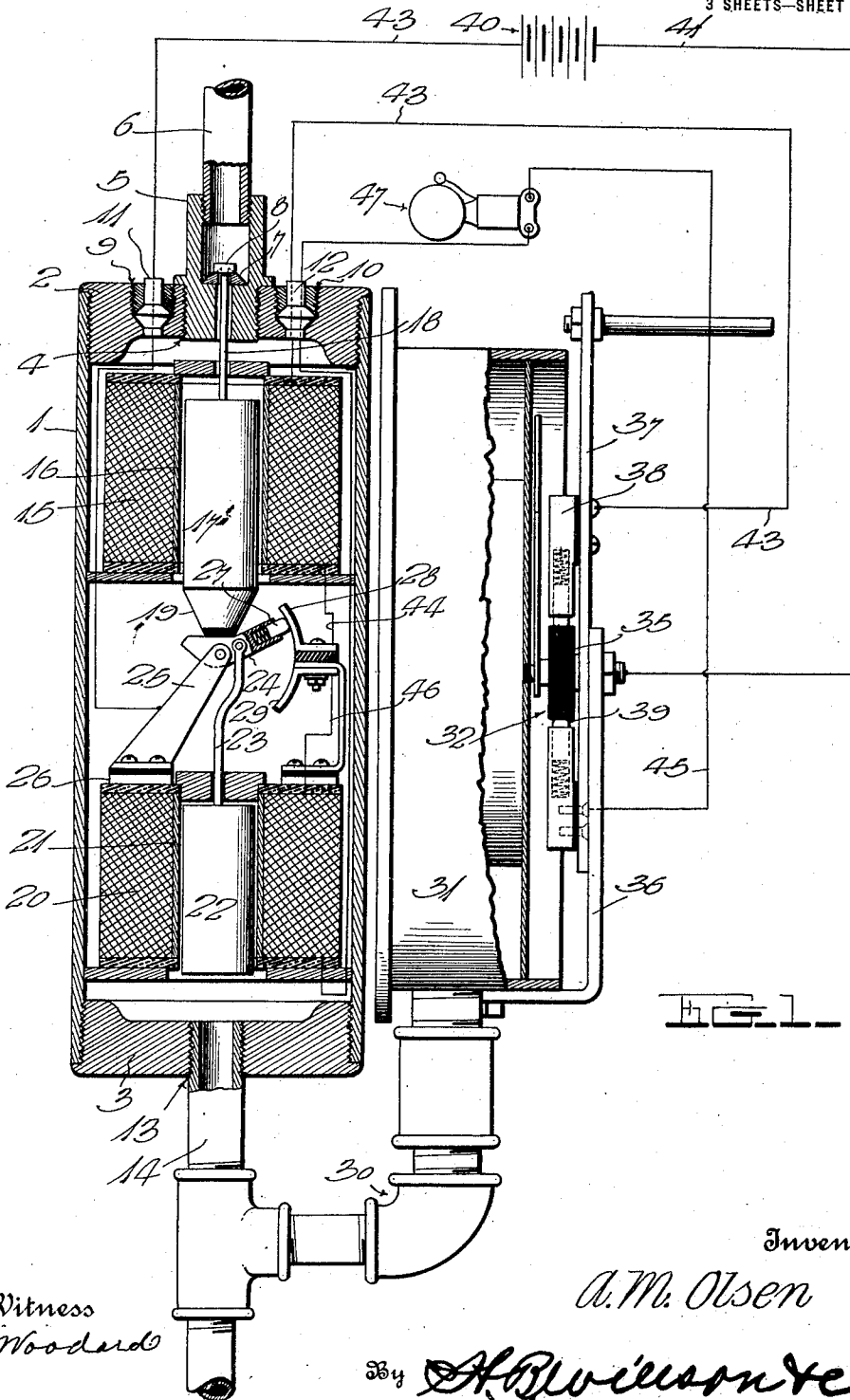


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ELECTROMAGNETIC VALVE.
APPLICATION FILED JULY 10, 1919.

