

## [54] ELECTRICAL CONNECTING DEVICE FOR SERVICE OUTLET

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[51] Int. Cl. .... H01r 27/02

[58] Field of Search ..... 339/31-33, 339/14, 22, 154-170, 217, 176, 191-194, 258

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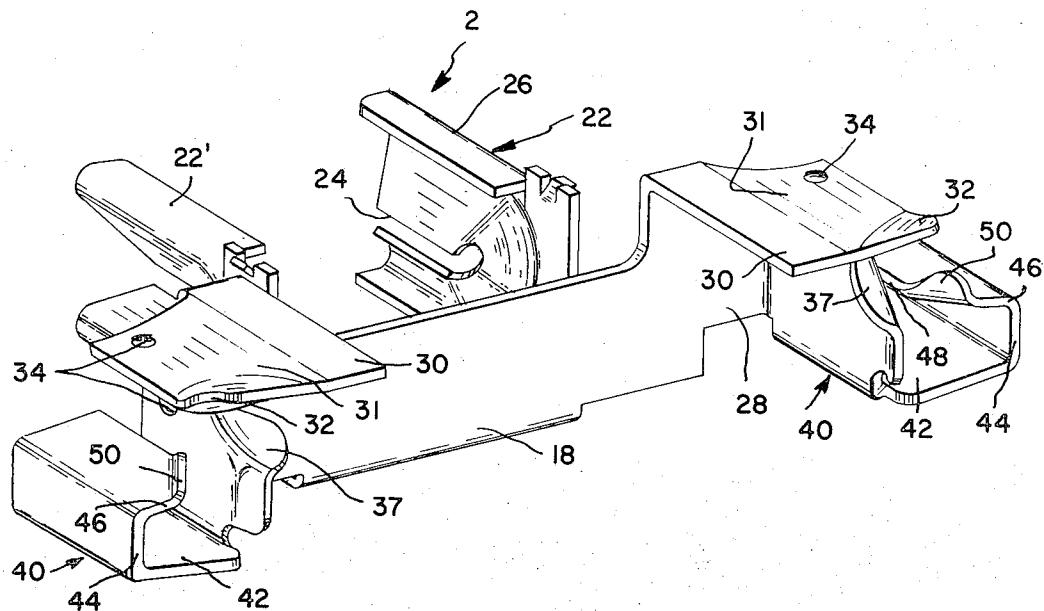
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## [57]

## ABSTRACT

An electrical connecting device for an electrical service outlet, such as a duplex receptacle, has a receptacle portion which is adapted to receive a blade terminal in either of two orientations. The receptacle portion has a plate-like first contact portion and a plate-like second contact portion which extends normally of, and is spaced from, the first contact portion. The second contact portion has a channel-shaped extension on its edge which is remote from the first contact portion. One sidewall of this extension lies in a plane which is normal to the plane of the first contact portion and has an edge which is adjacent to the first contact portion. The blade can be inserted if it is oriented parallel to the plate-like first contact portion between the surface of that portion and the adjacent edge of the second contact portion. The blade can also be inserted when it is parallel to the second contact portion between the surface of that portion and the free edge of the one sidewall of the extension.

