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ONE-PIECE SCREWLESS WIRE TERMINAL AND CONTACT FOR DUPLEX ELECTRIC RECEPTACLES

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FIG. 1

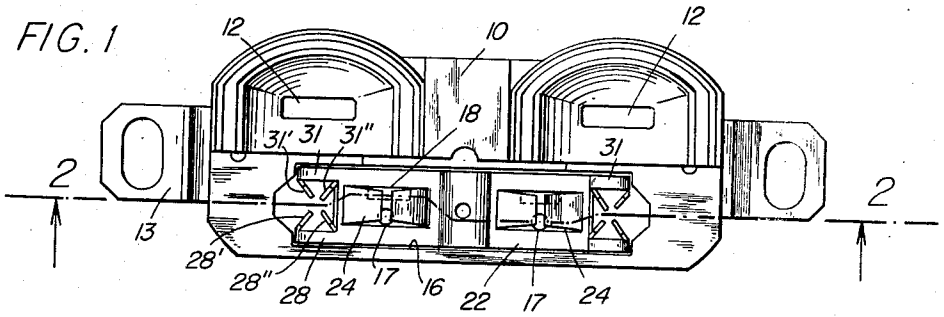
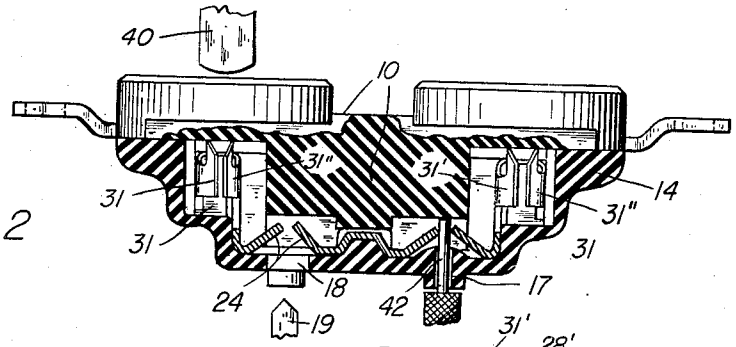


FIG. 2



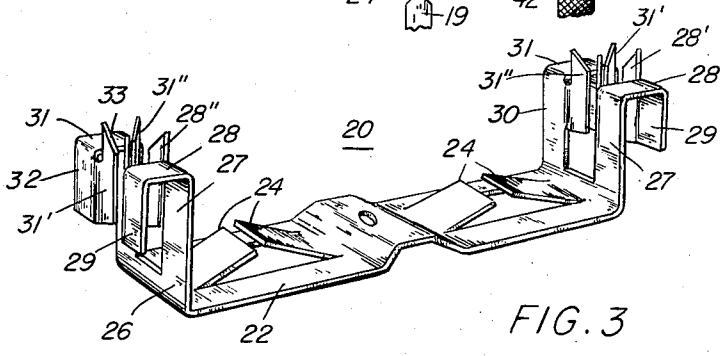


FIG. 3

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ONE-PIECE SCREWLESS WIRE TERMINAL AND CONTACT FOR DUPLEX ELECTRIC RECEPTACLES

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7 Claims. (Cl. 339—258)

This invention relates to electric receptacles and more particularly to a one-piece combined contact and wire terminal member which is particularly useful in duplex electric receptacles. The invention may be used, however, in single receptacles as well, and elsewhere.

Electric receptacles are now in common use in homes and business places as well as in factories and elsewhere throughout the world. The constant effort is to provide at lowest possible cost a receptacle construction which will withstand hard usage and many insertions and withdrawals of the prongs of a conventional attachment plug while continuing to provide firm and adequate electric contact pressure between the prongs of the plug and the receptacle contacts. In order for the installation of the receptacle to be economical in view of present day high labor costs and to be easy to install by persons who may desire to replace existing receptacles or install new ones, the present trend is to provide wire terminals without screws to which the bared end of a conductor may be secured by merely inserting the bared end through a hole in the receptacle body. It is desirable that the contact and terminal members be in one piece and not require any additional part which would have to be inserted in the receptacle body by a separate manual operation, thus adding unnecessarily to the manufacturing cost.

With the foregoing in mind, it is an object of this invention to provide an electric receptacle which has an improved combined contact and screwless terminal structure that may be stamped from one sheet of metal and incorporated economically in the insulating base of the receptacle.

Another object of the invention is to provide that improved terminal structure with means for enabling release of the wire by mere insertion of a screwdriver or pointed implement to release the grip of the terminal on the bared end of the conductor wire.

Another object of the invention is to provide a one-piece contact and screwless terminal structure of the aforesaid type in which the contact portion is constructed to provide a plurality of gripping surfaces which each, individually, will exert pressure upon the prongs of a conventional attachment plug cap to provide a plurality of current paths from the contact to the prong.

Other objects and advantages of the invention will appear as the invention is described in connection with the accompanying drawing.

In the drawing:

Fig. 1 is a plan view, partly in section, showing a receptacle embodying the invention.

