(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 652 609 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **94830164.3**

(51) Int. Cl.[6] : **H01R 25/14**

(22) Date of filing : **08.04.94**

(30) Priority : **05.11.93 IT MI932359**

(43) Date of publication of application :
10.05.95 Bulletin 95/19

(84) Designated Contracting States :
AT CH DE ES FR GB GR IT LI NL PT SE

(71) Applicant : **GI ZETA S.R.L.**
Via de Gasperi 25
I-25060 Collebeato, Brescia (IT)

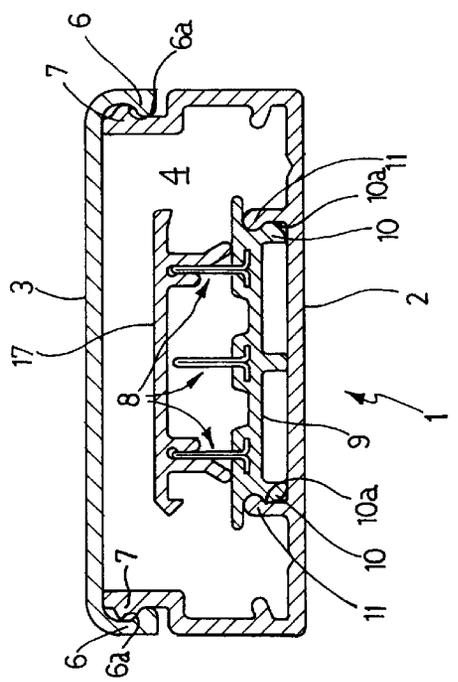
(72) Inventor : **Zucchini, Guido**
Via Benacense, 37
I-Brescia (IT)

(74) Representative : **Righetti, Giuseppe**
Bugnion S.p.A.
Via Carlo Farini, 81
I-20159 Milano (IT)

(54) Raceway for distributing electric energy and similar services in civil use premises.

(57) The described raceway consists of a strip-like base (2) to which a strip-like cover (3) is engaged by snapfitting so as to define a housing space (4) inside which three electric conductors (8) are disposed longitudinally and parallelly to one another. Each of said electric conductors has an anchoring portion (8a) buried in a supporting element (9) connected to the strip-like base (2), and a wiring portion (8b) extending perpendicular to the base itself. A clamp element (19) of a connector (20) associated endwise with a branching line or another external power line can be engaged to the wiring portion (8b) of earth conductor (8).

FIG. 1



EP 0 652 609 A1

The present invention relates to a raceway for distributing electric energy and similar services in civil use premises, of the type comprising a strip-like base to be fixed to a wall of a room, a strip-like cover to be removably engaged to said base in order to define at least one housing space therewith, a supporting element connected to said strip-like base and facing the inside of said housing space, and a plurality of electric conductors extending longitudinally and parallelly to each other at said supporting elements.

It is known that in civil use premises such as dwelling or business premises, the distribution of electric energy or other services such as broadcasting, television and telephone services, is carried out by arranging the respective conductors within pipes usually made of plastics, embedded in the walls forming the room. Also sockets, switches and at all events different branching devices are housed in boxes, usually made of plastics too and previously embedded into the walls. It is clear that this type of distribution structure is very rigid and involves a precise planning previously made in order to be sure that the distribution of the different services will reach all points of real interest. It is in fact to be noted that if one wishes to modify the position of the sockets or light points a posteriori or at all events to bring one or more conductors to areas different from those previously established, troublesome masonry works which are often very expensive too are to be carried out.

In order to obviate the above drawbacks, distribution structures have been recently widely used that, under use conditions, look like a common base or "skirting board" and that, disposed along the perimeter of a room, internally house the electric conductors relative to the services that are to be installed in the room. In this manner, electric and telephone systems and other similar services can be arranged in civil use premises without being it necessary to study in advance where the different apparatuses are to be installed because in this case a high degree of flexibility is ensured together with the possibility of adapting said distribution structures to all new requirements that may arise even in a later time, after laying of the raceways.

Usually these distribution raceways are made of an insulating material, thermosetting resins for example, and consist of a strip-like base to be fixed to a wall, by gluing or screwing for example, and a cover to be removably engaged, generally by snap-fitting, to said base in order to define one or more housing spaces along which the electric conductors as well as the cables relating to the services to be installed in the room are caused to run.

