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H2E EDLC

(56) Documents Cited:
GB 2273006 A **GB 2083716 A**
GB 2028016 A **FR 002728108 A1**

(58) Field of Search:
UK CL (Edition T) **H2E EDCR EDLA EDLC EDLJ**
INT CL⁷ **H01R 13/502 13/504 13/508 13/512 24/06 24/08**
Other:

(54) Abstract Title: **Detachable plug**

(57) A plug having a base plate 21 housing the pins 213,23 attached to a cover 22 by means of screws 29 and 211, the base plate having a perimeter wall designed to fit against ribs 221 located on the inside of the cover wall. Connecting blocks 24 of various shapes (including hexagonal, cylindrical and cube) to facilitate attaching the wires 25 to the terminals of the plug are also disclosed. The terminals may be rivetted or screwed to the connection blocks. The plug assembly may include a fuse. The specific embodiments relate to GB standard three pin plugs.

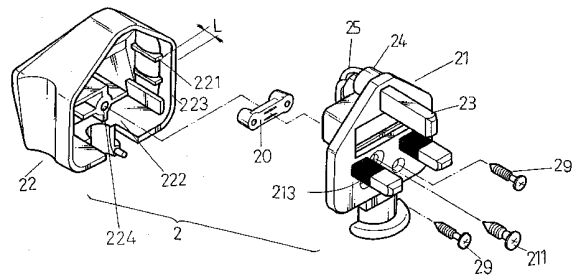


FIG. 2

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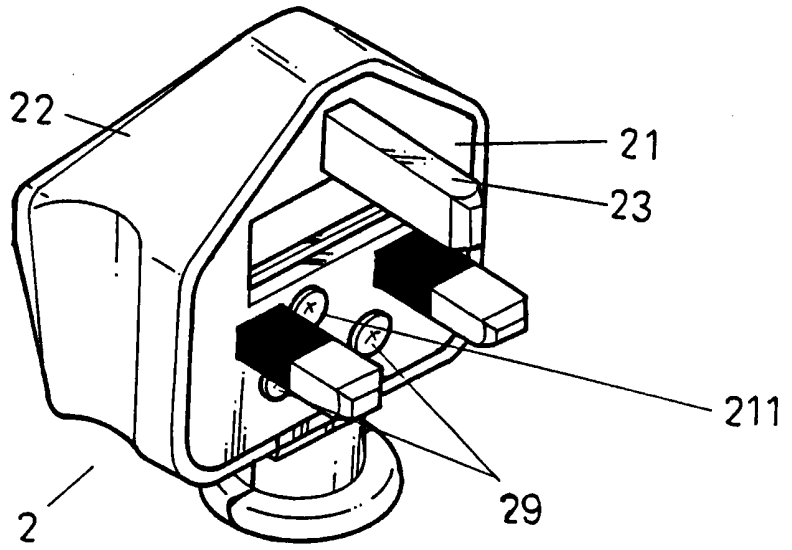


