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(54) Brusque rupture controllable thermostat with built-in temperature sensor

(57) The thermostat of the invention is based on a classic controllable thermostat in which one of the three classic spacers, specifically the upper spacer, is provided with a slot or socket into which an ancillary strip standing as a temperature probe is laterally plugged. Furthermore, the insulating shaft through which the control knob acts on the moving control has an intermediate ledge through which it acts on the probe strip, and therefore upon driving the control knob, both the main moving strip and the probe strip are acted on. Similarly, contact between the probe strip and the moving strip, to close the signalling circuit, is established through the free end of said probe strip and with the assistance of a screw acting as an electrical contact.

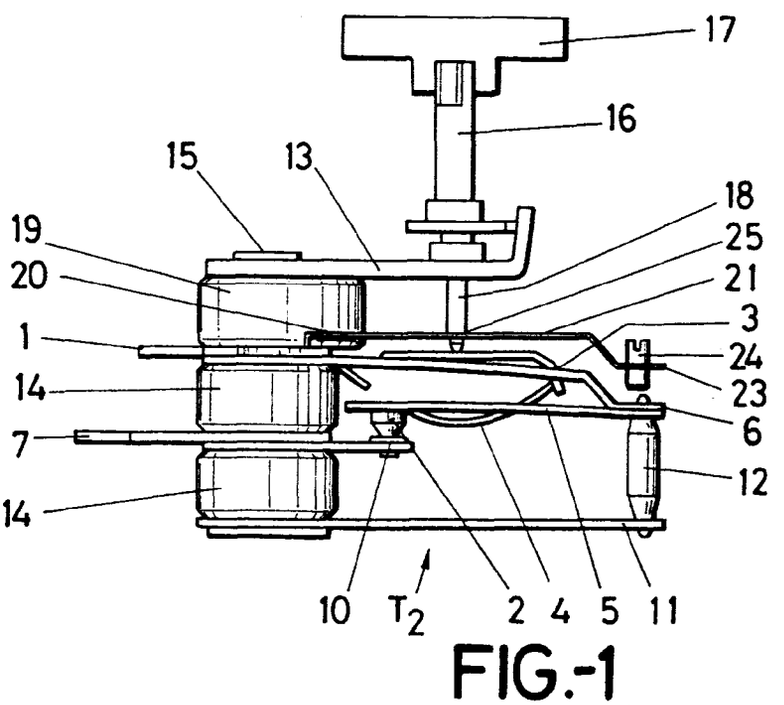

FIG.-1

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Description

OBJECT OF THE INVENTION

The present invention relates to a controllable thermostat, of the kind used in various home electrical appliances, particularly in electric irons, which thermostat has been devised and structured in order not only to perform its classic function as such a switching element for the circuit supplying the home electrical appliance resistor, but further to supply a signal indicating whether or not the temperature selected with the thermostat control knob and the actual temperature of the appliance match one another.

BACKGROUND OF THE INVENTION

In certain home electrical appliances, namely irons for instance, it is determinant to establish a range of temperature for various types of garments, because the use of an unsuitable temperature, particularly when such temperature is surpassed, can result in the fabric being significantly damaged. These and other home electrical appliances are therefore fitted with a controllable thermostat, which is generally of a mechanical kind, in which a bimetallic strip causes a moving contact to move away from a fixed contact, whereas a control allows the extent of deformation of the bimetallic strip to be controlled in order for the contact opening/closing operation to take place.

With reference to the above and in the above-mentioned case of an iron, if after ironing a particular kind of garment, requiring a high temperature, more delicate garments are then to be worked on, for which the ironing temperature must be significantly lower, action on the relevant thermostat control knob will not yield an immediate response or adjustment of the temperature, and a rather considerable time will however be required for such iron to switch from a given working temperature to another, during which time the use of the iron on the second type of fabric will result in its being damaged.

In an attempt to overcome this problem, temperature sensors are known to warn the user whether or not the temperature of the home electrical appliance matches the thermostat selected temperature.

Electronic sensors are in this sense known to use an NTC as the sensor, which devices are very dear and scarcely robust.

Mechanical solutions are also known to exist, for instance the one disclosed in European Patent publication number 0 677 860 A2, in which the temperature sensor is built into the thermostat as such, the sensor being fitted with an ancillary electrically conducting resilient strip, having a sidepiece through which it tends to close an auxiliary signalling circuit, acting on a strip of the moving contact, when the latter is in the open position, albeit overridden by the bimetallic strip, since the latter will not yet have reached the new control temperature.

