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(71) Applicants:
- **Bianchi, Alberto**
  58014 Manciano (GR) (IT)
- **Tosi, Iuri**
  58014 Manciano (GR) (IT)
- **Becuzzi, Federico**
  57016 Rosignano Marittimo (LI) (IT)

(72) Inventors:
- **Bianchi, Alberto**
  58014 Manciano (GR) (IT)
- **Tosi, Iuri**
  58014 Manciano (GR) (IT)
- **Becuzzi, Federico**
  57016 Rosignano Marittimo (LI) (IT)

(74) Representative: **Fanfani, Stefano**
Fanfani S.R.L.
Via Giovanni Bovio 19
50136 Firenze (IT)

(54) BAGGING DEVICE FOR CONSTRUCTION

(57) A manual bagging device for filling bags used in building yards, comprising a flared hopper (1) which co-operates with a bag-holder ring (2) to hold a bag and to make the loose material bagging operations easier.

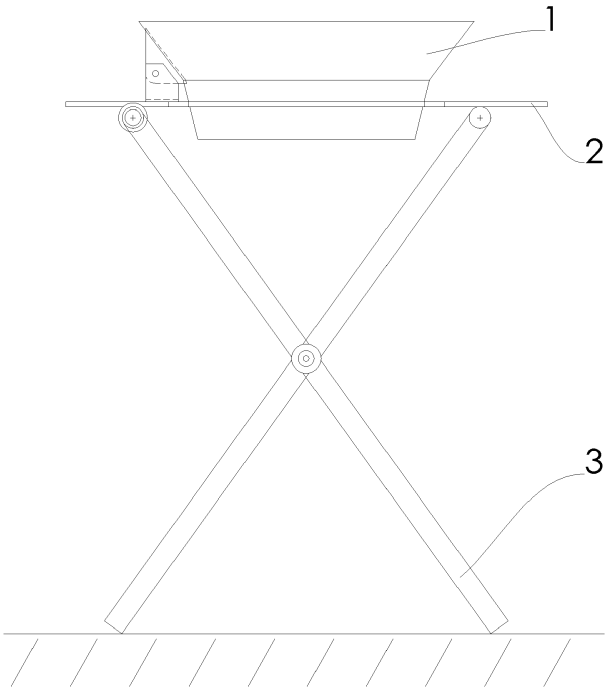

FIG. 3

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Description

Technical field

[0001] The present invention belongs to the sector of the civil works industry and specifically to the sector of tools used in building yards.

[0002] In particular, the present patent application relates to a device aiming at facilitating bagging of rubble, masonry debris, and other loose material, in specially provided bags.

[0003] More specifically, the present invention relates to a device that is easy to transport and little bulky, and enables one operator to bag loose materials.

Present status of the art

[0004] In the civil works sector a problem is felt of disposing rubble and debris that form while restoring buildings as well as of limiting emissions of powders or other pollutants.

[0005] A particularly felt problem is that of removing masonry debris from sites that cannot be easily reached by motorized means. A number of solutions have been developed for this purpose, one of which specifies the use of containers for manually transporting debris, without being obliged to use pails or mason's buckets; in one known and appreciated solution, specifically provided bags made from a strong plastic, or sacks, are used, to be filled with debris and rubble, and sufficiently strong to accommodate and handle them manually.

[0006] A limit to the use of these containers consists in that it is practically impossible for an operator to fill the bags alone, whereas it is necessary that a first operator uses a shovel or a similar tool to lift and handle the material, while a second operator holds the mouth of the bag open.

[0007] In order to avoid the costs of a second operator, a bagging device was developed, comprised of a big pipe having a flared upper end, so as to form a hopper shaped like a kind of big funnel.

[0008] The lower part of this device is shaped like a cylindrical surface which is inserted inside the bag, whereas the upper hopper is shaped like a lateral surface of a truncated cone, whose lower perimeter coincides with the upper perimeter of the cylindrical surface. Thanks to the considerable thickness of the plastic film the bags are made from, the latter are rather stiff so that, once wound about the pipe, they tend to adhere thereto, without sagging down to the floor; in this way, the bag remains open without requiring a second operator to intervene.

[0009] The mouth being flared upwards facilitates dumping of debris, an operation which ends when the cylindrical part underneath is full; at this point, the operator lifts the device from the floor and extracts it from the bag and the debris remain within the latter.

[0010] However, in many cases, lifting the just described device results to be an operation difficult to perform; especially when the debris comprise sharp edged pieces, it might easily occur that the latter get stuck with the inner surface of the device, thus rendering upward slipping difficult. Conversely, in the case of a very loose or powdery material, the hydrostatic pressure exerted by the latter against the inner walls of the pipe is such as to develop a high friction which, once again, makes extraction difficult.

[0011] It is also worth pointing out that the just described device is rather bulky and uncomfortable to transport because of its dimensions which are greater than those of a full bag, consequently the latter is usually made from a plastic material in order to reduce the weight of the device; this choice in terms of material is in fact an obliged one because, if the device were constructed from a heavier material, it would be even more difficult to extract after filling the bag; however, a plastic surface is easily vulnerable to sharp edged debris and easily subjected to breakages in the case of shocks or even light crushings.

[0012] Also, the known bagging device does not guarantee a complete filling of a bag and, in the case of a little bit lighter bags, it might occur that these sag to the floor, because the device does not include any retention means to keep the bag in an upright position; it is not possible either to use bags that adhere to the outer surface of the device too much, otherwise taking the latter out would be even more difficult.

[0013] Patent application US 2012/0001035 A1 discloses a support structure equipped with a plurality of clamps to put the opening of a bag below a hopper rotationally connected to a support structure.

Objects and summary of the invention

[0014] A first object of the present invention is thus to provide a device that enables one operator to bag debris bags and does not present the above-described problems concerning bag extraction upon completion of filling.

[0015] A further object of the device according to the present patent application is to provide a device that is light and little bulky during transportation, but simultaneously strong and capable of withstanding building yard environments.

[0016] Another object of the device according to the present patent application is to provide a bagging device that prevents the risk of an empty or not completely filled yet bag from sagging to the floor.

[0017] Others objects and advantages of the present invention will be apparent to those skilled in the art upon reading the following text.

[0018] The above-described objects are achieved by a device comprising a flared hopper, whose outer surface engages a bag-holder ring below; the latter is in turn supported by an external support structure.

[0019] The debris bag to be filled is put by the operator inside the bag-holder ring, by making the upper end of

the bag come out from the latter so as to receive the lower end of the flared hopper internally thereto.

[0020] In this way, the upper part of the bag is constrained between the bag-holder ring, which externally surrounds it, and the outer surface of the flared hopper. The latter and the inner surface of the bag-holder ring shall consequently feature shapes that allow to engage the flared hopper in the bag-holder ring; numerous and different shapes are possible in compliance with one and the same inventive principle. Good results have been achieved by a hopper shaped like a truncated pyramid which engages a ring that defines an inner square surface; other very practical and functional shapes are, conversely, axisymmetric shapes, for instance in a truncated-cone shaped hopper that engages a ring whose inner perimeter is circular. In a closed operating position, the flared hopper presents a conical outer surface which engages the bag-holder ring about a vertical axis, so as to secure the bag between their respective surfaces. Thanks to the shape of the surfaces engaged and to the flared hopper being coaxial with the bag-holder ring, if any, the bag is not only held open, but also supported, consequently it is prevented from closing back or sagging down to the floor.

[0021] Once filling is over, the hopper is released and the just filled bag, whose lower end lays on the floor, can be closed; finally, the operator lifts the complete device according to the present patent application and the full bag stays on the floor, ready for being handled.

[0022] Very advantageously is the flared hopper rotationally associated with the bag-holder ring about a horizontal axis of rotation, so that the operator can engage and disengage it in/from the ring by simply making it rotate and by using one hand.

[0023] Advantageously the bag-holder ring can include lightening holes which facilitate device lifting and transportation. According to a particularly comfortable and practical solution, the external support structure is foldable from an open operating position to a closed transportation position and vice versa.

[0024] Advantageously the bag-holder ring can also be rotationally associated with the support structure about a horizontal axis of rotation. In this way, the device can be completely folded to its closed transportation position whenever it is not set to the operating position, in order to save space and make it possible to displace it more easily.

[0025] The upper portion of the flared hopper can assume a variety of shapes which generally facilitate putting materials inside the bag, by thus originating a funnel. In one first embodiment, the flared hopper has one slope only.

[0026] In an embodiment of the flared hopper which is particularly effective and easy to use, the hopper is implemented like a preferably axisymmetric surface formed of two or more truncated-cone- or truncated-pyramid-shaped surfaces, each surface featuring an upper perimeter that coincides with the lower perimeter of the overlooking surface.

[0027] In a particularly comfortable version of the invention, the support ring comprises at least two handles to facilitate device lifting and removal after filling a bag; in a particularly functional arrangement of the handles, the latter are arranged in such a way as to be diametrically opposed about a diameter orthogonal to the horizontal axis of rotation of the support ring so that, whenever the latter is folded, the handle close to the axis of rotation can be used to easily transport the device in its closed position.

[0028] In a particularly complete version of the invention especially useful for use on irregular floors, said external support structure comprises adjustment means, such as for instance adjustable feet or telescopic legs, to provide for a correct positioning of the bag-holder ring.

[0029] A variety of materials can be used for manufacturing the device, even in combination with each other; good results were obtained both with metal and plastic materials.

Brief description of the drawings

[0030]

Figure 1 and **figure 2** show a top view and a side view of a flared hopper (1) respectively.

Figure 3 shows a side view of an embodiment of the device, the external support structure (2) being in an open operating position and the flared hopper (1) being in a closed operating position.

Figure 4 shows a side view of the device depicted in the previous figure, the flared hopper (1) being in an open loading position, being rotated upwards to make it possible to position a bag inside the bag-holder ring (2). Advantageously, in the here illustrated solution, the flared hopper (1) is in a stable equilibrium position at end of stroke, because its outer surface gets in contact with the bag-holder ring (2) beyond the vertical plane, i.e. the angle determined by these elements at end of stroke is greater than a right angle. At the same time, the flared hopper (1) is easily closable onto the bag-holder ring (2) because the angle of rotation is less than one straight angle.

Figure 5 shows a side view of the device depicted in the previous figures, both the flared hopper (1) and the bag-holder ring (2) being rotated upwards.

Figure 6 shows a top view of a bag-holder ring (2), complete with lifting handles (21) and a seat (22) for receiving a wing screw. The horizontal axis of rotation (X) of the bag-holder ring (2) with respect to the external support structure (3) is also visible.

