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(54) **Waste container**

(57) Waste container (1), wherein a casing (2) has an emptying opening (4) and at least one closing door (5) connected to the casing (2) by way of a connecting device (6) to rotate, with respect to the casing (2) and about a first axis (7), between a closed and an open position of the emptying opening (4); the waste container

(1) being provided with an actuating device (17) carried by the casing (2) and designed to cause the door (5) to oscillate between the closed and the open positions about the first axis (7); and the door (5) being provided with at least one guide (13) connected to a slider (12) mounted on the guide (13) to slide along the guide (13) itself during the oscillations of the door (5).

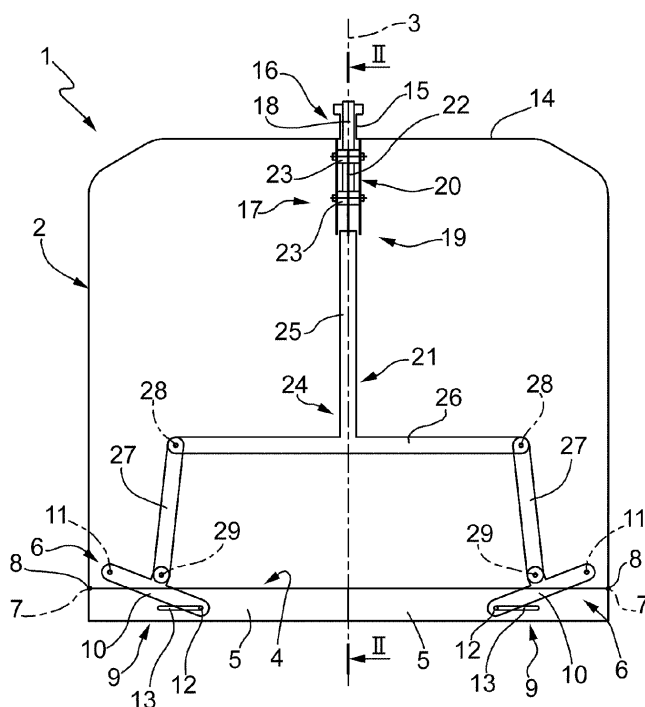


FIG. 1

Description

[0001] The present invention relates to a waste container.

[0002] In particular, the present invention relates to a waste container of the type with top filling and bottom discharge and comprising a casing having an emptying opening; at least one door closing the emptying opening; connecting means arranged between the casing and the door to connect the door to the casing and allow it to rotate, with respect to the casing and about a first axis, between a closed and an open position of the emptying opening; and actuating means carried by the casing designed to cause the door to oscillate between said closed and open positions about the first axis.

[0003] The purpose of the present invention is to provide a waste container of the type specified above, and wherein the opening of the door is as efficient and simple as possible.

[0004] According to the present invention, a waste container, as claimed in claim 1 and, preferably, in any one of the following claims depending directly or indirectly on claim 1 is provided.

[0005] The invention will now be described with reference to the accompanying drawings, which illustrate examples of nonlimiting embodiments, wherein:

- Figure 1 shows schematically and in axial section a first preferred embodiment of the waste container according to the present invention in a closed configuration;
- Figure 2 is a section along the line II-II of Figure 1;
- Figure 3 is a section similar to that of Figure 1 and is relative to the container of Figure 1 in an open configuration;
- Figure 4 is a section along the line IV-IV of Figure 3; and
- Figures 5 and 6 correspond to Figure 1 and, respectively, to Figure 3 and are relative to a second preferred embodiment of the waste container according to the present invention.

[0006] In Figures 1 to 4, number 1 indicates as a whole a waste container comprising a bell-shaped external casing 2, having a generally longitudinal vertical axis 3, positioned with its concavity facing downwards and having at the bottom an emptying opening 4 closed by two doors 5, which are connected to the casing 2 by way of respective connecting devices 6 adapted to allow the doors 5 to rotate in opposite directions, about respective axes 7, between a closed position (Figures 1 and 2), wherein the doors 5 are arranged coplanar with each other to close the opening 4, and an open position (Figures 3 and 4), wherein the doors 5 are moved downwards to leave free the opening 4.

[0007] As more clearly shown in Figures 1 and 3, each connecting device 6 comprises a hinge 8 coaxial to axis 7 and two crank and slotted links 9 (of which only one is

visible in Figures 1 and 2) arranged on opposite sides of the respective door 5 and, each comprising a lever 10 hinged at one end on the casing 2 to rotate about a respective fixed axis 11, parallel to the respective axis 7 and common to the lever 10 of the other crank and slotted link 9. Each lever 10 of each connecting device 6 carries integrally connected, at its free end, a cursor defined by a pin 12, which is parallel to the respective axis 11, is coaxial to the pin 12 of the other crank and slotted link 9 of the same door 5 and engages in a transversally slidable manner a respective guide defined by a slot 13 formed in the respective door 5 transversely to the axes 7 and 11.

[0008] The casing 2 is bounded from above by a wall 14, through which a waste loading opening (not shown) is formed, and a sleeve 15 of a mushroom-shaped head 16 is mounted, which is coaxial to the axis 3 and serves as a gripping device for an external coupling and lifting device (not shown), normally mounted on a movable arm of a vehicle (not shown) and comprising, in known manner, a clamping head (not shown) adapted to engage the mushroom-shaped head 16.

[0009] Through the head 16 is slidably mounted an inlet member of an actuator device 17 made in order to determine, when actuated, a displacement of the doors 5 from the normal closed position to the open position. The aforementioned inlet member is constituted by a rod 18, which is connected to the doors 5 by means of two transmissions 19 identical and made so that at a displacement of the rod 18 from a normal lowered position (Figures 1 and 2) to a raised position (Figures 3 and 4) corresponds a displacement of the doors 5 from the closed position to the open position.

[0010] The control of the rod 18 displacement between the lowered and raised positions is achieved, in use, by an actuator member (not shown) carried by said external coupling and lifting device (not shown) and adapted to impart to the rod 18 a downwards thrust so as to keep the doors 5 in the closed position when the waste container 1 is lifted to be transported above a waste collecting truck, to leave the rod 18 free to move upwards so as to allow opening of the doors 5 when the waste container 1 is in the emptying position, and, finally, to impart to the rod 18 a downwards thrust so as to close the doors 5 when the empty waste container 1 is set back on the ground.

[0011] In the example shown in Figures 1 to 4, each transmission 19 connects a lower end of the rod 18 to an intermediate point of the lever 10 of each of the two crank and slotted links 9 arranged on the same side with respect to the doors 5 and comprises a flexible portion 20 connected directly to the lower end of the rod 18 and a rigid portion 21 connecting the flexible portion 20 to the levers 10 of the crank and slotted links 9 that are on the same side with respect to the doors 5.

[0012] As shown in Figures 2 and 4, the flexible portion 20 extends in a plane passing through the axis 3 and parallel to the axes 7 and 11 and comprises a cable 22,

common to the other transmission 19, and two pulleys 23, around which the cable 22 is wound to assume an inverted U configuration when the rod 18 is arranged in its lowered closing position, and a substantially inverted L configuration when the rod 18 is arranged in its raised opening position. In any case, the axial displacements of the cable 22 are substantially equal to the movement of the rod 18 that cause them.

[0013] The rigid portion 21 lies in a plane perpendicular to the axes 7 and 11 and comprises an inverted T-shaped crosspiece 24 in turn comprising a central tie rod 25 connected to the end of cable 22 opposite to that connected to the rod 18, and a crossbar 26. The rigid portion 21 also comprises two levers 27, each of which is hinged to a respective end of the crossbar 26 to rotate about a respective axis 28 parallel to axes 7 and 11 and is connected, at its free end, to an intermediate portion of the lever 10 of the respective crank and slotted link 9 to rotate, with respect to the respective lever 10, about a respective axis 29 parallel to axis 28 and arranged at a given distance from the respective axis 11.

[0014] Even in this case, the transverse displacements of the axes 29, which are substantially equal to the displacements of the respective cables 22, are also substantially equal to the displacements of the rod 18 that caused them.

[0015] The operation of the waste container 1 and, in particular, of the doors 5 under the control of the actuator device 17 is immediately deducible from the above description and from the annexed Figures 1 to 4 and requires no further explanation.

[0016] The only details that deserve to be specified are the following:

- the transmissions 19 does not introduce any amplification of movement, since the transverse displacements of the axes 29 are substantially equal and opposite to the displacements of the rod 18 causing them;
- each connecting device 6 defines a double articulated hinge, which, due to the presence of the respective crank and slotted links 9, allows the respective door 5 to disengage, during a portion of its rotation about the respective axis 7, from the respective transmission 19 and to perform a displacement, that is imparted by the transmission 19, but is not controlled by the rod 18, but by the length of the respective slots 13.

[0017] According to a variant not shown, the emptying opening 4 is controlled by a single door 5.

[0018] In this case, there is a single transmission 19, the crosspiece 24 is missing and the levers 27 are directly connected at the end of the cable 22 opposite to that connected to the lower end of the rod 18.

[0019] According to a further variant not shown, and relative to the case in which two doors 5 are used, the crosspiece 24 is missing and the levers 27 are directly

connected at the end of the cable 22 opposite to that connected to the lower end of the rod 18.

[0020] According to yet a further variant not shown, the levers 10 are missing, the connecting devices 6 are constituted solely by hinges 8 and the pins 12 of the crank and slotted links 9 are carried directly by the levers 27.

[0021] The combination of these last two variants not shown constitutes part of the variant shown in Figures 5 and 6, which are related to a modified waste container 1, wherein each of the two transmissions 19 comprises the flexible portion 20 defined by the cable 22 wound on the pulleys 23 and connected at one end to the lower end of the rod 18, and the rigid portion 21 defined by two levers 27 hinged at one end to the end of the cable 22 opposite to that connected to the lower end of the rod 18 to rotate in opposite senses, with respect to cable 22, around an axis 28 movable with the rod 18 and parallel to axis 7. Each lever carries, at its other end opposite to that connected to the cable 22, the pin 12 of the respective crank and slotted link 9. Preferably, but not necessarily, in this case, the slots 13 are inclined upwards and towards the axis 3 so as to facilitate the sliding of the pins 12 along the respective slots 13 during the closing movement of the doors 5.

[0022] According to a variant not shown, this movement of the pins 12 could be further facilitated by the presence of springs (not shown) arranged, each, between a respective pin 12 and the free end of the respective door 5.

[0023] In conclusion to the foregoing, it should be stated that, according to a variant not shown, the slot 13 could be replaced by a linear guide carried by the relative door 5 and the pin 12 could be replaced by a sliding block hinged to the end of the relative lever 10, 27 and connected in sliding manner to the linear guide.

[0024] Finally, according to a variant not shown, the flexible portion 20 of each transmission 19 could be replaced by a leverage connected, at one end, to the rod 18 and, at the opposite end, at the relative rigid portion 21 and structured so that the end connected to the rigid portion 21 performs axial displacements of width substantially equal to the width of the displacements of the rod 18 causing them.

Claims

1. Waste container comprising a casing (2) having an emptying opening (4); at least a door (5) to close the emptying opening (4); connecting means (6) arranged between the casing (2) and the door (5) to connect the door (5) to the casing (2) and allow the door (5) to rotate, with respect to the casing (2) and about a first axis (7), between a closed and an open position with respect to the emptying opening (4); and actuating means (17) carried by the casing (2) to cause the door (5) to oscillate between said closed and open positions about the first axis (7); the con-

tainer (1) **characterized in that** the door (5) comprises at least a guide (13), and sliding means (12) coupled to the guide (13) to slide along the guide (13) during said oscillations of the door (5).

2. Waste container claimed in Claim 1, wherein the actuating means (17) comprises a control member (18) movable between a first and a second position, and a transmission (19) which has a first end connected to the control member (18) and is structured so that, when the control member (18) moves between the first and the second position, a second end of the transmission (19) performs movements the extent of which is substantially identical to that of the movements of the control member (18).

3. Waste container claimed in Claim 1 or 2, wherein the sliding means (12) comprise a pin (12) parallel to the first axis (7); and the guide (13) is a slot (13), which is engaged in a transversally slidable manner by the pin (12), is integral with the door (5) and extends in a direction generally transversal to the first axis (7).

4. Waste container claimed in anyone of the preceding Claims, wherein the slot (13) and the sliding means (12) are part of a crank and slotted link (9) further comprising a lever (10; 27) provided with the sliding means (12).

5. Waste container claimed in Claim 4, wherein the sliding means (12) comprise a pin (12) integral with the lever (10; 27) and parallel to the first axis (7).

6. Waste container claimed in Claims 2 and 4 or 5, wherein the connecting means (6) comprise an articulated hinge comprising a simple hinge (8), which is coaxial to the first axis (7), and said lever (10), which is connected both to the casing (2), to rotate, with respect to the casing (2), about a fixed second axis (11) parallel to the first axis (7), and to the second end of the transmission (19) so that movements of the control member (18) between the first and the second position result in rotations of the lever (10) about the second axis (11) and in rotations of the door (5) about the first axis (7).

7. Waste container claimed in Claim 6, wherein the transmission (19) is arranged between the control member (18) and a point of the lever (10) arranged at determined distance from the second axis (11).

8. Waste container claimed in Claims 2 and 4 or 5, wherein the connecting means (6) comprises a simple hinge (8) coaxial to the first axis (7); said lever (27) forming an end portion of the transmission (19) and being connected to a remaining part (20) of the transmission (19) to rotate about a second axis (28)

which is parallel to the first axis (7) and is movable with the control member (18) so that movements of the control member (18) between the first and the second position result in rotations of the lever (27) about the movable second axis (11) and in rotations of the door (5) about the first axis (7).

9. Waste collection system comprising a waste container (1) as claimed in anyone of the preceding Claims and a coupling and lifting device for engaging the container (1); the container (1) comprising a gripping head accommodating a movable end portion (18) of said actuating means (17); and the coupling and lifting device comprising clamping means to engage the gripping head, and control means to control the movable end portion (18) in position.

10. Waste collection system as claimed in Claim 9, and further comprising a vehicle comprising a movable arm and said coupling and lifting device carried by the movable arm.

