March 7, 1961 S. I. SLATER 2,974,301

DUPLEX PLUG RECEPTACLE

Filed Aug. 11, 1958 3 Sheets-Sheet 1

Fig. 1.

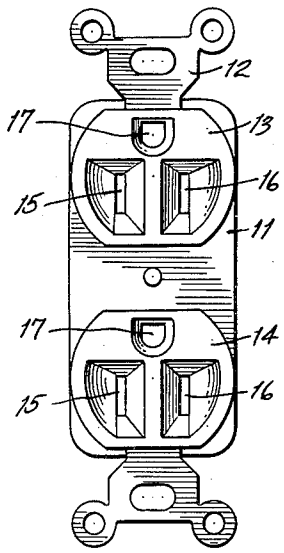


Fig. 2.

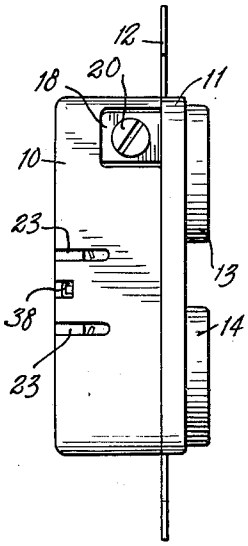


Fig. 3.

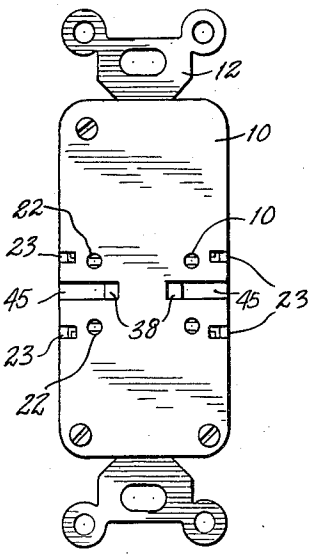
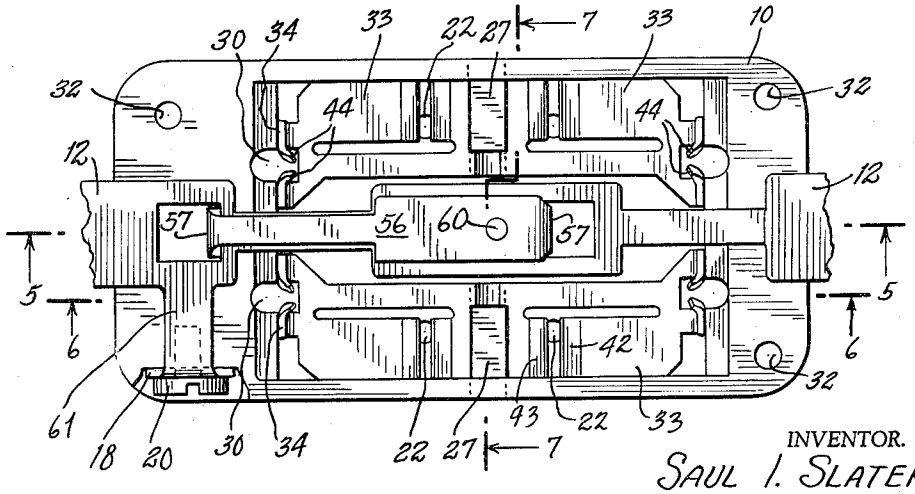


Fig. 4.



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Fig. 5.

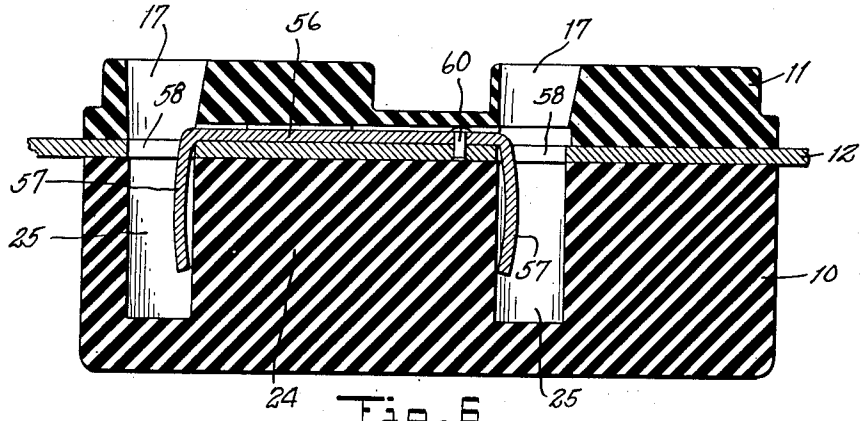


Fig. 6.

