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(54) **MODULAR METAL FENCE OR GATE**
PANEL ASSEMBLY

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(57) **ABSTRACT**

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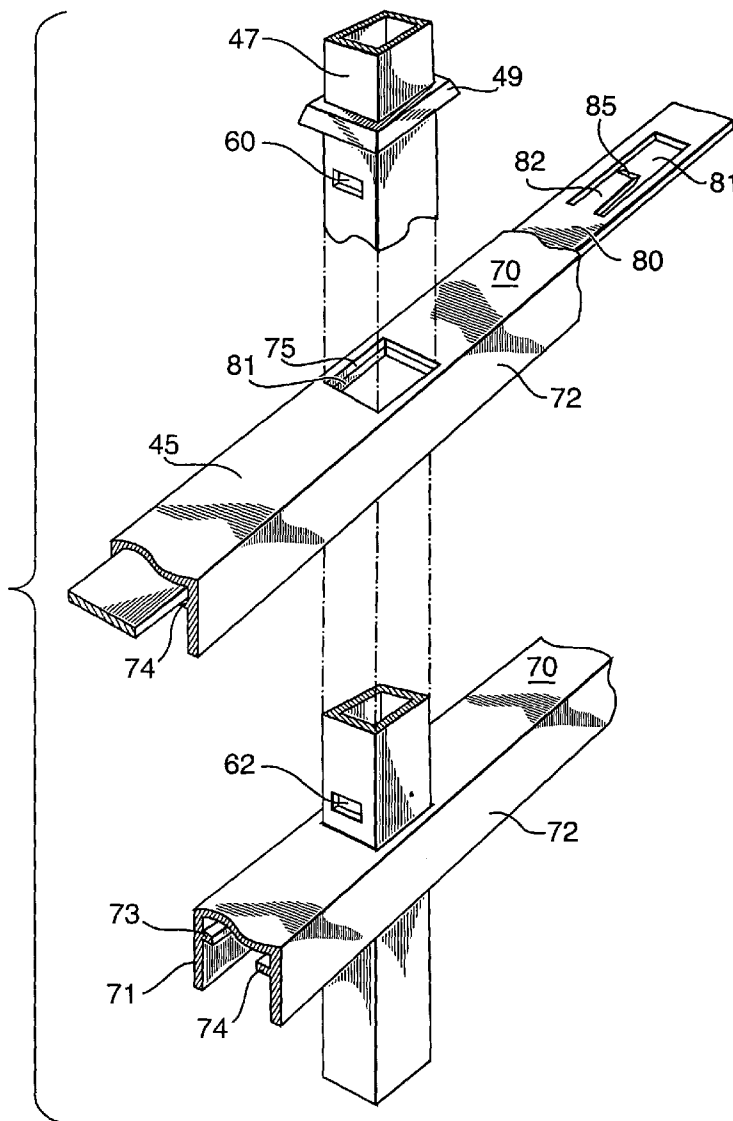
A novel modular metal fence or gate panel assembly constructed from vertically spaced apart rails and a horizontal row of vertically disposed pickets which extend therethrough is disclosed. At least the upper rail is locked to the pickets which extend therethrough by means of an elongate locking bar which is slidably disposed within the rail. The bar is moveable from a first position wherein apertures provided in the bar are in full open alignment with picket receiving apertures located in the rail, to a second position in which inwardly projecting flanges in each of the bar apertures are respectively received in rail connecting recesses located in the sidewalls of the pickets.

