Bleeding and Flushing Out of Brake System

Job No. 42 — 1

A. General

If air has entered the hydraulic brake system, it must be removed, i.e., the brake system must be bled. For the bleeding operation, various types of special equipment are available commercially, such as the ARC 50 pressure bleeder, or the ATE filler and bleeder AW 34 204. When these bleeders are used the instructions issued by the manufacturers should be carefully observed.

For bleeding the brake system it is advisable to use one of these special bleeders; the ARC 50 pressure bleeder is particularly useful and very easy to handle. However, it is also possible to bleed the system without the use of special equipment.

The brake fluid removed during the bleeding operation must be discarded, since otherwise there is a danger of foreign particles getting into the hydraulic system.

The most important bleeding principle is that bleeding should be started at the bleeding point farthest from the master cylinder, which as a rule will be the right rear wheel. **On vehicles equipped with the ATE power brake T 50 the power brake itself must first be bled at the two bleed screws. After that, the brake wheel cylinders are bled in the usual way and finally the power brake has to be bled again.** On later models the distributor fitting for the rear axle brake lines has also been fitted with a bleed screw (Fig. 42 — 1/1).

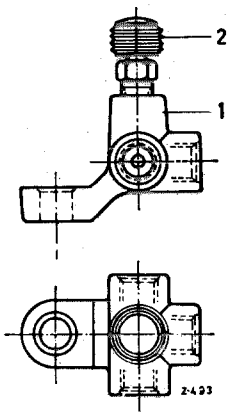

Fig. 42 — 1/1

1 Rear distributor fitting
2 Bleed screw with rubber cap

In addition, also the master brake cylinder is now being provided with a bleed screw (Fig. 42 — 1/2), which makes it possible to bleed the master brake cylinder quickly and satisfactorily.

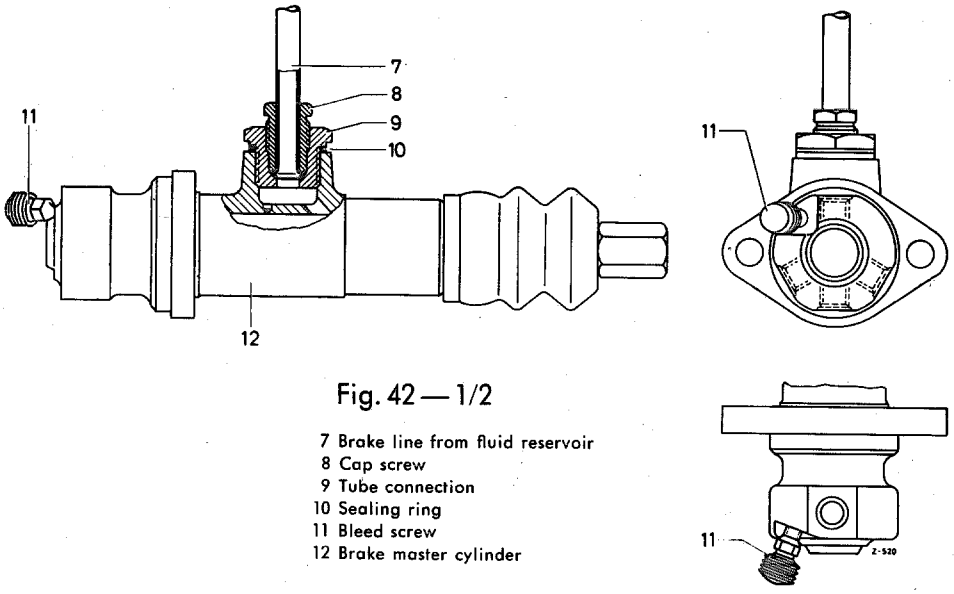

Fig. 42 — 1/2

7 Brake line from fluid reservoir
8 Cap screw
9 Tube connection
10 Sealing ring
11 Bleed screw
12 Brake master cylinder

With the introduction of the new brake master cylinder the previous fluid reservoir of sheet metal has been replaced by a transparent plastic reservoir and the connections of the brake line have been changed both at the master brake cylinder and at the fluid reservoir (see Fig. 42 — 1/2 and Fig. 42 — 1/3).

