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(54) **A vehicle for collection and transport of special wastes**

(57) A vehicle (1) for simultaneous collection and transport of special wastes, in particular farm wastes, of several types, is equipped with at least: a container (10) for dangerous solid wastes, mounted in the rear portion of the vehicle back and having a loading section (11) for

the introduction of the wastes into the container (10) and a tightly-sealed waste storage section (12); a tank (20) for substantially liquid matters mounted in the forward portion of the vehicle back; and boxes (30) for batteries and/or filters for engine fuel or lubricant, carried on the sides of the vehicle back.

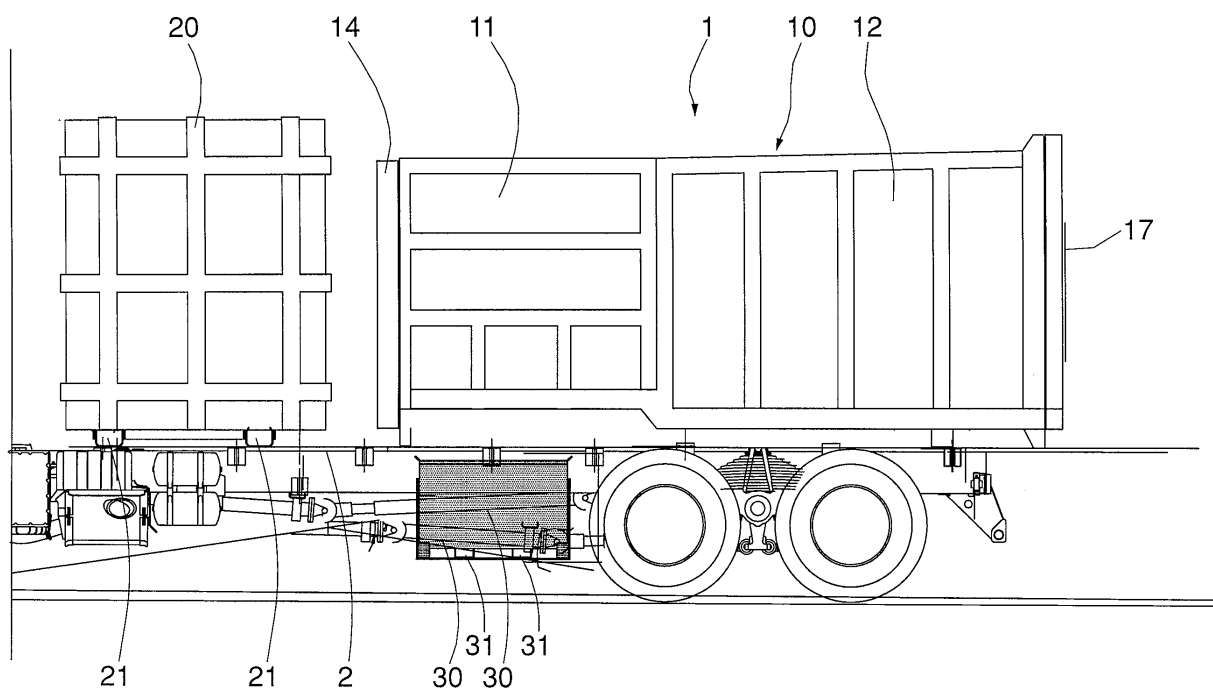


Fig. 1

Description

[0001] The present invention relates to collection and transport of wastes, especially farm wastes, and more particularly it concerns a vehicle arranged to simultaneously collect and transport several types of wastes.

[0002] According to national and supranational regulations, e.g. European Union regulations, certain types of farm wastes are classified as special wastes, disposal of which must obey special rules. Those wastes include for instance: containers for chemicals, such as plant protection products, herbicides, detergents, etc.; exhausted lubricating oils, sludge or sewage; batteries; used filters for lubricating oil or diesel fuel; gas discharge lamps; and so on.

