A fencing/railing assembly adapted to be positioned between a pair of posts and mounted thereto. The assembly includes a plurality of elongate pickets and one or more rails extending transverse to the pickets. The pickets each have at least one protrusion formed or positioned thereon. The rails have an elongate channel formed on an inside portion thereof for cooperating with the protrusion. The rails further include picket openings formed in an upper portion thereof for receiving pickets therethrough. The picket openings are sized and adapted to be slipped over the pickets and securely held in place by engagement of the protrusions with the channels formed on the inside portion of the rails. The channels and the protrusions form a connection between the pickets and the rails.
FIG. 8
METAL FENCE ASSEMBLY WITH CONCEALED HINGE CONNECTION

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority benefit of U.S. Provisional Patent Application Ser. No. 61/484,329, filed May 10, 2011, which is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to fencing and railings, and in particular relates to metal fencing and metal railings.

SUMMARY OF THE INVENTION

[0003] Briefly described, in a first preferred form the present invention relates to a metal fencing/railing assembly adapted to be positioned between a pair of posts and mounted thereto. The metal fencing/railing assembly includes a first subassembly having a first plurality of elongate metal pickets and a first plurality of metal rails extending transverse to the first plurality of pickets and secured thereto. The metal fencing/railing assembly also includes a second subassembly having a second plurality of elongate metal pickets and a second plurality of metal rails extending transverse to the second plurality of pickets and secured thereto. Two or more hinges are concealed within the first and second pluralities of rails for hingedly securing the first subassembly to the second subassembly. Advantageously, the fencing/railing assembly can be shipped and stored in a folded configuration and can be unfolded and extended for installation. This also facilitates installation by relatively unskilled workers or DIY'ers.

[0004] Preferably, the rails define a generally rectangular interior and further comprise hinge sockets sized and shaped to fit snugly within the generally rectangular interior and having a generally cylindrical bore for receiving the hinges therein. Also preferably, the hinges comprise barrel hinges and the barrel hinges are secured within the hinge sockets by screw-operated cams.

[0005] Optionally, the hinge sockets can be secured to the rails with fasteners. Also optionally, the rails are generally U-shaped and are attached to the pickets with fasteners and further comprising concealment strips for attachment to the rails for concealing the fasteners.

[0006] Optionally, the first and second subassemblies are hingedly secured to one another with at least three concealed hinges.

[0007] Also, openings formed in the rails for receiving the pickets therethrough can be wider than the width of the pickets to allow some racking of the fencing/railing assembly to adjust to various installation slopes. Preferably, the fencing/railing assembly, including the pickets and the rails, comprises aluminum extrusions. Alternatively, the fencing/railing assembly can be made of partly or completely of plastic.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a front perspective view of a fencing/railing assembly according to a preferred form of the present invention and shown in a folded, compact configuration for shipping and storage.

[0009] FIG. 2 is a detailed perspective view of a rail component of the fencing/railing assembly of FIG. 1.

[0010] FIG. 3 is a detailed perspective view of a rail component of the fencing/railing assembly of FIG. 1, showing a hinge socket portion of the fencing/railing assembly inserted therein.

[0011] FIG. 4 is a schematic perspective view of a hinge socket portion of the fencing/railing assembly of FIG. 1.

[0012] FIG. 5 is a detailed perspective view of a portion of the fencing/railing assembly of FIG. 1, showing a hinge portion thereof.

[0013] FIGS. 6 and 7 are perspective views of the fencing/railing assembly of FIG. 1 showing the assembly in partly unfolded and unfolded configurations.

[0014] FIG. 8 is a perspective view of a fencing/railing assembly of FIG. 1 showing the assembly in an unfolded configuration and the insertion of a concealment strip therein.

DETAILED DESCRIPTION

[0015] Referring now in detail to the drawing figures, wherein like reference numerals represent like parts throughout the several views, FIG. 1 shows a fencing assembly and/or railing assembly 10 according to a preferred example embodiment. As depicted, the assembly 10 can be used to enclose or edge yard spaces, decks, porches and the like. Generally, the assembly 10 comprises a first subassembly 20, a second subassembly 30, and a plurality of concealed hinges 41-43 hingedly securing the first subassembly to the second subassembly.

[0016] In depicted example embodiments, the first subassembly 20 comprises a first plurality of elongate metal pickets 21-25 and a first plurality of metal rails 26-28. The metal rails 26-28 extend transverse to the elongate metal pickets 21-25. Each of the pickets 21-25 can include an end cap coupled to the top of the same (or formed in the top portion thereof) to close off the top of the picket and/or provide an aesthetic element to the picket. The metal rails 26-28 can be located at any desired vertical level on the pickets. In this example embodiment as seen in FIG. 1, the first subassembly 20 comprises five pickets 21-25 and three metal rails 26-28, but in other embodiments, there can be more or fewer pickets and/or metal rails.

