

No. 775,018.

PATENTED NOV. 15, 1904.

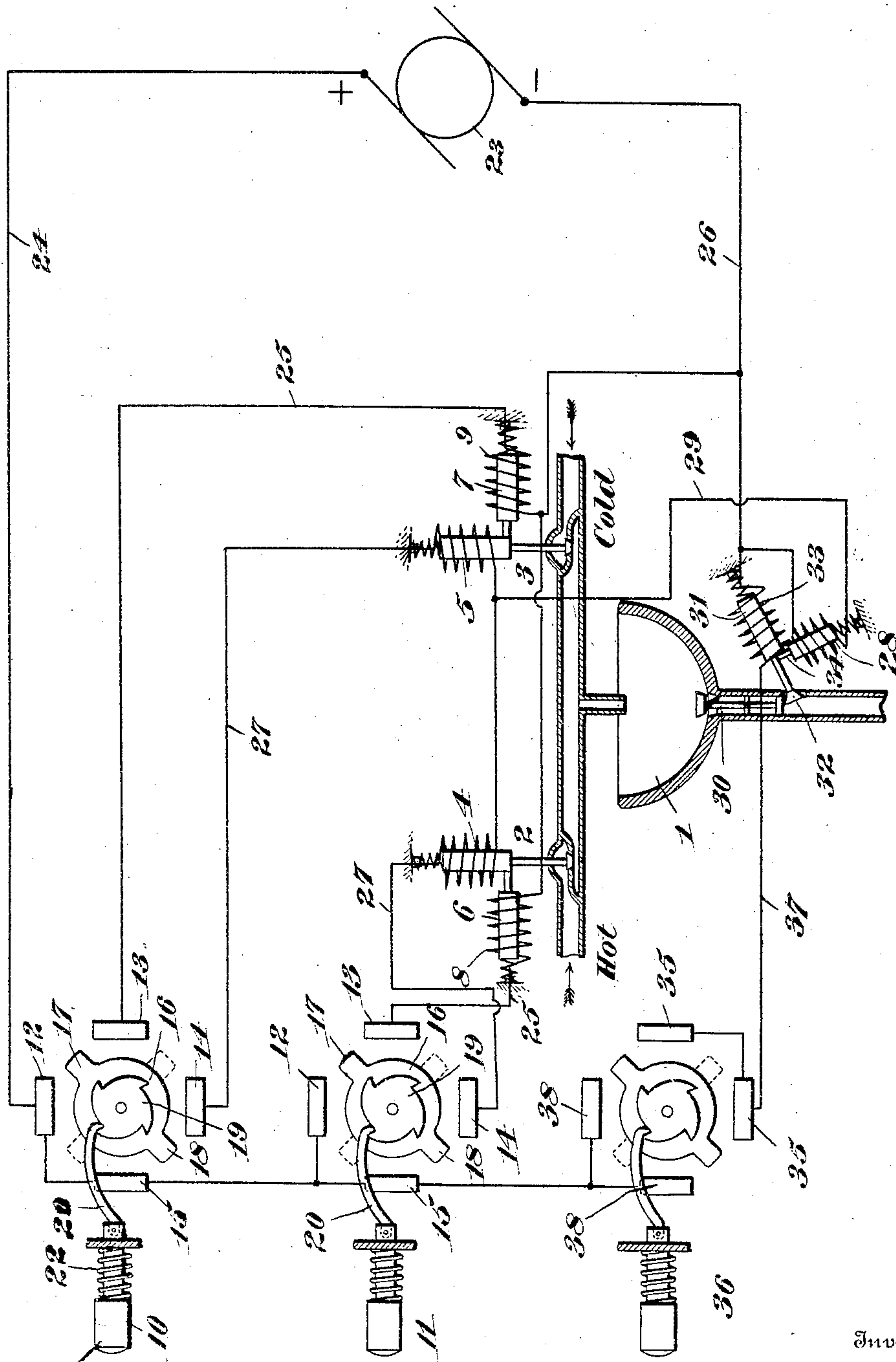
I. G. WATERMAN.
ELECTROMAGNETIC VALVE CONTROLLING MECHANISM.

APPLICATION FILED MAY 11, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

Isaac G. Waterman

Witnesses

Elmer Seavey
Isaac D. Lockwood

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Geo. R. Hamlin
Attorney

No. 775,018.

