

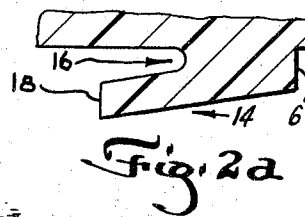
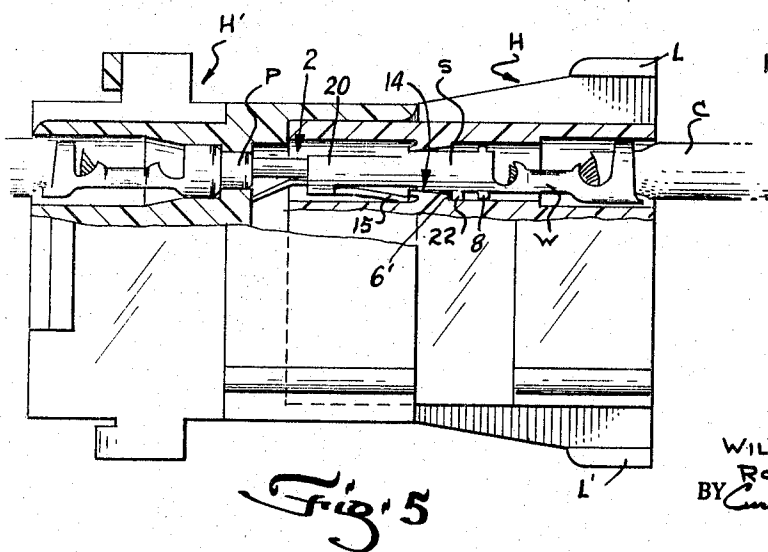
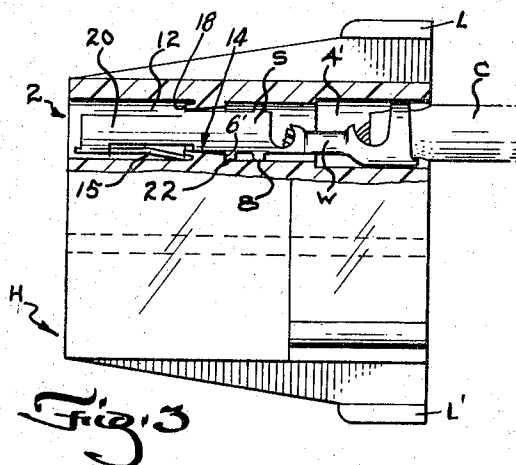
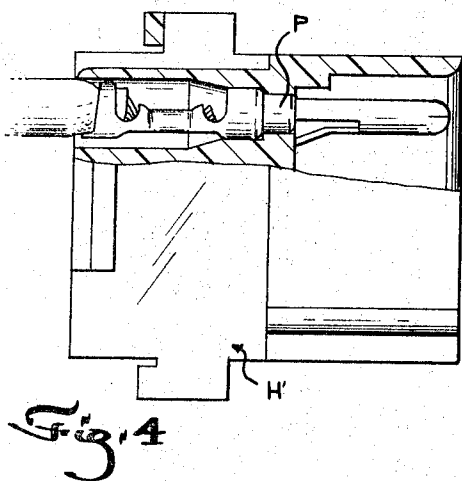
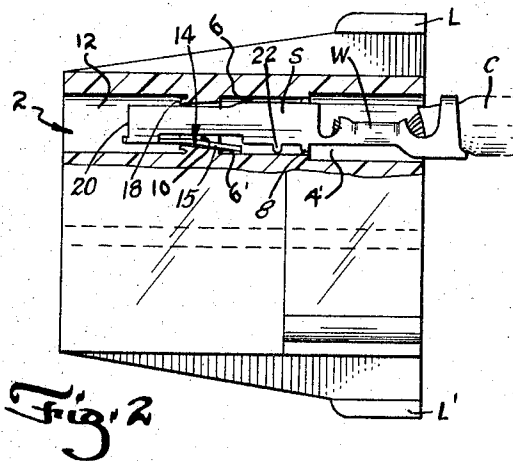
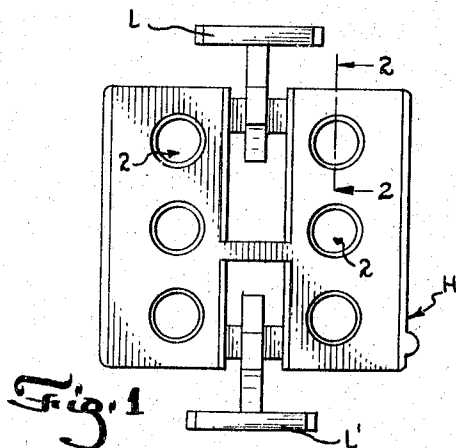
May 9, 1967

