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(54) **Resistance module for contactor**

(57) Two modules are used for each phase of the contactor, each module being connected between one of the phases of the latter and the corresponding phase of the auxiliary contact block (16) in order to protect the contactor against current peaks when activated. The module includes winding support means (2) with a winding of resistance wire (1) thereon. One of the ends (4) of the winding support means (2) constitutes the means

of connection to one of the phases of the contactor. The module includes means for coupling (13, 12) the end (6) of the resistance wire (1) to the end (7) of a flexible cable (8), the other free end of which is connected to the corresponding phase of the auxiliary contact block (16). In addition, it has housing means (9 and 10) for retaining and protecting of the foregoing components. This structure has a reduced volume and prevents mixing different phases during installation.

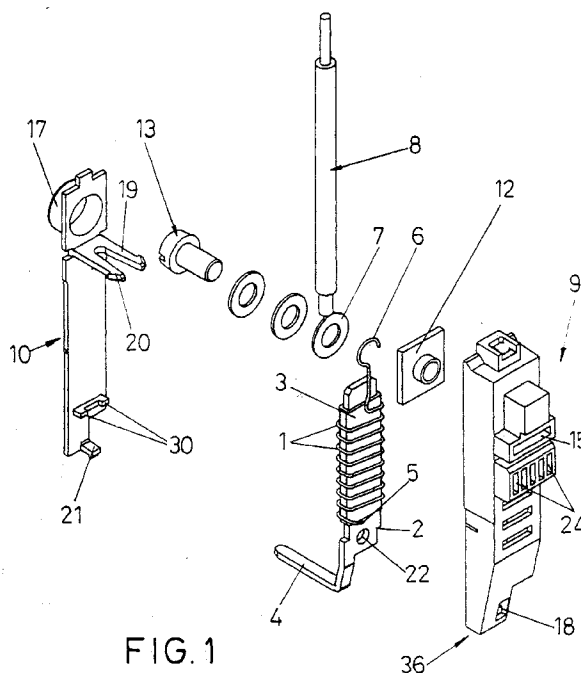


FIG. 1

Description

[0001] The invention with which we are concerned pertains to a resistance module for contactors of the type that employs two modules for each contactor phase and is connected between each of the phases of the contactor and the corresponding phase of an auxiliary contact block, so that the latter together with the resistors of each module protect the contactor against current peaks when it is activated; and it is intended to provide greater protection to the resistors when they have to be transported as well as when they are in operation.

[0002] Another object of the invention consists of endowing the resistance modules with a smaller volume, so as to reduce the packing space and therefore the cost of same, as well the cost of transportation. From this standpoint, it can be deduced that less space is necessary for installation, the unit being more compact.

[0003] Another object of the invention consists of endowing the module with a structure capable of preventing mistakes at the time of making the connection.

[0004] In the state of the art, the use of contactor is extremely well known, each of whose input phases is joined by means of resistors to the respective phases of an auxiliary contact block, the output phases of the contactor likewise being joined to the corresponding output phases of the auxiliary contact block, all in order to protect the contactor on being activated, current peaks being limited.

[0005] Now, these resistors constitute independent components that are formed by a resistance wire which must be of a certain length to provide the necessary resistance, so that said resistance wire forms loops that project considerably from the contactor and run from the input and output of each of the phases of the auxiliary contact block to each of the inlet and outlet phases of the contactors, and, in case a three-phase contactor is involved, six resistor loops are formed which project considerably from the base connector and auxiliary contact block, so that they may undergo couplings once installed, which represents a serious problem, at the same time as they occupy a large volume, which is detrimental to their installation as well as transportation, since on the same trip, a smaller number of these devices is transported, and packing costs are higher.

[0006] Furthermore, the resistance wires have to be protected by means of a sheath, which can fray, especially in the area of coupling with the contactor and, in addition, a thermo-retractable sheath is needed to prevent the flash occurring on activation of the contactor from breaking the resistor.

[0007] It is also to be indicated that the formation of these loops often facilitates bending of the resistors, which can suffer damage during transportation, another disadvantage.

[0008] The fact that the resistors are so long and form these loops sometimes causes mistakes to be made on connecting the phases, so that different phases are

mixed during installation, which represents a very serious problem.

