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S. I. SLATER
DUPLEX PLUG RECEPTACLE

2,969,518

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2 Sheets-Sheet 1

Fig. 1.

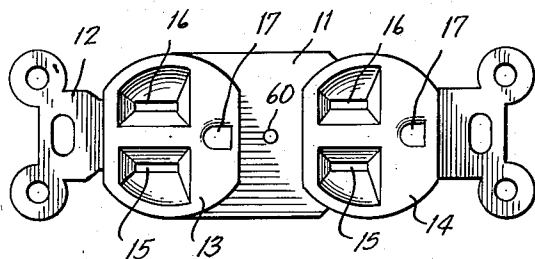


Fig. 2.

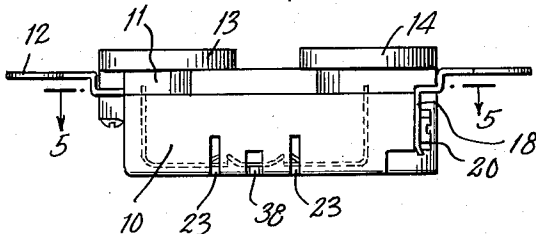


Fig. 3.

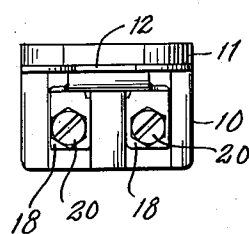
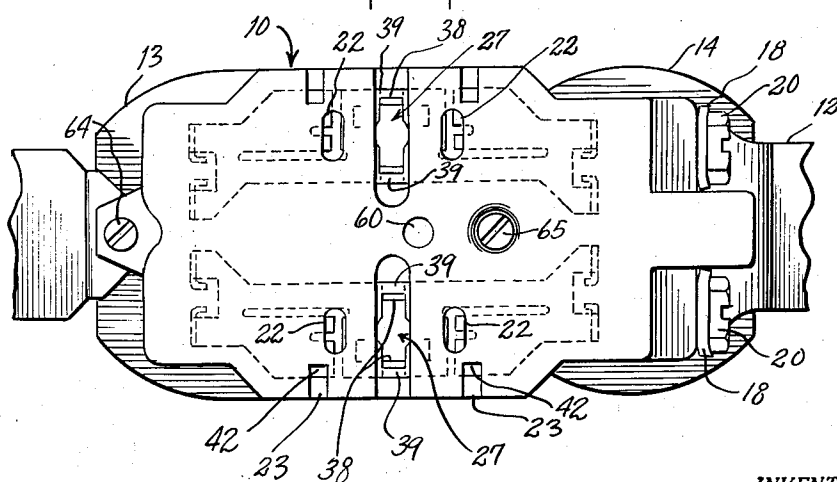


Fig. 4.



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2 Sheets-Sheet 2

Fig. 5.

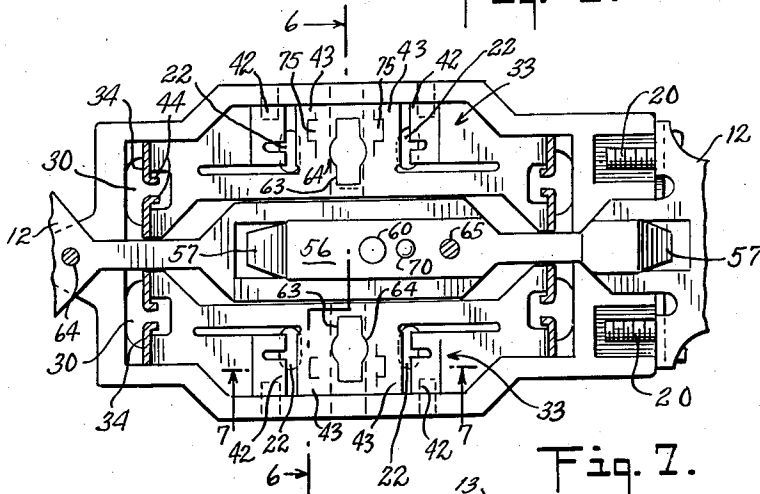


Fig. 7.

