(No Model.) 2 Sheets—Sheet 1.

W. W. WILCOX.

HEAT REGULATOR.

No. 551,427. Patented Dec. 17, 1895.

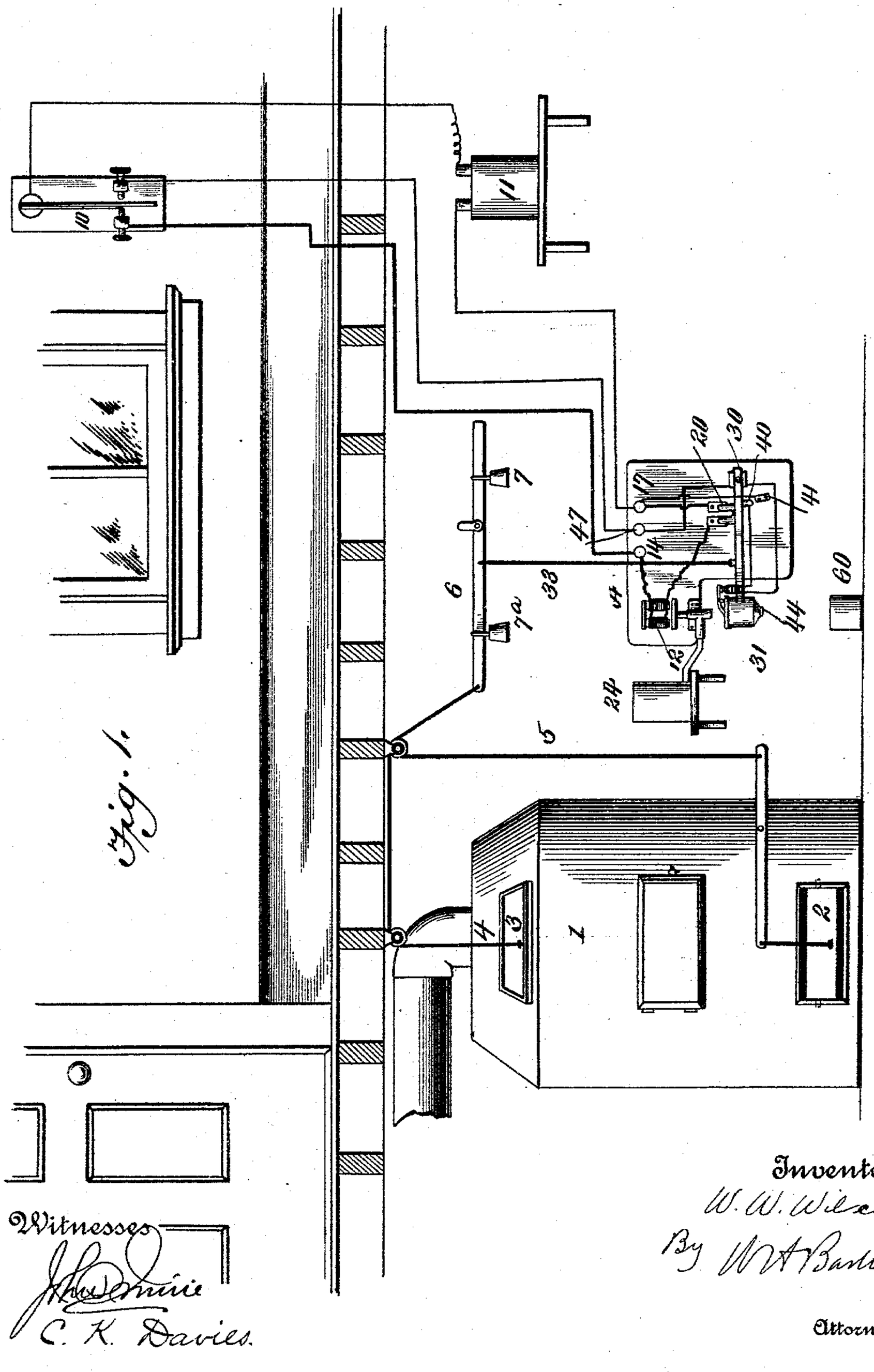

Fig. 1.

