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## (54) Resistive thermostat for electrical motors protection

(57) Resistive thermostat for motors protection against electrical overcurrents and overtemperature, comprising a rectangular prismatic body (1), with a front side cover (2), and the back side face being provided with a corner lowering (3) having a spherical sector shape, as well as a pair of thin rectangular windows (4), said box (1) forming an enlargement of the front edge (5) for fitting of the cover (2), from which a 10 lower tab (6) is appended, having a locating end cutout (7) with reference to two pins (8) of the three-pins connection plug; and further; and further, inside the prismatic box (1), corresponding to the pair of thin side windows (4), it is provided an end pair of metallic supports (9) and (10) for an electrical resistor (11), wherein one of such supports (9) projects a balanced metallic blade (12) outside the box, comprising one of its connection terminals, while in the other inner support (10) having a C shape, there attaches the end of the balanced bimetallic blade (13), immediately subjacent and connected in series with the electrical resistor (11) and with the lower opposite and free end having a contact button (movable) (14) facing another fixed button (15), the latter being mutual with the binding or inlet terminal (17), aligned with a corresponding orifice (18) provided on the cover surface (2), and receiving the third pin of the protector three-pins coupling plug concerned in the motor.

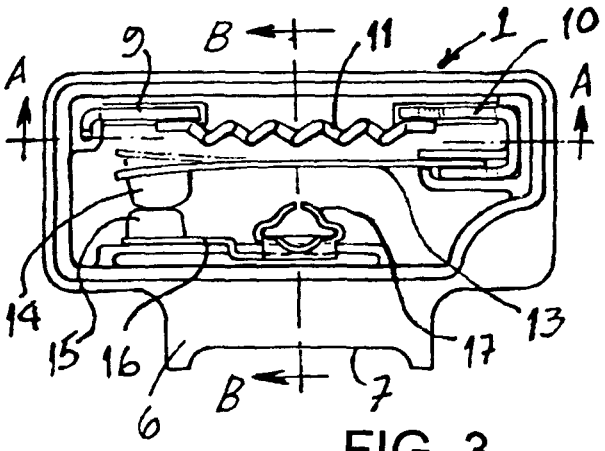



FIG. 3

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## Description

### BACKGROUND AND OBJECT OF THE INVENTION

**[0001]** Several types and models of protective for electrical motors are commonly known naturally pertaining to the most varied industrial, household and other equipment. Said protectors being responsive to both electrical current and temperature and avoiding the motors overheating occurring due to large and abrupt engine overcurrents, however with a short endurance, as well as motor smaller overcurrents, however with a greater endurance and, at the same time, overcoming the resulting problems and shortcomings both of the motors themselves and the facilities in which they are installed.

**[0002]** From the essential point of view, such protectors comprise a thermostat metallic device, with the corresponding pair of electrical contacts, and thermally coupled with the motor it intends to protect, and also an electrical resistor heater connected in series to the motor in order to heat the first, the assembly actuating so that, in case of any motor overheating, the combined heating effect of the thermal coupling with the motor and the electrical resistor heating system is such that results in the heating of the thermostat metallic device, being enough to configurationally deform it and separate the protector electrical contacts, thus interrupting the electric power feeding to the motor.

**[0003]** Concerning the real conceptive simplicity of such protectors, their currently existing constructive embodiments are extremely complex and expensive, including the unit external structure or body with multiple and varied cutouts, depressions, prominences and the like, such fact being also observed in the essential components themselves, also comprising a plurality of parts, further affected by several details of tabs, hotels, pins and the like, all such constructive complexity being naturally responsible for the major difficulties of its accomplishment and assembly, as well as increasing its cost, and further favoring the existence of disarrangements, lockings and other irregularities.

