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(54) **SAFETY DEVICE AT CONNECTORS TO ELECTRIC CURRENT RAILS, INSTALLATION CHANNELS AND THE LIKE**

SICHERHEITSVORRICHTUNG VON ELEKTRISCHEN VERBINDERN MIT STROMSCHIENEN,
INSTALLATIONSKANÄLEN UND ÄHNLICHEN.

DISPOSITIF DE SECURITE DE CONNECTEURS DESTINES A DES RAILS DE COURANT
ELECTRIQUE, CANAUX D'INSTALLATION ET EQUIVALENT

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Description

[0001] The present invention relates to a safety device of the type set forth in detail in the preamble of claim 1.

[0002] The invention originates first of all from a connector device according to our Swedish patent application no. 9501690-3. It is true, that this connector device on the whole is advantageous, but it does not comprise any special means, which prevent a contact closure between the device and possible connections in it to power-consumption, when the connection bar of the device with connection pins has been inserted into an electric contact position in a current rail or the like, but before the device has been mechanically fastened in the rail. Such a premature contact position may of course result in damages to the contact devices, e.g. in the form of weld, burn and corrosion damages, but it can also result in risks for children and young people.

[0003] DE-A-2 358 895 relates to a connector device for electric current adjacent a floor list. This device does not even meet fundamental safety requirements, since the conductors in the current rail are freely accessible. Thus, e.g. a needle, a knife, a screw driver or the like can be directly put into the conductors. In the light of these facts it is remarkable, that the current carrying bushings in the connector device have been provided with a rotatable blocking disc, which can be rotated to a connection or a release position, provided two hooks positioned adjacent each other have been fastened around the floor list. These hooks are the only fastening device of the connector device and an external means, which can be easily damaged, e.g. when the device is installed and when it is removed. In the latter case it is possible, that the device can be torn away by bending the hooks upwards. There are no means to guide the device into the current rail and the risk, that the device will be turned the wrong way and that the contact pins will end up in a wrong conductor of course seems to be substantial. Since the device is square, there is only one place available for a single connector. The device is mechanically seen constructed in such a way, that it is hardly possible to make room for more than one connector or the like.

[0004] One object of the present invention is to in an efficient and internal way fasten such a device to a current rail and to automatically prevent a premature contact position, in such a way, that it is only possible to draw electric current from a connector device, which is completely mechanically secured in the current rail. It must either be possible to mount and remove respectively a connector device, to which power-consumption devices have been connected. The guidance of the connector device into the current rail must be simple, quick and reliable. For the rest, the device must meet high safety requirements. Also, the device must allow an arbitrary amount of connectors or the like to be mounted and allow substantial variations. Finally, these objects must be

met in a simple way, which does not require considerable costs, when the device is either manufactured, mounted or used.

[0005] These objects are met according to the invention by designing a safety device of the type described in the introduction mainly in such a way, as is set forth in the characterizing clause of claim 1.

[0006] Additional characterizing features and advantages of the invention are described in the following specification, reference being made to the enclosed drawings, which depict a few partially sectioned and schematically shown, not limiting embodiments. In the drawings in detail:

Fig. 1 is a perspective view from below and from behind of a connector device with a first embodiment of a safety device according to the invention in a connection blocking position, i.e. a mounting and dismounting position respectively;

Fig. 2 is a perspective view from above and from behind of the same device;

Fig. 3 a partially perspective view on a larger scale from below and laterally of the same device in its connection blocking position;

Fig. 4 a perspective view from above and from behind of a blocking mechanism, which belongs to the device according to the invention;

Fig. 5 a view of the device according to Figs. 1-3 in its connection blocking position;

Fig. 6 a lateral view of the device according to Fig. 5, with parts partially cut away;

Fig. 7 a planar view from below of the device according to Figs. 5 and 6;

Figs. 8, 9 and 10 which correspond to views in Figs. 5, 6 and 7, but with the safety device in connection contact position and device insertion blocking position;

Fig. 11 a view which corresponds to the view in Fig. 9 and depicts the device insertion blocking position in relation to a current rail;

Fig. 12 a perspective view from above and of the front of the device according to Fig. 11;

Fig. 13 a view which is similar to the view of the device according to Figs. 5-7;

Fig. 14 an end view of the insertion end of the device;

Fig. 15 a perspective view from above and from behind of a connector device with a second embodiment of a safety device according to the invention in a connection blocking position;

Fig. 16 a corresponding view of the same device in a mounting position with activated blocking mechanisms, but before a connection position for power consumption devices;

Fig. 17 a perspective view from below and from behind of the device according to Fig. 15 and 16, but with the blocking mechanism in a connection contact position;

Fig. 18 a perspective view from above and of the front of the device according to Figs. 15-17;
 Figs. 19 and 20 end views from behind of the device according to Figs. 15-18 in a position inserted in a current rail before and after respectively the activation of the blocking mechanism;
 Figs. 21 and 22 a partially sectioned detailed enlargement of the vital parts of the safety device according to Figs. 15-20 before and after respectively the activation of the blocking mechanism;
 Fig. 23 a view which corresponds to the perspective view in Fig. 22;
 Fig. 24 a partially perspective view of an electric connector device with adjustable contact pins;
 Fig. 25 an exploded view of a portion of the embodiment according to Fig. 24;
 Fig. 26 a perspective view from above and of the front of a device, which comprises a connector with a third embodiment of a safety device according to the invention in an activation position;
 Fig. 27 a perspective view from below of a bottom portion of the device according to Fig. 26 in a blocking position;
 Figs. 28 - 30 views of the bottom portion according to Fig. 27 in partially cut-away planar views from above in an insertion position and an intermediary position and a blocking position respectively;
 Figs. 31-33 lateral views of the bottom portion and a top portion according to Fig. 26 in the positions, which corresponds to the positions according to Figs. 28-30;
 Fig. 34 a perspective view from below of the top portion according to Figs. 26 and 31 - 33; as well as Fig. 35 and 36 perspective views from above of a connector device according to Figs. 31 and 32 respectively, in which the list 31 is shown with cut-outs in order to show the position for underlying contact cases in the beam 14 and in which the top portion meshes with the list in a blocking and a contact position respectively.

[0007] The device according to the invention is in its entirety denoted by 1 in Figs. 1-14. A current rail 2 is also used and a connector 3 inserted into the current rail. The current rail, which also can be an installation channel or the like and designed with two grooves for electric conductors, used for signal and communication transmissions, as well as said connector can of course be designed in an arbitrary way, to the extent, that this does not directly influence the present invention.

[0008] The current rail has a body 4 with a longitudinal hollow space 5, a rear wall 6, designed e.g. for suspension of paintings or the like and at the bottom in profile shaped as a hook, on the inner side of which wall a ground rail 7 is mounted, and a front wall 8, in which a longitudinal lead-in hole 9 for an insertion part 10 of connector 3 has been made and behind which electric conductors 11 and 12 on each side of hole 9 are mounted.

Through insertion part 10 of the preferably oblong connector 3, provided with several electric sockets 13, has a beam 14, which fills said hole 9 and on the free end of which, which abuts ground rail 7, is mounted an e.g. longitudinal ground sheet 15 and with this connected ground clamps 17, which enclose the beam with their legs in e.g. recesses 16.

[0009] From the one axial end of beam 14 an extension 18 protrudes in the axial direction, having the same width but a considerably smaller height. The free end of extension 18 supports a transverse contact bar 19 with electric contact pins 20, 21, which protrude in a direct way from ground sheet 15. Ground sheet 15 suitably protrudes somewhat beyond the bar with a slight bending downwards, away from said extension and the bar but is then bent upwards as a terminating rounding 22. Since this ground sheet portion is bent away in this manner, it is resilient and consequently secures a permanent contact pressure.

[0010] The embodiment according to Figs. 24 and 25 comprises adjustable and interchangeable respectively contact pins, e.g. removable to various positions along bar 19, which pins e.g. are L-shaped, the shoulder of the protruding leg, forming the pin, being provided with cuts 23 and 24 respectively, designed to guide the pins along rails 25 and 26 respectively, which are mounted in the bar and extend in its longitudinal direction and have a C-profile and receive the base leg of the L-profiles in a gliding condition. The controlled pin position is secured by means of pivoted lock clamps 27 and 28 respectively, through which bridges are connected to the body shell of the bar and are stopped with their free end in a position on the same adjacent the contact pins by means of snap-in means known per se.

[0011] At the other end of insertion part 10, which is the rear axial end as regards the insertion of the device in the rail, the main part of the device 1 according to the invention is disposed. According to Figs. 1-14 this device comprises a blocking mechanism 29, which is shown in detail in Fig. 4. It preferably is an injection molded product with a flat list 31 provided with holes 30, which in a connection release position corresponds to the holes in the connectors. List 31 is provided with a front thickening 32, which extends downwards as well as forwards and is used, generally or together with the base, as a retaining means for the list in a guide opening 33 in the device and with an axial blocking means 34, which protrudes from the device and is designed to counteract an insertion of the device in rail 2 in said connection release position. The latter function is shown in Fig. 11, where the blocking mechanism 29, which is inserted in the device, allows contact pins 35 to be inserted into connector holes 36 but does not allow bar 19 of the device with contact pins to be inserted into rail 2, against front side 8 of which blocking means 34 abuts and at the same time prevents a complete insertion of the bar into hollow space 5 of the rail in order to be swung 90° to a starting position for a subsequent swing-

ing of 90° into an electric contact position. Consequently possibly inserted contact pins to a power-consuming equipment must first be removed and the blocking mechanism be pulled into a connection blocking position according to Figs. 1-7, blocking means 34 being pulled into the front end of guide opening 33 and the bar etc., being allowed to be pushed sufficiently far into the hollow space of the rail in order to be allowed to carry out the above described swinging operations.

[0012] At the rear end of blocking mechanism 29 there is also a slide, thickening or the like 37, which extends downwards as well as rearwards and has a multiple function. First of all it is an insertion limiting mechanism in the form of e.g. a plate 38 having a flange 39 all around as an abutment against guide opening 33 or any other opening or any other recess in e.g. beam 14. Above plate 38 a push button-like, axially backwardly extended protrusion 40 can be used, which in the inserted position of the blocking mechanism is flush with the contour of the rear end of the device (see Figs. 8 and 9).

[0013] Below protrusion 40 and axially seen in front of plate 38 there is a L-shaped block 41 with a recess 42 between the two legs and the push button, disposed above and its extension respectively axially and inwards into the device. From the area at the two free vertical corner edges of the lower leg two stop tongues 43, 44 extend in horizontal direction but obliquely outwards and forwards, which suitably are made of metal and have resilient properties and which are fastened to the lower leg. The free ends of the tongues are always guided by openings 45, 46 in the lateral walls of the beam. When blocking mechanism 29 is positioned in its connection locking position, i.e. protrudes backwards, the free ends of the mainly forwardly extending, somewhat to the respective side outwardly rounded tongues are positioned within said opening. However, in case blocking mechanism 29 is inserted (Figs. 8-11), then the tongues will be pushed out longer through their openings and at the same time be bent in a lateral direction by the latter in order to function as blocking mechanisms within apparent hollow space 5 against the rear, profiled part of apparent front wall 8.

[0014] Recess 42 is designed for rear end 47 of ground sheet 15. Within this area the ground sheet, which mainly below beam 14 abuts the same, is bent obliquely downwards and backwards and then straight or somewhat obliquely rearwardly extended upwards through an opening 48 in the bottom side of the beam and finally horizontally backwards in the shape of a holding tongue 49. In its by the ground sheet not influenced condition the holding tongue is positioned at a level below the lower limitation of recess 42. However, when subsequent to said two swingings of the connector, which supplement each other, the rear part of beam 14 with the ground sheet is pressed against ground rail 7, then the obliquely downwardly extended part of the ground sheet is pressed towards the bottom side of the beam, the holding tongue finally ending up at a level

above said lower limitation of recess 42, when the blocking mechanism can be pushed forwards and the latter below the holding tongue, which then also exercises a blocking influence on the blocking mechanism in this insertion position thanks to either friction or a certain profiling, e.g. through a certain bending downwards of the outermost free end of the holding tongue and because this free end, extended in this fashion, meshes with an indent or the like (not shown) in said limitation.

[0015] As is evident from the above, a blocking mechanism according to Fig. 11 can normally not be used, since the holding tongue of the device, which is inserted into the rail, prevents an insertion of the blocking mechanism. Also in this way an extra safety and reliability factor is obtained when using the device according to the invention, which factor in its entirety has the following features:

[0016] Device (connector) 3 according to Figs. 1-7 has a rearwardly protruding blocking mechanism, which prevents the use of the connectors (see Fig. 6). This device can now be inserted into rail 2, as is shown in principle in Fig. 11, and be rotated as well as be swung into its contact position, which is shown in principle in Figs. 19 and 20, when the holding tongue firstly is lifted in order to release the insertion passage for the blocking mechanism and secondly, when appropriate, is supported by the lower limitation of recess 42, which does not necessarily have to be the case. Thus, the holding tongue can also be present somewhere in recess 42. When the blocking mechanism is inserted, blocking means 34 is freely pushed out parallelly to and within opening 9. Consequently, it does not in this position meet a blocking or retaining need. Said device is now completely secured mechanically seen, the two ends being blocked within the rail, and it has now been established an electric contact with conductors 11 and 12. Power-consuming equipment can now be connected to the connector.

[0017] If the connector is to be removed, it is necessary to firstly remove all electric connections from the connectors. Secondly the blocking mechanism is to be drawn backwards, possibly simply by pressing inwards blocking protrusion 34. Stop tongues 43, 44 will be simultaneously drawn inwards and the holding tongue will slide downwards and out of recess 42, the spring force of the ground sheet and/or the stop tongues facilitating and speeding up a lifting of this connector portion out of the current rail. After the described swinging and rotation movements of the connector it can be removed completely from the current rail in order to e.g. place it in another position along the current rail.

[0018] Device 1' according to Figs. 15-23 is different from the device according to Figs. 1-14, since device 1' first of all comprises a list 31', which is positioned on top of the connector and has holes 30'. The list covers the width and the length of the connector with the exception of a short piece, which is required for displacement movements between a blocking position and a re-

lease position. List 31' is guided by means of laterally disposed grooves 50 in its bottom side on shape-attached claw-like guide beads 51, turned away from each other, along the upper lateral edges of the connector or at least along their ends. The diameter of holes 30' correspond to the diameter of connectors 13. The front end of list 31' and/or its front sides can be provided with not shown insertion blocking means having the same function as the already described blocking means 34.

[0019] In the rear end of connector 3' a blocking mechanism 29' is guided in a vertical guide groove 33'. This mechanism comprises a slide 52, at the upper end of which a push button 40' is mounted, having a horizontal axially forwardly extended continuation retaining portion 53, which is mounted in a vertical groove 54, which extends through the rear part of the connector, and ends with its upper end flush with and above respectively the upper side of the connector, depending on the adjusted position. The retaining portion has such a length, that it in its retaining position abuts from behind the rear end of list 31' (Fig. 15). The lower end of the slide is at its rearmost part a point 55 and attached to the same towards a transverse arm 56 with obliquely upwardly and outwardly towards both sides directed guiding holes 57 for tongues 58, downwardly extending from the bottom side of the connector. A mirror-symmetrical continuation of parts 53-55 can be used, forwards and attached to the transverse arm. The tongues are limited forwards and backwards by walls 59, which are directed downwards from the connector and which terminate in laterally extended stop claws 60.

