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(56) Related Art

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ABSTRACT

A joint assembly is mounted between adjacent supports of a frame of a tent and has a female joint (10), a male joint (20) and a slide (30). The male joint (20) covers on the female joint (10). The slide (30) is mounted slidably
5 between the joints (10, 20) and abuts a resilient member (40). The female joint (10) has a partition (13) with at least one through hole (131) to allow a protrusion (33) of the slide (30) to selectively pass through. When the slide (30) moves to completely retract between the joints (10, 20), the protrusion (33) leaves the through hole (131) to allow the joints (10, 20) to rotate relative to
10 each other. Therefore, when the frame is folded, the slide (30) is completely retracted to avoid damage other components.

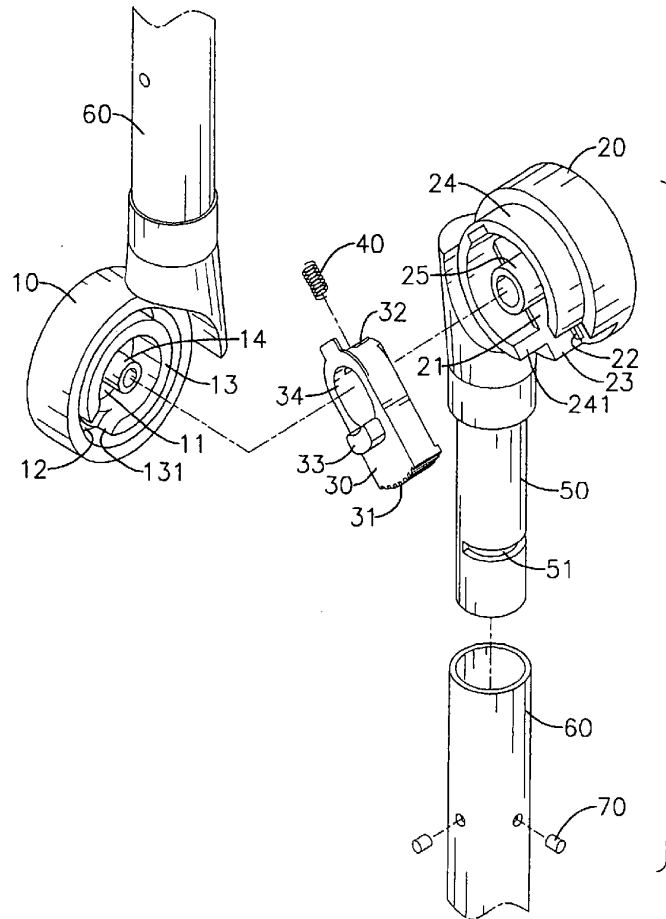


FIG. 1

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Regulation 3.2

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COMPLETE SPECIFICATION
FOR A STANDARD PATENT
ORIGINAL

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Invention title: JOINT ASSEMBLY

The following statement is a full description of this invention, including the best method of performing it known to us.

JOINT ASSEMBLY

1. Field of the Invention

The present invention relates to a joint assembly, especially to a joint assembly mounted between adjacent supports to allow the supports pivoting.

5 2. Description of the Prior Arts

European patent No.1975346 shows a quickly pitching tent, which is incorporated herein by reference. With reference to Figs. 8 and 9, the quickly pitching tent comprises a foldable frame (80) and a cloth housing (90) covering the frame (80). The foldable frame (80) has multiple supports (81) and multiple
10 conventional joint assemblies (82). Each conventional joint assembly (82) is mounted between adjacent supports (81) to allow the supports (81) pivoting. Each conventional joint assembly (82) has a pin (821) to selectively lock the conventional joint assembly (82). However, the end of the pin (821) is exposed
15 out from the conventional joint assembly (82). When the tent is folding or is folded, the exposed ends of the pins (821) easily penetrate through the cloth housing (90). Therefore, the conventional joint assembly (82) easily causes damage.

To overcome the shortcomings, the present invention provides a joint assembly to mitigate or obviate the aforementioned problems.

