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

(11) **EP 2 664 449 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
31.05.2017 Bulletin 2017/22

(21) Application number: **13001972.2**

(22) Date of filing: **16.04.2013**

(51) Int Cl.:
B30B 9/30 *(2006.01)* ***B30B 1/00*** *(2006.01)*
B65F 1/14 *(2006.01)* ***B65F 1/12*** *(2006.01)*

(54) Garbage container

Abfallbehälter

Conteneur à ordures

(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

(30) Priority: **16.04.2012 NL 1039541**

(43) Date of publication of application:
20.11.2013 Bulletin 2013/47

(73) Proprietor: **Rhino Engineering B.V.**
3542 AS Utrecht (NL)

(72) Inventors:
- **Samson, Nicolaas, Martinus**
  3542 AS UTRECHT (NL)
- **Van Ekris, Hans, Martin**
  3542 AS UTRECHT (NL)
- **Van Es, Paul, Jacobus**
  3542 AS UTRECHT (NL)

(74) Representative: **Ferguson, Alexander**
Octrooibureau Ferguson BV
P.O. Box 970
3800 AZ Amersfoort (NL)

(56) References cited:
EP-A1- 1 482 285
WO-A1-2005/002994
WO-A1-2009/106522
WO-A1-2011/058287
WO-A1-2011/077187
WO-A2-2008/094596
DE-B- 2 207 812
JP-A- 11 071 001
JP-A- 2001 300 339
NL-C2- 2 001 819
US-A1- 2002 185 016

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 664 449 B1

Printed by Jouve, 75001 PARIS (FR)

Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a domestic waste container, particularly to a garbage container for domestic waste to be positioned on a permanent location, on ground level or partially or entirely in the ground. The invention furthermore relates to a waste station or arrangement including such a garbage container. The invention further relates to a built-in unit for such a garbage container.

[0002] As an alternative for collecting waste offered per household in bags or mobile mini containers there is the option of providing relatively permanent garbage containers at various locations all over a city or village, to which the residents have to take their garbage themselves and dump it in there. The garbage containers usually comprise an underground accommodation space, in which a casing-shaped garbage space is accommodated. On ground level the casing is then covered by a plate, on which a column-shaped superstructure with supply opening is placed. The plate or column can be provided with lifting eyes or the like for lifting the casing from and lowering it into the accommodation space in view of emptying the casing over a collection truck. For the purpose of emptying the casing is provided with a closing flap in the bottom. An example is shown in NL 1036371.

[0003] A city can have up to a few thousand of such underground garbage containers. The logistic process of emptying said garbage containers by means of collection trucks is complicated and requires the collection trucks to move around a lot. It may also happen that a garbage container is full sooner than the moment of the scheduled emptying process. This particularly occurs when the garbage contains synthetic bottles. It is also disadvantageous if, when emptying a garbage container, it turns out that it is only partially filled and the emptying process could have been postponed until a next time.

[0004] In order to reduce the number of movements of the collection trucks, that have an environmental impact, it is known to compress the garbage. In NL 1019021 it was suggested to dispose a pair of cooperating compacting rolls at the top side of the casing, in the path of the garbage thrown in in the garbage space in the casing, which rolls are activated when throwing in the garbage. From NL 2001819 as well, a compacting device operating at the top side of the casing is known, comprising a press plate that swings about a shaft, which plate is activated when detecting introduced garbage, in order to push it in the direction of the casing. In NL1034075, which discloses a garbage container according to the preamble of claim 1, it is suggested to provide a pressure housing at the upper end of the casing, in which housing a roller and a helical press are disposed for pressing on the garbage that is thrown in. Another arrangement is known from DE 203 05 392, in which an underground garbage container having a column-shaped superstructure is shown, in which superstructure an inlet opening is provided and a press plate operated by a cylinder, which plate is activated when throwing in garbage in order to propel the garbage to the garbage space and is kept in its ultimate position at the lower end of the column until the next time something is thrown in.

[0005] From EP 1.916.202 an underground garbage container is known having a superstructure and a press plate disposed in the top side of the garbage space, for in vertical direction compacting the garbage thrown in. The press plate is attached on an axis that is rotatable about a horizontal centre line and is operational each time when garbage is thrown in.

[0006] From DE 10 2006 031 131 an underground garbage container is known having a press plate that is moved by a place-fixed drive including a piston rod which drive is fed by the electricity grid and is situated outside of the container, wherein the piston rod comes into abutment with the press plate and the press plate is rotated about a hinge axis at the bottom of the container. The press plate is returned to a vertical stand-by position by a spring.

[0007] Another solution is known from FR 2.710.329, wherein a two-part garbage casing is accommodated underground in a permanent housing, and wherein the first casing part is movable between a garbage reception position below an inlet column above-ground and a pressing position wherein the garbage received is compressed against the second casing part. For said movement the permanent housing is provided with a vertical press plate that is horizontally moved by a cylinder. A flap that can be turned up is provided next to the inlet column for emptying the garbage casing, in compressed condition.

[0008] The pressing devices of many known arrangements require quite a lot of power, as a result of which the pressing devices usually need to be connected to the electricity grid. This results in an increase of the costs of installation. Other known pressing devices require relatively much space and/or complex facilities.

SUMMARY OF THE INVENTION

[0009] It is an object of the invention to provide a garbage container for temporary, particularly underground storage including a pressing device that in a cycle of filling and emptying is able to operate using much less power.

[0010] It is an object of the invention to provide a garbage container for temporary, particularly underground storage including a pressing device that is able to function independent of the electricity grid for a long time, that means for months, possibly years.

[0011] It is an object of the invention to provide a garbage container for temporary, particularly underground storage including a pressing device that is able to function in a failure-proof manner.

[0012] It is an object of the invention to provide a pressing device as built-in unit for a garbage container for temporary, particularly underground storage.

[0013] For achieving at least one of these objects the invention provides a garbage container according to claim 1. The pressing device of the garbage container therefore is suitable to compress the garbage that is already in the casing, also when the garbage reaches a level situated a little below the top side of the casing, effectively against the fixed (counter) surface formed by the bottom wall. The pressing device is able to function independent of whether or not garbage is supplied, and thus will not need to be operational so often. As a result less power is required, resulting in the local energy source, i.e. the PV panel including battery placed on the garbage container, sufficing. The relatively high position and relatively low position mean the level of the positions in question relative to each other: the stand-by position is situated higher than the pressing position.

[0014] In a simple embodiment the drive that is operational in two directions is operational in vertical direction for moving the press substantially vertically up and down.

[0015] In a simple embodiment the press plate has a circumference that at least almost corresponds with the horizontal inner cross-section of the casing, so that it is prevented that during pressing garbage reaches the top side of the press plate and the garbage can be compressed in a substantially evenly manner.

[0016] In the stand-by position and during pressing the press is able to allow through new garbage since the press plate has an opening for allowing the garbage thrown in to pass through to the garbage space. In order to prevent that garbage thrown in ends up at the top side of the press and remains lying there, the garbage container can be provided with a chute (having a rectangular, circular or other cross-section) for guiding garbage thrown in down into the opening in the press. This can be prevented to an even larger extent, if not ruled out, if the chute is divided into chute sections that are telescopically movable with respect to each other between a retracted position in the stand-by position of the press and an extended position in the pressing position of the press. In that case the chute can be place-fixed at the upper end and attached to the press at the lower end, so that at downward extension of the press the chute extends as if of its own accord, and at retracting the press the chute is also retracted or telescopically folded in.

[0017] It is noted that from DE 2.207.812 an arrangement is known having mobile garbage containers placed in a cellar and a filling chute extending through a hole in the ceiling of the cellar, the filling chute having a pressing device attached thereon for compressing the garbage received in a mobile garbage container placed underneath it. The pressing device comprises a two-part press plate, wherein two pressure flaps are movable by means of an additional scissor structure including operation cylinder, between a filling position, in which they are rotated away from each other and the lower end of the filling chute is open for garbage, and a horizontal pressing position. Contrary to this the garbage container according to the invention comprises its own pressing device and its press plate need not be transformed from a filling position, in which garbage can be received, to a pressing position, as a result of which use of energy is saved on and the arrangement can remain simple.

[0018] The invention enables a large degree of compression of the garbage present in the casing, if the stroke of the drive and the press exceeds a quarter of the depth of the garbage space, preferably exceeds half the depth of the garbage space, preferably about ¾ of the depth of the garbage space or even more. The depth of the garbage space is the distance in vertical direction that is available in principle for the garbage in the garbage space. The larger the stroke the more readily the garbage in the garbage space can be compressed. Furthermore a large stroke may be advantageous to an emptying process, see below.

[0019] The pressing device according to the invention can also be utilised for emptying the since the garbage container is provided with a lifting means for lifting the garbage container from ground level or out of the ground, wherein the bottom wall of the casing is provided with a closable opening for emptying. Once the garbage container with open opening for emptying has been brought over the collection truck, the pressing device (which after all together with the casing forms the garbage container and therefore has been lifted along) can be operated as a result of which the emptying process is furthered, particularly when the garbage has become slightly stuck, for instance as a result of previous pressure courses or frost. The pressing device can then be operated at lower power than is the case at pressing in the preceding filling stage of the casing of the garbage container.

[0020] Stability and alignment of the press, particularly the press plate, are enhanced if the drive for the press comprises, preferably synchronous, drive members that operate parallel and that engage onto spaced apart locations of the press and preferably engage onto the press at locations situated near the circumferential wall.

