Aug. 13, 1929. F. SCHAUM 1,724,425

THERMOSTAT

Filed July 2, 1927

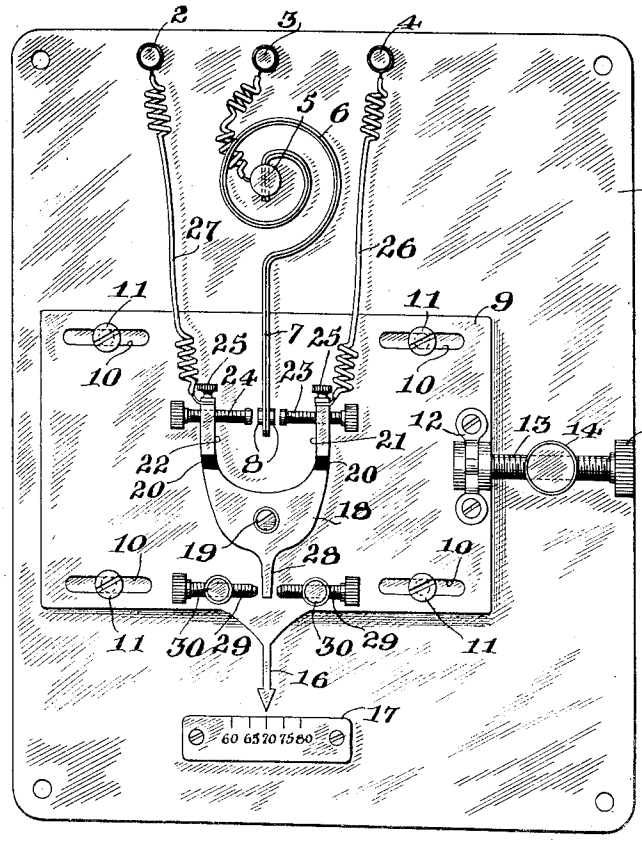


Fig. 1.

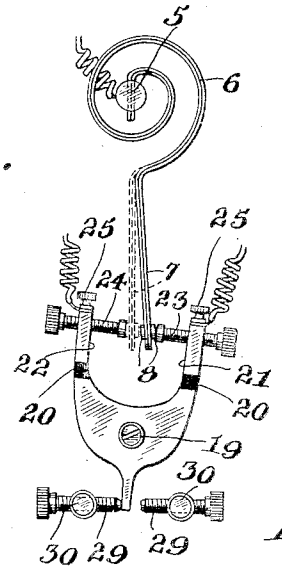


Fig. 2.

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UNITED STATES PATENT OFFICE.

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THERMOSTAT.

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My invention relates to new and useful improvements in thermostats and has for an object to provide a thermostat that is extremely sensitive in operation and will respond more quickly to the changes in temperature than will the ordinary forms of thermostat now in use.

Still another object of the invention is to provide a thermostat that is so arranged that it will overcome the usual lag that takes place between the action of the thermostat and the source of heat that affects the thermostat.

Still another object of the invention is to provide a thermostat wherein the contact posts opposite the bi-metal arm may oscillate through a small amplitude in its movement so that the bi-metal in retracting will not have to return through its full former amplitude to make contact with its opposing contact post.

Still another object of the invention is to provide a thermostat that may be easily adjusted to operate at different temperatures and at the same time provide an oscilliating yoke to quicken the action of the thermostat.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings showing a preferred embodiment of the invention.

Fig. 1 is a plan view of my improved thermostat, and

Fig. 2 is a similar detail view of the oscillating yoke and controlling arm, the oscillating yoke being shown at its limit of movement.

Referring now more particularly to the several views, there is shown a base 1, which may be of any common form of dielectric or this may be of wood if so desired, but if the latter, the binding posts 2, 3 and 4 must be properly insulated therefrom.

I have not shown any input connections to these binding posts 2, 3 and 4, but it will be understood that any wire leading to the post 3, will be a common pole to the other two posts.

