

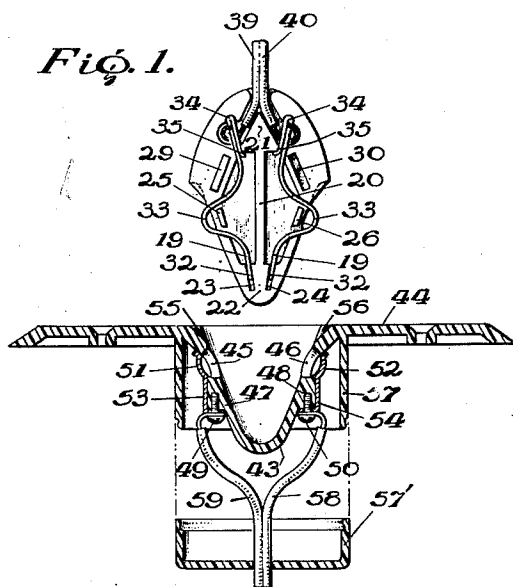
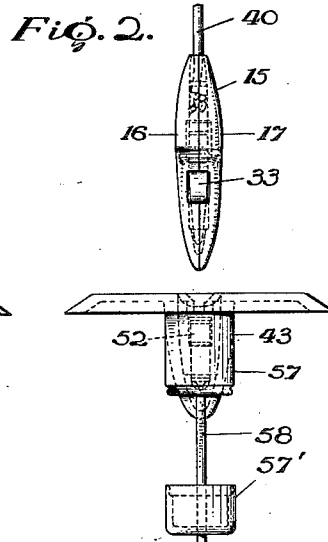
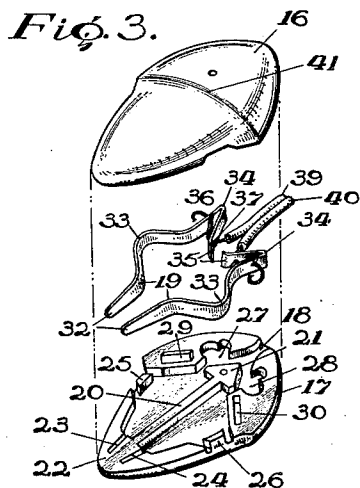
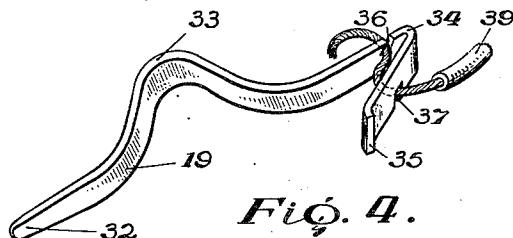
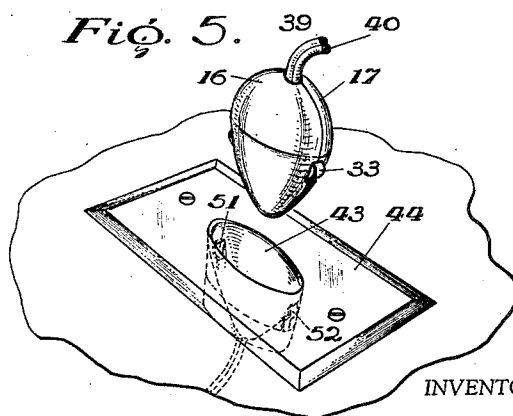
April 6, 1954

J. H. HURLBUT
ELECTRICAL CONNECTOR

2,674,723

Filed April 19, 1951

2 Sheets-Sheet 1



INVENTOR

John Henry Hurlbut

BY

Cameron, Kerkam & Sutton
ATTORNEYS

April 6, 1954

J. H. HURLBUT
ELECTRICAL CONNECTOR

2,674,723

Filed April 19, 1951

2 Sheets-Sheet 2

FIG. 6.