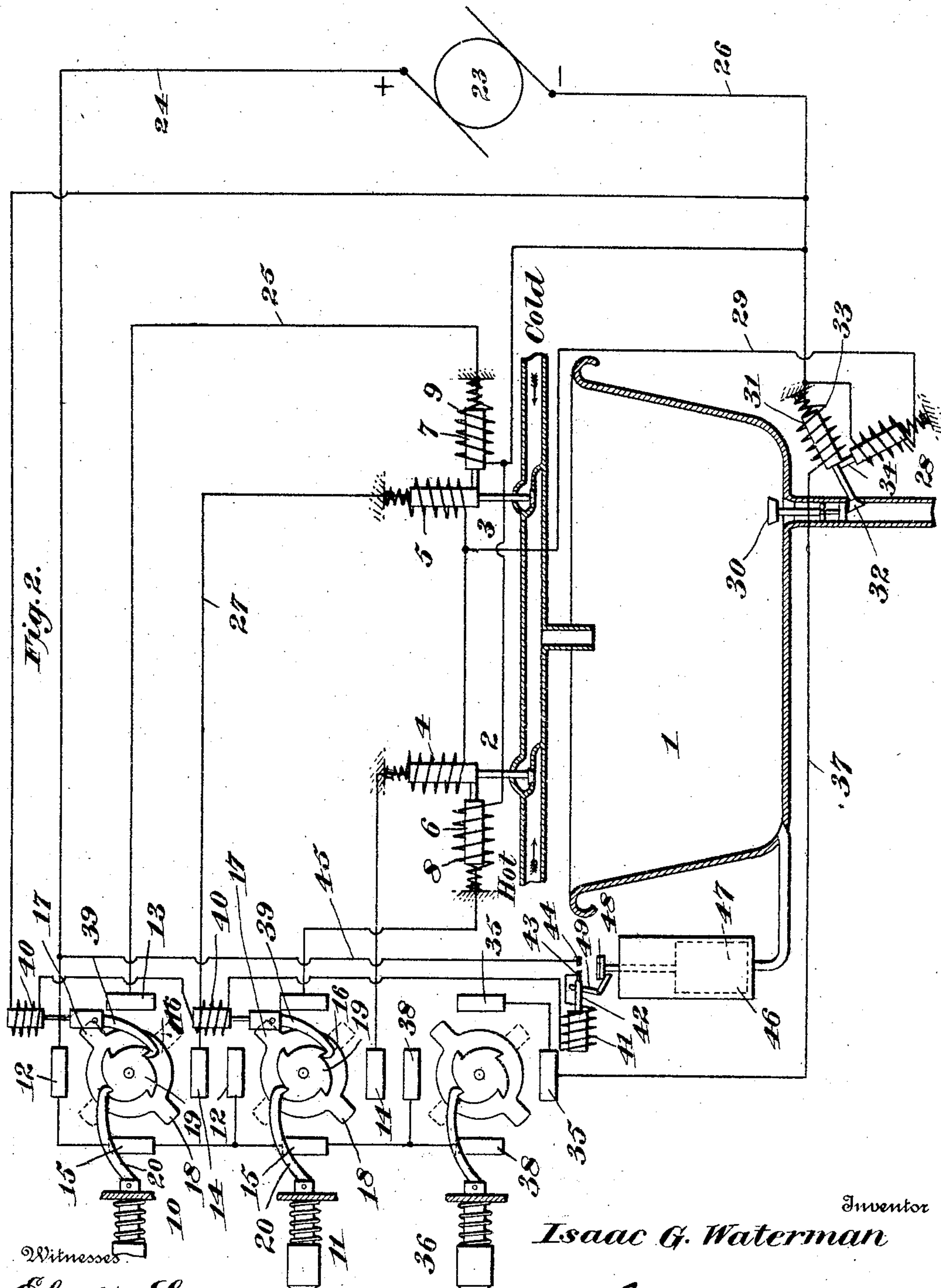
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2 SHEETS-SHEET 2.



Witnesses

Elmer Seavey
Charles L. Luker

By

Inventor
Isaac G. Waterman

Geo. H. Hamlin
Attorney

UNITED STATES PATENT OFFICE.

ISAAC G. WATERMAN, OF SANTA BARBARA, CALIFORNIA.

ELECTROMAGNETIC-VALVE-CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 775,018, dated November 15, 1904.

Application filed May 11, 1903. Serial No. 156,672. (No model.)

To all whom it may concern:

Be it known that I, ISAAC G. WATERMAN, a citizen of the United States, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented new and useful Improvements in Electromagnetic-Valve-Controlling Mechanisms, of which the following is a specification.

This invention relates to electromagnetic-valve-controlling mechanisms.

