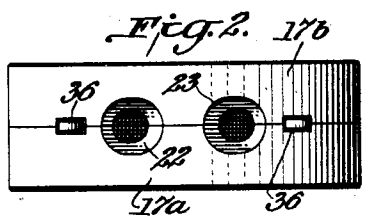
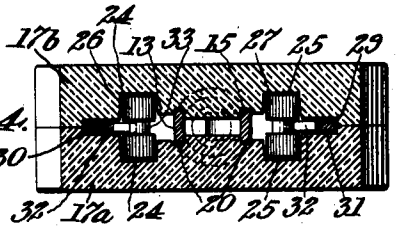
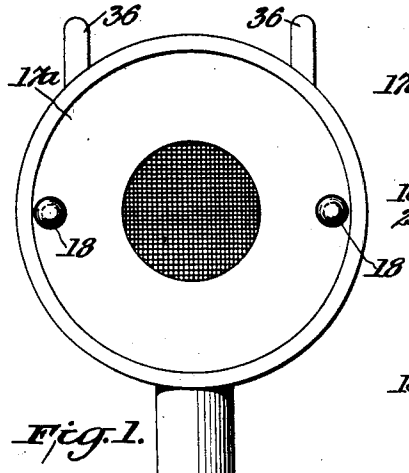
July 9, 1929. E. WESTON 1,720,653

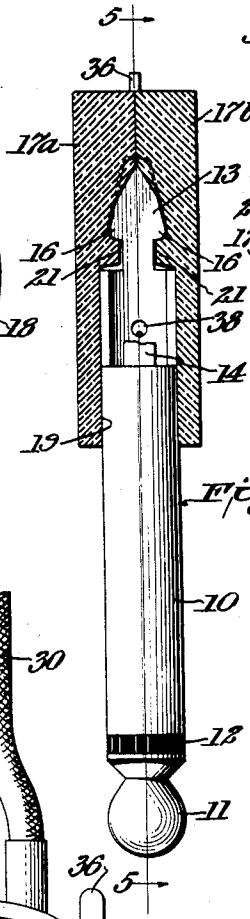
TELEPHONE PLUG CONNECTER

Filed Dec. 21, 1923









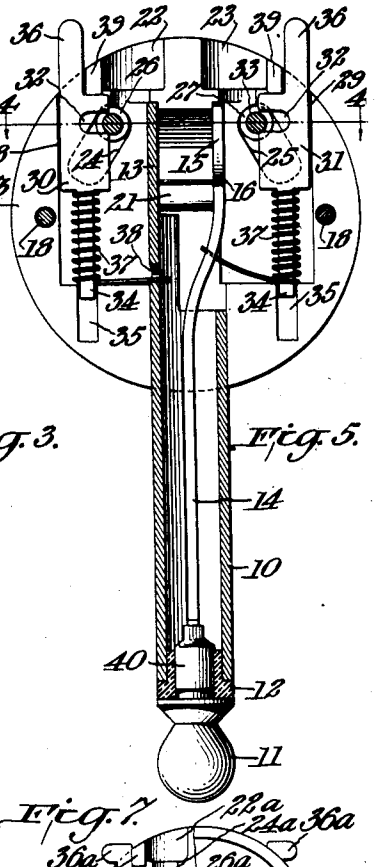
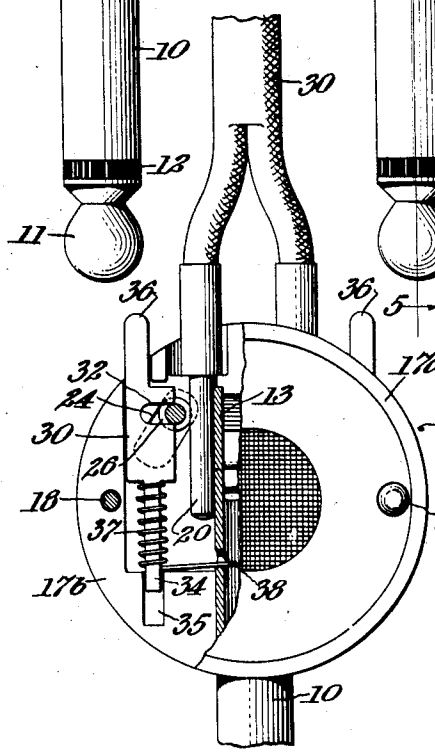


Fig. 1.

Fig. 3.

Fig. 5.