Properly mounted on the base 1, is a small retaining post 5, in which will be mounted a coil of bi-metal 6 that will expand under the influences of heat, the heat of course causing the coil to uncoil and thus swing the arm or end 7 of the coil to the right. On the other hand, a cooling temperature will cause the coil to contract and swing the arm towards the left, as is common in all forms of thermostats.

At the end of this arm 7, may be the small platinum points 8 as is also common to thermostats. Located beneath the coil 6 is a small plate 9, which is provided with four slots 10 at its opposite corners, through which pass the screws 11 which screws are firmly secured in the base 1. At one side of the plate 9, is a small retaining member 12, in which is fastened the bolt 13, which in turn is threaded within the post 14, the knurled knob 15 on the bolt may thus be used to laterally adjust this plate 9, so that the thermostat will respond at desired temperatures.

Along the bottom edge of the plate and centrally thereof may be formed the arrow or pointer 16 beneath which, and secured to the base 1 is the plate 17 on which will appear the different graduations in degrees of temperature.

One of the important features of the invention is the small yoke 18 that is pivoted as at 19, so that it may pivot or oscillate through a small amplitude of movement.

This yoke 18, however, will only pivot or oscillate when actuated by a movement of the arm 7 and will remain in its moved position until again actuated by a movement in the opposite direction of the arm. In other words, although it is pivotally mounted at 19, it will retain its position until moved in either direction by movement of the arm 7.

This yoke 18 may be of metal and is provided with two small pieces of dielectric 20 on its opposite arms, so as to properly insulate the yoke arms 21 and 22 from the body. Fitted within the arm 21 is the small threaded post 23, while a similar post 24 is threaded within the arm 22. Binding nuts 25 are provided for each post, so that connecting wires 26 and 27 may lead to the binding posts 4 and 2 respectively.

Referring again to the yoke 18, a small projection 28 is seen at the bottom thereof which in turn normally extends between the

two limiting screws 29, which in turn are threaded within the respective posts 30. These posts 29 may be regulated so that the yoke 18 is limited in its oscillation in both directions.

It will be remembered that the plate 9 as a whole is laterally movable and it will be also seen that contacting posts 23 and 24 are adjustable as well as the limiting screws 29, so that a fine degree of adjustment may be made with the plate and its yoke with relation to the coil 6 and its arm 7. The operation of the device is as follows:

Supposing that to the binding posts 3 and 4 lead wires (not shown) extend to a solenoid or other actuating means, which in turn will be connected to a heat supply or whatever is desired to be controlled by the thermostat. Also lead wires will extend from 3 and 2 to this or other regulating means. Now supposing that the temperature rises, the coil 6 will expand and swing its arm 7 to the position shown in Fig. 2. This will complete the circuit from the post 3 through the arm 23 and from the binding post 4 to the instrument to operate the desired mechanism for cutting off the heat.

It will also be noticed that when the coil 6 extends and contacts with the post 23, it will also oscillate the pivotal yoke slight to the right as shown in Fig. 2 and will in this manner move the post 24 over to the point where the arm 7 will contact with the same when the arm 7 has returned to its position shown in Fig. 1. The arm 7 therefore does not have to travel the distance between the platinum point 8 and the arm 24, (Fig. 1), which it ordinarily would have to travel if the yoke 18 were not pivoted and had not swung to the right.

As soon, therefore, as the arm 7 reaches its normal position, (vertical) it will then form the electrical contact through the arm 24 and complete the circuit through the instrument connected through the binding posts 2 and 3.

If the temperature continues to drop, the arm 7 will of course continue to move to the left and oscillate the yoke in the opposite direction shown in Fig. 2 and cause the yoke to assume a position just opposite to that shown in Fig. 2, so that when the arm 7 again returns to the normal position, the yoke being swung to the left would contact again with the arm 23 to thus operate the instruments connected to the leads 3 and 4.

