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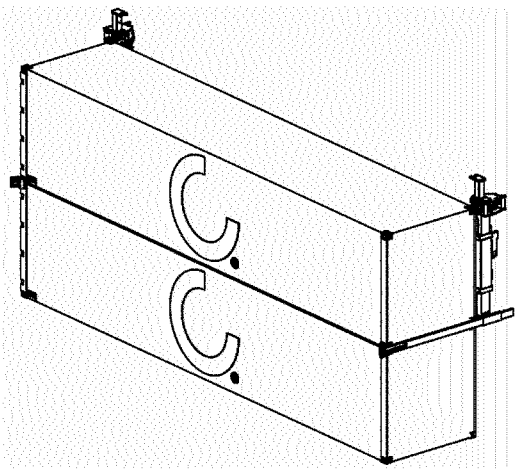
(54) Keksinnön nimitys - Uppfinningens benämning - Title of the invention
Nostinlaite tyhjien konttien nostamiseksi
Lyftanordning för att lyfta tomma containrar
A hoisting device for hoisting empty containers

(56) Viitejulkaisut - Anförda publikationer - References cited
EP 2151413 A1, EP 0148418 A2, WO 2018182487 A1, WO 2012114166 A2, EP 0701964 A1, US 4630855 A

(57) Tiivistelmä - Sammandrag - Abstract

Esillä oleva keksintö liittyy nostinlaitteeseen tyhjien konttien nostamiseksi. Keksinnön mukainen nostinlaite käsittää nostinrungon (1) ja levittäjän (2) liikkuvasti kiinnitettynä nostinrunkoon (1). Levittäjä (2) edelleen käsittää ensimmäisen lukitusjärjestelyn, ja ainakin yhden liikkuvan varren (3) ja toisen liikkuvan varren (4), jolloin liikkuvat varret (3, 4) kukin käsittää ainakin ensimmäisen lukitusmekanismin (5). Lisäksi, kukin liikkuva varsi edullisesti käsittää toisen lukitusmekanismin (6). Tyhjien konttien käsittely keksinnön mukaisella nostinlaitteella on nopeaa, tehokasta ja turvallista, sillä alemman kontin voi irrottaa erikseen ilman ylemmän kontin irrottamista.

The present invention relates to a hoisting device for hoisting empty containers. The hoisting device according to the invention comprises a hoisting frame (1) and a spreader (2) movably attached to the hoisting frame (1). The spreader (2) further comprises a first locking arrangement, and at least a first movable arm (3) and a second movable arm (4), wherein the movable arms (3, 4) each comprise at least a first locking mechanism (5). In addition, the movable arms advantageously each comprise a second locking mechanism (6). Handling empty containers with a hoisting device according to the invention is fast, efficient and safe, as a lower container may be released separately without releasing an upper container.



A HOISTING DEVICE FOR HOISTING EMPTY CONTAINERS

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to a hoisting device for hoisting empty containers.

DESCRIPTION OF PRIOR ART

Previously, empty cargo containers are handled in a dock area, for example, by lifting one empty container on top of another empty container and then lifting the bottom container for moving both containers. Handling empty containers with such a manner is time consuming as the pile of two containers needs to be lowered first, and the top container removed, before further handling the bottom container. In EP 2151413 A1, for instance, the hoisting device is designed to hold the lower container with a second support member which requires additional parts and machinery. Additionally, EP 0148418 A2 and WO 2018182487 A1 disclose hoisting devices for hoisting containers.

SUMMARY OF THE INVENTION

An object of the present invention is to solve at least some of the above mentioned drawbacks and to provide a hoisting device for empty containers wherein at least some of the above mentioned drawbacks are overcome. The goal of the invention is achieved with a hoisting device described in the independent claim. The preferred embodiments of the invention are disclosed in the dependent claims.

BRIEF DESCRIPTION OF DRAWINGS

In the following, the present invention will be described in closer detail by way of example and with reference to the attached drawings, in which

Figure 1 is a drawing showing hoisting device according to an embodiment;

Figure 2 is a drawing illustrating a spreader according to the embodiment of Figure 1;

Figures 3a and 3b are drawings illustrating movable arms according to the embodiment of Figures 1 and 2, wherein 3a illustrates a movable arm in a resting position and 3b illustrates a movable arm in locking position, and

Figures 4a and 4b are drawings illustrating a first locking mechanism and a second locking mechanism according to the embodiment of Figures 1-3; and

Figure 5 is a cross-sectional drawing illustrating the locking elements of a first locking mechanism in the lock position; and

Figure 6 is a general drawing illustrating how a hoisting device of Figures 1-5 may be implemented.

