Aug. 20, 1946. J. F. O'BRIEN 2,406,030

LOCKING DEVICE FOR ELECTRICAL CONNECTORS

Filed Oct. 14, 1942

Fig. 1.

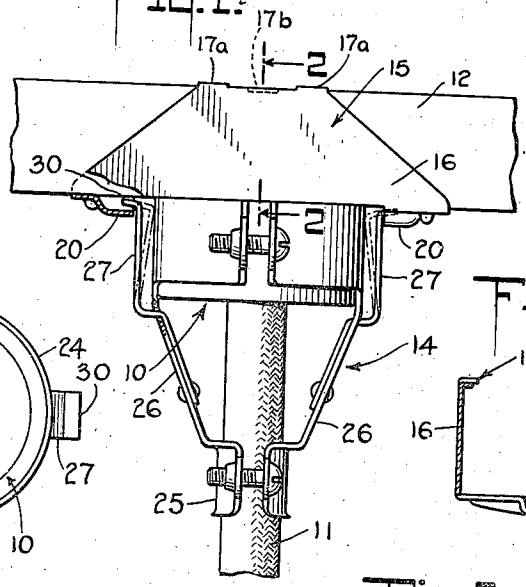


Fig. 3.

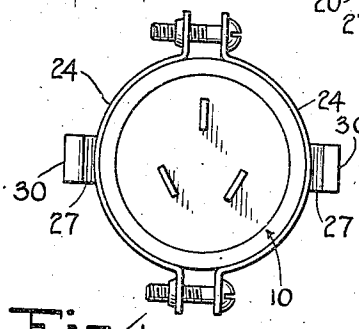


Fig. 2.

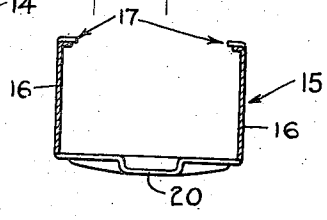


Fig. 4.

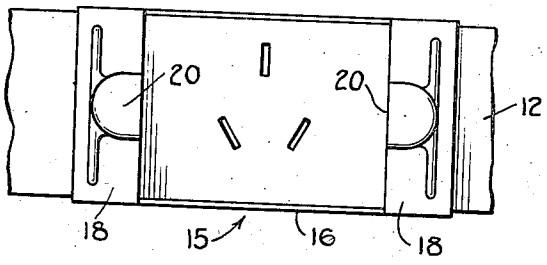


Fig. 5.

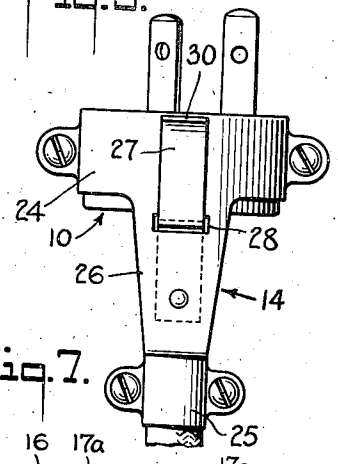


Fig. 6.

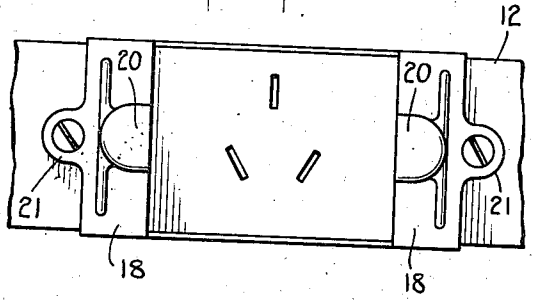
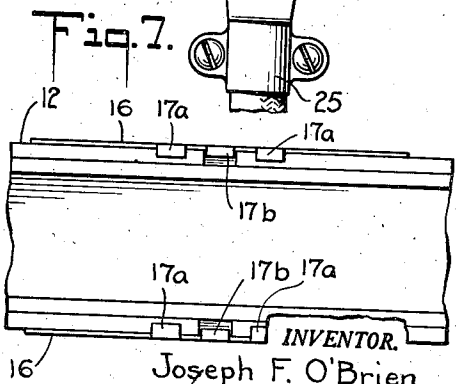


Fig. 7.



