

[54] RAILING SYSTEM

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[51] Int. Cl.² **E04H 17/14**

[58] Field of Search 256/21, 22, 24, 59, 65-70; 40/140, 142 R, 209, 210

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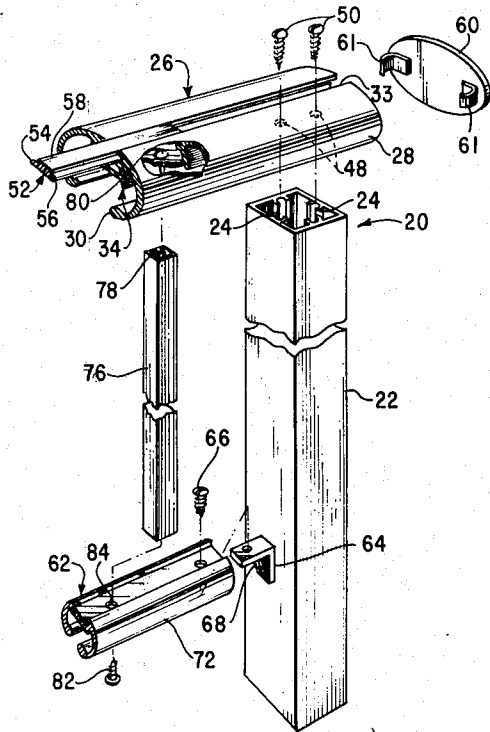
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Assistant Examiner—Conrad L. Berman
Attorney, Agent, or Firm—Robert H. Epstein

[57] **ABSTRACT**

A railing system including a top rail carrying a mounting member secured to spaced posts by fasteners, the mounting member being disposed below a top portion of the top rail having a longitudinal slot therein aligned with the mounting member, and an elongate insert strip removably received in the slot such that the fasteners are concealed from view by the insert strip. Various modifications of the railing system include pickets mounted between the top rail and a bottom rail, an insert strip for the bottom rail to conceal fasteners for the pickets, and channeled insert strips for the top and bottom rails to support top and bottom panels.