DESCRIPTION OF AT LEAST ONE EMBODIMENT

The solution disclosed herein is described with the aid of accompanying figures. Figure 1 is a drawing showing a hoisting device according to an embodiment. The hoisting device comprises a hoisting frame 1, a locking arrangement (not shown in Figure 1) and a spreader 2. The locking arrangement may attach an empty container to the spreader 2 from the upper corners of a container, for example. The spreader 2 of Figure 2 may be movably attached to the hoisting frame 1, for example, as shown in Figure 1. In the embodiment of Figure 1, the hoisting device is fixed to a transport vehicle 10.

Figure 2 is a drawing illustrating the spreader 2 according to the embodiment of Figure 1. As shown in Figure 2, the spreader 2 comprises at least a first movable arm 3 and a second movable arm 4, wherein the movable arms 3, 4 each comprise at least a first locking mechanism 5 for fixing two empty containers together. In the embodiment of Figures 1 and 2, the first locking mechanism is attached to an end of a movable arm 3, 4.

In the embodiment of Figures 1 and 2, the movable arms 3, 4 of the hoisting device each also comprise a second locking mechanism 6. The second locking mechanism 6 may be arranged at the movable arm 3, 4 at a distance from the first locking mechanism 5, as shown in Figure 2. In the example of Figure 2, the first and the second movable arms 3, 4 are attached to opposite sides of the spreader 2 and the movable arms 3,4 are in a resting position. The movable arms 3, 4 are further arranged move in a horizontal direction from the resting position (Figure 2) to a locking position (Figure 1). In the resting position, the movable arms retract so that the first locking mechanism 5 is in the vicinity of the spreader 2 and the movable arms 3,4 are by the sides of the transport vehicle 10.

The movable arms 3, 4 shown in Figure 2, are further illustrated in Figures 3a and 3b. Figure 3a and 3b are drawings illustrating movable arms 3, 4 according to the embodiment of Figures 1 and 2, wherein 3a illustrates the first movable arm 3 in the resting position and 3b illustrates the second movable arm 4 in the locking position. In Figure 3a, the first locking mechanism 5 of the first movable arm 3 is in a unlock position and in Figure 3b the first locking mechanism 5 of the second movable arm 4 is in a lock position. The first locking mechanisms 5 may each comprise an actuator 9 for controlling the movement of the locking elements between the unlock position and the lock position of the locking mechanism. The movable arms 3, 4 themselves do not carry the weight of the lower empty container as the lower empty container is arranged to hang from the upper empty container via the locking elements.

The first and second locking mechanisms 5, 6 are illustrated in detail in Figures 4a and 4b. Figures 4a and 4b are drawings illustrating a first locking mechanism 5 and a second locking mechanism according 6 to the embodiment of Figures 1-3. The first and the second locking mechanisms 5, 6 both comprise a locking head 7, 8 with a first locking element 7-1, 8-1 and a second locking element 7-2, 8-2.

The purpose of the locking elements is to attach a container to essentially hang from another container such that the force caused by the weight of the lower container is interposed to the upper container via the locking elements. The locking elements may be shaped such that the cross-sectional area of a locking element increases when moving from a first end of the locking element towards a second of the locking element, as shown in Figure 4a for the locking elements 7-1, 7-2 of the first locking mechanism 5. This is advantageous as the shape of the locking elements allows more variation with respect to the position of the containers that are being attached to each other.

An example of how the locking elements may be inserted in the corners of the containers is shown in Figure 5, which is a cross-sectional drawing illustrating the locking elements 7-1, 7-2 of a first locking mechanism 5 in the lock position wherein the locking elements 7-1, 7-2 have been inserted in to the openings of two containers. For simplicity, only one corner of each container, the locking head 7 and the locking elements 7-1, 7-2 of the first locking mechanism 5, are illustrated. Figure 5 further illustrates how one container may be arranged to hang from another container with the aid of the locking elements.

Figure 6 is a general drawing illustrating how a hoisting device of Figures 1-5 may be implemented. The transport vehicle 10, to which the hoisting device according to the embodiment of Figure 1 is fixed to, first moves in the vicinity of a first empty container. The first empty container is then removably attached to the spreader 2 of the hoisting device via the first locking arrangement. The first empty container is then lifted and the transport vehicle 10, with the first empty container is moved to the vicinity of a second empty container. The first empty container is then lowered on top of the second empty container.

Once the empty containers are in place on top of each other, the movable arms move from the resting position to the locking position via an actuator, for example. As the movable arms move to the locking position, the locking elements 8-1, 8-2 of the second locking mechanism 6 protrude into openings located in the corners of the first and second empty containers. For the first container, said openings are located in the bottom corners and for the second container, said openings are located in the top corners. In both cases, the openings are facing the hoisting device.

