SUPPLEMENT TO 911 WORKSHOP MANUAL

(XVI)

This supplement contains pages SR 28c - SR 28k

Replacement sheets: ST 11

Please insert this supplement as usual in the correct group of your 911 workshop manual, Vol. I, if necessary discarding existing pages bearing the same numbers.

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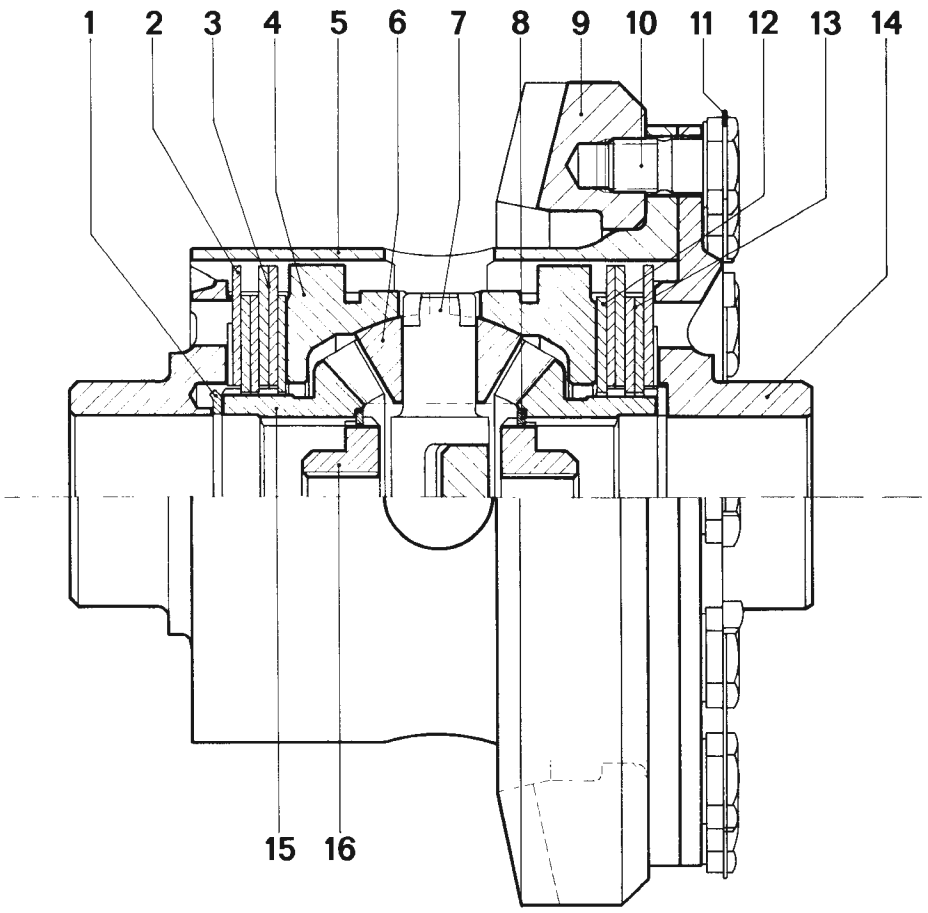
ZF DISC TYPE LIMITED SLIP DIFFERENTIAL - 69 MODEL

General

From 1. April, 1969 on the ZF limited slip differential (strengthened version) has been supplied as a special option. It provides 50 % locking effect. By modifying the sequence of inner and outer discs a locking effect of 75 % can be obtained for special competition purposes. The standard joint flange is now also used on the limited slip differential, but the expansion bolt has been modified.



1 Thrust washer
2 Outer disc (dished profile)
3 Outer discs
4 Pressure ring
5 Differential casing
6 Bevel pinion
7 Differential pinion shaft
8 Circlip
9 Crownwheel
10 Hex. bolt
11 Locking plate
12 Inner disc
13 Inner discs
14 Casing cover
15 Halfshaft bevel pinion
16 Threaded block

Fig. 1

Lubrication:

Use only Shell S 1747 A gear oil.
Note:
This oil is known in Australia as Shell SCL Gear Oil 90;
in Canada as Shell HDR Gear Oil 90;
in the USA as Shell HDR Gear Oil 90 E. P.

Dismantling

1. Take off the crown wheel.

2. Loosen and remove Allen screws on casing flange.

Fig. 2

3. Take out all internal components.
   Warning:
   Note installed sequence of discs; they must be re-assembled in the same order or the locking effect will not be the same.

