

ELECTRICAL CONNECTOR HAVING ELECTRICAL CONTACTS  
PROVIDED WITH RETENTION MEANS

This invention is related to an electrical connector having an electrical contact disposed in a dielectric housing, one end of  
5 the contact is connected to, for example, an end portion of an electrical wire, and the other end of which is electrically engageable with a matable electrical contact inside another dielectric housing.

The contact includes a resilient latching member having a  
10 projection member that engages an inside surface of the housing thereby preventing the latching member from projecting beyond an outside surface of the housing.

Prior art electrical connectors shown in Figures 6-8 comprise a connector housing 1 and a plurality of contacts 5,  
15 which are retained inside passageways 2 formed inside the housing 1. The contacts 5 include a receptacle portion 9 for electrical engagement with a pin, a connecting portion 7 to which the end of an electrical wire is connected and a clamp 8 to clamp onto the wire. The contact assembly is composed of a plurality  
20 of the contacts 5 held in a row by carriers 6. Figure 6 shows each of the contacts 5 of the contact assembly being partly inserted in the passageways 2 of the connector housing 1, and Figure 7A is a cross-sectional view showing the connector, along the line VII-VII of Figure 6. As shown in Figures 6 and 7A,  
25 at this stage, only the receptacle portion 9 of each contact 5 is inserted in the respective passageway 2, and the connecting

portion 7 and clamp 8 are exposed outside the housing 1. At this time, the resilient latching member 10 formed on each contact 5 has its free end projecting inside the temporary holding aperture 4 and retains the contact 5 at this position.

5 In connecting the electrical wire A to the contact 5, the wire is press-fitted into slots of the connecting portion 7 so that an electrical wire is electrically connected with the connecting portion and retained therein. Next, the clamp 8 is bent over and around the insulation of wire A, and thus the wire A is  
10 securely retained in the contact 5 by this clamp 8. Each contact 5 is then completely inserted inside its respective passageway 2 as shown in Figure 7B whereafter carriers 6 are removed. At this time, the free end of the resilient latching member 10 projects inside a latching aperture 3 formed in the housing 1 and  
15 engages with the housing 1, retaining the contacts 5 in position in housing 1. The assembled connector is matable with a complementary electrical connector so that the pins thereof inserted through the insertion apertures 1a formed at the front face of the housing 1 engage with the receptacle portions 9 of  
20 the contacts 5, and accordingly, electrically connect both connectors.

When using the above-mentioned connector, a pulling force may be applied to the wire A connected to the contact 5, and a problem arises in that the resilient latching member 10 may be  
25 bent by this pulling force and projected outward from the latching aperture 3.

In view of this problem, a connector having a contact as shown in Figure 8 has been proposed. The connector 1 includes the contact 5 with a latching member 10 having bifurcated end portions, one end portion 10a extending into the latching aperture 3, and the other end portion 10b being disposed inside the passageway 2. Thus, the contact 5 is firmly retained in the passageway by the engagement of the end portions 10a and 10b with the housing when a pulling force is exerted on the wire connected to the contact 5. Also, the end portion 10a of latching member 10 is prevented from projecting beyond the outside surface of the housing when subjected to a certain amount of pulling force. However, when the wire is subjected to a strong pulling force, the end portion 10a cannot be prevented from projecting further outward from the outside surface of the housing because of the bending of the end portions. Moreover, in order to bifurcate the tip of the latching member, the latching member must be made wider and both bifurcated end portions must be provided with a specified strength. Therefore, when the contact is inserted in the passageway, a stronger insertion force is required to deform the latching member, and thus a problem arises in that a stronger force is required to insert the contact. Also, since the bending of the bifurcated portions must be precise, a problem arises in that the control of the bending may cause difficulties during manufacturing.

~~In consideration of the above-mentioned problems, the object of this invention is to provide a contact having a resilient~~

According to one aspect thereof the invention consists in an electrical connector, comprising: a dielectric housing having a passageway extending therethrough and a latching aperture disposed therein; an electrical contact disposed in said passageway and having a resilient latching member, a free end means of said latching member being disposed in said latching aperture; and a projection on said latching member adjacent said free end for engagement with an inside surface of the housing so that if a force is applied to the contact in a direction opposite to the direction of insertion of the contact into the passageway, the projection will prevent the free end of the latching member from projecting beyond the outside surface of the housing, and wherein said projection extends substantially normally with respect to said latching member.

According to another aspect thereof the invention consists in an electrical contact for insertion into a passageway of a dielectric housing, comprising: a contact section for electrical engagement with a matable electrical contact; a terminating section for termination to an electrical conductor; a resilient latching member as part of said electrical contact with a free end of said latching member disposable within an aperture of the housing to maintain the contact in the passageway; a projection on the latching member adjacent a free end thereof for engagement with an inside surface of the housing so that if a force is applied to the contact opposite to the direction of insertion of the contact into the passageway, the projection will prevent the free end of the latching member from projecting beyond the outside surface of the housing, and wherein said projection extends substantially normal with respect to the latching member.

