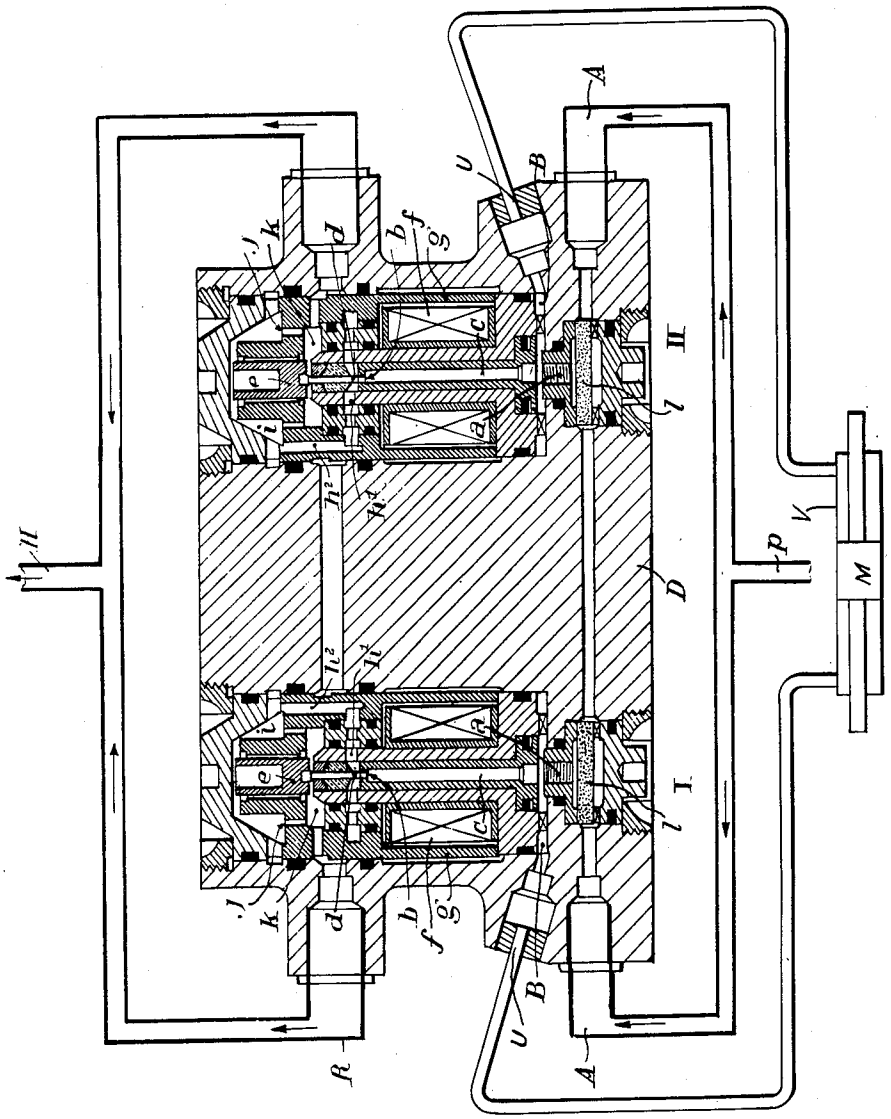
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ELECTROMAGNETIC DEVICE FOR DISTRIBUTING COMPRESSED FLUIDS

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ELECTROMAGNETIC DEVICE FOR DISTRIBUTING COMPRESSED FLUIDS

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5 Claims. (Cl. 121—46.5)

This invention relates to electromagnetic devices and more particularly to electromagnetic devices for distributing compressed fluids which are designed to control the operation of a liquid-operated motor.

In the operation of a distributor in accordance with my invention the following requirements are fulfilled: so little current is needed that an electronic tube can cover its consumption; the pressure at the inlet of the hydraulic motor is directly related to the control current; no background noise is set up, by which is meant that the device is wholly stable in operation and will neither generate nor maintain any vibration.

My distributing device is characterized essentially in that the pressure of the liquid supplied to the operating system is controlled by an outlet for said liquid through which the flow is regulated by a needle or the like which is responsive to the combined actions of the control current and of the back-pressure set up by the liquid below said outlet.

In a particular embodiment of my device, to be described hereinafter, such a back-pressure is generated by passing the liquid through one or several calibrated orifices provided below a chamber arranged opposite said outlet relative to the electromagnetic core.

According to a further feature of my device the rate of flow from the distributor into the working system is determined in dependency on the working pressure of the hydraulic motor by a calibrated orifice located ahead of a supply chamber connected with said system and through a by-pass with said outlet.

