United States Patent

[11] 3,622,950

[72] Inventor **Heinz A. Millinger**
Wiesbaden, Germany

[21] Appl. No. **833,400**
[22] Filed **June 16, 1969**
[45] Patented **Nov. 23, 1971**

[73] Assignee **AMP Incorporated**
Harrisburgh, Pa.

[32] Priority **June 26, 1968**
[33] **Germany**
[31] **P 17 65 657.4**

[54] **ELECTRICAL CONNECTOR ASSEMBLIES**
4 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **339/174,**
339/17 CF, 339/75 M, 339/258 R
[51] **Int. Cl.** **H01r 13/54,**
H01r 11/22
[50] **Field of Search** ..... 339/17 CF,
17 C, 59, 61, 62, 74, 75 M, 75 MP, 176 MP, 176
MF, 221, 256 S, 258 P, 192, 174, 17 L, 17 LC, 17
LM; 317/101 A, 101 C, 101 CC

[56] **References Cited**

UNITED STATES PATENTS

2,760,176	8/1956	Del Camp	339/192 T
2,966,651	12/1960	Von Holtz	339/14
3,022,481	2/1962	Stepoway	339/75
3,391,383	7/1968	Antes	339/174
3,409,861	11/1968	Barnes et al.	339/174
3,418,535	12/1968	Martinell	317/101
3,467,944	9/1969	Hammell et al.	339/125

OTHER REFERENCES

Henschen, H. E. Design of Connectors For Electronic Packaging, EDN Electronic Packaging, Oct., 1964, pp. 84–85, Copy in 339–17(c).

Primary Examiner—Marvin A. Champion
Assistant Examiner—Lawrence J. Staab
Attorneys—Curtis, Morris and Safford, Keating, William J., William Hintze, Frederick W. Raring, John R. Hopkins, Adrian J. La Rue and Jay L. Seitchik

ABSTRACT: The invention concerns an electrical connector assembly comprising a housing of flexible insulating material and having a number of transverse passageways, each of which retains a connector element by complementary engagement of shoulders formed in the passageway walls and the element. Each element is stamped from sheet metal and has a contact element, e.g., a terminal post, to which connections can be made, and a socket formed by wall portions one of which is held fixed and the other of which is movable in the passaGeway. The socket receives a lead from a modulat pack, and the lead may be retained in the socket by wedging a nonconductive rod member in a recess between the contact element and the movable wall portion. The assembly is easy to make, compact, versatile and resistant to vibration.

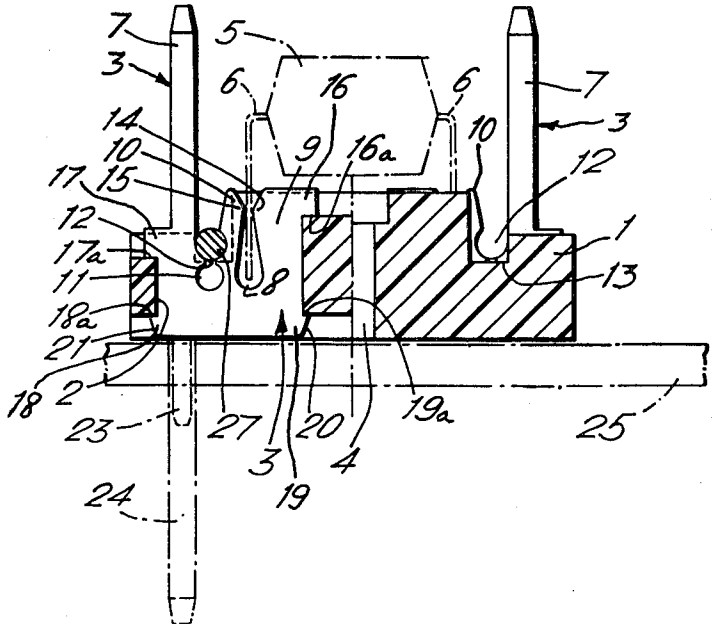


Fig. 1.