[0009] To solve the problems indicated above, the invention provides a new resistance module for contactors that is connected between each of the input and output phases of the contactor and the corresponding input and output phases of an auxiliary contact block, in order to protect the contactor when it is activated, the resistors consisting of resistance wires.

[0010] Now, the invention is characterized in that it has means of support and winding of a resistance wire, means formed by a flat body holding an insulator, on which the resistance wire is in turn wound.

[0011] One of the ends of the means of support and winding of the resistance wire constitutes the means of connection to one of the phases of the contactor, for which one of the ends of the resistance wire is joined to the flat body, said means of connection being formed by a tongue presented as an extension of the flat body.

[0012] The invention has means of coupling of the other end of the resistance wire to the end of a flexible cable, the other free end of which is connected to the corresponding phase of the auxiliary contact block.

[0013] It also has means of housing, retention and protection of the means of support and winding of the resistance wire and of the end of the flexible cable joined to the end of the resistance wire. These means of housing, retention and protection are formed by a casing consisting of a body and a cover of insulating material, the latter having interlocking claws in housings machined in the body of the casing.

[0014] The means of coupling of the end of the resistance wire to the end of the flexible cable are preferably formed by a screw running through a small loop, formed at the end of the resistance wire, and through an eyelet terminal integral with the end of the flexible cable, the screw being threaded and retained in a nut housed in a receptacle provided in the body of the casing.

[0015] In addition, the body of the casing is endowed with a cylindrical projection in which the head of the screw is situated.

[0016] To accomplish the correct positioning of the flat body inside the casing, its body has an interior pin that is inserted in a hole machined in the flat support.

[0017] In addition, the body of the casing and its cover have supplementary projections that press the flat body and include supplementary ribs, all in order to accomplish their complete and perfect locking.

[0018] The tongue for connection to the connector projects at the bottom of the casing and the flexible cable, which is connected to the contact block, projects at its top.

[0019] This modular structure considerably reduces the space and volume occupied by the present resistance module devices, so that, on connecting the tongue, the flexible cable comes opposite the phase on which it is to be connected, preventing the presence of errors in this operation.

[0020] The fact that the modules occupy a smaller volume means that, on transportation of the unit formed by the modules, contactor and auxiliary blocks, a greater number of units can be included, which reduces their cost, while making the packing simpler and requiring less material, which also represents a lower cost.

[0021] Another characteristic of the invention resides in the fact that the casing has means of retention of a crosspiece of sufficient length to couple the different modules connected between each phase of the contactor and of the auxiliary contact block, a compact module block being obtained.

[0022] The means of retention of the crosspiece in the body of each casing consist of at least one groove provided in the body of each casing, in which a claw of a tongue situated in the cross-piece fits and is retained. The crosspiece is inserted in different grooves, depending on the pitch existing between the phases of each size of contactor.

[0023] This feature, aside from making it possible to obtain a compact module block, makes for a sturdier unit.

[0024] An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows an exploded view in perspective of a resistance module for contactors according to the invention.

Figure 2 shows a view in perspective of the resistance module of the foregoing figure already assembled.

Figure 3 shows a view along a longitudinal section of the module of the foregoing figure.

Figure 4 shows a rear view of the module of the invention, in which the cover has been removed from the casing.

Figure 5 shows a view in perspective of the back part of the body constituting the casing.

Figure 6 shows a view in perspective of three resistance modules for connection to the three main phases of a contactor, which has been exploded and in which a crosspiece can be seen that provides the coupling of said three modules.

Figure 7 shows a view in perspective of the resistance modules joined by means of the crosspiece and mounted on the contactor and auxiliary contact block.

[0025] A description of the invention follows based on the figures referred to above.

[0026] The module of the invention has means of support and winding of a resistance wire 1, means formed by a flat body 2 holding an insulator 3, on which the resistance wire 1 is wound.

[0027] The flat body 2 is endowed with an extension forming a tongue 4 that is connected to one of the phases of a contactor 14, for which one of the ends 5 of the

resistance wire 1 is integrally joined to the flat body 2, while the other end of the resistance wire forms a small loop 6 that projects from the flat body 2 and is situated on an eyelet terminal 7 integral with the end of a flexible cable 8.

