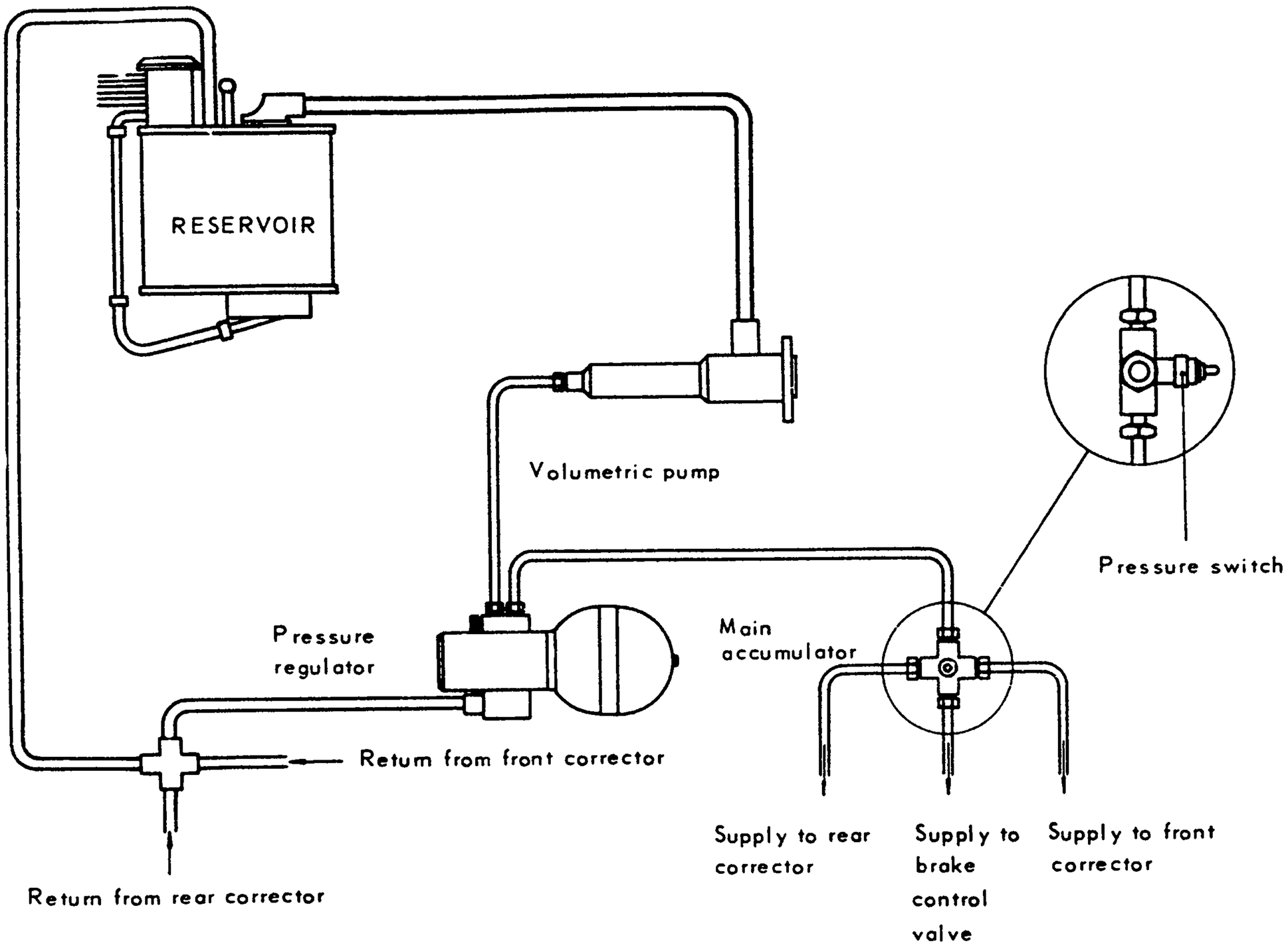
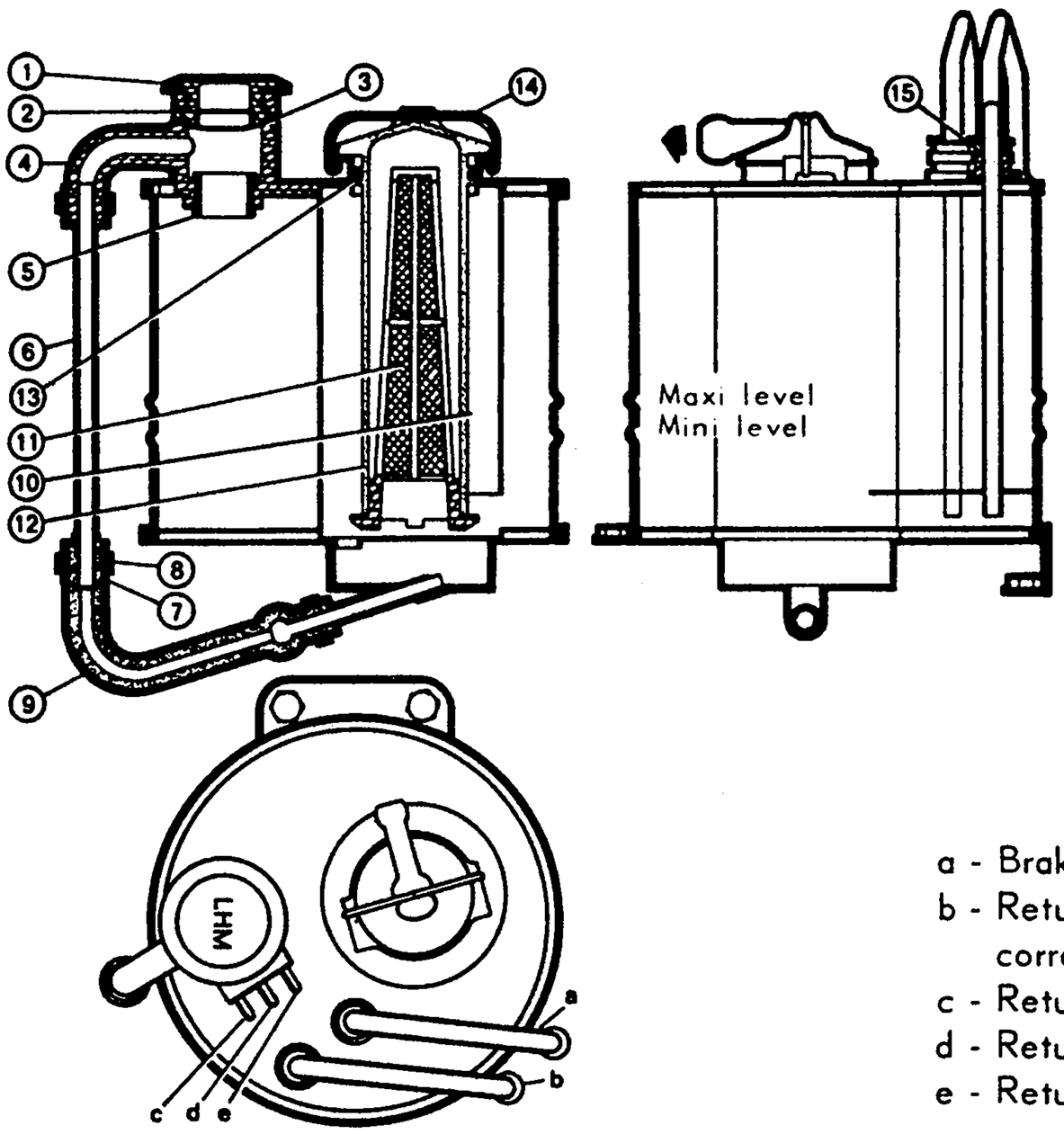
« GS » VEHICLES

SOURCE OF PRESSURE



I - RESERVOIR



1 - Reservoir cap
2 - Baffle-washer
3 - Baffle deflector
4 - Filler duct
5 - Passage frame
6 - Sight glass
7 - Ring
8 - Collar
9 - Drain tube
10 - De-aeration chamber
11 - Filter
12 - Plunger tube
13 - Sealing ring
14 - Retaining spring
15 - Rubber sleeve

a - Brake return pipe
b - Return pipe from pressure regulator (height correctors)
c - Return from front and rear correctors
d - Return from front and rear suspension cylinders
e - Return from brake control-valve

