

Sept. 25, 1934.

E. ADAMS

1,974,700

ELECTRIC PLUG

Filed April 26, 1933

2 Sheets-Sheet 1

Fig. 1.

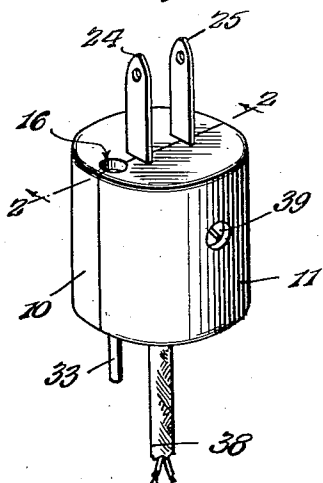


Fig. 2.

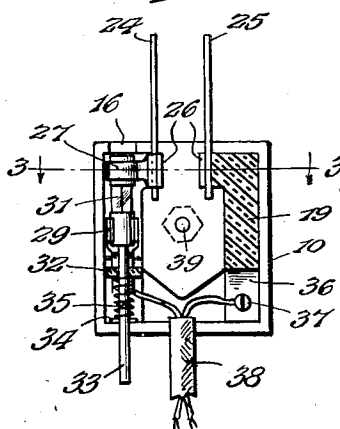


Fig. 3.

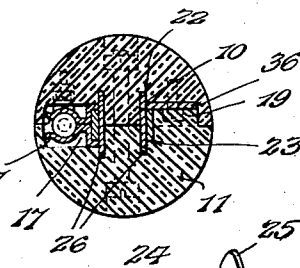
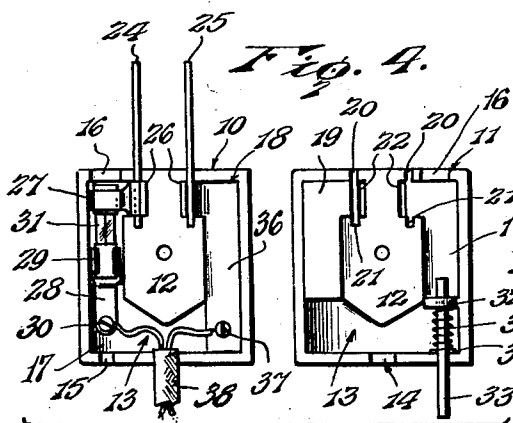


Fig. 5.

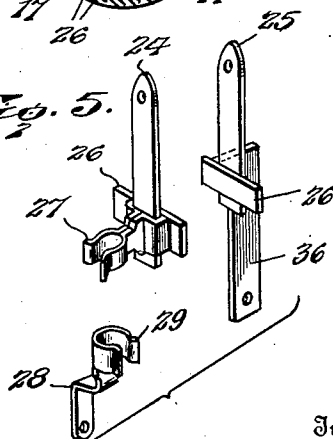
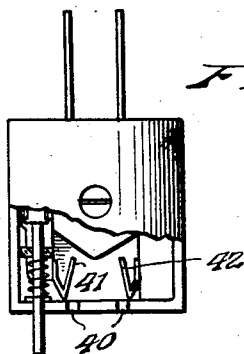


Fig. 6.



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2 Sheets-Sheet 2

Fig. 7.

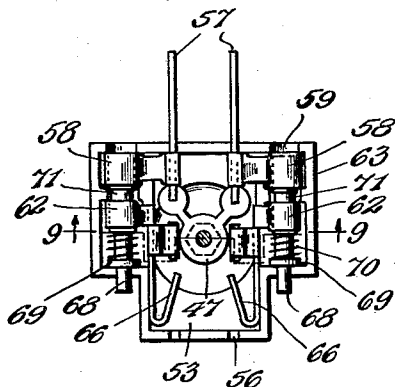


Fig. 10.

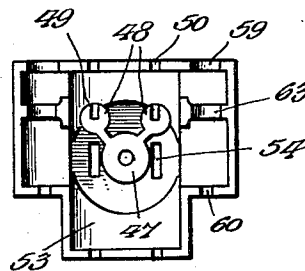


Fig. 8.

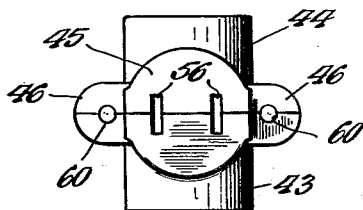


Fig. 12.

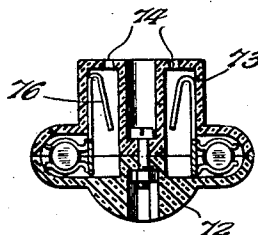


Fig. 11.

