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LELAND C. HOY ETAL

3,181,108

ELECTRICAL CONNECTORS

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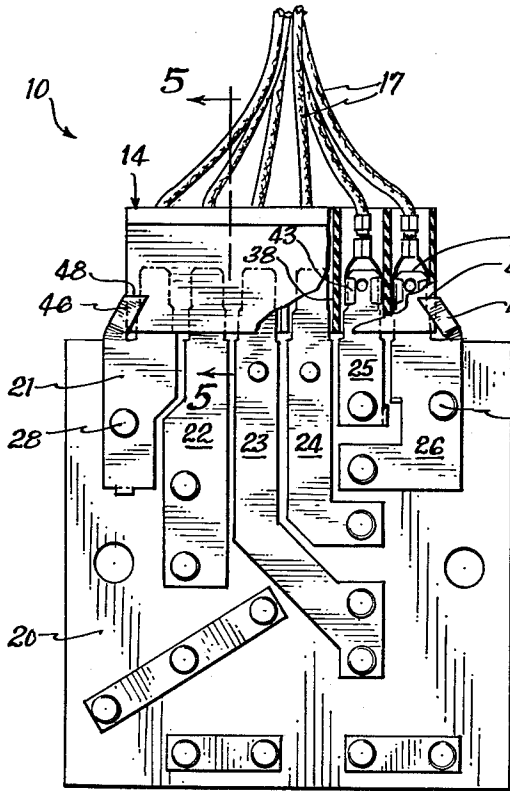


FIG. 1

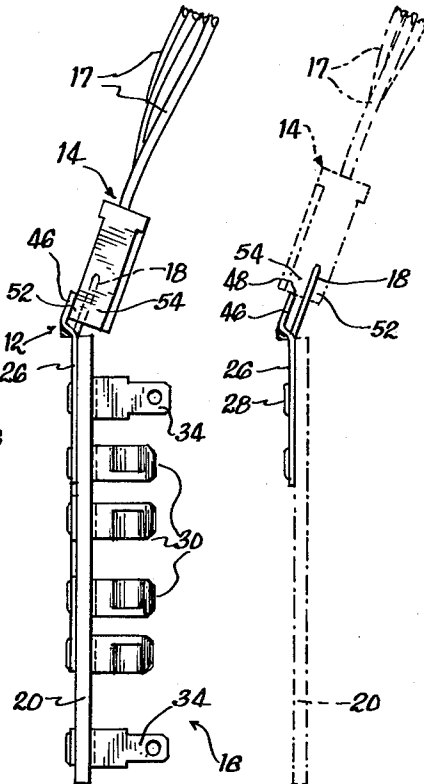


FIG. 2 FIG. 3

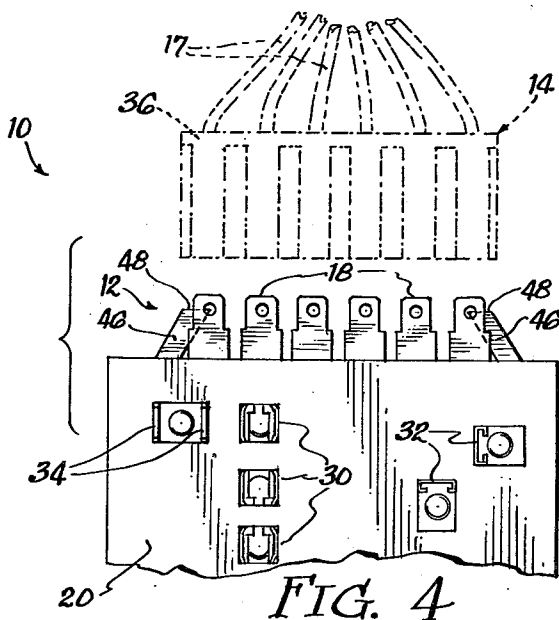


FIG. 4

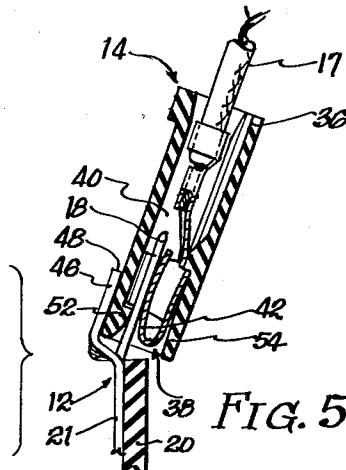


FIG. 5

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**ELECTRICAL CONNECTORS**

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 6 Claims. (Cl. 339-184)

This invention relates to electrical connectors for providing disengageable electrical connections, as, for example, between a plurality of electrical wires and a terminal block or the like.

One object of the present invention is to provide a pair of interengageable electrical connectors which are arranged in a new and improved manner so as to prevent the connectors from being engaged in a position which is backwards or reverse from the correct position of engagement.

