



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 052 663 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.11.2000 Bulletin 2000/46

(51) Int. Cl.⁷: **H01H 5/18, H01H 11/04**

(21) Application number: **00109259.2**

(22) Date of filing: **28.04.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **14.05.1999 IT TO990401**

(71) Applicant: **Bitron S.p.A.**
10064 Pinerolo(Torino) (IT)

(72) Inventor: **Barile, Marco**
12020 Rossana (CN) (IT)

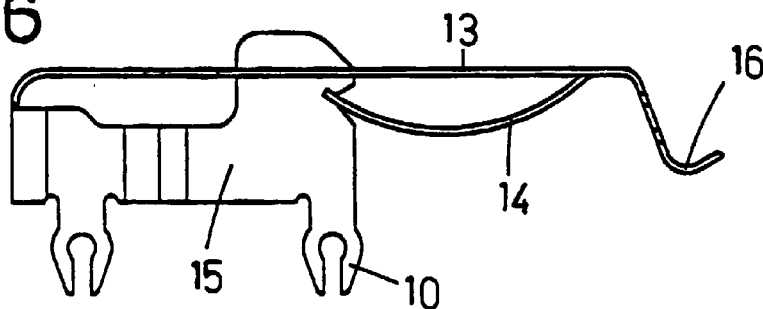
(74) Representative:
Di Francesco, Gianni et al
Ing. Barzanò & Zanardo Milano S.p.A.
Corso Vittorio Emanuele II, 61
10128 Torino (IT)

(54) **Base-foil metal unit for a quick release switch and process for its manufacturing**

(57) Base-foil unit for quick release low power switches used in motor vehicle electric circuits for functions provided on board, said switches being composed of a container(3), a horizontally pivoting release key (4), a printed electric circuit (8), a quick spring metal foil (13), and a support base (15) for the foil, providing the

electric contact between the circuit and the contact 16) carried in the foil, the foil (13), the base (15) and the contact (16) being formed by a unique metal plate appropriately shaped and folded.

FIG.6



EP 1 052 663 A2

Description

[0001] This invention relates to a metal foil of a quick release switch, to its base and to its manufacturing process. Said switches are used for low power operation of all functions provided in a motor vehicle, controlled by the electronic component of the on-board electric installation.

[0002] In switches of the known type, as for example the switch illustrated in figure one enclosed, the metal foil is composed of a plate on which the curved section obtained by shearing, is acting as an arch for foil release, from a first contact position to a second contact position, with the circuit to be monitored. To carry out described functions, the metal foil must be mounted on a suitable spring support. Said spring support is mounted on the switch body. It is clear that mounting process requires at least two subsequent operations, the first comprising foil mounting on the support, the second support mounting on the switch body or on the printed circuit, depending on the type of switch used. This results in an increase in costs as well as more complex automatic mounting of the switches.

[0003] It is an object of the present invention to carry out a base-foil unit for quick release switches that will make it possible to avoid said disadvantage.

[0004] Another object of the present invention is to define a process for base-foil unit manufacturing according to present invention.

[0005] Said object of the present invention can be achieved by a base-foil unit for quick release switches presenting the characteristics of claim one.

[0006] Said additional object can be achieved by way of the present invention through a process for the manufacturing of a base-foil unit presenting the characteristics provided in claim 7.

[0007] Other characteristics and advantages of the invention will be more apparent from the description given hereinafter by way of non-limiting examples with reference to the accompanying drawings, in which:

- Figure 1 is a partial sectional view of a quick release foil switch of the prior art;
- Figure 2 is a longitudinal sectional view of a quick release switch equipped with a base-foil unit according to the present invention;
- Figure 3 is an enlarged view of a section of figure 2;
- Figure 4 is a plan view of the unit of the present invention illustrated before folding;
- Figures 5 to 7 represent a lower plan view, side elevation view and top view of the unit object of the invention.

