

Jan. 7, 1969

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3,420,504

RAILINGS, LADDERS, TRUSSES AND SIMILAR TYPE ARTICLES

Filed Aug. 18, 1966

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FIG. 1.

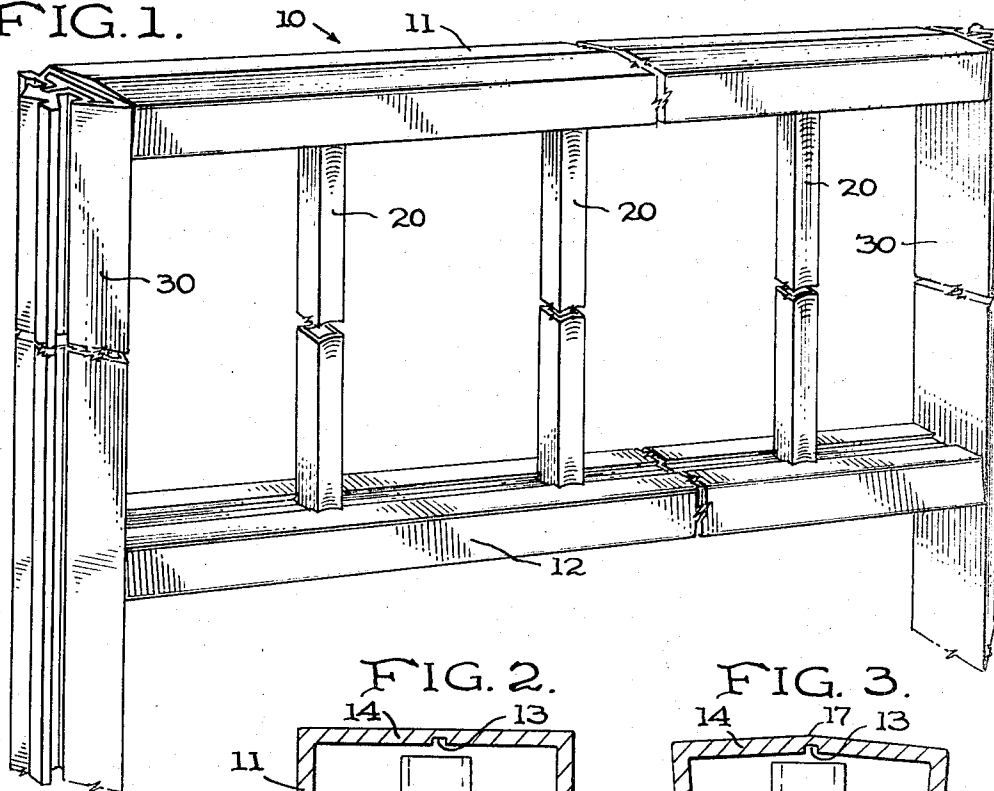


FIG. 2.

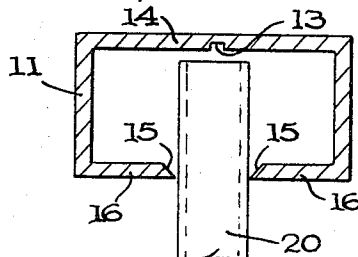


FIG. 3.

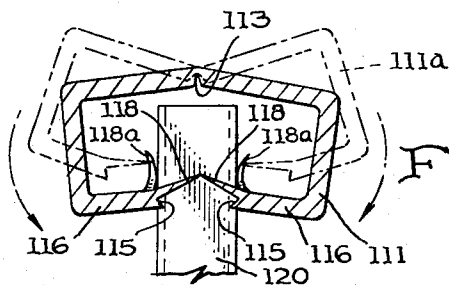
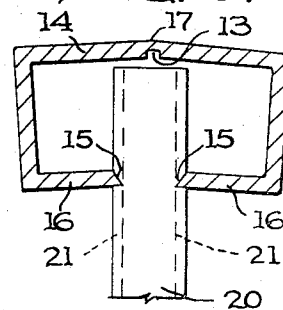
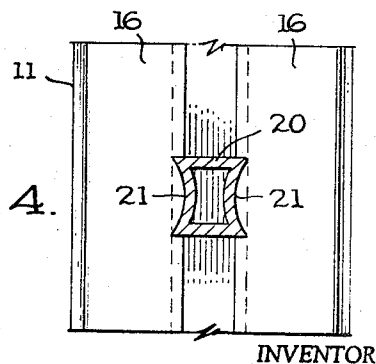


