This invention relates to an improvement in electric plugs and deals particularly with a simple and effective plug which will remain in position in a socket receptacle.

In my previous Patent, No. 2,850,711, I disclose a plug having a resilient body portion embodying a groove in one surface and including prongs embedded in the resilient body portion. These prongs are provided with flat surfaces on diverging planes. By manual manipulation the plug body is bent and the flat surfaces of the prongs turned into parallel relation for insertion into the aperture of a socket receptacle. While this plug functions effectively, certain changes have been incorporated in the course of manufacture which increase the effectiveness of its operation as well as convenience of assembly. It is an object of the present application to incorporate these changes and new features.

The primary object of the present invention lies in the provision of a plug having prongs which are held in spaced relation at all times, whether the prongs are disposed in a normal position having their flat surfaces on planes which intersect at an acute angle or whether their flat surfaces are disposed in spaced parallel planes.

While the feature of twisting the prongs out of diverging planes into spaced parallel planes for insertion into a socket receptacle has been successfully practiced, it has been noted that as the resilient plug body is compressed turning the prongs into substantially spaced parallel relation the prongs are not always held in equally spaced relation and are not always held in the same spaced parallel position due to variations both in the resiliency of the material used in the plug and the disposition of the groove in the plug body. It was found that by extending a rigid plate between the prongs within the resilient plug body and pivotally mounting the prongs on the ends of the plate that the prongs will remain in the same spaced relation at all times and thereby be held in alignment with apertures in a socket receptacle as they are pivoted preparatory to insertion in the socket receptacle.

An added feature of the present invention resides in the provision of a plug structure which is adapted to house a ground terminal conductor as well as the conventional prongs.

A further feature of the present invention resides in a particular plug construction which may be a molded one piece member or may be formed of two sections making it possible for a user to assemble or disassemble the plug to make necessary repairs or part replacements.

A still further feature of the present invention resides in the construction of the plug body. In my previous construction the plug body was substantially rectangular having a groove disposed medially of the plug body so that by flexing the sides thereof the prongs were turned into parallel relation. It was found that by forming the plug body substantially U-shaped with diverging opposed side walls, greater flexing action and resiliency was obtained insuring a positive and sufficient degree of pivoting of the prongs embedded within the plug.

These and other objects, advantages and novel features will appear from the following description taken in connection with the drawings wherein:

FIGURE 1 is a perspective view of a plug showing the construction thereof.

FIGURE 2 is a perspective view of the prongs and pivot plate in position within the plug, the plug shown in broken lines.

FIGURE 3 is a vertical sectional view taken through the intermediate portion of a plug and showing a modified form of two section plug construction.

FIGURE 4 is a top plan view of one section as shown in FIGURE 3 looking in the direction of the arrows 4-4.

FIGURE 5 is a sectional view showing the manner in which the plug may lock into a socket receptacle of conventional form.

FIGURE 6 is a perspective view of a modified form of plug construction.

FIGURE 7 is a side elevational view of the plug depicted in FIGURE 6.

FIGURE 8 is an enlarged end elevation view of the plug depicted in FIGURES 6 and 7.

FIGURE 9 is a perspective view of an additional modified form of plug construction.

FIGURE 10 is a side elevational view of the plug illustrated in FIGURE 9.

FIGURE 11 is an enlarged end elevation view of the plug shown in FIGURES 9 and 10.

It is well known that various types of socket receptacles are in use, some having conventional receptacle apertures disposed through an outside shell while others have a third aperture for receiving a ground prong.

While the various forms illustrated are not believed to be entirely equivalent they do have basic construction features which are common.

With reference first to the structure shown in FIGURES 1 and 2, these figures illustrate a plug body 10 formed of a resilient material such as rubber. The plug body includes opposed side members 12 and 14 joined together by a web portion 16. This structure is substantially U-shaped in cross section with the upper edges of the side walls 12 and 14 farther apart than the lower ends connected by the web portion 16. The side walls 12 and 14 are provided with edges 18 converging to a central opening 20 at one end of the plug body.

