

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/106529 A2

(51) International Patent Classification:
A47B 43/00 (2006.01)

(21) International Application Number:
PCT/US2007/006418

(22) International Filing Date: 14 March 2007 (14.03.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/782,214 14 March 2006 (14.03.2006) US
11/716,865 12 March 2007 (12.03.2007) US

(71) Applicant and

(72) Inventor: **SABOUJIAN, Azad** [US/US]; 17421 Von Karman, Irvine, California 92614 (US).

(74) Agent: **STETINA BRUNDA GARRED & BRUCKER;**
75 Enterprise, Suite 250, Aliso Viejo, California 92656 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

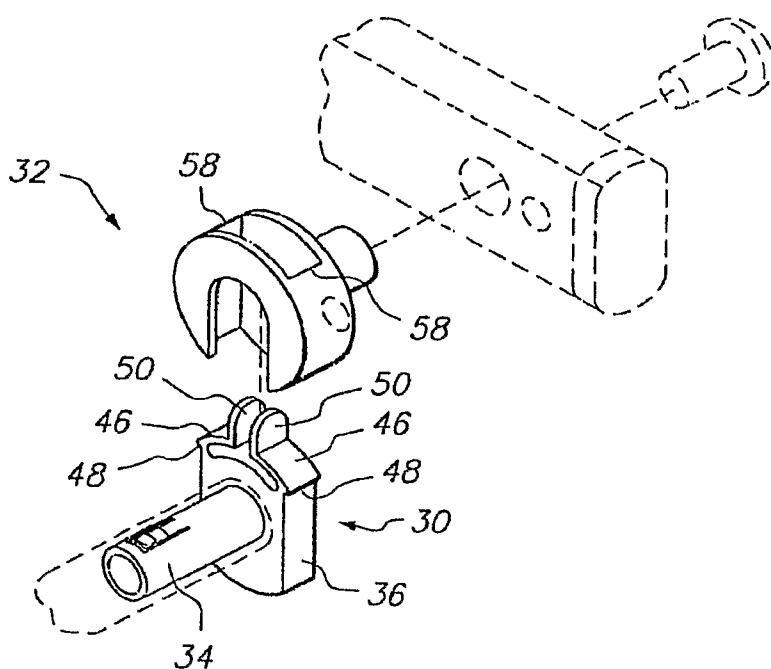
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **CONNECTOR FOR LAUNDRY RACK**



(57) Abstract: A collapsible laundry rack is provided wherein a plurality of cross members for hanging clothes may be attached to first and second scissor structures via a plurality of tab connectors and socket connectors. In particular, the distal ends of the cross members may be attached to the socket connector which is selectively removable from tab connectors attached to corresponding points of the first and second scissor structures. A socket portion of the socket connector may be aligned to a tab portion of the tab connector. Release levers formed on the tab portion may be inserted into the socket until retention members of the tab portion engage cam edges of the socket portion. To remove the tabs from the socket, the release levers may be inwardly deflected to deflect the retention members inwardly to release the retention members from the cam edges. Alternatively, the tab connectors may be attached to distal ends of the

cross members. Also, the socket connectors may be attached to corresponding points of the first and second scissor structures.

CONNECTOR FOR LAUNDRY RACK

CROSS-REFERENCE TO RELATED APPLICATIONS

5 The application claims the benefit under 35 U.S.C. § 119(e), of application serial no. 60/782,214, filed March 14, 2006, the entire contents of which are incorporated herein by reference.

STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT
Not Applicable

10

BACKGROUND

The present invention relates generally to laundry drying racks, and more particularly to collapsible laundry drying racks.

15 Conventional laundry drying racks may be used to dry laundered items when the laundered items are too delicate to be placed in an electric dryer because the laundered items may shrink when exposed to excessive heat. Laundry drying racks may also be used to temporarily store clothes during ironing tasks. For example, a user may place a plurality of ironed shirt on the laundry rack to prevent the ironed shirts from wrinkling as would occur if the ironed shirts were stacked upon each
20 other.

In order to minimize the price of the laundry drying rack to an end consumer, the laundry rack may be sold, packaged and shipped in a partially disassembled state. The end consumer or user would finish assembly of the laundry rack upon purchase and receipt of the laundry rack. This permits the laundry drying rack manufacturer to
25 shift the cost of manufacturing the laundry drying rack to the end consumer thereby lowering the price of the laundry drying rack to the end consumer at the retail level. Further, packaging and shipping the laundry drying rack in the partially disassembled state reduces the size of the shipping package of the laundry drying rack thereby reducing the cost to ship the laundry drying rack from the manufacturer to the retail
30 store or the end consumer. Unfortunately, conventional laundry drying racks, frequently comprise numerous components which makes assembly difficult and time consuming. Further, use of fasteners for the assembly may further require tools for the

attachment thereof. Accordingly, it may be unfeasible to shift the cost of assembly to the end consumer.

Accordingly, there is a need in the art for an improved laundry drying rack.

5

BRIEF SUMMARY

The laundry rack discussed herein addresses the problems identified above, discussed herein and those that are known in the art.

10

The laundry rack may be collapsible from an upright position to a folded position. In the upright position, the laundry rack may have a plurality of cross members spread apart such that a user may hang clothes for air drying the same. In the folded position, the laundry rack has a compact configuration for storage and/or shipment. The laundry rack may comprise a first scissor structure and a second scissor structure. The cross members may be disposed therebetween in parallel relationship and attached to the first and second scissor structures.

15

20

The cross members may be attached to the first and second scissor structures via tab connectors and socket connectors. In a first embodiment of the laundry rack, the tab connectors may be attached to distal ends of the cross members. Also, the socket connectors may be attached to the first and second scissor structures at mutually corresponding locations. The tab connector is selectively removable from the socket connector. In particular, the tab connector may comprise a tab portion having release levers formed with retention members. When the release levers are inwardly pressed together, the retention members are also inwardly deflected.

25

The socket connector may have a socket portion having a through hole. The through hole is sized and configured to receive the tab portion of the tab connector. The sidewall of the socket portion is also formed with a U-shaped cut out to permit the cross member to extend from the tab portion and through the U-shaped cut out.

30

To engage the socket connector to the tab connector, the tab portion is inserted into a gate of the through-hole of the socket portion with the retention members pointed toward the through hole. As the tab portion proceeds through the through hole, retention members of the tab portion deflect inwardly due to the inner surface of the through hole. Also, the cross member may be received into the U shaped cut out. When the tab portion is fully inserted into the through hole, the retention members engage cam edges of the socket portion preventing removal of the tab portion from

the socket portion. Also, the cross member is received into the U shaped cut out preventing the tab portion from slipping out of the through hole at an exit thereof. At this point, the tab connector is connected to the socket connector and may be removed only by depressing the release levers. To remove the tab portion from the socket
5 portion, the release levers are deflected inwardly which also deflects the retention members inwardly to disengage the retention members from the cam edges. The user may then remove the tab portion from the socket portion.

BRIEF DESCRIPTION OF THE DRAWINGS

10 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:

 Figure 1 is a perspective view of a first embodiment of a laundry rack in an expanded position;

15 Figure 2 is a perspective view of the laundry rack of Figure 1 in a folded position;

 Figure 3 is an enlarged view of the upper rack portion connected to a locking cross member of Figure 1;

 Figure 4 is a disassembled view of the laundry rack of Figure 1;

20 Figure 5A is a perspective view of an unassembled laundry rack of Figure 1 illustrating a first step of engaging the locking cross member to first and second scissor structures;

 Figure 5B is a perspective view of the unassembled laundry rack of Figure 1 illustrating a second step of connecting cross members to legs of an upper rack
25 portion;

 Figure 5C is a perspective view of the laundry rack of Figure 1 illustrating a third step of connecting the cross members to the first and second scissor structures;

 Figure 6A is a perspective view of a first embodiment of a tab connector aligned to a socket connector with release levers of the tab connector directed toward
30 a socket or through hole of the socket connector;

 Figure 6B is a perspective view of the first embodiment of the tab connector engaged to the socket connector;

Figure 6C is a perspective view of the first embodiment of the engaged socket connector and tab connector wherein fingers depress the release levers to prepare disengagement of the tab connector from the socket connector;

Figure 6D is a perspective view of the first embodiment of the tab connector disengaged from the socket connector;

Figure 7 is a front view of the cross member, tab connector, socket connector, leg and screw of the first embodiment;

Figure 8 is a perspective view of the first embodiment of the socket connector;

Figure 9 is a second embodiment of the laundry rack illustrating a tab connector attached to a leg of the first or second scissor structures and a socket connector attached to a cross member;

Figure 10 is a front view of the cross member, socket connector, tab connector, leg and screw of the second embodiment; and

Figure 10A is a side view of the socket connector.

