

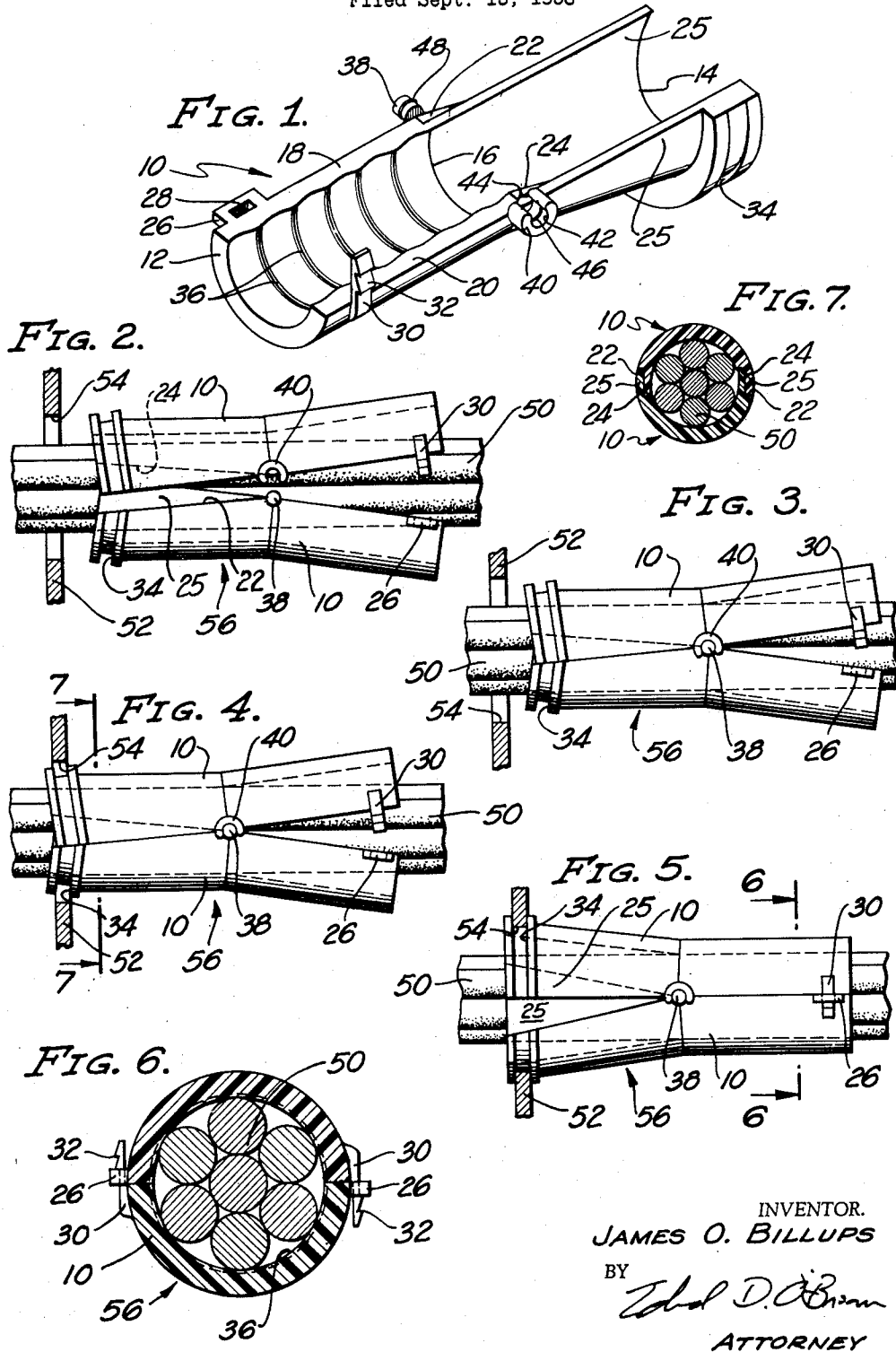
July 12, 1960

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2,945,085

THROUGH-WALL DIVIDED CONNECTOR

Filed Sept. 15, 1958



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THROUGH-WALL DIVIDED CONNECTOR

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Filed Sept. 15, 1958, Ser. No. 761,250

11 Claims. (Cl. 174-153)

This invention relates to new and improved connectors for groups of wires, electrical cables or the like.