20 The main objective of the present invention is to provide a joint assembly that does not damage other components while the frame is folded. The joint assembly is mounted between adjacent supports of a frame of a tent and has a female joint, a male joint and a slide. The male joint covers on the female joint. The slide is mounted slidably between the joints and abuts a

resilient member. The female joint has a partition with at least one through hole to allow a protrusion of the slide to selectively pass through. When the slide moves to mount the protrusion in the through hole, the joints are held from rotating relative to each other. When the slide moves to completely retract between the joints, the protrusion leaves the through hole to allow the joints to rotate relative to each other. Therefore, when the frame is folded, the slide is completely retracted to avoid damage other components.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Fig. 1 is an exploded perspective view of a joint assembly in accordance with the present invention;

Fig. 2 is an operational end view in partial section of the joint assembly in Fig. 1;

Fig. 3 is an operational side view of the joint assembly in Fig. 1;

Fig. 4 is another operational side view of the joint assembly in Fig. 1;

Fig. 5 is a side view in partial section of another embodiment of a female joint of a joint assembly in accordance with the present invention;

Fig. 6 is an operational perspective view of another embodiment of a joint assembly in accordance with the present invention;

Fig. 7 is an operational side view of the joint assembly in Fig. 6;

Fig. 8 is a perspective view of a quickly pitching tent shown in EP1975346 with multiple conventional joint assemblies in accordance with the prior art; and

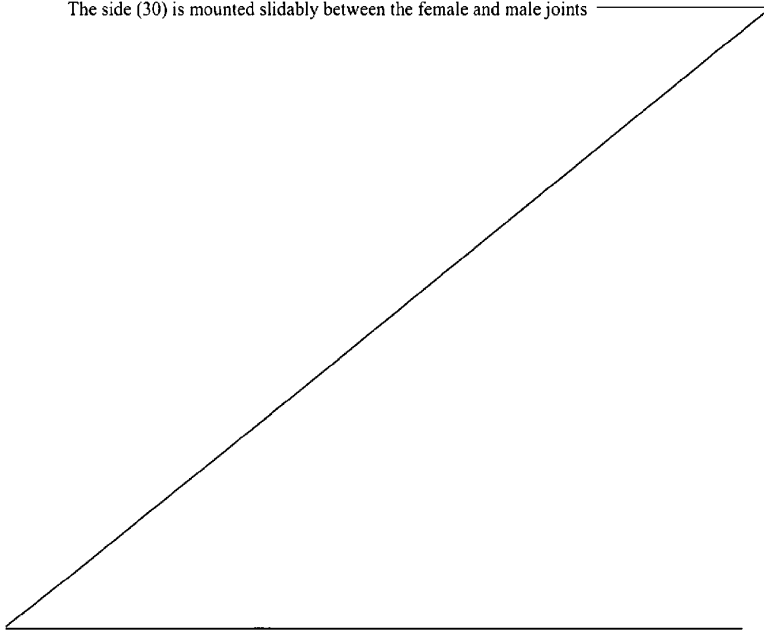
Fig. 9 is an operational perspective view of the tent in Fig. 8, shown folded.

With reference to Fig. 1, a joint assembly in accordance with the present invention comprises a female joint (10), a male joint (20), a slide (30), a resilient member (40) and two extending tubes (50). The joint assembly may be mounted between adjacent supports for a frame of a tent.

The female joint (10) is disk-like and has an inner annular channel (11), an outer annular channel (12), a partition (13) and a central pivot (14). The inner and outer annular channels (11, 12) are formed in an inside surface. The partition (13) is formed between the inner and outer annular channels (11, 12) and has at least one through hole (131). The through hole (131) is defined through the partition (13) and communicates the inner and outer annular channels (11, 12). The central pivot (14) is formed at a center of the inside surface of the female joint (10).

The male joint (20) is mounted on and covers the inside surface of the female joint (10) and has an inside surface, a radial groove (21), multiple guiding ribs (22), an opening (23) and a mounting rib (24). The inside surface of the male joint (20) faces the inside surface of the female joint (10). The radial groove (21) is formed in the inside surface of the male joint (20). The guiding ribs (22) are formed in the radial groove (21). The opening (23) is formed through a sidewall of the male joint (20) and communicates with the radial groove (21). The mounting rib (24) is C-shaped, is formed on the inside surface of the male joint (20) and has a gap (241) aligns with the opening (23) of the male joint (20).