Checking condition of components

1. Differential casing:
   Check wear at guide slots for outer discs and pressure rings.

2. Pressure ring:
   The guide pegs and thrust faces must not be heavily eroded or scored. The pressure rings must move freely in the differential casing.

3. Halfshaft bevel pinions:
   The contact faces for the thrust washers must not be worn. The inner discs must move freely on the splines of the halfshaft bevel pinions.

4. Discs:
   Check inner and outer discs for wear. The guide pegs on the outer discs and the splines on the inner disc must not have lost their original shape.

5. Thrust washers:
   Check for wear.

Re-assembly

For re-assembly note the following points:

1. Before re-assembly starts, apply Molykote 'G' or LM 348 to all sliding surfaces on discs, pressure rings and differential shafts.

2. Insert the thrust washers so that the retaining peg in the hole in the casing or casing cover engages into position. Hold the thrust washers in place with a little grease as used for lubrication.

3. The dished profile outer disc is next to the casing or casing cover.
   Warning:
   The dished area of these discs must allow an air gap between the oil groove in the base of the casing (or casing cover) and the discs themselves (see drawing).

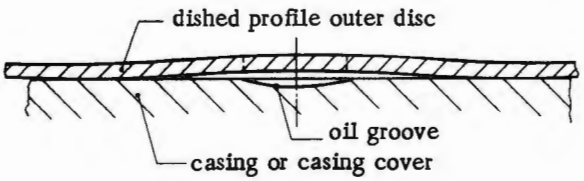


Fig. 3

4. The corret position of the discs is very important, or else the locking effect of the differential will be altered (see sectional and exploded drawings).

5. When re-assembled clamp the flange section of the differential into a vise, using protective jaws. Install the universal joint flange and rotate the differential with a torque wrench.

   Disc sequence for 50 % or 40 % locking effect: torque reading 4-8 mkp (30-57 lb/ft)

   Disc sequence for 75 % or 80 % locking effect: torque reading 6-12 mkp (43-85 lb/ft)

Fig. 4

Note:
By installing suitable inner discs the torque can be adjusted.

Inner discs are available in the thicknesses: 1.9, 2.0 and 2.1 mm.

If the minimum torque readings are not obtained with the thickest inner discs installed, the discs are severely worn and must be replaced.

Note:
The adaptor for the joint flange can be made from 30x15 mm (1.2x0.6") flat steel bar, 120 mm (4.7") long, with a 1/2" square cutout in the center.

