

(No Model.)

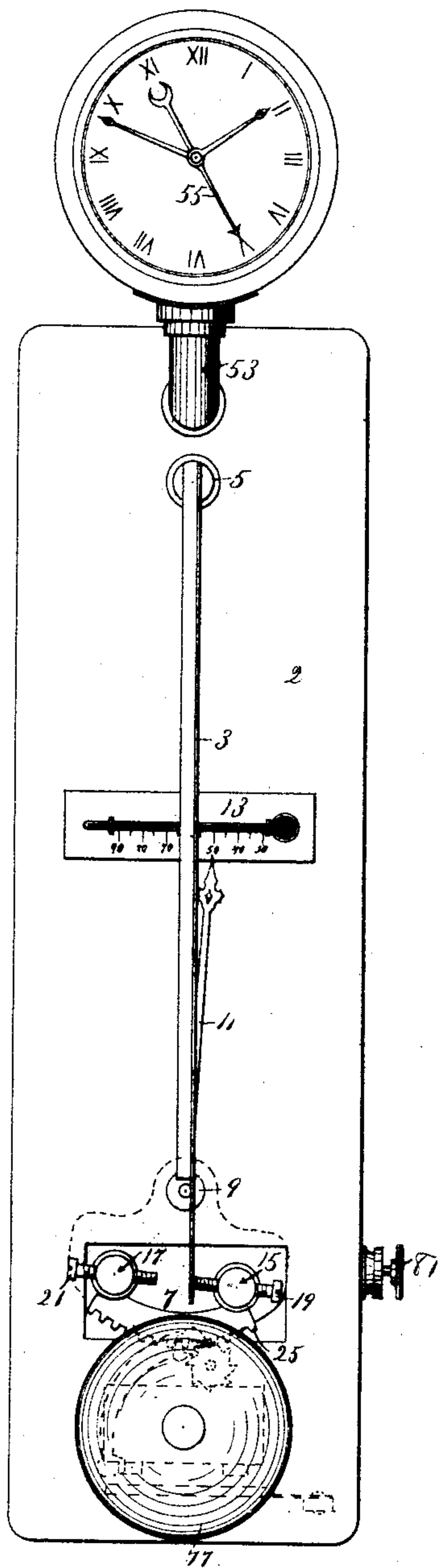
2 Sheets—Sheet 1.

A. M. BUTZ.
THERMOSTAT.

No. 409,316.

Patented Aug. 20, 1889.

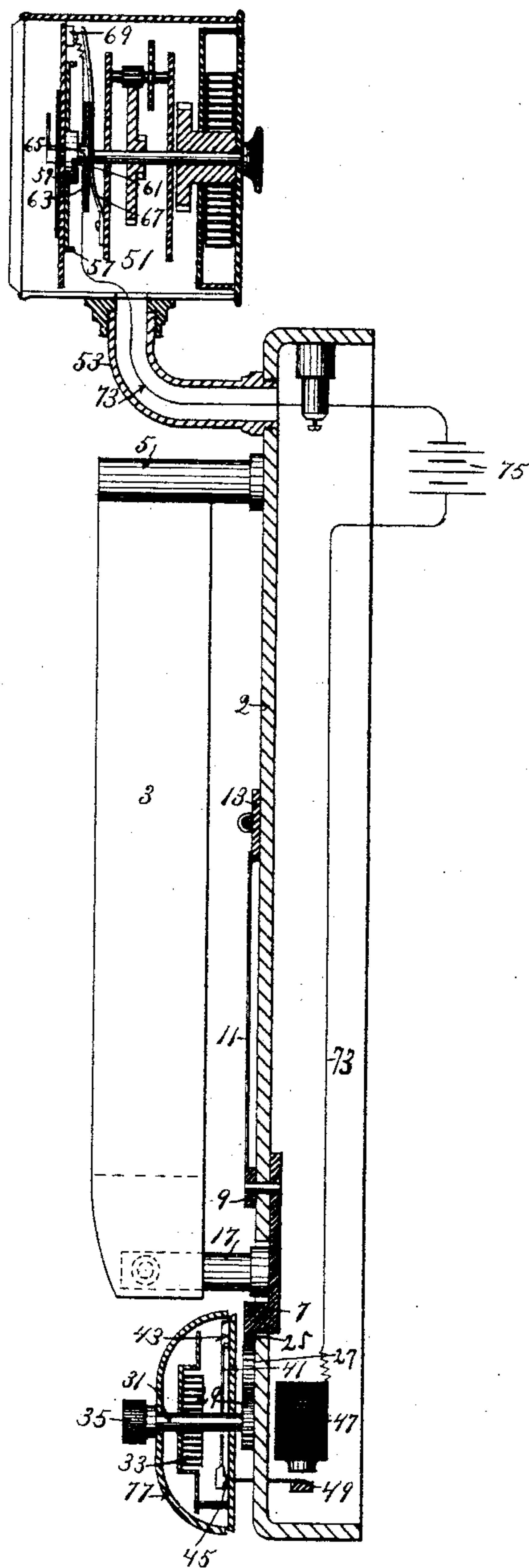
Fig. 1.



