Sept. 12, 1950 E. P. BRUS 2,522,341

END PLUG CONNECTION TO CORD

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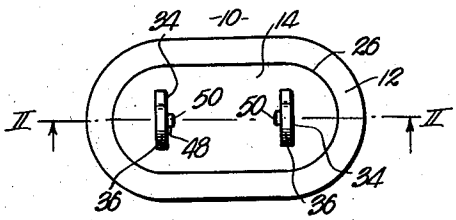


Fig. 1.

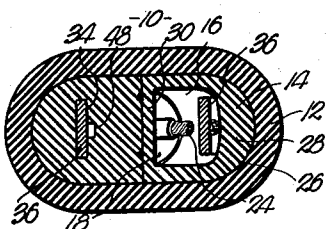


Fig. 3.

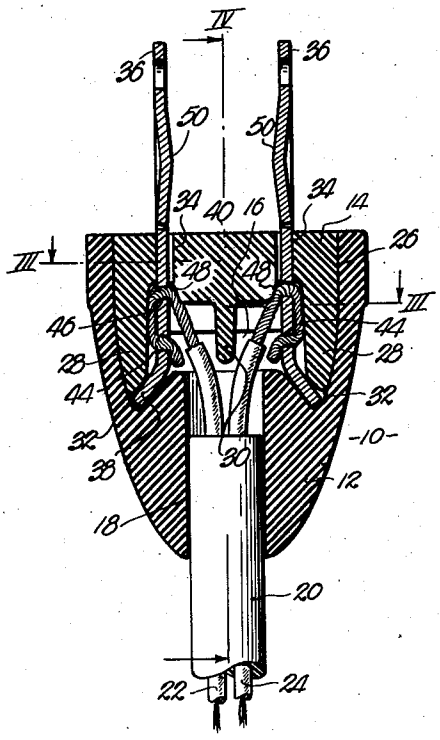


Fig. 2.

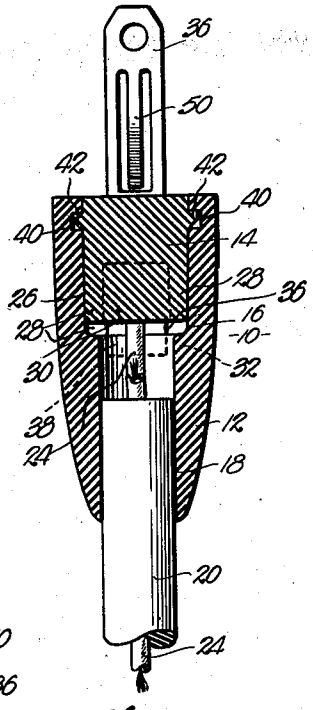


Fig. 4.

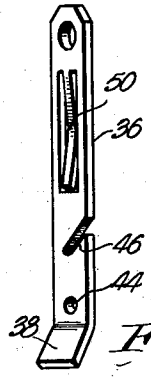


Fig. 5.

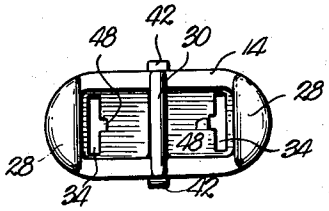


Fig. 6.

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END PLUG CONNECTION TO CORD

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2 Claims. (Cl. 173—361)

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This invention has to do with electric plugs and particularly with end plug connectors for extension cords and the like, the primary object being to provide a plug that is quickly and easily manufactured and extremely efficient from the standpoint of the component parts thereof being rigidly and virtually irremovably connected.

The most important object of this invention is the provision of an end plug connector having a pair of relatively telescoped sections, one of the sections receiving the contact prongs, which prongs extend into the interior of the outermost section through corresponding openings, said prongs each having a perforation formed therein that is disposed within the opening for the prong, said perforations receiving the conductors in clamping relationship within the openings.

Another important object of this invention is the provision of an end plug connector having a pair of spaced apart contact prongs extending into a hollow body through the corresponding openings formed in said body, the prongs each having a perforation formed therein and disposed within the corresponding body opening to the end that as a conductor wire is threaded through the perforation of the prong, such wire is tightly clamped within said opening.

