

L. BLUM

ORNAMENTAL RAILING STRUCTURES

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Feb. 5, 1963

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Filed Dec. 21, 1961

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FIG. 7.

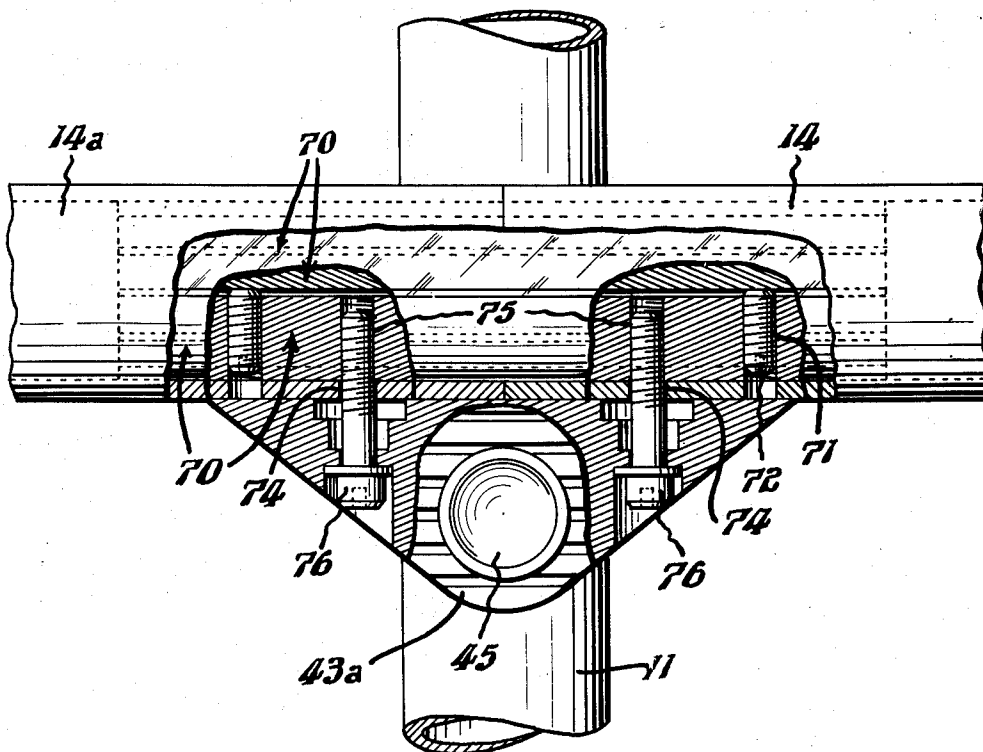


FIG. 8 -

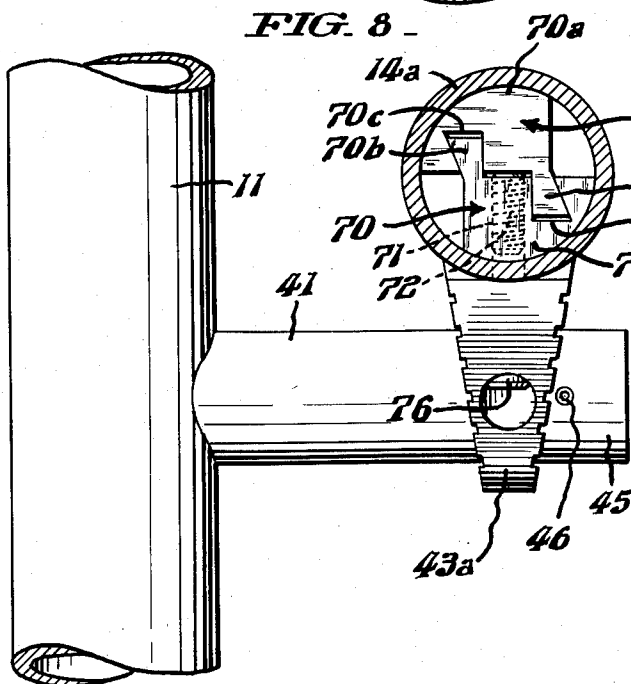
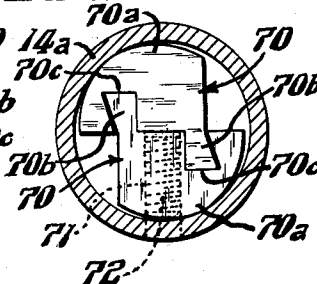


FIG. 11.



