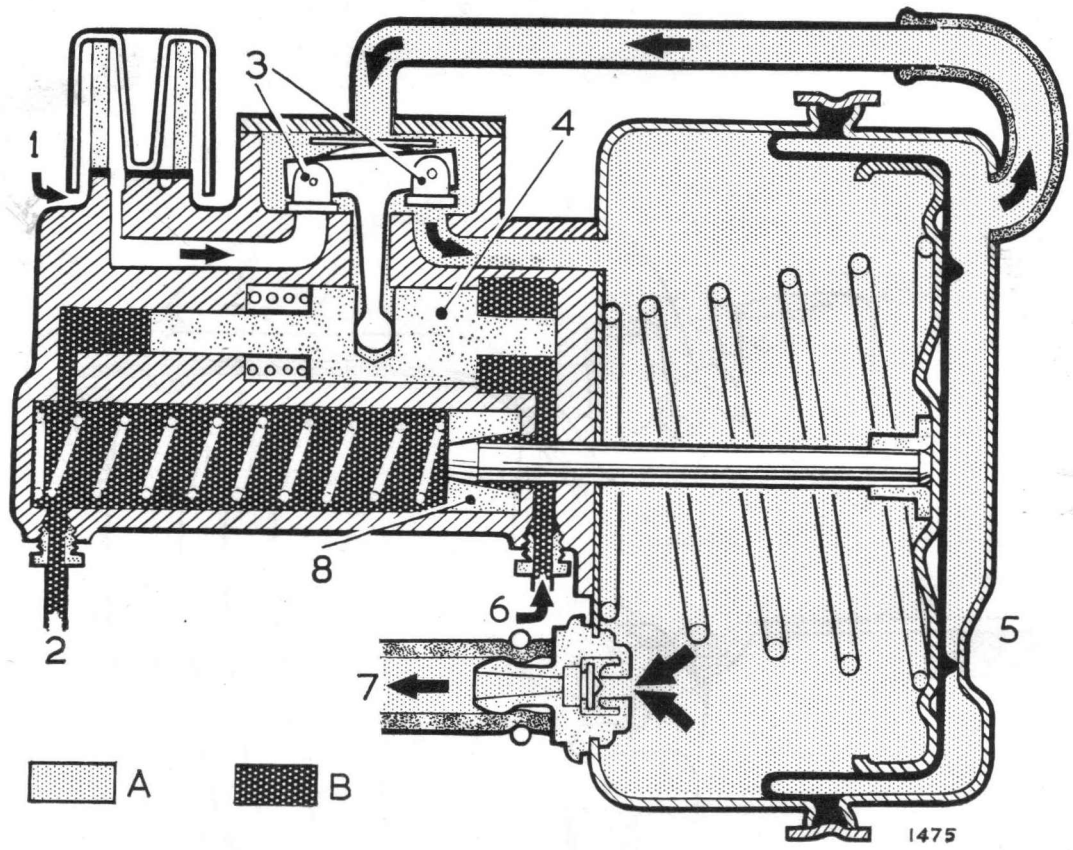
As the movement is continued the piston applies pressure on the fluid proceeding to the wheel cylinders and to the small end of the valve control piston. This movement of the output piston continues until the thrust on the small end of the plunger, by the high fluid pressure, overcomes the thrust by the pressure fluid on the large end.

The valve control piston is thus moved back, closing the air valve. At this point both valves are closed and the brakes held on. If the foot pedal is released, the fluid pressure is reduced at the large end of the control piston which moves to the right, the valve rocker opens the vacuum valve, air is drawn out of the cylinder, the diaphragm returns and with it the output piston, relieving the pressure to the wheel cylinders. The piston sleeve lifts the ball and allows the fluid to move unrestricted between the supply tank and wheel cylinders. The piston sleeve lifts the ball and allows the fluid to move unrestricted between the supply tank and the wheel cylinders.

If the force on the pedal is increased, the valve gear operates to give additional assistance from the diaphragm until the thrust on each end of the control piston is balanced or until the limit of available vacuum is reached. Conversely, if the foot pedal force is reduced the valve gear operates to reduce the pressure at the brake cylinders until again a state of balance of the control piston is reached. The difference in area between the two opposed ends of the control piston determines the proportion of assistance provided by the unit. If for example the large end is twice the area of the small end, the hydraulic pressure is built up to twice that of the input from the master cylinder before the control piston moves back to close the air valve. Such a unit therefore would have an output of twice the pressure of the input throughout the range of the unit.

In this way, the pressure in the wheel cylinder varies in proportion to the effort at the pedal.




1. AIR INLET
2. TO WHEEL CYLINDER
3. AIR VALVE
4. CONTROL PISTON
5. DIAPHRAGM
6. FROM MASTER CYLINDER
7. TO INLET MANIFOLD
8. OUTPUT PISTON

A. VACUUM
B. FLUID

**Fig. 18.** *Schematic view—'at rest' position.*