Nov. 27, 1951 I. F. MATTHYSSE 2,576,527

ANGULARLY ADJUSTABLE WIRE TO BAR CONNECTOR

Filed July 25, 1945

FIG. 1.

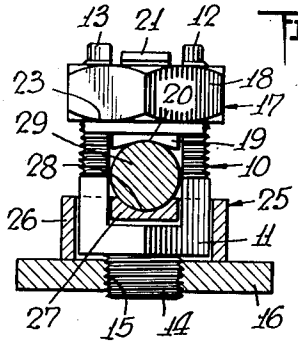


FIG. 2.

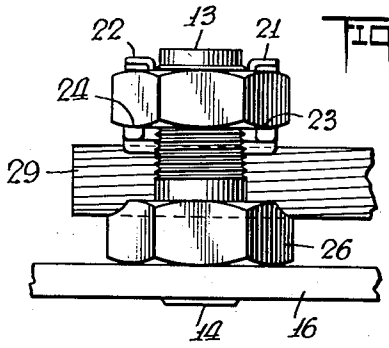


FIG. 3.

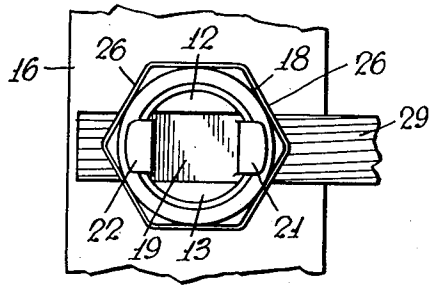


FIG. 4.

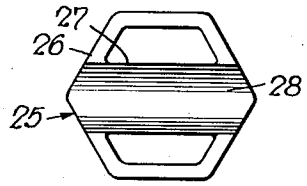


FIG. 5.

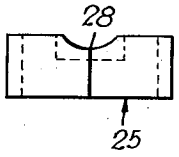


FIG. 6.

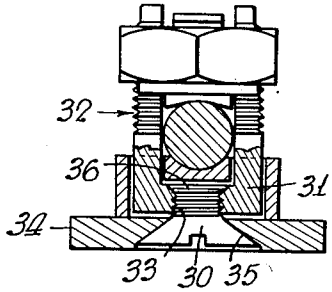


FIG. 7.

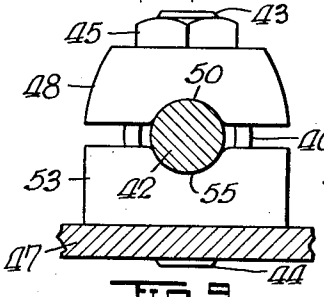


FIG. 8.

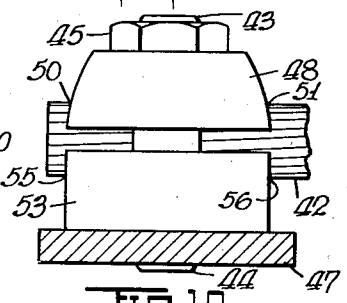


FIG. 9.

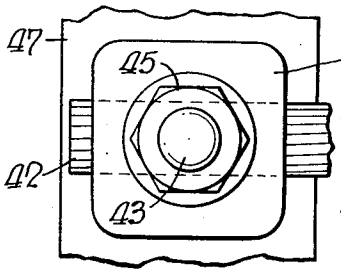


FIG. 10.

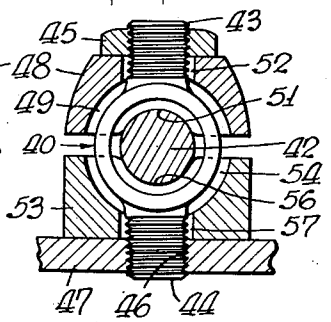


FIG. 11.

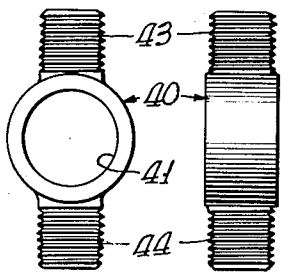


FIG. 12.

FIG. 13.

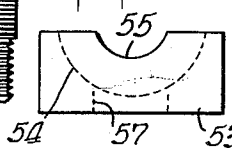
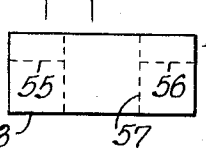


FIG. 14.