In the aforementioned embodiment of my invention said supply chamber is surmounted in the distributor housing with a magnetic circuit which carries the core-energizing coil and which is drilled axially with a channel constituting the said by-pass leading to the outlet.

A distributor involving these several features is illustrated in longitudinal sectional view in the drawing appended hereto.

In this embodiment the distributor comprises a pair of absolutely identical and geometrically equipollent wells I and II bored in a common block D. The corresponding members bear the same reference characters in the one and the other.

The two wells are provided with a common pressure-fluid supply or intake pipe P and a common discharge pipe H leading to the sump; each of them controls the pressure within the respective chambers defined by a piston M of a double-acting jack V. The source of pressure and the sump are not shown in the drawing since they are foreign to the invention. It will be appreciated that the distributor can be made to control a single-acting jack by using one single well of the distributor.

Each of the said wells comprises a delivery chamber B which communicates on the one hand with the supply orifice A through a calibrated orifice *a* and on the other hand with the operating system, here the jack, through the supply orifice U.

There is no inconvenience in the pressure of the hydraulic fluid supplied through the orifice A not being uniform since even a substantial variation of the said pressure will not affect the operation of the apparatus.

The calibrated orifice *a* determines the rate of flow depending on the operating pressure, for example the jack operating pressure.

The pressure within the chamber B is determined by the sectional area of an orifice *b* to which leads the channel *c* which on the other hand communicates with the said chamber.

The sectional area of the orifice *b* is governed by any member which can be actuated electromagnetically which, as shown by way of example in the drawing, is a needle *d* which can be substituted by any other member such as a ball, a valve, a flap, and so on.

The needle *d* or its equivalent is actuated by an electromagnetic control device having a core *e* which has an insert *z* protruding slightly beyond the core *e*. Through the insert *z*, the core *e* presses the needle upon orifice *b* with a force which is proportional to the current which flows through the coil *f* contained in the magnetic circuit *g* through which the channel *c* is bored.

The orifice *b* governs the pressure of the liquid in chamber B by allowing part of said liquid to flow back into the sump through channels h^1—h^2, the upper chamber *i*, the orifice *j*, chamber *k*, backflow orifice R and pipe H.

The orifices *j* are so calibrated that a definite pressure which is dependent on the rate of flow will prevail in the upper chamber *i* and thereby act upon the core *e* so as to counteract the movement initiated by the latter in one direction or the other. The purpose of such a counteraction is to practically eliminate the "background noise," and notwithstanding the fact that the performances at this stage are slightly decreased it will nevertheless result in an improvement of the operation of the whole system and the attainment of high performances.

It is to be pointed out that in the arrangement described which includes a pair of identical distributors the fact that the two distributors are geometrically equipollent affords the remarkable advantage that their conjugated actions are independent relative to the accelerations of the apparatus on which the are fitted, which accelerations, for want of such an equipollence, would cause perturbations.

The pressure supplied to the hydraulic motor by this apparatus is a linear function of the current flowing through the coil *f*.

Advantageously, the inlet to each well is protected by a filter *l* arranged in the pressure fluid intake pipe.

I claim:

1. An electro-magnetically actuated pressure fluid distributor, more particularly for use in an electrohydraulic remote control system for a hydraulic motor, and comprising: a pressure fluid supply, a delivery chamber communicating with the supply and with the hydraulic motor, a duct opening into the delivery chamber, a discharge port in the duct, a movable member for controlling the cross-section of the discharge port, and directly subjected to the pressure of the fluid discharged through said port, a core mechanically connected to the movable member, an electromagnetic control device acting on the core, and means for exerting on said core in the same direction as said electromagnetic device a variable back pressure the variations of which compensate to the variations of the force exerted on said core by the control device.

2. A distributor as in claim 1 wherein the said means comprise a back pressure chamber positioned on the opposite side of the control member with respect to the core, a passageway communicating between the back pressure chamber and the discharge port, an exhaust chamber adjacent said back pressure chamber, and narrow restricted passages between the back pressure and exhaust chambers.

3. A distributor as in claim 1 including a calibrated

orifice in the communication between the pressure fluid supply and the delivery chamber.

4. A distributor as in claim 1 wherein said electromagnetic control device comprises a magnetic circuit coaxial with the duct, and a coil included in the circuit.

5. A control system comprising two identical distributors each as claimed in claim 1 and means connecting the respective pressure fluid supplies, and the back pressure exerting means thereof in symmetrical relationship.

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