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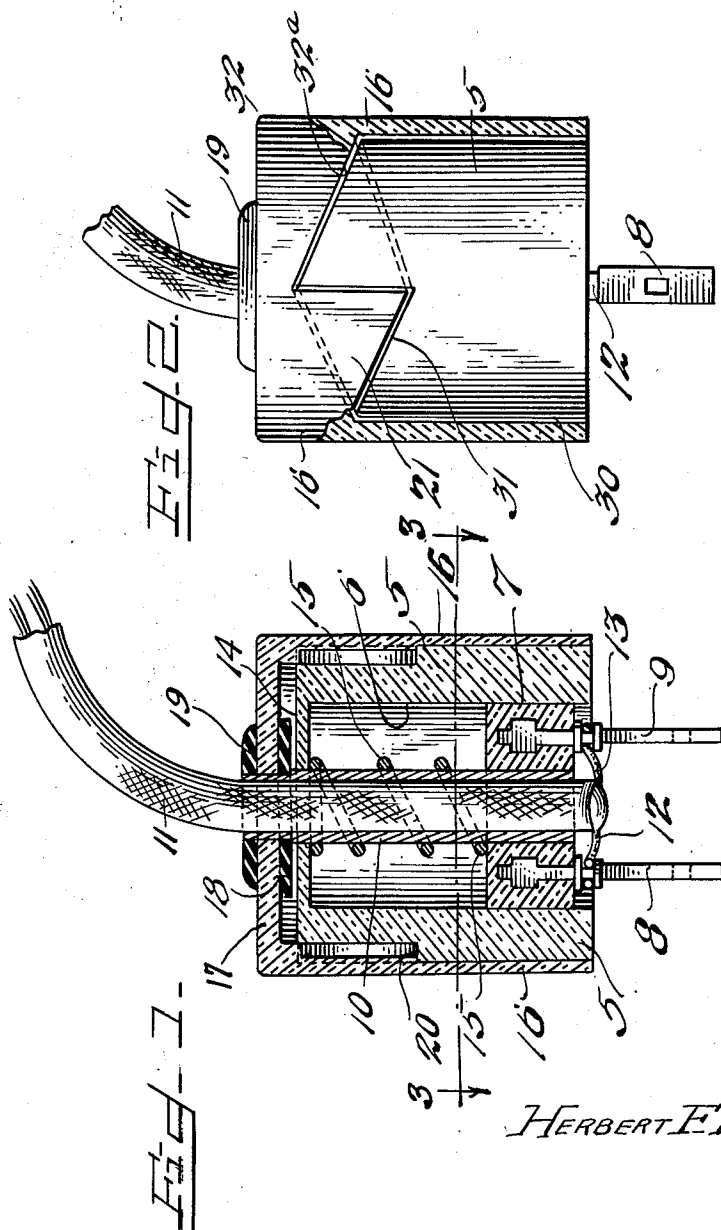
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ROTATABLY RELEASED ELECTRIC PLUG

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2 Sheets-Sheet 1



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UNITED STATES PATENT OFFICE

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ROTATABLY RELEASED ELECTRIC PLUG

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598,990, June 12, 1945. This application Janu-
ary 17, 1950, Serial No. 138,975

4 Claims. (Cl. 173-361)

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This invention relates to an improved electrical connector plug, and one of its objects is to provide an electrical plug, which is coupled in circuit connecting position, by a push operation, with means for releasing the plug by turning an outer sleeve arranged to develop a pulling action upon the connector prongs of the plug.

Another object of the invention is to provide an electrical connector plug, with a prong carrying core of insulation arranged to slide in a body sleeve, and a second sleeve swivelled to the core and having helical bearing on the body sleeve, so that the core will be pulled in the body sleeve when the second or outer sleeve is manually turned on the inner or body sleeve.

With the above and other objects in view, the invention consists in certain new and useful constructions, combinations and arrangements of parts, clearly described in the following specification, and fully illustrated in the drawings, in which:

Fig. 1 is a vertical sectional view, through the complete plug, in normal assembled condition.

Fig. 2 is a similar view, taken at right angles thereto, showing the outer sleeve partly in section.

Fig. 3 is a horizontal sectional view, taken on lines 3-3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a perspective view, showing the outer sleeve separated from the inner sleeve, in a modified construction.

Fig. 5 is a cross sectional view, showing a modified construction, which includes three connector prongs, or the type required in certain electrical service work.

Fig. 6 is a similar view, showing a four keyway construction.

Fig. 7 is a detail perspective view, on a reduced scale, of a two piece sleeve combination, showing a modified sloping tooth construction.

Fig. 8 is a side elevation of a modified arrangement thereof.

Fig. 9 is a side elevation of another modified arrangement.

This invention relates to the improved electrical connector plug disclosed and claimed in my prior application 598,990, filed June 12, 1945, now abandoned.

Referring to the accompanying drawings, which illustrates the practical application of my invention, 5 designates a main plug body sleeve, which is formed with a squared bore wall 6, against which the square core 7 is arranged to slide.

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The core 7 is constructed of insulating material, in which the prong connector elements 8 and 9 are embedded at their inner ends. A tube 10 of insulating material is positively connected to the center of the core or plug 7, and the electrical conductor cord 11 extends through the tube 10 and its circuit wires 12 and 13 are connected with the prongs 8 and 9, at the inner end of the tube 10.

The outer end of the body sleeve 5 is provided with an end wall 14, and a coil spring 15 is placed around the tube 10 and bears at its inner end against the core or plug 7, and at its outer end against the end wall 14.

