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).
Description

[0001] The present invention relates to a rubbish compacting apparatus according to the preamble of claim 1. Such an apparatus is known from EP 0 899 215. 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 claim 1.

[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.

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.

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.

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.

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.

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.

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

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

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

Optionally, motor 13 also actuates the compacting means 12.

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.

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.

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.

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

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

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

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

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

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.

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

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.

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.

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.

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.

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.

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

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

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
A rubbish compacting apparatus (100) comprises:

1. a compartment (11) adapted to contain the rubbish to be compacted, which is accessible through at least one rubbish loading mouth (14);
2. a door (15) for access to said mouth (14);
3. compacting means (12) adapted to compact said rubbish loaded in said compartment (11);
4. 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;
5. an autonomous power supplying device (20) for electric feeding of said motor (13);
6. an identification unit (30) for identifying users (50) of said rubbish-compacting apparatus (100), characterized in that the 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), 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.

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), characterized in that the 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), 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 user 50 to engage in a selective access to said compacting apparatus (100).
processing unit (40) to selectively actuate said motor (13).

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).

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.

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).

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.

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.

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.

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).

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).

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

Patentansprüche

1. Vorrichtung zum Verdichten von Müll (100), umfassend:
   - einen Raum (11), ausgelegt zum Enthalten des zu verdichtenden Mülls, der durch mindestens eine Müllladeöffnung (14) zugänglich ist;
   - eine Tür (15) für den Zugang zu dieser Öffnung (14);
   - Verdichtungsmittel (12), ausgelegt, um den Müll, der in den Raum (11) geladen wird, zu verdichten;
   - einen Motor (13), der auf die Tür (15) wirkt und ausgelegt ist, um die Tür (15) zwischen einer ersten offenen Stellung und einer zweiten geschlossenen Stellung zu bewegen;
   - eine eigenständige Stromversorgungsvorrichtung (20) für die elektrische Speisung des Motors (13);
   - eine Identifizierungseinheit (30) für die Identifizierung der Nutzer (50) der Vorrichtung zum Verdichten von Müll (100), dadurch gekennzeichnet, dass die Identifizierungseinheit ein Verarbeitungsmodul (32) umfasst, das ausgelegt ist, um die Zahl an Zugängen jedes Nutzers (50) zur Zugangstür (15) zu speichern;
   - eine Verarbeitungseinheit (40), angeschlossen an die Identifizierungseinheit (30) und ausgelegt, um die Daten der Identifizierungseinheit (30) zu verarbeiten, um den Motor (13) je nach der Zahl an Zugängen selektiv zu aktivieren.

2. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 1, wobei die Identifizierungseinheit (30) ein Betriebsmodul (31) umfasst, das ausgelegt ist, um den Identifikationscode jedes Nutzers (50) zu kontrollieren, und geeignet ist, um die Zahl an Zugängen jedes Nutzers (50) der Verarbeitungsmodule (32) auszulesen, damit dem Verarbeitungsmodul (40) ermöglicht wird, den Motor (13) selektiv zu aktivieren.

3. Vorrichtung zum Verdichten von Müll (100) nach einem der vorangehenden Ansprüche, wobei die Identifizierungseinheit (30) eine Ausleseeinheit (33) einer Identifizierungsvorrichtung (51) der Nutzer (50) umfasst.

4. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 3, wobei die Ausleseeinheit (33) einen Magnetleser und/oder einen Transponder umfasst, und die Identifizierungsvorrichtung (51) eine Magnetkar-
te und/oder einen Transponder umfasst.

5. Vorrichtung zum Verdichten von Müll (100) nach einem der vorhergehenden Ansprüche, umfassend eine Auffangschublade (17), die der Müll durch die Öffnung (14) geladen werden kann, um anschließend zum Raum (11) befördert zu werden.

6. Vorrichtung zum Verdichten von Müll (100) nach einem der vorhergehenden Ansprüche, wobei die eigenständige Stromversorgungsvorrichtung (20) einen elektrischen Akkumulator (21), vorzugsweise eine Batterie, umfasst.

7. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 6, wobei der elektrische Akkumulator (21) Energie von einer Wandiervorrichtung empfängt, die ausgelegt ist, um die von einer erneuerbaren Energiequelle erzeugte Energie in Strom zu verwandeln.

8. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 7, wobei die von der erneuerbaren Energiequelle gelieferte Energie in Gleichstromenergie umgewandelt und vom Motor (13) genutzt wird, ohne in Wechselstromenergie umgewandelt zu werden, und/oder vom Motor, der auf die Verdichtungsmittel (12), sofern vorhanden, wirkt.

9. Vorrichtung zum Verdichten von Müll (100) nach einem der vorhergehenden Ansprüche, umfassend eine Erfassungseinheit (60), die an die eigenständige Stromversorgungsvorrichtung (20) für die zeitgeschaltete Erfassung des Ladezustands der eigenständigen Stromversorgungsvorrichtung (20) ange schlossen ist.

10. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 9, wobei die Verarbeitungseinheit (40) an die Erfassungseinheit (60) angeschlossen und ausgelegt ist, um die Daten der Erfassungseinheit (60) zu verarbeiten, um einen selektiven Zugang zur Tür (15) durch die Nutzer (50) zu ermöglichen.

11. Vorrichtung zum Verdichten von Müll (100) nach Anspruch 10, wobei die Verarbeitungseinheit (40) ausgelegt ist, um die Ladung der eigenständigen Stromversorgungseinheit (20) mit einem Schwellenladewert zu vergleichen und die Bewegung der Tür (15) zu ermöglichen, wenn der erfasste Ladewert größer als der Schwellenwert ist.

Revendications

1. Dispositif pour le compactage des déchets (100), comprenant :
6. Dispositif pour le compactage des déchets (100) selon l'une quelconque des revendications précédentes, dans lequel le dit dispositif autonome d'alimentation en énergie (20) comprend un accumulateur d'énergie électrique (21), de préférence une batterie.

7. Dispositif pour le compactage des déchets (100) selon la revendication 6, dans lequel le dit accumulateur d'énergie électrique (21) reçoit de l'énergie à partir d'un transducteur pouvant transformer l'énergie produite par une source d'énergie renouvelable en énergie électrique.

8. Dispositif pour le compactage des déchets (100) selon la revendication 7, dans lequel l'énergie fournie par ladite source d'énergie renouvelable est transformée en énergie électrique en courant continu et utilisée par le moteur (13), sans être transformée en énergie électrique en courant alternatif, et/ou par le moteur agissant sur les moyens de compactage (12), le cas échéant.

9. Dispositif pour le compactage des déchets (100) selon l'une quelconque des revendications précédentes, comprenant une unité de détection (60) connectée au dit dispositif autonome d'alimentation en énergie (20), pour la détection temporisée de la condition de charge dudit dispositif autonome d'alimentation en énergie (20).

10. Dispositif pour le compactage des déchets (100) selon l'une quelconque des revendications précédentes, dans lequel ladite unité de traitement (40) est connectée à ladite unité de détection (60) et peut traiter les données de ladite unité de détection (60) afin de permettre un accès sélectif à ladite porte (15) par lesdits utilisateurs (50).

11. Dispositif pour le compactage des déchets (100) selon la revendication 10, dans lequel ladite unité de traitement (40) peut comparer la charge dudit dispositif autonome d'alimentation en énergie (20) avec une valeur seuil de charge et permettre le mouvement de ladite porte (15) si la valeur de charge détectée est supérieure à ladite valeur seuil.
REFERENCES CITED IN THE DESCRIPTION

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