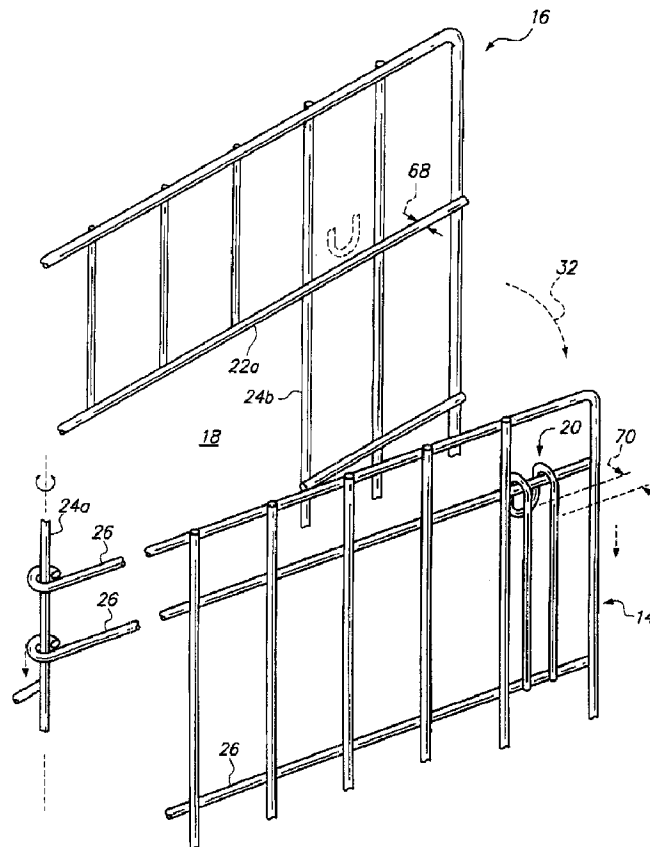




(22) **Date de dépôt/Filing Date:** 2011/05/17
(41) **Mise à la disp. pub./Open to Public Insp.:** 2012/09/10
(45) **Date de délivrance/Issue Date:** 2019/04/16
(30) **Priorité/Priority:** 2011/03/10 (US13/045,035)

(51) **Cl.Int./Int.Cl. A01K 1/03** (2006.01)
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(54) **Titre : SYSTEME DE PORTE DE CAGE AMELIOREE POUR ANIMAL DE COMPAGNIE**
(54) **Title: IMPROVED PET DOOR ENCLOSURE SYSTEM**



(57) **Abrégé/Abstract:**

The door system disclosed herein includes a frame and a door fabricated from a plurality of horizontal and vertical wire rods. The door may have an inverted hook which is aligned to a horizontal wire rod of the frame when the door is pivoted to the closed

(57) Abrégé(suite)/Abstract(continued):

position. To close the door, the door is dropped so that the horizontal wire rod of the frame is traversed into the inverted hook. At this point, the animal inside of the pet crate cannot open the door by pushing on the door. Rather, the door must be raised so that the inverted hook clears the horizontal wire rod of the frame to pivot the door to the opened position.

ABSTRACT OF THE INVENTION

The door system disclosed herein includes a frame and a door fabricated from a plurality of horizontal and vertical wire rods. The door may have an inverted hook which is aligned to a horizontal wire rod of the frame when the door is pivoted to the closed position. To close the door, the door is dropped so that the horizontal wire rod of the frame is traversed into the inverted hook. At this point, the animal inside of the pet crate cannot open the door by pushing on the door. Rather, the door must be raised so that the inverted hook clears the horizontal wire rod of the frame to pivot the door to the opened position.

IMPROVED PET DOOR ENCLOSURE SYSTEM

BACKGROUND

[0001] The embodiments disclosed herein relate to a pet door enclosure system.

[0002] Pet crates may be fabricated from a plurality of wire rods. Pet crates typically have six sides wherein top, front, back, left and right panels each have a plurality of vertical and horizontal transverse wire rods that are attached to each other. The bottom panel may also be fabricated from a plurality of transverse wire rods. A plastic or metal pan, mat or cushion may be placed on top of the bottom panel to allow the pet to comfortably sit in the pet crate. In one or more of the front, back, left or right panels, a door may be provided so that the pet can enter or exit the pet crate as desired. The door pivots about one of the vertical wire rods of the panel. To close the door, the user must pivot the door to the closed position and lock the door by way of a latch. The latch may be located on the opposite side of the pivot axis of the door or at multiple positions around the door. To lock the door, the user holds the door closed and engages the latch so that the door cannot be opened by the animal in the pet crate. To open the door the user unlocks the latch and opens the door. Unfortunately, for certain pet crates, the pet door may not be sufficiently strong for certain applications since the door is in most instances attached to a frame of the pet crate only at the pivot axis of the pet door and the latch. The upper and lower corners of the door may not be secured to the frame and could be permanently deformed when the animal pushes on the door.

[0003] Accordingly, there is a need in the art for an improved pet door enclosure system.

BRIEF SUMMARY

[0004] The door system discussed herein addresses the needs discussed above, discussed below and those that are known in the art.

[0005] The door system disclosed herein will be described in relation to a pet crate. However, the door system disclosed herein may be implemented in an animal crate for a wild animal as well as different uses. By way of example and not limitation, the

door system may also be incorporated into products other than a pet crate such as a hallway gate, partition, a back door pet entry way as well as to other products and situations. However, the door system discussed herein will be discussed in relation to a pet crate for the purposes of clarity and convenience, but may be implemented in the aforementioned products and situations.

[0006] The door system may be incorporated into a pet crate. The door system may have a frame and a door. The door and frame may both be fabricated from a plurality of vertical and horizontal wire rods. The frame of the door system forms an aperture through which a pet enters and exits the pet crate. The door is attached to the frame so that the door can be pivoted to the closed position. In the closed position, the pet cannot pass through the aperture of the frame. The door can also be pivoted to the opened position so that the pet can pass through the aperture of the frame. The door may have a plurality of inverted hooks that may receive one or more of the horizontal wire rods of the frame. The inverted hooks are positioned on the door so that the door must be raised for the inverted hooks to clear the horizontal wire rod of the frame when opening or closing the door. To close the door when the door is open, the door is raised and pivoted so that the door is flush against the frame. In this position, the inverted hooks are equipped to receive the horizontal wire rods of the frame when the door is lowered. When the door is lowered, the door is now in the closed position. To lock the door, a latch is engaged to secure the door in the closed position. Beneficially, the inverted hooks may be placed at strategic locations around a periphery of the door to strengthen the door.

[0007] To open the door when the door is closed, the latch is first disengaged. Although one latch per door is shown, it is also contemplated that the door may have multiple latches positioned around the door. The door is then raised, at which time the inverted hooks can clear the horizontal wire rods of the frame. The door is now pivoted to the opened position. Accordingly, the improved door system allows convenient closure and opening of the door and also strengthens the door so that the door can withstand greater abuse by strong animals. The door can also remain closed without having to engage the latch.

[0008] More particularly, an animal door system is disclosed which comprises a frame and a door. The frame may have a plurality of interconnected vertical and horizontal wire rods with an opening at a central area of the frame for allowing an animal to pass therethrough. The door may have a plurality of interconnected vertical and horizontal wire rods. The door may be pivotally attached to a first vertical wire rod of the frame for pivoting the door between opened and closed positions. The door may have a first inverted hook which receives a first horizontal wire rod of the frame when the door is in the closed position to strengthen the animal door system.

[0009] The first and second horizontal wire rods of the door may be wrapped around the first vertical wire rod of the frame for pivotally attaching the door to the frame.

[0010] One or more hooks may be utilized. By way of example and not limitation, the first inverted hook may be located at the upper portion of the door. Also, the door may further comprise a second inverted hook attached to a lower portion of the door. Moreover, a third inverted hook may be attached between the first inverted hook and the pivot connection between the door and the frame at the upper portion of the door.

[0011] The door system may further comprise a latch attached to an opposite side of the door from the pivot axis of the door.

[0012] An opening of the inverted hook may point downward. A width of the opening of the inverted hook attached to the door may be greater than a diameter of the horizontal wire rod of the frame.

[0013] Additionally, an animal door system is disclosed which may comprise a door and a frame. The door may have a plurality of interconnected vertical and horizontal wire rods. The frame may have a plurality of interconnected vertical and horizontal wire rods containing a large opening at a central area of the frame for allowing an animal to pass therethrough. The frame may have a first upright hook wherein the door is pivotally attached to a first vertical wire rod of the frame for pivotally opening and closing the door. The first upright hook receives a first horizontal wire rod of the door when the door is in the closed position to strengthen the animal door system.

[0014] An opening of the upright hook may point upward for receiving a wire rod of the door being lowered. A width of the opening of the upright hook attached to the frame may be greater than a diameter of the horizontal wire rod of the door.

[0015] Additionally, a method of opening and closing a door is disclosed which comprises the steps of: with the door closed, raising the door to clear a hook attached either to the door or the frame from a first horizontal wire rod of a frame or the door; pivoting the door to the opened position; and lowering the door.

[0016] The method may further comprise the steps of: with the door opened, raising the door to clear a hook attached either to the door or the frame from a first horizontal wire rod of the frame or the door; pivoting the door to the closed position; and lowering the door so that the hook attached either to the door or the frame receives the first horizontal wire rod of the frame or the door.

[0017] The hook may be an inverted hook attached to the door and raising the door clears the inverted hook attached to the door from the first horizontal wire rod of the frame. Alternatively, the hook may be an upright hook attached to the frame and raising the door clears the upright hook attached to the frame from the first horizontal wire rod of the door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

[0019] Figure 1 is an illustration of a pet crate incorporating an improved pet door enclosure system;

[0020] Figure 2 is a perspective view of inverted hooks that engage horizontal rods of a frame at upper and lower corners of a door of the pet door enclosure system shown in Figure 1 wherein the door is in a closed position;

[0021] Figure 3 is an illustration of a door and frame shown in Figure 2 with the door in a raised position;

[0022] Figure 4 is an illustration of a door and frame shown in Figure 3 with the door pivoted to an opened position;

[0023] Figure 5 is an illustration of a latch for locking the door shown in Figure 1 in the closed position;

[0024] Figure 6 is an illustration of the latch shown in Figure 5 wherein the latch is in the unlocked position;

[0025] Figure 7 is an alternate embodiment of the improved pet door enclosure system shown in Figure 1 with inverted hooks of the door positioned along a right vertical edge of the door opposite a pivot side of the door wherein the inverted hooks engage the frame;

[0026] Figure 7A is an enlarged view of one of the inverted hooks shown in Figure 7;

[0027] Figure 8A is an illustration of the improved pet door enclosure system shown in Figure 1 with the door pivot able upward on an upper edge of the door;

[0028] Figure 8B is an illustration of the improved pet door enclosure system with the door pivotal on a right edge of the door;

[0029] Figure 8C is an illustration of the improved pet door enclosure system with a door pivotal about the lower edge of the door; and

[0030] Figure 9 illustrates an alternate embodiment of the improved pet door enclosure system wherein upright hooks are attached to the frame which is engaged to horizontal wire rods of the door;

[0031] Figure 10 is an illustration of an inverted tab with a door in the closed position;

[0032] Figure 11 is an illustration of the door and frame shown in Figure 10 with the door in a raised position so that the inverted tab clears the horizontal wire rods of the frame;

[0033] Figure 12 is an illustration of the door and frame shown in Figure 11 wherein the door is pivoted to an opened position; and

[0034] Figure 13 is an illustration of an upright tab.

DETAILED DESCRIPTION

[0035] Referring now to the drawings an improved door system 10 is shown. The door system 10 is shown in Figure 1 as being incorporated into a pet crate 12. However, the door system 10 can be incorporated into other products such as a hallway gate, etc. The door system 10 discussed herein automatically aligns hooks 20, 48 and tabs 50, 64 to rods 22, 26 when the door 14 is pushed flush against the frame 16 to block, cover or close an aperture 18 of the frame 16. The aperture 18 allows an animal or pet to enter or exit the pet crate 12. By way of example and not limitation, the door 14 may have one or more inverted hooks 20 that can be placed at strategic locations around the door to strengthen the door 14. The inverted hooks 20 are removable securable to horizontal wire rods 22 of the frame 16. To open the door 14 from the closed position, the door 14 is raised so that the inverted hooks 20 clear the horizontal wire rods 22 as shown in Figure 3. After the inverted hooks 20 clear the horizontal wire rods 22, the door 14 may be pivoted as shown in Figure 4 to provide access through the aperture 18 of the frame 16. To close the door 14 from the opened position, the user raises the door 14 so that the inverted hooks 20 clear the horizontal wire rods 22. The door 14 is pivoted until the door 14 contacts the frame 16. At this time, the inverted hooks 20 are automatically aligned to the horizontal wire rods 22 whenever the door 14 contacts the frame 16. When the user releases the door 14, the door 14 slides down and the inverted hooks 20 engage the horizontal wire rods 22. The door 14 is now closed. When the animal or pet pushes against the door 14, the door 14 remains closed, because the rods 22 are received into the inverted hooks 20. By way of example and not limitation, the inverted hooks 20 are strategically positioned around the periphery of the door 14 so as to strengthen the door 14 and mitigate bending or breakage of the door 14. The inverted hooks 20 may be placed at the upper and lower corners of the door 14 to reinforce the frame 16. Moreover, the inverted hooks 20 do not protrude out so as to create a hazard for the animal entering and exiting the aperture as well as the operator of the door system 10.

[0036] More particularly, the frame 16 may be fabricated from a plurality of

horizontal and vertical wire rods 22, 24. The frame 16 defines the aperture 18 (see Figure 4) by vertical wire rods 24a, b (see Figure 1) and horizontal wire rods 22a, b (see Figure 1). The vertical and horizontal wire rods 24a, b, 22a, b define an inner periphery of the frame aperture or opening 18. The door 14 is also comprised of a plurality of horizontal and vertical wire rods 26, 28. The vertical and horizontal wire rods 26g, h and 28b define an outer periphery of the door 14. The door 14 is pivotally attached to one of the vertical wire rods 24 of the frame 16. In particular, the door 14 may be pivotally attached to the inner most left vertical wire rod 24a (see Figures 1 and 4). Referring to Figure 4, the horizontal wire rods 26 of the door 14 are wrapped around the vertical wire rod 24a of the frame 16 so that the door 14 pivots around vertical wire rod 24a. The vertical wire rod 24a defines a pivot axis 25 of the door 14. The door 14 may be designed to pivot about any of the vertical or horizontal wire rods 22, 24 of the frame 16 as shown in Figures 8A-8C, and discussed below. For purposes of clarity, the door system 10 is discussed in relation to a door 14 that opens to the left as shown in the figures.

[0037] The door 14 may be traversed up and down (see Figures 2 and 3) so that the inverted hooks 20 of the door 14 may clear horizontal wire rods 22 of the frame 16 to open and close the door 14. The door 14 can be vertically traversed to the extent that the horizontal wire rods 26 of the door 14 wrapped around the vertical wire rods 24 slide between the horizontal wire rods 22 of the frame 16. The distance between adjacent horizontal wire rods 22, 26 may be adjusted so that the door 14 may be sufficiently raised for the inverted hooks 20 to clear the horizontal rods 22. For the embodiment shown in the figures, when the door 14 is released, the horizontal wire rods 26a-f wrapped about the vertical wire rod 24a contact and rest upon the horizontal wire rods 22a-f. When the user raises the door 14, the upper most and lower most horizontal wire rods 26g, h of the door 14 contact the horizontal wire rods 22g, b to prevent or limit the vertical traversal of the door 14. Other configurations are also contemplated to regulate the range of vertical traversal of the door 14. The range of vertical movement for the door 14 may be enlarged so as to be sufficient for the inverted hooks 20 to clear the horizontal wire rods 22 when opening and closing the door 14.

[0038] Referring now to Figure 2, an enlarged view of inverted hooks 20 at upper and lower corners of the door 14 which are engaged to horizontal wire rods 22a, b of the

frame 16 are shown. The door 14 is made up of a plurality of horizontal and vertical wire rods 26, 28. The inverted hooks 20 may also be fabricated from a wire rod and shaped into a hook configuration. The inverted hooks 20 may be attached (e.g. welded) to the horizontal wire rod 26a at point 27. The wire rod of the inverted hook 20 extends upward, backward and back down to the horizontal wire rod 26a and is connected at point 29 to the horizontal wire rod 26a. The wire rod of the inverted hook 20 may have an inverted U-shape configuration. Optionally, it is contemplated that a second horizontal wire rod 26b of the door 14 may be attached to the inside of the inverted hooks 20 to add rigidity to the inverted hook 20 at points 33 and 35. An inverted hook 20 may also be positioned at the lower corner of the door 14. The inverted hook 20 may be attached to the horizontal wire rods 26f, g in a similar manner as discussed above. The horizontal wire rods 26a-h, extend across the entire width of the door 14. The inverted hooks 20 may be attached at other locations on the door 14, as shown in Figure 1. These inverted hooks 20, when the door 14 is in the closed position, add further rigidity to the door 14 so that pushing or pulling does not cause the door 14 to permanently deform inward or outward along the upper and lower edges of the door 14. The pushing and pulling forces are distributed to the frame 16 through the inverted hooks 20. The inverted hooks 20 engage the horizontal wire rods 22 of frame 16 so that energy imparted to the door 14 is also distributed to the frame 16. Additional inverted hooks 20 can be placed along the right vertical edge of the door 14 by overlapping the door 14 with the frame 16 as shown in Figures 7 and 7A, as discussed herein. These inverted hooks 20 may be positioned inside of an outer periphery of the door 14. The inverted hooks 20 do not protrude out of the outer periphery of the door so that the inverted hooks 20 do not injure an animal or user/operator.

[0039] To open the door 14 from the closed position, the user raises the door 14 vertically in the direction of the arrow 30 (see Figure 2). The door 14 is raised until the hooks 20 clear the horizontal wire rods 22 of the frame 16 as shown in Figure 3. The door 14 can be raised until the horizontal wire rods 26 of the door 14 contact the horizontal wire rods 22 of the frame 16. In the raised position, which is shown in Figure 3, the hooks 20 clear the horizontal wire rods 22 of the frame 16. After raising the door 14, the user rotates the door 14 in the direction of arrow 32, as shown in Figure 4. The

user can then lower the door 14. The door 14 stops when the horizontal wire rod 26 of the door 14 contacts the horizontal wire rods 22 of the frame 16. The user can then fully pivot the door 14 to the opened position.

[0040] To close the door 14, the user raises the door 14 so that the hooks 20 clear the horizontal wire rods 22 of the frame 16. The door 14 can be raised until the horizontal rods 26 of the door 14 contact the horizontal rods 22 of the frame 16. In the example shown in Figure 1, the door 14 is raised until horizontal rods 26g, h contact horizontal rods 22b, g. After raising the door 14, the user then pivots the door 14 so that the door 14 is now flush with the frame 16. In this position, the inverted hooks 20 are automatically aligned to the horizontal wire rods 22 of the frame 16. The user does not adjust the position of the door 14 to align the inverted hooks 20 to the wire rods 22. Rather, the user merely places the door 14 flush against the frame 16 to automatically align the inverted hooks 20 to the wire rods 22. Once the door 14 is flush with the frame 16, the user lowers the door 14. Because the opening of the inverted hooks 20 may be fabricated so as to be wider than a diameter of the wire rods 22, the inverted hooks 20 receive the horizontal wire rods 22 of the frame 16. In particular, a diameter 68 (see Figure 4) of the horizontal rod 22 may be less than a width 70 (see Figure 4) of an opening of the inverted hook 20. Once the door 14 is flush with the frame 16, the user can release the door 14 to allow the door 14 to drop and the inverted hooks 20 to automatically engage the horizontal wire rods 22.

[0041] Referring now to Figures 1, 5 and 6, the door system 10 may also include one or more optional latches 34. The latch 34 prevents the user or the animal from traversing the door 14 up in order to inadvertently open the door. When the latch 34 is engaged (see Figure 5), the door 14 cannot be opened. When the user or animal attempts to lift the door 14, a bolt 36 is trapped within a bolt hole 38. The bolt hole 38 may be formed by one of the vertical wire rods 24 of the frame 16. To unlock the latch 34, the bolt 36 can be traversed in the horizontal direction as shown by arrow 46. When the bolt 36 is traversed to the left as shown by arrow 46, the bolt 36 clears the bolt hole 38 and the door 14 may be raised to open the door 14. To move the bolt 36 to the left, the user must first rotate a handle 42 upward in the direction of arrow 44. The handle 42 is attached to the back side of the bolt 36 so that when the handle 42 is in the down position (see Figure

5), the handle interferes with vertical wire rod 28a thereby limiting horizontal traversal of a bolt 36. The bolt 36 cannot come out of the bolt hole 38. Also, an inturned portion 72 of the bolt 32 interferes with the vertical wire rod 28b (see Figure 4) of the door 14. When the handle 42 is raised as shown in dash lines in Figure 5, the handle 42 clears the vertical wire rod 28a and the inturned portion 72 of the bolt 32 clears the vertical wire rod 28b of the door 14. At this point, the user can shift the handle 42 to the left as shown by arrow 46 in Figure 6. The bolt 36 clears the bolt hole 38. The inturned portion 72 clears the vertical wire rod 28b. The handle 42 clears the vertical wire rod 28. When the handle 42 is released, the user can raise and lower the door 14 in order to disengage the inverted hooks 20 from the horizontal wire rods 22 of the frame 16. Although the bolt 32 was described as having the inturned portion 72, it is also contemplated that the bolt 32 may be straight.

[0042] Referring now to Figures 7 and 7A, the inverted hooks 20 may be positioned on a right vertical side of the door 14. These inverted hooks 20 may also be positioned on an inside of the outer periphery of the door 14 for the same reasons discussed above, namely, safety to the animal and/or user/operator. The door 14 may overlap the frame 16 (see Figure 7). A short horizontal wire rod 22 can be positioned between vertical wire rods 28 which are removably engageable to the hooks 20. Accordingly, the door 14 may be secured to the entire periphery of the aperture 18 of the frame 16. On the left side, the door 14 is pivotally wrapped around the vertical wire rod 24a. Inverted hooks 20 may engage the top, bottom and right edges of the door 14 and the inner periphery of the aperture 18 of the frame 16.

[0043] Referring now to Figures 8A-C, other orientations of the door 14 of the system 10 are shown. In Figure 8A, the door 14 pivots about horizontal wire rod 22a of the frame 16. To open the door 14, the latch 38 is disengaged and the door 14 is slid over to the right. The door 14 can be pivoted upward. To close the door 14, the door is laid flush against the frame 16. The door 14 is slid over to the left. Optionally, the latch 38 can then be engaged. In Figure 8C, the door 14 pivots about the right vertical wire rod 24b. The door 14 is opened and closed in the same manner discussed above in relation to Figures 1-4. In Figure 8B, the door 14 pivots about bottom horizontal wire rod 22b. To open the door 14, the latch 38 is disengaged and the door 14 is slid over to the right. The

door 14 can be pivoted downward. To close the door 14, the door is laid flush against the frame 16. The door 14 is slid over to the left. Optionally, the latch 38 can then be engaged. Although the door 14 is oriented so as to open in different orientations, the hooks 20 align to the wire rods 22 or 24 of the frame 16 when the door 14 is flush or contacts the frame 16.

[0044] Referring now to Figure 9, an alternate embodiment of the door system 10 is shown. Instead of inverted hooks 20 on to the door 14, upright hooks 48 are attached to the frame 16. The upright hooks 48 may be positioned outside an inner periphery of the opening 18 so that the inverted hooks 48 do not injure the animal entering or exiting through the aperture 18 and/or the user/operator operating the door 14. The upright hooks 48 may have an opening that receives one or more horizontal wire rods 26 of the door 14 as shown by arrow 51. By way of example and not limitation, one or more of the upright hooks 48 may be positioned along the upper side, lower side and/or the right side of the frame 16. These upright hooks 48 may also be positioned outside an inner periphery of the opening 18 for the same reasons discussed above. The upright hooks 48 may be secured to the horizontal wire rod 22g of the frame 16. The door 14 may be raised and pivoted so that the wire rods 26h may be inserted into the upright hook 48 as shown by the dash line 51. To add further rigidity to the upright hook 48, optional short segmented horizontal wire rods 22h may be attached to the distal end portion of the upright hooks 48. The upright hooks 48 are shown at the upper corner of the frame 16. However, it is also contemplated that the upright hooks 48 may be disposed at the lower corner of the frame 16 and the right side of the frame 16, the upper and/or lower side of the frame. The upright hooks 48 may be disposed along the left side of the frame 16 when the door 14 pivots open to the right instead of to the left as shown and described in the figures. These upright hooks may also be positioned outside an inner periphery of the frame opening 18 for the same reasons discussed above, namely, safety. Although not shown in Figure 9, a latch 34 (see Figure 5 and 6) may be secured to the door 14 and frame 16 to lock the door 14 in the closed position in the same manner as discussed above.

[0045] The improved door system 10 disclosed herein simplifies manufacture of the door 14 since the horizontal and vertical wire rods 22, 24 of the frame 16 and door 14

may be selectively positioned. Moreover, the additional inverted hooks 20 or upright hooks 48 increase the strength of the door 14 to mitigate permanent deformation of the door 14 when an animal is trying to push through the closed door 14. Forces applied to the door are distributed to the frame 16. Also, the wire rods of the door 14 and frame 16 may be fabricated from lighter or smaller wire rods since the inverted hooks 20 or the upright hooks 48 strengthens the door 14.

[0046] Referring now to Figures 10-12, an inverted tab 50 is shown. The second embodiment of the inverted hooks 50 may be used in conjunction with the inverted hooks 20 on a side door 14a (see Figure 1) of the pet crate 12. The inverted tab 50 has a protrusion 52 that is positioned behind a horizontal wire rod 22 of the frame 16a when the door 14a is in the closed position. Inverted tabs 50 can be placed strategically around the periphery of the door 14a so as to engage the frame 16a and reinforce and strengthen the door 14a. In the example shown in Figures 10-12, the inverted tab 50 is shown as being located on the bottom edge of the door 14a. However, inverted tabs 50 can be placed at other strategic locations on the periphery of the door 14a. By way of example and not limitation, inverted tabs 50 may be placed at the upper and lower corners, the right edge or portion of the door 14a or the upper edge or upper portion of the door 14a. However, for the purposes of clarity, only one inverted tab 50 is being shown. The inverted tabs 50 point downward so that an animal or the operator cannot step on the inverted tab 50 and injure themselves.

[0047] The inverted tab 50 may be secured or attached to one or more horizontal wire rods 26 of the side door. In the figures, the inverted tab 50 is shown as being secured or attached to two horizontal wire rods 26i, j of the side door 14a. In particular, the inverted tab 50 may be bent and shaped so as to be attached to the upper wire rod 26i and proceed behind the lower wire rod 26 and may protrude or extend beyond the lower wire rod 26j. The portion of the wire rod 26 that extends below the lower most wire rod 26j defines the tab portion 52 which is caught behind the horizontal wire rod 22 of the frame 16a. The interference between the tab portion 52 and the horizontal wire rod 22 prevents the door from being pushed open when in the closed position. In the example shown in Figure 10, the inverted tab 50 is comprised of a wire rod shaped into a U-shaped configuration. However, it is also contemplated that the wire rod of the inverted

tab 50a may be attached to upper and lower wire rods 26i, j of the door 14a and configured as an I-shaped configuration with a loop 54 at the bottom to prevent the inverted tab 50a from piercing the animal or user during use of the device. This configuration is shown in Figure 10 in phantom.

[0048] As can be seen in Figure 10, the inverted tab 50, 50a can be combined with inverted hooks 20. The inverted hooks 20 and inverted tabs 50, 50a can be strategically placed around the periphery of the door 14a to strengthen and reinforce the door 14a. In Figure 10, the inverted tab 50 is shown as being located on a bottom edge of the door 14a.

[0049] From the closed position shown in Figure 10, the door 14a may be traversed to the open position by raising the door 14a as shown in direction 56 in Figure 11. The inverted hooks 20 and inverted tabs 50 clear horizontal wire rods 22 of the frame 16a. The door 14a can now be pivoted to the opened position as shown by arrow 58 in Figure 12 so that the aperture 18a of the frame 16a is unblocked to allow the animal or pet to enter or exit through the aperture 18a of the frame 16a. When the door 14a is pivoted in the direction of arrow 58, the lowest most tips 60, 62 of the inverted hooks 20, 50 clear the horizontal wire rods 22 of the frame 16a. To close the door 14a, the door 14a is raised so that the inverted hooks 20 and inverted tabs 50 clear the horizontal wire rods 22 of the frame 16a. At this point, the door 14a can be pivoted so as to be in contact with the frame 16a. The inverted hooks 20 and inverted tabs 50 are aligned to the horizontal wire rods 22 of the frame 16a. When the door 14a is lowered, the horizontal wire rods 22 are received into the inverted hooks 20 and the inverted tab 50 is disposed behind the horizontal wire rod 22 of the frame 16a. The door 14a is now closed. The animal cannot push the door 14a open.