[0028] In addition, the module has means of housing, retention and protection of the flat body 2 and of the end of the flexible cable 8, means that are formed by a casing constituted by a body 9 and a cover 10.

[0029] The body 9 is endowed with a receptacle 11 accommodating and retaining a nut 12, in which screw 13 is threaded after running through the eyelet terminal 7 and the small loop 6, physical and electric coupling being made between the resistance wire 1 and the flexible cable 8.

[0030] The other end of the flexible cable 8 is the one connected to the corresponding phase of an auxiliary contact block 16.

[0031] The cover 10 includes a cylindrical projection 17 in which the head of the screw 13 is housed.

[0032] The body 9 has housings 15 and 18 opened outwards, so that claws 20 provided on tongues 19 of the cover 10 are retained in housing 15. A claw 21, which is also integral with the cover 10, is retained in housing 18, so that a perfect closing of the cover is achieved.

[0033] The flat body 2 is fastened by means of extensions 25 and 25, 31 and 30, situated respectively on the body 9 and the cover 10 pressing on the flat support 2.

[0034] In addition, the body 9 has an interior pin 23 that is inserted in a hole 22 machined in the flat support 2 in order to accomplish the correct positioning.

[0035] Ribs 32, 33, 34 and 35 have also been provided, which buffer the position of the flat body 2 on body 9.

[0036] The casing is endowed with means of retention of a cross-piece 27, means formed by a plurality of grooves 24 in which claws 28 of tongues 29 provided on the crosspiece 27 are fitted and retained, so that the crosspiece can be coupled to a plurality of casings.

[0037] The tongues 29 are inserted in different grooves 24, depending on the pitch or separation existing between the phases of each size of contactor, a compact block being obtained for any of the sizes of contactor.

[0038] Thus, in the embodiment in Figures 6 and 7, a crosspiece 27 is shown, which makes possible the union of three casings that are coupled to the three main phases of a contactor 14.

[0039] It is easily understandable from the description given that, after connecting the tongue 4 on the corresponding phase of the contactor 14, the flexible cable 8 comes opposite the corresponding phase of the auxiliary contact block 16, so that it is prevented from being connected on a wrong phase.

[0040] At this point, it is important to point out that the casing (body 9 and cover 10) has a narrowing 36 through which, after connecting the modules on the corresponding phases of the contactor 14 and auxiliary contact block 16, the different phases of the contactor

can be connected to the network.

[0041] The structure described has a reduced volume compared to conventional modules, which accounts for the advantages already discussed.

Claims

1. Resistance module for contactors that employs two modules for each contactor phase (14) and is connected between one of the phases of the contactor (14) and the corresponding phase of an auxiliary contact block (16), so that the latter together with the resistor of each module protect the contactor (14) when activated, the resistor of the module consisting of a resistance wire, the module comprising:

a winding support means with a winding of a resistance wire thereon, one of the ends of the winding support means constituting the means of connection to one of the phases of the contactor (14), for which one of the ends of the resistance wire (1) is joined to said winding support means;

means for coupling the other end of the resistance wire (1) to the end of a flexible cable (8), the other free end of which is connected to the corresponding phase of the auxiliary contact block (16); and

housing means for retaining and protecting the winding support means and the end of the flexible cable (8) joined to the end of the resistance wire (1).

2. Resistance module for contactors according to Claim 1, wherein the winding support means comprises a flat body (2) holding an insulator (3), on which the resistance wire (1) is in turn wound.

3. Resistance module for contactors according to Claim 1 or Claim 2, wherein the end of the winding support means forming the means of connection to one of the phases of the contactor (14) is determined by a tongue (4) that is presented as an extension of the flat body (2).

4. Resistance module for contactors according to Claim 1, wherein the housing means comprises a body (9) and a cover (10), which has interlocking claws (20 and 21) in housings (15 and 18) machined in the body (9).

5. Resistance module for contactors according to Claim 4 wherein the body (9) has an interior pin (23) that is inserted in a hole (22) machined in the flat support (2) in order to accomplish the correct positioning, the flat body (2) being locked by means of extensions (25 and 26, 31 and 30) respectively pro-

vided on the body (9) and the cover (10) and pressing on the flat body (2).

