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(54) **Relay block**

(57) The present invention relates to a relay block (10) comprising:

a block body (11) having an internal part equipped with a terminal housing (13) which houses first contact terminals (14);

at least one guiding part (20) comprising a relay-insertion opening (21) through which a relay (30) with second contact terminals (32) can be introduced into said block body (11), said second contact

terminals (32) being engageable with said respective first contact terminals (14) with a gripping force therebetween by introducing said relay (30) into the interior of said guiding part (20) through said relay-insertion opening (21). According to the invention, the relay block (10) further comprises at least one tool-introduction part (26 ; 42) provided in said guiding part (20), the frontier between said relay (30) and said terminal housing (13) being accessible through said tool-introduction part (26 ; 42).

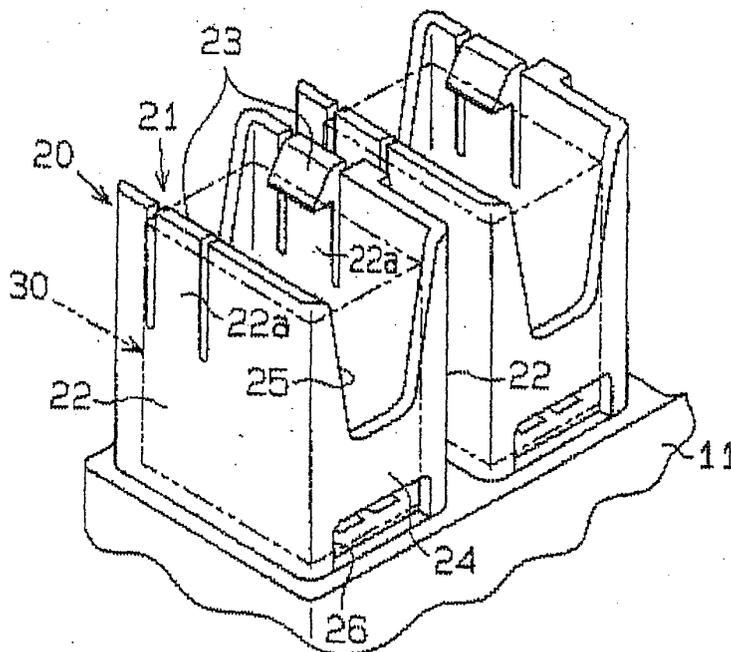


FIG. 2

Description

[0001] The present invention relates to relay blocks, which are embarked on board vehicles.

[0002] Figure 18 shows an example of a prior-art relay block 110. This relay block 110 comprises a block body 111, a relay-installation part 103 and a relay 100. The relay-installation part 103 projects out of the block body 111, and the relay 100 is removably installed into this relay-installation part 103. During the installation of the relay 100, the latter tends to be angularly misaligned with respect to the relay-installation part 103, the connecting terminals 101 of the relay 100 have to be inserted by force into the corresponding receiving terminals 105 which are housed in the relay-installation part 103. Thus, the receiving terminals 105 are distorted. Moreover, since the space for the insertion of the connecting terminals 101 into the receiving terminals 105 is designed to be very small, the angularly misaligned insertion position of the connecting terminals 101 causes permanent distortion of the receiving terminals 105. When the receiving terminals 105 are distorted, the space for inserting a connecting terminal 101 into its receiving terminal 105 is enlarged and consequently the contact gripping force between the receiving terminals 105 and the connecting terminals 101 is lowered.

[0003] In order to overcome the above-mentioned problems, a frame-shaped hood 102 is provided on the relay block 110, as shown in Figure 18. This hood 102 is disposed on the external wall of the relay 100 and envelops the connecting terminals 101. According to this structure, when installing the relay 100 onto the relay-installation part 103, the hood 102 guides the relay 100 and thus, the insertion position of the connecting terminals 101 towards the terminals 105 is kept properly aligned. Thus, there is no more stress between the connecting terminals 101 of the relay 100 and the receiving terminals 105 of the relay-installation part 103; the risks of distortion of the receiving terminals 105 of the relay-installation part 103 can be thus controlled.

[0004] However, there has recently appeared in a circle centred in Europe the notion "Value Engineering" (VE). Value Engineering is a technique aims for minimal modifications to obtain the basic functions of manufactured products or their part. From this approach, and in order to reduce at the same time the production cost of the relay 100, there is a tendency to use a relay 106, which does not comprise the hood 102. However, without the hood 102, the function of preventing distortions of the receiving terminals 105, as explained above, is lowered. Accordingly, as shown in Figure 19, it has been proposed to equip the block body 111, rather than the relay 106, with a guiding part 120. This guiding part 120 corresponds to the above-described frame-shaped hood 102.

[0005] This guiding part 120 comprises an opened extremity forming a relay-insertion opening 120a. The relay 106 is inserted through this relay-insertion opening

120a. During insertion, the relay 106 is inserted while being continuously guided by the guiding part 120. Thus, the insertion position of the connecting terminals 101 with respect to the receiving terminals 105 is kept properly aligned and distortions of the receiving terminals 105 are prevented.

[0006] However, when some relays are found not to operate upon testing the relay box, these failed relays must be changed. To change such a relay 106, the latter has to be pulled out of the guiding part 120. However, the relay 106 cannot be pulled out easily because of the strong contact pressure or gripping force between the connecting terminals 101 of the relay 106 and the receiving terminals 105. Moreover, since the external peripheral surface of the relay 106 installed in the guiding part 120 is not externally apparent, it is difficult for an operator to catch or grasp it. For these reasons, the removal of a relay 106 installed in the guide portion 120 is extremely difficult.

[0007] As shown in Figure 19, cut-out parts 121 have been formed in a portion of the guiding part 120 in order to facilitate the extraction of the relay 106. Thanks to these cut-out parts 121, the external peripheral surface of the relay 106 appears partially outside and the relay 106 can be grasped more easily. However, since the contact gripping force between the connecting terminals 101 of the relay 106 and the receiving terminals 105 is extremely strong, this expedient is not sufficient to facilitate significantly the removal of the relay 106. Further, when the surface of the cut-out parts 121 provided in the guiding part 120 becomes too important, this may improve the ease for grasping the relay 106 but it also decreases the mechanical strength of the guiding part 120 and thus diminishes its insertion-guiding function for the relay 106.

[0008] Related prior art techniques used for facilitating the removal of electrical functional parts different from the relay 106 are known. For example, a structure for removing a fuse is described in JP-A-Hei 10-255641. As shown in Figure 20, a linear element 132 is introduced into a guiding part 131. The guiding part 131 is concavely formed in the fuse-installation part 130. The extremity 132a of the linear element 132 passes through the underside of the fuse 134 and is curved again along the external side of the guiding part 131. Accordingly, the fuse 134 can be removed by joining and pulling up the both ends of the linear element 132, both extremities being emerging out of the guiding part 131.

[0009] However, according to this method, when pulling up the fuse 134, this former is just maintained by the linear element 132 and thus the position of the fuse 134 during extraction is not secured. For this reason, applying a similar method to a relay would distort the connecting terminal and/or the receiving terminal.

[0010] Utility Model JP-A-Hei 5-53106 discloses a structure comprising a junction block equipped with a fuse puller serving to facilitate fuse removal. As shown on Figure 21, there is provided a fuse-puller installation

part 140 which comprises a square frame body. A sliding-die removal opening 141 is formed in the middle portion of the bottom end of this square frame body. The structure corresponding to this fuse-puller installation part 140 may be considered for adaptation to replace the previously-explained guiding part. However, the way of using the fuse puller and the relay are totally different. For example, to facilitate the removal of the fuse puller 142, most of the latter emerges out of the fuse-puller installation part 140. However, with a structure where a large part of the fuse is kept projecting out of the guiding part like in the case of the fuse puller 142, the guiding function for the installation of the fuse would then be greatly decreased. Consequently, the structure of the fuse-puller installation part 140 cannot be adapted satisfactorily as a guiding part 120 in a relay block.

[0011] The present invention has been made taking these facts into account. One purpose of the present invention is to propose a relay block comprising a guiding part and a relay, where the relay can be easily removed from its guiding part.

[0012] This object is attained in accordance with the invention through a relay block comprising:

a block body having an internal part equipped with a terminal housing which houses first contact terminals ;

at least one guiding part comprising a relay-insertion opening through which a relay with second contact terminals can be introduced into said block body, said first contact terminals being connectible to said second contact terminals by introducing said relay into the interior of said guiding part through said relay-insertion opening,

characterised in that said relay block further comprises at least one tool-introduction part provided in said guiding part, the frontier between said relay and said terminal housing being accessible through said tool-introduction part.

[0013] According to such a structure, the tip of a tool can be introduced between the terminal housing and the relay, thus enabling the utilisation of the tool to relieve the contact pressure force (gripping force) between the second contact terminals and the first contact terminals. It is thus possible to raise the relay above the terminal housing by using a tool. The relay is in this way made to project out of the relay-insertion opening while being continuously guided by the guiding part. Accordingly, the contact pressure force (gripping force) between the second contact terminals and the first contact terminals is lowered and the relay can be easily removed.