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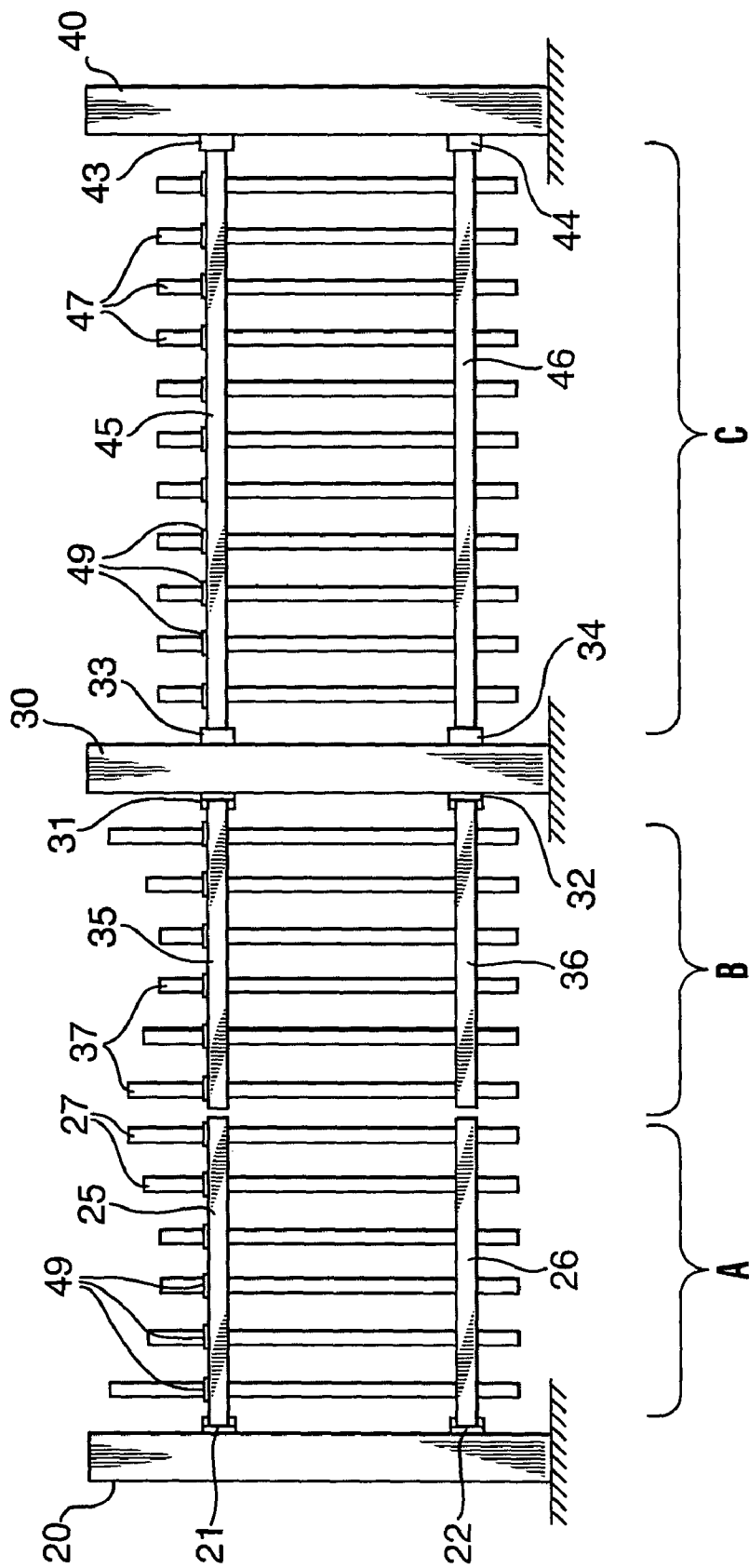