Fig. 9.

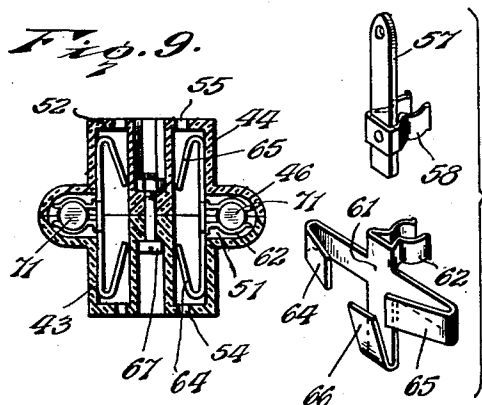
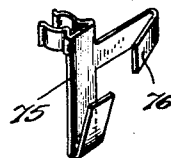


Fig. 13.



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UNITED STATES PATENT OFFICE

1,974,700

ELECTRIC PLUG

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Application April 26, 1933, Serial No. 668,121

9 Claims. (Cl. 200—115.5)

This invention relates to an improved electric plug and seeks, among other objects, to provide a device of this character adapted for use in conjunction with conventional sockets or outlets and which embodies a fuse in one side of the circuit connections of the plug so that should the line become overloaded, the fuse will be blown and thus protect the electrical equipment as well as the usual main fuses of the line circuit, as only the appliance attached to the plug is rendered useless when the fuse of the plug is blown.

The invention seeks, as a further object, to provide a plug of the character indicated embodying a plunger for ejecting a blown fuse and wherein the blown fuse may be thus ejected and a new fuse installed without the necessity of taking the plug apart.

And the invention seeks, as a still further object, to provide a plug wherein all of the parts will be secured in assembled relation by a single fastening device binding the sections of the body of the plug together.

With the foregoing and other objects in view, the invention consists in certain novel details of construction and combinations of parts herein-after fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a perspective view of my improved plug,

Figure 2 is a sectional view on the line 2—2 of Fig. 1,

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2,

Fig. 4 is an elevation looking at the inner sides of the mating sections of the body of the plug,

Fig. 5 is a perspective view showing the prongs of the plug and associated parts,

Fig. 6 is an elevation showing a slight variation of the invention, parts being broken away,

Fig. 7 is a view looking at one section of the plug body of another modified form of the invention,

Fig. 8 is a bottom plan view of the plug shown in Fig. 7,

Fig. 9 is a sectional view on the line 9—9 of Fig. 7,

Fig. 10 is an elevation looking at the inner side of one of the sections of the plug body shown in Fig. 8, the metal parts being removed,

Fig. 11 is a detail perspective view showing one of the prongs and one of the three-way contact

members employed in this modified form of the invention,

Fig. 12 is a sectional view showing a two-way plug, and

Fig. 13 is a detail perspective view showing one of the contact members employed in the plug of Fig. 12.

Referring now more particularly to the drawings, I employ a preferably cylindrical plug body which is split along a plane passing through the longitudinal axis of the body to provide mating semi-cylindrical sections 10 and 11, respectively, of suitable insulating material. As shown in Fig. 4, the sections are provided with central webs 12 which abut when the sections are assembled and formed in the inner faces of said sections, below said webs, are mating portions of a chamber 13 communicating with which is an opening 14 in the lower end of the plug body, the plug sections carrying like portions of said opening. At their lower ends, the plug sections are also notched to provide like portions of an opening 15 at one side of the opening 14, while, at their upper ends, the sections are notched at their inner sides to provide like portions of an opening 16, the opening 16 being somewhat larger than the opening 15 and alining therewith.

Formed in the inner faces of the plug sections 10 and 11, at one side of the mating webs 12, is an inverted L-shaped recess 17. The section 10 is provided at the opposite side of said web with a similar inverted L-shaped recess 18 and formed on the inner face of the section 11 to fit in this recess, as particularly seen in Figs. 2 and 3 of the drawings, is an inverted L-shaped boss 19. At the upper ends of the recesses 17 and 18, the plug sections are notched to provide mating portions of parallel slots 20 which open through the upper end of the plug body and similarly, the upper lateral shoulders of the webs 12 are notched, as particularly seen in Fig. 4, to provide mating portions of lateral slots 21 alining with the slots 20 therebeneath. Between the slots 20 and 21, the inner faces of the plug sections are provided at the upper reduced necks of the webs 12, as particularly seen in Fig. 3, with alined lateral recesses 22 communicating with the upper ends of the recesses 17 and 18, one of the recesses 22 in the section 11 of the plug body being stepped, as indicated at 23.