1,395,203.

Patented Oct. 25, 1921.

3 SHEETS—SHEET 1.



Witness
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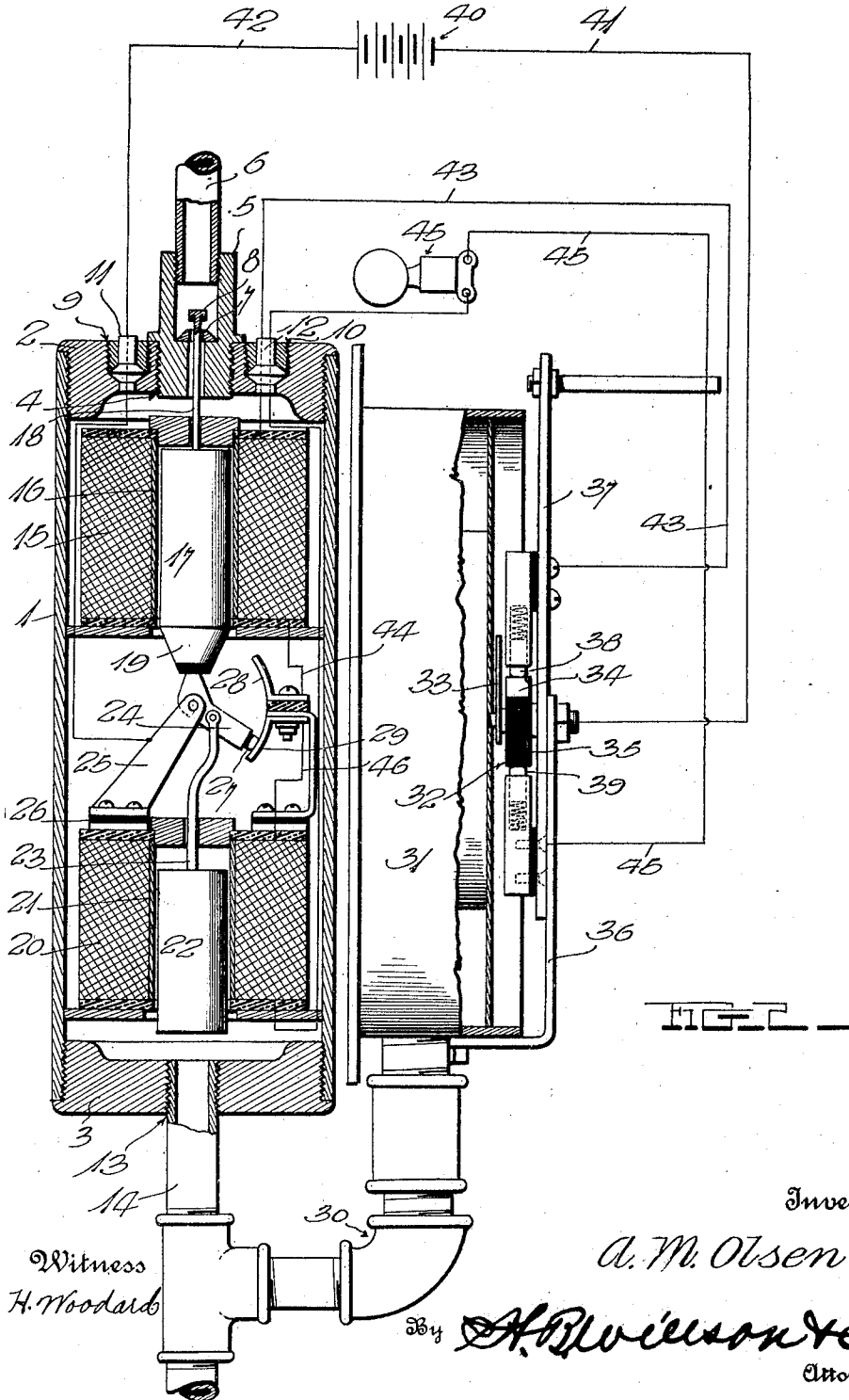
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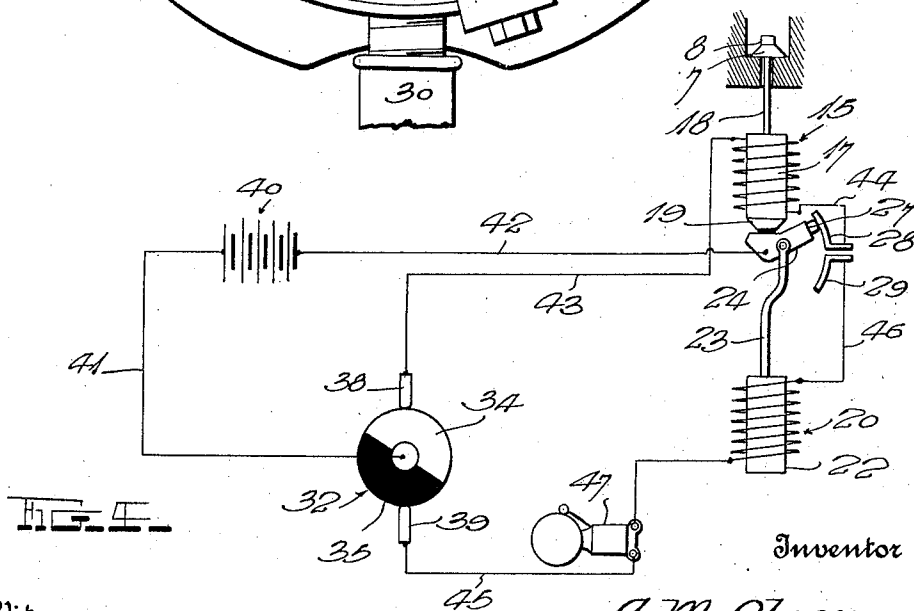
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

