Nov. 21, 1933. G. W. HARRISON 1,935,947

MULTIPLE FUSE PLUG

Filed May 6, 1932

Fig. 1

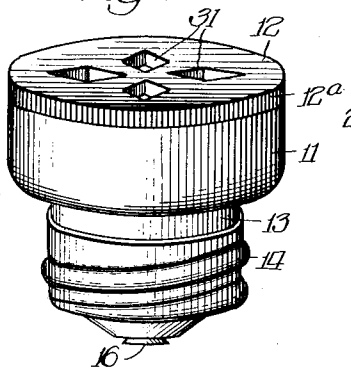



Fig. 2

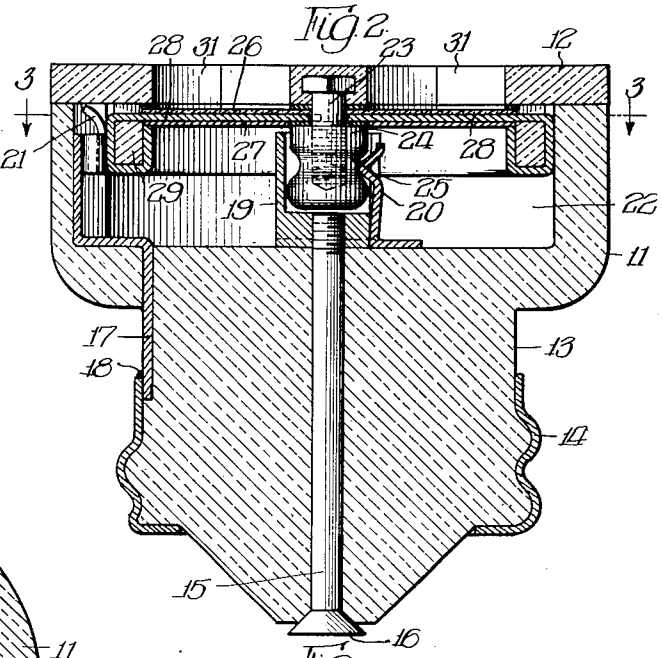



Fig. 3

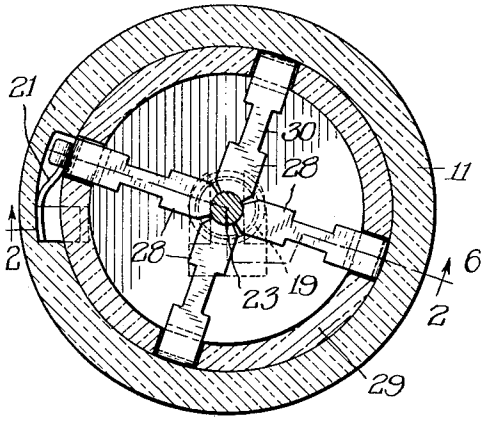



Fig. 4

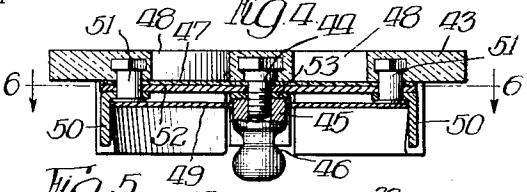



Fig. 5

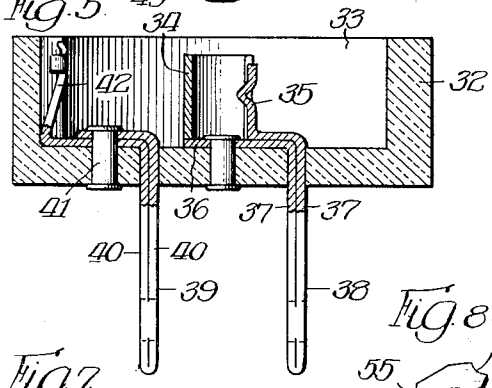



Fig. 6

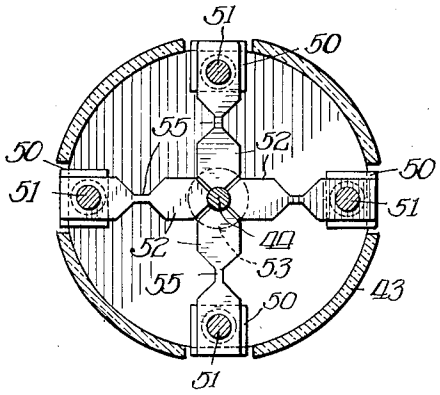



Fig. 7

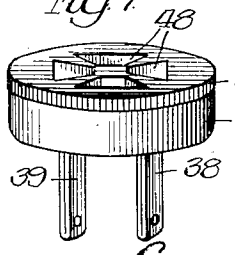
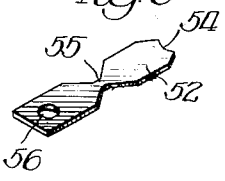



