PATENT SPECIFICATION

398,728

Convention Date (Italy): Feb. 15, 1932.

Application Date (in United Kingdom): Feb. 15, 1933. No. 4677/33.

Complete Accepted: Sept. 21, 1933.

COMPLETE SPECIFICATION.

Improvements in Devices for Controlling Vehicle Brakes Employing Hydraulic Pressure.

We, LANCIA & C. FABBRICA AUTOMOBILI TORINO S.A., an Italian Company, of 99, via Monginevro, Turin, Italy, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to vehicle brakes which are actuated by employing hydraulic pressure produced by means of a hand pump, the object of the invention being to provide a device for the hydraulic control of the brakes, which renders it possible to maintain the brakes indefinitely in their operative position after the operation of the pump, independently of the maintenance of the pressure produced by the pump.

In compressed air brakes of the kind in which the compressed air conduit terminates in the different mechanisms of the brakes, it is known to provide the mechanism of each brake or the rod connected to the shoe of the brake, with locking members which prevent the spontaneous release of the brakes and which are rendered inoperative by the action of compressed air.

In compressed air brakes in which the different mechanisms are connected by a rod gear to the piston of a cylinder, wherein the action of the compressed air is exerted, it is also known to employ a stop device, which may be rendered inoperative by means of air under pressure or by a manual control.

According to the invention, the hydraulic pressure created by the pump is caused to act upon a transmission member to which is connected the brake-gear and with which co-operates a mechanical stop normally preventing the slackening of the brakes, and which may be disengaged by the driver. In this way, it is possible to exert on the brakes an action having any desired intensity, because it is caused by means of hydraulic pressure created by a hand pump, and the braking effect once produced may be maintained as long as may be desired, due to the mechanical stop which blocks the transmission member and hence the brake-gear.

[*Price* 1/-]

A constructional form of a brake-controlling device according to the invention is shown in the accompanying drawings wherein:

Figure 1 is a vertical longitudinal section of the device taken along the line 1—1 in Figure 2;

Figure 2 is the plan view of the device, the cover of the casing being assumed to have been removed;

Figure 3 is a vertical section along the line 3—3 in Figure 2;

Figure 4 is a vertical cross-section along the line 4—4 in Figure 2;

Figure 5 is a vertical section along the line 5—5 in Figure 2; and

Figure 6 is an end view with a section taken along the line 6—6 in Figure 1.

As will be seen from these Figures, the apparatus is constituted by a casing 1, in the walls of which are provided cylinders and conduits and the cavity 2 of which is closed at the top by a cover 3. Through an opening in the said cover 3, which opening is closed by a flexible sleeve 4, there passes into the casing 1 an operating lever 5 which is adapted to oscillate on a pivot 6 mounted in the walls of the casing. The hub 7 of the lever 5 comprises a tail-piece 8 which, by means of an end fork, is hinged to a head 9, to which are connected two opposed pistons 10 and 11 having different diameters and adapted to move in the cylinders 12 and 13 provided in thickened portions of the wall of the casing 1.

The cylinders 12 and 13 are each closed at their external extremity by ends 14 and 15, in which are provided, respectively, a suction chamber 16 separated by a valve 17 from a conduit 18 terminating in the cavity 2 of the casing, and a compression chamber 19 controlled by a valve 20 and connected to a conduit 21 (Figure 5).

The conduit 21 can communicate with the cavity 2 through a passage 22, 22^1, controlled by a valve 23, which normally is maintained closed by a spring 24. The conduit 21 communicates with a cylinder 25 wherein is movable a piston 26 on which the lower end of a rod 27 bears freely, the other end of which is pivoted at 27^1 to a sector 28 keyed to the pivot 6

solid with an arm 29 connected to the brake gear.

The sector 28 is provided on its crown with ratchet teeth 30, with which co-operates a pawl 31 rotatably mounted on a pivot 32 and rigidly fixed to an arm 33 terminating above the pivot 6 where it forms an arc 34.

The system formed by the pawl 31 and by the arm 33 is returned by a spring 35 into the position in which the pawl 31 engages the teeth 30 of the sector 28.

On the same pivot 32 there is also rotatably mounted an arm 36, which terminates above the arc 34 (Figure 4) and is provided with a fork 37, which occupies a position below the head 38 of the valve 23. A spring 39 holds the fork 37 of the arm 36 against the head 38.

