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(54) IMPROVEMENTS IN AND RELATING TO ELECTRICAL CONNECTORS

(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 connector and, more particularly, to an electrical connector in the form of a receptacle for mating with a male member in the form of a tab or post.

According to the present invention, an electrical connector comprises a generally channel-shaped receptacle having a base from which extend two upstanding side walls, the side walls each having an extension bent back inwardly of the channel towards the base to present free edges spaced from the base for gripping resiliently a male terminal between the free edges and the base, each bent-back extension being arranged generally flat against the associated side wall, a portion of each side wall and bent-back extension being removed along the bend of the side wall and extension intermediate the two ends of the side wall, and each free edge projecting further towards the base at an intermediate portion corresponding to the removed portion than the remainder of the free edge.

In a preferred embodiment of the invention, when the intermediate portion is removed tabs, which are subsequently bent over parallel to the base, are formed. These tabs allow the receptacle to be used with posts of two different sets of cross-sectional dimensions.

An embodiment of the invention will now be described, by way of example, with

reference to the Figures of the accompanying diagrammatic drawings, in which:—

Figure 1 is a fragmentary perspective view of a connector according to the invention;

Figure 2 is an end view of the connector with the wire-connecting portion omitted for clarity and showing a flat tab received in the connector;

Figure 3 is a view similar to Figure 2 but showing a square-section post received in the connector;

Figure 4 is a part sectional side view of the connector receiving the tab; and

Figure 5 is a part sectional side view of the connector receiving the post.

An electrical connector 1 comprises a receptacle 2 integral with a wire-connecting portion 3. The receptacle 2 is generally channel-shaped having a base 4 from which extend two upstanding side walls 5. Each side wall 5 has an extension 6 which is bent back inwardly of the channel towards the base 4 to lie generally flat against the associated side wall 5. A portion of each side wall 5 and bent-back extension 6 is removed along the bend 7 to form a recess 8 intermediate the two ends 9 of the side wall.

Each bent-back extension 6 has a free edge 11 spaced from the base 4. The free edge 11 has an intermediate portion 12 which projects further towards the base 4 than two end portions 13, the intermediate portion 12 being aligned with the recess 8 formed by the removed portion. As can be seen particularly in Figures 1, 4 and 5, the intermediate portion 12 is smoothly rounded and the end portions 13 are slightly flared.

Each extension 6 has a tab 14 which extends integrally from an edge 15 of the extension 6, which edge 15 is defined by the recess 8. The two tabs 14 extend towards

each other in parallel spaced relation to the base 4 and aligned with the intermediate portions 12 of the free edges 11. As seen in Figures 4 and 5 the tabs 14 are slightly curved in the longitudinal direction of the receptacle to provide a slightly flared mouth for reception of a square section post as described below.

A longitudinal central rib 16 provided in the base 4 projects from the same side of the base as the side walls 5.

The wire connecting portion 3 is a U-shaped wire barrel which has a base 17 integrally connected through a slug 18 and generally in alignment with the base 4 of the receptacle. The wire barrel 3 has two side walls which extend from the base in a direction opposite to the direction of the side walls 5 for a purpose to be explained below.

Figures 4 and 5 show the wire barrel 3 crimped to an electrical conductor 19.

Figures 2 and 4 show a flat tab or post 20 mating with the receptacle 2. The tab 20 when inserted from the left-hand side as seen in Figure 4 engages the rib 16 and thereafter the portions 12 of the free edges 11. Each extension 6 acts as a beam joined at both ends to the associated side wall 5 so that as the tab is inserted the extensions 6 flex upwardly against the resilient bias of the extensions. Because the wire barrel 3 is reversely bent it does not impede the tab 20 which may be inserted completely through the receptacle 3.

Figures 3 and 5 show a square section post 21 mating with the receptacle 2. The post 21 engages the rib 16 and because the post 21 is narrower than the flat tab 20 it is received between the extensions 6 and engages the curved underside of the tabs 14 which transmit force to the extensions 6 to cause upward flexure of the extensions 6 in the same way as with the flat tab 20. The flared mouth provided by the curved tabs 14 allows easy insertion of the post 21.