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UNITED STATES PATENT OFFICE

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LOCKING DEVICE FOR ELECTRICAL CONNECTORS

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Application October 14, 1942, Serial No. 461,948

10 Claims. (Cl. 173—330)

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This invention relates to locking devices for electrical connectors.

In particular, the invention relates to improved means for securement of an electrical outlet plug to an outlet receptacle to prevent the accidental separation thereof, and to provide strain relief means to eliminate strain on the connections of the electric wire at the outlet plug.

It is an object of the invention to provide improved means for releasably securing an electric outlet plug to an outlet fixture.

It is an object of the invention to provide means whereby an outlet plug may be attached to an outlet receptacle in such manner that the plug cannot be pulled out of contact with the receptacle in normal usage, but will be released in the event of an abnormal pull on the wire or cable which might otherwise damage the cable or break its connection with the outlet plug.

It is an object of the invention to provide an outlet plug securement means which will not interfere with the use of the plug with standard or conventional receptacles.

It is an object of the invention to provide an outlet plug securement means which can be used with a standard plug and which will permit the securement of said plug without the necessity of twisting the plug or any complementary locking device on the plug or the receptacle.

According to a preferred form of the invention, I provide collar means adapted for securement about the body of an electric attachment plug, said collar means having spring members having outwardly extending terminals for engagement with a locking or anchor plate secured to the outlet receptacle.

Preferably, the locking or anchor plate has pockets or equivalent formed therein, into which the terminals of the spring members fit, thereby to hold the outlet plug in operative association with the outlet receptacle under all normal conditions of use.

It is a feature of the invention that the spring members which are carried by the plug-provided member do not extend beyond the face of the outlet plug, i. e., the blade-provided plug member from which its blades project, thereby permitting the use of an outlet plug equipped with my invention with conventional electric outlet receptacles.

In the accompanying drawing:

Fig. 1 is an elevation, partly in section, showing an outlet plug secured to an electric receptacle pursuant to a preferred form of the invention;

Fig. 2 is a section, taken on lines 2—2 of Fig. 1, of the cooperating locking or anchor plate of the outlet receptacle;

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Fig. 3 is a bottom plan view of an outlet plug fitted with my improved locking means;

Fig. 4 is a plan view of a section of electrical conduit at the outlet receptacle portion thereof, and having mounted thereon one form of locking or anchor plate;

Fig. 5 is a vertical elevation of an outlet plug equipped with a preferred embodiment of the invention;

Fig. 6 is similar to Fig. 4, illustrating a second form of plug locking or anchor plate; and

Fig. 7 is a bottom view of the locking or anchor plate of Fig. 4.

Referring to the drawing, an attachment plug 10 having a conventional electric cord connection or wire cable 11 is shown in operative position with respect to an outlet-provided conduit 12, and removably secured in such position by the plug lock 14 and anchor or locking plate 15.

The conduit 12 may be of any conventional cross-section, having outlet provisions including a flat upper surface against which the face of the attachment plug 10 may abut firmly. In the form illustrated in the drawing, the conduit 12 is rectangular in shape, as disclosed and claimed in U. S. Patent No. 2,239,652, entitled Electrical unit, of which I am a joint patentee.

The anchor or locking plate 15 is conveniently formed from stamped metal. For a rectangular conduit, the anchor 15 includes side walls 16 of triangular contour as shown in Fig. 1, which terminate in inwardly turned flanges 17 overlying the rear wall of the conduit 12, see Fig. 7. Said flanges 17 may include members 17a which overlie the outer rear wall of the conduit 12 and a countersunk portion 17b adapted to fit within a groove in the rear wall of said conduit 12 to secure the anchor or locking plate 15 against lateral movement along the conduit.

Preferably, the side walls 16 of said anchor or locking plate 15 are springable, to engage the sides of the conduit 12 snugly.

