Nov. 8, 1932. W. J. MACDONALD 1,886,706

COMBINED PLUG AND FUSE

Filed Jan. 14, 1930

Fig. 1.

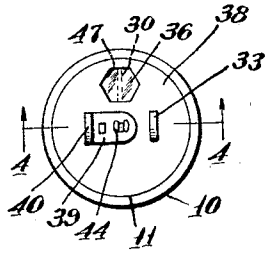
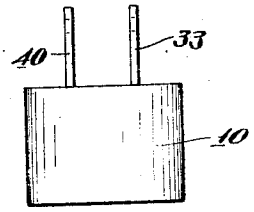


Fig. 2.



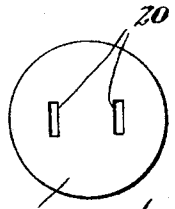


Fig. 3.

Fig. 4.

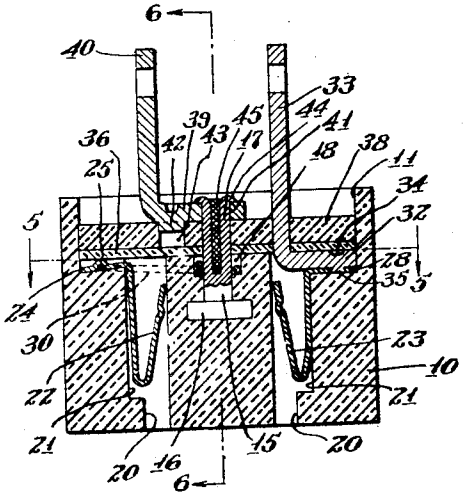
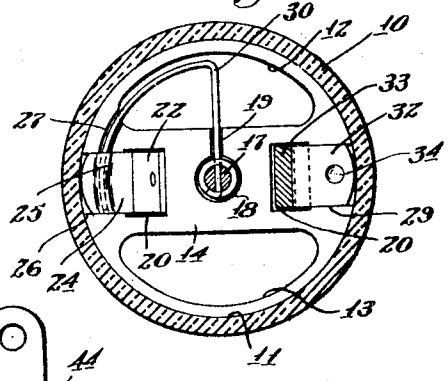


Fig. 5.



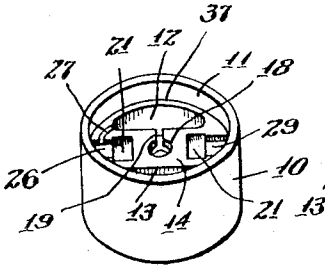


Fig. 7.

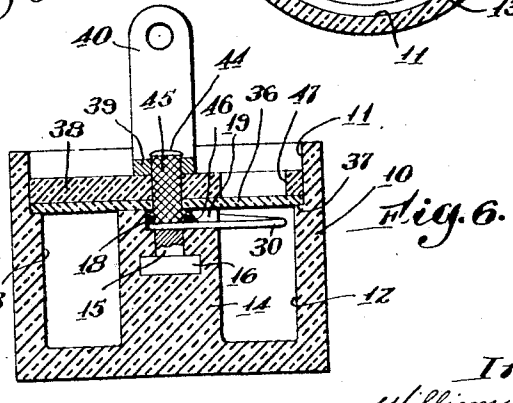


Fig. 6.

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UNITED STATES PATENT OFFICE

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COMBINED PLUG AND FUSE

Application filed January 14, 1930. Serial No. 420,704.

The invention of the present application relates to a novel and improved combined plug and fuse.

At present, in wiring systems, such as in houses, it is customary to have a plurality of circuits throughout the house, and to have each of these circuits controlled by a single fuse of relatively high amperage. There are many outlets on each of these circuits, and in the case of an overload, short circuit or other trouble, if the overload is sufficient, or more than the fuse controlling that particular circuit can carry, said fuse will blow, or burn out, thus cutting off the power to the entire circuit. Or if the overload is sufficient, it may even blow the main line fuses, which would cut off the power to all the circuits in a house or building.