[0008] Reference being made to figures 2 to 7, whereby 1 generally indicates a quick release type switch, presenting a container body 3 and a horizontally pivoting release key 4. A printed electric circuit 6 is located inside body 3, with pins 8 for connection to the

electric circuit (not illustrated) of the vehicle. On the printed circuit (four in the illustrated example), pins (10) are inserted on release in appropriate seats, blanked from a metal plate or foil. Said metal plate is designed to create, as one piece and with the adequate profile and required bendings, a metal foil 13 with elastic arch 14, as well as the base of support 15. Said foil 13 also includes a contact 16 designed to close other contacts on the printed circuit electrically, said contact being an integral part of the foil, to form a unit installed on release (by way of the pins) on printed circuit 6. The key 4 is pivotally connected on 17 and any traction or pressure on said key, that creates a rotation in the clockwise or anticlockwise direction of said key, is transmitted to foil 13 by way of projection 18, obtained in the key, that pushes lever 19 in body 3 of switch 1. Foil 13 and base 15 are connected by way of an elastic hinge obtained in the metal foil by way of bending 20, obtained during processing. The free end of arch 14, allowing the quick spring movement, is inserted in seats 21 obtained facing the latter, in noses 22 formed in base 15. Lever 19 of chamber 3 exerts force on the foil in a point located inside the area defined by pins 10, so as to avoid creating rotating moments that could cause the release of the base from the printed circuit, damaging electric contact points provided by said pins (10). The base-foil unit, with relative release pins and slidable contact, can be obtained by way of a copper-beryllium alloy, of the type provided by the company NGK BERYLCO in Boulogne, France, for example, so as to ensure optimum mechanical-electrical results.

[0009] The base-foil unit manufacturing is achieved by way of the process described below.

[0010] A substantially reversed T-shaped profile is obtained by blanking a brass-beryllium plate of the appropriate thickness (0,15 mm, for example). Said profile includes four pins 10 for coupling on release, in the seats of the printed circuit, located along the side of the head, designed to create the base 15, (fig. 4) and two noses 22 with seat 21 on each end. The stem of the T, forming the spring foil, presents two side arms 23, connected at the ends, and enclosing the arc-shaped section 14 of the foil. The shaft end opposite of the head protrudes at the junction point of the arms to create the electric slidable contact 16 on printed circuit 6.

[0011] The following process involves the folding of the head section of the T, carried out essentially along two transversal lines to the head, A and B, equidistant from the ends, in order to create a closed structure with pins 10 located substantially at the vortex of an isosceles triangle.

[0012] The third and final operation involves shaft folding, close to the head, along line C, that is perpendicular to the latter. The shaft is folded in such a way that the free end of the arc is inserted in seats 21 obtained in noses 22, connected via the previous folding operation. The projection of slidable contact 16 will also be slightly arched to avoid any locking on the contact

points of the printed circuit. The process described is carried out with a unique mould that blanks the profile first, then creates the folds and hook-on mechanism of the arch. The base-foil complex is then ready to be inserted, on release, in the appropriate seats obtained on the printed circuit. With the unit object of the present invention, it is possible to avoid the mounting operation of the plate on the base and the soldering of the base to the contacts on the printed circuit, saving time and money.

[0013] It is clear that the shape and dimensions of the unit can be adapted as required without necessarily depart from the protection of present invention, further defined in the following claims.

Claims

1. Base-foil unit for quick release low power switches used in motor vehicle electric circuits for functions provided on board, said switches being composed of a container(3), a horizontally pivoting release key (4), a printed electric circuit (8), a quick spring metal foil (13) equipped with an elastic arch (14) inserted in appropriate seats, an electric contact (16), and a support base (15) for the foil on the printed circuit, providing the electric contact between the circuit and the contact 16) carried in the foil, characterised by the fact that the foil (13), the base (15) and the contact (16) are formed by a unique metal plate appropriately shaped and folded.
2. Base-foil unit according to claim 1 characterised by the fact that before the folding operation the plate has a substantially reversed T-shaped profile.
3. Base-foil unit according to claim 1 characterised by the fact that the part of the base is equipped with pins (10) for insertion, by quick-release, in appropriate seats (8) located on the printed circuit.
4. Base-foil unit according to claims 1 and 2, characterised by the fact that the end of the stem of the T is equipped with noses (22) equipped with seats (21) for loose arch end (14) insertion.
5. Base-foil unit according to claims 1 and 3, characterised by the fact that with the folded base the pins (10) are substantially located at the vortex of an isosceles triangle.
6. Base-foil unit according to claim 1, characterised by the fact that it is carried out with a brass-beryllium alloy.
7. Process for the manufacturing of a base-foil unit according to claim 1, characterised by the following steps:

