

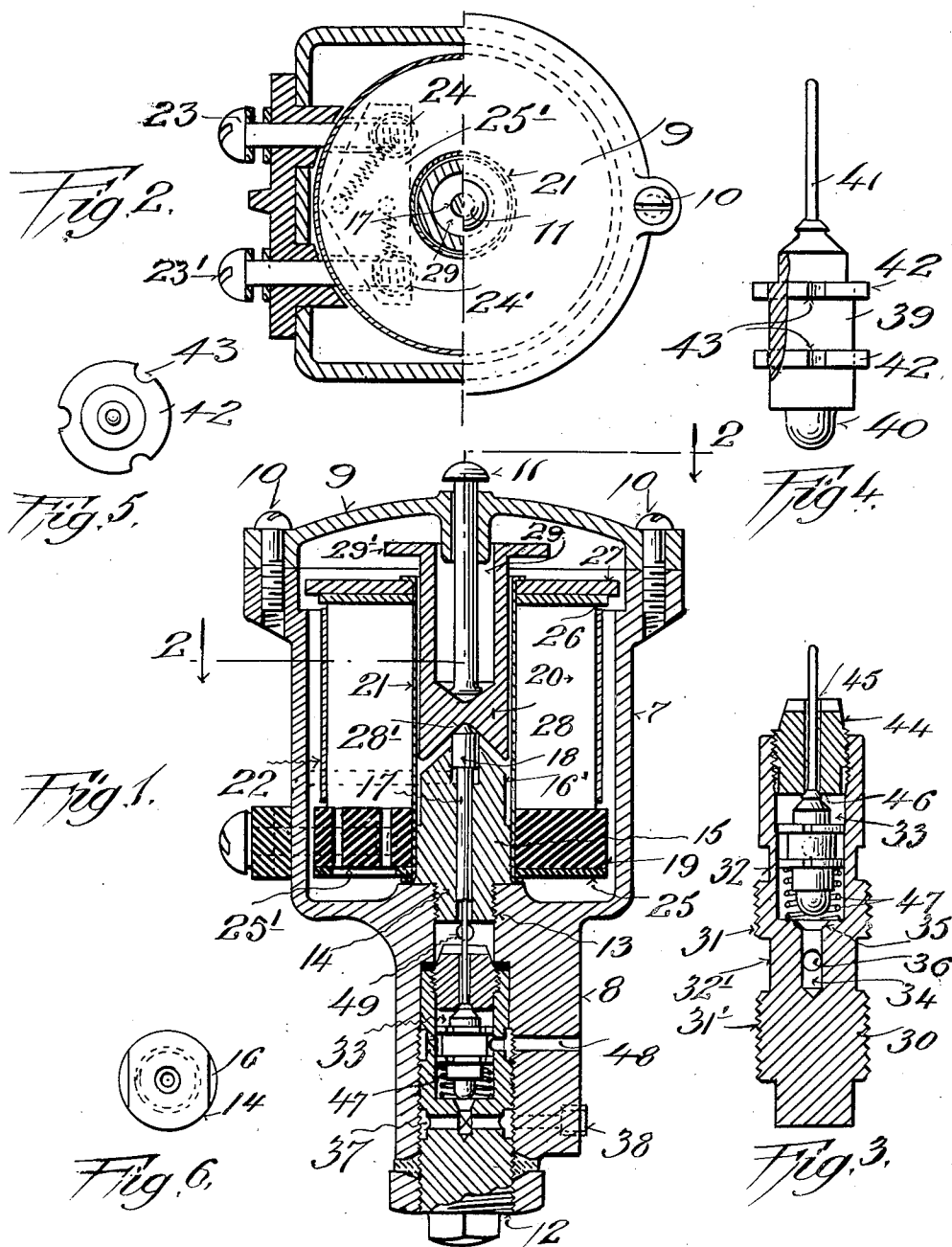
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G. W. MEYERS

MAGNET VALVE

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INVENTOR

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BY HIS ATTORNEYS

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UNITED STATES PATENT OFFICE.

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MAGNET VALVE.

Application filed November 30, 1920. Serial No. 427,431.

To all whom it may concern:

Be it known that I, GEORGE W. MEYERS, a citizen of the United States, residing at Rahway, county of Union, State of New Jersey, have made a certain new and useful Invention in Magnet Valves, of which the following is a specification.