DETAILED DESCRIPTION

As a preliminary matter, references to upper, lower, right, left, forward and rear are for convenience and are not meant to limit the scope of the aspects of the laundry rack.

Referring now to the drawings which are for the purposes of illustration and not for the purposes of limiting the laundry rack, 10 which will be described herein, Figure 1 shows a perspective view of a laundry rack 10 which is collapsible into a folded position (See Figure 2) and expandable to an upright position (See Figure 1). Cross members 12 are disposed apart from each other such that laundry (e.g., shirts, pants, etc.) may be hung over the cross members 12 for air drying. After the clothes are air-dried, the user may remove the clothes and traverse the laundry rack 10 to the folded position (See Figure 2) for compact storage. The laundry rack 10 provides a convenient mode of storage by being collapsible to the folded position so as to occupy a minimal amount of space. The folded laundry rack may then be stored between objects, in small crevices or under the bed.

The laundry rack 10 may comprise a first scissor structure 14 and a second scissor structure 16 (see Figures 1, 2, and 4). Preferably, the first scissor structure 14 has a mirror configuration compared to the second scissor structure 16. Also, the first

and second scissor structures 14, 16 work in conjunction with each other such that the laundry rack 10 may be traversed between the expanded position and the folded position. The cross members 12 are attached to the first and second scissor structures 14, 16 at mutual spatial reference points on the first and second scissor structures 14, 16 such that the cross members 12 are parallel with respect to each other. For example, the first and second scissor structures 14, 16 along with the cross members 12 may define an upper rack portion 18. The upper rack portion 18 may have a first leg 20 and a second leg 22 disposed parallel to the first leg 20. The upper rack portion 18 may have three cross members 12 disposed between the first and second legs 20, 22 and attached thereto. The first cross member 12 may be interposed between the first and second legs 20, 22 and attached at the right distal ends of the first and second legs 20, 22. The second cross member 12 may be offset to the left of the first cross member 12 approximately one-third of a length of the legs 20, 22. The third cross member 12 may be offset from the second cross member 12 in a similar manner that the second cross member 12 is offset from the first cross member 12. Accordingly, preferably, the cross members 12 are attached to mutual corresponding points on the first and second legs 20, 22 such that the cross members 12 are parallel with respect to each other. More broadly, the cross members 12 may be attached to corresponding points on the first and second scissor structures 14, 16 such that the cross members 12 are parallel with respect to each other.

As stated above, the laundry rack 10 is traversable between the folded position and the expanded position. To retain the laundry rack 10 in the expanded position, the upper rack portion 18 is selectively engageable to a locking cross member 12a attached to the upper left most corner of the first and second scissor structures 14, 16. When the laundry rack 10 is traversed to the expanded position, the upper rack portion 18 may be engaged to the locking cross member 12a. In this manner, upper distal ends of the first and second scissor structures 14, 16 are prevented from expanding away or contracting toward each other. Hence, the laundry rack 10 remains in the expanded position. To collapse the laundry rack 10, the upper rack portion 18 is disengaged from the locking cross member 12a. The laundry rack 10 may then be pushed down toward the ground to traverse the laundry rack 10 to the folded position.

The upper rack portion 18 may be locked onto the locking cross member 12a, as shown in Figure 3. In particular, the upper rack portion 18 may be formed with an undercut groove 24 which surrounds or receives the locking cross member 12a. Once the undercut groove 24 receives the locking cross member 12a, a clasp 26 may be pivoted under the locking cross member 12a. The clasp 26 may be biased toward the closed position to retain the locking cross member 12a in the undercut groove 24. Alternatively, the clasp 26 may have an interference fit with the locking cross member 12a to retain the clasp 26 in the closed position (shown in solid lines) and the locking cross member 12a in the undercut groove 24. To remove the upper rack portion 18 from the locking cross member 12a, the clasp 26 may be traversed to an open position (shown in dashed lines) such that the upper rack portion 18 may be pivoted up and away from the locking cross member 12a, as shown by arrow 28 in Figure 1.

As shown in Figure 4, the laundry rack 10 of Figure 1 may be provided to the user in a disassembled state to further reduce the storage volume of the laundry rack 10 compared to the folded position of the laundry rack 10. Also, the laundry rack 10 may be provided (i.e., sold, packaged and shipped) to the user in the disassembled state to reduce the price of the laundry rack 10 to the user. Providing the laundry rack 10 to the user or consumer in the disassembled state may serve two purposes. First, the cost to ship or transport the disassembled laundry rack 10 is less compared to the cost to ship the folded and assembled laundry rack 10 because the disassembled laundry rack 10 is smaller volumetrically compared to the laundry rack 10 in the folded position. Second, the manufacturer shifts a portion of the laundry rack's manufacturing cost to the consumer thereby reducing the cost and price of the laundry rack 10 because the consumer performs the task of completing assembly of the laundry rack 10.

Moreover, the laundry rack 10 may be provided as a kit containing the first scissor structure 14, the second scissor structure 16 and a plurality of cross members 12 which may be selectively attachable to the first and second scissor structures 14, 16. To assemble the laundry rack 10, the user may attach the locking cross member 12a (see Figure 4) to the first and second scissor structures 14, 16 at the upper left distal portions of the first and second scissor structures 14, 16 (see Figure 1). The first and second legs 20, 22 of the upper rack portion 18 may be engaged to the locking cross member 12a, as shown in Figure 5A. At this point, the first and second

scissor structures 14, 16 are expanded and locked because the first and second legs 20, 22 of the upper rack portion 18 is engaged to the locking cross member 12a. Thereafter, the cross members 12 may be attached to the first and second legs 20, 22 of the upper rack portion 18, as shown in Figure 5B. The remaining cross members 12 may then be attached to the first and second scissor structures 14, 16 at pre-determined corresponding locations about the first and second scissor structures 14, 16, as shown in Figure 5C.

In a first embodiment, the cross members 12 are attachable to the first and second scissor structures 14, 16 via a set of tab connector 30 and socket connector 32. The tab connector 30 is more particularly shown in Figures 6A and 7. The tab connector 30 may have a post 34 which extends perpendicularly from a tab portion 36 of the tab connector 30. The distal ends of the cross members 12 may each have a central aperture 38 sized and configured to receive the post 34 of the tab connector 30. The post 34 of the tab connector 30 may be inserted into the central aperture 38 at the distal ends of the cross members 12. When the post 34 is fully inserted into the distal end of the cross member 12, an outwardly biased detent 40 may be received into a receiving aperture 42 formed through the wall 44 of the cross member 12. This axially and rotationally locks the tab connector 30 to the cross member 12 and rotationally locks the tab connector 30 to the cross member 12.

