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(71) Applicant: **Fox International Group Limited**
**Hainault,**
**Essex IG6 3UT (GB)**

(72) Inventor: **Taylor, Adam Richard Ellis**
**Loughton, Essex IG10 2QH (GB)**

(74) Representative: **Crouch, David John et al**
**Bromhead Johnson**
**Sovereign House**
**212-224 Shaftesbury Avenue**
**London WC2H 8HQ (GB)**

(54) **A TENT FRAME AND CORRESPONDING TENT**

(57) A tent frame (10) comprising a hub (12) from which extend a plurality of limbs (14,15), respective ends of some of which are secured to the hub (12) by way of respective pivots (16), constituting a first set of pivots, having respective pivot axes which are generally parallel to one another. Respective ends of at least two (15) of the said plurality of limbs (14,15) are secured to the hub (12) by way of respective pivots (24), constituting a second set of pivots, enabling the said at least two (15) of the said plurality of limbs (14,15) to be pivoted about axes which are generally transverse of the pivot axes of the said first set of pivots (16). The pivots (16,24) of the first and second set of pivots are fixed in position relative to one another even when the limbs (14,15) are pivoted about their respective pivots (16,24) whilst the frame (10) is unfolded into an erect condition and whilst it is folded for stowage.

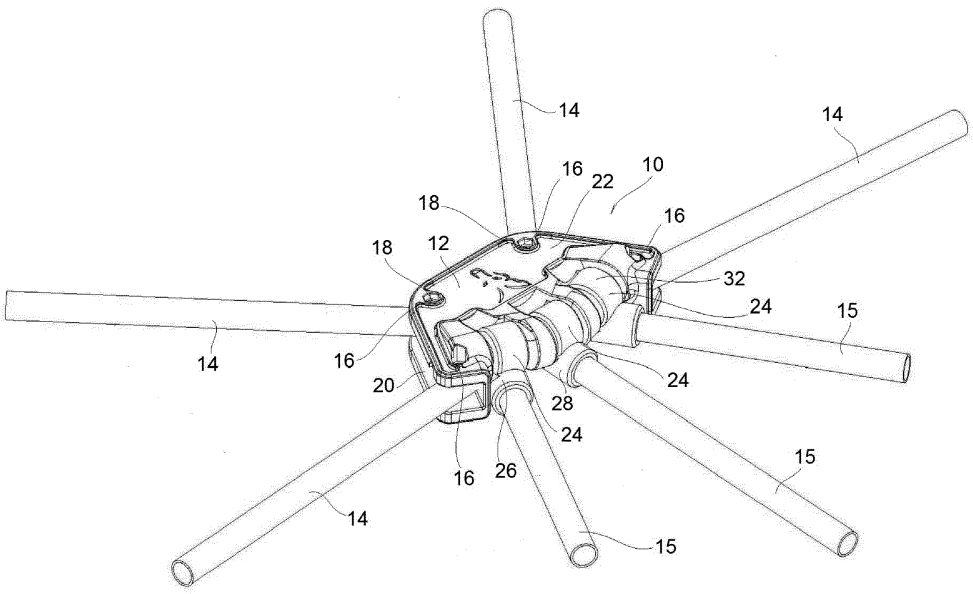


Fig. 1

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## Description

**[0001]** The present invention relates to a tent frame comprising a hub from which extends a plurality of limbs, respective ends of some of which are secured to the hub by way of respective pivots, constituting a first set of pivots, having respective pivot axes which are generally parallel to one another.

**[0002]** One such previously proposed tent frame is described and illustrated in EP 1445400 A1. In the construction of tent frame described therein, the said first set of pivots are located on a first part of the hub, and a plurality of limbs extend from a second part of the hub and are secured to that part of the hub by way of respective pivots, constituting a second set of pivots, having respective pivot axes which are also generally parallel to one another. The first and second parts of the hub are pivoted relative to one another, and sheet material is attached to the limbs of the tent frame so that when the two parts of the hub are pivoted to bring the axes of the said second set of pivots parallel to those of the said first set, the sheet material is opened out to form a canopy supported by the limbs of the frame, and the pivot axes of the first set of pivots are substantially parallel to those of the second.

**[0003]** A disadvantage of this construction is the strength required to pivot the two parts of the hub relative to one another in this fashion to erect the tent. For this purpose respective recesses are formed in the two parts of the hub, into which recesses are inserted the ends of respective levers to enable considerable force to be exerted on the two parts of the hub to bring them together in the foregoing fashion. A latch pivoted to a formation on one of the hub parts is then swung round to latch onto a corresponding formation on the other part of the hub to secure the hub parts together in such an erect condition of the frame, whereupon the levers are removed. Such a construction is therefore relatively expensive and complex, and requires a relatively awkward assembly procedure.

**[0004]** The present invention seeks to provide a remedy.

**[0005]** Accordingly, a first aspect of the present invention is directed to a tent frame having the construction set out in the opening paragraph of the present specification, characterised in that respective ends of at least two of the said plurality of limbs are secured to the hub by way of respective pivots, constituting a second set of pivots, enabling the said at least two of the said plurality of limbs to be pivoted about respective axes which are transverse, or have a component which is transverse, of the pivot axes of the said first set of pivots whilst the frame is unfolded into an erect condition and whilst it is folded for stowage, the pivots of the first and second set of pivots being fixed in position relative to one another even when the limbs are pivoted about their respective pivots.

**[0006]** This enables a relatively simple and inexpensive construction of tent frame to be made, in such a fashion that its erection is relatively simple.

**[0007]** The said first set of pivots may be spaced apart around the hub.

**[0008]** This provides an even distribution of the support for sheet material when such material is attached to the tent frame.

**[0009]** The said second set of pivots may be located together on one side of the hub.

**[0010]** This again facilitates a relatively easy erection of the tent frame.

**[0011]** The said second set of pivots may have fixed pivot axes which are set at an angle relative to one another so that the associated limbs are splayed when the tent frame is in an erect condition.

**[0012]** The said second set of pivots may have respective pivot axes which are orthogonal to those of the first set. This results in a relatively low force being required initially to open out the frame.

**[0013]** The pivots of the said first set of pivots may comprise respective pins extending through respective inner ends of the associated limbs.

**[0014]** This provides a relatively inexpensive way of manufacturing those pivots.

**[0015]** The pivots of the said second set of pivots may comprise axle portions of the hub embraced by generally circular portions on the sides of respective end portions of the associated limbs.

**[0016]** Alternatively the hub may be provided with respective cams for at least two limbs attached to the hub by way of universal pivots constituting or being included in the said second set of pivots.

**[0017]** The cams may be such as to generate a movement of the said at least two limbs when the frame is unfolded, which movement is such that the limbs splay away from one another as the latter are rotated about their respective pivots through a first part of such movement at a greater rate than in a second part of that movement.

**[0018]** This increases the extent to which the taughtness of sheet material is spread evenly across the dome it is beginning to form when attached to the frame.

**[0019]** The tent frame may comprise a further limb arranged centrally in relation to the other limbs of the tent frame, which further limb is fixed relative to the hub.

**[0020]** Such a fixed central limb may be in the same position relative to the hub for both the erect condition of the tent frame and the collapsed condition of the tent frame.

**[0021]** The said second set of pivots may be arranged between two pivots of the said first set of pivots.

**[0022]** Such a construction lends itself more readily to erection of the tent frame.

**[0023]** With such a construction, the other pivots of the said second set of pivots, viewed in a direction perpendicular to an imaginary line joining the midpoints of the said two pivots of the said first set of pivots, are within those midpoints.

**[0024]** This again affords an even distribution of support for sheet material when it is attached to the tent

frame.

**[0025]** The said at least two limbs may be retained in their splayed condition by one or more braces, for example by a rod or bar which may be removeably attached between and to each of those limbs.

**[0026]** According to a second aspect of the present invention, there is provided a tent frame comprising a hub from which extends a plurality of limbs, respective ends of which are secured to the hub by way of respective pivots, so that each leg is pivotable between a stow position and an extended position it adopts when the frame is in use, characterised in that at least one of the limbs can be retained in its extended position by means of interengaging parts respectively mounted on the hub and the hub end of the said at least one of the limbs, at least one of those interengaging parts being slidable between a first position, in which it accommodates movement of the other of those parts whilst the said at least one of the limbs is brought into its extended position, and a second position in which it engages the said other of those parts to retain the said at least one of the limbs in its extended position.

**[0027]** Such a construction enables the speedy erection and collapse of the tent frame.

**[0028]** The said at least one of the interengaging parts may be spring-loaded towards the said second position, so that upon movement of the said at least one of the limbs towards its extended position, the said one of those interengaging parts is slid by the said other of those interengaging parts to its said first position, and so that upon the said at least one of the limbs reaching its extended position, the said one of those interengaging parts snaps back to its second position so that those two parts can engage one another in such a manner as to retain the limb in its extended position.

**[0029]** This further facilitates speedy erection and collapse of the tent frame.

**[0030]** According to a third aspect of the present invention, there is provided a tent frame comprising a hub from which extends a plurality of limbs, respective ends of which are secured to the hub by way of respective pivots, so that each limb is pivotable between a stow position and an extended position it adopts when the frame is in use, in which at least one of the limbs is provided with a slider coupled to the said at least one of the limbs in such a manner as to be slidable therealong away from and towards the hub, there being two cross-members pivotally connected to the slider and extending therefrom to respective pivots on respective ones of the limbs which are on opposite respective sides of the said at least one of the limbs, whereby when the limbs are moved to their extended positions, the slider can slide along the limb on which it is provided away from the hub so that the cross-members retain the said respective ones of the limbs at a splay angle relative to the said at least one of the limbs.

**[0031]** Such a construction ensures a desired splay angle between the said at least one of the limbs and those two limbs on opposite sides thereof, and as a result ensures a desired degree of tensioning of any tent fabric supported by the frame.

**[0032]** The slider may be retained in the position it adopts when the limbs are in their extended positions by means of a clip, pin, latch or over-centre mechanism.

**[0033]** The present invention extends to a tent comprising a tent frame made in accordance with the present invention together with sheet material supported by the frame.

**[0034]** The construction of the tent frame is such that such sheet material can remain on the frame during stowage, during its use as a tent, and whilst the tent is being erected and whilst the tent is being collapsed. Thus the sheet material never has to be removed from the frame. The unfolding of the frame results in the sheet material being spread out into a canopy supported by the frame during use, and folding up of the frame results in the sheet material also being folded up for stowage. This therefore provides for efficient and speedy changeover from the folded condition of the tent to the unfolded condition, and vice versa.

**[0035]** Examples of tent frames made in accordance with the present invention will now be described in greater detail with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of the underside of a hub and limb portions of a tent frame embodying the present invention;

Figure 2 shows a perspective view from above of the tent frame shown in Figure 1, together with part of sheet material supported by the frame;

Figures 3a to 3e show respectively an underneath view, a perspective view from above and to one side, a top view, an end view and a side view of the tent frame shown in Figures 1 and 2 in a condition just after unfolding of the frame has commenced;

Figures 4a to 4e, 5a to 5e, 6a to 6e and 7a to 7e show views corresponding to Figures 3a to 3e for successive conditions of the frame as it is unfolded;

Figure 8 is a diagram illustrating the movement of limbs of the frame shown in Figures 1 to 7e between a folded condition of the frame and an unfolded condition of the frame;

Figures 9 to 16 show views which correspond to those of Figures 1 to 8, of a second embodiment of the present invention;

Figures 17 to 23 show views which correspond to those of Figures 1 to 7, of a third embodiment of the present invention; and

Figures 24 to 27 show respective perspective views of successive stages in the collapsing of the tent frame shown in Figures 17 to 23.

**[0036]** The tent frame 10 shown in Figures 1 and 2 comprises a hub 12 from which extend a plurality of limbs 14 and 15. Only portions of each limb 14,15 which are closer to the hub 12 are shown in Figures 1 and 2. A first

set of these limbs 14 are connected to the hub 12 by way of respective pivots 16. Each pivot 16 comprises a pin 18 which has its opposite ends fixed to respective flanges 20 and 22 of the hub 12 so that each pin extends from one flange 20 to the other flange 22. An inner end of the associated limb 14 is provided with the through-hole (not shown) which extends through it and through which extends the associated pin 18. This enables the limb 14 to swing about its associated pivot 16. Furthermore, from this described construction it will be appreciated that the pivots 16 constitute a first set of pivots of the frame 10 the pivot axes of which are parallel to one another.

**[0037]** Viewing the hub 12 along a median bisector thereof, the set of pivots 16 comprises two outermost pivots of the set, the other two pivots of which appear to be within those outer pivots when viewed in that direction.

**[0038]** A second set of limbs of the frame 10 constituted by the limbs 15 are attached to the hub 12 by way of respective pivots 24 constituting a second set of pivots located between the outermost pivots of the set of pivots 16.

**[0039]** Each pivot 24 comprises a bar (not shown) of the hub 12 which is of circular cross-section and which extends between two portions of the hub 12 in a direction which is orthogonal to the pins 18. A connector 26 of each pivot 24 comprises a tubular portion 28 which receives one end of its associated limb 15 in such a fashion as to be fixed relative thereto, with a portion 30 of the limb 15 extending beyond the tubular portion 28 within the hub 12 when the frame is in the extended condition shown in Figures 1 and 2. Each connector 26 further comprises a ring portion 32 which surrounds its associated bar of the hub 12 so as to be rotatable thereabout.

**[0040]** As shown in Figures 1 and 2, this particular illustrated frame 10 has three limbs 15 with three respective pivots 24. The bar of the central one of these pivots 24 is generally parallel to an imaginary line connecting the outermost pivots 16 of the first set of pivots. The bar of each of the other pivots 24 is on a slight slant relative to the central bar so that the limbs 15 are splayed apart from one another in a direction away from the hub 12 when the frame 10 is in the extended condition shown in Figures 1 and 2.

**[0041]** Figure 2 also shows a portion of sheet material 34 which is attached to the limbs 14 and 15.

**[0042]** Figures 3 to 7 show the frame 10 in successive stages of being unfolded from a stowage condition shown in Figure 3 to an unfolded condition shown in Figure 7 in which the combination of the frame 10 and the sheet material 34 constitute a tent, with the limbs 14 and 15 curving in a manner not shown so that they extend outwardly from the hub 12 and then downwardly towards the ground with the sheet material 34 adopting the shape of a dome to constitute a cover of the tent.

**[0043]** Thus it will be seen that as the frame 10 is unfolded, each limb 14 and 15 swings about its respective pivot relative to the hub 12. As the limbs 14 are fanned out from a position in which they are generally parallel to one another in the folded stowaway condition to a position in which they are spread outwardly from the hub 12 in a star formation, the limbs 15 rotate about their respective pivots 26 between a position in which they are generally parallel to the limbs 14, about pivot axes which are at right angles to those of the set of limbs 14, to a position in which those portions of all the limbs 14 and 15 which are close to the hub 12 are in the same general imaginary plane as one another. Furthermore, all the limbs fan out from the hub 12 and from one another, the spacing between the limbs 15 which are now splayed relative to one being slightly less than the spacing between the limbs 14. These limbs 15 support an entrance (not shown) to the tent.

**[0044]** As the limbs 14 and 15 of the frame 10 are unfolded, so the sheet material 34 which is attached to these limbs is also spread out into a dome formation. It therefore remains attached to the limbs 14 and 15 throughout the unfolding procedure.

**[0045]** After use, the tent may be folded up in stages also illustrated in Figures 3 to 7, but in reverse order, with the sheet material 34 being folded up as a result of the limbs 14 and 15 being folded together, so that the sheet material remains attached to the limbs 14 and 15 in the folded up stowaway position ready for the next unfolding of the tent when it is next erected.

**[0046]** It will be appreciated that when the tent is in its unfolded, erected condition, what is now the upper side 36 of the hub 12 now has sheet material 34 (not shown in Figure 1) taught just below it and against it with the ends 30 of the limbs 15 remaining recessed in the hub 12.

**[0047]** The limbs 15 may be retained in their splayed condition by means of one or more braces, comprising one or more cross-bars or rods (not shown) extending between and attached to one or more of the limbs 15.

**[0048]** The paths 38 of respective points on the three limbs 15 outwardly of the hub 12 as the limbs are unfolded are shown diagrammatically in Figure 5, so that those points are generally adjacent to one another at a first end 40 of each path 38, when the frame 10 is in the folded condition, and travel through a near semicircular path so as to be spaced apart from one another, at the other ends 42 of the paths, in the unfolded condition with the limbs 15 splayed apart from one another.

**[0049]** The embodiment of the present invention shown in Figures 9 to 16 is substantially the same the embodiment shown in Figures 1 to 8, except in the following respects.

**[0050]** Firstly, the flanges 20 and 22 are reduced at portions of the hub 12 between the pivots 16. Secondly, a fifth limb 14a is rigidly fixed to the hub 12, and extends along a median bisector of the hub 12. Thirdly, the two outer pivots of the set of pivots 24 are constituted by ball and socket joints, or universal joints, to give the associated limb a greater degree of freedom in its ability to be pivoted about the pivot 24. Fourthly, portions 60 of the hub 12 define respective guide cams for the outer pivots 24 such that the movement of points of the set of limbs

15 which are located outwardly of the hub 12 follow the paths represented diagrammatically in Figure 16. It will be seen from this Figure that the limbs 15 are splayed apart more rapidly during the first portion of the paths 38 near to the ends 40 thereof than they are during the remainder of those paths 38. This reduces the rate of splaying as the limbs 15 are swung outwardly once the tent is in a relatively unfolded condition to increase the extent to which the taughtness of the sheet material 34 is spread evenly across the dome it is beginning to form.

**[0051]** The embodiment of the present invention shown in Figures 17 to 27 is substantially the same the embodiment shown in Figures 9 to 16, except in the following respects.

**[0052]** Firstly, the hub end of the centre of the three legs or limbs 15 is reinforced by a connector 50 which has a tubular portion 52 which receives a hub end of the centre leg 15, and trunnions 54 through which a cylindrical bar (not visible in the Figures) extends from one support block portion 56 of the hub 12 on one side of the connector 52 to another support block portion 56 of the hub 12 on the other side of the connector 52. This construction provides a pivot between the centre leg or limb 15 and the hub 12. A centre support 58 of the hub 12 through which the bar passes is also provided to add strength to the pivot construction.

**[0053]** On the upper side of the connector 50 there is provided a hollow arched portion 60 which is open in the direction of the hub 12 and which can be seen more clearly in Figures 18 and 27. This portion 60 has transverse serrations or teeth (not shown) on the interior of its upper arcuate wall. It forms the first part of a snap-action locking device.

**[0054]** The second part of the snap-action locking device is provided by a slidable block 62 secured slidably on the hub 12. The block 62 is formed with an arcuate recess 64 which accommodates a part of the arched portion 60, and a forwardly protruding tongue portion 66 which is visible in Figures 25, 26 and 27. The tongue portion 66 has an upper curved surface 68 as viewed in cross-section, and this upper curved surface 68 has transverse serrations or teeth and has the same radius of curvature as that of the interior of the arched portion 60. The slidable block 62 is slidable towards and away from the front edge of the block 12 and is urged by a spring (not shown) into a forward position further from the rear leg or limb 14a.

**[0055]** Further transverse serrations or teeth (not shown) are also provided on the underside of the tongue portion 66 to engage with transverse serrations or teeth (not shown) on the block 12 when the tent frame is in use.

**[0056]** When the centre leg or limb 15 is pivoted relative to the hub into its extended position, the arcuate portion 60 of the connector 50 engages the slidable block 62 of the hub 12 and urges it rearwardly. When the centre leg 15 is in its fully extended position, the arcuate portion 60 of the connector 50 clears the upper forward edge of the tongue 66 so that the slidable block 62 snaps forward into a position in which the tongue 66 extends within the hollow arcuate portion 60 of the connector 50. Only a very slight downward movement of the centre leg or limb 15 will now be allowed before the teeth of the tongue 66 and the teeth of the arcuate portion 60 of the connector 50 interengage to prevent further such downward movement.

**[0057]** To collapse the tent from the erect condition of the tent frame as shown in Figure 24, the centre leg or limb 15 is urged upwardly to disengage the serrated teeth of the arcuate portion 60 of the connector 50 from those of the tongue 66 so that the slidable block 62 can be slid rearwardly as shown in Figure 25. The centre leg or limb 15 is now free to be lowered to the collapsed or stow position as shown in Figures 26 and 27.

**[0058]** Secondly, the centre leg or limb 15 is provided with a flat 70 running along its length. A slider 72 shown for example in Figure 21a surrounds the centre leg 15 and is provided with a corresponding flat (not shown) which engages the flat 70 to prevent rotation of the slider 72 around the centre leg 15. However, the slider 72 is free to slide along the centre leg 15 towards and away from the hub as shown for example in Figures 21a, 22a and 23a. Respective cross-members 74 and 76 are pivotally attached at respective ends thereof to the slider 72 by respective pivots 78 and 80 and are pivotally attached at their other ends to respective outer ends of the outer two legs or limbs 15 by respective pivots 82 and 84. The pivots 78, 80, 82 and 84 are universal joints to facilitate the degree of freedom of movement required. A latch (not shown) may hold the slider 72 at its position in which the two cross-members 74 and 76 are substantially collinear. In this way they retain the outer legs or limbs 15 at a desired angle relative to the centre leg 15, and the sheet material or fabric 34 of the tent is maintained at a desired tension.

**[0059]** With such a construction, as the frame is changed from its stow condition to its erect condition, the centre leg or limb 15 is raised, and the attachment of the sheet material or fabric 34 of the tent to the frame causes the outer legs or limbs to raise accordingly. Once the centre leg has been snapped into its fully extended position, the cross-members can be brought into alignment with one another by sliding the slider 72 fully to its latched position, so the the sheet material or fabric 34 of the tent is fully stretched, and the canopy (not shown) over the tent entrance is properly shaped.

**[0060]** As with the previously described embodiments, the legs or limbs 15 of the second set of legs or limbs of the tent frame are shorter than those legs or limbs 14 of the first set, although this is not evident from the Figures because they only show parts of the legs or limbs 14. With such a construction, the fabric 34 of the tent forms a canopy over an entrance (not shown) of the tent when the frame is in its erected condition.

**[0061]** Numerous variations and modifications may occur to the reader without taking the resulting construction outside the scope of the present invention. For example,

there may be only two limbs 15 instead of the three illustrated in the Figures. Furthermore, the limbs 15 do not necessarily curve when the tent is in the unfolded, erect condition. There may be more or fewer limbs 14 than those illustrated.

## Claims

1. A tent frame (10) comprising a hub (12) from which extends a plurality of limbs (14,15), respective ends of some of which are secured to the hub (12) by way of respective pivots (16), constituting a first set of pivots, having respective pivot axes which are parallel to one another, **characterised in that** respective ends of at least two (15) of the said plurality of limbs (14, 15) are secured to the hub (12) by way of respective pivots (24), constituting a second set of pivots, enabling the said at least two (15) of the said plurality of limbs (14, 15) to be pivoted about respective axes which are transverse, or have a component which is transverse, of the pivot axes of the said first set of pivots (16) whilst the frame (10) is unfolded into an erect condition and whilst it is folded for stowage, the pivots (16, 24) of the first and second set of pivots being fixed in position relative to one another even when the limbs (14, 15) are pivoted about their respective pivots (16, 24).

2. A tent frame (10) according to claim 1, **characterised in that** the pivots (24) of the said second set of pivots are located together on one side of the hub (12).

3. A tent frame (10) according to claim 1 or claim 2, **characterised in that** the pivots (24) of the said second set of pivots have fixed pivot axes which are set at an angle relative to one another so that the associated limbs (15) are splayed when the tent frame (10) is in an erect condition.

4. A tent frame (10) according to claim 1 or claim 2, **characterised in that** the hub (12) is provided with respective cams (60) for at least two limbs (15) attached to the hub (12) by way of universal pivots constituting or being included in the said second set of pivots (24).

5. A tent frame (10) according to claim 4, **characterised in that** the cams (60) are such as to generate a movement of the said at least two limbs (15) when the frame (10) is unfolded, which movement is such that the limbs (15) splay away from one another as the latter are rotated about their respective pivots (24) through a first part of such movement at a greater rate than in a second part of that movement.

6. A tent frame (10) according to any preceding claim, **characterised in that** it comprises a further limb (14a) arranged centrally in relation to the other limbs (14, 15) of the tent frame (10), which further limb (14a) is fixed relative to the hub (12).

7. A tent frame (10) according to claim 6, **characterised in that** the fixed central limb (14a) is in the same position relative to the hub (12) for both the erect condition of the tent frame (10) and the collapsed condition of the tent frame (10).

8. A tent frame (10) according to any preceding claim, **characterised in that** the said second set of pivots (24) are arranged between two pivots of the said first set of pivots (16).

9. A tent frame (10) comprising a hub (12) from which extends a plurality of limbs (14, 15), respective ends of which are secured to the hub (12) by way of respective pivots (16, 24), so that each limb (14, 15) is pivotable between a stow position and an extended position it adopts when the frame (10) is in use, **characterised in that** at least one of the limbs (15) can be retained in its extended position by means of interengaging parts (66, 60) respectively mounted on the hub (12) and the hub end of the said at least one of the limbs (15), at least one of those interengaging parts (66) being slidable between a first position, in which it accommodates movement of the other (60) of those parts whilst the said at least one of the limbs (15) is brought into its extended position, and a second position in which it engages the said other of those parts (60) to retain the said at least one of the limbs (15) in its extended position.

10. A tent frame (10) according to claim 9, **characterised in that** at least one (66) of the interengaging parts is spring-loaded towards the said second position, so that upon movement of the said at least one of the limbs (15) towards its extended position, the said one of those interengaging parts (66) is slid by the said other of those interengaging parts (60) to its said first position, and so that upon the said at least one of the limbs (15) reaching its extended position, the said one of those interengaging parts (66) snaps back to its second position so that those two parts (66, 60) can engage one another in such a manner as to retain the limb (15) in its extended position.

11. A tent frame (10) comprising a hub (12) from which extends a plurality of limbs (14, 15), respective ends of which are secured to the hub (12) by way of respective pivots (16, 24), so that each limb (14, 15) is pivotable between a stow position and an extended position it adopts when the frame (10) is in use, **characterised in that** at least one of the limbs (15) is provided with a slider (72) coupled to the said at

least one of the limbs (15) in such a manner as to be slidable therealong away from and towards the hub (12), there being two cross-members (74, 76) pivotally connected to the slider (72) and extending therefrom to respective pivots (82, 84) on respective ones of the limbs (15) which are on opposite respective sides of the said at least one of the limbs (15), whereby when the limbs (14, 15) are moved to their extended positions, the slider (72) can slide along the limb (15) on which it is provided away from the hub (12) so that the cross-members (74, 76) retain the said respective ones (15) of the limbs at a splay angle relative to the said at least one of the limbs (15).

**12.** A tent frame (10) according to claim 11, **characterised in that** the slider (72) can be retained in the position it adopts when the limbs (14, 15) are in their extended positions by means of a clip, pin, latch or over-centre mechanism.

**13.** A tent frame (10) according to any one of claims 9 to 12, **characterised in that** tent frame (10) has one or more of the additional features set out in claims 1 to 8.

**14.** A tent comprising a tent frame (10) as claimed in any preceding claim together with sheet material (34) supported by the frame (10).

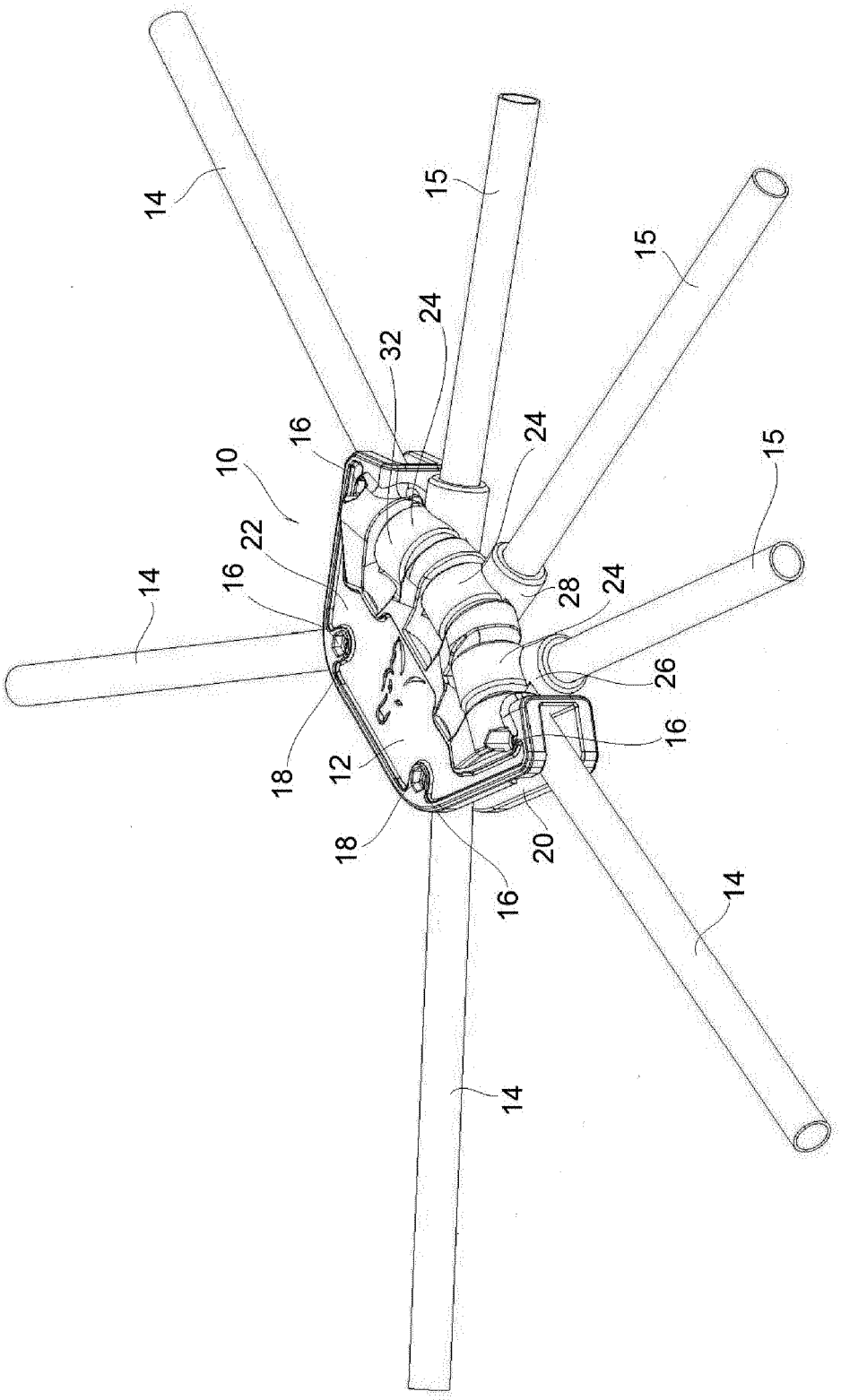


Fig. 1

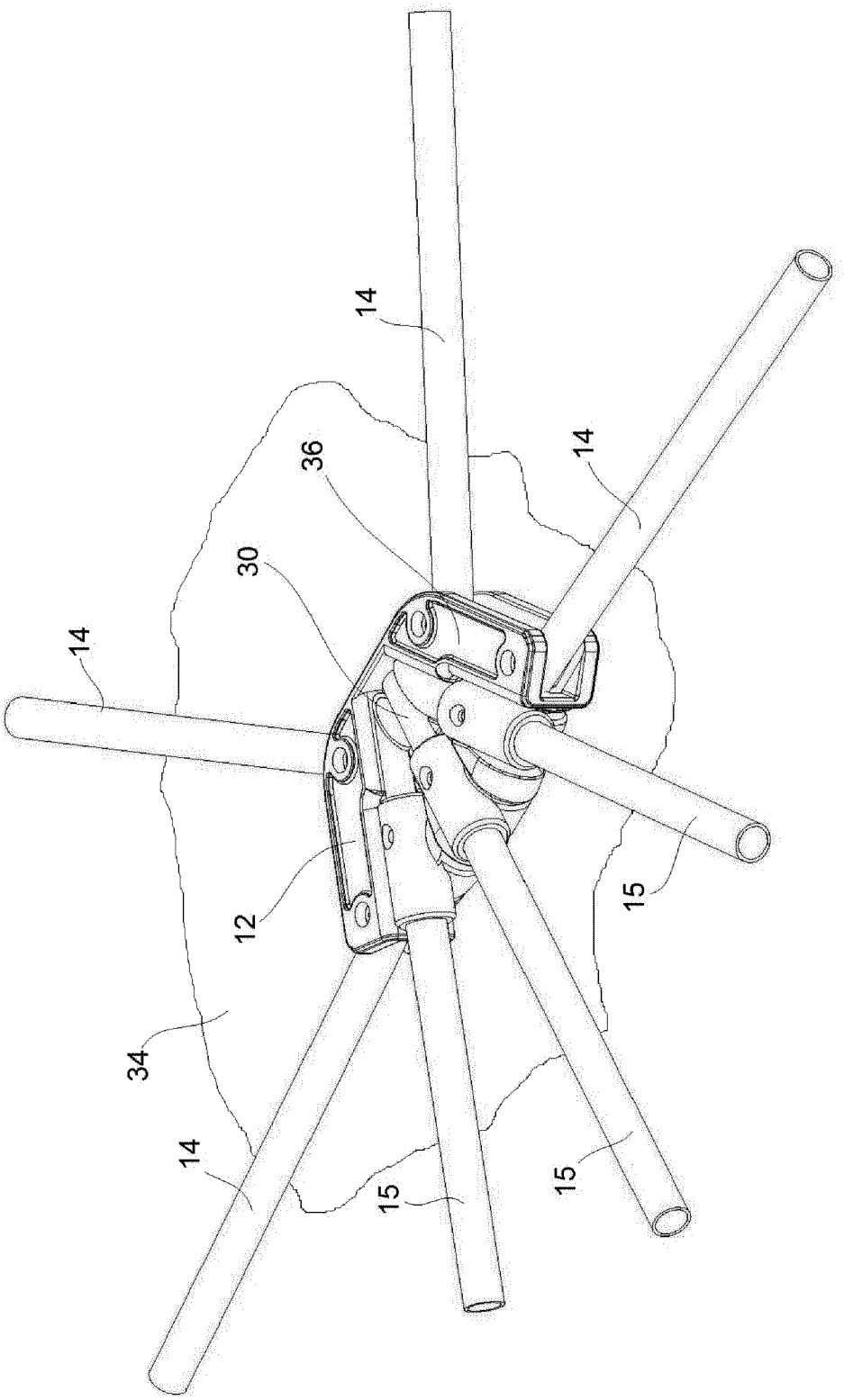


Fig. 2

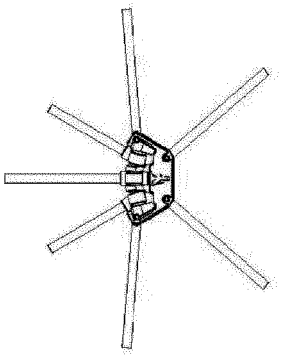

Fig. 7a

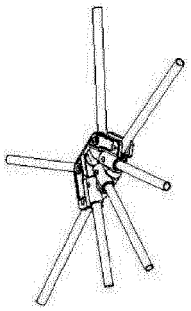

Fig. 7b

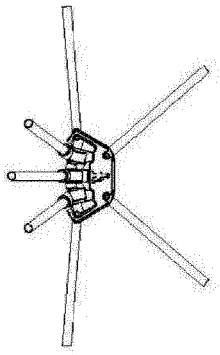

Fig. 6a

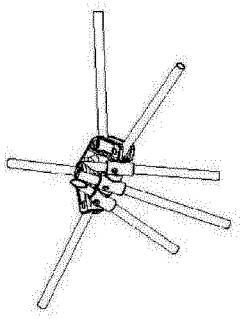

Fig. 6b

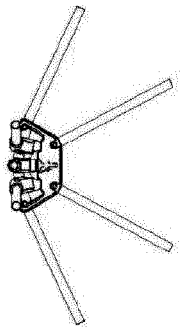

Fig. 5a

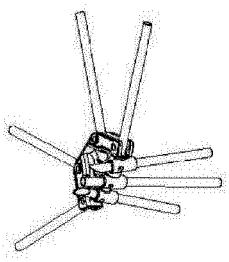

Fig. 5b

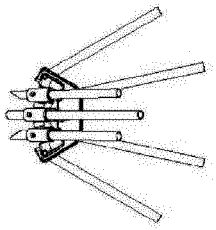

Fig. 4a

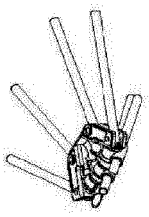

Fig. 4b

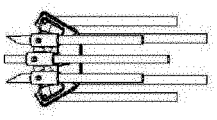

Fig. 3a

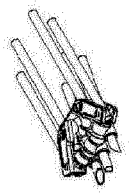

Fig. 3b

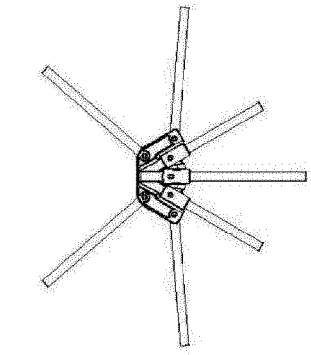

Fig. 7c

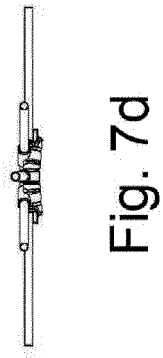

Fig. 7d

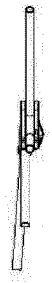

Fig. 7e

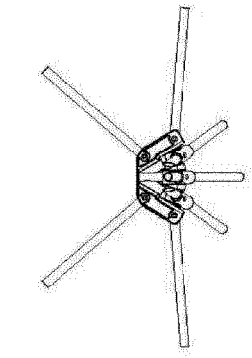

Fig. 6c

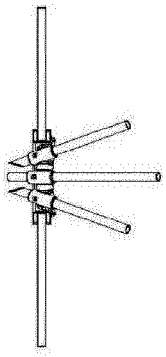

Fig. 6d

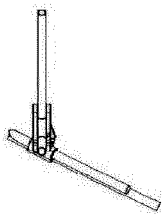

Fig. 6e

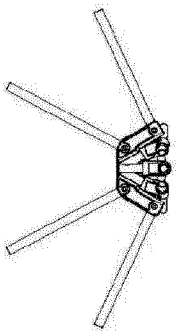

Fig. 5c

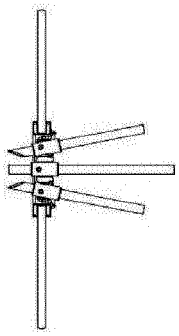

Fig. 5d

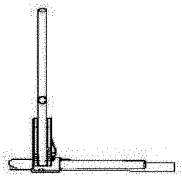

Fig. 5e

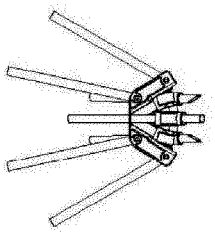

Fig. 4c

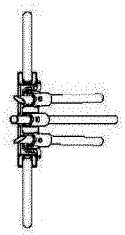

Fig. 4d

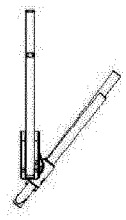

Fig. 4e

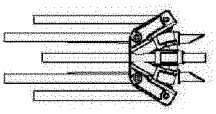

Fig. 3c

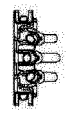

Fig. 3d

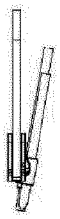

Fig. 3e

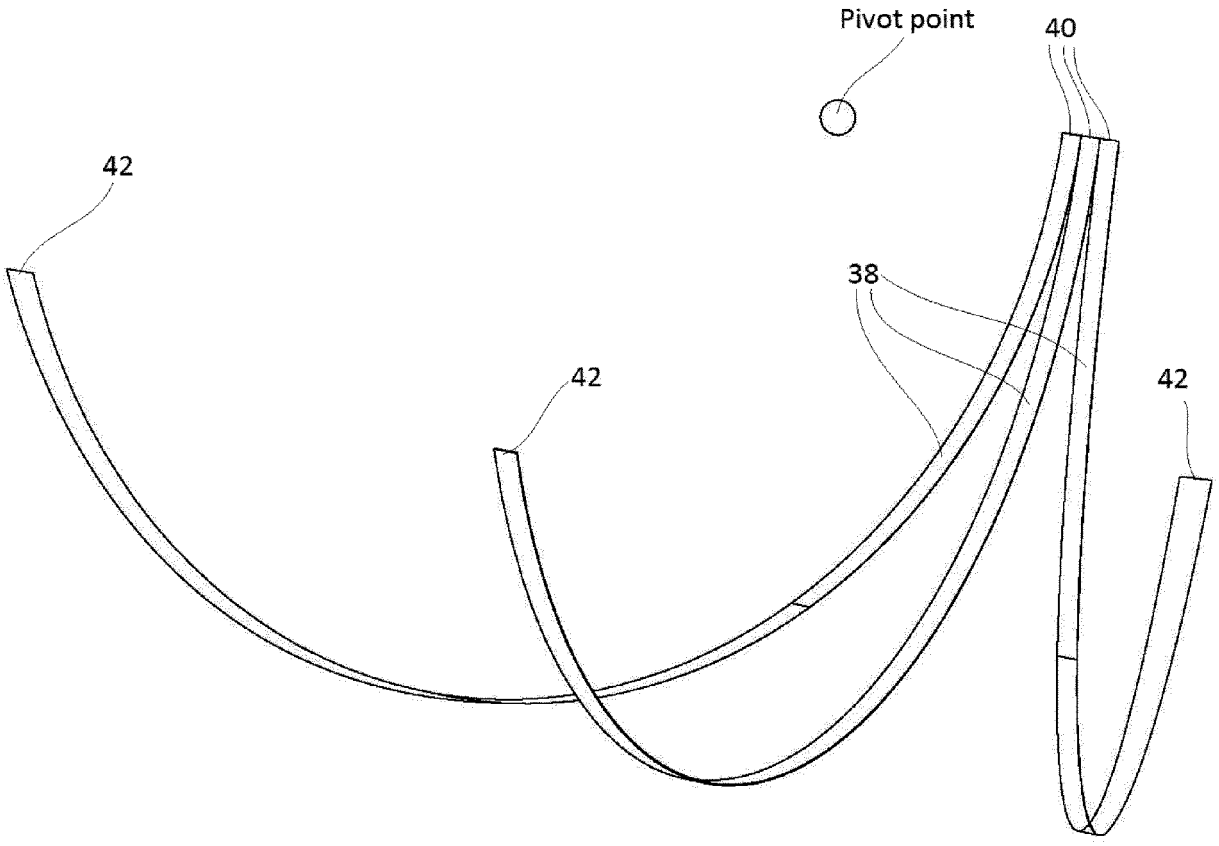


Fig. 8

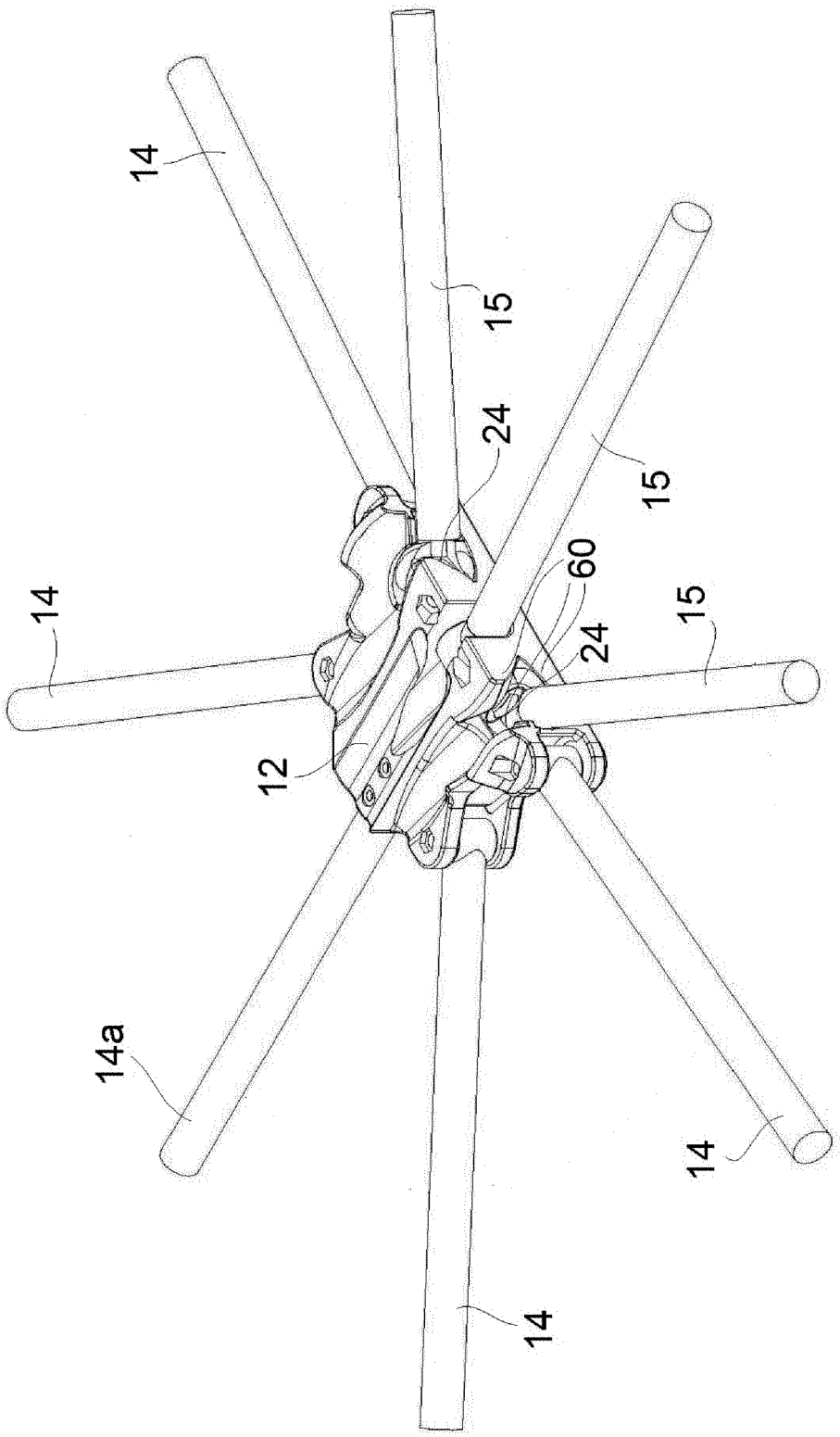


Fig. 9

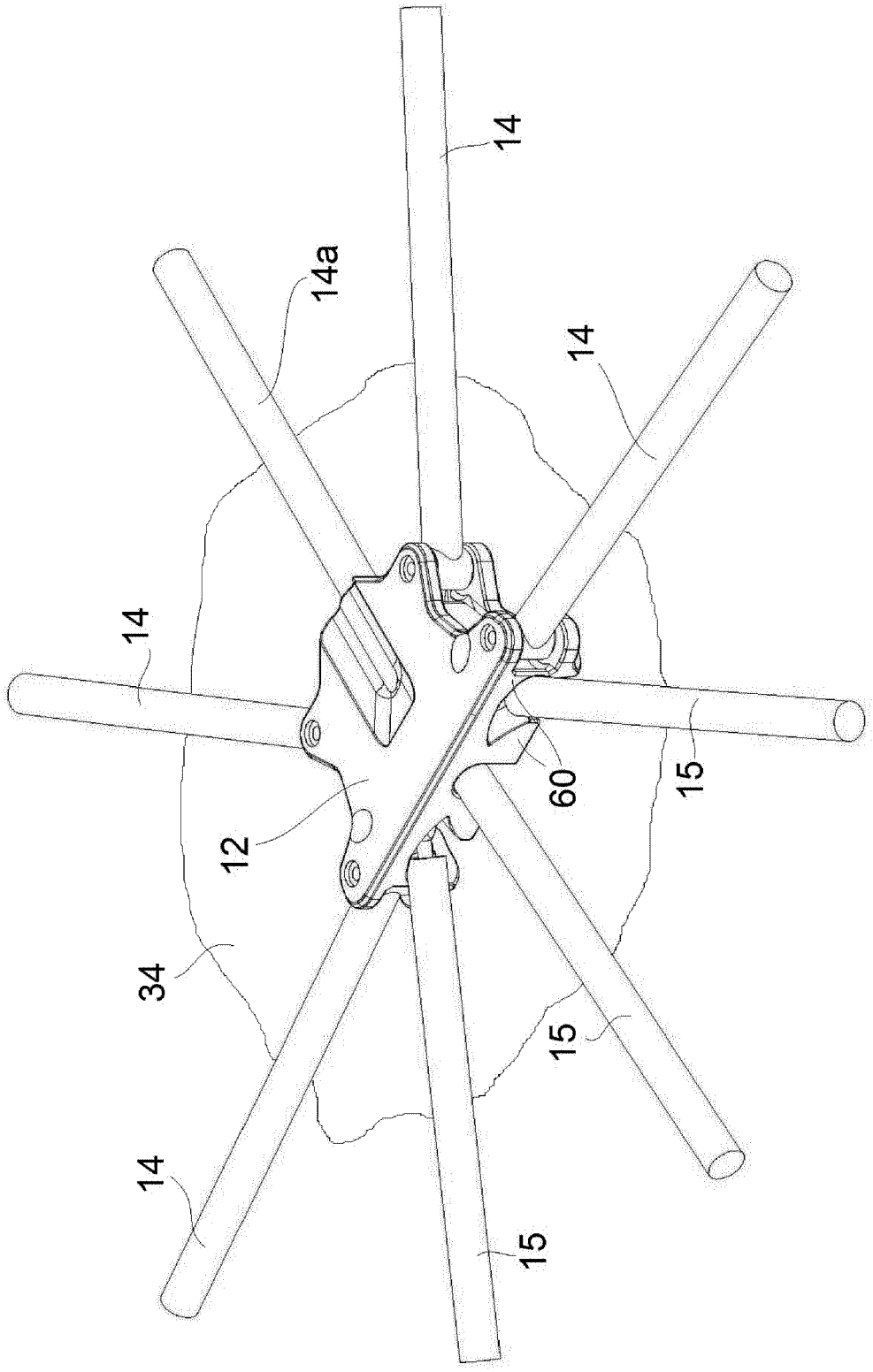


Fig. 10

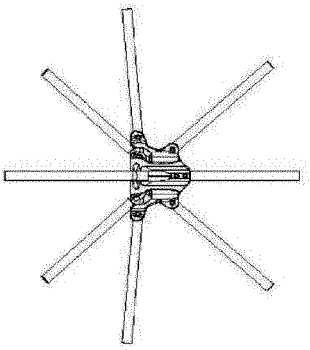

Fig. 15a

