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(71) Applicant: **Mondini Engineering S.A.**
6950 Capriasca-Tesserete (CH)

(72) Inventor: **Mondini, Stefano**
6950 Capriasca-Tesserete (CH)

(74) Representative: **Spina, Alessandro**
Società Italiana Brevetti S.p.A.
Via Carducci, 8
20123 Milano (IT)

(54) Device for collecting waste

(57) Device (100) for collecting waste, comprising a collecting column (2) adapted to be associated with a container located at least partially underground; the column (2) comprising:
- at least one outer casing (1);
- at least one door (3) which can be opened for introducing waste into the said column (2);
- at least one opening lever (4) actuatable from the outside of the said column (2);
- at least a first kinematic assembly (5) functionally associated with the said opening lever (4) and with the said outer casing (1);
- at least a second kinematic assembly (6) functionally associated with the first kinematic assembly (5) and with the said door (3) for moving, substantially by roto-translation, the said door (3) from a closed position to an open position and vice versa.

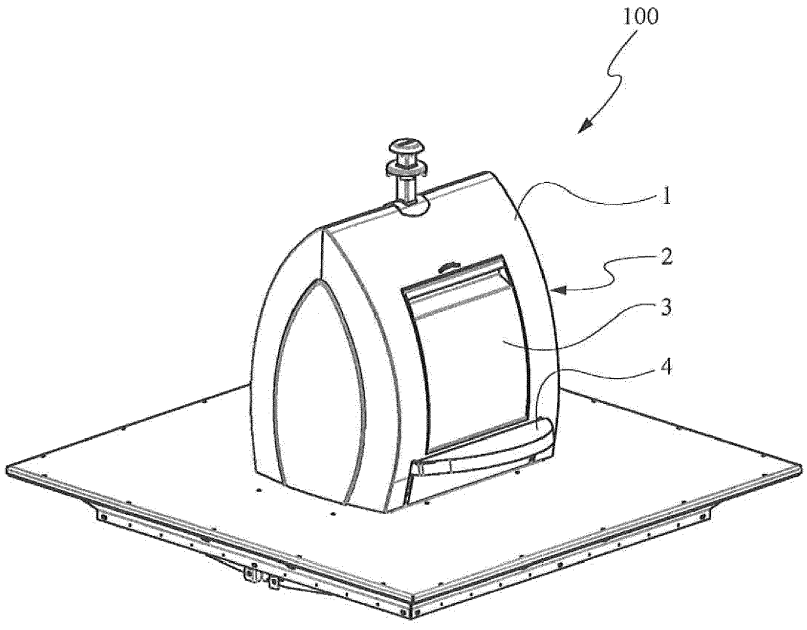

Fig. 1

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Description

[0001] The present invention relates to the field of waste collection and in particular to a device for collecting municipal waste.

[0002] These devices generally comprise a container that may be arranged under the ground for its whole height and in this case a device is provided with a collecting column protruding from the ground and suitable to receive waste.

[0003] The column is provided with a door, an opening lever and/or a board that opens or closes the door through a suitable kinematic assembly arranged between the lever and the door and operably connected thereto.

[0004] Devices of this type are disclosed e.g. in CH 697438. CH 697438 discloses a device for collecting waste comprising a container provided with a clamping member that can make a predefined stroke (A) in order to cause opening or closing of members forming the bottom of the container, the clamping member being restrained to these members by way of connecting members and rods that form a kinematic assembly.

[0005] The applicant has observed that in known devices the aperture of the column must be so configured that the outermost end of the door, i.e. the end closer to a user, is arranged at least about 70 cm above the ground, or above a possible opening board, in order to avoid that children may accidentally fall inside the waste collection device.

[0006] The applicant has also observed that in known waste collection devices wherein the door must be rotated in order to allow to access the column, the movement a user has to do in order to introduce waste is uncomfortable, poorly ergonomic and requires the user to bend towards the column and to push the bag containing waste in order to make it enter the device.

[0007] The applicant has further observed that in traditional devices wherein the door is rotated in order to allow to access the column and is driven by an opening board, it is possible that the outermost edge of the door kicks the knee of the user pushing on the board.

[0008] The applicant has found that the aforementioned problems can be overcome by way of a waste collection device that features a rotation-translation movement of the door.