[0003] Disposal of such wastes is to be carried out through authorised firms, which can provide for periodically collecting the wastes at the farms, where the different types of wastes are to be separately stored. Collection is usually effected by means of specially equipped vehicles. However, at present, such vehicles are arranged to collect only a single kind of wastes. Thus, collecting all special wastes produced in a farm entails several trips by different collecting vehicles: this is an ineffective and time-consuming procedure resulting in higher disposal costs for the farmers. Moreover, it is difficult to schedule the collection of a single type of waste at different farms so as to exploit at the best the transport capacity of each collecting vehicle.

[0004] Thus, there is a need for a more effective waste collecting and disposal procedure, which substantially reduces the time required and the costs involved.

[0005] It is an object of the present invention to provide an improved vehicle for waste collection and disposal that satisfies such need.

[0006] According to the invention, this is obtained through a vehicle equipped with at least: a container for dangerous solid wastes, having a loading section for the introduction of the wastes into the container, and a tightly-sealed waste storage section; a tank for substantially liquid matters; and at least one box for batteries and/or filters for engine fuel or lubricant.

[0007] The container is mounted onto a supporting frame in a rear part of the vehicle back, and is hinged to the frame so as to be tiltable for discharging its load; the tank is mounted onto said supporting frame in a front part of the vehicle back, and the at least one box is received on at least one side of the vehicle back, below the frame.

[0008] Advantageously, the loading section of the container is further associated with a mechanism for grasping and manoeuvring waste skips, to introduce into the container solid wastes contained in such skips, and the storage section is associated with means for compressing and compacting the solid wastes.

[0009] Preferably, the tank is equipped with: eyebolts for being secured to the vehicle frame; a volumetric pump for filling and discharging of the tank; internal barriers for limiting the movements of the liquids inside the tank; and

a double-action vent valve arranged to prevent the tank contents from coming out in case the vehicle overturns.

[0010] The or each box is received in a housing to be secured to the vehicle frame, which housing has side walls that are folded at their front ends so as to define front retaining strips intended to hold the box within the housing. The or each box further has bottom guides arranged to be engaged by the fork of a forklift trolley when the box is to be placed onto or removed from the waste-collecting vehicle.

[0011] Thanks to the invention, collection of several different types of wastes can be performed in a single pass. Moreover, collection of wastes at several sites, even scattered the country, may be managed more easily, thereby optimising exploitation of the carrying capacity of the lorry and minimise the transport costs.

[0012] The features of the invention and the advantages afforded by the invention will become apparent from the following description of preferred embodiments thereof, shown only by way of non-limiting example in the accompanying drawings, in which:

- Fig. 1 is a side view of a multi-function waste-collecting vehicle according to the invention;
- Fig. 2 is a side view the vehicle during loading of solid wastes;
- Fig. 3 is a side view of the vehicle during discharging of solid wastes;
- Fig. 4 is a top view of the container for solid wastes, showing the internal structure thereof;
- Fig. 5 is a top view of the tank for liquid wastes, showing the internal structure thereof; and
- Figs. 6 and 7 are a front and a side view, respectively, of a box for containing batteries and/or oil filters.

[0013] As shown in Figs. 1 to 4, the multi-function vehicle according to the invention, for instance in the form of a lorry generally shown at 1, is equipped, in the exemplary embodiment disclosed here, with means for collecting and carrying three kinds of farm wastes, namely:

- dangerous solid wastes, for instance for chemicals, such as plant protection products, herbicides, detergents, etc., which are received within a container 10 mounted in the rear part of the lorry back;
- substantially fluid wastes, e.g. exhausted oils or sludge or sewage etc., which are received in a tank 20 mounted in the front part of the lorry back;
- batteries and/or filters for lubricating oil or diesel fuel, received in boxes 30 mounted below frame 2 of lorry 1, always in the back portion thereof.

[0014] Container 10 for solid wastes has a loading section 11 for the introduction of the wastes into the container, and a tightly sealed waste storage section 12.