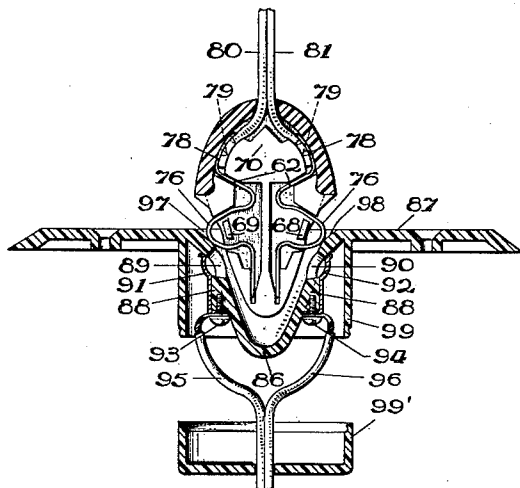


FIG. 7.

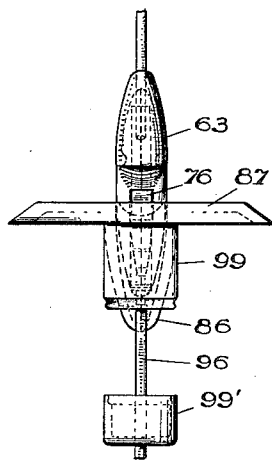


FIG. 8.

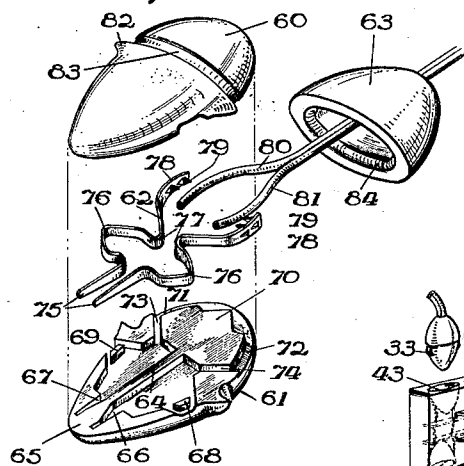


FIG. 9.

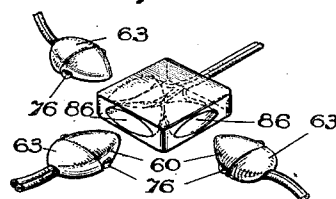
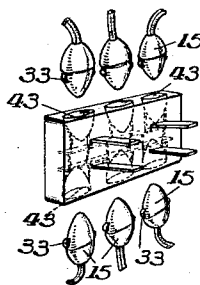


FIG. 10.

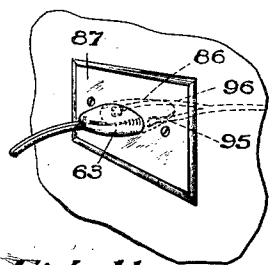
INVENTOR

John Henry Hurlbut

BY

Cameron, Kerkam & Sutton
ATTORNEYS

FIG. 11.



UNITED STATES PATENT OFFICE

2,674,723

ELECTRICAL CONNECTOR

John H. Hurlbut, Washington, D. C.

Application April 19, 1951, Serial No. 221,869

9 Claims. (Cl. 339-176)

1

This invention pertains to an improved electrical connector structure which is designed to eliminate many of the shortcomings of conventional electric connectors and in which the plug is self-aligning within the socket. The invention further contemplates the provision of an improved plug and socket of novel shape and structure.

Conventional electric connectors or plugs are normally provided with two flat contacts which must be aligned with two corresponding female slots before the plug can be inserted into the socket. It is difficult to form a proper connection with the conventional plug when light conditions are poor or when the socket is located in an inaccessible position.

It is therefore a primary object of this invention to provide a plug and socket structure wherein the plug may be readily and easily inserted into the socket despite the position of the socket and in which the plug is self-aligning.

It is a further object of this invention to provide such an improved electric plug and socket structure wherein a perfect electrical connection will be formed readily and in which the male plug will make a tight and strong connection with the female socket.

It is another object of this invention to provide an improved, flattened shape for the plug and socket and improved spring contacts therefor.

Other and further objects of this invention will become apparent as this specification proceeds.

