

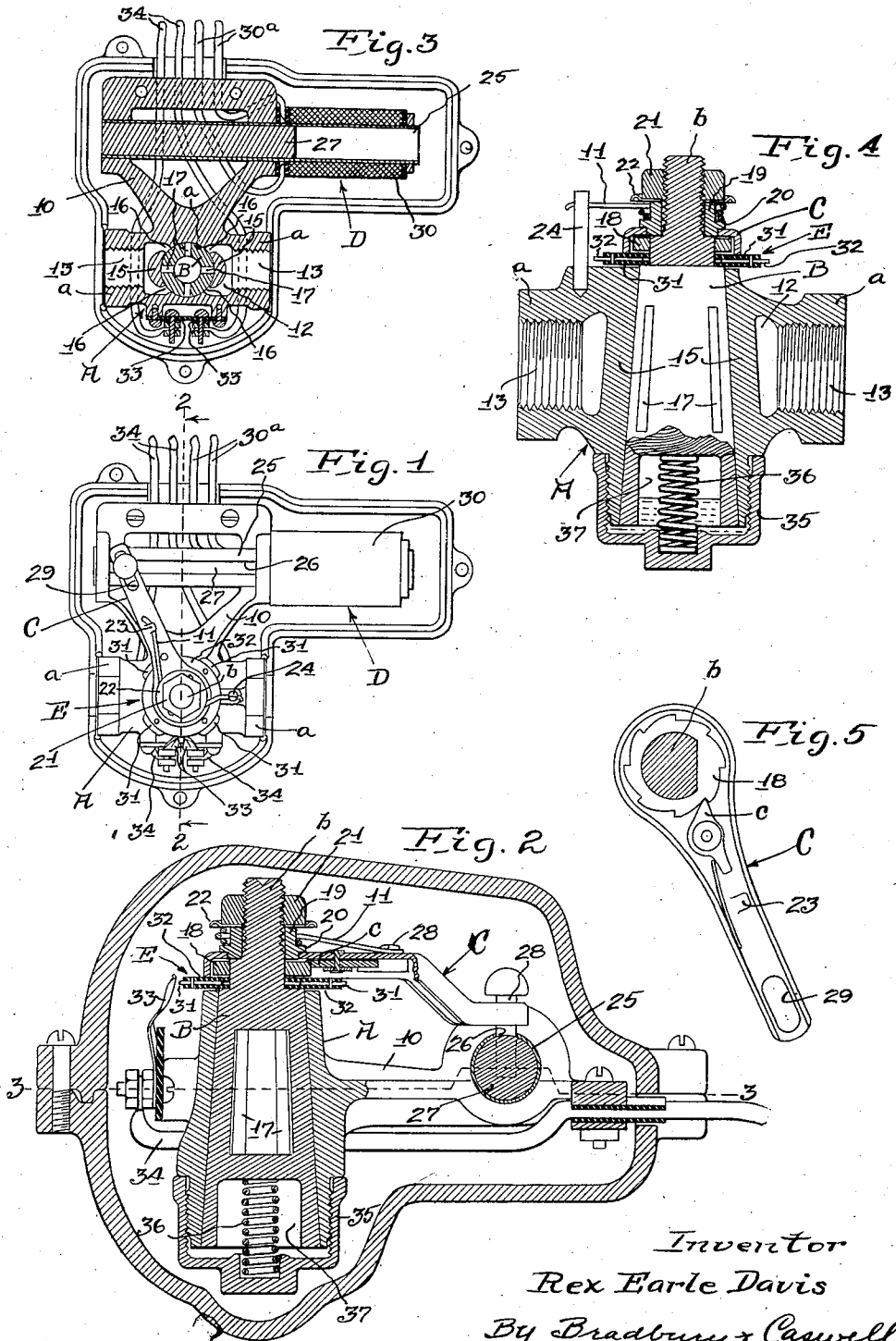
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ELECTRICALLY ACTUATED VALVE

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ELECTRICALLY-ACTUATED VALVE.

Application filed October 7, 1922. Serial No. 593,135.

My invention relates to improvements in electrically actuated valves.

Broadly its object is to supply an improved valve of this kind, which is simple, compact, positive in operation and economical in use.

