May 31, 1927. 1,630,936

C. E. GODLEY

ELECTRIC FITTING

Filed April 10, 1924

Fig. 1

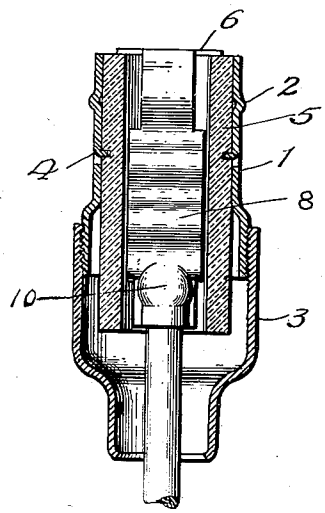


Fig. 3

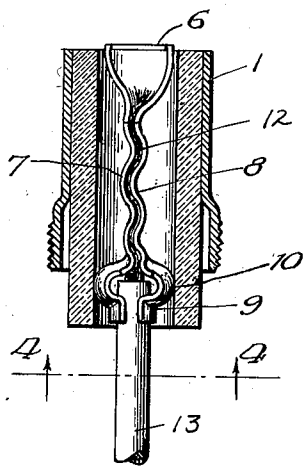


Fig. 2

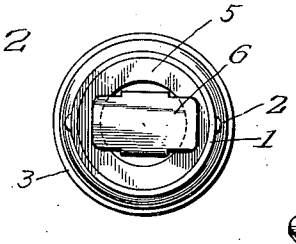


Fig. 4

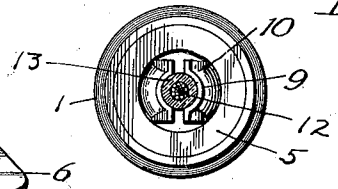
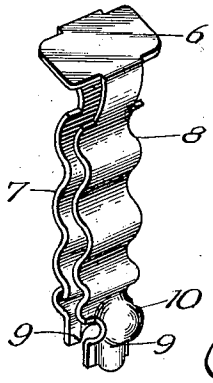


Fig. 5



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UNITED STATES PATENT OFFICE.

CHARLES E. GODLEY, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO C. M. HALL LAMP COMPANY, A CORPORATION OF MICHIGAN.

ELECTRIC FITTING.

Application filed April 10, 1924. Serial No. 705,457.

My invention relates to electric fittings of the kind commonly employed as sockets or connectors and more particularly to a simplified construction in which a single and cheaply manufactured single-piece member affords both a contact head and a wire terminal. For this purpose, my invention provides an electric fitting in which such a single-piece contact and wire-terminal member is arranged for affording a firm grip on the free end of the wire associated therewith, in which this grip kinks and desirably flattens the core of the wire so as to afford cooperating contact surfaces of large area, in which a portion of the said member also clamps the unremoved insulation on the wire so as to relieve the uninsulated tip portion of the wire of mechanical strains, and in which the said gripping and clamping portions of the combined contact and wire-terminal member are automatically forced into their said operative relation to the different portions of the wire by the mere insertion of these parts into an insulating housing of a suitable size.

In one of its immediate commercial applications, my invention is particularly suited for the construction of wire terminal plugs or the like of the kind in which an insulating body member has a metal contact portion exposed on its front end and has current supplied to it by a wire entering the bore of this insulating body member from the rear thereof. For this purpose, my invention provides a metal member having a head portion adapted to be disposed upon the front end of a hollow insulator and having a pair of rearwardly extending resilient arms adapted to be forced towards each other by the insertion thereof into the bore of the insulator from the front end of the latter. It also provides for forming these arms so that cooperating portions thereof will crinkle an interposed portion of a wire and will flatten such a wire portion if the latter is composed of a number of strands after the manner customary with flexible wires or cables. Furthermore, my invention provides the rear ends of the said resilient arms with jaw portions adapted to afford a clamping grip on an interposed part of the wire from which the insulation has not been removed, thereby causing these jaws to dig into the insulation so as to resist any rearward pulling strain on the wire and to prevent such strain from coming on the more forward and uninsulated wire portion. My invention also provides the resilient arms of the combination wire terminal and contact member with its said insulation-clamping jaws so formed as to prevent their cutting the insulation. Still further and also more detailed objects of my invention will appear from the following specification and from the accompanying drawings, in which

Fig. 1 is a central and longitudinal section through a connector plug embodying my invention and having its casing formed of a metal shell housing the forward part of the insulating body and a rear cap threaded on this shell.

