

PATENT SPECIFICATION

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(54) TERMINAL FOR INSULATED WIRE

(71) We, AMP INCORPORATED, a Corporation organised and existing under the laws of the State of New Jersey, United States of America, of Eisenhower Boulevard, Harrisburg, Pennsylvania, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an electrical terminal of the insulation piercing type.

We have described in the specification of our Patent Appln. No. 33313/72 (Serial No. 1369752) an electrical terminal comprising a metal plate having a slot at an end of the plate into which an insulated electrical wire can be forced, the plate being bowed so that opposed corners of flange portions bounding the slot can cut through the insulation of the wire, as the wire is forced into the slot to engage the electrically conductive core of the wire, the terminal further comprising a pair of supports between which the plate extends, the flange portions each being connected to one of the supports and being resiliently pivotable about their connections with the supports so that as a result of the wire's being forced into the slot, the opposed corners of the flange portions are urged against the core of the wire, the supports extending integrally from a bar disposed laterally with respect to the axes of the supports, the bar being formed at its free end with a socket.

The present invention is an electrical terminal comprising a bus member integral with a pair of supports, a bowed metal plate extending between the supports, the metal plate having a slot opening into an end of the metal plate remote from the base, the slot dividing the metal plate into two flange portions which present opposed edges to cut through wire insulation and which are resiliently pivotal about their connections

with the supports, the bus member extending generally perpendicularly of the bowed metal plate and being formed at a free end with a socket extending generally parallel to the supports, the socket comprising a first contact portion formed generally as a plate extending in a first plane disposed normally of the plane of the bus member, a second contact portion formed generally as a plate disposed in a second plane disposed normally of the first plane and the plane of the bus member, the second contact portion having one edge which extends parallel to, and is spaced from, a flat surface of the first contact portion to define one conductive blade receiving space, the second contact portion having a generally channel-shaped extension which includes a first side wall extending from a second edge of said second contact portion which is one the opposite side from said one edge, a channel web which is parallel to, and spaced from, the second contact portion and a second side wall which extends towards the second contact portion, the second side wall having a free edge which is parallel to and spaced from a flat surface of the second contact portion to define another conductive blade receiving space.

An embodiment of the present invention will now be described, by way of example, with reference to the drawings, in which:—

Figure 1 is an exploded perspective view of a receptacle for which the terminal of the invention is suitable;

Figure 2 is an enlarged perspective view of a terminal according to the invention;

Figure 3 is an enlarged perspective view of the terminal which is shown inverted with respect to Figure 2;

Figure 4 is a plan view of the receptacle housing with the cover removed and receiving one terminal;

Figures 5A—5D show the keying arrangements for electrical receptacles and



plugs commonly used for 125 volt and 250 volt electrical services;

5 Figure 6 is a fragmentary view of the terminal as disposed in Figure 2 and illustrating mating of a conductive blade in one orientation; and

Figure 7 is a view similar to Figure 6 but illustrating mating of the blade in a second orientation.

10 An electrical terminal 2 (Figure 2) in accordance with the invention is adapted to be mounted in a receptacle 4 of the type shown in Figure 1.

15 The receptacle assembly comprises an insulating housing 6, a back cover 8, and the housing contains electrical terminals 2 which have slots as described below adapted to receive the conductor wires 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 centre 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 in a panel.

25 The terminal 2 is manufactured of brass or other suitable conductive sheet metal by stamping and forming and has an elongated flat bus portion 18 from one side edge of which a flange 20 extends. Wire receiving portions 22 which are described fully in the specification of Patent Appln. No. 44076/71 (Serial No. 1362416) are integral with the side edges of the flange 20 and extend transversely across the bus portion 18. These wire receiving portions have bowed plates with centrally located aligned wire 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 plates tend to bend about marginal upright portions during insertion of the wire. 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.

