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(54) **Improvements in or relating to meter switches**

(57) A switch assembly for an electricity meter comprising two parts, one of which parts (2) includes a fixed contact (12) and a meter output terminal (13) and the other of which parts (1) includes a moving contact (8) and a meter input terminal (3), the moving contact being coupled to the input terminal via a conductive spring (7) on which it is supported and which serves in use both to carry switch current and to bias the moving contact towards the fixed contact, and via a meter shunt (5) adapted so as to receive in use, sensor conductors so that current supplied via the switch from the input terminal to a consumer via the output terminal can be sensed for measurement purposes.

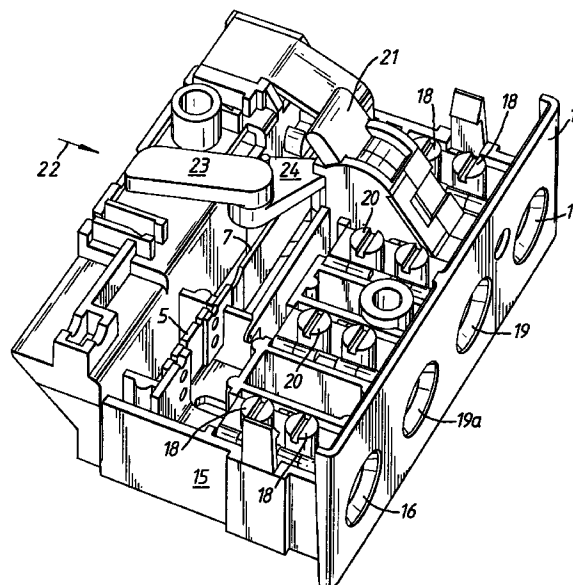


Fig.4

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Description

This invention relates to electricity meter switches and to electricity meters which embody them.

More especially, but not exclusively, it relates to switches for modular electricity meters of a kind described in our co-pending British patent application numbers 9509304.3 (F21093), 9501772.9 (F21069), and 9424461.3 (F21667), which include a mains isolating switch.

Modular meters of the kind described as aforesaid, comprise a basic meter module which includes a mains electricity isolating switch effective to isolate a consumer circuit from a supply circuit. The switch may be manually operated and/or it may be operated by an actuator in an 'add-on' module, fitted to the basic module to extend its functionality. Thus, as explained in our co-pending patent applications, the basic module may include for example a manually operated switch and be converted to a pre-payment meter by the addition of an 'add-on' module, which is arranged to receive electricity credit tokens and which includes a switch actuator operable automatically when credit is exhausted to cause the switch to disconnect a consumer from an electricity supply.

It is apparent that a switch for modular and other electricity meters should be robustly constructed and yet be simple and comparatively inexpensive to fabricate.

One object of this invention therefore is to satisfy these requirements.

According to the present invention a switch assembly for an electricity meter comprises two parts, one of which parts includes a fixed contact and a meter output terminal and the other of which parts includes a moving contact and a meter input terminal, the moving contact being coupled to the input terminal via a conductive spring on which it is supported and which serves in use both to carry switch current and to bias the moving contact towards the fixed contact, and via a meter shunt adapted so as to receive in use, sensor conductors so that current supplied via the switch from the input terminal to a consumer via the output terminal can be sensed for measurement purposes.

The switch assembly may form a part of a single pole switch.

The shunt may comprise strip metal to which a strip metal input terminal and a strip metal spring are electrically connected, in spaced apart relationship.

The spring may include between the moving contact and the shunt a narrowed portion to facilitate spring flexure without fracture at a junction with the shunt.

The output terminal may be formed from metal strip, one end of which is arranged to serve as the output terminal and the other end of which is adapted to define an electrical socket connector for receiving a complimentary plug of a meter 'add-on' module, the fixed contact being supported by the metal strip at a position intermediate between its ends.

The input and output terminals may be fabricated from flat copper strip material; the shunt and the spring may be fabricated from copper alloy strip material, not necessarily of the same composition, and the fixed and moving contacts may comprise silver alloy material.

The input and output terminals may be supported in spaced apart relationship within a meter housing so that flat strip material of respective terminals lies co-planar, both terminals being bent orthogonally of this plane so that the moving contact aligns with the fixed contact to facilitate switch operation and with a switch actuator which in use is used to effect switch operation against the biasing force of the spring.

The flat strip material of the output terminal may be formed so that the socket connector extends in planes generally parallel with the output terminal.

