Nov. 5, 1929. L. KRAFT ET AL 1,734,258

GAS CONTROL VALVE

Filed Aug. 5, 1927

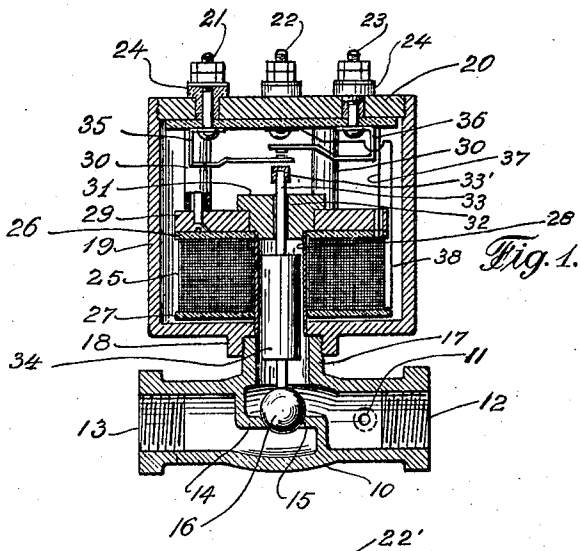


Fig. 1.

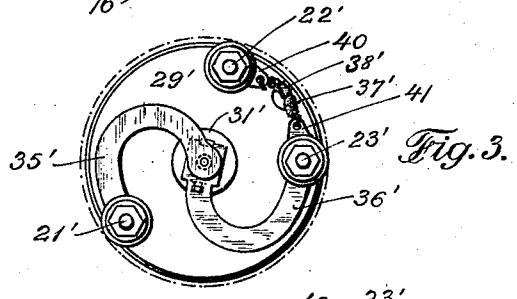


Fig. 3.

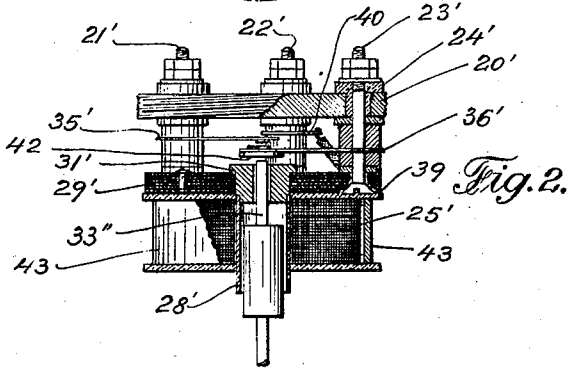


Fig. 2.

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Patented Nov. 5, 1929 1,734,258

UNITED STATES PATENT OFFICE

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GAS-CONTROL VALVE

Application filed August 5, 1927. Serial No. 210,855.

This invention relates to electromagnetically controlled valves in general and particularly to the kind adapted for use in connection with controlling systems of gaseous or other media.

This application is a division in part and continuation of our original application, Serial Number 157,315, filed December 27, 1926, for electric control system.

One of the objects of our invention is to provide an inexpensive, effective, simple and economically operating electromagnetic valve which, when connected with a source of energy in the manner outlined in our above mentioned co-pending application, will keep automatically open once energized by an initial current impulse passing through its solenoid.

Another object of our invention is to provide, in connection with this valve, various means for accomplishing the desired results and enhancing the efficiency of its operation.

The foregoing and further objects will be more fully apparent from the following description and the accompanying drawings, forming part of this disclosure, but by no means intended to limit the same to the showing, references being made from time to time to our first mentioned co-pending application.

Referring to the drawings, Fig. 1 illustrates a vertical cross sectional view through one form of our valve.

Fig. 2 is a side elevation partially in section of a modified interior arrangement of our valve, and

Fig. 3 is a partial top view of the latter.

In Fig. 1 there will be seen a valve casing 10, provided with a pilot light connection 11, adapted to receive a conduit leading to a gas burner (not shown).

The intake for the gas is denoted at 12, while the outlet of the main gas supply is at 13. At the inner web portion 14 there is provided a seat 15 for a ball or other type of valve 16. Neck 17 of the valve casing is threaded to receive the threaded end 18 of housing 19, in which the entire operating arrangement of our valve is air-tightly enclosed.

It will be observed at the top of the housing, is a cover 20 through which pass bolts 21, 22 and 23. All of them are insulated from cover 20 as shown at 24. Below cover 20, there will be seen a solenoid 25, held between insulating discs 26 and 27, while at the central portion of the solenoid is provided a tubular guide member 28, the function of which will be explained presently.

Above the solenoid there is provided a soft iron disc 29 which is spaced from the cover by spacers 30. At the center of disc 29 there is provided a soft iron bushing 31, having a central opening 32, through which passes stem 33 of the valve. Spindle 33 passes through a soft metal core 34, adapted to be attracted by the solenoid when energized.

It will be observed that bolt of binding post 21 holds the spring member 35, while binding post 23 supports another spring member 36. A conduit 37 leads also from binding post 23 to the solenoid, while a conduit 38 connects the other end of the solenoid with binding post 22.

Contact springs 35 and 36 are actuated by stem 33 of the valve, which latter is electrically insulated from the springs, as shown for instance at 33′.

