May 9, 1939. F. L. REESE 2,157,919

TWIN CONTACT PLUG

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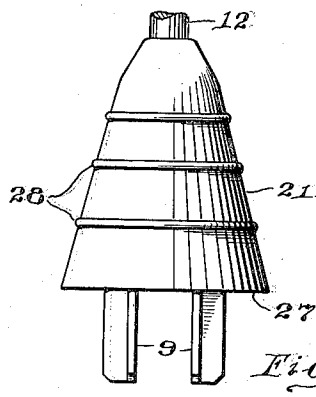


Fig. 1.

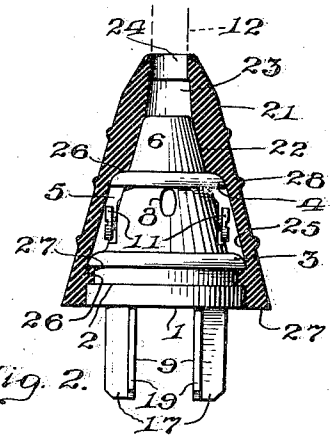


Fig. 2.

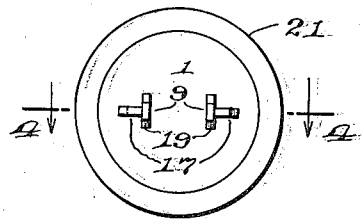


Fig. 3.

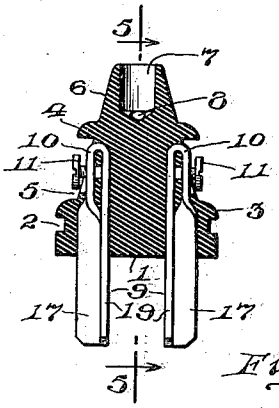


Fig. 4.

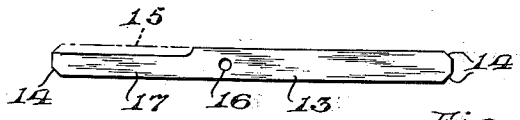


Fig. 6.

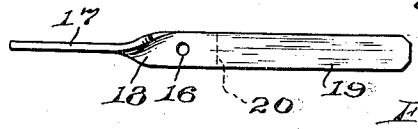


Fig. 7.

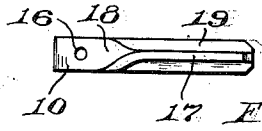


Fig. 8.

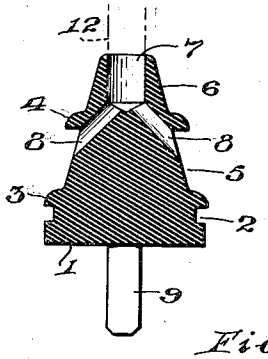


Fig. 5.

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2,157,919

TWIN CONTACT PLUG

Frank L. Reese, Philadelphia, Pa.

Application April 5, 1937, Serial No. 135,017

4 Claims. (Cl. 173—361)

The object of the invention is to provide improvements in electrical plug contacts, and more especially in that type which is primarily designed for industrial use, though it is obviously adapted for domestic use as well.

Further objects are to provide a plug in which the terminals are completely covered by an insulating jacket; to provide a plug in which the body portion is of yielding material such as rubber, to permit the terminals to move slightly with respect to each other, in order to conform to various irregularities in receptacles; to provide a body member into which a plurality of wires enter together, but within which body member said wires diverge through the opposite sides, after which the end portions of such wires extend circumferentially before engaging the contact elements to which they are secured; to provide a body member having a peripheral groove in which are positioned the usual wire-attaching portions of the contact elements; to provide upon the opposite sides of such groove a plurality of ridges or beadings having oppositely directed surfaces; to provide an elastic preferably tapering sleeve for said body member also having an internal groove, the opposite sides or walls of which engage the oppositely directed surfaces of said beadings; to provide said body member with a peripheral groove and said sleeve with a beading adapted to normally enter said last-mentioned groove, to prevent accidental longitudinal shifting of said sleeve with respect to said body member; to provide a one-piece contact element, formed from a strip of metal of substantially uniform width, and bent to form a T-shape in cross section; and to provide further details as will hereinafter appear.

