

Feb. 21, 1967

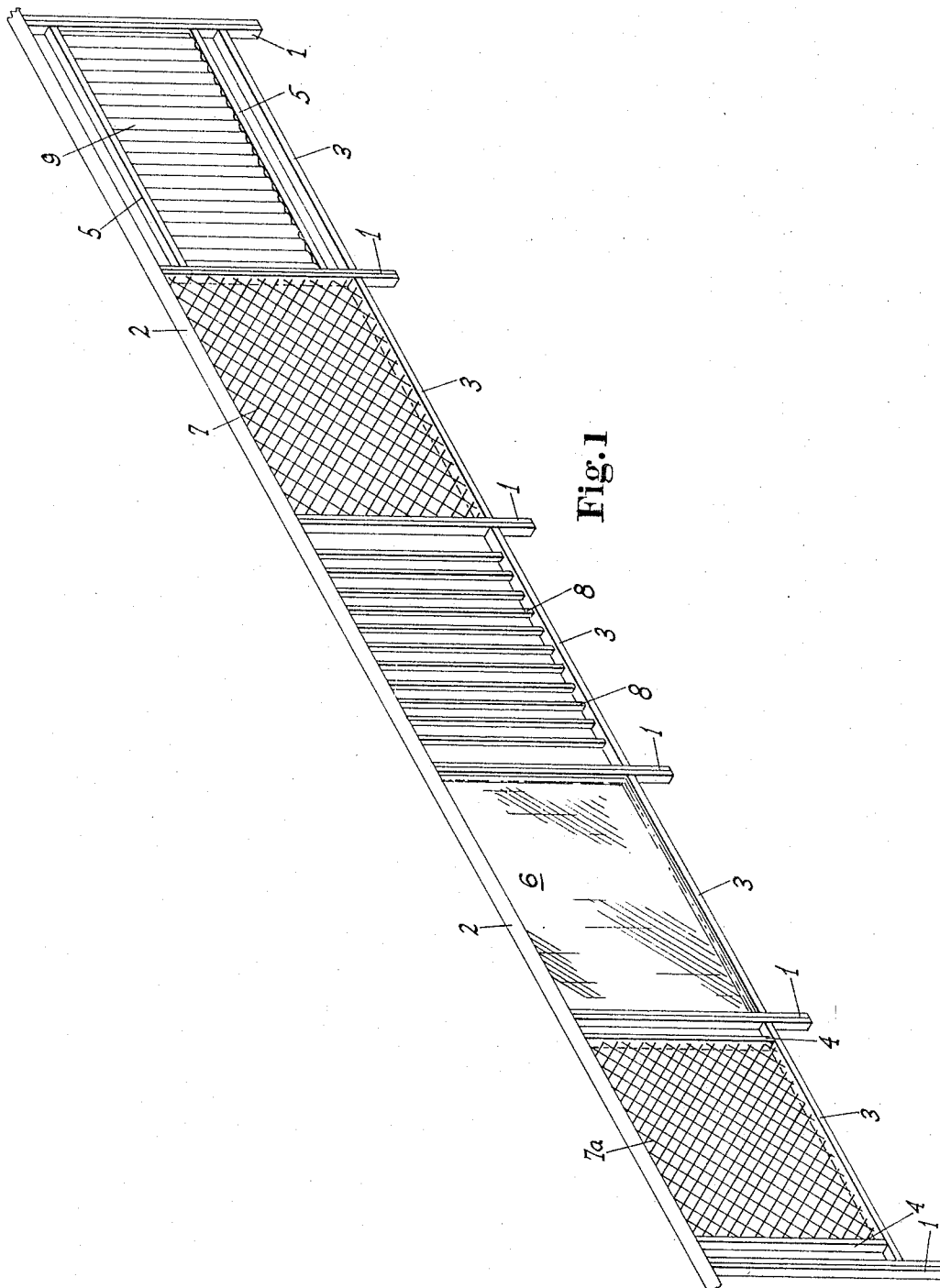
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3,305,221