[0017] It should be noted that while the components of the first subassembly 20 are described in detail, in this example embodiment, the second subassembly 30 is substantially similar in construction and design to the first subassembly. Likewise, the second subassembly comprises a second plurality of elongate metal pickets 31-35 and a second plurality of metal rails 36-38. The second plurality of metal rails extends transverse to the second plurality of metal pickets.

[0018] In example embodiments, the pickets and the metal rails can be formed from extruded aluminum. In other embodiments, the pickets and metal rails can be formed from solid aluminum, other metals and/or metal alloys, wood, rubber, plastic, and/or other materials known in the art. In this example embodiment, the pickets and the metal rails are substantially square aluminum extrusions having a generally rectangular interior, but in other embodiments, the pickets and metal rails can be any other desired shape.

[0019] As seen in FIG. 2, the metal rails have a substantially "U" shaped cross-section and are generally oriented open-side-down such that the "bottom" 51 (closed segment or web) of the "U" forms the top of the rail and the open portion 52 of the "U" is at the bottom of the rail. In alternative embodiments, the rails can have other cross-sections as desired. The rails comprise the upper portion 51, a first descending leg...
portion 53 and a second descending leg portion 54. The first descending leg portion 53 extends downwardly from one end of the upper portion 51 and the second descending leg portion 54 extends downwardly generally from the opposite end of the upper portion 51, resulting in the aforementioned open-side-down "U" shaped cross-section of the rail. The second descending leg portion 54 comprises a lower elongated hooked protrusion 56 that is oriented upwardly and an upper elongated hooked protrusion 57 that is oriented downwardly, each of which extends the entire length of the metal rail. Together, the upper and lower hooked protrusions and the leg portion 54 define a relatively tall, narrow “C”-shaped channel for receiving an elongate strip (described below). Thus, the inner surfaces of the hooked protrusions and a portion of the outer surface of the first descending portion form channels along the length of the metal rail. Optionally, the first descending leg portion comprises a formed decorative detail 58 for aesthetic purposes. As shown in this example embodiment, the decorative detail 58 comprises a bowed molding-like elongated protrusion.

FIG. 2 additionally shows a concealment strip or lock strip 60 positioned in the relatively tall, narrow C-shaped channel formed along one side of the metal rail 26. The concealment strip 60 is an elongated metal strip optionally comprising a decorative detail 61 formed therein. The decorative detail 61 is configured to match the decorative detail 58 of the rail 26. As shown, the concealment strip 60 includes the central portion 61 comprising the decorative detail and two opposing distal portions 62 and 63 adapted and sized to be closely guided in the tall, narrow C-channel. Thus, when the concealment strip 60 is inserted in the tall, narrow C-channel, it is closely guided and captured therein. The concealment strip 60 is positioned such that the top portion 63 and bottom portion 62 of the concealment strip are slid into small slots, held in by the upper elongated hooked protrusion 57 and the lower elongated hooked protrusion 56. A sliding fit between the concealment strip 60 and the upper and lower elongated hooked protrusions is favorable. The concealment strip can be installed on the metal rail to cover up any fasteners located on the first descending portion. As will be appreciated when viewing subsequent figures, the concealment strip can also operate to help make the assembly more rigid.

One or the other (or both) of the legs 53, 54 can be provided with a support ledge, such as ledge 59. Such a ledge can provide additional structural rigidity against bending forces. Also, as will be seen in connection with FIG. 3, such a ledge 59 can help support a hinge socket 70 positioned within an end portion of the rail 26. The hinge socket 70 can be constructed of various materials, but in one example embodiment is made from solid metal, such as aluminum or steel. The hinge socket 70 is shown in greater detail in subsequent figures, but as shown in FIG. 3, the hinge socket 70 is sized and shaped to be closely received within the rail 26 (and the other rails are constructed similarly).

FIG. 4 shows an example embodiment of a hinge socket or adapter 70 manufactured to be fitted within the metal rails. The hinge socket 70 is shaped as a rectangular block, preferably made of metal or any other suitable material. The hinge socket includes a small screw hole 71 extending from one side face 72 to the opposite side face 73. The hinge socket 70 also defines a relatively large cylindrical bore 76. In this particular example embodiment, the bore 76 is formed and positioned parallel to the longitudinal axis of the hinge socket 70 (thus is not centered in the hinge socket) and the screw hole is located adjacent an end 77 of the hinge socket 70 generally opposite to the bore 76. The bore 76 in this embodiment is formed off-center towards face 72 and intersects face 72 of the hinge socket, creating a slot or elongate opening 78 on one face of the hinge socket. The slot splits the side portion 72 of the hinge socket, creating an upper jaw 81 and a lower jaw 82. The hinge socket 70 preferably is sized and dimensioned to fit snugly and closely within the generally square shaped interior of the metal rail upon insertion, as seen in FIG. 3.

