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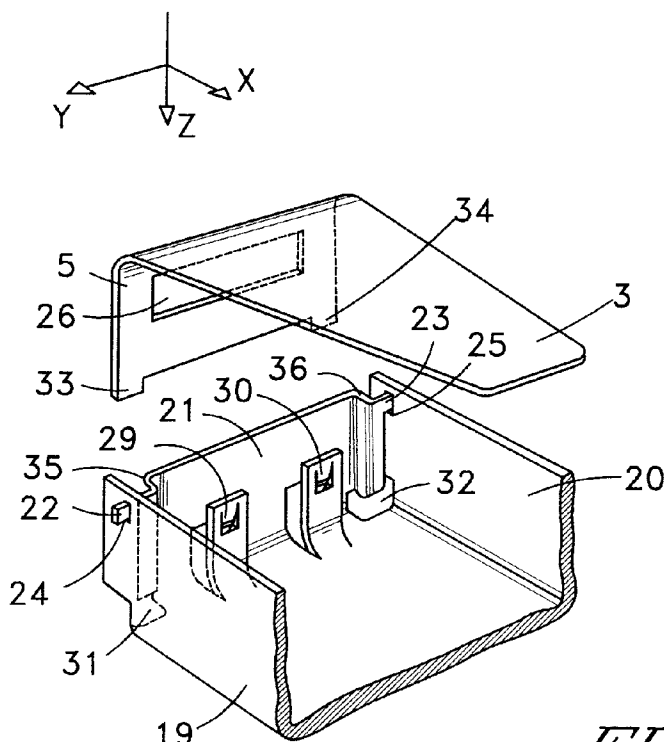
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AL LT LV MK RO SI(71) Applicant: **FAGOR, S.Coop****20500 Mondragon (Guipuzcoa) (ES)**(72) Inventor: **Azpeitia de Diego, Ramon****Markina (Bizkaia) (ES)**(30) Priority: **08.10.1997 NL 1007228**Remarks:Revendications modifiées conformément à la règle
86 (2) CBE.**(54) Thermally actuated switching device with an actuating arm**

(57) A thermally actuated switching device, at least comprising a base body (2) provided with a back wall (21), an electric switch (10) and a spring-mounted actuating arm (3) for the switch (10) by transmitting an actuating movement, which arm (3) in the region of one end comprises a bent part (5) and a hinge axis (4), and the bent part (5) is able to connect with two clamping

lips (27,28) supports, which are cut outs of the base wall (2) and of the back wall (21) and turned upwards to extend in a plane substantially parallel to the hinge axis (4). The base body (2,21) furthermore comprises one or more positioning elements (31,32), in which are inserted one or more projections (33,34) of the actuating arm (3), in order the latter to be secured in the direction of the hinge axis (4).

*FIG. 3.***EP 0 908 909 A1**

Description

[0001] The present invention relates to a thermally actuated switching device, at least comprising a base body, a electric switch and a spring-mounted actuating arm for actuating the switch by transmitting an actuating movement, as a function of the temperature transmitted to a heat responsive device, according to the preamble of claim 1.

[0002] A switching device of this kind is known from EP-0 377 169. This device comprises a setting spindle for adjusting the desired switching temperature, which via a heat responsive diaphragm interacts with the actuating arm. The actuating arm is a relevant component for the accuracy of the switching device. According to EP-0 377 169, a bent part of the actuating arm interacts with the support elements on the base body, which are produced by cutting and bending a sheet metal material, and are situated in a plane extended perpendicular to a hinge axis, which is directed along the bending line of the actuating arm or "Y" axis. The support elements are raised side walls of the base body with cutouts, in which the bent part of the actuating arm is directly connected, as is shown in fig. 2, which represents the switching device of EP-0 377 169.