Fig. 8




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# UNITED STATES PATENT OFFICE

1,935,947

## MULTIPLE FUSE PLUG

George W. Harrison, Chicago, Ill.

Application May 6, 1932. Serial No. 609,569

4 Claims. (Cl. 200—125)

My invention pertains to fuse plugs for insertion in the ordinary house lighting or other electric circuit.

A particular object of the invention is the provision in the one plug of a plurality of fusible elements so disposed that they may be individually successively brought into the circuit, whereby a new plug need not be inserted upon the blowing of a fuse, but by manipulation the same plug may be repeatedly used until the fuse elements are exhausted.

A further object is provision for renewal of the fuse-containing member in the same plug whereby cost of renewal is minimized and economy of fuse maintenance is attained.

Furthermore, the multiple fuse plug of my invention is of simple mechanical construction, low cost of manufacture, dependable in operation, and has other inherent advantages over prior devices of similar character which will be apparent to those skilled in this art from the accompanying drawing and the following description predicated thereon; it being understood that the drawing and description are to be taken in an illustrative rather than a limiting sense inasmuch as the invention may be embodied in other structural forms without departure from the essence of the same as set forth in the appended claims.

In the drawing,

Fig. 1 illustrates in perspective a fuse plug embodying the invention;

Fig. 2 is an axial section through Fig. 1;

Fig. 3 is a sectional plan on the line 3—3 of Fig. 2;

Figs. 4 and 5 are axial sections through the disassembled body and cap members of a second form of plug embodying the invention.

Fig. 6 is a sectional plan on the line 6—6 of Fig. 4;

Fig. 7 is a perspective assembly view of the parts shown in Figs. 4 and 5; and

Fig. 8 is a detail of one of the fuse elements.

Describing the invention with reference to the drawing, and first as to the embodiment shown in Figs. 1, 2 and 3, the fuse plug comprises generally a body member 11 and a cap member 12. The body member, in this form of construction, includes a reduced portion 13 with an enveloping ferrule 14 threaded for screwing into the ordinary plug socket and a central pin 15 headed at 16 to form a line contact element; also provided with another line contact element 17 intimately associated with the ferrule 14 as by solder at 18. The line contact element 15—16, at its upper end, is screwed or otherwise intimately attached to a socket member 19 in one wall of which is provided a slot within which plays a leaf spring 20.

The other line contact element 17 is continued upwardly and terminates in a leaf spring 21. The socket 19, equipped with the spring 20 and forming therewith a socket extension of the line contact element 15, is preferably disposed centrally of a chamber 22 formed in the upper portion of the body member 11, and the spring 21 forming an upper extension and terminal of the other line contact element 17 is disposed within the chamber 22 adjacent the wall thereof.

The plug cap member 12 is of disk form and carries a centrally disposed stud member 23 having a head 24 grooved at 25 to form a shouldered portion adapted to snap into the socket 19 and to be retained therein by the spring 20. Between the head 24 and the disk cap 12 is clamped a sheet of mica 26 and a sheet of insulating material 27, such as black paper. Between the mica and the paper are disposed a plurality, here shown as four, of fuse elements 28, each of which has an end adjacent the stud 23 concaved to fit about the stud and its opposite end wrapped around an annular extension 29 of the cap, with an outer vertical face lying closely adjacent the wall of the chamber 22.

Each of the fuse elements extends in a radial direction from the stud 23 and intermediate its length is provided with a portion 30 of reduced section to constitute a blow point immediately underlying windows 31 formed in the cap 12 above the mica 26.

The operation may be briefly described as follows: With the parts in position shown in Figs. 2 and 3, the electric circuit is closed through the line contact element 15, the socket 19, the head 24 and the stud 23, by way of one of the fuse elements 28, the spring 21, the line contact element 17 and the ferrule 14. In case of overload, the fuse is blown at the point 30. Thereupon, instead of removing the entire plug and discarding the same for a new one, the cap 12 by means of its knurled edge $12^a$ is rotated through 90° to bring the next fuse element 28 into the circuit between the stud 23 and the spring 21.