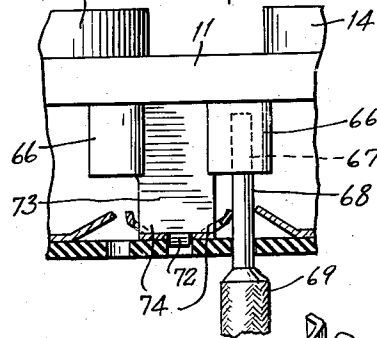


Fig. 6.

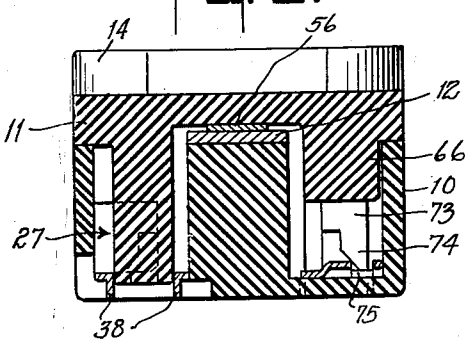


Fig. 8.

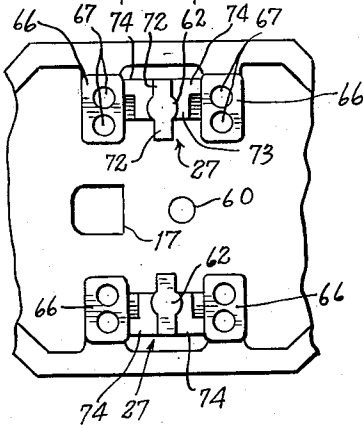
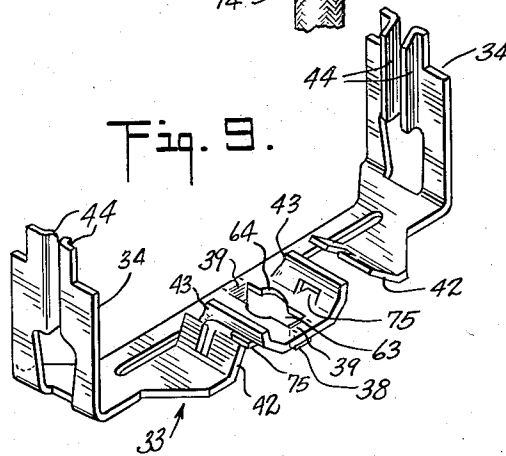


Fig. 9.



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1

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DUPLEX PLUG RECEPTACLE

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5 Claims. (Cl. 339—31)

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.

This application is related to my copending application for "Plug Receptacle," Serial Number 754,348, filed August 11, 1958.

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 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 connected 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 locked 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.

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.

2

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 elevational view of the receptacle.

Figure 3 is an end elevational view of the receptacle of Figures 1 and 2, illustrating particularly the terminal strips to which a ground wire may be connected for grounding one of the three-pronged receiving apertures of each of the plug receptacles.

Figure 4 is an enlarged rear elevational view of the duplex receptacle.

Figure 5 is a cross sectional view of the receptacle with the cover removed taken along line 5—5 in Figure 2. 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 6 is a transverse cross sectional view taken along the line 6—6 in Figure 5 and illustrating particularly the manner in which the connector strips are securely retained within the housing;

Figure 7 is a longitudinal cross sectional view taken along the line 7—7 in Figure 5, showing particularly the pressure lock terminals for receiving the conductor wires and securing them within the housing;

Figure 8 is a horizontal plan view of the inside of the housing cover illustrating particularly the portions of the cover engaging the connecting strips to secure them firmly in place and

Figure 9 is an isometric view of a terminal strip as utilized in the duplex plug receptacle.

Referring now to the drawings and particularly to Figures 1 through 3, there is shown therein a duplex receptacle comprising a housing 10 and cover member 11 which have mounted between them a mounting strap 12 by a 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 17 in each unit 13 and 14 for receiving grounding plugs.

As will appear hereinafter, plug prongs inserted into the openings 17 make connection with the strap 12 which strap is provided with portions 18 which extend into notches cut into the wall of the housing 11 and which portions are provided with screws 20 by means of which the strap may be connected to ground.

Referring now particularly to Figure 4, 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.

