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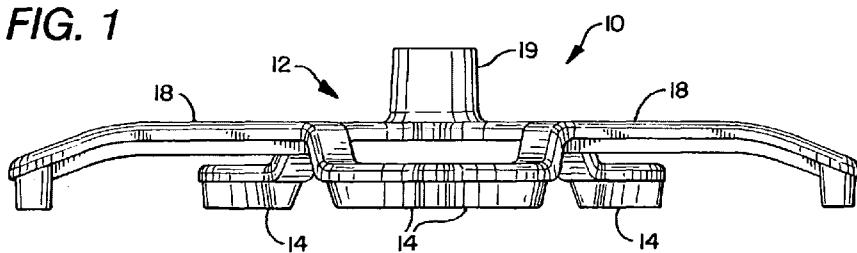
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FIG. 1



(57) Abstract: The present invention is directed to a base member for a portable intravenous stand. The base member includes a plurality of segments configured to facilitate the close nesting or alignment of multiple portable intravenous stands; and thus reducing the amount of space required for storing the portable intravenous stands when not in use.

## STORABLE INTRAVENOUS STANDS

### RELATED APPLICATIONS

**[Para 1]** The present invention claims priority to U.S. Patent Application Serial No. 12/287,535, filed October 10, 2008, entitled Storable Intravenous Stands; and in which its contents are incorporated by reference herein.

### TECHNICAL FIELD

**[Para 2]** The present invention is directed to stands for intravenous (IV) units, and more particularly to stands capable of being stored in such a manner so as to reduce the amount of space required during storage.

### BACKGROUND OF THE INVENTION

**[Para 3]** There are many styles of portable intravenous stands available today. In general, the intravenous stand includes a base support having a set of wheels or the like and a bar extending upward from the base, wherein the intravenous delivery unit is suspended from the bar and is capable of accompanying the user during movement. The intravenous stand is preferably designed such that it is resistant to tipping over. In most cases, such a design includes a sufficiently broad base support. Unfortunately, unless the broad base support is capable of being collapsed, storage of the intravenous stands requires a substantial amount of floor space. Alternatively, the intravenous stands may be stacked upon each other during storage, however it would be preferable if lifting the stand was not required.

**[Para 4]** The present invention is directed to addressing these and other matters.

### SUMMARY OF THE INVENTION

**[Para 5]** The present invention is directed to an intravenous stand including a base support that facilitates storage of multiple intravenous stands within close proximity to each other.

**[Para 6]** In one embodiment of the present invention, the portable intravenous stand includes a base member having a plurality of segments that substantially lie within a first plane, and a plurality of rotating members operatively connected—e.g., bolted, welded, press-fit, snap-fit, and any other attachment mechanism known to one of ordinary skill in the art that is used to connect such cooperating components—to the base member. An outrigger member is connected between two adjacent segments of the base member, wherein the outrigger member includes a

portion thereof being higher than a portion of the plurality of segments, which facilitates the positioning of another similarly configured portable intravenous stand proximate thereto and under the outrigger member. Preferably, a support is integral to the outrigger member and capable of maintaining a pole member substantially perpendicular to the first plane.

**[Para 7]** In another embodiment of the present invention, the portable intravenous stand comprises a base member including a plurality of segments substantially lying within a first plane, wherein the plurality of segments further include a main segment having a first and second end and preferably extending through the stand's center of mass; a first adjacent segment having a first and second end, wherein the first end of the first adjacent segment being operatively connected to the first end of the main segment; a first rotating member being operatively attached to the base member proximate the connection of the main segment and the first adjacent segment; a second adjacent segment having a first and second end, wherein the first end of the second adjacent segment being operatively connected to the second end of the main segment; a second rotating member being operatively attached to the base member proximate the connection of the main segment and the second adjacent segment; a third rotating member being operatively attached to the base member proximate the second of the first adjacent segment; a fourth rotating member being operatively attached to the base member proximate the second end of the second adjacent member; a pair of concentric circles lying within the first plane, wherein the first and second rotating members lying upon a circumference of a first circle and the third and fourth rotating members lying upon a circumference of a second circle; and, a support integral to the base member and capable of maintaining a pole member substantially perpendicular to the first plane.

**[Para 8]** Alternatively, the embodiment further comprises a third adjacent segment having a first and second end, wherein the first end of the third adjacent segment being operatively connected to the second end of the first adjacent segment; a fifth rotating member being operatively attached to the base member proximate the second end of the third adjacent segment; a fourth adjacent segment having a first and second end, wherein the first end of the fourth adjacent segment being operatively connected to the second end of the second adjacent segment; and, a sixth rotating member being operatively attached to the base member proximate the second end of the fourth adjacent segment; a third concentric circle lying within the first plane wherein the fifth and sixth rotating member essentially lie upon the circumference of the third circle.

**[Para 9]** In an alternate embodiment of the present invention, the concentric circles have the same circumference such that the first, second, third, fourth, and any additional rotating

members essentially lie upon the same circle and are preferably spaced about the circumference an equal distance apart from each other.

**[Para 10]** In another embodiment, a portable intravenous stand comprises a base member including a plurality of segments, wherein the plurality of segments further comprise a first segment having a first end and a second end; a second segment having a first end and a second end wherein the first end of the second segment is operatively attached to the first end of the first segment forming a first junction lying within a first plane; an outrigger member having a first end and a second end wherein the outrigger member first end is operatively attached to the first junction; a first rotating member operatively attached proximate the second end of the first segment; a second rotating member operatively attached proximate the second end of the second segment; a third rotating member operatively attached proximate the second end of the outrigger member wherein the first, second and third rotating members are within a second plane parallel to and lower than the first plane; a circle lying within the second plane, wherein the first, second and third rotating members essentially lie upon a circumference of the circle; and a support integral to the base member and capable of maintaining a pole member substantially perpendicular to the first plane.

**[Para 11]** It is an object of the present invention to provide a sturdy and sufficiently stable portable intravenous stand that includes a base capable of cooperating with bases of other similarly constructed portable intravenous stands such that the area required to store the portable intravenous stands is significantly less than those portable intravenous stands used today.

**[Para 12]** These and other aspects and attributes of the present invention will be discussed with reference to the following drawings and accompanying specification and claims.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[Para 13]** Having thus generally described the nature of the present invention, reference will now be made to the accompanying drawings showing, by way of illustration, preferred embodiments in which:

**[Para 14]** FIG. 1 is a front perspective view of the preferred embodiment of the present invention;

**[Para 15]** FIG. 2 is a left perspective view of the present invention shown in FIG. 1;

**[Para 16]** FIG. 3 is a right perspective view of the present invention shown in FIG. 1;

**[Para 17]** FIG. 4 is a rear perspective view of the present invention shown in FIG. 1;

**[Para 18]** FIG. 5 is a top perspective view of the present invention shown in FIG. 1;

**[Para 19]** FIG. 6 is a bottom perspective view of the present invention shown in FIG. 1;

**[Para 20]** FIG. 7 is a perspective view of several embodiments of the present invention shown in FIG. 1 as stored;

**[Para 21]** FIG. 8 is a perspective view of an alternative embodiment of the present invention;

**[Para 22]** FIG. 9 is a perspective view of another alternative embodiment of the present invention;

**[Para 23]** FIG. 10 is a perspective view of another alternative embodiment of the present invention;

**[Para 24]** FIG. 11 is a perspective view of another alternative embodiment of the present invention;

**[Para 25]** FIGS. 12-14 are perspective views of various embodiments of the present invention shown with the pole member attached thereto;

**[Para 26]** FIGS. 15-18 are perspective views of various embodiments of the portable intravenous stands of the present invention and attaching pole members as stored;

**[Para 27]** FIG. 19A-19C depict an alternate embodiment of the base member of the portable intravenous stand of the present invention, wherein FIG. 19A is an elevated view thereof, FIG. 19B is a plan view thereof, and FIG. 19C shows multiple stands in storage;

**[Para 28]** FIG. 20A-20C depict an alternate embodiment of the base member of the portable intravenous stand of the present invention, wherein FIG. 20A is a plan view thereof, FIG. 20B is an elevated view thereof, and FIG. 20C shows multiple stands in storage;

**[Para 29]** FIG. 21 is an alternate embodiment of the base member of the portable intravenous stand of the present invention;

**[Para 30]** FIG. 22 is an alternate embodiment of the base member of the portable intravenous stand of the present invention;

**[Para 31]** FIG. 23 is an alternate embodiment of the base member of the portable intravenous stand of the present invention;

**[Para 32]** FIG. 24 is an alternate embodiment of the base member of the portable intravenous stand of the present invention; and,

**[Para 33]** FIG. 25 is an alternate embodiment of the base member of the portable intravenous stand of the present invention.

### **DETAILED DESCRIPTION OF THE PRESENT INVENTION**

**[Para 34]** While the present invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

**[Para 35]** The preferred embodiment of the present invention is shown in FIGS. 1-7, wherein various views depict a portable intravenous stand 10 having a base member 12 further including a plurality of segments 14. The plurality of segments 14 lies substantially within a plane 22 (which is substantially parallel with the paper with respect to FIGS. 5 and 6). A plurality of rotating members 16 (not shown in FIGS. 1-7) can be operatively connected to the base member 12, preferably proximate the end(s) of each segment. It is to be understood that the operative connection of any part/component of the portable intravenous stand 10 contemplates utilizing any connecting mechanism known to one of ordinary skill in the art for connecting such cooperating components, such as, and not limited to: welds, bolts, screws, hinges, pivots, snaps, fittings, crimps, and alike. An outrigger member 18 is connected between two adjacent segments 14 of the base member 12, and preferably extends past the adjacent segments to provide additional stability to the stand 10. Similar to the segments 18, a rotating member 16 can be attached proximate each end of the outrigger member 18. The outrigger member 18 is configured such that its end, when attached to rotating members 16 would lie on the circle and equidistant apart from the other rotating members. The outrigger member 18 includes at least a portion thereof—and preferably a substantial portion thereof—that does not lie within the same plane as the plurality of segments 14; that is, at least a portion of the outrigger member 18 lies in another plane 23 that is above or higher than the first plane 22 and which is preferably substantially parallel to the first plane. The higher portion of the outrigger member 18 facilitates the positioning of another similarly designed portable intravenous stand 10 there under and proximate thereto. See FIG. 7. A support 19 is preferably integral to the base member 12 and is capable of maintaining a pole member 20 substantially perpendicular to the planes 22, 23 respectively containing the plurality of segments 14 and the outrigger member 18.

**[Para 36]** As shown in all the figures, the present invention contemplates utilizing various amounts and varieties of segments 14, outrigger members 18, and rotating members 16. That is,

the base member 12 can include two or more segments 14 of flat or rounded stock made of metal, non-metal, plastic, polymer, rubber, composite, solid, non-solid, and combinations thereof. See FIGS. 8-14. The preferred embodiment of the present invention shown in FIGS. 1-7 is cast out of aluminum and powder-coated. The rotating members 16 can also be selected from among a variety of types known to those of ordinary skill in that art; including and not limited to wheels, casters, balls, and rollers.

**[Para 37]** In other embodiments of the present invention shown in FIGS. 19A-19C and 20A-20C, a base member 12 comprises an outrigger member 18, at least two adjacent segments 14, and an elevated junction 27 proximate the center of mass 24. The outrigger member 18, having a first end and a second end, extends from the base member 12 proximate its center of mass 24, but does not connect between, nor extend past, adjacent segments 14. The outrigger member 18 first end is connected to adjacent segments proximate the junction 27. At least a portion of the outrigger member 18 is elevated and perhaps inclined toward the elevated junction 27. The angle of incline can be approximately 15° but other incline angles would be acceptable. The incline is of adequate steepness to facilitate the passage of one outrigger member of one base member 12 under another base member of an adjacent similarly configured portable intravenous stand 10 such that the poles of the stands are in close proximity. A rotating member can be attached proximate the outrigger member 18 second end.

**[Para 38]** At least two adjacent segments 14, having first and second ends, extend from proximate junction 27. The first ends of adjacent segments 14 are attached to the outrigger member 18 first end proximate junction 27. At least a portion of the adjacent segments 14 is elevated and perhaps inclined toward the elevated junction 27. The angle of inclination can be similar to the incline of outrigger member 18. Rotating members can be attached proximate the adjacent segment second ends.

