A racking assembly for adjustably mounting a spindle to a rail. The racking assembly includes a first member which engages the rail and a second member pivotally secured to the first member. The second member retains the spindle at an angle relative to the first member and therefore relative to the rail. As the second member pivots, the angle of the spindle relative to the rail is changed. In a fence rail assembly, each spindle is secured between a pair of rails by a pair of racking assemblies. Each racking assembly is mounted on one of the rails and is individually adjustable so as to set the angle of the spindle relative to the rails. The rails are secured between a pair of vertical posts. Each rail is secured to one of the posts by a bracket that is adjustable to set the angle of the rail relative to the posts.
METHOD AND APPARATUS FOR ATTACHING SPINDLES TO RAILS IN A FENCE ASSEMBLY

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] This invention generally relates to fencing systems. More particularly, the invention relates to a method and apparatus for attaching spindles to a rail assembly. Specifically, the invention relates to a spindle racking assembly that includes a first member that engages the rail and a second member that engages the spindle and is pivotally mounted to the first member and movable relative thereto to set the angle of the spindle relative to the rail.

[0003] 2. Background Information

[0004] One of the problems encountered when building a vinyl fence assembly is that of being able to quickly and easily connect spindles between spaced apart rails. Because of the type of material involved, the installer cannot simply place the spindle on the rail and drive a screw into the same. One of the easiest solutions is for the rail to be made with a plurality of apertures cut at predefined intervals. One end of each spindle insert is inserted into the lower rail and the other end thereof is inserted into the upper rail. While the method sounds easy, any differences between the apertures and the ends of the spindle can be problematic. Firstly, if the aperture is too small or is slightly incorrectly cut, the end of the spindle will not be able to be inserted into the same. On the other hand, if the aperture is too big then the spindle will be easily inserted but will tend to move around in the aperture making the installation of the upper rail difficult. Additionally, there will tend to be a gap around the end of the spindle and the rail thus giving the finished product an unfinished and unpolished appearance.

[0005] The problem is especially pronounced in the construction of stair rail assemblies. In this instance, two inclined rails have to be installed in such a manner that the apertures therein are aligned in exactly the correct orientation relative to each other. If there is a misalignment of the same, then the spindle may be able to be inserted into the aperture in the lower rail but be angled to the point that it cannot be received in the upper rail. Even if the spindles can be installed, they may not be angled correctly relative to the rails. If the angle is even slightly off, the stair rail assembly will have a misaligned appearance that can make the entire assembly look as if it has been installed by an amateur.

[0006] There is therefore a need in the art for a reliable and easily used method and apparatus for installing spindles between a pair of rails.

SUMMARY OF THE INVENTION

[0007] The device of the present invention is a racking assembly for adjustably mounting a spindle to a rail. The racking assembly includes a first member which engages the rail and a second member pivotally secured to the first member. The second member retains the spindle at an angle relative to the first member and therefore relative to the rail. As the second member pivots, the angle of the spindle relative to the rail is changed. The racking assembly gives an installer the ability to correctly set the angles of the spindles in a stair rail assembly that is to be used on stairs that range in steepness from between 25 and 40 degrees and preferably between 28 and 38 degrees.

[0008] In a fence rail assembly or stair rail assembly, each spindle is secured between an upper and lower rail by a pair of racking assemblies. Each racking assembly is mounted on one of the upper and lower rails and is individually adjustable so as to set the angle of the spindle relative to the rails. The rails are secured between a pair of vertical posts. Each rail is secured to one of the posts by a bracket that is adjustable to set the angle of the rail relative to the posts.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The preferred embodiments of the invention, illustrative of the best mode in which applicant has contemplated applying the principles, are set forth in the following description and are shown in the drawings and are particularly and distinctly pointed out and set forth in the appended claims.

[0010] FIG. 1 is a side elevational view of a stair rail assembly incorporating the spindle racking assembly in accordance with the present invention;

[0011] FIG. 2 is an enlarged perspective view of the bracket assembly used to secure the rails to the posts taken from a first highlighted region in FIG. 1;

[0012] FIG. 3 is an enlarged side view of the spindle racking assembly of the present invention taken from a second highlighted region in FIG. 1;

[0013] FIG. 4 is an exploded perspective view of the spindle racking assembly and a portion of the foot rail;

[0014] FIG. 5 is a top view of the spindle cover of the racking assembly;

[0015] FIG. 6 is a bottom view of the spindle cover;

[0016] FIG. 7 is a cross-sectional side view of the spindle racking assembly engaged with the foot rail and a spindle locked into the racking assembly;

