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2,849,573

ELECTRICAL FUSE AND PLUG-IN RECEPTACLE COMBINATION

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Fig. 1.

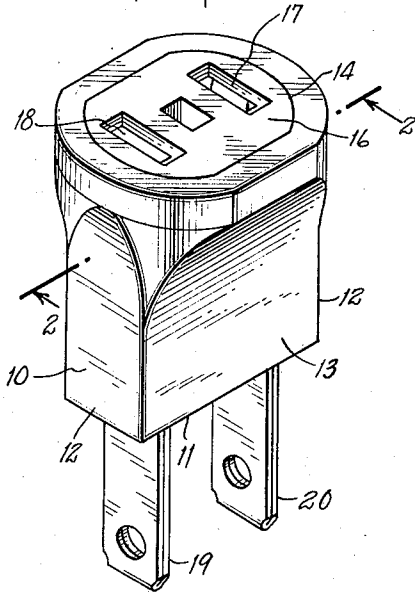


Fig. 2.

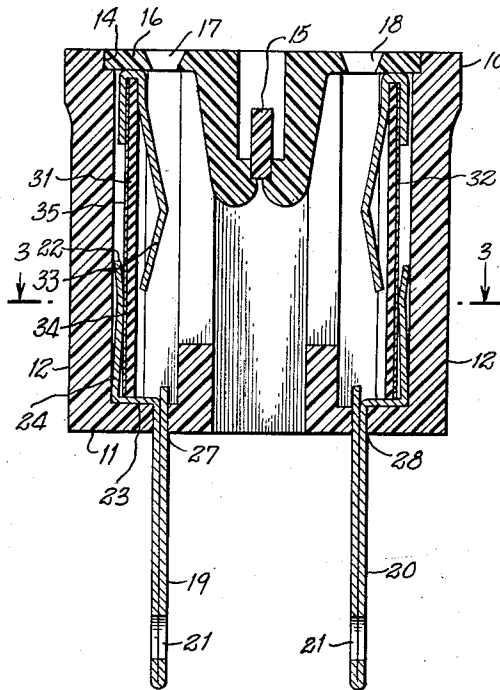


Fig. 5.

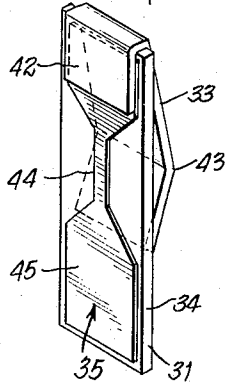


Fig. 4.

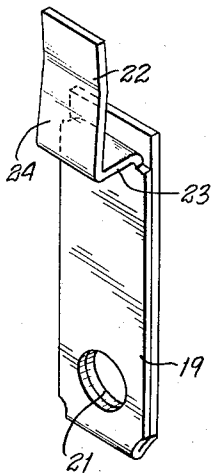
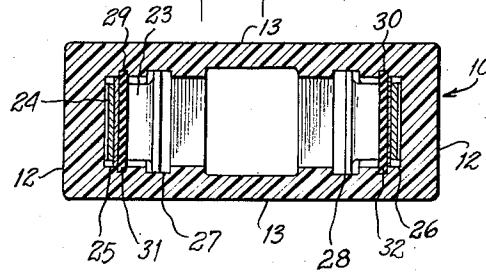


Fig. 3.



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ELECTRICAL FUSE AND PLUG-IN RECEPTACLE COMBINATION

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6 Claims. (Cl. 200—115.5)

This invention relates to an improvement in electrical fuses and in particular to improvements in a male plug-female receptacle combination containing electrical fuse means.

The need of electrical fuses or circuit breakers as a safety measure has been well known and established, and their use as protection for appliances and instruments as well as protection against the hazards of electric shock and fire need not be discussed at length here.

