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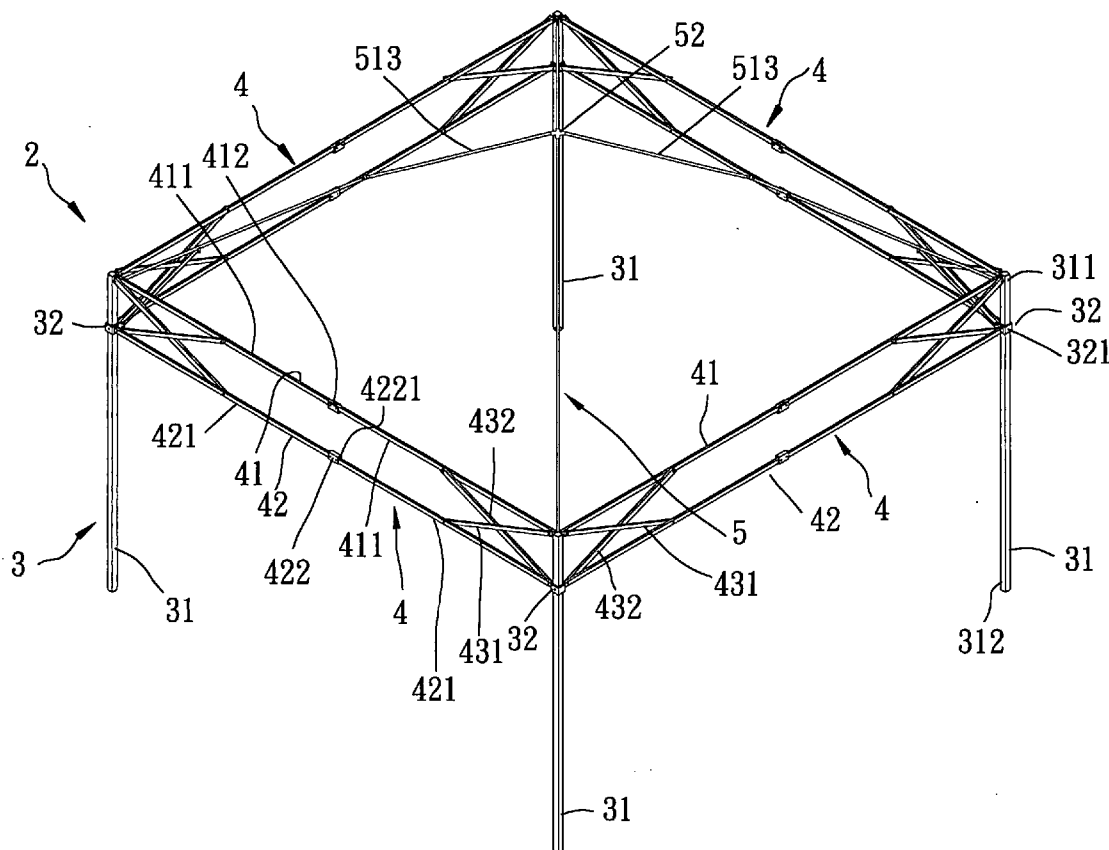
(19) **United States**(12) **Patent Application Publication****Tseng**(10) **Pub. No.: US 2005/0178419 A1**(43) **Pub. Date: Aug. 18, 2005**(54) **TENT FRAME ASSEMBLY**(52) **U.S. Cl. 135/131**(76) **Inventor: Chuen-Jong Tseng, Chiayi Hsien (TW)**(57) **ABSTRACT**

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E04H 15/38; E04H 15/50

A tent frame assembly includes a leg unit, a plurality of link units, and a plurality of first and second struts. The leg unit includes a plurality of upright posts respectively having top connection elements, and a plurality of sleeve units. Each link unit includes an upper foldable link with two first link sections and a first pivot unit between the first link sections, and a lower foldable link with two second link sections and a second pivot unit between the second link sections. Each first strut has one end pivoted to a corresponding sleeve unit and the other end pivoted to one of the first link sections. Each second strut has one end pivoted to a corresponding top connection element and the other end pivoted to one of the second link sections.



