

Description

The present invention relates to a shielded connector which is overmolded with an insulative layer and in particular to an improved shielding which will withstand the overmolding operation.

There is disclosed in US-A-4,457,576 a shielded electrical connector assembly of the type comprising an insulative housing having a front mating face and a rear conductor receiving face, and a plurality of terminals in the housing. Metal shell means enclose the rear conductor receiving face of the housing and a cavity extending rearward therefrom.

While not published before the priority date of the present application, US-A-4,457,576 discloses a connector well known before the priority date. The shell means of the known connector is intended to be overmolded with a sheath of insulative plastic, however, the high pressures generated in the overmolding operation can collapse the shells. This destroys the electrical shielding as well as allowing flow of considerable plastic into the cavity, which can fix the terminals in misaligned condition, eliminating the float necessary for proper mating.

According to the invention, therefore, a shielded electrical connector assembly as described above is characterized by at least one pressure relief vent stamped and formed in the shell means. Each vent comprises an aperture sheared completely through the metal shell means about only a portion of its periphery, the blank stamped therefrom remaining hinged to the surrounding shell means.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of the present invention together with a known electrical connector;

Figure 2 is a perspective showing the connector in a fully assembly condition;

Figure 3 is a perspective showing the connector after the overmolding operation;

Figure 4 is a plan view of one shell member;

Figure 5 is a partial section taken along line 5—5 of Figure 4;

Figure 6 is a partial section taken along line 6—6 of Figure 4;

Figure 7 is a side elevation, partially in section, taken along line 7—7 of Figure 4;

Figure 8 is a partial section similar to Figure 5 taken after the overmolding operation.

The subject shielded electrical connector assembly 10 is formed by a known electrical connector 12, first and second metal housings 14, 16 and a pair of rear metal shells 18, 20. The connector 12 is a miniature D connector of the type manufactured by the assignee AMP Incorporated and sold under the trade name Amplimate. This connector 12 has an insulative housing 22 with an integral peripheral flange 24 and a front mating face 26 with a plurality of terminal passages 28 therein. Each passage 28 has a

suitable terminal (not shown) mounted therein and used to terminate the respective conductors of a cable 30.

The metal housings 14 and 16 are each integral stamped and formed metal members. The front housing 14 has mounting apertures 32 and gripping lugs 34 and is received against the front surface of the flange 24. The front housing 14 can be provided with an integral shroud 36 enclosing the forward end of the housing 22. The rear housing 16 has a similar outer profile with apertures 38 aligned with the apertures 32 and recesses 40 aligned to receive the respective lugs 34. The rear housing 16 is also profiled to define a cavity 42, which receives a rear portion of the housing 22 of connector 12, as well as a rear flange of 44 having a central passage 46 and a plurality of slots 48 along the marginal edges thereof.

The one rear shell 18 is a stamped and formed integral metal member having a generally planar wall 50 surrounded by depending side walls 52, 54, 56, 58. The planar wall 50 is profiled to have first embossments 60, 62, second embossments 64, 66, forwardly directed gripping tines 68, a semicylindrical rearwardly directed cable exit 70, at least one pressure release means 72 and at least one overmold grip means 74.

The other rear shell 20 is somewhat similar to shell 18 having a planar wall 76 surrounded by side walls 78, 80, 82, 84, a first embossment 86, second embossments 88, 90 forwardly directed gripping tines 92, rearwardly directed semicylindrical cable exit 94, pressure release means 96, overmold gripping means 98 and continuity tines 100.

The electrical connector 12 and the housings 14, 16 are formed in the usual manner and loaded with terminals. These terminals are then used to engage and terminate the appropriate conductors of the cable 30 in any well-known manner such as crimping or insulation piercing. It should be pointed out that in this assembled condition, the housings 14, 16 are joined on opposite sides of the flange 24 and are secured together by the lugs 34 being clinched over recesses 40 in the rear housing 16. The rear shells 18, 20 are applied by putting the tines 68, 92 into the respective slots 48 and rotating the shells toward each other so that the side walls 52, 54, 56, 58 overlap the respective side walls 78, 80, 82, 84 and form a gripping engagement therewith. It should be noted that when the shells 18, 20 are fully in place, as shown in Figure 2, the continuity tines 100 will make a positive engagement with the rear housing 16, as shown in detail in Figure 7. The subject connector assembly of Figure 2 is now ready for the overmolding operation, Figure 3 showing the assembly with overmolding 102 in place.

An overmolding operation can develop tremendous pressures and for this reason pressure relief vents 72, 96 have been stamped and formed in the rear shells 18, 20. Each vent 72, 96 comprises a generally circular aperture sheared completely through the surrounding shell about most

of its periphery, the blank stamped from the aperture remaining hinged to the surrounding shell where it is not sheared through. As shown in Figure 5, the plane of the blank is parallel to the plane of the surrounding shell but displaced into the cavity enclosed by the shells, the aperture remaining closed by the blank. The size and shape of the vents are engineered to cause the blank to hinge into the cavity when a predetermined molding pressure is achieved, allowing some of the plastic 102 to flow into the cavity formed by shells 18, 20, as shown in Figure 8. This relieves the pressure of the overmolding operation and balances the pressure within the shells by allowing a limited amount of plastic to flow into the cavity without sufficient material entering to affect the normal free float and alignment of the terminals carried by the connector.

The gripping means 74, 98 each also allow a limited amount of overmold material 102 to flow into the central cavity. These gripping means 74, 98 are formed adjacent the front edge of the shells and directed so that as the material 102 flows into them and hardens, it will be prevented from pulling back or shrinking as the overall overmold 102 cools. Thus a good overmolded connector, such as shown in Figure 3, will be formed.

The shells 18, 20 are provided with first embossments 60, 62, and 86 which run generally in line with the conductors of cable 30, and further embossments 64, 66, 88, 90 which are parallel and oppositely spaced. These serve as added strengthening means to prevent collapse of the shells.

The continuity lines 100, as best illustrated in Figure 7, assure electrical and mechanical engagement between the shells 18, 20 and the rear housing 16.

Claims

1. A shielded electrical connector assembly (10) of the type comprising an insulative housing (22) having a front mating face (26) and a rear conductor receiving face, a plurality of terminals in said housing, and stamped and formed metal shell means (16, 18, 20) enclosing the rear conductor receiving face of the housing (26) and a cavity extending rearward therefrom, the connector being characterized by at least one pressure relief vent (72, 96) stamped and formed in the shell means (18, 20), each vent comprising an aperture sheared completely through the shell means about only a portion of its periphery, the blank stamped therefrom remaining hinged to the surrounding shell means (18, 20).

2. A connector assembly (10) as in claim 1 characterized in that the aperture remains closed by the blank stamped therefrom.

3. A connector assembly (10) as in claim 1 characterized in that the plane of the blank is parallel to but spaced from the plane of the shell means surrounding the aperture.

4. A connector assembly (10) as in claim 1 characterized in that the blank is displaced toward the cavity from the surrounding aperture.

5. A connector assembly (10) as in claim 1 characterized by further comprising a sheath of overmolded plastic (102) encapsulating the shell means (18, 20) and extruded through said aperture into said cavity, said blank having been hingedly displaced into the cavity by the molding pressure.