Once the movable arms 3, 4 are in the locking position, the first locking mechanisms 5 of the movable arms 3, 4 move into the lock position to engage the second, lower empty container to the first upper empty container by revolving the locking head 7 around an axis of revolution A, shown in Figure 4. The locking head 7 may be revolved in such a way that the locking elements 7-1, 7-2 are inserted into the openings, located in the corners of the empty containers, wherein said corners are located on the side furthest away from the hoisting device. After four corners of both containers have been attached with the locking elements, both containers may be lifted simultaneously and the second, lower empty container hangs from the first, upper empty container via the locking elements.

In the embodiment of Figures 1-6, the locking elements of the first locking mechanism move horizontally from the unlock position to a lock position. In the unlock position, the locking elements of the first locking mechanism are outside both containers. In the lock position, the locking elements are inserted into the openings of the empty containers provided in the corners of said empty containers. Preferably, to avoid uneven force distribution, all four bottom corners of the upper container are connected with the four top corners of the lower container.

When the locking elements are in the lock position and the hoisting device lifts both containers, the lower container hangs from the upper container as

the locking elements connect the two empty containers to each other. The two containers may then be moved to a platform of a truck, for example, and by moving the first locking elements to the unlock position and movable arm back to the resting position, respectfully. Thus, only the lower empty container is released onto the platform while the upper empty container still remains fixed to the hoisting device via the first locking arrangement. Such a hoisting device is advantageous as the lower empty container can be separately released for further handling or storing without the need to attach the hoisting device to the upper container for lifting. Lifting of empty container is also safer as both containers are attached to the hoisting device via the first locking arrangement and the first and second locking mechanisms during lifting and moving of said containers.

In Figures 1-6, the movable arms are attached to opposite sides of the spreader and the movable arms are arranged move in a horizontal direction from a resting position to a locking position. In another embodiment, not shown in the figures, the movable arms may be rotatably attached to the sides of the spreader and arranged to move between a resting position (vertical) and a locking position (horizontal) by revolving around an axis of revolution.

In Figures 1-6, the hoisting frame is arranged to approach an empty container from one of the vertical sides of the empty container. In yet another embodiment, not shown in the figures, the hoisting frame may be arranged onto a crane structure, for example, such that the hoisting frame may be arranged to approach an empty container from the top, horizontal side of the empty container. In such a configuration the spreader, attached to the hoisting frame, may comprise more than two movable arms, for example one in each corner of the spreader. In this embodiment, the movable arms may be arranged to move in a vertical direction from a resting position to a locking position. Furthermore, the movable arms may comprise cables, for example, for lowering the movable arms from the resting position to the locking position.

The embodiments discussed above mainly involve lifting of two empty containers. However, by applying more than two moving arms, to the embodiment of Figure 6 for example, such that both the first and the second moving arms are arranged onto the hoisting frame on top of and at a distance from each other, multiple containers may be lifted and moved. In such an embodiment, the vertical distance between the movable arms is advantageously approximately equal to the height of a cargo container.

For all the embodiments discussed here, the common feature is that the locking mechanisms are used to removably attach one container below another container so that the lower container hangs from the top container.

It is to be understood that the above description and the accompanying figures are only intended to illustrate the present invention. It will be obvious to a person skilled in the art that the invention can be varied and modified without departing from the scope of the invention.

CLAIMS:

1. A hoisting device for hoisting empty containers, comprising

a hoisting frame (1),

a spreader (2) movably attached to the hoisting frame (1), the spreader (2) comprising a first locking arrangement, and

the spreader (2) further comprises at least a first movable arm (3) and a second movable arm (4), wherein the movable arms (3, 4) each comprise at least a first locking mechanism (5), c h a r a c t e r i z e d in that

the first and the second movable arms (3, 4) each comprise a second locking mechanism (6), and

the first and second locking mechanisms (5, 6) both comprise a locking head (7, 8) with a first locking element (7-1, 8-1) and a second locking element (7-2, 8-2) to attach a lower container to essentially hang from an upper container, which is located on top of the lower container, such that the force caused by the weight of the lower container is transmitted to the upper container via the locking elements (7-1, 8-1, 7-2, 8-2).

2. A hoisting device according to claim 1, wherein

the second locking mechanism (6) is arranged at the movable arms (3, 4) at a distance from the first locking mechanism (5).

3. A hoisting device according to any one of claims 1-2, wherein

the first and the second movable arms (3, 4) are attached to opposite sides of the spreader (2).

4. A hoisting device according to any one of claims 1-3, wherein

the movable arms are arranged move in a horizontal direction from a resting position to a locking position.

5. A hoisting device according to claim 3, wherein

the movable arms (3, 4) are rotatably attached to the sides of the spreader (2) and are arranged to move between a resting position and a locking position by revolving around an axis of revolution.

6. A hoisting device according to claim 1, wherein

the spreader (2) comprises more than two movable arms.

7. A hoisting device according to claim 6, wherein

the movable arms are arranged move in a vertical direction from a resting position to a locking position.

8. A hoisting device according to claim 6 or 7, wherein

the movable arms comprise cables.

