

[54] **CONNECTING PLUG FOR A CURRENT SUPPLY RAIL ARRANGEMENT INTENDED PARTICULARLY FOR LIGHTING PURPOSES AND SMALL-SIZED ELECTRICAL MOTORS**

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[58] Field of Search .....339/21-24, 75, 339/91; 200/51

[56]

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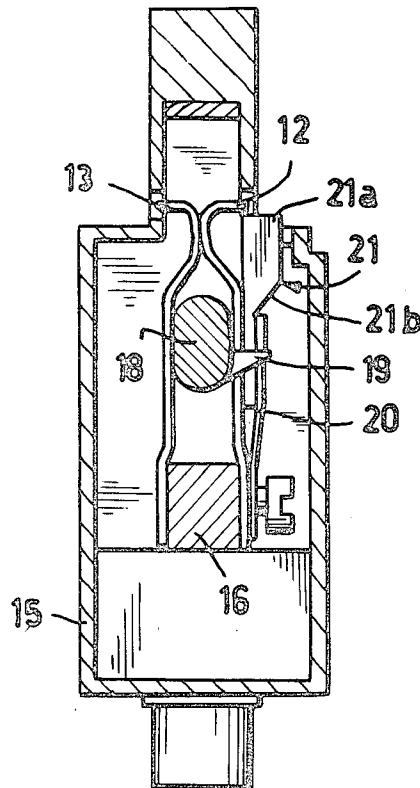
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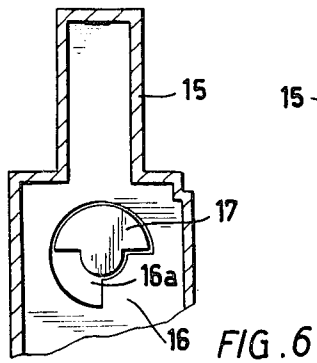
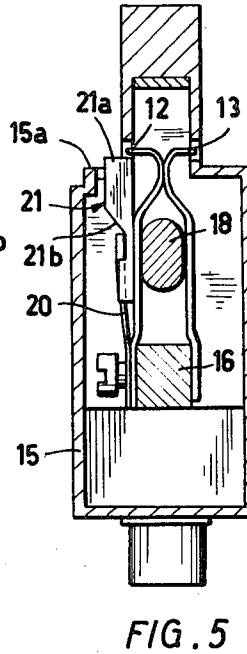
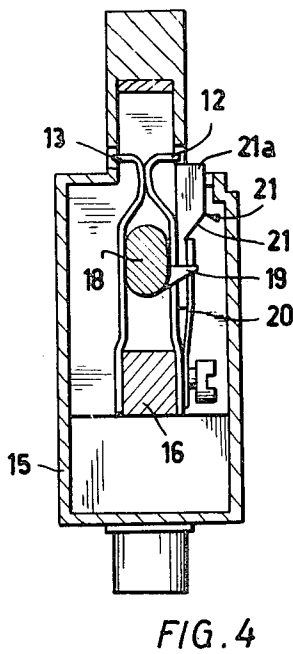
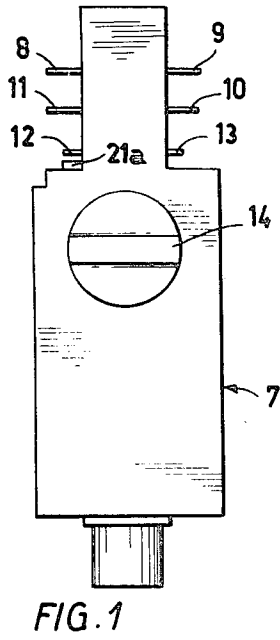
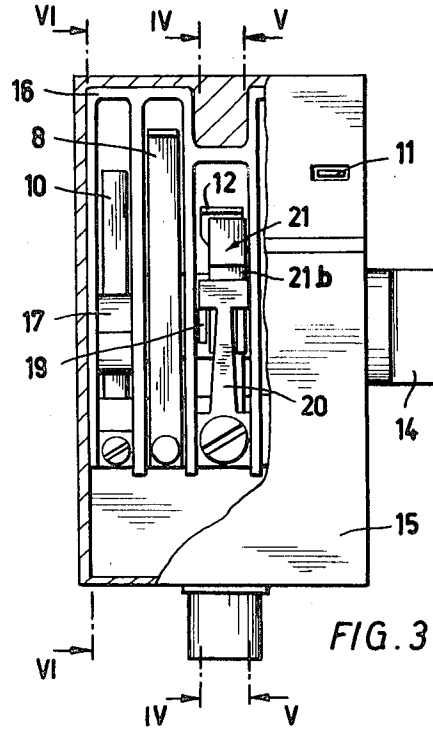
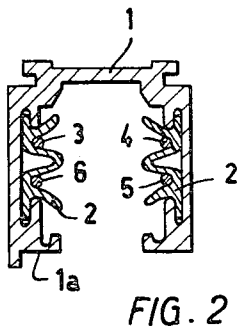
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**ABSTRACT**