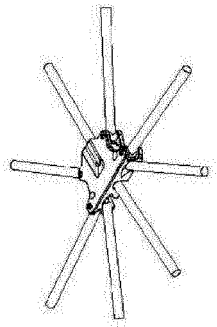

Fig. 15b

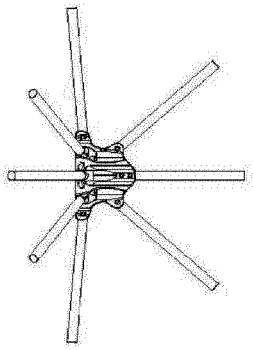

Fig. 14a

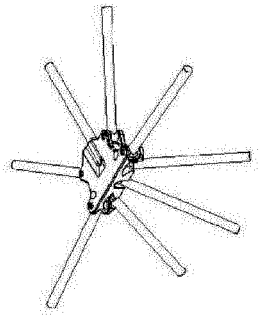

Fig. 14b

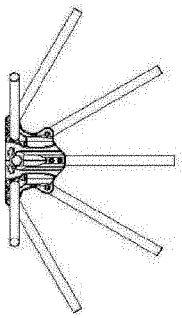

Fig. 13a

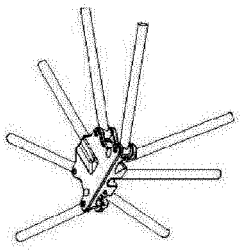

Fig. 13b

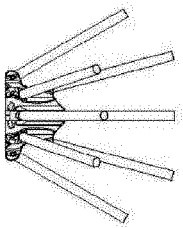

Fig. 12a

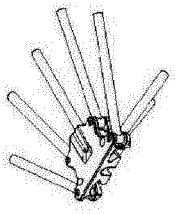

Fig. 12b

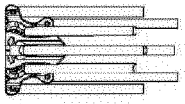

Fig. 11a

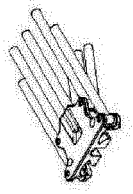

Fig. 11b

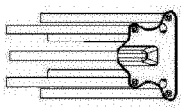

Fig. 11c

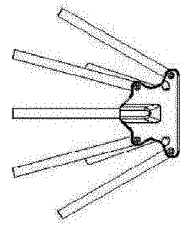

Fig. 12c

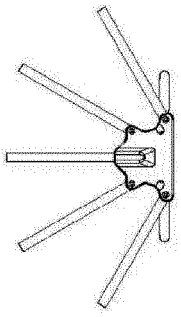

Fig. 13c

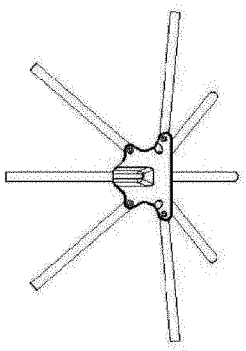

Fig. 14c

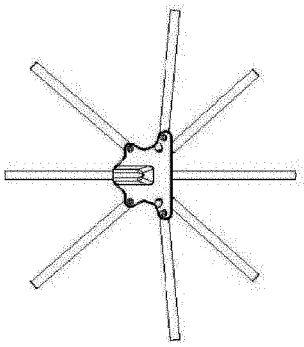

Fig. 15c

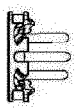

Fig. 11d

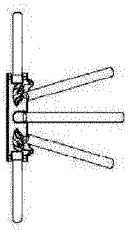

