March 15, 1949. A. E. ARMSTRONG ET AL 2,464,476

THERMOSTATIC SWITCH

Filed Oct. 27, 1943

Fig. 1.

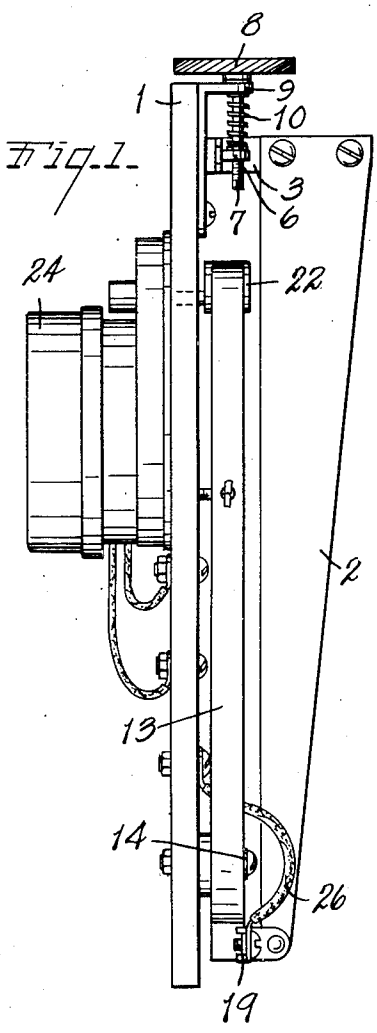
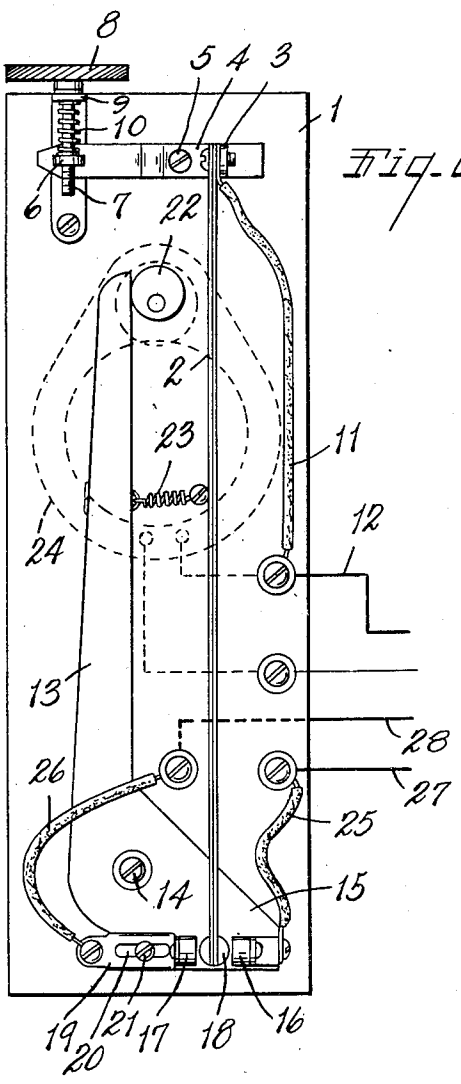


Fig. 2.



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Patented Mar. 15, 1949

2,464,476

UNITED STATES PATENT OFFICE

2,464,476

THERMOSTATIC SWITCH

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Application October 27, 1943, Serial No. 507,776

6 Claims. (Cl. 200—136.3)

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This invention relates to improvements in thermostatic switches.

The main objects of this invention are:

First, to provide a thermostat which is well adapted for use in heating system controls where a high degree of accuracy is desired.

Second, to provide a thermostat for use in connection with space heating controls which not only is effective within a small range of temperatures but minimizes "hunting" fluctuations.

Third, to provide a thermostat having these advantages which is not likely to become inoperative through accumulations of dust or "freezing" of contact points.

Fourth, to provide a structure which may be quickly and accurately adjusted for the required temperature.

Objects pertaining to details and economies of the invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure which embodies the features of the invention is clearly illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a thermostat embodying the features of our invention.