[0015] Loading section 11 is associated with a mechanism 14 for engaging, lifting and overturning waste skips 3, so that the contents of such skips can be introduced

into container 10 through an inlet port (not shown) on the top of loading section 11. In the preferred embodiment of the invention, mechanism 14 is mounted in front of loading section 11 and is arranged for manoeuvring skips 3 located on one side of truck 1. Mechanisms of such kind are well known in the art and are a usual accessory of waste-collecting vehicles.

[0016] Storage section 12 is equipped with compacting means, e. g. a horizontally displaceable piston 15 equipped with a moving head 13 in the form of a sliding wall, for reducing the bulk of the wastes.

[0017] Also such compacting means are well known in the art and are a usual accessory of waste-collecting vehicles.

[0018] Container 10 is hinged on frame 2 at the bottom corner of its rear end and, in its forward portion, is connected to frame 2 through a telescopic arm 16, allowing lifting and tilting container 10 for waste discharge, so that the wastes can fall out through rear door 17.

[0019] At the bottom of loading section 11 an electric motor 7 with associated oleodynamic pump 8 and oleodynamic control unit 9 are housed for controlling the mechanism 14, piston 15 and telescopic arm 16.

[0020] Tank 20 is equipped with eyebolts 21 for securing to frame 2 and with a volumetric pump (not shown) for sucking liquid materials from a tank or reservoir at a farm and discharging it into a tank or reservoir at the disposal site. The pump will be of a kind suitable for dealing with thick and viscous materials, possibly containing also small solid pieces dispersed within the material. For sucking and discharging the materials, the volumetric pump is associated with a pipe 23, wound on a reel 24 carried on one side of frame 2.

[0021] As shown in Fig. 5, tank 20 further has internal barriers 25 for limiting the fluid movements inside the tank, as well as a vent valve. Advantageously, the latter is a double-action valve preventing the tank contents from going out of the tank in case vehicle 1 overturns.

[0022] Boxes 30 are made of metal, e.g. steel plate, and are preferably mounted at both sides of lorry 1, e. g. one box 30 per side, as can be seen in Figs. 1 and 2. Boxes 30 have guides 31 at their bottom for engagement by the fork of a forklift trolley or the like when a box is to be placed on or removed from lorry 1. Charging and discharging of boxes 30 takes place at hands, with the boxes removed from the lorry.

[0023] As shown in Figs. 6 and 7, boxes 30 also are provided with a cover 32 closed by spring-actuated locking mechanisms 33, as well as with handles 34 for allowing manual displacement. Boxes 30 are received in housings 35, also made of metal plate, that can be suitably secured to lorry frame 2. Housings 35 are open upward and forward, and have side walls substantially in the shape of rectangular trapezoids, with the minor bases forming the front portions. At such minor bases, said walls are folded so as to define front retaining strips 36 intended to hold a box 30 within housing 35.

[0024] The above description clearly shows that the

proposed vehicle can perform in an effective way the periodic collection of even relatively small quantities of waste materials, such as those produced by small or medium-sized farms. At each farm, a single vehicle allows the collection of different kinds of materials at each trip. By suitably sizing container 10, tank 20 and boxes 30, the vehicle can effect the collection at several farms, even distant from one another, thereby maximising the quantity of wastes transported to the disposal site at each trip. All this reduces the equipment costs, the time required by the collection of all wastes at each farm, and the transport costs, which are one of the most important contributions to the disposal costs. The advantages for both the farmers and the firms in charge of collection and disposal are clearly apparent.

[0025] It is clear that the above description has been given only by way of non limiting example and that changes and modifications are possible without departing from the scope of the invention.

Claims

1. A vehicle (1) for simultaneous collection and transport of special wastes, in particular farm wastes, of several types, **characterised in that** it is equipped with at least:
 - a container (10) for dangerous solid wastes, having a loading section (11) for the introduction of the wastes into the container (10), and a tightly-sealed waste storage section (12);
 - a tank (20) for substantially liquid matters; and
 - at least one box (30) for batteries and/or filters for engine fuel or lubricant.
2. The vehicle (1) as claimed in claim 1, **characterised in that** said container (10) is mounted onto a supporting frame (2) in a rear part of the vehicle back, said tank (10) is mounted onto said supporting frame (2) in a front part of the vehicle back, and said at least one box (30) is received on at least one side of the vehicle back, below said frame (2) .
3. The vehicle (1) as claimed in claim 1 or 2, **characterised in that** the loading section (11) of said container (10) is associated with a mechanism (14) for grasping and manoeuvring waste skips (3), for introducing into the container (10) solid wastes contained in such skips (3).
4. The vehicle (1) as claimed in claim 3, **characterised in that** said grasping and manoeuvring mechanism (14) is arranged to operate on waste skips (3) located laterally of the vehicle (1).
5. The vehicle (1) as claimed in any preceding claim, **characterised in that** said container (10) is associ-