More specifically it is my object to provide a valve of the present nature for cutting off and permitting the flow of gas in a gas heater feed pipe, the movable valve member being turned step by step through electrically actuated ratchet mechanism for opening and closing the valve.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 is a plan view of a valve embodying my invention; Fig. 2 is a sectional view taken as on the line 2—2 of Fig. 1; Fig. 3 is also a sectional view, the same being taken as on the line 3—3 of Fig. 2; Fig. 4 is a detail sectional view illustrating the rotating valve member and valve body, also the ratchet mechanism and spring for turning said member and Fig. 5 is a bottom view illustrating the actuating lever and pawl thereon, also the ratchet carried by the valve member.

My valve is used particularly in replacing the ordinary hand valves on gas heaters used domestically and ordinarily located in the basements of dwellings. It is operated electrically from points remote from the heater and near the sources of water supply as in bathrooms, kitchens, laundries and elsewhere, whereby special trips to the heater for manipulation of the usual hand valve is avoided. The present valve is a unitary structure, employing the ordinary gas supply pipe as a mounting therefor. It includes a valve body A, a valve member B, a ratchet lever C for turning said member step by step, and a solenoid magnet D carried on a bracket integral with the valve body, said lever being swung in its operative throw by said magnet and returned to starting position by a wire spring 11.

The valve body A has an elongated chamber 12 therein and aligned passages 13 communicating therewith and reaching through opposed end portions *a* of the valve body. Said portions *a* are threaded internally to

receive the branches of a gas feed pipe, which supply a mounting for the valve. Within the chamber 12 are spaced webs 15 (Figs. 3 and 4). The inner walls of the webs 15 and the opposed walls *a'* of the chamber 12 from a valve seat tapering upward from the bottom of the valve body, the spaces between the webs 15 and the walls *a'* forming opposed pairs of ports 16, one port of each pair communicating with one of the passages 13. Engaging the valve seat is the tapered valve member B, the body thereof being hollow. Four equally spaced ports 17 formed longitudinally in the body of the valve member B communicate with each other and register simultaneously with the ports 16 in certain positions of the valve member B. A forty-five degree turn of the valve member B carries the ports 17 in said member from registering position with the ports 16 to positions obstructed by the webs 15 and walls *a'* of the valve body (Fig. 3), while a further forty-five degree turn of said valve member B, in the same direction, again causes the registration of said ports 17 with the ports 16. Thus it will be understood that, upon each one-eighth turn of the valve member B, the valve is either fully opened or closed.

Fixed on a reduced extension *b* of the valve member B is a ratchet 18 and a signal contacting device E, which will be more fully hereinafter described. Above the ratchet 18 and fitted over the extension *b* is a sleeve 19 having an annular flange 20 thereon, said sleeve 19 being held in position by means of a nut 21 fitted on the threaded extremity of said extension *b* and turned down against the sleeve. That portion of the sleeve beneath the flange 20 supplies a bearing for the lever C, which is pivoted horizontally thereon. A spring pressed pawl *c* pivoted on the under side of the lever C engages the ratchet 18 and turns the valve member B upon the movement of said lever C in direction to the right as seen in Fig. 1. The spring wire 11 coiled about the sleeve 19, above the flange 20 and beneath a washer 22 interposed between said sleeve 19 and nut 21, has one end thereof caught in a clip 23 on the lever C and its other end secured to a post 24 anchored in the valve body A. Said wire is wound and secured at its ends as described, to swing the lever C to the left, Fig. 1.