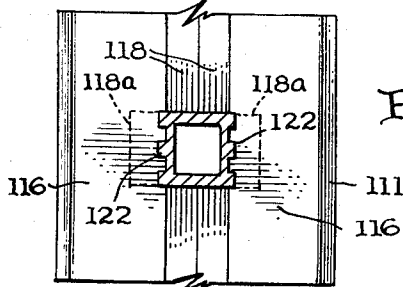
FIG. 5.

FIG. 4.



INVENTOR

FIG. 6.



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FIG. 7.

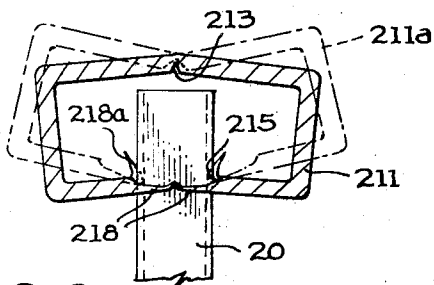


FIG. 10.

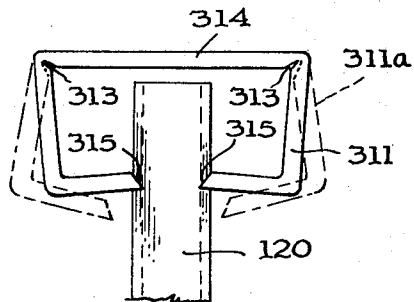


FIG. 8.

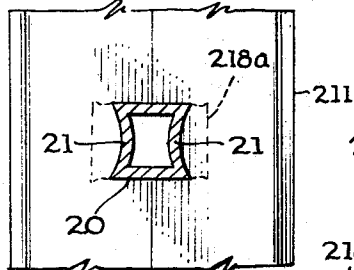


FIG. 9.

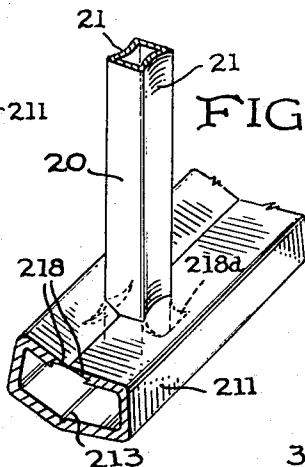


FIG. 11.

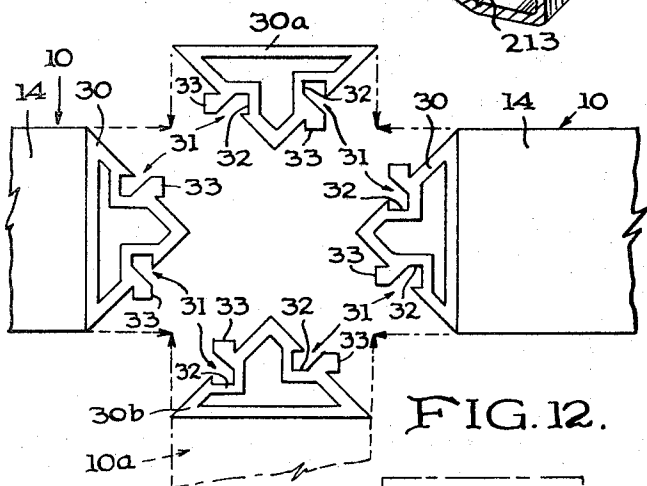
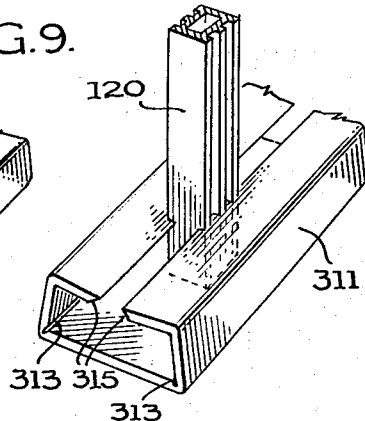


FIG. 12.

