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S. V. DELL

2,866,041

THERMOSTAT WITH TERMINAL CLIPS THEREON

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FIG-1

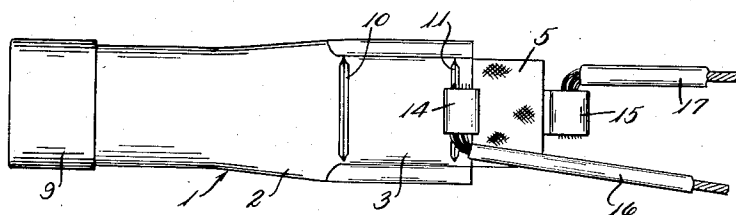


FIG-2

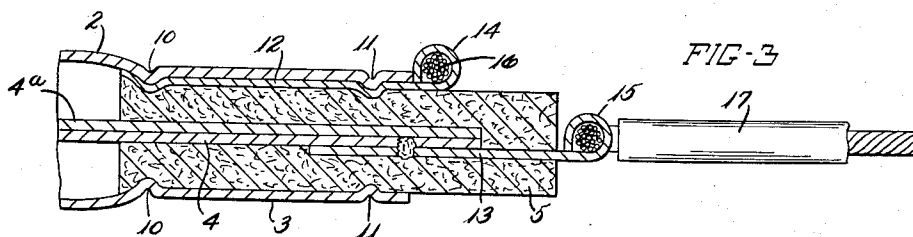
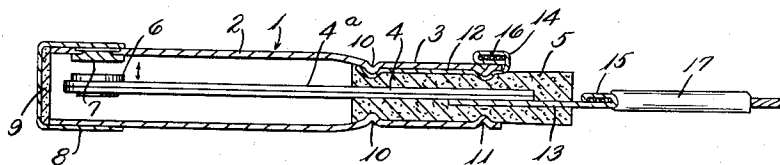


FIG-3

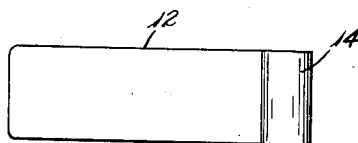


FIG-4

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2,866,041

THERMOSTAT WITH TERMINAL CLIPS THEREON

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4 Claims. (Cl. 200—138)

This invention relates to thermostats, and especially to a thermostat for making and breaking an electrical circuit with appropriate changes in temperature, said thermostat having special terminal strips or clips extending therefrom.

In making thermostats for commercial use, each customer normally wants different types and styles of leads connected thereto. Even though thermostats can be made to standard sizes, it still has been difficult for the manufacturer to build up any inventories of one of his standard thermostats and have such thermostat unit be available for adoption and use by any of a number of customers because of the different leads required for different uses of the thermostats. Hence, thermostats usually are custom built and are usually made as ordered. The leads for the thermostats have usually been made as integral portions thereof.

The present invention relates to thermostats of any conventional design, one example of which is shown in and covered by United States Letters Patent No. 2,586,309.

The general object of the present invention is to provide a standard thermostat unit with inexpensive easily positioned terminal slips or strips extending therefrom so that the thermostat can have any desired style and length of leads secured thereto after the thermostat unit has been completed.

Another object of the invention is to provide a thermostat characterized by its ability to have leads readily secured thereto after the thermostat unit per se had been completed and precalibrated to desired operating temperature.

Yet another object of the invention is to provide a thermostat with a steel terminal clip or strip extending therefrom whereby such thermostat units can be magnetically tested and be sorted from similar thermostats without such contacts thereon.

Yet another object of the invention is to provide a terminal clip or clips extending from a thermostat unit and with lead receiving loops being provided in such clips so that leads can be either welded to or be compressed in the loop for electrical connection to the thermostat.

Another object of the invention is to provide copper or cadmium plated steel terminal clips for use in thermostats, which clips being adapted to receive leads for connection to the thermostat.

Another object of the invention is to provide a thermostat with a steel or metal contact strip which can be easily inserted manually into a compressible assembly, without prewelding or soldering, and then staked and assembled under compression to provide a positive, fixed clip or wire terminal having very good mechanical strength to wire leads and excellent electrical conductivity to the thermostat.

