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CONVERTIBLE ELECTRIC PLUG AND SAFETY FUSE COMBINATION

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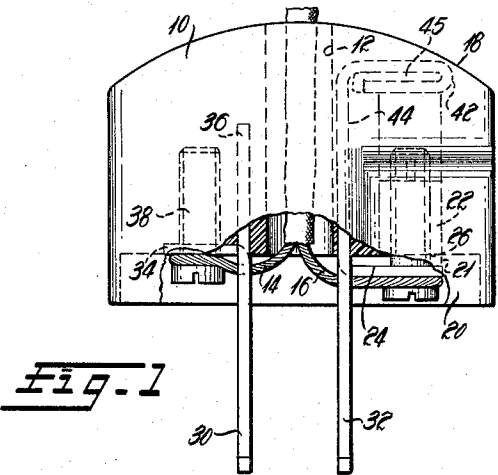


Fig. 1

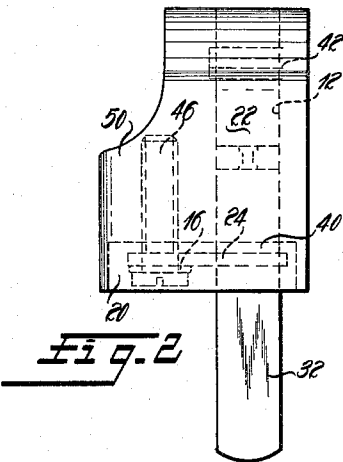


Fig. 2

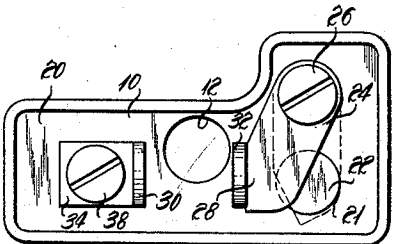


Fig. 3

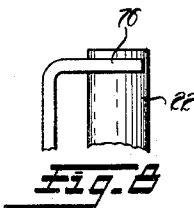


Fig. 4

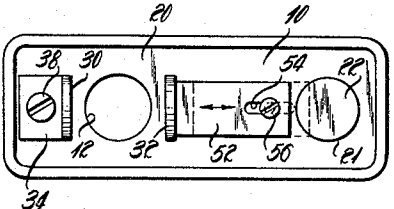


Fig. 5

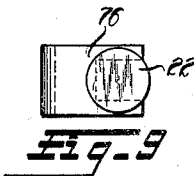


Fig. 6

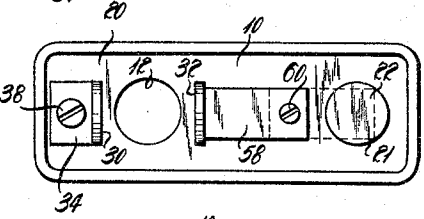


Fig. 7

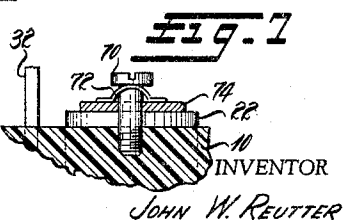


Fig. 8

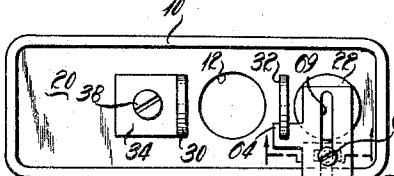


Fig. 9

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CONVERTIBLE ELECTRIC PLUG AND SAFETY FUSE COMBINATION

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6 Claims. (Cl. 200-115.5)

This invention relates to fuse protected electrical plugs. More specifically, to a convertible plug and fuse combination in which the fuse may be included in the electrical circuit or the fuse excluded from the circuit to provide for an electrical plug of conventional usage. Such protection being particularly important for such uses as domestic Christmas tree lighting.

In addition to the above protection usage the instant combination is of important use in any electrical usages wherein an electric cord is placed under a rug or carpet or under furniture. In such protection application the electrical usage applies to wiring for floor and table lamps which as a rule is under carpets or along base boards.

Another object of the invention is to provide an electrical plug with a readily insertable or changeable fuse attaching means.

Another object of this invention is to provide a fuse attachment means which functions as a safety device for determining when a fuse is properly included in the electrical plug.

Still another object of this invention is to provide an electrical plug and fuse combination which is inexpensively manufactured and does not involve complex parts or elaborate construction materials.

Yet another object of this invention is to provide an electrical plug and safety fuse combination in which the plug is alternately protected by the fuse or unprotected by the fuse and such conversion from one to the other is positively protected by an extremely simple safety device.

