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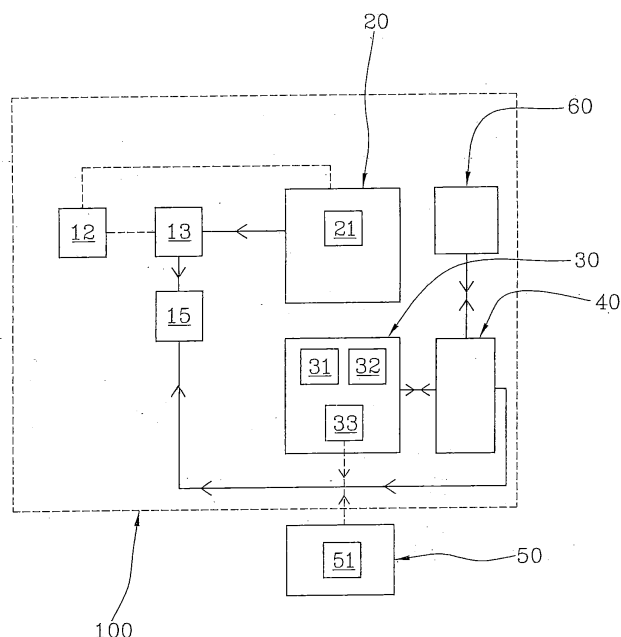
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(54) **Apparatus for compacting rubbish**

(57) A rubbish compacting apparatus (100) comprising a compartment (11) adapted to contain the rubbish to be compacted, which is accessible through at least one rubbish loading mouth (14), a door (15) for access to the mouth (14), compacting means (12) adapted to compact the rubbish loaded into the compartment (11), a motor (13) acting on the door (15) and adapted to move it between a first open position and a second closed po-

sition, an autonomous power supplying device (20) for feeding electric energy to the motor (13), an identification unit (30) for identifying the users (50) of said rubbish compacting apparatus (100), which identification unit comprises a processing module (32) adapted to store the number of accesses of each of the users (50) to the access door (15), a processing unit (40) connected to the identification unit (30) and adapted to process the data therefrom for selectively actuating the motor (13).

FIG 1



Description

[0001] The present invention relates to a rubbish compacting apparatus. In particular the invention concerns a rubbish compacting apparatus of the drawer type and the following specification refers to this application field for the only purpose of simplifying description thereof.

[0002] It is known that a rubbish compacting apparatus is an apparatus enabling a volume reduction for any type of bulky waste (paper, paperboard, plastic material, wood, metal containers, organic waste, etc.)

[0003] It is also well-known that there are industrial compacting apparatuses for waste of big sizes. Loading of waste or rubbish into these compacting apparatuses takes place through suitable transport means carrying out a house-to-house collection.

[0004] A problem connected with industrial compacting apparatuses resides in that for an efficient operation of same big energy amounts are required.

[0005] Another type of compacting apparatuses of a reduced scale as compared with the industrial ones contemplates the possibility that the person producing the rubbish may directly load it into said apparatus.

[0006] However a great heedlessness on the part of the users has been found as regards a clever discharge of the rubbish into these compacting apparatuses. Frequently the user takes advantage of the apparatus without taking the trouble to collect a certain amount of rubbish so as to carry out a more limited number of loading operations.

[0007] Usually, access to the compacting apparatus takes place through a door with automatic opening.

[0008] As known, in these compacting apparatuses opening of the door for rubbish loading is the main cause of waste of energy, the energy amount consumed being greater than that used by the compacting apparatus for the compacting operation itself.

[0009] The energy required for operation of the compacting apparatus therefore first of all depends on the number of accesses to the door by the users.

[0010] In systems provided with independent energy generators, i.e. that are not connected to an energy distribution network, optimisation of the number of door openings is therefore indispensable for the purpose of enabling a prolonged use of the apparatus.

[0011] It is an aim of the invention to produce a rubbish compacting apparatus provided with an independent energy generator enabling a reduced power consumption.

[0012] It is a further aim of the invention to enable access to the different potential users in an as much as possible fair and impartial manner.

[0013] The foregoing and further aims are reached by the rubbish compacting apparatus according to the description given in the appended claims.

