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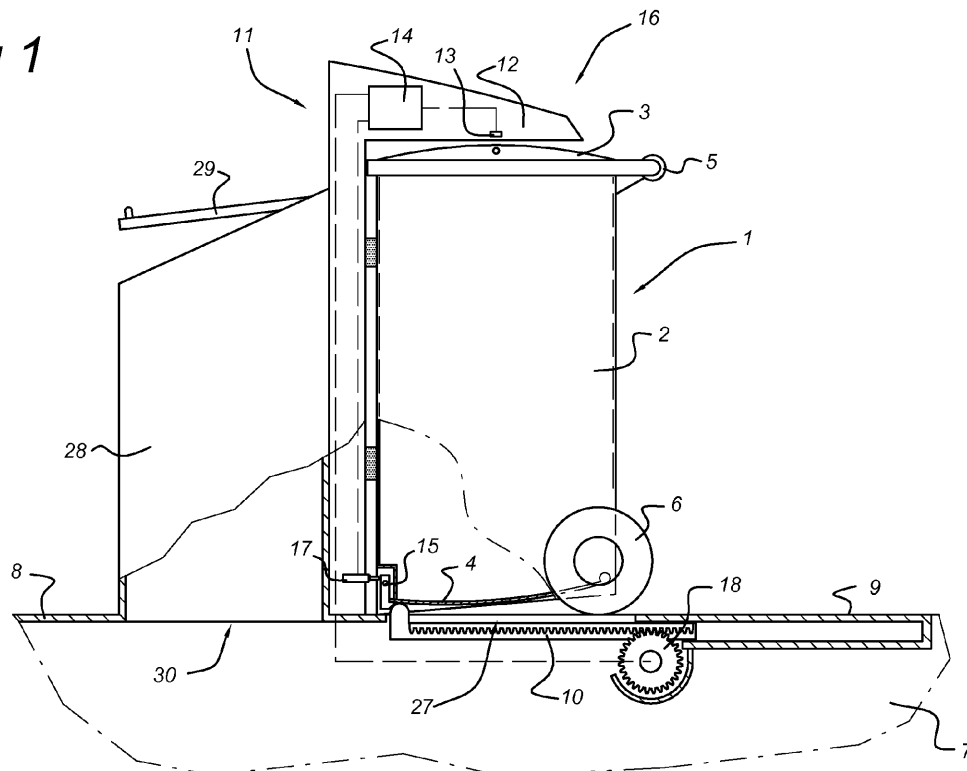
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(54) **System for collecting waste, and container therefor**

(57) The invention relates to a system for collecting waste, comprising at least one container (1) in which waste can be held, which container (1) comprises a container body (2), wheels (6) at the underside of the container body (2), a base (4) which is movable between a closed position and an open position in which waste can be discharged from the container (1), and, at the upper

side of the container body (2), a handle (5) and a lid (3) movable between a closed position and an open position. The system also comprises positioning means (16) above the ground with respect to which the container (1) can be positioned and a receptacle (7) arranged below the ground in the vicinity of the positioning means (16), comprising an inlet (8) for collecting waste from the container (1) which interacts with the positioning means (16).

**Fig 1**



## Description

**[0001]** The invention relates to waste collection. Various types of system have already been proposed in this field. In known systems, the waste is collected in wheeled containers which, in order to be emptied, have to be lifted and tilted upside down to deposit the waste into a compartment of a waste disposal lorry. Such a method of waste collection can be used, for example, in the case of housing which consists mainly of low-rise buildings, for example single-family dwellings. Fixed receptacles are also known which can be arranged above or below ground. The receptacles usually comprise a disposal lock by means of which waste bags can be inserted. The latter type of waste system is often found in high-rise buildings, where it is less convenient to use wheeled containers.

**[0002]** Both methods of waste collection have certain advantages. For example, collecting waste in wheeled containers is hygienic, with it being possible to dispose of the waste simply by wheeling the container. Collecting waste in plastic bags which can be deposited directly into a fixed receptacle also has the advantage of a high level of flexibility and hygiene. However, these methods of waste collection are also associated with some disadvantages. The disadvantage of the first system of waste collection using wheeled containers is that each container must be handled separately. This is time-consuming and involves fairly heavy physical labour on the part of the waste disposal workers. The disadvantage of the second type of waste collection is that the number of plastic bags used is relatively large. That is less desirable from an environmental perspective.