The slide (30) is mounted slidably between the female and male joints



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(10, 20), is mounted slidably in the radial groove (21) of the male joint (20) through the opening (23) and has a first side, a second side, multiple knurls (31), multiple guiding grooves (32) and a protrusion (33). The first side of the slide (30) faces to the inside surface of the male joint (20). The second side of the slide (30) faces to the inside surface of the female joint (10). The knurls (31) are formed on a distal end of the slide (30) for the user to easily push the slide (30). The guiding grooves (32) are formed in the first side of the slide (30) and are mounted movably on the guiding ribs (22) to limit the sliding path of the slide (30). The protrusion (33) is formed on the second side of the slide (30) and is selectively mounted in the through hole (131) of the partition (13). When the distal end of the slide (30) protrudes out of the male joint (20), the protrusion (33) is mounted in the through hole (131) of the partition (13) to keep the female and male joints (10, 20) from pivoting relative to each other. When the distal end of the slide (30) completely retracts completely between the female and male joints (10, 20), the protrusion (33) is located in the inner annular channel (11) of the female joint (10) to allow the female and male joints (10, 20) to pivot relative to each other.

To keep the slide (30) from departing from the male joint (20), a limit component may be applied between the slide (30) and the male joint (20). In the preferred embodiment, the male joint (20) has a limiting shaft (25) and the slide (30) has an elongated hole (34). The limiting shaft (25) is formed on the inside surface of the male joint (20) and is mounted around the central pivot (14) of the female joint (10). The elongated hole (34) is formed through the slide (30) and is mounted movably around the limiting shaft (25). When the

slide (30) moves, the limiting shaft (25) selectively abuts the ends of the elongated hole (34) to keep the slide (30) from departing from the male joint (20).

5 The resilient member (40) is mounted between a proximal end of the slide (30) and the sidewall of the male joint (20), may be mounted in the radial groove (21) and may be a spring.

10 With reference to Figs. 1 and 2, the extending tubes (50) are formed respectively on and protrude transversely out from sidewalls of the female and male joints (10, 20). Each extending tube (50) has a C-shaped sliding recess (51) formed in a sidewall of the extending tube (50). Each extending tube (50) has a connecting tube (60) mounted rotatably around the extending tube (50). The connecting tubes (60) are connected to or are formed with the supports of the frame of the tent. When external force acts on the frame of the tent, the connecting tubes (60) may rotate to absorb part of the external force. Each
15 connecting tube (60) has two limiting pins (70) mounted therethrough. The limiting pins (70) slide in the sliding recess (51) of the corresponding extending tube (50) to limit the rotating angle of the connecting tube (60). The C-shaped sliding recess (51) may be across 270 degrees while the two limiting pins (70) mounted through a connecting tube (60) may include by 90 degrees.

20 With reference to Figs. 1 and 3, when the frame of the tent is folded, the slide (30) is pushed to retract completely between the female and male joints (10, 20). Because the protrusion (33) is located in the inner annular channel (11) of the female joint (10), the protrusion (33) is allowed to slide in the inner annular channel (11) and the female and male joints (10, 20) are

allowed to pivot relative each other. Therefore, the included angle between the extending tubes (50) are changed to fold the frame.

With reference to Fig. 4, when the frame of the tent is unfolded, the female and male joints (10, 20) are pivoted to align the protrusion (33) with the through hole (131) of the partition (13). Then the resilient member (40) pushes the slide (30) to move and the protrusion (33) moves into the through hole (131) to block the female and male joints (10, 20). Therefore, the extending tubes (50) are held at a predetermined angle to hold the frame at an unfolded status.

The joint assembly as described has following advantages. When the tent is folded, the slide (30) needs to be complete retract into the female and male joints (10, 20). Therefore, the joint assembly as described has no protruding parts when the tent is folded so that the joint assembly as described does not cause damage to other parts of the tent. Furthermore, the cooperation between the slide (30) and the resilient member (40) easily lock and unlock the female and male joints (10, 20). Thus, the joint assembly as described is convenient for use.

The adjacent supports at different parts of the frame have different included angles. For example, the adjacent supports at the top of the frame may have included angle by 120 degrees while the adjacent supports at the side of the frame may have included angle by 180 degrees. Therefore, with reference to Fig. 5, the partition (13A) of the female joint (10A) has multiple through holes (131A) to provide different positioning angles for the supports at different parts of the frame.