**[Para 39]** The junction 27 is elevated above the outrigger member 18 and adjacent segments 14 second ends such that the center of mass is in a first plane and the second ends are in a second plane parallel to the first plane. The elevated junction 27 facilitates the passage of outrigger member 18 of another similarly configured portable intravenous stand 10 under the junction 27 and positioning of the stands 10 in close proximity. See FIGS. 19C and 20C. A support 19 is attached proximate junction 27. A rotating member, not shown, can be attached proximate each second end of outrigger member 18 and segments 14. Additional segments 14' can be attached proximate second ends of segments 14 to improve the stability of the base.

**[Para 40]** In all embodiments of the present invention including the outrigger member 18 extending between at least two segments 14 of the base member 12—e.g., FIGS. 1-18, 23, and 24—it is preferable that at least a portion of the outrigger member is raised above a portion of

the plurality of segments such that during storage, a portion of the segment of an adjacent stand 10 is capable of passing under the outrigger member to facilitate close positioning of the stands as shown in FIGS. 7 and 15-18. While the outrigger member 18 has been shown extending between two adjacent segments 14 closest to the center of the base member 12, it is to be understood that the outrigger member can extend past the segments (as shown in FIGS. 1-7) and/or be attached to other segments as well. Additional discrete outrigger members 18 can also be utilized to branch between subsequent adjacent segments 14 to provide increased sturdiness to the base member 10. The additional outrigger members 18 preferably also include at least a portion raised above a portion of the plurality of segments 14, which facilitates close positioning of additional stands during storage. The additional outrigger member 18 can be branched between at least any two segments 14—not necessarily immediately adjacent segments—and is not required to be aligned such that if extended further, it would eventually pass proximate to the base member's center. The present invention further contemplates that an additional support 19 can be attached or integral with the additional discrete outrigger member 18.

**[Para 41]** In yet another embodiment of the present invention shown in FIGS. 21 and 22, the portable intravenous stand 10 includes a base member 12 having a center of mass 24 and lying substantially within a plane 22 (substantially parallel with the paper). The base member 12 includes a main segment 26 that preferably extends through or proximate the base member's 12 center of mass 24. A first adjacent segment 28 having a first and second end is attached to a first end 30 of the main segment, and a second adjacent segment 32 having a first and second end is attached to a second end 34 of the main segment 26 forming a Z-shaped base 12. An angle  $\alpha$  between the main segment 26 and first adjacent segment 28 and second adjacent segment 32 is formed at the points of attachment. The angle  $\alpha$  can be approximately 15° to 75°. A first rotating member (not shown in FIGS. 21 and 22) can be attached proximate the attachment of the main segment 26 and the first adjacent segment 28, and a second rotating member (not shown in FIGS. 21 and 22) can be attached proximate the attachment location of the main segment 26 and the second adjacent segment 32. Additional segments 14' can be attached proximate the second end of adjacent segments 14 forming a base member 12 having a zig-zag form. The additional segments 14' increase the stability of the stand. Rotating members can be attached to the free ends of the segments 14'. A pole member 20 (not shown in FIGS. 21 and 22) can extend substantially vertical from the support 19 that is preferably integral with the base member 12 and proximate the center of mass 24, such that the base member enables the close positioning of corresponding segments of other similarly designed portable intravenous stands. An additional rotating member 16 can be attached to the main segment 26 of the base member 12 and proximate its center of mass 24 and/or support 19.

**[Para 42]** As shown in FIGS. 21 - 23—and which is also applicable to the various embodiments of the present invention shown throughout the figures—a pair of rotating members can be attached to the base member 12, wherein the pair of rotating members lie upon a circumference of a circle 40 that lies parallel to the plane 22 wherein the circle's center is preferably aligned with the center of the support 19, which is preferably proximate to the stand's 10 center of mass 24. Additional rotating members can further be attached to the base member 12 and also located about the circumference 40 and preferably an equal distance apart from each other along the path of the circumference.

**[Para 43]** Referring back to FIGS. 1-7, the outrigger member 18 is configured such that the rotating members attached to its ends, which extend past the adjacent segments 14, lie on the circumference 40 along with the other rotating members, wherein the rotating members are preferable positioned an equal distance apart from each other along the path of the circumference. In FIGS. 1-7, one half of the outrigger member is substantially perpendicular to one of the adjacent segments and the other half of the outrigger member is substantially perpendicular to the other of the adjacent segments. The equidistant spacing of rotating members 16 about the circumference 40 provides substantial stability to the base member.

**[Para 44]** It is to be noted however that not all rotating members 16 need to be located proximate the circumference 40, but rather can be spaced a different distance from the support 19. In other words, other rotating members, preferably in pairs, can be positioned about another circle having a different circumference that is concentric with the first circumference 40 about the support 19, or the center of mass 24 of the stand 10; but where the concentric circumferences have different diameters (see FIGS. 24 and 25).

**[Para 45]** It is to be understood that additional embodiments of the present invention described herein may be contemplated by one of ordinary skill in the art and the scope of the present invention is not limited to the embodiments disclosed. While specific embodiments of the present invention have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of the invention, and the scope of protection is only limited by the scope of the accompanying claims.

CLAIMS

What is claimed is:

1. A portable intravenous stand comprising:  
a base member including a plurality of segments substantially lying in a first plane;  
an outrigger member extending between and beyond each of the plurality of segments of the base member, wherein the outrigger member including a portion being elevated above a portion of the plurality of segments to facilitate positioning another similarly configured portable intravenous stand there under and proximate thereto;  
a plurality of rotating members operatively connected to each of the plurality of segments of the base member and the outrigger member; and,  
a support integral to the base member and capable of maintaining a pole member substantially perpendicular to the first plane.
2. The portable intravenous stand of claim 1, wherein the support being integral with the outrigger member.
3. The portable intravenous stand of claim 1, wherein at least a portion of the outrigger member substantially lying in a second plane, which is apart from and substantially parallel to the first plane.
4. The portable intravenous stand of claim 1, wherein the plurality of rotating members being selected from the group consisting of a wheels, balls, rollers, and casters.
5. The portable intravenous stand of claim 1, wherein each of the plurality of rotating members being arranged upon a circle, wherein the circle lies within a plane that is substantially parallel to the first plane.
6. The portable intravenous stand of claim 5, wherein each of the plurality of rotating members being arranged upon the circle an equal distance apart from each other.
7. The portable intravenous stand of Claim 1, wherein the support includes a longitudinal axis infinitely extending there from and intersecting a center of the circle.

8. The portable intravenous stand of Claim 1, wherein the support includes a longitudinal axis infinitely extending there from and perpendicular to the first plane and intersecting a center of mass of the portable intravenous stand.
9. The portable intravenous stand of claim 1, wherein the plurality of rotating members is five or more.
10. A portable intravenous stand comprising:
  - a base member including a plurality of segments substantially lying within a first plane, wherein the plurality of segments further include
    - a main segment having a first and second end;
    - a first adjacent segment having a first and second end, wherein the first end of the first adjacent segment being operatively connected to the first end of the main segment;
    - a first rotating member being operatively attached to the base member proximate the connection of the main segment and the first adjacent segment;
    - a second adjacent segment having a first and second end, wherein the first end of the second adjacent segment being operatively connected to the second end of the main segment;
    - a second rotating member being operatively attached to the base member proximate the connection of the main segment and the second adjacent segment;
    - a third rotating member being operatively connected proximate the second end of the first adjacent segment;
    - a fourth rotating member being operatively connected proximate the second end of the second adjacent segment;
    - a pair of concentric circles lying within the first plane, wherein the first and second rotating members lying upon a circumference of a first circle and the third and fourth rotating members lying upon a circumference of a second circle; and,
    - a support integral to the base member and capable of maintaining a pole member substantially perpendicular to the first plane.
11. The portable intravenous stand of claim 10, wherein the pair of concentric circles are identical and the first, second, third, and fourth rotating members essentially lie on the circumference of the same circle.

12. The portable intravenous stand of claim 11, wherein the first, second, third, and fourth rotating members being arranged an equal distance apart from each other along the path of the circumference.
13. The portable intravenous stand of Claim 10, wherein the support includes a longitudinal axis infinitely extending there from and perpendicular to the first plane, and intersecting the center of the pair of concentric circles.
14. The portable intravenous stand of Claim 10, wherein the support includes a longitudinal axis infinitely extending there from and perpendicular to the first plane and intersecting a center of mass of the base member.
15. The portable intravenous stand of claim 10, further comprising a fifth rotating member operatively connected to the main segment proximate the support.
16. The portable intravenous stand of claim 10, further comprising:
  - a third adjacent segment having a first and second end, wherein the first end of the third adjacent segment being operatively connected to the second end of the first adjacent segment;
  - a fifth rotating member being operatively attached proximate the third adjacent member second end;
  - a fourth adjacent segment having a first and second end, wherein the first end of the fourth adjacent segment being operatively connected to the second end of the second adjacent segment; and,
  - a sixth rotating member being operatively attached proximate the third adjacent member second end; and
  - a third concentric circle lying within the first plane, wherein the fifth and sixth rotating members essentially lie upon the circumference of the third circle.
17. The portable intravenous stand of claim 10, further comprising an outrigger member wherein the outrigger member is operatively attached to the first segment and second segment and is elevated above the first plane.
18. The portable intravenous stand of claim 17, wherein the support member is integral to the outrigger member.

## 19. A portable intravenous stand comprising:

- a base member including a plurality of segments, wherein the plurality of segments further include
  - a first segment having a first end and a second end;
  - a second segment having a first end and a second end wherein the first end of the second segment is operatively connected to the first end of the first segment forming a first junction lying within a first plane;
  - an outrigger member having a first end and a second end wherein the outrigger member first end is operatively attached to the first junction;
  - a first rotating member operatively attached proximate the second end of the first segment;
  - a second rotating member operatively attached proximate the second end of the second segment;
  - a third rotating member operatively attached proximate the second end of the outrigger member wherein the first, second and third rotating members are within a second plane parallel to and lower than the first plane;
  - a circle lying within the second plane, wherein the first, second and third rotating members essentially lie upon a circumference of the circle; and,
  - a support integral to the base member and capable of maintaining a pole member substantially perpendicular to the first plane.

## 20. The portable intravenous stand of claim 19 wherein the segments and outrigger member incline from the second plane to the first plane to facilitate the positioning of a similarly configured portable intravenous stand there under and proximate thereto.

