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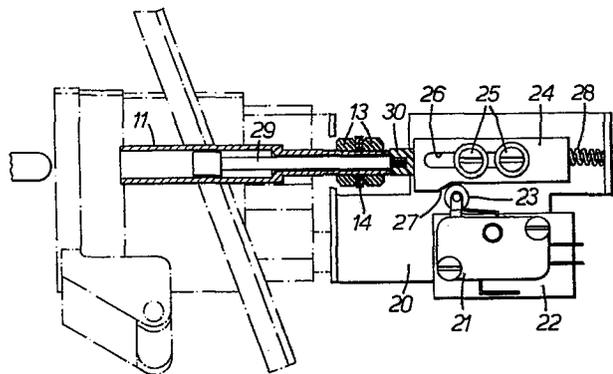
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54 **Electric sockets.**

57 An electric socket for a mains supply system includes means for sensing the presence of a plug inserted in the socket and comprising a plunger (29) slidable in a tubular earth contact (11) of the socket to be pushed in by the earth pin of a plug for operating a microswitch (21) through a linear ramp cam mechanism (24-28).



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Electric Sockets

This invention concerns electric sockets, and in particular a socket suitable for a mains supply system and adapted for releasable connection of an electric plug having contact pins for cooperation with
5 the socket contacts.

It is known to provide an electric socket with means for sensing the presence of a plug inserted in the socket. In the body of the known electric socket there is included a retractable plunger which is
10 depressed by the plug when it is engaged with the socket, the plug being equipped with an additional pin for this purpose and which pin plays no part in the electrical connection between the plug and socket. The plunger may be arranged to actuate a microswitch, e.g. to prevent
15 the supply of electric current to the socket contacts when there is no plug engaged with the socket.

A disadvantage of the known plugs and sockets is that an additional bore is needed in the socket body to receive the sliding plunger. Consequently moulds
20 required for manufacturing socket bodies which are to be fitted with plungers are different to the moulds needed to manufacture bodies which are not to have plungers. The plug bodies must also be modified in order to mount the extra pin for actuating the socket plunger.

25 The present invention seeks to overcome this

drawback and resides in an electric socket comprising an earth contact and current carrying contacts carried by a body to cooperate with respective contact pins of an electric plug engageable with the socket, and means
5 for sensing the presence of a plug inserted in the socket, said means including a member slidable relative to the body and arranged to be pushed inwardly by a pin of a plug when the plug is inserted into the socket, characterised in that said sensing member is
10 located adjacent the earth contact so as to be displaced by the earth pin of the plug as the plug is inserted into the socket.

In a preferred construction, the earth contact is tubular and the sensing member is slidable in this
15 tubular contact.

With a socket according to the invention the plug does not require an extra pin and the same plugs can be used for sockets with or without plungers. Furthermore, the same moulded bodies can serve for all
20 sockets whether or not sensing members or plungers are to be incorporated. As the same moulding tools can be used for all plugs and all sockets a significant saving in manufacturing costs is possible.

A full understanding of the invention will be
25 had from the following detailed description of an embodiment of the invention, reference being made to the accompanying drawings in which:-

Figure 1 is a side elevation of an electric socket in accordance with the invention;

30 Figure 2 is a rear end view of the socket;

Figure 3 is a side view with the earth contact and sensing plunger shown in section;

Figure 4 is a side view of the socket body;
and

35 Figure 5 is a rear end view of the body.

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The socket illustrated in the drawings has a casing 1 including a mounting flange 2 and a hinged cover 3. Accommodated in the casing and fixed to it by screws 4 is a body 5 having three longitudinal through bores receiving respectively live, neutral and earth contacts 9-11. The body includes a main part and a backing plate 6 fixed to the main part by a screw 7. The power contacts 9, 10 include terminals at their rear ends including conductor clamping screws (not shown) accessible through lateral openings 12 in the body. As seen in Figure 3, the earth contact is tubular with a stepped diameter and projects beyond the rear end of the body 5. The end portion of this contact is externally threaded and receives nuts 13 which secure an eyelet 14 crimped to the end of an earth wire 15. The live and neutral wires are not shown but it will be understood from the foregoing that they enter the openings 16, 17 at the rear end of body 5.

