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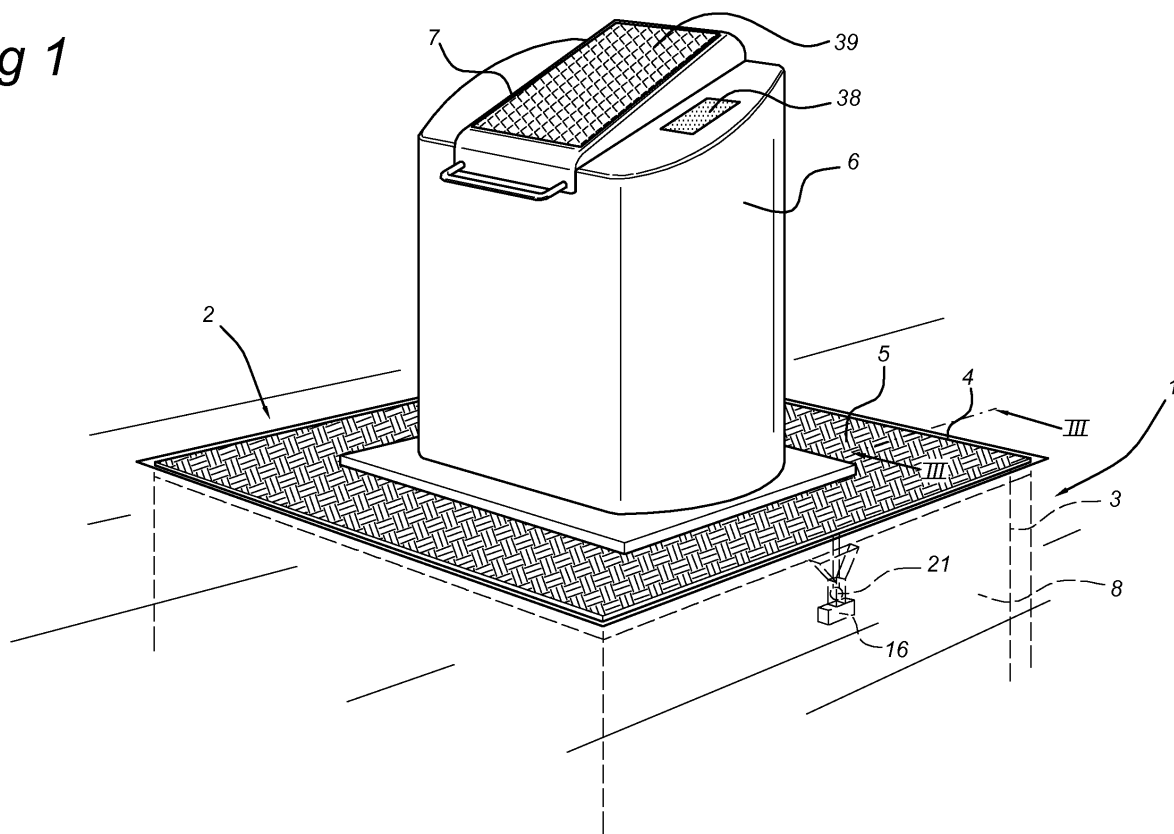
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(54) **Refuse collection device with integrated weighing means**

(57) A refuse use collection device located below ground (2) comprises a chamber (1) opening at ground level at the top. Said chamber (1) comprises a concrete housing (3), a metal frame (4) on top of the housing (3) as well as a cover (5) provided with a deposit opening and pivotably connected to the frame (4) for opening and closing the housing (3). Furthermore, the device com-

prises a container (8) which is open at the top and which is accommodated in the chamber (1) for collecting refuse via the deposit opening in the cover (5). The container (8) is removable from the housing (3) after opening the cover (5). The chamber (1) comprises weighing means (16) for weighing the container (8). The weighing means (16) are accommodated in the concrete housing.

Fig 1



Description

[0001] The invention is related to a refuse collection device located below ground, comprising a chamber opening at ground level at the top, said chamber comprising a concrete housing as well as a cover provided with a deposit opening and pivotably connected to the frame for opening and closing the housing, a container which is open at the top and which is accommodated in the chamber for collecting refuse via the deposit opening in the cover, said container being removable from the housing after opening the cover, said chamber comprising weighing means for weighing the container.

[0002] A refuse collection device of this type is disclosed in NL-C-1.027.909. Said prior art refuse collection device comprises weighing cells which are connected to the top side of a frame on the housing. The container has an outwardly protruding rim, which comes to rest on top of these weighing cells. One of the weighing cells is positioned on one of the rims, the opposite rim comprising two weighing cells. Although by means of this layout a proper and reliable weighing of the contents of the container can be obtained, nevertheless further improvements are possible. This is caused by the position of the prior art weighing means at the upper side of the housing. In fact, the weighing means are positioned on a metal frame which borders the housing upper edge. In such position, the weighing means can be exposed to external influences such as shocks, weather influences, soiling etc

[0003] The object of the invention is to provide a refuse collection device as described before, it is to say a refuse collection device which comprises weighing means, which has a less cumbersome and therefore more economic construction. This object is achieved in that the weighing means are accommodated in the concrete housing.

[0004] The step of accommodating the weighing means in the concrete housing has several advantages. In the first place, it is fairly easy to install the weighing means. According to a first possibility, the weighing means can be positioned in the proper place of the mould which is used to manufacture the housing. After the concrete has been brought in the mould, the weighing means can be fixed in the proper place during hardening of the concrete. A further advantage of the step of accommodating the weighing means in the concrete housing is the fact that they are well protected against external influences.

[0005] The weighing means can be positioned in different parts of the concrete housing, under the condition that proper weighing results can be obtained. Preference is given to an embodiment wherein the weighing means are positioned in or on opposite side walls of the concrete housing. Most preferably, two and only two weighing means are provided. In such case, the weighing means are positioned on opposite walls. This means that the container is supported at two points only, in such a way

that it can pivot somewhat so as to obtain an equilibrium position, depending on the distribution of the contents within the container. The weighing means can be positioned in either of the pairs of opposing walls of the housing. In contrast, according to the prior art as disclosed in said Dutch patent, three weighing cells are used.

[0006] The housing may have cavities within which the weighing means have been accommodated. According to a first embodiment, opposite walls of the concrete housing have facing internal depressions which open out at the top of said walls. Within these depressions, the weighing means are accommodated. In this connection, the container has protrusions fitting in said internal depressions, in such a way that the protrusions are resting on the weighing means. In particular, the weighing means can be positioned on the bottom of the depressions, when seen in vertical direction. For the purposes of making the proper positioning of the container within the concrete housing more easy, preferably the depressions are diverging in upward direction. In other words, the depressions, when seen in vertical direction, have a generally V-shaped introduction part, as well as a fitting part comprising a weighing cell.

[0007] According to a further embodiment which provides adequate protection to the weighing means, opposite walls of the housing are provided with internal shoulders. These shoulders, which are obtained by widening the internal space of the housing, are facing upwardly and thus provide a proper support for a weighing means. Here as well, the protrusions provided on the container are each resting on a corresponding weighing cell. Preferably, the shoulders have been provided in two of the opposite walls only. With the aim of facilitating the process of depositing the container in the proper way within the housing, centring devices can be provided above each weighing cell.

[0008] According to a further possibility, the shoulders and the additional space which is obtained thereby within the housing can be used fruitfully to install further devices. As an example, at least one of the shoulders is provided with an actuator for operating the cover.

[0009] Furthermore, a metal frame (4) can be provided on the housing (3). Said frame covers the top of the concrete housing leaving free the depressions of the concrete housing. In particular, the top of the concrete housing may comprise an uncovered inner section and a bordering outer section covered by the frame, the depressions emanating in the uncovered inner section of the top. For the purposes of connecting the frame firmly to the concrete housing, the frame may comprise anchors accommodated within the concrete material of the concrete housing during hardening thereof. Furthermore, the frame may protrude with respect to the outer surface of the concrete housing, the protruding section of the frame being provided with dewatering openings.

[0010] According to an alternative embodiment of the frame, said frame comprises a corner profile, one leg of which is connected to the outside of the concrete housing

walls and the other leg of which points inwardly at the wall top.

[0011] Furthermore, the invention is related to a method of fabricating a refuse collection device according to any of the preceding claims, comprising the steps of:

- providing moulding means for moulding concrete housing,
- positioning weighing cells within the moulding means,
- pouring concrete mortar in the moulding means,
- making the concrete mortar harden,
- removing the hardened concrete housing from the moulding means.

[0012] The invention will further be described with reference to an embodiment shown in the drawings.

Figure 1 shows a view in perspective of the upper part of the refuse collection device.

Figure 2 shows a phase during the positioning of the container (shown in dotted lines).

Figure 3 shows the detail of the upper part of the concrete housing according to III-III of figure 1.

Figure 4 shows a cross-section of a particular embodiment of the refuse collection device according to IV-IV of figure 1.

Figure 5 shows a top view of the housing of an alternative embodiment of the refuse collection device.

Figure 6 shows a cross-section according to VI-VI of figure 5.

Figure 7 shows a cross-section according to VII-VII of figure 5.

Figure 8 shows a view according to VIII of figure 5.

[0013] The refuse collection device shown in figures 1-4 comprises a chamber, indicated by the reference 1, which opens at ground level 2 at the top. Said chamber 1 comprises a concrete housing 3 (shown in dotted lines as the housing 3 is below the ground level 2), a metal frame 4 on top of the housing 3 and a cover 5 which is hingedly connected to the frame 4. The cover 5 carries a column 6, provided with a lid 7 which can be opened and closed. The lid is provided with a solar cell for feeding the electric devices such as an actuator, electronic access devices etc. Within the concrete housing 3, a steel container 8 (shown in dotted lines) is positioned for receiving the refuse which is thrown in through the column 6. A display/reader 38 is provided for giving access to the device through a chip card.

[0014] As shown in figure 2, the concrete housing 3 has side walls 9, a front wall 10 and a back wall 11. Furthermore, the concrete housing 3 has a bottom 12 (see figure 4) which is carried out as a unity with said walls 9-11. The side walls 9 are each provided with depressions 12 which each consist, seen from above, of a V-shaped introduction part 13, a prismatic part 14 and a fitting part 15 within which the actual weighing cells 16

have been accommodated. Furthermore, signal lines 17 are accommodated within the side walls 9. As is further clear from figure 2, each V-shaped introduction part opens out in uncovered section 18 at the top of the walls 9. Furthermore, bordering the uncovered section 18, the bordering outer section 19 is covered by the frame 4.

[0015] The container 8 is provided with protrusions 20 on two opposite side walls, which protrusions fit within the depressions 13 in the side walls 2 of the concrete housing 3. In particular, the protrusions 20 comprise a ball-shaped lower end 21, a prismatic part 22 and a V-shaped upper part 23. The ball-shaped lower end 21 comes to rest on a respective weighing cell 16, the prismatic part 22 is received in a correspondingly shaped prismatic part 14 of the depression 12, and the V-shaped upper part 23 is received in the V-shaped introduction part 13 of said depression 12. Thus, a reliable support of the container 8 is obtained, while at the same time the container is able to pivot somewhat and the weight thereof can be measured.

[0016] As shown in figure 3, the frame 4 comprises channel shaped profiles 33, consisting of a base 22, an inner side wall 23 and an outer side wall 24. Moreover, the profiles 33 comprise an integrated anchor part 25 which is anchored in the concrete of the back wall 11 of the concrete housing 3, during hardening of the concrete of thereof. The outer side wall 24 rests against the pavement 40, the base 22 is provided with openings 26 for the watering the profiles 21 into the ground. Onto the inner side wall 23, a hinge 27 is connected for opening and closing the cover 5.

[0017] Although the weighing cells 16, in the embodiment shown, are positioned in the side walls 9 of the concrete housing, alternatively they may be accommodated in the front wall 10 and back wall 11.

[0018] Also, the container can be provided with fittings for coupling lifting means to the container. By means of such lifting means, the container can be lifted from the concrete housing and subsequently the container can be emptied and placed back into the concrete housing 3. Finally the lifting means can be uncoupled from the fittings and the cover 5 is closed. These fittings and lifting means are well known, and are therefore not shown in the drawings.

[0019] The alternative embodiment of the refuse collection device as shown in figures 5- 8 comprises a concrete housing 3, the side walls 9 of which are provided with internal cavities 34, in such a way that upwardly facing shoulders 31 are provided. These upwardly facing shoulders 31 provide a support for the weighing cells 16. These weighing cells 16 are associated with centring devices 33 which are open in upward direction and which have a diverging shape. By means of the centring devices 33, the protrusions 20 as provided on opposite sides of the container 8 are guided into the proper position while lowering the container 8 into the housing 3. The protrusions have circular shape, in such a way that the container 8 can pivot and therefore can adjust its position

under the influence of the distribution of the waste contents which have been thrown into the container.

[0020] As shown in figure 5, each cavity 34 has been provided with a piston/cylinder device 32 for operating the cover 5. Said cover, in the closed position, cooperates with the horizontal leg 36 of the L-shaped profile 4, the vertical leg 35 of which is connected to the outside of the concrete housing 3. The upper edge of the housing comprises a groove 37, into which the horizontal leg 36 of the profile 4 extends. In such a way, a proper dewatering function is obtained that at the edge of the refuse collection device.

[0021] Although in the figures 5-8, the weighing cells have been accommodated in the side walls 9, is also possible to accommodate them in the front wall 10 and in the back wall 11, as has been indicated schematically.

List reference numerals

[0022]

1. Chamber
2. Ground level
3. Concrete housing
4. Frame
5. Cover
6. Column
7. Lid column
8. Steel container
9. Side wall
10. Front wall
11. Back wall
12. Bottom
13. V-shaped introduction part
14. Prismatic part
15. Fitting part
16. Weighing cell
17. Signal line
18. Uncovered section of wall
19. Bordering outer section of wall
20. Protrusion of container
21. Ball-shaped lower end of protrusion
22. Prismatic part of protrusion
23. V-shaped upper part of protrusion
24. Outer side wall profile
25. Anchor part profile
26. Opening profile
27. Hinge
28. Base profile
29. Inner side wall profile
30. Profile
31. Shoulder
32. Actuator
33. Centring device
34. Cavity
35. Vertical leg of L-shaped profile
36. Horizontal leg of L-shaped profile.
37. Groove

38. Display
39. Solar cell
40. Pavement

Claims

1. Refuse collection device located below ground (2), comprising a chamber (1) opening at ground level at the top, said chamber (1) comprising a concrete housing (3) as well as a cover (5) provided with a deposit opening and pivotably connected to the frame (4) for opening and closing the housing (3), a container (8) which is open at the top and which is accommodated in the chamber (1) for collecting refuse via the deposit opening in the cover (5), said container (8) being removable from the housing (3) after opening the cover (5), said chamber (1) comprising weighing means (16) for weighing the container (8), **characterised in that** the weighing means (16) are accommodated in the concrete housing (3).
2. Refuse collection device according to claim 1, wherein the weighing means (16) are positioned in or on opposite walls (9) of the concrete housing (3).
3. Refuse collection device according to claim 1 or 2, wherein two and only two weighing means (16) are provided.
4. Refuse collection device according to claim 2 or 3, wherein opposite walls (9) of the concrete housing comprise internal depressions (12) which open out at the top of said walls (9), the container (8) comprising protrusions (20) each fitting in a corresponding internal depression (12), the weighing means (16) being associated with said depressions (12) in such a way that the protrusions (20) are resting on the weighing means (16).
5. Refuse collection device according to claim 4, wherein the weighing means (16) are positioned on the bottom of the depressions (12), when seen in vertical direction.
6. Refuse collection device according to claims 4 or 5, wherein the depressions (12) are diverging in upward direction.
7. Refuse collection device according to claim 6, wherein the depressions (12), when seen in vertical direction, have a generally V-shaped introduction part (13), as well as a fitting part (15) comprising a weighing cell (16).
8. Refuse collection device according to claim 7, wherein the depressions (12) have a prismatic part

(14) which extends between the V-shaped introduction part (13) and the fitting part (15).

9. Refuse collection device according to any of claims 1-3, wherein opposite walls (9) have internal shoulders (31) which define internal cavities (34) and a relatively wide upper internal space within the housing (3), each shoulder (31) carrying a weighing cell (16), the container (8) comprising protrusions (20) which are each resting on a corresponding weighing cell (16). 5
10. Refuse collection device according to claim 9, wherein the shoulders (31) extend between and up to the two other opposite walls (10,11). 10
11. Refuse collection device according to claim 9 or 10, wherein a centring device (33) is provided above each weighing cell (16) 15
12. Refuse collection device according to claim 9, 10 or 11, wherein an actuator (32) for operating the cover (5) is provided above at least one of the shoulders (31). 20
13. Refuse collection device according to any of the preceding claims, wherein a metal frame (4) is provided on the housing (3). 25
14. Refuse collection device according to claim 13 when dependant on any of claims 4-8, wherein the frame (4) covers the top of the concrete housing (3) leaving free the depressions (12) of the concrete housing (3). 30
15. Refuse collection device according to claims 14, wherein the top of the concrete housing (3) comprises an uncovered inner section (18) and a bordering outer section (19) covered by the frame (4), the depressions (12) emanating in the uncovered inner section (18) of the top. 35
16. Refuse collection device according to claim 12-14, wherein the frame (4) comprises anchors (25) accommodated within the concrete material of the concrete housing (3) during hardening thereof. 40
17. Refuse collection device according to any of claims 12-15, wherein the frame (4) protrudes with respect to the outer surface of the concrete housing (3), the protruding section (22) of the frame (4) being provided with dewatering openings (26). 45
18. Refuse collection device according to claim 16, wherein the frame (4) comprises an upstanding edge (24) connected to the outer edge of the protruding section (22) thereof. 50
19. Refuse collection device according to any of claims

12-17, wherein the frame comprises a corner profile one leg of which is connected to the outside of the concrete housing walls and the other leg of which points inwardly at the wall top.

20. Method of fabricating a refuse collection device according to any of claims 4-8, comprising the steps of:

- providing moulding means for moulding concrete housing,
- positioning weighing cells within the moulding means,
- pouring concrete mortar in the moulding means,
- making the concrete mortar harden,
- removing the hardened concrete housing from the moulding means.

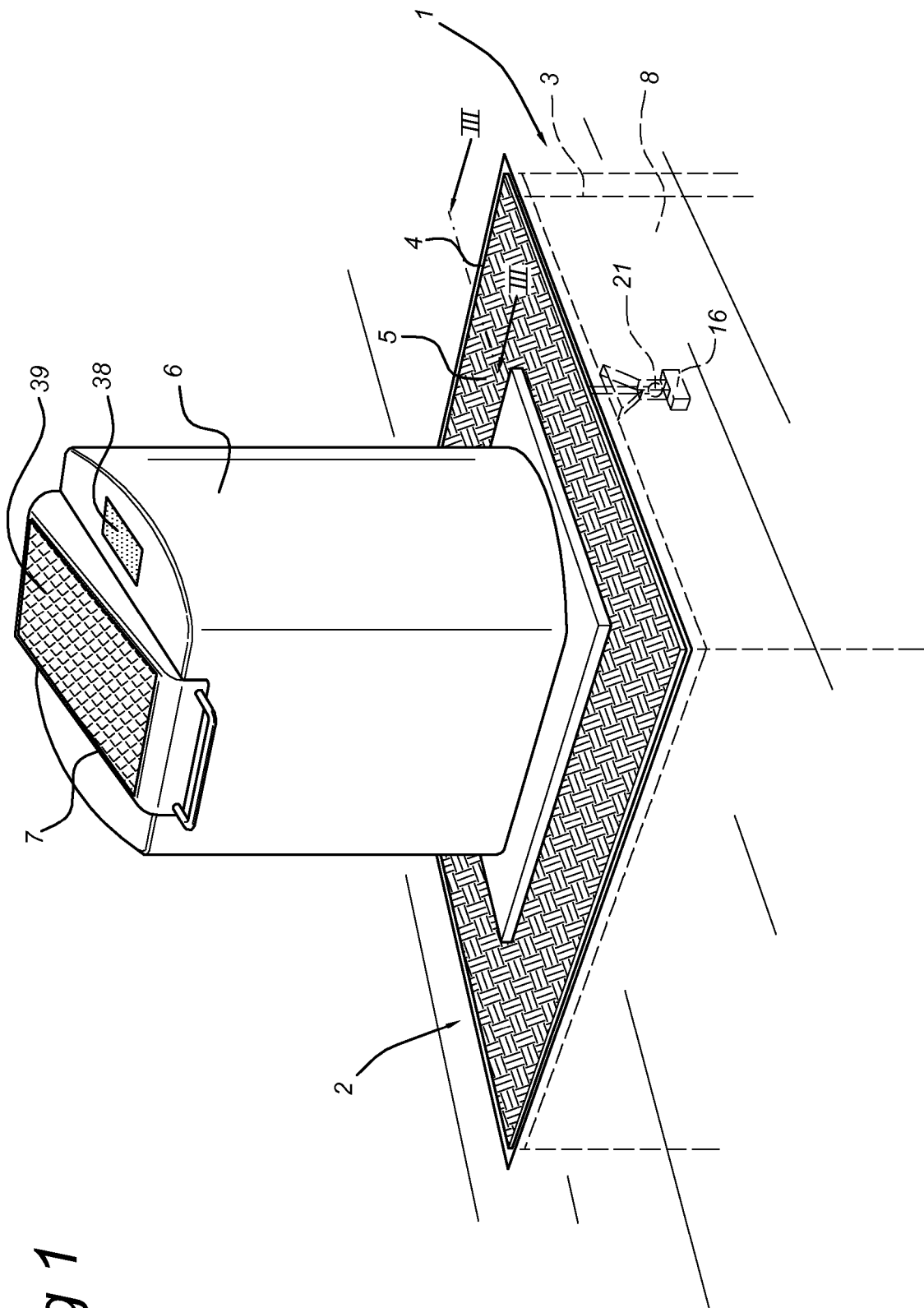


Fig 1

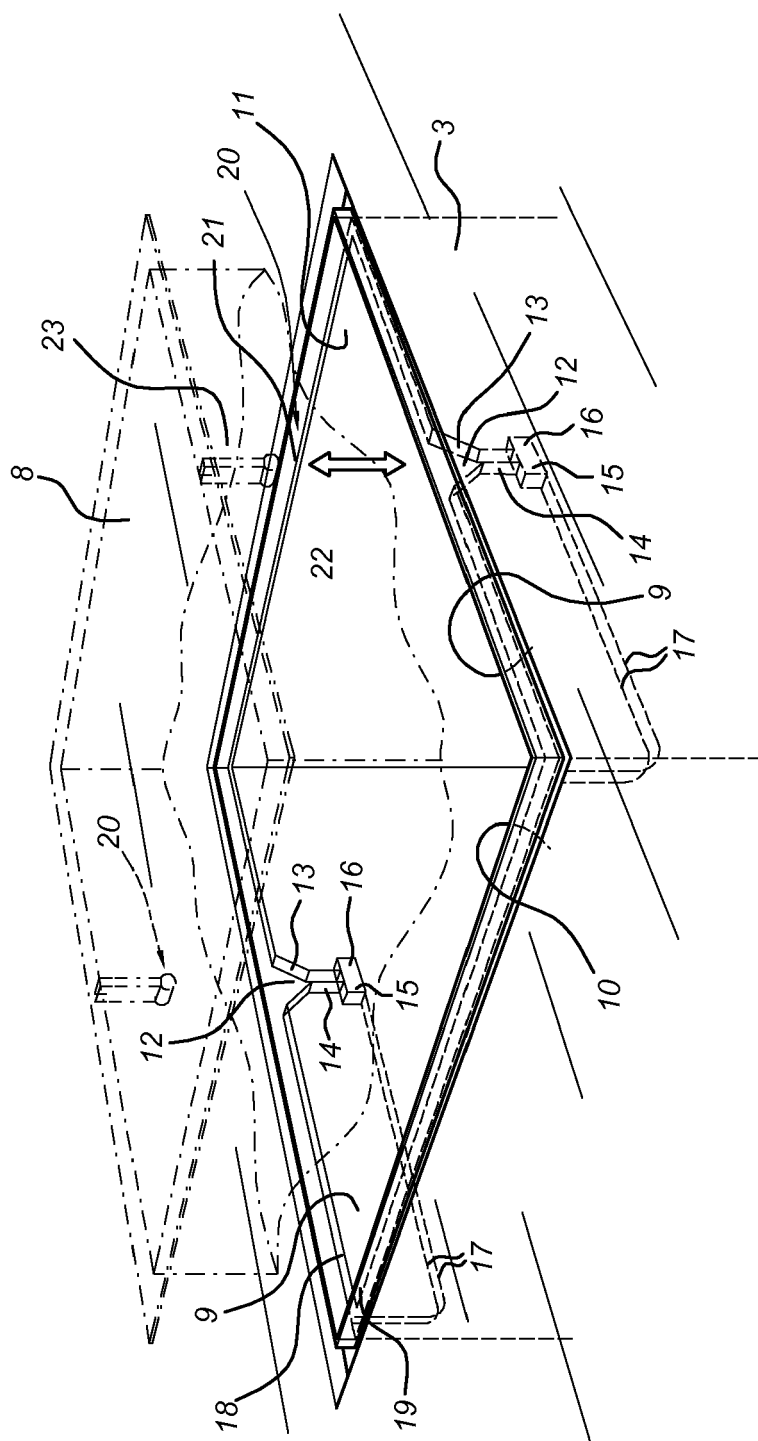


Fig 2

Fig 3

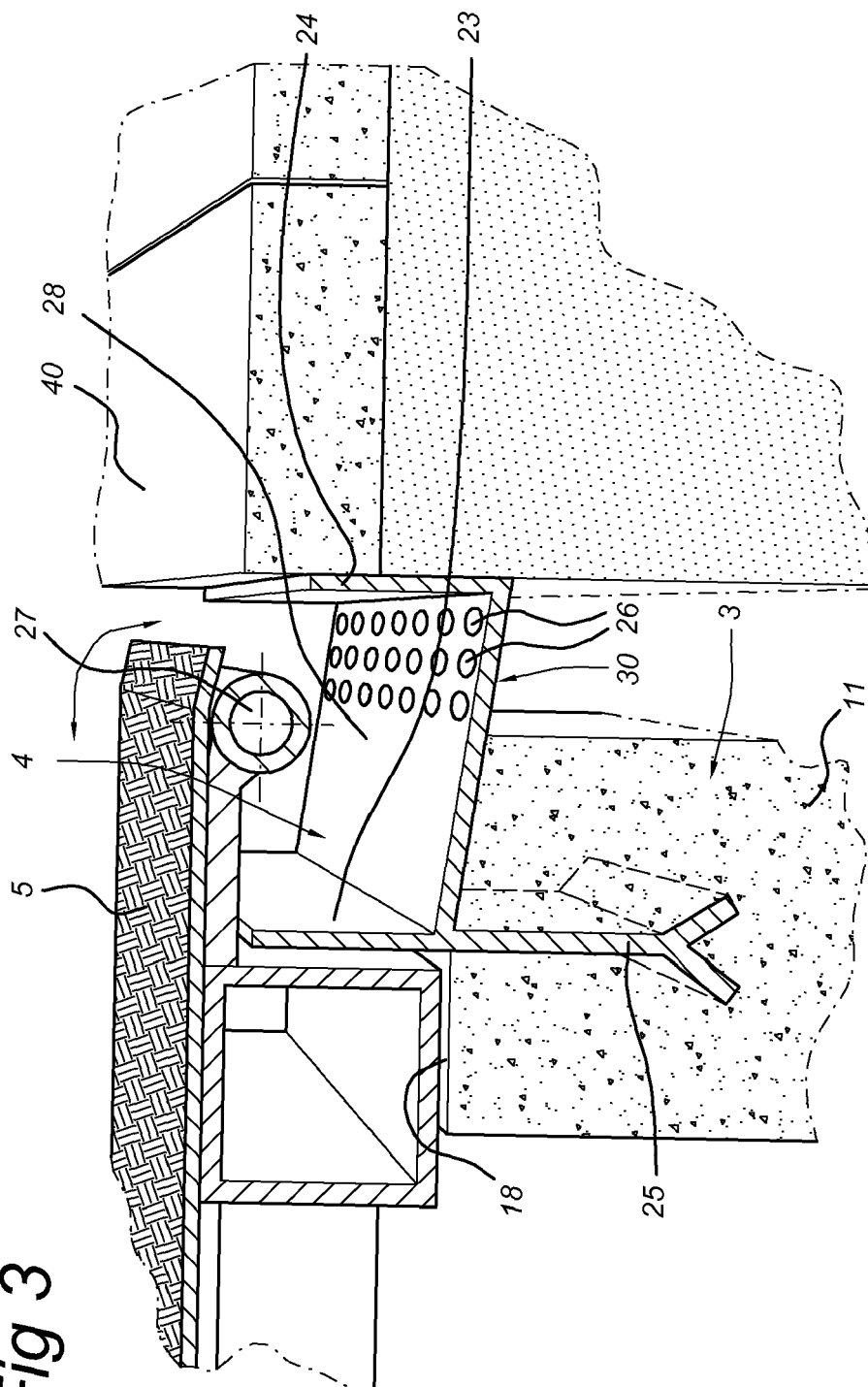


Fig 4

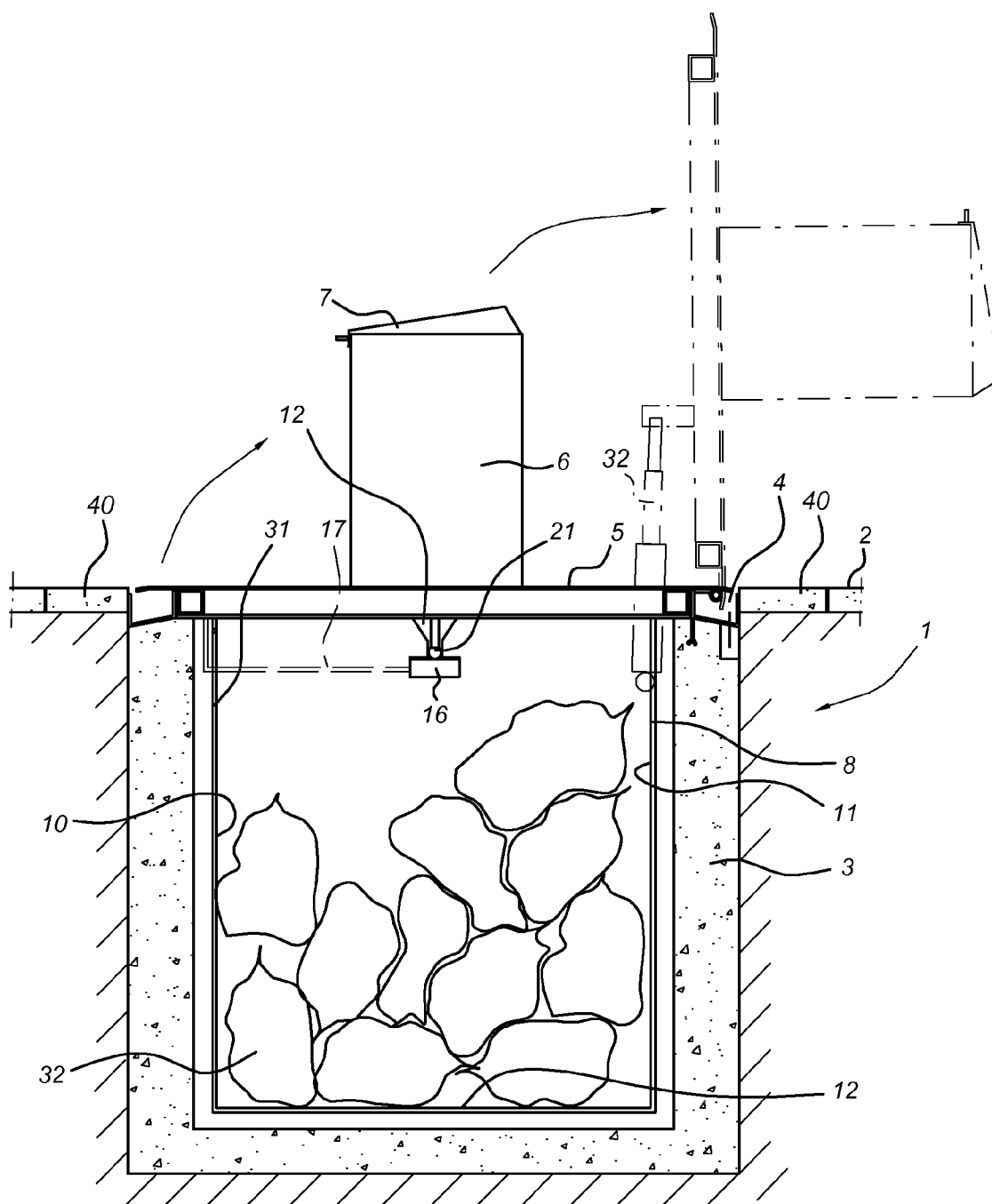


Fig 5

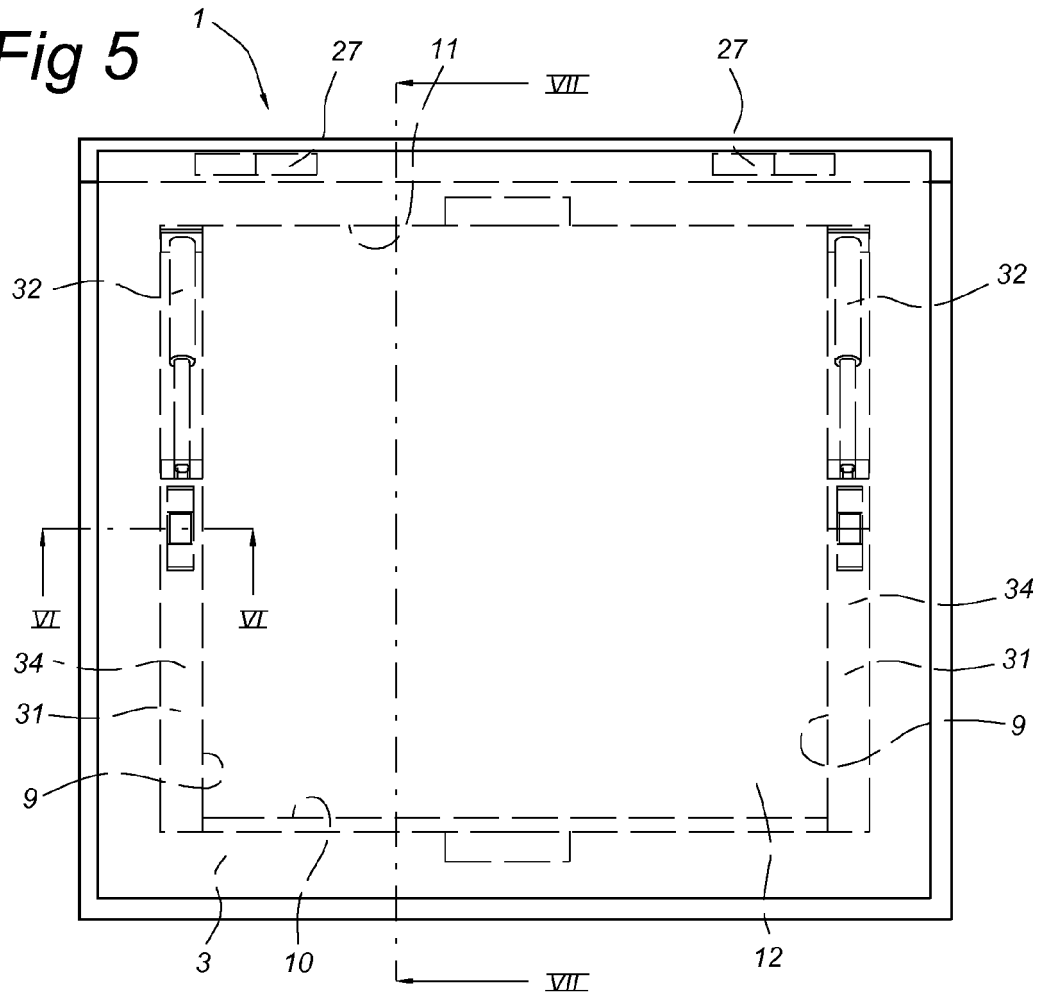


Fig 6

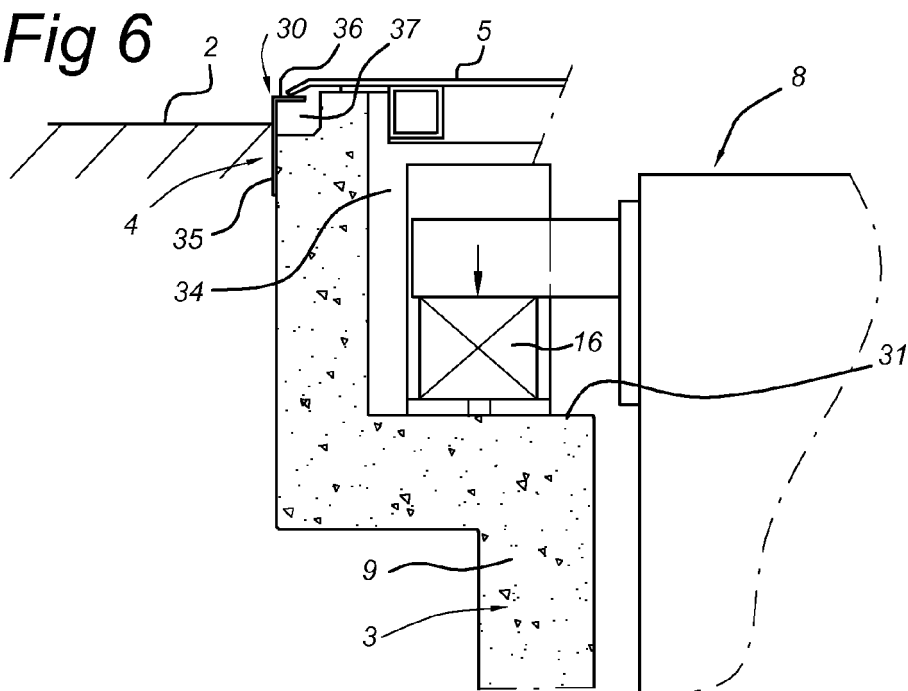


Fig 7

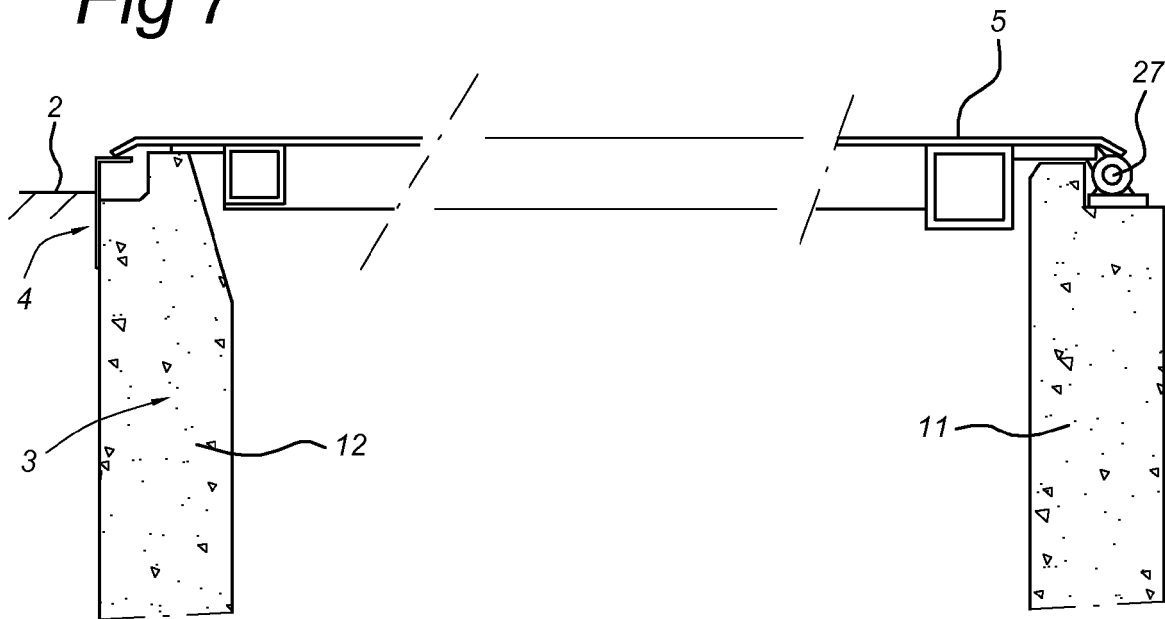
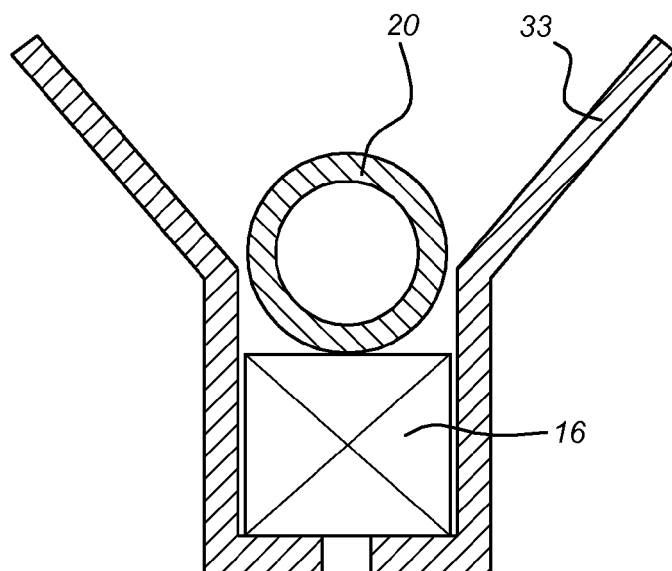


Fig 8





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 3761

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		29 August 2008	Smolders, Rob
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 15 3761

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