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(54) **METHOD AND APPARATUS FOR FIXING AND CONSTRUCTING FENCES**

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(57) **ABSTRACT**

An overall device is provided for supporting one or more pickets of a fence in alignment at the same height, in a horizontal plane in order to replace a damaged fence picket or in order to assemble a new fence unit. The overall device may be comprised of a first rail; a first device fixed to the first rail at a first location; and a second device fixed to the first rail at a second location spaced apart from the first location. The first device may include means for temporarily attaching the first device to a horizontal rail of a fence. The second device may include means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence.

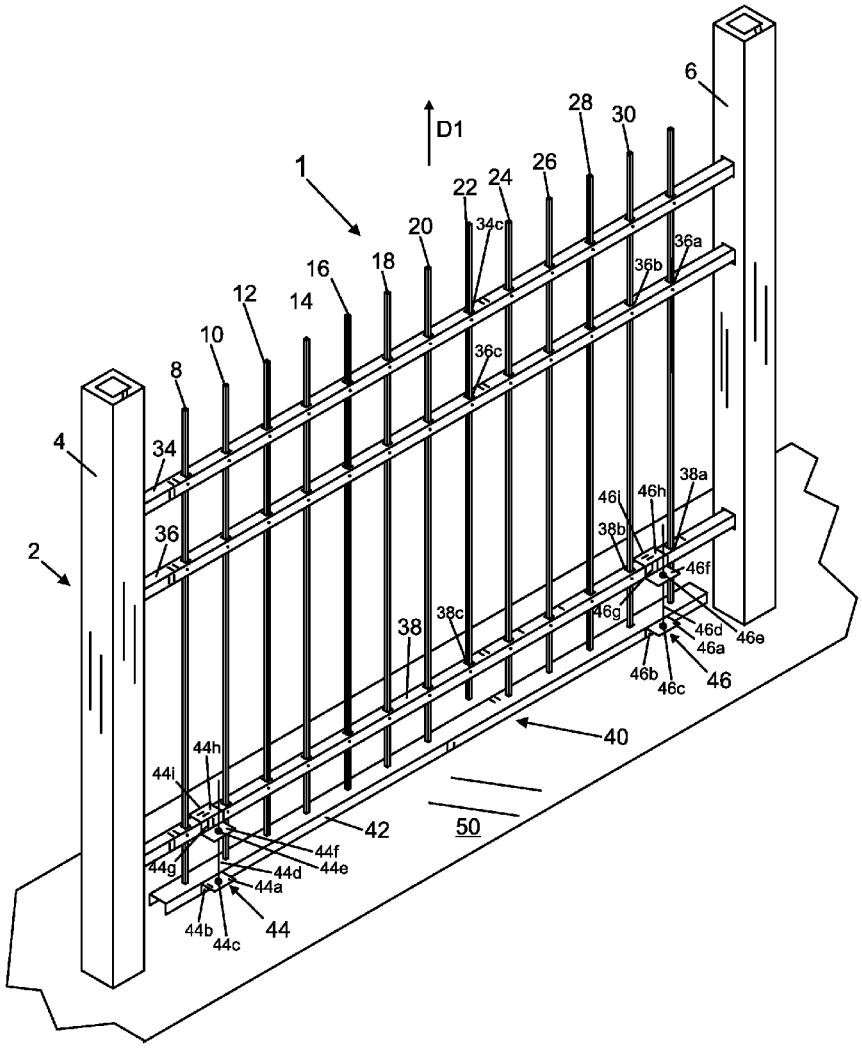

Fig. 1

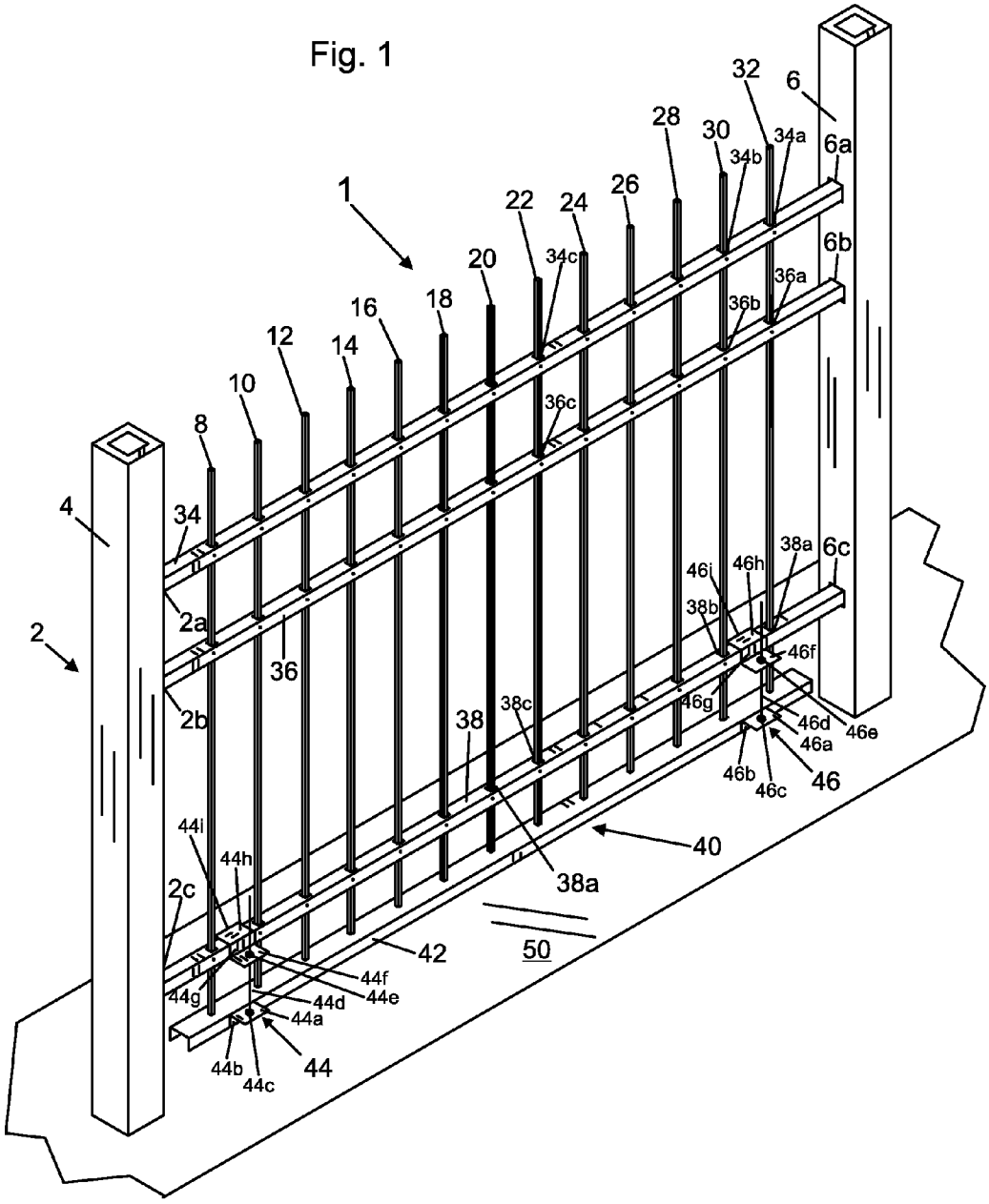
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Fig. 2