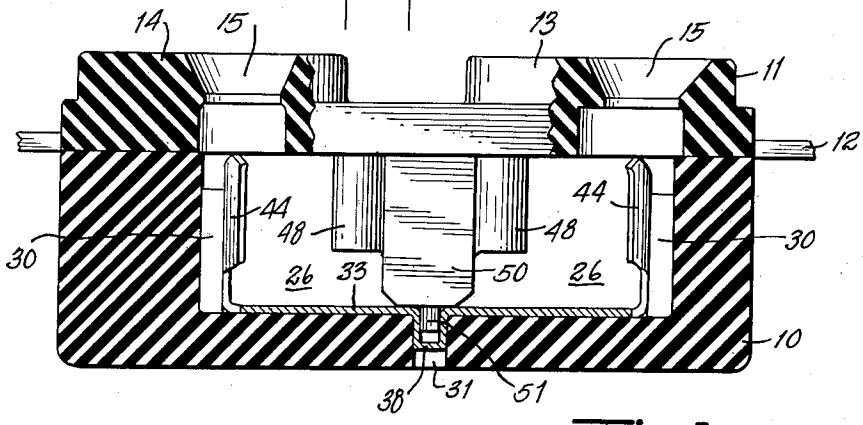


Fig. 7.

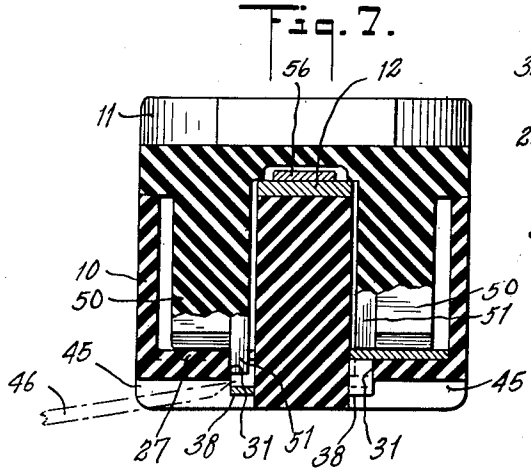
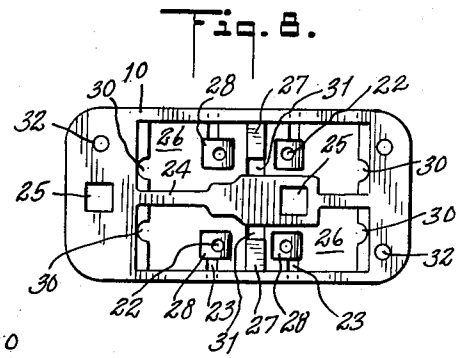


Fig. 8.



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Fig. 9.

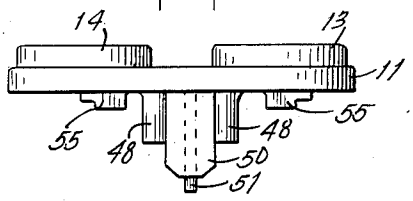


Fig. 10.

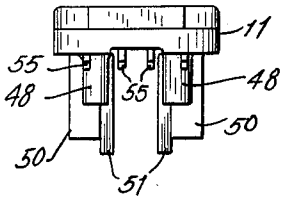


Fig. 11.

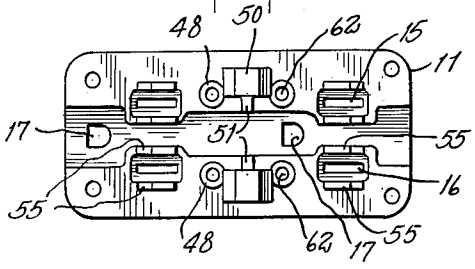


Fig. 12.