However, there is a need for fuse means that are supplementary to the permanent stationary fuses centrally located in normal electrical circuits. There is a need for a fuse that is capable of being used in conjunction with, and providing safety means solely for an individual appliance. There is need for such secondary fuse means within limited areas and/or limited circuits to localize any stoppage of electrical current.

It is accordingly among the objectives of this invention: to provide a fuse that will satisfy these needs; to provide a fuse with a plug-receptacle combination readily usable with individual appliances or instruments; to provide a fuse for use in limited circuitry and for limited loads. It is a further object of this invention to provide a fuse within a plug-receptacle combination that will be simple to use, easily manipulated and cheaply produced so as to be expendable after serving its function.

Situations in which this device may be used are numerous and the following are merely two of the more obvious ones. Directly coupled to a Christmas tree ornament, this device provides fire protection while assuring continued electrical service elsewhere. Coupled to a television receiver electrical cord it prevents potential overloading of household circuits by any excess current that may be drawn by the receiver.

Other advantages and objects of this invention will in part be obvious and in part appear hereafter.

The invention accordingly is embodied in a plug-receptacle structure formed essentially of two contact elements electrically connected by a metal strip having low electro-thermal capacity and low melting point. This metal strip acts as a fuse and when broken, severs the electrical connection between the two contact elements.

Reference is now made to the drawings showing an illustrative form of the invention, in which:

Fig. 1 is a perspective view of one form of device embodying the present invention;

Fig. 2 is a vertical cross-sectional view of said device taken along line 2—2 of Fig. 1 showing its internal structure;

Fig. 3 is a horizontal transverse cross-sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the prong contact element constituting the male plug portion of this device; and

Fig. 5 is a perspective view of the fuse means including the contact element constituting the female-contact portion of this device.

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The device shown in Fig. 1 comprises preferably molded body 10 of a rigid electrically insulating material such as any of the well known thermosetting or thermoplastic insulating substances, and is in the form of a hollow generally rectangular casing having a bottom wall 11, end walls 12, side walls 13 and having an opening 14 at the top. A transverse partition 15 is provided which contributes to the rigidity and strength of the body 10.

From within the body 10 extend two identical male prongs or contact blades 19 and 20.

As seen in Fig. 4, the contact blade 19 or 20 is made of a single strip of conductive material, such as brass, folded over itself for approximately two-thirds of its length, and assuming at one end the shape of a double-thickness prong or contact blade. An L-shaped projection 22 is formed at the other end of prong 19 having a short leg 23 perpendicular to and a longer arm 24 parallel to prong 19. The longer arm 24 is in addition bent slightly midway its length so as to provide a spring-like resiliency to it. An aperture 21 is provided near the folded end of the prong 19, forming a type of detent for the prong when seated in a corresponding cooperating plug receptacle.

The contact elements 19 and 20 are slidably mounted in the body 10 with portions 24 in recesses 25 and 26, more easily seen in Figs. 2 and 3, extending along the inner portions of end walls 12. The prongs 19, 20 extend out of body 10 through apertures 27 and 28 in the base wall 11.

Mounted directly adjacent to the respective contact elements 19 and 20 and in grooves 29 and 30 in body 10 are the fuse-contact means 31 and 32. Both fuse-contact elements 31 and 32 are alike in all details and as clearly seen in Fig. 5 comprise a contact member 33 consisting of a conductive somewhat resilient strip of metal, such as brass, mounted on a rectangular base or strip 34 of non-conductive material, such as fiberboard. The contact member 33 has one end 42 wrapped around an end of strip 34, and is bent slightly away from strip 34 midway its length as shown at 43 so as to have a spring-like resiliency.

Placed along the back of the non-conductive strip 34 on the side opposite element 33, and clamped to strip 34 by portion 42 of element 33 is a strip of fusible metal 35 constituting the fuse member. This metal strip 35 is composed of material having a predetermined electro-thermal capacity and has a necked-down configuration at 44 so as to readily fuse or burn and separate when more than a predetermined amount of electric current passes through it. The fuse-contact elements 31 and 32 are respectively inserted in grooves 29 and 30 so that the lower portion 45 of fusible strip 35 makes electrical contact with the upper arm 24 of prong 19 or 20. The resilience of bent arm 24 forces element 31 (or 32) against the surfaces of its groove 29 (or 30) so as to frictionally retain the elements in place.