[0020] This device functions in the following way: In its release position according to Fig. 15, which also is its connection blocking position, the connector can be inserted in a current rail, be rotated a quarter of a revolution and be swung a quarter of a revolution in it, a connecting position according to Fig. 19 being obtained, in which an electric contact is established, but the connectors are still blocked up. Push button 40' is now pressed downwards to a position according to Fig. 20, the point 55 being inserted between walls 59, which initially are V-shaped and with their lower ends are turned to each other, and spread the walls apart from each other, claws 60 catching hold of, at their rear parts, the inner ends or edges of the walls around lead-in hole 9 and in this way stopping the rear end of the connector in relation to the rail. Tongues 58 are in this way allowed to slide out of guiding holes 57, which are directly in relation to each other in a V-shaped fashion. Subsequently list 31' is according to Figs. 16 and 17 pushed backwards in order to cover retaining portion 53, the connectors being released and in this way power-consuming equipment being able to be connected and in this way the retaining portion itself being blocked from above, in which way it cannot be inadvertently pushed upwards and consequently put the mechanism out of order.

[0021] If then the connector is to be removed, firstly all the power-consuming equipment must be removed

from it, in order to be able to push list 31' towards and in this way block the connectors and release the blocking mechanism, which then is pushed upwards from a position according to Fig. 20 to a position according to Fig. 19, the point sliding away from the area between walls 59 and the guiding holes sliding over the tongues, in order to push them towards each other, also the walls in a V-shaped manner being pushed towards each other due to said guiding holes, since parts 53, 55-60 form an e.g. injection molded unit, in which the tongue and the walls are connected to each other and can be swung as a unit around thinly designed shoulders at body 61 towards the blocking mechanism, which possibly can be integrated with the body of the connector. The thin shoulders will function as hinges or bridges. The blocking mechanism, when it has been pushed upwards completely, will lock the list in its advanced connection blocking position and now the connector can be swung and rotated in the described way in order to remove it from the rail.

[0022] In a complete device 62 according to Fig. 26, which device is particularly suitable to be attached to a wall at a higher level, there is, in conformity with a few previous drawing figures, a current rail 2 with connectors 3", which include safety devices 1". The current rail has a body 4 with a longitudinal hollow space 5, a rear wall 6, on the inner side of which a ground rail 7 is mounted, and a front wall 8, in which there is a longitudinal opening 9 for a lead-in portion 10" of the connector 3" and behind which electric conductors 11 and 12 are mounted on each side of opening 9.

[0023] Connector device 3" comprises a low or bottom portion 63 and a top portion 64. The purpose of such a dividing up is to create opportunities for varying output possibilities, the bottom portion always being designed in the same way, whereas the top portion can obtain a varying shape and functioning, e.g. in order to span joints and angles between adjacent current rails and in particular for varying remote terminals, which via cables 65 can lead to electric connectors 13" or illumination devices and the like. Despite this dividing up, which results in important production and handling advantages, it has nevertheless been considered, that safety will be obtained during work, i.e. subsequent to the attachment of the bottom portion in a current rail but before the top portion has been attached to the bottom portion.

[0024] As regards connector 3" safety device 1" is similar to the device, which has been shown and described in connection with Figs. 1-14. The main difference is, that parts 37-42, 29-31 and 32,34 respectively, which according to Figs. 1-14 form a homogenous blocking mechanism, in this case have been divided up into three different means, namely a bottom portion 63, a list 31" movably mounted on it as well as a top portion 64.

[0025] Thus, the bottom portion is not provided with blocking means 34, which instead is mounted on top portion 64 as means 34" and can be, in a simple and

quick way, inserted into the current rail in the above described and shown way, its movable parts being disposed according to Fig. 28. It is shown, that from rear plate 38" two lateral claws 67 extend forwards having protrusions 68 turned towards each other, which in the shown insertion position are supported by primary recesses 69 in the sides of beam 14". The recesses diverge with their bottoms towards the insertion end of the connector and then reach secondary recesses 70. Block 41" is as in the previous case guided in beam 14" and ends at the end turned away from plate 38" in two diverging branches, which are designed as stop tongues 43" and 44". Since the tongues are made of a plastic material, e.g. a ABS-material, they can be bent away elastically during a large bending, when the block is pushed further into beam 14", which is shown in Figs. 29 and 30, in which tongues 43", 44" have been forced out through openings 45" and consequently laterally protrude a short distance from beam 14" and constitute efficient retaining means, since they become hooked up behind front wall 8 after the insertion of the connector in the current rail. When removed from the position according to Fig. 28 to the position according to Fig. 29/30 claws 67 with protrusions 68 are pushed further into and onto the beam, protrusions 68 being removed from recesses 69 to recesses 70 against the action of the diverging passage between the two recesses. The claws, which have been made in one piece jointly with plate 38", block 41" and tongues 43", 44", are elastically resilient first of all outwards and then inwards again in order to retain blocking mechanism 29" in either one of the positions.

[0026] When the connector device in this way has been mounted in the current rail, list 31", which with its two longitudinal edges is guided in the longitudinal direction on beam 14", e.g. in grooves 66 in mutually parallel elevations 71 on the beam, is positioned according to Figs. 29 and 35 respectively, in which position its openings 30", which suitably have an oblong slot-shape, are not congruent with connector holes 36" in the beam, a direct available electric contact thus not being allowed to be established. This protective position for the list is secured by means of a compression spring 72, which is mounted in a recess in the upper side of beam 14" and is grasped all around at one end of a follower arm 73, which protrudes downwards from list 31". If now an electric contact is to be established, upper portion 64 with its contact pins 35" will be pushed into openings 30" in order to longitudinally remove the upper portion jointly with the list into a position according to Figs. 30 and 36 respectively, until pins 35", openings 30" and contact cases 36" are congruent, the pins thus being allowed to be completely pushed into the latter and lock the list in this contact position against the action of spring 72.

[0027] When now the top portion is pressed down in the bottom portion completely, the contact pins are laterally protected by means of exterior, downwardly protruding shell portions 74, which in their end positions end

up in front of elevations 71. At the same time snap-in arms 32", which have been cut out of said shell portions 74 and reaches a point below the latter, with projections 75 facing each other on the interior side of the lower ends of the arms, will mesh with cavities 76 in the end surfaces of beam 14" in order to lock the top portion to the bottom portion. Opposite the projections blocking means 34" are disposed on the exterior side of the arms, which means penetrate hole 9 in the current rail in order to lock and stabilize the connection in the current rail. Also in this case the blocking means prevents, that somebody inadvertently join the top portion with the bottom portion and tries to insert the connectors, joined in this way into a current rail.

[0028] In case then a connector is to be removed from the current rail, it is necessary to first remove the top portion from the latter portion, which is done by inserting e.g. a screw driver into a hole 77 in each blocking means and bending it in order to make the projection leave the respective cavity, and then to lift off the top portion, the list, thanks to the spring, returning to the position according to Figs. 28/29 and 35 respectively. Then a screw driver or the like is applied between blocking mechanism 29" and beam 14" in a suitable place, possibly provided with special, for this purpose arranged location notches (not shown), making it possible for protrusions 68 to leave recesses 70 and return to recesses 69. Tongues 43", 44" are in this way drawn into openings 45" and the bottom portion can be swung outwards out of the current rail in the way described and shown above.

[0029] In Fig. 26 it is also shown, that two bottom portions can be used to establish an electric connection between two adjacent current rails, an electric cable 65 extending between two top portions, adjacent their ends, in the respective current rails. Also, it is possible to use solely one top portion shell 74 in order to shield selected open sections of a current rail. The ends can be closed by means of end pieces 78.

[0030] Above blocking means 34", from shell end sides 81, can in an axial direction sleeve-like cases or the like 82 protrude, through which connection cables 65 can be led out of and into respectively the top portion. Also, the sheet portions can within this area be bent transversely with a certain displacement inwards, following bearing surfaces 83 for e.g. empty shells, which solely are designed to shield a portion of the front side of a current rail.

[0031] The present invention is not limited to the embodiments, which have been described above and shown in the drawings, but it can be modified and supplemented in an arbitrary manner within the scope of the inventive idea, as it is set forth in the following claims.

55 Claims

1. A safety device (1;1';1") with a connection device (3;3';3") provided with connector openings (13;13';

30;30';30";36;36") and connectors respectively for an electric current to an electric current rail (2) or the like, the connection device, which with a front end can be inserted into the current rail, being positioned by means of first locking means (19), which brings about an electric contact closure between the rail and said connection device and is positioned at this connector device end, second locking means at the rear end of the safety device being designed to lock the connection device, when it has been completely inserted into the rail, to the same, **characterized in that** blocking mechanisms (29;29';29") are provided to block up the connectors and the connector openings respectively against connection to contact pins or other electric devices (35; 35") , until said second locking means has been activated and lock the connection device, which has been completely inserted into the rail, in relation to the rail by means of tongues (43;44;43';44';43";44"), which are positioned inside the insertion opening of the rail and behind its front wall (8) and which laterally protrude from the safety device, at the same time bringing about an automatic availability of the connectors and the connector openings respectively, which blocking mechanisms comprise a slide (37,41,52), disposed at the rear end of the safety device and designed to activate and inactivate respectively said second locking means, **in that** a removal of the connector device will imply first a removal of all possible power consumption connections from the connector device, and then a displacement of said second locking means to an inactive position, results in an automatic activation of said blocking mechanisms which also are designed to via the second locking means stop an insertion of at least the one end of the connector device into the rail when activated, **in that** at the rear end of the connection device (3;3';3") the main portion of the safety device (1;1';1") is disposed , which comprises said blocking mechanisms (29;29';29") , which comprises a flat list (31;31';31") , provided with said openings (30;30';30") , the openings in a connecting release position covering the holes (36; 36") in the connectors.

2. The devices according to claim 1, **characterized in that** the end of the device (3;3';3"), which end is the front axial one as regards the insertion of the device in the rail, is provided with blocking means (34), which protrude axially from the device and stops an insertion of the device in the rail in said connector release position, particularly because the list (31) or another connection device portion (64) is provided with a front thickening (32), which extends downwards as well as forwards and functions generally or jointly with the base as a blocking means for the list in a guide opening (33) in the device.

3. The devices according to claim 1 or 2, **characterized in that** said slide or the like (37) is displaceable in a vertical direction or in a horizontal direction between a locking position and a release position and has a multiple function, including an insertion limitation preferably in the form of a plate (38) having a flange (39) all around designed to abut the guide opening (33) or another opening or another recess in e.g. the beam (14) and having a push button-like, axially backwardly directed protrusion (40).
4. The devices according to claims 3, **characterized in that** below the protrusion (40) and axially seen in front of the plate (38) an L-shaped block (41) is disposed having a recess (42) between the two legs and the push button, disposed above, and its continuation axially inwards into the device respectively, **in that** from the area at the two free vertical corner edges of the lower leg two stop tongues (43,44) protrude, horizontally obliquely outwards and forwards, which suitably are made of metal and have resilience properties and which are fastened to the lower leg, and **in that** the free ends of the tongues always are guided by openings (45,46) in the lateral walls of the beam.
5. The devices according to claim 4, **characterized in that** the recess (42) is designed for the rear end (47) of the ground sheet (15), within which area the ground sheet, which mainly below the beam (14) abuts the same, is bent obliquely downwards and backwards and then straight or somewhat backwardly directed upwards through an opening (48) in the bottom side of the beam and finally horizontally backwards in the shape of a tongue (49), **in that** in a not influenced condition of the ground sheet the stop tongue is designed to be positioned on a level below the lower limitation of the recess (42), and **in that** when the rear part of the beam (14) with the ground sheet is forced to abut the ground rail (7), the obliquely downwardly directed portion of the ground sheet is forced towards the bottom side of the beam, the stop tongue finally ending up on a level above said lower limitation of the recess (42), when the blocking mechanism can be pushed towards and the latter below the stop tongue, which now can exercise a retaining action on the blocking mechanism in this inserted position due to either friction or a certain profiling, e.g. because the outermost free end of the stop tongue meshes with an indent or the like in said limitation.
6. The devices according to claim 1, **characterized in that** it comprises a list (31'), disposed above the device (3') and having holes (30') , which correspond to the diameter of the connectors (13') , which list covers the width and the length of the device, with the exception of a short piece designed for displace-

ment movements between a blocking and a release position, **in that** the list (31') is guided by means of e.g. lateral grooves in its bottom side on shape-attached claw-like guide beads (51), which face each other, along the upper lateral edges of the device or at least along their ends, and **in that** the front end of the list and/or its front sides preferably are provided with insertion blocking means for the device.

7. The devices according to claim 1 or 6, **characterized in that** in the rear end of the connector device (3') a blocking mechanism (29') is guided in a vertical guiding groove (33'), which mechanism comprises a slide (52), at the upper end of which a push button (40') is disposed having a horizontal axially forwardly directed blocking portion (53), which is mounted in a vertical groove (54), which extends through the device and ends with its upper end flush with and above respectively the upper side of the device, depending on the adjusted position and **in that** the blocking portion is so long, that it in its blocking position from behind abuts the rear end of the list (31').
8. The devices according to claim 7, **characterized in that** the lower end of the slide (52) at the rear end is a point (55) and in connection with the same a transverse arm (56) towards with obliquely upwards and outwards to both sides directed forced guidance spaces (57) for tongues (58), which protrude downwards from the bottom side of the device, **in that** preferably in connection with the transverse arm forwards a mirror-symmetrical repetition of the blocking portion (53) and the point (55) is disposed and **in that** said tongues (58) are forwardly and backwardly limited by walls (59), extending downwards from the device, which end in laterally extending holding claws (60).
9. The devices according to claims 6-8, **characterized in that** the connector device (3') is designed, in the connection blocking position of the list (31'), to be completely inserted into the rail (2), the electric contact position being established, **in that** the blocking portion (53) by means of the push button (40') then is designed to be pushed downwards, directed into the rail, while said point (55) is inserted between the walls (59), which initially are V-shaped and directed with their lower ends against each other, and the walls are taken apart, the claws (60) being introduced behind the inner ends or edges of the walls around the insertion opening (9) of the rail and a retaining of the rear end of the device in relation to the rail being accomplished.
10. The devices according to claim 1, **characterized in that** the connector device (3'') comprises a bottom or base portion (63) and a top portion (64) in order

to with only one base portion form create opportunities for varying withdrawal possibilities, since different top portions with varying shapes and functions are available, particularly designed to span joints and angles between adjacent current rails (2), for cable-connected connectors (13'') as well as for lighting devices and the like, the base portion (63) being designed to, without a top portion (64), be attached to and be removed from respectively a current rail (2) and the base portion, without an applied top portion, preferably being electrically secured or isolated outwards.

