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(54) **VOLTAGE RAIL**

STROMSCHIENE

RAIL CONDUCTEUR

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(73) Proprietor: **TOR SØRENSEN ELEKTRONIKK AS**
N-7112 Hasselvika (NO)

(72) Inventor: **SØRENSEN, Tore**
N-7112 Hasselvika (NO)

(74) Representative: **Bjerkén, Jarl Hakan et al**
Bjerkéns Patentbyrå KB
P.O.Box 1274
801 37 Gävle (SE)

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Description

The present invention relates to a voltage rail, as stated in the introductory part of claim 1.

A voltage rail is used for conducting electrical current around a house, office, etc. A number of conducting paths are situated entirely or partly hidden in the voltage rail. The paths can be arranged for distribution of both net voltage and signaling, such as telephone, broadcasting, alarm etc. The conducting paths should normally not be accessible for safety reasons. However, it should be possible to connect new equipment and move existing equipment.

DE 2 722 880 discloses a device in which contact with a voltage rail is made using contact pins which are brought into direct contact with the conducting paths of the rail. An adapter has projecting contact elements, and a spring mechanism urges these against the paths when the adapter is mounted to the rail. The paths have an isolated exterior section, in which are located comparatively small orifices for the contact elements. This construction is meant to avoid anyone making accidental contact with the conducting paths. A disadvantage with this construction is that there are very small tolerances for the contact elements. If the contact elements of the adapter are bent, later installation is more difficult.

SE 366 434 discloses a device wherein the contact elements of an adapter are pressed out after being mounted in a voltage rail, where the conducting paths are situated in two opposite sides. Also this rail presents a significant safety risk, as it is relatively simple to gain access to the conducting paths. The paths are furthermore open to corrosion, as there are directly exposed to the air all the time. Corroded paths results in a great effect loss.

SE 366 169 discloses a rail in which the path of a ground potential is situated against the wall with which the rail is mounted and two conducting paths are situated at a distance from, and parallel to the ground path. An adapter for connection to this rail comprises a projecting member having a spring loaded contact element in the middle, for ground contact, and two contact elements at its ends, for respective conducting paths.

The adapter is introduced between the conducting paths and pressed against the ground path, while being rotated 45°. As the conducting paths are situated behind a rim, the member with the contact elements must be pressed in beyond this rim before being released, whereupon the contact elements come in clamping contact with the conducting paths. Such a device has the disadvantage that a comparatively wide part of the voltage rail must be open for introduction of the contact element. The rim makes installation difficult and as the contact elements need to be pressed in and released this can result in a weak contact. It is also too simple to gain access to the conducting paths.

NO 147894, DE 3048828 and SE 380146 all disclose voltage rails having adapters which should be ro-

tated 90° radially against the conducting paths to bring the contact elements into contact with the paths. As with other rails the paths are also easily accessible. To restrict access to the part of the path that is not used for connection of equipment it should be covered by plastic covers which are pressed in place. However, this means that this system is not readily adaptable as new plastic covers need to be cut if some equipment is moved or new equipment is installed.

EP-A-7757 discloses a voltage rail according to the precharacterizing part of claim 1. The means for closing the cavities are formed by one or more doors. In one embodiment several flap doors are individually actuated in closing direction by springs. In another embodiment one single door or cover is provided to close the cavity, this door or cover being deformable into an open position and adapted to automatically return to the closed position after releasing. In both embodiments there will be one or more doors or covers closing the cavity, which internally of said door or cover is entirely open with the exception of spring plates 32 serving to overlies conducting paths in the cavity. Those spring plates may in an alternative embodiment be replaced by a continuous strip of plastics material, which is divided by slits so as to form a series of individually sprung flaps. The voltage rail according to EP-A-7757 suffers from the disadvantage that the construction is relatively complicated and expensive.

It is therefore an object of the present invention to provide a device of the above mentioned kind without the disadvantages of the prior art.

The object of the invention is achieved with a device having features as stated in the characterizing part of claim 1. Further features will be clear from the dependent claims.

In the following, the invention will be described using examples of embodiments, and with reference to the accompanying drawings, in which:

Fig. 1 shows a perspective view of an embodiment of a voltage rail having an adapter according to present invention,

Fig. 2a-2b show different steps in the installation of an adapter for tapping current from the voltage rail,

Fig. 3a-3g show sections of different embodiments of a rail according to the present invention,

Fig. 4a-4f show sections of different embodiments of a packing body for the channels of the rail according to present invention,

Fig. 5 shows a plug for use in connection with the present invention, and

Fig. 6 shows the plug from Fig. 5 during installation.

Referring first to Fig. 1 a voltage rail 1 is shown, which can be installed with a wall, in the roof, etc. The voltage rail 1 has conducting paths 2a, 2b, 2c and 2d, which are situated parallel to the surface on which the voltage rail 1 is installed said paths having open surfaces in against the voltage rail. Cavities or channels are formed between the conducting paths 2a - 2d and the back wall of the voltage rail. Further there is a path 3 which has ground potential situated next to the voltage rail. Signaling paths 11 are, in this example, situated in the voltage rail between the conducting paths 2a - 2d and the ground path 3. Preferably the circuits of the conducting paths are mixed, so that paths 2a and 2c form one circuit, and 2b and 2d form another circuit. In the cavity formed between the conducting paths and the back wall of the voltage rail is located a packing body, or "hose" 4 made from a flexible and insulating material, such as rubber, for filling the cavity. This gives the advantage that it is more difficult to accidentally gain access to the conducting paths, and it is also protects against corrosion.

