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BY A. P. C.

R. L. RAMBERT

VALVE CONTROL DEVICE

Filed April 8, 1942

Serial No.
438,103

2 Sheets-Sheet 1

Fig. 1

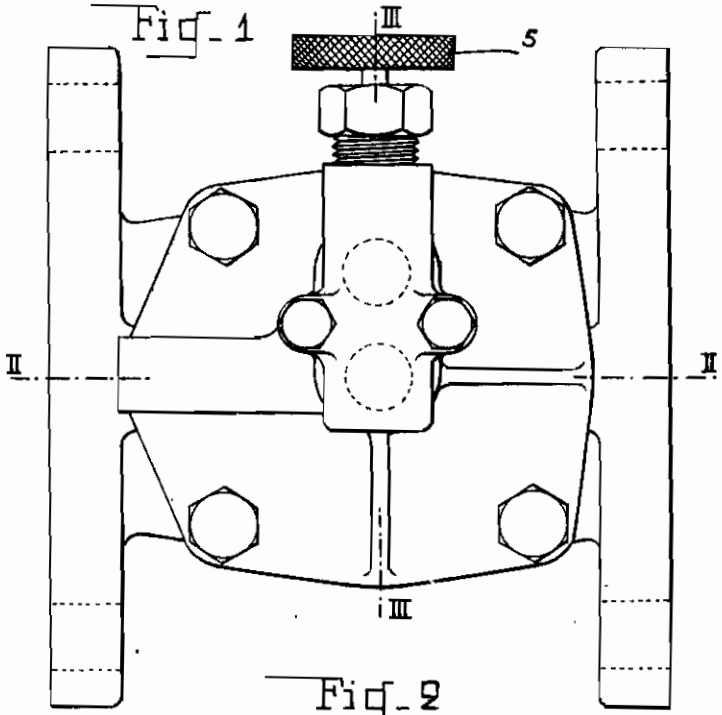

Fig. 2

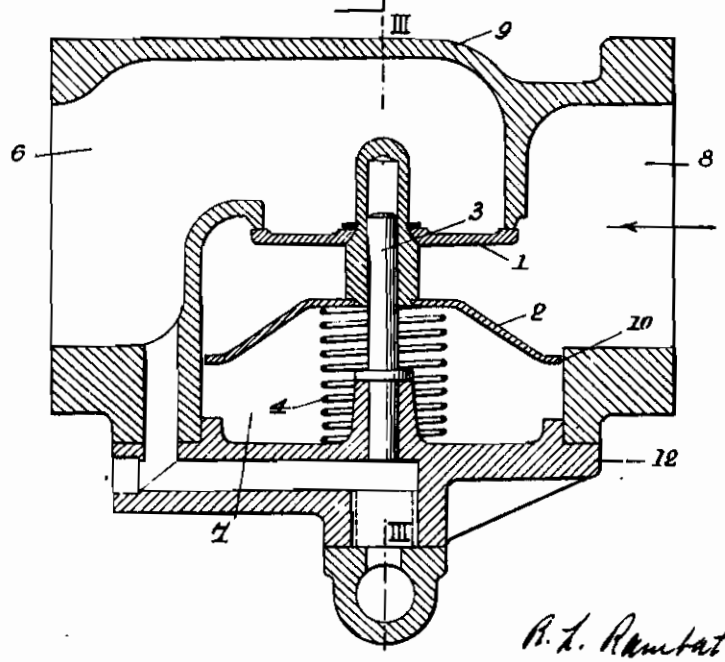

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Fig. 4

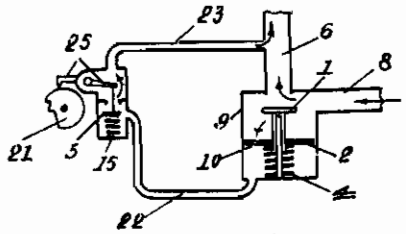


Fig. 5

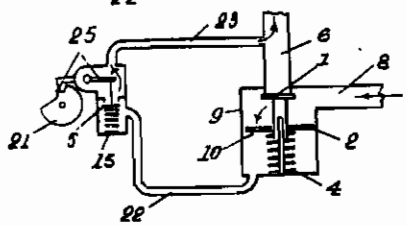


Fig. 6

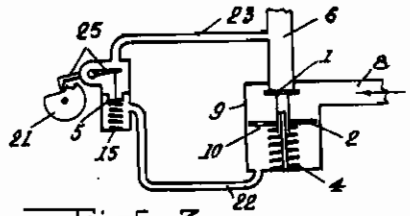
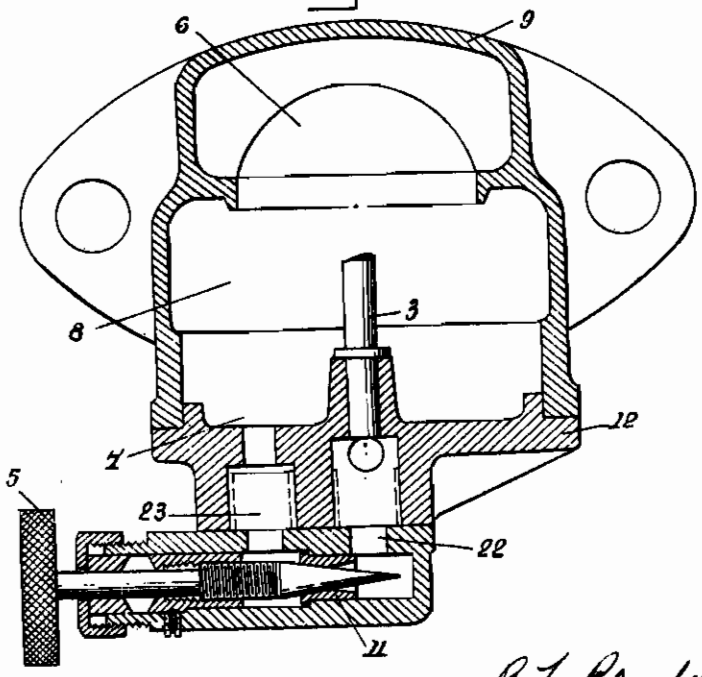


Fig. 3



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ALIEN PROPERTY CUSTODIAN

VALVE CONTROL DEVICE

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It is known to perform the remote control of the opening or closing of a valve through generally intricated and expensive mechanical means.

The present invention enables to avoid the use of any mechanical means and consists in varying the section of passage of a conduit forming a balancing by-pass for the valve to be controlled and in using for performing the closure and the opening of the valve only the losses of pressure exerted by the passage of the fluid in the said conduit upon a moving set integral with the valve.

Preferably, the said conduit allows a reduced output of the fluid after the closure of the valve, the reduced output being itself stopped, if necessary, due to the closure of the conduit by the driving element.

By way of examples, the accompanying drawings show two embodiments of the present invention.

Fig. 1 is a top view of a valve control device according to the present invention.

Figure 2 is a section according the line II—II of Figure 1.

Figure 3 is a section according the line III—III of Figures 1 and 2.

Figures 4, 5 and 6 diagrammatically show the three positions of a valve which controls the feed of a liquid gauging and dispensing apparatus and of its control device according to the invention.

In the control device shown in Figures 1 to 3, 1 is the closing valve and 2 a dics integral with said valve 1. The moving set is formed by the valve 1 and the disc 2 is slidable on a guiding rod 3 and is brought in the closing position of the valve 1 by a spring 4 bearing upon a piece 12 integral with the body 9 of the valve box. A shutter 5 controls the section of passage of a conduit 22, 23, connecting the chamber 7 located below the disc 2 with the chamber 6 located downstream of the valve 2. The said shutter coacts with a removable seat 11. The upper face of the disc 2 is directly subjected to the pressure prevailing in the chamber 8 located upstream of the valve 2. The disc 2 does not slide tightly in its housing; a given amount of gap 18 is provided between the periphery of the said disc and the walls of the space within which it can be displaced, the said gap connecting the chambers 7 and 8 to each other and consequently both faces of the disc.