The socket connectors 32 may be attached to the first and second scissor structures 14, 16. Also, the tab connectors 30 may be engaged to and removed from the socket connectors 32 to engage or remove the cross members 12 from the scissor structures 14, 16, as shown in Figures 6A-6D. In particular, the tab connector 30, and more particularly, the tab portion 36 may have opposed release levers 46 which are outwardly biased and have retention members 48 formed at an outer periphery thereof. Distal ends of the opposed release levers 46 may have finger platforms 50 which are graspable by the human hand to deflect the retention members 48 inwardly, which as will be discussed further below, to remove the tab connector 30 from the socket connector 32. With the cross member 12 in hand, the user may align the tab connector 30 to the socket connector 32 with the opposed release levers 46 directed toward a socket 52 (e.g., through hole) of the socket connector 32, as shown in Figures 6A and 7. The tab portion 36 is then inserted into the socket 52 through its gate 54 (see Figures 7 and 8). As the tab portion 36 proceeds through the socket 52,

the release levers 46 are slightly inwardly deflected because a distance between the inner surfaces 56 of the socket or through hole 52 is narrower compared to a distance between the retention members 48 when release levers 46 are released. When the tab portion 36 is fully inserted into the socket 52, the retention members 48 engage cam edges 58 of the socket connector 32, as shown in Figure 6B. At this point, the retention members 48 deflect outwardly to lock the tab connector 30 to the socket connector 32. To remove the cross member 12 from the scissor structures 14, 16, the user may depress the release levers 46 together which deflects the retention members 48 inwardly to avoid contact between the retention members 48 and the cam edges 58, as shown in Figure 6C. The tab portion 36 may then be slid out of the socket 52 of the socket connector 32, as shown in Figure 6D.

The retention members 48 may have a hook configuration, as shown in Figures 6A and 9. Each of the retention members 48 may be pointed away from each other. The cam edges 58 may be sized and configured to catch or retain a hook portion of the retention members 48. In this manner, when the tab portion 36 is fully inserted into the through hole or socket 52 of the socket connector 32, the hook portions of the retention member 48 catch the cam edges 58 to attach the tab connector 30 and the socket connector 32. Although the retention member 48 has been described as having a hook configuration, it is also contemplated that the retention member 48 may have other configurations such as tapered, J shaped, etc. with corresponding shaped cam edges which retain or catch the retention member when the tab portion 36 is fully inserted into the socket 52.

The socket connectors 32 may be attached to the first and second scissor structures 14, 16 at pre-determined corresponding location. As shown in Figures 7 and 8, the socket connector 32 may have a socket portion 60 and a post portion 62. The post portion 62 is insertable into a corresponding aperture 64 formed through legs of the first and second scissor structures 14, 16. Once the post 62 is fully inserted into the aperture 64, a screw 66 may be screwed into the post 62 of the socket connector 32 to lock the socket connector 32 to the leg. A detent 68 having a nub configuration formed on a medial surface of the socket portion 60 may be received into a detent aperture 70 formed on the inner surface of the legs. This fixes the rotational movement of the socket connector 32 to the legs such that the socket connectors 32 are generally aligned (see Figure 5C) to the tab connectors 30 and the cross members.

12 are easily engageable to the legs of the first and second scissor structures 14, 16. A throat distance 72 of the post portion 62 may be dependent upon the thickness of the leg. For example, in the upper rack portion 18, the two middle socket connectors may have a throat distance 72 which is equal to or slightly less than the thickness of the leg 20, 22. In this manner, the screw 66 may be screwed onto the post portion 62 and tightened onto the leg 20, 22. In contrast, the throat distance 72 of the socket connector 32 at the right-most distal ends of the legs 20, 22 of the upper rack portion 18 may be longer than a thickness of the two legs. The post portion 62 may also be sized and configured to proceed through two aligned holes of the legs. A screw 66 may then be screwed onto the post portion 62 to tightly secure the socket connector 32 to the scissor structure 14, 16. Since the post portion 62 is longer than the thickness of the two legs, the screw 66 is torqued onto the post portion 62 and not on the legs themselves. Accordingly, there is a loose fit between the legs, and the legs are pivotable with respect to each other.

15 An optional sliding washer may be fitted between the legs at each linkage joint 74 which permit rotational movement therebetween despite the existence of a compressive force caused by the socket portion 60 and the head of the screw 66. At every linkage joint 74 of the first and second scissor structures 14, 16, the sliding washer may be interposed between the legs, and the post portion 62 may be inserted into aligned holes. In this alternative configuration, the throat distance 72 of the post portion 62 of the socket connector 32 may be slightly smaller compared to the sum of the thicknesses of the two legs and the sliding washer. When the screw 66 is tightened onto the post portion 62, the screw 66 may be torqued onto the legs. Fortunately, the sliding washer permits rotational movement between the two legs despite the compressive force of the screw 66 and the post portion 62.

20 Alternatively, in a second embodiment of the laundry rack shown in Figures 9, 10 and 10A, the cross members 102 may be attached to the first and second scissor structures 14, 16 via tab connectors 104 and socket connectors 106 except that the tab connectors 104 are attached to the legs 138 of the first and second scissor structures 14, 16 and the socket connectors 106 are attached to distal ends of the cross members 102. In this second embodiment, the socket connector 106 may have a socket portion 108 and a post portion 110. The post portion 110 is insertable into the central aperture 112 formed at the distal ends of the cross members 102. The post portion

110 of the socket connector 106 may be formed with a detent 114 which is received into the receiving or detent aperture 116 of the cross member 102. In particular, the post portion 110 of the socket connector 106 may be inserted into the central aperture 112 formed in the distal end of the cross member 102. When the socket portion 108 is fully inserted into the central aperture 112 of the cross member 102, the detent 114 may spring or deflect outwardly into the receiving or detent aperture 116. This locks the axial position and the angular orientation of the socket connector 106 with respect to the cross member 102. The socket portion 108 may be formed with the through hole 118 and the U shaped cut out section 120 (see Figure 10A). The U shaped cut out 76 of the first embodiment is shown in Figure 8. However, in this second embodiment, the U shaped cut out section 120 is sized and configured to receive a spacer 122 of the tab connector 10, as will be discussed further below.

The tab connector 104 may be connected to the legs of the first and second scissor structures 14, 16 in a similar manner that the socket connectors 32 discussed above in relation to the first embodiment are connected to the legs.

The tab connector 104 may have a tab portion 124, a spacer 122, a collar 126, and a post portion 128. The collar 126 and the tab portion 124 may be coaxially aligned to each other and connected to each other via a spacer 122. The collar 126 may define a lateral side 130 and a medial side 132. The spacer 122 may be connected to the collar 126 on its lateral side 130, and the tab portion 124 may be connected to the spacer 122 on the opposite side of the collar 126. The post portion 110 may be coaxially aligned to the collar 126 and connected to the collar 126 on the medial side 132. The tab portion 124, spacer 122, collar 126 and post portion 110 may be formed of a unitary material.

To connect the tab connectors 104 to the legs of the first and second scissor structures 14, 16, the post portions 110 of the tab connectors 104 are inserted into apertures 134 formed in the legs of the first and second scissor structures 14, 16. For example, to connect the tab connector 104 to the first and second legs 20, 22 of the upper rack portion 18, the post portion 110 is inserted into the aperture 134 formed in the leg until the collar 126 contacts the leg to limit the insertion distance of the post portion 110 into the aperture 134. A screw 136 is then threaded onto internal threads formed in the post portion 110 to lock the axial location of the tab connector with respect to the leg. As discussed above in the first embodiment, a throat distance 72 of

the post portion 62 may be shorter compared to the thickness of the leg to permit the screw 66 to clamp the tab connector 30 down on the leg. The medial side of the collar may have a nub or detent 68 which is received into a detent aperture 70 formed on the leg when the collar contacts the leg or when the post portion 62 is inserted into the aperture 64. This locks the rotational movement of the tab connector 30 with respect to the leg. When the tab connectors 30 join two legs at a linkage joint 74, the throat distance 72 of the post portion 62 may be slightly longer than the thickness of the legs to permit the legs of the first and second scissor structures 14, 16 to pivot with respect to each other. A sliding washer may be interposed between two legs to promote pivotal motion of the legs, as discussed in relation to the first embodiment. The tab connectors 30 may be attached to the first and second scissor structures 14, 16 at corresponding locations throughout the entire first and second scissor structures 14, 16.

As in the first embodiment, the second embodiment of the laundry rack 10 may be provided to the user in a disassembled state to reduce the storage volume of the laundry rack 10 thereby reducing transportation costs to the consumer and to shift a portion of the laundry racks manufacturing cost to the consumer thereby reducing the price of the laundry rack.

