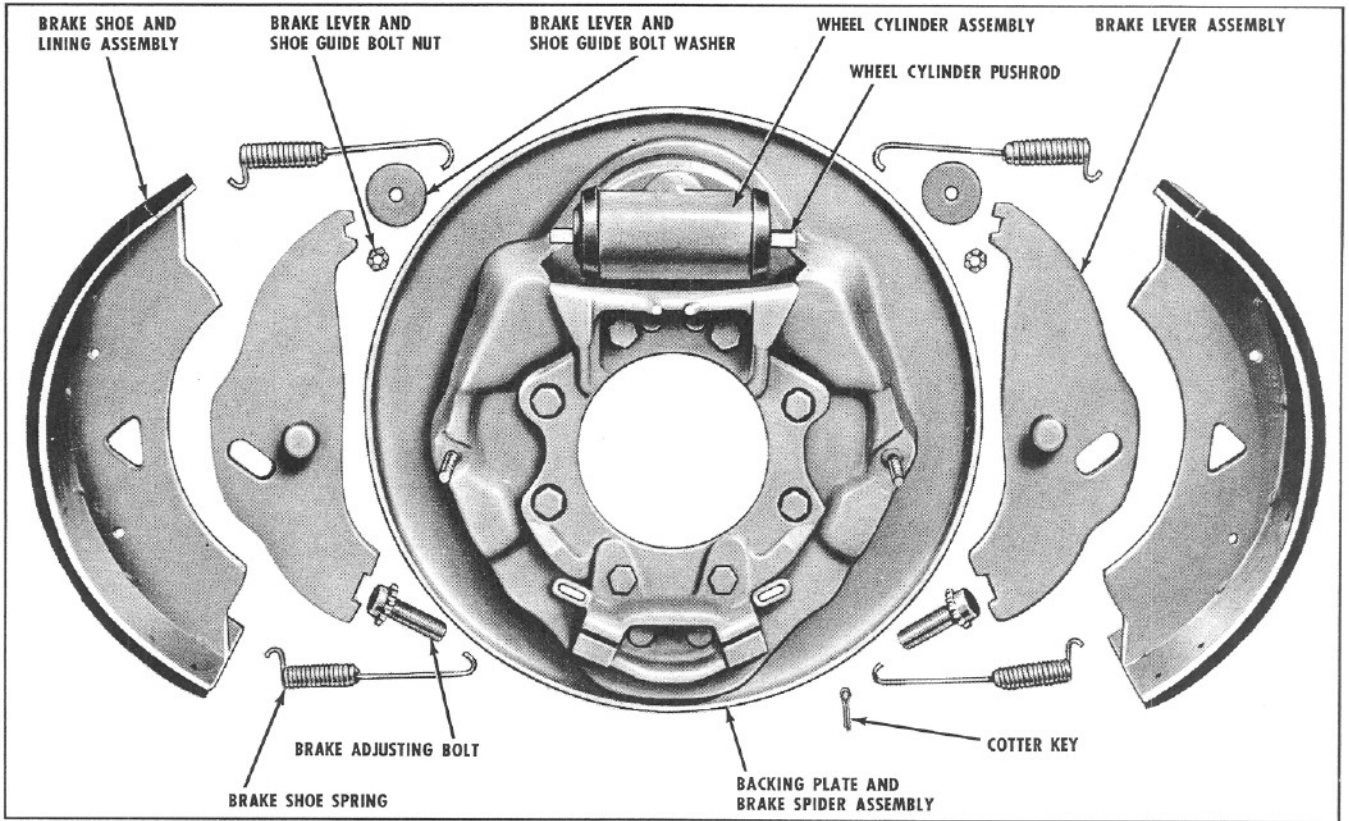
### SERVICE INSTRUCTIONS

#### "DH" SERIES BRAKES



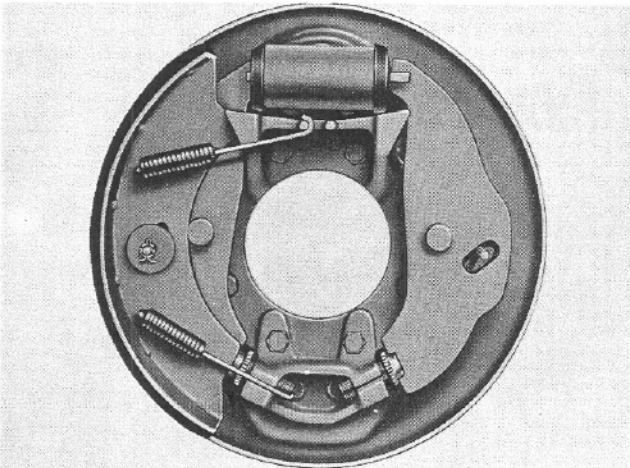
The "DH" Brake is a dual primary brake, hydraulically actuated. This brake, commonly referred to as the Duplex Brake, features identical shoe and liner assemblies and four identical return springs which simplify assembly and disassembly.

## "DH" BRAKE LAYOUT



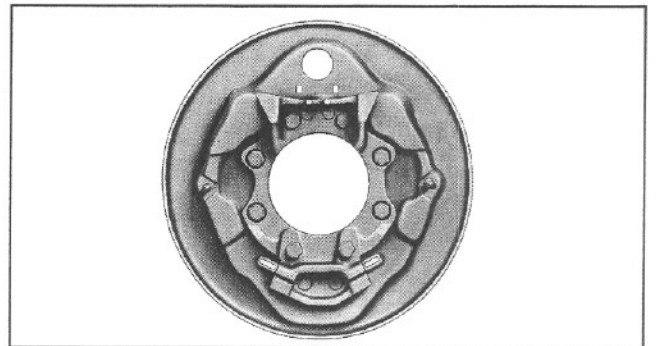
## DISASSEMBLY

- A. Remove wheels and brake drums.
- B. Remove cotter key from guide bolts.
- C. Install wheel cylinder clamp to prevent forcing pistons out of wheel cylinders.



- D. Holding the shoe against the brake backing plate with one hand (after guide bolt cotter keys have been removed), remove the guide bolt nut and washer with the other hand.
- E. Allow the springs to rotate the shoe abutment end until the spring tension is released.

- F. Unhook the return springs from the spider, adjustment bolt and shoes. Remove shoes.



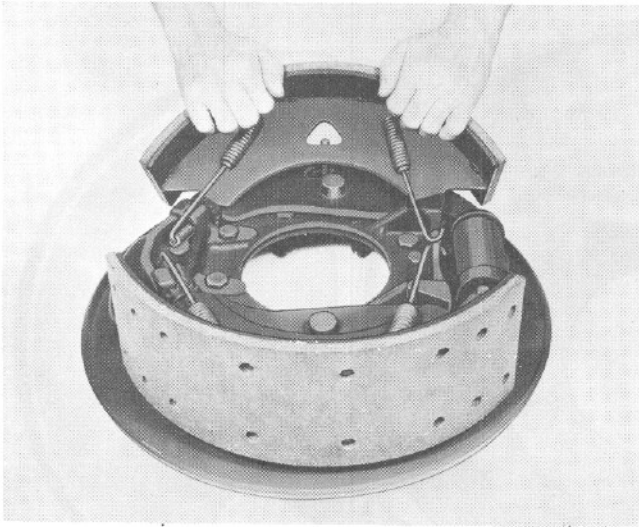
- G. For complete disassembly, disconnect the hydraulic lines, remove wheel cylinder cap screws and wheel cylinder.
- H. Remove brake adjusting bolts.

## ASSEMBLY

- A. Install wheel cylinder and push rods. Tighten wheel cylinder cap screws securely.
- B. Install adjusting bolts and turn in fully.
- C. Position lever so that ends mate with pushrod at top and adjusting bolt at the bottom. (There are right and left hand levers.)
- D. Hook short ends of both springs into brake shoe web holes.

## CARE AND MAINTENANCE

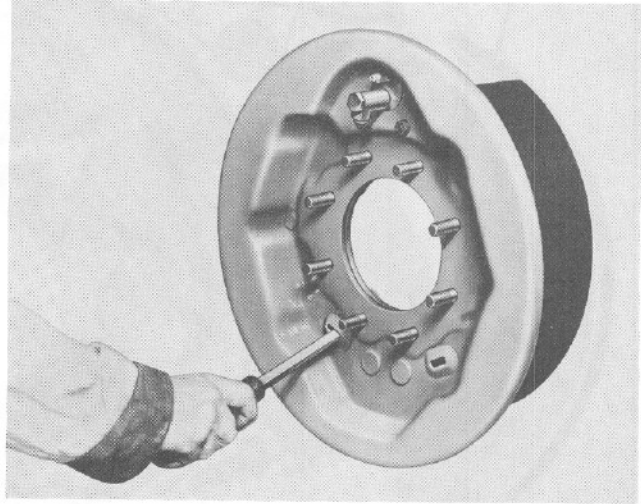
- E. Hook long end of upper spring on spider and long end of lower spring in adjusting bolt end. Lean abutment ends of shoe web against spider abutment and adjusting bolts.



- F. With both hands rotate shoe and liner assembly over lever pressure bottom and guide bolt into position against the lever.
- G. Hold shoe and liner assembly against lever with one hand and install washer and nut on guide bolt with the other.
- H. Tighten guide bolt nut so that shoe and lever will have clearance of .015". When the spring type guide bolt washer is used, tighten the guide bolt nut until the cotter pin can be inserted in the guide pin.
- I. Lock guide bolt nut with cotter key and connect hydraulic lines.
- J. Bleed Hydraulic System after all brakes have been re-assembled.

## ADJUSTMENT

- A. The "DH" Brakes are adjusted from the back-face of the backing plate at slotted holes.

