July 3, 1962 B. FOX 3,042,894

ELECTRICAL COUPLING DEVICE FOR MINIATURE TERMINALS

Filed July 17, 1958 2 Sheets-Sheet 1

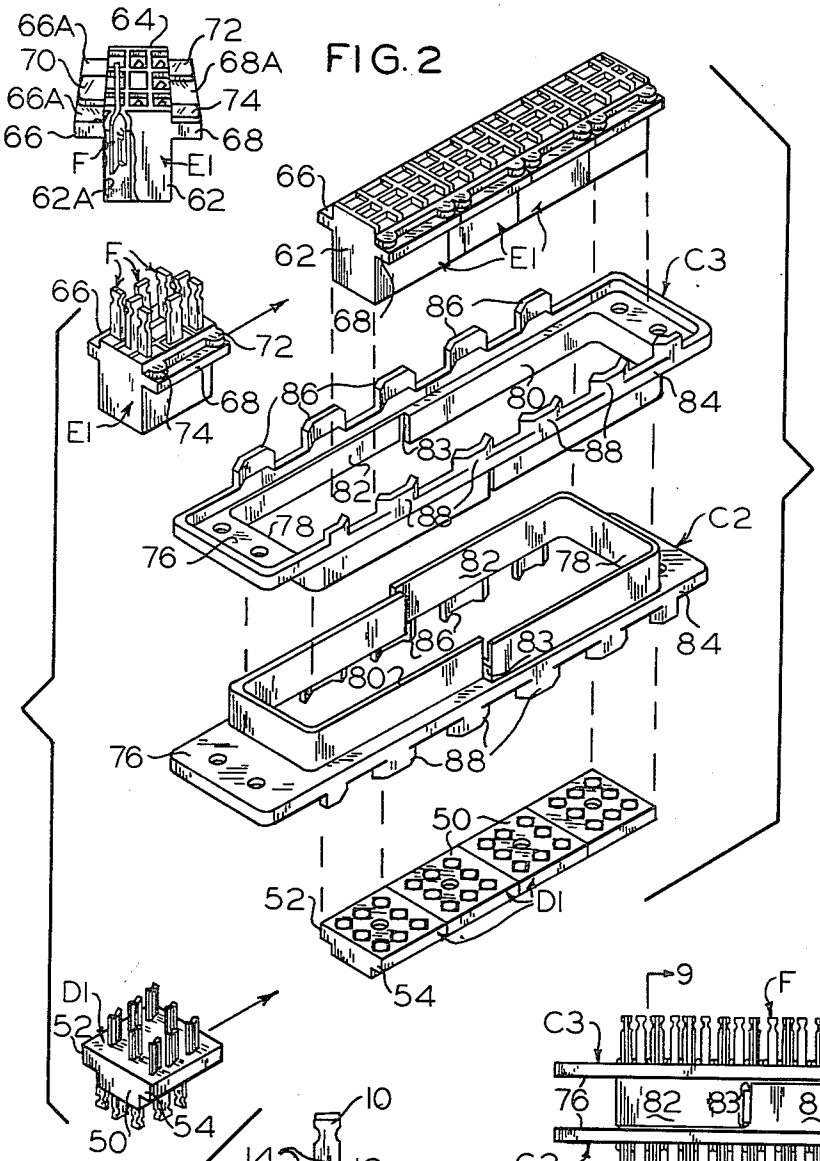

FIG. 2

FIG. 1

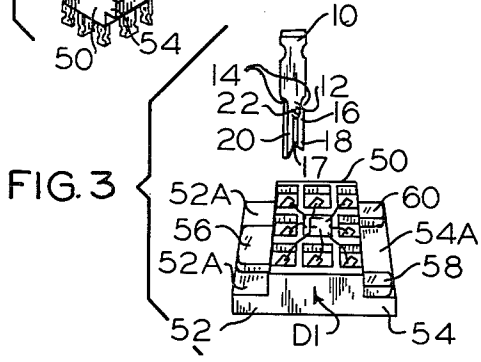

FIG. 3

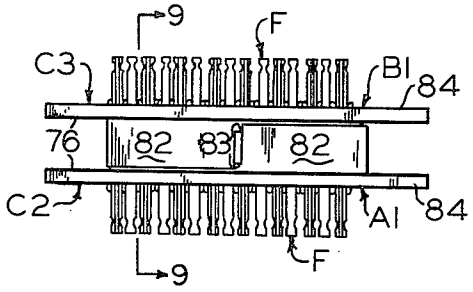

FIG. 4

INVENTOR.
BENJAMIN FOX
BY Harry Saragan
Stanley Bilker
ATTORNEYS

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ELECTRICAL COUPLING DEVICE FOR MINIATURE TERMINALS

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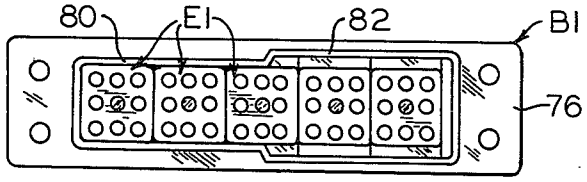