ated with means (13,15) for compressing and compacting the solid wastes within said storage section (12).

6. The vehicle (1) as claimed in any of claims 2 to 5, **characterised in that** said container (10) is hinged at its rear end to said supporting frame (2) and is connected to said frame (2), at its forward part, through means (16) for tilting the container (10) to make the solid wastes fall out of said container (10) through a rear door (17) thereof. 5
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7. The vehicle (1) as claimed in any of claims 2 to 6, **characterised in that** said tank (20) is equipped with: eyebolts (21) for securing to said frame (2); a volumetric pump for filling and discharging of the tank (20); internal barriers (25) for limiting the movements of the liquids inside the tank (20); and a double-action vent valve arranged to prevent the tank contents from coming out in case the vehicle overturns. 15
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8. The vehicle (1) as claimed in any of claims 2 to 7, **characterised in that** it is equipped with at least one box (30) on each side of the vehicle (1). 25
9. The vehicle (1) as claimed in claim 8, **characterised in that** the or each box (30) is received in a housing (35) to be secured to the vehicle frame (2).
10. The vehicle (1) as claimed in claim 8 or 9, **characterised in that** said housing (35) is open upward and forward, and has side walls that are folded at their front ends so as to define front retaining strips (36) intended to hold the box (30) within the housing (35). 30
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11. The vehicle (1) as claimed in any of claims 8 to 10, **characterised in that** the or each box (30) has bottom guides (31) arranged to be engaged by the fork of a forklift vehicle for placing and removing said boxes (30) onto and from the vehicle (1), respectively. 40