In operation, when a current greater than that desired passes through the device, the fuse member 35 will burn and sever. Thus the circuit between the two contact elements 19 and 33 (or 20 and 32) will be broken, stopping the flow of current.

Fitted into the top opening 14 of body 10 and clipped to the transverse partition 15 is a removable cover 16 made in the same manner and of the same material as the body 10. This cover has two rectangular openings 17 and 18 adapted to accommodate the corresponding prongs of a cooperating male plug. This cover is preferably but not necessarily similar to that shown and claimed in Patent No. 2,535,356 issued to Charles E. Gilbert on December 6, 1950.

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It will be seen that the bent portions 43 of fuse-contact elements 31, 32 extend inwardly from the end walls 12, to a position beneath cap openings 18, 17 so as to engage the prongs of the male plug of an appliance cord when inserted through openings 17, 18.

It can be readily seen that this device provides simple adequate fuse means capable of satisfying the requirements and objectives enumerated above.

It is further obvious that many modifications of this invention can be readily conceived without departing from the spirit thereof.

For example, the present device may be readily made reusable. Thus, a new fuse may be easily placed in the device shown in the drawing by removing the cover 16 and the fuse-contact means 31 and/or 32 and sliding a new fuse-contact means into grooves 29 or 30.

Accordingly the above description is intended to be illustrative only and is not to be interpreted in a limiting sense, the present invention being limited solely as defined in the appended claims.

What is claimed is:

1. An electrical fuse in combination with a plug-in receptacle adapted for use in conjunction with an appliance cord plug and receptacle outlet, comprising a hollow body of insulating material having end walls each containing a recess extending substantially the length thereof, side walls each containing a pair of grooves adjacent said end walls, a bottom wall containing a pair of apertures therein, and a cover having a pair of rectangular openings adapted to receive a pair of corresponding receptacle-mating-prongs; a pair of identical receptacle-mating contact elements each formed of a doubled-over conductive strip providing a prong at one end and having an L-shaped projection at the other end, each of said receptacle-mating contact elements being positioned within a respective end wall recess with its said L-shaped projection engaging said side walls and its said prong extending beyond and through a bottom wall aperture; a pair of identical fuse-contact elements each comprising a strip of non-conductive material, a strip of fusible conductive material, and a prong-mating contact member, said fusible conductive strip having substantially the same length as said non-conductive strip and being attached to one side of said non-conductive strip, said fusible conductive strip having a necked-down portion in the center thereof, and said prong-mating contact member being formed of a further strip of conductive material attached to and folded over one end of both said non-conductive strip and said fusible strip and extending away from the reverse side substantially half the length thereof; each of said fuse-contact elements being positioned within said side wall grooves adjacent said receptacle-mating contact element and having the end of one of said fusible conductive strips opposite its said prong-mating contact member in electrical contact with said receptacle-mating contact element and having said prong-mating contact member substantially in line with one of said openings in said cover.

2. An electrical fuse in combination with a plug-in receptacle adapted for use in conjunction with an appliance cord plug and a receptacle outlet, comprising a substantially hollow body of insulating material having a substantially rectangular configuration with a cover and base wall, said cover and base wall each having a pair of substantially rectangular openings therein; a pair of identical receptacle-mating contact elements positioned within said body and extending through said base wall openings; a pair of identical fuse-contact elements each comprising a non-conductive strip of material, a fusible conductive strip of material and a prong-mating contact member, said fusible conducting strip having substantially the same length as said non-conductive strip and being attached to one side of said non-conductive strip, said fusible conductive strip having a necked-down portion in the center thereof and said prong-mating contact member being formed of a further strip of conductive material

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attached to and folded over one end of said non-conductive strip and of said fusible conductive strip and extending away from the reverse side substantially half the length thereof; each of said fuse-contact elements being positioned within said body adjacent to said receptacle-mating contact elements and having its end opposite its prong-mating contact member in contact with said receptacle-mating contact elements, said prong-mating contact member being substantially in line with an opening in said cover.

