(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 115 318 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.01.2017 Bulletin 2017/02

(51) Int Cl.:
B65F 1/12 *(2006.01)*

(21) Application number: **15380028.9**

(22) Date of filing: **08.07.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(71) Applicant: **Palvi, S.L.**
25310 Agramunt (Lleida) (ES)

(72) Inventors:
- **Padullés Omedes, Albert**
  25310 Agramunt (Lleida) (ES)
- **Domènech Mestres, Carlos**
  08030 Barcelona (ES)

(74) Representative: **Juncosa Miro, Jaime et al**
Torner, Juncosa i Associates, S.L.
Gran Via de les Corts
Catalanes, 669 bis, 1º, 2ª
08013 Barcelona (ES)

(54) **WASTE CONTAINER WITH AN OPENING MECHANISM OF LOWER GATES**

(57) The present invention relates to a waste container with a lower gate opening mechanism operable by means of interaction of a holding and operating device with an operating head (12) connected to the gates by means of a kinematic chain, converting a movement of the operating head (12) into a larger movement of the gates (14); wherein said multiplier mechanism (20) integrates a knee mechanism (21) formed by a first bar (1) with a first end articulated with respect to the container and a second end articulated with respect to a first end of a second bar (2), which in turn has a second end articulated with respect to a movable part of the multiplier mechanism (20), a point of the knee mechanism (21) being connected to the operating head (12) by means of an articulated third bar (3), the first and second bars being almost aligned in the closed gate position.

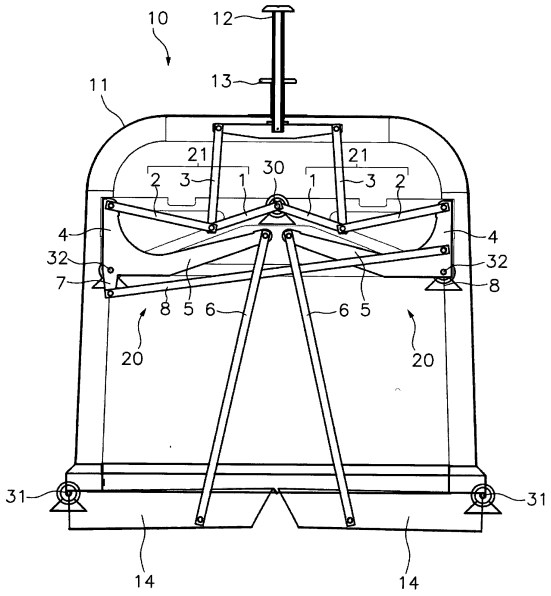

Fig. 1

EP 3 115 318 A1

Description

Field of the Art

[0001] The present invention relates to the field of waste containers with a lower gate opening mechanism operable by means of interaction with a container holding and gate mechanism operating device by means of an operating head, the holding and operating device being attached to a container lifting arm.

State of the Art

[0002] Waste containers provided with an internal mechanism envisaged for controlling and operating the opening and closing of lower gates of the container from an operating head arranged in the upper half of the container are known, said operating head being kinematically connected to said lower gates.

[0003] Such containers are typically gripped by their upper half by means of a holding and operating device connected to a lifting arm transported in a waste collection truck. After holding the container, the lifting arm lifts up the container and keeps its lower gates closed during this operation as a result of the interaction of said holding and operating device with the mentioned operating head of the container. When the container has been located over the waste collection truck, the holding and operating device manipulates the operating head of the container, causing the opening of the gates and emptying of the waste content by gravity.

[0004] For example, patent document EP1172308 describes a mechanism of this type in which the gate opening mechanism is furthermore designed for amplifying movement, such that a small movement of the head causes a large movement of the lower gates, which allows reducing the size of the holding and operating device, but in this case the described solution is limited to a lever mechanism which, in addition to the movement amplifying effect, also causes the weight of the stored waste on the lower gates to be transmitted to the operating head amplified by the same lever mechanism, being able to transmit extreme loads to both the structure of the container and the holding and operating device that must interact with the operating head.

[0005] Patent document US6276888 also describes a solution of this type, i.e., in which the gate opening mechanism is designed for amplifying movement, but in this case, a latch mechanism keeping the gates closed by bearing the weight on the latch is used to prevent the aforementioned problem, and said latch being connected to the gate opening mechanism such that upon operating the operating head, the latch is withdrawn and the gates open, so said mechanism, the operating head and the holding and operating device only have to bear the weight of the gates when the container is empty, during the gate closing operation after the emptying thereof and until the latch is closed again, but without preventing the mentioned transmitted load multiplying effect.

[0006] Patent document EP269532 also discloses an opening mechanism amplifying movement of the operating head, but in this case, the transmitted loads are also amplified without any solution having being envisaged for said problem.

[0007] A mechanism made up two bars articulated to one another, the first of said bars also being articulated with respect to a point of a movable vertical bar and the other bar being articulated with respect to a gate, is also known by means of patent document ES2147102A 1.