Seated at their lower ends in the slots 21 of the plug sections to project through the slots 20 is a pair of parallel prongs 24 and 25 tightly clamped between the sections and integrally formed on or secured to said prongs at their lower

ends, as particularly seen in Fig. 3, are cross bars 26 tightly fitting at their extremities in the aligned recesses 22 of the plug sections, the step 23 accommodating the prong 25. Thus, the cross bars 26 will coact with the plug sections for rigidly supporting the prongs against strain tending to separate the prongs as well as against strain tending to rock the prongs in a plane at right angles thereto.

Integrally formed on or otherwise secured to the cross bar of the prong 24 is, as particularly seen in Fig. 5, a pair of laterally projecting coacting jaws forming a spring clip 27 which, as shown in Fig. 3, is freely received within the upper end portion of the recess 17 and clamped between the body sections within the lower portion of said recess is an offset terminal 28 provided at its upper end with a spring clip 29 alining with the clip 27, the clip 29 being likewise provided with coacting yieldable jaws. At its lower end, the terminal 28 is received within the chamber 13, as shown in Fig. 4, and carries a binding screw 30.

As will now be observed, the clips 27 and 29 aline with the openings 15 and 16 of the plug body and the opening 16 is of a diameter to freely receive a cartridge fuse conventionally illustrated at 31. Accordingly, the fuse may be inserted through the opening 16 and then pushed downwardly until the lower end of the fuse is, as shown in Fig. 4, engaged by the spring clip 29 and the upper end of the fuse is engaged by the spring clip 27. As will be appreciated, these clips will firmly grip the terminal caps of the fuse so that a circuit will be completed from the terminal 28 through the fuse and through said spring clips to the prong 24. Projecting from the inner side of the body section 11, at the recess 17, as particularly seen in Fig. 4, is a perforated guide lug 32 which extends beneath the offset of the terminal 28 to engage the lower end portion of said terminal for clamping the terminal between the body sections and slidable through the perforation in said lug and through the opening 15 is a non-conductive plunger 33 projecting below the plug body. This plunger is mounted axially of the fuse 31 therebeneath and extending through the plunger is a pin 34 with which coacts a spring 35 disposed about the plunger between the lug 32 and said pin for urging the plunger downwardly and normally holding the plunger retracted. As will be appreciated, the plunger is thus disposed to limit the fuse in its downward movement when pushed downwardly through the opening 16 to engage with the spring clips 27 and 29 and accordingly, when the fuse becomes blown, the lower end of the plunger may be pushed upwardly for ejecting the fuse upwardly through the opening 16 of the plug body. The upper end of the fuse may thus be easily exposed and the fuse manually grasped and withdrawn so that a new fuse may be readily installed.

Depending from the cross bar 26 of the prong 25 is an inverted L-shaped terminal 36 which is received in the recess 18 of the body section 10 to project downwardly into the chamber 13 and, as shown in Fig. 3, is clamped in said recess by the boss 19. At its lower end, this terminal carries a binding screw 37. As shown in Fig. 4, the opening 14 at the lower end of the plug body is adapted to receive a suitable electric conductor 38 and the circuit wires of said conductor are secured to the terminals 28 and 36 by the binding screws 30 and 37. Extending diametrically through the plug body, medially of the webs 12, and in a plane at

a right angle to the joint between the sections of the plug body, is a connecting bolt 39 the ends of which are preferably countersunk in suitable recesses in the sections 10 and 11. The bolt 39 serves, of course, to bind the sections of the plug body firmly together and, as will be observed, rotation of the sections about the bolt as an axis will be prevented by the prongs 24 and 25 as well as by the cross bars 26 and boss 19.

Attention is now directed to the fact that the single bolt 39 serves to not only secure the sections of the plug body in assembled relation but serves to clamp the prongs 24 and 25 and the parts attached thereto as well as also clamp the terminal 28 in proper assembled position between the plug sections. The use of separate fastening devices for mounting the prongs or other parts indicated is thus avoided with a consequent reduction in cost of manufacture. At the same time, the plug as a whole is entirely rigid and free from any undesirable looseness of any of its parts.

