April 27, 1965 H. HUBBELL ETAL 3,180,955

FUSIBLE SAFETY ELECTRICAL ATTACHMENT PLUG

Filed June 8, 1961 2 Sheets-Sheet 1

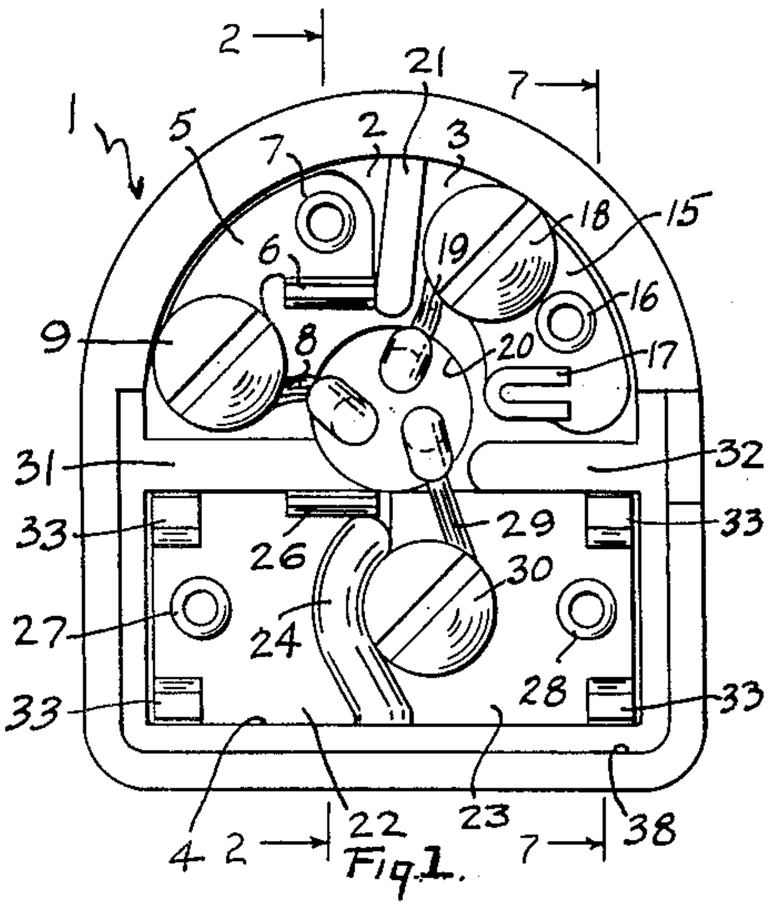


Fig. 1.