[0017] FIG. 8 is a front view taken through line 8-8 of FIG. 7;

[0018] FIG. 9 is an enlargement of the first highlighted region shown in FIG. 8;

[0019] FIG. 10 is an enlargement of the second highlighted region shown in FIG. 8;

[0020] FIG. 11 is a side elevational view of a fence rail assembly incorporating the spindle racking assemblies of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0021] Referring to FIGS. 1-10, there is shown a stair rail assembly 10 that includes a pair of spaced-apart vertical fence posts 14, 16; a hand rail 18, a foot rail 20 and a plurality of spindles 22 extending therebetween. Each rail 18, 20 is secured to one of posts 14, 16 by way of a rail bracket assembly 24. Each rail bracket assembly 24 is adjustable so as to allow rails 18, 20 to be set at a desired angle relative to posts 14, 16. Suitable bracket assemblies 24 for this purpose are any one of the bracket assemblies disclosed in U.S. Pat. Nos. 6,698,726; 6,986,505; 7,044,451 and 7,147,212 to the present inventor, the entire disclosures of which are incorporated herein by reference. Bracket assemblies 24 enable rails 18, 20 to be set at an appropriate angle for staircases that are built at different angles of steepness. Stair rail assembly 10 further includes a plurality of spindle racking assemblies in accordance with the present invention, which assemblies are generally indicated at 12. Hand and foot rails 18, 20 each define a plurality of spaced apart apertures 26 therein. In hand rail 18
said apertures 26 are formed in a lowermost wall 18a and in foot rail 20 said apertures 26 are formed in an uppermost wall 20a.

[0022] In accordance with a specific feature of the present invention, each of the racking assemblies 12 is configured to be engaged in one of apertures 26 in one of the hand and foot rails 18, 20. Furthermore, each spindle 22 is secured between a pair of racking assemblies 12. A single racking assembly 12 is shown in greater detail in FIG. 4. Racking assembly 12 comprises a rail pivot 28 and a spindle cover 30. Rail pivot 28 is fixedly engaged with rail 28 and spindle cover 30 is movably engaged with rail pivot 28. Spindle cover 30 receives an end of spindle 22 therein and spindle 22 extends outwardly away from spindle cover 30. As the position of spindle cover 30 is selectively adjusted on rail pivot 28, the angle of spindle 22 relative to rail pivot 28 and therefore relative to rail 20 is adjusted.

[0023] Referring still to FIG. 4, rail pivot 28 comprises a substantially planar base 32 having a length L and a width W. Preferably, base 32 is square and the length L and width W are equal. Aperture 26 in rail 20 has a length L and a width W and the length and width W of base 32 are greater than the length and width W of aperture 26. Thus, when rail pivot 28 is engaged in aperture 26, base 32 forms a lip that extends outwardly for a short distance beyond aperture 26. At least a portion of lower surface 32c (FIG. 3) of base 32 rests on the upper surface of wall 20a.

[0024] Rail pivot 28 further includes a perimeter wall 34 that extends downwardly away from lower surface 32c. Preferably, perimeter wall 34 comprises two substantially C-shaped regions 34a, 34b, each of which extends along one full side 32a or 32b of base 32 and partially along each of the two adjacent sides 32c, 32e thereof. Regions 34a, 34b are opposed to each other and are spaced a distance apart that is substantially equal to the length L of aperture 26. Consequently, when rail pivot 28 is engaged in aperture 26, wall regions 34a, 34b extend downwardly through aperture 26 and into the interior of rail 20. Rail pivot 28 preferably further includes a pair of opposed flanges 36 that extend downwardly from lower surface 32c and intermediate wall regions 34a, 34b. Each flange 36 includes a shoulder 36a that faces outwardly and is separated from lower surface 32c of base 32 by a notch 35 (FIG. 4). Notch 35 is sized so as to closely receive a portion of wall 20 of rail 20 therein (FIG. 10), as will be hereinafter described. Flange 36 is widest proximate shoulder 36a and tapers to its narrowest width proximate lowermost edge 38. As shown in FIGS. 3, 7, lowest edge 38 of flange 36 is disposed further outwardly from lower surface 32c of base 32 than is edge 40 of wall 34. Flanges 36 are separated from the adjacent regions 34a, 34b of wall 34 by spaces 37 (FIG. 7). Flanges 36 are therefore free to flex inwardly when rail pivot 28 is inserted into aperture 26. Rail pivot 28 has a longitudinal axis Y that is alignable with a longitudinal axis Y' of rail 20 when rail pivot 28 is engaged therewith.

[0025] In accordance with yet another feature of the present invention, rail pivot 28 further includes an exterior wall comprising an arcuate wall 44 and two opposed sides 50. Arcuate wall 44 is substantially semicircular in shape and extends upwardly and outwardly away from base 32. Arcuate wall 44 originates proximate a first side 32a of base 32 and terminates proximate a second side 32b thereof. Arcuate wall 44 describes an arc of substantially 180 degrees about an axis X. Axis X is disposed at right angles to the longitudinal axis Y of base 32. Sides 50 extend upwardly from proximate sides 32d, 32e of base 32 and join arcuate wall 44 along a first and second semicircular edge 45. A portion of arcuate wall 44 extends outwardly beyond edges 45 thereby forming a pair of opposed lips 46 that project beyond sides 50 and over sides 32d, 32e of base. Each lip 46 has a first end 47 and a second end 49. As shown in FIG. 7, first end 47 is spaced a greater distance along edge 45 and away from base 32 than is second end 49.

[0026] Exterior wall 42 is marked with an indicator arrow 48 that directs an engagement direction of rotational engagement for spindle cover 30 on the end of rail pivot 28 as will be hereinafter described. Arrow 48 has an end 48a and a tip 48b. It will be understood that arrow 48 may be a marking placed on arcuate wall 44 or may be recessed or printed region formed on arcuate wall 44 or anywhere else on exterior wall 42.

[0027] Spindle cover 30 is designed to interlockingly engage rail pivot 28 and to be movable relative thereto. Referring to FIGS. 4 and 7, spindle cover 30 has a substantially square outer wall 52. Outer wall 52 includes side walls 53a, 53b, 53c, 53d. Each side wall 53 has an upper edge 52a and a lower edge 52b. A substantially arcuate bottom wall 54 extends from bottom edge 52d of side wall 53c and terminates in the bottom edge 52e of side wall 53a. Bottom wall 54 is substantially concave and has a radius of curvature that is substantially identical to the radius of curvature of arcuate wall 44 of rail pivot 28. One or more supports 56 extend upwardly from an inner surface of bottom wall 54. In FIGS. 4 and 7, four support 56 extend upwardly from bottom wall 54 and each support 56 is positioned adjacent and parallel to one of side walls 53c-53d. Supports 56 each include a planar portion 56a that is substantially parallel to the inner surface of outer wall 52. Supports 56 further include a buttress 57 that extends inwardly from planar portion 56a. Buttress 57 extends from proximate the uppermost edge of support 56 and downwardly into abutting contact with bottom wall 54. Planar portion 56a of each support 56 is separated from outer wall 52 by a gap 58 that is substantially complementary to the thickness of the side walls 60 of spindle 22.

[0028] In accordance with yet another feature of the present invention and as shown in FIGS. 8 and 9, bottom wall 54 includes an arcuate region 62 which is complementary in shape to wall 44 of rail pivot 28 and further includes two interior regions 63 that extend downwardly from region 62 and toward lower edge 52b. Each interior region 63 includes a projection 64 spaced a distance from arcuate region 62 and defines a longitudinally aligned interior groove 66 complementary shaped, sized and positioned to receive one of the lips 46 of rail pivot 28 therein.

[0029] The racking assembly 12 of the present invention is used in the following manner. The installer first mounts a lower bracket base 70 (FIG. 2) of one of rail bracket assemblies 24 onto each post 14, 16 at an appropriate height. Lower bracket base 70 is mounted by inserting fasteners through pre-drilled holes in the base 70 and in posts 14, 16. Foot rail 20 is then dropped into a bracket on each base 70. A rail pivot 12 is snap-fitted into each one of spindle apertures 26 in foot rail 20. Special care must be taken to ensure that all of the rail pivots 28 on foot rail 20 are oriented in the same direction with the arrows 48 thereon all pointing the same way. On an inclined stairway, for example, the arrows 48 on rail pivots 28 on foot rail 20 preferably point downwardly toward the lowest post 14. Each rail pivot 28 is installed by inserting wall regions 34a, 34b and flanges 36 into aperture 26 and pushing
downwardly on rail pivot 28 in a direction toward wall 20a. This downward force causes flanges 36 to be flexed inwardly so that they can pass through the aperture. The inward force also causes flanges 36 to become spring loaded and when the shoulder 36a of flange 36 clears the lower surface of wall 20a, flanges 36 spring back into their original position. A small portion of wall 20a surrounding aperture 26 thereby becomes locked into notch 35 between shoulder 36a and lower surface 32c. When rail pivot 28 is so installed, it cannot be easily pulled back out of engagement with rail 20 because shoulder 36a wedges the portion of wall 20a against lower surface 32c of base 32 and the greater the upward force applied, the more tightly wall 20a is locked into notch 35.