AXEL M. OLSEN, OF EAST ORANGE, NEW JERSEY.

ELECTROMAGNETIC VALVE.

1,395,203.

Specification of Letters Patent.

Patented Oct. 25, 1921.

Application filed July 10, 1919. Serial No. 309,934.

To all whom it may concern:

Be it known that I, AXEL M. OLSEN, a subject of the King of Norway, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electro-magnetic Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates generally to valves and more particularly to certain new and useful improvements in electro-magnetically operated valves.

The principal object of the invention is to provide improved means for operating the valve from a point remote from the valve, said means including mechanism for opening the valve, mechanism for holding the valve in open position, and mechanism for releasing the valve holding means and permitting the valve to close. The invention may be used for various purposes, but is particularly applicable for use in connection with temperature or fluid pressure indicators or gages to automatically close the valve when the desired temperature or pressure has been reached.

Another object of the invention is to provide a device of this class, which will be comparatively simple, strong, durable and inexpensive in construction, efficient and reliable in operation, and well adapted to the purpose for which it is desired.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be hereinafter fully described and claimed.

In the accompanying drawings in which similar reference characters designate like parts throughout the several views,

Figure 1 is a vertical sectional view through a valve constructed in accordance with this invention, showing it in closed position and showing it used in connection with a pressure gage.

Fig. 2 is a similar view showing the valve in open position.

Fig. 3 is a front elevation of a fluid pressure indicator or gage in connection with which the valve is used, and

Fig. 4 is a diagrammatic view illustrating the electric circuits involved.

Referring more particularly to the draw-

ings, the numeral 1 designates a casing of cylindrical construction and having its ends internally threaded to provide for the connection therewith of heads 2 and 3. The upper head 2 has a centrally located threaded opening 4 therein, and screwed into this opening is a plug 5, the latter being connected at its upper end to an inlet fluid pressure pipe 6 and having therein a valve seat 7 upon which rests a valve 8 to control the passage of the fluid from the pipe 6 to the interior of the casing 1. The head 2 is also provided with diametrically disposed threaded openings 9 and 10 which are adapted to receive sockets or plugs 11 and 12 to which the electric conductors to be hereinafter described are connected.