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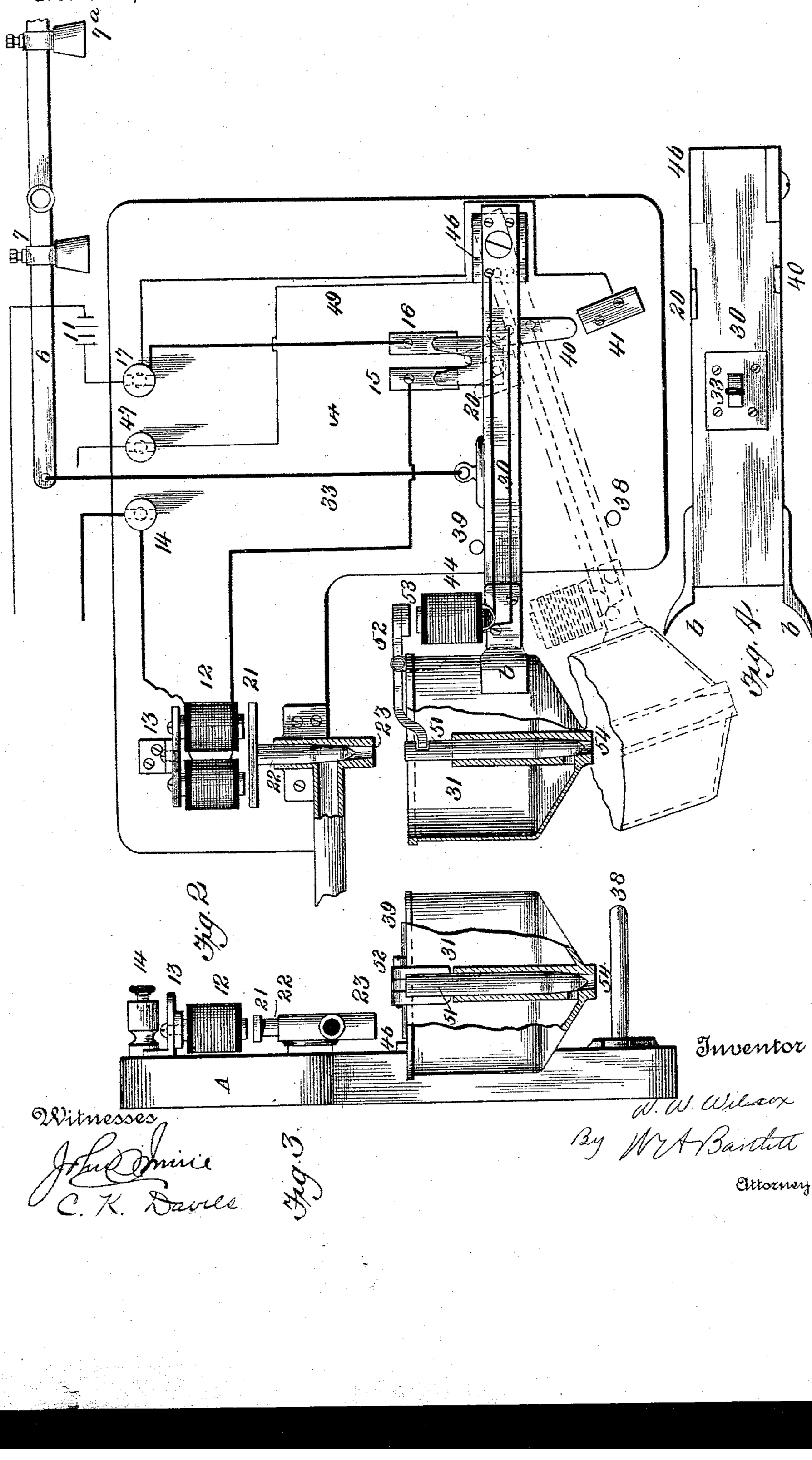

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UNITED STATES PATENT OFFICE.

