United States Patent

Guillemette et al.

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[54] APPARATUS FOR APPLYING INSULATING HOUSINGS TO ELECTRICAL CONNECTORS

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[52] **U.S. Cl.** ..... **29/203,** 29/203 DT

[51] **Int. Cl.** **H05k 13/00**

[58] **Field of Search** ..... 29/203 D, 203 DT, 203, 203 R, 29/203 H

[56] **References Cited**

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[57] **ABSTRACT**

An apparatus for applying insulating housings to electrical connectors comprises first means for releasably retaining an insulating housing; second means for releasably retaining an electrical connector for insertion and retention in the housing; and third means for effecting relative reciprocal movement between the first means and the second means towards and away from each other, the connector being inserted into the housing as the first means and the second means move towards each other, and being retained in the housing and released from the second means as the first means and the second means move away from each other.

6 Claims, 5 Drawing Figures

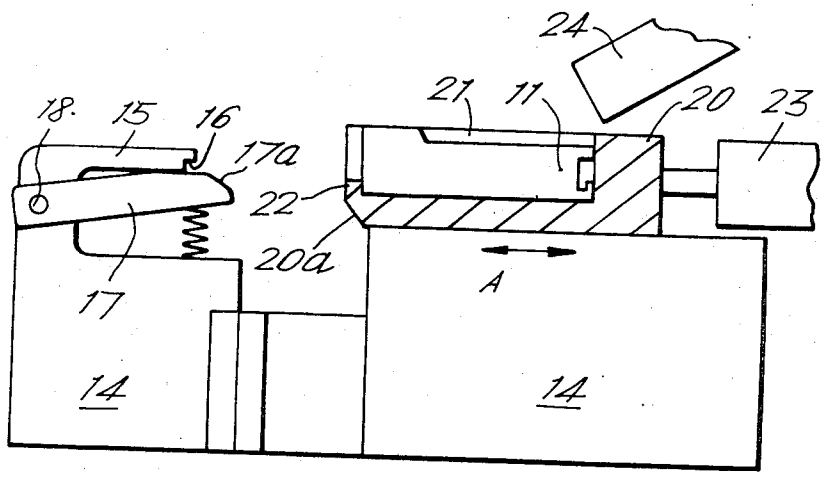


Fig. 1.

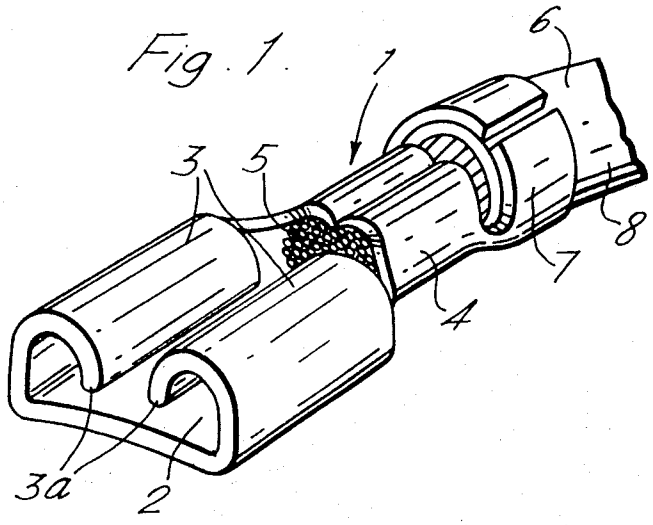


Fig. 2.

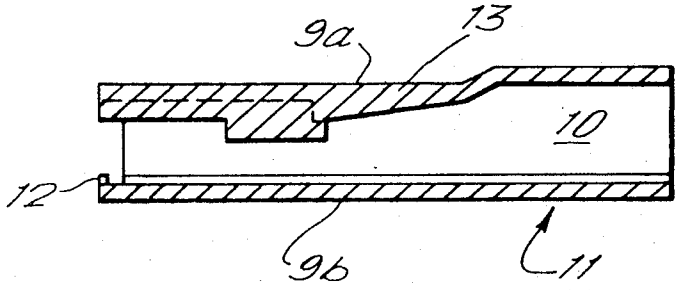
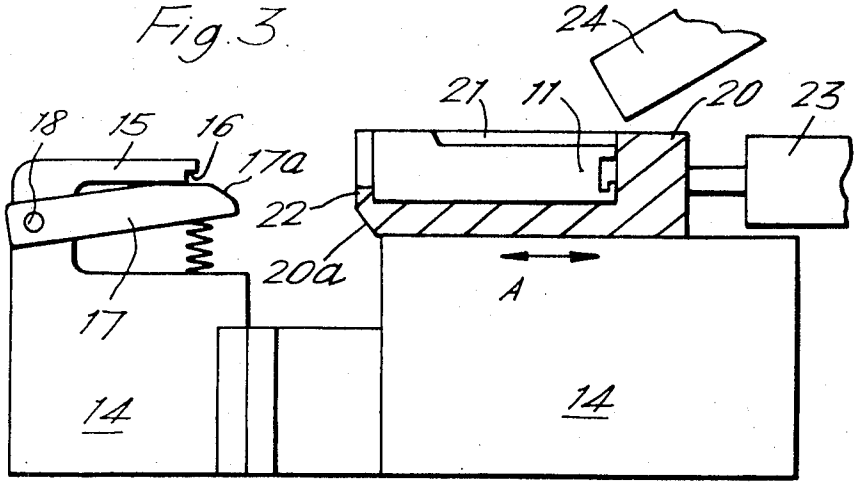