[0021] In one embodiment that requires little space in vertical sense in the stand-by position, the drive comprises one or more parallel, particularly multiple scissor structures that can be retracted and extended in vertical direction.

[0022] It is furthermore noted that from WO 2005/002994 an arrangement is known having an underground accommodation space including a carrousel of mobile garbage containers and a central filling chute. The filling chute discharges garbage to a belt conveyor situated below it, with which the garbage is moved horizontally to one of the garbage containers and discharged thereto. Above the mobile garbage containers press plates are situated that are movable by scissor structures attached to the bottom side of the walkable cover plate, and that therefore are positioned free from the mobile containers. WO 2009/106522 also shows an arrangement including mobile garbage containers, wherein a press plate operated by a scissor structure attached to a permanent cover, is operational adjacent to a space

where the mobile garbage container receives the garbage.

[0023] In a further development the garbage container is provided with means for determining the degree to which the garbage space has been filled. Said means can operate particularly acoustically, particularly ultrasonically.

[0024] In one embodiment the data from the filling degree determination means can be used for determining an optimal driving route for the collection trucks, for which purpose the garbage container is provided with a transmitter for (for instance via a wireless telephone network) transmitting the measurement data from the filling degree determination means to a remote location, particularly a central data storage unit and optionally data processing unit. The garbage container can also be provided with means for determining the temperature in the garbage space, means for determining the status of a battery for the drive, means for determining a malfunction, such as the press not moving after activation of the drive, etcetera. Such data can also be transmitted to the said location.

[0025] In one embodiment the data from the filling degree determination means can be used for an optimal operation of the garbage container in question, for which purpose the garbage container is provided with an in particular programmable control unit for the drive, wherein the filling degree determination means are connected to the control unit and the control unit is adapted for activation of the drive depending on the data received from the filling degree determination means. The control unit can be programmed for activating the drive at one or more particular filling degrees, such as approximately 40%, approximately 60%, and approximately 80%. The control unit can be provided with a data storage as log for the activations and movements of the press. Said data can also be transmitted to the remote location.

[0026] The garbage container comprises a PV panel including battery for feeding the drive and, if present the filling degree determination means and the transmitter.

[0027] Many existing garbage containers can also be provided with a pressing device according to the invention, for which purpose it is provided that the drive and the press, particularly the press plate, are part of a built-in unit. The said opening in the press, the (particularly telescopic) chute can also be provided thereon. The said filling degree determination means, the transmitter and the control unit can furthermore be provided thereon. The press plate can in this case function as stable and safe direct or indirect support for the other components so that the built-in unit as a whole can be relatively easy to handle.

[0028] The garbage container can furthermore be provided with a shock sensor for detecting the lifting of the garbage container. The shock sensor can for instance comprise a ball situated in a bowl, the movement of which ball can be detected by electronic means. In that way the number and moments of emptying can be logged in the control unit. If the press is also used for pushing the garbage out of the casing it can be provided that on the basis of data from the shock sensor the control unit switches to a low-power mode, in which, for driving the pressing device, lower power is used than is the case during pressing in the filling period.

[0029] The built-in unit can be detachably attached in the garbage container.

[0030] In one embodiment the built-in unit is attached against the lower side of a frame which as usual, and for instance by welding or bolts, is attached to the top side of the casing, particularly against its cross-beams, as a result of which in a simple manner a fixed push-off part is provided for the pressing device when it is active vertically downward. By utilising the said frame the pressing device can easily be arranged in existing arrangements including garbage containers.

[0031] The garbage container, particularly for full or partial underground placement of the casing, can comprises a superstructure situated particularly vertically above the pressing device and having a filling inlet for garbage to be thrown in, which filling inlet is in a garbage-passing communication with the filling opening, wherein the superstructure preferably is provided with a lifting means for lifting the garbage container in order to be emptied.

[0032] In one embodiment the garbage container comprises a PV panel attached to the superstructure, which panel has a battery for feeding the drive and, if present, the filling degree determination means and the transmitter. Although the superstructure provides a limited surface for a PV surface this will rather suffice for the pressing device that requires little power. It is noted that from NL 2001819 a PV panel on a garbage container is known per se but that the PV panel is in that case incorporated in the cover plate that can be walked on, as a result of which it can be slippery for users of the container, can get damaged and will quite quickly be less efficient due to dirt.

[0033] From a further aspect not part of the invention, it is provided a device apparently suitable as and intended for built-in unit according to the invention. The device in particular provides a built-in unit for accommodation in a garbage container according to the invention, comprising a pressing device having a press plate provided with a passage for garbage, a drive for the press plate, and preferably also a telescopic chute connecting to the passage and attached to a top side of the press plate. In case the garbage container is provided with the said filling degree determination means, transmitter and control unit they can also be part of the built-in unit.

[0034] According to a further aspect, it is provided an arrangement with a garbage container according to the invention, which is at least partially accommodated in a permanent casing in the ground.

[0035] Alternatively the invention provides an arrangement of a garbage container according to the invention placed on ground level.

[0036] The garbage container including pressing device and preferably also the superstructure, if present, can be lifted out of/from the permanent surroundings in order to be emptied and for that purpose be provided with a lifting means, such as a lifting eye or lifting rod.

[0037] In a simple embodiment the said PV-panel is attached on the superstructure. According to a further aspect the invention provides a garbage container that can be moved as one unity for placement underground, comprising a casing having a garbage space for receiving garbage, which casing comprises a bottom, a top side and a circumferential wall, wherein the casing is provided with a bottom wall in the bottom and with a filling passage for the garbage at the top side, further provided with a pressing device including a press, particularly a press plate, and a press drive fully accommodated in the garbage container for urging the press from a relatively high, stand-by position, to a pressing position situated relatively low in the garbage space, in which the garbage in the garbage space is compressed against the bottom wall. The drive can be operational in vertical direction for linear movement of the press, particularly press plate. The features described above can be applied here.

[0038] According to a further development of the invention an assembly is provided of a number of arrangements according to the invention, and a central data storage unit and optionally central data processing unit on a remote location, wherein the central data storage unit and optionally data processing unit is provided with a receiver for, particularly parallel, reception of data from the filling degree determination means of the garbage containers, wherein the central data storage unit and optionally central data processing unit is adapted in dependence on those data determining an optimal driving route for a collection truck with which the garbage from the garbage containers is collected. In that way it can for instance be determined that certain garbage containers need not be emptied so often or that certain garbage containers need to emptied more often indeed in certain periods.

[0039] The central data storage unit and optionally central data processing unit can also be adapted for receiving data from said means for determining the temperature in the garbage space, means for determining the status of a battery for the drive, means for determining a malfunction, such as the press not moving after activation of the drive, etc. In case a temperature exceeding a safety value has been measured, the battery voltage exceeds a certain value and the press does not move despite activation, action can be taken to remedy said defect.

[0040] The central data storage unit and optionally central data processing unit can be a computer that is accessible to users, such as a municipality and a garbage collection company.

[0041] The garbage containers may be provided with a transmitter in order to be located. This may for instance be via GSM or within a GPS. In that way it can be known where a garbage container is located when it has been moved for instance for maintenance.

[0042] According to a further aspect, it is provided a method for collecting garbage in underground garbage containers, particularly garbage containers according to the invention, wherein the garbage received in the garbage space of the garbage containers is compressed against the bottom of the garbage space by exerting a vertically downwardly oriented pressure force by substantially vertically and linearly moving a press in the garbage space.

[0043] In one embodiment the filling degree of the garbage space is determined, particularly by acoustic measurement, more particularly by acoustic measurement in downward direction on the garbage in the garbage space, wherein the press is activated in dependence on a predetermined value of the measurement.

[0044] Alternatively or additionally the garbage containers can be emptied in dependence on reaching a predetermined value of the filling degree, particularly at least approximately 60%, preferably approximately 80%. In addition a garbage collection truck can be controlled for following a route along the garbage containers in dependence on their determined filling degrees.

[0045] The aspects and measures described in this description and the claims of the application and/or shown in the drawings of this application may where possible also be used individually. Said individual aspects may be the subject of divisional patent applications relating thereto. This particularly applies to the measures and aspects that are described per se in the sub claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figures 1A and 1B show a schematic example of a pressing device for a garbage container according to the invention, in two side views that are perpendicular to each other;

Figures 2A and 2B show a schematic example of a garbage container according to the invention placed in the ground, provided with a pressing device of figures 1A, B, in two side views that are perpendicular to each other, during receiving garbage;

Figures 3A and 3B show the arrangement of figures 2A,B during activating the pressing device;

Figure 4 shows a diagram of an assembly of a number of garbage containers of figures 2A,B, a central control unit and a collection truck; and

Figures 4A-C show a few stages during emptying the garbage container of figures 2A and 2B.

DETAILED DESCRIPTION OF THE DRAWINGS

[0047] The pressing device 1 in figure 1 is a built-in unit that can be built in in a garbage container intended to be placed underground.

[0048] The pressing device 1 comprises a rectangular steel press plate 2, that is provided with a passage 2a for sonar waves and with a passage 2b for garbage. At the top side of the press plate 2, near two opposite side edges thereof, two scissor structures 3a,b are attached. The scissor structures 3a,b comprise synchronous electric actuators 4a,b for retracting and extending them. At their top sides the scissor structures 3a,b are provided with a steel strip 6a,b on which attachment lips 5a,b are attached.