The laundry rack 10 may be provided to the consumer as a kit containing the first scissor structure 14, the second scissor structure 16 and a plurality of cross-members 102 which may selectively attachable to the first and second scissor structures 14, 16. In this second embodiment, the socket connectors 106 are connected to distal ends of the cross members 102 and tab connectors 104 are connected to the first and second scissor structures 14, 16. To assemble the laundry rack 10, the user may attach the locking cross member 12 to the upper left distal portions of the first and second scissor structures 14, 16. In particular, the user aligns the gate 146 of the through hole 118 of the socket portion 108 toward the retention members 148 of the tab portion 124. The retention members 148 of the second embodiment may have a similar configuration as the retention members 48 of the first embodiment. The socket portion 108 is then pushed onto the tab portion 124 thereby traversing the tab portion 124 into the through hole 118 of the socket portion 108. As the tab portion 124 is being traversed through the through hole 118, the retention members 148 are inwardly deflected by inner surfaces of the through hole 118. Also,

the retention members 148 engage the cam edges 150 of the socket portion 108 to prevent removal of the socket portion 108 from the tab portion 124 when the tab portion 124 is fully inserted into the socket 118. Also, the spacer 122 of the tab connector 104 is received into the U-shaped cutout 120 of the socket portion 108. When the retention members 148 engage the cam edges 150, the spacer 122 is fully received into the U-shaped cutout 120. The U-shaped cutout 120 and the spacer 122 permit the sidewall of the socket portion 108 to be received between the collar 126 and the tab portion 124 when the socket connector 106 is fully engaged to the tab connector 104.

With the locking cross member 12a attached to the first and second scissor structures 14, 16, the first and second legs 20, 22 of the upper rack portion 18 may be engaged to the locking cross member 12a, as shown in Figure 5a. At this point, the first and second scissor structures 14, 16 are expanded with the first and second legs 20, 22 of the upper rack portion 18 engaged to the locking cross member 12a. Thereafter, the cross members 102 may be attached to the first and second legs 20, 22 of the upper rack portion 18, as shown in Figure 5b in the same manner that the locking cross member 12a is attached to the first and second legs 20, 22 of the upper rack portion 18 discussed above. The remaining members may then be attached to the first and second scissor structures 14, 16 at pre-determined corresponding locations about the first and second scissor structures 14, 16, as shown in Figure 5c.

The laundry rack 10 is now in the expanded position or upright position. To traverse the laundry rack 10 to the folded position, the upper rack portion 18 is disengaged from the locking cross member 12a. The first and second scissor structures 14, 16 are pushed downward to fold the first and second scissor structures 14, 16 upon each other. The upper rack portion 18 is then laid against the first and second scissor structures 14, 16 and the laundry rack 10 is now traversed to the folded position.

The cross members 102 may be removed from the first and second scissor structures 14, 16 in the following manner. First, the release levers of the tab portion are inwardly deflected by pressing finger platforms together. When the release levers are inwardly deflected, retention members 148 of the tab portion 124 are also inwardly deflected which disengage the retention members 148 from the cam edges

150. The tab portion 124 may then be slipped out of the socket portion 108 to remove the cross members 102 from the first and second scissor structures 14, 16.

5 In both the first and second embodiments, the legs of the first and second scissor structures 14, 16 are preferably between about six (6) inches and thirty-six (36) inches in length, and more preferably the legs are about nineteen (19) inches in length, but the legs may also be longer or shorter. The legs preferably have a width of about 7/8 of an inch and a height of about 1/2 of an inch, but the members may have any desired configuration and dimensions depending, for example, upon the type of material used to construct the legs and the intended use of the laundry rack 10.

10 The legs 20, 22 of the upper rack portion 18 are preferably about fourteen (14) inches in height and the legs have a generally C-shaped cross section with a width of about 7/8 of an inch and a length of about 1/2 of an inch, but the legs may have different configurations and dimensions.

15 The cross members 12, 102 which interconnect the first and second scissor structures 14, 16 are preferably between about twelve (12) inches and sixty (60) inches in height and more preferably about twenty-nine (29) inches in height, but the cross members 12, 102 may be longer or shorter. The cross members 12, 102 are preferably plastic tubes with walls of about 1/16 of an inch thick and the cross members 12, 102 have an outside diameter of about 3/8 of an inch, but the cross members 12, 102 may have any desired configuration and size. The cross members 12, 102 are preferably hollow tubes for decreased weight, but the cross members 12, 102 may also be solid for increased strength. Additionally, the cross members 12, 102 may have a generally smooth cylindrical exterior surface to prevent laundry from snagging or catching on the cross members 12, 102. Alternatively, the cross members 12, 102 may have any desired shape, such as square or rectangular, and the cross members 12, 102 may be constructed from any materials such as wood or metal. The cross members 12, 102 may also include coating or layer of material, for example, to help prevent laundry from catching or snagging on the cross members 12, 102.

25 The components of the laundry rack 10 are preferably constructed from plastic, and more preferably from a thermal plastic resin such as polyvinyl chloride (PVC), but other types of plastic such as polyethylene, polypropylene or ABS may also be used. The plastic components are preferably designed to withstand temperatures of over 120°F so that the laundry rack 10 does not melt or deform when

30

used outdoors and the plastic is preferably treated by known means to resist damage from the sun, including protection from ultra violet (UV) and infrared radiation. Advantageously, the plastic components increase the life expectancy of the laundry rack 10 and the rack 10 may be used both indoors and outdoors. It will be understood that the laundry rack 10 can also be constructed from other types of plastics and other materials such as metals or composites, or wood.

The components of the laundry rack 10, including the cross members 12, 102, first and second scissor structures 14, 16 desirably fit into a small bag or enclosure for shipping and storage. Because the unassembled or partially assembled stand 10 fits within a small, compact bag or enclosure, this significantly reduces shipping, transportation and storage costs.

Although the laundry rack 10 discussed above has four (4) cross members 12, 102 forming the upper rack portion 18 and three (3) cross members 12, 102 forming the lower racks, it is also contemplated that the tab connectors 30, 104 and socket connectors 32, 106 may be disposed on the legs and the cross members 12, 102 in other configurations. For example, the lower racks and the upper rack 18 may have two (2) or more cross members 12, 102.

The first and second scissor structures 14, 16 may each comprise a plurality of legs which are arranged to expand or contract when the laundry rack 10 is traversed between the upright position and the folded position, respectively. In the upright position, the legs may have a generally X-shaped configuration, but the legs may also be aligned at other angles. Although not shown in the accompanying drawings, in the folded position, the legs are placed generally parallel or adjacent to each other. It will be understood that other types of legs, such as straight, curved, telescoping, etc., may be used with the laundry rack 10.

In an aspect of the tab connectors and the socket connectors, the same may be employed in other types of structures such as a shoe rack, table, night stand, laundry basket, and the like. By way of example and not limitation, with respect to the shoe rack, the same may have a first sidewall structure and a second sidewall structure. The first and second sidewall structures may have a scissor configuration similar to the first and second embodiments of the laundry rack. Alternatively, the first and second sidewall structures may have a flat rigid construction. The first and second sidewall structures may have a plurality of tab connectors attached thereto. The tab

connectors attached to the first sidewall structure may be aligned to the tab connectors attached to the second sidewall structure. A cross member having socket connectors attached to distal ends of the cross member may be removeably engageable to the first and second sidewall structures via the tab connectors and the socket connectors.

5 The tab connectors may be positioned on the first and second sidewall structures such that the cross members form shoe support platforms sized and configured to receive one or more pairs of shoes. In particular, the cross members may form one or more levels or shelves (i.e., shoe support platform) or receiving the pairs of shoes. Each level may have a forward cross member and a rear cross member. The rear cross member is positioned to support the heel of the shoe. More preferably, the rear cross member is positioned such that the shoe's heel hooks onto the rear cross member. The forward cross member is positioned to support the outsole of the shoe. Preferably, the forward cross member is positioned at a lower elevation compared to the rear cross member such that the shoe is tilted forward when heel of the shoe is hooked on the rear cross member and outsole is rested on the forward cross member.

 By way of example and not limitation, the shoe rack may have one level or shoe support platform for storing pairs of shoes. In particular, the shoe rack may have first and second sidewall structures. Each side wall structure may comprise a first leg and a second leg forming an X configuration when spread open. The legs may define an upper distal end and a lower distal end. The legs may be pivotally joined to each other about a middle portion thereof defining a joint. The upper distal end of the first leg may be positioned at a higher elevation compared to the upper distal end of the second leg. A tab connector may be attached to the upper distal ends of the first and second legs. A tab connector may be attached to the first and second sidewall structures at the joints thereof. A cross member may be attached to the tab connector attached at the joints for stabilizing the shoe rack. An upper rack portion may pivot about the upper distal end of the second legs of the first and second sidewall structures. The upper rack portion may lock to the cross member attached to the upper distal ends of the first legs thereby fixing the shoe rack in an erected position. At this point, the first and second sidewall structures cannot expand or collapse due to the upper rack portion being locked to the cross member (i.e., locking cross member). The cross member attached to the upper distal ends of the first legs of the first and

second sidewall structures may be higher than the cross member attached to the upper distal ends of the second legs of the first and second sidewall structures. Alternatively, the cross member attached to the upper distal ends of the first legs of the first and second sidewall structures may be level with the cross member attached to the upper distal ends of the second legs of the first and second sidewall structures in a similar manner compared to the first and second embodiments of the laundry rack. The lower distal ends of the first and second legs may be level with each other such that the shoe rack may be rested on the ground in a similar manner compared to the first and second embodiments of the laundry rack. The user may rest his/her shoes on the cross members by resting the heel of the shoe on the cross member attached to the upper distal ends of the first legs and resting the outsole on the cross member attached to the upper distal ends of the second legs.

It is also contemplated that the socket connectors may be attached to the first and second sidewall structures, and the tab connectors may be attached to the cross members. The tab connectors and socket connectors may be attached to the cross members or the first and second sidewall structures in a similar fashion discussed in relation to the first and second embodiments of the laundry rack.

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. 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. A laundry drying rack for air drying clothes, the rack comprising:
 - a) a first structure;
 - b) a second structure;
 - 5 c) a socket connector attached to the first and second structures, at least one of the socket connectors defining a socket portion, the socket portion having a through hole defining cam edges;
 - d) a cross member sized and configured to fit between the first and second structures;
 - 10 e) a tab connector attached to the cross member, at least one of the tab connector defining a tab portion sized and configured to slide into the through hole of the socket connector, the tab portion having retention members sized and configured to engage the cam edges to connect the tab connector to the socket connector.
- 15 2. The rack of Claim 1 wherein the first and second structures have a scissor configuration.
3. The rack of Claim 1 wherein the tab portions have release levers and the retention members are integrally formed with the release levers.
- 20 4. The rack of Claim 3 wherein the release levers further comprise finger platforms for inwardly deflecting the retention members and disengaging the retention members and cam edges.
5. The rack of Claim 1 wherein the socket connector has a detent formed thereon which is received into a detent depression formed on the first and second scissor structures.
- 25 6. The rack of Claim 1 wherein a distance between the retention members when relaxed is wider compared to a distance between the cam edges.
7. The rack of Claim 5 wherein a distance between inner surfaces of the through hole is narrower compared to the distance between the retention members when relaxed.
- 30 8. The rack of Claim 1 wherein a post of the socket connector extends through two legs of the first scissor structure so the two legs can rotate relative to each other about the post.

9. The rack of Claim 1 wherein the first and second scissor structures define an upper rack portion, the upper rack portion being removeably secureable to the cross member via a clasp.

5 10. The rack of Claim 1 wherein the first and second scissor structures define an upper rack portion, the upper rack portion being removeably secureable to the cross member via an interference fit between an undercut groove of a leg of the upper rack portion and the cross member.

10 11. The rack of Claim 1 wherein the socket connector defines a U shaped cutout for receiving a post of the tab connector when the tab connector is connected to the socket connector.

12. The rack of Claim 1 further comprising a threaded locking member threadably engagable a post portion of the socket connector to connect the socket connector to the first and scissor structure.

15 13. The rack of Claim 1 wherein the threaded locking member is a screw.

14. The rack of Claim 1 wherein a post of the tab connector has a post with a detent and the cross member has a central aperture for receiving the post and a detent aperture for receiving the detent of the post, the post being insertable into the central aperture and the detent receivable into the detent aperture for connecting the tab connector to the cross member.

20 15. The rack of Claim 1 wherein the retention members have a hook configuration or a J shaped configuration.

16. A laundry drying rack for air drying clothes, the rack comprising:

- a) a first scissor structure;
- b) a second scissor structure;
- 25 c) a tab connector attached to the first and second scissor structures, at least one of the tab connectors defining a tab portion with retention members;
- d) a cross member sized and configured to fit between the first and second scissor structures;
- 30 e) a socket connector attached to the cross member, at least one of the socket connector having a socket portion defining a through hole, the through hole sized and configured to receive the tab portion and having cam

edges sized and configured to receive the retention members to connect the tab connector to the socket connector.

17. The rack of Claim 16 wherein the tab connector has a tab portion and a post portion interposed by a spacer and a collar.

5 18. The rack of Claim 17 wherein the socket connector has a U shaped cutout which is received between the collar and the tab portion.

19. The rack of Claim 18 wherein the spacer is received within the U shaped cutout of the socket connector.

10 20. An attachment device for connecting a first member to a second member, the connector comprising:

a. a tab connector attachable to the first member, the tab connector formed with retention members;

15 b. a socket connector attachable to the second member, the socket connector having a socket portion defining a through hole, the through hole sized and configured to receive the tab portion and having cam edges sized and configured to receive the retention members to connect the first member to the second member.

20 21. The device of Claim 20 wherein the retention members have a hook configuration and the cam edges of the socket connector are sized and configured to catch the retention members when a tab portion of the tab connector is fully inserted into the through hole of the socket connector.

22. The device of Claim 20 further comprising a screw attachable to a post portion of the tab connector for attaching the tab connector to the first member.

25 23. The device of Claim 20 further comprising a screw attachable to a post portion of the socket connector for attaching the socket connector to the second member.

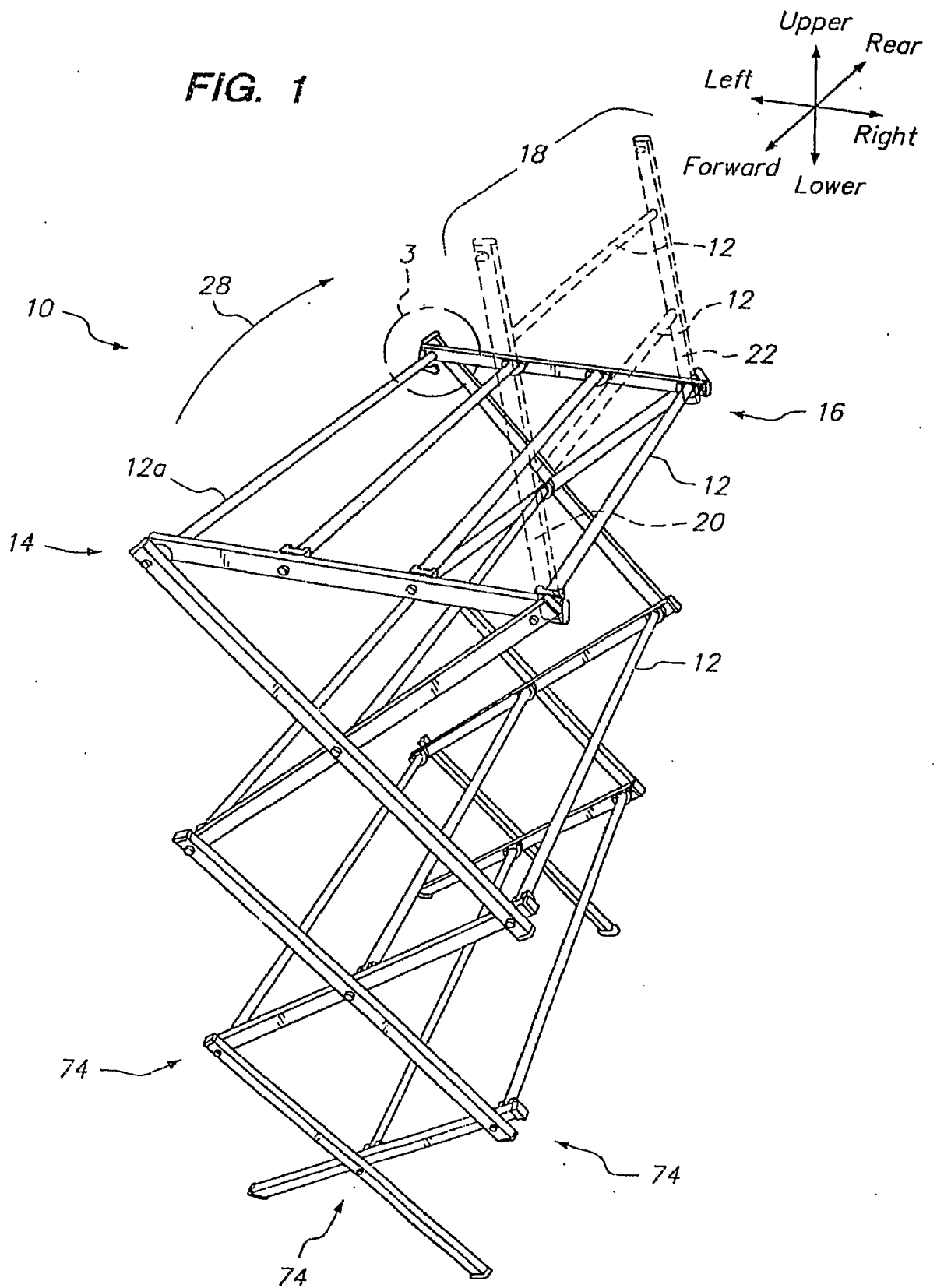
24. The device of Claim 20 wherein the socket connector has a socket portion, the socket portion having a U shaped cutout for receiving a post portion of the tab connector.

30 25. The device of Claim 20 wherein the retention members are integrally formed with release levers.

26. The rack of Claim 25 wherein the release levers further comprise finger platforms for inwardly deflecting the retention members and disengaging the retention members and cam edges.

1/7

FIG. 1



2/7

FIG. 2

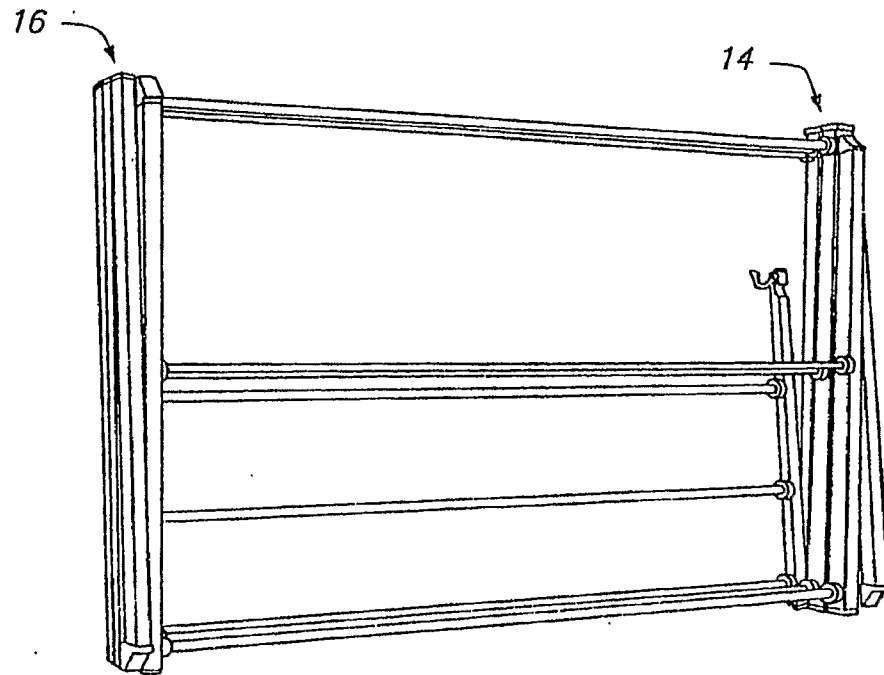
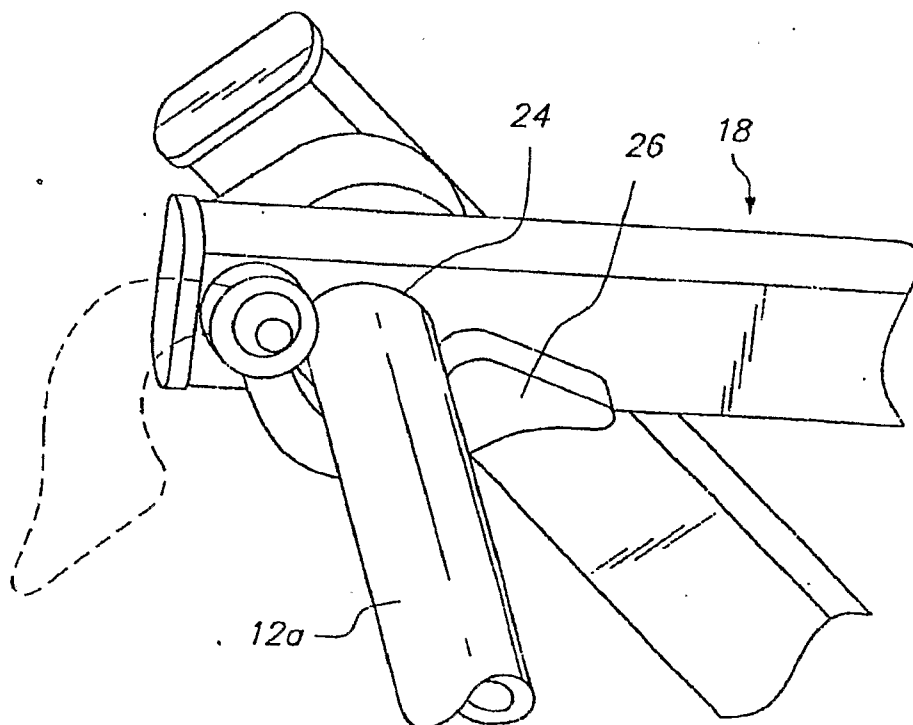
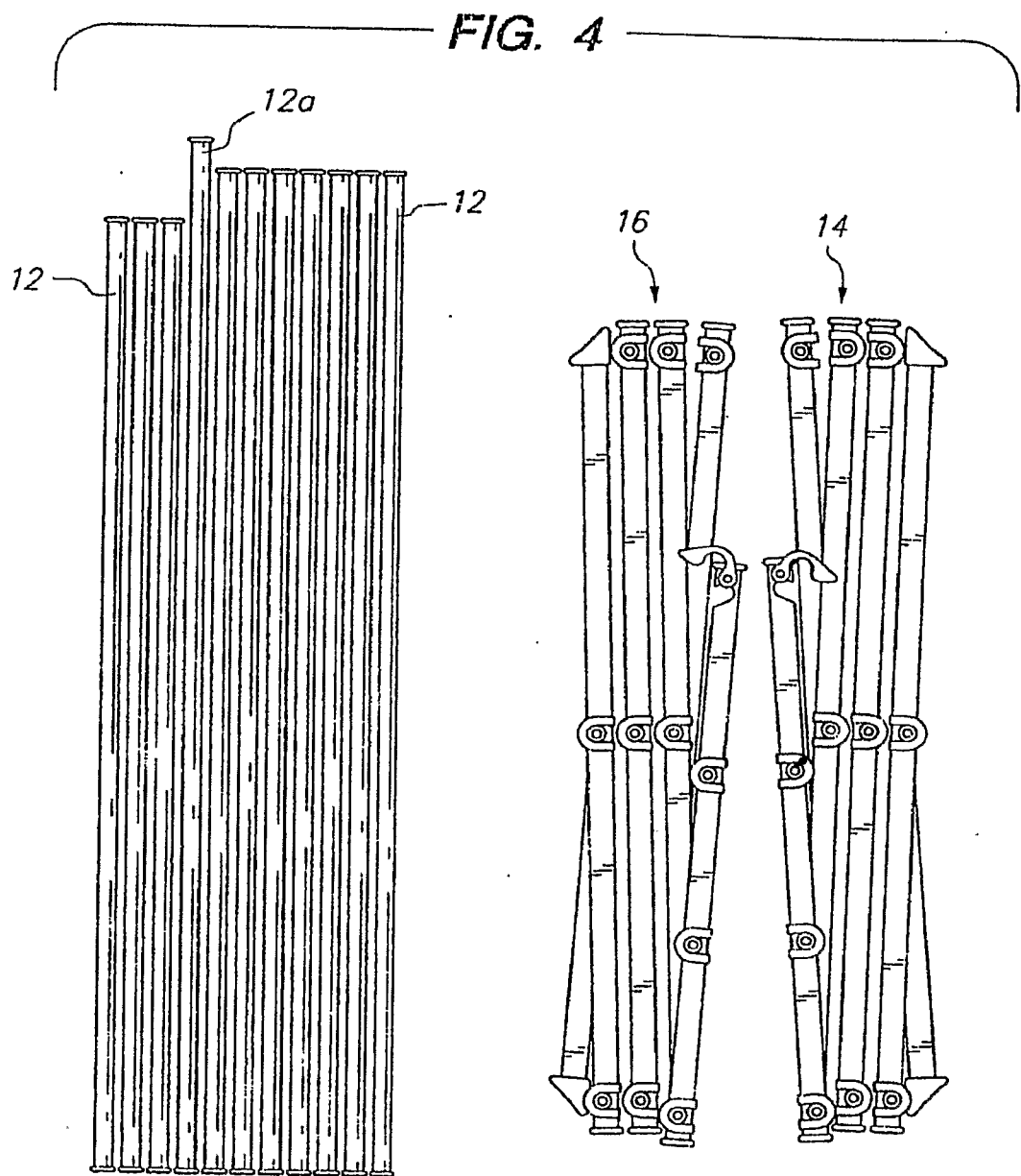


FIG. 3



3/7



4/7

FIG. 5A

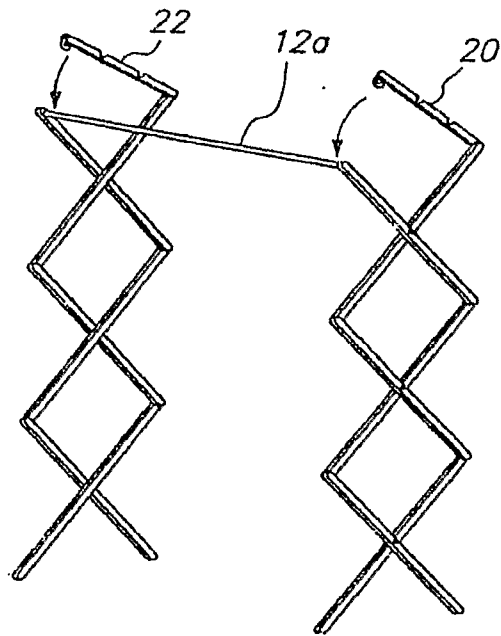


FIG. 5B

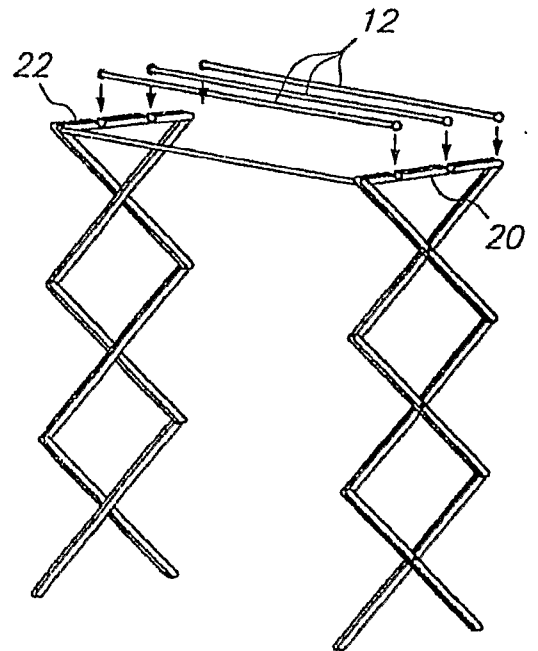
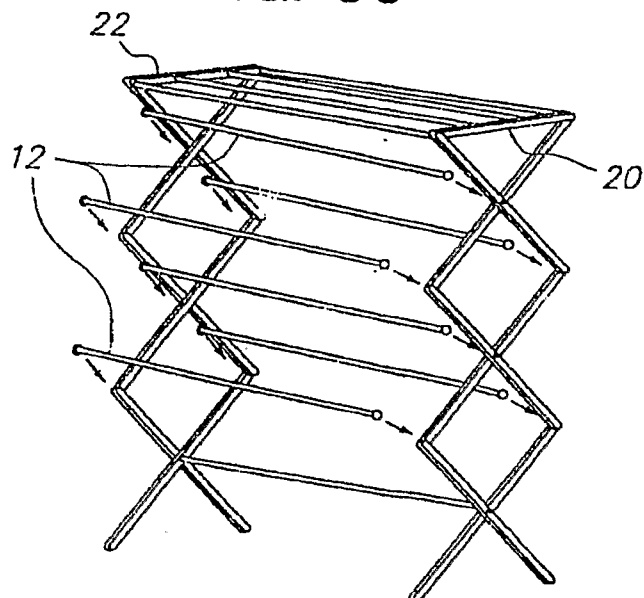