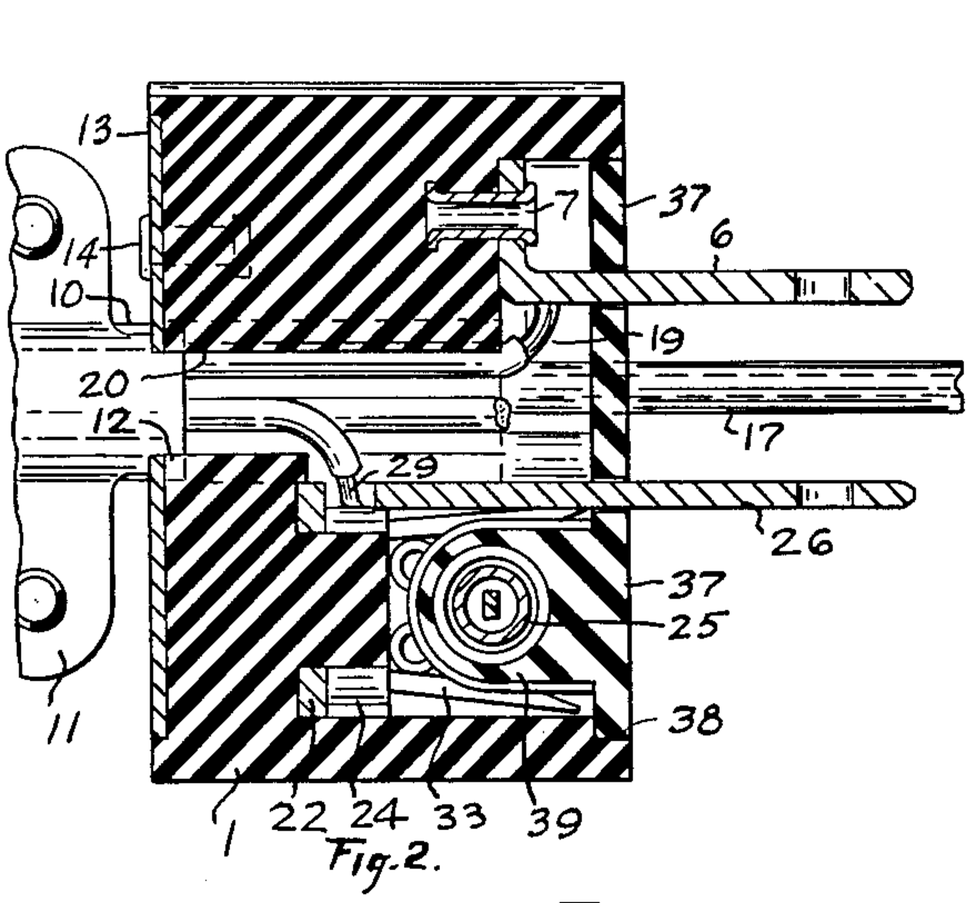


Fig. 2.

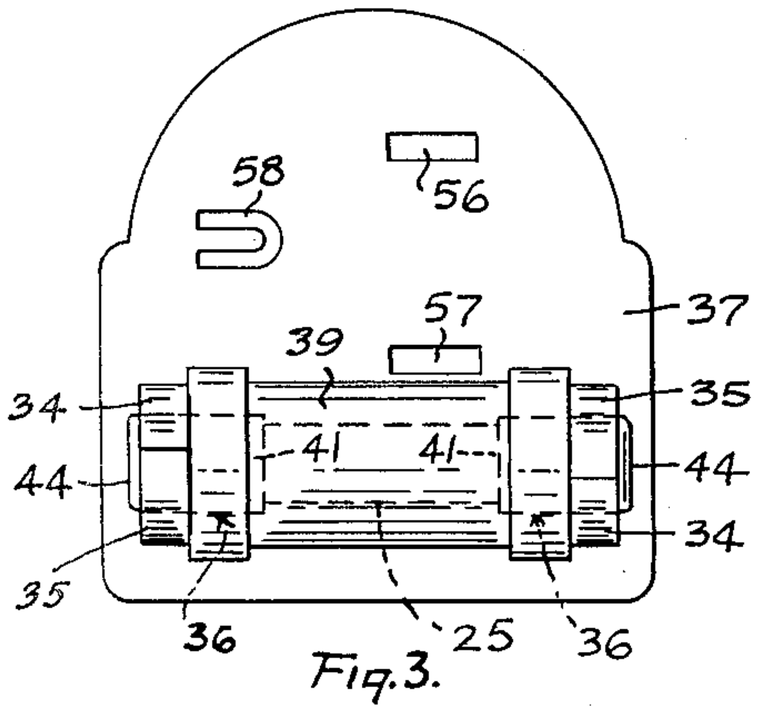


Fig. 3.

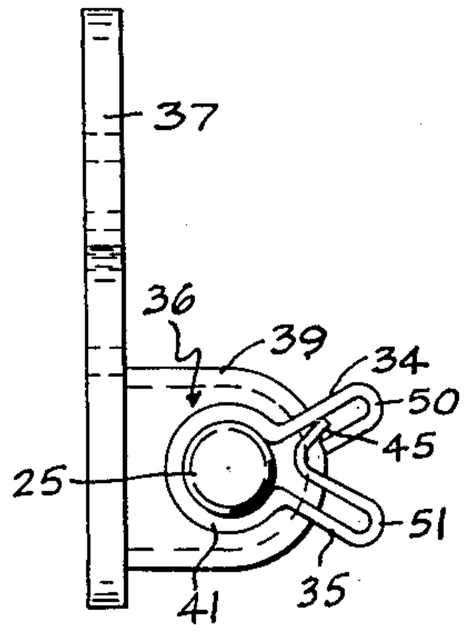


Fig. 4.

