July 29, 1958 A. JACKSON ET AL 2,845,604

FRAMED LOCKING CONNECTORS

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Fig. 1.

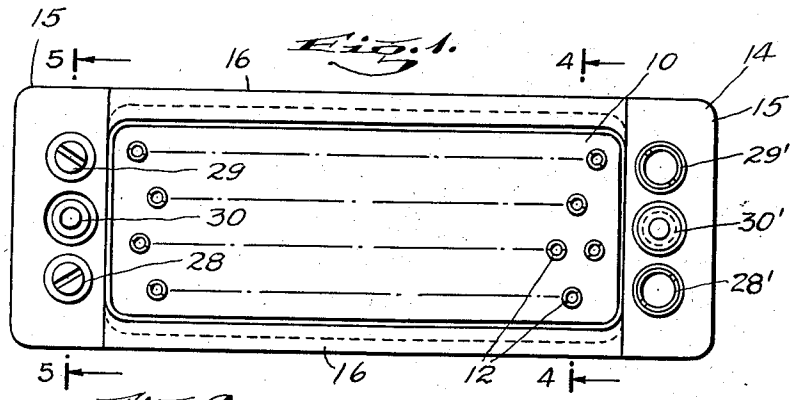


Fig. 2.

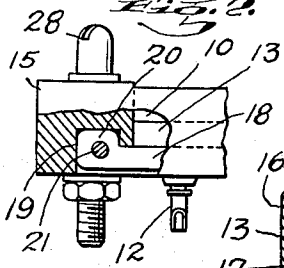


Fig. 3.

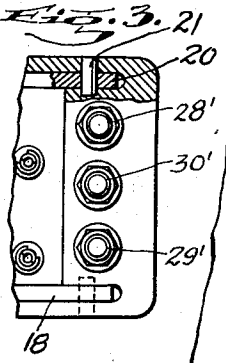


Fig. 4.

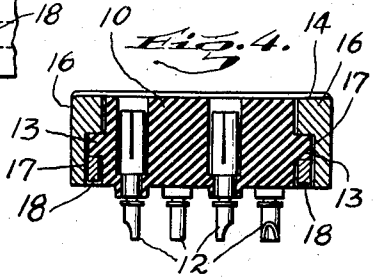


Fig. 6.

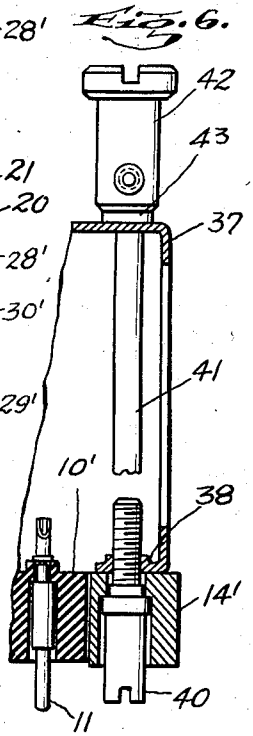


Fig. 5.

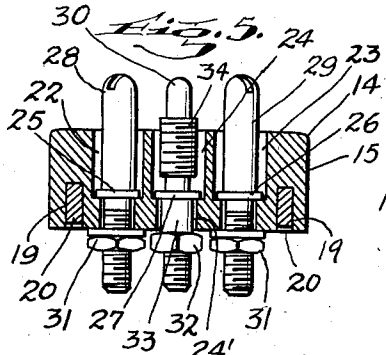


Fig. 7.

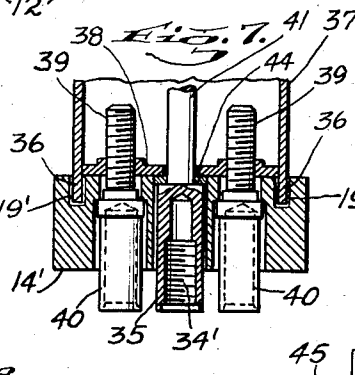


Fig. 8.

