

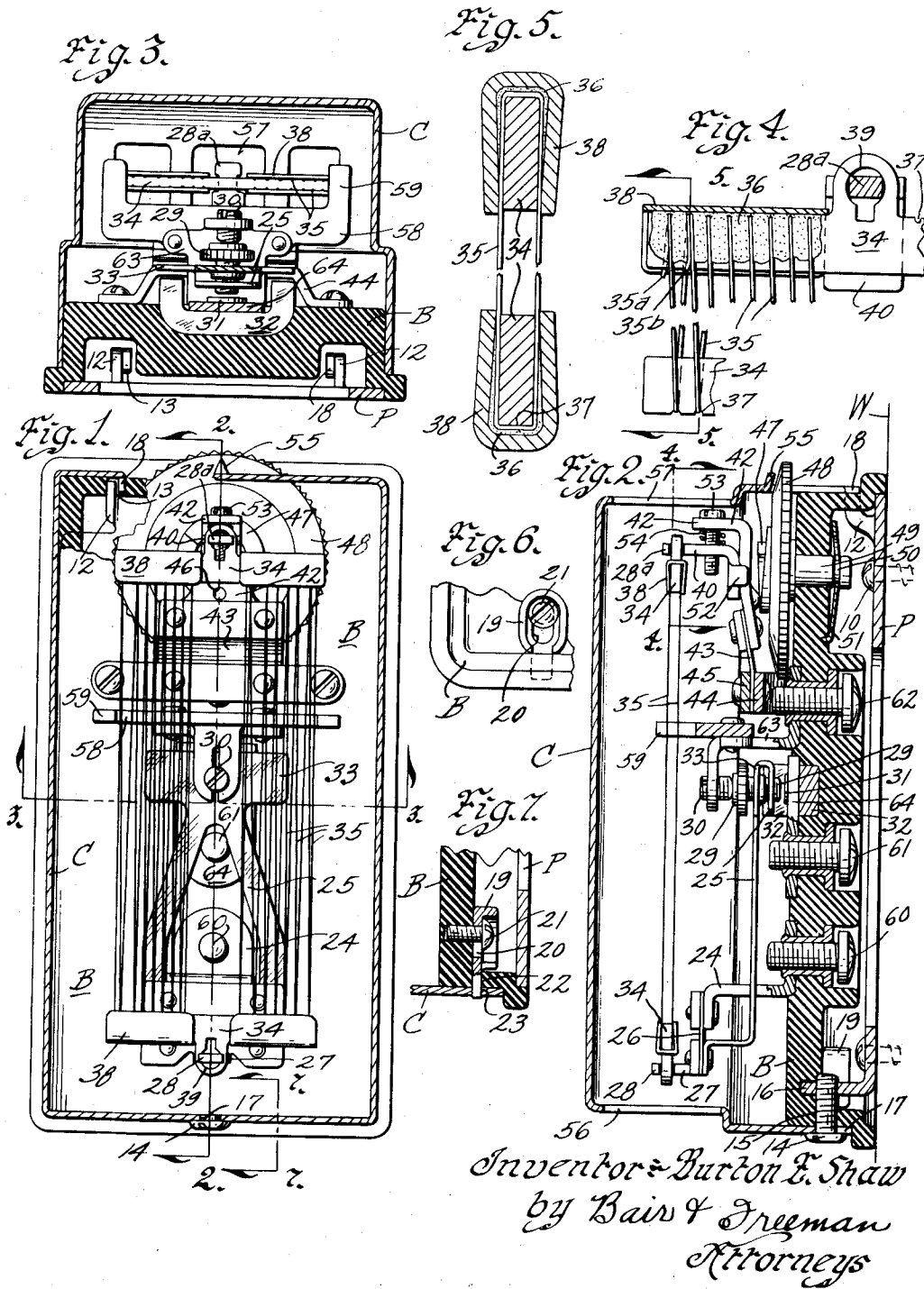
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HUMIDOSTAT

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HUMIDOSTAT

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One object of my present invention is to provide a simple and reliable humidostat which can be economically manufactured.

Another object thereof is to provide a humidostat which makes use of hygroscopic filaments (such as human hair) as the humidity responsive element, these filaments being so mounted that they are not of prohibitive length yet provide sufficient power and movement in response to slight changes in the relative humidity of the surrounding air for actuating a switch arm and thereby control a circuit, the switch arm being associated with a permanent magnet to secure snap action of the switch arm and the desired range of movement of the switch arm being secured by means of leverage between the actuating end of the switch arm controlled by the hygroscopic element and the contact carrying portion of the switch arm.