[0008] Said movable vertical bar includes a retainer for the mentioned bars which can be released by applying a vertical force overcoming a spring, after which the mentioned bar mechanism remains open and the bars are extended, prolonging the length of the movable vertical bar and allowing its vertical travel. After the mentioned extension of the bars, the mechanism can be tightened to keep the gates closed during lifting, or it can be loosened to open the gates.

[0009] Therefore, since the bar mechanism is in a folded position and is retained by the retainer, the length of the vertical bar plus the length of the bar mechanism prevents the vertical travel of the mentioned movable vertical bar, so the gates cannot be opened without first releasing the mentioned retainer.

Brief Description of the Invention

[0010] The present invention relates to a waste container with a lower gate opening mechanism operable by means of interaction with a holding and operating device attached to a container lifting arm, said container according to a structure which by itself is well known in this field of the art including:

- a waste storage receptacle provided with waste inlets in its upper half and with a discharge opening on its lower face;
- one or more gates articulated with respect to the receptacle to allow the movement therebetween a closed position in which said one or more gates completely block the discharge opening, and an open position in which they free up the discharge opening which allows emptying the receptacle by gravity;
- a handle attached to the upper half of the receptacle to allow holding and lifting thereof through said holding and operating device;
- an operating head accessible from outside the receptacle and located in the upper half thereof, said operating head including an axially movable rod envisaged for allowing the interaction thereof with the mentioned holding and operating device; and
- a multiplier mechanism integrated in said receptacle connecting the operating head with the one or more gates by means of a kinematic chain, transmitting movement of the operating head into a larger movement of the gates.

[0011] The container has a receptacle closed on its lower face by one or more gates which remain closed when the container is supported on the ground. Openings envisaged in the upper half of the receptacle allow users to throw waste into the container, said waste accumulating inside the container on top of the mentioned one or more gates. The receptacle also includes a handle in its upper half which allows being able to firmly grip and lift the container by means of a holding and operating device, usually attached to the end of a crane arm transported in a waste collection truck.

[0012] The container also includes in its upper half an operating head accessible from outside the container. Said operating head is mechanically connected by means of a multiplier mechanism with the lower gate or gates of the receptacle, such that their opening and closing is controlled from said operating head which is operated by the mentioned holding and operating device when it is attached to the handle.

[0013] The mentioned multiplier mechanism is integrated in the receptacle and connects the gates with the operating head by means of a kinematic chain, such that movement of the mentioned operating head produces a larger movement of the gate or gates, which allows the holding and operating device to be able to be compact, requiring a small movement range of the operating head.

[0014] The invention proposes, in a novel manner, for said multiplier mechanism to be formed based on a knee mechanism formed by a first bar with a first end articulated with respect to the receptacle and a second end articulated with respect to a first end of a second bar, which in turn has a second end articulated with respect to a movable part of the multiplier mechanism, a point of the knee mechanism, located between the first end of the first bar and the second end of the second bar, being kinematically connected with the rod of the operating head by means of at least one articulated bar, said kinematic connection determining a movement of said point of the knee mechanism due to the operation of the operating head, modifying the angle formed by the intersection between a first axis defined by the first bar and a second axis defined by the second bar, between a gate closing position, in which the smaller angle formed by said intersection of the first axis and the second axis is between 0° and 40°, and a gate opening position in which the intersection of said first and second axes forms a second angle greater than the first angle.

[0015] For the sake of clarity of the present description, it will be understood that a bar is a rigid body attaching two interaction points with other bars, with articulations or with other mechanisms, without preventing said bar from being able to include other additional interaction points. Furthermore, it will be considered that the direction or the axis defined by said bar is the straight line joining said two interaction points, regardless of the geometric shape of the actual solid body forming said bar.

[0016] It must also be pointed out that when the gates of the container are closed, the receptacle is filled with waste and the container is lifted from the ground, said waste rests on the lower gates and its weight is transmitted through the kinematic chain of the multiplier mechanism in the form of loads that end up being transmitted to both the receptacle and the operating head. Since it is a multiplier mechanism that typically serves as lever mechanisms to produce said movement multiplication, while at the same time the movement of the operating head to the gates is multiplied, multiplication of the load deposited on the gates up to the operating head takes place, since the force applied on a lever is the product of the length of the lever arm (although it also occurs in other mechanisms, such as in pulley mechanisms for example). This can entail a problem since the waste can represent a great load which, if furthermore amplified by the mentioned effect, can transmit undesirable enormous loads.

[0017] To prevent this destructive effect, the described knee mechanism is designed such that the load transmitted to it from the gates through the multiplier mechanism is broken down such that a main component of said load is in the direction of the first bar, perpendicular to the axis of rotation of the first end of said first bar with respect to the receptacle, and therefore said main component is counteracted by a reaction force having the same intensity and an opposite direction from said articulation, therefore being canceled and distributed through the structure bearing said articulation, without being transmitted to the operating head. Transmission of the main component of the force to the operating head is thereby prevented, only a secondary component of said force, having a magnitude substantially lower than the main component, being transmitted.

