Dec. 13, 1960 B. FOX 2,964,724

LOCKING AND ALIGNING A PLURALITY OF DETACHABLE ELECTRICAL CONNECTORS

Filed Dec. 9, 1957 2 Sheets-Sheet 1

FIG. 1

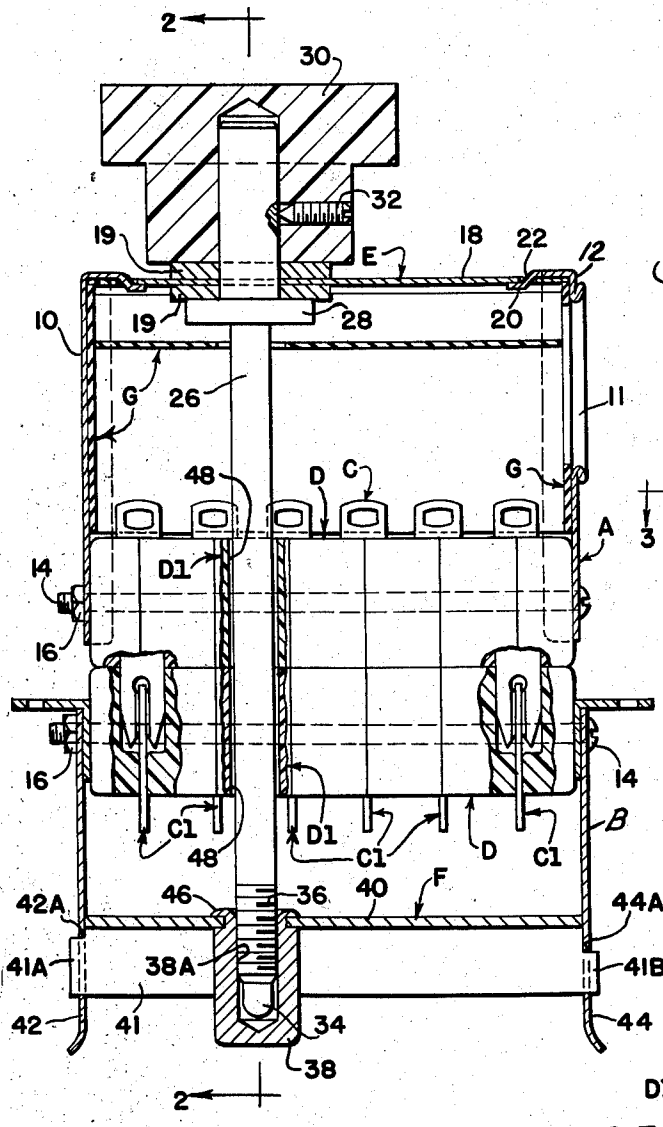
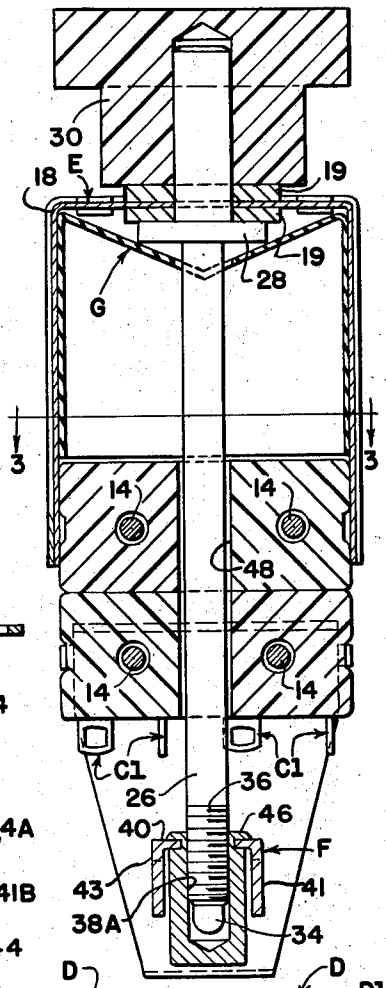