FIG. 1

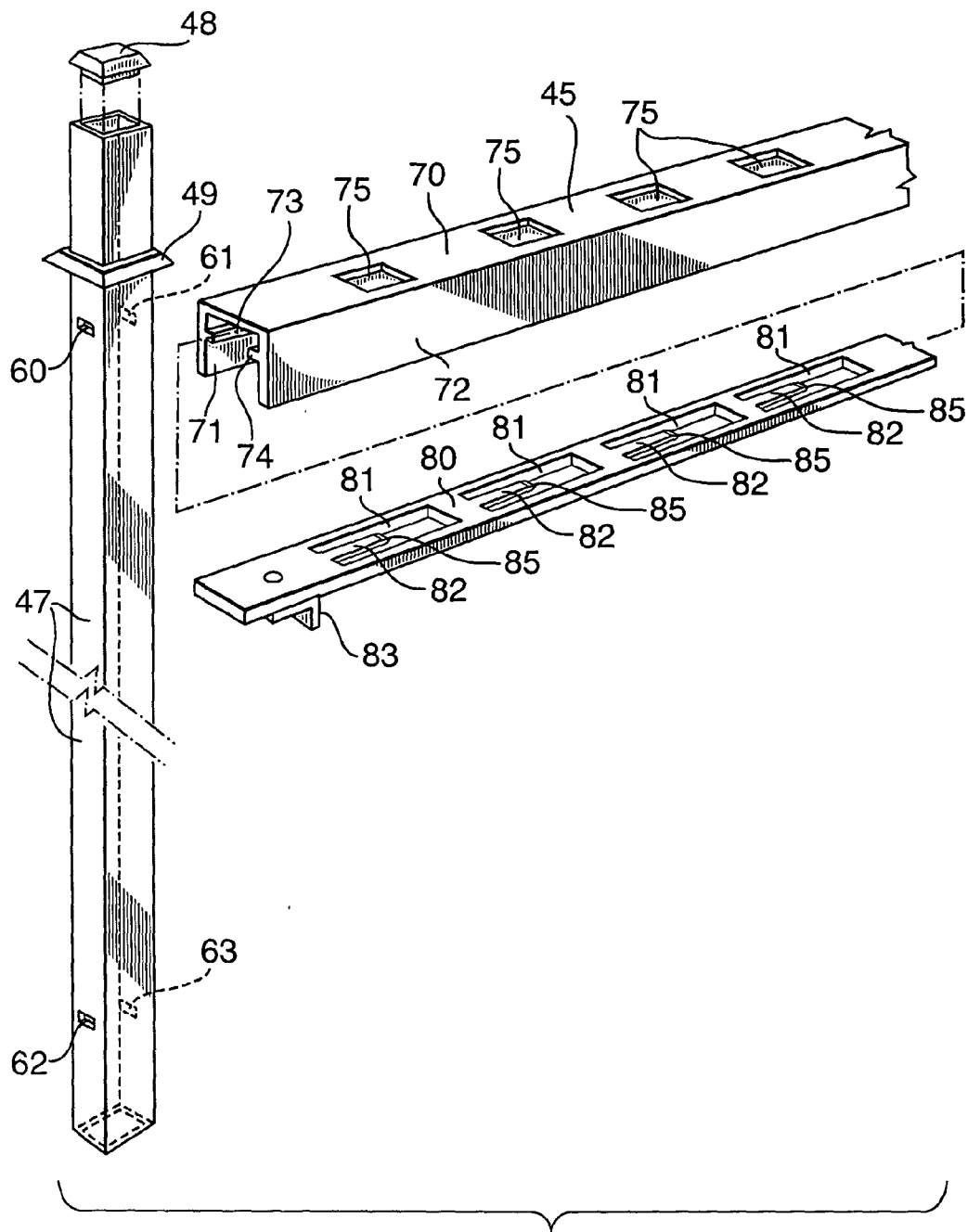


FIG. 2

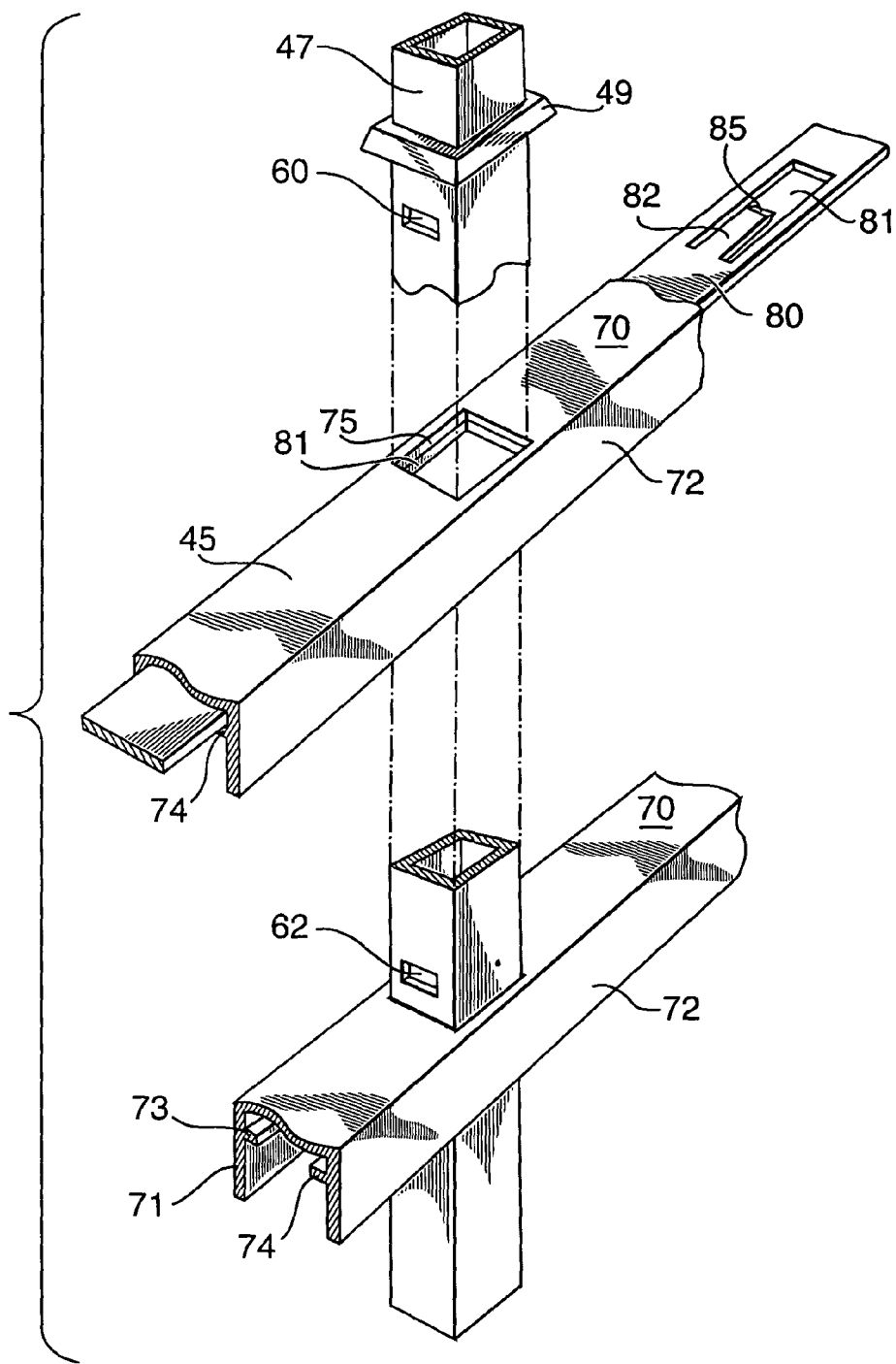


FIG. 3

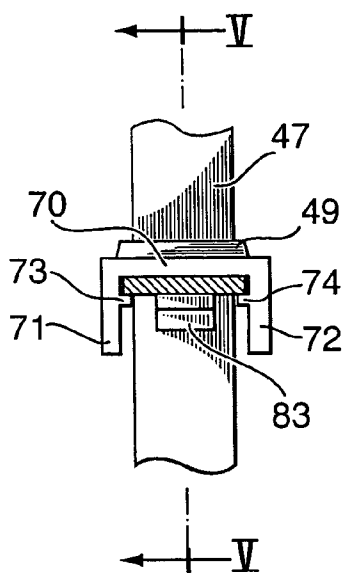


FIG. 4

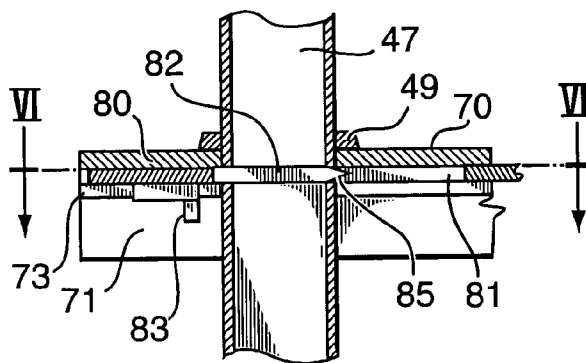


FIG. 5

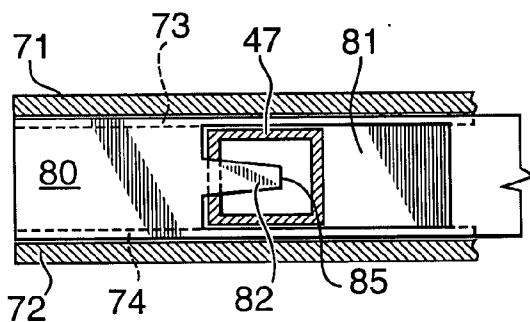


FIG. 6

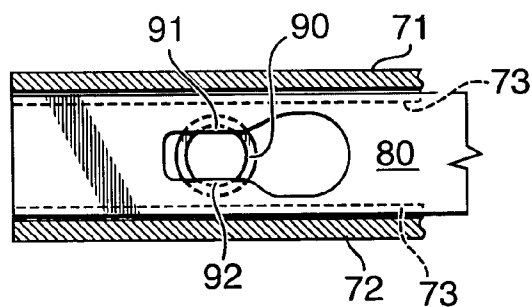


FIG. 7

MODULAR METAL FENCE OR GATE PANEL ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

REFERENCE TO A "SEQUENCE LISTING"

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] This invention relates to a modular metal fence or gate panel assembly of the type constructed from rails and pickets. Each panel section making up a portion of the gate or fence can be boxed and transported in unassembled form and assembled or erected on site requiring limited assembly skills or assembly tools. As a result, the modular panel section can be assembled on site either by professionals or homeowners.

DESCRIPTION OF THE PRIOR ART