It is pointed out that in raceways of recent construction the distribution of the electric energy takes place by means of three or more bare conductors pressure-fitted into longitudinal seats, disposed parallelly in side by side relation with respect to each other and formed on the raceway base. Said seats are longitudinally provided with continuous access openings intended to enable, on the one hand, a forced fitting of the electric conductors, and, on the other hand, the optional introduction of contact elements for connection both to the mains power supplies and to the most different branching devices such as switches, sockets and so on.

More particularly, each time it is necessary to carry out an electric connection between the conductors disposed in the longitudinal seats and a switch for example, connectors provided with spring contact elements in the form of a lamina are to be employed, said contact elements being spring urged through the longitudinal access openings so as to reach the electric conductors. The lamina contact elements are endwise connected to electric wires that in turn are connected to the switch. In order to spring urge the lamina contact elements against the electric conductors with the necessary contact pressure, small springs are provided that act within each of the connectors housing the respective lamina contact element.

While this type of solution is widely adopted, it has however important drawbacks from the point of view of operation.

In fact, the contact created between each electric conductor and the respective lamina contact element is substantially punctiform and therefore not very reliable, above all in the presence of high working temperatures and high humidity.

Actually, heat developed by the electric current and passing through the conductors induces deformations in the plastics element defining the seats of the springs housed in said connectors. Such deformations reduce the operating efficiency of the springs because said springs tend to sink into the plastic material forming their seats thereby partly discharging their elastic load, and therefore the thrust action they exert on the lamina contact elements is lower than the planned one.

From this point of view humidity too is very dangerous because it causes rusting of the spring that therefore partly or completely loses its elastic features. In conclusion, due to one of the above reasons, the specific pressure generated between the lamina contact elements and electric conductors is often too low.

Under this situation discharges may occur which are very dangerous for all component parts housed in the raceway and it may even happen that the electric connection between the contact element and conductor be completely precluded. In the last-mentioned case it may be very difficult to find the exact point where failure in the electric connection has occurred, due to the great number of connections that are normally made in a raceway.

Finally, since the electric conductors are fas-

tened to the raceway base being forcedly fitted into the respective seats, often the positioning of same is not carried out correctly, which will bring about obvious inconveniences from an operating point of view. On the other hand, the necessity to introduce the conductors accurately into their longitudinal seats greatly increases the raceway assembling time, which will involve important additional costs.

Under this situation, the fundamental object of the present invention is to substantially solve all the drawbacks of the known art by providing a raceway for distributing electric energy and similar services in civil use premises in which the connecton to the electric cables housed in said raceway can be carried out in a more reliable and functional manner as compared to the connections of the known art.

It is a further object of the invention to provide a raceway in which the electric conductors are fastened to the raceway base so as to completely exclude the possibility of disengagement therefrom.

The foregoing and further objects that will become more apparent in the following are substantially achieved by a raceway for distributing electric energy and other similar services in civil use premises, characterized in that each of said conductors exhibits an anchoring portion rigidly connected to said supporting element and a wiring portion extending substantially perpendicular to said strip-like base.

Further features and advantages will be best understood from the detailed description of a preferred embodiment, of a raceway for distributing electric energy and similar services in civil use premises, given hereinafter with reference to the accompanying drawings, in which:

- Fig. 1 is a cross-sectional view of the raceway being the object of the present invention;
- Fig. 2 is a cross-sectional view of the raceway in question in which two hollow spaces for housing the conductors and different cables are provided;
- Fig. 3 is a cross-sectional view of a detail of an electric conductor to an enlarged scale;
- Fig. 4 is a cross-sectional view of the raceway showing three connectors the clamp elements of which are engaged to respective electric conductors for connecting said conductors to an external power line;
- Fig. 5 is a sectional view along line V-V in Fig. 4;
- Fig. 6 shows the raceway in question at an area in which a branching is provided for installation of an outlet; and
- Fig. 7 is a cross-sectional view showing the supporting portion for the electric conductors to which a longitunal protection panel is engaged.

Referring to the drawings, a raceway for distributing electric energy and similar services in civil use premises is generally identified by reference numeral 1.

The raceway 1 can be widely used both in offices and in dwelling houses, each time it is necessary to distribute electric energy or provide cables for other services without carrying out boresome masonry operations. In particular, the raceway 1 can be disposed in the region of the base perimeter of the walls in a room, in place of, or side by side with false door jambs, along walls and ceilings where it is necessary to distribute particular services at points raised from the floor. Depending on requirements, the raceway can exhibit an external conformation of the "skirting" or "frame" type. In the last-mentioned case the raceway will have a reduced thickness so as to pass under wall cupboards, behind pieces of furniture, and be able to follow all types of path.