Reaching from the side of the valve body A is the bracket 10 carrying the solenoid magnet E, which includes a tubular guide 25, one end thereof being slotted as at 26. A core 27, freely slidable in this guide, has a pin 28 secured thereto and reaching upward through said slot 26 and through a slot 29 in the free end of the lever C. Wrapped about the end of the guide 25, opposite its slotted end, is a coil 30 of insulated wire, the ends 30^a thereof being connected with a circuit including a source of electrical supply and a switch (not shown) located in conveniently accessible position. The parts of the magnet D are so proportioned that the movement of the core 27, when attracted by the electrical force set up in the coil 30, is sufficient to swing the lever C, through forty-five degrees. In this working thrust of the core 27, said lever is moved against the action of the spring 11, which operates, upon the cessation of current through said coil, to return the lever C and core 27 to starting position, (Fig. 1). From the foregoing, it will be understood that an operator, temporarily setting up a current in the coil D, will either close or open the valve according to the position of the valve member B. To apprise the operator, at a distant switch, as to the position of the valve member B, I supply a signal including the contacting device E heretofore referred to. As will be observed, this device comprises four radial contact plates 31, spaced equally between insulating holding discs 32 axially secured on the extension b of the valve member B. A pair of spring arms 33 mounted on the valve body A, but insulated therefrom, rest in the paths of the plates 31, whose angular arrangement is such that contact between one of the plates 31 and both of said arms 33 occurs whenever the valve is open, or, in other words, when the ports 17 in the valve member B are brought into registration with the ports 16 in the valve body A. Wires 34 connected with the arms 33 are included in a circuit (not shown) equipped with an electric signaling lamp, which, when lighted, indicates to the operator that the valve is open. Threaded on the lower side of the valve body A is a cup 35 serving as an oil receptacle, also as a tension adjuster for a spring 36 interposed between said cup and the valve member B. The lower end of said member B is recessed, as at 37, to permit of the use of a spring 36 of substantial length and to supply a reservoir for oil. Said cup 35 provides for securing the desired pressure of the valve member B against its seat in the valve body A and holds oil, placed therein, in position to be drawn by capillary attraction between said valve member B and its seat.

Changes in the specific form of my inven-

tion, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A valve comprising a valve body having an elongated central chamber and passages communicating with said chamber transversely thereof, opposed webs reaching lengthwise of the chamber, the inner walls of the webs together with the opposed walls of the valve body forming a seat within said chamber having four, equally spaced ports therein, one port of each pair communicating through said chamber with one of said passages, a movable, hollow valve member engaging said seat and formed with four, equally spaced, elongated ports adapted to be alternately registered with the valve seat ports and sealed by the valve seat walls, a ratchet wheel fixed to the valve member, a lever pivoted thereon, a spring pressed pawl on the lever arranged to engage the ratchet wheel and turn the valve member in one direction, a spring tensed between the valve body and lever to return the latter, a bracket carried by the valve body, a solenoid magnet, on said bracket, including a guide, a core slidable within the guide and an energizing coil to draw the core in one direction in said guide and means connecting the free end of the lever with the core, said core, when energized, serving to swing the lever and open or close the valve member against the action of said spring and adapted, when demagnetized, to be retracted upon the return throw of said lever by said spring.

2. A valve comprising a valve body and a valve member revoluble therein and adapted alternately to "open" and "close" the valve a number of times upon each revolution of said member, a ratchet wheel fixed to the valve member, a sleeve on the valve member, a lever pivoted on said sleeve, a spring pressed pawl on the lever arranged to engage the ratchet wheel and turn the valve member upon a throw of said lever in one direction, a spring coiled medially thereof about said sleeve for returning the lever, a bracket carried by the valve body, a solenoid magnet, on said bracket, including a guide, a core slidable within the guide and an energizing coil wound on the guide to draw the core in one direction therein, and means connecting the free end of the lever with the core, said core, when energized, serving to swing the lever and "open" or "close" the valve by turning the valve member against the action of said spring and adapted, when demagnetized to be retracted upon the return throw of said lever by said spring.

3. A valve comprising a valve body and a valve member revoluble therein and adapted alternately to "open" and "close" the

valve member a number of times upon each revolution of said member, a ratchet wheel fixed to the valve member, a sleeve on said valve member, a lever pivoted on the sleeve, a pawl on the lever arranged to engage the ratchet wheel and cause the same to turn the valve member upon a throw of said lever in one direction, a spring coiled about said sleeve, one end thereof being secured to said lever and the other end thereof secured with respect to the valve body, means arranged

on the valve member for holding the sleeve in place thereon and for holding the coiled portion of said spring in place on said sleeve, electrically actuated means for swinging the lever in a direction to turn the valve member, said spring serving to return said lever. 15

In testimony whereof, I have signed my name to this specification.

REX EARLE DAVIS.