As will be seen in Figures 2 and 4, the arc 34 and the end of the arm 36 are positioned near one side of the lever 5 which, on this side, comprises a tooth 40 projecting laterally between the arc 34 and the pivot 6. The tooth 40 is carried by a link 41 movable on the lever 5 by means of a slot 42 and studs 43, and connected to a pull rod 44 terminating at the handle of the lever 5, where it is connected to an operating lever.

If the casing 1 contains a liquid and the arm 29 is connected to the brake mechanism, then, in order to apply the brakes, which is caused by an angular displacement of the arm 29, the driver has to effect several operations (by moving it alternately in opposite directions) of the lever 5, the pivot 6 of which will normally be mounted transversely to the longitudinal axis of the vehicle.

Owing to the different diameters of the pistons 10, 11 and the cylinders 12, 13, the resistance opposed by the pump during the two movements in opposite directions of the lever 5 is different, and is adapted to the different efforts which the operator's arm is capable of providing, according as to whether his arm approaches or moves away from his body.

Consequently, if the pump is disposed, relatively to the position of the person who has to operate it, in such a position that the compression stroke in the cylinder of larger diameter takes place during the displacement of the lever 5 for which the operator's arm is able to provide the maximum effort, the operation of the pump is balanced, and is therefore easier and more efficient.

Due to its reciprocating motion, each piston 10 and 11 produces a suction in the chamber 16, where liquid contained in the cavity 2 of the box 1 arrives through the conduit 18, and also the forcing of the liquid through the chamber 19 into the conduit 21 whence (the valve 23 being maintained closed by the spring 24) the liquid is forced into the cylinder 25. The piston 26 is thus lifted and, by means of the rod 27, produces the angular displacement of the sector 28, and hence the angular displacement of the pivot 6 and the arm 29.

Since the pawl 31 engages different teeth 30 as the sector is displaced, the said sector remains locked in the extreme position corresponding to the desired brake pressure.

In this position, the mechanism remains constantly locked, irrespective of the value of the pressure existing in the cylinder 25. Consequently, any losses or leakages have no detrimental effect on maintaining the pressure of the brakes, which is always the same during the entire period of the application of the brakes.

Again since the sector 28 is locked by the pawl 31, the said sector does not exert any reaction on the piston 26.

In order to slacken the brakes, the operator must first of all move the lever 5 as much as is required to produce a slight increase in pressure, which is necessary in order to eliminate the pressure exerted on the pawl 31 by the tooth 30 in engagement with the said pawl, and then the operator must manipulate the lever of the handle, which causes a displacement of the pull rod 44 and the tooth 40. The said tooth 40, irrespective of the position of the lever 5, encounters the arc 34 and, by lifting it, effects the angular displacement of the arm 33 and consequently of the pawl 31, which thus moves away from, and liberates, the sector 28.

After a portion of its lifting stroke, the arc 34, encounters one end of the arm 36 which, by means of its fork 37 acts upon the head 38 to lift the valve 23, in such a manner that the conduit 21 and the cylinder 25 are brought into communication through 22 with the cavity 2 of the box 1, and the pressure in the cylinder 25 falls immediately. The lever 29, being returned by the brake gear, then re-assumes the inoperative position.

By means of the apparatus described in the foregoing, the tightening of the brakes may thus be effected to the desired degree and may be maintained during the whole of the desired period by means of a simple operation, which does not require any great effort.

The arrangement shown provides a very compact construction which obviates the necessity for providing reservoirs for the liquid, the latter being always contained in the casing in which the various mem-

bers are mounted.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A device for actuating the brakes of a vehicle by utilising hydraulic pressure produced by means of a hand pump, characterised in that the pressure created by the pump is caused to act on a transmission member, to which is connected the brake-gear and with which co-operates a mechanical stop, which normally prevents the slackening of the brakes and which may be disengaged by the driver.

2. A device as claimed in claim 1, characterised in that the transmission member is constituted by a pivoted piece which is hinged to the piston of a hydraulic cylinder and which comprises a toothed sector engaged by a pawl.

3. A device as claimed in claims 1 and 2, in which a single external control, adapted to be operated by the driver, serves for actuating a valve intended for releasing the pressure in the hydraulic cylinder and the engagement pawl.