Connectors of the broad type to which this invention pertains are commonly used in supporting and holding a group of wires or an electrical cable or any other similar type of structure in a given location with respect to some other object. Thus, they are frequently used in order to support and hold a group of wires as such wires pass through an opening within a bulkhead. The connectors of the invention may also be used so as to hold electrical pipe or electrical cable with respect to a suitable fixture such as, for example, a common junction or terminal box. However, this invention is not limited to connectors capable of being used in such applications. The connectors herein described may be employed for holding pipe designed to convey fluids or for holding a plurality of individual small tubes, such as are frequently used in various remote reading applications.

The appropriate technical literature pertaining to connectors clearly shows that a large number of different types of connector structures have been developed in the past. Specifically, a number of different connectors have been developed which consist of two metal parts or sections mounted with respect to one another so that they may be slipped into an appropriate location and then rotated to an operative position in which these sections are attached to one another as by screws, bolts, etc. Prior devices of this category are not believed to have been widely adapted by various industries. It is believed that a number of factors are responsible for this.

The cost of any connector of the type to which this invention pertains is always a very material factor. In general, the prior connectors of the two section type briefly indicated above tend to be relatively expensive to manufacture because of the plurality of dies normally required with them. Also in the past these connectors have usually been made of metal. Metal is normally considered a rigid material and is incapable of yielding as may be required in many applications in developing a holding action with respect to an electric cable or various other items. Further, metal itself is electrically conductive; this is very disadvantageous where it is desired to insulate wires or cable or the like from an appropriate mounting.

A broad object of this invention is to provide new and improved connectors of a two part variety briefly indicated in the preceding discussion. A more specific object of this invention is to provide connectors of this type which employ identical sections. A further object of this invention is to provide connectors of this type in which the sections are preferably manufactured out of a flexible, somewhat resilient, non-conductive material. A still further object of this invention is to provide two part connectors in which the sections or parts are formed so as to include as an integral part of them what may be termed separate "locking" and "holding" means.

Because of the nature of this invention it is not considered necessary to set forth in this specification a fur-

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ther long list of various objects and advantages of it. The various advantages of this invention and further objects of it will be fully apparent to those skilled in the art to which this invention pertains from a detailed consideration of the remainder of this description including the appended claims and the accompanying drawing in which:

Fig. 1 is a perspective view of a part or section of a connector of this invention;

Figs. 2, 3, and 4 are side elevational views illustrating the manner in which connector sections of this invention are assembled and used;

Fig. 5 is an enlarged side elevational view, partially in section, showing a connector section of this invention;

Fig. 6 is a cross sectional view taken at line 6-6 of Fig. 5; and

Fig. 7 is a cross sectional view taken at line 7-7 of Fig. 4.

It is to be understood that the accompanying drawing is primarily intended so as to illustrate a presently preferred form or embodiment of this invention. Those skilled in the art to which this invention pertains will realize that the precise connector shown can be modified in a number of different manners in accordance with conventional engineering practice without departing from the essential features or principles of this invention as hereinafter explained.

As an aid to understanding this invention it can be stated in essentially summary form that it relates to two part connectors as briefly indicated above. Each of the parts in such a connector is identically formed so as to include two shell-like body sections located so that their axes meet at an obtuse angle. Adjacent to the juncture between these axes a shaft and a bearing are located as hereinafter described. Further, holding means and locking means are located upon the remote ends of the body sections employed. This type of structure is designed so that shaft of one of the connector parts may be held within the bearing upon the other part in such a manner that the two parts are capable of being rotated with respect to one another in use.

This general type of construction and the reasons for it are best more fully explained by referring to the accompanying drawing. In Fig. 1 there is shown a connector part 10 having integral first and second sections 12 and 14, each of which is preferably of a semi-circular, shell-like configuration. The sections 12 and 14 are located with respect to one another so that their axes are located at an obtuse angle with respect to one another and so that they meet at a common line 16. Also, the part 10 is formed so that the section 12 has side edges 18 and 20 and so that section 14 has side edges 22 and 24. The side edges 18 and 22, and 20 and 24 are located with respect to one another at an obtuse angle. If desired, shields 25 may extend from the side edges 20 and 24 as shown. These shields 25 increase in height from the junctions of the side edges 18 and 22, and 20 and 24, and are highest at the ends of the section 14.

