Dec. 5, 1933. W. C. TREGONING 1,938,303

ELECTRICAL CONNECTING DEVICE

Filed Oct. 3, 1929 2 Sheets-Sheet 1

Fig. 1

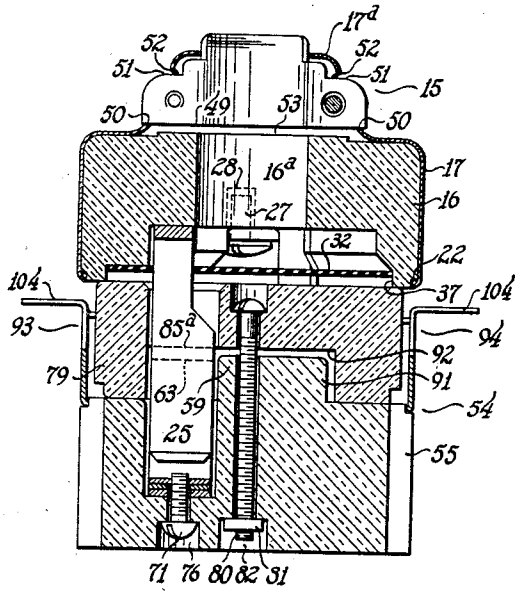


Fig. 2

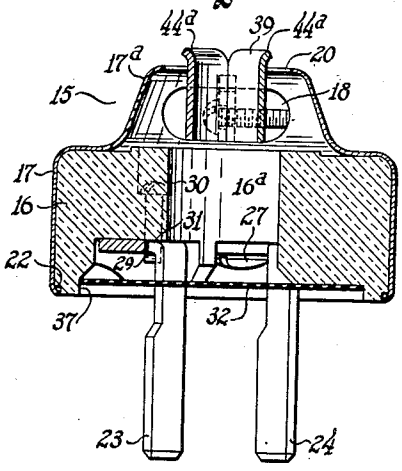


Fig. 3

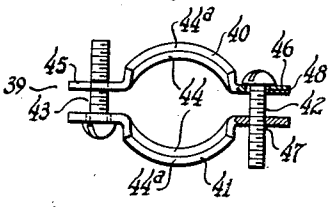


Fig. 5

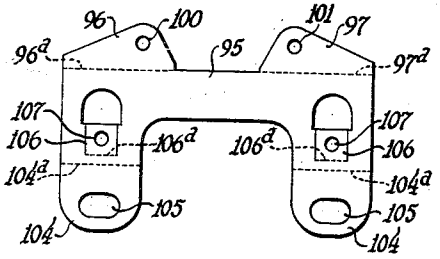


Fig. 4

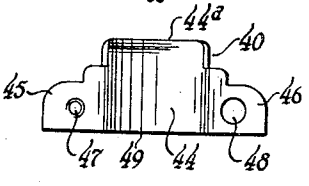


Fig. 6

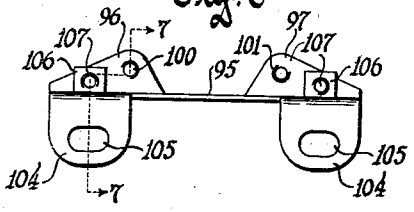
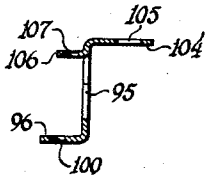