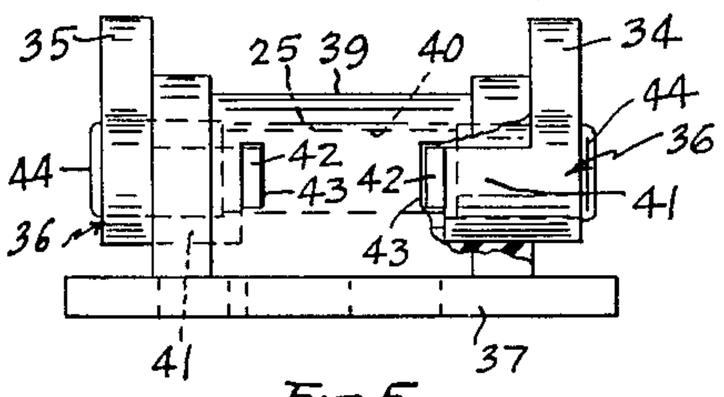


Fig. 5.

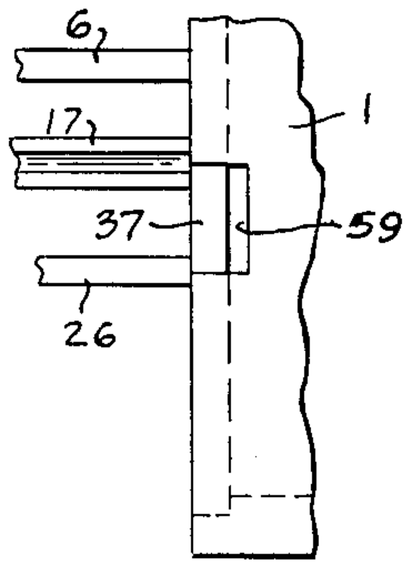


Fig. 2A.

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FUSIBLE SAFETY ELECTRICAL ATTACHMENT PLUG

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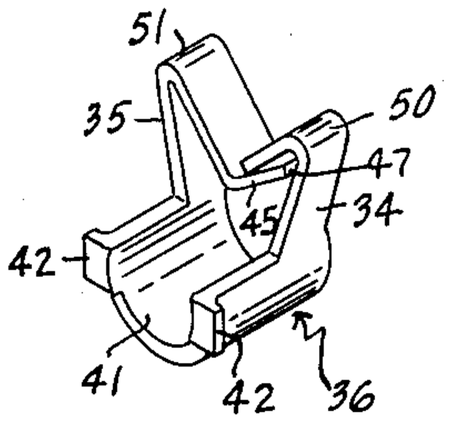


Fig. 6.

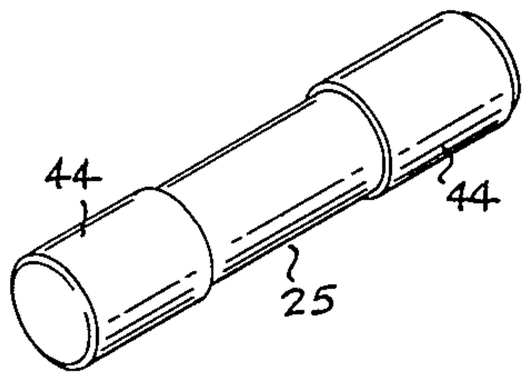


Fig. 8.