This invention relates to improvements in electromagnetic control valves of the type described in Patent No. 1,300,781, issued April 15, 1919, to Rowntree, which valves are adapted, among other purposes, for use in connection with electro-magnetic control fluid pressure actuated motors for operating doors, gates, and other devices, which are to be put into operation at various times by operating motors.

The objects of my invention include the provision of an electrically operable valve, for controlling the pressure in fluid pressure motors, which is certain and efficient in operation, yet simple and rugged in construction, to thereby admit of ready assembling and easy inspection or repair.

A further object of the invention is to provide means for protecting the magnet coil against injury, and to definitely locate and fix the magnetic centre.

A further object includes the provision of a simple adjustable valve structure which can be removed and replaced as a unit, and in which the operating parts are reduced to a minimum.

Other objects of the invention will appear more fully hereinafter.

I attain these objects by the mechanism illustrated in the accompanying drawings, of which—

Fig. 1 represents a sectional elevation of the structure embodying my invention;

Fig. 2 represents a cross-section in part on lines 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 represents the valve structure in longitudinal section;

Fig. 4 represents the valve head and stem;

Fig. 5 represents a cross section of the valve head; and

Fig. 6 represents a section of the central core stem.

Similar numerals refer to similar parts throughout the several views.

Referring now to the drawing, 7 represents the outer protective housing or casing which is integrally connected with the sup-

porting base 8, and has a removable cover 9. The cover is held in position by any convenient means, as by screws 10.

The base is provided with a longitudinal bore centrally located, into which is adjustably screwed at 12, the valve unit shown in Fig. 3, the construction and operation of which will be explained more in detail hereinafter. In the opposite end of this bore there is firmly fixed, as by a screw-thread 13, a central core stem 14, of iron or magnetic material, having an enlarged body portion 15 for supporting the solenoid with flattened sides 16, for adjustment, and a conical part or head 16', to aid in centering the movable core. This core stem is also provided with a central bore of comparatively small diameter, but having an enlarged portion at the conical end. Within this bore there is slidably mounted an operating stem 17, having a head 18, for operating the valve, as will be explained more fully below.

Upon the body portion of the central core stem there is mounted the solenoid support 19, of insulating material, which carries the solenoid 20 with its supporting core lining tube 21, preferably of copper or non-magnetic material, and solenoid sheath 22 of a magnetic metal. The insulating base is provided with binding screws 23 and 23', for the solenoid terminals 24 and 24'. The solenoid is further protected with insulating washers 25 and 26, and a magnetic shield 27, all of which are held in place by the core lining tube 21. To facilitate assembling and repair washer 25 is rotatively mounted on tube 21, and is provided with an opening 25', as shown in dotted lines in Fig. 2. By simply rotating the washer through 180°, more or less, to cover the terminal connections, complete protection is afforded for said connections. The protective sheath 22, not only protects the coil against injury before or during assembling, but also serves to locate and definitely fix the magnetic centre of the coil in the head portion of the operating core described below.

Within the core lining tube 21, there is slidably mounted the movable operating core 28, having a countersunk solid head portion 28', at one end, and a well 29, of comparatively large diameter, extending into the core from the other end. This end carries also extension 29' for increasing pull of armature at low voltages. The solid

counter-sunk head portion rests directly upon the conical head 18 of the valve operating stem 17, so as to constantly and automatically center itself thereupon, and directly operate the valve when the coil is energized. A pin 11, extends into the well 29, and is supported by the cover 9, so as to permit also manual manipulation of the valve.

I will now describe the valve structure; this embraces a one piece or unit valve base or support 30, of brass or other suitable material, having screw threaded parts 31 and 31', for adjustable attachment in the bore 12, and annular depressions 32 and 32' for air ducts, as will be explained below. The unit valve base is provided with a bore 33 of comparatively large diameter extending into the valve base and terminating in a smaller centrally located air duct 34, and formed into a valve seat at 35. Communicating with the central air duct 34 is air duct 36, which in turn communicates with the annular chamber 37 and the air supply duct 38.

