

(No Model.)

E. H. JOHNSON.

ELECTRIC CONTROLLING AND OPERATING DEVICE.

No. 435,898.

Patented Sept. 2, 1890.

FIG. 1.

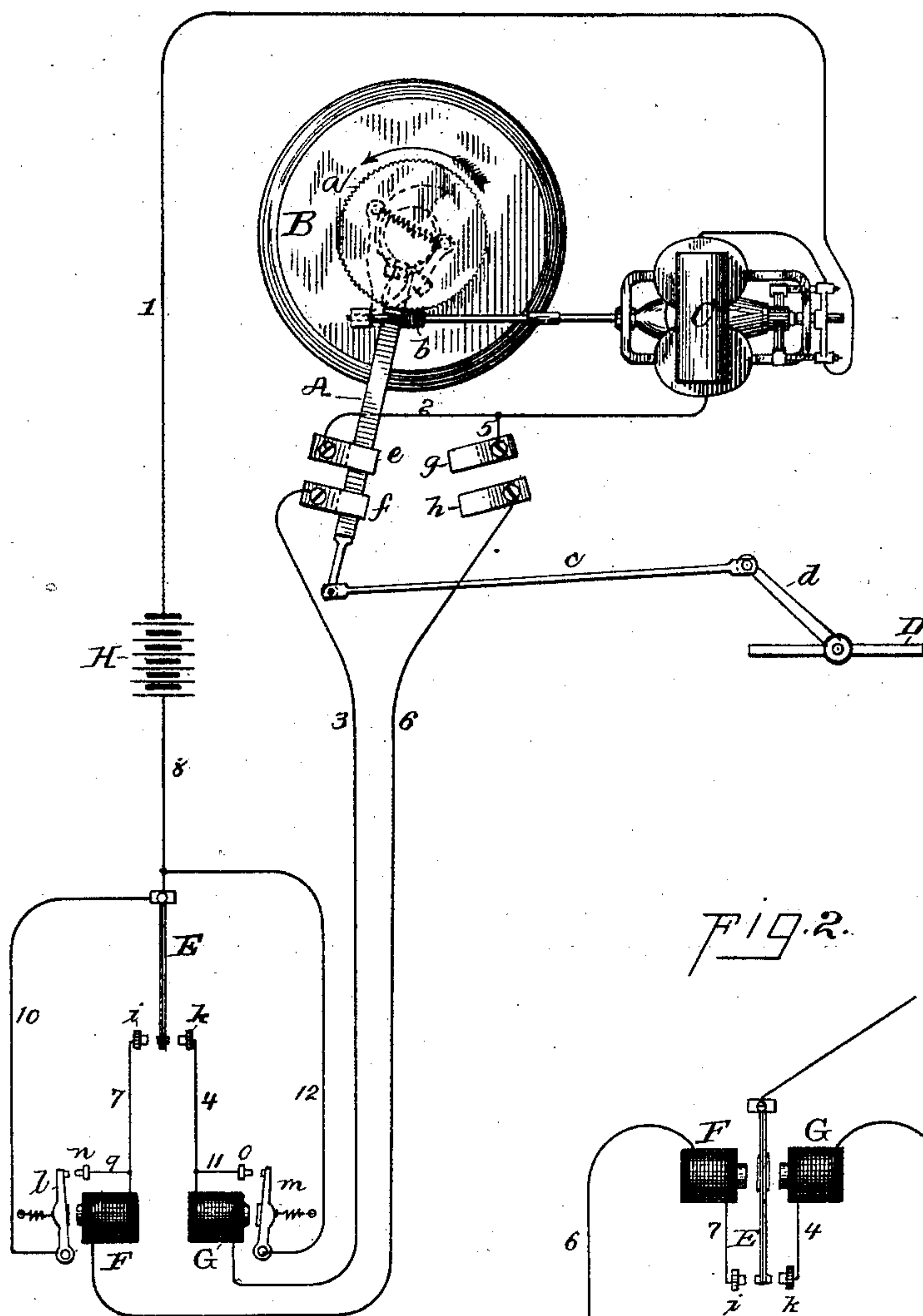


FIG. 2.