Referring to the drawings,

Fig. 1 is a cross-sectional view of one embodiment of a plug and socket structure formed in accordance with this invention;

Fig. 2 is a side perspective view of the plug and socket structures;

Fig. 3 is an exploded view of the male plug member showing the upper and lower disc portions thereof and the novel spring contact members which are fitted therebetween;

Fig. 4 is an enlarged and detailed perspective view of one of the two spring contact or conductor members showing the manner of attaching the terminal end of one of the feed wires thereto;

Fig. 5 is a perspective view taken from above of the male plug member in position for insertion into the female socket member;

Fig. 6 is a cross-sectional view of an alternative embodiment of the male plug and socket members showing the male plug member partially inserted into the socket member;

Fig. 7 is a side elevation of this embodiment of the invention with the male plug partially inserted into the female socket;

Fig. 8 is an exploded view of this embodiment of the invention showing the upper and lower disc segments of the plug with the spring conductors therefor disposed therebetween in position for insertion therein and the cap structure

2

for maintaining the two halves of the male plug in position over the spring conductors;

Fig. 9 is a perspective view, partially in phantom, of a terminal socket structure for receiving a plurality of the improved male plugs;

Fig. 10 is a perspective view, partially in phantom, of an adapter socket structure for use with the conventional type of pronged and slotted electric plug and socket structure; and

Fig. 11 is a perspective view of the improved plug and socket structure as adapted for use in a base board or analogous structure.

In the drawings, Figs. 1 and 2, one embodiment of the improved plug and socket structure is illustrated. The male plug 15 is preferably formed of two identical discs of hard rubber, plastic or other dielectric material which are closely fitted together over the spring conductor members. Plug 15 is preferably of flattened elliptical shape, tapering to a tongue-shaped point at its lower extremity and more fully rounded at its upper extremity. The two halves or discs of plug 15 are preferably identical in shape and are so formed as to be interchangeable with each other, as follows. Upper and lower discs 16 and 17 of plug 15 are preferably shouldered about their lateral edges and are substantially recessed through-out their medial portions, as shown. They are provided at their upper extremities with an inwardly widened slot or duct 18 through which the feed electric wire is passed to make contact with spring conductors 19, which are identical and which will be subsequently described in detail. Longitudinally disposed along the median lines of plug discs 16 and 17 is a central boss 20 which as shown extends substantially from the lower tip of the disc to a point adjacent and just below the inner enlarged extremity of duct 18. Central boss 20 is preferably shaped not unlike an arrow with its angular head portion disposed within the lower enlarged portion of duct 18. Slots 23 and 24 are provided adjacent the lower extremity of boss 20 and between it and curved shoulder 22 which extends about the tip of the disc in an elliptical curve, as shown. Upstanding shoulder segments 25 and 26 are provided adjacent the lateral median edges of discs 16 and 17 and are separated from the curved tip shoulder 22 and the upper shouldered section thereof by suitable angular slots disposed at an acute angle to each other and designed to freely receive the lateral portions of spring conductors 19, as will hereinafter be discussed in more detail. Curved recesses 27 and 28 are preferably provided in the upper shouldered portions of discs 16 and 17 and are disposed laterally of and below the lower expanded edges of duct 18 adjacent the two angular walls of head 21 of central boss 20. Curved recesses 27 and 28 are designed to receive the upper angular extremities of spring conductors 19 with the terminal ends of the feed wires inserted and clamped therein, as will hereinafter be further discussed.

3

Discs 16 and 17 are provided respectively with a rectangular upstanding stud 29 and a corresponding rectangular recess 30 to enable the two disc portions 16 and 17 of the plug structure to be closely locked together. If desired, an appropriate bore may be made through discs 16 and 17, preferably as at the centers of boss heads 21 to receive a bolt and nut to provide an even more positive connection therebetween.

Spring conductors 19 are preferably formed of flat, resilient conductive metal and are preferably tapered at their lower extremities 32 and smoothly outwardly curved to provide lateral curved segments 33, from whence they are again inwardly curved to their upper extremities 34 and then are bent back upon themselves to provide angular tip portions 35. Angular slots 36 and 37 are preferably provided, respectively adjacent the outer extremity of tip 34 and the inner extremity of angular end 35. It will be seen from Fig. 4 that slot 36 is preferably downwardly and inwardly inclined at an angle of approximately 45° in the upper edge of tip 34, while slot 37 is preferably similarly inclined in the lower edge of tip 35. It will further be seen from Fig. 4 that the extremity of tip 35 is preferably bent outwardly at an acute angle.