Also attached to the casing by the screws 4 is a bracket 20 which supports a microswitch 21 with an insulating plate 22 interposed therebetween, and a linear cam mechanism for operating the actuating member 23 of the microswitch. The cam mechanism consists of a cam member in the form of a moulded plastics block 24 guided for linear sliding movement by a pair of screws 25 fixed to bracket 20 and passing through a slot 26 in the block. The surface of the block 24 facing the microswitch includes a ramp 27 for depressing the switch actuating member 23 when the cam member is pushed rearwardly. A return spring 28 acts between the end of the bracket 20 and block 24 urging the latter forwardly to the position illustrated in the drawings.

A sensing plunger 29 is slidable in the earth contact tube 11 and consists of a rod with an enlarged head and a threaded tip onto which is screwed a moulded

plastics cap 30 which abuts against the front end of block 24. The cap 30 engages the end of contact 11 to limit the forward displacement of the plunger and the cam block under the bias of spring 28.

5 When there is no plug in the socket the parts take their illustrated positions. If a plug is introduced, the earth pin enters the socket contact 11, engages the head of plunger 29 and pushes the plunger, and hence the cam block 24, back against the force of
10 spring 28. The ramp surface 27 engages member 23 and depresses it whereby the microswitch is operated. When the plug is removed the parts are returned to the original positions by spring 28.

 The microswitch may be utilised for various
15 purposes, e.g. to control supply of electric current to the power contacts by means of a contactor, whereby power can only be drawn from the socket when a plug has been correctly inserted. Alternatively, the switch may be used merely to detect and provide an indication at
20 a remote location whether or not the socket has a plug connected to it.

 As mentioned already, the socket of the invention simplifies and reduces the cost of manufacture because it allows the same bodies to be used in sockets
25 with and without plungers. An additional advantage of the described socket is that it enables a wide variation in the longitudinal movement of the switch actuating cam to be tolerated. This variation in the longitudinal movement may be from approximately 4 mm to
30 8 mm, which enables quite large manufacturing tolerances to be absorbed.

 Manufacture of the socket is facilitated by the microswitch and cam mechanism being supported on a common bracket and the sensing plunger having abutting
35 engagement with the cam member. The cam member, micro-

switch and bracket can be pre-assembled and mounted on the socket as a unit.

It is to be understood the embodiment described above is given by way of example only and
5 that the invention is applicable equally to other forms of electrical socket.

Claims:

1. An electric socket comprising an earth contact (11) and current carrying contacts (9,10) carried by a body (5) to cooperate with respective contact pins of an electric plug engageable with the socket, and means for sensing the presence of a plug inserted in the socket, said means including a member (29) slidable relative to the body and arranged to be pushed inwardly by a pin of a plug when the plug is inserted into the socket, characterised in that said sensing member (29) is located adjacent the earth contact (11) so as to be displaced by the earth pin of the plug as the plug is inserted into the socket.

2. An electric socket according to claim 1, wherein the earth contact (11) is tubular and the sensing member (29) is slidable in said earth contact.

3. An electric socket according to claim 2, wherein the tubular earth contact (11) includes an outer end portion for receiving the earth pin of the plug and an inner end portion of reduced diameter, and the sensing member (29) is guided for sliding movement in the inner end portion and includes an enlarged head accommodated in the outer end portion of the contact for engagement by the plug pin.

4. An electric socket according to claim 2 or 3, wherein the sensing member (29) protrudes through the inner end of the contact (11) and includes a stop (30) for abutment with the inner end of the contact to limit forward displacement of the sensing member.

5. An electric socket according to any one of

claims 1 to 4, wherein the sensing means includes a microswitch (21), and the sensing member operates the microswitch through a cam mechanism (24).

6. An electric socket according to claim 5, wherein the cam mechanism comprises a member (24) guided for linear movement in a direction parallel with the sensing member (29), and the cam member and sensing member are arranged to move together.

7. An electric socket according to claim 6, wherein a spring (28) acts on the cam member (24) and urges the cam member and sensing member forwardly relative to the earth contact.

8. An electric socket according to claim 6 or 7, wherein the cam member (24) has a ramp surface (27) for operating the actuating member (23) of the microswitch in response to linear displacement of the cam member.

9. An electric socket according to claim 6, 7 or 8, wherein the microswitch (21) and cam member (24) are supported on a common bracket (20), and the sensing member (29) abuts against the cam member thereby to enable the cam mechanism, microswitch and bracket to be pre-assembled and mounted on the socket as a unit.

