June 23, 1953 B. F. NAUSLAR 2,643,364

INTERLOCKING SHOCKPROOF ELECTRICAL PLUG

Filed April 2, 1949

FIG. 1

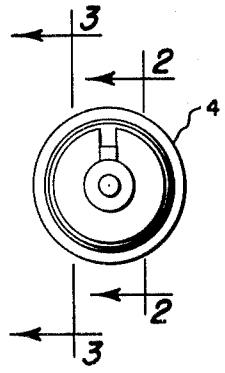


FIG. 2

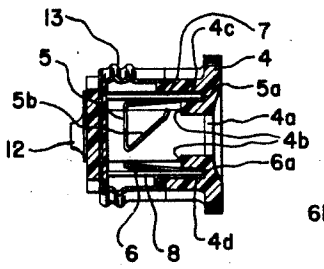


FIG. 3

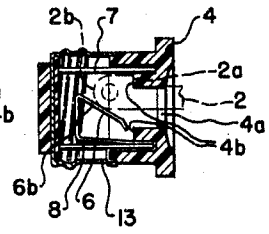


FIG. 5

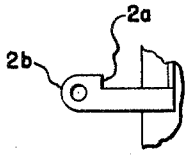


FIG. 4

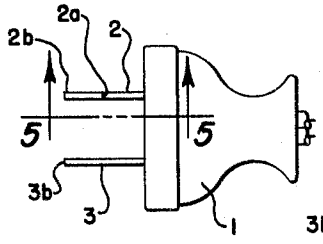


FIG. 6

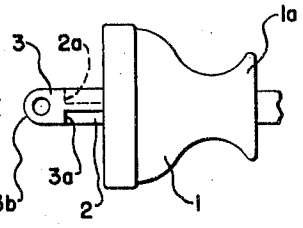


FIG. 7

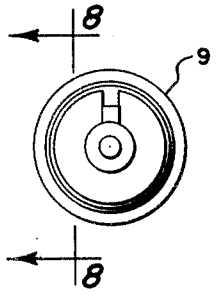
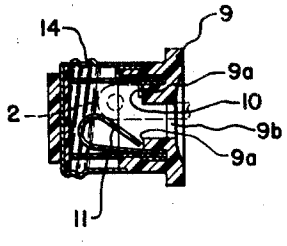


FIG. 8



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INTERLOCKING SHOCKPROOF ELECTRICAL PLUG

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1 Claim. (Cl. 339—189)

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My invention relates to an interlocking shockproof electrical plug, and the objects of my invention are:

First, to provide a combined shockproof and interlocking electrical plug for conventional household use;

Second, to provide a plug having combined electrical contacts and plug locking actuator means;

Third, to provide interlocking male and female plugs which are interchangeably useful with conventional plugs now in use;

Fourth, to provide contacts and interlocking means which may be incorporated in conventional male and female electrical plugs with a minimum of changes therein;

Fifth, to provide a shockproof electrical plug of this class which is interlocking and in which the electrical contacts of the female plug portion are inaccessible to any instrument inserted directly through the male contact receiving openings of the female plug; and

Sixth, to provide an interlocking shockproof electrical plug of this class which is very simple and economical of construction, efficient in operation and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions, and a certain modification, as will be hereinafter described in detail and particularly set forth in the appended claim, reference being had to the accompanying drawings and to the characters of reference thereon, forming a part of this application, in which:

Fig. 1 is an end view of the female component of my interlocking electrical plug; Fig. 2 is a longitudinal sectional view thereof, taken from the line 2—2 of Fig. 1; Fig. 3 is a longitudinal sectional view taken from the line 3—3 of Fig. 1; Fig. 4 is a side elevational view of the male component of my interlocking electrical plug; Fig. 5 is a fragmentary sectional view taken from the line 5—5 of Fig. 4; Fig. 6 is a side elevational view of the structure shown in Fig. 4, taken 90° to that as shown in Fig. 4; Fig. 7 is an end view of a modified form of my interlocking shockproof electrical plug; and Fig. 8 is a longitudinal sectional view taken from the line 8—8 of Fig. 7.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

The male plug frame 1, male plug contacts 2

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and 3, female plug frame 4, female plug contacts 5 and 6, and the insulation plates 7 and 8 constitute the principal parts and portions of my interlocking electrical plug.

The female plug frame 4, shown in Figs. 1, 2 and 3 of the drawing, is a substantially conventional female plug frame, produced and sold in large quantities. This female plug frame 4 is provided with a pair of male contact receiving openings 4*a*, adjacent to which are ledges 4*b*, disposed at right angles to the axis of the openings 4*a* and the axis of the plug frame 4. Supported within the female plug frame 4 are the female plug contacts 5 and 6. These contacts 5 and 6 are combined electrical contacts and male contact actuating springs, which tend to force the offset ledge portions 2*a* and 3*a* of the male plug contacts 2 and 3 into engagement with the ledge portions 4*b* internally of the female plug frame 4.

The male plug contacts 2 and 3 are rigidly secured to the male plug frame 1, which is a conventional electrical plug frame, common to many electrical appliances now in use. It will be noted that the female plug contacts 5 and 6, as shown in Fig. 2 of the drawing, are connected to the socket end terminal 12 and the socket screw band 13 of the conventional electrical plug structure.

It will be noted that the insulation plates 7 and 8 are each wedged into the U-shaped portions 5*a* and 6*a*, respectively of the contacts 5 and 6, as shown in Fig. 2 of the drawings, for maintaining said contacts 5 and 6 in the recess portions 4*c* and 4*d*, respectively, of the female plug frame 4. The contacts 2 and 3 in connection with the male plug frame 1 are provided with curved end portions 2*b* and 3*b*, which are engageable with the angularly inclined portions 5*b* and 6*b* of the contacts 5 and 6, as shown in Figs. 2 and 3 of the drawing, and particularly disclosed in Fig. 3 of the drawing, wherein the male plug contact 2 is illustrated by dash lines engaging the female contact portion 6*b* at its curved end 2*b*.