Having these objects in mind, the invention comprises additional details of construction and operation, as hereinafter fully brought out in the following description, when read in conjunction with the accompanying drawing, in which Fig. 1 is a side elevation of a contact plug comprising one embodiment of the invention; Fig. 2 is a side elevation of the internal body member of the same with the surrounding elastic sleeve shown in longitudinal section; Fig. 3 is a bottom plan view of the same; Fig. 4 is a section of the conical member only on the line 4—4 of Fig. 3; Fig. 5 is a section on the line 5—5 of Fig. 4; Fig. 6 is a plan view of a ribbon-shaped blank from which each of the contact elements is formed; Fig. 7 is a similar view showing one end portion of said blank twisted at substantially 90° with respect to the remaining portion of the same; and Fig. 8 is a similar view of the finished contact element after it has been bent into a U-shape with its adjacent end portions in T-shaped cross-sectional relation.

Referring to the drawing, a substantially conical body member 1 is provided, the outer surface of the forward portion of which is provided with a circumferential groove 2, the rear side of which groove is defined by an annular beading 3, which with a second annular beading 4 spaced rearwardly of and extending parallel with said first beading, forms a circumferential channel 5. The rearmost conical end portion 6 of said member is provided with an axial inwardly extending relatively large cylindrical recess 7, from which extend diagonally forwardly in V-shaped relation a pair of diverging conduits 8, which communicate with said channel upon substantially the opposite sides of said body member.

A pair, or in fact any number of contact elements 9, extend freely forwardly from the outer face of the body member 1, and are so molded therein that their rear looped portions 10 emerge into and are accessible within diametrically opposite portions of the channel 5, at points circumferentially spaced with respect to the forward portions of the respective conduits 8. Thus far it will be noted that the said contact elements may be of any desired shape, though in each case they are provided with some form of means such as the screws 11, for detachably securing to such elements bared portions of electrical conductors, which from such attaching means extend approximately one-quarter of the circumference of the channel 5, before they enter the rearwardly converging conduits 8 and unite in the recess 7, which is designed to be closely filled by the insulating covering of a conductor cable, or the like, as indicated by the dot-and-dash lines 12.

This arrangement of angularly directed portions of the conductors (not shown) in the channel 5, removes the strain of all outward pull upon either or both of said conductors from their connection with the contact elements 9—11.

As hereinbefore mentioned, the invention further comprises an improved contact element which is preferably formed from an initially flat ribbon blank 13 of suitable metal, the opposite corners 14 of each end of which may be tapered, if desired. As shown in Fig. 6, one lateral edge portion, indicated by the dot-and-dash line 15, is preferably cut away to a depth substantially equal to the thickness of said blank, while a properly positioned hole 16 is punched or drilled through said blank and tapped to receive one of

the binding screws 11. The tapped hole 16 is preferably nearer to one end portion 17 of said blank than to the other, and this end of the blank, from which a lateral edge portion has been removed, is then twisted at 18 at an angle of substantially 90° with respect to the opposite untwisted portion 19, which continues to lie in the initial plane of said blank. The blank is then loosely bent about the dot-and-dash line 20 to form the looped portion 10, hereinbefore referred to, so that the initially oppositely extending free end portions of said blank are thereafter in juxtaposition, as clearly indicated in Fig. 3, wherein the flat end portion 19 remains preferably straight or rectilinear, while the resulting edge of the cut-away end 17 of said blank lies flat against the transverse center of the opposite end portion of the resulting contact element, substantially as shown in Figs. 3 and 4. One or more of these contact elements are preferably molded in the insulating material of the body member 1, which latter is preferably composed of elastic material, such as rubber, with the result that the free end portions of said contact elements are thereafter able to move laterally within certain limits, with respect to each other, in order to accommodate their positions to the frequently irregular dimensions of receptacles into which they are inserted.

In order to effectually cover and protect the electrically energized portions of the device, other than the forwardly extending portions of said elements, a preferably conical sleeve 21 is also formed of rubber, or similar elastic material, and comprises an axial bore 22, adapted to fit closely about the rear-most portion of the body 1, said bore to the rear of said body member being substantially cylindrical at 23, and thence opening rearwardly through a slightly restricted aperture 24. The interior of said sleeve is provided with a transversely elongated circumferential groove 25, defined between opposite walls 26 and 27, which are normally positioned upon and directly engage the opposite sides of the beadings 3 and 4, to prevent the accidental removal of said sleeve from said body member, while said sleeve thereby completely encloses the channel 5, to protect the exposed circumferentially extending portions of wires entering said channel by way of the conduits 8, as well as the energized screws or similar attaching means 11, and exposed portions of the loops 10 of said contact elements.