11. The devices according to claim 10, **characterized in that** the blocking mechanism (37'' - 42'' ; 29'' - 31'' ; 32'' ; 34'') is divided into three different elements, namely the base portion (63), a list (31'') disposed on the same as well as the top portion (64), the blocking mechanism (34'') being disposed at the top portion (64).
12. The devices according to claim 10 or 11, **characterized in that** from plate (38'') two laterally disposed claws (67) extend, which grasp the rear end of the beam (14'') all around and have protrusions (68) facing each other at their free ends, which protrusions in the insertion or free position of the device are designed to be supported by primary recesses (69) in the sides of the beam, **in that** the recesses (69) preferably diverge with their bottoms towards the insertion end of the device and lead to secondary recesses (70) designed to receive the protrusions (68) in the forwardly removed locking position of the blocking mechanism (29'').
13. The devices according to any of claims 10-12, **characterized in that** the block (41'') is guided in the beam (14'') and ends at the end, which is turned away from the plate (38''), in two diverging branches, which constitute stop tongues (43'', 44''), which are made of a thin plastic material, e.g. of an ABS-material, being able to be laterally and elastically bent, a bending increase being obtained, when the block is displaced further into the beam (14''), the tongue (43'', 44'') being designed to be pressed out through lateral openings (45'') in the beam (14''), becoming efficient blocking elements by claspings them behind the front wall (8), when the device has been inserted into a current rail (2).
14. The devices according to any of claims 10-13, **characterized in that** the list (31'') can be displaced along the beam (14''), preferably because it, by means of its two longitudinal edges, can be longitudinally displaced and guided in grooves (66) in mutually parallel elevations (71) on the beam (14''), between a blocking and a contact position, in which the openings (30'') in the list, which suitably have

an oblong slit-shape corresponding to the profile of the contact pins (35"), are not and are respectively congruent with the connector holes (36") of the beam, through which an electric contact can be established with underlying electric contact cases or the like (79), **in that** the blocking position of the list is designed to be secured by means of a spring, preferably a compression spring (72), which is mounted in a recess (80) in the upper side of the beam and is grasped all around at its one end by means of a follower arm (73), which protrudes downwardly from the list, and **in that**, in order to establish an electric contact between the base portion (63) and the top portion (64) the latter is designed to, with its contact pins (35"), be pushed into the openings (30") in the list (31") with a resulting longitudinal displacement, the list being removed against the action of said spring to said contact position, where the pins (35"), the openings (30") and the contact cases (36") are congruent, the top portion with the pins in this way being able to be completely pushed into the bottom portion and lock the list in the contact position.

15. The devices according to claim 14, **characterized in that**, when the top portion (64) is fastened to the bottom portion (63), the contact pins (35") are designed to be protected in the lateral direction by means of outer downwardly protruding shell portions (74), which belong to the top portion, which shell portions, when the top portion has been completely pressed into place, end up outside said elevations (71), while snap-in arms (32"), which preferably are positioned between indents in the end sides (81) of the shell portions and reach points below the latter, mesh, with projections (75), facing each other on the inner side of the lower ends of the arms, with cavities (76) in the end surfaces of the beam (14") in order to lock the upper portion of the bottom portion, and **in that** preferably opposite the projections on the outer side of the arms (32") said blocking elements (34") are disposed, which are designed to penetrate the insertion opening (9) in the current rail (2) in order to lock and stabilize the connector device in the current rail and which are designed to prevent, that a connector device, which inadvertently has been assembled outside the current rail, can be inserted into the latter.

Patentansprüche

1. Sicherheitsvorrichtung (1; 1'; 1'') mit einer Verbindungsvorrichtung (3; 3'; 3''), welche für einen elektrischen Strom mit Verbinderöffnungen (13; 13'; 30; 30'; 30'') beziehungsweise Verbindern mit einer Stromschiene (2) oder dergleichen versehen ist, wobei die Verbindungsvorrichtung, welche mit

einem vorderen Ende in die Stromschiene eingefügt werden kann, mittels eines ersten Verriegelungsmittels (19) positioniert wird, welches eine elektrische Kontaktschließung zwischen der Schiene und der Verbindungsvorrichtung herbeiführt und an diesem Verbindervorrichtungsende positioniert ist, wobei ein zweites Verriegelungsmittel am hinteren Ende der Sicherheitsvorrichtung so ausgelegt ist, dass es die Verbindungsvorrichtung, wenn sie vollständig in die Schiene eingefügt ist, mit derselben verriegelt,

dadurch gekennzeichnet, dass

Blockierungsmechanismen (29; 29'; 29'') vorgesehen sind, um die Verbinder beziehungsweise die Verbinderöffnungen gegen Verbindung mit Kontaktstiften oder anderen elektrischen Vorrichtungen (35; 35'') zu blockieren, bis das zweite Verriegelungsmittel aktiviert wurde und die Verbindungsvorrichtung, welche vollständig in die Schiene eingefügt wurde, in Bezug auf die Schiene mittels Zungen (43; 44; 43'; 44'; 43''); 44''), welche im Inneren der Einfügungsöffnung des Endstücks und hinter ihrer Vorderwand (8) positioniert sind und welche von der Sicherheitsvorrichtung seitlich vorstehen, verriegelt, wodurch es gleichzeitig eine automatische Verfügbarkeit der Verbinder beziehungsweise der Verbinderöffnungen herbeiführt, wobei die Blockierungsmechanismen einen Schieber (37, 41, 52) umfassen, welcher am hinteren Ende der Sicherheitsvorrichtung angeordnet und so ausgelegt ist, dass er das zweite Verriegelungsmittel aktiviert beziehungsweise deaktiviert, dass eine Trennung der Verbindervorrichtung zuerst eine Trennung aller möglichen Leistungsverbrauchsverbindungen von der Verbindervorrichtung mit sich bringt, und dann eine Verschiebung des zweiten Verriegelungsmittels in eine inaktive Position zu einer automatischen Aktivierung der Blockierungsmechanismen führt, welche auch so ausgelegt sind, dass sie über das zweite Verriegelungsmittel eine Einfügung wenigstens des einen Endes der Verbindervorrichtung in die Schiene anhalten, wenn aktiviert, und dass am hinteren Ende der Verbindungsvorrichtung (3; 3'; 3'') der Hauptabschnitt der Sicherheitsvorrichtung (1; 1'; 1'') angeordnet ist, welcher die Blockierungsmechanismen (29; 29'; 29'') umfasst und welcher eine flache Leiste (31; 31'; 31'') umfasst, die mit den Öffnungen (30; 30'; 30'') versehen ist, wobei die Öffnungen in einer Verbindungsfreigabeposition die Löcher (36; 36'') in den Verbindern abdecken.

2. Vorrichtungen nach Anspruch 1,

dadurch gekennzeichnet, dass

das Ende der Vorrichtung (3; 3'; 3''), welches bezüglich der Einfügung der Vorrichtung in der Schiene das vordere axiale Ende ist, mit Blockierungsmitteln (34) versehen ist, welche von der Vorrichtung axial vorstehen und eine Einfügung der Vorrichtung in

der Schiene in der Verbinderfreigabeposition anhalten, insbesondere weil die Leiste (31) oder ein anderer Verbindungsvorrichtungsabschnitt (64) mit einer vorderen Verdickung (32) versehen sind, welche sich sowohl nach unten als auch nach vorne erstreckt und im Allgemeinen oder zusammen mit der Basis als ein Blockierungsmittel für die Leiste in einer Führungsöffnung (33) in der Vorrichtung dient.

3. Vorrichtungen nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Schieber oder dergleichen (37) in einer vertikalen Richtung oder in einer horizontalen Richtung zwischen einer Verriegelungsposition und einer Freigabeposition verschoben werden kann und eine Multifunktion aufweist, wobei er eine Einfüfungsbegrenzung vorzugsweise in Form einer Platte (38) mit einem Flansch (39), welcher rundum so ausgelegt ist, dass er an die Führungsöffnung (33) oder eine andere Öffnung oder eine andere Aussparung z.B. im Träger (14) stößt, und mit einem druckknopfähnlichen, axial nach hinten gerichteten Vorsprung (40) umfasst.
4. Vorrichtungen nach Anspruch 3, **dadurch gekennzeichnet, dass** unter dem Vorsprung (40) und axial gesehen vor der Platte (38) ein L-förmiger Block (41) angeordnet ist, welcher eine Aussparung (42) zwischen den beiden Schenkeln und dem Druckknopf, der darüber angeordnet ist, beziehungsweise seiner Fortsetzung axial nach innen in die Vorrichtung aufweist, dass von dem Bereich an den beiden freien vertikalen Ecken des unteren Schenkels zwei Anschlagszungen (43, 44), welche geeigneterweise aus Metall hergestellt sind, Rückfederungseigenschaften aufweisen und am unteren Schenkel befestigt sind, horizontal schräg nach außen und nach vorne vorstehen und dass die freien Enden der Zungen stets durch Öffnungen (45, 46) in den Seitenwänden des Trägers geführt werden.
5. Vorrichtungen nach Anspruch 4, **dadurch gekennzeichnet, dass** die Aussparung (42) für das hintere Ende (47) des Erdungsblatts (15) bestimmt ist, innerhalb welchen Bereichs das Erdungsblatt, welches hauptsächlich unter dem Träger (14) an denselben stößt, schräg nach unten und nach hinten und dann geradeaus oder etwas nach hinten gerichtet nach oben durch eine Öffnung (48) in die Unterseite des Trägers und schließlich horizontal nach hinten in Form einer Haltezunge (49) gebogen wird, dass in einem unbeeinflussten Zustand des Erdungsblatts die Haltezunge so ausgelegt ist, dass sie in einer Ebene unter der unteren Begrenzung der Aussparung (42) positioniert ist, und dass, wenn der hintere Teil des Trägers

(14) mit dem Erdungsblatt gezwungen wird, an die Erdungsschiene (7) zu stoßen, der schräg nach unten gerichtete Abschnitt des Erdungsblatts zur Unterseite des Trägers gezwungen wird, wobei die Haltezunge schließlich in einer Ebene über der unteren Begrenzung der Aussparung (42) endet, wenn der Blockierungsmechanismus vorwärts und die Letztere unter die Haltezunge drückbar sind, wobei die Haltezunge in dieser eingefügten Position nun entweder infolge von Reibung oder einer bestimmten Profilbildung eine Festhaltungswirkung auf den Blockierungsmechanismus ausüben kann, z.B. weil das äußerste freie Ende der Haltezunge in eine Kerbe oder dergleichen in der Begrenzung eingreift.

6. Vorrichtungen nach Anspruch 1, **dadurch gekennzeichnet, dass** sie eine Leiste (31') umfassen, welche über der Vorrichtung (3') angeordnet ist und Löcher (30') aufweist, welche dem Durchmesser der Verbinder (13') entsprechen, welche Leiste die Breite und die Länge der Vorrichtung abdeckt, mit der Ausnahme eines kurzen Stückes, welches für Verschiebewebewegungen zwischen einer Blockierungs- und einer Freigabeposition bestimmt ist, dass die Leiste (31') z.B. mittels seitlicher Nuten in ihrer Unterseite auf formbefestigten klauenähnlichen Führungswulsten (51), welche einander gegenüberliegen, entlang der oberen Seitenkanten der Vorrichtung oder wenigstens entlang ihrer Enden geführt wird und dass das vordere Ende der Leiste und/oder ihre vorderen Seiten vorzugsweise mit Einfüfungsblockierungsmitteln für die Vorrichtung versehen sind.
7. Vorrichtungen nach Anspruch 1 oder 6, **dadurch gekennzeichnet, dass** im hinteren Ende der Verbindervorrichtung (3') ein Blockierungsmechanismus (29') in einer vertikalen Führungsnut (33') geführt wird, wobei der Mechanismus einen Schieber (52) umfasst, an dessen oberen Ende ein Druckknopf (40') angeordnet ist, welcher einen horizontalen axial nach vorne gerichteten Blockierungsabschnitt (53) aufweist, welcher in einer vertikalen Nut (54) angebracht ist, welche sich durch die Vorrichtung erstreckt und mit ihrem oberen Ende in Abhängigkeit von der eingestellten Position bündig mit beziehungsweise über der Oberseite der Vorrichtung endet, und dass der Blockierungsabschnitt so lange ist, dass er in seiner Blockierungsposition von hinten an das hintere Ende der Leiste (31') stößt.
8. Vorrichtungen nach Anspruch 7, **dadurch gekennzeichnet, dass** das untere Ende des Schiebers (52) am hinteren Ende eine Spitze (55) und daran nach vorne hin ein quer verlaufender Arm (56) angeschlossen ist mit

beiderseits schräg nach oben und nach außen gerichteten Zwangführungshohlräumen(57) für Zungen (58), welche von der Unterseite der Vorrichtung nach unten vorstehen, dass vorzugsweise in Verbindung mit dem quer verlaufenden Arm vorwärts eine spiegelsymmetrische Wiederholung des Blockierungsabschnitts (53) und des Punkts (55) angeordnet ist und dass die Zungen (58) nach vorne und nach hinten durch Wände (59), welche sich von der Vorrichtung nach unten erstrecken und welche in sich seitlich erstreckenden Halteklauen (60) enden, begrenzt sind.

9. Vorrichtungen nach Anspruch 6 bis 8,

dadurch gekennzeichnet, dass

die Verbindervorrichtung (3') so ausgelegt ist, dass sie in der Verbindungsblockierungsposition der Leiste (31') vollständig in die Schiene (2) eingefügt ist, wodurch die elektrische Kontaktposition hergestellt wird, und dass der Blockierungsabschnitt (53) so ausgelegt ist, dass er dann mittels des Druckknopfs (40') nach unten gedrückt wird, in die Schiene gerichtet, während der Punkt (55) zwischen die Wände (59), welche anfänglich V-förmig und mit ihren unteren Enden zueinander gerichtet sind, eingefügt wird und die Wände auseinander genommen werden, wobei die Klauen (60) hinter den inneren Enden der Kanten der Wände um die Einfügungsöffnung (9) der Schiene eingeführt werden und ein Festhalten des hinteren Endes der Vorrichtung in Bezug auf die Schiene bewerkstelligt wird.

10. Vorrichtungen nach Anspruch 1,

dadurch gekennzeichnet, dass

die Verbindervorrichtung (3'') einen Boden- oder Basisabschnitt (63) und einen Deckabschnitt (64) umfasst, um mit nur einer Basisabschnittform Gelegenheiten zum Variieren von Ausziehmöglichkeiten zu schaffen, da verschiedene Deckabschnitte mit veränderlichen Formen und Funktionen verfügbar sind, welche insbesondere zum Überbrücken von Verbindungsstellen und Winkeln zwischen benachbarten Stromschienen (2), für Verbinder (13'') mit Kabelanschluss, sowie für Beleuchtungsvorrichtungen und dergleichen bestimmt sind, wobei der Basisabschnitt (63) so ausgelegt ist, dass er ohne einen Deckabschnitt (64) an einer Stromschiene (2) befestigt beziehungsweise davon entfernt wird, und der Basisabschnitt ohne einen aufgebrauchten Deckabschnitt vorzugsweise außen elektrisch gesichert oder isoliert ist.

11. Vorrichtungen nach Anspruch 10,

dadurch gekennzeichnet, dass

der Blockierungsmechanismus (37'' - 42''; 29'' - 31''; 32''; 34'') in drei verschiedene Elemente geteilt ist, nämlich in den Basisabschnitt (63), eine Leiste (31''), welche auf demselben angeordnet ist, sowie

den Deckabschnitt (64), wobei der Blockierungsmechanismus (34'') am Deckabschnitt (64) angeordnet ist.

