

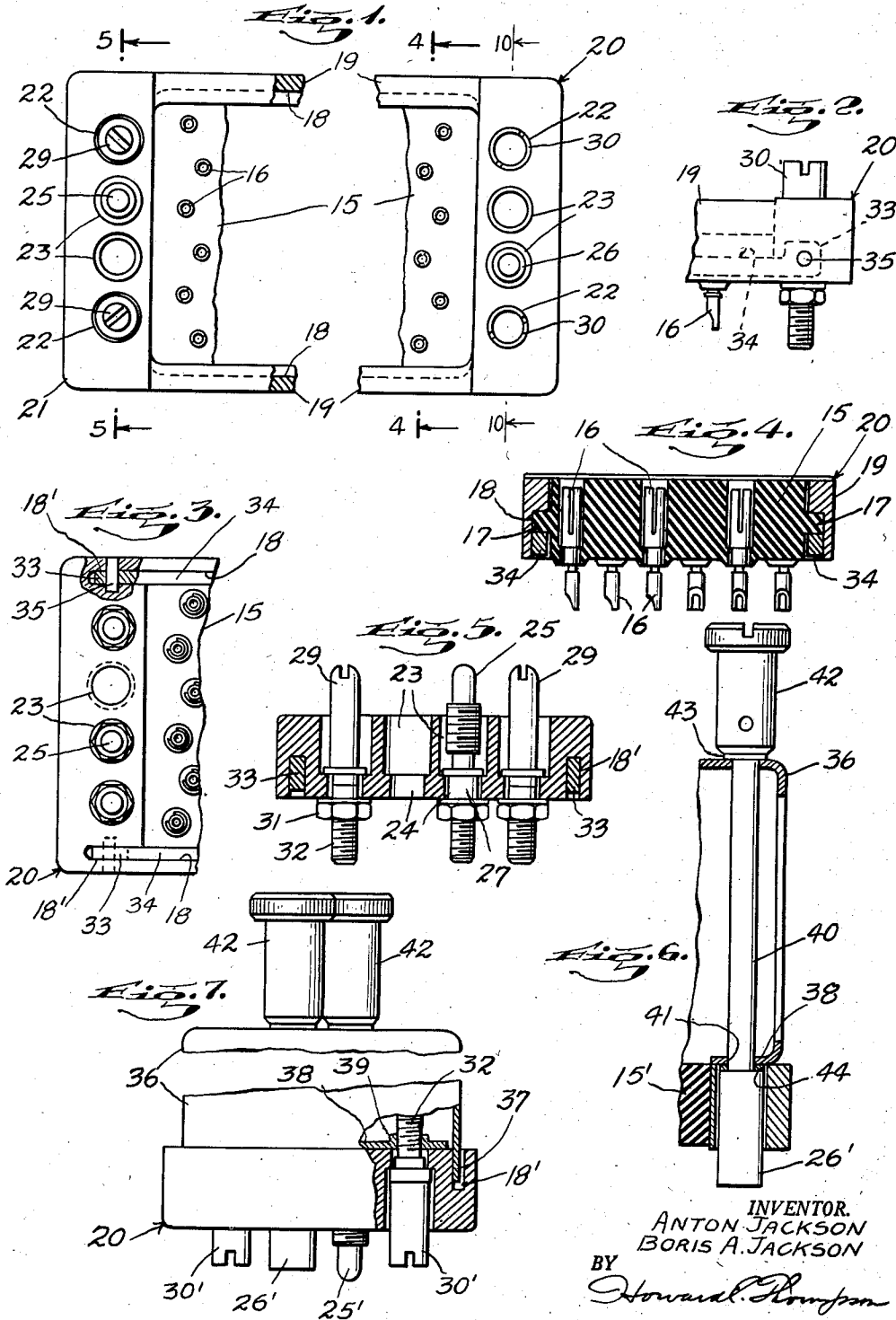
July 29, 1958

A. JACKSON ET AL  
FRAMED LOCKING CONNECTORS

2,845,603

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3 Sheets-Sheet 1



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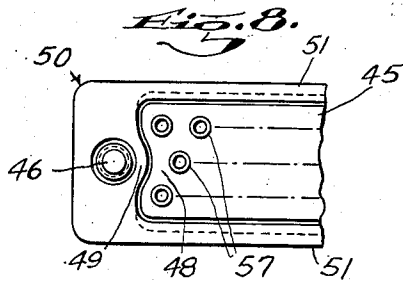
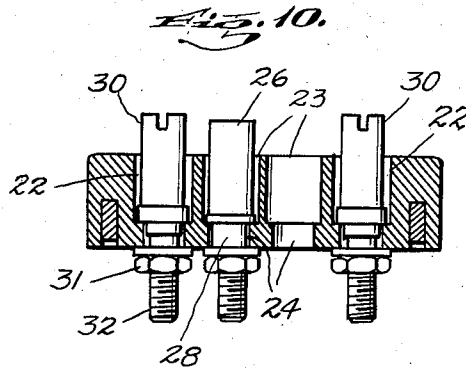