The operation of the device is as follows:

In the absence of any pressure within the upstream chamber 8, the valve is pressed upon its seat by the spring 4. When the pressure increases within the chamber 8 and if the shutter 5 is closed or if its leakage is quite reduced with respect to that due to the gap 10, the conditions are balanced between both faces of the disc 2 and the valve 1 is kept closed, as well by the spring 4 as by the difference of pressure prevailing between the chambers 6 and 8. When the shutter 5 is opened, the pressure within the chamber 7 will so much more tend to approach the value prevailing within the chamber 8 that the opening of the conduit 22, 23 is wider. Consequently both faces of the disc 2 will be subjected to different pressures and the action resulting upon the said disc 2 will tend to open the valve 1, but the latter will remain closed so long as the difference between the pressures prevailing within the chambers 8 and 8 is sufficiently reduced. A time will come at which the action of the disc 2 upon the moving set will be stronger than the action of the valve 1 and of the spring 4. At that time, the valve 1 will open, thus connecting the chambers 6 and 8. An increase of pressure will immediately result within the chamber 6, thus tending to reduce once more the unbalance of pressure prevailing on both faces of the disc 2. The valve will thus take a balanced position, which will thus depend from the rate of opening of the shutter 5. Consequently different balanced positions of the valve 1 will be obtained by opening more or less the shutter 5. It should be noted that the stress necessary for opening or for closing the shutter 5 can be made considerably weaker than that which is necessary for opening or closing directly the valve 1.

In the case of Figures 1 to 3, the shutter 5 is directly arranged on the body 9 of the valve box, but it is obvious that the shutter 5 could be located at any distance from the said box 9. In this case the amount of gap 10 can be adjusted in order to render the displacements of the valve 1 as progressive as desired, the displacement of the disc 2 determining a passage of liquid from chamber 7 to chamber 6 through the gap 10. It should be noted that, since the ring 11 is removable, the greatest opening to be allowed for the valve 1 can also be adjusted. The width of the gap 10 can also be adjusted by providing a conduit for short-circuiting the same and connecting the chambers 7 and 8, the said conduit can be of adjustable section.

The device shown in Figures 4 and 6 shows the above described device applied to a liquid gauging-dispensing device. In both devices shown on the one hand in Figures 1 to 3 and

on the other hand in Figures 4 to 6 the same parts are described by the same numerals. In Figures 4 to 6 the disc is shown under the form of a tight piston, the gap 10 is replaced by a calibrated orifice, the shutter 5 is formed by a valve subjected to the action of a spring 15 and the valve 1 acts as the output control valve of the device. The predetermining device of the apparatus, not shown, operates a cam 21, coacting with a lever 25, which controls the displacements of the shutter 5.

Figure 4 corresponds to the full output position of the dispensing apparatus.

Figure 5 corresponds to the reduced output position in which the valve 1 is closed and the liquid continues to flow through the aperture 10 and through the section of the passage which still remains free between the shutter 5 and its seat.

Figure 6 corresponds to the position in which the liquid dispensing apparatus is stopped, the valve 1 and the shutter being completely closed.

The device shown affords a very simple means for operating the valve which controls the output of the dispensing apparatus. The mechanical means heretofore in use are dispensed with thus avoiding many of the actual disadvantages and particularly the following:

(*a*) In the case of high output dispensing apparatus the direct control of a large size valve entrains considerable stresses, thus necessitating strong mechanical means.

(*b*) In some cases, it might be interesting to separate the predetermining device from the valve 1 itself, which is advantageously located at a non negligible distance from the said mechanism, the operation by usual mechanical means taking thus place in difficult conditions.

(*c*) The operation by mechanical means of the valve 1 entrains reactions of the said valve upon the mechanism, particularly in the case of water impacts which can render the adjustment unsafe if a balanced valve is not used.

(*d*) The closing speed of the valve 1 is difficult to adjust.

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