(No Model.)

E. R. MALMBORG.

ELECTRIC VALVE CONTROLLER.

No. 422,956. Patented Mar. 11, 1890.

Fig. 1.

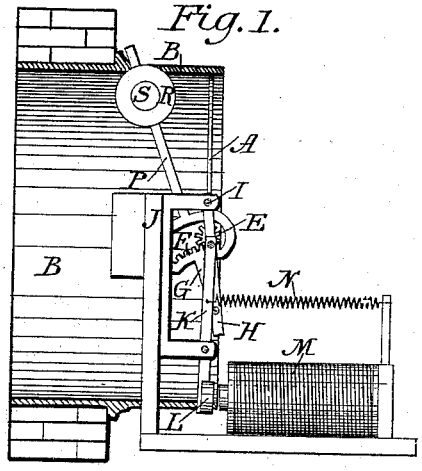


Fig. 2.

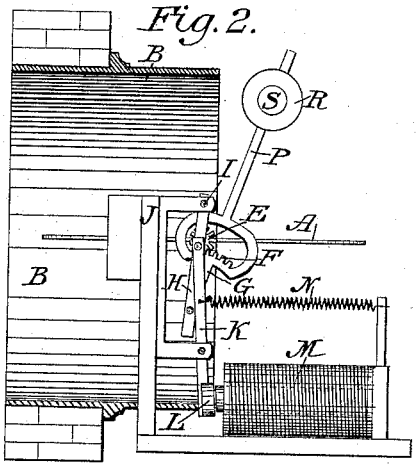
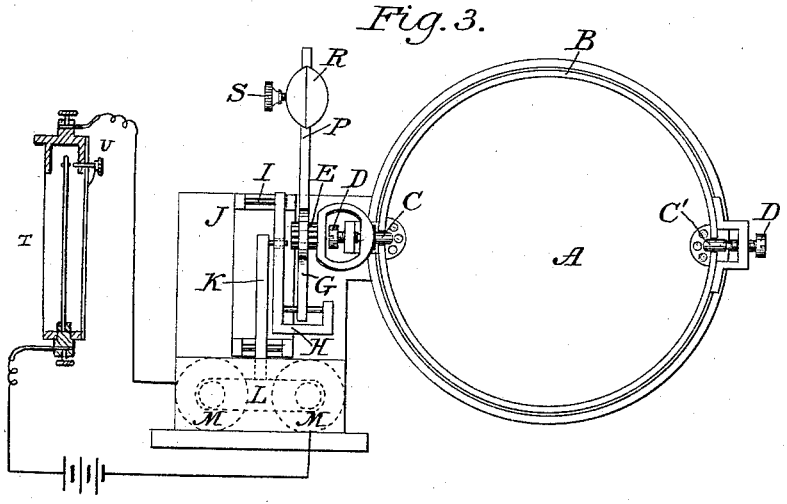


Fig. 3.



WITNESSES:

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ERNST R. MALMBORG, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-THIRDS TO JOHN M. GLOVER, OF SAME PLACE, AND WARREN B. MARTINDALE, OF KENOSHA, WISCONSIN.

ELECTRIC VALVE-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 422,956, dated March 11, 1890.

Application filed December 26, 1889. Serial No. 334,957. (No model.)

To all whom it may concern:

Be it known that I, ERNST R. MALMBORG, a resident of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electro-Thermostatic Valve-Controllers for Furnaces and other Purposes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of devices for regulating the temperature of rooms or buildings in which a thermostat operates to make or break an electrical circuit, including an electro-magnet, whose armature operates by its movement to govern a valve or damper connected with the heating apparatus.

It has for its object to simplify the construction and operation of a valve-controller of this character and reduce the cost thereof.

It consists in the novel construction, combination, and arrangement of a series of levers connected with the valve or damper and actuated by an electro-magnet, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal section of a pipe or flue governed by a valve revolving therein, my improved valve-controlling device being illustrated in side elevation with the valve closed; Fig. 2, a similar view showing the valve thrown open; and Fig. 3 is a front view of the device.