W. A. SMITH ET AL

3,319,212

ELECTRICAL CONNECTOR WITH DIELECTRIC HOUSING

Filed Jan. 23, 1964



INVENTOR  
WILLARD ALLEN SMITH  
ROBERT LA RUE WILLIAMSON  
BY *Curry, Morris & Safford*

1

2

## 3,319,212 ELECTRICAL CONNECTOR WITH DIELECTRIC HOUSING

Willard Allen Smith, Elizabethtown, and Robert La Rue  
Williamson, Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 23, 1964, Ser. No. 339,722

3 Claims. (Cl. 339—64)

This invention relates to connector housings in which electrical connectors are to be removably disposed.

Whenever electrical connectors, such as, the pin and socket type, are mounted in mounting means, such as insulated housings made of dielectric or other plastic material, they are generally disposed in spaced parallel openings therein, which, when the housing containing pins is mated with the housing containing sockets, the pins are telescopically disposed within corresponding sockets to provide electrical and mechanical interconnection.

It has been found that when the housings containing the pins and sockets are mated, the pins do not readily engage their corresponding sockets due to misalignment caused by manufacturing tolerances, both in the housings and electrical connectors, changes of temperature or other environmental conditions.

It is, therefore, a primary object of the present invention to provide new and improved housings in which the pins or sockets, and especially the latter, have a limited freedom of movement therein to compensate for minor misalignments that might otherwise cause jamming or hard operation when the pins and sockets are brought into engagement.

Another objective is the provision of a cavity in a housing which will frictionally hold an electrical connector as well as allow the contact engaging end of the connector to move radially so as to meet a mating electrical connector if the mating connector is not concentric with the first connector.

Another object of the present invention is to provide a seat in a housing cavity in which a spring latch means of an electrical connector is seated.

A further object of the present invention is the provision of stabilizing electrical connectors in position in a housing for engagement with mating electrical connectors in another housing.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration and principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 is a front elevational view of a connector housing constructed in accordance with the present invention;

FIGURE 2 is a side elevational view of the housing of FIGURE 1 and partially in section along lines 2—2 of FIGURE 1 showing a socket contact being inserted into a cavity therein;

FIGURE 2a is an enlarged fragmentary view of a feature of FIGURE 2;

FIGURE 3 is a side elevational view similar to FIGURE 2, but showing the socket contact fully inserted;

FIGURE 4 is a side elevational view partially in section and showing a pin contact and housing which mates with the housing of FIGURES 1, 2 and 3; and

FIGURE 5 is a partially sectioned view showing the contacts and housings mated.

The latching means L and L' on the housings are disclosed in U.S. patent application, Ser. No. 236,001, filed Nov. 7, 1962, assigned to the present assignee, and which is now U.S. Patent No. 3,179,738.

Referring now to the drawings, and particularly to FIGURES 1 and 2, the present housing H comprises a dielectric member, suitably molded or formed in any conventional manner. Housing H has a series of spaced parallel cavities 2 formed therethrough to slidably receive contacting contacts or terminals S of the socket or receptacle type. Each cavity 2 has a large opening 4 at its rearward end which receives contact S. Hole 4' extends from opening 4 into the cavity and provides an enclosure for the wire barrel W of contact S when it is fully inserted into the cavity. Hole 4' joins a smaller hole 6 near the center of the cavity wherein contact stabilizing members 8 on the contact are slidably received. Stabilizing members 8 project outwardly from the periphery of contact S and are preferably disposed equidistantly therearound.

At the innermost end of hole 6 is a smaller tapered hole 10 which constitutes the contact-engaging means. An annular ledge 6' is formed between holes 6 and 10 against which a stop member 22 on the contact abuts to limit inner movement of the contact within the cavity. This hole 10 is tapered, as shown, so as to frictionally engage the outer surface of contact S when it is pushed into cavity 2. The small end of tapered hole 10 terminates into a large opening 12 near the forward end of cavity 2. Tapered hole 10 has an integral annular lip 14 which extends into large opening 12.