In assembling male plug structures 15 the terminal extremities of feed wires 39 and 40 are first stripped of insulation for an appreciable distance sufficient to allow insertion of the stripped ends of the wires into slot 37 of angular tip 35 and then through and up into slot 36 of spring conductors 19. With the extremities of feed wires 39 and 40 firmly in position within slots 36 and 37 the tapered lower extremities 32 of spring conductors 19 are inserted into slots 23 and 24 of the base disc 17 with the curved portions 33 of spring conductors 19 disposed outwardly around shoulders 25 and 26 of the base disc 17. The upper angular extremities 35 are pressed back upon the upper portion of spring conductors 19 and are fitted firmly and positively within the upper circular portions of recesses 27 and 28, head 21 of boss 20 acting to positively separate feed wires 39 and 40 adjacent the lower extremity of duct 18. The lower portions of recesses 27 and 28 are provided to receive the ends of feed wires 39 and 40, as shown in Fig. 1. With spring conductors 19 firmly in position in base disc 17, as aforesaid, upper disc 16 is fitted firmly over lower disc 17 and spring conductors 19 and is pressed downwardly thereon, stud 29 and slot 30 of base disc 17 registering with the corresponding slot and stud of upper disc 16. With the plug structure so assembled an appropriate bolt may be inserted through the bore in the discs and a nut applied to its extremity to hold the discs in close fitting contact.

Referring to Fig. 1 it will be seen that the curved outer extremity 32 of spring conductors 19 extends outwardly from the plug body around shoulders 25 and 26 and that the lower terminal ends 32 of spring conductors 19 preferably do not extend fully to the lower extremities of slots 23 and 24, a space being provided in the lower extremities of slots 23 and 24 to allow a downward sliding movement of extremities 32 of spring conductors 19 when inward pressure is exerted on the curved outer portions 33 thereof.

Discs 16 and 17 of plug 15 are preferably provided about their upper outer peripheries with a shoulder 41 to provide a closer and more positive fit with the upper peripheral edge of the socket member.

4

Referring to Figs. 1 and 2, it will be seen that female socket 43, formed of suitable dielectric material is preferably provided in base plate 44 and is so shaped as to form a close fit with the lower, tapered tongue portion of plug 15 when plug 15 is fully inserted therein. Socket 43 is preferably also of flattened, elliptical shape and tapers downwardly to a rounded lower extremity in which the tip of male plug 15 fits closely. Socket 43 is provided adjacent its upper lateral extremities with suitable contact orifices 45 and 46 below which are disposed shoulders 47 and 48 which are appropriately bored and threaded at their lower extremities to receive spring contact screws 49 and 50. Curved spring contact members 51 and 52 are disposed outwardly over contact orifices 45 and 46 and are held firmly thereover by means of screws 49 and 50. Spring contacts 51 and 52 are preferably provided with lower, rectangular extremities 53 and 54 which bear against shoulders 47 and 48 and are appropriately bored to receive screws 49 and 50. At their upper extremities they are curved outwardly and extend upwardly to bear against the upper lateral edges of sockets 43 at points above the upper edges of contact orifices 45 and 46.

It will be seen from Figs. 1 and 2 that the upper lateral edges of socket 43 are preferably angularly slotted or grooved at points 55 and 56 to provide an entering slot or guide for the lateral curved segments 33 of spring conductors 19 of plug 15, to assist in the entry of plug 15 into socket 43 and to eliminate excessive compression of spring conductors 19 at the point of entry.

Laterally disposed about socket 43 and preferably formed integral with base plate 44 is flattened elliptical socket housing 57 which is open at its lower extremity and is provided about socket 43 to cover and protect spring contacts 51 and 52 and the points of juncture of wires 53 and 54 with contact screws 49 and 50. It will be appreciated that contact between wires 53 and 54 and screws 49 and 50 is made by loosening the screws, wrapping the terminal extremities of wires 53 and 54 about the screw shanks and then tightening the screws in shoulders 47 and 48.

If desired, an elliptical shouldered cover 57' may be provided, shaped to fit upwardly over the lower extremities of socket housing 57 and carrying a hole or bore in its center to permit passage of wires 53 and 54 therethrough. This cover would afford further protection to contacts 51 and 52 and contact screws 49 and 50. The lower edge of housing 57 may be provided with a flange to assist in holding this cover in position.