To enable a user to gain access to the conducting paths 2a - 2d, 3a, special adapter is used. Fig. 1 shows an adapter for an outlet; objects can of course also be connected directly to the rail. For example, it is easy to consider an electric heater or other stationary equipment, which can be connected directly to the rail without an interconnecting cable.

The adapter comprises a mounting plate 5, which is equipped with lips 12, 13 adapted to make total contact against the voltage rail 1. Furthermore, most adapters of this kind will have a contact 8 for the ground potential path 3 such as a lip 10 to contact against path 3 and a cable 9 or similar providing contact with the ground outlet of the equipment in question, in this case the electric outlet. The mounting plate 5 is also equipped with grooves 7 for the net voltage contacts 17 and an upward extending post 6 which functions as a guide for a rotating plate 20 and a electric outlet cover 15.

An "operative" part 14 of the electric outlet comprises contact elements 16, which have a lower end 17 adapted for making contact against one of the paths 2a - 2d, and an upper end 18 constructed as an "U", having a tapered section to form a strong contact against the protruding plug contacts. The upper end 18 is contained in an isolated cover 19 which is cast fixed to the isolating rotating plate 20 of the electric outlet. Ground potential is taken to ground clamps 21 through a cable 9 which is connected to the ground contact 8.

The cover 15 for the electric outlet contains a cavity 25 having two orifices for the protruding plug contacts. The cover 15 is fixed by a screw 24 in the center of the post 6 of the mounting plate 5.

Figs. 2a - 2b, show different steps during installation of the plug.

First, the contacts 16 are situated with their downward extending parts 17 into two conducting paths 2a, 2c. The flexible packing body 4 will bend away. The plug

is rotated anti clockwise, to the position shown in Fig. 2b. Here the contact element, or lips 17 are in place and form contact against the conducting paths 2a, 2c. Contacts 17 are thus brought into contact with the conducting paths 2a, 2c, in an axial direction.

By further referring to Figs. 3a-g, different variations of voltage rails 1 according to present invention are disclosed. The conducting paths 2a - 2d and the ground path 3 can be situated in different ways in the rail 1. Also, the ground path 3 can be situated in its own channel. Signaling paths 11 are best located on one side of the rail, but they can also be situated differently.

Fig. 3a shows a voltage rail 1 having one cavity for all of the conducting paths 2a - 2d. The ground path 3 is separate.

Figs. 3b - 3e show voltage rails with two cavities for conducting paths 2a - 2d. In Fig. 3e and 3d the ground path 3 is situated in the bottom of the voltage rail 1. In Fig. 3d and 3e, the conducting paths 2a - 2d are situated in the side walls of the channels. Fig. 3f and 3g show variations where the conducting paths are situated in three channels, and where Fig. 3g comprises three circuits.

In Fig. 4a - 4f different variations of packing bodies 4 are shown. The packing body should have a profile corresponding to the form of the cavity with the conducting paths 2a - 2d. In Fig. 4a - 4f there are shown variations of packing bodies which fit to voltage rail 1 of Fig. 1, but it should be understood that different profiles can be used for different variations of the voltage rail.

The packing bodies 4 have the task of making the cavities with the conducting path 2a - 2d tight while at the same time permitting access of the contact elements 16 to the conducting paths 2a - 2d. A person skilled in the art will realise which material can be used to achieve these objects. Herein are shown some variations of technical and aesthetic solutions.

Fig. 4a and 4b show packing bodies 4 of a relatively rigid flexible plastics material, and where the packing body 4 in Fig. 4a is open in against the rail 1, while in Fig. 4b it is a closed tube. Furthermore, the body 4 in Fig. 4a has an extension 26 on one of the side walls, to assist in the holding of the packing body in the cavity of the rail 1 shown in Fig. 1.

Fig. 4c shows a packing body 4 having a section 27 which extends diagonally to a base section 28. This arrangement will be resilient.

Fig. 4d shows a compact packing body 4 of rubber or syntetic materials having the necessary properties.

Fig. 4e and 4f shows the packing body 4 with resilient elements, where Fig. 4e has a separate helical spring 29, and Fig. 4f has a zig-zag spring, which can be cast in one piece with the packing body 4.

Although the example shows connections of an electrical outlet, different equipment can of course also be connected. It is possible to connect a plug directly, as shown in Fig. 5. The plug 31 is constructed so that the "operative" part 14 of the adapter is connected to

the cable 32 and situated in an isolating house 15. The mounting plate 5 is rotatably connected to the house 15 by the screw 24 being screwed in the guiding post 6. On the operative part 14 are situated two sleeves 33. In the house 15 are situated two columns (not shown), which fit in the sleeves 33. The columns may thereby assist the transfer of an applied torque from the house 15 to the operative part 14 with contact elements 16. The conductors are fixed directly to the contact elements 16, which tongues 17 fits in track 7 of the mounting plate 5. The mounting plate 5 is furthermore equipped with ribs 34 on the lower side.

Installation of the plug 31 is shown in Fig. 6. The contacts 17 are pressed in place against two conducting paths 2a, 2c, so that the packing bodies 4 give in. The mounting plate 5 is held against the rail 1 using ribs 34 which fit in the tracks in the grooves of the rail. The house 15 with the operative part 14 is rotated as shown with the arrow, and contact is achieved. The advantage of this embodiment is that the plug can be connected anywhere along the rail and it is not necessary to use stationary electrical outlets.

