

ROYAL CANADIAN AIR FORCE



**HANDBOOK WITH PART LIST**

**MASTER BRAKE CYLINDERS**

**(GOODYEAR)**

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

# LIST OF RCAF REVISIONS

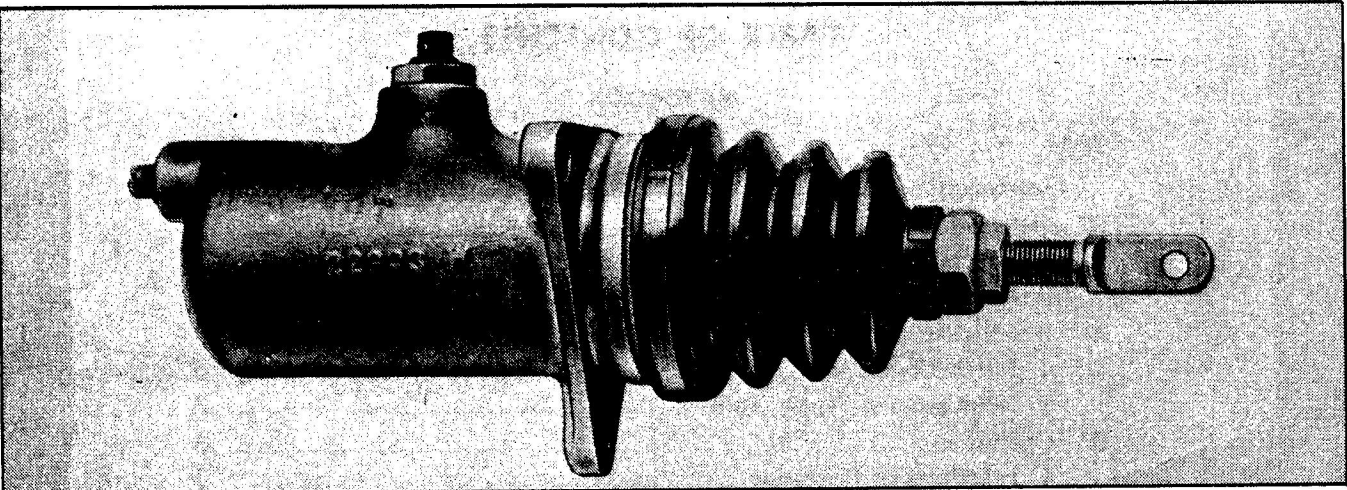
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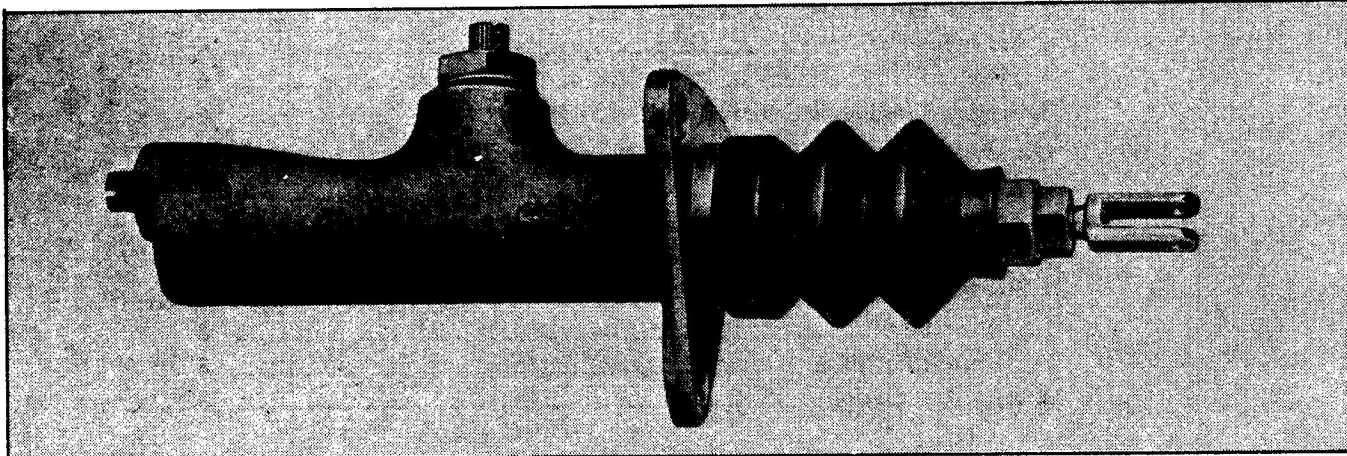
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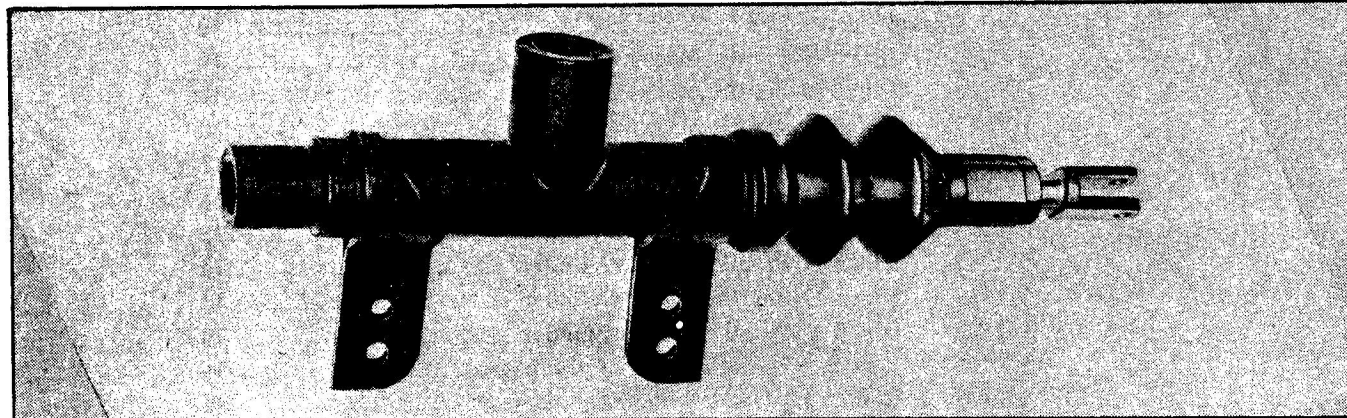
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**Figure 1—Three-quarter Front View—2-inch Master Cylinder  
(Cast Cylinder)**