[0049] Above the passage 2a, in a manner that is not further shown, indirectly attached to the permanent parts of the pressing device, an ultrasonic sensor 8 is arranged, which through the passage 2a is able to send sonic waves downwards and receive them back, in the manner known per se. The sensor 8 is functionally coupled to a control unit 50, which is provided with a transmitter 9. The transmitter 9 can be functional for transmitting signals of various measurement data, which will be discussed below.

[0050] On the edges of the passage 2b a telescopic chute 7 is attached, in this example comprising chute sections 7a-d, that can be slid in and out of each other and are provided with mutually active stops in order to prevent them from getting fully disconnected during extending.

[0051] In figure 2A,B the ground 100 with ground level 101 can be seen. In the ground 100 a cladded hole (not shown, see for instance pos 102 in figure 4A) has been made, in which the underground part or casing 11 of a garbage container 10 is fittingly and removably accommodated. Apart from the casing 11 and the pressing device 1 the garbage container 10 comprises a superstructure 12 supporting on a cover plate 23, and situated vertically above the pressing device 1.

[0052] The underground part 11 comprises a steel circumferential wall 13, circumferentially surrounding the garbage space 30, and a bottom wall 14 provided with flaps 15 for emptying that can be opened and closed via a hinging motions.

[0053] The pressing device 1 is mounted to the casing 11 in the upper section 30a of the space 30. The lips 5a,b are attached to steel frame beams 16a,b that are part of the framework of the garbage container 10 and on which the cover plate 23 has also been attached.

[0054] The space 30 has a cross-section that is slightly larger than the press plate 2, wherein at the edges the plate 2 can be provided with a flexible sealing strip that abuts the inner surface of the wall 3.

[0055] The superstructure 12 is column-shaped and has an inner space 17 forming the connection between the closable filling opening or throw-in opening 19 and the chute 7. With the upper edge 18 the chute section 7a is attached to the superstructure 12, in a manner that is not shown.

[0056] The super structure 12 is furthermore provided with a lifting means 20 that is known per se and includes an operation slide for the flaps 15 for emptying (see for instance NL 2001819) for lifting and lowering the garbage container 10 from/into the hole 102 in an emptying process, also see figures 4A-C. On top of the superstructure a cabinet 21 is attached, of which the inclined top surface 22a forms a UV light permeable shielding for a horizontal plate 22 cladded with PV cells. In the cabinet 21 there is a battery for storage of power generated by means of the PV cells. The control unit, actuators and the sensor are fed by the battery.

[0057] In operation, garbage W is introduced via the opening 19 in the superstructure 12, falls through space, direction A, to into the chute 7, falls further down there through the opening 2b, in direction B and in directions C in the space 30. The garbage W in the space 30 has an upper surface W1, the height of which, by approximation, can be measured by means of the sensor 8. The sensor 8 can for instance detect the highest point of W1.

[0058] When by means of the sensor 8 the control unit 50 detects that W1 approaches the plate 2 (for instance corresponding with a filling degree of 80%), the control unit 50 activates both actuators 4a,b that indirectly push off from the frame beams 16a,b as a result of which the scissor structures 3a,b are extended, see figures 3A and 3B and the press plate 2 is pressed vertically downwards from the stand-by position of figures 2A,B. The sensor 8 and the control unit 50 in this case remain at the top, as they are indirectly attached to the permanent part of the pressing device 1. Due to the presence of the chute 7 it is alternatively also possible that the sensor 8 is attached on the top side of the press plate 2, without risk of damage by garbage thrown in.

[0059] The scissor structures 3a,b have a stroke that is slightly larger than ¾ of the height of the net garbage space, so the distance between the bottom 14 and the press plate 2 in figures 2A,B. Large pressure P is exerted by the press plate 2 on the garbage W, as a result of which it can be compressed to a large extent and the top surface thereof will come to sit much lower W2. Due to sealing strips the garbage cannot escape upwards past the edges of the press plate 2. After some compression time the control unit 50 has the actuators 4a,b retract the scissor structures 3a,b again to the position of figures 2A,B. Said cycle can be repeated again when the surface W1 has reached a certain height again. Due to the presence of the chute 7, the garbage container has remained usable all this time for receiving garbage. As the chute sections 7a-d extend and retract the garbage cannot end up on the press plate or on another undesirable place within the casing 11, but will always be guided in direction B to the passage 2b.

[0060] By means of the invention it can therefore be realised that compression only takes place when truly necessary, in which way the need for energy is saved on further.

[0061] In general, due to the presence of a chute guiding the garbage downwards, it can also be opted for not to pull the press plate fully upwards after a compression course, but to leave it at a lower position (but indeed higher than the pressing position just taken), as a result of which energy is saved on.

[0062] At certain times, for instance once a day, the occasions of compression in a garbage container 10 can be transferred via the transmitter 9 by the control unit 50 to a central computer 200 including data storage and data processing, see figure 4, with receiver 201. The computer 200 can be located anywhere, accessible to a user, such as a garbage collection company. The computer can be in the same room as the operator or be remote therefrom and be accessible from an operator room, for instance via an internet connection.

[0063] A log of those occasions can be kept in the data storage. The measurement data at level W1 can also be transferred thereto. In the central computer 200 measurement data (including temperature measurements and possible malfunctions) can thus, in a parallel manner, be received from many garbage containers 10a-f, and more, said data can be stored and where necessary be processed. The position of the garbage containers has been entered in the computer 200 beforehand, and can optionally be tracked via GSM or GPS if a garbage container has been moved in connection with maintenance. Thus the position and filling degree of the garbage containers are regularly known in the central storage 200 and on the basis thereof after processing in a calculation program, the central computer 200 can make information available to a user, such as the garbage collection company, regarding the logistically most optimal route (for instance S1-S6) for a collection truck 202, provided with a transmitter/receiver 203.

[0064] When emptying the garbage container by the collection truck 202, see figures 4A-C, use can be made of the pressing device 1. The well filled container shown in figure 4A is picked up by a claw 205 on arm 206 of the collection truck from lifting means 20, direction E, see figure 4B. The shock is detected by sensor 30 present for that purpose, from which sensor a signal is received by the control unit 50, after which a corresponding signal is transmitted by transmitter 9 to the central computer 200. The fact that an emptying is taking place as well the point in time thereof is stored in there.

[0065] The control unit 50 activates the actuators 4a,b, but in connection with the received signal from the sensor 30 at lower power. In the meantime the casing 11 is brought over the loading space of the collection truck by the arm 206 and by means of lifting means 20, in the manner known per se, the flaps 15 are opened, direction F. The garbage W is urged downwards out of the casing 11 by the pressing device, see figure 4C.

[0066] The transmitter 9 can also be functional for a sensor (not shown) for following the temperature in the space 30 yet to be discussed of the garbage container. When exceeding a safety value the control unit 50 is able to send a related signal to the operating room (see figure 4) after which action can be taken, such as dispatching a fire unit. The transmitter 9 can also be functional for informing the operating room about malfunctions, such as the press jamming or the power of a battery for the drives 4a,b being too low.

[0067] The above description is included to illustrate the operation of preferred embodiments of the invention and not to limit the scope of the invention. Starting from the above explanation many variations that fall within the scope of the claims will be evident to an expert.

Claims

1. Garbage container (10) that can be moved as one unity and is suitable for placement underground, comprising a casing (11) having a garbage space (30) for receiving garbage, which casing comprises a bottom, a top side and a circumferential wall (13), wherein the casing is provided with a bottom wall (14) in the bottom and with a filling passage for the garbage at the top side, further comprising a pressing device (1) wherein the garbage container is provided with a lifting means (20) for lifting the garbage container from out of the ground, wherein the bottom wall (14,15) of the casing is provided with a closable opening for emptying, **characterized in that** the pressing device includes a press plate (2) and includes a press drive (3a,3b,4a,4b) for urging the press plate, which is situated substantially parallel to the bottom, from a relatively high, stand-by position of the press plate, in a substantially linear movement, particularly vertical movement, to a pressing position of the press plate situated relatively low in the garbage space, in which the garbage in the garbage space is compressed against the bottom wall, wherein the press plate (2) has an opening (2b) for allowing the garbage thrown in to pass through to the garbage space, and the garbage container comprises a PV panel (22) including battery for feeding the press drive.

2. Garbage container according to claim 1, wherein the press plate (2) has a circumference that at least almost corresponds with the horizontal inner cross-section of the casing (11).

3. Garbage container according to claim 1 or 2, provided with a chute (7) for guiding garbage thrown in down into the opening in the press plate (2), wherein, preferably, the chute is divided into chute sections (7a-d) that are telescopically movable with respect to each other between a retracted position in the standby position of the press plate and an extended position in the pressing position of the press plate.

4. Garbage container according to claim 3, wherein the

chute (7) is place-fixed at the upper end and attached to the press plate at the lower end.

5. Garbage container according to any one of the preceding claims, wherein the drive for the press plate comprises, preferably synchronous, drive members (4a,4b) that operate parallel and that engage onto spaced apart locations of the press plate and preferably engage onto the press plate at locations situated near the circumferential wall and/or wherein the drive comprises one or more parallel, particularly multiple scissor structures (3a,3b), wherein the stroke of the drive and the press plate (2) preferably is larger than half the depth of the casing, preferably at least ¾ thereof.

6. Garbage container according to any one of the preceding claims, provided with means (8) for determining the degree to which the garbage space has been filled, which filling degree determination means preferably operate acoustically, particularly ultrasonically, and/or are provided with means for determining the temperature in the garbage space, with means for determining the status of a battery for the drive and/or are provided with means for determining a malfunction.