[0009] In a first aspect thereof the invention relates to a device for collecting waste comprising a collecting column suitable to be associated with a container that is at least partially arranged under the ground; the column comprising:

- at least one outer casing;
- at least one door which can be opened in order to introduce waste into the column;
- at least one opening lever actuatable from the outside of the column;
- at least a first kinematic assembly functionally associated with the opening lever and the outer casing;

characterized by comprising:

- at least a second kinematic assembly functionally associated with the first kinematic assembly and the door in order to move by substantially roto-translation the door from a closed to an open position and vice versa.

[0010] The present invention, in said aspect, may comprise at least one of the preferred features that are disclosed in the following.

[0011] Conveniently, the first kinematic assembly comprises:

- at least one rocker lever hinged to the outer casing; and
- at least a first connecting rod hinged to the rocker lever and to the at least one opening lever.

[0012] Conveniently, the second kinematic assembly comprises a four-bar linkage.

[0013] The four-bar linkage preferably comprises:

- at least a second connecting rod;
- at least a portion of the door;
- at least a third connecting rod.

[0014] Conveniently, the second connecting rod is hinged at one end to the outer casing and at another end to the door.

[0015] Conveniently, the third connecting rod is hinged at one end to the door and at the other end to the outer casing.

[0016] Preferably, the third connecting rod has a length d3 measured along its prevailing extension that is smaller than or equal to the length d4 of the second connecting rod measured along its prevailing extension.

[0017] Conveniently, the relative distance d1 between the ends of the second and the third connecting rod that are hinged to the door is greater than the relative distance d2 between the ends of the second and the third connecting rod that are hinged to the outer casing.

[0018] The outer casing preferably comprises a vertical axis X-X;

- the second connecting rod being hinged to the outer casing at a distance 11 relative to the vertical axis X-X;
- the third connecting rod being hinged to the outer casing at a distance 12 relative to the vertical axis X-X, wherein 12 > 11.

[0019] Conveniently, in the closed position of the door, the second connecting rod is arranged along a line inclined relative to the vertical axis X-X, so as to form an angle α that is greater than or equal to 90°.

[0020] Conveniently, in the open position of the door the second connecting rod is arranged along a line inclined relative to the vertical axis X-X, so as to form an

angle α that is smaller than or equal to 90°.

[0021] Further advantages and features of the present invention will become clearer from the detailed disclosure preferred but non-limiting embodiments of a device for collecting waste.

[0022] The disclosure will be set forth in the following with reference to the attached drawings, which are provided for an illustrative and non-limiting purpose only, wherein:

- figure 1 is a schematic perspective view of a device for collecting waste according to the present invention;
- figure 2 is a lateral view partially showing a longitudinal section of a device for collecting waste according to the present invention, wherein the door allowing to access the column is in the closed position;
- figure 3 is a lateral view partially showing a longitudinal section of a device for collecting waste according to the present invention, wherein the door allowing to access the column is in the open position in order to allow to introduce waste into the column;
- figure 4 is a lateral view partially showing a longitudinal section of a device for collecting waste according to the present invention, wherein the door allowing to access the column is in the closed position, the first kinematic assembly being shown by way of a dashed line;
- figure 5 is a lateral view partially showing a longitudinal section of a device for collecting waste according to the present invention, wherein the door allowing to access the column is in the open position in order to allow to introduce waste into the column, wherein the first kinematic assembly is shown by way of a dashed line.

[0023] Referring to figures 1 to 5, a device for collecting waste according to the present invention is identified by the reference numeral 100.

[0024] The device 100 comprises a container, not shown in the drawings, that may be completely or partially arranged underground in the direction of its length or height, and a column 2 allowing to introduce waste, which protrudes from the ground.

[0025] The column 2 has a door 3, an opening lever 4, which is preferably in the form of a board, that drives the door in order to open or close it through suitable kinematic assemblies.

[0026] The opening lever 4 is hinged to the outer casing 1 at a pivot point 24.

[0027] The door 3 can move between a closed position, wherein it is substantially aligned with an outer casing 1 of the column 2 and does not allow to introduce waste therein, as shown in figure 2, and an open position, wherein the door is roto-translated relative to the closed position and allows to introduce waste into the column as shown in figure 3.

[0028] In particular, the column 2 features a vertical axis X-X, which is preferably an axis of vertical symmetry, and the door 3 has such a shape to form a concavity 21 facing the vertical symmetry axis X-X when the door is in the closed position (shown in figure 2) and inclined relative to the vertical axis X-X when the door 3 is in the open position (shown in figure 3).