The respective side walls 16 of anchor 15 are interconnected by transverse end elements 18, see Fig. 4, suitably spaced to provide an opening of ample area to expose the plug openings and to accommodate an attachment plug of maximum conventional size. The center portions of the end elements 18 are struck upwardly to provide pockets 20, in mutual alignment.

In the embodiment of Figs. 1, 2, 4 and 7, the anchor or locking plate 15 is held in position by the snug embrace of side members 16 with the con-

duit walls 12 and the engagement of the depressed portion 17b with a groove or the like in said conduit.

According to the embodiment of Fig. 6, end elements 18 are provided with ears 21 through which screws may pass into suitable tapped openings in the conduit 12, thereby permanently securing the anchor member 15 against the possibility of accidental removal or displacement.

Referring to Figs. 3 and 5, the plug lock 14 includes members of similar shape but opposite hand, each member having a relatively large, substantially semi-circular strap 24 for securement about the body of the plug 10, and a semi-circular collar 25, said strap and collar being connected by the bridge 26.

Secured to each of said bridges 26, desirably to the under side thereof, are spring members 27, the free ends of which extend through a slot 28 in each of the respective bridges to present an external springable portion which may be grasped and squeezed inwardly to an extent permitting the hooked ends 30 thereof to clear the end walls of the pockets 20.

The respective straps 24 of the plug lock 14 may be clamped about the plug 10 as by the illustrated screws, and the collar portion 25 clamped tightly about the conductor wire 11 to serve as a strain relief and prevent a disconnection of the wire cable 11 with the terminals of the outlet plug 10 in the event that a strong pull is exerted on the wire.

In employing the invention, the spring members 27 carried by the blade-provided plug member are squeezed together as aforesaid, whereupon such blade-provided plug member may be inserted directly into the indicated apertures of the outlet, following which upon manual release of the spring members 27 their outwardly directed hook free ends 30 are caused to engage beneath the top walls of the pockets 20.

Desirably, in the circumstance of an abnormal pull exerted upon the wire cable either the upper wall surface of the pockets 20, or the outwardly extending ends 30 of springs 27, or both, should be so sloped that a strong outward pull applied to the cable 11 will initiate a camming action of the ends of spring members 27 against the pockets 20 and urge the said spring members inwardly to release from pockets 20, whereupon the plug 10 will be released from the receptacle before damage can be done to the cord 11 or the connection of the conductors of said cord with the outlet plug 10.

It will be observed that embodiments of the invention are particularly applicable to blade-provided electrical plugs in association with electrical outlets or receptacles having a substantially flat face in which their blade-receiving apertures are located, thus affording the affixing to such substantially flat face a substantially flat anchor or locking plate, the pockets of which are arranged in close contiguity with such flat face of the outlet whereby the spring members having springable hook free ends are disposed within the zone of the body of the blade-provided plug, thereby facilitating the manual release of such springable members from such pockets of the locking plate concomitant with the act of grasping the plug in the normal manner of withdrawing its blades from the apertures of the outlet or receptacle when it is desirable to disconnect the plug with respect to the outlet or receptacle.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made provided they do not depart from the scope of the claims.

I claim:

1. Means for releasably securing an attachment plug to an outlet receptacle, comprising the combination with an anchor plate having side walls resiliently embracing the side walls of the outlet receptacle, flange means engaging with the rear walls thereof, and spaced pocket means disposed above the face of the receptacle, of a strap for securement about the body of the attachment plug and spring means operatively associated with said strap and having free, springable ends terminating in outwardly directed hook members for engagement beneath the pockets of said anchor plate.

2. Means for removably securing an attachment plug to an outlet receptacle, comprising the combination with an anchor plate having side walls resiliently embracing the side walls of the outlet receptacle, flange means engaging with the rear walls thereof, and spaced pocket means disposed above the face of the receptacle, of a strap for securement about the body of the attachment plug, members extending upwardly therefrom, and spring means fastened at one end to the underside of said members and having free, springable ends terminating in outwardly directed hook members for engagement beneath the pockets of said anchor plate.