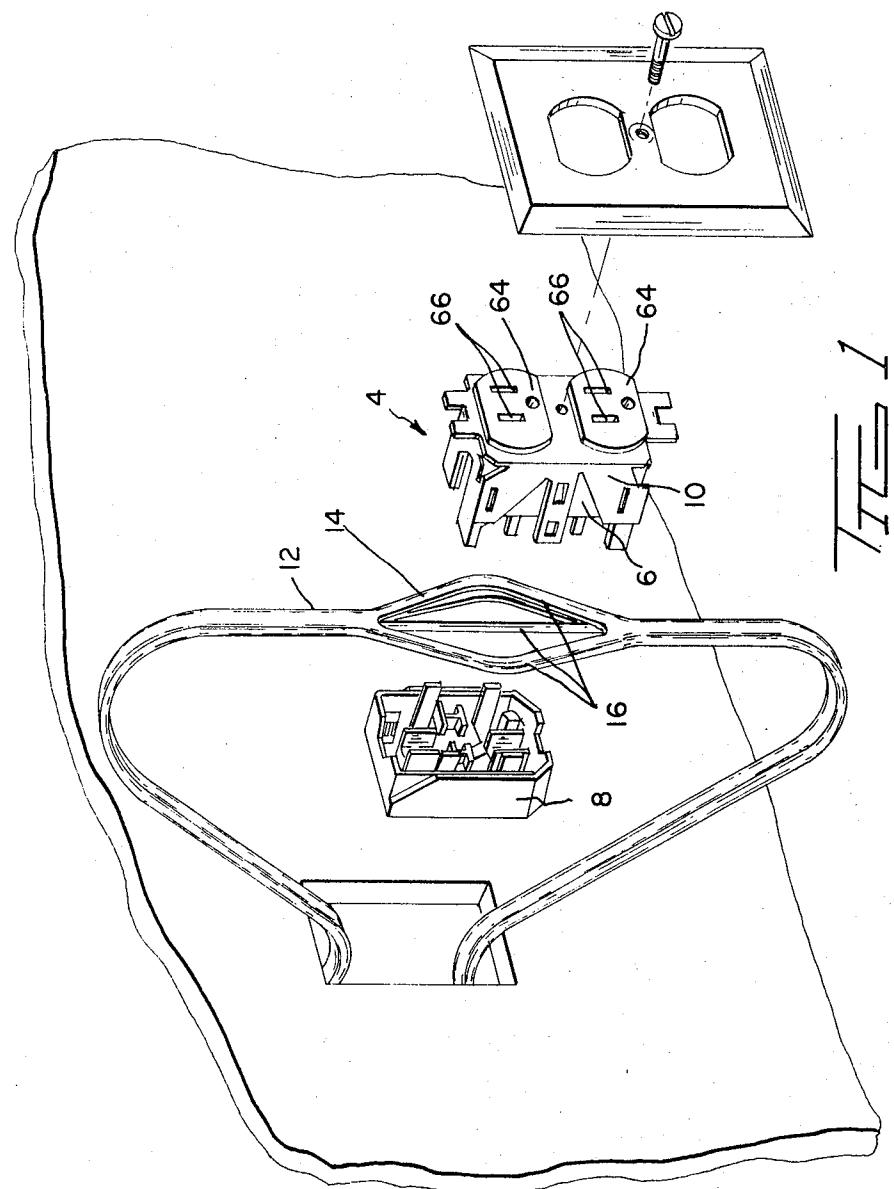
3 Claims, 10 Drawing Figures



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