March 29, 1927. 1,622,723

P. M. JOHNSON

VALVE

Filed Sept. 3, 1924

Fig. 1

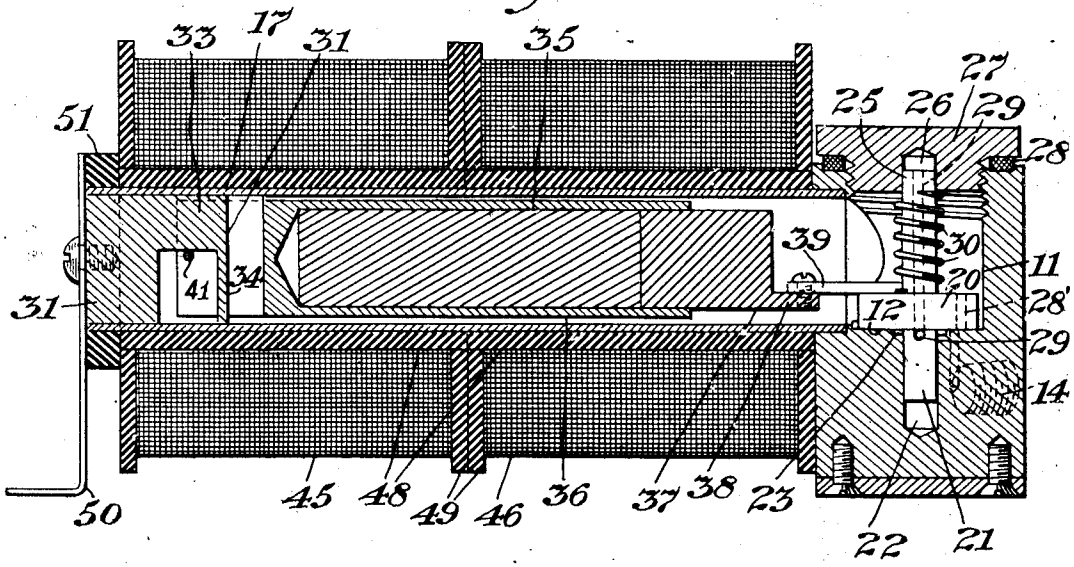


Fig. 2

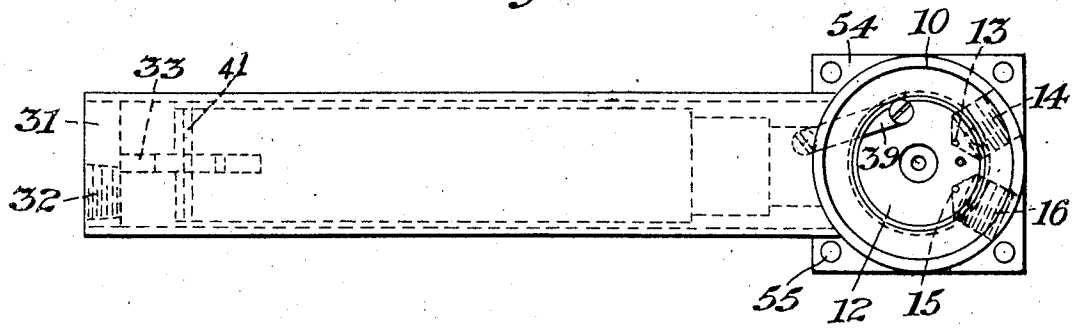
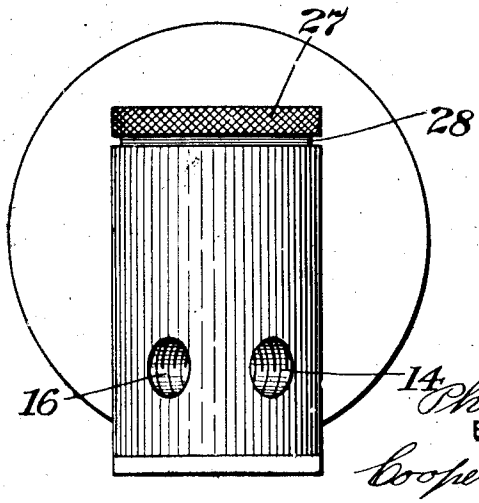


Fig. 3



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UNITED STATES PATENT OFFICE.

PHILIP M. JOHNSON, OF NEWTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL REFRIGERATING COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF MASSACHUSETTS.

VALVE.

Application filed September 3, 1924. Serial No. 735,551.

My present invention relates to a liquid controlling valve which has connected thereto for the automatic operation thereof a plurality of electromagnets which are energized through suitable connections and in accordance with automatic operation of the apparatus on which the valve is used, but the valve of my invention is applicable for use in the arts generally and for manual as well as automatic control.

In certain forms of automatic refrigeration apparatus the volatile constituents of a refrigerating mixture are driven over by the action of heat from a distilling to a condensing chamber from whence they are conducted to a refrigerating chamber. When the latter is full or filled to a predetermined extent the heat is shut off from the distilling chamber, and water which during the distilling operation was directed through or around the condensing chamber, is shut off from the latter and directed through or around the distilling chamber to promote the reabsorption of the refrigerant by the absorbent constituents in the latter.

