Feb. 11, 1969 F. C. BERGMAN 3,427,054

CONNECTOR FOR HOLDING ALIGNED MEMBERS AGAINST SEPARATION

Filed April 5, 1967

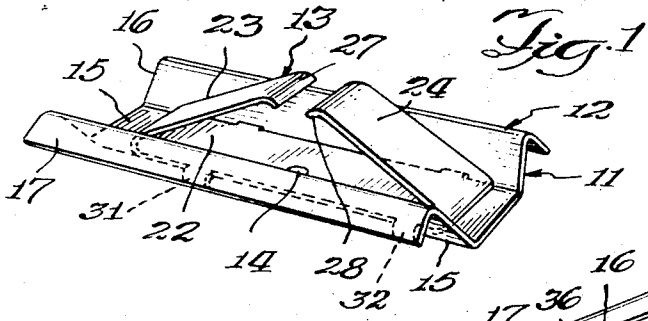


Fig. 1

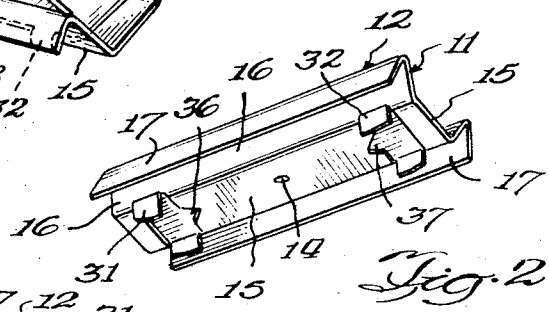


Fig. 2

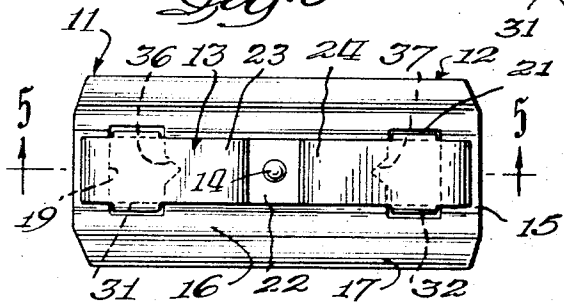


Fig. 3

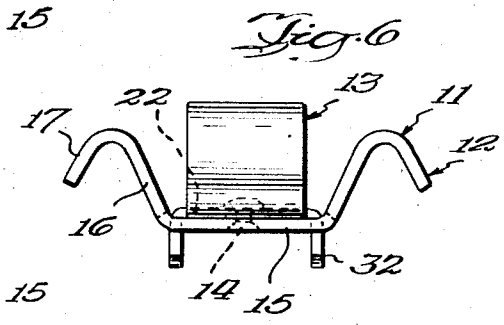


Fig. 6

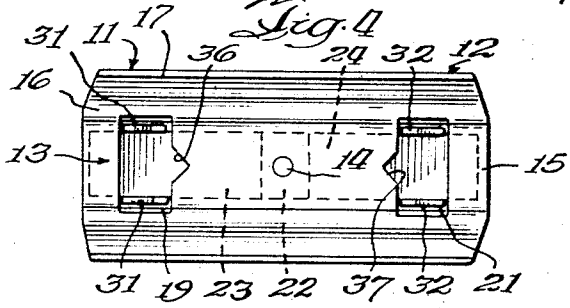


Fig. 4

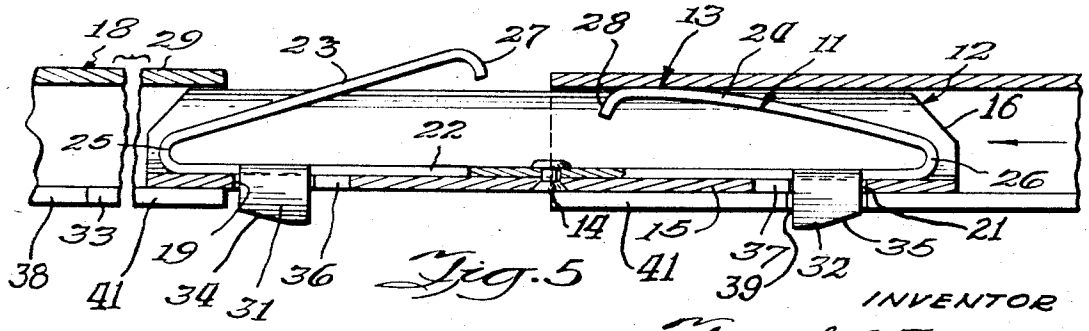


Fig. 5

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CONNECTOR FOR HOLDING ALIGNED MEMBERS AGAINST SEPARATION

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Int. Cl. F16b 7/04, 2/00; F16l 37/12

ABSTRACT OF THE DISCLOSURE

A connector, comprising a spring mounted in a holder, has a pair of ears extending downwardly through openings in the bottom wall of the holder adjacent each end thereof and resilient fingers extending above the upper edges of the holder. The opposite end portions of the connector are adapted to fit within the adjacent open ends of two tubular members, and the resilient fingers force the ears downwardly into engagement with openings in the bottom walls of the tubular members. The interengagement of the ears of the connector with the openings in the bottom walls of the tubular members holds the tubular members against relative longitudinal movement.

