PATENT SPECIFICATION (11) 1 567 323

(21) Application No. 15734/76 (22) Filed 15 April 1976 (19)

(23) Complete Specification filed 5 April 1977

(44) Complete Specification published 14 May 1980

(51) INT. CL.³ H01H 85/22

(52) Index at acceptance
H2G DG

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(54) IMPROVEMENTS IN AND RELATING TO ELECTRICAL FUSE HOLDERS

(71) We, BELLING & LEE LIMITED, a British company of Great Cambridge Road, Enfield, Middlesex, EN1 3RY, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrical fuse holders for accepting cartridge fuses as now generally used for relatively small currents (up to 30 amperes) and low voltages (below 1000 V. a.c. or 1500 V. d.c.).

A very wide variety of fuse holders of this general type is already known.

In one extensive class of fuse holders for cartridge fuses the fuse cartridge is frictionally held by one end cap in a first contact member mounted in a cap member of insulating material which is engageable upon an end of a generally tubular body member of insulating material into which the fuse cartridge is inserted so that its other end cap makes resilient contact with a second contact member connected directly to one terminal member of the fuse holder. A part of the first contact member is arranged, when the cap member is engaged upon the tubular body member, to make electrical contact with an electrical conductor connected to another terminal member of the fuse holder. Although some fuse holders of this general construction are proof against accidental contact between an operator's finger and a possibly live contact member or terminal member of the fuse holder, all suffer from the disadvantage that an additional frictional electrical connection is necessary in the electrical circuit between the contact member in the cap member and the associated terminal member. Fuse holders of this type are therefore often suitable for low currents, for example, up to five amperes.

In another extensive class of cartridge fuse holders the fuse holder comprises a body member provided with a slot into which a fuse cartridge may be placed laterally, with its end caps simultaneously engaging in respective contact clips. To avoid the necessity for an operator to extract the cartridge from the clips, some such fuse holders have a lid-like carrier member provided internally with a means for grasping the portion of the fuse cartridge intermediate the end caps. It is, however, a disadvantage of this type of fuse holder that manual contact with the possibly live fuse clips is very possible. It is a further disadvantage of known fuse holders of this type that dislodgement of the fuse carrier and fuse can rather readily occur by accidental contact with a projecting portion of the carrier provided for ease in handling.

The invention provides a cartridge fuse holder having advantages over fuse holders of the prior art.

According to the present invention there is provided an electrical fuse holder for a fuse comprising an electrically insulating body portion extending between electrically conductive end caps, said fuse holder comprising a body member of electrically insulating material having wall members defining a fuse receiving slot and contact means for receiving respective end caps of said fuse, said slot extending between an access aperture and said contact means, and a fuse carrier of electrically insulating material having means for gripping the fuse between said end caps and resilient limb portions, which comprise spaced apart members provided with catch means and joined at one end, said one end being adjacent said gripping means, wherein the fuse carrier is slideably engageable within the fuse receiving slot with the free ends of said members projecting therefrom and the catch means are engageable with said body member to retain the fuse carrier within the fuse receiving slot and are releasable by resilient deformation of the limb portions.

It is an advantage of the invention that it provides a cartridge fuse holder in which the necessity for frictional electrical or resilient contact other than between the fuse

end caps and their respective contact members is avoided.

It is also an advantage of the invention that it provides a cartridge fuse holder in which digital contact with possibly live contact members is prevented.

It is a further advantage of the invention that it provides a cartridge fuse holder in which accidental dislodgement of the fuse is impossible, though intentional removal is very readily performed.

It is another advantage of the invention that it provides a fuse holder that comprises a minimum of individual parts and is therefore cheap to manufacture.