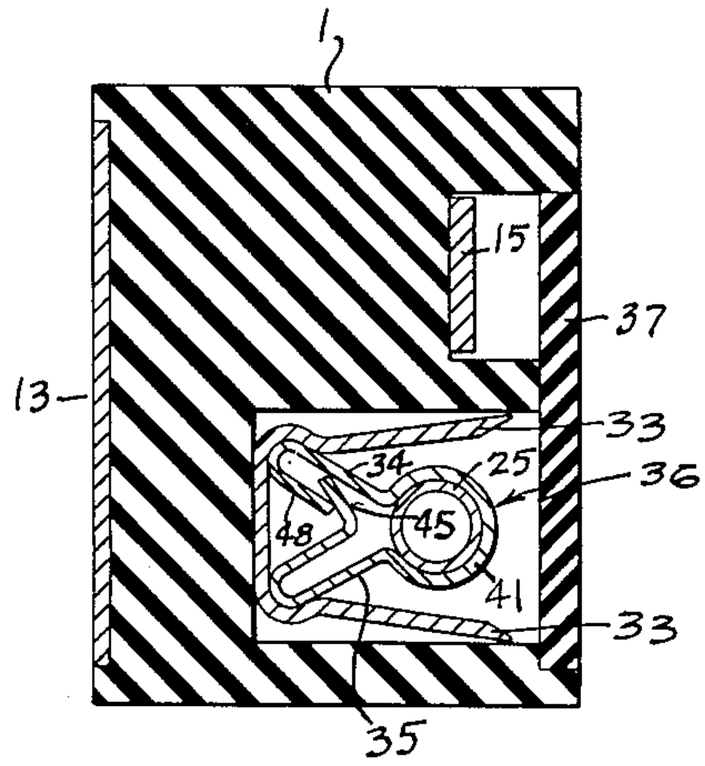


Fig. 7.

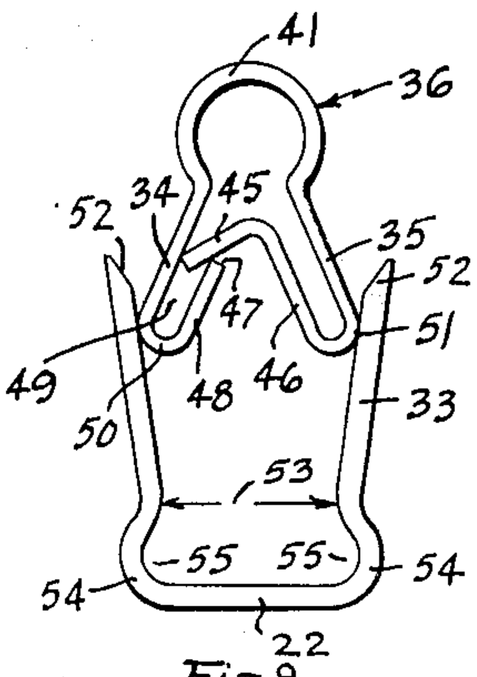


Fig. 9.

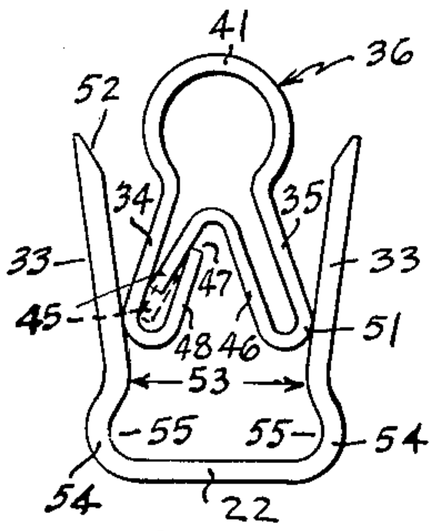


Fig. 10.

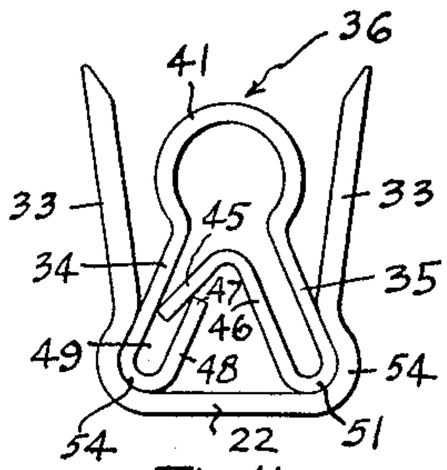


Fig. 11.