Patentansprüche

1. Abgeschirmter elektrischer Verbinderaufbau (10) derjenigen Art, die ein isolierendes Gehäuse (22) aufweist, welches eine vordere Steckfläche (26) und eine hintere Leiternaufnahme fläche besitzt, mit einer Vielzahl von Anschlüssen in dem Gehäuse und gestanzten und geformten Metallschalen (16, 18, 20), welche die hintere Leiternaufnahme fläche des Gehäuses (26) umschließen sowie einen Hohlraum, der sich davon nach hinten erstreckt, dadurch gekennzeichnet, daß wenigstens ein Druckentlastungsventil (72, 96) in den Schalen (18, 20) gestanzt und geformt ist, wobei jedes Ventil eine Öffnung umfaßt, die nur um einen Teil ihres Umfangs herum vollständig durch die Schale ausgesichert ist, und daß das ausgestanzte Schnitteil gelenkig mit der umgebenden Schale (18, 20) verbunden bleibt.

2. Verbinderaufbau (10) nach Anspruch 1, dadurch gekennzeichnet, daß die Öffnung durch das ausgestanzte Schnitteil verschlossen bleibt.

3. Verbinderaufbau (10) nach Anspruch 1, dadurch gekennzeichnet, daß die Ebene des Schnitteils parallel zu jedoch im Abstand zur Ebene der die Öffnung umgebenden Schale angeordnet ist.

4. Verbinderaufbau (10) nach Anspruch 1, dadurch gekennzeichnet, daß das Schnitteil von der umgebenden Öffnung weg zum Hohlraum hin versetzt ist.

5. Verbinderaufbau (10) nach Anspruch 1, dadurch gekennzeichnet, daß ferner eine Hülle aus umformtem Kunststoff (102) vorgesehen ist, welche die Schalen (18, 20) umschließt und durch die Öffnung in den Hohlraum hinein extrudiert ist, und daß das Schnitteil durch den Formungsdruck gelenkig in den Hohlraum hinein versetzt ist.

Revendications

1. Ensemble à connecteur électrique blindé (10) du type comprenant un boîtier isolant (22) présentant une face avant (26) d'accouplement et une face arrière de réception de conducteurs, plusieurs bornes dans ledit boîtier, et des moyens à coques métalliques découpées et formées (16, 18, 20) renfermant la face arrière de réception de conducteurs du boîtier (26) et une cavité s'étendant vers l'arrière de cette face, le connecteur étant caractérisé par au moins un évent (72, 96) de décharge de pression découpé

of its periphery, the blank stamped from the aperture remaining hinged to the surrounding shell where it is not sheared through. As shown in Figure 5, the plane of the blank is parallel to the plane of the surrounding shell but displaced into the cavity enclosed by the shells, the aperture remaining closed by the blank. The size and shape of the vents are engineered to cause the blank to hinge into the cavity when a predetermined molding pressure is achieved, allowing some of the plastic 102 to flow into the cavity formed by shells 18, 20, as shown in Figure 8. This relieves the pressure of the overmolding operation and balances the pressure within the shells by allowing a limited amount of plastic to flow into the cavity without sufficient material entering to affect the normal free float and alignment of the terminals carried by the connector.

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et formé dans les moyens à coques (18, 20), chaque évent comprenant une ouverture dont seule une partie de la périphérie est réalisée par cisailage complet, de part en part, des moyens à coques, le flan ainsi découpé restant articulé sur les moyens à coques entourantes (18, 20).

2. Ensemble à connecteur (10) selon la revendication 1, caractérisé en ce que l'ouverture reste fermée par le flan qui en est découpé.

3. Ensemble à connecteur (10) selon la revendication 1, caractérisé en ce que le plan du flan est parallèle au mais espacé du plan des moyens à coques entourant l'ouverture.

4. Ensemble à connecteur (10) selon la revendication 1, caractérisé en ce que le flan est décalé vers la cavité à partir de l'ouverture l'entourant.

5. Ensemble à connecteur (10) selon la revendication 1, caractérisé en ce qu'il comprend en outre une gaine de matière plastique surmoulée (102) enveloppant les moyens à coques (18, 20) et pénétrant dans ladite cavité en passant par extrusion dans ladite ouverture, ledit flan ayant été déplacé en pivotant vers l'intérieure de la cavité par la pression de moulage.

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