Claims

1. Voltage rail (1) comprising an insulated back wall, and a front wall spaced a distance from said back wall, and a number of conducting paths (2a, 2b, 2c, 2d, 3) which at least in part are situated in parallel longitudinally extending cavities between the back and the front wall, wherein an adapter (14) is engageable with the voltage rail, said adapter comprising contact elements (16) connected to a mount which is rotatable relative to the rail (1), the contact elements (16) being locatable in the cavities for the paths (2a-d) of the rail in a first position where they are not in contact with the paths (2a-d), but upon the mount being rotated to a second position, the contact elements (16) come into contact with the paths (2a-d), said voltage rail comprising means for closing the cavities, said means being able to move away when the contact elements (16) are introduced into the cavities and caused to move into contact with the paths (2a-d, 3), **characterized** by said closing means being formed by a packing body (4) being located in the cavity, said packing body being made from an insulating material and having an outer shape corresponding to the profile of the cavity.
2. Device according to claim 1, **characterized** by the conducting paths (2a-d) being fixed to the front wall with their accessible side facing towards the back wall.
3. Device according to claim 1, **characterized** by the conducting paths (2a-d) being fixed to the side walls

and having their accessible side facing towards the opposite side wall.

4. Device according to any of claims 1-3, **characterized** by the mount with the contact elements (16) being adapted to be rotated into contact with the conducting path in an axial direction.
5. Device according to any of claims 1-4, **characterized** by the packing body (4) being formed from a flexible material.
6. Device according to any of claims 1-5, **characterized** by the packing body (4) being at least in part hollow.
7. Device according to any of claims 1-6, **characterized** by the packing body (4) being equipped with a resilient element (28, 29, 30).
8. Device according to any of claims 1-7, **characterized** by the contact element (16) comprising a lip (17) having an U-shape with one leg adapted to make contact with one of the conducting paths (2a-2d, 3).
9. Device according to any of claims 1-8, **characterized** by there being no rim between the conducting paths (2a-2d, 3) hindering rotation of the contact elements (16).
10. Device according to any of claims 1-9, **characterized** by a path (3) of the rail having a ground potential, and a cover (5) being removably mounted to the rail (1), which cover is equipped with contact elements (8) for the ground path (3).
11. Device according to any of claims 1-10, **characterized** by the adapter (14) being connected to a cable (32) and equipped with an isolating housing (15) for forming a plug (31).
12. Device according to any of the preceding claims, **characterized** by the packing body (4) filling the cavity.

Patentansprüche

1. Spannungsschiene (1), enthaltend eine isolierte Rückwand, eine mit einem Abstand zu der Rückwand angeordnete Vorderwand und eine Anzahl von Leitungswegen (2a, 2b, 2c, 2d, 3), die mindestens zum Teil in parallelen, in Längsrichtung verlaufenden Hohlräumen zwischen der Rückwand und der Vorderwand liegen, bei welcher ein Adapter (14) mit der Spannungsschiene in Eingriff bringbar ist, welcher Adapter Kontaktelemente (16) enthält,

die mit einer Fassung verbunden sind, die relativ zu der Schiene (1) drehbar ist, wobei die Kontaktelemente (16) in den Hohlräumen für die Wege (2a-d) der Schiene in einer ersten Position, in der sie nicht in Kontakt mit den Wegen (2a-d) sind, platzierbar sind, aber durch Verdrehen der Fassung in eine zweite Position die Kontaktelemente (16) mit den Wegen (2a-d) in Kontakt kommen, welche Spannungsschiene eine Einrichtung zum Verschließen der Hohlräume enthält, welche Einrichtung in der Lage ist, sich wegzubewegen, wenn die Kontaktelemente (16) in die Hohlräume eingeführt werden und veranlaßt werden, sich in Kontakt mit den Wegen (2a-d, 3) zu bewegen, dadurch gekennzeichnet, daß die Verschlußeinrichtung durch einen Packungskörper (4) gebildet ist, der in dem Hohlraum angeordnet ist, welcher Packungskörper aus einem isolierenden Material hergestellt ist und eine äußere Form hat, die dem Profil des Hohlraumes entspricht.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Leitungswege (2a-d) an der vorderwand so befestigt sind, daß ihre zugängliche Seite zur Rückwand weist.
3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Leitungswege (2a-d) an den Seitenwänden befestigt sind und ihre zugängliche Seite zu der entgegengesetzten Seitenwand weist.
4. Vorrichtung nach einem der Ansprüche 1 - 3, dadurch gekennzeichnet, daß die Fassung mit den Kontaktelementen (16) so ausgelegt ist, daß sie in einer axialen Richtung mit dem Leitungsweg in Kontakt gedreht wird.
5. Vorrichtung nach einem der Ansprüche 1 - 4, dadurch gekennzeichnet, daß der Packungskörper (4) aus einem flexiblen Material gebildet ist.
6. Vorrichtung nach einem der Ansprüche 1 - 5, dadurch gekennzeichnet, daß der Packungskörper (4) mindestens zum Teil hohl ist.
7. Vorrichtung nach einem der Ansprüche 1 - 6, dadurch gekennzeichnet, daß der Packungskörper (4) mit einem elastischen Element (28, 29, 30) ausgerüstet ist.
8. Vorrichtung nach einem der Ansprüche 1 - 7, dadurch gekennzeichnet, daß das Kontaktelement (16) eine U-förmige Lippe (17) enthält, bei der ein Schenkel so ausgelegt ist, daß er den Kontakt mit einem der Leitungswege (2a-2d, 3) herstellt.
9. Vorrichtung nach einem der Ansprüche 1 - 8, dadurch gekennzeichnet, daß kein Randwulst zwi-

schen den Leitungswegen (2a-2d, 3) vorhanden ist, der die Drehung der Kontaktelemente (16) behindert.