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FIG. 1

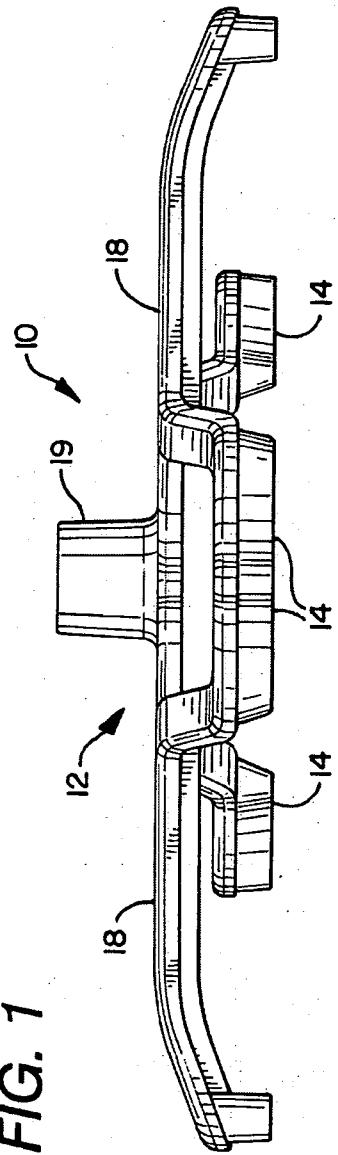
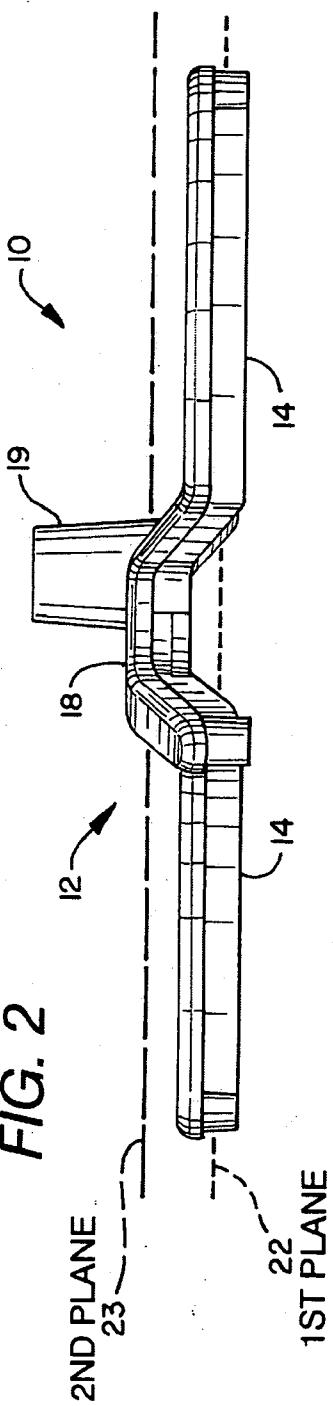
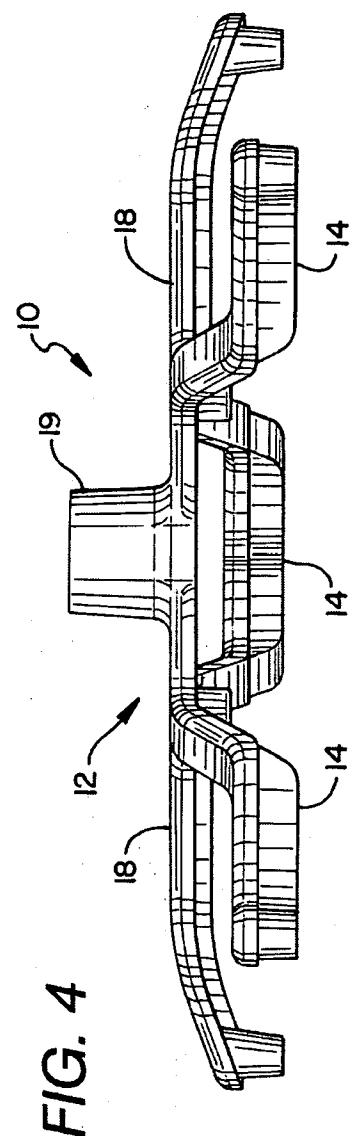
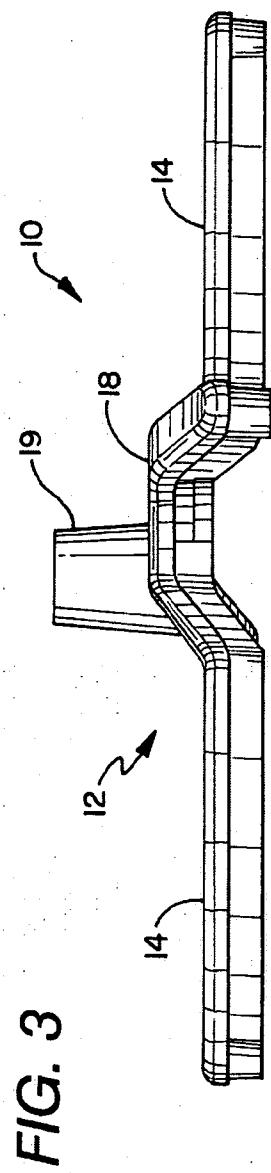


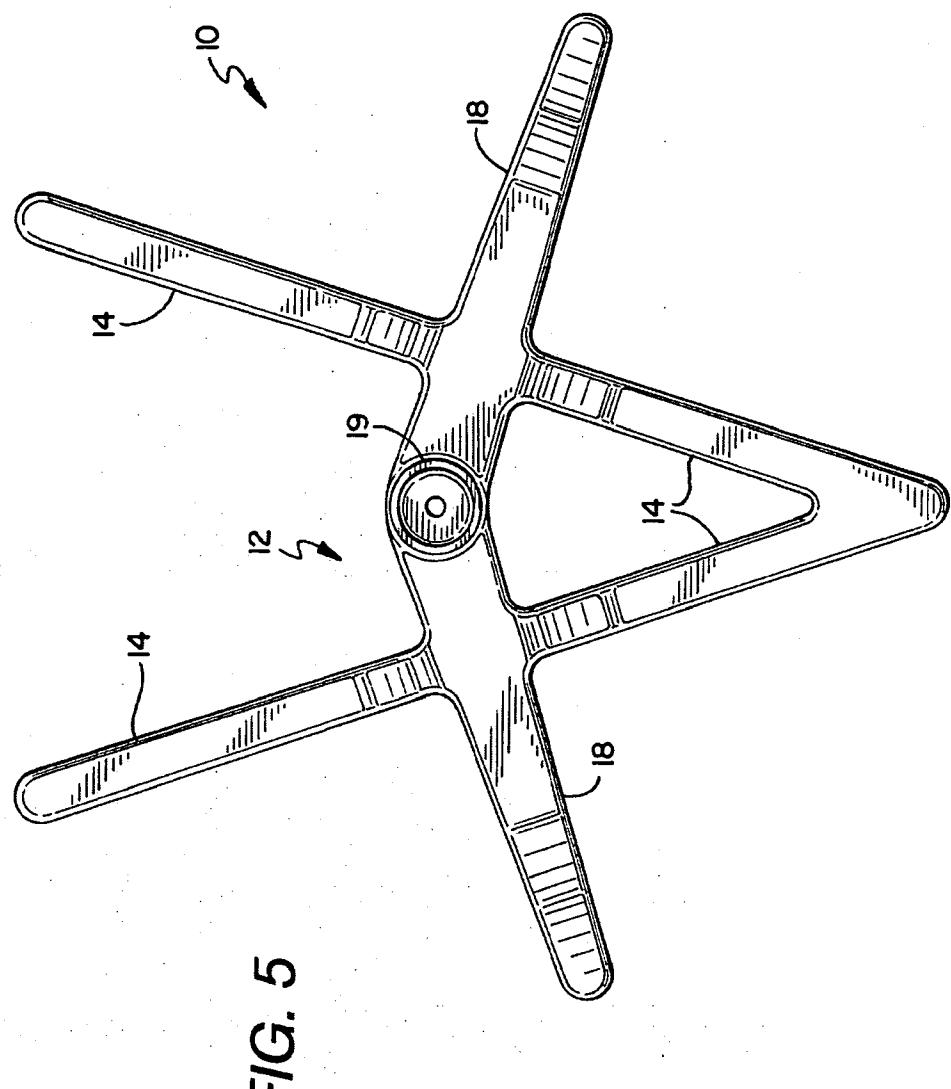
FIG. 2



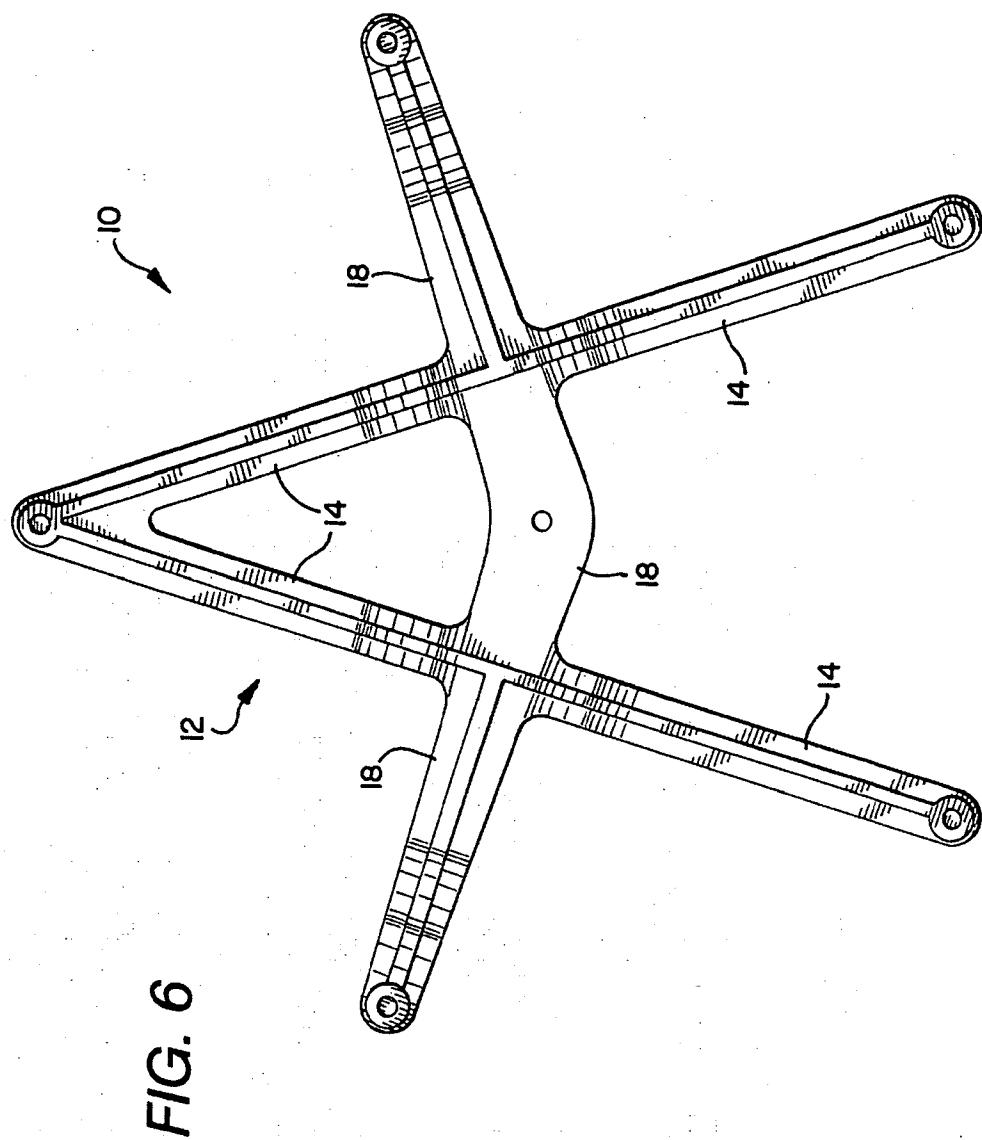
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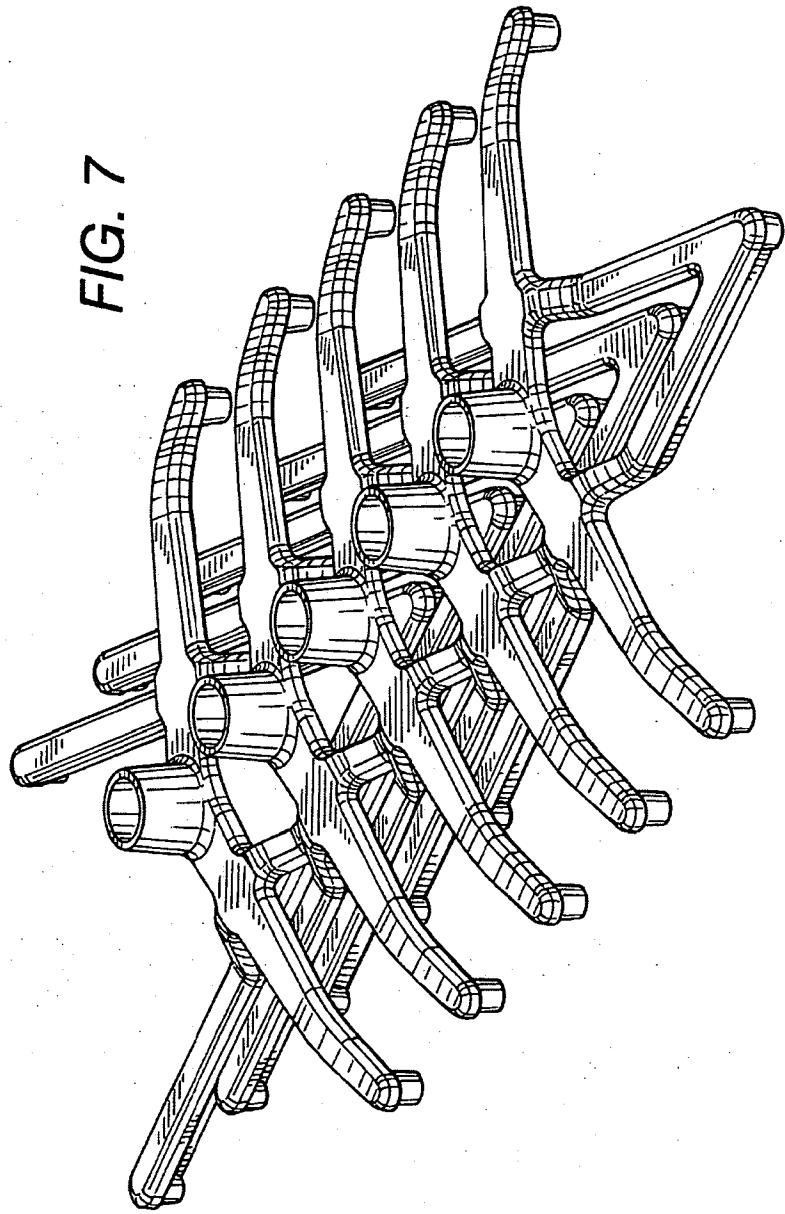