Witnesses.

S. J. Beardslee.
R. H. Sanford

Fig. 2.



Inventor.

Albert M. Butz.

By *A. O. Paul* atty.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

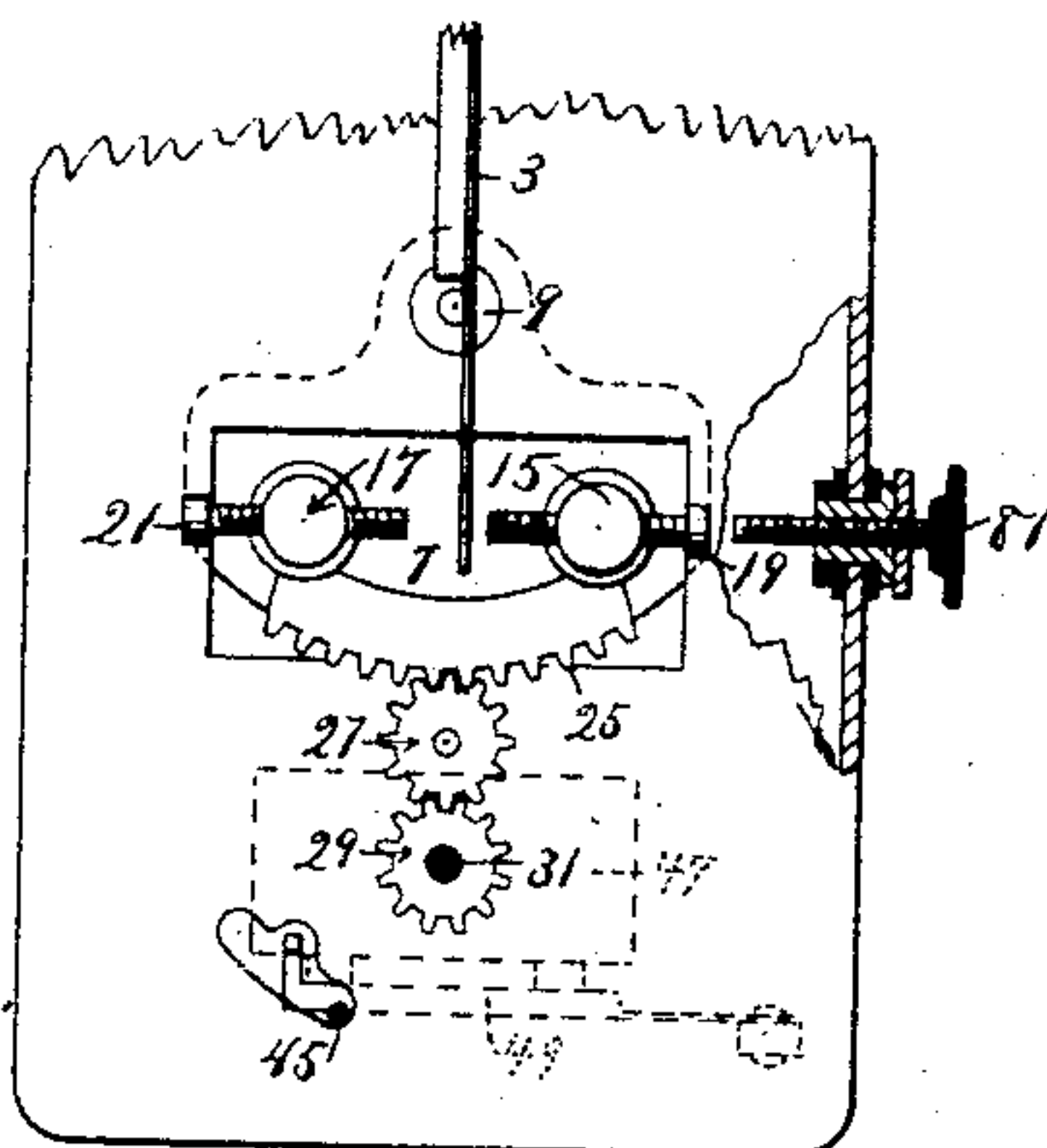
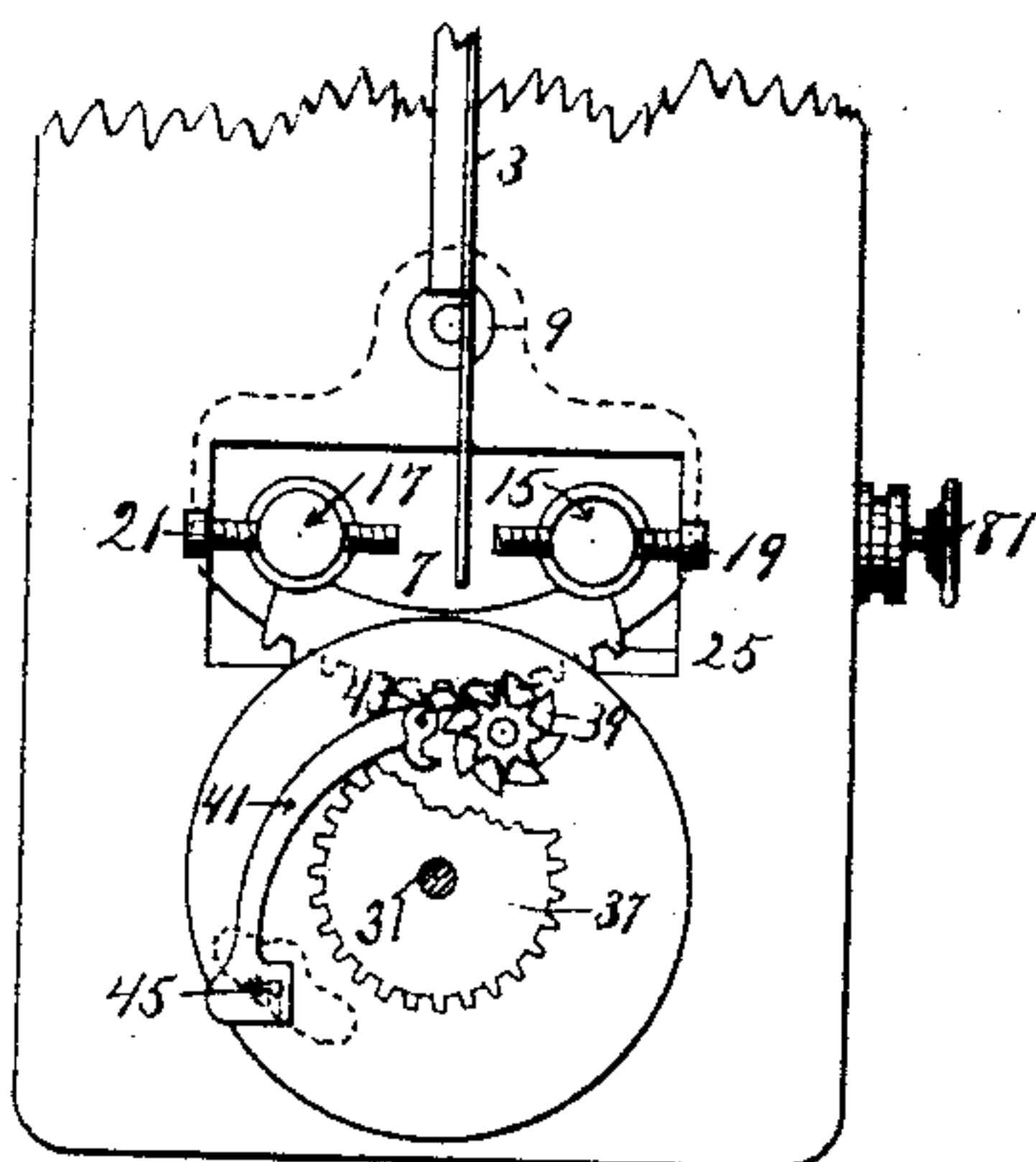