10. Vorrichtung nach einem der Ansprüche 1 - 9, dadurch gekennzeichnet, daß ein Weg (3) der Schiene Erdpotential hat und eine Abdeckung (5) abnehmbar an der Schiene (1) angebracht ist, welche Abdeckung mit Kontaktelementen (8) für den Leitungsweg (3) versehen ist.
11. Vorrichtung nach einem der Ansprüche 1 - 10, dadurch gekennzeichnet, daß der Adapter (14) mit einem Kabel (32) verbunden ist und mit einem isolierten Gehäuse (15) versehen ist, um einen Stecker (31) zu bilden.
12. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Packungskörper (4) den Hohlraum füllt.

Revendications

1. Rail conducteur (1) comprenant une paroi arrière isolée, et une paroi avant espacée d'une distance de ladite paroi arrière, et un nombre de voies conductrices (2a,2b,2c,2d,3) qui au moins en partie sont situées dans des cavités s'étendant longitudinalement en parallèle entre les parois arrière et avant, dans lesquelles un adaptateur (14) peut être engagé avec le rail conducteur, ledit adaptateur comprenant des éléments de contact (16) reliés à un support qui peut tourner par rapport au rail (1), les éléments de contact (16) pouvant être positionnés dans les cavités pour les voies (2a-d) du rail dans une première position, où ils ne sont pas en contact avec les voies (2a-d), mais quand le support est tourné vers une seconde position, les éléments de contact (16) viennent en contact avec les voies (2a-d), ledit rail conducteur comprenant des moyens pour fermer les cavités, lesdits moyens étant capables de s'éloigner quand les éléments de contact (16) sont introduits dans les cavités et entraînés à se déplacer en contact avec les voies (2a-d,3), caractérisé en ce que lesdits moyens de fermeture sont formés par un corps de garniture (4) qui est situé dans la cavité, ledit corps de garniture étant réalisé à partir d'une matière isolante et ayant une forme externe correspondant au profil de la cavité.
2. Dispositif selon la revendication 1, caractérisé en ce que les voies conductrices (2a-d) sont fixées à la paroi avant avec leur côté accessible faisant face à la paroi de fond.
3. Dispositif selon la revendication 1,

caractérisé en ce que les voies conductrices (2a-d) sont fixées aux parois latérales et présentent leur côté accessible faisant face à la paroi latérale opposée.

5

4. Dispositif selon l'une quelconque des revendications 1-3,
caractérisé en ce que le support ayant les éléments de contact (16) est adapté pour être tourné en contact avec la voie conductrice dans une direction axiale. 10
5. Dispositif selon l'une quelconque des revendications 1-4,
caractérisé en ce que le corps de garniture (4) est réalisé à partir d'une matière souple. 15
6. Dispositif selon l'une quelconque des revendications 1-5,
caractérisé en ce que le corps de garniture (4) est au moins en partie creux. 20
7. Dispositif selon l'une quelconque des revendications 1-6,
caractérisé en ce que le corps de garniture (4) est équipé d'un élément élastique (28,29,30). 25
8. Dispositif selon l'une quelconque des revendications 1-7,
caractérisé en ce que l'élément de contact (16) comprend un rebord (17) ayant une forme de U avec une aile adaptée pour faire contact avec l'une des voies conductrices (2a-2d,3). 30
9. Dispositif selon l'une quelconque des revendications 1-8,
caractérisé en ce qu'il n'y a pas de bord entre les voies conductrices (2a-2d,3) empêchant la rotation des éléments de contact (16). 35
- 40
10. Dispositif selon l'une quelconque des revendications 1-9,
caractérisé par une voie (3) du rail ayant un potentiel de terre, et un couvercle (5) est monté de façon amovible sur le rail (1), lequel couvercle est équipé d'éléments de contact (8) pour la voie de terre (3). 45
11. Dispositif selon l'une quelconque des revendications 1-10,
caractérisé en ce que l'adaptateur (14) est relié à un câble (32) et est équipé d'un boîtier isolant (15) pour former une prise (31). 50
12. Dispositif selon l'une quelconque des revendications précédentes,
caractérisé en ce que le corps de garniture (4) remplit la cavité. 55