[0005] U.S. Pat. No. 5,454,548—Moore issued Oct. 3, 1995 discloses modular metal fencing or gratings employing vertically spaced apart upper and lower support rails and a horizontal row of vertically disposed pickets which extend through apertures provided in the rails. In order to lock a given rail to the pickets which extend through the rail, an elongate "L"-shaped bar is slidably located within the rail and thus can engage uniformly oriented slots in the side of the pickets extending therethrough. Because of the length of the "L"-shaped bar, the panel cannot be assembled in situ between the supporting posts located at either end of the panel. Rather, the panel must be assembled on the ground and when the rails and pickets are locked together by the "L"-shaped bar, only then positioned between the panel support posts. A further drawback as a result of the use of the "L"-shaped locking bar is the fact that the slots in the pickets which are received by the bar must be cut into three sides of the picket, thereby weakening its structure. Further, each picket must pass through a total of four apertures provided in the upper and lower rails which can result in unwanted damage to the exterior finish on the pickets.

[0006] A modular rail and panel assembly similar to the foregoing is disclosed in U.S. Pat. No. 5,882,001 issued Mar. 16, 1999—Reinbold. In this panel arrangement, the upper portion of each rail which is in the form of an inverted "U"-shaped channel, is provided with a plurality of longitudinally spaced apertures for receiving a picket inserted therein. Each aperture has a tab portion which positively engages with a slot provided in the sidewall of the picket. The picket is then held in this engagement position by means of a picket locking fastener or wedge which is interposed in the aperture between each picket opposite the tab and the opposite limit of the aperture diametrically opposed to the tab. As an average fence panel contains 24 pickets, assembly of the panel is time consuming since 48 wedges must be inserted. Additionally, and like the above-described modular assembly of Moore, the exterior finish of the pickets can be

damaged during assembly and particularly when the wedges are forced into position by means of a hammer or the like.