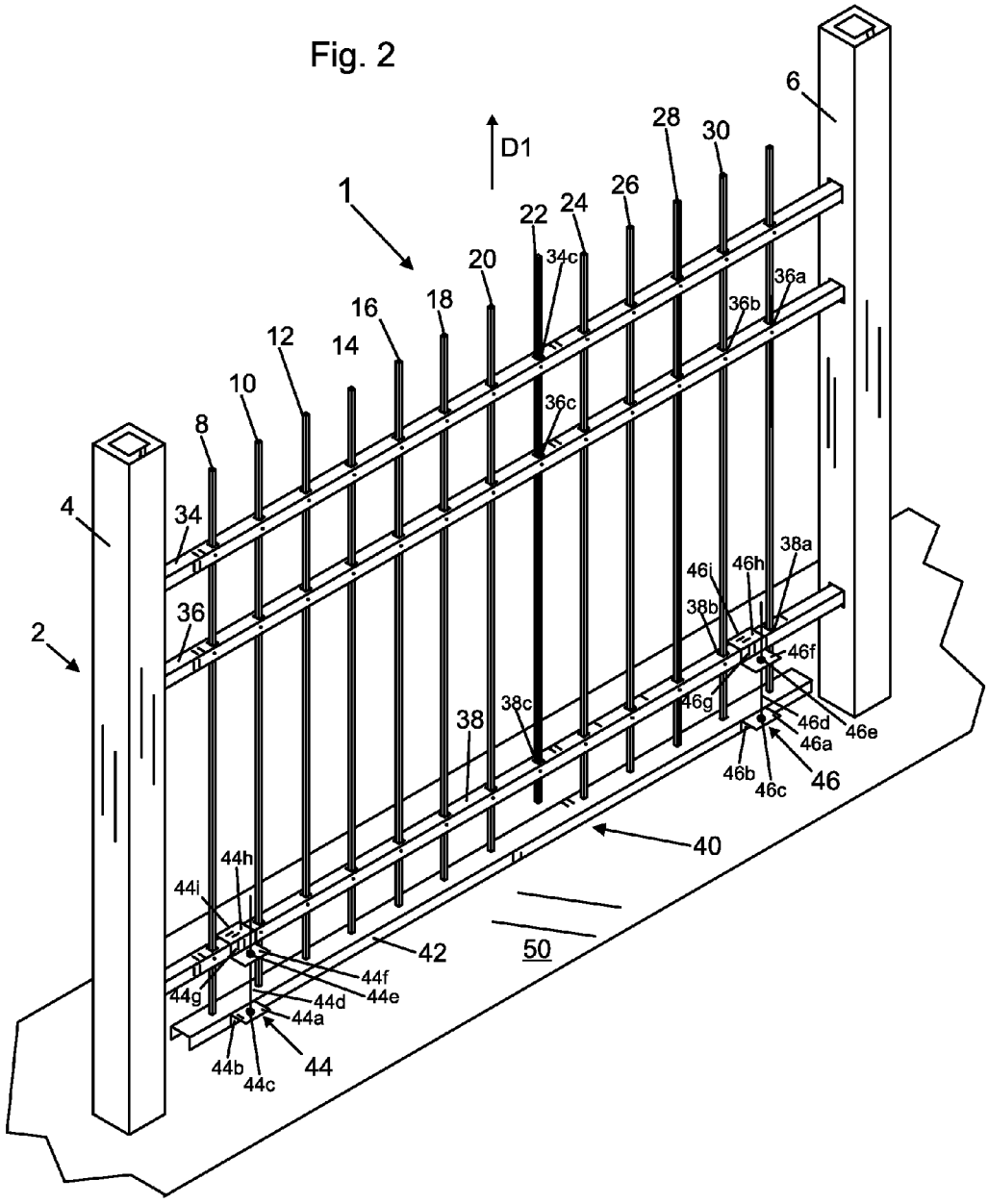
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Fig. 3