7. Garbage container according to claim 6, provided with a transmitter (9) for transmitting the measurement data of the filling degree determination means to a remote location, particularly a central data storage unit and optionally data processing unit.

8. Garbage container according to claim 6 or 7, provided with an in particular programmable control unit (50) for the drive, wherein the filling degree determination means (8) are operationally connected to the control unit and the control unit is adapted for activation of the drive depending on the data received from the filling degree determination means, particularly at one or more different filling degrees.

9. Garbage container according to any one of the preceding claims, wherein the drive and the press plate (2), and when depending on claim 4 the chute (7) as well, are part of a built-in unit, wherein the built-in unit preferably is attached against the lower side of a frame (16a,b) that is attached to the top side of the casing, particularly against its cross-beams.

10. Garbage container according to claim 9 and any one of the claims 6-8, wherein the filling degree determination means (8), the transmitter (9) and the control unit (50) are part of the built-in unit.

11. Garbage container according to any one of the preceding claims, furthermore comprising a superstructure (12) situated particularly vertically above the pressing device (1) and having a filling inlet (19) for garbage to be thrown in, which filling inlet is in a garbage-passing communication with the filling opening, wherein the superstructure is provided with the lifting means (20) for lifting the garbage container in order to be emptied and wherein the PV panel (22) is attached to the super structure.

12. Garbage container according to claim 11 and any one of the claims 6-8, wherein the battery is also for feeding the filling degree determination means (8) and the transmitter.

13. Arrangement of a garbage container (10) according to any one of the preceding claims, at least partially accommodated in a permanent casing (102) in the ground .

Patentansprüche

1. Abfallbehälter (10), der als eine Einheit bewegt werden kann und sich für die unterirdische Platzierung eignet und der ein Gehäuse (11) mit einem Abfallraum (30) zum Aufnehmen von Abfall umfasst, wobei das Gehäuse einen Boden, eine Oberseite und eine Umfangswand (13) umfasst, wobei das Gehäuse mit einer Bodenwand (14) im Boden und mit einem Einfüllkanal für den Abfall an der Oberseite versehen ist, ferner umfassend eine Pressvorrichtung (1), wobei der Abfallbehälter mit einem Hubmittel (20) zum Anheben des Abfallbehälters aus dem Boden versehen ist, wobei die Bodenwand (14, 15) des Gehäuses mit einer verschließbaren Öffnung zum Entleeren versehen ist, **dadurch gekennzeichnet, dass** die Pressvorrichtung eine Pressplatte (2) aufweist und einen Pressenantrieb (3a, 3b, 4a, 4b) zum Zwängen der Pressplatte, die im Wesentlichen parallel zum Boden liegt, aus einer verhältnismäßig hohen Ruhestellung der Pressplatte in einer im Wesentlichen linearen Bewegung, insbesondere senkrechten Bewegung, in eine verhältnismäßig niedrig im Abfallraum befindliche Pressstellung der Pressplatte aufweist, in der der Abfall im Abfallraum gegen die Bodenwand zusammengedrückt wird, wobei die Pressplatte (2) eine Öffnung (2b) aufweist, damit der eingeworfene Abfall hindurch zum Abfallraum gelangen kann, und der Abfallbehälter ein PV-Panel (22) mit Batterie zum Versorgen des Pressenantriebs umfasst.

2. Abfallbehälter nach Anspruch 1, wobei die Pressplatte (2) einen Umfang aufweist, der zumindest beinahe dem waagerechten Innenquerschnitt des Gehäuses (11) entspricht.

3. Abfallbehälter nach Anspruch 1 oder 2, der mit einem Schacht (7) zum Leiten von eingeworfenem Abfall

hinunter in die Öffnung in der Pressplatte (2) hinein versehen ist, wobei der Schacht vorzugsweise in Schachtabschnitte (7a-d) unterteilt ist, die zueinander teleskopisch bewegbar sind zwischen einer eingezogenen Stellung in der Ruhestellung der Pressplatte und einer ausgefahrenen Stellung in der Pressstellung der Pressplatte.

4. Abfallbehälter nach Anspruch 3, wobei der Schacht (7) am oberen Ende an seinem Ort fixiert ist und am unteren Ende an der Pressplatte angebracht ist.

5. Abfallbehälter nach einem der vorhergehenden Ansprüche, wobei der Antrieb für die Pressplatte, vorzugsweise synchrone, Antriebselemente (4a, 4b) umfasst, die parallel arbeiten und die an zueinander beabstandeten Stellen in Eingriff sind mit der Pressplatte und vorzugsweise in Eingriff sind mit der Pressplatte an Stellen, die sich in der Nähe der Umfangswand befinden, und/oder wobei der Antrieb eine oder mehrere parallele, insbesondere Mehrfachscherenstrukturen (3a, 3b) umfasst, wobei der Hub des Antriebs und der Pressplatte (2) vorzugsweise größer als die Hälfte der Tiefe des Gehäuses ist, vorzugsweise mindestens 3/4 davon.

6. Abfallbehälter nach einem der vorhergehenden Ansprüche, der mit Mitteln (8) zum Bestimmen des Grads versehen ist, bis zu dem der Abfallraum gefüllt wurde, wobei die Füllgrad-Bestimmungsmittel vorzugsweise akustisch, insbesondere per Ultraschall, arbeiten, und/oder mit Mitteln zum Bestimmen der Temperatur im Abfallraum, mit Mitteln zum Bestimmen des Zustands einer Batterie für den Antrieb versehen sind und/oder mit Mitteln zum Bestimmen einer Funktionsstörung versehen sind.

7. Abfallbehälter nach Anspruch 6, der mit einem Sender (9) zum Senden der Messdaten der Füllgrad-Bestimmungsmittel an einen entfernten Ort, insbesondere eine zentrale Datenspeichereinheit und gegebenenfalls Datenverarbeitungseinheit, versehen ist.

8. Abfallbehälter nach Anspruch 6 oder 7, der mit einer insbesondere programmierbaren Steuereinheit (50) für den Antrieb versehen ist, wobei die Füllgrad-Bestimmungsmittel (8) funktionsmäßig mit der Steuereinheit verbunden sind und die Steuereinheit zur Aktivierung des Antriebs in Abhängigkeit von den Daten ausgelegt ist, die von den Füllgrad-Bestimmungsmitteln empfangen werden, insbesondere bei einem oder mehreren unterschiedlichen Füllgraden.

9. Abfallbehälter nach einem der vorhergehenden Ansprüche, wobei der Antrieb und die Pressplatte (2), und bei Abhängigkeit von Anspruch 4 auch der Schacht (7), Bestandteil einer Einbau-einheit sind, und wobei die Einbau-einheit vorzugsweise an der Unterseite eines Rahmens (16a, b) angebracht ist, der an der Oberseite des Gehäuses angebracht ist, insbesondere an seinen Querträgern.

10. Abfallbehälter nach Anspruch 9 und einem der Ansprüche 6 bis 8, wobei die Füllgrad-Bestimmungsmittel (8), der Sender (9) und die Steuereinheit (50) Bestandteil der Einbau-einheit sind.

11. Abfallbehälter nach einem der vorhergehenden Ansprüche, ferner umfassend eine Überkonstruktion (12), die sich insbesondere senkrecht über der Pressvorrichtung (1) befindet und eine Fülleinlassöffnung (19) zum Einwerfen von Abfall aufweist, wobei die Fülleinlassöffnung mit der Befüllöffnung in einer Abfalldurchlassverbindung steht, wobei die Überkonstruktion mit dem Hubmittel (20) versehen ist, damit der Abfallbehälter zwecks Entleerung angehoben wird, und wobei das PV-Panel (22) an der Überkonstruktion angebracht ist.

12. Abfallbehälter nach Anspruch 11 und einem der Ansprüche 6 bis 8, wobei die Batterie auch zum Versorgen der Füllgrad-Bestimmungsmittel (8) und des Senders dient.

13. Anordnung eines Abfallbehälters (10) nach einem der vorhergehenden Ansprüche, der zumindest teilweise in einem dauerhaften Gehäuse (102) im Boden untergebracht ist.

Revendications

1. Conteneur à ordures (10) pouvant être déplacé comme une unité et approprié pour une installation souterraine, comprenant une enceinte (11) présentant un espace à ordures (30) destiné à recevoir des ordures, ladite enceinte comprenant un fond, un côté supérieur et une paroi circonférentielle (13), dans lequel l'enceinte est pourvue d'une paroi inférieure (14) dans le fond et d'un passage de remplissage pour les ordures au niveau du côté supérieur, comprenant en outre un dispositif de pressage (1), dans lequel le conteneur à ordures est pourvu de moyens de levage (20) pour élever et faire sortir le conteneur à ordures du sol, dans lequel la paroi inférieure (14, 15) de l'enceinte est pourvue d'une ouverture refermable pour le vidage, **caractérisé en ce que** le dispositif de pressage comprend une plaque de pressage (2) et comprend des actionneurs de pressage (3a, 3b, 4a, 4b) pour pousser la plaque de pressage, qui est disposée sensiblement parallèlement au fond, à partir d'une position d'attente relativement haute de la plaque de pressage, avec un déplacement sensiblement linéaire, en particulier un déplacement vertical, jusqu'à une position de pressage

de la plaque de pressage située relativement bas dans l'espace à ordures, dans lequel les ordures dans l'espace à ordures sont comprimées contre la paroi inférieure, dans lequel la plaque de pressage (2) comporte une ouverture (2b) destinée à permettre aux ordures jetées de passer à travers celle-ci en direction de l'espace à ordures, et le conteneur à ordures comprend un panneau photovoltaïque (22) comprenant une batterie pour alimenter les actionneurs de pressage.