For a better understanding of the present invention and to show how it may be carried into effect, reference will now be made by way of example to the accompanying

drawings, in which:

Figure 1 is a perspective view of the connector according to this invention;

Figure 2 is a cross-sectional view showing the connector along the line II-II in Figure 1;

Figure 3 is a cross-sectional view showing the connector with the contact inserted completely inside the housing and the wires are connected with the terminating portion of the contact;

Figure 4 is a part enlarged cross-sectional view of the resilient latching member of the connector in Figure 3;

FIGURE 5 is a part perspective view of the contact when removed from the connector;

FIGURE 6 is a perspective view of the prior art connector;

FIGURES 7A and 7B are cross-sectional views showing the connector along the line VII-VII in Figure 6; and,

FIGURE 8 is an enlarged cross-sectional view of the resilient latching member of another prior art connector.

The following is a detailed description of the preferred embodiment of the present invention, with reference to the accompanying drawings.

Figures 1-4 show connector ~~20~~ which comprises a connector housing 21 and a plurality of electrical contacts 25 which are retained in passageways 22 formed in the housing 21. Each contact 25 includes receptacle portion 29, connecting portion 27 to which the end portion of an electrical wire is connected, and clamp 28 which clamps onto the wire when connected. The contact assembly is composed of a plurality of contacts 25 retained in a row by carriers 26. Figure 1 shows the contact assembly which is partly inserted in the housing. In Figures 1 and 2, only the receptacle portion 29 of each contact 25 is inserted in the passageway 22, and the connecting portion 27 and clamp 28 are exposed outside. At this time, the free end of resilient latching member 30 formed on each contact 25, is disposed within temporary holding aperture 24, thereby retaining the contacts 25 at this position. Further, a projection 31, which is an integral part of the latching member 30 and bent at a right

angle to the latching member 30, is formed at the side portion of resilient latching member 30. Projection 31 is disposed within the passageway 22.

In connecting wires A to contacts 25, the wires are  
5 press-fitted into slots of the connecting portions 27 so that the wires are electrically connected with the connecting portions and retained therein. Next, the clamps 28 are bent over and around the wires A, so that the wires A are firmly retained in the contacts 25 by the clamps 28. Then, as shown in Figure 3, the  
10 contacts 25 are completely inserted inside the passageways 22. At this time, the free ends of resilient latching members 30 project into the latching apertures 23 formed in the housing 21, and accordingly, the contacts 25 are retained in the housing passageways. Furthermore, at this time, the projections 31 are  
15 disposed inside the passageways and engage with the inside walls of the passageways 22.

When the connector 20 mates with a complementary connector and the pins thereof engage with the receptacle portions 29 of the contacts 25, an electrical connection between  
20 both connectors is realized. Moreover, at this time, a projection 41 of a latching arm 40 formed at the bottom surface of the housing 21 engages with the housing of the complementary connector thereby retaining both housings in the mated condition.

25 Next, the case where a pulling force is exerted in a direction opposite to the insertion direction of the contacts upon

the wires A is considered with reference to Figure 4. If tension is applied to the wire in Figure 4, the free end of resilient latching member 30 may<sup>not</sup> project outward from the latching aperture 24. However, the projection 31 counteracts the tension  
5 by engaging with the inside surface of the housing 21, therefore, the free end of resilient latching 30 is prevented from projecting outward beyond the outside surface of the housing.

Also, as shown in Figure 5, the width W of the resilient latching member 30 can be the same as that of the resilient  
10 latching member 10 of the conventional connector shown in Figures 7A and 7B. Accordingly, the width of the portion 30a where the elastic deformation is created at the time of inserting the contact is reduced, and therefore, less force is needed to insert the contacts into the cavity. Furthermore, even if the  
15 angle  $\alpha$  at which the resilient latching member 30 is bent upward is larger than usual as shown in Figure 4, no problem will arise because the free end of the resilient latching member 30 is prevented from being projected outward from the latching aperture by the projection 31 engaging the inside surface of the  
20 housing. Therefore, an advantage is obtained whereby the bending of the resilient latching lance is simplified.

As disclosed above, according to this invention, because the projection is formed integrally with the resilient latching member, which is inserted in and engaged with the housing, the  
25 free end of the resilient latching member is prevented from projecting outward even when a pulling force is exerted on the

contact in a direction opposite to the insertion direction.

Further, the width of the resilient latching member can be kept small, and thus only a small force is needed to insert the contact into the housing.

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CLAIMS



1. An electrical connector, comprising: a dielectric housing having a passageway extending therethrough and a latching aperture disposed therein; an electrical contact disposed in said passageway and having a resilient latching member, a free end means of said latching member being disposed in said latching aperture; and a projection on said latching member adjacent said free end for engagement with an inside surface of the housing so that if a force is applied to the contact in a direction opposite to the direction of insertion of the contact into the passageway, the projection will prevent the free end of the latching member from projecting beyond the outside surface of the housing, and wherein said projection extends substantially normally with respect to said latching member.

2. An electrical contact for insertion into a passageway of a dielectric housing, comprising: a contact section for electrical engagement with a matable electrical contact; a terminating section for termination to an electrical conductor; a resilient latching member as part of said electrical contact with a free end of said latching member disposable within an aperture of the housing to maintain the contact in the passageway; a projection on the latching member adjacent a free end thereof for engagement with an inside surface of the housing so that if a force is applied to the contact opposite to the direction of insertion of the contact into the passageway, the projection will prevent the free end of the latching member from projecting beyond the outside surface of the housing, and wherein said projection extends substantially normal with respect to the latching member.

3. An electrical contact as claimed in claim 2, substantially as hereinbefore described with reference to the accompanying drawings.

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