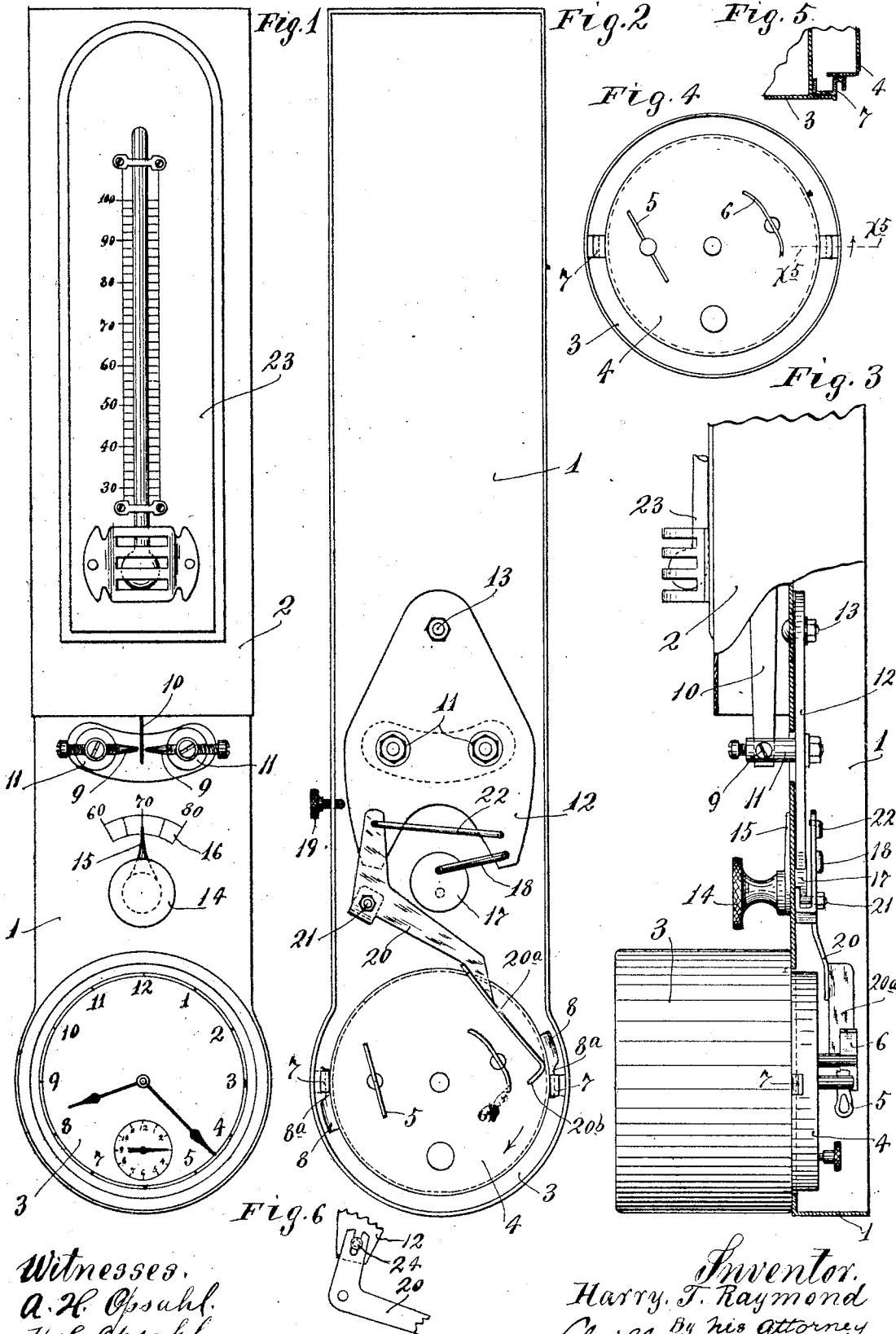


1,131,733.

Patented Mar. 16, 1915.



Witnesses.
A. H. Opsahl.
H. L. Opsahl.

Inventor.
Harry T. Raymond
By his Attorney
Williamson & Merchant

UNITED STATES PATENT OFFICE.

HARRY T. RAYMOND, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO GEORGE C. ANDREWS, OF MINNEAPOLIS, MINNESOTA.

THERMOSTAT.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY T. RAYMOND, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Thermostats; and I do hereby 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.