[0018] To achieve that effect, when the gates of the container are closed, i.e., when the load of the waste is maximum, the mentioned first and second bars are aligned with one another or with a maximum deviation of 40° with respect to said aligned position. This can be achieved by either the first and second bars being arranged one after the other, forming between both an obtuse angle between 140° and 180°, or by both bars being superposed or almost superposed, forming an acute angle between 0° and 40° with respect to one another. In any of these two positions, the first and second axes defined by the first and second bars, respectively, form by means of their intersection four angles, the smallest angles measuring between 0° and 40°.

[0019] Additionally, it is optionally proposed that the angle formed by the first bar and the second bar in the gate closing position is an obtuse angle between 150° and 180°, or an acute angle between 0° and 30°, i.e., the smallest angles formed by the intersection of the first and second axes are between 0 and 30°.

[0020] The rest of the multiplier mechanism, from the knee mechanism to the gate, is described below, each of the elements of said mechanism being an example of possible embodiment.

[0021] Therefore, according to one embodiment the

mentioned movable part of the multiplier mechanism to which the second end of the second bar is articulated is a first end of a fourth bar articulated at a second end with respect to a fixed point of the receptacle, and having a fifth bar rigidly and integrally attached at a first end to the fourth bar, and a second end of the fifth bar being connected to the rest of the multiplier mechanism, the fifth bar being of greater length than the fourth bar.

[0022] In other words, a rigid assembly formed by the attachment of a fourth bar and a fifth bar is articulated with respect to the receptacle, said rigid assembly being able to be L-shaped, V-shaped, T-shaped or triangular shaped, for example, a point of said rigid assembly located away from the articulation with the receptacle being articulated with respect to the second end of the second bar.

[0023] The greater length of the fifth bar with respect to the fourth bar causes movement of the first end of the fourth bar to be transformed into a larger movement of the second end of the fifth bar, movement multiplication being produced.

[0024] Additionally, it is proposed that the first end of said fifth bar is attached to the fourth bar forming an angle between 50° and 130°, said angle being more preferably between 80° and 100°.

[0025] Subsequently it is proposed that a first end of a sixth bar is articulated with respect to the second end of the fifth bar, and a second end of the sixth bar is articulated with respect to one of the gates, therefore transmitting the swinging movement of the mentioned rigid body formed from the fourth and fifth bars, to the gates, causing the opening or closing thereof.

[0026] It is also contemplated that the distance between the first and second ends of the fifth bar is greater than the distance between the articulation of the gate with respect to the receptacle, and the articulation point of the sixth bar with the mentioned gate. This feature causes the swinging movement of the mentioned rigid body to be amplified when being transmitted to the gate, a larger swinging movement being achieved.

[0027] According to another embodiment, it is proposed that the multiplier mechanism is housed at least 15 cm from a side face of the storage receptacle, leaving the central portion of said receptacle clear, facilitating the filling thereof.

[0028] It is also contemplated that the multiplier mechanism operating one and the same gate is symmetrically duplicated on opposite sides of the container, operating said gate from its two ends.

[0029] In another additional embodiment, the container has two lower gates operated by means of two symmetrical multiplier mechanisms, both connected to one and the same operating head.

[0030] In this case, the first ends of the first bars of the two symmetrical multiplier mechanisms will preferably be articulated with respect to one and the same shared articulation point, connected to the receptacle. Additionally, it is also proposed that, in the gate closing position, the first bars of the two symmetrical multiplier mechanisms form a third angle between 135° and 180° with respect to one another.

[0031] This last feature allows the main component of the forces transmitted on the articulation shared by the two first bars symmetrically arranged on opposite sides of said articulation to counteract one another, since the fact that said two first symmetrical bars are aligned or almost aligned will cause the main component of the load transmitted by both first bars to the shared articulation to have similar intensity and opposite directions, thereby canceling one another and preventing transmission of said main component of the load to the structure bearing the articulation and the multiplier mechanism.

[0032] An additional embodiment contemplates that both symmetrical multiplier mechanisms are connected and coordinated with one another by means of a torsion bar, forcing each multiplier mechanism to symmetrically reproduce the movement of the other multiplier mechanism.

[0033] In this case, the mentioned torsion bar will have an end connected to a point of the fourth bar of a multiplier mechanism, said point being separated a distance with respect to the second end of the fourth bar, and an opposite end connected to a point of the other symmetrical multiplier mechanism, specifically to a point of a seventh bar aligned with the fourth bar and integral therewith, being prolonged after the second end of said fourth bar, the distance between said end of the torsion bar and the second end of the fourth bar being identical at both ends of the torsion bar.