[0014] The relay block may also further comprise a cut-away part, which is provided in a portion of the external wall of said block body, near said tool-introduction part, in such a manner that said cut-away part reveals the sidewall of said terminal housing, said cut-away part being in communication with the end part of said tool-

introduction part.

[0015] This cut-away part may be a step formed by cutting off the external wall of the block body in order to let the sidewall of the terminal housing appear near the tool-introduction part. According to such a structure, whatever the position of the installation of the relay block, which may differ according to the type of vehicle, the tool can in all cases be introduced from several directions into the tool-introduction part through the cut-away part.

[0016] According to the invention, the relay may be larger than the end part of the terminal housing. In such a structure, when the relay is installed in said terminal housing, one part of the relay is projecting out beyond the sidewall of the terminal housing. The tool can be pushed against this outwardly projecting part to enlarge the space of the frontier between the terminal housing and the relay. Accordingly, the tool can be easily introduced in the frontier between the relay and the terminal housing

[0017] According to one embodiment, an inclined surface may be provided on the side of the end part of said terminal housing, said inclined surface being formed in order to render the width of said end part of said terminal housing gradually narrower along the direction facing said guiding part. According to such a structure, the tip of the tool can be easily conducted onto the surface of the relay located at the side of the terminal housing since the width of the end part of the terminal housing becomes gradually narrower in the direction of the guiding part. Accordingly, the tip of the tool can easily enter into contact with the portion of the relay located at the side of the terminal housing.

[0018] According to another embodiment, the relay block further comprises means forming a pivot and facing said tool-introduction part. The relay can thus be removed very easily by applying the principle of the lever and the fulcrum.

[0019] According to one embodiment, means forming a pivot comprise an abutment amenable for use as a fulcrum by entering into contact with a tool introduced through said tool-introduction part, the tip of said tool being in contact with the internal end part of said relay located at the side of said guiding part. According to such a structure, for example, a screwdriver or any other tool having the form of a long spoon can be introduced between the relay and the terminal housing while abutting against this abutment. In such a position, the abutment can be used as a fulcrum and the relay can be removed from the guiding part by moving the tool around the abutment, which is used as a fulcrum. It is thus possible to raise the relay above the terminal housing by applying a reduced force on the tool.

[0020] This abutment may be a thrust surface installed on the block body at a place facing the tool-introduction part and distant from said tool-introduction part by a determined distance.

[0021] According to another embodiment, the relay

block further comprises introduction-limiting means, which form a space between said relay and said terminal housing when said relay is inserted in said guiding part. For example, said introduction-limiting means may comprise at least one abutment located on the end-part surface of said terminal housing.

[0022] According to such a structure, when the relay is inserted into the guiding part, the internal end face of the relay abuts against the introduction-limiting means. A space is thus formed at the frontier between the relay and the terminal housing. Accordingly, the tip of the tool is no longer introduced by force between the relay and the terminal housing thanks to this space.

[0023] The present invention also relates to a method for removing a relay out of a guiding part of a relay block according to the present invention. According to this method, a tool is introduced through said tool-introduction part into the junction between said relay and said terminal housing.

[0024] When said relay block further comprises means forming a pivot, said tool may further be inclined against said means forming a pivot to raise said relay above said guiding part.

[0025] The above and other objects, features and advantages of the present invention will be made apparent from the following description of the preferred embodiments, given as non-limiting examples, with reference to the accompanying drawing, in which:

Fig. 1 is a three-dimensional view of a relay box according to a first embodiment of the present invention;

Fig. 2 is a three-dimensional view of the guiding part according to a first embodiment of the present invention;

Fig. 3 is a cross-sectional view of the guiding part according to a first embodiment of the present invention;

Fig. 4 is a cross-sectional view of the guiding part according to a first embodiment of the present invention;

Fig. 5 (a), (b), (c), and (d) are three-dimensional views of variations of the first embodiment of the present invention;

Fig. 6 is a three-dimensional view of the guiding part according to a second embodiment of the present invention;

Fig. 7 is a cross-sectional view of the guiding part according to a second embodiment of the present invention;

Fig. 8 is a three-dimensional view of a variation of the guiding part according to the second embodiment of the present invention;

Fig. 9 is a cross-sectional view of a variation of the guiding part according to the second embodiment of the present invention;

Fig. 10 is a cross-sectional view of a variation of the guiding part according to the second embodiment

of the present invention;

Fig. 11 is a cross-sectional view of a variation of the guiding part according to the second embodiment of the present invention;

Fig. 12 is a three-dimensional view of the guiding part according to a third embodiment of the present invention;

Fig. 13 is a cross-sectional view of the guiding part according to the third embodiment of the present invention;

Fig. 14 is a three-dimensional view of a variation of the guiding part according to the third embodiment of the present invention;

Fig. 15 is a cross-sectional view of a variation of the guiding part according to the third embodiment of the present invention;

Fig. 16 is a three-dimensional view of the guiding part according to a fourth embodiment of the present invention;

Fig. 17 is a cross-sectional view of the guiding part according to the fourth embodiment of the present invention;

Fig. 18 shows the structure of the prior art relay installation;

Fig. 19 is a three dimensional view of a relay block equipped with guiding parts;

Fig. 20 is an illustration of the method of the related prior art used to remove a fuse;

Fig. 21 is a cross-sectional view of a fuse-puller installation structure.

[0026] The first embodiment will be further explained on the basis of Figures 1 to 4.

[0027] In the example of Figure 1, the relay block 10 equips the rear face of the instrument panel of a vehicle. The relay block 10 comprises a block body 11 made of a synthetic resin and a plurality of fuses 12 installed in this block body 11. Two guiding parts 20 having a square shape and made from a synthetic resin project out of the block body 11 at a position distant from the above-mentioned installation part. These guiding parts 20 are formed as an integral part of the block body 11. A relay-insertion opening 21 is formed at the extreme end (upper end on the Figure) of each guiding part 20. The relay 30 can be installed and removed from the relay block 11 through the relay-insertion opening 21.

[0028] As shown in Figures 2 and 3, terminal housings 13 are formed inside the block body 11 at places corresponding to the position of the guiding parts 20. A plurality of female gripping-contact terminals 14 (corresponding to the first contact terminals) soldered to electrical wire 2 are housed in the terminal housings 13. A plurality of terminal-insertion cavities 9 are formed on the end surface (upper surface on the Figures) of these terminal housings 13. These terminal-insertion cavities 9 rise above the gripping-contact terminals 14. The connecting terminals 32 (corresponding to the second contact terminals) that equip the relay 30 are inserted

through the previous cavities, and consequently the connecting terminals 32 and the above-mentioned gripping-contact terminals 14 engage each other and are thus in connection with some contact pressure.

[0029] The dimensions of the internal periphery of the guiding parts 20 are substantially the same as the dimensions of the external periphery of the relay 30, which is installed on the guiding part 20. Consequently, when inserting the relay 30, the side faces of the relay 30 are guided by the guiding part 20. Changes in the position of the relay 30 or clearance are thus limited and the relay 30 can be inserted in a correct and secured position. Accordingly, there is no stress (or load) in the connecting parts of the connecting terminals 32 of the relay 30 and the gripping-contact terminals 14 which are installed inside the cavities 9. Also, as a consequence, the gripping-contact terminals 14 cannot be distorted.

[0030] A flexible member 22a is formed in each of the two facing sidewalls 22 of the guiding part 20. Each flexible member 22a has a base end and an upper end. The flexible members 22a can be deflected, from their base end, towards the external side of the guiding part 20 by pressure acting against their elastic force. A click-fit abutment 23, which extends inside the relay-insertion opening 21, is provided at the upper end of each of the flexible members 22a. When the relay 30 is inserted into the guiding part 20, the flexible members 22a are thus deflected outwardly from the guiding part 20 and form an opening. When the relay 30 is fully inserted, the flexible members 22a recover their initial position and the click-fit abutments 23 cooperate with the end part of the relay 30 (upper part on the Figures). By virtue of this cooperation, the relay 30 cannot detach from the guiding part 20 even in presence of vibrations, shocks or the like.

[0031] Further, the guiding parts 20 comprise two sidewalls 24 which are not equipped with abutments 23. The upper end-part of these sidewalls 24 comprises a cut-away part 25. When the relay 30 is inserted inside the guiding part 20, one portion of the peripheral surface of the relay 30 is exposed to the outside through the cut-away parts 25. Accordingly, the space required for enabling the operator's finger to grasp the relay 30 is protected in a secured manner.

[0032] Moreover, regarding the guiding part 20, the bottom end part of each of those of the above-mentioned sidewalls 24 that is equipped with a cut-away portion 25 comprises a tool-introduction part 26. In the example, the latter is the form of a square opening. This tool-introduction part 26 is provided at the bottom end part of the guiding part 20, which corresponds to the proximity of the frontier or junction between the relay 30, and the terminal housing 13. The dimensions of the tool-introduction part 26 are designed to be large enough to allow the introduction or insertion of the tip of a tool or rod. This tool or rod helps to remove the relay 30 (according to one embodiment, a minus driver is used). Since the block body 11 is formed of a plastic resin with a metal mould, preferably, the tool-introduction part_26

has a relatively simple shape, for manufacturing simplification. The tool used is not limited to a minus driver. For instance, the configuration may be modified, for example to suit any tool having the general shape of a long spoon with a curved, hook forming end, or equivalent.