It will be obvious that the rotation of the cap to bring another fuse link into functioning position will be through a greater or less arc, depending upon the number of fuse links in the cap. That is to say, in the embodiment illustrated the turning movement would be through 90°, whereas if there were three fuse links instead of four the turning movement would be through 120°; if six fuse links were incorporated in the cap, the

turning movement would be through an arc of 60°.

When the total number of available fuse links is exhausted by the successive blowing of each, the fuse plug body is not discarded, but the cap 12 only is thrown away and a new cap with a full complement of fuse elements is applied to the fuse body by snapping its headed stud 24 into the socket 19; whereupon the plug is given a new series of lives corresponding to the number of fuse links in the new cap.

Having reference now to the slightly modified form of construction illustrated in Figs. 4 to 8 inclusive, the principle of construction and operation is substantially the same. The fuse plug body 32 (Fig. 5) chambered at 33 carries centrally thereof the socket 34 with cooperating spring 35, the socket 34 being electrically connected with one end 36 of the line contact 37, which in this case is a strip of metal doubled upon itself to form a prong 38, while the spring 35 constitutes the other end of the same strip 37. A companion prong 39 comprises a strip of metal 40 doubled upon itself and secured to the plug body by a rivet 41, one end of the doubled strip 40 being extended into the chamber 33 along the side wall thereof as a leaf spring 42.

This form of plug body is of the ordinary separable type in which the upper body portion is assembled with and disassembled from the portion which screws into a plug socket, the electric circuit being completed through the prongs 38 and 39. The fuse cap member (Fig. 4) comprises a disk 43 with a central stud 44 headed at 45 and shouldered at 46 for snapping into the socket 34 and there held by the spring 35. A sheet of mica 47 is disposed against the inner face of the disk 43 immediately below the windows 48 and in spaced relation thereto is disposed an insulation sheet of paper 49. A plurality of brackets 50, here shown as four in number, are secured to the disk 43 by means of rivets 51 upon the outer end of radiating fuse elements 52, the inner ends of the fuse elements or links being clamped between the head 45 and the disk by a conductive washer 53 through the action of the screw plug 44. Each of these fuse elements 52 has a concave end 54 to accommodate the stud 44 and is intermediate its ends reduced at 55 to form a blow point immediately beneath its window 48. The opposite end of the fuse link is apertured at 56 to accommodate the rivet 51. Upon the rotation of the plug cap 43 the brackets 50 will be brought successively into wiping contact with the spring 42 thereby completing the electric circuit through one of the prongs 38 and the socket 34 and spring 35 by way of one of the fuse links 52 through the spring 42 and the other line contact prong 39.

As in the former case, upon the blowing of one of the fuse links, the cap 43 is rotated through an arc corresponding in degrees to the number of fuse links whereby a new link is brought into operative position. When the links have been exhausted by the blowing of each, the cap 43 is removed and a new cap carrying a new complement of fuse links is substituted.

It will readily appear that the form of cap and fuse link assembly shown in Figs. 1, 2 and 3 and that form of cap and fuse link assembly shown in Figs. 4 to 8 inclusive may be interchangeably used with either type of plug body illustrated, the only requisite being that the line contact elements of the plug body shall be so proportioned and arranged that one shall constitute a sustained contact with the rotatable separable plug of the cap and that the other line contact may be brought successively into contact with the several fuse links of the cap. It will also be obvious that the number of radiating fuse links may be varied as desired and that details of assembly of the parts may also be varied to suit the views of the designer without departing from the novel principles of construction as illustrated by way of example in the accompanying drawing, the foregoing description, and the appended claims.

That the cap is turned step by step through the proper arc to effect register between the fuse end and the line contact, is determined by the click or resistance offered by the peripheral spring forming the terminal of the line contact, which may be supplemented by any well known device such as indicator points on the plug body and cap.