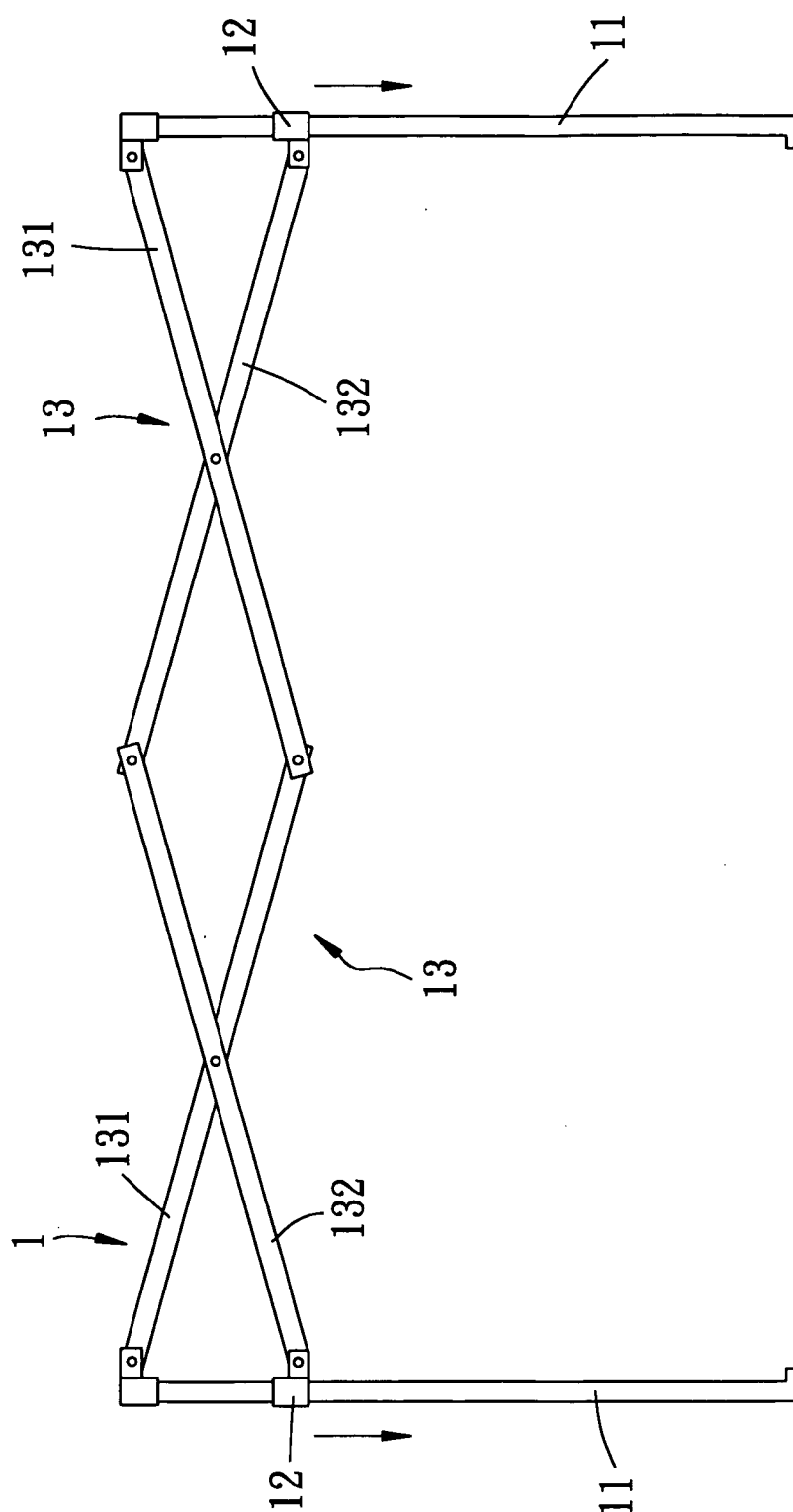


FIG. 1
PRIOR ART

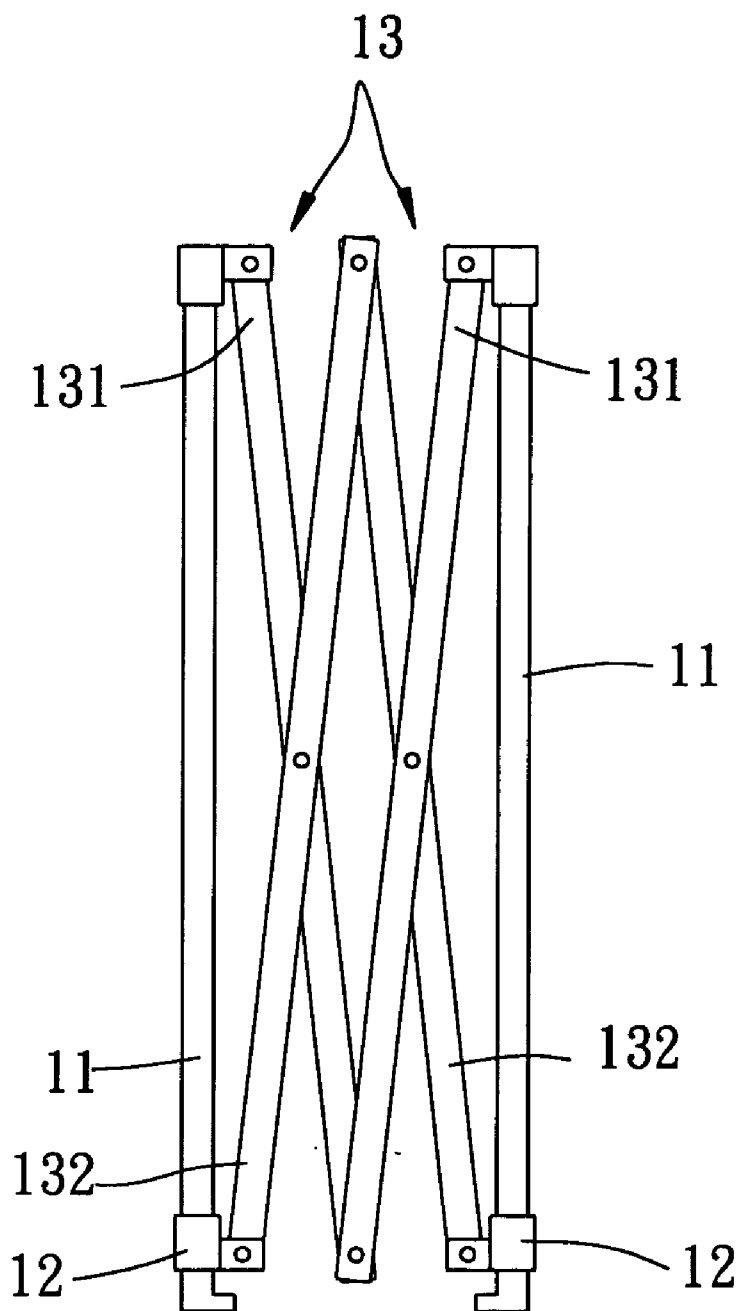


FIG. 2
PRIOR ART

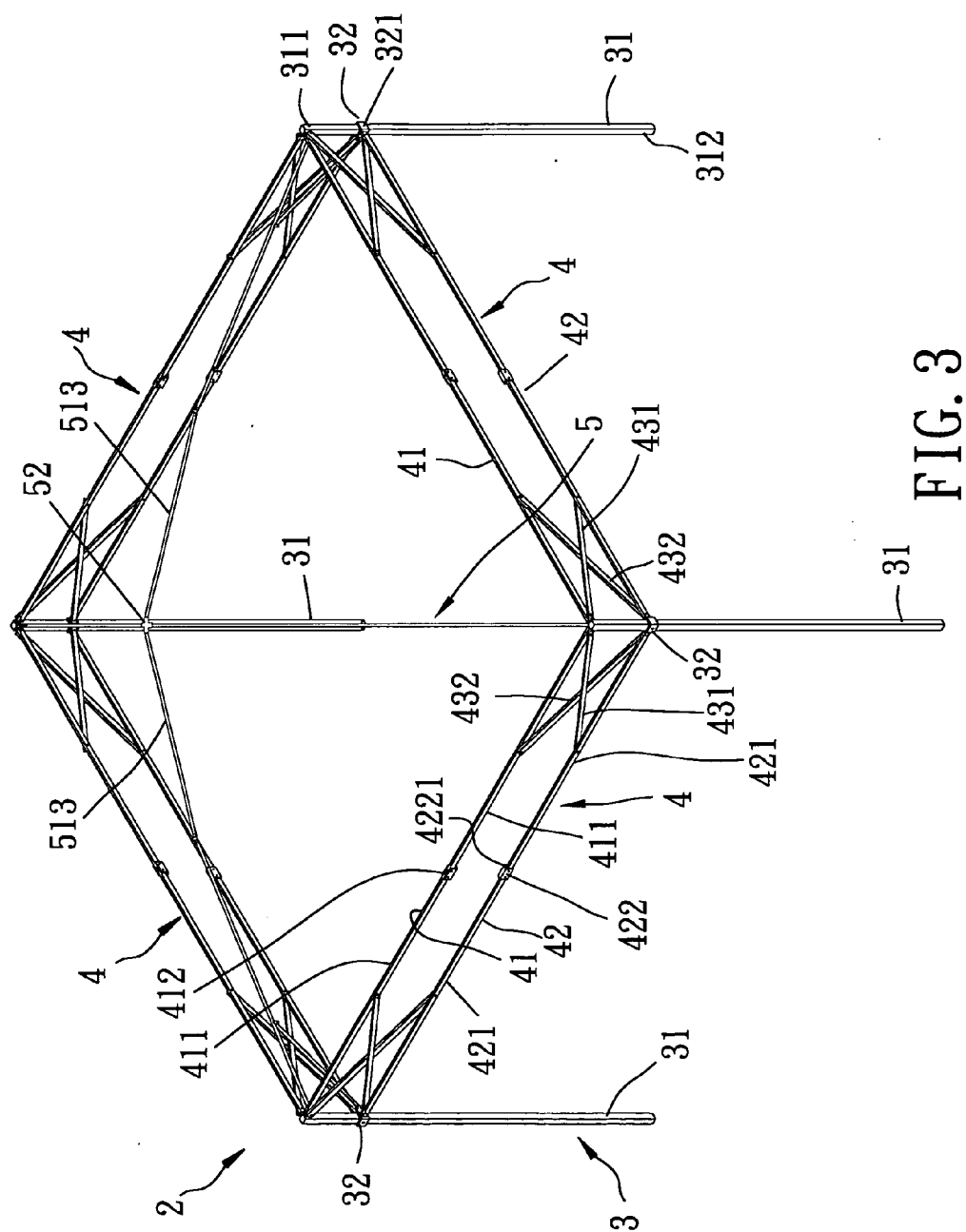


FIG. 3

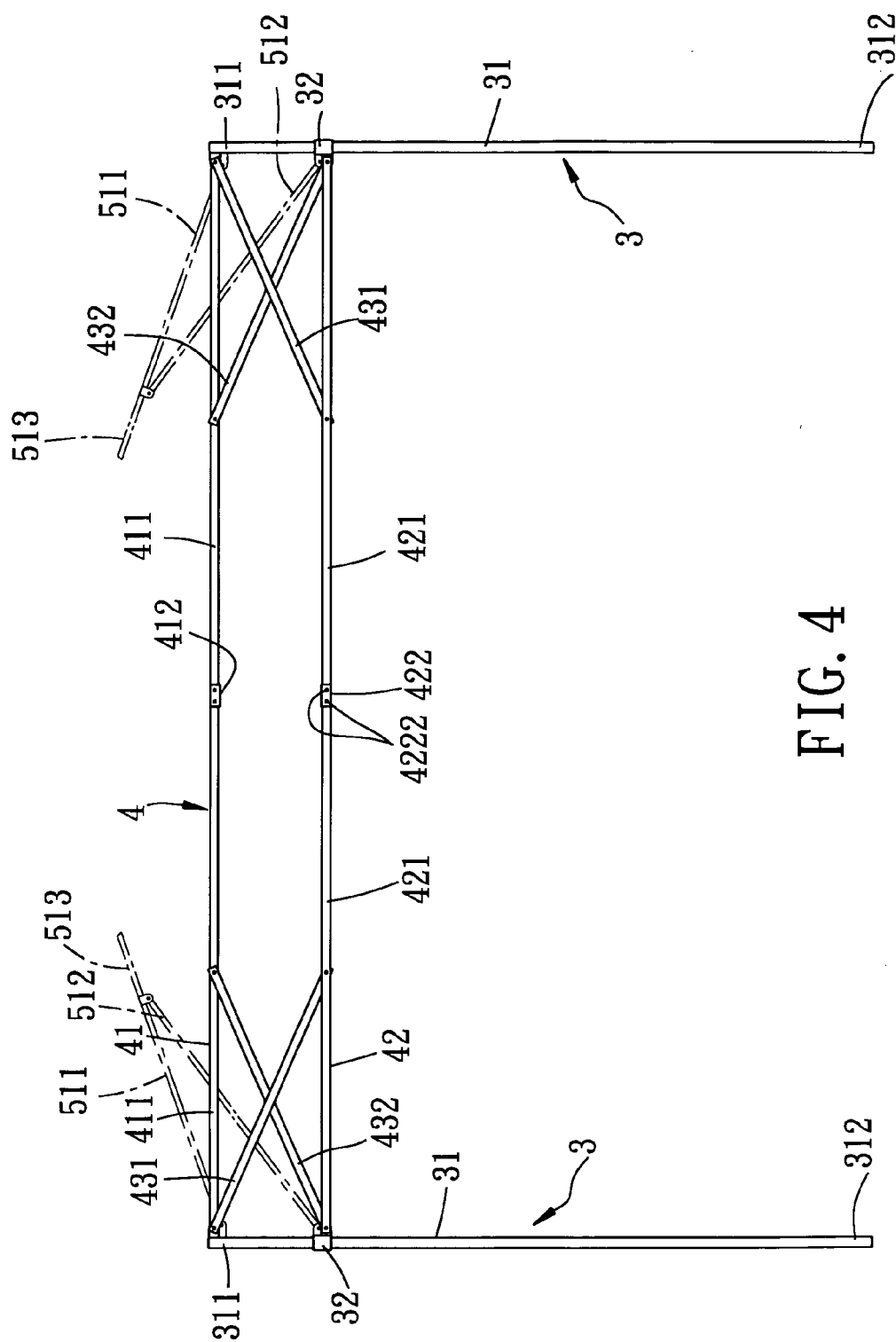


FIG. 4

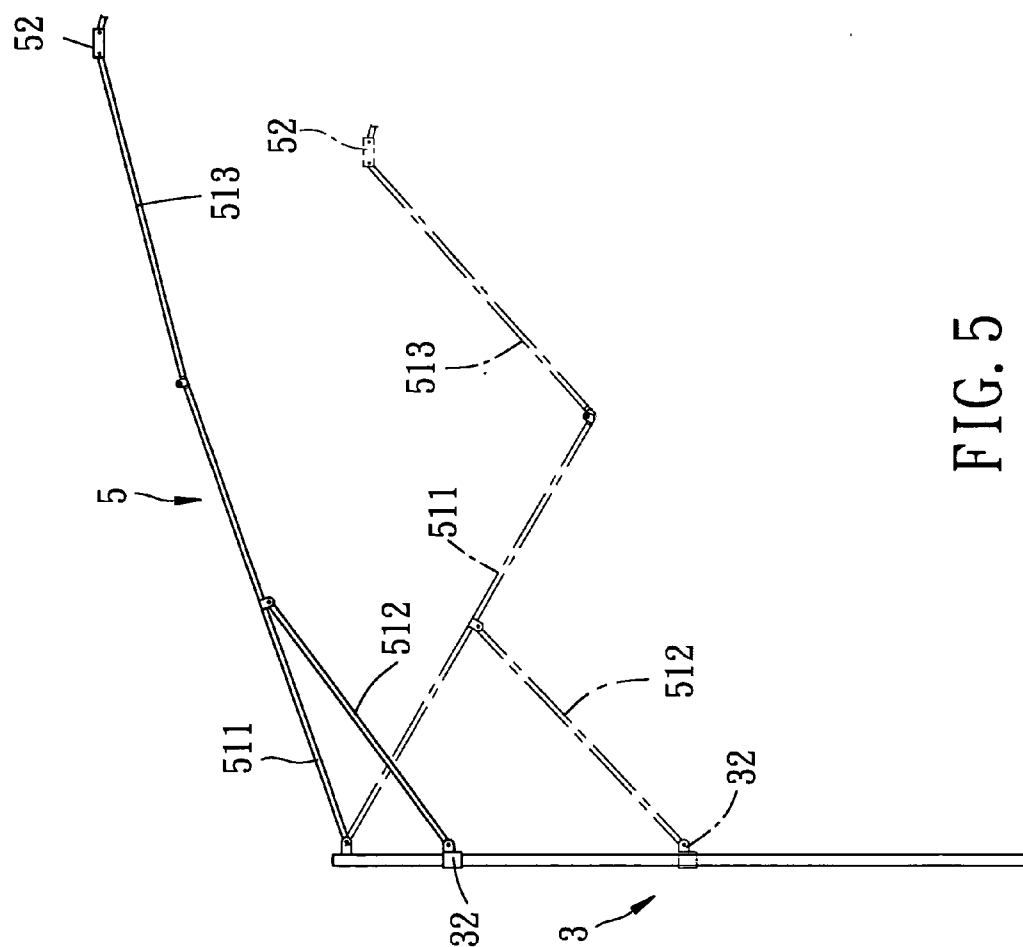


FIG. 5

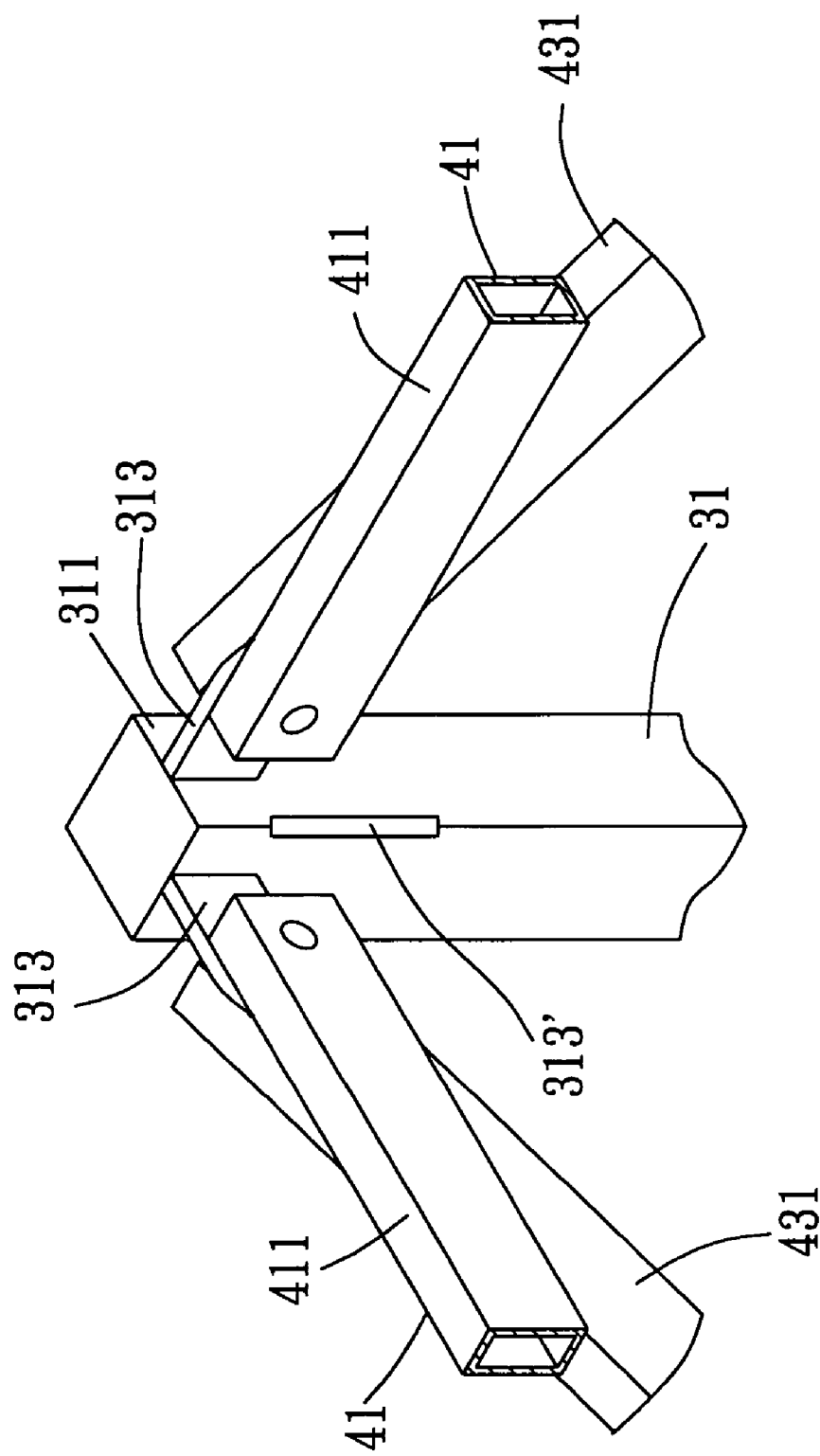


FIG. 6

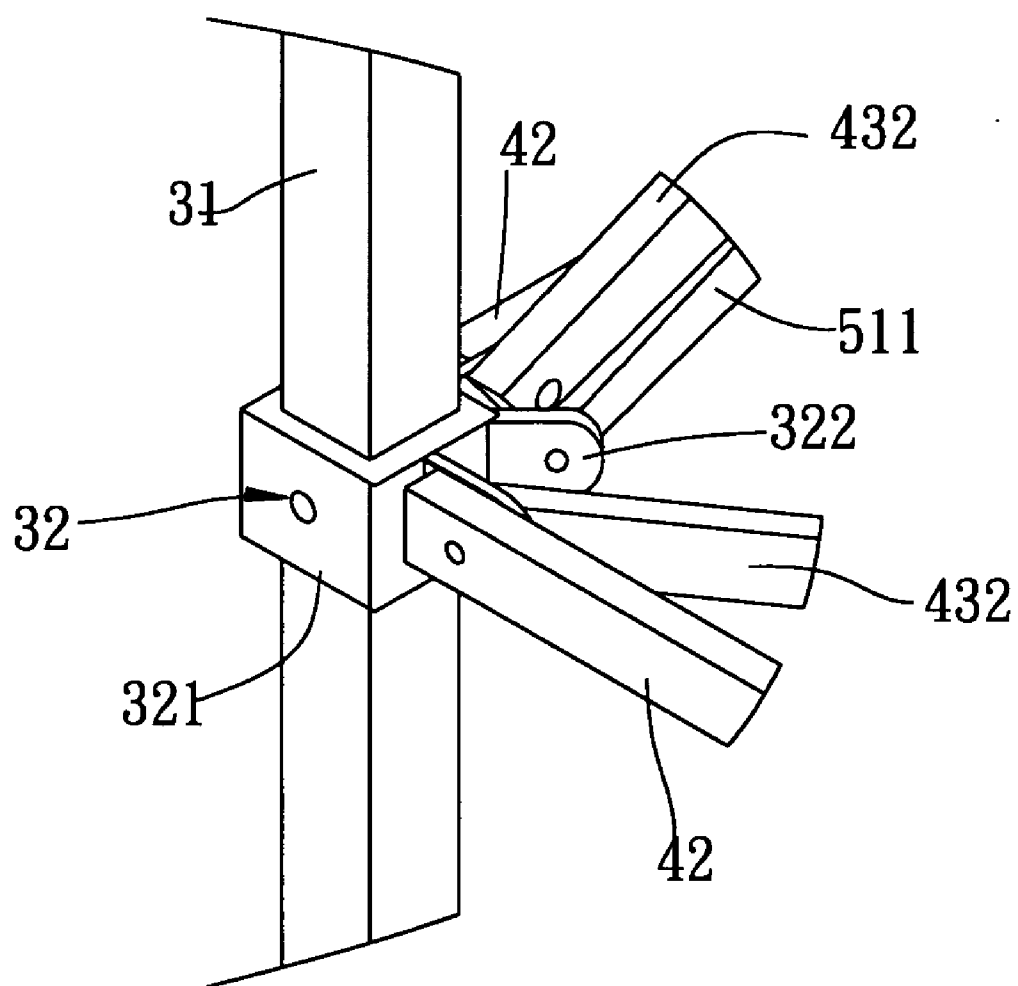


FIG. 7

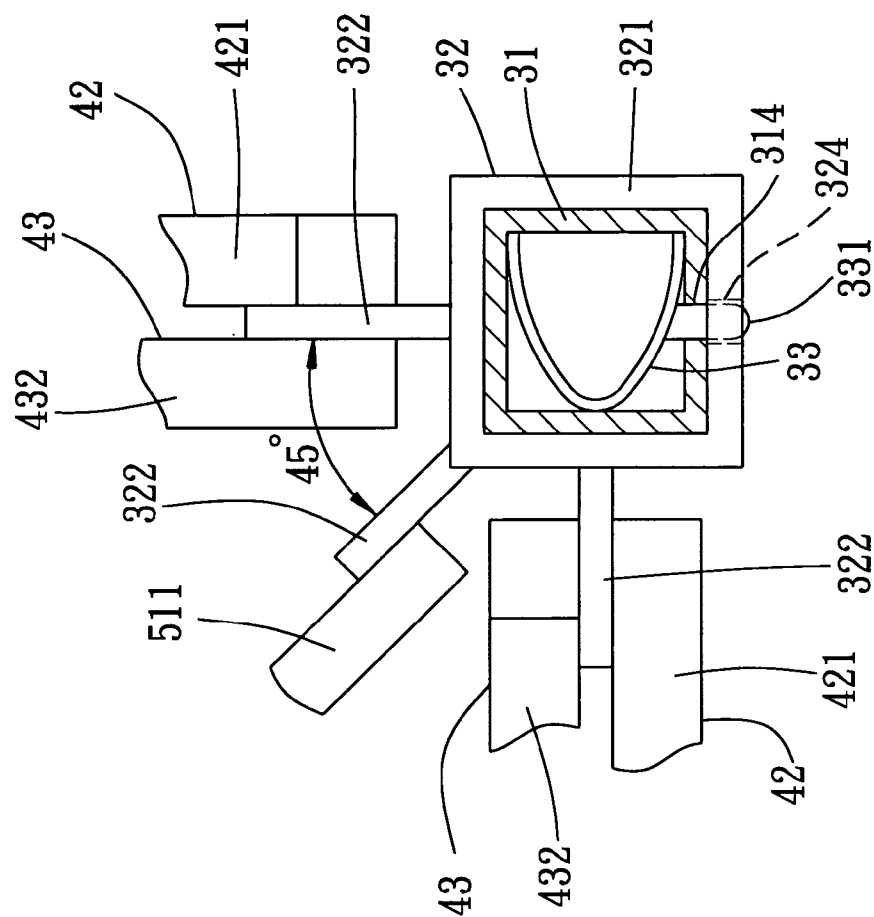


FIG. 8

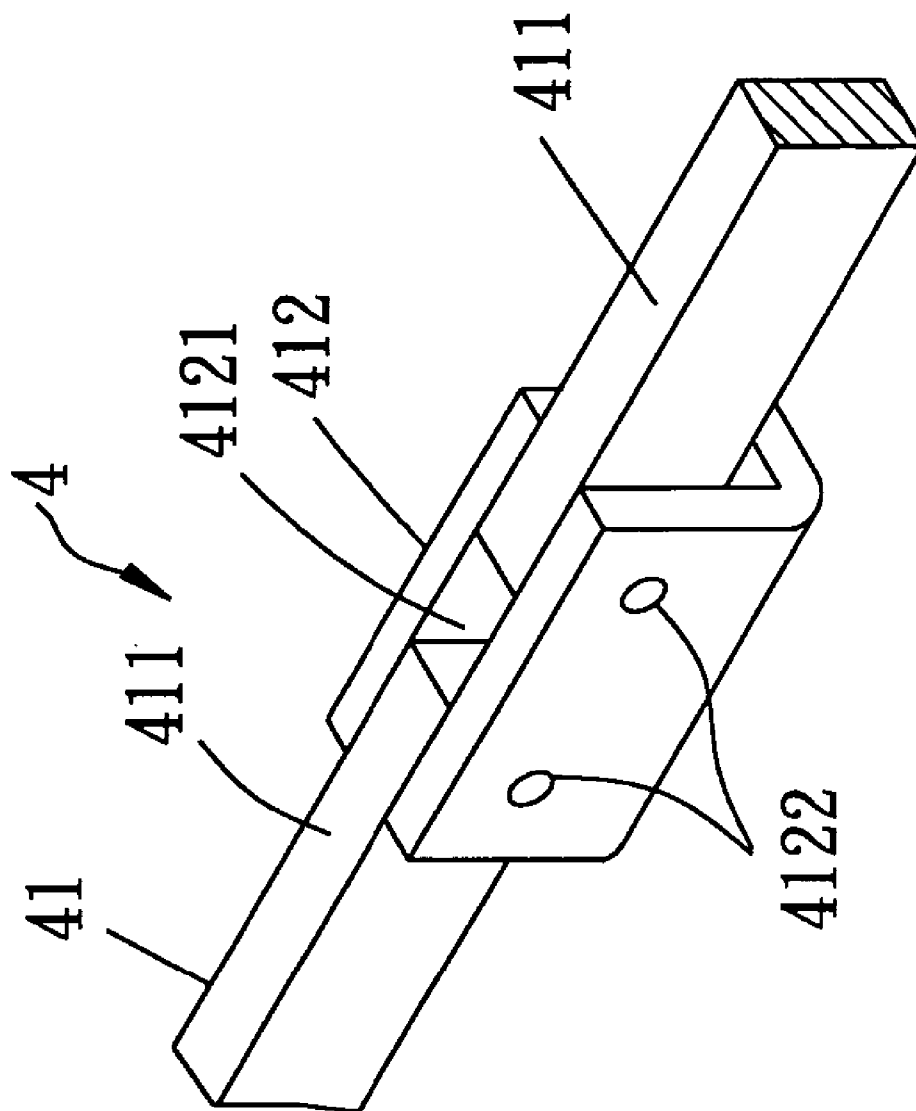


FIG. 9

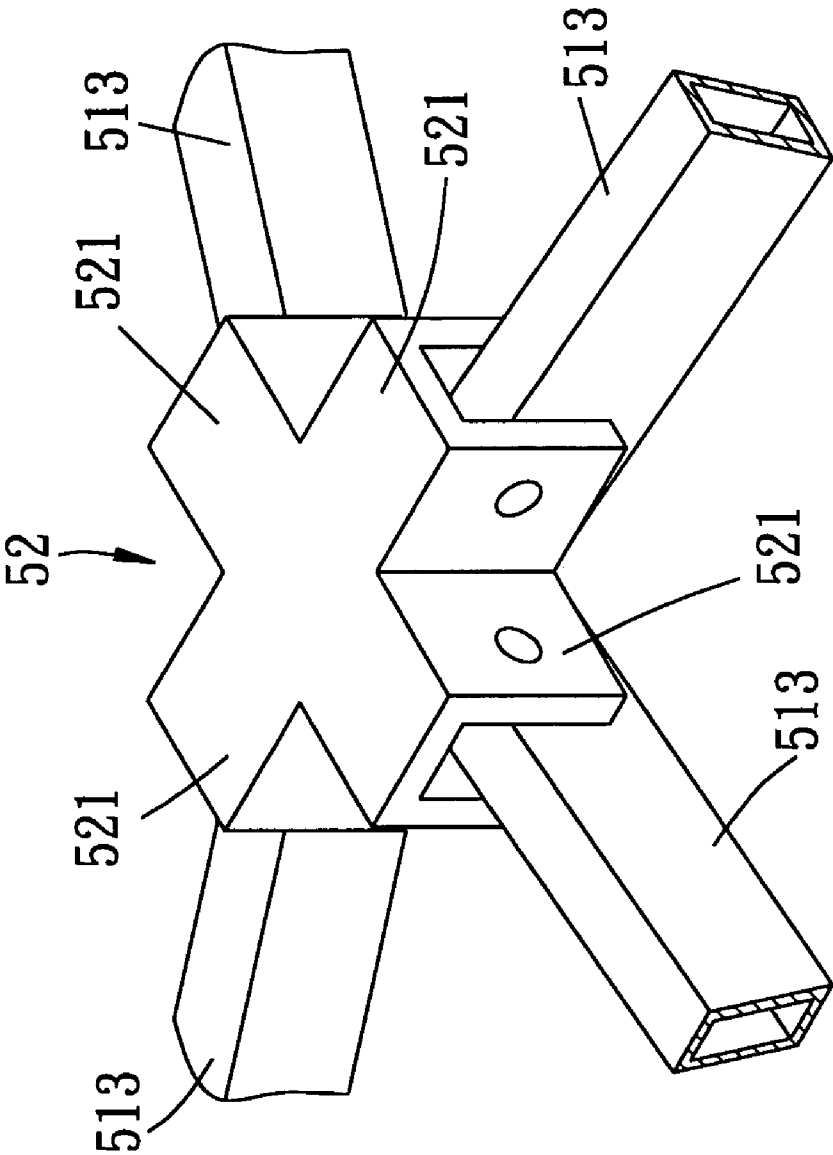


FIG. 10

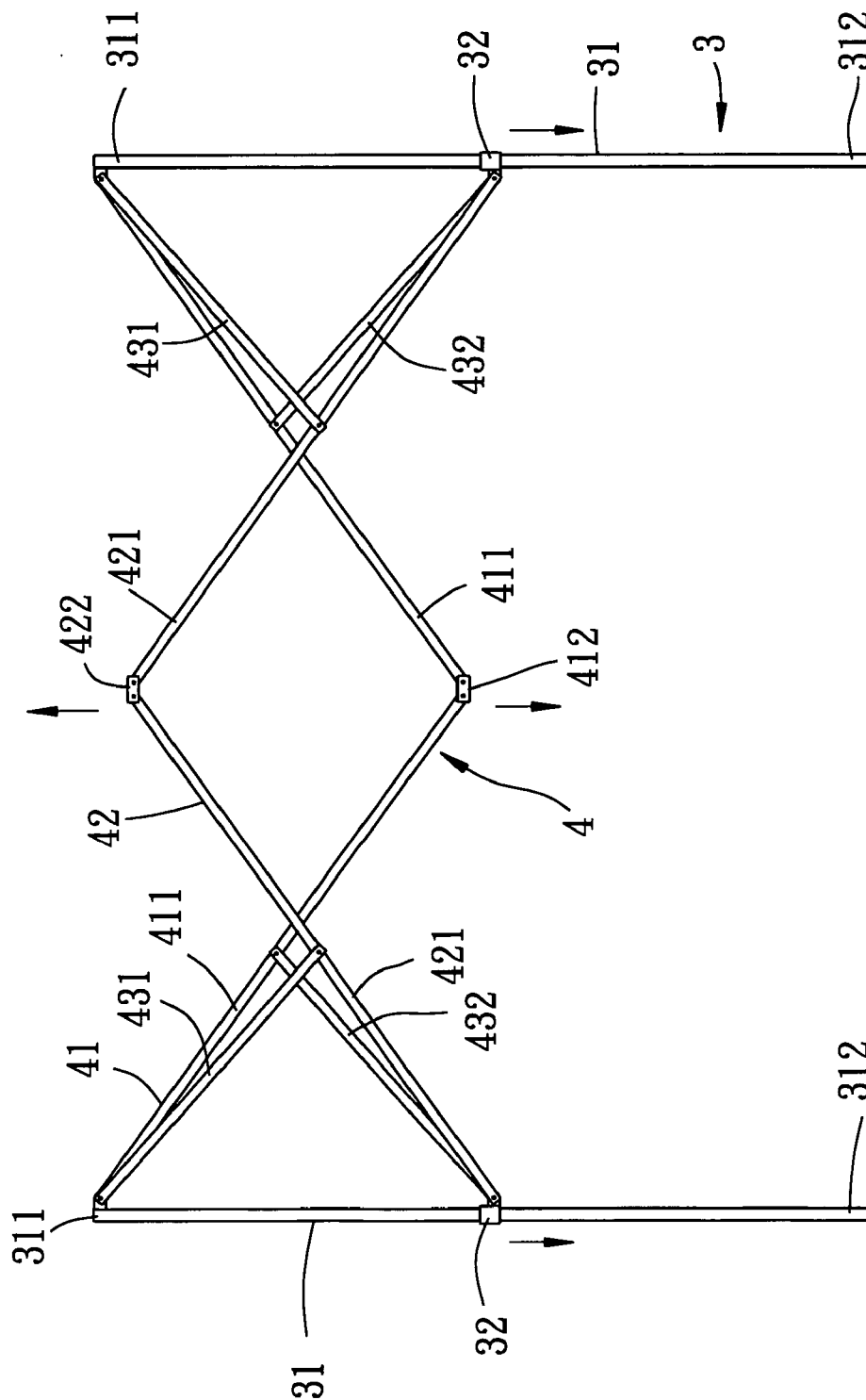


FIG. 11

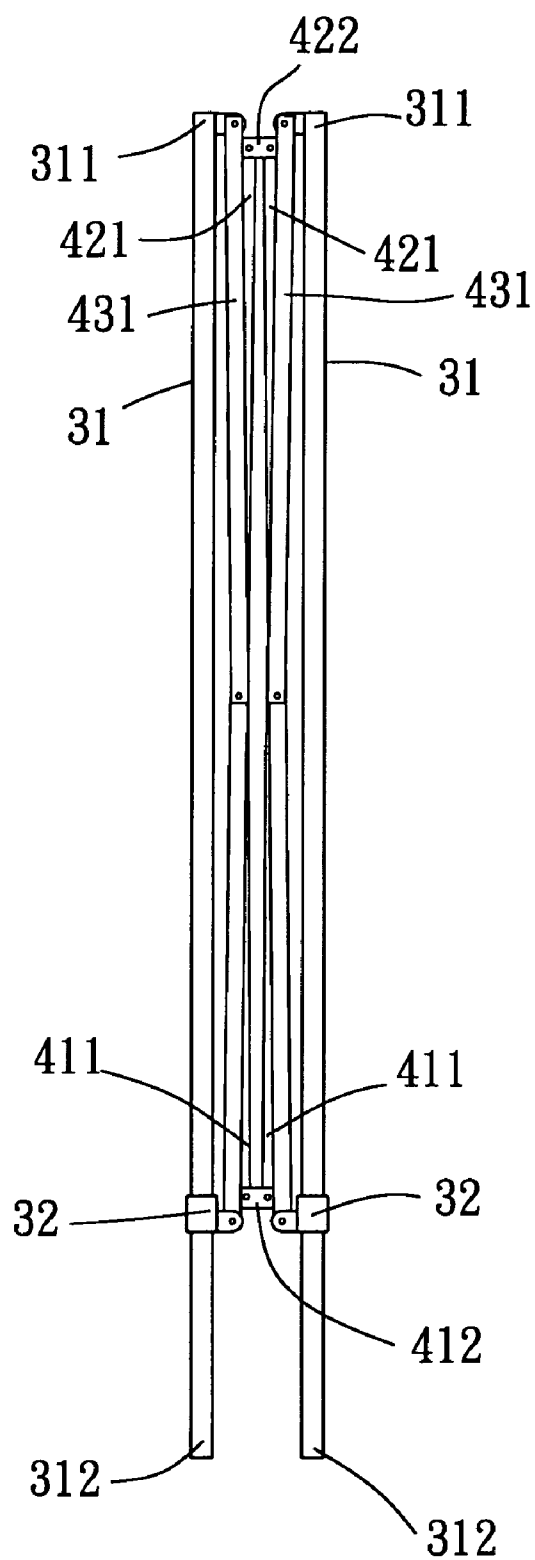


FIG. 12

TENT FRAME ASSEMBLY

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to a tent frame assembly, more particularly to a foldable tent frame assembly.

[0003] 2. Description of the Related Art

[0004] Referring to **FIGS. 1 and 2**, a conventional tent frame assembly for mounting a canopy thereon includes a plurality of post units **1**, each of which includes two spaced-apart upright legs **11**, two sleeve units **12** sleeved slidably and respectively on the upright legs **11**, and two interconnected cross-link units **13** between the upright legs **11**. Each of the cross-link units **13** includes a first link rod **131** and a second link rod **132** connected pivotally to and intersecting the first link rod **131**. One end of the first link rod **131** is connected pivotally to a top end of a respective one of the upright legs **11**, while one end of the second link rod **132** is pivotally connected to a respective one of the sleeve units **12**. The other ends of the first and second link rods **131**, **132** are connected pivotally and respectively to each other. The top ends of the upright legs **11** are provided with a plurality of upwardly extending and foldable rods (not shown) to serve as a top support for the canopy (not shown). Since the top support is not pertinent to the present invention, a detailed description of the same will be dispensed herewith for the sake of brevity.

[0005] When folding the conventional tent frame assembly, the upright legs **11** are moved toward each other, with the sleeve units **12** sliding simultaneously and downwardly along the lengths of the upright legs **11**. The sleeve units **12** pivot the second link rods **132** downwardly relative to the first link rods **131**, thereby gradually gathering the various components of the tent frame assembly altogether. Since the first and second link rods **131**, **132** are pivoted to and intersect each other, the conventional tent frame assembly can be folded, but cannot be kept in a closely folded position because the link rods **131**, **132** tend to stretch outwardly due to residual outward forces.

SUMMARY OF THE INVENTION

[0006] Therefore, the object of the present invention is to provide a foldable tent frame assembly that can be disposed in a fully folded state and that has enhanced supporting strength.