GUARDRAIL CONSTRUCTION

Filed Aug. 17, 1964

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

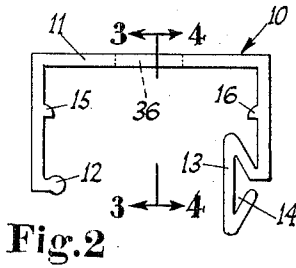


Fig. 2

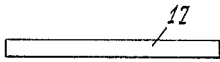


Fig. 5

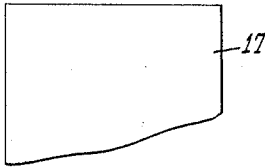


Fig. 6

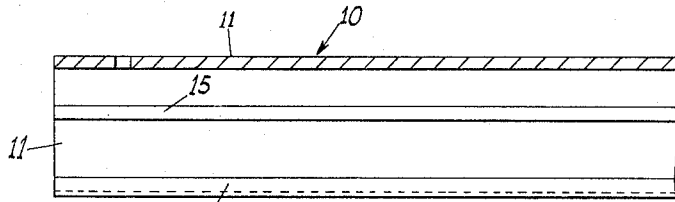


Fig. 3

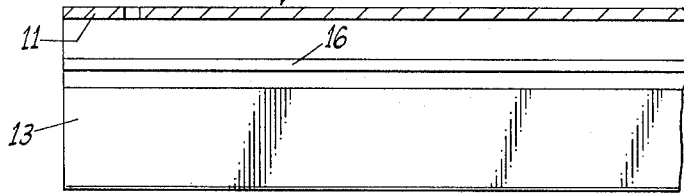


Fig. 4

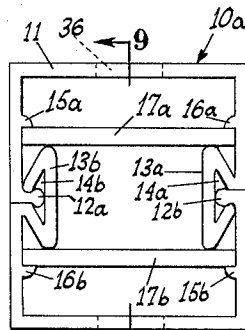


Fig. 8

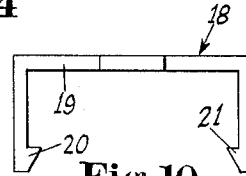


Fig. 10

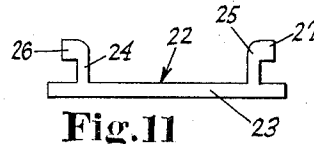


Fig. 11

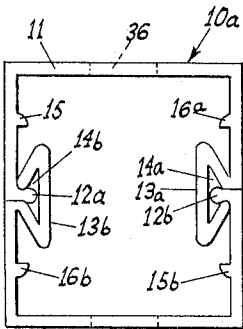


Fig. 7

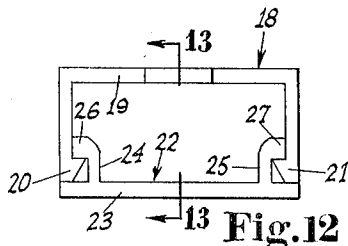


Fig. 12

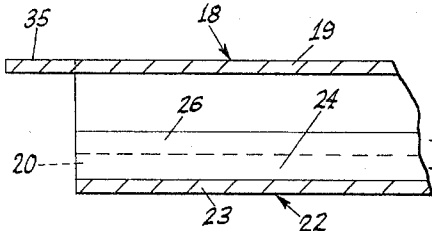


Fig. 13

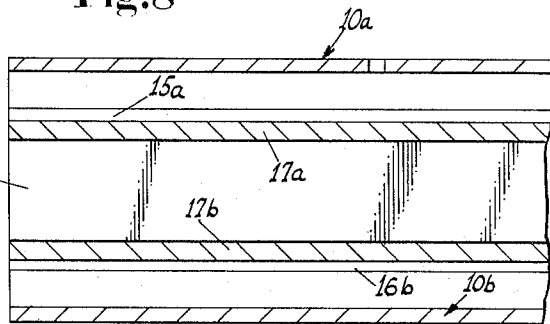


Fig. 9

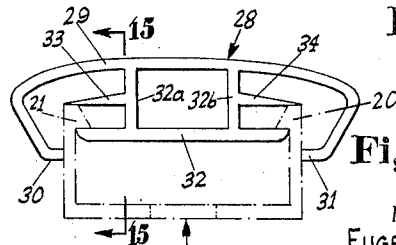


Fig. 14

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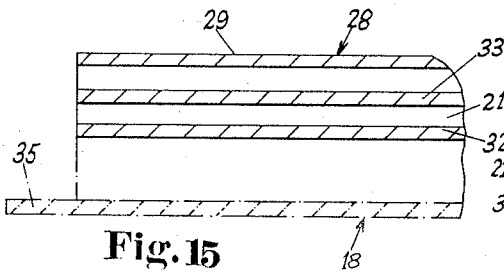