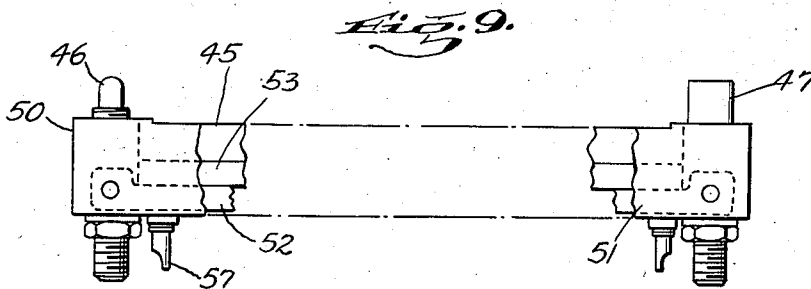
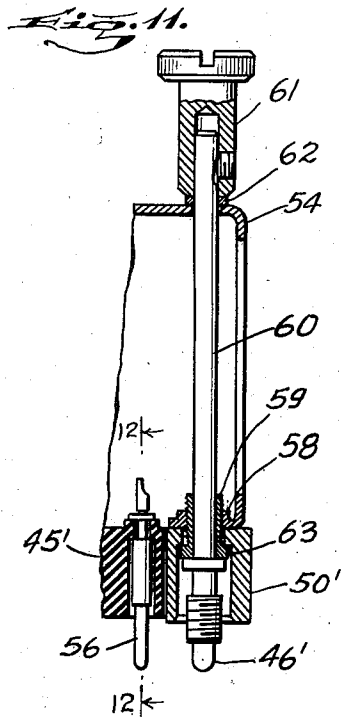
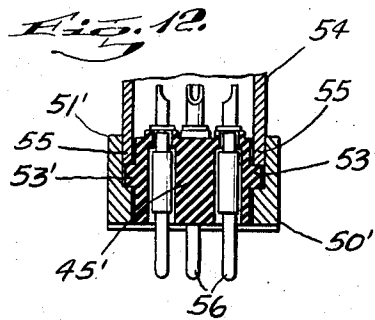
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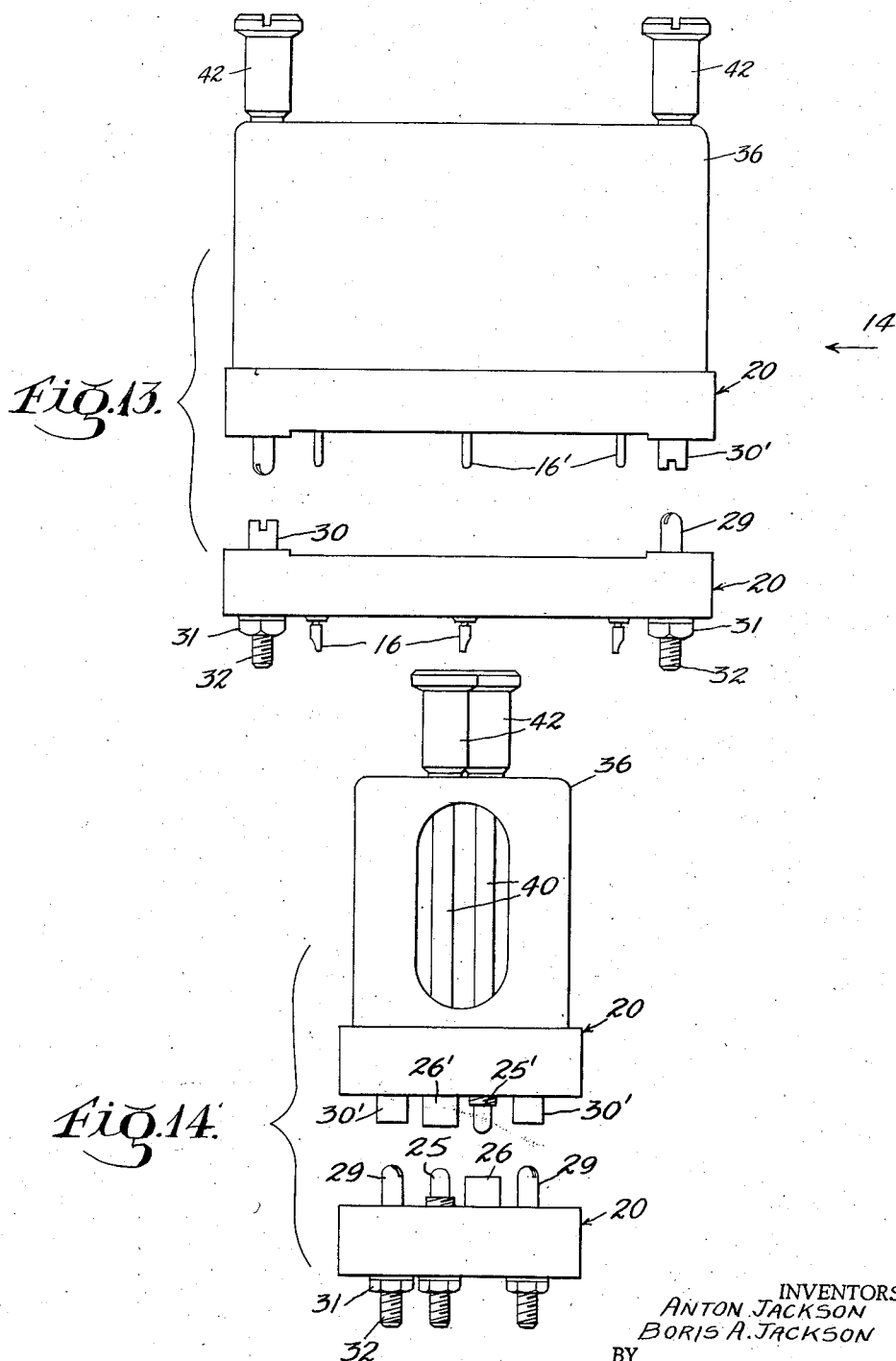
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3 Sheets-Sheet 3



