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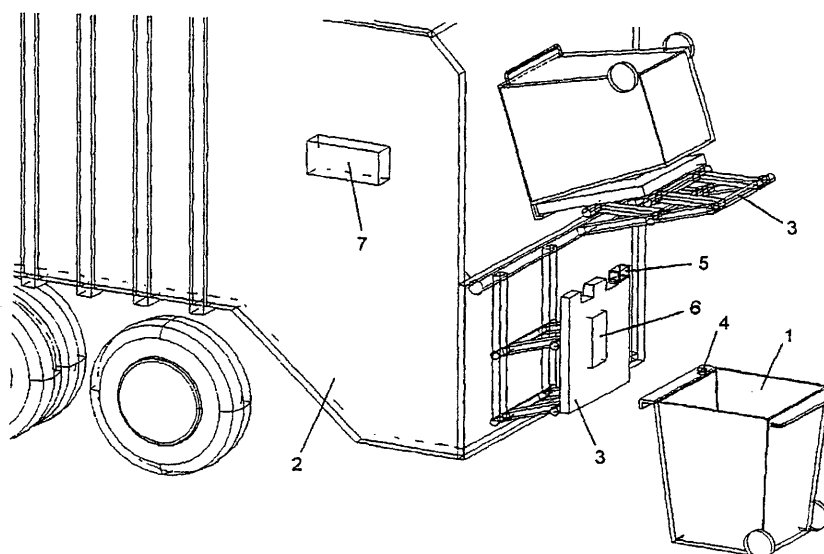
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(54) **Weighing method in particular for weighing waste materials**

(57) The present invention is related to a method for weighing weighing the waste contained in a waste container for individual waste collection, said container comprising an identification element (4), wherein said waste is collected into a waste collection truck, equipped with a data collection means (7), a sensor means (5) and an emptying device (3) said emptying device (3) comprising a weighing mechanism (6), said method comprising the steps of :

- attaching a waste container (1) to the emptying device (3), thereby bringing the identification element (4) in contact with the sensor means (5),

- lifting the container (1) from the ground,
- taring the weighing mechanism (6) to define a zero weight reference,
- emptying the container into the waste collection truck,
- lowering the emptied container,
- before putting the container back onto the ground, weighing the emptied container, with respect to the zero weight reference defined by the taring step, to obtain the net weight,
- sending a signal related to the net weight and the identification to the data collection means (7).



**FIG. 2**

## Description

### Field of the invention

[0001] The present invention is related to methods for weighing, in particular of household waste containers of small volume, used by residents to collect waste and collected on a regular basis by waste collection services.

### State of the art

[0002] More and more, the cost of waste collection and disposal need to be controlled. One of the ways of doing this is by establishing the cost of each waste collection on the basis of the weight of the waste produced. Nowadays this principle is also applied to individual waste producers, by weighing their waste containers, before emptying these containers into the collection vehicle.

[0003] A system for this purpose is for example described in document EP-A-186820. A lifting mechanism is attached to the back of the collection truck. A filled container is hooked onto this mechanism, lifted up and weighed a first time. The emptying cycle continues until the container is emptied, and returns on a downward path. In the course of this path, the container is again weighed. Electronic registering means are present to record the two weight values. These values allow to derive the weight of the waste actually emptied into the collection truck. Even though systems of this kind are known, there is a basic flaw in the way in which the weight is determined. This is related to the fact that the actual weight value is obtained by subtracting one measured value from another. The norm EN45501 (1992) does not allow a net weight to be obtained by subtraction, as this increases the measurement error.

### Aims of the invention

[0004] The present invention aims to provide a method for weighing waste containers, which does not suffer from the drawbacks of the prior art methods.

### Short description of the drawings

[0005] Figs. 1 and 2 represent a waste collection truck with a lifting mechanism, used to implement the method of the invention.

### Detailed description of the invention

[0006] As shown in figure 1, the method of the invention is applicable to a lifting and weighing mechanism similar to the ones known in the art. Such a mechanism comprises, on the back of a waste collection truck 2, a lifting and emptying device 3 to which a waste container 1 may be attached. The container is attached in such a

way that after it is lifted from the ground, its weight is measured by a weighing mechanism 6, integrated in the emptying device. The weighing mechanism typically comprises one or more load cells (not shown), which produce an electrical signal related to the suspended weight. According to the invention, the actual weighing is preceded by an identification step, involving an identification element 4, preferably an electronic chip, attached to the container 1, which is put in contact with a sensor means 5, able to read the information contained in the chip. In this way, an identification code can be read by the sensor means, and registered by saving it into a data collection means 7.