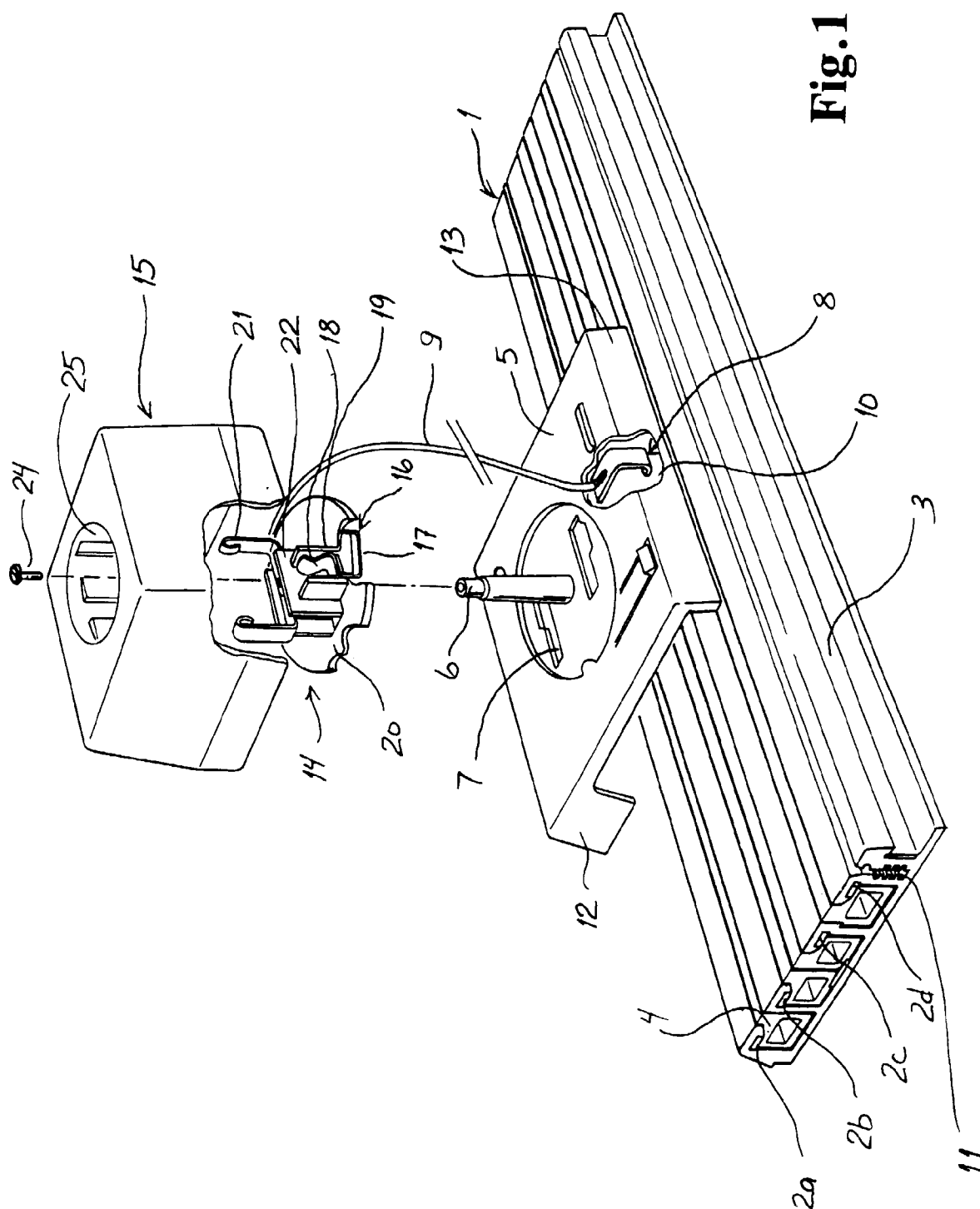
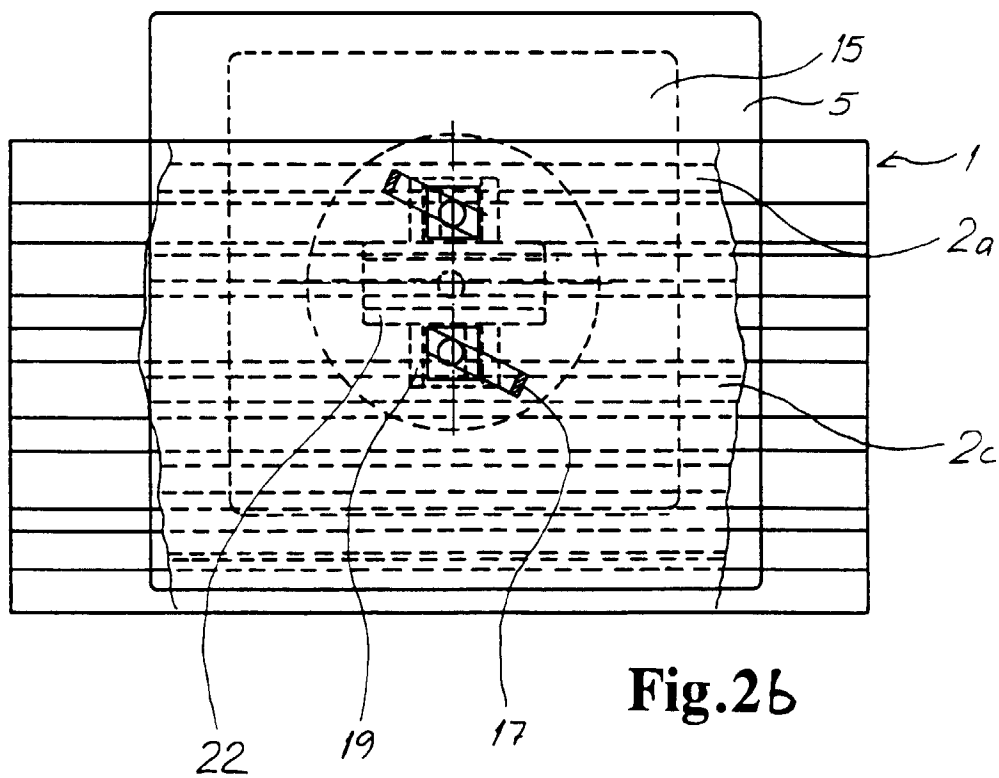
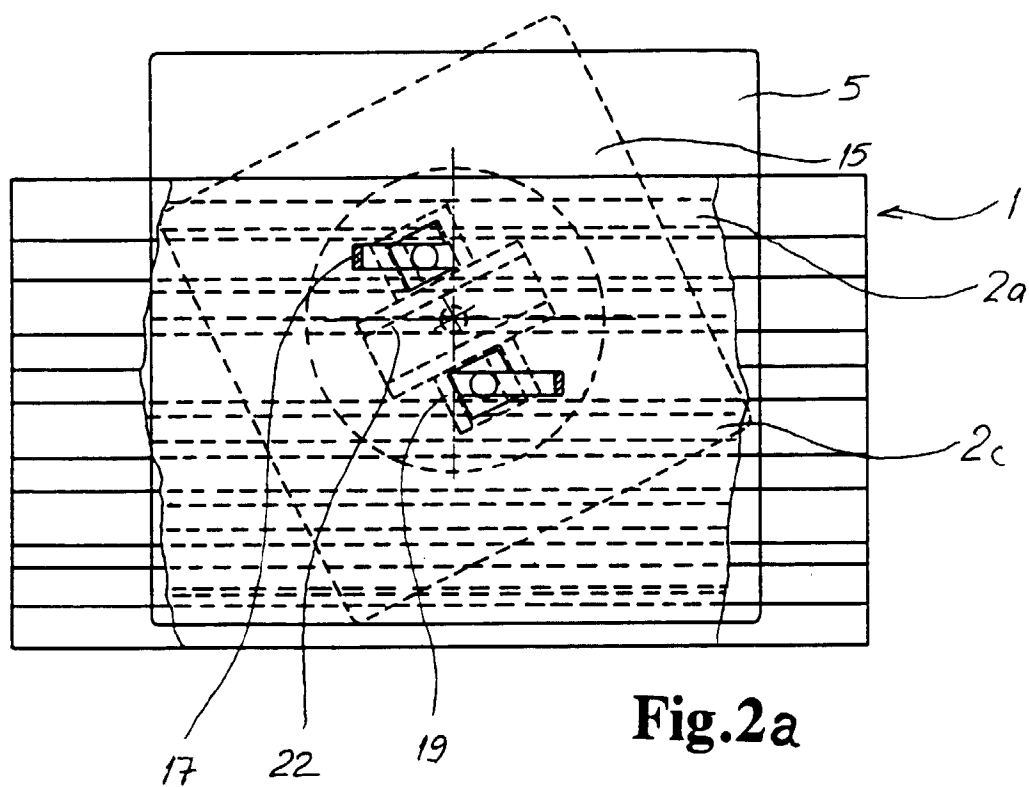
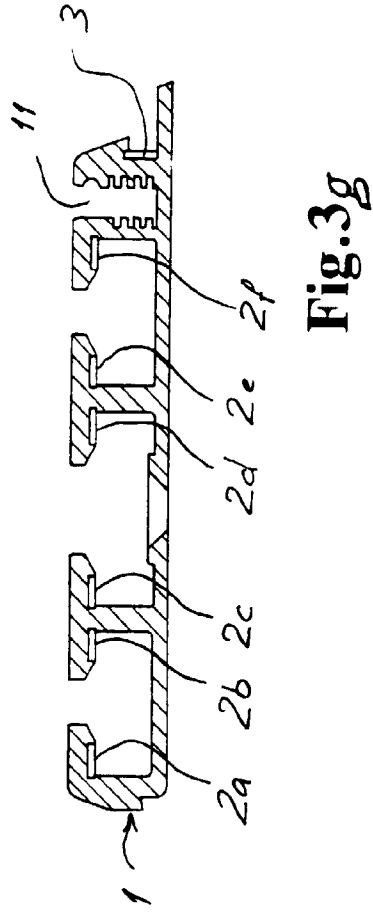
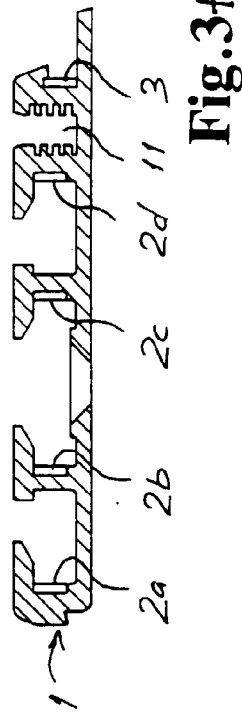