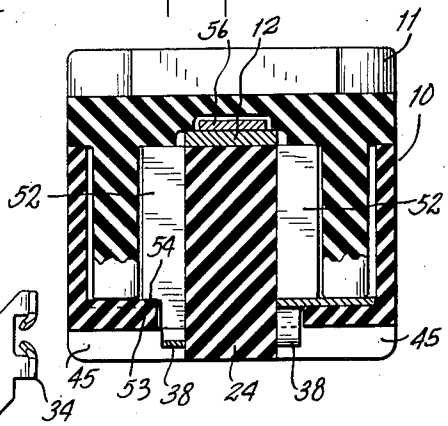


Fig. 14.

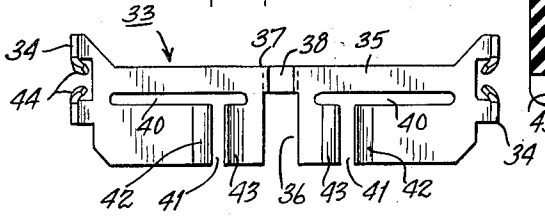


Fig. 15.

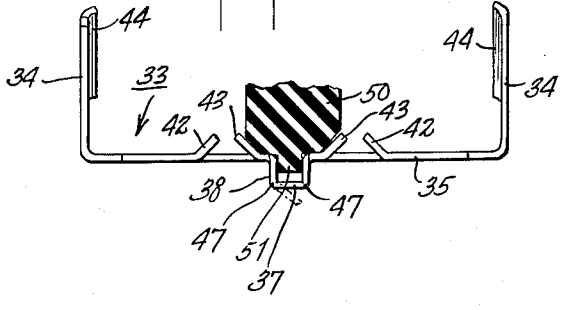
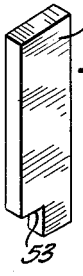


Fig. 13.



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DUPLEX PLUG RECEPTACLE

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Filed Aug. 11, 1958, Ser. No. 754,348

8 Claims. (Cl. 339—14)

The present invention relates to wiring devices and especially to a duplex plug receptacle having a grounding connection and being provided with means whereby the two receptacles can be electrically isolated one from the other. Additionally, the plug receptacle of the present invention is provided with so-called pressure lock connections for the circuit wires.

In the present day practice plug receptacles are frequently used to supply power to portable appliances which are subject to shock hazards. As a result, in many localities ordinances require that means be provided in the receptacle for grounding the plugged in device thus eliminating shock hazard. Additionally, because of the heavy load requirements placed upon the receptacle by the use of appliances such as air conditioning units, space heaters, etc., in some localities ordinances require that the two receptacles of a duplex receptacle combination be adapted to two separate circuits in order that a circuit cannot be overloaded by plugging two heavy appliances into the same duplex receptacle, and in order to comply with such rules the receptacle must be made in such a manner that the two normally interconnected plug receiving units be readily and permanently disconnected one from the other.

In the past few years a number of wiring devices such as switches, plug receptacles, and the like have been placed on the market having pressure lock terminals, that is, terminals which seize a stripped portion of a conductor and hold it in place by means of pressure usually exerted by a resilient member, rather than requiring the tightening of a screw in order to clamp the wire in position. Such pressure lock terminals are advantageous since they decrease the length of time required to install the wiring device and also because the arrangement thereof permits removal of a wiring device from the circuit much more speedily than is otherwise the case.

The present invention provides a duplex receptacle which has the advantages of a grounding connection, pressure lock terminals and ready isolation of the two units of the duplex receptacle from each other so that they may be connected in separate and individual circuits. In the past this combination has not been possible and the only duplex receptacle convertible to two circuit use was one with screw terminals.

It is therefore an object of the invention to provide a duplex receptacle having pressure lock terminals.

It is a further object of the invention to provide such a duplex receptacle having a grounding connection.

It is a still further object of the invention to provide a duplex receptacle, the two plug receptacles of which may be electrically isolated from each other although normally initially connected.

It is a still further object of the invention to provide a duplex receptacle having the features mentioned above which is at the same time inexpensive and comparable in size with ordinary receptacles having none of the advantages mentioned.

