

April 6, 1954

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2,674,722

LOCKING MEANS AND GROUND CONNECTION FOR ELECTRICAL PLUGS

Filed March 3, 1950

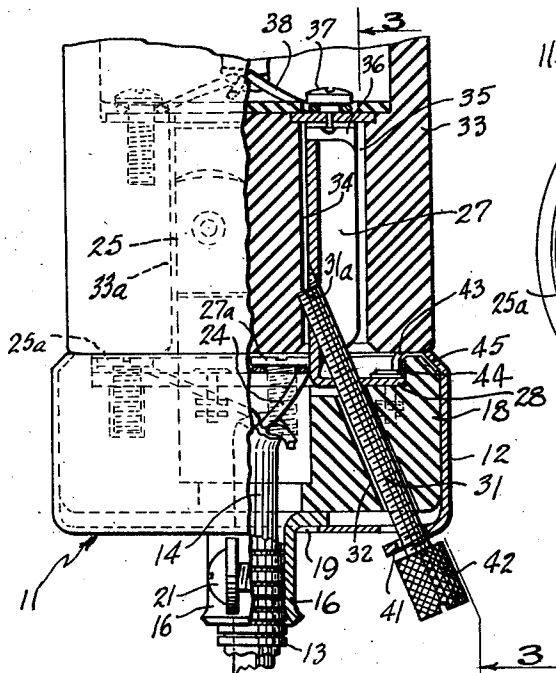


Fig. 2.

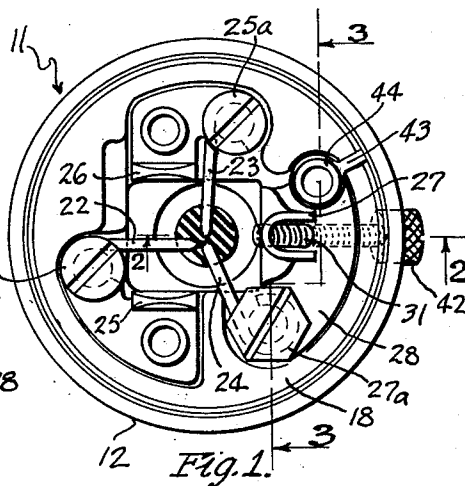


Fig. 1.

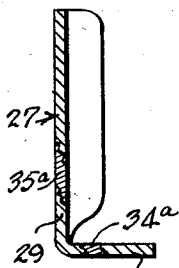


Fig. 4.

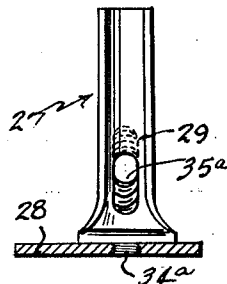


Fig. 5.

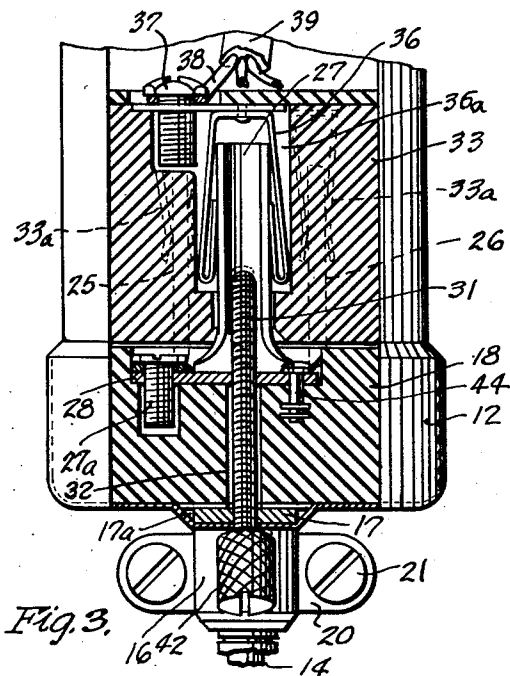


Fig. 3.

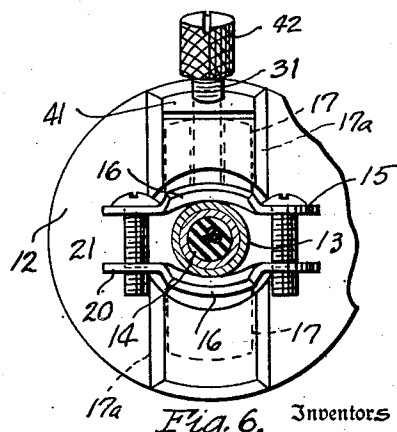


Fig. 6.

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UNITED STATES PATENT OFFICE

2,674,722

LOCKING MEANS AND GROUND CONNECTION FOR ELECTRICAL PLUGS

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Application March 3, 1950, Serial No. 147,362

3 Claims. (Cl. 339-14)

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This invention relates to plug connectors for electric circuits, particularly to locking devices for securing such plugs against withdrawal from their associated receptacles, and an object is to provide an improved locking device for use with plug type connectors.

A further object is to provide a locking device for plug connectors having an improved safety construction which avoids any exposure of live parts on the exterior either of the plug or the associated receptacle, so that there is no danger of any such parts being touched by anyone.

One specific aspect of the invention relates to locking devices for plugs used with three conductor cables which frequently are provided with metallic sheaths, and a further object is to provide a locking device constructed and arranged to form part of the grounding connection between the neutral contact blade of the plug and the metallic cable sheath, thereby grounding the locking mechanism and eliminating the possibility of exposed live parts on the plug.