12. Vorrichtungen nach Anspruch 10 oder 11,

dadurch gekennzeichnet, dass

sich von der Platte (38'') zwei seitlich angeordnete Klauen (67) erstrecken, welche das hintere Ende des Trägers (14'') rundum ergreifen und Vorsprünge (68) aufweisen, welche an ihren freien Enden einander gegenüberliegen, wobei die Vorsprünge so ausgelegt sind, dass sie in der Einfügungs- oder freien Position der Vorrichtung durch primäre Aussparungen (69) in den Seiten des Trägers gehalten werden, dass die Aussparungen (69) bei ihren Böden zum Einfügungsende der Vorrichtung vorzugsweise auseinander gehen und zu sekundären Aussparungen (70) führen, welche so ausgelegt sind, dass sie die Vorsprünge (68) in der nach vorne versetzten Verriegelungsposition des Blockierungsmechanismus (29'') aufnehmen.

13. Vorrichtungen nach einem der Ansprüche 10 bis 12,

dadurch gekennzeichnet, dass

der Block (41'') im Träger (14'') geführt wird und an dem Ende, welches von der Platte (38'') weggekehrt ist, in zwei auseinander gehenden Zweigen endet, welche Anschlagszungen (43'', 44'') bilden und welche aus einem dünnen Kunststoffmaterial, z.B. ABS-Material, das seitlich und elastisch gebogen werden kann, hergestellt sind, wodurch eine Biegunszunahme erhalten wird, wenn der Block weiter in den Träger (14'') verschoben wird, wobei die Zungen (43'', 44'') so ausgelegt sind, dass sie durch seitliche Öffnungen (45'') im Träger (14'') nach außen gepresst werden und zu wirksamen Blockierungselementen werden, indem sie hinter der Vorderwand (8) eingehakt werden, wenn die Vorrichtung in eine Stromschiene (2) eingefügt wurde.

14. Vorrichtungen nach einem der Ansprüche 10 bis 13,

dadurch gekennzeichnet, dass

die Leiste (31'') entlang des Trägers (14'') verschoben werden kann, vorzugsweise weil sie mittels ihrer beiden Längskanten in Längsrichtung in Nuten (66) in zueinander parallelen Erhebungen (71) auf dem Träger (14'') zwischen einer Blockierungs- und einer Kontaktposition verschoben und geführt werden kann, in welchen die Öffnungen (30'') in der Leiste, welche geeigneterweise eine längliche Schlitzform entsprechend dem Profil der Kontaktstifte (35'') aufweisen, mit den Verbinderlöchern (36'') des Trägers, durch welche ein elektrischer Kontakt mit darunter liegenden elektrischen Kontaktgehäusen oder dergleichen (79) hergestellt werden kann, übereinstimmen beziehungsweise nicht übereinstimmen, dass die Blockierungsposition der Leiste so ausgelegt ist, dass sie mittels einer Feder, vor-

zugsweise einer Druckfeder (72), gesichert wird, welche in einer Aussparung (80) in der Oberseite des Trägers angebracht ist und ringsum an ihrem einen Ende mittels eines Nachlaufarms (73) ergriffen wird, welcher von der Leiste nach unten vörsteht, und dass, um den elektrischen Kontakt zwischen dem Basisabschnitt (63) und dem Deckabschnitt (64) herzustellen, Letzterer so ausgelegt ist, dass er bei einer resultierenden Längsverschiebung mit seinen Kontaktstiften (35") in die Öffnungen (30") in der Leiste (31") gedrückt wird, wobei die Leiste gegen die Wirkung der Feder in die Kontaktposition versetzt wird, in welcher die Stifte (35"), die Öffnungen (30") und die Kontaktgehäuse (36") übereinstimmen, wobei der Deckabschnitt mit den Stiften auf diese Weise vollständig in den Bodenabschnitt gedrückt werden und die Leiste in der Kontaktposition verriegeln kann.

15. Vorrichtungen nach Anspruch 14, **dadurch gekennzeichnet, dass** die Kontaktstifte (35") so ausgelegt sind, dass sie, wenn der Deckabschnitt (64) am Bodenabschnitt (63) befestigt ist, in der seitlichen Richtung mittels äußerer nach unten vorstehender Schalenabschnitte (74), welche zum Deckabschnitt gehören, geschützt werden, wobei die Schalenabschnitte, wenn der Deckabschnitt vollständig in Stellung gepresst wurde, außerhalb der Erhebungen (71) enden, während Einschnapparme (32"), welche vorzugsweise zwischen Kerben in den Endseiten (81) der Schalenabschnitte positioniert sind und Punkte unter den Letzteren erreichen, mit Vorsprüngen (75), welche auf der Innenseite der unteren Enden der Arme einander gegenüberliegen, in Hohlräume (76) in den Endflächen des Trägers (14") eingreifen, um den oberen Abschnitt des Bodenabschnitts zu verriegeln, und dass vorzugsweise gegenüber den Vorsprüngen auf der Außenseite der Arme (32") die Blockierungselemente (34") angeordnet sind, welche so ausgelegt sind, dass sie die Einfügungsöffnung (9) in der Stromschiene (2) durchdringen, um die Verbindervorrichtung in der Stromschiene zu verriegeln und zu stabilisieren, und welche so ausgelegt sind, dass sie verhindern, dass eine Verbindervorrichtung, welche unbeabsichtigt außerhalb der Stromschiene montiert wurde, in die Letztere eingefügt werden kann.

Revendications

1. Dispositif de sécurité (1 ; 1' ; 1") comprenant un dispositif de connexion (3 ; 3' ; 3") muni d'ouvertures de connecteurs (13 ; 13' ; 30 ; 30' ; 30" ; 36 ; 36') et de connecteurs respectivement pour acheminer un courant électrique à un rail d'alimentation en courant électrique (2) ou analogues, le dispositif de

connexion, dont une extrémité frontale peut venir s'insérer dans le rail d'alimentation en courant, étant positionné à l'aide d'un premier moyen de verrouillage (19) qui établit un contact électrique entre le rail d'alimentation et ledit dispositif de connexion et qui est positionné à cette extrémité du dispositif de connexion, un deuxième moyen de verrouillage à l'extrémité arrière du dispositif de sécurité étant conçu pour verrouiller le dispositif de sécurité au rail d'alimentation lorsqu'il a été complètement inséré dans ce dernier, **caractérisé en ce qu'on** prévoit des mécanismes de blocage (29 ; 29' ; 29") pour bloquer les connecteurs et les ouvertures de connexion respectivement à l'encontre d'une connexion avec des broches de contact ou avec d'autres dispositifs électriques (35 ; 35") jusqu'à ce que ledit deuxième moyen de verrouillage ait été activé et verrouille le dispositif de connexion, qui a été complètement inséré dans le rail d'alimentation, par rapport au rail d'alimentation à l'aide de languettes (43 ; 44 ; 43' ; 44' ; 43" ; 44") qui sont positionnées à l'intérieur de l'ouverture d'insertion du rail d'alimentation et derrière la paroi frontale (8) de celui-ci, qui fait saillie en direction latérale par rapport au dispositif de sécurité, tout en procurant en même temps une mise en disponibilité automatique des connecteurs et des ouvertures de connexion respectivement, les mécanismes de blocage comprenant un coulisseau (37, 41, 52) disposé à l'extrémité arrière du dispositif de sécurité et conçu pour activer et désactiver respectivement ledit deuxième moyen de verrouillage, **en ce qu'un** retrait du dispositif de connexion implique d'abord un retrait du dispositif de connexion de toutes les connexions possibles consommatrices de courant, un déplacement dudit deuxième moyen de verrouillage dans une position inactive donnant alors lieu à une activation automatique desdits mécanisme de blocages qui sont également conçus pour, via le deuxième moyen de verrouillage, stopper une insertion d'au moins la première extrémité du dispositif de connexion dans le rail d'alimentation lorsqu'il est activé, **en ce que**, à l'extrémité arrière du dispositif de connexion (3 ; 3' ; 3"), est disposée la portion principale du dispositif de sécurité (1 ; 1' ; 1"), qui comprend lesdits mécanismes de blocage (29 ; 29' ; 29"), qui comprend une traverse d'appui de forme plate (31 ; 31' ; 31"), munies desdites ouvertures (30 ; 30' ; 30"), les ouvertures, dans une position de libération de connexion, recouvrant les trous (36 ; 36") dans les connecteurs.

2. Dispositifs selon la revendication 1, **caractérisés en ce que** l'extrémité du dispositif (3 ; 3' ; 3"), ladite extrémité représentant l'extrémité axiale frontale lorsqu'on prend en compte l'insertion du dispositif dans le rail d'alimentation, est munie de moyens de blocage (34) qui font saillie en direction axiale par

rapport au dispositif et qui stoppe une insertion du dispositif dans le rail d'alimentation dans ladite position de libération de connexion, en particulier parce que la traverse d'appui (31) ou une autre portion (64) du dispositif de connexion est munie d'un épaissement frontal (32) qui s'étend vers le bas et vers l'avant et qui fait fonction, de manière générale ou de manière conjointe avec la base, de moyens de blocage pour la traverse d'appui dans une ouverture de guidage (33) dans le dispositif.

3. Dispositifs selon la revendication 1 ou 2, **caractérisés en ce que** ledit coulisseau ou analogues (37) est à même de se déplacer en direction verticale ou en direction horizontale entre une position de verrouillage et une position de libération et possède une fonction multiple, y compris une limitation d'insertion de préférence sous la forme d'une plaque (38) possédant une bride (39) en position périphérique pour venir buter contre l'ouverture de guidage (33) ou contre une autre ouverture ou un autre évidement par exemple dans la traverse (14) et possédant une saillie (40) en forme de bouton-poussoir, orientée vers l'arrière en direction axiale.
4. Dispositifs selon la revendication 3, **caractérisés en ce que**, en dessous de la saillie (40) et lorsqu'on regarde en direction axiale, devant la plaque (38), est disposé un bloc en forme de L (41) comportant un évidement (42) entre les deux branches et le bouton-poussoir, disposé par-dessus, et son prolongement en direction axiale vers l'intérieur dans le dispositif respectivement, **en ce que**, à partir de la zone située aux deux bords libres cunéiformes verticaux de la branche inférieure, font saillie deux languettes d'arrêt (43, 44) en direction horizontale en oblique vers l'extérieur et vers l'avant, languettes qui, de manière appropriée, sont réalisées en métal et possèdent des propriétés de résidence et qui sont fixées à la branche inférieure, et **en ce que** les extrémités libres des languettes sont toujours guidées par des ouvertures (45, 46) dans les parois latérales de la traverse.
5. Dispositifs selon la revendication 4, **caractérisés en ce que** l'évidement (42) est conçu pour l'extrémité arrière (47) de la feuille de mise à la terre (15), la zone dans laquelle la feuille de mise à la terre, qui vient buter contre la traverse (14) principalement en dessous de cette dernière, est pliée en oblique vers le bas et vers l'arrière et est ensuite dirigée vers le haut en position rectiligne ou légèrement orientée vers l'arrière à travers une ouverture pratiquée dans le côté inférieur de la traverse et enfin en direction horizontale vers l'arrière sous la forme d'une languette (49), **en ce que**, à l'état non influencé de la feuille de mise à la terre, la languette d'arrêt est conçue pour être positionnée à un niveau

situé en dessous de la limite inférieure de l'évidement (42), et **en ce que**, lorsque la partie arrière de la traverse (14) comprenant la feuille de mise à la terre est forcée pour venir buter contre le rail de mise à la terre (7), la portion de la feuille de mise à la terre, orientée vers le bas en oblique, est forcée en direction du côté inférieur de la traverse, la languette d'arrêt aboutissant enfin à un niveau situé au-dessus de ladite limite inférieure de l'évidement (42) lorsque le mécanisme de blocage peut être poussé vers l'avant et vers le dernier élément mentionné, en dessous de la languette d'arrêt qui peut maintenant exercer une action de retenue sur le mécanisme de blocage dans cette position d'insertion grâce, soit à une friction, soit à un certain profilé, par exemple par le fait que l'extrémité libre de la languette d'arrêt située le plus à l'extérieur vient s'engrener avec un renforcement ou analogues dans ladite limite.

6. Dispositifs selon la revendication 3, **caractérisés en ce qu'ils** comprennent une traverse d'appui (31') disposée au-dessus du dispositif (3') et possédant des trous (30') qui correspondent au diamètre des connecteurs (13'), ladite traverse d'appui recouvrant la largeur et la longueur du dispositif, à l'exception d'un court morceau conçu pour des mouvements de déplacement entre une position de blocage et une position de libération, **en ce que** la traverse d'appui (31') est guidée au moyen par exemple de rainures latérales dans son côté inférieur sur des nervures de guidage (51) en forme de griffes épousant la forme, lesdites nervures se faisant réciproquement face, le long des bords latéraux supérieurs des dispositifs ou au moins le long de leurs extrémités, et **en ce que** l'extrémité frontale de la traverse d'appui et/ou ses côtés frontaux sont de préférence munis de moyens de blocage d'insertion pour les dispositifs.
7. Dispositifs selon la revendication 1 ou 6, **caractérisés en ce que**, dans l'extrémité arrière du dispositif de connexion (3'), est guidé un mécanisme de blocage (29') dans une rainure de guidage vertical (33'), ledit mécanisme comprenant un coulisseau (52), à l'extrémité supérieure duquel est disposé un bouton-poussoir (40') possédant une portion de blocage horizontale (53) orientée vers l'avant en direction axiale, qui est monté dans une rainure verticale (54) qui s'étend à travers les dispositifs et qui aboutit, avec son extrémité supérieure, à fleur avec le côté supérieur du dispositif et au-dessus dudit côté, respectivement, en fonction de la position réglée, et **en ce que** la portion de blocage possède une longueur telle que, dans sa position de blocage, elle vient buter de l'arrière contre l'extrémité arrière de la traverse d'appui (31').