[0034] It will be understood that references to geometric positions such as, for example, parallel, perpendicular, tangent, etc., allow deviations of up to $\pm 5°$ with respect to the theoretical position defined by said nomenclature.

[0035] Other features of the invention will be described in the following detailed description of an embodiment.

Brief Description of the Drawings

[0036] The foregoing and other advantages and features will be more clearly understood based on the following detailed description of an embodiment in reference to the attached drawings which must be interpreted in an illustrative and non-limiting manner, in which:

Figure 1 shows a cross-section of a container according to one embodiment in which the container has two lower gates operated by two symmetrical multiplier mechanisms operated by one and the same operating head, said gates being in a closed position, schematically showing the articulations of the gates and of the multiplier mechanism with respect to the receptacle;

Figure 2 shows the same container shown in Figure 1 from the same point of view, but the lower gates being in an open position.

Detailed Description of an Embodiment

[0037] Figure 1 and Figure 2 show a non-limiting, illustrative embodiment according to which the proposed container 10 includes a receptacle 11 having a square or rectangular bottom formed by four walls and a roof attached to one another, the base of said receptacle 11 being open. A pair of symmetrical gates 14 are envisaged for jointly blocking said lower opening in the gate closing position (Figure 1), each gate 14 covering one half of the opening, and each gate 14 being articulated with respect to one of the walls of the receptacle 11 by means of a gate articulation 31.

[0038] The receptacle 11 also includes openings in its upper half (not shown) to allow filling the receptacle 11 with waste.

[0039] There is included in the center of the roof of the receptacle 11 a mushroom-shaped handle 13 firmly attached to said receptacle 11, which allows a holding and operating device (not shown) of the multiplier mechanism, the mentioned device being attached to a crane arm of a collection vehicle, to hold the container 10 through said handle 13, and lift same until it is placed over the vehicle for emptying. However, said operation would cause, due to gravity, the lower gates 14 of the container 10 to open and the waste to fall before reaching the unloading position over the vehicle. For that reason, a multiplier mechanism 20 is included inside the receptacle 11 mechanically connecting by means of a kinematic chain the lower gates 14 with an operating head 12 located in the upper half of the receptacle 11, in this case, a mushroom-shaped operating head 12 coaxial with the handle 13 and going through said handle 13, projecting from its upper end.

[0040] This allows the movement of said operating head 12 to determine the movement of the lower gates 14 since they are connected, so the interaction of the operating head 12 with the mentioned holding and operating device allows said device to manipulate the operating head 12, and therefore control the opening and closing of the gates 14.

[0041] Said multiplier mechanism 20 produces a movement multiplication, converting relatively small movement of the operating head 12 into a much larger movement of the gates 14. In this example, it is contemplated that axial movement of about 20 cm of the operating head 12 causes an opening between 80° and 90° of the gates 14, the end of said gates 14 being moved more than 100 cm.

[0042] Said multiplier mechanism 20 is made up of a set of connected rigid bars that achieve the multiplying effect as a result of the ratios of distances between their articulation points. In addition to multiplying the movement from the operating head 12 to the gates 14, said multiplier mechanism 20 also causes the weight of the stored waste on the gates 14 to be transmitted through the multiplier mechanism 20 to the operating head 12 upon lifting the container 10, and if no specific solution is applied, said load of the waste is multiplied due to the effect of the multiplier mechanism 20, since the same ratio of distances between the articulation points of said mechanism multiplying the movement also multiply the transmitted forces caused by said weight of the waste.

[0043] The proposed multiplier mechanism 20 is symmetrically repeated in the form of two multiplier mechanisms 20, one for the operation of each of the two gates 14, and furthermore each of said multiplier mechanisms 20 is also duplicated on both sides of the receptacle 11, freeing up the central space of the receptacle 11 for waste accumulation, such that each gate 14 is simultaneously operated from both sides by two symmetrical multiplier mechanisms 20. Therefore, each container 10 includes four identical multiplier mechanisms 20 coordinated with one another, two multiplier mechanisms 20 being responsible for operating one gate 14, and the other two mechanisms being responsible for operating the other gate 14. The four multiplier mechanisms 20 are simultaneously operated from a single operating head 12 to which they are all connected.

[0044] Said operating head 12 can be moved axially guided through the inside of the handle 13, and it includes at its lower end a rigidly attached structure which moves vertically together with the operating head 12. Said rigid structure has four articulations, one for each of the four symmetrical multiplier mechanisms 20, and a first end of a rigid third bar 3 transmitting the vertical movement of the operating head 12 is articulated to each of them.

[0045] Three articulation points which cannot move with respect to said receptacle 11 are arranged in each of two opposite side walls of the receptacle 11. A central articulation point 30 is located in the center of symmetry of the multiplier mechanisms 20 operating different gates 14, and the other two points are symmetrical articulation points 32 symmetrically arranged in said wall, a distance away from the central articulation 30.