Fig. 15

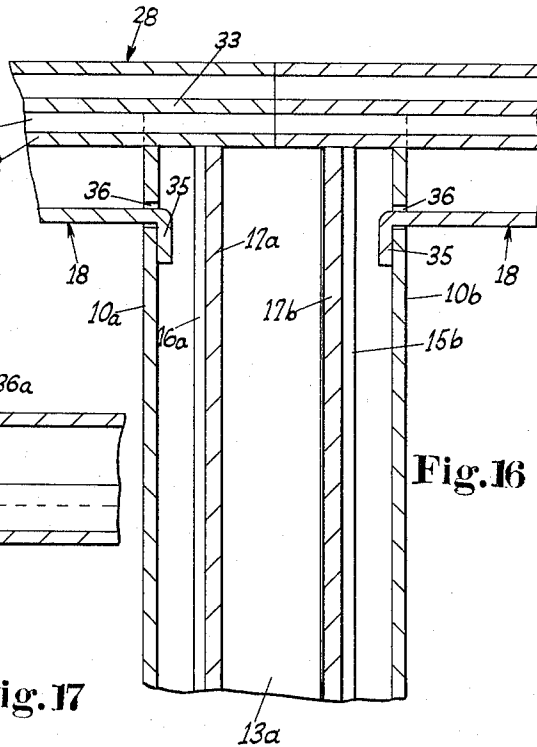


Fig. 16

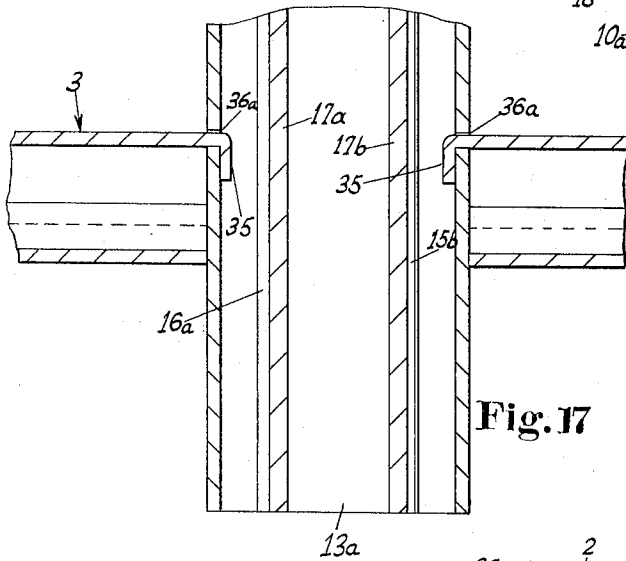


Fig. 17

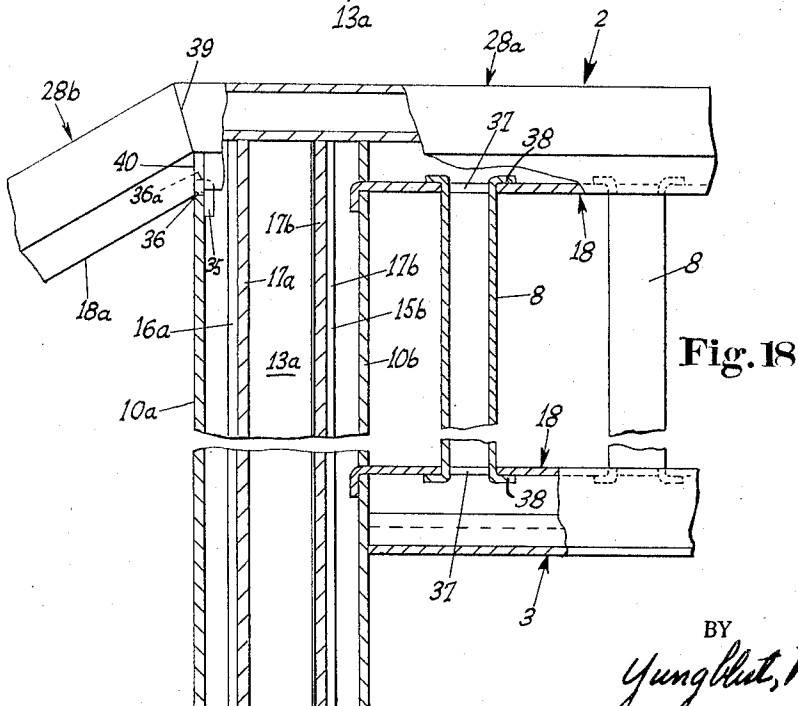


Fig. 18

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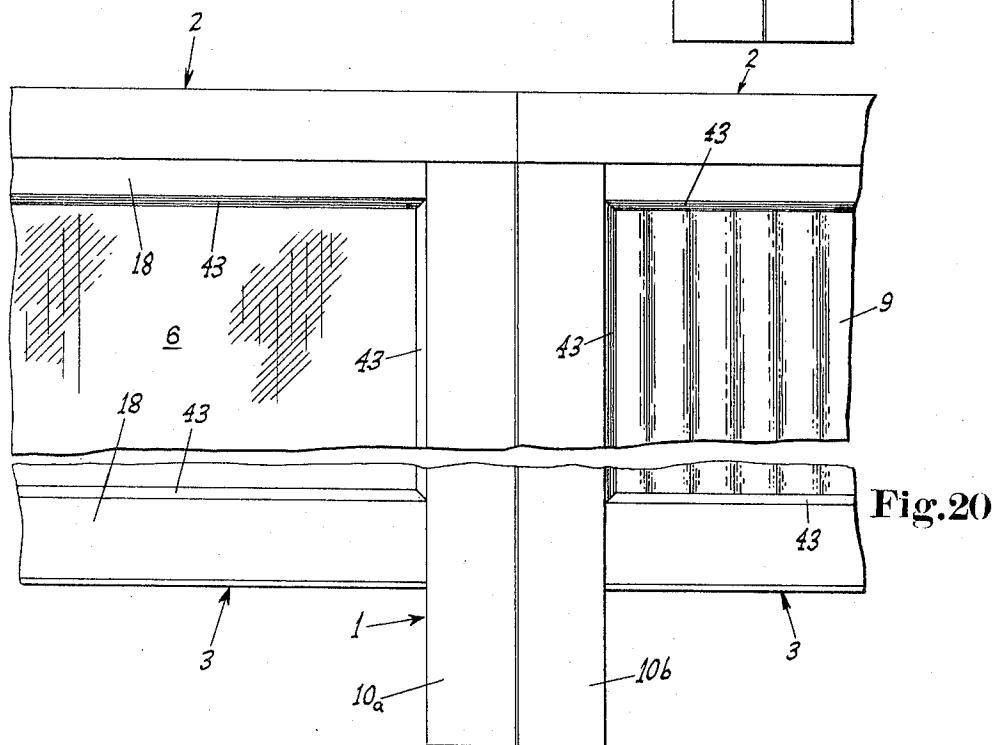
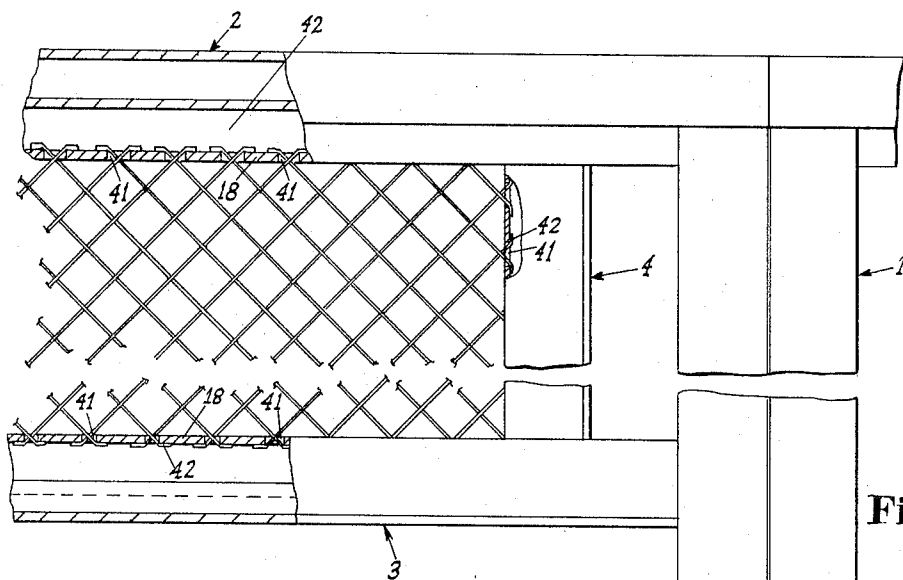
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GUARDRAIL CONSTRUCTION

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4 Sheets-Sheet 4



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GUARDRAIL CONSTRUCTION
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Filed Aug. 17, 1964, Ser. No. 389,880
9 Claims. (Cl. 256—21)

This invention relates to guardrails or balustrades and has to do more particularly with a guardrail construction embodying interlocking post and rail members which may be readily assembled and which coact with additional rail members to provide a number of distinctively different guardrail assemblies all of which are formed from the same basic components.