This portion of lip 14 which extends into opening 12 is undercut as designated at 16 so that lip 14 may spring open slightly when contact S enters therein. This arrangement provides a stabilizing means by which the protruding portion 20 of contact S will have a limited freedom of radial movement to compensate for minor misalignments between pin and socket contacts when the connector halves are brought together for engagement. Opening 12 provides an enclosure into which protruding end 20 of contact S is disposed.

End 18 of lip 14 is squarely cut, as shown, so that a spring latch 15 on contact S, such as disclosed in U.S. patent application Ser. No. 319,020, filed Oct. 25, 1963, now abandoned, will snap outwardly therefrom when the contact is bottomed into cavity 2. Spring latch 15 will abut end 18, or move under lip 14 depending upon the thickness of spring latch 15 or lip 14, when rearward pull is exerted on contact S. The combination of stop member 22 on contact S abutting ledge 6' in one direction, and the spring latch operation as described above, will prevent the contact from becoming accidentally dislodged from cavity 2.

### Operation

An electrical contact S is suitably crimped or cold-forged to the conductor portion of wire C to provide a current coupling member for the connector. This contact is inserted into a housing cavity as described hereinbefore. During insertion, a spring latch 15 on the contact, which is biased downwardly, becomes depressed towards the body of the contact, as shown in FIGURE 2. As contact S bottoms into cavity 2, stop member 22 on the contact abuts ledge 6' between hole 6 and hole 10. At the same time, spring latch 15 snaps into place outwardly from lip 14 as shown in FIGURE 3. This ar-

3

range limits longitudinal movement of contact S relative to housing H.

FIGURE 4 shows a pin contact P in place in a housing H'. This assembly constitutes the other half of the connector, and mates with the assembly of FIGURE 3. This pin and housing are disclosed in said last mentioned U.S. patent application. It is to be understood that the contact engaging means, contact stabilizing means, and contact latching means disclosed hereinbefore may be utilized in its entirety or in part in the housing shown in FIGURE 4.

FIGURE 5 shows the herein disclosed connector and the connector of FIGURE 4 in engageable relationship by which a mechanical and electrical interconnection is made between the two connector halves, and the housings in which the connectors are mounted are also shown in mating relationship.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

We claim:

1. In an electrical connector; a dielectric housing having an opening extending therethrough, said opening provided with a tapered section, a resilient annular lip at one end of said tapered section and an abutment at the other end of said tapered section, said annular lip being spaced from a surface of said opening; an electrical contact having a body section provided with projection means engageable with said abutment to limit movement of said electrical contact in one direction in said opening and a spring latch means having a free end disposed between said annular lip and said surface of said opening to limit movement of said electrical contact in another direction in said opening, said annular lip engaging said body section of said electrical contact to permit freedom of movement of said electrical contact so as to become aligned with a complementary electrical contact during interengagement therebetween.

2. In an electrical connector; a dielectric housing having an opening extending therethrough, said opening having an engaging section of less diameter than said opening, said engaging section being provided with resilient lip means spaced inwardly from as surface of said opening and extending along said surface; an electrical contact dis-

4

posed in said opening, said electrical contact having a body section provided with projection means and latch means, said body section and said projection means being disposed in engagement with said engaging section and said body section being in snug and resilient engagement with said resilient lip means, said latch means being in engagement with said lip means between said surface and said lip means, said projection means being engageable with said engaging section and said latch means being engageable with said lip means thereby maintaining said electrical contact in position within said opening, said resilient lip means in resilient and snug engagement with said body section permitting freedom of movement of said electrical contact in said opening so as to align with a complementary electrical contact during interengagement therebetween.

3. In an electrical connector; a dielectric housing having an opening extending therethrough, said opening having an engaging section being provided with resilient lip means spaced inwardly from a surface of said opening and extending longitudinally of said surface; an electrical contact having a body section provided with positioning means and latch means, said body section being disposed in said engaging section; said positioning means and said latch means in association with said engaging section positioning said body section within said opening and said engaging section; said latch means having an end disposed between said lip means and said surface; said lip means providing for limited freedom of movement of said electrical contact in said opening so as to effect alignment with a complementary electrical contact during interengagement therebetween.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

3,078,439	2/1963	McKee et al. ....	330—59
3,165,369	1/1965	Maston .....	339—59
3,172,721	3/1965	Kelly .....	339—217
3,178,673	4/1965	Krehbiel .....	339—217
3,178,674	4/1965	Scheller .....	339—217

MARVIN A. CHAMPION, *Primary Examiner*.

ALFRED S. TRASK, *Examiner*.

J. H. MCGLYNN, *Assistant Examiner*.