2. Conteneur à ordures selon la revendication 1, dans lequel la plaque de pressage (2) présente une circonférence qui correspond au moins pratiquement à la section transversale horizontale de l'enceinte (11).

3. Conteneur à ordures selon la revendication 1 ou 2, pourvu d'une chute (7) pour guider les ordures jetées vers le bas dans l'ouverture dans la plaque de pressage (2), dans lequel, de préférence, la chute est divisée en sections de chute (7a-d) qui sont mobiles de façon télescopique les unes par rapport aux autres entre une position rétractée dans la position d'attente de la plaque de pressage et une position étendue dans la position de pressage de la plaque de pressage.

4. Conteneur à ordures selon la revendication 3, dans lequel la chute (7) est fixée en place à l'extrémité supérieure et est attachée à la plaque de pressage à l'extrémité inférieure.

5. Conteneur à ordures selon l'une quelconque des revendications précédentes, dans lequel les actionneurs pour la plaque dé pressage comprennent des éléments d'entraînement dé préférence synchronisés (4a, 4b) qui opèrent parallèlement et qui agissent à des endroits mutuellement espacés de la plaque de pressage et qui agissent de préférence sur la plaque de pressage à des endroits situés à proximité de la paroi circonférentielle et/ou dans lequel les actionneurs comprennent une ou plusieurs structure(s) de ciseaux parallèle(s), en particulier multiples (3a, 3b), dans lequel la course des actionneurs et de la plaque de pressage (2) est de préférence plus grande que la moitié de la profondeur de l'enceinte, de préférence au moins trois quarts de celle-ci.

6. Conteneur à ordures selon l'une quelconque des revendications précédentes, pourvu de moyens (8) pour déterminer le degré auquel l'espace à ordures a été rempli, lesdits moyens de détermination du degré de remplissage opérant de préférence de façon acoustique, en particulier de façon ultrasonique, et/ou étant pourvus de moyens pour déterminer la température dans l'espace à ordures, et de moyens pour déterminer le statut d'une batterie pour les actionneurs et/ou de moyens pour déterminer un dysfonctionnement.

7. Conteneur à ordures selon la revendication 6, pourvu d'un émetteur (9) pour transmettre les données de mesure des moyens de détermination du degré de remplissage à un site distant, en particulier une unité centrale de stockage de données et optionnellement à une unité de traitement de données.

8. Conteneur à ordures selon la revendication 6 ou 7, pourvu en particulier d'une unité de commande programmable (50) pour les actionneurs, dans lequel les moyens de détermination du degré de remplissage (8) sont connectés de façon opérationnelle à l'unité de commande, et l'unité de commande est conçue pour déclencher les actionneurs sur la base des données reçues en provenance des moyens de détermination du degré de remplissage, en particulier à un ou plusieurs degré(s) de remplissage différent(s).

9. Conteneur à ordures selon l'une quelconque des revendications précédentes, dans lequel les actionneurs et la plaque de pressage (2), et la chute (7) lorsqu'elle dépend de la revendication 4, font partie d'une unité intégrée, dans lequel l'unité intégrée est de préférence attachée contre le côté inférieur d'un cadre (16a, b) qui est attaché au côté supérieur de l'enceinte, en particulier contre ses poutres transversales.

10. Conteneur à ordures selon la revendication 9 et l'une quelconque des revendications 6 à 8, dans lequel les moyens de détermination du degré de remplissage (8), l'émetteur (9) et l'unité de commande (50) font partie de l'unité intégrée.

11. Conteneur à ordures selon l'une quelconque des revendications précédentes, comprenant en outre une superstructure (12) située en particulier verticalement au-dessus du dispositif de pressage (1) et comportant une entrée de remplissage (19) pour des ordures à y jeter, ladite entrée de remplissage se trouvant en communication de passage d'ordures avec l'ouverture de remplissage, dans lequel la superstructure est pourvue des moyens de levage (20) pour soulever le conteneur à ordures dans le but de le vider, et dans lequel le panneau photovoltaïque (22) est attaché à la superstructure.

12. Conteneur à ordures selon la revendication 11 et l'une quelconque des revendications 6 à 8, dans lequel la batterie sert aussi à alimenter les moyens de détermination de degré de remplissage (8) et l'émetteur.

13. Arrangement d'un conteneur à ordures (10) selon

l'une quelconque des revendications précédentes, logé au moins partiellement à l'intérieur d'une enceinte permanente (102) dans le sol.

Fig. 1A

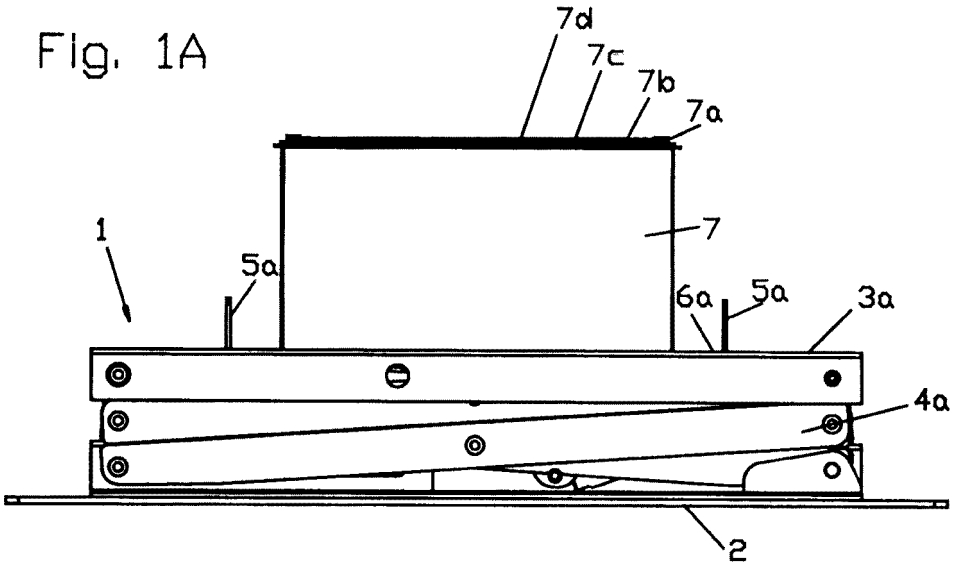

7d
7c
7b
7a
7
1
5a
6a
5a
3a
4a
2

Fig. 1B

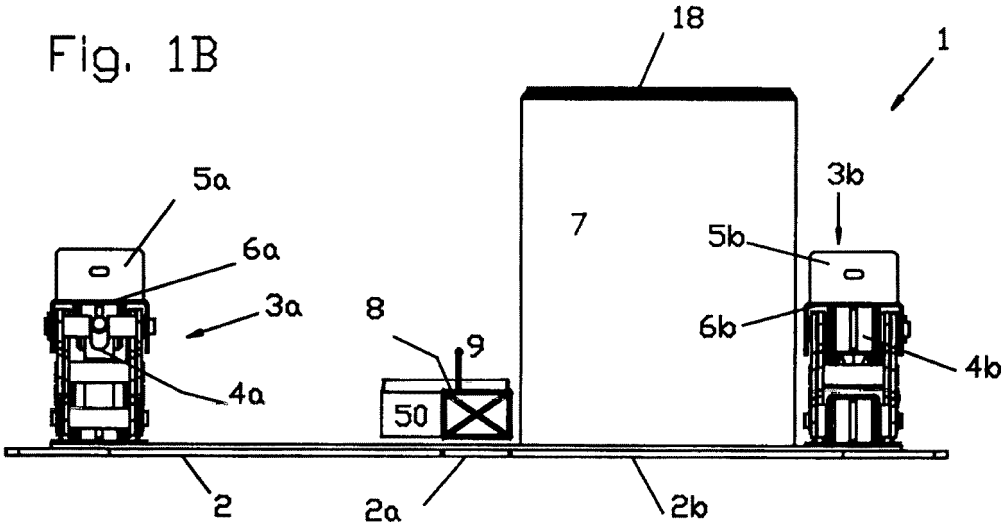

18
1
5a
3b
7
6a
5b
3a
8
9
6b
4b
4a
50
2
2a
2b

Fig. 2A

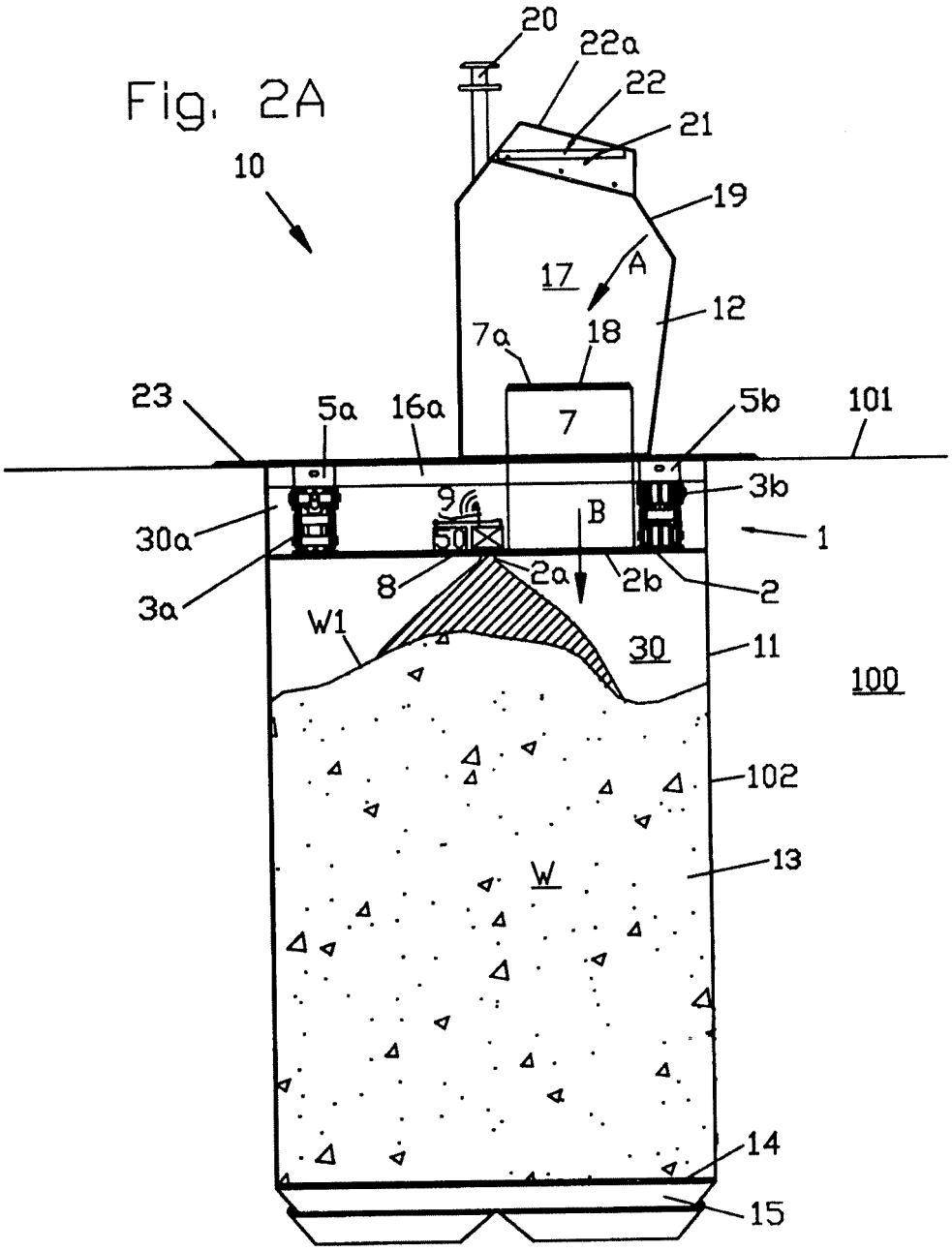

20
22a
22
21
10
19
17
A
12
7a
18
23
5a
16a
7
5b
101
3b
30a
9
B
1
50
3a
8
2a
2b
2
W1
30
11
100
102
13
W
14
15

Fig. 2B

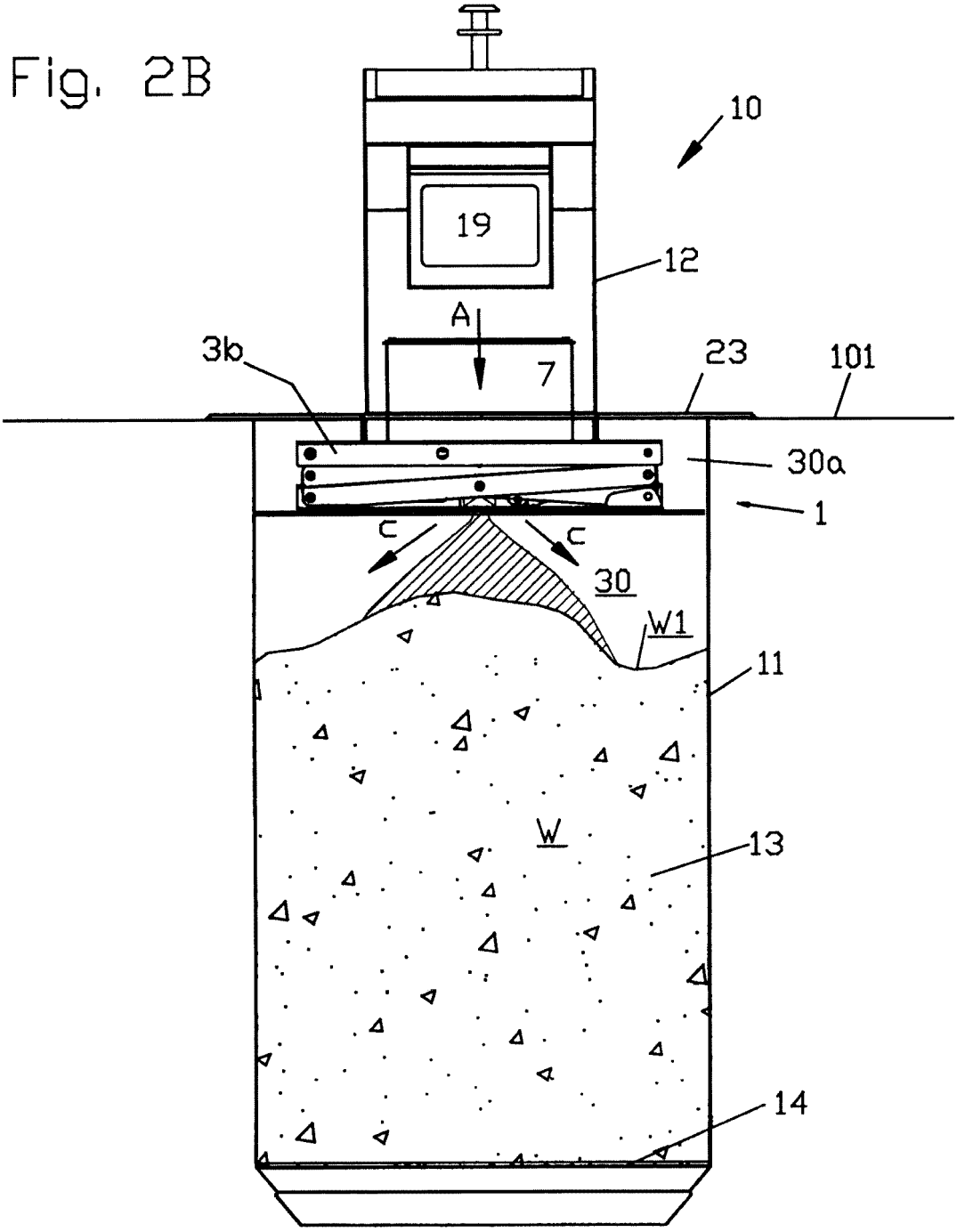


Fig. 3A

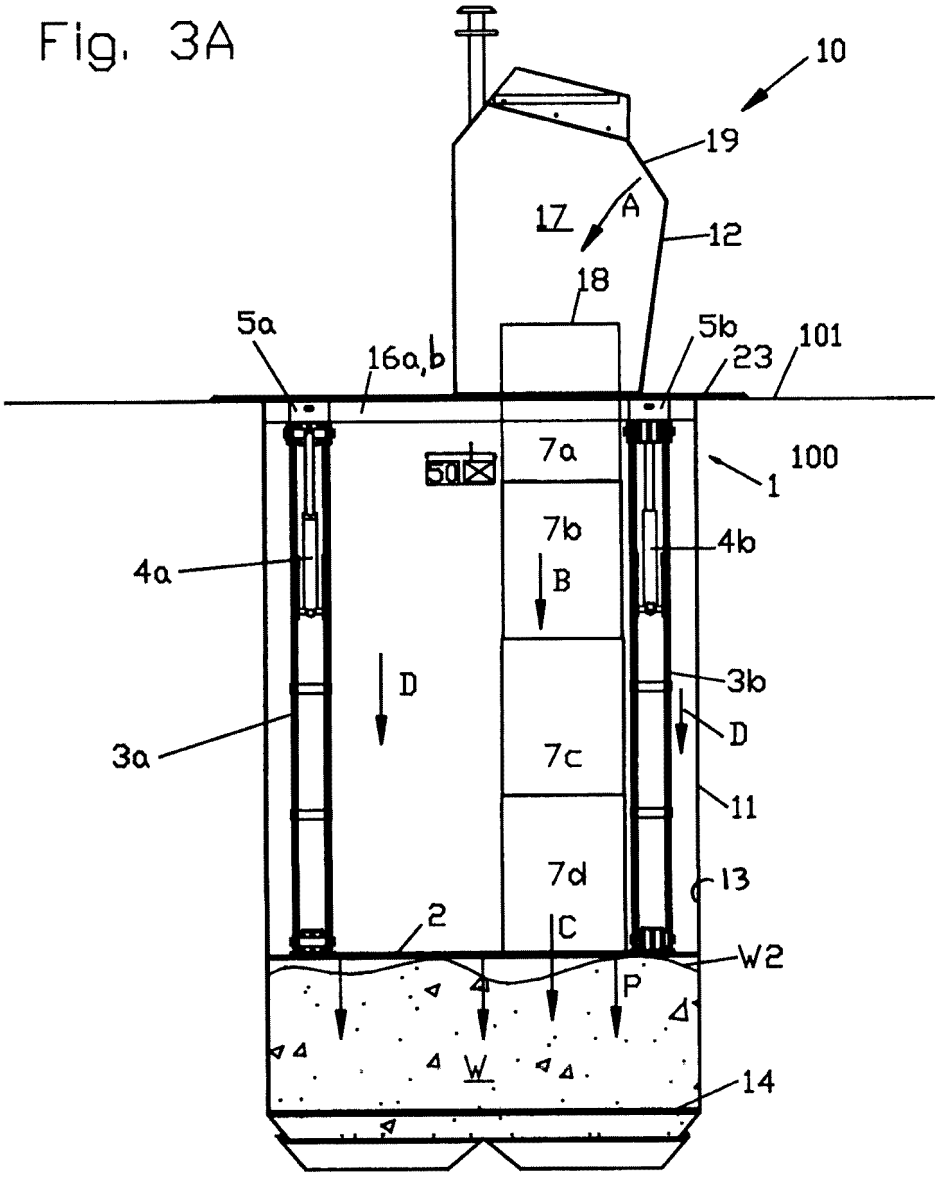

10
19
17
A
12
18
5a
16a,b
5b
23
101
100
1
7a
50
7b
B
4b
4a
D
3b
D
3a
7c
11
7d
13
2
C
W2
P
W
14