9. A hoisting device according to any one of claims 6-8, wherein the movable arms are located at the corners of the spreader (2).

10. A hoisting device according to claim 1, wherein the locking elements are shaped such that the cross-sectional area of the locking element increases when moving from the first end towards the second of the locking element.

11. A hoisting device according to claim 1, wherein the first locking mechanism (5) comprises a control unit (9) controlling the movement of the locking elements (7-1, 7-2) of the first locking mechanism (5).

Patenttivaatimukset:

1. Nostinlaite tyhjien konttien nostamiseksi, joka käsittää nostinrungon (1),

levittäjän (2) liikuttavasti kiinnitettynä nostinrunkoon (1), joka levittäjä (2) käsittää ensimmäisen lukitusmekanismin, ja

levittäjä (2) edelleen käsittää ainakin ensimmäisen liikuttavan varren (3) ja toisen liikuttavan varren (4), jolloin liikuttavat varret (3, 4) kumpikin käsittää ainakin yhden lukitusmekanismin (5), t u n n e t t u siitä, että

ensimmäinen ja toinen liikuttava varsi (3, 4) kumpikin käsittää toisen lukitusmekanismin (6), ja

ensimmäinen ja toinen lukitusmekanismi (5, 6) molemmat käsittävät lukituspään (7, 8), jossa on ensimmäinen lukituselementti (7-1, 8-1) ja toinen lukituselementti (7-2, 8-2) alemman kontin kiinnittämiseksi olennaisesti roikkumaan ylemmästä kontista, joka sijaitsee alemman kontin päällä, siten että alemman kontin painosta aiheutuva voima on välitetty ylemmälle kontille lukituselementtien (7-1, 8-1, 7-2, 8-2) välityksellä.

2. Patenttivaatimuksen 1 mukainen nostinlaite, jolloin toinen lukitusmekanismi (6) on järjestetty liikkuvalle varrelle (3, 4) etäisyyden päähän ensimmäisestä lukitusmekanismista (5).

3. Patenttivaatimuksen 1 tai 2 mukainen nostinlaite, jolloin ensimmäinen ja toinen liikkuva varsi (3, 4) on kiinnitetty levittäjän (2) vastakkaisille puolille.

4. Minkä tahansa patenttivaatimuksen 1-3 mukainen nostinlaite, jolloin liikkuvat varret on järjestetty liikkumaan horisontaalisessa suunnassa lepoasennosta lukitusasentoon.

5. Patenttivaatimuksen 3 mukainen nostinlaite, jolloin liikkuvat varret (3, 4) on kiertyvästi kiinnitetty levittäjän (2) sivuille ja on järjestetty liikkumaan lepoasennon ja lukitusasennon välillä kiertymällä kiertoliikkeen akselin ympäri.

6. Patenttivaatimuksen 1 mukainen nostinlaite, jolloin levittäjä (2) käsittää enemmän kuin kaksi liikkuvaa vartta.

7. Patenttivaatimuksen 6 mukainen nostinlaite, jolloin liikkuvat varret on järjestetty liikkumaan vertikaalisessa suunnassa lepoasennosta lukitusasentoon.

8. Patenttivaatimuksen 6 tai 7 mukainen nostinlaite, jolloin liikkuvat varret käsittävät kaapeleita.

9. Minkä tahansa patenttivaatimuksen 6-8 mukainen nostinlaite, jolloin liikkuvat varret sijaitsevat levittäjän (2) kulmissa.

10. Patenttivaatimuksen 1 mukainen nostinlaite, jolloin lukituselementit ovat muodoiltaan sellaisia, että lukituselementin poikkileikkauksen pinta-ala kasvaa kun siirrytään lukituselementin ensimmäisestä päästä kohti toista.

11. Patenttivaatimuksen 1 mukainen nostinlaite, jolloin ensimmäinen lukitusmekanismi (5) käsittää ohjausyksikön (9) ohjaamaan ensimmäisen lukitusmekanismin (5) lukituselementtien (7-1, 7-2) liikettä.