As is most clearly indicated in FIGURE 2, a pair of elongated prongs 22 and 24 are embedded or molded into the plug body 10 and are arranged having their flat surfaces on planes which intersect at an acute angle. In other words, the prongs 22 and 24 are arranged on substantially the same planes as are the diverging side members 12 and 14. The prongs 22 and 24 extend into and from the plug body in spaced parallel relation. A pivot plate 26 formed of a non-conductive rigid material is embedded or molded in the plug body and is disposed between the prongs. The corners of the pivot plate 26 are provided with tangs 28 which extend through openings 30 in the flat surface of the prongs 22 and 24 and are bent in opposite directions. By this arrangement it will be seen that the prongs will maintain a fixed spaced parallel position within the plug body and that they will be pivotally mounted on the pivot plate 26. The inward ends of the prongs may be provided with extensions 31 to which the conductors 32 and 34 are connected, held thereto by a screw 35 threaded into the prongs 22 and 24.

Referring now to FIGURE 3 of the drawings, the plug 10 as shown in FIGURE 1 may be a piece molded structure or may be formed of two sections, which for the sake of clarity will hereinafter be referred to as an upper section 36 and a lower section 38. The sections may be molded separately having substantially the assembled shape as the plug 10 shown in FIGURE 1.

The sections may be joined together along planes extending through the web portion 16 and along diverging planes through the opposed side walls 12 and 14.

The inner abutting surfaces 40 and 42 may be treated with an adhesive so that when they are assembled together they will be held securely together in sealed relation.

If desired, one or both of the inner surfaces 40 and 42 may be provided with recesses 44 to accommodate...
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3. The prongs 22 and 24 and with a lateral recess 46 to accommodate the pivot plate 26. The central opening 20 is provided with bifurcated channels 48 to accommodate the conductors 32 and 34 leading from the central opening to the recesses 44.

The upper section 36 may be provided with openings 59 in alignment with the screws 55 to provide accessibility to the connection between the prongs and the conductors. Closure plugs 52 insertable in the openings 50 may be positioned therein to seal the plug body 10 after a repair or connection has been completed.

The purpose of the plug body structure together with the pivoting prongs is to provide a fixed parallel relation between the prongs in which the prongs have flat surfaces which are normally in planes which intersect at an acute angle but which can be pivoted into spaced parallel perpendicular planes by squeezing the opposed sides of the plug body together. In other words, by grasping the plug body at the opposed side between the thumb and fingers and compressing the sides inwardly toward each other, the sides will flex causing the prongs to pivot into parallel perpendicular planes while at the same time remaining in fixed spaced relation so that the contact ends of the prongs will be in alignment with the slots 54 of a conventional socket receptacle 56.

As is best shown in FIGURE 5, the prongs 22 and 24 may be provided with intermediate portions 58 which are of lesser width than the opposite ends thus forming notches 60 on either side of the prongs. As the plug body 10 is compressed and the prongs pivoted into parallel perpendicular planes with the slots 54 in the socket receptacle and inserted therein and released, the resiliency of the plug body 10 will inherently return the prongs to a normal position having the flat surfaces in planes intersecting at an acute angle. The ends of the prongs 22 and 24 will be frictionally engaged by the springs 62 and the plug body 10 will be retained or locked into engagement with the socket receptacle by the notches 60 engaged against the inward side of the shell or receptacle wall 64, thus the plug cannot be removed by a longitudinal pull on the cord 66.

In FIGURE 6 of the drawings I disclose a modified form of plug body construction adapted to accommodate a socket receptacle having a ground terminal connection. This second body illustrated in FIGURE 6 and generally indicated by the numeral 68 is constructed similar to the plug body 10 in FIGURES 1 and 2 having opposed side walls 70 and 72 connected by a web portion 74. A further web portion 76 is molded into the web 74 adapted to accommodate a ground terminal prong 78 which is embedded therein and is provided thereon in parallel relation with prongs 80 and 82. The ground prong 78 is suitably connected to a ground wire 84 which is enclosed by the cord 66 in certain electrical systems. The web portion 76, which is disposed longitudinally the length of the plug acts as a stop between the sides 70 and 72 as they are flexed inwardly. Thus, when the sides 70 and 72 are compressed causing the web 76 the prongs 80 and 82 are in alignment with the apertures of a socket receptacle.

As is indicated in FIGURE 8, the plug 68 may be formed in two sections joined together in the same manner as the plug 10 and its sections as illustrated in FIGURE 3, the separation line between the sections being along planes extending through the web portion 74 and the opposed sides 76 and 72 as indicated by the broken lines 86 of FIGURE 8. It will be understood that this modified plug is provided with the same prong and pivot plate arrangement as is provided in the plug body 10.

A further modified form of plug structure is illustrated in FIGURES 9, 10 and 11 and is generally indicated by the numeral 88 comprising opposed prongs 90 and 92 arranged in substantially the same manner as the sides of plug body 10 depicted in FIGURE 1 and the sides of plug 68 of FIGURE 6. A web portion 94 connects the side walls 90 and 92 and is further provided with a flared or rounded portion 96 in which is embedded a ground terminal prong 98. The prong 98 extends from the plug body 88 in parallel relation with prongs 100 and 101 which are also enclosed in the sides 90 and 92 similar to the prong and pivot plate arrangement of the plugs 10 and 68.

From the foregoing description it will become apparent that by resiliently supporting the prongs in fixed parallel spaced relation at all times that the prongs will remain in parallel relation whether in a normal angular position or in a pivoted perpendicular position in alignment with the spaced slots or apertures and extending therefrom, a pair of elongated side members 90 and 92 arranged in substantially the same manner as the sides of plug 68 of FIGURE 6. A web portion 94 connects the side walls 90 and 92 and is further provided with a flared or rounded portion 96 in which is embedded a ground terminal prong 98. The prong 98 extends from the plug body 88 in parallel relation with prongs 100 and 101 which are also enclosed in the sides 90 and 92 similar to the prong and pivot plate arrangement of the plugs 10 and 68.

From the foregoing description it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish, and that it will find an important place in the art to which it pertains when once placed on the market.

It is thought that persons skilled in the art to which the invention pertains will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded unnecessary.

Changes in shape, size, and arrangement of details and parts such as come within the purview of the invention claimed may be resorted to in actual practice, if desired.

I claim:

1. A plug including a generally U-shaped resilient body having opposed side walls joined together by a web portion, a pair of elongated prongs embedded in said side walls and extending therefrom in parallel relation, said prongs comprising elongated strips having their flat surfaces arranged on planes intersecting at an acute angle, a non-conductive rigid pivot plate extending between said prongs, said plate having tangs projecting in spaced relation from opposite ends thereof, said prongs having longitudinally spaced openings through which said tangs extend, whereby when said opposed side walls are compressed toward each other said prongs will pivot until their flat surfaces are in parallel relation.

2. A plug including a generally U-shaped resilient plug body having opposed side walls joined together by a web portion, a further web portion extending between said opposed side walls from said first named web portion, a prong partially embedded in said second named web and extending therefrom, a pair of elongated prongs in said side walls extending therefrom in parallel relation to each other and to said first named prong, said last named prongs comprising elongated strips having flat surfaces arranged on planes intersecting at an acute angle, a non-conductive rigid pivot plate extending between said last named prongs, ends on said plate pivotally connected to said last named prongs to hold them in spaced relation, whereby when said opposed side walls are urged together said walls will flex and said prongs will pivot until their flat surfaces are in parallel relation.