An outer sleeve 16 is mounted to turn on the body sleeve 5, and is provided with an end wall 17, which turns on the tube 10, and is held against relative endwise movement to the tube by the collars 18 and 19, which are cemented or otherwise positively connected to the outer end of the tube 10, on opposite sides of the end wall 17. This assembly provides a swivel connection between the outer sleeve 16 and the tube 10.

The outer wall surface of the body sleeve 5 is formed with a series of inclined or helically disposed teeth 20, equally spaced thereon, which are engaged by the internal inclined or helical teeth 21 of the outer sleeve 16.

Due to the polygonal sliding fit between the core or plug 7 and the body sleeve 5, the core or plug cannot turn in the body sleeve. When the outer sleeve is turned on the body sleeve, the inclined internal teeth 21 of the outer sleeve will slide along the inclined or helical external teeth 20 of the body sleeve, thereby pulling the core or plug 7 in the bore of the body sleeve, which will place the coil spring 15 under compression, and pull the connector prongs 8 and 9 from circuit connecting relation with the conductor elements of a receptacle.

The angle of inclination or the lead of the helical teeth, is such that a short turning effort will produce the required longitudinal sliding movement of the core or plug in the body sleeve, and thereby detach the connector prongs from circuit coupling engagement with the corresponding elements of a receptacle. Due to the fact that the outer sleeve is swivelled on the central tube, no twisting action is induced on the connector prongs.

In Fig. 4 I show an inner sleeve 30, having helical end teeth 31, engaged by the helical end teeth 32a of the sleeve cap 32. In this construction the sleeve 30 and the sleeve cap 32 are of the same cylindrical diameter.

In Fig. 5 I show an inner body sleeve 35, which is formed with an octagonal inner wall surface 36, which is engaged by the core or plug 37, also of octagonal construction. This core or plug 37 is equipped with three connector prongs 38, 39 and 40, and the central operating tube 41.

In Fig. 5 the outer sleeve 42 is mounted to turn on the body sleeve 35, to operate the tube and plug.

In Fig. 6 the body sleeve 50 is formed with integral key ribs 51, which slidably engage the keyways 52 of the plug or core 53, which is provided with a central tube 54, fixed thereto at its inner end. An outer sleeve 55 turns on the body sleeve 50 to propel the central tube 54 and the plug or core 53.

In Fig. 7 I show an outer cylinder 60, having helical teeth 61 on its inner end which are designed to engage the outer helical teeth 62 of the inner cylinder 63.

In Fig. 8 I show another similar arrangement, the outer cylinder 64 being formed with inner helical teeth 64a, and the inner cylinder 65 being formed with outer helical teeth 66.

In Fig. 9 I show another modified arrangement, wherein the outer cylinder 67 is provided with inner helical teeth 68, which engage the outer helical teeth 69 of the cylinder 70.

In these three last-named views, the helical teeth are disposed at different angles or pitches.

It is understood that any form of helical tooth construction, or helical screw thread construction, may be employed between the operating or movable sleeve and the inner or stationary body sleeve. By using screw threads or low pitch a firmly coupled pair of connector prongs may be readily displaced from circuit coupling position, without subjecting the conductor cord or connector prongs to a twisting action, and without displacing the end connections of the circuit wires of the cord, so as to produce a crossed wire condition, with a resulting short circuit, and the accompanying fire hazards.

The invention provides an electrical push plug with means for disconnecting the plug, by a turning operation instead of a pulling operation, and therefore provides a push-turn-plug.

I claim:

1. An electrical connector plug, consisting of a main body sleeve, a plug arranged to slide in the main sleeve and keyed therein against relative rotation, a tube connected at its inner end to the plug, connector prongs carried by the plug and projecting endwise thereof, an electrical conductor cord having circuit wires connected with the prongs, and a sleeve swivelled on the tube and turning on the main body sleeve and having means to produce an endwise movement of the last-named sleeve when said last-named sleeve is turned on the main body sleeve, the main body sleeve having cooperating means for this purpose,

2. An electrical connector plug, consisting of a main body sleeve having external inclined teeth thereon, a plug arranged to slide in the main body sleeve and keyed therein against relative rotation, conductor prongs secured to the plug, a second sleeve mounted to turn on the main body sleeve and provided with inclined internal teeth adapted to engage the external teeth of the main body sleeve, whereby an endwise movement of the second sleeve will result from the turning of said second sleeve on the main body sleeve, a tube connected at its inner end with the plug and means connecting the tube to the second sleeve for swivel movement of the sleeve on the tube.

3. An electrical connector plug, consisting of a main body sleeve, a plug sliding therein and keyed thereto against relative rotation, connector prongs having inner ends secured in the plug and outer ends projecting therefrom, said main body sleeve having an integral end wall, a second sleeve mounted to turn on the main body sleeve and having a swivel connection with the outer end of the tube, means between the second sleeve and the main body sleeve for causing the second sleeve to move endwise on the main body sleeve when the second sleeve is turned thereon, and a coil spring between the plug and the end wall of the main body sleeve.

4. In combination, a main body sleeve, a plug slidable therein and keyed against relative rotation in the sleeve, conductor prongs having inner ends secured in the plug, a tube connected centrally to the plug, the main body sleeve having an endwall, a coiled spring located between said plug and said endwall around said tube, an outer sleeve mounted to turn on the main body sleeve and provided with an endwall having swivel connection with the tube, and means between the inner wall surface of the outer sleeve and the outer wall surface of the main body sleeve adapted to cause the outer sleeve and the tube to move endwise on the main body sleeve when the outer sleeve is turned thereon, whereby the plug will be caused to slide in the main body sleeve to disengage the conductor prongs from coupling with an electrical receptacle.

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