Feb. 19, 1963 T. SZENTAL 3,078,438

SINGLE OR STRIP CONNECTORS

Filed Oct. 21, 1959

Fig-1

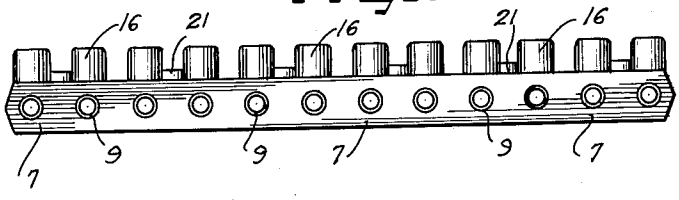


Fig-2

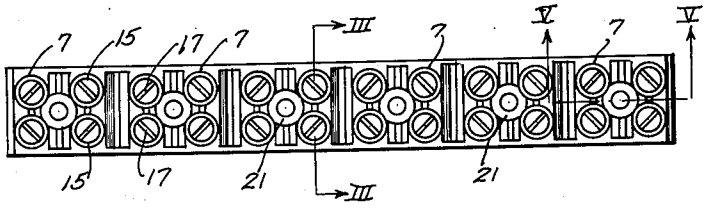


Fig-3

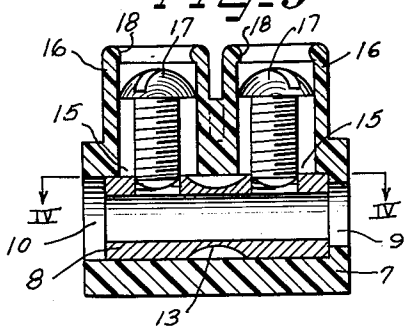


Fig-4

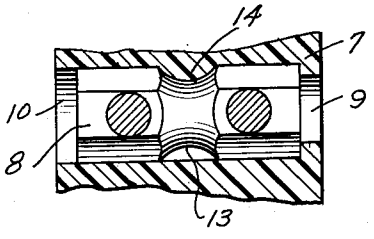


Fig-5

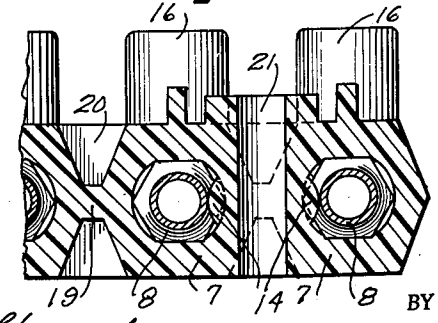
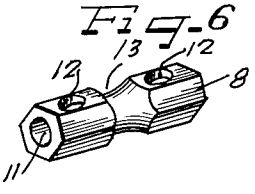


Fig-6



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SINGLE OR STRIP CONNECTORS

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This invention relates to single and multiple connectors, and especially to strip connectors of the type in which wires are inserted and secured in a conducting bushing which is mounted within an insulating base.

Presently known strip connectors of the type referred to above usually comprise a series of separate two-wire connectors joined together by web portions, which are made of insulating material and are located between the separate connectors to form a continuous strip. Each connector usually comprises a substantially cylindrical, hollow shell of insulating material. The shell is provided with two radially directed apertures through which screws are inserted. A substantially cylindrical, outwardly projecting, elongated collar surrounds each aperture, being usually moulded integrally with the shell. A bushing of conducting material is located within the insulating shell and is retained therein by two screws which penetrate through the apertures in the shell and are adapted to engage screw-threaded holes in the bushing. The wires to be connected are inserted into the bushing from both ends thereof and are secured therein by further tightening of the two screws. The elongated collars provided on the outside of the shell serve to prevent accidental contact with the heads of the screws, thereby minimizing the risk of shock or short circuit. The conducting bushing is similarly protected by the insulating shell which envelops it. Generally the insulating shells, the collars thereon, and the webs joining a number of shells together into a strip, are moulded integrally from a hard, brittle, insulating plastic or like material, such as that marketed under the registered trademark "Bakelite." If desired, any required number of connectors may be separated from the strip by cutting through a web portion at the appropriate place along the strip.

Strip connectors of the type described above suffer from three main disadvantages. Firstly, in order to retain the bushing within the shell and the screws within the collars it is necessary, when assembling the connector, to bring the screws into threaded engagement with the respective bushing. This is a separate operation which has to be carried out in the manufacture of these strip connectors and accordingly adds to the expense of such manufacture. Secondly, during installation of such a connector, an operator has to unscrew the screws before he can insert the wire within the bushing and then has to tighten the screws again, thus performing two operations on each screw. This is time-consuming and accordingly adds to the expense of installation. Thirdly, on unscrewing the screws prior to the insertion of the wire into the bushing, an operator may inadvertently remove the screw from engagement with the bushing and, especially if the installation is being carried out with the open ends of the collars directed downwardly, as is often the case with lighting systems, a screw may easily fall out from its collar and be lost. Similarly if both screws are unscrewed from the bushing at the same time, the bushing may fall out from within the shell and be lost. This causes inconvenience and annoyance to the operator and accordingly lengthens the time required for the installation of such a connector.

It is the principal object of this invention to provide a strip or single connector of the type referred to, in which

some or all of the above-mentioned disadvantages are overcome.

According to one aspect of the invention there is provided a single or strip connector of the type referred to above in which the collars surrounding the apertures through which the screws are inserted are each provided with an inwardly directed resilient lip or shoulder.

The conducting bushing may be provided with a recess, and the shell may be provided with an inwardly directed projection which is adapted to co-act with the recess so as to locate the conducting bushing within the shell in its correct position i.e. having the screw openings in the bushing in alignment with the collars on the shell of the connector.

Preferably connectors according to the present invention incorporate a shell which has an opening at one end thereof of such size that the conducting bushing may not penetrate therethrough, and is also provided with an inwardly directed projection, which is adapted to co-act with a corresponding recess in the bushing.

Usually several connectors are joined together into the form of a strip by interconnecting web and flange portions.

In order that the invention may be more fully understood a presently preferred embodiment thereof will now be described with reference to the accompanying drawings in which:

FIGURE 1 is a side elevation of a strip connector comprising twelve individual connectors,

FIGURE 2 is a plan view of the strip connector shown in FIGURE 1,

FIGURE 3 is a sectional view along the line 3—3 in FIGURE 2, showing a single connector in cross-section,

FIGURE 4 is a sectional view along the line 4—4 in FIGURE 3, showing a conducting bushing in plan view,

FIGURE 5 is a sectional view along the line 5—5 in FIGURE 2, showing in part-section a conducting bushing in position within an insulating shell, and

FIGURE 6 is a perspective view of a conducting bushing.

The strip connector described herein is preferably made from polyethylene, but may be made from any other suitable resilient insulating material such as for example, rubber, polyvinyl-chloride or the like. The strip connector comprises twelve or any other convenient number of substantially hexagonal hollow shells **7** which are open at both ends and in which conducting bushings **8** are located. The opening **9** at one end of each separate shell **7** is circular and of such size that a wire may be conveniently inserted through the opening, but is small enough to prevent the bushing **8** from passing through the said opening. The opening **10** at the other end of each separate shell **7** is of convenient size to permit the bushing **8** to be inserted into the shell through this opening. The bushing **8** conveniently comprises a hexagonal bar of copper which is provided with a central bore **11** and two screw-threaded openings **12**, located in one hexagonal face thereof and disposed perpendicularly to the central bore **11**. A constriction **13** is formed in the bushing between the two screw-threaded openings **12**, and an inwardly directed resilient projection **14** is provided within each shell and located so that when the bushing is inserted into the said shell, the projection **14** co-acts with the recess **13** thereby locating and retaining the bushing within the shell. Two apertures **15** are provided in each shell, each being surrounded by an elongated externally projecting cylindrical collar **16** within which a screw **17** is located. The screws **17** may be tightened to engage the screw-threaded openings **12** in the bushing through the apertures **15** in the shell. Each collar **16** is provided at its outer edge with an inwardly directed circumferential resilient lip **18** which may be

deformed elastically to permit the screw 17 to be inserted within the collar 16 and which prevents the screw from falling out of the collar once it has been inserted therein.

The separate connectors, each comprising a shell and two collars, are joined together by web portions 19 which are disposed between adjacent shells 7 and by flanges 20 at either end of the shells, thus forming a continuous strip such as that shown in FIGURES 1 and 2. The strip comprises a number of individual connectors arranged side by side in parallel relationship. The strip is provided with sockets or mounting fixtures 21, conveniently located on alternate web portions 19, by means of which the strip may be attached to a wall, switchboard or other base surface on which it is to be installed in use. If required, any desired number of connectors may be separated from the strip by cutting through the web and flange portions at the appropriate places.

It has been found that in the embodiment described above it is only necessary to provide a single projection, such as that denoted by 14, within each shell. These projections are preferably located adjacent the web portion 19 in which the mounting socket 21 is formed so as to provide a thickening of the web in the longitudinal direction of the strip connector. This thickening enables the mounting socket to be accommodated at such locations on the strip, without unduly weakening the web.

A connector of the type described herein is cheaper to manufacture and more convenient to use than connectors at present in use. In the manufacture of a connector according to the invention, the insulating base is moulded integrally from a suitable resilient material and then it is possible to insert all the bushings into the shells in one operation by means of a press which forces them within the shells where they are then retained by the resilient projections. All the screws may also be inserted in the one operation by means of another press which forces them within the collars. In this way manufacturing time and therefore cost is substantially reduced, as it is no longer necessary to secure the bushings within the shells and the screws within the collars by tightening the screws to engage with the bushings.