13 Claims, 16 Drawing Figures



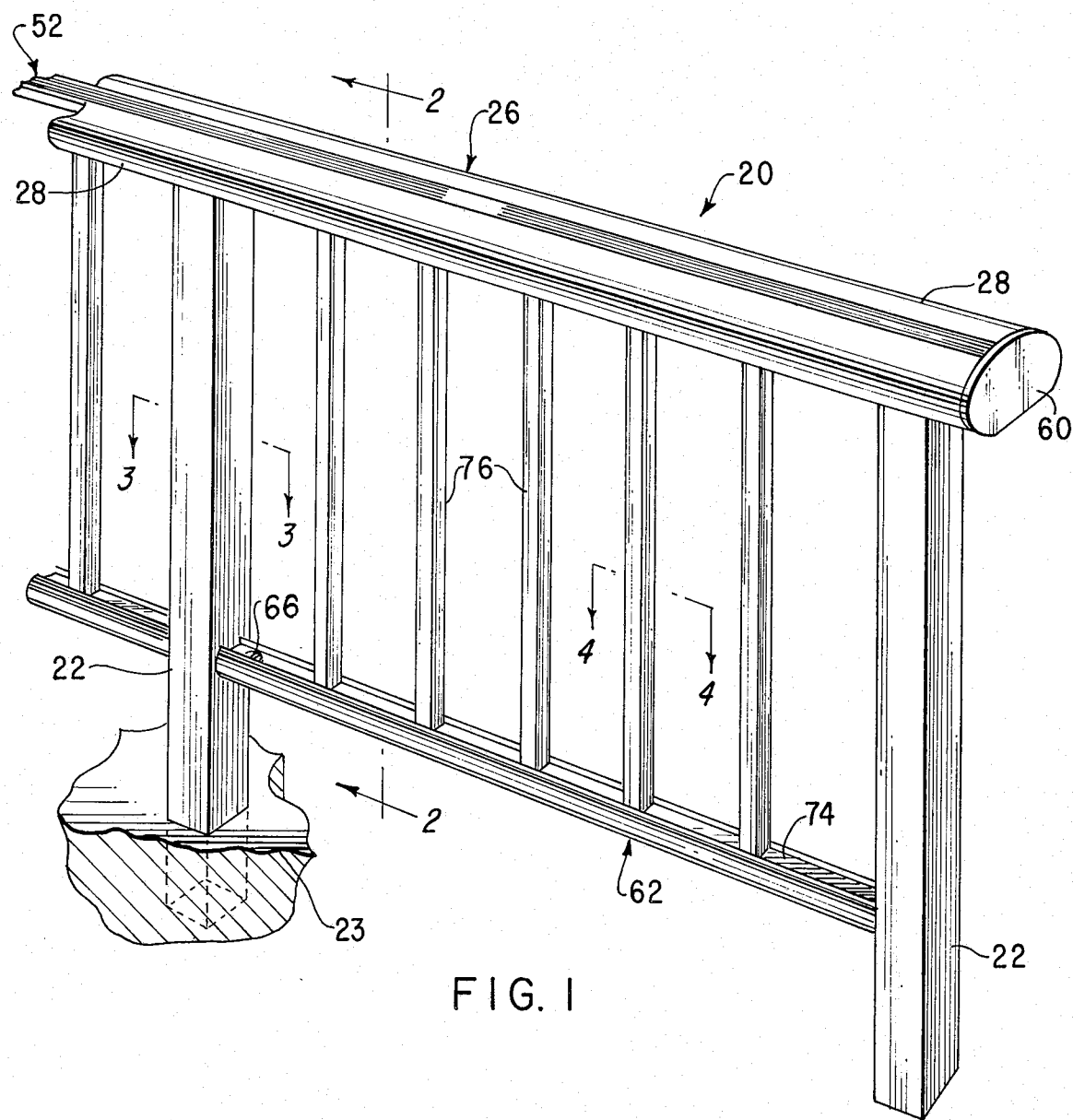


FIG. 1

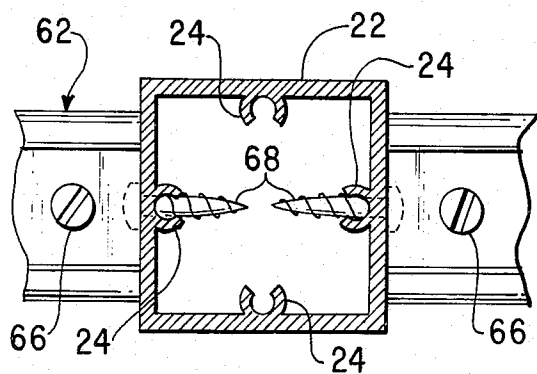


FIG. 3