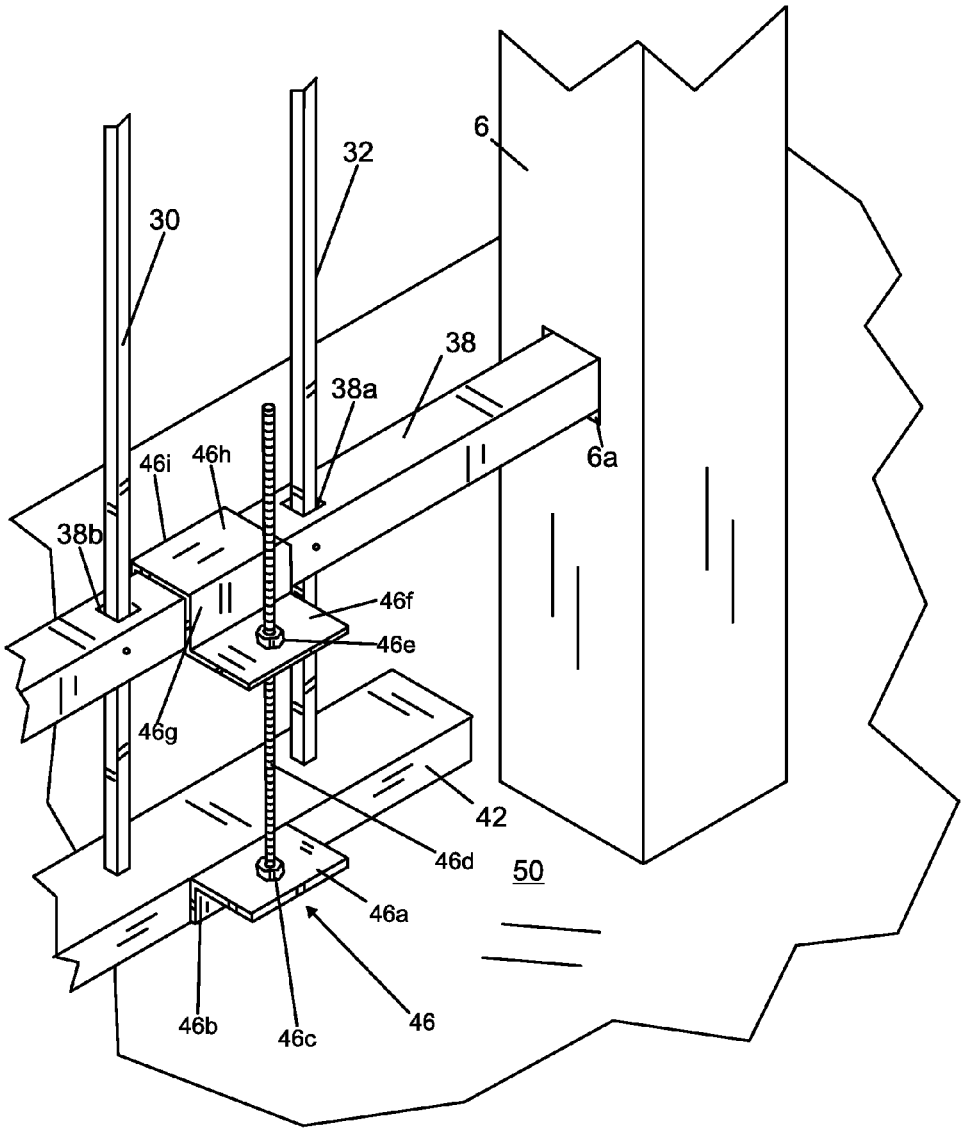

Fig. 4

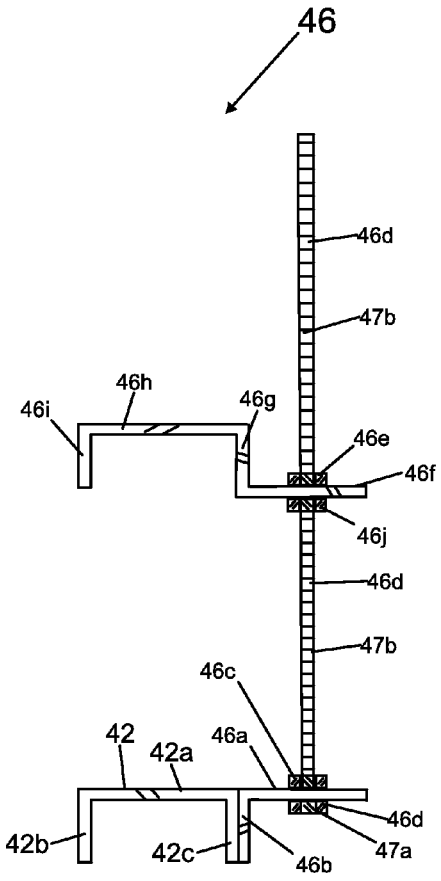
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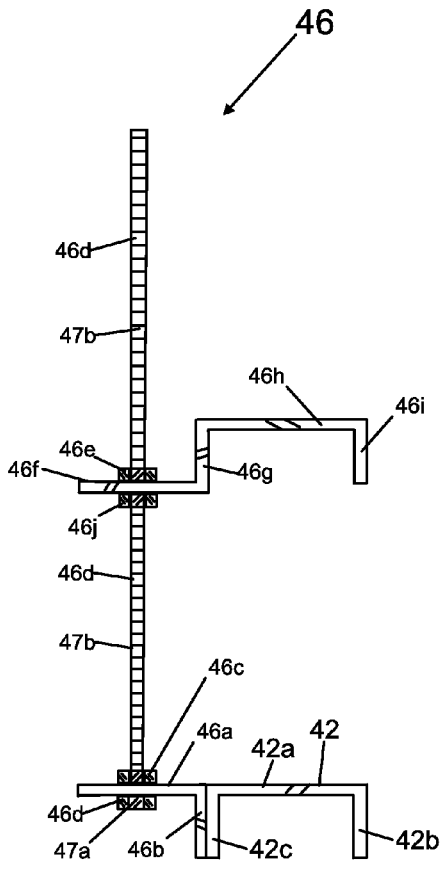
Fig. 5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METHOD AND APPARATUS FOR FIXING AND CONSTRUCTING FENCES

FIELD OF THE INVENTION

[0001] This invention relates to methods and apparatus concerning fixing and constructing fences, railings, and other assemblies typically involving horizontal and vertical members.

BACKGROUND OF THE INVENTION

[0002] There are various devices and methods known for fixing and constructing fences, railings and other assemblies.

SUMMARY OF THE INVENTION

[0003] In at least one embodiment, an overall device is provided for supporting one or more pickets of a fence in alignment at the same height, in a horizontal plane in order to replace a damaged fence picket or in order to assemble a new fence unit.

[0004] In at least one embodiment, an apparatus is provided which may include an overall device which is comprised of a first rail; a first device fixed to the first rail at a first location; and a second device fixed to the first rail at a second location spaced apart from the first location.

[0005] The first device may include means for temporarily attaching the first device to a horizontal rail of a fence. The second device may include means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence.

[0006] The means for temporarily attaching the first device to the horizontal rail of the fence and the means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence, together may cause the first rail to be temporarily suspended from the horizontal rail of the fence.

[0007] The means for temporarily attaching the first device to the horizontal rail of the fence and the means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence, together may cause the first rail to be temporarily suspended from the horizontal rail of the fence, substantially parallel to the horizontal rail of the fence.

[0008] The apparatus may include the fence.

[0009] The first device may be comprised of a U-shaped member which is configured to be temporarily attached to the horizontal rail of the fence; and the second device may be comprised of a U-shaped member which is configured to be temporarily attached to the horizontal rail of the fence, while the U-shaped member of the first device is temporarily attached to the horizontal rail of the fence.

[0010] The first device may include a first bolt which is inserted through a first plate fixed to the rail of the overall device and through a second plate fixed to the U-shaped member of the first device; and the second device may include a second bolt which is inserted through a third plate fixed to the rail of the overall device and through a fourth plate fixed to the U-shaped member of the first device. There may be a first distance between the first plate and the second plate which can be adjusted by moving the second plate along the first bolt; and there may be a second distance between the third plate and the fourth plate which can be adjusted by moving the fourth plate along the second bolt.

[0011] The first device may include first and second nuts through which the first bolt is inserted and the second plate may be between the first and second nuts and the first and second nuts may be configured to set the first distance of the second plate from the first plate. The second device may include third and fourth nuts through which the second bolt is inserted and wherein the fourth plate is between the third and fourth nuts and the third and fourth nuts may be configured to set the second distance of the fourth plate from the third plate.

[0012] In at least one embodiment, a method is provided comprising attaching an overall device to a horizontal rail of a fence, wherein the overall device may be configured as previously specified.

[0013] In at least one embodiment, in a repair operation, the method may further include aligning the first rail of the overall device with first ends of a plurality of pickets of the fence; thereafter removing a damaged picket of the plurality of pickets from a location of the fence; thereafter inserting a new picket at the location of the fence in a manner which allows the new picket to rest on the first rail; fixing the new picket to the fence at the location of the fence; and thereafter detaching the overall device from the horizontal rail of the fence.

[0014] In at least one embodiment, in an assembly operation, the method may include resting a plurality of pickets on the first rail of the overall device, so that the plurality of pickets are spaced apart and parallel to each other; thereafter, fixing the plurality of pickets to the fence at a plurality of corresponding spaced locations; and thereafter, detaching the overall device from the horizontal rail of the fence.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. **1** shows a front, top, left perspective view of an apparatus for use in accordance with an embodiment of the present invention, with the apparatus in a first state;

[0016] FIG. **2** shows a front, top, left perspective view of the apparatus of FIG. **1**, with the apparatus in a second state;

[0017] FIG. **3** shows a front, top, and left perspective view of a close-up of a portion of the apparatus of FIG. **1**;

[0018] FIG. **4** shows a left side view of a device for use with the apparatus of FIG. **1**; and

[0019] FIG. **5** shows a right side view of the device of FIG. **4**.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] FIG. **1** shows a front, top, left perspective view of an apparatus **1** for use in accordance with an embodiment of the present invention, with the apparatus **1** in a first state. FIG. **2** shows a front, top, left perspective view of the apparatus **1** of FIG. **1**, with the apparatus **1** in a second state. FIG. **3** shows a front, top, and left perspective view of a close-up of a portion of the apparatus **1**. FIG. **4** shows a left side view of a device **46** for use with the apparatus **1** of FIG. **1**. FIG. **5** shows a right side view of the device **46** of FIG. **4**. The apparatus **1** includes a fence **2**, and a device **40**. The device **40** may be called an overall device and includes rail **42** and devices **44** and **46**. Devices **44** and **46** may be called first and second devices, respectively.

[0021] The fence **2** may be, or may be replaced by any type of known fence. The fence **2** may include a plurality of

pickets or vertical bars or members, including pickets **8**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24**, **26**, **28**, **30**, and **32**. The fence **2** may further include a plurality of rails or horizontal bars or members, including rails **34**, **36**, and **38**. The fence **2** may further include a plurality of posts, such as posts **4** and **6**.

[0022] Each picket, of pickets **8**, **10**, **12**, **14**, **16**, **18**, **20**, **22**, **24**, **26**, **28**, **30**, and **32** is shown inserted through one opening in rail **34**, one opening in rail **36**, and one opening in rail **38** in FIGS. **1** and **2**. For example, picket **30** is shown inserted in opening **34***b*, **36***b*, and **38***b* in FIGS. **1** and **2**; and picket **32** is shown inserted in opening **34***a*, **36***a*, and **38***a* in FIGS. **1** and **2**.

[0023] In FIG. **1**, all of the pickets **8-32** are inserted so that an end of each picket contacts and sits on a rail **42** of the device **40**. The rail **42**, in at least one embodiment, keeps the pickets **8-32** aligned with each other so that all of the pickets **8-32** are at the same height in FIG. **1**. While the weight of the pickets **8-32** is supported by the rail **42**, the pickets **8-32** can be fixed to the rails **34**, **36**, and **38**, such as by nails, screws, or in any other known manner, such as by locking strips or wire rods such as shown in U.S. patent application Ser. Nos. 14/505,901 and 14/855,457, both titled "Method and Apparatus for Construction When Vertical and Horizontal Members are Used", which are both incorporated herein by reference in their entirety. Thus the rail **42** of the device **40** maintains the pickets **8-32** in an even and aligned state, while the pickets **8-32** are being attached to rails **34-36**.

[0024] In FIG. **1**, the rails **34**, **36**, and **38** have first ends which are inserted into openings **6***a*, **6***b*, and **6***c*, respectively, of the post **6**. The first ends of the rails **34**, **36**, and **38** may be fixed to the post **6**, such as by nails, screws, or in any known manner. Similarly, or identically, the rails **34**, **36**, and **38** have second ends, which are opposite the first ends, which are inserted into openings **2***a*, **2***b*, and **2***c*, respectively, of the post **2**. The second ends of the rails **34**, **36**, and **38** may be fixed to the post **2**, such as by nails, screws, or in any known manner. The rails **34**, **36**, and **38** may also be fixed to posts **2** and **6** using brackets not shown.

[0025] The device **40** includes devices **44** and **46**, in addition to rail **42**. The devices **44** and **46** may be similar and/or identical, in at least one embodiment. Referring to FIGS. **3** and **4**, the device **46** includes member or plates **46***a* and **46***b*, nut **46***c*, bolt **46***d*, nut **46***e*, member or plate **46***f*, member or plate **46***g*, member or plate **46***h*, member or plate **46***i*, and nut **46***j*. Similarly or identically, the device **44** shown in FIGS. **1** and **2**, includes member or plates **44***a* and **44***b*, nut **44***c*, bolt **44***d*, nut **44***e*, member or plate **44***f*, member or plate **44***g*, member or plate **44***h*, and member or plate **44***i*, and a corresponding nut, not shown, similar or identical to nut **46***j* for the device **44**. The nuts **46***c*, **46***e*, and **46***j* may be or may be replaced by wing nuts. The bolt **46***d* includes a bolt head **47***a* and a bolt body portion **47***b*. The bolt body portion **47***b*, in at least one embodiment has outer threads. Similarly or identically, the bolt **44***d* includes a bolt head not shown corresponding to bolt head **47***a* and a bolt body portion, where the bolt **44***d* is identified in FIG. **1**. The bolt body portion of bolt **44***d*, in at least one embodiment, has outer threads.

[0026] The rail **42** may be welded or otherwise fixed to member or plate **46***b* as shown in FIG. **4** and FIG. **5**. Similarly, the rail **42** may be welded or otherwise fixed to member or plate **44***b* as shown in FIG. **1**. The members **46***g*, **46***h*, and **46***i*, form a U-shaped member or plate which can be temporarily attached to the rail **38** as shown in FIG. **1**. Similarly, the members **44***g*, **44***h*, and **44***i*, form a U-shaped member or plate which can be temporarily attached to the rail **38** as also shown in FIG. **1**. With the U-shaped member (including plates **46***g-l*) and the U-shaped member (including plates **44***g-l*) attached as in FIG. **1**, the rail **42** of the device **40** sits under the rail **38** so that pickets **8-32** contact and rest on the rail **42**.

[0027] The spacing between the plate or member **46***h* and the plate or member **42***a* of rail **42** can be adjusted by adjusting the locations of nuts **46***e* and **46***j*. Typically the location of nut **46***c* will be situated to press against plate **46***a* to hold the plate **46***a* tightly against bold head **47***a*. The nuts **46***e* and **46***j* can be rotated on the outer threads of the bolt body portion **47***b* to adjust the vertical spacing between the plate **46***h* and the plate **42***a*, so that the height of the pickets **8-32** can be adjusted.

[0028] The spacing between the plate or member **44***h* and the plate or member **42***a* of the rail **42** can be adjusted by adjusting the locations of nuts **44***e* and a nut, not shown, which would be identical to nut **46***j*, but for device **44**. Usually spacing between the plates **46***h* and **42***a* will be equal to the spacing between the plates **44***h* and **42***a*, so that the rail **42** will be parallel to the rail **38** from which it is suspended.

[0029] In operation, a picket, such as picket **22**, shown in FIG. **2**, may be slid upward in the direction D**1**. The picket **22** may be thereafter removed, such as when the picket **22** is damaged. The picket **22** may be replaced with another picket, which is not damaged and which may be identical to the other pickets, such as picket **24**. The new picket may be slid into the openings **34***c*, **36***c*, and **38***c*, until one end of the new picket rests on the rail **42**. The new picket may thereafter be fixed to rails **34**, **36**, and **38** so that the first end resting on the rail **42** is even with first ends of all of the other pickets of **8-32** (not including removed damaged picket) and so that second ends of all the inserted pickets opposite the first ends, are also even in a straight line.

[0030] After all pickets of **8-32** (not including damaged picket **22**) and the new picket are attached, the U-shaped member (including **46***g*, **46***h*, and **46***i*) can be taken off of rail **38** and the U-shaped member (including **44***g*, **44***h*, and **44***i*) can be also taken off of rail **38**.

[0031] In FIG. **1** and FIG. **2**, the posts **6** and **2** are shown inserted into holes in a ground surface **50**. The ground surface **50** may be comprised of dirt, concrete, or some other known material, or some combination thereof.

[0032] The pickets **8-32**, the rails or railings **34**, **36**, and **38**, and the posts **2** and **6** may be made entirely or partially out of any known fence materials, such as wood, aluminum, or vinyl. The rail **42** of the device **40**, the plates **46***f*, **46***g*, **46***h*, **46***i*, **46***b*, and **46***a*, and the plates **44***f*, **44***g*, **44***h*, **44***i*, **44***b*, and **44***a* may be made out of rigid metal such as aluminum or any other rigid material such as a rigid metal or wood material. The bolts **46***d* and **44***d* may be made out of rigid metal and the nuts **46***e*, **46***j*, and **46***c*, and corresponding nuts **44***e*, a nut not shown corresponding to nut **46***j* but for device **44**, and nut **44***c*, may be made out of a rigid metal.

[0033] In at least one embodiment, the overall device **40** is provided for supporting one or more pickets **8-32** of a fence in alignment at the same height, in a horizontal plane, through use of rail or railing **42** in order to replace a damaged fence picket or in order to assemble a new fence unit.

[0034] In at least one embodiment, in a repair operation, a method is provided which may include temporarily attaching the overall device **40** in the manner shown in FIGS. **1** and **2**, thereafter aligning the first rail **42** of the overall device **40** with first ends of a plurality of pickets **8-32** of the fence; thereafter removing a damaged picket, such as picket **22** shown in FIG. **2** of the plurality of pickets **8-32** from a location of the fence (the fence including posts **4** and **6**, and rails **34**, **36**, and **38**); thereafter inserting a new picket, not shown, at the location of the fence, where the old picket **22** was, in a manner which allows the new picket to rest on the first rail **42** of the overall device **40**; fixing the new picket, not shown, but similar or identical to any of pickets **8-32**, to the fence, such as to rails **34**, **36**, and **38**, at the location of the fence; and thereafter detaching the overall device **40**, and devices **44** and **46** from the horizontal rail **38** of the fence.

[0035] In at least one embodiment, in an assembly operation, the method may include resting a plurality of pickets, such as **8-32** on the first rail **42** of the overall device **40**, so that the plurality of pickets **8-32** are spaced apart and parallel to each other, as in FIG. **1**, thereafter, fixing the plurality of pickets, such as **8-32** to the fence, at a plurality of corresponding spaced locations as shown in FIG. **1**; and thereafter, detaching the overall device **40**, and devices **44** and **46**, from the horizontal rail **38** of the fence.

[0036] The fence posts **2** and **6** may be any type of fence posts, such as eight foot long, and four inch by four inch cross section (width by depth) fence posts. The rails **34**, **36**, and **38** may be any type of fence rails, such as eight foot long and two inch by one inch cross section (width by depth) rails. The pickets may be any type of fence pickets, such as five feet long and one inch by one inch cross section (width by depth) pickets.

[0037] One or more embodiments of the present invention can be used in any existing fencing, railing or other system, typically involving horizontal and vertical members.

[0038] Although the invention has been described by reference to particular illustrative embodiments thereof, many changes and modifications of the invention may become apparent to those skilled in the art without departing from the spirit and scope of the invention. It is therefore intended to include within this patent all such changes and modifications as may reasonably and properly be included within the scope of the present invention's contribution to the art.

1. An apparatus comprising:
an overall device which is comprised of:
a first rail;
a first device fixed to the first rail at a first location;
a second device fixed to the first rail at a second location spaced apart from the first location;
wherein the first device includes means for temporarily attaching the first device to a horizontal rail of a fence;
wherein the second device includes means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence; and
wherein the means for temporarily attaching the first device to the horizontal rail of the fence and the means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence, together cause the first rail to be temporarily suspended beneath the horizontal rail of the fence.