[0033] There shall now be explained a method of removing the relay 30 out of the guiding part 20. As shown in Figure 4, the tip of the tool 5 is inserted through one of the tool-introduction parts 26 which equips the bottom end part of the two sidewalls 24. The tool 5 is introduced into the junction between the relay 30 and the terminal housing 13. The relay 30 is then pushed up above the border of the terminal housing 13, while being continuously guided by the guiding part 20. Further, the side surface of the relay 30 (see the upper central part of Figure 4) is slightly tapered and formed as to render the relay 30 more slender at its upper part (not shown in the Figures). This particular shape facilitates the release of the engagement between the end part (upper part) of the relay 30 and the click-fit abutment 23. As the relay 30 is led out, the elastic members 22a deflect outwardly and the relay 30 and the stoppers 23 thus end their cooperation. The upper end part of the relay 30 is then caused to project out of the relay-insertion opening 21. The relay 30 can be removed from the guiding part 20 by grasping or catching this outwardly projecting part. When removing the relay 30, the gripping force between the connecting terminals 32 and the gripping-contact terminals 14 is greatly decreased because the relay 30 is emerged from the end surface of the terminal housing 13 (upper surface on the Figures). Accordingly, the relay 30 can be easily removed just by exerting a small force. Consequently, as regards the first embodiment of the present invention, a tool 5 is used to push out the relay 30 before grasping it. The contact pressure between the connecting terminals 32 and the gripping-contact terminals 14 is relieved and thus it is possible to remove the relay 30 from the guiding part 20 easily, just a small force having to be exerted.

[0034] The first embodiment of the present invention can be modified as follows.

[0035] As shown on Figure 5 (a) a tool-introduction part 26a comprising a pair of opposed corner portions can be provided at the bottom end-part of the guiding part 20. As shown in Figure 5(d), two pairs of opposed corners can also be provided in the bottom end-part of the guiding part 20. In this case, all of the corners are provided with a tool-introduction part 26d. A tool-introduction part 26b extending along the distance between two corners may be provided, as shown in Figure 5 (b), at the bottom end-part of the sidewalls 24 which are equipped with cut-away parts 25. Further, as shown in Figure 5(c), the tool-introduction parts 26 may also be provided in the central part of the bottom end part of the pair of sidewalls 22 equipped with the click-fit abutments 23.

[0036] The second embodiment of the present invention will be further explained on the basis of Figures 6

and 7. The explanations regarding the elements and parts of the second embodiment which are similar to the first embodiment will be abbreviated.

[0037] As shown in Figures 6 and 7, a cut-away part 40 which is a step formed by cutting down a portion of the external wall of the block body 11, is provided near the tool-introduction part 26 of the block body 11. In this case, the sidewall 13a of the terminal housing 13 emerges out as an external portion through the tool-introduction part 26 and through the cut-away part 40. Further, the tool-introduction part 26 is opened as to communicate with one end part of the cut-away part 40. Globally, it forms a concave shape. The terminal housing 13 has a smaller width due to an inclined surface 41 formed at the proximity of its junction point with the relay 30. In this case, one portion of the external side of the relay 30 projects outwardly beyond the end part of the terminal housing 13.

[0038] Consequently, the sidewall 13a of the terminal housing 13 emerges out as an external part through the cut-away part 40 formed in the block body 11. Thus, even if the orientation for the installation of the relay block 10 is different according to the type of vehicle, it is possible, from the side of the cut-away part 40, to introduce a tool 5 into the frontier or junction part between the relay 30 and the terminal housing 13 through the tool-introduction part 26. Accordingly, the tool 5 can be introduced from a plurality of directions and thus it is possible to remove the relay 30 from the guiding part 20 without any influence of the position or orientation of the installation of the relay block 10.

[0039] Moreover, since the relay 30 projects outwardly from the end-part surface (upper surface, on the Figures) of the terminal housing 13, it is possible to push against this outwardly projecting portion with the tip of a tool 5. Further, the tip of the tool 5 is easy to introduce on the surface of the side of the terminal housing 13 of the relay 30 due to the inclined surface 41 which is formed in such a way that, at the end part of the terminal housing 13, the width of the terminal housing 13 progressively decreases according to the direction of the side of the guiding part 20. Consequently, the tip of the tool 5 can rapidly touch the surface of the relay 30 located at the side of the terminal housing 13.

[0040] The second embodiment of the present invention can be modified as follows.

[0041] As shown in Figure 8, the two guiding part 20 which are on the top of the block body 11 may be connected together. In this case, the tool-introduction parts 26 which equipped the central portion of the bottom end part of the two guiding parts 20 are also connected together to form a single tool-introduction part 42. Near the tool-introduction part 42 of the block body 11 is formed a cut-away part 43 which is a step formed by cutting away inside the external wall of the block body 11.

[0042] As shown in Figure 9, there may be no cut-away part 43 in the block body near the tool-introduction

part 26. In this case, the tip of the introduced tool 5 enters into contact with the surface of the relay 30 located at the side of the terminal housing through the tool-introduction part 26 and the contact point between the tool 5 and the external wall of the block body 11 is used as a fulcrum. It is then possible to use the principle of the lever and fulcrum. Accordingly, it is possible with a rather small force to raise the relay 30 out of the guiding part 20.

[0043] As shown in Figure 10, the sidewall 13a of the terminal housing 13 may have a smaller thickness. In this case, the cut away portion enables the relay 30 to project out from the end part of the terminal housing 13. Thus, the surface of the relay 30 located at the side of the terminal housing 13 appears on the outside.

[0044] As shown in Figure 11, an escape groove 44 having a V-shaped cross section, may be formed in the space between the housing terminal 13 and the external wall of the block body 11. In this case, the tip of the tool 5 enters into contact with the face of the relay 30 located at the terminal housing side and the contact point between the tool 5 and the end part 44a of the external side of the escape groove 44 is used as a fulcrum. Thus it is possible to use the principle of the lever and fulcrum. In this case, it is also possible to raise the relay 30 out of the guiding part 20 using a rather small force.

[0045] As shown in Figures 12 and 13, a thrust point 50 can be installed on the block body 11, at a place corresponding to the position of the tool-introduction part 26 which equips the bottom end part of the guiding part 20. This thrust point 50 is provided at a determined distance from the tool-introduction part 26 and extends along the width direction of the tool-introduction part 26. With such a structure, the tip of the tool 5 can enter into contact with the face of the relay 30 located at the side of the terminal housing 13. The contact point between the tool 5 and the thrust point 50 can be used as a fulcrum and the principle of the lever and fulcrum can be used. Thus, the relay 30 can be easily raised.

[0046] The third embodiment of the present invention can be modified as follows.

[0047] The thrust point 50 which equips the block body 11 may have a shape other than a pyramidal support, as depicted. For example, as shown in Figures 14 and 15, the shape of the thrust point 51 can be modified in order to have a conical shape with a round extremity. In this case, the tip of the tool 5 can also contact the face of the relay 30 located at the side of the terminal housing 13. The contact point between the tool 5 and the thrust point 51 can be used as a fulcrum and thus, the principle of the lever and fulcrum can also be used. Moreover, the tip of the tool 5 moves automatically since the fulcrum which support the tool 5 corresponds to the summit of the conical thrust point 51. Accordingly, the operation of raising the relay 30 is facilitated.

[0048] As shown in Figures 16 and 17, this embodiment has introduction-limiting stops 60 provided on the end surface of the terminal housing 13. These introduc-

tion-limiting stops 60 abut against the internal end surface of the relay 30 when the relay 30 is installed in the guiding part 20. In this case, the introduction-limiting stops 60 maintain the relay 30 at a position where the relay 30 does not have any contact with the terminal housing 13. For this reason, a space is formed between the relay 30 and the terminal housing 13.

[0049] Accordingly, the introduction-limiting stops 60 already maintain the relay 30 in a position where it raised upon the end face of the terminal housing 13. Thus, it is easy to introduce the tip of the tool 5 in the space formed in the frontier between the relay 30 and the terminal housing 13. Further, the tip of the tool 5 contacts the end face of the relay 30 and the contact point between the tool 5 and the external wall of the block body 11 is used as a fulcrum. It is thus possible to use the principle of the lever and fulcrum. It is possible to rise up the relay 30 from the upper part of the introduction-limiting stops 60.

[0050] Any combination of the features described in the first, second, third and fourth embodiments which are compatible with each other is also included in the scope of the present invention.

[0051] Moreover, the shape and other features of the above-described first contact terminals can be transposed to the second contact terminals.

