April 9, 1929. D. O. MARKS 1,708,276

ELECTROMAGNETIC VALVE

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Fig. 1

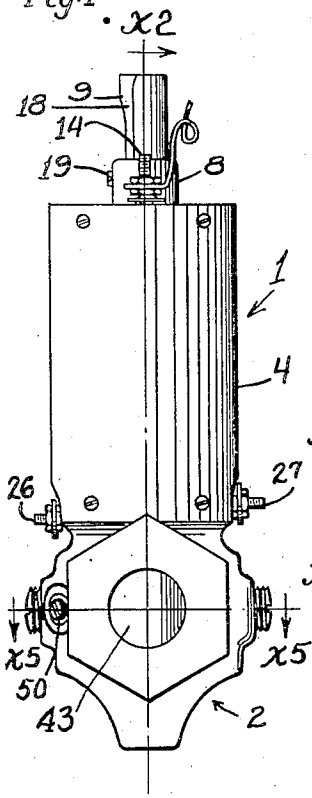


Fig. 2

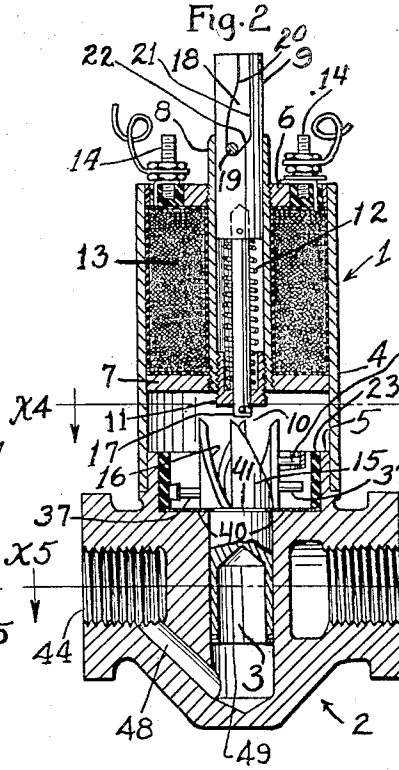


Fig. 7

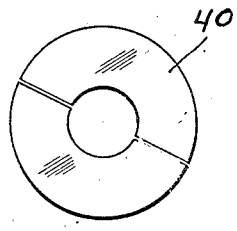


Fig. 3

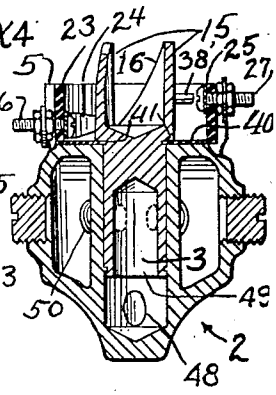


Fig. 4

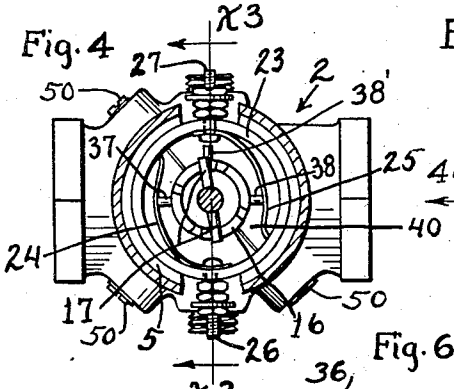


Fig. 5

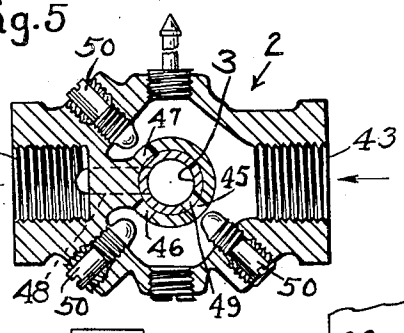


Fig. 6

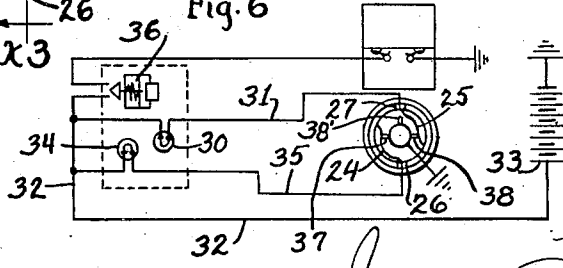
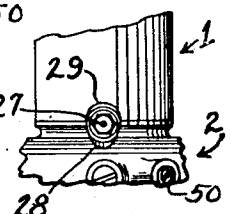