8. Dispositifs selon la revendication 7, **caractérisés en ce que** l'extrémité inférieure du coulisseau (57), à l'extrémité arrière, est un endroit (55) auquel est relié un bras transversal (56) qui s'étend vers l'avant et qui est muni d'espaces de guidage forcé (57) orientés de part et d'autre en oblique vers le haut et vers l'extérieur, destinés à des languettes (58) qui font saillie vers le bas à partir du côté inférieur du dispositif, **en ce que**, de préférence, en liaison avec le bras transversal s'étendant vers l'avant, est disposée une image spéculaire de la portion de blocage (53) et de l'endroit (55), et **en ce que** lesdites languettes (58) sont limitées vers l'avant et vers l'arrière par des parois (59) s'étendant vers le bas par rapport au dispositif, qui aboutissent dans des griffes de retenue (60) s'étendant en direction latérale.
9. Dispositifs selon l'une quelconque des revendications 6 à 8, **caractérisés en ce que** le dispositif de connexion (3') est conçu, dans la position de blocage de connexion de la traverse d'appui (31'), pour être complètement inséré dans le rail d'alimentation (2), pour ainsi établir la position de contact électrique, **en ce que** la portion de blocage (53), à l'aide du bouton-poussoir (40') est conçue pour être ensuite poussée vers le bas, pour être dirigée dans le rail, tandis que ledit endroit (55) est inséré entre les parois (59) qui, au départ, prennent la forme d'un V et sont orientées, avec leurs extrémités inférieures, l'une vers l'autre, les parois étant écartées, des griffes (60) venant s'introduire derrière les extrémités internes ou les bords internes des parois autour de l'ouverture d'insertion 9 du rail d'alimentation, une retenue de l'extrémité arrière du dispositif par rapport au rail d'alimentation étant mise en oeuvre.
10. Dispositifs selon la revendication 1, **caractérisés en ce que** le dispositif de connexion (3'') comprend une portion de base ou inférieure (63) et une portion supérieure (64) dans le but de, avec seulement une forme de portion de base, créer des opportunités pour faire varier des possibilités de retrait, étant donné que différentes portions supérieures possédant des configurations et des fonctions variables sont disponibles, en particulier conçues pour serrer les joints et les angles entre des rails d'alimentation de courant adjacents (2), pour des connecteurs (13'') reliés à des câbles, ainsi que pour des dispositifs d'éclairage et analogues, la portion de base (63) étant conçue pour, en l'absence d'une portion supérieure (64), être fixée et être retirée respectivement d'un rail d'alimentation de courant (2) et de la portion de base, en l'absence d'une portion supérieure appliquée, en étant de préférence isolée ou protégée du point de vue électrique vers l'extérieur.
11. Dispositifs selon la revendication 10, **caractérisés en ce que** le mécanisme de blocage (37'' - 42'' ; 29'' - 31'' ; 32'' ; 34'') est subdivisé en trois éléments différents, plus précisément la portion de base (63), une traverse d'appui (31'') disposée sur la première citée ainsi que sur la portion supérieure (64), le mécanisme de blocage (34'') étant disposé sur la portion supérieure (64).
12. Dispositifs selon la revendication 10 ou 11, **caractérisés en ce que** deux griffes (67) disposées en position latérale s'étendent à partir de la plaque (38''), qui viennent s'appliquer tout autour de l'extrémité arrière de la traverse (14'') pour la saisir et possèdent des saillies (68) opposées l'une à l'autre à leurs extrémités libres, lesdites saillies, lors de l'insertion ou de la position libre du dispositif, étant conçues pour être supportées par des évidements primaires (69) dans le côté de la traverse, **en ce que** les évidements (69) divergent de préférence avec leurs bases en direction de l'extrémité d'insertion du dispositif et mènent à des évidements secondaires (70) conçus pour recevoir les saillies (68) dans la position de verrouillage, déplacée vers l'avant, du mécanisme de blocage (29'').
13. Dispositifs selon l'une quelconque des revendications 10 à 12, **caractérisés en ce que** le bloc (41'') est guidé dans la traverse (14'') et se termine à l'extrémité qui se détourne de la plaque (38'') en formant deux branches divergentes qui constituent des languettes d'arrêt (43'', 44'') qui sont constituées d'une matière plastique mince, par exemple d'une matière ABS, capable d'être soumise à une déformation élastique en direction latérale, une augmentation de la déformation étant obtenue lorsque le bloc est déplacé davantage dans la traverse (14''), les languettes (43'', 44'') étant conçues pour sortir par pression à travers des ouvertures latérales (45'') dans la traverse (14''), pour ainsi devenir des éléments de blocage efficaces lorsqu'elles sont serrées derrière la paroi frontale (8) quand le dispositif a été inséré dans un rail d'alimentation en courant (2).
14. Dispositifs selon l'une quelconque des revendications 10 à 13, **caractérisés en ce que** la traverse d'appui (31'') peut être déplacée le long de la traverse (14''), de préférence grâce au fait, au moyen de ces deux bords longitudinaux, de pouvoir se déplacer et d'être guidée en direction longitudinale dans des rainures (66) dans des élévations (71) sur la traverse (14''), entre une position de blocage et une position de contact dans laquelle les ouvertures (30'') dans la traverse d'appui, qui possèdent, de manière appropriée, une configuration en forme de fentes oblongues correspondant au profil des broches de contact (35''), ne correspondent pas ou correspondent respectivement avec les trous de con-

nexion (36") sur la traverse, à travers laquelle on peut établir un contact électrique avec des boîtiers de contact électrique sous-jacents ou analogues (79), **en ce que** la position de blocage de la traverse d'appui est conçue pour être fixée à l'aide d'un ressort, de préférence un ressort de compression (72) qui est monté dans un évidement (80) dans le côté supérieur de la traverse et qui est saisi, sur toute sa périphérie, à sa première extrémité, par un bras commandé (73) qui fait saillie vers le bas par rapport à la traverse d'appui, et **en ce que**, afin d'établir un contact électrique entre la portion de base (63) et la portion supérieure (64), cette dernière est conçue pour, avec ses broches de contact (35"), être poussée dans les ouvertures (30") dans la traverse d'appui (31") avec un déplacement longitudinal qui en résulte, la traverse d'appui étant soumise à un retrait à l'encontre de l'action exercée par ledit ressort, pour prendre ladite position de contact dans laquelle les broches (35"), les ouvertures (30") et les boîtiers de contact (36") coïncident, la portion supérieure comprenant les broches étant de cette manière apte à être complètement poussée dans la portion de base pour verrouiller la traverse d'appui dans la position de contact.

15. Dispositifs selon la revendication 14, **caractérisés en ce que**, lorsque la portion supérieure (64) est fixée à la portion de base (63), les broches de contact (35") sont conçues pour être protégées en direction latérale à l'aide de portions d'enveloppes externes (74) faisant saillie vers le bas, qui font partie de la portion supérieure, lesdites portions d'enveloppes, lorsque la portion supérieure a été complètement pressée en place, aboutissant à l'extérieur desdites élévations (71), tandis que des bras d'encliquetage (32"), qui de préférence sont positionnés entre des renforcements dans les côtés terminaux (81) des portions d'enveloppes et atteignent des endroits situés en dessous des premiers cités, viennent s'engrener avec des cavités (76) dans les surfaces terminales de la traverse (14") dans le but de verrouiller la portion supérieure de la portion inférieure, et **en ce que** de préférence, à l'opposé des saillies sur le côté externe des bras (32"), sont disposés desdits éléments de blocage qui sont conçus pour pénétrer dans l'ouverture d'insertion (9) dans le rail d'alimentation en courant (2) dans le but de verrouiller et de stabiliser le dispositif de connexion dans le rail d'alimentation en courant, et qui sont conçus pour empêcher le fait qu'un dispositif de connexion qui, par inadvertance a été monté à l'extérieur du rail d'alimentation en courant, ne puisse être inséré dans ce dernier.

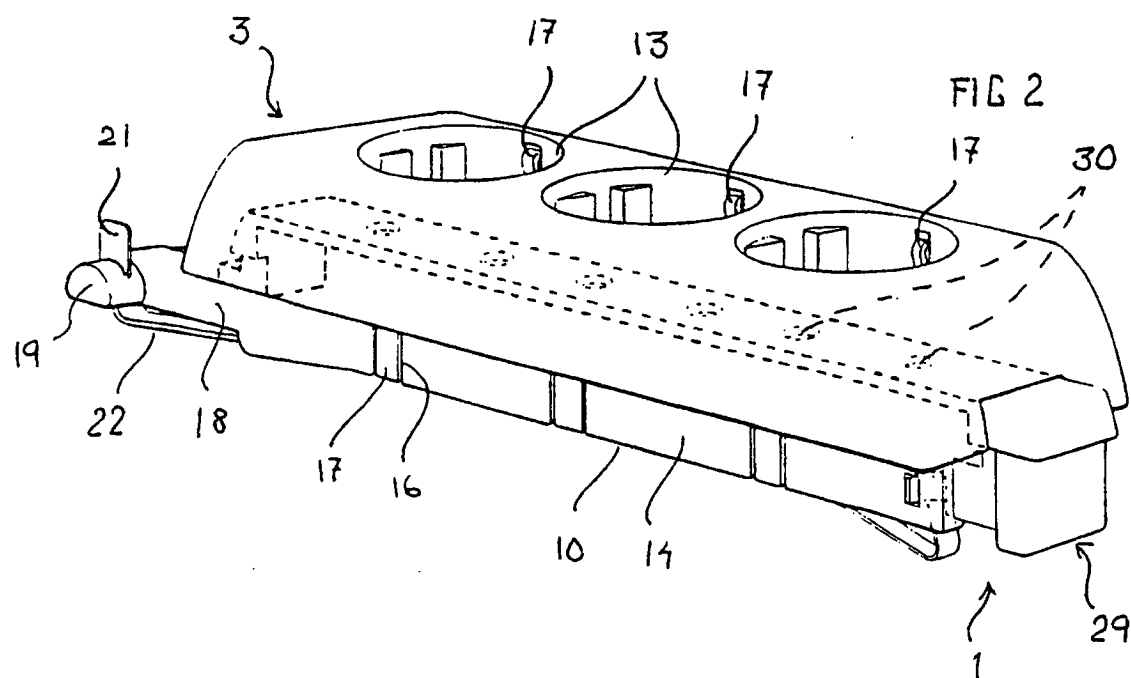
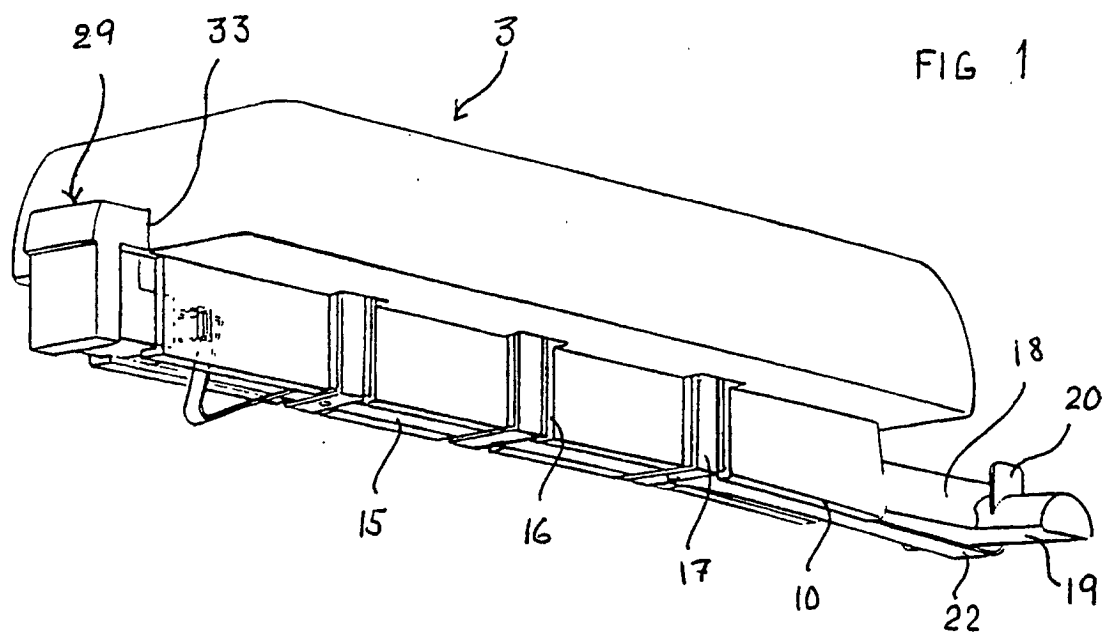