Claims

1. A relay block (10) comprising:
 - a block body (11) having an internal part equipped with a terminal housing (13) which houses first contact terminals (14);
 - at least one guiding part (20) comprising a relay-insertion opening (21) through which a relay (30) with second contact terminals (32) can be introduced into said block body (11), said second contact terminals (32) being engageable with said respective first contact terminals (14) with a gripping force therebetween by introducing said relay (30) into the interior of said guiding part (20) through said relay-insertion opening (21), **characterised in that** said relay block (10) further comprises at least one tool-introduction part (26 ; 42) provided in said guiding part (20), the frontier between said relay (30) and said terminal housing (13) being accessible through said tool-introduction part (26 ; 42).
2. A relay block (10) according to claim further comprising a cut-away part (40), which is provided at a portion of the external wall of said block body (11), near said tool-introduction part (26 ; 42), in such a manner that said cut-away part (40) reveals the sidewall of said terminal housing (13), said cut-away part (40) being in communication with the end part of said tool-introduction part (26 ; 42).
3. A relay block (10) according to any one of claims 1 or 2, wherein said relay (30) is larger than the end part of said terminal housing (13).
4. A relay block (10) according to claim 3, wherein an inclined surface (41) is provided on the side of the end part of said terminal housing (13), said inclined surface (41) being formed in order to render the width of said end part of said terminal housing (13) gradually narrower along the direction of said guiding part (20).
5. A relay block (10) according to any one of claims 1 to 4, further comprising means forming a pivot, facing said tool-introduction part (26 ; 42).
6. A relay block (10) according to claim 5, wherein said means forming a pivot comprise an abutment (44a ; 50 ; 51) amenable for use as a fulcrum by entering into contact with a tool introduced through said tool-introduction part (26 ; 42), the tip of said tool (5) being in contact with the internal end part of said relay (30) located at the side of said guiding part (20).
7. A relay block (10) according to claim 6 wherein said abutment is a thrust point (50) installed on the block body (11) at a location facing the tool-introduction part (26 ; 42) and distant from said tool-introduction part (26 ; 42) by a determined distance.
8. A relay block according to any one of claims 1 to 7, further comprising introduction-limiting means (60), which form a space between said relay (30) and said terminal housing (13) when said relay (30) is inserted in said guiding part (20).
9. A relay block (10) according to claim 8, wherein said introduction-limiting means (60) comprise at least one abutment (60) located on the end-part surface of said terminal housing (13).
10. A method for removing a relay (30) out of a guiding part (20) of a relay block (10) according to any one of claims 1 to 9, **characterised in that** a tool (5) is introduced through said tool-introduction part (26 ; 42) into the junction between said relay (30) and said terminal housing (13).