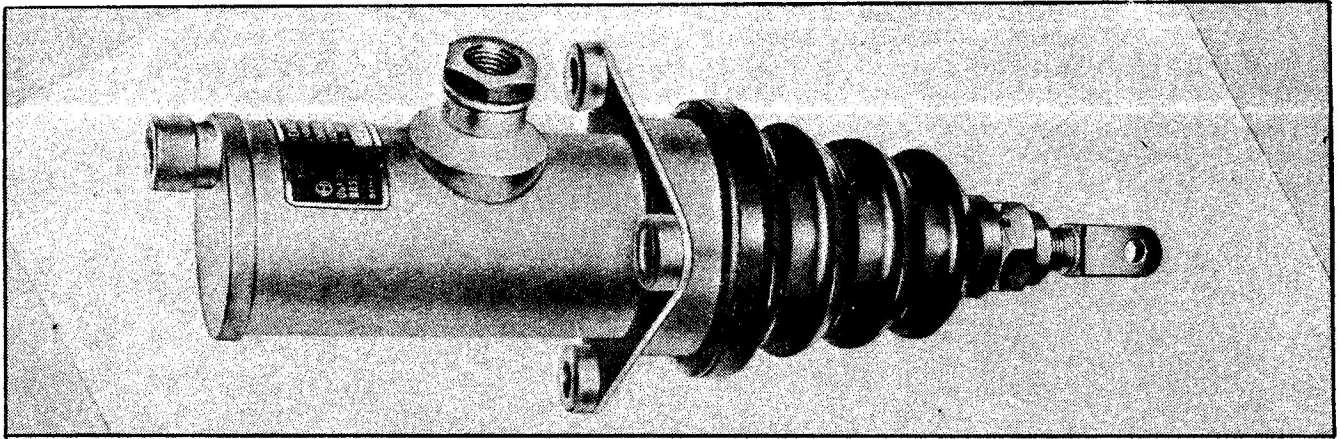


**Figure 2—Three-quarter Front View—1-inch Master Cylinder  
(Cast Cylinder)**

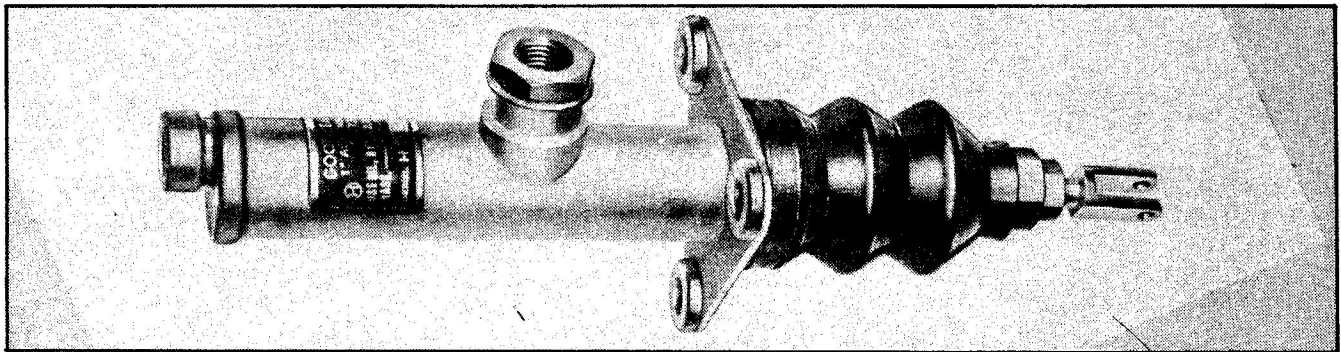


**Figure 3—Three-quarter Front View—3/4-inch Master Cylinder, Non-Reservoir Type  
(Machined Cylinder)**

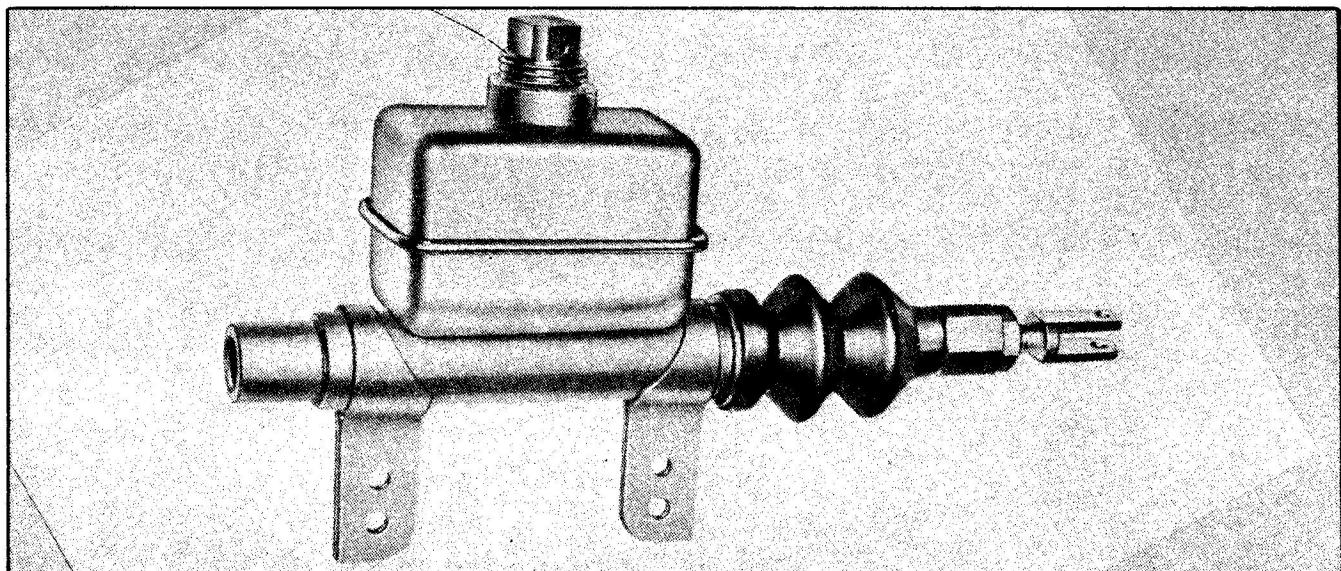




**Figure 3A—Three-quarter Front View—2-inch Master Cylinder  
(Machined Cylinder)**



**Figure 3B—Three-quarter Front View—1-inch Master Cylinder  
(Machined Cylinder)**



**Figure 3C—Three-quarter Front View—3/4-inch Master Cylinder, Reservoir Type  
(Machined Cylinder)**



# SECTION I INTRODUCTION

This handbook is issued as the basic Technical Order for the equipment involved. It contains installation, operation, maintenance, and overhaul instructions with parts lists for the master cylinders listed below:

Number	Size Inside Dia. of Cylinder	Maximum Stroke Inches	Maximum Displacement Cubic Inches	Number	Size Inside Dia. of Cylinder	Maximum Stroke Inches	Maximum Displacement Cubic Inches
270788-2	2-inch	1.43	4.49	511732	1-inch	1.43	1.08
270788-4	2-inch	1.43	4.49	511738	1-inch	1.43	1.08
530802	2-inch	1.43	4.50	511827	1-inch	1.43	1.08
270435-2	1½-inch	1.43	2.53	530701	¾-inch	1.25	0.552
218073-2	1-inch	1.43	1.11	530875	¾-inch	1.25	0.552
218073-3	1-inch	1.43	1.11	9520293	¾-inch	1.25	0.552