Fig. 12d

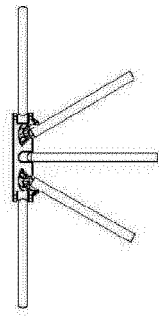

Fig. 13d

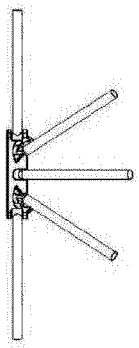

Fig. 14d

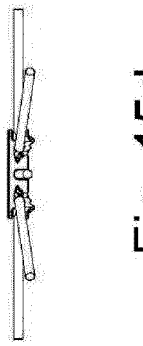

Fig. 15d

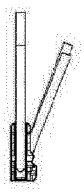

Fig. 11e

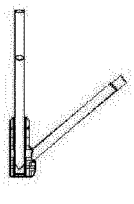

Fig. 12e

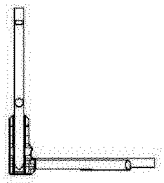

Fig. 13e

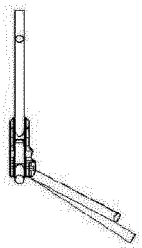

Fig. 14e

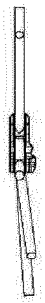

Fig. 15e

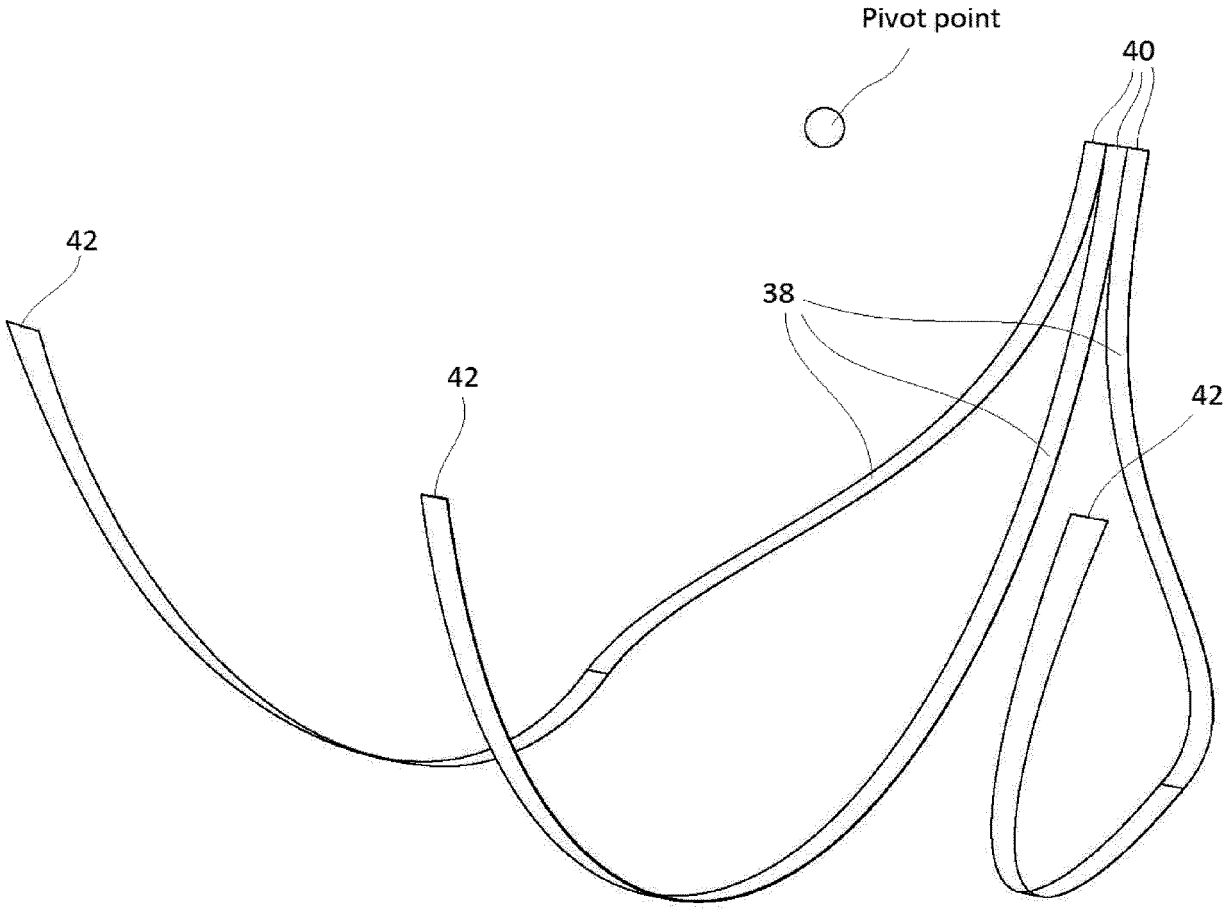


Fig. 16

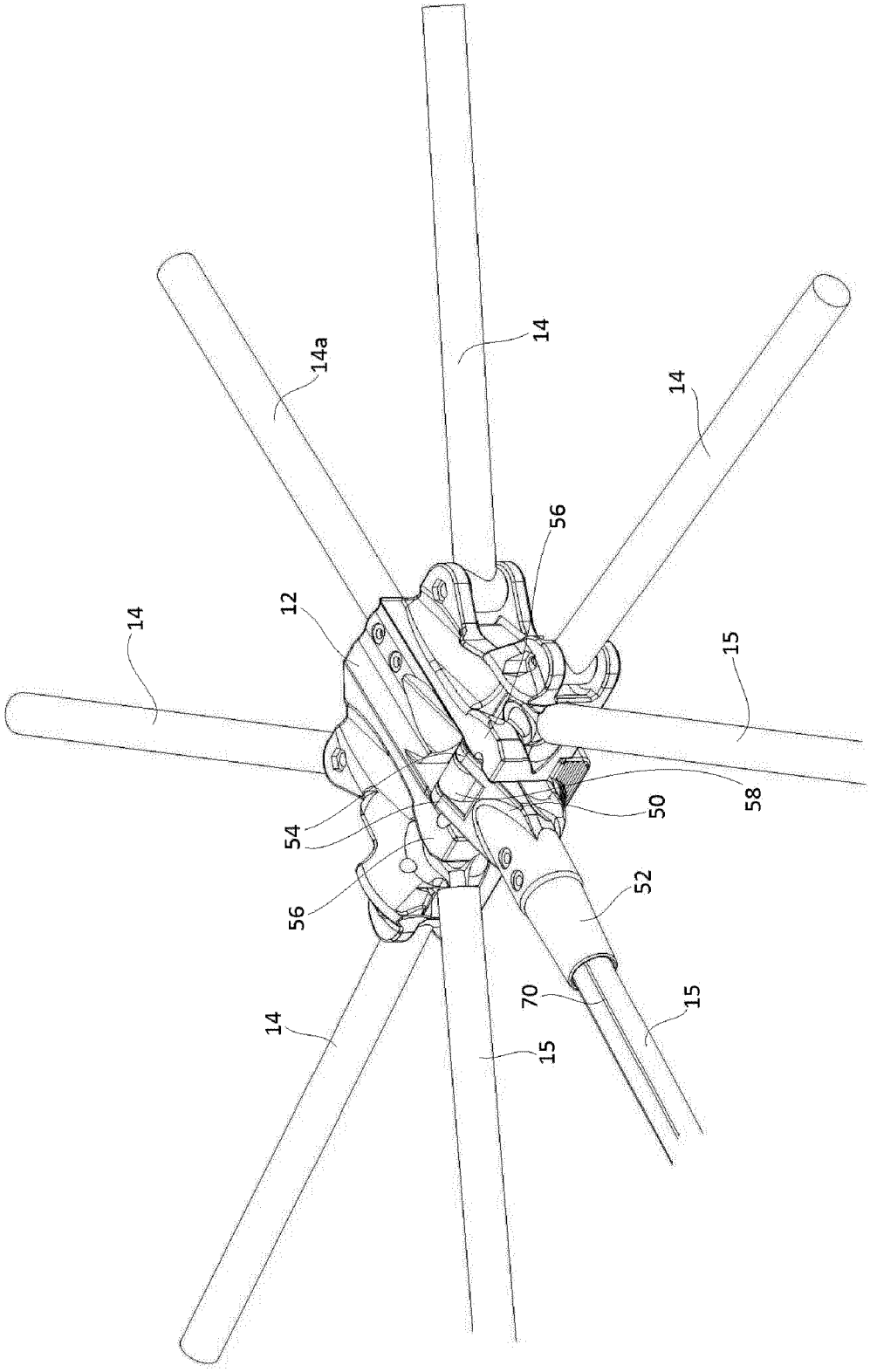


Fig. 17

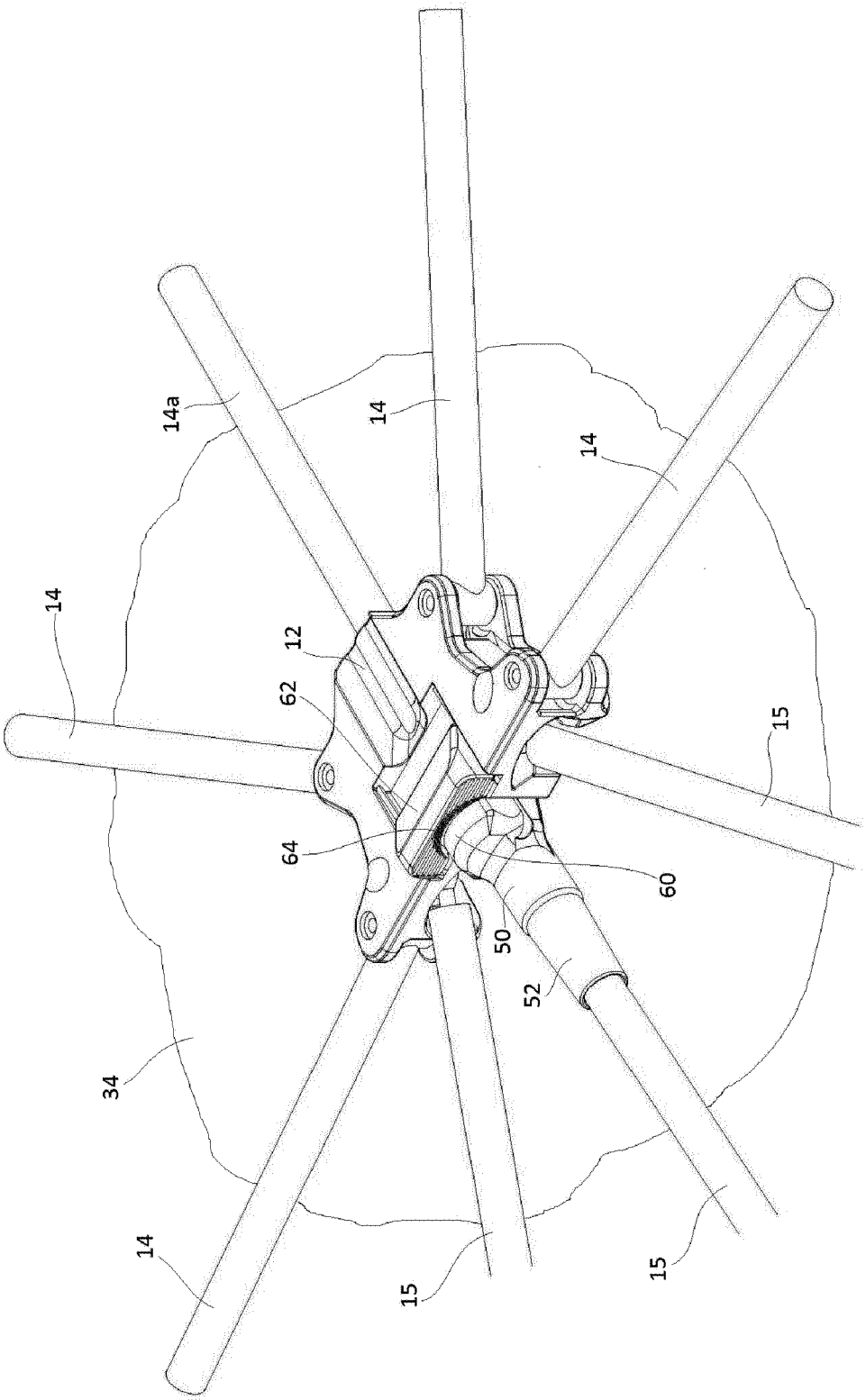


Fig. 18

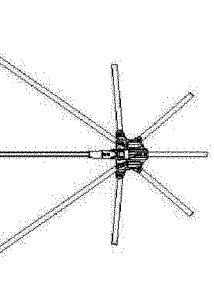

Fig. 23a

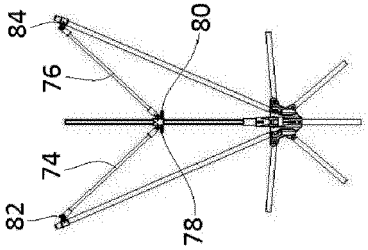


Fig. 22a

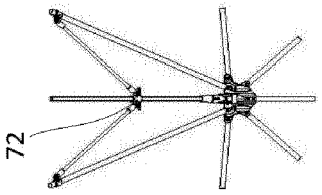


Fig. 21a

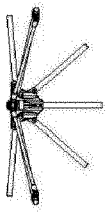

Fig. 20a