Fig. 2 is a side elevational view, partly broken away and in section, of the receptacle of Fig. 1.

Fig. 3 is a perspective view of the one-piece contact and screwless terminal structure embodied in Figs. 1 and 2.

Referring to the drawing, the receptacle is shown as having an insulating housing in which are contained current carrying parts. The housing comprises a body portion 14 over which is a cover portion that is formed

to fit snugly on the upper surface. The receptacle is shown in duplex form having two pairs of rectangular slots 12 for the reception of conventional attachment plug cap prongs. As the top outer surface and outline of receptacles of this type are now well standardized so as to be useable in connection with standard face plates, further description of the configuration of the cover need not be given.

The cover and base are supported by a conventional metallic strap 13 which is adapted to abridge across the open face of a conventional outlet or wall box. The strap may be stamped from sheet metal and fitted in longitudinally extending cooperating channels (not shown) formed in the cover and base members in any conventional or convenient form.

The base is formed preferably of molded insulating material hollowed out for the reception of the contact portions of a combined one-piece contact and terminal member 20 which is best illustrated in Fig. 3. Preferably the base has a pair of separate parallel longitudinally extending channels or recesses 16, each to receive a combined contact and terminal member 20 of the sort illustrated in Fig. 3. Pierced in the bottom of the floor of the base are two round holes 17 through which the bared end 42 of a conductor wire may be inserted for engagement with the gripping or terminal portions 24 of the combined contact and terminal member, as will hereinafter be more fully described. Alongside of the holes 17 and separate therefrom are rectangular openings 18 so located and positioned as to lie beneath the portions 24 whereby the pointed end of an implement 19 or screwdriver may be inserted to press apart the gripping portions 24 and enable the end of the conductor wire to be withdrawn therefrom, all as will hereinafter more fully appear as the contact and terminal structure is described.

The combined contact and terminal member may be stamped from a strip of sheet metal having uniform width throughout its length, thus economizing on the amount of metal required and avoiding waste. The central portion of the strip may be bent up to form a hump 21 transversely across the strip so as to pass over a similar hump in the floor of the receptacle base 14 at the midportion of the channel 16 in which the combined contact and terminal member is located. The hump in the floor provides additional strength to the base of the receptacle while the hump in the metal strip provides some rigidity to counteract a tendency of the strip to twist.

In order that the bared end 42 of one or two conductor wires may be engaged with, and electrically connected to, the body of the metallic strip 22 at two points, wire gripping tongues 24 are bent up from the body of the strip at two spaced locations near the ends or contact portions of said combined contact and terminal member. These tongues may conveniently be formed by making a pair of parallel longitudinally extending slits through the body of the strip 22 at the place where it is desired to have the tongues located. The slits may be connected by a transverse slit across the portion of the strip 22 between the slits whereupon the tongues 24 will be formed and may be bent up as shown in Fig. 3.

In order that the metal shall have resilience or springiness sufficient to grip the bared end of the conductors as they are inserted through the holes 17, it is desirable to select the metal of which the strip is made of such material and such thickness as will possess springiness and resilience while, at the same time, possessing the necessary high conductivity necessary for current carrying parts and devices of this sort. Phosphorous bronze is a commonly used and acceptable material.

It will be noted that when the bared end of the conductor wires is inserted through the holes 17, it engages the tongues 24 and presses the tongues apart, permitting

passage of the wire between the adjacent ends of the tongues. Upon attempt to withdraw the wire, however, the edges of the tongues **24** bite into the wire and they wedge themselves more firmly toward each other and against the wire as the pull to withdraw is increased. In order to permit the wires to be withdrawn for any purpose, a rectangular opening **18** is provided adjacent each of the wire holes **17** beneath the tongues **24** in such position that upon insertion of the end of a screwdriver or a pointed implement such as **19**, the ends of the tongues may be pressed inwardly away from the bared end of the conductor wire and thus release their grip on the wire, permitting it to be withdrawn.

The insertion of the bared end may be limited by abutment against the top of the recess formed in the bottom surface of the cover member **10** as may readily be seen in Fig. 2. To that end and also to hold the contact and terminal member at its center from rising beyond above the floor of the base more than a predetermined amount, the cover member is preferably formed with a part of its body depending into and sitting within the channel or recess **16** into which the contact and terminal member is seated.

The contact portions at opposite ends of the combined contact and terminal member are identical and similar reference numerals are applied.

The contact portions are formed by bending up the ends **26** of the strip at right angles to the plane of the main midportion of the contact and terminal member. Just beyond the bend, the midportion of the strip is cut out. From the cut-out portion to the ends of the strip, the strip is cut longitudinally along the center line and is punched to form pairs or sets of continuous elements composed of legs, shoulders and arms which will now be described. The components of each set are similar and parallel.