Another object of this invention is the provision for fuse engaging elements within the electrical plug which are not complex and will function by the resilient spring action of the necessary parts of the electrical plug.

It is to be stressed that the major object of this invention is to provide a convertible electrical plug and safety fuse combination in which the plug may conduct current for use in an external circuit with or without the inclusion of the safety fuse and may be used as an ordinary electrical plug even in the event that there is no operable safety fuse included within the electrical plug. The latter is accomplished by shorting out the safety fuse from the circuit by a very simple device which will be further illustrated.

These and other objects and advantages of this invention will be apparent from the following description and claims.

In the accompanying drawings which illustrate by way of example various embodiments of this invention:

FIGURE 1 is a side elevation of an electrical plug and safety fuse combination embodying this invention and showing the internal parts of said plug;

FIGURE 2 is an end elevation of the plug shown in FIGURE 1;

FIGURE 3 is a bottom elevation of the plug shown in FIGURES 1 and 2;

FIGURE 4 is a bottom view of a modification of the instant plug and fuse combination;

FIGURE 5 is yet another modification of the combination of FIGURES 1 and 2;

FIGURE 6 is a third modification of the plug and fuse combination;

FIGURE 7 is a cross section taken on the line 7-7

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of FIGURE 6 and shows in greater detail the spring attachment member to provide for reciprocal motion of the fuse retainer member;

FIGURE 8 is a modification of the fuse engaging member shown in FIGURE 1;

FIGURE 9 is a top view of the fuse engaging member of FIGURE 8.

The convertible electrical plug and safety fuse combination shown in FIGURES 1, 2 and 3 comprises a body member 10 constructed of Lucite plastic, Bakelite, thermal setting resin or other suitable material. Plug body 10 is provided with a central longitudinal opening 12 which opening is disposed to receive electrical conductors 14 and 16. Plug 10 is formed with an arcuate top portion 18, a recessed bottom portion 20 and a fuse well 21.

Safety fuse 22 is positioned within the longitudinally aligned fuse well 21 and is contacted on the bottom end thereof by retainer tab 24. Retainer tab 24 is pivotally secured within the recessed bottom portion 20 by screw 26. Retainer tab 24 has a flatten edge 28 provided for purposes which will be explained below.

Plug 10 is provided with two terminal prongs 30 and 32. Prong 30 has a screw contacting lateral flange 34 disposed midway along the body thereof. The top most end 36 of prong 30 is disposed in molded engagement within plug body 10. Flange 34 is secured to the recessed portion 20 of plug 10 by screw 38. Terminal prong 32 is provided with a doubled spring flange 42 disposed on end 44 of said terminal prong. The top most portion of the longitudinal body of terminal prong 32 is disposed in molded engagement with plug body 10 whereas spring flange 42 is free from molded engagement with said plug body, as shown in FIGURE 1 by cavity 45.

Screw 26 is disposed within elevated portion 50 (as shown in FIGURE 2) of plug 10.

All members except the plug body may be constructed of metal and particularly brass or Phosphor bronze. Member 24 is preferably constructed of spring brass as is spring flange 42 to provide for the resilient engagement of fuse 22. Fuse 22 is intended to be sized according to the power load placed upon the external circuit composed terminally of conductor members 14 and 16. Actual test show that a one amp. fuse will service and carry a load of 100 watts within household usage and this fuse may be scaled up according for increased power loads, e.g., a 2 amp. fuse will carry a 200 watt load and so on up to fuses of 30 amp.

In the event that fuse 22 blows due to overloading the external circuit of conductor members 14 and 16 the retainer tab 24 may be pivoted around screw 26 to force flatten edge 28 into electrical contact with terminal prong 32. Thus, if there is no available fuse in the immediate vicinity or if a heavy current is desired to be run through the external load the plug may be adapted to function as a normal electrical plug by means of bypassing the fuse. Electrical current flowing through electrical conductor 16 flows into retainer tab 24 by means of contact provided therewith by means of screw member 26 and is sent to the far end of the retainer tab. If the retainer tab is positioned as shown in the dotted line of FIGURE 3, the current will then flow through fuse 22 and into the spring flange 42 of FIGURE 1 and thence to the terminal prong 32 and returned through terminal prong 30, flange 34 and conductor member 14. While if there is no fuse available or if a heavier power load is desired in the circuit the combination will permit flattened edge 28 of retainer tab 24 to be pivoted around screw 26 into engagement with the bottom part of terminal prong 32 and then flow directly to the power source without the safety fuse bypass.