FIG. 5

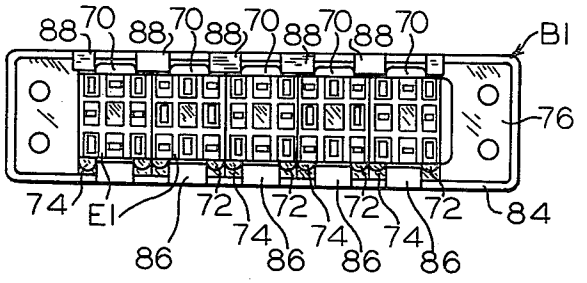

FIG. 6

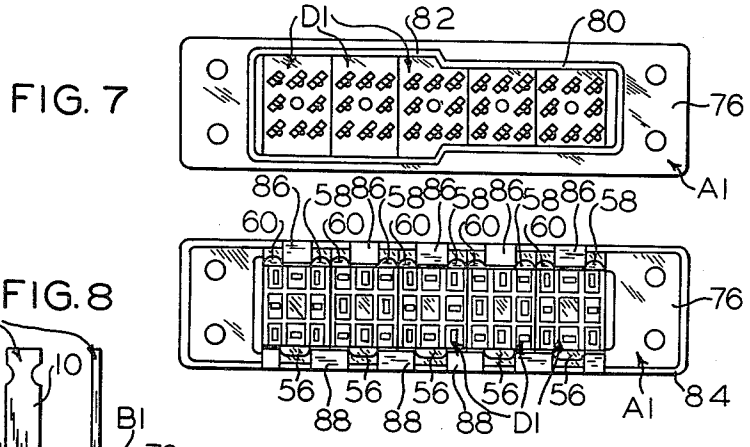

FIG. 7

FIG. 8

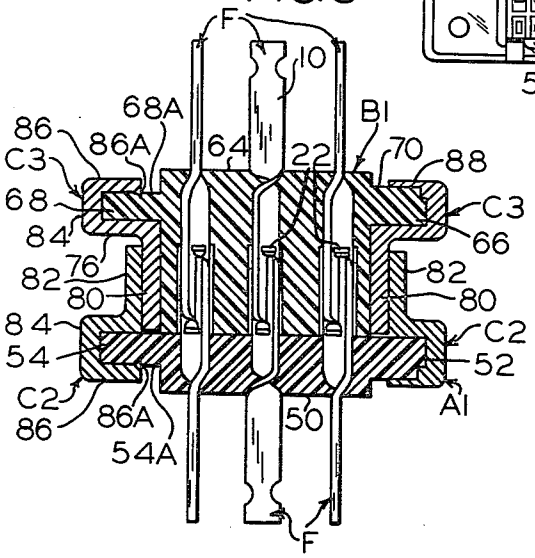

FIG. 9

INVENTOR.
BENJAMIN FOX
BY Harry Langman
Stanley Silber
ATTORNEYS

United States Patent Office

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ELECTRICAL COUPLING DEVICE FOR MINIATURE TERMINALS

Benjamin Fox, 403 Gribbel Road, Wyncote, Pa.

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8 Claims. (Cl. 339—142)

My invention relates to an electrical coupling device and more particularly relates to complementary separable male and female members in which cooperating miniature bifurcated electrical terminals are aligned respectively in molded male and female insulator cores and a plurality of the cores are securely retained in indexed position within respective casings which interfit in a predetermined orientation.

This invention is an improvement over that of my prior Reissue Patent No. 23,547 wherein is disclosed a quick detachable connector having bifurcated flat terminals separably engaged longitudinally at right angles to one another. The present invention is primarily concerned with orienting a large plurality of the miniature terminals in complementary interfitting male and female members, occupying a minimum of space.