Another object is to provide a humidostat in which the hygroscopic element is of less length than the base of the humidostat and is so mounted relative to the base that it is well away from the supporting wall for the humidostat and is thereby effectively subject to circulation of air within the room, such mounting of the hygroscopic element reducing the possibility of deposition of a film of dirt and grease thereon from air traveling upwardly along the wall to a minimum.

Still another object is to provide a humidostat in which the structure may be readily initially calibrated at the factory and thereafter adjusted within a certain range in a simple manner by an adjusting cam.

A further object is to provide the parts of the structure so arranged and related to each other that tension release for the hygroscopic element is provided without stressing the element beyond its elastic limit when the hygroscopic filaments are excessively shrunk.

It is a further object of my invention to provide the hygroscopic element in the form of a pair of spaced bars which are universally or swivelly connected to an abutment and the switch arm respectively in a manner so they can be readily removed therefrom, the hygroscopic filaments being cemented to the spaced bars and further retained in intimate connection therewith by cover clips which partially enclose the bars and the cemented ends of the hygroscopic filaments.

Still a further object is to provide a humidostat so constructed that it can be mounted on a wall and removed from its mounting without

opening the casing of the humidostat so that the relatively delicate hygroscopic filaments therein are not readily accessible and thereby subject to injury yet the humidostat can be opened when desired if it becomes necessary to replace the hygroscopic element.

With these and other objects in view, my humidostat consists in the construction, arrangement and combination of the various parts thereof, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more than one in order to give a full understanding thereof, both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment of my humidostat in the accompanying drawing, in which:

Figure 1 is a front elevation of a humidostat embodying my invention with the top of the cover thereof broken away and the walls of the cover shown in section, portions of the humidostat also being broken away, and still other portions being shown in section.

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 1.

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 2, showing the manner in which the hygroscopic filaments are connected to supporting bars therefor.

Figure 5 is a further enlarged sectional view on the line 5—5 of Figure 4.

Figure 6 is a rear elevational view of the humidostat showing a fragment of one corner thereof and a cover securing means; and

Figure 7 is a sectional view on the line 7—7 of Figure 1.

On the accompanying drawing, I have used the reference character B to indicate generally a base, C a cover therefor and P a mounting plate. The plate P is adapted to be secured to a wall W or the like by screws 10. The plate P includes a pair of upstanding lugs 12 adapted to be received in openings 13 adjacent the top of the base B. The base B is secured to the plate P adjacent the lower ends thereof by a screw 14. The screw 14 extends through a perforation 15 of the base B and into a threaded lug 16 of the plate P after passing through a slot 17 of the cover C.

The top wall of the cover C is provided with downturned lugs 18 adapted to also enter the openings 13 and the lower wall of the cover is retained in position by a slidable locking lug 19. The lug 19 is provided with a slot 20 through which a screw 21 extends into the base B as shown in Figures 6 and 7. The lug 19 in its normal position extends through a perforation 22 in the base B and a perforation 23 in the cover C. To remove the cover, the base and cover both must be removed as a unit from the plate P before access can be had to the screw 21 for loosening it, whereupon the locking lug 19 can be slid upwardly to release it from the opening 23. In this manner ready access to the interior of the humidostat is not procurable except by removing the humidostat from the supporting plate P. The lug 19 is cup-shaped so that it can be filled with sealing material, if such precaution is desired by the manufacturer.

A bracket 24 extends upwardly from the base B and a switch arm 25 is swingably connected therewith. The connection disclosed consists of a leaf spring 26. The switch arm 25 has an actuating arm 27 terminating in a T shaped head 28.

The switch arm 25 extends substantially parallel to the base B and carries a contact screw 29. The screw 29 is adapted for contacting with one or the other of contacts 30 and 31. Snap action is provided for the switch arm in the form of a permanent magnet 32 cooperating with an armature portion 33 of the switch arm 25.

For operating the switch arm 25 in response to humidity changes, I provide a humidity responsive member comprising a pair of spaced bars 34 and hygroscopic filaments 35. The filaments 35 are preferably formed of human hair, wrapped around the spaced bars 34 as best shown in Figures 4 and 5. The filaments 35 are secured to the bars 34 by cement indicated at 36. The bars are notched as at 37 to receive the filaments which are preferably as long as can be obtained, the minimum desired length being sufficient to start as indicated at 35a in Figure 4 and end as indicated at 35b. The ends 35a and 35b wrap over opposite sides of the bars 34 and pass through the notches 37 so that they may be effectively held against slipping out of position by the cement 36.

To further assist in positively retaining the hygroscopic filaments connected with the bars 34, I provide U-shaped cover clips 38 over the cemented ends of the filaments which clips are substantially filled with the cement 36 as shown in Figure 5, the cement also filling the notches 37.