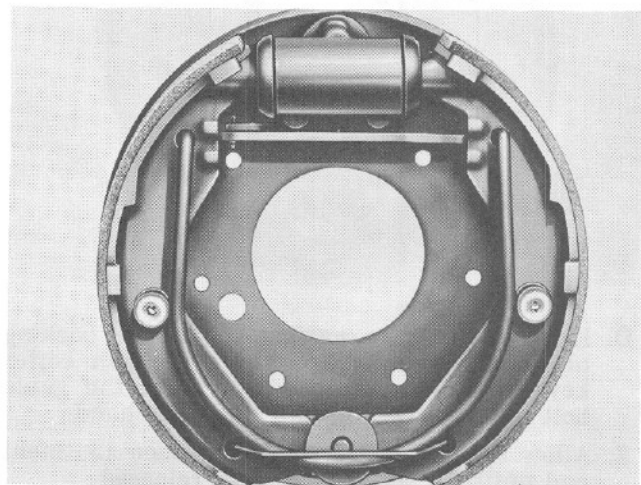


- B. Insert adjusting spoon through slotted hole to engage lugs on adjusting bolt. Move handle up or down using slot end as a fulcrum. To expand shoes move tool handle down when in the L.H. slot and move tool handle up when in the R.H. slot.
- C. Shoe liners should be brought out tight against the brake drum. Adjusting bolt should then be backed off until the drum can rotate freely. Brake shoes should be adjusted individually.

## "FSH" SERIES BRAKES

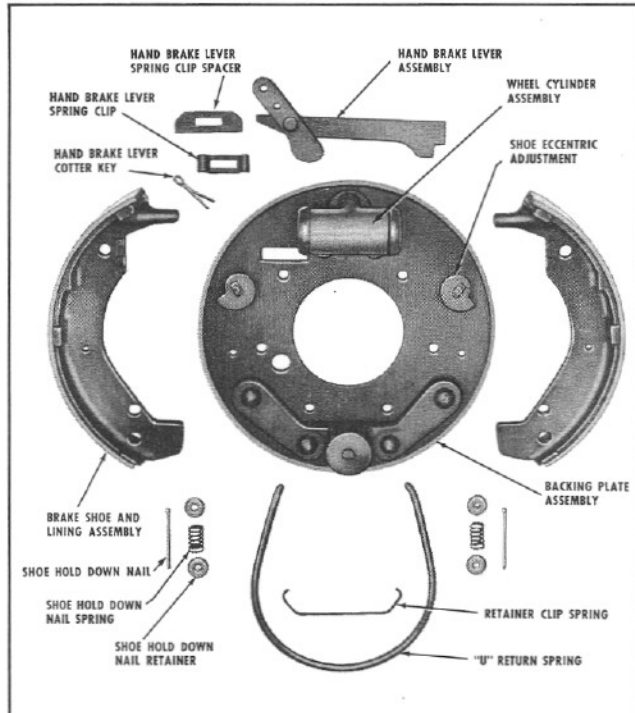
The "FSH" brake is a floating shoe hydraulic brake. Actuation permits the shoes to center themselves in drum with equal effectiveness in either direction. This brake is supplied either with or without a built-in mechanical parking brake.

The "FSH" brake is also built with automatic adjustment for use on special applications. On the "FSH" automatic type, one actuation of the foot pedal sets the automatic adjustment. No further adjustment of the brake is required during the full life of the brake lining.



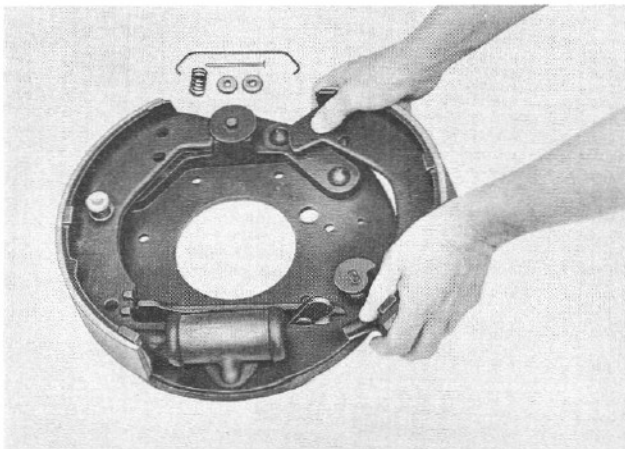


## "FSH" BRAKE LAYOUT



## DISASSEMBLY

- Remove wheels and brake drums.
- Remove "clip spring" over "U spring" with suitable tool.
- Unhook and remove "U spring."
- Hold from turning, the "hold down nail outer spring cup" with one hand, depress spring until pliers can grip the nail. Turn nail  $\frac{1}{4}$  turn and remove cup, spring and hold down nail.
- Remove brake shoes.
- On "FSH" brakes incorporating the mechanical hand brake, remove the cotter key on lever and remove spacer, clip and hand brake assembly.



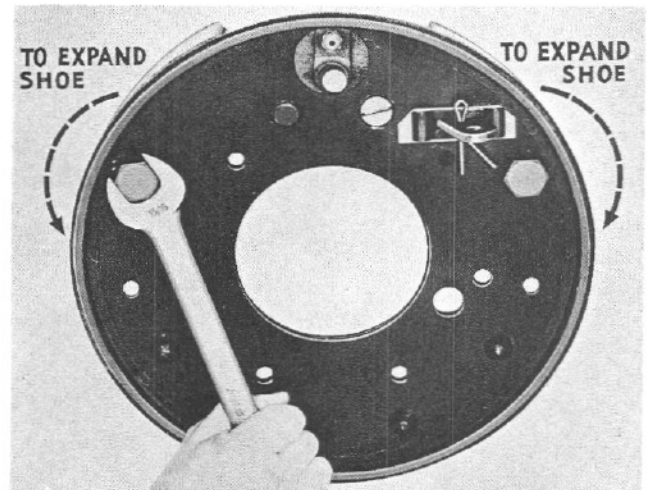
- For complete disassembly, disconnect hydraulic line, remove wheel cylinder attaching screw, cap screw and wheel cylinder.

## ASSEMBLY

- Install wheel cylinder and tighten screw and cap screw securely. Connect hydraulic line.
- Install on units employing the mechanical hand brake, the hand brake lever assembly and insert clip, spacer and cotter key.
- Insert push rod end of shoe in wheel cylinder and position brake shoe.
- Assemble "hold down nails," cups and springs.
- Assemble "U spring." Place hook in one shoe and stretch spring opposite hook into the other shoe.
- Assemble bottom "clip spring" into shoes over "U spring."
- To position adjusting pawl on brakes with automatic adjustment, tap shoe in with lead hammer until brake assembly will go into drum.

## ADJUSTMENT

- The "FSH" adjustable type brake has two eccentric cams that may be adjusted by use of a  $\frac{15}{16}$ " open end wrench on adjusting bolts.



- Upon reassembly, first actuate brake to center shoes in drum.
- Adjust liners out until a slight drag can be felt while drum is in rotation. Back off adjusting bolt until drum can rotate freely.

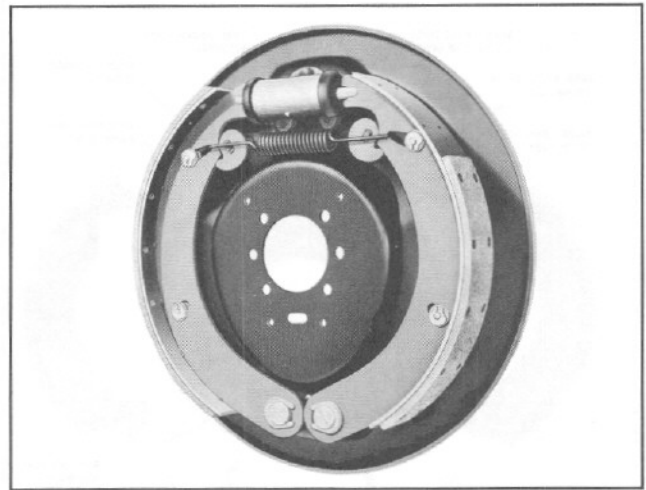
Subsequent adjustments to compensate for lining wear may be made by moving shoe in or out by turning the eccentric cam in direction desired.

"FSH" brakes which are not equipped with the parking lever feature, usually have an upper coil spring rather than the "U" spring.

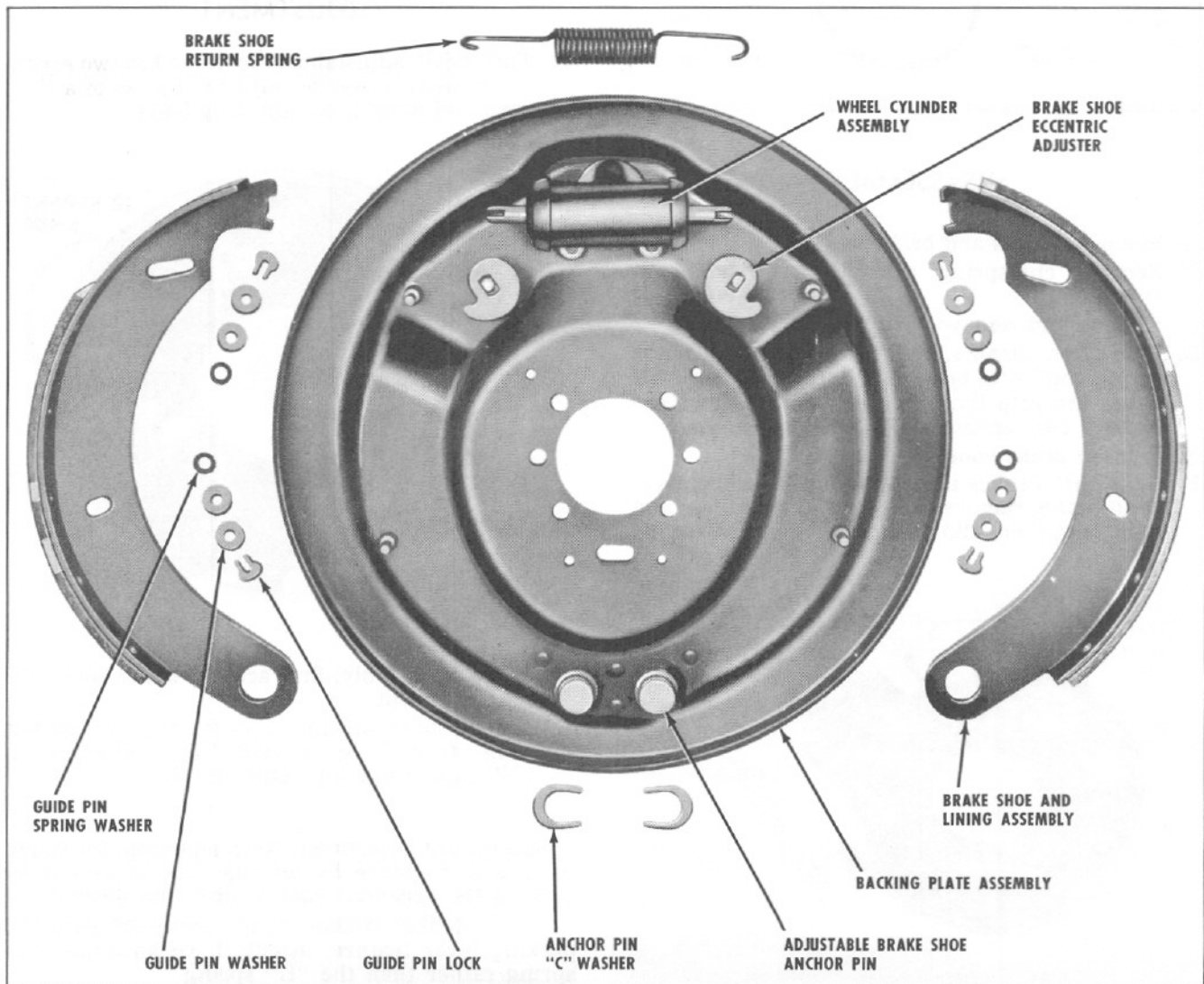


## "H" SERIES BRAKES

The Hydraulic Brake commonly referred to as the plain "H" is a light duty, two shoe type brake, mounted on a backing plate which also serves as a dust shield. Adjustable anchor pins provide a means of centering the brake shoe arc in relation to the drum, and secondary or minor adjustments are made by rotating the eccentric cam which bears on the brake shoe web or pin in the shoe web.

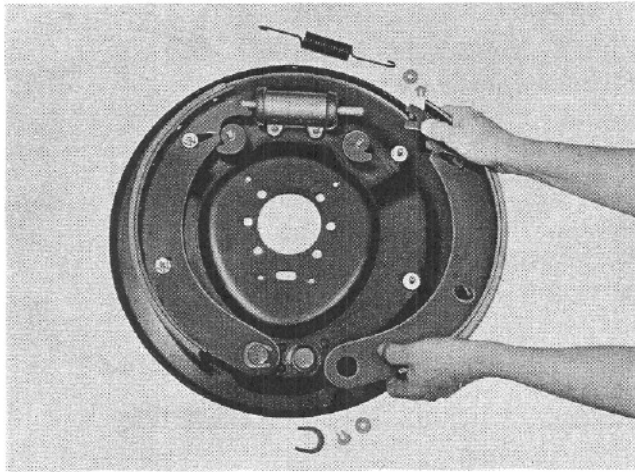


### HYDRAULIC BRAKE LAYOUT



## DISASSEMBLY

- A. Disconnect brake shoe return spring.
- B. Remove anchor pin "C" washers and guide pin locks and washers.



- C. Remove brake shoe and lining assemblies.
- D. Remove anchor pin lock nuts, lock washers and anchor pins.
- E. For complete disassembly remove cap screws, washers and wheel cylinder assembly and disconnect hydraulic lines.

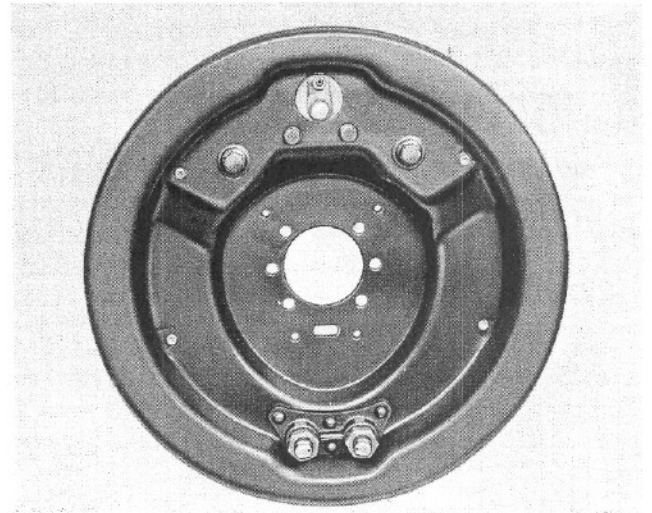
## REASSEMBLY

- A. Position wheel cylinder, install cap screws and lock washers and tighten securely. Re-connect hydraulic lines.
- B. Insert anchor pins and install washers and lock nuts. (Punch marks must be together and wrench flats in line.)
- C. Position shoe and lining assemblies and install washers and lock rings.
- D. Back off adjusting cams and position shoes on push rods in wheel cylinder.
- E. Hook shoe return spring in brake shoe web holes.

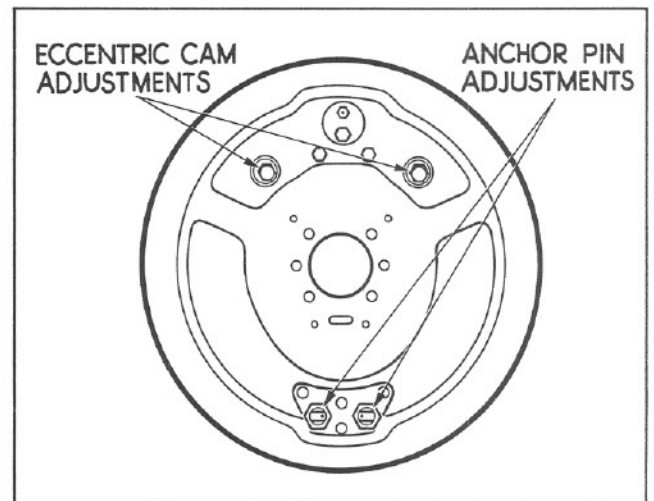
## ADJUSTMENT

Following overhaul or when new linings are installed, the initial adjustment should be carefully

made to both properly locate the curvature of the lining to the drum and obtain the proper clearance.



Each shoe must be adjusted to center the brake shoe arc in relation to the drum. Adjust cam to bring lining into contact with the drum and rotate anchor pin sufficiently to relieve drag. Repeat until additional rotation of anchor pin will no longer relieve drag. Lock anchor pin lock nut and back off cam sufficiently to permit wheel to turn freely.



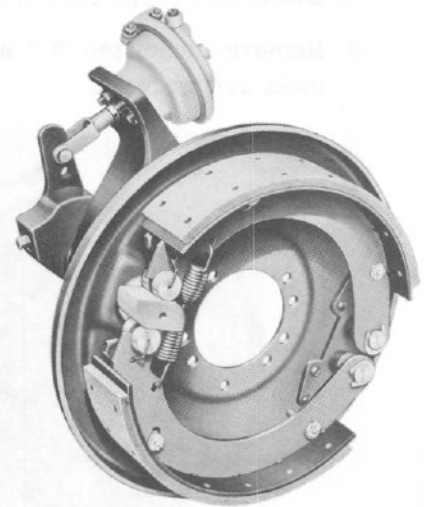
Subsequent adjustments to compensate for lining wear are made with the eccentric cam only. Turn cam to bring lining into contact with the drum. Back off sufficiently to permit free rolling drum. Repeat on opposite shoe.

## THE CAM-MASTER "T" SERIES BRAKES

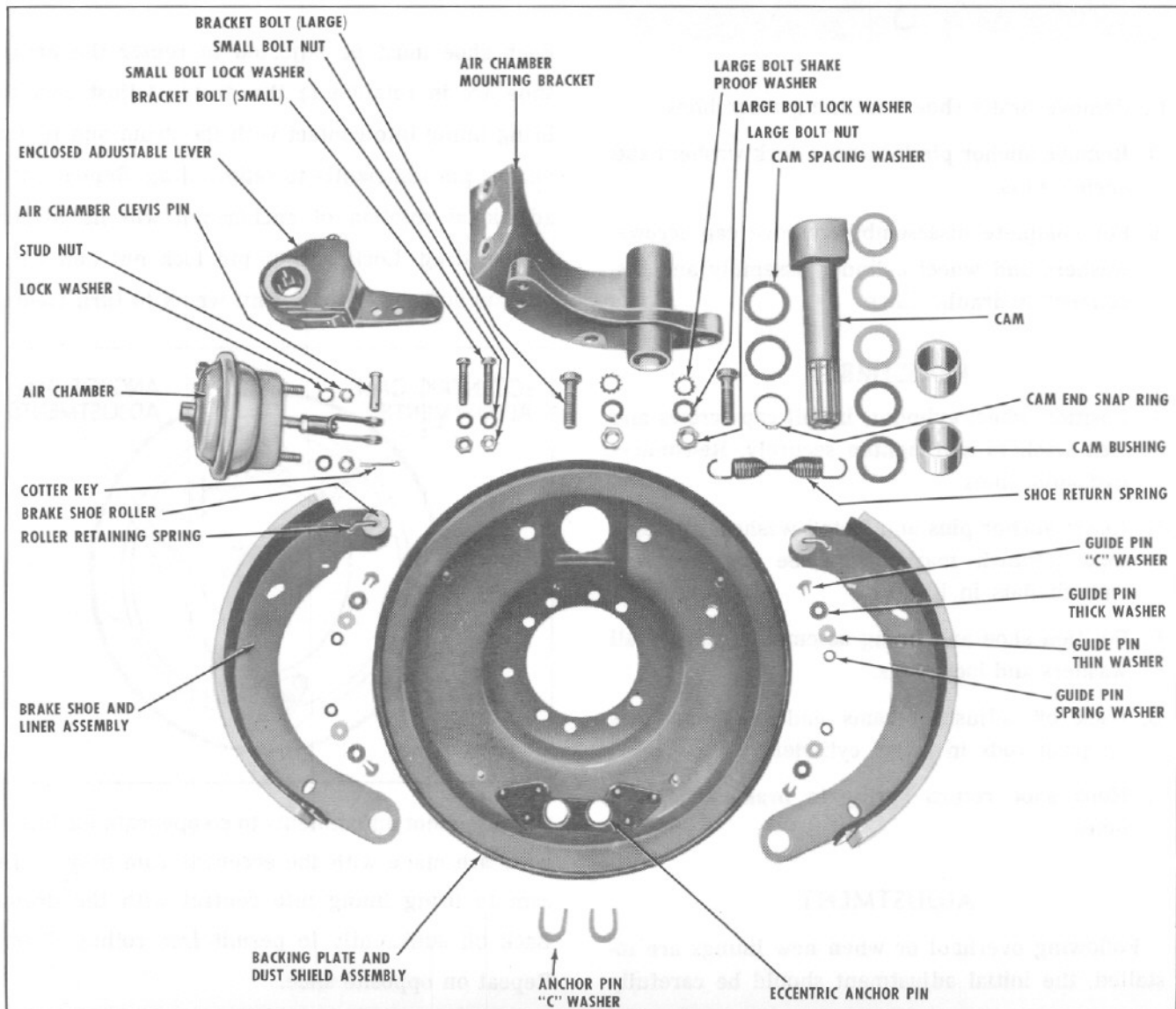
The "T" series brake is an air actuated two shoe brake, each shoe employing a one piece liner of uniform thickness. These brakes are either unit mounted with all component parts assembled on a backing plate or spider, or have inboard cam supports where operation warrants locating the air chambers toward the axle centers.

Some sizes of "T" brakes employ fabricated shoes with hardened steel cam roller followers while other sizes employ either heat treated malleable cast shoes with hardened cam follower wear pads or cam roller followers. Anchor pins of two different designs are used in various sizes of "T" series brakes. Some sizes use eccentric pins while others use fixed anchor pins.

The "T" series brakes are equipped with Rockwell enclosed adjustable levers when shoe liner thickness does not exceed 7/16". The Rockwell enclosed adjustable lever on these will permit the maximum liner wear. "T" series brakes with thicker liners, up to and including 1/2", are equipped with slack adjusters.

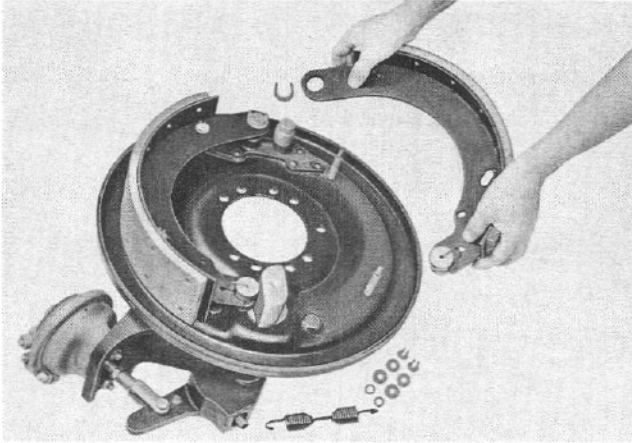


"T" BRAKE LAYOUT



**DISASSEMBLY**

- A. Remove shoe return spring.
- B. Remove "C" washers from guide pins and anchor pins.



- C. Remove brake shoe and liner assemblies.
- D. Remove flat washers from guide pins.
- E. Remove brake shoe rollers and springs if necessary to replace.
- F. Disconnect cam lever assembly by removing first the spring lock, washer and the clevis pin.
- G. Remove the cam lever, cam and cam washer.
- H. Remove cam bushing only if replacement is necessary.

**ASSEMBLY**

- A. Install camshaft bushing if removal was made.
- B. Install cam and spacer washers.
- C. Assemble guide pin washers and position shoes over anchor pins and guide pins.
- D. Assemble guide pin and anchor pin washers and "C" washers.
- E. Hook brake shoe return spring between shoes.
- F. Install cam lever assembly and washer and secure with spring groove lock.

**ADJUSTMENT**

On the "T" Fabricated Steel Brake each shoe must be adjusted to center the brake shoe arc with the drum.

- A. Loosen cam bracket bolts. Apply full air. Hold air and tighten bolts. Be sure bolts are tight.
- B. Rotate both anchor pins to the full release position. (Punch marks together—wrench flats in line.)
- C. Adjust cam to bring liners in contact with drum and rotate anchor pins sufficiently to relieve drag. Repeat until additional rotation of anchor pins will no longer free drag.
- D. Tighten anchor pin lock nuts and back off cam to minimum running clearance.

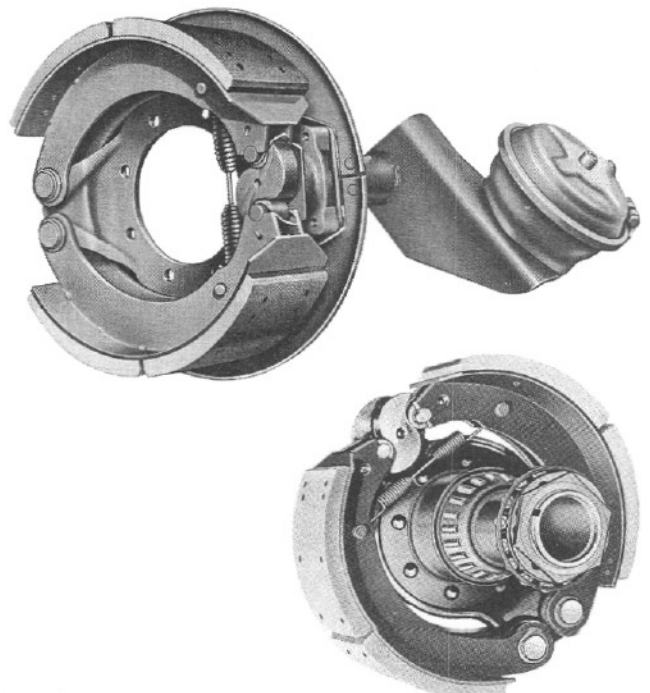
To compensate for liner wear on both the "T" Fabricated Steel and the "T" Cast assemblies, adjust cam at cam lever adjusting bolt to bring liners in contact with drum and back off to minimum running clearance.

**THE CAM-MASTER "P" SERIES BRAKES**

The Automotive "P" series brake is an air actuated two shoe brake, each shoe employing two  $\frac{3}{4}$ " tapered block liners. These shoes are of fabricated steel, mounted on individual anchor pins and supported by open type spiders. The air chamber mounts on a bracket that bolts directly to the spider thus making the brake completely unit mounted. Automotive "P" series brakes may also be equipped with inboard cam supports where operation or axle design requires mounting the air chambers toward the axle centers.

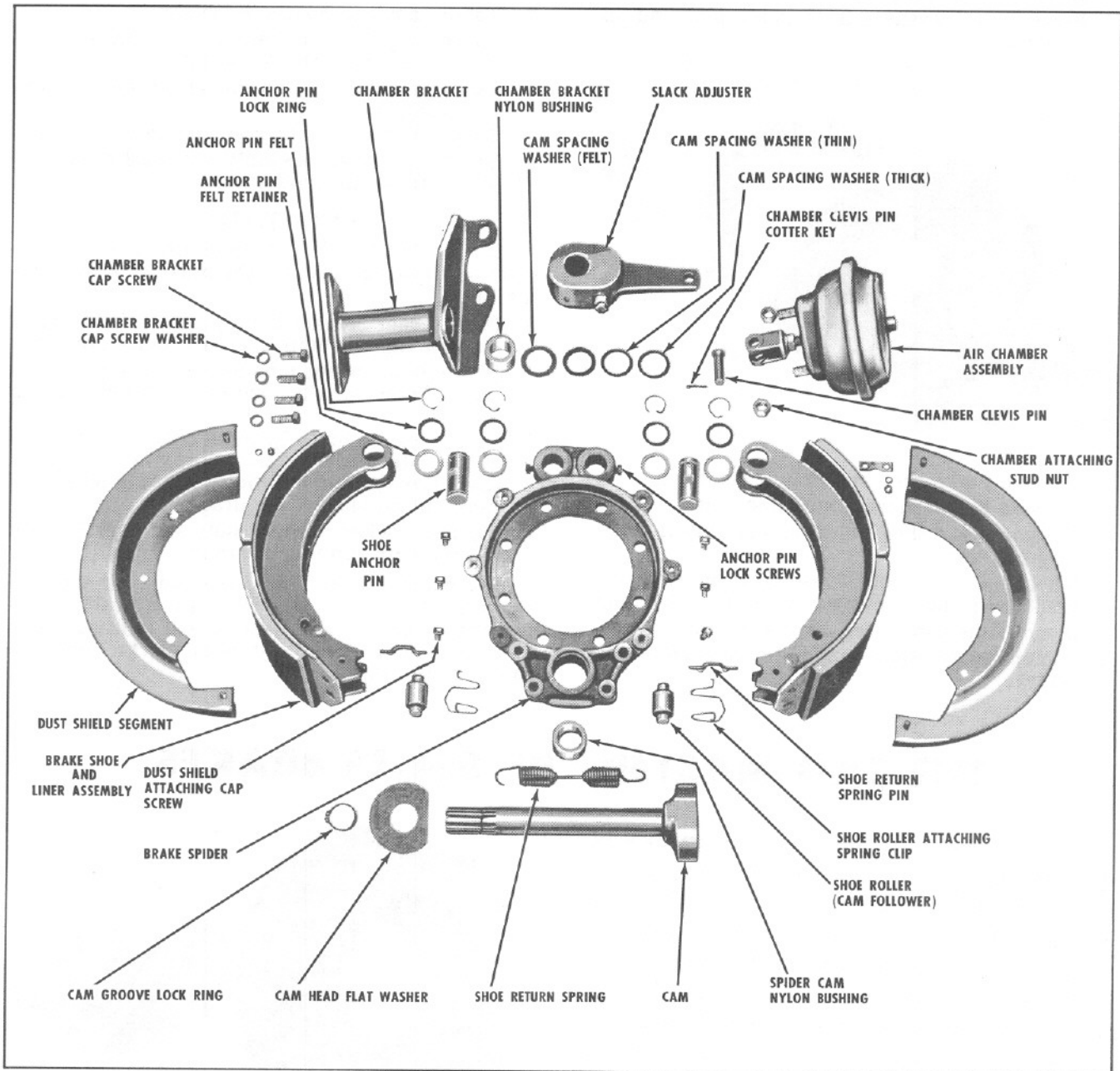
Dust shields are available for use when protection becomes desirable.

The "P" series brakes are actuated by the "S" type constant lift cams which are forged integrally with shaft and supported in nylon bushings. Cam pressure is applied through roller cam followers.





"P" BRAKE LAYOUT



DISASSEMBLY

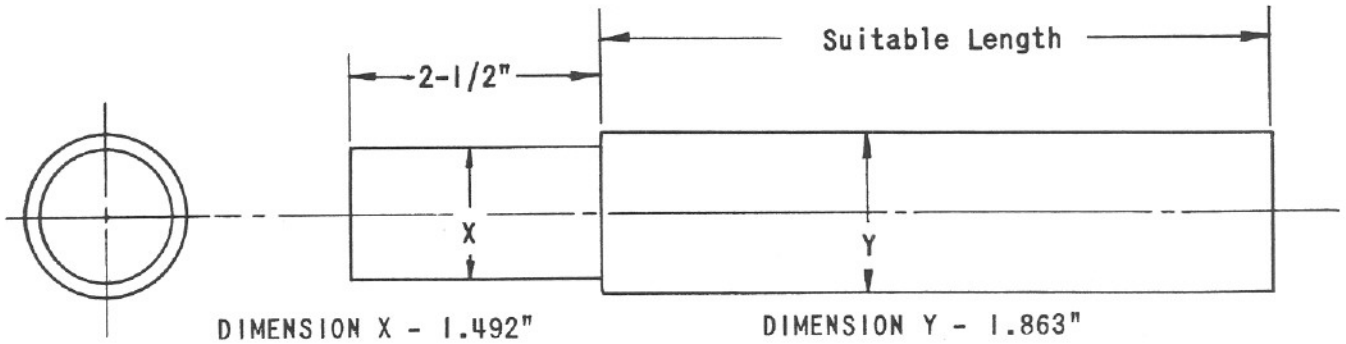
- A. Remove shoe return spring.
- B. Remove lock rings, retainers and felts from anchor pins.
- C. Cut lock wire and remove anchor pin lock screws.
- D. Remove anchor pins and shoe assemblies.
- E. Unhook cam follower retainer spring and remove roller cam follower.
- F. Remove cam end lock ring, washer and slack adjuster.



- G. Remove cam shaft with felt, washer for felt and large washer, from spider.
- H. Remove washers and felts from cam shaft and spider.

- I. Remove nylon bushing from spider only if replacement is necessary. See suitable tool for both the removal and installing of nylon bushings.

**BUSHING REMOVAL AND INSTALLATION TOOL**



**ASSEMBLY**

- A. Install new nylon bushing in brake spider if required, using suitable tool.
- B. Install roller cam followers and retainer springs. See instruction relative to roller cam followers where drums have been refaced and oversize liners installed.
- C. Install large washers, felt and washer on cam end of cam shaft. Install assembly through spider and bracket.

- D. Position brake shoe assembly over spider and tap anchor pin into position with brass punch, "flat" in line with lock screw hole. See special instructions if combination lining has been used.
- E. Install lock screws, tighten securely and thread with lock wire.
- F. Position felts, retainers and install lock rings.
- G. Install shoe return spring.
- H. Install slack adjuster on splined end of cam shaft and adjust as required.

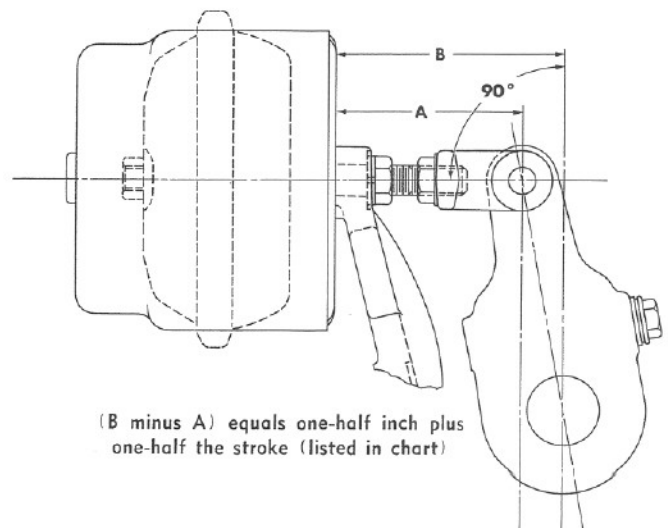
**ADJUSTMENT**

- A. New liners should be circle ground to .070" less than drum diameter. Adjust cam as required to obtain 80% contact.
- B. Adjust slack adjusters or levers to obtain free running clearance. When travel increases from liner wear to the maximums listed in the table below, readjust.

**CHAMBER STROKE AT WHICH BRAKE SHOULD BE READJUSTED**

Chamber Size Effective Area	"Diaphragm"	"Brake Chamber"	"Roto-chamber"
9"	1 3/8"	1 1/2"	1 1/2"
12"	1 3/8"	1 1/2"	1 1/2"
16"	1 3/4"	1 3/4"	1 7/8"
20"	—	1 3/4"	1 7/8"
24"	1 3/4"	1 3/4"	1 7/8"
30"	2"	2"	2 1/4"
36"	2 1/4"	2 1/2"	2 5/8"
50"	—	—	3"

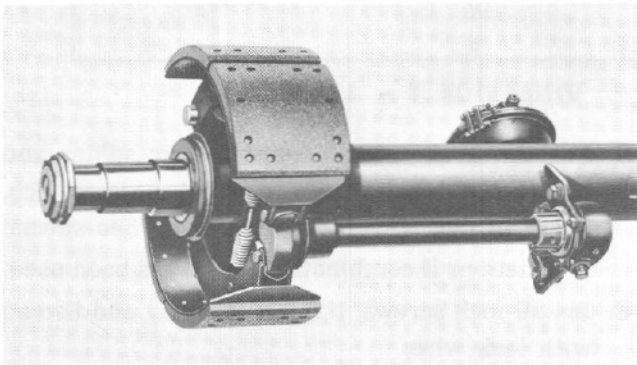
**CORRECT POSITION OF CHAMBER PUSH-ROD AND SLACK ADJUSTER IN "OFF" POSITION**



## THE CAM-MASTER TRAILER AXLE POWER BRAKES

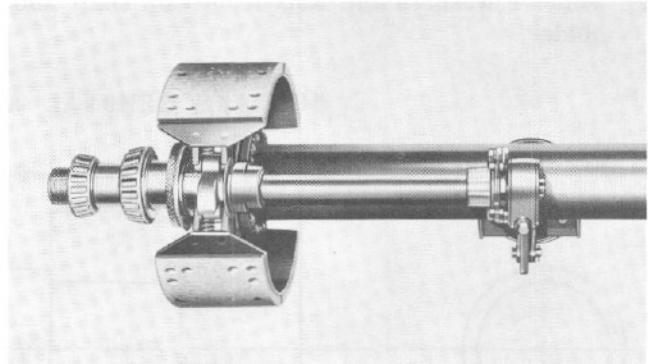
The Trailer "P" series brake is a two shoe brake designed for use with power. The shoes are fabricated steel and are mounted on individual anchor pins on either replaceable open spiders or fixed open spiders.

The air chambers are mounted on brackets that are welded to the beam and inner cam supports are adjustable for cam shaft alignment.



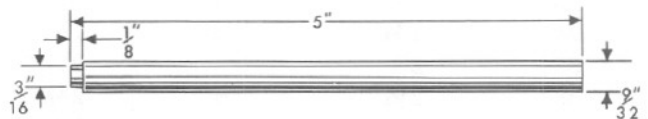
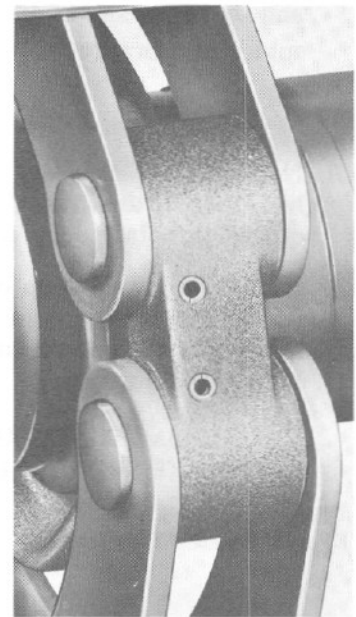
DISASSEMBLY

- A. Remove shoe return spring.
- B. Remove lock ring, retainer and felt from anchor pin if employed.
- C. Cut lock wire and remove anchor pin lock screw or drive out locking pin.
- D. Tap out anchor pin and remove shoe assembly.
- E. Unhook shoe web retainer spring and remove roller cam follower.
- F. Remove inner cam end lock ring, washer and slack adjuster.
- G. Remove washers and felts from cam shaft and spider.
- H. Remove nylon bushing from spider only if replacement is necessary.
- I. If inner cam end nylon bushing is to be replaced remove bolts and separate adjustable support bracket and remove the bushing.



Trailer brake shoe anchor pins (depending on model) may be either the stationary type secured by use of spider set screws or the free rolling type held in place by a locking pin. The brakes are actuated by the "S" type constant lift cams which are forged integrally with the shaft and supported in nylon bushings at both inner and outer ends. Cam pressure is applied through roller cam followers.

A suitable punch for the removal of these locking pins may be made from a 5" rod  $\frac{9}{32}$ " in diameter by turning or grinding one end to  $\frac{3}{16}$ " diameter  $\frac{1}{8}$ " long. This smaller end will pilot in the pin and prevent punch from slipping. See illustration of suitable punch below.



## ASSEMBLY

- A. Install the spider (outer) nylon bushing, felts and retainers first if (outer) nylon bushing has been replaced.
- B. Loosely assemble the camshaft inner nylon bushing retainers to the nylon bushing and then loosely attach the retainers and nylon bushing assembly to the housing bracket.
- C. Lubricate the inner surfaces of both the (outer) nylon and (inner) nylon bushing.
- D. Install camshaft with large flat washer into spider and nylon bushing assembly. When end of camshaft clears bushing assembly install lock ring on camshaft and proceed with shaft into and through the inner nylon bushing.
- E. Slide lock ring over shaft and secure into groove next to spider.
- F. Align the parts and carefully tighten the retainers around the nylon bushing, then tighten the retainer and bushing.
- G. Position "S" cam at zero and install slack adjuster, washer and lock ring.
- H. Attach roller cam follower to brake shoe web with retainer spring.
- I. Assemble brake shoe assembly to spider and tap anchor pin in place.
- J. Secure anchor pin with lock screw and lock wire or locking pin depending on type employed.
- K. Install felts, retainers and lock rings if employed.
- L. Install shoe return spring.

## ADJUSTMENT

*Follow adjustment procedure as outlined under "P" Brake section, located on bottom of page 14.*

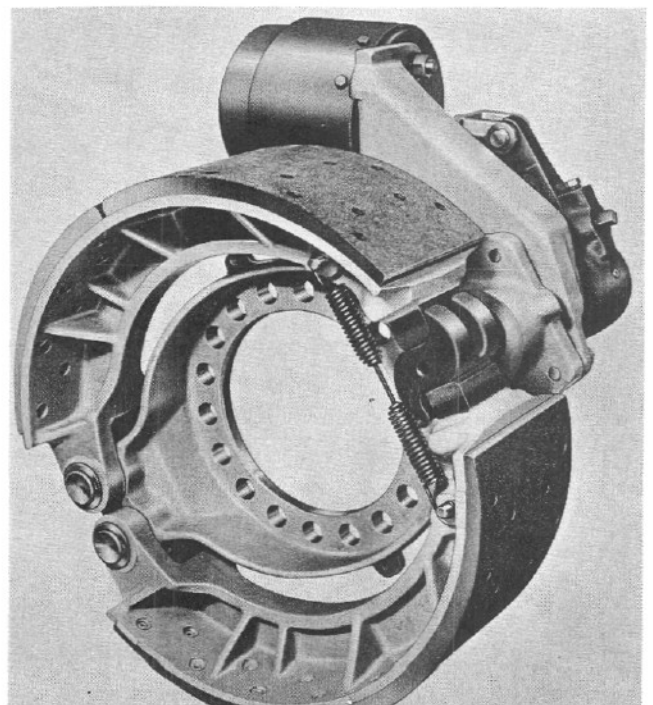
# THE CAM-MASTER HEAVY DUTY "P" SERIES BRAKES

The HEAVY DUTY "P" series brake is an air actuated two shoe brake designed for heavy duty and special equipment where greater shoe and drum areas are necessary. This heavy duty series ranges in diameter from 18" to 22" and in width from 4" to 7".

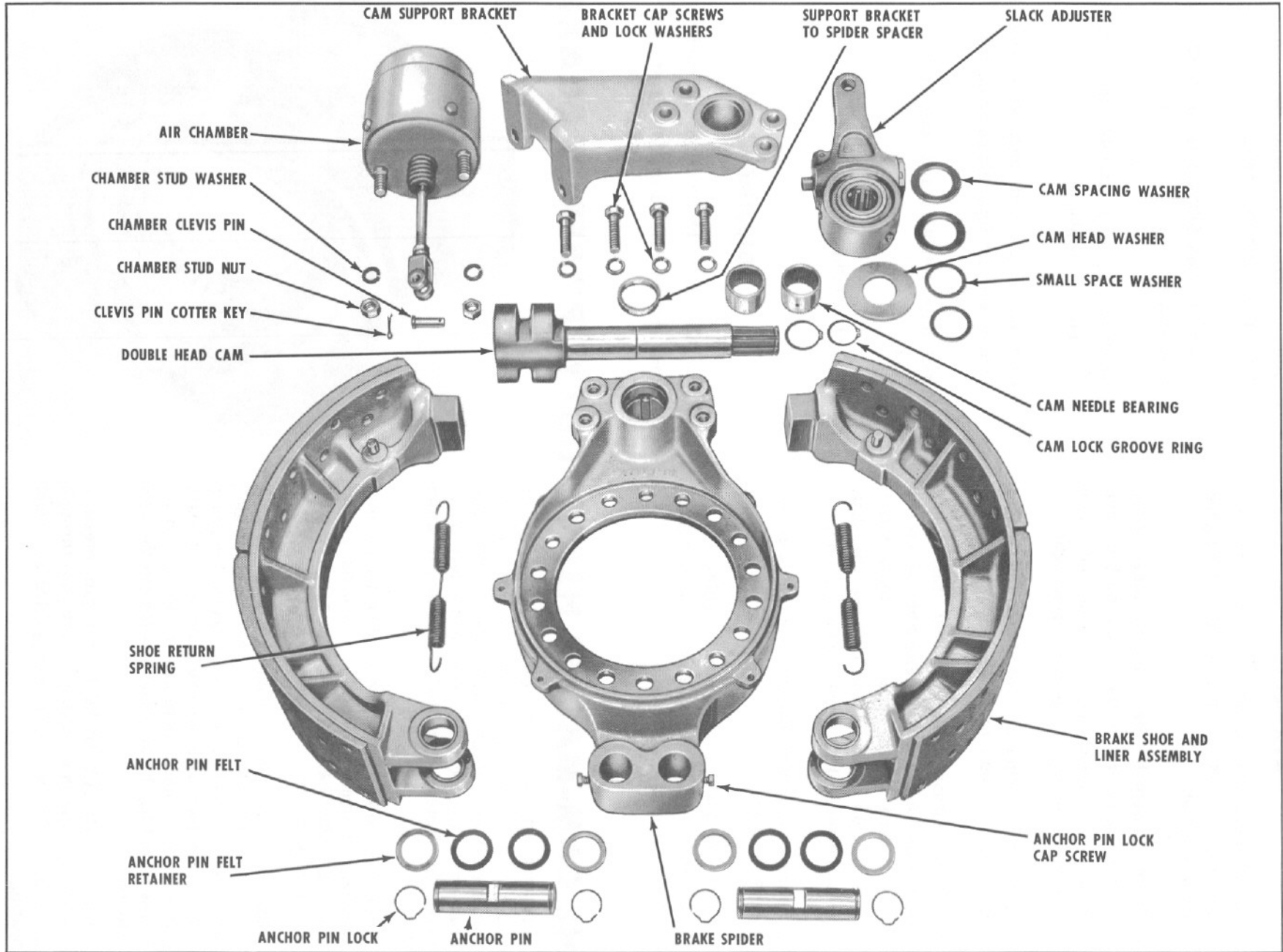
The shoes are of heat treated malleable castings mounted on open spiders by individual anchor pins. Each shoe has hardened cam pressure pads and employs two  $\frac{3}{4}$ " tapered block liners.

The camshaft and air chamber support bracket is mounted directly on the brake spider making the assembly complete as a unit, however the heavy duty brake may also be equipped with inboard cam supports where operation or axle design requires mounting the air chambers toward the axle centers.

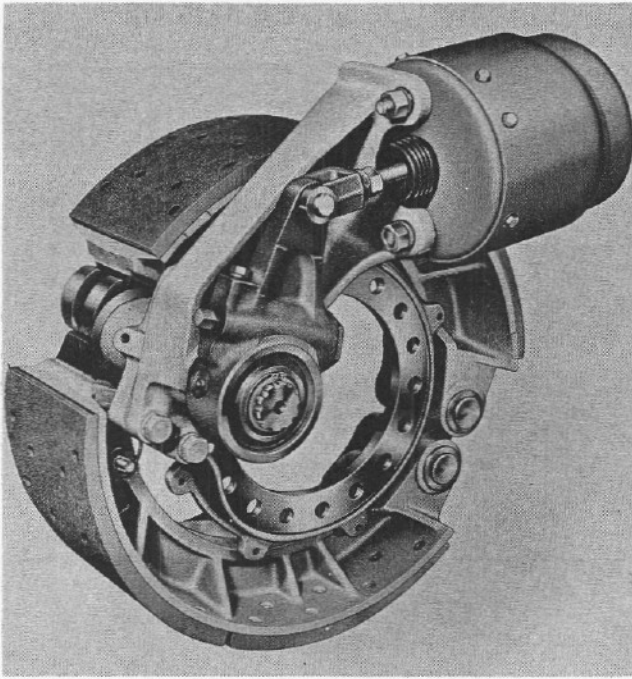
On these HEAVY DUTY brakes, cam pressure is applied to the shoe hardened wear pads through the double "S" cam which is supported in needle bearings.



### HEAVY DUTY "P" BRAKE LAYOUT

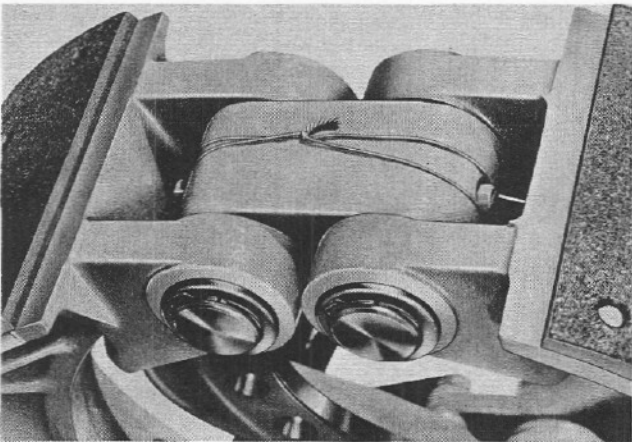






### DISASSEMBLY

- A. Remove shoe return springs.
- B. Remove lock rings, retainers and felts from anchor pins.

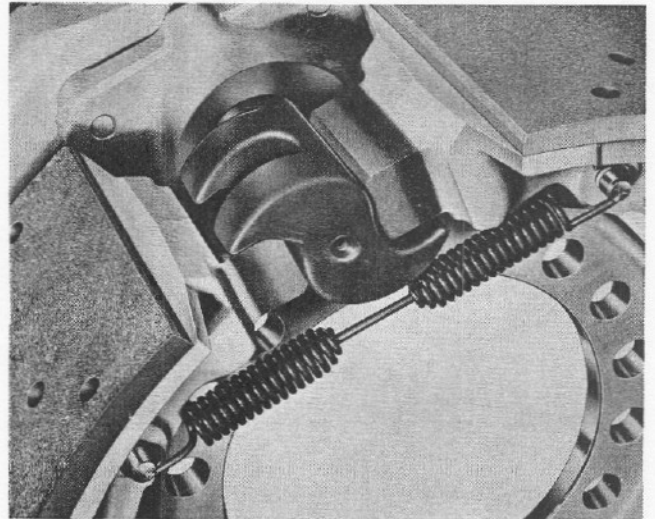


- C. Cut lock wire and remove anchor pin lock screws.
- D. Remove anchor pins and shoe assemblies.
- E. Remove air chamber mounting stud nuts and lock washers.
- F. Remove air chamber clevis pin cotter key, clevis pin and air chamber.
- G. Remove cam end lock ring and flat washer.
- H. Remove slack adjuster lever.
- I. Remove cam by tapping out from rear.