[0014] The rubbish compacting apparatus according to the invention achieves the following advantages as compared with the known art:

- the power consumption is limited;
- the access to the compacting apparatus is controlled;
- the apparatus use appears to be more impartially and fairly distributed among the possible users;
- a trace is maintained of the users that have utilised the compacting apparatus.

[0015] The foregoing and further advantages of the invention will become more apparent from the description given hereinafter by way of non-limiting example of an embodiment of the invention with reference to the accompanying drawings.

Brief Description of the Drawings:

[0016]

- Fig. 1 is a block diagram of the compacting apparatus according to the invention;
- Fig. 2 is a perspective view of the apparatus seen in Fig. 1;
- Fig. 3 is a top plan view of the compacting apparatus of Fig. 1;
- Figs. 4a and 4b show two sectional views of the apparatus seen in Fig. 3, taken along line G-G, in two different operating conditions.

[0017] As already mentioned, a rubbish compacting apparatus is an apparatus adapted to obtain a volume reduction of any type of bulky rubbish (paper, paperboard, plastic material, wood, metal containers, organic waste, etc.).

[0018] In Figs. 2, 3, 4a and 4b a rubbish compacting apparatus 100 according to the invention is shown in different views.

[0019] In Fig. 1 the rubbish compacting apparatus is shown in a diagrammatic representation, in which the functional relations between the different components thereof are shown.

[0020] Apparatus 100 comprises a compartment 11 adapted to contain the rubbish to be compacted, which is accessible through a rubbish loading mouth 14.

[0021] Apparatus 100 further comprises compacting means 12 adapted to compact the rubbish loaded into compartment 11. Preferably, this compacting means 12 comprises a press.

[0022] Preferably, in a preferred embodiment and as clearly shown in Figs. 4a and 4b, the compacting apparatus 110 is of the so-called and already known "drawer" type. In fact, preferably, the compacting apparatus 100 comprises a collecting drawer 17 into which the rubbish is loaded, through the loading mouth 14, to be then moved towards the compartment 11.

[0023] The compacting means 12 is adapted to move the rubbish from drawer 17 to the holding compartment 11.

[0024] In Fig. 4a the compacting means 12 is in a rest

condition, so that rubbish loading through mouth 14 enables falling of said rubbish into the holding drawer 17.

[0025] In Fig. 4b the compacting means 12 is represented in a maximum-extension condition corresponding to the occurred translation with consequent occurred movement of the rubbish from the holding drawer 17 to the compartment 11.

[0026] Progressively, with loading of new rubbish into drawer 17, the compartment 11 will start filling and a further rubbish loading will involve both a movement and a compacting operation.

[0027] Preferably, the movement/compacting operation will go on until complete filling of compartment 11. Preferably, a suitable photoelectric cell, provided in compartment 11, will signal complete filling.

[0028] In a variant form the compacting apparatus is of a known type referred to as "shovel compacting apparatus". In this variant, not shown in the figures, suitable thrust means cause rotation of the compacting means so as to move the rubbish towards a holding compartment for compacting.

[0029] In a further variant form, the compacting apparatus is of a known type referred to as "screw compacting apparatus". In this variant, not shown in the figures, suitable thrust and grinding or chopping means cause movement and simultaneous grinding of the rubbish towards a holding compartment, for compacting.

[0030] In each of the possible variants, the compacting apparatus comprises a door 15 for access to the loading mouth 14.

[0031] Preferably, the door 15 is adapted to be moved between a first open position enabling rubbish feeding and a second closed position.

[0032] Preferably, a motor 13 (Fig. 1) allows actuation of door 15 between said two positions.

[0033] Optionally, motor 13 also actuates the compacting means 12.

[0034] Alternatively, the compacting means 12 can be interlocked with a different motor (not shown), specifically dedicated to the thrust means itself. Preferably this motor 13 is a oil-pressure motor.

[0035] In other words, the compacting apparatus 100 comprises a motor 13 acting on door 15 and adapted to move this door 15 between a first open position and a second closed position. Optionally, door 15 is maintained in the second closed position when the aforesaid photoelectric cell provided in compartment 11 will signal complete filling of the compartment.

