Jan. 20, 1931.

T. HEAP

1,789,548

INDICATOR SWITCH

Filed April 17, 1929

Fig. 1.

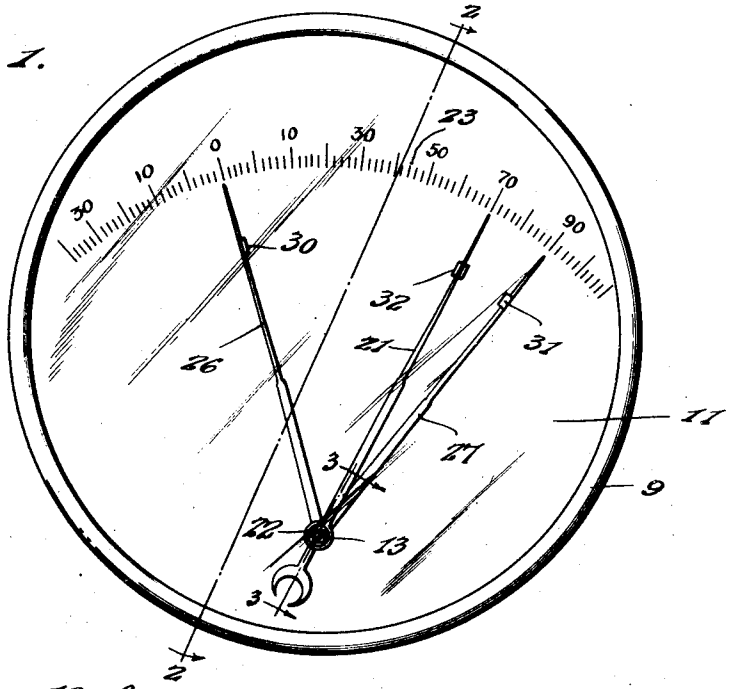


Fig. 2.

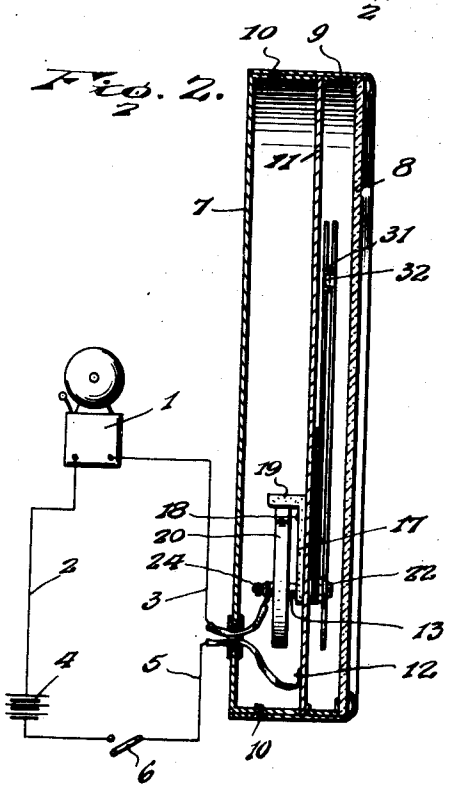
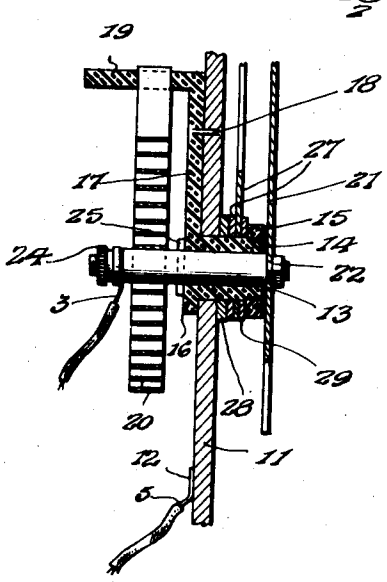


Fig. 3.



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Patented Jan. 20, 1931 1,789,548

UNITED STATES PATENT OFFICE

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INDICATOR SWITCH

Application filed April 17, 1929. Serial No. 355,905.

This invention relates to a thermostatic alarm and more particularly to a device by means of which a circuit may be closed and a signal sounded when temperature varies and becomes either too hot or too cold.