Fig. 3.



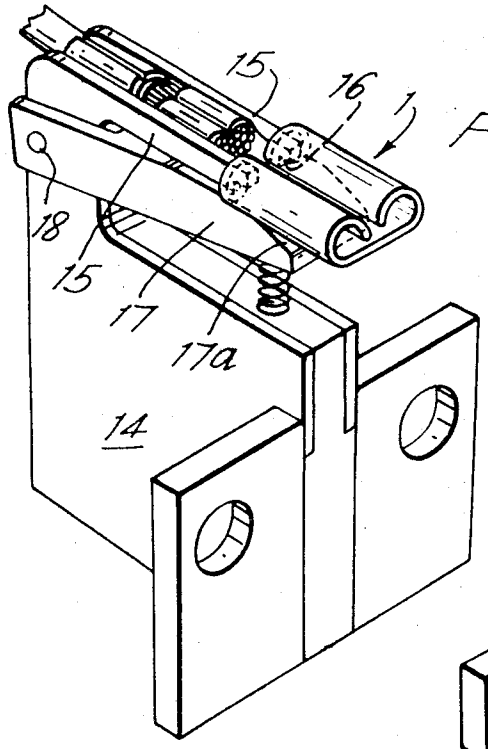
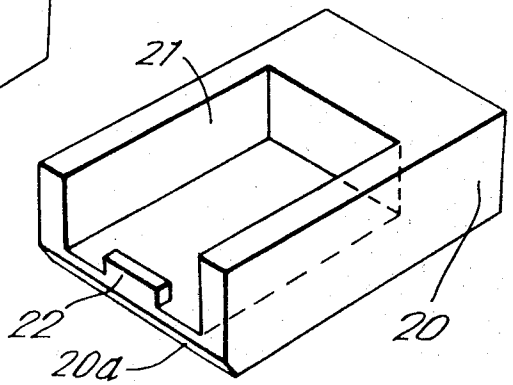


Fig. 4.

Fig. 5.



APPARATUS FOR APPLYING INSULATING HOUSINGS TO ELECTRICAL CONNECTORS

This invention relates to apparatus for applying insulating housings to electrical connectors, and particularly to apparatus for applying tubular insulating housings to electrical contact receptacles for receiving flat electrical tab contacts.

According to the present invention, apparatus for applying insulating housings to electrical connectors comprises first means for releasably retaining an insulating housing; second means for releasably retaining an electrical connector for insertion and retention in the housing; and third means for effecting relative reciprocal movement between the first means and the second means towards and away from each other, the connector being inserted into the housing as the first means and the second means move towards each other, and being retained in the housing and released from the second means as the first means and the second means move away from each other.

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

FIG. 1 is a perspective view of an electrical contact receptacle with which the apparatus is to be used;

FIG. 2 is a sectional side elevation of an insulating housing for the receptacle shown in FIG. 1;

FIG. 3 is a diagrammatic part-sectional side elevation of the apparatus; and

FIGS. 4 and 5 are diagrammatic perspective views of parts of the apparatus of FIG. 3.

As shown in FIG. 1, the receptacle 1 comprises a substantially flat base 2 from two opposite edges of which extend a pair of inwardly rolled arms 3, the free ends 3*a* of which are directed towards the base 2, and from another edge of which extends a connection portion having a first ferrule 4 crimped about the core 5 of an insulated wire 6 and a second ferrule 7 crimped about the insulation 8 of the wire 6.