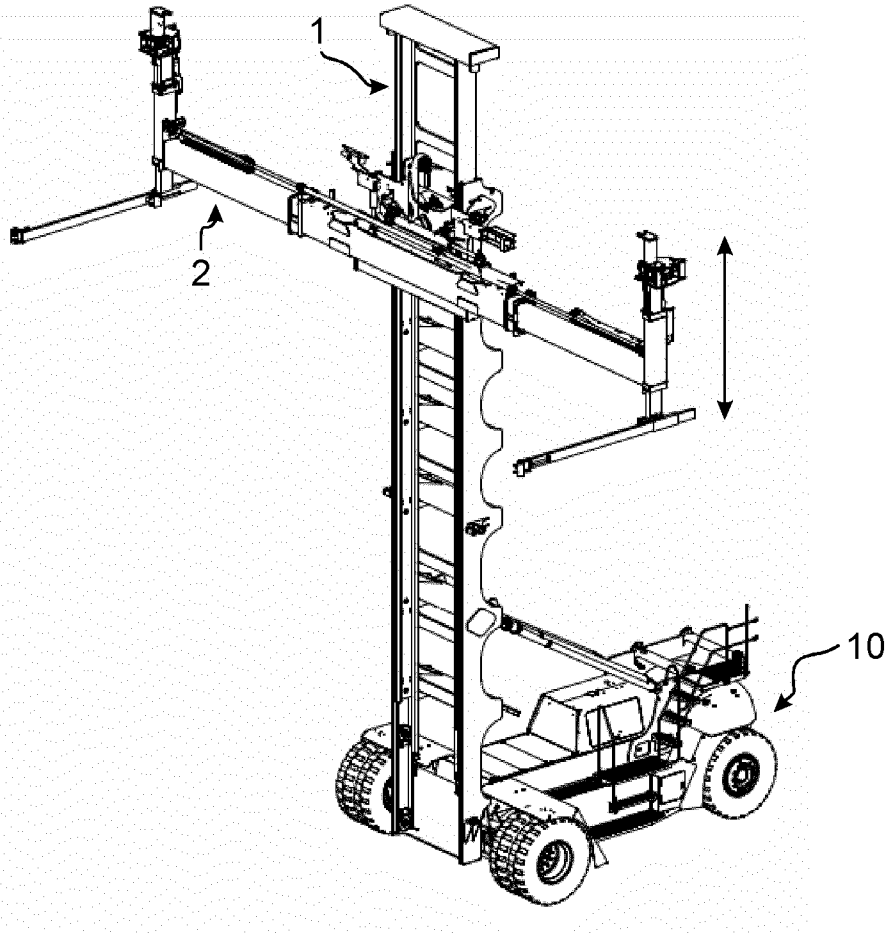


FIG. 1

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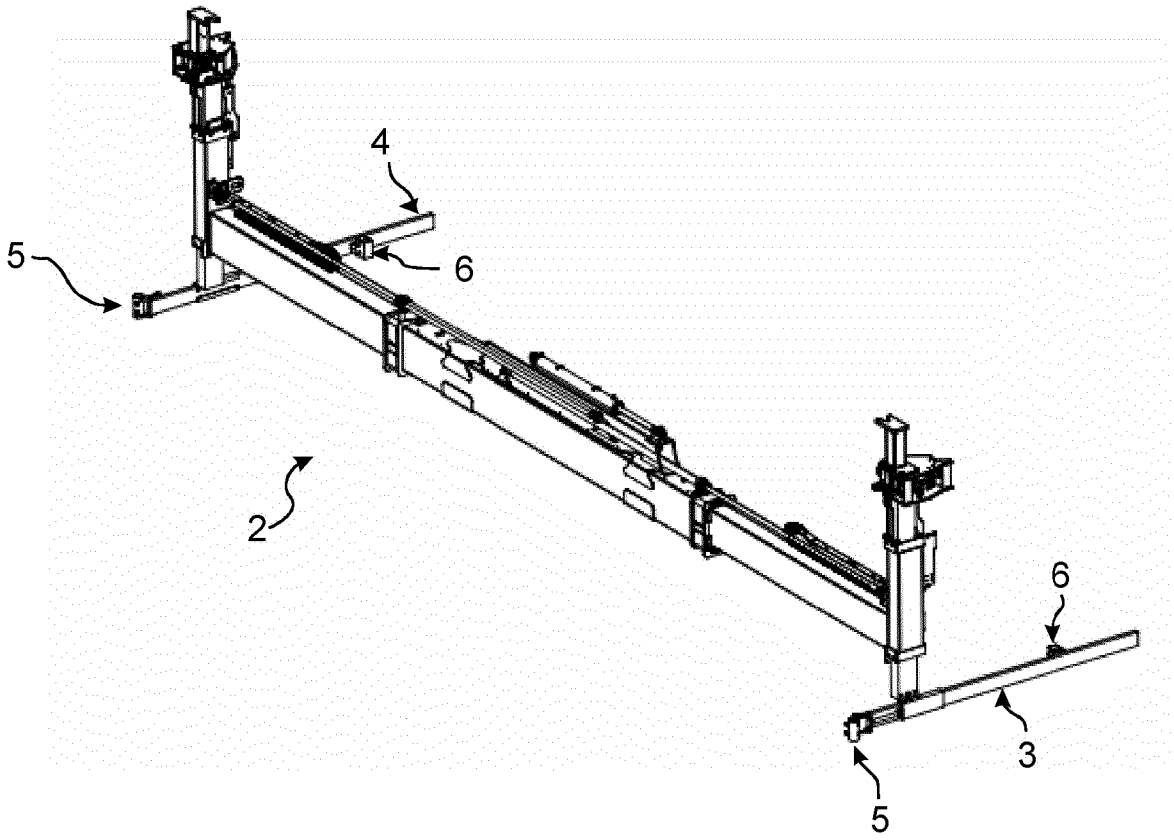