One embodiment of the invention will now be described by way of example only with reference to the accompanying drawings, in which,

FIGURE 1 is a generally schematic perspective view of parts for a single pole electricity meter switch;

FIGURE 2 is a perspective view of the parts shown in Figure 1 from a different angle;

FIGURE 3 is a perspective view of the parts shown in Figures 1 and 2, assembled in a meter housing and shaded for ease of identification, and

FIGURE 4 is a perspective view of the parts shown in Figures 1, 2 and 3, assembled in a meter housing which includes a switch actuator.

Referring now to the drawings, wherein corresponding parts of the various Figures bear, as appropriate, the same numerical designation, a contact assembly for a single pole meter switch comprises two parts 1 and 2. The part 1 includes a flat copper metal strip input terminal 3, which is bent orthogonally and which is electrically and mechanically connected by a means of brazing points 4 to a flat copper alloy shunt 5. The shunt 5 is connected by brazing points 6 to a copper alloy leaf spring 7 which supports a moving switch contact 8. To facilitate brazing of the points 4 and 6, the parts may first be 'part pierced', so that they mutually locate. Although in this example, brazing points are used, to effect electrical connection, it will be appreciated that in alternative embodiments the parts may be welded, hard soldered or screwed together so as to provide the necessary electrical connection, and mechanical strength. The shunt 5 includes grooves 9 to which conductors are connected which couple the shunt to a measurement circuit (not shown). Grooves 10 are also provided in which conductors are soldered which serve to provide power for other parts of the electricity meter.

In order to facilitate flexure of the spring 7, a narrowed neck 11 is formed between the shunt 5 and the moving contact 8. The moving contact 8 is arranged to co-operate with a fixed contact 12, which is supported on a copper strip output terminal 13 which is bent

orthogonally so that the fixed and moving contacts 12 and 8 respectively align. Strip material from which the output terminal 13 formed is provided at an end thereof remote from the terminal 13, with a spring connector 14, as shown in Figure 2, which, as will hereinafter be explained, serves to provide electrical connection via a complimentary plug part (not shown) of an 'add-on' module (not shown).

As can be best be seen in Figure 3, the terminals 3 and 13 are arranged to lie flat in a housing body 15 so that they are mutually parallel and lie in substantially the same plane. In use of a meter of which the housing forms a part, input and output conductors are introduced through apertures 16 and 17 respectively in the housing 15 and clamped into position by means of screws 18 against the input and output terminals 3 and 13 respectively. Apertures 19 and 19a in the housing are provided for input and output neutral conductors respectively, which are secured by means of clamping screws 20. Connection of the neutral conductors is not central to the present invention, since the meter incorporates single pole switching only.

