

May 26, 1953

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2,640,125

EXTENSION CORD PLUG WITH REPLACEABLE FUSE ELEMENT

Filed Aug. 31, 1951

2 Sheets-Sheet 1

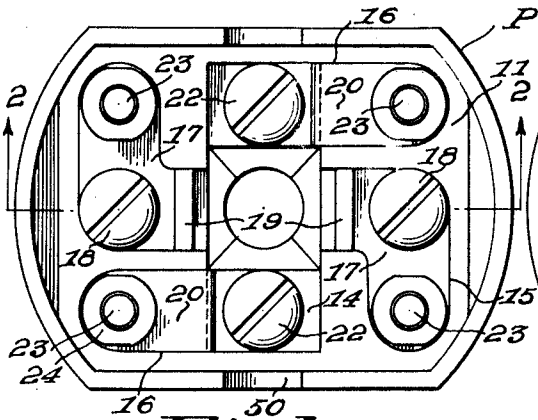


Fig. 1.

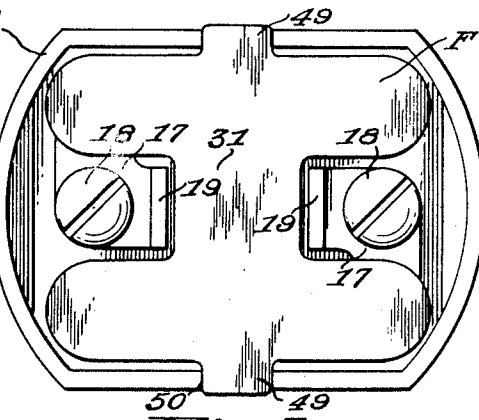


Fig. 3.

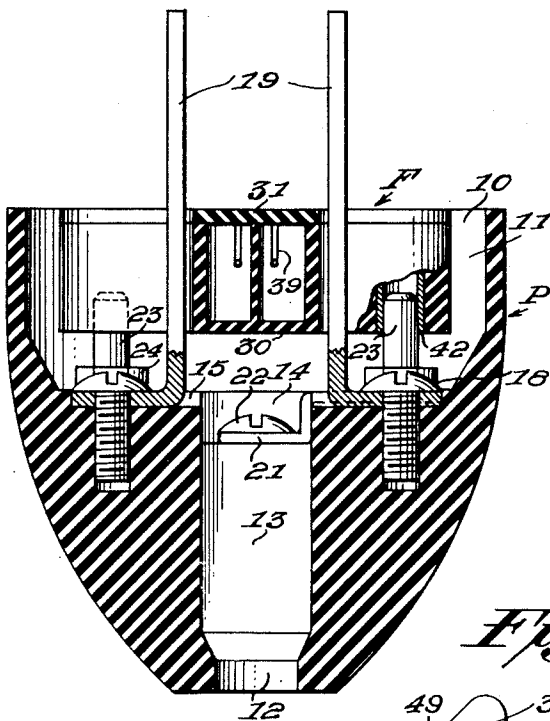


Fig. 2.

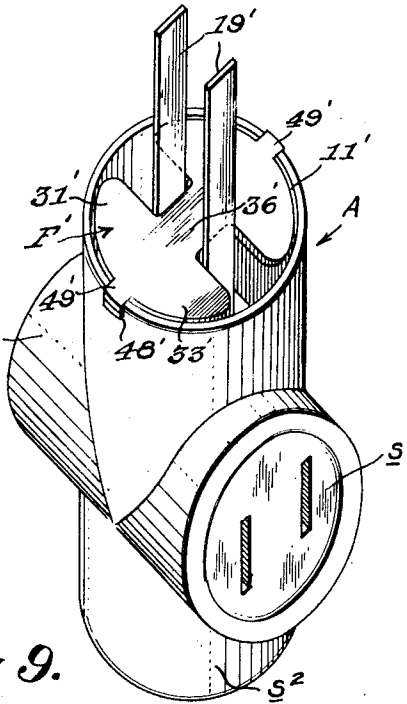


Fig. 9.