In my copending applications, Serial No. 146,975, filed March 9, 1903, and Serial No. 146,976, filed March 9, 1903, I have disclosed electromagnetic valves which are opened on sending a current through the valve-opening magnet-coil and then automatically locked and afterward closed by sending a current through an unlocking magnet-coil to release the valve and permit it to close. These electromagnetic valves are, as set forth in the aforesaid applications, designed to operate on a momentary current, so that the necessity for maintaining a current in the coils while the water is flowing is obviated.

In my copending applications, Serial No. 146,977, filed March 9, 1903, and Serial No. 149,561, filed March 25, 1903, I have disclosed certain electric switches designed for making a temporary current—that is, connecting with the switch-contacts only momentarily—as contradistinguished from switches commonly known to the art in which the movable switch-contact remains on the contacts permanently. These switches are designed for use in connection with the electromagnetic valves of my applications Serial Nos. 146,975 and 146,976.

In an application filed of even date herewith I have shown an electrically-opened, automatically-locked, and electrically-released waste-valve adapted to be operated by a temporary or momentary current, which is an improvement on the electrically-released waste-valve set forth in my copending application filed January 31, 1903, Serial No. 141,388.

In certain applications filed of even date herewith and in my applications filed November 27, 1903, Serial No. 182,908, (Renewal,) and filed August 4, 1902, Serial No. 118,338, I have set forth my electrical valve-controlling systems where a float is used to cause com-

pletion of circuit of a magnet for releasing or throwing off a switch controlling the circuit of valves which can only be kept open by a continuously-maintained current.

In the present invention I contemplate the provision of a system wherein a temporary or momentary current will be made on operating the switch which will open the supply valve or valves and close the waste-valve, the supply-valve being locked open without maintaining the current, and which will utilize another temporary current to unlock the supply valve or valves to permit them to seat and also electrically open the waste-valve.

The present invention also contemplates the provision of means for automatically operating the switches by a temporary current when the water reaches a predetermined height in the receptacle to cause the switches to send a temporary current to the unlocking mechanisms of the valves to permit the valves to close and cut off the water-supply.

The invention is set forth hereinafter and the novel features recited in the appended claims.

In the accompanying drawings, Figure 1 is a diagrammatic view of the invention, omitting the automatic throw-off mechanism; and Fig. 2 is a diagrammatic view showing the automatic throw-off mechanism.

Referring first to Fig. 1, 1 designates the water-receptacle, such as a bowl or bath-tub, which has the hot and cold water supply pipes controlled by self-closing valves 2 and 3, opened by the electrical energization of the coils 4 and 5. The valves are locked when opened by spring-pressed cores or plungers 6 and 7, which are retracted when their coils 8 and 9 are electrically energized. The electrically-operated valves are similar in principle to the valves of my applications Serial Nos. 146,975 and 146,976. The numerals 10 and 11 designate switches for operating the valves. These switches are similar in principle to the switches set forth in my applications Serial Nos. 146,977 and 149,561 and have the four contacts or switch-points 12, 13, 14, and 15, rotary tumbler 16, having contact projections 17, and a ratchet-wheel 19, operated by the engagement of a pawl 20, movable with a

push-button 21, retracted by a spring 22. From the generator 23 a wire 24 runs to contacts 12 and 15. From contact 13 a circuit 25 runs to the coils 8 and 9 and thence by return-feeder 26 to the generator 23. Circuits 27 run from the contact 14 to the coils 4 and 5 and thence to the releasing-coil 28 of the waste-valve by a circuit 29, thence to feeder 26. The waste-valve embodies the principles of the improved electrically-operated waste-valve of my application filed of even date herewith. The waste-valve proper is shown at 30. The numeral 31 designates a core having a coned head 32, on which the waste-valve 30 rests. When the core 31 is drawn into the magnet-coil 33, which surrounds it, the coned head 32 raises the valve 30, so that the water drains from receptacle 1, and the core 31 is locked in this position by a core 34 in coil 28. The coil 33 is connected to feeder 26 and to the contacts 35 of a switch 36 by circuit 37. The switch 36 has two other contacts 38, connected to wire 24. Assuming the valves and switches to be in the positions shown and cold water is desired, the button 21 of switch 10 is pushed in and released. The pawl 20 rides on the ratchet-wheel 19 and on the return of the push-button engages said wheel and snaps the tumbler to the position indicated by dotted lines, meanwhile causing the contact projections 17 and 18 to momentarily engage the contacts 12 and 14, thus sending a temporary current through coil 5 and opening valve 3, which is then locked open by core 7. The current also traverses coil 28 and unlocks core 31, which then drops and allows waste-valve 30 to close by gravity. The water will continue to flow into receptacle 1 until the push-button of switch 10 is again operated and contacts 13 and 15 temporarily bridged by the tumbler, whereupon a temporary current will flow through coil 9, which will unlock valve 3 and allow it to close and cut off the water. The water will remain in the receptacle 1 until the switch 36 is operated to momentarily bridge contacts 35 and 38 and send a temporary current through coil 33, whereupon the core 31 will be drawn up and locked by core 34 and in doing this will elevate the waste-valve 30 and hold it open. The action of valve 2 and the waste-valve is the same as the action of valve 3 and is controlled by switch 11.

