

(No Model.)

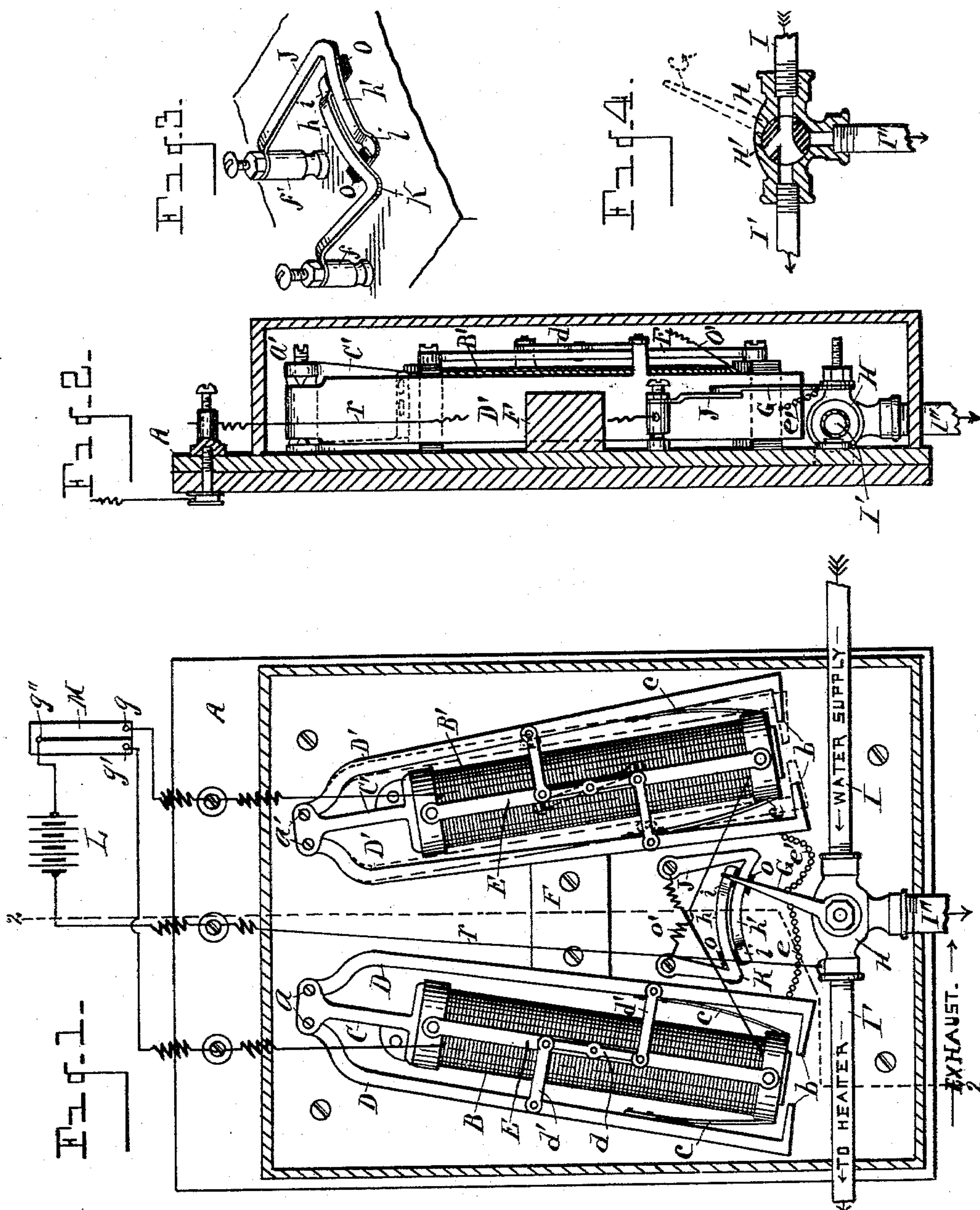
2 Sheets—Sheet 1.

A. A. BOSS.

AUTOMATIC TEMPERATURE REGULATOR.

No. 596,955.

Patented Jan. 4, 1898.



WITNESSES

O. B. Barzger.

M. A. Martin

INVENTOR

Addy A. Boss.