In any event, the raceway 1 consists of a strip-like base 2 made of electrically insulating material to which a cover 3 is detachably engaged. The cover too has a strip-like structure defining with the base 2 one or more housing spaces 4. In particular, in Fig. 1 a raceway having a single housing space 4 is shown, whereas in Fig. 2 a raceway provided with two superposed housing spaces is shown, said spaces being separated by a rib 5 emerging from the cover 3 and extending longitudinally in a substantially horizontal plane.

The cover 3 is generally fixed by snap fitting to the base 2 by means of suitable mutually engaging extensions or ribs. For example, in Fig. 1 the substantially flat cover 3 laterally has curved edges 6, provided with cavities 6a into which respective swellings 7 carried by the base 2 of a substantially C-shaped cross section are engaged.

On installation of the raceway 1, the strip-like base 2 can be fastened by means of screws or the like, to the walls of the room where the electric distribution system or other services are to be arranged.

Two or more electric conductors 8 are housed within the hollow space 4 of the raceway 1 and they extend longitudinally and parallelly to each other following the extension of the raceway 1 itself.

In each of the raceways shown in the accompanying drawings three of said electric conductors 8 are always provided; however, it is possible to simultaneously use a greater number of said conductors. For example, particularly advantageous is the solution in which in a single raceway five conductors 8 disposed in mutual side by side relation are provided. In this case, in fact, the central conductor may be used as a common earth conductor for the conductor pairs adjacent thereto. More particularly, the two conductors disposed to the right with respect to the centre conductor may work with a first voltage of 220 V for example, whereas the two conductors placed to the left with respect to the centre conductor may work with a second voltage of 380 V for example, so that said cen-

tre conductor acts as an earth conductor for both pairs without an additional conductor being required.

Regardless of their number, the electric conductors 8 are connected to a supporting element 9 integral with the base 2 and facing the inside of said hollow space 4. Preferably, said supporting element consists of a panel provided, at least at its ends, with spacing ribs 10 adapted to enable a correct spacing between the conductors 8 and the wall to which the base 2 is fastened. Formed in the spacing ribs 10 located at the ends of the supporting element are respective engagement grooves 10a for receving by snap fitting auxiliary ribs 11 emerging at right angles from the base 2 and extending parallel to the conductors 8.

In an original manner, each conductor 2 exhibits an anchoring portion 8a (see Fig. 3) rigidly engaged to said supporting element 9 and a wiring portion 8b extending substantially perpendicular to the strip-like base 2, so as to advantageously offer a wide surface to which can be engaged the connectors for the branching lines or power sypply lines terminating at the electric conductor. Each of the electric conductors 8 is obtained by successive bending operations starting from a ribbon, preferably made of copper, and has first and second ribbon-like portions 12 and 13, disposed symmetrically opposite to each other and rotated through 180° with respect to each other, at a longitudinal bending edge 14. In this manner, the ribbon-like portions 12 and 13 are mutually faced and substantially parallel to each other. Each of said portions 12 and 13 is then provided with a respective hooking lip 15, 16 forming a 90° bent relative to the ribbon-like portion. Thus, the anchoring portion 8a defines with the wiring portion 8b a substantially T-shaped cross-section. Advantageously and in accordance with the present invention said anchoring portion is buried in the supporting element 9. Practically, during the production step, after the different electric contact elements 8 are made, the latter are disposed at the extrusion die by which the supporting elements 9 are formed. In other words, the connection between the electric contact elements 8 and supporting element 9 takes place directly during the extrusion of the supporting element, thereby ensuring a better and more precise positioning of the electric contact elements, a reliable and strong anchoring of the contact elements, and an important reduction in time when laying of the raceway occurs.

In order to prevent any accidental contact with the electric conductors 8 when the cover 3 is disengaged from the base 2, a longitudinal protection panel 17 may be provided to advantage and be arranged so as to cover said electric conductors. The protection panel 17 is engaged in a removable manner and, depending on the cases, can be hooked directly to the electric conductors 8, as shown in Figs. 1 and 2, or to the supporting portion 9, as shown in Fig. 7.

In any event, the longitudinal protection panel 17 is cut whenever necessary in order to create access windows enabling the conductors 8 to be connected to branching lines leading to outlets and other branching devices or lines belonging to an external power line.

Both when the panel 17 is present and when said panel is not used, suitable connectors are employed for connecting the conductors 7 to power or branching lines.