[0050] Referring now to Figure 13, an upright tab 64 is shown. The upright tab 64 is shown as being located on the top and bottom edges of the frame 16a. Additional upright tabs 64 may be strategically placed at other locations around the periphery of the door 14a to strengthen and reinforce the door 14a to the frame 16a. The upright tab 64 may be attached to one or more adjacent horizontal wire rods of the frame 16a. In Figure 13, the upright tab 64 is shown as being attached to two adjacent horizontal wire rods of

the frame 16a. The upright tab 64 extends beyond the upper horizontal wire rod 22 so that a protrusion 66 is disposed in front of the horizontal wire rod 26 of the door 14a. More particularly, the protrusion 66 is disposed in front of a horizontal wire rod 26 of the door 14a. When the animal or pet attempts to push the door 14a open from the inside, the door 14a pushes against the tab portion 66 of the upright hooks 64 and cannot be opened. The upright tab 64 has a single wire rod 22 that is attached to a horizontal wire rod 22, extends upward and downward to form protrusion 66 and has a U-shaped configuration which terminates at the lower wire rod 22. Other configurations are also contemplated, such as an I-shaped configuration shown in dash lines in Figure 13. In this alternative configuration, the wire rod 22 extends from the lower wire rod 22 and extends above the upper wire rod 22 and terminates in a round loop to prevent the upright tab 64 from piercing or cutting the user or pet during use of the device.

[0051] The upright tabs 64 on the top edge of the frame 16a may be disposed outside of the inner periphery of the aperture of the frame 16a through which the animal enters and exits. The upright tabs 64 on the bottom edge of the frame 16a may extend inside of the inner periphery of the aperture of the frame, as shown in Figure 13. However, this is not preferred. Rather, the protrusion 66 of the upright tab 64 can be shortened as shown in dash lines on the right of Figure 13 so that the protrusion 66 is outside or under the inner periphery of the aperture of the frame 16a. The upright tab 64a may be attached to only one of the horizontal wire rod of the frame 22. Alternatively, to strengthen the upright tab 64, a short horizontal wire rod 22a may be welded or attached to two adjacent vertical wire rods of the frame 16a and the upright tab 64a. The bottom of the door 14a would also overlap the frame 16a as shown in Figure 13 so that the bottom horizontal wire rod 26a of the door 14a is received behind the protrusion 66a of the upright tab 64a.

[0052] The inverted hooks 20, upright hooks 48, inverted tabs 50 and upright tabs 64 may be utilized alone or in combination with each other and strategically placed about the door 14 or door 14a and/or frame 16 or frame 16a to strengthen the door.

[0053] The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within

the scope and spirit of the invention disclosed herein, including various ways of forming the pivot axis of the door 14. Further, the various features of the embodiments disclosed herein can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described herein. Thus, the scope of the claims is not to be limited by the illustrated embodiments.

WHAT IS CLAIMED IS:

1. An animal door system comprising:
 - a frame having a plurality of interconnected vertical and horizontal wire rods with an opening at a central area of the frame for allowing an animal to pass therethrough;
 - a door having a plurality of interconnected vertical and horizontal wire rods, the door being pivotally attached to a first vertical wire rod of the frame for pivoting the door between opened and closed positions, the door having a first inverted hook positioned inside an outer periphery of the door, the inverted hook receives a first horizontal wire rod of the frame when the door is in the closed position to strengthen the animal door system.
2. The door system of Claim 1 wherein first and second horizontal wire rods of the door are wrapped around the first vertical wire rod of the frame for pivotally attaching the door to the frame.
3. The door system of Claim 1 or 2 wherein the first inverted hook is located at an upper portion of the door, and the door further comprises a second inverted hook attached to a lower portion of the door.
4. The door system of any one of Claims 1 - 3 further comprising a third inverted hook attached between the first inverted hook and a pivot connection between the door and the frame at the upper portion of the door.
5. The door system of any one of Claim 1 - 4 further comprising a latch attached to an opposite side of the door from a pivot axis of the door.
6. The door system of any one of Claims 1 - 5 wherein an opening of the first inverted hook points downward.

7. The door system of Claim 3 or any one of Claims 4 - 6 when dependent upon Claim 3 wherein an opening of the second inverted hook points downward.
8. The door system of Claim 4 or any one of Claims 5 - 7 when dependent upon Claim 4 wherein an opening of the third inverted hook points downward.
9. The door system of any one of Claims 1 - 8 wherein a width of the opening of the first inverted hook attached to the door is greater than a diameter of the horizontal wire rod of the frame.
10. The door system of Claim 3 or any one of Claims 4 - 9 when dependent upon Claim 3 wherein a width of the opening of the second inverted hook attached to the door is greater than a diameter of the horizontal wire rod of the frame.
11. The door system of Claim 4 or any one of Claims 5 - 10 when dependent upon Claim 4 wherein a width of the opening of the third inverted hook attached to the door is greater than a diameter of the horizontal wire rod of the frame.
12. An animal door system comprising:
 - a door having a plurality of interconnected vertical and horizontal wire rods;
 - a frame having a plurality of interconnected vertical and horizontal wire rods with an opening at a central area of the frame for allowing an animal to pass therethrough, the frame having a first upright hook positioned outside of an inner periphery of the opening of the frame wherein the door is pivotally attached to a first vertical wire rod of the frame for pivotally opening and closing the door, and the first upright hook receives a first horizontal wire rod of the door when the door is in the closed position to strengthen the animal door system.
13. The door system of Claim 12 wherein an opening of the first upright hook points upward.

14. The door system of Claim 12 or 13 wherein a width of the opening of the first upright hook attached to the frame is greater than a diameter of the horizontal wire rod of the door.
15. The door system of any one of Claims 12 - 14 wherein the first horizontal wire rod of the door and a second horizontal wire rod of the door are wrapped around the first vertical wire rod of the frame for pivotally attaching the door to the frame.
16. The door system of any one of Claims 12 - 15 wherein a first inverted hook is located at an upper portion of the frame, and the frame further comprises a second inverted hook attached to a lower portion of the frame.
17. The door system of Claim 16 further comprising a third inverted hook attached between the first inverted hook and a pivot connection between the door and the frame at the upper portion of the frame.
18. The door system of any one of Claim 12 - 17 further comprising a latch attached to an opposite side of the door from a pivot axis of the door.
19. The door system of Claim 16 or Claim 17 or 18 when dependent upon Claim 16 wherein an opening of the second inverted hook points upward.
20. The door system of Claim 17 or Claim 18 or 19 when dependent upon Claim 17 wherein an opening of the third inverted hook points upward.
21. The door system of Claim 16 or any one of Claims 17 - 20 when dependent upon Claim 16 wherein a width of the opening of the second inverted hook attached to the frame is greater than a diameter of the horizontal wire rod of the door.

22. The door system of Claim 17 or any one of Claims 18 - 21 when dependent upon Claim 17 wherein a width of the opening of the third inverted hook attached to the frame is greater than a diameter of the horizontal wire rod of the door.

23. A method of opening and closing a door in a frame comprising the steps of:
with the door closed, raising the door to clear a hook or tab attached either to the door or the frame from a first horizontal wire rod of the frame or the door wherein the hook or tab is positioned inside an outer periphery of the door or outside an inner periphery of an opening of the frame;
pivoting the door to the opened position; and
lowering the door.

24. The method of Claim 23 further comprising the steps of:
with the door opened, raising the door to clear the hook or tab attached either to the door or the frame from a first horizontal wire rod of the frame or the door;
pivoting the door to the closed position;
lowering the door so that the hook or tab attached either to the door or the frame receives the first horizontal wire rod of the frame or the door.

25. The method of Claim 23 or 24 wherein the hook is an inverted hook attached to the door and raising the door clears the inverted hook attached to the door from the first horizontal wire rod of the frame.

26. The method of Claim 23 or 24 wherein the hook is an upright hook attached to the frame and raising the door clears the upright hook attached to the frame from the first horizontal wire rod of the door.

27. The method of any one of Claims 24 - 26 wherein the tab is an inverted tab attached to the door and raising the door clears the inverted tab attached to the door from the first horizontal wire rod of the frame.

28. The method of any one of Claims 24 - 26 wherein the tab is an upright tab attached to the frame and raising the door clears the upright tab attached to the frame from the first horizontal wire rod of the door.

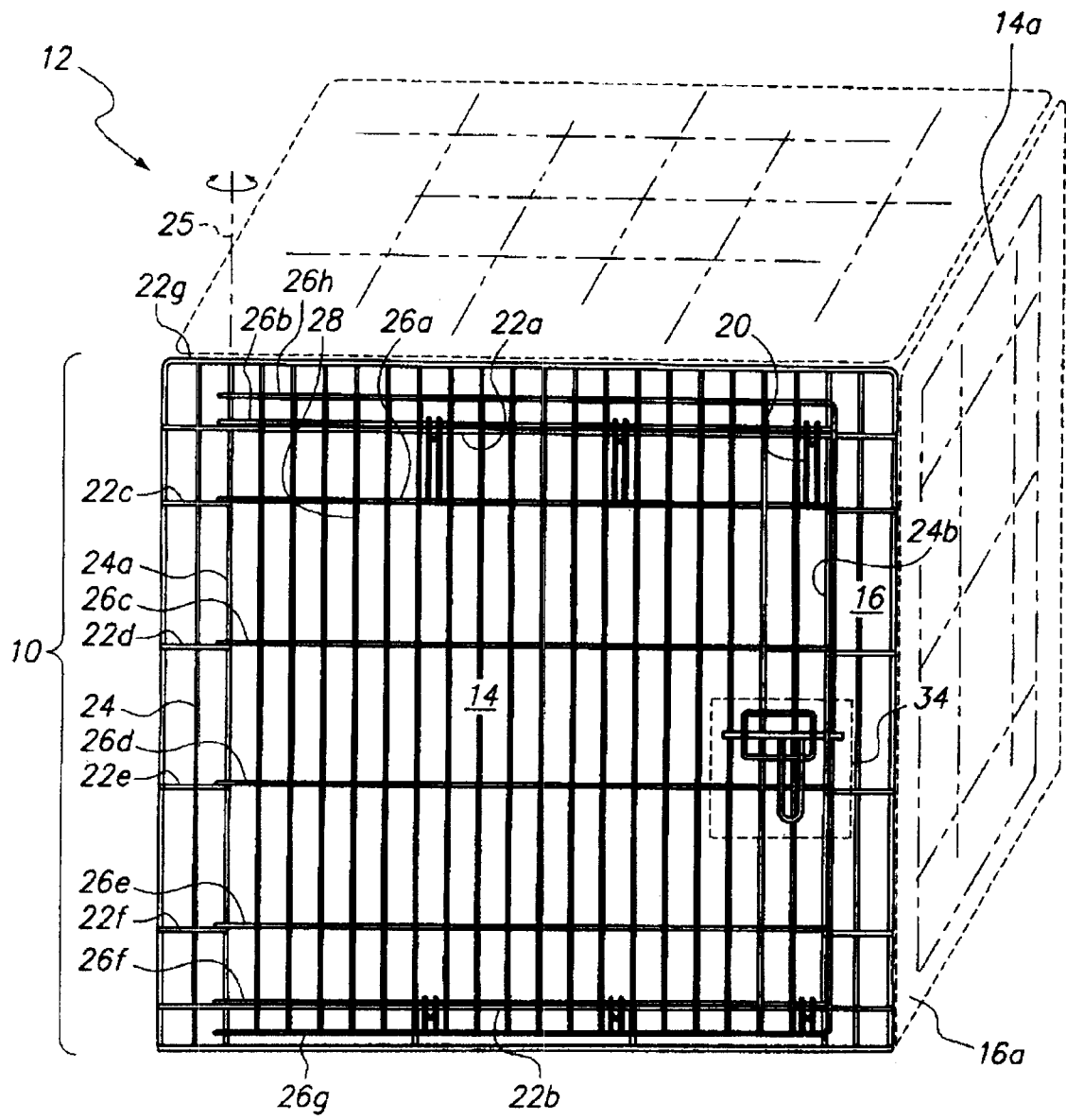


FIG. 1

FIG. 2

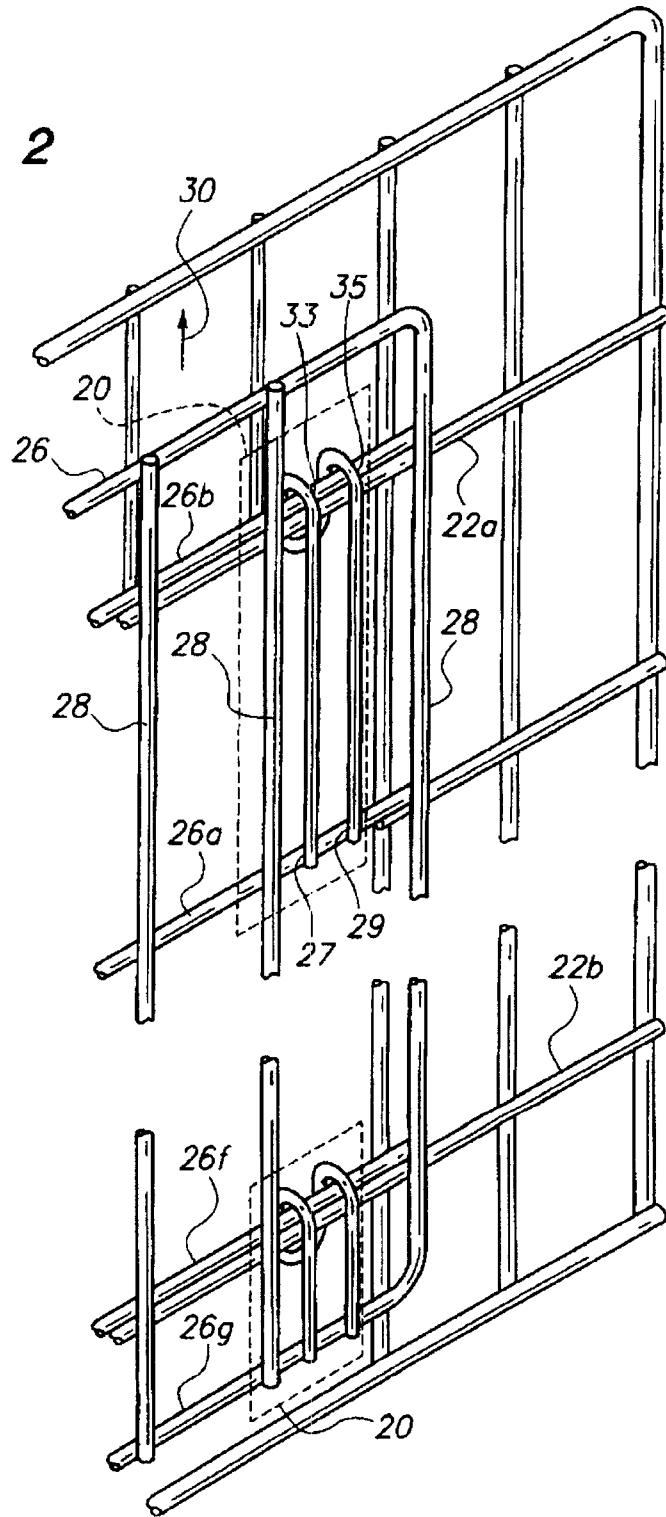


FIG. 3

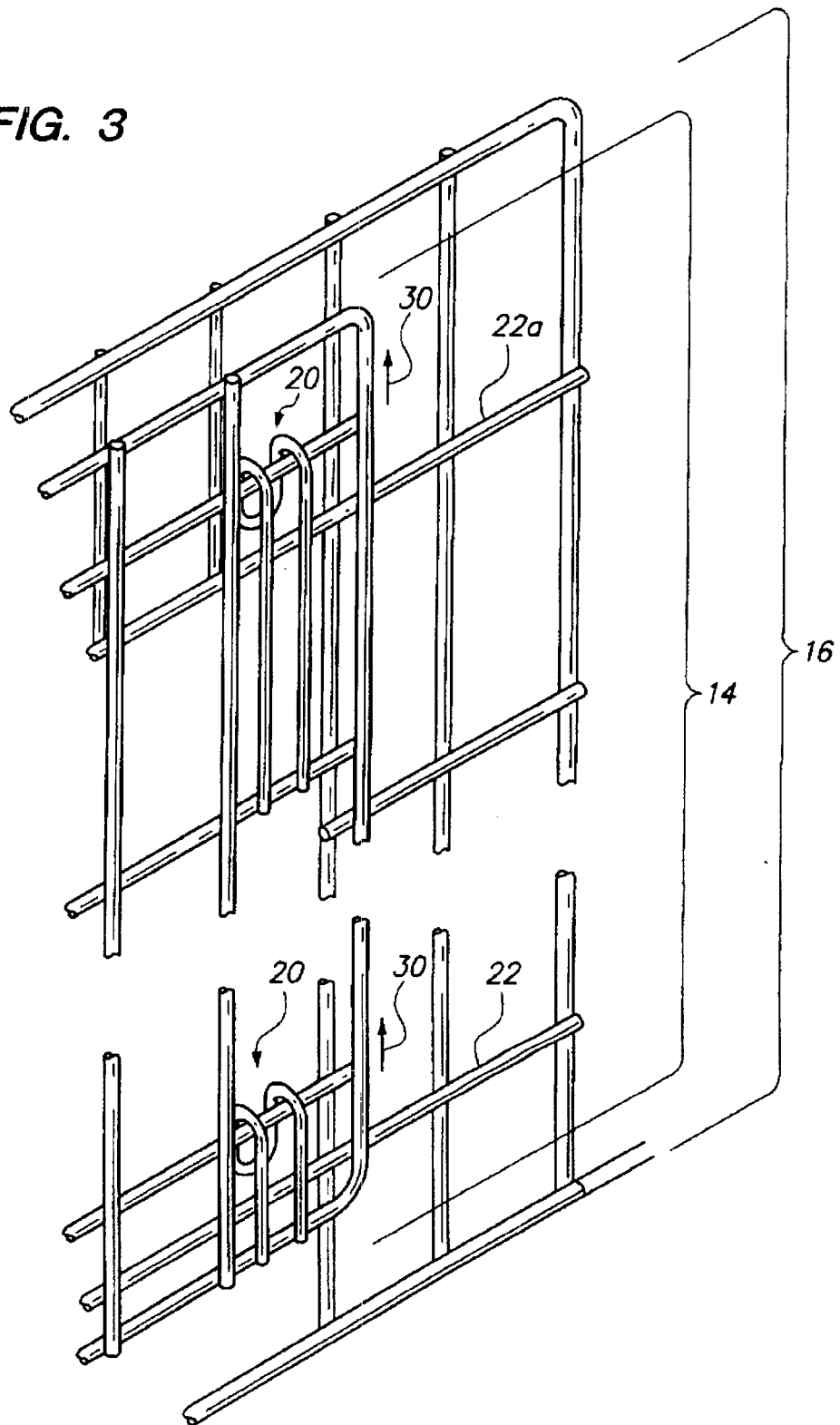
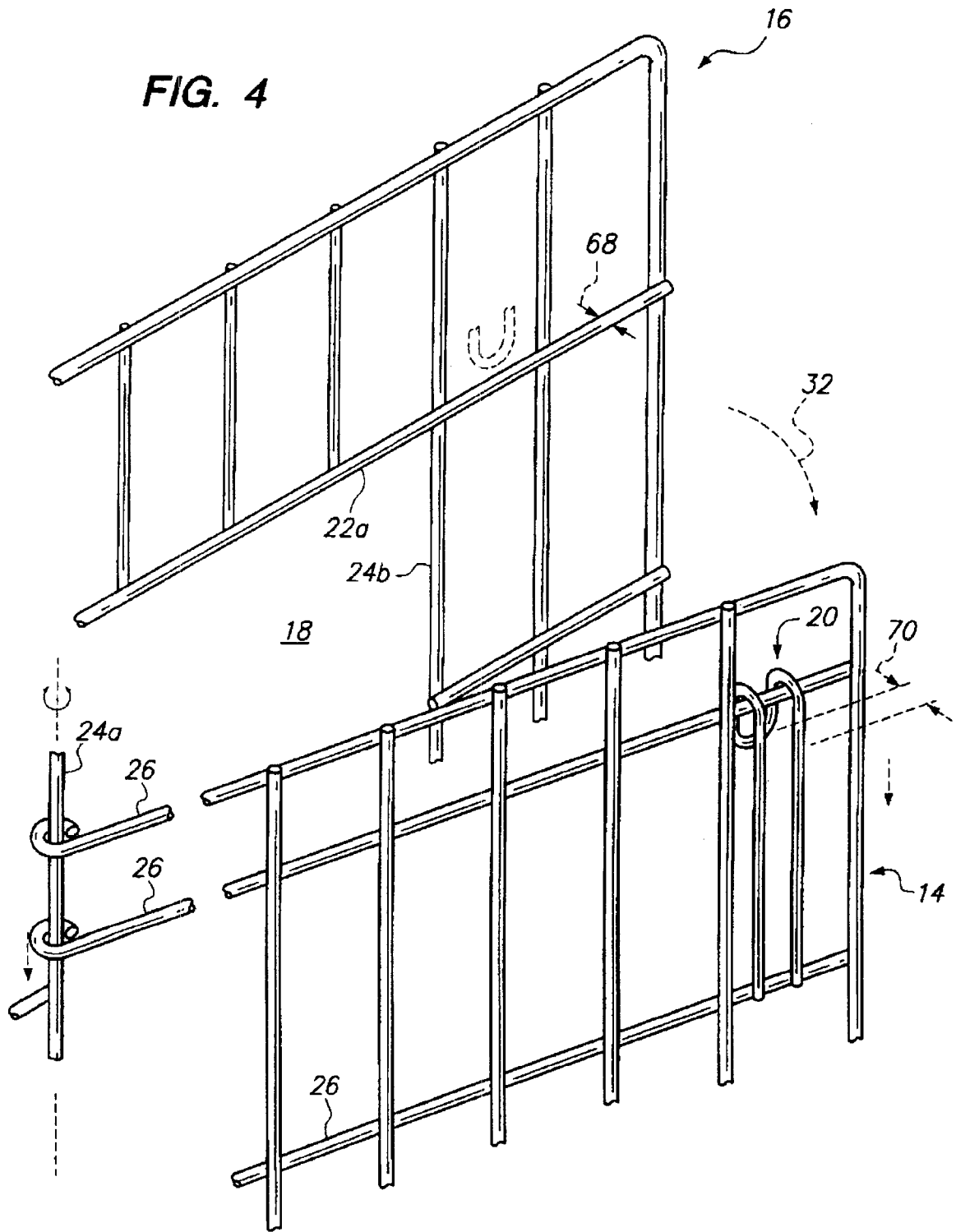


FIG. 4



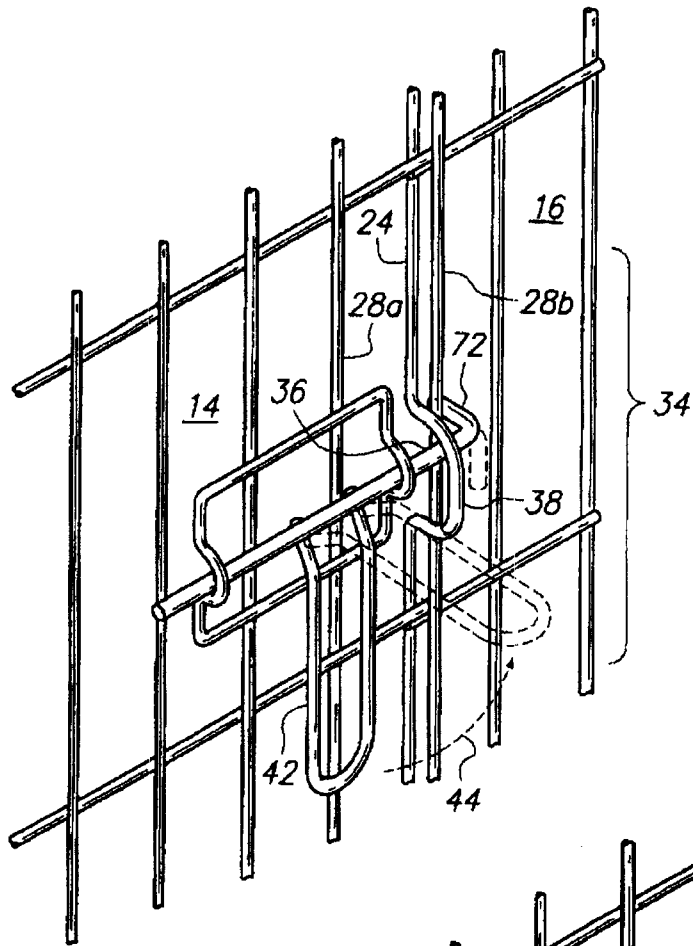


FIG. 5

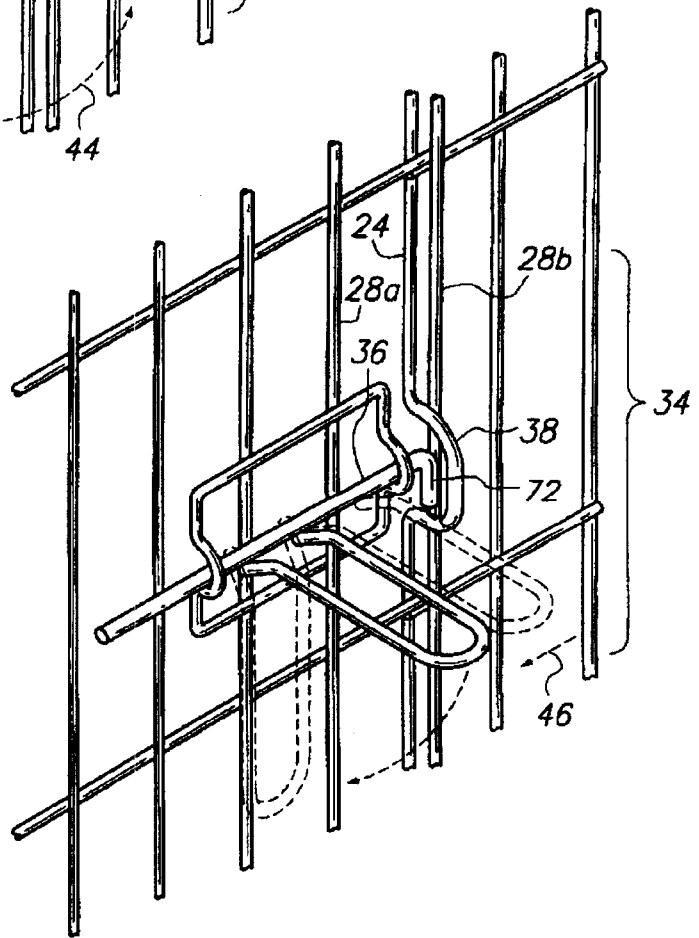


FIG. 6

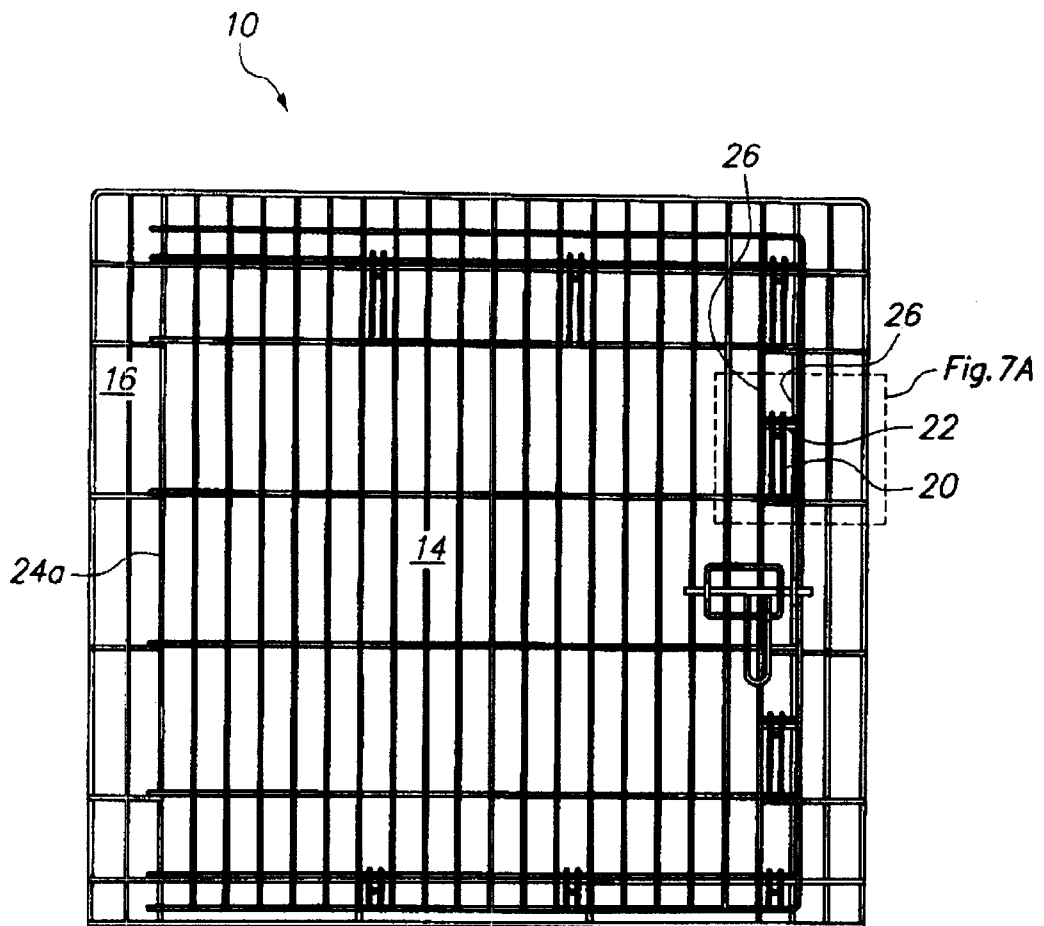


FIG. 7

FIG. 7A

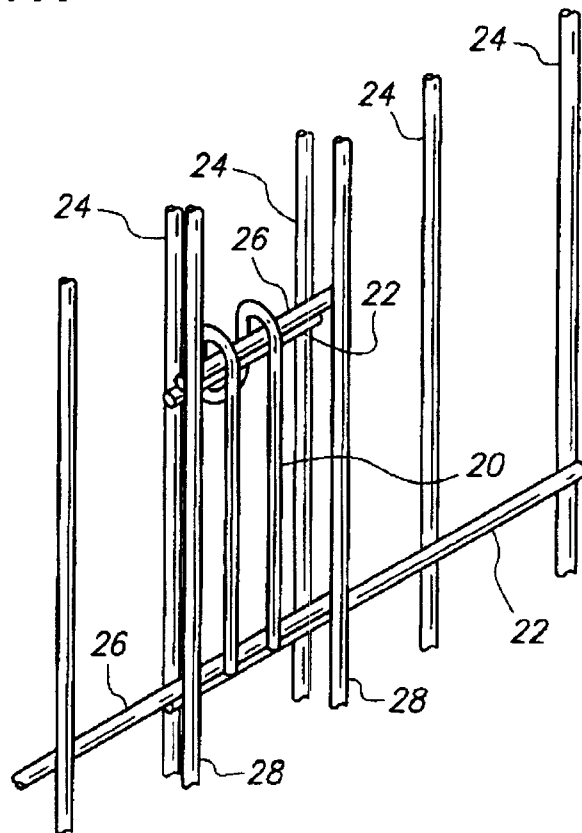


FIG. 8A

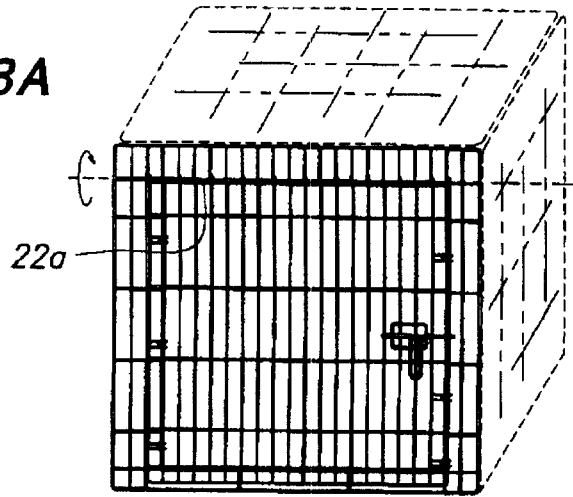


FIG. 8B

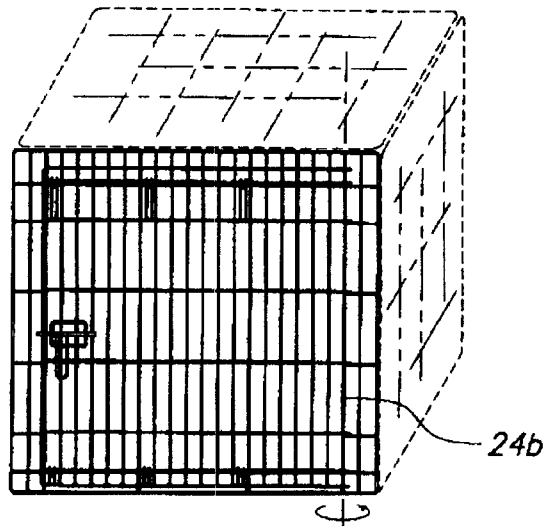
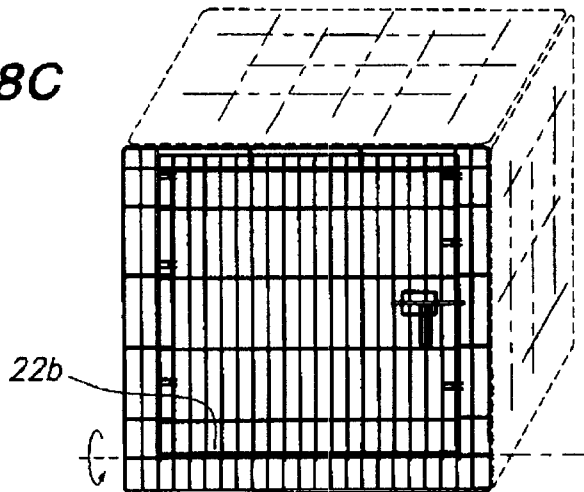