**[0003]** US-A-5228591 discloses a system for collecting waste, comprising at least one container provided with a receiving opening for inserting waste, a base which is movable between a closed position and an open position in which waste can be discharged from the container. A vehicle is also provided which has positioning means with respect to which a container can be positioned. Waste can be collected in the vehicle from a container which has been placed on the vehicle. There is also an operating mechanism for releasing or closing the base of a container which interacts with the positioning means.

**[0004]** Said known system has the disadvantage that each container must again be handled separately by means of a special vehicle in which the waste must be held. The object of the invention is therefore to provide a system for collecting waste which has the advantages of the existing systems, such as hygiene, but which is more efficient and environmentally friendly.

**[0005]** This object is achieved by means of a system for collecting waste, comprising at least one container in which waste can be held, which container comprises a container body, wheels provided at the underside of the container body and a base which is movable between a closed position and an open position in which waste can be discharged from the container, and, at the upper side

of the container body, a handle and a lid which is movable between a closed position and an open position in which waste can be held in the container, positioning means above the ground with respect to which a container can be positioned and a receptacle arranged below the ground in the vicinity of the positioning means, comprising an inlet for collecting waste from a container which interacts with the positioning means.

**[0006]** The system according to the invention offers the advantage that it is no longer necessary to handle each container separately by means of a waste collection lorry. The users of the containers bring the waste itself to a central receptacle, into which the relevant containers can be directly emptied. The waste can still be deposited without it being necessary to use a bag: the waste can be collected in a container which the user himself can empty. Owing to the base which releases at the bottom, this does not require much effort.

**[0007]** Preferably, a base operating mechanism is also provided for releasing or locking the base of a container which interacts with the positioning means. In particular, locking means may be provided on the container, which locking means are movable between an active position in which the base is locked in the closed position and an inactive position in which the base is unlocked. There may also be a lock operating mechanism provided on the positioning means for moving the locking means between the inactive and the active position for respectively releasing and locking the base of a container which interacts with the positioning means.

**[0008]** Preferably, the lid and the base are coupled in such a way that in each case at least one of the lid and the base is closed.

**[0009]** In that connection, the receptacle may preferably be arranged in a space below ground level. It is advantageous in this case if the positioning means are also located at and/or above ground level. According to a first option, the positioning means may be located directly above the receptacle. The containers may then simply be wheeled to the area above the receptacle without it being necessary to bridge any significant differences in height. According to a second option, the positioning means may be located adjacent to and at a distance from the receptacle, in which case transfer means for transferring waste from the container into the receptacle extend between the positioning means and the receptacle. Said transfer means are known per se and may transfer the waste, for example, in a pneumatic way. As an alternative, it is also possible to use mechanical transfer means, such as a chute or slide device.

**[0010]** In connection with emptying waste into the receptacle, the positioning means may comprise a hatch. The receptacle comprises an inlet which can be closed or released by the hatch. The hatch may be displaceable, for example, in a substantially horizontal direction.

**[0011]** The base may be opened (after it has been unlocked) and closed in various different ways, for example by means of an operating arm connected to the position-

ing means for manual opening and closing. Preferably however, the inlet, for example a hatch, of the receptacle can be made to interact with the base of the container for releasing or closing the base of the container, such that opening the inlet results in moving the base to the open position, for example under the influence of gravity, and closing the inlet results in the closing of the base.

**[0012]** The container which may be used in the system according to the invention can preferably be operated in a simple manner by one person. In that connection, the container is provided with wheels and a handle so that the container can be gripped and wheeled. The container may also be provided with a filling lid.

**[0013]** The positioning means may comprise a housing or dock in which the container can be at least partially held. Such a housing has the advantage that the position of the container can be well defined with respect to the receptacle so that it can receive waste from the container in a problem-free manner. The housing may also comprise a cover, underneath which the filling lid can be arranged in a close-fitting manner. It is then not possible to open the lid of the container placed in the housing while the container is being emptied. This prevents the occurrence of an open connection to the interior of the receptacle, as a result of which waste could be deposited in the receptacle in an uncontrolled manner.

**[0014]** The container and the positioning means may be provided with control and detection means in connection with detecting the proximity of the container to the positioning means, and/or in connection with address details and/or in connection with the contents of the container. The hatch, which functions as an inlet to the receptacle, is preferably displaceable by means of an electric drive, which drive is controllable by the control and detection means.

**[0015]** In connection with the reliable emptying of the container, the dimension(s) of the cross section of the container may increase monotonously as seen in the direction from the top of the container to the bottom, or from the filling lid to the base. The positioning means may also comprise a weighing device for weighing the container.

**[0016]** The invention further relates to a container for use in the system as described above, provided with a container body comprising a filling lid for inserting waste, a base which is movable between a closed position and an open position in which waste can be discharged from the container, locking means which are movable between an active position in which the base is locked in the closed position and an inactive position in which the base is released, wheels near the base and a handle near the lid.

**[0017]** The dimension(s) of the cross section of the container may also increase monotonously as seen in the direction from the top of the container to the bottom. The container may be provided with detection means which are used to detect when the container is in the housing. The base of the container may be hingeable, or displaceable in opposite grooves of the container body.

The container may have fixed wheels and/or castors. In the latter case, the container may be used in the manner of a rollator.

**[0018]** In connection with the power supply of the base operating mechanism, a photovoltaic cell comprising a battery may be provided.

**[0019]** The invention also relates to a method for operating the system described above, comprising the following steps:

- causing a container to interact with the positioning means,
- unlocking the base of the container,
- opening the inlet of the receptacle,
- opening the base of the container under the influence of gravity,
- depositing waste from the container into the receptacle under the influence of gravity.

**[0020]** The method may also comprise the following steps:

- closing the hatch of the receptacle,
- moving the hatch of the receptacle up to the open base of the container,
- continuing the process of closing the hatch of the receptacle, carrying with it the base of the container into the closed position,
- locking the base of the container in the closed position,
- disengaging the container from the positioning means.

**[0021]** Although in this method the base of the container is opened and closed by means of displacement of the hatch of the receptacle, it is also possible to use other drives for opening or closing the base of the container. A hydraulically or electrically driven operating arm is mentioned by way of example, said operating arm being able to engage with the base of the container in order to move it into the open state after it has been unlocked or into the closed state. The opening may also possibly occur solely under the influence of gravity, without the base being guided during the opening by guiding means, for example the hatch of the receptacle or a separate operating arm.

**[0022]** The method may further comprise the following steps:

- weighing the container,
- depositing waste located in the container into the receptacle after the container has been weighed,
- weighing the container after the waste has been deposited,
- determining the amount of waste which has been deposited from the two preceding steps of weighing the container. In this way, it is possible to individually charge the users, for example, for the amount of

waste they have deposited.

**[0023]** The invention will be explained in greater detail below on the basis of an exemplary embodiment illustrated in the figures.

Figure 1 shows a side view in cross section of the arrangement according to the invention, in the closed position.

Figure 2 shows the arrangement in the open position.

Figure 3 shows an arrangement with an alternative container.

**[0024]** Figures 1 and 2 show a side view of the waste system, partly in cross section. Said system comprises a container 1 consisting of a container body 2, a filling lid 3 and a base 4. In the position illustrated in Figure 2, the base 4 has been pivoted open in order to release the waste. The container has a handle 5 and wheels 6. The system further comprises an underground receptacle 7 which is connected to ground level 9 by means of a lock 8. The lock may be closed off at ground level 9 by means of a hatch in the form of a slide 10; said slide is in the open position in the arrangement illustrated in Figure 2. The slide 10 can be opened and closed by means of the electric operating mechanism 14 and the drive 18; the latter position is illustrated in Figure 1.