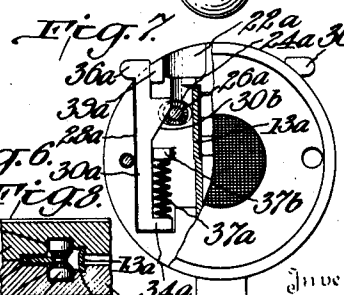
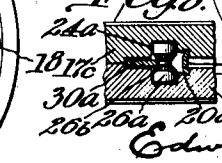


Fig. 7.

Fig. 6.

Fig. 8.



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Patented July 9, 1929. 1,720,653

UNITED STATES PATENT OFFICE.

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TELEPHONE PLUG CONNECTER.

Application filed December 21, 1923. Serial No. 682,115.

This invention relates to electric connecters of the well known telephone plug type.

Connecters of this type comprise the plug proper and mechanism for detachably securing the contact members of the plug to the two wires or leads of the telephone.

Inasmuch as it is often necessary to disconnect the wires from the plug, it is a desideratum that the operation of attaching the wires to the plug and disconnecting them from it be as simple and quick as possible. It is at the same time absolutely essential that the electrical connection be as near perfect as possible and it is also highly desirable that the connection be mechanically positive and reliable.

It is the principal object of this invention to provide a connecter which permits of ready and quick separation of the wires and the plug and at the same time affords a reliable electrical and mechanical connection.

Another object is the provision of a construction of the character which is simple and cheap and does not easily get out of order.

For a full understanding of the invention reference is made to the accompanying drawings in which

Fig. 1 is a plan view of a connecter embodying the invention;

Fig. 2 is an end view thereof;

Fig. 3 is a longitudinal section thereof;

Fig. 4 is a section on line 4—4, Fig. 5;

Fig. 5 is a section on line 5—5, Fig. 3;

Fig. 6 is a fragmentary section on the same line, showing the relative position of certain detail during application;

Fig. 7 is a partly sectional view of a modification; and

Fig. 8 is a sectional view of a detail thereof.

The plug proper consists of a hollow stem 10 which at its inner end, has, preferably integral therewith, a tongue 13 forming a flat contact member for engagement with one of the wire terminals 20 of a pair of telephone leads 30 and the usual knob 11 insulated from the stem by means of an insulating bushing 12. The knob carries a strip of metal 14 which extends through the stem and is co-extensive with the latter and the tongue 13 thereon. A portion of the stem 10 is cut away and the strip 14 is bent outwardly from the center thereof away from the tongue 13 to define a tongue 15 substantially parallel therewith, the distance between the tongues being approximately equal to the diameter of the stem 10. The tongues 13 and 15 have undercut shoulders 16 for a purpose to be more particularly referred to.

The tongues 13 and 15 and a part of the stem are enclosed in an insulating shell composed of two like parts 17^a and 17^b held together by rivets 18. The two parts define in conjunction a bore 19 adapted to have a tight fit about the stem to prevent play. The tongues 13 and 15 are seated in recesses 20 which are separated from the bore 19 by cross bars 21 which in turn form abutments against the shoulders 16 of the tongues 13 and 15. The tongues are thus held against lateral movement and against longitudinal movement and once the two complementary parts 17^a and 17^b of the shell are secured together, the stem including the tongues 13 and 15 is immovable relatively thereto.

The inner surfaces of the parts 17^a and 17^b have complementary recesses 22 and 23 defining entrance openings for the wire terminals and depressions for mechanism adapted to releasably hold the terminals in contact with the tongues 13 and 15 respectively. In depressions 24 and 25 which are disposed at an angle to the stem 10, are mounted rollers 26 and 27 of steel or other suitable metal. The depressions are just wide enough to allow the rollers to roll on the side walls thereof. Laterally of and partly co-extensive with the depressions 24 and 25 are comparatively shallow recesses 28 and 29 accommodating slide pieces 30 and 31 which have slots 32 open toward the rollers. The rollers have circular grooves 33 allowing the reduced portions of the rollers to pass into the slots 32 while the walls of the grooves engage the opposite surfaces of the slide pieces to prevent tilting of the rollers in the slot and consequential binding. One end of each of the slide pieces has a stem portion 34 guided in complementary channels 35 of the parts 17^a and 17^b of the shell and the other ends have extensions 36 projecting out of the shell and forming finger portions. The stem portions 34 are surrounded by coil springs 37 tending to press the slide pieces in the direction of the finger portions 36. The inner ends of the springs are conveniently anchored by passing them into perforations 38 in the stem 10 and strip 14 respectively. This arrangement has the advantage that a second good current connection is established between the terminals and the plug members, since the rollers, the slide

pieces and the springs are in pressure contact with the terminals and the plug members respectively and with each other.