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2,845,603

## FRAMED LOCKING CONNECTORS

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Application July 12, 1956, Serial No. 597,522

6 Claims. (Cl. 339—92)

This invention relates to electrical connectors employing means for coupling or locking the connectors together. More particularly, the invention deals with a metallic frame mounted on each connector, in which the coupling threaded members, as well as the alinement members, when employed, are mounted so that stresses and strains are directly taken up by the frame and not transmitted to the connector bodies of insulating material supported within the frames.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a top plan view of a framed connector made according to the invention, with the central portion of the frame and connector broken away and part in section.

Fig. 2 is an edge view of one side portion of the construction, as seen in Fig. 1.

Fig. 3 is a bottom plan view of the left end portion of the structure, as seen in Fig. 1, with part of the construction broken away and in section.

Fig. 4 is a section substantially on the line 4—4 of Fig. 1.

Fig. 5 is a section substantially on the line 5—5 of Fig. 1.

Fig. 6 is a detail sectional view through the associate connector showing the mounting on a box-shaped casing and illustrating, in elevation, a female threaded coupling.

Fig. 7 is an end view of the structure shown in Fig. 6, with part of the construction broken away, part in section, and illustrating part of the background showing.

Fig. 8 is a view, similar to Fig. 1, showing one end portion only of a modified form of connector.

Fig. 9 is a side view of the structure, as shown in Fig. 8, omitting the central portion thereof.

Fig. 10 is a section substantially on the line 10—10 of Fig. 1.

Fig. 11 is a view, similar to Fig. 6, showing the connector associated with the structure shown in Figs. 8 and 9.

Fig. 12 is a section substantially on the line 12—12 of Fig. 11.

Fig. 13 is a diagrammatic exploded side view of aligned connectors of the type disclosed in Figs. 1 to 7 and Fig. 10, the connectors being shown in a position preparatory to assembly thereof; and

Fig. 14 is an exploded end view of the structure as seen in Fig. 13, looking in the direction of the arrow 14 of Fig. 13.

This application is a continuation-in-part of our re-

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cently filed application on a "Framed Locking Connector" filed July 3, 1956, Serial Number 595,787.

In Figs. 1 to 7, inclusive, and Fig. 10, we have shown, at least in part, associate members of a pair of electrical connectors and, in Figs. 1, 3 and 4, 15 represents the connector body of insulating material of one connector, in which a multiplicity of electrical contacts 16 are arranged and, in Fig. 6 of the drawing, we have indicated at 15' a small portion of an associate connector, having contacts which are in alinement with and are adapted to engage the contacts 16. The contacts of the connector 15' are shown in part in Fig. 13 at 16'.

In Fig. 4 of the drawing, it will appear that the sides of the connector body 15 have projecting flanges 17, which flanges fit freely in recesses 18 of the side rails 19 of a mounting frame 20. The frame 20 is preferably metallic and includes, at its ends, enlarged bearing portions 21 having a plurality of small and large diameter side apertures 22 arranged therein and intermediate apertures 23, the latter apertures differing from the apertures 22 in that the lower, small diameter portions 24 thereof have flat key surfaces for the purpose of keying the threaded male and female coupling members 25 and 26 therewith, a male coupling member being shown in Fig. 5 and a female coupling member being shown in Fig. 6.

By providing the pairs of apertures 23, it is possible to arrange the members 25, 26 so as to adapt and aline them with associate male and female threaded coupling members 25', 26' of the associated connector, these latter members being indicated in Fig. 7 of the drawing. This construction is to control definite alinement of the two connectors one with the other.

All of the connector members 25, 26; 25', 26' are freely mounted in the bearing ends 21 of the frame for movement radially with respect to the axis of said members. The members 25', 26' are rotatable in their supports; whereas, the members 25 and 26 have flattened shanks 27, 28 engaging the flattened key portions 24 to prevent rotation of said members in their supports.

The frame 20 includes, in the apertures 22, male and female alinement members 29 and 30, the members 29 being in the end of the frame, including the male coupling member 25; whereas, the members 30 are in the opposed end, including the female coupling member 26, as will clearly appear from a consideration of Figs. 5 and 10 of the drawing.

The members 29 and 30 are definitely fixed in position, so as to maintain accurate alinement of the connector 15 with corresponding members fixed to the connector 15' and two of these latter female alinement members are indicated at 30' in Fig. 7 of the drawing. Nuts 31 are mounted on the threaded portions 32 of the members 29 and 30 to fix the same in position.

Considering Fig. 3 of the drawing, it will appear that the grooves 18 of the side rails 19 of the frame 20 extend into the bearing ends 21, as seen at 18', so as to receive enlarged square ends 33 of retaining bars 34, which fit beneath the flanges 17, as noted in Fig. 4, to retain the connector 15 against displacement from the frame 20.

Drive pins or the like 35 are passed through the frame and apertures of the enlarged square ends 33 in securing the bars 34 in position.

Considering Figs. 6 and 7 of the drawing, it will appear that the associate connector includes a frame 20, identical to the frame 20 of the first connector, and on the associate connector is mounted a box-shaped casing

36, shown in part in Figs. 6 and 7, the casing having side flanges 37 which extend into the grooves 18, 18' in aligning the casing on the connector and also in retaining the body 15' against displacement from the casing.

End walls of the casing 36 include inwardly extending bearing portions 38, the ends of which include threaded enlargements 39, into which the threaded ends 32 of the alinement members, such, for example, as the members 30' are adapted to pass, one of these connections being illustrated at the right of Fig. 7 of the drawing. The same arrangement is employed in connection with the male alinement members which are not shown.

Apertures are provided in the bearing portions 38 for reception of extended rods 40 of the screw coupling members and one of these apertures is indicated at 41 in Fig. 6 of the drawing, the rod, in this instance, constituting part of a female threaded coupling member 26'. It will appear, however, that a similar rod is fixed to the male coupling member 25', the lower end of which member is indicated in Fig. 7 of the drawing to simply illustrate part of the background showing and that the operating knob 42 of this member is offset from the corresponding knob 42 of the member 26'. Like references have been used for the knobs 42, as they are both mounted on identical rods 40 for the two different members 25 and 26.

It will appear, from a consideration of Fig. 6 of the drawing, that a washer 43 is disposed between the knob 42 and the top of the casing 46 and another washer 44 is positioned between the member 26' and the bearing portion 38. It will thus appear that stresses or strains of coupling engagements are taken up directly through the casing 36 and not transmitted to the insulator body of the connector 15'.

Turning now to the structure shown in Figs. 8, 9, 11 and 12, here is shown a slight modification where instead of employing a relatively wide connector body 15 for a large number of contacts 16, a narrow connector body 45 is employed, the associate connector body being indicated, in part, at 45' in Figs. 11 and 12 of the drawing. The primary difference between the structure of the latter figures and that of the earlier figures resides in dispensing with the alinement male and female members, such as the members 29 and 30 in simply utilizing the male and female threaded coupling members 46 and 47, respectively. These members are identical in construction with the members 29 and 30 and are mounted in the same manner and, for this reason, no further detailed description thereof is deemed to be necessary.

