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(54) **A current supply device for a cable duct.**

(57) Current supply device for a cable duct comprising a case-like channel track (3) forming a cable space (4) for cables and cords (12) and having a front plate provided with an installation slot (6) for outlet boxes (2). To simplify the electrical connection and attachment of the outlet box, its connecting means form a contact pin (14) with fingers (15) arranged to make contact with a conductor rail (9) positioned in the cable duct, and a frame (13) forms a socket outlet, whereby the contact pin projects from the frame in such a manner that when the frame is inserted to the installation slot of the channel track into the cable space, the contact pin extends into the conductor rail (9) into contact with electrical conductors (11) provided in the conductor rail.

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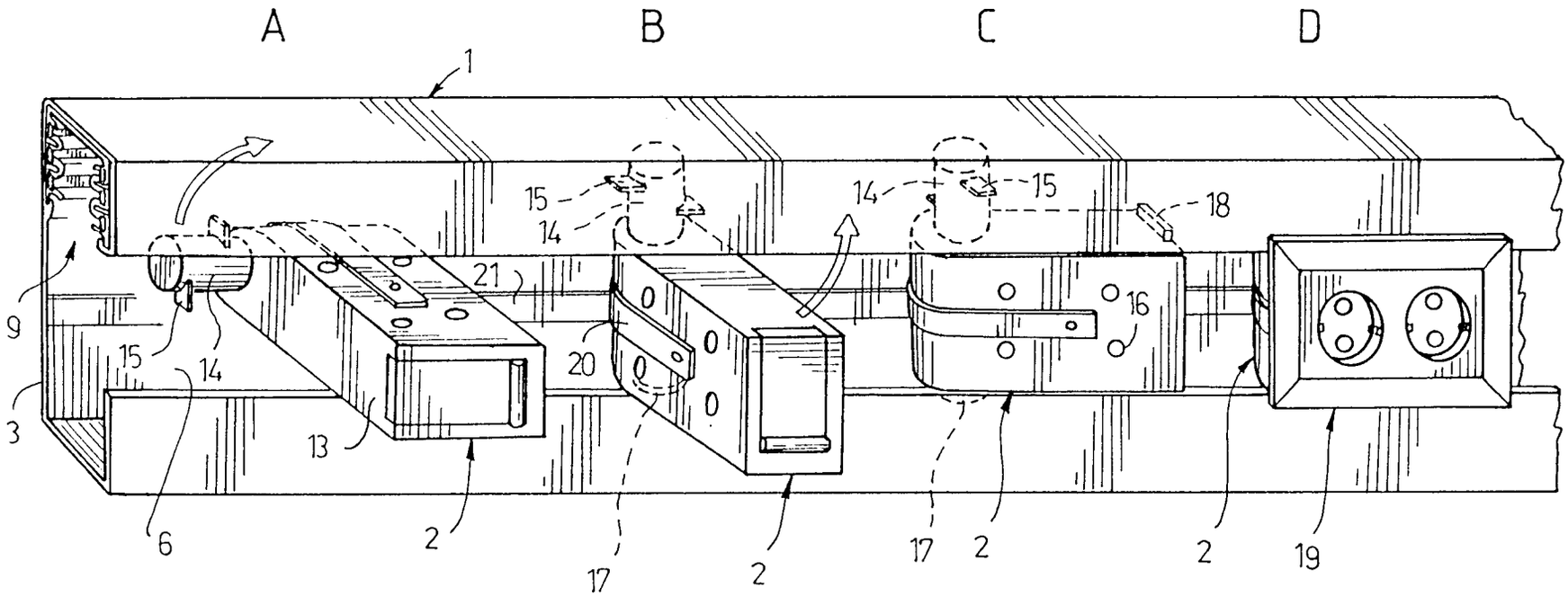


FIG. 4

This invention relates to a current supply device for a cable duct comprising a case-like channel track forming at least one cable space for cables and cords and having a front plate provided with an installation slot opening into the cable space for current supply devices and other similar outlet boxes, whereby the current supply device comprises a frame provided with electrical equipment and arranged to be installed in the installation slot of the channel track, and means for connecting the equipment to electrical conductors in the cable duct.