[0036] Advantageously, according to the invention, with particular reference to Fig. 1, the compacting apparatus 100 comprises an autonomous power supplying device 20 for feeding electric energy thereto.

[0037] Preferably, this autonomous power supplying device 20 comprises an electric energy accumulator 21. Preferably this electric energy accumulator 21 comprises one or more batteries. Preferably this battery is fed by a photovoltaic panel. In other words, the electric energy accumulator 21 is adapted to store the electric en-

ergy produced starting from the thermal energy collected by a photovoltaic panel.

[0038] According to a possible embodiment, at least one photovoltaic panel covers the upper surface of the compacting apparatus 100.

[0039] Alternatively or in addition, the electric energy accumulator 21 is suitable to store the electric energy obtained starting from a geothermal generator.

[0040] Alternatively or in addition, the electric energy accumulator 21 is suitable to store the electric energy obtained starting from a biomass plant.

[0041] Alternatively or in addition, the electric energy accumulator 21 is suitable to store the electric energy obtained starting from an aeolian generator.

[0042] In general, the accumulator 21 receives energy from a transducer device suitable to convert the energy produced by a renewable energy source into electric energy.

[0043] The stored energy powers the different parts of the compacting apparatus 100, in particular the compacting means 12 and door 15.

[0044] The compacting apparatus preferably works using direct current without any device converting the alternating current into direct current; therefore, advantageously, the energy supplied by said renewable energy source (photovoltaic panel, aeolian panel, geothermal generator, biomass plant, etc.) is converted into direct-current electric energy and used, without any conversion into alternating current, by motor 13 and/or the motor, if any, acting on the compacting means 12.

[0045] In other words, in the rubbish compacting apparatus 100 the energy supplied by said renewable energy source is converted into direct-current electric energy and fed to motor 13 and/or the possible motor acting on the compacting means 12, without any conversion into alternating current being carried out.

[0046] The greatest energy consumption by the compacting device 100 is caused by opening and closing of door 15. That is why optimisation of the number of opening/closing operations of door 15 is of a fundamental importance.

[0047] In addition, minimisation of the opening/closing operations can allow the autonomous power supplying device 20 to power the compacting apparatus 100 until the condition of complete filling and compacting of the rubbish loaded into compartment 11 has been achieved.

[0048] Advantageously, the compacting apparatus 100 comprises an identification unit 30 for identifying the users 50. This enables a trace to be kept of the persons that have used the compacting apparatus.

[0049] Preferably, the identification unit 30 too is powered by the energy stored in the energy accumulator 21.

[0050] Advantageously, the identification unit 30 comprises a reading unit 33 to read an identification device 51 provided for each user 50.

[0051] Advantageously, in this manner each and every access to the compacting apparatus 100 is recorded so as to enable a databank of the accesses to be filled, which

databank can be consulted for statistical data on the type of users having access to the compacting apparatus, the access frequency, etc.

[0052] Preferably, the reading unit 33 comprises a magnetic-card reader and the identification device 51 comprises a magnetic card.

[0053] Alternatively, the reading unit 33 comprises a transponder reader and the identification device 51 comprises a transponder. In particular the transponder may comprise a RFID Tag.

[0054] Again, alternatively, the reading unit 33 comprises a keyboard through which the user 50 can type its identification code.

[0055] Advantageously, the identification unit 30 comprises a processing module 32 adapted to store the number of accesses of each of the users 50 to door 15.

[0056] Advantageously, the identification unit 30 further comprises an operating module 31 adapted to control the identification code of each of the users 50, and suitable to read, from the processing module 32, the number of accesses already carried out by each of the users 50 in order to enable the processing unit 40 to selectively actuate motor 13.

[0057] In this manner, access to the compacting apparatus is controlled and the energy consumption is limited.

[0058] Advantageously, according to the invention, the compacting apparatus 100 comprises a detecting unit 60 connected to the autonomous power supplying device 20, for timed detection of the charge of said power supplying device.

[0059] In other words, this unit will carry out detection of the charging condition of the autonomous power supplying device 20, at predetermined time intervals. The processing unit 40 is connected to the control unit 60 and is adapted to process the data from the latter to enable a selective access to door 15 by users 50. In other words, if the detecting unit 60 detects that the charge of the autonomous power supplying device-20 is too low to enable a compacting operation, movement of door 15 is inhibited.

[0060] In addition or alternatively, if the detecting unit 60 detects that the charge of the autonomous power supplying device 20 is too low to enable an opening operation of door 15, movement of the door 15 itself is inhibited.

[0061] Preferably, access to door 15 is inhibited if the charge of the autonomous power supplying unit 20 is too low and/or the identified user 50 has already taken advantage of the compacting device for a predetermined number of times in a predetermined time interval.

[0062] By way of example, access to door 15 is inhibited if the user 50 has already made use of the compacting apparatus three times in a day.

[0063] Operation of the compacting apparatus according to the invention can be easily understood, based on the preceding description.

[0064] The user 50 is about to load the rubbish into the compacting apparatus 100. Said user is identified

through the reading unit 33.

[0065] Identification takes place through reading of an identification card or through a transponder unit or through typing of a code on a suitable keyboard.

[0066] An operating module 31 controls the identification code of user 50 and reads the number of accesses the user has already carried out from the processing module 32.

[0067] If the access number is lower than a predetermined threshold, the processing unit 40 starts motor 13 for opening of door 15, otherwise it does not allow opening of door 15, safeguarding the energy reserve. In this way, use of the compacting apparatus is more equitably distributed among the possible users.

[0068] Simultaneously, the detecting unit 60 detects the charging condition of the autonomous power supplying device 20.

[0069] The processing unit 40 processes the data from the detecting unit 60 and compares the charge of the power supplying device 20 with a threshold charge value; if the detected charge value is greater than the threshold value, movement of door 15 is allowed.

Claims

1. A rubbish compacting apparatus (100), comprising:

- a compartment (11) adapted to contain the rubbish to be compacted, which is accessible through at least one rubbish loading mouth (14);
- a door (15) for access to said mouth (14);
- compacting means (12) adapted to compact said rubbish loaded in said compartment (11);
- a motor (13) acting on said door (15) and adapted to move the door (15) between a first open position and a second closed position;
- an autonomous power supplying device (20) for electric feeding of said motor (13);
- an identification unit (30) for identifying users (50) of said rubbish-compacting apparatus (100), which identification unit comprises a processing module (32) adapted to store the number of accesses of each of said users (50) to said access door (15);
- a processing unit (40) connected to said identification unit (30) and adapted to process the data from said identification unit (30) for selectively actuating said motor (13) as a function of said number of accesses.

2. A rubbish compacting apparatus (100) as claimed in claim 1, wherein said identification unit (30) comprises an operating module (31), adapted to control the identification code of each of said users (50), and suitable for reading the number of accesses already carried out by each of said users (50) from said processing module (32), in order to enable said

processing unit (40) to selectively actuate said motor (13).

and to enable movement of said door (15) if the detected charge value is greater than said threshold value.

3. A rubbish compacting apparatus (100) as claimed in anyone of the preceding claims, wherein said identification unit (30) comprises a reading unit (33) of an identification device (51) of said user (50). 5
4. A rubbish compacting apparatus (100) as claimed in claim 3, wherein said reading unit (33) comprises a magnetic reader and/or transponder and said identification device (51) comprises a magnetic card and/or a transponder. 10
5. A rubbish compacting apparatus (100) as claimed in anyone of the preceding claims, comprising a collecting drawer (17) in which the rubbish is adapted to be loaded through said mouth (14), to be then moved towards said compartment (11). 15
20
6. A rubbish compacting apparatus (100) as claimed in anyone of the preceding claims, wherein said autonomous power supplying device (20) comprises an electric energy accumulator (21), preferably a battery. 25
7. A rubbish compacting apparatus (100) as claimed in claim 6, wherein said electric energy accumulator (21) receives energy from a transducer device adapted to convert the energy produced by a renewable energy source into electric energy. 30
8. A rubbish compacting apparatus (100) as claimed in claim 7, wherein the energy supplied from said renewable energy source is converted into direct-current energy and used by the motor (13), without being converted into alternating-current energy, and/or by the motor acting on the compacting means (12), if any. 35
40
9. A rubbish compacting apparatus (100) as claimed in anyone of the preceding claims, comprising a detecting unit (60) connected to said autonomous power supplying device (20), for timed detection of the charge condition of said autonomous power supplying device (20). 45
10. A rubbish compacting apparatus (100) as claimed in anyone of the preceding claims, wherein said processing unit (40) is connected to said detection unit (60) and adapted to process the data from said detection unit (60) in order to enable a selective access to said door (15) by said users (50). 50
11. A rubbish compacting apparatus (100) as claimed in claim 10, wherein said processing unit (40) is adapted to compare the charge of said autonomous power supplying device (20) with a threshold charge value 55