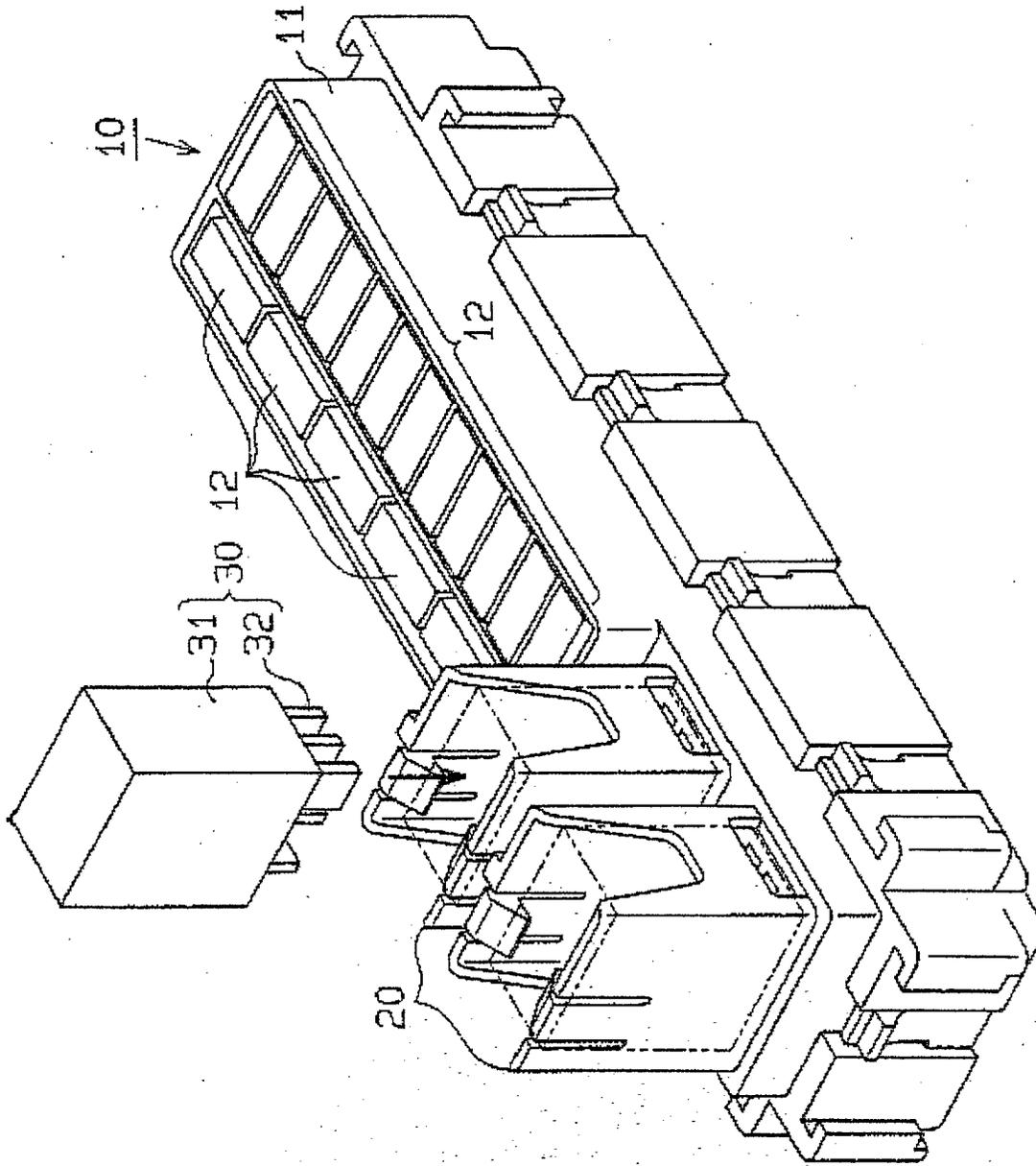


FIG. 1

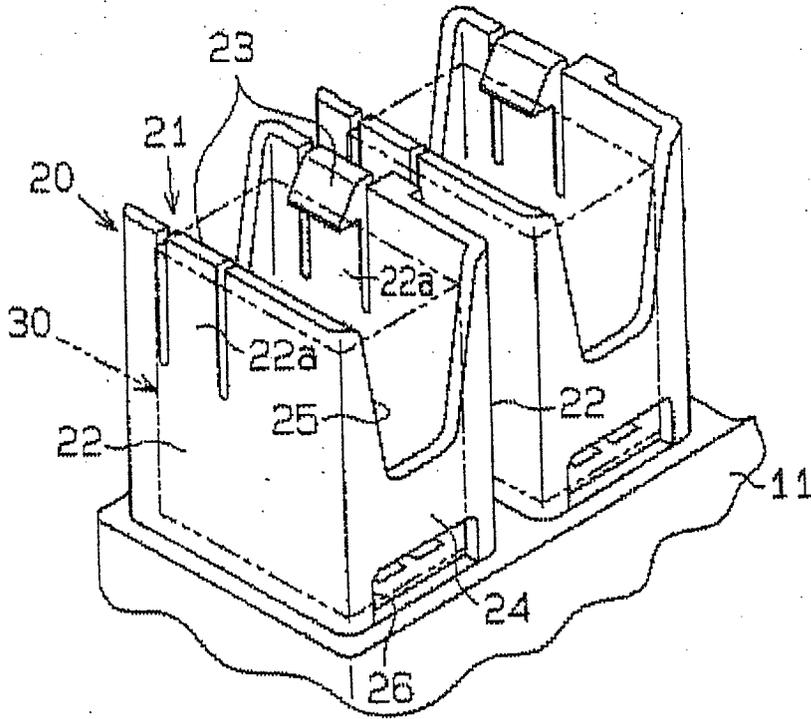


FIG. 2

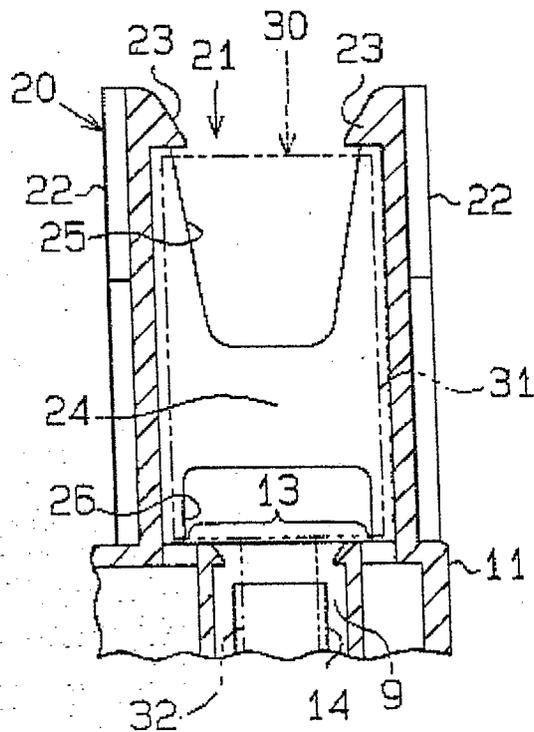
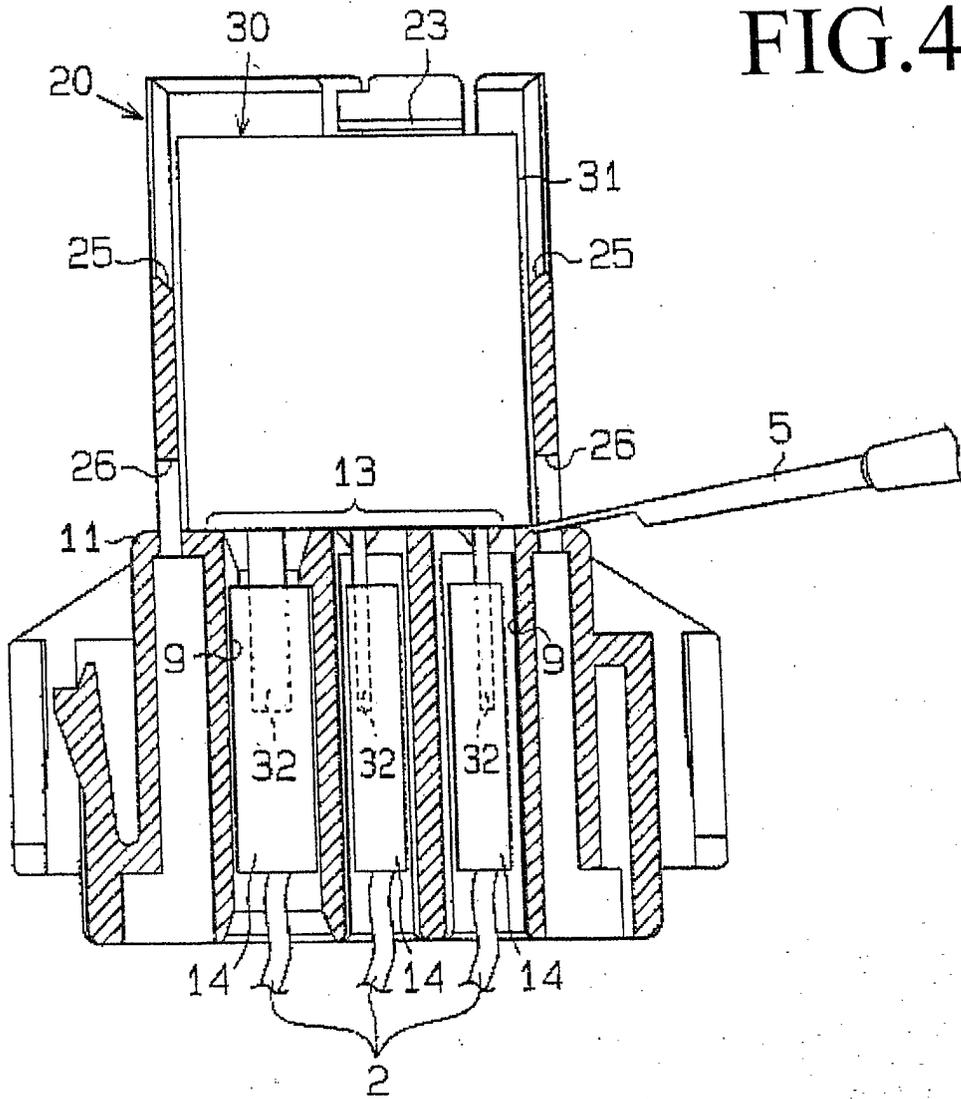


