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Russo

[11] **3,869,109**

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[54] **RAILING CONSTRUCTION**

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[52] **U.S. Cl.** **256/59,** 256/24

[51] **Int. Cl.** **E04h 17/14**

[58] **Field of Search** 256/21, 22, 24, 25, 26, 256/59, 65

[56] **References Cited**

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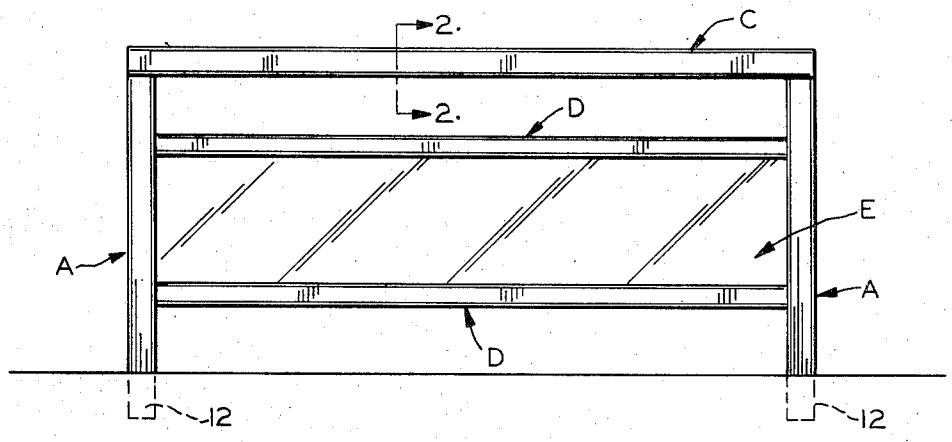
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Primary Examiner—Dennis L. Taylor

[57] **ABSTRACT**

A railing construction includes a plurality of one-piece frame members, each having a substantially inverted U-shaped configuration including a horizontal upper portion and opposite upright portions. The upright portions of adjacent frame members are interlocked with the flanges of an I-beam member by interdigitated locking means integral therewith to form the supporting posts. The upper portion of each frame member has horizontally opening grooves facing toward the members. Flat brackets secured to the upper end of the channel member webs extend horizontally into the grooves. A top rail extends the length of the railing over the top of each post. Cooperating interdigitated locking means are formed integral on the upper portions of the frame members and on a top rail for locking the top rail to the frame member. Vertically spaced panel support members extend between the upright portions of the frame member substantially parallel to the upper portion thereof for supporting a substantially rectangular panel.

16 Claims, 4 Drawing Figures



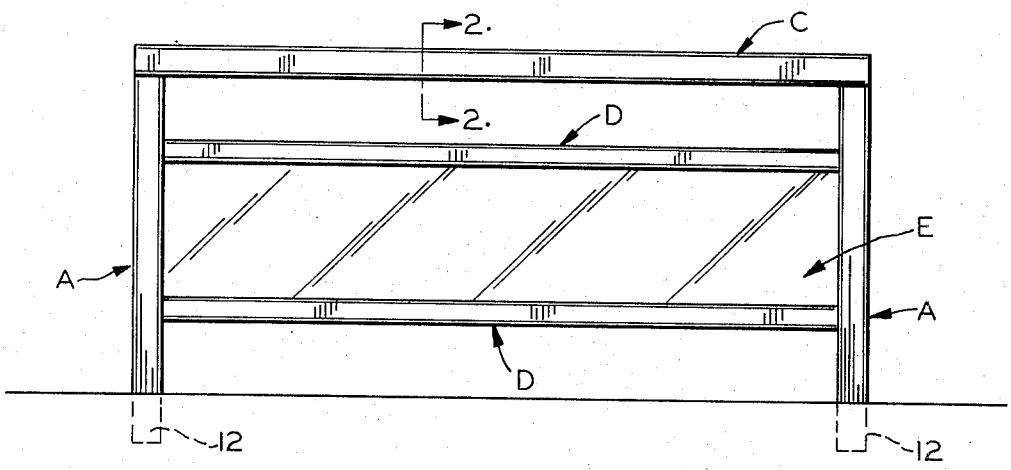


Fig. 1.