In order to overcome the disadvantage and difficulty of frequently replacing blown fuses, it is a common practice to utilize fuses of higher amperage than intended, thus enabling a circuit to carry a greater overload than is safe. This is especially true when portable electric devices such as percolators, waffle irons, sewing machines, heaters, or other electric devices of relatively high amperage are utilized. It is also a common, and at the same time a dangerous custom, to place copper cents behind the fuse plugs, to increase the current required to cut out a circuit.

Thus, in case of a short circuit in a floor lamp, for example, instead of blowing the fuse and cutting off the circuit, the short circuit is extremely liable to cause fire. These are well known facts, and campaigns are carried on throughout the country by fire departments and others, to educate the public to disconnect any portable attachments, lights or the like from their sockets, particularly at night-time.

An important object of the present invention, therefore, is to provide means, associated with each portable electric fixture, whether lamp, iron or other fixture, to control the flow of electricity to that particular fixture. In event of any trouble developing in a particular fixture, therefore, that fixture only will be automatically disconnected, the other fixtures on the same circuit remaining in working condition.

By the use of my invention a high factor of safety is attained, which will be instantly appreciated and understood by those skilled in the art.

A further feature of my invention is that a householder, for example, will not be obliged to study the fuse box to ascertain which circuit has been cut out, but will know, from the particular fixture which has been disabled, just where the trouble is, and where to replace the blown or burned out fuse member.

A further feature of the present invention resides in the provision of means to confine the flash from the fuse if and when it is blown to a predetermined location within the plug, thus eliminating the danger of any of said flash projecting beyond the confines of the plug. This limiting or confinement of the flash within the body of the plug is a safety factor of considerable value.

A still further feature of the invention resides in the provision of means to enable an observer to instantly determine if the source of trouble is in the fuse itself. I accomplish this desirable result by providing a sight opening into the fuse confining chamber, so that, should a particular fixture become disabled, by merely removing the plug the fact of whether or not the fuse is blown will be instantly apparent to the observer. The chamber within which the fuse is confined, however, is so insulated that none of the flash from the fuse when blown can penetrate through the sight opening.

Further features of the invention reside in the particular details of construction of the plug, and the particular assembly of the various cooperating parts thereof.

The above and other objects of the invention, details of construction, combination of parts, and advantages, will be hereinafter more fully pointed out, described and claimed.

Referring to the drawing, illustrating a preferred embodiment of the present invention,

Fig. 1 is a top plan view of my novel plug;

Fig. 2 is a side elevation of said plug;

Fig. 3 is a bottom plan view of said plug;

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a plan sectional view on the line 5—5 of Fig. 4;

Fig. 6 is a vertical sectional view on the line 6—6 of Fig. 4; and

Fig. 7 s a perspective view of the plug body with all parts removed therefrom.

Referring now to the drawing, for a particular description of the invention, my present novel plug comprises a body 10 of insulating material, preferably cylindrical in contour and provided with an annular recess 11 at one end thereof.

Extending downwardly into said body from said recess is a chamber 12, a similar chamber 13 being also formed therein for lightness and conservation of material. Embedded in the central web or wall 14 of the body is a rivet 15, said rivet having a head 16 to securely anchor the same in the material of the wall 14. In Fig. 7 this rivet 15 has been omitted for the purpose of clarity. The rivet 15 is split throughout the major portion of its length, as at 17, and surrounding said rivet at the top of the wall 14 is an annular recess 18 having a groove 19 leading thereto from the chamber 12. At the end of the plug opposite the annular recess 11 are two prong entrances 20, opening on the interior of the body into enlarged recesses 21. Seated in these recesses are current conducting members 22 and 23, of current conducting material. The spring 22 has an end 24 provided with a ridge 25, there being a small groove under said ridge 25, as clearly shown. The end portion 24 of the spring 22 is seated in an inclined, substantially rectangular recess 26, and leading from said recess 26 to the chamber 12 is a groove or channel 27. The spring 23 has an end 28 which is seated in a substantially rectangular recess 29 on top of the wall 14. A fusible wire 30 has one end thereof positioned in the groove under the ridge 25 on the end 24 of the spring 22, and said fusible wire runs through the groove 27 and into the chamber 12, thence through the groove 19 into and through the split portion 17 of the rivet 15, being then wrapped around rivet 17 in the small annular recess 18. Before the spring 23 is seated in its recess 21, the base 32 of the male prong 33 is punched, as illustrated at 34, to produce a lug 35 which penetrates through a hole in the end 28 of the spring 23 and is then headed over, so that the prong 33 and the spring 23 constitute a unit.