FIG. 8C



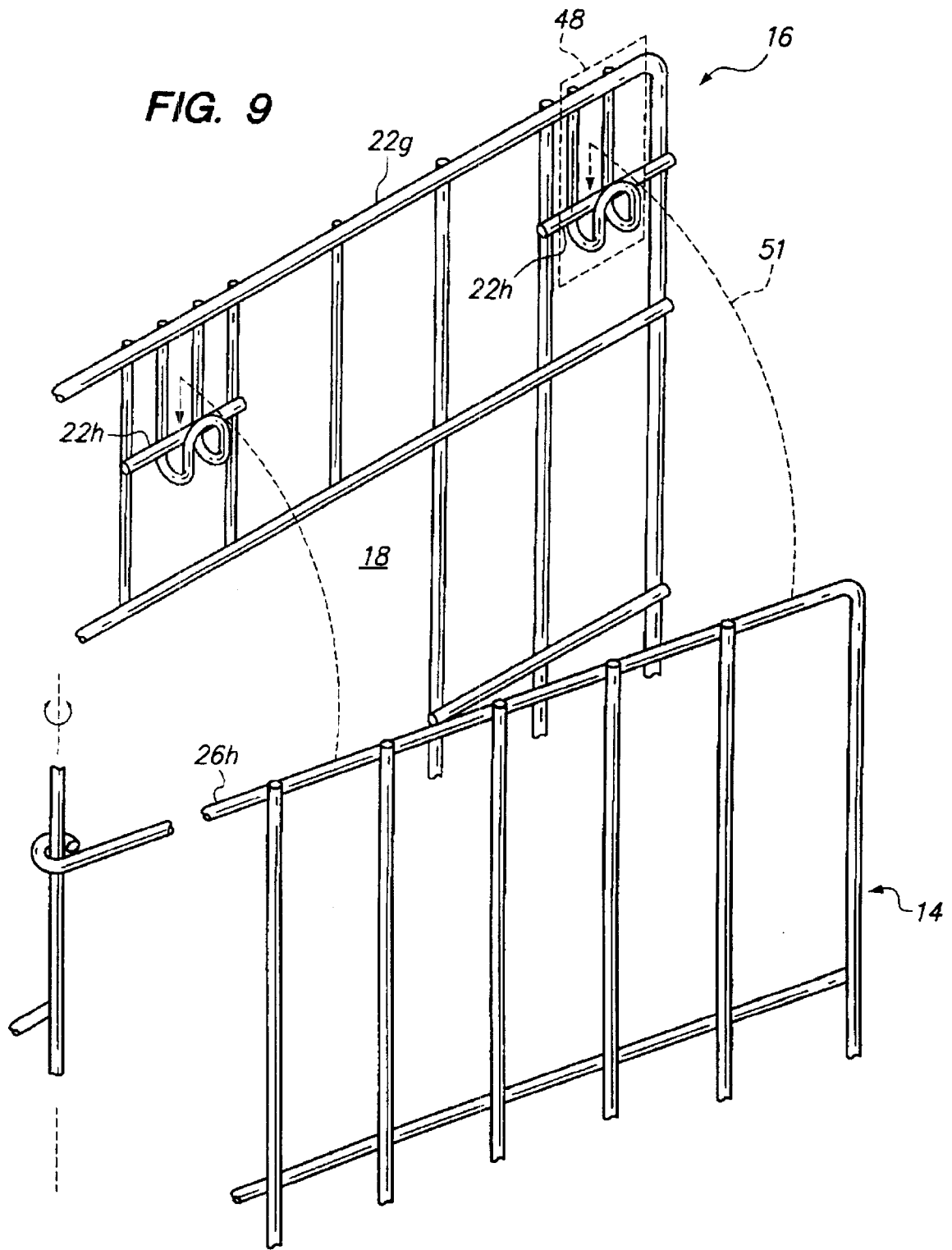


FIG. 10

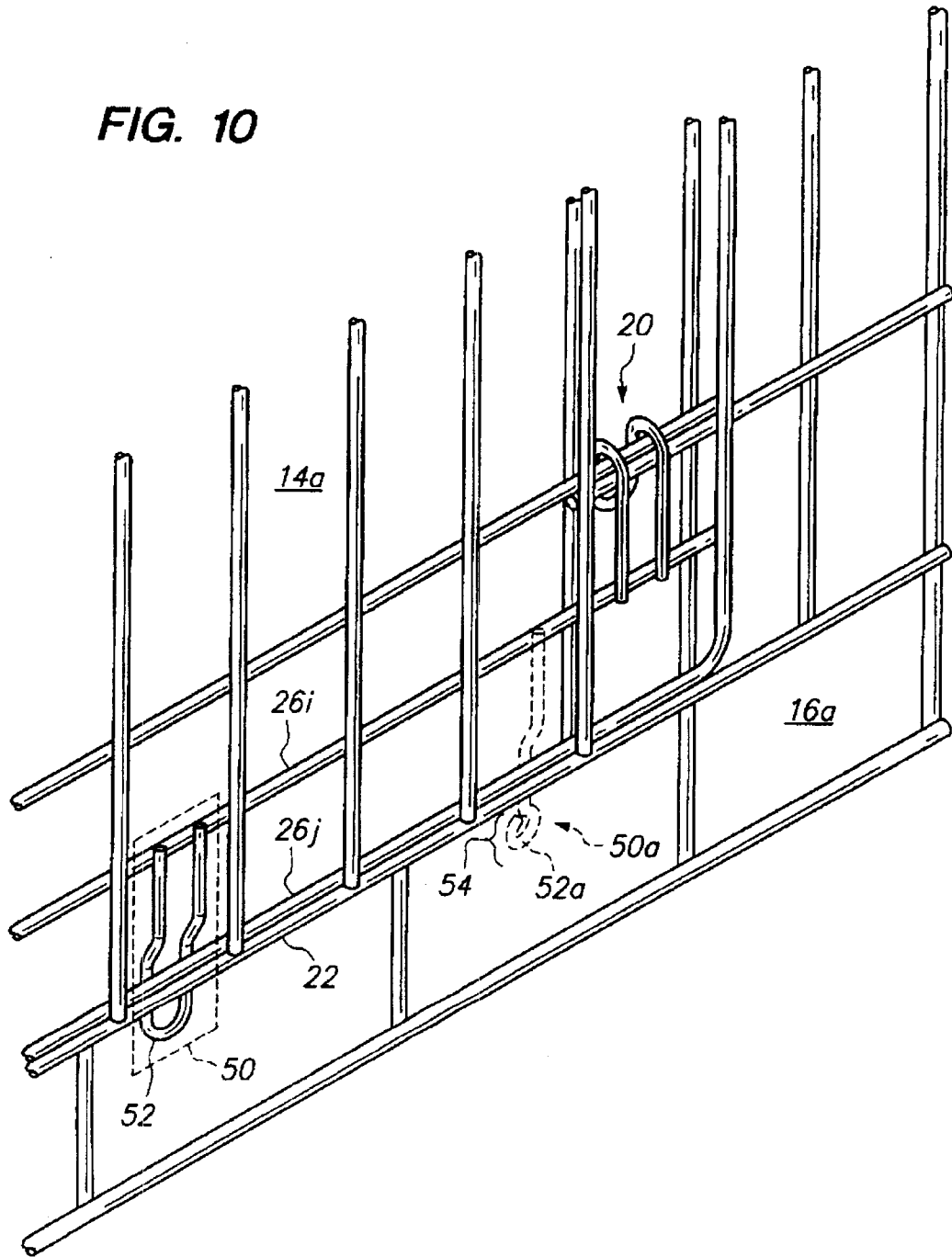