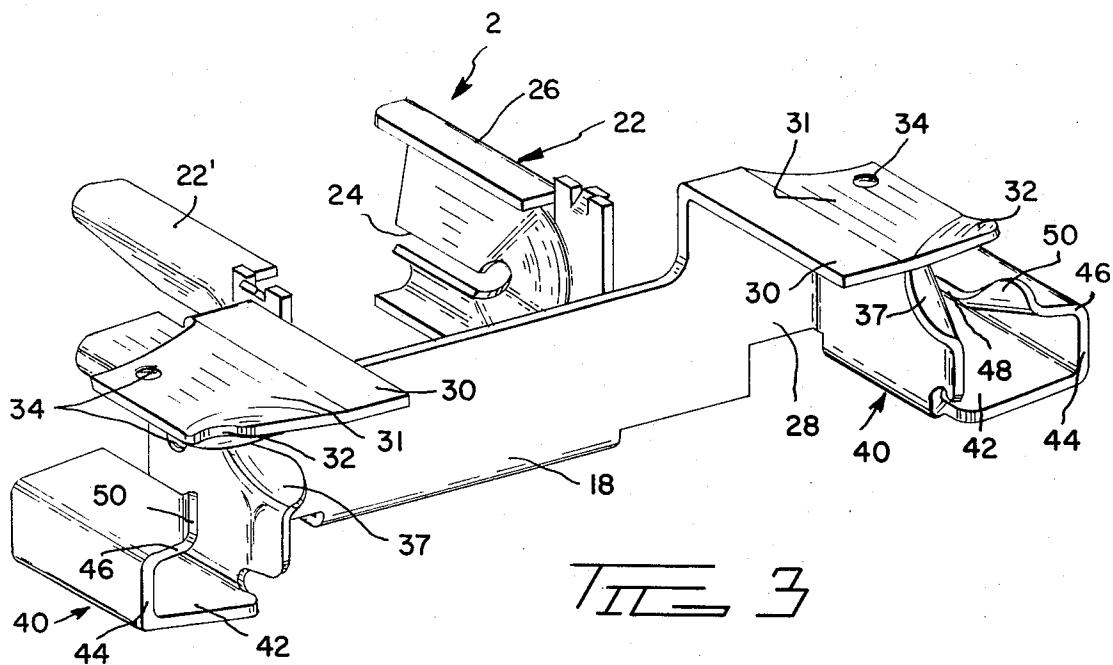
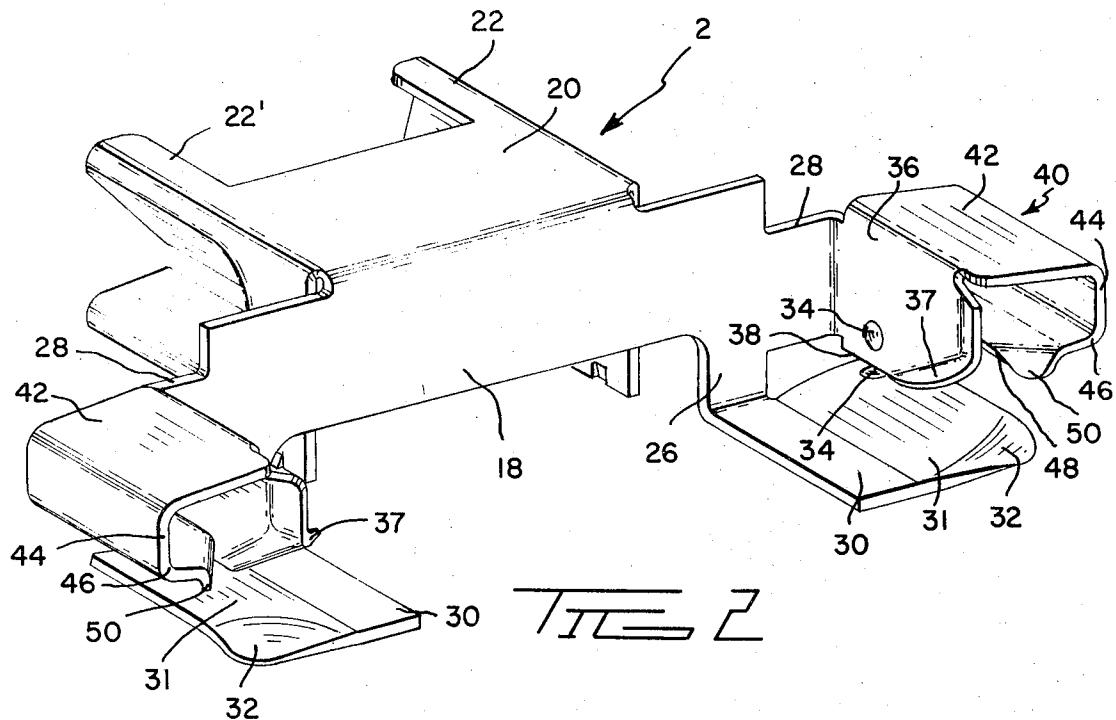