6. Tighten the hex bolts for the crown wheel to the specified torque.

EXPLODED VIEW OF ZF DISC TYP LIMITED SLIP DIFFERENTIAL

FROM 69 MODEL ON

50 % LOCKING EFFECT

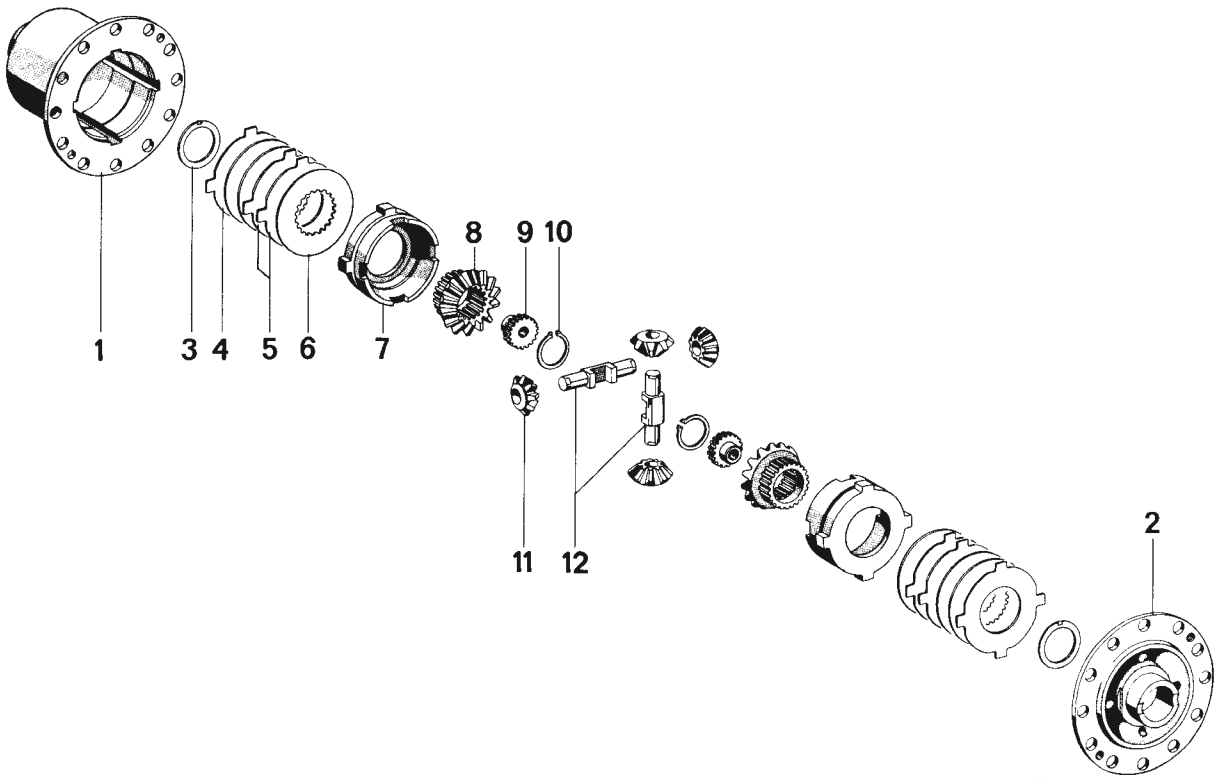


Fig. 5

1 Differential casing
2 Casing cover
3 Thrust washer
4 Outer disc (dished profile)
5 Outer disc
6 Inner disc
7 Pressure ring
8 Halfshaft bevel pinion
9 Threaded block
10 Circlip
11 Differential bevel pinion
12 Differential pinion shaft