[0046] Two rigid first bars 1, each of a different multiplier mechanism 20, are attached at a first end thereof to each of said central articulation points 30. A second end of each first bar 1 is simultaneously articulated with a second end of one of the third bars 3 and with a first end of a rigid second bar 2. Each multiplier mechanism 20 furthermore has fourth and fifth bars 4 and 5 which are rigidly attached to one another, forming an L-shaped arm or a rigid body, which bars are articulated at the intersection with respect to one of the symmetrical articulations 32, the first end of the fourth bar 4 being attached to the second end of the second bar 2, and the second end of the fourth bar 4 being articulated with respect to the symmetrical articulation point 32 rigidly attached to the first end of the fifth bar 5 forming an angle of about 90°.

[0047] This mechanism causes the vertical movement of the operating head 12 to result in simultaneous swinging of all the first bars 1 of the four multiplier mechanisms 20, and also the identical rotation of all the L-shaped arms formed by the attachment of the fourth and fifth bars 4 and 5.

[0048] Finally, the second end of each fifth bar 5 is connected to a first end of a sixth bar 6 which in turn has a second end connected to a gate 14, transmitting movement of the operating head 12 to said gate 14.

[0049] The ratio of distances existing between the central articulation point 30 and each symmetrical articulation point 32, as well as the length of each of the bars determines that the movement is being amplified. For example, the fourth bar 4 is shorter than the fifth bar 5, so the movement will be larger in the second end of the fifth bar 5 than in the first end of the fourth bar 4, when both bars have the same angular rotation, amplification being produced. Similarly, the length of the fifth bar 5 is greater than the distance existing between the second end of the sixth bar 6 and the gate articulation 31, also causing movement amplification.

[0050] To prevent said multiplier mechanism 20 from having the problem described above, i.e., the multiplication of load transmitted from the gates 14 to the operating head 12, a knee mechanism 21 integrated in the multiplier mechanism 20 is included.

[0051] The knee mechanism 21 is formed by the attachment of the first bar 1 with the second and third bars 2 and 3, and with the central articulation point 30 described above, but the lengths and positions of each of the bars of the multiplier mechanism 20 and of the articulation points being sized such that when the gates 14 are in a closing position, the first and second bars 1 and 2 are almost aligned or with a deviation less than 30° with respect to said aligned position.

[0052] A bar articulated at its two ends can only transmit tensile or compressive loads in the direction of the axis of the mentioned bar. The limited angle existing between the first and second bars 1 and 2 causes the main component of the load transmitted to the second bar 2 from the gate 14 to be transmitted through the first bar 1 to the central articulation point 30, and only a secondary component of the load is transmitted through the third bar 3 to the operating head 12, which thereby prevents transmitting most of the load to said operating head 12.

[0053] Therefore, since the container 10 is lifted with the gates 14 closed, the sixth bar 6 is subjected to traction, causing a bending moment on the fifth bar 5, which in turn transmits same to the fourth bar 4. The first end of the fourth bar 4 pushes the second end of the second bar 2 transmitting said load in the form of compression of the second bar 2 in the same direction as said second bar 2. Said compression aims to move the first end of the second bar 2 connected with the first bar 1 and with the third bar 3 by means of an articulation, but if the first end of the first bar 1 cannot move since it is attached to the central articulation point 30, and the third bar 3 cannot move either without also moving the operating head 12, said load can only be distributed as tensile or compressive forces from said first and third bars 1 and 3.

[0054] The almost aligned position of the first and second bars 1 and 2 causes said breaking down of the load to have a main component which is assumed by the first bar 1 in the form of compression thereof, and finally transmitting said load in the mentioned central articulation point 30, leaving only a secondary component of the load transmitted by the third bar 3 to the operating head 12, thereby preventing unwanted overloading of the operating head 12, or of the holding and operating device interacting with said operating head 12.

[0055] Furthermore, since the central articulation point 30 is shared by two symmetrical first bars 1, a large part of said main component of the load is canceled by the main component of the load transmitted by the symmetrical first bar 1, transmitting a load having the same intensity but of the opposite direction.

[0056] Ideally, both first bars 1 will be aligned in a closed gate position (Figure 1), the main component of the load being completely counteracted without transmitting any load to the bearing structure of the central articulation point 30. However in the present embodiment shown in the drawings, said two first bars 1 will form an angle of about 140°, such that most of the main component of the load will be counteracted, but a small part of said main component will be transmitted to the bearing structure of the central articulation point 30.

[0057] With the proposed mechanism, when the gates 14 are in the open position the knee mechanism 21 loses said property of having the first and second bars 1 and 2 almost aligned, and therefore the main component of the load is no longer canceled or compensated for; however, when the gates 14 are in said opening position, the waste falls by gravity and is no longer supported on the gates 14, so the multiplier mechanism 20 only transmits the actual weight of said gates 14, which does not entail any problem whatsoever.