A principal object of the instant invention is the provision of a guardrail construction wherein the posts and rails are formed from extruded aluminum or similar material, and wherein the extrusions may be formed in unit lengths which may be cut to the desired size to provide the required parts for any given guardrail.

Another object of the instant invention is the provision of a post construction wherein the posts are each formed from an interlocking pair of extruded members, but wherein the extruded members are of identical configuration so that only a single die is required to form the post members.

Still another object of the invention is the provision of a top rail construction also formed from two interfitting parts, but wherein one of the top rail parts is also designed to serve as a bottom rail or as a vertical support extending between the top and bottom rails.

Still a further object of the instant invention is the provision of a guardrail construction of the character described wherein the posts and rails may mount a diversity of barrier materials ranging from solid panels to wire mesh and including spindles, bars, louvers, and the like.

Still a further object of the instant invention is the provision of a guardrail construction of the character described wherein novel means are provided to lock the component parts together to the elimination of screws, bolts, or other externally visible fastening means.

The foregoing, together with other objects of the invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon the reading of this specification, are accomplished by those constructions and arrangements of parts of which certain exemplary embodiments shall now be described.

Reference is made to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a guardrail constructed in accordance with the instant invention, the view serving to illustrate various alternative barrier treatments which may be employed.

FIGURE 2 is an end elevational view of the extruded member employed to form the guardrail posts.

FIGURE 3 is a fragmentary vertical sectional view taken along the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary vertical sectional view taken along the line 4—4 of FIGURE 2.

FIGURE 5 is an end elevational view of a locking bar for locking together two of the posts defining members.

FIGURE 6 is a fragmentary plan view of the locking bar.

FIGURE 7 is an end elevational view illustrating two of the posts defining members in interlocking engagement.

FIGURE 8 is an end elevational view similar to FIGURE 7 but showing the locking bars in engagement with the post defining members.

FIGURE 9 is a vertical sectional view taken along the line 9—9 of FIGURE 8.

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FIGURE 10 is an end elevational view of one of the rail forming members.

FIGURE 11 is an end elevational view of another rail forming member adapted to coact with the rail forming member of FIGURE 10 to define lower rail parts and also vertical supports.

FIGURE 12 is an end elevational view illustrating the rail forming parts of FIGURES 10 and 11 in assembled condition.

FIGURE 13 is a fragmentary vertical sectional view taken along the line 13—13 of FIGURE 12.

FIGURE 14 is an end elevational view of the top rail forming member, the view also illustrating in dotted lines the coaction of such member with the rail member illustrated in FIGURE 10.

FIGURE 15 is a fragmentary vertical sectional view taken along line 15—15 of FIGURE 14.

FIGURE 16 is a fragmentary vertical sectional view illustrating the manner in which the top rail assembly is joined to the post assembly.

FIGURE 17 is a fragmentary vertical sectional view illustrating the manner in which the bottom rail assembly is joined to the post assembly.

FIGURE 18 is a fragmentary vertical sectional view illustrating the manner in which vertically disposed spindles, bars or the like may be secured between the top and bottom rails.

FIGURE 19 is a fragmentary side elevational view with parts broken away to illustrate the manner in which a wire mesh may be employed as a barrier material, including the utilization of vertical supports extending between the top and bottom rail assemblies.

FIGURE 20 is a fragmentary vertical sectional view with parts broken away illustrating the manner in which solid panels may be utilized as a barrier.

For a general understanding of the invention, reference is first made to FIGURE 1 of the drawings wherein an exemplary guardrail is illustrated. As seen therein, the guardrail comprises a plurality of spaced apart post assemblies 1 interconnected along their uppermost edges by a top rail assembly 2, the uppermost member of which may conveniently span a plurality of the post assemblies, depending upon the length of the guardrail being constructed. Lower rail assemblies 3 extend between adjacent posts and will be spaced upwardly from the lowermost ends of the posts in the manner illustrated. If desired, and as seen at the leftmost end of FIGURE 1, additional vertical supports 4 may extend between the top rail assembly and the lower rail assembly, the vertical supports being basically identical in construction to the lower rail assembly. Similarly, horizontal supports 5, also of essentially identical construction to the lower rail assemblies, may be provided, as seen at the rightmost end of FIGURE 1. The foregoing assemblies constitute the basic components of the guardrail and are supplemented by various barrier materials which may be arranged to extend between the posts and rails or other supports, as the case may be. Thus, the barrier may comprise a solid panel 6 formed from metal, plastic, or other planar material, such panel being secured directly to the posts and rails. Alternatively, the barrier may comprise a wire mesh 7 extending between adjacent posts and the enclosing top and bottom rail sections; or as a variation the wire mesh 7a may extend laterally between a pair of vertically disposed supports 4 spaced inwardly from the adjacent post assemblies. Spaced apart spindles or bars 8 may extend between the top and bottom rail assemblies; or a corrugated panel, such as the molded Fiberglas panel 9 may be fitted between adjacent posts and the horizontally disposed supports 5, as illustrated at the rightmost end of FIGURE 1. It is to be understood that the foregoing examples are merely representative