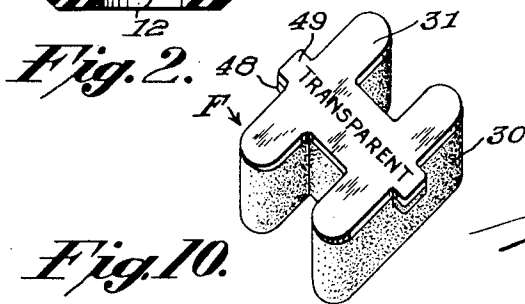


Fig. 10.

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2 Sheets-Sheet 2

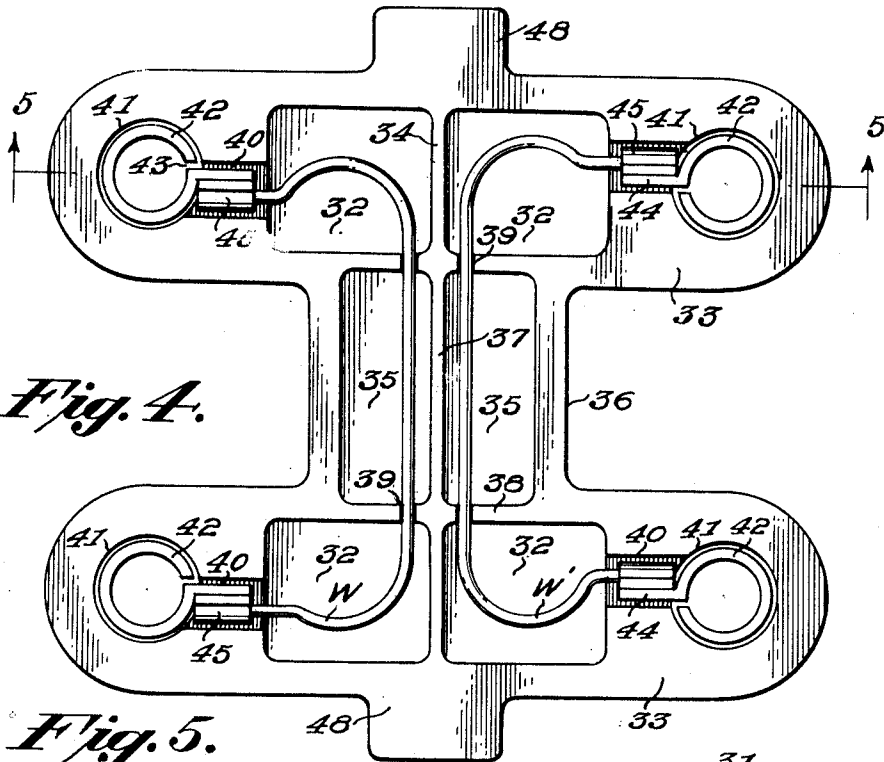


Fig. 4.

Fig. 5.

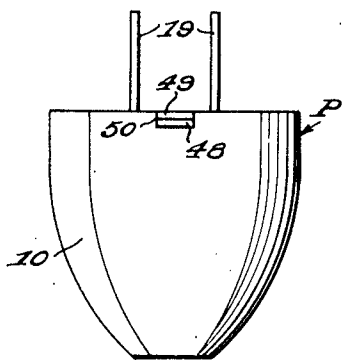
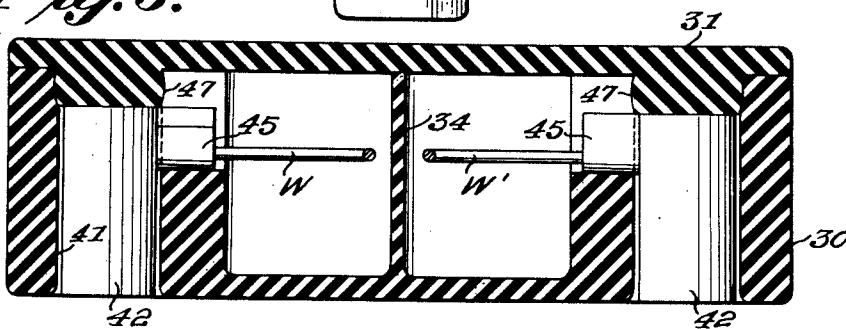


Fig. 6.