Fig. 2 is a top view of the same connector plug.

Fig. 3 is a central and longitudinal section taken at right angles to that of Fig. 1, with the cap of the casing removed.

Fig. 4 is a view taken from the bottom of Fig. 3.

Fig. 5 is a perspective view of the combined contact and wire terminal member of the same embodiment.

In the illustrated embodiment, I am showing a connector plug of a kind suitable for use in connection with the lighting circuits of automobile lamps. This has as its casing a metal shell 1 provided with the usual oppositely directed lateral projections 2 for interlocking with the customary bayonet slots on the shell of a standard type of socket or connector and which has its rear head threaded to match the threading on the forward end of a rear cap 3. Anchored in the forward casing portion 1, as for example by inwardly directed fingers 4 formed from the said shell is an insulated body consisting of a tube 5 of hard rubber or the like, which insulator serves as a support for the single-piece metal contact member and wire terminal of my appliance.

This combination member is desirably made of resilient sheet metal (such as bronze) and is here shown as comprising a medial head 6 connecting two arms of such width that their edge portions will be engaged by the wall of the said bore in the insulator so as to be forced towards each other when the said arms are slipped into the bore.

In assembling such a connector, this combination metal member is initially left detached from the tubular insulator and the wire is shoved through the bore of this insulator from the rear end of the latter after the insulation 13 has been stripped off the wire for a suitable distance from the end of the latter. Then the stripped wire core portion is inserted between the said corrugated arm portions of the said metal member and the two arms are pressed towards each other digitally so as to permit the rear ends of the arm to be inserted in the bore of the insulator from the front of the latter. On then sliding the said metal member rearwardly by pressure exerted on its head portion 6, the engagement of the arms with the wall of the bore in the insulator will press these arms forcibly against the interposed bare wire 12, and if this bare wire portion is stranded, the force thus exerted will readily spread out the strands so as to cause the clamping arms to engage a large number (if not all) of the constituent wires of the strand. By thus spreading the wires composing the strand, I secure contact surfaces of large area and correspondingly large carrying capacity, and by forming the repeated kinks in the wires I effectively anchor them so as to prevent their being pulled out of my wire terminal by a rearward pull on the wire.

However, while a high carrying capacity is thus secured, the strength of the separated component wires of the strand might not be adequate for resisting an unusual rearward pulling strain on the wire, and if the forward end of the insulation on the wire is left free, this is apt to unravel and to slip back so as to present an unsightly appearance. I therefore desirably also provide this metal member with portions adapted to engage the more rearward part of the wire from which the insulation on the wire is unremoved. For this purpose I am here showing the extreme rear ends of the arms 7 and 8 as formed into clamping jaws 9 which spread further apart than the main corrugated portions of the arms when the plug is assembled and which jaws are desirably connected to the said main portions of the arms by outwardly bowed portions 10 also adapted to engage the bore of the insulator. These bowed portions preferably are curved in transverse cross-section as shown in Figs. 4 and 5, so as to present smooth surfaces to the bore of the insulator, thereby preventing their edges from biting into the insulator. To prevent the jaws 9 from cutting the insulation, I desirably concave them towards each other after the manner shown in the drawings, thereby causing them to cooperate in gripping a considerable peripheral portion of the insulation.

With the various parts of my said combination metal member suitably proportioned with respect to the size of the wire and the diameter of the bore in the insulator, I can readily secure a firm gripping of both the uninsulated terminal wire portion and an adjacent portion of the insulation on the wire, such a firm gripping being secured when the parts are assembled in the above described manner even by an inexperienced person. When thus assembled, the tight fit of the clamping arms within the bore of the insulator cooperates with the resiliency of the arms in firmly anchoring these parts in position, so that the assembled plug can readily be handled as a unit, although it includes no binding screws or other auxiliary fastening elements and no soldering for securing either this rigidity of connection or the desired ample carrying capacity. Moreover, since the combination metal member as above described can readily be manufactured by simple punch press operations, its cost is quite low; and since a simple insulating tube serves for the insulating body of the connecting body of the connector plug, the entire appliance is unusually low in cost.