FIG. 2

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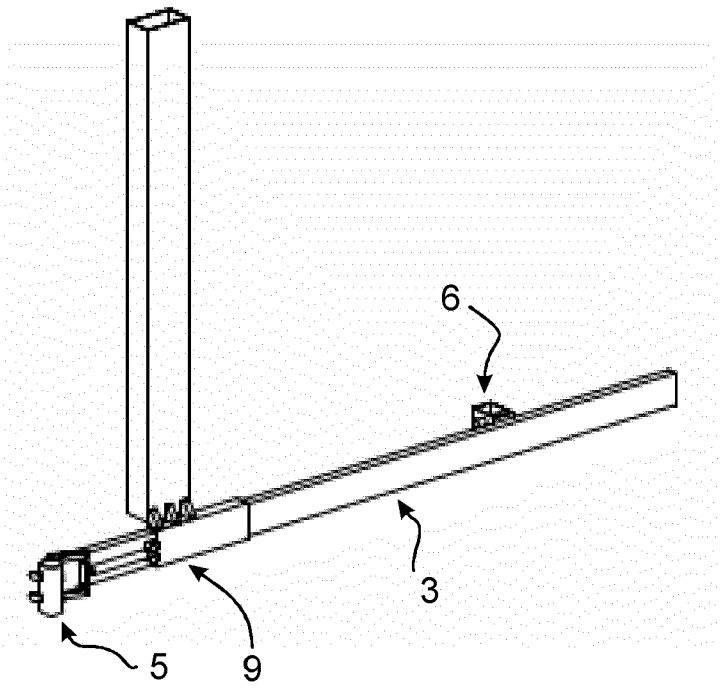