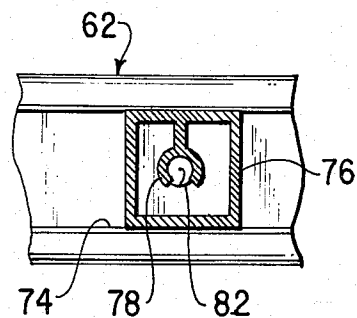
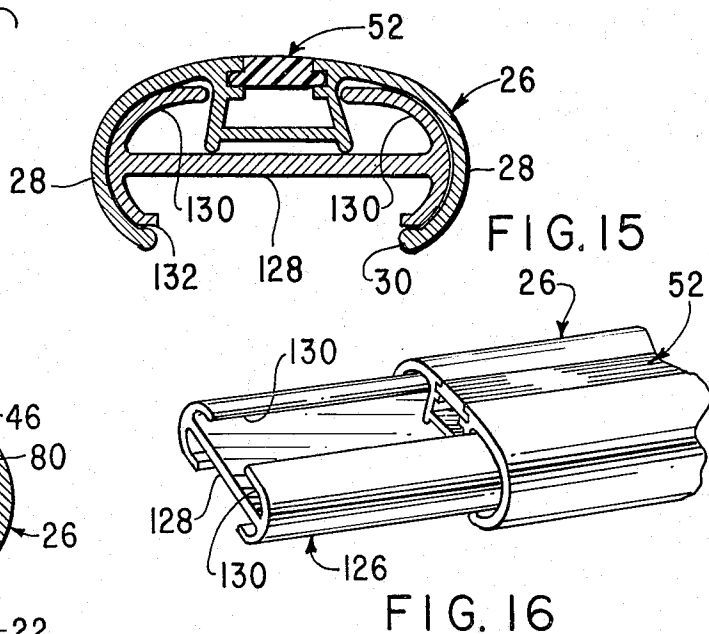
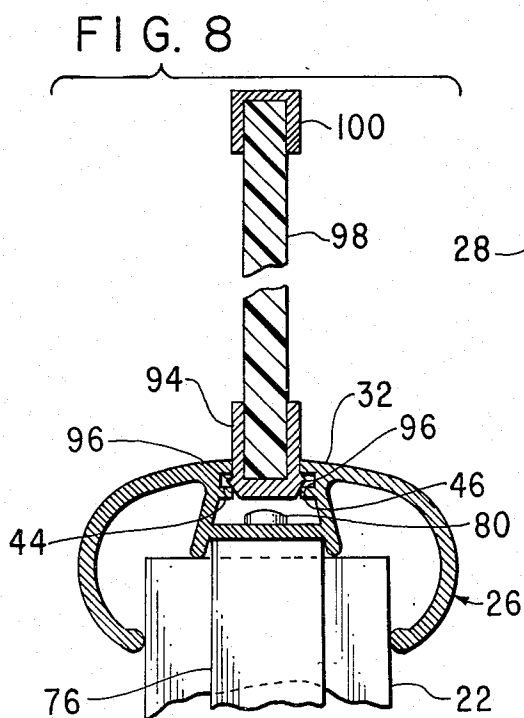
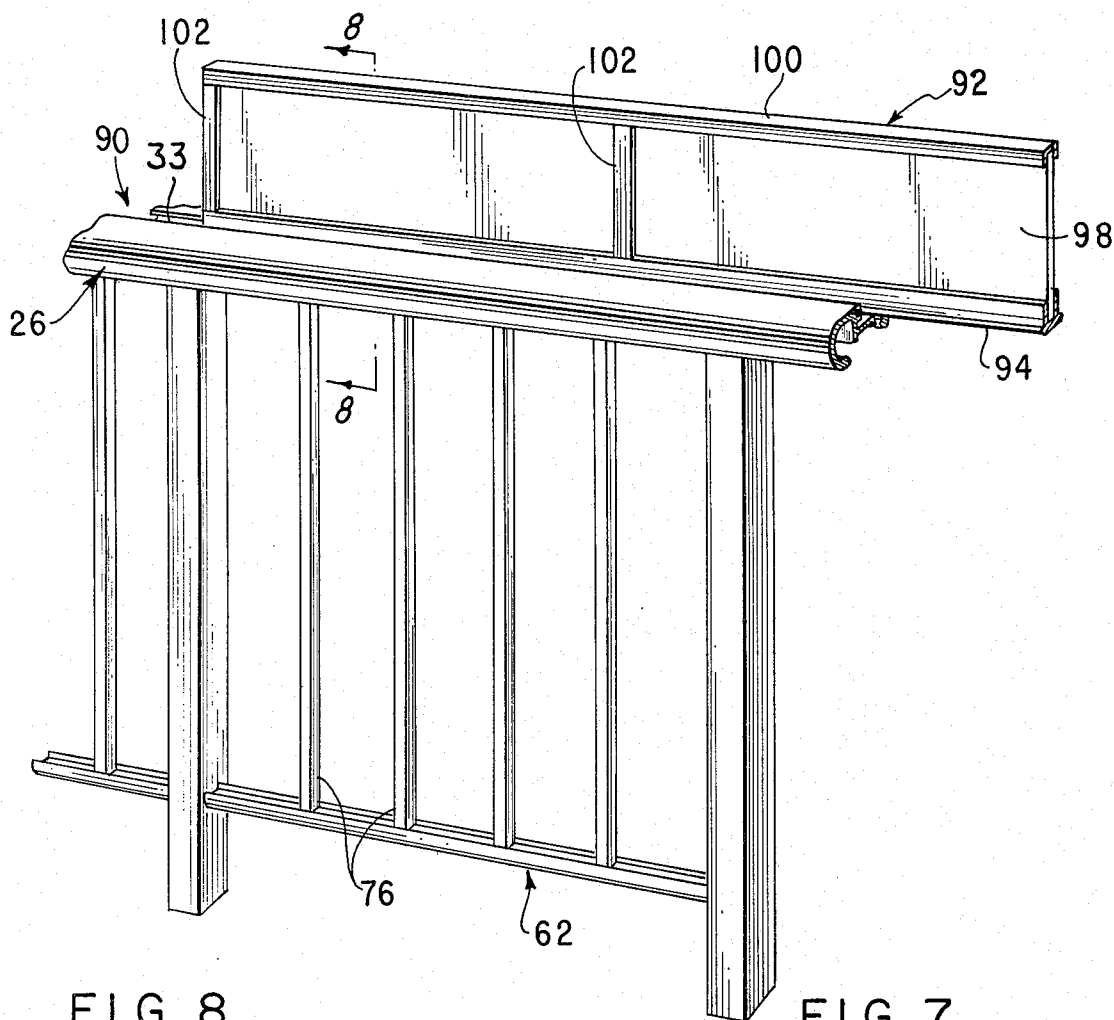