In this embodiment applicant has provided a plug and socket structure in which the plug will automatically align itself as it is forced downwardly in socket 43, spring contacts 19 will be forced inwardly through shoulders 33, with the terminal extremities of conductors 19 sliding downwardly in slots 23 and 24 until the outer curved portions 33 of conductors 19 have passed the upper shoulders of socket 43 and expand outwardly into contact orifices 45 and 46 to make firm and positive contact with curved spring contacts 51 and 52 of socket 43.

An alternative embodiment of the invention is disclosed in Figs. 6, 7 and 8 of the drawings and will be hereinafter described in detail. The embodiment of the invention disclosed in Figs. 1, 2 and 3 comprises three parts, i. e., identical upper and lower discs 16 and 17 and spring conductors 19 disposed therebetween. The alternative embodiment of the invention comprises upper

5

and lower discs 60 and 61, spring contacts 62 and a cap member 63 designed to maintain the entire structure in a unitary condition upon assembly. Discs 60 and 61 are identical in structure and are interchangeable, therefore only one of the two discs will be discussed in detail.

Referring to Fig. 8, it will be seen that disc 61 comprises broadly a flattened, outwardly curved and downwardly tapered member formed of a suitable dielectric material, i. e., hard rubber, plastic or other suitable material, and is preferably shouldered about its lower tip portion at 65 to provide a central cavity through which is longitudinally disposed a narrow boss 64 which divides the cavity portion into two equal sections. Boss 64 preferably widens toward its lower extremity, angular slots 66 and 67 being provided between the end of boss 64 and tip shoulder 65. Medial shoulders 68 and 69 are preferably provided between tip shoulder 65 and the upper shouldered extremities of disc 61 and define angular slots therebetween designed to freely receive the lateral edges of spring conductor 62.

An enlarged angular head boss 70 is preferably provided at the upper end of boss 64 and extends laterally across the upper portion of disc 61 to within an appreciable distance to its upper peripheral extremities, spaces 71 and 72 being provided between the lateral edges of boss 70 and the outer edges of disc 61, for a purpose hereinafter to be more fully discussed. Angular slots 73 and 74 are provided adjacent the lower angular extremities of boss 70, connecting the central cavities of disc 61 with lateral spaces 71 and 72.

Spring contacts 62 are preferably formed of any high conductive, resilient metal and as shown comprise two elongated tapered lower extremities 75 above which they are outwardly and angularly curved to provide outwardly curved contact surfaces 76, above which they are brought in closely together to provide a constricted portion 77 from which they again curve outwardly to terminate in outwardly extending, substantially parallel arm portions 78. Arm portions 78 are preferably provided at their inner extremities with a series of small and sharpened penetrating points 79. Points 79 are designed to penetrate the insulation of wire sections upon assembly of the plug and to form contact between conductors 62 and the feed wires 80 and 81.

As illustrated, the upper, outer extremities of discs 60 and 61 are appropriately shouldered and grooved about their outer peripheries at 82 and 83 to provide a firm seating for assembly cap 63.

Cap 63 is also formed or molded of a suitable dielectric material and as shown is interiorly shaped to conform closely to the upper configuration of discs 60 and 61 when the two are applied together. Cap 63 bears a suitable raised boss or ring 84 about its lower inner periphery which ring is designed to closely fit into groove 83 of discs 60 and 61 when cap 63 is forced downwardly thereover.

In assembling the plug structure the following procedure is followed: tapered extremities 75 of spring conductors 62 are first inserted into slots 66 and 67 disposed at the lower extremity of disc 61, the outwardly curved portions 76 of conductors 62 freely fitting over shoulders 68 and 69 and extending outwardly therefrom, the angular portions of conductors 62 fitting respectively through slots 73 and 74 of disc 61 with the upper, pointed extremities 78 of the conductors extending outwardly from spaces 71 and 72 at an acute angle thereto. With the conductors in primary posi-

6

tion in disc 61 wires 80 and 81 are laid in spaces 71 and 72 of disc 61, bearing against the upper lateral walls of boss 70. Extremities 78 of conductors 62 are then forced inwardly against wires 80 and 81 until points 79 have penetrated the insulation thereof and made contact with the wires. At this point upper disc 60 is fitted firmly over lower disc 61 and cap 63 is then slipped downwardly over the tops of both discs until its inner peripheral ring 84 seats firmly in peripheral groove 83. In this position the outer curved extremities 76 of spring conductors 62 extend outwardly an appreciable distance from the peripheral walls of the tongue of the plug around shoulders 68 and 69 and in such position that they will resiliently resist efforts to force them inwardly.