FIG. 1

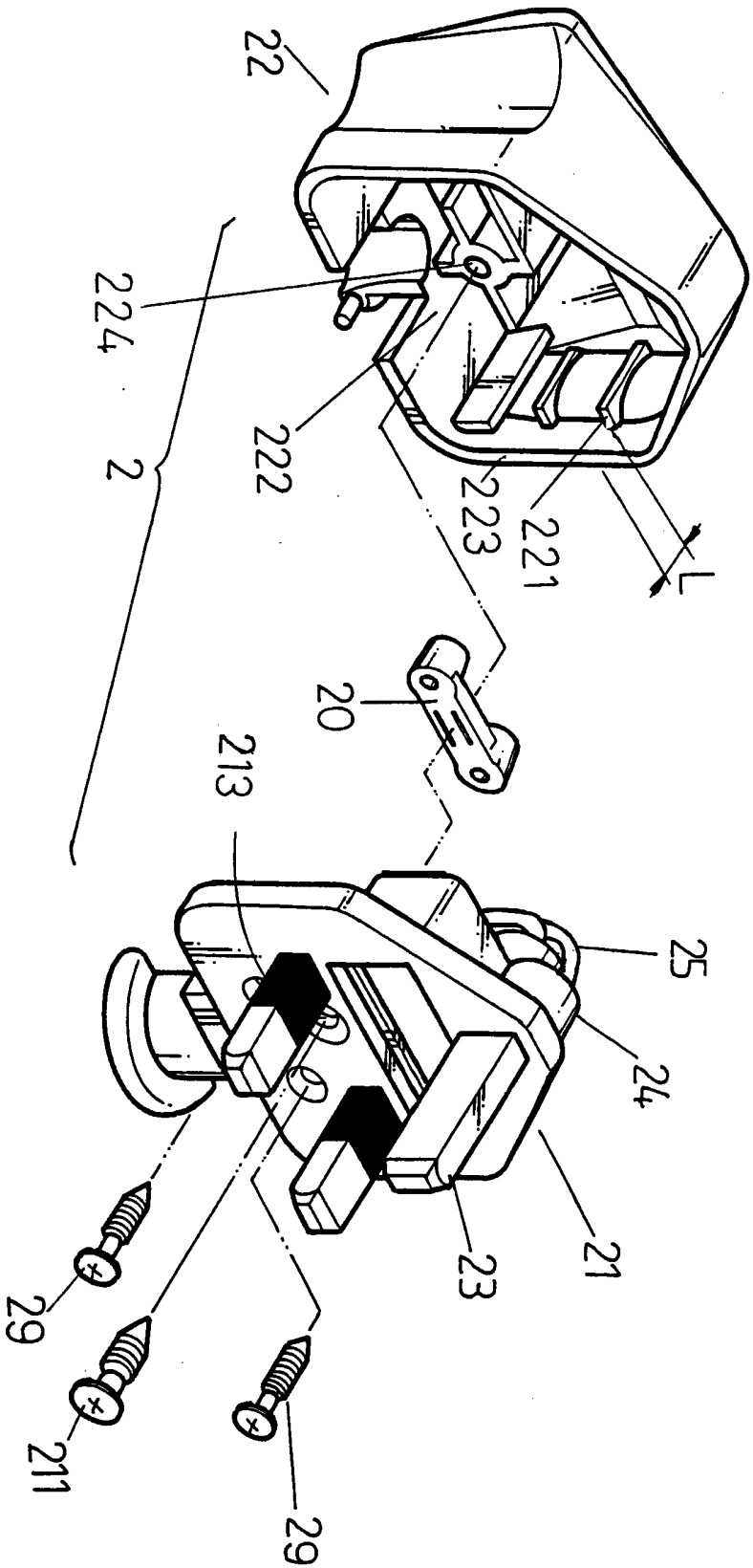


FIG. 2

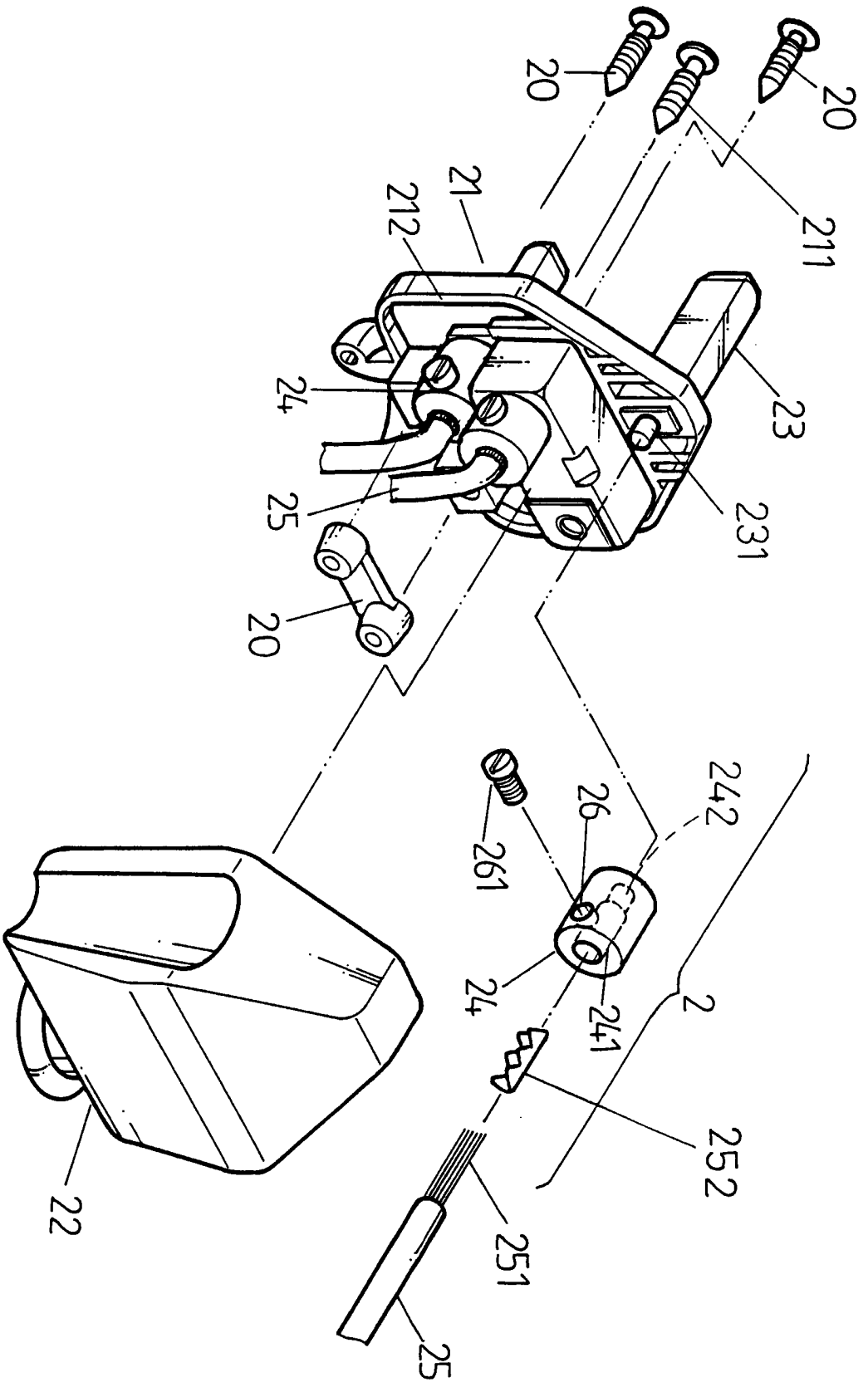


FIG. 3