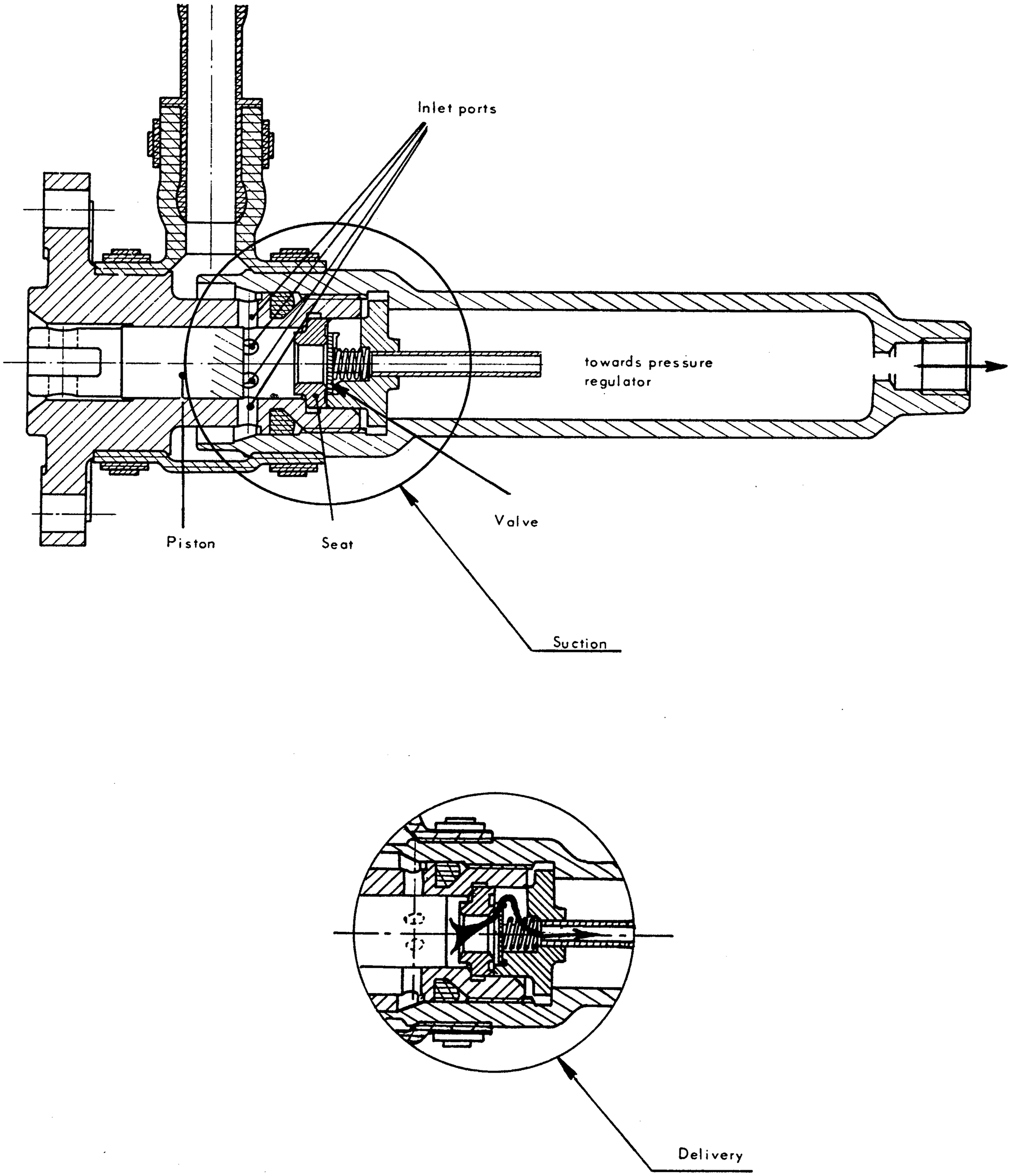
II - HIGH PRESSURE PUMP

- Single piston volumetric pump
  Actuated by a connecting rod and an eccentric machined on the engine oil-pump shaft.

Operation .

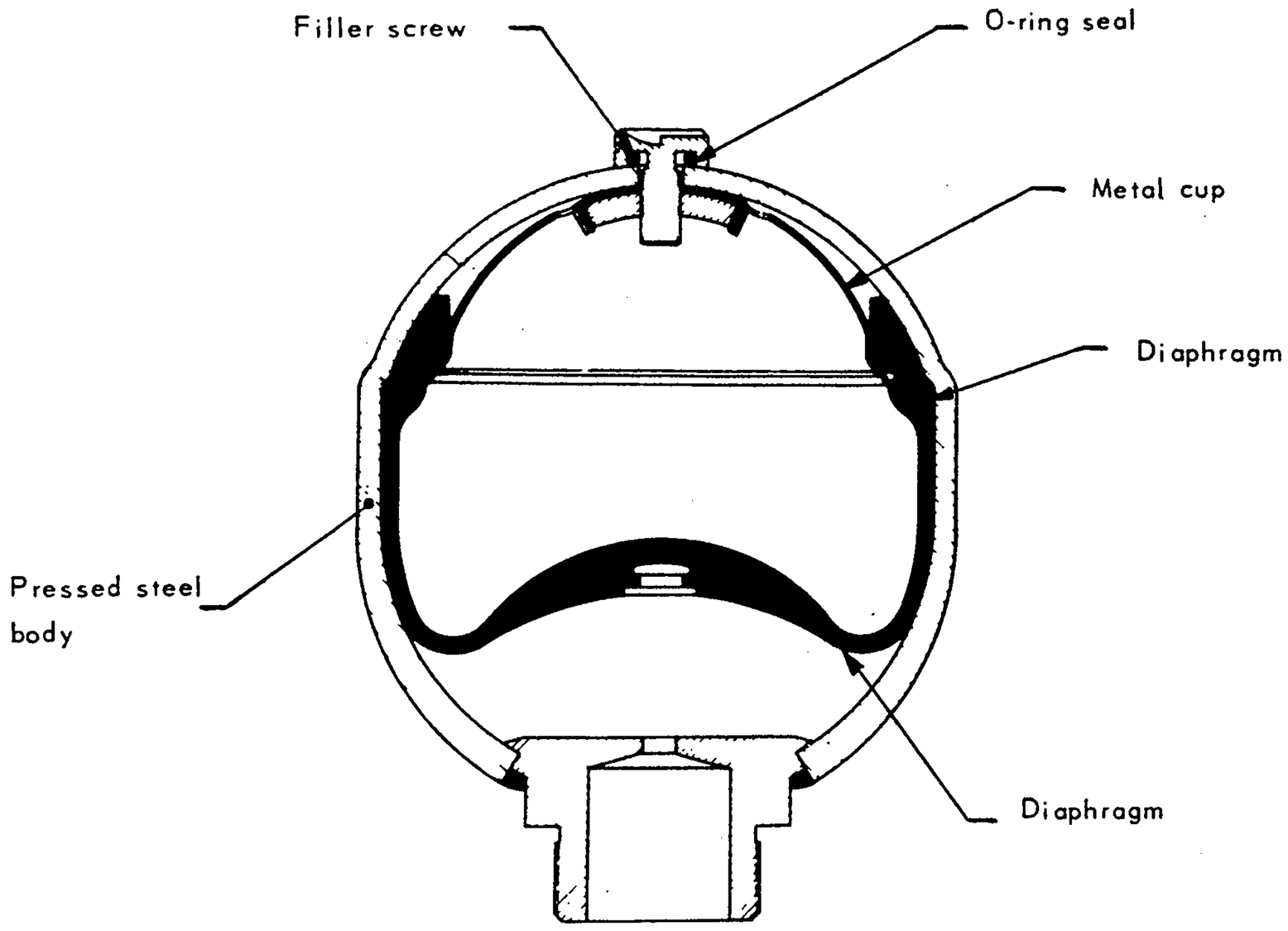
- SUCTION : The piston descends, operated by the connecting rod and eccentric assembly and reveals the suction ports. The fluid penetrates into the cylinder.

- DELIVERY : The piston rises again, closes the suction ports, and drives out the fluid held, which raises the valve.