**[0025]** The container 1 interacts with the positioning means designated overall by 16. In this case, the container 1 is positioned in the housing 11 which is arranged on the ground 9 directly above the lock 8. The housing has a cover 12. The container 1 positioned above the lock 8 is of such a height that the lid 3 of the container 1 fits exactly under the cover 12 when it is closed, such that the lid 3 cannot be opened when the container 1 is in this position.

**[0026]** The base 4 of the container 1 can be locked in the closed position by means of the locking means 15, in order to hold the waste. In this position, the container can be wheeled and positioned in order to collect the waste. After the container has been placed into the housing 11, the locking means can be brought into the inactive position in order to open the base 4. As soon as the slide 10 is pulled back, the base 4 opens under the influence of gravity acting on the lid itself and on the waste resting on the lid. In that connection, the positioning means 16 are provided with a lock operating mechanism 17, by means of which the locking means 15 can be operated as soon as the container 1 is located in the housing 11.

**[0027]** Detection and control means 13 are provided in the container 1 and in the housing 11. As soon as said detection and control means 13 register that a container 1 has been positioned in the housing 11, the electrical operating mechanism 14 of the slide 10 is actuated. The lock operating mechanism 17 is also actuated which results in the lock mechanism of the base 4 being brought into the inactive position. The base 4 then opens under the influence of gravity, following which the waste can

drop from the container 1 into the receptacle 7 via the lock 8.

**[0028]** After the waste has been released in that manner, the slide 10 can be closed, with the base 4 of the container 1 being simultaneously pushed closed. Finally, the locking means 15 are activated, for example by automatically clicking into place.

**[0029]** The receptacle 7 may be of the type that can be lifted out of the ground by means of suitable lifting means, in order to empty it into a compartment of a lorry.

**[0030]** The arrangement as illustrated in Figure 3 largely corresponds to the previous arrangement, but the container 1 has a different type of base 4. Said base consists of a flexible base plate 23, each side of which is guided in the grooves 19 which are recessed into the side walls of the container body 2. Said grooves 19 have a curved part 20 at the bottom, a right part 21 adjacent thereto and a likewise curved part 22 at the top. By means of the handle 24, the base plate can be pushed upwards in the grooves 19 into the position illustrated in Figure 3. The base is then open in order to discharge the contents of the container into the receptacle, after the sliding lid 10 has been opened. Conversely, the base can be closed by moving the handle 24 downwards with the base plate 23.

**[0031]** The lid 3, which also consists of a flexible cover plate 26, is located in the upper curved part 22 of the grooves 19. The lid can be opened and closed by being pushed back and forth using the handle 25 attached to the cover plate 26. However, as an alternative, it is also possible to use a hingeable lid.

#### List of reference numerals

#### **[0032]**

1. Container
2. Container body
3. Container filling lid
4. Container base
5. Container handle
6. Container wheels
7. Receptacle
8. Lock
9. Ground level
10. Sliding lid
11. Housing
12. Housing cover
13. Detection and control means
14. Electric drive for lid
15. Locking means
16. Positioning means
17. Lock operating mechanism
18. Hatch drive
19. Groove
20. Curved groove part
21. Right groove part
22. Curved groove part