With the foregoing and other objects in view, we have devised the construction illustrated in the accompanying drawing 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 this drawing:

Fig. 1 is an end elevation showing the interior of a plug having a locking mechanism constructed in accordance with one embodiment of this invention;

Fig. 2 is a side view partly in elevation and partly in section on the line 2-2 of Fig. 1, showing the plug operatively mounted in a connecting receptacle;

Fig. 3 is a transverse section on the line 3-3 of Fig. 1;

Fig. 4 is a section of a plug contact blade which also forms a cooperating part of the locking mechanism;

Fig. 5 is an elevation partly in section of the blade shown in Fig. 4, and

Fig. 6 is an end view looking from the bottom of Figs. 2 and 3, showing an associated cable in section.

The present invention contemplates a locking device forming a permanent part of the connector plug, so arranged as to be easily operated from the outside of the plug while, at the same time, avoiding any possibility of an operator or anyone else having to touch a "live" part.

The illustrated embodiment of the invention is

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shown in connection with a plug 11 having a metallic sheath or cover 12 adapted to be secured to the metallic sheath 13 of a cable 14 by a clamp 15 having cable gripping jaws 16 and radial flanges 17 secured between the plug sheath or cover 12 and the main insulating body 18 of the plug. The clamp projects through the axial opening 19 in the sheath or cover of the plug. Each cable gripping jaw has ears 20 engaged by clamping screws 21 for securing the clamp to the cable sheath 13. The feet slide laterally in grooves 17a on the inner side of the end wall of the cover or shell.

As illustrated, the cable 14 is a three conductor cable having two live conductors 22, 23 and a neutral conductor 24. The former are connected to contact blades 25, 26 respectively, by means of the usual binding screws 25a. The neutral conductor 24 is connected to a grounding blade 27 of U-shaped cross section as shown in Figs. 1, 4 and 5, by a binding screw 27a on base plate 28 mounting the blade 27.

In the present invention the locking mechanism is so connected to the neutral or grounded conductor that all possibility of any exposed "live" part is entirely eliminated. This mechanism is shown as including a locking member in the form of an elongated screw threaded bolt or screw 31 extending through an opening 32 in the plug body 18 at an acute angle to the axis of the plug. The screw 31 extends through and is threaded to the U-shaped grounded contact blade 27, so that it can be readily screwed into and out of the locking position, in which position its inner end 31a engages a part of the insulating material 34 of associated receptacle 33 in which the plug is mounted. As shown, the screw is threaded to both the base 28 and the projecting body portion 29 of the U-shaped grounded blade 27, suitable threaded or tapped openings 34a and 35a being formed in the blade for that purpose, and they are inclined so that the screw is at an angle to the axis of the plug for a purpose presently to be described.

The receptacle 33 has the usual openings and blade receiving contacts for connection to the blades of the plug upon insertion of the plug therein. These include contacts 33a for engagement with contact blades 25 and 26 and a contact 36 in chamber 35a for receiving the U-shaped grounded blade on the plug 11, and which is connected through a binding screw 37 with the neutral conductor 38 of the three conductor cable 39.

As shown in Figs. 2 and 6, the locking screw 31

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extends through an opening in an ear 41 struck up from the metallic casing 12 of the plug body 11 to form a ground connection from the blade 27 to the cable sheath 13, and also a support for the outer portion of the screw, in addition to the conventional ground connection for the blade shown at 43 secured to base 28 by the mounting rivet 44 and extending at its outer end 45 under and into engagement with metal shell 12. The end of the screw 31 has a knurled and slotted head 42 to facilitate the operation thereof into and out of operative position.

Before inserting the plug into the receptacle 33 the locking device is retracted into inoperative position. In the illustrated embodiment, this requires unscrewing the threaded bolt or screw 31 until the outer end 31a is retracted within the plane of the contact 27 so that it does not project outwardly far enough to interfere with inserting the plug in the receptacle. After the plug is in place in the receptacle, the screw 31 is screwed into the plug until the inner end 31a of this screw engages the adjacent surface 34 of the plug slot 35 in which the blade receiving contact 36 is mounted. In this position the screw threads cut into the material of the body of the receptacle and lock the plug against withdrawal from the receptacle, while release of the locking mechanism can be easily accomplished merely by unscrewing the screw 31.

The invention can be variously modified and adapted within the scope of the appended claims.

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

1. An electrical plug comprising a body of insulating material and a contact blade mounted thereon including a portion projecting from the body for insertion in a slot in a receptacle leading to a recess containing a contact for engagement thereby, a screw extending through the body of the plug and inclined to the axis of the plug, and said screw being threaded into the projecting portion of the contact blade and including an inner end projectable from one side of this blade so that inward adjustment of the screw relative to the plug will cause its inner end to engage and grip a side wall of the recess to retain the plug in the receptacle.

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2. An electrical plug comprising a body of insulating material and a contact blade mounted thereon including a portion projecting from the body for insertion in a slot in a receptacle leading to a recess containing a contact for engagement thereby, a metallic sheath for said body, a screw grounded on the sheath extending through the body of the plug and inclined to the axis of the plug, said screw being threaded into the projecting portion of the contact blade so as to ground the contact blade on the sheath and including an inner end projectable from one side of this blade so that inward adjustment of the screw relative to the plug will cause its inner end to engage and grip a side wall of the recess to retain the plug in the receptacle.

3. An electrical plug comprising a body of insulating material and a contact blade mounted thereon including a portion projecting from the body for insertion in a slot in a receptacle leading to a recess containing a contact for engagement thereby, a metallic cover for the body including means for grounding it on the metal covering of a conductor cable, a screw threaded in the projecting portion of said blade and inclined to the axis of the plug, said screw extending through the body and cover and grounded on said cover to ground the contact blade thereon and including an inner end projectable from one side of this blade, and said screw being adjustable from the exterior of the cover to cause its inner end to engage and grip a side wall of the recess to retain the plug in the receptacle.

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