By his Attorneys

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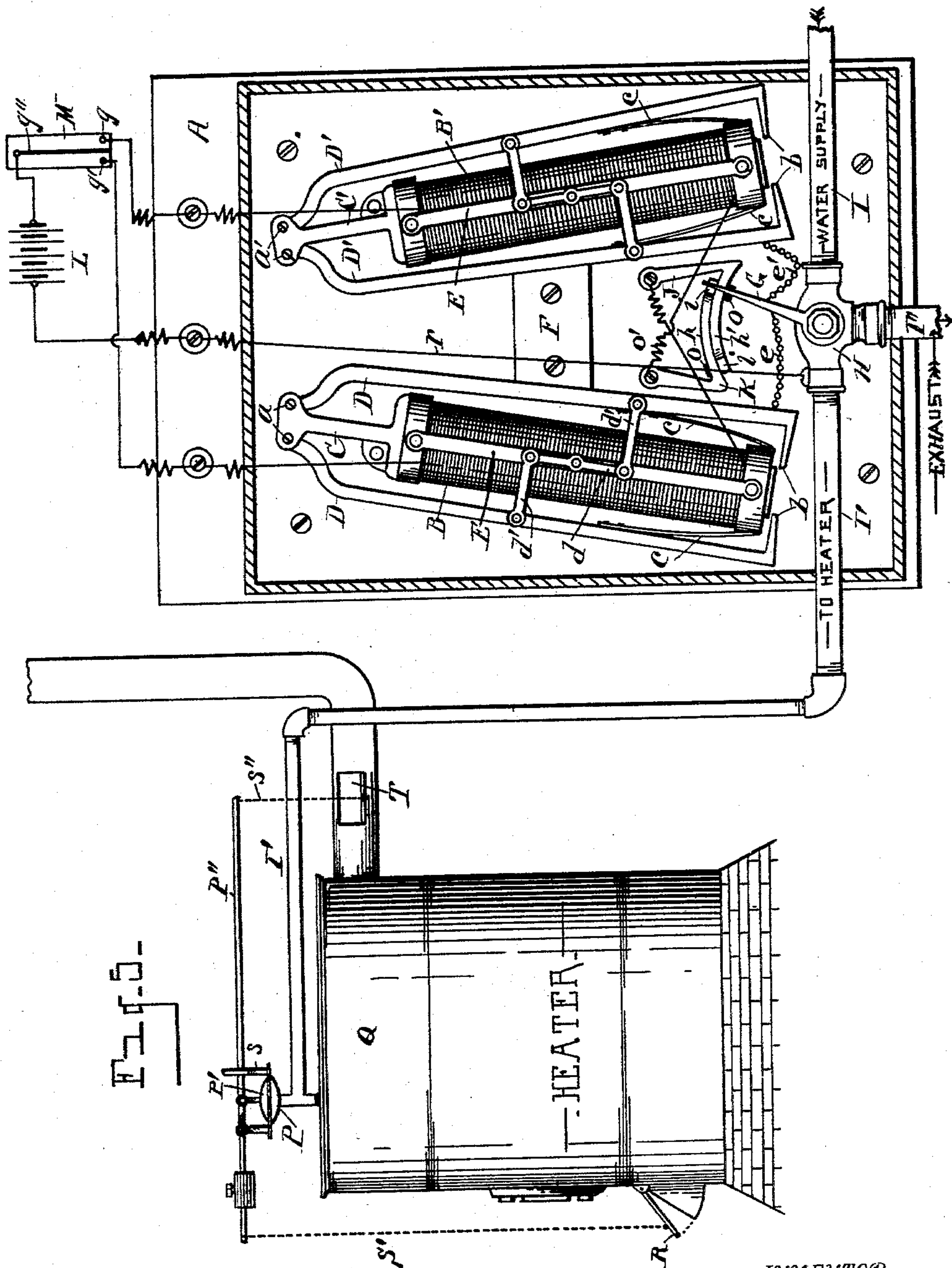
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UNITED STATES PATENT OFFICE.

ADDY A. BOSS, OF DETROIT, MICHIGAN, ASSIGNOR OF THIRTY-ONE FORTY-EIGHTHS TO ALMON C. VARNEY AND ALVIN W. VARNEY, OF SAME PLACE.

AUTOMATIC TEMPERATURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 596,955, dated January 4, 1898.

