Oct. 17, 1967 D. R. COLDREN ET AL 3,348,189

ELECTRICAL CONNECTOR

Filed Nov. 24, 1965

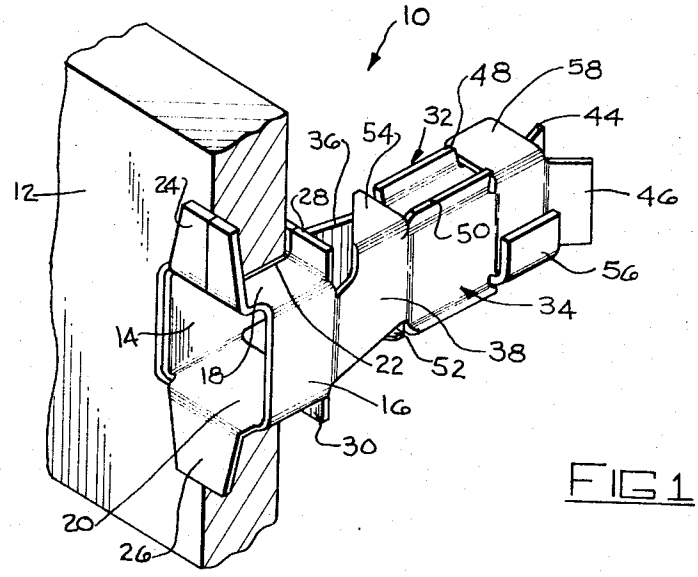


FIG 1

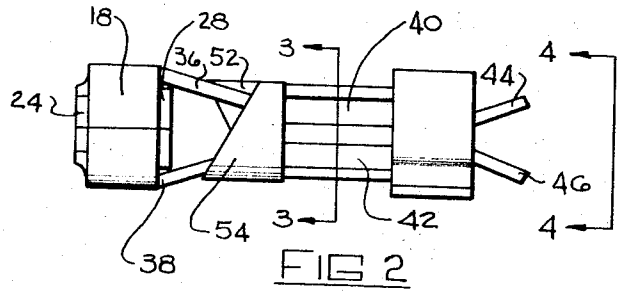


FIG 2

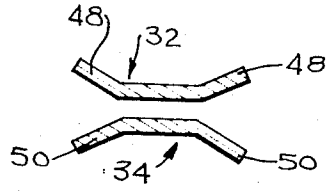


FIG 3

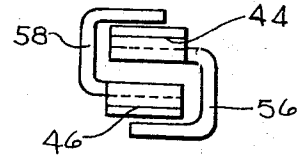


FIG 4

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ELECTRICAL CONNECTOR

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9 Claims. (Cl. 339—32)

This invention relates to the art of electrical connectors and more particularly to a new and novel female contact which may be positioned on a panel or printed circuit board or the like.

In the electrical industry today there are numerous applications which utilize modular components wherein numerous panels or printed circuit boards or the like are employed. These boards or panels are frequently quite small in size and a great number of such boards may be employed in a single system. The need has therefore arisen for an electrical contact which may be used in conjunction with such boards or panels for connecting such panel to some other component in the electrical system. Such a contact must be relatively inexpensive because of the great number of contacts which would be necessary in such a system.

An object of this invention is to provide a female contact which is easily connected to a printed circuit board or panel for electrically connecting such board or panel to another electrical circuit member.

Another object of the present invention is to provide a female contact which is relatively inexpensive to produce.

A further object is to provide a female contact which will receive a male tab from any of four different directions.

Another object of the present invention is to provide a contact having means to prevent the over stressing of the tab receiving portion of the contact.

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 purpose 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.

In the drawings, in which like reference numerals refer to like parts:

FIGURE 1 is a perspective view showing a contact embodying the teachings of the present invention, said contact being mounted on a panel or printed circuit board or the like;

FIGURE 2 is a top plan view of the contact shown in FIGURE 1;

FIGURE 3 is a cross-sectional view taken along the line 3—3 of FIGURE 2; and

FIGURE 4 is a partial end view as seen in the direction of the arrows 4—4 of FIGURE 2.

The contact of the present invention, indicated generally at **10**, is shown in FIGURE 1 mounted perpendicularly to a printed circuit board or panel **12**. The contact is formed from a sheet metal blank and comprises a generally rectangular strap portion having side walls **14**, **16**, **18** and **20**, the side wall **18** being split as indicated at **22**. A pair of tines **24** and **26** extend from side walls **18** and **20** respectively and are bent at substantially right angles to said side walls so that the said tines lie flush against the rearward face of panel **12**. Projecting from the opposite sides of walls **18** and **20** are flanges **28** and **30** respectively, the said flanges being bent to lie flush against the forward face of panel **12** to thus securely position the contact. The tine **24** and flange **28** are split similarly to side **18**. By locating the contact within a rectangular aperture in panel **12**, the split side of the contact is prevented from opening.

A pair of spring members **32** and **34** project from side walls **14** and **16** respectively, the said spring members defining a longitudinal passageway through the contact which is open from end to end to receive a male tab from either end. The springs **32** and **34** have converging portions **36** and **38** respectively and intermediate parallel portions **40** and **42** respectively. At the free end of the spring members **32** and **34** there are diverging portions **44** and **46** respectively. By flaring outwardly the free ends of the springs there is provided a guideway which will receive a male tab and guide the male tab into the longitudinal passageway between the springs **32** and **34**.

The intermediate parallel portions **40** and **42** of the springs are provided with wings **48** and **50** respectively, the said wings being flared outwardly to provide an entrance way for a male tab at right angles to the main longitudinal passageway of the contact. The wings **48** and **50** are bordered on one side by a pair of tabs **52** and **54** extending from portions **36** and **38** respectively, the said tabs partially defining a side wall of the longitudinal passageway of the contact and defining an end wall of the transverse passageway.

At the opposite end of wings **48** and **50** a pair of ears **56** and **58** project from spring members **32** and **34** respectively. As best seen in FIGURE 4 the ears **56** and **58** are of generally U-shaped configuration, the base of the U further defining a side wall of the longitudinal passageway of the contact and the outer leg of the U constituting a portion which overlies the opposite spring member to which the ear is attached. When a male tab is inserted into either the longitudinal or transverse passageway of the contact the spring members **32** and **34** will be forced outwardly. It is necessary that these spring members only be moved within their elastic limit so as to insure that the springs move back to their unstressed condition after removal of the tabs. The ears **56** and **58** perform this function in that the spring members cannot move outwardly beyond the point where they would contact the ears.

In the use of the contact a rectangular opening would be formed in a panel or printed circuit board and the contact would be inserted therein. The tines **24** and **26** and the flanges **28** and **30** would be bent into a position where they would lie flush with the opposite faces of the board or panel. In the case of a printed circuit board, the tines **24** and **26** would engage a conductor lying along the face of the board and the tines would be soldered or otherwise electrically bonded to the conductor. With the contact so positioned, the board or panel **12** may then be connected to another electrical circuit member by inserting a male tab connected to such other member through any of the four openings in the female contact **10**. In this way boards or panels can be either stacked in parallel relationship or they may be joined at right angles to each other.

It can be seen that the contact of the present invention is extremely versatile in allowing modular components to be connected in a number of various configurations. By forming the contact out of a single blank the contact is relatively inexpensive to produce and yet is sturdy and rigid in construction.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the

scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

We claim:

1. A female contact having a longitudinal passageway extending completely therethrough for the reception of a male tab member, said contact comprising a generally rectangular strap portion, an elongated spring member extending from each of opposite sides of said strap portion and defining opposite side walls of said longitudinal passageway, said spring members converging inwardly from said strap portions and diverging outwardly at their free ends, said spring members having a portion lying between said convering and diverging ends which lies substantially parallel to the longitudinal extent of said passageway, a pair of wings extending from the central portion of each of said spring members and substantially perpendicularly to the longitudinal extent thereof, said wings being flared outwardly to permit insertion of a male tab through said spring members and at substantially right angles to said longitudinal passageway, an ear extending from each of said spring members substantially perpendicularly to the longitudinal extent thereof, each said ear having a first portion defining a wall of said longitudinal passage and a second portion overlying the opposite spring member to which said ear is attached to thereby limit the outward movement of said spring member due to insertion of a male tab member, and means extending from said contact for securing said contact to an electrical conductor.

2. A female contact as set forth in claim 1 wherein said last named means comprises tines extending from opposite sides of said strap portion and engageable by electrical conductors on a board member, and additional means extending from said strap member for engaging the opposite wall of said board member from said tines to thereby firmly secure said contact to said board member.

3. A female contact having a longitudinal passageway extending completely therethrough for the reception of a male tab member, said contact comprising a generally rectangular strap portion, a pair of elongated spring members extending from opposite sides of said strap portion and defining opposite walls of said longitudinal passageway, said spring members having a first portion extending inwardly at an angle to said passageway and a second portion extending substantially parallel to said passageway, a pair of flared wing members extending from said second portion of said spring members to permit insertion of a male tab through said wing members and spring members at substantially right angles to said longitudinal passageway, an ear extending from each of said spring members and substantially perpendicularly thereto, each said ear having a first portion defining a wall of said longitudinal passage and a second portion overlying the opposite spring member to which said ear is attached to thereby limit the outward movement of said spring member, and means extending from said contact for securing said contact to an electrical conductor.

4. A female contact as set forth in claim 3 wherein said last named means comprises tines extending from opposite side of said strap portion.

5. A female contact as set forth in claim 3 wherein said ears are disposed adjacent one end of said wing members, and a tab extending from each of said spring members and disposed at the other end of said wind members to thereby define a rectangular opening through which said male tab may be inserted.

6. A female contact as set forth in claim 1 wherein said ears are disposed adjacent one end of said wing members, and a tabe extending from each of said spring members adjacent the other end of said wing members to thereby define a rectangular opening through which said male tabs may be inserted.

7. A female contact comprising a generally rectangular strap portion, means extending from said strap portion for securing said contact to an electrical conductor, a pair of elongated spring members extending from opposite sides of said strap member, said spring members defining a longitudinal passageway extending entirely therethrough, a flared portion at each end of said spring members whereby a male tab may be inserted into said longitudinal passageway from either end thereof, said spring members further having outwardly flared portions extending from an intermediate section of said spring members to thereby define a second passageway extending substantially at right angles to said longitudinal passageway whereby a male tab may be inserted into said second passageway from either end thereof.

8. A female contact as set forth in claim 7 further comprising means extending from each of said spring members and overlying the other of said spring members to limit the outward movement thereof.

9. A female contact as set forth in claim 7 wherein said securing means comprises a pair of tines extending from opposite sides of said strap portion, said tines serving to secure said contact to an electrical circuit member and to make electrical connection therewith.

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