FIG 1

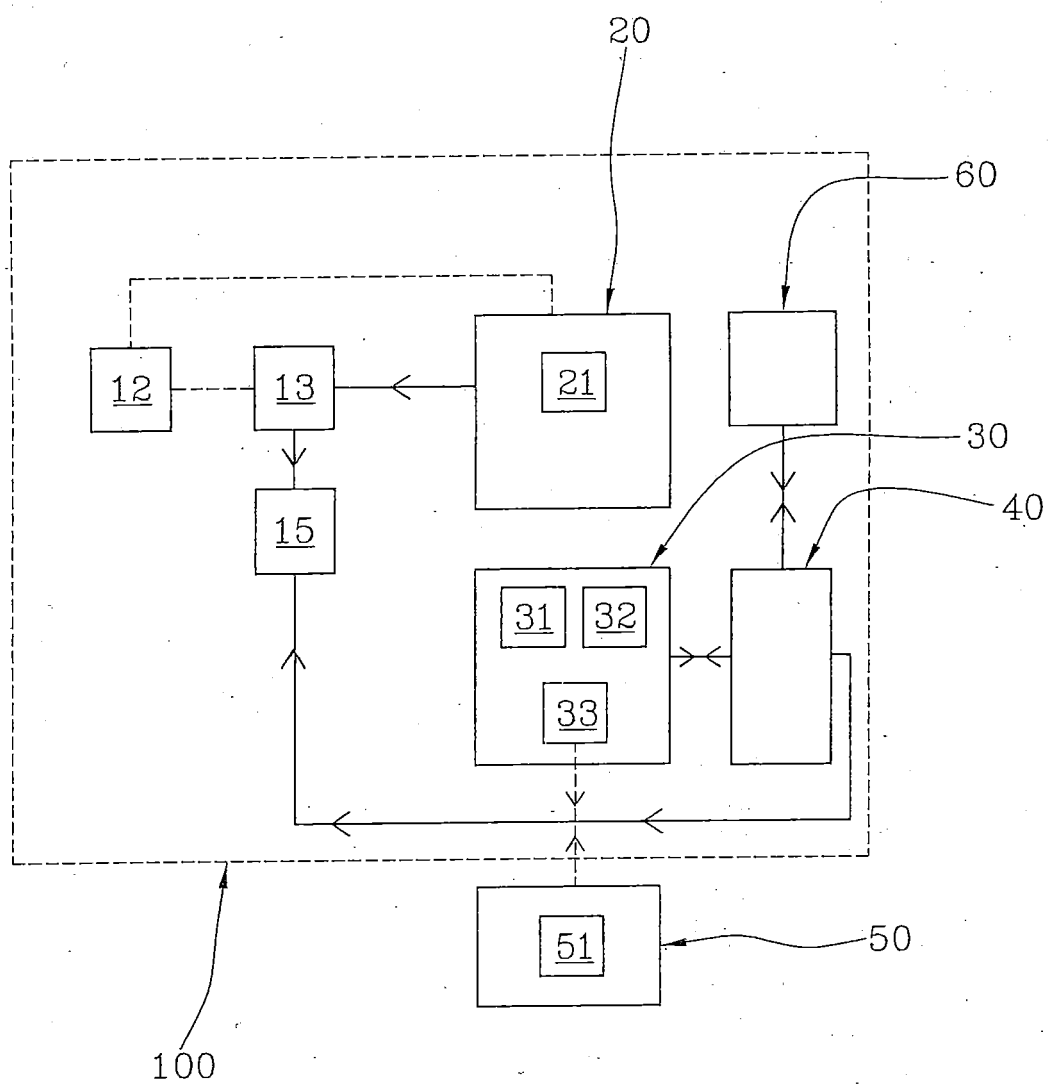


FIG 2

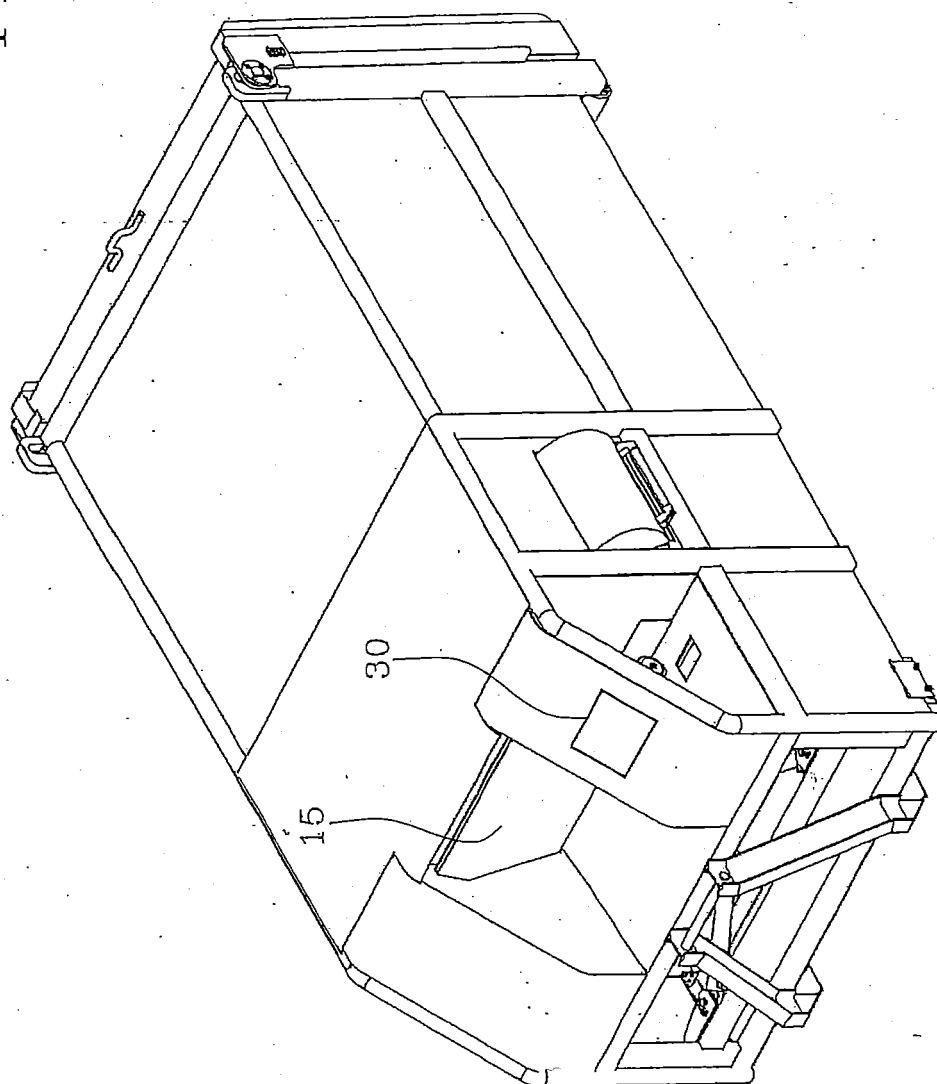


FIG 3

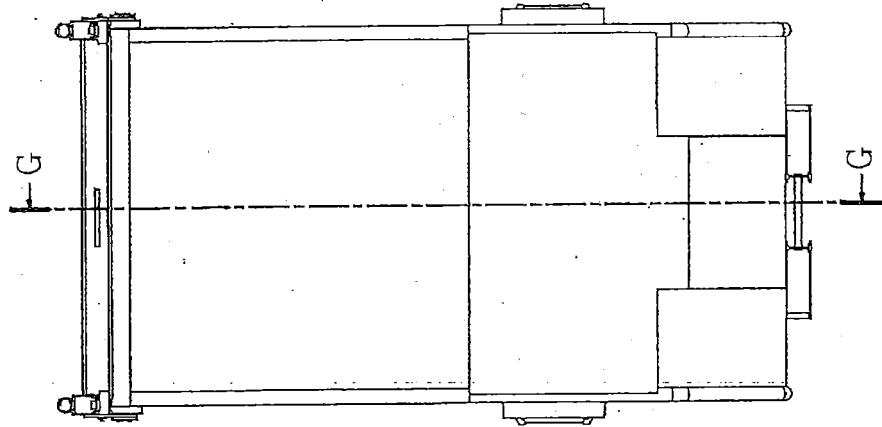


FIG 4a

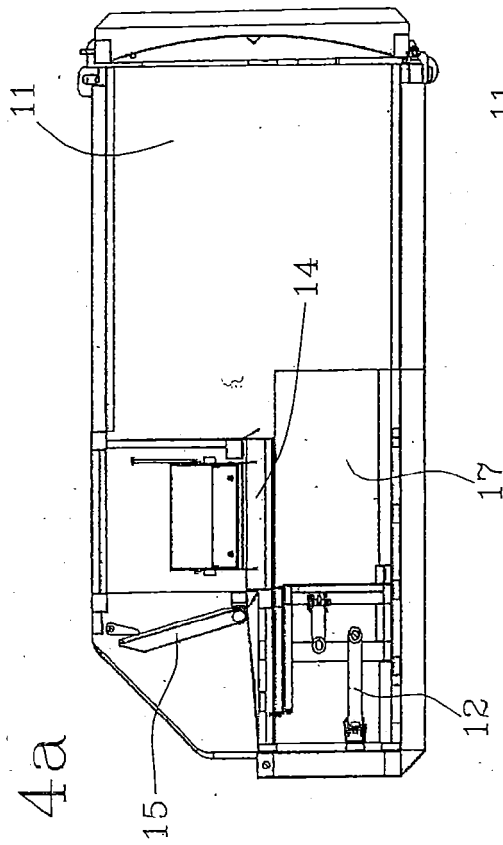
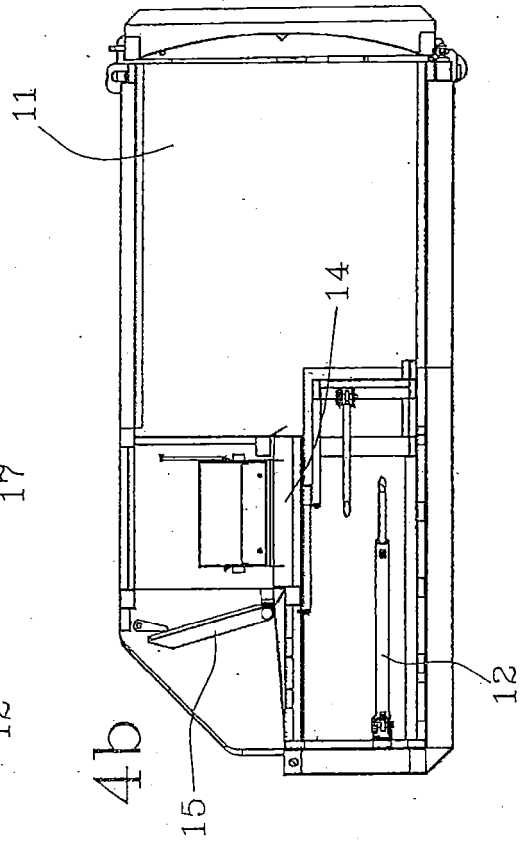


FIG 4b





EUROPEAN SEARCH REPORT

Application Number
EP 10 18 9075

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 899 215 A1 (MIPI CONST B V [NL]) 3 March 1999 (1999-03-03) * paragraphs [0040] - [0042], [0 47], [0 52] - [0054], [0 71]; figures 1-5 *	1	INV. B30B9/30 B65F1/14
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A	FR 2 761 350 A1 (PARTICIPATIONS VPCG [FR]) 2 October 1998 (1998-10-02) * page 4, line 22 - page 5, line 7 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B30B B65F
Place of search		Date of completion of the search	Examiner
The Hague		1 March 2011	Petrucchi, Luigi
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

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

EP 10 18 9075

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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01-03-2011

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