Moreover, with reference to Figs. 6 and 7, a receiving recess (52A) and

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5 a wedge (53A) are formed respectively on ends of the extending tubes (50A). The length of the wedge (53A) is larger than the depth of the receiving recess (52A). When the extending tubes (50) align with each other, the wedge (53A) protrudes into the receiving recess (52A) to form an interval (54A) between the ends of the extending tubes (50). Therefore, the ends of the extending tubes (50) do not bump into each other so that the ends of the extending tubes (50) do not clamp the user to enhance safety.

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

0 It will be understood that the term "comprise" and any of its derivatives (eg. comprises, comprising) as used in this specification is to be taken to be inclusive of features to which it refers, and is not meant to exclude the presence of any additional features unless otherwise stated or implied.

5 Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and features of the invention, the disclosure is illustrative only. Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A joint assembly comprising:

a female joint having

a partition formed on an inside surface of the female joint and having at least one

5 through hole defined through the partition; and

an inner annular channel formed in the inside surface of the female joint;

a male joint mounted on and covering the inside surface of the female joint and having

an inside surface of the male joint facing the inside surface of the female joint; and

an opening formed through a sidewall of the male joint;

0 a slide mounted slidably between the female and male joints through the opening and having

a first side of the slide faces to the inside surface of the male joint;

a second side of the slide faces to the inside surface of the female joint; and

a protrusion formed on the second side of the slide and selectively mounted in the at

least one through hole of the partition;

5 a resilient member mounted between a proximal end of the slide and the sidewall of the male joint; and

two extending tubes formed respectively on and protruding transversely out from sidewalls of the female and male joints.

2. The joint assembly as claimed in claim 1, wherein

20 the male joint has a radial groove formed in the inside surface of the male joint;

the opening of the male joint communicates with the radial groove of the male joint; and

the slide is mounted slidably in the radial groove of the male joint.

3. The joint assembly as claimed in claim 2, wherein

the male joint has multiple guiding ribs formed in the radial groove; and

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the slide has multiple guiding grooves formed in the first side of the slide and mounted movably on the guiding ribs of the male joint.

4. The joint assembly as claimed in any claim of claims 1 to 3, wherein

the female joint has an outer annular channel;

the partition is formed between the inner and outer annular channels of the female joint; and
the male joint has a C-shaped mounting rib formed on the inside surface of the male joint and having a gap aligning with the opening of the male joint.

5. The joint assembly as claimed in any claim of claims 1 to 3, wherein

the male joint has a limiting shaft formed on the inside surface of the male joint; and

0 the slide has an elongated hole formed through the slide and mounted movably around the limiting shaft.

6. The joint assembly as claimed in claim 5, wherein

the female joint has a central pivot formed at a center of the inside surface of the female joint; and

5 the limiting shaft of the male joint is mounted around the central pivot of the female joint.

7. The joint assembly as claimed in claim 4, wherein

the male joint has a limiting shaft formed on the inside surface of the male joint; and

the slide has an elongated hole formed through the slide and mounted movably around the limiting shaft.

20 8. The joint assembly as claimed in claim 7, wherein

the female joint has a central pivot formed at a center of the inside surface of the female joint; and

the limiting shaft of the male joint is mounted around the central pivot of the female joint.

9. The joint assembly as claimed in any claim of claims 1 to 3, wherein the partition of the

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female joint has multiple through holes.

10. The joint assembly as claimed in any claim of claims 1 to 3, wherein each extending tube

has

a C-shaped sliding recess formed in a sidewall of the extending tube; and

5 a connecting tube mounted rotatably around the extending tube, and each connecting tube having two limiting pins mounted therethrough and sliding in the sliding recess of the corresponding extending tube.

11. The joint assembly as claimed in claim 8, wherein each extending tube has

a C-shaped sliding recess formed in a sidewall of the extending tube; and

0 a connecting tube mounted rotatably around the extending tube, and each connecting tube having two limiting pins mounted therethrough and sliding in the sliding recess of the corresponding extending tube.

12. The joint assembly as claimed in any claim of claims 1 to 3, wherein a receiving recess and a wedge are formed respectively on ends of the extending tubes, and a length of the wedge is

5 larger than a depth of the receiving recess.

13. The joint assembly as claimed in claim 11, wherein a receiving recess and a wedge are formed respectively on ends of the extending tubes, and a length of the wedge is larger than a depth of the receiving recess.

20 14. The joint assembly as claimed in claim 13, wherein the slide has multiple knurls formed on a distal end of the slide.

15. A joint assembly substantially as herein described with reference to the accompanying drawings.

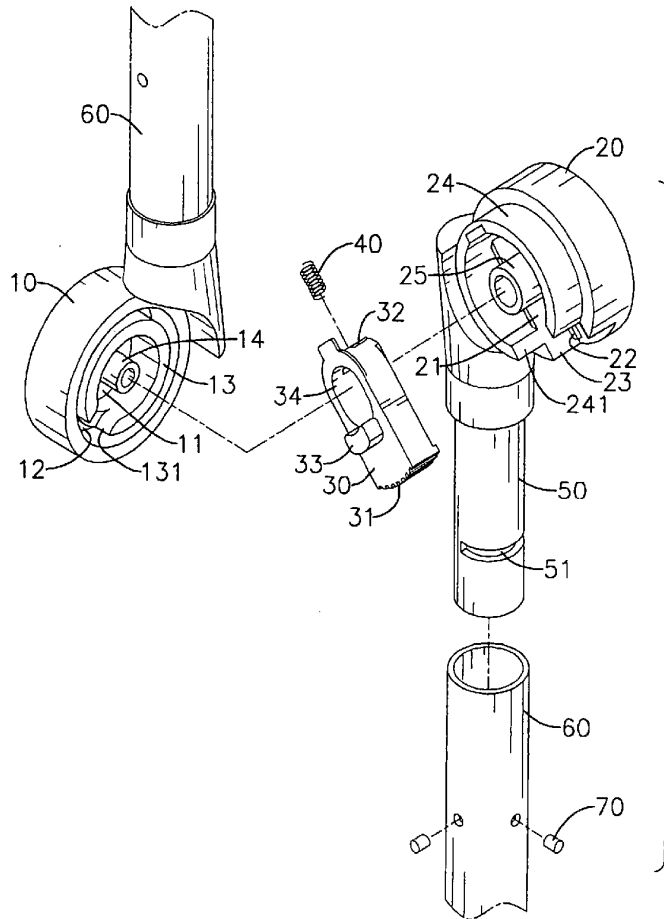


FIG. 1

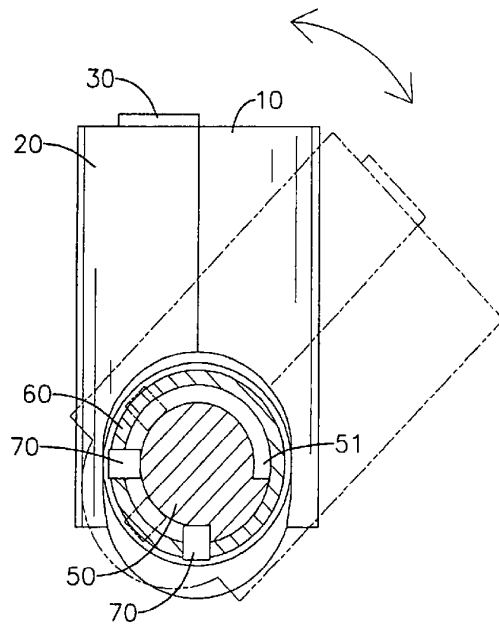


FIG. 2

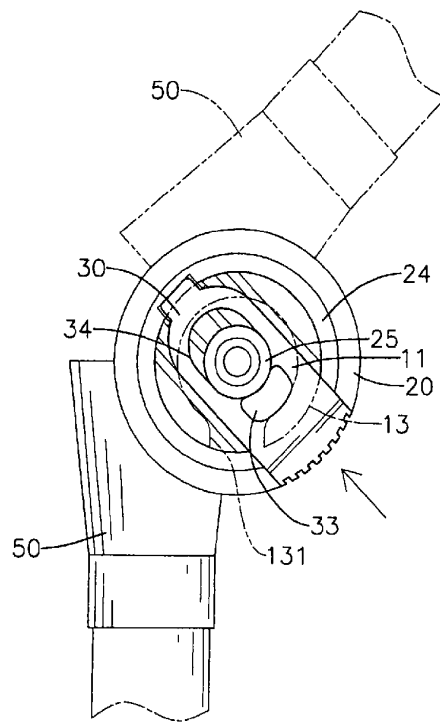


FIG. 3

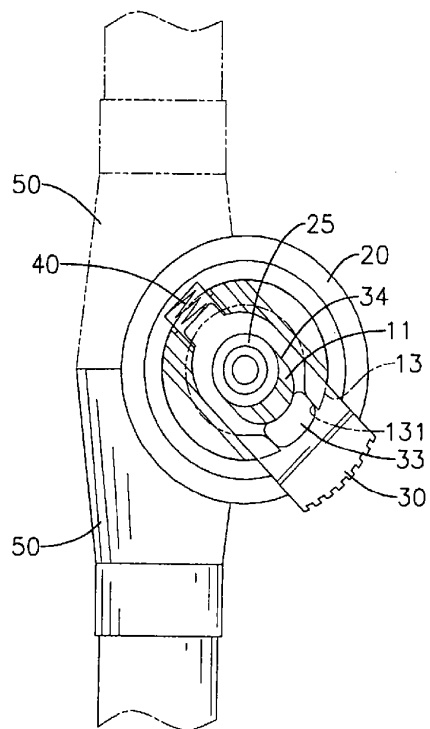


FIG. 4

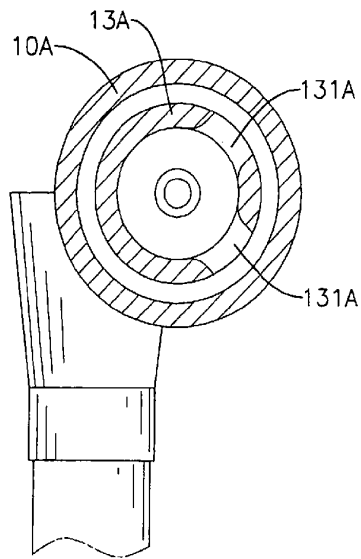


FIG. 5