FIG. 3a

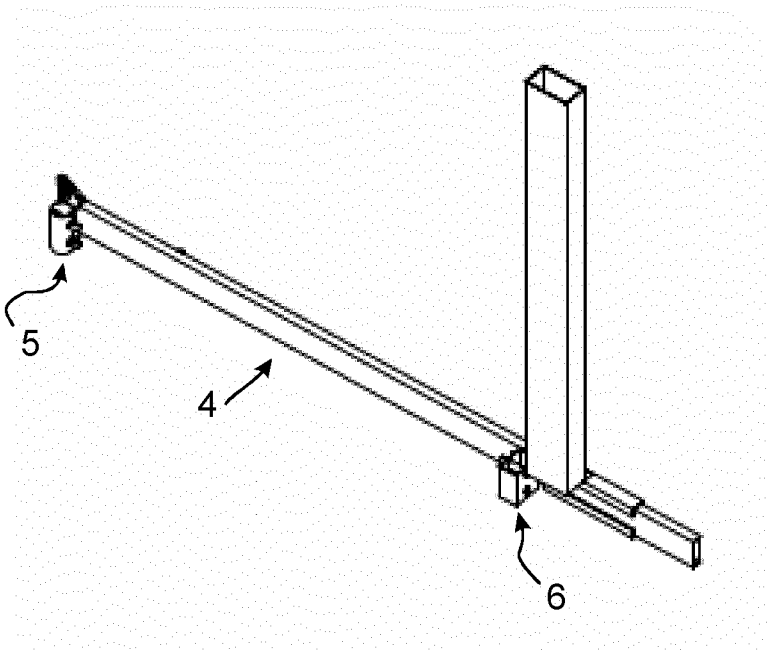

FIG. 3b

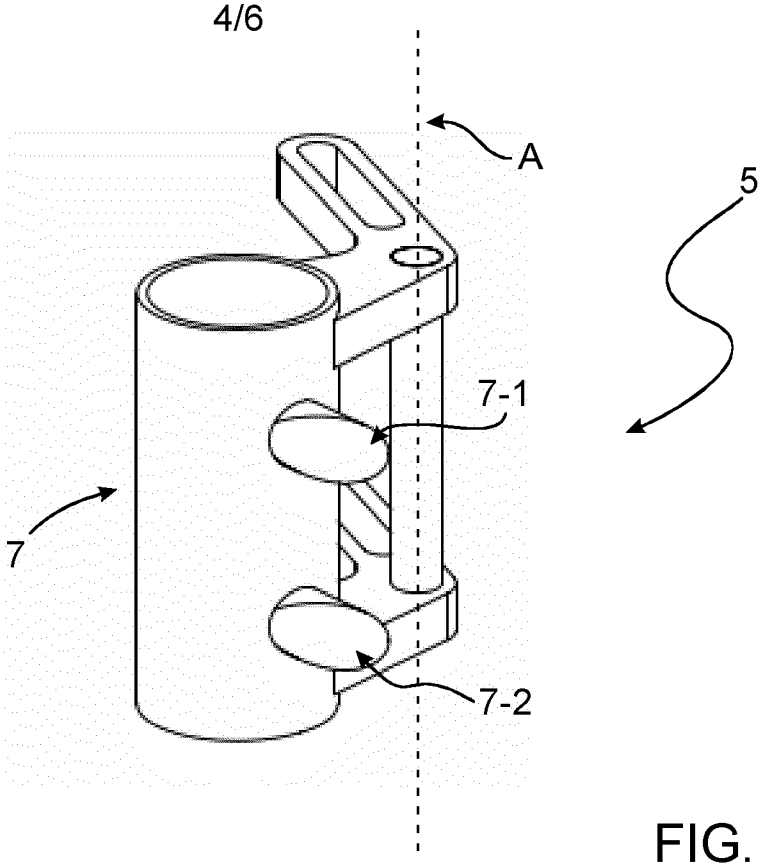

FIG. 4a

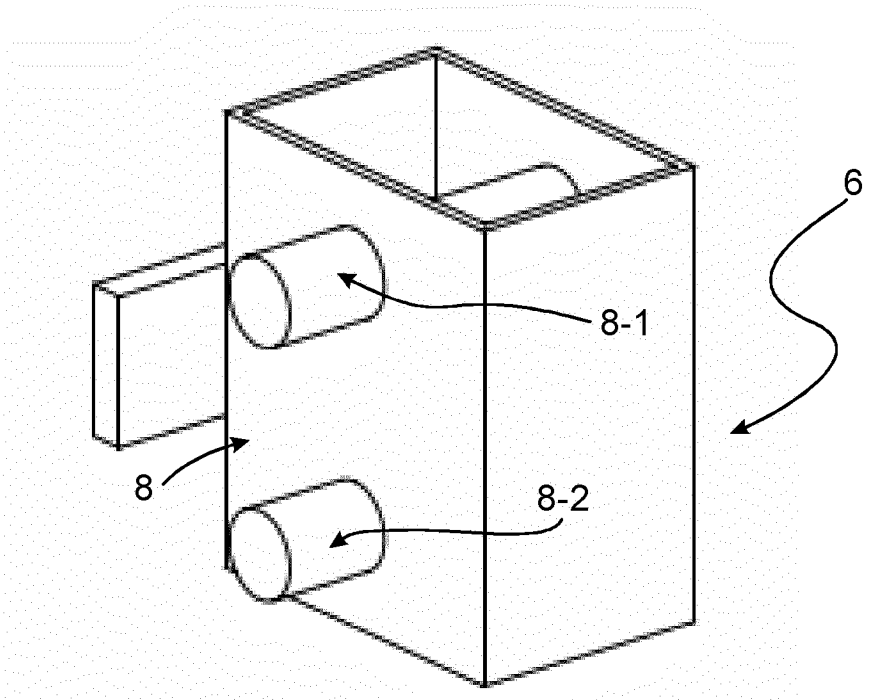

FIG. 4b

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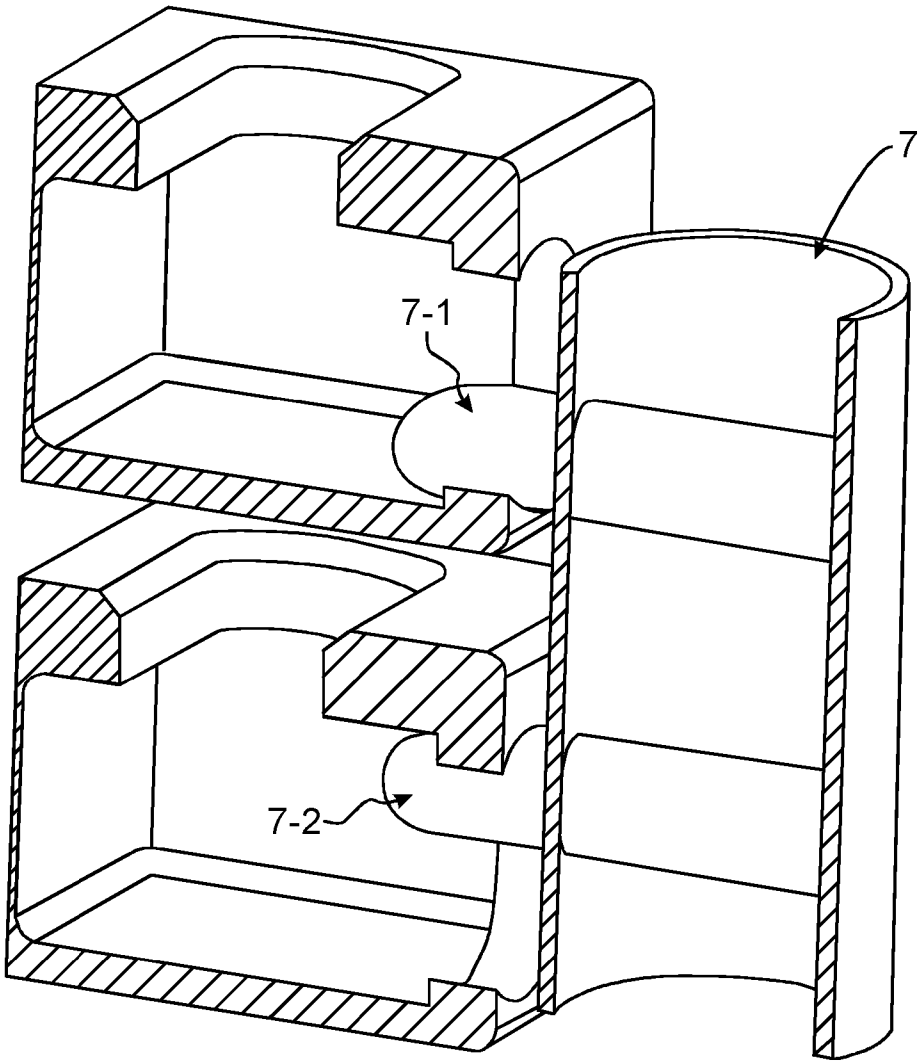