After the fusible wire 30, spring 22, prong 33 and spring 23 have been positioned, a sheet of mica 36 or other transparent insulating material is pressed into the recess 11, said sheet of mica having a firm contact with the top of the wall 14 and with the shoulders 37 around the chambers 12 and 13. Thereupon a disc 38, also of insulating material, is pressed into the recess 11, this disc 38 having a press fit, similar to the press fit of the mica disc 36, within the walls of the recess 11. Because of the inclination of the recess 26, a more secure retaining of the spring end 24 and end of the fuse wire 30 will be effected. Thereupon the base 39 of the male prong 40, having an aperture 41 therein, is slid over the upper end of the rivet 15, said prong 40 having a lug 42 punched out thereon to seat in a recess 43, to prevent turning of the prong 40. Thereupon the rivet 15 is headed over, as illustrated at 44, securely clamping the discs 36 and 38 within the recess 11, and also securely clamping the base 39 of the male prong 40 to the disc 38.

Thereupon solder 45 is flowed into the split portion 17 of the rivet 15, flowing down over the portion of the fusible wire 30 which projects through said rivet, and also out over a portion of said wire as clearly shown at 46 in Fig. 6. This insures current conductivity from the spring 22 through the fuse wire 30, through the rivet 15 to the male prong 40.

A slight opening 47 is provided in the disc 38, enabling visual examination of the fuse wire 30 through the mica disc 36. Thus, if the fuse should blow, such fact will be instantly evident at a glance through the sight opening 47. This sight opening may be made of any desired shape to indicate fusible wires of varying degrees of strength.

By having one end of the fusible wire 30 positioned under the ridge 25, and by having the other end thereof soldered into the rivet 15, danger of clamping the fuse wire and producing a weak point, is eliminated. This danger has been existent in prior devices where screws have been utilized to secure the ends of the fuse wire in position.

It will be instantly apparent on a glance at the drawing, that should the fuse wire blow, the flash therefrom will be confined within the chamber 12, with no possibility of any of said flash escaping beyond the confines of the plug. This is an advantage and safety factor which will be instantly apparent to those skilled in this art, and one which is of considerable value.

My novel plug may be applied to any standard base or receptacle and the male prongs on any cap or connection from any portable electric fixture instantly inserted in the entrance slots 20, to complete the circuit to the fixture desired.

When my novel device is utilized, if a householder, for example, should neglect to disconnect a fixture connected to one of my fuse plugs, if any trouble, such as a short circuit in the fixture should arise, danger from fire is entirely eliminated, since the fuse 30 will blow before damage could occur, without disturbing or disabling the rest of the cir-

cuit, and the householder will be instantly apprised as to where to look for the source of trouble. When corrected, a new plug 10 may be attached and the fixture is again ready for operation.

I believe that my present fuse plug is novel, and have therefore claimed the same broadly in the present application.

While I have necessarily described my present invention somewhat in detail, it will be appreciated that I am not limited thereto, but may vary the size, shape, and arrangement of parts within reasonably wide limits without departing from the spirit of the invention.

Another feature and object of my invention, and one which will be readily understood by those skilled in the art, is the total elimination of all screws from my novel plug, thus obviating and eliminating disadvantages which have been present in prior plugs where screws have been utilized as the holding, clamping, or retaining means. When screws are utilized, involuntary loosening of the same tends to produce short circuits, with other well-known resulting injuries and damage. In my novel plug there is nothing which can be involuntarily loosened, and once the rivet or post 15 is headed over, as at 44, the plug becomes substantially an integral unit, united and clamped together by said single rivet.

The invention is further described and defined in the form of claims as follows:

1. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, and a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, and the other of said prongs being fixed to the top of said second disc.

2. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, and the other of said prongs being fixed to the top of said second disc, said body portion having a pair of recesses spaced from said chamber, and a contact member in each of said recesses, said fusible member being fixed at one end to one of said contact members and arranged to transmit current to said second prong.

3. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a split post embedded in said body and projecting beyond each of said discs, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc by said post, said body portion having a pair of recesses spaced from said chamber, and a contact member in each of said recesses, said fusible member contacting at one end with one of said contact members and at the other end with said post, whereby current may be transmitted from said contact member through said fusible member to said post and to said second prong.

4. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a split post embedded in said body and projecting beyond each of said discs, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc by said post, said body portion having a pair of recesses spaced from said chamber, and a contact member in each of said recesses, said fusible member contacting at one end with one of said contact members, the other end of said fusible member passing through said split post, said body being provided with a recess surrounding said post, and the free end of said fusible member surrounding said post and being seated in said recess.

5. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a split post embedded in said body and projecting beyond each of said discs, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc by said post, said body portion having a pair of recesses spaced from said chamber, a contact member in each of said recesses, said fusible member contacting at one end with one of said contact members, the other end of said fusible member passing through said split post, said

body being provided with a recess surrounding said post, the free end of said fusible member surrounding said post and being seated in said recess, and means to prevent removal of said fusible member from said post.

6. A plug of the kind described, comprising a body portion, having a recess therein at one end thereof and having a chamber communicating with said recess at one end and being closed at its other end, a fusible member located in said chamber, a disc of transparent insulating material seated in said recess and closing said chamber, a second disc of insulating material seated in said recess over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, said two discs having a close fit in said recess to confine a flash from said fuse to said chamber.

7. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, and the other of said prongs being fixed to the top of said second disc, said body portion having a pair of recesses spaced from said chamber, a spring contact member in each of said recesses, said fusible member being fixed at one end to one of said contact members and arranged to transmit current to said second prong, the recess in which said last named contact member is located having an inclined bottom face, and means to retain said contact member in said inclined recess.

8. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a split post embedded in said body and projecting beyond each of said discs, a pair of contact prongs one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc by said post, said body portion having a pair of recesses spaced from said chamber, a contact member in each of said recesses, said fusible member contacting at one end with one of said contact members, the other end of said fusible member passing through said split post, said body being provided with a recess surrounding said post, the free end of said fusible member surrounding said post and being seated in said recess, means to prevent removal of said fusible member from said post, said second disc having a recess therein, and a boss on the bottom face of said second prong seated in said recess to prevent rotative movement of said second prong.

9. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a split post embedded in said body and projecting beyond each of said discs, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc by said post, said body portion having a pair of recesses spaced from said chamber, a contact member in each of said recesses, said fusible member contacting at one end with one of said contact members, the other end of said fusible member passing through said split post, said body being provided with a recess surrounding said post, the free end of said fusible member surrounding said post and being seated in said recess, means to prevent removal of said fusible member from said post, and cooperating means on said second disc and said second prong to prevent rotative movement of said prong.

10. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc, and cooperating means on said second prong and said second disc to prevent rotative movement of said second prong.

11. A plug of the kind described, comprising a body portion having a chamber therein, a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, the other of said prongs being fixed to the top of said second disc, said second disc having a recess therein, and a lug on the bottom face of said second prong seated in said recess to prevent rotative movement of said prong.

12. A plug of the kind described, comprising a body portion having a chamber therein,

a fusible member located in said chamber, a disc of transparent insulating material closing said chamber, a second disc of insulating material over said first disc, said second disc having a sight opening therein to permit visual examination of said fuse, a pair of contact prongs, one of said prongs being held on said body beneath said first insulating disc, and the other of said prongs being fixed to the top of said second disc, said body portion having a pair of recesses spaced from said chamber, and a spring contact member in each of said recesses, said fusible member being fixed at one end to one of said contact members and arranged to transmit current to said second prong, said body being provided with a groove communicating with said chamber and with the recess in which said last named contact member is seated, said fusible member being located in said groove between said recess and said chamber.

In testimony whereof, I have signed my name to this specification.

WILLIAM J. MACDONALD.