As shown in greater detail in Figs. 4 and 5 in which, by way of example, the system for connecting the conductors 8 to an external power line is shown, each electric conductor 8, at its wiring portion 8b is engaged by a clamp element 19 of a connector 20 terminating at a respective power line. More particularly, each clamp element 19 has a central body 21 from which two arms 22 and 23 extend at right angles; said arms are disposed symmetrically relative to each other and define an insertion seat 24 into which the wiring cable 8b of the conductor 8 engages. As soon as the wiring cable 8b of the electric conductor 8 is engaged in the insertion seat 24, the above mentioned arms 22 and 23 exert an elastic thrust action on the sides of the ribbon-like portions 12 and 13 of the electric conductor 8, so as to ensure a sufficient mutual-contact pressure. It will be also noted that the shape of the arms 22 and 23 of the clamp element 10 substantially matches the shape of the wiring portion 8b of the electric conductor 8, so as to define a relatively wide contact surface with said electric conductor, which surface is therefore capable of ensuring a very reliable and durable electric connection.

The invention achieves important advantages. It will be recognized, in fact, that since the wiring portion 8b of the electric conductors 8 emerges perpendicularly to the strip-like base 2, said conductors offer a wide surface on which the clamp elements 19 of each connector 20 can efficiently exert their clamping action, each time it is necessary to make a branching or an electric connection with power lines external to the raceway 1. In addition, the contact area between the clamp elements and the wiring portion of the conductors is relatively wide and not substantially punctiform as it is, on the contrary, in the known art. This quality not only ensures a very reliable contact, but also enables the conductors and connectors to be submitted to a reduced wear at the region of mutual contact, in that arising of sparks or, what is worse, of flames is substantially averted.

It will be also noted that, since the springs used in the known art for urging the lamina contact elements of the connectors against the electric conductors are eliminated, the distribution raceway as well as the different connecting elements have been made substantially insensitive to heat and humidity, which will bring about advantages in terms of operation and subsequent servicing. In fact, the type of

connection made between the clamp connector and the respective conductor ensures a fixed anchoring of the connector itself, without further means for mechanically ensuring said connection being necessary.

In addition, due to the elimination of the above mentioned springs, a structure less responsive to manufacture tolerances can be accomplished.

Also important is the fact that, in the raceway in question the electric conductors are anchored to the supporting element directly when the latter is being extruded. As a result, the time necessary for manufacturing and assembling the raceway is reduced and in addition anchoring of said conductors becomes very strong and reliable.

Obviously many modifications and variations may be made to the invention as conceived, all of them falling within the scope of the invention as defined in the appended claims. In particular, the electric conductors disposed in the raceway may have a structure different from the one previously described in detail. They may for example have a structure similar to that of the clamp connectors, that is be provided with a central body fastened to the supporting element and two arms disposed symmetrically with respect to each other and defining an insertion seat into which a connector will be engaged, said connector in this case having a peg conformation.

Claims

1. A raceway for distributing electric energy and similar services in civil use premises, comprising:
   - a strip-like base (2) to be fixed to a wall of said premises or of a room;
   - a strip-like cover (3) to be removably engaged to said base (2) in order to define at least one housing space (4) therewith;
   - a supporting element (9) connected to said strip-like base and facing the inside of said housing space (4); and
   - a plurality of electric conductors (8) housed in said hollow space (4) and extending longitudinally and parallely to each other at said supporting element (9), characterized in that each of said conductors exhibits an anchoring portion (8a) rigidly connected to said supporting element (9) and a wiring portion (8b) extending substantially perpendicular to said strip-like base (2).

2. A raceway according to claim 1, characterized in that said anchoring portion (8a) of the conductors (8) is buried in said supporting element (9).

3. A raceway according to claim 1, characterized in that said anchoring portion (8a) defines with said wiring portion (8b) of the conductors (8), a substantially T-shaped transverse section.

4. A raceway according to claim 1, characterized in that each of said electric conductors (8) exhibits first and second ribbon-like portions (12 and 13) which are symmetrically opposite and joined to each other at a longitudinal bending edge (14).

5. A raceway according to claim 4, characterized in that said first ribbon-like portion (12) is bent relative to said second ribbon-like portion (13) according to a bending angle of substantially 180°.

6. A raceway according to claim 4, characterized in that each of said ribbon-like portions (12, 13) is provided with a respective hooking lip (15, 16) exhibiting a 90° bending relative to the ribbon-like portion itself, in order to substantially define said anchoring portion (8a).