[0007] According to the preferred embodiment, the method of the invention comprises the following steps :

- attaching a waste container 1 to the emptying device 3, thereby bringing the identification element 4 in contact with the sensor means 5,
- lifting the container from the ground,
- taring the weighing mechanism 6 to define a zero weight reference. This means that the weighing scale with respect to which the weight is measured, is put to zero,
- emptying the container into the waste collection truck,
- lowering the emptied container,
- before putting the container back onto the ground, weighing the emptied container, with respect to the zero weight reference defined by the taring step,
- sending the net weight signal to the data collection means 7.

[0008] The new and inventive step of this method resides in the taring. In stead of weighing the container for the first time during the lifting phase, the weighing mechanism is put to zero. The weighing step during the lowering phase is performed relative to the zero, so that a negative weight is measured, the absolute value of which corresponds exactly to the net weight of the collected waste.

[0009] This value can then be stored in the data collection means 7, along with the identification obtained from the ID-element 4.

[0010] In the context of the invention, a 'weighing step' is defined as a procedure whereby a weight value is determined, followed by the registration of said value. In the method of the invention, only one such weighing step is present, during the lowering phase. During the lifting phase, the weighing mechanism is tared, which does not constitute a weighing step in the meaning set out above, as this does not involve recording and storing a weight value. This defines the difference between the method of the invention and the prior art.

[0011] This way of determining the weight has a number of advantages : the measuring fault is reduced, due to the fact that the error on a zero weight is smaller than on the measurement of an actual weight determi-

nation. This is a rule which is laid down in weights and measurement laws.

**[0012]** The method can be performed as an automatic measurement cycle, which is launched when the container is attached to the emptying device 3, and ends when the container is released from this device. Alternatively, the method can be performed in such a way that certain steps have to be done manually, for example the steps of taring and weighing.

**[0013]** Preferably, detectors are present on the emptying device, which monitor the emptying path and allow to interrupt the emptying cycle in case of an error, for example when the taring or weighing steps have been compromised due to external influences. There is preferably also a means present which allows the cycle to be relaunched manually after such an interruption.

**[0014]** The method may equally comprise a step wherein the user manually enters data, which are to be stored along with the registered net weight and the identification data. For example, a code may be entered which is related to the type of waste, a defect on the waste container or other information.

**[0015]** The method of the invention may also comprise a step of sending signals from the data collection means 7 through the sensor means 5 to the identification element 4, in case this element consists of a read/write chip.

2. The method according to claim 1, wherein said steps are performed automatically, as soon as the container is attached to the weighing device (6).

5 3. The method according to claim 1, wherein said steps are performed in a non-automatic way, and wherein the step of taring and/or weighing is performed manually.

10 4. The method according to any one of claims 1 to 3, wherein the path of said container (1) is monitored by way of detectors, which allow to stop the emptying process, in case of errors.

15 5. The method according to any one of claims 1 to 4, wherein an operator enters data manually, said data to be sent to said data collection means (7) along with the weight and identification data.

20 6. The method according to any one of claims 1 to 5, comprising the step of sending signals from the data collection means (7), through the sensor means (5) to the identification element (4).

## Claims

1. A method for weighing the waste contained in a waste container for individual waste collection, said container comprising an identification element (4), wherein said waste is collected into a waste collection truck, equipped with a data collection means (7), a sensor means (5) and an emptying device (3) said emptying device (3) comprising a weighing mechanism (6), said method comprising the steps of :

- attaching a waste container (1) to the emptying device (3), thereby bringing the identification element (4) in contact with the sensor means (5),
- lifting the container (1) from the ground,
- taring the weighing mechanism (6) to define a zero weight reference,
- emptying the container into the waste collection truck,
- lowering the emptied container,
- Before putting the container back onto the ground, weighing the emptied container, with respect to the zero weight reference defined by the taring step, to obtain the net weight,
- sending a signal related to the net weight and the identification to the data collection means (7).