Fig. 8



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ELECTROMAGNETIC VALVE

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Fig. 9

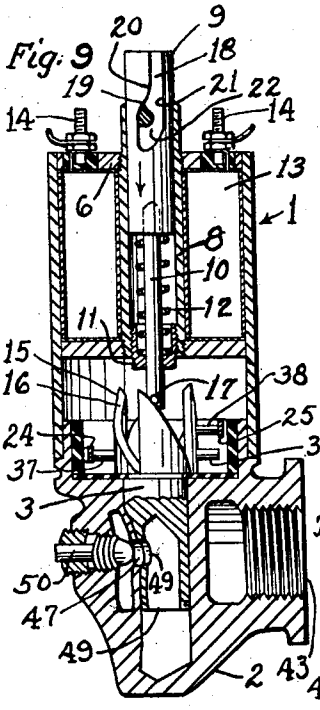


Fig. 10

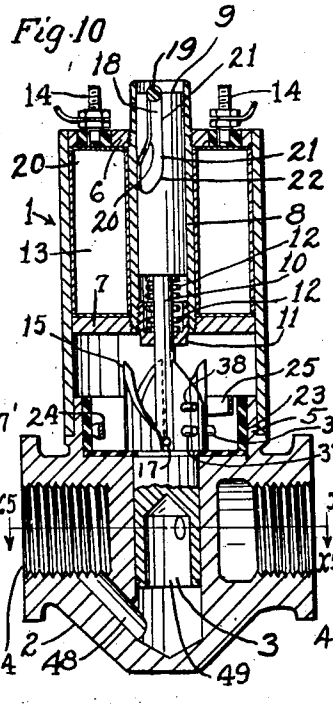


Fig. 11

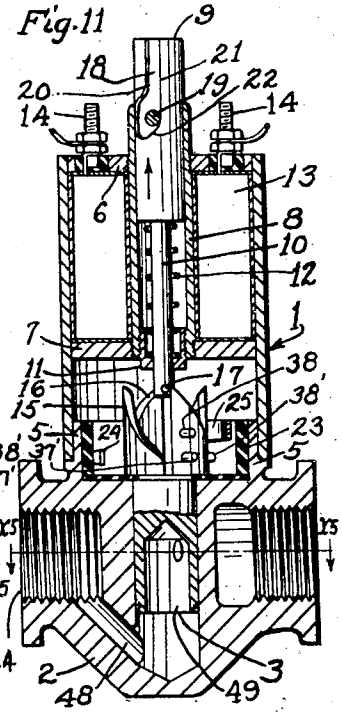
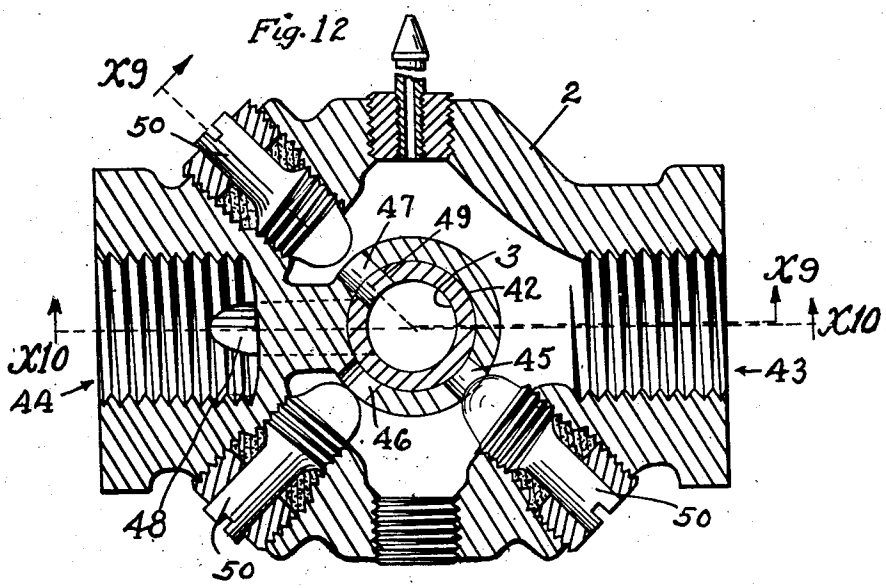


Fig. 12



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Patented Apr. 9, 1929. 1,708,276

UNITED STATES PATENT OFFICE.

DONN OTTO MARKS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO GEORGE GARTLING, OF LOS ANGELES, CALIFORNIA.

ELECTROMAGNETIC VALVE.

Application filed April 30, 1927. Serial No. 187,747.