# SECTION II DESCRIPTION

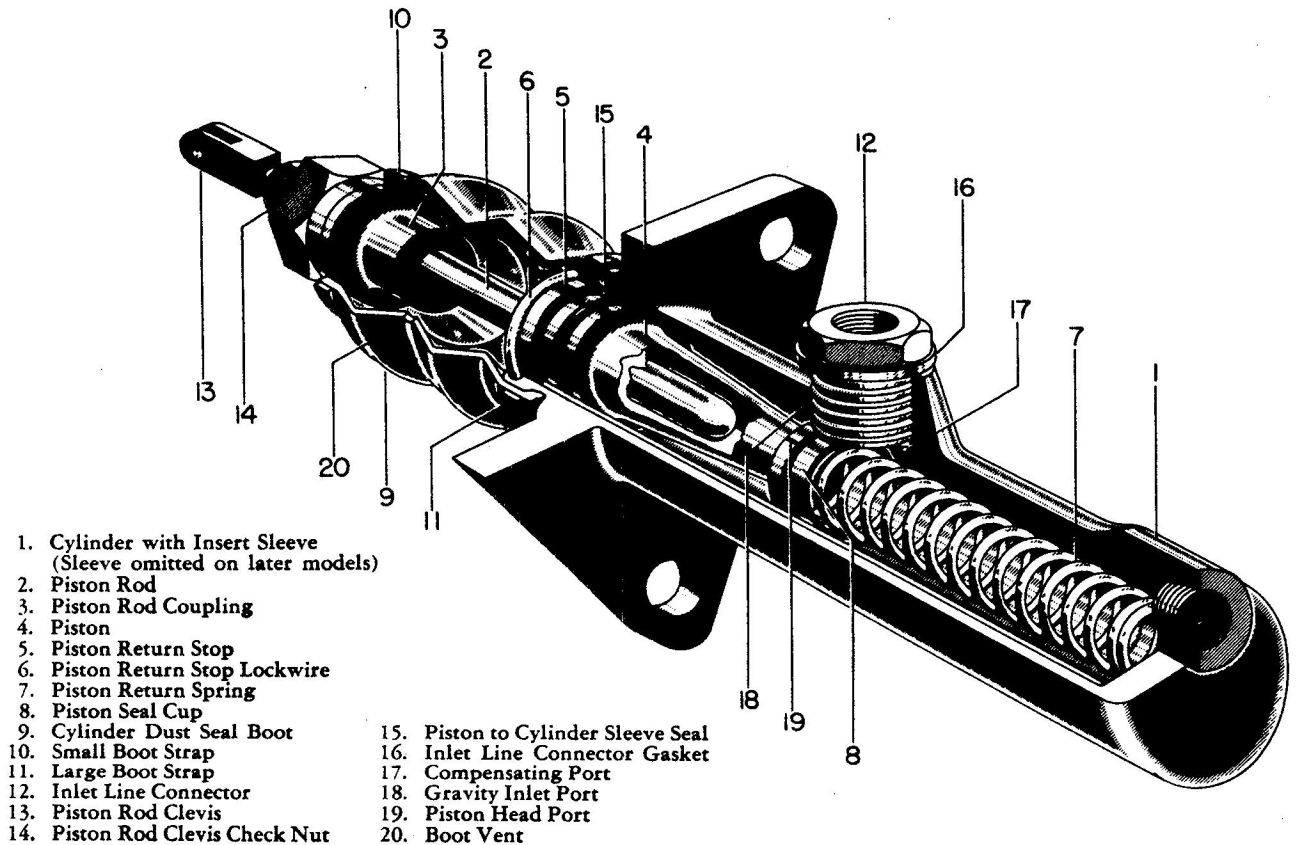
## 1. GENERAL.

a. The brake master cylinders serve three functions:

- (1) They build up and release the varying hydraulic pressure needed for brake operation.
- (2) They constantly maintain the correct volume of fluid in the hydraulic lines connected to the brakes.

If low temperature decreases the fluid volume, an inlet port in the master cylinder allows more fluid to enter the connecting lines from the fluid reservoir tank. If heat conditions increase the fluid volume, a compensating port in the master cylinder allows the excess volume to escape back to the fluid reservoir.

- (3) They tend to prevent air from entering the hy-



- |  |                                    |
|--|------------------------------------|
| 1. Cylinder with Insert Sleeve<br>(Sleeve omitted on later models) | 15. Piston to Cylinder Sleeve Seal |
| 2. Piston Rod  | 16. Inlet Line Connector Gasket    |
| 3. Piston Rod Coupling   | 17. Compensating Port              |
| 4. Piston  | 18. Gravity Inlet Port             |
| 5. Piston Return Stop  | 19. Piston Head Port               |
| 6. Piston Return Stop Lockwire                                     | 20. Boot Vent                      |
| 7. Piston Return Spring  |                                    |
| 8. Piston Seal Cup   |                                    |
| 9. Cylinder Dust Seal Boot   |                                    |
| 10. Small Boot Strap   |                                    |
| 11. Large Boot Strap   |                                    |
| 12. Inlet Line Connector   |                                    |
| 13. Piston Rod Clevis  |                                    |
| 14. Piston Rod Clevis Check Nut                                    |                                    |

Figure 4—Three-quarter Cutaway View of Typical Master Cylinder

hydraulic connecting lines due to leaks, because these master cylinders automatically replace any fluid lost through leakage.

b. Since steering an airplane on the ground requires varying brake action on right and left wheels, a master cylinder (or a metering valve on heavy ships) is installed for each brake.

c. All master cylinders discussed herein are barrel type compensating master cylinders, available in four sizes —  $\frac{3}{4}$ -inch, 1-inch  $\frac{1}{2}$ -inch, and 2-inch. This nomenclature indicates the internal diameter or bore of the cylinder.

## 2. DETAILED DESCRIPTION.

a. PISTON.—Hydraulic pressure is developed by the forward movement of the master cylinder piston. (See figure 4.) The piston head ports are machined into the piston to replenish lost fluid.

### b. PISTON ROD ASSEMBLY.

(1) Forward thrust is exerted on the piston by the master cylinder piston rod which has near its outer end the master cylinder piston rod coupling. The rod and coupling are threaded and sometimes safetied with a cotter pin.

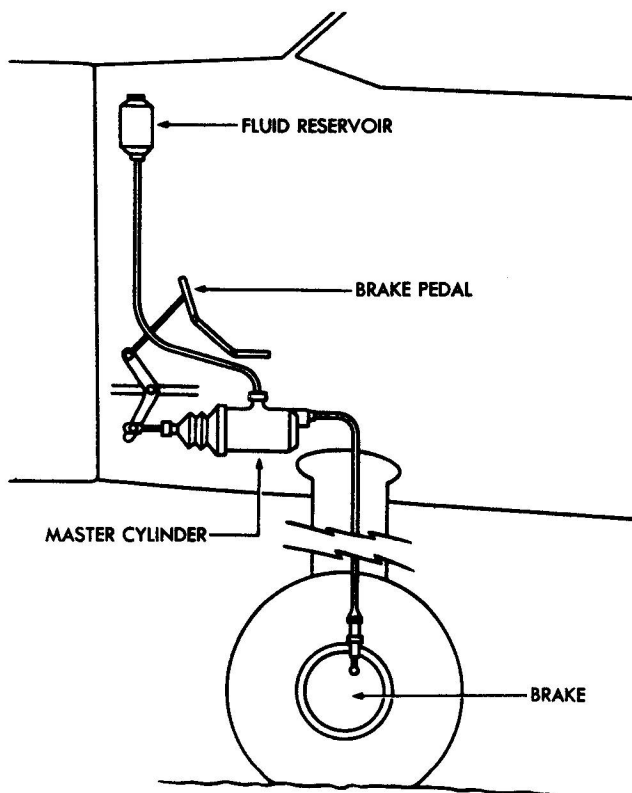


Figure 5—Diagram of Hydraulic System

(2) The piston rod is connected to the brake pedal by means of a terminal. This may be a clevis type piston rod terminal, or it may be an eyebolt type of terminal. In either case, its position is regulated by a master cylinder piston rod terminal check nut.

### c. PISTON RETURN SPRING AND STOP.

(1) When brake pedal pressure is released, the piston is returned to "off" position by the piston return spring.

(2) The end of the piston return spring toward the piston is covered by the piston return spring seat.

(3) The correct "off" position to which the piston is returned by the return spring is determined by the piston return stop which is secured by the piston return stop lock wire.

### d. PISTON SEALS.

(1) A synthetic or natural rubber cup-shaped seal, called the front piston seal, is provided ahead of the piston.

(2) A groove in the back part of the piston holds the ring-shaped rear piston seal.

(3) The master cylinder seals are made of synthetic rubber (P-59 or equivalent) which resists deterioration by mineral oil base hydraulic fluid. Wherever Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366, or similar fluid is used, any replacement seals installed must be oil-resistant synthetic rubber. In rare cases where vegetable oil base fluid is used, natural rubber seals (4821 or equivalent) should be used.

### e. MASTER CYLINDER BARREL AND PORTS.

(1) The piston and all other parts of the master cylinder in contact with the hydraulic fluid are enclosed in the master cylinder barrel. Early models were cast and machined from magnesium or aluminum and were fitted with an integral steel insert sleeve. Late model cylinder barrels are of machined steel and welded construction.