My invention relates to thermostats or temperature regulators of that type wherein clock mechanism is employed for the purpose of automatically setting the thermostat at predetermined times for the maintenance of some predetermined temperature, and the invention has for its object to simplify and improve mechanism of this character.

Generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in front elevation showing the improved temperature regulator; Fig. 2 is a rear elevation of the same; Fig. 3 is a view partly in side elevation and partly in vertical section and with some parts broken away showing the temperature regulator illustrated in Figs. 1 and 2; Fig. 4 is a rear elevation showing the clock removed from working position; Fig. 5 is a fragmentary section taken on the line $x^5 x^5$ on Fig. 4; and Fig. 6 is a fragmentary view in elevation illustrating a modified form of one of the lever connections.

The body of the regulator is preferably in the form of a pressed sheet metal member 1 having a detachable supplemental channel shaped sheet metal section 2, and provided with a lower end portion formed with a large perforation for the application of the clock 3. This clock 3 is preferably in the form of a small alarm clock having a bell 4, a time winding key 5 and an alarm winding key 6. The perforation at the lower end of the body or base 1 is of such size that the bell 4 projects therethrough with clearance so that it is free to vibrate. The body or case of the clock is detachably connected to the base 1, by bayonet joints applied in such

manner that they do not interfere with the vibration of the clock bell. These bayonet joints comprise approximately S-shaped lugs 7 soldered, or otherwise rigidly secured to the body of the clock, and segmental notches 8 cut in the face of the body 1 at the edge of the larger perforation therein, through which the clock bell 4 projects. The notches 8 permit the lugs 7 to be inserted therethrough by the shallow extensions 8^a of said perforations, permitting the lugs to be turned into interlocking engagement with the face of the body 1, and the extensions thereof afford stops for limiting the rotary movement of the clock in the direction of the arrow marked thereon in Fig. 2. To detach the clock from the body 1, it is rotated in the direction reverse from that indicated by the arrow in Fig. 2, so as to align the lugs 7 with the deep portions of the lugs 8, and then the clock may be removed by axial outward movements. The form of the lugs 7, is best shown in Fig. 5, and by reference thereto, it will be noted that the outer bends thereof, afford hooks which will engage and interlock with the front plate of the body 1 adjacent to its large perforation.

Of the three contacts which control the flow of current through the three-line circuit (not shown), in the usual way, the numeral 9 indicates the opposing relatively fixed contacts, and the numeral 10 indicates the intermediate relatively movable contact which is arranged to alternately engage the said contacts 9. The so-called relatively fixed contacts 9, as is usual, are in the form of set screws that work adjustably through binding posts 11 insulated from but secured to an adjacent contact carrier in the form of an insulating plate 12 of wood fiber or other suitable material. This insulating plate 12 is pivotally connected to the body 1 at 13. The relatively movable intermediate contact 10 is connected to and moved by a thermally actuated element of the usual or any suitable construction, not shown, and the operation of which is well understood.

It will be understood that the temperature at which the regulator will operate, either to open or close the temperatures of a furnace, or to perform some similar function, will depend on the position in which the relatively fixed contacts 9 are set in a direction from right to left, in respect to Figs. 1 and

2. In devices of this character, it has hitherto been customary to thus adjust the plate or contact carrier 12 by the oscillation of a controlling knob or finger piece having a pointer cooperating with a temperature scale to indicate the temperature at which the controller will operate. In the drawings, such a knob is indicated by the numeral 14, the same being pivotally connected to the lower portion of the face of the body 1 just above the clock 3. At its outer portion, this knob 14 is provided with a pointer 15 that cooperates with the scale 16 on the body 1, and at its inner end, it is shown as provided with a crank in the form of a disk 17. The crank disk 17 is shown as connected by a link 18, to the lower portion of the contact carrier 12. Extreme movements of the contact carrier 12 toward the right, in respect to Fig. 1, and toward the left in respect to Fig. 2, is limited by a stop screw 19 having threaded engagement with one flange of the body 1 and engageable at its inner end with one edge of said contact carrier 12. This set screw adjustably limits the position in the direction of high temperature which the contact carrier 12 may be set by the clock.

A clock actuated setting lever 20 is intermediately pivoted to the front plate of the body 1 at 21, and its upper end is connected to the lower portion of the contact carrier 12 by a link 22. This link 22 is preferably constructed from a piece of wire having its ends bent laterally and passed through perforations in the lever 20 and in the contact carrier plate 12 and upset at its ends, so as to hold the same in working position. At its depending end, the lever 20 is preferably provided with a flat and straight section 20^a that terminates in a laterally projecting stop finger or lug 20^b, for a purpose which will presently appear.