However, while I have heretofore described my invention in a particular embodiment including a two-part shell as its housing, I do not wish to be limited to this or other details of the construction and arrangement here disclosed, it being obvious that the same might be modified in many ways without departing either from the spirit of my invention or from the appended claims.

I claim as my invention:—

1. A fitting for detachedly connecting a socket with a wire which has the insulation stripped for its end, comprising a shell having means thereof for interlocking it with the socket; an insulator mounted in the shell and having a smooth bore extending longitudinally through it, and a metal wire terminal comprising in the integral formation a head larger than the said bore and normally engaging the front end of the insulator and a pair of rearwardly directed integral jaws normally spread apart by their own resiliency and forced toward each other by the engagement of the jaws with longitudinally spaced portions of the wall of the said bore when the jaws are slid into the bore from the front end of the bore; the wire having its said insulation free and extending into the bore and between the jaws from the rear of the insulator and tightly clamped between the jaws through the said forcing of the jaws towards each other.

2. In an electric fitting, an insulator having a smooth bore extending longitudinally through it, a metal wire terminal having a head larger than said bore and having this head normally extending across the front of the insulator; the terminal having a pair

of integral jaws normally spread apart by their own resiliency, the said jaws having two pairs of portions adapted to engage longitudinally spaced parts of the bore of the insulator and to be forced toward each other by such engagement when the jaws are slid into the bore from the front of the insulator, and two transversely corrugated portions interposed respectively between the said two longitudinally spaced portions of the jaws; and a wire having an uninsulated end portion extending between the jaws from the rear of the latter and clamped between the corrugated portions of the two jaws by the said forcing of the jaws toward each other, so that the corrugations of the jaws correspondingly kink the said uninsulated portion, the jaws also having opposed rear end portions adapted to grip the insulation on the wire for preventing a rearward withdrawal of the wire from the jaws.

3. An electric fitting as per claim 2, in which the jaws have opposed and substantially hemispherical portions interposed between their said rear end portions and their corrugated portions, the said hemispherical portions engaging the bore of the insulator to force the jaws toward each other.

4. A detachable plug for electric fittings, comprising a metal shell, an insulator mounted on the same and having a cylindrical bore, an insulated wire extending into the said bore from the rear end of the insulator, and a single-piece substantially U-shaped wire terminal; the said terminal being formed from a strip of flat sheet metal provided at its center with a pair of lateral wings so as to make the width of the central portion considerably greater than the diameter of the said bore, the parts of the strip between the said central portion and is ends being somewhat narrower than the said diameter; each end of the strip having its end portion arched longitudinally of the strip and being provided with a relatively higher dome-like formation adjacent to its arched end, the said arched portions and dome-like formations being all convexed in the same direction in the initial strip and the parts of the strip between the central portion and the dome-like formations being provided with transverse corrugations, the strip being then bent into a U-shaped formation with its central portion substantially at right angles to the remaining portions to form the shanks of the U; the wire being stripped of its insulation to present a bare wire portion of less length than the said shanks, and having its said bare wire portion disposed between the said corrugations and having its adjacent insulated portion disposed between the said arched ends; the U-shaped terminal thereafter forced rearwardly into the bore of the insulator until the wings of its central portion engage the forward end of the insulator; the height of the dome-formations above the arched ends being such that the engagement of the dome formations with the bore of the insulator forces the said arched ends into gripping relation to the insulated wire portion disposed between these ends and also forces two corrugations toward each other so as to crimp and grip the bare wire portion between them.

5. An electric fitting as per claim 2, in which the jaws are provided between their said rear end portions and their corrugated portions with oppositely directed projections engaging the bore of the insulator to force the jaws towards each other when the said jaws are inserted in the bore, and in which the jaws are reduced in width between the corrugated portions of the said head so as to increase the flexibility of the jaw portions adjacent to the head.

Signed at Detroit, Michigan, April 2nd, 1924.

CHARLES E. GODLEY.