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RESILIENT SELF-LOCKING ELECTRICAL CONNECTOR

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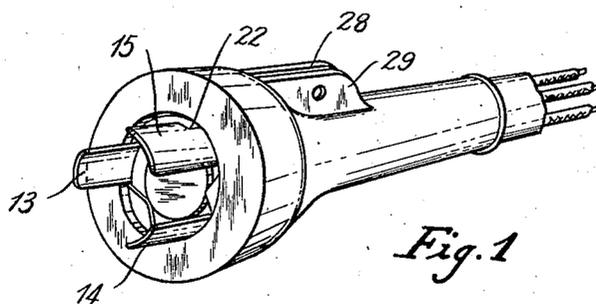


Fig. 1

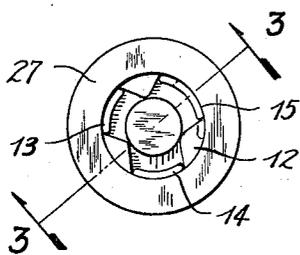


Fig. 2

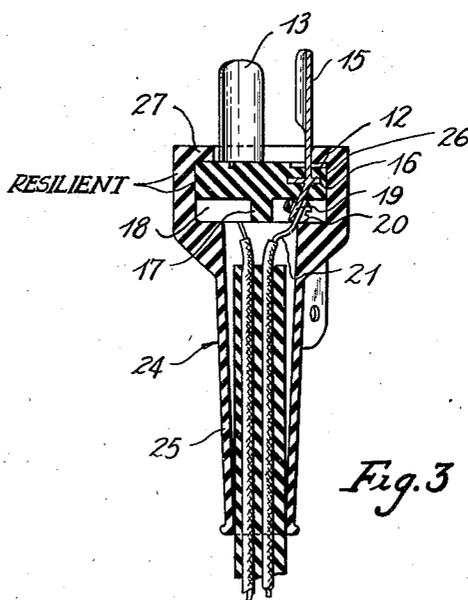


Fig. 3

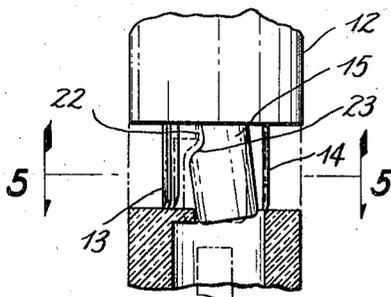


Fig. 4

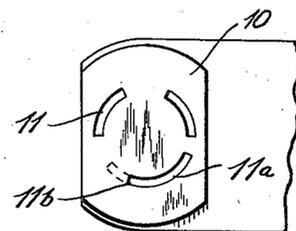


Fig. 5

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## RESILIENT SELF-LOCKING ELECTRICAL CONNECTOR

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4 Claims. (Cl. 173—332)

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This invention relates to improvements in resilient self-locking electrical connectors wherein a plug has a plurality of metal tongues extending outwardly therefrom which are receivable in slots of a receptacle so as to establish and maintain an electrical connection between conductors leading to the receptacle and conductors leading from the plug.

Heretofore, a lock-type of plug has been devised wherein three tongues or prongs project from the plug and which are receivable in three corresponding slots of a receptacle. One side of each tongue is recessed to receive an end of its corresponding slot in the receptacle so that when the tongues are fully inserted into the slots and the plug is given a slight rotary movement about its axis the ends of the slots will be partially received in the recesses to lock the plug against withdrawal or detachment from its receptacle. Detachment can be effected only by reversely rotating the plug to disengage the ends of the slots in the receptacle from the recesses in the sides of the tongues.

An objection to this type of connector is that if the plug is connected to apparatus located remotely from the receptacle and a short circuit should develop or other destructive circumstance should occur that it is impossible to withdraw the plug or connector from its receptacle by merely pulling on the electrical cable or conductor that is connected to the plug. Under such circumstances an operator must proceed to the location of the receptacle and reversely rotate the plug in order to detach it.

An object of the present invention is to provide an improved plug or connector of this general type which is so constructed that when the plug is inserted into the receptacle it will automatically lock itself therein against withdrawal under all ordinary circumstances. However, should a short circuit develop or other destructive circumstance occur a severe pull on the cable or conductor connected to the plug is capable of withdrawing the plug from the receptacle.

Another object of the invention is to provide an improved plug or connector for use in conjunction with electrical receptacles which is of relatively simple and highly durable construction and which is so designed that danger of short circuits developing therein is eliminated.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the

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accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a perspective view of the improved plug or connector embodying the present invention;

Fig. 2 is an end view in elevation of the same;

Fig. 3 is a vertical section taken substantially upon the line 3—3 upon Fig. 2;

Fig. 4 is a partial view of a portion of the plug or connector illustrating the manner in which it is inserted into its receptacle; and

