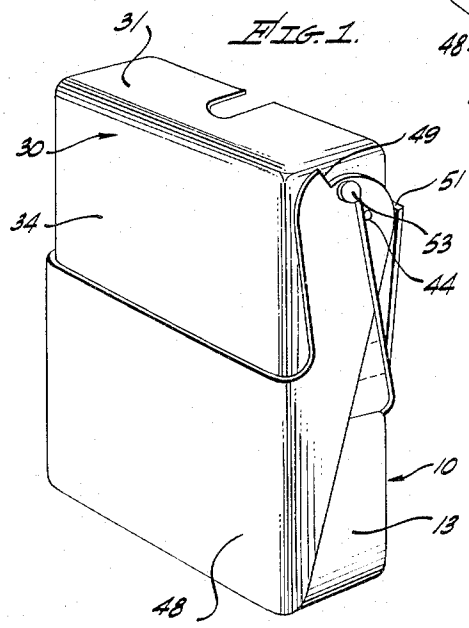
Nov. 15, 1955 R. B. LEWIS 2,724,094

ELECTRICAL CONNECTOR HOOD ASSEMBLY

Filed Nov. 3, 1954

FIG. 1.



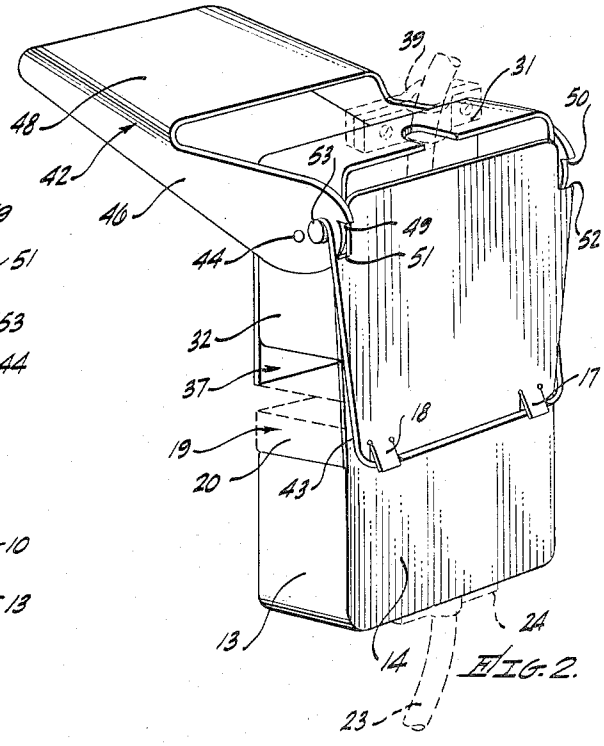


FIG. 2.

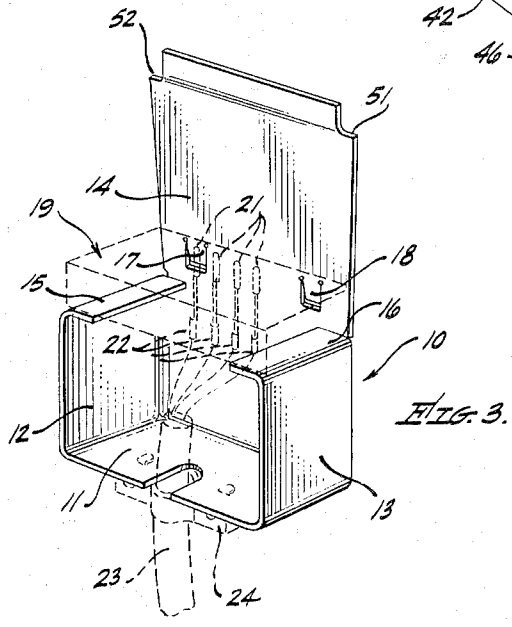


FIG. 3.

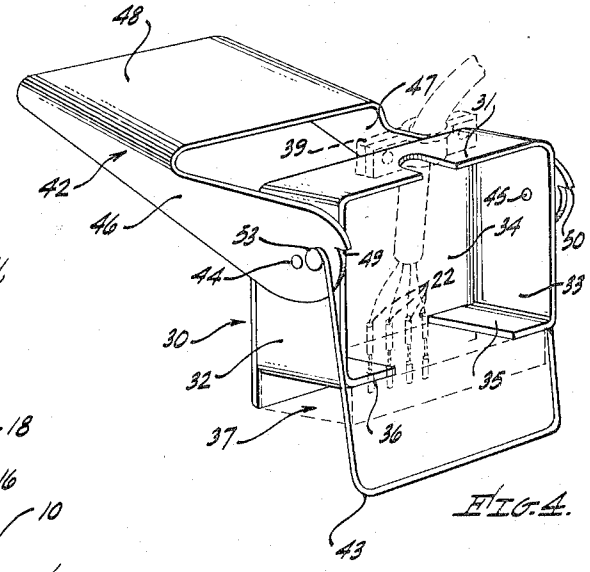


FIG. 4.