As can be seen from the foregoing the safety fuse in

this invention is positioned in serial arrangement with the external power load.

It is to be noted that the safety fuse 22 may be bypassed when the fuse is operable and placed within the plug by means of the bypassing arrangement which will pass the current through the path of least resistance which will be the route from the retainer type 24 directly to terminal prong 32 in the solid line configuration of FIGURE 3.

FIGURE 4 illustrates a modification of the present invention in which a retainer tab 52 is shown to be laterally reciprocable due to longitudinally and centrally positioned slot 54. Retainer tab 52 is secured by means of screw 56 which is disposed within elongated slot 54. By moving retainer tab 52 to the left into contact with terminal prong 32 the plug will function in the normal electrical plug capacity and at the same time allow fuse 22 to be withdrawn from fuse well 21. By positioning retainer tab 52 to the right as shown by the dotted lines of FIGURE 4 the fuse will be contacted and held in position and the terminal prong 32 will then be out of contact with the retainer tab 52 and the electrical current will then pass through safety fuse 22.

FIGURE 5 illustrates a modification of the present electrical plug and a safety fuse combination in which retainer tab 58 is secured to plug 10 by means of screw 60. Tab 58 positioned in the solid line position of FIGURE 5 will provide for the normal operation of the electrical plug by contacting terminal prong 32 with the end of the retainer tab 58. In this position the safety fuse 22 may be removed from fuse well 21. The dotted line positioning of retainer tab 58 is only accomplished by removing screw 60 from plug and reversing the tab's positioning so that the tab 58 covers a portion of the end of safety fuse 22. In this position the current is then directed through the safety plug for the safety feature of the present combination. It is to be noted that in this modification only one or the other of the alternatives are present with the plug being in use and the conversion from one to the other necessitates a removal of the plug and a switching of the retainer tab position means.

FIGURE 6 shows a third modification of the present invention in which the normally shaped electrical plug is provided with a specially configured retainer tab 62 which has a prong contacting slot 64 at one end thereof and a finger grip tab 66 provided at the outside end thereof. Retainer tab 62 is secured to electrical plug 60 by means of screw 68 through elongated slot 69 disposed longitudinally and centrally therein. The prong contacting slot or notch 64 is of particular importance for a proper contact area of the edge of terminal prong 32. The prong contacting position of retainer tab 62 is shown in solid line. The dotted line positioning of retainer tab 62 is the position in which the fuse may be withdrawn. Intermediate these two positions is the safety fuse route of the combination plug and fuse arrangement and functions to pass current through the fuse in the same manner as in FIGURES 1 through 3. Particular novelty is shown by the modification as illustrated in FIGURE 6 as by a visual inspection of the outside end of retainer tab 62 the route of electrical current either bypassing safety fuse 22 or going through the safety fuse is easily determined. By calibration of a line or by coloring the end of the retainer tab 62 which protrudes from the plug 10 a simple and efficient visual inspection means is obtained for determining when the fuse is being used and there is either no fuse in the plug or the fuse therein is inoperative.

FIGURE 7 shows an additional modification of the screw members 26, 56, 60 and 68 in which by illustration screw 70 is provided with an elongated spring brass resilient retaining member 72 to force the retainer tab 74 against fuse 22. As shown by this illustration the bottom end of safety fuse 22 is optatively positioned $\frac{1}{2}$ of an inch below the surface of plug body 10.

FIGURES 8 and 8 show a modification spring flange 42 of FIGURE 1. In this modification the lower end of a terminal prong is configured as shown by prong 76. Prong 76 then engages the topmost end of safety fuse 22 by resilient spring finger action.

While the invention has been described in connection with different embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within the known or customary practice in the art to which the invention pertains, and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention what I claim is:

1. A convertible electric plug and safety fuse combination comprising, a plug body having an arcuate topmost portion, said plug body having a centrally disposed longitudinal opening for the passage of electrical conductors, said plug body having the central portion of the bottom thereof recessed from the depending sides, a safety fuse well positioned to one side of said longitudinal opening, a safety fuse disposed in said well and having one end extending therefrom, a current carrying retainer tab pivotally secured to said central portion of said bottom of said plug body and disposed to pivotally contact said fuse by said one end thereof, said plug body having disposed on either side of said longitudinal opening two terminal prongs, at least one of said prongs having a securing flange normally affixed to the mid portion thereof to serve as anchoring means, a retaining means engaging said securing flange and in engagement with said plug body, said retainer tab being pivotally secured by a second retaining means, said retainer tab having a flat body portion parallel to said central bottom portion and a flattened edge portion, said retainer tab positioned to alternately conduct current to said fuse through said flat body portion and to one of said terminal prongs through said edge portion, whereby said plug may be safety protected by said fuse when said retainer tab is in contact with said fuse and is operative when said fuse is inoperative when said retainer tab is in contact with said one terminal prong.

2. A convertible electric plug and safety fuse combination comprising, a plug body having an arcuate topmost portion, said plug body having a centrally disposed longitudinal opening for the passage of electrical conductors, said plug body having the central portion of the bottom thereof recessed from the depending sides, a safety fuse well positioned to one side of said longitudinal opening and having its axis parallel to the axis of said opening, a fuse disposed in said well and having one end extending therefrom, a current carrying retainer tab adjustably secured to said central portion of said bottom of said plug body and disposed to reciprocably contact said fuse by said one end thereof, said plug body having disposed on either side of said longitudinal opening two terminal prongs, a first of said prongs having disposed on the topmost end thereof fuse contacting means, the second of said terminal prongs having a securing flange normally affixed to the mid portion thereof to serve as anchoring means, a retaining means engaging said securing flange, said retainer tab being reciprocably slidable in a plane parallel to the plane of said bottom portion of said plug body, means for securing said retainer tab, and said retainer tab alternately conducting current to said fuse and to said first terminal prong, whereby said plug may be safety protected by said fuse when said retainer tab is in contact with said fuse and is operative when said fuse is inoperative when said retainer tab is in contact with said first terminal prong.

3. A convertible electric plug and safety fuse combination as defined in claim 2 wherein, said reciprocable

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retainer tab has therein a longitudinally disposed elongated slot, said slot permitting said retainer tab to be reciprocated to either side of said securing means, said tab contacting said fuse by one end thereof and said first terminal prong by the other end thereof.

4. A convertible electric plug and safety fuse combination comprising, a plug body having a centrally disposed longitudinal opening for the passage of electrical conductors, said plug body having the central portion of the bottom thereof recessed from the depending sides, a safety fuse well positioned to one side of said longitudinal opening, a current carrying retainer tab adjustably secured to said plug body, said plug body having disposed on either side of said longitudinal opening two terminal prongs, a first of said prongs having disposed on the top most end thereof fuse contacting means, the second of said terminal prongs having a securing flange normally affixed to the mid portion thereof to serve as anchoring means, a retaining means engaging said securing flange, means for securing said retainer tab, said retainer tab alternately covering said fuse well and contacting said first terminal prong, said retainer tab having longitudinally disposed therein an elongated slot for permitting reciprocable movement to either side of said securing means, said retainer tab having on the outer most end thereof a finger grip tab, said finger grip tab extending on the outside of said plug body and functioning as a visual indicator as to the position of contact of said retainer tab and said flange member, whereby visual indication may be given on the outside of said plug for indicating whether said retainer tab is in covering engagement with said fuse well or is in the position of contact with said first terminal prong so that when a fuse is installed in said fuse well the user of said plug may have indication of safety protection of said plug through the use of said fuse and may also have indication of the nonuse of said fuse when said retainer tab is in contact with said first terminal prong.

5. In a convertible electric plug and safety fuse combination having a plug body and terminal prongs projecting therefrom, said plug body having removably disposed therein an electrical fuse the improvement comprising, a current carrying adjustable contact means con-

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nected to said plug, said means adjustable between positions of fuse contact and terminal prong contact whereby said plug may be safety protected by said fuse when said adjustable means is in contact with said fuse and is operative when said fuse is inoperative when said adjustable means is in contact with one of said terminal prongs, a finger grip tab connected to said adjustable contact means, and said grip tab extending past the outside surface of said plug body whereby visual indication of the position of said adjustable contact means may be readily observed.

6. A convertible electric plug and safety fuse combination comprising, a plug body, a safety fuse removably disposed within said plug body, a current carrying retainer tab adjustably connected to the underside of said plug body, two terminal prongs having portions thereof disposed in molded engagement within said plug body, the top most end of said first of said terminal prongs contacting said safety fuse, the opposite end of said safety fuse positioned to be contacted by said adjustable retainer tab, and said adjustable retainer tab alternately contacting said fuse and said first terminal prong whereby said plug may be safety protected by said fuse when said retainer tab is in contact with said fuse and is operative when said fuse is inoperative when said retainer tab is in contact with said first terminal prong, said adjustable retainer tab removable from said plug body and reversible in its position from contacting said fuse for alternately contacting said first terminal prong, whereby accidental contact of either fuse or terminal prongs is rendered impossible.

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