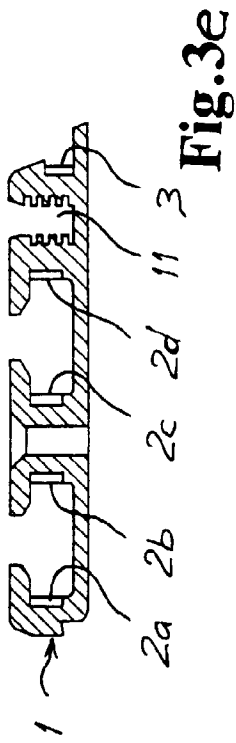
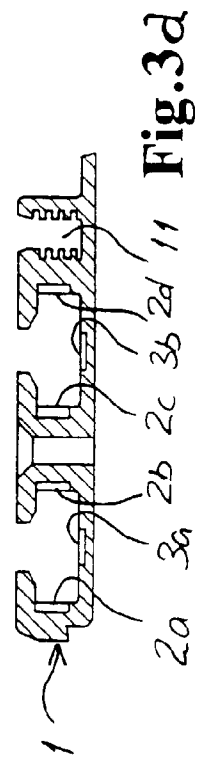
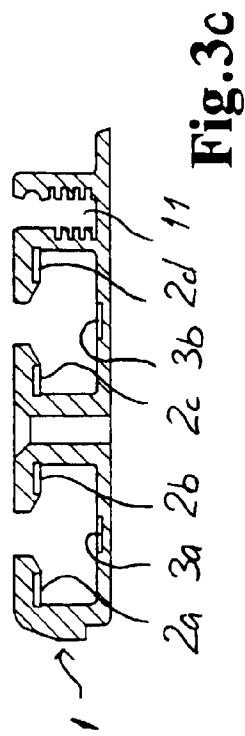
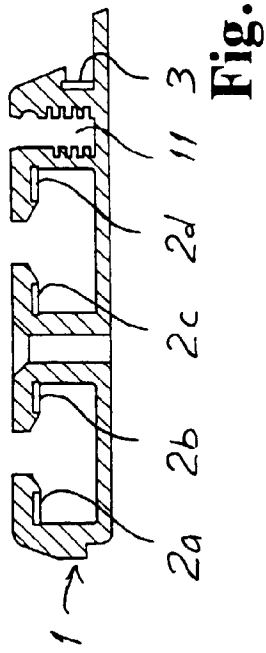
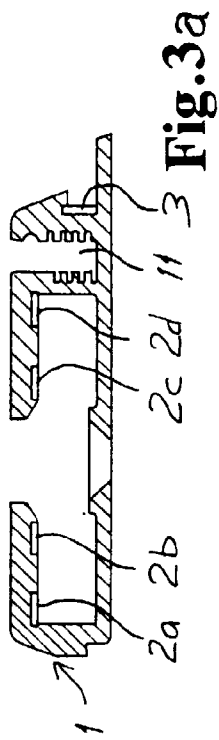