The leg components **27** and **30** (which for convenience will be referred to as vertical legs) terminate at their upper ends in right angle bends by which they are joined to horizontal connecting portions or shoulders **28** and **31**. Beyond the shoulders **28** and **31**, the strip is bent at right angles vertically downward to form vertical arms **29** and **32**, respectively, which are parallel to the legs **27** and **30** but may be shorter if desired.

In order to form a plurality of prong engaging parts which are resilient and will engage the sides of conventional attachment plug prongs **40**, four wings **28'**, **28''**, **31'**, **31''** are provided. These wings are individually identical in form but are attached to different components of the contact structures. Referring to the wing **31'** as an example, it extends inwardly from the inner edge of the arm **32** and is bent at an angle of about 45° inwardly from the plane of the arm **32**. The wing **31'** extends above the plane of the shoulder **31** and has its top edge inclined inwardly forming a guide surface **33**.

The wing **31''** extends inwardly from the leg **30** at the inner edge thereof and is bent at an angle of 45° to the plane of the leg **30** toward the wing **31'**. In similar manner, the wings **28'** and **28''** extend inwardly from the inner edges of the arm **29** and leg **27** and are bent inwardly at 45°. The inner edges of the wings, after the wings are inwardly bent, will be spaced from each other a distance less than the thickness of a conventional attachment plug cap prong. Also, the longitudinal distance between adjacent edges such as **31** and **31'** will be less than the width of the prong. Each of the wings has an inclined upper surface, like **33**, directed toward the center line of the combined contact and terminal member. Those surfaces act jointly as guide surfaces when the prongs of the attachment plug cap are inserted through the slots **12** and guide the movement of the prongs toward the contact-engaging edges of the wings. Since the wings are flexible, each automatically compensates for misalignment of itself with relation to the edges of the other wings and with relation to any irregularity or non-parallelism

of the side surfaces of the prongs of the attachment plug with relation to each other and to the combined contact and terminal member.

From the foregoing, it will be observed that the one-piece contact-terminal member, as illustrated and described, may be stamped in economical fashion, with a minimum of waste metal, from a strip of sheet metal which is of uniform width and that the structure of the parts may be easily bent and formed into the proper shape by stamping and pressing tools. The terminal and contact structure thus formed may be very economically assembled with the base and cover by merely inserting or pressing the structure into the channel formed in the base for that purpose. When so formed and assembled, the terminal will receive the bared end of the conductor wire inserted through the holes **17** in the base of the receptacle and will hold the wire with a firm engagement and with good electrical contact.

Many modifications within the scope of the invention will occur to those skilled in the art. Therefore, I do not limit the invention to the specific shape and form of parts as illustrated and described.

What is claimed is:

1. A one-piece contact and terminal for electric attachment plug receptacles, comprising a sheet metal stamping having a bottom portion adapted to lie flatwise with respect to the floor of a receptacle, wire terminal means formed in said bottom portion, a contact portion adapted to receive a prong of an attachment plug, said contact portion comprising two sets of legs, arm and connecting portions which are connected together, in each set the leg portion extending angularly from the plane of said bottom portion and being joined to an arm portion by a connecting portion, the arm portion being angularly directed with respect to said bottom portion, and wing portions extending from said arm and leg portions towards each other and adapted to grip said prong, each wing having a free edge parallel to like edges of the other wings and positioned to be in engagement with the prong of an attachment plug when the latter is connected to said receptacle contact.

2. A one-piece contact and terminal for electric attachment plug receptacles, comprising a sheet metal stamping having a bottom portion adapted to lie flatwise with respect to the floor of a receptacle, a pair of oppositely directed resilient wire-gripping fingers bent up in the same direction from said bottom portion in position to grip opposite sides of a conductor wire between their ends when it is inserted therebetween, a contact portion adapted to receive a prong of an attachment plug, said contact portion comprising two sets of leg, arm and connecting portions which are connected together, in each set the leg portion extending angularly from the plane of said bottom portion and being joined to an arm portion by a connecting portion, the arm portion being angularly directed with respect to said bottom portion, and wing portions extending from said arm and leg portions towards each other and adapted to grip said prong, each wing having a free edge parallel to like edges of the other wings and positioned to be in engagement with the prong of an attachment plug when the latter is connected to said receptacle contact.

3. A contact and terminal structure as claimed in claim 1 in which said wing portions extend toward each other from the inner edges of said arm and leg portions and are bent toward the center line of an inserted plug prong so that edges of each of the wings engage the side faces of the prong.

4. A contact and terminal structure as claimed in claim 3 having the top edges of the wings inclined inwardly and downwardly to guide the plug prongs during insertion.

5. A contact and terminal structure as claimed in claim 2 having the top edges of the wings inclined inwardly and downwardly to guide the plug prongs during insertion.

6. A contact and terminal structure as claimed in claim 2 in which said wing portions extend toward each other from the inner edges of said arm and leg portions and are bent toward the center line of an inserted plug prong so that edges of each of the wings engage the side faces of the prong.

7. A contact and terminal structure as claimed in claim 6 having the top edges of the wings inclined inwardly and downwardly to guide the plug prongs during insertion.

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