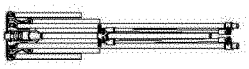

Fig. 19a

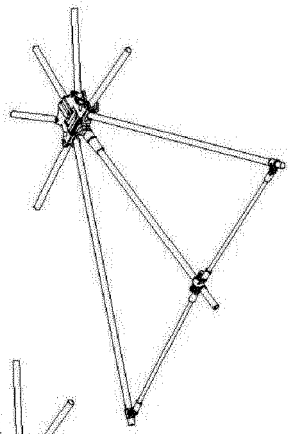

Fig. 23b

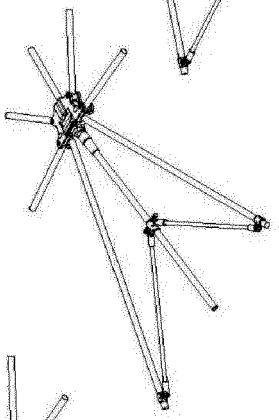

Fig. 22b

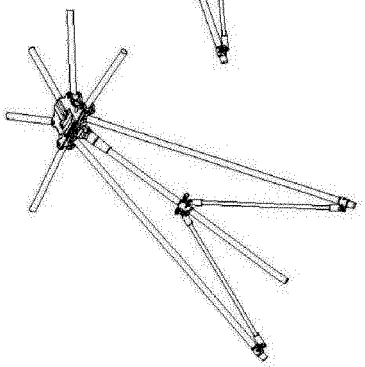

Fig. 21b

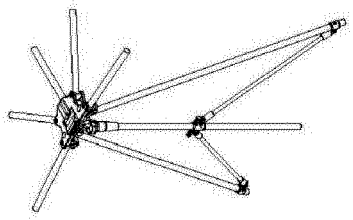

Fig. 20b

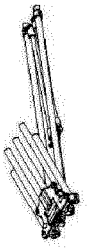

Fig. 19b

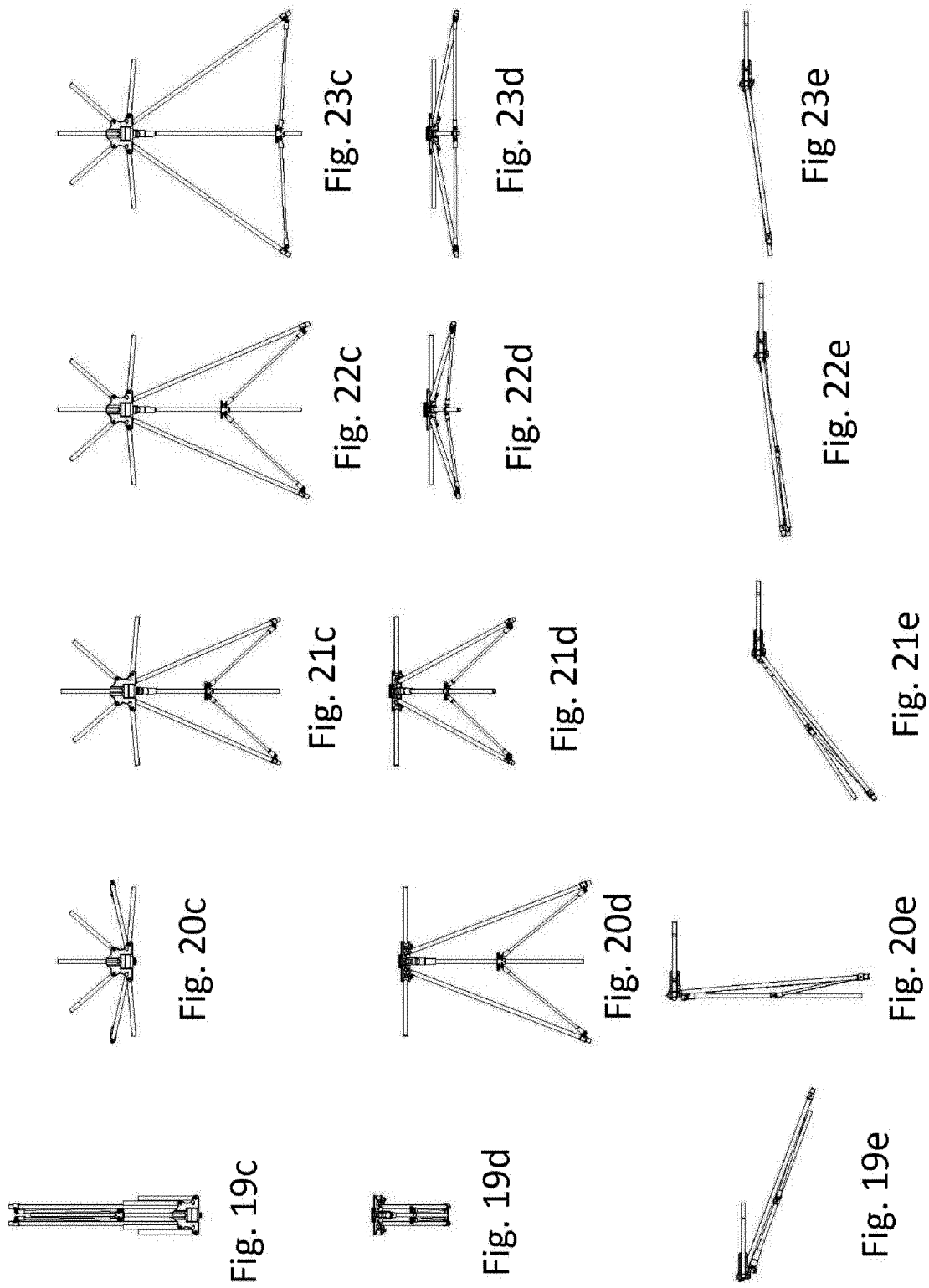

Fig. 19c Fig. 20c Fig. 21c Fig. 22c Fig. 23c

Fig. 19d Fig. 20d Fig. 21d Fig. 22d Fig. 23d

Fig. 19e Fig. 20e Fig. 21e Fig. 22e Fig 23e

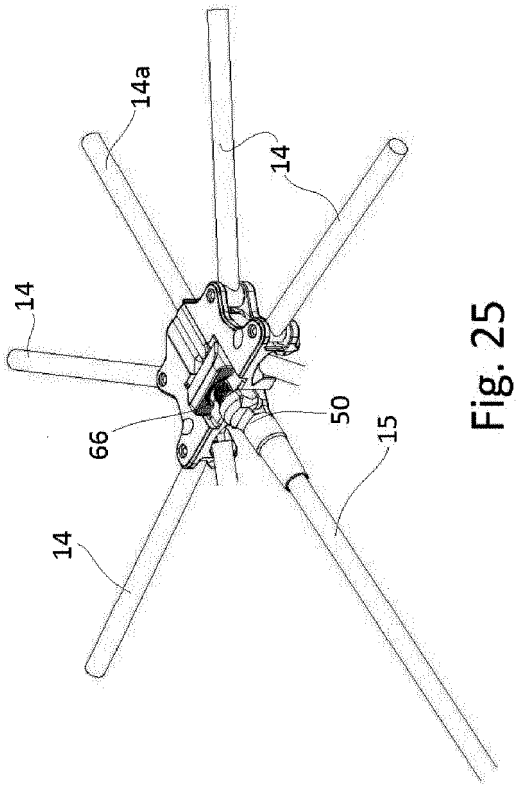


Fig. 25

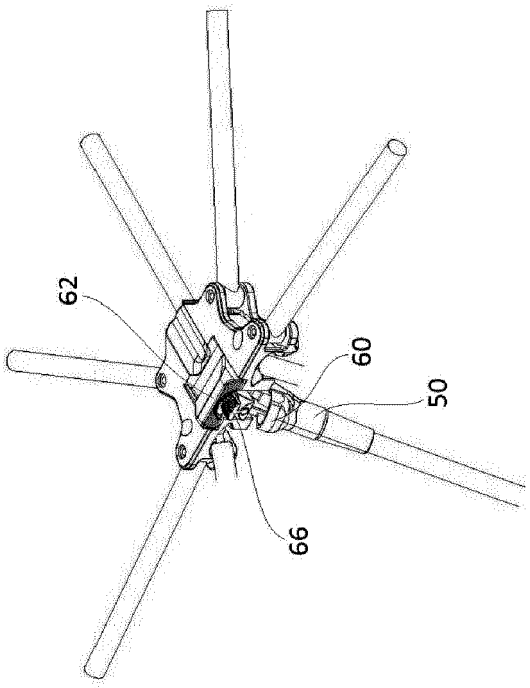


Fig. 27

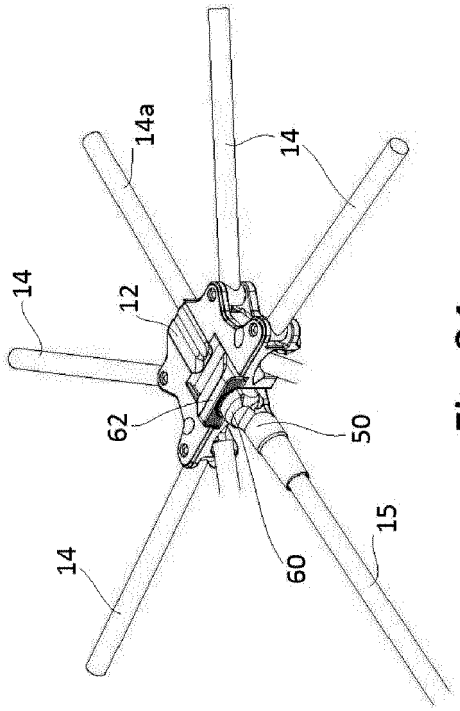


Fig. 24

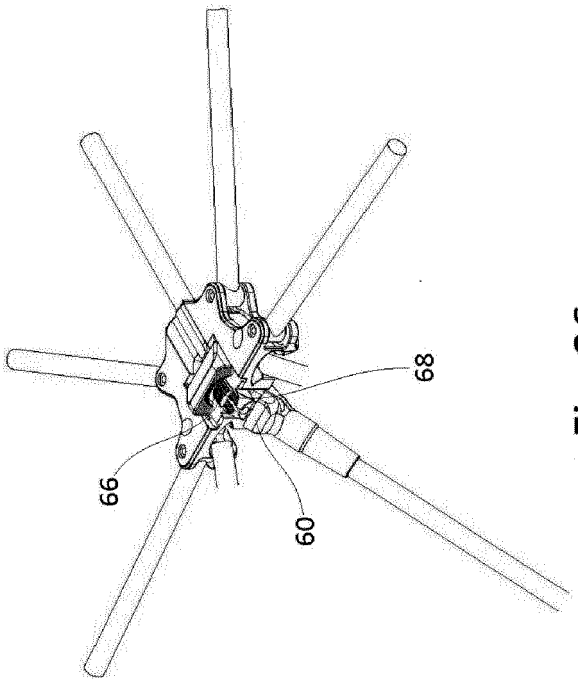


Fig. 26

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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