It is known from the prior art to use a cable duct arrangement in apartments, offices, staircases and the like, the required cables and cords for electricity, telephone, antenna, etc., being encased in a cable duct extending along a desired wall/desired walls. Only socket outlets and other outlets and connections mounted in the front plate of the cable duct for use at various points are outwardly visible. All cords, outlet boxes and installation equipment are invisible within the case-like channel track. The outlet boxes are attached to the channel track in such a way that their cover plates are positioned substantially flush with the cover of the installation slot. The outlet boxes may be installed side by side in contact with or spaced apart from each other. Openings possibly remaining between the boxes are covered with cover plates of suitable size.

Today all cables and cords in a cable duct are positioned loosely in the cable space of the channel track either on the bottom of the cable space, in its different compartments or on separate shelves. For connecting socket outlets, junction boxes and other required outlet boxes, the respective electrically insulated cable or cord has to be drawn out from the cable space and connected electrically to the socket outlet, box, etc., at each desired point of the cable duct. This makes the installation and connection of outlet boxes difficult and time-consuming, and a great number of different tools are frequently needed. In addition, only an electrician can carry out the installation.

It has been suggested previously to replace a round power cable with a band-like cable and to provide the outlet boxes with special connectors which cut through or penetrate into the insulation of each conductor to be connected in such a way that the conductor need not be separately revealed at the connection point. In such an arrangement, the frame of the outlet box is provided with connecting means which clamp the band-like cable in a jaw-like manner at a desired point in the channel track. This does make the connection of outlet boxes somewhat easier; however, an electrician is still needed for the installation and connection of the boxes.

This invention relates to an outlet box including electrical equipment, which is called a current supply device below because it is primarily intended to be connected to a power cable of the cable duct to supply current e.g. to a socket outlet, to the connector of an outlet box or the like. Even though the invention will be described in the following mainly in connection with a power cable application, the invention may also be applied when connecting other cables and cords in the cable duct.

The object of the invention is to provide a current supply device for a cable duct, which avoids the above-mentioned disadvantages and can be connected as such to the conductors of the cable in the cable duct with a few simple movements of the hand and is ready for use as an outlet in the cable duct immediately after connection. This object is achieved by means of a current supply device according to the invention, which is characterized in that the connecting means of the current supply device are formed as a contact member for a conductor rail, said contact member being provided with projecting contact fingers; the frame is case-like and encloses the equipment in an insulating manner; and the contact member projects from the frame in such a way that when the frame is installed in the installation slot of the channel track, the contact member extends into a conductor rail positioned in the cable duct into contact with the conductors provided in the conductor rail.

The invention is based on the idea that the means for connecting the frame of the current supply device to the conductors of the cable in the cable duct are formed in such a way that they come into contact with the conductors at the same time as the frame is otherwise installed in position in the installation slot of the channel track. In this way, the installation of the current supply device does not require any special connecting measures.

The connecting means of the current supply device of the cable duct are preferably similar to the known current supply devices developed for conductor rails, with the modification that the current supply devices now take into account the size of the installation slot of the cable duct and the position of the current conductors in the channel track with respect to the installation slot, and that the connecting means of the current supply device are automatically positioned in contact with the conductors of the cable when the frame of the current supply device is positioned in its operating position in the installation slot of the channel track. Current supply devices developed for conductor rails are disclosed e.g. in Finnish Patent Specifications 44019 and 47236 (push/pull contacts), GB Patent Specification 1 329 663 (turnable contacts) and GB Patent Specification 1 000 925 (pivotable contacts).

The cable conductors to be connected to the current supply device are arranged to extend in the cable space of the channel track of the cable duct similarly as a conductor rail known *per se*, whereby it is possible to use bare conductors which are ready to be connected at any point in the channel track. A conductor

rail of this type is disclosed e.g. in Finnish Patent Specification 44019.

The current supply device of the invention can be connected to the conductors in the channel track of the cable duct without any installation or connecting measures which would require an electrician. If required, the user may himself carry out the connection and fastening to the channel track of the cable duct by a simple movement of the hand.

The invention will be described in greater detail in the following with reference to the attached drawings, in which

Figure 1 is a perspective view of a cable duct arrangement in which current supply devices according to the invention are used;

Figure 2 is an enlarged cross-sectional view of the channel track of the cable duct;

Figure 3 is a perspective view of one embodiment of the current supply device to be used in the cable duct; and

Figure 4 is a perspective view of the different steps for connecting the current supply device of Figure 3 to the cable duct.

