

PATENT SPECIFICATION

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(19)



(54) IMPROVEMENTS IN OR RELATING TO MEANS FOR ESTABLISHING ELECTRICAL CONNECTIONS WITH CORES OF INSULATED WIRES OR CABLES

(71) We, PRESSAC LIMITED a British Company of Leopold Street, Long Eaton, Nottingham, NG10 4QL 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 a connector for establishing electrical connections with wires or cables and particularly to such connectors of the kind adapted to penetrate the outer insulation of a wire or cable and make intimate electrical contact with the core thereof thereby avoiding the necessity of having to strip the insulation from the wire.

One object of the present invention is the provision of a connector of the above kind capable of making an excellent electrical contact with said core without weakening the cable or flattening the core of the cable or cutting the insulation in a complete circle which would allow the insulation to be pulled away from the connector and result in a bared conductor being accessible over an indeterminable length and also result in that the strength of the cable would be reduced as the conductor would be the only support.

A disadvantage experienced with connectors of this kind is that should the insulating covering become burnt away or perish, relative movement may take place between the cable and the connector which may result in the electrical connection between them being broken or impaired.

A further object of the present invention therefore is to provide a connector which is so constructed that it prevents or resists the possibility of said relative movement between itself and a wire or cable to which it is fitted.

Broadly, according to the present invention there is provided a connector of

the kind referred to for establishing an electrical connection with a core of an insulated wire or cable which comprises a pair of co-acting notched blades between which a cable can be received and the insulation penetrated by the edges of said notches when the blades are clenched toward each other about the cable and the notches are caused to embrace the cable circumferentially, said blades being positioned in respective planes inclined one relatively to the other so that when a cable is received between them and the blades are clenched toward each other the edges of each notch penetrate through the insulation over substantially 180° of the circumference without combining to produce a single cut continuously around through the insulation, the connector also comprising a portion adapted to be electrically interconnected with another required part of an electric circuit.

To enable the invention to be clearly understood a preferred embodiment thereof will now be described by way of example with reference to the drawings accompanying our Provisional Specification wherein:—

Figure 1 is a side elevation of the connector.

Figure 2 is an end elevation.

Figure 3 is a perspective view of the connector drawn to a larger scale and in a condition in which it is clenched to a cable which is omitted for clarity. Figure 4 is a view showing the connector clenched to a cable.

Figure 5 is a side view of Figure 4, and Figure 6 is a plan view of a wire or cable being introduced into the connector.

Reference will also be made to the drawings accompanying this Complete Specification which serve diagrammatically to amplify the manner in which the notched blades co-act and cut through the insula-

tion of a cable. In these drawings:—

Figure 7 is a perspective view illustrating how a pair of co-acting blades at one side of the connector penetrate the insulation.

Figure 8 is a sectional side view looking in the direction of the arrow "A" in Figure 7.

Figure 9 is a side view drawn to a larger scale and illustrating by shaded areas the approximate degree of cut insulation, and

Figure 10 is a side elevation.

Referring to said drawings, the connector is made from a one-piece blank of electrically conductive metal and comprises a portion 1 for penetrating the outer insulation 2 of a wire or cable at two spaced apart locations along the length of the cable so as to make an intimate electrical connection with the core 3 thereof; a co-acting portion 4 for penetrating the insulation 2 also at two spaced apart locations along the length of the cable and a portion 5 adapted to be electrically interconnected with another required part of an electric circuit.

The portion 1 is conveniently of "U" shape having the free edges of the side flanges thereof, which are arranged so as to extend at right angles to the axis of the cable, each formed with a notch or cut-out 1b to provide notched blades 1a that can be pressed about the insulation 2 of a wire or cable so that the edges 1c of the notch in each of the blades 1a penetrate the insulation and make the required intimate electrical connection with the core 3 of the cable.

The portion 1 is formed integrally, by means of a U-bend 6, with said part 5 adapted to be electrically interconnected with another required part of an electric circuit. The part 5 is shown formed with rolled over side portions 7 to receive thereunder a "spade" connector, but may be in the form of a spade constituting a male contact that can be electrically engaged with a female connector, or it may be a solder tag or any other suitable part capable of being electrically interconnected with a complementary member.

The portion 4 consists of two side blades or flanges 8 which extend in planes at substantially 45° to the planes of the blades 1a and therefore to the axis of the cable when engaged with the connector and these flanges 8 are each formed with fingers 8a defining a notch having insulation-penetrating edges 9 in which the insulation of the wire can be located so as to extend transversely of the connector so that the insulation is also penetrated by the edges 9 of the notch between said fingers 8a.

The relative disposition of the coacting blades 1a of the portion 1 and the blades 8 of the portion 4 so that they extend at

45° (or any other suitable angle) to one another is most important because each notch of the blades pierces through substantially 180° of the insulation to provide a sound electrical contact but because of the arrangement the insulation is not cut continuously (i.e. in a complete circle) around the circumference of the cable. This feature is emphasized by Figures 7 to 10 of the drawings accompanying this Complete Specification.

Prior to use, the portion 1 inclines upwardly away from the U-bend 6 as shown in Figure 1 so as to leave a space to permit a cable to be located beneath the blades 1a of the portion 1 and so as to straddle the two blades 8 of the portion 4. The portion 1 is then clenched down on to the cable and the edges 1c and 9 of the notches of the co-acting blades 1a, 8 penetrate the insulation of the cable and make intimate electrical contact with the core 3. Also, due to this disposition of the blades it is impossible for the core to be completely sheared circumferentially by the co-acting notched blades. Thus, the core of the cable is held by the frictional resistance due to the compression of the core by the connector. This prevents relative movement behind the core and connector should the insulation become burnt or perished.