The socket 86 of this embodiment of the invention is similar to the socket structure previously described in connection with the first embodiment and comprises broadly a downwardly tapered, flattened female member formed integral with an appropriate base plate 87 of suitable dielectric material and corresponding closely in shape to the shape of the lower extremity of the plug member. Socket 86 is provided with suitable shoulders 88 adjacent its lateral edges, above which shoulders are provided contact orifices 89 and 90 over which spring contact members 91 and 92 are closely fitted. Spring contact members 91 and 92 are preferably rectangularly bent at their lower extremities and appropriately bored to receive contact screws 93 and 94 which hold them firmly in position adjacent the lateral extremities of socket 86. Contact spring 91 and 92 are outwardly curved over contact orifices 89 and 90 and the upper extremities thereof preferably bear against the shouldered exterior edges of socket 86 above contact orifices 89 and 90. Screws 93 and 94 also provide a firm contact between wires 95 and 96 and spring contacts 91 and 92.

As shown in Fig. 6, appropriate angular slots or ramps 97 and 98 are preferably provided at the upper lateral edges of socket 86 to provide an entering path for the curved extremities 76 of spring conductors 62 when the male plug is inserted into the socket 86. It will be further noted that when the male plug is forced downwardly into socket 86 spring contacts 62 are inwardly compressed until the shoulder portions of the socket above the contact orifices 89 and 90 have been passed by curved portions 76, at which point spring contacts 62 spring outwardly, forcing curved portions 76 into close contact with contact springs 91 and 92 of socket 86.

A flattened elliptical guard or housing 99 is preferably provided and made integral with base plate 87 about socket 86. Guard 99 is open at its lower extremity and surrounds socket 86 in such fashion that access may be had from below to contact screws 93 and 94 for the purpose of attaching wires 95 and 96 thereto. A centrally bored, elliptical cover 99' may be provided to fit up over the bottom extremity of housing 99, about wires 95 and 96, if desired.

Suitable adaptors or terminal plugs for either embodiment of the invention are shown in Figs. 9 and 10. The embodiment shown in Fig. 9 is for a female structure to be applied to the end of a feed wire and as shown carries three female sockets which are suitably cross-connected therewithin to the terminal end of the feed wire. These sockets are identical in structure to those previously described.

The adaptor shown in Fig. 10 is designed to

7

make the plug and socket structure of the present invention adaptable for use in conjunction with the conventional tongue and slot plug structures and as shown the female sockets in this embodiment of the invention are appropriately cross-connected to provide six outlets for the plug structures.

The advantages inherent in the present connector structures are manifold. Both embodiments of the male plug may be rapidly disassembled for insertion of the extremities of the feed wires and in neither embodiment are any screws or other type of extraneous connectors necessary.

In the first embodiment of the invention the terminal end of the wire is firmly clamped in slots 36 and 37 and the angular extremity 35 of the resilient conductor is then forced downwardly over the wire segment and is clamped between the upper interior walls of the base disc in recesses 27 and 28, providing a positive and permanent connection which is substantially unbreakable.

In the second embodiment an equally positive connection between the terminal extremities of the resilient conductors 62 and the feed wires is formed by means of the points 79 and peripheral spaces 71 and 72 of the upper boss 70 of the disc. In this embodiment of the invention as cap 63 is forced downwardly over discs 60 and 61 pointed extremities 78 of conductors 62 are forced inwardly against wires 80 and 81, points 79 penetrating the insulation of the wires to complete the contact.

It will be noted further that due to the internal configuration of the discs in both embodiments of the invention sufficient interior space is provided in both of the male plugs to accommodate the necessary compression of the spring conductor members during insertion of the male plug into the female socket. Furthermore, due to the novel internal configuration of the discs of each of the male plugs and the novel configuration of the spring conductor members these spring conductor members are maintained between the discs of the plug members without screws or any extraneous holding means. Some compression of the spring conductor member is necessary to insert them into either embodiment of the male plug and this compression serves to hold the spring conductors firmly in fixed bearing relationship therein.

