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(54) **DEMOUNTABLE ENCLOSURES**

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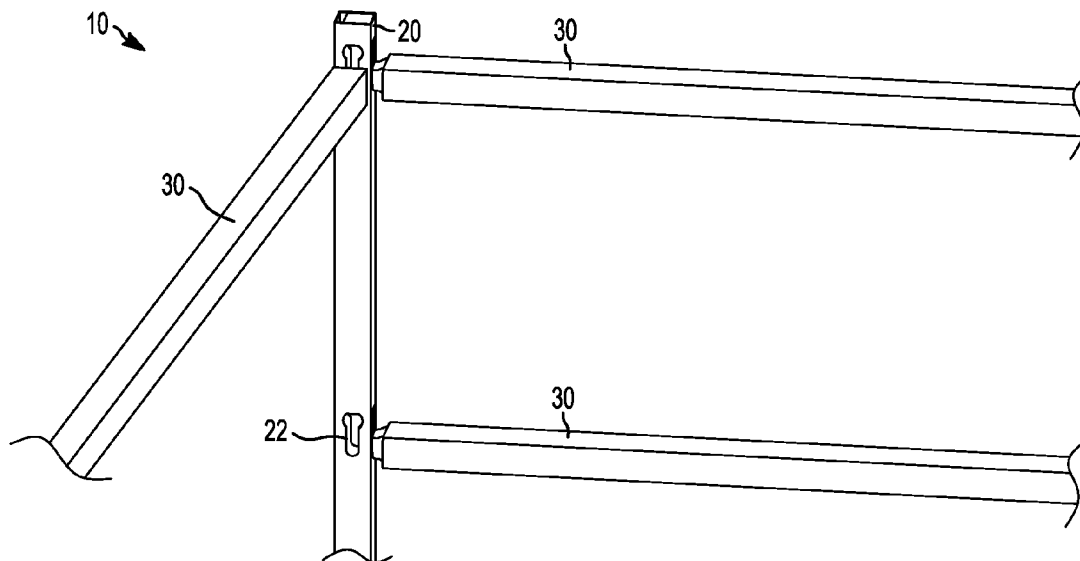
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(57) **ABSTRACT**

An end section for a rail which is engageable with a post having a slot. The end section is so arranged that in one orientation the end section is releasable from a slot of the post, and when rotated to a second orientation, the end section is in a locked position and cannot be released from the slot of the post. The end section may be fastened, or otherwise attached to a rail and used in a demountable enclosure or support structure having at least two posts. Each post of the demountable enclosure or support structure has at least one slot for receiving a rail and the at least one rail is releasably mountable between an adjacent pair of the posts. The end section of the rail is engageable in a slot provided in one of the adjacent posts, and each slot is complementary, at least in part, to the end section of a rail. Each rail, when mounted to an adjacent post, is moveable between a locked position and an unlocked position by rotation of the respective rail.



