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R. G. GOODYEAR

2,238,561

CONNECTOR

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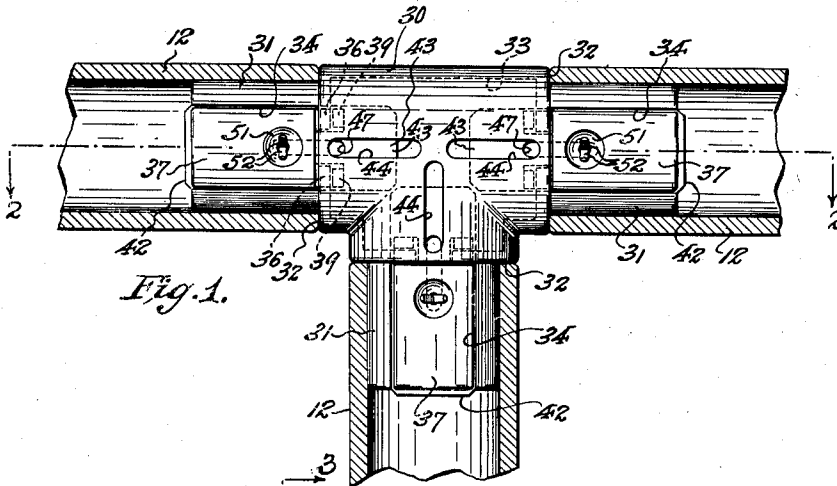


Fig. 1.

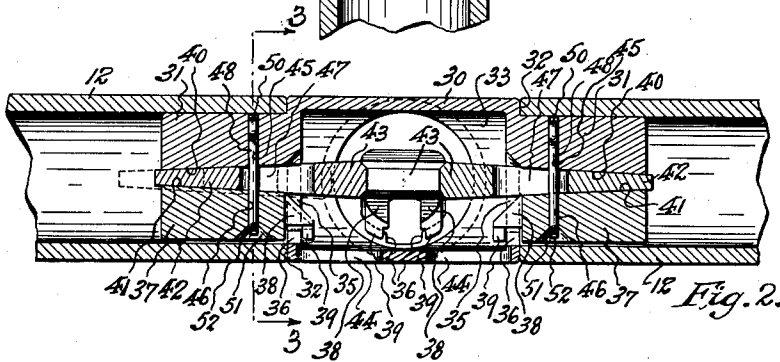


Fig. 2.

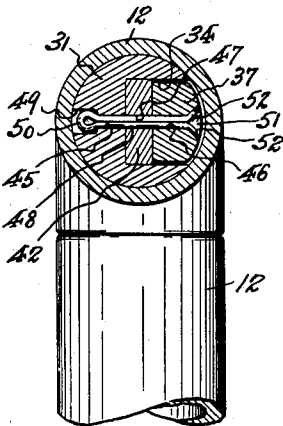


Fig. 3.

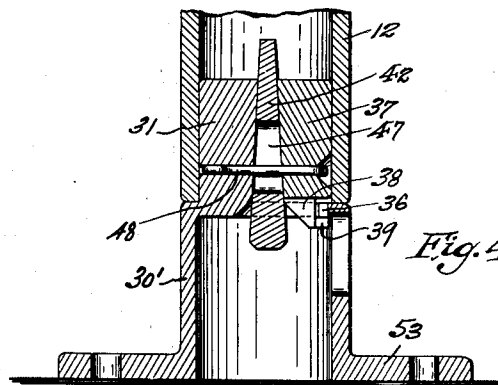


Fig. 4.

INVENTOR.

Robert G. Goodyear,

BY

George D. Richards,

ATTORNEY.

UNITED STATES PATENT OFFICE

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CONNECTOR

Robert G. Goodyear, New York, N. Y.

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4 Claims. (Cl. 287-54)

This invention relates to improvements in connector means for joining tubular elements in coupled together relation; and the invention has reference, more particularly, to improvements in the general type and kind of connector means shown and described in my prior United States Letters Patent No. 2,198,964 dated April 30, 1940.

The present invention has for an object to provide a novel connector means for anchoring or joining together tubular elements employed in the erection of various kinds of frame structures, hand rail structures, electrical bus bar assemblies and the like; and to such end the novel connector means according to this invention comprises a connector body, having means to internally engage in a tubular element to be served, including a laterally movable gripper means and cooperating intermediate drivable wedge means for actuating said gripper means.