Other objects and features of the invention will be apparent when the following description is considered in connection with the annexed drawings, in which,

Figure 1 is a front elevational view of the duplex receptacle of my invention;

Figure 2 is a side elevation of the receptacle illustrating particularly the terminal strip to which a ground wire is connected for grounding one of the three prong-receiving apertures of each of the plug receptacles;

Figure 3 is a rear elevation of the receptacle of Figures 1 and 2 illustrating particularly the means of normally electrically connecting the two units or receptacles of the duplex receptacle and the placement thereof so that the connection may readily be broken without disassembling the unit;

Figure 4 is a view similar to Figure 1 but showing the cover removed. This view thus shows the grounding strap and the internal construction particularly the shaping and arrangement of the connector strips which provide means for receiving the prongs of a plug in each of the duplex receptacles and also means for receiving the circuit wires and locking them in position;

Figure 5 is a longitudinal cross sectional view taken on the plane of the line 5—5 of Figure 4 and illustrating the means for providing connections to the grounding prongs of a plug;

Figure 6 is a longitudinal cross sectional view on the plane of the line 6—6 of Figure 4 showing particularly the plug prong-receiving portions of the terminal strips and a portion thereof which may be broken away to isolate one of the two receptacles from the other;

Figure 7 is a transverse cross sectional view of the device taken on the plane 7—7 of Figure 4 and showing particularly the location of the removable link connecting the terminal strip of one receptacle to that of the other. This view also shows the means for holding the terminal strips in position in the cavity of the housing;

Figure 8 is a front elevational view of the device showing the cover strip and grounding strap as well as the terminal strips removed. In other words, this view illustrates the housing with the various cavities and bosses therein;

Figure 9 is a side elevational view of a cover member which is mounted on the housing and provides the apertures for reception of the prongs of the various plugs and also provides means for holding the terminal strips in position in the cavity of the main housing;

Figure 10 is an end view of the cover of Figure 9;

Figure 11 is a rear elevational view of the cover of Figure 9 illustrating particularly the apertures and bosses formed on the cover which cooperate with the plug prongs and the terminal strips;

Figure 12 is a transverse cross sectional view similar to Figure 7 showing a modified arrangement for insulating the two portions of a terminal strip and assuring that once they have been broken apart there will be no possibility of short-circuit;

Figure 13 is a perspective view showing the form of insulator utilized in the modification of Figure 12;

Figure 14 is a top plan view of one of the terminal strips showing its shape and construction and particularly the shape and construction of the wire gripping or pressure lock terminals and the shape and construction of the portion interlinking the two ends of the terminal strips which portion may be removed to isolate the two receptacles of the duplex unit; and

Figure 15 is a side elevation of the terminal of Figure 14 further illustrating the shape and construction thereof.

Referring now to the drawings and particularly to Figures 1 through 3, there is shown therein a duplex receptacle comprising the usual housing 10 and cover member 11 which have mounted between them the

mounting strap 12 by means of which the receptacle is fixed in the usual outlet box. As indicated in the drawings, the duplex receptacle has the usual form and provides the two plug receiving units 13 and 14, each of which has prong receiving apertures 15 and 16. Additionally, in the present invention there are provided apertures in each unit 13 and 14 for receiving grounding plugs, these apertures being designated 17. As will appear hereinafter, plug prongs inserted into the openings 17 make connection with the strap 12 which strap is provided with a portion 18 which extends into a notch cut into the side wall of the housing 11 and is provided with a screw 20 by means of which the strap may be connected to ground.

Referring now particularly to Figure 3, the housing 12 is provided with the four openings 22 extending therethrough into which openings circuit wires are inserted and gripped in the manner hereinafter described. Additionally, slots 23 are formed in the side and rear walls of housing 12 and provide ingress for a tool such as a screwdriver to release a wire which has been inserted through the holes 22 and held in place by the pressure lock terminals. These slots 23 are particularly advantageous since they extend from the rear wall into the side wall and permit a tool to be utilized which is held so that the blade thereof extends in a direction generally parallel to the rear surface of the housing. This feature is not novel in this outlet, but is instead the subject matter of my U.S. Patent No. 2,795,677 issued June 11, 1957.

The structure of the present duplex outlet will be described in detail by describing the separate portions thereof, that is, the housing, the cover, the terminal strips, etc.

Referring now to Figure 8, the housing 10 is a molded plastic piece having various apertures therein. Thus the housing 10 has a central rib 24 therein which is provided with the apertures 25 which accommodate the grounding terminals and grounding prongs of wiring plugs. These apertures 25 are in alignment with the apertures 17 in the cover 11.