[0030] A spindle cover 30 is then engaged with each rail pivot 28. This is accomplished by positioning cover 30 over rail pivot 28 so that edge 52b of side wall 53c is in close proximity to region 32d on base 32 and arcurate portion 62 of bottom wall 54 rests of wall 44 of rail pivot 28. Spindle cover 30 is then rotated about the axis X and in the direction indicated by arrow 48 so that end 47 of lip 46 enters groove 66 in wall 54. Spindle cover 30 continues to be rotated in the direction indicated by the arrow until lip 46 is substantially entirely received in groove 66. At this stage, spindle cover 30 cannot be disengaged from rail pivot 28 by pulling upwardly or side to side. Spindle cover 30 can only be released from rail pivot 28 by rotating it in the opposite direction to that indicated by the arrow and to the degree that lip 46 becomes completely disengaged from groove 66. The position of lips 46 on edge 45 is such that spindle cover 30 can be rotated about axis X and through at least 90 degrees and not become disengaged from rail pivot 28. It will be understood that spindle cover 30 could be engaged with rail pivot 28 before rail pivot 28 is inserted into aperture 26, but cover 30 tends to obscure the base 32 and it is therefore more desirable to insert rail pivot 28 into aperture 26 prior to engaging spindle cover 30 with rail pivot 28.

[0031] The installer secures upper rail bracket assemblies 24 into position on posts 14, 16. Hand rail 18 is lowered into brackets of upper rail bases 70 and the installer begins installation of racking assemblies 12 onto hand rail 18 by snap-fitting a rail pivot 28 into each aperture 26 in hand rail 18. Once again, care must be taken to ensure that arrows 48 on all of rail pivots 28 on hand rail 18 point in the same direction. The rail pivots 28 in fence rail assembly 10 preferably are oriented so that the tips 48b of the arrows 48 face upwardly toward the uppermost post 16 on the stairway. In other words, the arrows 48 on rail pivots 28 on foot rail 20 point in a first direction and the arrows 48 on the rail pivots 28 on hand rail 18 point in a second opposite direction. Hand rail 18 is placed into position at this time so that the installer can check that the arrows on the rail pivots in the hand rail 18 are opposite in orientation to those of the pivots in the foot rail 20. A spindle cover 30 is then engaged with each rail pivot 28 in hand rail 18 in the same manner as was described with reference to the foot rail 20. When the installer is sure that all racking assemblies 12 are installed in the correct orientations, the hand rail 18 is removed.

[0032] The installer then engages spindles 22 in racking assemblies 12. A spindle 22 is inserted into each spindle cover 30 of racking assemblies 12 in foot rail 20. This is accomplished by pushing spindle 22 downwardly so that side walls 62 thereof slide into gap 58 between outer wall 52 and supports 56. Spindle 22 is pushed downwardly until the lowermost edge of spindle 22 contacts the interior surface of bottom wall 54 (FIG. 7). Supports 56 clamp side walls 62 of spindle 22 against outer wall 52 sufficiently firmly that spindle 22 cannot easily become dislodged from spindle cover 30. Additionally, the butresses of supports 56 prevent independent movement of spindle 22 relative to spindle cover 30. Thus, spindle 22 is locked into spindle cover and when either of spindle 22 and spindle cover 30 are moved, the other of spindle cover 30 and spindle 22 moves in unison therewith.

[0033] In accordance with another of the features of the present invention, spindle cover 30, and therefore spindle 22 retained therein, can be slidably moved along wall 44 of rail pivot 28. This enables the installer to set the tilt angle of the spindles 22 relative to wall 20a. So, for example, spindles 22 can be positioned at any angle between 25 and 40 degrees relative to wall 20a of rail 20. The ability to vary the tilt of the spindles 22 is important for installing fence rail assemblies on stairways that are of different steepness. On a very steep stairway it is necessary to set the spindles 22 at a more acute angle relative to rail 20, e.g., an angle of 25 degrees. On a less steep stairway, the spindles 22 can be set at a less acute angle, e.g., 35 degrees relative to rail 20.

[0034] Once all spindles 22 are installed in racking assemblies 12 in foot rail 20, hand rail 18 is repositioned into brackets of rail bracket assemblies 24 once again. Each spindle cover 30 on hand rail 18 is rotated into a position where it can receive the free upper end of one of spindles 22 therein. Side walls 60 of spindle 22 are received into gap 58 of spindle cover 30, but may not necessarily extend inwardly into cover 30 to the degree that the uppermost edge thereof abuts the interior surface of the bottom wall 54. Once spindles 22 are engaged between racking assemblies 12 in the hand and foot rails 18, 20, the spindles 22 may be moved slightly from side to side to rotate the spindle covers 30 on the rail pivots 28 and to thereby achieve the correct alignment of spindle 22 relative to hand and foot rails 18, 20. This adjustment also enables the installer to ensure that the spacing between adjacent spindles 22 is kept substantially constant. No fasteners are required to install spindles 22. Additionally, because spindle covers 30 hide the outer ends of spindles 22, the connection between spindles 22 and hand and foot rails 18, 20 is more aesthetically pleasing. Once all spindles 22 are determined to be in the correct position, the installer snap fits bracket covers 76 (FIG. 2) over the brackets in rail bracket assemblies 24.

[0035] As shown in FIG. 11, the racking assemblies of the present invention may also be used to put together a fence rail assembly 180. In this instance, an upper and foot rail 118, 120 are to be connected between two vertical posts, such as post 114. Brackets 170 are mounted onto posts 114. Foot rail 120 is dropped into lower brackets 170a. Racking assemblies 112 are engaged with foot rail 120 by installing rail pivots 128 into apertures (not shown) in rail 120. Again, care must be taken to ensure that all of rail pivots 128 are installed with the arrows (not shown) thereof pointing in the same direction. A spindle cover 130 is interlockingly engaged with each rail pivot 128 as previously described. Hand rail 118 is positioned in upper brackets 170 and racking assemblies 112 are engaged therein as previously described. Hand rail 118 is then removed. A lower end of a spindle 122 is inserted into each spindle cover 130 and is pushed downwardly until the lower end thereof engages the bottom wall of the spindle cover 130 as previously described. Hand rail 118 is then lowered into place in upper brackets 170. Racking assemblies 112 in hand rail 118 and foot rail 120 are rotated into a suitable position so as to
allow the free upper ends of spindles 122 to be received into spindle covers 130 of racking assemblies 112 in hand rail 118. Spindles 122 are moved slightly from side to side to rotate spindle covers 130 and therefore spindles 122, about rail pivot 128 to set the desired angle of spindle 122 relative to wall 120. When correctly positioned, spindles 122 are oriented substantially at right angles to wall 120 on foot rail 120.

In the foregoing description, certain terms have been used for brevity, clearness, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention are an example and the invention is not limited to the exact details shown or described.

1. A racking assembly for adjustably mounting a spindle on a rail, said racking assembly comprising:
   a first member adapted to engage the rail;
   a second member secured to the first member, said second member being adapted to engage the spindle and set the spindle at an angle relative to the first member and therefore relative to the rail; and wherein the second member is adjustably movable on the first member so as to selectively change the angle of the spindle relative to the rail.

2. The racking assembly as defined in claim 1, wherein the second member pivots relative to the first member.

3. The racking assembly as defined in claim 2, wherein the first member has a longitudinal axis adapted to be aligned with a longitudinal axis of the rail and the second member pivots about an axis disposed at right angles to the longitudinal axis of the first member; and wherein the spindle extends outwardly from the second member such that it pivots in a plane coplanar with the longitudinal axis of the first member.

4. The racking assembly as defined in claim 2, wherein the first member comprises:
   a base;
   an engagement member extending downwardly and outwardly from a first surface of the base; said engagement member being adapted to be received through an aperture in the rail and to lock the base and rail together.

5. The racking assembly as defined in claim 4, wherein the engagement member includes a pair of opposed flanges that extend downwardly and outwardly from the first surface of the base, said flanges including a notch that is sized to receive a portion of a rail wall therein.

6. The racking assembly as defined in claim 4, wherein the first member further comprises an exterior wall that extends upwardly and outwardly away from a second surface of the base; and wherein said second member engages said exterior wall and is adjustably movable therealong.

7. The racking assembly as defined in claim 6, wherein the exterior wall includes a substantially semicircular arcuate wall which originates proximate a first side of the base and terminates proximate a second side of the base.

8. The racking assembly as defined in claim 7, wherein the exterior wall further includes:
   a first side wall that originates proximate a third side of the base and terminates in a first arcuate edge with the arcuate wall; and
   a second side wall that originates proximate a fourth side of the base and terminates in a second arcuate edge with the arcuate wall.