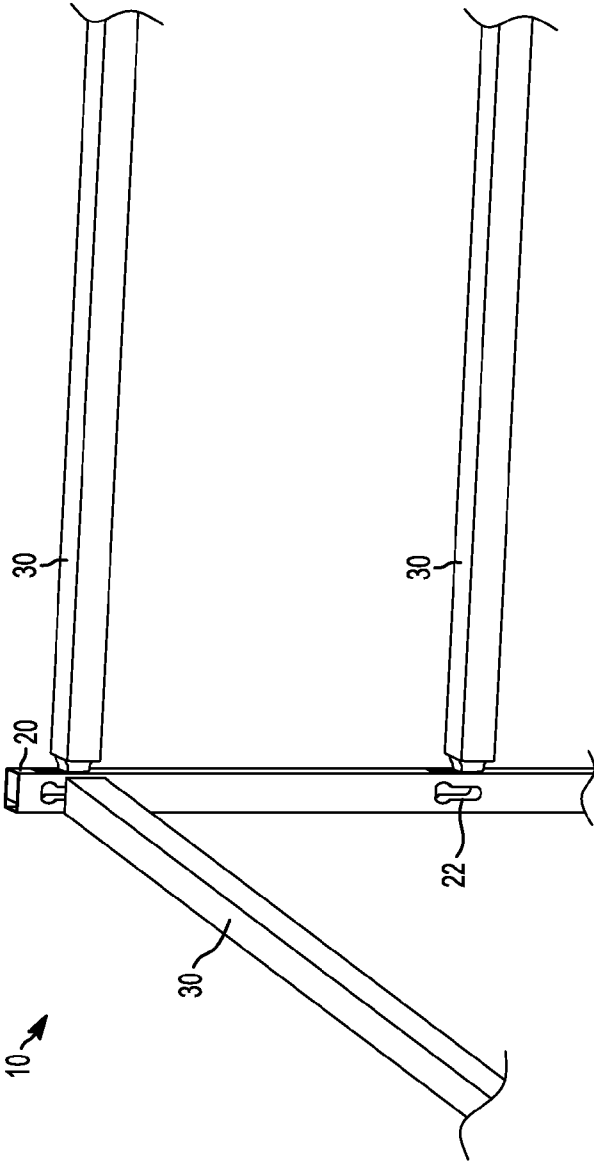


FIG. 1

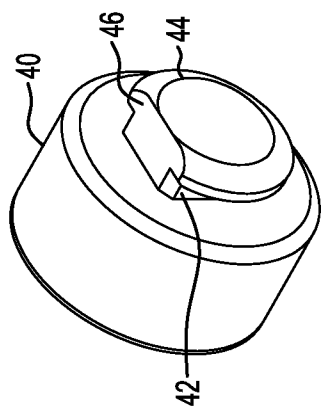


FIG. 2b

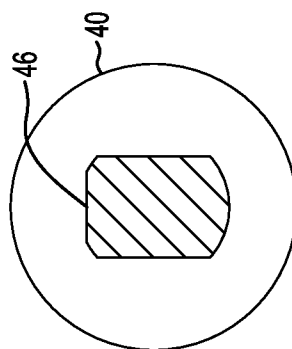


FIG. 2c

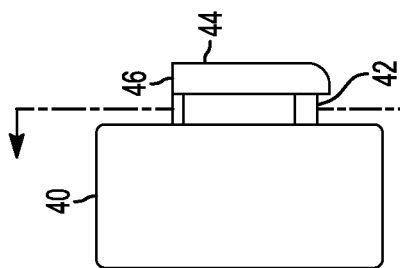


FIG. 2a

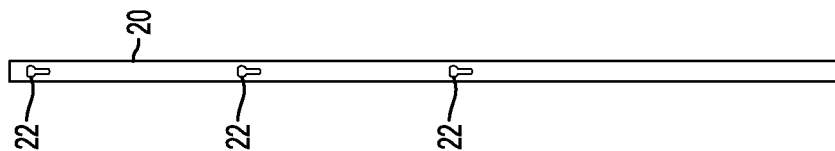


FIG. 3a

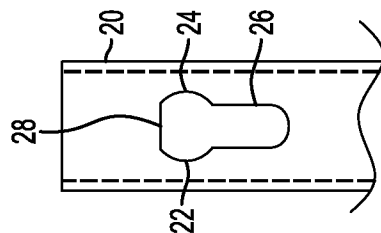


FIG. 3b

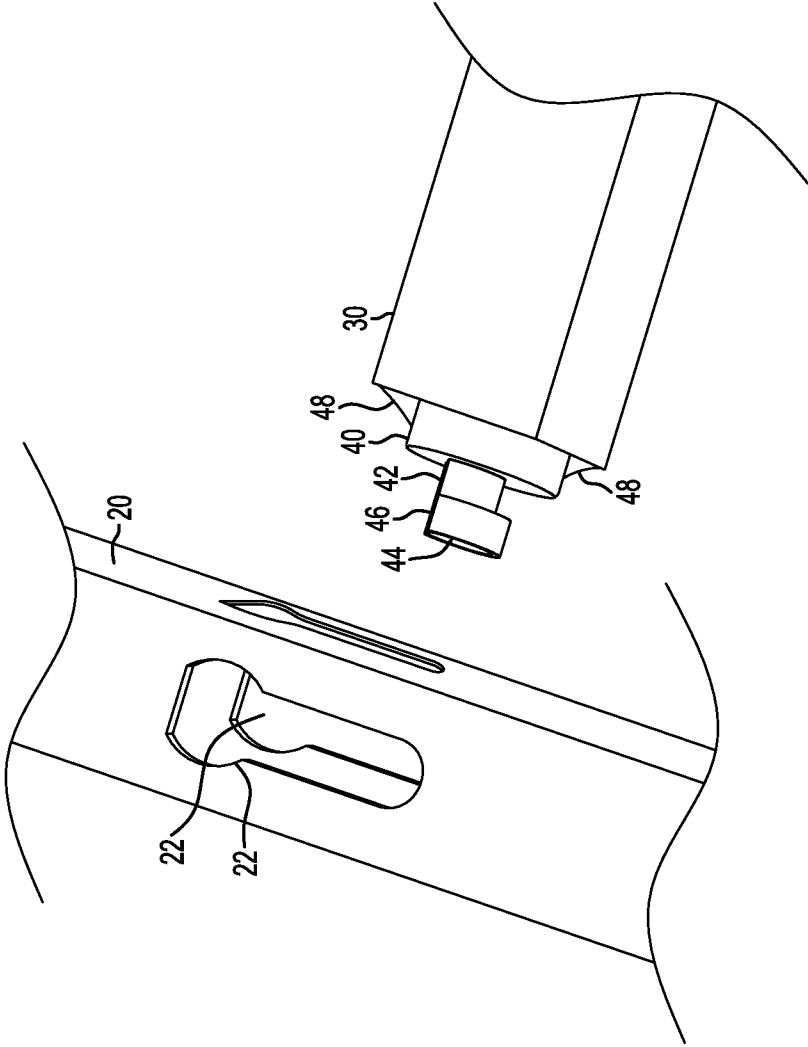


FIG. 4

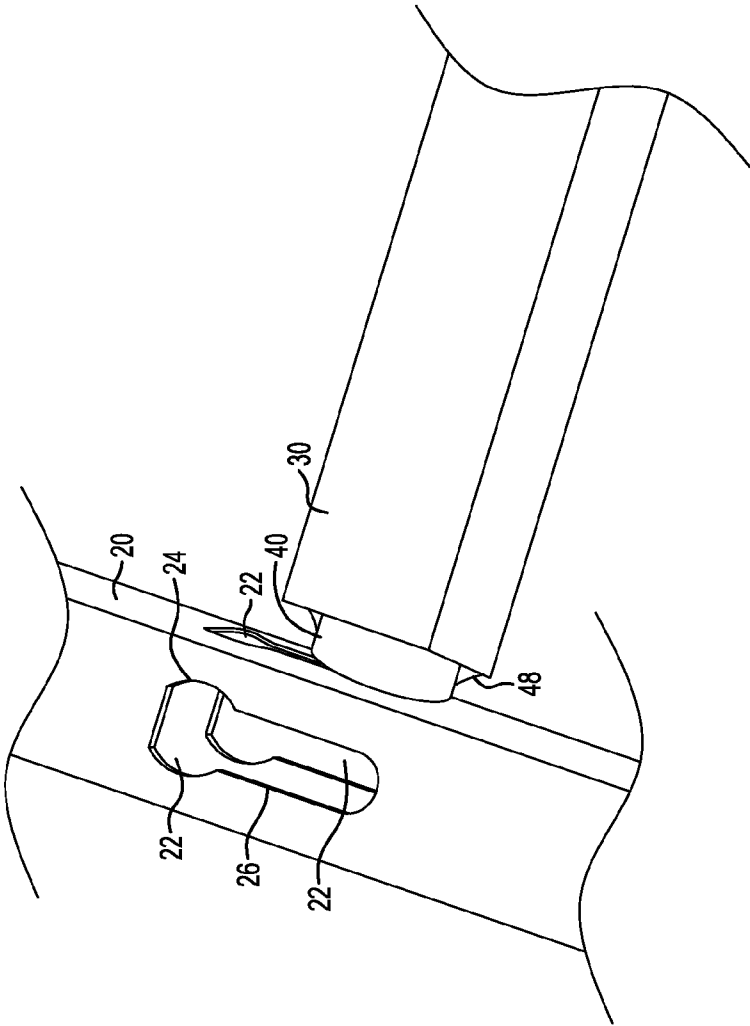


FIG. 5

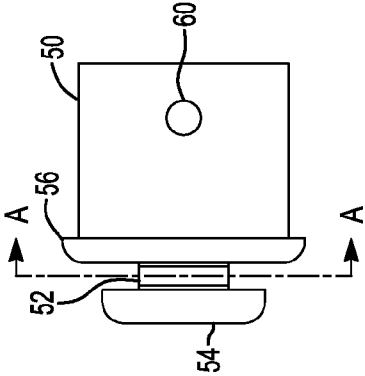


FIG. 6b

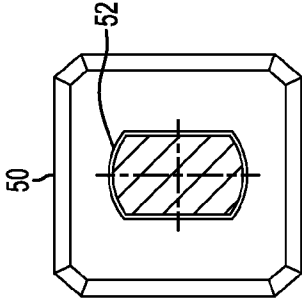


FIG. 6d

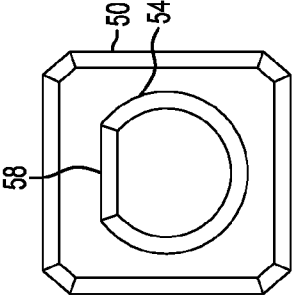


FIG. 6a

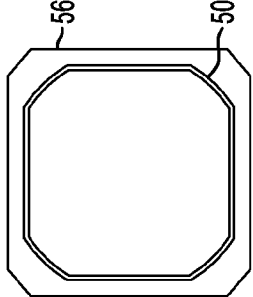


FIG. 6c

DEMOUNTABLE ENCLOSURES

FIELD OF THE INVENTION

[0001] The present invention relates to demountable enclosures or support structures. The invention is particularly suitable for, but not limited to, demountable enclosures for the confinement of animals such as horses and cattle.

BACKGROUND TO THE INVENTION

[0002] There is often a need to confine animals such as horses and cattle in temporary or semi-permanent enclosures, for example, at competitive events such as camp drafting, equestrian, show jumping, and rodeos.

[0003] Large fencing panels are often transported to event sites and assembled into an enclosure or support structure of suitable size. Such fencing panels are heavy, bulky and often difficult to assemble. The panels are generally large and therefore take up a considerable amount of space on a vehicle.

[0004] Electric fences are also used to confine animals to a certain area. These fences may not physically restrain the animal, but rather provide a psychological or virtual barrier. Such fences can be ineffective because a stressed or startled animal can run through the fence, potentially causing damage to itself and its surroundings. Another disadvantage of electric fences is that the entire fence can be disabled due to a break in a conducting wire or during a power failure. Further, members of the general public could be shocked or injured as a result of accidentally coming into contact with the electric fence.