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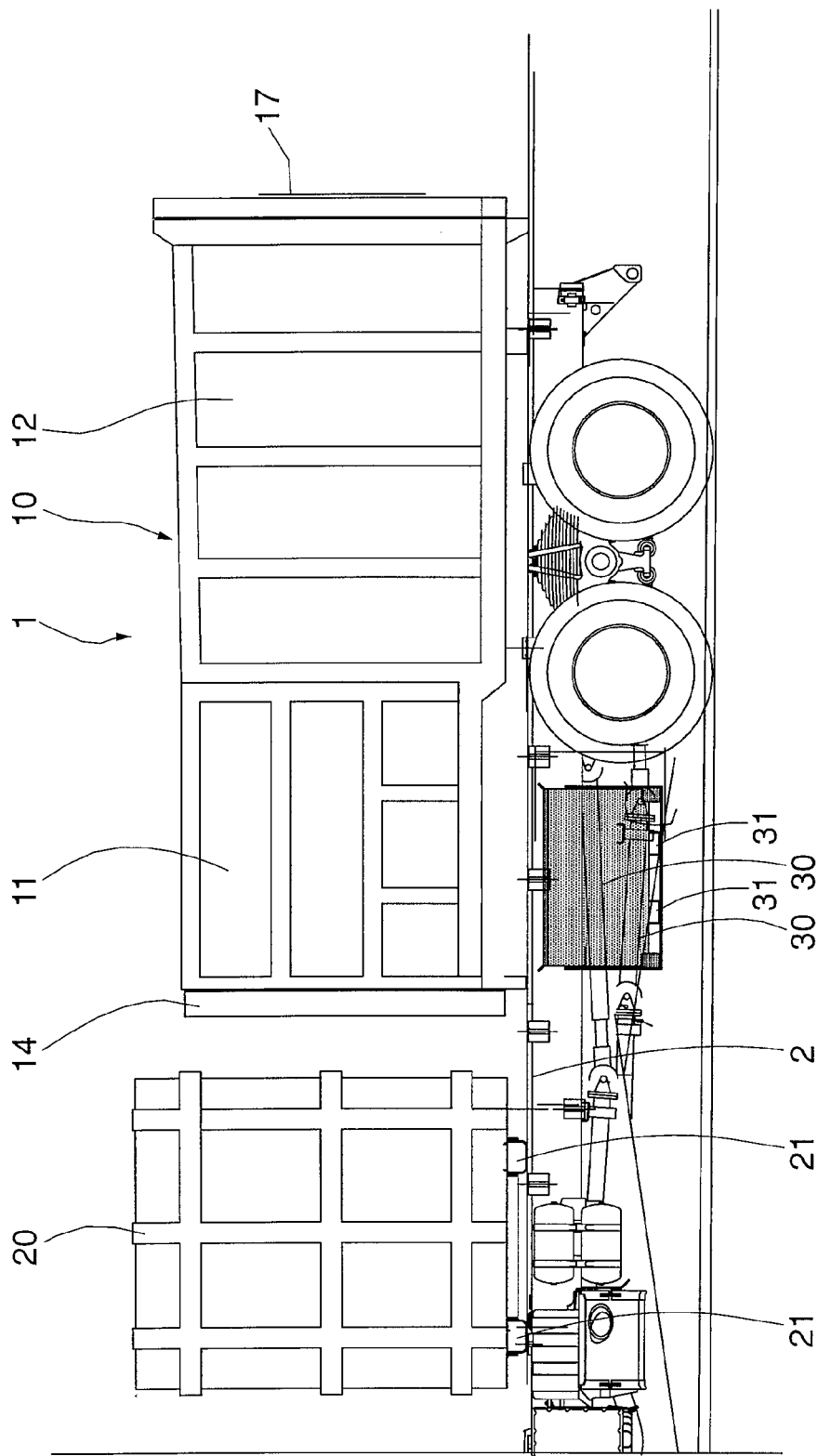


Fig. 1

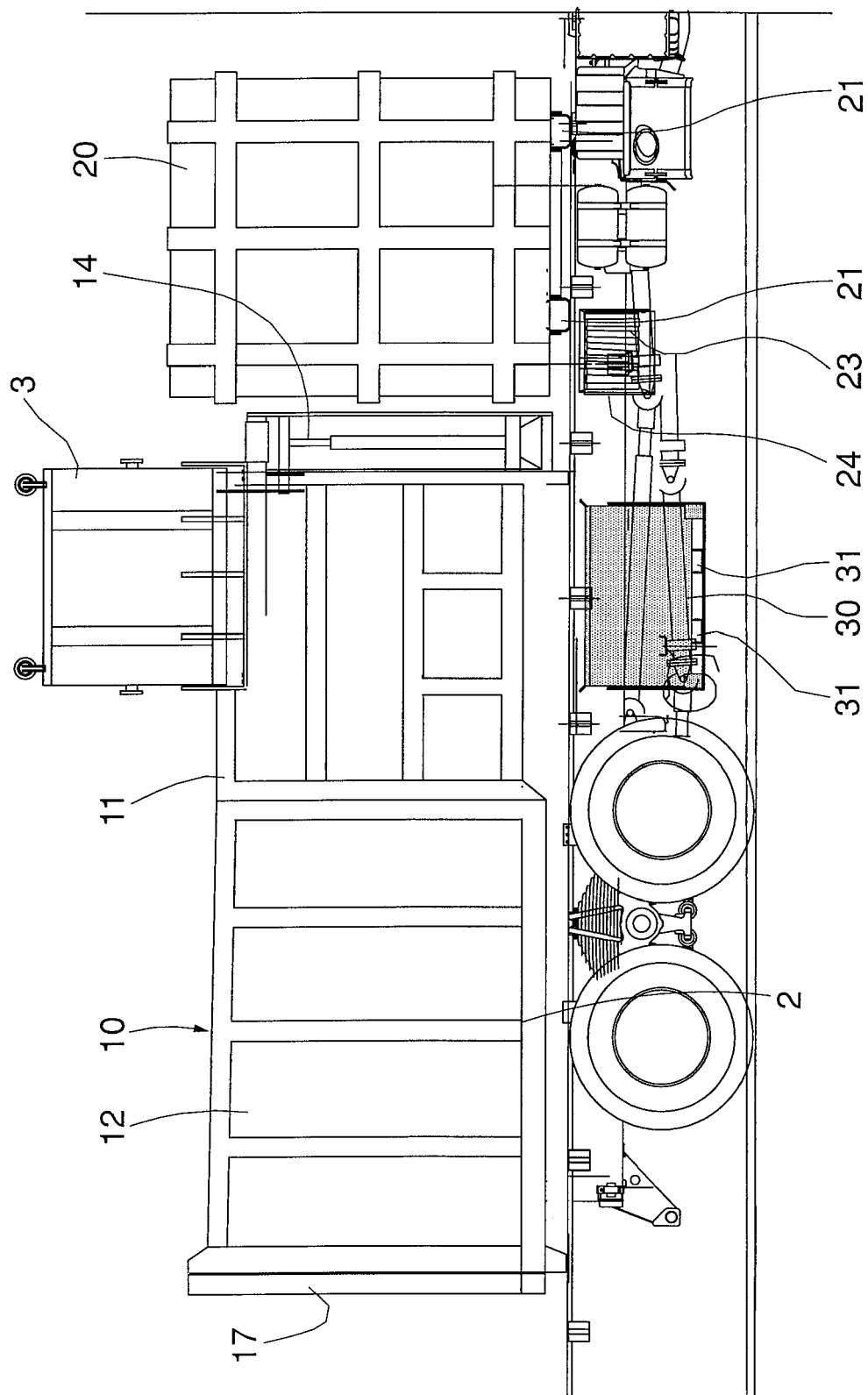


Fig. 2

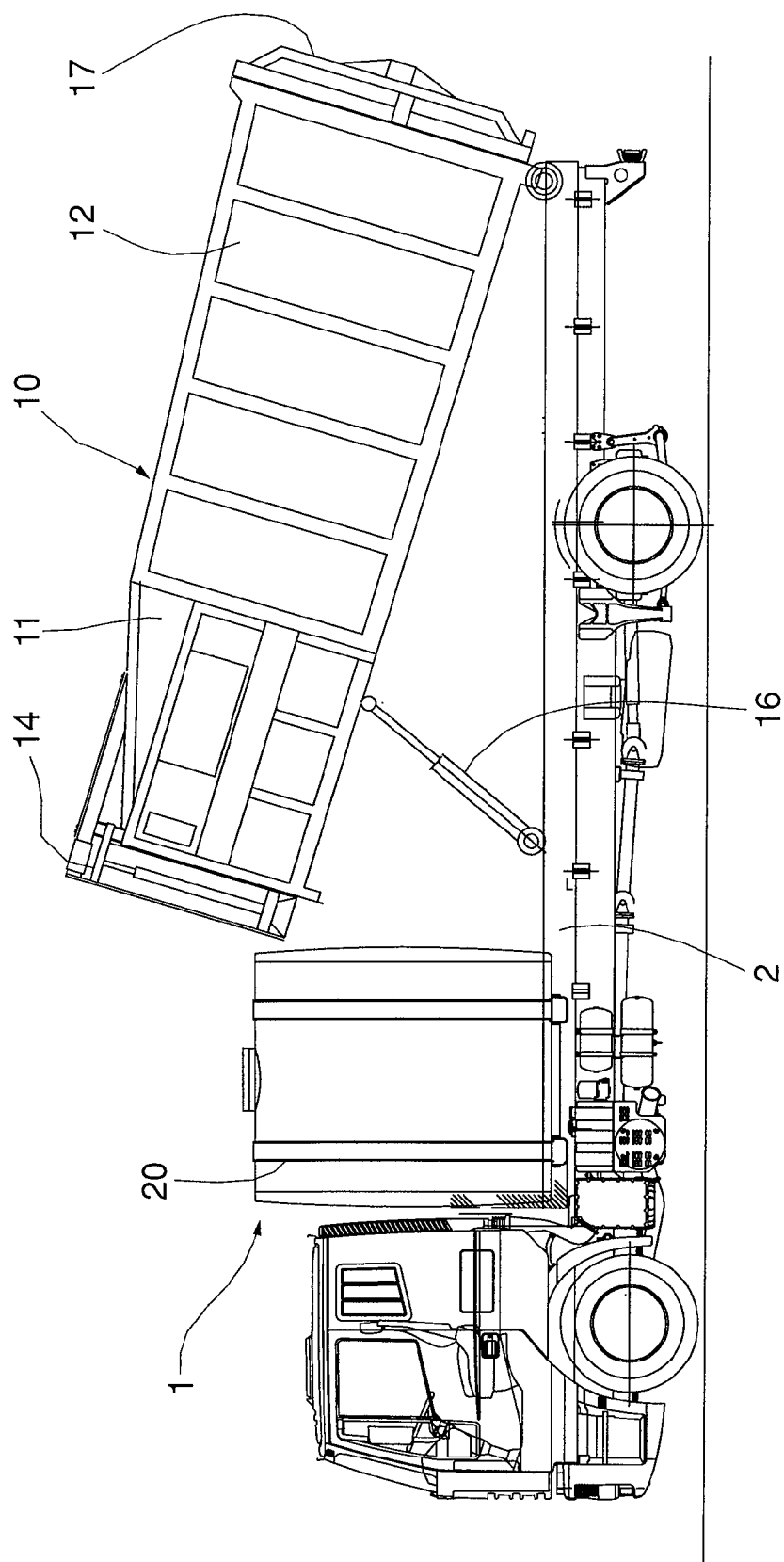


Fig. 3

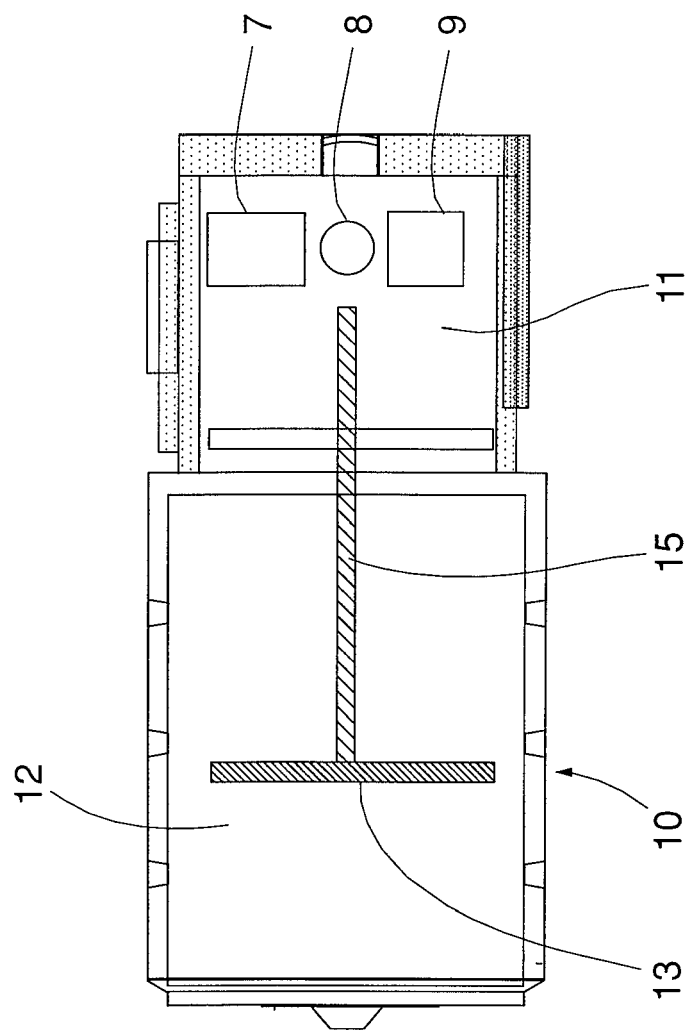


Fig. 4

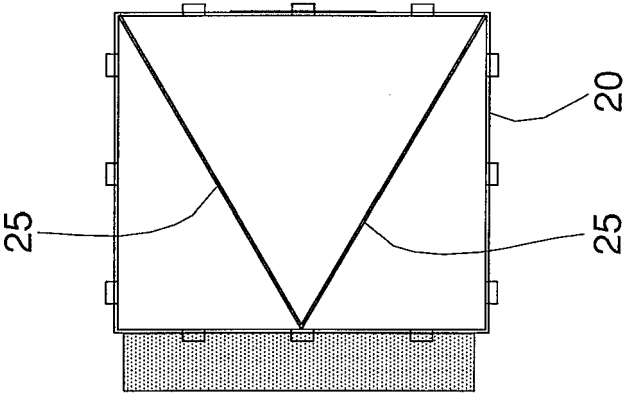


Fig. 5

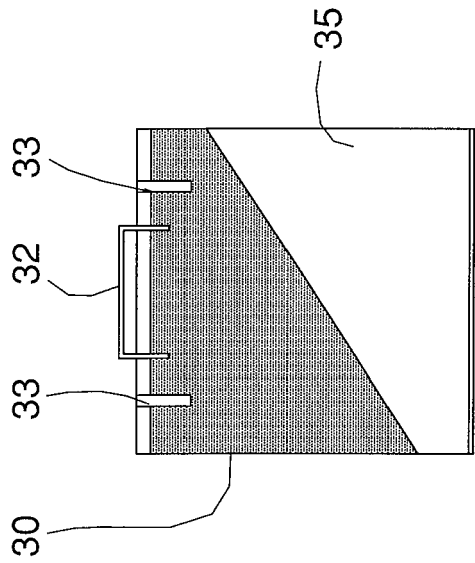


Fig. 6

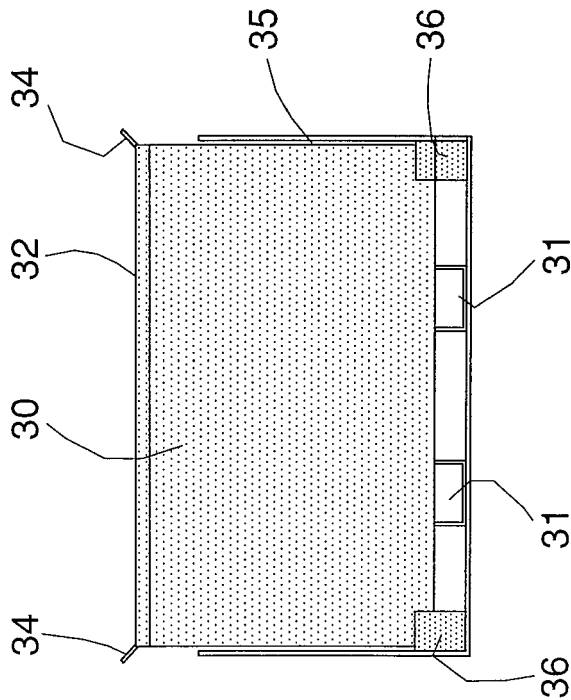


Fig. 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 11 3433

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	DE 88 11 611 U (E.S.D. ENTSORGUNGS-SYSTEME FÜR DEUTSCHLAND GMBH & CO) 26 January 1989 (1989-01-26)	1,3	INV. B65F3/00
Y	* the whole document *	2,4-6,8, 9,11	ADD. B65F3/26
Y	----- US 6 499 931 B1 (B. GARRETT, JR. ET AL.) 31 December 2002 (2002-12-31) * column 3, line 49 - column 6, line 67 * * figures 1-5 * -----	2,4-6,8, 9,11	
			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 3 October 2006	Examiner Smolders, Rob
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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

EP 06 11 3433

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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03-10-2006

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