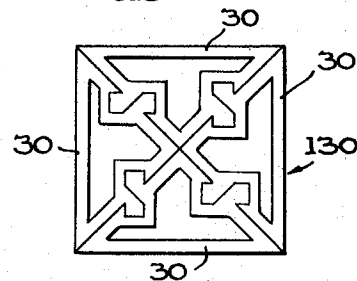


FIG. 13.

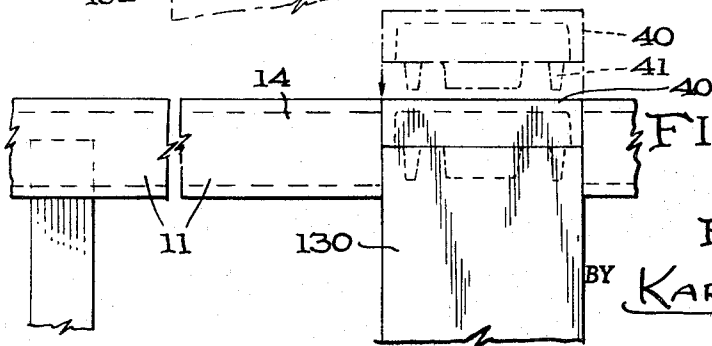


FIG. 14.

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RAILINGS, LADDERS, TRUSSES AND SIMILAR TYPE ARTICLES

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Int. Cl. E04f 11/18

10 Claims

ABSTRACT OF THE DISCLOSURE

Construction for use in railings, ladders, etc., using rails connected by pickets with inwardly beveled edges on the rails which are pressed into the pickets and with elongated portions at these edges which close the spaces between rail edges, between the pickets. The end posts are interlocking quarter sections for a variety of connection combinations of sections.

The present invention relates to railings, ladders, trusses and similar type articles that may be prefabricated in sections and more specifically to these articles simply fabricated with a finished appearance in sections which may be easily attached either in line or at angles to each other.

In the case of handrails having the form of the present invention the sections may be made either to extend horizontally in a level plane and thus at right angles to the pickets or with the pickets still remaining in a vertical position the handrails may extend at an angle other than 90° to these pickets.

Also with the form of the present invention the handrails may be attached to the pickets or supports to ladder rungs by a clamping arrangement and due to the form of the handrail and picket or support and rung combination present a finished appearance where this clamping arrangement takes place, even from a bottom view of the handrail or side view of the ladder in an upright position.

Accordingly, the present invention is directed to a railing type of assembly with a pair of rails in substantially parallel spaced relationship with at least one connecting element therebetween attached at its opposite ends to the rails, posts connected at opposite ends of the rails with the rails having inwardly extending opposed beveled edges pressed into the connecting element and extending substantially perpendicular thereto.

Furthermore, the sections of railing and similar type articles may be prefabricated at the factory with end posts attached thereto which will interlock with adjacent end posts to extend the section and connect it to an adjacent section of railing or similar article with the advantage of the present invention that a single design may be used for all end posts whether the connection between sections is to be made in line or at an angle to the adjoining section.

The advantages stated above lead to a further advantage that a minimum number of molds are needed along with a minimum number of different forms of rail sections thereby standardizing the production of these railings or similar articles and further contributing to the economy of manufacture.