FIG. 4



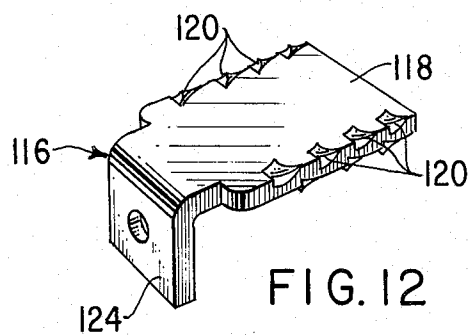
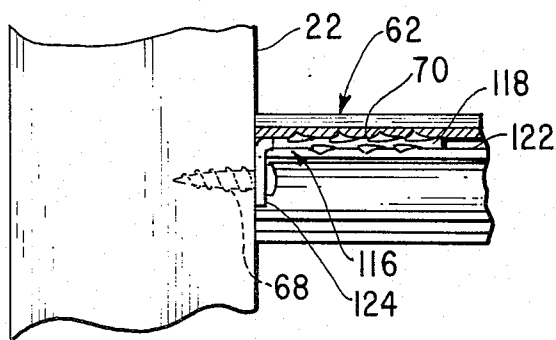
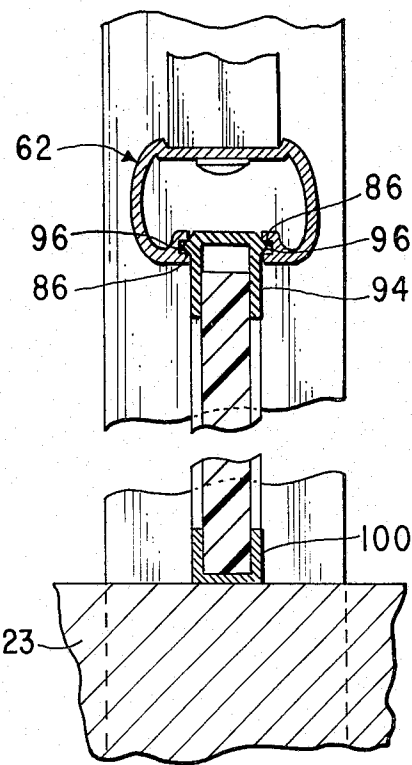
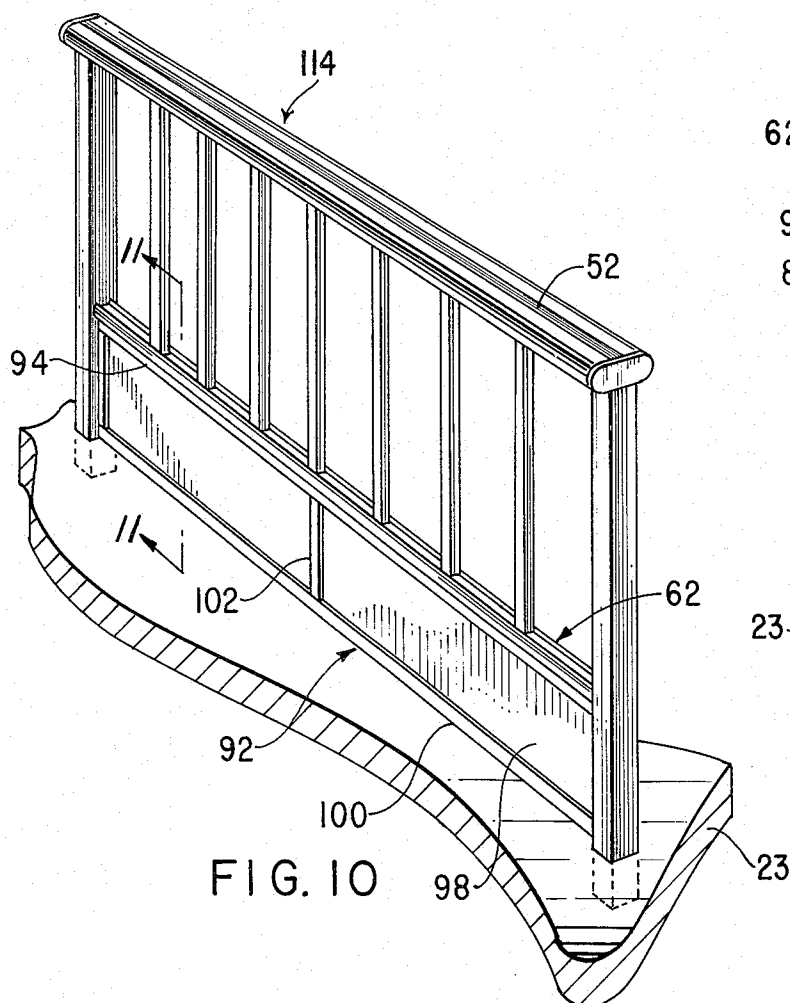


FIG. 14

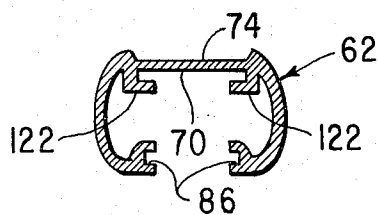


FIG. 13

RAILING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains to railing systems and, more particularly, to extruded aluminum railing systems and components therefor.