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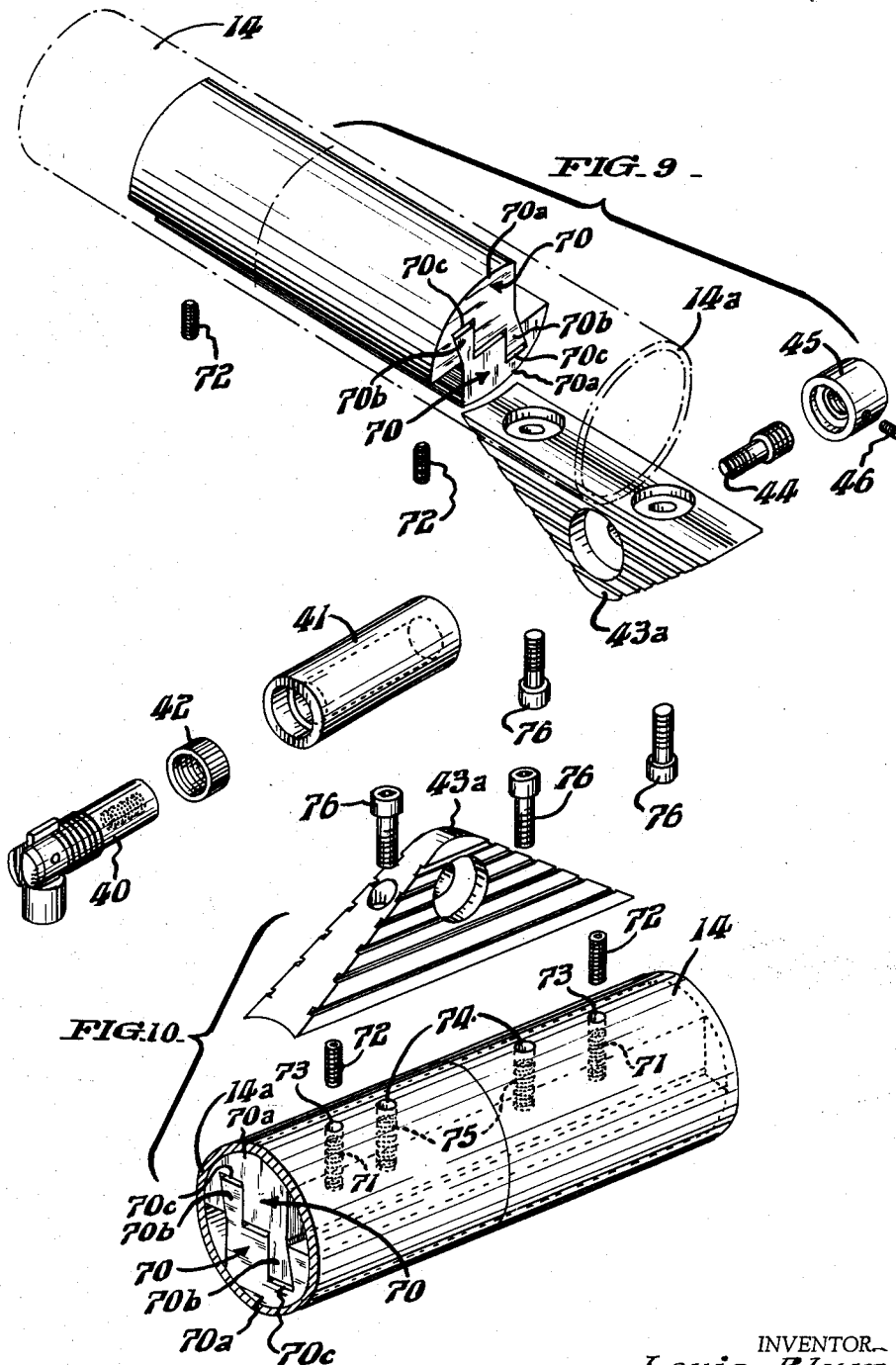
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Filed Dec. 21, 1961, Ser. No. 162,313
5 Claims. (Cl. 256—65)

This invention relates to ornamental railing structures and more particularly it relates to such structures which are constructed by the use of posts and rails having hollow cylindrical cross-sectional characteristics.