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of different treatments which may be employed; and it should be readily apparent that diverse other barrier materials could be employed and fastened directly to the post and rails or to various combinations of vertical and horizontal supports.

Referring now to FIGURE 2 of the drawings, the post assemblies 1 are each composed of a pair of like extrusions 10 having a body 11 which is generally U-shaped in cross section and terminates along one side edge in an intumed longitudinal bead 12. At its opposite side edge the body terminates in a reversely bent portion 13 which defines an outwardly opening longitudinal channel 14 which, as will be explained more fully hereinafter, is of a size to slidably receive and retain the longitudinal bead 12 of another extrusion brought into mating engagement therewith. The inner surface of the body 11 is also provided with an opposing pair of inwardly directed longitudinal shoulders 15 and 16 which coact with the reversely bent portion 13 of a mating extrusion to receive a locking member 17 which, as seen in FIGURES 5 and 6, comprises a relatively flat bar which may be formed from metal or other sufficiently rigid material so that it may be wedged in place.

FIGURE 7 illustrates the manner in which a pair of the extrusions are joined together to form a post. As seen therein, the longitudinal bead 12a of extrusion 10a is received in the channel 14b of extrusion 10b; and conversely, the longitudinal bead 12b is received in the channel 14a. While in the embodiment illustrated the extrusions define a rectangular post, it will be understood that their specific shapes do not constitute a limitation on the invention, and that the extrusions may be of round or oval shape if so desired. Fundamentally, however, they will be of what may be deemed generally U-shaped in cross section and they will incorporate the interfitting longitudinal bead and channel construction. The diameter or cross sectional dimension of the longitudinal bead 12 will be larger than the opening or mouth of the channel 14; and preferably the mating extrusions will be fitted together by being placed end to end and then effecting axial movement of the two members toward each other so as to join them together.

Once the two extrusions have been joined together in the manner illustrated in FIGURE 7, the locking members 17 are then inserted in the manner illustrated in FIGURE 8, wherein it will be seen that the member 17a is wedged between the longitudinal shoulders 15a, 16a and the reversely bent portions 13a and 13b. Similarly, the locking member 17b engages between the shoulders 15b, 16b and the opposite ends of reversely bent portions 13a and 13b. The wedging action of the locking members 17a and 17b thus serves to fixedly join the extrusion together in the absence of external fastening means; and for practical purposes the post assembly has the external appearance of a solid post. Yet as will become more apparent hereinafter, the ability to assemble the post on the job site also permits the ready attachment of the barrier material—such as a wire mesh—to the inside surfaces of the posts and also facilitates the attachment of the rail members prior to the assembly of the post.

Referring now to FIGURE 10 of the drawings, the extrusion 18 forms a part of the top rail assembly as well as the lower rail assembly and the vertical and horizontal supports. It too comprises a generally U-shaped body 19 terminating along its free side edges in longitudinally extending intumed flanges 20 and 21. Where such extrusion is employed as a bottom rail or support and it is desired to close the remaining side of the member, a mating cover member 22 may be employed, as seen in FIGURE 11. Where the assembly is to be of rectangular shape, the cover member may comprise a planar base 23 having a pair of upwardly projecting longitudinal ribs 24, 25 having out-turned lips 26 and 27, respectively. As seen in FIGURE 12, the dimensioning of the parts is

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such that the out-turned lips 26 and 27 engage above flanges 20 and 21 of the extrusion 18 when the parts are interconnected. Again, it is preferred that the parts be interconnected by placing them end to end and sliding them together axially; although depending upon the dimensioning of the parts and the resiliency of the material from which the members are formed, they may be snap-fitted together.