A connecting plug for a current supply rail, provided with contact fingers displaceable by means of manually turnable eccentrics from an inner inoperative position to an outer contact-making position. The plug is provided with locking means in engagement with the eccentrics for preventing turning of the eccentrics in an incorrect contact position of the plug in the current supply rail.

**4 Claims, 9 Drawing Figures**





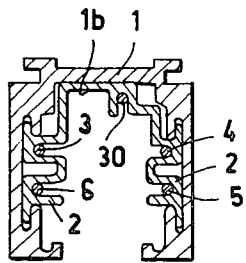


FIG. 8

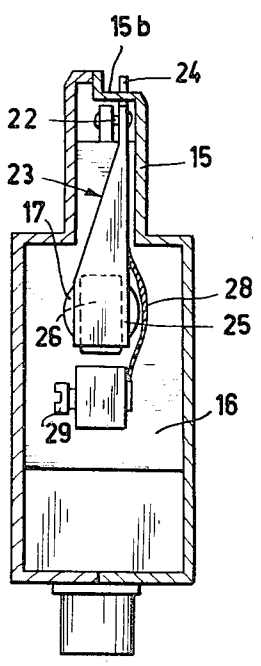


FIG. 7

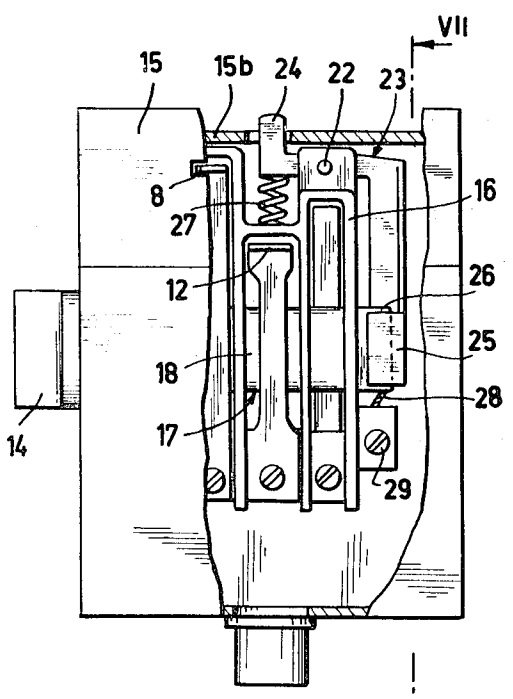


FIG. 9

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**CONNECTING PLUG FOR A CURRENT SUPPLY RAIL  
ARRANGEMENT INTENDED PARTICULARLY FOR  
LIGHTING PURPOSES AND SMALL-SIZED ELECTRICAL  
MOTORS**

The present invention relates to a connecting plug for a current supply rail arrangement equipped with current conductors and a protective grounding lead, the connecting plug consisting of a casinglike body, separate flexible contact fingers attached to the body and a rotating eccentric for each contact finger journaled in the body, which eccentric on being rotated displaces the respective contact finger between a position retracted into the casing and a position protruding from the casing and contacting the current conductors in the current supply rail.

An earlier connecting plug of this type is known, i.e., from the Finnish Pat. No. 40,644, the Austrian Pat. No. 278,131 and the German Gebrauchsmuster No. 1,989,491. As connecting plugs of this type are used in connection with three-phase current supply rails it is possible in practice that the connecting plug due to careless coupling to the supply rail is not pushed right to the bottom of the rail and that the eccentrics are thereupon rotated in the usual way in order to make the contact fingers contact the current conductors in the supply rail. The result is that only part of the contact fingers get into touch with the current conductors without the grounding fingers of the connecting plug being in contact with the grounding lead of the supply rail. The rest of the contact fingers are on the other hand quite bare outside the supply fingers rail and may consequently be touched by hand. The bare contact fingers become current-carrying through the consumer apparatus, when the latter is switched on. Considering that protective grounding has not been effected either, the defective coupling of the connecting plug may cause serious accidents.