Binding posts 22 and 23 are intended to be connected with an electric source of energy which is controlled by a switch (not shown in the drawing). Binding post 21 is also connected with the same source of energy. The arrangement of connecting the several binding posts to the source of supply is as follows:

Binding post 22 connects with one potential, say the positive. Binding posts 21 and 23 are connected to the other potential, for instance the negative. A specially designed switch is placed in series between the electric source, and binding post 23. The switch is so arranged that the moment contact is made, electric energy is passed from the electric source through binding post 22, to the solenoid, and from there through binding post 23 back to the electric source. The moment the switch however is released, connections between binding post 23 and the electric source is interrupted. The moment the solenoid is energized by the initial switch contact, the core 34 is drawn up and causes spin-

dle 33, with its insulated end 33′, to press together contact springs 35 and 36. In this manner current is passed from the electric energy through binding post 22, through the solenoid to binding post 23, through spring 36, spring 35 to binding post 21 and from there to the source of energy. In this manner the solenoid remains energized, and the valve remains open until an interruption of the current is caused in the electric circuit.

In connection with Fig. 1, there has been mentioned that on top of the solenoid is a soft iron disc 29, and a soft iron bushing 31. Particular attention is called to the latter, the lower end of which reaching into the guide tube 28, which latter is adapted for guiding core 34. The fact that bushing 31 is intimately connected with soft iron disc 29, both disc and bushing are magnetized the moment the solenoid is energized. The magnetic power of the solenoid is greatly enhanced because of the particular construction of the bushing which attracts the core of the valve.

In Figs. 2 and 3, there will be seen a modified construction of the operation mechanism, although its function remains identical with that described and explained in connection with Fig. 1.

Referring to Figs. 2 and 3, numerals 21′, 22′ and 23′ denote the respective binding posts adapted to connect with the electric source of energy in the same manner as explained above in connection with Fig. 1.

These binding posts pass through cover members 20′ and are insulated therefrom as shown at 24′. The spacers in this arrangement are provided, in that the screws of the binding posts are longer, and pass through the soft iron laminated disc 29′, from which they are insulated, as shown at 39. Contact springs 35′ and 36′ are placed between a plurality of spacers and are held together by the screws of the binding posts 21′ and 23′.

Another set of spacers is provided between cover 20′ and laminated disc 29′, held together by screw of binding post 22′. Between these spacers there is provided a lug 40, to which is connected a conduit 28′, leading to one end of the solenoid, while to lug 41, forming an extension of contact spring 36′, is attached the conduit 37′ leading to the other end of the solenoid (see Fig. 3).

Attention is called to soft iron disc 29′ which consists of a plurality of relatively thin layers adapted to enhance the magnetic power of the disc when the solenoid 25′ is energized. At the center of discs 29′ there is again provided a bushing 31′ which extends into the guide tube 28′. It will be observed that the end of the spindle 33″ of the valve is not provided with an insulation. On the other hand an insulation disc 42 is secured to the bottom face of contact spring 36′.

Another improvement of the construction shown in Fig. 2 is the provision of a soft metal bar 43, arranged circumferentially about the solenoid 25′. The provision of this bar greatly enhances the magnetic efficiency of the solenoid, and therefore makes it possible to retain the valve in its upward position more readily than is the case in the construction shown in Fig. 1.

The operation of the construction shown in Figs. 2 and 3 is identical to that explained in connection with Fig. 1, except that a greater efficiency is attained from the improved arrangement.

Having thus explained our invention, we claim:

1. The combination with a fluid control valve, of a casing arranged above said valve and having a hermetically sealing cover, a plurality of insulated binding posts attached to said cover and forming suspensions for the mechanism within said casing, said mechanism comprising a solenoid adapted to extend to the bottom of said casing and provided at its upper end with a laminated soft iron member, a soft iron bushing or extension arranged at the center of said laminated member, a circuit maker and braker disposed between said laminated member and the casing cover and comprising two resilient blades, each connected to and held by one of said binding posts, the free ends of said blades disposed above each other and in line with the center axis of said solenoid, an armature operatively arranged within said solenoid and having an upper central extension, adapted to actuate said circuit maker and braker, and a lower extension forming the operating member of said valve, said circuit maker and braker controlling an auxiliary circuit for energizing said solenoid when said armature has been operated.

2. The combination with a fluid control valve, of a casing arranged above said valve and having a hermetically sealing closure, an operating mechanism within the casing, comprising a solenoid adapted to extend towards the bottom thereof and provided at its upper end with a laminated soft iron member, a soft iron bushing or extension arranged at the center of said laminated member, suspension means connected with said closure and with said operating mechanism for suspending the latter within the casing, a circuit maker and braker disposed between the laminated member and the casing closure and comprising resilient blades, connected to and held by said suspension means, the free ends of said blades disposed above one another and in line with the center axis of said solenoid, an armature operatively arranged within said solenoid and having an upper central extension adapted to actuate said blades, and a lower extension forming the operating member of said valve, said circuit maker and braker controlling an auxil-

iary circuit for energizing said solenoid when said armature has been operated.

Signed at New York in the county of New York and State of New York this 12th day of August, A. D. 1927.

LUCAS KRAFT.
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