Figure 7 shows a perspective view of an embodiment of the device, the external support structure (3) being in an open operating position and the flared hopper (1) being in a closed operating position. The perspective view makes it possible to look at the ex-

ternal support structure (3), of a foldable type, which comprises two "U"-shaped legs open downwards, i. e. having their ends laying on the floor. The legs are rotationally connected to each other about a horizontal axis, so as to shift from a closed transportation position, wherein they are practically superimposed, to an open operating position, wherein they define two "X". Let's note that the external support structure (3) does not occupy the space below the opening of the bag-holder ring (2), a space which will be subtended by a bag laid on the floor. It is here pointed out that, in the here illustrated embodiment, the end of the bag-holder ring (2) not rotationally associated with said external support structure (3) is reversibly secured to the latter by way of engaging means which, in one preferred embodiment, comprise a wing screw (4) which crosses said seat (22).

Figures 8 thru **14** show a sequence according to which the external support structure (3) of the illustrated embodiment shift from an open operating position to a closed transportation position, the lifting handle (21) of the bag-holder ring (2) being in a position useful for handling the device.

Figure 15 shows a perspective view of one embodiment of the device, wherein the flared hopper (1) is a truncated-pyramid-shaped one and is provided with end-of-stroke means, comprising cylindrical pieces (31) integrally connected to either "U"-shaped leg, comprised of a pipe having a square cross-section, so as to prevent a further reciprocal rotation of the legs upon opening, after reaching the operating position.

Figure 16 shows one embodiment of the engagement means that secure the bag-holder ring (2) to the external support structure (3), which comprises a clamp shaped like a "J" (23) integral with the bag-holder ring (2).

Figure 17 shows a top view of the truncated-pyramid-shaped flared hopper (1).

Figure 18 and **Figure 19** show two perspective views, from different angles, of a device comprising legs having a circular cross-section and a flared hopper (1) comprised of two superimposed surfaces or one one-slope surface respectively.

Figure 20 and **figure 21** show two perspective views, from different angles, of the device wherein the flared hopper (1) is comprised of one truncated-cone axisymmetric surface.

Detailed description of one embodiment of the invention

[0031] In the particularly complete embodiment that is shown in figures 1 thru 14 attached to the present patent application, the device according to the present invention comprises:

- an external support structure (3), foldable from a closed transportation position to an open operating position and vice versa;
- a horizontal bag-holder ring (2), rotationally associated with said external support structure (3) about a horizontal axis of rotation (X) and movable from a horizontal operating position to a vertical transportation position and vice versa; two lifting handles (21) aligned to each other about a diametral axis orthogonal to said horizontal axis of rotation (X) being integrally connected to the outer perimeter of the bag-holder ring;
- a flared hopper (1), comprised of two axially superimposed truncated-cone axisymmetric surfaces, each of which features an upper perimeter that coincides with the lower perimeter of the overlooking surface; the lower truncated-cone surface being suitable for engaging the inner edge of said bag-holder ring (2). Said flared hopper (1) is rotationally associated with said bag-holder ring (2) about an axis that lays in a plane parallel to the horizontal plane defined by the bag-holder ring (2), so as to be movable form a horizontal, closed operating position, wherein the flared hopper (1) is coaxial to the bag-holder ring and coaxially engages the inner edge of the latter, to an open bag loading position and vice versa. In the closed operating position, the surfaces of the flared hopper (1) and of the bag-holder ring (2) co-operate to hold a bag.

[0032] The device according to the present patent application allows a simple and comfortable bagging of loose building materials according to the following operating steps:

(a) the hopper being set to an open bag loading position, arranging a bag inside the bag-holder ring (2) so that the lower end of the bag lays on the floor and the upper end of the bag comes out from the bag-holder ring (2) ;
(b) rotating the flared hopper (1) up to the closed operating position, so as to engage it inside the upper end of the bag so that the latter is constrained between the inner perimeter of the bag-holder ring (2) and the outer lateral surface of the flared hopper (1) ;
(c) dropping the loose materials into the flared hopper (1) ;
(d) rotating the flared hopper (1) to the open bag loading position so as to disengage it from the bag-holder ring (2) and to release the upper end of the bag;
(e) lifting the device;
(f) handling the full bag.

[0033] Should the external support structure (3) be foldable, it is preliminarily brought to an open operating position before arranging the bag, so as to set the bag-holder ring (2) to a substantially horizontal position, by rotating it, if necessary, should it be rotationally associ-

ated with the external support structure (3) about a horizontal axis of rotation (X).

Claims

1. A device for supporting a bag and making it easier to bag loose materials **characterized in that** it comprises a flared hopper (1) whose lower portion includes an outer surface suitable for engaging the inner edge of a horizontal bag-holder ring (2) borne by an support external structure (3), said flared hopper (1) being rotationally associated with said bag-holder ring (2), about an axis that lays in a plane parallel to the plane defined by said bag-holder ring (2), so as to reversibly rotate from an open bag loading position up to a closed operating position wherein said flared hopper (1) coaxially engages said inner edge of the bag-holder ring (2) and holds a bag.

2. The device according to claim 1 **characterized in that** said outer surface is shaped as a truncated-cone axisymmetric surface.

3. The device according to claim 1 **characterized in that** said outer surface is shaped as a truncated-pyramid surface.

4. The device according to any of the previous claims **characterized in that** the angle of rotation of the flared hopper (1) between said closed operating position and said open bag-loading position is greater than a right angle and smaller than a straight angle.

5. The device according to any of the previous claims **characterized in that** said bag-holder ring (2) is rotationally associated with said external support structure (3) about a horizontal axis of rotation (X).

6. The device according to claim 5 **characterized in that** said external support structure (3) is foldable between an open operating position and a closed transport position.

7. The device according to any of the previous claims **characterized in that** said bag-holder ring (2) comprises at least two transport handles (21) which are aligned about a diametral axis orthogonal to said horizontal axis of rotation (X).

8. The device according to any of the previous claims **characterized in that** said outer surface comprises two or more axially superimposed surfaces, each surface featuring an upper perimeter that coincides with the lower perimeter of the overlooking surface.

9. The device according to claim 6 or according to any of the previous claims depending thereon **characterized in that** said external support structure (3), in the open operating position, is arranged externally to the space below the opening of said bag-holder ring (2).

10. The device according to any of the previous claims **characterized in that** said external support structure (3) comprises two "U"-shaped legs open downwards, having a square section, rotationally connected to each other about an axis parallel to said horizontal axis (X).

11. The device according to claim 6 or according to any of the previous claims depending thereon **characterized in that** said external support structure (3) comprises end-of-stroke means which prevent them from opening beyond said open operating position.

12. The device according to the previous claim whenever it depends on claim 12 **characterized in that** said end-of-stroke means comprise at least one piece (31) projecting from one of said "U"-shaped legs towards the other leg, thus preventing the latter from rotating beyond said open operating position.

13. The device according to any of the previous claims **characterized in that** it comprises engaging means which reversibly secure the end of the bag-holder ring (2) which is not rotationally associated with said external support structure (3) to the external support structure (3) itself.

14. The device according to claim 15 **characterized in that** said engaging means comprise a clamp shaped like a "J" (23) integral with said bag-holder ring (2).

15. A method for bagging a loose material by way of the device according to claim 1 hereabove **characterized in that** it comprises the following operating steps:

    (a) the hopper being set to an open bag loading position, arranging a bag inside the bag-holder ring (2) so that the lower end of the bag lays on the floor and the upper end of the bag comes out from the bag-holder ring (2);
    (b) rotating the flared hopper (1) up to the closed operating position, so as to engage it inside the upper end of the bag so that the latter is constrained between the inner perimeter of the bag-holder ring (2) and the outer lateral surface of the flared hopper (1) ;
    (c) dropping the loose materials into the flared hopper (1) ;
    (d) rotating the flared hopper (1) to the open bag loading position so as to disengage it from the bag-holder ring (2) and to release the upper end of the bag;

(e) lifting the device;
(f) handling the full bag.