The lower head 3 is provided with a centrally threaded aperture 13 having connection with an outlet fluid pressure pipe 14.

Mounted in any suitable manner within the casing 1 is an upper electro-magnet 15, the central portion of which is hollow and provided with a suitable lining 16 of non-magnetic material. The magnet 15 controls a core 17 of magnetic material such as iron. This core 17 is slidable within the lining 16 and has its upper end connected to the valve 8 by means of a stem 18. The lower end of the core 17 is reduced as at 19 for a purpose to be hereinafter described and when the valve 8 is in closed position, it projects below the plane of the lower end of the magnet.

Mounted in any convenient manner in the lower end of the casing 1 is an additional electro-magnet 20 constructed similar to the magnet 15 and having a brass lining 21 in which is disposed or slidably mounted a core 22. Projecting from the upper end of the core 22 is a stem 23 having its upper end connected to a lever 24 fulcrumed on an arm 25 which is securely fixed at 26 to the upper end of the magnet 20. The core 17 of the magnet 15 is larger and heavier than the core 22 of the magnet 20 and when the valve 8 is in closed position it rests upon the lever 24 so as to hold the core 22 in raised position. However when the magnet 15 is energized so as to throw the core 17 upwardly, the core 22 will drop to its lowermost position under its own weight and consequently pull the lever 24.

The lever 24 is provided at one of its ends with a spring pressed contact 27 which engages with either of two contact plates 28 and 29 as the lever moves from one posi-

tion to another. These contact plates 28 and 29 are fixedly mounted in any suitable manner within the casing 1 and are curved around the axis of the lever 24 for an obvious purpose.

The fluid pressure pipe 14 is provided with suitable pipe fittings 30 by which a fluid pressure indicator or gage 31 is connected. This gage has a commutator 32 mounted upon the axis of its indicating pointer 33 so as to rotate as the pointer moves across the dial. The commutator 32 is provided with a conducting segment 34 and a non-conducting segment 35, the latter comprising the major portion of the commutator.

Pivoted to a bracket 36 attached to the casing of the gage is a manually movable hand 37 which is adapted to be moved over the base of the dial and to be set at the various positions thereon. The pivot of the hand 37 is therefore preferably coincident with the axis of the pivot of the indicating pointer 33. The hand 37 carries the contact members or brushes 38 and 39 disposed on opposite sides of its pivot and positioned so as to constantly brush or engage the commutator 32.

The source of current for operating the magnets 15 and 20 is derived from a battery 40, one pole of which is connected by a conductor 41 to the conducting portion 34 of the commutator, while its other pole is connected by a conductor 42 to the arm 25, said conductor 42 passing through the plug 11 in the upper head 2 of the casing 1. The contact or brush 38 is connected by a conductor 43 to one terminal of the magnet 15, the other terminal of which is electrically connected with the contact 28 by means of a short length of wire 44. The other brush or contact 39 is connected by a wire 45 to one terminal of the magnet 20 which has its other terminal connected to the contact 29 by a short wire 46. The wire 45 has disposed within its length an electric bell or other suitable alarm device 47.

Assuming that the indicating pointers 33 and 37 of the gage are at zero and the brushes 38 and 39 therefore engaging the portions 34 and 35 respectively of the commutator, and also assuming that the mechanism disposed within the casing 1 is in the position shown in Fig. 1 of the drawings, and it is desired to open the valve 8 to allow the fluid in the pipe 6 to pass into the pipe 14 and from there to some suitable article such as an automobile tire, the hand 37 is first moved across the dial to the position corresponding to the desired pressure. As soon as this is done the brush 38 will engage the conducting position 34 of the commutator by closing the circuit through the magnet 15 and throwing the core 17 upwardly. The valve 8 being connected with the core 17 by the stem 18 obviously is

