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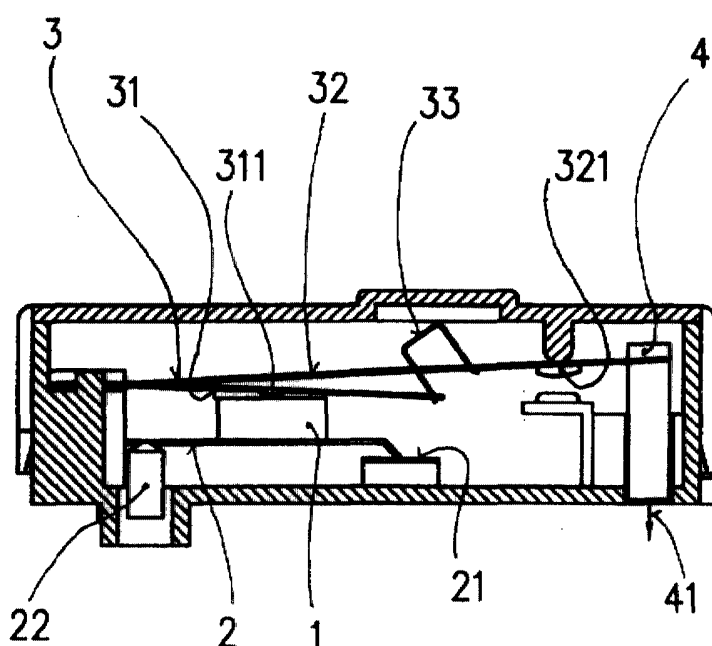
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(54) **Electric switching unit for security means in household appliances**

(57) Electric switching unit for a security means in household appliances comprises a PTC resistor (1), a bimetal strip (2), a bimetal strip (21) compensating for an elevated appliance temperature and a bistable switching spring (3), which is made of a strip spring (31) and a hoop spring (32) coupled to each other by a coupling spring (33). The PTC resistor (1) is placed in a electrically conductive way between the strip spring (31) de-

cisive for the jumping over of the hoop spring (32) and the bimetal strip (2). A first end of the bimetal strip (2) is leaned against an adjusting screw (22) and the second end thereof is leaned against the compensating bimetal strip (21) supported at both ends. The length of the bimetal strip (2) is such that the PTC resistor (1) only slightly influences the temperature of the compensating bimetal strip (21).



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## Description

**[0001]** The invention concerns an electric switching unit for a security means in household appliances, wherein a PTC resistor is inserted between a bistable switching spring, whereto a security means blocking element is attached, and a bimetal strip and wherein, at a possible elevated temperature of the appliance, the PTC resistor displacement towards the bistable switching spring as accomplished by the bimetal strip is compensated for in a more precise manner.

**[0002]** The applicant manufactures a security means for use in household appliances. It is provided with a suitable electric switching unit. This unit comprises a PTC resistor, a bimetal strip connected to a first connecting terminal of the unit, a compensating bimetal strip and a bistable switching spring, which is connected to a second connecting terminal of the unit. The bistable switching spring is composed of a strip spring and a hoop spring, which at one end are rigidly joined to each other and fastened to a casing of the electric switching unit, whereas, close to the free end, they are elastically joined by a coupling spring. The PTC resistor is inserted between the bimetal strip and the strip spring, the position of which is decisive for the jumping over of the hoop spring from one stable position into another one, and it has an electric contact with both of them. A security means blocking element is inclinably mounted to the free end of the hoop spring. The ends of the bimetal strip are leaned against the ends of the compensating bimetal strip which compensates for the PTC resistor displacement due to the elevated appliance temperature. The proximity of the compensating bimetal strip to the PTC resistor and a good thermal contact therewith through both ends of the bimetal strip result in the compensating bimetal strip being too strongly influenced by the PTC resistor temperature, which overshadows the influence of the appliance temperature.

**[0003]** Consequently, the technical problem to be solved by the present invention is how to improve the sensing of the appliance temperature by means of a compensating bimetal strip so that by a properly placing it with respect to a bimetal strip the influence of the temperature of a PTC resistor supported by the bimetal strip is reduced.

**[0004]** The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims.

**[0005]** The advantage of the electric switching unit for a security means in household appliances with respect to such known electric switching unit exists in that therein a more precise compensation for the elevated appliance temperature is accomplished, which favourably results in a shorter turning-off time of the security means and also its spread is narrower.

**[0006]** The invention will now be explained in more detail by way of the description of an embodiment and with reference to the accompanying drawing represent-

ing in the sole Figure a section of a preferential embodiment of the electric switching unit for a security means in household appliances.

**[0007]** An electric switching unit according to the invention and provided for a security means in household appliances is represented in the Figure in sectional view. It comprises a PTC resistor 1, a bimetal strip 2 connected to a first connecting terminal of the electric switching unit, a compensating bimetal strip 21 and a bistable switching spring 3, which is connected to a second connecting terminal of the electric switching unit.

**[0008]** The bistable switching spring 3 is made up of a strip spring 31 and a hoop spring 32. The springs 31 and 32 are rigidly joined to each other at one end and fastened to a casing of the electric switching unit, whereas, close to the free end they are elastically joined by a coupling spring 33. Depending on the position of the strip spring 31, the hoop spring 32 of the bistable switching spring 3 jumps over from one stable position into another one.