2. Discussion of the Prior Art

Extruded aluminum railing systems are frequently used in the construction industry due to the strength thereof and the adaptability of such railing systems to permit various types and configurations of railings to be provided utilizing standard components. In order to optimize the use of such aluminum railing systems, the number of standard components is desirably kept at a minimum; however, the components must be designed to permit them to be securely fixed together to provide a safe and sturdy structure. Aluminum railing systems are also advantageous due to their aesthetic appeal; and, accordingly, it is desirable that the fastening means for the components, such as welds or screws, bolts, rivets or similar fasteners, be concealed from view.

Prior art aluminum railing systems, as exemplified by U.S. Pat. No. 3,596,880 to Greenberg, have been designed to conceal the fastening means from view by the use of additional components referred to as dressing plates or subrails; however, while the railing system of U.S. Pat. No. 3,596,880 has been found very effective and commercially acceptable, it is desirable to conceal the fastening means in a manner not requiring additional components.

In order to provide a commercially acceptable railing system, the railing system must not only be aesthetically appealing, but further the components thereof, such as pickets, posts, rails, panels and the like, must be fastened together in a manner to prevent collapse or misalignment thereof while permitting simple and quick assembly for installation. For ease of assembly, it is preferable to utilize screws or rivets to fasten the components together; however, the use of such fasteners presents the problem that the pickets, posts and panels have a tendency to work loose and rattle after installation, particularly when subjected to lateral forces tending to knock them out or twist them.

SUMMARY OF THE INVENTION

The present invention is generally characterized in a railing system including a plurality of spaced posts having lower ends adapted to be mounted on a support and upper ends; an elongate top rail having a top portion with a longitudinal slot therein and a longitudinal mounting member disposed below the top portion and accessible through the slot; means securing the upper ends of the posts to the mounting member; and an elongate insert strip removably received in the slot in the top portion of the top rail whereby the securing means are concealed from view by the insert strip.

Accordingly, it is an object of the present invention to overcome the above mentioned disadvantages of the prior art by providing an aluminum railing system utilizing a minimum number of components while being capable of modification for various applications.

Another object of the present invention is to utilize a single extrusion as a top rail for a railing system with an elongate insert strip inserted in a longitudinal slot therein to conceal fasteners from view.

A further object of the present invention is to utilize insert strips in combination with top and bottom rails of a railing system to conceal the fasteners securing the components of the railing system together.

The present invention has an additional object in the design of a bottom rail for a railing system facilitating the mounting of panels thereon.

Yet another object of the present invention is to provide a railing system utilizing square pickets and posts received in channels in top and bottom rails such that the pickets and posts are reinforced against lateral movement and prevented from twisting.

An additional object of the present invention is to utilize a reinforcing extrusion slidably received in a single top rail extrusion to increase the strength thereof.

The present invention has a further object in the design of an angle brace for a railing system to secure a bottom rail to a pair of posts without requiring conventional screws or rivets.

Some of the advantages of the present invention over the prior art are that the number of components of the railing system is reduced while permitting the basic components to be universally utilized for various designs and applications, the railing system can be easily assembled with minimum labor and expertise, and the railing system facilitates repair or replacement of railing components without requiring complete removal of the top rail as in prior art railing systems.

Other objects and advantages of the present invention will become apparent from the following description of the preferred embodiments taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a broken perspective view of a railing system according to the present invention.

FIG. 2 is a broken vertical section taken along line 2—2 of FIG. 1.

FIG. 3 is a horizontal section taken along line 3—3 of FIG. 1.

FIG. 4 is a horizontal section taken along line 4—4 of FIG. 1.

FIG. 5 is an exploded view of the railing system of FIG. 1.

FIG. 6 is a broken elevation partly in section of a modification of a bottom rail for use in a railing system according to the present invention.

FIG. 7 is a perspective view of another embodiment of a railing system according to the present invention.

FIG. 8 is a vertical section taken along line 8—8 of FIG. 7.

FIG. 9 is a broken vertical elevation partly in section of a modification of the panel support channel of the railing system of FIG. 7.

FIG. 10 is a perspective view of a further embodiment of a railing system according to the present invention.

FIG. 11 is a vertical section taken along line 11—11 of FIG. 10.

FIG. 12 is a perspective view of a modification of an angle brace for use with the railing system of the present invention.