Naturally, the dimensions of the receptacle are chosen such that the distance between the intermediate portions 12 of the free edges 11 and the ribs 16 is less than the thickness of the tab 20 to be accommodated. Similarly the distance between

the underside of the tabs 14 and the rib is less than the thickness of the post 21 to be accommodated. Further the width of the receptacle and thickness of the side walls are chosen such that the tab 20 is received under the free edge 11 of the extensions 6 and the post 21 is received between extensions 6.

The connectors are manufactured by stamping from resilient sheet metal stock after which the receptacles 2 are formed by bending back the extensions 6 and bending out the tabs 14.

WHAT WE CLAIM IS:—

1. An electrical connector comprising a generally channel-shaped receptacle having a base from which extend two upstanding side walls, the side walls each having an extension bent back inwardly of the channel towards the base to present a free edge spaced from the base for gripping resiliently a male terminal between the free edges and the base, each bent-back extension being arranged generally flat against the associated side wall, a portion of each side wall and bent-back extension being removed along the bend of the side wall and extension intermediate the two ends of the side wall, and each free edge projecting further towards the base at an intermediate portion corresponding to the removed portion than the remainder of the free edge.

2. An electrical connector as claimed in claim 1, in which two tabs integral with respective extensions extend towards each other in parallel spaced relation to the base, each tab extending from an edge of the extension which edge is defined by the removed portion.

3. An electrical connector as claimed in claim 1 or claim 2, in which a longitudinal rib projects from the base on the same side of the base as the side walls.

4. An electrical connector, constructed and arranged, substantially as hereinbefore described, with reference to, and as illustrated in the Figures of the accompanying drawings.

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A longitudinal central rib 16 provided in the base 4 projects from the same side of the base as the side walls 5.

The wire connecting portion 3 is a U-shaped wire barrel which has a base 17 integrally connected through a slug 18 and generally in alignment with the base 4 of the receptacle. The wire barrel 3 has two side walls which extend from the base in a direction opposite to the direction of the side walls 5 for a purpose to be explained below.

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Figures 3 and 5 show a square section post 21 mating with the receptacle 2. The post 21 engages the rib 16 and because the post 21 is narrower than the flat tab 20 it is received between the extensions 6 and engages the curved underside of the tabs 14 which transmit force to the extensions 6 to cause upward flexure of the extensions 6 in the same way as with the flat tab 20. The flared mouth provided by the curved tabs 14 allows easy insertion of the post 21.

Naturally, the dimensions of the receptacle are chosen such that the distance between the intermediate portions 12 of the free edges 11 and the ribs 16 is less than the thickness of the tab 20 to be accommodated. Similarly the distance between

the underside of the tabs 14 and the rib is less than the thickness of the post 21 to be accommodated. Further the width of the receptacle and thickness of the side walls are chosen such that the tab 20 is received under the free edge 11 of the extensions 6 and the post 21 is received between extensions 6.

The connectors are manufactured by stamping from resilient sheet metal stock after which the receptacles 2 are formed by bending back the extensions 6 and bending out the tabs 14.

WHAT WE CLAIM IS:—

1. An electrical connector comprising a generally channel-shaped receptacle having a base from which extend two upstanding side walls, the side walls each having an extension bent back inwardly of the channel towards the base to present a free edge spaced from the base for gripping resiliently a male terminal between the free edges and the base, each bent-back extension being arranged generally flat against the associated side wall, a portion of each side wall and bent-back extension being removed along the bend of the side wall and extension intermediate the two ends of the side wall, and each free edge projecting further towards the base at an intermediate portion corresponding to the removed portion than the remainder of the free edge.

2. An electrical connector as claimed in claim 1, in which two tabs integral with respective extensions extend towards each other in parallel spaced relation to the base, each tab extending from an edge of the extension which edge is defined by the removed portion.

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