This invention relates to an improved novel automatic valve positioning device, and indicating means for the valve plug, and an object of the invention is to provide a device of the character stated in which novel accessible switch contacts are provided.

Another object is to provide a novel and simple positioning device for the valve plug actuating rod.

A feature of this invention comprises a novel and simple valve plug retaining means.

Advantages of the invention include a device of the character stated which is simple in construction, effective in operation, and the parts of which are readily accessible for inspection and repair and which may be readily assembled with a minimum amount of labor.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of the positioning device on a valve.

Fig. 2 is a sectional view on line x^2, Fig. 1.

Fig. 3 is a sectional view on line x^3, Fig. 4.

Fig. 4 is a sectional view on line x^4, Fig. 2.

Fig. 5 is a sectional view on line x^5, Figs. 1 and 2.

Fig. 6 is the wiring diagram for my device.

Fig. 7 is a plan view of the valve plug retaining washer.

Fig. 8 is a fragmentary side elevation of my device.

Fig. 9 is a view similar to Fig. 2 as taken on the line x^9, Fig. 12, showing the plunger as partially depressed and the cam as moving the plug from high-flow to the shut-off position.

Fig. 10 is a view taken on line x^{10}, Fig. 12, showing the plunger as fully depressed and the cam and plug in shut-off position.

Fig. 11 is a view similar to Fig. 10 showing the plunger as being restored to elevated position and about to be reset for subsequent rotational movement of the plug.

Fig. 12 is an enlarged sectional plan view, similar to Fig. 5 showing more clearly the valve portage and the means for selectively varying gas flow through the several ports.

My valve positioning device 1 is mounted on a valve 2 and operates a plug 3 in the valve.

The device 1 comprises a shell 4 which is mounted concentric with the plug 3 on a ring 5 formed on the valve 2 and is secured to said ring.

Spaced heads 6, 7 are secured in the shell 4, and a tube 8 is secured in said heads in alinement with the plug 3. A movable cylindrical core 9 is slidably mounted in the tube 8 and an extension rod 10 depends from the core 9.

The rod 10 is guided by a nut 11 screwed into the lower end of the tube 8. A spring 12 is positioned between the nut 11 and core 9 to urge said core and rod 10 upwardly.

Windings 13 are spaced between the shell 4, tube 8 and heads 6, 7.

Terminals 14, 14 extend through the head 6 to which the electrical leads are secured to pass current to the windings and cause the core 9 to move downwardly for a purpose to be further described.

The plug 3 is formed with teeth 15 on the upper end thereof, said teeth having cam surfaces 16 on one face thereof.

The rod 10 is provided with a pin 17 on the lower end thereof, which engages the cam surfaces 16 to rotate the plug 3.

In order that the pin 17 may always be properly positioned to engage the cam surfaces 16, a groove 18 is formed in the core 9 into which a screw 19 extends.

This screw is threaded through the tube 8 into said groove. As the core 9 is depressed, a surface 20 is engaged by the screw 19 which carries the core a fraction of a revolution in the direction of rotation of the plug 3, and carries the screw against a vertical surface 21.

As the core 9 is returned by the spring 12, the screw 19 moves down the surface 21 and engages a cam surface 22 at the lower end of the groove 18 which moves the core 9 a fraction of a revolution counter to the rotation of the plug 3, and thus positions the pin 17 so that it will always engage the surfaces 16.

A fibrous sleeve 23 is mounted in the ring 5, and spring contacts 24, 25 are mounted in the sleeve.

Terminal posts 26, 27 are attached to the contacts 24, 25 respectively, and extend through the sleeve 23. Notches 28, 29 are cut in the valve 2 and shell 4 respectively to permit the passage of the posts 26, 27.

The post 27 is connected to a lamp 30

through a lead 31, and the lamp is also connected to a lead 32 extending to the battery 33.

The post 26 is connected to a lamp 34 through a lead 35, and the lamp 34 is also connected to the lead 32.

The lamps are of different colors, for instance, the lamp 30 may be red and the lamp 34 white, or vice versa at the direction, option or convenience of the operator or the one installing the lamps.

In the drawings the lamp 30 may be regarded as red and the lamp 34, as white.

A switch 36 is provided in the lead 32 which lead also extends to one of the terminal posts 14 of the windings 13 to energize said windings and actuate the core 9.

The plug 3 is provided with four pins 37, 37′, and 38, 38′ which pins are adapted to engage the contacts 24, 25 respectively to light the lamps 34, 30.