A further object is to provide new and improved connectors of the foregoing character, in which reverse engagement of the connectors is prevented by a construction which is extremely economical and easy to manufacture.

Another object is to provide a new and improved connector construction in which reverse engagement of the connectors is prevented by a finger or flange formed integrally with one or more of the prongs on one of the connectors, such finger or flange being engageable with the body of the other connector.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

FIG. 1 is a rear elevational view of a connector construction to be described as an illustrative embodiment of the present invention.

FIG. 2 is a side elevational view showing the plug and receptacle members of the connector fully engaged in their normal positions.

FIG. 3 is a fragmentary view similar to FIG. 2 but showing the manner in which the receptacle member of the connector is blocked against being engaged with the plug member in a reverse position.

FIG. 4 is a fragmentary front elevational view showing the receptacle member of the connector detached from the plug member.

FIG. 5 is an enlarged fragmentary sectional view taken generally along the line 5-5 in FIG. 1.

It will be seen that the drawings illustrate a connector 10 comprising a plug member 12 which is detachably engageable with a receptacle member or socket 14. In this case, the plug member 12 is formed as part of a fuse and terminal block 16. A plurality of electrical wires 17 are connected to the receptacle 14. The purpose of the connector 10 is to establish detachable electrical connections between the wires 17 and the fuse block 16.

The plug member 12 comprises a plurality of prongs 18 which are mounted on an insulating plate or body 20. In this case, all of the prongs 18 are alike and are mounted at equal intervals along one end of the insulating plate 20. The illustrated prongs 18 are in the form of flat bars which are substantially rectangular in cross section.

In this case, the prongs 18 are formed integrally with a series of conductor bars 21-26 which are suitably secured to the rear side of the insulating plate 20, as by means of rivets 28. A plurality of fuse clips 30, connector clips 32 and connector prongs 34 are mounted on the front side of the insulating plate 20 and are connected to the conductor bars 21-26 by means of the rivets 28. The exact arrangement of the clips 30 and connector elements 32 and 34 is not of importance to the present invention. It will suffice to understand that the purpose of the connector 10 is to provide disengageable electrical connections

between the wires 17 and the various elements 30-34 mounted on the insulating plate 20.

The illustrated receptacle or socket member 14 comprises a body 36 made of plastic or other insulating material. The body 36 is formed with a plurality of aligned slots 38 for receiving the prongs 18 of the plug 12. The slots 38 communicate with openings 40 in the body 36. It will be seen that clips 42 or other suitable elements are mounted in the openings 40 for engaging and establishing electrical contact with the prongs 18. Each of the wires 17 is connected to one of the clips 42. The exact construction of the clips 42 is not of importance to the present invention. For convenience, the prongs 18 are bent at or near the edge of the insulating plate 20 so as to extend at a small angle to the conductor bars 21-26.

In accordance with the present invention, the receptacle member 14 is prevented from being mounted in a reverse position on the prongs 18 by means of a flange or finger 46 formed on one or more of the connector prongs 18. In this case, there are two such flanges or fingers 46, formed integrally with the conductor bars 21 and 25 which support the two endmost connector prongs 18. It will be seen that the flanges 46 are offset from the prongs 18 but extend parallel thereto, as viewed in FIGS. 2, 3 and 5. Each flange or prong 46 is bent or twisted edgewise so as to be engageable with the body 36 of the receptacle 14. As shown in FIG. 1, the flanges 46 partially overlap the connector prongs 18. Each of the illustrated flanges 46 is cut off at an angle to form an outer edge 48 which is at right angles to the direction in which the receptacle 14 is moved when it is engaged with the prongs 18.

It will be seen that the slots 38 in the body 36 of the receptacle 14 are formed off center in the end face 50 of the body 36. Thus, the body 36 has a relatively thin portion 52 on one side of the row of slots 38, and a relatively thick portion 54 on the other side of the row of slots. The thin portion 52 is small enough to pass between the connector prongs 18 and the flanges 46, so that the receptacle 14 may readily be mounted in its normal position on the prongs 18. However, the thicker portion 54 is too thick to pass between the prongs 18 and the flanges 46. This will be clearly evident from FIG. 3, which shows the manner in which the prongs 46 engage the thicker body portion 54 of the receptacle 14 so as to prevent the receptacle from being mounted backwards on the prongs 18.

The construction and operation of the illustrated connector 10 may be summarized by noting that the receptacle member 14 is adapted to receive the flat prongs 18 of the plug member 12. The evenly spaced prongs 18 fit into the slots 38 in the receptacle 14 and are engaged by the clips or contact members 42 mounted within the body 36 of the receptacle. The blocking fingers or flanges 46 on the endmost prongs 18 prevent the receptacle 14 from being mounted backwards on the plug member 12. The thin portion 52 of the receptacle body 36 is small enough to pass between the prongs 18 and the blocking fingers 46 so that the receptacle 14 may readily be mounted in its normal position on the prongs 18. However, the thicker portion 54 of the receptacle body 36 is too thick to pass between the prongs 18 and the blocking fingers 46.

It will be understood that it is easy and very economical to form the blocking flanges 46 as integral members of the conductor bars 21 and 26 on which the corresponding connector prongs 18 are also formed. Thus, the flanges or fingers 48 afford very efficient and economical means for blocking the receptacle 14 against reverse mounting on the plug prongs 18.

Various other modifications, alternative constructions and equivalents may be employed without departing from

the true spirit and scope of the invention, as exemplified in the foregoing description and defined in the following claims.

We claim:

1. In an electrical connector,
  - a combination comprising an insulating plate having a plurality of conductor bars mounted thereon,
  - a plurality of parallel aligned connector prongs formed integrally with said bars and disposed at equally spaced intervals along one edge of said insulating plate,
  - a receptacle having a body formed with a plurality of aligned equally spaced slots for receiving said connector prongs,
  - a plurality of contact elements mounted in said body and engageable with said prongs for establishing electrical connections thereto,
  - said prongs and said slots being arranged in a linear row,
  - and blocking flanges formed integrally with the two endmost connector prongs,
  - said flanges being generally parallel to said prongs but offset laterally from the row of prongs,
  - said row of slots being positioned off-center of said body,
  - said body thereby having a thinner portion and a thicker portion on opposite sides of said row of slots,
  - said thinner portion being thin enough to move between said row of prongs and said flanges,
  - said thicker portion being too thick to move between said row of prongs and said flanges and thereby being blocked by said flanges if an attempt is made to connect said receptacle to said prongs in a reverse position.
2. In an electrical connector,
  - the combination comprising an insulating member,
  - a plurality of flat connector prongs mounted in a row on said member,
  - a receptacle having a body formed with openings for receiving said prongs,
  - contact elements in said body for engaging said prongs,
  - and at least one flat blocking finger formed integrally with one of said prongs and offset laterally from the row of prongs,
  - said body having a portion on one side of said openings and adapted to pass between said prongs and said finger,
  - said body having a projecting portion on the other side of said openings and engageable with said finger to prevent reverse mounting of said receptacle on said prongs.
3. In an electrical connector,
  - the combination comprising a plug including an insulating support,
  - a plurality of flat bar-shaped connector prongs mounted on said support at equal intervals along a linear row,
  - a receptacle having a body formed with a linear row of slots for receiving said prongs,
  - contact elements in said body for engaging said prongs,
  - and flat blocking fingers formed integrally with endmost prongs in said row and offset laterally from said row,
  - said fingers partially overlapping said endmost prongs,
  - said body having thinner and thicker portions on opposite sides of the row of slots,
  - said thinner portion being thin enough to pass between said prongs and said fingers,
  - said thicker portion being too thick to pass between said prongs and said fingers so as to prevent reverse mounting of said receptacle on said plug.
4. In an electrical connector,
  - the combination comprising a plug including an insulating support,
  - a plurality of flat bar-shaped connector prongs mounted on said support at equal intervals along a linear row,
  - a receptacle having a body formed with a linear row of slots for receiving said prongs,
  - contact elements in said body for engaging said prongs,
  - and flat blocking fingers formed integrally with two of said prongs in said row and offset laterally from said row,
  - said fingers partially overlapping the corresponding prongs,
  - said body having thinner and thicker portions on opposite sides of said row of slots,
  - said thinner portion being thin enough to pass between said prongs and said fingers,
  - said thicker portion being too thick to pass between said prongs and said fingers so as to prevent reverse mounting of said receptacle on said plug.
5. In an electrical connector,
  - the combination comprising a plug including an insulating support,
  - a plurality of flat bar-shaped connector prongs mounted on said support at equal intervals along a linear row,
  - a receptacle having a body formed with a linear row of slots for receiving said prongs,
  - contact elements in said body for engaging said prongs,
  - and a flat blocking finger formed integrally with at least one of said prongs in said row and offset laterally from said row,
  - said finger partially overlapping said one prong,
  - said body having thinner and thicker portions on opposite sides of the row of slots,
  - said thinner portion being thin enough to pass between said prongs and said finger,
  - said thicker portion being too thick to pass between said prongs and said finger so as to prevent reverse mounting of said receptacle on said plug.
6. In an electrical connector,
  - the combination comprising a plug including an insulating support,
  - a plurality of flat bar-shaped connector prongs mounted on said support at equal intervals along a linear row,
  - a receptacle having a body formed with a linear row of slots for receiving said prongs,
  - contact elements in said body for engaging said prongs,
  - and a pair of flat blocking fingers formed integrally with two of said prongs in said row and offset laterally from said row,
  - said body having thinner and thicker portions on opposite sides of the row of slots,
  - said thinner portion being thin enough to pass between said prongs and said fingers,
  - said thicker portion being too thick to pass between said prongs and said fingers so as to prevent reverse mounting on said receptacle on said plug.

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70 JOSEPH D. SEERS, *Primary Examiner.*