As shown in Fig. 2, the radially inwardly directed beading 26 enters the groove 2 of the body member, while the forward surface 27 of said sleeve is preferably in the same plane as the forward surface of the said body member, in order that the assembled device as a whole will snugly and substantially uniformly engage the adjacent surface of a receptacle to which it may be attached, and thereby still further prevent any possible contact between the fingers or other portions of an operator or his wearing apparel with otherwise exposed energized portions of the improved plug, or with such receptacle. This condition is further insured by reason of the slightly constricted aperture 24 of said sleeve, closely binding against the insulated covering 12 of a conductor cable, since it is intended that such cable insulation entirely unbroken shall extend as far as possible, not only into the bore of said sleeve, but also to the innermost portion of the recess 7 in said body member. The exterior of the sleeve may be of any desired shape, but preferably carried one or more integral circumferentially extending ridges or other irregularities, 28, to facilitate manual gripping and removal of the plug as a whole from or insertion of the same into a receptacle.

Furthermore, in interpreting the appended claims, it is to be understood that the particular form of the device hereinbefore described, and illustrated in the accompanying drawing, is merely illustrative of one embodiment of the invention, and that said invention is capable of being modified in many ways, as to the exact details of its construction and operation, without departing from the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent of the United States is:—

1. A contact plug, comprising a rearwardly tapering conical body member composed of resilient insulating material and provided with a circumferential channel formed between a pair of annular beadings having rearwardly directed curved surfaces, a contact element extending freely from the forward portion of said member and emerging rearwardly into said channel, a conduit extending from the rear of said body member into said channel at a point circumferentially spaced from the adjacent portion of said element, and an elastic sleeve having a conical bore throughout the major portion of its longitudinal extent and provided with a circumferential groove defined between walls that fit over and engage the opposite sides of said beadings, to enclose said channel and prevent the accidental separation of said sleeve from said member.

2. A contact plug, comprising a rearwardly tapering conical body member composed of resilient insulating material and provided with a circumferential channel formed between a pair of annular beadings having rearwardly directed curved surfaces, a contact element extending freely from the forward portion of said member and emerging rearwardly into said channel, a conduit extending from the rear of said body member into said channel at a point circumferentially spaced from the adjacent portion of said element, and an elastic sleeve having a conical bore throughout the major portion of its longitudinal extent and provided with a circumferential groove defined between walls that fit over and engage the opposite sides of said beadings, to enclose said channel and prevent the accidental separation of said sleeve from said member, the rear end portion of said conduit being enlarged to closely receive and grip the insulating covering of a conductor entering said sleeve through a centrally positioned restricted aperture in the adjacent portion thereof, and the curvature of said beadings being operative to facilitate the attachment of said sleeve to said body member.

3. In a contact plug, a contact element comprising a single metallic ribbon, one end of which is twisted substantially ninety degrees with respect to the other end portion, and reversely bent into substantial parallelism therewith, to form an element of substantially T-shaped cross section, one edge of said twisted portion being slightly cut away, in order that the width of the remainder of said twisted portion plus the thickness of the opposite portion will substantially equal the width of said opposite portion.

4. A contact plug, comprising a body member

having a conical surface and provided with a pair of annular beadings having curved rear surfaces and defining between them a peripheral groove, one of said beadings being diametrically larger than the other, a pair of contact elements extending freely from the forward end of said member and emerging rearwardly in said groove, a pair of divergent conduits extending from the rear of said member and opening into said groove at points circumferentially spaced with respect to the adjacent portions of said elements, and an elastic sleeve having a conical bore provided with a circumferential groove between walls which engage the opposite sides of said beadings, to enclose said groove and prevent the accidental removal of said sleeve from said body member, and a flange substantially flush with the plane of the forward face of said body member and spaced from the larger of said beadings, to provide a circumferential groove into which said sleeve resiliently extends.

FRANK L. REESE.