- J. Remove chamber bracket mounting cap screws and lock washers. Remove bracket.
- K. Remove needle bearings, only if replacement is to be made, by pressing out with a suitable sleeve.

### ASSEMBLY

- A. Install new cage and needle bearing assemblies if replacement is necessary.
- B. Locate and secure with cap screw and lock washers the air chamber mounting bracket and tighten cap screws securely.
- C. Lubricate needle bearings with lubricant (specification of 0-615 or the equivalent).
- D. Install slack adjuster on cam so that shoes are in a fully released position and install cam washer and cam groove lock ring.
- E. Mount air chamber on bracket and secure with chamber mounting stud nuts and washers.
- F. Connect slack adjusting lever to air chamber pushrod clevis with clevis pin and cotter key.
- G. Install brake shoes with anchor pins and secure pins with felts, felt retainers and pin groove locking rings.
- H. Install anchor pin locking screws and lock wire.



- I. Connect brake shoe return springs.

### ADJUSTMENT

*Follow adjustment procedure as outlined under "P" Brake section, located on bottom of page 14.*

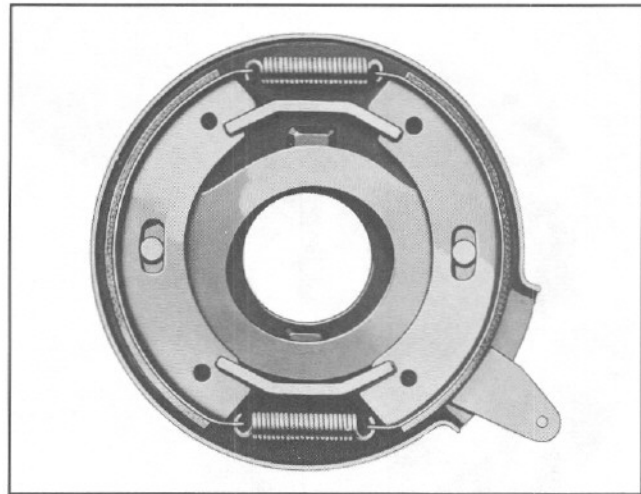


## "DLM" DUPLEX LEVER MECHANICAL BRAKES

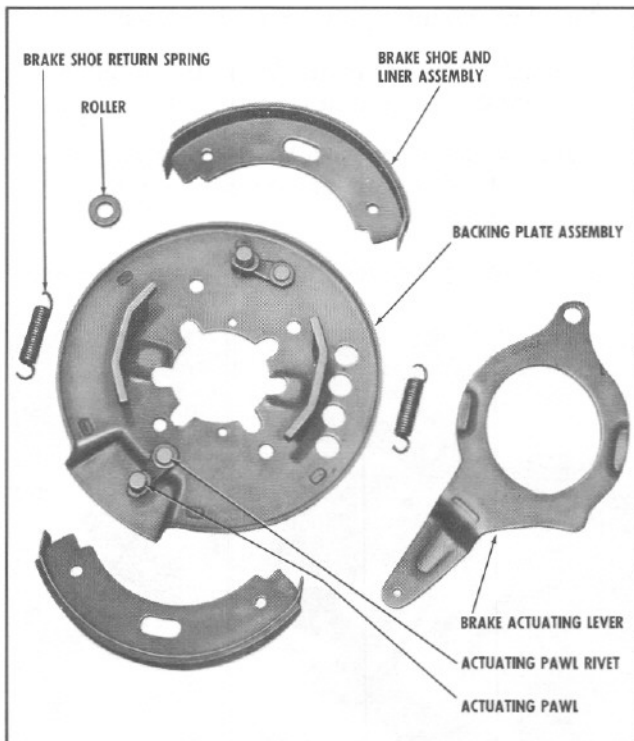
The "DLM" brake is a two shoe mechanical brake designed for use as either a control or parking brake.

Equal pressure is applied to both shoes through lever actuation in either forward or reverse rotation.

"DLM" brake shoes and springs are interchangeable. Brake is fully enclosed to exclude dirt or foreign matter.



### "DLM" BRAKE LAYOUT



### DISASSEMBLY

- A. Disconnect and remove brake shoe return springs.
- B. Remove brake shoes and liner assemblies.

- C. Lift out brake shoe lever.

### ASSEMBLY

- A. Install brake lever over opposite pawl pin and position so that lever arm lies in backing plate depression.
- B. Install roller on remaining pawl.
- C. Install brake shoes.
- D. Connect brake shoe return springs in slots nearest backing plate.

Note: On smaller size "DLM" brakes two rollers are used, one on each pawl.

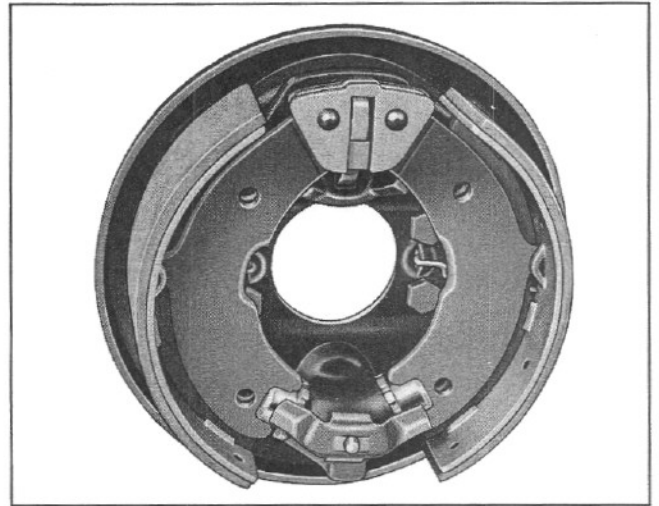
### ADJUSTMENT

Equal alignment is completely controlled by the design of the actuating lever and the only adjustment necessary is through connecting linkage to lever arm.

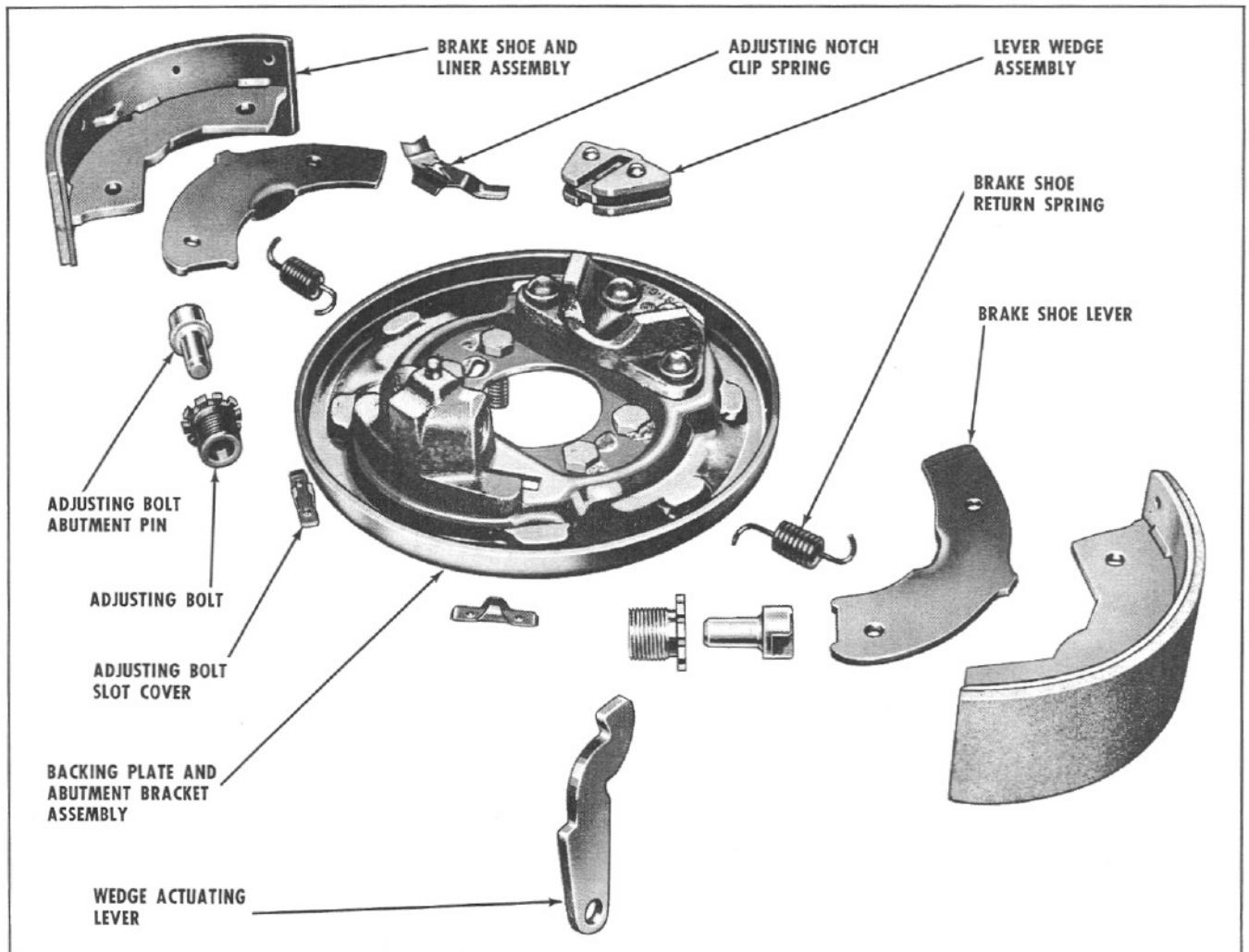
## "DM" DUPLEX MECHANICAL BRAKES

The "DM" brake is a two shoe mechanical brake designed for either service or parking use. The shoes are actuated by a lever and wedge and are self-aligning. The two shoes are interchangeable and do an equal amount of work in either forward or reverse direction.

The adjusting bolts in the abutment bracket provide a means for adjusting the brake shoe clearance with the drum.