FIG. 3

FIG.4



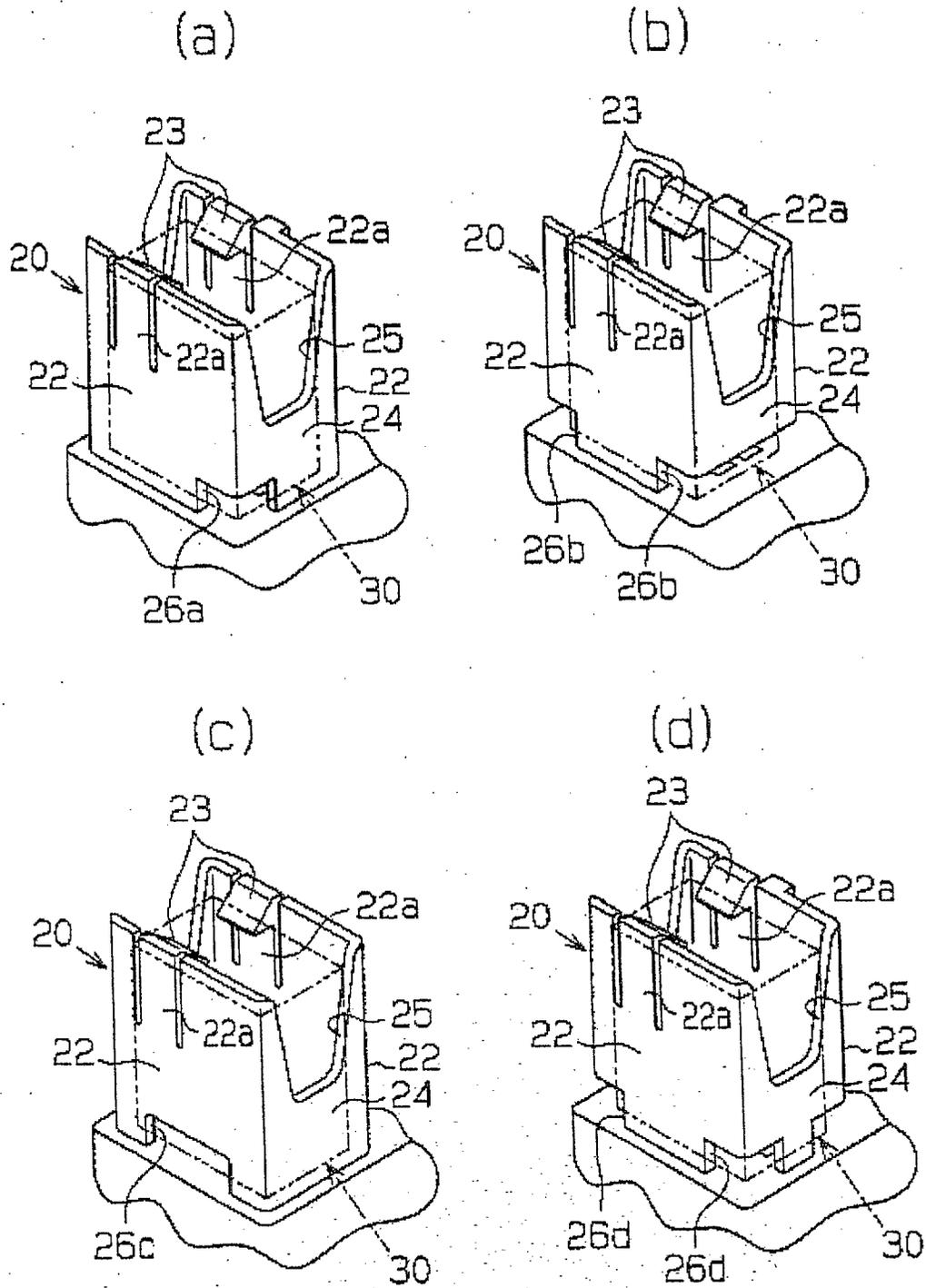


FIG.5

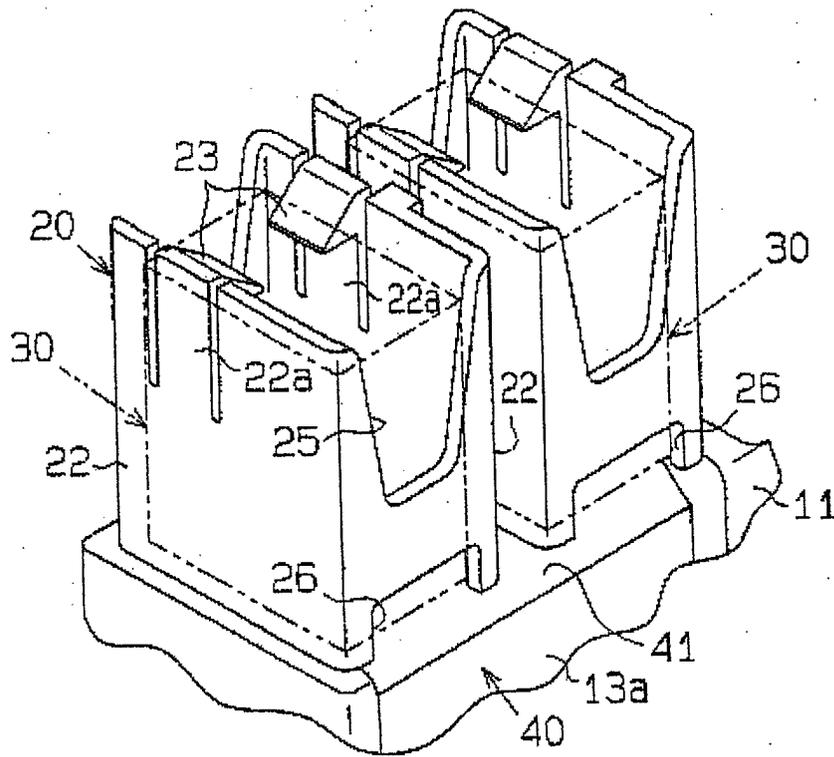


FIG. 6

【図7】

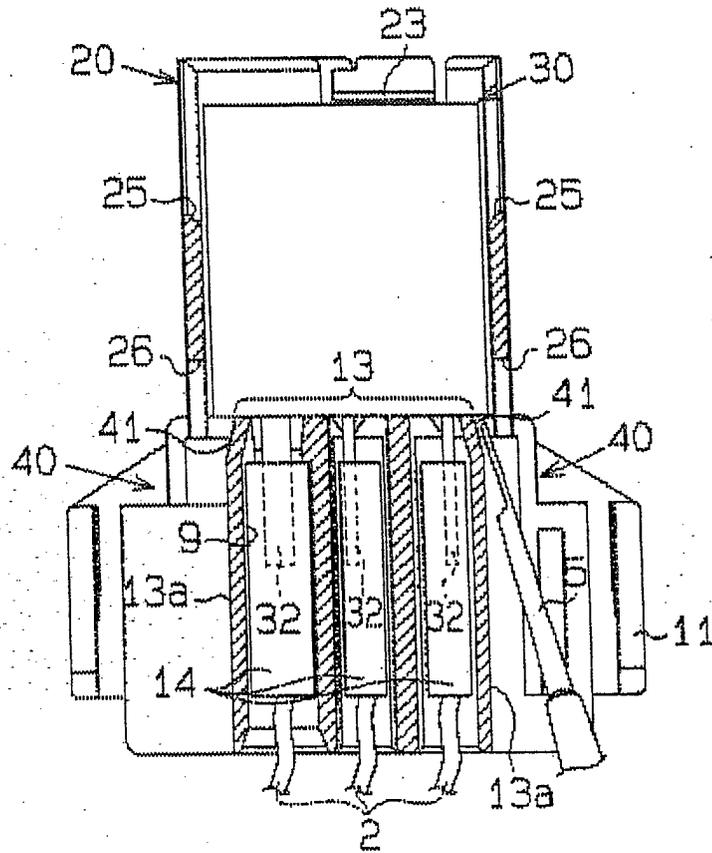


FIG. 7

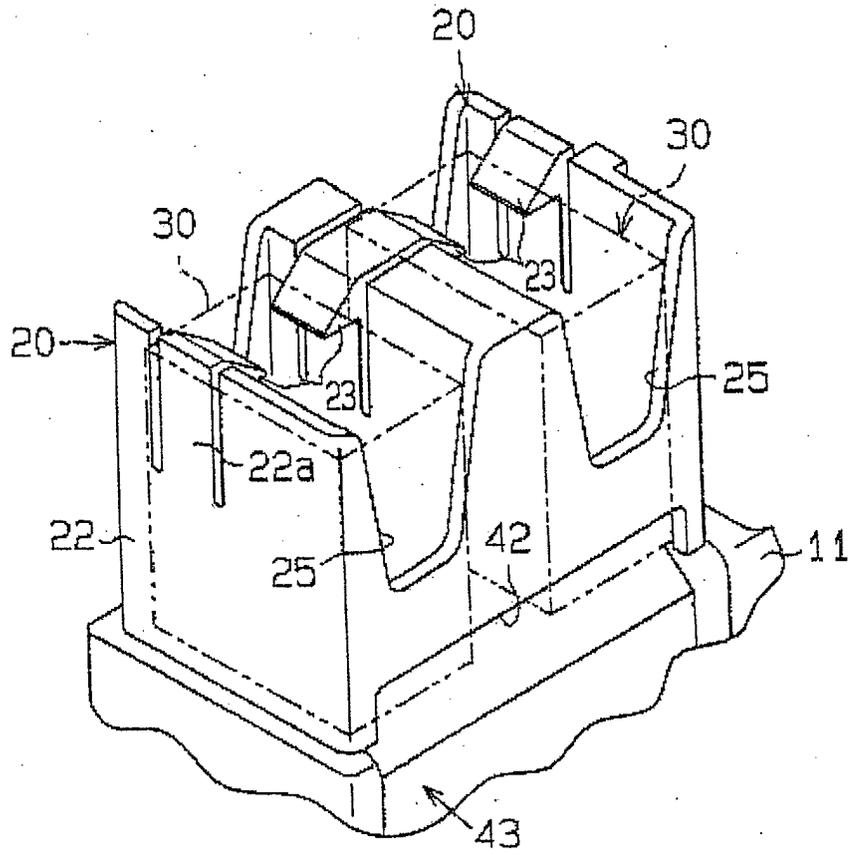


FIG.8

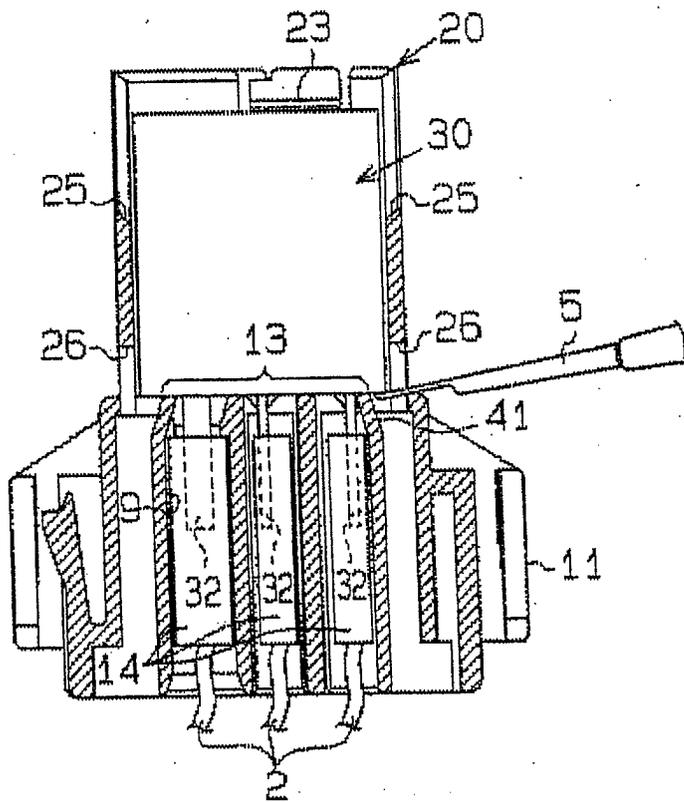


FIG.9

