United States Patent [19]

Ayer

[11] **3,887,259**

[45] **June 3, 1975**

[54] **CONNECTOR RETAINING ADAPTER**

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[22] Filed: **Oct. 17, 1973**

[21] Appl. No.: **407,127**

[52] **U.S. Cl.** ..... **339/119 R**; 339/97 R; 317/122

[51] **Int. Cl.** **H01r 13/46**

[58] **Field of Search** ..... 174/72 A; 317/122; 339/17 M, 97 R, 97 P, 119, 125, 126, 128, 132

[56] **References Cited**

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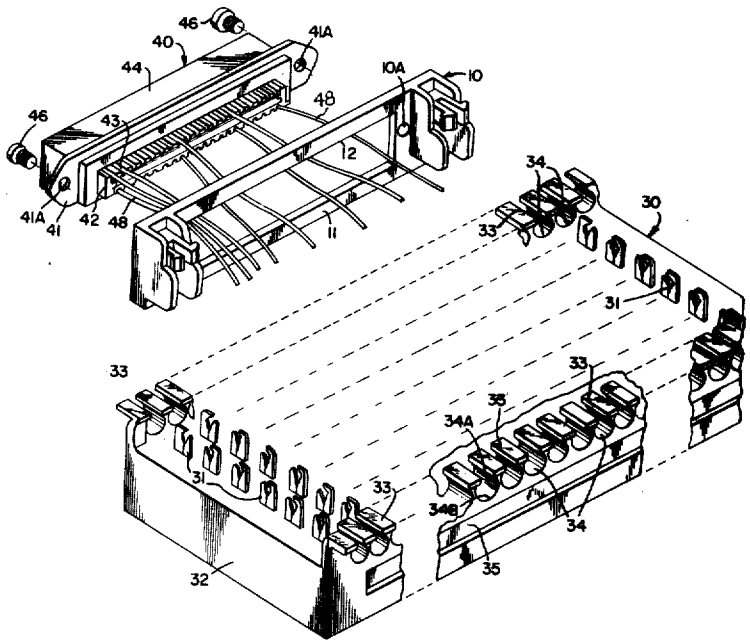
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Attorney, Agent, or Firm—D. A. Bair; F. Arbuckle

[57] **ABSTRACT**

An adapter for mechanically connecting an electrical connector to a terminal block having an apertured conductor-receiving ridge and a related recess; the adapter includes a base for receiving the electrical connector, including an opening for the individual conductors from the electrical connector to pass, a flexible arm on each end of the base shaped to pass through an aperture in the terminal block ridge, and a stabilizing flange on each end of the adapter base with upper and lower portions shaped to abut against the ridge and recess, respectively, of the terminal block.