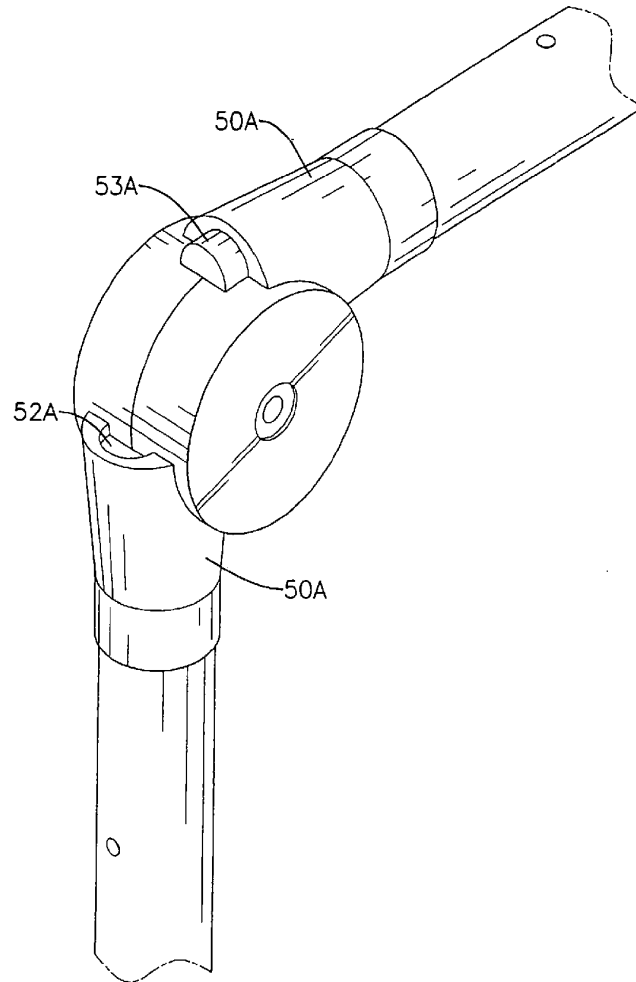


FIG. 6

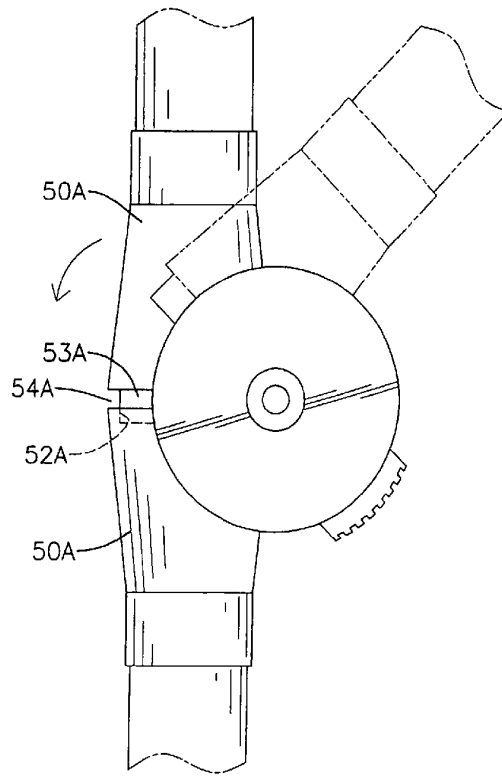


FIG. 7

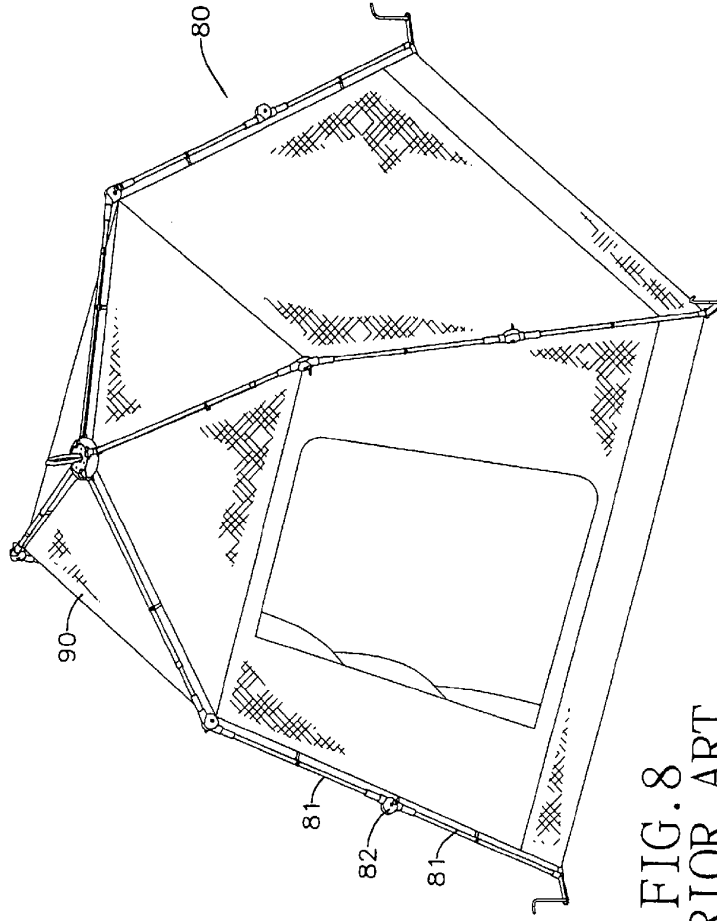


FIG. 8
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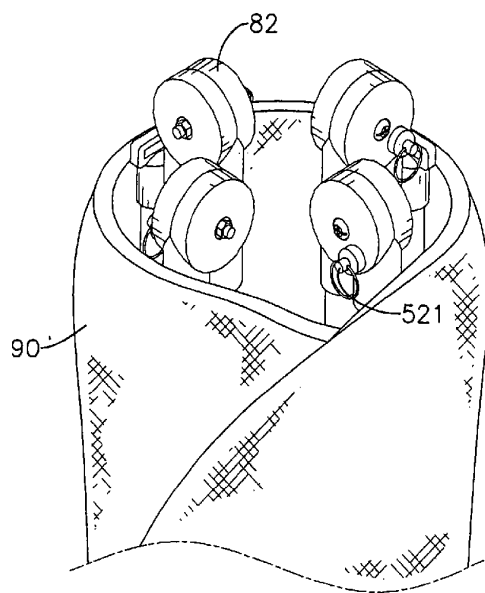


FIG. 9
PRIOR ART