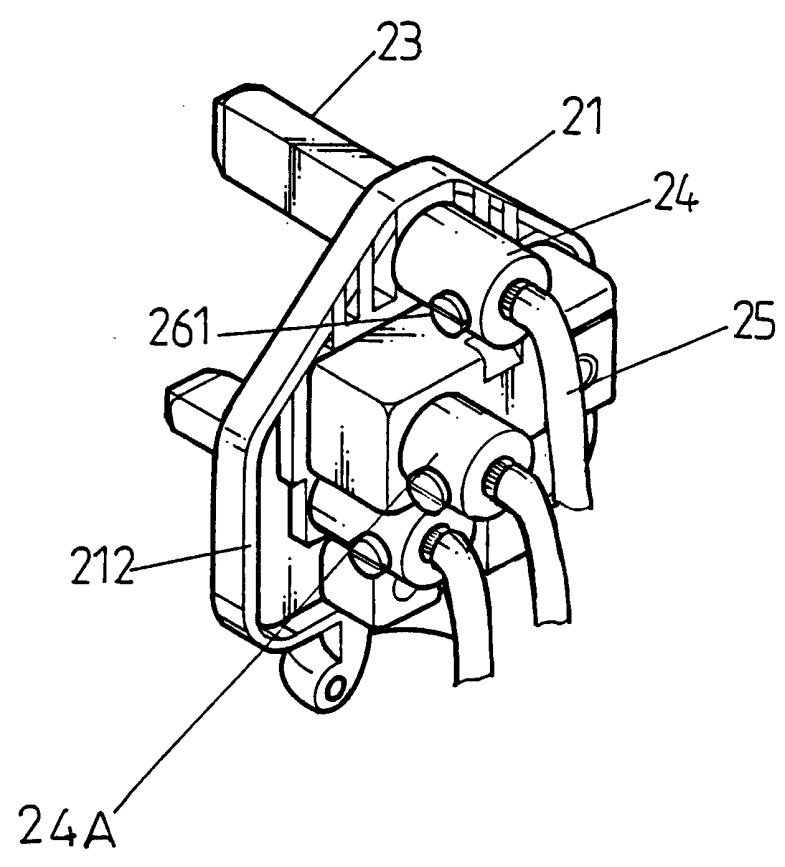


FIG. 4

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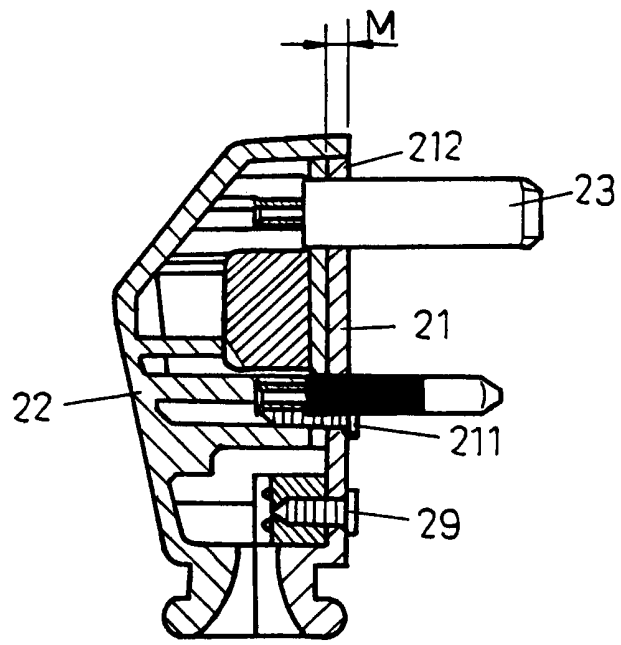