The operation is as follows:

The springs 37 normally push the slide pieces outwardly into limiting positions defined by abutments 39. The rollers 26 and 27 are thus normally kept at the outer end of the depressions 24 and 25. When the terminals are inserted into the openings 22 and 23 they strike against the rollers and pressure is necessary to push them farther in. Under the pressure the rollers tend to roll along the walls of the depressions 24 and 25 respectively. Due to their engagement with the slots 32, the slide pieces are carried along against the tension of springs 37. The rollers and the slide pieces move sufficiently to allow the terminals to pass and the latter are held firmly in contact with the tongues 13 and 15. Return movement of the terminals is effectively prevented by the binding wedge action of the rollers. The gripping action of the rollers is increased by the knurled surfaces thereof.

In order to detach the terminals, it is merely necessary to push the slide pieces inwardly while pulling the terminal outwardly.

The strip 14 is conveniently connected to the knob 11 by means of a tubular stud 40 on the knob. The strip 14 is entered into the stud and the metal of the latter compressed on all sides. This makes a good electrical and mechanical joint.

The rivets 18 are preferably depressed below the surfaces of the shell so that they cannot be reached and the connecter cannot be taken apart. This makes the device substantially fool proof.

A part of the outer surfaces is knurled to afford a non-slip grip, as indicated in Fig. 1.

The modification shown in Fig. 7 is generally similar to the construction shown in Figs. 1–6 and for this reason only so much is disclosed as represents a deviation therefrom.

The roller 26^a has two conical knurled surfaces 26^b converging toward each other and is engaged by an inclined edge 30^b of the slide piece 30^a. This edge overhangs the knurled surfaces and is forced into contact therewith by a compression spring 37^a bearing at one end against an abutment 37^b forming part of one of the component parts 17^c and 17^d of the insulating shell, and bearing, at the other end, against a shoulder 34^a of the slide piece 30^a. The slide piece 30^a is movable lengthwise in a channel 28^a and limited against lateral motion by an abutment 39^a and by the abutment 37^b just mentioned. A grip portion 36^a at the outer end permits manual movement of the slide piece. The tongue 13^a of the plug 10^a is confined in recesses 20^a of the shell members and presents a convexly curved surface toward the roller 26^a. Between the tongue 13^a and the roller 26^a is an interspace so dimensioned that a terminal can enter into it only by force sufficient to move the roller laterally away from the tongue 13^a. The roller has a limited movement between the walls of recesses 24^a in the two parts of the shell and is normally forced toward the walls nearest to the tongue 13^a by the action of spring 37^a which tends to move the slide piece inwardly and causes the inclined edge 30^b to exert a cam action upon the roller 26^a.

When a terminal is pushed into the opening 22^a and strikes against the roller 26^a, the latter yields, in opposition to the action of spring 37^a, sufficiently to permit the terminal to enter to the desired extent. The knurled surfaces, however, partly encompass the terminal and wedge it against the tonue 13^a. This wedging action is very positive due to the cam action of the inclined edge 30^b which forms a small angle with the axis of opening 22^a. Conversely, it would require a very large force to pull out the terminal against the action of spring 37^a exerted through the cam edge 30^b. The tooth action of the knurled surfaces under the influence of cam action mentioned affords a firm grip of the terminal which effectively prevents withdrawal thereof.

While I have shown only one specific arrangement and a modification thereof embodying the invention, it is understood that the invention may find expression in other forms.

I claim:—

1. In an electrical connecter, a support of insulating material, a terminal-receiving recess in said support, a contact element carried by said support, a portion of said element serving as a longitudinal wall of said recess, means yieldingly projected into said recess and adapted to be readily displaced by a terminal as the latter is pushed into said recess and slid along said wall-forming portion of said element, said means being constructed and arranged to wedge the terminal against said wall portion of the element, and means for releasing a terminal from said first means.

2. In an electrical connecter, a support of insulating material, means including a contact element defining a recess for the axial introduction of a terminal, said contact element providing an extended portion of a longitudinal wall of the recess, yielding means projecting into said recess from the side opposite said longitudinal wall and constructed to wedge a terminal against said longitudinal wall upon attempted withdrawal of the terminal.