2. The apparatus of claim **1** wherein
the means for temporarily attaching the first device to the horizontal rail of the fence and the means for temporarily attaching the second device to the horizontal rail of the fence while the first device is temporarily attached to the horizontal rail of the fence, together cause the first rail to be temporarily suspended from the horizontal rail of the fence, substantially parallel to the horizontal rail of the fence.

3. The apparatus of claim **1** further comprising the fence.

4. The apparatus of claim **1** wherein
the first device is comprised of a U-shaped member which is configured to be temporarily attached to the horizontal rail of the fence;
and the second device is comprised of a U-shaped member which is configured to be temporarily attached to the horizontal rail of the fence, while the U-shaped member of the first device is temporarily attached to the horizontal rail of the fence.

5. The apparatus of claim **4** wherein
the first device includes a first bolt which is inserted through a first plate fixed to the rail of the overall device and through a second plate fixed to the U-shaped member of the first device;
wherein the second device includes a second bolt which is inserted through a third plate fixed to the rail of the overall device and through a fourth plate fixed to the U-shaped member of the first device;
wherein a first distance between the first plate and the second plate can be adjusted by moving the second plate along the first bolt; and
wherein a second distance between the third plate and the fourth plate can be adjusted by moving the fourth plate along the second bolt.

6. The apparatus of claim **5** wherein
the first device includes first and second nuts through which the first bolt is inserted and wherein the second plate is between the first and second nuts and the first and second nuts are configured to set the first distance of the second plate from the first plate;
and wherein the second device includes third and fourth nuts through which the second bolt is inserted and wherein the fourth plate is between the third and fourth nuts and the third and fourth nuts are configured to set the second distance of the fourth plate from the third plate.

7-14. (canceled)

15. An apparatus for constructing a fence comprising:
an alignment rail; and
a first device attached to the alignment rail and having a first attachment member disposed a first distance from the alignment rail, the first attachment member defining a channel that opens in a direction toward the alignment rail and is configured to receive a horizontal rail of the fence therein such that when the horizontal rail of the fence is received within the channel, the alignment rail is temporarily suspended beneath the horizontal rail.

16. The apparatus of claim **15**, further comprising a second device attached to the alignment rail at a location offset from the first attachment member along the length of the alignment rail, and wherein the second device includes a second attachment member that is disposed a second distance from the alignment rail and that defines a channel

that opens in a direction toward the alignment rail which is configured to receive the horizontal rail of the fence therein.

17. The apparatus of claim **16**, wherein the first and second distances are substantially equal.

18. The apparatus of claim **15**, wherein the alignment rail defines a planar surface which faces an opening of the first attachment member.

19. The apparatus of claim **15**, wherein the first attachment member is adjustably attached to the alignment rail via an adjustment member extending between the alignment rail and first attachment member.

20. The apparatus of claim **19**, wherein the adjustment member is a threaded shaft.

21. The apparatus of claim **15**, wherein the first attachment member includes a first portion, a second portion, and an intermediate portion that extends between the first and second portions, and each of the intermediate portion and first and second portions partially define the channel.

22. The apparatus of claim **21**, wherein the first and second portions intersect the intermediate portion so as to extend downwardly therefrom and so that when the horizontal rail of the fence is received within the channel, the intermediate portion rests on a top surface of the horizontal rail and the first and second portions extend along opposite sides of the horizontal rail so as to restrict movement of the first attachment member relative to the horizontal rail.

23. A method of constructing a fence comprising:

placing a first attachment member of a first device of a fence construction apparatus onto a horizontal rail of a fence such that the horizontal rail of the fence is received within a channel defined by the first attachment member and such that an alignment rail of the fence construction apparatus which is attached to the first device is suspended beneath the horizontal rail;

contacting the alignment rail with a bottom end of a first picket; and

attaching the first picket to the horizontal rail of the fence.

24. The method of claim **23**, further comprising placing a second attachment member of a second device of the fence construction apparatus onto the horizontal rail of a fence such that the horizontal rail of the fence is received within a channel defined by the second attachment member, the second device being attached to the alignment rail offset from the first device.

25. The method of claim **23**, further comprising passing the bottom end of the first picket through an opening in the horizontal rail of the fence.

26. The method of claim **23**, further comprising:

contacting the alignment rail with a bottom end of a second picket offset from the first picket so that the bottom end of the second picket is aligned with the bottom end of the first picket, and

attaching the second picket to the horizontal rail of the fence.

27. The method of claim **23**, further comprising adjusting a distance between the first attachment member and alignment rail.

28. The method of claim **27**, wherein adjusting includes rotating a nut coupled to a threaded shaft attaching the alignment rail and first attachment member.

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