Inlet ports
towards pressure
regulator
Valve
Piston
Seat
Suction
Delivery

III - PRESSURE REGULATOR : Identical to D Vehicles

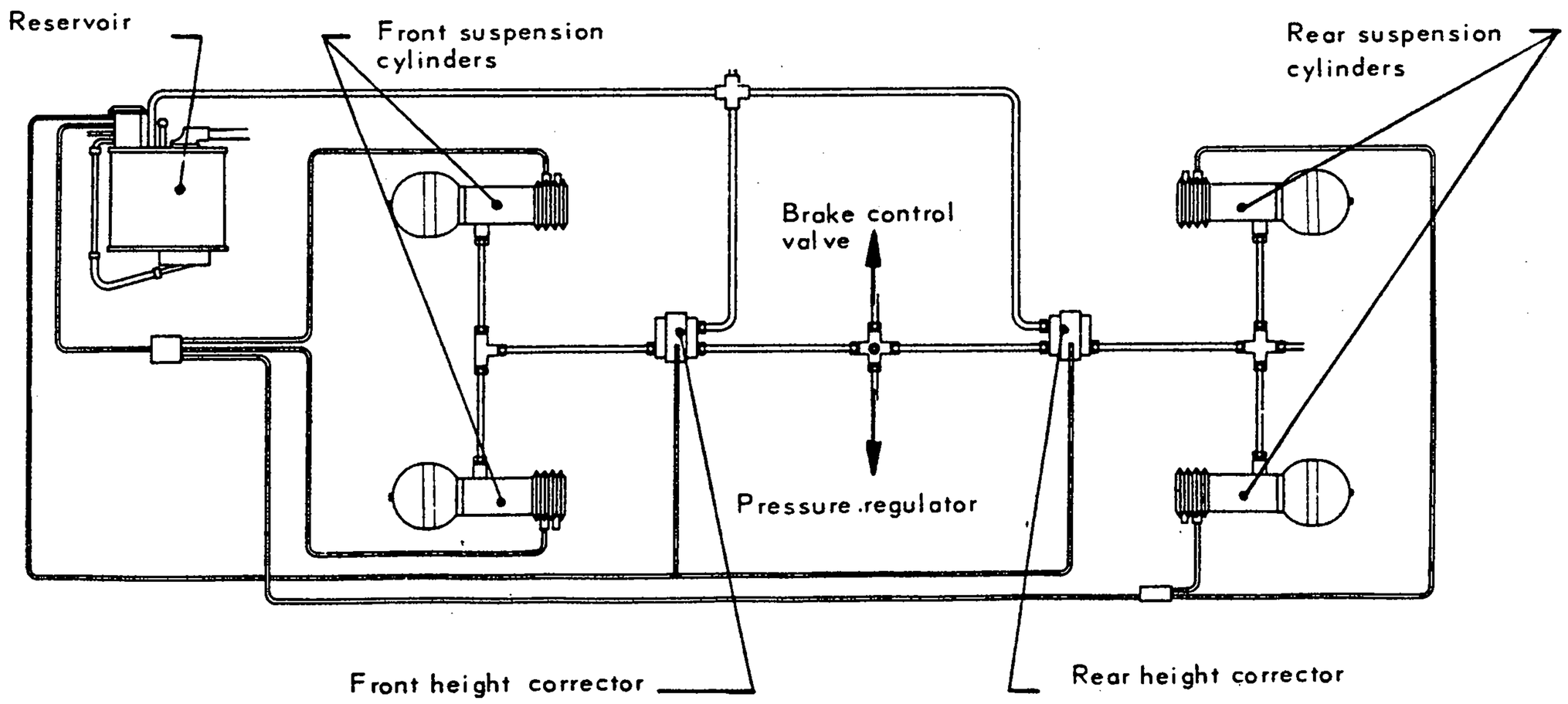
IV - MAIN ACCUMULATOR



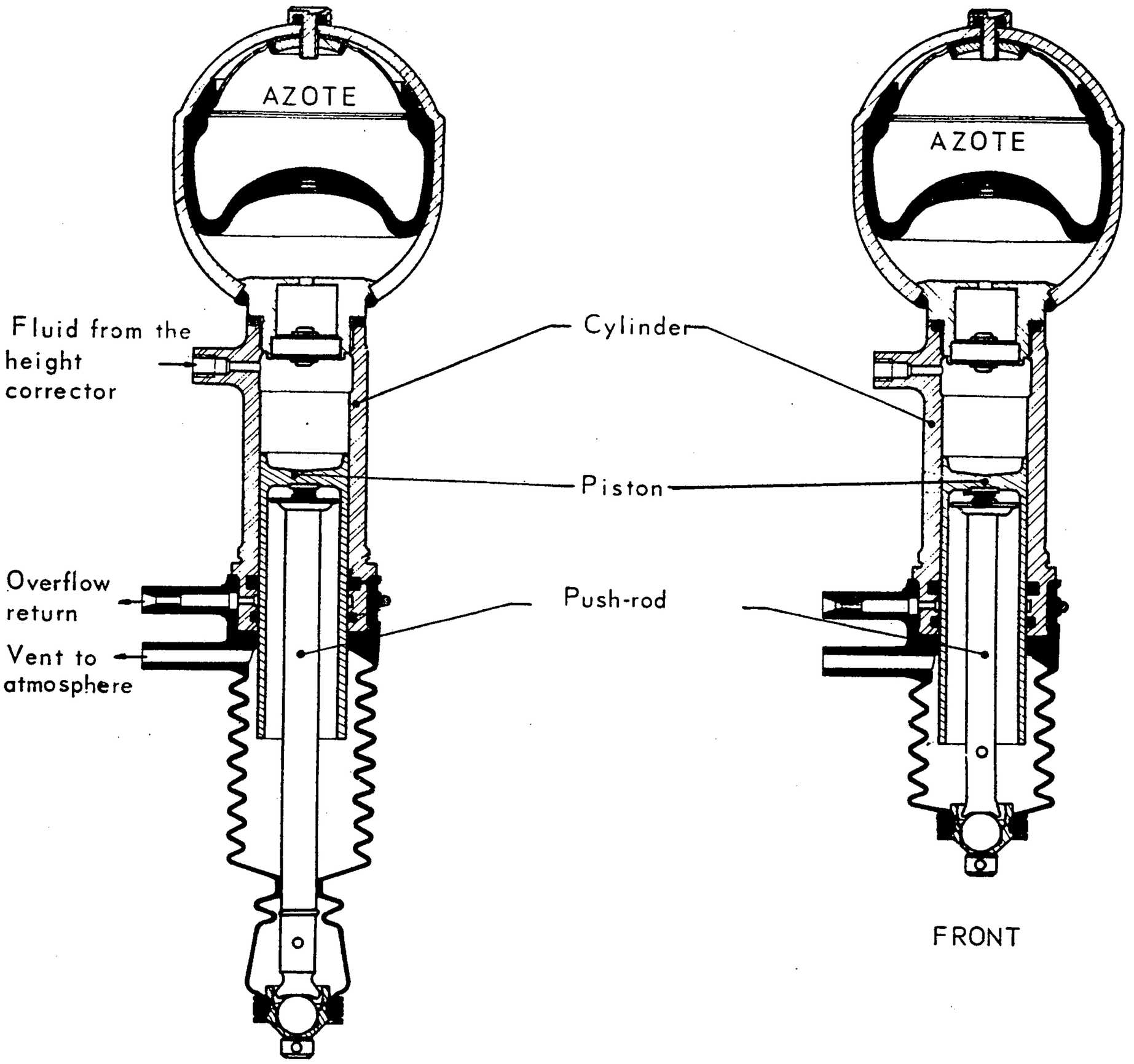
V - PRESSURE SWITCH

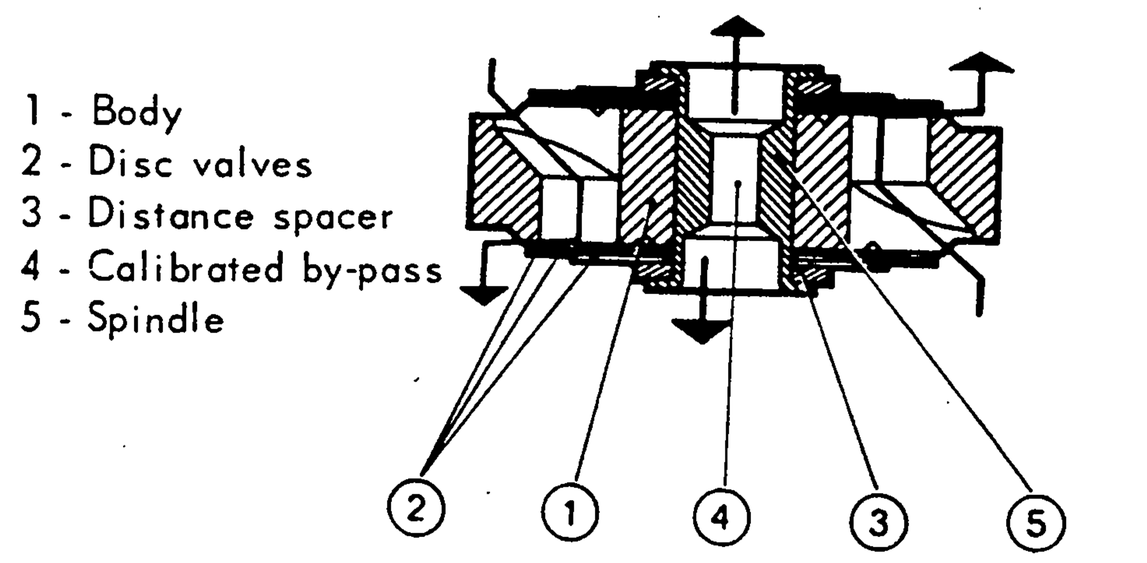
A pressure control switch if fitted on the 4 -way union situated after the pressure regulator. Its setting pressure is : 870 to 1160 psi (60 to 80 bars).