[0058] To assure the coordination of the movement of the symmetrical multiplier mechanisms 20 operating different gates 14, there is included a torsion bar 8 connected at one end to a point of the fourth bar 4 of a multiplier mechanism 20 and at the other end to a seventh bar 7 rigidly attached after the fourth bar 4 of the other multiplier mechanism 20, the distances of said two articulation points of the torsion bar 8 with respect to the respective symmetrical articulation points 32 of the two symmetrical multiplier mechanisms 20 being identical, which causes a rotation of the fourth bar 4 of a multiplier mechanism 20 to produce an identical rotation of the other fourth bar 4 of the other symmetrical multiplier mechanism 20, pushed by the torsion bar and by the seventh bar 7.

Claims

1. A waste container with a lower gate opening mechanism operable by means of interaction with a holding and operating device attached to a container lifting arm, said container including:

   a waste storage receptacle (11) provided with waste inlets in its upper half and with a discharge

opening on its lower face;
one or more gates (14) articulated with respect to the receptacle (11) to allow the movement therebetween a closed position in which said one or more gates (14) completely block the discharge opening, and an open position in which they free up the discharge opening which allows emptying the receptacle by gravity;
a handle (13) attached to the upper half of the receptacle (11) to allow holding and lifting thereof through said holding and operating device;
an operating head (12) accessible from outside the receptacle (11) and located in the upper half thereof, said operating head (12) including an axially movable rod, envisaged for allowing the interaction thereof with the mentioned holding and operating device;
a multiplier mechanism (20) integrated in said receptacle (11) connecting the operating head (12) with the one or more gates (14) by means of a kinematic chain, converting movement of the operating head (12) into a larger movement of the gates (14);

characterized in that
said multiplier mechanism (20) integrates a knee mechanism (21) formed by a first bar (1) with a first end articulated with respect to the receptacle (11) and a second end articulated with respect to a first end of a second bar (2), which in turn has a second end articulated with respect to a movable part of the multiplier mechanism (20), a point of the knee mechanism (21), located between the first end of the first bar (1) and the second end of the second bar (2), being kinematically connected to the rod of the operating head (12) by means of at least one articulated third bar (3), said kinematic connection determining a movement of said point of the knee mechanism (21) due to the operation of the operating head (12), modifying the angle formed by the intersection between a first axis defined by the first bar (1) and a second axis defined by the second bar (2), between a gate closing position, in which the smaller angle formed by said intersection of the first axis and the second axis is between 0° and 40°, and a gate opening position in which the intersection of said first and second axes forms a second angle greater than the first angle.

2. The container according to claim 1, **characterized in that** the angle formed by the first bar (1) and the second bar (2) in the gate closing position is an obtuse angle between 150° and 180° or an acute angle between 0° and 30°.

3. The container according to claim 1 or 2, **characterized in that** the mentioned movable part of the multiplier mechanism (20) to which the second end of the second bar (2) is articulated is a first end of a fourth bar (4) articulated at a second end with respect to a fixed point of the receptacle (11), and having a fifth bar (5) rigidly and integrally attached at a first end to the fourth bar (4), and a second end of the fifth bar (5) being connected to the rest of the multiplier mechanism, the fifth bar (5) being of greater length than the fourth bar (4).

4. The container according to claim 3, **characterized in that** the first end of said fifth bar (5) is attached to the fourth bar (4) forming an angle between 50° and 130°.

5. The container according to claim 3, **characterized in that** the first end of the fifth bar (5) is attached to the second end of the fourth bar (4) forming an angle between 80° and 100°.

6. The container according to claim 3, 4 or 5, **characterized in that** a first end of a sixth bar (6) is articulated with respect to the second end of the fifth bar (5), and a second end of the sixth bar (6) is articulated with respect to one of the gates (14).

7. The container according to claim 6, **characterized in that** the distance between the first and second ends of the fifth bar (5) is greater than the distance between the articulation of the gate (14) with the receptacle (11) and the articulation point of the sixth bar (6) with the mentioned gate (14).

8. The container according to any one of the preceding claims, **characterized in that** the multiplier mechanism (20) is housed closer than 15 cm from a side face of the storage receptacle (11).

9. The container according to claim 8, **characterized in that** the multiplier mechanism (20) operating a gate (14) is symmetrically duplicated on opposite sides of the container (10).

10. The container according to any one of the preceding claims, **characterized in that** it has two lower gates (14) operated by means of two symmetrical multiplier mechanisms (20), both connected to one and the same operating head (12).

11. The container according to claim 10, **characterized in that** the first ends of the first bars (1) of the two symmetrical multiplier mechanisms (20) are articulated with respect to one and the same shared central articulation point (30).

12. The container according to claim 10 or 11, **characterized in that** in the gate closing position, the first bars (1) of the two symmetrical multiplier mechanisms (20) form a third angle between 135° and 180°

with respect to one another.