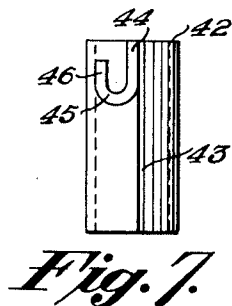


Fig. 7.

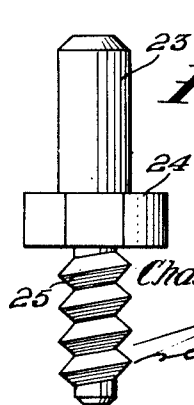


Fig. 8.

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UNITED STATES PATENT OFFICE

2,640,125

EXTENSION CORD PLUG WITH REPLACEABLE FUSE ELEMENT

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Application August 31, 1951, Serial No. 244,505

13 Claims. (Cl. 200—115.5)

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This invention relates to improvements in a fuse carrying quick detachable connecting plug for electric extension cords, adapters and the like and to an improved replaceable fuse element therefor. More particularly the instant invention comprises improvements in the type of plug and fuse organization disclosed and claimed in Letters Patent 2,486,380, November 1, 1949, as well as an application Serial No. 119,735, filed October 5, 1949, for Fusible Extension Cord Plug.

There have been many attempts made to produce a satisfactory safety plug, of the character above referred to, which protects both lines of the plug circuit against overload with a single replaceable fuse unit and which permits ready inspection of the fusible members of the replaceable unit without removal or rearrangement of any portion thereof or of the plug, except the mere withdrawal of the plug from an associated socket, and at the same time meet all of the requirements of the Fire Underwriters.

The present invention has as an important object the provision of such a safety plug or adapter having a replaceable unit for a pair of fusible members, in which unit a separate and insulated explosion chamber is provided for each fusible member through which variable sizes of fusible wires may be supported adjacent opposite ends of the chambers.

It is also an object of this invention to more completely insulate the spaces overlying the binding posts and fuse elements and to close the recess between the connecting prongs by the replaceable fuse unit. This unit thus provides support for the prongs and prevents inward bending thereof when in use, and is only replaceable after the circuit is broken by removal of the plug from an associated socket.

A further object of the invention is to provide a one-piece plug having a recess in the outer or prong end thereof communicating with a cord receiving aperture opening through the other end, the plug having a pair of spaced binding posts engageable plates and a pair of spaced plates unitary with the prongs, and a cylindrical contact member projecting outwardly from each plate in parallelism with the axis of the said aperture, and a fuse unit removably supported within said recess and having spaced socket contacts receiving said cylindrical contacts.

A still further object of the invention is to provide a quick detachable electric plug or adapter comprising a body which is preferably constructed in one piece from any suitable insulating material, such as rubber, or any other synthetic resin, the body having a relatively deep recess in one end thereof, the plug being provided with a

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contact plate at each side of the recess secured to the base of the recess by a wire binding post, a pair of contact plates disposed intermediate the first plates and each provided with a prong, a cord receiving aperture in the other end of the plug communicating with the recess, a cylindrical contact member projecting outwardly from each plate in parallelism with the axis of said prongs and aperture, and opposite walls of the recess at the free end of the plug outwardly of each binding post being provided with a slot for guiding and supporting a fuse element having contact sockets for receiving said cylindrical contacts.

A still further object of the invention is to provide a novel fuse element for use with a recessed plug having cylindrical contacts projecting from the base of the recess and which comprises a transparent box having opposed insulated chambers therein, a pair of spaced tubular contacts adjacent each chamber, and a fuse wire disposed within each chamber and having its ends secured to the respective pair of contacts whereby the fuse wires may readily be inspected through the transparent box.