In the construction of ornamental railing structures, it is advantageous to provide railings and posts, both of which are formed from extruded shapes having hollow cylindrical cross-sectional characteristics, for reason of economy. It is also advantageous to provide such railing structures with means for connecting the railings to the posts in a manner such that a maximum of hand gripping area of the surface of the railing is made accessible.

It is an object of this invention to provide a novel means for connecting pipe rails and posts of railing structures, such elements being formed from extruded materials having hollow cylindrical cross-sectional characteristics.

It is another object of this invention to provide such a railing structure whereby an increased amount of hand gripping surface is provided on the railing members.

It is another object of this invention to provide such a railing structure in which the means for mounting the posts and for connecting the railings to the posts are readily adjustable while at the same time being capable of being hidden in order to preserve the ornamental character of the railing structure.

It is another object of this invention to provide such a railing structure including a novel means for splicing adjoining sections of ornamental railing.

Other objects and advantages of the apparatus of this invention will become apparent from a reading of the following description and from the drawings wherein:

FIG. 1 is a vertical elevational view of a railing structure constructed in accordance with this invention;

FIG. 2 is a vertical cross-sectional view taken along the lines and in the direction of the arrows II—II of FIG. 1;

FIG. 3 is a sectional view taken along the lines and in the direction of the arrows III—III of FIG. 2;

FIG. 4 is a plan view of the structure shown in FIG. 1;

FIG. 5 is an exploded perspective view of the railing structure of this invention showing the method of connecting the top rail and post thereof;

FIG. 6 is an exploded perspective view similar to FIG. 5 showing the method of connecting an intermediate railing to the post;

FIG. 7 is a view similar to FIG. 1 showing a modification of the railing structure of this invention which is adapted to splice rails at the post;

FIG. 8 is a vertical cross-sectional view taken along the lines and in the direction of the arrows VIII—VIII of FIG. 7;

FIG. 9 is an exploded perspective view of the modification shown in FIG. 7;

FIG. 10 is an exploded perspective view showing certain details of the modification shown in FIG. 7; and,

FIG. 11 is a detailed sectional view showing the operation of the modification shown in FIG. 7.

Generally, this invention comprises a combination of ornamental railing and post means, both railing and post means having hollow cylindrical cross-sections wherein means are provided for rigidly connecting the rail means to the post means in a spaced angular relationship, the connecting means including (1) a saddle member having a top surface complementally configured to the surface

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of the rail means, the saddle member having a bored opening formed therein and extending from one side thereof to the opposite side; (2) a spacing connector disposed between the post means and the saddle means and having a bore formed therein, which bore is disposed in axial alignment with the opening in the saddle member; (3) a cap connector disposed in covering relationship to the outer end of the bore in the spacing connector, which cap connector has a threaded opening formed in the surface thereof abutting the spacing connector bore and in axial alignment therewith; (4) concealed means for interconnecting the post means, spacing connector and cap connector including toggle means disposed partly within the post and partly within the bore of the spacing connector; (5) internally threaded bolt means disposed within the bore of the spacing connector and connected to the toggle means; and (6) double headed screw means disposed through the opening in the saddle member and in threaded engagement with the bolt means and cap connector.