Fig. 4.



Witnesses.

S. J. Beardsley.
R. H. Sanford

Inventor.

Albert M. Butz.

By A. C. Paulson,

UNITED STATES PATENT OFFICE.

ALBERT M. BUTZ, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CONSOLIDATED TEMPERATURE CONTROLLING COMPANY, OF MINNESOTA.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 409,316, dated August 20, 1889.

Application filed May 10, 1887. Serial No. 237,709. (No model.)

To all whom it may concern:

Be it known that I, ALBERT M. BUTZ, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain
5 new and useful Improvements in Thermostats, of which the following is a specification.

This invention relates to improvements in thermostats that are designed especially for use with electric-heat regulators, and particularly to thermostats that are used with two
10 electric circuits, an "opening" and a "closing" circuit—such, for example, as is shown in my prior patent, No. 347,866, granted August 24, 1886, or in the patent to Julien M.
15 Bradford, No. 222,234, granted December 2, 1879.

The object that I have in view is to provide a thermostat having adjustable contact-points with automatic means for adjusting
20 said points.

Another object of the invention is to provide such a thermostat with automatic means for adjusting its contact-points, and a clock mechanism by which the time at which said
25 mechanism shall operate may be predetermined.

Other objects of the invention will appear from the following detailed description, taken in connection with the accompanying drawings, in which—
30

Figure 1 is a front elevation of my improved thermostat. Fig. 2 is a vertical longitudinal section of the same. Figs. 3 and 4 are details illustrating the mechanism for
35 moving the contact-points.

In the drawings, 2 represents the base of the thermostat, which is usually formed of metal and of any preferred size, form, and construction. A thermostat-bar 3, composed,
40 preferably, of a strip of rubber and a strip of metal, is secured at one end in a post 5, mounted upon the base. The other end of the bar is free to move toward either side, as the two strips forming the bar are unequally ex-
45 panded or contracted under the changes of temperature to which the bar is subjected, in a manner well understood by persons familiar with thermostats of this class.

Posts 15 and 17 are arranged upon opposite
50 sides of the free end of the thermostatic bar,

and these posts are provided with contact pins or screws 19 and 21. The posts are mounted upon a suitable plate 7, which is free to be moved toward either side of the base, and thus carry either post and contact-
55 point nearer to or farther from the free end of the bar. I prefer to secure the plate 7 to a pin 9, by which it is pivoted upon the base, as shown; but it might instead be arranged to slide toward either side of the base. A
60 pointer 11 is preferably secured to the pivot-pin 9, and a scale or thermometer 13 may be secured upon the base in such position that as the plate 7 is moved the pointer moves
65 along over the scale.