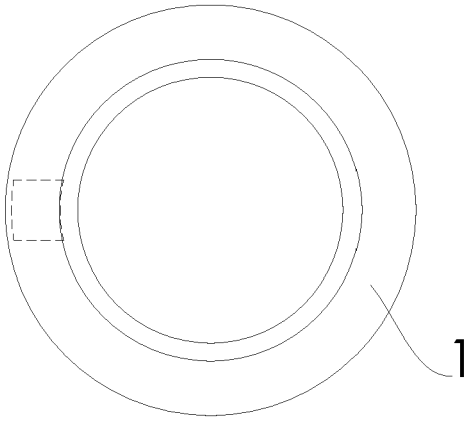

FIG. 1

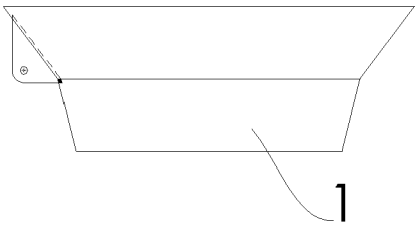

FIG. 2

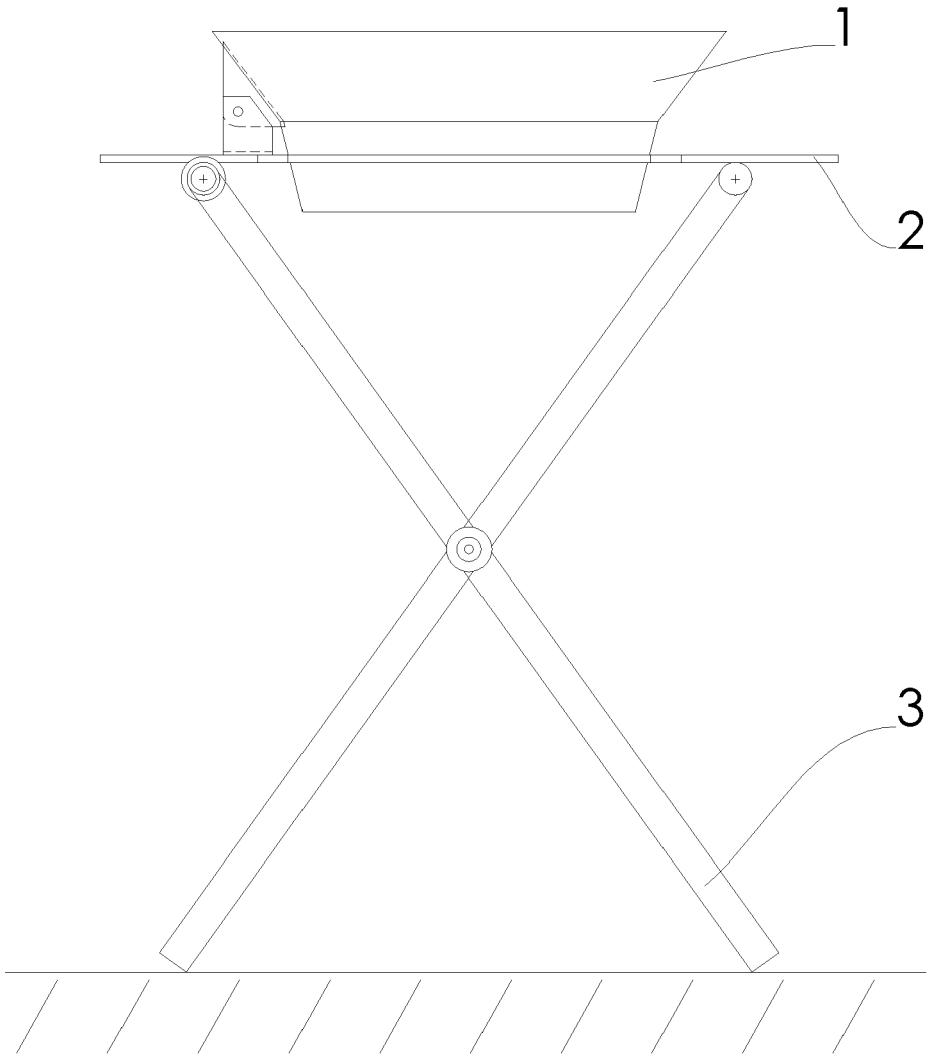

FIG. 3

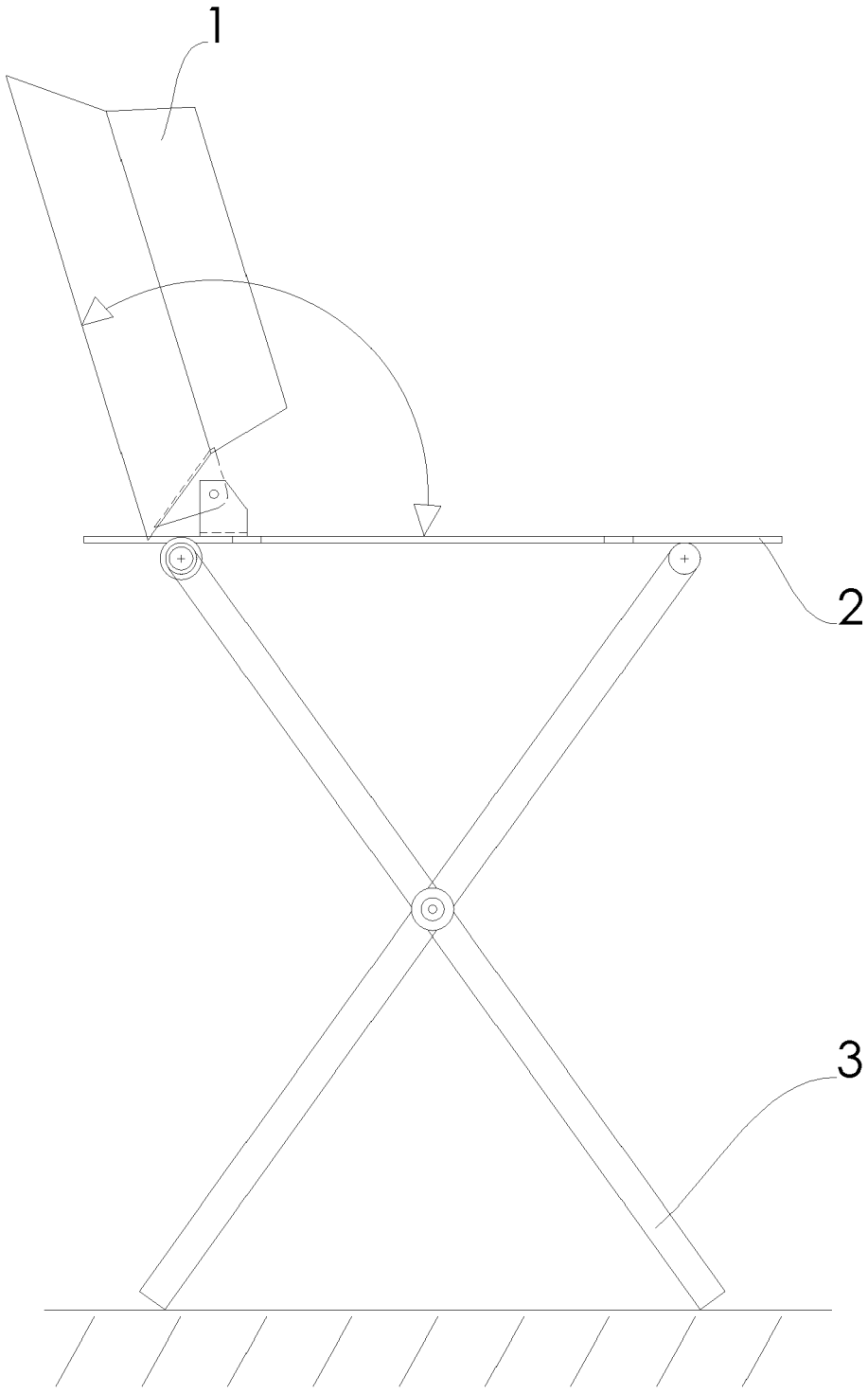

FIG. 4

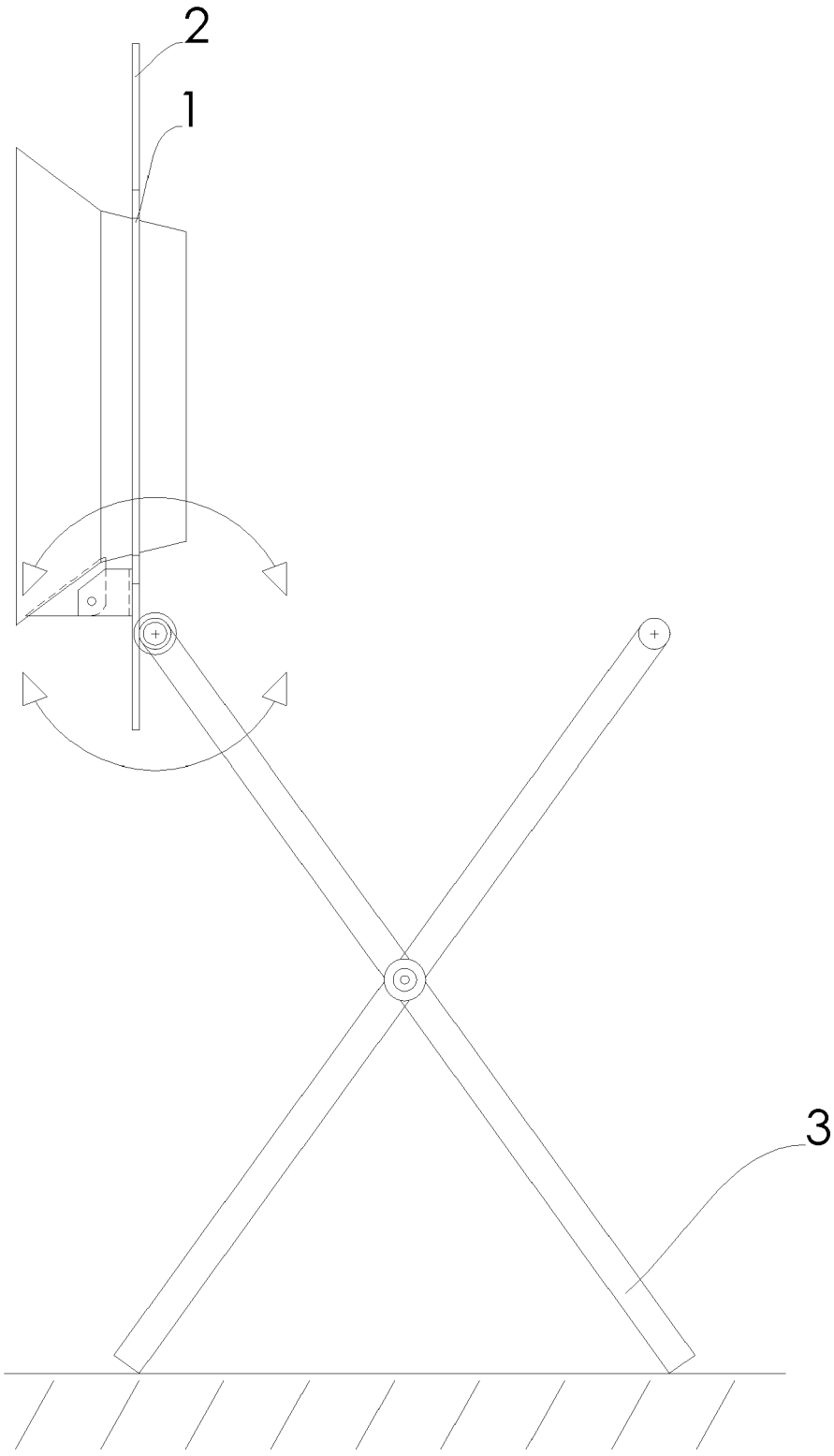

FIG. 5

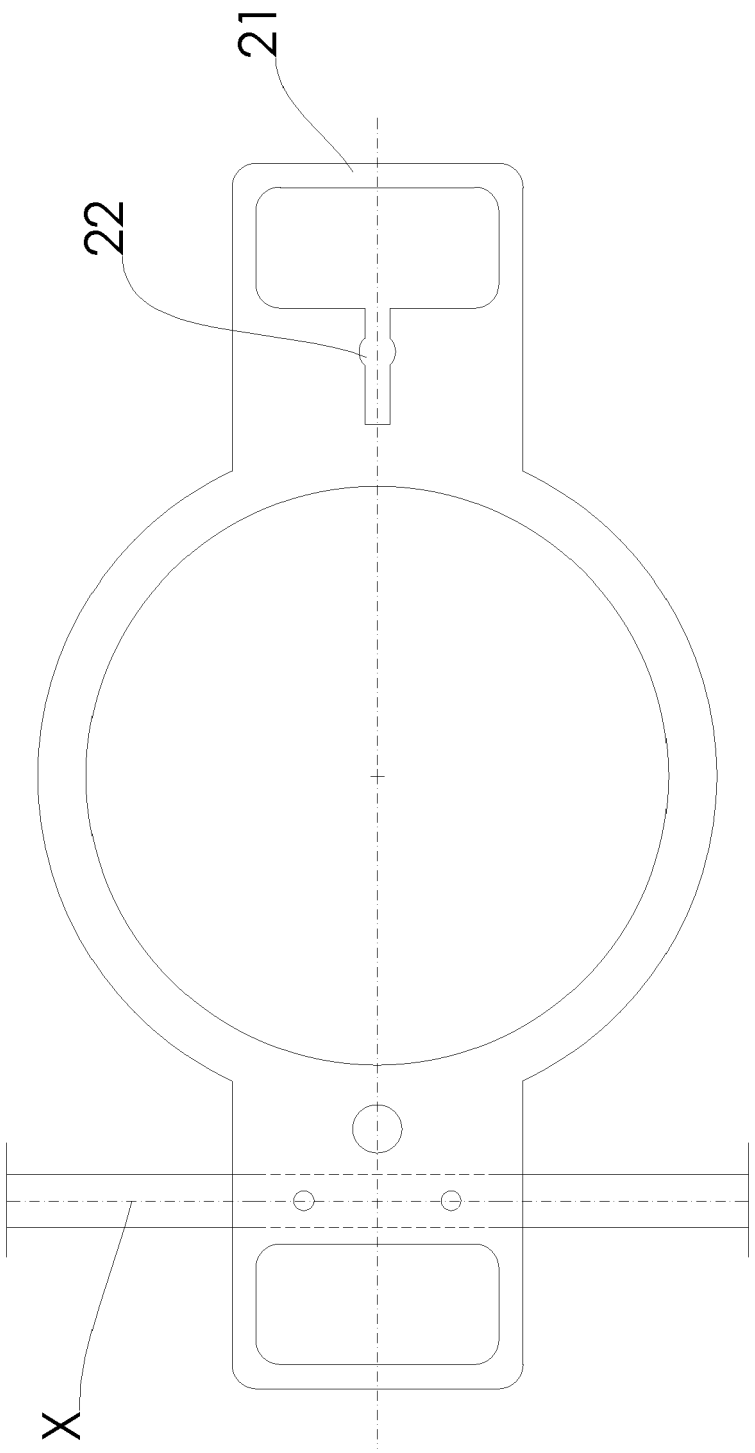

FIG. 6

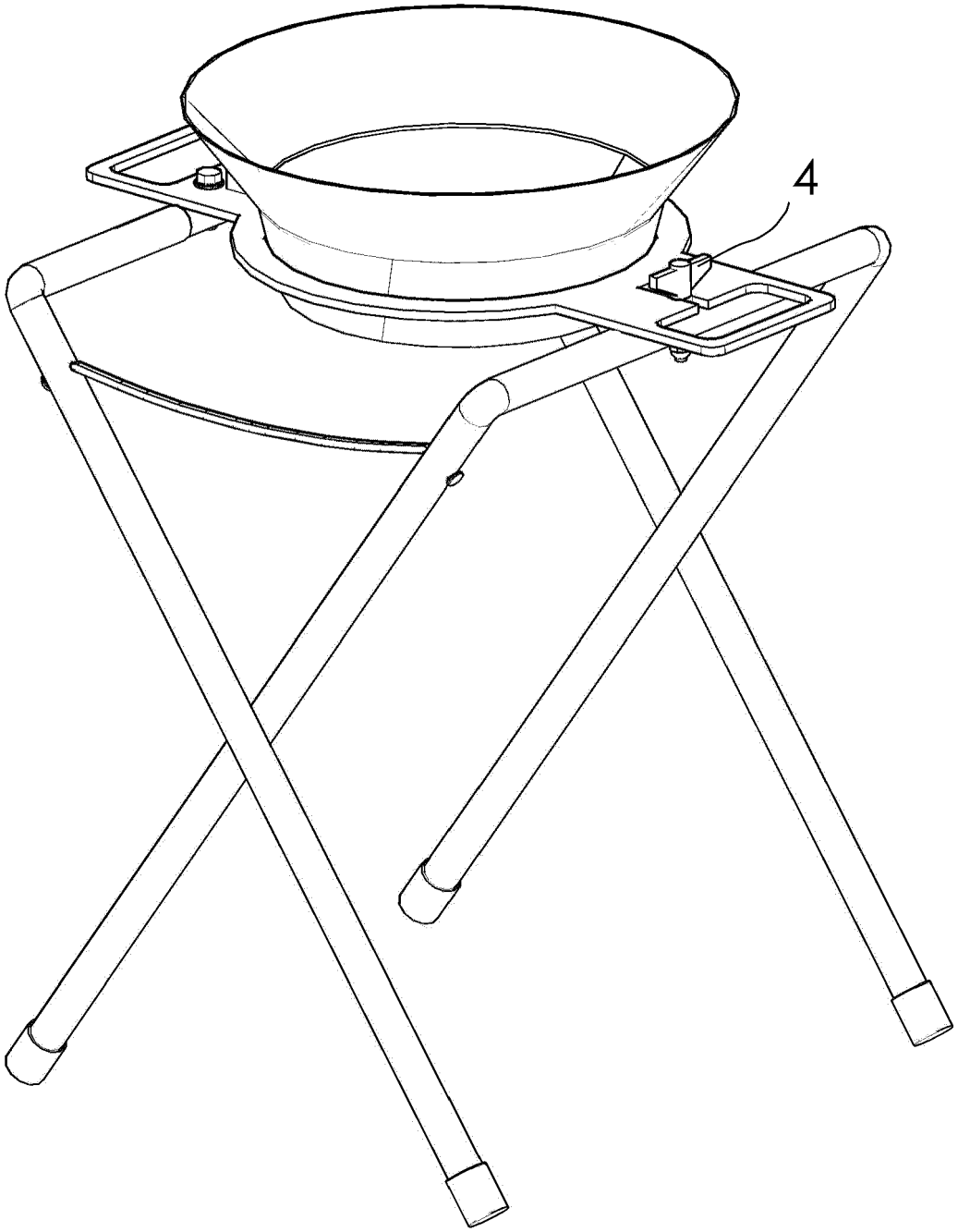

