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(54) HORIZONTAL BAR DEVICE

(57) A horizontal bar device comprises at least three vertically disposed struts, and crossbars connected between the two adjacent struts. A plurality of sleeves are sleeved on an upper part of each of the struts with the sleeves being stacked on top of one another, each end of each of the crossbars is fixedly connected to one of the sleeves, and each of the struts has a blocking surface capable of preventing the sleeves from sliding downward. A positioning structure is disposed between the two adjacent sleeves capable of preventing rotation of the sleeves. An upper end of each of the struts is sleeved with a locking sleeve, and the locking sleeve is pressed against the sleeves through a fastener.

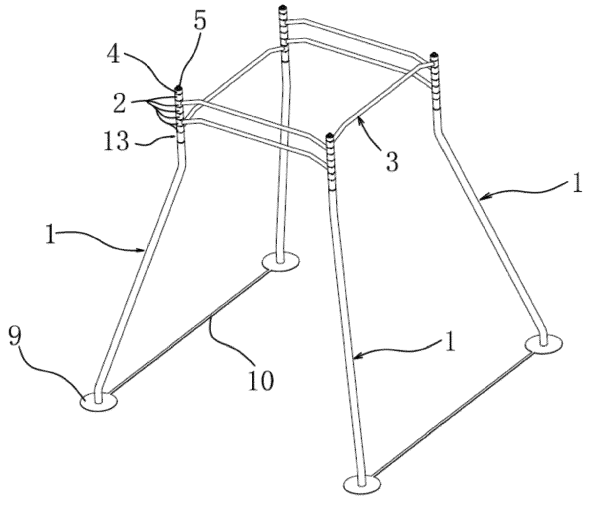

Fig. 1

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Description

Background of the invention

Field of Invention

[0001] The present invention belongs to the technical field of exercise equipment and relates to a horizontal bar device, and more particularly to a horizontal bar device capable of height adjustment.

Related art

[0002] With the continuous development of technology, people gradually pay more attention to physical exercise, but for various reasons, most people do not want or are not willing to exercise in the gym, but prefer to buy home fitness equipment and exercise directly at home.

[0003] The existing horizontal bar frame is a relatively common fitness equipment. When the horizontal bar frame is installed indoors, the height of the horizontal bar needs to be adjusted often due to different heights of the people using it. The existing horizontal bar frames generally use holes in the mounting tube, the horizontal bar is plug-connected into the holes of corresponding height, and the horizontal bar is fixed to the mounting tube by bolts. For example, Chinese patent application (application No. CN201420167172.3) discloses an adjustable four-sided horizontal bars including a base frame and four vertical columns connected to the base frame. A plurality of lateral positioning holes and a plurality of longitudinal positioning holes are disposed in the vertical columns. Lateral horizontal bars are fixed on the vertical columns through the lateral positioning holes and lateral positioning screws, and longitudinal horizontal bars are fixed on the vertical columns through the longitudinal positioning holes and longitudinal positioning screws.

[0004] Since the human hands hold onto the horizontal bar during use, the horizontal bar is subjected to vertical downward acting force, and the locking screws lock the sleeves on the vertical columns in the radial direction of the vertical columns, the positions where the locking screws contact the sleeves are subjected to downward pulling stress, and long-term use will cause the locking screws at the portions to be easily deformed and broken. Since the horizontal bar is a straight rod, when a person performs actions on the horizontal bar, the horizontal bar is deformed downwardly at the portion where force is exerted, thereby the sleeves at both ends of the horizontal bar are pulled inwardly, resulting in the tendency of the locking screws to move outward relative to the sleeves, it is easy for the locking screws to disengage from the vertical columns, or it is easy for them to break, which makes the stability of the horizontal bar frame worse. Furthermore, when the horizontal bar frame is not used, the horizontal bar frame can only be completely disassembled and stored, which makes the assembling, disassembling and storage of the horizontal bar frame inconvenient.

Summary of the invention

[0005] One object of one embodiment of the present invention is to solve the above problems in the prior art by providing a horizontal bar device. The technical problems to be solved by the present invention are how to make the horizontal bar convenient to adjust while improving the stability.

[0006] One object of one embodiment of the present invention can be achieved by the following technical solutions: a horizontal bar device, comprising at least three vertically disposed struts, and crossbars connected between the two adjacent struts, characterized in that a plurality of sleeves are sleeved on an upper part of each of the struts with the sleeves being stacked on top of one another, each end of each of the crossbars is fixedly connected to one of the sleeves, and each of the struts has a blocking surface capable of preventing the sleeves from sliding downward.

[0007] One embodiment of the three struts can form a three-dimensional frame, and more than three of the struts, such as four or five, can also form a three-dimensional frame to stand up on the ground. The two ends of the crossbar are fixedly connected with the sleeves, and the crossbars are disposed on the struts with the sleeves being stacked on top of one another over the struts. Different stacking orders of the sleeves will produce different heights of the crossbars, and the way in which the sleeves being stacked on top of one another replaces the fixing method of pin insertion. The crossbars are horizontally connected, and the force exerted on the sleeve is only in the axial direction of the sleeve without radial shearing force, which improves the stability.

[0008] According to one embodiment of the horizontal bar device described above, the blocking surface can be an annular surface on the strut abutting against a lower end surface of the sleeve, and the annular surface can be an end surface of a tube body or a shoulder formed by compression, or an externally connected shoulder. The blocking surface can also be a convex pin or blocker connected to the strut.

[0009] According to one embodiment of the horizontal bar device described above, the sleeves stacking on top of one another are pressed firmly against the blocking surface by a locking sleeve and a fastener, and a positioning structure is disposed between the two adjacent sleeves capable of preventing rotation of the sleeves. Positioning of the positioning structure can be released after the fastener is loosened, and more than four of the struts can be folded, because the two ends of the crossbar are pivotally connected to the struts via the sleeves, and more than four of the crossbars form a movable polygon structure, while the positioning structure can improve the stability of the unfolded horizontal bar device.

[0010] According to one embodiment of the horizontal bar device described above, the shape of the strut is also

improved, a leg tube of the strut comprises an inclined portion, the inclined portion can be formed into a segmented structure or an integral structure. An upper end of the inclined portion is bent upwardly to form a vertical mounting portion, and a lower end thereof is bent downwardly to form a vertical support portion. The support portion is connected with a footing, an upper surface of each of the footings has a vertical connector, and the support portion is plug-connected to the connector.