Referring now to Fig. 2, the constructions, circuit arrangements, &c., are the same as in Fig. 1, with the addition of the automatic valve-closing float-operated mechanism. In conjunction with the switches 10 and 11 I provide an armature 39, adapted to engage and turn the switch-tumbler, and a magnet-coil 40 for attracting said armature. The coils of the two magnets 40 are in series circuit with each other and one terminal leads to return-feeder 26. The other terminal leads through a magnet-coil 41, having a core 42, provided with two separated contacts 43 and 44. Contact 43

is connected to coil 41 and contact 44 leads to feeder 24 by a circuit 45. A float-tank 46 has a pipe connection with the bath-tub 1. In the float-tank is a float 47, having a contact-head 48, adapted to engage the contacts 43 and 44 when the float has risen sufficiently by reason of the water reaching the level at which it is desired to stop the flow. A bell-crank lever 49 coöperates with the contact-head and the core, so that when the float drops the bell-crank lever projects the core from the coil. When the water reaches the predetermined level, the contact-head 48 bridges contacts 43 and 44, thereupon completing the circuit through the coils 40 and 41. The magnets 40 attract armatures and snap the switch-tumblers into momentary engagement with the contacts 13 and 15, sending a momentary current through the coils 8 and 9 and unlocking either valve that was open, whereupon the valve closes and cuts off the flow of water. The current also causes magnet-coil 41 to quickly draw aside the core 42 and instantaneously disengage contacts 43 and 44 from contact-head 48, thus preventing continuance of the current while the water remains in the bath-tub and preventing sparking when the float drops on running off the water. It will be understood that the contacts 43 and 44 remain against contact-head 48 a sufficient time for the coils 40 to be energized sufficiently to snap the switch tumblers or contacts before the coil 41 draws the armature 42 and contacts 43 and 44 off from the contact-head 48. This automatic circuit-breaker or "throw-off" forms the subject-matter of my copending application, Serial No. 163,131, filed June 25, 1903.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a fluid-receptacle, of an electrically-opened, automatically-closing valve controlling the fluid-supply thereto, an electrically-released locking device for holding the valve open, and mechanism, operated when the fluid assumes a predetermined position in the receptacle, adapted to complete the circuit of the electrical releasing means and cause the valve to close.

2. The combination with a fluid-receptacle, of an electrically-opened, automatically-closing valve controlling the fluid-supply thereto, an electrically-released locking device for holding the valve open, and mechanism operated when the fluid assumes a predetermined position in the receptacle, adapted to momentarily or temporarily complete a circuit of the electrical releasing means and cause the valve to close.

3. The combination with a fluid-receptacle, of an electrically-operated valve controlling the fluid-supply thereto, an electrically-released locking device for holding the valve open, a switch controlling the electrically-re-

leased mechanism, electrically-operated mechanism for operating the switch, and mechanism operated, when the fluid in the receptacle assumes a predetermined position, adapted to momentarily or temporarily complete the circuit of the electrical switches operating mechanism whereby the switch is thrown to release the valve and cause it to close.

4. The combination with a fluid-receptacle, of an electrically-operated supply-valve therefor, an electrically-operated waste-valve therefor, and switch mechanism and circuit connections for opening the supply-valve and closing the waste-valve at substantially the same time by a temporary current.

5. The combination with a fluid-receptacle, of a supply-valve therefor, means for positively opening said supply-valve electrically, means for electrically closing said valve, an electrically-closed waste-valve for the receptacle, and means for electrically opening the supply-valve and electrically closing the waste-valve.

6. The combination with a fluid-receptacle, of an electrically-opened and electrically-closed supply-valve therefor adapted to remain either open or closed, an electrically-closed waste-valve for the receptacle, means for electrically operating the supply-valve and means for automatically electrically closing the waste-valve when the supply-valve is opened.