The auxiliary strip is fixed to the rest of the thermostat structure through the classic rivet which fixes the various thermostat elements, thereby substantially complicating mounting of the strip, for a further insulator is required between the probe and the moving contact spring. A significant adjustment problem also ensues because the auxiliary strip and its contact sidepiece are fixed, and there is hence a very short run to be covered in approaching the moving strip, and great precision is therefore required in manufacturing and mounting these parts.

DESCRIPTION OF THE INVENTION

The controllable thermostat subject of the invention, which is based on a temperature sensor of the mechanical kind, as that described above, fully solves the above-mentioned drawbacks.

More specifically, and in order to achieve the above, based on the construction of a classic controllable thermostat, the thermostat disclosed herein has one of its primary characteristics in that one of the three classic spacers, specifically the upper spacer, is provided with a slot or socket in which the ancillary strip standing as the temperature probe may be coupled, by simply plugging it sideways, said probe strip being therefore easy to mount and dismount on and off the basic fully finished thermostat structure.

In accordance with another characteristic of the invention, the insulating shaft through which the control knob acts on the moving control, instead of simply crossing the probe strip, without acting on it, has an intermediate ledge through which it acts on said probe strip, and therefore upon the control knob being driven, it in turn acts both on the main moving strip and on the probe strip.

Finally, and in accordance with another characteristic of the invention, the contact between the probe strip and the moving strip, to close the signalling circuit, is provided through the free end of said probe strip and preferably with the assistance of the screw, not only acting as an electrical contact but moreover allowing its own position to be adjusted to functionally control the probe. This screw must obviously be out of step with respect to the insulator connecting the bimetallic strip and the moving contact, in order to avoid the latter impinging on the projecting sector of the insulator, cancelling out its operativeness.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification as an integral part thereof which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1.- Is a side elevation view of a brusque rup-

ture controllable thermostat with a built-in temperature sensor, made in accordance with the object of the present invention, in which the probe strip end contact materialises as a screw.

Figure 2.- Is a plan view of the thermostat of figure 1.

Figure 3.- Is a side elevation view of a brusque rupture controllable thermostat with a built-in temperature sensor, made in accordance with the object of the present invention, in which the probe strip end incorporates a fold which enables the distance between the probe strip end and the spring end to be adjusted.

Figure 4.- Is a perspective of the spacing insulator with a probe strip in accordance with the present invention.

Figure 5.- Is finally a schematic of the electric circuit forming part of said thermostat.

PREFERRED EMBODIMENT OF THE INVENTION

With reference to these figures, the thermostat subject hereof, as any conventional bimetallic thermostat of this kind, is shown to consist of an input terminal (1) electrically connected to the moving contact (2) through a spring (3) and the taught plate (4) of a second spring (5) welded to the aforesaid spring (3) through its free end (6), whereas a second output terminal (7) towards an end (8) of the heating resistor (9), is electrically connected to the fixed contact (10), complementing the aforesaid contact (2), a bimetallic strip (11) lying at a lower level which may be deformed depending on the temperature and is able to mobilise the free end (6) of the spring (3) through an insulator (12), said bimetallic strip (11) and the terminals (1) and (7) and the classic upper bridge (13) being spaced by spacers (14) and fixed by means of a tubular rivet (15), the upper bridge (13) having a screwed controller (16) with the corresponding outer control knob (17), its insulating shaft (18) acting on the spring (3) and simultaneously on the probe strip (21).

Now then, starting with this basic construction and in accordance with one of the characteristics of the invention, one of the aforesaid spacing insulators (14), specifically the upper insulator designated (19), incorporates a side slot or socket (20) through which it may be coupled with a probe strip (21) with its corresponding connection terminal (22) and free end (23) of which coincides at one side of the spring end (6) and out of the vertical of the spacer (12), as was mentioned above and is shown specifically in figure 2, said end (23) incorporating a contact (24) which, in the practical embodiment shown in the figures, consists of a screw driven into the strip, which may travel axially with respect thereto and which, consequently, allows its function as a heat probe to be adjusted. Nevertheless, this adjustment can be made on the end of the probe strip (21), suitably folding it so as to lie at a suitable distance from the spring end (6).

Additionally, the insulating shaft (18) associated to the controller (16) has a recessed bottom area so that the same defines a ledge (25) through which it acts on the probe strip (21), whereas through its free end it acts on the spring (3).

The screw or contact (24) is normally kept spaced from the spring end (6), in which position a signalling pilot light (26), preferably green in colour, will be switched on, whereas a second signalling pilot light (27), red in colour, will be switched off, for due to an auxiliary resistor (28), as shown in figure 3, the current passing through the pilot light (27) is not sufficient to light it.