4. A device as claimed in claim 3, characterised in that, for controlling the valve, there is provided a pivoted arm bearing on an arm rigidly fixed to the stop pawl and operated by a control member adapted to be operated from the outside.

5. A device as claimed in claim 1, characterised in that, for producing the pressure there is provided a pump with opposed cylinders, wherein are displaceable pistons connected to the same operating lever.

6. A device as claimed in claim 5, characterised in that the cylinders and pistons of the pump have different diameters.

7. A device as claimed in claims 3 and 4, characterised in that the member for disengaging the pawl and for displacing the valve is mounted to move on the oscillating lever for the operation of the pump.

8. The device for controlling vehicle brakes employing hydraulic pressure substantially as described or substantially as shown in the accompanying drawings.

Dated this 15th day of February, 1933.

LANCIA & C. FABBRICA AUTOMIBILI TORINO S.A.
Per Boult, Wade & Tennant,
111/112, Hatton Garden, London, E.C. 1,
Chartered Patent Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1933.

Fig. 1

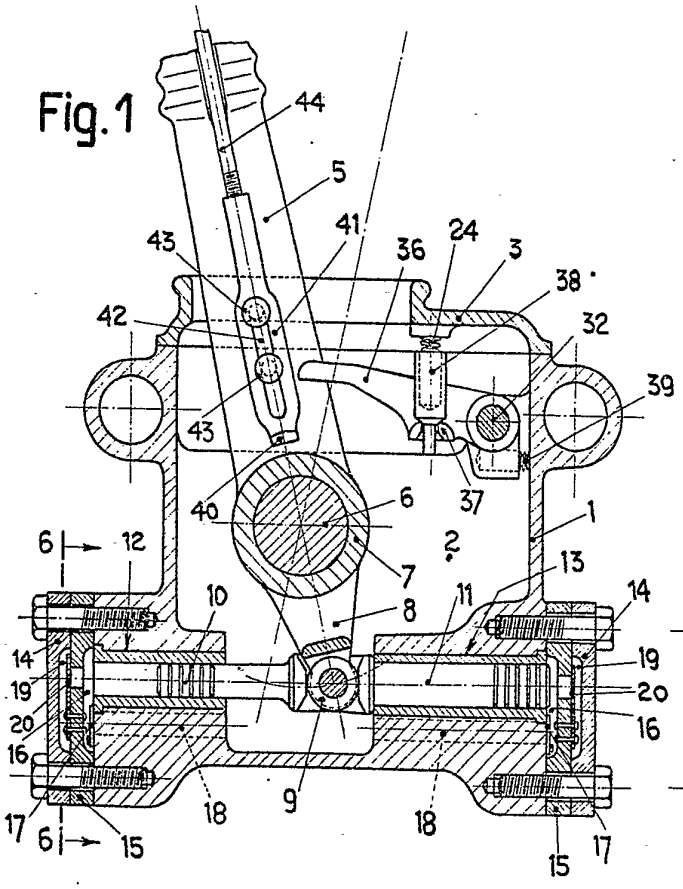


Fig. 3

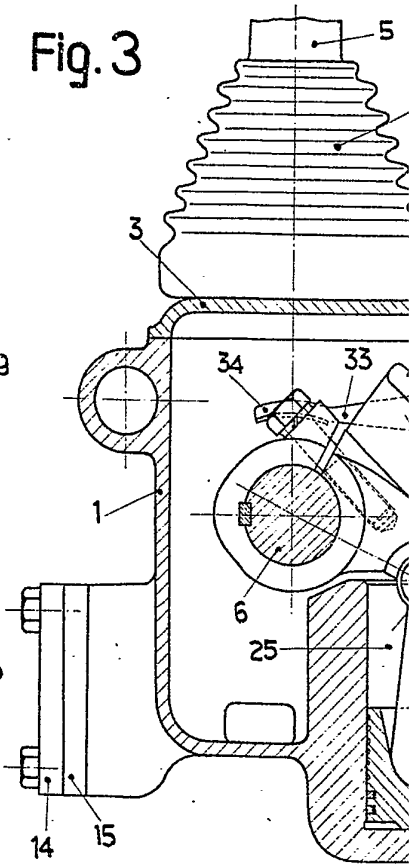


Fig. 2

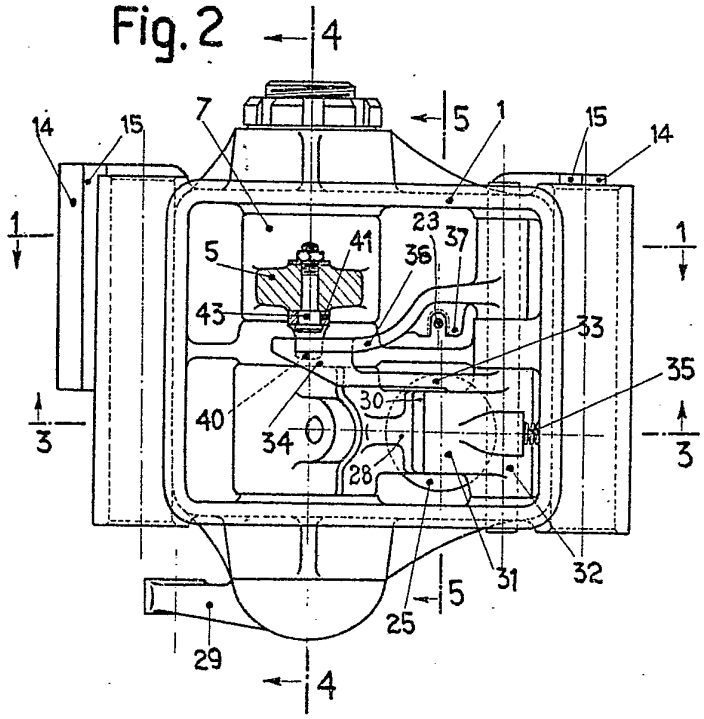
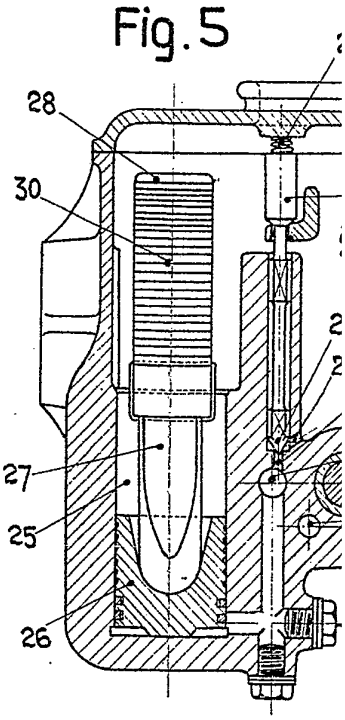