Fig. 7



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Fig. 8

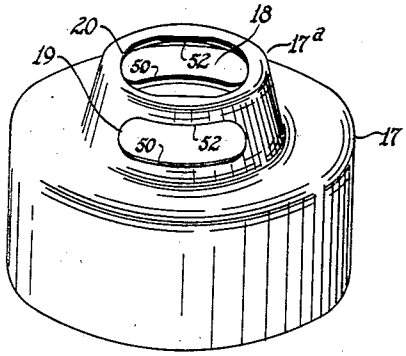


Fig. 9

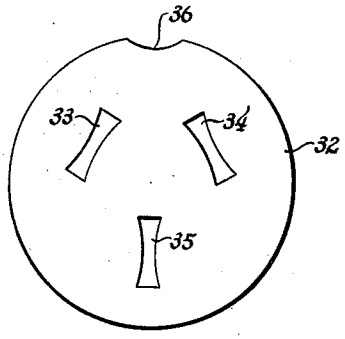


Fig. 10

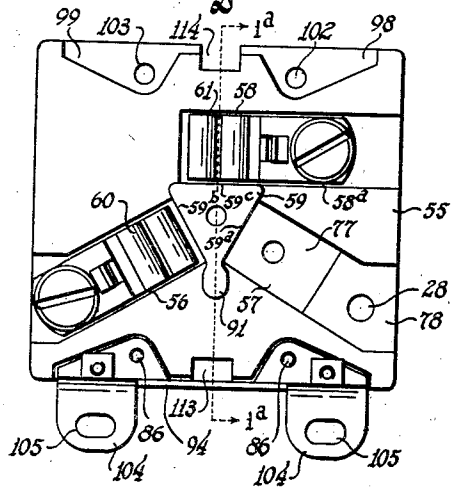


Fig. 12

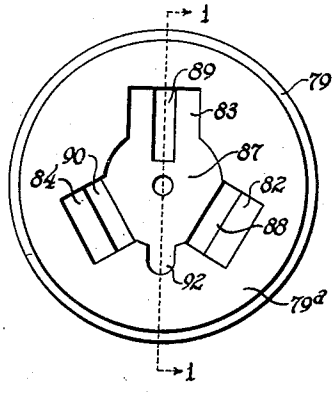


Fig. 11

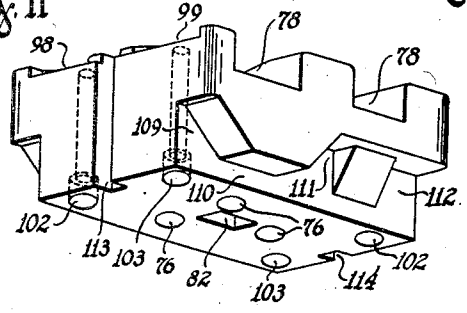
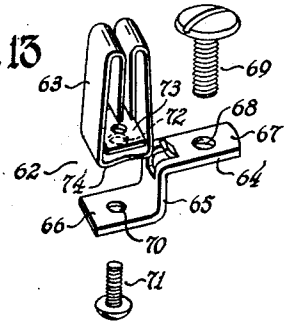


Fig. 13



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UNITED STATES PATENT OFFICE

1,938,303

ELECTRICAL CONNECTING DEVICE

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Application October 3, 1929. Serial No. 396,974

4 Claims. (Cl. 173—322)

This invention relates to improvements in electrical connecting devices.

An object of the invention is to generally improve and simplify the construction of devices of the aforementioned character.

Another object is to provide a device of the aforementioned character having an improved form of cord grip or strain relief.

Another object is to provide an improved form of shell or armor for the plug cap whereby the cord grip or strain relief may be assembled and supported with respect thereto independently of the insulating base of the cap.

Another object is to minimize the number of different parts and the amount of material required to produce a device of the character herein contemplated.

Other objects and advantages of the invention will be apparent or will be pointed out in the course of the following description.

In the drawings, Figure 1 is a vertical sectional view of the several elements of the device in assembled and cooperative relation.

Fig. 2 is a vertical sectional view of the plug cap,—the section being taken on a line at right angles to the section of Fig. 1.

Fig. 3 is a top plan view of the cord gripping elements.

Fig. 4 is a side elevation of one of the cord gripping elements shown in Fig. 3.

Fig. 5 is a plan view of a form of punched sheet metal blank from which each of the respective supporting brackets may be produced.

Fig. 6 is a top plan view of one of the supporting brackets.

Fig. 7 is a vertical sectional view on the broken line 7—7 of Fig. 6.

Fig. 8 is a perspective view of the metal shell or armor for the plug cap illustrated in Figs. 1 and 2, showing the projection or boss for housing and supporting the cord gripping elements.

Fig. 9 is a plan view of the insulating disk shown in Figs. 1 and 2.

Fig. 10 is a top plan view of the receptacle base with the cover block removed, and with one of the contact and terminal elements omitted for purposes of illustration.

Fig. 11 is a perspective view of the receptacle base from beneath showing the manner in which the latter may be formed to effect an economy in the amount of insulating material required.

Fig. 12 is a bottom plan view of the cover block for the receptacle base, and

Fig. 13 is a perspective view of one of the stationary contacts and the terminal members therefor, the several parts being shown in separated relation.