FIG. 5

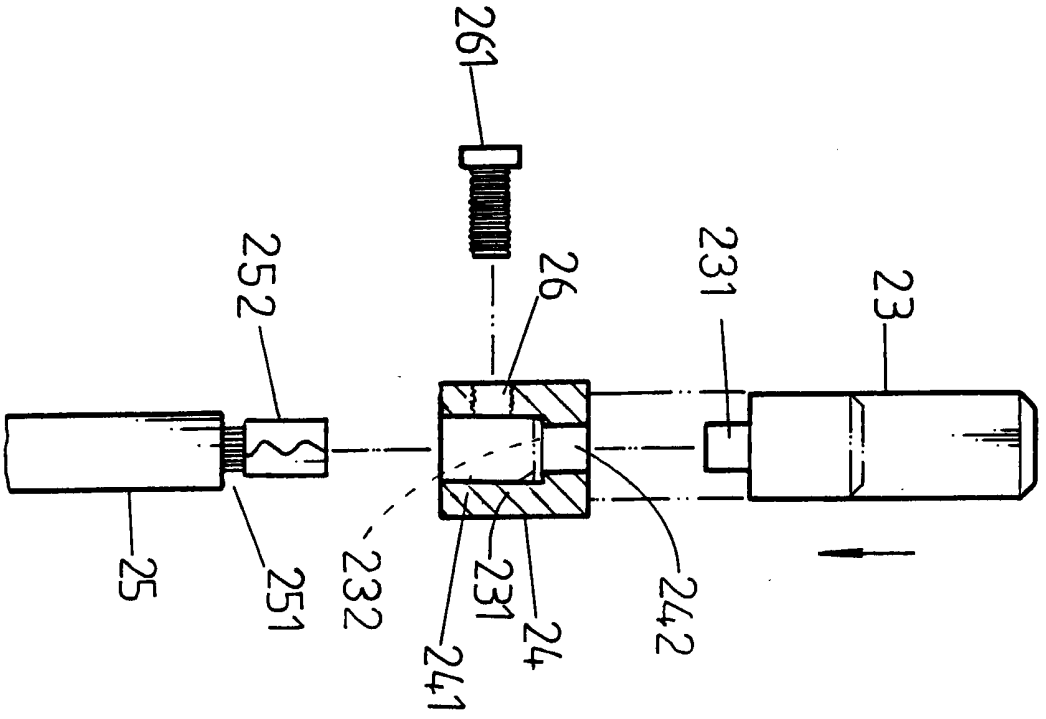


FIG. 6

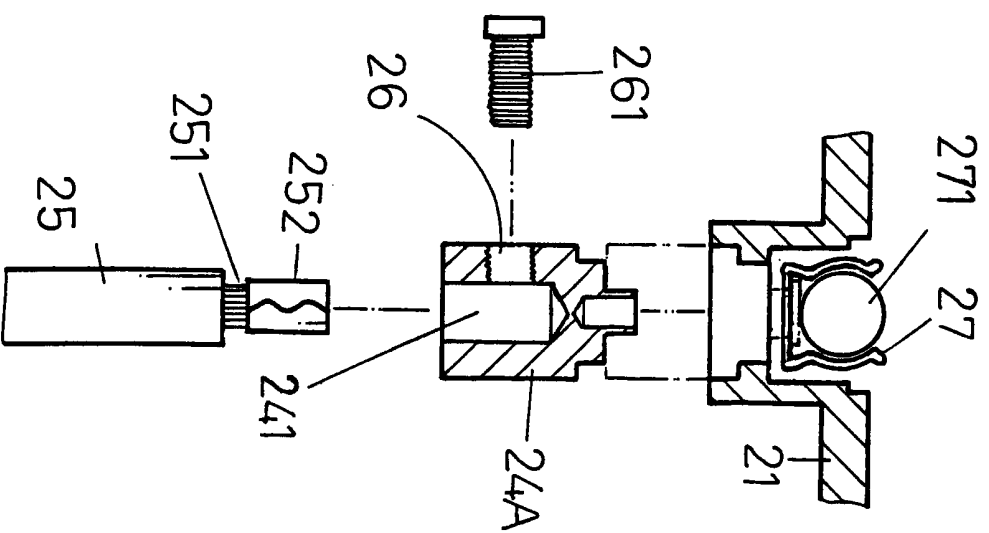


FIG. 7

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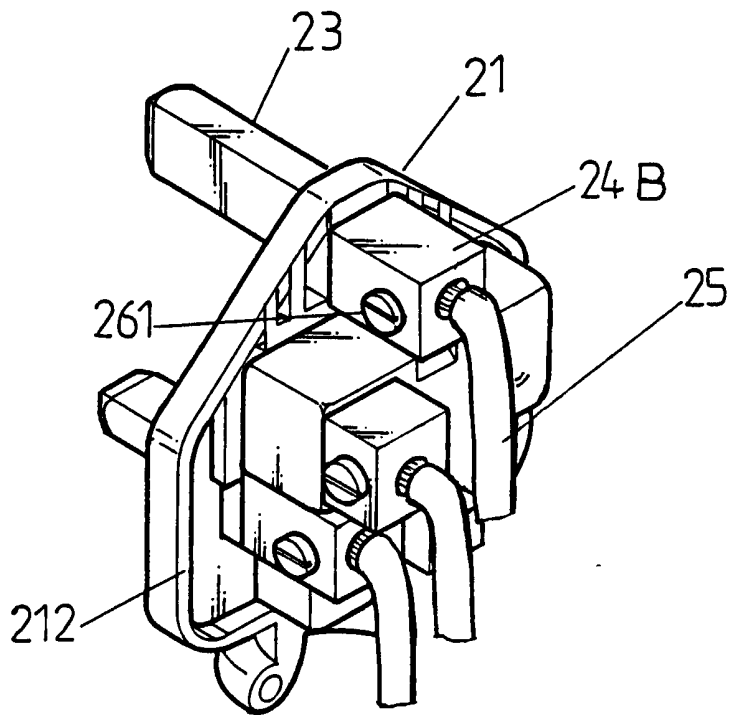


FIG. 8

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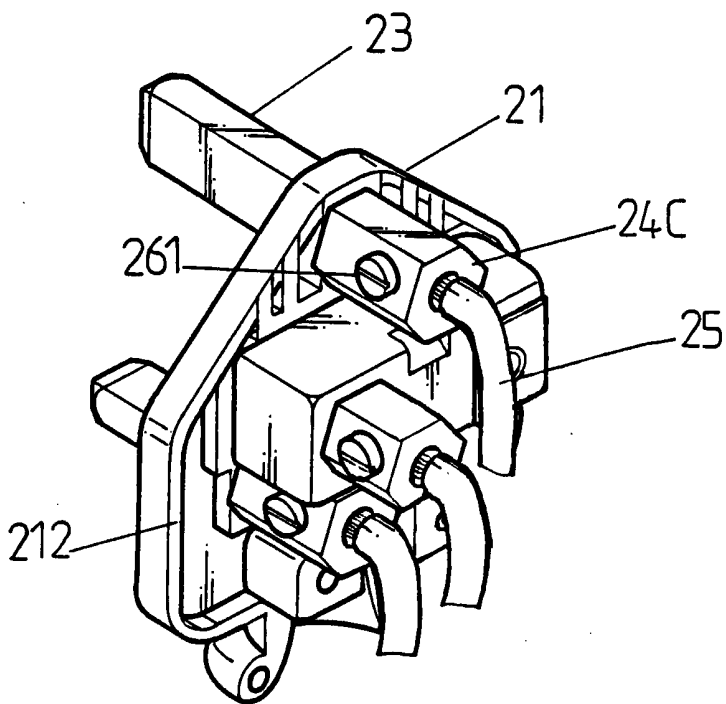