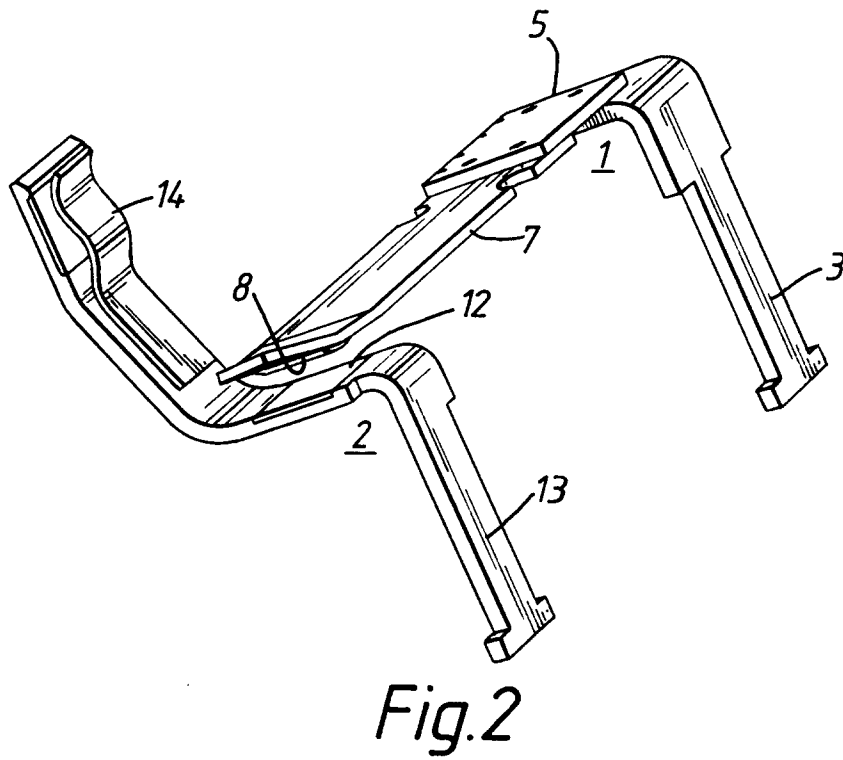
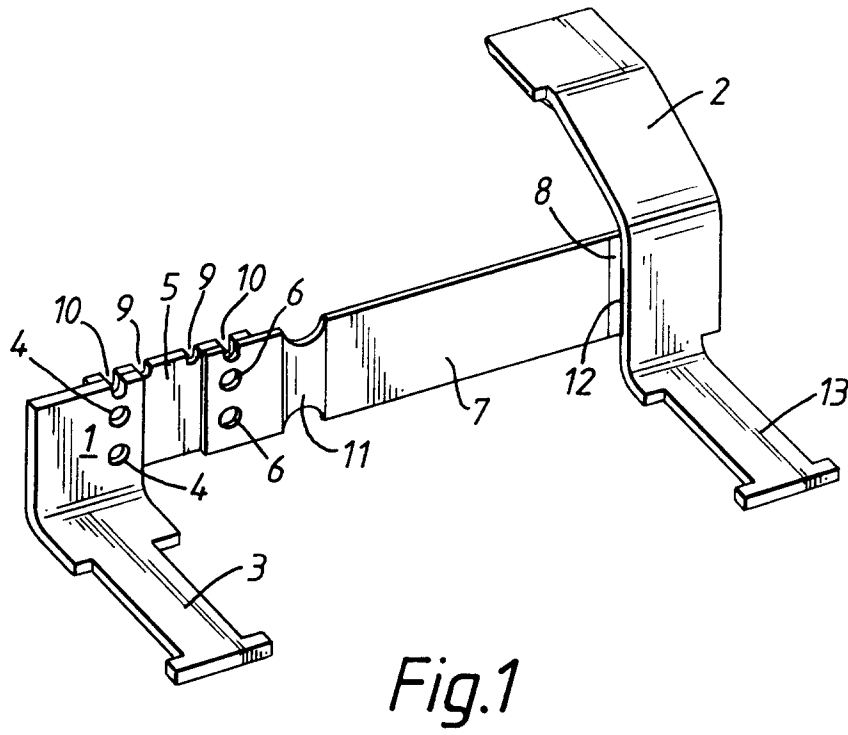
As shown in Figure 4, a mechanical switch actuator 21 is provided which is arranged to effect switch operation so as to open or close the contacts 8 and 12 against the biasing force provided by the leaf spring 7. Additionally the switch may be operated by an actuator (not shown), which is contained in an 'add-on' module (not shown) fitted to the basic meter module to extend functionality, as described in our co-pending patent applications.

The actuator (not shown) is arranged to operate in the direction of an arrow 22 so as to make contact with a switch operating member 23 which operates through a lever 24 to effect switch operation in a manner similar to operation as effected by the switch actuator 21.

Although the 'add-on' module and parts associated therewith are not described in detail, they are described in our co-pending patent applications to which attention is directed.

Claims

1. A switch assembly for an electricity meter comprising two parts, one of which parts includes a fixed contact and a meter output terminal and the other of which parts includes a moving contact and a meter input terminal, the moving contact being coupled to the input terminal via a conductive spring on which it is supported and which serves in use both to carry switch current and to bias the moving contact towards the fixed contact, and via a meter shunt adapted so as to receive in use, sensor conductors so that current supplied via the switch from the input terminal to a consumer via the output terminal can be sensed for measurement purposes.
2. A switch assembly as claimed in Claim 1, which forms a part of a single pole switch.
3. A switch assembly as claimed in any preceding Claim, wherein the shunt comprises strip metal to which a strip metal input terminal and a strip metal spring are electrically connected, spaced apart by the shunt.
4. A switch assembly as claimed in any preceding Claim, wherein the spring includes between the moving contact and the shunt a narrowed portion to facilitate spring flexure.
5. A switch assembly as claimed in any preceding Claim, wherein the output terminal is formed from a metal strip, one end of which is arranged to serve as an output terminal connector and the other end of which is adapted to define an electrical socket connector for receiving a complimentary plug of a meter 'add-on' module, the fixed contact being supported by the metal strip at a position intermediate between its ends.
6. A switch assembly as claimed in any preceding Claim, wherein the input and output terminals are fabricated from flat copper strip material; the shunt and the spring are fabricated from copper alloy strip material and the fixed and moving contacts comprise silver alloy material.
7. An electricity meter including a switch assembly as claimed in any preceding Claim, wherein the input and output terminals are supported in spaced apart relationship within a meter housing so that flat strip material of respective terminals lies co-planar, both terminals being bent orthogonally of this plane so that the moving contact aligns with the fixed contact to facilitate switch operation and aligns with a switch actuator which in use is used to effect switch operation against the biasing force of the spring.
8. A switch assembly as hereinbefore described with reference to the accompanying drawings.