At either side of the central rib 24 are the cavities 26 which are provided with the bosses 27 and 28 which extend upwardly from the bottom thereof, these bosses cooperating with the terminal strips in a manner which will be hereinafter described. In addition, the ends of the cavities 26 are provided with grooves 30 which provide a passageway for the usual non-grounding prongs of a wiring plug. The holes 22 through which the wire connectors are inserted are formed centrally of the bosses 28 thus providing a considerable bearing surface for the conductors and guiding them properly to the gripping portions of the terminal strips. In addition, rectangular openings 31 are provided in the base of the cavities 26 and portions of the terminal strips are bent into a U form and extend through these openings. Additionally, holes 32 are formed adjacent three of the corners of the housing 10 these holes serving to accommodate screws by means of which the cover 11 is fastened to the housing 10.

As has been indicated, terminal strips are placed in the cavities 26 and serve the function of making contact with the prongs of a wiring plug as well as of making contact with the conductors of the electrical circuit. A terminal strip is shown in Figures 14 and 15 particularly and shown inserted in the housing cavities 26 in Figure 4. The terminal strip generally designated 33 is stamped from a single piece of conductive material such as copper or Phosphor bronze. The terminal comprises the bent up end portions 34 joined by the central portion 35.

A notch 36 divides the terminal strip into two portions which are, however, joined by the narrow strip 37 which is bent into a U-shaped form as indicated in Figure 15 at 38. Slots 40 on opposite sides of the notch 36 cooperate with a cut 41 to provide two sets of wire gripping fingers 42 and 43. The finger 42 of each pair is resilient whereas the finger 43, although formed of the same material, is of much lesser resiliency due to the fact that the portion thereof which is not joined to member 37 is much lesser in length than the portion of finger 42 which is not joined to the strip 37.

The upstanding ends 34 are slotted and the ends of the slots bent inwardly as indicated at 44 to form prong-gripping elements in a conventional manner, these elements 44 being in alignment with the grooves 30 previously mentioned.

When the terminals are inserted in the housing it will be clear that the U-shaped bend 38 of the portion 37 of the terminal strip extends through one of the openings 31 and since the housing is formed with a depression extending inwardly thereof, as indicated at 45 in Figure 7, the portion 38 of the strip extends below the outer surface of the housing and is exposed and may be broken away by use of a screwdriver or other tool such as shown at 46 in dotted lines. It is to be noted that the corners 47 of the U-shaped bend are scored so that the breaking away of the central portion of the bent material is facilitated.

As will be clear from Figure 4, the openings 22 are offset outwardly a slight amount from a position in alignment with the space between the wire gripping fingers 42 and 43 and thus a wire inserted through the opening causes the finger 42 to move inwardly as the wire is inserted and grips the wire and prevents it from being removed. The slotted openings 23 underlie the inner edges of fingers 42 and make it possible, by means of a screwdriver or like tool inserted in the slots, to move the fingers 42 inwardly to release conductors held in the manner just described.

Reference to Figure 4 also clarifies the manner in which the grooves 30 cooperate with the upstanding ends 34 of terminal strips 33 and particularly with the inwardly bent portions 44 to form a prong receiving and gripping means.

The notched out portion 36 of the terminal strips fits over corresponding bosses 27 of the housing 10 and thus assures that the two ends of a particular terminal strip 33 will be electrically isolated one from the other when the central portion of the U-shaped bend is removed by breaking at the score points 47.

The terminal strips are held in the position mentioned by the cover 11 particularly by the depending lugs 48 formed integrally therewith. These lugs 48, as is seen by reference to Figures 9, 10 and 11, are formed as a central portion joined by the narrow rectangular pieces to an outward circular portion. The central portion 50 of each lug 48 is generally rectangular and extends downwardly and bears against the inner edges of the fingers 43 holding these fingers rigidly in position so that they do not move when a wire is inserted, in a manner previously described, into the corresponding aperture 22. Formed on the lower end of the central portion 50 of each lug 48 is a projection 51 which extends through the opening 31 in the base of the housing 10 and lies between the vertically extending portions of the U bend 38 in the narrow strip 37. The depth of the projection 51 is such that a space exists between the end thereof and the base portion of the U-shaped bend 38 to permit the insertion of the tool 46 in the manner shown in Figure 7.