FIG. 9

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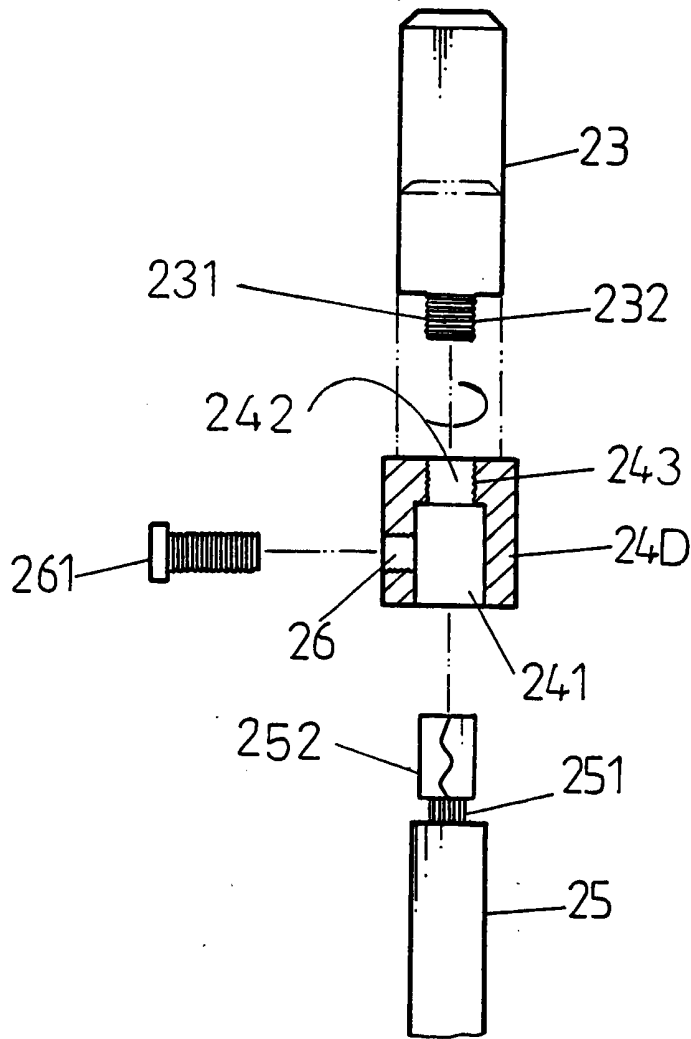


FIG. 10

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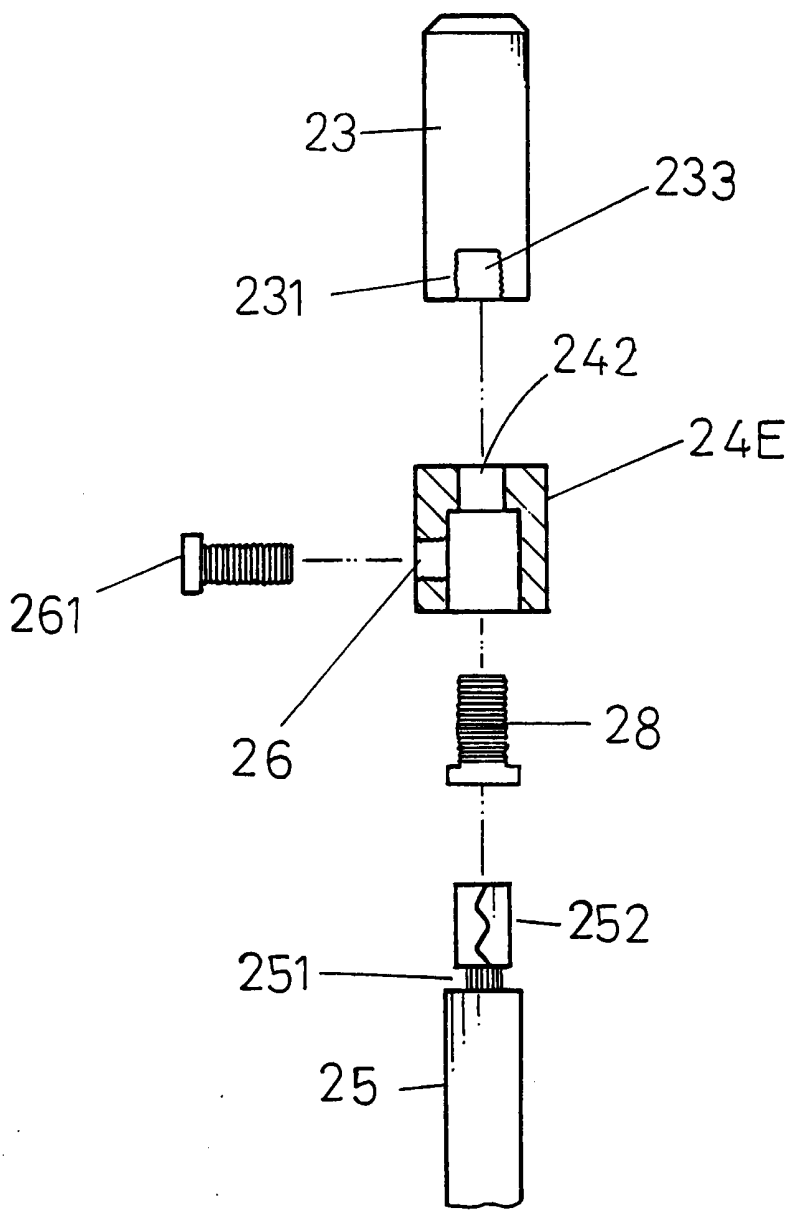