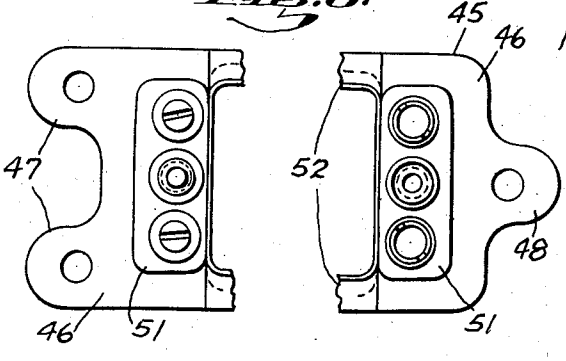
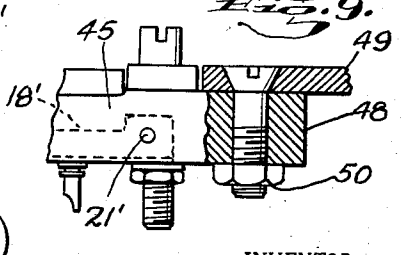


Fig. 9.



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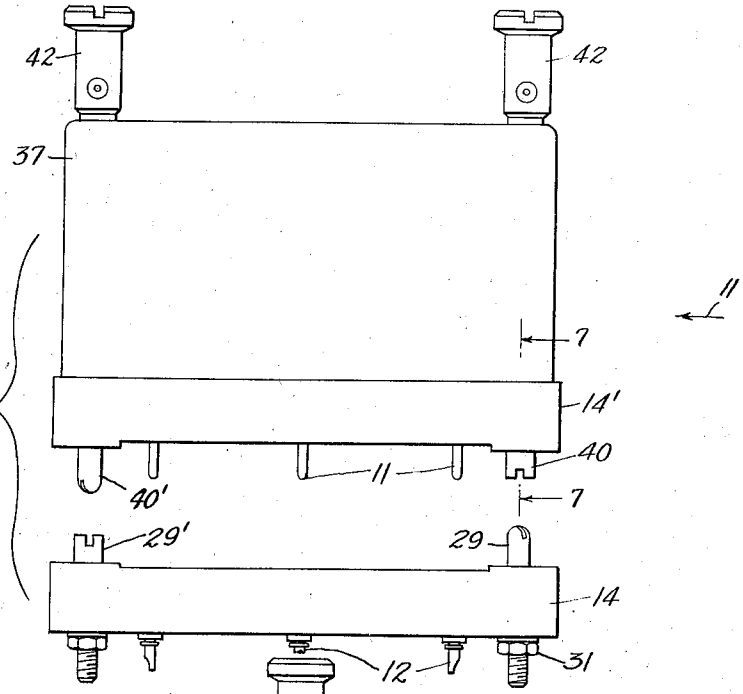


Fig. 10.

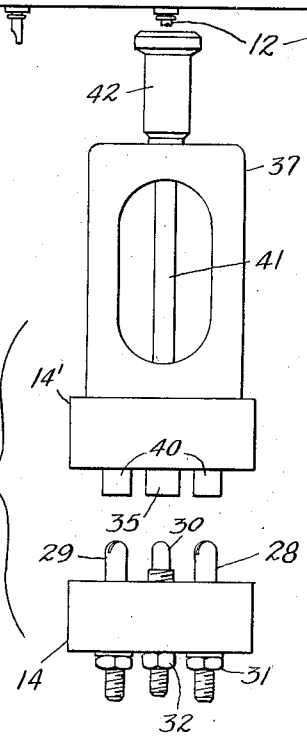


Fig. 11.

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FRAMED LOCKING CONNECTORS

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Application July 3, 1956, Serial No. 595,787

4 Claims. (Cl. 339—92)

This invention relates to locking connectors employing an insulated body having a multiplicity of male and female contacts on the associated connector parts, with means involving male and female threaded coupling members for moving the connectors toward and from each other in what are generally known as locking connectors.

More particularly, the invention deals with a metallic frame, with means for retaining the insulated body of a connector in the frame, the frame providing supports for the locking pin and sockets, as well as the male and female alinement pins employed for alining connectors one with the other.

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 one form of connector made according to our invention, diagrammatically showing only part of the electric contacts of the connector.

Fig. 2 is an edge view of one end portion of the structure, as shown in Fig. 1, with part of the construction broken away and in section.

Fig. 3 is a bottom plan view of the other end portion of the connector, 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 sectional view through one end portion of a companion connector, showing the hood part.

Fig. 7 is a vertical sectional view through the lower part of the structure, as seen in Fig. 6, the section being on the line 7—7 of Fig. 10.

Fig. 8 is a view, generally similar to Fig. 1, omitting the central portion of the construction and showing a modified form of frame.