Other objects and advantages of the invention will become apparent in the course of the following description, taken in connection with the accompanying drawing, wherein:

Fig. 1 is an end view of the improved plug as observed from the prong engaging end thereof and with the fuse element removed;

Fig. 2 is a vertical sectional view as observed in the plane of line 2—2, on Fig. 1, and further showing the improved fuse element, also partly in section in operative association with the cylindrical contacts of the plug;

Fig. 3 is an end view of the plug end assembled fuse element as observed from the top or prong end of Fig. 2, i. e. as the safety plug would appear when withdrawn from an associated socket for inspection;

Fig. 4 is a top plan view of the fuse element or unit apart from the plug and with the cover thereof removed to show the interior of the unit;

Fig. 5 is a vertical sectional view in the plane of line 5—5 on Fig. 4;

Fig. 6 is a side elevational view of the combined plug and fuse element on a reduced scale;

Fig. 7 is an elevational view of one of the fuse element supporting tubular contact members;

Fig. 8 is an elevational view of one of the plug supported cylindrical contact members with which a fuse supporting tubular contact engages;

Fig. 9 is an isometric view of a safety adapter plug which has one or more outlet sockets for quick detachable plugs of ordinary design. In

such a unit the several outlet circuits are protected by the fuse within the unit, and

Fig. 10 is also an isometric view and shows the replaceable fuse element or unit as it would appear separate from a quick detachable plug.

Referring now in detail to the drawings, P designates the improved safety plug, which as shown, embodies a moulded or otherwise formed insulated body member 10, provided with a relatively deep and substantially rectangular recess 11, in one end thereof. The body is further provided with a cord receiving aperture 12, opening through the opposite end thereof and which aperture communicates with an elongated passageway 13 extending centrally through the body. The body is further provided with two lateral recesses 14, communicating with the recess 11, at one side thereof and with the passageway 13, at their adjacent ends. The base wall of the recess 11, is further recessed at 15, and 16, for a purpose later to appear.

Seated in the recesses 15, is a pair of contact plates 17 which as indicated in Fig. 1, are of L-form in plan. These plates are secured in position by screws 18 which are disposed at the juncture of the legs thereof and longitudinally aligned legs of such plates are provided with elongated socket engageable contact prongs 19.

A second pair of contact plates 20, are disposed in the recess 16, which recess communicates at one end with the deeper recess 14. These plates 20, include inner end portions 21, which are offset from the portions disposed within recesses 16, so as to extend into and rest on the base wall of the communicating recesses 14. These offset portions are secured to the base walls of recesses 14, by means of cord binding screws or posts 22.

As will be seen in Fig. 1 the outermost ends of plates 17 and 20, are disposed at points corresponding to the corners of an imaginary rectangle with the screws 18 and 22, disposed in the sides of such rectangle intermediate the corners thereof.

The improved plug further includes four cylindrical fuse contact pins 23, each of which projects outwardly from the base of recess 11 to points substantially midway of the top and bottom of the recess.

Each contact pin projects from one side of a flat sided head 24, and from whose opposite side extends a screw 25, as is clearly shown in Fig. 3. These screws extend through apertures in the outer ends of the plates 17 and 20 and are engaged within threaded sockets in the body material of the plug.

It will be seen from Fig. 1, that the plates 17 and 20, are wholly independent of each other and are insulated from each other by the supporting material of the body 10 of the plug P.

The current bearing wires are connected to the plates 20, as has been indicated. No current is obtainable however, through the spaced prong supporting plates 17 until connection is made within the recessed plug by the improved fuse unit F, which will now be described.

The improved fuse F is generally designated F, and same comprises a partitioned box-like body 30 having a transparent cover 31 secured thereon in any desired manner and each of which is formed of an insulating material.

The body 30 is of generally H-form, as indicated in Figs. 3 and 10, with the legs extending longitudinally of the plug and the central cross member extending transversely thereof.