**[0004]** In view of such circumstances, the resistive thermostat for motors protection was created, being the object of the present invention, which exactly aims the so desired constructive simplicity, being perfectly consistent with its conception, providing excellent regularity, perfection and working efficiency, as well as great accomplishment, assembly and maintenance facilities, further including an advantageous economic aspect and the total impossibility of disarrangement and other shortcomings.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0005]** The attached drawings depict the present invention, wherein:

Fig. 1 is a front view of the concerned resistive thermostat for motors protection;

Fig.2 is a side and partially sectioned view of the same resistive thermostat of figure 1;

Fig. 3 is an internal and front view of said resistive thermostat;

Fig. 4 is a longitudinal section view as per A-A, indicated in Fig. 3;

Fig. 5 is a cross-section view as per B-B, also indicated in Fig. 3; and

Fig. 6 is an internal and front view of another embodiment of the concerned resistive thermostat.

### DESCRIPTION OF THE INVENTION

**[0006]** According to what the above mentioned figures depict, the resistive thermostat for motors protection against electrical overcurrents and overtemperature, object of the present invention, initially comprises a rectangular prismatic body or box 1, with a front side cover 2, both naturally made of thermal and electrical insulating material (figures 1 and 2), such body having the back side face (and opposite to cover 2) provided with a corner lowering 3 having a spherical sector shape, for supporting the user's finger when handling it to apply and remove from the external surface of the engine (not shown), being also provided with a pair of thin rectangular windows 4, being longitudinally aligned and proximately to its upper edge.

**[0007]** Further, said prismatic box 1, constituting the unit body, forms an enlargement of the front edge 5 (Figures 2 and 4) for a stable fitting of cover 2, from which a lower tab 6 is appended, having a locating en cutout 7 (Figure 1) with reference to two pins 8 of the three-pins connection plug which projects from the engine body.

**[0008]** Advancing, and inside the prismatic body 1 of the concerned device (Figures 3 and 4), also corresponding to the aligned pair of thin windows 4 of its back side face, it is provided an end pair of metallic supports 9 and 10 for the electrical resistor 11, being dully positioned, wherein one of such supports 9 projects a balanced metallic blade 12 outside the box, comprising one of its connection terminals.

**[0009]** In turn, the other inner support 10 for the electrical resistor 11, intentionally having a C shape, attaches one of the ends of a balanced bimetallic blade 13, arranged in immediate subjacency and connected in series with the electrical resistor 11 (Figure 3), and naturally with the lower opposite and free end having a contact button (movable) 14, facing another fixed button 15, the latter being mutual, by a connection metallic plate 16, with the binding or inlet terminal 17 being aligned with a corresponding orifice 18 provided on the cover surface 2, and receiving the third pin of the protector three-pins

coupling plug concerned in the motor it is intended to.

**[0010]** In relation to the functioning of the concerned protection resistive thermostat, it is virtually identical to other known protectors, that is, while the motor does not overheat due to eventual overcurrents or equivalents, it remains as illustrated (shown in full line) in Fig. 3, that is, with the movable contact 14 and the fixed contact 15 dully closed, thus keeping the power feeding circuit for the motor.

**[0011]** Continuing, in any eventual case wherein said motor overheating takes place, the thermal and electrical coupling heating effect, combined with the motor, by means of the electrical resistor 11 and the bimetallic blade 13, determines a naturally progressive heating of this latter, until its resulting configurative deformation (shown in dotted line in Figure 3), due to its balanced assembly, pushes away the movable contact 14 from the fixed contact 15, opening the power feeding circuit for the motor and thus stopping its operation.

**[0012]** It is worth emphasizing that the resistive thermostat, as described above, may be used in any condition of the motor, however, it is particularly indicated for those working with a low current that would not be enough to deform the bimetallic blade 13, such case justifying the contribution of the electrical resistor 11, connected in series therewith.

**[0013]** In cases where the motor works with a high electric current that is enough to deform the bimetallic blade 13, it is possible to dispense with the electrical resistor (Fig. 6) and, in such case, the balanced metallic blade 12, consisting in one of the connection terminals of the protector, is derived and projected outside the C-shaped support 10 (to which the end of the bimetallic blade 13 is attached).