EXPLODED VIEW OF ZF DISC TYPE LIMITED SLIP DIFFERENTIAL

FROM 69 MODEL ON

75 % LOCKING EFFECT

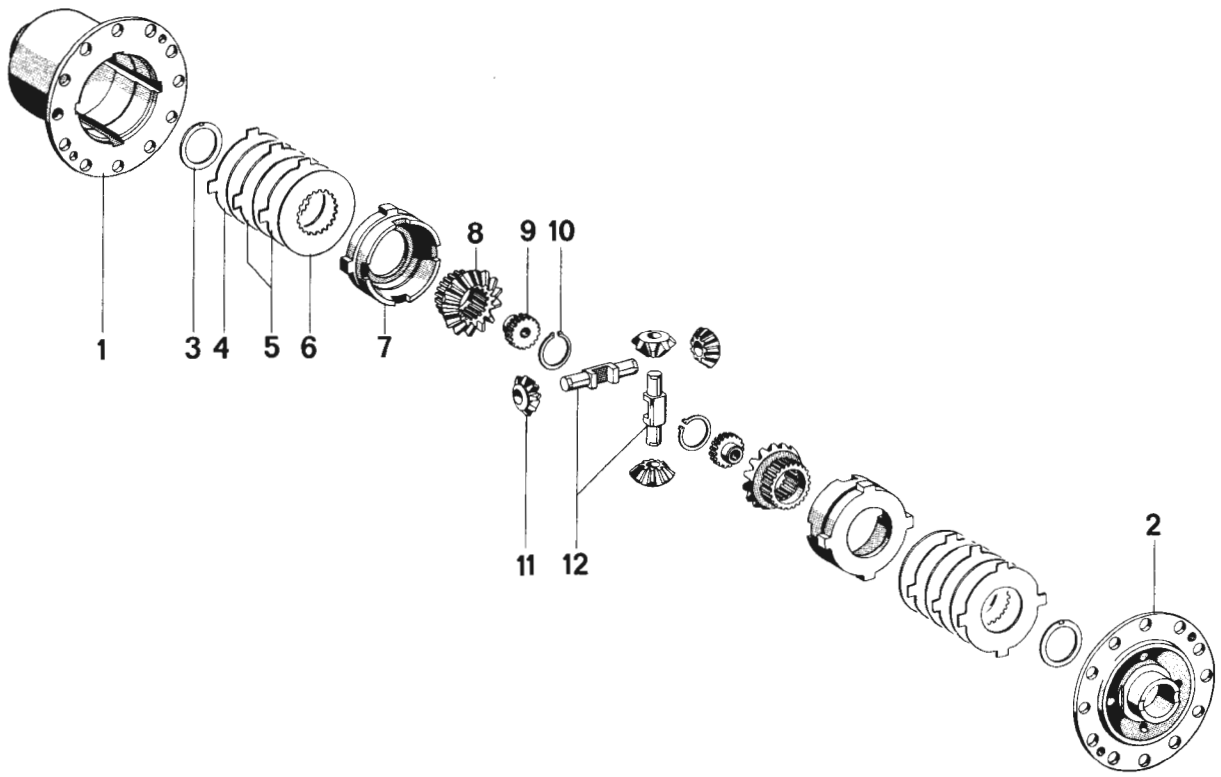


Fig. 6

1 Differential casing
2 Casing cover
3 Thrust washer
4 Outer disc (dished profile)
5 Outer disc
6 Inner disc
7 Pressure ring
8 Halfshaft bevel pinion
9 Threaded block
10 Circlip
11 Differential bevel pinion
12 Differential pinion shaft

ZF DISC TYPE LIMITED SLIP DIFFERENTIAL

PRODUCTION DATE AFTER 1 JULY 1969

From 1 July 1969 on the optional ZF limited slip differential uses molybdenum coated inner discs.

When these inner discs are installed, the limited slip differential becomes quieter in operation and the level at which locking effect remains constant is increased.

The normal setting gives 40 % locking effect. By changing the sequence of outer and inner discs, a locking effect of up to 80 % can be obtained for competition purposes.

The molybdenum coated inner discs, part number 901. 332. 551. 21/22/23, replace the plain inner discs, part number 901. 332. 551. 11/12/13, and should be installed in the '69 model' limited slip differential if complaints are received.

Warning:
When subsequently installing molybdenum coated inner plates, the sequence of outer and inner plates changes. See pages SR 28i and SR 28k.

