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SUPPORTING AND CONTACTING STRUCTURE, ESPECIALLY FOR RELAYS, CONSTRUCTED FOR MECHANIZED AND ADJUSTMENT-FREE ASSEMBLY THEREOF

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Fig. 1

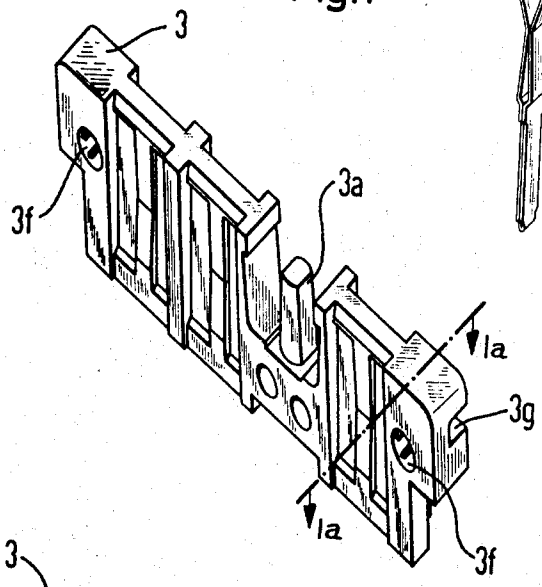


Fig. 3a

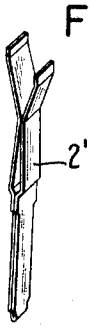


Fig. 1a

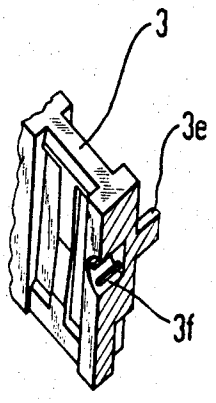


Fig. 2

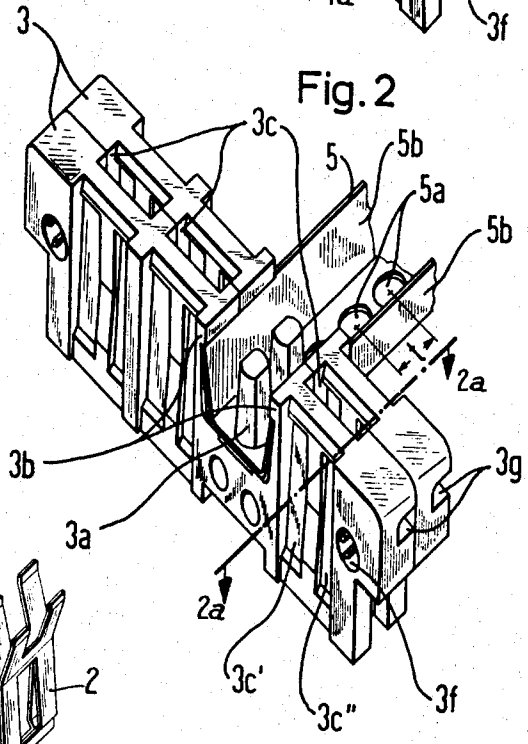
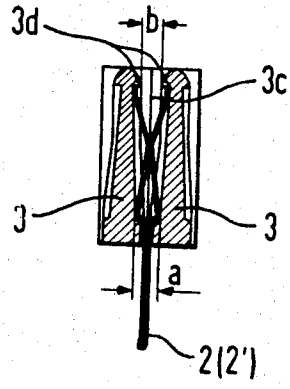


Fig. 2a



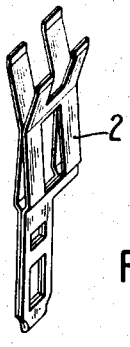


Fig. 3b

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SUPPORTING AND CONTACTING STRUCTURE, ESPECIALLY FOR RELAYS, CONSTRUCTED FOR MECHANIZED AND ADJUSTMENT-FREE ASSEMBLY THEREOF

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8 Claims

ABSTRACT OF THE DISCLOSURE

A supporting and contacting structure, particularly for relays and the like, of modular construction employing a plurality of like body members of insulating material, a mounting rail preferably of U-shape cross section, having openings therein to receive projections on the respective body members and constructed to interlock therewith to retain the same in assembled relation, adjacent body members cooperably by defining a plurality of chambers disposed in a common plane, and contact springs disposed in respective chambers provided with spring means interlocking with portions of the body members to retain the contact springs in their associated chamber.

