

Jan. 13, 1931.

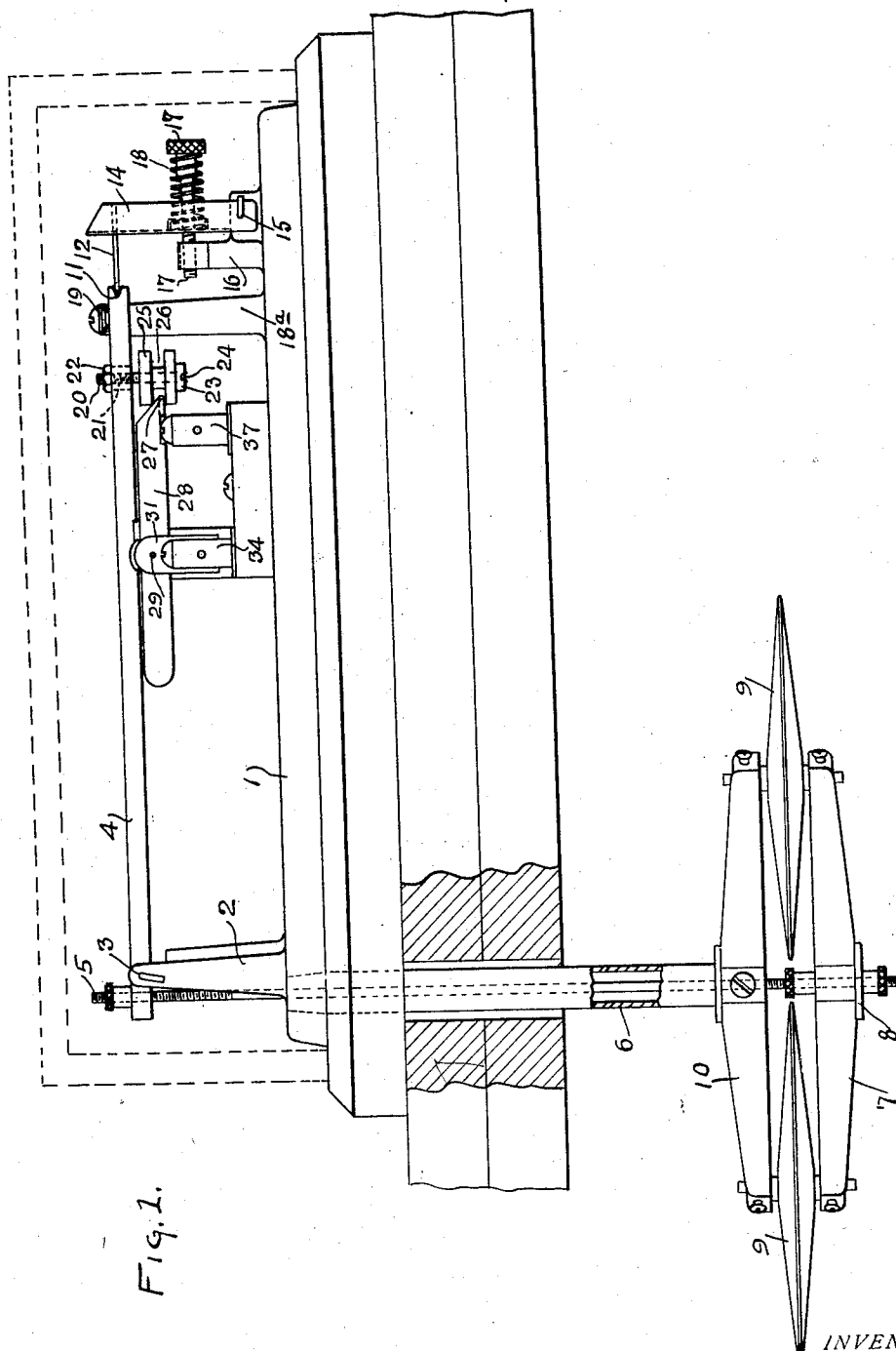
F. E. STOVER

1,788,640

THERMOSTATIC SWITCH

Filed Sept. 6, 1927

4 Sheets-Sheet 1



INVENTOR
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Jan. 13, 1931.