It often happens that blossoms in a fruit orchard will be killed by frost or plants in a hothouse damaged by the hothouse becoming either too hot or too cool. This loss could be averted if the owner or the manager were warned in time to set out smoke boxes in an orchard or regulate the heating system of a hothouse.

Therefore, one object of the invention is to provide an alarm including a bell or equivalent signal energized by electricity and an improved thermostatic switch by means of which the circuit may be closed when the temperature is approaching the danger point.

Another object of the invention is to provide a circuit closer including a hand which moves according to variations in the temperature and setting hands insulated from the temperature-indicating hand and adapted to be engaged by the temperature-indicating hand so that when the temperature-indicating hand contacts with the setting hand the circuit will be closed and the alarm sounded.

Another object of the invention is to allow the setting hands to be moved relative to a scale upon the dial of the thermometer and thereby allow the signal to be sounded at any temperature desired.

The invention is illustrated in the accompanying drawing, wherein

Figure 1 is a view looking at the front face of the improved thermostatic circuit closer which controls sounding of the alarm,

Fig. 2 is a sectional view through the circuit closer taken on the line 2—2 of Fig. 1 and including an electric bell and a circuit for the bell operatively connected with the circuit closer, and

Fig. 3 is an enlarged fragmentary sectional view taken on the line 3—3 of Fig. 1.

The signal with which the improved circuit closer constituting the subject-matter of this invention is used includes a bell 1 which may be mounted in a house or at any other place where it can be easily heard by the owner or manager of an orchard or greenhouse. Wires 2 and 3 lead from the bell. The wire 2 is connected with one side of a battery or other source of electric energy 4 while from the other side of the battery extends a wire 5 having a switch 6 intermediate its length so that the circuit may be manually opened and closed when found necessary. The wires 3 and 5 are of sufficient length to extend to the place where the thermostatic circuit closer is to be located and this circuit closer may be mounted upon a suitable support in an orchard or greenhouse.

This circuit closer is in some respects similar to a thermostat of a conventional construction and includes a casing 7 open at its front and in order to close the open front of the casing there has been provided a transparent closer sheet 8 formed preferably of glass and retained in place by a rim 9 removably secured about the casing by screws or equivalent fasteners 10. A dial 11 is mounted in the casing intermediate the depth thereof and to this dial, which is formed of conductive material, the wire 5 is grounded, as shown at 12. A shaft 13 formed of conductive material passes through the dial, and in order to insulate the shaft from the dial, there has been provided a bushing 14, the forward end of which is threaded in order to receive a securing nut 15. The bushing 14 has an enlarged rear end portion 16 to limit its movement outwardly through the dial and from this enlarged inner or rear end portion of the bushing extends an arm 17 which is rigidly secured to the dial by a rivet or equivalent fastener 18. The upper portion 19 of the arm projects rearwardly from the dial and to this portion is secured the outer end of a thermostatic spring which is coiled about the shaft and has its inner end secured to the shaft. It will thus be seen that when the spring is effected by change in temperature the shaft will be rotated and the temperature-indicating hand 21 which is secured firmly upon the forward end of the shaft by a securing nut 22 will be swung relative to a scale 23 marked or otherwise provided upon the outer face of the dial. The wire 3 is secured to the rear end of the shaft by a

securing nut 24 and the shaft is prevented from sliding forwardly through the bushing by a pin 25.

Hands 26 and 27 which may be referred to as setting hands fit loosely upon the bushing in front of the dial and this bushing also carries washers 28 and 29 between which the setting hands are located. It will thus be seen that when the securing nut 15 is tightened the two setting hands will be gripped between the washers and frictionally held in set positions. Since these washers are formed of conductive material and the washer 28 bears against the dial, an electric connection will be established between the dial and the setting hands but the two setting hands will be in insulated relation to the temperature-indicating hand. These two hands extend at opposite sides of the temperature-indicating hand and each of them carries a tongue or abutment, indicated respectively by the numerals 30 and 31, which project outwardly and the temperature-indicating hand carries a tongue 32 which projects inwardly. By this arrangement the two contacts 30 and 31 will be disposed in the path of movement of the contact 32 and may be engaged thereby in order to establish an electrical connection between the temperature-indicating hand and either of the setting hands and cause the circuit to be closed and the alarm bell to ring.