As shown in FIG. 2, the housing 11 for the receptacle 1 comprises a first pair of walls 9*a* and 9*b* joined by a second pair of walls 10 to form a substantially rectangular section tubular body which is open at both ends. A stop 12 extends inwardly of the housing 11 from one end of the wall 9*b*, and a detent 13 extends inwardly from the wall 9*a* at a position intermediate the ends of the housing 11. The stop 12 and the detent 12 co-operate to secure the receptacle 1 in the housing 11 when it is inserted into the housing 11 from the end of the housing 11 opposite to that at which the stop 12 is disposed.

As shown in FIGS. 3 and 4, the apparatus includes a stand 14 which carries a pair of rigid parallel arms 15 each having a downward facing shoulder 16 at its free end. The stand 14 also carries an upwardly (as seen in FIG. 3) spring biased arm 17 which is pivotally mounted on the stand 14 on a pin 18, to extend between the arms 15. The arms 15 and 17 are such that the receptacle 1 can be arranged between the arms 15 and held by the arms 17 with its base 2 against the shoulders 16. When so held, the receptacle 1 is prevented from moving upwards, downwards or to the left (as seen in FIG. 3) relative to the arms 15, but can be moved to the right (as seen in FIG. 3) away from the arms 15.

For better retention of the receptacle 1, there may be more than one spring biased arm 17.

As shown in FIGS. 3 and 5, the apparatus also includes a bed member 20 having a recess 21 which is open to the top of the member 20, and to one end of the member 20. An upstanding tongue 22 is formed on the base of the recess 21 at its open end. The recess 21 is dimensioned to receive a housing

11 as shown in FIG. 2, the housing 11 being prevented from axial movement in either direction relative to the member 20 by the rear wall of the recess 21 and the tongue 22. The member 20 is connected to a pneumatic piston and cylinder arrangement 23 for giving it a reciprocating motion relative to the stand 14 as indicated by the arrow A in FIG. 3.

Housings 11 are automatically fed under gravity into the recess 21 from a dispenser (not shown) by way of a delivery chute 24.

With a housing 11 in the recess 21 and a receptacle 1 arranged between the arms 15 and 17 the apparatus is actuated by a switch (not shown) and the member 20 is moved towards the arms 15 by the pneumatic arrangement 23 so that the receptacle 1 and the arms 15 pass into the housing 11. The lower leading edge of the member 20 has a cam surface 20*a* which engages a cam surface 17*a* on the arm 17 as the member 20 moves towards the arms 15. The arm 17 is depressed against the action of its spring by this engagement, the base of the recess 21 and the base of the housing 11 in the recess 21 passing between the top of the arm 17 and the base 2 of the receptacle 1. The arms 15 prevent the receptacle 1 from moving with the housing 11 so that the housing 11 is pushed over the receptacle 1 and is secured in the housing 11 by the stop 12 and detent 13.

The member 20 is then return to its initial position by the pneumatic arrangement 23, the tongue 22 retaining the housing 11 with the receptacle 1 secured in it in the recess 21 the receptacle 1 moving with the housing 11 out of engagement with the arms 15.

When the member 20 has reached its initial position again, the housing 11 with the receptacle 1 secured in it is removed from the recess 21, a new housing 11 then being automatically fed in from the delivery chute 24.

We claim:

1. Apparatus for applying insulating housings to electrical connectors, comprising first means for releasably retaining an insulating housing, the first means comprising a bed member having a recess in which the housing rests, the recess opening to one end of the bed member and being so shaped that the housing is prevented from moving axially in either direction relative to the bed member; second means for releasably retaining an electrical connector for insertion and retention in the housing; and third means for effecting relative reciprocal movement between the first means and the second means towards and away from each other, the connector being inserted into the housing as the first means and the second means move towards each other, and being retained in the housing and released from the second means as the first means and the second means move away from each other.

2. Apparatus as claimed in claim 1, in which the recess has an upstanding tongue on its base at its open end, the housing being prevented from moving axially in either direction relative to the bed member by the tongue and the opposite end wall of the recess.

3. Apparatus as set forth in claim 1, in which the second means comprises a pair of rigid parallel arms each having a shoulder at its free end, and a third spring biased arm which urges the connector against the shoulders.

4. Apparatus as claimed in claim 3 in which there are a plurality of spring biased arms symmetrically arranged with respect to the pair of arms.

5. Apparatus as set forth in claim 1 in which a dispenser is arranged to automatically feed housings to the first means.

6. Apparatus as set forth in claim 1 in which the third means is a pneumatic piston and cylinder arrangement.

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