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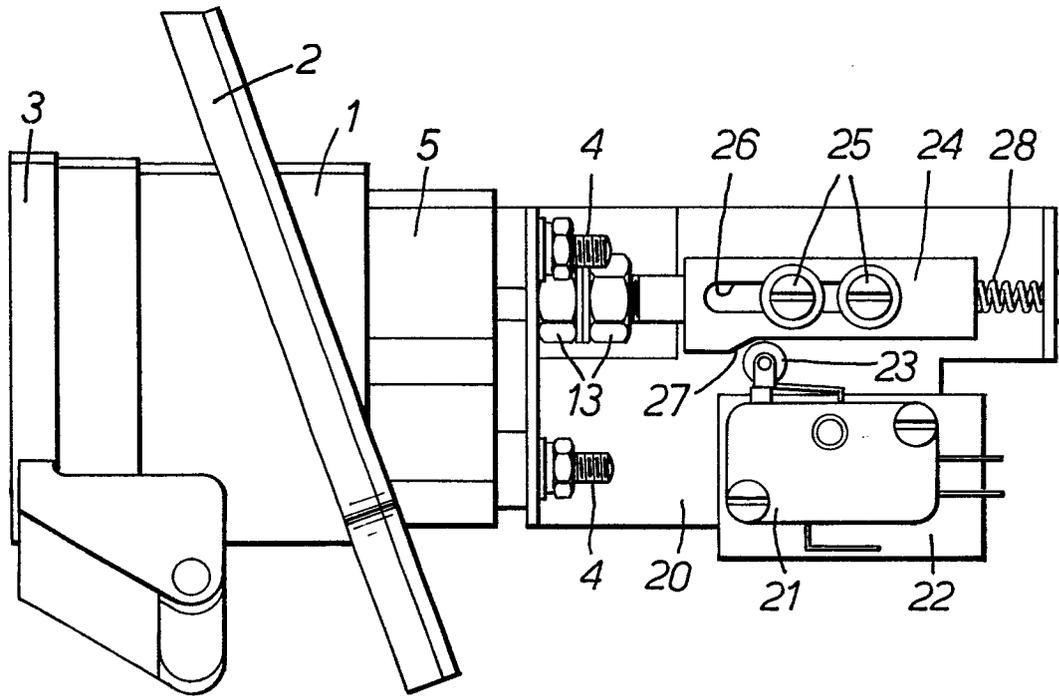


FIG. 1.

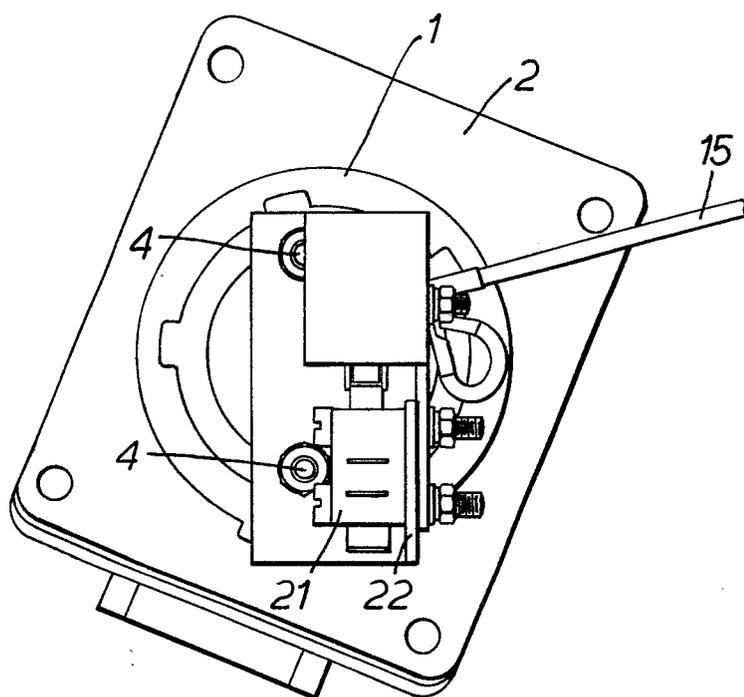


FIG. 2.