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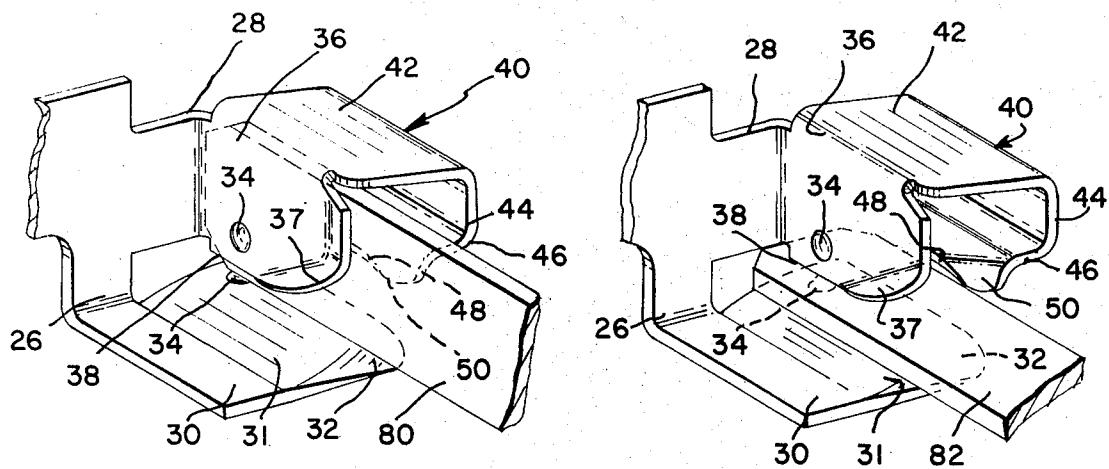
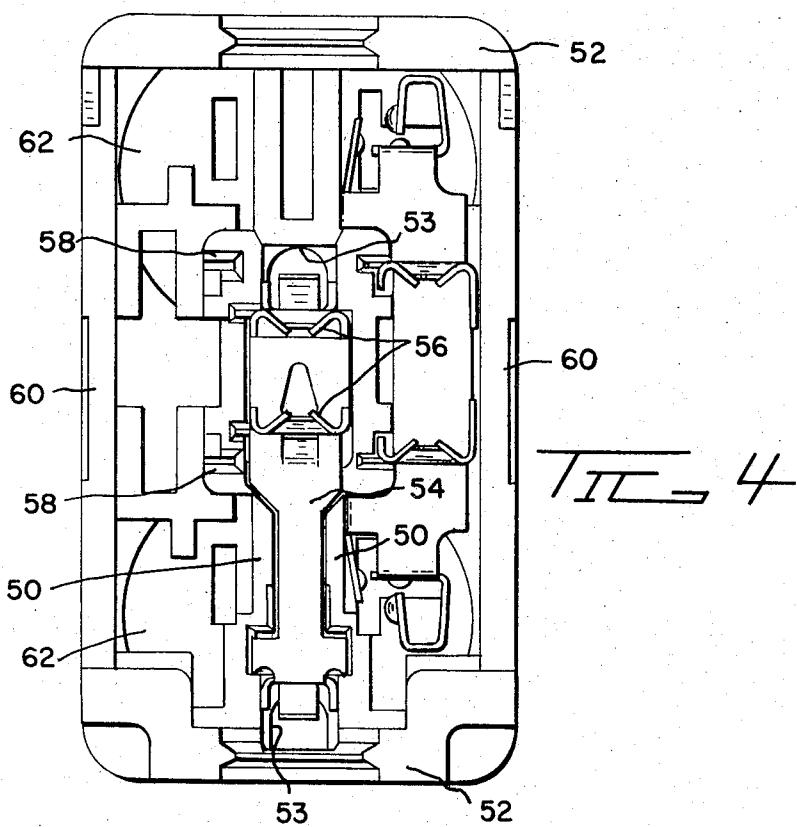