SUSPENSION



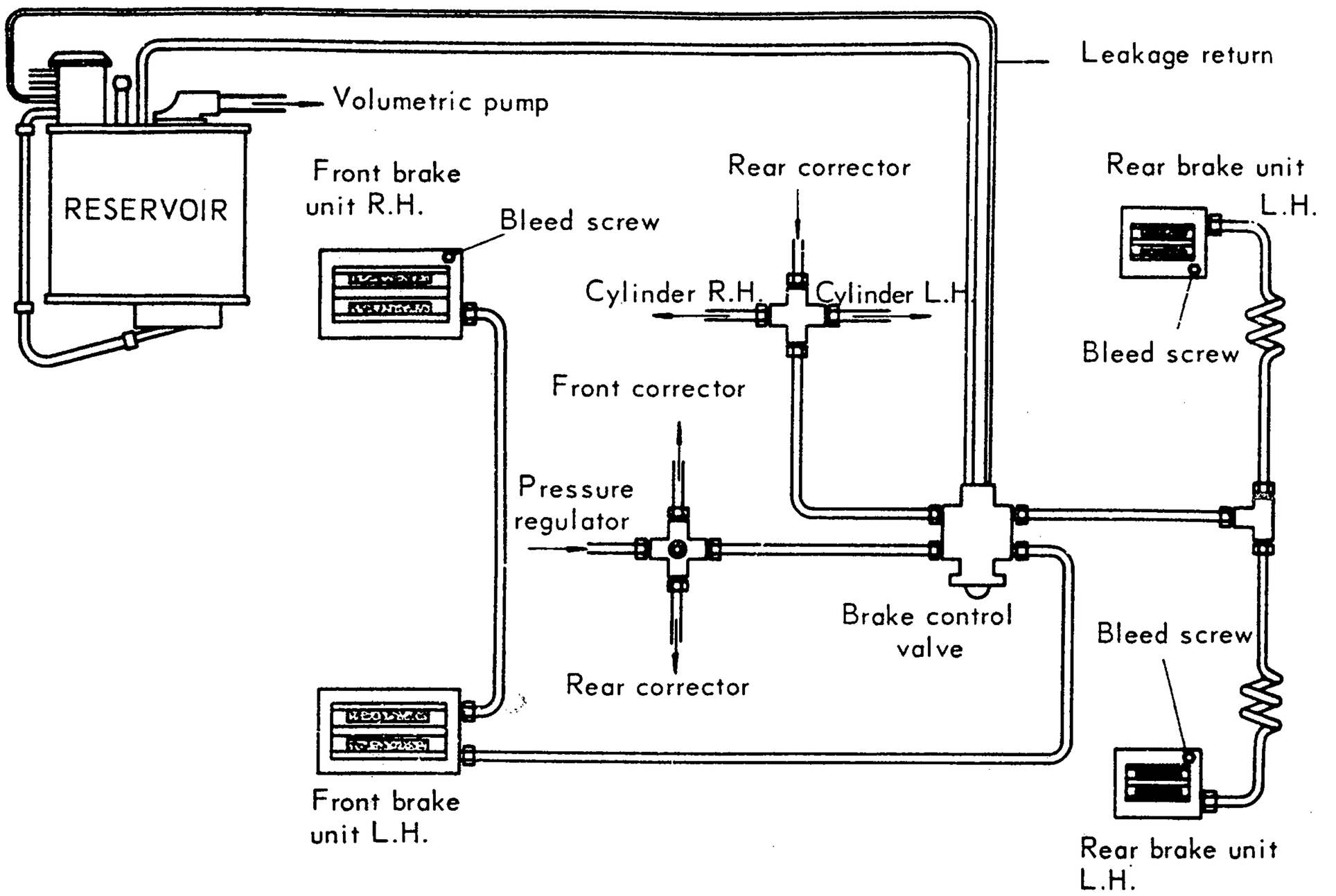
SUSPENSION CYLINDERS



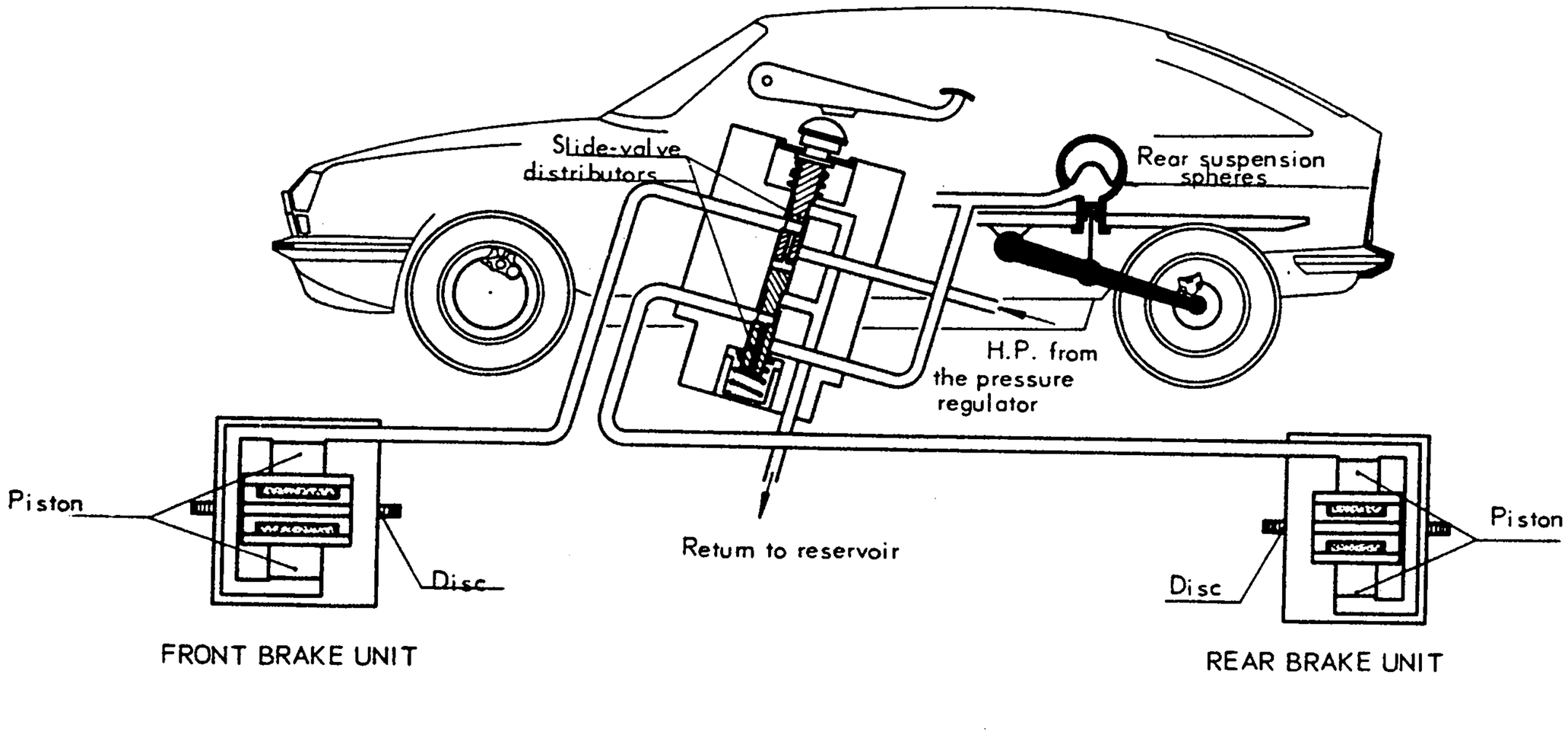


MB, see p. 27 for dimensions

BRAKING SYSTEM

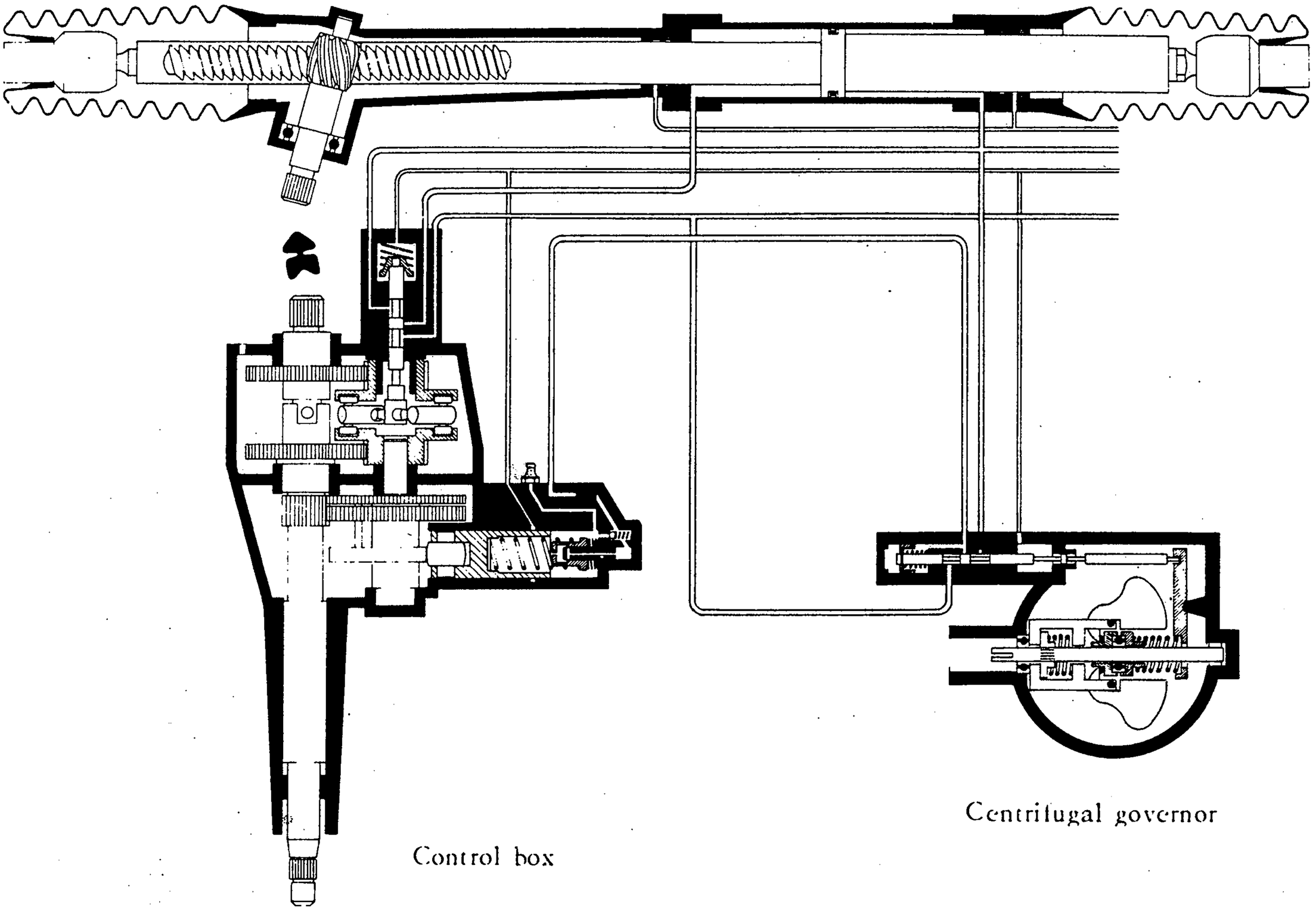


The operation of the GS control-valve is identical to that of the D.



« CX » VEHICLES

POWER ASSISTED STEERING WITH POWER-CENTERING



Rack hydraulic control

Control box

Centrifugal governor

POWER ASSISTED STEERING WITH POWER CENTERING

1. CHARACTERISTICS :

Rack and pinion steering hydraulically assisted.

- Reduction ratio	1/13,5
- Number of steering wheel turns from lock to lock	2.5
- Turning circle : « between walls »	11.80 m (38 ft 9in)
« between kerbs »	10.90 m (35 ft 9 in)
- Parallelism (pinching of the wheels towards the front *(in normal road position)*)	1 to 4 mm (0.04 to 0.16 in)

The design of steering with power centering increases safety when driving at high speeds and steering sensivity at low ones, it also gives greater comfort thanks to its neutral steering behaviour.

The CX steering system is of the rack and pinion type, with hydraulic power assistance carrying out three different functions :

I - Power assistance
II.- Progressive hardening of steering as speed increases
III - Power- centering