The invention relates to a support structure for electrical devices, for example, relays, by means of which electrical connections may be effected therewith, and which is of modular construction whereby only a single mold or tool is required for the production of the body member or part of insulating material, independently of the number of contact springs required in the finished structure. As is known, conventional supporting structures of this type, particularly for relays, consist of a single body part of insulating material, in which the required number of contact springs are disposed. If additional contact springs are required for a more extensive contact arrangement, it is necessary to use a correspondingly larger body of insulating material, which often requires the fabrication of a new mold or tool.

These disadvantages are eliminated in a supporting structure according to the invention in which a mechanized or automated and adjustment-free fabrication may be readily achieved, in which a mounting rail, preferably U-shaped, is povided with openings adapted to receive cooperable projections on like body parts of insulating material, which parts may be assembled as aligned modular elements which can be secured in the desired positions by the interlocking of the flexible legs of the rails behind shoulders on the bodies of insulating material, with each pair of bodies of insulating material cooperably forming chambers lying in a common plane, in which V-shaped contact springs, preferably extending to adjacent the chamber opening, are provided with spring means for retaining the contact springs in position. Thus, it is possible to provide a supporting structure as an assembly of a desired number of body units and cooperable mounting rail which are secured together by means of an interlocking connection and a pressed connection. The aligned modular elements in this case comprise uniformly constructed body parts of insulating material in which the projections on the bodies, inserted into corresponding precisely disposed apertures in the rail, prevent the build-up of cumulative tolerances.

In an effective further development of the invention, the apertures in the U-shaped mounting rail, preferably

round, define the desired alignment distance between the respective body parts of insulating material. In order to facilitate the mounting of such body parts, the projections thereon may be constructed with a conical shape. A further development of the invention provides that interlocking of legs of the contact springs extending toward each other with V-shaped configuration, takes place adjacent the mouth or insert opening of the chamber receiving the same, which opening is reduced in size by respective shoulders. The body of insulating material can be produced, for example, as an injection molded part or a pressed part. In order to obtain good accessability for soldering of the terminal ends of the contact springs of the support structure, it is possible to utilize contact springs which are provided with a soldering connection at one side thereof, whereby in the assembly the contact springs can be alternately rotated by 180°. It is also possible, in particular for connecting the support to an etched printed circuit board, to alternately supply one section of a two-part chamber with a contact spring of suitable width.

In order to obtain a direct positive connection between the body parts of insulating material, they may be provided with projections or plugs, preferably of conical shape, which can be inserted by a press fit, into correspondingly arranged recesses which may be provided with longitudinally extending ridges. Additional recesses can also be provided on the respective outer ends of the body parts of insulating material for the reception of a portion of a safety bail forming retaining means for the device to be received, for example, a relay.

Further details of the invention will be apparent from the following description in connection with the drawings, in which:

FIG. 1 illustrates a single body part of insulating material constructed in accordance with the invention;

FIG. 1*a* illustrates a section taken approximately on the line A–B of FIG. 1;

FIG. 2 illustrates two modular body parts of insulating material assembled into a unit, which is sufficient for the formation of a plurality of support chambers lying in a common plane;

FIG. 2*a* is a section taken approximately on the line C–D of FIG. 2;

FIG. 3*a* illustrates a wide supporting spring having a solder connection disposed at one side thereof; and

FIG. 3*b* illustrates a narrow support spring for use in connection with etched circuits.

Referring to FIG. 1, the modular body part **3** of insulating material is provided with a projection **3***a* which in assembly is inserted into the aperture of a cooperable mounting rail. The section A–B of FIG. 1*a* illustrates details of a generally cylindrically shaped plug **3***e* on the body **3** of insulating material, which plug can be inserted into a correspondingly arranged recess **3***f* when assembled with a like additional body part.

Referring to FIG. 2, two modular body parts **3** are assembled on a mounting rail **5**, which is provided with apertures **5***a*, in two of which the projections **3***a* of the associated body part **3** of insulating material extend. It will be evident from this figure that when the body parts are in their final assembled positions with the U-shaped mounting rail **5**, the flexible legs **5***b* thereof may be spun behind and locked with projections **3***b* on the modular body part. In addition, it will be noted that both of the body parts **3** of insulating material cooperate to form a total of three chambers **3***c* which are disposed in a common plane, and into which respective contact springs can be inserted. As apparent from the transverse section of FIG. 2*a*, the contact springs **2** and **2'** can be interlocked behind elongated heads **3***d* which define respective insert

openings for the contact springs, which openings are of reduced dimensions as compared with the corresponding dimensions of the chamber.