[0029] In other words, the ends of the concavity 21 of the door 3 are arranged along a straight line (not shown in the drawings) that is inclined relative to the vertical symmetry axis X-X, the inclination being preferably suitable to define a substantially acute angle.

[0030] Moreover, in figures 2 and 3 a first kinematic assembly 5 is shown suitable to open and close the door 3. The first kinematic assembly 5 comprises at least one rocker lever 10 hinged to the outer casing 1 of the column 2, in particular to a side wall thereof, and at least a first connecting rod 11 hinged to the rocker lever 10 and to the opening lever 4.

[0031] The first connecting rod 11 is longer than the rocker lever 10.

[0032] The rocker lever 10 is hinged at one end thereof to the first connecting rod 11 and comprises a counterweight at the other end suitable to maintain the door 3 in the closed position, which counterweight is integral with the rocker lever.

[0033] The rocker lever 10 is hinged to the outer casing of the column 2 at a substantially intermediate position relative to its ends, and in particular at a point 19.

[0034] As better shown in figures 4 and 5, wherein the first kinematic assembly is shown by way of a dashed line, the device for collecting waste 100 comprises a second kinematic assembly 6 that is substantially made up of a four-bar linkage 12.

[0035] In the embodiment shown in figures 4 and 5, the four-bar linkage 12 comprises at least a second connecting rod 13, at least a portion 15 of the door 3 and at least a third connecting rod 14.

[0036] The second connecting rod 13 is hinged at one end to the outer casing 1 and at the other end to the door 3.

[0037] Similarly, also the third connecting rod 14 is hinged at one end to the outer casing 1 and at the other end to the door 3.

[0038] The third connecting rod 14 has a length d3 measured along its prevailing extension that is smaller than or equal to the length d4 of the second connecting rod 13 measured along its prevailing extension.

[0039] In the frame of the present invention, the wording "along the prevailing extension" indicates the size of a member, such as e.g. a connecting rod, measured along its major dimension.

[0040] The relative distance d1 between the ends of the second connecting rod 13 and the third connecting rod 14 that are hinged to the door 3 is greater than the relative distance d2 between the ends of the second connecting rod 13 and the third connecting rod 14 that are hinged to the outer casing 1.

[0041] In the embodiment shown in figures 4 and 5,

the second connecting rod 13 is hinged to the outer casing 1 at the pivot point 19 at a distance 11 relative to the vertical axis X-X, while the third connecting rod 14 is hinged to the outer casing 1 at a pivot point 25 at a distance 12 relative to the vertical axis X-X, wherein 12>11.

[0042] Still referring to the embodiment shown in the drawings, in the closed position of the door 3 the second connecting rod 13 is arranged along a straight line inclined relative to the vertical axis X-X so as to form an angle α that is greater than or equal to 90° (figure 4), whereas in the open position of the door 3, the second connecting rod 13 is arranged along a straight line inclined relative to the vertical axis X-X so as to form an angle α that is smaller than or equal to 90° (figure 5).

[0043] In other words, when passing from the closed to the open position of the door 3, the second connecting rod 13 rotates counterclockwise so as to reduce angle α.

[0044] Driving of the lever 4 by a user in order to introduce waste into the device 100 in fact causes the rocker lever 10 and the second connecting rod 13 to rotate counterclockwise. Since distance d1 is fixed, this movement determines the rotation of the third connecting rod 14 as well, which rotates clockwise at first and then counterclockwise in order to reach the position shown in figure 5. The movement of the four-bar linkage 12 described above, and in particular the movement of the second and the third connecting rod 13, 14 determines the roto-translation of the door 3.

[0045] In other words, the door 3 and in particular its proximal end 26 (from the user's point of view) perform a roto-translation movement relative to its pivot points, thus remaining at a predefined height relative to the ground and in particular relative to the opening lever 4.

[0046] The present invention has been disclosed with reference to some embodiments thereof. Several modifications may be made to the embodiments disclosed in detail, while remaining within the scope of protection of the invention as defined in the following claims.

Claims

1. Device (100) for collecting waste, comprising a collecting column (2) adapted to be associated with a container located at least partially underground; the column (2) comprising:

   - at least one outer casing (1);
   - at least one door (3) which can be opened for introducing waste into the said column (2);
   - at least one opening lever (4) actuatable from the outside of the said column (2);
   - at least one first kinematic assembly (5) functionally associated with the said opening lever (4) and with the said outer casing (1);

   characterized by comprising

   - at least one second kinematic assembly (6) functionally associated with the first kinematic assembly (5) and with the said door (3) for moving, substantially by roto-translation, the said door (3) from a closed position to an open position and vice versa.