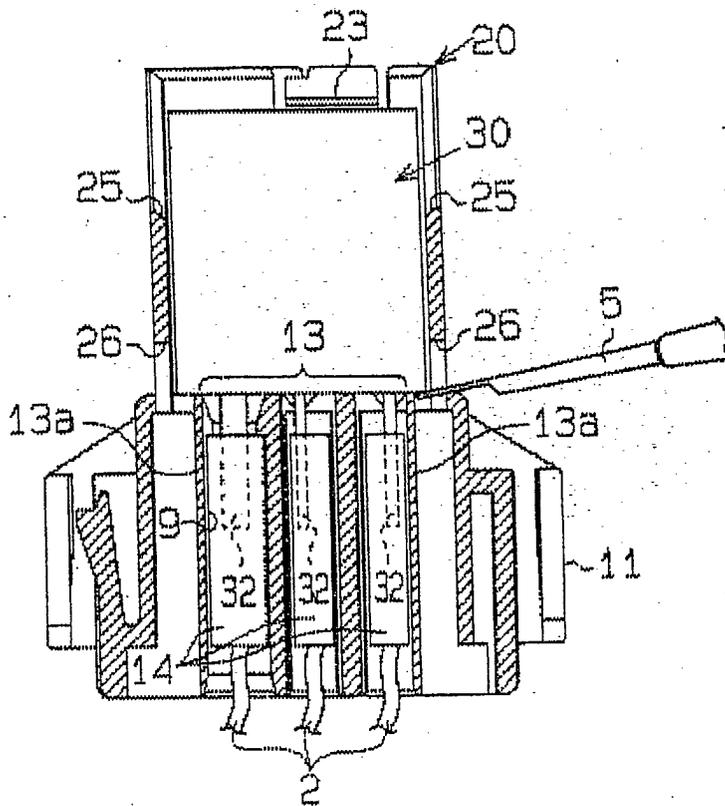


FIG.10

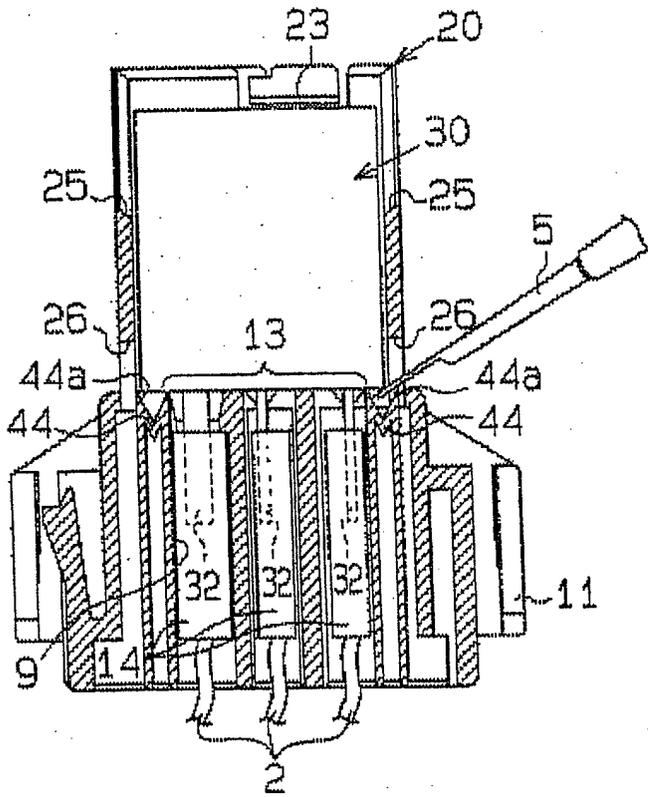


FIG. 11

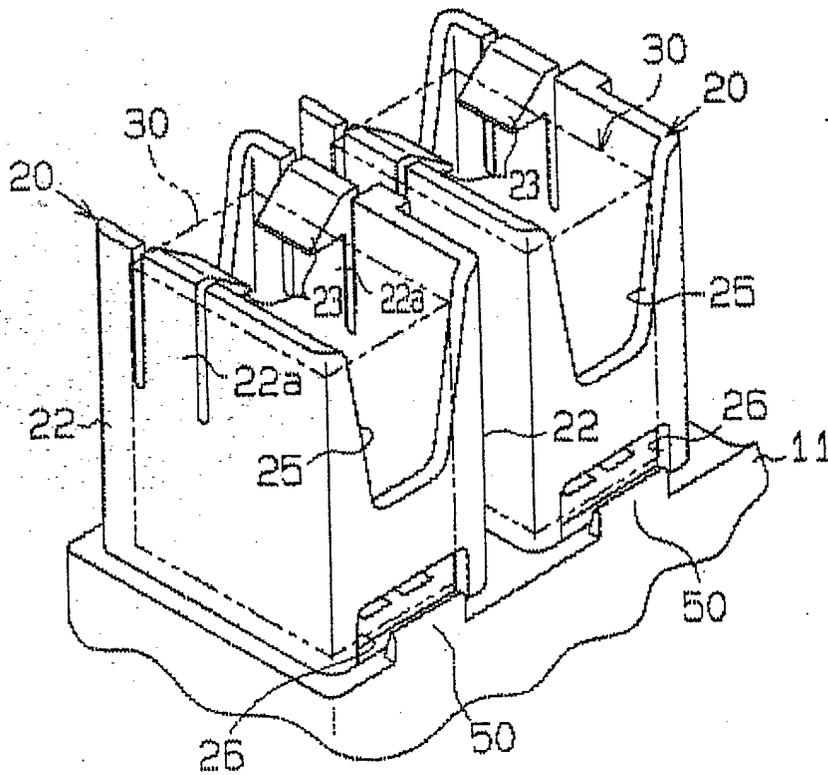


FIG. 12

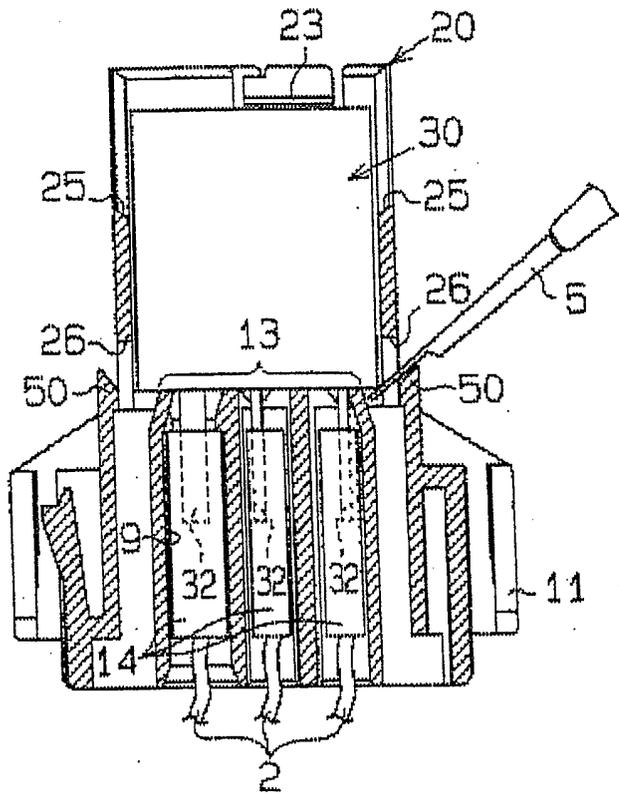


FIG. 13

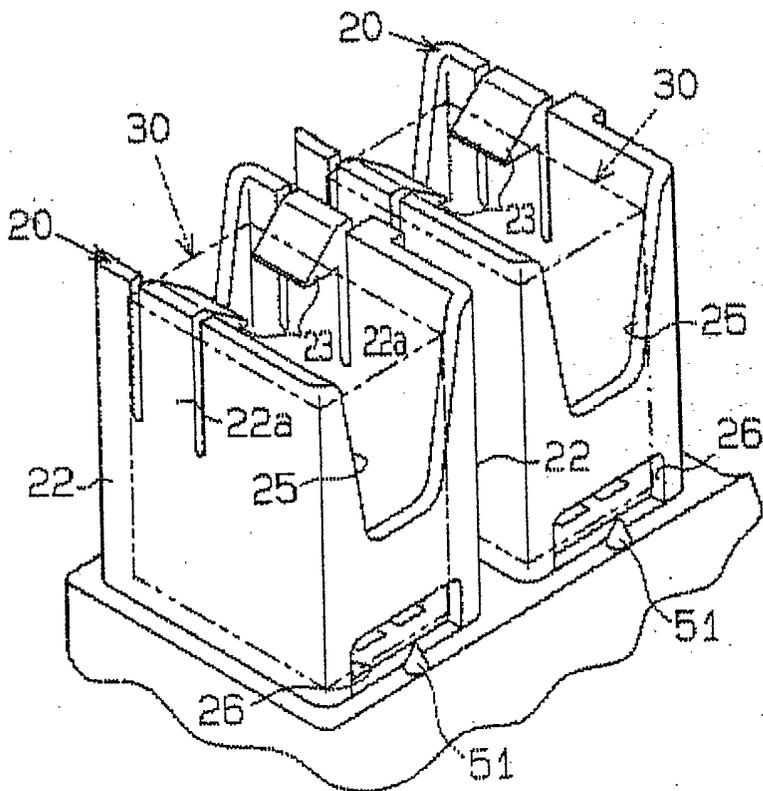


FIG. 14

FIG.15

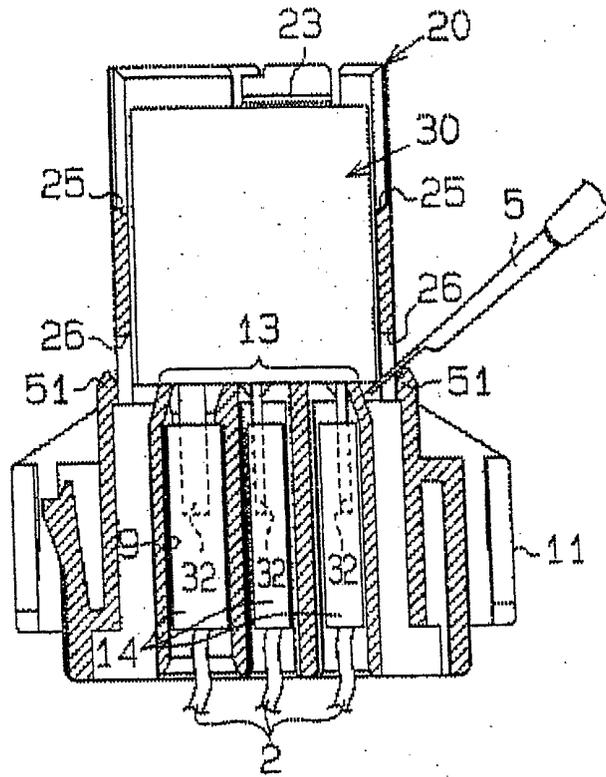