Referring now to FIGS. 1 and 2, the railing structure of this invention consists generally of a vertical post 11 constructed from extruded metal having a cylindrical cross-section, a generally cylindrical mounting bracket 12 sleeved upon post 11, a top rail 13 spaced from post 11 and rigidly connected thereto, an intermediate rail 14, likewise spaced from post 11 and rigidly connected thereto. Mounting bracket 12 is rigidly affixed to a structural element 15 of the structure served by the combination railing and post of this invention. Post 11 is prevented from any movement after initial adjustment within bracket 12 by means of set screws 16, 17, 18, 19 which are threaded through the body of bracket 12. Bracket 12 is affixed to element 15 by means of a pair of threaded bolts 20, 21 which are inserted through bored holes in the extension 22 of bracket 12 and tightened securely into tapped openings in element 15. Post 11 is provided with ornamental end caps 23, 24 at the bottom and the top thereof. The top end cap 23 comprises a frusto-conical shaped exposed portion 25, a cylindrical seating portion 26 and a cylindrical solid plug portion 27. The diameter of seating portion 26 is greater than the internal diameter of post 11, thereby limiting the extent to which cap 23 may be inserted within post 11. The plug portion 27 of cap 23 has formed therein a threaded hole 28. Post 11 has formed in the cylindrical surface thereof a corresponding opening 29 positioned so as to coincide with hole 28.

Referring now to FIGS. 5 and 6, the means for connecting rail 13 to post 11 is shown as consisting of a connector 30, bolt 31, saddle 32, double-headed screw 33, cap 34, set screw 35, toggles 36, 37, cap screws 38, 39.

Similarly, intermediate rail 14 is connected to post 11 by the means consisting of toggle 40, connector 41, knurled nut 42, saddle 43, double-headed screw 44, cap 45, set screw 46, toggles 47, 48 and cap screws 49, 50.

The assembling of top rail 13 with post 11 is accomplished by first securing saddle 32 to rail 13. Saddle 32 has a generally trapezoidal cross section, the upper extended surface thereof having a configuration complementary to that of the outer cylindrical surface of rail 13. The saddle 32 has formed therein a pair of shouldered cylindrical bores 51, 52, the axes of which are located centrally of saddle 32 and parallel to each other. Rail 13 has formed therein a pair of openings 53, 54 having diameters at least that of the smaller diameters of the bores 51, 52. Openings 53, 54 are spaced apart longitudinally of rail 13, a distance equal to the distance between the axes of the bores 51, 52. A pair of counterbored recesses 51a, 52a are formed in saddle 32 concentric with bores 51, 52 respectively. As shown in FIGURES 1 and 5, toggles 36, 37 are inserted through the cylindrical bores

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51, 52 through openings 53, 54 and into the hollow interior of rail 13, whereby the swingable portions 55, 56 thereof being pivoted about, pivots 57, 58 assume the positions shown in FIGURE 1, due to the top heavy configuration of portions 55, 56. Cap screws 38 and 39 are inserted into the threaded openings 59, 60 formed in the stub portions 61, 62 of toggles 36, 37 and drawn up to the extent necessary to firmly secure rail 13 to saddle 32. As shown in FIGURES 1 and 2, cap screws 38, 39 are thus hidden from view. Prior to assembly, toggles 36, 37 are maintained in position within saddle 32 by means of cap screws 38, 39 and knurled nuts 61a, 62a, which are threaded on the outer threaded surface of stub portions 61, 62 and retained within recesses 51a, 52a.

The assembled rail and saddle portions 13, 32 are connected to post 11, through connector 30. Connector 30 has a pair of axial cylindrical bores 63, 64 formed therein, the sizes of which are complementary to the size of the shank portion 63a and head portion 64a of bolt 31, respectively, and portion 64 has formed therein an axial threaded bore 65. Bolt 31 is inserted through connector 30, the threaded shank 63a passing through opening 29 and into the threaded opening 28 of the plug portion 27 of top end cap 23, which has been inserted into the inner open end of post 11. Saddle 32 has a counterbored opening 66 formed on one lateral face thereof, opening 66 being slightly larger than the outside dimension of connector 30, so that the free end of connector 30 may be disposed within opening 66. A drilled hole 67 extends through saddle 32 to a corresponding opening 68 formed in the other lateral face of saddle 32. Double-headed screw 33 has the smaller threaded portion thereof inserted through opening 67 and into the threaded bore 65, and tightened therein by turning the larger threaded portion of screw 33. An internally threaded cap 34 is disposed over the larger threaded portion of screw 33 and within opening 68, thereby obscuring screw 33 from view. Cap 34 is locked into position by means of set screw 35.