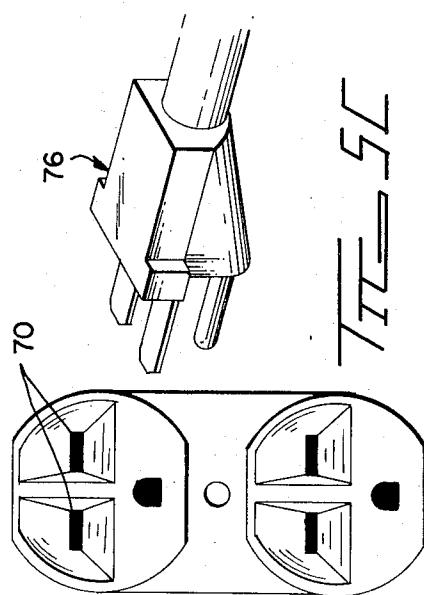
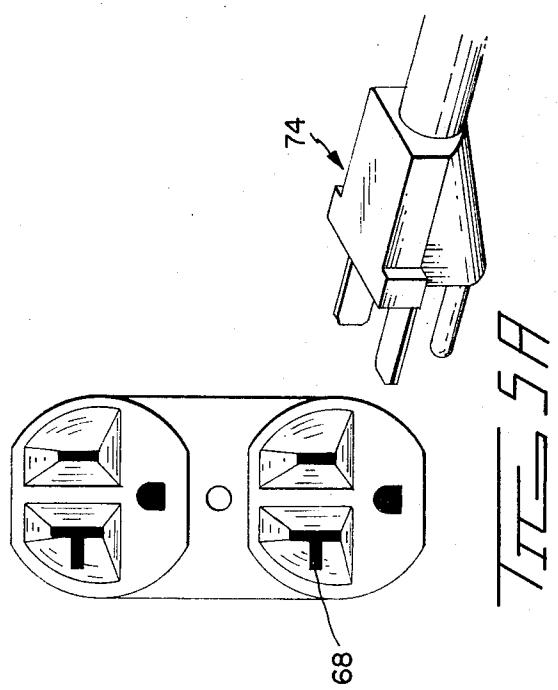
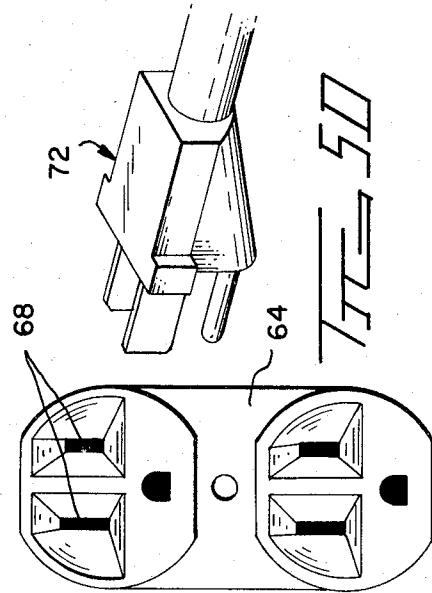
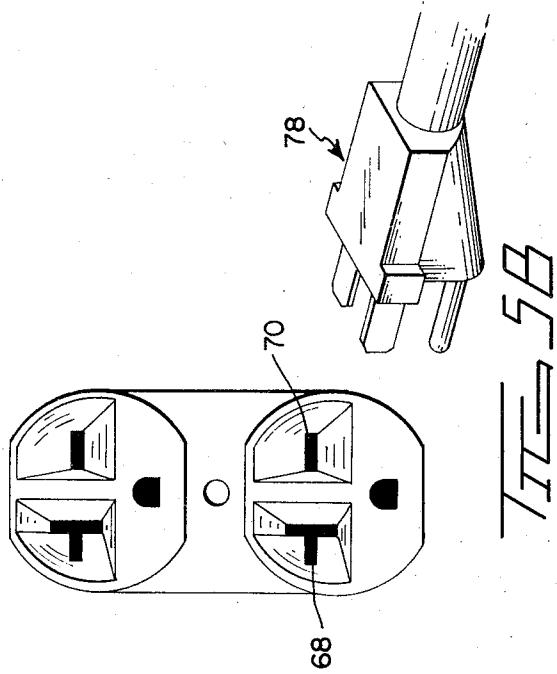
FIG. 6