Figure 4 illustrates a connector fitted to an end of a cable but it will be readily appreciated that a connector may be fitted to a cable at any required position between the ends of the latter, e.g. as shown in Figures 7 to 10, so as to bridge the blades 8 of the portion 4 and to extend from either side thereof.

The thickness of the material from which the connectors are made is such that the edges 1c and 9 of the notches are capable of penetrating the insulation of a cable.

WHAT WE CLAIM IS:—

1. A connector of the kind referred to for establishing an electrical connection with a conductor core of an insulated wire or cable comprising a pair of co-acting notched blades between which a cable can be received and the insulation penetrated by the edges of said notches when the blades are clenched toward each other about the cable and the notches are caused to embrace the cable circumferentially, said blades being positioned in respective planes inclined one relatively to the other so that when a cable is received between them and the blades are clenched toward each other the edges of each notch penetrate through the insulation over substantially 180° of the circumference without combining to produce a single cut continuously around the insulation, the connector also com-



tion of a cable. In these drawings:—

Figure 7 is a perspective view illustrating how a pair of co-acting blades at one side of the connector penetrate the insulation.

Figure 8 is a sectional side view looking in the direction of the arrow "A" in Figure 7.

Figure 9 is a side view drawn to a larger scale and illustrating by shaded areas the approximate degree of cut insulation, and Figure 10 is a side elevation.

Referring to said drawings, the connector is made from a one-piece blank of electrically conductive metal and comprises a portion 1 for penetrating the outer insulation 2 of a wire or cable at two spaced apart locations along the length of the cable so as to make an intimate electrical connection with the core 3 thereof; a co-acting portion 4 for penetrating the insulation 2 also at two spaced apart locations along the length of the cable and a portion 5 adapted to be electrically interconnected with another required part of an electric circuit.

The portion 1 is conveniently of "U" shape having the free edges of the side flanges thereof, which are arranged so as to extend at right angles to the axis of the cable, each formed with a notch or cut-out 1b to provide notched blades 1a that can be pressed about the insulation 2 of a wire or cable so that the edges 1c of the notch in each of the blades 1a penetrate the insulation and make the required intimate electrical connection with the core 3 of the cable.

The portion 1 is formed integrally, by means of a U-bend 6, with said part 5 adapted to be electrically interconnected with another required part of an electric circuit. The part 5 is shown formed with rolled over side portions 7 to receive thereunder a "spade" connector, but may be in the form of a spade constituting a male contact that can be electrically engaged with a female connector, or it may be a solder tag or any other suitable part capable of being electrically interconnected with a complementary member.

The portion 4 consists of two side blades or flanges 8 which extend in planes at substantially 45° to the planes of the blades 1a and therefore to the axis of the cable when engaged with the connector and these flanges 8 are each formed with fingers 8a defining a notch having insulation-penetrating edges 9 in which the insulation of the wire can be located so as to extend transversely of the connector so that the insulation is also penetrated by the edges 9 of the notch between said fingers 8a.

The relative disposition of the coacting blades 1a of the portion 1 and the blades 8 of the portion 4 so that they extend at

45° (or any other suitable angle) to one another is most important because each notch of the blades pierces through substantially 180° of the insulation to provide a sound electrical contact but because of the arrangement the insulation is not cut continuously (i.e. in a complete circle) around the circumference of the cable. This feature is emphasized by Figures 7 to 10 of the drawings accompanying this Complete Specification.

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The thickness of the material from which the connectors are made is such that the edges 1c and 9 of the notches are capable of penetrating the insulation of a cable.

WHAT WE CLAIM IS:—

1. A connector of the kind referred to for establishing an electrical connection with a conductor core of an insulated wire or cable comprising a pair of co-acting notched blades between which a cable can be received and the insulation penetrated by the edges of said notches when the blades are clenched toward each other about the cable and the notches are caused to embrace the cable circumferentially, said blades being positioned in respective planes inclined one relatively to the other so that when a cable is received between them and the blades are clenched toward each other the edges of each notch penetrate through the insulation over substantially 180° of the circumference without combining to produce a single cut continuously around the insulation, the connector also com-



prising a portion adapted to be electrically interconnected with another required part of an electric circuit.

2. A connector as claimed in Claim 1, comprising a one-piece blank of electrically conductive material bent to a substantially U-shape, and having the parallel limbs thereof formed with blades or flanges having said notches and which are directed inwardly of the U towards one another so that to provide two pairs of co-acting notched blades that can engage a cable at spaced apart locations along the length thereof, the blades of each pair being angularly inclined relatively to one another.

3. A connector as claimed in Claim 2, wherein one of the limbs of the U-shaped

blank extends beyond the other and is adapted to be electrically interconnected with another required part of an electric circuit.

4. A connector for establishing an electrical connection with a conductor core of an insulated wire or cable, constructed substantially as hereinbefore described with reference to and as illustrated by the drawings accompanying our Provisional Specification and also those accompanying this Complete Specification.

5. Electrical equipment comprising an electrical connection made by a connector as claimed in any of the preceding Claims.

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