[0011] One embodiment of the segmented inclined portion comprises at least two tube bodies, and the two neighboring tube bodies are connected, with connection being made through their respective plug-connection to a connecting tube in-between, and such structure allows greater height adjustment.

[0012] Compared with the prior art, one embodiment of the horizontal bar device of the present invention has the following advantages:

1. During use, the human hands hold onto the crossbar, and the crossbar is subjected to vertical downward acting force, so that the sleeves connected to the crossbar are pressured downwardly, and the force exerted is only in the axial direction of the sleeves without radial shearing force. When the stacked sleeves transmit the force to the blocking structure, because the blocking surface is an annular surface, especially the annular surface formed by an end surface of the strut, the force exerted is also along the axial direction, and therefore the stability is very high. The fastener connected to the locking sleeve is only subjected to its own tightening force, and is not subjected to the shearing force and thrust of the sleeve connected with the crossbar, thereby ensuring the stability of the connection.

2. The fastener is rotated to move outward a certain distance. At this time, the sleeves and the locking sleeve are both loosened, and the two diagonal struts are drawn close to each other by an external force. After the two diagonal struts abut with each other, the entire horizontal bar device is flat, and the horizontal bar device is convenient for folding and storage.

Brief description of the drawings

[0013]

FIG. 1 is a perspective view of a horizontal bar device being unfolded according to a first embodiment of the present invention;

FIG. 2 is a partially exploded view of the horizontal bar device of FIG. 1;

FIG. 3 is an enlarged view of Section A of FIG. 2;

FIG. 4 is a cross-sectional view of an upper end of a strut of the first embodiment;

FIG. 5 is an enlarged view of Section B of FIG. 4;

FIG. 6 is one embodiment of a blocking surface according to a second embodiment of the present invention;

FIG. 7 is another embodiment of a blocking surface according to a second embodiment of the present invention;

FIG. 8 is a perspective view of an inclined portion of the strut according to a third embodiment of the present invention;

FIG. 9 is an enlarged cross-sectional view of an enlarged portion of the third embodiment; and

FIG. 10 is a perspective view showing arrangement of crossbars according to a fourth embodiment of the present invention.

Detailed description of the invention

[0014] The technical solutions of the present invention are further described below with reference to the specific embodiments of the present invention in conjunction with the accompanied drawings, but the present invention is not limited to these embodiments.

Embodiment 1:

[0015] One embodiment of a horizontal bar device is a three-dimensional frame that can be folded, or disassembled to be stored, or unfolded to be placed on a horizontal ground. As shown in FIG. 1, the unfolded three-dimensional frame comprises four struts 1 with a rectangular distribution. An upper end portion of each of the struts 1 is sleeved with cylindrical sleeves 2, and other tubular structures, such as ones with rectangular outside surface, can also be used as a shape for the sleeve 2. The sleeves 2 are stacked on top of one another, and crossbars 3 are disposed between the two adjacent struts 1, and each end 31 of each of the crossbars 3 is fixedly connected to one of the sleeves 2 so that each of the crossbars 3 can independently slide upward and downward along the struts 1. The crossbar 3 can be fixedly connected with the sleeves 2 by welding, or by integral manufacturing. The two ends 31 of the crossbar 3 are bent downwardly so that the crossbar 3 has an arch structure, and the direction of the arch shape is vertical. The arch structure is set in such a way that, after a middle portion of the crossbar 3 is subjected to vertical downward acting force during use, since the two ends 31 of the crossbar 3 are formed as bent portions, the stress is concentrated on the bent positions of the crossbar 3, and

therefore the middle portion of the crossbar 3 is not easily deformed.

[0016] An outer peripheral surface of the upper end portion of one embodiment of the strut 1 has a blocking surface13 capable of preventing the sleeves 2 from sliding downward. More than two of the sleeve 2 on each of the struts 1 is provided, and the bottommost sleeve 2 abuts against the blocking surface13. An upper end of the strut 1 is sleeved with a locking sleeve 4 that cooperates with the blocking surface13 to press the sleeves 2 tightly, and the locking sleeve 4 is locked on the strut 1 by a fastener 5.

[0017] As shown in FIGS. 2 and 3, one embodiment of the blocking surface13 is an annular surface 6 on the strut 1, and a section A at the upper left corner of FIG. 2 is a perspective view with some of the sleeves 2 being separated, and FIG. 3 is an enlarged view of the section A of FIG. 2. Each of the struts 1 further includes a leg tube 1a and a straight tube 1b, refer to FIG. 5 for a detailed cross-sectional view. The straight tube 1b is inserted and fixed in an upper end of the leg tube 1a, and the annular surface 6 is an annular end surface 1a4 of the upper end of the leg tube 1a. The sleeves 2 have a same size and are stacked on top of one another over the straight tube 1b, and a lower end surface 2a of the bottommost sleeve 2 is stacked up over the annular surface 6. Thus, the sleeves 2 are blocked from moving downward, and since the blocking surface13 uses an upper end surface of the leg tube 1a, the leg tube 1a is also subjected to axial force when the force is exerted, thereby eliminating the radial force and improving the stability when the force is exerted.

[0018] In order to further improve the stability, as shown in FIG. 3, and in one embodiment of the sleeves, a positioning structure is disposed between two adjacent sleeves 2 capable of preventing rotation of the sleeves 2. The positioning structure comprises a notch 7 disposed at an upper end surface of the sleeve 2 and a bulge 8 disposed at a lower end surface 2a of the sleeve 2, and the bulge 8 and the notch 7 between the two adjacent sleeves 2 interlock with each other. A plurality of the notches 7 and the bulges 8 on the sleeve 2 are evenly distributed circumferentially. The annular surface 6 is disposed with the notches 7 capable of preventing the sleeve 2 from rotating. The notch 7 and the bulge 8 can be in any shapes, and the notch 7 and the bulge 8 can be swapped for achieving the same positioning effect. The sleeves 2 are circumferentially restrained on the strut 1, and the sleeves 2 cannot be rotated relative to the strut 1 for improving the stability.

[0019] When the horizontal bar device is unfolded to form the three-dimensional frame, as shown in FIG. 5, one embodiment of a nut 11 is fixedly connected inside an upper end of the straight tube 1b. The locking sleeve 4 is sleeved on the upper end of the straight tube 1b, and an upper end surface of the locking sleeve 4 is a pressed surface 4a. The fastener 5 is a bolt, a brim of the bolt is pressed against the pressed surface 4a, and a lower end of the bolt passes through the pressed surface 4a and is connected to the nut 11 inside the straight tube 1b of the strut 1 through threads. A spring washer 12 sleeved on the bolt is provided between the brim of the bolt and the pressed surface 4a, and the spring washer 12 is abutted against the brim of the bolt and the pressed surface 4a. After tightening the bolt, the sleeves 2 are sandwiched tightly between the locking sleeve 4 and the blocking surface 13, and under the positioning of the positioning structure, the horizontal bar device which is unfolded into the three-dimensional frame forms a very stable structure.

[0020] One embodiment of the sleeves 2 sleeved over the straight tube 1b are rotatable with the straight tube 1b as an axis. When the horizontal bar device needs to be folded for storage, the fastener 5 is unscrewed loose to release the pressing state of the locking sleeve 4, so that sufficient clearance is provided between the sleeves 2 to release the restriction of the positioning structure in order to allow the sleeves 2 to be capable of rotating freely. Then, the two diagonal struts 1 are pressed towards the center and close to each other, and the other two diagonal struts 1 are moved outwardly away from each other, thereby the horizontal bar device is folded flatly to be stored away.

[0021] For ease of storage, as shown in FIGS. 1 and 2, one embodiment of the four struts 1 are tubular rods, each of the struts 1 includes the leg tube 1a. Referring to the leg tube 1a on the left side in FIG. 2, which includes an inclined portion 1a1, an upper end of the inclined portion 1a1 is bent upwardly to form a vertical mounting portion 1a2, and a lower end thereof is bent downwardly to form a vertical support portion 1a3. The four struts 1 form a pyramid-shaped structure, and the horizontal bar device is not easily shaken during use. The mounting portion 1a2 has a tube section with an inner diameter smaller than an inner diameter of the inclined portion 1a1, and the straight tube 1b is plug-connected into the mounting portion 1a2 by tight fit. The support portion 1a3 is connected with a footing 9, an upper surface of each of the footings 9 has a vertical connector 9a, and the support portion 1a3 is plug-connected to the connector 9a. The four footings 9 are evenly divided into two groups, each of the groups of the footings 9 is connected by a tie rod 10, and the two struts 1 on each pair of the footings 9 are connected integrally by the tie rod 10 so that the diagonal struts 1 are further prevented from drawing close to each other with an external force, thereby improving the stability of the use of the horizontal bar device.

[0022] The horizontal bar device is placed on a flat ground for use, one embodiment of the sleeves 2 are sleeved all together on top of one another on the strut 1, and the sleeves 2 of each of the crossbars 3 are sleeved at corresponding heights as needed. Then the locking sleeve 4 is sleeved, and the sleeves 2 are pressed tightly between the blocking surface13 and the locking sleeve 4 by the fastener 5. By the positioning structure, the sleeves 2 cannot be rotated relative to the strut 1, and finally the footings 9 are plug-connected to form the stable

three-dimensional frame. During use, the human hands hold onto the crossbar 3, and the crossbar 3 is subjected to vertical downward acting force, so that the sleeves 2 connected to the crossbar 3 are pressured downwardly without being pushed upwardly. At this time, the fastener 5 connected to the locking sleeve 4 is only subjected to its own tightening force, and is not subjected to the shearing force and thrust of the sleeve 2 connected with the crossbar 3. During use, the fastener 5 and the strut 1 are thread connected more securely, which prevents the fastener 5 from loosening during use, and improves the stability of the horizontal bar device. In addition, some of the sleeves 2 are fixedly connected with the crossbar 3, and some of the sleeves 2 are not fixedly connected with the crossbar 3, so it is only necessary to take out the fastener 5, to take out the locking sleeve 4, to take out the sleeves 2 to be adjusted , and then the sleeves 2 can be re-arranged and combined as needed to achieve height adjustment of the crossbars 3.

[0023] When the horizontal bar device is not in use, one embodiment of the fastener 5 is unscrewed to retract outward a certain distance. At this time, the sleeves 2 and the locking sleeve 4 are both loosened, and both the sleeves 2 and the locking sleeve 4 are rotatable relative to the strut 1 and are capable of sliding upward and downward along the strut 1. The two diagonal struts 1 are drawn close to each other by an external force. After the two diagonal struts 1 abut with each other, the entire horizontal bar device is flat, and the horizontal bar device is convenient for folding and storage.

Embodiment 2:

[0024] The embodiment 2 is basically the same as the embodiment 1, the difference lie in the blocking surface13 as shown in FIG. 6. The blocking surface13 is a shoulder of the strut 1, the annular surface 6 is a shouldering surface 1a5, and the sleeve 2 abuts against the shouldering surface 1a5; or the blocking surface13 is a convex blocker 1a6 connected to the strut 1, as shown in FIG. 7.

Embodiment 3:

[0025] The embodiment 3 is basically the same as the embodiment 1, as shown in FIG. 8 and FIG. 9, the differences lie in that, the inclined portion 1a1 comprises at least two tube bodies 1a11, and the two neighboring tube bodies 1a11 are connected, with connection being made through their respective plug-connection to a connecting tube 1a7 in-between. The connecting tube 1a7 and one of the tube bodies 1a11 are fixedly connected by welding, and the connecting tube 1a7 and the other tube body 1a11 are connected by a screw 15.

Embodiment 4:

[0026] The embodiment 4 is basically the same as the embodiment 1, as shown in FIG. 10, the differences lie in that, the two adjacent struts 1 are connected by the two crossbars 3 in-between. The lower crossbar 3 is a straight rod with the two ends being connected to the bottommost sleeves 2, and the two ends 31 of the upper crossbar 3 are bent so that the crossbar 3 has an arch structure. The arch structure extends horizontally inward toward the three-dimensional frame, and the upper crossbar 3 is connected to the topmost sleeves 2.

[0027] The specific embodiments described herein are merely illustrative of the spirit of the present invention. Technical personnel skilled in the art to which the present invention pertains can make various modifications or additions to the specific embodiments described or replace them in a similar manner, without departing from the spirit of the present invention or beyond the scope defined by the appended claims.

LIST OF REFERENCED PARTS

[0028]

strut 1
blocking surface13
leg tube 1a
inclined portion 1a1
mounting portion 1a2
support portion 1a3
annular end surface 1a4
straight tube 1b
sleeve 2
lower end surface 2a
crossbar 3
locking sleeve 4
pressed surface 4a
fastener 5
annular surface 6
notch 7
bulge 8
footing 9
connector 9a
tie rod 10
nut 11
shouldering surface 1a5
blocker 1a6
tube body 1a11
connecting tube 1a7
screw 15

Claims

1. A horizontal bar device, comprising: at least three vertically disposed struts and crossbars connected between two adjacent struts, **characterized in that** a plurality of sleeves sleeved on an upper part of each of the struts and each end of each crossbar is fixedly connected to one of the sleeves, the sleeves

are stacked on top of one another, an axial direction of a main portion between two ends of each crossbar is perpendicular to an axial direction of the sleeves, and each strut has a blocking surface capable of preventing the sleeves from sliding downward.

2. The horizontal bar device as claimed in claim 1, wherein the blocking surface is an annular surface on a first strut capable of abutting against a lower end surface of a first sleeve.

3. The horizontal bar device as claimed in claim 2, wherein the first strut is a tubular rod comprising a leg tube and a straight tube, the straight tube is inserted and fixed in an upper end of the leg tube, and the annular surface is an annular end surface of the upper end of the leg tube.

4. The horizontal bar device as claimed in claim 2, wherein the first strut has a shoulder, and the annular surface is a shouldering surface.

5. The horizontal bar device as claimed in claim 1, wherein the first blocking surface is a convex blocker connected to the first strut.

6. The horizontal bar device as claimed in claim 1, wherein an upper end of each strut is sleeved with a locking sleeve, and the locking sleeve is pressed against the first sleeve through a fastener.

7. The horizontal bar device as claimed in claim 6, wherein the sleeves sleeved over the first strut are rotatable with the first strut as an axis, and a positioning structure is disposed between the two adjacent sleeves, the positioning structure capable of preventing rotation of the sleeves.

8. The horizontal bar device as claimed in claim 7, wherein the positioning structure comprises a notch disposed at an upper end surface of the first sleeve and a bulge disposed at a lower end surface of the first sleeve, and the bulge and the notch between the two adjacent sleeves interlock with each other.

9. The horizontal bar device as claimed in claim 8, wherein an annular surface is disposed with a notch or bulge capable of preventing rotation of the first sleeve.

10. The horizontal bar device as claimed in claim 6, wherein the first sleeve is sleeved over the straight tube, the locking sleeve is sleeved on an upper end of the straight tube, an upper end surface of the locking sleeve is a pressed surface, the fastener is a bolt, a brim of the bolt is pressed against the pressed surface, and a lower end of the bolt passes through the pressed surface and is connected to an inside of the first strut through threads.

11. The horizontal bar device as claimed in claim 10, wherein a spring washer sleeved on the bolt is provided between the brim of the bolt and the pressed surface, and the spring washer is abutted against the brim of the bolt and the pressed surface.

12. The horizontal bar device as claimed in claim 3, wherein the leg tube comprises an inclined portion, an upper end of the inclined portion is bent upwardly to form a vertical mounting portion, a lower end thereof is bent downwardly to form a vertical support portion, the support portion is connected with a footing, an upper surface of each of the footings has a vertical connector, and the support portion is plug-connected to the connector; the mounting portion has a tube section with an inner diameter smaller than an inner diameter of the inclined portion, and the straight tube is plug-connected into the mounting portion by tight fit.

13. The horizontal bar device as claimed in claim 1, wherein the two ends of the first crossbar are bent such that the main portion of the first crossbar intersects the two ends to form included angles, the two ends and the main portion are in a same plane, and the plane in which the first crossbar is located is set in a vertical direction.

14. The horizontal bar device as claimed in claim 9, wherein the inclined portion comprises at least two tube bodies, and the two neighboring tube bodies are connected, with connection being made through their respective plug-connection to a connecting tube in-between.

15. The horizontal bar device as claimed in claim 1, wherein the two ends of the first crossbar are bent such that the main portion of the first crossbar intersects the two ends to form included angles, the two ends and the main portion are in a same plane, and the plane in which the first crossbar is located is set in a horizontal direction.