Similar letters indicate like parts in all of the figures.

A represents the valve or damper, governing a flue or an opening B, and which is pivoted upon journals C C′, fitted thereto at diametrically-opposite points. (See Fig. 3.) These journals are preferably supported to turn freely upon the hardened points of set-screws D D, passing through suitable supports in line with the axis of the valve into sockets in the ends of the journals, as shown in Fig. 3; but the valve may be otherwise pivoted to turn freely upon journals or a spindle fixed thereto and mounted in suitable bearings in any approved manner.

One of the journals C of the valve is fitted with a pinion E, whose axis is made to coincide with that of the valve, and this pinion is engaged by a toothed segment or segmental rack F upon the end of an arm G, which is pivoted to oscillate freely upon and is carried by the lower end of a lever H, depending from and swinging freely upon a pin I, fitted in the frame-work J of the apparatus.

An oscillating lever K is pivoted to the frame-work at a point below the pivotal point of support of the lever H, so that its longer arm shall extend up alongside of it, and said arm is pivoted laterally to said lever H at a point about opposite the segmental rack and pinion E. The lower shorter arm of the lever K carries the armature L for an electro-magnet M, so that when the magnet is excited it will operate to oscillate said lever K, and thereby cause the segmental rack F to move in one direction, while its movement in the opposite direction, when the armature is released, is automatically effected by means of a suitable spring N, as shown in Figs. 1 and 2.

To enforce the movement of the segmental rack in either direction and render it positive, an arm P, bifurcated at its inner end to admit of attachment to the ends of the rack F, is secured thereto to extend therefrom beyond the pinion E spanned thereby in line with its arm G, as shown in Figs. 1 and 2. A weight R is fitted to slide for adjustment longitudinally upon said arm, and is secured when adjusted by a set-screw S.

The thermostat, by which the electric circuit for the electro-magnet is closed as the temperature in the room or building falls below the desired point and opened when it rises above the same, may be of any of the customary forms—such, for example, as that shown in Fig. 3, in which a compound strip T, of brass and steel, operates by its expansion or contraction under the influence of the changes of temperature to open and close the electrical circuit by making or breaking contact with the screw U.

In the operation of this device, when by an undue fall of temperature in the room the electric circuit is closed by the thermostat, and the magnet thereby excited, the armature

L, attracted by the magnet, will oscillate the lever K, so as to swing the lever H, carrying the arm of the segmental rack F, in the opposite direction. This movement of the lever H will, as shown in Fig. 2, so move the rack F, engaging the pinion E, as to produce a quarter-revolution of the valve or damper A upon its pivotal axis, and thereby open wide the flue B. So soon as the thermostat, operating under the influence of a rise of temperature, opens the electric circuit the armature will be released and the tension of the spring N will operate to produce a reverse movement of the levers, and thereby close the valve, as shown in Figs. 1 and 3.

I claim as my invention—

1. The combination, with a pivoted valve or damper and a segmental rack and pinion actuating the same, of an electro-magnet whose armature is carried upon an oscillating lever coupled mediately to the rack, whereby the movements of the armature are made to actuate the rack and operate the valve, substantially in the manner and for the purpose herein set forth.

2. The combination, with a pivoted valve or damper and a pinion carried upon one of its journals, of a segmental rack engaging said pinion, a pendulous lever swinging at the side of the segmental rack with its lower end pivoted to the arm of said rack, a second lateral lever carrying an armature upon its lower end, and which is pivoted at its upper end to the pendulous lever and near its lower end to a fixed support, an electro-magnet to attract said armature, and a spring to retract it, all substantially in the manner and for the purpose herein set forth.

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

ERNST R. MALMBORG.

Witnesses:
A. N. JESBERA,
E. M. WATSON.