FIG 3

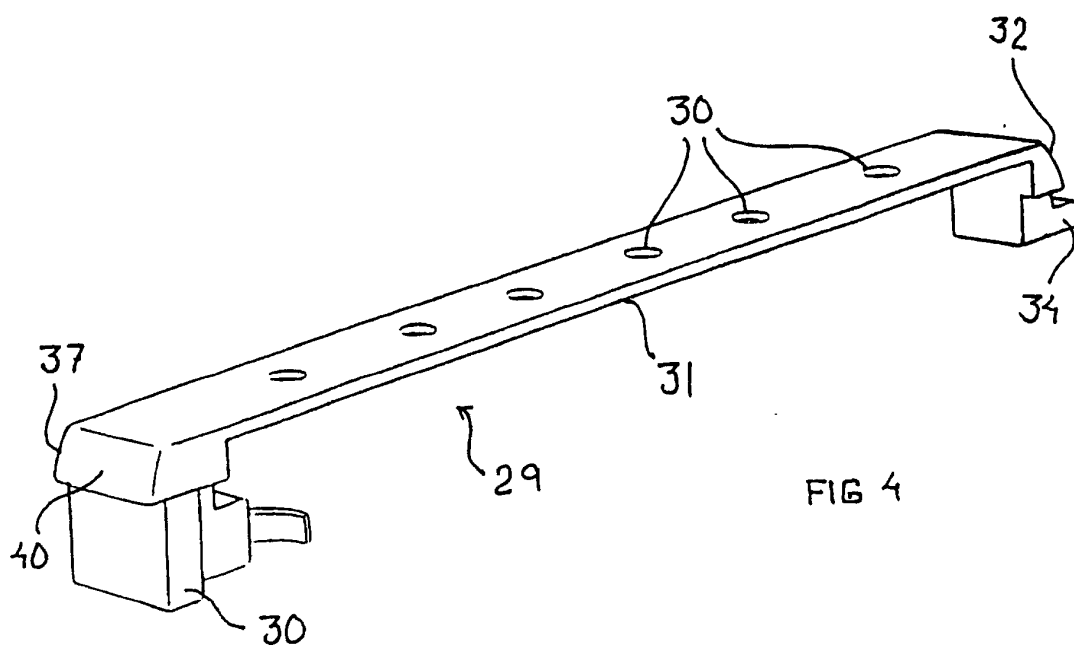
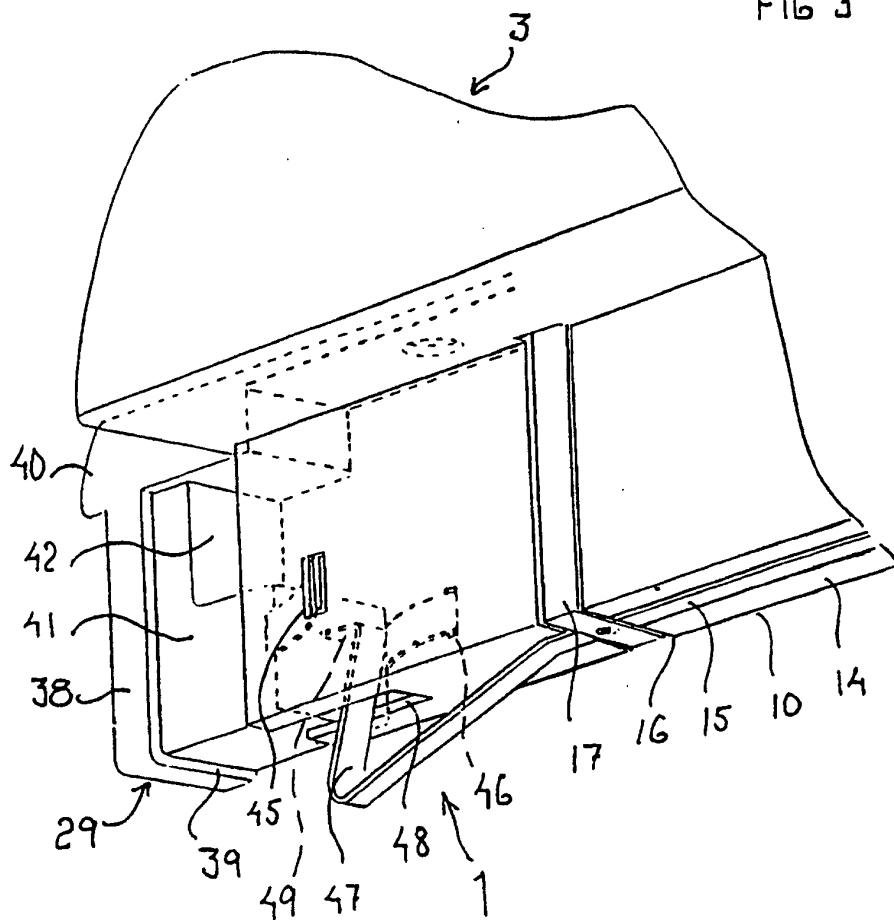
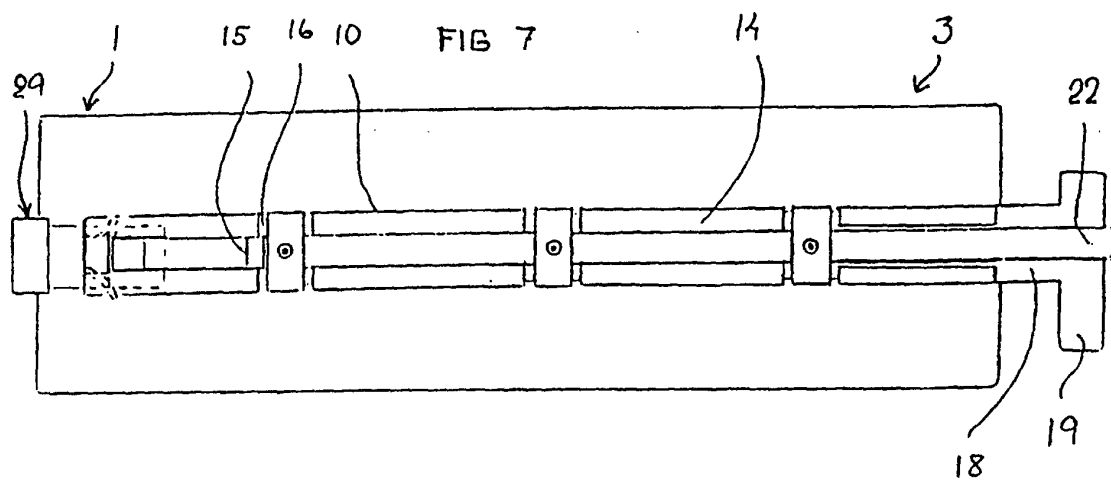
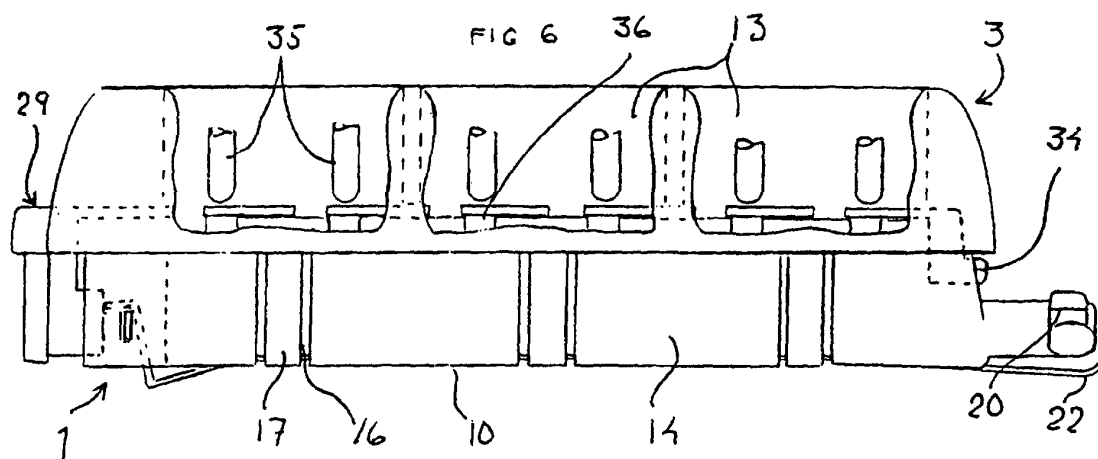
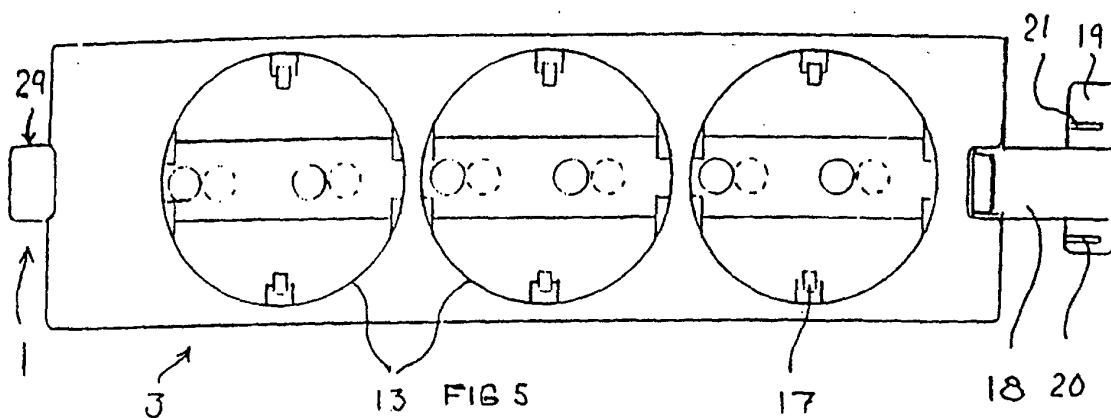
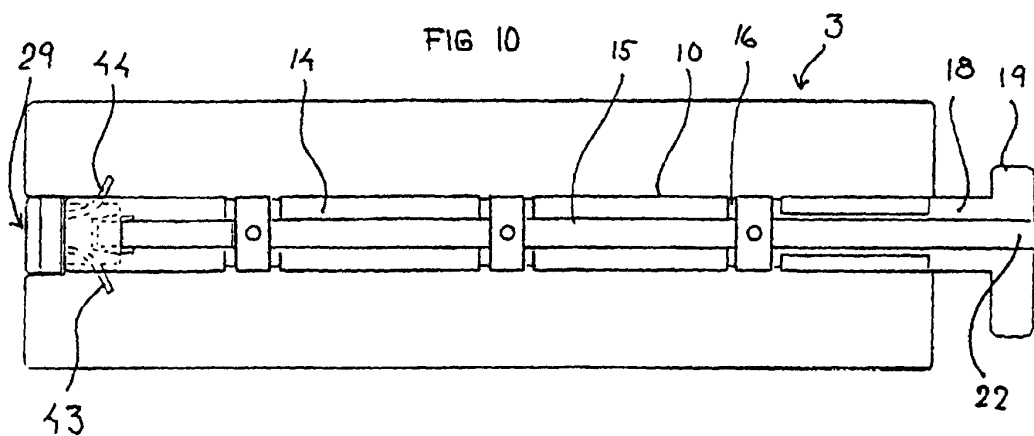
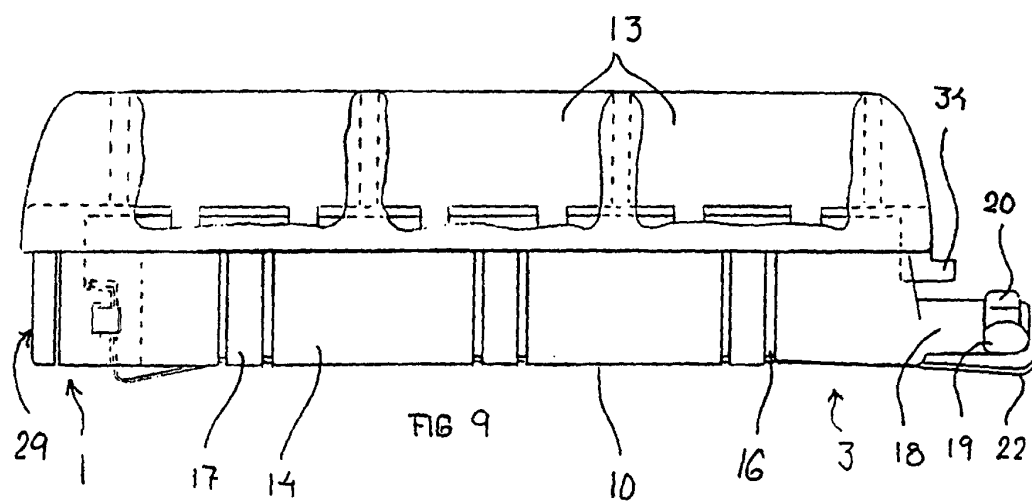
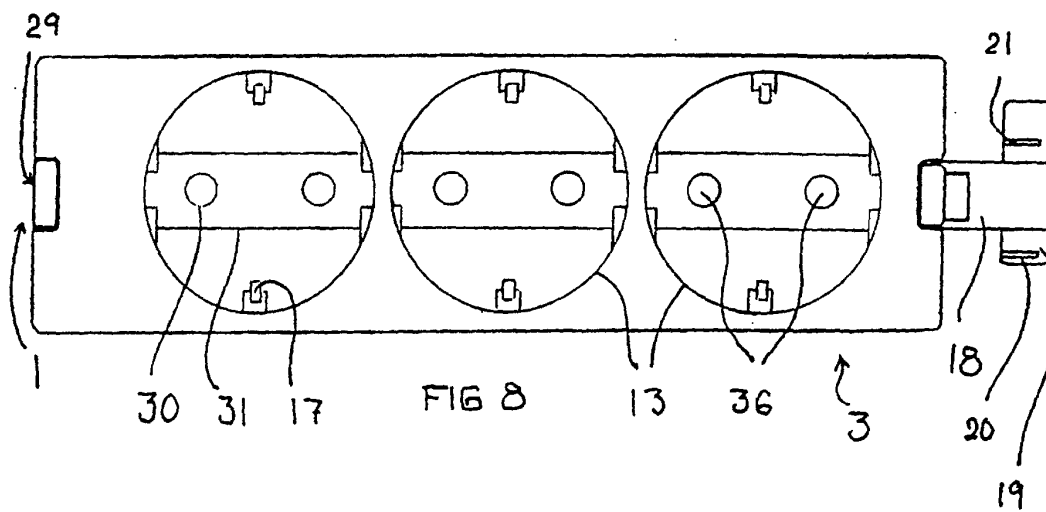
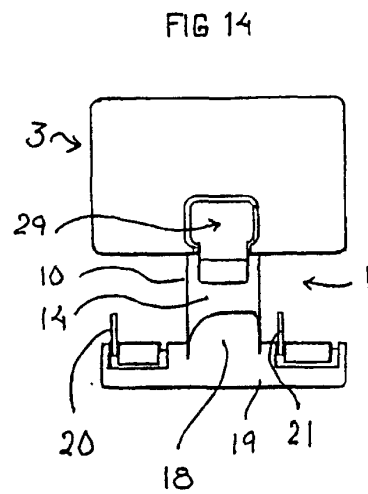
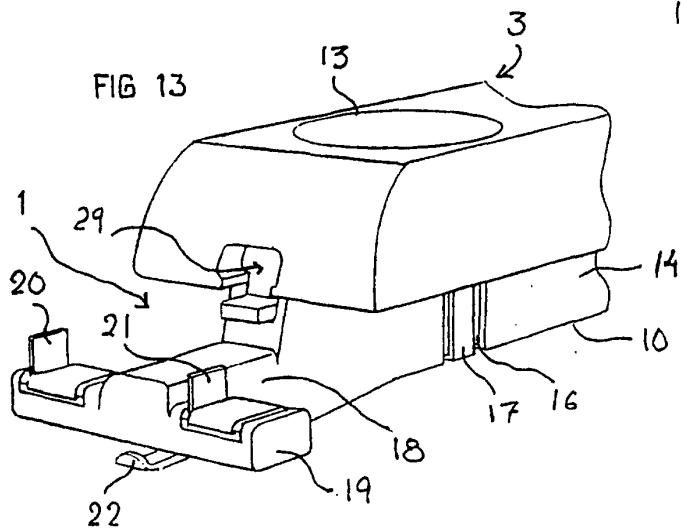
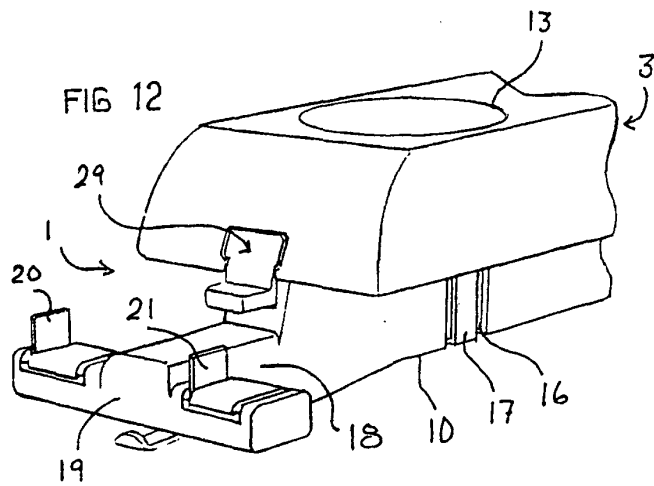
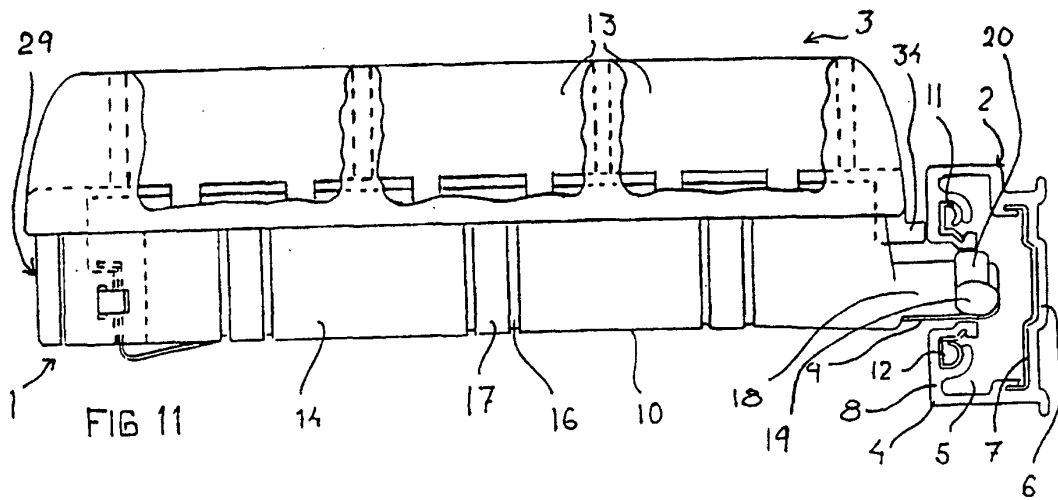
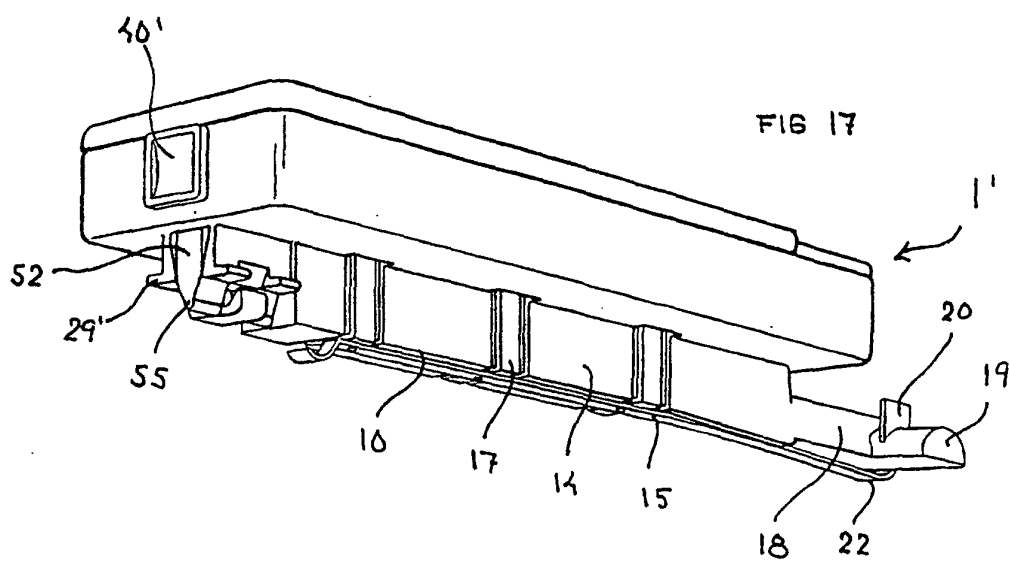
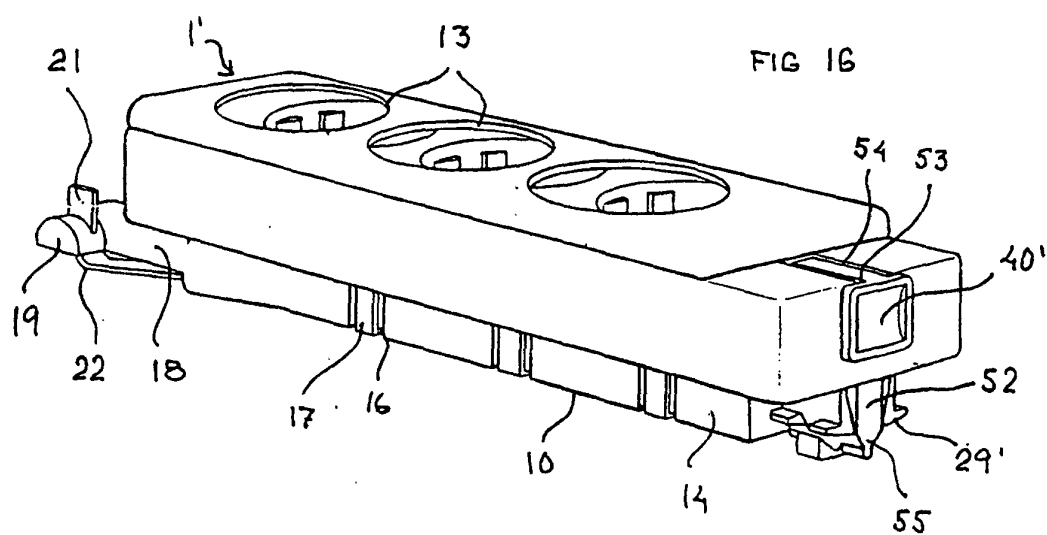
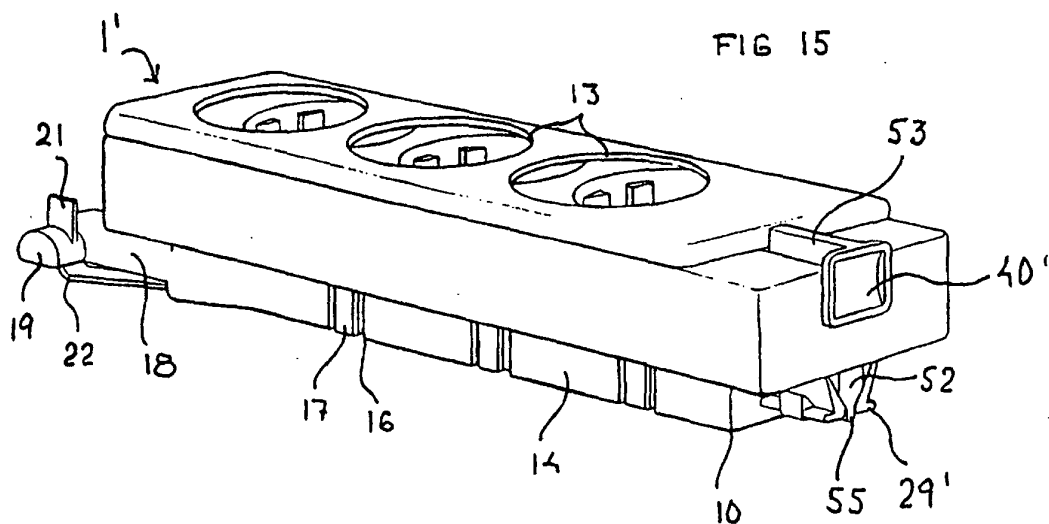