Referring now to FIGURE 14 which shows the top rail assembly, it will be seen that the assembly includes an extrusion 18 which, in this instance, is interlocked with an extrusion 28 which defines a cap portion for the top rail. The extrusion 28 thus has an essentially U-shaped body 29 the free longitudinal edges of which are intumed, as at 30 and 31; but in this instance the intumed edges either abut or lie in close proximity to the opposite sides of the extrusion 18. Interlocking engagement of the parts is effected by means of locking plate 32 which is suspended from body 29 by means of spaced apart ribs 32a and 32b, the ribs also mounting outwardly projecting longitudinal tongues 33 and 34 which parallel the plate 32 and lie in spaced relationship thereto. As will be evident from FIGURE 14, the dimensioning of the parts is such that the flanges 20 and 21 of the extrusion 18 will be received between and engaged by the opposite side edges of the plate 32 and the outer edges of tongues 33 and 34.

The rails and supports may be conveniently connected to each other and to the posts by means of locking tongues provided at the ends of the extrusions 18. Thus, with reference to FIGURES 13 and 15, the extrusions 18 are provided with locking tongues 35 projecting outwardly from their end edges. Where the extrusions comprise a part of the top rail assemblies, the tongues may be engaged with the post assembly 1 in the manner illustrated in FIGURE 16 wherein it will be seen that the tongues 35 are fitted in slots 36 which may be cut in the body of the extrusions 10, whereupon the tongues are inserted in the slots and folded over so as to lock therein. This will be done prior to the joining together of the extrusions making up the post assemblies—or at least prior to the insertion of the locking member 17. Similarly, where the extrusions 18 comprise a part of the lower rail assembly 3, the tongues 35 will be inserted in slots 36a, as seen in FIGURE 17. Where the extrusions 18 are employed for either horizontal or vertical supports, additional slots will be provided in either or both of the post extrusions 10 and the rail extrusions 18. While the rails may be connected to the cover extrusion 22, this extrusion will normally lie on the side of the extrusions 18 opposite the interconnecting support where it will serve primarily as a cap or cover.

FIGURE 18 illustrates the manner in which spindles or bars 8 may be mounted between the top and lower rail assemblies, the extrusions 18 being provided with cutouts 37 of a size to receive the spindles, which in the embodiment illustrated comprise generally rectangular tubes having their ends split so that they may be turned outwardly, as at 38, to thereby secure them in place. FIGURE 18 also serves to illustrate the manner in which adjoining sections of railing may be brought together in angular relation. Thus, the extrusions 28a and 28b are brought together in a mitered joint 39. In similar fashion, the extrusion 18a will have its end edge cut slantwise, as at 40, so as to fit against the post 1 at the desired angle of inclination. While in the embodiment illustrated the inclination is in a vertical plane, similar considerations apply with respect to the horizontal plane, as where the guardrail would turn a corner or the like. It is also within the spirit and purpose of the invention to provide special sections of curved configuration wherein such are required.

A wire mesh barrier material may be secured to the guardrail assembly in the manner illustrated in FIGURE 19. As seen therein, the extrusions 18 may be provided

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with spaced apart openings 41 extending longitudinally of the extrusions, irrespective of whether such extrusions comprise a part of the top rail assembly 2, the lower rail assembly 3, or the vertical supports 4. The spacing of the openings 41 will be such that the ends of the wire mesh, indicated at 42, may be inserted through the openings and either bent over or twisted together on the inner sides of the extrusions so as to secure the mesh in place. It will be apparent that similar spaced apart openings may be provided in the body of the extrusions 10, which form the post assemblies, where it is desired to secure the mesh material directly to the posts.

FIGURE 20 illustrates the manner in which solid barrier panels, such as the panel members 6 and 9 may be affixed to the guardrail by means of narrow channel shaped member 43 which may be secured to the extrusions 18 of the top or bottom rail assemblies, or to the extrusions 10 of the post assemblies. The channel members 43 will be of a size to just nicely receive the edges of the panels and hold them securely in place. Alternatively, the extrusions could be provided with recessed grooves to receive the panel edges; although this would require modification of the extrusion.