(2) The master cylinder barrel contains an inlet port, a compensating port, and an outlet port. The inlet port located on the upper side of the cylinder and the outlet port at the rear of the cylinder are sealed during shipment with port plugs which are removed for installation of brake line connections.

(3) The inlet port is threaded to receive the inlet port connector fitting which in turn has a threaded hole of smaller diameter into which the hydraulic inlet line from the fluid reservoir is fitted. The inlet port connector fitting is seated against the casting with a gasket.

(4) The entire master cylinder assembly is bolted in place on the airplane through installation bolt holes in a projecting flange around the master cylinder cast-

ing. The  $\frac{3}{4}$ -inch master cylinder has the installation bolt holes in two projecting brackets. (See figure 3.)

**f. BOOT AND STRAPS.**

(1) To seal the open end of the piston against dust and dirt, a protective rubber boot is sometimes provided.

(2) The large end of the protective boot is seated around the master cylinder casting and is sometimes

further secured by a large metal boot strap.

(3) The small end of the boot is forced into place over the master cylinder piston rod coupling and is sometimes secured with the small metal boot strap.

(4) As the bellows-shaped rubber boot is compressed and expanded with the movement of the piston, air is allowed to escape or enter the boot through the small rubber boot air vent.

## SECTION III INSTALLATION

### 1. INSTALLATION OF MASTER CYLINDER.

*a.* The size master cylinder or power unit used will vary with different brake installations. Project drawings show the fluid displacement required to operate the various Goodyear brakes. Listed below are the sizes, strokes and displacements of the four sizes of Goodyear master cylinders.

#### MASTER CYLINDERS

<i>Size I.D. of Cylinder</i>	<i>Maximum Stroke Inches</i>	<i>Maximum Displacement Cubic Inches</i>
$\frac{3}{4}$ -inch	1.25	0.552
1-inch	1.43	1.08
$1\frac{1}{2}$ -inch	1.43	2.53
2-inch	1.43	4.50

*b.* Install master cylinders or power control units (one for each brake) in brackets or position provided for them.

*c.* All master cylinders should be so installed that when the ship is in a landed position the master cylinder outlet is as nearly horizontal as possible with the inlet boss always at the top. Such mounting permits proper bleeding of the system.

### 2. INSTALLATION OF SUPPLY TANK.

*a.* A plain gravity type supply tank of approximately one-pint capacity should be used in conjunction with Goodyear master cylinders. This tank must be mounted so that it is the highest point in the brake system. (See figure 5.) The supply tank must be air vented in order to permit gravity to keep the system full at all times.

*b.* In order to facilitate bleeding by pressure, it is recommended that a short valve stem be installed in the top of the supply tank. A Schrader valve stem, No. 1954, with valve core removed and with valve cap drilled to provide an air vent, may be used for this purpose.

## SECTION IV OPERATION

### 1. PRINCIPLES OF OPERATION.

*a.* An airplane master cylinder is a device that receives pressure from the brake pedal, builds up that pressure by the movement of a piston inside a sealed, fluid-filled cylinder, and transmits the resulting hydraulic pressure to the hydraulic lines which are connected to the brakes.

*b.* A fluid reservoir located higher than the piston of the master cylinder is the source from which the hydraulic fluid is supplied. The fluid enters through the cylinder inlet port and compensating port (figure 4) and fills the master cylinder casting ahead of the piston and on down the hydraulic brake connecting line to the piston of the brake.

*c.* Application of the brake pedal which is linked to the master cylinder piston rod causes the piston rod to push the piston forward inside the master cylinder casting. A slight forward movement blocks the compensating port and the building up of pressure begins.

*d.* When the brake pedal is released and returns to "off" position, the piston return spring pushes the front piston seal and the piston back to full "off" position against the piston return stop. This again clears the compensating port.

*e.* Fluid that was moved into the brake cylinder and brake connecting line is then pushed back to the master cylinder by the brake piston as the piston is returned to "off" position by the pressure of the brake piston return springs.

*f.* Any pressure or excess volume of fluid is relieved through the compensating port and passes back to the fluid reservoir. This insures against dragging or locked brakes being caused by the master cylinder.

*g.* If, due to leakage, any fluid is lost back of the front piston seal, the fluid is automatically replaced from the fluid reservoir by gravity.

*h.* Any fluid lost in front of the piston by leaks in the connections, line, or at the brake is automatically replaced through the piston head ports, and around the lip of the front piston seal when the piston makes the return stroke to full "off" position. The front piston seal functions as a seal only during the forward stroke.

*i.* The automatic fluid replacement arrangements described in paragraphs *g.* and *h.* above always keep the master cylinder, brake connecting line and brake cylinder fully supplied with fluid as long as there is fluid in the reservoir.

*j.* The rear piston seal seals the rear end of the cylinder at all times to prevent leakage of fluid.

*k.* The flexible rubber boot serves only to keep out dust.

## 2. OPERATION INSTRUCTIONS.

Refer to the handbook for the airplane concerned.

## SECTION V

### SERVICE INSPECTION, MAINTENANCE, AND LUBRICATION

#### 1. SERVICE TOOLS REQUIRED.

No special service tools are required.

#### 2. SERVICE INSPECTION.

DELETED

COLUMN NO. 38  
WHEELS AND BRAKES

##### 30 Hour Inspection

Visually inspect the master cylinder for leaks.

##### 60 Hour Inspection

Check the fluid reservoir, and, if less than  $\frac{1}{2}$  full, add more fluid until the tank is about  $\frac{3}{4}$  full.

#### CAUTION

Use only recommended Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366. Other fluids may cause rapid deterioration of gaskets, corrosion of metal parts, or vaporization of fluid at relatively low temperatures.

Inspect fittings on master cylinders for proper alignment and tightness.

##### 600 Hour Inspection

Inspect the entire hydraulic system, from fluid reservoir to brakes, for leaks. This inspection should be made

with brakes applied to maintain pressure in the system.

Check fluid level in reservoir, and if less than half full, add more Hydraulic Fluid, Specification AN-VV-O-366, until the reservoir is about  $\frac{3}{4}$  full.

Inspect the flexible hydraulic hose and the connections in the line. After long period of service, hose may crack or swell. If this condition exists, hose must be replaced. All hose must be protected from oil and gasoline.

#### 3. MAINTENANCE.

*a.* BLEEDING THE HYDRAULIC SYSTEM.—An excessive amount of air in the hydraulic system results in "spongy," ineffective brake action. This requires bleeding of the hydraulic system.

##### (1) PREPARATION.

(*a*) The entire hydraulic system must be connected.

(*b*) Fluid reservoir must be *filled* with Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366.

(*c*) Remove the cap screw from the bleeder plug in the brake and insert in its place a standard bleeder hose. Place free end of hose in a clean glass receptacle. Back off bleeder plug and proceed to bleed the system by either of the following methods:

##### (2) BLEEDING WITH AIR PRESSURE.

(*a*) Bleeding the system can be most quickly and satisfactorily handled by attaching an ordinary hand pump to the connection on the supply tank where such connection is provided, and forcing fluid from the supply tank through the system under air pressure. (See figure 6.)



(b) Bleeding is assisted by applying the brake pedals and holding them in "on" position while the fluid is passing through the system. Work the brake pedal back and forth several times between the full "on" and full "off" positions during the bleeding operation. The brakes must finally be held in the full "on" position until the bleeder plug is closed.

(c) Very little pressure is required. Several strokes of the hand pump will provide sufficient speed of movement of the fluid through the line to cause any air in the system to be carried along and eliminated through the bleeder hose.

(d) When no more air bubbles come from bleeder hose, the hydraulic system has been properly bled. The brake bleeder plug should be tightened and the cap screw with washer replaced.

### CAUTION

Do not allow the supply tank to run dry, or it will be necessary to refill the tank and rebleed the system.