The object of the present invention is to produce a more reliable connecting plug, by the use of which the foresaid risks of accidents will be avoided.

This is achieved by using a connecting plug according to the present invention, characterized in that the connecting plug is provided with a locking device, which is arranged so that it by the action of the current supply rail is displaced away from a position preventing the rotating of the eccentrics when the connection plug is pushed to the bottom of the supply rail.

The arrangement according to the present invention makes it impossible to turn out the contact fingers before the connecting plug is pushed into the supply rail right down to the bottom of it, because the locking device releases the eccentrics to be rotated only after the connecting plug is altogether pushed into the current supply rail. This releasing and locking operation takes place automatically when pushing in or pulling out the connecting plug and does not consequently require any extra manipulations. The construction of the locking device is very simple and known connecting plugs may by means of simple constructional modifications be made reliably usable.

The invention will be described in the following more in detail with reference to the accompanying drawings, wherein

FIG. 1 shows a side view of a first embodiment of the connecting plug.

FIG. 2 shows in cross section a known current supply rail of the connecting plug.

FIG. 3 shows a side view of the connecting plug, in partial section,

FIG. 4 shows a section along line IV—IV in FIG. 3,

FIG. 5 shows a section along line V—V in FIG. 3,

FIG. 6 shows a section along line VI—VI in FIG. 3,

FIG. 7 shows a section along line VII—VII in FIG. 9 of a second embodiment of the connecting plug according to the invention,

FIG. 8 shows a cross section of a current supply rail for the connecting plug according to FIG. 7,

FIG. 9 shows partly a section a side view of the connecting plug.

The three-phase supply rail arrangement shown in FIG. 2, comprises a metal rail 1 serving as protective grounding lead and supporting structure, to which insulating and fastening strips 2 are attached, in which are embedded current conductors 3, 4, 5 and 6 (three phase-conductors and one zero-conductor).

The connecting plug 7 shown in FIG. 1 comprises a casing 15 covering a body 16, to which contact fingers 8, 9, 10 and 11 are flexibly attached, which are intended to contact the current conductors 3, 4, 5 and 6 in the supply rail, whereas contact fingers 12 and 13 are intended to contact the metal rail 1 in order to achieve protective grounding. A turning spindle 17 is journaled in the body and formed with a number of eccentrics 18, one eccentric for each contact arm, and in addition at one end provided with a knob 14 for rotating the spindle. By rotating the spindle 17 the contact fingers may by means of the eccentrics be displaced between an outside position, where the contact fingers are protruding from the casing, and an inside position, where the contact fingers are retracted into the casing. The connecting plug is intended to be pushed into the current supply rail according to FIG. 2 with the contact fingers being in their inside position, whereupon the contact fingers by the turning of the knob are brought into their outside position, where contact fingers 8—11 make contact with the current conductors 3—6 whereas contact fingers 12—13 make contact with the metal rail 1.

The construction and function of the connecting plug so far described are previously known.

One end of the turning spindle is journaled in the body 16 in such a notch 16a, FIG. 6, that the spindle may be turned 90° by means of the knob 14, i.e., between said position where the contact fingers are kept inside the casing and said position where the eccentrics are pressing the contact fingers out of the casing, as described above.

The connecting plug is in order to be in the right contacting position expected to be completely pushed into the supply rail. However, it is evident that the connecting plug can also be pushed only partly into the current supply rail, and in order to prevent the contact fingers from being moved in such a case into their outside position by turning the knob 14 a locking device is arranged.

In the embodiment, according to FIGS. 1—6 there is formed on the turning spindle at the middle eccentric 18 a protruding locking cam 19, FIG. 3 and 4, and to the body 16 there is attached a resilient locking clasp 20, which is engaged with the cam 19 so as to prevent the spindle 17 from being rotated. Between the locking clasp 20 and the contact finger 12 there is slidably positioned a slide 21, FIG. 3 and 4, the upper end of which forms an operating element 21a protruding out of the edge surface 15a of the casing, and which is provided with an oblique guiding surface 21.

As the connecting plug is pushed into the supply rail right to the bottom, the operating element 21a strikes against the opening edge 1a of the supply rail, whereby the slide is pushed inside the casing. The oblique guiding surface 21b of the slide forces then the locking clasp 20 away from the eccentric 18, causing the locking cam 19 to get released from the locking clasp 20, whereby the turning spindle 17 is free to be turned by means of the knob 14. As the connecting plug is being pulled out of the supply rail, the slide is on account of the oblique guiding surface 21b and the spring action of the locking clasp 20 forced back to its starting position, whereupon the locking clasp again gets engaged with locking cam 19. It is noticed, that the rotating of the eccentrics is blocked until the connecting plug is pushed in to reach the bottom of the current supply rail.