SUMMARY OF THE INVENTION

[0007] The novel metal picket fence or gate panel assembly of my invention is similar to the foregoing modular assemblies in the sense it is fabricated from spaced apart and vertically aligned upper and lower support rails each defined by an inverted "U"-shaped channel having an elongate top portion and a plurality of vertically spaced apart picket receiving apertures extending therethrough and which is accompanied by a horizontal row of vertically disposed elongate pickets which respectively extend through vertically aligned pairs of picket receiving apertures in the upper and lower support rails. Further, and like the known assemblies described above, the pickets of my invention each have uniformly oriented rail connecting recesses in at least one sidewall thereof and positioned at locations therealong corresponding to the relative positioning of at least one, and preferably both, of the upper and lower support rails.

[0008] In accordance with one aspect of my invention, fastening means is provided for positively connecting one or both of the support rails to corresponding rail connecting recesses in the elongate pickets and which consists of an elongate bar having spaced bar apertures extending there-through. The elongate bar is designed to be slidably disposed within the support rail and when in the support rail, moveable from a first position wherein respective ones of the bar apertures are in full open alignment with corresponding ones of the picket receiving apertures to a second position wherein at least one inwardly projecting flange or tab in respective ones of said bar apertures are received in corresponding ones of the rail connecting recesses.

[0009] The foregoing fastening means arrangement allows the panel to be either assembled and locked together on the ground or alternatively, assembled in location between two vertical support posts located at the ends of each panel section.

[0010] Because the elongate bar moves between two positions, each bar aperture for permitting the passage of the picket therethrough and thereafter positively connecting the picket to the rail has a first open portion the dimensions of which at least correspond to the dimensions of the picket receiving recess, and a second open portion of lesser surface area than the first and which includes the inwardly projecting flange or tab for engagement with rail connecting recess on the pickets.

[0011] In order to better facilitate the correct alignment of the rails with the associated pickets extending therethrough and hence enable the elongate bar carried by the rail to slidably move between its first open and second locking position, where the support rails are substantially identical as are the elongate pickets, a collar surrounding the picket can be advantageously positioned at the same location on each of the pickets such that when the collars abut the top portion of the upper support rail, the location of the upper support rail relative to the corresponding rail connecting recesses in the pickets is determined and which as a consequence thereof, enables the elongate bar to be slidably moved within the rail from its first open to its second locked position. The collar itself may be made of metal and attached to the picket at its predetermined location by soldering,

welding or the like. Alternatively, the collar may be made from suitable plastic material which frictionally engages the outer surface of the picket and is positioned at its predetermined location. After assembly, and if desired, the plastic collar used for alignment purposes can be removed by cutting off.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In the accompanying drawings:

[0013] **FIG. 1** is a front elevation view of two panel assemblies used in swing gates and a single panel assembly as used in conventional fencing;

[0014] **FIG. 2** illustrates in exploded perspective the componentry of a typical picket and rail assembly featuring the novel fastening means of this invention used to positively secure the rail to the pickets;

[0015] **FIG. 3** is a perspective cutaway view illustrating a picket being inserted into the upper and lower rails when the rail aperture and the aperture in the sliding bar are in aligned and fully opened relationship;

[0016] **FIG. 4** is a cross-sectional end view of the upper rail and picket when the latter is in its locked position;

[0017] **FIG. 5** is a cross-sectional view of the rail and picket assembly taken along the lines V-V of **FIG. 4**;

[0018] **FIG. 6** is a cross-sectional view of a similar assembly taken along the lines VI-VI of **FIG. 5** but where the locking tab is tapered and extends through only one slot in the picket; and