FIG. 7

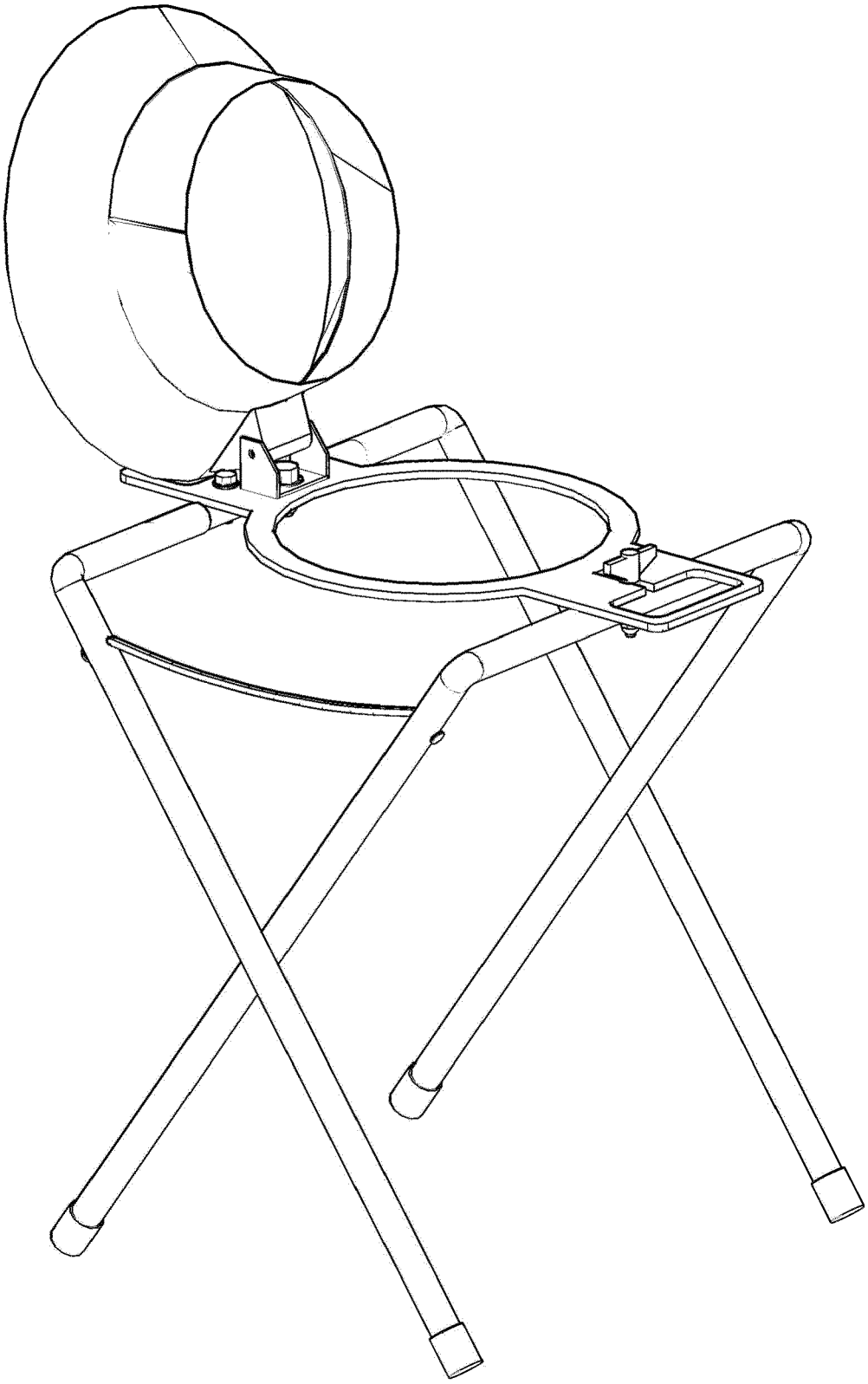

FIG. 8

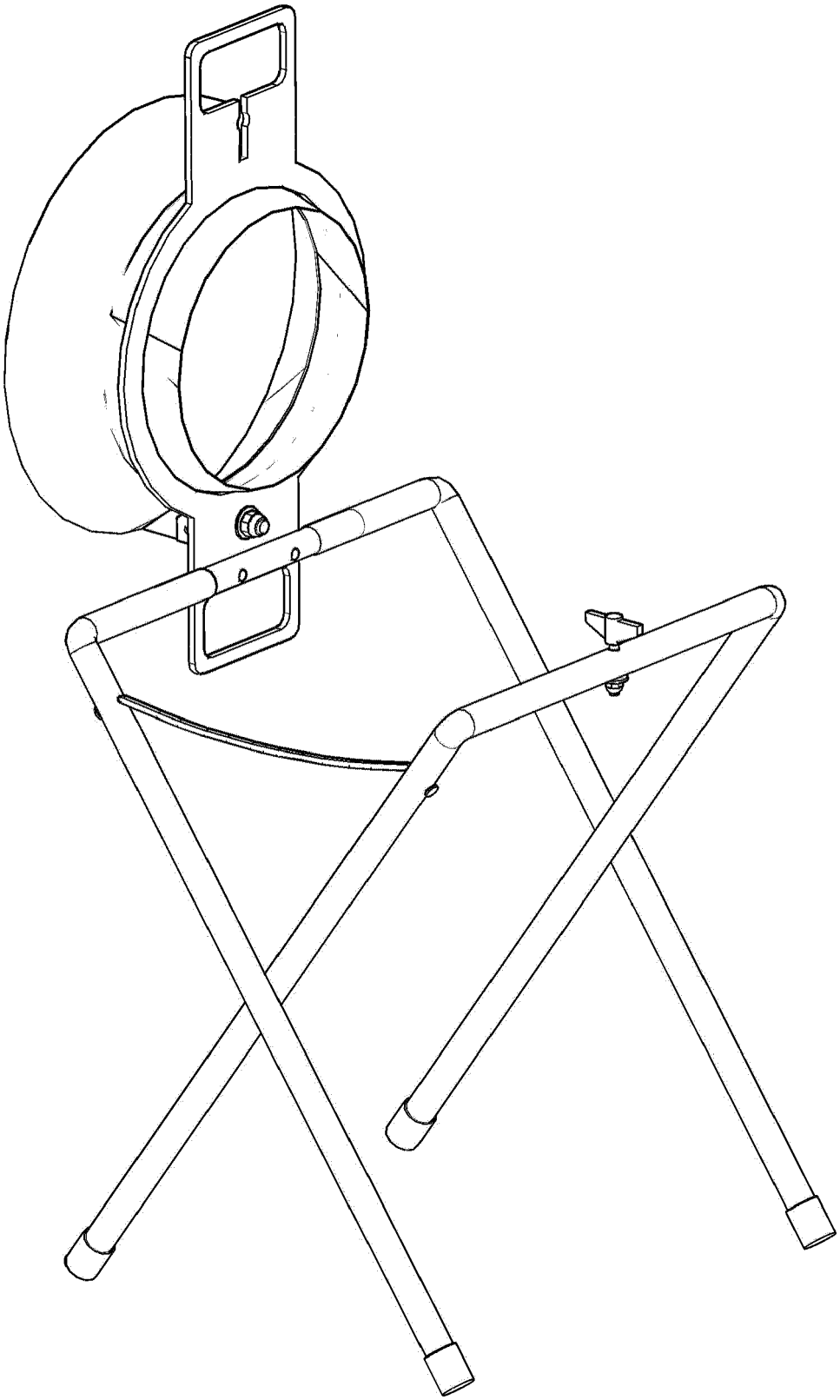

FIG. 9

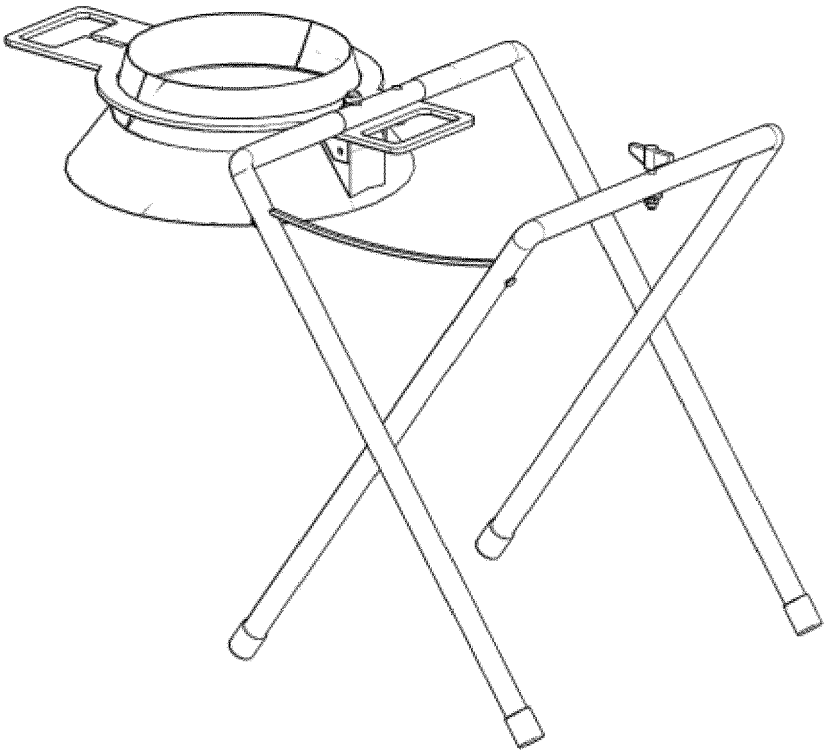

FIG. 10

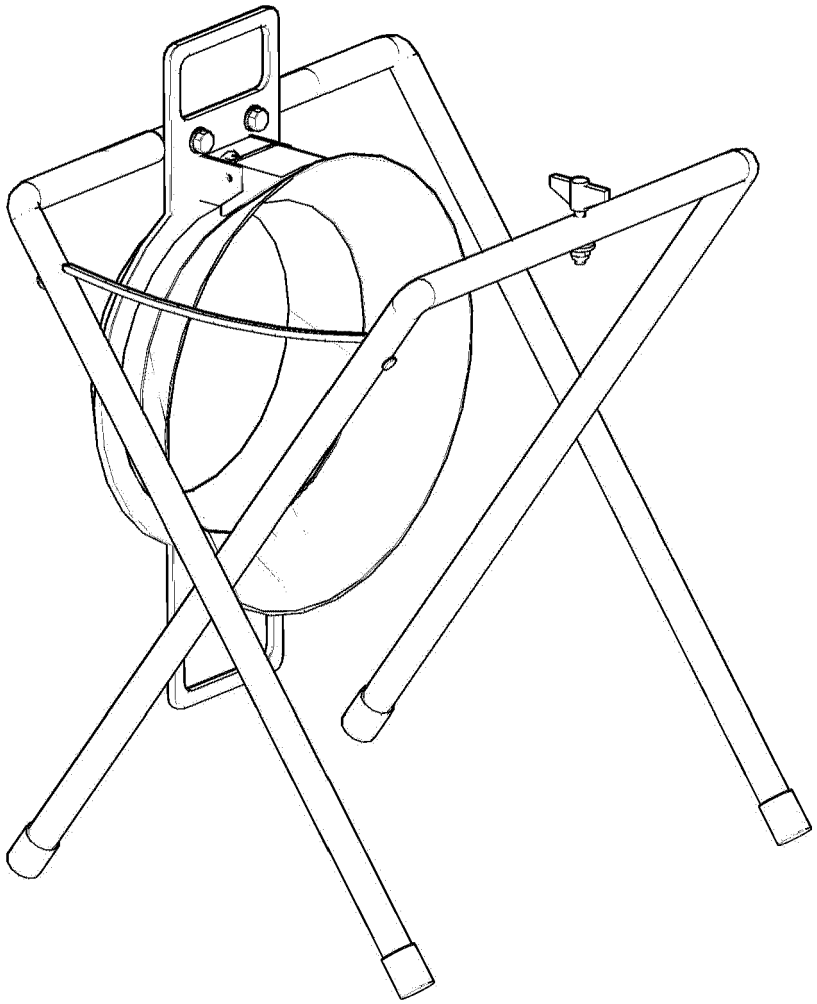

FIG. 11

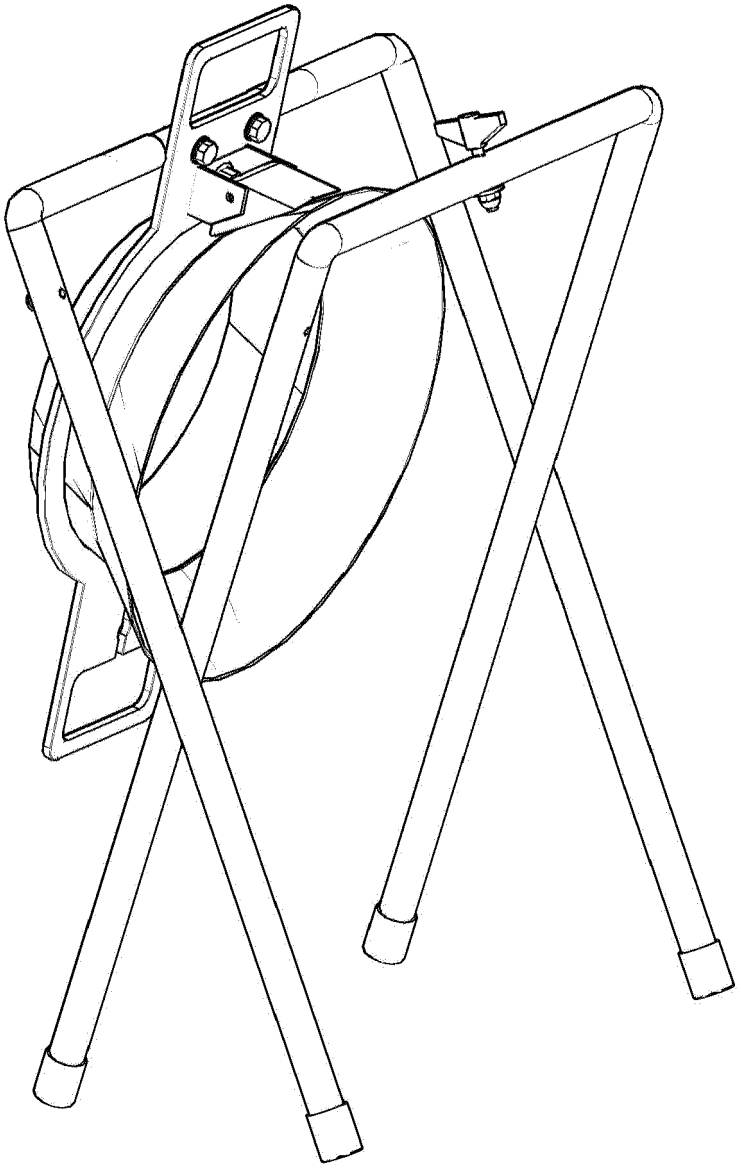

FIG. 12

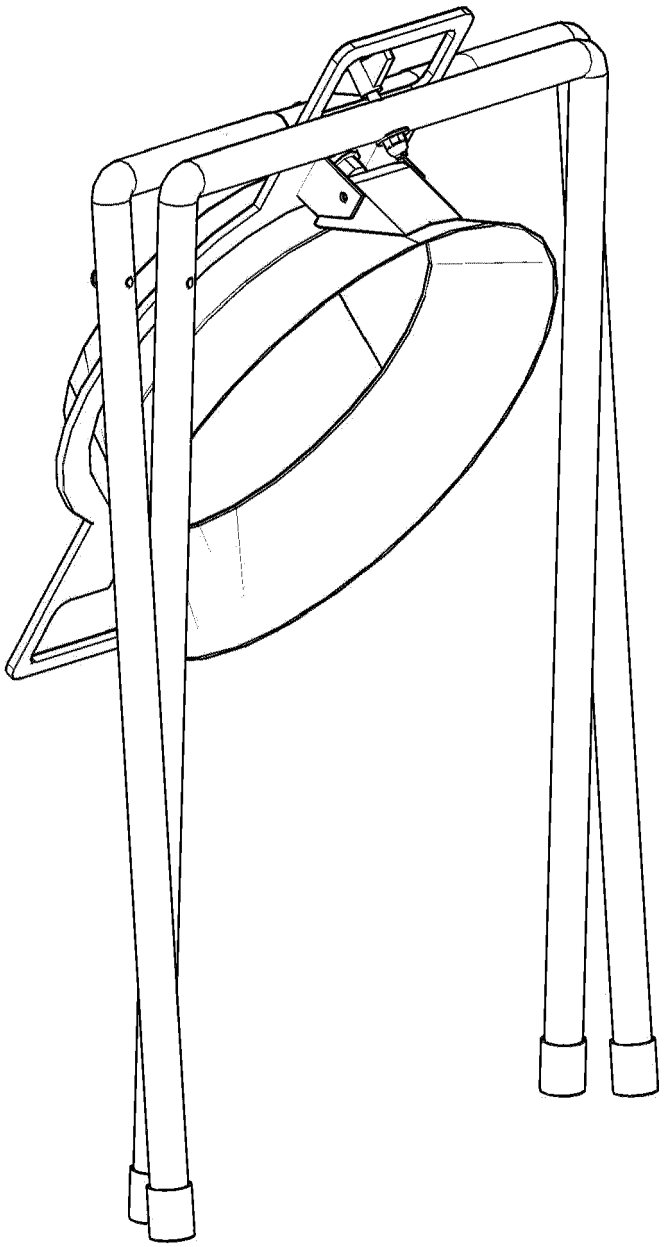

FIG. 13

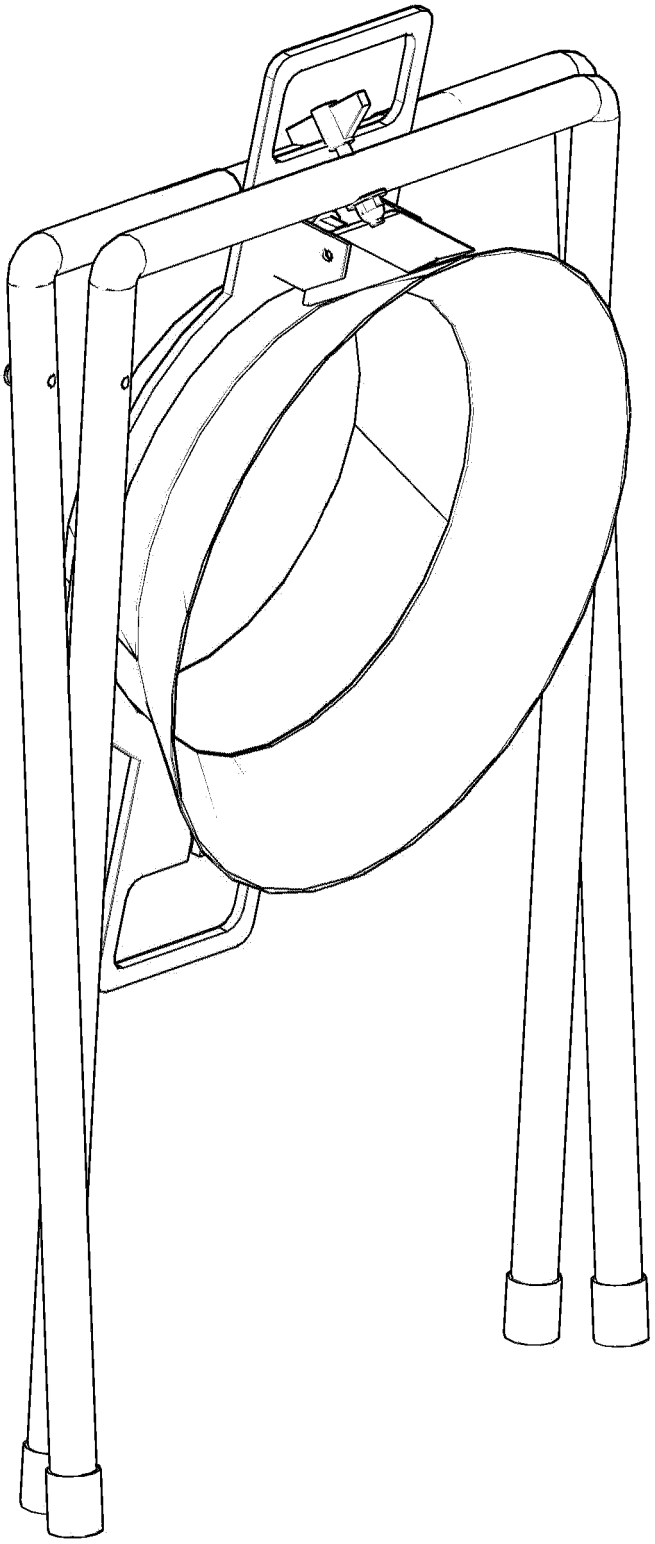