- 23. Base plate
- 24. Handle
- 25. Handle
- 26. Cover plate

## Claims

1. System for collecting waste, comprising at least one container (1) in which waste can be held, which container (1) comprises a container body, wheels provided at the underside of the container body and a base (4) which is movable between a closed position and an open position in which waste can be discharged from the container, and, at the upper side of the container body, a handle and a lid which is movable between a closed position and an open position in which waste can be held in the container, positioning means (16) above the ground with respect to which a container can be positioned and a receptacle (7) arranged below the ground in the vicinity of the positioning means, comprising an inlet (8) for collecting waste from a container which interacts with the positioning means.
2. System according to Claim 1, wherein a base operating mechanism (10, 15, 17) is provided for releasing or locking the base (4) of a container (1) which interacts with the positioning means (16).
3. System according to Claim 1 or 2, wherein locking means (15) are provided on the container, which locking means (15) are movable between an active position in which the base (4) is locked in the closed position and an inactive position in which the base (4) is unlocked, and a lock operating mechanism (14) which is provided on the positioning means (16) for transferring the locking means (15) between the inactive and the active position for respectively releasing and locking the base (4) of a container (1) which interacts with the positioning means (16).
4. System according to one of the preceding claims, wherein the lid (3) and the base (4) are coupled in such a way that in each case at least one of the lid and the base is closed.
5. System according to one of the preceding claims, wherein the receptacle (7) is arranged in a space below ground level (9).
6. System according to one of the preceding claims, wherein the positioning means (16) are located at and/or above ground level (9).
7. System according to one of the preceding claims, wherein the positioning means (16) are located directly above the receptacle (7).
8. System according to one of Claims 1-6, wherein the positioning means are located adjacent to and at a distance from the receptacle, and transfer means for transferring waste from the container to the receptacle extend between the positioning means and the receptacle.
9. System according to one of the preceding claims, wherein the inlet (8) comprises a hatch (10) and hatch operating means (14, 18), and the inlet (8) of the receptacle (7) can be closed or released by the hatch (10).
10. System according to Claim 9, wherein the hatch (10) is displaceable in a substantially horizontal direction.
11. System according to one of the preceding Claims 9 and 10, wherein the inlet (8) of the receptacle (7) can be made to interact with the base (4) of the container (1) for releasing or closing the base (4) of the container (1), such that opening the inlet (8) results in moving of the base (4) to the open position, for example under the influence of gravity, and closing the inlet (8) results in the closing of the base (4).
12. System according to one of the preceding claims, wherein the positioning means (16) comprise a housing (11) in which the container (1) can be at least partially held.
13. System according to one of the preceding claims, wherein the container (1) and the positioning means (16) are provided with control and detection means (13) in connection with detecting the proximity of the container (1) to the positioning means (16) and/or in connection with address details and/or in connection with the contents of the container.
14. System according to Claim 13 when dependent on Claim 9 or 10, wherein the hatch (10) is displaceable by means of a drive (18), such as an electric drive, which drive is controllable by the control and detection means (13).
15. System according to one of the preceding claims, wherein the dimension(s) of the cross section of the container (1) increases monotonously as seen in the direction from the top of the container (1) to the bottom.
16. System according to one of the preceding claims, wherein the positioning means comprise a weighing device for weighing the container (1).
17. Container (1) for use in combination with the system according to one of the preceding claims, provided with a container body (2) which is provided at the upper side with one or more handles and at the un-

derside with wheels, and comprising a lid (3) for inserting waste, a base (4) which is movable between a closed position and an open position in which waste can be discharged from the container, locking means (15) which are movable between an active position in which the base (4) is locked in the closed position and an inactive position in which the base (4) is released, wheels near the base (4) and a handle (5) near the lid.

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18. Container (1) according to Claim 17, wherein the dimension(s) of the cross section of the container increase monotonously as seen in the direction from the top of the container to the bottom.

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19. Container (1) according to Claim 17 or 18, provided with detection means (13).

20. Container (1) according to one of Claims 17-19, wherein the base is hingeable.

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21. Container (1) according to one of Claims 17-19, wherein the base is curved and is displaceably arranged in opposite grooves (19) of the container body (2).

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22. Method for operating the system according to one of Claims 1-16, comprising the following steps:

- causing a container (1) to interact with the positioning means (16), 30
- unlocking the base (4) of the container (1),
- opening the inlet (8) of the receptacle (7),
- opening the base (4) of the container (1) under the influence of gravity, 35
- depositing waste from the container (1) into the receptacle (7) under the influence of gravity.

23. Method according to Claim 22, further comprising the following steps: 40

- closing the hatch (10) of the receptacle (7), carrying with it the base (4) of the container (1) into the closed position,
- locking the base (4) of the container (1) in the closed position, 45
- disengaging the container (1) from the positioning means (16).

24. Method according to Claim 22 or 23 for operating the system according to Claim 14, comprising the following steps: 50

- weighing the container (1),
- depositing waste located in the container (1) into the receptacle (7) after the container (1) has been weighed, 55
- weighing the container (1) after the waste has

been deposited,

- determining the amount of waste which has been deposited from the two preceding steps of weighing the container.

