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ELECTRICAL CONNECTOR HOUSING

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This invention relates to an electrical connector housing for use in terminating an end of a jacketed multi-insulated-conductor cord to provide means for connecting the conductors thereof to other circuitry.

5 Such a housing is described in US-A-3,860,316. This housing, which is formed in one piece, defines a cavity to receive an end of the cord. A wall of the housing extending parallel to the direction of entry of the cord end into the cavity is formed with a plurality of slots each to receive an electrical
10 contact member having a first end directed into the cavity and being adapted to penetrate the insulation of a respective conductor of the cord, when the cord end received in the cavity, thereby to establish an electrical connection to that conductor, and a second end exposed to the exterior of the housing for
15 mating with a respective contact member of an electrical socket connector with which the housing can be mated.

In the use of such a housing, the outer jacket is first stripped from an end portion of the cord to expose end portions of the conductors thereof, these end portions, together with a
20 short, still jacketed, portion of the cord, are then inserted into the cavity in the housing. The contact members are then inserted into the slots in the housing and are urged inwardly of the slots so that the first end of each contact penetrates the insulation of a respective one of the conductors and thus estab-
25 lishes electrical connection to the core of the conductor. The

plug connector thus provided can then be mated with the socket connector.

It is essential that when the end portions of the conductors of the cord are inserted into the cavity in the housing, each conductor end portion is brought into alignment with a respective slot so that when the contact members are inserted into the slots and are urged inwardly of the housing, the required electrical connections to the cord conductors are established. Such alignment can readily be achieved when the contact members of the completed plug connector are to be the same pitch, as, i.e. have the same spacing as, as the conductors of the cord, but if the contact members are to be at a greater pitch than that of the conductors of the cord, it is much more difficult to achieve the alignment required.

According to one aspect of the invention, an electrical connector housing is formed with a cavity to receive an end of a jacketed multi-insulated-conductor cord through a conductor entry end of the cavity, a wall of the housing extending parallel to the direction of entry of said cord end into the cavity being formed with a plurality of slots each to receive an electrical contact member having a first end directed into the cavity and being adapted for penetrating the insulation of a conductor of a cord, when the cord end is received in the cavity, thereby to establish an electrical connection to the conductor, and a second end exposed to the exterior of the housing for mating with a contact member of an electrical socket connector with which the

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housing can be mated, at least one of two opposed surfaces defining the cavity being formed with a plurality of ribs which serve to guide each conductor inserted into the cavity, into register with a respective one of said slots, the ribs being

5 symmetrically arranged on either side of the central axis of insertion of the cord end into the cavity, one of the ribs lying on said axis, the ends of the ribs nearest to the conductor-entry end of the cavity being spaced from the conductor-entry end of the cavity, each by a distance which

10 increases with the spacing of such rib from said central axis and the longitudinal axes of said other ribs crossing said central axis between said ends of the ribs and the conductor receiving end of the cavity.

Preferably, each of two opposed surfaces defining the

15 cavity is formed with said ribs, the ribs on these two surfaces being arranged in mirror-image relationship.

Preferably also, the, or each, said opposed surface is formed with a plurality of channels into which the conductors are guided by the ribs when the conductors are inserted into the

20 cavity, each channel being in alignment with a respective one of said slots.

The cavity may, with advantage, be bridged by walls extending between the wall in which said slots are formed and the opposite wall of the cavity, the bridging walls extending

25 parallel to said central axis, between said slots and beyond each

end thereof, but the bridging walls not extending as far as the adjacent ends of the ribs.

Such an arrangement ensures adequate insulation of the conductors at the positions where they are engaged by the contacts, whilst interference between the leading ends of the conductors and the bridging walls when the conductors are being inserted into the cavity, is avoided. During the insertion of the conductors, the ribs serve to guide the conductors into the channels which in turn serve to guide the conductors between the bridging walls and under the slots.

The connector housing of this invention has the advantages that by virtue of the conductor guidance afforded by the ribs, and where provided, the channels, the housing can be applied to a cord using an automatic machine, to which a plurality of housings provided in strip form are fed, in known manner, and that when automatic application is not used, the conductor guidance provided, facilitates and makes possible relatively high speed manual application.

According to another aspect of the invention an electrical plug connector housing moulded in one piece from an electrically insulating plastics material has a first and a second end, two opposite major walls and two opposite minor side walls, said major and minor walls defining a cavity opening into the first end of the housing to allow the insertion into the cavity, of end portions, arranged in side-by-side relationship, of individually insulated conductors of a jacketed, multi-insulated-conductor

cord from which the jacket has been stripped to expose said conductor end portions, the second end of the housing being closed, one of said minor side walls being formed with a cantilever latching arm by which the housing can be latched in a mating socket, one of said major walls being formed with a plurality of slots each for receiving an electrical contact member with a first end thereof directed inwardly of the cavity and being adapted to penetrate the insulation of a respective one of said end portions to establish electrical connection with the conductor thereof, and a second end thereof exposed to the exterior of the housing to mate with a contact member in said mating socket, the cavity being divided by bridging walls extending between the inside surfaces of said major walls, the inside surface of at least one of said major walls, which surface is elongate, being formed with a plurality of ribs intermediate said bridging walls and the first end of the housing and being symmetrically arranged on either side of the longitudinal axis of said surface, each rib tapering along a longitudinal axis towards the first end of the housing and having a pointed end directed there towards, the ribs being adapted to guide each conductor end portion during its insertion into the cavity, between said bridging walls and into register with a respective one of said slots, one of the ribs lying on the longitudinal axis of said surface and the pointed ends of the ribs being spaced from the first end of the housing, each by a distance which increases with the distance between such rib and the longitudinal axis of

said surface, the other ribs converging towards said one rib so that the longitudinal axes of said other ribs cross the longitudinal axis of said surface between the pointed ends of the ribs and the first end of the housing.

5 An embodiment of an electrical connector housing according to this invention, for use in terminating a telephone apparatus cord, will now be described by way of example with reference to the accompanying, partially diagrammatic, drawings, in which:

FIGURE 1 is a top plan view of the housing;

10 FIGURE 2 is an elevational view of one side of the housing;

FIGURE 3 is a bottom plan view of the housing;

FIGURE 4 is an elevational view of the other side of the housing;

FIGURE 5 is a view of one end of the housing;

15 FIGURE 6 is a view of the other end of the housing;

FIGURE 7 is a section of the line VII-VII in Figure 6; and

FIGURE 8 is a section on the line VIII-VIII in Figure 6.

The housing shown in the drawings is moulded in one piece from electrically insulating plastics material, together with a
20 plurality of similar housings (not shown) joined by a carrier strip 100, formed integrally with the housings, in known manner. The provision of the housings in strip form, facilitates assembly of the housings with the necessary contact members onto the conductors of jacketed multi-insulated conductor cords
25 (not shown), by means of an automatic machine (not shown).

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The housing to be described is for use in terminating a six conductor telephone apparatus cord comprising six individually insulated conductors arranged side-by-side in an outer insulating jacket at a pitch distance less than that of the contact members to be used to terminate the conductors.

Further, the housing to be described is in many respects similar to the housings disclosed in US-A-3,860,316, cited above, and thus only those features of the housing shown in the drawings, which are necessary for a proper understanding of the invention, will be described in detail here.

The housing is formed with a blind cavity 1 open to one end of the housing to receive an end of a cord to be terminated, as shown in Figures 5, 7 and 8, the cavity, being blind, is closed at its other end. One major wall of the housing is formed with six slots 2 each to receive an electrical contact member (not shown). The opposite major wall of the housing is formed with six apertures 3 which serve as inspection ports through which correct receipt of the cord conductors in the cavity 1 can be ascertained.

One side wall, that is to say one minor wall, of the housing is formed with a cantilever latching arm 4 by which the housing can be latched in a mating socket (not shown).

The inside surfaces of the two major walls of the housing which surfaces are elongate as shown in Figures 6 and 7, are formed with mirror-image arrangements of five triangular cross-section, tapering ribs 5, the ribs 5 on each said inside surface

being symmetrically arranged on either side of the longitudinal axis of that surface. The pointed ends 6 of the ribs 5 nearest to the open end of the cavity 1 are spaced from the open end of the cavity 1, each by a distance which increases with spacing of such rib 5 from the central axis of insertion of the cord end into the cavity 1 which axis coincides with said longitudinal axis, the longitudinal axes of the four ribs 5 which do not lie on the longitudinal axis of the surface carrying the ribs 5 crossing the longitudinal axis of the surface carrying the ribs 5 between the pointed ends 6 of the ribs 6 and the open end of the cavity 1.

As shown in Figure 8, one of the two surfaces carrying the ribs 5 is formed with six aligned channels 7, there being a contact-member-receiving slot 2 in line with each channel 7.

As clearly shown in Figures 7 and 8, the pointed ends 6 of the ribs 5 are spaced from the open end of the cavity 1.

The cavity 1 is bridged by walls 8 extending between the two surfaces carrying the ribs 5, the bridging walls 8 extending parallel to the axis of insertion of the conductors into the cavity 1 between the contact-receiving slots 2 and beyond each end of the contact-receiving slots 2 but not as far as the adjacent ends of the ribs 5.

In use of the housing described above, the outer insulating jacket is stripped from an end portion of the cord to expose end portions of the six individually insulated conductors. The end of the cord, when so prepared, is then inserted into the cavity 1 through the open end thereof, the end portions of the

individual conductors being separated to the required pitch distance and guided by the ribs 5 into the channels 7 and then between the walls 8. Correct receipt of a conductor in each channel 7 under a contact-receiving slot 2 can be ascertained
5 through the apertures 3. A still jacketed portion of the cord is received in the un-ribbed portion of the cavity 1 adjacent to the open end thereof.

Contact members are then inserted into the slots 2 to terminate the conductors as described in US-A-3,860,316, cited
10 above.

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CLAIMS:

1. An electrical connector housing formed with a cavity to receive an end of a jacketed multi-insulated-conductor cord through a conductor entry end of the cavity, a wall of the housing extending parallel to the direction of entry of said cord end into the cavity being formed with a plurality of slots each to receive an electrical contact member having a first end directed into the cavity and being adapted to penetrate the insulation of a conductor of the cord, when the cord end is received in the cavity, thereby to establish an electrical connection to the conductor, and a second end exposed to the exterior of the housing for mating with a contact member of an electrical socket connector with which the housing can be mated, at least one of two opposed surfaces defining the cavity being formed with a plurality of ribs which serve to guide each conductor inserted into the cavity, into register with a respective one of said slots, the ribs being symmetrically arranged on either side of the central axis of insertion of the cord end into the cavity, one of the ribs lying on said axis, the ends of the ribs nearest to the conductor-entry end of the cavity being spaced from the conductor-entry end of the cavity, each by a distance which increases with the spacing of such rib from said central axis and the longitudinal axes of said other ribs crossing said central axis between said ends of the ribs and the conductor receiving end of the cavity.



2. A housing as claimed in claim 1, in which each of two opposed surfaces defining the cavity is formed with said ribs, the ribs on these two surfaces being arranged in mirror-image relationship.

5 3. A housing as claimed in claim 1 or claim 2, in which the, or each, said opposed surface is formed with a plurality of channels into which the conductors are guided by the ribs when the conductors are inserted into the cavity, each channel being in alignment with a respective one of said slots.

10 4. A housing as claimed in claim 1, 2 or 3, in which the cavity is bridged by further walls extending between the wall in which said slots are formed and the opposite wall of the cavity, the further walls extending parallel to said central axis, between said slots and beyond each end thereof, but the further walls
15 not extending to the adjacent ends of the ribs.

5. A housing as claimed in any one of the preceding claims, in which the wall of the cavity opposite to that in which said slots are formed, is provided with a plurality of inspection ports, through which correct receipt of the conductors in the
20 cavity can be ascertained.

6. A housing as claimed in any one of the preceding claims, in which the cavity is a blind cavity.

7. An electrical plug connector housing moulded in one piece from an electrically insulating plastics material and having
25 a first and a second end, two opposite major walls and two opposite minor side walls, said major and minor walls defining a



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cavity opening into the first end of the housing to allow the insertion into the cavity, of end portions, arranged in side-by-side relationship, of individually insulated conductors of a multi-conductor jacketed cord from which the jacket has been

5 stripped to expose said end portions, the second end of the housing being closed, one of said minor side walls being formed with a cantilever latching arm by which the housing can be latched in a mating socket, one of said major walls being formed with a plurality of slots each for receiving an electrical contact

10 member with a first end thereof directed inwardly of the cavity and being adapted to penetrate the insulation of a respective one of said conductor end portions to establish electrical connection with the conductor thereof, and a second end thereof exposed to the exterior of the housing to mate with a contact member in

15 said mating socket, the cavity being divided by bridging walls extending between the inside surfaces of said major walls and between said slots, the inside surface of at least one of said major walls, which surface is elongate, being formed with a plurality of ribs intermediate said bridging walls and the first

20 end of the housing and being symmetrically arranged on either side of the longitudinal axis of said surface, each rib tapering along a longitudinal axis towards the first end of the housing and having a pointed end directed there towards, the ribs being adapted to guide each conductor end portion during its insertion

25 into the cavity, between said bridging walls and into register with a respective one of said slots, one of the ribs lying on the



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longitudinal axis of said surface and the pointed ends of the ribs being spaced from the first end of the housing, each by a distance which increases with the distance between such rib and the longitudinal axis of said surface, the other ribs converging
5 towards said one rib so that the longitudinal axes of said other ribs cross the longitudinal axis of said surface between the pointed ends of the ribs and the first end of the housing.

8. An electrical connector housing substantially as herein-
before described with reference to and as shown in the accom-
10 panying drawings.

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