Fig. 5



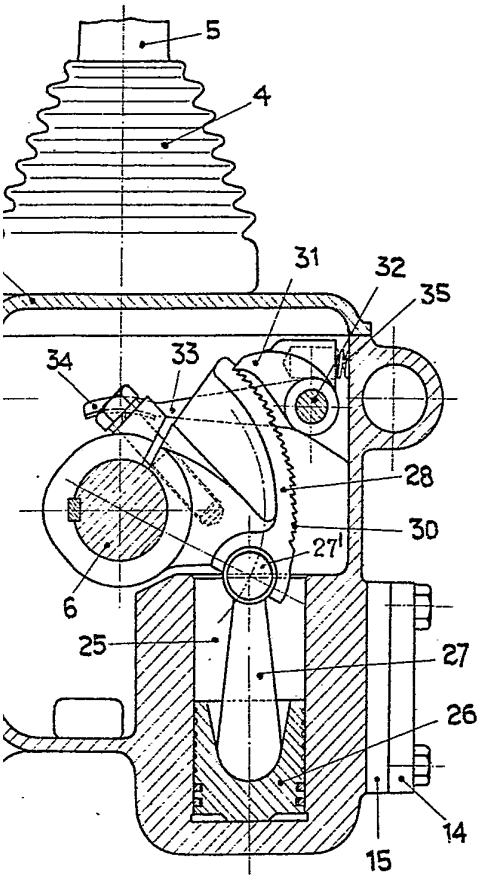


Fig. 4

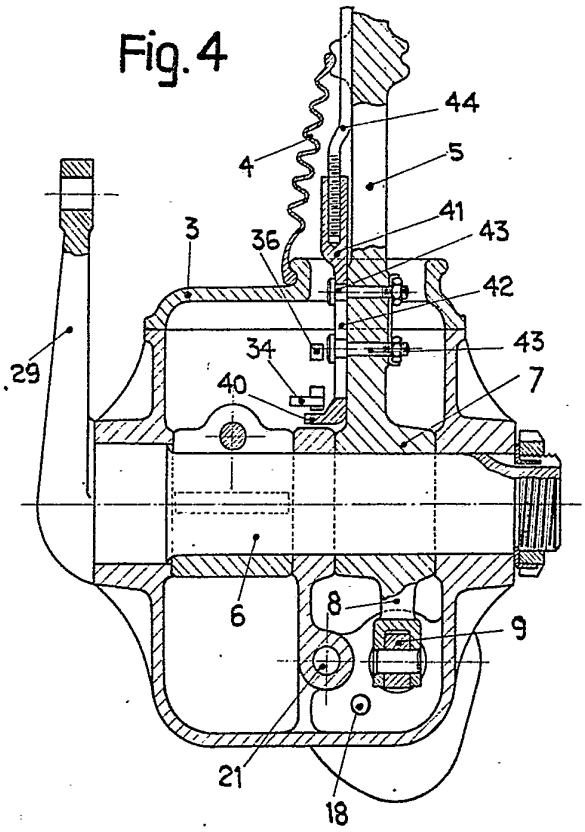


Fig. 5

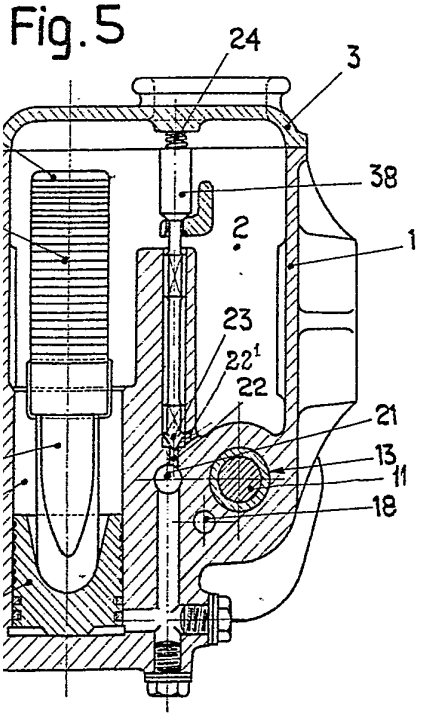


Fig. 6

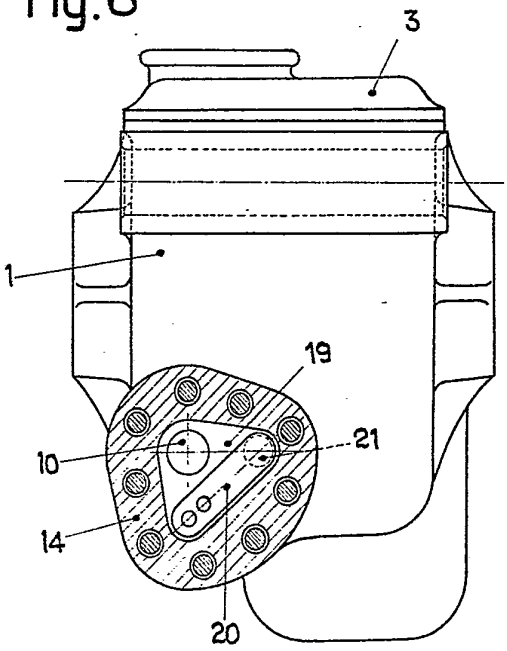


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Fig. 1

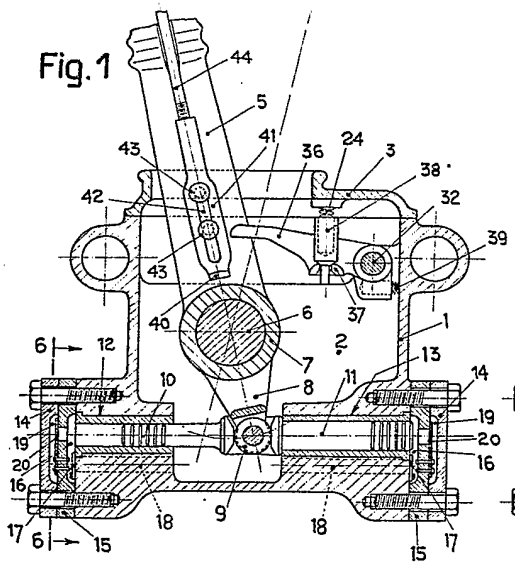