The operation of my interlocking electrical plug, as shown in Figs. 1 to 6, inclusive, of the drawing, is substantially as follows:

When the male plug contacts 2 and 3 are inserted into the openings 4*a* in the female plug frame 4, the curved end portions 2*b* and 3*b* of the male plug contacts 2 and 3 engage the inclined portions 5*b* and 6*b* of the female plug contacts 5 and 6, which are resilient electrical conducting contacts, which tend to rotate the

male plug frame 1 in connection with the male plug contacts 2 and 3 in a counter-clockwise direction, whereby the ledge portions 2*a* and 3*a* of the male plug contacts 2 and 3 are engaged with the ledge portions 4*b* on the inner side of the female plug frame 4, as shown in Figs. 2 and 3 of the drawings, longitudinally interlocking the male plug frame 1 relative to the female plug frame 4.

In order to remove the male plug contacts 2 and 3 from their engaged relation with the ledges 4*b* of the female plug frame 4, the male plug frame 1 is grasped at its handle portion 1*a* and rotated in a clockwise direction, slightly deflecting the resilient female plug contacts 5 and 6, whereby the ledge portions 2*a* and 3*a* of the male plug contacts 2 and 3 are disengaged with the ledge portions 4*b* of the female plug frame 4, as shown in Figs. 2 and 3 of the drawing, permitting axial withdrawal of the male plug contacts 2 and 3 from the openings 4*a* in the female plug frame 4.

In the modification, as shown in Figs. 7 and 8 of the drawing, the parts are designated as follows:

The female plug frame 9, female plug contacts 10, and the male contact operating springs 11.

The female plug frame 9 of the modified structure, shown particularly in Fig. 8 of the drawing, is similar to the female plug frame 4 hereinbefore described. The contacts 10 of the modified structure, shown in Fig. 8 of the drawing, extend only to the inner surface of the ledges 9*a* of the female plug frame 9, which correspond with the ledges 4*b* of the hereinbefore described structure disclosed in Figs. 1 to 3 of the drawing. The insulation members 14 secure the contacts 10 in position in a similar manner to the securement of the contacts 5 and 6, hereinbefore described in connection with the female plug frame 4.

Opposed to each of the contacts 10, only one of which is disclosed in Fig. 8 of the drawing, is a male contact operating spring 11, which is not an electrical conductor, but which forces the male plug contacts 2 and 3 into engagement with the female plug contacts 10, it being noted that the same male plug used in connection with the structure disclosed in Figs. 1 to 3 of the drawing is operated in connection with the structure shown in Figs. 7 and 8 of the drawing.

The operation of the modified structure shown in Figs. 7 and 8 of the drawings is substantially as follows:

When the male contacts 2 and 3 are inserted into the openings 9*b* in the female plug frame 9, the ledge portions 2*a* and 3*a* are forced into engagement with the contact portions 10, resting on the inner ledges 9*a* of the female plug frame 9, which correspond to the ledges 4*b* of the female plug frame 4 hereinbefore described in connection with Figs. 1 to 3 of the drawing. When the male plug is not engaged with the female plug, as shown in Fig. 8 of the drawing, and the openings 9*b* in the female plug frame 9 are unobstructed, the insertion of a pin or other small instrument into the openings 9*b* by a child, or other innocent person, would not cause electrical contact, due to the obscure relationship of the contacts 10 behind the ledge 9*a*, all as shown in Fig. 8 of the drawing.

Thus, the obscure relationship of the contacts 10 rearwardly of the ledge 9*a* provides for shockproof condition of the plug disclosed in Fig. 8 of the drawing, in combination with the interlocking feature, wherein the ledges 2*a* and 3*a* of the contacts 2 and 3, disclosed in Figs. 5 and 6 of the drawing, engage the contacts 10, shown in Fig. 8 of the drawing, causing longitudinal or axial interlocking relationship of the male and female elements of the electrical plug, which is urged and maintained by the springs 11 engaging the male contacts 2 and 3, tending to rotate the male plug frame 1 in a counterclockwise direction.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, and a certain modification, I do not wish to be limited to this particular construction, combination and arrangement, nor to the modification, but desire to include in the scope of my invention the construction, combination and arrangement, and the modification, substantially as set forth in the appended claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

In a shockproof interlocking electrical plug assembly a female plug frame and a male plug frame having a common axis, said female plug frame having slot openings of similar character and similarly spaced on opposite sides of said axis, said female plug frame having ledges at the ends of said slot openings, said female plug frame having an external screw-threaded conductor sleeve and a center terminal, oppositely disposed electrical contacts terminating on the inner surfaces of said ledges and individually connected with said sleeve and said terminal, said male plug frame having a pair of male contacts spaced on opposite sides of said axis and extending through said slot openings, oppositely disposed springs mounted within said female plug frame in opposing relation to said ledges and engaging said male contacts so as to urge said male contacts along with the male plug frame to rotate in one direction about said axis relative to said female plug frame, said male contacts each having a projecting portion, said portions being on opposed sides of the male contacts and the direction of their projection corresponding generally with said one direction, said portions engaging said ledges and first mentioned contacts when the male plug is rotated by the springs through a small angle of rotation, the first mentioned contacts being disposed on said ledges at points slightly removed from alignment with said slot openings in the direction of said rotation, whereby the plug is made shockproof as well as interlocking.

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