From this it will be seen that the thermostat is one of delicate operation and quick action, and as it will operate more quickly than the ordinary thermostat, it will overcome the lag that is generally incident to other forms of thermostat controls.

It will also be seen that whether the bimetal arm swings to the right or left, it will oscillate the yoke with it, so that when the arm again returns to its vertical position, it will contact with the opposing post more quickly than if the yoke and the posts 23 and 24 were stationary.

Furthermore, it will be seen that the thermostat is one of simple construction, there being but one moving part beside the coil, and only parts that need to be insulated are the arms 21 and 22, as otherwise, of course, the circuits would be complete through the yoke 18.

I have found that the thermostat is one that may be easily adjusted and after one adjustment, needs no further attention. It will also operate under very slight changes in temperature due to the pivotal arrangement of the yoke.

This is important, as the slight variations in temperature will cause first one circuit and then the other to operate, so that there will be no lag between operations and will not let, say the fire in the heater or under the boilers, get too low or too high between operations of the thermostat.

Many slight changes might be made without in any way departing from the spirit and scope of the invention.

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

1. A thermostat comprising a base, a bimetal coil mounted on said base, a pivotal yoke straddling the end of said coil, the opposite arms of said yoke being insulated from the yoke, the two arms and the said coil adapted to be placed in an electric circuit whereby the coil will form a common pole for either circuit, and a swinging of the end of the coil in either direction will close one of said circuits and slightly oscillate said yoke to bring the non-contacting arm closer to the end of the coil.

2. A thermostat comprising a base, a heat actuated metal coil mounted on said base, a pivotal yoke straddling the end of said coil, the opposite arms of said yoke being insulated from the body of said yoke and from each other, posts in each of said arms, the said posts and the arm of said coil adapted to be connected to electric circuits so that the coil will be a common pole with either post and a movement of said arm in either direction completing an electric circuit to oscillate said yoke to bring the non-contacting post closer to said swinging arm than if the yoke remained stationary.

3. A thermostat comprising a base, a thermo-controlled coil having a vertically extending arm, a pivotal member having two opposite posts straddling said arm, said posts insulated from each other, the thermo arm and the said posts adapted to be electrically connected so that the thermo arm is a common pole for either post, the pivotal member adapted to oscillate by an expansion or contraction of said coil so that a return

movement of the thermo-arm after swinging and contacting with one post will more quickly contact with the other post than would be the case if the pivotal member had remained stationary.

4. A thermostat comprising a base, a thermo-controlled coil having a vertically extending arm, a pivotal member having two opposite posts straddling said arm, said posts insulated from each other, the thermo coil arm and the said post adapted to be so electrically connected that the thermo arm is a common pole for both posts, the thermo arm on expanding contacting with one of said posts to close an electric circuit, and also oscillating said pivotal member to cause the other of said posts to follow the arm in its swing, so that said thermo arm will more quickly contact with the latter of said posts on a returning movement than would be the case if the pivotal member had not oscillated.

5. A thermostat comprising a base, a thermo-controlled coil having a vertically extending arm, oppositely disposed adjustable electrical contact points straddling said arm, the thermo arm adapted to form a common pole with both of said posts, the operation of said arm in one direction contacting with one of said posts to close an electric circuit and also causing the opposite post to follow it in its swing, so that a swinging of the arm in the other direction will close the electric circuit with the other of said posts more quickly than had the last mentioned post not followed the coil arm in its first movement.

6. A thermostat comprising a base, a thermo-arm mounted on said base, two movable electric posts straddling said arm, the thermo arm being wired so that it will form a common pole with both of said posts, the said thermo arm when expanding swinging to the right to close one circuit and move both of said posts so that on a cooling of the arm and a swinging of the same in the opposite direction, it will contact with the other of said posts to close the circuit when the said arm reaches substantially a vertical position.