Referring now to Figure 4, studs 27 projecting from cover 11 are shown which engage the connecting strips 33. The studs 27 pass through an opening in the terminal strips 33 designed to accommodate them. It will be noted that the only electrical connection between the respective halves of the terminal strip 33 is provided by a removable portion 39 of the terminal strip 33 on

either side of the opening for the stud 27. The removable portion 39 may be made more easily removable by providing a milling or by otherwise weakening the terminal strips at the ends of the removable portions 39.

Upturned portions 38 are provided as an integral part of the removable portion 39 which facilitates engagement by a screwdriver, long nosed pliers or other conventional electrician's tool. Thus, it will be seen that by pressing on or pulling on the upturned portions 38, the removable portion 39 may be broken out of the terminal strips 33, thus separating each terminal strip into two halves which are electrically and physically separate.

It will be noted that the removable portions of the terminal strips do not extend outside the normal area of such a strip and thus a very compact arrangement is provided; furthermore, the bent portions 38 which facilitate breaking of the strip are struck out of a portion of the strip within the normal outline of such a strip, and the opening so formed is utilized to engage stud 27. It is also noteworthy that the bent portions 38 do not protrude from the housing of the receptacle, yet separation of the halves of the terminal strip is easily accomplished due to the leverage which is achievable due to the presence of the upturned portions 38.

It may also be seen in Figure 4 and others of the figures that the resilient wire gripper members 42 are accessible through the slide opening slots 23 so that a wire engaged by wire gripping member 42 or by second wire gripping member 42, may be released by means of a screwdriver inserted through opening 23.

The cover and body portions of the housing and the mounting strap 12 may be secured together by screws 64 and 65, or by any other suitable means. A hole 60 may be provided so that a screw may be threaded into the duplex plug receptacle unit to secure a rectangular cover plate after installation of the plug receptacle unit in the wall in accordance with customary practice.

Further details of the arrangement of terminal strips 33 within the duplex plug receptacle may be seen in Figures 5-9, and particularly the provisions made for securing the terminal strips 33 securely in place, even after they have been separated by breaking out the removable portions 39. It is obviously of great importance to secure the terminal strips 33 in place within the housing so that the separation of such strips into two parts will not allow the strips to shift or change their position as this might result in reestablishing a connection between the two halves of the terminal strip, defeating the purpose of the removable portion and resulting in an unsatisfactory device.

Furthermore, the retention of the terminal strips in the proper position is rendered more difficult and at the same time more important by reason of the use of pressure lock terminals. When the wire is inserted into the pressure lock terminal after terminal strip 33 has been broken into, considerable force is exerted on the half of the terminal strip 33 and it is important that the half of the terminal strip remain securely in position to insure proper operation of the pressure lock terminal. Although the wires could be inserted into the pressure lock terminals of the plug receptacle prior to breaking out the removable portions 39, this procedure would at times be difficult or impossible. In any event the plug receptacle, according to the present invention, makes it possible to insert the conductor wires into the pressure lock terminal either before or after the removable portion of the terminal strips 33 have been broken out to divide each terminal strip into two separate parts.

In Figures 5-9 the configuration of terminal strips 33 is clearly shown and it will be observed that each terminal strip 33 is provided with two pressure lock terminals, each comprising a relatively rigid wire engaging portion 43 and a resilient wire gripping portion 42. The resiliency of the wire gripping portion 42 is achieved

due to a small minimum width and a relatively long length. The wire gripping element 42 is bifurcated so that the bifurcated portions may yield independently to compensate for the slight differences in the size of two wires inserted in the openings 22. The openings 22 and the pressure lock terminals are designed to accommodate two wires so that one wire may be connected to the main power line and a further wire be extended to an additional plug receptacle thereby eliminating the necessity for any further connecting means where it is desired to carry the power line on to further receptacles or other devices.

Prong receiving fingers 44 are formed from the upstanding portions 34 of the terminal strips 33 which firmly frictionally engage and establish electrical contact with prongs of an electrical plug inserted in the receptacle.

The manner in which mounting strap 12 is also utilized as a terminal for the ground connection for the plug receptacle is shown in Figure 5. A resilient strip 56 having inwardly turned end portions 57 is secured to the mounting strap 12 such as by a brad 70. The end portions 57 bear against the ground terminal prongs of a three-pronged plug inserted into the plug receptacle and cause an electrical connection to be established between the ground prong and the mounting strap 12. The mounting strap 12 may be connected to a ground wire by means of screws 20, or in some cases, the connection of the mounting strap 12 to the outlet box itself will supply adequate ground connection.