A further object of the invention is to provide a thermostat with a steel or metal contact strip with a cylindrical opening for the insertion of a wire terminal so shaped and positioned that a wire lead may be both welded and

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compressed to the cylindrical contact strip barrel in a single operation, and so providing maximum strength and conductivity to the wire lead.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

For a better understanding of the invention, reference should be had to the accompanying drawings, wherein:

Fig. 1 is a plan of a thermostat member embodying the principles of the invention and having a pair of contact leads secured thereto and extending therefrom;

Fig. 2 is a vertical section taken of the thermostat element of Fig. 1;

Fig. 3 is an enlarged fragmentary vertical section through the base end of the thermostat with the terminal clips or strips extending therefrom; and

Fig. 4 is a plan of a terminal clip or strip of the invention.

When referring to corresponding parts shown in the drawings and referred to in the specification, corresponding numerals are used to facilitate comparison therebetween.

In order to understand the present invention completely, reference now should be had to the details of the invention and, in the drawings, a thermostat is indicated as a whole by the numeral 1. This thermostat 1 includes a casing 2 that usually is made of metal, for example, aluminum, brass or copper, or the equivalent, so that the casing is a good conductor of electricity. This casing 2 normally has a substantially oval shape in cross section and with one end of the casing being flattened and compacted as indicated at 3. The flattened and compacted end 3 of the casing 2 engages with and positions a bimetal arm or strip 4 within the casing 2. Such casing 25 engages the strip 4 by suitable means such as an insulation sleeve or wrap 5 provided around one portion of the bimetal strip 4. This insulation means provided is of any conventional construction and, for example, may be made from silicon-impregnated glass fabric, as such material 30 has previously been found to be particularly effective for use in thermostats of the invention.

One portion of this bimetal strip 4, as indicated at 4a, is positioned as a cantilever within the casing 2 by the insulation and casing means being in clamped or compressed engagement therewith so that such section of the bimetal strip is available for arcuate movement within the casing dependent upon the temperature conditions to which the bimetal strip is subjected.

Any suitable type of contact members, such as contact buttons 6 and 7, are suitably secured to the free end portion of the bimetal strip 4 and to a wall of the casing 2, respectively, as best shown in Fig. 2 of the drawings.

In the example shown for illustrative purposes, the casing 2 has one open end thereon and a metal end cap 8 is shown in engagement therewith. This end cap 8 usually positions an asbestos disc 9 at the open end of the casing 2 and effectively insulates the contact buttons 6 and 7 from any arcing condition or from any short circuiting through the end cap or other associated portions of the enclosure means of the thermostat. Any suitable type of an insulation disc can be provided in the cap, or the end cap could have an insulation lining therein, as desired. Usually the end cap 8 is soldered to the remainder of the casing.

Normally the flattened and compacted areas of the casing 2 include transversely extending stakes 10 and 11 in the top and bottom of the casing which stakes or flattened areas effect a concentration of the compacting pressures on the casing and insure a spaced-apart, effective anchoring or gripping of each bimetal strip in the casing so as to provide a very rigid cantilever support for the bimetal strip 4. Thus the present thermostat is con-

structed in general like the thermostat shown in the U. S. Patent referred to hereinabove and it may have two bimetal strips therein, if desired.

This thermostat 1 can be calibrated readily by changing the angular relationship between the casing 2 in the portion thereon adjacent the bimetal strip 4 with relation to the fixedly anchored end of such bimetal strip.

As an important feature of the present invention, a pair of terminal clips, or strips, 12 and 13 are provided in the thermostat 1 and they extend from the end of the casing 2 having the insulation means 5 positioned therein. Fig. 2 of the drawings best shows that one of these terminal clips 12 is positioned intermediate the insulation means 5 and the associated surface of the casing 2; whereas the other clip 13 is positioned adjacent and secured, as by a spot welding operation, to the bimetal strip 4.

Each of these metal clips 12 and 13 is formed from a suitable material, preferably steel or other magnetic material, and the clips 12 and 13 usually would be copper or cadmium plated, or otherwise coated, as for example by dipping the clips or strips into a molten metal bath. Thus excellent electrical contacts are provided by the clips 12 and 13 and with each of these clips having lead receiving means such as a slot, hole, or an end loop 14 or 15, respectively, provided thereon for receipt of suitable lead or connector wire therein.

Fig. 3 of the drawings shows the position of the loops 14 and 15 on these clips 12 and 13 when the thermostat 1 is initially made. Thus the loop 14 normally will lie immediately adjacent the end of the casing 2, whereas the loop 15 extends from the end of the insulation means 5 used in the thermostat. Preferably when the thermostat is made, no leads or other connector means are associated with these loops 14 and 15 and the thermostats 1 are stored until actually sold to a specific customer for a particular job. At such time, it is known what style and length of leads are required for the thermostat 1 so that at such time leads 16 and 17, respectively, are threaded through the loops 14 and 15. Usually the loops are thereafter flattened and the leads 16 and 17 may, if desired, be welded to these loops 14 and 15 for effective electrical contact with the thermostat 1.

It will be seen that the terminal clip 12 is in good physical engagement with the casing 2 because of the compression of the one end of the casing and by the staking 10 and 11 provided in the casing. Thus a good electrical contact is provided between the terminal clip 12 and the casing.

It will be seen that the bimetal strip 4 effectively determines the length of the casing 2 and of the thermostat 1 so that any desired reasonable length may be provided in such bimetal strip 4. The thermostat 1 can then be adjusted to have the operating properties desired for normal use of such member.

It should be realized that the thermostats 1 of the invention then can be sorted by use of magnetic means where one is testing or sorting the thermostats to determine whether they are properly completed and have clips 12 and 13 of the invention associated therewith. By making such clips from a magnetic material, the thermostat 1 can be treated as a magnetic unit and rapid, effective, inexpensive sorting can be performed to test for the presence of such clips in the thermostat.

It should be realized that these novel clips of the invention can be used with thermostat means of other designs, as desired, and that the particular construction shown herein is only one typical illustration of a thermostat with which the terminal clip means of the invention are readily adapted for use.

It will be seen that preferably the loop 14 on the terminal clip or strip 12 is doubled back upon the top end portion of the casing 2 and this aids in attaining an effective electrical connection between the clip 12 and the casing 2 as such loop 14 may be welded to the casing when welding a lead to this clip loop.

From the foregoing, it will be seen that a novel, useful type of a thermostat has been provided and this thermostat can be assembled and then calibrated to a desired operating temperature and stored before sale of the thermostat to a particular customer. Thus, either the customer can directly attach leads as desired to this thermostat 1, or the thermostat manufacturer can apply such conductor leads to the thermostat member immediately prior to sale thereof when the specific requirements of a given customer are known. Hence, it is believed that the objects of the invention have been achieved.

While one complete embodiment of the invention has been disclosed herein, it will be appreciated that modification of this particular embodiment of the invention may be resorted to without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. In a thermostat, a tubular metal casing, a bimetal strip, insulating means about a portion of said bimetal strip positioning said bimetal strip to extend into said casing as a cantilever therein and insulating it from the casing, and a terminal clip conductively secured to said bimetal strip between the strip and the insulating means and extending beyond said casing and positioning means, said terminal clip having a lead receiving loop at the free end thereof, said loop being adapted to be permanently secured in engagement with a lead inserted therein.

2. In a thermostat, a tubular casing, a bimetal strip, insulating means about a portion of said bimetal strip positioning said bimetal strip to extend axially into said casing as a cantilever therein and insulating it from the casing, and a terminal clip secured to said bimetal strip and clamped thereagainst by said insulating means and extending from said casing, said terminal clip having a lead receiving loop at the free end thereof.

3. A thermostat comprising a conductive tubular casing, a bimetal strip, tubular insulation means about one end of said strip, said casing being compacted around said insulation means to position it tightly around said bimetal strip and secure the bimetal strip as a cantilever in said casing, contact means in opposed relation on said bimetal strip and said casing, a terminal clip secured to said bimetal strip within the casing and extending axially beyond said casing and insulation means in clamped relation thereto, and a second terminal clip conductively clamped to said casing between said casing and said insulation means, said terminal clips having lead receiving loops at their exposed ends.

4. A thermostat comprising a conductive tubular casing, a bimetal strip, tubular insulation means about one end of said strip, said casing being compacted around said insulation means to secure it tightly around said bimetal strip and position the strip as a cantilever in said casing, contact means in opposed relation on said bimetal strip and said casing, a terminal clip secured to said bimetal strip within the casing and extending axially beyond said casing and insulation means in clamped relation thereto, and a second terminal clip clamped between said casing and said insulation means and protruding beyond said casing.

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