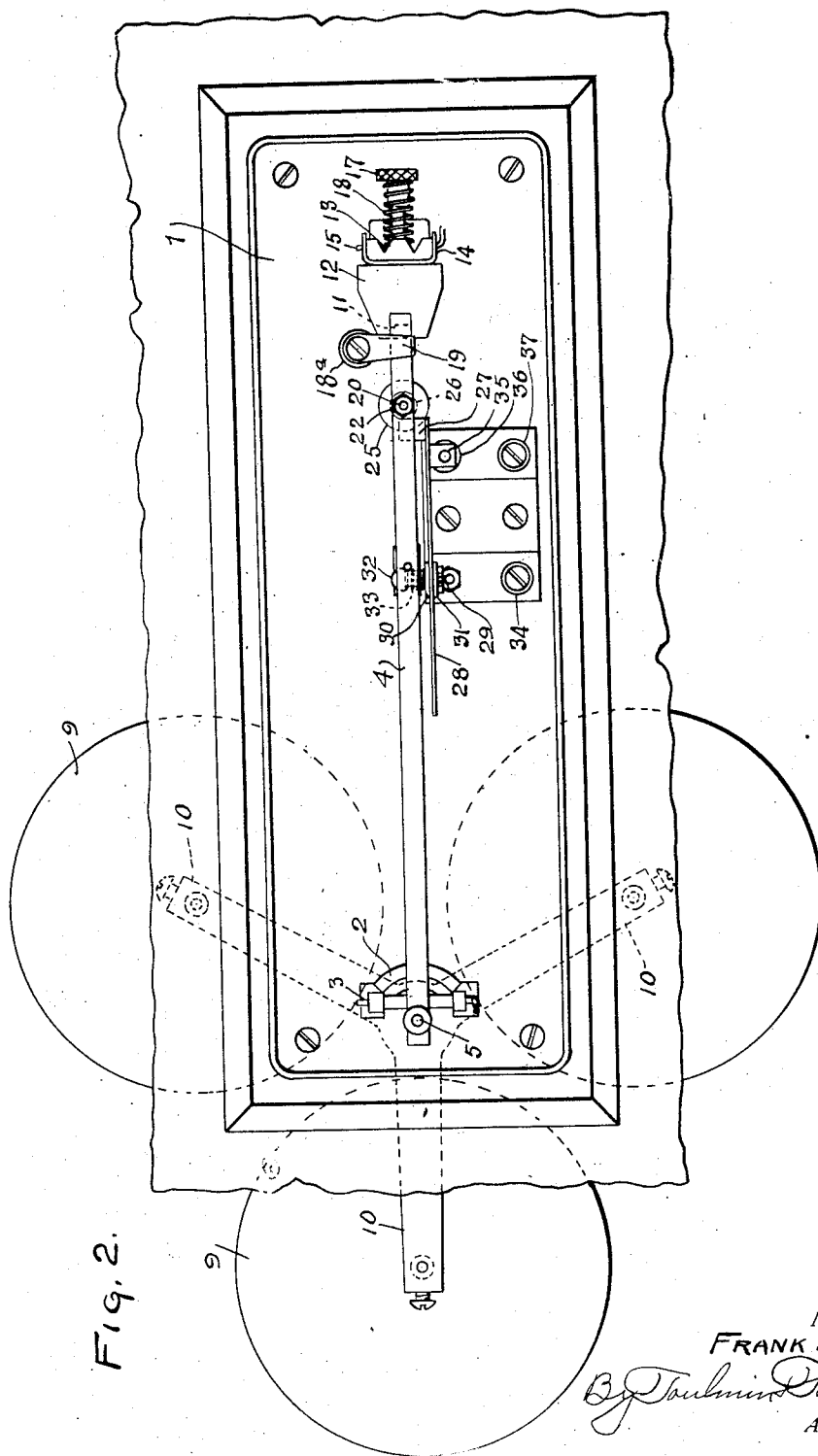
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THERMOSTATIC SWITCH