6. Resistance module for contactors according to any one of Claims 1 to 4 wherein the means of coupling of the ends of the resistance wire (1) to the flexible cable (8) are formed by a screw (13) running through a loop (6), formed at the end of the resistance wire (1), and through an eyelet terminal (7) on the end of the flexible cable (8), the screw (13) being threaded and retained in a nut (12) located in a receptacle (11) provided in the body (9) of the casing, the cover (10) further having a cylindrical projection (17) in which the head of the screw (13) is situated.
7. Resistance module for contactors according to claim 3 wherein the tongue (4) connecting to the contactor phase (14) comes out of the casing through the end of the cover (10), and the flexible cable (8) comes out of the casing through its opposite end, guaranteeing that the connection will be made in the opposite phases of the auxiliary contact block (16).
8. Resistance module for contactors according to the foregoing claims, wherein the housing has a narrowing (36) that enables the contactor (14) to be connected to the network.
9. Resistance module for contactors according to Claim 1, wherein the housing has means for retaining a crosspiece (27) of sufficient length to couple the different modules connected between each phase of the contactor (14) and of the auxiliary contact block (16), whereby a compact module block is obtained.
10. Resistance module for contactors according to Claim 9, wherein the means for retaining the crosspiece (27) in the casing are formed by at least one groove (24), located in the body (9) of each casing, in which a claw (28) of a tongue (29) situated in the crosspiece fits and is retained, the tongues (29) being inserted in different grooves (24), depending on the pitch existing between the phases of each size of contactor.