13. The container according to any one of the preceding claims 10 to 12, **characterized in that** both symmetrical multiplier mechanisms (20) are connected and coordinated by means of a torsion bar (8), forcing each multiplier mechanism (20) to symmetrically reproduce the movement of the other multiplier mechanism (20).

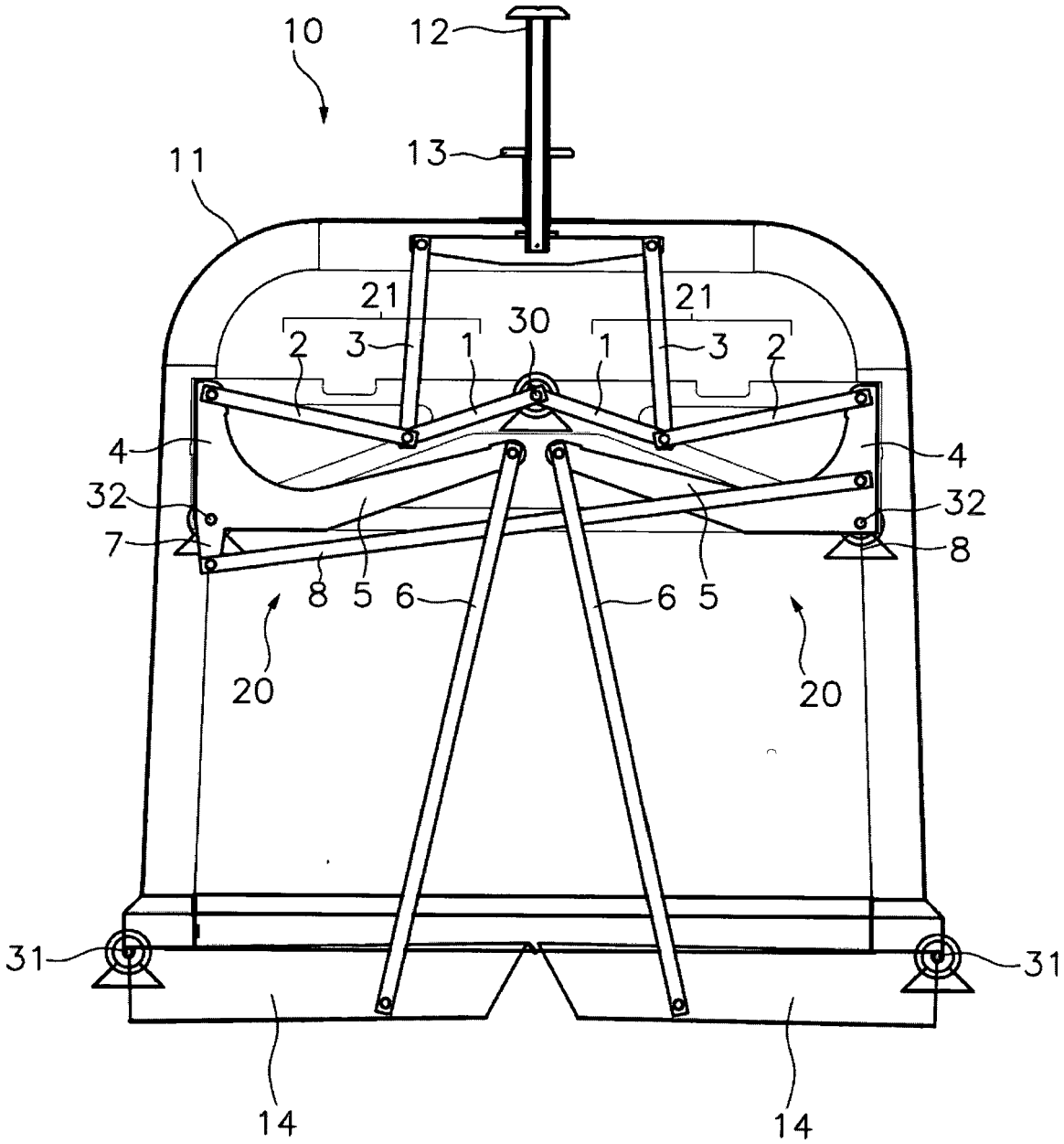

Fig. 1

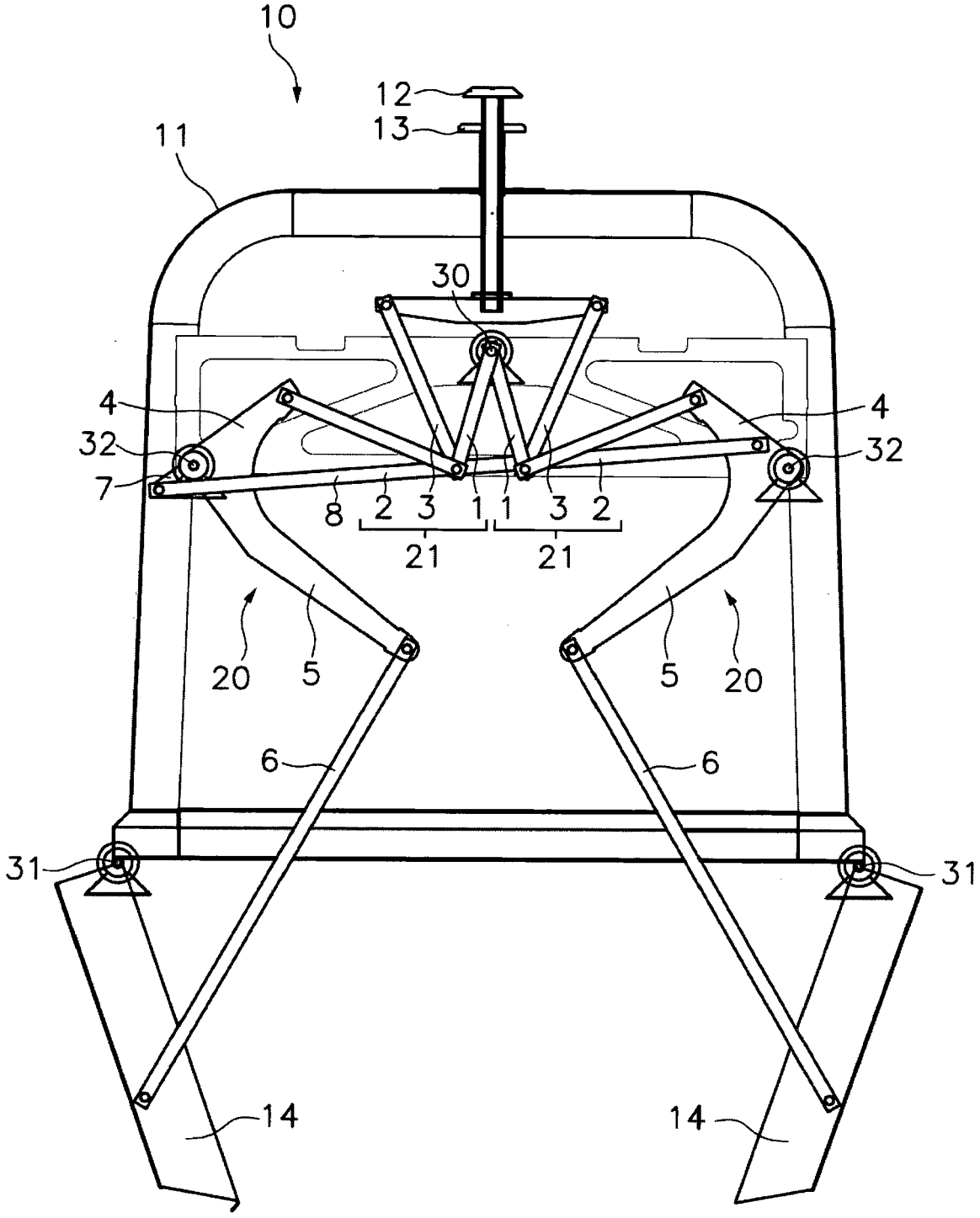

Fig.2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 15 38 0028

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	EP 1 671 899 A1 (MONDINI ENGINEERING S A [CH]) 21 June 2006 (2006-06-21) * figures 1-4 * * paragraphs [0007] - [0013] *	1-13	INV. B65F1/12
A,D	EP 1 172 308 A1 (NORD ENGINEERING DI ARMANDO LO [IT]) 16 January 2002 (2002-01-16) * figures 1-12 * * paragraphs [0032] - [0062] *	1-13	
A	EP 2 565 133 A1 (FARID IND S P A CON UNICO SOCIO [IT]) 6 March 2013 (2013-03-06) * figures 1-6 *	1	
A	EP 2 695 832 A1 (ROMERO MARTI RICARDO [ES]; SORS BORES JORDI [ES]; ROMERO MARTI FRANCIS) 12 February 2014 (2014-02-12) * figures 1-16 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B65F
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 December 2015	Pardo Torre, Ignacio

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
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 38 0028

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-12-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1671899 A1	21-06-2006	CH 697438 B1	15-10-2008
		EP 1671899 A1	21-06-2006
EP 1172308 A1	16-01-2002	AT 276941 T	15-10-2004
		DE 60105710 D1	28-10-2004
		DE 60105710 T2	08-09-2005
		EP 1172308 A1	16-01-2002
		ES 2228704 T3	16-04-2005
		IT TO20000679 A1	07-01-2002
EP 2565133 A1	06-03-2013	NONE	
EP 2695832 A1	12-02-2014	EP 2695832 A1	12-02-2014
		ES 2362848 A1	14-07-2011
		WO 2012136866 A1	11-10-2012

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1172308 A **[0004]**
- US 6276888 B **[0005]**
- EP 269532 A **[0006]**
- ES 2147102 A1 **[0007]**