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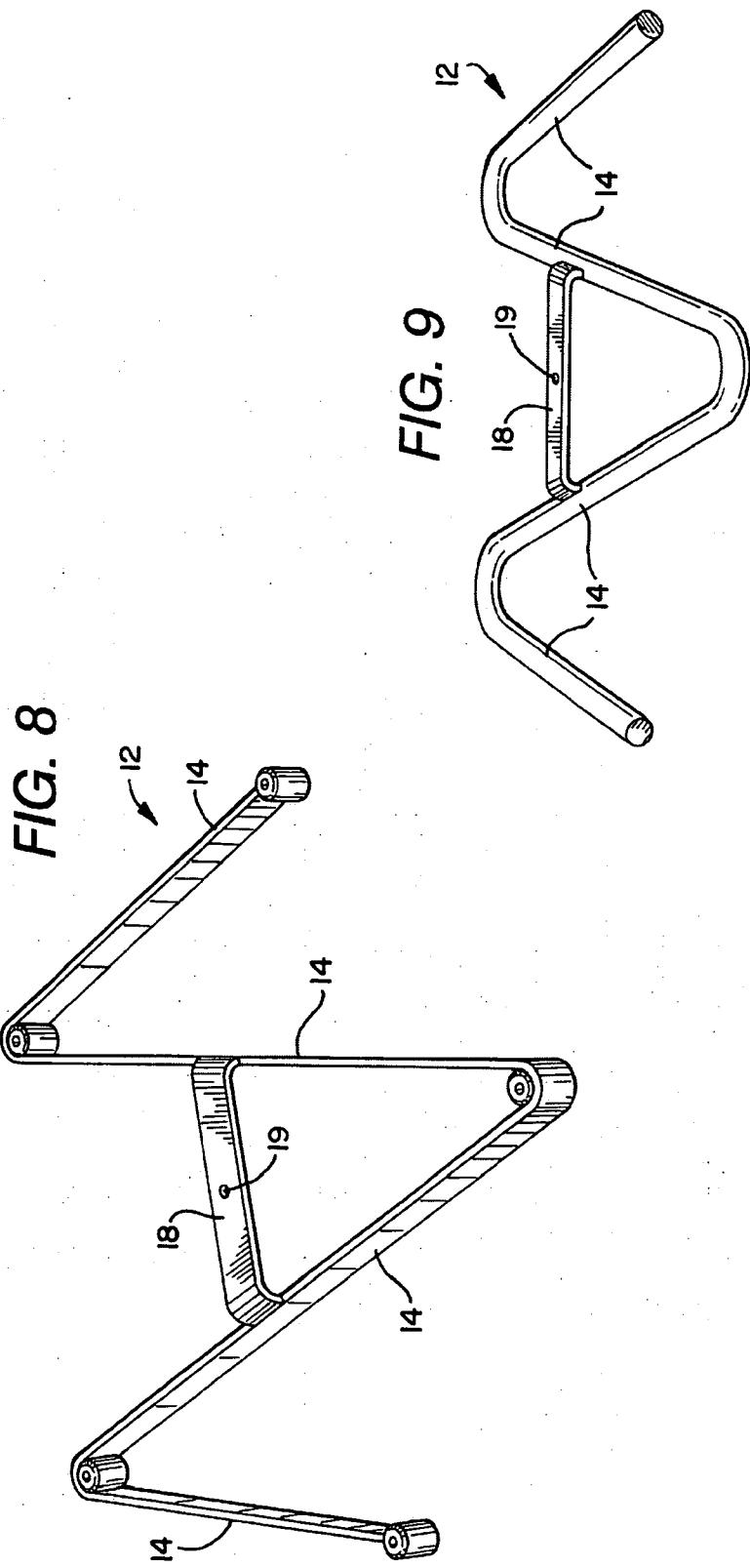


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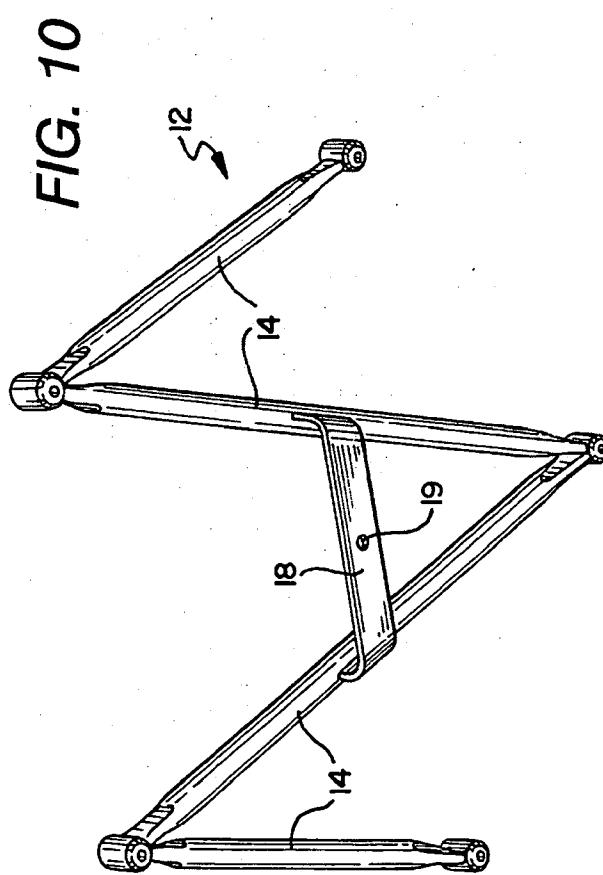
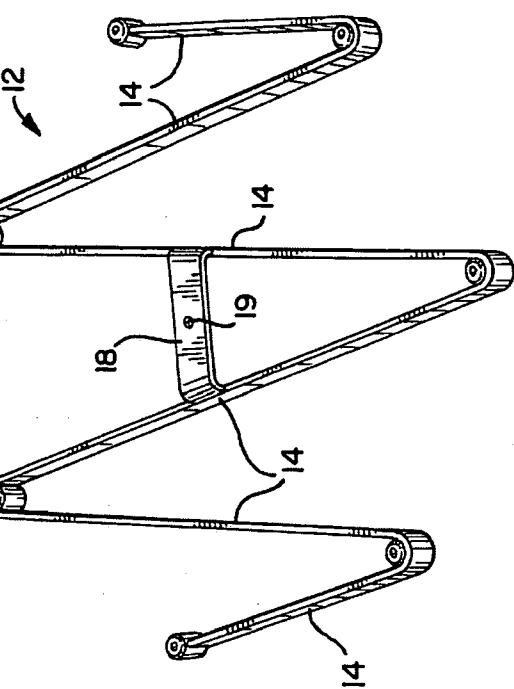
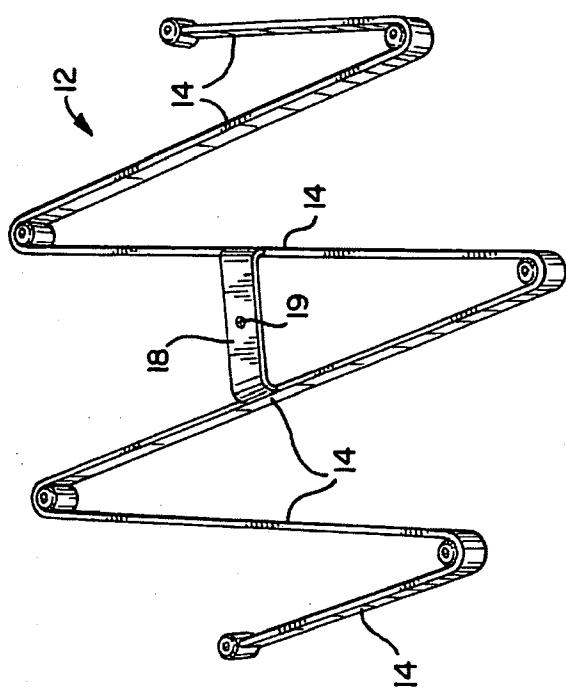
FIG. 7



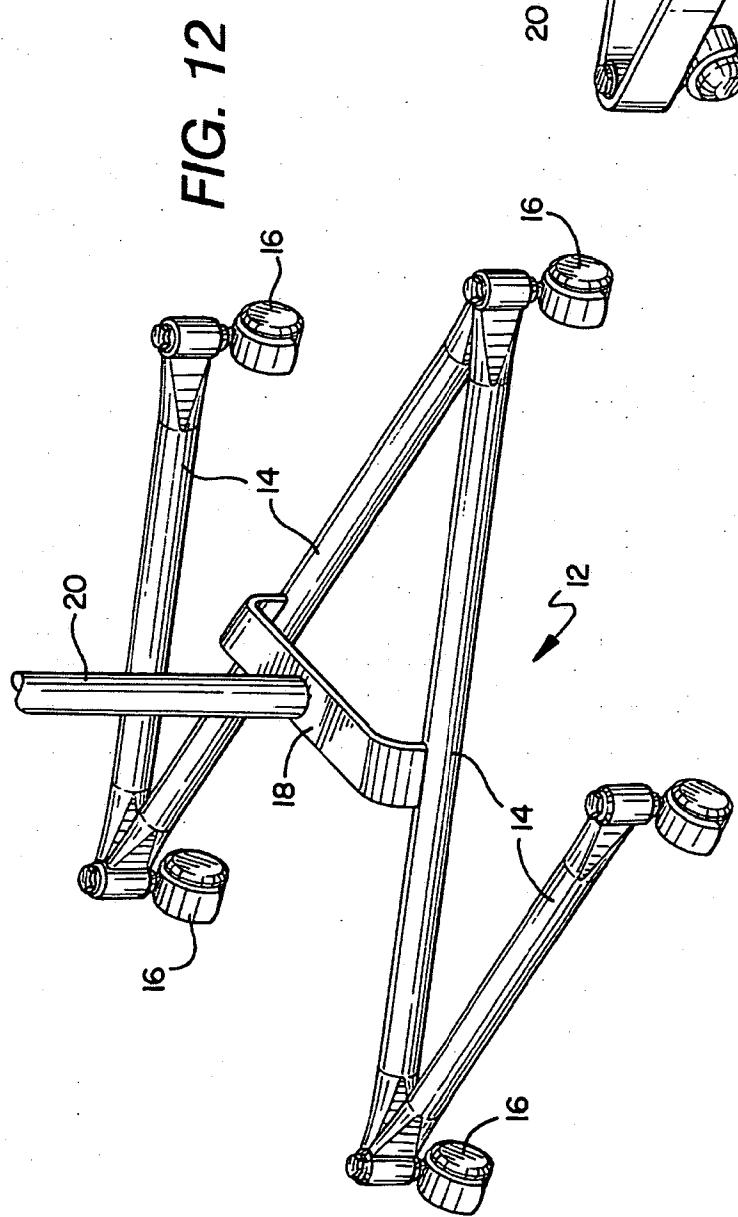
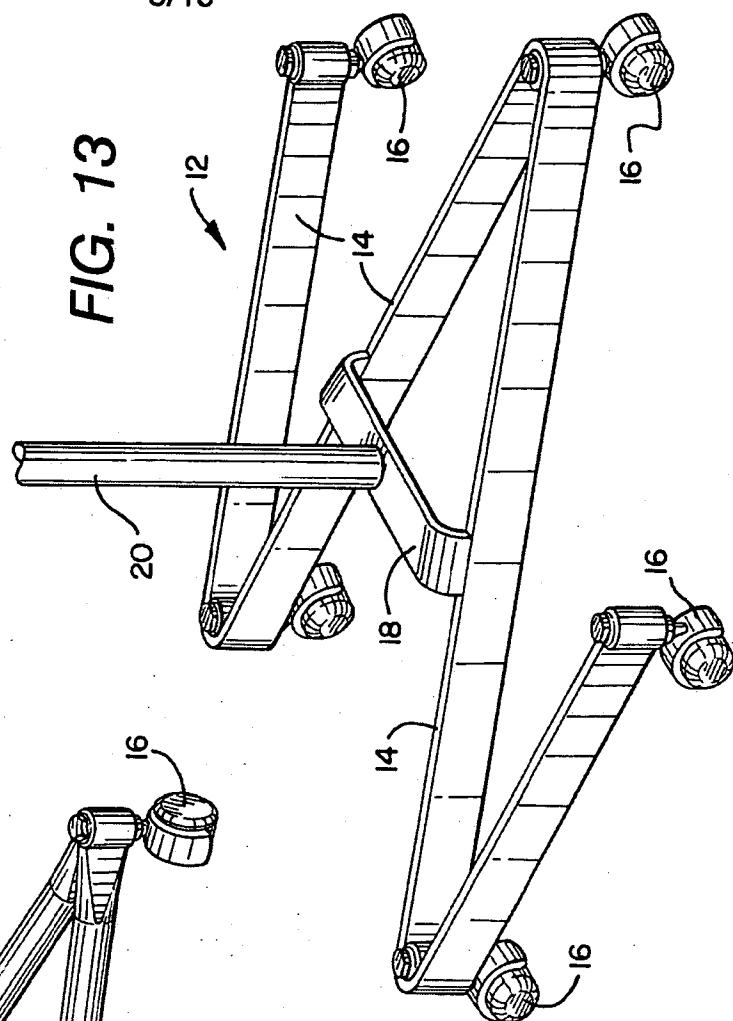
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**FIG. 11**