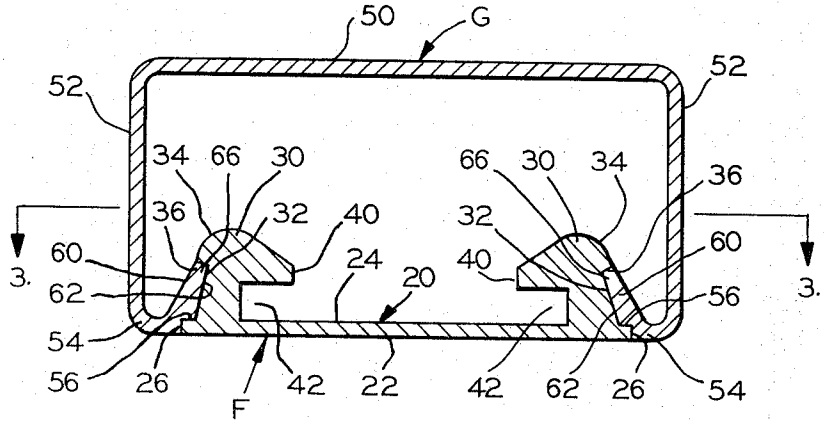


Fig. 2

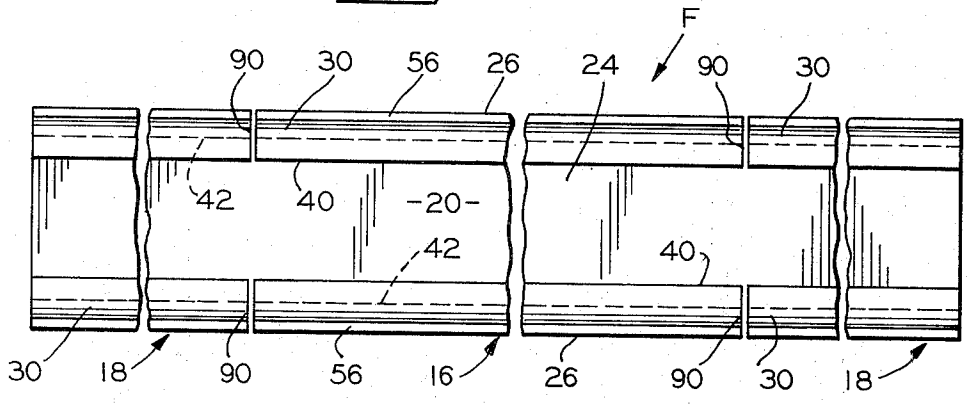


Fig. 3.