**[0014]** As discussed above, it is evident the extreme constitutive simplicity of the concerned resistive thermostat, relating to both its reduced number of component parts and their simplified configuration, being all aimed to reach the excellent working regularity, perfection and efficiency, as well as great facilities for its accomplishment, assembly and maintenance, further including an advantageous economic aspect and the total impossibility of disarrangement and other shortcomings.

## Claims

1. Resistive thermostat for electrical motors protection against electrical overcurrents and overtemperature, **characterized in that** it initially comprises a rectangular prismatic body or box (1), with a front side cover (2), and having the back side face, opposite to cover (2), provided with a corner lowering (3) having a spherical sector shape, for supporting the user's finger when handling, being also provided with a pair of thin rectangular window (4) longitudinally aligned and proximately to its upper edge, said prismatic box (1) forming an enlargement of the front edge (5) for a stable fitting of cover (2), from which a lower tab (6) is appended, having a locating end cutout (7) with reference to two pins (8) of the three-pins connection plug which projects from the motors body.

2. Resistive thermostat for electrical motors protection as claimed in claim 1, **characterized in that** inside the prismatic box or body (1), also corresponding to the aligned pair of thin windows (4) of its back side face, it is provided an end pair of metallic supports (9) and (10) for the electrical resistor (11) so positioned, wherein one of such supports (9) projects a balanced metallic blade (12) outside the box, comprising one of its connection terminals, while in the other inner support (10) having a C shape, there attaches one of the ends of the balanced bimetallic blade (13), arranged in immediate subjacency and connected in series with the electrical resistor (11), and naturally with the lower opposite and free end having a contact button (movable) (14), facing another fixed button (15), the latter being mutual, by a connection metallic plate (16), with the binding or inlet terminal (17) being aligned with a corresponding orifice (18) provided on the cover surface (2), and receiving the third pin of the protector three-pins coupling plug concerned in the motor.

3. Resistive thermostat for electrical motors protection as claimed in claim 1 or 2, **characterized in that**, in another embodiment, it is internally provided with the bimetallic blade (13) only, thus dispensing with the electrical resistor and, in such case, the balanced metallic blade (12) projected outside the unit body (1), and consisting in one of the connection terminals of the protector, derives from the C-shaped support (10) to which the end of the bimetallic blade (13) is attached.