This invention relates to means for joining two axially aligned tubular members, and is particularly advantageous in the construction of a structural assembly for supporting and displaying wearing apparel, or other merchandise.

Structural assemblies for supporting and displaying wearing apparel, or other merchandise, have heretofore been fabricated as individual frame members and secured together at the place of use by nuts and bolts, or similar fasteners. The use of such fastening devices has always been burdensome because of the amount of labor required to position a multiplicity of bolts and to tighten a nut on each bolt. Another disadvantage inherent in such structures is the possibility of the loss of nuts and bolts, thus making replacement of them necessary. In time, some of the nuts may work loose on the bolts. It is also possible that some of the nuts may become frozen on the bolts, thus making removal difficult.

A single connector of the present invention is sufficient to hold two frame members against relative lateral or vertical displacement, and thus eliminates the need for a multiplicity of nuts and bolts.

The connector comprises a holder and a spring seated in the holder. The holder, which is adapted to fit within the tubular members that are to be held against separation, is in the form of a channel having a bottom wall and two sidewalls. The bottom wall defines an opening near each end thereof. The bottom wall of each of the tubular members also defines an opening near each end thereof, and the adjacent opening of two tubular members are adapted to register with the openings in the bottom wall of the channel when the adjoining ends of the tubular members abut.

The spring has a pair of depending ears projected through each of the openings in the bottom wall of the channel and into the adjacent opening in the bottom wall of one of the abutting tubular members by the resilient of the spring. When it is desired to remove a connector from the tubular members, one end of the spring is pressed upwardly to lift one pair of ears out of the plane of the bottom wall of the tubular member, and the connector is moved longitudinally of the tubular members far enough to move the opening in the bottom wall of the channel out of register with the corresponding opening in the tubular member. The tubular member may then be moved

longitudinally in the opposite direction to disengage it from the connector. The connector may then be removed from the other tubular member by pressing the other end of the spring upwardly to lift the other pair of ears out of the plane of the bottom wall of the tubular member and then pulling the connector out of the tubular member.

Suitable structure by means of which the above mentioned and other advantages will be described in the fol the accompanying drawings, illustrating a preferred embodiment of the invention, in which:

FIGURE 1 is a perspective view of a connector embodying the invention;

FIGURE 2 is a bottom perspective view;

FIGURE 3 is a top plan view;

FIGURE 4 is a bottom plan view;

FIGURE 5 is a longitudinal sectional view, taken generally along the line 5—5 of FIGURE 3, with one end of the connector entering a tubular member; and

FIGURE 6 is an end elevational view.

Referring to the drawings, a connector **11**, constructed in accordance with the present invention, comprises a holder **12** in the form of a channel and a spring **13** secured thereto in any suitable manner, as, for example, by a rivet **14**. The spring may, of course, be located within the holder free of any connector, such as a rivet, if desired. The channel **11** comprises a flat bottom wall **15** and a pair of sidewalls **16** extending upwardly from its longitudinal edges. The outer longitudinal edge portions of the sidewalls are downwardly, as indicated at **17**, to provide smooth surfaces for the upper edges of the channel. The sidewalls **16** are of the same height, which is less than the inside height of a tubular member **18** into which the connector is to be inserted. The bottom wall **15** defines a pair of openings **19** and **21** spaced equidistantly from opposite ends thereof for a purpose hereinafter disclosed.

The spring **13** comprises a flat strip **22** and a pair of resilient fingers **23** and **24**. The strip **22** is juxtaposed against the bottom wall **15** of the channel **12** and extends longitudinally thereof. The rivet **14** is positioned centrally of the strip **22** and holds it against the bottom wall of the channel. The outer end portions of the strip **22** are bent upwardly and inwardly along the lines **25** and **26** to define resilient fingers **23** and **24**, respectively. The fingers **23** and **24** extend upwardly above the upper edges of the sidewalls **16** to provide frictional engagement with the tubular members **18** into which they are inserted. The outer ends of the fingers **23** and **24** are bent downwardly, as indicated at **27** and **28**, respectively, to prevent them from digging into the underside of the top wall **29** of the tubular member in which they are inserted.

In addition to holding two abutting tubular members against longitudinal separation, the connector prevents relative lateral or vertical movement in any direction. The channel **12**, which spans the joint between the abutting ends of two adjacent frame members, serves as a rigid reinforcing bar for the interior of the top stretchers of the frame members in proximity to the joint. In the instant embodiment the channel has a width substantially equal to the inside width of the tubular members and a height substantially equal to the inside height of the tubular members.