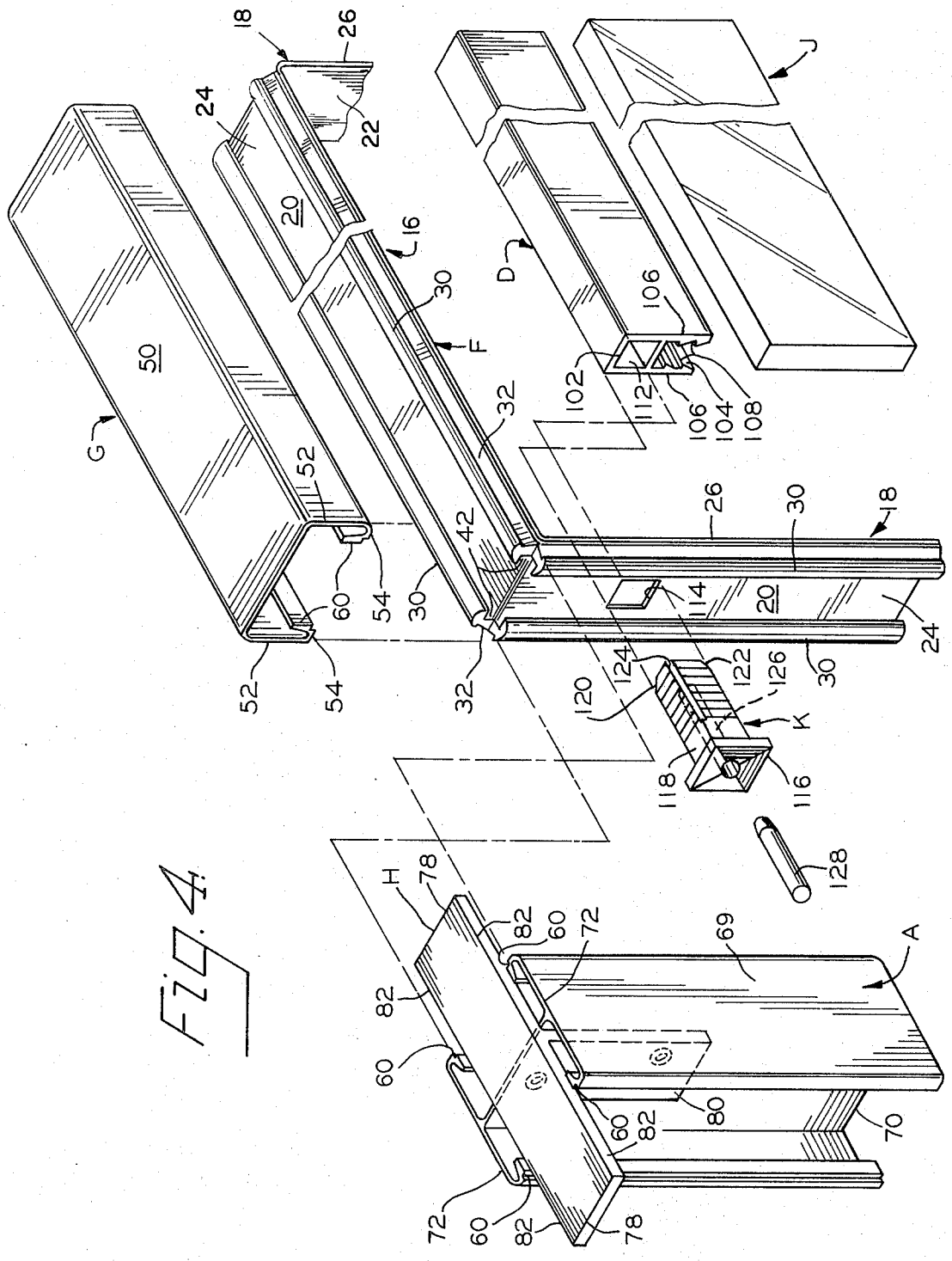

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F
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J
106
102
112
104
108
50
G
52
54
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114
124
122
126
120
K
118
116
128
H
78
82
60
72
69
A
80
70

FIG. 4

RAILING CONSTRUCTION

BACKGROUND OF THE INVENTION

This application pertains to the art of railings, and more particularly to railings for use along the edges of overhead walkways or balconies.

Railings of known types are fabricated from metal structural members. Examples of such railings are disclosed in U.S. Pat. Nos. 3,498,589 and 3,608,938 to Murdock. Such railings include upper and lower rails extending between and secured to a plurality of upright posts. A plurality of horizontally spaced upright bar members are secured to the upper and lower rails between the posts. In prior railings of this type, there are an extremely large number of different structural pieces and fasteners to be assembled. Therefore, fabrication of the railing is very expensive because a large number of different structural members and fasteners must be manufactured, and assembly is very time consuming.

SUMMARY OF THE INVENTION

A railing construction includes an elongated one-piece frame member, such one-piece frame member having a substantially inverted U-shaped configuration including a horizontally extending upper portion and spaced, vertically extending portions integral therewith. This member is in the shape of an outwardly facing channel having a base and side flanges, which flanges are cut at the intended juncture of the horizontal and vertical portions. The base is then bent 90°. The posts of the railing are formed by the vertical portions of the frame in cooperation with a vertically extending channel member. The flanges have cooperating interdigitated locking means integral therewith which are snapped together at final assembly. The vertical channel member is normally in the shape of an I-beam so that it may join adjacent frame members.

In accordance with another aspect of the invention, the flanges of the upper portion of the frame member define longitudinally opening grooves at each end. The vertical channel member has a bracket secured to the upper end of its web which bracket includes a horizontal flange which is slidably received in the grooves when the vertical portions of the frame member are assembled with its channel member.

A top rail in the shape of a downwardly facing channel extends integrally over the top of the posts and the flanges of this rail and the upper portion of the frame member have cooperating interdigitated locking means integral therewith for locking the top rail to the upper portion of the frame member.

In accordance with a preferred arrangement, vertically spaced panel support members extend between the upright portions of the frame member substantially parallel to the upper portion thereof. The panel support members are for supporting a substantially rectangular panel. The panel support members preferably have hollow end portions aligned with holes in the upright portions of the frame member. Expansion fasteners extend through the holes into the hollow end portions of the panel support members for securing the panel support members to the upright portions of the frame member.

It is a principal object of the present invention to provide an improved railing construction which uses a minimum number of different structural parts.

It is a further object of the present invention to provide an improved railing construction which is very simple to assemble.

It is another object of the present invention to provide an improved railing construction wherein the parts are interlocked with one another by the use of integral interdigitating locking means.

It is a further object of the present invention to provide an improved railing construction having a one-piece frame member extending between spaced-apart upright posts and having upright frame portions interlocked with the posts.

BRIEF DESCRIPTION OF THE DRAWING

The invention may take form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawing which forms a part hereof.

FIG. 1 is an elevational view of a railing construction assembled in accordance with the present invention.

FIG. 2 is a cross-sectional elevational looking generally in the direction of arrows 2—2 of FIG. 1;

FIG. 3 is a plane view of a frame member looking generally in the direction of arrows 3—3 of FIG. 2; and,

FIG. 4 is a perspective illustration of a portion of an improved railing construction formed in accordance with the present invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting same, FIG. 1 shows an improved railing construction constructed in accordance with the present invention. The railing construction includes a plurality of spacedapart upright posts A having their lower end portions 12 embedded in concrete, or received in sockets which are embedded in concrete or otherwise secured to a supporting surface.

The railing construction includes a substantially horizontal upper rail C extending between and over posts A. Vertically spaced panel support member D extends between posts A substantially parallel to top rail C. Panel support members D are located intermediate top rail C and the support surface to which posts A are mounted. Panel support members D support a rectangular panel member E which may be formed of opaque synthetic plastic material or the like.

In accordance with one aspect of the invention, a one-piece metal frame member F extends between posts A. One-piece frame member F may be extruded from aluminum or the like. Frame member F has a generally inverted U-shaped configuration including a substantially horizontally extending upper portion 16, and opposite vertical portions 18 integral therewith. Vertical portions 18 extend substantially perpendicular to upper portion 16 from the opposite ends of upper portion 16. Vertical portions 18 may have a total length substantially equal to the distance from the top of a supporting surface on which the railing is mounted to the top ends of posts A.

One-piece frame member F, including all of portions 16 and 18 thereof, has a cross-sectional configuration as shown in FIG. 2. Frame member F includes a base 20 having a substantially plane surface 22 and an opposite surface 24. Base 20 has opposite longitudinal edges

26. A pair of legs 30 extend along the full length of frame member F and project outwardly from inner surface 24 of base 20. Legs 30 are spaced inwardly from opposite longitudinal edges 26. Legs 30 have outer inclined surfaces 32 which incline inwardly toward one another away from opposite longitudinal edges 26. Inclined surfaces 32 are spaced inwardly from opposite edges 26. Legs 30 have outwardly extending projections 34 to define outwardly extending locking surfaces 36 which generally face toward opposite surface 24 in spaced relationship thereto. Legs 30 have inwardly extending projections 40 in spaced relationship to opposite surface 24. This defines opposite surface 24 of base portion 20 between legs 30.

A top rail member G has an inverted generally channel-shaped cross-sectional configuration as shown in FIG. 2. Top rail G is extruded from aluminum or the like. Top rail G includes a flat web 50 and opposite integral flanges 52 extending substantially perpendicular to web 50. Flanges 52 have inwardly extending terminal end portions 54 which terminate at longitudinal notches 56 dimensioned for receiving opposite edges 26 on frame member F. Integral channel legs 60 extend upwardly and inwardly from terminal end portions 54. Channel legs 60 have inclined surfaces 62 adapted to mate with inclined surfaces 32 on legs 30. Channel legs 60 terminate at locking surfaces 66 which extend parallel to locking surfaces 36 on legs 30. Top rail G may be assembled to frame member F until the outer ends of outwardly extending projections 34 on legs 30 strike against sloping surfaces 62 on channel legs 60. Further application of force will cause flanges 52 to deform outwardly until locking surfaces 66 on channel legs 60 can snap inwardly beneath locking surfaces 36 on legs 30. Opposite edges 26 on frame member F are then received in notches 56, while inclined surfaces 32 and 62 substantially contact one another along their entire length. Plane surface 22 on frame member F lies in a substantially common plane with the outer surfaces of terminal end portions 54 on channel flanges 52. Top rail G is then securely locked to frame member F against displacement therefrom.

It should be recognized that the defined integral legs, projections and locking surfaces described actually define integral interdigitated locking mean on top rail G and frame member F for locking top rail G to frame member F without requiring the use of additional fasteners.

In accordance with one arrangement, each post A is comprised of vertical portions 18 and a member 69 with an I-beam cross-sectional configuration as shown in FIG. 4. Member 69 includes a web 70 integral with opposite flanges 72. Flanges 72 have legs 60 thereon of the identical shape described with respect to legs 60 on top rail G in FIG. 2. In further explanation, if web 70 were longitudinally split in half by a plane which would also longitudinally bisect post flanges 72, there would be two channel members having a substantially identical cross-sectional configuration with the cross-sectional configuration of top rail G in FIG. 2. In other words, member 69 may also be considered as being constructed of two top rails G reversely positioned with webs 50 thereof in contact with one another and secured together to define web 70 of member 69. With this explanation, a further detailed description of legs 60 and the parts thereof on member 69 is unnecessary.

Legs 60 on member 69 and legs 30 on upright portions 18 of frame member F, define integral interdigitated locking means for locking with vertical portions 18 to form posts A without requiring additional fasteners.

In a preferred arrangement, the upper end of each member 69 has a generally T-shaped bracket member secured thereto. Bracket member H includes oppositely extending substantially flat horizontal portions 78 and a central flat downwardly extending portion 80. Downwardly extending portion 80 is secured to web 70 as by pop rivets, welding, screws, bolts or in any other suitable manner. Preferably, pop rivets are used. Flat horizontally extending bracket portions 78 have opposite edges 82 receivable in grooves 42 on upper portion 16 of frame member F. That is, the width and thickness or horizontally extending flat bracket portions 78 is such as to snugly fit within grooves 42 between opposite legs 30.

As shown in FIG. 3, to manufacture frame member F, legs 30 are notched or cut away as at 90 and the base 20 is then bent through an angle of 90°. Upper portion 16 of frame member F is then defined between notched portions 90, while upright frame portions 18 are defined outwardly of notched portions 90. Legs 30 are preferably cut away all the way down to opposite surfaces 24 of base portion 20 on frame member F. Therefore, base 20 can easily be bent to provide right angle corners. After bending to the configuration previously described, the notches leave grooves 42 in upper frame portion 16 or longitudinally opening for reception of flat bracket portions 78. Frame member F is bent so that plane surface 22 forms the inner surface thereof, while legs 30 are located on the outside periphery of frame member F.

As shown in FIG. 4, each panel support member D comprises an aluminum extrusion having a rectangular hollow portion 102 and a channel portion 104 defined by spaced-apart channel legs 106 extending integrally from hollow portion 102. Channel legs 106 may have inwardly extending longitudinal projections 108 for gripping a panel received in channel space 104. The upper edge of a panel J may be received in channel space 104. Panel J may be a rectangular panel formed of opaque synthetic plastic material or the like. Obviously, other types of panels could be used.

Hollow portion 102 of panel support member D includes rectangular hollow end portions 112 alignable with rectangular holes as at 114 in base 20 of vertical portions 18 on frame member F. Expansion fasteners K are then positioned through rectangular holes 114 and extend into hollow end portions 112. Fasteners K are then expanded for securly locking panel support members B to upright portions 18 of frame member F. Expansion fasteners K may be of any known type. Fasteners K include an enlarged head 116 and a shank portion 118 having a rectangular cross-sectional configuration of generally the same size as opening 114 and hollow end portion 112. Shank portion 118 is divided into two halves 120 and 122 by longitudinally extending slot 124. A tapered bore 126 extends through head 116 into shank portion 118. A metal pin 128 is insertable into tapered bore 126, and is driven inwardly for expanding shank portions 120 and 122 outwardly into firm engagement with the periphery of hole 114 and the inner wall of hollow end portion 112. Shank portion

118 may have a plurality of striations or ridges thereon for enhancing the locking effect.

In constructing a railing of the type described, frame member F is first formed to the described configuration. Either upper or lower panel support member D is then secured between upright portions **18** with expansion fasteners K. An edge of panel J is then inserted into channel groove **104** in the assembled panel support member. The other panel support member is then positioned with its channel space **104** receiving the opposite edge of panel J. The other panel support member D is then secured to upright portions **18** with expansion fasteners K. Preferably, the bottom panel support member D is assembled first so that panel J can rest thereon with its bottom edge received in channel space **104** while the top panel support member is secured between upright portions **18.**

Members **69** may then be moved toward upright portions **18,** or frame member F moved toward members **69,** so that flat horizontal bracket portions **78** will extend into grooves **42,** and legs **60** on posts A will interlock with legs **30** on frame member F, in the manner previously described. A complete railing section is then assembled.

As many railing sections as desired can be assembled between a plurality of spaced-apart posts. The assembled railing is then ready for securement to a mounting surface, or for positioning the bottom portions of posts A within sockets.

At an end of the railing, the outer flat bracket portion **78** may be omitted and the opening defined between post flanges **72** closed by a length of frame member having the same cross-sectional configuration as described with respect to frame member F. In the alternative, an end post for a railing may simply be a vertically positioned member having the same cross-sectional configuration as top rail G. A bracket member having only depending portion **80** and one horizontally extending portion **78** would then be secured to the web of the end channel member. Top rail G extends over the top of posts A. Top rail G may be of sufficient length to span several posts and several sections of railing.

Although the invention has been shown and described with respect to a preferred embodiment, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. The present invention includes all such equivalent alterations and modifications, and is limited only by the scope of the claims.

Having thus described my invention, I claim:

1. A railing construction including vertical posts and a top railing, a one-piece frame member positioned between said posts and having a substantially inverted U-shaped configuration comprised of a substantially horizontal upper portion and spaced vertical portions integral therewith at its ends and vertically extending channel members coacting with said vertical portions by means of integral cooperating interdigitated locking means to form the posts for said railing.

2. The construction of claim **1** wherein said upper portion of said frame member has longitudinally opening grooves facing toward said channel members, said members having upper end portions, brackets secured to the web of said upper end portions of said posts, said brackets including substantially flat bracket portions extending substantially horizontally and having flat bracket portion opposite edges received in said grooves.

3. The construction of claim **2** and including a top rail, said top rail and said upper portion of said frame member having cooperating interdigitated locking means integral therewith for locking said top rail to said upper portion of said frame member, said top rail extending over the upper end of the posts.

4. The construction of claim **1** wherein said upright portions have bottom terminal ends and further including a pair of vertically spaced panel support members extending between said upright portions substantially parallel to said upper portion and located intermediate said upper portion and said terminal ends.

5. The construction of claim **4** wherein said panel support members have hollow opposite end portions and said base portions of said upright portions have holes therethrough aligned with said hollow opposite end portions, and expansion fasteners extending through said holes and into said hollow opposite end portions for fastening said panel support members to said upright portions.

6. The construction of claim **5** and including a substantially rectangular panel supported between said panel support members.

7. In a railing construction including a plurality of posts and a top railing the improvement which comprises: a one-piece frame member having a generally inverted U-shaped configuration including a substantially horizontal upper portion having spaced-apart opposite vertical portions integral with said upper portion and extending downwardly from the end of said horizontal portions, said frame member having a cross-sectional configuration defined by a base portion having opposite edges, a substantially plane surface and an opposite surface, said opposite surface having opposite locking and mounting legs extending outwardly therefrom and spaced inwardly from said opposite edges, said legs having locking surfaces extending outwardly therefrom toward said opposite edges and facing toward said opposite surface in spaced relationship thereto, said legs having projections extending inwardly therefrom in spaced relationship to said opposite surface to define a pair of spaced-apart grooves facing one another on said opposite surface between said legs, said legs being on the outer surface of said frame member and said plane surface of said base portion defining an inner surface of said frame member, said legs being cut away at said corners so that said grooves on said upper portion open substantially horizontally outward and so that said base portion can be readily bent where said legs are cut away to form said frame member into said substantially inverted U-shaped configuration.

8. The construction of claim **7** wherein said upright portions have bottom terminal ends and further including a pair of vertically spaced panel support members extending between said upright portions substantially parallel to said upper portion and located intermediate said upper portion and said terminal ends.

9. The construction of claim **8** wherein said panel support members have hollow ooposite end portions and said base portions of said upright portions have holes therethrough aligned with said hollow opposite end portions, and expansion fasteners extending through said holes and into said hollow opposite end

portions for fastening said panel support members to said upright portions.

10. The construction of claim **7** and further including spaced-apart substantially vertical channel members having spaced-apart flange portions, said flange portions having inwardly extending locking projections integral therewith and including flange locking projection surfaces, said legs on said upright portions of said frame member being received between said flanges with said locking surfaces thereon interdigitated with said flange locking projection surfaces, said channel members and said vertical portions when assembled forming the posts of said railing.

11. The construction of claim **10** wherein substantially flat bracket members are secured to said upper ends of said channel members, said brackets including substantially horizontally extending flat bracket portions having opposite edges received in said grooves between said legs on said opposite surface of said upper portion of said frame member.

12. The construction of claim **11** and further including a top rail extending integrally over said posts and having a substantially inverted channel-shaped cross-sectional configuration and including opposite channel legs, said channel legs having inwardly extending channel locking projections thereon including channel locking projection surfaces, said locking surfaces on said legs on said upper portion of said frame member and said channel locking projection surfaces being interdigitated for securely locking said rail to said frame member.

13. The construction of claim **12** wherein said upright portions have bottom terminal ends and further including a pair of vertically spaced panel support members extending between said upright portions substantially parallel to said upper portion and located intermediate said upper portion and said terminal ends.

14. The construction of claim **13** wherein said panel support members have hollow opposite end portions and said base portions of said upright portions have holes therethrough aligned with said hollow opposite end portions, and expansion fasteners extending through said holes and into said hollow opposite end portions for fastening said panel support members to said upright portions.

15. The construction of claim **14** and including a substantially rectangular panel supported between said panel support members.

16. The construction of claim **7** and including spaced-apart substantially vertical channel members, substantially flat bracket members secured to the upper ends of said members, said brackets including substantially horizontally extending flat bracket portions having opposite edges received in said grooves between said legs on said opposite surface of said upper portion of said frame member.

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