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*FIG. 13*

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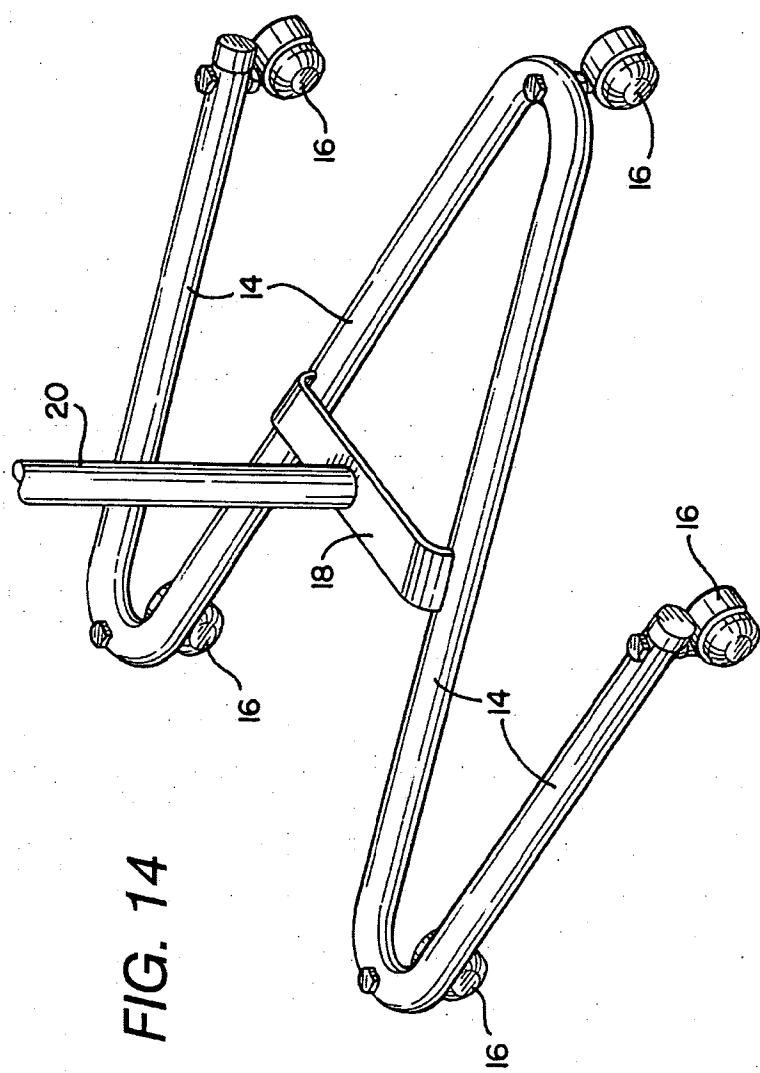
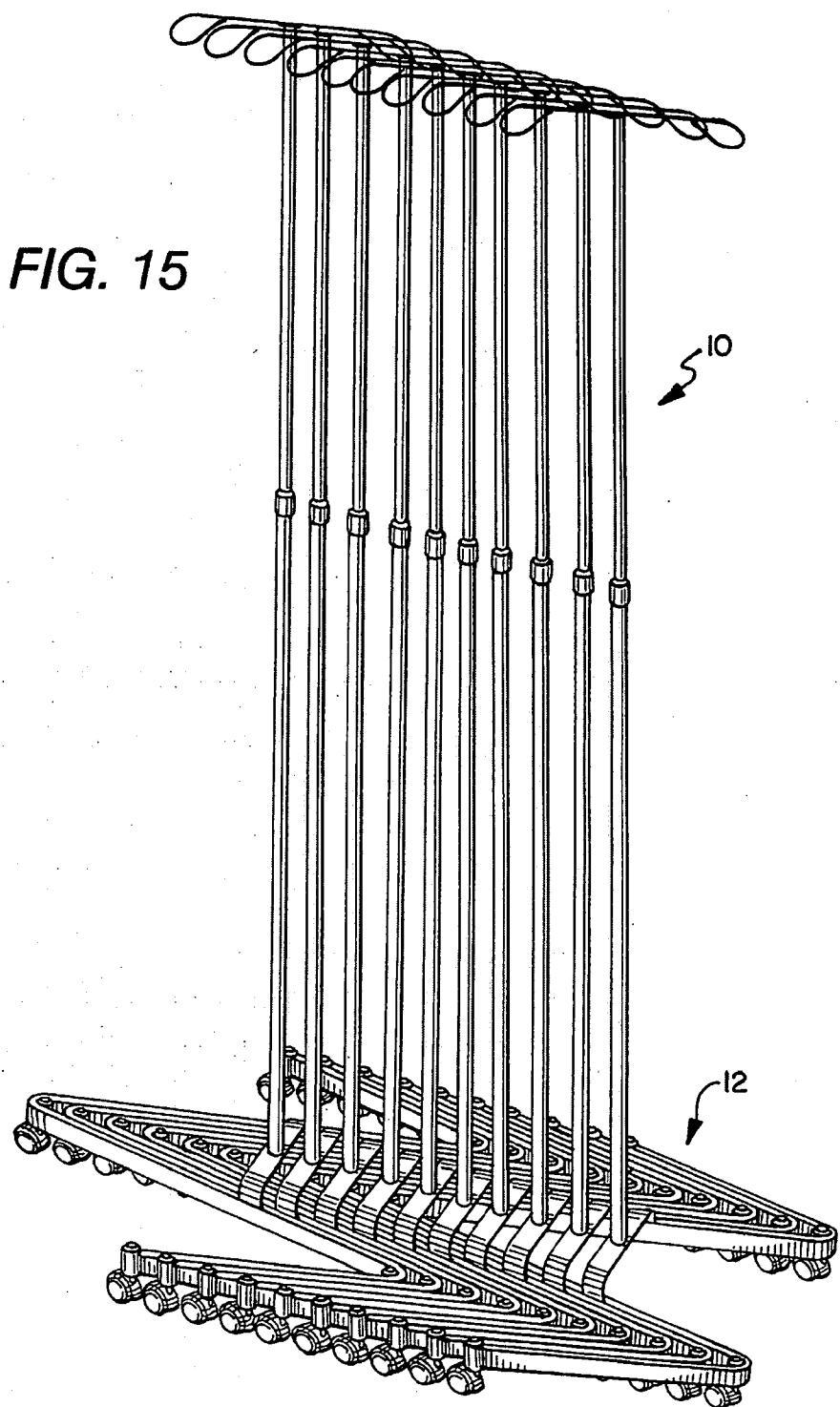


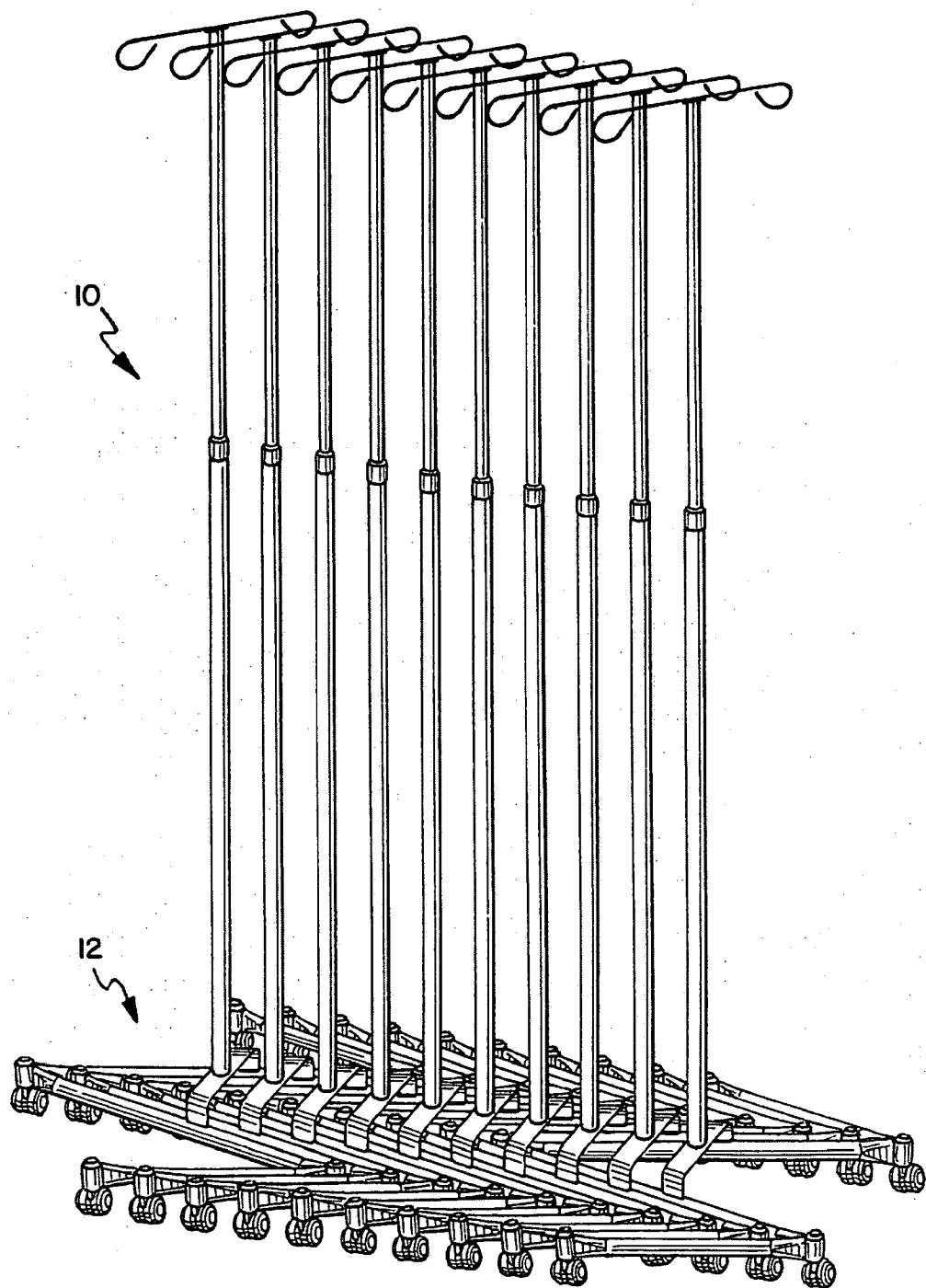
FIG. 14

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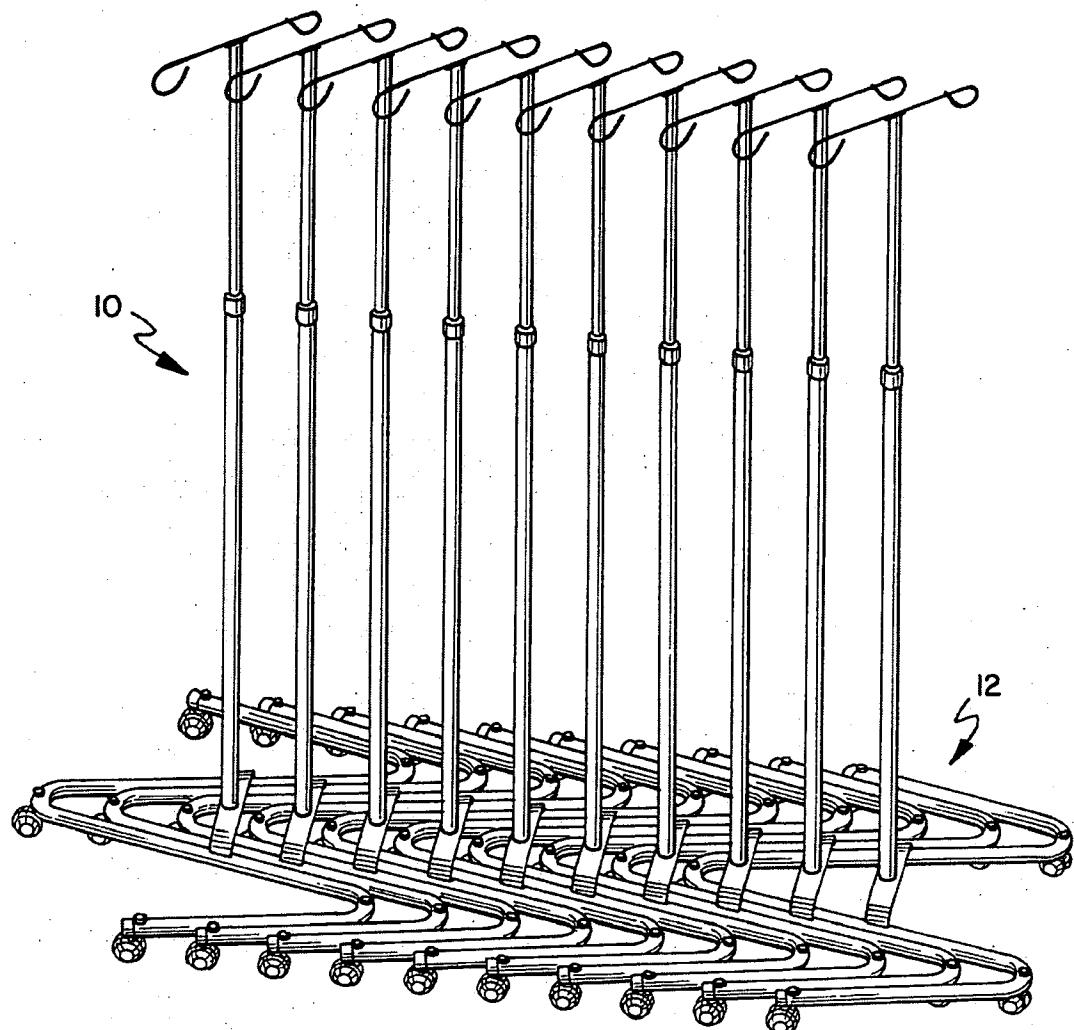
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FIG. 16



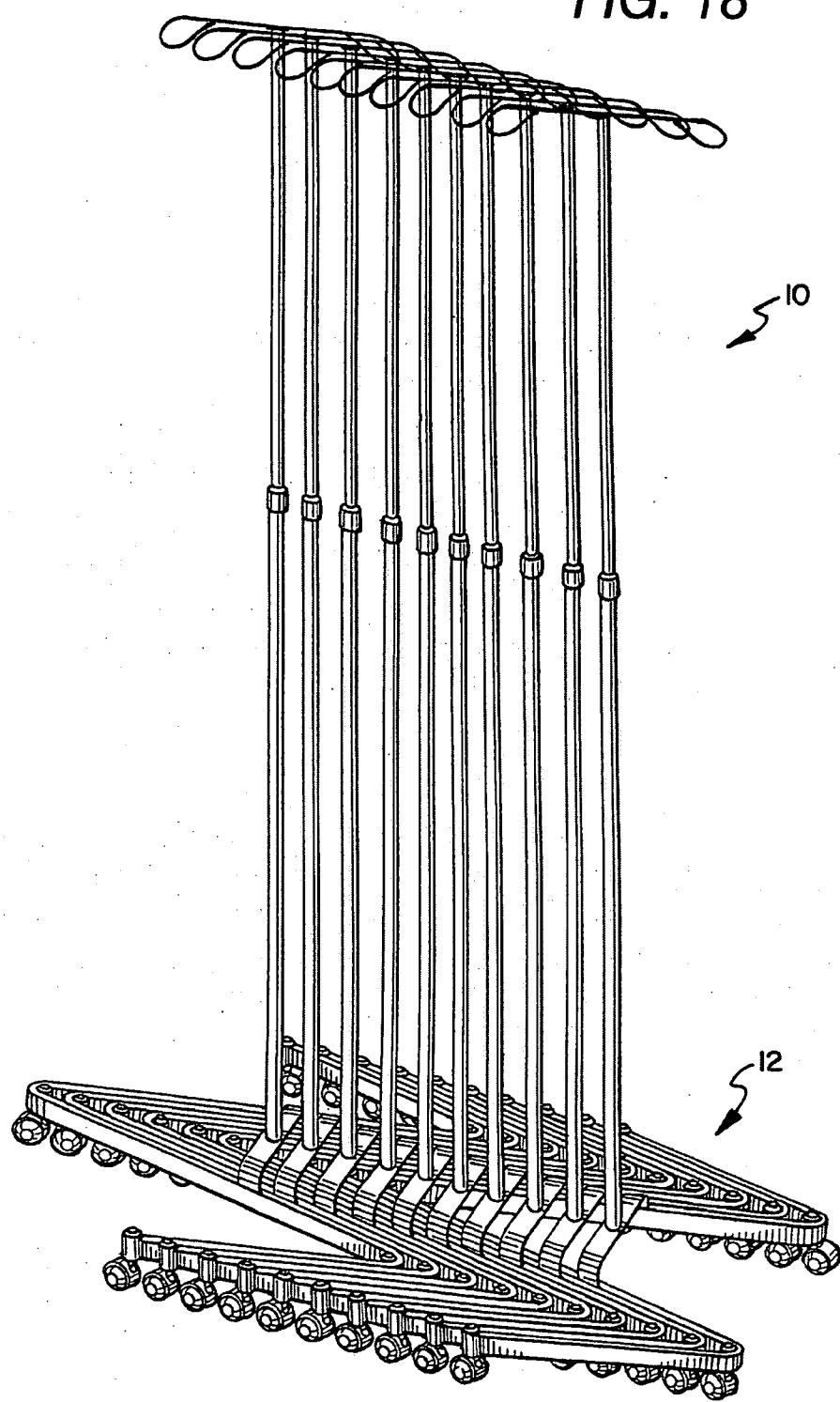
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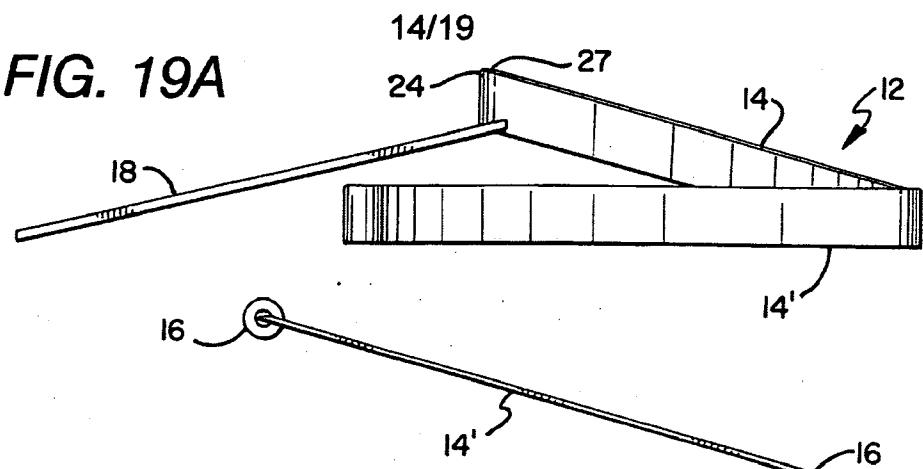
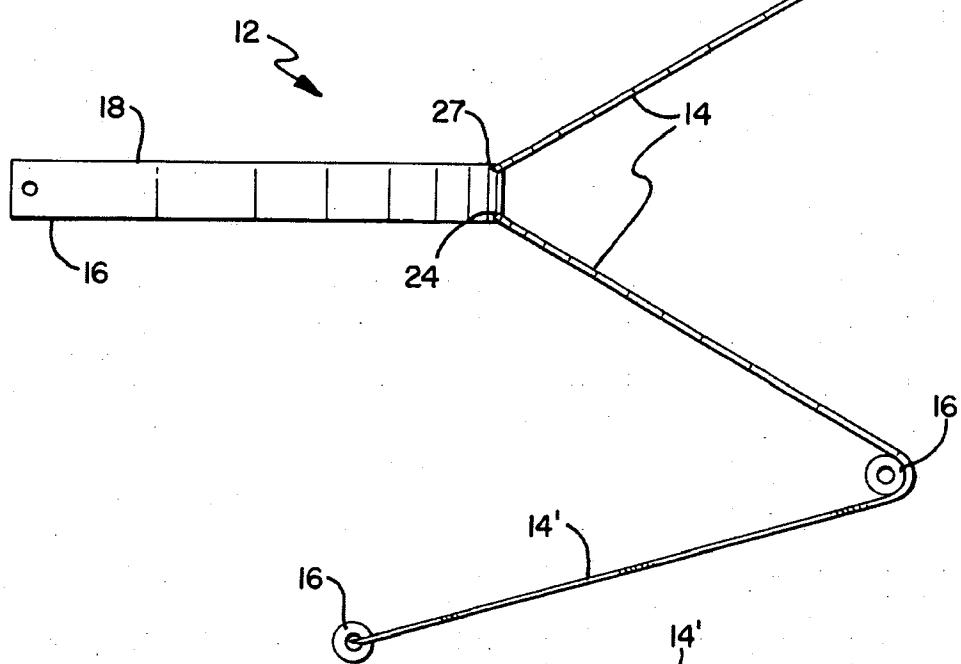
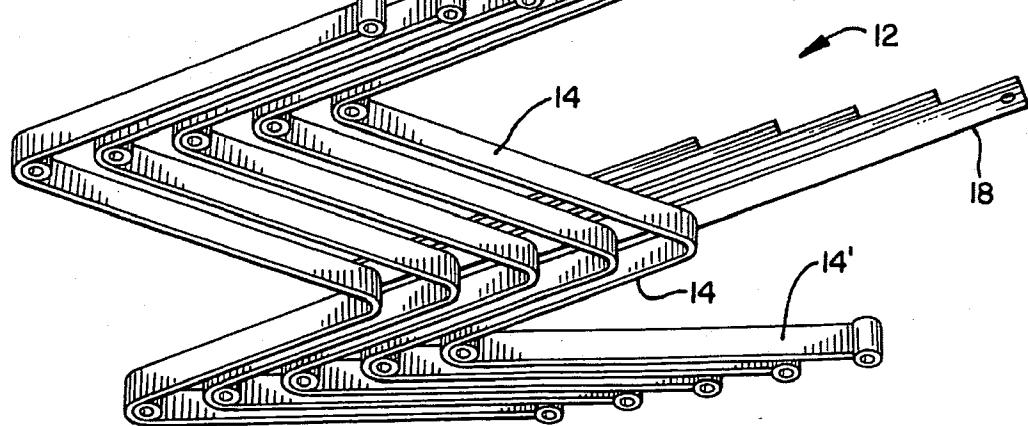
FIG. 17



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FIG. 18



**FIG. 19A****FIG. 19B****FIG. 19C**

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FIG. 20A

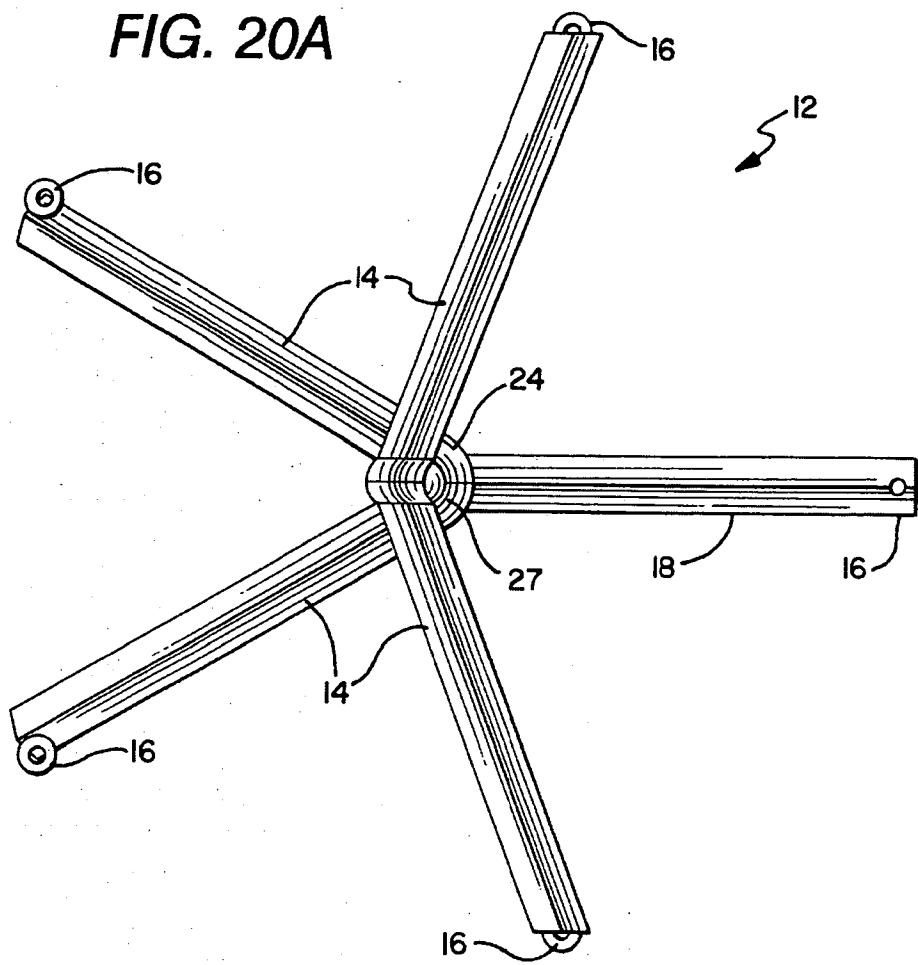
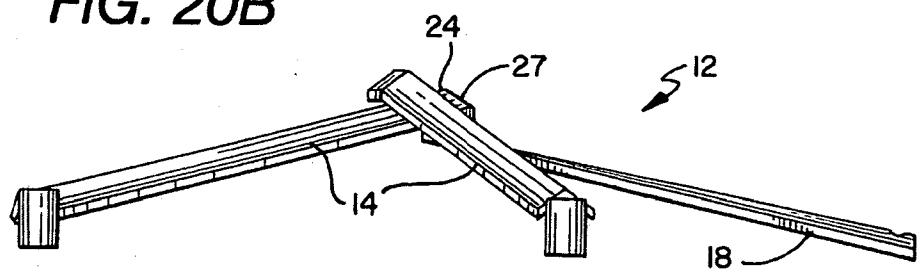


FIG. 20B



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FIG. 20C

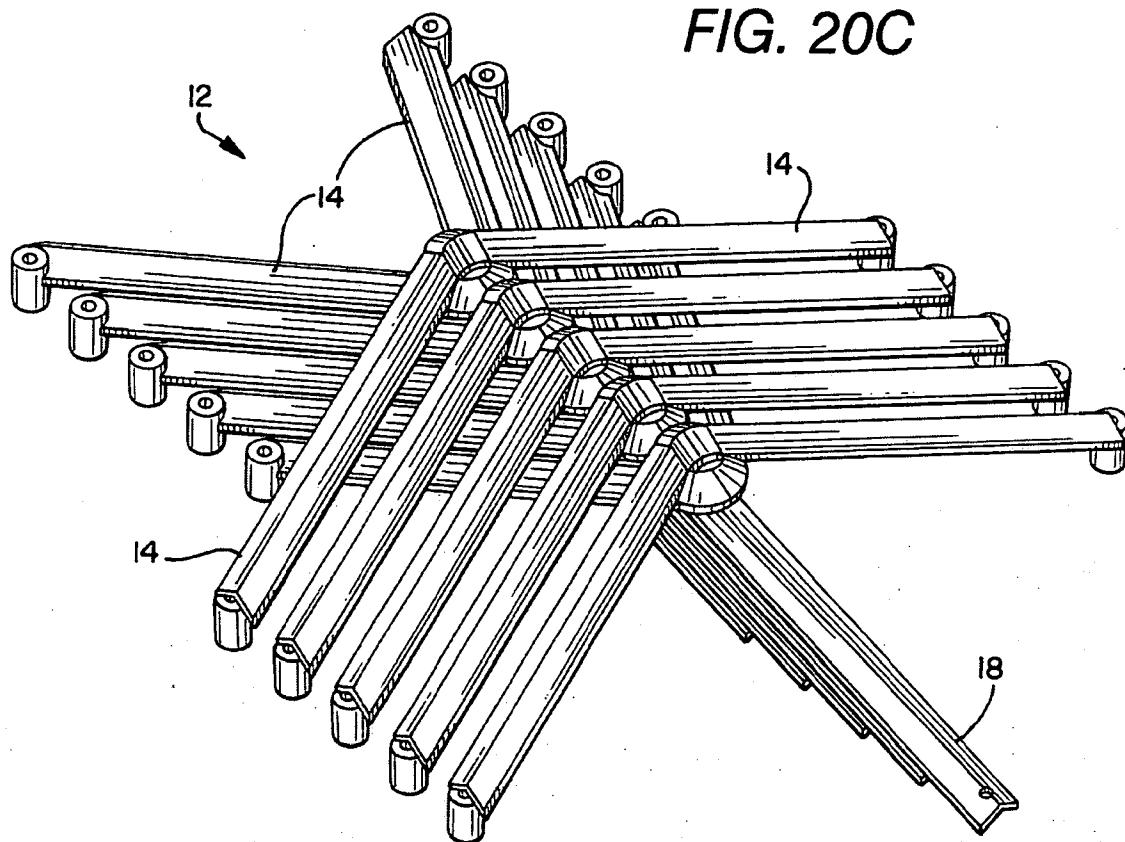
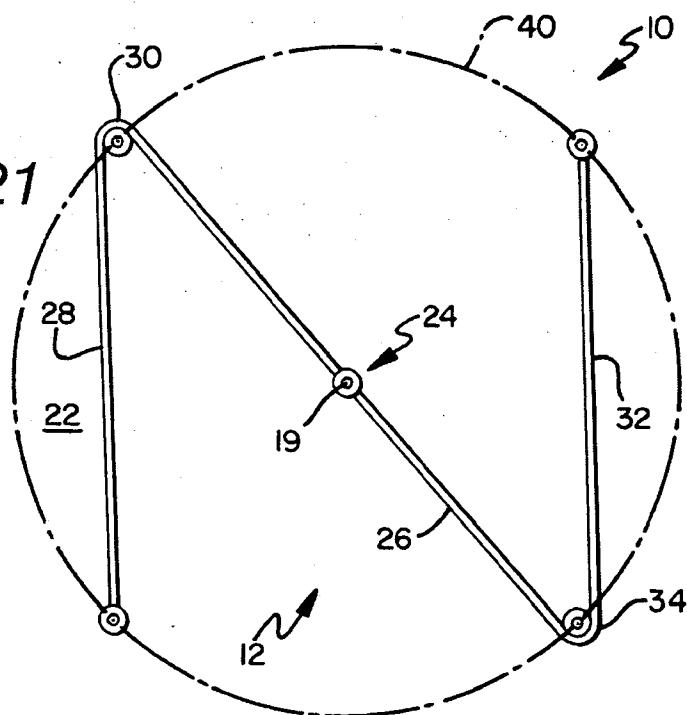
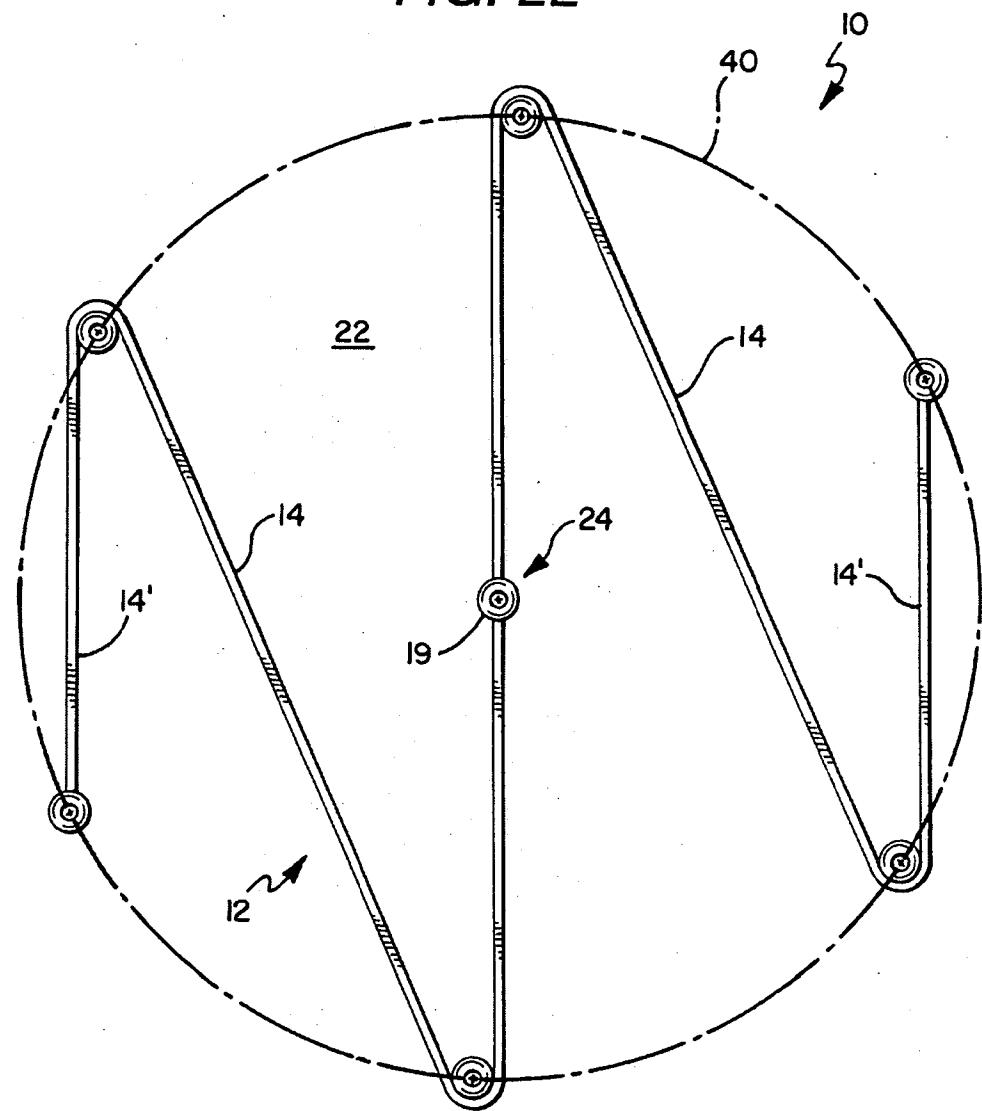


