

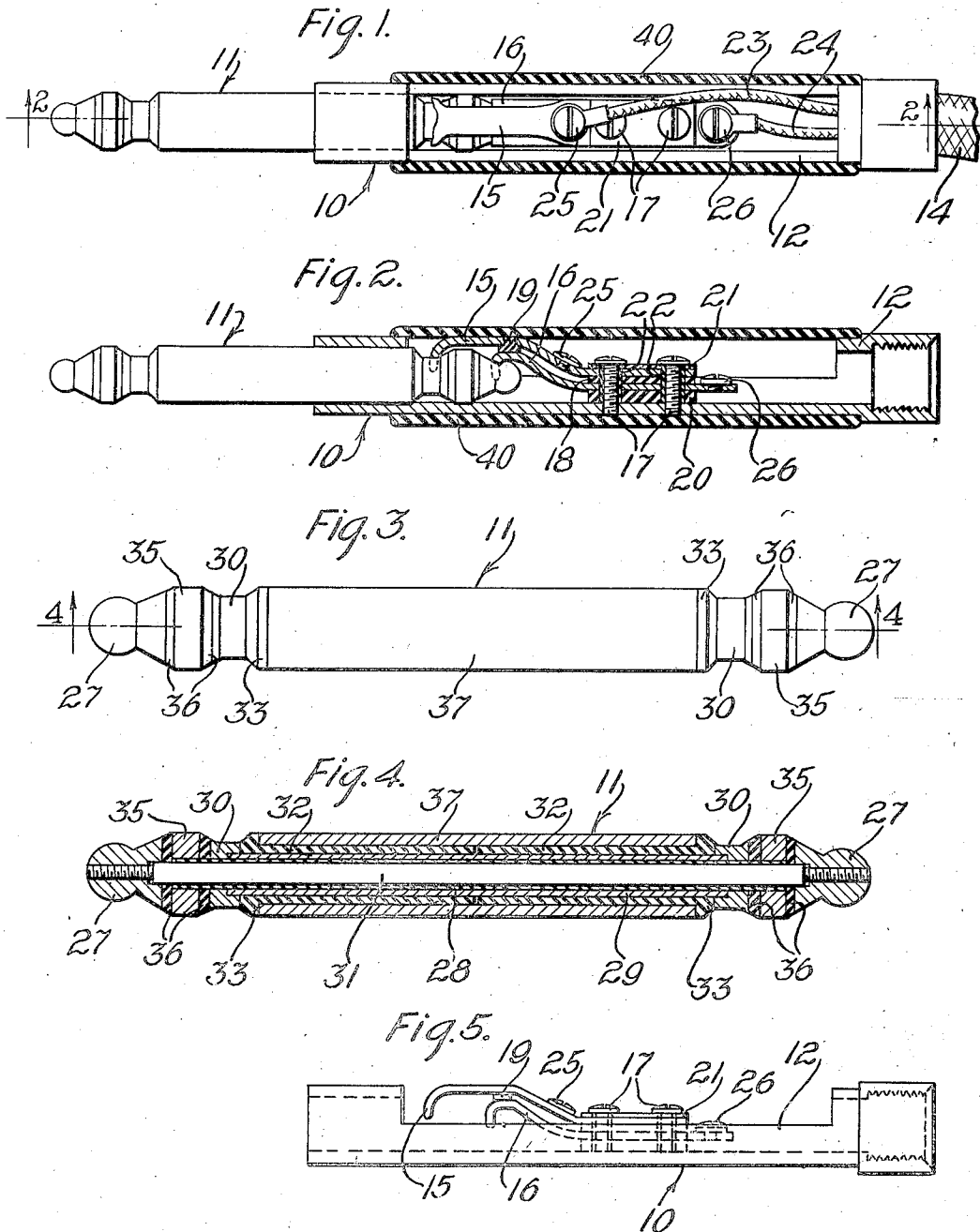
June 24, 1930.

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1,765,540

TERMINAL PLUG

Filed Dec. 19, 1925



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UNITED STATES PATENT OFFICE

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TERMINAL PLUG

Application filed December 19, 1925. Serial No. 76,372.