I provide an electro-magnet and an electric circuit with means for closing the circuit and thereby causing the plate 7 to be moved to change the position of the contact-points. I
70 have shown and described a preferred mechanism by which this may be done, but do not confine myself to the specific construction and arrangement thereof, and I wish to be understood as covering, broadly, any electro-magnetic mechanism for causing the position of
75 the contact-points to be changed when the same is provided with a circuit-closer, so that the position of the contact-points will be changed when the circuit-closer is operated.

The plate 7 is preferably provided with a
80 rack-bar 25, formed on or secured to its edge. A pinion 27 is arranged to mesh with this rack-bar, and is in turn engaged by a pinion 29 on a short shaft 31. This shaft is provided with a spring 33, which is wound up when
85 the shaft is turned in one direction, and when so wound up tends to turn the shaft in the opposite direction. This shaft is provided with a suitable knob or handle 35, by means of which it may be turned. A pinion 37 is
90 also mounted on the shaft 31 and meshes with a pinion carrying an escapement-wheel 39. A lever 41 carries a verge 43 that engages this escapement-wheel. This lever is also preferably provided with a lug 45.
95

Arranged preferably within the base 2 is an electro-magnet 47, provided with a spring-armature 49. When this armature is in its normal position, it encounters the lug 45, and prevents the lever 41 from moving in one di-
100

rection, thereby causing the spring to remain wound up and the plate 7 to remain in any position that it may be in. When the magnet attracts the armature, it moves it out of the line of the lug 45, and allows the spring, through the pinions and rack, to move the plate 7 and change the position of the contact-points. Any suitable circuit-closer that can be operated to close the electric circuit in which the magnet is placed may be used in connection with this mechanism.

I prefer to provide a suitable clock mechanism 51, having a circuit-closer, which may be set to close the circuit at any predetermined point of time. This clock mechanism may be located at any desired place. I have shown the clock mounted upon a support 53, that is secured to the base of the thermostat. The clock mechanism may be of any suitable construction. It is preferably provided with a hand 55, that may be set to indicate the hour at which the circuit is to be closed. This hand and the mechanism for setting it may be similar to that employed in an ordinary alarm-clock. A wheel 57, having a barrel or collar 59, is connected with the hand 55, and by turning the wheel the hand is set. The collar 59 is provided with a notch 61, as shown in Fig. 2. A wheel 63 is connected with the shaft of the hour-hand and moves therewith, but is capable of sliding longitudinally on said shaft. A lug 65 on this wheel bears on the collar 59 and is adapted to enter the notch 61. A spring 67, secured to a stationary part of the clock mechanism, bears against the wheel 63 and presses it toward the collar 59, and forces the lug 65 into the notch 61 when, in the revolution of the wheel, this lug is brought opposite the notch. The end of the spring 67 is opposite a stationary insulated contact-point 69. The contact-point is connected with the magnet by means of an insulated circuit-wire 73, which is also connected to a suitable battery 75. The other end of the wire of the coil may be connected to the base 2, and the other part of the circuit be made by the base, the clock-support, and the mechanism of the clock. If preferred, a suitable wire might be used for the other part of the circuit. When the lug 65 on the wheel 63 bears against the uncut portion of the collar, the spring 67 will be held out of contact with the contact-point 69, and the circuit remains open. When the wheel 63 turns, so as to bring its lug 65 opposite the notch 61 in the collar 59, the spring 67 forces the wheel 63 toward the face of the clock, and the end of the spring comes in contact with the point 69, and the circuit through the magnet is closed. The plate 7 will then be turned on its pivot and the position of the contact-point carried by it will be changed. For instance, let it be supposed that the plate 7 has been set with its pointer opposite 60° on the scale. As long as it remains in this position the temperature of the room where the thermostat is placed will

not be allowed to rise above that point; but as soon as the circuit-closer on the clock mechanism is operated the plate 7 will be switched to any desired higher degree on the scale—for instance, to 70°. The thermostat controls suitable mechanism for regulating the temperature of the room. It may be used in connection with any suitable mechanism for this purpose. The position of the posts and their contact-points having now been changed the temperature will be allowed to rise to that higher degree. The base 2 is preferably provided with an insulated set-screw 81, by means of which the point to which the thermostat may be switched may be predetermined.

In practice the thermostat will usually be switched down to a low degree—say 60° at night—and the clock will be set to close the circuit at any desired time—say five o'clock in the morning—and switch the thermostat back to the degree of temperature desired for the day. As an equivalent construction, the posts 15 and 17 might obviously be stationary, and the post 5, carrying the thermostat-bar, be movable and controlled by the electro-magnet and circuit.

I have shown a gong 77 arranged as a shield over the mechanism that moves the plate. The end of the lever 41 may act as a hammer on this gong, and thus sound an alarm at the time when the thermostat is switched. The device may thus operate both as an alarm and as a switch for the thermostat.

I may operate the circuit-closer by any other suitable mechanism, or may employ a circuit-closer as an ordinary push-button designed to be operated by hand.

The circuit-closer, it will be understood, may be located at any desired distance from the thermostat, and in a separate room or building, if preferred.

No claim is made herein to the construction of the thermostat, as it is substantially the same as that shown and claimed in my prior patent hereinbefore referred to, and any suitable thermostat may be used in place of that here shown, if preferred.

I claim as my invention—

1. The combination, with a thermostat provided with adjustable contact-points, of an electro-magnet, an electric circuit, and a circuit-closer, whereby when said circuit is closed the relative position of said contact-points is changed, substantially as described.

2. The combination, with a thermostat provided with a thermostatic bar, as 3, and posts carrying contact-points, as 19 and 21, the free end of said bar and said contact-points being relatively adjustable, of an electro-magnet, an electric circuit, and circuit-closer, whereby when said circuit is closed the relative position of said bar and contact-points is changed, substantially as described.

3. The combination, with a thermostat having a thermostatic bar 3, and a movable plate 7, carrying the posts 15 and 17 and contact-

points 19 and 21, of an electro-magnet controlling the position of said plate, an electric circuit, and a circuit-closer, substantially as and for the purpose set forth.

5 4. The combination, with a thermostat having relatively-adjustable contact-points and thermostatic bar, of an electro-magnetic mechanism for changing the adjustment of said parts, and a clock mechanism provided with
10 a circuit-closer controlling said electro-magnetic mechanism, substantially as described.

5 5. The combination, with a thermostat, of an electro-magnetic device for changing the position of its contact-points, a clock mechanism, a circuit-closer on said clock mechanism, and means for predetermining the time
15 at which said circuit-closer will be operated, substantially as described.

20 6. The combination, with a thermostat provided with a movable plate 7, carrying contact-points, of mechanism for moving said plate in one direction, mechanism for automatically moving said plate in the opposite direction, an electro-magnet for releasing said
25 automatic mechanism, a circuit, and a circuit-closer, substantially as described.

7. The combination, with a thermostat pro-

vided with a movable plate 7, and contact-points carried by said plate, of mechanism for moving said plate in one direction, automatic
30 mechanism for moving said plate in the opposite direction, an electro-magnet controlling said automatic mechanism, an electric circuit, and a clock mechanism provided with a circuit-closer for closing said circuit, substan-
35 tially as described.

8. The combination, with a thermostat provided with movable contact-points, and mechanism for moving said points, of an electro-magnet controlling said mechanism, a
40 clock mechanism carrying a circuit-closer in circuit with said magnet, and an alarm arranged to be operated by the mechanism for moving the contact-points of the thermostat.

9. A thermostat having movable contact-
45 points, in combination with an electro-magnetic mechanism for changing the position of said points.

In testimony whereof I have hereunto set my hand this 3d day of May, 1887.

ALBERT M. BUTZ.

In presence of—

R. H. SANFORD,

A. C. PAUL.