FIG. 5C



5/7

FIG. 6A

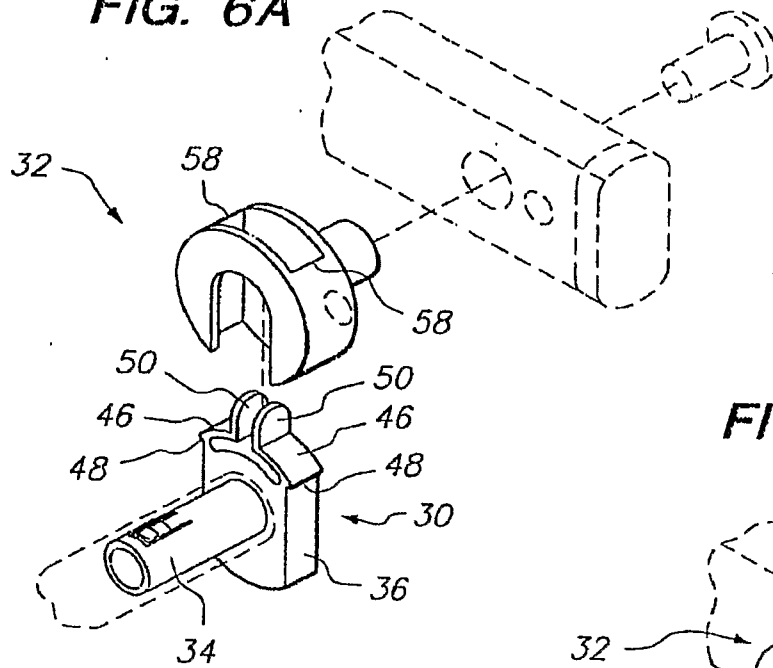


FIG. 6B

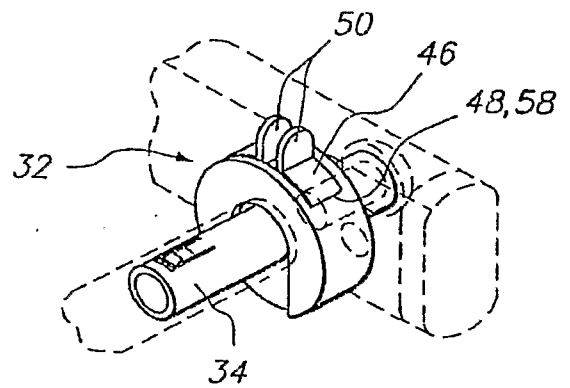


FIG. 6C

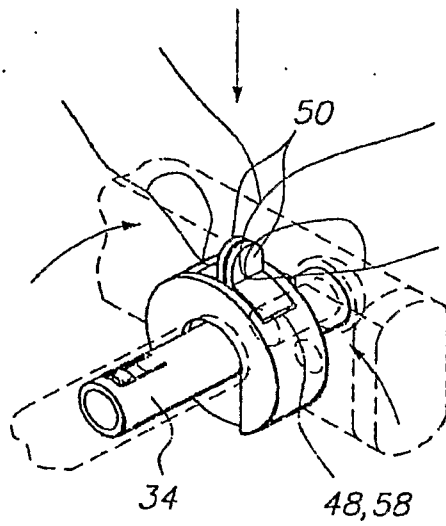
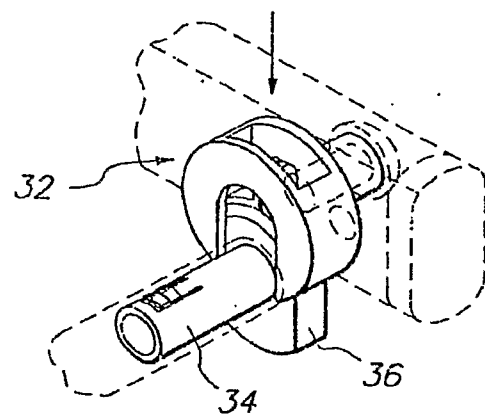


FIG. 6D



617

FIG. 7

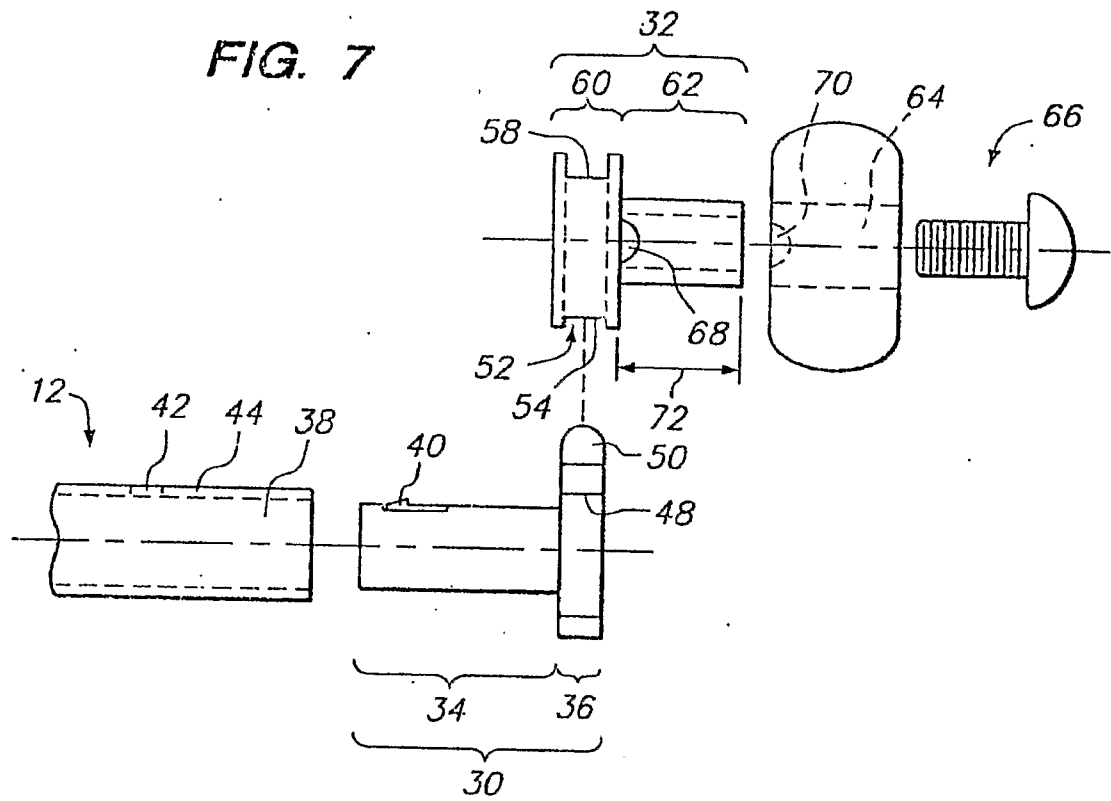
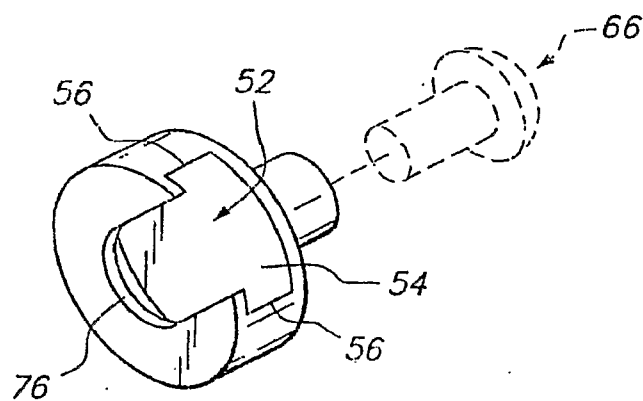


FIG. 8



7/7

FIG. 9

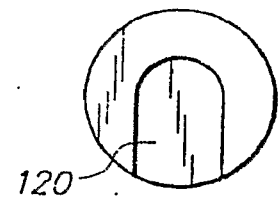
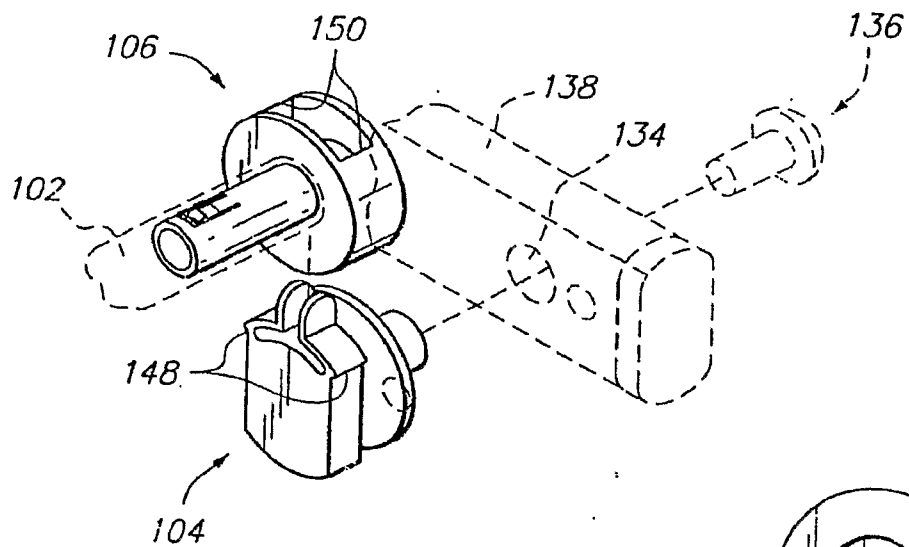


FIG. 10A

FIG. 10