Preferred features of a particular embodiment of the invention, given by way of example only, will become apparent from the following description given with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a fuse holder assembly;

Figure 2 is a plan view of the fuse holder assembly of Figure 1;

Figure 3 is a front elevation of a body portion of the assembly of Figures 1 and 2, the left-hand half being in section along line 3—3 in Figure 4;

Figure 4 is an inverted plan view of the body portion shown in Figure 3;

Figure 5 is a plan view of the body portion shown in Figures 3 and 4;

Figure 6 is a sectional end elevation of the body portion, showing a contact member;

Figure 7 is an end view of an alternative form of contact member;

Figure 8 is a front elevation of a fuse carrier portion of the assembly shown in Figures 1 and 2; and

Figure 9 is a sectional end elevation of the assembly shown in Figures 1 and 2.

The fuse holder 10 shown in the drawings comprises as its main components a body portion 11 and a fuse carrier portion 31. Body portion 11 is generally of rectangular parallelepipoidal form having end portions 12 extending upwardly from its narrow ends as shown in the drawings. It will be understood that the fuse holder may in use be mounted in any attitude and that directional features mentioned in the description are not to be understood as imposing any limitation to a particular mounting attitude. Shoulders 12a formed on end portion 12 extend laterally and endwise beyond the general body portion, as best seen in Figure 3, to define a plane and provide a locating means for the fuse holder when, as is intended, this is mounted in a rectangular aperture formed in a mounting panel, the shoulder portions 12a then abut against the front surface of the panel. The fuse holder is held in its mounted position by resilient arms 13 having stepped upper end portions 13a. Arms 13 extend curvedly outwards from the outer side walls 14 of the body portion 11 and when this is inserted in a rectangular aperture of which the length and width slightly exceed the length L and width W of body portion 11, as shown in Figure 4, stepped ends 13a of arms 13 will engage the rear margins of the aperture to provide snap mounting of the device.

Within body member 11 and generally parallel to its outer side walls 14 there extend, at each end of the body portion, internal or partition walls 15, L-shaped in plan, that enclose with the adjacent side walls 14 and the end walls 16 rectangular pockets 17 having narrow slots 18 formed in their bottoms (Figure 6) in which are mounted respective contact members 50 or 51, the respective forms of which are best seen in Figures 6 and 7. The contact members, formed of suitably resilient metal sheet, are generally U-shaped, with an outward jog or offset 52 formed medially of each upwardly extending arm 53.

At the upper end of each arm 53 is formed an outwardly and downwardly projecting tab 54 which, when the contact member is mounted in body member 11 by urging the upper ends of its arms through slots 18, reassumes its original form to retain the contact members in the body member. In the lower portions of the arms of the contact members are formed inwardly extending contact tongues 55 which engage an end cap of a fuse mounted in the holder. The means for making connection between the fuse holder contacts and external wiring may be varied to suit different applications. Contact member 50, shown in Figure 6 and elsewhere, is provided with a reflexly bent spade portion 56 that extends parallel to, though offset from one arm for engagement by a known form of wiring terminal.

Outer side walls 14 of body portion 11 are cut away at 14*a* to allow access to contact spades 56. Immediately above wide slot 18*a* through which the doubled arms 53*a* enters its respective pocket 17*a* the surface of partition wall 15*a* bounding the pocket is recessed at 15*b* to provide room for the doubled arm.

Contact member 51, shown in Figure 7, lacks this spade but is provided instead with a downwardly extending apertured soldering tag 57 extending from its central portion. Other modifications of form to provide for different means of connection are obviously possible.

The parts of partition walls 15 that extend parallel to side wall 18 define between them a central slot 19 to accept a fuse carrier 31.

A fuse to be inserted in the holder is carried in the fuse carrier 31. This portion of the assembly comprises a common por-

tion having on one side a fuse gripping means and having extending from its other side spaced-apart limb portions. In the illustrated embodiment the fuse carrier 31 comprises a generally bifurcate member having parallel, spaced-apart laminar limb portions 32 extending upwardly from a base portion 33 on the underside of which is formed a somewhat resilient C-shaped clip portion 34 which grips the body of the cartridge fuse shown in broken line at 60. The upper portions of wall portions 32 are formed with out-turned flanges 35 and downwardly extending ridged finger-pieces 36 by which the fuse carrier may conveniently be handled. Centrally of each of wall portions 32 is provided a preferably downwardly tapering rib 37 which is of a size to fit slidingly within one of the slots formed within body portion 11 between adjacent ends of partition walls 15 to guide the fuse carrier during insertion into the body portion. Towards the upper ends of rib 37 are provided catch portions 38 which, when the fuse carrier is inserted in the body portion, engage below inwardly extending abutments 20 formed on walls 14 at the upper ends of slots 19. To remove the fuse carrier from the body portion, finger pieces 36 are squeezed towards one another, thus disengaging catches 38 from abutments 20 and permitting the upward withdrawal of the fuse carrier from the body portion.