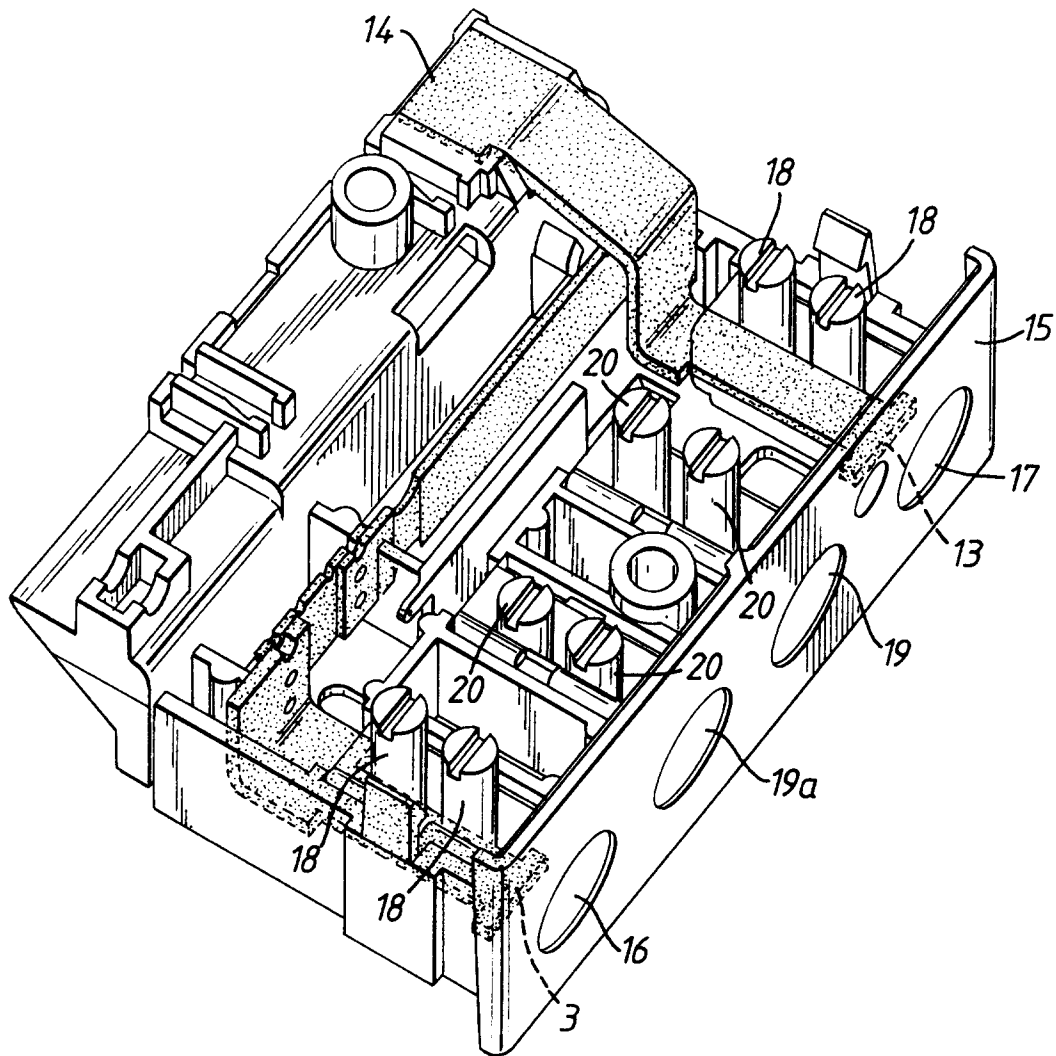


Fig.3

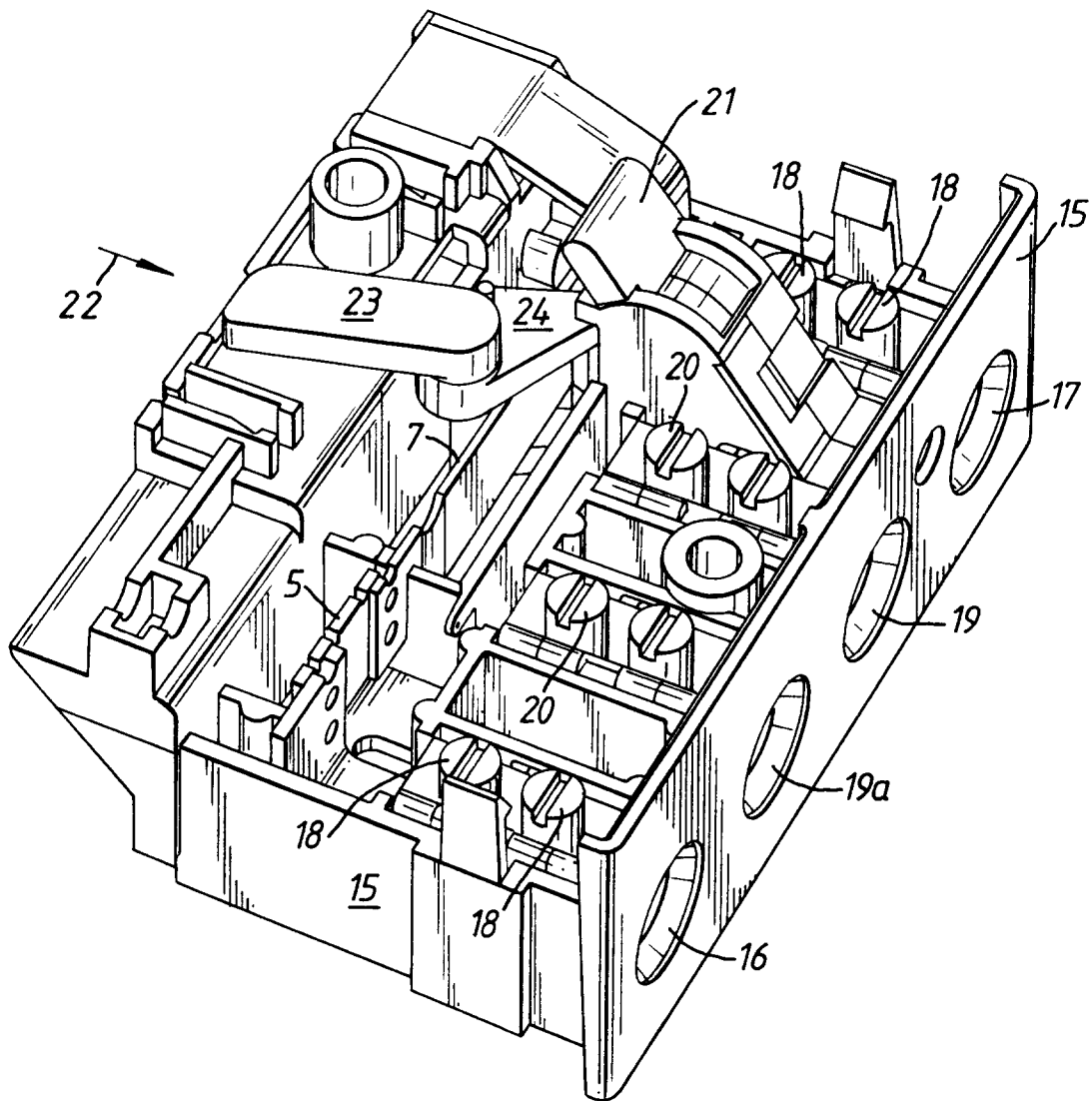


Fig.4



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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 96 11 5905
shall be considered, for the purposes of subsequent
proceedings, as the European search report

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	GB 2 070 862 A (BOSCH GMBH ROBERT) 9 September 1981 * abstract; claim 1; figure 1 *	1,2	G01R11/04
A	EP 0 598 521 A (GEN ELECTRIC CO PLC) 25 May 1994 * column 2, line 14 - line 29; figure 1 *	1,2	
A	EP 0 612 081 A (SAGEM) 24 August 1994 * column 2, line 54 - column 3, line 15; figure 1 *	3,6	
A	GB 2 128 410 A (GEN ELECTRIC CO PLC) 26 April 1984 * abstract; figure 1 *	4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G01R H01H
INCOMPLETE SEARCH			
The Search Division considers that the present European patent application does not comply with the provisions of the European Patent Convention to such an extent that it is not possible to carry out a meaningful search into the state of the art on the basis of some of the claims. Claims searched completely : 1 - 7 Claims searched incompletely : -- Claims not searched : 8 Reason for the limitation of the search: References to the figures.			
Place of search		Date of completion of the search	Examiner
BERLIN		3 February 1997	Hijazi, A
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