FIG. 2



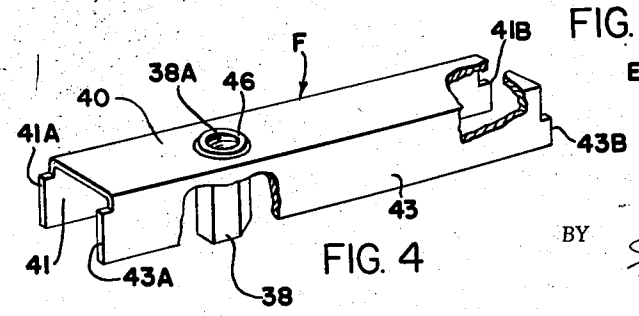


FIG. 4

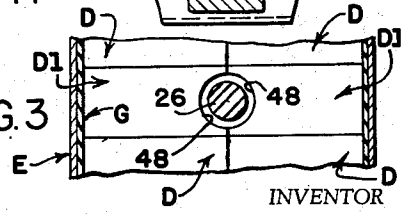


FIG. 3

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LOCKING AND ALIGNING A PLURALITY OF DETACHABLE ELECTRICAL CONNECTORS

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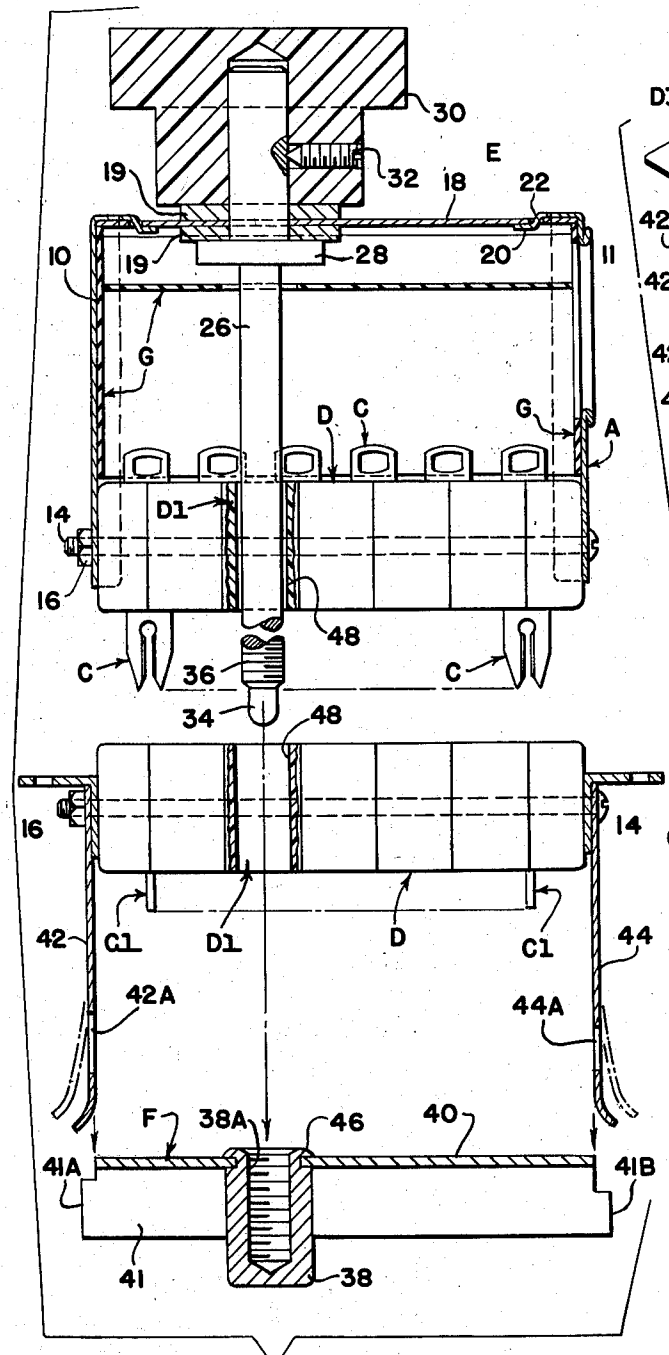


FIG. 5

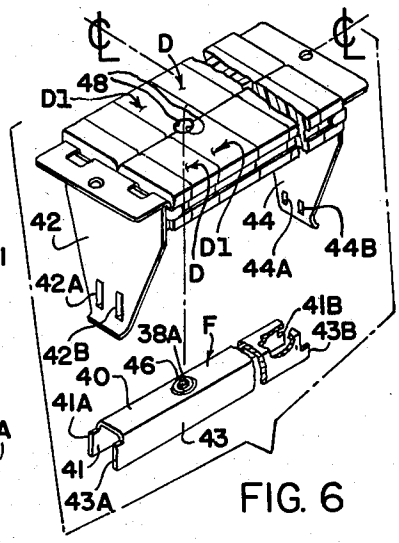


FIG. 6

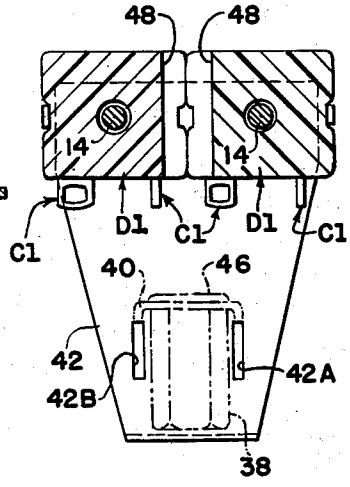


FIG. 7

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2,964,724

LOCKING AND ALIGNING A PLURALITY OF DETACHABLE ELECTRICAL CONNECTORS

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3 Claims. (Cl. 339—45)