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ANGULARLY ADJUSTABLE WIRE TO BAR CONNECTOR

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Application July 25, 1945, Serial No. 606,981

3 Claims. (Cl. 24—125)

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My invention relates to swivel connectors for joining conductors such as wire or cable to the flat surfaces of bus bars and the like.

Electrical junction-boxes, fuse boxes, switch boxes, etc., are usually equipped with flat copper bus bar to which the incoming and outgoing electric wires are connected. These bus bars are generally equipped with electrical connectors to receive the wires and the wires must be bent so that their ends will slip into the openings in the connectors. This is not difficult when the wires are very small, but for large size wires, and particularly in compact boxes having very little wiring space it is difficult to bend the wire to just the correct angle to permit it to enter the connector. One means used to relieve this situation has been to provide connectors having the cable entrance grooves set at the angle which requires the minimum of bending of the wire. This method is not entirely satisfactory since the correct angle depends on the way the wire is placed in the wiring space, on the amount of slack left in the wire, on the type of wire stranding, the type of wire insulation and on the size of the wire.

Another means has been to use connectors which are tightened to the bus bar after they are set to the desired angle and the wire inserted. An obvious form of such a connector is the common terminal connector or lug, having an extending flat tongue for bolting to the bus bar. The wire may be inserted and tightened into such a terminal after which the bolt in the flat tongue is tightened. Such a connector has the disadvantage of requiring additional space due to the length of the flat tongue. In addition, two tightening operations are required, one for the wire and one for the flat tongue.

It is an object of this invention to provide an electrical connector for joining a wire to a flat bus bar such that the connector may rotate or swivel in the plane of the bus bar so that the wire may be connected at any angle with respect to the bus bar.

An additional object is to provide such a swivel connector which becomes locked to the wire and bus bar in a single tightening operation. A further object is to provide a compact swivel connector to accomplish the aforementioned objects.

Other objects are to provide such a swivel connector so that the wire may be laid into an open groove for those cases where it is difficult to enter the end of the wire into an opening; to provide a swivel connector that can take a wide range of conductor sizes; to provide a swivel connector that can be attached to the flat bus bar with no special skill; and to provide a swivel connector which does not require removal of the bus bar from the box in order to install the connector.

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I accomplish these and other objects and obtain my new results as will be apparent from the device described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing in which:

Fig. 1 is a front elevational view of a split bolt connector employing my invention shown in section attached to a flat bus bar.

Fig. 2 is a side elevation of the connector shown in Fig. 1.

Fig. 3 is a plan view of the connector shown in Fig. 1.

Fig. 4 is a plan view of the pressure transferring element.

Fig. 5 is a front elevation of the element shown in Fig. 4.

Fig. 6 is a front elevational view similar to Fig. 1 showing an alternative means for attachment to the bus bar.

Fig. 7 is a front elevational view of an eye-bolt type of connector employing my invention, attached to a bus bar.

Fig. 8 is a side elevation of the connector shown in Fig. 7.

Fig. 9 is a plan view of the connector shown in Fig. 7.

Fig. 10 is a sectional view of the connector shown in Fig. 7.

Fig. 11 is a front elevational view of the eyebolt.

Fig. 12 is a side elevation of the eyebolt shown in Fig. 11.

Fig. 13 is a front elevational view of the pressure transferring element.

Fig. 14 is a side elevation of the element shown in Fig. 13.

Referring more in detail to the drawing, reference numeral 10 designates a connection body or split-bolt type of connector having a head 11, and two extending threaded and semi-cylindrical legs 12 and 13. A threaded stud or securing means 14 longitudinally extends from the head, in the opposite direction of the legs, and engages a threaded aperture 15 in the supporting structure or bus bar 16.

A follower or pressure applying section 17 consists of the nut or pressure producing means 18 held captive by a U-shaped pressure bar 19, having a conductor engaging surface 20 and two extending ears 21 and 22 which are bent over as shown in Fig. 1 to hold the nut captive against

the shoulders 23 and 24 of the bar 19, as shown in Fig. 2.

The bar 19 has a width slightly less than the distance between the legs 12 and 13 of the bolt, and a length sufficient to provide a satisfactory conductor engaging surface 20 on the bottom thereof.

A pressure transferring element or washer 25 constituting the conductor receiving section is provided for transferring the pressure applied to the conductor, to the bus-bar 16. It consists of an annular ring 26, having an inner space sufficient to enclose the head 11 of the splitbolt, with a diametrically extending bridge 27 provided with a conductor receiving surface 28 having a width sufficient to allow it to be positioned between the legs of the splitbolt. The bridge extends across the ring on one side thereof, leaving sufficient clearance at the bottom for containing the head 11 of the split-bolt.