EXPLODED VIEW OF ZF DISC TYPE LIMITED SLIP DIFFERENTIAL, '69 MODEL

PRODUCTION DATE AFTER 1 JULY 1969

LOCKING EFFECT 40 %

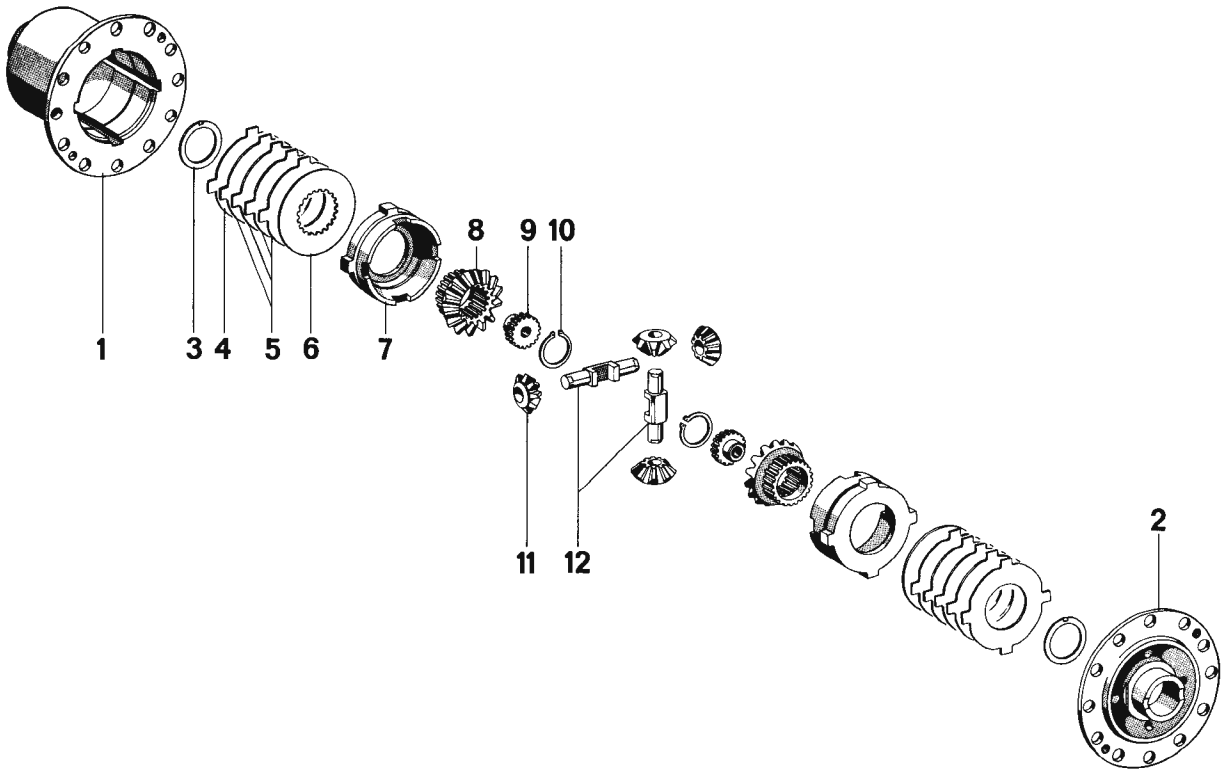


Fig. 7

1 Differential casing
2 Casing cover
3 Thrust washer
4 Outer disc (dished profile)
5 Outer disc
6 Inner disc (molybdenum coated)
7 Pressure ring
8 Halfshaft bevel pinion
9 Threaded block
10 Circlip
11 Differential bevel pinion
12 Differential pinion shaft

EXPLODED VIEW OF ZF DISC TYPE LIMITED SLIP DIFFERENTIAL, 69 MODEL

PRODUCTION DATE AFTER 1. JULY 1969

LOCKING EFFECT 80 %

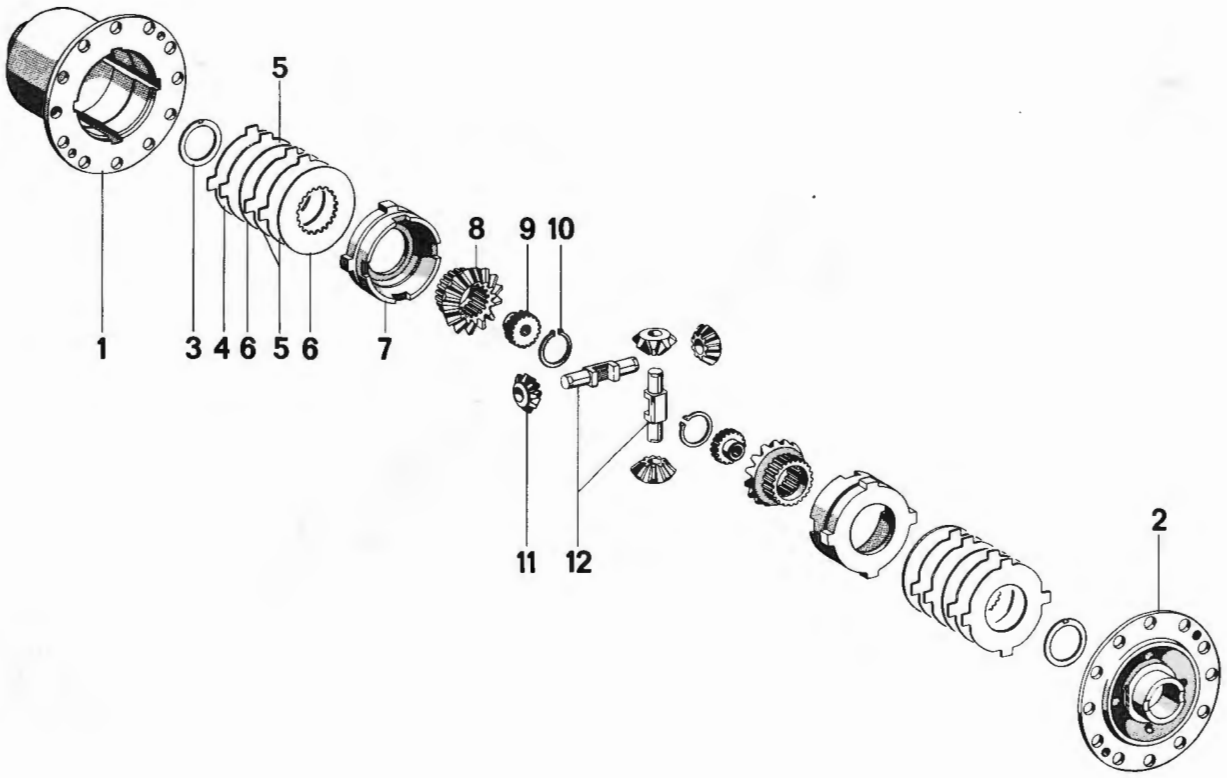


Fig. 8

1 Differential casing
2 Casing cover
3 Thrust washer
4 Outer disc (dished profile)
5 Outer disc
6 Inner disc (molybdenum coated)
7 Pressure ring
8 Halfshaft bevel pinion
9 Threaded block
10 Circlip
11 Differential bevel pinion
12 Differential pinion shaft