The fact that the contact clips in which the fuse engages are disposed, as regarded from the front of the panel in which the fuse holder is mounted, at the bottom of a deep and narrow slot provides the advantage that the contacts are completely safe from finger contact. A further advantage is that removal of the fuse carrier for fuse replacement is extremely convenient, rapid and entirely safe.

It will be understood that the depth of body member 11, and therefore of walls 15 defining slot 19, may be changed to ensure that contacts 50 are protected from contact with probes of different forms, so as to comply with particular safety specifications.

Although only a particular embodiment of the invention has been described and illustrated, it will be apparent to those skilled in the art that various modifications and alterations may be made therein. It is therefore the intention in the appended claims to cover all such modifications and alterations as may fall within the true spirit and scope of the invention.

WHAT WE CLAIM IS:—

1. An electrical fuse holder for a fuse comprising an electrically insulating body portion extending between electrically conductive end caps, said fuse holder comprising a body member of electrically insulating material having wall members defining a fuse receiving slot and contact means for receiving respective end caps of said fuse, said slot extending between an access aperture and said contact means, and a fuse carrier of electrically insulating material having means for gripping the fuse between said end caps and resilient limb portions, which comprise spaced apart members provided with catch means and joined at one end, said one end being adjacent said gripping means, wherein the fuse carrier is slideably engageable within the fuse receiving slot with the free ends of said members projecting therefrom and the catch means are engageable with said body member to retain the fuse carrier within the fuse receiving slot and are releasable by resilient deformation of the limb portions.

2. A fuse holder in accordance with claim 1, wherein said body member is a unitary rectangular member of insulating material with said fuse-receiving slot positioned medially therein said slot having opposite end portions slidably permitting the passage of said fuse and having a wider central portion forming grooves extending from said access aperture inwardly of said slot, and in that said limb portions of the fuse carrier comprise parallel, rectangular laminar portions spaced apart to fit slidably in said slot and further comprise oppositely extending finger pieces abutting the surface of said body member adjacent said slot to limit the penetration of said fuse carrier into said slot, said limb portions having on their outer faces, medially of their length, rib portions fitting slidably in said grooves and having catch portions therein, said grooves having inwardly-extending abutment portions arranged for resilient engagement by said catch portions to retain said fuse carrier in said slot.

3. A fuse holder in accordance with claim 1, wherein said body member has adjacent the face thereof including said access aperture outwardly extending locating shoulders and has extending from the outer walls thereof resilient, outwardly arcuately curved retaining members having serrated slanting end faces.

4. A fuse holder in accordance with claim 1, wherein said body member is so formed as to provide, adjacent said slot, recesses with apertured bases, and in that each said contact means comprises a U-shaped metal strip having adjacent the base thereof opposed inwardly extending resilient tongues that make electrical contact with said fuse cartridge and cap and having adjacent its limb end portions, resilient tongues extending towards said base portion and engaging the bases of respective recesses to retain the contact member ends therein.

5. A fuse holder in accordance with

claim 4, wherein each said contact member includes a reflexly folded said limb end portion from which said metal strip extends spaced from said limb and forming a terminal.

6. A fuse holder in accordance with claim 4, wherein said contact member has extending from said base portion an apertured lug forming a terminal.

7. A fuse holder in accordance with any of claims 1—6 wherein said fuse-receiving slot is so narrow as not to admit a human finger.