Fig 3B

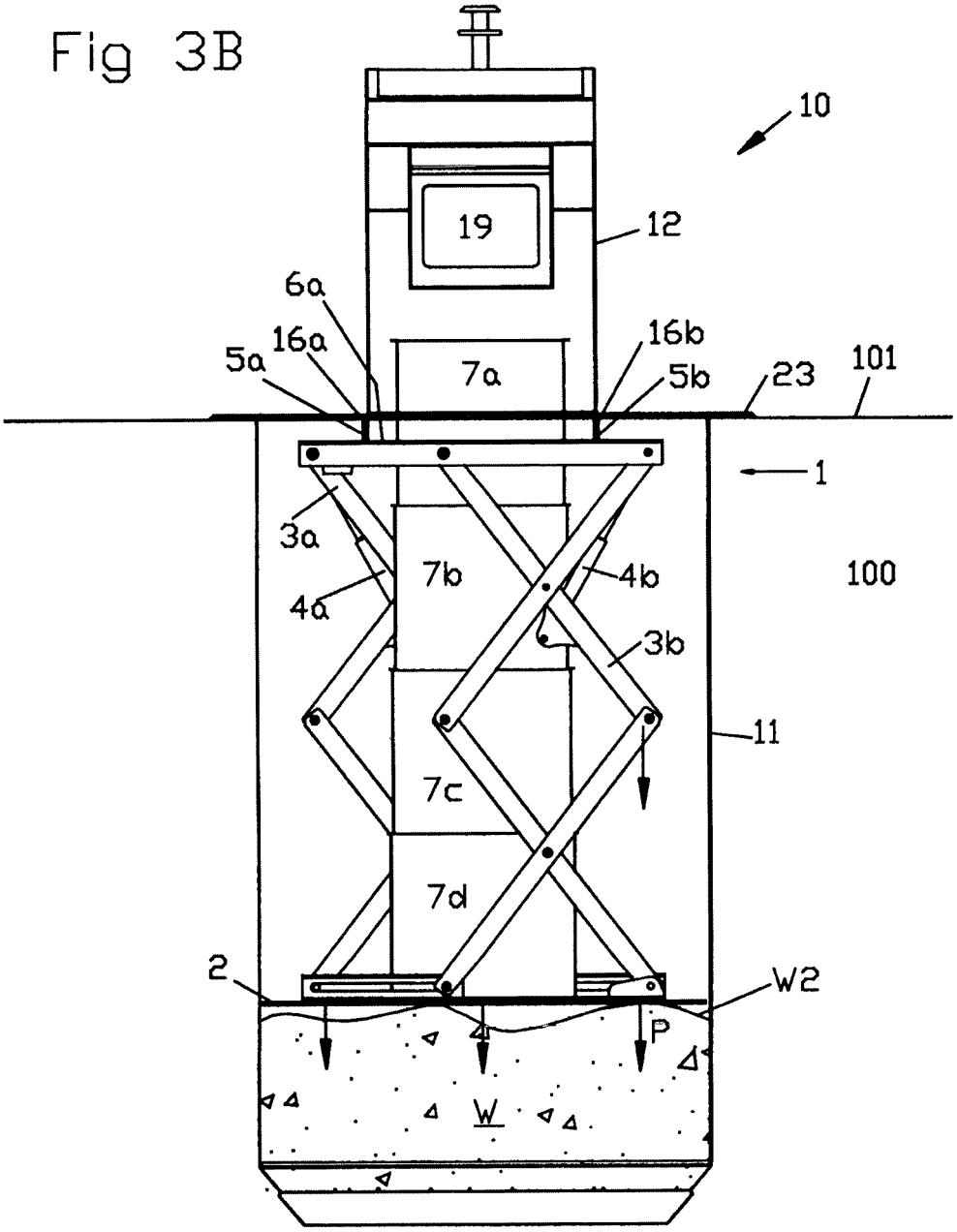
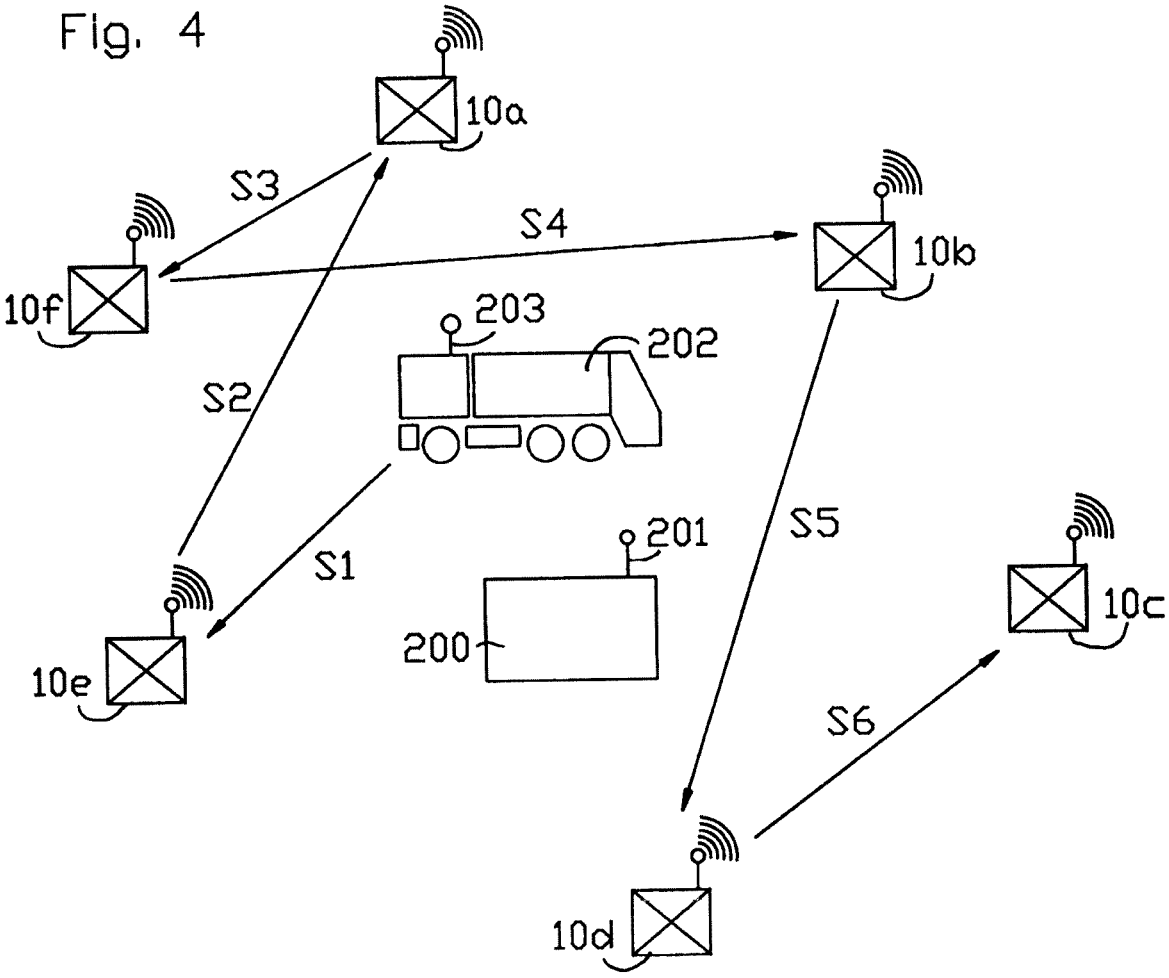

