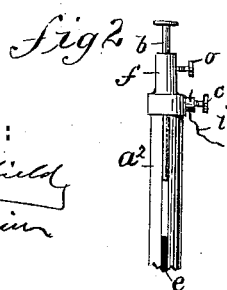


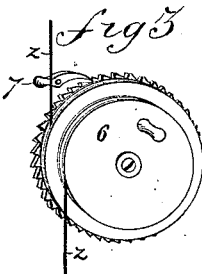
J. A. LAKIN.

No. 304,330.

Patented Sept. 2, 1884.



J. D. Farfield
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JAMES A. LAKIN, OF WESTFIELD, MASSACHUSETTS.

THERMO-ELECTRIC REGULATOR FOR HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 304,330, dated September 2, 1884.

Application filed March 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. LAKIN, a citizen of the United States, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Thermo-Electric Regulators for Heating Apparatus, of which the following is a specification.

This invention relates to improvements in thermo-electric apparatus for operating the combustion-controlling devices of furnaces and similar heating apparatus, the object being to provide improved devices for causing heating apparatus to give out less heat when the temperature in the apartment warmed thereby has risen to a certain point, which devices are capable of being adjusted to permit said apartment to be heated to different degrees of temperature before they will operate to reduce the heat therein.

In the drawings forming part of this specification, Figure 1 illustrates portions of a dwelling and heating apparatus having applied thereto thermo-electric apparatus constructed according to my invention. Figs. 2 and 3 are detail views. Fig. 4 is a front view of an aneroid-thermometer.

In the drawings, B indicates the cellar of a house, having located therein a furnace, D, adapted by well-known means to warm the apartment A above. The furnace D is adapted to be operated by the hereinafter-described mechanism for regulating the heat thereof by having its smoke-pipe E provided with a pivoted damper, *t*, its cold-air pipe F, with the damper *x*, and its ash-box, with the pivoted damper *y*.

Compound levers *m m'* are pivoted at 2 2 at some convenient point near the furnace, and to each other at 3. Lever *m'* has a counterbalance-weight, *r*, hung on it. The dampers *y* and *x* are connected with the free end of lever *m* by a cord or cords, *w*, which pass over the rollers 4, and the damper *t* is connected with said lever by the cord *s*, which passes over the rollers *v*.

A clock, 5, and a wheel, 6, substantially such as described in my application for Letters Patent of the United States filed February 1, 1884, Serial No. 119,446, are connected by a cord, *z*, which passes over a roller, 5, with lever *m*.

A thermometer, *a*, is located in the apartment A, the mercury-tube of which, *a'*, is provided with a screw-connection, *d*, at its lower end, and a metallic head, *f*, at its upper end. Through said head *f* passes a metallic connection-rod, *b*, which is adjustable toward and from the mercury-column *c*, and is held in place by a screw, *o*.

A battery, *h*, has one pole thereof connected by a wire, *i*, with the head *f* on the thermometer *a*, being secured thereto by the screw *c*. The opposite pole of battery *h* is connected by a wire, *K*, with an electro-magnet, J, and the latter is connected by a wire with the connection-screw *d*, which is in contact with the lower end of the mercury-column in the thermometer *a*. An armature, *n*, is secured to lever *m'* over the electro-magnet J.

The operation of the above-described thermo-electric devices for operating the dampers of the furnace D is as follows: The drawings illustrate said dampers in a position to allow the furnace to burn freely, the dampers being held in this position by their connection with levers *m* and *m'*, the weight *r*, which is hung on the latter, serving to overbalance the weight of the dampers slightly.

The connection-rod *b* in the head *f* of the thermometer *a* has its lower end adjoining the mercury-column adjusted to such an indicated degree of temperature on the thermometer as it is desired the heat of the apartment A shall not exceed. Therefore so long as said degree of heat is not attained the dampers of the furnace remain in the position shown; but when the heat in the apartment A is sufficient to cause the mercury-column of the thermometer to rise and come in contact with the connecting-rod *b* an electric circuit is established through the magnet J, and the armature *n* is drawn against the latter, swinging levers *m m'* to the positions shown by dotted lines *m*, Fig. 1. Said movement of levers *m m'* causes the damper *t* in pipe E to be opened, thereby decreasing the draft of the furnace, and allows the dampers *y* and *x* to shut, thus moderating the fire in the furnace and reducing the temperature in apartment A.

If desired, an aneroid-thermometer, H, Fig. 4, may be employed with the above-described devices in place of thermometer *a*, by adapting it to this service as follows: I place upon

the metallic front of the thermometer, under the graduation-marks, an insulating-piece of rubber, 8, of segmental form, over which the pointer 10 vibrates. A wire, 11, is suitably connected to the thermometer, and a second wire, 12, is connected with the pointer 10. Holes are pierced through the piece 8 and the metallic front of the thermometer, coinciding with certain graduation-marks thereon. A metallic pin, 9, is placed in one of said holes opposite the temperature-mark on the thermometer which indicates the greatest heat required in the apartment, and when the pointer 10 strikes pin 9 an electric circuit is established through wires 11 and 12, (which in Fig. 4 answer to wires *i i'* in Fig. 1,) and through the electro-magnet, causing the levers *m* and *m'* to be actuated, as above described. When the temperature in apartment A falls sufficiently, the mercury-column in thermometer *a'* drops away from contact with the bar *b*, and, opening the circuit through magnet J, so releases levers *m* and *m'* as to permit them and the furnace-dampers actuated by weight *r* to resume the positions shown in Fig. 1.

If desired, any ordinary switch may be placed on wire *i* or *i'*.

To set the dampers to be operated upon by the clock 5, which operates independently of the thermo-electric devices, the pawl 7 on wheel 6 is raised out of engagement with the ratchet-teeth, and the clock is wound up, the

pawl being left in said position. The cord *z* from the clock, which is connected with the end of lever *m*, serves to hold the latter in equilibrium between the action of weight *r* and the dampers *y x*, so that when clock 5 operates at a given hour, as described in my said application, the levers *m m'* are brought to the position shown by dotted lines in Fig. 1, and the dampers *y x* are shut.

What I claim as my invention is—

1. The combination, with the dampers of a heating apparatus, of the compound levers *m m'* and a suitable counter-weight, an electro-magnet and a battery, and the thermometer *a*, having the lower end of its mercury-column connected with one pole of the battery, and having a metallic head on its mercury-tube, connected also with said battery, and provided with an adjustable connecting-bar extending into said tube, substantially as set forth.

2. The combination, with the dampers of a heating apparatus, of the compound levers *m m'* and a suitable counter-weight, an electro-magnet, a battery, and the aneroid-thermometer H, provided with an insulating-segment, a pointer, and an adjustable stop for forming the circuit, substantially as shown and described, and for the purpose set forth.

JAMES A. LAKIN.

Witnesses:

H. H. BOWMAN,
J. D. GARFIELD.