### (3) BLEEDING WITHOUT AIR PRESSURE.

(a) Bleeding can be done without air pressure (i.e., by gravity) if there is no valve stem on the supply tank for a hand pump or air hose.

(b) Be sure all preparations described in paragraph 3 a. (2), this section, have been made.

(c) Back off bleeder plug at brake and permit system to fill by gravity from the supply tank. This will require a few minutes.

(d) When the fluid starts to flow from the bleeder hose, apply the brake pedal rapidly and force fluid through the hose into the receptacle. While fluid is flowing, hold brake on and turn bleeder plug tight. Then allow pedal to return slowly to full "off" position. This draws new fluid into the system from the supply tank.

(e) Open bleeder plug and push brake pedal on rapidly again. While fluid is flowing, tighten bleeder plug before allowing brake pedal to return slowly to brake "off" position.

(f) Repeat this operation until no more air bubbles come from bleeder hose. System is then properly bled and hose should be removed.

(g) Replace the bleeder plug cap screw and washer.

### CAUTION

The end of the bleeder hose must be kept under the surface of the fluid in the receptacle at all times in order to properly check for air bubbles escaping from the hose.

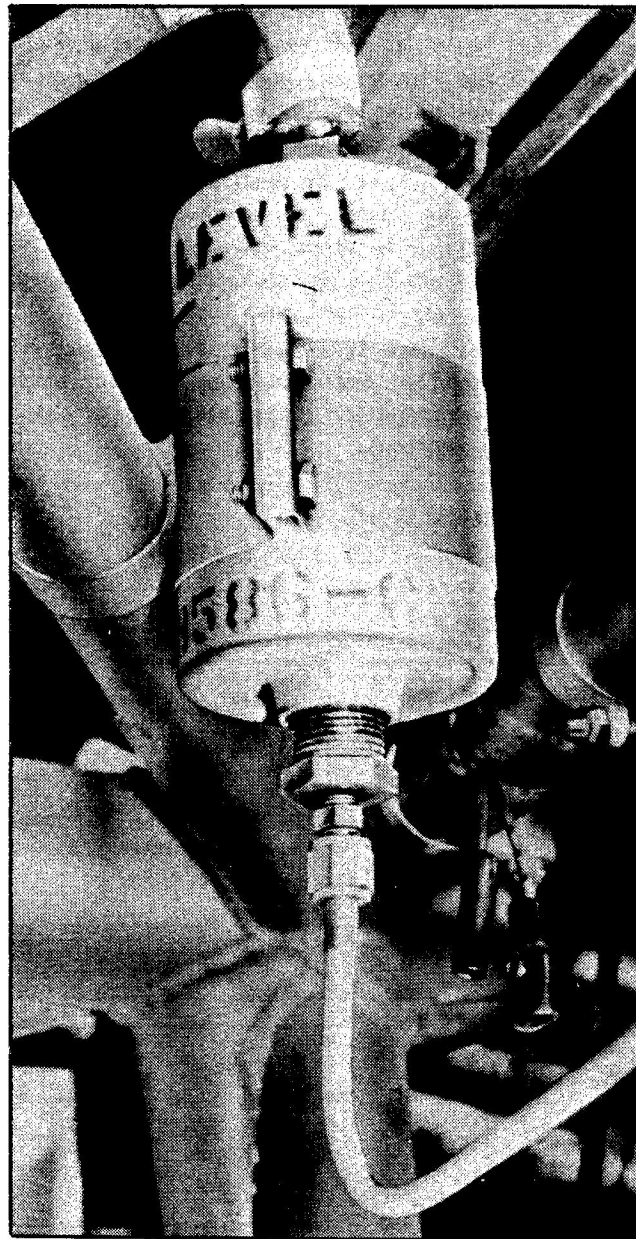


Figure 6—Hydraulic Fluid Supply Reservoir—Air Hose in Position for Pressure Bleeding

### (4) PRECAUTIONS.

(a) In no case should bleeding be attempted from the bottom of the hydraulic system, because it is impossible to remove the air in back of the piston seal of the master cylinder when using this method.

(b) Extreme care must be taken to see that the fluid reservoir and all lines and fittings are absolutely clean. Any dirt or other particles in the system may stick in the master cylinder compensating port, pre-



venting the system from compensating and resulting in a locked or dragging brake. Such particles may also work under the seals on the master cylinder piston or under the brake piston seal and cause leaks.

(c) Denatured Alcohol, U. S. Treasury Department Formula No. 1, can be used in cleaning the line or for washing or cleaning the synthetic rubber seals. *Never use gasoline to clean seals.* If alcohol is not available, Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366, may be used, then discarded.

b. SEAL REPLACEMENT.—Whenever a master cylinder is disassembled, both the front and rear piston seals must be inspected and if they are scored or out of shape must be replaced.

### CAUTION

If Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366, is used in the system, be sure to use *synthetic* rubber seals. Natural rubber seals deteriorate rapidly in this type of fluid.

### 4. LUBRICATION.

The hydraulic fluid provides all the lubrication necessary.

### 5. SERVICE TROUBLES AND REMEDIES.

TROUBLE	PROBABLE CAUSE	REMEDY
Dragging or locked brakes.	Master cylinder compensating ports clogged with dirt.	Clean compensating ports. Flush out the system with Denatured Alcohol, U. S. Treasury Department Formula No. 1. If alcohol is not available, use clean Petroleum Base Hydraulic Fluid, Specification AN-VV-O-366, and then discard. Refill with fluid and bleed.
	Weak or broken master cylinder piston return spring.	Replace with new spring.
	Parking brake improperly installed or adjusted, preventing master cylinder piston from returning to piston return stop even though brake pedal is in "off" position.	Adjust or install parking brake properly.
	Binding of brake pedal linkage prevents full return of master cylinder piston.	Free up point of brake pedal binding.
	Use of improper hydraulic fluid may cause the cylinder to operate improperly under severe heat or cold conditions—may destroy seals or cause swelling of seals.	Replace all seals in brakes and master cylinders. Flush system thoroughly with Denatured Alcohol, U. S. Treasury Department Formula No. 1. Fill and rebleed system with the recommended fluid.

TROUBLE	PROBABLE CAUSE	REMEDY
<b>"Spongy," ineffective brake action.</b>	Air in hydraulic system.	Bleed system as described in paragraph 3 <i>a.</i> , this section.
	Small air bubbles mixed with fluid because system was bled several times in a short period.	Wait until air accumulates in larger bubbles which can be eliminated by re-bleeding, or drain the hydraulic system and refill with new fluid.
	Fluid reservoir empty.	Refill and bleed system.
	Leak in system, or damaged, worn or shrunk piston gaskets in brake or master cylinder.	Check lines and connection for leaks. Check piston gaskets and replace if necessary.
	Vent in supply tank stopped up.	Clean vent.

## SECTION VI

### DISASSEMBLY, INSPECTION, REPAIR, AND REASSEMBLY

#### 1. OVERHAUL TOOLS REQUIRED.

No special overhaul tools are required.

#### 2. DISASSEMBLY.

*a.* Remove large and small boot straps, if provided, from flexible rubber boot. (See figure 4.)

*b.* Remove boot from master cylinder casting, and the piston rod assembly will come loose from the casting with the boot.

*c.* Remove boot from piston rod assembly.

*d.* Place master cylinder casting in a vise. Push with piston rod to depress piston sufficiently to relieve tension against piston stop. While tension against piston stop is relieved, use a small screwdriver to remove the piston stop lock wire.

*e.* Remove piston stop and piston from master cylinder. The cylinder can now be removed from the vise.

*f.* If damaged or leaking, remove rear piston seal from the piston.

*g.* Remove front piston seal from master cylinder casting by placing finger over inlet port and applying air pressure or blowing through outlet port.