5 Claims, 6 Drawing Figures



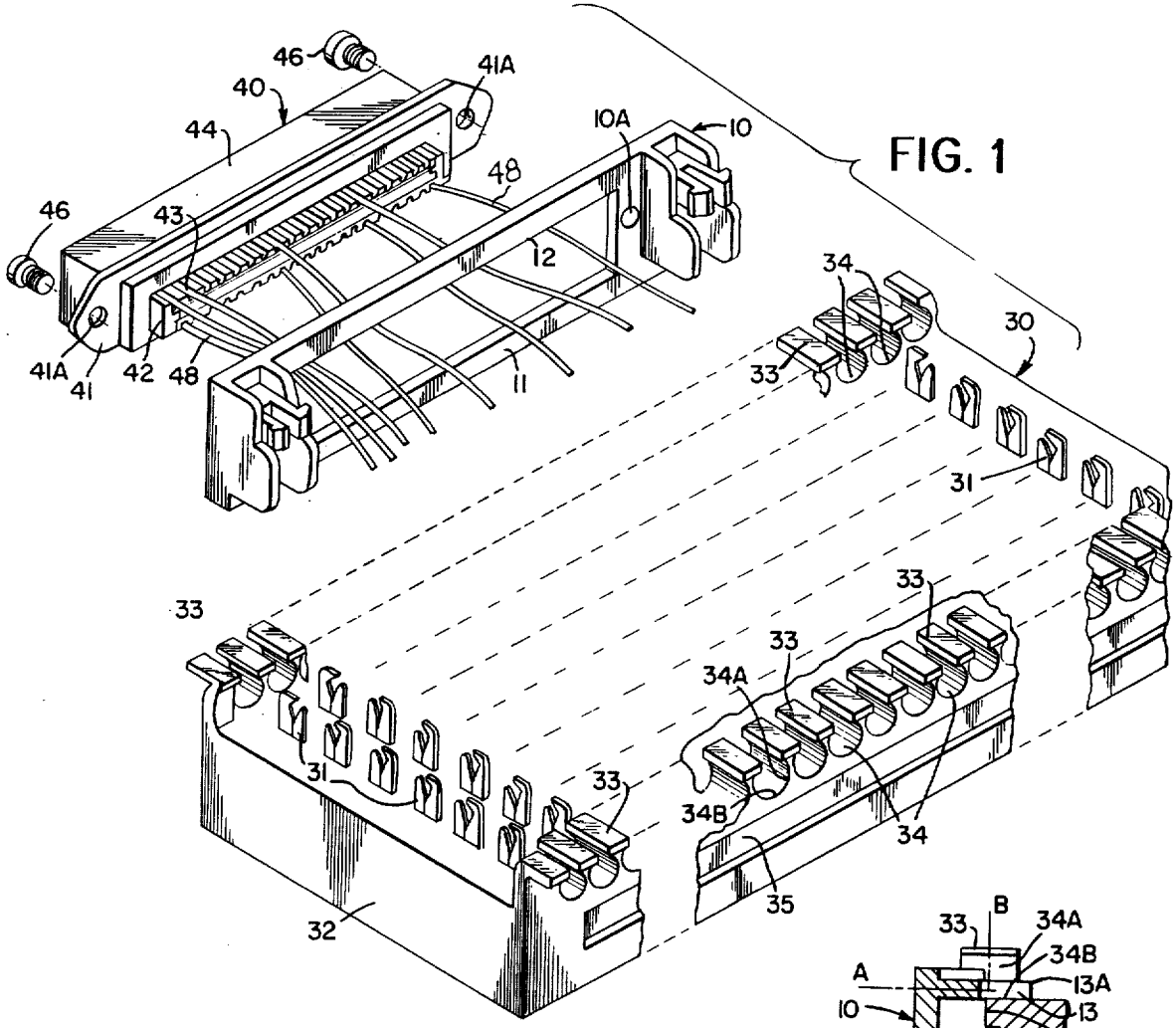


FIG. 1

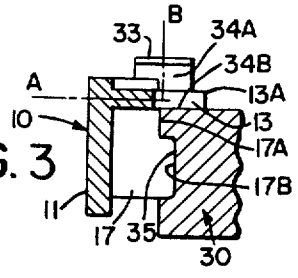
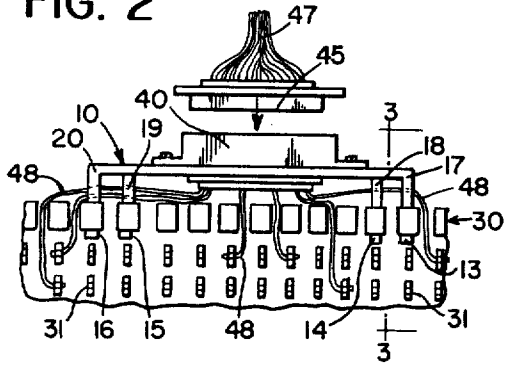


FIG. 3

FIG. 2



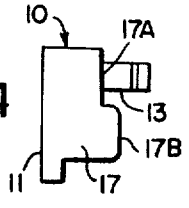


FIG. 4

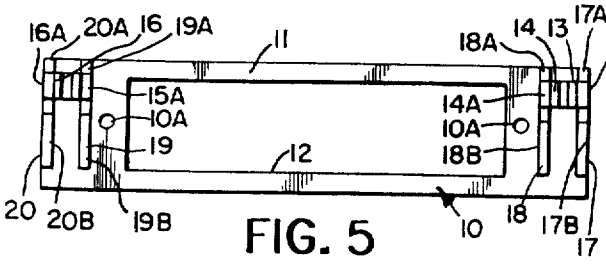


FIG. 5

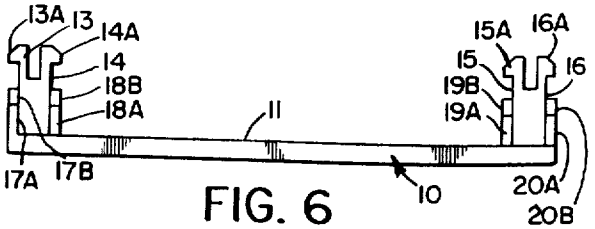


FIG. 6

CONNECTOR RETAINING ADAPTER

BACKGROUND OF THE INVENTION

This invention relates generally to connector retaining adapters and more particularly concerns an adapter suitable to mechanically interconnect a multi-contact electrical connector with a terminal block having a plurality of electrical terminals. The terminal block is of the type having at least one side with a raised ridge, the ridge having a row of apertures for receiving individual electrical conductors and an elongated recess located below the apertures but parallel to the row of ridge apertures.

