June 9, 1936. F. B. KINGSBURY 2,043,666

ELECTRIC CONNECTER PLUG

Filed July 21, 1934

Fig. 1.

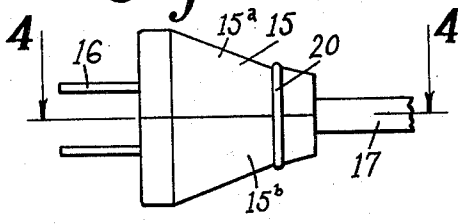



Fig. 2.

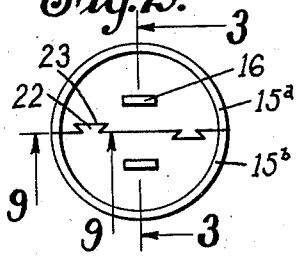



Fig. 3.

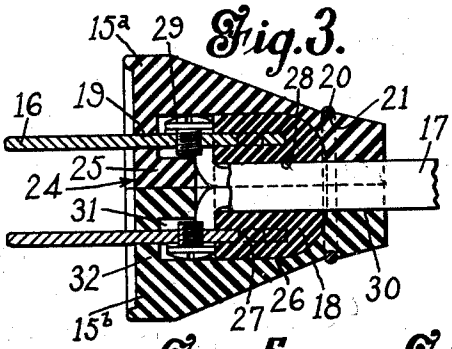



Fig. 4.

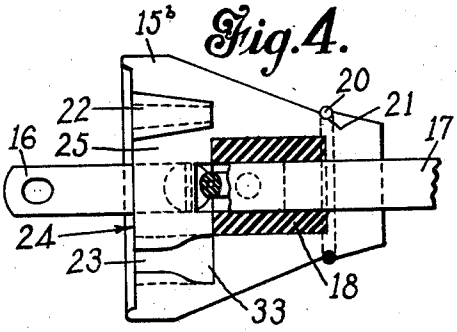



Fig. 5.

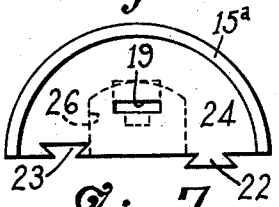



Fig. 11.

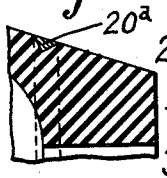



Fig. 6.

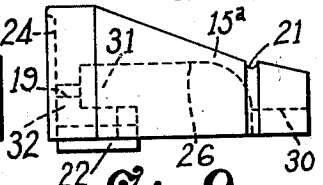



Fig. 7.

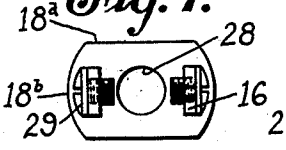



Fig. 8.

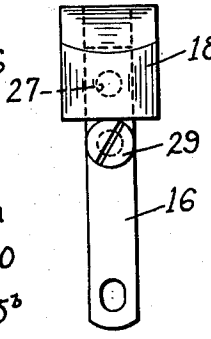



Fig. 9.

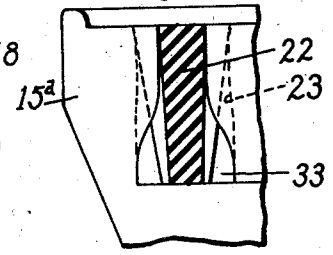
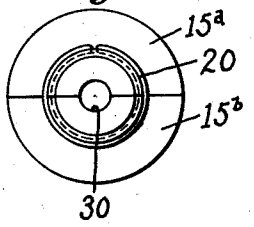



Fig. 10.




Inventor

Fred B. Kingsbury

By Roclurree & Barthalow

Attorneys

Patented June 9, 1936 2,043,666

# UNITED STATES PATENT OFFICE

2,043,666

## ELECTRIC CONNECTER PLUG

Fred B. Kingsbury, Hamden, Conn., assignor to The Whitney Blake Company, Hamden, Conn., a corporation of Connecticut

Application July 21, 1934, Serial No. 736,284

7 Claims. (Cl. 173—361)

This invention relates to electric connecter plugs, and one object is to provide an improved plug of this character.

Rubber or rubber-like materials are commonly used in constructing the bodies of various connecter plugs now on the market. Rubber of suitable hardness is a satisfactory material for the purpose, owing to its insulating properties and its somewhat yielding non-brittle character. In some of the present plugs, however, substantial distortion of the body parts is required in assemblage, and this makes assemblage difficult.

I have in view the provision of a plug whose body may be constructed of rubber, although not necessarily so, and in which the process of manufacture, including assemblage, is very easy and convenient, so that the expense of production as compared to prior plugs is materially reduced.