FIG. 7

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## ELECTRICAL CONNECTING DEVICE FOR SERVICE OUTLET

### BACKGROUND OF THE INVENTION

This invention relates to electrical connecting devices adapted for use in 125 volt or 250 volt electrical service outlets such as conventional duplex receptacles. The embodiment of the invention disclosed herein is particularly intended for use in a receptacle of the type disclosed and claimed in application Ser. No. 300,931 filed Oct. 26, 1972 to which reference is hereby made.

It is common practice in the electrical arts to provide service outlets in household wiring which are keyed to receive two blade-like terminals of a plug (such as the plug of a tool or appliance) in preferred orientations. The purposes of this keying system stems from the fact that electrical service is commonly provided as either 125 volt service or 250 volt service and in one or the other voltages, the line extending to the outlet may be designed to carry either 15 amps of current or 20 amps of current. The keying arrangement of the receptacle and the plug prevents the consumer from plugging say a 125 volt appliance into a 250 volt line.

The keying of the receptacle is commonly achieved by providing openings in the receptacle face which will accept terminal blades that are oriented (vertically or horizontally) in accordance with accepted keying standards. The electrical connecting device contained in the receptacle, by means of which the blade contacts of the plug are connected to the conductors extending to the receptacle, must also accept blades in the orientation which is called for in a particular outlet. Connecting devices are known which will accept blades in either of two orientations but the known types of universal receptacles are not compatible without teachings of the above-identified application Ser. No. 300,931 and are, moreover, quite often such that they must be manufactured of relatively heavy gauge metal.

It is accordingly an object of the instant invention to provide an improved connecting device for an electrical outlet of the type used for ordinary 125 volt or 250 volt service. A further object is to provide a stamped and formed connecting device which will receive a blade in either of its two conventional orientations as used for 125 volt or 250 volt service. A further object is to provide a connecting device which can be inexpensively produced, which has a high degree of reliability, and which is capable of carrying a relatively high current as is encountered in ordinary electrical service outlets.

These and other objects of the invention are achieved in a preferred embodiment thereof which is briefly described in the foregoing abstract, which is described in detail below, and which is shown in the accompanying drawing in which:

FIG. 1 is an exploded view of the parts of a duplex receptacle of a type for which the connecting device of the instant invention is intended.

FIG. 2 is a perspective view of a connecting device in accordance with the invention having receptacle portion at each end thereof.

FIG. 3 is a perspective view, the connecting device being inverted with respect to FIG. 2.

FIG. 4 is a plan view of the receptacle housing having one connecting device in accordance with the invention mounted therein.

FIG. 5A-5D show the keying arrangements for electrical receptacles and plugs commonly used for 125 volt and 250 volt electrical service.

FIG. 6 is a fragmentary view similar to FIG. 2 showing the manner of inserting a vertically oriented terminal blade into the blade receptacle portion of the connecting device.

FIG. 7 is a view showing the manner of inserting a horizontally oriented blade into the receptacle portion of the connecting device.

A preferred form of connecting device 2 (FIG. 2) in accordance with the invention is adapted to be mounted in the insulating housing 6 of a duplex receptacle 4 of the type shown in FIG. 1 and described in the above identified application Ser. No. 300,931. The receptacle assembly of FIG. 1 and the manner of installing it on conductors will thus be described only briefly and to the extent necessary for an understanding of the instant invention.