Examples of such terminal blocks are the Telephone Industries wiring terminal blocks which have a multiplicity of terminals supported in an elongated flat base and capable of connection to a large number of conductors. The terminals are easily connected to insulated conductors by slots in the terminals which pierce the insulation to make an electrical connection. While these terminal blocks have made great strides to ease the wiring of complicated systems, the present invention is designed to further simplify the cross-wiring of such terminal blocks.

SUMMARY OF THE INVENTION

The adapter of the present invention makes it possible to interconnect part or all of two terminal blocks or to connect a terminal block to a multi-conductor cable. An electrical connector can be attached to the connector retaining adapter, which in turn is connected to the terminal block. The various conductors from the multi-contact electrical connector are attached to the terminals of the block. A multi-conductor cable attached to a mating multi-contact electrical connector can be plugged into the connector that is attached to the adapter. This makes it possible for an installer to mate multi-contact connectors to the terminal blocks, eliminating the time-consuming job of hand-wiring each block. Terminal blocks can similarly be connected to each other by providing a female electrical connector on one block and matching male connector on another block, merely plugging the female and male connectors together to interconnect the two terminal blocks. Any number or combination of such block-to-block or block-to-cable connections can be made using the adapters of the present invention.

Accordingly, the invention relates to a connector retaining adapter for mechanically and electrically interconnecting an electrical conductor and a wiring terminal block, the electrical connector having a mounting flange and a rear contact portion connected to a plurality of individual conductors, the terminal block having a foundation supporting a plurality of electrical terminals and at least one side with a raised ridge having a row of apertures normally receiving individual conductors and an elongated recess below the apertures and parallel to said row. The adapter includes a base for receiving the mounting flange of the electrical connector, the base including an opening through which the individual conductors from the rear contact portion of the electrical connector can pass. At least one flexible arm is provided on each end of the adapter base, each arm being shaped to pass through an aperture of the terminal block when flexed and with a latching portion extending laterally from the end of each arm which latching portion abuts against the back portion of the ridge when passed through the aperture. At least one stabilizing flange is provided on each end of the adapter base and in juxtaposition with each of the flexible arms, each stabilizing flange having an upper portion shaped to abut against the raised ridge of the terminal block and a lower portion shaped to abut against the recess of the terminal block. In a preferred embodiment, the adapter includes a pair of flexible arms on each end of the base shaped to pass through one of the apertures of the terminal block when flexed together and a pair of stabilizing flanges on each end of the base and in juxtaposition with each pair of flexible arms, the stabilizing flanges having upper portions shaped to abut against the raised ridge of the terminal block and lower portions shaped to abut against the recess of the terminal block.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of an adapter comprising one embodiment of the present invention, showing the relation of the adapter to an electrical connector and a terminal block;

FIG. 2 is a partially exploded plan view of the adapter attached to an electrical connector and a terminal block, showing the relation with a multi-conductor cable and a matching electrical connector;

FIG. 3 is a sectional view taken approximately along line 3—3 of FIG. 2;

FIG. 4 is a side view of the adapter;

FIG. 5 is a rear view of the adapter of FIG. 4; and

FIG. 6 is a plan view of the adapter of FIG. 4.

DETAILED DESCRIPTION ON THE INVENTION

FIG. 1 shows a connector retaining adapter **10** constructed in accordance with one embodiment of the invention, utilized in conjunction with a wiring terminal block **30** and an electrical connector **40**. The electrical connector **40** has two mounting flanges **41** at opposite ends of the connector. The rear contact portion **42** of connector **40** contains a plurality of individual contact elements **43** which extend through the connector. The front portion **44** of the electrical connector **40** is adapted to connect with another complementary multiple contact connector; the connector **40** can be either a male or a female connector unit as desired to match with the corresponding connector **45** as shown in FIG. **2**.