The internal configuration of the discs of both embodiments of the male plug structure is of the essence of the present invention. Both structures resulted from lengthy experimentation to evolve the best practical internal structure which would provide a firm and stable seating for the resilient conductors and yet at the same time would provide sufficient internal space for the necessary compression thereof during insertion of the male plug into the socket.

Attention is further directed to the manner of attaching the terminal ends of the wires to the angular extremity of spring conductor 19 in the first embodiment of the invention. The problem was to provide a strong and positive holding contact between the end of the wire and the extremity of the conductor within a very restricted space in the upper portion of the plug. The problem was solved by providing the bent back extremity 35 with angular slot 37 disposed in the lower outer edge and complementary off-line slot 36 disposed in the upper inner edge. By "jogging" these slots and by making them angu-

8

lar it was possible to provide a permanent binding connection for the extremity of the wire which occupied little space and yet which gave an absolutely positive connection and one which would not break. The angular tip 35 at the terminal extremity of conductor 33 is provided to fit under the lower edge of boss 21 to further stabilize the assembly.

The terminal assembly shown in the second embodiment of the invention, wherein the resilient angular extremities of resilient conductors 62 are provided internally with points 79, was also evolved due to the necessity for providing a positive and strong connection in a restricted space.

The plug and socket structures of the present invention obviate many of the deficiencies of conventional structures. The plug may be readily inserted in the socket regardless of its position and in the dark. The tapered elliptical shape of the extremity of the plug and the novel socket structure provide an automatic alignment therebetween as soon as the plug is inserted in the socket.

A positive and strong contact is evolved between the plug and socket which is practically impossible to break on a straight pull but which may readily be released by forcing the male plug slightly to one side or the other to compress the spring contact on that side, prior to withdrawal.

The invention is susceptible to numerous alternative embodiments without departing from the spirit thereof. For example, the plug structure may be adapted to the male extremities of light bulbs or analogous electrical fixtures. Adaptations of the invention may, in fact, be utilized wherever it is desired to obtain a strong, positive and readily connected electrical fixture.

Attention is directed to the appended claims for a limitation of the scope of the invention.

What is claimed is:

1. In an electrical connector structure, a flattened and tapered lower plug disc, a boss extending longitudinally and medially of said disc and defining two identical recesses within said disc, a shoulder about the edges of said disc provided with lateral and terminal slots and with curved recesses at its upper extremity, outwardly and inwardly curved spring conductor members fitted within said terminal slots and said curved recesses in said disc on opposite sides of said central boss and extending outwardly at their curved medial extremities from the lateral edges of said disc through said lateral slots, an identical disc fitted over said lower disc and over said spring conductors and means for maintaining said discs in close contact with each other.

2. In an electrical connector structure, a flattened elliptical lower plug disc, a central boss extending longitudinally of said disc and defining identical recesses within said disc, an upstanding shoulder about the edges of said disc around said recesses and provided with lateral and terminal slots and with curved recesses at its upper extremity, curved spring conductor members removably fitted within said disc in said terminal slots and said curved recesses on opposite sides of said central boss and extending outwardly therefrom at their curved medial edges through said lateral slots, an identical disc fitted over said lower disc and said spring conductors and means for maintaining said discs in close contact with each other.

3. In an electrical connector structure, a flat-

tened elliptical recessed plug disc, a central boss extending longitudinally of said disc and defining two identical recesses therewithin, a peripheral shoulder about the edges of said disc around said recesses, lateral and terminal slots in said shoulder, curved recesses in said shoulder adjacent the upper extremity of said boss, curved spring conductors removably fitted within said disc on opposite sides of said central boss in said terminal slots and said curved recesses and extending outwardly from said disc at their medial edges through said lateral slots, an identical disc fitted over said lower disc and said spring conductors and means for maintaining said discs in close contact with each other.

4. In an electrical connector structure, a flattened, downwardly tapered hollow plug disc, a central boss extending longitudinally on the median line of said disc and defining two identical recesses therewithin, a peripheral shoulder about the edges of said disc around said recesses, lateral and terminal slots in said shoulder, curved recesses in said shoulder at its upper extremity on opposite sides of said boss, medially curved and recurved flat spring conductors removably fitted within said disc within said terminal slots and said curved recesses on opposite sides of said central boss and extending outwardly therefrom at their central curved extremities through said lateral openings, an identical disc fitted over said lower disc and said spring conductors and means for holding said discs in close contact.

5. In an electrical connector structure, an elliptical flattened lower plug disc, a central boss extending longitudinally of said disc and defining two identical recesses therewithin, an angular head provided at one extremity of said boss, angular slots provided adjacent the other extremity of said boss, a peripheral shoulder about the edges of said disc and provided with paired openings adjacent its lateral extremities and with an inwardly extending groove at its forward extremity and curved recesses disposed laterally thereof, outwardly curved spring conductor members fitted at their lower extremities into said angular slots and extending outwardly of said disc body through said paired openings, angular slotted upper extremities on said conductors to receive the extremities of feed wires passed through said groove and fitting into said curved recesses in said shoulder, an identical upper plug disc fitted over said lower disc and said spring conductors and an elliptical flattened socket designed to closely fit the extremity of said plug and provided with laterally disposed contacts registering with the curved outer extremities of said spring conductors when said plug is fitted in said socket.

6. In an electrical connector structure, an elliptical, flattened lower plug disc, a central boss extending longitudinally of said disc and defining two identical recesses within said disc, a tapered head provided at one extremity of said boss, angular slots provided adjacent the other extremity of said boss, a peripheral shoulder upstanding about the edges of said disc and provided adjacent its lateral extremities with paired openings, curved spring conductor members fitted at their extremities into said angular slots and extending outwardly of said disc body through said paired openings, angular slotted upper extremities on said conductors to receive the extremities of feed wires and fitting into curved recesses in the upper extremity of said disc, an identical upper plug disc fitted over said lower disc and

said spring conductors and an elliptical flattened socket structure designed to closely fit the extremity of said plug structure and carrying laterally disposed contacts registering with the curved outer extremities of said spring conductors when said plug is inserted in said socket.

7. In an electric connector, a lower elliptical disc, a central boss extending longitudinally of said disc and providing identical internal recesses therewithin, pairs of laterally disposed slots communicating between said internal recesses and the exterior of said disc, a tapered slot disposed in the upper extremity of said disc adjacent the extremity of said boss, curved spring conductor members fitted into the interior of said disc and extending outwardly thereof through said laterally disposed slots, angular slotted upper extremities on said conductors to receive feed wires inserted through said tapered slot, an identical upper disc fitted over said lower disc and said spring conductors and held rigidly but removably thereover and a corresponding socket carrying lateral spring contacts designed to receive said plug and form an electrical connection with the outward extensions of said spring conductors.

8. In an electrical connector structure, a flattened elliptical lower plug disc, a central boss extending longitudinally of said disc and defining two identical recesses therewithin, a peripheral shoulder about the edges of said disc provided with lateral and terminal openings, curved spring conductor members fitted within said disc on opposite sides of said central boss and extending outwardly therefrom at their medial edges through said lateral openings, feed wires attached to said curved spring conductors and passing through said terminal opening, an identical upper plug disc fitted over said lower disc and said conductors and an elliptical flattened socket designed to closely fit said plug and provided with laterally disposed spring contacts registering with the outer extremities of said spring conductors when said plug is inserted in said socket.

9. In an electrical connector structure, a flattened and tapered lower plug disc, a boss extending longitudinally and medially of said disc and defining two identical recesses within said disc, a shoulder about the edges of said disc provided with lateral and terminal slots, outwardly curved spring conductor members fitted within said disc on opposite sides of said central boss and extending outwardly from the lateral edges of said disc through said lateral slots, an identical disc fitted over said lower disc and over said spring conductors and a flattened hollow cap fitting over the upper extremities of said discs and holding them in close contact with each other.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
808,097	Lawrence, Jr.	Dec. 26, 1905
1,166,349	Goodridge	Dec. 28, 1915
1,317,548	Casper	Sept. 30, 1919
2,235,535	Saunders	Mar. 18, 1941
2,310,024	Frank et al.	Feb. 2, 1943
2,356,752	Deysher	Aug. 29, 1944
2,398,634	Geers et al.	Apr. 16, 1946

FOREIGN PATENTS

Number	Country	Date
678,913	Germany	July 24, 1939