Referring first to Figs. 1, 2, 8 and 9, the numeral 15 designates in general a plug member comprising an insulating body portion or base 16 and a substantially cylindrical shell or armor 17, said shell having a hollow boss or raised portion 17^a provided with elongated side openings 18 and 19 and a top opening 20. The lower edge of the shell 17 is spun over an annular shoulder 22 on base 16 to hold the insulating base and shell in assembled relation.

Secured to the base 16 are three contact blades or jacks 23, 24 and 25. Blades 23 and 24 are identical in shape and size, whereas the blade 25 is slightly longer than the blades 23 and 24, the purpose being to insure that the "grounding" blade 25 will engage its cooperating receptacle contact prior to cooperative engagement of blades 23 and 24 with the other contacts of the receptacle. Blade 25 is otherwise similar to the blades 23 and 24.

Each blade has a wiring terminal or foot portion, slightly curved to conform to the curvature of base 16, the respective foot portions being set into correspondingly shaped recesses in the face of the base,—said recesses being of sufficient depth to afford an insulating barrier between the foot portions of the respective blades, and said foot portions being provided with tapped openings to receive the usual terminal screws 27. Recesses 28 are provided in the base portion to accommodate the shanks of the respective terminal screws. Screws 29 are provided to secure the foot portions of the blades to the insulating base, said screws passing through openings 30 in the insulating base and engaging tapped openings 31 in the respective foot portions.

Cooperating with the blade portions 23, 24 and 25 is a disk 32 of fiber or other suitable insulating material, as shown in Fig. 9. Disk 32 is provided with three angularly positioned openings 33, 34 and 35. Said openings are preferably in the form of slots, each having an intermediate portion of reduced width, whereby the walls of said openings are adapted to frictionally grip the contact blades. The disk may be notched circumferentially at one or more points in the manner illustrated at 36 to facilitate removal thereof. To accommodate this disk the insulating body 16 is provided with a relatively deep annular recess 37 offset from the outer edge thereof. Disk 32 serves to retain the wire ends or beards within the respective terminal recesses, and adds a more

finished appearance to the plug cap. As will be noted, the disk 32 in assembled position is preferably offset inwardly a substantial distance from the lower edge of base 16.

Cooperating with the boss or raised portion 17a and the openings 18, 19, 20 therein is the strain relief assembly 39. This assembly comprises two cord gripping members 40 and 41 and screws 42 and 43 cooperating therewith as will now be described.

The members 40 and 41 are best illustrated in Fig. 3, a face view of one of the members is shown in Fig. 4 and the manner of cooperation with the shell part of the plug can best be understood by reference to Figs. 1, 2, 3 and 8. The members 40 and 41 are identical in every respect, as will be apparent.

These members each comprise an arcuate face portion 44, having a portion 44a thereof at its outer edge flared outwardly from the arcuate face for the purpose hereinafter set forth. On each side of said arcuate portion are arm portions 45 and 46. The arm 45 is provided with a tapped opening 47 and the arm 46 is provided with a relatively larger opening 48.

Fig. 3 shows the members 40 and 41 in assembled relation with respect to each other, the arcuate faces of said members being opposed to each other to provide for passage of the cord therebetween. Thus the tapped opening 47 of arm 45 and the perforation 48 of arm 46 are made to register and a screw 42 or 43 can be passed through the perforation 48 and brought into threaded engagement with the tapped opening 47 to adjustably hold the two members in assembled relation.

The manner of assembling the cord gripping elements with respect to the shell 17 will now be described. The boss portion 17a of the shell 17 has three openings 18, 19 and 20. The openings 18 and 19 are arranged in registering relation on opposite sides of said boss. The opening 20 is in the top of the boss and centered with the opening 16a in the insulating base 16 through which a conductor cord may pass for securement of the individual wires thereof by the terminal screws 27.

The two members 40 and 41 are turned flatwise and inserted individually through the openings 18 and 19 in boss 17a. Members 40 and 41 are then turned upright to the position illustrated in Figs. 1, 2 and 3. In this position the arm portions 45 and 46 are positioned in the openings 18 and 19 respectively and the flared portions 44a then extend through the opening 20, as best shown in Fig. 2. Screws 42 and 43 are then threaded in opposite directions into the respective tapped openings and the two members are held in upright position thereby. As will be apparent the members 40 and 41 may be moved toward and from each other by adjustment of these screws, whereby the clamping elements are adapted to accommodate conductor cords of various sizes.