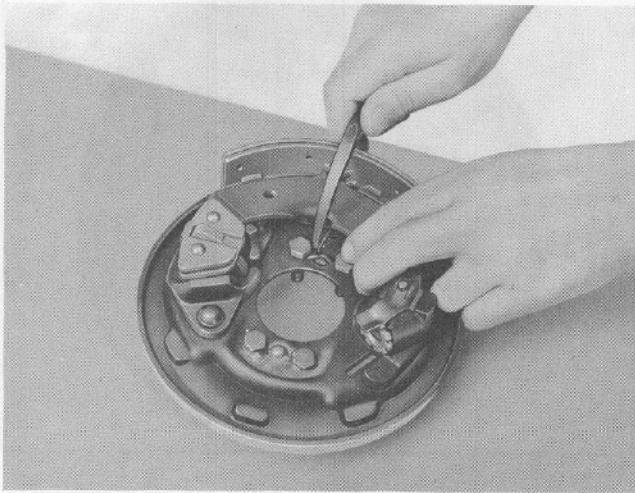


### "DM" BRAKE LAYOUT



**DISASSEMBLY**

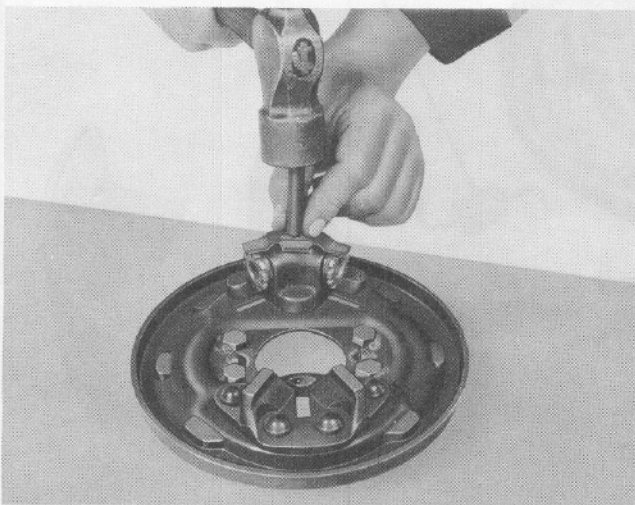
- A. Disconnect brake shoe return springs.



- B. Remove shoe and liner assemblies.
- C. Remove levers and wedge assembly.
- D. Remove abutment pins.
- E. Screw out adjusting bolts.

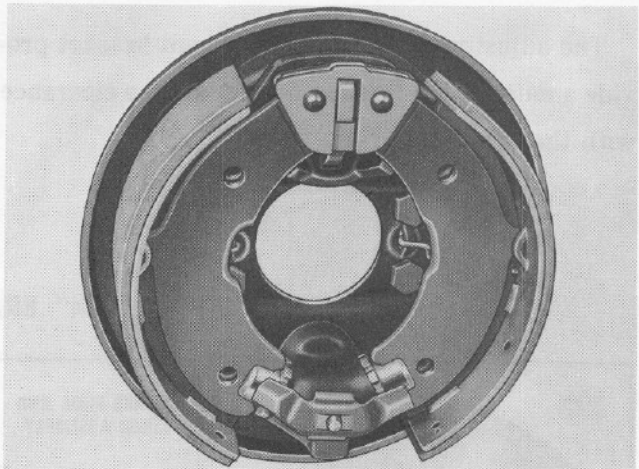
**ASSEMBLY**

- A. Lubricate and install adjusting bolts. Use specification 0-615.

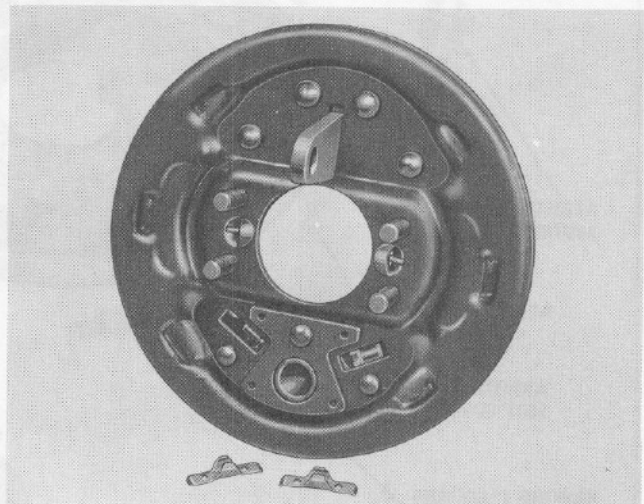


- B. Position abutment pins in adjusting bolts.
- C. Install shoes on backing plate with web pressure points above center line.

- D. Insert straight end of return spring in shoe web and hook rounded end into backing plate catch.
- E. Install brake shoe levers (formed pressure points contacting web pressure points).
- F. Insert operating lever through top abutment slot.
- G. Lubricate with specification 0-615 the wedge assembly side slots and install by spreading the shoe and lever assemblies.



- A. Insert adjusting spoon through slotted hole to engage lugs on adjusting bolt. Move handle up or down using slot end as a fulcrum. To expand shoes move tool handle down when in the L.H. slot and move tool handle up when in the R.H. slot.



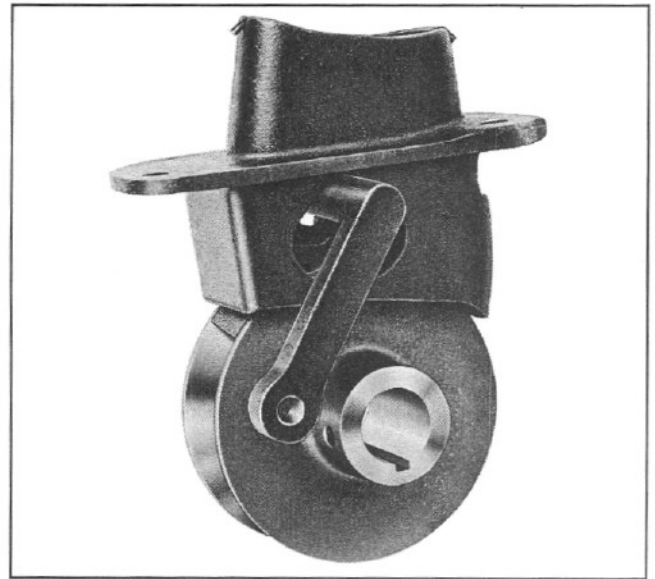
- B. Shoe liners should be brought out tight against the brake drum. Adjusting bolt should then be backed off until the drum can rotate freely. Brake shoes should be adjusted individually.
- C. Replace adjusting slot cover.

## "VEE" BRAKES

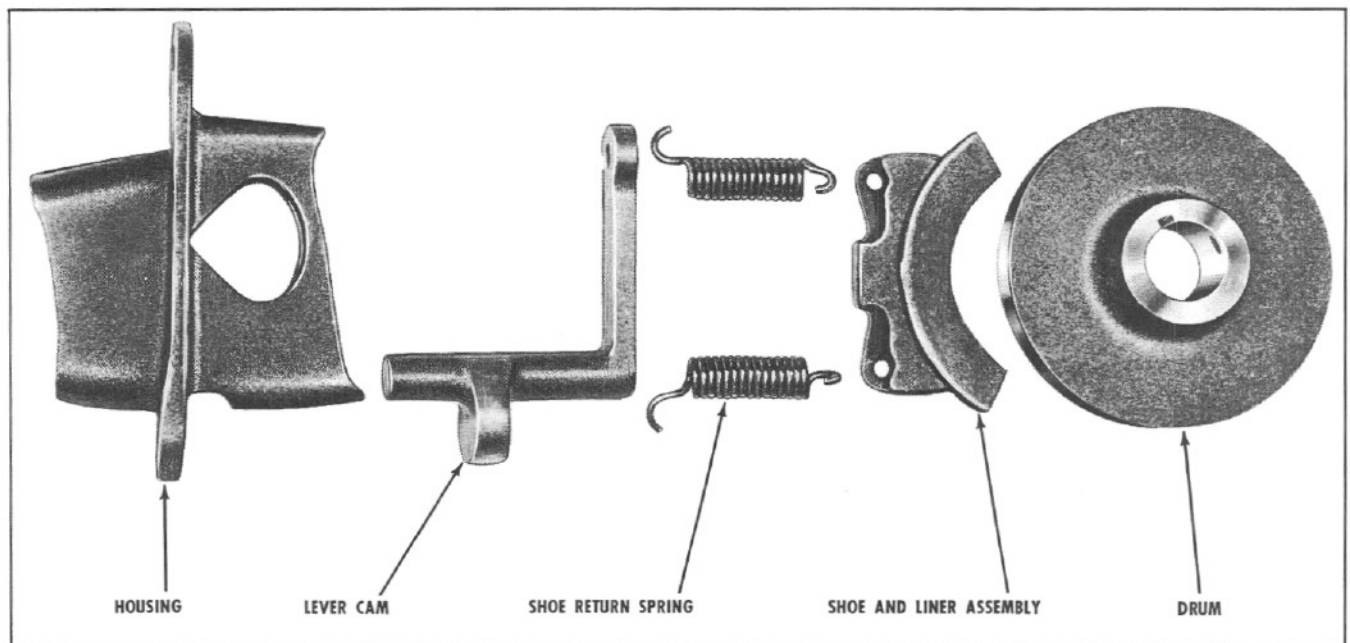
The "VEE" brake is a mechanical wedge shoe type brake. The wedge shoe and liner assembly when actuated into the "V" of drum is equally effective in forward and reverse.

The drum mounts on the shaft to be controlled and pressure is applied through the lever. The "VEE" brake is used both as a service brake and a parking brake.

The "VEE" brake can be completely assembled before mounting into its enclosure.



"VEE" BRAKE LAYOUT



### DISASSEMBLY

- A. Unhook return spring ends. (Use a buttonhook type of spring stretcher.)
- B. Remove lever by dropping shoe assembly and rotating lever cam to pass through opening.
- C. Remove shoe and spring assembly and unhook springs from shoe.

### ASSEMBLY

- A. Lubricate housing abutment, shoe cam pad and lever cam bearing area.

- B. Insert small hook of springs into shoe with opposite hook ends out.
- C. Install lever and rotate cam so that shoe may be raised into actuating position.
- D. Hook spring end hooks into housing.

### ADJUSTMENT

- A. Pull lever forward to maximum cam travel and back off  $\frac{3}{8}$ ".
- B. Insert linkage connection pin.



## **Rockwell International**

**Heavy Vehicles Components Operations**  
**Rockwell International Corporation**  
2135 West Maple Road  
Troy, Michigan 48084 U.S.A.