7. A thermostat comprising a base, a thermo arm mounted on said base, movable electric contact posts straddling said arm and wired so that the thermo arm is a common pole to either post, said thermo arm when swinging in one direction contacting with one of said posts to close the circuit, and causing the other post to follow said thermo arm in its movement so that an opposite swinging of said arm will cause the thermo arm to quickly contact with the following post to close said posts in either direction.

8. A thermostat comprising a thermo coil arm, two oppositely disposed contact posts straddling the coil arm, said posts being capable of being set in a horizontal predetermined position and the said posts being insulated from each other, the coil arm and the said posts being so electrically connected that the said coil arm is a common pole with either of said posts, and a swinging movement of the said arm in either direction contacting with one post and causing the other post to follow it, whereby, on a retracting movement of said arm, it will more quickly overtake the other post than had the two posts not moved with the initial swinging of said arm.

9. A thermostat comprising a base, a thermo coil on said base, a yoke pivotally mounted beneath the end of said coil, said yoke also movable horizontally, said yoke having two adjustable posts insulated from each other, the two posts and thermo coil being so electrically connected that the thermo coil is a common pole for either of said posts, said thermo arm adapted to contact with either one of said posts to thereby close a respective circuit, said arm also causing said yoke to oscillate whereby a retracting movement of the said coil arm will more quickly contact with one of said post arms than had said yoke remained stationary.

10. A thermostat comprising a base, a thermo coil mounted on said base, said coil having a vertical arm extending therefrom, a plate mounted beneath the coil, capable of horizontal adjustment, a pivotal yoke on said plate, means for limiting the oscillations of said yoke, the upper ends of said yoke being insulated from the body of the yoke, the thermo arm and said ends being so electrically connected that the thermo arm is a common pole for each of said ends of the yoke, and a swinging of said arm in either direction closing the circuit through one of the ends of said yoke and causing the yoke to oscillate whereby the other end of said yoke will more quickly contact with said arm on a retracting movement of said arm than would be the case if the yoke had remained stationary.

11. A thermostat comprising a thermo controlled arm, a plate horizontally movable beneath the said arm, a pivotal member secured to said plate and having oppositely disposed insulated posts straddling said arm, means for regulating the distance between the posts and said arm, means for limiting the pivotal movement of said member, means for determining the horizontal position of said plate and said pivotal member, said thermo arm and said posts being so wired as to make the thermo arm a common pole for either post of the pivotal member, and a movement of said arm causing the pivotal member to swing in the direction of the movement of said arm whereby a return movement of the arm will quickly overtake

the arm that lies in the path of the retracting thermo arm.

12. A thermostat comprising a base, a thermo arm, a horizontally adjustable movable plate beneath the arm, a pivotal yoke on said plate and straddling said arm, binding contact posts on said yoke insulated from each other, the thermo arm adapted to close an electric circuit with either of said posts, the said thermo arm also causing a small oscillation of the arm in either direction so that a return movement of said arm will quickly contact with the arm that has followed the arm in its swinging position to thereby close the other of said circuits.

13. A thermostat comprising a thermo arm and a pivotal yoke straddling said arm, two electric contacts on said yoke and insulated from each other, the thermo arm arranged in a circuit that is common to either electric contact, and a swinging of the arm pushing one electric contact in one direction and causing the other electric contact to follow the arm whereby a return movement of the thermo arm will quickly contact with the electric contact that followed the arm in its movement, and a continued movement of the arm causing the yoke to oscillate in a direction reverse to the first oscillating movement of the yoke.

14. A thermostat comprising a base, a thermo arm, a yoke beneath the arm capable of an oscillatory movement, said yoke and thermo arm arranged in an electric circuit whereby the thermo arm is common to both ends of the yoke, and a movement of the thermo arm in one direction completing one circuit, a movement of the arm in the other direction closing the other circuit, and a movement of said arm also causing said yoke to oscillate in a direction of the swinging of the arm.

In testimony whereof I affix my signature.

FLETCHER SCHAUM.