Other objects of the present invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

Illustrative embodiments of the present invention are shown in the accompanying drawing, in which:

Fig. 1 is a side elevational view of a novel connector means according to this invention as initially engaged with tubular elements to be joined together thereby and preparatory to locking up the same, said tubular elements being shown in longitudinal section; Fig. 2 is a horizontal longitudinal sectional view, taken on line 2-2 in Fig. 1; and Fig. 3 is a transverse sectional view, taken on line 3-3 in Fig. 2.

Fig. 4 is a vertical sectional view of another modified form of the novel connector means in operative locked up condition.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

Referring to the drawing, the connector means according to this invention comprises, a mid-section 30, of circular or other desired cross-sectional shape, having extended fixed end sections 31 of corresponding cross-sectional shape but of reduced diameter so as to provide shoulders 32 at the junctures thereof with the mid-section, against which the extremities of the tubular elements 12, applied to and over the said fixed end sections, may abut in stopped relation to said mid-section. The diameters of said fixed end sections 31 are so sized that the same will slidingly enter and fit the bores of tubular elements 12 to be operatively served by the connector

means. Said mid-section 30 is cored out to provide a hollow interior or internal chamber 33. Formed in each fixed end section 31, to open laterally outward from a side thereof, is a channel-like cavity 34, which communicates at its rearward end with the interior of the mid-section chamber 33 through a corresponding opening 35 in the adjacent mid-section end wall. Said openings 35 are so shaped as to provide, in connection with the mid-section 30 end wall, spaced anchor lugs 36.

Cooperative with each fixed end section 31 is a gripper block 37 which is disposed within the cavity 34 thereof. Said gripper blocks 37 are provided at their rearward extremities with rearwardly projecting spaced tail pieces 38 which terminate at their free ends in downwardly extending coupling lugs 39. These tail pieces 38 extend through an adjacent mid-section end wall opening 35 into the internal chamber 33 of said mid-section so that, when the gripper block carrying the same is operatively assembled in the cavity 34 of a corresponding fixed end section, the coupling lugs 39 will hook over the anchor lugs 36. When so assembled, the engagement of the coupling lugs 39 behind the anchor lugs 36 will serve to retain the gripper blocks 37 against longitudinal displacement from operative assembled relation to the fixed end sections 31, while nevertheless permitting lateral bodily movement of said gripper sections relative to said fixed end sections.

Each fixed end section 31 is provided at its inner side with an inclined wedge bearing face 40 corresponding in angular pitch to the angular pitch of the cooperating face of an associated wedge means. In like manner, each gripper block 37 is also provided at its inner side with an inclined wedge bearing face 41 which also corresponds in angular pitch to the angular pitch of the cooperating face of an associated wedge means. Arranged between the opposed wedge bearing faces 40 and 41 of associated fixed end sections 31 and gripper blocks 37 are longitudinally disposed, outwardly directed wedge members 42, the head ends 43 of which lie within the internal chamber 33 of the mid-section 30. The head ends 43 of said wedge members 42 are accessible, for engagement by a suitable driving instrumentality, through longitudinal slots 44 suitably located in the side walls of said mid-section 30.

Means are provided for initially retaining the gripper blocks 37 and wedge members 42 in assembled relation to the fixed end sections 31 of

the connector means. A preferred form of such retaining means comprises the provision respectively in the associated fixed end sections 31 and gripper blocks 37 of aligned transverse openings 45 and 46. Extending through said aligned openings 45 and 46, and through elongated longitudinal slots 47 provided in the wedge members 42 intermediate the same, are split cotter pins 48. At the outer extremities of the openings 45 of the fixed end sections 31, said openings terminate in laterally enlarged seating sockets 49 to engage and hold the eye portions 50 of said cotter pins, whereby the latter are retained against longitudinal movement in one direction. At their outer extremities said openings 46 of the gripper blocks 37 terminate in countersunk conical seats 51, and the tips 52 of the cotter pin legs are bent outwardly into engagement with the inclined sides of said conical seats 51, whereby said cotter pins are retained against longitudinal movement in the opposite direction. Said cotter pin leg tips 52 are bent into engagement with said conical seats 51 when the wedge members 42 are in retracted normal initial positions and the gripper blocks in laterally retracted position, and consequently a yieldable frictional interengagement of the wedge members with the wedge bearing faces 40 and 41 of the fixed end sections 31 and the gripper blocks 37 is set up, such engagement being sufficient to retain these parts in their normal initial assembled relations.