FIG. 5

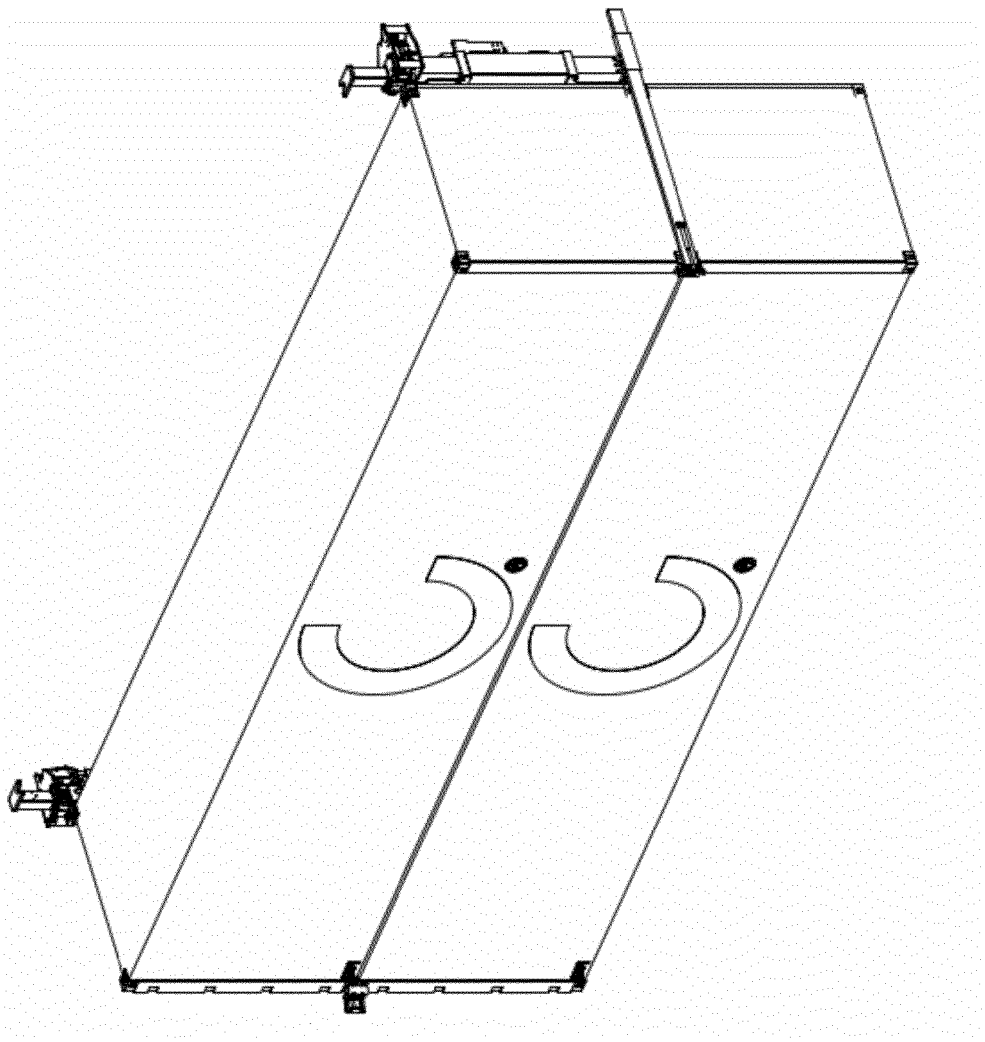

FIG. 6

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