Another object of this invention is the provision of a connector plug having contact prongs provided with a perforation and a slot spaced from the perforation, the conductor wire passing through the perforation and extending into the slot in loop fashion to the end that the conductors may be easily and quickly connected to the prongs without the necessity of using screws, bolts and the like in the conventional manner.

A further object of this invention is the provision of a connector plug formed from readily rigid material to the end that as the looped end of the conductors is disposed in clamping relationship as above described, the rigidity of the material itself will prevent relative movement between the wires and their respective prongs.

A still further object of this invention is the provision of a plug of the aforementioned character having a pair of body sections interconnected by projecting ear and cavity assemblies, to the end that when the sections are assembled by a snap-fit action, they can be separated only by a strong prying action imparted thereto.

An additional object of this invention is to provide a plug as above described wherein one of the sections is formed with a pair of spaced apart projections precisely contoured to fit the other section and bearing directly against a portion of

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the prongs to the end that the prongs are held rigidly against movement relative to the body.

Many minor objects referring to details of construction will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Fig. 1 is an end view of an end plug connector for extension cords or the like made in accordance with the present invention.

Fig. 2 is a longitudinal cross sectional view taken on line II—II of Fig. 1.

Fig. 3 is a transverse cross sectional view taken on irregular line III—III of Fig. 2.

Fig. 4 is another longitudinal cross sectional view taken on line IV—IV of Fig. 2.

Fig. 5 is a perspective view of one of the contact prongs per se; and

Fig. 6 is an inverted plan view of the innermost of the two body sections showing the same entirely removed from other parts of the plug.

It is common knowledge that electric end plug connectors have heretofore been made in a large number of different ways resulting in a highly competitive field and necessitating the production of a plug having all the necessary advantages thereof and at the same time being inexpensive to manufacture, to the end that constant price cutting can be met.

Accordingly, the plug about to be described, has been produced to permit quick and easy assembling by the manufacturer primarily to the end that the cost of production thereof can be appreciably decreased. Obviously, while cutting such cost of production, it is still necessary to have an efficient plug and, as will hereinafter become apparent, a great advancement has also been made particularly with respect to the plug maintaining itself in an assembled condition even after a long period of continued use. In other words, one of the inherent defects of most plugs on the market today, lies in the fact that after the same has been placed in use, the prongs thereof and/or the conductors become broken loose and oftentimes results in discarding of the entire plug.

In the drawing, a sectional body broadly designated by the numeral 10, has a main body portion 12 and a secondary body portion 14 telescoped within the body portion 12. The outermost main body portion or section 12 has a continuous longitudinal bore 16 formed therethrough. One section 18 of this bore 16 is relatively small and is of such size as to receive an insulated extension cord or the like 20. This

cord 20 has a pair of insulated conductors 22 and 24, the free ends whereof are bare and devoid of insulation.

Another section 26 of the bore 16 communicates with section 18 and is of an appreciably greater cross sectional area than section 18 of bore 16 for receiving the body section 14. As clearly illustrated in Figs. 1 and 3, this section 26 of bore 16 is elliptical as is the section 14 which is tightly fitted therein. Obviously however, the precise cross sectional contour of the sections 12 and 14, is immaterial to this invention.

The outermost end of the body section 14 is substantially flat and flush with the proximal end of section 12 in the usual manner, whereas, the opposite end of body section 14 is irregular and provided with a pair of opposed projections 28 and an intermediate projection 30.

As illustrated in Fig. 4 of the drawing, the side walls of the body section 12 and consequently the section 14, are substantially straight, but, as shown in Fig. 2 of the drawing, the end walls of both sections 14 and 12 are slightly arcuate. Consequently the projections or fingers 28 of the body section 14, curve inwardly along their outermost faces as the lowermost ends thereof are approached. The section 26 of the bore 16 extends inwardly beyond the innermost end of the section 18 of bore 16 to present a pair of opposed cavities 32. These cavities 32 extend outwardly and downwardly from the innermost end of section 18 of bore 16 in overlapping relationship to a portion of bore section 18.