When thus assembled the cord gripping device is supported by the edges of the openings 18 and 19 and independently of the insulating base 16 of the cap. The edges 49 of the clamping members normally rest upon the edges 50 of said openings whereas in the event of a pull upon the cord the upper edges 51 of the arms 45 and 46 engage the edges 52 of the openings. As shown at 53 in Fig. 1 the edges 49 of the clamping members are located an appreciable distance above the upper surface of the insulating base 16, and the cord grip device depends only upon its cooperative engagement with the cut metal edges of the openings wherein it is positioned. The facility with which the aforedescribed parts may be assembled will be appreciated by those skilled in the art,—it being observed that there is a considerable advantage in providing for a sub-assembly of the parts independently of the insulating base of the cap.

Adapted for cooperation with the plug cap is the receptacle 54. Said receptacle comprises an insulating base 55 of rectangular shape, preferably square, as shown in Fig. 10. Base 55 is provided with recesses 56, 57, 58 in the upper face thereof and arranged around a triangular abutment or raised portion 59 in the center thereof, the sides 59a, 59b, 59c of the raised portion 59 being arranged with respect to each other at an angle of substantially 120 degrees. Recesses 56 and 57 are preferably arranged at substantially right angles to two of the sides 59a, 59b of said portion 59, and recess 58 is arranged in a plane substantially parallel to the side 59c, as shown at 58a.

Positioned within said recesses 56, 57 and 58 are the stationary contact assemblies 60, 61 and 62. The contact assembly has been omitted from recess 57 and as shown in Fig. 13 the same comprises a stationary contact 63, a terminal member 64 having a main body portion 65 and two oppositely extending arm portions 66 and 67. The portion 67 is provided with a tapped opening 68 into which the terminal screw 69 is adapted to thread. The portion 66 is provided with a perforation 70 to permit free passage of the shank of screw 71. The contact member 63 is likewise provided with a perforation 72 to permit free passage of said screw shank. Screw 71 is adapted for cooperative engagement with a nut 73 of rectangular shape which is adapted to overlie the base portion 74 of contact 63, whereby said elements are rigidly secured within the recess 57 of the insulating base, as illustrated in Fig. 1,—said base being provided with an upwardly countersunk perforation 76 for this purpose. Each recess 56, 57, 58 comprises two portions 77 and 78 the portion 78 being offset upwardly with respect to the portion 77 to conform to the shape of the member 64. All elements of the stationary contact assemblies 60, 61 and 62 are identical. Thus considerable economy is effected in the cost of manufacturing and assembling such parts due to their standardization.

The cover block shown at 79 in Fig. 12 is adapted to cooperate with the base member 55 to house the stationary contacts. Said block is held in assembled relation to the base as by means of a relatively long screw 80 extending through the block and base members and engaging a nut 81 in the countersunk perforation 82, Fig. 1.

The view of the block 79 in Fig. 1 is a section on the line 1—1 of Fig. 12, and the view of the base member 55 in Fig. 1 is a section on the line 1a—1a of Fig. 10. As shown in Figs. 1 and 12 the block 79 is preferably circular in form. The under face 79a thereof is recessed as indicated at 82, 83 and 84 to a depth (see dotted line 85a, Fig. 1) sufficient to clear the upper ends of contacts 63. Recesses 82, 83 and 84 open into a substantially circular central recess 87 into which the raised portion 59 of the base 55 is adapted to fit. Leading from the upper face of block 79 in register with the recesses 82, 83 and 84 are access slots or perforations 88, 89 and 90. The nib 91 on the raised portion 59 cooperates with a cor-

respondingly shaped notch 92 in the block 79 to insure proper positioning of the openings 88, 89, 90 above their corresponding contacts 60, 61, 62. Proper assembly of the block with respect to the insulating base is thus insured.

Brackets 93 and 94, as shown in Fig. 1, are provided for mounting of the receptacle within an outlet box. Fig. 5 illustrates a metal blank from which such brackets may be formed. Fig. 6 is a top plan view of one of the finished brackets, and Fig. 7 is a sectional view on the line 7—7 of Fig. 6. As the brackets are identical in shape, size and structure, a description of one will be sufficient.