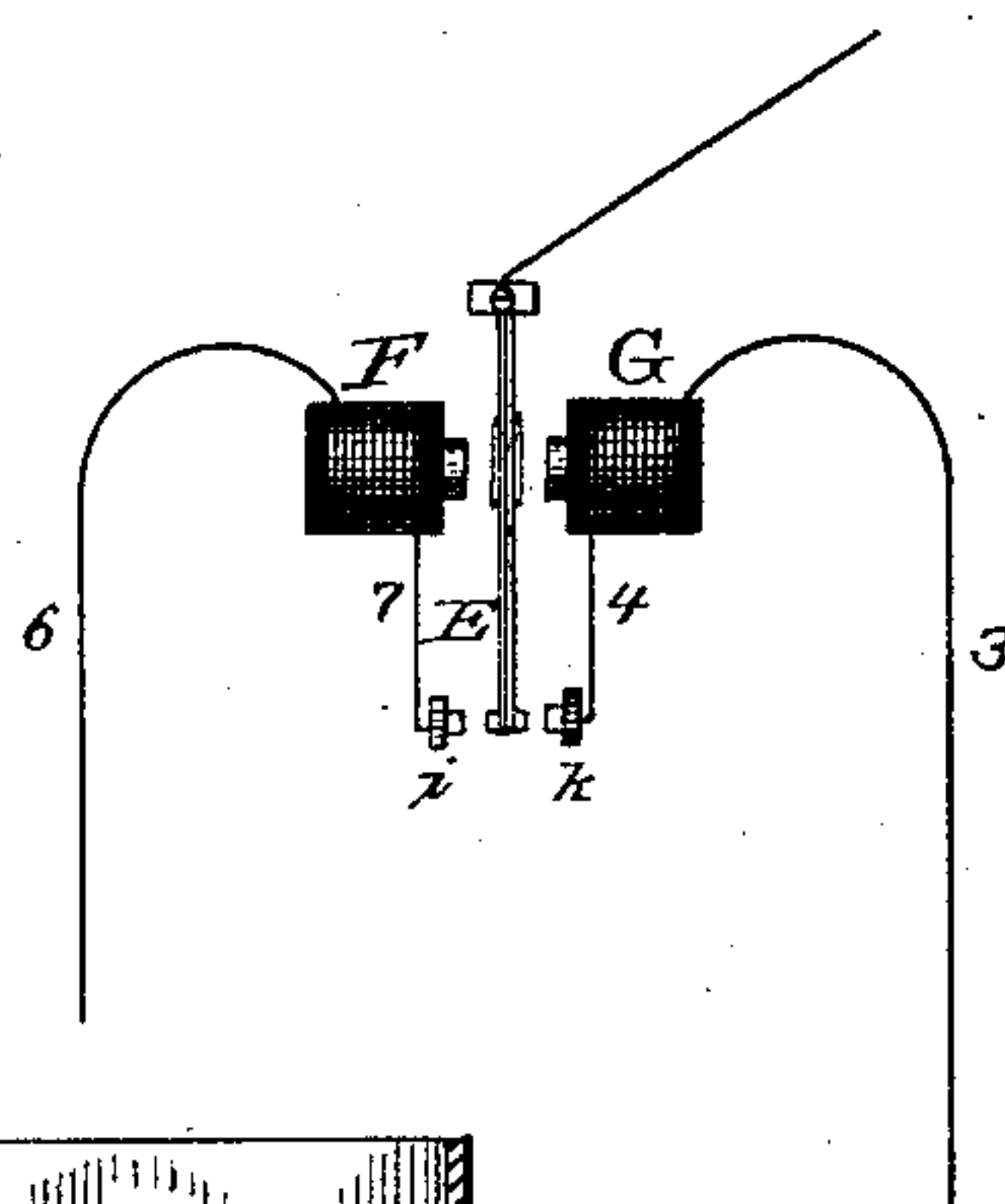
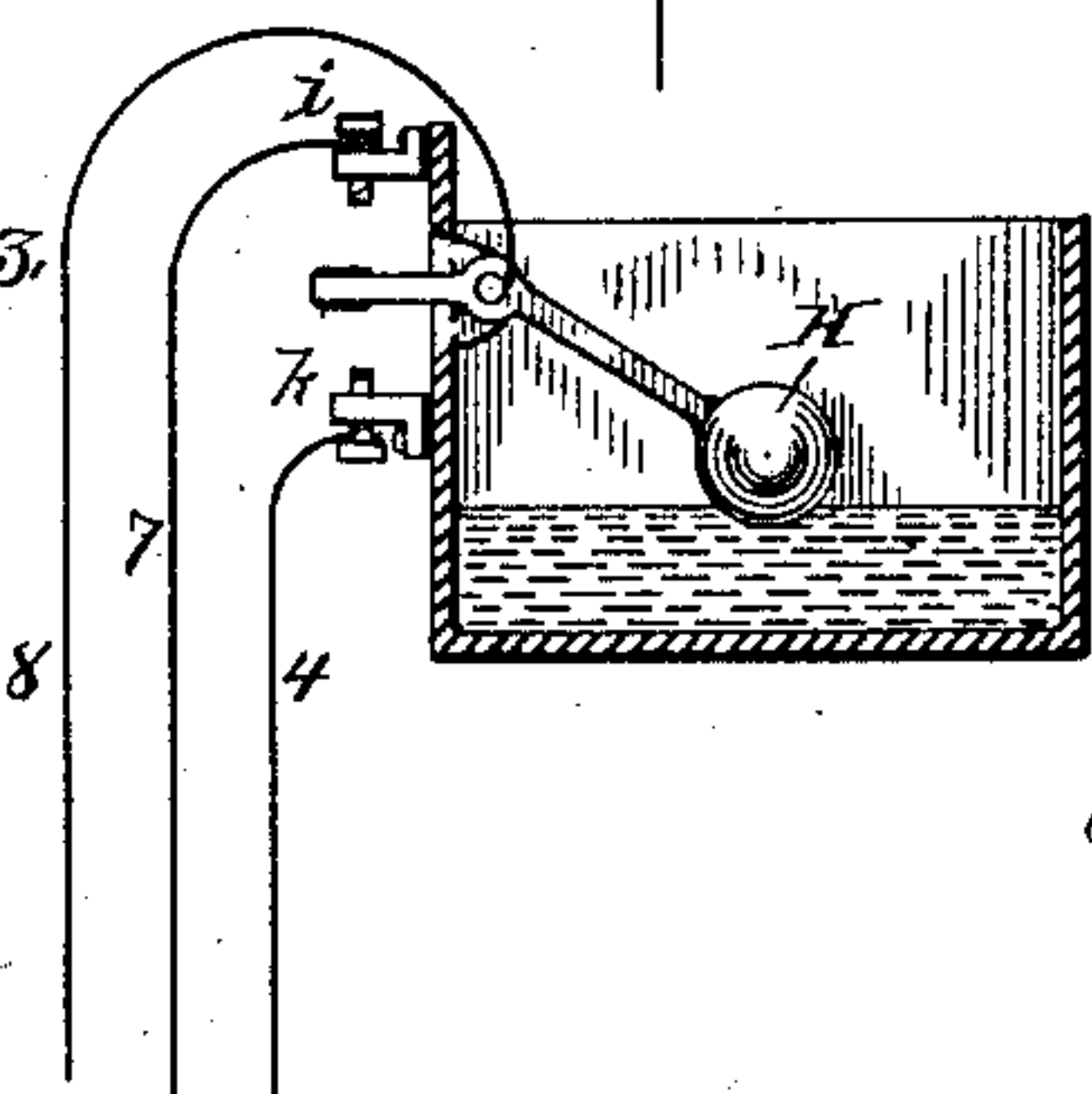


FIG. 3.



WITNESSES:

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EDWARD H. JOHNSON, OF NEW YORK, N. Y., ASSIGNOR TO THE INTERIOR
CONDUIT AND INSULATION COMPANY, OF SAME PLACE.

ELECTRIC CONTROLLING AND OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 435,898, dated September 2, 1890.

Application filed October 19, 1887. Serial No. 252,802. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. JOHNSON, of the city of New York, in the county and State of New York, have invented a certain new and
5 useful Improvement in Electrical Controlling and Operating Apparatus, of which the following is a specification.

The object I have in view is such an improvement upon the electrical controlling or
10 operating apparatus described in an application for patent of even date herewith (Serial No. 252,801) that the same will be particularly adapted for control by a thermostat, a float, or a delicate indicator of electrical conditions,
15 pressures, temperatures, and the like, which are liable to fluctuate at the limits of their movement and might set my apparatus in operation a second time and thus establish conditions opposite to those desired.

20 My present apparatus is designed to make the controlling device inert at each contact after it has once set the apparatus in operation from that contact, the operation from one contact setting the parts for operation
25 from the opposite contact. This I accomplish by carrying the circuit from each of the limit contacts or stops through a separate circuit-breaker acted on by the spring-snapping movement and opening the circuit at that con-
30 tact when the movement works, which then closes the circuit at the opposite contact. The circuit from each contact also has a separate circuit-maintaining magnet.

35 The invention consists in the several novel devices and combinations hereinafter described, and pointed out by the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a view, partly in diagram, illustrating the invention in connection
40 with a thermostat; Fig. 2, a modified arrangement of the circuit-maintaining magnets, and Fig. 3 a view illustrating the use of a float as the controlling device.

A is the arm, which is thrown back and forth
45 by the spring-snapping movement B. (Shown in dotted lines in Fig. 1.) The spindle of the snapping movement has a worm-wheel *a*, which is turned by a worm *b*, mounted on the shaft of an electric motor C. The arm A may
50 carry the moving electric contacts of a switch,

as described in the application before referred to; or it may be connected with any object it is desired to move, such as a hot-air register or a steam, air, or water valve. As shown, it is connected by a rod *c* with the
55 crank-arm *d* of a damper D, which may open and close a flue for supplying hot or cold air to the room in which is located the controlling thermostat, or it may be a furnace-damper. At the limits of the movement of the arm A
60 are two sets of contacts *ef* and *gh*, the contacts *ef* being bridged by the arm at one limit of its movement, and the contacts *gh* being bridged by the arm at the other limit of its
65 movement.

E is a controlling-thermostat playing between limit stops or contacts *i k*.

F and G are two circuit-maintaining magnets having armatures *lm* and front contacts
70 *n o*, and H is the source of electrical supply, which may be a galvanic battery or a suitable connection with the conductors of an electric light or power system or circuit. The circuit-connections are from one side of the source H by wire 1 to the armature and field
75 of the electric motor C. From the motor C the circuit is divided into two parts. One part passes by wire 2 to contact *e*, from contact *f* by wire 3 to magnet G, and by wire 4 to the thermostat-contact *k*. The other part of the
80 divided circuit passes by wire 5 to contact *g*, from contact *h* by wire 6 to magnet F, and by wire 7 to the thermostat-contact *i*. From the thermostat E a single wire 8 extends to the other side of the source H. The armature *l*
85 and front contact *n* of the magnet F are connected by wires 9 and 10 with the wires 7 and 8, while the armature *m* and front contact *o* of the magnet G are similarly connected by
90 wires 11 and 12 to the wires 4 and 8, these connections forming, when closed, shunts around the thermostat-contacts. With the parts in the position shown the thermostat can produce no effect by touching the con-
95 tact *i*. When, however, it touches the contact *k*, the circuit will be closed through the contacts *ef*, the electric motor, and the main-
100 taining-magnet G. The magnet G will attract its armature and close at *o* the shunt around the thermostat, thus relieving the

thermostat-contacts from the duty of carrying the current to the motor. The motor will start and will run until the snapping movement works, when the arm A will be thrown 5 to the other side, opening or closing the damper and leaving the contacts *e f* and passing over to the contacts *g h*, thus opening the division of the circuit through the magnet G to contact *k*. Now the thermostat can produce 10 no further effect on contact *k* until it has first touched contact *i* and caused the parts to operate from that contact.

In Fig. 3 is shown a float H, used as the controlling device in place of the thermostat. 15 This is shown simply as an illustration of one of the many controlling devices that may be substituted for the thermostat.

In Fig. 2 the circuit-maintaining magnets F G are shown as acting directly upon the thermostat-bar. They serve to make a good closure of the circuit at the thermostat-contacts 20 and to maintain it until the snapping movement acts and opens the circuit.

The snapping movement B is not fully illustrated and described herein, it being a mechanical movement made use of in a well-known form of electrical switch. (Letters Patent No. 376,976, dated January 24, 1888.) I simply substitute the worm-wheel *a* for the 25 handle of the switch.

What I claim is—

1. In an electrically-operated controlling or operating device, the combination, with a circuit-controller closing different circuits at its 35 limit stops or contacts, of a spring snapping movement, an electric motor operating the snapping movement and in circuit with the cir-

cuit-controller, and circuit-breakers worked by the spring snapping movement and acting to alternately break and make the circuits 40 leading to such controlling limit-stops, substantially as set forth.

2. In an electrically-operated controlling or operating device, the combination, with a circuit-controller closing different circuits at its 45 limit stops or contacts, of a spring snapping movement, an electric motor operating the snapping movement and in circuit with the circuit-controller, circuit-breakers worked by the spring snapping movement and acting to 50 alternately break and make the circuits leading to such controlling limit-stops, and circuit-maintaining magnets in circuit with such controlling limit-stops, substantially as set forth. 55

3. In an electrically-operated controlling or operating device, the combination, with a circuit-controller closing different circuits at its limit stops or contacts, of a moving apparatus set in motion by the circuit-controller, circuit-breakers worked by the moving apparatus 60 and acting to alternately break and make the circuits leading to such controlling limit-stops, and circuit-maintaining magnets in circuit with such controlling limit-stops and 65 acting to shunt such controlling limit-stops, substantially as set forth.

This specification signed and witnessed this 5th day of October, 1887.

EDWD. H. JOHNSON.

Witnesses:

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