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4 Sheets-Sheet 2



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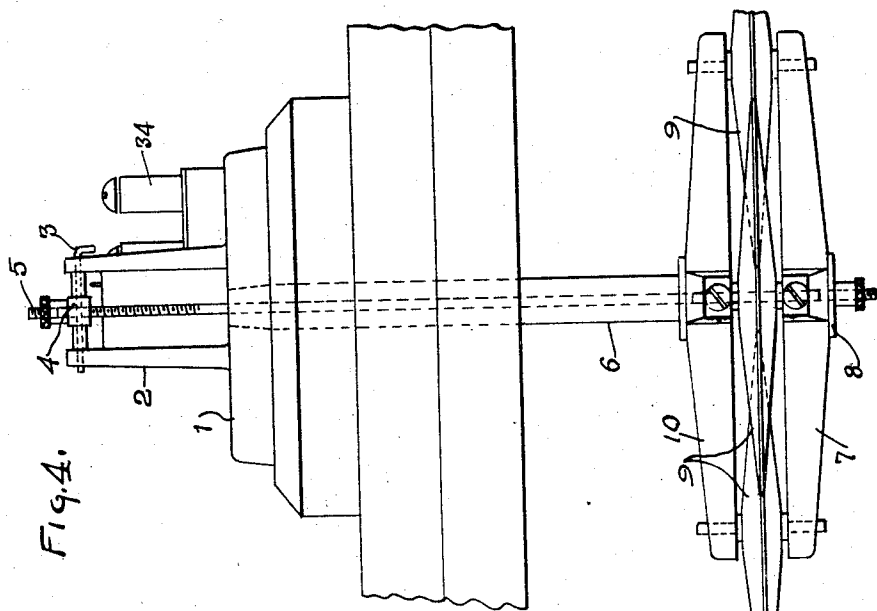
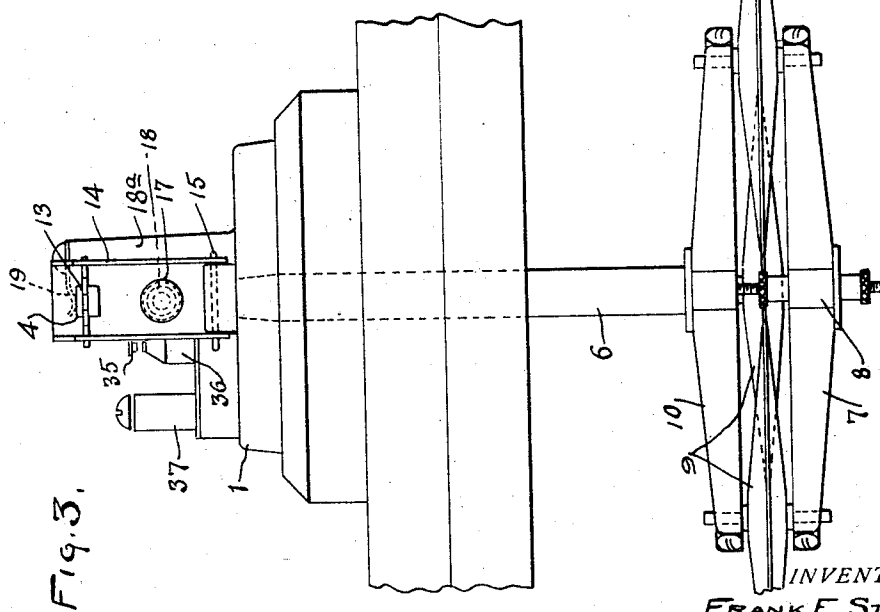
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1,788,640