The outer circular portions of the depending lugs 48 are provided with apertures 62 therein which apertures are in alignment with the holes 22 in the base of housing 10 and thus permit the conductors to be inserted through the holes and to be guided for movement substantially perpendicularly to the housing base.

In a modified form of the structure shown particularly in Figures 12 and 13, the projections 51 are omitted from the central portions 50 of lugs 48 and instead strips of insulating material 52 (see Figure 13) are provided which strips are provided with a shoulder 53 which rests against

the housing base as indicated at 54 (Figure 12), and serve the same purpose of insulating the two portions of the terminal strip 33 as does the depending portion 51 in the form previously described. In the arrangement of Figures 12 and 13 the undersurface of the cover plate 11 bears against the upper end of the insulating strips 52 and holds them in position with the shoulder 53 against the interior surface of the housing, and specifically against the bosses 27.

The cover 11 is provided with the depending ears 55 made integrally therewith which ears extend downwardly at either side of the plug prong-receiving apertures 15 and 16, thus cooperating to guide the prongs into the space between the inwardly bent terminal strip portions 44. Moreover, the inward ones of the pairs of ears 55 cooperate with the strap 12 to hold the strap in position with respect to the housing 10 and particularly with respect to the central rib 24 of that housing. Strap 12 is the usual mounting strap, but is, in this instance, provided with the means for grounding an appliance plugged into the receptacle. This grounding means comprises a conductive member 56 (see Figure 5) which has two bent portions 57 which extend through openings 58 in the strap 12 and into the cavities 25 in the central rib 24. In the present instance the member 56 is fixed to the strap 12 by means of the rivet 60 although any other suitable fastening means might be utilized. At its left hand end, as seen in Figure 4, strap 12 is provided with the extension 61, the bent over end 18 of which extends into a depression in the outer surface of the housing 10 and is provided with a screw 20 threaded into it by means of which the strap 12 and the member 56 may be connected to ground.

It will be seen that with the construction described insertion of a plug into either one of the two units 13 and 14 of the duplex receptacle connects the appliance to which the plug is fixed to both sides of the line and to ground. Moreover, the duplex receptacle may be readily connected to the electrical wiring of a building in which it is installed by simply inserting the two line conductors, one into an opening 22 at one side of the receptacle and the other into an opening 22 on the opposite side thereof, it being understood that the wires are stripped of their insulation for a sufficient length so that the bare portion will be gripped by the resilient fingers 43 cooperating with the fixed fingers 42.

As has been indicated in some instances it is desirable that the two receptacles 13 and 14 be connected to different wiring circuits. When this is desired, it is only necessary to remove the central joining portions of the two terminal strips by breaking the base of the U-shaped bend 38 therein away along the score lines 47 by means of a screwdriver or other tool such as indicated at 46 in Figure 7. When this has been done, conductors are inserted in all four of the openings 22, in circuit pairs, so that each duplex receptacle unit is connected to an individual electrical circuit.

It will be seen that the construction described hereinabove provides a duplex receptacle with a ground connection for each of the units thereof and additionally provides pressure lock terminals for four conductors together with means for separating the terminal strips associated with each side of the electrical circuit to enable the two units of the receptacle to be connected in separate circuits. It will further be seen that the two plug-receiving units may readily be electrically isolated while at the same time retaining the advantages of the pressure lock terminal arrangement and without affecting the ground connection of the two receptacle units.

While I have described a particular embodiment of the invention, I wish not to be limited by the foregoing description but, on the other hand, solely by the claims granted to me.

What is claimed is:

1. In a heavy duty duplex plug receptacle, in combination, a housing formed of electrically insulating material and having a pair of cavities therein separated by a central rib, a terminal strip mounted in each said cavity, each terminal strip comprising two pairs of plug prong-receiving fingers and two pairs of current wire-receiving fingers, an opening in said housing adjacent a central portion of each said terminal strip, means comprising a bent central portion of said terminal strip extending through a corresponding housing opening, said means electrically connecting one of said pair of plug prong-receiving fingers and an associated pair of circuit wire-receiving fingers with the other pairs of fingers, said connecting means being readily mechanically fractionable from the exterior of said housing to divide said terminal strip and electrically isolate one of said pairs of prong-receiving fingers and wire-receiving fingers from the second pairs of like elements, and a cover member fixed to said housing and having dependent bosses thereon, said bosses bearing against central portions of said terminal strips and holding said strips in position in said cavities, said bent central portion of said terminal strip being in the shape of a U, said bosses on said cover holding said terminal strips in place and having depending projections thereon which extend through said housing openings and lie between the arms of said U-shaped bend, the base of said projection being spaced from the base of said U-shaped bend, whereby a tool may be inserted between said projection and said base of said bend to break away the base of said bend.

