

Oct. 16, 1956

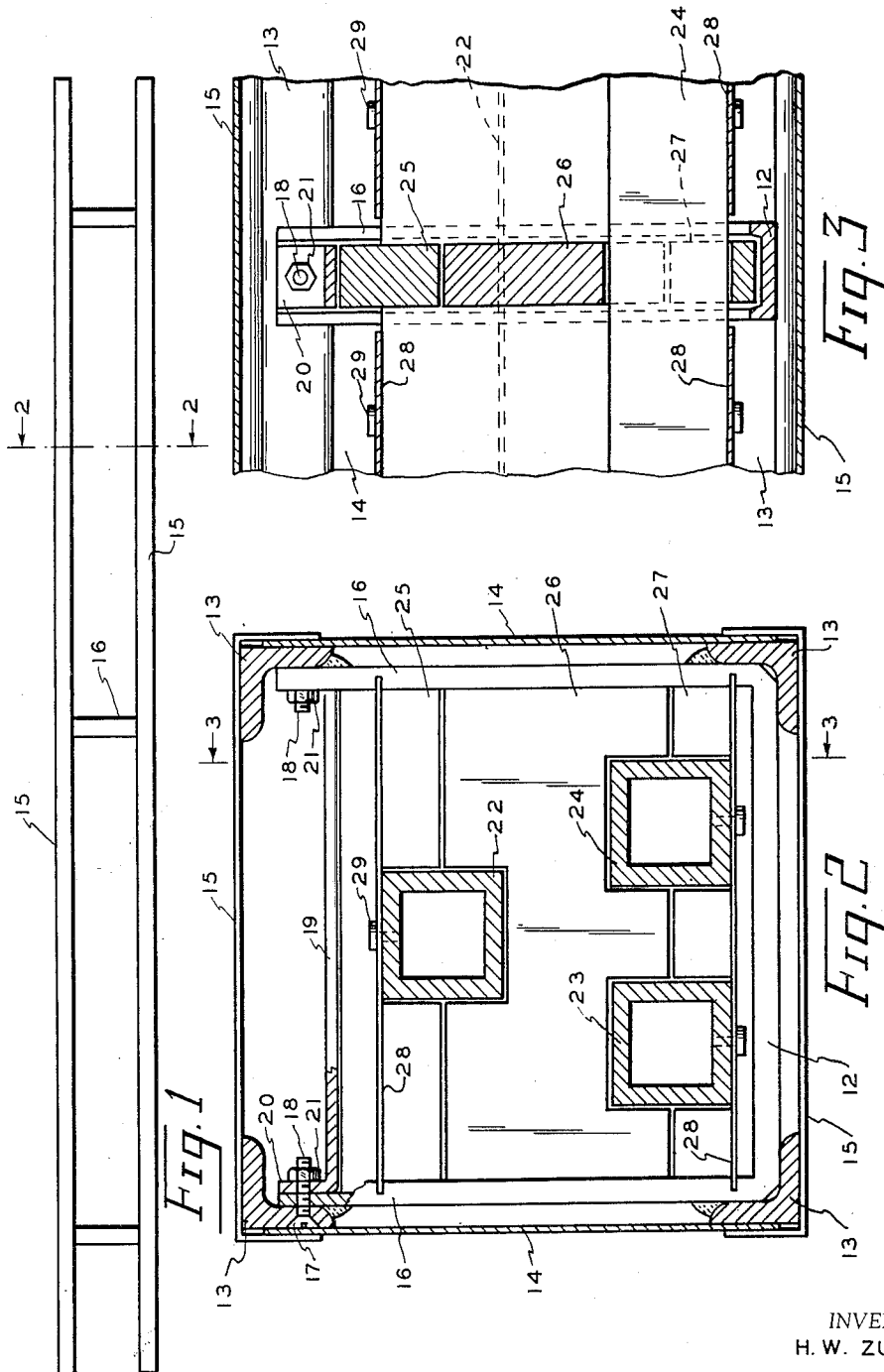
H. W. ZUCH

2,767,241

BUSBAR DUCT

Filed Aug. 1, 1952

3 Sheets-Sheet 1



INVENTOR
H. W. ZUCH

BY *Gustave Miller*
ATTORNEY

Oct. 16, 1956

H. W. ZUCH

2,767,241

BUSBAR DUCT

Filed Aug. 1, 1952

3 Sheets-Sheet 2

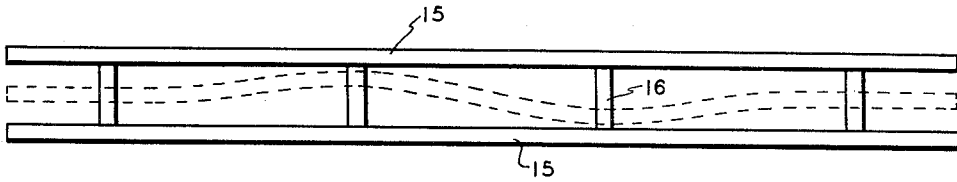


Fig. 4

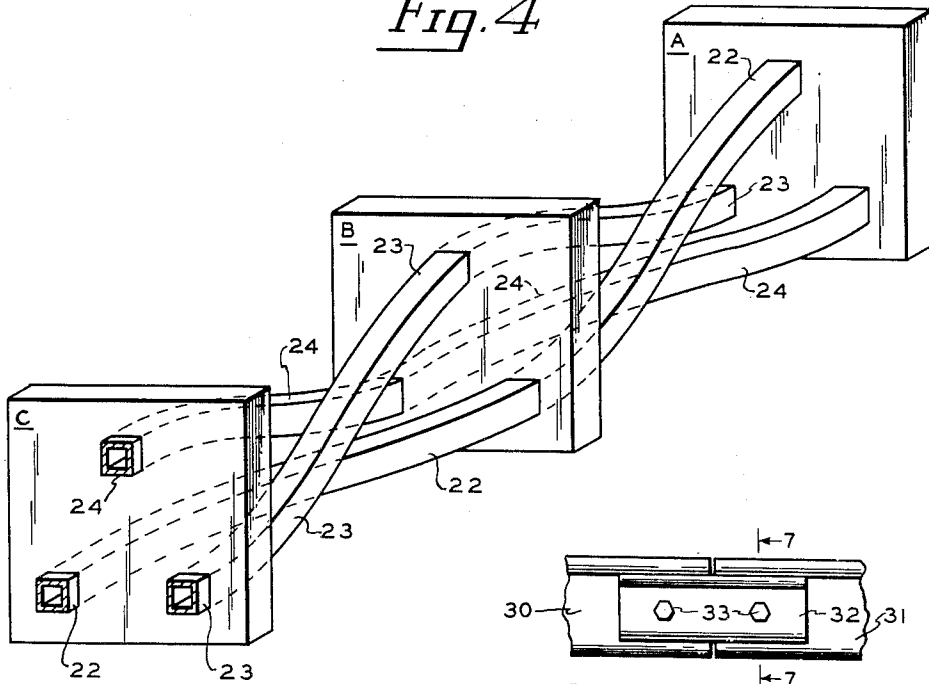


Fig. 5

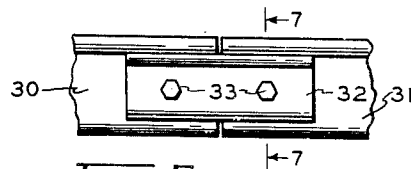


Fig. 6

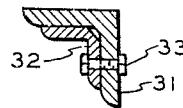


Fig. 7

INVENTOR

H. W. ZUCH

BY *Gustav Miller*

ATTORNEY

Oct. 16, 1956

H. W. ZUCH

2,767,241

BUSBAR DUCT

Filed Aug. 1, 1952

3 Sheets-Sheet 3

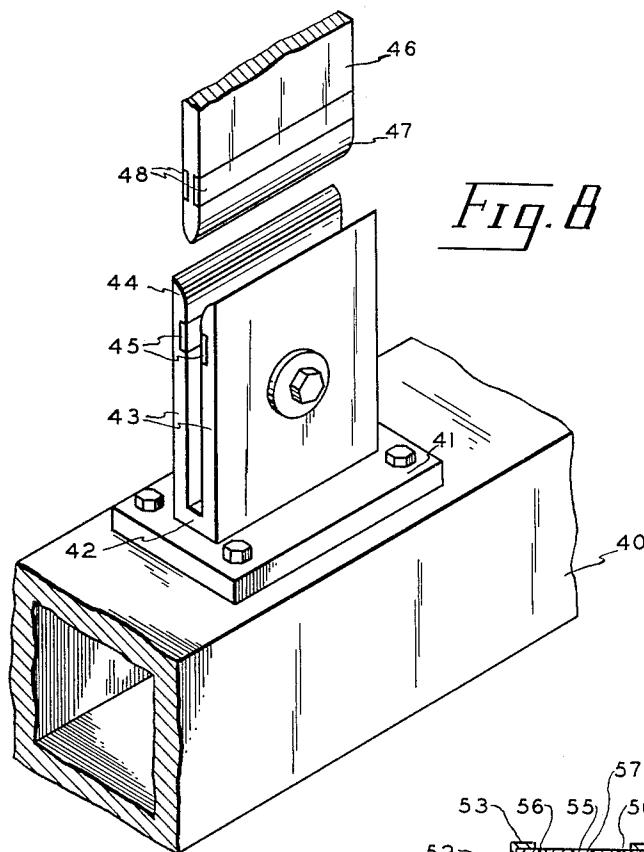


Fig. 8

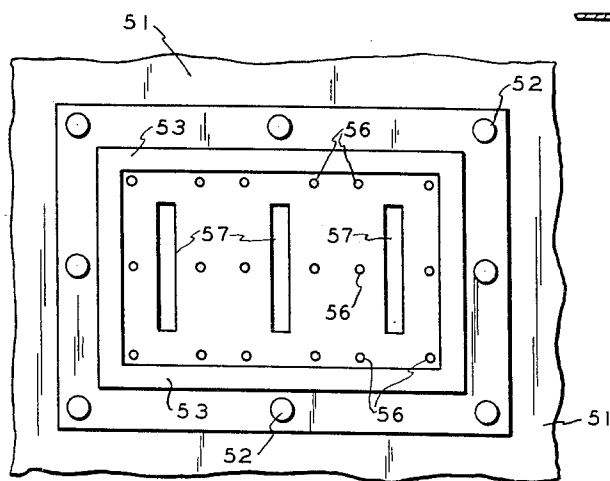


Fig. 9

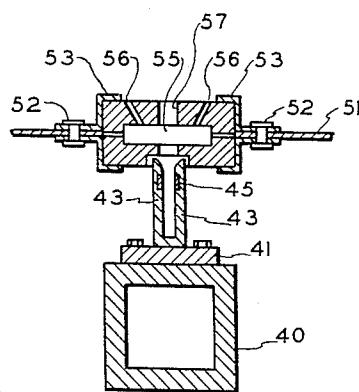


Fig. 10

INVENTOR
H. W. ZUCH

BY *Gustav Miller*

ATTORNEY

1

2,767,241

BUSBAR DUCT

Helmuth W. Zuch, Austin, Tex.

Application August 1, 1952, Serial No. 302,277

1 Claim. (Cl. 174—99)

This invention relates to improvements in busbar ducts, and more particularly to the provision of a busbar duct which enables a better arrangement and more efficient operation of busbars.