FIG. 21



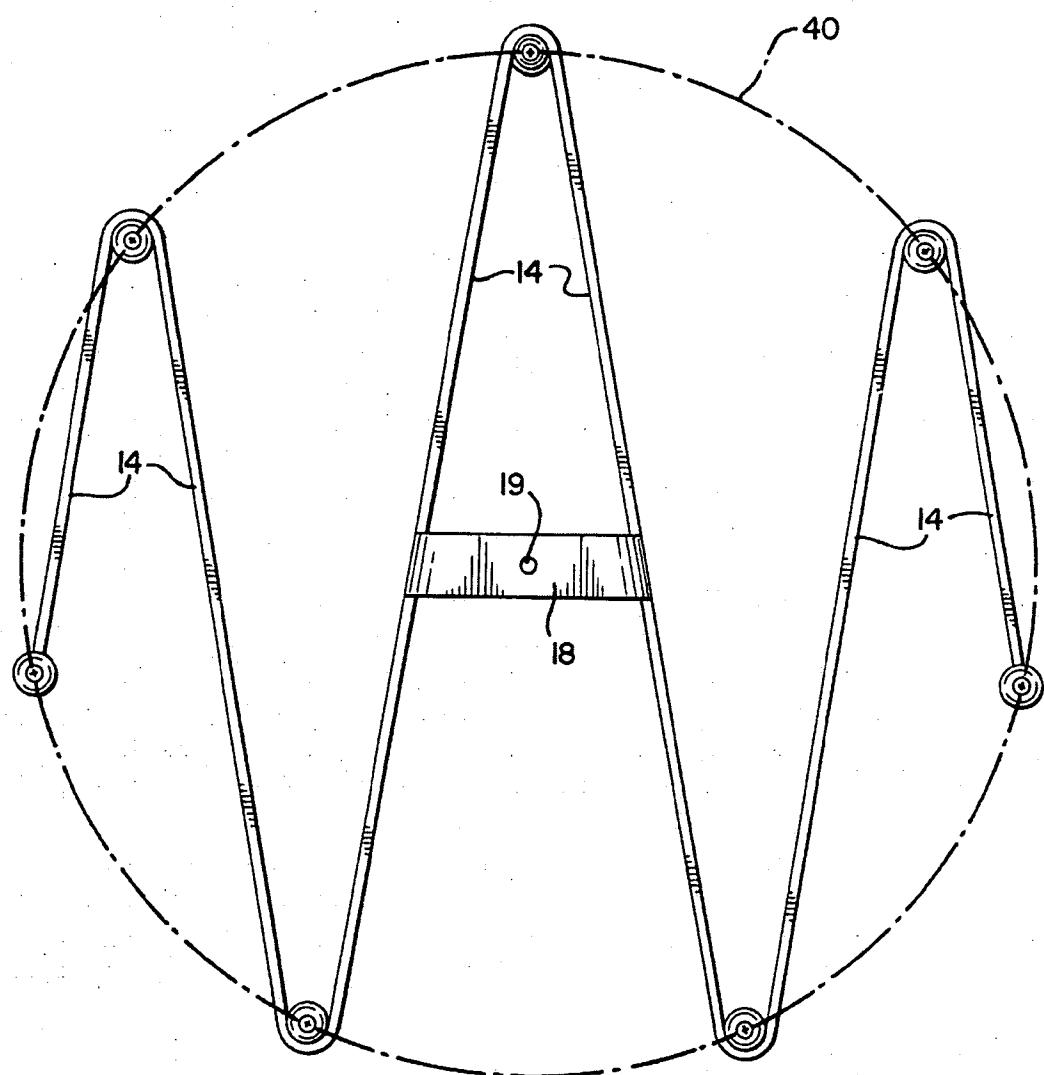
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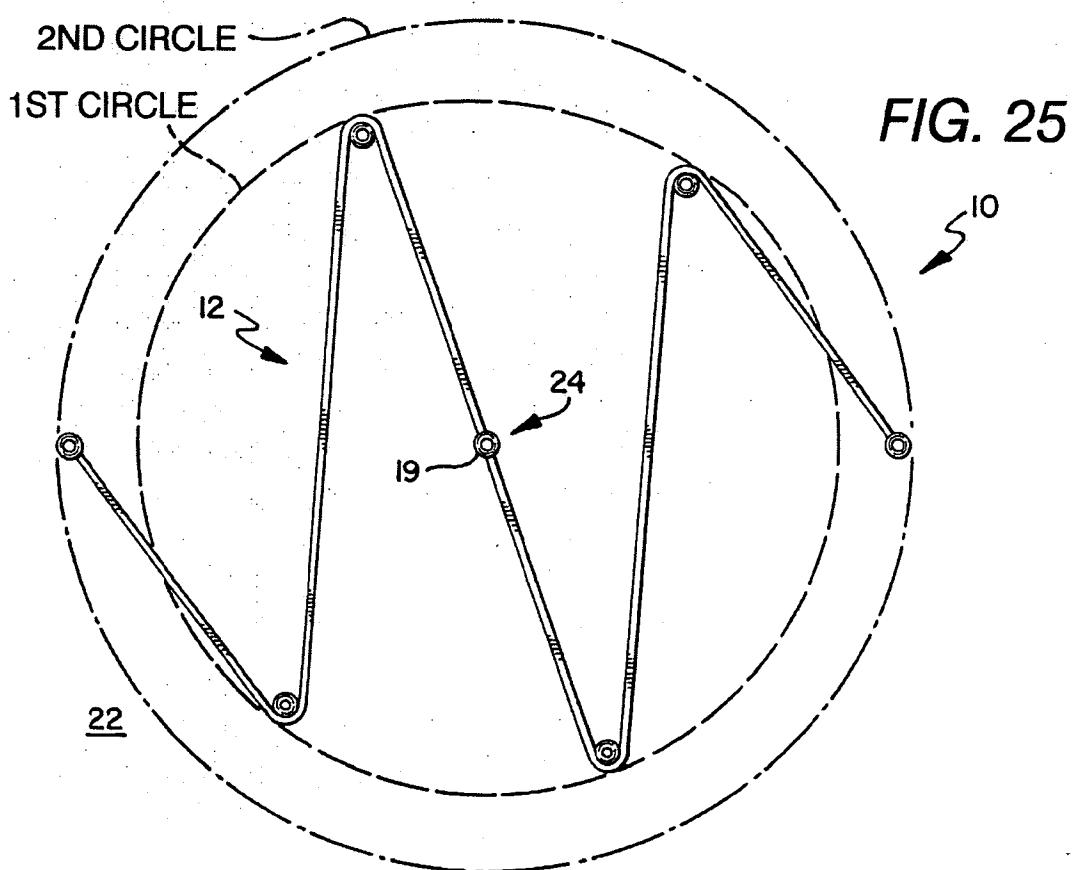
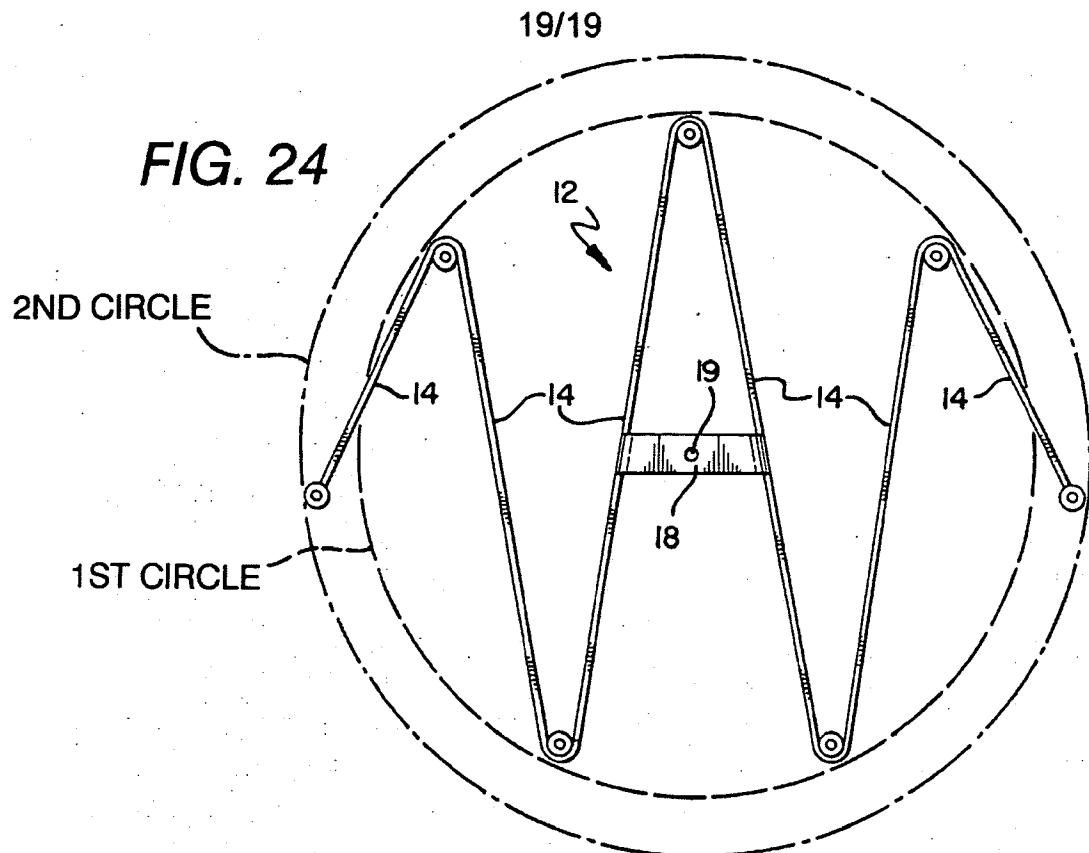
FIG. 22



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FIG. 23





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 08/13264

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A47F 5/00, A47F 7/00, F16M 11/00, F16M 13/00 (2009.01)

USPC - 248/125.8

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC: 248/125.8

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC: 248/125.8, 121, 127, 128, 129, 157; 211/85.13, 189, 195

See Serach Terms Below

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

pubWEST(PGPB,USPT,EPAB,JPAB); Google

Search Terms Used: nestable, roll, stackable, rolling, stand, IV, intravenous, storable, wheel, ball, caster, roller, stack\$4, stor\$4

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0196997 A1 (JOHNSON) 7 September 2006 (07.09.2006) fig 1, 10, para [0107], [0112]	1-8 and 19
Y	US 5,479,953 A (PASULKA) 02 January 1996 (02.01.1996), fig 2, col 3, ln 32-55	9-18 and 20
Y	US 2002/0096608 A1 (CEDARBERG) 25 July 2002 (25.07.2002) fig 1, para [0014], [0015]	10-18
Y	US 2007/0063460 A1 (O'QUIN) 22 March 2007 (22.03.2007) para [0005]-[0006], fig 1	9, 15, and 16
A	US 2003/0196975 A1 (MURRAY et al.) 23 October 2003 (23.10.2003), entire patent	20
A	US 2008/0156946 A1 (SCHMUTZER et al.) 03 July 2008 (03.07.2008), entire patent	1-20
A	US 2007/0205339 A1 (ANTHES et al.) 06 September 2007 (06.09.2007), entire patent	1-20
A	US 2007/0187559 A1 (NEWKIRK et al.) 16 August 2007 (16.08.2007), entire patent	1-20

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

16 January 2009 (16.01.2009)

Date of mailing of the international search report

02 FEB 2009

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