7. A raceway according to claim 1, characterized in that a clamp element (19) of a branching connector (20) can be engaged to the wiring portion (8b) of each of said electric conductors (8).

8. A raceway according to claim 9, characterized in that the clamp element (19) of each branching connector (20) exhibits a central body (21) from which at least two arms (22, 23) extend, said arms being disposed symmetrically with respect to each other so as to define an insertion seat (24) for said wiring portion (8b) of the corresponding electric conductor (8) and exerting an elastic thrust action on the sides of said ribbon-like portions (12, 13) of the electric conductor itself.

9. A raceway according to claim 8, characterized in that the shape of the arms (22, 23) of each clamp element (19) substantially matches the shape of the wiring portion (8b) of the respective electric conductor.

10. A raceway according to claim 1, characterized in that a longitudinal protection panel (17) is provided within said housing space (4), which panel is intended to cover said electric conductors (8) to which it is detachably engaged in order to prevent an accidental contact with said electric conductors (8) when the cover (3) is removed from the base (2).

FIG. 1

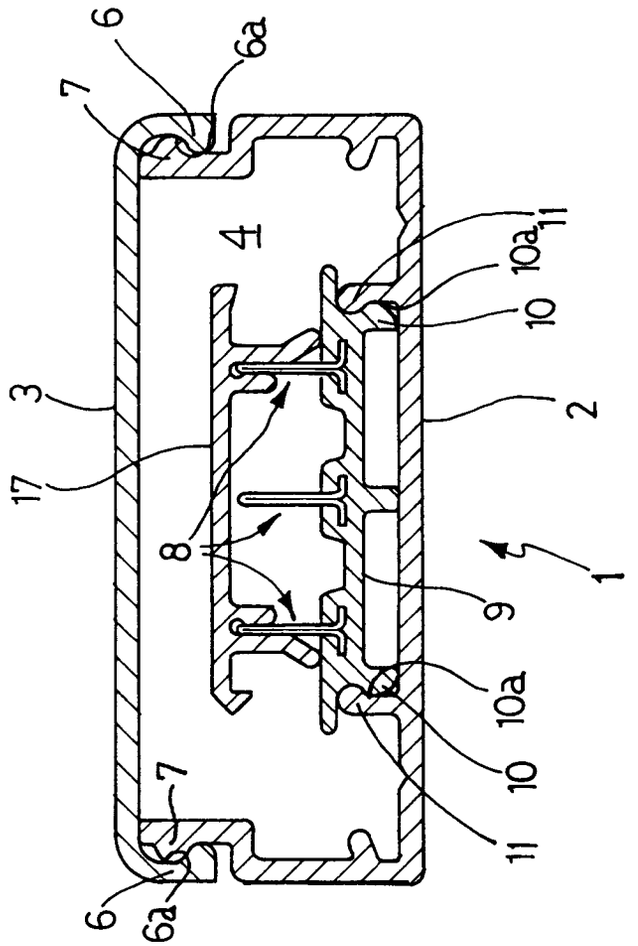


FIG. 3

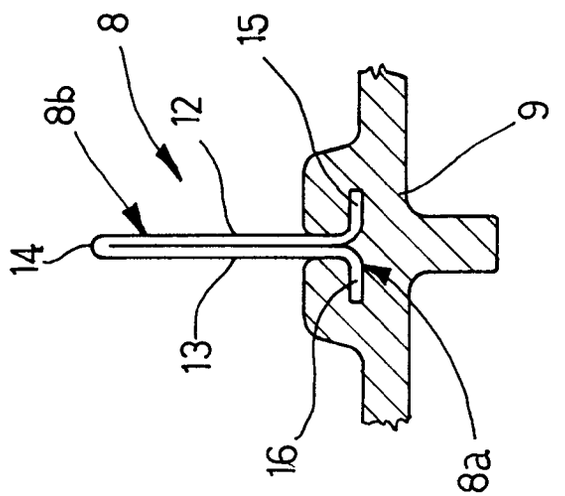


FIG. 2

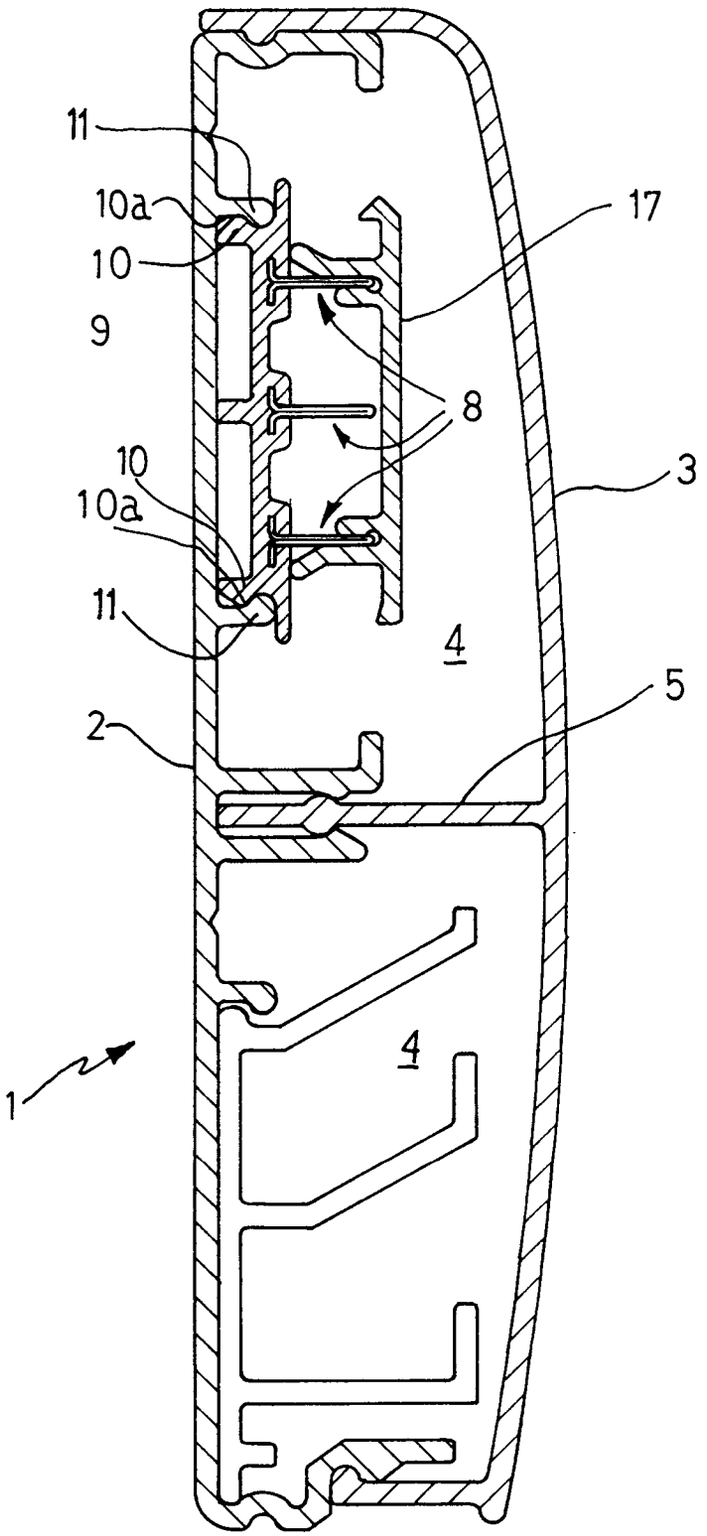


FIG. 4

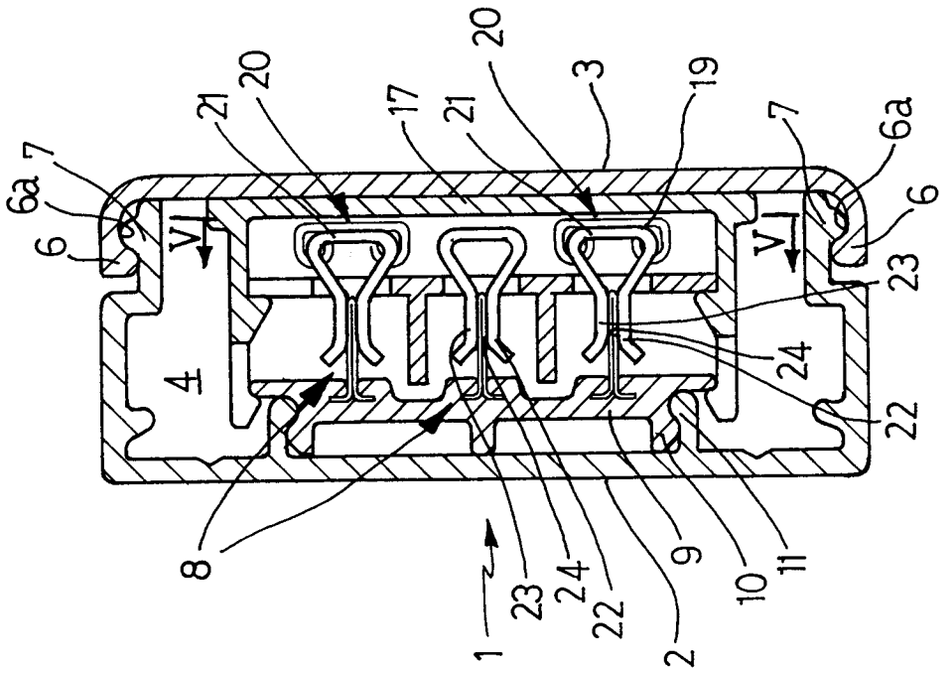
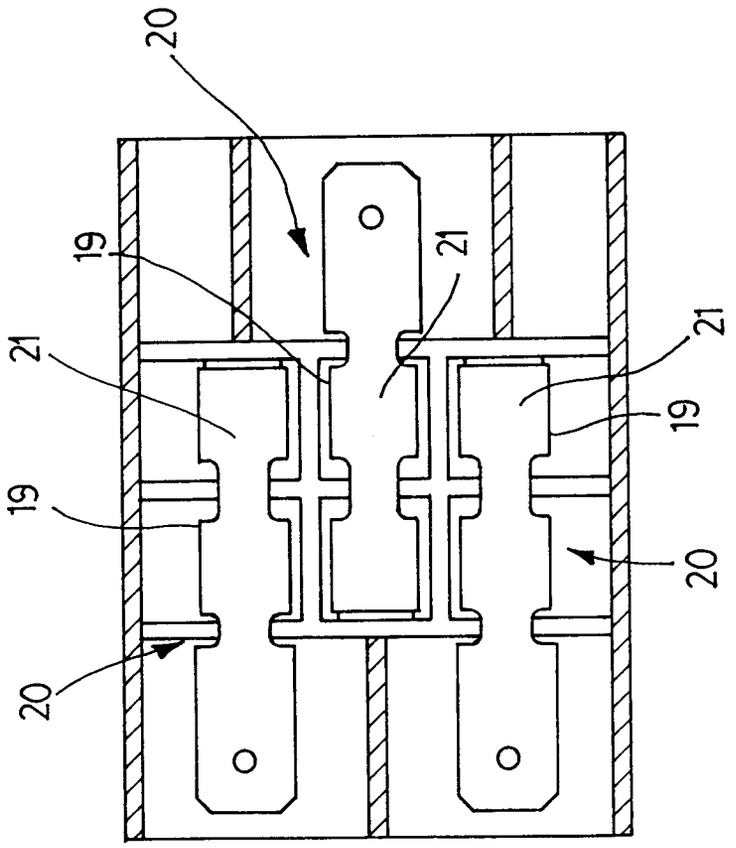

20
21
20
17
21
3
19
7
6a
7
6a
6
VI
VI
6
23
24
22
4
8
23
24
22
9
10
11
1
2

FIG. 5


20
19
21
21
21
19
19
20
20

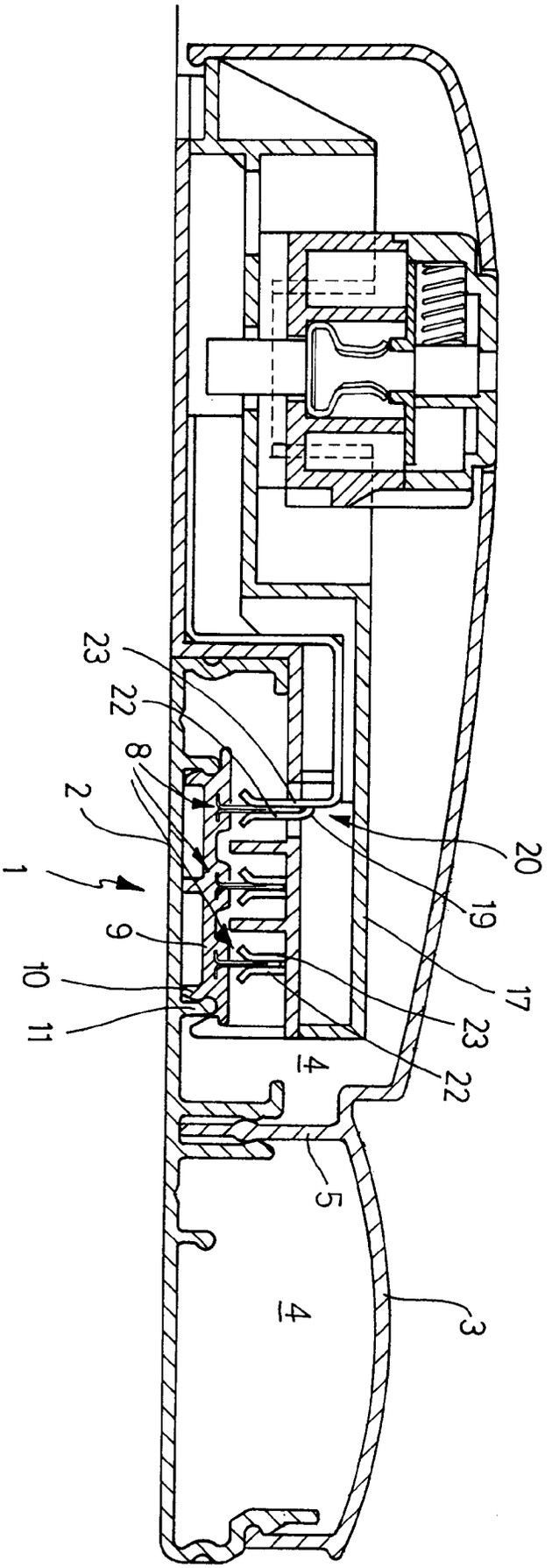
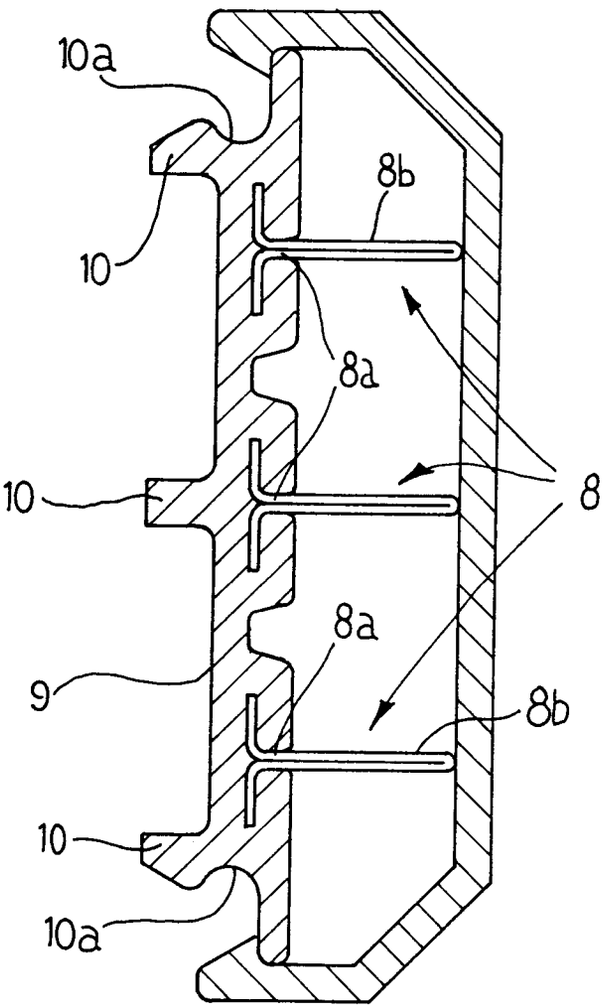


FIG.6

FIG. 7



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0164

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	EP-A-0 336 295 (RITTAL-WERK) * the whole document * ---	1-3,7-9 10	H01R25/14
Y	EP-A-0 453 267 (ASHLEY) * column 6, line 40 - line 44 * * column 10, line 35 - line 43 * ---	10	
X	DE-A-40 13 998 (NOWA-PLAST) * the whole document * ---	1-4	
Y	DE-A-40 13 370 (SCHUPA) * abstract; figure 6 * * column 3, line 1 - line 6 * ---	1-3,7-10	
Y	FR-A-2 607 976 (REGIE NATIONALE DES USINES RENAULT) * the whole document * ---	1-3,7-10	
A	US-A-2 146 829 (R. MACFARLANE) * figures * ---	1-3	
A	EP-A-0 330 525 (TELEMECANIQUE) * figures * -----	1,4-9	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
H01R
H02G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 February 1995	Desmet, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)