In busbars carrying large currents, such as 1600 to 2000 amperes the arrangement of the busbars in a duct is considerably important in order to minimize stresses between the busbars, and to reduce the losses due to heat, as the resistance of the busbar increases with rise in temperature. In accordance with this invention, square tubular conductors are used and all are enclosed in one busduct.

It is an object of the invention to provide a busduct system in which the conductors are arranged in a triangular configuration to decrease the losses between conductors.

A further object is the provision of a busduct system which is self-ventilating and cooling, and can be used with forced cooling means to pass a cooling medium through the conductors, thus increasing the current carrying capacities and produce appreciable economies in metal.

A further object is to provide a busduct system enabling the arranging of conductors spirally to decrease losses over long runs of conductors.

A further object is to provide means for supporting conductors to reduce shock damages and enable free movements of conductors in all planes to minimize undesirable stresses in installations.

A further object is to provide a conductor and arrangement enabling a full and complete range of "plug-in" device connections regardless of the size of the device or rating of the conductor so long as the capacity of the device is not larger than that of the conductor.

A further object is to provide a support and enclosure structure which minimizes hysteresis losses and reduces temperature rise, and enables a saving in metal and manufacturing costs.

These and other objects are attained by the novel arrangement and construction of parts hereinafter described and claimed, and illustrated by the accompanying drawings, forming a part hereof, and in which:

Fig. 1 is an elevational view of a busduct embodying the invention, with one side wall removed.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, showing conductors mounted in a separator.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is an elevational view of the busduct with a spirally mounted conductor indicated by dotted lines.

Fig. 5 is a perspective schematic view including three different separators showing the path of the conductors therethrough.

Fig. 6 is a side view of a splice for connecting two conductors.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6.

Fig. 8 is a perspective view of plug-in arrangement for connecting a device to a conductor.