The receptacle assembly comprises the insulating housing 6, a back cover 8, and the housing contains electrical connecting devices having slots which are adapted to receive the conductors 16 of the cable 12. When the wires are to be connected to the connecting devices, the cable jacket is slit as shown at 14 and the outside conductors are bent away from the center conductor. The slit portion of the cable is then located on the rearward side of the housing 6, the conductors are forced into the wire receiving slots of the terminals, and the back cover 8, is then assembled to the housing. The housing has a metallic grounding frame 10 in surrounding relationship thereto which also has means to facilitate its being secured in an opening 4 in a opening in a panel. In the description which follows, the connecting device 2 will first be described in detail and the interior of the housing will then be described with relationship to the structure of the connecting device.

The connecting device 2 is manufactured of brass or other suitable conductive sheet metal by stamping and forming and has an elongated flat buss or web section 18 from one side edge of which a flange 20 extends. Plate-like conductor receiving portions 22 are integral with the side edges of the flange 20 and extend transversely across the buss section 18. These conductor receiving portions have centrally located aligned conductor receiving slots 24 therein, the width of these slots being such that when a wire is forced laterally of its axis and into one of the slots, the edges of the slot will penetrate the insulation of the wire and establish electrical contact with the conducting core thereof. The conductor receiving portions are inwardly formed towards each other on each side of each slot and edge flanges may be provided as shown for strengthening purposes.

The buss section 18 has at each end thereof a blade receptacle means in accordance with the invention which is adapted to receive an electrical plug blade 74 or 76 of standard dimensions whether the blade is oriented with its plane extending either vertically or horizontally as viewed in FIG. 2. Since these blade receptacle portions at each end of the buss section 18 are substantially the same, a description of one will suffice for both.

The buss section 18 can, for descriptive purposes, be considered to be lying in a third plane with reference

to first and second planes defined below. First and second arms 26, 28 extend from the end of the buss section in this first plane, these arms being mutually perpendicular with respect to each other as shown. A first contact portion 30 extends normally of the third plane from the arm 26 and can for reference purposes, be considered as lying in the first plane. This plate-like contact portion is flag-like and its free end 31 is bent or formed slightly upwardly as viewed in FIG. 2 out of the first plane. The leading corner 32 of this contact portion is additionally swaged to provide an inclined surfaces and a thin point and this swaged portion is bent downwardly to facilitate movement of the blade into the receptacle as will be described below.

A plate-like second contact portion 36 extends from the end of the arm 28 in the second reference plane which is generally perpendicular to the first and third reference planes. This plate-like portion has one edge 38 which is opposed to the surface of the first contact portion 30 and is spaced from this contact portion by a distance which is slightly less than the thickness of the terminal blade. The leading corner 37 of this contact portion 36 is swaged and bent laterally out of the second plane of the contact portion to provide guidance for a blade during insertion thereof as will also be described below. A channel-shaped extension 40 is integral with the upper edge (as viewed in FIG. 2) of contact portion 36 and has one sidewall 42 extending away from the contact portion 36. The web 44 of this extension is parallel to, and spaced from, the contact portion 36 and the remaining sidewall 46, extends towards the contact portion 36. The edge 48 of this sidewall 46 is spaced from the surface of the plate section 36 by a distance which again is substantially equal to the thickness of the terminal blade. It should also be noted that the corner 50 of this sidewall is swaged and formed away from the surface of the plate section 36 in the manner of the corner 32.

As shown in FIG. 6, a blade 80 which is oriented in a plane extending parallel to the second plane (the plane of the contact portion 36) can be inserted between the edge 48 and the opposed surface of the contact portion 36. A blade 82 which is oriented in a plane extending parallel to the plane of the contact portion 30 can be inserted between the edge 38 of contact portion 36 and the surface of the contact portion 30 as shown in FIG. 7. Dimples or bosses 34 are advantageously provided on the contact portions 30, 36 for cooperation with the circular holes which are customarily provided in the blade contacts of electrical plugs.