Fig. 9 is a side and sectional view of the righthand end portion of the structure, as seen in Fig. 8, also illustrating, in part, a method of mounting the connector.

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

Fig. 11 is an exploded end view of the structure as seen in Fig. 10, looking in the direction of the arrow 11 of Fig. 10.

In Fig. 1 of the drawing, we have shown at 10 one connector part, the associated connector part of a pair of connectors being indicated, in part, at 10' in Fig. 6 of the drawing. These connectors are moulded from suitable insulating material, plastics being commonly employed, and are so made to provide mountings for a multiplicity of male and female contacts, one of the male contacts being indicated at 11 in Fig. 6 and a few of

the female contacts being indicated at 12 in Figs. 1 and 4 of the drawing.

The structures of the moulded body of the connectors 10, 10' are generally the same. Accordingly, the brief description of the connector 10 will apply to the connector 10'.

Considering Fig. 4 of the drawing, it will appear that the connector 10 has substantially centrally of its sides projecting ribs 13, which are employed for mounting the connector, in connection with a mounting and coupling frame 14. This frame may be considered an elongated O-frame having generally similar coupling ends 15 joined by side rails 16, the rails 16 being also of the same general cross-sectional form, as clearly noted in Fig. 4 of the drawing.

The lower portion of the rails 16 are recessed, as seen at 17, to freely receive the projecting flanges 13, as well as retaining bars 18.

Considering Fig. 2 of the drawing, it will appear that the coupling ends 15 have, in alinement with the recesses 17, enlarged recesses 19, in which enlarged apertured ends 20 of the bars 18 are arranged. The ends 15 also have transverse apertures in alinement with the apertures of the ends 20 to receive coupling drive pins 21, which retain the bars 18 in position in the frame and also secure the connector 10 against displacement from the frame.

Considering Fig. 5 of the drawing, it will be seen that each end 15 of the frame 14 has a series of three apertures 22, 23 and 24, the apertures having reduced lower ends to form shoulders, upon which collar portions 25, 26 and 27 of a series of alinement and coupling pins 28, 29 and 30 are adapted to bear, as clearly noted.

At this time, it will be pointed out that the opposed end of the frame 14, instead of having the pins as shown in Fig. 5, will have alinement and coupling sockets 28', 29' and 30'. In both instances, the pins and sockets 30, 30' constitute the coupling or locking male and female members for securing a pair of connectors together. It will be noted, from a consideration of Fig. 5 of the drawing, that nuts and washers 31 are arranged on lower threaded ends of the pins 28 and 29 in securing these pins in position in the frame and clearances are allowed for establishing the definite positioning of these pins for alinement of connectors one with the other. The same is true with the female socket members 28', 29'.

In contrast, it will be noted that a nut 32 is mounted on the lower threaded end of the pin 30 and this construction is such as to provide a floating mounting of the pin within the aperture 24. However, the shank portion 33 of the pin is flattened on at least one side to fit the correspondingly formed contour in the lower smaller diameter portion 24' of the aperture, so as to key the pin against rotation in the end 15. This is also true of the socket 30' at the other end of the connector. At this time, it might be pointed out that with the companion connector 10', shown in part in Fig. 6 of the drawing, both the male and female coupling members are rotatably mounted to engage the keyed members 30, 30' of the first mentioned connector. The pin 30 includes, within the aperture 24, a threaded portion 34 for reception of the threaded socket of the companion part and, in Fig. 7 of the drawing, the threaded socket 34' of the socket member 35 would engage the pin 30. In both instances, the threads employed are what are known as double threads to provide quick coupling and uncoupling of the connectors, while, at the same time, providing the necessary movement of the threads to compensate for the free mounting of the male and female couplings in their respective supports.

Turning now to Figs. 6 and 7 of the drawing, in these figures, we have shown, in part, a mounting and coupling frame 14' which is generally similar to the frame 14.

The sides of the frame **14'** have longitudinal recesses **19'**, generally similar to the recesses **19**, for reception of downwardly extending flange sides **36** of a box-shaped casing or hood **37**. The end walls of the casing or hood **37** have inwardly extending bearings and the bearings at one end portion of the hood are indicated at **38** in Figs. 6 and 7 of the drawing. These bearings are adapted to receive the threaded portions **39** of male and female alinement members **40**, **40'** the female alinement members **40** being shown in Figs. 6 and 7, and the opposed end of this assemblage will employ the male alinement members **40'**, note Fig. 10, similar to the members **28** and **29**.

