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THERMALLY CONTROLLED ELECTRICAL SWITCH
HAVING MOTION-AMPLIFYING LEVER MEANS
Filed Sept. 9, 1964

Fig. 1.

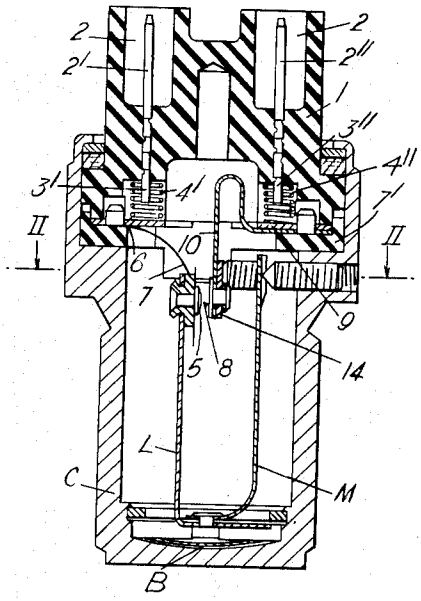
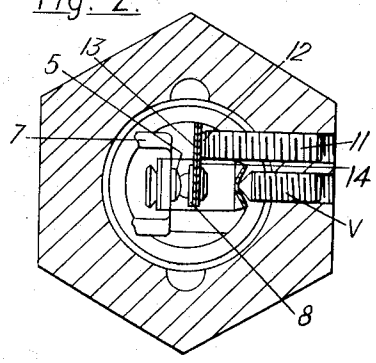


Fig. 2.



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THERMALLY CONTROLLED ELECTRICAL SWITCH HAVING MOTION-AMPLIFYING LEVER MEANS

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Claims priority, application Italy, Sept. 10, 1963, 18,556/63
4 Claims. (Cl. 200—138)

This invention relates to thermally controlled electrical switches and is an improvement in or modification of the invention disclosed in the specification of co-pending patent application Serial No. 279,104.

The said specification describes a thermally controlled electrical switch with a metallic housing for automatically closing and opening an electrical circuit in accordance with predetermined limits of temperature of the medium surrounding the thermal element of the switch, the said limits being adjustable from the exterior of the housing.

One object of the present invention is to render the adjustment of the switch more accurate and reliable.

In accordance with the present invention there is provided a thermally controlled electrical switch having a metallic housing, the switch being of the type in which a movable contact is subjected to the opposing actions of resilient means and of a bimetallic member in the form of a curved disc disposed on the base of the housing and adapted to reverse its curvature at predetermined limits of temperature of the said medium, and in which a movable contact is carried by an arm, disposed along the axis of the housing, of a bent lever the other arm of which extends parallel to the disc and is connected at one end to a fixed point, within the said housing, about which it can turn under the action of the disc and the said resilient means, whereby there is imparted to the movable contact a displacement greater than the movement of the disc so as to move it into and out of engagement with the fixed contact to close and open a circuit in which the switch is included, the fixed contact being carried, within the housing and facing the movable contact, by the free end of a supporting strip the other end of which is fixed to a metallic sector located between the insulating cover of the housing and an insulating ring bearing on a shoulder of the housing, and is electrically connected to a terminal carried by the cover.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawing, in which:

FIG. 1 is an axial section of a switch according to the invention, taken on the plane of movement of the movable contact of the switch, and

FIG. 2 is a transverse section of the switch on the line II—II of FIG. 1.

The switch illustrated comprises a cylindrical metallic housing C in the base of which is located a bimetallic plate B of disc form associated with a flat spring M and a right angle lever L carrying the movable contact, and a cap or cover **1** of plastic insulating material carrying terminals **2** and closing the open end of the housing C, the cover **1** being clamped against an annular shoulder **7'** within the housing with interposed rings of insulating material, by upsetting the upper rim of the housing.