The nut 18, and the outer surface of the washer may be hexagonally shaped to facilitate the application of a wrench thereto.

In application, the split bolt is inserted into the washer with the bridge of the washer positioned between the legs of the split-bolt. The connector stud 14 is then threaded into the bus bar as far as it will go, and at the same time keeping the split-bolt lined up with the wire it is to receive which is then inserted therein. The nut is tightened causing the follower to force the conductor against the bridge of the washer which is thus pressed to the bus-bar with sufficient pressure to keep the split-bolt from rotating on the stud.

The bottom surface of the washer may be roughened to prevent rotation while the nut is being tightened.

It will be seen that the conductor or member 29 is directly in contact with the washer which transfers the current to the bus-bar. Thus the split-bolt may be made of high strength alloy without regard to conductivity values. The washer being subject to compressive stresses only may be made of metal having high conductivity values with relatively low tensile strength.

A large number of conductor sizes may be accommodated by this construction being limited only by the space between the legs of the split-bolt.

In Fig. 6, instead of the stud 14, a screw-headed bolt 30 may be used. Thus the head 31 of the split-bolt 32 is shown provided with a threaded aperture 33, and the bus-bar 34 is provided with a reamed hole 35 to permit the bolt 30 to enter. The end of the bolt may be peened over as at 36 after attachment to the split-bolt, to prevent separation.

In Figs. 7 to 14, an eye-bolt construction is shown which may employ the invention. This alternative form comprises a connection body or eye member 40 haveing an inner bore 41 sufficient to permit the conductor or member 42 to be inserted therein. Threaded studs 43 and 44 extend in line therefrom, one for engaging a nut or pressure producing means 45, and the other for threaded engagement with a threaded aperture 46, in the supporting structure or bus-bar 47.

A cap or pressure applying section 48 having a hollow portion 49 for receiving the upper portion of the eyebolt, is provided with two conductor engaging shoulders 50 and 51, and a central aperture 52 for the stud 43 of the eyebolt.

A pressure transmitting washer or conductor receiving section 53 is similarly provided with a

hollow portion 54 for the eyebolt, two conductor engaging surfaces 55 and 56, and a central aperture 57 for the stud 44 of the eyebolt.

In assembling this modification, the stud 44 of the eyebolt is inserted through aperture 57 of the washer and the eyebolt threaded to the bus-bar. The conductor is thereafter inserted through the eye, and the cap placed over the upper stud. The nut is tightened to force the cap against the conductor, the pressure being transmitted through the washer to the bus-bar.

The eyebolt type of swivel connector has the advantage over the previous designs of using a smaller tightening nut, making it easier to tighten in close quarters. It is also more compact in length and width, making possible a greater number of connections, in a given area.

I have in the foregoing described devices which broadly permit a swiveling action in the plane of the bus-bar so that the conductor may be secured thereto in any angle. A single tightening action locks the conductor or member to the connector and the connector to the supporting structure or bus-bar in the desired position.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiment herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. An angularly adjustable connector for fixedly connecting an extending member to a supporting structure in any one of a plurality of positions about the axis of the connector comprising a connector body having an opening therein for positioning the extending member therethrough, securing means on one end of the connector body for detachably and rotatably securing the connector to the supporting structure in the selected position, a pressure producing element mounted on and secured to the other end of the connector body having a pressure applying surface for engaging the extending member, and a pressure transferring element adapted to be positioned between the extending member when inserted and the supporting structure, and having a conductor receiving surface for engaging the extending member and on the opposite side thereof an engaging surface for the supporting structure, said pressure transferring element and connector body being formed to inter-engage one another to prevent relative rotary motion while allowing relative axial movement therebetween, said pressure transferring element being axially positioned with respect to the connector body so as to form a support for the inserted extending member whereby pressure from the pressure producing element will be transmitted to the inserted extending member and to the pressure transferring element thereby locking it to the supporting structure against the action of the securing means.

2. The connector of claim 1 wherein the connector body is a split bolt having threaded legs, and the pressure producing element is a nut therefor.

3. The connector of claim 1 wherein the connector body is an eyebolt having a threaded stem, and the pressure producing element is a nut therefor.

IRVING FREDERICK MATTHYSSE.

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