A composting toilet assembly and installation are disclosed. The composting toilet assembly includes a separating means housed in a pedestal toilet seat. Liquid and solid waste entering the toilet assembly are separated by the separating means which includes a sloping conveyor belt, actuated by control means, which serves to separate the liquid waste from the solid waste by means of gravity. The liquid waste is diverted to a bottom end of the sloping conveyor belt and the solid waste is diverted to an opposing top end of the sloping conveyor belt. A receptacle is attachable at the bottom end of the sloping conveyor belt for collecting the diverted liquid waste for disposal. The solid waste is diverted to the top end of the sloping conveyor belt and through a rear opening of the housing where the solid waste is disposed away from the toilet assembly. The solid waste can be disposed into a composting space located adjacent to the toilet assembly and/or below the toilet assembly.
COMPOSTING TOILET ASSEMBLY

FIELD OF THE INVENTION

[0001] The present invention relates to the field of toilets and, in particular, to composting toilet assemblies.

BACKGROUND OF THE INVENTION

[0002] Composting toilets have found wide application in rural, isolated, or under-developed locations where water and sewage networks may be limited or completely non-existent. For example, U.S. Pat. No. 6,601,243 describes a vermi-composting toilet installation adapted for use in the wild. Specifically, the toilet installation is designed to distribute fecal matter within an underground tunnel for vermi-composting. The conditions in the underground tunnel are maintained by dampening means that self-regulate the amount of rainwater entering the tunnel where vermi-composting takes place. In this way, the toilet installation is designed to be relatively self-regulating to allow for its use in such remote and under-developed sites.

[0003] The advantages of composting toilets from an environmental perspective have been gaining popularity and particular interest has grown in the adoption of composting toilets for domestic applications in urban locations. In this respect, a variety of batch composting toilet systems have been developed. Such systems are typically designed with a container in which waste material is collected and the composting process is carried out. Once the composting process is completed inside the sealed container, the container is fully composted and ready for emptying. While the self-contained nature of batch composting systems facilitates installation into domestic locations, these systems are limited in the amount of material that can be processed at any given time. As well, many of these systems require the addition of materials such as chemicals and/or sawdust or wood chips to catalyze the composting process.

[0004] U.S. Pat. No. 4,254,515 describes a self-contained composting toilet which can be used in domestic environments in which liquid and solid waste material is first separated and then each separately treated with auxiliary agents to compost the materials. By separately treating the waste, the treatment capacity of the composting toilet is increased, however, the large treatment capacity results in a bulky design that is described as being installed underground. Accordingly, installation of such a system would require extensive retrofitting to be operational in a dwelling-house, for example.

[0005] Continual processing systems that are in a constant state of composting have also been described. U.S. Pat. No. 3,136,608 describes a continual processing system that can be adapted for use in a dwelling-house. A large underground container is situated to receive waste from a toilet. The container is dimensioned with an inclined bottom to allow entering waste to successively slide from the reception compartment down towards the storage compartment of the container. The entering waste slides down the container at a speed such that by the time the waste arrives at the storage compartment, the waste is essentially moulder for use as compost. While such a system allows for a larger volume of material to be in a constant state of composting, the underground nature of the container installation would require extensive retrofitting for operation.

[0006] This background information is provided for the purpose of making known information believed by the applicant to be of possible relevance to the present invention. No admission is necessarily intended, nor should be construed, that any of the preceding information constitutes prior art against the present invention.

SUMMARY OF THE INVENTION

[0007] Disclosed herein are exemplary embodiments pertaining to a composting toilet assembly. An exemplary embodiment of the present disclosure relates to a composting toilet assembly comprising: a separating means for separating liquid and solid waste entering the toilet assembly, the separating means comprising a sloping conveyor belt actuated by control means and serving to separate the liquid waste from the solid waste by means of gravity, wherein the liquid waste is diverted to a bottom end of the sloping conveyor belt and the solid waste is diverted to a top end of the sloping conveyor belt; a receptacle attachable at the bottom end of the sloping conveyor belt for collecting the diverted liquid waste for disposal;

[0008] and a housing shaped as a pedestal toilet seat and sized to house the separating means, wherein the toilet seat comprises an opening aligned with the sloping conveyor belt through which the liquid and solid waste enters the toilet assembly, and wherein the housing further comprises a rear opening through which the top end of the sloping conveyor belt diverts the solid waste for disposal away from the toilet assembly.