[0007] According to this invention, a tent frame assembly for mounting a canopy thereon comprises a leg unit, a plurality of link units, and a plurality of first and second struts. The leg unit includes a plurality of spaced-apart upright posts respectively having first top connection elements, and a plurality of sleeve units sleeved slidably and respectively on the upright posts below the first top connection elements. Each of the link units includes two upper and lower foldable links disposed between an adjacent pair of the upright posts. The upper foldable link includes two first link sections respectively pivoted to the first top connection elements of the upright posts of the adjacent pair, and a first pivot unit connected between the first link sections. The lower foldable link includes two second link sections respectively pivoted to the sleeve units of the upright posts of the adjacent pair, and a second pivot unit connected between the

second link sections. Each of the first struts has one end pivoted to a corresponding one of the sleeve units and the other end pivoted to one of the first link sections. Each of the second struts has one end pivoted to a corresponding one of the first top connection elements and the other end pivoted to one of the second link sections.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

[0009] **FIG. 1** is a schematic view of a conventional foldable tent frame assembly;

[0010] **FIG. 2** is a view similar to **FIG. 1**, but illustrating the tent frame assembly in a folded state;

[0011] **FIG. 3** is a perspective view of the preferred embodiment of a tent frame assembly according to the present invention;

[0012] **FIG. 4** is a schematic view to illustrate a leg unit and a link unit of the preferred embodiment;

[0013] **FIG. 5** is a fragmentary schematic view to illustrate a top support frame of the preferred embodiment;

[0014] **FIG. 6** is a fragmentary perspective view, illustrating a top end portion of an upright post of a leg unit of the preferred embodiment;

[0015] **FIG. 7** is a fragmentary perspective view, illustrating a sleeve unit of the preferred embodiment;

[0016] **FIG. 8** is a partly sectional, schematic top view of **FIG. 7**;

[0017] **FIG. 9** is an enlarged fragmentary perspective view to illustrate a first pivot unit of the preferred embodiment;

[0018] **FIG. 10** is an enlarged fragmentary perspective view to illustrate a topmost connecting unit of the top support frame of the preferred embodiment;

[0019] **FIG. 11** illustrates a folding operation of the tent frame assembly of the preferred embodiment; and

[0020] **FIG. 12** is a schematic view to illustrate the preferred embodiment in a folded state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] Referring to **FIGS. 3 to 5**, the preferred embodiment of a tent frame assembly **2** according to the present invention is used for mounting a canopy (not shown) thereon, and is shown to comprise a leg unit **3**, a plurality of link units **4**, a plurality of first struts **432**, a plurality of second struts **431**, and a top support frame **5**.