My invention relates to quick detachable electrical connectors and relates particularly to means to definitely align and lock detachable male and female connector components in a predetermined position.

Heretofore, detachable electrical connectors having complementary female and male members have been used wherein each member has a plurality of bifurcated electrical contacts fastened in an insulator casing. However, where a large number of electrical contacts are used on each of the connector components, the problem of causing each pair of complementary contacts to properly mate is not easy since the contacts on each member depend upon the ability of the individual to apply an even pressure when forcing the connector component together and also when separating the connector components. Since each individual does not possess the same sensitive pressure to evenly apply pressure to connect or to disconnect the connector member, proper electrical connections are not always completed and danger of damage to one or more contacts is always present.

It, therefore, is an object of my invention to provide a definite aligning guide when joining a plurality of complementary detachable electrical connector components.

Another object of my invention is to provide a definite aligning guide and an even pressure applying member when joining a plurality of complementary detachable electrical connector components.

Another object of my invention is to provide a definite aligning guide and substantially constant pressure member when mechanically joining a plurality of complementary detachable electrical connector components wherein the guide and the pressure member may be easily removed at the time of attaching wire leads to the electrical contacts on each component.

Another object of my invention is to provide a combined aligning guide and even pressure applying member for complementary detachable electrical connector components wherein the combined guide and even pressure applying member may be easily attached or removed.

With the above and related objects in view, my invention embodies in a detachable electrical connector an insulator casing having a plurality of electrical contacts therein whereby a bolt passes through one component of the connector and a complementary nut is attached to the other complementary electrical connector component. The bolt and the nut are in alignment but eccentrically positioned on the components so that the electrical components shall be interfitted in but one predetermined position; the interfitting bolt and nut are located in elements of the connectors which may be easily attached or detached from the electrical connectors during the course of wiring the connectors.

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 a fragmentary elevational view disclosing a detachable electrical connector having a male and a female component and wherein there are a plurality of electrical connectors on each of the components and wherein the components are connecting. The components are held together by the threaded bolt or spindle and its nut or thread receiving member.

Fig. 2 is a fragmentary sectional view taken along line 2—2 of the detachable electrical connector shown in Fig. 1.

Fig. 3 is a sectional view taken along lines 3—3 of Fig. 2.

Fig. 4 is a fragmentary sectional view of the bridge or nut supporting bar.

Fig. 5 is a fragmentary sectional view of components similar to that shown in Fig. 1 but wherein the male and female components are separated from the other.

Fig. 6 is an exploded view showing the female connector wherein the bridge or nut supporting bar is separated from its mounting brackets. The details of the contacts in the insulators is omitted.

Fig. 7 is a side view of the female connector component wherein the bridge or nut supporting bar is attached to the mounting brackets.

Referring now in greater detail to the drawings, wherein similar reference characters refer to similar parts, I show a detachable electrical connector wherein the prong or male component is generally designated as A, and the receptacle or female component is generally designated as B, each connector component comprising a plurality of bifurcated electrical contacts, generally designated as C, which are held between separate insulator casings, generally designated as D.

The construction and arrangement of the electrical contacts C and C1 and the insulator members D are described in greater detail in my pending application Serial No. 383,053, now Patent No. 2,828,474, issued March 25, 1958, and in Patent No. Re. 23,547. Mounted upon the male component A of the connector, as illustrated in Figs. 1 to 5, is a metal casing, generally designated as E, wherein side metal brackets or plates **10** and **12** are attached by means of a nut **16** and bolt **14** to retain the insulator casing D together. The nut and bolt also retain the electrical contacts C in position on the insulator D.

A housing **18**, forming part of the casing or cover, is held between the brackets or plates **10** and **12** by virtue of an interfitting flange **20** that passes through an opening **22** in the U-shaped metal cover **18**. The top of the U-shaped member **18** interlocks with bracket members **10** and **12** and is easily detached therefrom for the purpose of wiring the connector. The cover **18** may be removed by loosening the nut and bolt from the brackets **10** and **12**.