- blanking of the predefined T-shape from a metal sheet of appropriate thickness;
- folding of the T head along two transversal lines to create the base and locate the pins and noses in a predefined position, and
- folding of the T stem to position the foil, with the insertion of the arch in the appropriate seats.

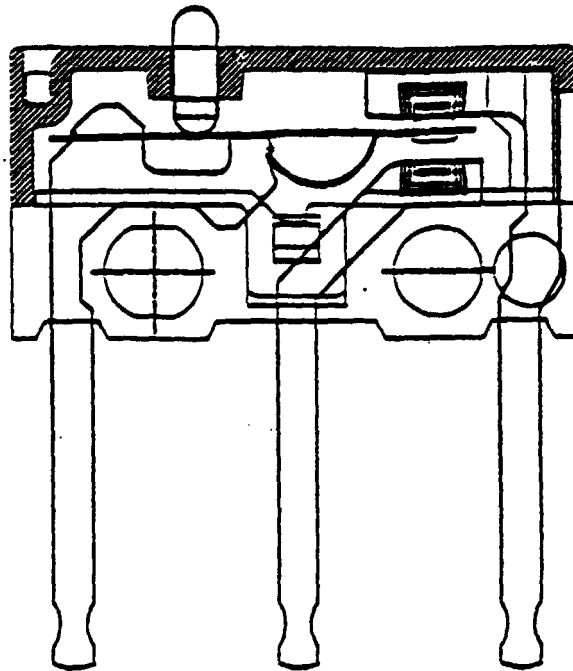


FIG.1

PRIOR ART

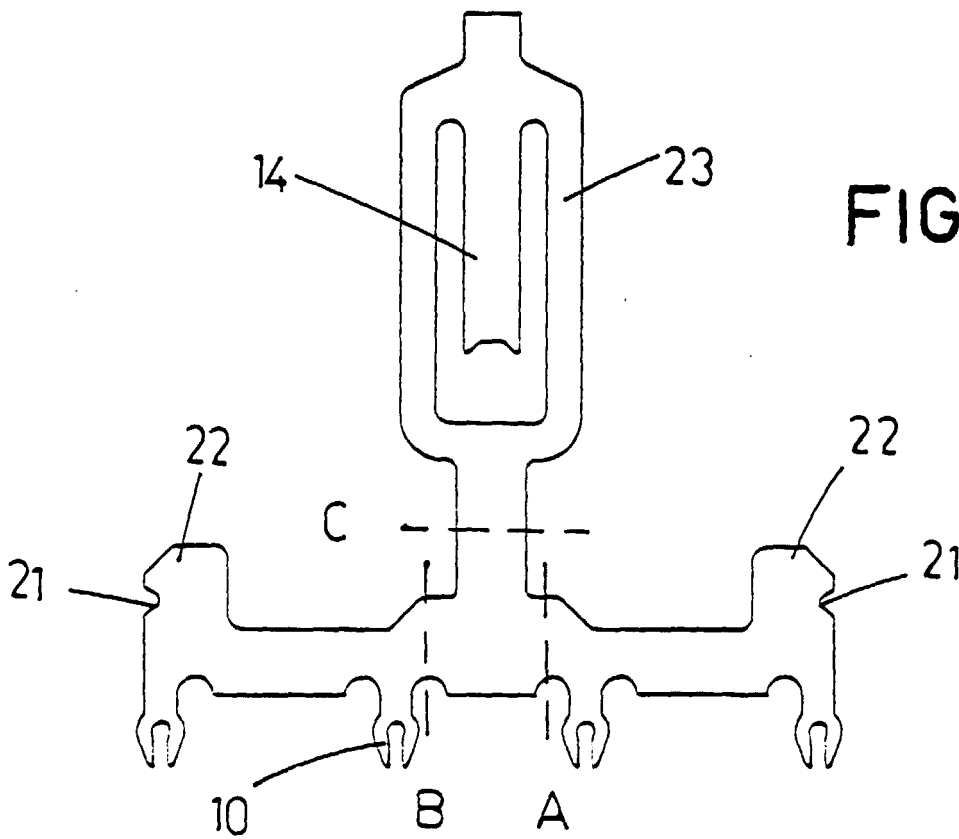


FIG.4