FIG 4









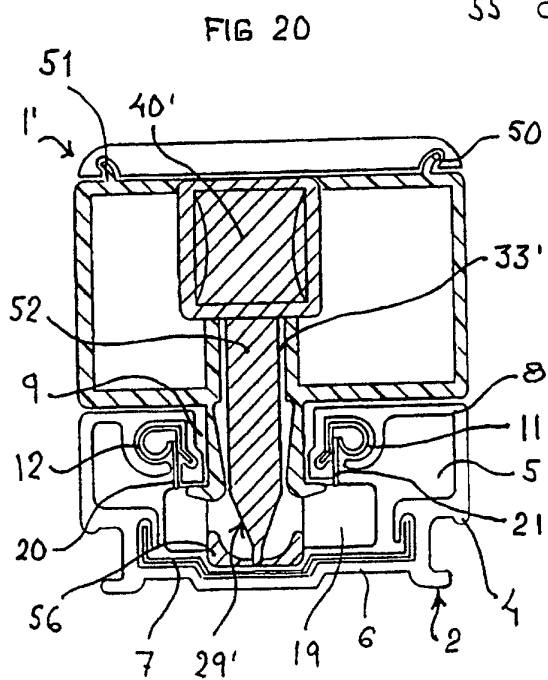
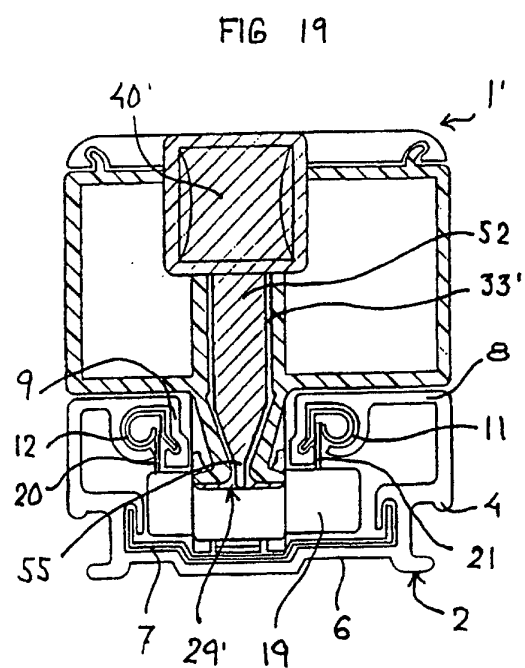
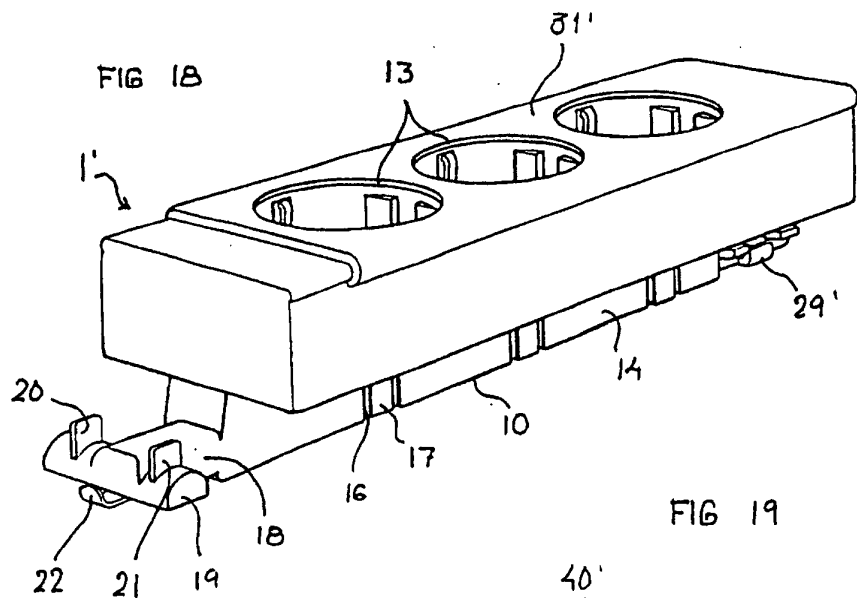