THERMOSTATIC SWITCH

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4 Sheets-Sheet 3



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THERMOSTATIC SWITCH

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4 Sheets-Sheet 4

Fig. 5,

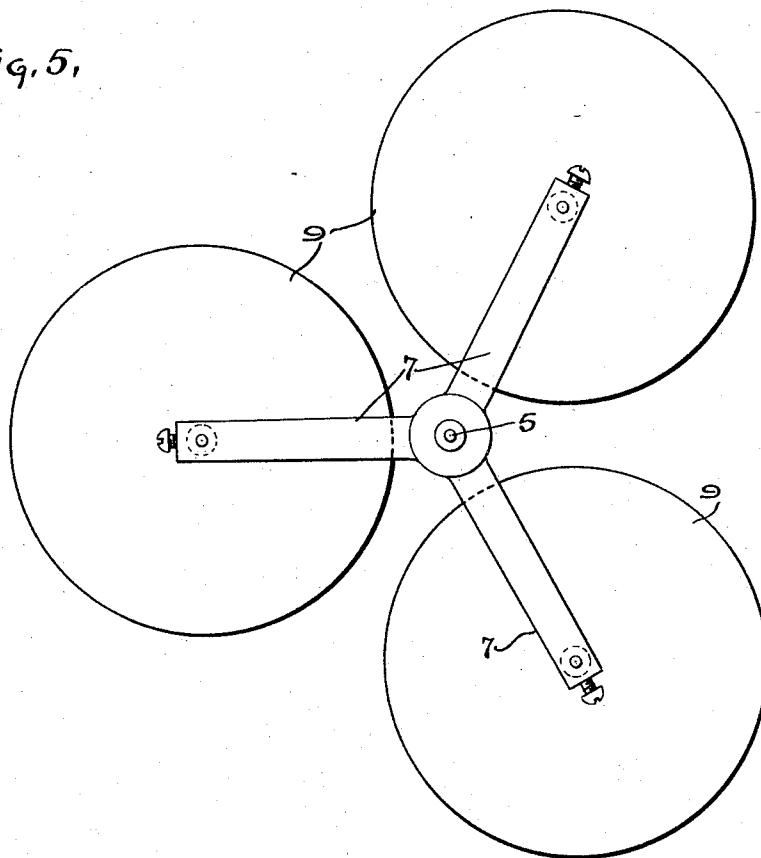
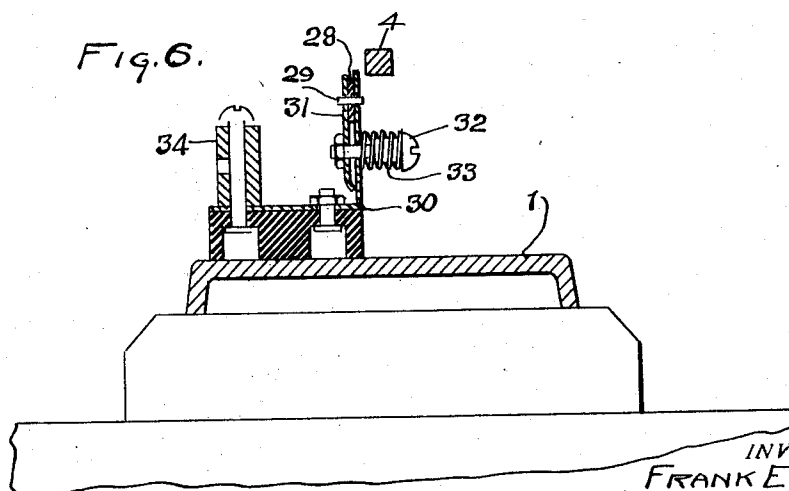


Fig. 6.



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UNITED STATES PATENT OFFICE

FRANK E. STOVER, OF SPRINGFIELD, OHIO

THERMOSTATIC SWITCH

Application filed September 6, 1927. Serial No. 217,630.

My invention relates to thermostatic switches.

It is the object of my invention to provide a thermostatic switch for controlling a circuit in such a manner that the regulation of the temperature of an enclosure such as an incubator, may be kept constant within a range of one-eighth of a degree.

It is my object to provide a switch which is sufficiently sensitive and at the same time is sufficiently powerful to maintain this very minute regulation of temperature.

It is a further object to provide a switch which will not flutter, which operates upon a small amount of current and which will be positive in action although easily adjustable.

Referring to the drawings:

Figure 1 is a side elevation of a switch.

Figure 2 is a plan view thereof.

Figure 3 is an end elevation from the toggle end.

Figure 4 is an end elevation from the thermostat end.

Figure 5 is a bottom plan view of the thermostat.

Figure 6 is a section through the control lever and the adjustable connection between the control lever and the switch lever.

Referring to the drawings, 1 is a base having a standard 2 carrying a pivot 3 for pivotally supporting the control lever 4. This control lever is adjustably positioned in one end thereof beyond the pivot and operated by the rod 5. The rod 5 passes through a sleeve 6 merging from the bottom of the sleeve and terminating in a spider 7, to which it is connected at 8.

This spider is connected to the bottom of a plurality of thermostatic discs 9, the tops of which are connected and held rigidly to another spider 10, carried on the sleeve 6 and spaced relatively with the spider 7.

As the temperature changes these discs furnish sufficient power by their movement to move the rod 5 and the lever 4 and the pivot 3.

The remote end of the lever 4 carries a V-shaped slot 11, in which is mounted a knife edged sheet of metal 12, that is pivotally

connected at 13 to a pivoted upright 14. Thus a toggle construction is formed between the plate 12 and the lever 4.