[0003] This manner of interaction between the actuating arm and the base body has in practice turned out to be not completely satisfactory. For example, it has been found that the position of the diaphragm with respect to that of the setting spindle is not sufficiently accurate. In EP-0 377 169, insufficient positioning accuracy of the actuating arm is obtained in the direction of the hinge axis, since the support elements are situated in a plane which extends substantially perpendicular to the hinge axis. The design in accordance with the prior art in practice, does not provide any positioning accuracy of the diaphragm and the actuating arm in the "Y" direction.

[0004] The object of the present invention is a thermally actuated switching device, provided with a heat responsive component and an actuating arm supported in a base body, as is defined in claim 1.

[0005] The switching device according to the invention considerably improves the positioning accuracy of the actuating arm with respect to heat responsive component and the setting spindle of the switching device. In particular, the device according to the invention ensures the positioning accuracy of the actuating arm in a direction parallel to its hinge axis, as well as the two others directions.

[0006] The base body made of sheet metal comprises a base wall, two raised side walls and a raised back wall, the back wall interacting in place with the side walls. The back wall and the base wall of the base body form the support element of the switching components and also define the positioning elements. It has been found that the final positional accuracy of the switching components on and in a base body made of sheet metal, is

impaired by the bending operations when it is processed, whereas this accuracy is substantially achieved by cutting operations. In other words, it is preferred as far as possible to avoid bending and to undertake cutting operations. In this context, cutting is also intended to encompass stamping, punching, sawing, milling and the like.

[0007] In the switching device according to the invention, the positioning accuracy of the actuating arm is not dependent on the bent side walls supporting. The base body, in the region of the back wall adjacent to the base wall, comprises one or more raised clamping lips, in such a manner that the actuating arm be clamped in between the back wall and the clamping lips.

[0008] In a particular embodiment of the invention, the bent part of the actuating arm has one or more projections, and the base wall has one or more cutouts for engaging with one another in order to secure the actuating arm in the direction of its hinge axis and furthermore to avoid any positioning inaccuracy parallel to the hinge axis of the actuating arm.

- Fig. 1 shows a cross section view a thermally actuated switching device, according to the invention.
- Fig. 2 shows a perspective view of a base body and the actuating arm of the switching device EP-0 377 169.
- Fig. 3 shows the base body and the actuating arm according to the preferred embodiment of the fig. 1.

[0009] With reference to the Fig. 1, a thermally actuated switching device according to the invention comprises the base body 2 and the actuating arm 3, which is provided with the hinge axis 4 and the bent part 5, turned towards the base body 2. The numeral 6 indicates a diaphragm through which the actuating arm 3 interacts with the setting spindle 9, the switch 10 has a spring element 13, and the actuating arm 3 has a pushing lug 14. In the position shown in the Fig. 1, if the diaphragm 6 is expanded the actuating arm 3 will be bent away from the base body, this turn taking place about its hinge axis 4, and the switch 10 opens the electric contact. It will be clear that for the temperature operating point to function optimally, the positioning accuracy of the actuating arm 3 and thus of the diaphragm 6 with respect to the setting spindle 9, and of the switching lug 14 with respect to the switch 10, is of extremely great importance.

[0010] Fig. 3 shows an embodiment of the fastening elements of the actuating arm 3 to the base body 2 according to the present invention. Arrows indicate the "X", "Y" and "Z" directions. The back wall 21 has projections 22 and 23 which engage into cutouts 24 and 25 of the side walls 19 and 20, respectively. Two clamping lips 27 and 28 are cut out of the base wall 2 and the back wall 21 and turned upwards. The clamping lips have two U-shaped detent incisions 29 and 30 respectively. After clamping the actuating arm 3, the detent incisions 29

and 30 engage with the inner edge of a cutout 26 of the actuating arm 3, in order the latter to be retained. The base body 2 comprises, in the two corners between the back 21 and base 2 walls, two cutouts 31 and 32, into which the projections 33 and 34 on the bent part 5 are inserted, to obtain the right position of the actuating arm 3 relative to the base body 2, in the direction of the "Y" axis.