Application filed March 31, 1897. Serial No. 630,050. (No model.)

To all whom it may concern:

Be it known that I, ADDY A. BOSS, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Automatic Temperature-Regulators; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to automatic temperature-regulators especially designed for use in buildings having independent heating plants; and it consists of the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to provide simple and effective means for automatically actuating the draft-controlling mechanism of heaters, so that the dampers of the heater may be automatically opened and closed according to the variation of the temperature of the building, the purpose being to maintain the temperature at as nearly a uniform degree as possible. This object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved device, the inclosing case being in section. Fig. 2 is a section as on line 2 2 of Fig. 1. Fig. 3 is an enlarged perspective of the switch employed for shifting the electric current. Fig. 4 is an enlarged section through the valve and case. Fig. 5 is a view in elevation, showing the application of my device for controlling the damper-actuating mechanism of the heater.

Referring to the letters of reference, A designates a suitable base, preferably of wood, upon which are mounted the opposed electromagnets B B', respectively. Secured to the upper ends of said magnets are the brackets C C', whose ends are provided with the laterally-projecting ears a a', respectively. Between these ears of the brackets of said mag-

nets are pivoted the opposed sets of armatures D D'. These armatures depend on opposite sides of their respective magnets and are provided at their lower ends with right-angled L portions b, which stand inward toward the poles of the magnets, so that they are always within the magnetic field. Each of these armatures is provided on its inner face with a releasing-spring c, which serves to prevent said armatures from sticking to the magnets.

Mounted upon each of said magnets and extending longitudinally thereof is a bar E, to the center of which is pivoted an arm d. To the outer ends of said arm are pivoted the links d', which are in turn pivoted to the opposed armatures. By this arrangement upon the energizing of the magnet both armatures are attracted, and by means of this connection between them their united power may be exerted for a given purpose.

The armatures are adapted to normally depend free from the magnets, and the opposed inner pair are arrested by a stop-block F, secured to the base, so as to prevent them from swinging too far from the magnets' poles.

The lower end of each of the inner pair of magnets is connected to an operating-lever G by means of the chains e e', respectively, the chain e connecting the armature D to said lever and the chain e' connecting the armature D' whereby as said magnets are successively energized the free end of said lever is alternately drawn from side to side. Said lever G is mounted upon the stem of an ordinary three-way plug-valve H (see Fig. 4) and is seated in a valve-case H', having the connections for coupling the three pipes I, I', and I''. When the parts are in the position shown in Figs. 1 and 4, a straight opening is formed between the pipes I I'; but when said lever is drawn in the opposite direction the valve H is rotated so as to close the opening leading from pipe I and form an open way through said valve connecting the pipes I' I''.

The free movable end of the lever G is adapted to lie in contact with an electrical switch and cut-out consisting of the curved spring-arms J and K. These arms are mounted, respectively, upon the binding-posts f and f' and project toward the valve-case H, their

free ends h h' projecting inwardly at an angle to the body of said arms and lying approximately parallel with each other in the same plane for the greater portion of their length and concentric with the axis of oscillation of the lever G, the extreme ends of the curved portions h h' being bent downward and at right angles, as shown at z , and extend under the curved portion, said opposite arm being insulated therefrom by the interposed layer of rubber o , carried by said end portions z , as clearly shown in Fig. 3, by which arrangement the spring-arms J and K, although connected, are insulated one from the other. The free end of the lever G is adapted to swing over the curved portion h h' of said arms and alternately open and close the electric circuit, as hereinafter described.

The automatic switch or cut-out arrangement just described, with the electromagnets, are located, together with the battery L and a thermostat M, in a normally open circuit. The thermostat is located in the living-rooms of the building at such point as desired and is adapted, through expansion and contraction, as is well understood, to alternately close the circuit through the binding-posts g g' .