Another object which I have in view is to provide a plug structure in which the live parts are effectively insulated and protected. In achieving this result, I have provided a plug structure of firm substantial character having no substantial interior void. Such voids are objectionable in that they lend themselves to short circuiting and, further, make the finished plug easily collapsible or distortable. My new connecter is not subjected to substantial distortion either in assemblage or in use.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing:

Fig. 1 is a side elevation of one form of connecter plug constructed in accordance with my invention;

Fig. 2 is an end view looking toward the prongs;

Fig. 3 is an enlarged section on line 3—3 of Fig. 2;

Fig. 4 is an enlarged section on line 4—4 of Fig. 1;

Fig. 5 is a detail end view and Fig. 6 is a detail side elevation of one of the body sections;

Figs. 7 and 8 are detail views of the insulating base with its attached prongs;

Fig. 9 is a considerably enlarged section on line 9—9 of Fig. 2;

Fig. 10 is a rear end elevation of the plug; and

Fig. 11 is a fragmentary longitudinal section showing a modified form of retaining ring.

In general, the plug shown in the drawing has a substantially frusto-conical body 15 which can be conveniently made of rubber or like insulating material by a process of molding. Preferably, the body is non-brittle, the rubber having resiliency to the degree desired. From the body 15, at the larger end thereof, project contact members 16 which, for the purposes of this description, may be referred to as prongs. The conductor cord or cable 17 enters the body at the smaller end of the latter and within the body is connected to an appropriate insulating base 18 from which the prongs 16 project, said prongs passing through slots 19 in the forward wall of the body.

The body 15, in accordance with this invention, is of sectional character, said body being split longitudinally into sections, which in this instance are two in number, said sections preferably extending throughout the entire length of the body. In the case illustrated, there is a section $15^a$ of semi-round cross section and a complemental section $15^b$. These two sections are held together at the forward end of the plug by the prongs 16, and preferably the sections are held together in a region toward their rear ends by an appropriate clamping device or retainer which may be constituted by the spring ring 20 fitting an annular groove 21 in the side surface of the body. It will be observed that in the particular case illustrated, the ring 20 is located somewhat forwardly of the rear end of the plug and surrounds the plug in a region adjacent the rear face of the insulating base 18, but it will be understood that various modifications may be made in this respect.

While the prongs 16 constitute the prime means for holding together the sections $15^a$ and $15^b$ at the front end of the plug, it is preferable to provide additional means for holding these sections against relative lateral displacement; and in the form shown I have provided the sections at their forward ends, on their opposing faces, with interlocking means which may conveniently comprise interfitting mortises, or tongues, and tenons, or grooves.

From the standpoint of manufacture, it is preferable to have the sections $15^a$, $15^b$ of identical structure so that the operator making the assembly can pick up any two sections from a pile and be assured that they will properly fit together. With this in mind, I prefer to form each of the sections with an undercut or dovetailed tongue 22 on one side of the center, and an undercut or dovetailed groove 23 on the opposite side of the center, as best shown in Fig. 5. Each section is arranged so that its tongue 22 will fit the groove of the other section, while its groove 23 will receive the tongue of the other section. The tongues 22 preferably extend from the forward

face 24 of the body rearwardly to a point adjacent the inner face of the front wall 25 of the corresponding section.

Each section is cored out or recessed to provide a part of the interior chamber in which the insulating base 18 is confined, and in Fig. 6 the cutaway or hollowed part of the section is shown at 26. The side wall of the section is so shaped as to conform to and firmly hold the insulating base 18. This insulating base may conveniently comprise a block of hard rubber or other suitable insulating material of substantially rectangular cross section, having flat side faces 18a and curved surfaces 18b, as shown in Fig. 7, the rear end of the block preferably being gently curved to conform to the socket in the body 15. The socket in the body also conforms to the flat faces 18a of the base and to the curved edge portions 18b thereof.

The prongs 16 are preferably fastened to the base 18 by embedding them therein. The embedded portions of the prongs are provided with anchoring holes 27. Extending longitudinally through the base is a bore 28 which receives and closely conforms to the cord 17. The ends of the conductors are spread laterally and attached to binding screws 29 with which the prongs are provided adjacent the forward face of the base 18. In the form shown, the cord passes through the insulating base, and its forward end, located between the prongs, is removably attached to the prongs; but it is also possible, if that is desired, to pass the leads of the cord or cable over the insulating base and to the prongs exteriorly instead of interiorly, in which case the insulating base is provided with exterior longitudinal grooves or the like to receive the conductors.

Adjacent its rear end, each section 15a, 15b is provided with a semi-round cutout 30 snugly receiving the cord 17.

Within the plug body, at points adjacent the binding screws 29, the body has cutouts or recesses 31 to clear said binding screws, these cutouts being produced by thinning the front wall of the body, as shown at 32 in Fig. 3.

The locking tongues 22 are of tapered formation, as best shown in Fig. 4, being somewhat wider at their front than at their rear ends, but the undercut portions of the tongues preferably extend throughout the length thereof. As to the grooves 23, however, it will be observed from Figs. 4 and 9 that the undercuts of these grooves do not extend throughout the length thereof, the rear end portions of these grooves, shown at 33, being unprovided with undercuts in order to form clearance for the larger end of the tongue 22 when that end is introduced into the rear end portion of the corresponding groove.