FIG. 11

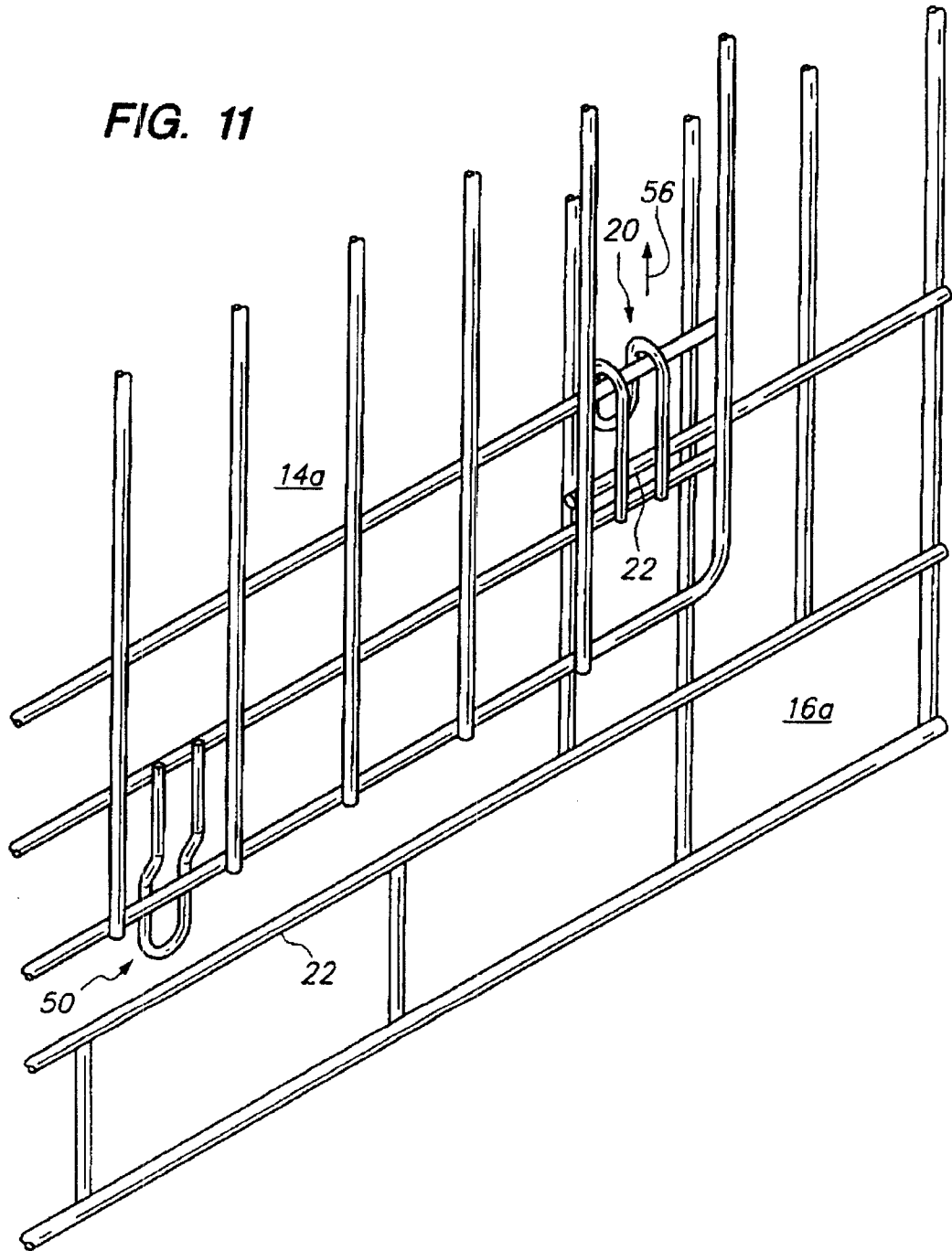


FIG. 12

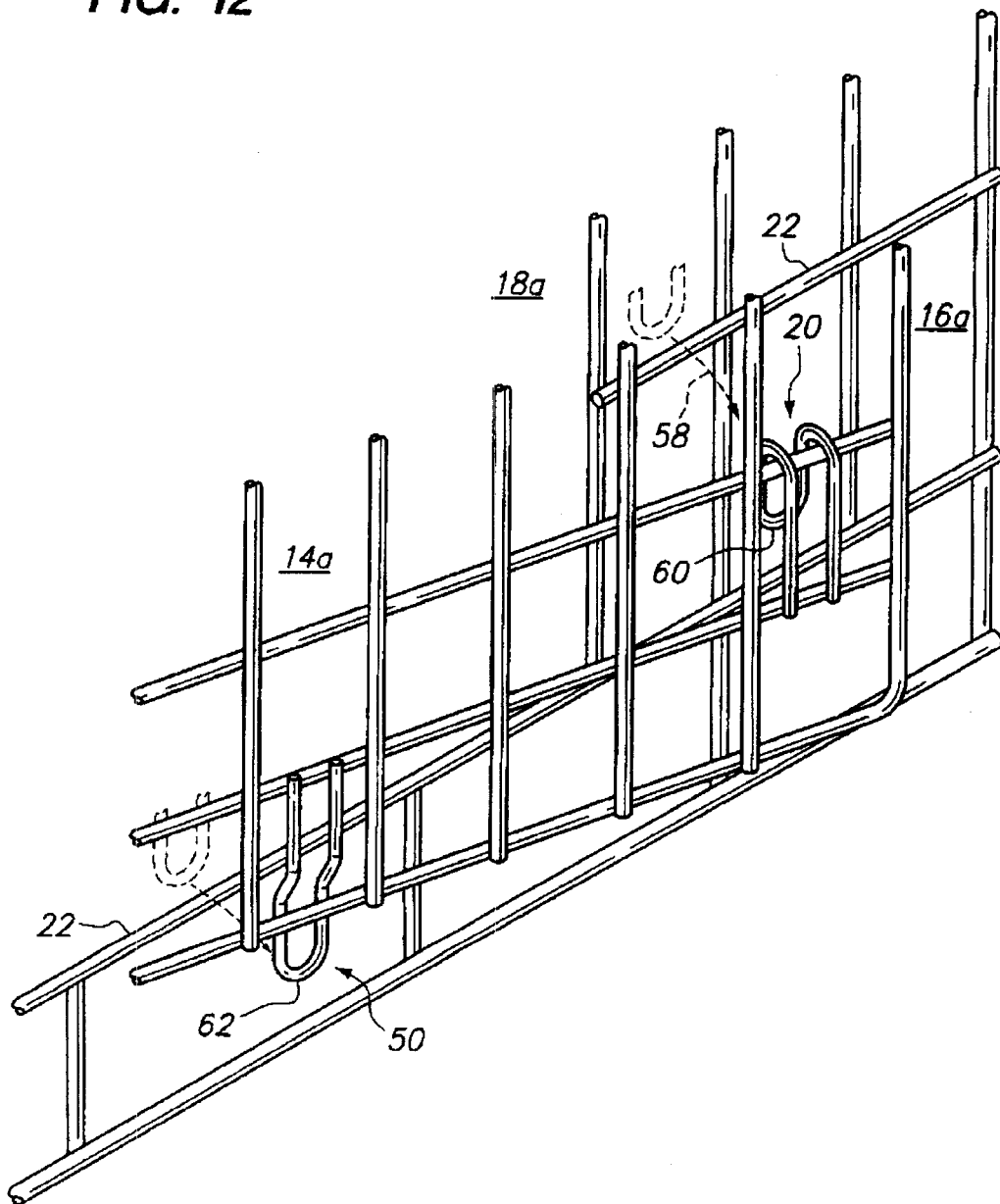


FIG. 13

