

PATENT SPECIFICATION

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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:

The present invention relates to an electrical connector.

According to the present invention, an electrical connector comprises a housing of insulating material formed with a cavity in which is received an electrical contact, the electrical contact having a slot, the edges of the material defining the slot electrically engaging a wire when positioned in the slot, the housing having an aperture extending between an outside surface of the housing and the cavity and in general alignment with the slot for the passage therethrough of the wire, and a stuffer slidably received in a channel in the housing, the stuffer having a surface which, on movement of the stuffer along the channel is adapted to engage a wire when passed through the aperture and positioned in alignment with the slot, and move the wire along the slot.

An embodiment of the invention will now be described, by way of example, reference being made to the Figures of the accompanying diagrammatic drawings in which:—

Figure 1 is an exploded perspective view of an electrical connector;

Figure 2 is a side view of a housing forming part of the electrical connector of Figure 1; and

Figure 3 is a plan view of the housing of Figure 2.

As shown, an electrical connector 1 comprises a housing 2 of insulating material, at least one electrical contact 3 and a stuffer 4 of insulating material.

The housing 2 has a generally rectangular base part 5 and a pair of opposed side walls 6 extending upwardly from the upper surface 16 (as shown in Figure 1) of the base part 5. Generally mid-way between the side walls 6 a row of spaced cavities 7 is formed in the base part 5 which extends axially of the base part 5. Between adjacent cavities 7, and the end cavities and the respective end faces 8, 9 of the base part 5 are embossments 10 which, in effect, define a central interrupted rib 11. Holes 12 are formed in base part 5, each hole 12 communicating with a cavity 7.

Each side wall 6 has three apertures 13, each aperture 13 being in alignment with an aperture 13 in the opposite side wall 6 to form an aligned pair of apertures. The base 14 of each aligned pair of apertures communicates with a cavity 7. Each side wall 6 has a flange 15 which extends inwardly over the base part 5 and defines with the upper surface 16 of the base part 5 a channel 17 extending axially of the base part and laterally of the apertures 13. A stop 18 is provided at the end face 8. The electrical contact 3 is formed from sheet material and includes a pair of spaced, parallel sides 20 inter-connected by a bight portion 21. Each side has formed in one edge 22 a slot 23. Each slot 23 has a lead-in portion 24 immediately adjacent the edge 22 and the slots 23 are in alignment. A contact arm 25 extends from an edge 26 of one side 20 towards the bight portion 21 between the sides 20.

An electrical contact 3 is received in each cavity 7 so that the slots 23 are in alignment with an aligned pair of apertures 13. Further, the space between the free end of the contact arm 25 and the bight portion 21 is such that the contact arm 25 is in alignment with the slot 23.

As shown, an electrical connector 1 comprises a housing 2 of insulating material, at least one electrical contact 3 and a stuffer 4 of insulating material.

The housing 2 has a generally rectangular base part 5 and a pair of opposed side walls 6 extending upwardly from the upper surface 16 (as shown in Figure 1) of the base part 5. Generally mid-way between the side walls 6 a row of spaced cavities 7 is formed in the base part 5 which extends axially of the base part 5. Between adjacent cavities 7, and the end cavities and the respective end faces 8, 9 of the base part 5 are embossments 10 which, in effect, define a central interrupted rib 11. Holes 12 are formed in base part 5, each hole 12 communicating with a cavity 7.

tion 21 is in general alignment with a hole 12.

The stuffer 4 is elongate and has a base 30 formed with a central longitudinally extending groove 31 in its lower surface and a longitudinally extending rib 32 on its upper surface (as shown). The forward end 33 of the stuffer 4 is formed with a cam surface 34 which tapers towards the forward end 33. The rib 32 has a boss 35.

When it is desired to interconnect two wires 40, 41, the wire 40 is first placed in an aligned pair of apertures 13 so that a portion of the wire 40 rests on the lead-in portions 24 of a contact 3. Next, the stuffer 4 is moved along the channel 17, force, if necessary being applied to the boss 35 as indicated by arrow A. The cam surface 34 engages and moves the wire 40 along the aligned slots 23 so that the edges of the material defining the slots electrically engage the wire 40, that is, pierce any insulation to engage the conductive core of the wire. The rib 11 engages in the groove 31 and guides the stuffer 4 during its movement along the channel 17. When inserted fully into the channel 17, the forward end 33 of the stuffer 4 engages the stop 18. The flanges 15 minimise the possibility of accidental release of the stuffer 4 from the channel 17.

The wire 41 has a prepared end with insulation removed to expose a conductive core which is threaded through the corresponding hole 12 and gripped resiliently between the contact arm 25 and the bight portion 21 of the contact 3.

When an electrical contact 3 is received in each cavity 7, and a corresponding wire 40 is to be connected to each contact 3, the stuffer 4 will engage successively each wire. This minimises the maximum force required to move all the wires 40 along their respective slots 23. The stuffer also prevents accidental removal of a wire 40 from its respective slot 23.

The electrical connector described above is simple and economic to manufacture. Further, the electrical contacts 3 are pre-loaded in the housing 2 prior to use in an electrical circuit which minimises assembly time on site. Finally, the connector 1 permits a rapid and economic electrical interconnection of two wires arranged in planes at right angles to each other.

Modifications can be made to the electrical contact 3. For example, the contact arm 25 can be replaced by a tubular socket extending from the bight portion 21. The tubular socket extends through a hole 12 and can act as a receptacle for a pin

terminating the wire 41.

Alternatively, one side 20 can have connected to it, a cutter plate so that the electrical contact 3 cuts excess wire 40 when the wire 40 and contact 3 are assembled together. In this situation, the wire 40 is, in effect, terminated by the contact 3.

WHAT WE CLAIM IS:—

1. An electrical connector comprising a housing of insulating material formed with a cavity in which is received an electrical contact, the electrical contact having a slot, the edges of the material defining the slot electrically engaging a wire when positioned in the slot, the housing having an aperture extending between an outside surface of the housing and the cavity and in general alignment with the slot for the passage therethrough of the wire, and a stuffer slidably received in a channel in the housing, the stuffer having a surface which, on movement of the stuffer along the channel is adapted to engage a wire when passed through the aperture and positioned in alignment with the slot, and move the wire along the slot.

2. An electrical connector as claimed in claim 1, in which the cavity is formed in a base part of the housing and a pair of housing apertures is formed, one in each of an opposed pair of side walls of the housing, the apertures being in alignment, the channel extending between the side walls and over the cavity.

3. An electrical connector as claimed in claim 2, in which a plurality of spaced-apart cavities are formed in the base part, each cavity having an associated pair of aligned housing apertures, the stuffer passing successively over each cavity during its movement along the channel.

4. An electrical connector as claimed in any one of claims 1 to 3, in which a rib in the channel engages within a groove in the stuffer for guiding the stuffer during its movement along the channel.

5. An electrical connector as claimed in any one of claims 2 to 4, in which an individual hole in the base part communicates with the or each cavity for permitting the passage therethrough of a second wire into the or each cavity.

6. 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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The stuffer 4 is elongate and has a base 30 formed with a central longitudinally extending groove 31 in its lower surface and a longitudinally extending rib 32 on its upper surface (as shown). The forward end 33 of the stuffer 4 is formed with a cam surface 34 which tapers towards the forward end 33. The rib 32 has a boss 35.

When it is desired to interconnect two wires 40, 41, the wire 40 is first placed in an aligned pair of apertures 13 so that a portion of the wire 40 rests on the lead-in portions 24 of a contact 3. Next, the stuffer 4 is moved along the channel 17, force, if necessary being applied to the boss 35 as indicated by arrow A. The cam surface 34 engages and moves the wire 40 along the aligned slots 23 so that the edges of the material defining the slots electrically engage the wire 40, that is, pierce any insulation to engage the conductive core of the wire. The rib 11 engages in the groove 31 and guides the stuffer 4 during its movement along the channel 17. When inserted fully into the channel 17, the forward end 33 of the stuffer 4 engages the stop 18. The flanges 15 minimise the possibility of accidental release of the stuffer 4 from the channel 17.

The wire 41 has a prepared end with insulation removed to expose a conductive core which is threaded through the corresponding hole 12 and gripped resiliently between the contact arm 25 and the bight portion 21 of the contact 3.

When an electrical contact 3 is received in each cavity 7, and a corresponding wire 40 is to be connected to each contact 3, the stuffer 4 will engage successively each wire. This minimises the maximum force required to move all the wires 40 along their respective slots 23. The stuffer also prevents accidental removal of a wire 40 from its respective slot 23.

The electrical connector described above is simple and economic to manufacture. Further, the electrical contacts 3 are pre-loaded in the housing 2 prior to use in an electrical circuit which minimises assembly time on site. Finally, the connector 1 permits a rapid and economic electrical interconnection of two wires arranged in planes at right angles to each other.

Modifications can be made to the electrical contact 3. For example, the contact arm 25 can be replaced by a tubular socket extending from the bight portion 21. The tubular socket extends through a hole 12 and can act as a receptacle for a pin

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WHAT WE CLAIM IS:—

1. An electrical connector comprising a housing of insulating material formed with a cavity in which is received an electrical contact, the electrical contact having a slot, the edges of the material defining the slot electrically engaging a wire when positioned in the slot, the housing having an aperture extending between an outside surface of the housing and the cavity and in general alignment with the slot for the passage therethrough of the wire, and a stuffer slidably received in a channel in the housing, the stuffer having a surface which, on movement of the stuffer along the channel is adapted to engage a wire when passed through the aperture and positioned in alignment with the slot, and move the wire along the slot.

2. An electrical connector as claimed in claim 1, in which the cavity is formed in a base part of the housing and a pair of housing apertures is formed, one in each of an opposed pair of side walls of the housing, the apertures being in alignment, the channel extending between the side walls and over the cavity.

3. An electrical connector as claimed in claim 2, in which a plurality of spaced-apart cavities are formed in the base part, each cavity having an associated pair of aligned housing apertures, the stuffer passing successively over each cavity during its movement along the channel.

4. An electrical connector as claimed in any one of claims 1 to 3, in which a rib in the channel engages within a groove in the stuffer for guiding the stuffer during its movement along the channel.

5. An electrical connector as claimed in any one of claims 2 to 4, in which an individual hole in the base part communicates with the or each cavity for permitting the passage therethrough of a second wire into the or each cavity.

6. 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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