It will be also noted that adjacent to the end of the section 12 on the side 18 there is located on this section a small tab 26 having a generally rectangular opening 28 formed therein. At the same end of the section 12 on the side 20 there is located another tab 30 having a serrated ridge-like exterior surface 32. Preferably the tabs 26 and 30 extend generally tangentially from the exterior of the section 12. The tabs 26 and 30 are "locking means" adapted to be used as hereinafter explained. "Holding means" on the part 10 are formed on the section 14 and consist of an exterior groove 34 formed on this section so as to extend completely around it at the end of the section 14 remote

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from the section 12. If desired, the interior of the section 12 may be provided with a plurality of transverse extending ridges 36 which serve a purpose as hereinafter described.

At the juncture of side edges 18 and 22 there is located on the exterior of the part 10 an axle or shaft 38. At the other side of the part 10 adjacent to the intersection of the side edges 20 and 24 there is formed a bearing 40 which is adapted to rotatably hold an axle of the same dimension as the axle 38. Preferably the bearing 40 is formed so as to have a slot 42 located therein, which slot opens in the same direction as the open side of the sections 12 and 14. If desired the slot 42 may be formed so as to have slightly overhanging shoulders 44 adapted so that an axle may be firmly held within a bearing 40 with a so-called snap type motion.

Both the axle 38 and the bearing 40 preferably have aligned axes which intersect the axes of sections 12 and 14 at a common point. Further, preferably the common axes of the axle 38 and the bearing 40 are located so as to coincide with a line drawn across the part 10 where the side edges 18 and 22, and 20 and 24 come together. In order to prevent lateral movement of parts such as the part 10 if necessary, it is possible to provide in the slot 42 a groove 46 extending perpendicular to the axis of the bearing 40 and to provide a correspondingly shaped ridge 48 in the axle or shaft 38.

The entire part 10 is preferably manufactured out of a somewhat flexible, somewhat resilient material. This entire part may be conveniently manufactured with a comparatively low cost die by appropriate known injection molding techniques out of a variety of materials, such as a number of different commercial available grades of polyethylene, various plasticized vinyl polymers or the like.

When parts 10 are manufactured from such materials two of these parts may be used together so as to hold a group of wires 50 with respect to a mounting member such as a bulkhead 52 as indicated in Figs. 2-5 of the drawing. For such use the bulkhead 52 has a circular opening 54 formed therein through which the wires 50 pass; this group of wires is of less diameter than the diameter of this opening 54. In assembling a complete connector 56 of this invention two of the parts 10 previously described are located directly opposite each other as shown in Fig. 2 of the drawing so that the sections 12 and 14 on the parts face one another.

Next, as indicated in Fig. 3 of the drawing the two parts 10 are brought together so as to locate the axes 42 within the bearing 44. When this occurs the two parts 10 are rotatably mounted with respect to one another about the group of wires 50, and the shields 25 fit together in a torque end groove manner. The parts 10 are then rotated with respect to one another so that the sections 14 fit around the wires 50 in the locus of a cylinder. At this point the complete connector 56 may be moved along the wires 50 as illustrated in Fig. 4 with a minimum of difficulty so as to locate the groove 34 generally within the opening 54.

The sections 12 on the parts 10 may then be rotated toward one another so as to move the sections 14 about in order to fit the bulkhead 52 into the grooves 34. During such motion preferably the tabs 26 and 30 on the parts 10 are bent and slide together so that the tabs 30 fit within the openings 28 in the tabs 26. After the parts 10 have been rotated in this manner and the tabs inserted as indicated the surfaces 32 of the tabs 30 will engage the edges of the openings 28 in a ratchet-like manner so as to securely lock the two parts 10 in the operative position as shown in Fig. 5 of the drawing. The inherent resiliency of the tabs 26 and 30 aid in the maintenance of this locking action. The manner in which these locking means operate is best seen in Fig. 6 of the drawing.