[0009] In accordance with another aspect of the disclosure, there is provided a composting toilet installation comprising: an airtight composting space having at least one wall opening; and one or more toilet assemblies, each toilet assembly comprising: a separating means for separating liquid and solid waste entering the toilet assembly; the separating means comprising a sloping conveyor belt actuated by control means and serving to separate the liquid waste from the solid waste by means of gravity, wherein the liquid waste is diverted to a bottom end of the sloping conveyor belt and the solid waste is diverted to a top end of the sloping conveyor belt; a receptacle attachable at the bottom end of the sloping conveyor belt for collecting the diverted liquid waste for disposal; and a housing shaped as a pedestal toilet seat and sized to house the separating means, wherein the toilet seat comprises an opening aligned with the sloping conveyor belt through which the liquid and solid waste enters the toilet assembly, and wherein the housing further comprises a rear opening through which the top end of the sloping conveyor belt diverts the solid waste for disposal; wherein the rear opening of each toilet assembly is in sealing engagement with the wall opening of the airtight composting space and the top end of the conveyor belt extends therethrough to divert the solid waste for disposal into the composting space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] These and other features of the invention will become more apparent in the following detailed description in which reference is made to the appended drawings.

[0011] FIG. 1A is a side cross-sectional view of a toilet assembly, according to embodiments of the present disclosure;

[0012] FIG. 1B is a side view of a toilet assembly, according to embodiments of the present disclosure;
FIGS. 2A and 2B are side views of the separation means of a toilet assembly, according to embodiments of the present disclosure;

FIG. 3 is a perspective view of the front end of the separation means of a toilet assembly, according to embodiments of the present disclosure;

FIG. 4 is a top view of a separation means of a toilet assembly, according to embodiments of the present disclosure;

FIG. 5A is a rear end view of the separation means of a toilet assembly, according to embodiments of the present disclosure;

FIG. 5B is a perspective view of a receptacle for liquid waste separated from the separation means shown in FIG. 5A, according to embodiments of the present disclosure;

FIG. 6 is a diagrammatic perspective view of an example of a composting toilet installation, according to embodiments of the present disclosure;

FIG. 7 is a diagrammatic perspective view of a ground level composting toilet installation, according to embodiments of the present disclosure;

FIGS. 8A and 8B are diagrammatic perspective views of ground level composting toilet installation, according to embodiments of the present disclosure;

FIGS. 9A and 9B are diagrammatic perspective views of upper level composting toilet installations, according to embodiments of the present disclosure;

FIGS. 10 is a diagrammatic perspective view of a multi-level composting toilet installations, according to embodiments of the present disclosure;

FIGS. 11A and 11B are diagrammatic top views showing exemplary arrangements of composting zones in a composting space, according to embodiments of the present disclosure;

FIGS. 12A and 12B are diagrammatic top views showing exemplary arrangements of composting zones in a composting space, according to embodiments of the present disclosure;

FIG. 13 is a diagrammatic perspective view of the interior of a composting space, according to embodiments of the present disclosure;

FIG. 14 is a diagrammatic partial side view of a composting space showing a side access door to the composting space, according to embodiments of the present disclosure, and

FIG. 15 is a diagrammatic perspective view of an installed toilet assembly, according to embodiments of the present disclosure, in which the housing has been removed.

DETAILED DESCRIPTION OF THE INVENTION

The adoption of composting toilets raises a number of issues relating to the practicalities of installing and operating composting toilets, particularly for use in urban sites. For example, in most cases the installation and operation of a composting toilet will need to be adaptable to the existing infrastructure of a building, such as a dwelling-house, in terms of spatial efficiency, ease of installation, compatibility with existing building infrastructure, ease of use and maintenance, and accommodation of the needs of the user. These issues are not limited to urban sites but can also arise in more remote sites such as in campgrounds and leisure areas. Accordingly, while exemplary embodiments of the toilet assembly may herein be described in context to urban environments, such as a dwelling-house, it will be understood that the toilet assembly of the present disclosure may be adapted for use in other environments such as rural and industrial sites.

The composting toilet according to embodiments of the present disclosure is designed to be easily adapted for installation and use. The toilet assembly is of a compact design comprising a separation mechanism within the body of the assembly and designed for disposal and composting of waste outside of, and away from, the toilet assembly. In this way, the toilet assembly of the present disclosure is designed for spatial efficiency. According to embodiments of the present disclosure, the compact design of the toilet assembly can accommodate a range of spaces, including the oftentimes small and limited space available in the existing structure of a dwelling-house, for example.