The electrical connector **40** is conveniently mounted to adapter **10** by means of appropriate screws **46** or equivalent mounting means. When using screws, electrical connector **40** has mounting holes **41A** formed in flanges **41**; the mounting holes **41A** are aligned with corresponding mounting holes **10A** in the base **11** of adapter **10**. A plurality of individual conducting elements **48** are connected to the contacts **43** of electrical connector **40**. The conductors **48** all pass through opening **12** in adapter base **11** and can be individually attached to terminals **31** of block **30** as desired.

Terminal block **30** has a foundation **32** which supports a plurality of electrical terminals **31** and has sides with raised ridges **33**. Each ridge **33** includes a row of apertures **34** through which conducting elements are normally passed to afford access to terminals **31**. Terminal block **30** also includes an elongated recess **35** below each row of apertures **34**, and parallel to the row of apertures **34**.

As best seen in FIGS. **4–6**, adapter **10** includes base **11** with rectangular opening **12** and mounting holes

10A by which an electrical connector 40 can be mounted on the adapter so that individual conducting elements 48 can pass through the opening 12. The rear contact portion 42 of electrical connector 40 preferably passes through opening 12 also. Two flexible arms 13 and 14 are attached at one end of base 11 and a similar set of flexible arms 15 and 16 are attached to the other end of base 11. Each of these flexible arms includes a latching portion 13A, 14A, 15A and 16A, respectively, extending laterally from the end of the arm. Each pair of flexible arms 13–14, and 15–16 are shaped to pass, when flexed, through one of the apertures 34 of terminal block 30. Stabilizing flanges 17 and 18 are attached at one end of base 11 in juxtaposition to the flexible arms 13 and 14, and stabilizing flanges 19 and 20 are attached to the other end of base 11 and in justaposition to the flexible arms 15 and 16.

As best seen in FIG. 2, when the adapter 10 is attached to terminal block 30, the flexible arms 13 and 14 are passed through an aperture 34 in ridge 33 so that the latching portions of the flexible arms snap over the back portion of ridge 33 to lock one end of adapter 10 in place on the terminal block. Similarly, arms 15 and 16 pass through another aperture 34 and snap over the back of ridge 33 to lock the other end of adapter 10 onto the terminal block 30. The stabilizing flanges 17, 18, 19 and 20 have upper portions 17A, 18A, 19A, and 20A, respectively, each shaped to abut against the raised ridge 33 of terminal block 30, and lower portions 17B, 18B, 19B, and 20B each projecting beyond the corresponding upper portion and shaped to abut against the bottom and sides of the recess 35 in terminal block 30.

Note in FIG. 5 that each of the flexible arms 13, 14 15 and 16 has a curved lower surface which matches the lower curved portion of one of the apertures 34, providing abutment of each flexible arm, not only against one of the sides 34A of the aperture, but also against part of the aperture perpendicular to the sides of the aperture, for example part 34B. Thus, the flexible arms and the stabilizing flanges provide a gripping force not only along the central axis A (FIG. 3) of the flexible arms but also along an axis perpendicular to the central axis of the flexible arms, as shown by axis B in FIG. 3. Accordingly, electrical connector 40 is stabilized from forces applied from any direction by the coaction of the flexible arms and the stabilizing flanges. As best seen in FIG. 2, a matching electrical connector 45 attached to a multi-conductor cable 47 can easily be inserted onto or removed from the electrical connector 40 mounted on adapter 10 and wired to terminal block 30. As can be expected, the insertion and removal of electrical connector 45 makes it necessary that the adapter 10 be securely mounted as provided by the present invention.

In a preferred means of connecting individual conductor elements 48 to terminal board 30, the top row of conducting elements is most easily passed through apertures 34 contained between the flexible arms on each end of base 11. The lower row of conductor elements 48 can conveniently be passed through apertures 34 outside of the flexible arms 13–16. Of course, if it is desired, a lower conductor element 48 could be passed through an aperture 34 between the flexible arms 13–16 or an upper conductor element 48 could be attached through an aperture 34 outside of the flexible arms.