Fig. 9 is a plan view of an assembly for accommodating a plurality of plug-in connectors.

Fig. 10 is a sectional view of a conductor and plug-in connector.

2

Referring to the drawings, the busduct is shown to comprise a frame including four metal angles 13 to which are secured steel side cover plates 14, and enclosed by removable aluminum covers 15. The lower angles 13 are welded to a metal U-shaped channel 12 having legs 16. The upper angles 13 (see Fig. 2) are countersunk at 17 and receive bolts 18 which pass through legs 16 and the upturned ends 20 of an aluminum bar 19. Nuts 21 are threaded on the bolts 18.

Square tubular conductors 22, 23, and 24 are arranged in a delta or triangular formation as shown in Fig. 2, and are supported by separators 25, 26, 27 positioned in the U-shaped channel 12 and held in position by the bar 19. The separators are made of an insulating material such as ebony, asbestos or the like.

The conductors are secured by phenolic rivets 29 to strips 28 of a phenol condensate product such as phenolite.

In Fig. 4 is shown in dotted lines a conductor spirally arranged in a busduct. In Fig. 5, the path of the conductors is shown through three separator sections A, B, and C. For example, conductor 22 goes from the upper portion of section A to the right side of the lower portion of section B, and thence to the left side of the lower portion of section C, and thence to the upper portion of a succeeding section. The other conductors 23 and 24 follow similar paths. This spiral arrangement of the conductors minimizes stresses, hysteresis losses, and produce a more efficient operation of the conductor.

In Figs. 6 and 7 is shown a splice for connecting two sections 30 and 31 of a conductor. The splice comprises a plate 32, secured to the sections 30 and 31 by bolts or rivets 33.

From the above description it will be seen that there has been provided a busduct which is light in weight and easily installed, and due to the saving in metal, can be manufactured at relatively low cost. The spiral arrangement of the conductors through the various separator sections decreases losses over long runs; and the tubular type of conductor facilitates ventilation and cooling to increase the current carrying capacity.

In Fig. 8 is shown a "plug-in" device for connecting a conductor to a device requiring electrical power. Attached to the conductor 40 is a plate 41 having fixed thereto a U-shaped member 42 having blade receiving members 43, the upper ends of which are rounded at 44 to facilitate insertion of a blade 46 having a rounded end 47. The members 43 have silver inlays 45 arranged to contact silver inlays 48 on the blade 46. The underside of plate 41 and the upper side of conductor 40 are silver plated.

In Fig. 10 is shown a cover 51 for contact blades 43. Attached to cover 51 by rivets 52 is a casing 53 in which is mounted an ebony asbestos block 54 having an arc quenching chamber 55 and gas outlet passages 56.

In Fig. 9 is shown a cover plate 51 having a casing 53 attached thereto to accommodate a plurality of blades, the casing having three slots 57 for three blades 46 and gas escape openings 56.

The structure shown in Figs. 8, 9 and 10 facilitates connecting external circuits to conductors 40 easily and with safety, as arc is quickly quenched and the gases dissipated.

The foregoing description is to be considered as illustrative and not limitative of the invention of which modifications can be made without departing from the scope and spirit of the appended claim.

The invention having been described what is claimed is:

In combination with an electrical busduct, of U-shaped cross section, a plurality of tubular conductors, said conductors being polygonal in cross section, a plurality of

rectangular supports for the conductors, said supports being made of insulating material and having a like plurality of apertures of the same polygonal shape as the conductors for the passage of the conductors to hold the conductors in polygonal formation, said apertures being slightly larger than the conductors to enable loose sliding of the conductors through the apertures, the apertures being small enough to prevent rotation of the conductors to enable free expansion and contraction of the conductors, said supports being spaced at intervals longitudinally of the duct, and means to prevent rotation of the supports in the duct.

2,098,414
2,138,617
2,226,386
2,306,527
5 2,320,093
2,400,223
2,533,545
2,569,223
2,619,515
10 2,626,301

De Mask ----- Nov. 9, 1937
Scott ----- Nov. 29, 1938
Ramsey ----- Dec. 24, 1940
Daniels ----- Dec. 29, 1942
Moore ----- May 25, 1943
Cole ----- May 14, 1946
Ainsworth ----- Dec. 12, 1950
Bowers ----- Sept. 25, 1951
Doane ----- Nov. 25, 1952
Hammerly ----- Jan. 20, 1953

References Cited in the file of this patent

UNITED STATES PATENTS

15

1,860,498 Ford ----- May 31, 1932