The plug 3 is rotated 90° more or less each time the core 9 is actuated; and, starting at the off position where the pins 37, 37′, 38, 38′, do not engage the contacts 24, 25, and no gas can pass through the valve, and neither lamp is lighted. The first rotation of the plug carries the pin 37 onto the contact 24 to light the white lamp 34 to indicate a small amount of fluid passing through the valve 2.

A second rotation carries the pin 38′ against the contact 25, and the pin 37 away from the contact 24 thus lighting the red lamp 30 and extinguishing the white lamp 34 to indicate a medium flow. The next rotation carries the pins 37′, 38 against contacts 24, 25 to light both lights 30, 34 and to thereby indicate a high flow of fluid through the valve.

Longitudinal movement of plug 3 is prevented by a split washer 40 which is held under the sleeve 23, and enters a groove 41 in the plug 3, thus securely holding said plug in position.

As best shown in Fig. 3, the valve plug 3 is of cylindrical form; is directly seated in the valve casing 2 and has formed integrally therewith the teeth 15 having cam surfaces for plug rotation, and has the switch pins 37, 37′, 38 and 38′ built onto the teeth.

The undercut groove 41, in the plug body, beneath the teeth, provides for a facile introduction of the halves of the split washer 40, after a seating of the plug.

The switch proper, is constructed as a unit and comprises the fiber sleeve 23, with the contacts 24 and 25, and terminal posts 26 and 27 assembled on the sleeve, and may be placed on the valve fully assembled.

The means carried by the core for rotation of the plug, consists only of a simple pin extended through the end of the extension rod of the core, and the positioning means for the pin consists only of a simple pin and cam-slot.

As best shown in Fig. 12, the seat 42, of the valve is formed as a cylindrical bore, the walls of which partition the inlet 43 from the outlet 44 and through which is formed valve ports 45, 46 and 47 and a by-pass 48 for gas movement from the inlet to the outlet.

The valve-plug 3, as shown is tubular for a portion of its length; is open bottomed for communication with the bore of the valve seat and provided with a single port 49. The ports 45, 46, 47 and 49 are of like capacity so that the single port of the plug may effectively operate with any selected port of the seat. Gas flow through the several ports of the seat is adjustably regulated by means such as, the screw-plugs 50, which are threaded through the valve body.

I claim:—

1. In combination, a valve having a plug therein, teeth on said plug, a tube in alinement with said plug, a core in said tube, electrical means for moving said core downwardly to engage said teeth and rotate said plug; and means on said core adapted to move said core to position said engaging means to engage the teeth.

2. In combination, a valve having a plug therein, teeth on said plug, a tube in alinement with said plug, a core in said tube, means on said core adapted to engage said teeth and rotate said plug as the core is depressed; and means on said core adapted to move said core to position said engaging means to engage the teeth; said last named means comprising a core having a groove therein, a screw entering said groove, and a cam surface in the groove adapted to be engaged by the screw, substantially as described.

3. In combination, a valve having a plug therein, teeth on said plug, a tube in alinement with said plug, a core in said tube, means on said core adapted to engage said teeth and rotate said plug as the core is depressed, means on said core adapted to move said core to position said engaging means to engage the teeth, a split washer engaging said plug, whereby longitudinal movement of said plug is prevented; and means to retain said washer in the valve.

4. In combination, a valve having a plug therein, teeth on said plug, means adapted to engage said teeth to rotate said plug, a sleeve concentric with said plug, contacts on said sleeve, means on said plug adapted to engage said contacts, and signal means connected to said contacts.

5. In combination, a valve having a plug therein, teeth on said plug, means adapted to engage said teeth to rotate said plug, a sleeve secured to said valve concentric with said plug, contacts on said sleeve, pins on said plug adapted to engage said contacts; and signal means connected to said contacts.

6. In combination, a valve having a plug therein, teeth on said plug, means adapted to

engage said teeth to rotate said plug, a sleeve concentric with said plug, contacts on said sleeve, means on said plug adapted to engage said contacts, and signal means connected to said contacts, a split washer engaging said plug whereby longitudinal movement of said plug is prevented, said washer being positioned under said sleeve and retained in position thereby.

7. In combination, a valve having a plug therein, teeth on said plug, a tube in alinement with said plug, a core in said tube and slidable therein, a rod depending from said core, spring means engaging said core adapted and arranged to urge said core upwardly, a pin in said rod adapted to engage said teeth to rotate said plug when the core is depressed, said core having a groove therein, a screw extending through said tube into said groove, said groove having a cam surface to be engaged by said screw to rotate said core and position said pin over the teeth.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 25th day of April, 1927.

DONN OTTO MARKS.