*b.* Remove piston return spring and piston return spring seat from cylinder.

#### 3. CLEANING, INSPECTION, AND REPAIR.

*a.* Wash piston, piston seals and master cylinder casting in Denatured Alcohol, U. S. Treasury Department Formula No. 1, making sure that piston head ports and the compensating valve in the casting are perfectly clean.

#### CAUTION

Never use gasoline to clean rubber seals.

*b.* Inspect piston seals. Replace if damaged, worn, or misshapen.

*c.* Inspect piston return spring. Replace if weak.

#### 4. REASSEMBLY

*a.* Place piston return spring seat on end of piston return spring, and crimp edges of seat around spring.

*b.* Install piston return spring in the master cylinder casting with the spring seat toward the large, open end of the cylinder. (See figure 4.)

*c.* Lubricate the front piston seal with hydraulic fluid, and carefully install with the lips of the cup-shaped seal facing into the master cylinder casting.

*d.* If necessary to install new ring type seal, immerse seal in hydraulic brake fluid to lubricate, and install in groove in piston.

*e.* Place piston in the cylinder casting with the open end of the piston facing out of the open end of the cylinder.

*f.* Put cylinder casting in a vise. Lay piston stop and then the piston stop and lock wire on top of piston.

*g.* With round end of piston rod, press hard enough on piston to depress it sufficiently so the piston stop lock wire can be snapped into the locking groove.

*h.* If the piston rod assembly has been taken apart, screw the piston rod coupling on the piston rod and secure with the piston rod coupling cotter pin, if one is provided. Screw the check nut on the piston rod terminal and then screw the terminal into the piston rod coupling.

*i.* When the piston rod assembly is complete, stretch the small end of the flexible rubber protective boot around the groove in the piston rod coupling, and fasten with the small boot strap, if one is provided.

*j.* Insert the round end of the piston rod into the cavity of the piston and stretch the large end of the

rubber boot around the groove in the end of the cylinder casting. Fasten with the large boot strap, if one is provided.

#### NOTE

If the master brake cylinder assemblies are to be stored after repair, lubricate the internal surfaces of the unit thoroughly by filling the cylinder with the proper hydraulic fluid and drain to the drip point. Seal the open ports with suitable plugs.

#### CAUTION

Exercise care to insure proper hydraulic fluid is used for this purpose. Oil preservative, Specification No. AN-O-7, may be used for this purpose in lieu of hydraulic fluid Specification No. AN-VV-O-366, in all master brake cylinders referenced in this handbook, except master brake cylinder assembly No. 218073-3, which uses natural rubber cups and seals. Hydraulic fluid, AAF Specification No. 3586, will be used for this purpose in this assembly.

## SECTION VII TEST PROCEDURE

### 1. BEFORE INSTALLATION.

Depress the master cylinder piston and be sure the piston return spring returns the piston to full "off" position.

### 2. AFTER INSTALLATION.

Have someone depress the brake pedal while checking for leaks at all fittings throughout the hydraulic system.

**PARTS CATALOG****SECTION VIII  
INTRODUCTION**

1. This Parts Catalog illustrates and describes the parts for hydraulic master cylinders manufactured by The Goodyear Tire and Rubber Company, Inc., Akron, Ohio.

2. The Group Assembly Parts Lists, Section IX, list and illustrate the eleven major assemblies divided into minor assemblies and detail parts which make up the final assembly. The breakdown lists the components in their sequence of assembly, and is arranged and indented in the order which indicates the relation of assemblies, sub-assemblies, and detail, to the main assembly.

3. Each illustration is arranged on the page in logical order of assembly. Each part has been given a separate index number, which appears in the second left-hand column of the Group Assembly Parts List for ease in locating parts.

4. Parts marked with an asterisk (\*) are procurable only in assembly and may not be purchased separately. When ordering parts, specify the part number, part name, quantity required, and the part number of the master cylinder on which the part is to be used.

5. All replacements for master cylinders covered by this catalog are standard size and no oversize and/or

undersize parts are procurable.

a. Assembly No. 511827 is interchangeable with assemblies No. 511738 and No. 511732 with respect to component parts, excepting the sub-assembly which utilizes the 7/16-20 connections.

b. Assembly No. 530678 was replaced by No. 530854 which was subsequently voided and replaced by No. 530875. The components of assembly No. 530875 are interchangeable with No. 530678 and No. 530854.

c. The following chart lists additional replacements.

<i>Size</i>	<i>New Ass'y No.</i>		<i>Old Ass'y No.</i>
2-inch	530802	replaces	270788-2; -4
1-inch	511738	replaces	218073-2
1-inch	511732	replaces	218073-3
3/4-inch	530701	replaces	510979

6. Symbols used in this catalog and their explanation follows:

\* Parts are not procurable as separate components.

## SECTION IX GROUP ASSEMBLY PARTS LISTS

FIG. NO.	INDEX NO.	STOCKED	GROUP - Wheels and Brakes						Units Per Assy			
			MAJOR ASSEMBLY - 2-in. Hydraulic Master Cylinder						270788-2	270788-4	530802	
			PART NUMBER	1	2	3	4	5				6
			270788-2							1		
			270788-4								1	
			530802									1
			218017							1	1	
			530804									1
7	1		*277568							1	1	
7	1		*511680									1
7	2		*218018							1	1	
7	3		217750-1							1	1	1
7	4		213788							1	1	1
7	5		216268							1	1	1
7	6		218019							1	1	1
7	7		213793-2							1	1	
7	7		213793-4									1
7	8		213801							1	1	
7	8		511833									1
7	9		216347-3							1	1	
7	9		AN6227-29									1
7	10		213795							1	1	1
7	11		213794							1	1	1
			510574							1	1	1
7	12		*213800							1	1	1
7	13		*213799							1	1	1
7	14		AN316-8R							1	1	1
7	15		213797							1	1	1
7	16		AN380B4-5							1	1	1
7	17		511280								1	1
7	17		510954							1		
7	18		217723-1							1	1	1
7	19		217723-5							1	1	1

\*Not procurable as a separate component.

Assembly No. 530802 replaces No. 270788-2 (P-59 seal) and No. 270788-4.

Sub-assembly No. 530804 which utilizes Linear compound only is interchangeable with No. 218017 (P-62 seal).

## SECTION IX GROUP ASSEMBLY PARTS LISTS

FIG. NO.	INDEX NO.	STOCK NO.	GROUP - Wheels and Brakes						Units Per Assy	
			MAJOR ASSEMBLY - 1-1/2-in. Hydraulic Master Cylinder (P-59 Seals)							
			PART NUMBER	1	2	3	4	5		6
			270435-2						Master Cylinder Assembly - 1-1/2-in. hydraulic	1
			217749						Master Cylinder Sub-assembly - 1-1/2-in.	1
7	1		*217747						Cylinder - Piston cavity	1
7	2		*217748						Sleeve - Cylinder lining	1
7	3		217750-1						Gasket - Hydraulic line inlet connector	1
7	4		213788						Connector - Hydraulic - Hydraulic line inlet	1
7	5		214835						Spring - Piston return	1
7	6		217719						Seat - Piston return spring	1
7	7		217436-2						Cup - Piston seal (P-59 compd)	1
7	8		216348						Piston - Master cylinder	1
7	9		216347-6						Seal - Piston (P-59 compd)	1
7	10		217725						Stop - Piston	1
7	11		217724						Wire - Lock, piston stop, retaining	1
			510574						Rod Assembly - Piston	1
7	12		*213800						Rod - Piston	1
7	13		*213799						Coupling - Piston rod	1
7	14		AN316-8R						Nut - Aircraft check	1
7	15		213797						Bolt - Eye, piston rod	1
7	16		AN380B4-5						Pin - Cotter	1
7	17		217722						Boot - Master cylinder (SM705 compd)	1
7	18		217723-1						Strap - Boot, small	1
7	19		217723-2						Strap - Boot, large	1

\* Not procurable as a separate component.

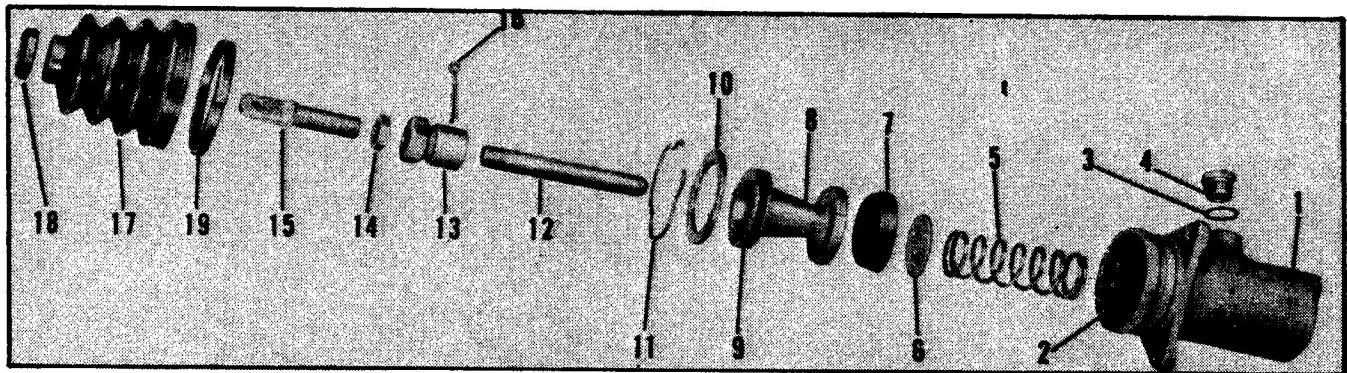


Figure 7 - 1-1/2-inch and 2-inch Master Cylinder - Exploded View

SECTION IX GROUP ASSEMBLY PARTS LISTS

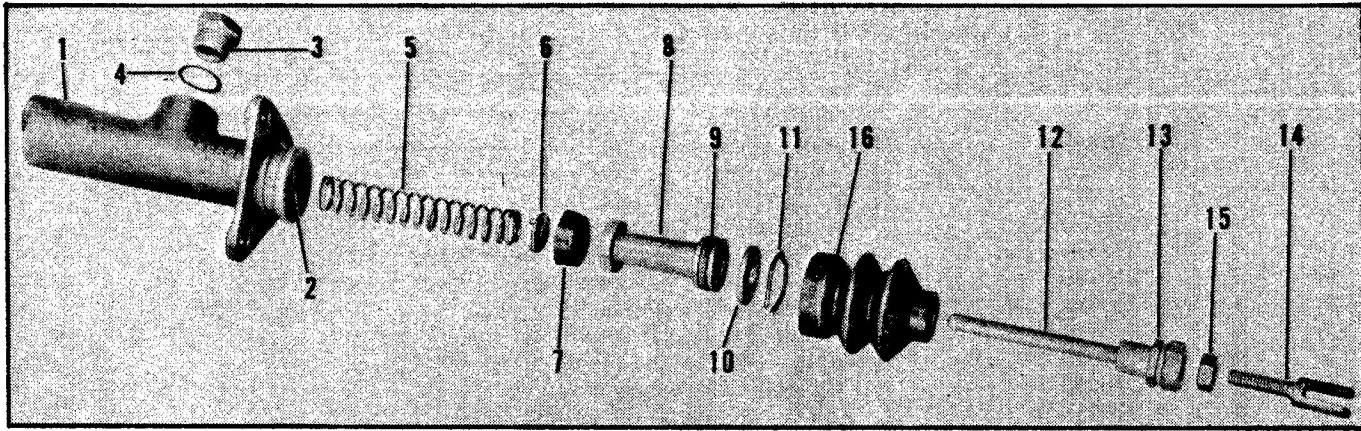


Figure 8 - 1-inch Master Cylinder - Exploded View



## SECTION IX GROUP ASSEMBLY PARTS LISTS

FIG. NO.	INDEX NO.	STOCKED	GROUP - Wheels and Brakes						Units Per Assy						
			MAJOR ASSEMBLY - 1-in. Hydraulic Master Cylinder						218073-2	218073-3	511732	511738	511827		
			PART NUMBER	1	2	3	4	5						6	NOMENCLATURE
			218073-2								1				
			218073-3									1			
			511732										1		
			511738											1	
			511827												1
			218074								1	1			
			511734-1										1		
			511734-2											1	
			511828												1
8	1		*218075								1	1			
8	1		*511737										1	1	1
8	2		*214180								1	1			
8	3		AN893-3D												1
8	3		213788								1	1	1	1	
8	4		217750-1								1	1	1	1	1
8	5		511113								1	1	1	1	1
8	6		218079								1	1	1	1	1
8	7		217957-3									1	1		
8	7		217957-2								1				
8	7		217957-5											1	1
8	8		214238								1	1	1		
8	8		511834											1	1
8	9		AN6227-15											1	1
8	9		216347-1									1	1		
8	9		216347-5								1				
8	10		214181								1	1	1	1	1
8	11		218078								1	1	1	1	1
			218076								1	1	1	1	1
8	12		*214183								1	1	1	1	1
8	13		*214182								1	1	1	1	1
8	14		214184								1	1	1	1	1
8	15		AN335B5								1	1	1	1	1
8	16		218077								1	1	1	1	1

\* Not procurable as a separate component.

Assembly No. 511738 replaces No. 218073-2; Assembly No. 511732 replaces No. 218073-3.

Assembly No. 511827 is interchangeable with assemblies No. 511738 and No. 511732 with respect to component parts, excepting sub-assembly No. 511828 which utilizes 7/16-20 connections.

## SECTION IX GROUP ASSEMBLY PARTS LISTS

FIG. NO.	INDEX NO.	STOCKED	GROUP - Wheels and Brakes						Units Per Assy			
			MAJOR ASSEMBLY - 3/4-in. Hydraulic Master Cylinder						530701	530875		
			PART NUMBER	1	2	3	4	5			6	NOMENCLATURE
			530701							Master Cylinder Assembly - (Non-Reservoir)	1	
			530875							Master Cylinder Assembly - (Reservoir)		1
9	1		9530119							Master Cylinder Sub-assembly - (Non-Reservoir)	1	
9	1A		9530133							Master Cylinder Sub-assembly - (Reservoir)		1
9	2		9510116							Spring - Piston return	1	1
9	3		9510117							Retainer - Return spring	1	1
9	4		510986							Cup - Piston seal (P-62 compd)	1	1
			9510128							Piston Assembly - Master cylinder	1	1
9	5		*9530123							Piston - Master cylinder	1	1
			*9510123							Cup - Protector	1	1
9	6		AN6227-11							Seal - 'O' Ring (Linear compd)	1	1
9	7		510989-1							Ring - Piston retainer	1	1
			9510125							Rod Assembly - Piston	1	1
9	8		*9510127							Rod - Piston	1	1
9	9		9510126							Coupling - Piston rod	1	1
9	10		214184							Clevis - Piston rod	1	1
9	11		AN335B5							Nut - Plain hex (Coarse Thread)	1	1
9	12		511575							Boot - Master cylinder	1	1
9	13		9510185							Plug Assembly - Filler		1

Assembly No. 530701 replaces No. 510979.  
 Assembly No. 530701 is interchangeable with No. 530875 with respect to component parts excepting sub-assembly No. 9530133 (Reservoir is brazed to pressure tube).  
 \* Not procurable as a separate component.