When the signal is in use, the bell is mounted where it can be easily heard and the thermostatic circuit closer mounted in an orchard or greenhouse to be protected. The hand 26 will be set a few degrees above freezing if the device is used to protect an orchard. If the circuit closer is located in a greenhouse, the hand 26 will be set at the lowest point upon the scale which is considered safe and the hand 27 set a few degrees below the highest point which it is considered safe. The temperature-indicating hand moves in the usual manner as the spring 20 is affected by changes in temperature and when it is substantially parallel to one of the setting hands its contact 32 will engage the contact of the setting hand and thereby close the circuit and cause the signal bell to ring. This will warn the owner or attendant of the orchard or greenhouse and as the signal is sounded while the temperature is still a few degrees away from the danger point there will be ample time to take precautionary measures by setting out smoke boxes in an orchard or adjusting the heating system of a greenhouse.

Having thus described the invention, I claim:

1. A thermostatic circuit closer comprising a casing open at its front, a dial of conductive material in said casing having a scale upon its outer face, a shaft of conductive material extending through said dial, an insulating bushing fitting about said shaft and having an arm behind the dial, a spring coiled about the rear portion of said shaft with its inner end anchored to the shaft and its outer end anchored to said arm and serving to rotate the shaft as it expands and contracts, a setting hand of conductive material rotatable about said bushing in front of the dial for adjustment relative to the scale and having conductive connection with the dial, a hand fast upon the front end of said shaft and adapted to make contact with the setting hand at a temperature determined by adjusting the setting hand, and conductors anchored to the shaft and dial.

2. A thermostatic circuit closer comprising a casing open at its front, a dial of conductive material in said casing having a scale upon its outer face, a shaft of conductive material extending through said dial, an insulating bushing fitting about said shaft and having an arm behind the dial, a spring coiled about the rear portion of said shaft with its inner end anchored to the shaft and its outer end anchored to said arm and serving to rotate the shaft as it expands and contracts, a temperature-indicating hand fast upon the front end of said shaft formed of conductive material and extending towards the scale, a setting hand of conductive material fitting upon said bushing between the dial and first hand and adapted to be swung to a set position relative to the scale, contacts extending from said hands and adapted to make contact to close a circuit when the first hand has been moved substantially into alignment with the setting hand, and conductors anchored to the shaft and dial.

3. A thermostatic circuit closer comprising a casing open at its front, a dial of conductive material in said casing having a scale upon its outer face, a shaft of conductive material extending through said dial, an insulating bushing fitting about said shaft and having an arm behind the dial, a spring coiled about the rear portion of said shaft with its inner end anchored to the shaft and its outer end anchored to said arm and serving to rotate the shaft as it expands and contracts, a temperature-indicating hand fast upon the front end of said shaft formed of conductive material and extending towards the scale, a setting hand of conductive material fitting upon said bushing between the dial and first hand and adapted to be swung to a set position relative to the scale, washers of conductive material upon said bushing in front of and in back of the setting hand with the rear washer bearing against said dial, a securing nut threaded upon said bushing and when tightened causing the setting hand to be gripped between the washers and frictionally held in a set position, abutments extending from said hands and adapted to contact and close a circuit when the first hand

moves substantially into alignment with the setting hand, and conductors anchored to the shaft and dial.

4. A thermostatic circuit closer comprising a casing, a dial in said casing having a scale upon its outer face, a rotatable shaft extending through the dial and insulated therefrom, a control spring coiled about said shaft with its inner end secured to the shaft and its outer end secured in insulated relation to the dial, a temperature-indicating hand of conductive material fast upon the outer end of said shaft and extending towards the scale, a setting hand of conductive material movable about the shaft in insulated relation thereto between the dial and first hand for adjustment relative to the scale, the first hand being adapted to contact with the setting hand and close a circuit when substantially in alignment therewith, and conductors having electric connection with the shaft and setting hand.

In testimony whereof I affix my signature.

THOMAS HEAP. [L. S.]