The compact design of the composting toilet assembly of the present disclosure allows the toilet assembly to be easily adaptable to the existing infrastructure of a dwelling-house. In particular, the composting toilet assembly according to certain embodiments of the present disclosure does not require complicated, extensive, retrofitting of an existing infrastructure for its installation and operation. Specifically, according to embodiments of the present disclosure, separation of the liquid waste from the solid waste occurs within the toilet assembly itself and is diverted away from the solid waste for disposal. In certain embodiments, the toilet assembly is connectable to the existing used-water system of an infrastructure. The liquid waste is then diverted to the existing used-water system for disposal. In this way, the toilet assembly of the present disclosure can be made to be compatible with the existing infrastructure of the environment without extensive retrofitting. Because the liquid waste is diverted away from the solid waste and separately disposed, the liquid waste cannot compromise the composting process. Accordingly, the toilet assembly of the present disclosure can accommodate any liquid waste entering the toilet assembly, including cleaning products typically used with regular water-run toilets, without compromising the operation of the composting process.

The separated solids are also separated and diverted away from the toilet assembly within the toilet assembly itself. According to embodiments of the present disclosure, the separated solid waste is diverted to a designated composting space where it is treated using any of the composting methods known to those skilled in the art. In preferred embodiments, the solid waste is treated by vermi-composting and conditions favourable to vermi-composting are maintained within the composting space.

According to embodiments of the present disclosure, the separated solid waste is diverted away from the toilet assembly and to an external composting space for disposal. The composting space, according to certain embodiments, is an airtight enclosure in sealing engagement with the toilet assembly through a wall opening but otherwise separated from the toilet assembly. The composting space is on the ground-level and may be configured to receive solid waste from one or more toilet assemblies. In one embodiment, the composting space is configured to receive solid waste from one toilet assembly. In other embodiments, the composting space is configured to receive solid waste from multiple toilet assemblies.

Being on ground-level facilitates installation of the composting space of the present disclosure and allows for one or more toilets to be accommodated. In this way, the toilet
assembly of the present disclosure is adaptable to the practicalities of a user’s needs where multi-toilet facilities are often desired. As well, the ground-level composting space allows it to be accessible by a toilet assembly from multiple levels. For example, the composting space according to the present disclosure can be accessible from either the ground-level or from a level above. In one embodiment, the composting space is configured to receive solid waste from one or more toilet assemblies located on ground-level. In another embodiment, the composting space is configured to receive solid waste from one or more toilet assemblies located on a level above the composting space. In a further embodiment, the composting space is configured to receive solid waste from one or more toilet assemblies located on ground-level and on a level above the composting space.

Definitions

[0034] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs.

[0035] As used herein, the term “about” refers to an approximately +/-10% variation from a given value. It is to be understood that such a variation is always included in any given value provided herein, whether or not it is specifically referred to.

[0036] The term “vermi-composting”, as used herein, refers to the breakdown of organic matter by the ingestion and digestion of the matter by worms. As well, vermi-composting also includes the collateral biotransformation of such organic matter from the bacterial action inherent in such systems.

[0037] The term “liquid waste” and “solid waste”, as used herein, refers to urine and fecal matter respectively and may further include any liquid or solid waste that may enter the toilet assembly of the present disclosure. For example, without limitation, toilet paper, sanitary products, and cleaning products.

Toilet Assembly

[0038] Referring to FIGS. 1A and 1B, the composting toilet assembly 10 according to embodiments of the present disclosure comprises a housing 50 shaped as a pedestal toilet seat 55 defining a gravity outlet opening 57 for receiving both liquid and solid waste. The housing 50 is sized to house a separating means 20 for separating liquid and solid waste entering the toilet assembly 10 through the outlet opening 57. The separating means 20 is positioned within the housing 50 such that the outlet opening 57 is aligned with the separating means 20 to receive the liquid and solid waste. In some embodiments, the separating means 20 comprises a bowl 90 for directing the liquid and solid waste to the separating means 20 as shown in FIGS. 2A and 2B.

[0039] As shown in FIGS. 2A and 2B, the separating means comprises a sloping conveyor belt 25 actuated by control means 30 and serving to separate the liquid waste from the solid waste by means of gravity. The conveyor belt 25 comprises an endless strip mounted between two rollers designed to rotate so as to move the conveyor belt 25 in an upward direction towards the top end 40 of the belt 25. The conveyor belt 25 is arranged to ensure complete gravitational separation of the liquid waste from the solid waste. The sloping conveyor belt 25 is positioned within the housing 50 at an angle that causes the liquid waste to be diverted to the lower positioned bottom end 35 of the sloping conveyor belt 25 at the front portion of the housing 50 (as indicated by the solid arrow shown in FIG. 2B). Advancement of the conveyor belt 25 by actuating the control means 30 advances the solid waste towards the top end 40 of the sloping conveyor belt 25 located at the opposite rear end of the housing 50 where the solid waste can then be disposed of through a rear opening 60 in the housing (as indicated by the outlined arrow shown in FIG. 2B). In some embodiments, the control means 30 is a mechanically-controlled foot pedal that advances the conveyor belt 25 with each activation of the pedal. In other embodiments, the control means 30 may be power assisted.