FIG. 13 is a vertical section of a modified bottom rail for use with the angle brace of FIG. 12.

FIG. 14 is a broken elevation of the railing system of the present invention utilizing the angle brace of FIG. 12 and the bottom rail of FIG. 13.

FIG. 15 is a section of a reinforced modification of the railing system of the present invention.

FIG. 16 is a broken perspective of the reinforced modification of FIG. 15.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A railing system 20 according to the present invention, as illustrated in FIGS. 1-5, includes a plurality of parallel spaced, vertical posts 22 having lower ends adapted to be mounted on a support 23, either by suitable mechanical means, such as screws, rivets or the like, or fixed in a material such as cement. The posts 22 are preferably formed of extruded aluminum and are square in cross section with longitudinal curved splines 24 carried on the inner surface of each wall, as best shown in FIG. 3.

The posts 22 are attached to a top rail 26 at their upper ends, the top rail 26 being formed preferably of an aluminum extrusion and having curved longitudinal legs 28 terminating at laterally spaced, thickened tear-drop shaped lips 30 contacting the outer surfaces of the upper ends of the posts 22, as best shown in FIG. 2. The legs 28 are joined by a slightly curved top portion 32 having a longitudinal slot 33 therein from the edges of which depends a mounting member 34 formed of a pair of slightly outwardly diverging, longitudinal legs 35 and 36 joined by a longitudinal cross member 38. The ends of legs 35 and 36 extend beyond the cross member 38 to contact the top edges of the posts 22 and define a longitudinal channel 40 in the top rail. The slot 33 forms a track defined by grooves 44 and 46 formed in legs 35 and 36, respectively, adjacent the top portion 32. The cross member 38 has a plurality of holes 48 disposed along the longitudinal center thereof and a pair of self-tapping screws 50 extend through adjacent holes 48 to secure the top rail 26 to each of the posts 22, as best shown in FIG. 5, the screws 50 extending through the holes 48 to be received in the splines 24 extending from the inner surface of opposite side walls of posts 22.

An elongate insert strip 52 has a configuration mating with the configuration of slot 33 with longitudinal flanges 54 and 56 received in grooves 44 and 46, respectively, and a central portion 58 positioned such that the top surface thereof provides a continuous surface with the top portion 32 of the top rail 26. The insert strip 52 can be made of any suitable material, such as vinyl plastic or an aluminum extrusion. End plates 60 are mounted on the ends of the top rail and carry spring arms 61 adapted to provide spring tension contact with the inner surfaces of the curved legs 28 of the top rail.

An extruded aluminum bottom rail 62 is mounted between pairs of posts 22 in parallel with top rail 26 by angle braces 64 having an L-configuration with a horizontal leg thereof fixed to bottom rail 62 by a screw 66 and a vertical leg fixed to one of the posts 22 by a screw 68. The horizontal leg of angle braces 64 abuts the lower surface of a longitudinal mounting member 70 of bottom rail 62, and the upper surface of the mounting member 70 is recessed below the edges of a pair of longitudinal legs 72 depending from the mounting member to define a longitudinal channel 74 in the bottom rail. A plurality of spaced, parallel, extruded aluminum pickets 76 are vertically mounted between the top and bottom rails, and each of the pickets 76 is square in cross section, as best shown in FIG. 4, and has a longi-

tudinal curved spline 78 centrally formed by an extension from one of the sides thereof. The pickets 76 are fixed at their upper ends by self-tapping screws 80 extending through the apertures 48 in the mounting member of the top rail to be received in the spline 78, and the pickets 76 are secured to the bottom rail 62 by self-tapping screws 82 extending through holes 84 in mounting member 70 and received in the spline 78.

The rectangular configuration of the pickets 76 of the railing system 20 cooperating with the channels 40 and 74 in the top and bottom rails, respectively, assure that the pickets are reinforced against lateral forces and are retained in the top and bottom rails to prevent twisting thereof. The recessed positioning of the mounting member 34 of the top rail below the top portion thereof permits all screws or other fasteners, such as rivets and the like, to be concealed by the insert strip 52, and the use of the insert strip 52, which may be either snapped into the track formed by grooves 44 and 46 or slid therein, further operates to provide a contrasting color strip centrally disposed in the top rail and to permit replacement of individual pickets after installation without disassembling the entire railing system. The pickets 76 can support panels or other structure desired to be mounted between the top and bottom rails, it being important in accordance with the present invention only that such structure have flat side surfaces to cooperate with the flat sides of the channels 40 and 74 in the top and bottom rails to provide a sturdy construction. The tear-drop lips 30 at the edges of the legs of the top rail permit easy insertion of the posts 22 to abut the ends of legs 35 and 36 and, further, provide a spring tension on the posts thereby eliminating any tendency of the posts to rattle or work loose after installation. By utilizing square posts and pickets not only is the railing system 20 stabilized but, additionally, the posts are symmetrical for handling purposes thereby permitting all of the attaching holes 48 for the posts and the pickets to be formed in a straight line. In order to further increase the aesthetic qualities of the railing system 20, the legs 28 of the top rail 26 extend below the mounting member 34 to conceal the abutment of the posts 22 therewith and the attachment of the pickets 76; and, similarly, the legs 72 of the bottom rail 62 extend a distance so as to conceal the screws 66 and 82 and the vertical legs of the angle braces 64.