The resulting integral structure, as shown in FIGS. 1 and 2, provides a rigid rail and post combination wherein the rail portion is provided with a maximum amount of hand gripping area in the vicinity of the connection between rail and post, the rail being supported out of the plane of both the post and the connecting elements.

Similarly, as shown in FIGS. 1, 2 and 6, intermediate rail 14 is connected to post 11 in like manner with the exception that toggle 40 is utilized to form the means for affixing the connecting structure to the wall of post 11. Prior to assembly, toggle 40 is maintained in position by means of the knurled nut 42, which upon assembly is retained within the counterbored recess 41a formed in connector 41.

Referring now to FIGS. 7-10, there is shown a modification of the railing and post structure of this invention, wherein the apparatus is adapted to splice independent rail means at the location of a post. This is desirable for the increased support thereby effected at the splice joint and for reasons of ornamentation, which will readily become apparent hereinafter. In FIG. 7, the rail 14 is shown abutting an identical rail 14a, the line of abutment being centered on the post 11. The railings 14, 14a are supported by the complementary saddle 43a, and certain other elements correspond to those hereinbefore described. In order to perfect the shown splice of rails 14, 14a, an expandable pair of complementary bars 70 is disposed within the abutting end portions of rails 14, 14a, bridging the rail joint, and the pair of bars 70 expanded to effectively maintain the rails in abutting relationship while preserving the supporting function ordinarily performed by the railing structure. Bars 70 are formed from solid stock and comprise a segmental surface 70a, a dovetail portion 70b, and a dovetail recess 70c. It is then apparent that by matching the dovetail portion 70b of each bar with the dovetail recess 70c of the complementary bar, a keyed pair of bars 70 is formed.

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It is also apparent that the dovetail cross-section of the portions 70b is slightly smaller in area than the complementary dovetail recesses 70c, which permits relative expansion of the bar pair. Accordingly, one of the bars 70 is provided with a pair of longitudinally aligned threaded bores 71, into which are disposed a pair of set screws 72. The bores 71 are spaced at a longitudinal distance such that they do not oppose a portion of the rails 14, 14a at a greater length than the length of the top surface of saddle 43a. Access to the set screws 72 is obtained through a pair of openings 73 formed in the walls of rails 14, 14a, wherefrom it will be appreciated that the saddle 43a will obscure openings 73, set screws 72 and bars 70 when the railing structure is assembled, thereby fully preserving its ornamental characteristics. When the set screws 72 are tightened through bores 71 and against the opposing bar 70, the pair of bars 70 expands whereby the segmental surfaces 70a tightly grip the internal walls of rails 14, 14a, holding the same in abutting relationship against both tension and bending forces. The operation of the bars 70 is more clearly seen in FIG. 11, wherein the paired bars 70 are shown in a relaxed state, the set screw 72 being backed off from the position shown in FIG. 8. As thus relaxed, it is apparent that the arcuate surface of the bars 70 is out-of-round with the internal surface of the rails 14, 14a. Thus, in assembling the structure as shown in FIGS. 7 and 8, the tightening of screws 72, the incidental separation of the bars 70 and the incidental forces exerted by the dovetail portions 70b within the recesses 70c cooperate to conform the arcuate surface of the bars 70 tightly to the internal surface of the rails 14, 14a, thereby providing an extremely rigid splice joint. The integral railing structure thus formed is rigidly attached to the saddle member 43a by the pair of socket head screws 76 which pass through openings 74 in rails 14, 14a and which engage a pair of longitudinally aligned threaded bores 75 formed in the same bar 70 having bores 71 formed therein, the bores 71 and 75 being substantially in common alignment. Moreover, as clearly shown in FIG. 10, the saddle 43a effectively obscures from vision the various functional elements just described upon the assemblage thereof.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred embodiment. Various changes may be made in the shape, size and arrangement of parts. For example, equivalent elements may be substituted for those illustrated and described herein, parts may be reversed, and certain features of the invention may be utilized independently of the use of other features, all without departing from the spirit or scope of the invention as defined in the subjoined claims.