The cable duct arrangement shown in Figure 1 of the drawings mainly comprises a cable duct 1 and a number of outlet boxes 2 provided with electrical equipment and cover plates, some of the outlet boxes being formed as current supply devices of the invention. The cable duct comprises a metallic, case-like channel track 3 having a rectangular cross-section. The channel track comprises an internal cable space 4 and an installation slot 6 in a front plate 5, the installation slot being covered with an openable cover plate 7. Both longitudinal edges of the installation slot are formed as fastening edges 8 for the outlet boxes and current supply devices.

A conductor rail 9 is provided in the top portion of the cable space of the channel track; in this specific case, the conductor rail replaces the power cable of the cable duct. The conductor rail comprises an insulation strip 10 and a number of current conductors 11 embedded in it. The current conductors are grouped so as to be positioned on the inner surfaces of the front and back plates of the channel track.

Other cables and cords 12 in the cable duct are positioned in the bottom portion of the cable space of the channel track and connected to the connectors of the corresponding outlet boxes 2′, such as telephone and antenna outlets.

Figure 3 of the drawings shows an outlet box 2 suitable for the conductor rail of the cable duct. In this specific case, the outlet box is a current supply device forming a base for a socket outlet. The current supply device comprises a case-like frame 13 and a contact pin 14 projecting from one narrow side of the frame. Two contact fingers 15 project in opposite directions from the contact pin. The contact finger intended for a phase conductor of the conductor rail is axially adjustable in the contact pin. The frame is provided on both sides with pairs of openings 16 for contact plugs, and required phase and neutral conductors and connections to the contact fingers are provided within the frame.

The frame and the contact pin of the current supply device are dimensioned and shaped according to the height of the installation slot of the channel track and the position and dimensions of the conductor rail in such a way that the current supply device can be connected electrically to the conductor rail and fastened to the channel track as shown in Figure 4.

The current supply device is first inserted in a horizontal position in the installation slot of the channel track with the pin end ahead so as to be pressed against the back wall of the cable space, step A in Figure 4. Thereafter the frame is turned through 90° into a vertical position in such a manner that the frame is still positioned perpendicularly to the channel track and the contact pin points upwards. The contact pin thereby extends into the conductor rail between the two current conductor groups. A retaining shoulder 17 on the bottom of the frame is positioned behind the lower edge of the installation slot, keeping the frame in position in the installation slot of the channel track, step B. The frame is then turned through 90° in a sideward direction, so that the whole frame is displaced within the channel track and the front surface of the frame is positioned substantially flush with the front plate of the channel track. In this position the contact fingers are turned towards the current conductors into contact with the corresponding conductors. A latch 18 at the other end of the frame is now displaced into a locking position, in which it is positioned behind the upper edge of the installation slot, step C. Finally, a cover plate 19 is fastened to the frame, step D. Grounding bows in the cover plate are provided with a prod which makes contact with a grounding strip 20 in the frame, and the grounding strip 20 in turn makes contact with a grounding strip 21 in the back wall of the channel track. To enable the frame to be turned within the installation slot, the frame is provided with notches 22.

The drawings and the description related to them are only intended to illustrate the idea of the invention. In its details, the cable duct of the invention may vary within the scope of the claims. In the embodiment shown in the drawings, the current supply device is provided with a cylindrical contact pin attached rigidly to the frame. The contact member of the current supply device may also be arranged to be pivotable or turnable with respect to the frame, as is known *per se* from British Patent Specifications 1 000 925 and 1 396 058. The contact member of the current supply device may also be plate-like, in which case the contact fingers are turnable or displaceable into different positions, as described e.g. in Finnish Patent Specifications 44019 and 47236 and British Patent

Specification 1 329 663. In the embodiment shown in the drawings, the conductor rail is of the type disclosed in Finnish Patent Specification 44019. If required, the current conductors may be grouped in some other way, whereby the corresponding grouping is taken into account in the structure of the current supply device. Even though it seems to be advantageous to position the conductor rail in the top portion of the cable space, whereby there is no danger of cables and cords or other foreign objects falling on the conductor rail, the conductor rail may be positioned in some other portion of the cable space, if required. Accordingly, the current supply device may deviate in type and structure from that shown in the figures, depending on the structure, shape and dimensions of the cable duct in each particular case. In place of the disclosed socket outlet structure, the frame of the current supply device may be formed e.g. as a connector for connecting an extension cable.

The features disclosed in the foregoing description, in the following claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. Current supply device for a cable duct comprising a case-like channel track (3) forming at least one cable space (4) for cables and cords (12) and having a front plate (7) provided with an installation slot (6) opening into the cable space for current supply devices (2) and other similar outlet boxes (2′), whereby the current supply device comprises
   - a frame (13) provided with electrical equipment and arranged to be installed in the installation slot of the channel track, and
   - means for connecting the equipment to electrical conductors (11) in the cable duct; **characterized** in that
   - the connecting means of the current supply device are formed as a contact member (14) for a conductor rail (9), said contact member being provided with projecting contact fingers (15);
   - the frame (13) is case-like and encloses the equipment in an insulating manner; and
   - the contact member projects from the frame in such a way that when the frame is installed in the installation slot (6) of the channel track (3), the contact member extends into a conductor rail (9) positioned in the cable duct into contact with the conductors (11) provided in the conductor rail.

2. Current supply device according to claim 1, **characterized** in that the contact member (14) is fixed to the frame (13) and that the contact fingers (15) are so positioned with respect to the frame that when the frame is positioned in the installation slot (6) of the channel track (3) perpendicularly to the channel track, the contact fingers of the contact member extend in the longitudinal direction of the channel track and when the frame is turned 90° within the installation slot of the channel track, the contact fingers point towards a front plate (7) and a back plate of the cable space of the channel track, respectively.

3. Current supply device according to claim 1 or 2, **characterized** in that a front surface of the frame (13) is positioned substantially flush with a front plate (7) of the channel track (3) when the frame is fastened in place in the cable space (4) of the channel track.

4. Current supply device according to any of the preceding claims, **characterized** in that the frame (13) comprises a grounding strip (20) which contacts a grounding strip (21) in the channel track (3) when the frame is inserted in the installation slot of the channel track.

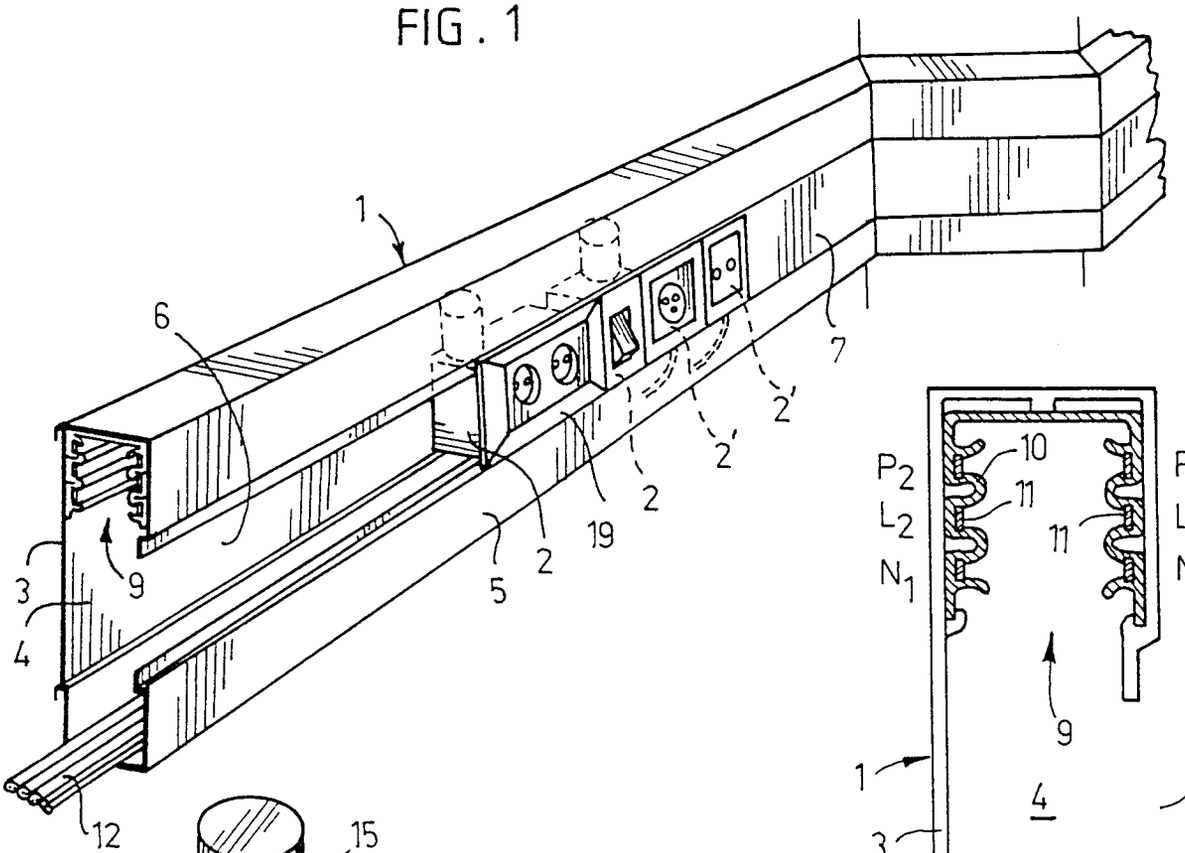
5. Current supply device according to any of the preceding claims, **characterized** in that the contact member (14) is a cylindrical pin and that at least one contact finger (15) is axially adjustable in the contact pin.