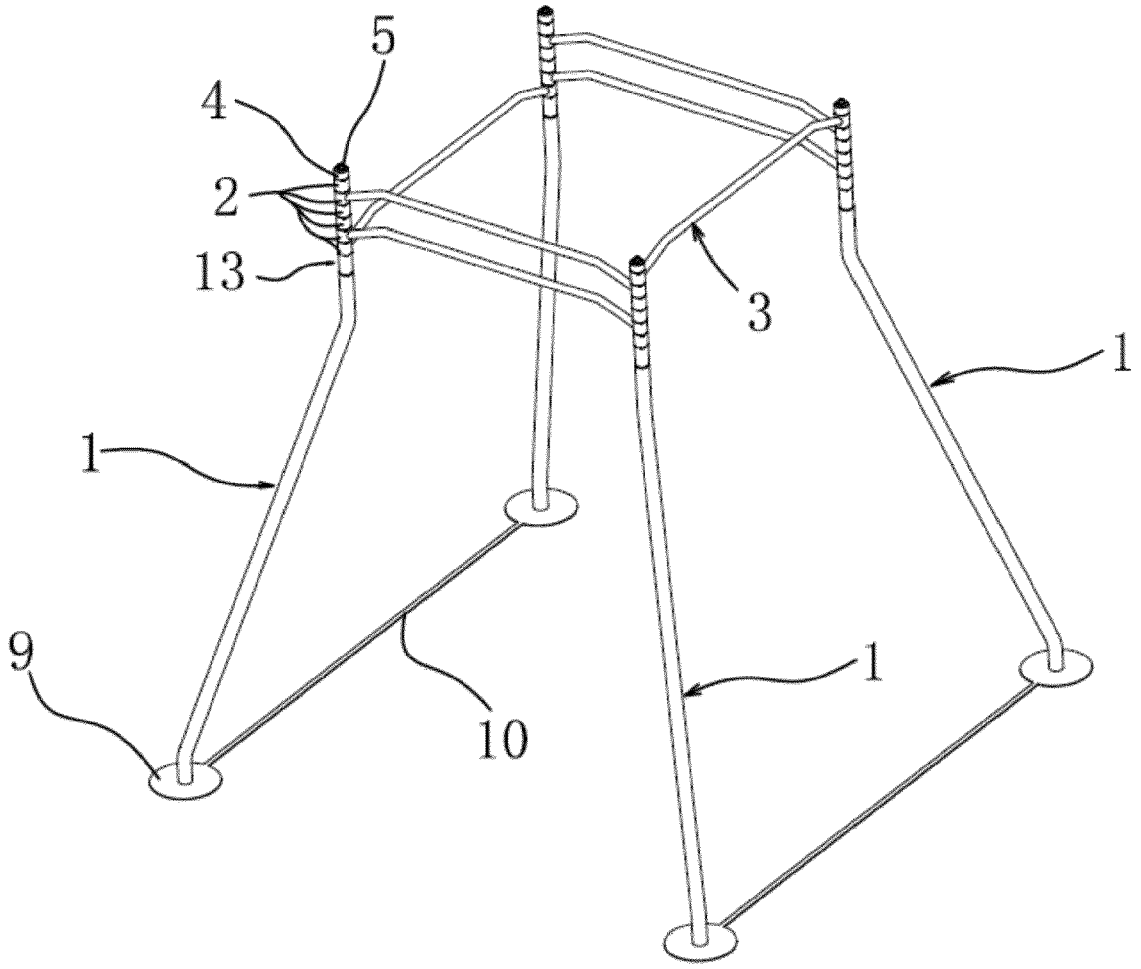

Fig. 1

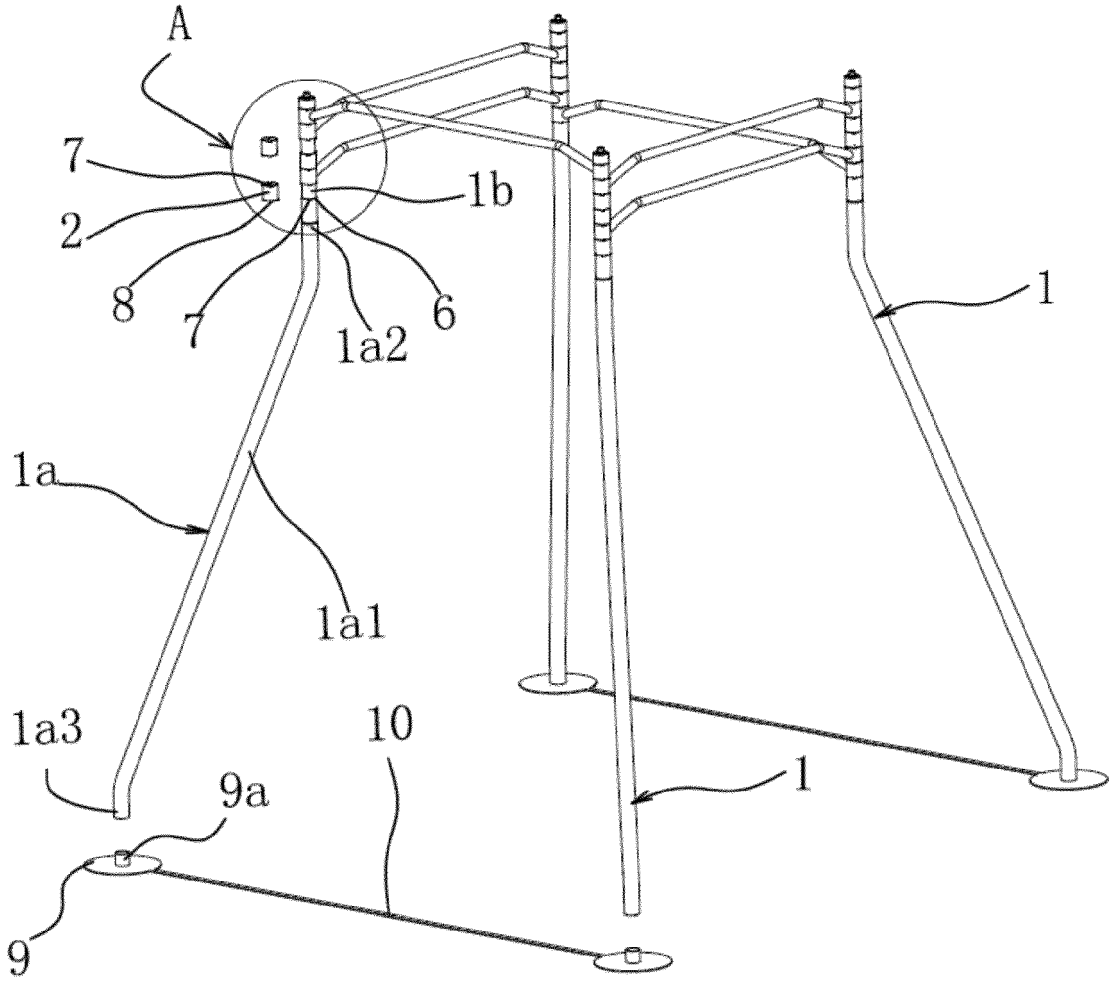

Fig. 2

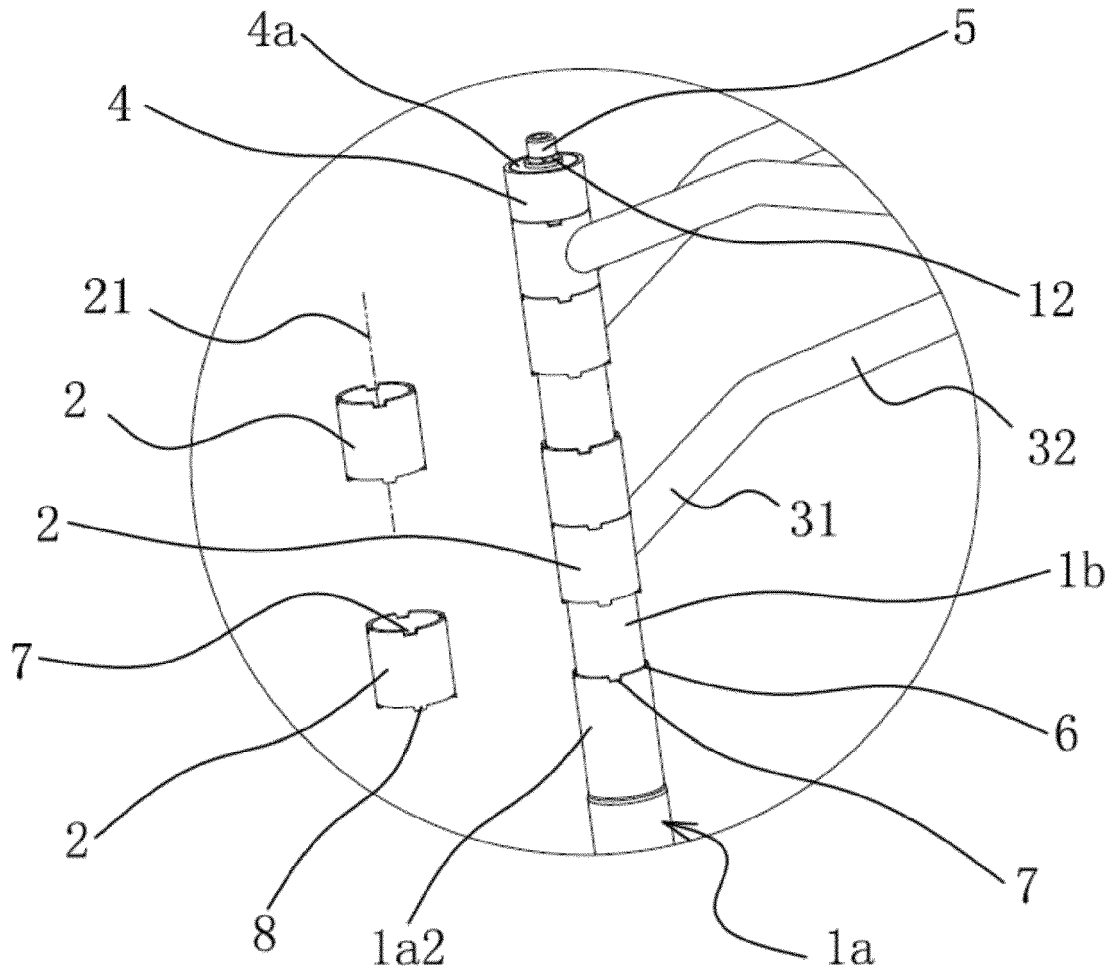

Fig. 3

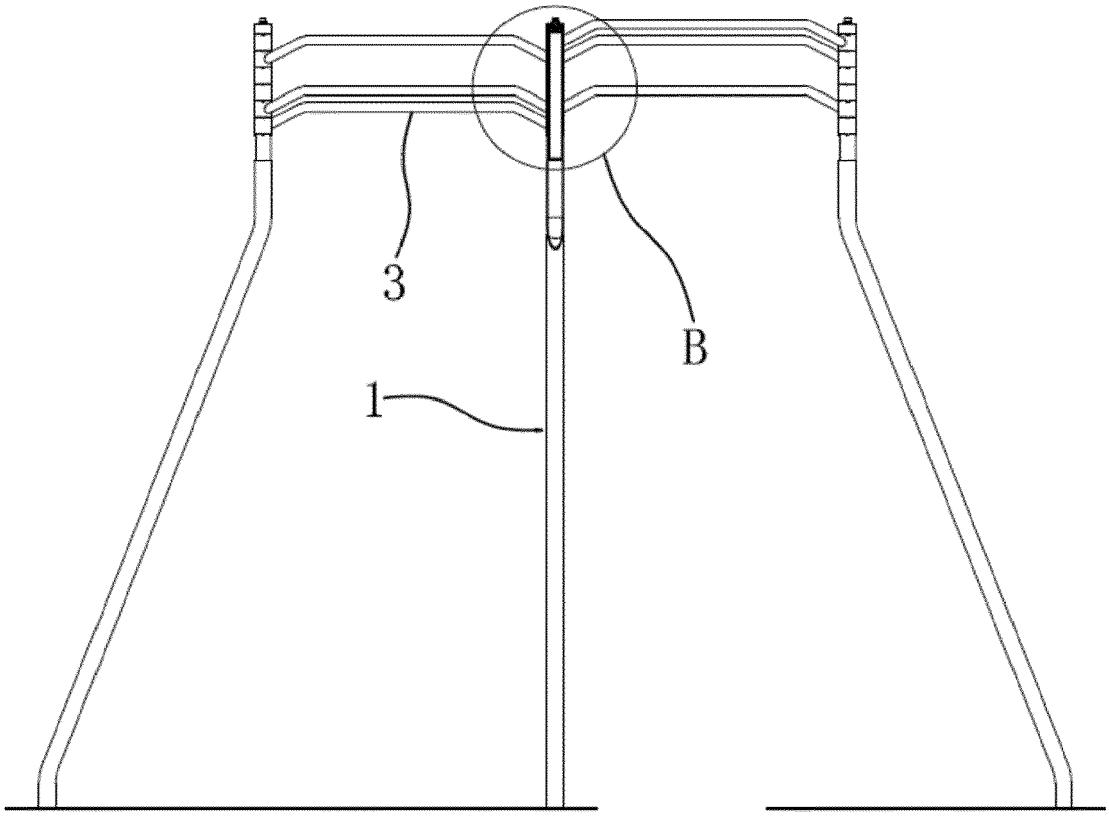

Fig. 4

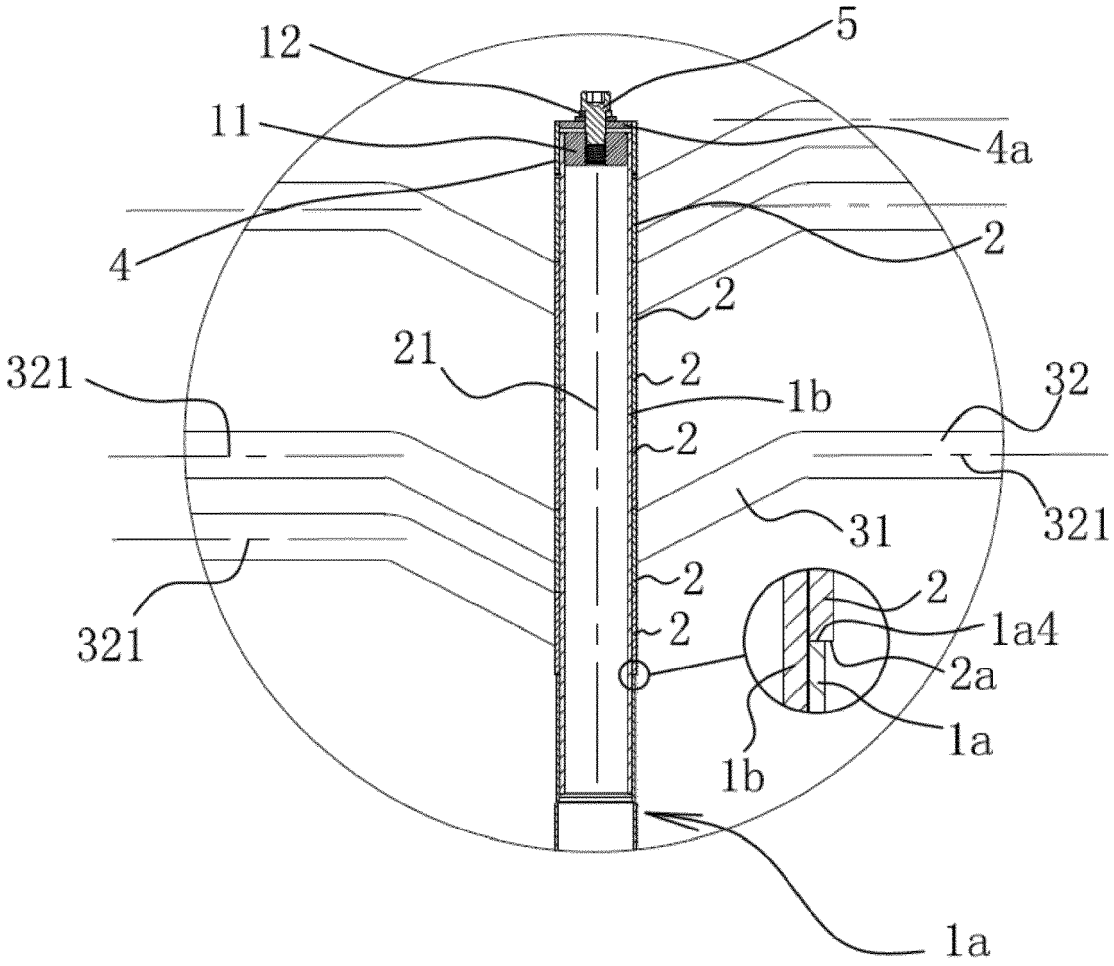

Fig. 5

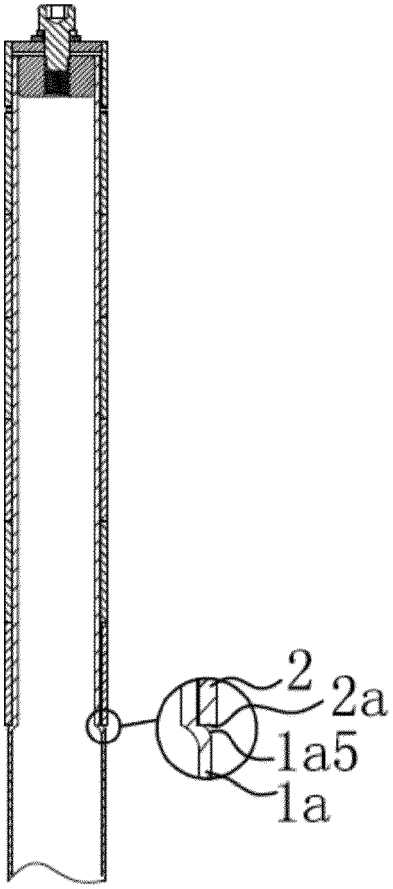

Fig. 6

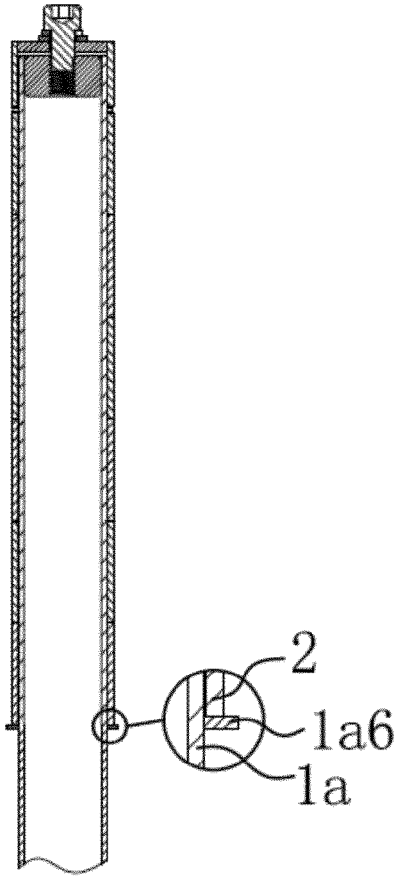

Fig. 7

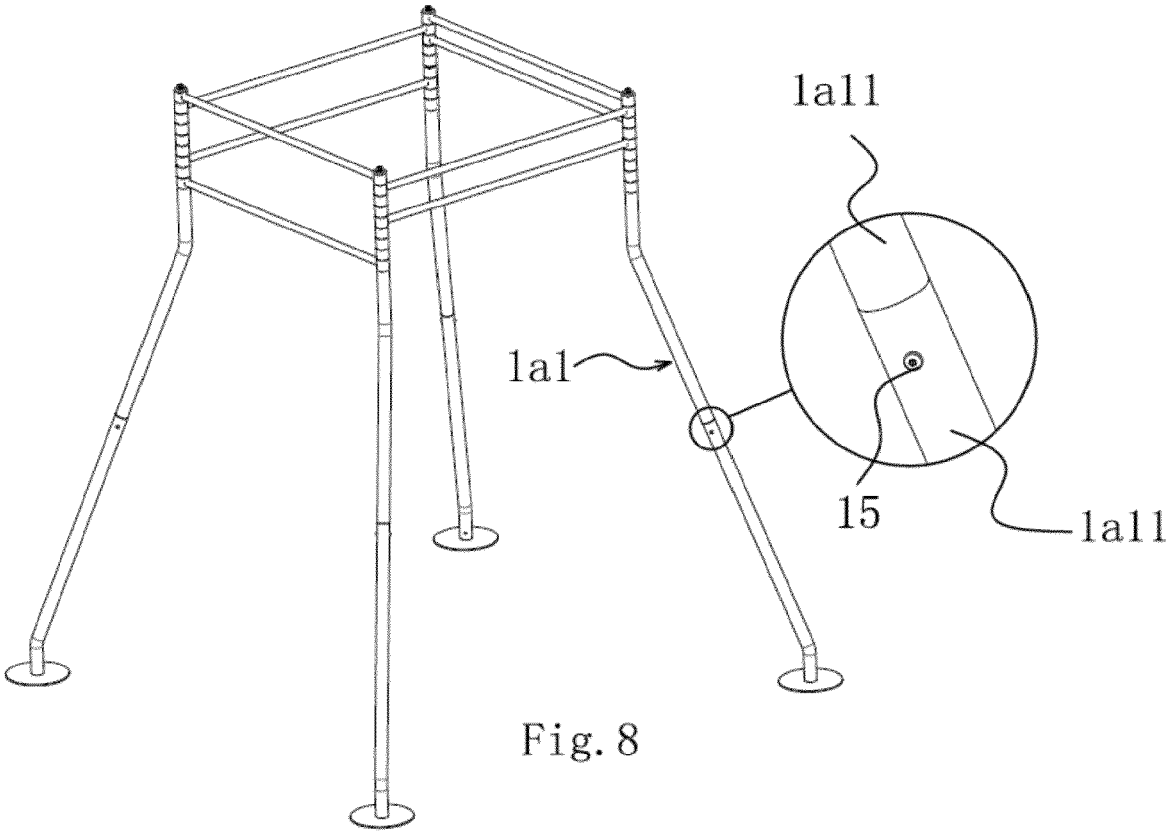

Fig. 8

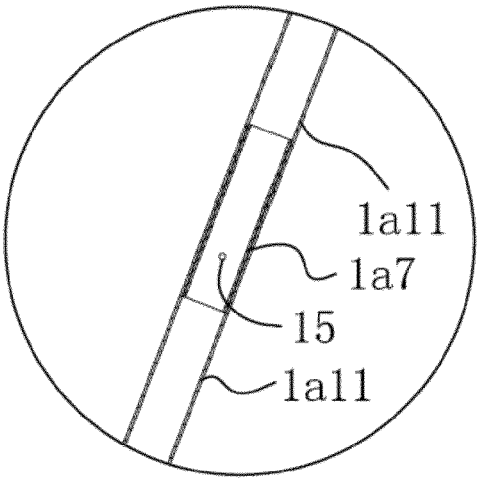

Fig. 9

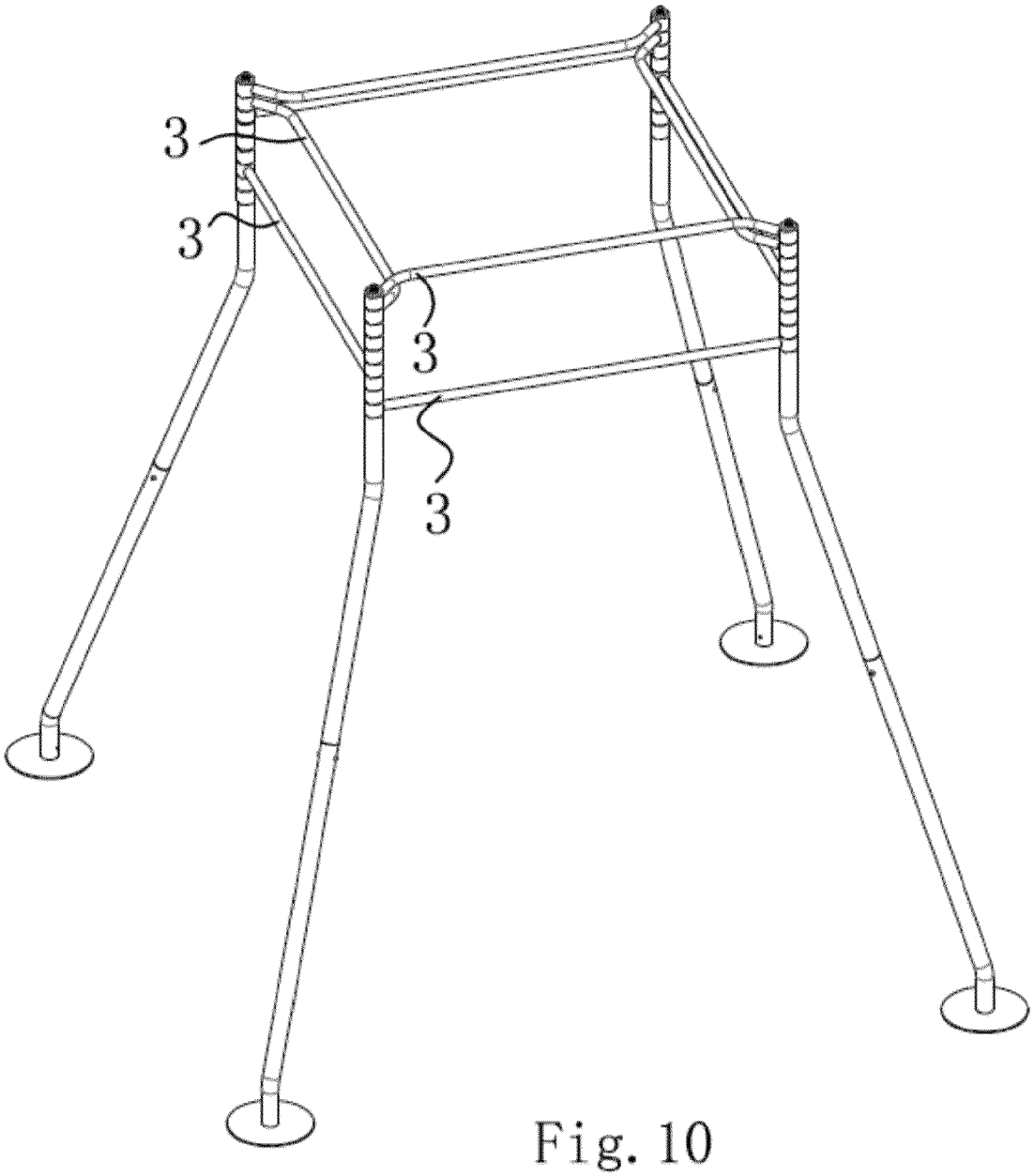

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 3815

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 1 582 487 A (SHANK JOSEPH H) 27 April 1926 (1926-04-27) * figures *	1-15	INV. A63B1/00 A63B17/04 A63B21/068
A	WO 2018/011650 A1 (LE NGUYEN KHANH TRINH [VN]) 18 January 2018 (2018-01-18) * figures *	1	A63B23/12
A	FR 2 871 390 A1 (CESSY FREDERIC [FR]) 16 December 2005 (2005-12-16) * figures *	1	
A	US 6 551 224 B1 (LIM EDGAR [US]) 22 April 2003 (2003-04-22) * figure 1 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 August 2019	Lundblad, Hampus

CATEGORY OF CITED DOCUMENTS

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