Fig. 3

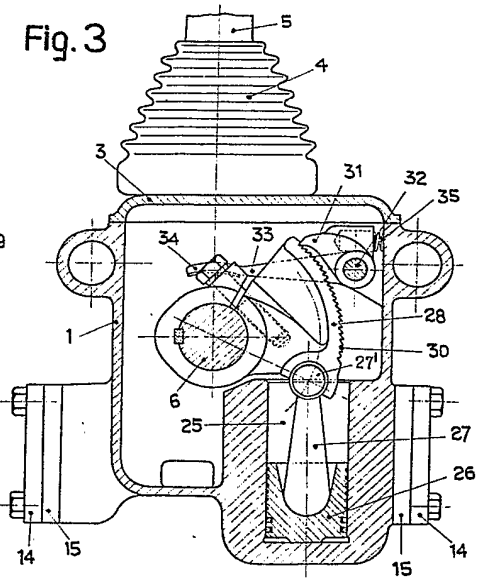


Fig. 4

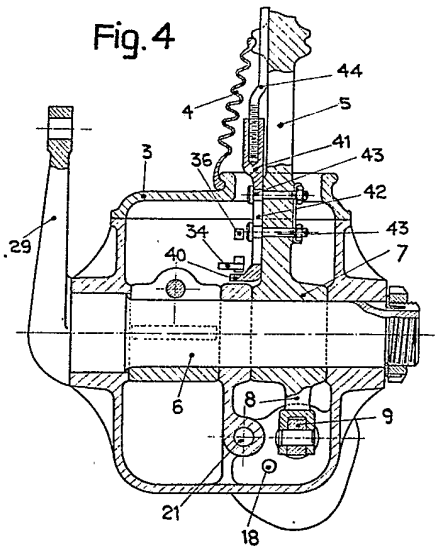


Fig. 2

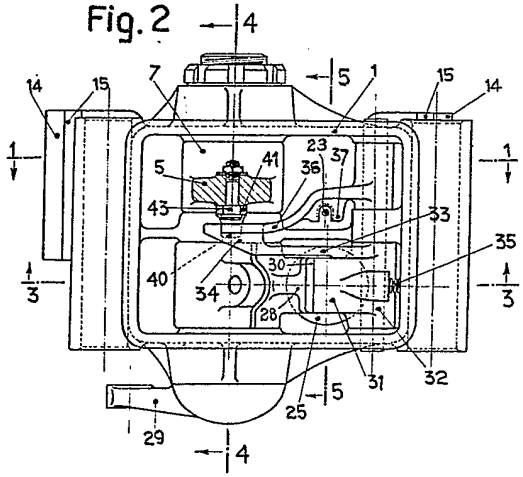


Fig. 5

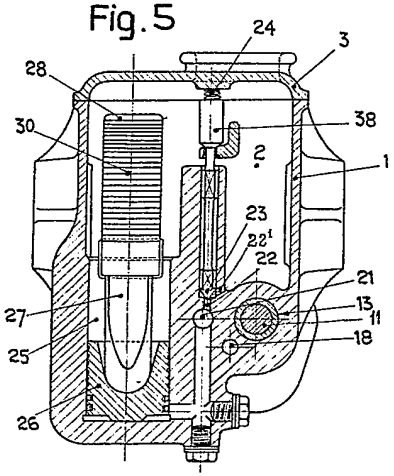
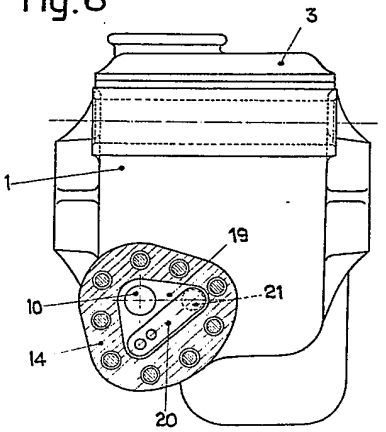


Fig. 6



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