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ELECTRICAL CONNECTOR HOOD ASSEMBLY

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4 Claims. (Cl. 339—75)

This invention relates in general to electrical connectors and more particularly to a hood for electrical connector parts.

Multiple pin and socket electrical connectors are frequently used in electrical communication systems and other electrical multiple conductor assemblies for establishing terminal connections between apparatus units. Such plugs are generally provided with a large number of individual electrical contactor elements which utilize contacting surfaces having wiping engagement with associated contactors. The connection and separation of the plug elements of these multi-contactor units is therefore resisted by considerable frictional force due to the effect of the several contacting members, thus requiring high compressive force to properly connect these units and considerable tensile force to separate them. Further, it is necessary that these multicontactor units be connected and separated while properly aligned since separation or connection with improper alignment may result in distortion and cause bending, breaking or twisting of the contactor pins so that subsequent operation is thereby impaired.

Hood assemblies of the prior art, for use in combination with such multiple contactor electrical connectors for the protection of the electrical wiring connections made to the contactors, are generally difficult to connect and disconnect. Further, in order that the connector parts may be disassembled from the hood unit enclosing it, it is necessary in the hood assemblies of the prior art to disconnect all electrical wiring connections made to the electrical contactors in the connector parts.

The multiple contactor electrical connectors of the prior art often are subject to separation and poor electrical contact when used in electrical systems which are subject to a considerable amount of vibration or stress.

Accordingly, it is an object of the present invention to provide a hood assembly for multiple contact electrical connectors which properly aligns the mating units of the electrical connector during the connection or separation of the mating connector parts.

It is another object of the present invention to provide a hood assembly for multiple contact electrical connectors and the like which allows separation and connection of the mating units of the electrical connector with a minimum of manual effort required to overcome the high frictional resistance of the electrical connectors.

It is a further object of the present invention to provide a hood assembly for multiple contact electrical connectors which allows the mating parts of the electrical connector to be locked in firm engagement.

It is a still further object of the present invention to provide a hood assembly for multiple contact electrical connectors and the like which allows easy accessibility to the electrical wiring connections made to the multiple contact electrical connector parts.

It is a still further object of the present invention to provide a hood assembly for multiple contact electrical connectors and the like which allows quick assembly and disassembly of the hood from the electrical connector mating parts.

Other objects and advantages of the present invention will be apparent to those skilled in the art from the following description of a presently preferred embodiment as illustrated in the accompanying drawing made a part of this specification in which:

Figure 1 is a view in perspective of a hood assembly of the present invention in an assembled electrically connected position;

Figure 2 is a perspective view of a hood assembly of the present invention in combination with a multiple contactor electrical connector, shown in a partially assembled position; and

Figures 3 and 4 are perspective views in elevation of the respective cooperating sections of the hood assembly of the present invention.

The hood assembly of the present invention comprises two cooperating parts designated as a male and female section, each of which has a closed end with three closed sides and a fourth open side which is closed when the male and female sections are mated and assembled; and a means for aligning and forcing the hood assembly and an electrical connector mounted thereon, into a connected and disconnected position.

Referring to the drawing, and more particularly to Figures 3 and 4, a presently preferred embodiment of the present invention, in combination with a multiple contact electrical connector common to the prior art, is shown.

Referring now particularly to Figure 3, the male section 10 of the hood assembly of the present invention comprises a sheet metal receptacle having a rectangular end 11 joined at right angles to a lateral wall 12 and an opposed lateral wall 13. An elongated back wall 14 joining the lateral walls 12, 13 and the end 11 forms a third closed side of the male hood section. The back 14 extends beyond the sides 12, 13 and is substantially equal in length to the length of the hood and electrical connector parts when assembled, as described hereinafter. Mounting brackets 15, 16 on which a part of the multiple contactor electrical connector may be mounted are provided in the embodiment shown and described, by bending the upper end of the sides 12, 13 inward normal to the sides 12, 13.

Protrusions 17, 18 are positioned on the outer surface of the back 14 to provide hook means for the purpose described hereinafter. In the presently preferred embodiment, as shown, the back 14 has two segments punched in the form of three sides of a rectangle and bent outwardly from the plane of the back to form the protrusions 17, 18.

A male or female electrical connector part 19 is affixed to the male section 10 of the hood on the mounting brackets 15, 16. The multiple contactor electrical connector may be one of the many types known to the prior art and in the embodiment shown the connector part 19 affixed to the male section 10 has an insulating body 20 with a plurality of male terminals 21 connected thereto extending from the surface of the insulating body 20. The terminals 21 have hollow shanks 22 extending from the opposed surface of the insulating body for receiving the respective wires of a cable or multiple conductor 23, shown representatively. An opening is provided in the end 11 of the hood receptacle to accommodate the insertion of the cable 23. The opening is continuous from the open side of the end 11. Thus, the connector part 19 may be removed from the mounting brackets 15, 16 and detached from the hood section without disconnecting the cable from the plurality of connection points 22. If strains or forces on the cable are anticipated, a suitable cable clamp 24 shown representatively may be affixed to the end 11 of the hood section to fasten the cable 23

in place so that any forces on the cable are not transmitted to the plurality of connection points 22.

Referring now particularly to Fig. 4 the female section 30 of the hood assembly is shown. The female section 30 of the hood assembly comprises an end 31 equal in dimensions to the end 11 of the male section of the hood assembly, and the opposed lateral walls 32, 33, which are again substantially equal to the opposed lateral walls 12, 13 forming two sides of the male section of the hood assembly. The front 34 is affixed to the sides 32, 33 and the end 31 thus forming a receptacle closed on three sides and an outer end, and having a side and an inner end open. At the open inner end of the receptacle the sides 32, 33 have a normal inward extension to form mounting brackets 35, 36, on which the mating part 37 of the electrical connector is affixed. The electrical connector part 37 may be either male or female but mates with the electrical connector part 19 of Fig. 3 and is shown as a female part.

An opening is provided in the end 31 of the female section 30 of the hood assembly similar to the opening provided in the end 11 of the male portion of the hood assembly, for the insertion of an armored cable or similar multiple conductor 23. A cable clamp 39 similar to the cable clamp described in connection with Fig. 1 may be affixed at the end 31 of the female portion of the hood assembly.

An actuating lever 42 has lever arms 46, 47 pivotally affixed to the female section 30 at the pivot points 44, 45 on the lateral walls 32, 33 and lying in a plane parallel and juxtaposed to the plane of the lateral walls 32, 33.

The lever arms 46, 47 are joined by the front surface 48 which is normal to the plane of the arms and forms a lever handle. The surface 48 between the lever arms is substantially equal in width to the back 14 of the male section 10 and the front 34 of the female section of the hood assembly. The length of the front surface 48 is substantially equal to the length of the sides 12, 13 of the male section 10 plus the height of the electrical connector part affixed to the mounting brackets 15, 16, and extends from the outer ends of the lever arms 46, 47. The length of the lever arms 46, 47 is such that when the actuating lever 42 is rotated to the position in which the front surface 48 is parallel to the front 34 of the hood section 30, the surface 48 is a juxtaposed extension of the front 34 and substantially equal in length thereto, thus forming a front closure for the male section 10 of the hood assembly. The lever arms 46, 47 extend beyond the pivot points 44, 45 and form bearing surfaces 49, 50. In the presently preferred embodiment the distance from the pivot points 44, 45 to the outer ends of the lever arms corresponding to the end of the front surface 48 is approximately equal to ten times the distance from the pivot points to the bearing surface 49, 50. As described hereinbefore with reference to Fig. 3, the length of the back 14 of the male section 10 is substantially equal to the length of the hood assembly with the electrical connector in place. Horizontal bearing shoulders 51, 52 extending beyond the sides 32, 33 of the receptacle in its assembled position are provided at a point approximately opposed to the pivot points 44, 45. These form mating bearing surfaces 49, 50. In the presently preferred embodiment the bearing shoulders are formed by tapering the width of the back 14 to a maximum at the shoulders for maximum strength. A spring or similar fastening means 43 is pivotally affixed to the lever arms 46, 47 at points 53, 54 between the pivot points 44, 45 and the bearing surfaces 49, 50. The fastening means is so formed that it engages the protrusions 17, 18 on the male section 10 when the hood is in an assembled position (Fig. 1).

Referring to Figs. 1 and 2, in assembling the hood of the present invention with a multiple contactor electrical connector affixed and to be connected as shown, the female section 30 is placed on the male section 10, with the actuating lever 42 in the outward position, i. e. with the front surface 48 raised out of the plane parallel to the front 34, and the fastening means 43 engaging the protrusions 17, 18. The back 14 comon to both sections provides proper alignment between the sections. As the actuating lever 42 is rotated downward to its assembled position in a plane juxtaposed and parallel to the front 34 of the female section 30, the pivot points 53, 54 of the fastening means 43 are rotated upwardly causing the female section to be forcibly pulled into engagement with the male section, thus bringing the electrical connector parts into mating contact. It should be noted that with the actuating lever 42 in its assembled position (Fig. 1), the pivot points 53, 54 of the fastening means 43 are so positioned on the lever arms 46, 47 that they rotate beyond the line extending from the lever arm pivot points 44, 45 and the protrusions 17, 18. Thus, a locking action in the assembled position is provided. In the presently preferred embodiment the upper end of the back 14 is turned slightly inward to provide alignment during assembly.

In disassembling the hood assembly of the present invention, and thus the electrical connector affixed thereto, the actuating lever 42 is pulled outwardly from the hood assembly. As the lever is swung upward the bearing surfaces 49, 50, on the lever arms engage the bearing shoulders 51, 52 on the back 14 of the male section 10, forcing the back 14 downward to separate and disconnect the electrical connector.

It is to be noted that when assembled the front surface 48 which provides a handle for the lever 42 forms the fourth side of the male section 10 of the hood assembly described herein, while the back 14 of the male section forms the fourth side of the female section of the hood assembly. Thus, when assembled (Fig. 1), the receptacle and the electrical connector contained therein are completely protected and enclosed. When the mating sections of the hood assembly are separated, however, the receptacles have a side open to provide accessibility to the connections between the cable and the contactors 22 for repair or maintenance. The hood of the present invention also makes possible the removal of the electrical connector from the hood without disconnecting the cable from the connector parts.

Thus, what has been described herein is a hood assembly for use with multiple contact electrical connectors and the like which allows ready accessiblity to the electrical connections of the multiple contactor electrical connectors, and provides a quick connect and disconnect means for uniting the male and female parts of the electrical connector.

While a presently preferred embodiment of the present invention as applied to one type of multiple contactor electrical connector has been described in some detail, it is to be understood that this is given by way of example only. Various modifications and applications of the hood assembly of the present application will be apparent to those skilled in the art, and the scope of the invention is to be determined by the objects and the claims.

What is claimed is:

1. A hood assembly for an electrical connector having mating connector parts comprising: a first and second mating receptacle section, said first receptacle section being defined by opposed lateral walls and a front wall, said second receptacle section being defined by opposed lateral walls and a back wall, said opposed lateral walls of said first section and said opposed lateral walls of said second section being substantially equal and lying in parallel common planes; said back wall of said second receptacle section extending beyond said second receptacle to form a back wall for said first receptacle section; lever arms affixed to said lateral walls of said first receptacle section, a handle interconnecting said lever arms, said handle defining a plane surface lying in a plane normal to the plane of said lateral walls of said first and second recepta-

cle, said surface of said handle defining a front closure for said second receptacle in said hood assembly, fastening means rotatably affixed to said lever arms and detachably affixed to said second section of said hood assembly; said lever arms exerting a compressive force on said receptacle sections through said fastening means when said handle surface is rotated to form a front closure for said second receptacle; said lever arms defining a cam action between said lever arms and said second receptacle when said lever arms are rotated away from said second receptacle.

2. A hood assembly for an electrical connector having mating connector parts comprising: a first and second mating receptacle, opposed lateral walls and a front wall defining said first receptacle, opposed lateral walls and a back wall defining said second receptacle, said first and second receptacle having juxtaposed open ends; a first electrical connecting part affixed to said open end of said first receptacle, a second electrical connector part affixed to said open end of said second receptacle, said first electrical connector part being matable with said second electrical connector part; said back wall of said second receptacle extending beyond said juxtaposed open end of said second receptacle, said back being substantially equal in length to the assembled length of said hood assembly, whereby said back wall of said second receptacle forms a closure for the open back of said first receptacle; lever arms rotatably affixed to said lateral walls of said first receptacle, fastening means pivotally affixed to said lever arms and detachably connected to said second receptacle, said lever arms having a handle defining a surface in a plane normal to the plane of said lateral bearing walls, said handle being similar in configuration and substantially equal in size to the open front of said second receptacle, said lever handle defining a front closure for said second receptacle in said hood assembly; lever means between said lever arms and said fastening means for exerting a compressive force between said first and second receptacle as said lever handle is rotated to the position forming a front closure for said second receptacle, and cam means between said lever arms and said second receptacle for exerting a tensile force between said first and said second receptacle as said lever handle is rotated away from said second receptacle.

3. A hood assembly for an electrical connector having mating connector parts comprising: a first and second mating receptacle, said first receptacle being defined by opposed lateral walls and a front wall, said second receptacle being defined by opposed lateral walls and a back wall, said first and second mating receptacles having juxtaposed open ends; said mating electrical connector parts being interposed between said juxtaposed open ends of said mated receptacles in said hood assembly, a first electrical connector part being affixed to the open end of said first receptacle, a second electrical connector part matable with said first electrical connector part being affixed to the juxtaposed open end of said second receptacle; said back wall of said second receptacle extending beyond said juxtaposed open end of said second receptacle and being substantially equal in length to the length of said hood assembly, said back wall in extension forming a back closure for said first receptacle; lever arms rotatably affixed to said opposed lateral walls of said first receptacle, said lever arms being rotatably affixed at opposed fulcrum points near the end of said first receptacle opposed to the mating end of said first receptacle, said lever arms extending beyond said front wall of said first receptacle, said lever arms being interconnected by a lever handle, said lever handle being a substantially plane surface normal to the plane of said lateral walls of said hood assembly, said handle surface forming the front closure for said second receptacle when said lever is rotated to a maximum closed position; said lever arms extending beyond said fulcrum points to lever arm ends

opposed to said handle ends of said lever arms, a fastening means pivotally affixed to said lever arms at points between said fulcrum points and said lever arm ends opposed to said handle ends, said fastening means being detachably connected to said back wall of said hood assembly at at least one point of said back wall within the segment of said back wall defining the back of said second receptacle, whereby compressive force is exerted between said first and second receptacle as said lever arm is rotated to a maximum position to form a closure for the front of said second receptacle; cam means on said lever arms beyond said fulcrum points, and cam bearing means on said second receptacle whereby tensile force is exerted between said first and said second receptacles as said lever arms are rotated to a maximum open position.

4. A hood assembly for an electrical connector having mating connector parts comprising: a first and second mating receptacle section; said first receptacle section being defined by opposed lateral walls, a front wall and an outer end wall; said second receptacle section being defined by opposed lateral walls, an elongated back wall and an outer end wall; said opposed lateral walls of said first receptacle section and said opposed lateral walls of said second receptacle section being substantially equal in configuration and lying in parallel common planes, said first receptacle section and said second receptacle section having juxtaposed open ends; said elongated back wall of said second receptacle section being substantially equal in length to the length of said hood assembly, said back wall of said second receptacle section forming a back closure for said first receptacle section; mating first and second electrical connector parts interposed between said juxtaposed open ends of said first and second receptacle sections, said first connector part being affixed at said open end of said first receptacle section, said second connector part being affixed at said open end of said second receptacle section; a wall of said first receptacle section defining an opening therethrough, a wall of said second receptacle section defining an opening therethrough; a first and second parallel lever arm rotatably affixed to said opposed lateral walls of said first receptacle section at opposed fulcrum points on said opposed lateral walls, said lever arms extending beyond said front wall of said first receptacle section, a lever handle interconnecting said lever arms, said handle being a substantially plane surface, said plane surface being substantially equal in size and configuration to said open front defined by said second receptacle section, said plane surface lying in a plane normal to the plane of said opposed lateral walls, said lever arms being rotatable to a maximum closed position in which said handle forms a front closure for said second receptacle; said lever arms extending beyond said fulcrum points in a direction opposed to said lever arm handle, fastening means pivotally affixed to said lever arms at points on said extensions of said lever arms beyond said fulcrum, said fastening means being detachably affixed to said second receptacle section, whereby a compressive force is exerted between said first and second receptacle sections when said lever arms are rotated to the maximum closed position; a bearing surface between said lever arm extensions and said elongated back wall of said second receptacle section whereby a tensile force is exerted between said first and second receptacle sections when said lever handle is rotated away from said second receptacle section.

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