A modification of the railing system 20 of FIG. 1 is illustrated in FIG. 6 wherein the longitudinal legs 72 of the bottom rail 62 are formed with thickened edges having grooves 86 therein adapted to receive flanges or tongues of an insert strip 88 such that the screws 82 and the angle braces 64 are concealed from view. Similar to the insert strip 52, the insert strip 88 can be formed of plastic, such as vinyl, extruded aluminum or any suitable material to be concealed or snapped into the track formed by grooves 86.

Another embodiment of a railing system 90 according to the present invention is illustrated in FIGS. 7 and 8 and components of the railing system 90 identical to components of the railing system 20 are given identical reference numbers and not described again. The primary difference between the railing systems 20 and 90 is that the railing system 90 utilizes a panel assembly 92, the panel assembly including an insert strip in the form of a panel support channel member 94 having longitudinal bevelled ribs 96 extending from opposite sides thereof and adapted to be received in the grooves 44

and 46 in the slot 33 in the center of the top portion 32 of the top rail 26. A plurality of panels 98 are mounted in the panel support channel member 94 and capped by a top channel member 100, the channel members 94 and 100 being interconnected by uprights 102.

The channel member 94 can be made of any suitable material such as vinyl plastic or extruded aluminum and the bevelled configuration at the ribs 96 facilitates snap installation thereof in the slot 33. The panels 98 may be glass, plastic or any suitable material providing a desired decorative or concealing effect, and the panels can be stacked edge-wise one upon the other to form a screen.

A modification of the railing system 90 is illustrated in FIG. 9 wherein an insert strip in the form of a bottom channel member 104 is formed of extruded aluminum and has bevelled ribs 106 extending from parallel legs 108 which diverge to form a support channel 110 adapted to mount a panel 112 of greater width than the panels 98 in FIGS. 7 and 8. The channel member 104 can be snapped into the slot 33 due to the bevelled configuration of the ribs 106, and the bottom ends of the legs 108 contact the cross member 38 of the top rail 26 to stabilize the structure.

A further embodiment of a railing system 110 according to the present invention is illustrated in FIGS. 10 and 11 and components of the railing system 114 identical to components of the railing system 90 are given the same reference numbers and not described again. The primary difference between the railing systems 90 and 114 is that the panel assembly 92 is mounted between the bottom rail 62 and the support 23 rather than on the top rail 26. The panel assembly 92 is inverted with the channel member 94 snapped into the track formed in the bottom rail 62 illustrated in FIG. 6 with the bevelled ribs 96 received in the grooves 86. The channel member 100 rests on the surface of the support 23 such that the panels 98 form a partition between the bottom rail 62 and the support surface to define a kick or toe plate.

A modification of the railing system of the present invention is illustrated in FIGS. 12, 13 and 14 wherein the angle braces mounting the bottom rails 62 between pairs of posts 22 are designed to permit the bottom rails to be secured thereto without separate fasteners. To this end, an angle brace 116 has its horizontal leg 118 formed with barbs 120 on the edges thereof, and the bottom rail 62 has a pair of depending projections 122 forming a channel for receiving the horizontal leg 118 of the angle braces 116. As illustrated in FIG. 14, the vertical legs 124 of the angle braces 116 are secured to posts 22 by means of screws 68 while the horizontal legs 118 are received in the channels formed by projections 122 with the barbs 120 engaging the mounting member 70 to hold the angle brace firmly in place with the bottom rail 62. With the use of the barbed angle braces 116, the screws 66 are obviated such that none of the fasteners of the railing system are visible.

A reinforced modification of the railing system of the present invention is illustrated in FIGS. 15 and 16 wherein a reinforcing extrusion 126 is provided with a configuration to be slidably received within the curved legs 28 of the top rail 26. The extrusion 126 has a cross member 128 with longitudinal curved sides 130 having an outer configuration corresponding to the configuration of the inner surface of the legs 28 of the top rail, the bottom edges of the sides 130 being flattened at

132 to accommodate the lips 30 of the top rail while the sides 130 are spaced to receive the mounting member 34.