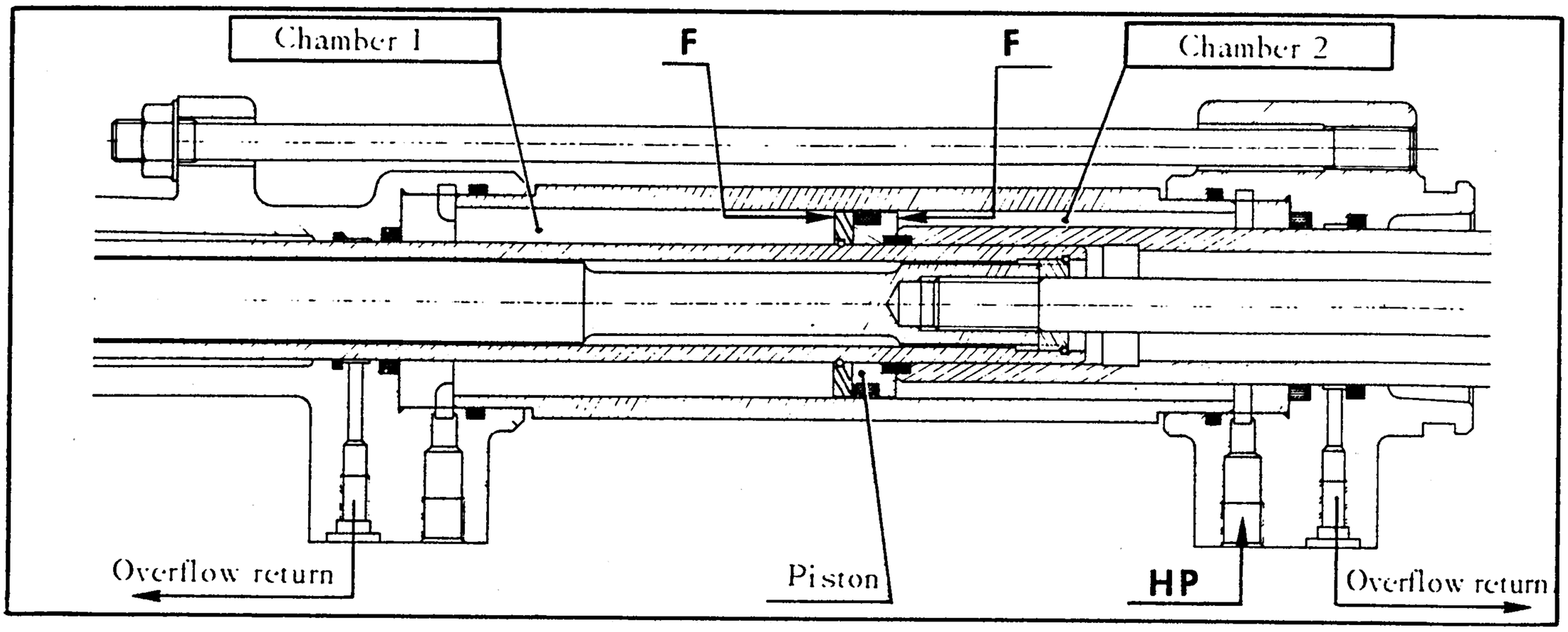
Three main hydraulic components make up the hydraulic system of the steering.

1 - The hydraulic steering rack control (hydraulic ram with different piston)

2 - The assembly of the control box, distributor and variable output regulator.

3 - Centrifugal governor

FUNCTIONING OF POWER ASSISTANCE



a) **Hydraulic rack control (cylinder)**

Description :
The rack is joined up to the piston of the hydraulic rack control (cylinder)
Let S be the surface of the piston in chamber 1 and S/2 its surface *(by construction)* in chamber 2.

Functioning :
The steering balance is obtained when the forces **F and F1** which act on each face of the piston are equal :

$$\text{Let : } F = S \times \frac{HP}{2} = F1 = S/2 \times HP$$

HP : Pressure of the functioning of the hydraulic circuit *(variation of the conjunction to the disjunction pressure)*
The displacement of the rack **(whence assistance)** is effectuated by a modification of pressure in the interior of chamber 1 for instance :

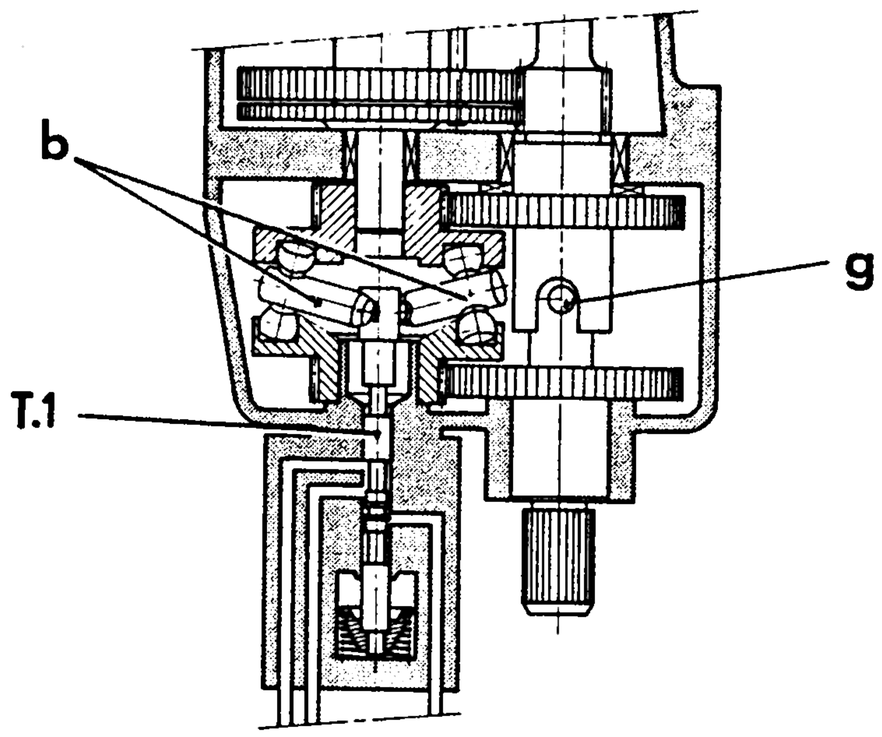
- return of liquid to reservoir ⟶ HP/2 diminishes
- admission of liquid ⟶ HP/2 increases

b) **Control box :**

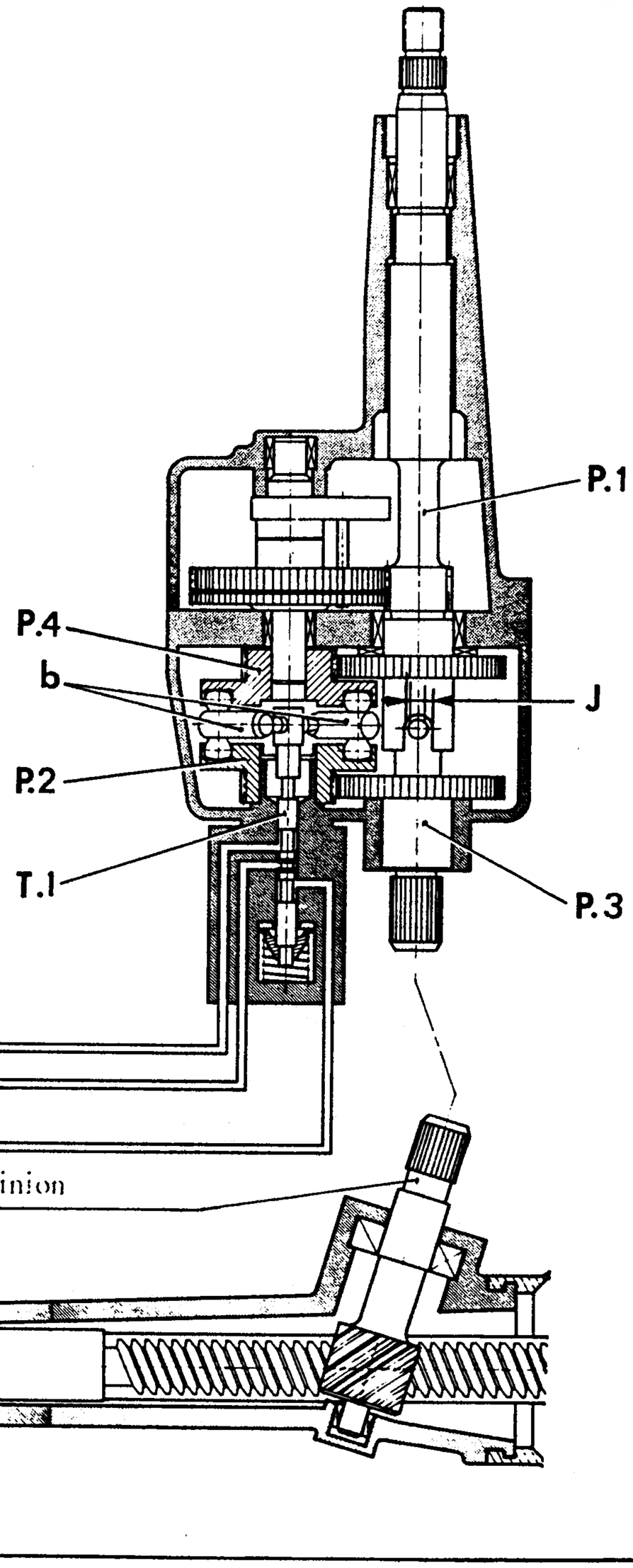
Description :
The control box situated under the steering wheel, contains a distributor slide-valve (T.1) in its position of hydraulic equilibrium assures in chamber 1 the pressures necessary to the balance of the assisting piston.
The control box is also made up of :

- a control shaft in liaison with the steering-wheel (P.1),
- an outlet shaft in liaison with the rack pinion (P.3),
- Two pinions (P.4 and P.2) draglink holder (b),
- a security lock (g)

Mechanical control is assured by the liaison in rotation, of the control shaft (P.1) and the pinion (P.3) after the annulment of the play « J ».
The liaison between the pinions (P.2 and P.4) is effectuated by a draglink with ball joints.



Displacement of levers b when steering to the right



Functioning :

In the play « J » permitted, the shaft (P.1) drives in rotation the pinion (P.4). The outlet shaft (P.3) and the pinion (P.2) are therefore fixed *(connected mechanically to the rack pinion)*. The draglinks (b), moving rudder-fashion, drive the slide-valve inside movements.

- Displacement towards the top : Chamber 1 of the HP fed cylinder
- Displacement towards the bottom : Chamber 1 of the cylinder in contact with the reservoir return.

Return to position of equilibrium :

The displacement of the rack drives in rotation its control pinion, the outlet shaft P.3 and the pinion (P.4) The pinion P.4 being fixed, the pinion P.2 acts on the draglinks b which bring back the slide valve T.1 into a position of equilibrium.

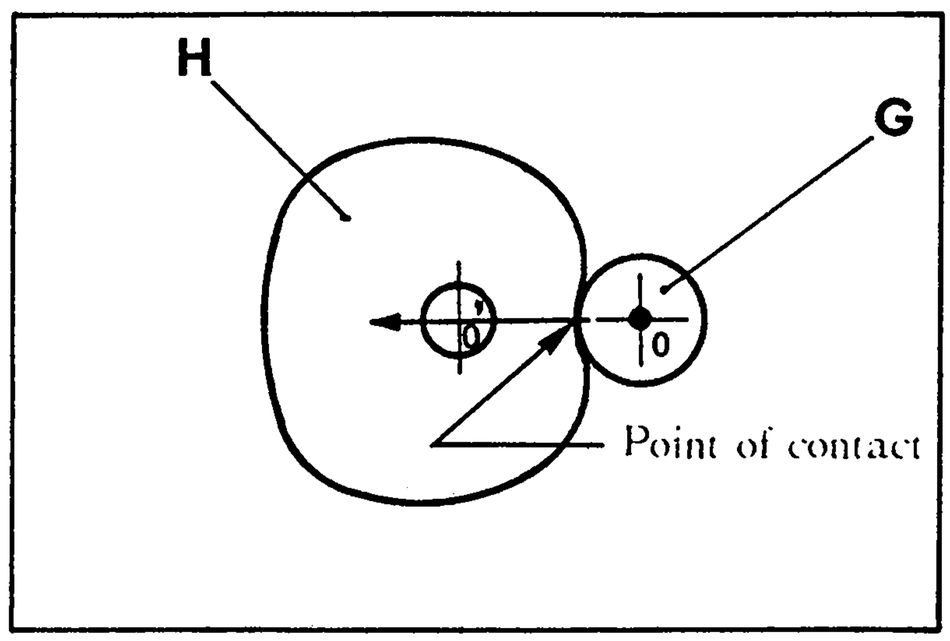
NOTE :

The rack is hydraulically locked for all turning positions hence there is a great stability of the vehicle This is an important factor from the point of view of security. The turning cannot be influenced by :

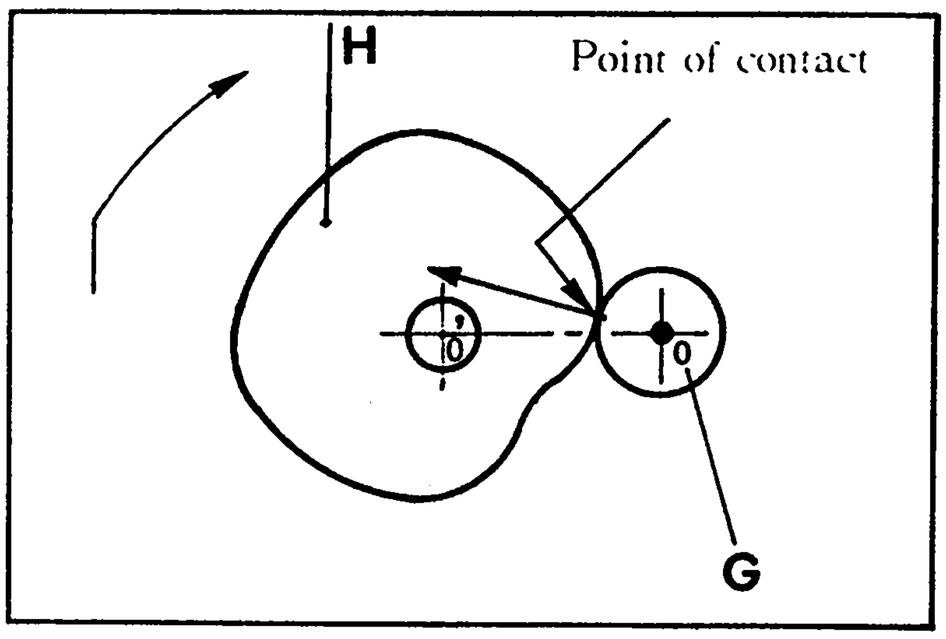
- a difference in brake force between the RH and the LH wheel,
- the bursting of a tyre, by its meeting with an evident obstacle, a puddle of water, etc..

PROGRESSIVE HARDENING of steering as speed increases :

The hardening of the steering is obtained by the exertion of a variable mechanical force on the steering control shaft A.

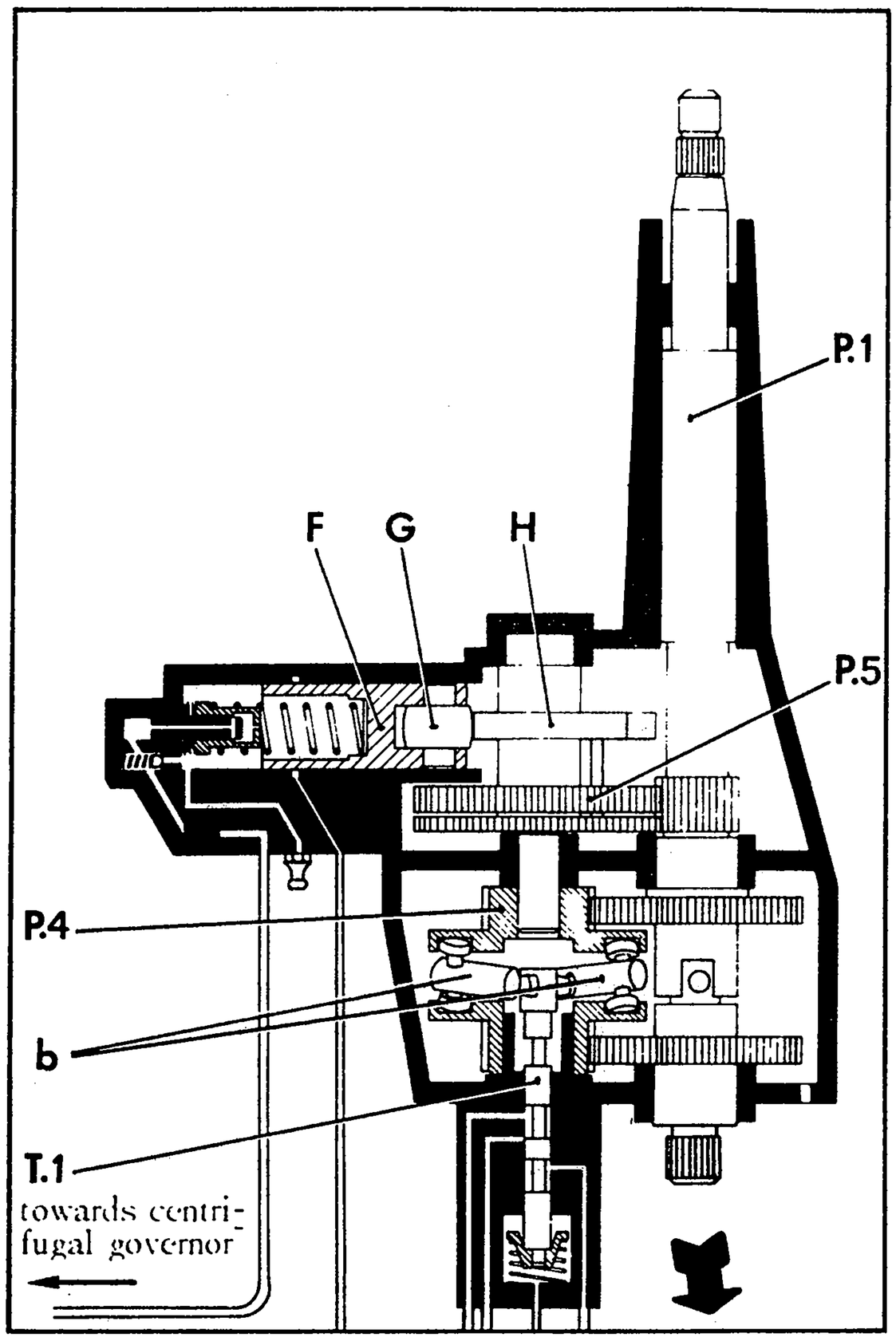


« STRAIGHT LINE » POSITION



TURNING

L 44-14 d



a) **Mechanical principle :**

The control shaft P.1 is in connection with pinion P.5

The pinion P.5 forms part of a cam H, on wheich a piston F with a cam follower G applies a variable pressure following :

- the rotation angle of the control shaft, *(effected of the eccentric)*
- the pressure exerted on the piston F *(variable pressure supplied by the centrifugal regulator).*

Straight line position :

The force of the piston F acts in the hollow of the cam and tends to keep the vehicle in a straight line.

When turning :

The point of contact of the cam follower situated outside the axis O and O', exerts a torque which acts against the turning movement caused by the driver, therefore : **hardening.**

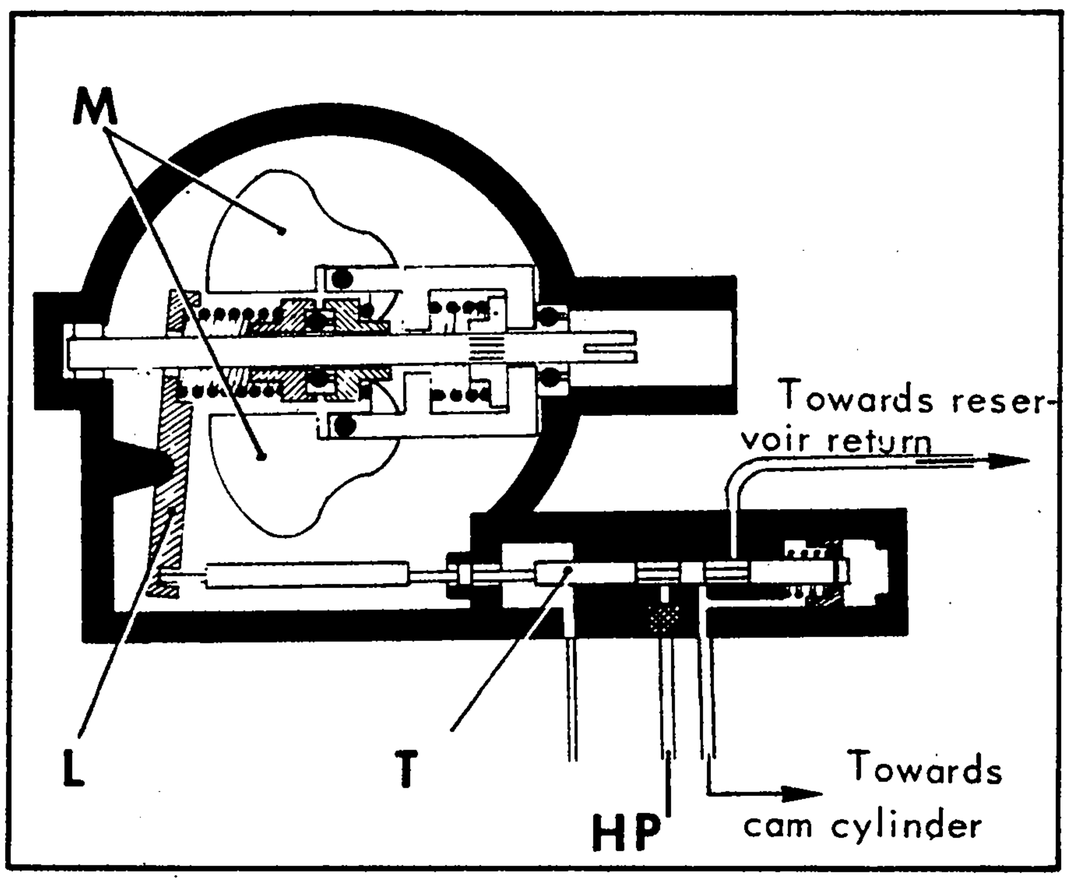
b) Centrifugal govemor :

Situated on the front axle frame and driven mechanically (flexible joint) by the cylindrical torque of the gearbox.

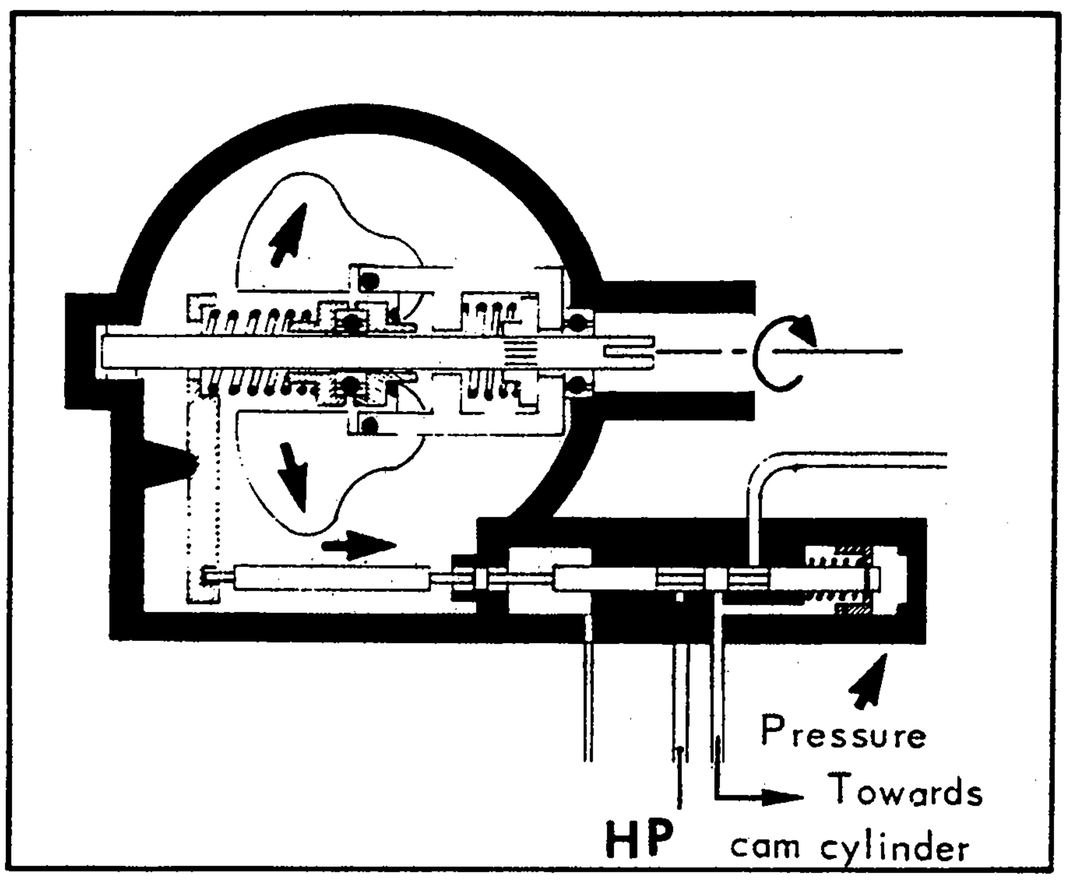
Description :

It is composed of :

- an assembly consisting of a body with counterweights (M) and springs
- a control lever (L)
- a distributor slide-valve.



VEHICLE AT STANDSTILL *(Engine running)*



VEHICLE MOVING

Functioning :

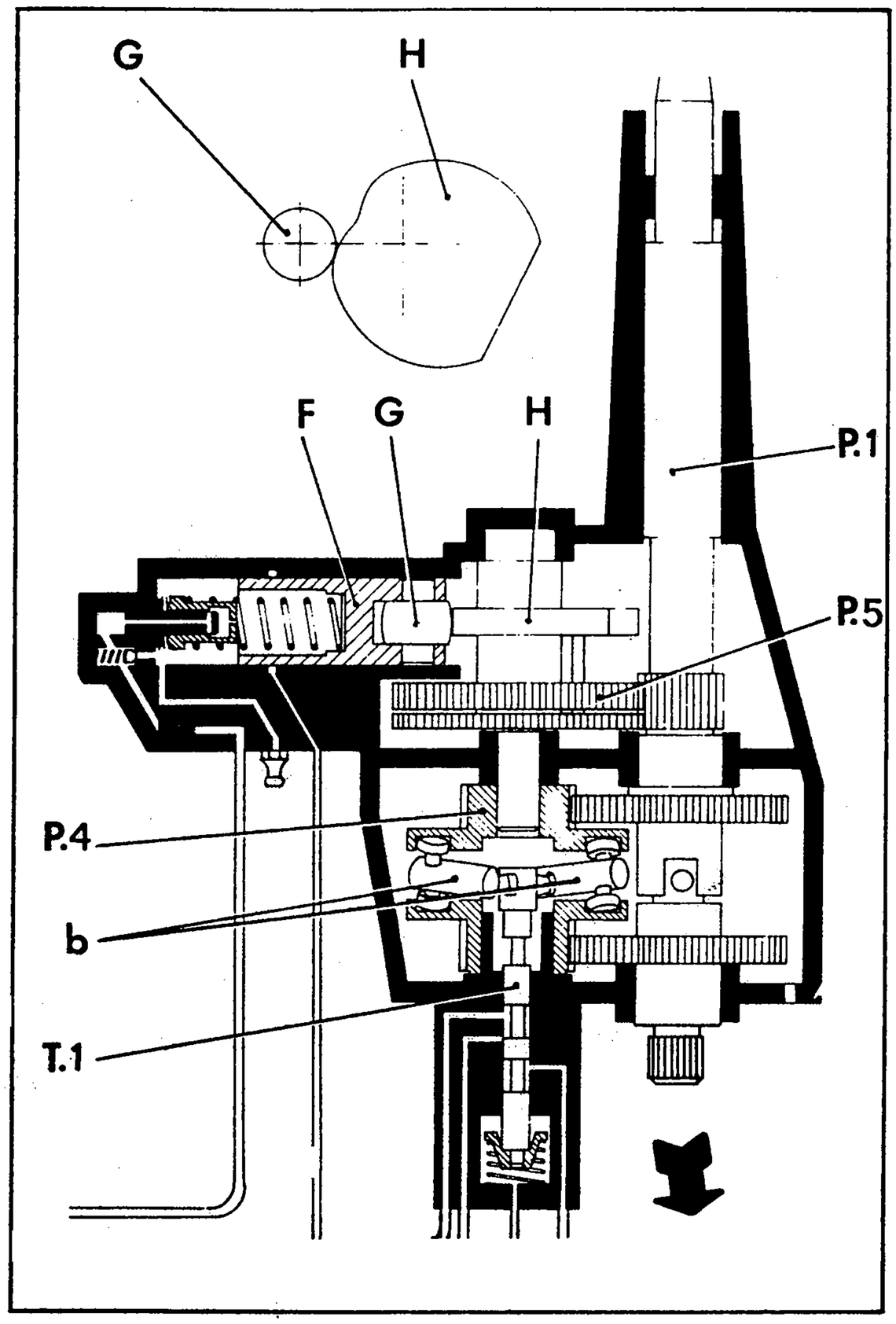
- The distributor slide-valve (T.2) is connected in traverse to the lever L.
- The counterweights M (submitted to centrifugal force) causes lever L to rock.
- The variable driving-in of the distributor slide-valve T.2 allows a modulation of pressure acting on the cam cylinder piston.

NOTE :

To assure the functioning of the powered centering, the centrifugal gorvernor delivers a pressure of 20 ± 5 bars when the vehicle is at a standstill *(engine running)*.

POWER-CENTERING

The power centering is a combination of the two preceding functions, the hardening function controlling the **assistance** function.