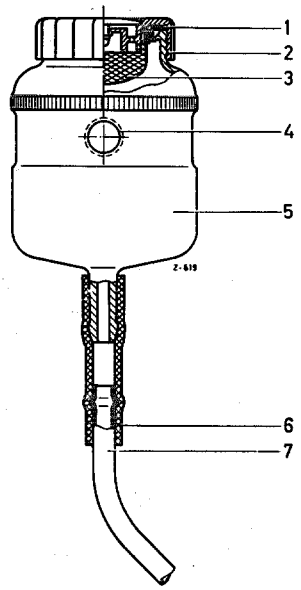

Fig. 42 — 1/3

1 Sealing ring
2 Filler plug
3 Strainer
4 Bracket attaching hole
5 Fluid reservoir
6 Connecting hose
7 Brake line to master brake cylinder

The transparent fluid reservoir has the advantage that the fluid level can be checked readily without removing the filler plug.
The distributor fitting with bleed screw has the additional advantage that the brake system can be quickly filled through the distributor fitting; depending on the type of bleeding equipment used, the brake system can also be bled through this bleed screw.

Only approved brake fluids or alcohol may be used for flushing out the brake system. **Gasoline, solvents, or mineral oils should under no circumstances be used,** since these agents swell the rubber cups and thus make the whole brake system inoperative in a very short time. Before making a complete change of brake fluid always clean the whole line system by means of completely dry, filtered compressed air.

Alcohol should only be used as a flushing fluid in exceptional cases, since it is impossible to remove all traces of alcohol from the hydraulic system. When brake fluid is added, the two liquids mix and the mixture is liable to produce gas bubbles if it is heated up beyond a certain point.

B. Bleeding the Brake System without Special Equipment

1. Remove the filler plug (7) of the fluid reservoir and, if necessary, fill up to the prescribed minimum level (1—2 cm below top edge) Fig. 42 — 1/1).

Note: During the bleeding operation keep a constant check on the fluid level in the reservoir and make sure that it never falls below a depth of 1 cm, since otherwise air will be drawn into the hydraulic system.

2. Bleed the system in the following order:

   a) upper bleed screw (5) at the ATE power brake T 50 (Fig. 42 — 1/4);

   b) lower bleed screw (4) at the ATE power brake T 50;

   c) rear wheel brake cylinder right;

   d) rear wheel brake cylinder left;

   e) front wheel brake cylinder right;

   f) front wheel brake cylinder left;

   g) upper bleed screw (5) at the ATE power brake T 50;

   h) lower bleed screw (4) at the ATE power brake T 50;

   i) brake master cylinder (if provided with bleed screw).

3. To start the bleeding operation remove the rubber protective cap of the bleed screw and fit the bleeder hose over the bleed screw nipple (Fig. 42 — 1/5).

Note: Fig. 42 — 1/5 shows the bleeding operation at the right front wheel.

On the front wheels both brake wheel cylinders are bled through the bleed screw fitted to the upper brake wheel cylinder.

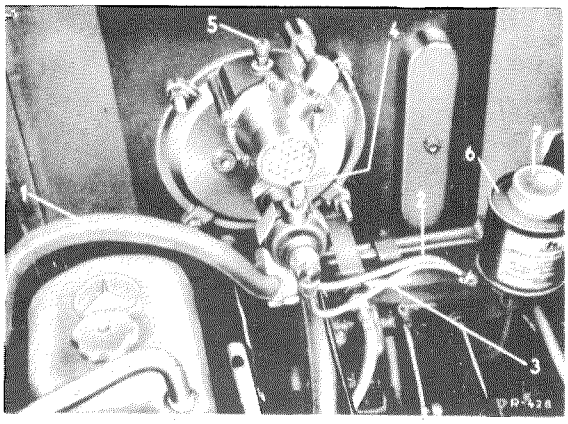

Fig. 42 — 1/4

1 Vacuum tube from engine intake manifold to power brake
2 Brake line from master brake cylinder to power brake
3 Brake line from power brake to distributor fitting
4 Slave cylinder bleed screw
5 Control valve bleed screw
6 Fluid reservoir
7 Filler plug

Immerse the free end of the bleeder hose in a clean glass container partly filled with brake fluid until the end of the bleeder hose is below the fluid level (Fig. 42 — 1/5).

5. Back out the bleed screw about one turn to the left, using box wrench SW 11.

6. Get a second mechanic to depress the brake pedal full stroke and allow it to return