When the appliance is being used at high temperatures and the control knob is moved toward lower positions, the probe strip (21) moves downward and upon contacting the spring end (6) is tensioned and the red pilot light (27) is lighted, just as the green pilot light (26) is turned off, warning that the temperature of the appliance is excessive for the selected position of the control knob (17). As the appliance cools down, the spring end (6) will be gradually lowered due to the deformation of the bimetallic strip (11) until the probe strip (21) is separated, advising that the temperature is suitable through the green pilot light (26), which shall have been switched on just as the red pilot light (27) is switched off.

We feel that the description need not be extended any longer for any expert in the art to have grasped the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

Claims

1. A brusque rupture controllable thermostat with a built-in temperature sensor, of the kind incorporating a strip functioning as a spring carrying a moving contact, a fixed contact and a bimetallic strip, duly associated to a common support in which insulating spacers are also provided, and to which an upper bridge is also solidly attached on which a control is established, provided with an outer knob, to control the activation of the moving contact by the bimetallic strip, the thermostat being further provided with a probe strip to control the real working temperature of the appliance supplied through the thermostat, characterised in that said probe strip is coupled to one of the insulating spacers on which the remaining thermostat mechanisms are mounted, through a slot or side socket, in which it may be embedded by being merely plugged by pressure, after the rest of the thermostat has been mounted, said probe strip being therefore easy to mount and dismount.

2. A brusque rupture controllable thermostat with a built-in temperature sensor, as in claim 1, charac-

terised in that the insulating shaft associated to the control and through which the latter acts on the spring of the moving contact, has its free end recessed to define an intermediate ledge, and therefore while its free end acts on said spring, its ledge acts on the probe strip, which is crossed by its recessed terminal sector.

3. A brusque rupture controllable thermostat with a built-in temperature sensor, as in preceding claims, characterised in that the probe strip is provided at its free end with a fold through which it may impinge on the free end of the spring supporting the moving contact, said fold being provided to be of varying lengths in order thereby to be able to adjust the spacing between the end of the supporting spring and the fold.

4. A brusque rupture controllable thermostat with a built-in temperature sensor, as in claim 3, characterised in that said contact established at the free end of the probe strip can materialise as an axially displaceable screw, acting as a functional adjuster for the heat control probe, the end of the probe strip and consequently the screw lying out of the vertical of the insulator relating the free end of the spring to the free end of the bimetallic strip.