The numeral 23 indicates a thermometer applied to the detachable case section 2, but which, however, constitutes no part of the present invention and has nothing to do with the operation of the thermostat, or temperature regulator.

The operation of the regulator or thermostat under variations in temperature are well understood. With a clock attachment, it is, as is well known, possible to set the regulator for operation during the night and maintain a relatively low temperature, say for instance 60 degrees, and the clock is adapted to be set so that its alarm device will be released and the head of the key 6 rotated at any predetermined desired time in the morning. The alarm device including the bell, is preferably employed, but the use of the bell is not at all necessary, the primary object being to obtain a rotation of the thermostat setting tappet or arm at the desired time in the morning. The head of the key 6 affords such a tappet, and when it is

rotated, its longer side or end will engage with the section 20^a of the setting lever 20 and operating on the said lever will force the contact carrier 12 against the stop screw 19. When the contact carrier 12 strikes the stop screw 19, movements of the lever 20 as well as of said carrier 12, will be intercepted and the lever end 20^a will then afford a stop which will hold the tappet or key-head 6 against further rotation, the bent end 20^b further insures positive stopping of the tappet 6 under all adjustments of the stop screw 19. As before stated, the extent of movement given to the contact carrier 12, and hence, to the contacts 9 in a direction for higher temperature, will depend on the adjustments of the stop 19. In some instances, a fixed stop may be employed instead of the adjustable stop 19, but the adjustment is highly desirable because different persons will desire different temperatures in a room at the time of rising.

When the contact carrier 12 is locked against the stop 19 by the tappet 6 and the latter held against further rotation, the entire clock must be removed or rotated so as to permit the said tappet 6 to release itself from the end of the lever 20, and thereby again set the regulator for automatic thermally actuating control.

Fig. 6 illustrates a modification in which the lever 20, at its upper end, is connected to the contact carrier 12 by a slot and screw connection 24 in lieu of the link connection 22. The link, however, is much preferred because it operates under less friction with less play or looseness.

What I claim is:

1. In a thermostatic temperature regulator, the combination with cooperating contacts, of means for relatively adjusting said contacts, comprising a time actuated tappet and a tappet engaged member, said engaged member operating as a stop to limit the movements of said tappet.

2. In a thermostatic temperature regulator, the combination with cooperating electrical contacts, of means for relatively adjusting said contacts, comprising a time actuated rotary tappet and a tappet engaged lever, said lever operating as a stop to intercept and limit the movements of said tappet.

3. In a thermostatic temperature regulator, the combination with cooperating electrical contacts, of means for relatively adjusting said contacts, automatically and to a predetermined extent and at a predetermined time, said means comprising a time actuated tappet, a tappet engaged member, and a stop limiting the movements of said tappet engaged member and causing said tappet engaged member to intercept and limit the movements of said tappet.

4. In a thermostatic temperature regu-

lator, the combination with cooperating electrical contacts, of means for relatively adjusting said contacts, automatically and to a predetermined extent and at a predetermined time, said means comprising a time actuated tappet, a tappet engaged member, and a stop limiting the movements of said tappet engaged member and causing said tappet engaged member to intercept and limit the movements of said tappet, the said stop being adjustable so as to vary the extent of relative adjustment given to said electrical contacts.

5. In a thermostatic temperature regulator, the combination with a thermally actuated contact, of a pivoted contact carrier provided with a contact for cooperation with said thermally actuated contact, a setting lever connected to said contact carrier, a clock having a time actuated tappet operative on said setting lever and a stop limiting the movements of said contact carrier and of said setting lever and causing the latter to operate as a stop to limit the movements of said tappet.

iting the movements of said contact carrier and of said setting lever.

6. In a thermostatic temperature regulator, the combination with a thermally actuated contact, of a pivoted contact carrier provided with a contact for cooperation with said thermally actuated contact, a setting lever connected to said contact carrier, a clock having a time actuated tappet operative on said setting lever and an adjustable stop limiting the movements of said contact carrier and of said setting lever and causing the latter to operate as a stop to limit the movements of said tappet.

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

HARRY T. RAYMOND.

Witnesses:

BERWIN G. WHEELER,
HARRY D. KILGORE.