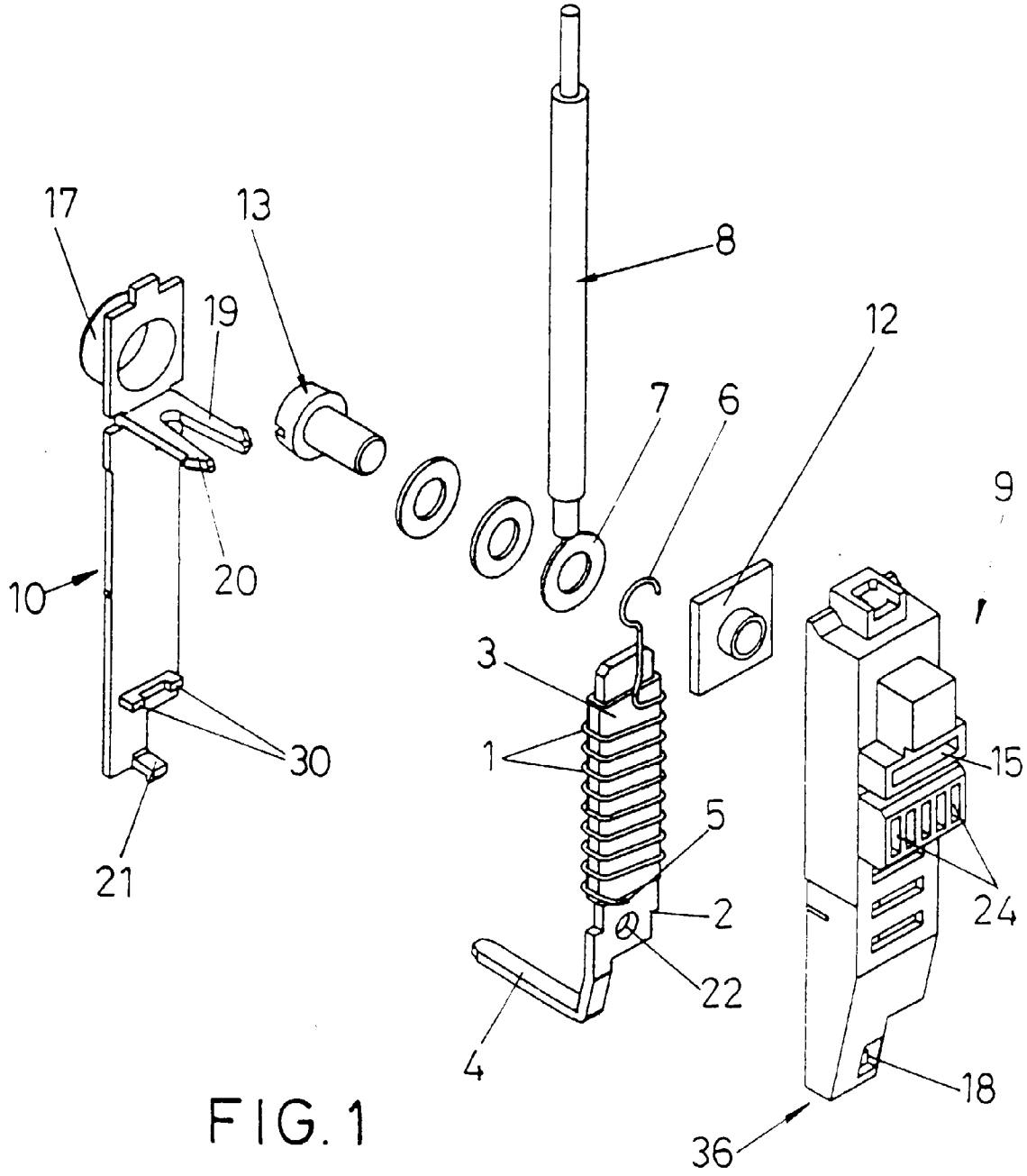


FIG. 1

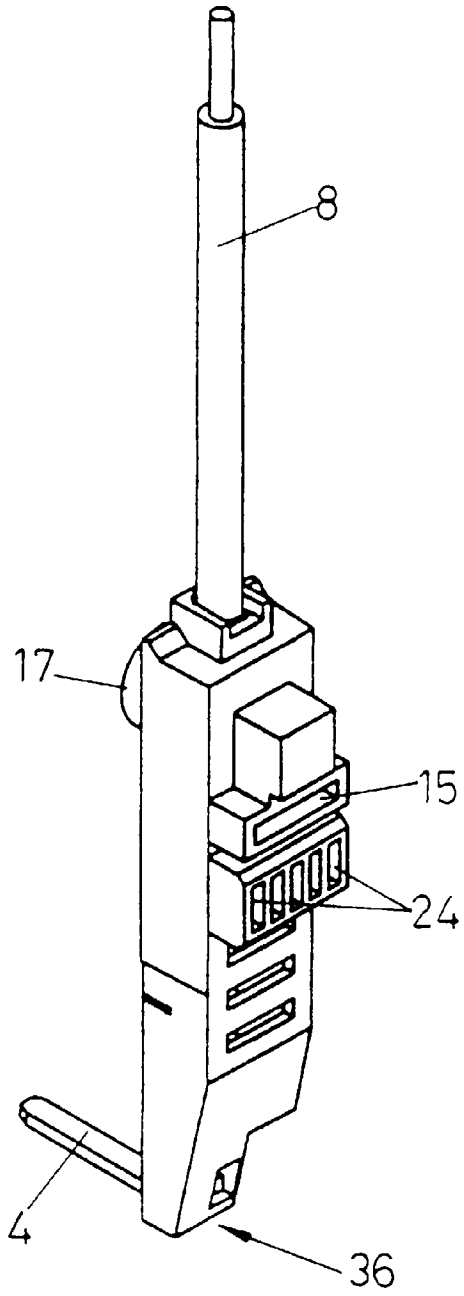