These as well as further advantages which are inherent in the invention will become apparent from the following description, reference being had to the accompanying drawings wherein:

FIG. 1 is a perspective view of a section of railing in accordance with the present invention;

FIG. 2 is a section view of a handrail positioned over a picket before attachment thereto;

FIG. 3 is a section view of the handrail and picket of FIG. 2 after attachment of the handrail to the picket;

FIG. 4 is a bottom view of the handrail and picket of FIG. 3;

FIG. 5 is a section view of a modified form of handrail positioned over the end of a picket in dotted outline and connected to said picket shown in full lines;

FIG. 6 is a bottom view of the handrail and picket of FIG. 5 connected to each other;

FIG. 7 is a section view of a further modified form of the handrail with a handrail in open position shown in dotted outline and in position attached to the picket in full lines;

FIG. 8 is a bottom view of the handrail and picket of FIG. 7 attached to each other;

FIG. 9 shows either a bottom perspective view or a partial perspective view of the lower horizontal railing using the picket and handrail combination shown in FIGS. 7 and 8;

FIG. 10 shows a further modified form of handrail positioned over the picket in dotted form and clamped to the picket in full lines;

FIG. 11 shows an inverted perspective view of the picket and handrail of FIG. 10 attached to each other;

FIG. 12 shows a top plan exploded view of an end post formed from quarter posts;

FIG. 13 shows a top plan assembly view of the end posts; and

FIG. 14 shows an elevation of an assembled end post.

Referring first to FIG. 1, there is illustrated therein in perspective a section of railing 10 as it may be assembled, at the factory if preferred, having a horizontal handrail 11 with a lower horizontal rail 12 located below handrail 11 and attached thereto at intermediate points by pickets 20 and at their ends by quarter posts 30.

All portions may be manufactured of extruded aluminum or other convenient material and by other convenient methods, although it has been found that this construction is particularly adaptable to the use of extruded aluminum parts.

FIGS. 2, 3 and 4 show section and bottom views of the handrail and picket combination of the perspective view of FIG. 1. In inverted form these figures would also illustrate the combination of lower horizontal rail 12 and picket 20.

Handrail 11 has weakening groove 13 centrally located on the underside of its top horizontal portion 14 and inwardly beveled edges 15 on its bottom horizontal portions 16. Picket 20 has concave shaped sides 21 along opposite surfaces and so positioned that inwardly beveled edges 15 are in opposing relationship to concave shaped sides 21 when handrail 11 is clamped to picket 20. During this clamping procedure handrail 11 which must bend at some point will bend at weakening groove 13 thereby forming a handrail with a crown 17 in the center of top horizontal portion 14. As stated above, this same construction in an inverted form forms the attachment of lower horizontal rail 12 to pickets 20.

FIG. 5 and 6 show a second embodiment of the handrail or lower horizontal rail in combination with and attached to a picket. In this embodiment handrail 111 shown in open form in dotted outline 111a also has a weakening groove 113 and inwardly beveled edges 115 on bottom horizontal portions 116 but, in addition, has extending inward edge portions 118 extending from the upward part of inwardly beveled edges 115. Extending thin edge portions 118 are of such length and so angled upwardly from bottom horizontal portions 116 so as to allow the insertion of picket 120 when in open position 111a and so as to have their tips just touching each other when clamped to picket 120 and bent at weakening groove 113 with inwardly beveled edges 115 clamped into the end portion of picket 120. As shown in FIG. 5, when handrail 111 is clamped to picket 120, extending thin edge por-

tions 118 touch each other at their tips only where they do not encounter picket 120 in the clamping action. When edge portions 118 do encounter picket 120 they are bent back as shown by edge portion 118a. Portions 118a are bent back and inward within the handrail 111, where they cannot be seen in the finished product, because of the inward slope of edge portions 118 when they encounter the sides of picket 120. The picket used with handrail 111 may have a form as that of picket 20 or a form as shown in FIG. 6 whereby picket 120 has plurally grooved sides 122 opposite each other and so placed as to have inwardly beveled edges 115 clamped against them. The force of the clamping action has a tendency to force inwardly beveled edges 115 into the sides of the picket 120 and cause them to penetrate substantially to the depths of the grooves in the plurally grooved sides 122. In a similar manner inwardly beveled edges 15 will penetrate the corners of pickets 20 substantially to the depth of the concave shaped sides 21 of the pickets.