The operation of the device may be described as follows: Should the temperature of the room become too low, the spring-bar g' of the thermostat, by the unequal contraction of its component parts, will spring over and make a contact with the binding-post g , whereby the circuit is closed through the electromagnet B', through the spring-arm K, by means of the connecting-wire o' , through the lever G, which is at that time in contact with the curved end h of said arm, and through the valve-case back to the battery through the line r , whereby the magnet B' is energized and its pivoted armatures D' are attracted, causing them to swing inward, as shown by dotted lines at the right of Fig. 1, whereby the chain e' is drawn upon and the lever G is drawn over to the position shown in said last-mentioned figure, whereby the valve H is opened so as to establish communication with the water-supply pipe I and the pipe I', leading to the damper-actuating mechanism of the heater, (shown in Fig. 5,) which mechanism consists of a receiving vessel P, mounted on the heater Q and having a flexible diaphragm P', to which a weighted arm P'' is pivoted, said arm being in turn pivoted to a support s . To the forward end of said arm is attached a chain s' , which is connected with the draft-damper R, while the rear end of said arm is attached to the check-damper T by means of the chain s'' . This diaphragm P', actuated by the water-pressure, operates the arm P to open the damper and close the check-draft, as will be well understood. As the lever G is drawn over by the action of the armatures D' its extreme outer end is carried from contact with the outer end of the curved portion h of the arm K, whereby the circuit is broken and the battery remains

inactive until the circuit is again closed. The opening of the damper in the heater by the operation just described will cause the fire to burn more briskly and increase the temperature in the building, causing the spring g' , when said temperature has attained a certain degree, to swing back and make a contact with the binding-post g' , thereby closing the circuit through the magnet B and through the spring-arm J and lever G to the battery through the line r . The magnet B is energized by the passage of the current there-through and its armatures D are attracted, whereby the chain e is drawn upon and the lever G drawn back to the opposite side, which movement operates the valve H to close the opening leading from the pipe I and establishes a communication between the pipe I and I', so that the small amount of water used in the previous operation may be discharged. The cutting off of the water-pressure from the damper-actuating mechanism causes said damper to close through the operation of the weighted arm P, thereby checking the fire in the heater, in which position said parts remain until the temperature in the building falls below the desired point, when the circuit will again be closed through the magnet B' and the damper again opened, as before described. As the lever G is drawn over by the action of the armatures of the magnet B through the current passing through the spring-arm J said lever is drawn out of contact with the curved portion h' of said arm J by being carried over the depressed portion z thereof and remains only in contact with the curved end portion h of the arm K, which is out of circuit until the circuit is again closed through the magnet B'. By means of this arrangement it will be seen that the circuit is normally open and is closed only at the instant of the operation of the armatures of the respective magnets.

This device is very simple and comparatively inexpensive, and as a temperature-regulator is most efficient in its operation. The additional power derived by the employment of the double armatures for each magnet enables me to readily actuate the valve, at the same time maintaining said valve sufficiently tight to obviate any leakage.

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

1. In an automatic temperature-regulator, the combination with an electric circuit having a circuit-closer therein, of the electromagnet, the movable armatures, the valve-case and valve therein, the lever for actuating said valve, and a connection coupling said armatures to said valve-actuating lever, said connection being of such a character as to permit said armatures to attain their maximum velocity when attracted before acting upon said lever.

2. In an automatic temperature-regulator, the combination of the thermostat and elec-

tromagnets located in a normally open circuit, of the pivoted armatures, the valve, the lever for operating said valve, and means connecting said armatures with said lever, the spring-arms also forming a portion of said circuit and connected with the coils of said magnets respectively, said arms having the parallel portions insulated one from the other with which the outer end of said lever is in contact, whereby, as said lever is drawn back and forth by the actuation of said armatures, the circuit is alternately opened, substantially as set forth.

3. In an automatic temperature-regulator, the combination with the thermostat and electromagnet located in a normally open circuit, of the two armatures hinged or pivoted to opposite sides of said magnet, having angled end portions projecting toward the magnet's pole, means connecting said armatures so as to cause them to operate in unison, the valve, the actuating-lever therefor, and the

chain or other flexible connection uniting said armatures and lever.

4. In an automatic temperature-regulator, the combination in an electric circuit, of the thermostat and the electromagnets, the spring-arms forming a portion of said circuit, said arms having the curved end portions which stand approximately parallel and whose extreme ends are bent at right angles and extend one under the other, the insulation interposed between the ends of said arms, the valve, the operating-lever adapted to engage the parallel portions of said arms, the movable armatures located on opposite sides of said lever, and means connecting said lever with said armatures.

In testimony whereof I affix my signature in presence of two witnesses.

ADDY A. BOSS.

Witnesses:

E. S. WHEELER,
M. A. MARTIN.