FIG. 14

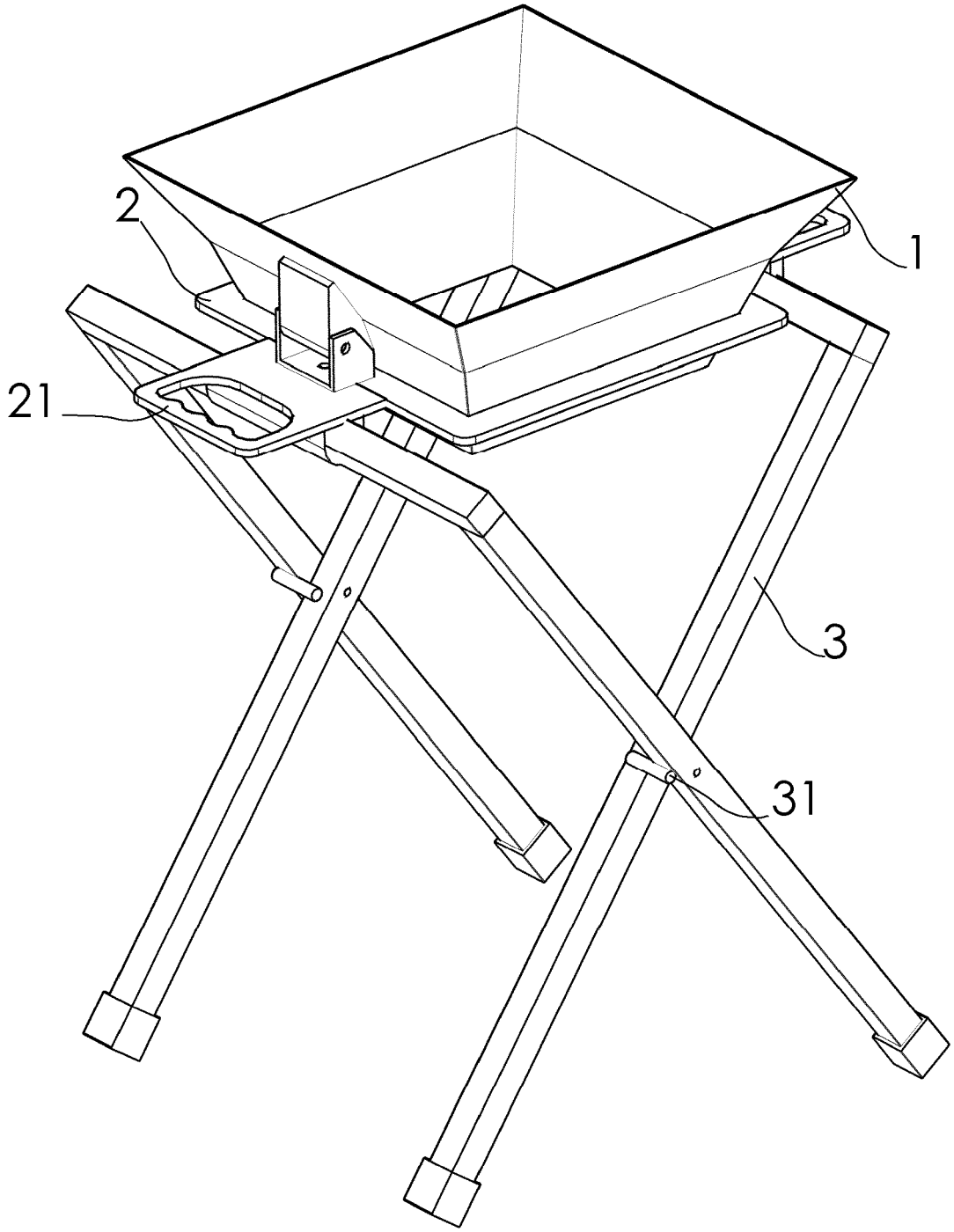

FIG. 15

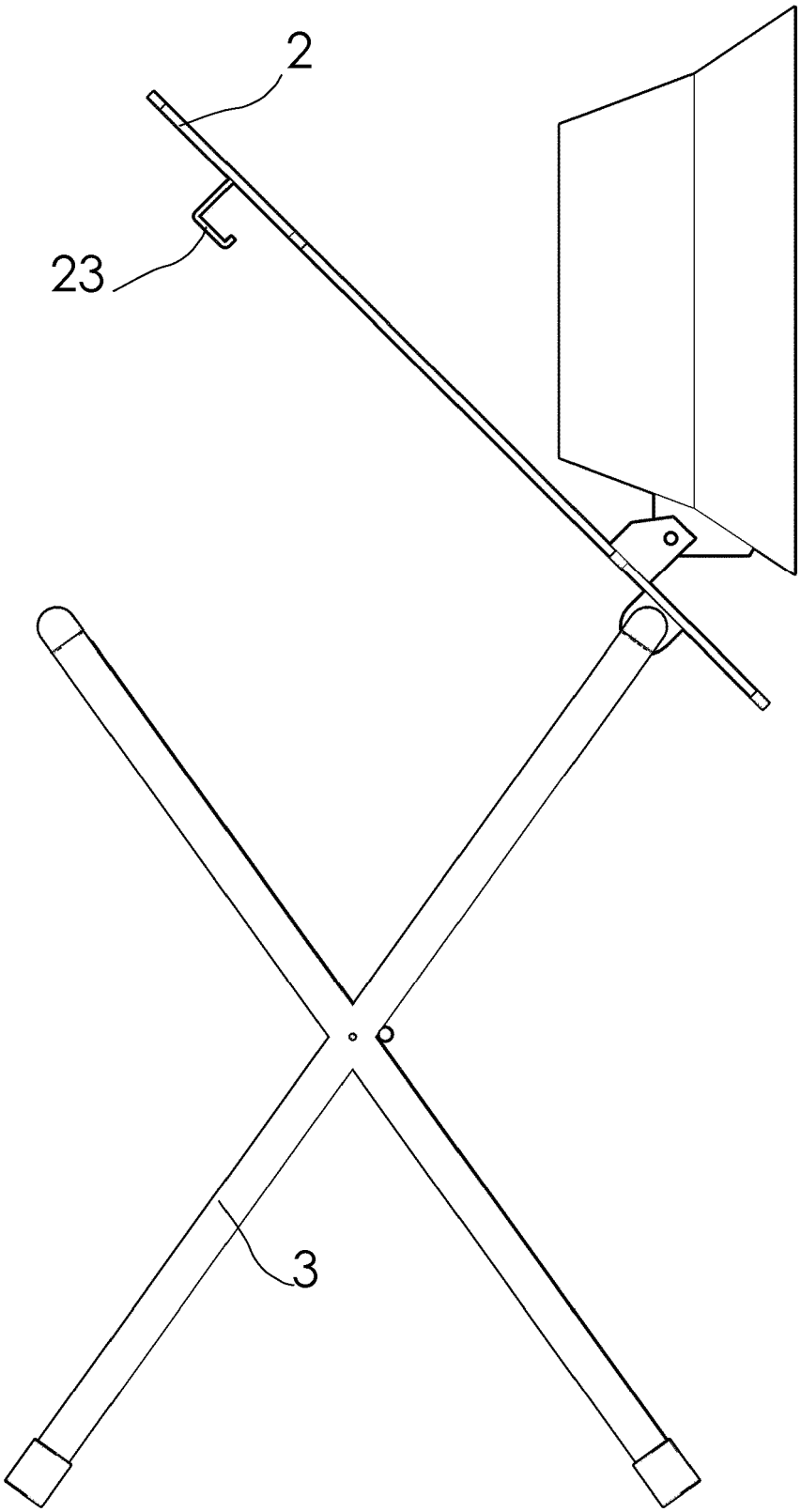

FIG. 16

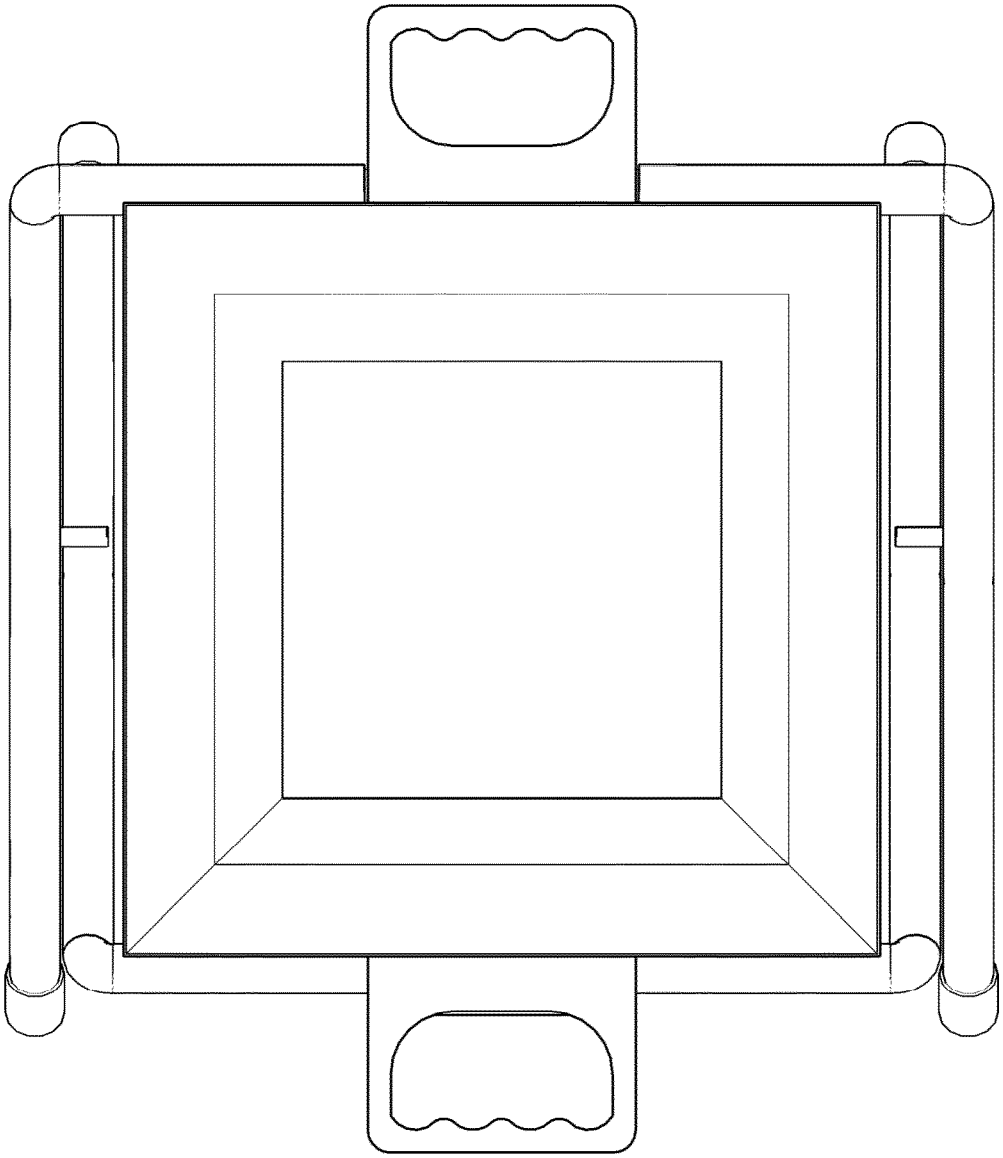

FIG. 17

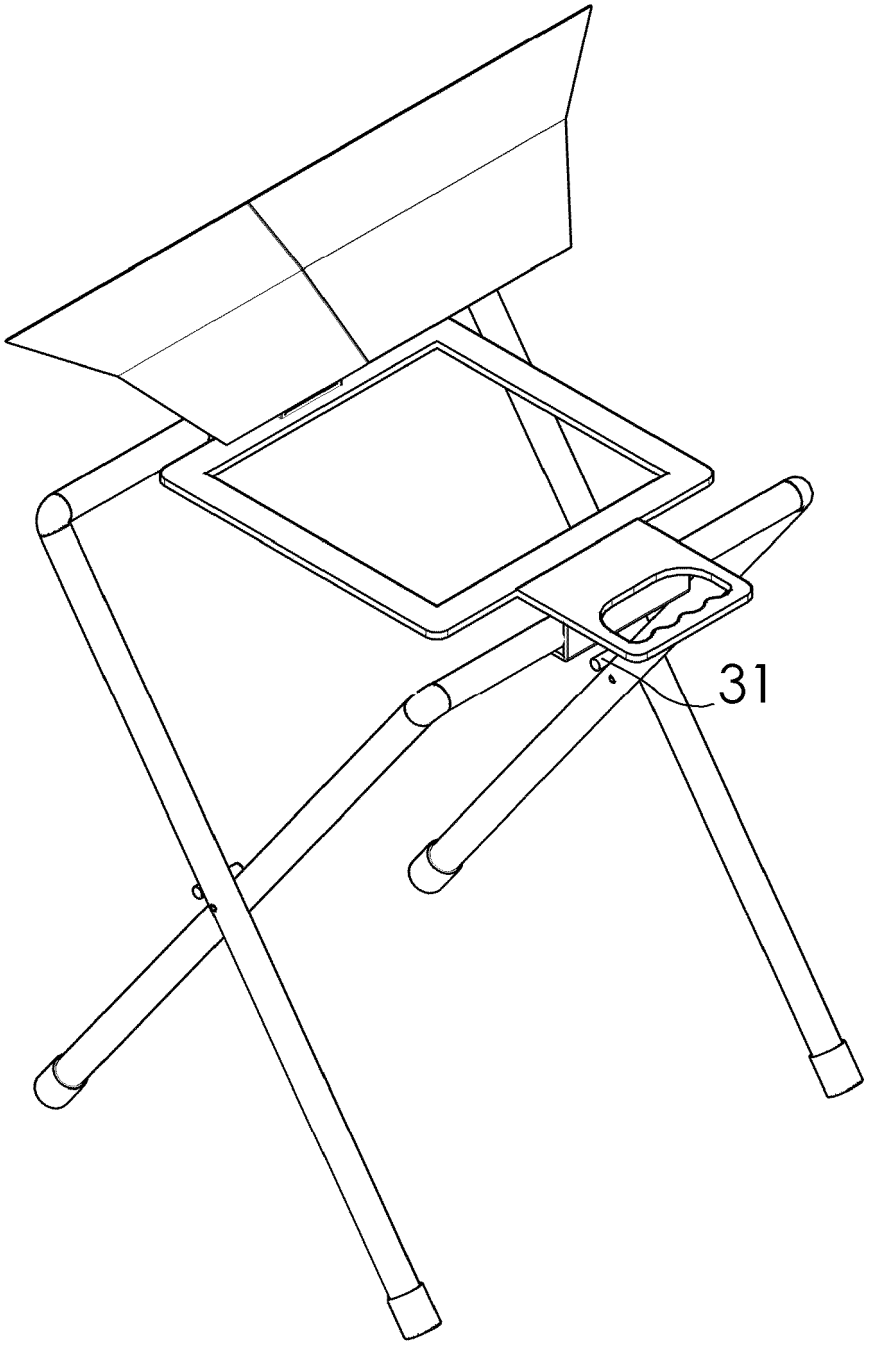

FIG. 18

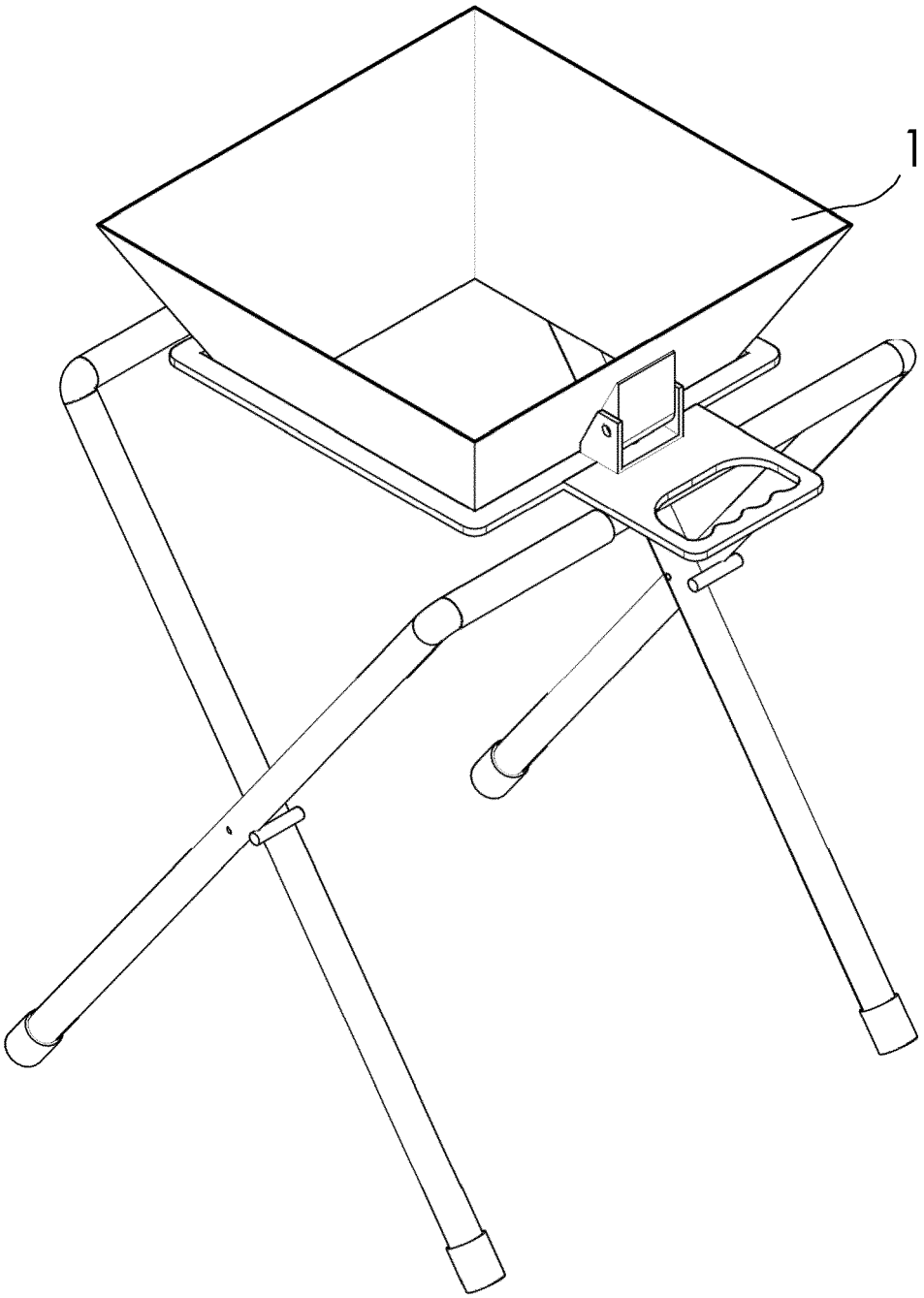

FIG. 19

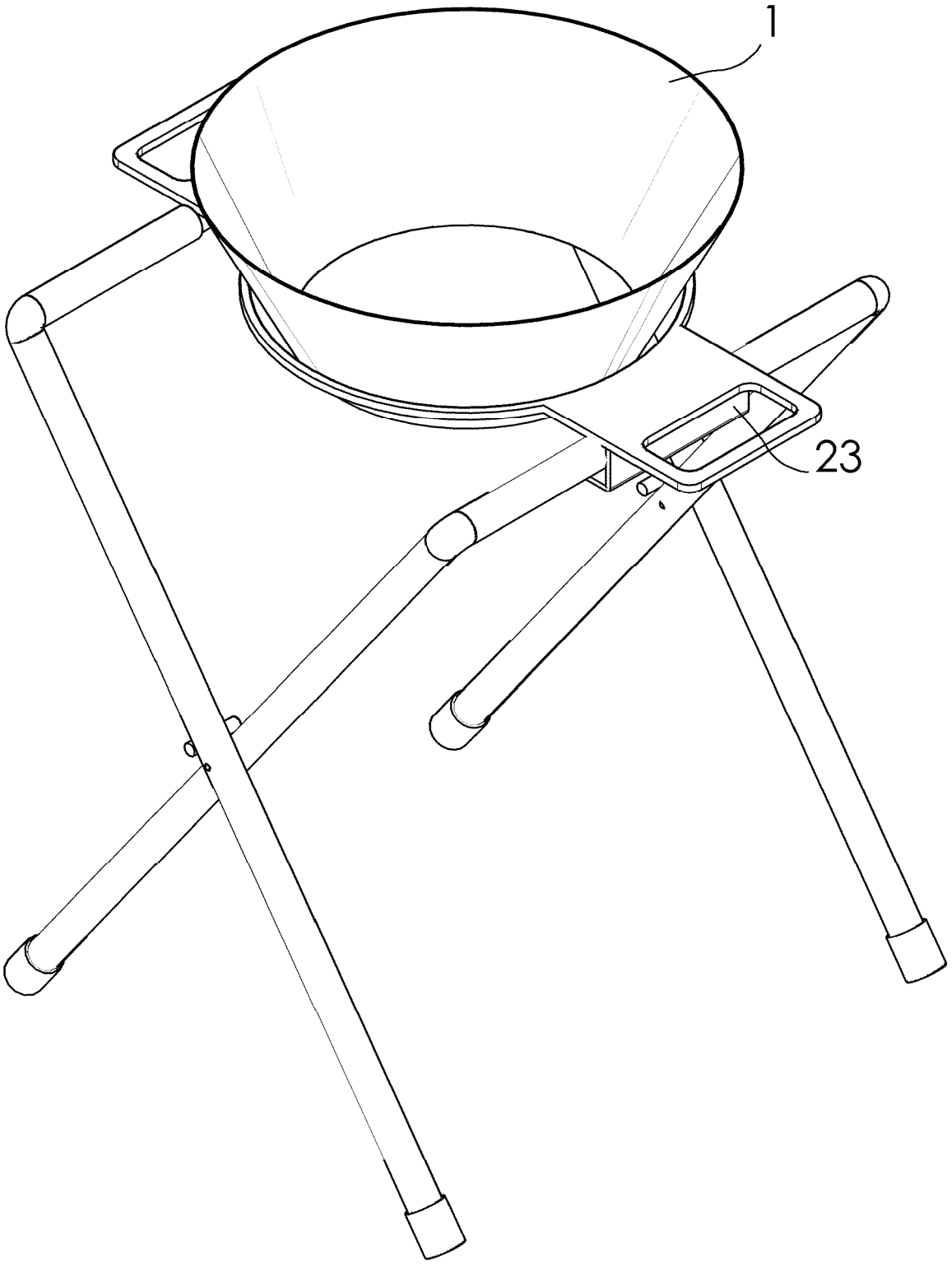

FIG. 20

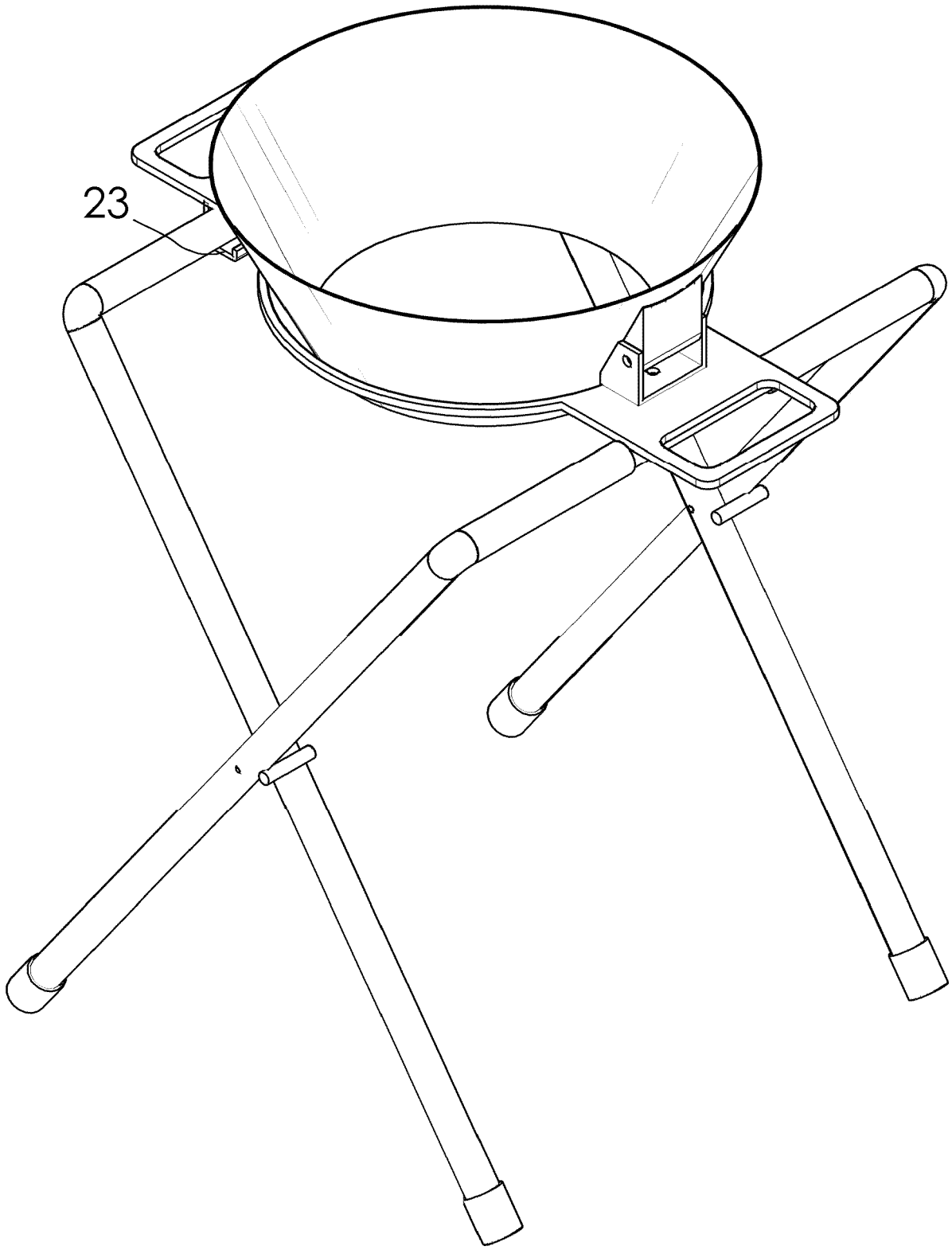

FIG. 21

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 6084

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 2012/001035 A1 (MICHEL DANIEL [US]) 5 January 2012 (2012-01-05) * paragraphs [0047] - [0051]; figures 1,8 *	1-15	INV. B65B67/12 B65B39/06
A	DE 70 21 513 U (MEISENBURG & AHLEFF RHEINWERK [DE]) 3 September 1970 (1970-09-03) * page 3, lines 7-24; figure 1 *	1-15	
A	US 2013/019995 A1 (MUSE JOHN RICHARD [US]) 24 January 2013 (2013-01-24) * paragraphs [0013], [0014], [0031]; figure 1 *	1-15	
A	US 7 472 727 B1 (SHERRARD RYAN N [US]) 6 January 2009 (2009-01-06) * column 2, line 26 - column 3, line 37; figures 1-3 *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 April 2019	Kulhanek, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 16 6084

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-04-2019

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US 2013019995 A1	24-01-2013	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- US 20120001035 A1 **[0013]**