Fig. 2 is a front elevation thereof.

The embodiment of our invention illustrated comprises a plate-like base 1 preferably of insulating material, hard fiber or wood being satisfactory. The blade type bimetallic thermal element 2 is mounted on the forwardly projecting arm 3 on the support 4 pivoted at 5. This support is provided with an ear 6 engaged by the adjusting screw 7 having a hand piece 8. This structure is rotatably mounted in the bracket 9, the spring 10 being arranged between the ears 6 and the bracket to apply stress and facilitate the accurate adjustment of the screw through its hand piece.

The bimetallic element has an electrical connection 11 to a current source 12. The lever-like contact supporting member 13 is pivoted to the base at 14 and provided with a laterally projecting arm 15 at its lower end which carries the contact members 16 and 17. These contact members are disposed in opposed relation relative to the contact point 18 on the swinging end of the thermal element. This contact point 18 is preferably curved and the contact members 16 and 17 are preferably flat faced.

The contact member 17 is carried by an adjustable bracket or clip member 19 having a longitudinal slot 20 therein receiving the screw

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21 which enables the adjustment of the contact member 17 relative to the contact member 16.

The support member 13 is periodically oscillated or actuated on its pivot by means of a cam 22 which engages the swinging end of the lever or support, the spring 23 holding the support against the cam. This cam is continuously driven by the motor 24 which is preferably of the synchronous type, that is, it is an electrical synchronous type of motor. The driving connections for the motor to the shaft of the cam are not illustrated, but it will be understood that they are such that the cam is rotated at the desired speed to oscillate the contact support member 13 on its pivot, thereby alternately moving the contact members 16 and 17 toward and from the contact point 18 of the thermal element or toward and from its normal position.

It will be observed that owing to the position of the contact members 16 and 17 relative to the pivot on the oscillating support 13 a wiping motion is imparted thereto as the member 13 is oscillated. This keeps their faces free from dust and prevents "freezing." The contact members 16 and 17 are provided with electrical connections 25 and 26, respectively, to the controlled circuits 27 and 28.

A practical setting is to adjust the oscillating contacts 16 and 17 so that the distance between them is equal to the horizontal movement of the contacts, plus the diameter of the contact 18, plus about two-thousandths of an inch. The oscillation of the contacts 16 and 17 permits the length of time or the period in which the contact 18 is engaging either member 16 or 17 to be directly proportional to the amount that the area to be controlled is warmer or cooler than the setting of the thermostat. If the space to be controlled is warmer than the thermostat setting, the thermal element will move to the left in which position the contact 18 on the thermal element is moved into position where it may be intermittently engaged at relatively short intervals by the oscillating contact 17, and if cooler than the setting the thermal element will move to the right in which position the contact 18 is moved into position where it may be intermittently engaged at relatively short intervals by the oscillating contact 16. This is a statement intended to point out operation and of course it would depend on the type of thermal element and the relative arrangement of the metals constituting it.

We have illustrated and described our invention in a highly practical embodiment thereof.

We have not attempted to illustrate or describe various embodiments and adaptations contemplated as it is believed this disclosure will enable those skilled in the art to practice the invention as may be desired.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. In a thermostat, the combination with a base plate, of a blade type bimetallic thermal element mounted at one end for regulating adjustment and having oppositely facing contact points at its free end, a lever-like contact support member pivotally mounted on said base plate for oscillating movement thereon and having a relatively short arm disposed transversely of said thermal element, contact members mounted on said support arm in opposed coacting relation with said contact points of said thermal element, said contact points and contact members being relatively positioned for a substantial sliding engagement of said contact members with said contact points when said contact points are moved by said thermal element into the path of oscillation of said contact members, at least one of said contact members being mounted on said support arm for adjustment toward and from the other, a cam for oscillating said contact support member, a coiled spring yieldingly urging said support member against said cam, and a motor for continuously driving said cam at a speed to permit of successive oscillations of said contact support member being separated by relatively short time intervals.