In Fig. 6 of the drawings, I have shown a slight variation of the invention wherein the sections of the plug body are formed at their lower ends to provide parallel slots 40 communicating with the chamber 13. The binding screws 30 and 37 are eliminated and in lieu thereof I provide a V-shaped spring contact 41 on the lower end of the terminal 28 and a similar V-shaped spring contact 42 on the lower end of the terminal 36. The free ends of the contacts 41 and 42 converge toward each other over the slots 40 so that the prongs of a conventional plug may be inserted through said slots to coact with said contacts. Thus, a conventional plug may be readily used in conjunction with this variation of the present invention for interposing a fuse in the circuit.

In Figs. 7 to 11, inclusive, of the drawings, I have shown another variation of the invention embodying a three-way plug. In this modification, the plug body is formed with aligned cylindrical bosses 43 and 44 as well as with a depending cylindrical boss 45 disposed at right angles to the bosses 43 and 44, and extending vertically at the sides of the plug body are lugs 46.

As will be observed, the plug body is split along a plane passing through the axis of the boss 45 to provide mating companion sections and these sections are formed centrally, as shown in Figs. 7, 9 and 10, with mating webs 47 from which project upwardly diverging legs 48, the webs and said legs abutting when the sections of the plug body are assembled. Formed in the legs 48 are notches 49 and formed in the upper end of the plug body in alinement with said notches are slots 50, the sections of the plug body carrying like portions of said slots. As best brought out in Fig. 9, the lugs 46 are chambered to provide recesses 51 while the sections of the plug body are chambered to provide recesses 52 extending laterally within the bosses 43 and 44. Similarly the boss 45 is chambered to provide a recess 53. Formed in the boss 43 to communicate with the recesses 52 is a pair of slots 54. The boss 44 is provided with a like pair of slots 55 communicating with said recesses and formed in the boss 45 to communicate with the recess 53 is a similar pair of slots 56.

Seated at their lower ends in the notches 49 of the legs of the webs 47 is a pair of prongs 57 carrying resilient clips 58 which project into the recesses 51 of the lugs 46 and formed through the upper ends of said lugs are axial openings 59 while at their lower ends, the lugs are provided with smaller openings 60. The prongs with their clips 58 are rigidly clamped between the sections

of the plug body and similarly clamped between said sections, at opposite sides of the webs 47, are contact members or terminals 61.

Projecting from the upper ends of the contact members 61 are spring clips 62 which are received within the recesses 51 of the lugs 46 in vertical alignment with the clips 58 and formed on the sections of the plug body within said recesses are mating guide ribs 63 lying between the pairs of clips. Projecting from the contact members 61 at corresponding sides thereof is a pair of V-shaped spring contacts 64 received within the ends of the recesses 52 lying within the boss 43, and projecting from the contact members at their opposite sides are similar V-shaped spring contacts 65 received within the ends of the recesses 52 lying within the boss 44. At their lower ends, the contact members 61 are further provided with V-shaped spring contacts 66 which lie within the recess 53. Extending through the webs 47 of the sections of the plug body, as particularly seen in Fig. 9, is a bolt 67 tightly securing said sections together, the webs being recessed at their outer ends so that the ends of the bolt are deeply countersunk. The bolt 67 provides a single fastening device employed for securing all of the parts in assembled relation so that the device may thus not only be cheaply manufactured but quickly assembled.

As will now be seen, the prongs of a conventional plug may be inserted through the slots 56 to engage the pair of spring contacts 66 when the pair of prongs 57 may be engaged in a conventional socket for interposing the present device in the circuit of the electrical apparatus being used. Furthermore, the prongs of a plug may be inserted through the slots 54 to engage the pair of contacts 64 for connecting another electrical apparatus with the device and, similarly, the prongs of a plug may be inserted through the slots 55 to engage the contacts 65 for connecting still another electrical apparatus with the device. A plug of multiple outlet connections is thus provided.

Slidable through the openings 60 of the lugs 46 of the plug body are plungers 68 of suitable insulating material. These plungers are provided with stop shoulders 69 for limiting the plungers in their downward movement and surrounding the plungers are springs 70 resting at their lower ends against said shoulders and at their upper ends against the clips 62, the springs serving to normally hold the plungers retracted. Inserted through the openings 59 at the upper ends of the lugs 46 are fuses 71 engaged between the pairs of clips 58 and 62 and electrically connecting the contact members 61 with the prongs 57. Thus, both sides of the circuit are protected by the fuses and should either fuse burn out, the proper plunger 68 may be pushed upwardly for projecting the burnt out fuse above the plug body when said fuse may be readily removed and a new fuse installed in lieu thereof.