The support 14 is pivoted at 15 to the base 1. Adjacent to the plate 14 is a standard 16, in which is supported an adjustable screw 17, passing through the plate 14. The screw 17 supports a helical spring 18, which is held between the end of the screw and the plate 14 and yieldingly resists movement of the plate 14.

The third standard 18^a is mounted on the base 1 and carries at its top an overhanging spring finger 19, which engages with the top of the lever 4.

Depending from the lever 4 is an adjustable rod 20, screw threaded therein at 21 and locked in position by a locking nut 22. A head 23 is provided on the rod 20, with a slot 24 to facilitate its adjustment with respect to the lever 4.

An insulating washer 25 is carried on the rod 20 having a groove 26 for receiving the end 27 of the switch lever 28, which is pivoted at 29. The pivot 29 of the switch lever is carried in a pair of relatively movable plates 30 and 31, which are yieldingly held to one another by means of the adjusting screw 32, a helical spring 33 which engages with one of the plates and the head of the screw, thus yieldingly holding the lever 28 in either open or closed position. The lever 28 is connected to a terminal 34. The lever 28 carries a contact member 35, adapted to engage with a stationary contact member 36, which is connected to the other terminal 37.

Operation

Thus the movement of the thermostats will operate the rod 5 and the toggle levers consisting of the plate 12 and lever 4 opening and closing the contact 35 and 36. The connection between the projection 27 and the washer 25 is a loose connection so that the contact will not be made or broken until near the end of the stroke of the toggle arrangement so that a snap action will be provided, which will open and close the contact. The spring 33 will ensure the main-

nance of the lever 28 in either its open or closed position until this sudden action takes place.

The thermostats are arranged in multiple so that while they will only move a limited amount and will be sufficiently delicate to register a very minute change of temperature, such as a variation of a degree, yet by having a group of them sufficient power will be provided for the operation of the mechanism as described.

I desire to comprehend within my invention such modifications as may be clearly embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim is new and desire to secure by Letters Patent, is:

1. In combination, a plurality of interconnected thermostatic elements, a common means operated thereby, a common suspension means, snapping mechanism operated by the thermostatic elements, a switch mechanism operated by said snap mechanism and means to yieldingly resist the movement of the switch mechanism holding it in open or closed position until the snap mechanism has substantially completed its movement.

2. In combination, a plurality of thermostatic means, a stationary spider for suspending said means from one side, a movable spider connected to the other side of said thermostatic means, a rod connected thereto at one end, and, a movable element connected to the other end of said rod and composing one part of a toggle, a second movable element pivoted to said first movable element and forming therewith a snap mechanism over dead center, means to limit the movement thereof in one direction, a switch mechanism to limit the movement thereof in the other direction, said switch mechanism being operated by said snap mechanism.

3. In combination, a plurality of thermostatic means, a stationary spider for suspending said means from one side, a movable spider connected to the other side of said thermostatic means, a rod connected thereto at one end, a movable element connected to the other end of said rod and composing one part of a toggle, a second movable element pivoted to said first movable element and forming therewith a snap mechanism, means for pivotally supporting each of said movable elements mechanisms, means for yieldingly accommodating and resisting the movement of said snap mechanism over dead center, means to limit the movement thereof in one direction, a switch mechanism to limit the movement thereof in the other direction, said switch mechanism being operated by said snap mechanism, and yielding means to resist the movement of said

switch mechanism until the snap mechanism shall have substantially completed its movement in either direction.

4. In combination, a plurality of thermostatic means, a stationary spider for suspending said means from one side, a movable spider connected to the other side of said thermostatic means, a rod connected thereto at one end, a movable element connected to the other end of said rod and composing one part of a toggle, a second movable element pivoted to said first movable element and forming therewith a snap mechanism, means for pivotally supporting each of said movable elements, means for yieldingly accommodating and resisting the movement of said snap mechanism over dead center, means to limit the movement thereof in one direction, a switch mechanism to limit the movement thereof in the other direction, said switch mechanism being operated by said snap mechanism, yielding means to resist the movement of said switch mechanism until the snap mechanism shall have substantially completed its movement in either direction, and means to adjust the position between said rod and said lever.