In use, the fixed end sections 31 with their laterally retracted gripper blocks 37 are inserted in the end portions of the tubular members 12 to be operatively engaged thereby, whereupon, by application of suitably manipulated actuating means, the wedge members 42 are driven forward so as to move the gripper blocks 37 laterally outward and thereby frictionally engage the same against the contiguous internal surfaces of the tubular elements 12, while at the same time effecting a reaction upon the end sections 31 to likewise cause the same to frictionally engage internal surfaces of the tubular elements contiguous thereto, thus strongly gripping said tubular elements and binding the same against displacement from the connector means. As the wedge members 42 are driven forward to force the gripper blocks 37 outward into gripping and holding relation to the tubular elements, the bent lips 52 of the cotter pin legs ride upon and yield to the outwardly moving surfaces of the seats 51, and thus not only do not impede the gripper block movement, but are placed under a tension, which, if the wedge members are subsequently retracted, aids said gripper blocks in returning to laterally retracted normal initial relation to the fixed end sections 31 of the connector means.

In Fig. 4 there is shown a connector means having the same construction of fixed end section 31 and cooperating gripper block 37, but wherein the chambered body 30', from one end of which extends said end section and gripper block structure, is provided at the opposite end with a base flange 53, by means of which the same may be affixed to a floor or wall surface or the like.

The wedge members hereinabove described are so designed that their over all taper includes a comparatively shallow or small angle, which may fall between two and fifteen degrees inclusive, but which is preferably about six degrees. Wedge members of such shallow or small angle, as frictionally engaged with the surfaces of the con-

connector body and gripper block parts contiguous thereto, will be strongly held so that there is no tendency to accidental retractable movement thereof, once they are driven home.

Various changes could be made in the shape forms of the described connector means, and many other changes could be made in the construction thereof without departing from the scope of the present invention as defined in the following claims. It is therefore intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A connector means for fixedly securing an end of a tubular element comprising, a body portion having an extended fixed end section of cross-sectional shape conformable to and insertable into the interior of the tubular element to be engaged, said fixed end section having a laterally open channel-like cavity along its length, a laterally movable gripper member lodged in said cavity, said gripper member having an external face surface also conformable to the interior of the tubular element, wedge means extending outwardly from said body portion endwise through said cavity behind said gripper member, the bottom of said cavity and the back of said gripper member having longitudinally inclined mutually opposed flat faces to provide an intermediate receiving space conformable to the taper angles of contiguous wedge means faces, means giving access to the wedge means to permit driving thereof, said fixed end section and said gripper member having aligned transverse openings and said intermediate wedge means having a longitudinal slot intersecting said openings, a split cotter pin engaged through said openings and slot, the outer end of one said opening having an enlarged portion to seat and hold the eye part of said cotter pin, and the outer end of the other said opening having a countersunk conical seat into tensional engagement with which the tips of the cotter pin legs are bent to yieldably bind said wedge means in initially retracted assembled position between said fixed end section and gripper member.

2. A connector means as defined in claim 1 wherein, said body portion and gripper member have cooperating means for holding the latter against longitudinal displacement relative to said fixed end section without impeding its operative lateral movement.

3. A connector device to engage and anchor an end of a tubular element comprising, a longitudinally divided gripper means having parts relatively movable laterally, said gripper means having a cross-sectional shape conformable to and insertable into the interior of the tubular element to be engaged, wedge means extending longitudinally outward between said gripper means parts, the opposed inner faces of said gripper means parts having longitudinally inclined flat surfaces to provide an intermediate receiving space conformable to the taper angles of contiguous wedge means faces, said gripper means parts having aligned transverse openings and said intermediate wedge means having a longitudinal slot intersecting said openings, a split cotter pin engaged through said openings and slot, the outer end of one said opening having an enlarged portion to seat and hold the eye part of said cotter pin, and the outer end of the other said opening having a countersunk conical

seat into tensional engagement with which the tips of the cotter pin legs are bent to yieldably bind said wedge means in initially retracted assembled position between said gripper means parts.

4. A connector means for fixedly securing an end of a tubular element comprising, a hollow main body having an extended fixed end section of cross-sectional shape conformable to and insertable into the interior of the tubular element 10 to be engaged, said fixed end section having a laterally open channel-like cavity along its length with its inner end opening into communication with the interior of said main body, a laterally movable gripper member lodged in said cavity, 15 said gripper member having hook-like means at its inner extremity to project into the interior

of the main body, said main body having means engageable by said hook-like means whereby said gripper member is retained against longitudinal displacement without impeding its operative lateral movement, wedge means extending from the interior of said main body outwardly through said end section cavity behind said gripper member, the bottom of said cavity and the back of said gripper member having longitudinally inclined mutually opposed flat faces to provide an intermediate receiving space conformable to the taper angles of contiguous wedge means faces, and the sides of said main body having slots to give access to said wedge means to permit driving thereof.

ROBERT G. GOODYEAR.