As is more particularly indicated in Fig. 4, the body 30 is provided with a pair of recesses 32,

in each of the legs 33 thereof and which are separated by a web 34. A third pair of recesses forming elongated chambers 35 are provided in the central cross member 35, and such recesses or chambers are also separated by a web designated at 37 and which is aligned and integral with the webs 34. The recesses or chambers 35, are separated from the recesses 32, by other webs 38, and these webs are provided with fuse wire receiving slots 39, opening through the open face of the fuse body 30, where they are closed by the top 31.

The legs 33, at each end thereof, are provided with a relatively shallow recess 40 communicating at its inner end with an adjacent recess 32 and at its outer end with a relatively large aperture 41, which extends entirely through the body 30.

An expansible metallic contact sleeve 42, is freely disposed within each aperture 41 as is clearly shown in Figs. 4 and 5. These sleeves are preferably slit longitudinally thereof, as at 43, and the material of one edge portion of the sleeve is radially extended, as at 44. This edge portion 44 extends longitudinally of the sleeve in the form of a U-shaped member 45, in the bight of which is received one end of a fuse wire W and W'. The extended free end portion 46, of this member 45, is then bent toward the extension 44, as in Fig. 4, for retaining the ends of the fuse wires in position.

As will be noted in Fig. 5, the U-shaped members 45, seat on the bases of the slots 40, thereby preventing movement of the sleeves 42 axially of the apertures 41, in the direction of the base of the fuse body 30.

Furthermore, the cover 31 is provided with four spherical surfaced knobs 47 frictionally engaged within corresponding seats in the body 30 adjacent the cover ends of the apertures. Thus the cover may be cemented or otherwise maintained in closed engagement with the body against inadvertent separation, and the knobs will engage the corresponding ends of the sleeves and thus preclude axial movement thereof in a direction toward the open side of the body.

The improved fuse unit F, is removably supported within the recess 11, in the plug P, and with the outer face of the cover 31, flush with the corresponding end of the plug, as is seen in Fig. 2.

In order to readily guide and retain the fuse unit into such position within the plug P the fuse body 30, and its attached cover 31, are provided with mating lug portions 48 and 49, respectively, which are frictionally engageable within notches 50, in opposite walls of the plug P.

With the fuse unit thus positioned the prongs 19 will extend between the legs 33 of the unit and adjacent the central cross member 36 thereof and the contact pins 23 will extend axially within the sleeves 42, see Fig. 2.

A modified embodiment of the invention is illustrated in Fig. 9 wherein the improved combination plug and fuse element is in the form of an adapter A. In this embodiment of the invention, the plug is of the well known three-way type, having the sockets S, S¹ and S² for a standard plug and the portion of the plug axially aligned with socket S², is extended to provide the fuse element engageable recess 11'. A fuse element F' of the construction shown in Figs. 4 and 5, is provided but is modified in plan contour to suit the cylindrical form of recess 11', the fuse element cover and associated body and cover lugs are designated 31', 48' and 49' respectively.

With the safety adapter plug of Fig. 9, the single replaceable fuse element serves and protects one or more different circuits to appliances having standing connecting plugs. When a num-

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ber of appliances are thus connected into a single socket a dangerously heavy load may be placed on the line. By the provision of this simple and easily replaceable fuse element the trouble may be quickly detected and the circuit restored in the event of a blown fuse.

While I have herein disclosed my invention in accordance with a preferred embodiment thereof, it is obvious that changes in structure may be resorted to without departing from the spirit of the invention, and I therefore do not desire to be limited to the precise form disclosed beyond the limitation imposed by the following claims.

What I claim and desire to secure by U. S. Letters Patent is:

1. A combination electric plug and fuse comprising a body member having a recess in one end thereof, a cord receiving aperture in the opposite end thereof communicating with said recess, a pair of spaced contact plates secured by binding posts to the base of said recess, a second pair of contact plates secured to the base of said recess in spaced relation to each other and said first plates, a socket engageable prong unitary with each of said last plates, a cylindrical contact pin projecting from each plate toward the open end of said recess in parallelism with the axis of said aperture, and a fuse unit removably seated in said recess and provided with tubular contact members removably receiving said cylindrical contact pins.