From Figures 5-9, it will be observed that stud 27 is shaped to provide an efficient retaining means for retaining mounting strip 33 in place even after it has been separated into two parts. Stud 27 is provided with a generally circular center portion 62 and terminal strip 33 is provided with a mating opening 64 of generally circular form so that the engagement between these two members, even after removal of the removable portion 39 of mounting strips 33, serves to prevent dislocation of the separated half of the mounting strip 33. In addition, a guide 66 is provided having openings 67 therein for the accommodation of conductor wires 68 of electrical cable 69.

The wings 72 on the stud 27 serve to retain the terminal strip 33 both before and after the removable portions 39 are broken out, and a support 73 extends downward between the stud 27 and the wire guide 66 to hold the terminal strips 33 securely against the bottom of the housing 10. This is particularly important in view of the pressure imparted to the terminal strips 33 upon insertion of a conductor wire such as 69. The support 73 is formed with a post 74 which engages an indentation 75 in terminal strip 33. In cooperation the post 74, the stud 27, and the various portions of the terminal strip 33 which they engage cause each terminal strip 33, even after having been separated into two parts, to be firmly secured in the housing against displacement by the insertion of conductor wires or for any other cause.

From the foregoing explanation it will be seen that a duplex plug receptacle is provided, having many desirable features including pressure lock terminals, a grounding terminal and the capability of separating the halves of the duplex outlet to provide independent electrical circuits. Notwithstanding these many desirable features and rugged and durable nature of the plug receptacle unit, only a single unitary terminal strip is required for each half of the electrical circuit and only two parts are required for the housing and for all retaining and supporting structure for the terminal strips. Thus, a particularly desirable and yet inexpensive wiring device is provided.

It will be appreciated that many variations and modifications to the apparatus shown may be made by those of ordinary skill in the art, and accordingly the scope of the invention is not to be construed to be limited to the particular embodiment shown, but is to be limited solely by the appended claims.

What is claimed is:

1. In a heavy duty duplex receptacle, a terminal strip formed from a flat metal sheet comprising at least two prong-receiving means, at least two conductor wire connecting means and at least one frangible portion located to divide said terminal into two electrically separable parts each having at least one prong-receiving means and at least one conductor wire connecting means, each said frangible portion comprising a narrow strip of said sheet within the outline of the remainder of said terminal strip and near the edge of a longitudinal central portion of said terminal strip and having an upturned portion formed and bent up from an interior portion of said terminal strip, said upturned portion being engageable to break said frangible portion, said frangible portion having at least one weakened section to facilitate breaking thereof.

2. In a heavy duty duplex receptacle, a terminal strip formed from a flat metal sheet comprising at least two prong-receiving means, at least two conductor wire connecting means and at least one frangible portion located to divide said terminal into two electrically separable parts, each having at least one prong-receiving means and at least one conductor wire connecting means, each said frangible portion comprising a narrow strip of said sheet near the edge of a longitudinally central portion of said terminal strip and having an upturned portion formed and bent up from an interior portion of said terminal strip, said upturned portion being engageable to break said frangible portion.

3. Apparatus as claimed in claim 2 wherein said conductor wire connecting means each comprise a portion

of said strip formed as a resilient wire gripping and wire engaging means adapted to grip an inserted conductor wire to establish electrical contact therewith.

4. Apparatus as claimed in claim 2 wherein said wire connecting means each comprise a portion of said strip having a resilient wire gripping finger and a wire contacting element separated by a slot in said strip whereby a conductor wire may be forced into said slot to separate said finger and said wire contacting element and will be held thereby in electrical contact with said strip.

5. In a heavy duty duplex receptacle, a terminal strip formed from a flat metal sheet comprising at least two prong-receiving means, at least two conductor wire connecting means and at least one frangible portion located to divide said terminal into two electrically separable parts, each having at least one prong-receiving means and at least one conductor wire connecting means, each said frangible portion comprising a narrow strip of said sheet within the outline of the remainder of said terminal strip and near the edge of a longitudinally central portion of said terminal strip and having an upturned portion formed and bent up from a portion of said terminal strip, said upturned portion being engageable to break said frangible portion.

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