[0019] **FIG. 7** is a similar cross-sectional view to that of **FIG. 6** but where the picket is tubular in cross-section and the aperture in the elongate locking bar has been modified in order to accommodate same.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] The metallic panel assemblies of this invention and which are intended to be used as gate or fence panels are generally illustrated in **FIG. 1**. Panel assemblies A and B are identical to each other and when employed as gate panels, are respectively pivotally connected to supporting posts or uprights **20** and **30**, employing for that purpose like pairs of upper pivot connectors **21** and **31** and like pairs of lower pivot connectors **22** and **32** which are well known in the art.

[0021] In a like fashion, fence panel C is held in fixed position between support posts or uprights **30** and **40** and are also attached thereto employing for that purpose upper connectors **33** and **43** and lower connectors **34** and **44** which, like the gate pivot connectors, are well known in the art. As illustrated, the panel assembly functioning either as a swing gate panel assembly or as a stationary fence panel assembly are constructed from upper gate rails **25**, **35** and **45**, lower elongate rails **26**, **36** and **46** and a multiplicity of vertically aligned pickets **27**, **37** and **47**. As illustrated, it will be observed that the pickets **27** and **37** which form gate panels A and B are of differing lengths for ornamental purposes. Vertically disposed upper and lower rails **45** and **46** of fence panel C support vertically aligned pickets **47** which are of equal length.

[0022] An exploded view of one picket **47** and upper rail **45** forming part of the fence panel C is illustrated in **FIG. 2**.

In this particular drawing, picket **47** is tubular and square in cross-section and has attached to it in a known manner upper end cap **48**. Surrounding picket **47** is collar **49** proximate its upper end and the function of which is described in greater detail below. Each picket **47** also includes upper rail connecting recesses **60** and **61** located in opposed sidewalls of the picket, and optionally, lower rail connecting recesses **62** and **63** located in the same opposed sidewalls of picket **47**.

[0023] Although the lower support rail **46** is not illustrated in **FIG. 2**, it is identical to upper support rail **45** and thus the following description applies to both. Each support rail is defined by an inverted "U"-shaped channel having an elongate top portion **70** and depending sidewalls **71** and **72**. The interior of these sidewalls each include an inwardly projecting elongate rails **73** and **74** which are arranged in opposed relationship so as to slidably accommodate elongate bar **80** when positioned between rails **73** and **74** and the interior portion of top section **70**. Top portion **70** is itself provided with a plurality of spaced apart picket receiving apertures **75** which are dimensioned to compliment the exterior dimensions of picket **47** that extends therethrough.

[0024] Elongate bar **80** which functions as a locking or "shutter" bar is itself provided with a plurality of spaced apart bar apertures **81** complimenting the apertures **75** in upper rail **45**.

[0025] With reference to **FIGS. 2 through 6**, bar **80** which is located interior of at least upper rail **45**, is slidably movable from an first position wherein respective ones of the bar apertures **81** are in full open alignment with corresponding ones of the picket receiving apertures **75**, to a second position whereby inwardly projecting flanges or tabs **82** extending inwardly of each aperture **81** are received in rail connecting recesses **60** and **61** of picket **47**. If bottom rails **26**, **36** or **46** also include a locking bar **80**, the projecting tabs or flanges **82**, when in the second sliding position, engage rail connector recesses **62** and **63** located proximate the lower end of the picket and best seen in **FIG. 2**. Where the panel assemblies function as gate panels A and B seen in **FIG. 1**, for panel rigidity, rails **26** and **36** are provided with locking bars **80**.

[0026] In order to facilitate sliding movement of bar **80** within rails **25**, **26**, **35**, **36** and **45** and optionally rail **46**, bar **80** proximate its end has attached to its undersurface tab **83** which projects downwardly and which can be finger grasped or impacted with a drift in order to move it from its first open to its second locked position.