When using a single or strip connector according to the invention, the bushings or screws are not likely to fall out of the connector as they are securely retained within their respective seats and may not be displaced therefrom without the application of quite a considerable force. The time taken for the installation of such a connector is also reduced as it is not necessary for an operator to disengage the screws from the respective bushing before inserting the wire to be connected into the bushing. In a connector according to the present invention the screws are merely located adjacent to their mating apertures in the bushings, thus leaving the hollow central portion of each bushing free for the insertion of the wire which may then be secured within the bushing by tightening of the respective screw. In this way a strip connector according to the present invention eliminates a previously necessary step in the process of installation. Thus the time required for the installation of such a connector is considerably reduced.

In view of the features mentioned above it is clear that single or strip connectors according to the present invention eliminates various difficulties encountered in the past when using known connectors of this type and accordingly provides a substantial improvement over the prior art in this field.

I claim:

1. A connector comprising a hollow conducting bushing having an inwardly directed screw threaded opening, an insulating shell enclosing the bushing and having an aperture corresponding to said opening in the bushing, an outwardly projecting collar surrounding said aperture and an inner resilient abutment in an outer end of said collar, spaced from the aperture to retain a screw therein for insertion in said aperture, said abutment being deformable elastically to permit the screw to be inserted within the collar and thereafter to prevent the screw from falling out of the collar.

2. A connector comprising a hollow conducting bushing having two radially directed screw threaded openings, an insulating shell enclosing the bushing and having an end opening for selective insertion or removal of the bushing, said insulating shell having two apertures corresponding to said openings in the bushing, an outwardly projecting collar surrounding each of said apertures, a screw within each of the collars to engage the bush, and an inwardly directed resilient abutment in each of the collars, said collars having an inner diameter greater than the maximum diameter of said screws, the said abutments having an inner diameter less than the maximum diameter of said screws and being deformable elastically to permit the screws to be inserted within the collars and thereafter preventing the screws from falling out of the collars, and means releasably retaining the bushing within the insulating shell.

3. In a connector for joining electric wires in conductive relationship, an insulating shell for a hollow bushing of the type having an inwardly directed screw threaded opening for receiving a screw to secure a wire in the bushing, an outwardly projecting collar on the shell for surrounding an aperture in the bushing, and an inner resilient abutment in the collar spaced a predetermined distance radially from the juncture of the collar with the shell for releasably retaining a screw within the collar so that when a conducting bushing of the type described is enclosed in the insulating shell, a screw for insertion in the aperture of the bushing may be inserted within the collar and thereafter prevented from falling out of the collar.

4. A connector comprising a hollow conducting bushing having two radially directed screw-threaded openings, an insulating shell enclosing the bushing and having two apertures corresponding to said openings in the bushing, outwardly projecting collars surrounding said apertures, screws within the collars to engage the bushing, and inwardly directed resilient abutments on the collars, said collars having an inner diameter greater than the maximum diameter of said screws, the said abutments having an inner diameter smaller than the maximum diameter of said screws and being deformable elastically to permit the screws to be inserted within the collars and thereafter preventing the screws from falling out of the collars while being unrestrainedly adjustable in said collar.

5. A connector as claimed in claim 4, and further comprising a radially internally directed resilient projection in said shell, said shell being open at one end, said bushing having a recess mating with said projection whereby the bushing is retained within the shell after being inserted therein past said projection, the other end of the insulating shell being at least partially closed.

6. A strip connector comprising a plurality of individual connectors as claimed in claim 4 and including integral transverse webs joining the individual connectors axially of the individual bushings and flanges on each end of each of the webs extending axially of the strip and perpendicularly of the webs, to reinforce the strip.

7. A connector comprising a hollow conducting bushing having two radially directed screw-threaded openings and a recess disposed between said openings, an insulating shell enclosing said bushing and having two apertures corresponding to said openings in the bushing, a radially inwardly directed resilient projection in said shell mating with said recess and thereby retaining said bushing within said shell, outwardly projecting collars surrounding said apertures, screws within said collars to engage said bushing, said collars having an inner diameter greater than the maximum diameter of the screws therein, and an inwardly directed resilient abutment on each of said collars having an inner diameter smaller than the maximum diameter of the screw in the collar therefor, said abutments being elastically deformable to permit said screws to be readily inserted and re-

tracted relative to the collars, selectively, and affording unrestrained adjustment of the screws within the collars while preventing the screws from falling out of the collars.

8. A strip connector comprising a plurality of individual connectors as claimed in claim 7 and including integral transverse webs joining the individual connectors axially of the individual bushings and flanges on each end of each of the webs extending axially of the strip and perpendicularly of the webs, to reinforce the strip.

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