[0005] The reference to any prior art in this specification is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

OBJECTS OF THE INVENTION

[0006] It is an object of the present invention to overcome or at least alleviate one or more of the above described disadvantages of the prior art, or to provide the consumer with a useful commercial choice.

[0007] It is a preferred object of the present invention to provide a demountable enclosure or support structure which can be easily transported, assembled and disassembled.

SUMMARY OF THE INVENTION

[0008] Throughout the specification, the terms “rotating” and “lowering” shall be taken to include the opposite i.e. “lowering” and “rotating”. Similarly, “raising” and “rotating” should be taken to also include “rotating” and “raising”. The phrase “complementary, at least in part” shall be taken to mean at least part of the recited feature, for example the head, matches at least part of another recited feature, for example a slot.

[0009] In one aspect, although it need not be the only or indeed the broadest aspect, the invention resides in an end section for a rail which is engageable with a post having a slot, the end section being so arranged that in one orientation the end section is releasable from a slot of the post; and when rotated to a second orientation, the end section is in a locked position and cannot be released from the slot of the post.

[0010] The end section may be integrally formed with a rail, or be manufactured as a separate piece which can be welded, or otherwise fastened, to one end of a body of the rail.

[0011] In a second aspect, the invention resides in a demountable enclosure or support structure, including:

[0012] at least one post with at least one slot; and

[0013] at least one rail releasably mountable to the post;

[0014] wherein, the rail includes at least one end section which is engageable in a complementary slot in the post; and

[0015] wherein the rail is moveable between a locked position and an unlocked position.

[0016] In a third aspect, the invention resides in a demountable enclosure or support structure, including:

[0017] a plurality of posts, each post having one or more slots;

[0018] wherein adjacent posts are connected by a plurality of rails, each rail engageable in complementary slots in the posts; and

[0019] wherein the rails are releasably mountable to the posts and each rail is moveable between a locked and an unlocked position.

[0020] Preferably, each rail has a body interconnecting respective end sections, each end section having a neck and a head, wherein the shape of the head is complementary, at least in part, to the shape of the slot in the post.

[0021] Preferably, each slot in each post is of regular or irregular shape. The regular shapes may include triangles, rectangles, pentagons, or other polygonal shapes, ellipses, stars, crosses, and the like. The irregular shapes may include keyhole shapes, arrows, zigzag shapes, and the like.

[0022] In a preferred form, the slots in the posts are keyhole shaped with an enlarged portion above an elongated portion. Preferably, the slots have a planar section at the top of the enlarged portion.

[0023] Preferably, the head of the end section of each rail is substantially circular with a planar top. The planar top on the head preferably corresponds to the planar section on the slots of the posts. The dimensions of the head are preferably slightly less than the dimensions of the enlarged portion of the keyhole shaped slots of the posts, such that the head is receivable in a slot.

[0024] The width of the neck of each end section of each rail is preferably slightly less than the width of the elongated portion of the keyhole shaped slots of the posts. Preferably, the height of the neck is greater than the width of the elongated portion of the keyhole shaped slots of the posts.

[0025] Preferably, the end section of the rail is receivable in the body of the rail. In a preferred form, the head of the end section includes a flange and the body of the rail abuts the flange when it is pushed over the end section.

[0026] Preferably, the end section includes an aperture which corresponds with an aperture in the body of the rail, for securing the end section to the body of the rail.

[0027] In use, a rail is moved into a locked position by inserting the head of the end section into the enlarged portion of a slot of a post, rotating the rail, and lowering the rail toward the elongated portion of the slot. Preferably, the rail is rotated approximately 180 degrees. The rail can then be moved into an unlocked position by raising the rail towards the enlarged portion of the slot of the post and then rotating the rail, preferably 180 degrees. The rail can be released from the post when the planar top on the head of the rail is aligned with the planer section on the enlarged portion of the slot of the post.

[0028] Preferably, each rail is telescopic, or otherwise adjustable, in length.

[0029] Preferably, each rail includes a spring loaded button which, when pushed, allows the rail to be adjusted in length.

[0030] Preferably, each post and rail is comprised of square hollow tubing. However, persons skilled in the art would appreciate that the posts and rails may be of other suitable shapes, including rectangular or circular. The posts and rails may also be of solid construction, with recesses in the body of the posts associated with the slots.

[0031] Preferably, the end sections of the posts are circular. In another preferred form, the end sections are substantially square.

[0032] Suitably, each post may have one or more slots on one or more sides of the post for connecting multiple rails.

[0033] In a fourth aspect, the invention resides in a method of connecting a rail to a post, including the steps of:

[0034] inserting an end section of a rail into a slot in a post; and

[0035] rotating the rail, optionally through 180 degrees, and lowering the rail, such that the end section is in a locked position;

[0036] wherein the rail cannot be released from the post when in the locked position; and

[0037] wherein the rail can be moved to an unlocked position and thereby released from the post by raising and rotating the rail, optionally through 180 degrees.

[0038] Further features and advantages of the present invention will become apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] To assist in the understanding of the invention, and to enable a person skilled in the art to put the invention into practical effect, preferred embodiments of the invention will be described by way of examples only, with reference to the accompanying drawings, in which:

[0040] FIG. 1 is a perspective view of a portion of an assembled enclosure or support structure according to the present invention;

[0041] FIGS. 2a, 2b and 2c are respective side, isometric, and sectional views of an end section of a rail for an enclosure or support structure;

[0042] FIG. 3a is a side view of a post for an enclosure or support structure;

[0043] FIG. 3b is enlarged side view of the post of FIG. 3a;

[0044] FIG. 4 is a perspective view of a post and a rail;

[0045] FIG. 5 is a perspective view of the post and rail of FIG. 4 when connected; and

[0046] FIGS. 6a, 6b, 6c and 6d are respective front, side, rear and sectional views of an alternative embodiment of an end section of a rail.

DETAILED DESCRIPTION OF THE INVENTION

[0047] Embodiments of the invention are illustrated in concise outline form in the drawings, showing only those specific details that are necessary for understanding the embodiments of the present invention, but so as not to obscure the disclosure with excessive detail that will be readily apparent to those of ordinary skill in the art in light having the benefit of the present description.

[0048] In this patent specification, adjectives such as first and second, left and right, front and back, top and bottom, etc., are used solely to distinguish one element from another element without necessarily requiring a specific relative posi-

tion or order. Words such as “comprises” or “includes” are not used to define an exclusive set of elements. Rather, such words merely define a minimum set of elements included in a particular embodiment of the present invention. It will be appreciated that the invention may be implemented in a variety of ways, and that this description is given by way of example only.

[0049] Referring to FIG. 1, there is shown a portion of an assembled enclosure or support structure 10 according to the present invention. One post 20 of the enclosure or support structure 10 is shown and three rails 30 are connected to two sides of the post 20. The post contains slots 22 for receiving the rails 30. Although not shown in this figure, the rails 30 in this example are telescopic with a spring loaded button. When the spring loaded button is pushed, the rail 30 slides into itself which allows for easy storage.

[0050] In this example, the post 20 and the rails 30 of the enclosure or support structure 10 are formed from square hollow tubing. However, persons skilled in the art would appreciate that the post and rails of the enclosure or support structure may be of other suitable shapes, including rectangular or circular.

[0051] FIG. 2a shows a side view of an end section 40 of a rail (not shown). As shown in FIGS. 2b and 2c, the end section 40 in this example is substantially circular. Attached to the end section 40 are a neck 42 and a head 44. The dimensions and shape of the neck 42 and head 44 is largely dependent on the dimensions and shape of the slots 22 of the posts 20, and vice versa.

[0052] In this embodiment, the head 44 is largely circular with a planar top 46. This shape is complementary, at least in part, to the shape of the enlarged portion 26 of the slot 22 of a support structure, such as a post 20 (shown in FIGS. 3a and 3b).

[0053] The end section 40 in this embodiment is manufactured as a separate piece which is fastened, for example by welding, to one end of the body of the rail. However, persons skilled in the art would appreciate that the end section 40 could be integrally formed with a rail.

[0054] FIG. 3a shows a side view of a post 20 having three slots 22 in one side of the post 20. An enlarged view of one of the slots 22 of the post 20 is provided in FIG. 3b. In this example, the slot 22 is keyhole shaped with an enlarged portion 24 located above an elongated portion 26. The enlarged portion 24 of the slot 22 is adapted to receive a head 44 of an end section 40 of a rail 30. In a preferred embodiment, the enlarged portion 24 of the slot 22 is substantially circular with a planar portion 28 at the top. However, persons skilled in the art would appreciate that the shape of the slot 22 could be of any suitable size and shape.

[0055] In use, the posts 20 are mounted substantially vertically by affixing the bottom of the posts 20 to the ground by suitable means. The posts 20 may have bases for added stability. Such bases may be secured to the ground by way of tent pegs or other means. Further, the posts 20 may have reinforcing elements, such as a metal plate, attached to the post to stabilize the enclosure or support structure 10. For example, the post 20 may have a triangular metal plate protruding from one or more sides. When the enclosure or support structure 10 is assembled, the rail 30 may rest on one side of the metal plate for added stability.

[0056] FIG. 4 shows an enlarged view of a section of a post 20 and a rail 30 of the enclosure or support structure 10. The rail 30 has an end section 40 which includes a neck 42 and a

head 44. The end section 40 of the rail 30 is sized and shaped so as to fit in the enlarged portion 24 of the slot 22 of the post 20. It is clear from this figure that the post 20 has slots 22 in three sides of the post 20, for connecting with three rails 30. Persons skilled in the art would appreciate that the post 20 could have slots 22 in two sides of the post 20, or in all four sides. In this embodiment, the end section 40 of the rail 30 has been welded to the body of the rail 30. Numeral 48 denotes the welding points. Persons skilled in the art will appreciate that the end section may be fastened to the rail by other suitable means, for example by brazing, using locking pins, or crimping the rail.

[0057] Referring to FIG. 5, there is shown a perspective view of a section of a rail 30 connected to a post 20. In this example, the head 44 of the end section 40 of the rail 30 has been inserted into the enlarged portion 24 of the slot 22 of the post 20. The rail 30 has then been rotated, by approximately 180 degrees, and lowered towards the bottom of the elongated portion 26 of the slot 22. In this arrangement, the neck 42 abuts the bottom of the elongated portion 26 of the slot 22, and the head 44 of the rail 30 abuts an inner wall of the post 20. The planar top 46 of the head 44 now faces downward i.e. in the opposite orientation to the planar portion 28 of the slot 22.

[0058] It will be appreciated that the width of the head 44 is greater than the width of the elongated portion 26 of the slot 22 to prevent the head 44, and therefore the rail 30, from being removed from the post 30 via the elongated portion 26 of the slot 20. Ideally, the width of the neck 42 is slightly less than the width of the elongated portion 26 of the keyhole shaped slots 22 of the posts 20, to enable the neck 42 to fit into the elongated portion 26 of the slot 22, when the rail 30 is lowered. However, the height of the neck 42 is greater than the width of the elongated portion 26 of the keyhole shaped slots 22 of the posts 20 (shown in FIGS. 3 to 5), so that once the neck is lowered into the elongated portion 26 of the slot 22, the end section 40 cannot be rotated and the rail 30 is now in the locked position. The rail 20 remains in locked position until it is raised to the enlarged portion 24 of the slot 22, and then rotated by approximately 180 degrees. This rotation aligns the planar top 46 of the head 44 with the planar portion 28 of the enlarged portion 24 of the slot 22. In this orientation, the rail 30 is in the unlocked position, and the rail 30 can be removed from the post 20.

[0059] In the embodiment shown in FIG. 5, the post 20 is made from square hollow tubing. However, persons skilled in the art would appreciate that the posts 20 may be of other suitable shapes, for example circular. The posts 20 could even be solid with recesses rather than slots 22, for connection with the rails 30.

[0060] FIGS. 6a to 6d show an alternative embodiment of an end section 50 of a rail 30. In this embodiment, the end section 50 is substantially square. Attached to the end section 50 are a neck 52 and a head 54 with a planar top 58, similar to that shown in FIG. 2a. The shape of the head 54 is complementary, at least in part, to the shape of the enlarged portion 24 of the slot 22 in a support structure, such as a post 20 (shown in FIGS. 3a and 3b). The end section 50 can be received in, and fastened to, the body of a rail 30 (not shown), which may be formed from square hollow tubing.

[0061] For fastening purposes, the end section 50 in this embodiment includes an aperture 60 which corresponds with an aperture on the rail 30 (not shown). In use, the body of the rail 30 is pushed over the end section 50 so that the apertures are aligned. The end section 50 can then be fastened to the

body of the rail 30 by inserting a roll pin, dowel or other suitable fastener into the apertures. As shown in FIGS. 6b and 6c, the end section 50 also includes a flange 56, which abuts the body of the rail 30 once the end section 50 is received in the rail 30.

[0062] As discussed in relation to FIG. 5, the width of the neck 52 is slightly less than the width of the elongated portion 26 of the slot 22 of the post 20, so that the neck 52 can fit into the elongated portion 26, when the rail 30 is lowered. However, the height of the neck 52 is greater than the width of the elongated portion 26 of the slot 22 to prevent translational movement of the rail 30 when it is in the locked position.

[0063] In operational use, the head 44, 54 of an end section 40, 50 of a rail 30 is inserted into the enlarged portion 24 of a slot 22 of a support structure, such as a post 20. The rail 30 is then moved to the locked position by rotating the rail 30, preferably through 180 degrees, and lowering the rail 30 towards the bottom of the elongated portion 26 of the slot 22 of the post 20. In this position, the head 44, 54 of the end section 40, 50 abuts an inner wall of the post 20 and the neck 42, 52 of the end section 40, 50 abuts the bottom of the elongated portion 24 of the slot 22 of the post 20. As described in relation to FIGS. 2a to 2c and FIG. 6a, the head 44, 54 of the end section 40, 50, in these embodiments, is circular with a planar top 46, 58. This shape is complementary to the shape of the enlarged portion 24 of the slot 22 of the post 20, as described in relation to FIG. 3b. Accordingly, the head 44, 54 of the end section 40, 50 of the rail 30 must be oriented with the planar top 46, 58 facing upward in order for the head 44, 54 to fit in the elongated portion 26 of the slot 22 of the post 20. Once the rail 30 is rotated and lowered, the planar top 46, 58 faces downward. Thus, if the rail 30 is vertically displaced, it cannot be released from the enlarged portion 24 of the slot 22 of the post 20 because the circular portion of the head 44 will abut an inner wall of the post 20. In order to be released from the slot 22 of the post 20, the rail 30 must be lifted and rotated, preferably through 180 degrees, thereby aligning the planar top 46, 58 of the head 44, 54 with the planar portion 28 of the slot 22 of the post 20.

[0064] Advantages of the present invention over the prior art include, but are not limited to, the compactness and portability of the demountable enclosure 10 or support structure. By way of example, approximately thirty panels comprised of two rails 30 and two posts 20 can be placed in a tool box that is 1200 mm in length, 350 mm in width and 300 mm in height. This is sufficient to assemble an enclosure 10 that is 4 metres square.

[0065] Further, the enclosure 10 or support structure is easy to assemble and disassemble. The locking feature of the rails 30 makes the enclosure 10 safe for confining animals such as horses for temporary periods. In addition, the demountable enclosure 10 is safer to use than some prior art enclosures such as electric fences. As the posts 20 of the enclosure 10 can be connected with any rail 30, the size and shape of the enclosure 10 can be selected by the user, and varied according to the type or number of animals being housed, and the available space.

[0066] The demountable enclosure 10 of the present invention could be used to confine larger animals. The enclosure 10 could also be used to confine wild or lively animals. In this application, the rails 30 and posts 20 of the enclosure 10 could be manufactured out of a heavy material such as solid metal to withstand the force of such animals. The height of the posts 20

could be increased and additional rails 30 could be added to the enclosure for greater stability.

[0067] The present invention could be used as a support structure for a variety of uses, such as for stacking pallets. The present invention could also be adapted for use as a fence, a trellis for a garden, click together shelving, scaffolding, and vet crushes. Persons skilled in the art would appreciate that the present invention could be used in many additional applications.

[0068] The above description of various embodiments of the present invention is provided for purposes of description to one of ordinary skill in the related art. It is not intended to be exhaustive or to limit the invention to a single disclosed embodiment. As mentioned above, numerous alternatives and variations to the present invention will be apparent to those skilled in the art of the above teaching. Accordingly, while some alternative embodiments have been discussed specifically, other embodiments will be apparent or relatively easily developed by those of ordinary skill in the art. Accordingly, this invention is intended to embrace all alternatives, modifications and variations of the present invention that have been discussed herein, and other embodiments that fall within the spirit and scope of the above described invention.

1. An end section for a rail, the end section being engageable with a post having a slot, the end section being so arranged that in one orientation the end section is releasable from a slot of the post; and when rotated to a second orientation, the end section is in a locked position and cannot be released from the slot of the post.

2. The end section of claim 2, wherein the end section is integrally formed with the rail, or manufactured as a separate piece and welded, or otherwise fastened, to one end the rail.

3. A demountable enclosure or support structure, including:

at least two posts, each post having at least one slot for receiving a rail;

at least one rail releasably mountable between an adjacent pair of the posts, each rail including an end section which is engageable in a slot provided in one of the adjacent posts;

wherein each slot is complementary, at least in part, to the end section of a rail; and wherein each rail, when mounted to an adjacent post, is moveable between a locked position and an unlocked position by rotation of the respective rail.

4. The demountable enclosure or support structure of claim 3, wherein each rail has a body interconnecting respective end sections, each end section having a neck and a head.

5. The demountable enclosure or support structure of claim 4, wherein the shape of the head is complementary, at least in part, to the shape of a slot in each post, such that the head is receivable in the slot when the rail is in the unlocked position.

6. The demountable enclosure or support structure of claim 4, wherein the head cannot be withdrawn from the slot when the rail is in the locked position.

7. The demountable enclosure or support structure of claim 3, wherein the rail is movable between a locked position and an unlocked position by rotational and translational movement of the rail.

8. The demountable enclosure or support structure of claim 3, wherein each slot has an enlarged portion above an elongated portion.

9. The demountable enclosure or support structure of claim 8, wherein the shape of the head is complementary to the enlarged portion of the slot, and wherein the head is of greater width than the elongated portion of the slot.

10. The demountable enclosure or support structure of claim 8 or claim 9, wherein the enlarged portion of the slot has a planar section at the top.

11. The demountable enclosure or support structure of claim 4, wherein the head is substantially circular with a planar top.

12. The demountable enclosure or support structure of claim 10, wherein the planar top of the head corresponds to the planar section in the enlarged portion of the slot.

13. The demountable enclosure or support structure of claim 8, wherein the width of the neck is less than the width of the elongated portion of the slot.

14. The demountable enclosure or support structure of claim 8, wherein the length of the neck is greater than the width of the elongated portion of the slot.

15. The demountable enclosure or support structure of claim 3, wherein each slot is substantially keyhole shaped.

16. The demountable enclosure or support structure of claim 4, wherein the end section of the rail is receivable in the body of the rail.

17. The demountable enclosure or support structure of claim 16, wherein, when the body of the rail is pushed over the end section, the body abuts a flange on the end section.

18. The demountable enclosure or support structure of claim 3, wherein the end section includes an aperture which corresponds with an aperture in the body of the rail, for securing the end section to the body of the rail.

19. The demountable enclosure or support structure of claim 3, wherein the end sections of each rail are substantially circular or substantially square in shape.

20. The demountable enclosure or support structure of claim 3, wherein each post has one or more slots on one or more sides for connecting multiple rails.

21. The demountable enclosure or support structure of claim 3, wherein each rail is telescopic, or otherwise adjustable, in length.

22. A method of connecting a rail to a post, including the steps of:

inserting an end section of a rail into a slot in a post; and rotating and lowering the rail, such that the end section is in a locked position;

wherein the rail cannot be released from the post when in the locked position; and wherein the rail can be moved to an unlocked position and thereby released from the post by raising and rotating the rail.

23. The method of claim 22, wherein the rail is moved into the locked position by rotating the rail through 180 degrees, before lowering the rail; and wherein the rail is moved into the unlocked position by rotating the rail through 180 degrees before raising the rail.

* * * * *