opened and the lower end 19 of the core is moved so as to allow lever 24 to swing downwardly under the weight of the core 22. As the lever 24 swings downwardly the contact 27 moves out of engagement with the contact 28 breaking the circuit through the magnet 15, and moves into engagement with the contact 29. When the pressure in the pipe 14 reaches the desired amount the indicating pointer 33 will be disposed beneath the hand 37 and the moment this takes place the brush 39 will come into engagement with the segment 34 of the commutator and complete the circuit through the magnet 20. The magnet 20 being thus energized will draw its core 22 upwardly and actuate lever 24 so as to allow the core 17 to drop to close the valve 8. When the circuit through the magnet 20 is energized, the bell 47 will obviously operate to sound the alarm as to the condition of the apparatus.

From the foregoing description, taken in connection with the accompanying drawings, the construction, use and operation of the device will be readily understood.

Various changes in the form, proportion, and in the minor details of construction may be resorted to without departing from the spirit of the invention as defined in the claims. For instance, the valve and casing may be so connected and constructed that none of the fluid passing through the valve will enter the casing. Hence, when the valve is placed in a steam line, the magnets will not be destroyed.

I claim—

1. In an apparatus of the class described, the combination of a valve, a magnet for opening said valve, a magnet for closing said valve, electric circuits for said magnets, a fluid pressure indicator having a dial and a pointer actuating over the same, a manually movable hand also actuating over said dial and adapted to be set at the various positions thereon, a contact carried by said pointer and included in both of said circuits, and a pair of additional contacts positioned for engagement with the first mentioned contact, one of said additional contacts being disposed in one of said circuits and the other being disposed in the other circuit.

2. In an apparatus of the class described, the combination of a valve, a magnet for opening said valve, a magnet for closing said valve, electric circuits for said magnets, a fluid pressure indicator having a dial and a pointer actuating over the same, a manually movable pivoted hand also actuating over said dial and adapted to be set at the various positions thereon, a commutator mounted upon the axis of said pointer and having a non-conducting segment and a conducting segment, the latter being included in both of said circuits, and a pair of

brushes mounted upon said hand on opposite sides of the pivot thereof and positioned for engagement with said commutator, one of said brushes being disposed in one of said
5 circuits and the other being disposed in the other circuit.

3. A device of the class described comprising a casing having a valve seat therein, a valve disposed in said seat, a lever fulcrumed
10 intermediate of its ends in said casing, a magnetic core suspended from said valve and resting upon one end of said lever, a second magnetic core suspended from the other end of said lever, a magnet for raising the first
15 core to open said valve and permitting the second core to drop and rock said lever into locking engagement with the first core, a second electro-magnet for raising the second
20 core and rocking said lever out of locking engagement with the first core to permit the latter to drop and close said valve, electric circuits for said magnets, immovable switch
25 members mounted in said casing and included in said circuits, and a coacting switch member carried by said lever for breaking the circuits through said magnets upon the
actuation of said lever.

4. A device of the class described comprising a casing having a fluid inlet and a

fluid outlet, a valve controlling passage of 30
fluid through the inlet, an electro-magnet in said casing having a core constituting weight means for holding said valve in a closed position, a second electro-magnet in
35 said casing, a support, a lever pivoted intermediate its length to said support between said magnets and having the core of the second magnet suspended from one end portion to normally retain the lever in set position
40 with its second end portion supporting the core of the first magnet in a raised position with the valve open, the second magnet when energized moving said lever out of locking engagement with the first core to
45 permit the latter to drop and close said valve and engage the lever to lock the lever in the adjusted position with the core of the second magnet raised, electric circuits for said magnets, removable switch members
50 mounted in said casing and included in said circuits, and a co-acting switch member carried by said lever for breaking the circuits through said magnet upon movement of said lever.

In testimony whereof I have hereunto set 55
my hand.

AXEL M. OLSEN.