In this example embodiment, the plurality of hinges comprises a plurality of barrel hinges, such as are commercially available and often used in indoor furniture. Such a barrel hinge 41 is shown in detail in FIG. 5. The barrel hinge 41 includes a first barrel portion 91, a second barrel portion 92, and a plate-and-pin mechanism 93 pivotally connecting the two barrels 91, 92 to one another. One barrel portion 92 of a barrel hinge with portions hidden for clarity is shown fitted within the off-center bore in FIG. 4.

The barrel hinge is well known in the indoor furniture and decorative arts, but heretofore apparently has not been used in fencing and railings. The barrels are connected to one another to allow pivotal motion relative to one another. The barrel hinge comprises two barrels and a plurality of hinge leaves that are connected and positioned between the barrels to allow for pivotal motion (three such leaves 95-97 are seen in FIG. 5 and pivotally connected to one another by pivot pin 98). The barrels have a plurality of knurled serrations on their outer surface and slits cut as chords on the cross-section of the barrels. Moreover, as is well-known in the art, the barrels can have a movable portion forming locking cams on the barrels, such as locking cam 101 shown in FIG. 5. A screw 102 is positioned in the barrel, and operates to extend the locking cam 101 when screwed inwardly. Thus, when the cam screw 102 is tightened, the locking cam 101 on the barrel 91 expands outwardly to lock the barrel into the bore in which it is placed. The other barrel 92 of the hinge 41 also has such a locking cam (not seen in this figure) and a corresponding cam screw 104.

The barrel hinge can be installed in the hinge socket by placing a barrel into the off-center bore of the hinge socket and tightening the cam screw on that barrel, as shown in FIG. 4. As the cam screw is tightened, the cam on the barrel expands outwardly, pushing the knurled serrations of the locking cam portion of the barrel into the inner surface of the off-center bore, creating a tight fit. The barrel then rests snugly and tightly within the cylindrical bore of the hinge socket. Additionally, while the cam expands in the bore of the hinge adapter, the upper and lower jaws of the hinge adapter are pushed and flexed outwardly slightly due to the expansion of the cam. In construction, it can be favorable to first install the hinge socket into the metal rails and to secure the hinge socket therein with a screw threaded into screw hole 71. Then the cam screws of the barrels can be tightened, causing the upper and lower jaws to press against the inner surfaces of the metal rails. This promotes a tight fit between the hinge socket and the metal rail.

The upper portions of the rails each include a plurality of picket openings which are sized, shaped and adapted to receive the plurality of pickets therethrough. The picket openings in this example embodiment are square cutouts or apertures, dimensioned to provide a somewhat snug and secure fit around the pickets, which have a square cross-section. In other embodiments, the picket openings can be
dimensioned to provide a slightly loosened fit around the pickets in order to allow the pickets to pivot somewhat when assembled with the rails, allowing the fencing/railing assembly to be installed on a sloped or angled surface with a vertically plumb orientation (to rack). The pickets can be secured to the first descending portion of the rails with a plurality of fasteners.

In the manufacturing of this example embodiment, the five pickets of the first subassembly are inserted into the picket openings of the three metal rails and secured to the first descending portions of the metal rails by fasteners. Likewise, the second subassembly is constructed in a similar manner. The hinge sockets are inserted into the open ends of the metal rails of both subassemblies and secured to the first descending portions of the metal rails by fasteners. Three barrel hinges are then installed in the cylindrical bores of the hinge sockets and their cam screws are operated to expand the cams within the hinge sockets. The resulting assembly can initially be fully closed or folded, as seen in FIG. 1, wherein the first subassembly 20 and the second subassembly 30 are in a first closed and folded position. In FIG. 1, the metal fencing/railing assembly 10 is in a folded, compact configuration that can be shipped and stored to the site of installation.

In FIG. 6, the first subassembly 20 and the second subassembly 30 are shown in a partially unfolded position, securely connected by the hinges. In this position as shown, the first and second subassemblies 20, 30 are positioned at ninety degrees from each other. Note that the barrel hinges have not fully opened and are still in a partially unfolded position. In FIG. 7, the first and second subassemblies 20, 30 are shown in a fully unfolded, final position, wherein the barrel hinges of the first and second subassemblies 20, 30 are fully unfolded, open, and the two subassemblies 20, 30 are coplanar. As shown in FIG. 8, the concealment strips 60, 60′, 60″ are then slid into the channels of the metal rails, concealing the otherwise-visible fasteners on the first descending portions of the metal rails (the fasteners that secure the pickets to the rails and the fasteners that secure the hinge sockets to the rails). The concealment strips also provide increased structural rigidity of the fencing/railing assembly once it is fully inserted into the channels on the metal rails. As described above, preferably the pickets and the rails can be rocked to allow for installations on different surface inclinations and grades.

