

H. R. SARGENT.
ATTACHMENT PLUG.
APPLICATION FILED JULY 14, 1915.

1,187,657.

Patented June 20, 1916

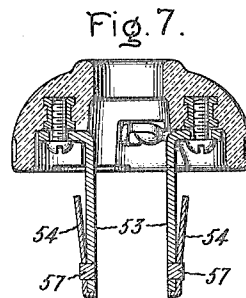
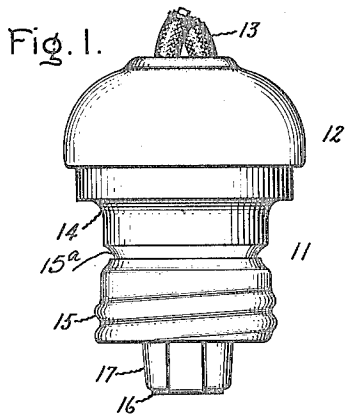


Fig. 2.

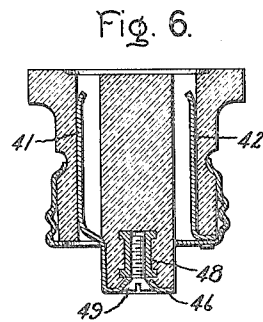
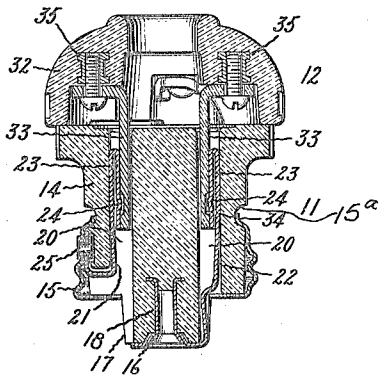


Fig. 8.

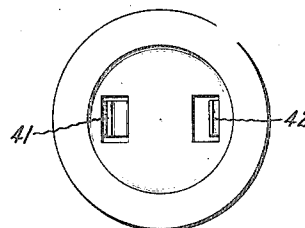


Fig. 9.

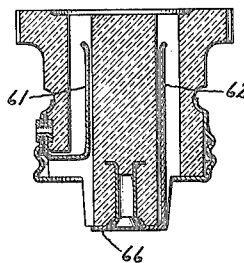


Fig. 5.

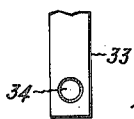


Fig. 4.

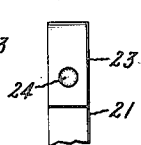
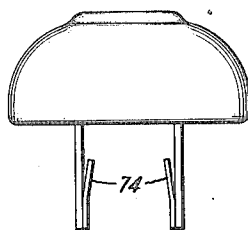


Fig. 10.



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UNITED STATES PATENT OFFICE.

HOWARD R. SARGENT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ATTACHMENT-PLUG.

1,187,657.

Specification of Letters Patent.

Patented June 20, 1916.

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To all whom it may concern:

Be it known that I, HOWARD R. SARGENT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Attachment-Plugs, of which the following is a specification.

My invention relates to attachment plugs and connectors such as are used for making electric circuit connections, and it is especially concerned with devices of the separable plug type and with the connection between the separable devices or elements.

The invention comprises various novel features and details of construction and combinations and arrangements of parts that can best be presented by the description of particular devices embodying them in the most advantageous forms at present known to me. Some of the devices described are substantially the same as those disclosed in my application, Serial No. 876,433, filed December 10, 1914, attachment plug, of which this application is in part a continuation.

Many advantages obtainable in connection with the invention will appear from this description,—such as simplicity and ruggedness of construction, neatness of appearance, and ease and cheapness of manufacture,—while its scope will be indicated in my claims.

In the accompanying drawing, Figure 1 is a side view of a complete connector device embodying my invention, this device being of the separable plug type. Fig. 2 is a mid-sectional view of the device shown in Fig. 1. Fig. 3 is a view of the device of Fig. 1 as it appears from beneath. Figs. 4 and 5 are fragmentary side views of corresponding sides of contact members shown in Fig. 2. Figs. 6 and 7 are mid-sectional views of the separable parts or elements of a modified form of plug device. Fig. 8 is a plan view of the part shown in Fig. 6. Fig. 9 is a mid-sectional view of a modified part corresponding to that shown in Fig. 6. Fig. 10 is a side view of a modified part corresponding to that shown in Fig. 7 and adapted for use with that shown in Fig. 9.