A further modified form of handrail 211 is shown in open position in dotted outline 211a and in section in position clamped on picket 20 in FIGS. 7 and 8. Handrail 211 also has a centrally located weakening groove 213 and an extending thin edge portion 218 on inwardly beveled edge 215, but in this embodiment edge portion 218 is formed as an extension of sloping portion 215 and interrupts what would be considered the beveled edge by this extending portion. Also, it has a further modification in that the tip of the extending thin edge portion 218 is upturned at its end so that upon a clamping action attaching handrail 211 to picket 20 the thin edge portion 218 encountering picket 20 will have a tendency to turn upward and inward forming inwardly bent portions 218a which cannot be seen in the finished form of the railing since they are within the handrail 211 framework. Again, the length of extending thin edge portions 218 should be so determined that upon completion of the clamping action their tips are just touching so as to form a closed finished appearing handrail as shown in the view of FIGS. 8 and 9.

FIGS. 10 and 11 show the use of picket 120 with still another form of the handrail. This form of handrail 311 is similar to handrail 11 except that instead of a weakening groove centrally located, in this embodiment, weakening grooves 313 are located in the corners on the under side of top horizontal portion 314 so that upon application of the clamping action to the handrail 311 shown in open position 311a, top horizontal portion 314 remains flat and does not form a crown thereon as with handrail 11. Since there are no extending thin edge portions on this embodiment of the handrail, when the inwardly beveled edges 315 have penetrated as far as they can into picket 120 there is still a spacing between the opposite edges as shown in FIG. 11 which may or may not be desirable depending upon the usage of the railing. Incidentally, FIG. 11 also illustrates in perspective a view of picket 120 connected to a lower horizontal rail having the form of handrail 311.

If it is desired that the handrail and the lower horizontal rail be placed in a sloping position in such cases as when the railing will be used along a stairway or on sloping ground, then it is a simple matter to place the pickets with their ends within the handrail and lower rail at an angle to these rails other than 90° and then to clamp the rails to the pickets at whatever angle is desired, obtaining results comparable to those obtained when the railings are in a horizontal position.

In the embodiment of the rail section described in FIG. 1, a quarter post 30 is attached by welding or other convenient means to the ends of handrail 11 or the other embodiments of the handrail shown in the figures, and to the ends of the lower horizontal rail 12 having embodiments similar to those of the handrails. In order to produce a more finished appearance the quarter posts may be attached to the handrail with the topmost portion of quar-

ter post 30 slightly below the top surface of top horizontal portion 14. Each of the quarter posts 30 is in substantially triangular form forming a right triangle in the embodiment illustrated. All quarter posts 30 are of similar form and therefore may be manufactured from the same mold. As seen from a top plan view of FIG. 12, the sides of the right triangle have interlocking portions 31 each formed with a slot 32 and a raised portion 33. Both slot 32 and raised portion 33 extend the full length of quarter posts 30. A similar slot 32 and raised portion 33 arrangement is found on the other side of the right triangle. On the hypotenuse of the right triangle formed by quarter posts 30 the connection is made to the handrail 11 and lower horizontal rail 12. Some of the quarter posts 30 are manufactured and left without any connection to a handrail or lower horizontal rail. With the quarter posts 30 made with interlocking portions 31 thereon so formed as to always interlock with an adjacent quarter post 30, four of these quarter posts may be interlocked to form a full end post 130 as shown in FIG. 13. Also, since any quarter post will interlock with an adjacent quarter post, railings may be assembled with railing sections 10 in line as shown in full lines in the exploded view of FIG. 12 with oppositely placed quarter posts 30a and 30b used to present a finished appearance of each full end post 130 at the end of each section of railing 10. Alternatively, quarter post 30b may have a railing section as shown in dotted outline 10a in FIG. 12 attached thereto thereby forming a connection for three railing sections with section 10a at right angles to in line sections 10 shown in full lines. In a similar manner two sections at right angles or four sections may be connected by the quarter posts by a proper combination of quarter posts with and without the remainder of railing sections 10 attached thereto.