5. In combination, a plurality of thermostatic means, a stationary spider for suspending said means from one side, a movable spider connected to the other side of said thermostatic means, a rod connected thereto at one end, a movable element connected to the other end of said rod and composing one part of a toggle, a second movable element pivoted to said first movable element and forming therewith a snap mechanism, means for pivotally supporting each of said movable elements, means for yieldingly accommodating and resisting the movement of said snap mechanism over dead center, means to limit the movement thereof in one direction, a switch mechanism to limit the movement thereof in the other direction, said switch mechanism being operated by said snap mechanism, yielding means to resist the movement of said switch mechanism until the snap mechanism shall have substantially completed its movement in either direction, and means to adjust the connection and relative position between said lever and said switch mechanism.

6. In combination, a plurality of thermostatic means, a stationary spider for suspending said means from one side, a movable spider connected to the other side of said thermostatic means, a rod connected thereto at one end, a movable element connected to the other end of said rod and composing one part of a toggle, a second movable element pivoted to said first movable element and forming therewith a snap mechanism, means for pivotally supporting each of said movable elements, means for yieldingly accommodating and resisting the movement of

said snap mechanism over dead center, means to limit the movement thereof in one direction, a switch mechanism to limit the movement thereof in the other direction, said switch mechanism being operated by said snap mechanism, yielding means to resist the movement of said switch mechanism until the snap mechanism shall have substantially completed its movement in either direction, means to adjust the connection and relative position between said lever and said switch mechanism, and means to insulate the connection therebetween.

7. In combination, a thermostat, a toggle mechanism operated thereby, means to yieldingly resist the movement of said toggle, means to limit the movement thereof, an adjustable insulated means mounted on said toggle mechanism having a relatively wide jaw for engagement with a switch mechanism, the switch mechanism adapted to move within said jaw and to be moved thereby near the end of the stroke of said toggle mechanism in either direction.

8. In combination, a thermostat, a toggle mechanism operated thereby, means to yieldingly resist the movement of said toggle, means to limit the movement thereof, an adjustable insulated means mounted on said toggle mechanism having a relatively wide jaw for engagement with a switch mechanism, the switch mechanism adapted to move within said jaw and to be moved thereby near the end of the stroke of said toggle mechanism in either direction, and yielding means to resist the movement of said switch mechanism until the end of the stroke shall have nearly been accomplished by the toggle mechanism.

9. In combination, a plurality of thermostatic elements equi-distantly disposed from a common center, means for maintaining said elements in suspended position, means for equi-distantly and equally connecting to a common center said thermostatic elements, an operating rod, a rigid platform, a lever pivoted on a standard at one end thereof connected to said rod, a movable standard pivoted at the other end of said platform, a knife edge plate engaging with the jaw on the end of said lever carried by said movable standard pivotally, a stationary standard adjacent to said movable standard having an adjusting screw projected through said movable standard, yielding means for engaging with said screw on said movable standard for yieldingly resisting the movement of the lever and the knife edge plate over dead center, a third stationary standard, means carried thereby for limiting the movement of said lever in one direction, insulated means mounted on said lever having a jaw, a rocking switch arm carrying a contact member adapted to move within said jaw and to be actuated thereby, a stationary

contact member cooperating therewith, and means for connecting an electric circuit to said movable and stationary contact members.

10. In combination, a plurality of thermostatic elements equi-distantly disposed from a common center, means for maintaining said elements in suspended position, means for equi-distantly and equally connecting to a common center said thermostatic elements, an operating rod, a rigid platform, a lever pivoted on a standard at one end thereof connected to said rod, a movable standard pivoted at the other end of said platform, a knife edge plate engaging with the jaw on the end of said lever carried by said movable standard pivotally, a stationary standard adjacent to said movable standard having an adjusting screw projected through said movable standard, yielding means for engaging with said screw on said movable standard for yieldingly resisting the movement of the lever and the knife edge plate over dead center, a third stationary standard, means carried thereby for limiting the movement of said lever in one direction, insulated means mounted on said lever having a jaw, a rocking switch arm carrying a contact member adapted to move within said jaw and to be actuated thereby, a stationary contact member cooperating therewith, means for connecting an electric circuit to said movable and stationary contact members, and yielding means for resisting the movement of said switch mechanism until it shall have been suddenly moved into engaging or disengaging position by the action of said lever.

In testimony whereof, I affix my signature.

FRANK E. STOVER.