The terminals **2'**, **2''** of the switch are of the flat plug type, arranged at the centres of recesses **2** formed in the cap and adapted to receive socket sleeves. Such terminals are practicable and easy to use, and the walls of the recesses ensure complete electrical insulation, against the exterior.

On the lower ends **3'**, **3''** of the terminals **2'**, **2''** springs **4'**, **4''** are threaded in electrical contact with those lower ends. The spring **4'** establishes metallic continuity and hence electrical continuity between the terminal **2'** and a movable contact **5** via a sector **6** and a flexible metallic strip **7** clamped between the sector **6** and the insulating ring **7'**.

The spring **4''** establishes metallic and hence electrical continuity between the terminal **2''** and a normally fixed adjustable contact **8** via a sector **9** and a support in the form of a bent flexible strip **10** on which the contact **8** is fixed.

The movable contact **5** is fixed to the free end of the long arm, extending parallel to the axis of the housing C, of the lever L, the said long arm being straight. The normally fixed adjustable contact **8** carried by the end of the flexible strip **10** is disposed exactly facing the movable contact **5**. It is fixed on the strip **10** together with a laterally extending projection **13** and an insulating plate **14** which covers the projection **13** on the side thereof nearest the wall of the housing C.

Parallel to a screw V provided for adjustment of the spring M (as described in the above-mentioned specification) there is provided for adjustment of the contact **8** a screw **11** which is screwed into the housing C and the inner end **12** of which bears against the insulating plate **14** and thus acts through it on the projection **13** to adjust the position of the contact **8** according to the extent to which the screw **11** is screwed into the housing C, the position of the contact **8** being maintained by the resilience of the strip **10**.

A switch according to the invention as above described presents important advantages: in fact, it enables the cover or cap **1** to be made completely independent of the movable contact **5**, and any deformation thereof has no effect on the position of the contact itself, which may further be put into the operating position before the cap is applied and consequently may be inspected before the switch is closed. The form of the terminals is also advantageous, permitting more rapid and certain connection of the cables of the electrical circuit.

What I claim is:

1. In a thermally controlled electrical switch having a metallic housing and a cover of insulating material, a movable contact, a bimetallic plate disposed in the base of the housing and adapted to reverse its curvature at predetermined limits of temperature of the medium surrounding the plate, an arm carying the movable contact, means for transmitting motions of the bimetallic plate to the arm thereby to multiply the motion of the bimetallic plate, and a fixed contact; the improvement comprising terminals carried by the cover, flexible conductors leading to the contacts, and spiral spring means in electrical contact at one end with the terminals and at the other end with said flexible conductors.

2. Structure as claimed in claim 1, and a screw adjustable in the housing by screwing it from the exterior thereof, said flexible conductor leading to said fixed contact being bent in such a manner that its end bears resiliently on the end of said screw thereby to permit positioning of the fixed contact relative to the movable contact.

3. Structure as claimed in claim 2, and a second screw side by side with said first-named screw and acting against said movable contact to adjust the rest position of said movable contact.

4. Structure as claimed in claim 1, in which said terminals are in the form of flat plugs, and peripheral insulating and protecting walls formed integrally with the cover and surrounding said plugs.

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ROBERT K. SCHAEFER, *Acting Primary Examiner.*

BERNARD A. GILHEANY, *Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,223,806 December 14, 1965

Antonio Moro

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, line 3, after "Italy," insert -- assignor to Soc. per Azioni Fratelli Borletti, of Milan, Italy, a company of Italy, --; line 12, for "Antonio Moro, his heirs" read -- Soc. per Azioni Fratelli Borletti, its successors --; in the heading to the printed specification, line 5, for "Antonio Moro, Piazza Po 6, Milan, Italy" read -- Antonio Moro, Milan, Italy, assignor to Soc. per Azioni Fratelli Borletti, Milan Italy, a company of Italy --.

Signed and sealed this 31st day of January 1967.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents