

Sept. 20, 1966

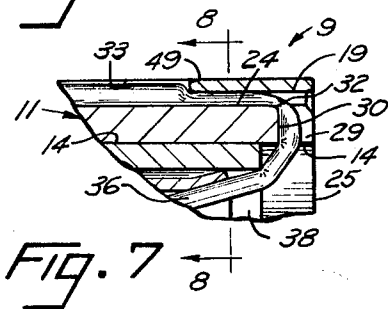
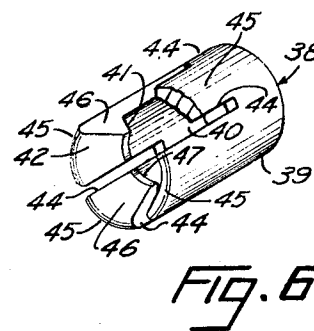
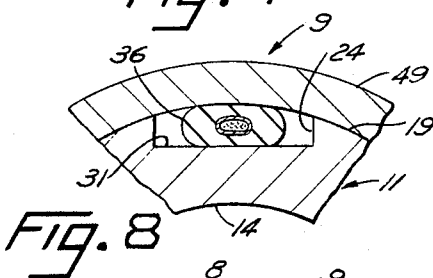
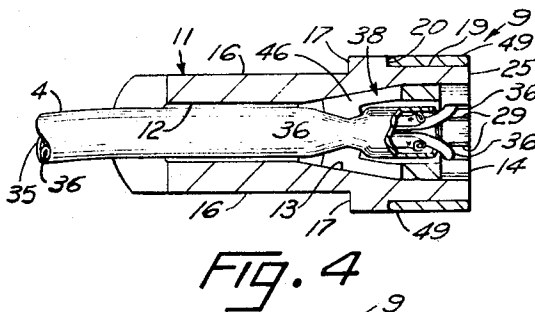
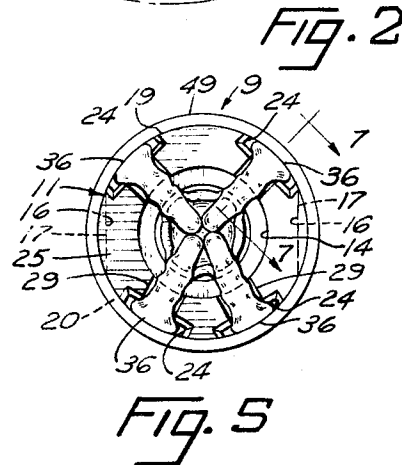
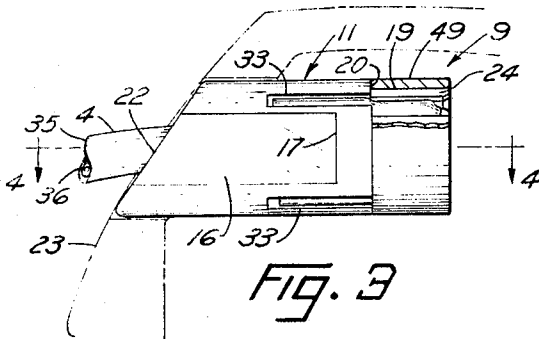
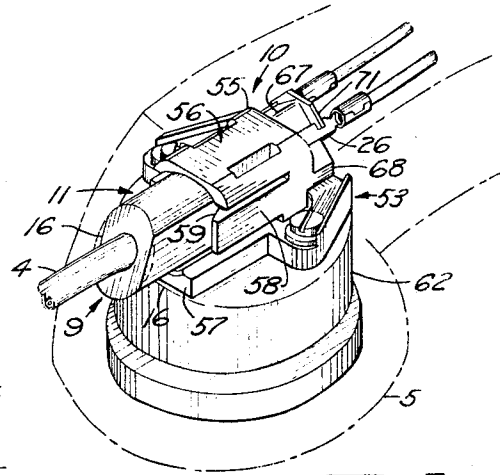
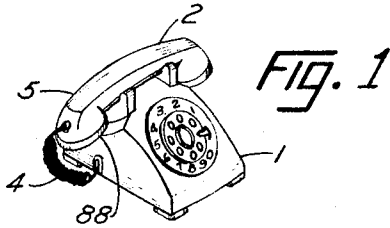
C. E. MICHAELY

3,274,530

TINSEL WIRE CONNECTOR

Filed Nov. 5, 1963

3 Sheets-Sheet 1



INVENTOR

Charles E. Michaely

BY

Boardman S. Mowry
ATTY

Sept. 20, 1966

C. E. MICHAELY

3,274,530

TINSEL WIRE CONNECTOR

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3 Sheets-Sheet 2

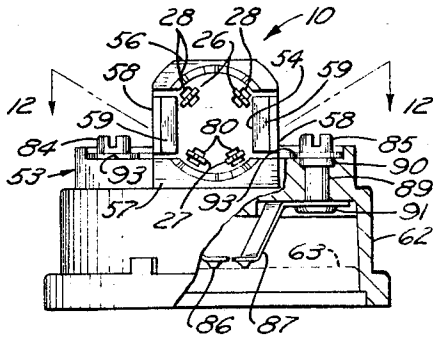


Fig. 9

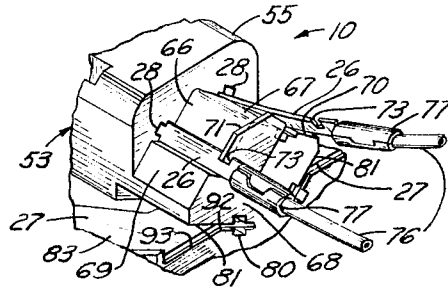


Fig. 11

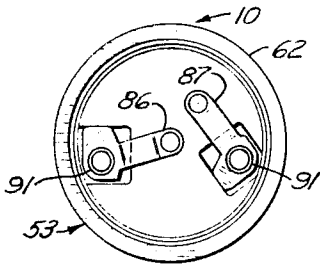


Fig. 10

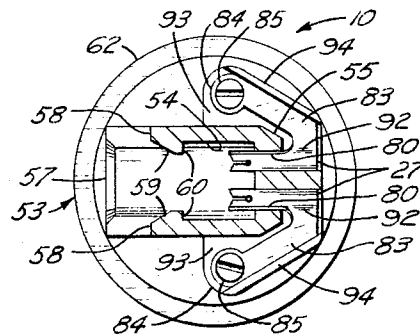


Fig. 12

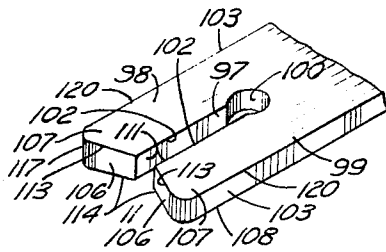


Fig. 13

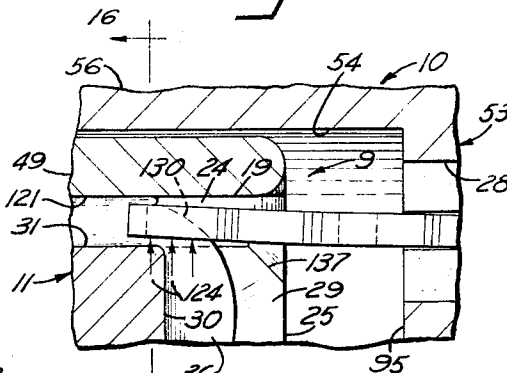


Fig. 15

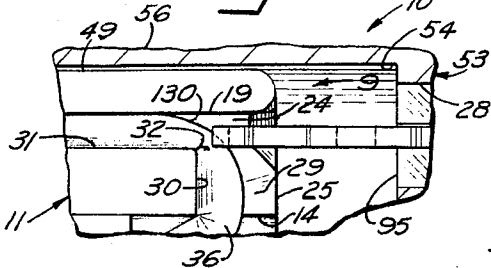


Fig. 14

INVENTOR

Charles E. Michaeley

BY

Boardman S. Mowry
Atty

Sept. 20, 1966

C. E. MICHAELY

3,274,530

TINSEL WIRE CONNECTOR

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3 Sheets-Sheet 3

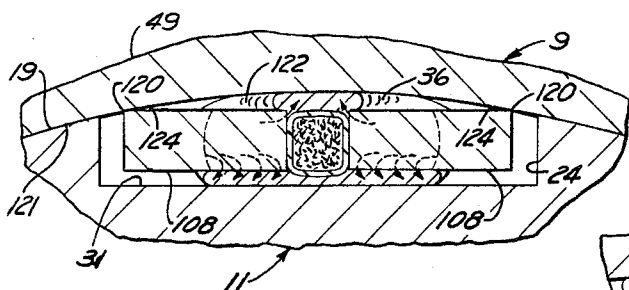


Fig. 16

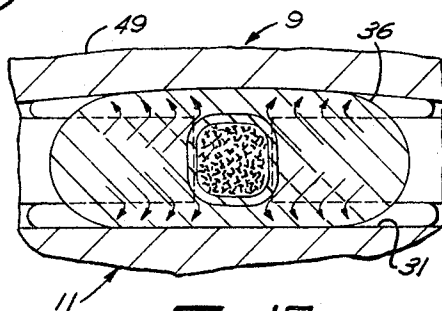


Fig. 18

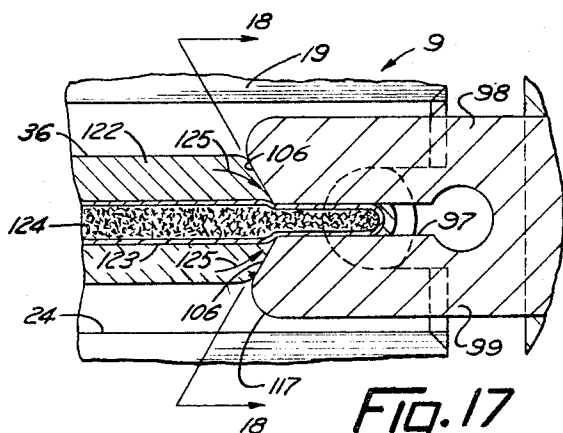


Fig. 17

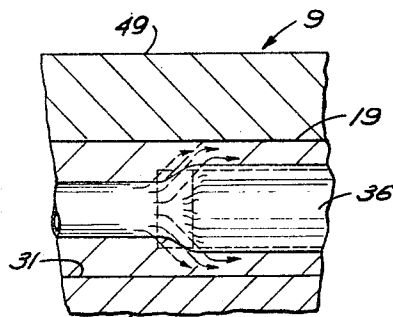


Fig. 20

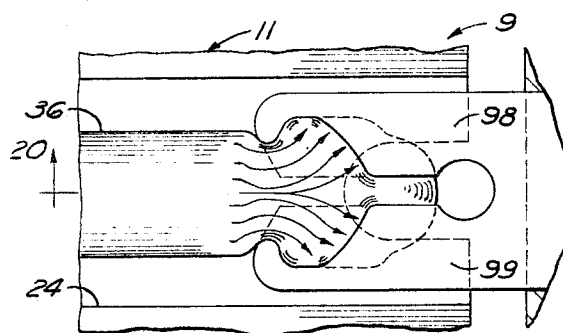


Fig. 19

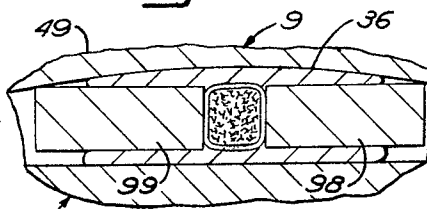


Fig. 22

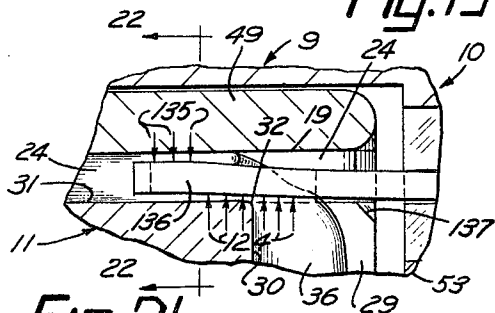


Fig. 21

INVENTOR
 BY *Charles E. Michaely*
 Boardman S. Mowry
 ATTORNEY

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3,274,530

TINSEL WIRE CONNECTOR

Charles E. Michaely, 9132 Greenwood Ave.,
Des Plaines, Ill.

Filed Nov. 5, 1963, Ser. No. 321,492

4 Claims. (Cl. 339-97)

This invention pertains to electrical connectors and more particularly, to means for making an electrical connection or electrical connections to a tinsel wire or to a plurality of such wires. The invention especially pertains to telephones and the cord containing tinsel wires, now almost without exception a stretchable coil cord, between the hand set and the base portions of the phone, though the invention, in other than some of its more specific aspects, is very definitely not restricted to the same.

A primary objective of the invention is to provide a connector for making an electrical connection directly to an insulated tinsel wire having its insulation substantially intact to the end thereof without damaging the tinsel conductor of the wire.

Another very important object of the invention is to provide a connector for making an electrical connection directly to an insulated tinsel wire having its insulation substantially intact to the end thereof without damaging the tinsel conductor of the wire.

Another very important object of the invention is to provide a connector as above set forth which will reliably make a good electrical connection to even very old wire having a thick coating or layer of insulating oxide, sulphide, or other undesired matter.

Another and much more specific object of the invention is to provide a telephone coil cord having a connector portion at each end thereof which portions and the wires of the cord attached thereto are insertable through an opening in the microphone end of the hand set and an opening in the side of the base, respectively, of a telephone into electrical making engagement of the wires with contact means of a connector portion in the hand set and contact means of a connector portion in the base, respectively, of the telephone as above indicated for the connection making, which first named portions also being most easily removable from the electrical making engagement of the wires thereof with the contact means of the second named portions, respectively.

Other objects, advantages and features of the invention in its various aspects and forms will appear in the course of reading and considering the following description, in conjunction with the accompanying drawing in which:

FIG. 1 is a perspective view of a telephone employing a preferred form of the invention;

FIG. 2 is an enlarged perspective view of the upper connector and microphone casing combination contained within the speaking end of the hand set of the telephone, which latter is indicated in phantom lines;

FIG. 3 is an enlarged side elevational view of the plug or female portion of the upper connector in the FIG. 2 position but with the rest of the connector being omitted for the purposes of illustration, part of the hand set of the telephone being shown in phantom lines and part of said portion being shown broken away;

FIG. 4 is a sectional view taken on line 4-4 in FIG. 3 and in the direction of the arrows;

FIG. 5 is an enlarged end elevational view of the connector portion shown in FIG. 3 as seen from the right in that figure;

FIG. 6 is an enlarged perspective view of the inner wire holding member shown by itself in an unstressed condition;

FIG. 7 is an enlarged fragmentary sectional view taken

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on line 7-7 of FIG. 5 and in the direction of the arrows;

FIG. 8 is an enlarged cross sectional view taken on line 8-8 in FIG. 7 and in the direction of the arrows;

FIG. 9 is a front elevational view of the socket or female portion of the upper connector with a portion being broken away to show the interior;

FIG. 10 is a bottom plane view of the portion shown in FIG. 9;

FIG. 11 is an enlarged fragmentary perspective view of the upper rear portion of the connector portion shown in FIG. 9 showing one of the contacts in the process of being inserted and anchored in said portion;

FIG. 12 is an enlarged sectional view taken along lines 12-12 of FIG. 9 and in the direction of the arrows;

FIG. 13 is a greatly enlarged perspective view of the forward end portion of one of the four contacts of the connector portion shown in FIG. 9, such end portions of all of the contacts being the same;

FIG. 14 is an enlarged fragmentary longitudinal center sectional view similar to FIG. 7 but showing a portion of the socket part with one of its contact members just touching the insulation of one of the tinsel wires and ready to start its insertive contact making movement relative to the plug portion;

FIG. 15 is a more greatly enlarged view similar to FIG. 14 but showing the contact member introduced to some extent;

FIG. 16 is a greatly enlarged fragmentary cross sectional view taken on line 16-16 of FIG. 15 and in the direction of the arrows and showing the paths of plastic insulation flow taking place ahead of the cutting plane;

FIG. 17 is a greatly enlarged fragmentary longitudinal center sectional view at right angles to the FIG. 15 showing but with the contact member being shown in a more fully inserted position than that shown in FIG. 15 and with the paths of plastic insulation flow being indicated by means of arrows;

FIG. 18 is a greatly enlarged fragmentary sectional view taken on lines 18-18 of FIG. 17 and in the direction of the arrows and with the paths of plastic insulation flow being indicated by means of arrows;

FIG. 19 is a view similar to FIG. 17 but at a higher elevation showing the exterior of the plug member under the collar and of the wire and contact member and with the plastic flow of the insulation being indicated by arrows;

FIG. 20 is a fragmentary sectional view taken along lines 20-20 of FIG. 19 and in the direction of the arrows and with the plastic flow being indicated by arrows;

FIG. 21 is a view similar to FIG. 15 but with the contact member being shown fully inserted and with forces which maintain the member in the proper disposition while inserted being indicated by arrows;

FIG. 22 is a cross sectional view taken on lines 22-22 of FIG. 21 and in the direction of the arrows showing the static condition of the plastic insulation when the electrical connection is made.

Referring to the drawing figures in detail and first to FIGS. 1 through 22, the numeral 1 designates the base portion of the telephone on which a hand set 2 is normally cradled or supported when not in use. A flexible and extendable coil cord 4 extends between the speaking end 5 of the hand set and the lower part of the base portion 1 of the phone. The upper connector and microphone casing combination, shown in the fully assembled, electrical connection making condition in FIG. 2, comprises a plug or female portion generally designated 9 and a socket or male portion including the microphone casing generally designated 10.

The plug portion 9 comprises a rigid member generally designated 11 of electrically insulative material such as

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suitable plastic having an opening 12 extending there-through along the axis of the member. The opening 12 has a forwardly converging frusto-conical surface 13 in the mid and forward portion thereof while the opening has a cylindrical surface 14 extending rearwardly of the conical surface to the rear limits of the plug member 11. The latter member is cylindrical in outer configuration between the ends thereof except for a pair of opposite, coextensive flat, surfaces 16 forming a pair of forward flat shoulder portions 17 at the rear ends thereof and a rearward reduced portion 19 of cylindrical form forming an annular shoulder 20 at the forward end thereof. The member 11 has a flat forward inclined face 22 which is disposed in a generally flush relation with the end surface 23 of the hand set of the telephone in the position of the member shown in FIG. 2.

The member 11 is also provided with four rectangular grooves 24 extending from the rearward face 25 of the member forwardly as far as the annular shoulder 20. The upper grooves 24 are disposed at 45 degrees from and on opposite sides of a vertical plane passing through the axis of the member while the lower grooves 24 are disposed at 30 degrees from and on opposite sides of such plane to provide a polarizing arrangement for engagement of the four contained tinsel wires with the four contacts 26 and 27 of the socket portion 10 which contacts are similarly arranged at the same angularity to a vertical plane passing through the axis or longitudinal center line of the portion, thus to permit but a single electrical connection making relation between the portions 9 and 10 in the assembled condition shown in FIG. 2. The member 11 is further provided with four identical notches 29 extending forwardly from the rear face 25 of the member and each terminating in a rearwardly facing semi-cylindrical forward or inner surface 30 (see FIG. 7) and which notches extend from the inner cylindrical surface 14 of the member radially outwardly to the inner or bottom flat surfaces 31 of the notches, respectively, each of the notches 29 so entering its groove 24 with a slightly rounded semi-circular edges 32. The plug member 11 is also provided with four grooves 33 (only two of which are shown) of a little less width than a tinsel wire and continuing straight forwardly from the grooves 24, respectively.

The coil cord 4, which comprises an outer sheathing 35 of flexible resilient material such as a suitable plastic and four insulated flexible tinsel wires 36 therewithin, extend within the central opening 12 of the plug member 11 and also a combination tinsel wire holding member and coil cord strain relief member generally designated 38 and now to be described.

The member 38 has an outer cylindrical wall or surface 39 extending from the front to the rear thereof in the unstressed, unmounted condition of the member shown in FIG. 5 and an inner cylindrical surface 40 extending from the rear forwardly and terminating in an annular shoulder 41 in the condition of the member shown in FIG. 5. An inwardly converging frusto-conical surface 42 extends rearwardly from the front end of the device terminating close to the shoulder 41. Four equally spaced, identical parallel slots 44 extend most of the length rearwardly from the front of the device to provide four resilient segments or portions 45. The conical surface 42 together with the shoulder 41 form four inwardly projecting portions 46, one on each of the segments 45, for a purpose to appear shortly.

The plug portion 9 is also provided with a ring like collar 49 formed of rigid, electrically insulative material such as suitable plastic which member extends around the cylindrical surface 19 of the member 11 from the rear face 25 of the latter to the annular shoulder 20 of the same in the mounted relation of the parts. Although the inner diameter of the collar 49 is such as to cause the collar to remain on the plug member 11 in engagement with the cylindrical surface 19 thereof both prior to as well as after the securement of the four tinsel wires 36 within

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the plug portion, such inner diameter may be somewhat larger so that the collar 49 will not so remain on the plug member 11 prior to such attachment of the wires but is retained thereon, even out of contact with the cylindrical surface 19 of the member, by the four tinsel wires 36 received within their respective grooves 24 of the member 11 when thereon and cannot be retained thereon prior to the mounting of the collar over the four tinsel wires 36 and which is retained on the member 11 only by the resiliency of the squeezed tinsel wires interposed between the same and the member 11 as well as a collar of the dimensions to which reference was made above and represented in the drawing figures.

For attachment or securement of the end portion of the coil cord 4 of the telephone to the plug portion 9 of the upper connector, the coil cord which comprises the outer sheathing 35 and the four contained tinsel wires 36 is inserted through the central opening 12 of the plug member 11 from the front thereof and pulled entirely through that member. The entire coil cord is then inserted through the central opening 47 of the holding member 38, between the portions 46 thereof, from the front and entirely through the open center of that member. It is pointed out in this connection that the opening 47 between the inwardly projecting portions 46 of the segments 45 of the member 38 is of a smaller size than the outer diameter of the outer sheathing 35 of the coil cord 4, thus to cause the segments 45 to flex outwardly when the coil cord is passed through the opening 47 of the member 38. The outer sheathing 35 of the coil cord 4 is next cut away back from the ends of the four tinsel wires 36 a substantial and suitable distance if such cutting of the sheathing has not already been accomplished prior to this time. The entire cord 4 is next pulled forwardly through the holding member 38 until the end of the outer sheathing 35 of the cord is somewhat inwardly of the rear end of the member 38 as can best be appreciated from viewing FIG. 4. The entire cord 4 together with the member 38 thereon is then moved forwardly within the inner cylindrical portion 14 of the opening 12 of the plug member until the front end of the holding member 38 is in light engagement with the inner conical surface 13 of the plug member 11. The four tinsel wires 36 are then placed within the respective radially extending notches 29 against the semi-cylindrical forward surfaces thereof with as much as possible of the surplusage or looseness of the wires eliminated and the wires therebrought around and placed within the respective longitudinal slots 24 of the plug member 11, as can best be appreciated from FIG. 7. Any extra lengths of the tinsel wires may be placed within the respective grooves 33 if they are not too excessive in length or the same may be trimmed off. The collar 49 is then moved forwardly onto over the outer reduced cylindrical portion 19 of the plug member 11 the four tinsel wires 36 in the grooves 24 of the member into the mounted position shown in FIGS. 3-7, for instance, of the drawing. As can be seen in FIGS. 5, 7 and 8, the distances between the inside of the collar 49 and bottom or inside surfaces of the grooves 24 is considerably less than the diameters of the tinsel wires 36 when in their normal round unstressed or unsqueezed conditions. Accordingly, when the collar 49 is slipped over the end of the plug member 11 and the four tinsel wires 36, the latter becomes considerably squeezed between the collar and bottom or inner surfaces of the grooves 24 of the member 11. This squeezing retains the collar 49 as well as the four tinsel wires firmly in place. Such retention of the collar is of course the only means of retention of the same on the member 11 where the inner diameter of the collar is appreciably greater than the diameter of the portion 19 as previously indicated. The coil cord 4 is then grasped by one hand and pulled forwardly firmly or as far as reasonably possibly while holding onto the plug member 11 with the other hand. This causes movement of the holding member 38 forwardly with the coil cord

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by virtual of a certain gripping of the cord by the inwardly projecting portions 46 of the member and the engagement of the ungripped sheathing 35 of the cord immediately behind the annular shoulder of the member with the shoulder. Such forward movement of the holding member 38 relative to the plug member 11 produced inward coming and flexure of the sectors or portions 45 of the holding member by the engagement of portions 45 with the frusto-conical surface 13 of the plug member 11 to even more strongly grip the coil cord 4 and pull the member 38 forwardly along with the same. The member 38 accordingly becomes very tight within the plug member 11 to serve as a combination strain relief of the coil cord 4 and also, most importantly, to pull the individual tinsel wires 36 into a relatively taut condition from their squeezed portions within the grooves 24 of the plug member 11. The latter holding of the tinsel wires 36 in a taut condition serves an important purpose which will appear hereinafter. It should of course be appreciated in this connection that friction between the frusto-conical surface 13 of the plug member 11 and the resilient portions 45 of the holding member 38 retain the latter member in a forward mounted condition within the plug member 11 as seen in FIG. 4.

The socket or male portion 10 of the connector comprises a member generally designated 53 of electrically insulative material such as a suitable plastic which member provides a forwardly opening cavity 54 for relatively snugly receiving the assembled plug portion 9 with attached and positioned tinsel wires 36 therewithin for the assembled relation of the connector shown in FIG. 2. The cavity 54 is more particularly formed by a back portion 55, and upper and lower portions 56 and 57 and two outwardly flexible and resilient side portions 58. The two side portions 58 are provided with a pair of flat, vertical, rear-converging, cam surfaces 59, respectively, which are flat, coplanar shoulder surfaces 60, respectively, for outward flexure or coming of the side portions over the round rearward portion of the plug portion 9 of the connector during insertion of the plug portion within the cavity 54 of the socket portion and for inward flexure of the portions 58 behind the round rearward portion of the plug member for interlocking engagement by the shoulders 60 of the side portions 58 of the socket member with the shoulder portions 17 of the plug portion. It is pointed out in this connection that a U shape tool may be inserted along the opposite flat surfaces 16 of the plug portion 9 and pushed against the cam surfaces 59 of the socket portion 10 to expand or outwardly flex the side portions 58 thereof for the release and withdrawal of the plug portion 9 from the locked, electrical contact making relation with the socket portion whenever desired. Referring to FIG. 2, the above mentioned tool can be inserted in the space which is available between the plug member 11 and the hand set of the telephone on each side of the member. It is also pointed out that the same release may be effected in the same manner in connection with the lower connector portion shown in FIGS. 26 through 28, the tool also being conveniently insertable from outside of the telephone.

The socket member 53 is also provided with a lower open bottom cylindrical casing portion 62 for containing the microphone 63 shown in phantom lines in FIG. 9, the socket portion 10 further being provided with four electrical contacts 26 and 27. These contacts have identical forward, tinsel wire engaging, electrical contact making portions one of which is shown fragmentarily in FIG. 13 and which will be considered subsequently.

The upper contacts 26 extend straight rearwardly through a cross-shaped opening 28 for each which relatively snugly receives the same which contacts extend in flat bottom side engagement with rear surfaces 66 and 67, respectively, of a rearwardly extending portion 68 of the member 53. The lower or outer edges of the contacts 26 extend along and rest against the inner flat surfaces, re-

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spectively, of raised outwardly extending portions 69 and 70, respectively, of said rearwardly extending portion of 68 to provide firm support together with the surfaces 66 and 67 to the contact members in the fully assembled relation of the latter. A transversely extending vertical wall portion 71 of the portion 68 extends rearwardly of the upwardly surfaces 66 through 70 and upwardly to some extent from the surfaces 66 and 67 for snug fitting engagement within the notches 73 of the contact members 26 when the latter are in the mounted, locked conditions thereof shown in the case of one of the contact members at the lower half of FIG. 11. The upper part of FIG. 11 shows the other resilient contact 26 slightly outwardly flexed and being passed over the upwardly extending rearward wall portion 71 during insertion of the contact through its opening 28 which extends through the rear portion 55 of the socket member 53. This latter contact member is continued in its forward movement until the notch 73 thereof registers with the upward extending wall portion 71 whereupon the resilient contact snaps inwardly or downwardly into the interlocked relation indicated for the other contact in the lower half of FIG. 11. It should be obvious that these contacts 26 may be easily removed from the socket member 53 merely by lifting the rear portions of the contacts 26 above the rearward wall portion 71 and then moving the entire contact members, in a flexed condition, rearwardly out of the openings 28 through the rear portion 55 of the socket member. Each of the contacts 26 is connected to an insulated tinsel wire 76 by means of crimping an originally U shaped rear portion of the contact 77 within which the end part of insulated wire is placed and which rearward portion 77 has a pair of longitudinally spaced upwardly struck elements for piercing the wire and the electrical contact with the tinsel wire upon formation of the U shaped rear portion 77 into the cylindrical crimped condition shown in FIG. 11. It is also pointed out that the contacts 26 are identical to each other, one of them merely being flipped over 180° relative to the other so that this can be the case, that is, so that the notch 73 thereof is uppermost or innermost.

The lower two contacts 27, which are mirror images of each other, extend through cross shaped openings 80 in the rear portion 55 of the socket member 53, being relatively snugly received within the same, and rearwardly from there in flat upperside engagement with the flat inclined under surfaces 81, respectively, of the rearwardly extending portion 68 of the socket member. The contacts 27 are provided with outwardly extending legs 83 terminating in somewhat enlarged and centrally apertured portions 84 through which screws 85 extend for electrical connection to spring contact members 86 and 87 within the microphone casing 62 for electrical contact with the microphone 63 when placed within the casing and retained therein by a lower perforated portion 88 of the hand set 2 of the telephone threaded receiver on the rest of the hand set. Each of the screws 85 is actually threadedly received within an internally threaded sleeve 89 (only one of which is shown) which is retained within the socket member 53 and also which retains its spring finger such as 87 thereon by being enlarged at its upper end 90 and rolled outwardly and upwardly at its lower end 91. Each of the contact members 27 is outwardly and horizontally bent at 92 from its downward and inwardly inclined condition, the outer flat legs 83 of which contacts rest against the upper flat, horizontal coplanar surfaces 93 of the socket member. These contact members may also be easily removed from the socket member 53 by merely removing the screws 85 and slipping the contacts out rearwardly through the openings 80 in the socket member. To complete this part of the description, upwardly extending, rearwardly converging walls 94 are provided from the flat surfaces 93 of the socket member 53 along which walls the legs 83 of the lower contacts 27 continually engage along the outer edges thereof, thus to retain the contacts in their proper posi-

tions during the making of the electrical connections. For removal of the contacts 27 from the socket member, the leg portions 83 thereof, of course, must be raised up, flexing the contact member, over the walls 94.

Each of the contacts 26 and 27 extend forwardly of the rear wall or surface 95 of the cavity 54 of the socket member a substantial and equal distance therefrom. Each of the electrical contacts is longitudinally, medially slotted at 97 to form two spaced connector portions 98 and 99 of the same width thereacross. The slot 97 terminates rearwardly in a circular opening 100 which facilitates the formation of the slot and serves no other function over having the flat sidewalls of the slot 97 extend all the way to the rear extremity thereof. It is also pointed out that the slot 97 terminates at the rear thereof, by way of the circular opening 100, somewhat forwardly of the rear wall 95 of the cavity 54.

Each of the spaced portions 98 and 99 of each contact is of rectangular cross section and has inner and outer parallel faces 102 and 103, each of said portions being of uniform cross section from the front of the slot 97 to the round opening 100 of the contact. The co-extensive portions 98 and 99 each contain a flat lead-in surface 106. Each of these lead-in surfaces and also each of the inner and outer faces 102 and 103 of the spaced portions 98 and 99 is in a vertical plane normal or at right angles to the upper and lower, flat, parallel faces 107 and 108 of said portions.

Each of the lead-in surfaces 106 extend outwardly and forwardly from the inner faces 102 of the portions 98 and 99 at 120 degrees to form a well defined combination insulation shearing and scraping edge extending the full height or thickness of the contact portions 98 and 99. The junctures of these lead-in surfaces 106 with the upper and lower flat faces of the contact portions 98 and 99 are also well defined insulation shearing surfaces 113 and 114. The lead-in surfaces 106 smoothly merge into curved outer end surfaces 117 which latter in turn smoothly merge into the outer faces 103 of the contact portions. Each of the contact portions 98 and 99 of each of the contacts of both the upper and lower connectors are mirror image duplicates of each other as is believed quite evident from the drawing figures.

The height or thickness of each pair of contact portions 98 and 99 is substantially less than the distance between the collar 49 in which the pair of contact portions is inserted, along the center of the groove and the bottom surface 31 of the groove 19, as is quite evident from viewing FIG. 16 for instance. Moreover, the thickness of each pair of said contact portions is also appreciably less than the distance between the collar 49 and bottom surface 31 of the groove 19, in which the pair of contact portions is inserted, along the outer portions of the groove in the neighborhood of the outer edges or surfaces 103 of the contact portions 98 and 99 as can be appreciated from viewing FIG. 16 for instance.