The bars 34 are provided with keyhole slots 39 adapted to coact with the T-head 28 of the actuating arm 27 and with a similar T-head 28a of an abutment or lever 40. The lever 40 is substantially stationary relative to the base B though it is preferably adjustable relative to a second lever 42 which in turn is swingably mounted relative to the base B by a leaf spring connection 43. A bracket 44 and clamp bar 45 are utilized to support the anchored end of the spring 43.

The spring 43 is tensioned so that a projection 46 on the lever 42 engages a cam 47. The cam is carried by an adjusting disc 48 pivotally mounted by a stud 49 on the base B. The stud is grooved as indicated at 50 and retained assembled relative to the base by a spring washer 51, having a keyhole slot engaged in the groove.

The inner end of the lever 40 is provided with

a pair of guide lugs 52 which engage opposite sides of the lever 42 for causing the lever 40 to be aligned therewith. An adjusting screw 53 extends rotatably through the lever 42 and is threaded into the lever 40. In this manner the lever 40 may be initially adjusted at the factory relative to the lever 42 to secure the proper calibration of the humidostat. A spring 54 is provided to retain the adjustment and prevent looseness of the parts. The disk 48 may or may not be provided with an indicating scale while the cover C may be provided with a pointer 55, if desired.

To permit air to circulate over the hygroscopic filament 35, openings 56 and 57 are provided in the bottom and top respectively of the cover C. To prevent undue sagging of the hygroscopic filaments 35 I provide a supporting bar 58 preferably formed of fiber or other non-metallic material.

From the construction of my humidostat as just described, it is obvious that the hygroscopic filaments 35 are located in a position where they can be effectively responsive to air circulating within a room, which circulation is more pronounced at a point spaced from the wall than adjacent the wall. Such remote mounting of the hygroscopic element minimizes the possibility of deposition of a film of dirt and grease thereon, as it has been found that deposition of such film occurs in a greatly pronounced manner adjacent the wall surface than at a point spaced therefrom. Such films are detrimental to the proper operation of a humidostat.

The parts 42 and 43 are so arranged that tension release is provided for the hygroscopic element, which, upon excess shrinkage, merely swings the lever 42 counterclockwise in Figure 2 with the projection 46 leaving the cam 47, which cam acts as a one direction stop therefor. The arrangement of the switch arm 25, thus increases the movement at the contact 29. The necessary power for making it possible to use such leverage is secured by having a relatively short hygroscopic element consisting of a great number of hygroscopic filaments acting together as a unit.

The arrangement is such that snap action can be secured in both directions for the switch contacts. Movement from the position shown in Figure 2 to the opposite position is secured by release of the tension of the hygroscopic element due to a rise in humidity and thereby swelling of the element until the attraction of the magnet 32 overcomes the tension of the spring 36 whereupon the contact 29 will snap from the contact 30 to the contact 31. Moving in the opposite direction, shrinking of the hygroscopic element as a result of decreased humidity will build up tension in the element 35 until such tension is sufficient to overcome the magnetic pull of the magnet 32 on the armature 33.

The armature will then start moving and since it is immediately in a weaker magnetic field, will snap over to the position in Figure 2. Any excess swelling of hygroscopic element will cause it to buckle and the member 58 serves as a means to keep it from buckling to a position where it will contact with the contact 30 or any part of the humidostat mechanism or base B. The member 58 is provided with arms 59 which prevent swinging of the outer hygroscopic filaments to an out-of-line position.

Terminals 60, 61 and 62 are provided for the switch arm 25, the contact 31 and the contact 76

30 respectively. The contact 30 is mounted on a bracket 63 which also supports the bar 59 while the contact 31 is mounted on a bracket 64 which also serves to retain the magnet 62 relative to the base. The terminal 60 is the common terminal while the terminals 61 and 62 are opposite terminals in the usual manner of three-wire humidostats or the like. The terminal 61 establishes a circuit upon a decrease in humidity while the terminal 62 establishes circuit upon an increase in humidity.

The keyhole slots 39 coacting with the T heads 28 and 28a, as shown in Figure 4, make it possible to remove the hygroscopic element by swinging the bars 34 to a position at right angles to their normal position after the screw 53 is removed from the lever 40. In this manner the hygroscopic element can be readily removed and replaced with another one in case of breakage or failure of the element.

Some changes may be made in the construction and arrangement of the parts of my humidostat without departing from the real spirit and purpose of my invention. I therefore intend to cover such modified forms of structure or use of mechanical equivalents, as may be reasonably included within the scope of my appended claims.

I claim as my invention:

1. In a humidostat, a base, a bracket projecting therefrom, a leaf spring blade secured thereto, a switch arm mounted on said spring blade to swing toward and away from said base, said switch arm lying substantially parallel to said base and having an actuating arm projecting away from said base, a humidity responsive element comprising a pair of spaced bars, hygroscopic filaments connecting said bars together, one of said bars being directly connected with said actuating arm, a stationary member projecting from said base and having the other of said bars connected therewith and contacts controlled by movement of said switch arm as caused by swelling or shrinking of said hygroscopic filaments, said filaments being spaced remotely from said base and means adapting said base for mounting on a wall or the like.

2. In a humidostat, a switch arm swingably mounted, a humidity responsive element for operating said switch arm and comprising a pair of spaced bars, hygroscopic filaments connecting said bars together, said filaments extending around the bars and being cemented thereto, clips over said bars and enclosing the cemented portions of the humidity responsive element, one of said bars being connected with said switch arm, a stationary member having the other of said bars connected therewith and contacts controlled by movement of said switch arm as caused by swelling or shrinking of said hygroscopic filaments.

3. In a humidostat, a base, a switch arm swingably mounted on said base and means for actuating said switch arm comprising a hygroscopic filament connected at one end to said switch arm, means for supporting the other end thereof comprising a stop, a lever, means biasing said lever to engage said stop, said other end of said hygroscopic filament being connected with said lever and operable to move it away from said stop when said element shrinks beyond a predetermined degree, the maximum tension of said biasing means being less than that required to stretch said hygroscopic element beyond its elastic limit, said stop comprising a cam which is adjustable to change the position in which said lever is

stopped and thereby change the range of operation of the humidostat, said lever having a movable portion with which the hygroscopic element is connected whereby the humidostat may be initially calibrated.

4. In a humidostat, a switch arm swingably mounted and means for actuating said switch arm comprising a hygroscopic filament connected at one end to said switch arm, means for supporting the other end thereof comprising a stop, a lever, means biasing said lever to engage said stop, said other end of said hygroscopic filament being connected with said lever and operable to move it away from said stop when said element shrinks beyond a predetermined degree, said stop comprising a cam which is adjustable to change the position in which said lever is stopped and thereby change the range of operation of the humidostat.

5. In a humidostat, a base, an abutment thereon adjacent one end thereof, a switch arm pivotally mounted on said base and having an actuating arm adjacent the other end of the base, a humidity responsive member of less extent than said base, said humidity responsive member being connected to said actuating arm and abutment and the connections including T-shaped heads on the actuating arm and the abutment respectively, said bars having keyhole slots to receive said T-shaped heads with the longitudinal axes of the slots at substantially right angles to the planes of the heads.

6. In a humidostat, a base, an abutment thereon, a switch arm pivotally mounted on said base and having an actuating arm, a humidity responsive member comprising a pair of bars adjacent opposite ends of the base and a plurality of hygroscopic filaments extending therearound from one bar to the other, the portions of said filaments adjacent said bars being cemented thereto, cover clips over said portions and the cement substantially filling the space around and between said hygroscopic elements within said cover clips.

7. In a humidostat, a base, an abutment thereon, a switch arm pivotally mounted on said base and having an actuating arm, a humidity responsive member comprising a pair of notched bars and a plurality of hygroscopic filaments extending therearound from one bar to the other and located in the notches thereof, the portions of said filaments in said notches being cemented to the bars, cover clips over said portions and the cement substantially filling the space around and between said hygroscopic elements within said cover clips and filling said notches.

8. In a humidostat, a base, a switch arm pivotally mounted for movement toward and away from said base, a humidity responsive member comprising a pair of bars and a plurality of hygroscopic filaments extending therearound from one bar to the other, said bars being swivelly connected with said switch arm and with a stationary abutment, opposite contacts with which said switch arm is adapted to make contact for establishing electric circuits, an armature for said switch arm, a magnet cooperating therewith to provide snap action for said switch arm when it moves in either direction, and a support for the portion of said humidity responsive member intermediate its ends to support such portion and to prevent contact thereof with the remaining parts of said humidostat when the member is stretched beyond a predetermined limit.

9. In a humidostat, an abutment, a switch arm

pivotally mounted, a humidity responsive member having opposite ends connected with said actuating arm and said abutment respectively, and a support for the portion of said humidity responsive member intermediate said opposite ends when the member is stretched beyond a predetermined limit, said support preventing contact of said intermediate portion of said humidity responsive member with the remaining parts of said humidostat.

10. In a humidostat, a base, an abutment there-

on, a switch arm pivotally mounted on said base and having an actuating arm, a humidity responsive member connected to said actuating arm and abutment and the connections including T-shaped heads on the actuating arm and the abutment respectively, said bars having keyhole slots to receive said T-shaped heads with the longitudinal axes of the slots at substantially right angles to the planes of the heads.

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