WILLIAM W. WILCOX, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO PHINEAS M. RANDALL, JR., OF TAUNTON, MASSACHUSETTS.

HEAT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 551,427, dated December 17, 1895.

Application filed April 6, 1895. Serial No. 544,776. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. WILCOX, residing at Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Heat-Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an automatic heat-regulating apparatus or thermostat.

The object of the invention is to control the damper, valve, or other means for regulating heat-supply from a furnace or heater by automatic mechanism connected with a thermometer or heat-indicator; also to supply the power for operating said valves by the weight of a liquid, and to control the flow of such liquid automatically; also to arrange the electrical connections in such manner that the battery may be called into use as little as may be, and thus preserved for long periods of time, and in general to improve a thermostat or heat-regulator.

Figure 1 is a diagrammatic view showing in elevation and section an entire apparatus and connections by which the heat-supply may be regulated to a room or rooms or to a house or hall. Fig. 2 is an enlarged view, in section and elevation, of the levers, valves, and connections by which the dampers or draft-regulators are controlled. Fig. 3 is an end view of most of the mechanism of Fig. 2, showing parts in section. Fig. 4 is a plan of the balance-lever.

The numeral 1 indicates a furnace or other heater, having a damper 2 and air-valve 3, connected by cords 4 and 5 to the operating or actuating lever 6. Lever 6 is provided with weights 7 7^a, by which it can be counterbalanced so as to be rocked on its pivot with any desirable or practicable increment of weight or power to move the valves and damper or to lift the balance-lever.

There are numerous furnaces in which the valves or dampers are controlled by lever or levers, and the furnace illustrated is intended merely as an example, and it will be understood that when a lever, as 6, is moved with sufficient force it is within the knowledge of competent mechanics to make connections to the dampers or valves of a furnace or other heater so as to regulate the combustion therein or heat-supply therefrom.

The numeral 10 indicates a thermal-circuit closer of common form, in which the rising or falling of temperature beyond a given amount causes an electric circuit to be closed in one direction or the other. A battery 11 is connected by suitable conductors to the thermal-circuit closer and supplies electromotive force for the electric magnets hereinafter referred to. When the thermal-circuit closer 10 is in its normal position and the temperature is between the extremes allowed, the circuit from the battery is broken, and there is no tendency to exhaust the battery. The electromagnets and balance-lever are shown mounted on a support A, which may be of any suitable construction. Electromagnets 12 are attached to this support by suitable brackets or angle-plates 13. The electromagnets 12 are connected to binding-post 14 by suitable conductors, and this post 14 is connected to the contact-piece at one side of the thermal-circuit closer, as indicated by the heavy line, Fig. 1.

From the electromagnet or magnets 12 metallic connection is made to a plate 15, and a plate 16 near the same has metallic connection to the post 17, and so to battery 11.

It will be understood that the electrical connections are suitably insulated, and that the circuit described has two breaks, one of which can be closed by the movement of the thermal-circuit closer, and the other, between the plates 15 and 16, can be closed by a bridge-plate 20, as shown in Fig. 2, and as will be described.

Let it be understood that the break between plates 15 and 16 is closed by bridge-plate 20. Then if the action of the thermal-circuit closer closes the electrical circuit, in which are the electromagnets 12, these magnets will become active.

Armature 21 is near the electromagnets 12, and is connected to valve 22, which closes a passage 23 from any suitable water-supply, as a tank 24.

The mechanical construction of the water-controlling valve is not important, as such are well known.