3. An electric fuse in combination with a plug-in receptacle comprising an insulating shell having a pair of apertures in the top thereof, a pair of identical receptacle-mating contact elements positioned within said shell and having respective prongs extending from one end thereof opposite said top, a pair of identical fuse-contact elements each comprising a strip of non-conductive material, a strip of fusible conductive material attached to one side thereof and a prong-mating contact member extending from the reverse side thereof and to said non-conductive strip and to said fusible conductive strip adjacent an end thereof, each of said fuse-contact elements being positioned within said shell adjacent to one of said receptacle-mating contact elements and having the end of said fusible conductive strip opposite said prong-mating contact member in contact with said one receptacle-mating contact element and having its prong-mating contact member substantially in line with a respective one of said apertures in said shell top.

4. An electrical fuse in combination with a plug-in receptacle comprising an insulating shell having a pair of apertures in the top thereof; and a pair of identical receptacle-mating contact elements positioned within said shell and having respective prongs extending from the end thereof opposite said top; a pair of identical fuse-contact elements each comprising a non-conductive strip of material, a fusible conductive strip of material and a prong-mating contact member, said fusible conductive strip having substantially the same length as said non-conductive strip and being attached to one side of said non-conductive strip, said fusible conductive strip having a necked-down portion in the center thereof and said prong-mating contact member being formed of a further strip of conductive material folded over at end and attached to said non-conductive strip and said fusible conductive strip and extending away from the reverse side of said non-conductive strip, each of said fuse-contact elements being positioned within said shell adjacent one of said receptacle-mating contact elements and having the end of said fusible conductive strip opposite said prong-mating contact member in contact with said one receptacle-mating contact element and having its prong-mating contact member substantially in line with said apertures in said shell top.

5. An electrical fuse in combination with a plug-in receptacle comprising an insulating shell having a pair of apertures in the top thereof; a pair of identical receptacle-mating contact elements positioned within said shell and having respective prongs extending from the end thereof opposite said top; a pair of identical fuse-contact elements each comprising a non-conductive strip of material, a fusible conductive strip of material and a prong-mating contact member, said fusible conductive strip being attached to one side of said non-conductive strip and said prong-mating member being formed of a strip of resilient conductive material having an end folded over and crimped to one end of said strip of non-conductive material and of said fusible conductive strip and extending away from the reverse side of said non-conductive strip, each of said fuse contact elements being positioned within said shell adjacent one of said receptacle-mating contact elements and having the end of said fusible conductive strip opposite said prong-mating contact member in contact with said respective receptacle-mating contact element and having its prong-mating contact

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member substantially in line with a respective one of said apertures in said shell top.

6. An electrical fuse in combination with a plug-in receptacle comprising an insulating shell having a pair of apertures in the top thereof; a pair of identical receptacle-mating contact elements positioned within said shell and having respective prongs extending from the end thereof opposite said top; a pair of identical fuse contact elements each comprising a strip of non-conductive material, a strip of fusible conductive material attached to one side of said non-conductive strip, and a prong-mating contact member extending from the reverse side thereof and having an end folded over and crimped to said non-conductive strip and to said fusible conductive strip adjacent an end thereof, each of said fuse contact

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elements being slidably fitted within said shell and having a fixed position adjacent one of said receptacle-mating contact elements and having the end of said fusible conductive strip opposite said prong-mating contact member in contact with said respective receptacle-mating contact element and having its prong-mating contact member substantially in line with a respective one of said apertures in said shell top.

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