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Claims

1. A thermally actuated switching device, at least comprising a base body (2), a electric switch (10) and a spring-mounted actuating arm (3) for the switch (10) by transmitting an actuating movement from a heat responsive element (6), said arm (3) in the region of one end having a bent part (5) provided with one or more connecting elements (26,33,34), and a hinge axis (4), and said base body (2) having a back wall (21) which extends in a plane substantially parallel to said hinge axis (4), and two side walls (19,20) extended substantially perpendicular to said hinge axis (4), wherein the bent part (5) of the actuating arm is connected with one or more support elements (27,28) belonging to the base body (2), characterized in that the one or more support elements (27,28) for connecting the actuating arm (3) are extended in a plane substantially parallel to the hinge axis (4), and the base body (2) furthermore comprises one or more positioning elements (31,32) into which the one or more connecting elements (33,34) of the actuating arm (3) are inserted for positioning the actuating arm in the direction of the hinge axis (4).
2. The switching device according to claim 1, characterized in that the support elements (27,28) on the base body (2), comprise one or more raised clamping lips (27,28) on the region of the back wall (21), in such a manner that the bent part (5) of the actuating arm (3) is clamped in between the back wall (21) and the one or more clamping lips (27,28), whereas the back wall (21) is connected to the side walls (19,20).
3. The switching device according to claim 1, characterized in that the connecting elements (26,33,34) of the bent part (5) of the actuating arm (3) comprise projections (33,34) for being (4) inserted into the positioning elements (31,32) of the base body (2), which are one or more cutouts (31,32) in the corners between said walls (2,21).

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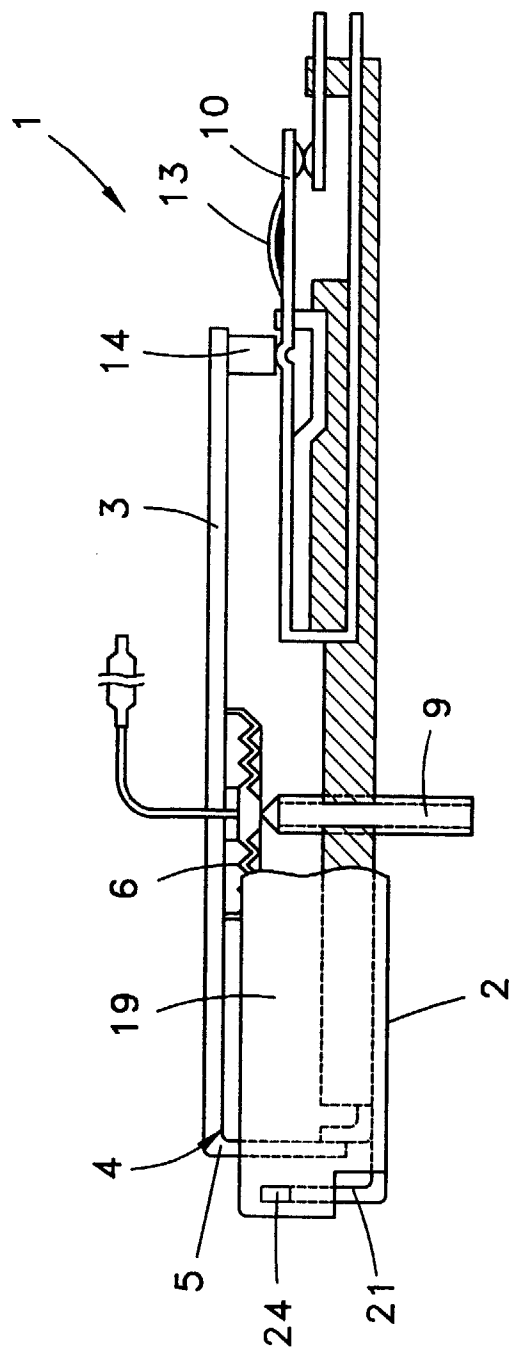


FIG. 1.