2. An attachment plug comprising a body portion having a recess in one end thereof, a pair of binding posts in the base of said recess, a pair of separated rigid cylindrical contacts associated with each binding post within said recess, said contacts being disposed substantially outwardly of said binding posts and adjacent opposite walls of the recess, the said recess adapted to be substantially closed by a circuit completing member engageable with said pairs of contacts.

3. An attachment plug comprising a body portion having a recess in one end thereof, a pair of socket engageable prongs supported by the body portion and extending through said recess and beyond said end, a contact plate carried by each of said prongs and secured to the base of said recess, a contact plate spaced from and associated with each of said first plates and secured to the base of said recess by a binding post, a cord receiving aperture in the other end of said body portion communicating with said recess, and a cylindrical contact projecting outwardly from each of said plates in parallelism with the axis of said aperture and terminating substantially below the open end of said recess.

4. An attachment plug comprising a body portion having a generally rectangular recess in one end thereof, a cord receiving aperture in the other end of the body portion communicating with said recess, a pair of prong supporting plates secured to the base of said recess by screws disposed in the major axis of said recess, a second pair of plates secured to the base of said recess by binding posts disposed in the minor axis of said recess, a cylindrical contact extending outwardly from each of said plates and disposed adjacent the corners of said recess, a contact on each of said first plates cooperating with a contact on each of said second plates, the said recess adapted to be closed at its open end by a removable fuse box having tubular contacts receiving said cylindrical contacts.

5. A fuse member comprising a generally rectangular open top box of insulating material, a partition wall dividing said box into opposed in-

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sulated chambers, a contact member disposed within the material of said box adjacent each corner thereof, a fusible element in each chamber connected to the pair of contacts associated therewith, and a cover of insulating material for the box.

6. The structure according to claim 5, wherein said box and said cover are each transparent for ready visual inspection of the fusible elements.

7. The structure according to claim 5, wherein said contacts are each in the form of a sleeve having a clinchable U-shaped member for receiving and retaining an end of said fusible element.

8. The structure according to claim 5, wherein said box and said cover are provided with mating lugs at each opposite side thereof for frictional engagement within corresponding notches in opposed side walls of a recessed attachment plug.

9. The structure according to claim 5, wherein said box is provided with apertures extending from the open top and through the bottom thereof and in which said contact members are disposed, and said cover having spherical surfaced knobs frictionally receivable in the adjacent ends of said apertures.

10. A fuse member for removable disposition within a recess in an attachment plug having pairs of cooperating contacts, a pair of socket engageable prongs projecting beyond the open end of the recess and a notch in each of two opposing recess walls comprising an open top box of insulating material and of generally H-form in plan, a contact embedded in the material of each leg of the box adjacent each end thereof, a partition extending centrally of the cross member and substantially through the legs of the box providing a chamber at each side thereof and with one insulated from the other, a fusible element disposed within each chamber and having its ends secured to the corresponding contacts, and a cover of insulating material for the box.

11. The structure according to claim 10, wherein said box and said cover are transparent for visual inspection of the fusible elements.

12. The structure according to claim 10, wherein said box and said cover are provided with a pair of mating lugs on each of two opposite sides thereof for frictional reception within said notches.

13. The structure according to claim 10, wherein each of said ends of the box legs is provided with an aperture extending from the open top and through the bottom of the box, each of said legs being provided with a recess communicating therewith and with the adjacent chamber adjacent the open top of the box, each of said contacts comprising a sleeve seated in one of said apertures and having a fusible element attaching member projecting from a side wall thereof and seated on the bottom of a cooperating recess, and said cover being provided with knobs removably receivable in the ends of said apertures at open top of the box and engaging the corresponding ends of the sleeves.

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