The upper and lower flat faces of each contact extend substantially straight forwardly from the back surfaces 95 of the cavity 54 of the socket member 53 substantially at right angles to the same prior to insertion of the contact and further, the lower flat face of the contact is substantially co-planar with the bottom, flat surface 31 of the groove 24, in which the contact is inserted, of the plug member 11 before the contact is inserted in the groove, or more precisely, before the contact is caused to be inserted in the groove by the movement of the plug portion 9 farther within the socket portion 10, as can be appreciated from viewing FIG. 14. In this figure, the plug portion 9 has been shown moved within the socket member 53 so that the outer surface of the insulation of the tinsel wire 36 just touches the lead-in surfaces 106 of the contact portions 98 and 99 on each side of the central slot 97 of the contact.

In FIG. 15, the plug portion 9 has been depicted as having been moved somewhat farther within the socket

member 53 to, in effect, cause the contact portions 98 and 99 of each pair of portions to be inserted somewhat farther within the space between the collar 49 of the plug portion and bottom of the groove thereof in which the pair of contact portions is inserted. It will be noted that the spaced contact portions 98 and 99 have flexed somewhat upwardly from their support within the socket member 53, after first eliminating what space there may be present, the contact portions having ridden up on the curved outer surface of the insulation of the tinsel wire, rather than appreciably compressing the same or causing shearing thereof, until the forward parts of the outer upper edges 120 of the portions 98 and 99 engaged the inner cylindrical surface 121 of the collar 49 above the outer portions of the groove 24 of the plug member as shown in FIG. 16. Further insertive movement of the contact portions 98 and 99 beyond the point where they first contact the surface 121 will cause cutting of the insulation of the tinsel wire by shearing and a certain cold flow of the plastic insulation producing a considerable amount of plastic pressure below the forward parts of the contact portions 98 and 99 exerted or applied upwardly on said portions as indicated by the arrows at 124 (see FIG. 15), to thenceforth cause the forward part of the outer upper edge 120 of each contact portion to continually engage and ride along the inner surface 121 of the collar 49 during the rest of the insertive movement of the contact portions and as long as the electrical connection remains thereafter.

Although certain illustrative forms of the invention have been disclosed for telephone use as well as general use, it should be appreciated that many other forms of the invention in its various aspects and areas may be had within the general overall spirit of the invention. Accordingly, the present invention should be limited only by the terms of the appended claims read in the light of the broad overall spirit of the invention in its various aspects and concepts.

What is claimed is:

1. A plug member for an electrical connector comprising a body member having an opening therethrough, said body member having an annular portion of reduced diameter at its rearward end, said annular portion having a series of axially extending grooves in its outer surface extending from its rearward end toward its forward end, a strain relief member disposed within said opening, said relief member having an axial passage therethrough, a plurality of wires extending through said passage, each of said wires having an insulating covering, the outer end of each of said wires being folded back to engage the bottom surface of one of said grooves, a collar encircling said annular portion and engaging said insulating covering of said wires to hold said wires in engagement with said body member, and said body member and said strain relief member having means cooperating to hold said members in assembly, and said strain relief member having elements gripping said wires to minimize a pull-strain thereon, said strain relief member and said collar cooperating to hold the wires firmly in said grooves, said grooves being of greater dimensions than said wires and being adapted to receive a mating contact and for making electrical connection therewith by removal of the insulation from the wires upon movement of the mating contact into the grooves.

2. The device of claim 1 in which said strain relief member has a plurality of flexible portions gripping said wires, said body member having a constricted portion adjacent said opening therethrough, said constricted portion engaging said flexible portions when said body member and strain relief member are in assembly to hold said flexible portions in gripping relation to said wires.

3. The device of claim 1 in which said strain relief member is of tubular form and provides a series of flexible portions extending axially thereof at its forward end, each of said flexible portions having an inwardly disposed

gripping element extending into said passage, and said body member having walls adjacent said opening converging forwardly thereof, said converging walls engaging said flexible portions when said body member and strain relief member are in assembly to hold said flexible portions in gripping relation to said wires.

4. A plug member for an electrical connector comprising a body member having an opening therethrough, said body member having an annular portion at its rearward end, said annular portion having a series of axially extending grooves in its outer surface extending from its rearward end toward its forward end, a strain relief member disposed within said opening, said relief member having an axial passage therethrough, a plurality of wires extending through said passage, each of said wires having an insulating covering, the outer end of each of said wires being folded back to engage the bottom surface of one of said grooves, fastener means associated with said annular portion for holding said wires in engagement with said body member, and said body member and said strain relief member having means cooperating to hold said members in assembly, and said strain relief

member having elements gripping said wires to minimize a pull-strain thereon, said strain relief member and said fastener cooperating to hold the wires firmly in said grooves, said grooves being of greater dimensions than said wires and being adapted to receive a mating contact and for making electrical connection therewith by removal of the insulation from the wires upon movement of the mating contact into the grooves.

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EDWARD C. ALLEN, *Primary Examiner*.

W. DONALD MILLER, *Examiner*.