FIG. 11

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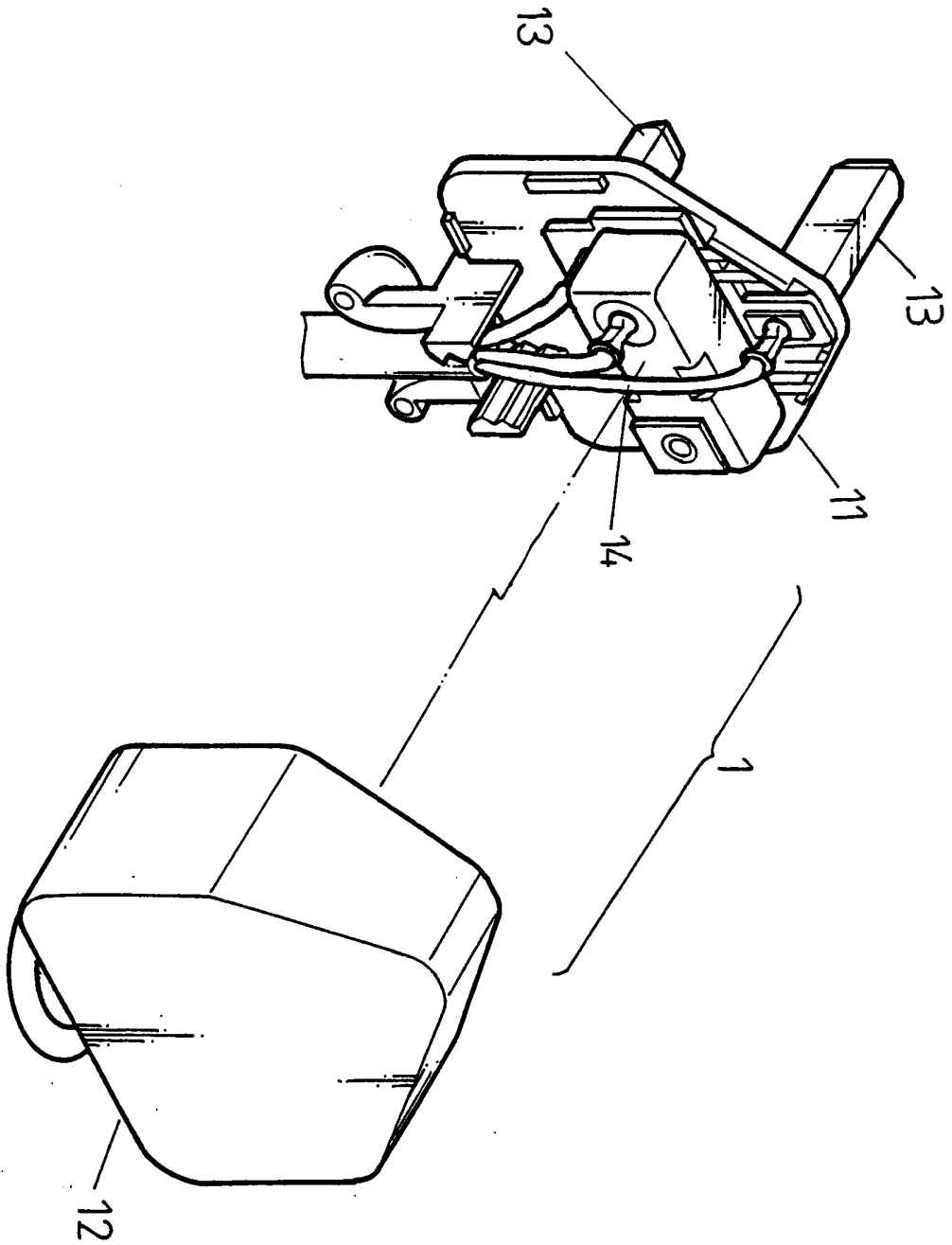


FIG.12
PRIOR ART

Detachable Plug

Background of the Invention

1. Field of the Invention

The present invention relates to a detachable plug that can be detached to
5 allow replacement of blades and/or wires in the plug.

2. Description of the Related Art

Fig. 12 of the drawings illustrates a conventional plug 1 including a
mounting plate 11 and a cover 12 attached to a rear side of the mounting plate
11. In manufacture, blades 13 are placed in a mold and an injection molding is
10 then performed to form the mounting plate 11. Next, wires of cables 14 are
respectively attached by a terminal-coupling machine to rear ends of the blades
13. The cover 12 is resilient to allow the mounting plate 11 to be forcibly
inserted into a compartment in the cover 12. However, detachment of the
mounting plate 11 from the cover 11 is impossible. The whole plug is useless
15 when the cables 14 are wrongly connected to the blades 13. Further, it is not
uncommon that the wires of the cables 14 are burnt by the heat generated
during use or oxidized after a period of time. Replacement of the blades and
the wires is impossible for the plug of this type.