In the embodiment according to FIGS. 7—9 a pivoting double-armed lever 23 is mounted on a pivot shaft 22 in the body, one arm of the lever forming an operating element 24 protruding from the top surface 15b of the casing while the second arm is forming an U-shaped locking element 25. The turning spindle 17 is formed with an end part 26 having a rectangular cross section, which fits into the U-shaped locking element 25

FIG. 9.

As the connecting plug is pushed into the supply rail 1 right to the bottom thereof, the operating element 24 of the lever strikes against the bottom surface 1b of the supply rail, whereby the operating element is pushed into the casing and the lever is turned anticlockwise (FIG. 9) round the pivot shaft so that the locking element 25 is pushed away from its engagement with the end part 26 of the turning spindle and the spindle is free to be turned by means of the knob 14. As the connecting plug is pulled out from the supply rail the lever is returned to its locking position by means of a spring 27, whereupon locking position element again gets engaged with the end part 26 of the spindle. It is observed that the rotating of the eccentrics is locked until the connecting plug is pushed in right to the bottom of the supply rail.

In the embodiment according to FIGS. 7-9 the lever 23 is made of electric conductor material and connected by means of a flexible cable 28 with a grounding contact screw 29. The current supply rail is equipped with a special protective grounding lead 30, which the operating element 24 of the lever 23 contacts, when the plug is pushed into the rail. In this connection, the function of the contact fingers 12-13 is only to serve as holding means for the connecting plug in the supply rail.

The operating element of the locking device is in both embodiments preferably arranged to protrude nearby the center of the connecting plug (FIGS. 3 and 9) in order to prevent that the locking action of the locking device is affected by an oblique insertion of the plug into the supply rail.

The drawings and descriptions referring to them are only intended to exemplify the idea of the invention. As to details, the connecting plug may vary considerably within the scope of the invention.

I claim:

1. A connecting plug for a current supply rail arrangement provided with current conductors and a protective grounding lead, particularly for lighting purposes and small electric motors, said plug comprising; a casinglike body, contact fingers being separately flexibly fastened in the body; an eccentric for each said contact finger rotatably journaled in the body, each said eccentric upon being rotated displacing a corresponding contact finger between a position retracted within a casing and a position protruding therefrom for contact with the current conductors in the current supply rail; and a locking device adapted to be displaced by the action of the supply rail

away from a position locking the rotation of the eccentrics as the plug is pushed to the bottom of the supply rail, said locking device comprising a locking cam formed on a turning spindle connecting said eccentrics, a locking clasp attached to said body and engaged with the locking cam; and a slide positioned in said body, said slide having one of end forming an operative element having a guiding means, said slide being displaceable between a locking position in which said operative element protrudes from said casing, and a releasing position in which said operative element is pushed into the casing and said guiding means displaces the locking clasp from its engagement with the locking cam.

2. A connecting plug as claimed in claim 1, wherein said operative element of the slide is adapted to protrude from the center portion of said casing, said portion being adapted to be positioned against the edge of an opening in the current supply rail.

3. A connecting plug for a current supply rail arrangement provided with current conductors and a protective grounding lead, particularly for lighting purposes and small electric motors, said plug comprising; a casinglike body; contact fingers being separately flexibly fastened in the body; an eccentric for each said contact finger rotatably journaled in the body, each said eccentric upon being rotated displacing a corresponding contact finger between a position retracted within a casing and a position protruding therefrom for contact with the current conductors in the current supply rail; and a locking device adapted to be displaced by the action of the supply rail away from a position locking the rotation of the eccentrics as the plug is pushed to the bottom of the supply rail, said locking device comprising a locking means formed on a turning spindle connecting the eccentrics, and a pivoting lever journaled in said body, said lever having one arm forming an operative element and another arm forming a locking element, said lever being pivotable between a locking position in which said operative element protrudes from said casing so as to engage the locking element with the locking element with the locking means on said spindle and a releasing position in which the operative element is pushed into the casing and the locking element is disengaged from said locking means.

4. A connecting plug according to claim 3, wherein said operative element of the lever is adapted to protrude from the center portion of said casing, said portion being adapted to be positioned against the bottom of said current supply rail.

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