3. In an electrical connecter, a support of insulating material, a pair of contact elements each having a tongue disposed within said support, said support being recessed adjacent each of said tongues to form therewith a pair of passages for the reception of terminals, spring-pressed means projecting

into said passages from the sides opposite the respective tongues and effective to press the introduced terminals against the respective tongues, and means for releasing the terminals from the action of said spring-pressed means.

4. A connecter of the telephone plug type, comprising in combination with contact elements forming part of the plug, means defining passages for bringing terminals into sliding contact with the contact elements, spring pressed rollers normally projecting into the said passages, means for guiding the rollers obliquely to the terminals and means for moving the rollers out of binding contact with the terminals.

5. A connecter of the telephone plug type, comprising in combination with contact elements forming part of the plug, means defining passages for bringing terminals into sliding contact with the contact elements, spring pressed rollers normally projecting into said passages, guide ways for the rollers, converging in a direction opposite to the entering movement of the terminals and means for moving the rollers out of binding contact with the terminals.

6. A connecter of the telephone plug type, comprising in combination with a plug having electrically separate contact elements, a housing of insulating material containing said contact elements and a portion of the plug, recesses in said housing and portions of said contact elements defining passages for bringing terminals into sliding contact with the said contact elements, spring pressed means movably mounted in the housing to normally project into the said passages and to exert pressure against the terminals at an angle thereto and in a direction opposite to the entering movement thereof, and means for making the spring-pressed means ineffective.

7. A connector of the telephone plug type, comprising in combination with a plug having electrically separate contact elements, a housing of insulating material containing said contact elements and a portion of the plug and having passages for bringing terminals into sliding contact with the contact elements, rollers mounted in the housing for rolling movement in a direction at an angle to the terminals and opposite to the entering movement thereof, spring means for forcing the rollers into contact with the terminals to press the latter against the contact elements and means for making the spring means ineffective.

8. Device according to claim 7 in which the means for making the spring means ineffective comprise members slidably mounted in the housing in directions parallel to the movement of the terminals and means thereon for moving the rollers out of engagement with the terminals, the sliding members having finger pieces extending out of the casing.

9. Device according to claim 7 in which the means for making the spring means ineffective comprise members slidably mounted in the housing in directions parallel to the movement of the terminals and provided each with a slit disposed at an angle to the direction of movement of the corresponding roller and adapted to receive the same and means on the member and the roller for movably maintaining the latter in a position at right angle to the slide plane of the member.

10. Device according to claim 7 in which the means for making the spring means ineffective comprise members slidably mounted in the housing in directions parallel to the movement of the terminals and provided each with a slot disposed at an angle to the direction of movement of the corresponding roller and adapted to receive the same and means including circular grooves in the roller substantially midway between the ends thereof, engaging the walls of said slot.

11. A connecter of the telephone plug type, comprising in combination with two substantially parallel contact elements forming part of the plug and terminals to be connected thereto, means defining two parallel passages having as portions of the walls thereof the contact faces of said elements, spring actuated means movable in paths obliquely to said passages and normally projecting into the passages in a direction opposite to the entering movement of the terminals and means for making the spring actuated means ineffective.

12. A connecter of the telephone plug type, comprising a hollow sleeve terminating at its inner end in a flat contact member, a knob carried by and insulated from the outer end of said sleeve, a conducting strip secured to said knob and passing through said sleeve, said strip terminating in a flat contact member, a housing of insulating material enclosing said contact members, said housing being recessed adjacent said members to provide two terminal receiving passages, and means in said passages for holding terminals against the respective contact members.

13. The invention as set forth in claim 12 wherein said flat contact members form extended portions of the walls of the adjacent passages, and the said means project into the respective passages from the sides opposite the said contact members.

14. A connecter of the telephone plug type, including as part a housing of insulating material, composed of two symmetrical halves placed face to face and having in the opposing faces a plurality of like recesses cooperating to define parallel passages for terminals, passages directed obliquely thereto and passages extending parallel to said parallel passages and intersecting the oblique passages.

15. An electrical connecter of the type com-

prising a support of insulating material, a pair of contact elements each of which has a portion disposed within said support, said support being recessed adjacent each of the said portions of the contact elements to form therewith a pair of passages for the reception of terminals, the said contact element portions forming sections of the longitudinal walls of the respective passages, cam elements and yielding means for projecting said cam elements into the respective passages from the sides opposite the said longitudinal wall sections formed by said contact elements for maintaining in contact therewith terminals introduced axially of the said passages.

16. The invention as set forth in claim 15, in combination with means for releasing said terminals from said locking cam elements.

In testimony whereof, I affix my signature.

EDWARD WESTON.