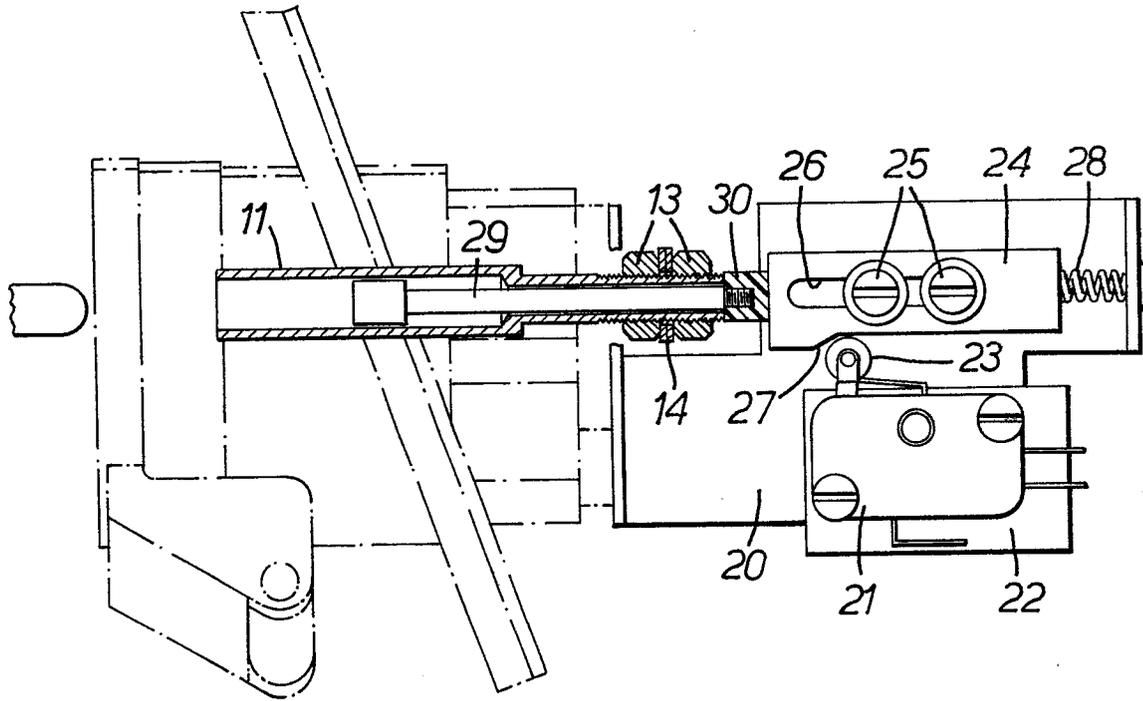


FIG. 3.

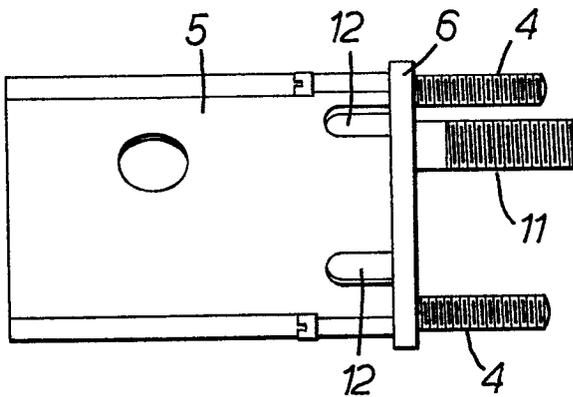


FIG. 4.

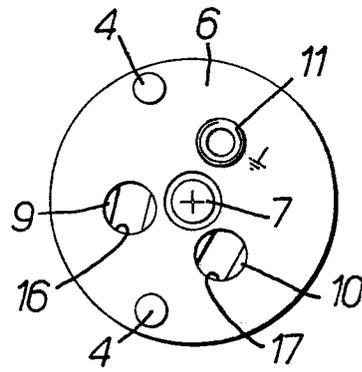


FIG. 5.



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. ³)
X	US-A-3 778 569 (NEWMAN et al.) * Column 3, line 51 - column 5, line 4; figures 1-4 *	1-9	H 01 R 13/703
A	DE-A-2 656 214 (PARRIER et al.) * Page 14, line 12 - page 22, line 4; figure 1 * -----	1,2,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			H 01 R 13/703 H 01 R 13/71
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 22-03-1984	Examiner HAHN G
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p> <p>& : member of the same patent family, corresponding document</p>			