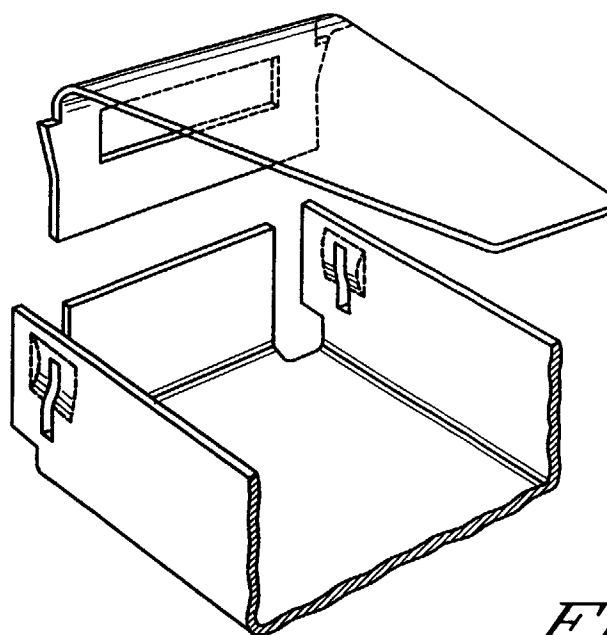


FIG:2.

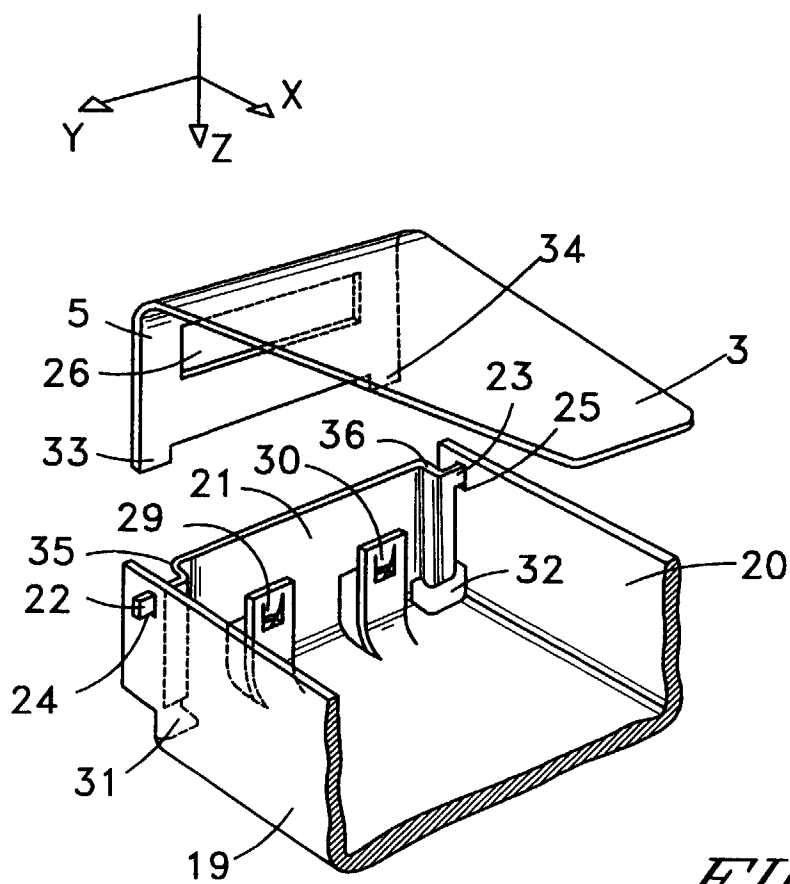


FIG:3.



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EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0215

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 November 1998	Examiner Overdijk, J
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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