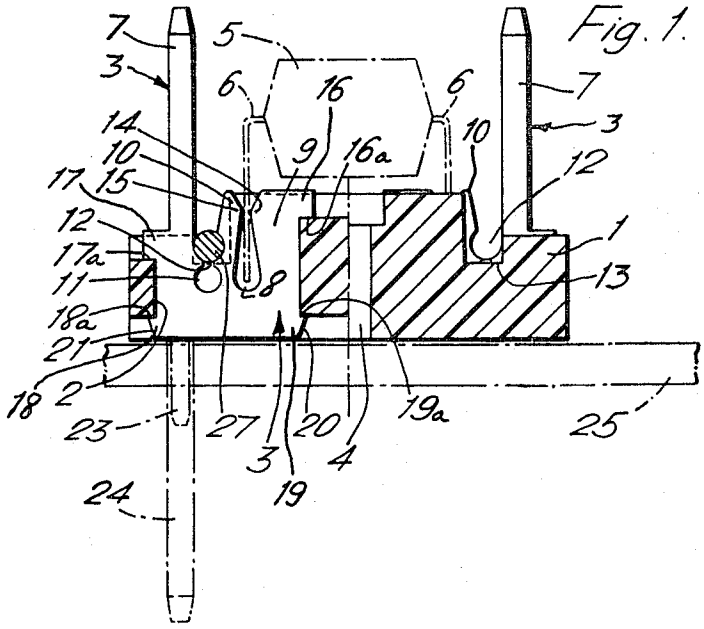
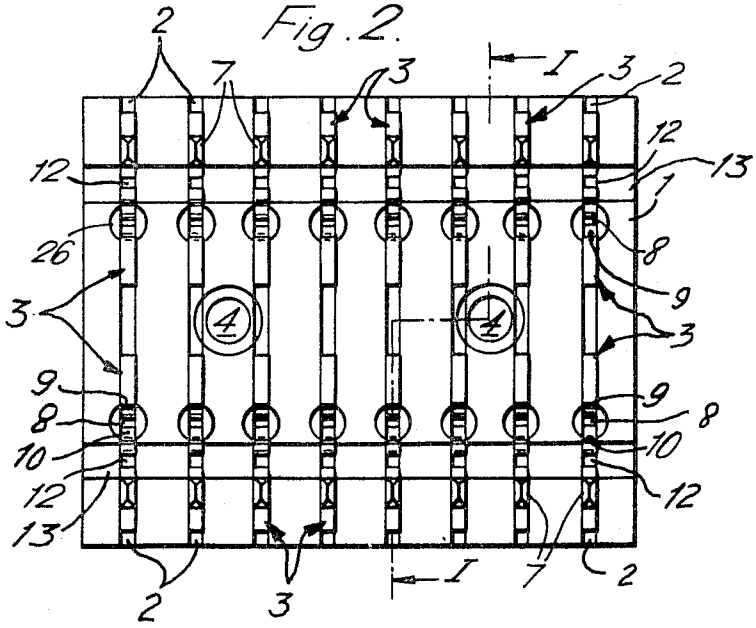


Fig. 2.



INVENTOR
HEINZ A. MILLINGER
BY Adrian J. Lafave

ELECTRICAL CONNECTOR ASSEMBLIES

The invention relates to an electrical connector assembly.

An electrical connector assembly, according to the invention, comprises a housing of insulating material formed with a plurality of passageways extending along one surface of the housing, each passageway being adapted to receive and retain a connector element stamped from sheet metal, each connector element comprising a contact member extending outwardly of the housing and a socket member defined by a pair of wall portions one of which is held in the passageway and another of which is movable relative to the first, within the passageway, the socket member being arranged to receive a lead of a modular pack between the wall portions.

An object of the invention is to provide an electrical connector assembly having connector elements for removably receiving leads of an electrical component therein.

Another object is the provision of an electrical connector assembly wherein leads of an electrical component are permanently connected to connector elements in a dielectric housing.

A further object is to provide an electrical connector assembly having electrical connector elements provided with sockets for receiving leads of an electrical component and slots for receiving wedging means to move sections of the sockets to permanently secure the leads in the sockets.

An additional object is the provision of an electrical connector assembly having electrical connector elements provided with sockets for receiving leads of an electrical component and terminal posts provided by the connector elements which extend outwardly from a top surface of a dielectric housing carrying the connector elements, the posts extending in the same direction in which the insertion axes of the sockets extend.

Still a further object is to provide an electrical connector assembly having electrical connector elements provided with sockets for receiving leads of an electrical component and terminal posts provided by the connector elements which extend outwardly from a top and bottom surface of a dielectric housing carrying the connector elements, the posts extending parallel to axes of the sockets.

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 in order that others skilled in the art may fully understand the invention and the 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.

The invention will now be described, by way of example, with reference to the accompanying partly diagrammatic drawings, in which:

FIG. 1 is a cross-sectional view taken on the line 1—1 of FIG. 2 through a connector assembly; and

FIG. 2 is a plan view of the connector assembly.

The assembly includes a housing 1, molded from resiliently flexible insulating material and formed with passageways 2, arranged in parallel rows transversely of the housing, each passageway being adapted to receive a connector element generally indicated at 3. Two fixing holes 4 are formed through the housing between the top and the bottom, each being adapted to receive a screw or bolt to hold the housing to a support 25, for example, a panel or printed circuit board, shown in broken outline in FIG. 1.

An electrical flat modular pack 5, shown in broken outline in FIG. 1, is disposed above the housing 1 and leads 6 extend normally of the modular pack 5 from opposite sides and then downwardly towards the housing. Each connector element 3 is arranged to receive a lead 6, as explained below. The flat modular pack 5 may be an integrated circuit unit or an individual circuit component, for example, a condenser or resistor.