As shown in Figs. 6 and 7 the bracket member comprises a vertically extending body portion 95 having three pairs of lugs bent outwardly therefrom at substantially right angles thereto. The inwardly extending lower lugs 96 and 97 are adapted to fit within the recesses 98 and 99 in the upper face of base 55. Said lugs have threaded openings 100 and 101 which register with the perforations 102 and 103 in said base,—screws 86 being provided to secure the lugs to the insulating base. These lugs are formed by bending the parts 96 and 97 along the dotted lines 96^a, 97^a, Fig. 5. Lugs 104 are formed by bending along the dotted lines 104^a of Fig. 5 in a direction opposite to that of lugs 96, 97. These lugs are adapted for attachment of the receptacle to an outlet box (not shown), being provided with perforations 105 for that purpose.

Lugs 106 are bent along the dotted lines 106^a, Fig. 5, and in the same direction as the lugs 96, 97. Lugs 106 are provided with tapped openings 107 to cooperate with the securing screws of a suitable flush or cover plate (not shown).

In Fig. 11 is shown the base portion 55 in perspective from beneath. This view shows in detail certain of the cutaway portions of the base. These portions 109, 110, 111, 112 are arranged to provide a maximum strength of the molded base while permitting a considerable economy in the amount of insulating material required for the piece.

The cutaway portions are substantially the same on each side of the base. The side channels 113 and 114 shown in Figs. 10 and 11 are adapted to provide clearance for projecting elements upon certain types of outlet boxes.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, the combination with a stamped sheet metal shell having a cylindrical portion and an integral hollow boss at one end thereof, said boss being annularly offset inwardly from said cylindrical portion whereby a shoulder is formed therebetween, a cylindrical insulating base adapted to fit within said cylindrical portion and rigidly secured thereto, said boss having a pair of diametrically opposed substantially elliptical openings in a plane above the upper end of said base, said boss also having an opening at the upper end thereof, a pair of stamped sheet metal gripping elements each having portions thereof insertable within and projecting from the respective diametrically opposed and upper end openings and adapted for support by the walls of the latter jointly independently of said base, and adjusting means for said gripping elements, said means being adapted to retain said elements in assembled relation to each other whereby the same are positively restrained against separation from said boss.

2. In a strain relief device for cord connectors, in combination, a metal shell member having a raised or boss shaped portion integral therewith, said raised portion having registering elongated openings in the side walls thereof and an opening in the center of the top thereof, and cord clamping means comprising a pair of stamped sheet metal members of like form, each of said members having end portions engaged with the walls of said side openings and an intermediate portion projecting upwardly through said top opening, and a pair of screws cooperatively engaging the end portions of said members to adjustably retain the latter in assembled relation to each other, said members when so assembled being supported solely by the walls of said side and top openings and being positively restrained by said walls against separation from said raised portion.

3. In an electrical connecter plug, in combination, a substantially cylindrical insulating base, contact blades mounted on one face of said base, a stamped sheet metal shell having a cylindrical portion adapted to receive and enclose said insulating base, said metal shell having a concentrically arranged hollow boss of reduced diameter formed integrally therewith, said boss having diametrically opposed substantially elliptical openings in the side walls thereof and an opening in the top thereof, a pair of stamped sheet metal cord gripping elements each having projections at opposite ends thereof and a projection intermediate the length thereof, said projections being adapted for cooperative engagement with the walls of said side and top openings respectively and being supported by the walls of said openings independently of said insulating base, and adjusting means for said gripping elements, said adjusting means being located substantially within the contour of said hollow boss but accessible from the exterior of the latter.

4. In a conductor cord strain relief device, in combination, a pair of like stamped sheet metal members having opposed arcuate face portions, a flared projecting portion located intermediate the length of the upper edge of each arcuate portion, arm portions of equal length extending outwardly in opposite directions from the respective arcuate portions, one arm of each member having a relatively large opening and the other arm having a relatively smaller tapped opening, a pair of adjusting screws passing in opposite directions through the opposed arms of said members, and a stamped sheet metal shell having side and top openings respectively adapted to receive the arm portions and the intermediate projecting portions of said elements and to permit assembly and adjustment thereof with respect to each other, the walls of said last mentioned openings acting to positively prevent displacement of said elements from said shell when so assembled.

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