The attachment plug shown in Figs. 1, 2, 3, 4 and 5 comprises a base or plug element proper 11 adapted for insertion in an incandescent lamp socket or receptacle and an element 12 (conveniently termed the "cap" element) adapted to be secured to the con-

ductor cord or cable 13. The base element 11 comprises a body structure 14 (see Fig. 2) shown as consisting of a single piece of compound or other insulating material. On the lower end of this integral unitary body 14 is a shell 15 which is secured by having its upper edge rolled, spun, or otherwise pressed over the shoulder at its edge into an exterior circumferential groove 15^a in said body. As the plug shown is intended for a socket or receptacle of the Edison screw type, the shell 15 is a screw-threaded contact or terminal shell. A center contact or terminal 16 on a reduced lower portion 17 of the body 14 is secured to an anchor piece 18 consisting of a flanged sleeve molded and embedded in the material of the body. As shown, a rivet portion of the tubular anchor piece 18 is expanded or headed over on the center contact 16 for this purpose, by a spinning or other operation.

In the insulating body 14 are narrow rectangular openings 20, 20 (see Figs. 2 and 3) shown as of uniform width and size and as extending from end to end completely through said body. In these openings 20, 20 are contact members 21, 22 that lie flat against their corresponding (outer) sides. These contact members 21, 22 are in the form of narrow strips of phosphor bronze, or other springy metal, and they extend nearly to the upper ends of the openings 20, 20 and are then bent or folded back substantially flat on themselves. The retroverted ends 23, 23 of the metal strip contact members 21, 22 serve as resiliently yielding contact portions and have embossed on their faces very slight rounded projections 24, 24 (see Figs. 2 and 4) for interlocking with the "cap" contact members as hereinafter described. Near the lower end of its opening 20 the contact strip 21 is bent around U-fashion in a groove in the insulating material so as to lie against the plain portion of the shell 15 (between its screw threads and its spun over upper edge), where it is secured and electrically connected to said shell by a tubular rivet 25. The contact member 22, likewise, is directly attached and electrically connected to the center contact or terminal 16 (shown as consisting of its enlarged end), and is bent so as to come against the body portion 17 and also bent or offset where it enters its opening 20,—the bottom portion of the shell 15 being cut

away so as to insure against short circuiting at this latter point. Turning of the shell 15 on the body 14 is prevented by engagement between the body and the bottom of the shell, by means of protuberances 26 on the body portion 17 which lie in notches 27 in the shell bottom, as well as by the contact member 21.

The "cap" element 12 comprises a cap structure proper 32 (see Fig. 2) shown as a single piece of compound, or other insulating material, and a pair of thin, flat, relatively rigid metal strip contact members 33, 33 projecting downward from it. The cap contact members 33, 33 are so spaced and arranged that they lie flat against corresponding (inner) sides of the openings 20, 20 (the drawing shows a distinct clearance in order to avoid confusion) so that when introduced into said openings the ends of said cap contact members cannot displace the body contact members 21, 22 or fail to pass them properly. For receiving the projections 24, 24 on the body contact members 21, 22, the cap contact members 33, 33 (see Fig. 5) have socket means in the form of very shallow circular depressions 34, 34 (their depth is somewhat exaggerated on the drawing for the sake of clearness) on their outer sides, and said contact members 33, 33 are of such thickness that they substantially fill the space between the inner sides of the openings 20, 20 and the contact portions 23, 23 of the body contact members 21, 22. The body contact members 21, 22 are so proportioned that when the cap contact members 33, 33 are pushed home in the openings 20, 20 the engaging portions 23, 23 of the former can be momentarily deflected enough to allow a yielding interlocking of cap and body contact members by engagement of the projections 24, 24 in the sockets 34, 34. The contact members 33, 33 are secured to the cap structure 32 by means of screws engaged in double flanged nut pieces 35, 35 molded and embedded in the material. The configuration of the cap structure 32 and the provisions for connecting the conductors of the cord 13 to the contact members 33, 33 require no departure from common practice and so need not be described in detail.

The base element shown in Figs. 6 and 8 differs from that already described principally in that the body contact members 41, 42 are merely strips lying flat against corresponding (outer) sides of the body openings with their upper ends slightly bent inward toward one another. The anchor piece 48 is shown as an internally threaded flanged sleeve or nut member molded and embedded in the insulating material, and the center contact 46 is secured to this tubular anchor piece by means of a screw 49 threaded therinto. The lower end of the contact member 42 is merely bent at right

angles in a groove in the insulating material and riveted to the screw shell bottom. The corresponding cap element shown in Fig. 7 has downward projecting metal strip contact members 53, 53, and these contact members have on their outer sides resiliently yielding contact portions 54, 54 extending from their outer ends back toward the cap structure substantially flat against the main portions of said contact members. The contact portions 54, 54 (which correspond to the contact portions 23, 23 of Fig. 2) consist of thin, springy, strips of phosphor bronze, cold rolled brass, or other metal, and they are riveted at 57, 57 to tolerably thin but rigid flat metal strips that form the main portions of the cap contact members 53, 53. The ends of the spring strips 54, 54 are bent across those of the rigid strips to prevent the former from turning on the rivets 57, 57 with reference to the latter.