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# 3,180,955
# FUSIBLE SAFETY ELECTRICAL ATTACHMENT PLUG

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8 Claims. (Cl. 200—115.5)

This invention relates to fused electric attachment plugs, and has for an object to provide an improved construction and arrangement for mounting the fuse in the plug.

It is also an object to provide a structure in which the plug must be removed from the wall receptacle in order to change the fuse, and the fuse can therefore be replaced in a convenient manner and without any hazard.

Another object is to provide improved means for mounting the fuse, and one in which the fuse is removably mounted in a removable cover for the recess in which the fuse and the electrical connections cooperating therewith are located.

A particular object is to provide a fuse mounting for an attachment plug comprising detachable spring contacts which are so designed as to prevent their easy collapse or being bent out of shape while handling, and will effect a more reliable and effective electrical connection which can be relied on to carry the desired load.

A further particular object is to provide a grounding type plug which may be fused to protect the device or appliance to which it supplies current.

With the foregoing and other objects in view, we have devised the construction illustrated in the accompanying drawings forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In these drawings:

FIG. 1 is an end view of the improved plug looking toward the rear or inner end from which the blade contacts project, and with the rear cover and fuse removed;

FIG. 2 is a longitudinal section substantially on line 2—2 of FIG. 1 showing the rear cover and fuse in place;

FIG. 2A is a partial side view of the plug;

FIG. 3 is an elevational view of the back cover removed from the plug looking toward the inner or rear side thereof;

FIG. 4 is an edge view of the cover looking from the left of FIG. 3;

FIG. 5 is an edge view loking toward the bottom of FIG. 3;

FIG. 6 is a perspective view of one of the mounting clips for the fuse;

FIG. 7 is a section substantially on line 7—7 of FIG. 1 with the cover in place;

FIG. 8 is a perspective view of a type of fuse that may be used;

FIG. 9 is a detail view of a fuse mounting clip and receiving contacts showing the clip as it first enters between the contacts;

FIG. 10 is a similar view showing the clip further inserted and in an intermediate position, and

FIG. 11 is a similar view showing the clip fully inserted to its final position.

This improvement plug comprises a body 1 of molded insulating material provided with recesses 2, 3 and 4 extending inwardly from its inner or rear wall, and in which are mounted certain contact elements. In the recess 2, and anchored to the bottom wall thereof, is a plate 5 carrying one blade 6 of a pair of contact blades, the blade



6 being anchored to the insulating material by a suitable rivet 7 molded into this material. Also on the plate 5 is means for fastening a conductor wire 8 comprising a binding screw 9, the wire 8 being one of the conductors of an insulating cable 10 leading to an attachment or auxiliary device to be provided with an operating current. This cable is secured in the strain-relief clamp 11 having lateral feet 12 under an end plate 13 secured to the outer end surface of the body by suitable anchoring rivets 14. Secured in the recess 3 and anchored to the bottom thereof is a plate 15 anchored by a suitable rivet 16 molded in the insulating material, and projecting outwardly and rearwardly from this plate is a grounding strip or blade contact 17, preferably of substantially U-shaped cross section so that it is readily distinguishable from the other contact blades. Also on this plate is a binding screw 18 for connecting the grounding conductor wire 19 of the insulated cable, the body member being provided with a suitable opening 20 through which the lead wires may be connected to the binding screws. The two recesses 2 and 3 are separated by a dividing wall 21 to prevent short-circuiting between the contact blades or the lead wires leading to them.

Mounted in the recess 4 and anchored to the bottom wall thereof are separated contact plates 22 and 23, the plates being separated by a dividing wall 24 extending transversely across the recess. This recess is much deeper than the recesses 2 and 3 as it is designed to enclose the fuse indicated, for example, as of the general cylindrical or tubular type 25, as will be further described. One of the plates in the recess, as for example the plate 22, has secured to it and projecting rearwardly therefrom, the other blade contact 26 parallel to the blade contact 6 and adapted with this contact to be inserted or plugged into the entrance slots in a suitable outlet receptacle, to engage the receptacle contacts therein for supplying electric current through the cable 10 to a suitable electrical appliance or attachment to be operated thereby, the contact 26 being ordinarily connected to the "hot" side of the circuit through the fuse 25. These plates 22 and 23 are anchored to the insulating body member by suitable rivets 27 and 28 respectively anchored by molding into the insulating material. The plate 23 is connected in the "hot" side of the circuit comprising the conductor wire 29 by means of a binding screw 30. The recess 4 is separated from the recesses 2 and 3 by transverse dividing walls 31 and 32.