The spring **13**, which is riveted to the bottom wall of the channel, is provided with two pairs of ears **31** and **32**, that depend from the longitudinal edges of the strip **22**. The ears are located so that the ears **31** extend through the opening **19** in the bottom wall of the channel, and the other ears **32** extend through the opening **21**. The resilient finger **23** urges the ears **31** downwardly, and the resilient finger **24** urges the ears **32** downwardly.

The total height of the spring, i.e., the vertical distance between the uppermost surface of the resilient

fingers 23 or 24 and the bottom of the ears 31 or 32, is greater than the inside height of the tubular member 18. Accordingly, when the connector is to be inserted in one of the top stretchers, one end of the strip 22 is pressed upwardly to lift the ears above the upper surface of the bottom wall 33 of the tubular member. As the end of the strip 22 is pressed upwardly, the connector is pushed longitudinally into the open end of the tubular member 18. When the opening 19 is moved into register with an opening 38 in the bottom wall 33 of the tubular member, the resilience of the spring finger 23 forces the ears 31 downwardly into the latter opening to lock the connector against separation from the tubular member.

A second tubular member 18 is pushed on to the projecting end of the connector as the opposite end of the strip 22 is pressed upwardly to lift the fingers 32 above the plane of the bottom wall of the tubular member. When the second tubular member is pushed into abutting engagement with the first tubular member, the connector is moved longitudinally in the opposite direction, as hereinafter described, to move the opening 21 into register with the opening 39 in the bottom wall of the second tubular member, at which time the ears 32 snap into the last mentioned opening to interlock the two tubular members securely in end to end relationship. The outer edges of the ears 31 and 32 are tapered, as indicated at 34 and 35, respectively, to facilitate entry of the ears into the tubular members.

The bottom wall 15 of the channel is provided with oppositely directed notches 36 and 37, respectively, at the edges of openings 19 and 21 closest to the rivet 14. The bottom wall 33 of the tubular member is provided with a centrally disposed slot 41 extending longitudinally throughout its length so that a screw driver or similar tool can be projected through the slot into engagement with either notch 36 or 37 so that the connector can be pushed in either longitudinal direction whenever the ears 31 and 32 are clear of the bottom wall 33. The notches 36 and 37 are preferably of triangular configuration to facilitate engagement of the screw driver with the notches.

The connector may be removed from the tubular members by pushing up on one end of the strip 22 to lift the ears 31 above the bottom wall of the tubular member, and moving the connector longitudinally into the other tubular member far enough to move the opening 19 out of register with the opening 38 in the bottom of the first tubular member. The first tubular member may then be pulled off the connector. The connector is then moved in the opposite longitudinal direction and the opposite end of the strip 22 is pressed upwardly to lift the ears 32 above the bottom wall of the tubular member. The connector may then be pulled out of engagement with the second tubular member.

In the embodiment of the invention illustrated in the drawings, the spring is riveted to the channel, but it will be understood that the rivet may be omitted, and the spring may be held in place solely by the engagement of

the ears 31 and 32 with the openings 19 and 21, respectively.

Although a preferred embodiment of the invention has been described in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as many details of construction may be modified or changed. Accordingly, it is not desired to be restricted to the exact structure described.

What is claimed is:

1. In combination with a pair of tubular members aligned in end to end relationship and having longitudinally aligned openings therein, a connector comprising a holder provided with a bottom wall defining longitudinally aligned openings adjacent opposite ends thereof and a spring seated in said holder, said holder fitting within said tubular members with its openings in register with the openings in said tubular members, said spring comprising a flat strip having projections extending into each of said pairs of registering openings and two resilient fingers integral with said flat strip, said fingers extending inwardly and upwardly from opposite ends of said strip into engagement with the inner surfaces of said tubular members whereby the resilience of said fingers exerts pressure against said flat strip to hold said projections against retraction from said registering openings by force applied longitudinally of said connector.

2. The combination recited in claim 1, in which one edge of said holder defining each of said openings therein defines a notch, and said tubular member has a bottom wall provided with a slot extending from each of its openings to the adjacent end of said bottom wall in longitudinal alignment with said notches, whereby a tool passing through said slot into engagement with said notches may move said connector as a unit in either longitudinal direction relative to said aligned tubular members.

3. The combination recited in claim 2, in which each projection extends downwardly from one edge of said flat strip in laterally spaced relationship to said slot and has its edge remote from the edges of said holder defining said notches tapered toward the plane of said bottom wall to facilitate entry of said projections into said aligned tubular members.

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WAYNE L. SHEDD, *Assistant Examiner.*

U.S. Cl. X.R.

52—726; 285—319, 397

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,427,054 February 11, 1969

Frank C. Bergman

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, after line 8, insert -- lowing specification, taken in conjunction with --; line 29, after "sidewalls are" insert -- curved --.

Signed and sealed this 24th day of March 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents