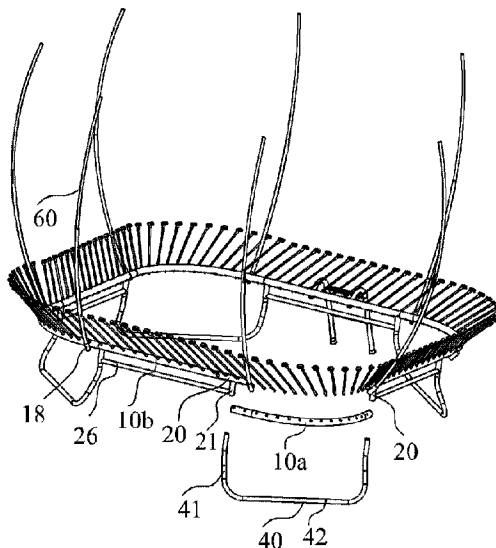




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 (54) Title: TRAMPOLINE FRAME AND TRAMPOLINE WITH THE TRAMPOLINE FRAME HEREOF



(57) **Abrégé/Abstract:**

Provided is a trampoline frame formed by multiple frame pipes sequentially connected. Two adjacent frame pipes are connected by a T-shaped pipe composed of a horizontal and a vertical pipe. The horizontal pipe's outer diameter is smaller than the frame pipe's inner diameter. The horizontal pipe's two ends are respectively inserted into the two adjacent frame pipes to form a closed trampoline frame. The frame pipe's top and bottom surfaces comprise a plurality of equally spaced upper frame holes and equally spaced lower frame holes respectively. The horizontal pipe's top and bottom surfaces are provided with a plurality of equally spaced upper inserting holes and equally spaced lower inserting holes respectively. When the horizontal pipe's two ends are inserted into the two adjacent frame pipes, each upper inserting hole mates with the corresponding upper frame hole, and each lower inserting hole mates with the corresponding lower frame hole.

## **ABSTRACT**

Provided is a trampoline frame formed by multiple frame pipes sequentially connected. Two adjacent frame pipes are connected by a T-shaped pipe composed of a horizontal and a vertical pipe. The horizontal pipe's outer diameter is smaller than the frame pipe's inner diameter. The horizontal pipe's two ends are respectively inserted into the two adjacent frame pipes to form a closed trampoline frame. The frame pipe's top and bottom surfaces comprise a plurality of equally spaced upper frame holes and equally spaced lower frame holes respectively. The horizontal pipe's top and bottom surfaces are provided with a plurality of equally spaced upper inserting holes and equally spaced lower inserting holes respectively. When the horizontal pipe's two ends are inserted into the two adjacent frame pipes, each upper inserting hole mates with the corresponding upper frame hole, and each lower inserting hole mates with the corresponding lower frame hole.

## TRAMPOLINE FRAME

### AND TRAMPOLINE WITH THE TRAMPOLINE FRAME HEREOF

#### TECHNICAL FIELD

**[0001]** The invention relates to the technical field of trampoline, in particular, to a trampoline frame and a trampoline with the trampoline frame.

#### BACKGROUND

**[0002]** Trampoline exercise is a kind of healthy and interesting entertainment. Studies have shown that trampoline exercise can't only exercise the body and strengthen muscle strength, but also help people to develop balance ability and improve sports skills. With the development of technology, trampoline is entering people's life more and more. The basic structure of a trampoline includes a bouncing pad, a frame, multiple flexible rods, supporting legs, a protecting net and supporting rods. The top ends of the flexible rods are arranged around the periphery of the bouncing pad, and the bottom ends of the flexible rods are mounted on the frame, so that the bouncing pad is mounted above the frame. The frame is mounted on the ground through supporting by the support legs. The protecting net is arranged around the periphery of the bouncing pad and extends upwards to form a closed or semi-closed space for the player to do bouncing jump on the bouncing pad. The protecting net protects people jumping on the bouncing pad from falling off from the bouncing pad. The supporting rods are arranged around the bouncing pad and used to support and spread the protecting net.

**[0003]** The frame of the existing trampoline is mostly composed of multiple straight and / or curved tubes, the adjacent two tubes are welded connected, screw connected or connected by a connector. For example, the Chinese utility model application CN201721278304.X discloses a trampoline frame connector, which has a frame connector connected to a first horizontal member. The frame connector is

also connected to a second horizontal member. A trampoline leg includes a vertical leg member connected to a horizontal leg member.

**[0004]** The existing trampoline frame has the following shortcomings:

**[0005]** 1. The size of the trampoline frame can't be adjusted, it can't meet the requirements of different users.

**[0006]** 2. It has to be installed by the professionals, the installation is difficult.

**[0007]** 3. It is not convenient to install the flexible rods on trampoline frame connector, and the distribution of flexible rods is uneven, which affects the elasticity of bouncing pad.

**[0008]** 4. During player jumping on the trampoline, the tubes rotate relatively, which will cause harsh friction noise.

## SUMMARY

**[0009]** In order to overcome the shortcomings of the prior art, the invention provides a trampoline frame and a trampoline with the trampoline frame, which can overcome the above defects of the existing trampoline frame, which can be conveniently disassembled and assembled, with its size can be flexibly adjusted.

**[0010]** The technical proposals of the present invention are as follows:

**[0011]** A trampoline frame formed by multiple frame pipes which are connected in turns, adjacent two of the frame pipes are connected by a frame connector; the frame connector is a T-shaped pipe composed of a horizontal pipe and a vertical pipe; an outer diameter of the horizontal pipe is slightly smaller than an inner diameter of each of the frame pipes; two opposite ends of the horizontal pipe are inserted into the adjacent two of the frame pipes respectively so as to form a closed trampoline frame; a top surface of each of the frame pipes and a bottom surface of each of the frame pipes are provided with a plurality of equally spaced upper frame holes and a plurality of equally spaced corresponding lower frame holes respectively, the upper frame holes and the lower frame holes are staggered in pairs;

a top surface of the horizontal pipe and a bottom surface of the horizontal pipe are provided with a plurality of equally spaced upper inserting holes and a plurality of equally spaced corresponding lower inserting holes respectively, the upper inserting holes and the lower inserting holes are staggered in pairs; when the opposite two ends of the horizontal pipe are inserted into adjacent two of the frame pipes, each of the upper inserting holes coincides with one of the corresponding upper frame hole, and each of the lower inserting holes coincides with one of the corresponding lower frame holes.

**[0012]** One end of the frame connector is fixedly connected to one of adjacent two of the frame pipes.

**[0013]** Adjacent two of the vertical pipes are fixed connected by a connecting pipe.

**[0014]** The horizontal pipe and the vertical pipe are integrally formed, or are connected by welding, riveting or screwing method.

**[0015]** The trampoline frame is in circular shape or approximately circular shape, when it is composed of a plurality of curved frame pipes.

**[0016]** The trampoline frame is approximate in square shape or approximate rectangle shape, when it is composed of a plurality of straight frame pipes and four curved frame pipes.

**[0017]** The bottom surface of each of the frame pipes is provided with a notch through which the vertical pipe extends.

**[0018]** Adjacent two of the frame connectors are connected by a supporting frame; the supporting frame includes two curved tubes and a horizontal connecting tube which connects with the two curved tubes; the top ends of said two curved tube are inserted into the corresponding vertical pipes of adjacent two of said frame connectors.

**[0019]** Each of the frame pipes is also provided with a supporting rod pipe, and a supporting rod is inserted in the supporting rod pipe; and a reinforcing rib is arranged between one of the frame pipes and the supporting rod pipe.

**[0020]** The trampoline frame also includes multiple supporting frames, each of the supporting frames connects and supports three connected the frame pipes; each of the supporting frames comprises two L-shaped tubes and an inverted T-shaped tube which connecting with the two L-shaped tubes respectively; a transverse tube part of the inverted T-shaped tube connects with the transverse tube part of each of the two L-shaped tubes so as to form a horizontal connecting tube; a vertical tube part of the inverted T-shaped tube is fixedly connected with a middle one of three connected said frame pipes,, two vertical tube parts of the two L-shaped tubes are respectively connected with two on both sides of three connected said frame pipes.

**[0021]** A vertical tube part of each of said two L-shaped tubes is arranged to bend in a direction towards a centre of the trampoline frame, the horizontal connecting tube is located in a region of a forward projection of the trampoline frame.

**[0022]** A square shaped trampoline frame with four curved corners is arranged in a sequence of one curved frame pipe and one straight frame pipe, adjacent two of the straight frame pipes are spaced by one of the curved frame pipes respectively, and each of the curved frame pipes is connected with adjacent two of the straight frame pipes; each of the supporting frames is connected with one of the curved frame pipes and two of the straight frame pipes at both sides of the curved frame pipe; ends of the two vertical tube parts of the two L-shaped tubes are respectively connected with and support the two straight frame pipes at both sides of it; the vertical tube part of the inverted T-shaped tube is fixedly connected with one of the curved frame pipes.

**[0023]** A connection between each of the two vertical tube parts of the two L-shaped tubes and each of the straight frame pipes is located at about  $1/3^{\text{rd}}$  a length of a respective side of the trampoline frame.

**[0024]** An inner diameter of the transverse tube part of the inverted T-shaped tube is slightly larger than an outer diameter of each of the transverse tube parts of the two L-shaped tubes, or an outer diameter of the transverse tube part of the inverted T-shaped tube is slightly smaller than an inner diameter of each of the transverse

tube parts of the two L-shaped tubes, therefore the transverse tube part of the inverted T-shaped tube can relatively slide along the transverse tube parts of the two L-shaped tubes.

**[0025]** The two vertical tube parts of the two L-shaped tubes are respectively inserted into the vertical tube parts of adjacent two of the frame connector.

**[0026]** A screw extends through the middle one of three connected the frame pipes and is inserted into the vertical tube part of the inverted T-shaped tube so as to fix the inverted T-shaped tube with the middle one of three connected the frame pipes.

**[0027]** The vertical tube part of the inverted T-shaped tube is provided with a first inserting hole and a second inserting hole respectively; the screw extends through the middle one of three connected the frame pipes and is inserted into the first inserting hole or the second inserting hole and fixed thereof.

**[0028]** The present invention also provided with a trampoline with the above trampoline frame.

**[0029]** The present invention also provided with a trampoline frame formed by multiple frame pipes which are connected in turns, adjacent two of the frame pipes are connected by a frame connector; the frame connector comprises a horizontal pipe and a vertical pipe which is located away from the horizontal pipe; an outer diameter of the horizontal pipe is slightly smaller than an inner diameter of each of the frame pipes; opposite two ends of the horizontal pipe are inserted into the adjacent two of the frame pipes so as to form a closed trampoline frame; the vertical pipe is fixedly arranged underneath a bottom of the frame pipes; a top surface of each of the frame pipes is provided with a plurality of equally spaced upper frame holes, a bottom surface of each of the frame pipes is provided with a plurality of equally spaced lower frame holes which are corresponded with the upper frame holes respectively, and the upper frame holes and the lower frame holes are staggered in pairs; a top surface of each of the horizontal pipes is provided with a plurality of equally spaced upper inserting holes, a bottom surface

of each of the horizontal pipes is provided with a plurality of equally spaced lower inserting holes which are corresponded with the upper inserting holes respectively, and the upper inserting holes and the lower inserting holes are staggered in pairs; when the two ends of the horizontal pipe are inserted into the adjacent frame tubes, each of the upper inserting holes coincides with one of the upper frame hole, and each of the lower inserting holes coincides with one of the lower frame hole.

**[0030]** One end of the horizontal pipe is welded on one of the frame pipes.

**[0031]** The trampoline frame also includes multiple supporting frames, each of the supporting frames connects and supports three connected the frame pipes; each of the supporting frames comprises two L-shaped tubes and an inverted T-shaped tube which connects with the two L-shaped tubes; a transverse tube part of the inverted T-shaped tube connects with transverse tube parts of the two L-shaped tubes so as to form a horizontal connecting pipe; a vertical part of the inverted T-shaped tube is fixedly connected with a middle one of three connected said frame pipes, two vertical tube parts of the two L-shaped tubes are connected with two on both sides of three connected said frame pipes.

**[0032]** A vertical tube part of each of the two L-shaped tubes is arranged to bend in the direction towards the centre of the trampoline frame, the horizontal connecting tube is located in a scope of a forward projection of the trampoline frame.

**[0033]** The trampoline frame is square shaped with four curved corners and is arranged in a sequence of one curved frame pipe and one straight frame pipe, and each of the curved frame pipes is connected with adjacent two of the straight frame pipes; each of the supporting frames is connected with one of the curved frame pipes and two of the straight frame pipes at both sides of the curved frame pipe; ends of the two vertical tube parts of the two L-shaped tubes are respectively connected with and support the straight frame pipes at both sides; the vertical tube part of the inverted T-shaped tube is fixedly connected to one of the curved frame pipes.

**[0034]** A connection between each of the two vertical tube part of the two L-shaped tubes and each of the straight frame pipes is located at about 1/3<sup>rd</sup> the length of its respective side of the trampoline frame.

**[0035]** An inner diameter of the transverse tube part of the inverted T-shaped tube is slightly larger than an outer diameter of each of the transverse tube parts of the two L-shaped tubes, or an outer diameter of the transverse tube part of the inverted T-shaped tube is slightly smaller than an inner diameter of each of the transverse tube parts of the two L-shaped tubes, therefore the transverse tube part of the inverted T-shaped tube can relatively slide along each of the transverse tubes part of the two L-shaped tubes.

**[0036]** The two vertical tube parts of the two L-shaped tubes are respectively inserted into the vertical tube parts of adjacent two of the frame connectors.

**[0037]** A strengthen pipe connects with the horizontal pipes of adjacent two of the frame connectors.

**[0038]** A screw extends through the middle one of three connected the frame pipes and is inserted into the vertical tube part of the inverted T-shaped tube so as to fix the inverted T-shaped tube with the middle one of three connected the frame pipes.

**[0039]** The first vertical part of the inverted T-shaped tube is provided with a first inserting hole and a second inserting hole respectively; the screw extends through the middle one of three connected the frame pipes and is inserted into the first inserting hole or the second inserting hole.

**[0040]** Adjacent two of the frame connectors are connected by a supporting frame; the supporting frame includes two curved tubes and a horizontal connecting tube which connects with the two curved tubes; top end of each of the curved tubes is inserted into the adjacent vertical pipe.

**[0041]** The beneficial effects of the invention are as follows: the trampoline frame is enclosed by connecting multiple frame pipes, and the adjacent frame pipes are connected by a frame connector, the frame connector is a T-shaped pipe composed

of a horizontal pipe and a vertical pipe; the outer diameter of the horizontal pipe is slightly smaller than the inner diameter of the frame pipe; the two ends of the horizontal pipe are inserted into the adjacent frame pipes so as to form the trampoline frame; the top and the bottom of the frame pipe are provided with a plurality of upper frame holes and corresponding lower frame holes in pairs, and the upper frame holes and the lower frame holes are staggered in pairs; the top and the bottom of the horizontal pipe are provided with a plurality of upper holes and corresponding lower holes in pairs, and the upper holes and the lower holes are staggered in pairs. When the two ends of the horizontal pipe are inserted into the adjacent frame tube, each of the upper holes coincides with the upper frame hole, and each of the lower holes coincides with the lower frame hole. After the flexible rod of the trampoline is inserted into the upper frame hole and the lower frame hole, and the corresponding upper hole and the lower hole, the adjacent frame pipe can't rotate relatively, and the stability of the trampoline is increased. When people jumps on the trampoline, there is no friction sound caused by the relative rotation of steel pipes, it is a silent trampoline, it is convenient to do the disassemble and assemble, and the size of trampoline can be adjusted flexibly.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0042]** Fig. 1 is a perspective view of the trampoline frame according to the present invention.

**[0043]** Fig. 2 is an exploded view of Fig.1.

**[0044]** Fig. 3 is a perspective view of the frame connector 20 according to the present invention.

**[0045]** Fig. 4 is a combination view of the frame connector 20 and the frame pipe 10 according to the present invention.

**[0046]** Fig. 5 is the other combination view of the frame connector 20 and the frame pipe 10 in another embodiment according to the present invention.

**[0047]** Fig. 6 is a structural diagram of the trampoline frame in another embodiment according to the present invention.

**[0048]** Fig. 7 shows the exploded view of Fig. 6.

## DETAILED DESCRIPTION OF EMBODIMENTS

**[0049]** For the purpose of the invention, the technical scheme and the technical effect are more clearly understood, and the invention will be further described in the following with reference to specific embodiments. It should be understood that the specific embodiments described herein are for illustrative purposes only and are not intended to limit the invention.

**[0050]** Referring to Fig. 1, Fig. 2, Fig. 3 and Fig. 4, a trampoline frame includes multiple frame pipes 10 which are connected in turns, adjacent two of the frame pipes are jointed together by a frame connector 20. The frame connector 20 is a T-shaped pipe composed of a horizontal pipe 21 and a vertical pipe 22. The horizontal pipe 21 and the vertical pipe 22 are integrally formed, or are connected by welding, riveting or screwing. The outer diameter of the horizontal pipe 21 is slightly smaller than the inner diameter of the frame pipe 10. Opposite two ends of the horizontal pipe 21 are inserted into adjacent two of the frame pipes 10 so as to form a closed trampoline frame. When the trampoline frame is assembled and disassembled, it is only necessary to insert both ends of the horizontal pipe 21 into adjacent two of the frame pipes 10 or pull both ends of the horizontal pipe 21 out of adjacent two of the frame pipes 10. The disassembly and assembly are very simple and convenient, and there is no need for additional tools.

**[0051]** Referring to Fig.4, preferably, the top surface of the frame pipe is provided with a plurality of equally spaced upper frame holes 11a, the bottom surface of the frame pipe is provided with a plurality of equally spaced lower frame holes 11b, and the upper frame holes 11a and the lower frame holes 11b are staggered in pairs. This structure facilitates the installation of flexible rods 30. Each of the flexible

rods 30 of the trampoline is inclined relative to the frame pipes 10 and inserted into a pair of staggered upper frame hole 11a and a corresponding lower frame hole 11b respectively. Referring to Fig. 3 and Fig. 4, the top surface of the horizontal pipe 21 is provided with a plurality of equally spaced upper inserting holes 25a, the bottom surface of the horizontal pipe 21 is provided with a plurality of equally spaced lower inserting holes 25b, and the upper inserting holes 25a and the lower inserting holes 25b are staggered in pairs. When two ends of the horizontal pipe 21 are inserted into adjacent two of the frame pipes 10, each of the upper inserting holes 25a coincides with one of the corresponding upper frame hole 11a, and each of the lower inserting holes 25b coincides with one of the corresponding lower frame hole 11b. At the position of the frame connector 20, each of the flexible rods 30 are inclined relative to each of the corresponding frame pipes 10 and inserted into the pairs of staggered upper frame holes 11a and lower frame holes 11b, and simultaneously inserted into pairs of the staggered upper inserting holes 25a and the lower inserting holes 25b coinciding to the pairs of upper frame holes 11a and lower frame holes 11b. This structure fixes the frame connector 20 to the frame pipe 10 to prevent relative rotation between the frame connector 20 and the frame pipe and increases the stability of the trampoline.

**[0052]** Preferably, in one embodiment of the invention, one end of the frame connector 20 is fixedly connected to one of the adjacent frame pipes 10. The connecting method is preferably welded. On one hand, the structure eliminates the rotation of the frame connector 20 relative to the frame pipe 10, thereby resulting the trampoline more stable, avoiding friction sound caused by relative rotation, on the other hand, when the trampoline frame is installed, it is only necessary to insert the other end of the frame connector 20 into the other adjacent frame pipe 10. The installation is simple and convenient.

**[0053]** In one embodiment of the present invention, the trampoline frame is in round shape or approximately circular shape, which means that the trampoline is composed of a plurality of curved frame pipes. The outer diameter of the horizontal

pipe 21 is slightly smaller than the inner diameter of the curved frame pipe. The both ends of the horizontal pipe 21 are inserted into the adjacent curved frame pipes, thereby forming a round or approximately circular shaped trampoline frame.

**[0054]** In one embodiment of the present invention, the trampoline frame is in an approximate square shape or rectangle shape, which means that the trampoline is composed of a plurality of straight frame pipes 10b and four curved frame pipes 10a. The straight frame tube 10b and the curved frame tube 10a have the same inner diameter. The two ends of the horizontal pipe 21 are inserted into the adjacent straight frame pipe 10b and the curved frame pipe 10a, or the two ends of the horizontal pipe 21 are inserted into adjacent two straight frame pipes 10b. The approximate square-shaped trampoline frame, as shown in Fig. 1, comprises four curved frame pipes 10a at the four corners, each side of the trampoline frame has one straight frame pipe 10b. When the trampoline frame is similar to a rectangle shape, the trampoline comprises four curved frame pipes 10a at four corners, one pair of the straight frame pipes 10b are arranged on the two opposite sides of the trampoline frame respectively, at least two pairs of the straight frame pipes 10b are arranged on the other two opposite sides of the trampoline frame. All of the straight frame pipes 10b are of the same specification, thereby to reduce costs and facilitate production, and for easy transportation and assembly. In the trampoline frame, the number of the straight frame pipes 10b can be adjusted according to the actual needs, so as to adjust the size of the trampoline to meet the requirement of different users.

**[0055]** The bottom surface each of the frame pipe 10 is provided with a notch 13 through which the vertical pipe 22 extends, facilitating the installation and disassembly of the frame connector 20.

**[0056]** The trampoline frame also comprises multiple supporting frames 40. Adjacent two of the frame connectors 20 are connected by one of the supporting frames 40. Each of the supporting frames 40 includes two curved tubes 41 and a horizontal connecting tube 42 connected with the two curved tubes 41. The top

ends of the two curved pipes 41 are inserted into adjacent two of the vertical pipes 22 respectively. The horizontal connecting tube 42 is placed on the ground, thereby supporting the trampoline frame on the ground.

**[0057]** Adjacent two of the vertical pipes 22 are fixed and connected by a connecting pipe 26. The connecting pipe 26 provides a function of improving the stability of the connection, thus making the trampoline frame more secure.

**[0058]** Each of the frame pipes 10 is also provided with a supporting rod pipe 15, and a supporting rod 50 is inserted in the supporting rod pipe 15; a reinforcing rib 16 is arranged between each of the frame pipes 10 and the corresponding supporting rod pipe 15, which improves the stability of the connection.

**[0059]** The invention also provides a trampoline with the trampoline frame described above. Since the structure of the trampoline is known to the existing technology and is known to the technical personnel in the field, this application will not repeat it.

**[0060]** Referring to Fig. 5, in the embodiments in the present invention, the frame connector 20 is composed of a horizontal pipe 21' and a vertical pipe 22' which can be arranged away from each other. The vertical pipe 22' is fixed at the bottom of one of the frame pipes 10, the structure of the horizontal pipe 21' is the same as that of the horizontal pipe 21 as described above, and the invention no longer affixes one by one. It should be understood that, using the frame connector of such structure, it is unnecessary to set a notch 13 at the bottom surface of the frame pipe 10 anymore. Such structure of arranging the horizontal pipe 21' and the vertical pipe 22' apart from each other can provide the same effect as that structure, in which the horizontal pipe 21 and the vertical pipe 22 are connected. And for the assembly of the frame pipes 10, and the assembly of the frame pipes 10 with the supporting frames 40, the position of the vertical pipe 22' on each of the frames 10 can be adjusted according to the requirement, thus making the product structure more flexible and making the assembly easier. Preferably, one end of the horizontal pipe 21' is welded fixed on one of the frame pipes 10.

**[0061]** In some embodiments in the present invention, two top ends of the curved pipes 41 of the supporting frame 40 are inserted into adjacent two of the vertical pipes 22'.

**[0062]** In another embodiment in the present invention, the supporting frame 40 can also be designed as the supporting frames 50 as shown in Fig. 6 and Fig. 7. Each of the supporting frames 50 connects and supports three connected the frame pipes 10. Each of the supporting frames 50 comprises two L-shaped tubes 51 and an inverted T-shaped tube 52 which is connected with the two L-shaped tubes 51. A transverse tube part 521 of the inverted T-shaped tube 52 connects with two transverse tube parts 511 of the two L-shaped tubes 51 so as to form a horizontal connecting tube. A vertical tube part 522 of the inverted T-shaped tube 52 is fixedly connected with a middle one of three connected the frame pipes 10, two vertical tube parts 512 of the two L-shaped tubes 51 are respectively connected with and thus support two at both sides of three connected the frame pipes 10.

**[0063]** It should be understood that when the inverted T-shaped tube 52 is connected with the two L-shaped tubes 51, the two L-shaped tubes 51 are roughly mirrored located with the vertical tube part 522 of the inverted T-tube 52 as the center, in order to realize the transverse tube part 521 of the inverted T-shaped tube 52 connected with the transverse tube parts 511 of the two L-shaped tubes 51.

**[0064]** It should be understood that, the trampoline frame can be in round, square or rectangular shape. If the trampoline frame is in round shape, the frame pipes 10 are curved pipes. If the trampoline frame is in square shape, the trampoline frame is arranged in a sequence of one curved frame pipe 10a and one straight frame pipe 10b. If the trampoline frame is in rectangular shape, it is made of four curved frame pipes 10a and at least six straight frame pipes 10b, the four curved frame pipes 10a are distributed at the four corners of the trampoline frame, whilst the straight frame pipes are distributed symmetrically between the curved frame pipes 10a.

**[0065]** Taking a square trampoline frame as an example, the invention is further described as follows.

**[0066]** Referring to Fig. 6 and Fig. 7, the square-shaped trampoline frame disclosed in the invention is composed of four curved frame pipes 10a and four straight frame pipes 10b arranged in a sequence of one curved frame pipe 10a and one straight frame pipe 10b. The supporting frames 50 is evenly arranged below the trampoline frame. The number of the supporting frames 50 is four. Each supporting frames 50 connects with one curved frame pipe 10b and two straight frame pipes 10a which are located on both sides of the curved frame pipe 10b hereof.

**[0067]** The supporting frame 50 comprises two L-shaped tubes 51 and an inverted T-shaped tube 52 which is connected with the two L-shaped tubes 51. The transverse tube part 521 of the inverted T-shaped tube 52 connects with the transverse tube parts 511 of the two L-shaped tubes 51. The vertical tube part 522 of the inverted T-shaped tube 52 is fixedly connected with the curved frame pipe 10b, the vertical pipe parts 512 of the two L-shaped tubes 51 are respectively connected with and support the two straight frame pipes 10b which are located at both sides of the curved frame pipe 10a.

**[0068]** When a person is standing on the bouncing mat or jumping on the bouncing mat, the mat then tilt downwardly pulls the trampoline frame centered on the standing position or jumping position. When the standing position or the jumping position is not at the center of the mat, each of the frame pipes suffers different stress. Especially when the trampoline frame is in square shape, the straight frame pipes and the curved frame pipes suffer uneven forces, which can easily lead to the relative deflection of the adjacent frame pipes and even the distortion of the frame pipes, and the joint between the straight frame pipes and the curved frame pipes can be destroyed. In order to solve the problem, the vertical tube part 512 is arranged to bend in the direction towards the centre of the trampoline, and the vertical tube part 512 is connected with the frame pipe and also support the frame pipe, thus it can push the frame pipe in the direction of away from the center of the trampoline so as to balance the force that the frame pipe

suffers, therefore preventing the relative deflection of the adjacent frame pipes . When the trampoline frame is in square shape, the end of the vertical tube part 512 is connected with and support the straight frame tube 10a, thus pushing the straight frame tube 10a in the direction of away from the center of the trampoline, so that the force that the straight frame tube 10a suffering can be balanced, no relative deflection of the adjacent frame pipes and no distortion will happen. On the other hand, the vertical tube part 522 of the inverted T-shaped tube 52 is fixed connected with the curved frame pipe 10b, so that the curved frame pipe 10b and the inverted T-shaped tube 52 form a whole structure and the structure can prevent the trampoline frame from flipping, thus maintaining the structure of the whole trampoline frame stable, it is not easy to collapse.

**[0069]** In some embodiments in the invention, when the trampoline is in square shape, the connection position between each of the vertical tube parts of the two L-shaped tubes and the straight frame pipe is located at about  $1/3^{\text{rd}}$  a length of its respective side of the trampoline frame, thus making the trampoline more stable and symmetrical.

**[0070]** In some embodiments in the invention, the bottom surface of the straight frame pipe 10a is provided with a first inserting tube 14a and a second inserting tube 14b. The vertical tube parts 512 of the two L-shaped tubes 51 are inserted into the first inserting tube 14a and the second inserting tube 14b respectively. The structure is easy to be installed and operated.

**[0071]** Preferably, the first inserting tube 14a and the second inserting tube 14b are respectively located at both ends of the bottom surface of the straight frame pipe 10a. Preferably, the first inserting tube 14a and the second inserting tube 14b are located close to  $1/3$  and  $2/3$  position of the side of the trampoline frame, respectively, so that the whole trampoline frame is balanced.

**[0072]** One reinforcing tube 15 connects the first inserting tube 14a and the second inserting tube 14b. When the mat pulls the straight frame pipes 10a in the direction to the centre of the trampoline, the reinforcing tube 15 is conducive to

maintaining the straight frame pipe 10a, preventing the straight frame pipe 10a from bending towards the centre of the mat under the action of tension force. Preferably, an auxiliary reinforcement tube 16 is also arranged between the reinforcement tube 15 and the straight frame pipe 10a, which further helps to maintain the straight frame pipe 10a.

**[0073]** Specifically, a screw 525 extends through the curved frame pipe 10b and inserts into the vertical tube part 522, thus fixedly connecting the vertical tube part 522 and the curved frame pipe 10b, which increases the stability of the trampoline frame.

**[0074]** In some embodiments in the invention, the vertical tube part 522 is provided with a first inserting hole 523 and a second inserting hole 524 respectively. The screw 525 extends through the curved frame pipe 10b and inserts into the first inserting hole 523 or the second inserting hole 524, thus fixedly connecting the vertical tube part 522 to the curved frame pipe 10b. On one hand, the first inserting hole 523 and the second inserting hole 524 are provided to facilitate the vertical tube part 522 to be accurately aligned with the screw 525, on the other hand, when one of the inserting holes is worn and can't be matched with the screw 525 anymore, the screw 525 still can be fitted with another inserting holes to prolong the service life of the trampoline frame.

**[0075]** Preferably, the curved frame pipe 10a is provided with a screw hole 9 for the insertion of the screw 525.

**[0076]** It is difficult for the screw 525 to be accurately aligned with the vertical tube part 522 of the inverted T-shaped tube 52 due to the production error, which brings the difficulties for the installation. For solving the problem, the inner diameter of the transverse tube part 521 of the inverted T-shaped tube 52 is arranged to be slightly larger than the outer diameter of the transverse tube part 511 of the two L-shaped tubes 51, or the outer diameter of the transverse tube part 521 of the inverted T-shaped tube 52 is arranged to be slightly smaller than the inner diameter of the transverse tube parts 511 of the two L-shaped tubes 51. Thus, the

transverse tube part 521 of the inverted T-shaped tube 52 can slide along the transverse tube parts 511 of the two L-shaped tubes 51. When the vertical tube parts 512 of the two L-shaped tubes 51 are inserted into the inserting tubes 11a and 11c respectively, the transverse tube part 521 of the inverted T-shaped tube 52 is connected with the transverse tube parts 511 of the two L-shaped tubes 51 and slides along them. The screw 525 extends through the curved frame pipe 10b, so that the screw 525 can be accurately inserted into the vertical tube part 522 of the inverted T-shaped tube 52 to achieve insertion and installation. Such structure is convenient for the installation and disassembly of the supporting frames 50 and the frame pipes 10, and the production precision for the supporting frames 50 and the frame pipes 10 is not high, which is convenient for production and reducing the cost.

**[0077]** Further, at least one pair of matching grooves 12 and convex blocks 12' are provided at the connecting ends 17, 17' of the adjacent frame pipes 10 respectively, the convex block 12' is inserted and accommodated in the groove 12, thus connecting the adjacent two frame pipes 10. When the trampoline frame with this structure is assembled or disassembled, it is only necessary to insert the convex block 12' into the groove 12 or pull it out from the groove 12, which making the assembly and disassembly very simple and convenient, without additional tools and installation techniques required. The cooperation of the groove 12 and the convex block 12' also prevent the adjacent two frame pipes 10 from rotating relatively, thus maintaining the stability of the whole trampoline frame and preventing any deformation.

**[0078]** Preferably, there are more than 2 pairs of the grooves 12, all distributed evenly at the connecting end 17, and there are more than 2 pairs of the convex blocks 12', all distributed evenly at the corresponding connecting end 17'. Such structure equilibrates the force of the frame pipe 10 and further prevents the adjacent frame pipe from rotating relatively, making the structure more stable.

**[0079]** Optionally, the groove 12 and the convex block 12' are spaced-apart

arranged at the connecting end 17 or the corresponding connecting end 17'.

**[0080]** The invention also provides a trampoline with the trampoline frame as described above. As the structure of trampoline is known to the prior art, this application will not be repeated.

**[0081]** It should be understood that although the above description takes a square-shaped trampoline frame as an example, the supporting frames 50 provide the same structure and effect when the trampoline frame is in round shape and rectangular shape.

**[0082]** The above is a further detailed description of the invention in combination with a specific preferred embodiment, and it can't be concluded that the specific implementation of the invention is limited to these instructions. For the general technical personnel in the technical field to which the invention belongs, without being separated from the conception of the invention, the architecture form can be flexible and changeable, and a series of products can be derived. If it is just making a number of simple deductions or substitutes should be regarded as falling within the scope of patent protection determined by the claim submitted by the present invention.

## CLAIMS:

1. A trampoline frame, formed by multiple frame pipes which are connected in turns, wherein each said frame pipe is connected to an adjacent said frame pipe by a frame connector, said frame connector is a T-shaped pipe composed of a horizontal pipe and a vertical pipe; an outer diameter of said horizontal pipe is slightly smaller than an inner diameter of each of said frame pipes; two opposite ends of said horizontal pipe are inserted into said frame pipe and said adjacent frame pipe so as to form a closed trampoline frame; a top surface of each of said frame pipes is provided with a plurality of equally spaced upper frame holes, a bottom surface of each of said frame pipes is provided with a plurality of equally spaced lower frame holes, and said upper frame holes and said lower frame holes are staggered in pairs; a top surface of said horizontal pipe is provided with a plurality of equally spaced upper inserting holes, a bottom surface of said horizontal pipe is provided with a plurality of equally spaced lower inserting holes, and said upper inserting holes and said lower inserting holes are staggered in pairs; when said two opposite ends of said horizontal pipe are inserted into said frame pipe and said adjacent frame pipe, said upper inserting holes correspond with said upper frame holes, and said lower inserting holes correspond with said lower frame holes;

flexible rods are inclined relative to said frame pipes and inserted into said upper frame holes and said lower frame holes which are staggered in pairs, and inserted into said upper inserting holes and said lower inserting holes which are staggered in pairs and correspond with said upper frame holes and said lower frame holes respectively so that said frame connector is fixed to said frame pipe to prevent a relative rotation between said frame connector and said frame pipe.

2. The trampoline frame according to claim 1, wherein one end of said frame connector is fixed to said frame pipe or said adjacent frame pipe.

3. The trampoline frame according to claim 1, wherein said vertical pipe is fixedly connected to an adjacent said vertical pipe by a connecting pipe.

4. The trampoline frame according to claim 1, wherein said horizontal pipe and said vertical pipe are integrally formed, or are connected by welding, riveting or screwing method.

5. The trampoline frame according to claim 1, wherein said trampoline frame is in round shape or approximately circular shape, and each of the multiple frame pipes is curved.

6. The trampoline frame according to claim 1, wherein said trampoline frame is approximately in square shape or rectangle shape, and the multiple frame pipes comprise a plurality of straight frame pipes and four curved frame pipes.

7. The trampoline frame according to any one of claims 1-6, wherein said bottom surface of each of said frame pipes is provided with a notch through which said vertical pipe extends.

8. The trampoline frame according to any one of claims 1-6, wherein adjacent two of said frame connectors are connected by a supporting frame; said supporting frame includes two curved tubes and a horizontal connecting tube connected with said two curved tubes; top ends of said two curved tubes are inserted into said vertical pipes of the adjacent two of said frame connectors.

9. The trampoline frame according to any one of claims 1-6, wherein each of

said frame pipes is also provided with a supporting rod pipe, and a supporting rod is inserted in said supporting rod pipe; and a reinforcing rib is arranged between one of said frame pipes and said supporting rod pipe.

10. The trampoline frame according to any one of claims 1-6, wherein said trampoline frame also includes multiple supporting frames, each of said supporting frames connects and supports three connected said frame pipes, each of said supporting frames comprises two L-shaped tubes and an inverted T-shaped tube connecting with said two L-shaped tubes respectively; a transverse tube part of said inverted T-shaped tube connects with transverse tube parts of said two L-shaped tubes so as to form a horizontal connecting tube; a vertical tube part of said inverted T-shaped tube is fixedly connected with a middle one of the three connected said frame pipes, two vertical tube parts of said two L-shaped tubes are respectively connected with two of the frame pipes on both sides of the three connected said frame pipes.

11. The trampoline frame according to claim 10, wherein a vertical tube part of each of said two L-shaped tubes is arranged to bend towards a centre of said trampoline frame, said horizontal connecting tube is located in a scope of a forward projection of said trampoline frame.

12. The trampoline frame according to claim 10, wherein said trampoline frame has curved frame pipes and straight frame pipes; said trampoline frame is square shaped with four curved corner and is arranged in a sequence of one of the curved frame pipes and one of the straight frame pipes, and each of said curved frame pipes is connected with adjacent two of said straight frame pipes; each of said supporting frames is connected with one of said curved frame pipes and two of said

straight frame pipes at both sides of said curved frame pipe; ends of said two vertical tube parts of said two L-shaped tubes are respectively connected with and support said straight frame pipes at both sides of said curved frame pipe; said vertical tube part of said inverted T-shaped tube is fixedly connected to one of said curved frame pipes.

13. The trampoline frame according to claim 12, wherein a connection between each of said two vertical tube parts of said two L-shaped tubes and each of said straight frame pipes is located at about  $1/3^{\text{rd}}$  a length of each side of said trampoline frame.

14. The trampoline frame according to claim 10, wherein an inner diameter of said transverse tube part of said inverted T-shaped tube is slightly larger than an outer diameter of each of said transverse tubes of said two L-shaped tubes, or an outer diameter of said transverse tube part of said inverted T-shaped tube is slightly smaller than an inner diameter of each of said transverse tube parts of said two L-shaped tubes, such that said transverse tube part of said inverted T-shaped tube slides along each of said transverse tube parts of said two L-shaped tubes.

15. The trampoline frame according to claim 10, wherein said two vertical tube parts of said two L-shaped tubes are respectively inserted into said vertical pipes of the adjacent two of said frame connectors.

16. The trampoline frame according to claim 10, wherein a screw extends through said middle one of the three connected said frame pipes and is inserted into said vertical tube part of said inverted T-shaped tube so as to fix said inverted T-shaped tube to said middle one of the three connected said frame pipes.

17. The trampoline frame according to claim 16, wherein said vertical tube part of said inverted T-shaped tube is provided with a first inserting hole and a second inserting hole respectively; said screw extends through said middle one of the three connected said frame pipes and is inserted into said first inserting hole or said second inserting hole.

18. A trampoline, comprising the trampoline frame as defined in any one of claims 1-17.

19. A trampoline frame formed by multiple frame pipes which are connected in turns, wherein each said frame pipe is connected to an adjacent said frame pipe by a frame connector, said frame connector comprises a horizontal pipe and a vertical pipe which is arranged away from said horizontal pipe; an outer diameter of said horizontal pipe is slightly smaller than an inner diameter of each of said frame pipes; said horizontal pipe has two opposite ends inserted into said frame pipe and said adjacent frame pipe so as to form a closed trampoline frame, said vertical pipe is fixedly arranged underneath a bottom of said frame pipes; a top surface and a bottom surface of each of said frame pipes are evenly spaced apart and provided with a plurality of upper frame holes and a plurality of corresponded lower frame holes respectively, said upper frame holes and said lower frame holes are staggered in pairs; a top surface and a bottom surface of said horizontal pipe are evenly spaced apart and provided with a plurality of upper inserting holes and lower inserting holes respectively, said upper inserting holes and said lower inserting holes are staggered in pairs; when said opposite two ends of said horizontal pipe are inserted into said adjacent two of said frame pipes, said upper inserting holes correspond with said

corresponding upper frame holes, and said lower inserting holes correspond with said lower frame holes;

flexible rods are inclined relative to said frame pipes and inserted into said upper frame holes and said lower frame holes which are staggered in pairs, and inserted into said upper inserting holes and said lower inserting holes which are staggered in pairs and correspond with said upper frame holes and said lower frame holes respectively so that said frame connector is fixed to said frame pipe to prevent a relative rotation between said frame connector and said frame pipe.

20. The trampoline frame according to claim 19, wherein one end of said horizontal pipe is welded to one of said frame pipes.

21. The trampoline frame according to claim 19, wherein said trampoline frame also includes multiple supporting frames, each of said supporting frames connects and supports three connected said frame pipes, each of said supporting frames comprises two L-shaped tubes and an inverted T-shaped tube which connects with said two L-shaped tubes; a transverse tube part of said inverted T-shaped tube connects with transverse tube parts of said two L-shaped tubes so as to form a horizontal connecting tube; a vertical tube part of said inverted T-shaped tube is fixedly connected with a middle one of the three connected said frame pipes, two vertical tube parts of said two L-shaped tubes are respectively connected with two of the frame pipes on both sides of the three connected said frame pipes.

22. The trampoline frame according to claim 21, wherein a vertical part of each of said two L-shaped tubes is arranged to bend in the direction towards a centre of said trampoline frame, said horizontal connecting tube is located in a scope of a forward projection of said trampoline frame.

23. The trampoline frame according to claim 21, wherein said trampoline frame is square shaped with four curved corner and is arranged in a sequence of one curved frame pipe and one straight frame pipe and each said curved frame pipes is connected with adjacent two of said straight frame pipes; each of said supporting frames is connected with one of said curved frame pipes and two of said straight frame pipes at both sides of said curved frame pipe; ends of said two vertical tube parts of said two L-shaped tubes are respectively connected with and support said straight frame pipes at both sides of said curved frame pipe; said vertical tube part of said inverted T-shaped tube is fixedly connected to one of said curved frame pipes.

24. The trampoline frame according to claim 23, wherein a connection between each of said two vertical tube part of said two L-shaped tube and each of said straight frame pipes is located at about  $1/3^{\text{rd}}$  a length of a respective side of said trampoline frame.

25. The trampoline frame according to claim 21, wherein an inner diameter of said transverse tube part of said inverted T-shaped tube is slightly larger than an outer diameter of each of transverse tube parts of said two L-shaped tubes, or an outer diameter of said transverse tube part of said inverted T-shaped tube is slightly smaller than an inner diameter of each of said transverse tube parts of said two L-shaped tubes, such that said transverse tube part of said inverted T-shaped tube relatively slides along each of said transverse tube parts of said two L-shaped tubes.

26. The trampoline frame according to any one of claims 21-25, wherein said two vertical tube parts of said two L-shaped tubes are respectively inserted into said vertical pipes of adjacent two of said frame connectors.

27. The trampoline frame according to claim 26, wherein a strengthening pipe

is arranged to connect with said horizontal pipes of the adjacent two of said frame connectors.

28. The trampoline frame according to claim 26, wherein a screw is arranged to extend through said middle one of the three connected said frame pipes and is inserted into said vertical tube part of said inverted T-shaped tube so as to fix said inverted T-shaped tube with said middle one of the three connected said frame pipes.

29. The trampoline frame according to claim 28, wherein said vertical tube part of said inverted T-shaped tube is provided with a first inserting hole and a second inserting hole respectively; said screw extends through said middle one of the three connected said frame pipes and is inserted into said first inserting hole or said second inserting hole.

30. The trampoline frame according to claim 19, wherein adjacent two of said frame connectors are connected by a supporting frame; said supporting frame includes two curved tubes and a horizontal connecting tube which connects with said two curved tubes; a top end of each of said two curved tubes is inserted into said vertical pipe.

31. A trampoline comprising the trampoline frame of claim 19 or claim 20.

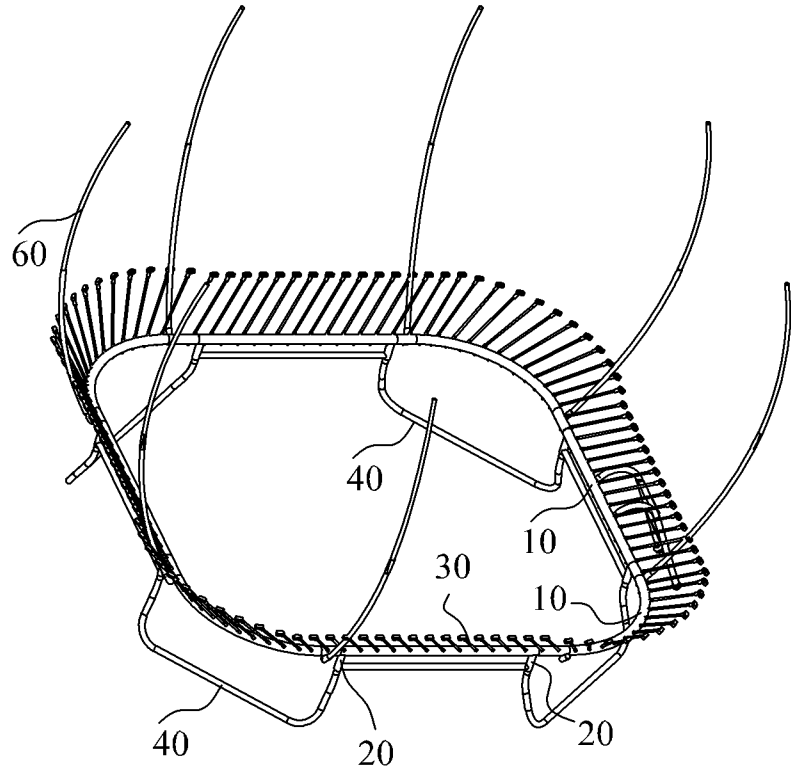


Fig. 1

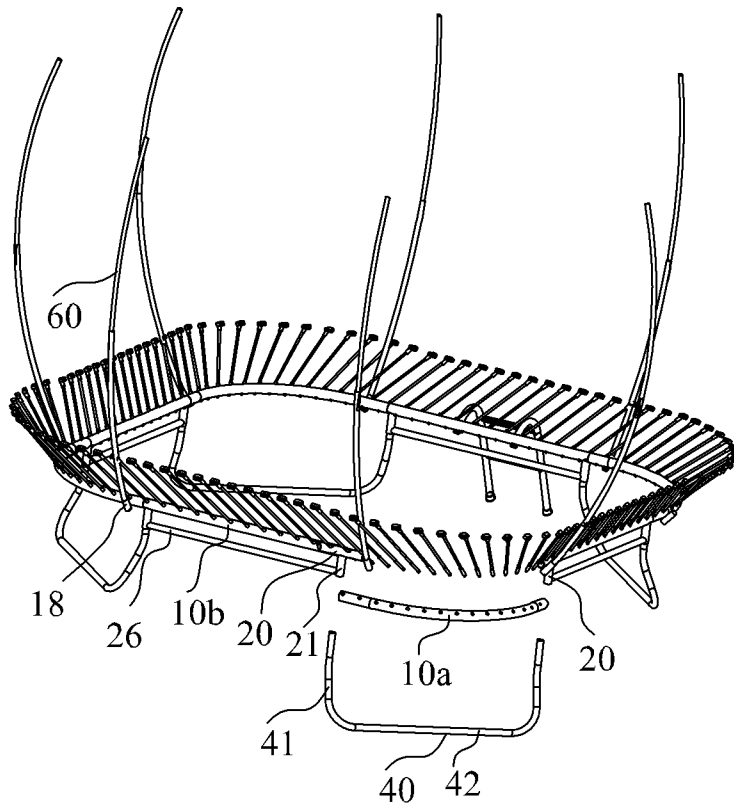


Fig. 2

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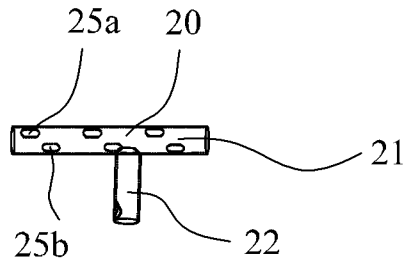


Fig. 3

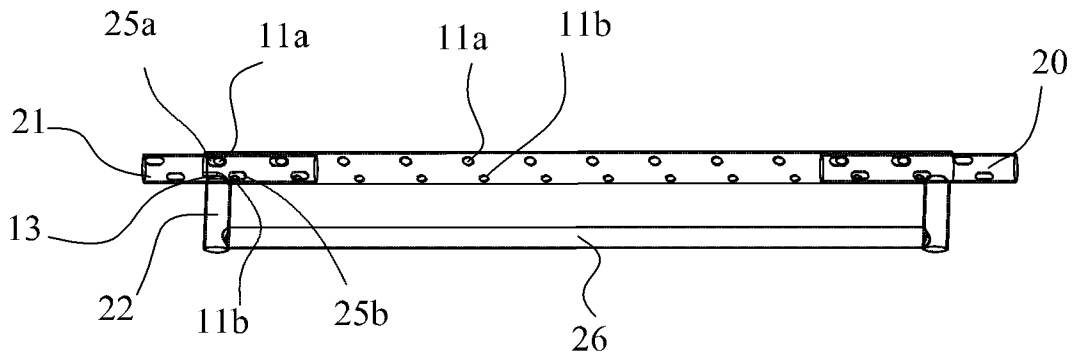


Fig. 4

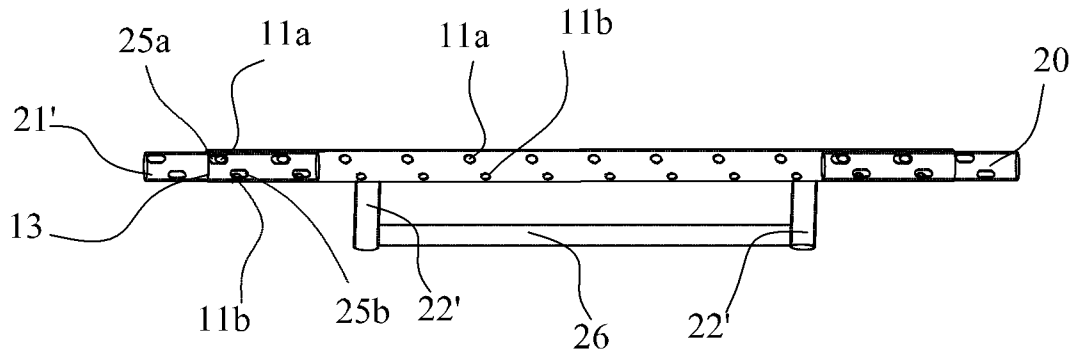


Fig. 5

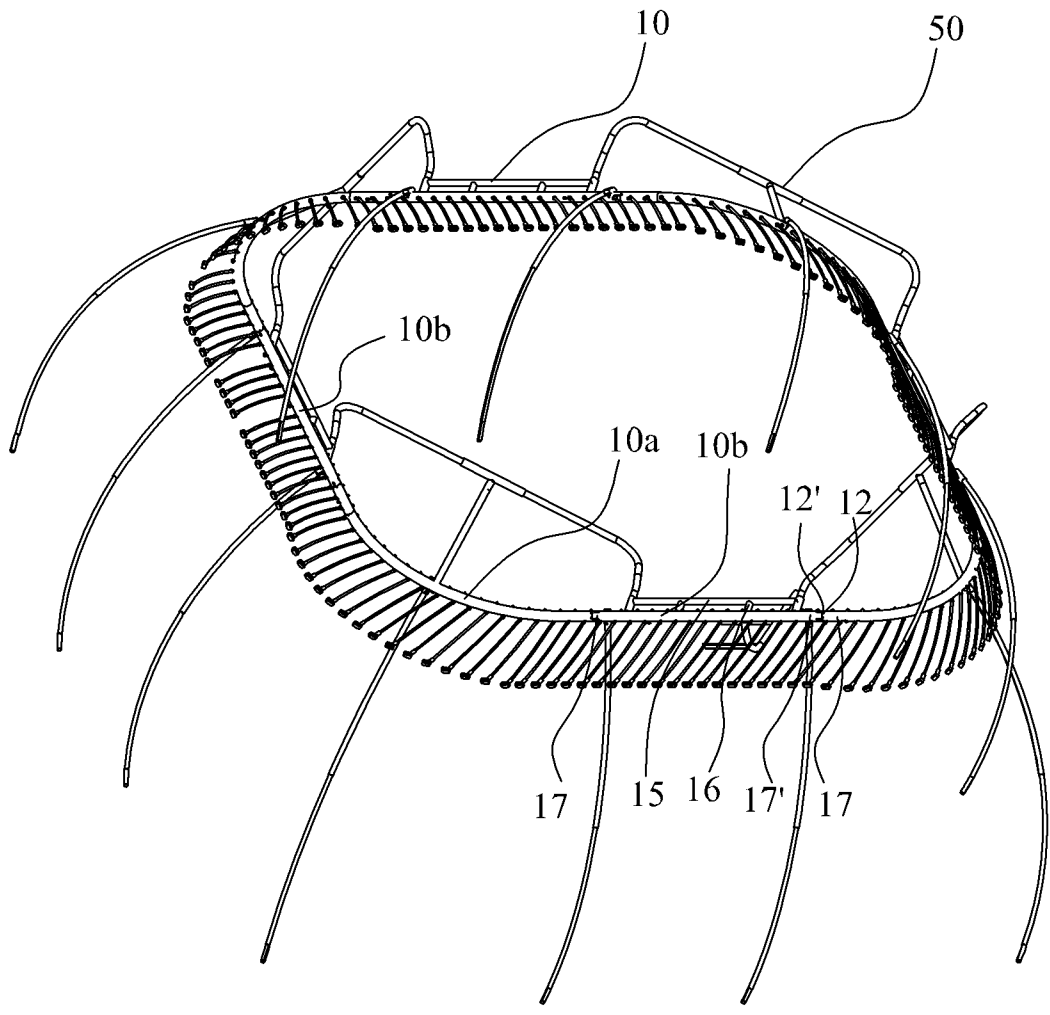


Fig. 6

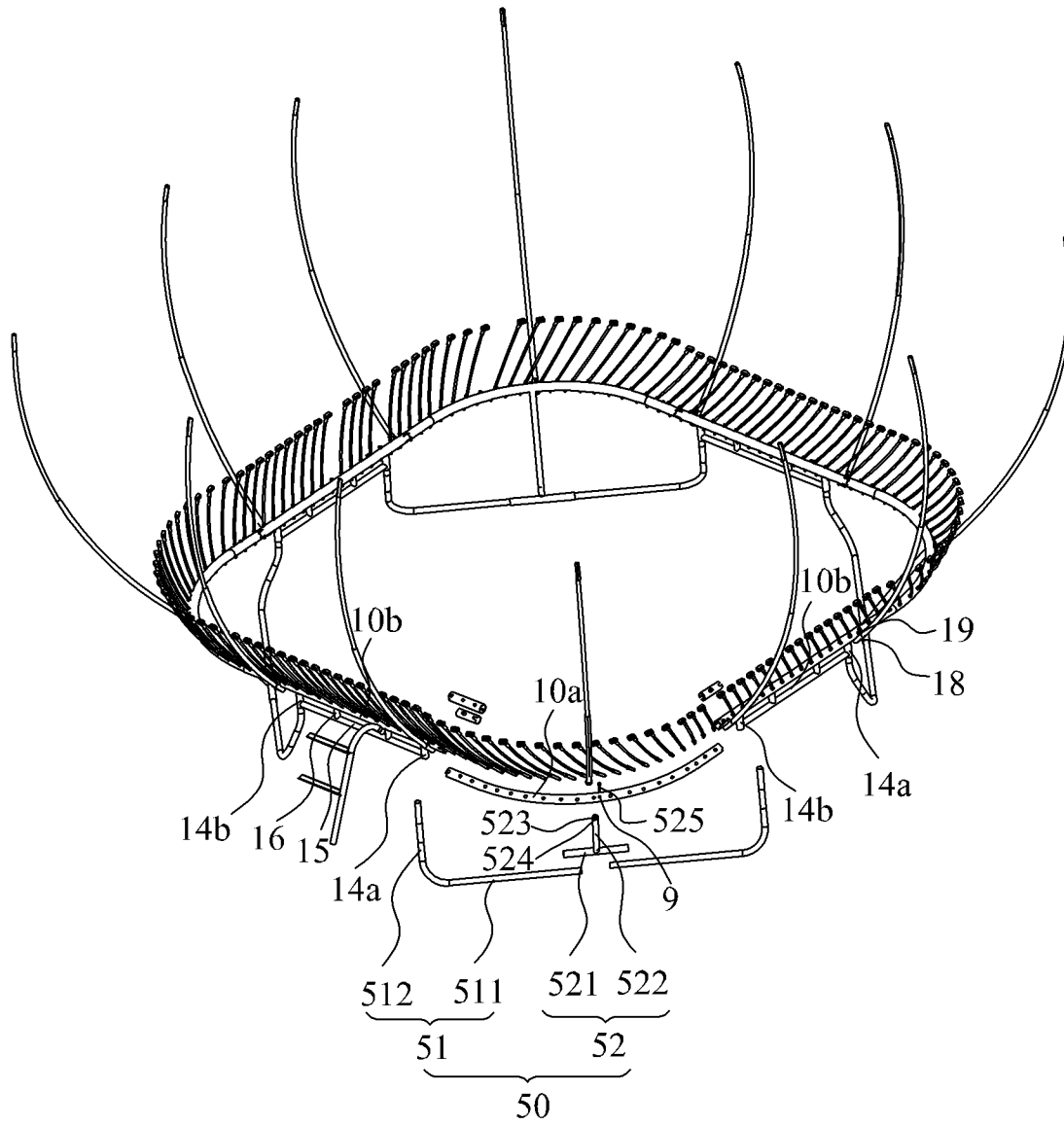


Fig. 7