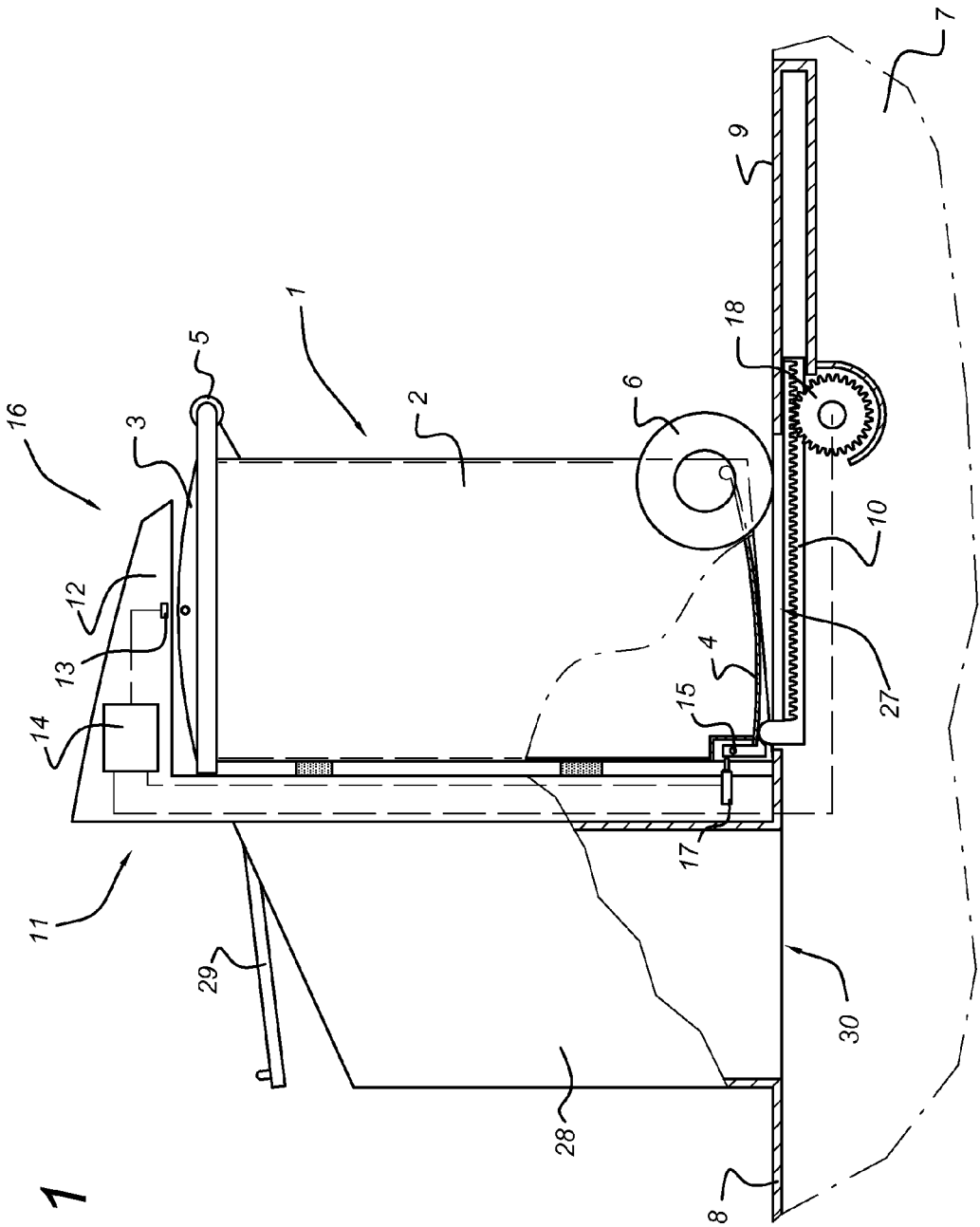


Fig 1

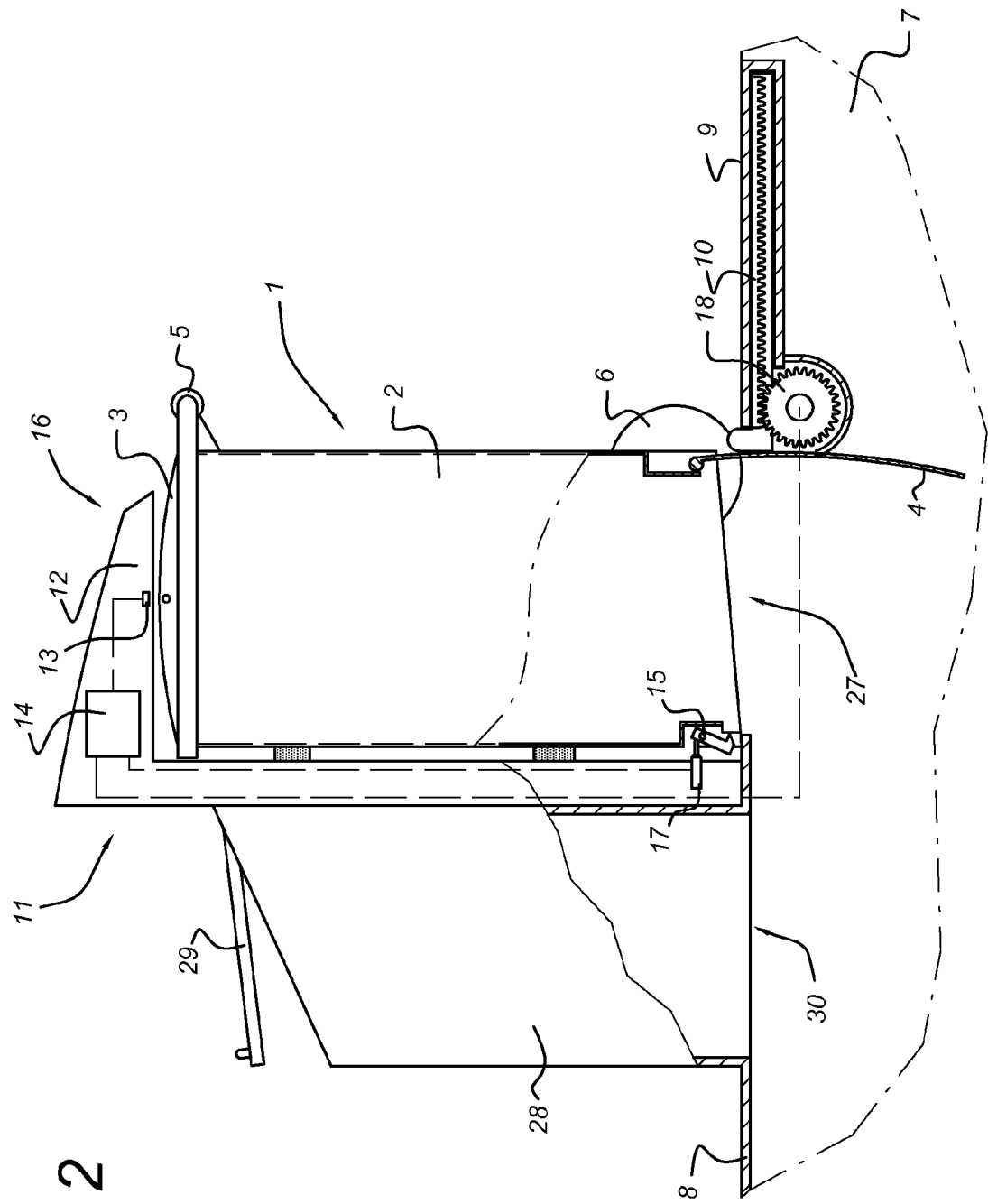


Fig 2



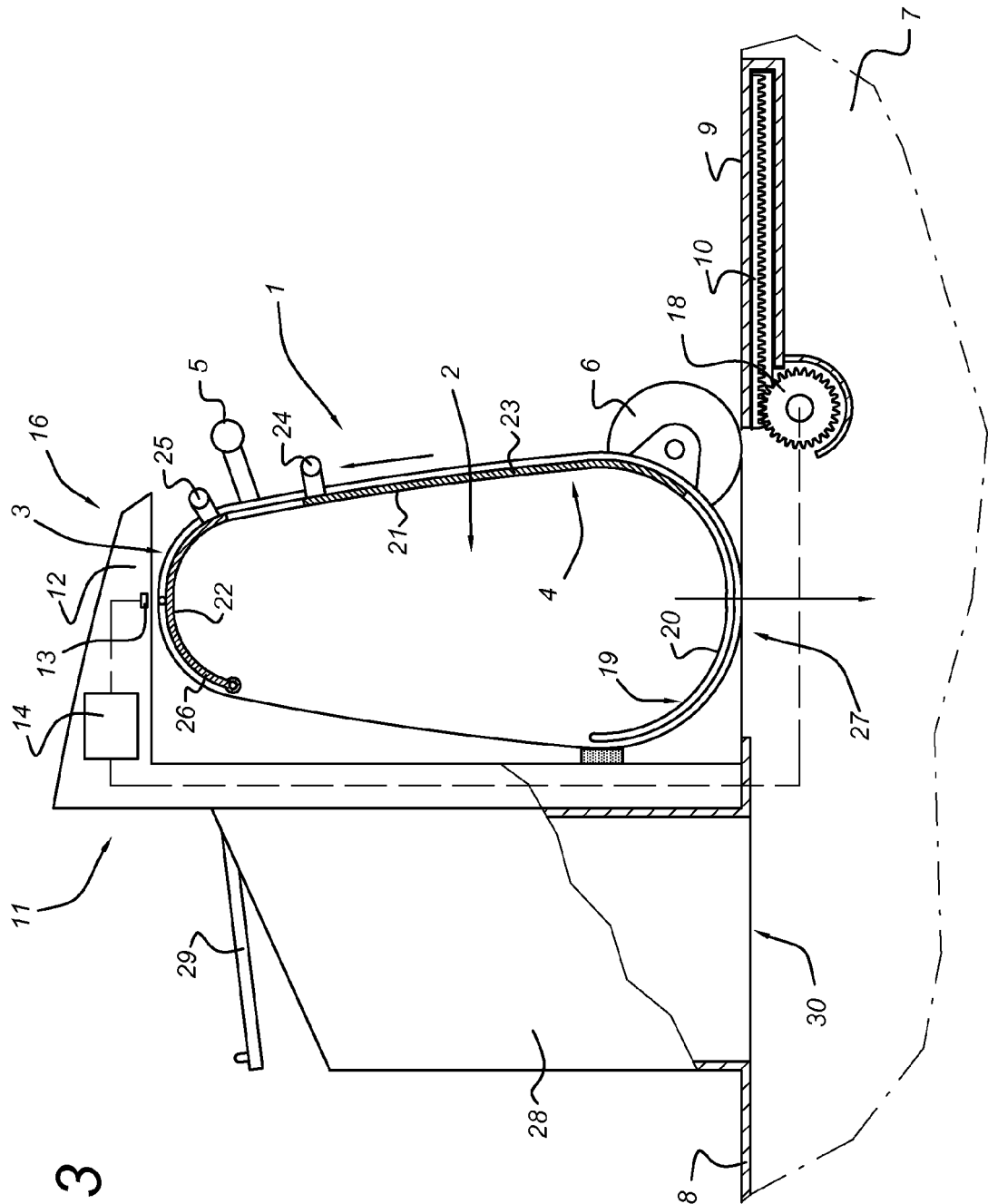


Fig 3



## EUROPEAN SEARCH REPORT

Application Number  
EP 13 17 3239

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 A	US 4 358 238 A (L. ELY) 9 November 1982 (1982-11-09) * column 4, line 12 - column 8, line 68 * * figures 1-7 * -----	1-3,5-9, 17,20,22 4,10-12, 15,18,23	INV. B65F1/12 B65F1/14
			TECHNICAL FIELDS SEARCHED (IPC)
			B65F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 September 2013	Examiner Smolders, Rob
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4358238	A	09-11-1982	NONE
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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**

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