8. A fuse holder in accordance with any of claims 1—7, wherein said fuse carrier is a unitary member of insulating material, said member having spaced-apart resiliently deformable parallel laminar limb portions united at one end into a common portion and having at their other ends mutually oppositely extending finger pieces with slanting and serrated outer faces and having, extending from said finger pieces to said common portion, centrally disposed ribs provided with outwardly projecting catch members having slant surfaces directed towards said common portion and perpendicular catch surfaces spaced from said finger pieces, said common portion having centrally thereon, on the side thereof remote from said limb portions, a C-shaped protrusion embracing a notch resiliently engageable with said fuse cartridge.

10. A fuse holder in accordance with claim 9, wherein said body member has projecting end wall portions of trapezoidal form between which said finger pieces are disposed.

11. A fuse holder substantially as herein described with reference to the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1980.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

1567323 COMPLETE SPECIFICATION
4 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

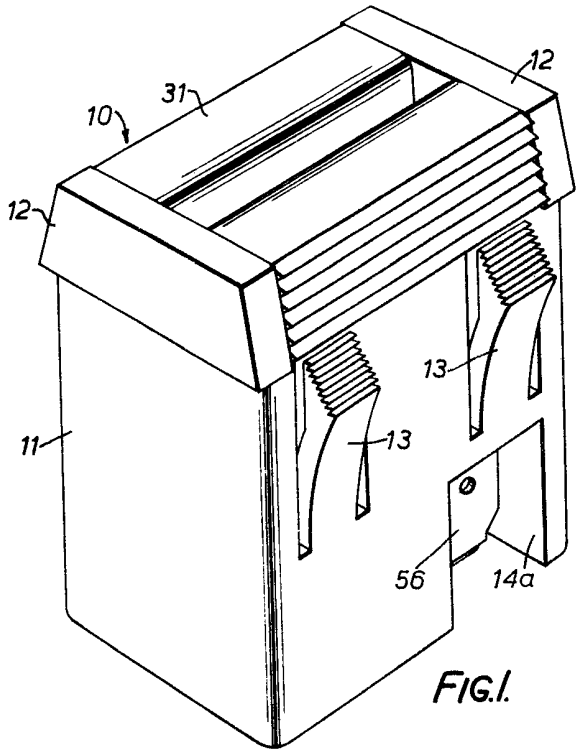

FIG.1.

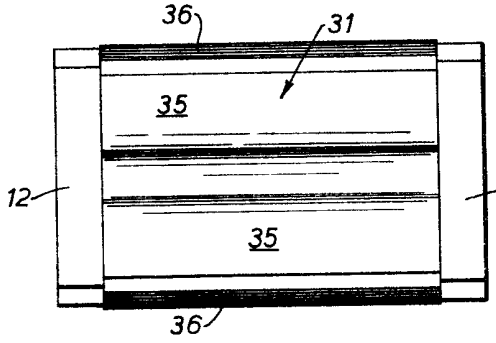

FIG.2.

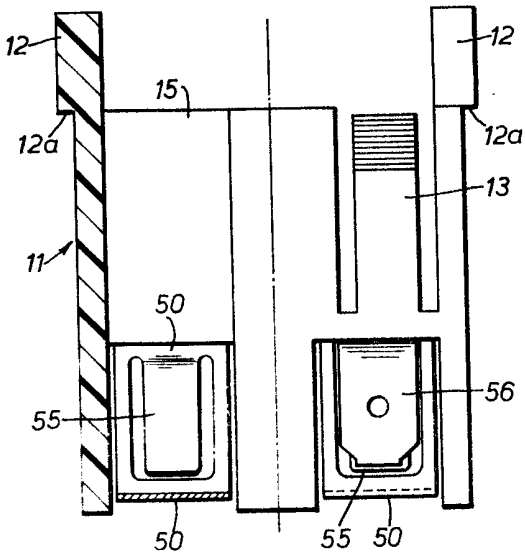
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FIG.3.