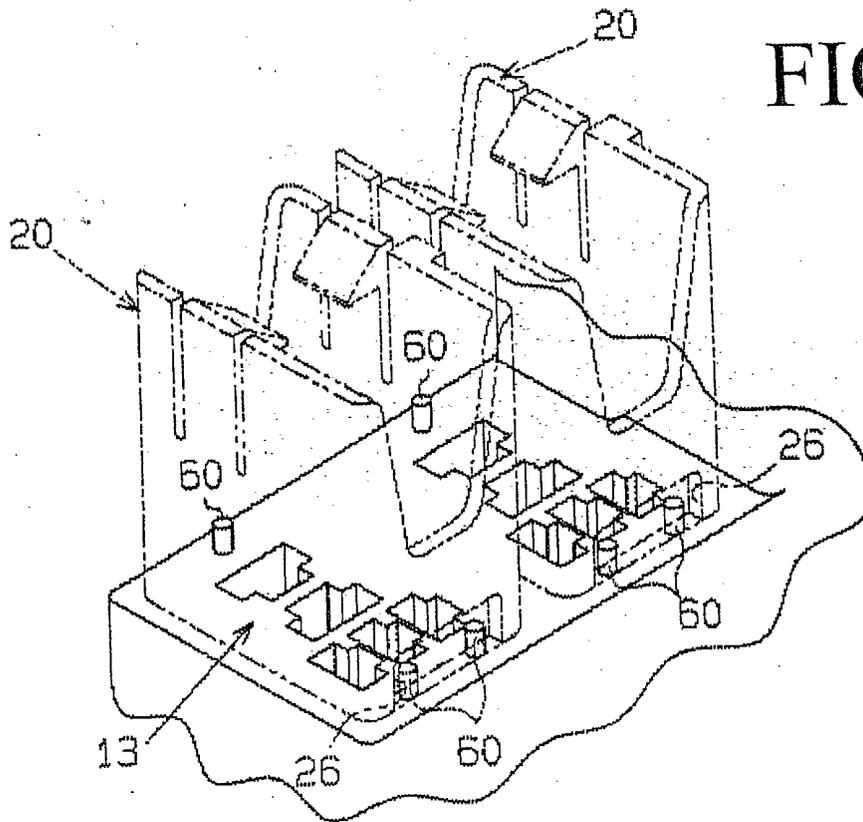


FIG.16



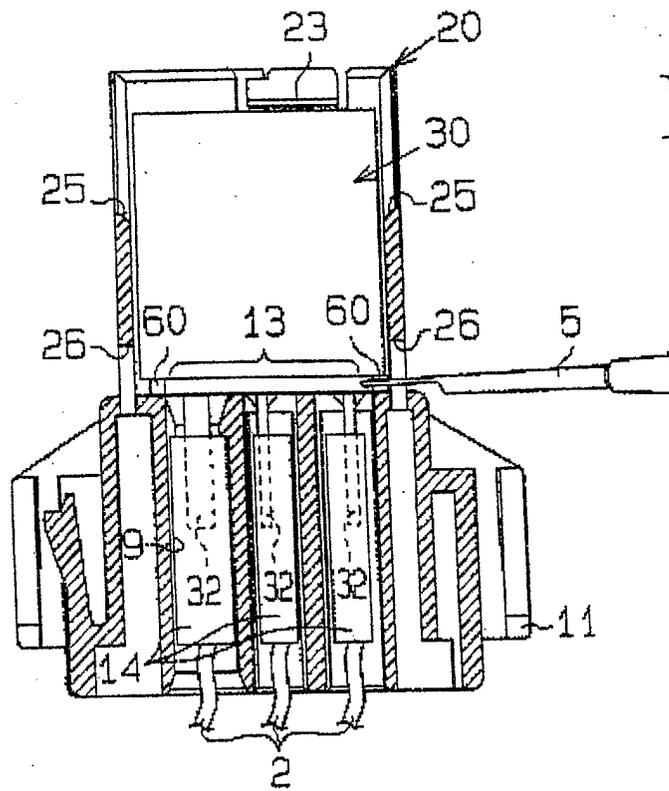


FIG. 17

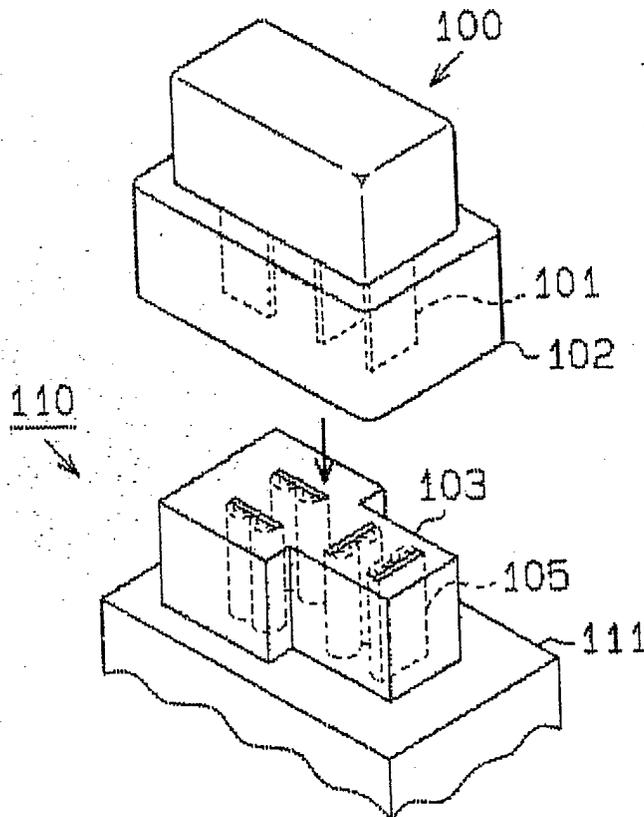


FIG. 18

FIG.19

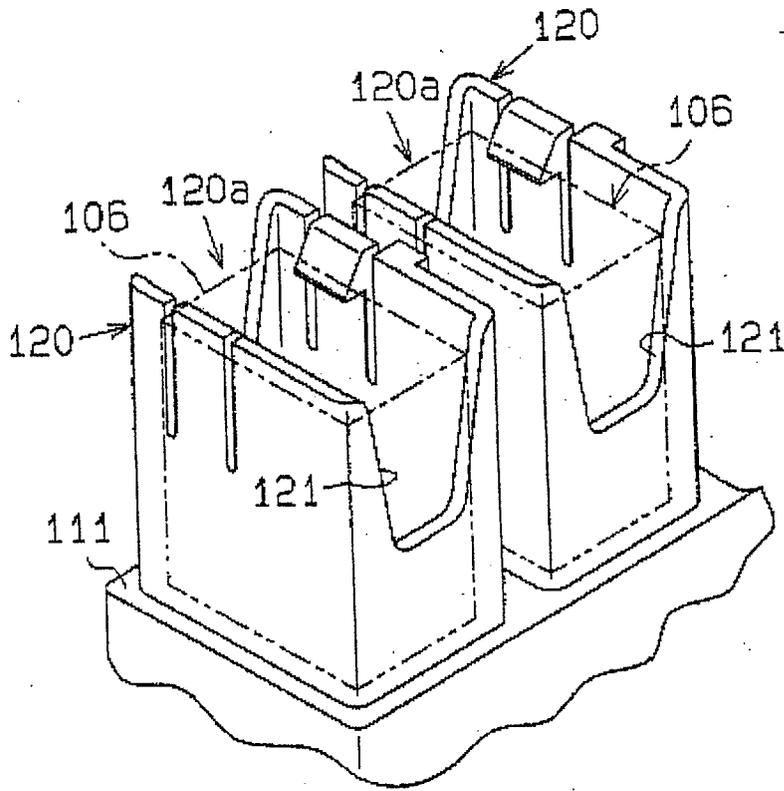


FIG.20

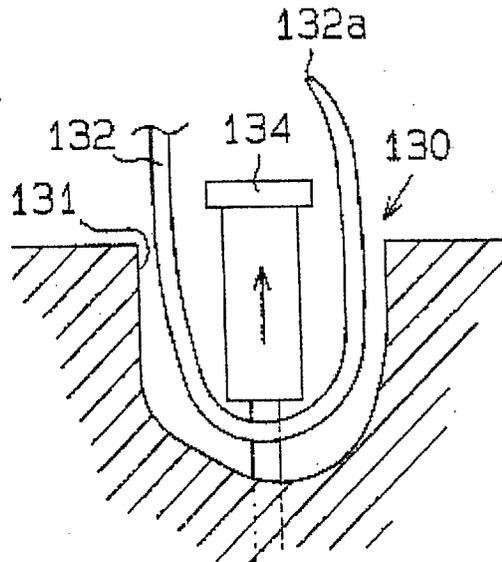


FIG.21