I claim:

1. A multiple fuse plug comprising a plug body and a separable plug cap, the outer end portion of said plug body being cylindrically chambered and having a substantial part of its adjacent exterior portion peripherally exposed to be grasped when placing the plug in and removing it from a receptacle, said plug cap having a peripheral grasping portion and an annular flange at its inner side constituting a cylindrical chamber and being insertable within the cylindrically chambered outer end portion of said plug body, the plug body having a pair of line contact elements one of which extends centrally therethrough, and the other being peripheral, the central line contact element terminating at its outer end in a cylindrical socket member located centrally of the cylindrically chambered portion of said plug body, said socket being provided with a laterally operable shouldered resilient retaining member, the peripheral line contact element terminating with its outer end portion within said cylindrically chambered portion of the plug body and in radially opposed relation to said central socket member, said plug cap embodying a centrally disposed fuse contact element comprising a peripherally shouldered stud insertable to fit rotatably in said central socket member of the plug body and being releasably held against longitudinal movement by said resilient retaining member, a plurality of peripherally disposed fuse contact elements located in openings provided therefore in said annular flanged portion of the plug cap in radially opposed relation to said central contact stud member, said plug cap peripheral fuse contact elements being successively engageable with the outer terminal portion of said peripheral line contact element of the plug body when the assembled plug cap is rotated with relation to said plug body, and a plurality of radially disposed fusible links on said plug cap respectively connecting the central fuse contact stud member with said peripheral fuse contact elements of the plug cap.

2. A multiple fuse plug comprising a plug body having an open-ended circular chamber in its outer end portion and a separable plug cap adapted to close said chamber, the plug body embodying a pair of line contact elements one of which is peripheral and the other central and the cap embodying a centrally disposed fuse contact element and a plurality of peripherally disposed fuse contact elements, a plurality of fuse links on said cap each bridging the space between the central fuse contact element and one of the peripheral fuse contact elements, the plug body

having a cylindrical terminal socket member for the central line contact element provided with a cooperating spring element having a retaining portion projected normally into the socket and the plug cap having a terminally shouldered stud constituting the central fuse contact element and being adapted to snap into said cylindrical socket of said central line contact element with normally sustained releasable rotary engagement whereby the peripheral contact elements of the plug cap successively wipe over the peripheral line contact of the plug body to make and break the circuit as the cap is rotated.

3. A multiple fuse plug comprising a plug body and a separable plug cap each made of dielectric material, the body having an open-ended circularly chambered and enlarged cylindrical end portion, the periphery of which is to be grasped in placing the plug in and removing it from a receptacle, and the cap having an annularly flanged portion insertable in said chamber of the plug body contiguous to the circular wall thereof, said cap having a peripheral grasping portion, the plug body provided with a peripheral line contact element having a spring terminal portion disposed in an inner recessed portion of the cylindrical chamber wall thereof and a central line contact element having a terminal portion extending axially into the body chamber, the plug cap having a plurality of peripheral terminal contact elements operably disposed in and through openings provided therefor in said annularly flanged portion thereof, a central terminal contact element releasably engageable with the terminal extension of said central line contact element of the plug body, the one element having a rigid cylindrical socket portion with a cooperating shouldered spring latch element normally projected therein and the other element comprising an annularly grooved stud insertable in said socket portion of the other member whereby to be held laterally immovable but freely rotatable while releasably retained normally against endwise movement by said spring latch element in engagement with the annularly grooved portion of the inserted stud, and a plurality of fuse links electrically connecting said central terminal contact separately with the respective peripheral terminal contacts of said plug cap.

4. A multiple fuse plug comprising a plug body and a separable plug cap, the plug body being formed with a large circular open-ended chamber and an external peripheral grasping portion adjacent its outer end, the plug cap being formed with an annularly flanged portion insertable in said plug body chamber contiguous to the circular wall thereof, said plug cap having an external peripheral grasping portion, said plug body having a central line contact element the outer end portion of which terminates in a cylindrical socket member provided with a spring latch element projecting laterally therein, said plug body also having a peripheral line contact element terminating in a spring contact portion located in a recess in the circular wall of the chamber of said plug body, said plug cap having a central fuse contact element comprising an annularly grooved stud member insertable to fit rotatably in said socket member of said central line contact element of the plug body and being releasably held normally against endwise movement by the engagement of its annularly grooved portion with said spring latch element of the socket, said fuse cap being provided with an annular series of fuse contact elements radially opposed to said central fuse contact stud member and being located in openings provided therefor in said annularly flanged portion of the plug cap, and a plurality of radially disposed fusible links on said plug cap respectively connecting said central fuse contact stud member with said annular series of fuse contact elements, said annular series of fuse contact elements being adapted to successively engage the spring terminal portion of said peripheral line contact element of said plug body when the assembled plug cap is rotated thereon.

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