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After the parts 10 have been locked together in this manner, the internal ridges 36 on the sections 12 engage the wires 50 in a resilient manner so as to achieve a good holding action with respect to these wires. If desired, the ridges 36 can be formed in the shape of threads or grooves described to engage corresponding structures on a member or on members held by the parts 10. When the parts 10 are assembled in this manner and shields, such as the shields 25 are employed, these shields extend from the edges 22 and 24 so as to prevent the wires from chafing against the bulkhead 52. It will be seen from this that the complete connector 56 firmly holds these wires 50 in such a manner that they are out of contact with the bulkhead 52 but are yet supported thereby. Thus, the connector 56 serves to guard against abrasion of the wires 50 and to insulate them from this bulkhead 52. With the connector 56 the ridges 48 fit within the grooves 46 so as to aid in properly aligning the parts 10 during the use of the connector 56.

Although the invention has been illustrated and explained with respect to the use of connectors, such as the connector 56, with a bulkhead and with a group of wires it will be obvious to those skilled in the art that these connectors may be used with a terminal box or any other similar type of mounting member and that they may be used so as to hold a pipe, a plurality of tubes, an electrical cable or the like. Because of the fact that the connectors of this invention may be modified and used in a number of different ways this invention is to be considered as being limited only by the appended claims forming a part of this disclosure.

I claim:

1. A connector part which comprises: semi-circular shell-like body sections joined to each other at an obtuse angle, said sections having side edges located with respect to one another at said angle and each having an end located away from the juncture of said sections; a shaft attached to said body sections at the juncture thereof at one side of said body sections, the axis of said shaft being aligned with the juncture of said side edges; a bearing attached to said body sections at the juncture thereof on the side of said body sections remote from said shaft, the axis of said bearing being aligned with the axis of said shaft and with the junction of said side edges; holding means located on the outside of one of said body sections at one of said ends, said holding means being adapted to be used in securing a pair of said connector parts to a supporting member; and locking means located on the outside of the other of said sections at one of said ends, said locking means being adapted to co-act with similar locking means on another connector part so as to secure said connector parts together.

2. A connector part as defined in claim 1 including shield means located on the side edge of said body section adjacent to said holding means the shield means on one of said side edges being located further from the axis of said body section than the shield means on the other of said side edges of said body section, said shield means being adapted to move with respect to similar shield means on another connector part of like construction.

3. A connector part as defined in claim 1 wherein the interior surfaces of said body section upon which said holding means are located have surface irregularities formed thereon.

4. A connector part as defined in claim 3 wherein said surface irregularities comprise a plurality of ridges formed in said body sections, said ridges extending transversely to the axis of said sections.

5. A connector part as defined in claim 1 wherein said connector part is formed of a unitary body of a flexible, resilient material.

6. A connector part as defined in claim 1 wherein said connector part is electrically non-conductive.

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7. A connector part as defined in claim 1 wherein said locking means comprises a first flexible tab having an opening located therein, said tab being located at one side of said other section and a second flexible tab having a plurality of ratchet-like ridges located on the exterior thereof located at the other side of said other section, said second tab being adapted to engage a first tab on another similar connector part and said first tab being adapted to engage a second tab on said similar connector part.

8. A connector which comprises two parts, each of said parts including two shell-like sections located with respect to one another at an obtuse angle, shaft means attached to said sections at the juncture thereof at one side of said part and bearing means attached to said sections at the juncture thereof on the side of said part remote from said shaft means, holding means located on the outside of one of said sections at one end of said part and locking means located on each side of said part on the other of said sections, said parts being pivotally held with respect to one another with the shaft means on one of said parts being held by the bearing means on the other of said parts, said parts being adapted to be moved with respect to one another so as to move said holding means into contact with a mounting member so as to hold said connector into place, said locking means serving to lock said parts together so as to hold said holding means in contact with said mounting member.

9. A connector as defined in claim 8 wherein said locking means on each of said parts comprises a tab having a ratchet-like surface located at one side of said section and a tab having an opening formed therein located at the other side of said section, and wherein the tab having a ratchet-like surface on each of said parts is adapted to fit within the opening in the tab on the other of said parts so as to lock said parts with respect to one another.

10. A connector as defined in claim 8 wherein said holding means comprises a groove located on the outside of said part.

11. A connector as defined in claim 8 including shield means formed on each of said parts, said shield means being adapted to be moved with respect to one another when said parts are rotated with respect to one another, said shield means serving to prevent a member held by said connector from coming into contact with a mounting member when said connector is mounted upon said mounting member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,945,085

July 12, 1960

James O. Billups

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 55, for "edge" read -- edges --.

Signed and sealed this 31st day of January 1961.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents

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