Referring now to FIG. 4, an insulating housing in accordance with the teachings of application Ser. No. 300,931 is recessed on its rearward side and has spaced apart ribs 50 extending between its ends 52. An enlarged recess is provided between these ribs in the geometric center of the housing for the reception of the blade-like conductor receiving portions 56 of a grounding terminal 54. When a plug is inserted into either of the receptacles, the grounding pin of the plug will extend through one of the centrally located holes 53 and engage a portion of this grounding terminal as explained in application Ser. No. 300,931.

Connecting devices in accordance with the invention are provided in the housing on each side of the central ribs 50 and transverse ribs generally indicated at 58 extend between the central ribs and the sides 60 to support the buss section 18 of the connecting device. Cavi-

ties or recesses 62 are provided at each of the corners of the housing for the blade receptacle portions described above. These cavities extend to the front wall or face 64 of the housing so that the receptacle portion of the connecting device will be adjacent to the openings in the face which are adapted to receive the blade terminals of the plug. The connecting devices are firmly held in the housing by legs which are integral with the back cover 8 and which bear against the receptacle portions of the connecting devices when the back cover is assembled to the housing.

FIGS. 5A-5D show the standard openings for the various electrical conditions and types of plugs. The blade openings for 125 v 16 amp service (FIG. 5D) are adapted to receive only a plug having blades which are in parallel vertical planes as in the drawing. It will be apparent that of the electrical plugs shown in FIGS. 4a-5d, only the plug 72 can be inserted into the receptacle of FIG. 5d. FIG. 5a shows the type of receptacle used for 125 v 20 amp service. This type of receptacle has a T-shaped opening in combination with an opening adapted to receive a blade in a vertical orientation. The receptacles shown in FIGS. 5a can thus receive either of the plugs 72 or 74. Similarly, the receptacle standards (FIG. 5c) have 250 v 15 amp service will receive only plugs 76 having contact blades in side-by-side co-planar relationship while the receptacle shown in FIG. 5b which is provided for 250 v 20 amp service and will receive either the plugs 76 or the plug 78 which has one vertical and one horizontal blade. It will be apparent that the connecting device shown in FIGS. 2 and 3 can thus be used in any of the receptacles shown in FIGS. 5a-5d.

While the principals of the invention have been herein described with reference to a standard duplex outlet, it will be apparent that a blade receptacle in accordance with the invention can also be used in other electrical devices such as a single receptacle or a receptacle of the type which is supplied or connected to a free hanging wire.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only.

What is claimed is:

1. An electrical receptacle terminal intended for use in an electrical service receptacle, said terminal having an elongated buss section extending in a third plane and having a socket portion at each end of said buss section, each of said socket portions being adapted to receive a blade in either of two orientations, each of said socket portions comprising:  
a web section extending in a said third plane, first and second contact portions,  
said first contact portion comprising a plate-like section extending in a first plane which extends normally of said third plane,  
said second contact portion comprising a plate-like section in a second plane which extends normally of said first and third planes, said second contact portion having one edge which extends parallel to, and is spaced from, said first contact plate-like section, whereby said blade is adapted to be inserted between said one edge and said surface of said first

contact portion when said blade is parallel to said first plane,

a generally channel-shaped extension on said second contact portion, said extension having one sidewall extending from a second edge of said second contact portion which is on the opposite side thereof from said first edge, said channel-shaped extension having a channel web which is parallel to, and spaced from, said second contact portion and having a second sidewall which extends towards said second contact portion, said second sidewall having a free edge which is spaced from said second contact portion whereby, a blade terminal oriented in said second plane can be inserted

between said second edge and said second contact portion.

2. A receptacle terminal as set forth in claim 1, said terminal having means on said buss section for forming a permanent electrical connection to a wire.

3. A receptacle terminal as set forth in claim 1, said terminal having a flange integral with, and extending from one side edge of said buss section, said flange extending parallel to said first plane, an ear extending from said flange over said buss section in a plane extending parallel to said second plane, said ear having a wire-receiving slot extending therein for forming an electrical connection with a wire.

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