Summary of the Invention

20 An object of the present invention is to provide a detachable plug that can
be detached to allow replacement of blades and/or wires in the plug.

A detachable plug comprises a mounting plate and a cover mounted to a
rear side of the mounting plate, the cover including a compartment for
accommodating the mounting plate. A plurality of blades each have an end
25 securely attached to the mounting plate, and a plurality of cables each contain
wires therein for electrical connection with the end of an associated blade. The

mounting plate includes an upright wall extending therefrom. A plurality of ribs are formed on an inner periphery defining the compartment of the cover. The upright wall of the mounting plate presses against the inner periphery defining the compartment of the cover. Each rib has an outer end. A distance
5 between the outer end of each rib and an end face of the cover is equal to a width of the upright wall of the mounting plate. The ribs prevent excessive movement of the mounting plate into the compartment. A screw is extended through the mounting plate into the cover, thereby securing the mounting plate and the cover together.

10 A plurality of connecting blocks are provided for respectively connecting the wires of the cables to the ends of the blades. Each connecting block includes a through-hole having a first end and a second end. Each connecting block further includes a radial screw hole. The wires of each cable are mounted in the first end of the through-hole. A screw is extended through the
15 radial screw hole to adjustably press against the wires.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

20 Fig. 1 is a perspective view of a first embodiment of a plug in accordance with the present invention.

Fig. 2 is an exploded perspective view of the plug in Fig. 1.

Fig. 3 is an exploded perspective view of the plug as viewed from another direction.

25 Fig. 4 is a perspective view of a mounting plate of the plug in Fig. 3.

Fig. 5 is a sectional view of the plug in Fig. 1.

Fig. 6 is a schematic side view, partly sectioned, illustrating assembly of a blade, a connecting block, and wires of the plug in Fig. 3.

Fig. 7 is a view similar to Fig. 6, illustrating a modified embodiment of the connecting block.

5 Fig. 8 is a perspective view illustrating another modified embodiment of the connecting block.

Fig. 9 is a perspective view illustrating a further modified embodiment of the connecting block.

10 Fig. 10 is a view similar to Fig. 6, illustrating still another modified embodiment of the connecting block

Fig. 11 is a view similar to Fig. 6, illustrating yet another modified embodiment of the connecting block.

Fig. 12 is an exploded perspective view of a conventional plug.

Detailed Description of the Preferred Embodiments

15 Referring to Figs. 1 through 5, a plug 2 in accordance with the present invention generally comprises a mounting plate 21 and a cover 22 mounted to a rear side of the mounting plate 21. Blades 13 are placed in a mold (not shown) and an injection molding is then performed to form the mounting plate 21. The cover 22 includes a compartment 222 (Fig. 2). Further, the mounting
20 plate 21 includes an upright wall 212 (Fig. 3) extending from the rear side thereof. The cover 22 includes a plurality of ribs 221 (Fig. 2) on an inner periphery defining the compartment 222. Each rib 221 has an outer end, and a distance L between the outer end of the rib 221 and an end face 223 of the cover 22 is equal to a width M (Fig. 5) of the upright wall 212 of the mounting
25 plate 21.

In assembly, the upright wall 212 of the mounting plate 21 is received in the cover 22 with the upright wall 212 pressing against the inner periphery defining the compartment 222. The ribs 221 prevent excessive movement of the upright wall 212 into the compartment 222 of the cover 2. A screw 211 is then extended through a hole 213 in the mounting plate 21 and a hole 224 in the cover 22 to thereby secure the mounting plate 21 and the cover 22 together.

A connecting block 24 is provided to each blade 23 for connection with an associated cable 25. Each connecting block 24 includes a through-hole 241 (Fig. 3) having a first end and a reduced second end 242. Further, each connecting block 24 includes a radial screw hole 26 communicated to the through-hole 241. Wires 251 in each cable 25 are clamped together by a coupler 252 so as to be inserted into the through-hole 241 easily. A rear end 231 of each blade 23 is engaged in the reduced second end 242 of the through-hole 24 of an associated connecting block 24. A screw 261 is extended through the screw hole 26 of the associated connecting block 24 to adjustably press against the coupler 252.

Referring to Fig. 6, the end 231 of the blade 23 is inserted into the reduced second end 242 of the through-hole 241 of the connecting block 24 and partially into the first end of the through-hole 241 having a larger diameter. The end 231 of the blade 23 is then punched to form an enlarged end portion 232 having a diameter greater than that of the reduced second end 242 of the through-hole 241, thereby preventing disengagement of the blade 23 from the connecting block 23. Thus, the end 231 of the blade 23 is positioned by riveting.

Fig. 7 illustrates a modified embodiment of the invention, wherein the connecting block (now designated by 24A) has a hole 241 for receiving the

wires 252 of the cable 25 that are clamped together by a coupler 252. The mounting plate 21 includes a fuse clip 27 for holding a fuse 271. The connecting block 24 is made of conductive metal and thus electrically connected to the end 231 of the blade 23 through the fuse 271 and the fuse clip 27. Thus, it is not necessary to connect the end 231 of each blade 23 to the coupler 252.