7. The combination with a fluid-receptacle, of an electrically-opened and electrically-closed supply-valve therefor adapted to remain either open or closed, and electrically-opened and electrically-closed waste-valve for the receptacle, means for electrically operating the supply-valve, said waste-valve being adapted to remain either open or closed, means for automatically electrically closing the waste-valve when the supply-valve is opened, and means for electrically opening the waste-valve.

8. The combination with a fluid-receptacle, of an electrically-operated valve therefor, and independent means for temporarily electrically energizing the electrical-valve-operating means when the fluid in the receptacle reaches a predetermined position.

9. The combination with a fluid-receptacle, of an electrically-operated valve therefor, contact mechanism and circuit connections adapted to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position, and independent means for automatically breaking the circuit controlled by the contact mechanism.

10. The combination with a fluid-receptacle, of an electrically-operated valve therefor, a temporary contact-switch for operating the valve, and means for electrically operating the switch to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position.

11. The combination with a fluid-receptacle, of an electrically-operated valve therefor, a temporary contact-switch for operating the valve, means for electrically operating the switch to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position, and means for automatically breaking the circuit of the electrical switch-operating means.

12. The combination with a fluid-receptacle, of an electrically-operated valve therefor, contact mechanism and circuit connections adapted to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position, and an independent electromagnet and armature adapted for breaking the circuit of the contact mechanism after said circuit has been completed.

13. The combination with a fluid-receptacle, of an electrically-operated valve therefor, a switch for operating the valve, means for electrically operating the switch to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position, and means for automatically breaking the circuit of the electrical switch-operating means.

14. The combination with a fluid-receptacle, of an electrically-operated valve therefor, contact mechanism and circuit connections adapted to cause electrical operation of the valve when the fluid in the receptacle reaches a predetermined position, and electrically-operated means for automatically breaking the circuit controlled by the contact mechanism.

15. The combination with a fluid-receptacle, of an electrically-operated supply-valve therefor, an electrically-operated waste-valve therefor, a hand-operated switch and circuit connections for opening the supply-valve and closing the waste-valve substantially at the same time, and a switch and circuit connections for opening the waste-valve at will.

16. The combination with a fluid-receptacle, of supply and waste valves therefor, means for opening and closing the supply-valve at will, means for automatically closing the waste-valve when the supply-valve is opened, and means for opening the waste-valve at will.

17. The combination with a fluid-receptacle, of an electrically-operated supply-valve therefor, a waste-valve for the receptacle, means for automatically closing the waste-valve when the supply-valve is opened, and means for the independent electrical operation of the waste-valve.

18. The combination with a fluid-receptacle, of an electrically-operated supply-valve therefor, a waste-valve for the receptacle, means for automatically closing the waste-valve when the supply-valve is opened, and switch mechanism adapted for electrically controlling the supply-valve at will.

19. The combination with a fluid-receptacle, of an electrically-operated valve controlling

the flow of the fluid thereto, an electrically-operated waste-valve for the receptacle, and switch mechanism adapted for controlling the supply-valve at will and for closing the waste-valve on the opening of the supply-valve.

20. The combination with a fluid-receptacle, of an electrically-operated supply-valve adapted to be opened by electrical energization, controlling the supply of the fluid into the receptacle, an electrically-operated waste-valve for the receptacle, and a hand-operated switch controlling the operation of the supply and waste valves.

21. The combination with a fluid-receptacle, of an electrically-operated supply-valve controlling the fluid-supply to the receptacle, a self-closing waste-valve, electrically-released locking means for securing the waste-valve in open position, and means for simultaneously opening the supply-valve and releasing the waste-valve.

22. In an electromagnetic-valve-controlling system, the combination with a fluid-receptacle, of an electrically-operated valve controlling the fluid-supply to said receptacle, contact mechanism operated when the fluid in

the receptacle assumes a predetermined position adapted to cause operation of the electrically-operated valve, mechanism for opening the circuit of the contact mechanism after said circuit has been made, and mechanism for restoring the circuit of the contact mechanism.

23. In an electromagnetic-valve-controlling system, the combination with a fluid-receptacle, of an electrically-operated valve controlling the fluid-supply to said receptacle, an electrically-operated switch controlling the valve, contact mechanism operated when the fluid in the receptacle assumes a predetermined position adapted for electrically operating the switch, mechanism for opening the circuit of the contact mechanism after said circuit has been made, and mechanism for restoring the circuit of the contact mechanism.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC G. WATERMAN.

Witnesses:

ELMER SEAVEY,
E. S. PILLARD.