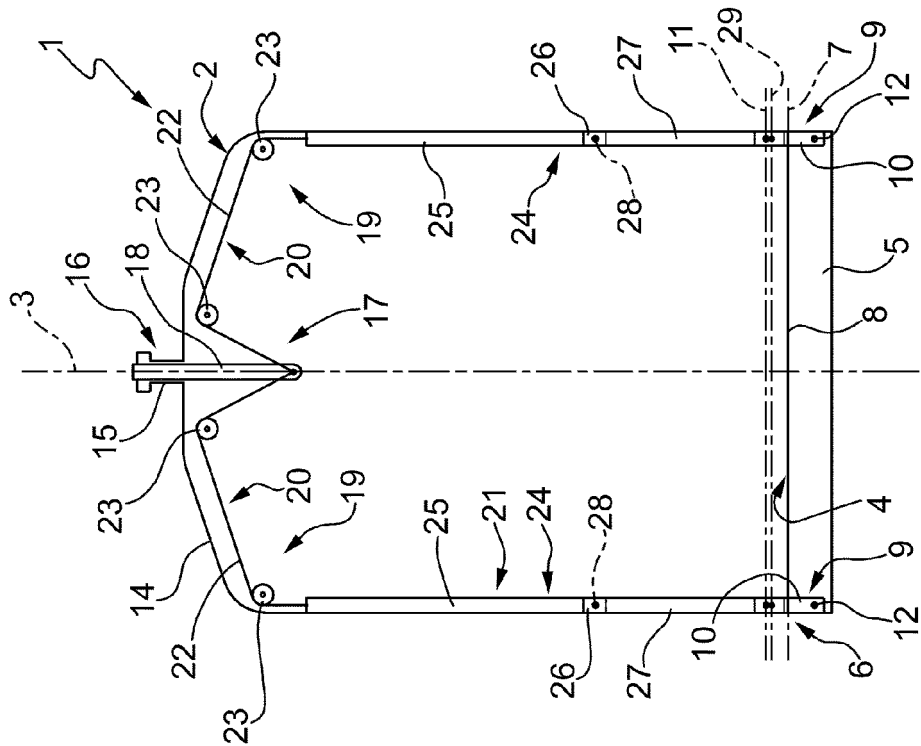


FIG. 2

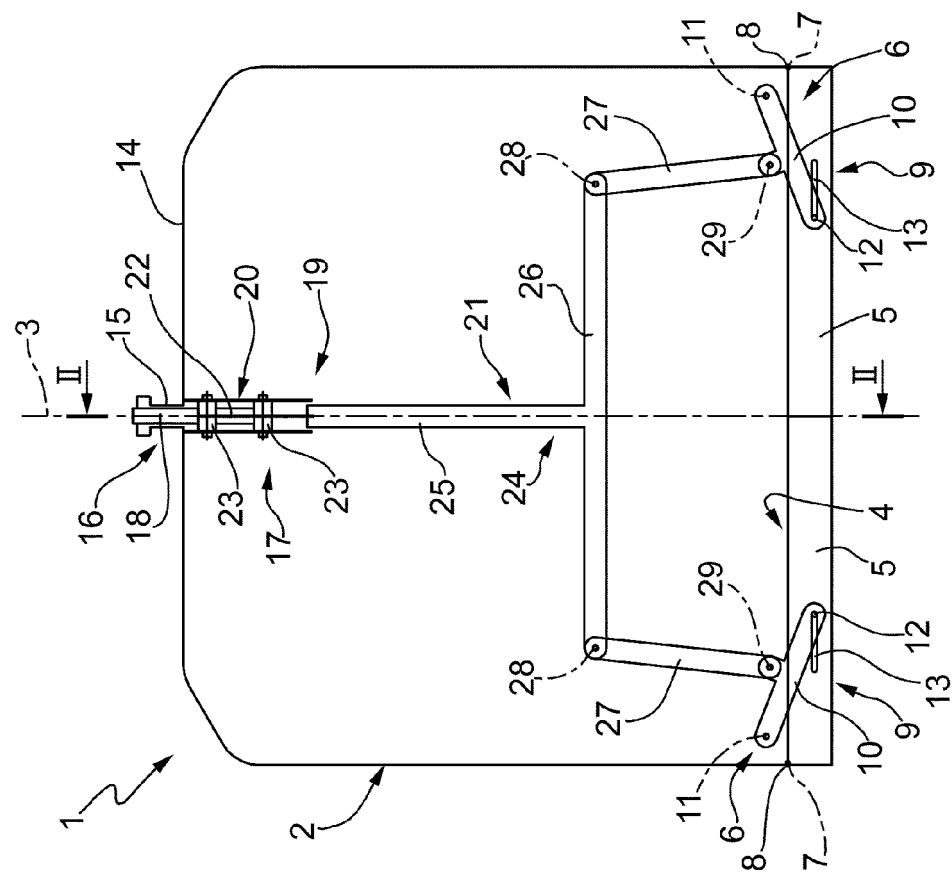


FIG. 1

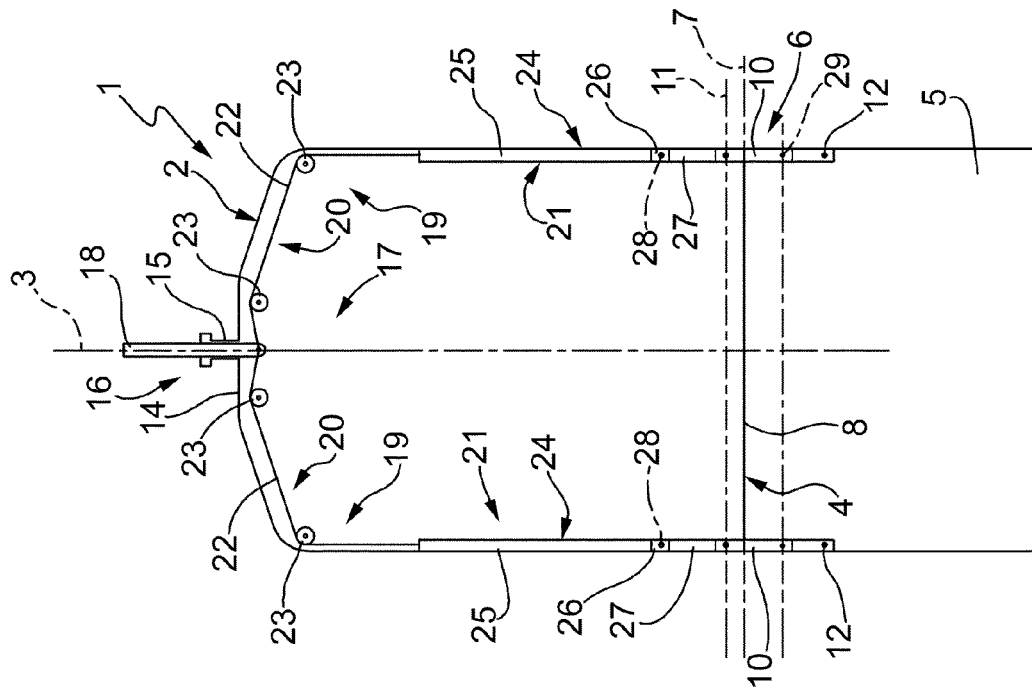


FIG. 4

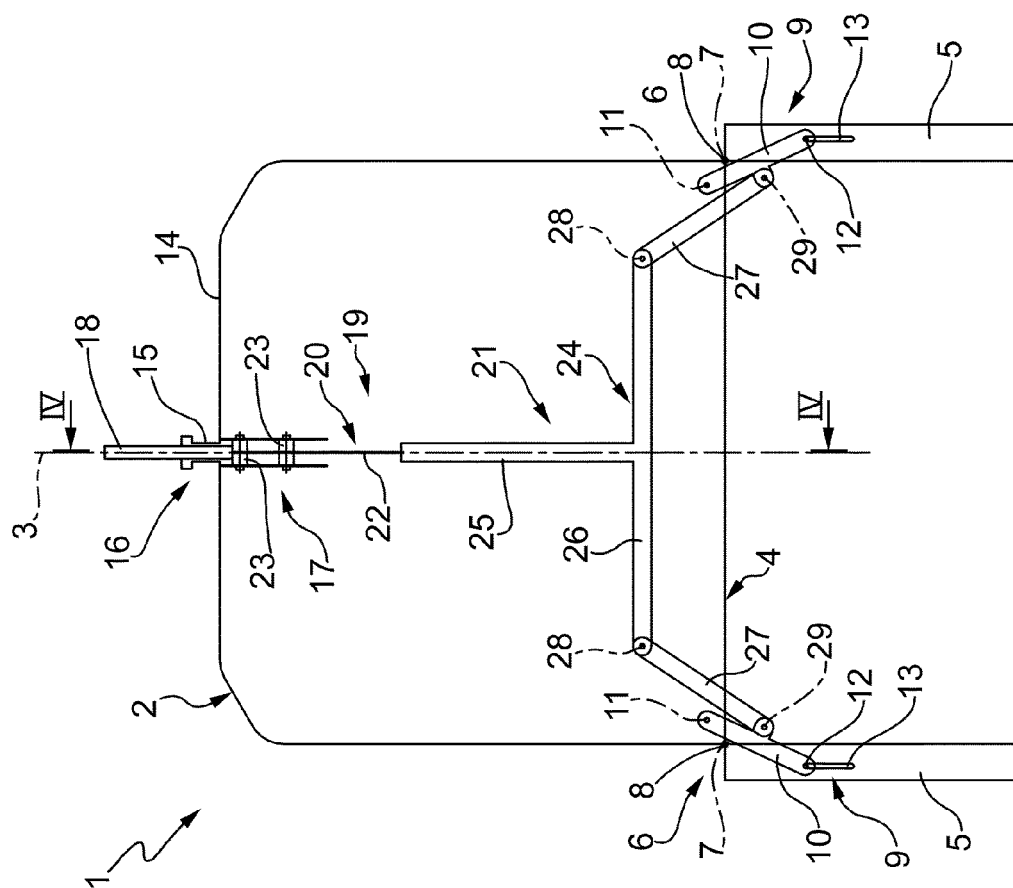


FIG. 3

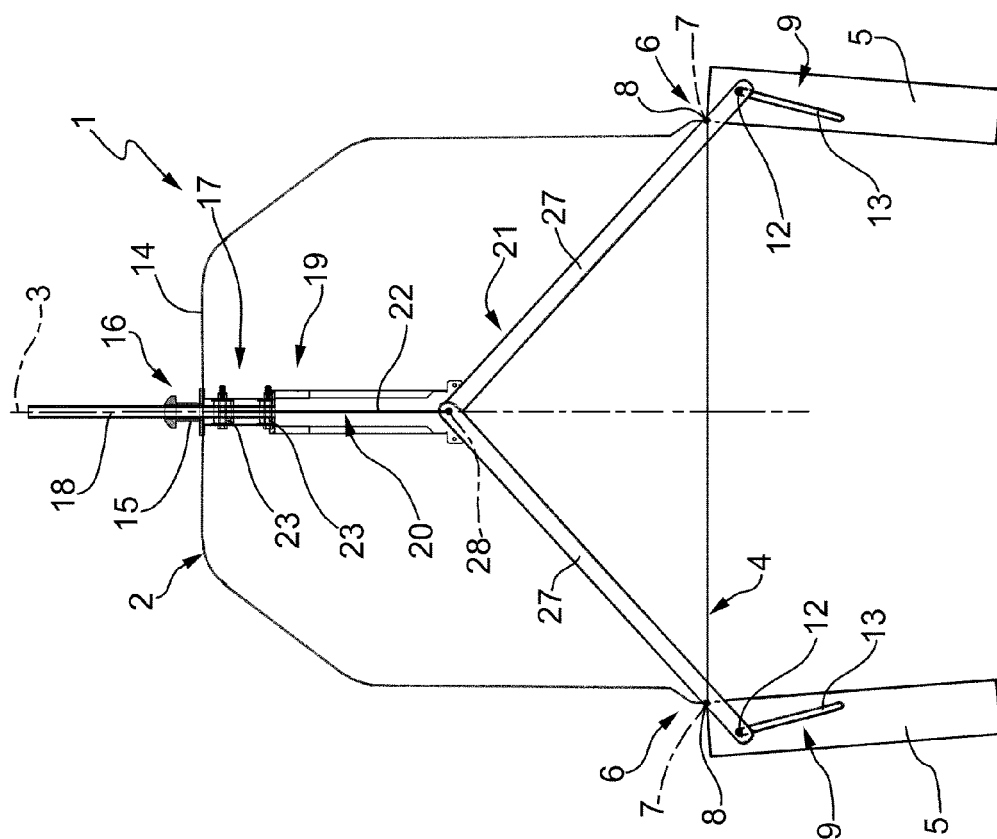


FIG. 6

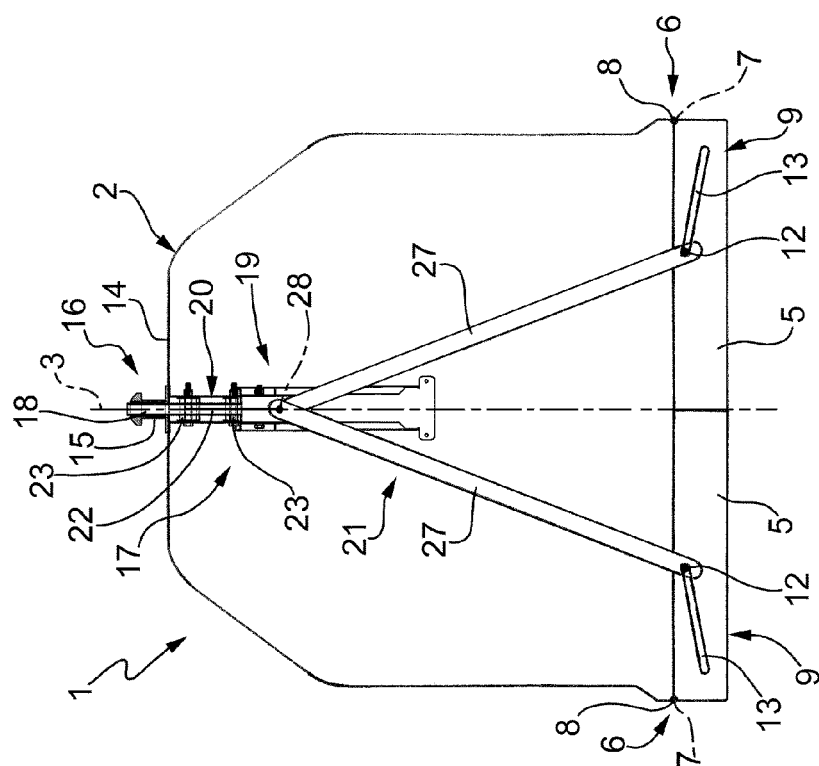


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 12 18 2695

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 277 259 A (J. NIXON) 15 September 1927 (1927-09-15)	1,2,9,10	INV. B65F1/12
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A	FR 2 761 963 A1 (COMPAGNIE PLASTIC OMNIUM SA) 16 October 1998 (1998-10-16) * page 2, line 14 - page 5, line 6 * * figures 1-10 *	1-10	

A	DE 35 23 465 A1 (L. RÜHLAND) 8 January 1987 (1987-01-08) * column 3, line 58 - column 5, line 43 * * figure *	1-10	

			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		8 November 2012	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 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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 18 2695

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08-11-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 277259	A	15-09-1927	NONE
FR 2761963	A1	16-10-1998	NONE
DE 3523465	A1	08-01-1987	NONE

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