This invention relates to terminal plugs, and more particularly to a terminal plug for electrical conductors.

Electrical conductors such as are used for interconnecting electrical circuits are frequently provided at their free ends with terminal plugs which are designed to engage jack terminals attached to other conductors and which may be fixedly positioned. A plurality of individually insulated conductors of this type assembled under a common sheath to constitute a flexible strand termed a "cord" is frequently used in telephone exchanges for interconnecting electrical circuits of telephone switchboards. In such cases the terminal plug attached to the cord is usually provided with contacting portions which are insulated from each other, individually connected with the conductors of the cord and designed to engage cooperating contacting portions or springs of a jack terminal secured in the telephone switchboard. These contacting portions of the terminal plugs sometimes become worn from such usage to such an extent that they are no longer capable of making entirely satisfactory electrical connections with the contacting portions of the jack terminal. In order to insure continuously giving satisfactory service, it has been the practice to frequently inspect such terminal plugs and discontinue the use of any, the contacting portions of which appear to be nearing the expiration of their service life. In such instances it has usually been necessary heretofore to replace the entire terminal plug, although some portions thereof would give entirely satisfactory service for an indefinite period.

The primary object of this invention is to provide an improved terminal plug wherein the worn parts may be replaced expeditiously and economically.

In accordance with the invention there is provided in one embodiment thereof a terminal plug having a body portion bearing a plurality of individually insulated contact springs which may be readily and securely attached to the ends of the separate conductors of a multiple conductor cord. A reversible contacting member is provided with

similarly arranged individually insulated contacting portions at each end which may be used interchangeably for resiliently, rotatably and electrically engaging either the contact springs of the body portion or the contact springs of a terminal jack.

Other objects and features of the invention will become apparent in the following detailed description, reference being had to the accompanying drawing, wherein

Fig. 1 is an enlarged elevational view, partly in section, of a terminal plug embodying the features of the invention;

Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1 with the reversible member shown in elevation;

Fig. 3 is an enlarged detailed view of the reversible member;

Fig. 4 is a longitudinal section taken on the line 4—4 of Fig. 3, and

Fig. 5 is an enlarged detailed view of the plug body.

It is believed that the invention will be clearly understood from a detailed description of a terminal plug embodying the general features thereof.

Referring now to the drawing in detail, a terminal plug embodying the features of this invention comprises, in general, a body 10 and a reversible contacting member 11. The body 10 is tubular in form and is provided on one side with an excision 12 (Fig. 5) to facilitate the assembling of the plug and its attachment to a flexible triple conductor cord 14 (Fig. 1). Contact springs 15 and 16 are secured within the body 10 by means of screws 17 threaded in the wall thereof opposite the excision 12. The contact springs 15 and 16 are insulated from each other by means of spacers 18 and 19 of any suitable insulating material, preferably hard rubber. Strips 20 and 21 of insulating material serve to insulate the springs 15 and 16 from the plug body 10 and the screws 17, respectively. The screws are further insulated from the contact springs by means of insulating bushings 22 (Fig. 2). The ends of conductors 23 and 24 of the cord 14 may be fastened to the contact springs 15 and 16 by means of screws 25 and 26, respectively. A third conductor

(not shown) may be suitably electrically connected to the body 10.

The reversible member 11 comprises a central metal member 31 which is of circular cross section and threaded at each end to receive a nut 27 (Fig. 4). Surrounding the member 31 substantially throughout its length is a tube 28 composed of any suitable insulating material, preferably hard rubber. The tube 28 is, in turn, surrounded by a metal sleeve 29 which is electrically connected at each end to a collar 30 which may be swetted or otherwise secured thereto. Each of the collars 30 is insulated from the member 31 by the tube 28. A metal sleeve 37 surrounds the sleeve 29 and is spaced therefrom by hard rubber bushings 32 which are provided, at opposite ends, with shoulder portions 33 which portions serve to insulate the sleeve 37 from the collars 30. Disposed between each of the collars 30 and its associated nut 27 is a collar 35 of enlarged diameter which is insulated on each side by a hard rubber washer 36 (Fig. 4). The collars 35 are also insulated from the member 31 by the tube 28.