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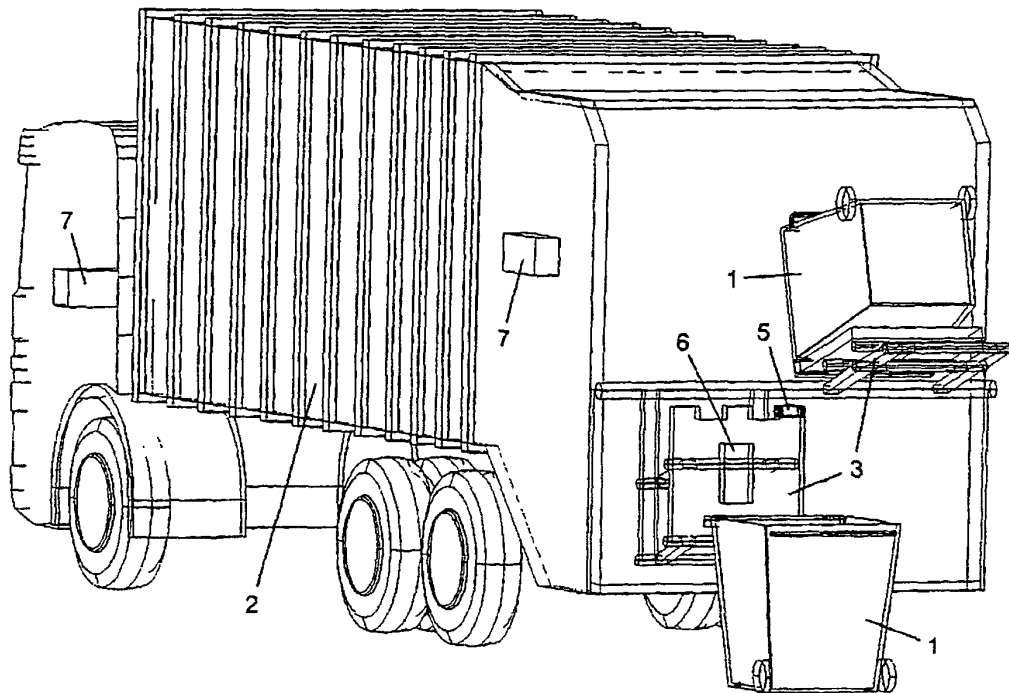


FIG. 1

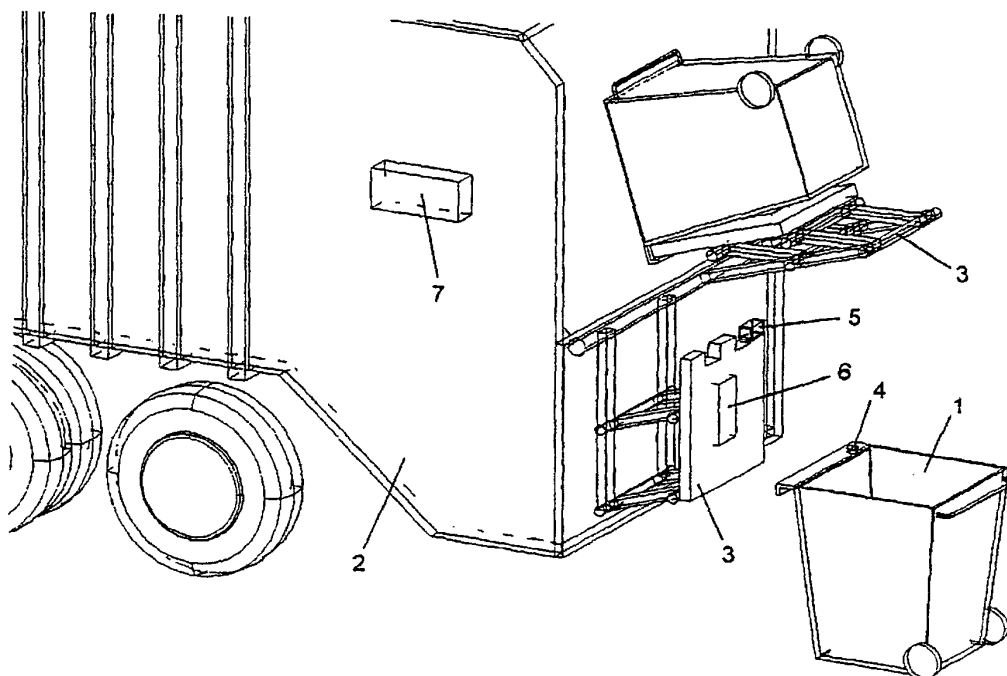


FIG. 2



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 03 44 7286

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                  |                                                  |                                              |
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