Exploded View of Tandem Brake Master Cylinder (for USA)

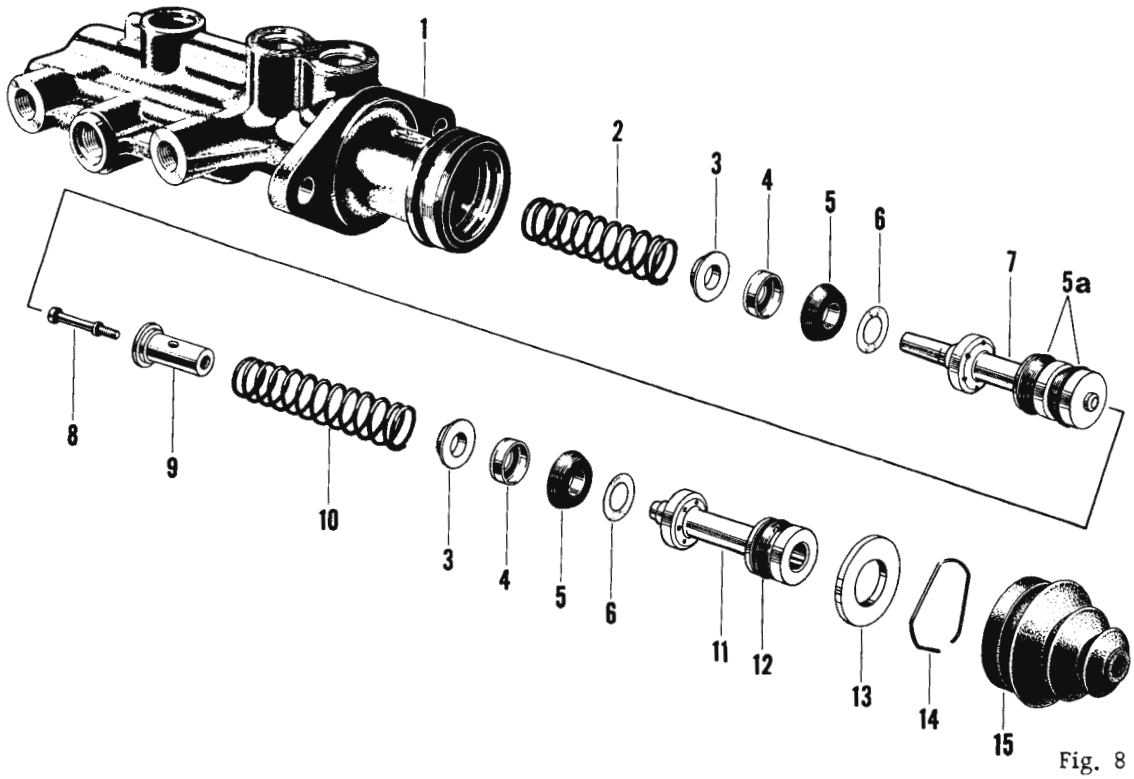


Fig. 8

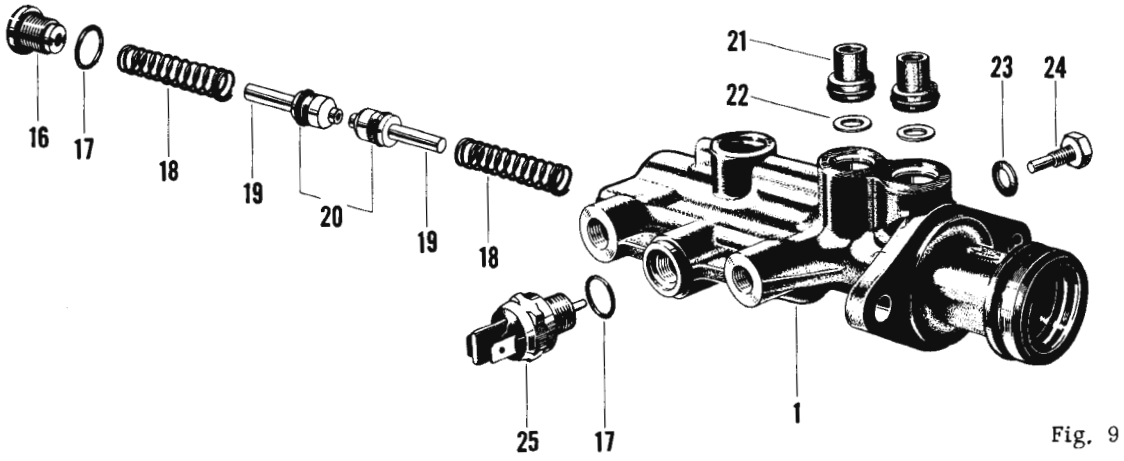


Fig. 9

1 Housing
2 Secondary piston return spring
3 Spring seat
4 Supporting washer
5 Primary cup
5a At 19.05 dia. - primary collar or separating collar 3.3301-1923.2; or at 20.64 dia. separating collar 3.3301-2022.1
6 Filler disc
7 Secondary piston
8 Stroke limiting bolt
9 Travel stop
10 Primary piston return spring
11 Primary piston
12 Secondary cup
13 Stop plate
14 Lock ring
15 Dust boot
16 Bolt
17 O-ring
18 Spring
19 Piston
20 Piston cup
21 Grommet
22 Washer
23 Gasket
24 Stop bolt
25 Circuit failure sender

Disassembly

1. Fasten master cylinder in a vise with light force (use jaw covers).

2. Withdraw lock ring with a small screwdriver.

Fig. 10

3. Remove stop plate together with the complete primary piston with installed spring, cups, etc.