30 The bus portion 18 has at each end an identical socket integrally joined to the bus portion by first and second mutually perpendicular arms 26, 28 coplanar with the bus portion. A first contact portion 30 extends in a first plane disposed normally with respect to the plane of the bus portion

from the arm 26. This contact portion is formed generally as a plate which is bent slightly out of the first plane at a free end portion 31. A leading corner 32 of this contact portion is swaged to provide an inclined lead-in surface to facilitate reception of a conductive blade as will be described below.

A plate-like second contact portion 36 extends from the arm 28 in a second plane which is generally perpendicular to the first plane and the plane of the bus portion. This plate-like portion has one edge 38 which is parallel 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 as will be described below. A channel-shaped extension 40 is integral with the upper edge (as viewed in Figure 2) of contact portion 36 and has one side wall 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 side wall 46, extends towards the contact portion 36. The edge 48 of this side wall 46 is parallel to and spaced from the surface of the plate portion 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 side wall is swaged and formed away from the surface of the plate portion 36 in the manner of the corner 32.

As shown in Figure 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 into the space 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 into the space between the edge 38 of contact portion 36 and the surface of the contact portion 30 as shown in Figure 7. Dimples or bosses 34 are advantageously provided on the contact portions 30, 36 for co-operation with the circular holes which are customarily provided in the blade contacts of electrical plugs.

Two terminals 2 and a grounding terminal 54 are contained in an insulating housing to form the receptacle shown in Figure 4. The housing is recessed on its rearward side and has spaced apart ribs 51 extending between its end 52. An enlarged recess is provided between these ribs in the geometric centre of the housing for the reception of wire-receiving slotted 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 socket portion of this grounding terminal.

The terminals 2 are secured in the housing between the central ribs 50 and the sides 60 of the housing. Transverse ribs 58 extend between the central ribs and the sides 60 to support the bus portion 18 of the terminals. Cavities or recesses 62 are provided at each of the corners of the housing for the terminal sockets described above. These cavities extend to the front wall or face 64 of the housing so that the socket of the terminals will be adjacent to the openings in the face which are adapted to receive the blades of the plug. The terminals 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.

Figures 5A—5D show the standard openings for the various electrical conditions and types of plugs. The blade openings for 125v and 16 amp service (Figure 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 Figures 5A—5D, only the plug 72 can be inserted into the receptacle of Figure 5D. Figure 5A shows the type of receptacle used for 125v 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 Figure 5A can thus receive either of the plugs 72 or 74. Similarly, the receptacle (Figure 5C) used for 250v 15 amp service will receive only the plug 76 having contact blades in side-by-side coplanar relationship while the receptacle shown in Figure 5B which is provided for 250v 20 amp service will receive either the plug 76 or the plug 78 which has one vertical and one horizontal blade. It will be apparent that the terminals shown in Figures 2 and 3 can be used in any of the receptacles shown in Figures 5A—5D.

WHAT WE CLAIM IS:—

1. An electrical terminal comprising a bus member integral with a pair of supports, a bowed metal plate extending between the supports, the metal plate having a slot opening into an end of the metal plate remote from the base, the slot dividing the metal plate into two flange portions which present opposed edges to cut through wire insulation and which are resiliently pivotal about their connections with the supports, the bus member extending generally perpendicularly of the bowed metal plate and being formed at a free end with a socket extending generally parallel to the supports, the socket comprising a first contact portion formed generally as a plate extending in a first plane disposed normally of the plane of the bus member, a second contact portion formed generally as a plate disposed in a second plane disposed normally of the first plane and the plane of the bus member, the second contact portion having one edge which extends parallel to, and is spaced from, a flat surface of the first contact portion to define one conductive blade receiving space, the second contact portion having a generally channel-shaped extension which includes a first side wall extending from a second edge of said second contact portion which is on the opposite side from said one edge, a channel web which is parallel to, and spaced from the second contact portion and a second side wall which extends towards the second contact portion, the second side wall having a free edge which is parallel to and spaced from a flat surface of the second contact portion to define another conductive blade receiving space.
2. An electrical terminal as claimed in Claim 1, including a second similar socket integrally connected with the bus member and disposed in spaced parallel relation to the first socket.
3. An electrical terminal substantially as described with reference to and as shown in the drawings.

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