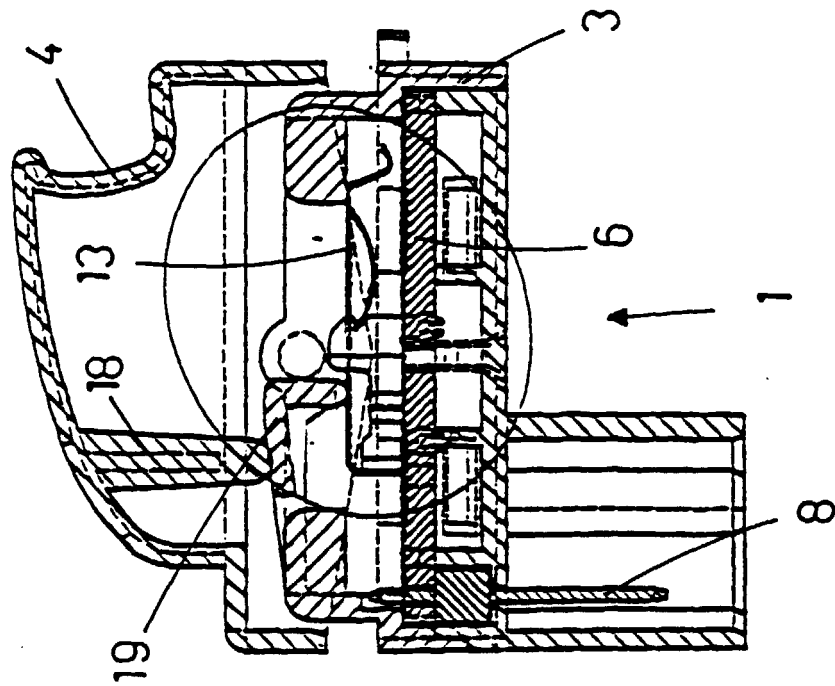


FIG. 2

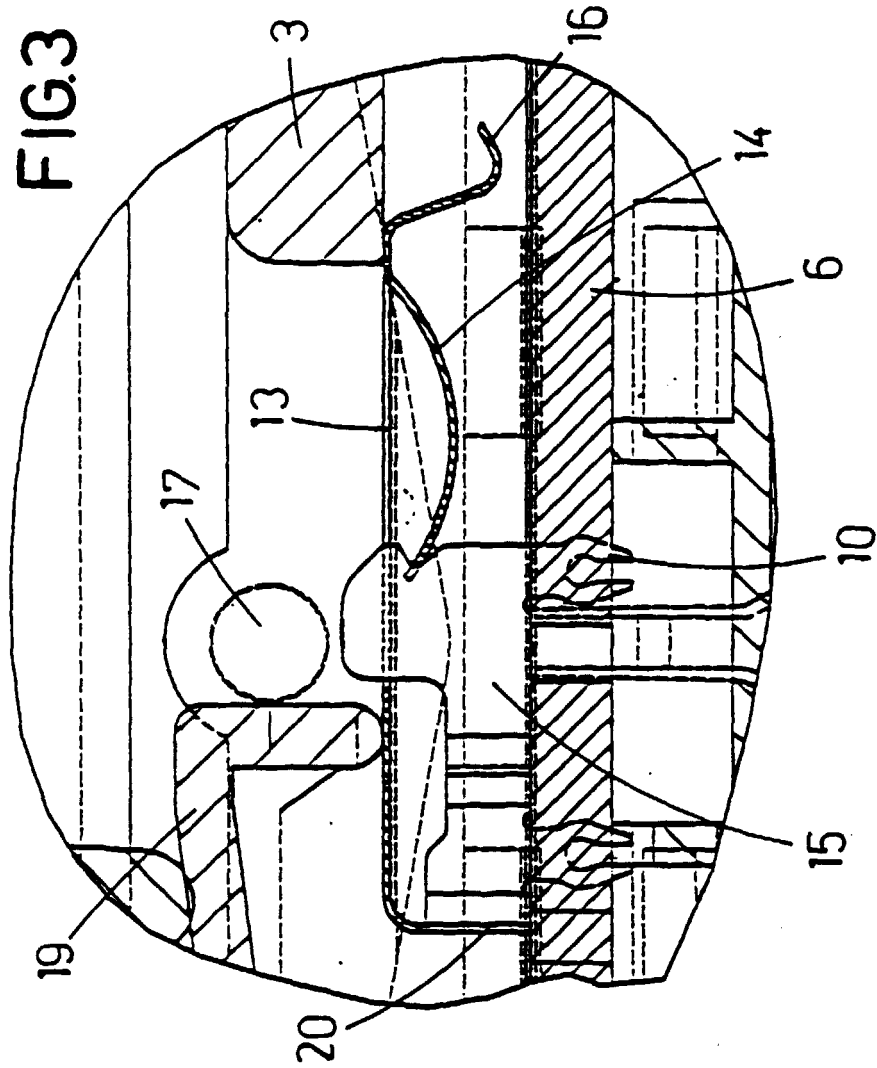


FIG. 3

FIG.5

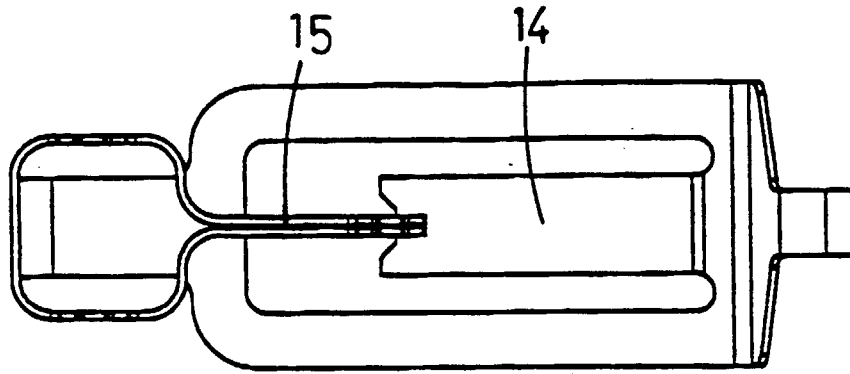


FIG.6

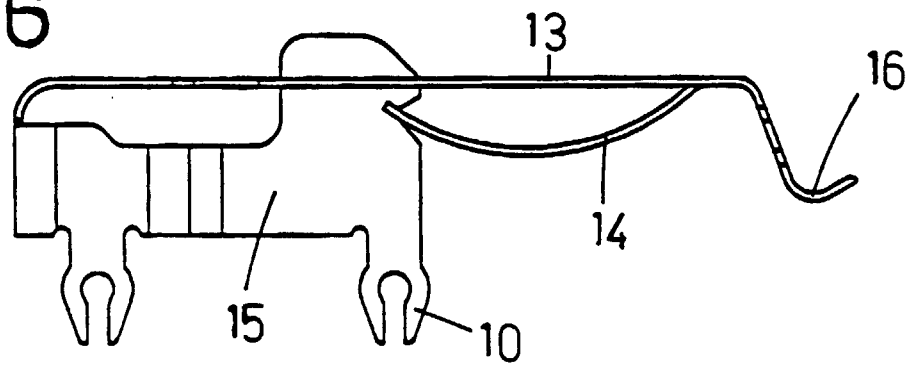


FIG.7