2. Device (100) for collecting waste according to claim 1, **characterized in that** said first kinematic assembly (5) comprises:

   - at least one rocker lever (10) hinged to said casing (1); and
   - at least one first connecting rod (11) hinged to said rocker lever (10) and to said at least one opening lever (4).

3. Device (100) for collecting waste according to claim 1 or 2, **characterized in that** said second kinematic assembly (6) comprises a four-bar linkage (12).

4. Device (100) for collecting waste according to claim 3, **characterized in that** said four-bar linkage (12) comprises:

   - at least a second connecting rod (13);
   - at least a portion (15) of the said door (3);
   - at least a third connecting rod (14).

5. Device (100) for collecting waste according to claim 4, **characterized in that** said second connecting rod (13) is hinged at one end to said outer casing (1) and at another end to the said door (3).

6. Device (100) for collecting waste according to claim 4, **characterized in that** said third connecting rod (14) is hinged at one end to said door (3) and at another end to said outer casing (1).

7. Device (100) for collecting waste according to claim 4, **characterized in that** said third connecting rod (14) has a length d3 measured along its prevailing extension smaller than or equal to the length d4 of the said second connecting rod (13) measured along the prevailing extension of the latter.

8. Device (100) for collecting waste according to claim 4, **characterized in that** the mutual distance d1 between the ends of the second (13) and third (14) connecting rods that are hinged to said door (3) is greater than the mutual distance d2 between the ends of the second (13) and third (14) connecting rods that are hinged to the said outer casing (1).

9. Device (100) for collecting waste according to claim 4, **characterized in that** the said outer casing (1) comprises a vertical axis X-X:

   - the second connecting rod (13) being hinged to the said outer casing (1) at a distance 11 from

the vertical axis X-X;
- the second connecting rod (14) being hinged to the said outer casing (1) at a distance 12 from the vertical axis X-X, wherein 12>11.

10. Device (100) for collecting waste according to claim 4, **characterized in that** in a closed position of the door (3) the said second connecting rod (13) is positioned along a straight line inclined relative to the said vertical axis X-X so as to form an angle α greater than or equal to 90°.

11. Device (100) for collecting waste according to claim 4, **characterized in that** in an open position of the door (3) the said second connecting rod (13) is positioned along a straight line inclined relative to the said vertical axis X-X so as to form an angle α smaller than or equal to 90°.

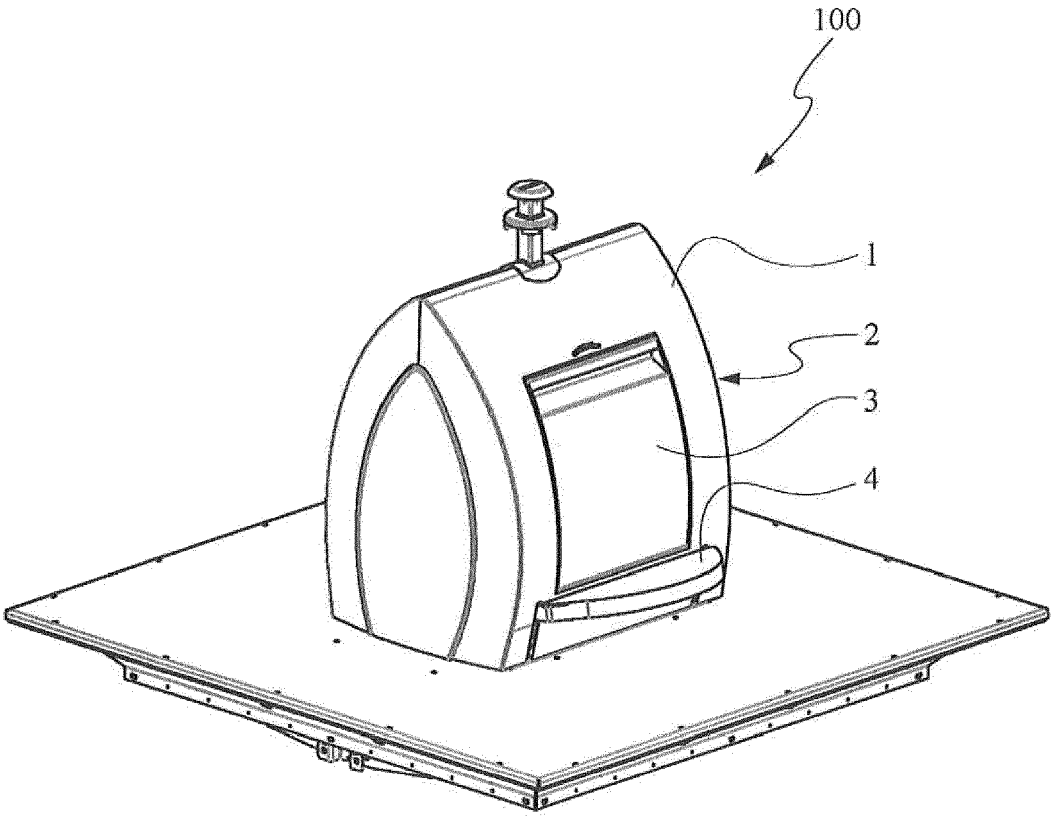

Fig. 1

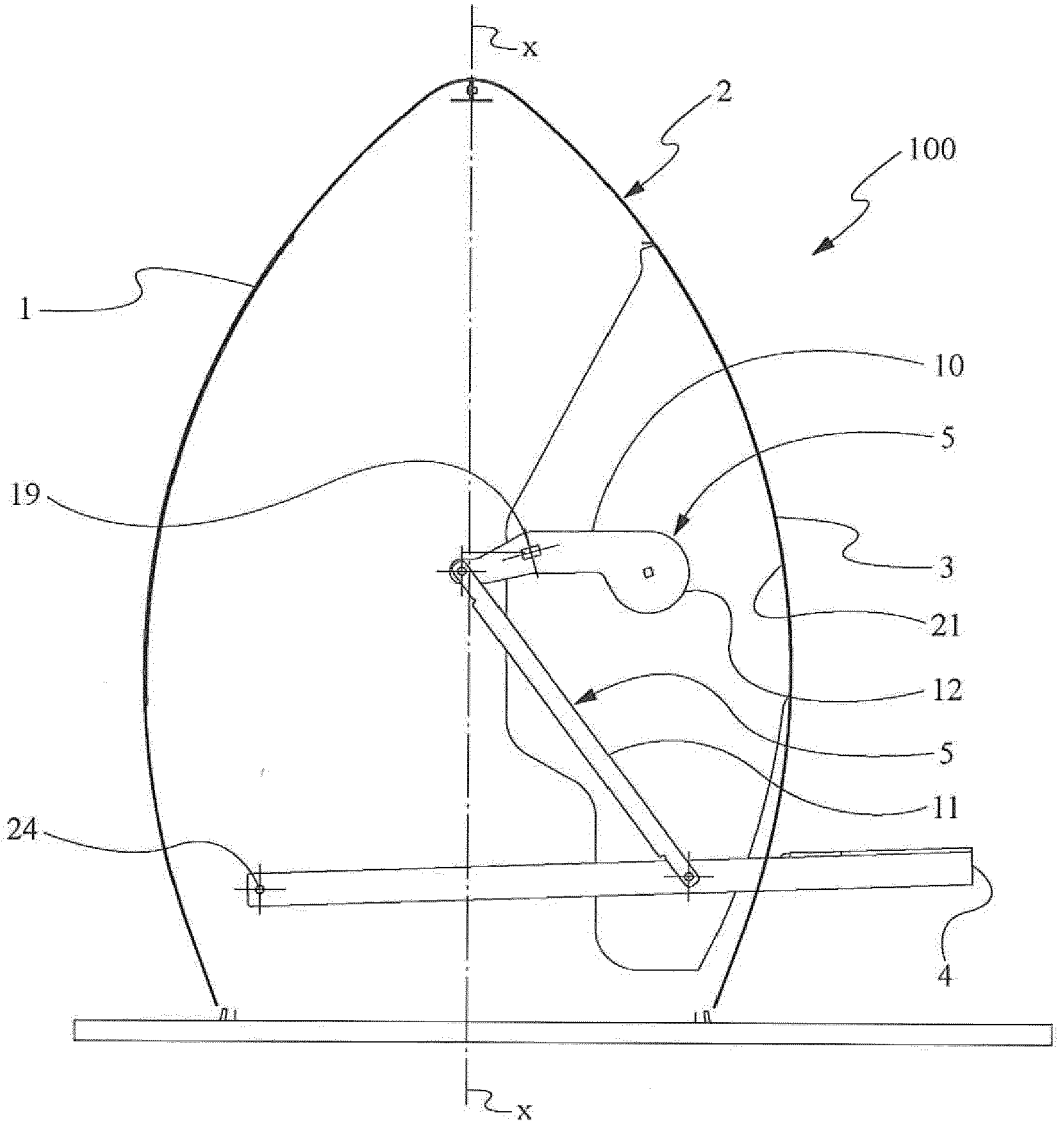

Fig. 2

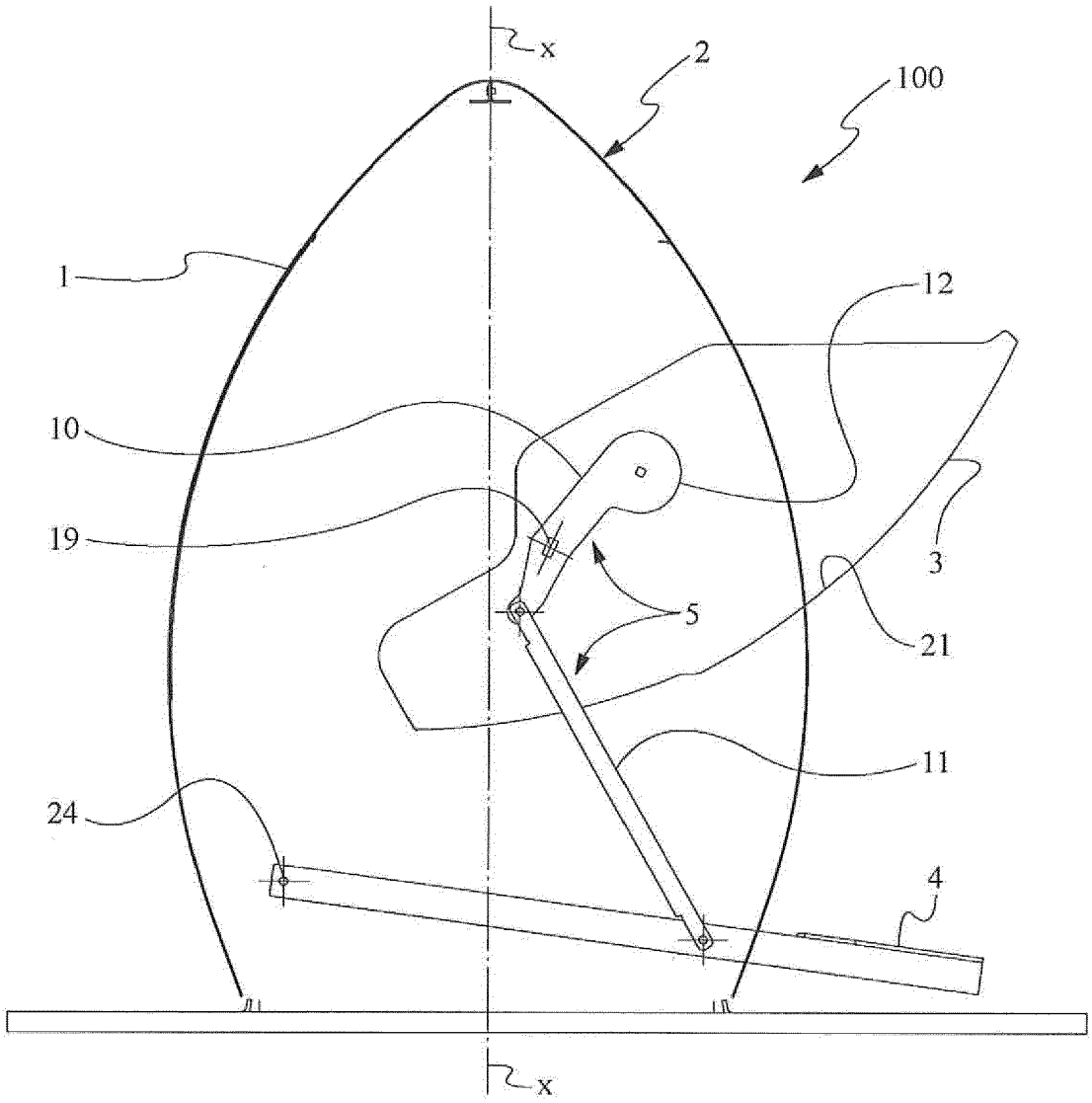

Fig. 3

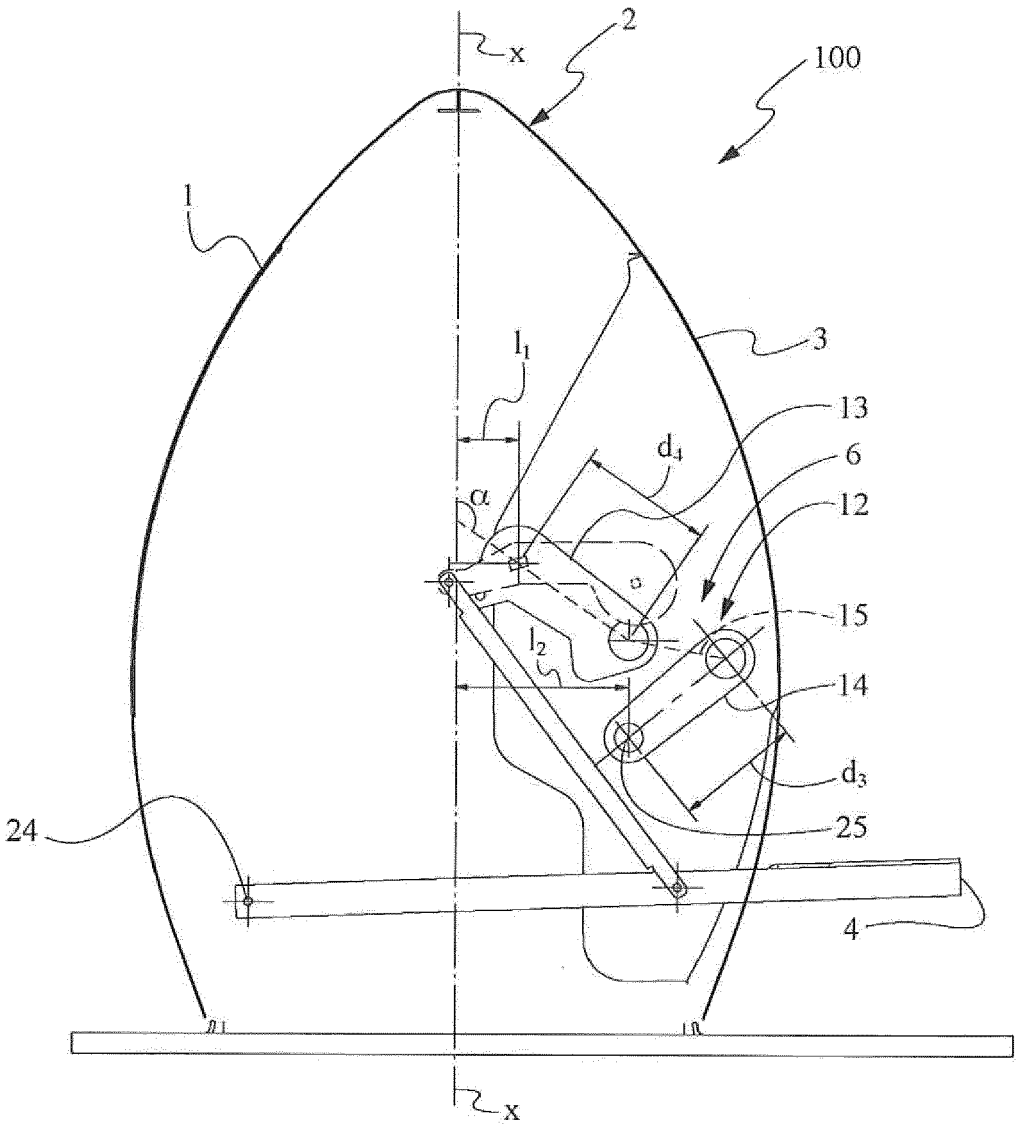

Fig. 4

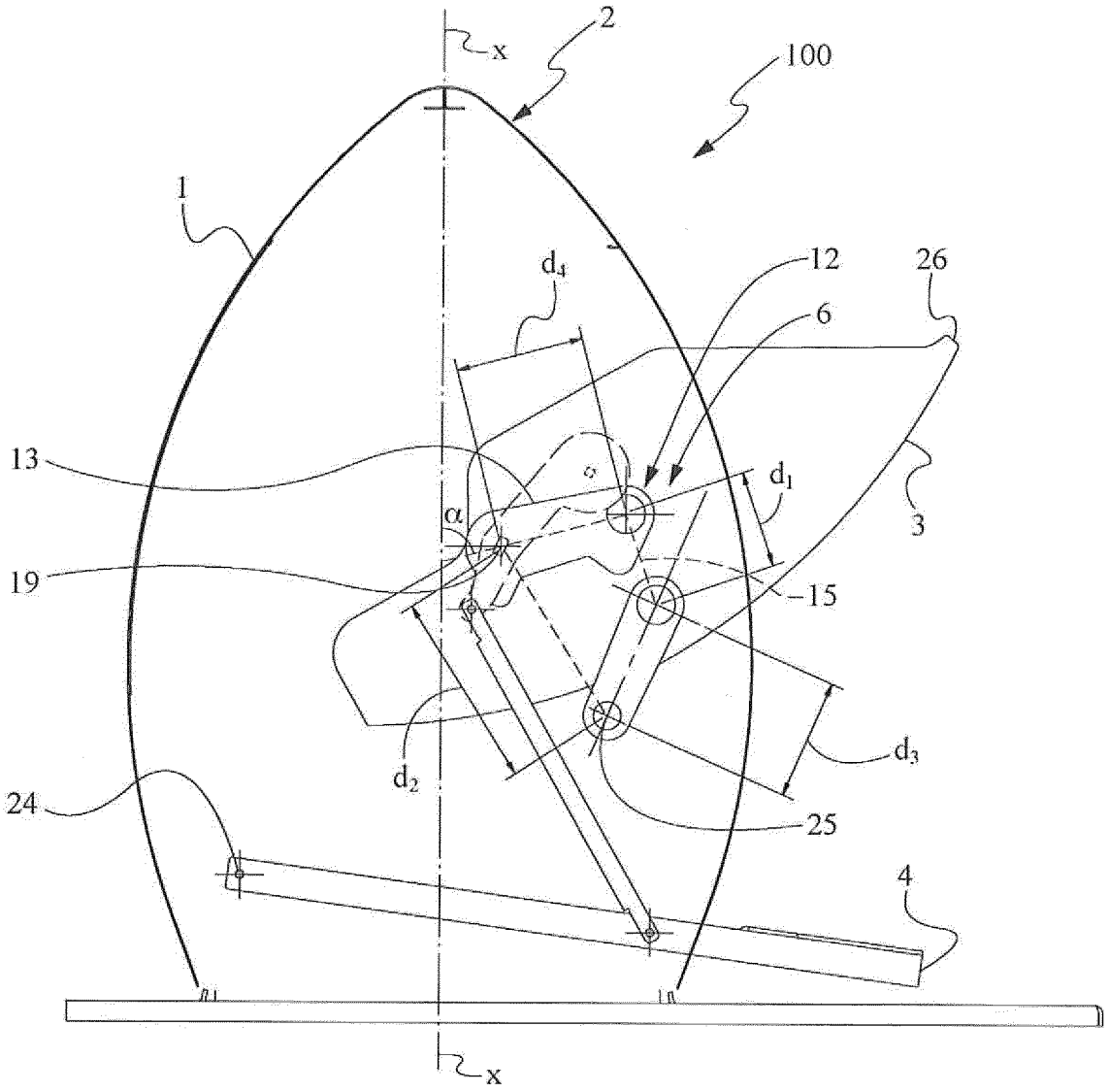

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 4242

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	WO 2007/120086 A1 (ENVAC CENTRALSUG AB) 25 October 2007 (2007-10-25) * page 5, line 17 - page 8, line 29 * * page 10, line 8 - page 12, line 12 * * figures 1,2,7,8 * -----	1	INV. B65F1/10 B65F1/16
A	EP 0 915 034 A1 (MATURI E SAMPIETRO S.A.) 12 May 1999 (1999-05-12) * paragraph [0010] - paragraph [0019] * * figures 1,2 * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 March 2013	Smolders, Rob

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 19 4242

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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22-03-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007120086 A1	25-10-2007	NONE	
EP 0915034 A1	12-05-1999	AT 4450 U1	25-07-2001
		CH 690432 A5	15-09-2000
		EP 0915034 A1	12-05-1999

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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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Patent documents cited in the description

- CH 697438 **[0004]**