It is therefore an object of my invention to provide an electrical coupling device for miniature electrical terminals wherein a large plurality of the terminals may be securely aligned in a minimum of space within complementary male and female members.

Another object of my invention is to provide separable male and female members, each having a plurality of core elements holding a unit group of perimetrically disposed terminals in fixed cooperative alignment.

Another object of my invention is to provide a metal casing for maintaining a plurality of male or female core elements in fixed position therein and wherein complementary male and female assembled members will be aligned in a predetermined indexed position.

Another object of my invention is to provide a metal casing for a plurality of molded cores, each containing a group of bifurcated miniature terminals, wherein the cores will be tightly held within the casing and the terminals maintained in positive alignment for electrical coupling.

Another object of my invention is to provide an electrical coupling device for miniature terminals wherein the terminals are grouped within complementary male and female core units.

Another object of my invention is to provide an electrical connector for miniature terminals for transversely holding core element groups of eight perimetrically disposed terminal units.

Another object of my invention is to provide an electrical coupling device having a plurality of complementary male and female members which are readily mated with each other to provide improved electrical connection between a multi-element circuit parts to which they are connected.

Another object of my invention is to provide complementary electrical coupling members which may be made from a single set of dies, punches and molds.

Another object of my invention is to provide complementary casings for a large plurality of miniature electrical terminals which may be made of a single set of punches and dies.

Other objects of my invention are to provide an improved device of the character described that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, my invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawings, in which:

FIG. 1 is an exploded view of a modification of the electrical coupling device.

FIG. 2 is a bottom perspective view, partly broken away, of a female core element group of terminals embodying my invention.

FIG. 3 is a bottom perspective view, partly exploded of a male core element group of terminals.

FIG. 4 is a side view of the modified electrical coupling device showing the male and female members in engaged position.

FIG. 5 is a front plan view of the modified female member.

FIG. 6 is a rear plan view of the modified female member.

FIG. 7 is a front plan view of the modified male member.

FIG. 8 is a rear plan view of the modified male member.

FIG. 9 is a sectional view taken along lines 9—9 of FIG. 4.

As best shown in FIGS. 3 and 9, the electrical terminals F consist of flat sheet metal members of copper or other suitably electrically conductive material, and have a head portion **10**, a constricted neck **12** defined intermediate opposed notches **14** in the side edges, and a body portion **16** therebeyond. The body portion **16** is bifurcated by virtue of a longitudinal slot **17** along the central axis, thereby defining coplanar spaced prongs **18** and **20**. An arcuate tab **22** is punched from the body portion **16** at the terminus of the slot **17** and lies in a plane substantially perpendicular to the plane of the body portion at right angles to the central axis thereof. The tab **22** defines a stop in the forward portion of an insulated core element slotted to receive the terminal F, as will be more fully described hereinafter.

In FIGS. 1 to 9, I show a modification of the electrical coupling device comprising detachable male and female members A1 and B1 respectively.

The male type member A1 comprises an elongated rectangular metal shell C2 having a plurality of laterally aligned male insulated core elements D1 transversely secured therein. The female member B1 is also comprised of an elongated metal casing, designated as C3, which maintains a plurality of laterally aligned female insulated core elements E1 in a transversely fixed position.

Each of the male insulated core elements comprises a rectangular base **50** having shoulders **52** and **54** oppositely extending therefrom. See FIG. 3. A plurality of the terminals F are again mounted in perimetrically disposed slots in the base whereby the terminals project outwardly at 90° to the front surface of the base and the plane of each body portion of the terminal is oriented in the same 45° direction as previously described. The shoulder **52** has on the rear surface **52A**, a centrally disposed lug **56** integrally molded thereon whereas the shoulder **54** has a pair of spaced lugs **58** and **60** on the outboard ends at the rear surface **54A**. Thus, a depression is provided at **54A** intermediate the lugs **58** and **60** and depressions are defined at **52A** on each side of the lug **56**.

The modified female core elements E1 comprise a cored receptacle portion **62**, a base **64** and shoulders **66** and **68** extending outwardly from the base. See FIG. 2. Again, the terminals F are perimetrically disposed in the cored recesses **62A** and positioned within 45° slots in the base **64**. A lug **70** is molded on the shoulder **66** centrally disposed thereon on the rear surface **66A** and spaced lugs **72** and **74** are formed on the rear surface **68A** of shoulder **68**. Depressions **66A** are defined on each side of the lug **70** and a depression **68A** is formed intermediate the lugs **72** and **74**.