Each contact element 3 is stamped from sheet metal preferably phosphor bronze, and comprises a lamina of generally rectangular form and from one of the longer sides of which, the upper as seen in FIG. 1, extends a contact member 7, comprising a terminal post. The member 7 may instead be a tab receptacle or a socket. A socket 8 is notched inwardly of the lamina from the same, upper, side. The socket is narrower at its mouth than at its bottom and is formed with wall portions 9, 10 which are formed with facing projections 14, 15 respectively, defining a constriction in the socket 8 to receive a lead 6 from the module 5 in a tight fit. A wedge-receiving slot is stamped between the contact member 7 and the socket 8; the slot is shaped in a generally figure-8 manner as shown with an outer section 12 to receive a wedging member 27 and an inner section 11 cut in the body of the contact element 3. The inner section 11 extends inwardly of the contact element 3 to about the same depth as the socket 8 so that the portion of the wall 10 between then is narrowed, as shown. Outer sections 12 are in alignment along each side of housing 2 via channels 13 which receive wedging members 27. Shoulders 16, 19, 17 and 18 are formed in the shorter sides of the contact element 3 to engage respectively with complementary shoulders 16*a*, 19*a*, 17*a*, and 18*a* extending from the passageway walls into the passageways 2. The longer side of the contact element 3 remote from socket 8, the lower as seen in FIG. 1, is formed at its ends with tapered portions 20, 21 to facilitate snap-in engagement of the contact element 3 in a passageway 2. The contact element 3 may be formed integrally with a further contact member intermediate the tapered portions 20 and 21, for example, a short post 23 or a long post 24, both shown in broken outline in FIG. 1.

The upper surface of the housing 1 is formed with funnel depressions 26, FIG. 2, in alignment with the sockets 8 of the contact elements 3.

In making an electrical contact assembly according to the invention, a contact element 3 is force fitted into each passageway 2, the longer side between the tapered portions 20, 21 leading, the resilient flexure of the passageway walls allowing the contact element 3 to bottom in the passageway 2 and the shoulders 16, 17, 18 and 19 of the contact element to engage with the complementary shoulders 16*a*. 17*a*, 18*a* and 19*a* of the passageway walls. The lead 6 of a module 5 are bent normal to the module and the free end of each lead 6 is passed into a funnel 26 of the housing 1 and then pressed downwardly into the associated socket 8 to make electrical contact with contact zones 14, 15. Electrical connections may then be made to the contact element 7, and to element 23 or 24 if present, by using electrically conductive clips to secure leads to the elements, wrapping the leads around the elements or using solder. The module 5 may be removed by withdrawing the leads 6 out of the sockets 8, but the connection can be made permanent by wedging a strip 27 of nonconductive semiresilient material, for example, a monofilament polyamid string, into the slot 12 and in channel 13 to bias wall portion 10 towards the wall portion 9 which is held firm by engagement of the shoulders 16 and 19 with complementary shoulders of the passageway walls. The housing can be secured to a panel 25 by screws passed through fixing holes 4.

A connector assembly according to the invention is advantageous because the housing and the contact element are each made by a single operation and because the assembly is compact, versatile and resistant to vibration.

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.

The invention is claimed in accordance with the following:

1. An electrical connector element comprising a lamina of generally rectangular configuration, a terminal post extending outwardly from one of the longer sides of said lamina and being in the same plane of said lamina, a socket provided in one of the longer sides of said lamina and being defined as a movable wall portion and a stationary wall portion thereby

providing a notch extending inwardly from the one of the longer sides of the lamina, and means provided in said lamina adjacent said movable wall portion to cause said movable wall portion to be moved toward said stationary wall portion.

2. An electrical connector element according to claim 1 wherein said terminal post extends outwardly from the same side of said lamina in which said socket is disposed.

3. An electrical connector element according to claim 1 wherein said means to cause said movable wall portion to be moved toward said stationary wall portion comprises a slot having a generally figure- 8 configuration so that a wedging member can be received therein.

4. An electrical connector assembly for receiving the leads of a modular pack or the like, said assembly comprising a housing of insulating material and formed with a plurality of relatively narrow passageways extending from one surface of the housing, at least some of said passageways containing connector elements therein, each said connector element being formed from sheet metal and being relatively thin, planar configuration, shoulder means disposed on each said connector element and complementary shoulder means at said passageways for holding the connector elements in their respective passageways, a contact member extending from each said connector element outwardly of said housing, and a socket cut inwardly from an edge of each connector element, the sidewalls of the socket defining a pair of wall portions, one said wall portion being retained stationary in the passageway and the other said wall portion being movable relative to the stationary wall portion, a slot provided in the connector element on the side of the movable wall portion remote from the stationary wall portion and adapted to receive a wedging member to bias the movable wall portion towards the stationary wall portion, the slots of a row of connector elements being aligned in a housing channel to receive the wedging member common to the row of connector elements, whereby a lead of a modular pack is receivable between said socket wall portions and electrically connected thereto, the lead being retained in position due to pressure exerted by said movable wall portion on said stationary wall portion.

* * * * *