Fig. 5 is a view taken substantially upon the line 5—5 upon Fig. 4 to illustrate the plan of the receptacle.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, the plug or connector embodying the present invention is designed to be used in conjunction with the receptacle generally indicated at 10 and which conventionally has a porcelain, or other di-electric cap or facing in which slots 11 are formed. The number of slots formed in the cap or facing will vary with different electrical systems depending on whether a two-wire or three-wire system is employed. It will be understood, however, that the present connector is applicable to electrical systems having any number of conductors therein. For purposes of illustration, however, the number of slots illustrated in the cap or facing of the receptacle have been illustrated as three, and these are equidistant radially from an axial center through the receptacle. The plug or connector embodying the present invention comprises a body 12 in the form of a short cylinder or resilient rubber. A plurality of metal tongues or prongs 13, 14, and 15 project forwardly from the face of this body and extend longitudinally therethrough. These prongs or tongues may have struck-out portions or flanged portions 16 which are embedded in the body 12. In constructing this portion of the connector the tongues are suitably mounted in a mold and the rubber molded about them and vulcanized so that the tongues will be embedded therein. The rear face of the body 12 has radially extending partitions 17 formed thereon dividing the back of the body into three compartments 18 into which the end of one of the tongues or prongs extend. These ends, one of which is indicated at 19, may have screws 20 mounted thereon serving as binding posts for the ends of conductors 21 of a cable. One of the tongues or prongs indicated at 15 has one side edge thereof recessed as indicated at 22 forming a sloping shoulder 23. This tongue is so

positioned in body 12 as to be slightly displaced circumferentially with respect to its slot 11a in the receptacle 10 so that in order to insert the connector into the receptacle it is necessary to spring the tongue laterally or circumferentially from its normal position shown in dotted lines on Fig. 4 to the full line position. As the body 12 is formed of resilient rubber the body permits of this spring or resilient action. When the plug is fully inserted into the receptacle tongue 15 returns to its normal position shown in dotted lines in Fig. 4, wherein the sloping shoulder 23 engages beneath the end 11b of slot 11a. During the inserting movement the unrecessed tongues 13 and 14 merely slide inwardly through their slots 11 without being laterally sprung or otherwise deformed. When the tongue 15 returns to its normal position after being inserted into the receptacle, shoulder 23 which engages the end of slot 11a serves to releasably retain the plug in its applied position and hold it against withdrawal under all ordinary conditions. However, under unusual circumstances by applying a severe pull to the cable leading from the plug or connector inclined shoulder 23 will function as a cam camming the tongue 15 into the full line position shown in Fig. 4, and permitting the plug to be detached from its receptacle.

The plug or connector is completed by the provision of an outer sleeve 24 having a shank portion 25 which is slipped over the cable or conductors and a hollow body portion 26 which receives and snugly retains the body 12. The body portion is equipped with a flange 27 which overlies or extends inwardly over the face of body 12 about the tongues or prongs 13, 14, and 15. In assembling the cable with the plug or connector the flange 27 may be stretched or peeled outwardly to release the body 12. The cable may then have its conductors inserted through the shank portion 25 in the sleeve and electrically connected to the tongues. Thereafter, the body 12 may be positioned in the body portion 26 and the flange 27 permitted to return to its normal position retaining the body 12 in the sleeve. The sleeve is preferably slotted intermediate its ends and apertured ears 28 and 29 formed thereon at the sides of the slot. The apertures through these ears may receive a suitable clamping bolt which on being tightened will draw the forward end of the shank portion 25 into tight engagement with the exterior of the cable thus relieving strains on the binding posts of the tongues whenever the severe pull is applied to the cable to pull the connector from its receptacle.

From the above-described construction it will be appreciated that an improved electrical connector is provided which is of extremely simple and highly durable construction. All exposed portions with the exception of the tongues are adequately housed within resilient rubber taking advantage of its insulating properties. The resiliency of the body 12 provides adequate spring for tongues 15 which on being inserted into or withdrawn from its receptacle may be laterally or circumferentially displaced as illustrated in Fig. 4.

Various changes may be made in the details of construction without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. An electrical connector comprising a body

formed of resilient rubber or the like, a plurality of tongues extending through the body so as to be resiliently mounted thereby, a sleeve having a body portion fitting about the body, and a flange portion overlying the face of the body about the tongues, said sleeve being formed of resilient rubber and having a shank portion through which the cable connected to the tongues extend, the shank portion being slotted and having apertured ears at the side of the slot designed to receive a tightening bolt.

2. In combination, an electrical receptacle having openings therein adapted to receive the tongues of a plug, at least one of the openings having a flange at the end of its mouth and being laterally displaced with relation to the normal position of its tongue on the plug, and a plug having a body formed of resilient insulating material and contact tongues projecting therefrom adapted to be inserted into the openings in the receptacle and in so doing have the tongue receivable in the mentioned opening displaced from its normal position in order to enter the mentioned opening, the mentioned tongue having a shoulder on its side edge receivable in the receptacle beneath said flange so as to retain the plug in the receptacle against easy withdrawal.

3. In combination, an electrical receptacle having openings therein adapted to receive contact tongues of a plug, and a plug having contact tongues receivable therein, at least one of the tongues being resiliently mounted on the plug as to be displaceable relatively thereto upon insertion into the receptacle, the opening in the receptacle which is to receive the mentioned tongue being displaced from the normal position of said tongue so as to require such displacement upon insertion of the tongue therein, and means on the tongue and receptacle adapted to mutually engage when the plug is inserted and the tongue has returned to normal position therein relative to the plug for resisting withdrawal of the plug from the receptacle.

4. In combination, an electrical receptacle having three openings therein arranged about an axial center, one of said openings being circumferentially displaced and a plug having three contact tongues arranged about an axial center, one of said tongues being resiliently mounted on a plug for circumferential displacement so as to be receivable upon displacement through the displaced openings in the receptacle and then returned to normal position with relation to the plug when the contact tongues have been completely inserted into the receptacle, and means on the mentioned tongue and the wall of the mentioned opening adapted to mutually engage when the mentioned tongue has been completely inserted and has returned to normal for resisting withdrawal of the plug from the receptacle.

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