The contacting member 11 is designed so that the sleeve 37 thereof fits snugly within the body portion 10 to insure a good electrical connection therewith. Moreover, the contacting member is rotatable in the plug body, thus insuring a uniform wear of its contacting portions. The contact springs 15 and 16 are formed with forked ends which are designed to grip the collar 30 and nut 27 to hold the member 11 securely in place. A shell 40 composed of fiber or other suitable insulating material fits snugly around the plug body and serves to press the springs 15 and 16 into resilient engagement with the collar 30 and nut 27 respectively.

It is obvious from the above description that the nut portions 27 of the contacting member 11 are electrically interconnected through the central member 31 and the collars 30 are electrically interconnected through the sleeve 29. The nut 27, collar 30, and sleeve 37 serve as the tip, ring and sleeve contacting portions which cooperate with the tip, ring and sleeve contacting springs of a terminal jack in connecting the conductors of the cord 14 with the conductors connected with the terminal jack. Due to the rotatable mounting of the member 11 in the plug body 10 as hereinbefore described, self-cleaning contacts are produced between the springs 15 and 16 and the ring and tip contacting portions 30 and 27, respectively, as well as between the interior surface of the plug body 10 and the exterior surface of the sleeve 37.

Since either end of the contacting member 11 may be inserted into the plug body, it is obvious that when either the tip or ring contacting portion at one end becomes worn, the contacting member may be reversed to permit the use of the contacting portions at the op-

posite end thereof. This is accomplished by removing the shell 40 and lifting the contacting springs 15 and 16 to allow the member 11 to be removed, whereupon it is reversed and replaced in the plug body. The contact springs are then released to lock the member in place and the shell is replaced on the plug body. The contacting springs 15 and 16 are so designed that they will make good electrical connections with the tip and ring portions of the member 11 and securely hold the member in the body portion even though such portions are so worn as to render them unsuitable for electrical engagement with terminal jacks. Furthermore, when the contacting portions at both ends have become worn, the contacting member 11 may be replaced by a new one without disconnecting the plug from the conductors.

Although the invention, as herein illustrated and described, is particularly applicable to telephone switchboard plugs, it should be understood that the novel features thereof are capable of other applications and should be limited only by the scope of the appended claims.

What is claimed is:

1. In a terminal plug for use with a terminal jack having a plurality of contacting portions, a tubular body having a plurality of individually insulated contact springs, and a cylindrical contacting member having similarly arranged contacting portions at each end for interchangeably, resiliently and rotatably engaging the contact springs and the contacting portions of the terminal jack.
2. In a terminal plug, a body, contacting means carried thereby, a reversible contact member for engaging the contacting means to form a swivel connection, and means to prevent a disconnecting of the reversible member from the contact means.
3. In a terminal plug, a reversible connecting means having interchangeable insulated end contacts, a tubular contact having a cutout portion, a plurality of individually insulated contacts secured on one side of the tubular contact opposite the cutout portion, and a member adapted to engage the insulated contacts of the tubular contact through the cutout portion to engage them with the contacts of the reversible connecting means.
4. In a terminal plug, a body, a spring contact carried thereby, a reversible member having a shoulder for engaging the contact, and removable means for forcing the spring contact over the shoulder to permit of a swivel connection and to prevent withdrawal of the reversible member.
5. In a terminal plug, a reversible contact member, an electric contacting support engaging a portion of the reversible member, a spring contact carried thereby, and means for causing an engagement of the spring contact with the reversible member to permit rel-

ative rotation between them and to prevent their disengagement.

6. In a terminal plug for use with a terminal jack having contacting means, a tubular contact, a plurality of insulated contacts carried thereby, a reversible member having insulated annular contacts for engaging the tubular contact and the plurality of insulated contacts, and means for engaging the plurality of insulated contacts with the reversible member.

7. In a terminal plug, a body, contacting means carried thereby, a reversible contact member for engaging the contacting means and adapted to be inserted in and make electrical connection with a switchboard jack, and releasable means for maintaining the contacting means in engagement with the reversible contact member.

In witness whereof, I hereunto subscribe my name this 5th day of December, A. D. 1925.

WILLIAM HARRY RAY