As mentioned, three chambers 3*c* are created by the assembly of a pair of body members 3 of insulating material, into which can be inserted either wide contact springs provided with soldering lugs disposed at one side in accordance with FIG. 3*a*, or narrow contact springs in accordance with FIG. 3*b*. The dimension *a* of the contact spring 2 or 2' is smaller than the chamber opening *b* of the aligned body part 3 of insulating material, so that the contact spring can be readily inserted without difficulty from the top and interlocked behind the shoulders formed by the head 3*d* (FIG. 2*a*). As a result of the interlocking of the contact spring a supplementary attachment of the spring, as required, for example, in known support structures by twisting the spring ends or by adding a cover plate, can be omitted.

Likewise, the projecting heads 3*d* preclude an erroneous insertion of the knife-type prong to be received in the support structure. Each of the chambers 3*c* may be constructed in the form of two sectional chambers 3*c'* and 3*c''* and to make allowance for the distance of division in etched circuit printed boards, only alternate sectional chambers 3*c'* or 3*c''* may be provided with respective narrow contact springs 2'. If on the other hand a contact spring with a soldered connection at one side, as illustrated in FIG. 3*a*, is employed, improved accessibility for soldering from row to row may be achieved by inserting the respective contact springs in the chambers 3*c* with the offset soldering connections disposed in staggered relation.

To prevent the cumulative build-up of tolerances, the apertures 5*a* of the U-shaped mounting rails 5 may be constructed to close tolerances and thus having precise distances of division, whereby the projection 3*a* of the body parts 3, when inserted into the apertures 5*a*, will be very accurately positioned.

By constructing the projections 3*a* on the body 3 of insulating material with a conical formation, they can, in the assembly thereof, be readily inserted into the apertures of the mounting rail without difficulty. The fact that the laterally extending resilient legs 5*b* of the mounting rail 5 can be interlocked behind the projection 3*b* of the body part 3 contributes to the rigidity and stability of the complete assembly consisting of a number of modular body parts. In addition to such interlocking connection, the body parts 3 are also retained in assembled relation by a pressed connection, through which an absolutely accurate and secure positional fixing in all directions of the body parts of insulating material is achieved. The cylindrically formed projections or plugs 3*e* on the body parts, which can be inserted under pressure into the correspondingly arranged recesses 3*f* on the adjacent body parts serve to achieve such press fit connection. Such plugs being located adjacent both ends of the body parts thus provide a good positive connection of the aligned bodies of insulating material. Additional recesses 3*g* (FIGS. 1 and 2) located at the outer end of the respective body parts are provided for the mounting reception of portions of a safety bail which may be engaged, for example, with a relay which has been inserted into the support structure and thereby insure retention of the assembly.

We claim:

1. A supporting and contacting structure, particularly for relays, capable of mechanized and adjustment-free manufacture, comprising a plurality of like modular body members of insulating material cooperable to define a plurality of chambers disposed in a common plane, a mounting rail constructed to engage each of said body members, said rail having a separate aperture therein for each body member, each of the latter having a projection thereon extending into different ones of said cooperable apertures to align the respective body members in cooperable relation, said rail and the respective body members having cooperable interlocking elements arranged to retain the same in assembled relation, and contact springs having V-shaped portions disposed in respective chambers and having spring means interlocking with adjacent portions of said body members operative to retain such contact spring in the associated chamber.

2. A support according to claim 1, wherein the mounting rail is of U-shaped cross section and the apertures therein are, in each case, spaced at the desired alignment distance between the adjacent body members of insulating material.

3. A support according to claim 2, wherein said projections have a conical shape to facilitate the assembly of the respective body members with the mounting rail.

4. A support according to claim 1, wherein the body members are provided with enlarged head portions defining access openings for the respective chambers, which openings are smaller than the corresponding dimensions of the chambers, said spring means comprising leg portions formed on the contact springs engageable with said head portions.

5. A support according to claim 1, wherein the respective body members of insulating material are constructed as an injection molding or a pressed part.

6. A support according to claim 1, wherein each of the contact springs are provided with a solder connection offset at one side thereof which can be disposed in the respective chambers in either of two positions 180° apart.

7. A support according to claim 1, wherein the body members of insulating material are provided with preferably cylindrically shaped plugs, with the plugs on one body member being disposed with a press fit into cooperably arranged recesses having longitudinally extending ridges therein, formed in the adjacent body member.

8. A support according to claim 1, wherein the body members of insulating material have recesses therein at the free ends thereof for receiving portions of a safety bail forming retaining means for a device, such as a relay, disposed on the support structure.

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