[0022] The leg unit **3** includes a plurality of spaced-apart upright posts **31**, and a plurality of sleeve units **32**. Each of the upright posts **31** has a top end portion **311** provided with two first top connection elements **313** and a second top connection element **313'**, which is spaced apart from each of the first top connection elements **313** by an angle of 45°, as shown in **FIG. 6**, and a bottom end portion **312** opposite to the first end portion **311**. The sleeve units **32** are sleeved

slidably and respectively on the upright posts **31** below the first top connection elements **313**. Each of the sleeve units **32** has a main body **321** sleeved on an outer surface of the respective upright post **31**, and three second connecting pieces **322** which extend outwardly from the main body **321** and which form 45° angles thereamong, as shown in FIGS. 7 and 8. Each upright post **31** and the main body **321** of the corresponding sleeve unit **32** are provided respectively with through holes **314**, **324** (see FIG. 8) to engage a protruding stub **331** (see FIG. 8) of a C-shaped biasing member **33** (see FIG. 8), which is disposed in the upright post **31** in a conventional manner, so as to position the sleeve units **32** on the upright posts **31**.

[0023] Each of the link units **4** is disposed between an adjacent pair of the upright posts **31**, and includes two upper and lower foldable links **41**, **42** connected pivotally and respectively to the upright posts **31**. The upper foldable link **41** includes two first link sections **411** arranged in a straight line and pivoted to the respective first top connection elements **313**, and a first pivot unit **412** connected between the first link sections **411**. The lower foldable link **42** includes two second link sections **421** arranged in a straight line and pivoted to the respective sleeve units **32** through the respective connecting pieces **322**, and a second pivot unit **422** connected between the second link sections **421**. The first and second pivot units **412**, **422** have similar configurations. As shown in FIG. 9, the first pivot unit **412** has a U-shaped first channel **4121** that opens upwardly, and two spaced-apart pins **4122** which pass through the first channel **4121** to pivot respectively the first link sections **411**. The second pivot unit **422** has a U-shaped second channel **4221** (see FIG. 3) that opens downwardly, and two spaced-apart pins **4222** (see FIG. 4) which pass through the second channel **4221** to pivot respectively the second link sections **421**.

[0024] Each of the first struts **432** has one end pivoted to a corresponding one of the sleeve units **32** through the respective connecting piece **322**, and the other end pivoted to one of the first link sections **411**.

[0025] Each of the second struts **431** has one end pivoted to a corresponding one of the first top connection elements **313**, and the other end pivoted to one of the second link sections **421**. The first and second struts **432**, **431** cross each other, and cooperate to reinforce the link units **4**.

[0026] The top support frame **5** is connected pivotally to the second top connection elements **313'** of the upright posts **31**, and is located on top of the link units **4** for supporting the canopy (not shown). The top support frame **5**, as shown in FIGS. 3, 4, 5 and 10, includes a topmost connecting unit **52**, a plurality of first support rods **511**, a plurality of second support rods **513**, and a plurality of third struts **512**. The first support rods **511** are pivoted respectively to the second top connection elements **313'** of the upright posts **31**. The second support rods **513** are pivoted respectively to the ends of the first support rods **511** that are distal from the upright posts **31**, and extend toward each other. Each of the third struts **512** has one end pivoted to a corresponding one of the sleeve units **32**, and the other end pivoted to a corresponding one of the first support rods **511**. The topmost connecting unit **52** has a cross-shaped cross section, and includes four angularly spaced-apart pivot parts **521**. The ends of the second support rods **513** that are distal from the first support rods **511** are pivoted respectively to the pivot parts **521**.

[0027] When the tent frame assembly **2** of the present invention is unfolded, as shown in FIG. 3, the canopy (not shown) can be mounted thereon.

[0028] Referring to FIGS. 5, 11 and 12, to fold the tent frame assembly **2**, the upright posts **31** are simply moved toward the center so as to be disposed close to each other. The sleeve units **32**, at the same time, slide downwardly along the lengths of the upright posts **31**. The first pivot units **412** are moved downwardly and the second pivot units **422** are moved upwardly at this time so that the first and second link sections **411**, **421** and the first and second struts **432**, **431** can move closely relative to each other. At the same time, the topmost connecting unit **52** of the top support frame **5** is moved downwardly so that the first and second support rods **511**, **513** move closely toward each other.

[0029] Since the upper and lower foldable links **41**, **42** do not intersect each other, and since the first and second pivot units **412**, **422** are used to interconnect pivotally the first and second link sections **411**, **421**, the first and second link sections **411**, **421** are substantially parallel to each other when the tent frame assembly **2** is folded. As such, the residual outward forces of the tent frame assembly **2** can be reduced when the assembly **2** is folded, thereby keeping stably the tent frame assembly **2** in the folded state.

[0030] While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

I claim:

1. A tent frame assembly for mounting a canopy thereon, comprising:

- a leg unit including a plurality of spaced-apart upright posts respectively having first top connection elements, and a plurality of sleeve units sleeved slidably and respectively on said upright posts below said first top connection elements;
- a plurality of link units, each of which includes two upper and lower foldable links disposed between an adjacent pair of said upright posts, said upper foldable link including two first link sections respectively pivoted to said first top connection elements of said upright posts of the adjacent pair, and a first pivot unit connected between said first link sections, said lower foldable link including two second link sections respectively pivoted to said sleeve units of said upright posts of the adjacent pair, and a second pivot unit connected between said second link sections;
- a plurality of first struts, each of which has one end pivoted to a corresponding one of said sleeve units and the other end pivoted to one of said first link sections; and
- a plurality of second struts, each of which has one end pivoted to a corresponding one of said first top connection elements and the other end pivoted to one of said second link sections.

2. The tent frame assembly as claimed in claim 1, wherein said first pivot unit has a U-shaped first channel, and two

spaced apart pins which pass through said first channel to pivot respectively said first link sections, said second pivot unit having a U-shaped second channel, and two spaced apart pins which pass through said second channel to pivot respectively said second link sections.

3. The tent frame assembly as claimed in claim 2, wherein said first channel opens upwardly, and said second channel opening downwardly.

4. The tent frame assembly as claimed in claim 1, further comprising a top support frame connected pivotally to said leg unit.

5. The tent frame assembly as claimed in claim 4, wherein each of said upright posts further includes a second top

connection element which is angularly spaced apart from one of said first top connection elements, said top support frame including a topmost connecting unit, a plurality of first support rods pivoted respectively to said second top connection elements of said upright posts, a plurality of second support rods pivoted respectively to said first support rods and extending toward each other and pivoted to said topmost connecting unit, and a plurality of third struts each having one end pivoted to a corresponding one of said sleeve units and the other end pivoted to a corresponding one of said first support rods.

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