What is claimed is:

1. A connector retaining adapter for mechanically joining an electrical connector and a wiring terminal block, said electrical connector having a mounting flange and a rear contact portion connected to a plurality of individual conductors, said terminal block having a foundation supporting a plurality of electrical terminals and at least one side with a raised ridge having a row of apertures therethrough normally receiving individual conductors, and an elongated recess of constant width extending below the apertures and parallel to said row, said adapter comprising:

a base for receiving the mounting flange of the electrical connector, said base including an opening for conductors from the electrical connector;

at least one flexible arm extending from each end of said base in a direction perpendicular thereto, each arm being shaped to pass through an aperture of the terminal block when flexed and with a latching portion extending laterally from the end of each arm, which latching portion abuts against the back portion of the ridge when passed through an aperture; and

at least one stabilizing flange extending from each end of said base in the same direction as said flexible arms and in juxtaposition with each of said flexible arms, each stabilizing flange having

an upper portion of such dimensions from said base that when the latching portion of the juxtaposed flexible arm abuts the back portion of the ridge of said terminal block, said upper portion of the stabilizing flange abuts the opposite side of the ridge, and

a lower portion of such dimension from said base as to project beyond said upper portion and to the bottom of said elongated recess in said terminal block when the latching portion of the juxtaposed flexible arm abuts the back portion of the ridge of said terminal block.

2. An adapter as in claim 1 which includes two pair of flexible arms, one pair on each end of said base, each arm being shaped to pass through one of the apertures of the terminal block when flexed together; and

two pair of stabilizing flanges, one pair on each end of said base and in juxtaposition on each side of a pair of said flexible arms.

3. An adapted connector for mechanical interconnection to a wiring terminal block, said block having a foundation supporting a plurality of electrical terminals and at least one side with a raised ridge having a row of apertures therethrough normally receiving individual conductors and an elongated recess of constant width extending below the apertures and parallel to said row, said adapted connector comprising:

an electrical connector having a mounting flange and a rear contact portion for connection to a plurality of individual conductors;

a base upon which the mounting flange of the electrical connector is mounted, said base including an opening for conductors from the electrical connector;

at least one flexible arm extending from each end of said base in a direction perpendicular thereto, each arm being shaped to pass through an aperture of the terminal block when flexed and with a latching portion extending laterally from the end of each arm, which latching portion abuts against the back

portion of the ridge when passed through an aperture; and

at least one stabilizing flange extending from each end of said base in the same direction as said flexible arms and in juxtaposition with each of said flexible arms, each stabilizing flange having

an upper portion of such dimension from said base that when the latching portion of the juxtaposed flexible arm abuts the back portion of the ridge of said terminal block, said upper portion of the stabilizing flange abuts the opposite side of the ridge, and

a lower portion of such dimension from said base as to project beyond said upper portion and to the bottom of said elongated recess in said terminal block when the latching portion of the juxtaposed flexible arm abuts the back portion of the ridge of said terminal block.

4. An electrical connector adapted terminal block, comprising:

an electrical connector having a mounting flange and a rear contact portion connected to a plurality of individual conductors;

a terminal block having a foundation supporting a plurality of electrical terminals and at least one side with a raised ridge having a row of apertures normally receiving individual conductors and an elongated recess below the apertures and parallel to said row;

a base upon which the mounting flange of the electrical connector is mounted, said base including an opening through which the individual conductors from the rear contact portion of the electrical connector pass, said conductors extending through the apertures in the ridge and electrically connected to the desired terminals of the terminal block;

at least one flexible arm on each end of said base, each arm passing through an aperture of the terminal block with a latching portion extending laterally from the end of each arm which abuts against the back portion of the ridge; and,

at least one stabilizing flange on each end of said base and in juxtaposition with each of said flexible arms, each stabilizing flange having an upper portion abutting against the raised ridge of the terminal block and a lower portion abutting against the recess of the terminal block.

5. An adapted terminal block for mechanical interconnection to an electrical connector, said electrical connector having a mounting flange and a rear contact portion connected to a plurality of individual conductors, comprising:

a terminal block having a foundation supporting a plurality of electrical terminals and at least one side with a raised ridge having a row of apertures normally receiving individual conductors and an elongated recess below the apertures and parallel to said row;

a base for receiving the mounting flange of the electrical connector, said base including an opening through which the individual conductors from the rear contact portion of the electrical connector can pass;

at least one flexible arm on each end of said base, each arm passing through an aperture of the terminal block with a latching portion extending laterally from the end of each arm, which latching portion abuts against the back portion of the ridge; and,

at least one stabilizing flange on each end of said base and in juxtaposition with each of said flexible arms, each stabilizing flange having an upper portion abutting against the raised ridge of the terminal block and a lower portion abutting against the recess of the terminal block.

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