2. In a thermostat, the combination with a base plate, of a blade type bimetallic thermal element mounted at one end for regulating adjustment and having oppositely facing contact points at its free end, a lever-like contact support member pivotally mounted on said base plate for oscillating movement thereon and having a relatively short arm disposed transversely of said thermal element, contact members mounted on said support arm in opposed coacting relation with said contact points of said thermal element, said contact points and contact members being relatively positioned for a substantial sliding engagement of said contact members with said contact points when said contact points are moved by said thermal element into the path of oscillation of said contact members, a cam for oscillating said contact support member, a coiled spring yieldingly urging said support member against said cam, and a motor for continuously driving said cam at a speed to permit of successive oscillations of said contact support member being separated by relatively short time intervals.

3. In a thermostat, the combination with a base plate, of a blade type bimetallic thermal element mounted at one end for regulating adjustment and having oppositely facing curved contact surfaces at its free end, a lever-like contact support member pivotally mounted on said base plate and having a relatively short arm disposed transversely of said thermal element, flat-faced contact members mounted on said support arm in opposed coacting relation with said curved contact surfaces of said thermal element, said contact members being mounted on said support arm so that a wiping movement is imparted thereto as they are alternately moved toward and from the normal plane of the thermal element as the contact support member is actuated on its pivot, a cam for oscillating said contact support member, a coiled spring yieldingly urging said support member against said cam, and a motor for continuously driving said cam at a speed to permit of successive oscillations of said contact support member being separated by relatively short time intervals.

4. In a thermostat, the combination of a blade type bimetallic thermal element mounted at one end for regulating adjustment and having oppositely facing contact points at its free end, a pivotally mounted contact support member, contact members mounted on said support in opposed coacting relation with said contact points of said thermal element, said contact members being oscillated by said support member in a direction disposed at a substantial angle to the direction of movement of said contact points due to movement of the thermal element, to facilitate a substantial sliding engagement of the contact members with said contact points when the contact points are moved by the thermal element into the paths of oscillation of said contact members, at least one of said contact members being mounted on said support for adjustment toward and from the other, and means for oscillating said contact support member on its pivot with successive oscillations being spaced by relatively short time intervals, said contact support member being disposed to move said contact members toward and from said contact points, said thermal element upon flexing due to changes in temperature, being disposed to move said contact points towards and from said contact members, said contact members being spaced relative to each other to permit of the same being intermittently oscillated at relatively short intervals by said contact support member without either of said contact members engaging either of said contact points after a predetermined temperature is reached and permitting intermittent engagement at relatively short intervals of one of said contact points with one of said contact members upon flexing of said thermal element due to a change in temperature from said predetermined temperature.

5. In a thermostat, the combination of a thermal element adapted to flex under varying temperatures mounted for regulating adjustment, contact points mounted to be moved by said thermal element, a movably mounted oscillatable contact member support, contact members mounted on said support in such relation to the pivot thereof that they are moved toward and from the contact points, said contact members being oscillated by said support in a direction disposed at a substantial angle to the direction of movement of said contact points due to movement of the thermal element, to facilitate substantial sliding engagement of the contact members with said contact points when the contact points are moved by said thermal element into the paths of oscillation of the contact members, and means for periodically oscillating said support.

6. In a thermostat, the combination of a thermal responsive element adapted to be flexed by changes in temperature, electrical contact means operable by said thermal responsive element, an oscillatable contact member support, means for periodically oscillating said support with successive oscillations thereof separated by relatively short time intervals, an electrical contact member mounted on said support to be oscillated thereby, said contact means being positioned by said thermal responsive element out of the path

of oscillation of said contact member after a predetermined temperature is reached and positioned in the path of oscillation of said contact member for intermittent engagement therewith at relatively short intervals upon a change from said predetermined temperature, the direction of the path of oscillation of the contact member being at a substantial angle to the direction of the path of movement of said contact means by said thermal responsive element whereby the contact member slidably engages the contact means when said contact means is moved by the thermal responsive element into the path of oscillation of said contact member.

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