10
19
12
6a
16a
5a
7a
16b
5b
23
101
1
3a
7b
4b
100
4a
3b
11
7c
7d
2
W2
P
W

Fig. 4



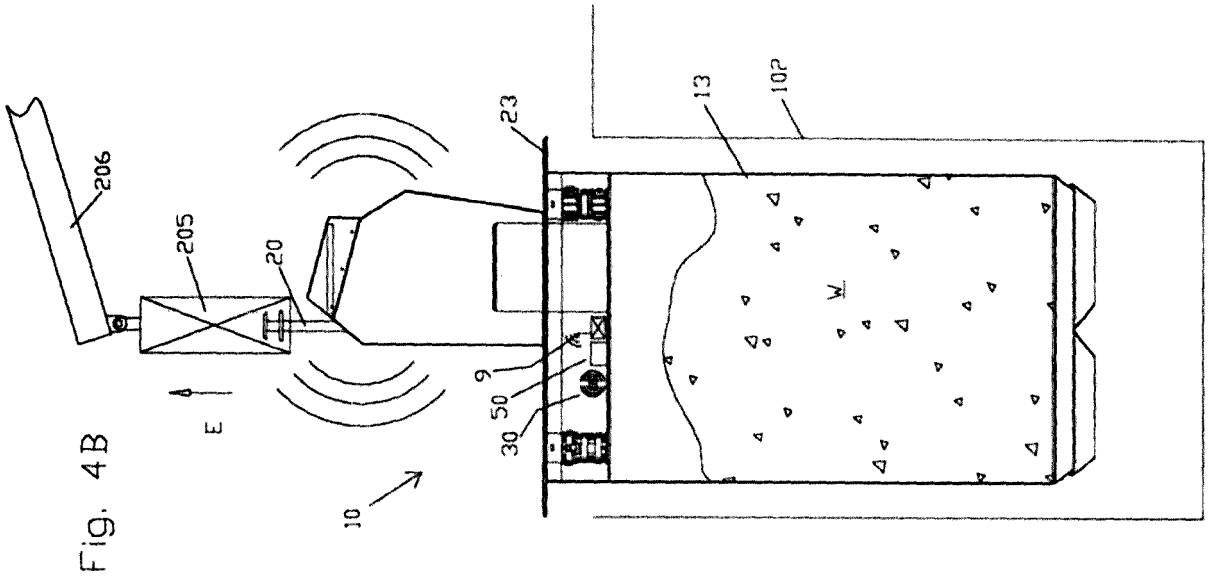


Fig. 4B

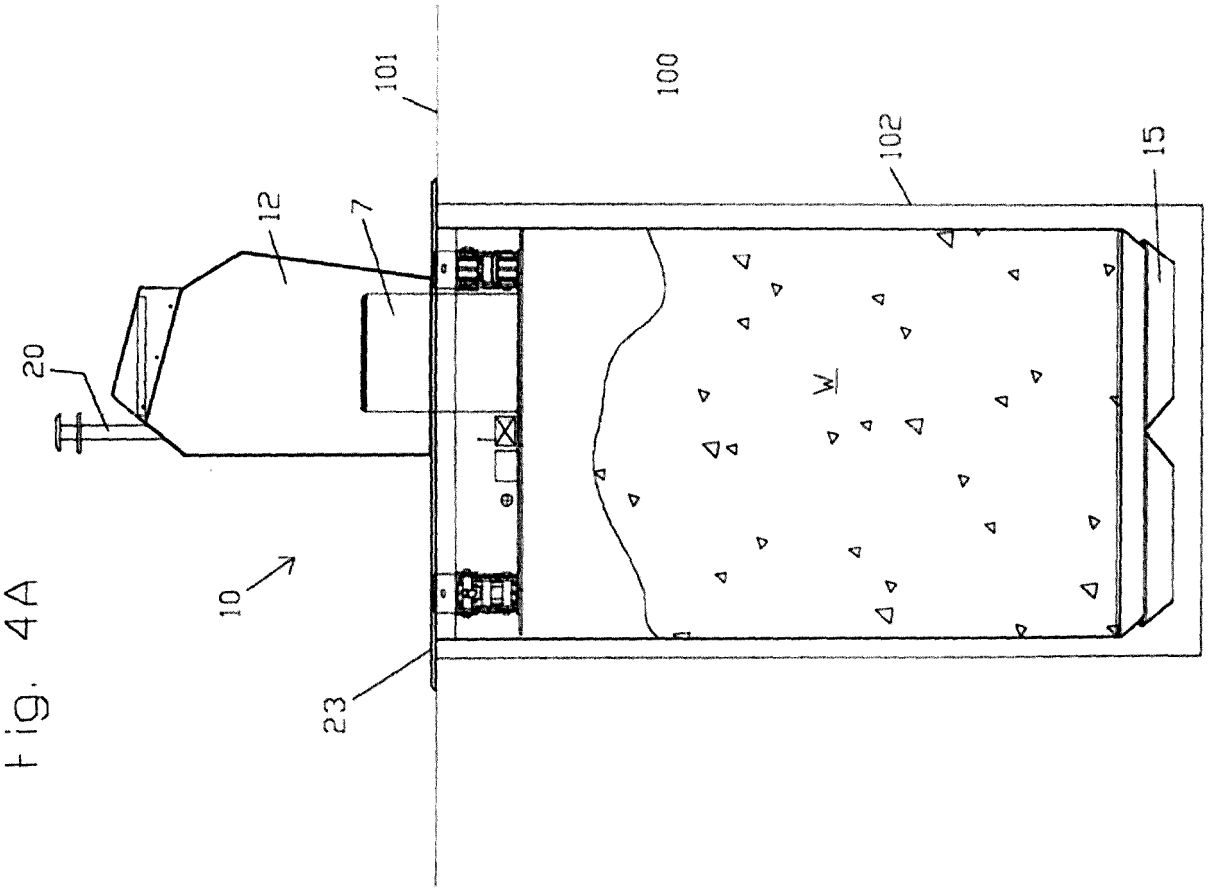
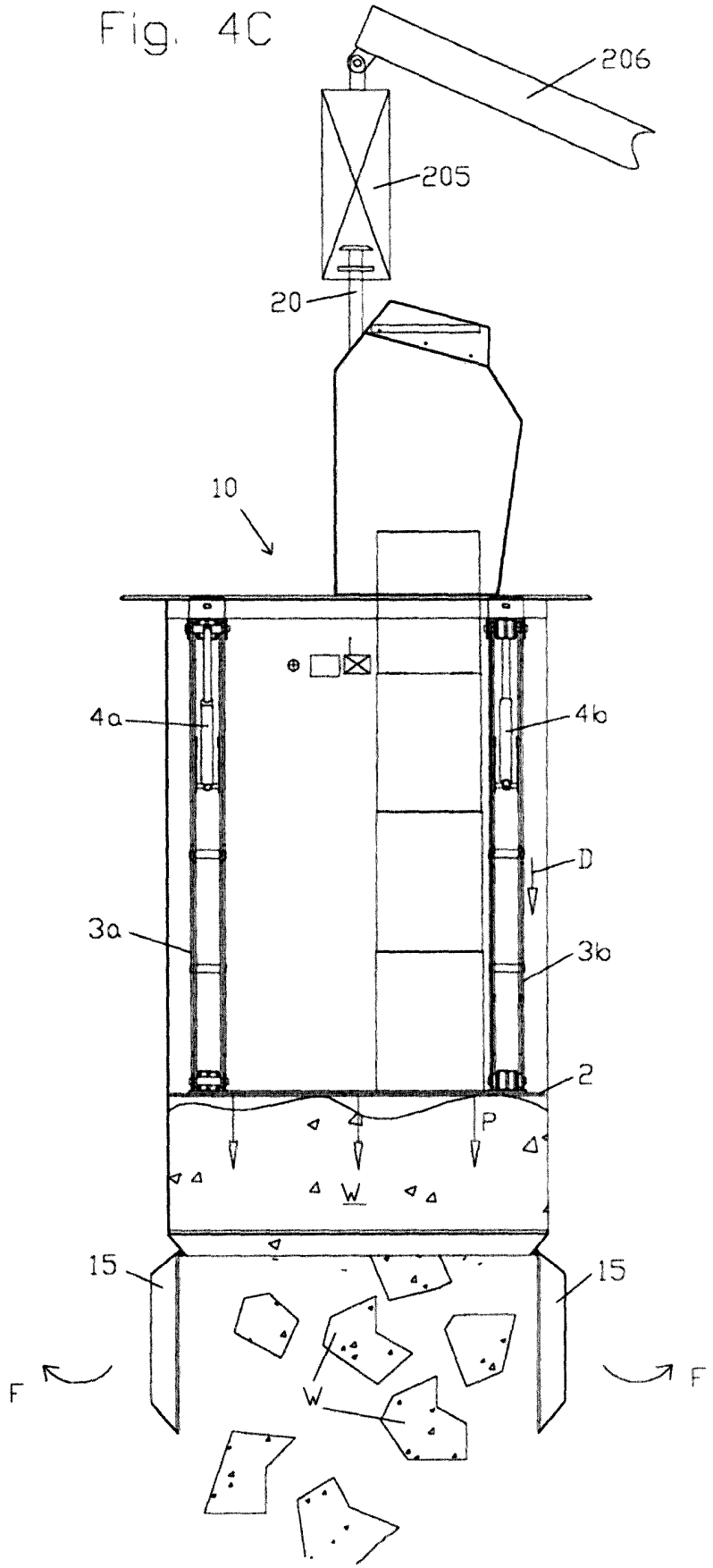


Fig. 4A

Fig. 4C



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

- NL 1036371 **[0002]**
- NL 1019021 **[0004]**
- NL 2001819 **[0004] [0056]**
- NL 1034075 **[0004]**
- DE 20305392 **[0004]**
- EP 1916202 A **[0005]**
- DE 102006031131 **[0006]**
- FR 2710329 **[0007]**
- DE 2207812 **[0017]**
- WO 2005002994 A **[0022]**
- WO 2009106522 A **[0022]**
- NL 2001819 A **[0032]**