A balance-lever 30, pivoted to support A,

carries a dish 31, held by brackets *b b* in position to receive water from valve or passage 23. The lever 30 carries the bridge 20 in such position that when the lever is raised, as in full lines, Figs. 1 and 2, the circuit between the plates 15 and 16 will be closed by bridge 20; but when by the flow of water into the dish 31 that end of the lever is overweighted, the lever falls and rests on pin 38, pulling the bridge 20 away from plates 15 and 16, thus breaking the circuit. This causes the magnets 12 to become inert, and valve 22 falls by gravity, closing passage 23. As the lever 30 is connected by rod or cord 33 to the operating-lever 6, the dropping of the weighted end of said lever causes lever 6 and the fire-damper or other connections to be moved, and the parts will stay in this position until the dish 31 be relieved of the overweight of water. When the lever 30 falls to the position indicated in dotted lines, Fig. 2, it carries the contact-piece 40 (connected to the lever) into contact with the contact-piece 41, suitably supported on the frame A. This piece 41 is connected by wire to binding-post 17, and so to the battery. The lever 30 carries electromagnets 44, which are in circuit with the piece 40, and also in circuit by a wire along the lever, to metallic plate 46 and wire 49, to the binding-post 47, which has metallic connection to the thermal-circuit closer. Thus it will be seen that the electromagnets 44 are in circuit which may be closed by contact of plates 40 and 41 at one place, and by the thermal-circuit closer at another place, and these magnets will be inert when circuit is broken in either place. The dish 31 has an opening 54 in its bottom, which opening is closed by valve 51, connected by lever 52 to armature 53. When balance-lever 30 is down and resting on pin 38, the electrical circuit in which the magnets 44 lie is closed at 40 41. When now the thermal-circuit closer closes the other break in the circuit, the magnets 44 will be excited, and by drawing on armature 53 the valve 51 will be opened, and the water in dish 31 will escape. As soon as the weight in dish 31 is sufficiently diminished the weights 7 and 7ª will operate to shift the actuating-lever 6 and dampers, and by means of connection 33 the balance-lever will be lifted against pin 39, thus breaking the circuit at 40 41, when the magnets 44 will no more be active, and the valve 51 will drop by gravity.

Insulations, connections, and contacts are made in manner well known in the art. The illustration is not intended to give precise constructions, but only to explain in a general way, so that the apparatus may be made by a skilled mechanic.

While it is advisable to have the weights and dampers so nearly balanced that only a small quantity of water may be needed to overbalance and operate the device, it is apparent that a very considerable operating power may be had by using water. The waste water may generally flow into a tank 60, or into the sewer, and the supply may be from the service-pipe.

What I claim is—

1. In a heat regulating apparatus, a movable receptacle for liquid operatively connected to a heat controlling valve or damper, a liquid supply for said receptacle, thermostatic means for controlling the flow of liquid into said receptacle, and distinct thermostatic means for controlling the escape of liquid from said vessel, all combined substantially as described.

2. In a heat regulating apparatus, the movable vessel connected to the damper, the liquid supply, the valve controlling the entrance of liquid to said vessel, an electro-magnet for operating said valve and in circuit with the thermal circuit closer, and a valve controlling the escape of liquid from said vessel operated by an electro-magnet also in circuit with the thermal circuit closer, all combined substantially as described.

3. In a heat regulating apparatus, the balance lever operatively connected to the valve or damper, a dish mounted on said lever and a liquid supply therefor, a valve controlling the liquid escape from said dish, an electro-magnet mounted on said lever and controlling said valve, and the thermal circuit closer in circuit with said electro-magnet, all in combination substantially as described.

4. In a heat regulating apparatus, the balance lever operatively connected to the heat damper or valve, the dish mounted on said lever, the escape valve connected to said dish, the electro-magnet controlling said escape valve and in circuit with the thermal circuit closer, the water supply pipe, valve for closing same, and the electro-magnet controlling said supply valve, also in circuit with the thermal circuit closer, all combined substantially as described.

5. In a heat regulating apparatus, the balance lever operatively connected to the heat controlling valve or damper, the dish on said lever and means for supplying liquid to said dish, the escape valve of said dish and the electro-magnet controlling said valve, the thermal circuit closer and connections therefrom to suitable contact pieces in proximity to the lever, and an electrical connection from the battery to the magnet on the lever, whereby the circuit may be completed to the magnet through one or the other of the contact pieces according to the position of the lever, all combined substantially as described.

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

WILLIAM W. WILCOX.

Witnesses:

A. R. STILLMAN,

ARCHIE C. THOMPSON.