Quarter posts 30 may be attached to handrails 11 or the variations thereof with their topmost surface slightly below the top horizontal portion 14 of handrail 11. In order to present a finished appearance a cap 40 having depending prongs 41 is placed over the assembled quarter posts with the prongs extending within the hollow portions of these quarter posts. The cap 40 may be fitted to the full end posts 130 with its top surface flush with the top surfaces of the railing as shown in FIG. 14 or some ornamentation may be attached to the cap 40 in order to add some decoration to the fence at the posts.

It should be noted that the forms of the pickets and of the handrails shown are merely illustrative of the invention and do not comprise all the forms of handrails and pickets which may be used within the spirit of the invention. In general a picket should preferably have some form of grooving or concave surface or surfaces where the edge of the handrail is clamped thereto. The handrails may have many and varied forms which forms may be rectangular, rounded with flat portions, or without flat portions, and even of irregular shape with the shaping and clamping accomplished by the placing of one or more weakening grooves so as to allow the handrail to assume whatever shape desired when it is clamped to the picket. Also, the quarter posts may vary somewhat in shape but in the preferred form of the invention should allow complete interchangeability of these posts so that interlocking may take place to either side of the individual units so as to maintain diversity and economy of the present invention.

It should further be noted that although the embodiments described have been railings, this has been done because railings lend themselves to an extremely large variety of forms and therefore are able to provide a number of examples of the present invention. Most of these examples may be applied to the manufacture of trusses and of ladders and also to other articles of similar construction.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

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What is claimed is:

1. A railing type of assembly comprising
a first rail and a second rail in substantially parallel
spaced relationship to each other,
at least one connecting element between said first and 5
second rails attached at its opposite ends to said first
rail and said second rail respectively,
a first post connected to one end of said first and second
rails,
and a second post connected to the opposite end of said 10
first and second rails,
said rails having inwardly extending opposed beveled
edges pressed into said connecting element and sub-
stantially perpendicular thereto
whereby said connecting element is clamped and held 15
by said beveled edges of said rails.
2. The railing type of assembly of claim 1, further
characterized by
said rails each having at least one weakened region
along the length of its inner surface 20
whereby said rails bend at the weakened region when
clamped on said connecting element.
3. The railing type of assembly of claim 1, further
characterized by
thin elongated portions extending from said opposed 25
beveled edges contacting each other at their ends
except where bent inward against said connecting
element.
4. The railing type of assembly of claim 3, further
characterized by 30
said thin elongated portions extending from the inner
portions of said beveled edges and inclined toward
the interior of said rail.
5. The railing type of assembly of claim 3, further
characterized by 35
said thin elongated portions extending from the outer
portions of said beveled edges and having their edges
inclined inward toward the interior of said rail.
6. The railing type of assembly of claim 1, further
characterized by 40
said connecting element having at least two opposite
concave faces.
7. The railing type of assembly of claim 1, further
characterized by 45
said first and second posts each forming a quarter of a
full end post,
locking means on each of said posts to lock each of
said first and second posts to adjacent quarters of said
full end post.
8. The railing type of assembly of claim 7, further
characterized by 50
said first and second posts each having a horizontal

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- cross section substantially in the shape of a right
triangle,
said locking means located on each of the arms of
said right triangle and the hypotenuse of said right
triangle forming one of the outer faces of said full
end post.
9. The railing type of assembly of claim 7, further
characterized by
top ends of said first and second posts located below
the level of the upper surface of said upper rail,
and capping means having prongs depending therefrom
shaped to fit into said top ends of said posts when
locked to adjacent quarters of a full end post.
10. A railing type of assembly comprising
a rail,
a first post connected to one end of said rail,
a second post connected to the opposite end of said
rail,
at least one element extending from said rail in a plane
substantially parallel to the plane including said posts,
said rail having opposed inwardly extending beveled
edges pressed into said element and substantially
perpendicular thereto thereby clamping said element
to said rail,
thin elongated portions extending from said beveled
edges and having their outer edges adjacent each
other except where said elongated portions are bent
against said element,
and at least part of said elongated portions inclined
inward toward the interior of said rail.

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U.S. Cl. X.R.

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