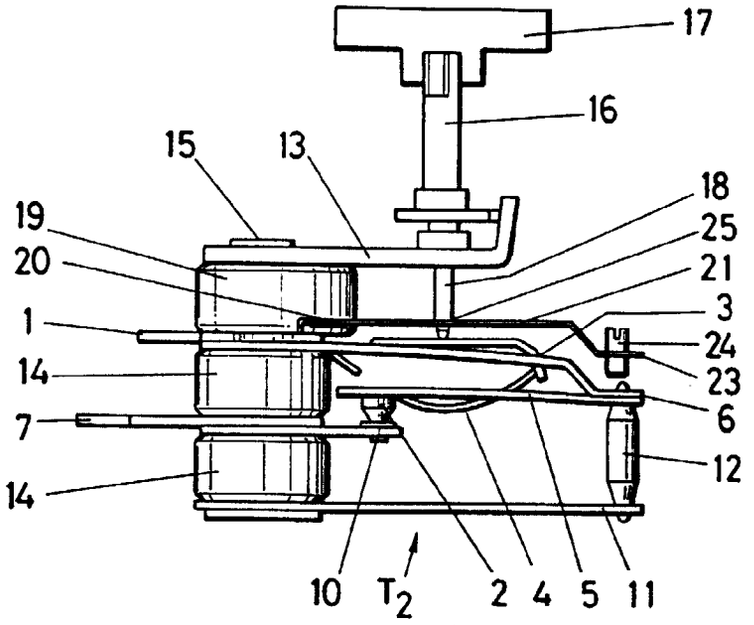

FIG.-1

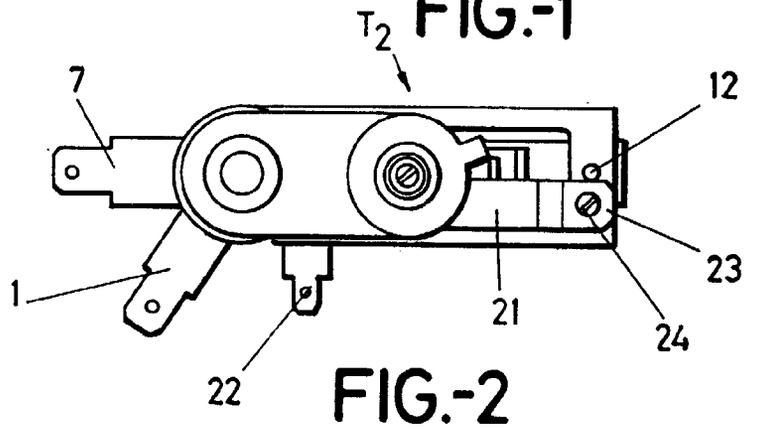

FIG.-2

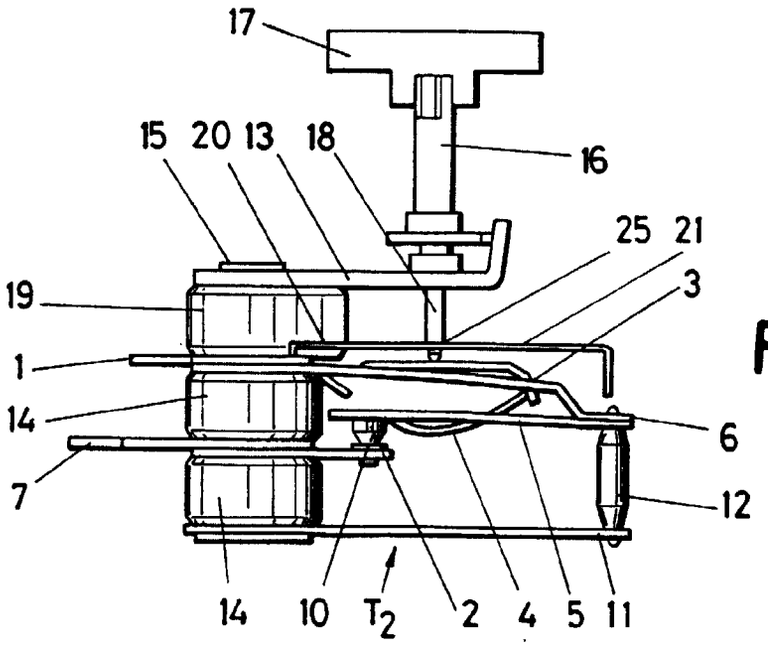

FIG.-3

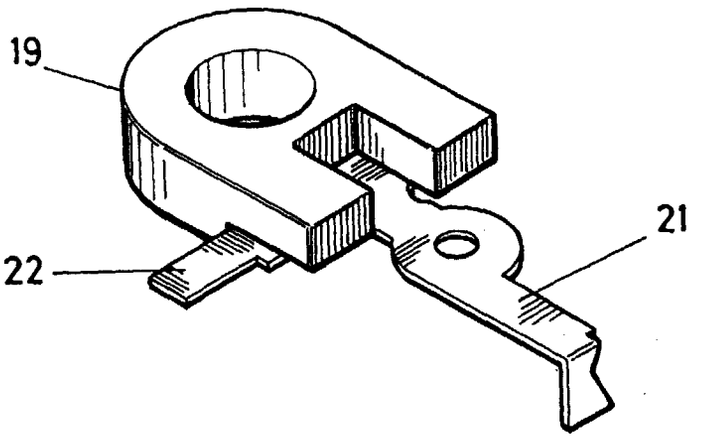

FIG.-4

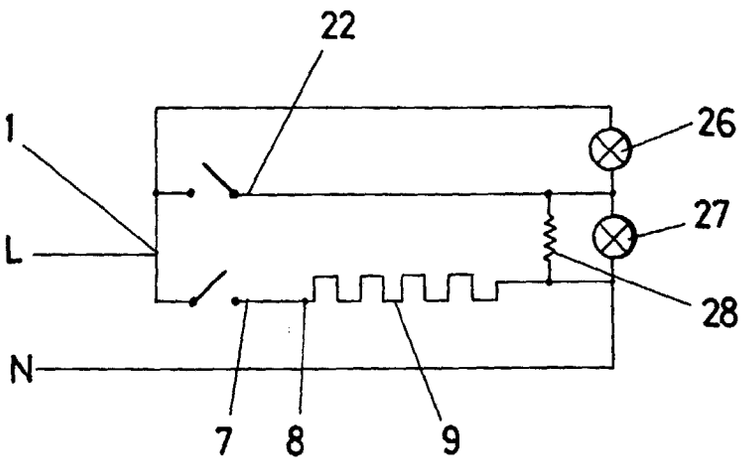

FIG.-5