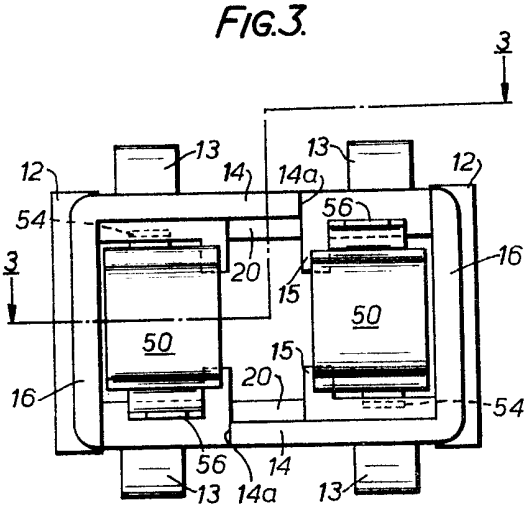
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FIG.4.

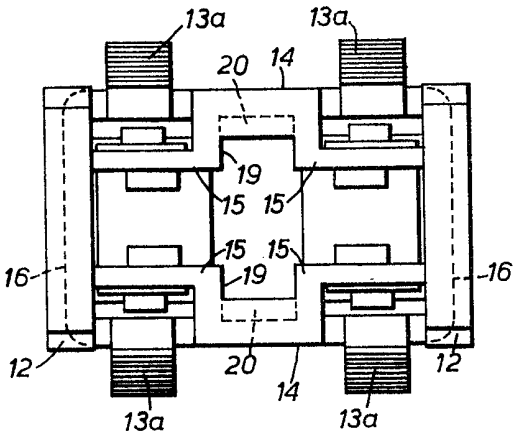

FIG.5.

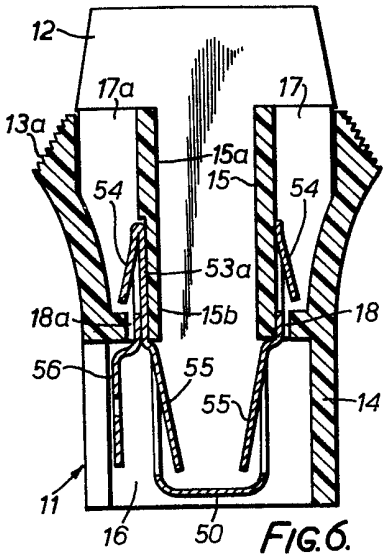

FIG.6.

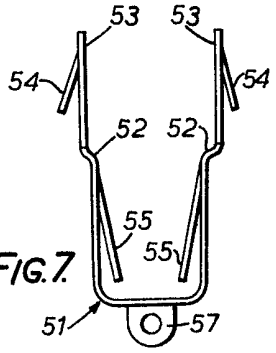

FIG.7.

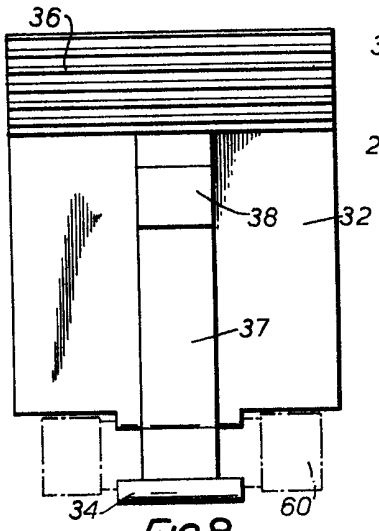

FIG.8.

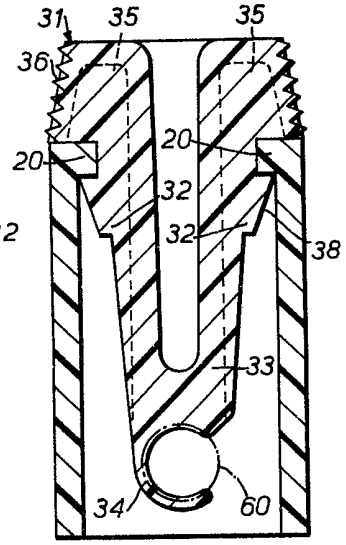

FIG.9.