It will be noted, however, that the connector body 45 has a recessed end 48 to receive a rounded portion 49 on the end of the metallic frame 50, in which the members 46 and 47 are mounted. This is to minimize the overall length of the connector, as will be apparent. The side rails 51 of the mounting frame 50 are recessed to receive mounting bars 52, similar to the bars 34, and engaging flange sides 53 of the connector bodies 45. Here again, as this structure is identical with the structure of Figs. 1 to 7, inclusive, no further detailed description is deemed to be necessary.

Considering Fig. 12 of the drawing, it will appear that the connector body 45' has flanged sides 53', similar to the flanges 53, and operate in the side rails 51' of the frame 50', the two frames 50, 50' being of identical construction.

In Fig. 12, it will be seen that a box-shaped casing 54, generally similar to the casing 36, has the side wall extending flanges 55, similar to 37, which enter the recesses of the frame and directly engage the flanges 53' in establishing the coupling engagement of the connector body 45' with the frame. This same engagement is established with the structure shown in Figs. 6 and 7 of the drawing.

In Fig. 12 are shown the male electrical contacts 56, 75

which engage the female electrical contacts 57 of the connector 45.

Considering Fig. 11 of the drawing, it will appear that the casing 54 includes an inwardly extending threaded bearing portion 58, generally similar to the threaded bearings 39 to receive a threaded bushing 59, which is arranged upon the extending rod 60 of a male threaded coupling 46', similar to 46. The rod 60 has an operating knob 61 at its upper end bearing upon a washer 62 at the top of the casing. With this construction, the sleeve 59 takes the place of the washer 44 shown in Fig. 6 of the drawing, the enlarged portion 63 of the sleeve bearing upon the frame 50' in directly coupling the frame with the casing 54.

It will be apparent from the foregoing description that, throughout the different connectors, the male and female threaded coupling members are standardized so that these members are interchangeable with the respective frames, regardless of the particular type and style of frame and connector which are being used, the frames and connectors, themselves, being modified to suit the different sizes or capacities of connectors employed and this is also true with respect to the casings 36 and 54 which will be made to be consistent with the width of frames employed.

With our improved construction, it will be apparent that the casings 36 and 54 are mounted directly upon the frames employed and not on the insulator connector bodies. Further, it will be apparent that, by reason of the free movement of the members 25, 26; 25', 26', 46, 47 and 46', all of these members may be said to have an axially floating mounting in the connectors. By virtue of this mounting, the said members are free to tilt within limits and this construction, in combination with the double threads employed, permits the connectors to be coupled and uncoupled without setting up any stress or strain or without jamming, even though one end of the connector is coupled before coupling engagement is started at the other end thereof.

Also, it will be seen that, providing the pairs of apertures 23 in the ends of the frame, the positioning of the coupling members 25, 26; 25', 26' of companion connectors can be adjusted to accomplish the one-way assembly of the connectors, thereby utilizing a single frame for both of the companion connectors.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In framed connectors of the class described, one connector comprising an elongated body of insulating material having a plurality of spaced contacts exposed through opposed surfaces of said body, a rectangular frame encircling the periphery of said body, said frame having wide coupling ends joined by side rails, the body having side projections seating in said rails, means, fixed to the frame at end portions of said rails, engaging side projections of said body in retaining the body in the frame, the coupling ends of said frame having, within peripheral boundaries of said ends, male and female coupling means for coupling with female and male coupling means respectively of a companion connector, the companion connector including a casing mounted on one surface of its connector frame, and means mounted in coupling ends of the frame of the companion connector and engaging said casing to secure the casing on said frame.

2. A structure as defined in claim 1, wherein the last named means comprises sleeves in threaded engagement with the casing and in which the coupling means of the companion connector are rotatably mounted.

3. A structure as defined in claim 1, wherein the coupling means of the companion connector are rotatable, and the coupling engagement of said rotatable coupling means with the casing of said connector includes washer parts, with means for supporting the members in engagement with the washer parts.

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4. A structure as defined in claim 1, wherein ends of the frames include male and female alinement members, said ends of the frames, intermediate the alinement members, have pairs of apertures for varied mounting of the male and female coupling means, and said coupling means have free axial floating and tilting movement in said apertures.

5. A structure as defined in claim 1, wherein the end portions of said body and adjacent walls of the frame ends have interfitting projections and recesses.

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6. A structure as defined in claim 1, wherein the last named means comprises connector alinement members mounted in the frame ends and coupled with the casing.

**References Cited in the file of this patent****UNITED STATES PATENTS**

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|-----------|----------------------|---------------|
| 2,647,244 | Dewey -----          | July 28, 1953 |
| 2,761,108 | Jackson et al. ----- | Aug. 28, 1956 |