Fig. 2 of the drawing, clearly illustrates the manner in which the innermost free ends of the two fingers 28 extend into the respective cavities 32 of body section 12. A pair of spaced apart openings 34 are formed in the body section 14 next adjacent the fingers 28 and communicate at their innermost ends with the section 26 of bore 16. In other words, there is an opening 34 between the central projection 30 of section 14 and each of the fingers 28 thereof. The openings 34 are polygonal in cross sectional contour to conform to prongs 36 having the form and contour illustrated in Fig. 5. These two prongs 36 extend into the openings 34 of section 14 and extend beyond both ends of the respective openings 34. The innermost free end of each of the prongs 36 is provided with a laterally projecting portion 38 and when the component parts of the plug are assembled as illustrated in Fig. 2, this portion 38 of the prongs extends into the respective cavities 32 of body section 12. Since the cavities 32 extend at an angle substantially the same as the angularity of portion 38 of prongs 36, a tight fit is presented with the innermost free ends of the fingers 28 bearing tightly against the portions 38 of prongs 36. Thus, when assembled, the prongs 36 cannot move longitudinally in either direction since the two sections 12 and 14 cooperate in preventing such movement.

A pair of opposed relatively small cavities 40 are formed in the innermost faces of the side walls of body section 12 near the uppermost end thereof. Corresponding side walls of the body section 14 are provided with outturned ears 42 that fit within the cavities 40 when the sections 12 and 14 are assembled together. It is contemplated that the sections 12 and 14 of body 10, be formed from a relatively hard and substantially rigid material such as plastic. Such material is capable of slight flexing and therefore, as the section 14 is moved into place within the section 12, the side walls of section 12 will bend outwardly permitting passage of the out-turned ears 42 until such ears reach the cavities 40 and snap into place.

The sections 12 and 14 can be separated by prying action but it is contemplated that no separation become necessary and certainly with such formation the sections 12 and 14 will not become readily displaced. Obviously, the particular disposition of the cavities 40 and the ears 42 is of no great importance and it is understood that they may be formed inwardly from the end of the plug near the fingers 28 of section 14 and if desired, can be shifted to the end walls of sections 12 and 14 rather than along the side walls thereof. Furthermore, any number of such ear-cavity assemblies can be utilized if desired or if such should become necessary. Each of the prongs 36 is provided with a pair of spaced apart perforations, one of which constitutes a small hole 44 adjacent the laterally extending portion 38 thereof, whereas the other perforation extends at an angle in the form of a slot 46. The slot 46 communicates at its open end with one edge of the flat prong 36 and is spaced toward the normally outermost end of the respective prong 36. As noted in Fig. 2 of the drawing, the innermost end of both of the openings 34 in body section 14, are enlarged as at 48. When the prongs 36 are disposed within the openings 34, the slot 46 thereof is within this enlarged portion 48 of the openings 34.

The conductors 22 and 24 extend into the section 26 of bore 16 between the projection 30 and the proximal prong 36. The uninsulated portion of conductors 22 and 24 then pass into slot 46 and are looped inwardly, one leg thereof passing along the outermost face of the respective prong 36 and into the hole 44 of such prongs 36. Since the slots 46 are within the portions 48 of openings 34, the bight and a portion of the legs of the loop formed in the conductors 22 and 24 are within this enlarged portion 48 of openings 34. This over-all width of this enlarged portion 48 is less than the combined thicknesses of the prong 36 and the two legs of the loop of conductors 22 and 24, all to the end that when the conductors 22 and 24 and their prongs 36 are forced into the enlarged portion 48 of openings 34, a squeezing and clamping action will be imparted to the conductors 22 and 24. Since the prongs 36 cannot move inwardly toward each other because of the presence of a portion of the conductors 22 and 24 disposed between the prongs and the innermost wall forming enlarged openings 48, a clamping action will be imparted to the conductors 22 and 24 throughout that portion of the legs thereof extending between the slot 46 and the hole 44. In other words, this portion of the loop is disposed between the innermost face of the fingers 28 and the proximal face of the prongs 36.

Manifestly, when all of the component parts of the plug are in assembled relationship, absolutely no movement is possible between the sections 14 and 12 of the body 10, nor between the prongs 36, the conductors 22 and 24 and the body 10. The conductors 22 and 24 being looped over a portion of the prong 36 after passing through the slot 46 renders it positively impossible to separate cord 20 and the plug itself by pulling outwardly on the cord 20. If such outward movement is imparted to the cord 20 relative to the plug itself, the conductor wires 22 and 24 will break before the loops thereof pull through the slot 46 and hole 44. By the same token, the connector prongs 36 cannot move inwardly or outwardly with respect to the body section 14 and

this last mentioned section cannot move inwardly because of the fingers 28 bearing against the portions 38 of prongs 36, nor outwardly because of the ears 42 and their interlocking engagement with cavities 40.