FIG 21

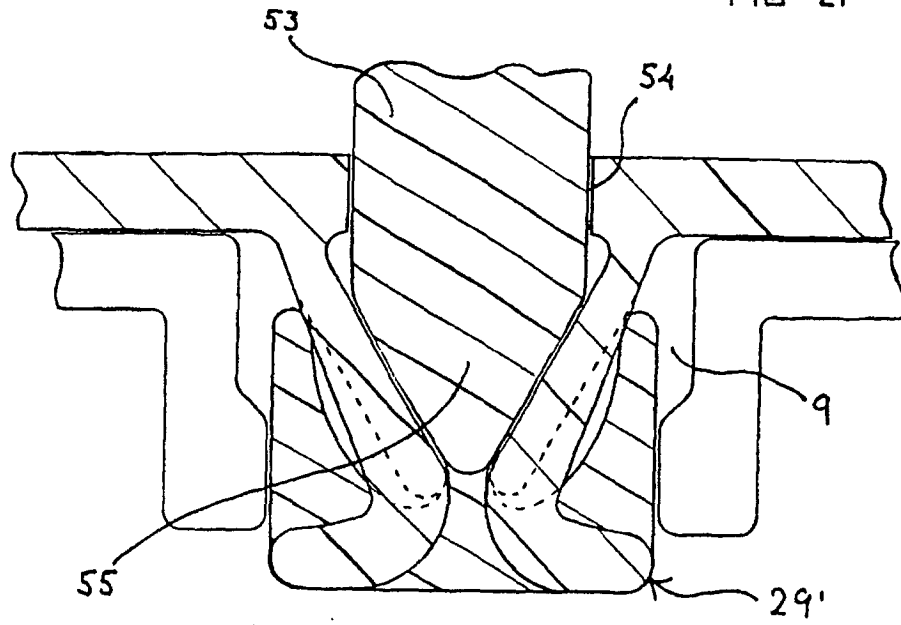


FIG 22

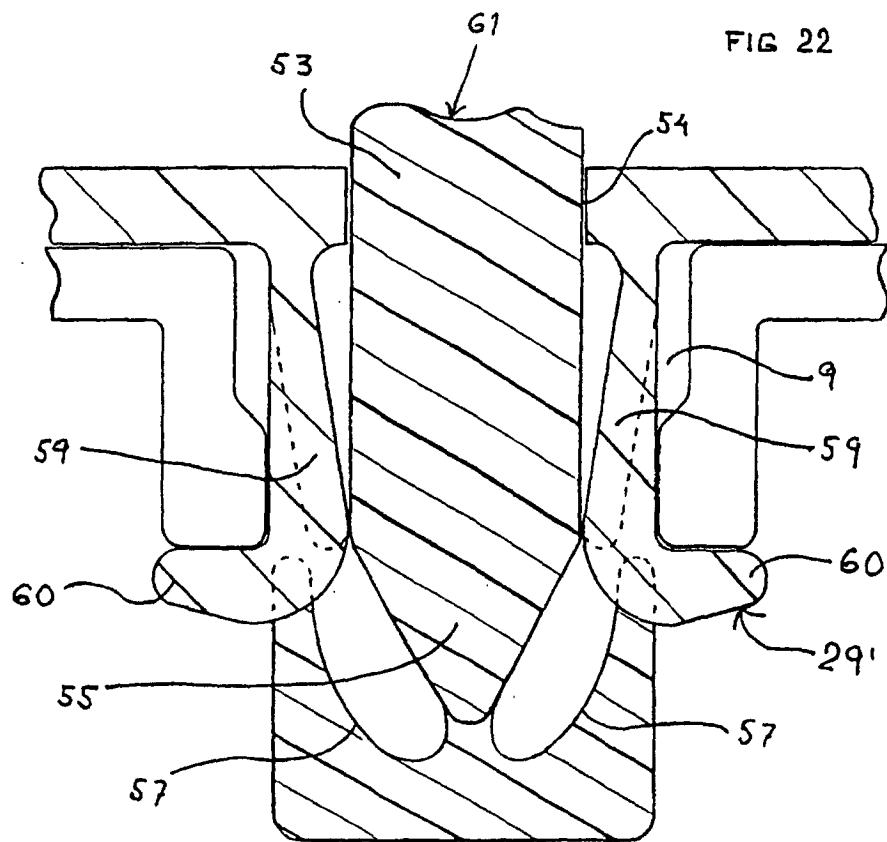


FIG 23

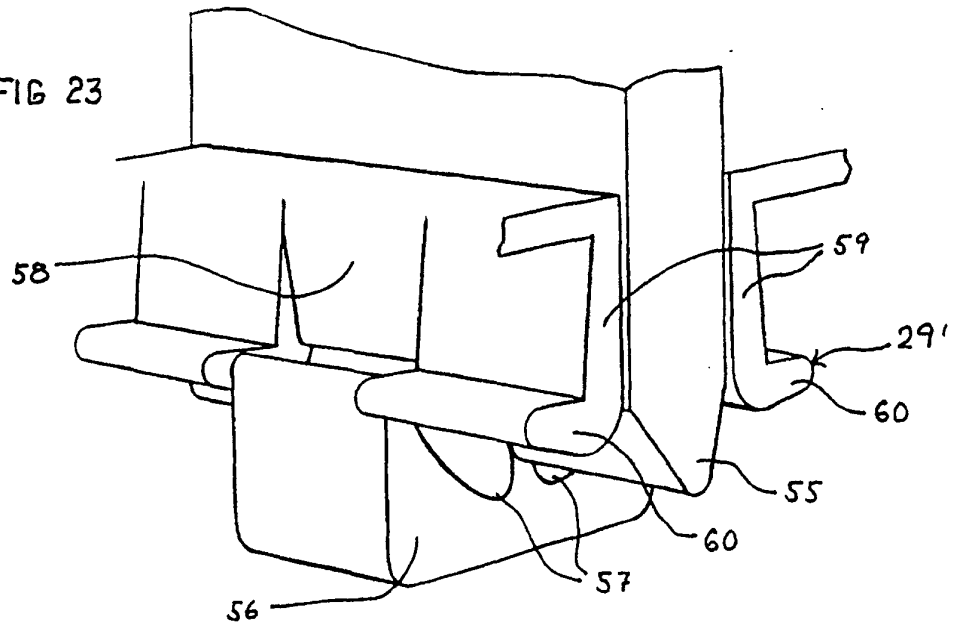


FIG 24

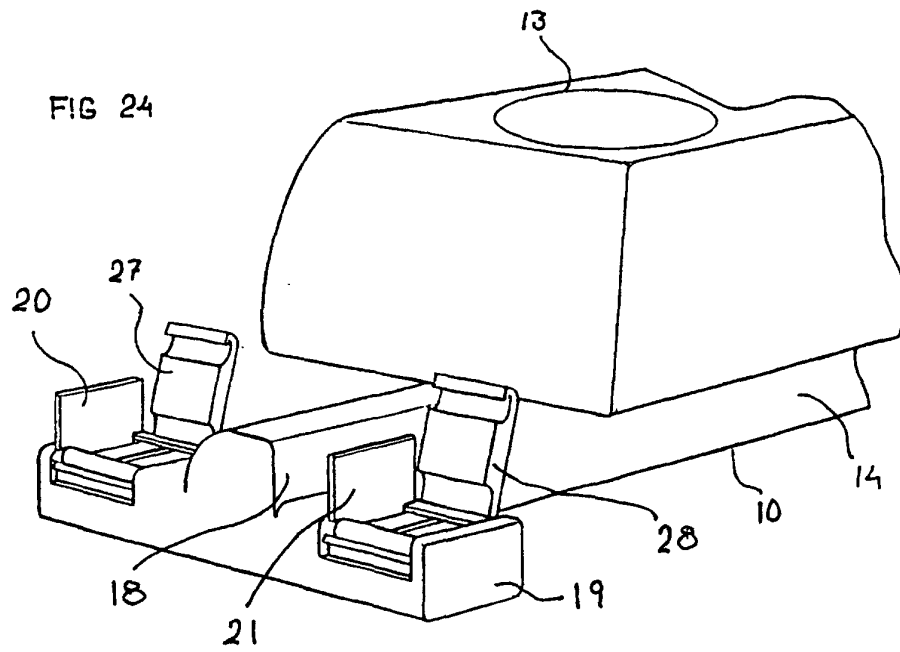


FIG 25

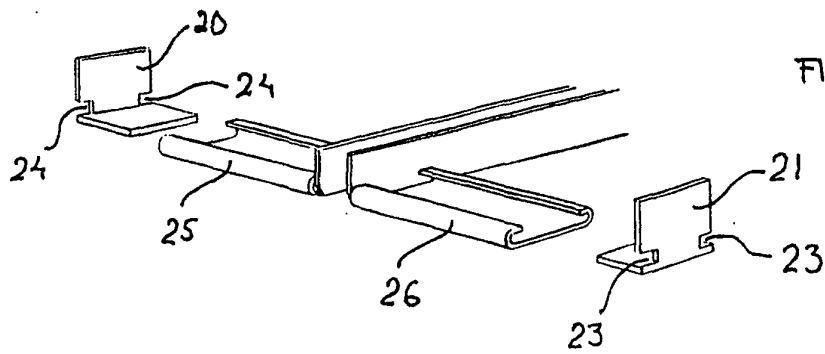
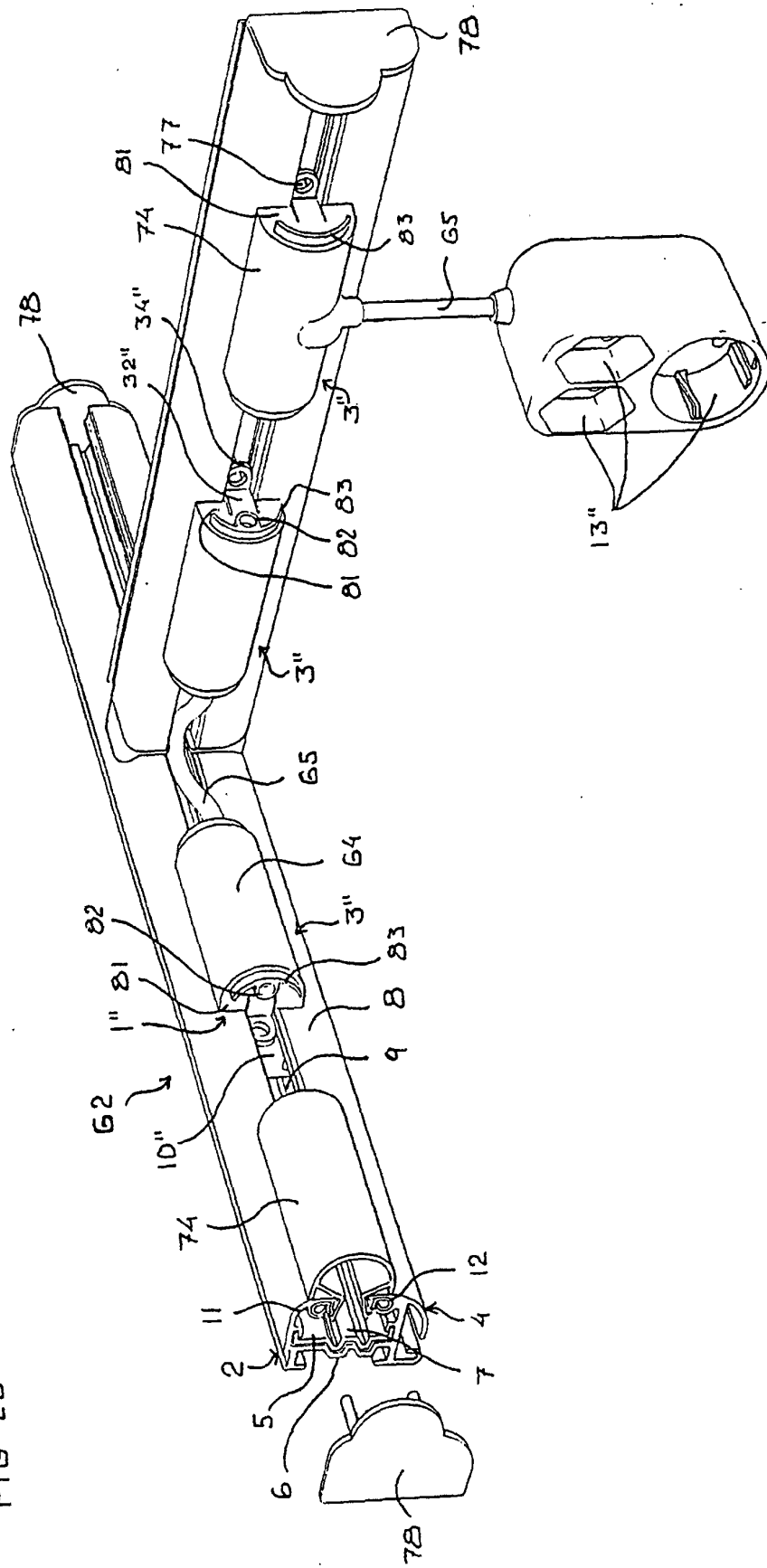


FIG 26



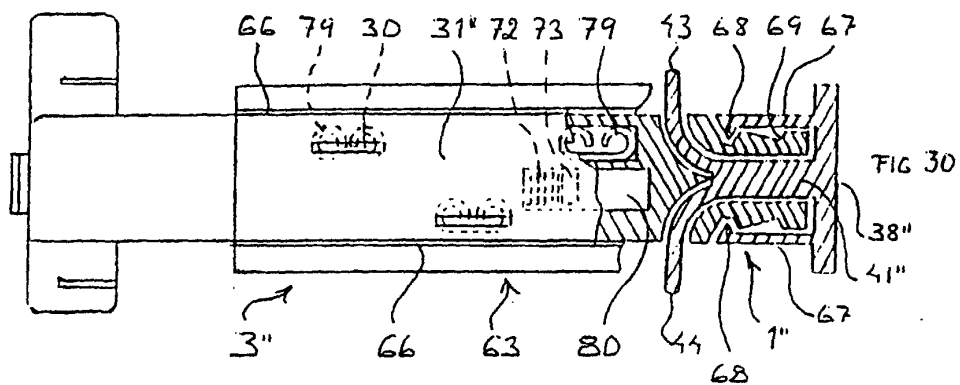
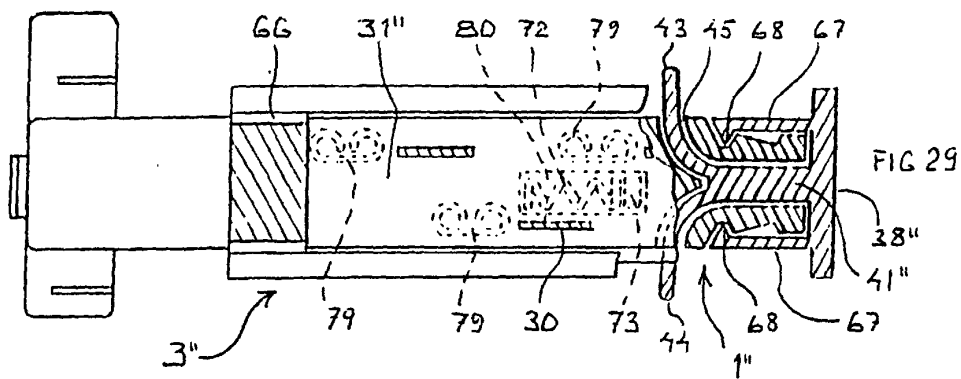
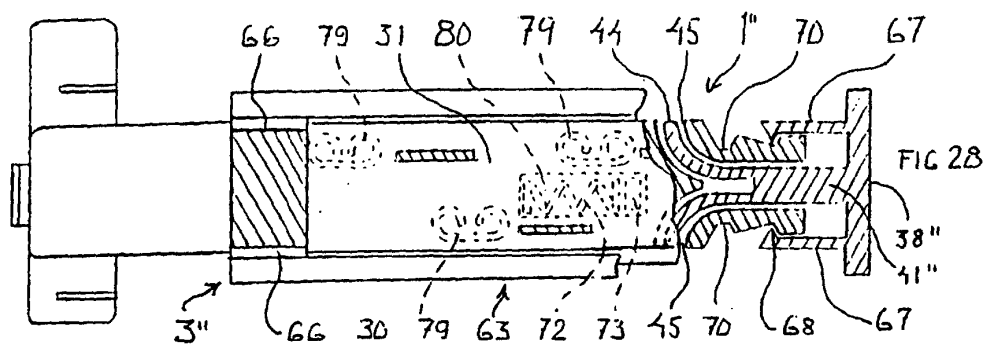
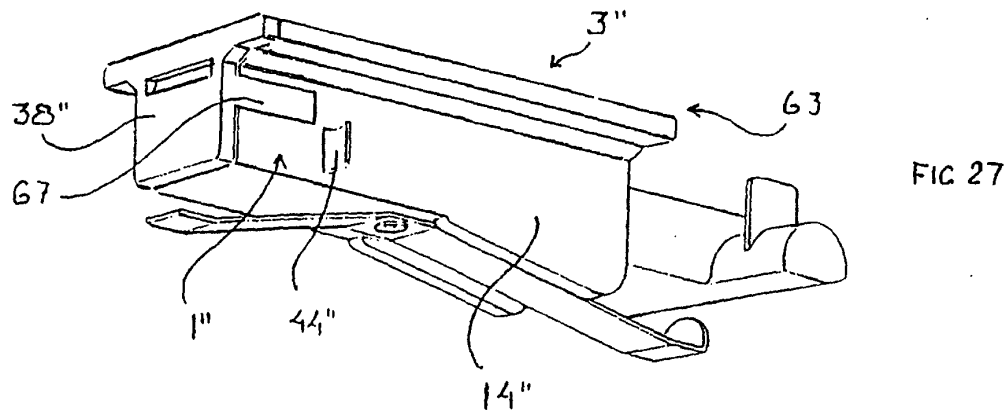


FIG 31

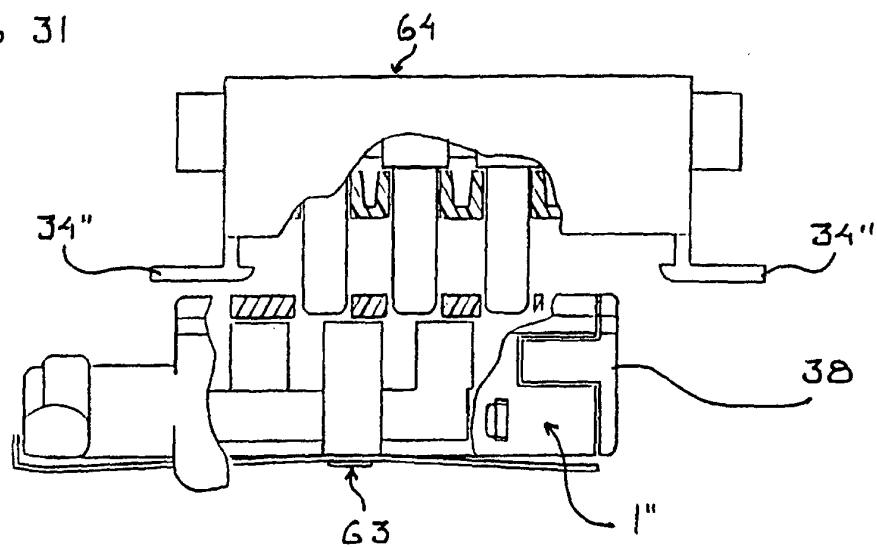


FIG 32

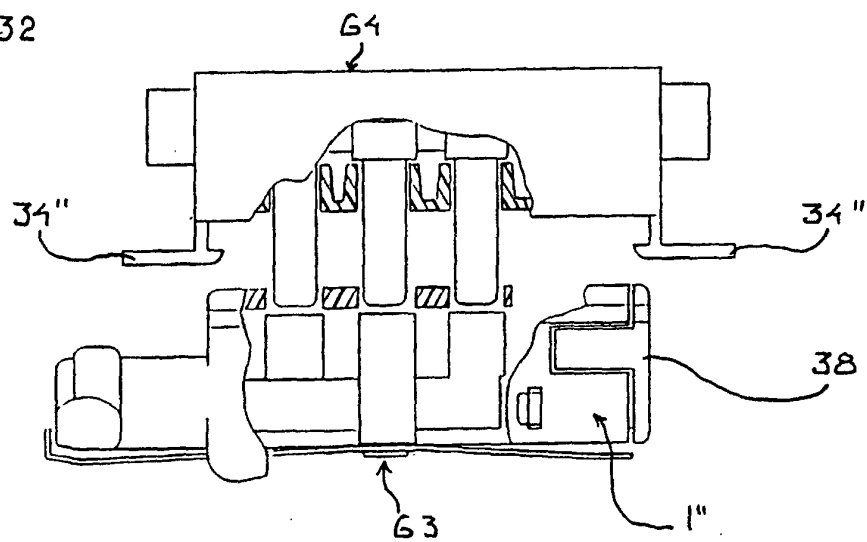


FIG 33