Each of the plates 22 and 23 is provided with a pair of contact fingers 33 located at the outer ends of these plates and projecting rearwardly from the plates toward the open side of the recess. These fingers are adapted to receive inserted between them the contact legs 34 and 35 of mounting clips 36 for the fuse 25.

The recesses 2, 3 and 4 have their open sides at the rear end of the plug closed by a cover in the form of a molded plate 37 of insulating material, this plate seating in a recess 38 around the recess 4 and at its opposite edge seating in the outer peripheries of the recesses 2 and 3. Molded on the rear or inner side of this plate 37, and molded integral therewith, is a lug 39 provided with a longitudinal circular passage 40 open through its opposite ends to receive the fuse 25. The fuse is removably mounted in this passage by means of a pair of metal spring clips 36, each clip comprising a tubular or looped body portion 41 and a pair of spring contact legs 34 and 35 projecting from the opposite edges thereof, as shown more clearly in FIGS. 5 to 11 inclusive. These two clips are mounted in the passage 40 in the lug 39 on the inner surface of the cover 37, the tubular portion 41 being located within this passage and secured therein by outwardly extending ears 42 at the inner end of this tubular

portion snapped and seated in openings 43 in the side walls of the passage, as shown in FIG. 5, this tubular portion embracing the opposite end contact ferrules 44 of the fuse 25, the relative sizes being such that on insertion of the fuse the tubular portion 41 is expanded somewhat to provide a close-gripping electrical contact between the clips and the fuse contacts. The spring contact legs 34 and 35 are at the outer end of the tubular portion 41 so that they are located outside the lug 39 at the opposite ends thereof so that they are exposed and may be inserted in the contact fingers 33 forming a part of the plates 22 and 23 anchored at the bottom of the recess 4. When the fuse is in place in this recess, the spring contact legs 34 and 35 are inserted in and between the spring fingers 33, thus connecting the opposite ends of the fuse to the respective plates 22 and 23, and therefore, one end of the fuse is connected to the contact blade 26 and the other end of the fuse is connected to the conductor 29, and therefore the fuse is in the "hot" side of the circuit.

The clips 36 for mounting the fuse are an improved construction comprising the two substantially U-shaped spring contact legs 34 and 35. One of these legs, in this case the leg 35, is provided with an extension 45 extending laterally from the free end of the free side 46 of this leg, and it extends over the free end 47 of the free side 48 of the leg 34 and into the space 49 between the two side portions of this leg 34, as seen in FIGS. 9 to 11. These legs 34 and 35 are inclined downwardly and outwardly from the opposite edges of the looped or tubular portion 41 of the clip, and therefore, when inserted between the contact fingers 33, the outer portions of the curved ends 50 and 51 engage the inner sides of the opposed fingers 33, the outer free ends of these fingers being preferably inclined as shown at 52 to facilitate insertion of the legs 34 and 35 between these fingers and guide them to a position between them. The fingers 33 are also inclined downwardly and inwardly so that their inner surfaces converge toward the lower or inner ends thereof, the narrowest portion between them being indicated at 53, and below this narrow portion these fingers are curved outwardly, as indicated at 54, providing at their lower ends and on the inner sides thereof opposed concave recesses or pockets 55. It will be seen from FIGS. 10 and 11, as the clip is inserted further from the position of FIG. 9, the free ends of the two legs 34 and 35 are pressed inwardly toward each other, causing the free end of the extension 45 to engage the inner side of the inclined leg 34, and as its inward movement continues it follows along the inner surface of this leg into the space 49, as indicated by dotted lines in FIG. 10, and also tending to bend or flex the free end portion 45 backwardly, as indicated in FIG. 10. This provides, as the two legs are compressed toward each other, increased resistance to this compressing action, the greatest resistance or compression being when the outer surfaces of the reverse bends 50 and 51 reach the narrowest distance 53 between the two fingers 33, and then as the inserting action is continued these curved end portions snap into and are seated in the concave recesses or pockets 55, as shown in FIG. 11. These legs have, however, been compressed sufficiently so they still have material and effective outer pressure on the fingers 33 after they have expanded somewhat to seat in these recesses 55, thus providing good contact pressure and a good and effective electrical contact between the legs 34 and 35 and the contact fingers 33.

It will be seen from the above that the fuse is mounted on the inner side of the removable cover 37 for the recesses 2, 3 and 4, this cover having suitable elongated openings 56 and 57 for the respective blade contacts 6 and 26, and the similarly shaped, in this case substantially U-shaped, opening 58 for passage of the grounding contact 17. Although this cover fits snugly in the recess 38 in the body portion it may be removed to permit renewal of the fuse member. Thus it will be seen that while the lug 39 in which the fuse is mounted is molded as an integral part of the cover or plate 37, removal of this cover will also remove its fuse from engagement with the contact fingers 33. The fuse member may be removed from this lug 39 and its mounting clips 36 by sliding it longitudinally through this lug 39 by pressure on either end, and a new fuse may be inserted in the same way. In order to facilitate removal of the cover 37 the body member 1 is notched in one side, as indicated at 59, as shown in FIGS. 1 and 2A, to permit insertion of an instrument, such as the bit of a screw-driver, for example, under the cover 37 so that it may be pried outwardly and removed from the recess 38 and its position covering the recesses 2, 3 and 4, carrying with it the fuse member 25. After the old fuse has been removed and a new fuse inserted in the lug, return of the closure 37 to its position in the recess 38 will insert the spring contact legs 34 and 35 into their position between the contact fingers 33, as shown in FIGS. 7 and 11, and effect electrical contact and connection between them.



It will be seen that this structure and arrangement has several distinct advantages in that the plug must be removed from the wall or outlet receptacle in order to change the fuse, so that the fuse may be removed and replaced in a convenient manner and without any hazard. It also eliminates the need for a trip to the cellar or other similar location for branch fuse replacement. It provides an effective arrangement by which the grounding type plug may be fused to protect the device or appliance to which it supplies current; for example, if it is used with an appliance such as a toaster, when an overload occurs the fuse in the plug will "blow," preventing damage to the operating parts of the toaster. After removal of the cover 37 the fuse may be readily removed by pushing in either direction on the end of the fuse, and replacement of the fuse is accomplished by reversing this operation. The construction and the shape of the spring contact legs 34 and 35 are such that they are not easily bent out of shape or displaced in handling, and they are effective in providing a good tight electrical contact and engagement between these legs and the contact fingers 33 which would be effective in carrying the proper load.

Having thus set forth the nature of our invention, we claim:

1. An attachment plug comprising a body of insulating material having an outer end and an inner end and provided with recesses in its inner end, a pair of separated conductive plates anchored at the bottom of one of the recesses and each provided with a pair of separated contact fingers, a pair of blade contacts mounted on said body and extending from said inner end in a direction away from said outer end adapted for insertion in an outlet receptacle and one of which is connected to one of the plates, means for connecting conductor wires to the other plate and the other blade contact, a cover removably secured to said body at said inner end to close the open sides of the recesses, and a fuse member carried by the cover and mounted on the inner side of the cover and provided with contact means at its opposite ends seated in the pairs of contact fingers.

2. An attachment plug according to claim 1 in which the cover is a member of molded insulating material with an integral tubular lug molded on the inner side of this cover in which the fuse member is removably mounted.

3. An attachment plug according to claim 1 in which the cover is a member of molded insulating material with an integral lug molded on the inner side thereof provided with a longitudinal passage, a pair of metal clips mounted in said passage provided with exposed spring contact legs at the opposite ends of the lug seated in the pairs of contact fingers, and the fuse member is mounted in the clips.