[0027] In keeping with one aspect of this invention, pickets **47** preferably are provided with metal or plastic collars **49** which are located at the same position along the length of each picket so that when the pickets are inserted through aperture **75**, recesses **60** and **61** are in a position to register with tabs **82** of bar **80** when the bar is moved into its second locking position. Further, and in order to assist the entry of tabs **82** into and through recesses **60** and **61** in the sidewalls of pickets **47**, the leading end of tabs **85** are inwardly tapered. Advantageously, even where the pickets are of different lengths as seen in gate panels A and B in **FIG. 1**, the collars can be positioned at preselected positions on pickets in order to facilitate alignment of the locking bar with the recesses in the pickets.

[0028] While pickets having rectangular sidewalls have been illustrated in **FIGS. 1 through 6**, it will be obvious that

pickets having different sidewall configurations, such as triangular, circular or polygonal can be employed. FIG. 7 illustrates sliding bar 80 designed for use with a tubular picket 90 having a circular cross-section and wherein the opposed slots in the sidewall of the circular picket, unlike that for the picket having rectangular sidewalls, extend in a direction perpendicular to the longitudinal extent of the bar 80 and hence when the bar 80 is in its second position, are engaged by inwardly projecting tabs 91 and 92.

[0029] It will also be apparent that for locking purposes, only one locking tab need be employed and it can be used to engage only one single recess provided in the sidewall of the picket.

1. A metal picket fence or gate panel assembly comprising:

- (a) spaced apart and vertically aligned upper and lower support rails, each defined by an inverted "U"-shaped channel having an elongate top portion and a plurality of spaced apart picket receiving apertures extending therethrough;
- (b) a horizontal row of vertically disposed elongate pickets which respectively extend through vertically aligned pairs of said picket receiving apertures in a said upper and lower support rails;
- (c) said elongate pickets each having uniformly orientated rail connecting recesses in at least one sidewall thereof and at locations there along corresponding to the relative positioning of at least one of said upper and lower support rails;
- (d) fastening means for positively connecting said at least one support rail to corresponding rail connecting recesses in said elongate pickets comprising an elongate bar having a spaced bar apertures extending therethrough, said elongate bar being slidably disposed within the said support rail and moveable from a first position wherein respective ones of said bar apertures are in full open alignment with corresponding ones of said picket receiving apertures, to a second position wherein at least one inwardly projecting flange in

respective ones of said bar apertures are received in corresponding ones of said rail connecting recesses.

2. The assembly as claimed in claim 1, wherein it said upper and lower support rails are identical and parallel one to the other, said elongate pickets are identical, and said fastening means is slidably disposed in at least said upper support rail.

3. The assembly as claimed in claim 2, wherein each said bar aperture includes a first open portion the dimensions of which at least correspond to the dimensions of said picket receiving recesses, and a second open portion which includes said at least one inwardly projecting flange.

4. The assembly as claimed in claim 1, wherein the sidewalls of each elongate picket includes a surrounding collar, and the location of a said upper support rail relative to said corresponding rail connecting recesses is determined when said collar abuts the top portion of said upper support rail.

5. The assembly as claimed in claim 1, wherein said fastening means is slidably disposed in at least said lower support rail, the sidewalls of each said elongate picket include a surrounding collar, and the location of said lower support rail relative to said corresponding rail connecting recesses is determined when said collar abuts the top portion of said lower support rail.

6. The assembly as claimed in claim 1, wherein said elongate pickets are tubular and said sidewalls are rectangular in cross-section, said rail connecting recesses each include a pair of slots which extend through opposed sidewalls, and said one inwardly directed flange is received in said pair of slots when said elongate bar is in said second position.

7. The assembly as claimed in claim 1, wherein said elongate pickets are tubular and said sidewalls are circular in cross-section, said rail connector recesses each include a pair of slots which extend through opposed sidewalls, and a pair of opposed and inwardly projecting flanges in said bar aperture is received in said pair of slots when said elongate bar is in said second position.

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