In addition to the plug being highly efficient from the standpoint of rigid interconnection between its component parts, the assembling itself is relatively simple and easy. The operator simply threads the cord 20 into the section 18 of bore 16 to a point where the free ends of conductors 22 and 24 are beyond the innermost end of bore section 18. The free, uninsulated ends of the conductors 22 and 24 are then inserted into the holes 44 of the respective prongs 36 and then quickly and easily looped over and into the slots 46. The body section 14 can then be moved over the contact prongs 36 to a point where the enlarged openings 48 thereof embrace and receive a portion of the conductors 22 and 24. It is to be noted that the prongs 36 are provided with the usual outwardly bowed and downwardly extending stamped tongues 50, serving primarily to yieldably hold the contact prongs 36 in an electric outlet. Since the prongs 36 are made from resilient material, these tongues 50 will readily yield to the openings 34 when prongs 36 are inserted therein. Inasmuch as the prongs 36 have sufficient means for preventing displacement thereof with respect to body section 14, it is not necessary that these tongues 50 aid in that respect as is common in many types of devices of this character.

As the body section 14 is so moved into position, the central projection 30 thereof will readily separate the two conductors 22 and 24 and maintain the same in separated condition throughout the life of the plug. Consequently, the uninsulated portions of the conductors 22 and 24 will never come into mutual contact causing an electrical short. After the conductors 22 and 24, together with the prongs 36 and the body section 14 are all interconnected, section 14 is moved into the bore section 26 to a point where the ears 42 thereof snap into place. It is readily apparent that these steps can be performed very quickly and with a minimum amount of skill, and actual practice has proved that the number of plugs which can be assembled by an individual operator in a given length of time, is tremendously increased through formation of a plug as above described.

All of the advantages initially set forth herein are, therefore, attained by the plug forming the subject matter hereof and while only one embodiment thereof has been illustrated and described, any changes and modifications as fairly come within the scope of the appended claims are contemplated hereby.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. An end plug connection comprising a pair of body sections, one of said body sections having a cavity for receiving the other of said body sections and a bore communicating at one end thereof with said cavity and adapted to receive a pair of electrical conductors, said other body section having a pair of spaced openings, each registering at one end thereof with said cavity; and an elongated prong within each opening respectively of the other body section, one end of each prong extending outwardly beyond said other body section, the opposite end of each prong being within said cavity and wedged between proximal parts of the body sections, each prong being provided with a pair of spaced perforations in that portion thereof within the cavity adapted to receive a corresponding conductor with the latter extending through one perforation in one direction and thence through the other perforation in the opposite direction, said prongs and said one body section having complementary, inclined, interengaging parts for forcing the prongs in one direction toward the other body section, whereby to clamp a portion of the conductors in place.

2. An end plug connection comprising a pair of body sections, one of said body sections having a cavity for receiving the other of said body sections and a bore communicating at one end thereof with said cavity and adapted to receive a pair of electrical conductors, said other body section having a pair of spaced openings, each registering at one end thereof with said cavity; an elongated prong within each opening respectively of the other body section, one end of each prong extending outwardly beyond said other body section, the opposite end of each prong being within said cavity and wedged between proximal parts of the body sections, each prong being provided with a pair of spaced perforations in that portion thereof within the cavity adapted to receive a corresponding conductor with the latter extending through one perforation in one direction and thence through the other perforation in the opposite direction; and means forming a part of said one body section adjacent the cavity thereof for forcing the innermost ends of the prongs apart, that portion of each conductor extending from one perforation to the other perforation being disposed between its corresponding prong and the other section, and being clamped therebetween when the prongs are forced apart.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,015,418	Wermine	Sept. 24, 1935
2,211,591	Benander	Aug. 13, 1940
2,333,152	Chirelstein	Nov. 2, 1943
2,337,735	Brus	Dec. 28, 1943
2,406,144	Herman	Aug. 20, 1946