4. Remove stroke limiting bolt of secondary piston and blow the piston out with compressed air (approx. 1 atm or 14 psi pressure). (Cover appropriate holes in housing.)

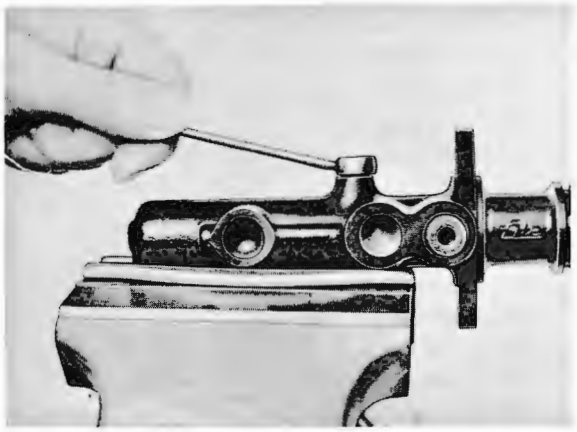


Fig. 11

5. Remove spring, spring seat, and supporting washer.

6. Gently hold primary piston in a vise and remove the stroke limiting bolt; during this operation, slightly compress the spring so that the stop bolt threads in the piston will not be damaged.

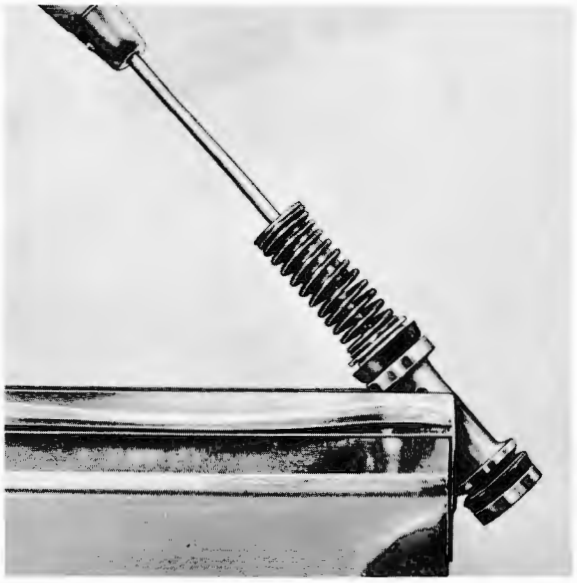


Fig. 12

7. Remove stop sleeve, stop bolt, spring, spring seat, and supporting washer from the primary piston.

8. (Applicable only to USA-type cars equipped with the brake circuit failure warning sender:) Remove warning sender, and cap screw, blow out plungers and springs with compressed air (approx. 1 atm or 14 psi).