In other example embodiments, not pictured herein, the fencing/railing assembly can comprise three or more subassemblies of metal rails and metal pickets described herein, connected to one another with a plurality of hinges. The multiple subassemblies can be constructed and folded in an initial accordion configuration, wherein their unfolding and deployment result in a longer fencing assembly. In these example embodiments, there can be three or more subassemblies that make up the fencing/railing assembly.

While the invention has been described and disclosed in preferred example forms, those skilled in the art will appreciate that various modifications, changes, addition, and deletions may be made therein within the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A metal fencing/railing assembly adapted to be positioned between a pair of posts and mounted thereto, the fencing/railing assembly comprising:

   a first subassembly comprising a first plurality of elongate metal pickets and a first plurality of metal rails extending transverse to the first plurality of pickets and secured thereto;
   a second subassembly comprising a second plurality of elongate metal pickets and a second plurality of metal rails extending transverse to the second plurality of pickets and secured thereto;
   two or more barrel hinges concealed within the first and second pluralities of rails for hingedly securing the first subassembly to the second subassembly, wherein the fencing/railing assembly can be shipped and stored in a folded configuration and can be unfolded and extended for installation; and
   wherein the rails define a generally rectangular interior and further comprising hinge sockets sized and shaped to fit snugly within the generally rectangular interior and having a generally cylindrical bore for receiving the hinges therein.

2. A fencing/railing assembly as claimed in claim 1 wherein the barrel hinges are secured within the hinge sockets by screw-operated cams.

3. A fencing/railing assembly as claimed in claim 1 wherein the hinge sockets are secured to the rails with fasteners.

4. A fencing/railing assembly as claimed in claim 1 wherein the rails are generally U-shaped.

5. A fencing/railing assembly as claimed in claim 1 wherein the rails are attached to the pickets with fasteners and further comprising concealment strips for attachment to the rails for concealing the fasteners.

6. A fencing/railing assembly as claimed in claim 1 wherein the pickets and the rails comprise aluminum extrusions.

7. A fencing/railing assembly as claimed in claim 1 wherein the first and second subassemblies are hingedly secured to one another with at least three concealed hinges.

8. A fencing/railing assembly as claimed in claim 1 wherein openings formed in the rails for receiving the pickets therethrough are wider than the width of the pickets to allow some racking of the fencing/railing assembly to adjust to various installation slopes.

9. A fencing/railing assembly as claimed in claim 7 wherein the concealment strips operate to enhance the rigidity of the assembly.

10. A metal fencing/railing assembly adapted to be positioned between a pair of posts and mounted thereto, the fencing/railing assembly comprising:

    a first subassembly comprising a first plurality of elongate metal pickets and a first plurality of metal rails extending transverse to the first plurality of pickets and secured thereto;
    a second subassembly comprising a second plurality of elongate metal pickets and a second plurality of metal rails extending transverse to the second plurality of pickets and secured thereto; and
    two or more hinges concealed within the first and second pluralities of rails for hingedly securing the first subassembly to the second subassembly, wherein the fencing/railing assembly can be shipped and stored in a folded configuration and can be unfolded and extended for installation.

11. A fencing/railing assembly as claimed in claim 10 wherein the rails define a generally rectangular interior and
further comprising hinge sockets sized and shaped to fit snugly within the generally rectangular interior and having a generally cylindrical bore for receiving the hinges therein.

12. A fencing/railing assembly as claimed in claim 11 wherein the hinges comprise barrel hinges.

13. A fencing/railing assembly as claimed in claim 12 wherein the barrel hinges are secured within the hinge sockets by screw-operated cams.

14. A fencing/railing assembly as claimed in claim 11 wherein the hinge sockets are secured to the rails with fasteners.

15. A fencing/railing assembly as claimed in claim 10 wherein the rails are generally U-shaped.

16. A fencing/railing assembly as claimed in claim 10 wherein the rails are attached to the pickets with fasteners and further comprising concealment strips for attachment to the rails for concealing the fasteners.

17. A fencing/railing assembly as claimed in claim 16 wherein the concealment strips operate to enhance the rigidity of the assembly.

18. A fencing/railing assembly as claimed in claim 10 wherein the pickets and the rails comprise aluminum extrusions.

19. A fencing/railing assembly as claimed in claim 10 wherein the first and second subassemblies are hingedly secured to one another with at least three concealed hinges.

20. A fencing/railing assembly as claimed in claim 10 wherein openings formed in the rails for receiving the pickets therethrough are wider than the width of the pickets to allow some racking of the fencing/railing assembly to adjust to various installation slopes.

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