In Figs. 12 and 13 of the drawings, I have illustrated still another modification of the invention wherein the plug body, indicated as a whole at 72, is provided at one side only with a cylindrical boss 73 in which are formed slots 74. In this modification, the contact members 75 are each provided at one side only with a lateral V-shaped spring contact 76. As shown in Fig. 12, the contacts 76 are received within the recesses of the boss 73 so that the prongs of a plug may be inserted through the slots 74 to engage said contacts. Otherwise, this modified form of the invention is

substantially identical with the prior modification and further description is accordingly believed unnecessary.

Having thus described the invention, I claim:

1. A plug including mating body sections, having registering recesses opening through the top of the plug, prongs clamped between the sections, a terminal clamped between the sections but free with respect thereto, a removable fuse seated in the registering recesses and extending between said terminal and one of said prongs, an ejecting device independent of the fuse projecting through one end of the plug for ejecting the fuse through the other end of said plug, yieldable means for returning the ejecting device to normal position, and means connecting the sections and clamping the prongs and said terminal therebetween.

2. A plug including mating body sections, having registering recesses opening through the top of said plug, prongs clamped therebetween but free with respect to the sections, a terminal clamped between the sections but free with respect thereto, a removable fuse seated in the registering recesses and extending between said terminal and one of said prongs, means connecting the sections and clamping the prongs and said terminal therebetween, and a spring pressed ejecting device operable from one end of the plug for ejecting the fuse through the other end of said plug.

3. A plug including a body having a seating recess, prongs projecting from the body, a terminal housed within the body, a removable fuse seated in said recess and extending between said terminal and one of said prongs, and a spring pressed plunger extending through the body at said recess for ejecting said fuse.

4. A plug including a body having a seating recess, prongs projecting from the body, one of said prongs being provided with a clip fitting within the seating recess, a terminal housed within the body and provided with a clip disposed within the seating recess in alignment with the first mentioned clip, a fuse detachably engaged by said clips and electrically connecting said terminal with said prong, and a spring pressed plunger extending through the body at said recess for ejecting the fuse.

5. A plug including mating body sections having registering recesses opening through the top of the plug, prongs clamped between said sections and provided with cross bars engaged by the sections, a terminal extending from the cross bar of one of said prongs, a clip extending laterally from the cross bar of the other of said prongs and fitting in said recesses, a second terminal clamped between the sections and provided with a clip disposed in alignment with the first mentioned clip, a removable fuse extending between said clips and electrically connecting the latter terminal with the latter prong, a spring pressed plunger independent of the fuse mounted beneath the fuse and movable for ejecting the fuse through the top of the body, and means connecting the sections and clamping the prongs and said terminals as well as said cross bars therebetween.

6. A plug including a body formed of mating body sections one of which is provided with a perforated guide lug, prongs clamped between the sections but free with respect thereto, a terminal clamped between the sections but free with respect thereto, a removable fuse extending between said terminal and one of said prongs, means connecting the sections and clamping the prongs and said terminal therebetween, and a spring pressed plunger independent

of the fuse slidably mounted in the perforation of the guide lug for ejecting the fuse.

7. A plug including a body having seating recesses opening through the top of the plug, prongs projecting from the body and provided with clips housed within the recesses, terminals housed within the body and provided with clips alining with said first-mentioned clips and with a pair of spring contacts disposed for engagement by the prongs of another plug, fuses engaged by said clips and electrically connecting said terminals with said first-mentioned prongs, and spring pressed plungers operating within said recesses and independent of the fuses for ejecting said fuses through the top of the plug.

8. A plug including a body, prongs projecting therefrom and provided with clips housed within the body, terminals housed within the body and provided with clips alining with said first-mentioned clips and with pairs of spring contacts disposed for engagement by the prongs of other plugs, removable fuses engaged by said clips and electrically connecting said terminals with said first-mentioned prongs, and a spring pressed plunger disposed beneath each fuse and inde-

pendent thereof and each plunger provided with a depending portion extending below the plug for elevating the plunger to eject the adjacent fuse.

9. A plug including mating body sections having registering recesses opening through one end of the plug, one of said sections being provided with an inverted L-shaped boss fitting in the mating section, prongs projecting from the plug, terminals having pairs of spring contacts disposed for engagement by the prongs of other plugs, the prongs and terminals being free with respect to said sections, a fastening device extending through the sections for securing them together and clamping the prongs and said contact members therebetween, a fuse seated in said registering recesses and electrically connecting one of said prongs with the adjacent contact member, and a spring pressed ejecting plunger extending within said registering recesses, one end of the plunger forming a stop to limit the longitudinal movement of the fuse and the other end of the plunger extending beyond the plug and constituting an operating handle.

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