Fig. 1





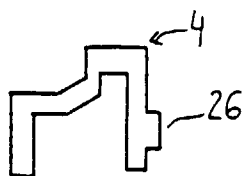


Fig. 4a

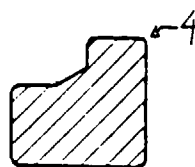


Fig. 4d

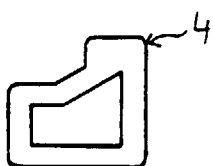


Fig. 4b

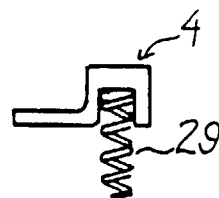


Fig. 4e

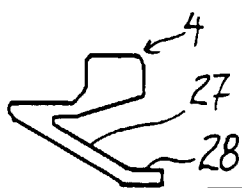


Fig. 4c

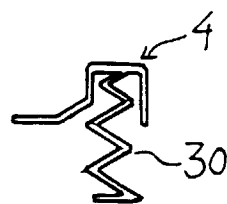


Fig. 4f

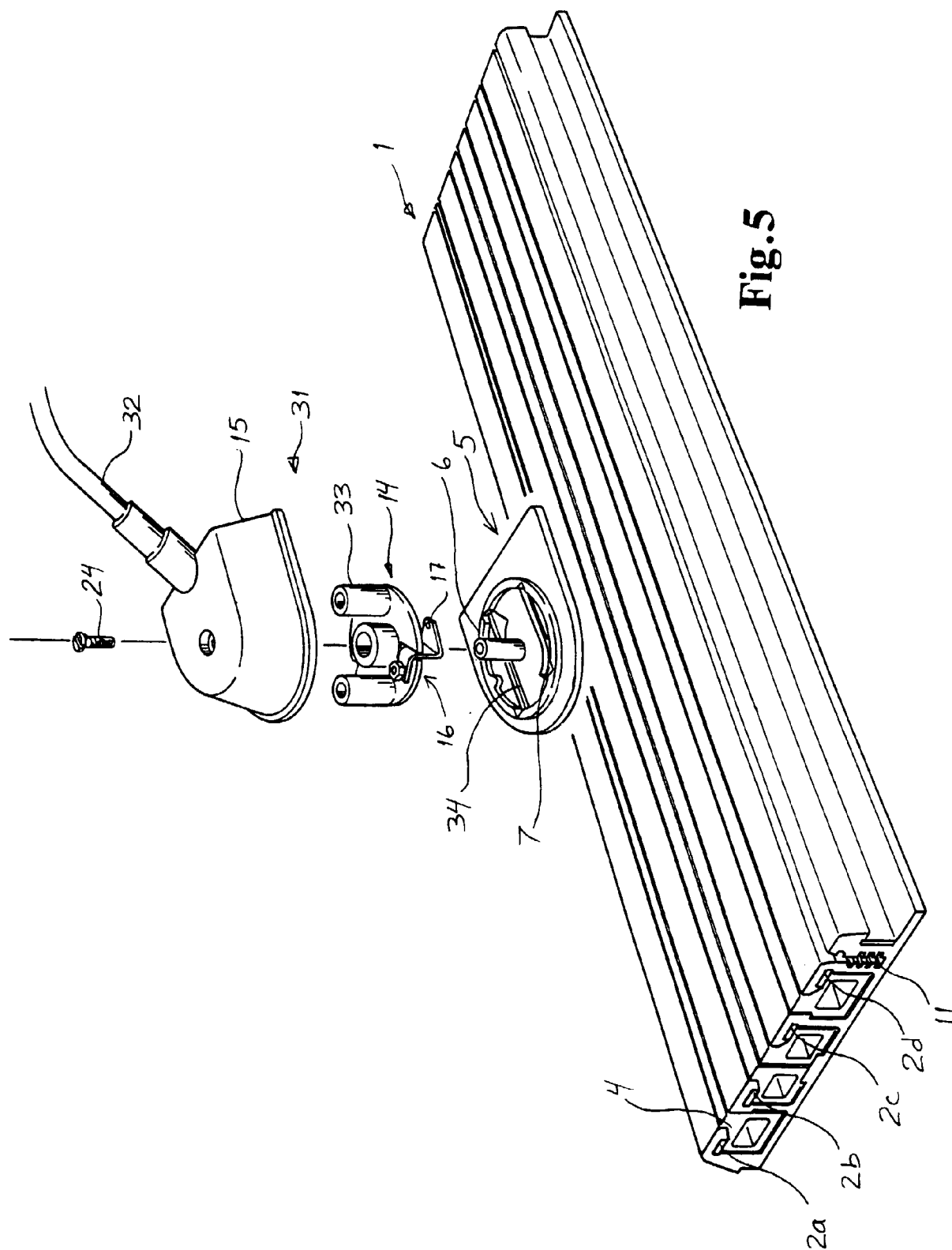


Fig. 5

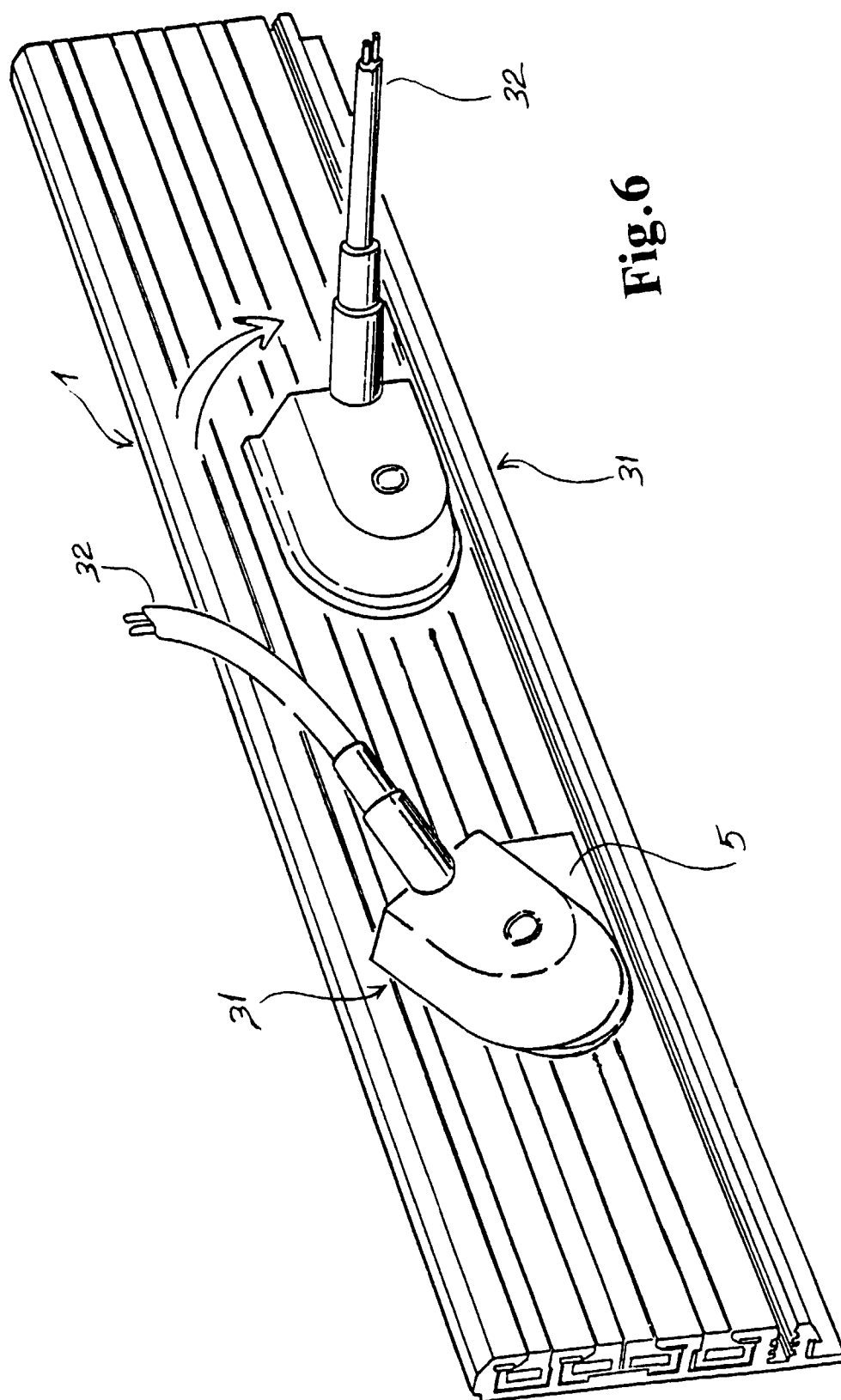


Fig. 6