A valve head 39, having a valve seat closure 40, at one end, and a valve guide stem 41, at the other, is slidably mounted and fitted within the valve bore. Intermediate the ends of the valve head are piston-ring extensions 42, provided with passages 43. In the upper part of the valve bore, by screw threads or other means for adjustment, there is fitted a guide plug 44, having a central escape passage 45, and a valve seat 46. It will be observed that guide plug 44 is adjustable so that the distance between valve seats 35 and 46 may be properly adjusted whenever necessary or desirable.

A spring 47 normally holds the valve head in a closed position against valve seat 46, thus preventing the escape of the operating medium, the pressure of which also aids in keeping the valve seated. When the valve is unseated, however, as when the coil is energized, or when the valve head is otherwise depressed, the pressure medium employed escapes through passage 43, to passage 45, and out to the open atmosphere through the opening 49.

When air is employed as the operating medium for the motor or operating cylinder with which the valve mechanism is in direct communication, and with the valve in position as shown in Fig. 1, pressure is maintained in the operating cylinder due to the direct and open communication with the source of supply through the supply duct 38, annular chamber 37, valve 35, and through cylinder supply or exhaust passage 48. If it is now desired to cause the valve to operate the operating mechanism to which it is applied, the solenoid is energized by any suitable means, thus pulling down the operating core, which communicates its

motion to the valve stem and valve head through the operating stem 17, and thus unseating the valve and opening the exhaust to the air in the manner described above, for the operation of said motor.

Therefore, having now set forth the objects and nature of my invention, and having shown and described an operative structure embodying the principles thereof, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In a magnet valve, the combination with an energizing coil and a control valve for controlling fluid pressure in an operating motor, of a fixed core stem terminating in a beveled head end, a pin projecting from said head end, and a movable core within said coil having a concave seat for centering on said pin head for operating said valve.

2. In an electro-magnetic valve, the combination with an energizing coil and a control valve for controlling fluid pressure in an operating motor, of a fixed core stem terminating in a beveled head end and provided with a bore, a pin mounted in said bore, a self centering operating core within said coil seated on said pin, and means carried by said core for manually operating said valve.

3. In an electro-magnetic valve, the combination with an energizing coil and a control valve mounted in a unit valve base and housing for controlling fluid pressure in an operating motor, of a fixed core stem mounted in said valve base and projecting into said coil, said core stem being provided with a bore, a pin in said bore, an insulating base carried by said core stem for supporting said coil, an operating core within said coil, and means carried by said operating core for effecting the operation of said valve.

4. An electro-magnetic valve comprising a unitary valve base and magnetic coil housing, said base being provided with a bore, an adjustable valve plug in one end of said bore, a valve in said plug, a fixed core stem in the other end of said bore and extending into said housing, said stem being provided with a bore, a bevel headed pin in said bore, an insulation base carried on said fixed core stem, a coil carried by said base, said coil being provided with an inner non-magnetic shield and an outer magnetic shield, and a floating core extending into said coil and centered on said pin-head for effecting the operation of said valve when the coil is energized.

5. The combination, in a magnet valve, of a supporting base and an energizing coil carried on said base, of a pressure control valve adjustably mounted on said base in central alignment with said coil, a movable operating core within said coil, a stem on

said base for fixedly supporting said coil and having a countersunk bore, and a beveled headed pin carried by said stem in said countersunk bore for positioning the operating core, and for limiting and transmitting its movement to the control valve.

6. In a magnet valve, the combination with an energizing coil and a control valve for controlling fluid pressure in an operating motor, of a fixed core stem, and a movable core within said coil for operating said valve, said movable core being provided with a central well, a pin in said well for manually effecting the operation of said control valve, and a protective shield for said coil.

7. As an article of manufacture, an adjustable unit pressure control valve, comprising a valve base provided with pressure medium ports, a fixed valve seat and an adjustable valve seat within said base, and means

for controlling pressure medium through said ports, said means including a slidable valve head having valve seat closures at both ends with a resiliently holding member at one end.

8. A unit control valve for controlling fluid pressure in an operating mechanism, comprising a one piece adjustable valve base provided with fluid pressure medium ports intermediate the ends thereof, an adjustable valve plug in one end of said base, and a valve seat in said plug, a fixed valve seat near the other end of said base, and a double seating pressure control piston operating to close one port upon opening of the other and vice versa.

In testimony whereof I have hereunto set my hand on this 18 day of November, A. D. 1920.

GEORGE W. MEYERS.