The insulating base portion 18 of my improved plug with its attached cable-connected prongs is of simple structure and can be readily produced.

In assembling the plug, one of the body sections has its slot 19 engaged with the tip of one of the prongs, and the section is then moved rearwardly over the prong, or the prong moved forwardly into the section so as to bring this section to the assembled position. This partial assemblage being held in the hand, the other section is thrust over the other prong and moved longitudinally to bring the parts into the assembled position, during which process the interfitting tongues and grooves are engaged and brought into assembled relation by the relative longitudinal movement of one section with respect to the other. In other words, the sections slide into interlocking engagement with each other at their forward end portions.

It will be observed that in sliding the sections into their interfitting relation, the tongue of one section enters the corresponding groove at the face end of such corresponding groove, whereas the tongue on the other section enters the rear end of the mating groove. It is to permit this operation that the rear end of each groove is somewhat opened up and enlarged, as above described.

After the sections are brought to the assembled position, the ring 20 is snapped in place and the article is then complete.

In case it is considered desirable to have the body-embracing retainer or ring flush with the exterior surface of the body, a construction such as shown in Fig. 11 may be employed. In this form, the ring 20a has its outer surface in the plane of the body surface, the outer surface of the ring being flat. The ring may be substantially V-shaped in cross section, fitting a correspondingly shaped groove in the body.

Where a three-prong or a multi-prong connecter is required, the body will be divided into a number of sections corresponding with the number of prongs.

It will be observed that in the form of my invention shown herein, the forward end of the insulating base lies closely adjacent the front wall of the body 15, as shown in Fig. 3, and that the cutout portions 31 which receive the binding elements 29 rather snugly, constitute provisions preventing collapse of the body under inward pressure in the region immediately forward of the front end of the insulating base.

While certain changes in the structure, which come within the broad principle involved, have been indicated herein, it is to be understood that these are mentioned merely by way of example. I have not attempted to illustrate or to describe the many different forms which the device can take without departing from the scope of the invention as defined in the claims.

What I claim is:

1. An electric connecter plug comprising a cable-connected element having projecting prongs, an enclosing body for said element having completely enclosed slots through which said prongs project, said body being split longitudinally into sections having cooperating facing recesses to receive said element whereby the latter is completely enclosed by the walls of said sections, and means for holding said sections together.

2. An electric connecter plug comprising a cable-connected element having projecting prongs and an enclosing body for said element through which said prongs project, said body being split longitudinally into sections having cooperating facing recesses to receive and substantially completely enclose said element, each of said sections being engaged with one only of said prongs whereby the prongs hold the sections in place, and means in addition to said prongs for holding said sections together.

3. An electric connecter plug comprising a cable-connected element having forwardly projecting prongs and a molded hollow enclosing body for said element divided longitudinally into sections along a plane transverse to a line joining the prongs, said sections being interlocked between the prongs to prevent separation thereof and being provided with cooperating facing

recesses opening through the abutting surfaces thereof to receive and enclose said element.

4. An electric connecter plug comprising an insulating prong-supporting base member and a body having substantially co-extensive sections adapted to be brought together laterally in abutting assembled relation about said member, each section being provided with a recess to receive a portion of said base member and an independent completely enclosed prong opening, and said sections having means formed integrally therewith for interlocking them against relative direct lateral separation.

5. An electric connecter plug comprising a prong-supporting base element and a molded body member comprising identical sections co-extensive in length adapted to be brought face to face about said base member, said sections being provided with cooperating facing recesses to receive and embrace said base member, and provided with integrally formed means adapted to be interengaged by a movement of one section relatively to the other to prevent lateral separation of the sections.

6. An electric connecter plug comprising a prong-supporting insulating base member and a molded body for said plug comprising substantially co-extensive sections adapted to be brought face to face about said base member in a direction transverse to the abutting faces of the sections, said sections having cooperating recesses opening through their abutting faces to receive said base member and being provided with interengaging interlocking means adapted to be brought into interengagement by relative longitudinal sliding movement of the sections.

7. An electric connecter plug comprising a rigid base block of insulating material having forwardly projecting prongs anchored therein, and provided with an interior bore, a cable passing through said bore and having conductors connected with the respective prongs, a body surrounding said base and conforming thereto and interiorly supported thereby in substantially the entire region occupied by the base, said body being of round cross section and of substantially frusto-conical shape, said body being split longitudinally into sections, brought into face-to-face contact about said insulating base, the forward end wall of said body having a completely enclosed slot in each section through which the prongs project outwardly, means for interlocking said sections between said prongs, said interlocking means being brought into action by a relative longitudinal sliding movement of one section with respect to another, said body having provisions for preventing collapse thereof in the region between the front end face of said insulating base and the rear face of the forward wall of said body, and a retainer associated with the rearward smaller end of the body for preventing separation of the sections at their rear portions.

FRED B. KINGSBURY.