4. An attachment plug according to claim 1 in which the cover is a member of molded insulating material with an integral molded lug on the inner side thereof provided

with a longitudinal passage, a pair of metal clips each comprising a looped portion mounted in the passage and retained therein by an ear seated in an opening in a side wall of the passage, each clip provided with exposed spring contact legs at its respective end of the lug seated in one of the pairs of contact fingers, and a fuse member in the lug passage provided with contact ferrules at its opposite ends embraced by the looped portions of the clips.

5. An attachment plug comprising a body of insulating material provided with a recess, means mounting a fuse member in said recess comprising a pair of separated plates anchored at the bottom of the recess each provided with a pair of spaced contact fingers, a fuse member provided with contact ferrules at its opposite ends, a metal contact clip at each end of the fuse member comprising a central looped portion embracing the ferrule and spring contact legs at the opposite ends of the looped portion comprising substantially U-shaped primary and secondary legs with the secondary legs provided with a lateral extension at the free end of the U-shaped portion extending over the free end of the U-shaped portion of the primary leg and located in the space between the sides of this portion, and said spring contact legs seated in and compressed between the spaced contact fingers of the separated plates.

6. An attachment plug comprising a body of insulating material provided with a recess, means mounting a fuse member in said recess comprising a pair of separated plates anchored at the bottom of the recess each provided with a pair of spaced contact fingers curved outwardly at their lower ends providing opposed recesses, a fuse member provided with contact ferrules at its opposite ends, a metal contact clip at each end of the fuse member comprising a central looped portion embracing the ferrule, spring contact legs at the opposite ends of the looped portion comprising substantially U-shaped primary and secondary legs with the secondary leg provided with a lateral extension at the free end of the U-shaped portion extending over the free end of the U-shaped portion of the primary leg and into the space between the sides of this portion, and said spring contact legs inserted in and compressed between the spaced contact fingers of the separated plates with the free reversely curved ends of these legs seated in the opposed recesses provided by these fingers.

7. An attachment plug comprising a body of insulating material provided with recesses in its inner end, a pair of separated plates anchored at the bottom of one of the recesses and each provided with a pair of contact fingers curved outwardly at their inner ends providing opposed recesses, a pair of blade contacts adapted for insertion in an outlet receptacle and one of which is connected to one of the plates, means for connecting conductor wires to the other plate and the other blade contact, a cover for the open sides of the recesses comprising a



member of molded insulating material with an integral lug molded on the inner sides thereof provided with a longitudinal passage, a pair of metal clips mounted in said passage each comprising a looped portion mounted in the passage and provided with an ear seated in an opening in a side wall of the passage to retain the clip therein, a fuse member in the lug passage provided with contact ferrules at its opposite ends embraced by said looped portions of the clips, each clip provided with a pair of spring contact legs at the opposite end edges of the looped portion comprising substantially U-shaped primary and secondary legs with the secondary leg provided with a lateral extension at the free end of the U-shaped portion extending over the free end of the U-shaped portion of the primary leg and into the space between the sides of this portion, and said spring contact legs inserted in and compressed between the spaced contact fingers of the separated plates with the free reversely curved ends of these legs seated in the opposed recesses provided by these fingers.

8. An attachment plug comprising a body of insulating material having an outer end and an inner end and provided with recesses in its inner end comprising a first recess extending transversely of the body and a pair of recesses separated from the first recess by dividing walls, a pair of separated conductive plates anchored at the bottom of the first recess and each provided with a pair of separated contact fingers, a conductive plate anchored at the bottom of each of the pair of recesses, a pair of parallel contact blades mounted on said body and extending from said inner end in a direction away from said outer end connected one to one of the plates in the first recess and the other to one of the plates in the pair of recesses, a grounding blade contact connected to the other of the plates in the pair of recesses, means for connecting a conductor wire to each of the plates in the pair of recesses and the other of said plates in the first recess, a cover removably secured to said body at said inner end to close the open sides of the recesses provided with openings for passage of each of the blade contacts, a fuse member, and means mounting the fuse member on the inner side of the cover provided with contact means at its opposite ends seated in the pairs of contact fingers, whereby said fuse member is removably mounted with said cover.


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