With this associated connector, the male and female coupling or locking members include the extended rods **41**, which pass upwardly through the casing or hood **37** and have, fixed to their protruding ends, operating knobs **42**, a washer **43** being preferably arranged between the knob and the top wall of the casing or hood and a washer **44**, note Fig. 7, is also disposed between the socket **35** and the threaded bearing portion **38**. It will, thus, be seen that stresses or strains of the coupling engagement is taken up directly through the casing **37**, rather than through the connector **10'**. It will be apparent that the members **35** and **40** are positioned in apertures in the ends of the frames **14'** in the same manner as with the frame **14** and, for this reason, no further detailed description is deemed to be necessary.

It will be understood that the flange sides **36** of the box-shaped casing **37** engage the projecting flanges of the insulated body in establishing the coupling engagement in the same manner as the bars. In other words, with the structure as shown in Fig. 6, the bars **18** are not employed. This particular engagement is not shown, but will be apparent from the illustration in the other figures.

In Figs. 8 and 9 of the drawing, we have shown a slight modification in the construction of the frame and, in said figures, **45** shows this form of frame in part. The difference between the frame **14** and the frame **45** resides primarily in providing reduced thickness flange extensions **46** at end portions of the frame, one end portion having a pair of rounded apertured extensions **47**; whereas, the other end has a single rounded apertured extension **48**, these extensions being provided for special mountings of the frame in connection with supports. Part of such a support is indicated at **49** in Fig. 9 of the drawing. In said figure, a coupling screw **50** is indicated passing through the aperture of the extension **48**.

The portions **51** of the ends of the frame **45** are of the same thickness as the end portions **15** of the frame **14** and are apertured to receive the same alinement and coupling members shown in Figs. 1 to 7, inclusive and, for this reason, no further detail description is deemed to be necessary. The side members **52** of the frame **45** are generally similar to the member **16** and recessed to receive the mounting bars, one of these bars being indicated, in part, at **18'** in Fig. 9 of the drawing and, in said figure, one of the securing pins **21'**, similar to the pin **21**, is also indicated.

In the operation of coupling and uncoupling a pair of connectors, it will be apparent that the male and female alinement members first establish alinement between the connectors so as to aline the male and female electrical contacts. This takes place prior to positive engagement of the threaded male and female coupling or locking members so that, when these latter members are brought into engagement, a definite alinement has been attained. In the coupling operation, the metallic or other reinforcing frames, in which the connectors are housed, directly take up any stresses or strains which may prevail during the coupling and uncoupling of the connectors, thus dispensing with any possible breakage or distortion of the contacts or the bodies of insulating material in which the contacts are disposed.

With devices of the type and kind under consideration, where the coupling or locking members were directly mounted in the bodies of insulating material, the stresses or strains which, at times, prevail would result in distortions and breakages which became very costly. The use of our improved frames or other reinforcing supporting means eliminates such losses.

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

1. In connectors of the class described, comprising a pair of connectors, each connector having an elongated body of insulating material, a plurality of electric contacts spaced within peripheral edges of said body, an O-frame for said body, said frame having long sides and short ends, the long sides of the frame and said body having means for seating said body in the frame, end portions of said body being spaced from inner surfaces of said frame ends and arranged in close proximity thereto, means mounted on the frame sides and engaging said body to retain said body seated in and against displacement from the frame, said frame ends having male and female coupling members arranged within peripheral boundaries of said ends and freely supported therein for movement radially with respect to the axis of said members, and the male coupling member of one frame engaging the female coupling member of the other frame in coupling the frames of both connectors.

2. A structure as defined in claim 1, wherein the first named means of the frame of one connector comprises projecting portions at sides of the connector body disposed in recessed portions of the frame, the second named means comprises elongated members arranged at sides of the frame and engaging said projecting portions on the connector body, and means fixing said members to the frame.

3. A structure as defined in claim 1, wherein the second named means of the frame of one connector includes a box-shaped casing having, at its end portions, threaded bearings overlying the frame ends, and the frame includes mounting and alinement members in threaded engagement with said bearings to secure the casing to one surface of said frame.

4. A framed 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 the side projections of said body in retaining the body in the frame, and the coupling ends of said frame having, within peripheral boundaries of said ends, male and female alinement and coupling means for alinement and coupling with female and male alinement and coupling means respectively of a companion connector.

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