2. A plug receptacle, as claimed in claim 1, wherein the wall of said housing is of decreased thickness from said opening outwardly to the edge of said housing whereby the base of said bend of said central joining portion of said terminal strip lies beneath the rear surface of said housing.

3. A plug receptacle as claimed in claim 1, wherein each said terminal strip has a notch extending inwardly from the outer edge, and said boss on said cover has tapered lower ends, said ends conforming to the shape of the wire gripping fingers adjacent said notch whereby said fingers are held against inward movement.

4. A plug receptacle as claimed in claim 3, wherein said housing has bosses formed therein extending upwardly from the base thereof centrally of each cavity in transverse alignment with said opening in said cavity, said bosses conforming to the shape of said notches in said terminal strips, said bosses of said cover member seating against the edges of the notch in said terminal strips to hold said terminal strips in position, said bosses on said housing serving to insulate the ends of said terminal strip when said central bent portion thereof has been fractured.

5. A plug receptacle as claimed in claim 3, wherein said bent central portion of said terminal strip has score lines thereacross where the base of the U-shaped bend joins the arms to facilitate fracture thereof.

6. In a heavy duty duplex plug receptacle, in combination, a housing formed of electrically insulating material and having a pair of cavities therein separated by a central rib, a terminal strip mounted in each said cavity, each terminal strip comprising two pairs of plug prong-receiving fingers and two pairs of current wire-receiving fingers, an opening in said housing adjacent a central portion of each said terminal strip, means comprising a bent central portion of said terminal strip in the shape of a U extending through a corresponding housing opening, said means electrically connecting one of said pair of plug prong-receiving fingers and an associated pair of circuit wire-receiving fingers with the other pairs of fingers, said connecting means being readily mechanically fractionable from the exterior of said housing to divide said terminal strip and electrically isolate one of said

pairs of prong-receiving fingers and wire-receiving fingers from the second pairs of like elements and a cover member fixed to said housing and having dependent bosses thereon, said bosses bearing against central portions of said terminal strips and holding said strips in position in said cavities and an insulating strip having a shoulder thereon placed in position in each said cavity, said shoulder resting against the base of said cavity, the projecting portion of said strip extending into said opening in said housing between the arms of said U-shaped bend in said terminal strip, said insulating strip being held in position by said cover.

7. In a heavy duty duplex plug receptacle, in combination, a housing formed of electrically insulating material and having a pair of cavities therein separated by a central rib, a terminal strip mounted in each said cavity, each terminal strip comprising two pairs of plug prong-receiving fingers and two pairs of current wire-receiving fingers, an opening in said housing adjacent a central portion of each said terminal strip, means comprising a bent central portion of said terminal strip extending through a corresponding housing opening, said means electrically connecting one of said pair of plug prong-receiving fingers and an associated pair of circuit wire-receiving fingers with the other pairs of fingers, said connecting means being readily mechanically fractionable from the exterior of said housing to divide said terminal strip and electrically isolate one of said pairs of prong-receiving fingers and wire-receiving fingers from the second pairs of like elements and a cover member fixed to said housing and having dependent bosses thereon, said bosses bearing against central portions of said terminal strips and holding said strips in position in said cavities, said cover member having formed integrally therewith on the inner side thereof guide members extending adjacent said prong-receiving fingers, said cover further being provided with apertures in alignment with said guide members, which apertures receive the prongs of an appliance plug.

8. A plug receptacle in accordance with claim 7, wherein said housing is provided with additional cavities, a mounting strap extends longitudinally of said housing centrally thereof and is held in place by said cover, said mounting strap having downwardly extending fingers extending into said additional cavities, said cover having apertures in alignment with said cavities to receive grounding prongs of appliance plugs to provide electrical connection through said fingers to said mounting strap for grounding an appliance plugged into said receptacle.

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