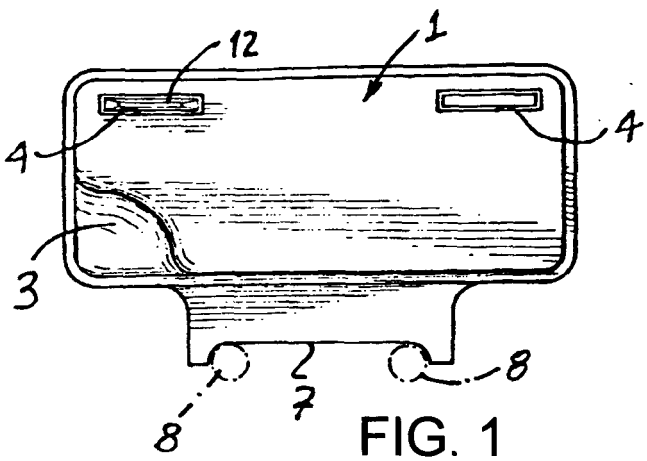



FIG. 1

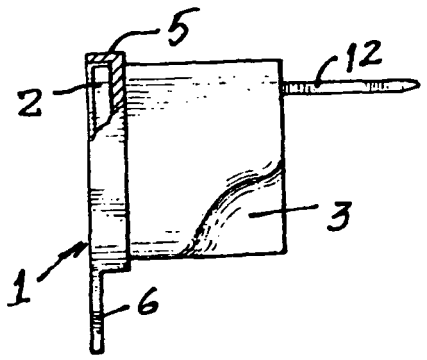



FIG. 2

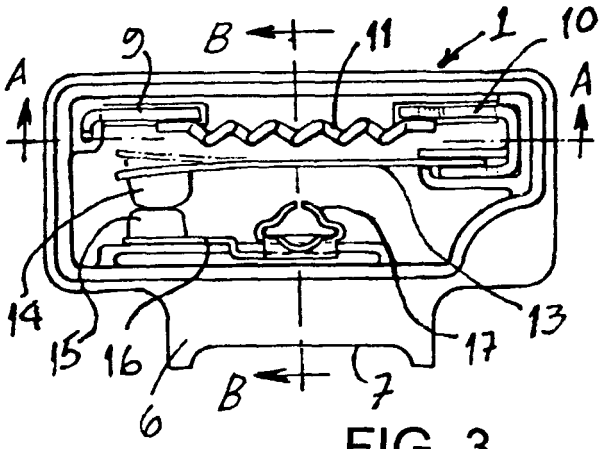



FIG. 3

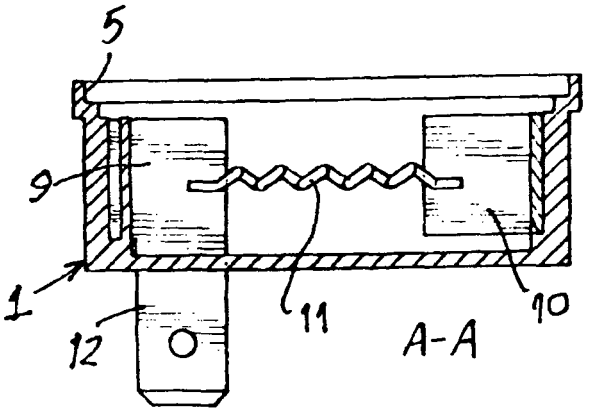



FIG. 4

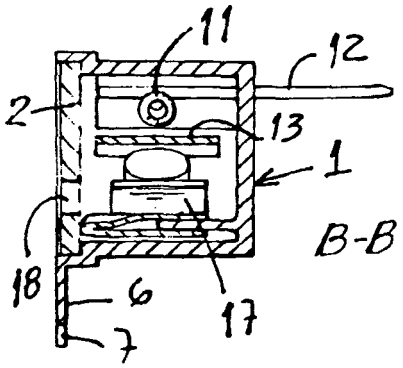



FIG. 5

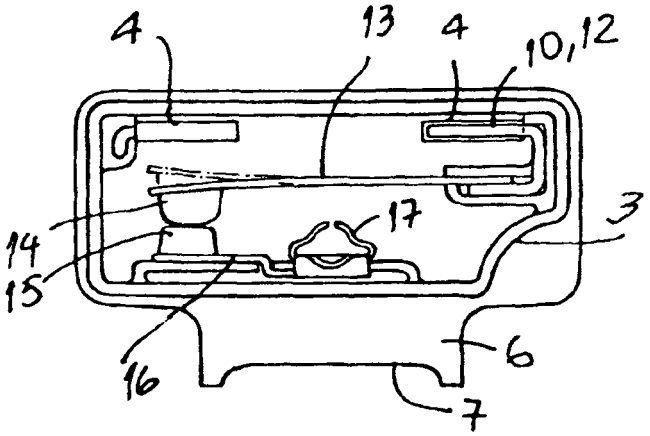



FIG.6

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# EUROPEAN SEARCH REPORT

Application Number
EP 04 07 7923

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
|---|---|---|---|
| X | FR 2 806 830 A (TECUMSEH DO BRASIL LTDA) 28 September 2001 (2001-09-28) * the whole document * ----- | 1-3 | H01H81/02 H01H37/04 H01H9/08 |

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H01H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 31 March 2005 | Ramírez Fueyo, M |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 07 7923

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82