As should now be apparent, the instant invention provides a highly versatile guardrail construction capable of numerous modifications to add a distinctively different appearance to any given installation. Yet, component parts are essentially standardized and require only three basic extrusions plus the cover member which serves to close the basic rail extrusion. The construction of the parts is such that they may be readily assembled without resort to bolts or other fastening means which would be exposed to view; and the entire assembly is such that it may be fitted together piece by piece as the construction of the guardrail progresses. In this connection, it is to be understood that the posts may be mounted in place by any known anchoring means, inclusive of the use of anchor bolts and the like, whether exposed or not; and while, as previously pointed out, the components do not require externally visible fastening means to joint them together, there may be instances wherein such fastening means may be deemed necessary or desirable, and it is to be understood that their use is not precluded. Other modifications may be made in the invention without departing from its spirit and purpose.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A guardrail construction comprising a plurality of vertical posts arranged in spaced apart relation, each of said posts comprising a pair of essentially identical generally U-shaped post extrusions each having an inturned longitudinal bead along one side edge and a reversely bent portion along the opposite side edge defining an outwardly opening longitudinal channel, said pairs of post extrusions being fitted together with their respective longitudinal beads received in the longitudinal channel of the other, and locking means securing said pairs of extrusions together, said locking means comprising an essentially rectangular bar wedged in contact with the reversely bent portions of the fitted together post extrusions, and rail assemblies extending between said posts, said rail assemblies each comprising a generally U-shaped rail extrusion having flanges extending along its opposite side edges, attachment means securing the opposite ends of said rail extrusions to said posts, some at least of said rail extrusions extending between the uppermost ends of said posts with their flanges uppermost, and a top rail extrusion overlying and covering said last named rail extrusions and the uppermost ends of said posts, said top rail extrusion having longitudinally extending locking tongues engaging the flanges of the underlying rail extrusions.

2. The guardrail construction claimed in claim 1 wherein others of said rail extrusions extend between said posts

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adjacent their lowermost ends, wherein the flanges of said last named rail extrusions face downwardly, and wherein a cover member closes the underside of each of the said last named rail extrusions, said cover members having a pair of longitudinally extending ribs terminating in lips engaged with the flanges of said rail extrusions.

3. The guardrail construction claimed in claim 2 including barrier means intermediate said posts and secured to said rail extrusions.

4. The guardrail construction claimed in claim 3 including additional rail extrusions extending between the rail extrusions defining said top and lower rail assemblies, including attachment means securing the ends of said last named rail extrusions to the rail extrusions of said top and lower rail assemblies.

5. The guardrail construction claimed in claim 3 wherein additional rail extrusions extend between adjacent pairs of said posts, and wherein attachment means secure said last named rail extrusions to said posts.

6. A guardrail construction comprising a plurality of vertical posts arranged in spaced apart relation, each of said posts comprising a pair of essentially identical generally U-shaped post extrusions each having an inturned longitudinal bead along one side edge and a reversely bent portion along the opposite side edge defining an outwardly opening longitudinal channel, said pairs of post extrusions being fitted together with their respective longitudinal beads received in the longitudinal channel of the other, and locking means securing said pairs of extrusions together, said locking means comprising a locking bar wedged between the reversely bent portions of the fitted together post extrusions and a pair of longitudinal shoulders projecting inwardly from the opposite sides of said post extrusions, and rail assemblies extending between said posts, said rail assemblies each comprising a generally U-shaped rail extrusion having flanges extending along its opposite side edges, and attachment means securing the opposite ends of said rail extrusions to said posts.

7. In a guardrail construction wherein a plurality of vertical posts are arranged in spaced apart relation and wherein rail assemblies extend between said posts, a post construction comprising a pair of essentially identical generally U-shaped post extrusions each having an inturned longitudinal bead along one side edge and a reversely bent portion along the opposite side edge defining an outwardly opening longitudinal channel, said pairs of post extrusions being fitted together with their respective longitudinal beads received in the longitudinal channel of the other, and locking means securing said pairs of extrusions together, said locking means comprising a locking bar wedged in contact with the reversely bent portions of the fitted together post extrusions.

8. The post construction claimed in claim 7 wherein said longitudinal beads are of a size to be slidably received in said longitudinal channels, whereby a pair of said extrusions may be fitted together by placing them in end to end relation with their respective longitudinal beads in alignment with the longitudinal channel of the other and then effecting axial movement of the extrusions so as to bring them together in interlocking relationship.

9. A guardrail construction comprising a plurality of vertical posts arranged in spaced apart relation, each of said posts comprising a pair of essentially identical generally U-shaped post extrusions each having an inturned longitudinal bead along one side edge and a reversely bent portion along the opposite side edge defining an outwardly opening longitudinal channel, the pairs of post extrusions being fitted together with their respective longitudinal beads received in the longitudinal channel of the other, and locking means securing said pairs of extrusions together, said locking means comprising a locking bar wedged in contact with the reversely bent portions of the fitted together post extrusions, and rail assemblies extending between said posts, said rail assemblies each com-

prising a generally U-shaped rail extrusion having flanges extending along its opposite side edges, and means for securing the opposite end edges of said rail extrusion to said posts.

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