The connecting blocks 24 are cylindrical in the embodiment shown in Figs. 1 through 5. Modified embodiment of the connecting blocks are shown in Figs. 8 and 9, wherein the connecting block 24B in Fig. 8 is a parallelepiped and the connecting block 24C in Fig. 9 is a polyhedron such as a hexahedron.

Fig. 10 illustrates still another modified embodiment of the connecting block, wherein the reduced second end 242 of the connecting block 24D includes inner threading 243 for threadedly engaging with an outer threading 232 on the end 231 of the blade 23.

Fig. 11 illustrates yet another modified embodiment of the connecting block, wherein the end 23 of the blade 231 includes a screw hole 233, and a screw 28 is mounted in the through-hole 241 of the connecting block 24E and extended through the reduced second end 242 of the connecting block 24E into the screw hole 233 of the blade 23.

A pressing block 20 (Figs. 2 and 3) may be provided to retain the cables 25 in place. Thus, the cables 25 could be located in a tidy manner.

After assembly, the upright wall 212 presses against the inner periphery defining the compartment 222 of the cover 22. The ribs 221 prevent excessive movement of the upright wall 212 into the compartment 222 of the cover 22. A screw 211 is provided to secure the cover 22 and the mounting plate 21 together. Such an arrangement allows detachment of the plug 2 after assembly.

As a result, when the wires have been oxidized or burnt, the manufacturer or user may detach the plug 2 for replacement. The production cost of the manufacture is reduced, and the waste to the user is avoided.

5 Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the invention as hereinafter claimed.

CLAIMS

1. A detachable plug comprising:

a mounting plate, a plurality of blades each having an end
securely attached to the mounting plate, a plurality of cables each
5 containing wires therein for electrical connection with the end of an
associated one of the blades; and

a cover mounted to a rear side of the mounting plate, the cover
including a compartment for accommodating the mounting plate;
wherein

10 said mounting plate includes an upright wall extending therefrom,
a plurality of ribs are formed on an inner periphery defining said
compartment of the cover, the upright wall of the mounting plate presses
against the inner periphery defining said compartment of the cover, each
said rib has an outer end, a distance located such that between the outer
15 end of each said rib and an end face of the cover is equal to a height of
the upright wall of the mounting plate, the ribs prevent excessive
movement of the mounting plate into the compartment, a first screw is
extended through the mounting plate into the cover, thereby securing the
mounting plate and the cover together;

a plurality of connecting blocks are provided for respectively connecting the wires of the cables to the end of the blades, each said connecting block includes a through-hole having a first end and a second end, each said connecting block further includes a radial screw hole, the wires of each said cable are mounted in the first end of the through-hole, a second screw is extended through the radial screw hole to adjustably press against the wires.

2. A detachable plug as claimed in claim 1, wherein the end of each said blade is mounted in the second end of the through-hole of an associated one of the connecting blocks.

3. A detachable plug as claimed in claim 2, wherein the second end of the through-hole has a diameter smaller than that of the first end of the through-hole, the end of each said blade is extended through the second end of the through-hole of an associated one of the connecting blocks into the first end of the through-hole and then punched to form an enlarged end portion having a diameter greater than that of the second end of the through-hole.

4. A detachable plug as claimed in any one of the preceding claims, wherein the end of each said blade is electrically connected to

the wires of an associated one of the cables through a fuse.

5 5. A detachable plug as claimed in any one of the preceding claims, wherein the second end of the through-hole has an inner threading, and wherein the end of each said blade has an outer threading for threadedly engaging with the inner threading.

 6. A detachable plug as claimed in any one of the preceding claims, wherein each said connecting block is cylindrical

 7. A detachable plug as claimed in any one of the preceding claims, wherein each said connecting block is a parallelepiped.

10 8. A detachable plug as claimed in any one of the preceding claims, wherein each said connecting block is a polyhedron.

 9. A detachable plug as claimed in any one of the preceding claims, wherein the end of each said blade has a screw hole, a screw is mounted in the first end of the through-hole of each of said connecting block and extended through the second end of the through-hole into the screw hole of an associated one of the blades.

15 10. A detachable plug substantially as hereinbefore described with reference to and as illustrated in any one of the accompanying drawings.

11. A detachable plug comprises:

(i) a mounting plate;

(ii) a cover mounted to a rear side of the mounting plate, the cover including a compartment for accommodating the mounting plate;

5 (iii) a plurality of blades each having an end securely attached to the mounting plate;

(iv) a plurality of cables each containing wires therein for electrical connection with the end of an associated blade;

10 (v) an upright wall extending from the mounting plate, the upright wall of the mounting plate presses against the inner periphery defining the compartment of the cover;

15 (vi) a plurality of ribs formed on an inner periphery defining the compartment of the cover, each rib having an outer end, said ribs preventing excessive movement of the mounting plate into the compartment; and

(vii) a screw extending through the mounting plate into the cover, thereby securing the mounting plate and the cover together.



INVESTOR IN PEOPLE

Application No: GB 0219691.3
Claims searched: 1 to 11

Examiner: Alastair Kelly
Date of search: 14 November 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): H2E EDCR, EDLA, EDLC, EDLJ

Int Cl (Ed.7): H01R 13/502 13/504, 13/508, 13/512, 19/06, 19/08

Other: On-line EPODOC, WPI, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	FR2728108 A1 (BASTIEN) Figures 2,5 and 6	11
X	GB2273006 (WAIBLE) Fig 1,2 and 19	11
A	GB2083716 A (CAPPER) Fig 1	-
A	GB2028016 A (MACH) Fig 3	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.