The lugs and depressions cooperate to act as side stops

for tabs on the casings C2 and C3 and maintain the core elements D1 and E1 respectively in positive transverse alignment.

Referring to FIG. 1, it is seen that the metal shells or casings C2 and C3 are identical and each comprises a rectangular panel portion 76 having a rectangular aperture 78 disposed therein spaced from the sides and ends of the panel. A semi-rectangular or U-shaped flange 80 defines a forwardly projecting rim about half of the aperture 78 and a second semi-rectangular or U-shaped flange 82 defines a rim about the other half of the rectangular aperture. The interior surface of the flange 82 is complementary with the exterior surface of the flange 80. Webs 83 interconnect adjacent ends of the flanges 80 and 82. A peripheral skirt 84 projects at right angles to the back surface of the panel 76 and a plurality of arcuate holding tabs 86 are spaced along one longitudinal edge of the skirt 84. A plurality of spaced, arcuate holding tabs 88 extend along the opposite edge of the skirt 84 and are staggered with respect to the tabs 86.

The male elements D1 are laterally aligned transversely within the shell C2 whereby the shoulders 52 and 54 rest upon the longitudinal edges of the panel 76 intermediate the aperture 78 and the longitudinal sides of the peripheral skirt 84. The shoulders 52 and 54 respectively define a plane. Adjacent core elements D1 will have the lug 58 of one abut the lug 60 of the other whereas the adjacent depressions 52A will form a double depression 52A, 52A on adjacent shoulders 52. The female core elements F1 are similarly aligned with respect to their respective lugs and depressions.

As seen in FIGS. 6, 7, 8 and 9, the tabs 86 and 88 are bent inwardly substantially at right angles to the skirt 84 until the arcuate edges of each tab bite into the depressions intermediate adjacently spaced lugs. The arcuate nature of each of the tabs assists in preventing them from springing upwardly after peening thereof, thereby acting as a ribbed construction with respect to the core elements. Note particularly, in FIG. 9, the manner in which the sharp edge 86A of the arcuate tabs 86 pierce the surface of the depressions 54A and 68A, respectively. It is also to be noted that the lateral edges of each tab are compressed against the lateral edges of the adjacent lugs to preclude the insulated core elements from springing out of position from the respective shells when the core elements D1 and E1 are aligned within their respective shells C2 and C3. The male member A1 is complementary to and separable from the female member B1, the flanges 80 and 82 interfitting with each other on the respective shells C2 and C3. The arrangement is such that a large plurality of miniature terminals F may be separably engaged in positive interlocking position.

Although my invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

I claim:

1. In an electrical coupling device for miniature terminals, a plurality of insulated core elements each having oppositely disposed shoulders, spaced lugs on said shoulders, a shell transversely securing said core elements therein, and arcuate tabs on said shell biting into said shoulders intermediate said lugs.

2. The invention of claim 1 wherein each said shell includes a pair of adjoining, relatively smaller and larger complementary flanges, said flanges of each of said shells being adapted to engage each other with the larger flange of each said shell embracing and fitting around the smaller said flange of the other of said shells.

3. The invention of claim 1 wherein each of said core elements has oppositely disposed shoulders thereon, and a skirt on each of said shells abutting the respective shoulders.

4. The invention of claim 3 wherein a plurality of spaced, arcuate tabs extend from the edges of said skirt and are wedged into respective, complementary depressions intermediate adjacently spaced lugs on said shoulders.

5. The invention of claim 1 including terminals perimetrically disposed rectangularly in each of said core elements.

6. The invention of claim 5 wherein said terminals are oriented respectively in each core element at 45° to the sides thereof.

7. The invention of claim 5 wherein each terminal lies at right angles to an adjacent terminal.

8. The invention of claim 5 wherein said terminals are bifurcated.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,547	Fox	Sept. 9, 1952
1,819,657	Smith	Aug. 18, 1931
2,495,838	Deakin	Jan. 31, 1950
2,525,210	Del Camp	Oct. 10, 1950
2,664,552	Ericsson et al.	Dec. 29, 1953
2,750,572	Fox	June 12, 1956
2,790,153	Arson	Apr. 23, 1957
2,828,474	Fox	Mar. 25, 1958
2,853,689	Jackson et al.	Sept. 23, 1958
2,953,768	Miller	Sept. 20, 1960

FOREIGN PATENTS

379,568	Italy	Nov. 14, 1939
586,049	France	Dec. 20, 1924
1,043,106	France	June 10, 1953