FIG. 2

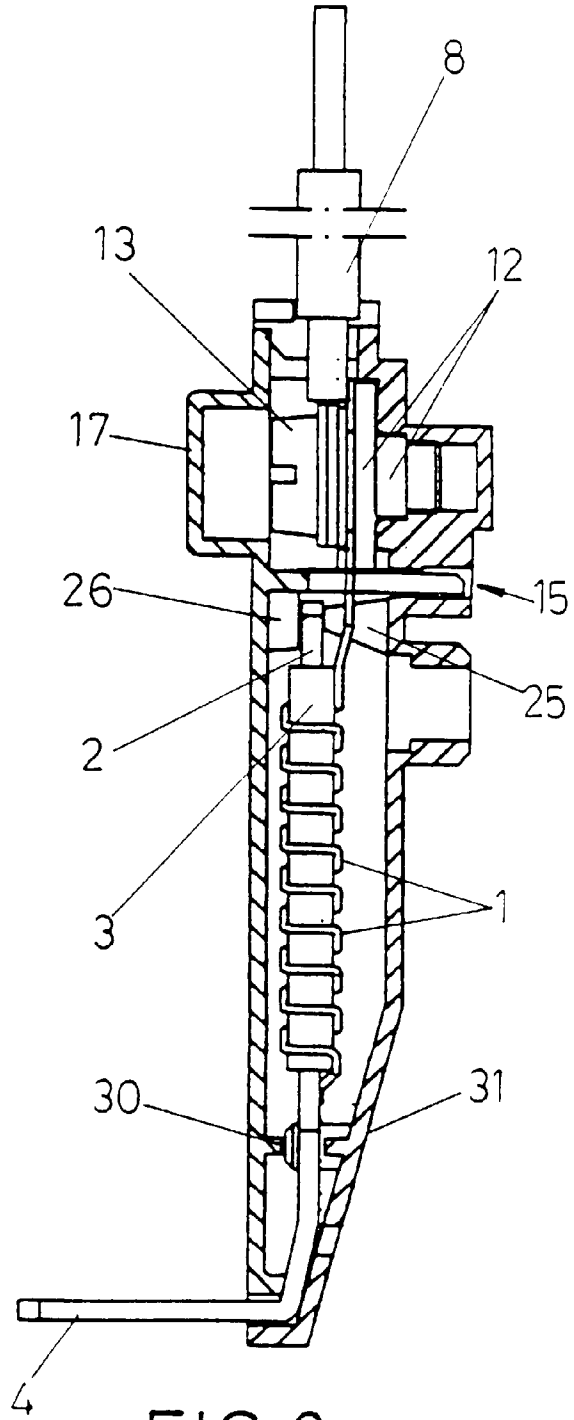
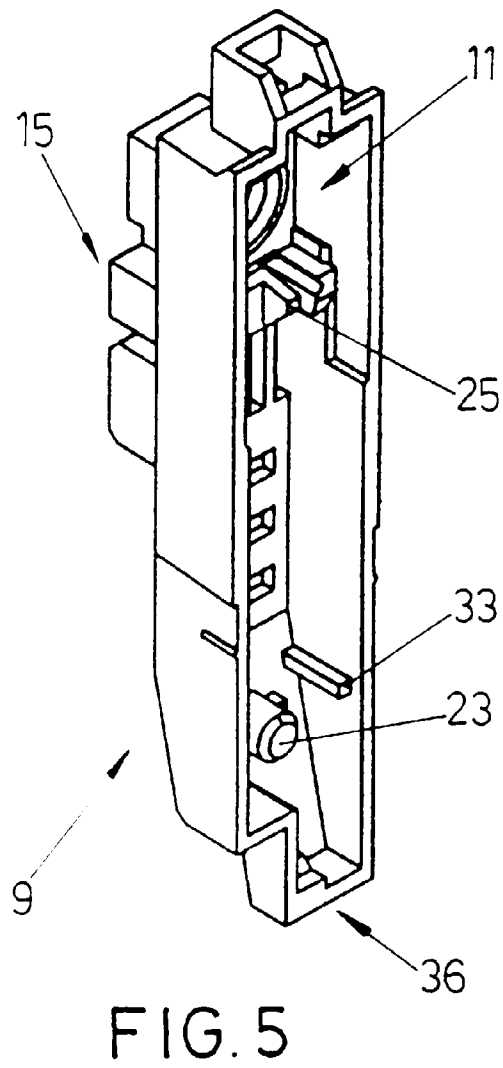
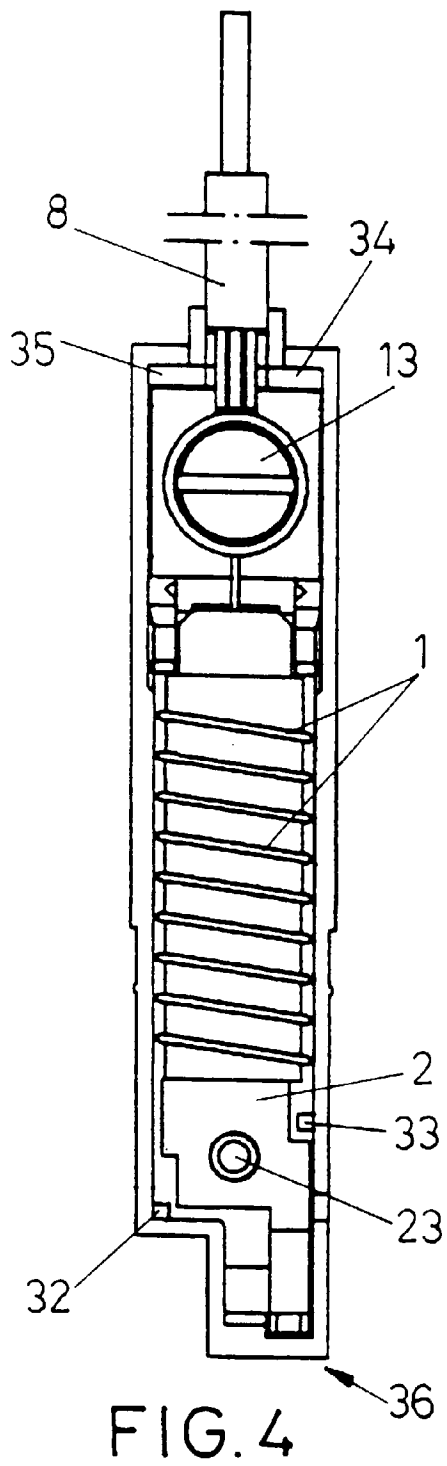


FIG. 3



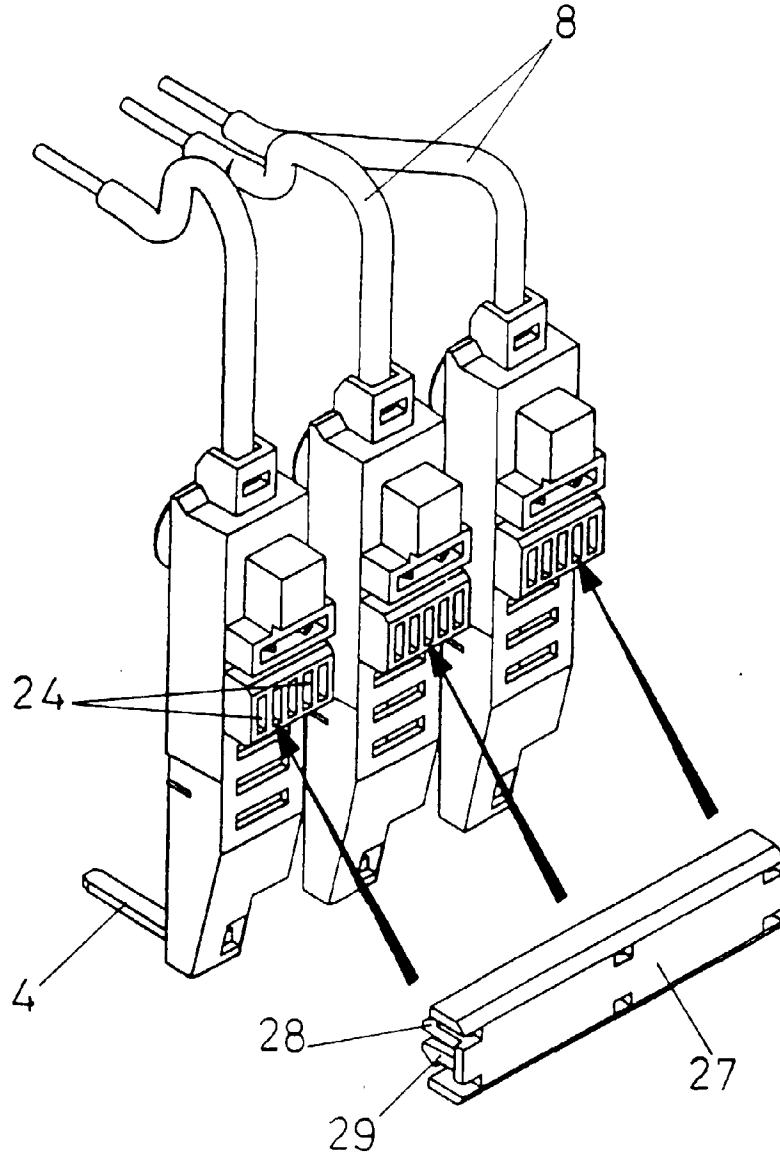


FIG. 6

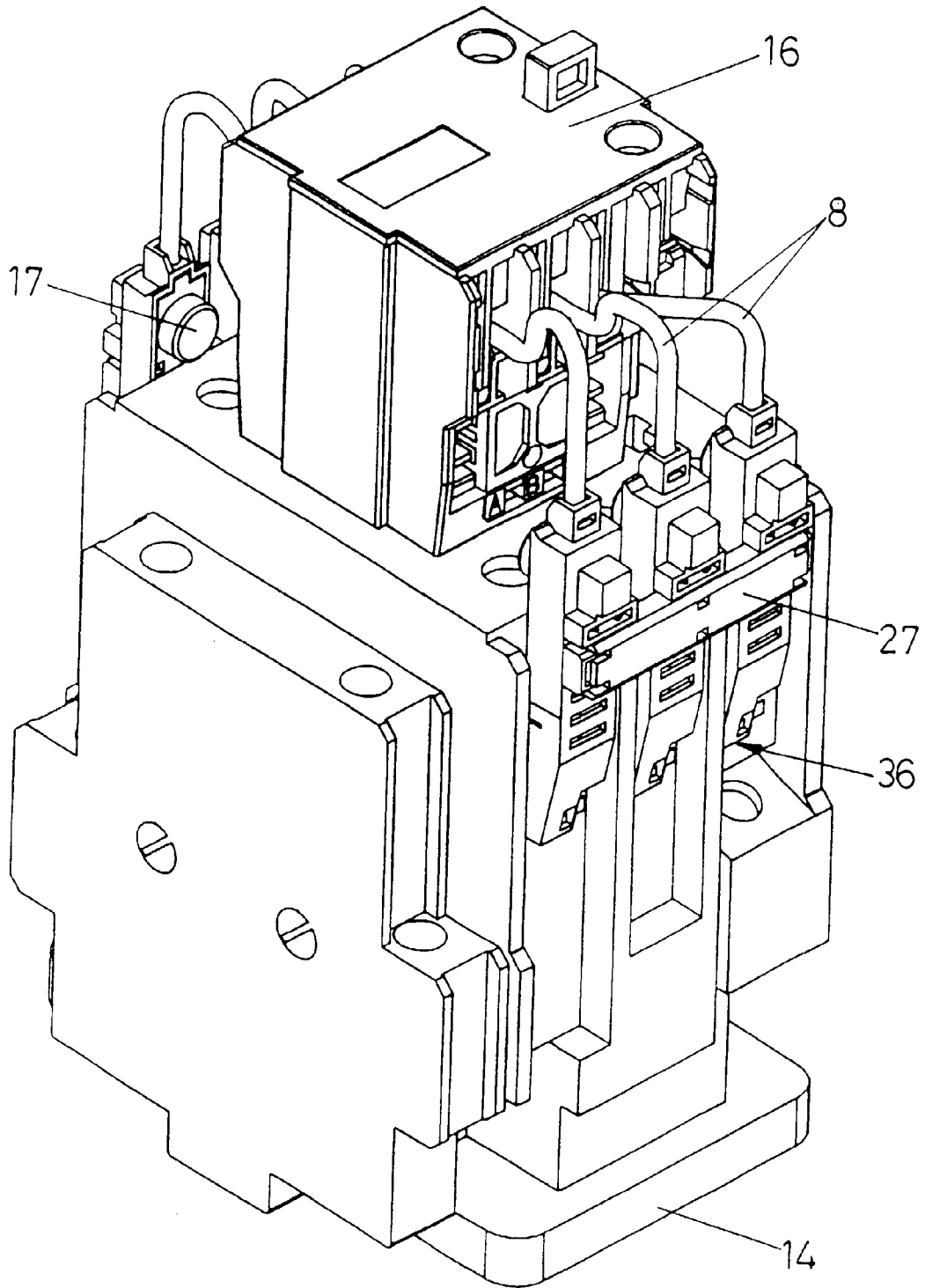


FIG. 7