Through the bracket **10** is an opening **24** through which the lead wires may pass. The lead wires (not shown) are adapted to be attached either by a slide fastener (not shown) or by soldering (not shown) to one end of the contacts C.

Mounted eccentrically through the upper portion of the housing **18** is a rotatable bolt **26** which has a flange **28** adapted to prevent the movement of the bolt **26** in one longitudinal direction from the cover **18**. Washers **19** are located on each side of the top of the U-shaped cover so that the bolt passes therethrough. On the outside of the cover **18** is a knob **30** which is attached to the bolt **26** by a set screw **32**. The set screw **32** presents longitudinal movement of the bolt or spindle **26**. Hence, when the set screw is locked in position, rotation of

the knob 30 rotates the bolt 26. The free end 34 of the bolt is narrow to serve as a guide to pass easily into the threads 38A of the nut 38 and adjacent the narrow guide portion 34 are a series of threads 36 which are adapted to be interlocked with the internal threads of a nut 38.

The nut 38 is definitely affixed to a supporting bar or bridge, generally designated as F, which is detachably connected to side brackets 42, 44.

The bridge F is of U-shaped configuration with the center portion 40 having parallel legs 41, 43. The legs 41, 43 extend longer than the center portion to define projections 41A, 43A which interfit with locating openings 42A, 42B on the bracket 42.

Another nut and bolt 14, 16 passing through the insulator of the female component B holds the side brackets 42, 44 in position. The nut 38 has an outside locking flange 46 which holds the nut 38 to the shackle or bridge F.

A through opening 48 through the connector components A and B permits the bolt 26 to pass therethrough.

In order to avoid placing the bridge F in the wrong direction, otherwise the nut 38 and its bolt 26 will not interfit, the bridge projection 41B, 43B are of a different size than the projections 41A, 43A so that the projections 41B, 43B interfit with the opening 44A and 44B in the bracket 44. However, the four projections on the bridge only interfit properly with these complementary openings or slot when the bridge is properly aligned whereby the nut 38 and bolt interfit.

The locking nut and bolt exerts an even, parallel pressure upon each pair of interfitting contacts C and C1. It should be noted that the contacts C and C1 are similar in construction except that the male contact C may have a longer body than the female contact C1. Although the intermediate insulator D is of substantially the same construction, it should be noted that the intermediate insulators D1 differ from the intermediate insulators D by having a semi-circular recess on one side to define the opening 48 for the passage of the bolt 26.

To assemble my invention, the following steps are suggested:

(1) Thread the cable wires through a cable clamp (not shown) and the cover end plate.

(2) Insert the bolt through the hole 48 of the male connector with a washer on its flange.

(3) Assemble the casing with the paper insulator G which prevents any electrical contact of the wires with the casing in place.

(4) Bring up one end plate and assemble it to the bolt.

(5) Move the moving bolt into position through the U-shaped cover.

(6) Place a second washer over the moving bolt 26.

(7) Place the knob in position and tighten the set screw.

(8) Remove the bridge and attach appropriate wires to contacts C1.

(9) Insert the bridge in the resilient bracket members 42, 44.

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 as my invention:

1. An electrical connector comprising a pair of separably connectable components, each of said components comprising an insulator member having a set of electrical contacts rigidly positioned therein, the contacts of one of said sets being aligned with and being constructed to embraceably engage the contacts of the other of said sets when said insulator members are in connectable position, an elongated bolt rotatably movably but axially immovably mounted on one of said components, a bolt-receiving aperture in the insulator member of said last mentioned component, said bolt extending through said aperture, a corresponding bolt-receiving aperture in the insulator member of the other of said components, said last mentioned bolt-receiving aperture being arranged to permit passage therethrough of said bolt when said components are in connectable position, a pair of side brackets on one of said components, said side brackets being connected to the corresponding insulator member, there being one side bracket connected to each of two opposite sides of said corresponding insulator member and extending beyond said corresponding insulator member, a bridge detachably secured between said side brackets, means for detachably securing said bridge to said side brackets, a nut rigidly connected to said bridge, said nut constituting an internally threaded socket and being arranged on said bridge to threadedly receive said bolt when said components are in connectable position, said components being relatively movable toward and away from each other upon rotation of said bolt within said socket in accordance with the direction of rotation of said bolt.

2. The electrical connector of claim 1 wherein said means for detachably securing said bridge to said side brackets comprise projections on opposite sides of said bridge and openings in said side brackets for receiving said projections when said bridge is positioned between said side brackets.

3. The electrical connector of claim 1 wherein said bolt and said nut are correspondingly off-center relative to their respective components.

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