6. Current supply device according to claim 2, **characterized** in that the frame (13) is arranged to be turned through 90° in both directions from a position perpendicular to the channel track (3).

7. Current supply device according to any of the preceding claims, **characterized** in that the frame (13) forms a socket outlet on two opposite sides of the frame.

8. Current supply device according to any of the preceding claims, **characterized** in that the frame (13) forms a flat casing in which the height of at least one broader side is substantially equal to the height of the installation slot (6) of the channel track (3), whereby the contact member (14) projects from one narrower side of the casing perpendicularly to said narrower side close to its one end.

FIG. 1



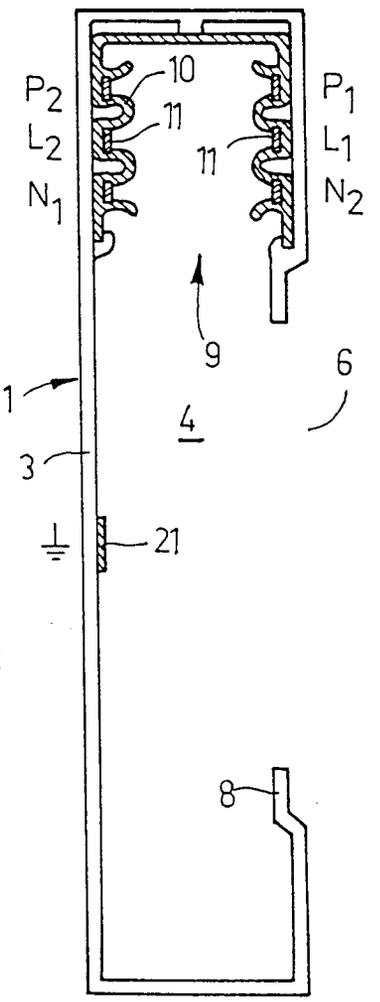


FIG. 2

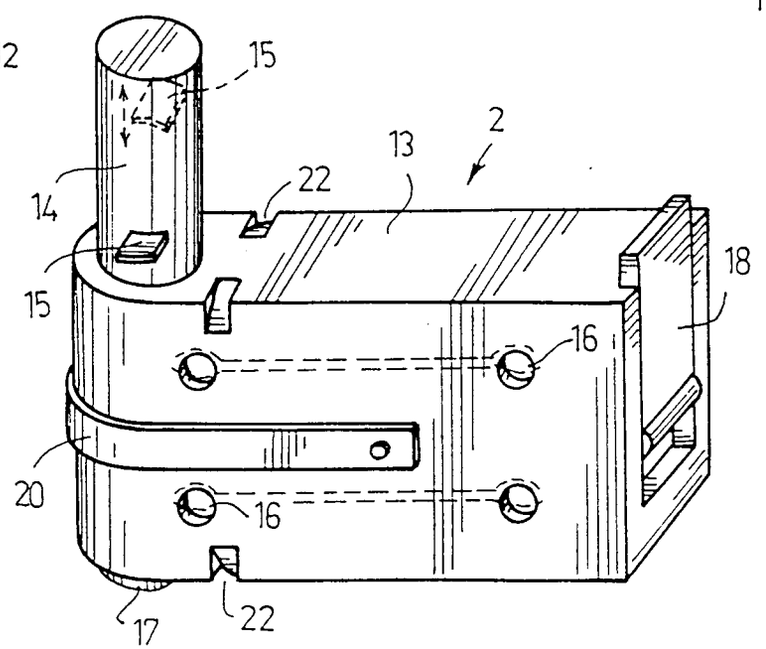


FIG. 3

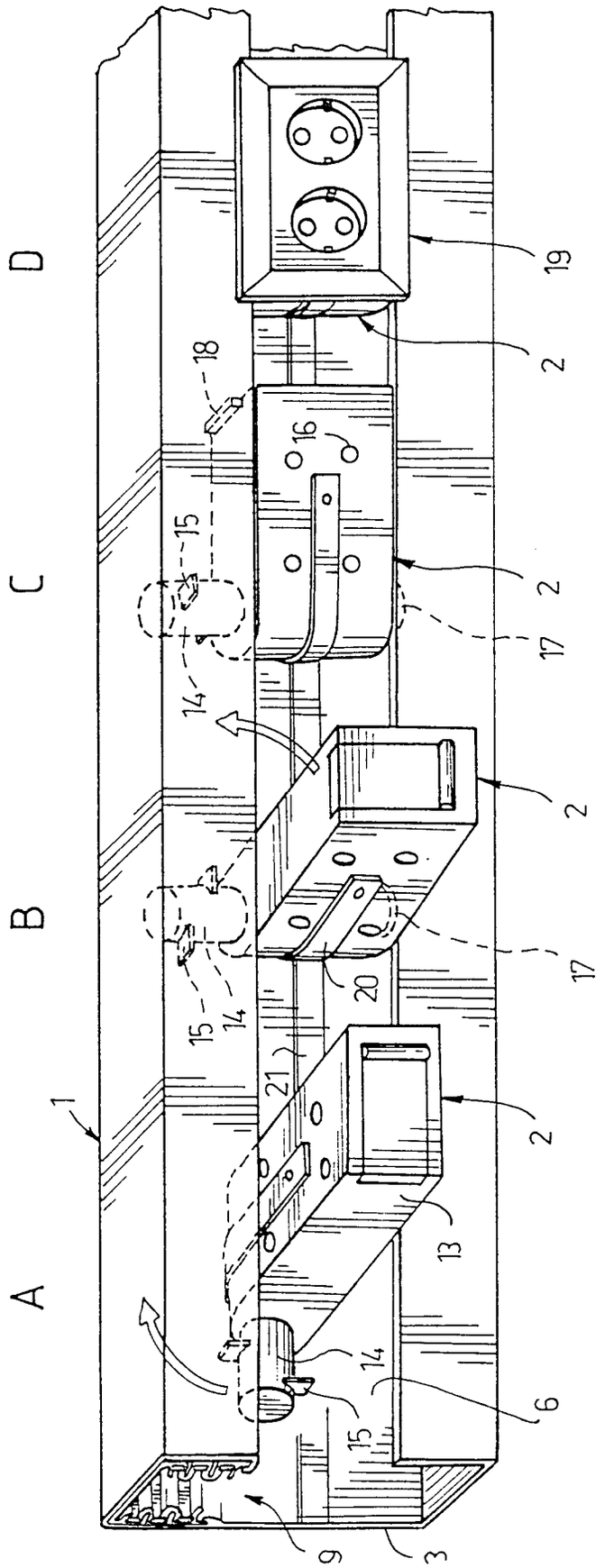


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 5751

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.5)
X	WO-A-8701524 (BARRIER SHELF CO.) * figure 5 *	1-2	H01R25/14
A	---	3-8	
A	FR-A-2169499 (POLI) * page 1, lines 28 - 36 * ---	1-2	
A,D	US-A-3848715 (HESSE) * column 3, lines 44 - 48 * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

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	23 SEPTEMBER 1991	SIBILLA S.

CATEGORY OF CITED DOCUMENTS

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