Having thus described my invention, I claim:

1. In an ornamental railing structure, ornamental rail means constructed from a metal extrusion having a hollow cylindrical configuration, ornamental post means constructed from a metal extrusion having a hollow cylindrical configuration, means for rigidly connecting said rail means to said post means in spaced angular relationship thereto including

- (1) a saddle member having a top surface thereof complementally configured to the outer cylindrical surface of said metal extrusion, and having a bored opening formed therein extending from one side surface thereof to the opposite side surface thereof and intersecting a vertical plane passing through the axis of said rail means;
- (2) concealed interconnecting means disposed within said rail means and said saddle member adapted to rigidly join the rail means and saddle member;
- (3) a spacing connector disposed between said post means and said saddle member and having a bore

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formed therein, said bore being disposed in axial alignment with said opening;

(4) a cap connector covering the outer end of said opening and having a threaded opening in one surface thereof, said opening being in axial alignment with the opening in said saddle member; and,

(5) concealed means for interconnecting said post means, spacing connector, saddle member and cap connector including

(a) toggle means disposed partly within said post means and partly within the bore of said spacing connector,

(b) internally threaded bolt means disposed within the bore of said spacing connector and connected to said toggle means, and,

(c) double headed screw means disposed through the opening in said saddle member in threaded engagement with said bolt means and said cap connector.

2. The ornamental railing structure in accordance with claim 1 wherein said rail means comprises an abutting pair of rail sections, the place of abutment being at a point adjacent said post means and overlying said saddle member, and wherein said concealed interconnecting means disposed within said rail means comprises an expandable pair of bars having gripping surfaces adapted to maintain said rail sections in abutting relationship.

3. The ornamental railing structure in accordance with claim 2, wherein one of said bars has screw means disposed therein adapted to effect the expansion of the bar pair, and wherein said rail means has an access opening formed therein and overlying said saddle member, whereby relative expansion-contraction of the bar pair may be effected while said rail sections are abutted.

4. In an ornamental railing structure, ornamental rail means constructed from a metal extrusion having a hollow cylindrical configuration, ornamental post means constructed from an identical metal extrusion as said rail means, means for rigidly connecting said rail means to said post means in spaced angular relationship thereto including a saddle member having a top surface thereof complementally configured to the outer cylindrical surface of said metal extrusion, and having a bored opening formed therein extending from one side surface thereof to the opposite side surface thereof and intersecting a vertical plane passing through the axis of said rail means, said rail means and said saddle member being interconnected by concealed toggle means; a spacing connector disposed between said post means and said saddle means and having a bore formed therein, said bore being disposed in axial alignment with said opening; a cap connector covering the outer end of said opening and having a threaded opening in one surface thereof, said opening being in axial alignment with the opening in said saddle member; and concealed means for interconnecting said

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post means, spacing connector, saddle member and cap connector including toggle means disposed partly within said post means and, partly within the bore of said spacing connector, externally and internally threaded bolt means disposed within the bore of said spacing connector and threaded into said toggle means, double headed screw means disposed through the opening in said saddle member and in threaded engagement with said bolt means and said cap connector.

5. In an ornamental railing structure, ornamental rail means constructed from a metal extrusion having a hollow cylindrical configuration, ornamental post means constructed from a metal extrusion having a hollow cylindrical configuration, means for rigidly connecting said rail means to said post means in spaced angular relationship thereto including

(1) a saddle member having a top surface thereof complementally configured to the outer cylindrical surface of said metal extrusion, and having a bored opening formed therein extending from one side surface thereof to the opposite side surface thereof and intersecting a vertical plane passing through the axis of said rail means;

(2) concealed interconnecting means disposed within said rail means and said saddle member adapted to rigidly join the rail means and saddle member;

(3) a spacing connector disposed between said post means and said saddle member and having a bore formed therein, said bore being disposed in axial alignment with said opening;

(4) a cap connector covering the outer end of said opening and having a threaded opening in one surface thereof, said opening being in axial alignment with the opening in said saddle member; and,

(5) concealed means for interconnecting said post means, spacing connector, saddle member and cap connector including

(a) first means disposed partly within said post means and partly within the bore of said spacing connector,

(b) second means disposed within the bore of said spacing connector and connected to said first means, and,

(c) double headed screw means disposed through the opening in said saddle member in threaded engagement with said bolt means and said cap connector.

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