Any of the above described embodiments and modifications of the railing system of the present invention can be combined to provide a railing system of any desired configuration. Additionally, while the configuration of the top rail preferably utilizes curved longitudinal arms having confronting edges or lips for contacting the posts, the top rail can have any desired configuration with a mounting member recessed below a top portion such that a removable insert strip can be disposed in a slot in the top portion to hide the fasteners of the railing system. To this end, the top rail could take the form of a closed member having any configuration with a slot in a top wall thereof to permit access to the bottom wall which would form the mounting member for securing the posts and the pickets. The width of the slot in the top rail need only be wide enough to permit insertion of a tool, such as a screwdriver, for tightening or loosening the fasteners. The configuration of the pickets and posts, while preferably rectangular, can also vary; however, it is advantageous that the pickets have flat sides to be engaged by the sides of the channels in the top and bottom rails and that the posts have flat sides to be engaged by the confronting edges of the curved arms of the top rail in order to protect the railing system from rattling or working loose.

Inasmuch as the present invention is subject to many variations, modifications and changes in detail, it is intended that all matter described above or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A railing system comprising
 - a plurality of spaced posts having lower ends adapted to be mounted on a support and upper ends;
 - an elongate top rail having a top portion defining a surface with a centrally positioned longitudinal slot therein, a longitudinal mounting member disposed below said top portion and accessible through said slot, and a pair of curved longitudinal legs depending from opposite sides of said top portion and terminating at confronting edges spaced below said mounting member and engaging said posts adjacent said upper ends such that said legs provide a spring tension on said posts to prevent said posts from rattling or working loose, said top portion, said legs and said mounting member being integrally formed as a one-piece component;
 - means securing said upper ends of said posts to said mounting member; and
 - an elongate insert strip removably received in said slot in said top portion of said top rail and having a width substantially the same as the width of said slot whereby said securing means are concealed from view by said insert strip.
2. A railing system as recited in claim 1 wherein said top rail is formed of an aluminum extrusion and said insert strip is formed of plastic.
3. A railing system as recited in claim 1 wherein said top rail and said insert strip are each formed of an aluminum extrusion.
4. A railing system as recited in claim 1 wherein said posts each carry curved splines, said securing means includes screws extending through said mounting member of said top rail to engage said curved splines and

said slot in said top portion of said top rail is aligned with said mounting member and has a width to receive a tool for tightening or loosening said screws.

5. A railing system as recited in claim 1 wherein said elongate insert strip has a channel formed therein and further comprising a plurality of panels received in said channel.

6. A railing system as recited in claim 1 wherein said top rail is formed of an aluminum extrusion and further comprising an extruded aluminum reinforcing member having a configuration mating with the configuration of said top rail and slidably received therein.

7. A railing system as recited in claim 1 and further comprising a bottom rail disposed below said top rail having means projecting therefrom to form a channel, and means for mounting said bottom rail between a pair of said posts including a pair of angle braces, each of said braces having a vertical leg fixed to one of said posts and a barbed horizontal leg engaged in said channel in said bottom rail.

8. A railing system as recited in claim 1 wherein said top rail has a longitudinal channel with flat sides formed in said mounting member and further comprising a bottom rail secured to a pair of said posts below said top rail and having a longitudinal channel with flat sides formed therein, a plurality of spaced pickets square in cross section having curved splines centrally disposed therein, upper ends of said pickets being received in said longitudinal channel in said top rail and lower ends of said pickets being received in said longitudinal

tudinal channel in said bottom rail, a plurality of screws extending through said mounting member of said top rail to engage said splines in said pickets, and a plurality of screws extending through said bottom rail to engage said splines in said pickets.

9. A railing system as recited in claim 1 wherein said posts are square in cross section and have curved splines extending from the inner surface of each wall thereof, said top rail has curved longitudinal legs with edges engaging said posts, said mounting member has a plurality of spaced holes therein, said securing means for each of said posts includes a pair of screws extending through adjacent ones of said holes.

10. A railing system as recited in claim 1 and further comprising a bottom rail secured to a pair of said posts below said top rail having a mounting member with legs depending therefrom and terminating in spaced relation to define a track and an elongate insert strip removably received in said track in said bottom rail.

11. A railing system as recited in claim 10 wherein said bottom rail insert strip is formed with a channel therein and further comprising panel means received in said channel.

12. A railing system as recited in claim 1 wherein said confronting edges of said legs have tear-drop configurations to facilitate insertion of said posts.

13. A railing system as recited in claim 12 wherein said posts are square in cross section and said posts and said top rail are constructed of aluminum.

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