3. Means for removably securing an attachment plug to an outlet receptacle, comprising: an anchor plate having side walls for tightly embracing the side walls of said outlet receptacle, said side walls terminating in inwardly directed flanges for gripping the rear wall of said outlet receptacle, said side walls being connected by spaced transverse members extending across the face of said outlet receptacle, each transverse member having a pocket formed therein; and attachment plug means including opposed substantially semi-circular strap portions adapted collectively to encircle the body of said plug for securement thereto, opposed, substantially semi-circular collar portions adapted collectively to securely embrace a wiring serving said attachment plug, bridge means connecting the respective strap and collar portions, each said bridge means having a slot intermediate the ends thereof, and spring means secured to each said bridge means on the underside thereof and having free, springable ends extending through said slot thereof, said springable ends terminating in outwardly extending hook portions disposed substantially in the plane of the face of the attachment plug for engagement with the pockets of the respective transverse end members of the anchor plate.

4. Means for removably securing an attachment plug to an outlet receptacle, comprising the combination with an anchor plate having side walls resiliently embracing the side walls of the outlet receptacle, flange means engaging with the rear walls thereof, and spaced pocket means disposed above the face of the receptacle, of a strap for securement about the body of the attachment plug, members extending upwardly therefrom, and spring means fastened at one end to the underside of said members and projecting through said members to the outside thereof, said spring means having springable ends terminating in outwardly directed hook members for engagement beneath the pockets of said anchor plate.

5. Means for releasably securing a blade-provided electrical plug to an aperture-provided electrical receptacle or other outlet, comprising: a locking plate arranged to be affixed to the aperture-provided face of such outlet, said locking plate having mutually spaced pockets; a strap arranged to be fixedly secured to such blade-provided plug about the body thereof; members extending from said strap; spring members secured to said members and having free springable hook end portions arranged for resilient insertion into said pockets.

6. Means for releasably securing a blade-provided electrical plug to an aperture-provided electrical receptacle or other outlet, comprising: a locking plate arranged to be affixed to the aperture-provided face of such outlet, said locking plate having mutually spaced pockets; a strap arranged to be fixedly secured to such blade-provided plug about the body thereof; members extending from said strap; spring members fixedly secured at their one ends to said members and having free springable hook end portions arranged for resilient insertion into said pockets, said spring members being disposed within the zone of the body of such blade-provided plug.

7. Means for releasably securing a blade-provided electrical plug to an electrical receptacle or other outlet having a flat face provided with blade-receiving apertures, comprising: a substantially flat locking plate arranged to be affixed to the substantially flat face of such electrical outlet, said locking plate having mutually spaced pockets; a strap arranged to be secured to such blade-provided plug about the body thereof; members supported by said strap in fixed relation with said blade-provided plug; spring members secured to said members and having free springable hook end portions arranged for resilient insertion into said pockets.

8. Means for releasably securing a blade-provided electrical plug to an electrical receptacle or other outlet having a flat face provided with blade-receiving apertures, comprising: a substantially flat locking plate arranged to be affixed to the substantially flat face of such electrical outlet, said locking plate having mutually spaced pockets; a strap arranged to be fixedly secured to such blade-provided plug about the body thereof; members supported by said strap; spring members secured to said members and having free springable hook end portions arranged for resilient insertion into said pockets, said spring members being disposed within the zone of the body of such blade-provided plug.

9. A blade-provided electrical plug having a body provided with a substantially flat face; electrical blades projecting from said body at said flat face; strap means secured in substantially fixed relation with said body; members fixedly supported by said strap means, spring members secured to said members and having free springable hook end portions, said spring members extending within the zone of said body.

10. Means for releasably securing a blade-provided electrical plug to an electrical receptacle or other outlet having a substantially flat face and blade-receiving apertures in such face, comprising: a locking plate arranged to be affixed to such receptacle adjacent such substantially flat face and having locking means; spring means secured at one end thereof in fixed relation with and within the zone of the body of such blade-provided electrical plug, said spring means having springable free end means arranged to cooperate with said locking means of said locking plate for releasable connection therewith.

JOSEPH F. O'BRIEN.