The other modified base element shown in Fig. 9 differs from that of Figs. 6 and 8 in that the metal strip contact members 61, 62 are at the inner adjacent sides of the body openings and that the center contact 66 is secured to the body just as the center contacts 16 of Figs. 1, 2 and 3 is secured. The corresponding cap element shown in Fig. 10 differs from that of Fig. 7 in that the springy contact strips 74, 74 of the contact members are at the inner adjacent sides of the rigid strips and are merely soldered, brazed, or welded to them.

Obviously the "cap" connector devices shown in Figs. 1, 2, 7 and 10 can be used with suitable fixed wall receptacle base elements or devices and the like, as well as with the plug devices shown in Figs. 1, 2, 6 and 9.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electrical connector consisting of a base element comprising an integral unitary body with narrow longitudinal openings of uniform width, a center contact secured on one end of said body and a metal strip contact member in one of said openings directly attached to said center contact, a shell contact secured on the same end of said body as said center contact, and a metal strip contact member in the other opening secured at the same end of said body and in electrical connection with said shell contact, said contact members extending toward the other end of said body flat against corresponding sides of said openings; and a cap element separable from said base element and comprising a cap structure and thin, flat contact members projecting therefrom and adapted and arranged to enter said openings flat against corresponding sides thereof and substantially to fill the space between said sides and said base contact members; the

contact members of one of said elements having resiliently yielding contact portions extending from their outer ends back toward their point of attachment substantially flat against their main portions.

2. An electrical connector consisting of a base element comprising an integral unitary insulating body with narrow longitudinal openings of uniform width, a shell contact and a center contact secured on one end of said body, spring contact strips in said openings attached, independently of said body, one to said shell contact and one to said center contact, said contact strips extending toward the other end of said body flat against corresponding sides of said openings and being bent back flat upon themselves so as to extend back toward the end of said body where they are attached as aforesaid, and having slight projections on the outer sides of their retroverted portions; and a cap element comprising a cap structure and thin, flat contact members projecting therefrom, said members being adapted and arranged to enter said openings flat against corresponding sides thereof, and being of such thickness as substantially to fill the space between said sides and the retroverted ends of said spring contacts, and having socket means for receiving and interlocking with said projections on said retroverted ends of said spring contacts.

3. A separable attachment plug base element comprising an integral unitary insulating body with narrow longitudinal openings of uniform width; a center contact secured on one end of said body and a spring contact strip in one of said openings directly attached to said center contact; a shell contact secured on the same end of said body as said center contact; and a spring contact strip in the other opening secured at the same end of said body and in electrical connection with said screw shell; said contact strips extending toward the other end of said body flat against corresponding sides of said openings and being bent back flat upon themselves so as to extend back toward the end of said body where they are attached as aforesaid.

4. A separable attachment plug base element comprising an insulating body having longitudinal openings and an exterior circumferential shoulder; a screw shell contact on one end of said body with its edge pressed over said shoulder; a spring contact strip in one of said openings secured to said screw shell; a tubular anchor piece embedded in the end of said body on which is said screw shell; a center contact on the same end of said body secured to said anchor

piece; and a spring contact strip in the other of said openings secured to said center contact.

5. A separable attachment plug base element comprising an insulating body having longitudinal openings and an exterior circumferential groove; a screw shell contact on one end of said body having a plain upper portion with its edge pressed into said groove; a spring contact strip in one of said openings bent back on itself and riveted to said plain portion of said shell; a center contact on the same end of said body as said screw shell; an anchor piece embedded in said body and riveted over on said center contact; and a spring contact strip in the other opening secured to said center contact.

6. A separable attachment plug base element comprising an integral unitary insulating body having longitudinal openings and an exterior circumferential shoulder; a screw shell contact on one end of said body having a bottom portion so engaged with said body as to prevent said shell from turning with reference thereto and a plain upper portion with its edge pressed over said shoulder; a spring contact strip in one of said openings bent back on itself and secured to said plain portion of said shell; a center contact on the same end of said body as said screw shell; and a spring contact strip in the other of said openings secured to said center contact.

7. A separable attachment plug base element comprising an integral unitary insulating body having narrow longitudinal openings of uniform width and an exterior circumferential shoulder; a center contact secured on one end of said body and a contact member directly attached to said center contact; a screw shell contact on the same end of said body as said center contact having a bottom portion so engaged with said body as to prevent said shell from turning with reference thereto and a plain upper portion with its edge pressed over said shoulder; and a contact member in the other opening secured at the same end of said body and in electrical connection with said shell contact; said contact members extending toward the other end of said body flat against corresponding sides of said openings and having resiliently yielding contact portions extending from their outer ends back toward their point of attachment substantially flat against their main portions.

In witness whereof, I have hereunto set my hand this 13th day of July, 1915.

HOWARD R. SARGENT.