9. The racking assembly as defined in claim 8, wherein the exterior wall further comprises a lip that extends outwardly from each of the first and second arcuate edges, and wherein said lips have substantially the same radius of curvature as the arcuate wall.

10. The racking assembly as defined in claim 9, wherein each lip originates a first spaced distance from the first side of the base and terminates a second spaced distance from the second side of the base and the first spaced distance is greater than the second spaced distance.

11. The racking assembly as defined in claim 7, wherein the second member comprises a housing having:
   a peripheral wall having a top end and a bottom end;
   a bottom wall extending across the bottom end of the peripheral wall; wherein said peripheral and bottom walls define a cavity adapted to receive an end of the spindle therein;
   at least one support member extending upwardly from an interior surface of the bottom wall and into said cavity; said support member being adapted to engage the end of the spindle and to retain the same within the second member.

12. The racking assembly as defined in claim 11, wherein the support is spaced a distance inwardly from an interior surface of the peripheral wall whereby a gap is defined therewithin and wherein the second member is adapted to receive one of the side walls of the spindle in the gap and to clamp the side wall between the support and the peripheral wall.

13. The racking assembly as defined in claim 11, wherein said bottom wall is arcuate in cross-sectional shape and has substantially the same radius of curvature as the arcuate wall of the first member.

14. The racking assembly as defined in claim 13, wherein the bottom wall defines a pair of spaced apart grooves that are configured to interlockingly receive the lips of the arcuate wall therein; whereby the bottom wall is slidingly engaged with the arcuate wall and is positionable at any one of a range of positions on the arcuate wall.

15. The racking assembly as defined in claim 11, wherein the arcuate wall of the first member has a longitudinal axis that is adapted to be aligned with a longitudinal axis of the rail; and wherein the second member is slidably adjustable along the arcuate wall in a direction parallel to the longitudinal axis thereof.

16. The racking assembly as defined in claim 15, wherein the peripheral wall of the second member extends outwardly at an angle relative to the arcuate wall and therefore relative to the base; whereby the second member is adapted to retain the spindle at that angle relative to the base; and when the second member is moved along the arcuate wall of the first member, the angle of the peripheral wall and therefore of the spindle relative to the base is changed.

17. The racking assembly as defined in claim 6, wherein the exterior wall further includes a direction indicator marked thereon.

18. A fence rail assembly comprising:
   a first and a second vertical post spaced a horizontal distance from each other;
   a hand rail and a foot rail connected between said first and second post and spaced a vertical distance from each other;
   a plurality of adjustable lower racking assemblies mounted at intervals along said foot rail;
a plurality of adjustable upper racking assemblies mounted at intervals along said hand rail; and
a plurality of spindles; each spindle having a first end that one of the upper racking assemblies; whereby said upper and lower racking assemblies are adjusted to retain the spindles at a desired angle relative to the hand and foot rail.

19. The fence rail assembly as defined in claim 18, wherein the upper and lower racking assemblies are adjustable to retain the spindles at an angle of between 25 degrees and 40 degrees relative to the hand rail and foot rail.

20. The fence rail assembly as defined in claim 18, wherein the upper and lower racking assemblies are adjustable to retain the spindles at an angle of between 25 degrees and 90 degrees relative to the hand rail and foot rail.

21. The fence rail assembly as defined in claim 18, further comprising a plurality of adjustable brackets for connecting the hand and foot rails to the vertical posts; wherein each bracket includes:
   a base that is fixedly secured to one of the posts; and
   a rail receiving receptacle movably mounted on the base;
   and wherein an end of one of the hand and foot rails is engageable in the rail receiving receptacle, and the position of the rail receiving receptacle is adjusted on the base to set the one of the hand and foot rails at a desired angle relative to the post.

22. A method of assembling a fence rail assembly comprising the steps of:
   securing a plurality of first racking assemblies to a lower rail;
   securing a plurality of second racking assemblies to an upper rail;
   inserting a first end of one of a plurality of spindles into a spindle engaging mechanism on each of the plurality of first racking assemblies;
   adjusting the orientation of each of the spindle engaging mechanisms so as to present the spindles at an angle suitable for a second end of each spindle to be received into a spindle engaging mechanism on one of the plurality of upper racking assemblies; and
   adjusting one or more of the spindle engaging mechanisms on the upper and the lower racking assemblies to set the spindles at a desired angle relative to the upper and lower rails.