**[0009]** The PTC resistor 1 is inserted between the bimetal strip 2, preferentially in the middle of the bimetal strip 2, and the strip spring 31, the position of which is decisive for the jumping over of the bistable switching spring 3. The PTC resistor 1 has an electric contact with the bimetal strip 2 and also with the hoop spring 32 through a contact 311 mounted thereon.

**[0010]** In a known way a security means blocking element 4 is inclinably mounted to the free end of the hoop spring 32, which is provided with a movable contact 321 close to said free end.

**[0011]** A first end of the bimetal strip 2 is leaned against an adjusting screw 22 and the second end thereof is leaned against the compensating bimetal strip 21, preferentially in the middle of the compensating bimetal strip 21, both ends of which are leaned against the casing of the electric switching unit.

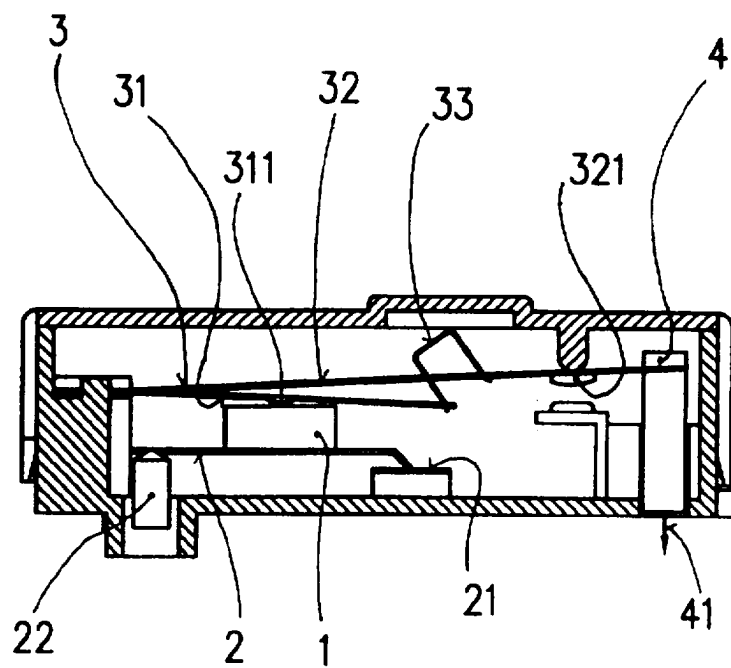
**[0012]** When voltage is applied to the connecting terminals of the electric switching unit according to the invention, the electric current flows through the PTC resistor 1 warming it up. The bimetal strip 2, which is in touch with the PTC resistor 1, gets warm too and pushes the PTC resistor 1 towards the strip spring 31. When the strip spring 31 undergoes a certain displacement, the hoop spring 32 jumps over into another stable position and the blocking element 4 is moved in direction 41 to a blocking position.

**[0013]** The compensating bimetal strip 21 compensates for the said displacement for a contribution resulting from the elevated appliance temperature. Therefore the PTC resistor 1 should only slightly influence the temperature of the compensating bimetal strip 21. Namely, the compensating bimetal strip 21 must sense the temperature of the appliance wherein the security means is placed. This is accomplished by the length of the bimetal strip 2 sufficiently exceeding the diameter of the PTC resistor 1 so that the warmed up PTC resistor 1 does not exert too strong influence upon the compensating

bimetal strip 21.

## Claims

1. Electric switching unit for a security means in household appliances, comprising a PTC resistor (1), a bimetal strip (2) connected to a first connecting terminal of the unit, a compensating bimetal strip (21) and a bistable switching spring (3), which is connected to a second connecting terminal of the unit and where to a blocking element (4) is attached and between a part (31) of the bistable switching spring (3) decisive for its jumping over and the bimetal strip (2) the PTC resistor (1) is placed, which has an electric contact with said part (31) as well with the bimetal strip (2), **characterized in that** a first end of the bimetal strip (2) is leaned against an adjusting screw (22) and the second end thereof is leaned against the compensating bimetal strip (21).
2. Electric switching unit for a security means in household appliances as recited in claim 1, **characterized in that** the PTC resistor (1) is placed in the middle of the bimetal strip (2) **and that** the second end of the bimetal strip (2) is leaned against the middle of the compensating bimetal strip (21) which is supported at both ends.
3. Electric switching unit for a security means in household appliances as recited in claim 1 or 2, **characterized in that** the length of the bimetal strip (2) exceeds the diameter of the PTC resistor (1) to such an extent that the PTC resistor (1) only slightly influences the temperature of the compensating bimetal strip (21).





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# EUROPEAN SEARCH REPORT

Application Number  
EP 01 10 6430

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)
A	US 3 702 454 A (BROWN HORACE D) 7 November 1972 (1972-11-07) * claim 1; figures 1-5 *	1-3	H01H37/10 H01H61/06
A	EP 0 682 352 A (SAMUEL MONTAGU & CO LIMITED AS) 15 November 1995 (1995-11-15) * abstract; figure 1 *	1-3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01H
The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>9 July 2001</b>	Examiner <b>Mausser, T</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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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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09-07-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP 0682352    A	15-11-1995	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82