Generally and preferably all of the operations necessary to the attainment of this result are performed automatically and one way of accomplishing this is by electromagnetic agency under the control of suitable circuit closers. Let it be assumed, for example, that a water supply is received through a proper pipe or conduit which is to be passed automatically through coils in or about the condensing chamber, and then in or about the distilling chamber. In such cases a suitable valve is inserted in the said pipe which is operated by one or more electro-magnets to direct the path of flow to one or the other as the occasion may require, and circuit closers controlled, it may be, by the filling and emptying of the refrigerating chamber or of the condensing chamber are employed to energize or deenergize the said magnets at the proper times.

The object of my invention therefore is to provide a two way valve operated by electro-magnets to alternately open one way thereof and then the other continually or as required.

Another object of my invention is to provide such a valve which is simple and compact of construction and simple in operation.

Other objects of my invention will appear from the specification and drawing.

In the drawing:

Fig. 1 is a sectional elevation view of the valve of my invention showing the valve thereof and the armature for the actuation thereof,

Fig. 2 is a plan view of the valve and armature casing of the device of Fig. 1, and

Fig. 3 is an end elevation view of the device of Fig. 1.

In the device of my invention a water tight casing encloses a magnetic armature and a rotary valve connected thereto and movable thereby over a valve seat to control the flow of water from an inlet to either one of two outlet ports according to its position on its seat. Said armature is connected from one end thereof by a link to said valve and is movable in said casing between limits at one of which the valve connects with one of said ports and at the other of which limits it connects with the other of said ports, each of said ports being closed when the other is open. When said armature is midway between said limits the valve is closed to both the said ports. For actuating the armature I employ two solenoids surrounding it and oppositely charged magnetically when connected to electric circuits, said solenoids operating one to move said armature to one of said limiting positions and the other to the other of said limiting positions.

To secure strong and effectual control of said armature by said solenoids the sides of the enclosing casing are made of thin yet strong material and the solenoids wound closely thereabout suitably insulated.

In the drawing the casing 10, preferably of brass, has formed therein at the bottom of the opening 11 the valve seat 12 which connects through opening 13 with port 14 and through opening 15 with port 16, and into the side of which connects the open ended tube 17 of thin material, preferably brass.

The valve 20 rides on said seat 12 and carries a lower stem 21 which fits into round hole 22 formed at the center of seat 12 with a slide fit. An upper stem 25 carried by said

valve 20 fits slidably into the central opening or bore 26 formed in the bottom of plug cap 27 which screws into the top of said opening 11 and with gasket 28 makes water tight closure for said opening 11.

The hole 29 through stem 25 and connecting with the annular channel 23 formed about the upper edge of hole 22 serves to equalize the pressure on both sides of valve 20 and thus prevent the jamming thereof and to carry lubricating material placed in hole 26 for the lubrication of the valve and stems. A compression spring 30 mounted about stem 25 and pressing against the top of valve 20 and the bottom of plug 27 serves to hold said valve 20 seated tightly on said seat 12. The hole 28′ through valve 20 serves to connect opening 11 and openings 13 and 15 in the open positions of the valve.

The closure 31 fixed to the rear of tube 17 serves to complete the water tight casing and has formed therethrough the threaded inport 32 for connection with a water supply main. Said closure 31 carries on its inner end the narrow bridge extension 33 which terminates in the post 34 which extends at right angles thereto.

Within the casing is the armature 35 of magnetic material which is enclosed by the protecting casing or carrier 36 of non-corroding material such as brass, the end closure 37 of which terminates in a thin step or lug 38 which is connected to said valve 20 by means of link 39 which is pivoted at its ends to said lug 38 and valve 20 respectively. The back end 40 of carrier 36 is bifurcated and straddles bridge 33 and post 34, and the pin 41 passing through said end 40 between said post 34 and the inner end of closure 31, limits the movement of said armature 35 and carrier 36 and of valve 20 thereby to the positions at which said opening 28′ connects with opening 13 and opening 15 respectively. Said carrier 36 is made sufficiently smaller than the bore of tube 17 to allow the passage of water between their respective sides in its flow from inport 32 to the valve. About the outside of said tube 17 are mounted the magnet coils 45 and 46 which are insulated from the valve casing by the sleeves 48 and the washers 49. The plate 50 screwed to closure 31 serves to hold the washer 51, of rubber or other resilient insulating material, against the magnets and their washers, whereby they are held tightly against casting 10 and secure against movement on said tube 17. The lower end of plate 50 is bent at an angle to the main part thereof and serves for securing the valve mechanism to a suitable holding means. The plate 54 fixed to the bottom of casting 10 and having the holes 55 in the extending edges thereof also serves for mounting the mechanism.

I claim:

A liquid flow controlling valve for automatic operation comprising a closed casing connecting with a valve seat and outports at one end and having an inport at its other end, a valve on said seat, an armature in said casing spaced from the wall thereof for liquid flow therethrough thereby, link connection between said armature and said valve, means in said casing for limiting the extreme positions of said armature therein to corresponding registry of said valve with two of said outports, electro-magnetic coils about said casing adapted, when severally energized, to move said armature to its respective limiting positions, and adapted when jointly and equally energized to move and hold said valve into outport closing position.

In testimony whereof I hereto affix my signature.

PHILIP M. JOHNSON.