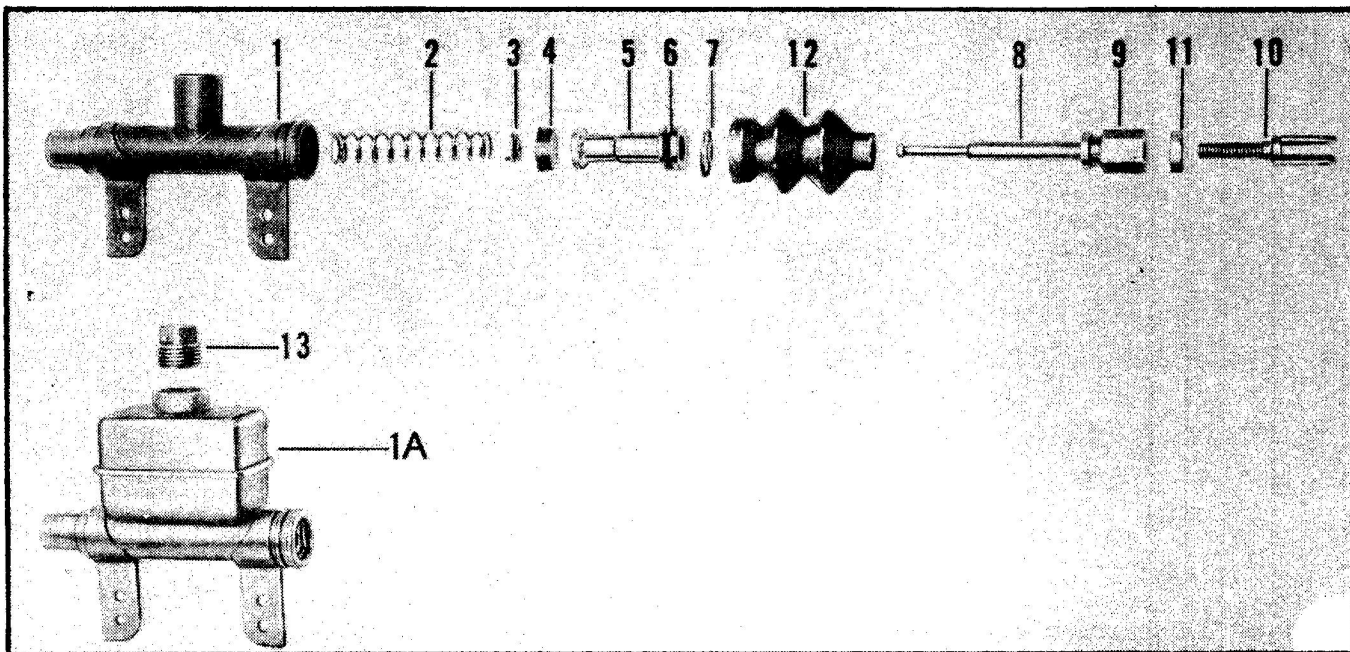
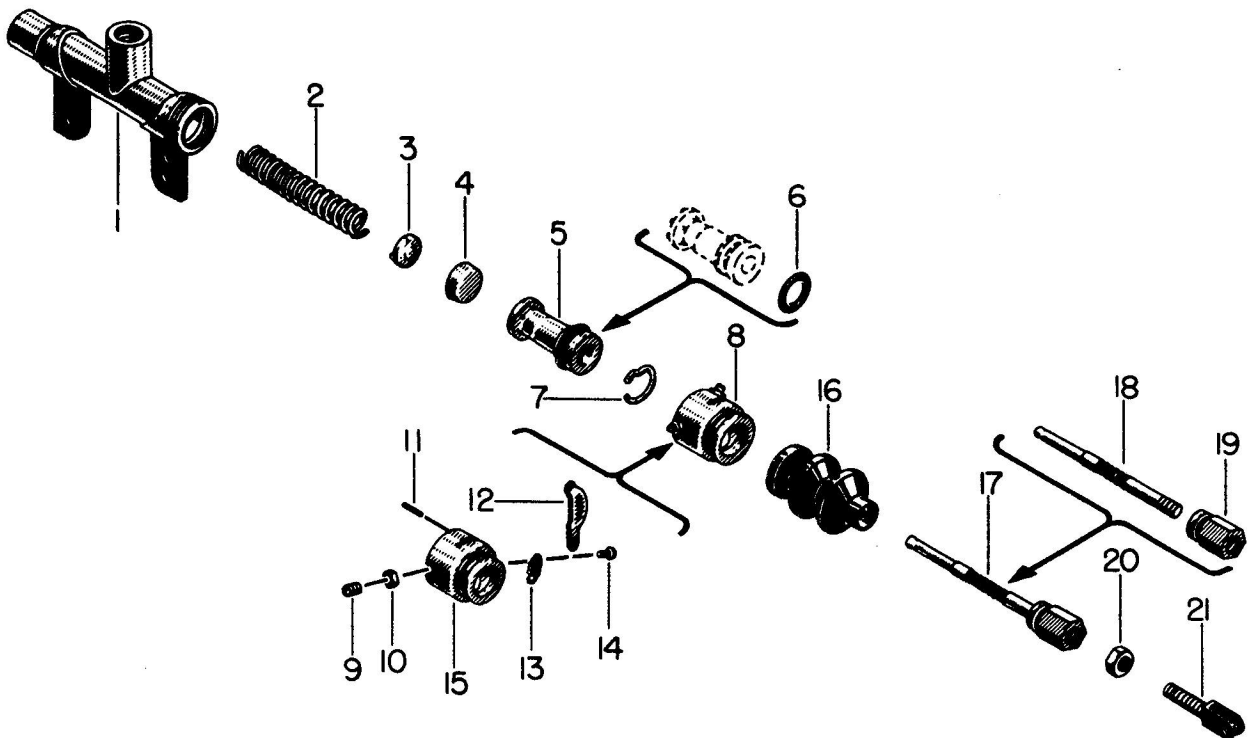


Figure 9 - 3/4-inch Master Cylinder - Exploded View

## SECTION IX GROUP ASSEMBLY PARTS LIST

FIG. NO.	INDEX NO.	STOCKED	GROUP—Wheels and Brakes						Units Per Assy	
			MAJOR ASSEMBLY— $\frac{3}{4}$ -in. Hydraulic Master Cylinder with Parking Device							
			PART NUMBER	1	2	3	4	5		6
10	1		9520293						Master Cylinder Assembly	1
10	2		9530119						Master Cylinder Sub-assembly	1
10	3		9510116						Spring—Piston return	1
10	4		9510117						Retainer—Return spring	1
10	5		510986						Cup—Piston seal (P-62 compd)	1
10			9510128						Piston Assembly—Master cylinder	1
10			*9530123						Piston—Master cylinder	1
10			*9510123						Cup—Protector	1
10	6		AN6227-11						Seal—“O” Ring	1
10	7		510989-1						Ring—Piston retainer	1
10	8		9520483						Parking Device Assembly	1
10	9		AN565A6-5						Setscrew—Headless	3
10	10		AN340C6						Nut—Light hex	3
10	11		9510052						Pis—Dowel	1
10	12		9510051						Lever—Parking	1
10	13		9510055						Spring—Lever return	1
10	14		Coml						Screw—Phillips round hd No. 6-32 x $\frac{1}{4}$ in. lg thread cutting type 1	1
10	15		9520299						Housing—Parking lever	1
10	16		511575						Boot—Master cylinder	1
10	17		9510054						Rod Assembly—Push	1
10	18		9510049						Rod—Push	1
10	19		9510126						Connector—Push rod	1
10	20		Coml						Nut—Hex $\frac{5}{16}$ -18 NC-2 x $\frac{3}{16}$ in. thick	1
10	21		214184						Clevis—Rod end	1

\* Not procurable as a separate component.

Figure 10— $\frac{3}{4}$ -inch Master Cylinder—Exploded View