3. A plug including a generally U-shaped resilient plug body having opposed side walls joined together by a web portion, a further web portion extending from said first named web on a plane intermediate the said side walls, said further web extending from said first named web in a direction opposite the direction in which said side walls extend, a prong partially embedded in said second named web and extending therefrom, a pair of elongated side members 90 and 92 arranged in substantially the same manner as the sides of plug body 10 depicted in FIGURE 1 and the sides of plug 68 of FIGURE 6.
comprising elongated strips having flat surfaces arranged on planes intersecting at an acute angle, a non-conductive rigid pivot plate extending between said prongs, said plate having means on the ends thereof for pivotally connecting said plate to said prongs to hold them in spaced relation, whereby when said side walls are flexed towards each other said prongs will pivot until their flat surfaces are in parallel relation.

4. A plug including a generally U-shaped resilient plug body having opposed side walls connected together by a web portion, a pair of elongated prongs in said opposed side walls and projecting therefrom in parallel relation, said prongs having flat surfaces on planes intersecting at an acute angle, a non-conductive rigid pivot plate extending between said prongs and engaging the nearer flat surfaces intermediate the edges of said prongs, ends on said plate pivotally connecting said prongs to said plate to hold them in spaced relation, said resilient plug body comprising two sections connected together, said sections being joined together along planes extending through said web portion and along diverging planes through said opposed side walls.

5. The structure as described in claim 4 and in which one of said sections is provided with recesses in its adjoining surface adapted to accommodate the said elongated prongs and said rigid pivot plate, an open end in one of said sections, wire connector grooves in one of said sections between said recesses and said open end of one said section whereby when said sections are joined, said elongated prongs, said rigid pivot plate, and said wire connector will be held enclosed in said plug body.

6. A plug including a plug body of resilient material having generally diverging opposed side walls joined together by a web portion, a pair of elongated strips forming prongs partially embedded in said side walls and extending in parallel relation therefrom in the same direction from said body, said prongs having flat surfaces arranged on planes intersecting at an acute angle, and a pivot plate of insulation material pivotally connecting said prongs together at a locus intermediate the side edges of each prong, the projecting ends of said prongs having portions of reduced widths adjoining said plug body forming notches whereby when said side walls are compressed together said prongs are pivoted into parallel relation for use in conjunction with a socket having an enclosing shell provided with generally rectangular apertures through which and spring contacts inwardly of said shell adapted to engage the said prongs of a plug when said prongs are inserted into said rectangular apertures and when the said plug is released after insertion said notches of said prongs will permit the ends of the said prongs to twist out of alignment with said apertures in said shell.

7. The structure described in claim 5 and in which the side walls of one of said sections is provided with opposed openings overlying said elongated prongs, and closure plugs insertable in said openings whereby said wire conductors connected with said elongated prongs are exposed and accessible when said plugs are removed and are enclosed and sealed when said plugs are in place in said openings.

8. A plug including a generally U-shaped resilient plug body having opposed side walls and a web portion connecting opposed edges of said side walls, a pair of elongated prongs in said side walls extending therefrom in parallel relation to each other, said prongs comprising elongated strips having flat surfaces arranged on planes intersecting at an acute angle, a non conductive rigid pivot plate extending between said prongs, said pivot plate extending longitudinally of said prongs and hingedly connected along opposite ends to said prongs between the edges thereof, whereby when said opposed side walls are urged together, said walls will flex and said prongs will pivot until their flat surfaces are in parallel relation, said pivot plate holding said prongs properly spaced.

9. A plug including a generally U-shaped resilient plug body having opposed side walls and a web portion connecting opposed edges of said side walls, a further web portion extending from said first named web portion at substantially right angles thereto, a prong partially imbedded in said further web portion and extending therefrom, a pair of elongated prongs in said side walls extending therefrom in parallel relation to each other and to said first named prong, said last named prongs comprising elongated strips having flat surfaces arranged on planes intersecting at an acute angle, a nonconductive rigid pivot plate extending between said last named prongs, said pivot plate extending longitudinally of said prongs and having ends pivotally connected to last named prongs to hold them in spaced relation, whereby when said opposed side walls are urged together said walls will flex and said prongs will pivot until their flat surfaces are in parallel relation.

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