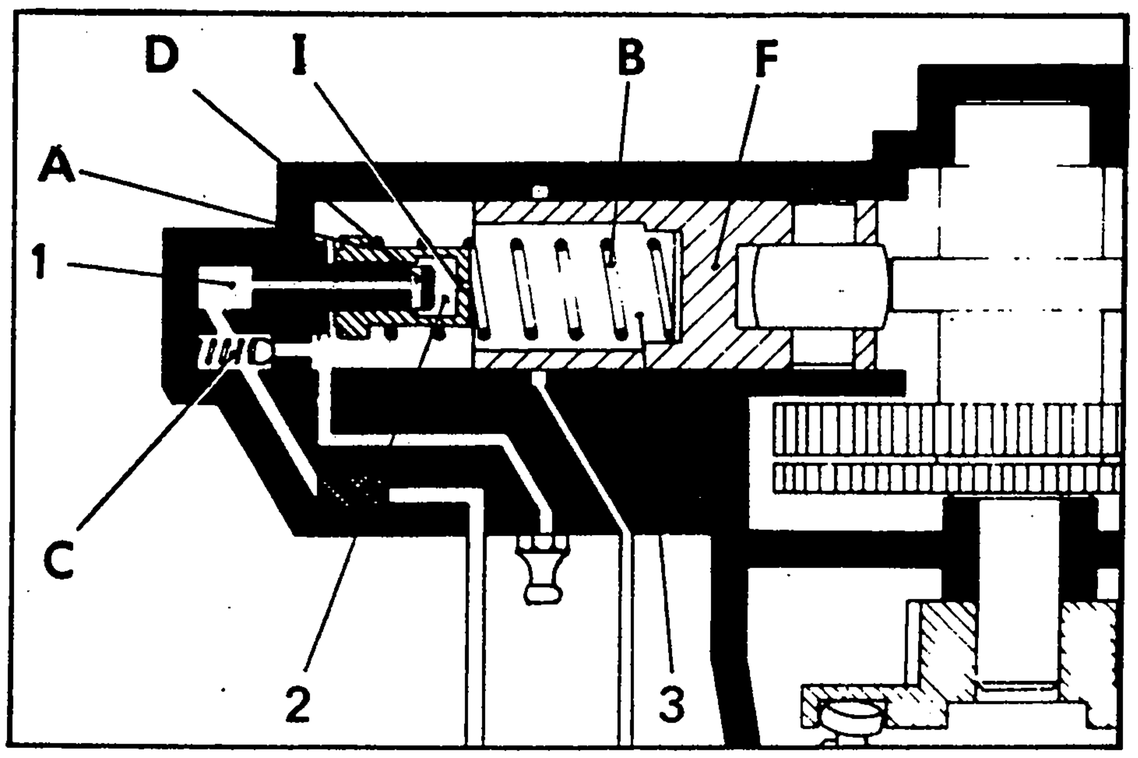
a) **Mechanical principle :**

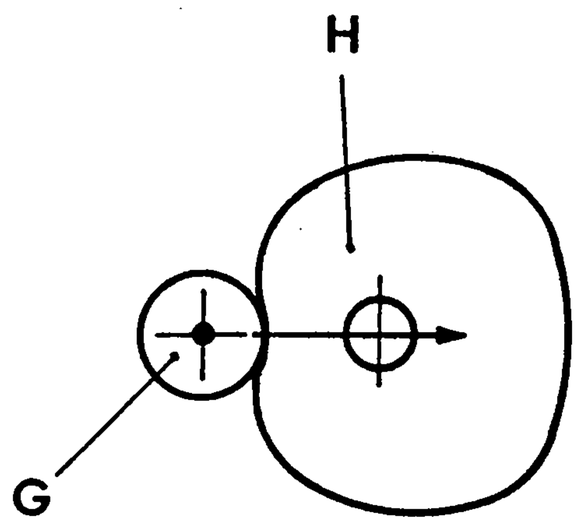
After turning the driver releases the wheel :

- The piston F, exerting a torque on the cam H causes its rotation.
- The pinion P.5 forming a part of the cam H drives the control shaft P.1.
- The rotation of the control shaft P.1 transmitted to the pinion P.4 powers the side-movement of the distributor slide-valve T.1 thus displacing the rack.

This movement is stopped when the cam-roller G reaches the hollow of the cam H (*annulment of torque*). The steering is then in straight line.

NOTE : The pressure delivered by the regulator is only exerted on the piston F across a variable flow regulator; this is done in order to brake.





b) **Variable flow regulator :**

Description :

It is composed of :

- a body in which slides a piston (F).
- a sleeve (A) with a calibrated hole (1) sliding on the central part of the body where small orifices have been drilled,
- a spring (B) acting on the sleeve
- a valve and its spring (C).

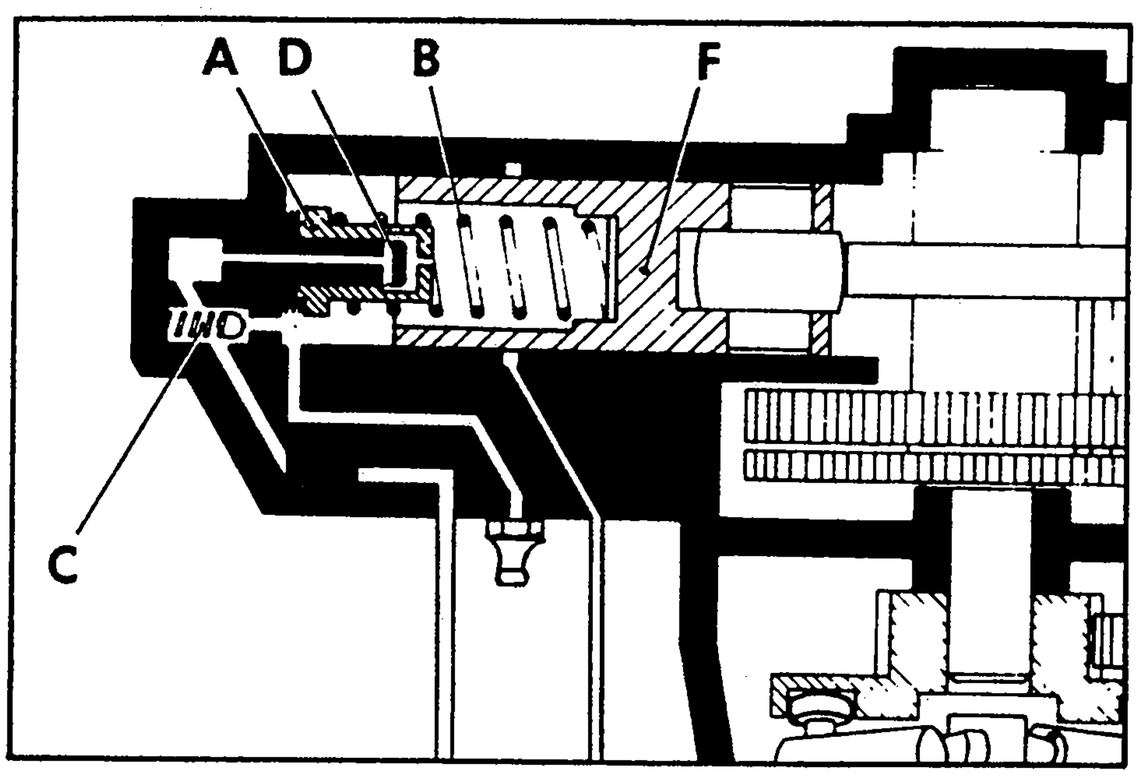
Functioning :

Neutral position or straight line position

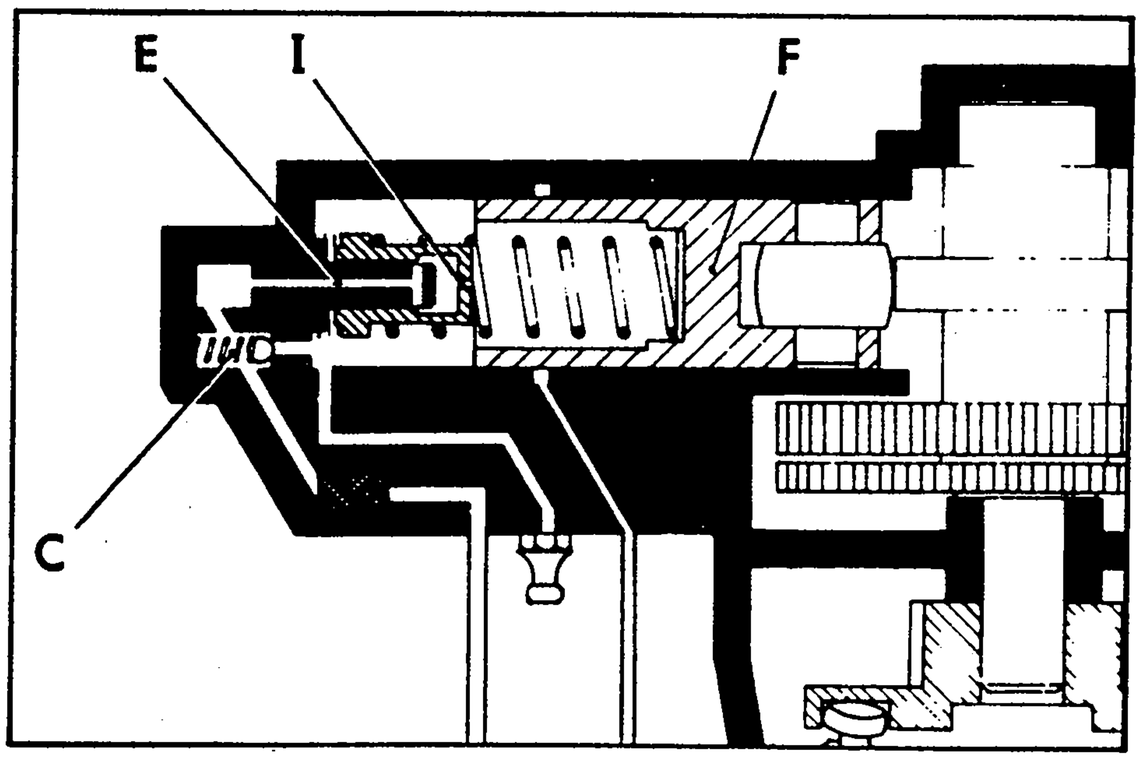
In this position of rest the pressure delivered by the regulator is present in all chambers 1-2- and 3.

The spring (B) is under tension, and the sleeve (A) closes the orifices (D) of the body.

The spring (B) being under tension, the discharge possible across the calibrated hole (I) is nil.



Turning position : the recoil of the piston F provokes :
- the return of the fluid across valve (C),
- the compression of spring (B) which pushes the sleeve (A) thus uncovering the orifices (D).



« Return » position

- The fluid passes by the channel (E) (valve (C) closed) and by the calibrated hole (I) thus provoking the recoil of the sleeve (A).
- The sleeve (A) therefore lightly compressing the spring (B), slowly comes back to cover the orifices (D) progressively, as the piston (F) is displaced.

CX STEERING HYDRAULIC CIRCUIT (DIRAVI : " Vari Power ")