[0040] According to some embodiments, the sloping conveyor belt 25 is disposed on a support 75 for positioning the sloping conveyor belt 25 at an incline sufficient for separating and diverting the liquid waste from the solid waste. In one embodiment, the angle of inclination of the conveyor belt 25 is from about 5° to about 45°. In other embodiments, the angle of inclination of the conveyor belt 25 is from about 10° to about 30°. In further embodiments, the angle of inclination of the conveyor belt 25 is from about 15° to about 25°. Due to the incline of the sloping conveyor belt 25, the conveyor belt 25 serves to separate the liquid waste by causing it to flow down the sloping conveyor belt 25 and into a receptacle 45 situated at the bottom end 35 of the conveyor belt 25. The solid waste, on the other hand, is diverted towards the top end 40 of the conveyor belt 25 by actuating the control means 30.

Liquid Waste Disposal

[0041] Liquid waste is collected in the receptacle 45 at the bottom end 35 of the separating means 20. As shown in FIG. 5B, the receptacle 45 is removable from the separating means 20 for ease of cleaning and maintenance. According to embodiments of the present disclosure, the receptacle 45 is connectable to a wastewater disposal system 65 as is commonly found in existing developments (see FIGS. 1A and 5A). The conduit 67 can take a variety of forms suitable for connecting the receptacle 45 to the wastewater disposal system 65 as will be readily ascertainable by the skilled person. In certain embodiments, the conduit 67 can comprise a PVC pipe configured to provide the necessary connection for diverting and disposing of the liquid waste. According to embodiments of the present disclosure, the receptacle 45 can also include an overflow conduit 70 to control liquid waste levels in the receptacle 45. In one embodiment, the overflow conduit 70 is configured to divert overflow liquid waste through the rear opening 60 of the housing 50 (see FIGS. 2A, 2B, and 15).

[0042] In certain embodiments, the separating means 20 will include anti-splash edges 80 to prevent liquid waste from spilling sideways from the sloping conveyor belt 25. In other embodiments, as shown in FIGS. 2A, 2B, 3 and 4), the separating means 20 includes an upper cover 85 for covering the sloping conveyor belt 25. In this way, the liquid and solid waste entering the toilet assembly 10 remain contained until disposal. In preferred embodiments, the separating means 20 includes an upper cover 85 having an opening shaped as a bowl 90 for directing the liquid and solid waste into the separating means 20 (see FIG. 3).

Solid Waste Disposal

[0043] Solid waste that is separated from the liquid waste is diverted towards the top end 40 of the conveyor belt 25 by
advancing the belt 25 with each use. As shown in FIGS. 1A and 1B, the housing 50 comprises a rear opening 60 through which the top end 40 of the sloping conveyor belt 25 extends to allow disposal of the solid waste through the rear opening 60. In a preferred embodiment, the rear opening 60 is in sealing engagement with an enclosed composting space into which the diverted solid waste is disposed.

At the bottom portion of its top end 40, the conveyor belt 25 can have one or more scrapers 95 and 97 as shown in FIG. 1B. Each scraper 95 and 97 is situated on the path of the conveyor belt 25 to detach any solid waste that has stuck to the conveyor belt 25. In this way, the one or more scrapers 95 and 97 serve to clean the conveyor belt 25 with each use. In one embodiment, the separating means 20 comprises one or more scrapers 95 and 97 fixedly positioned at the top end 40 to dislodge solid waste that has stuck to the sloping conveyor belt 25. In another embodiment, the separating means 20 comprises one or more scrapers 95 and 97 that are hingedly fixed to resiliently press against the surface of the sloping conveyor belt 25 during return movement (see FIGS. 2A and 2B).

As shown in FIG. 6, after each use of the toilet the sloping conveyor belt is advanced by the control means 30 to divert or transport the solid waste upwards towards the top end 40 of the conveyor belt, through the rear opening of the housing 50 and into a composting space 100. On reaching the top end 40 of the conveyor belt, the solid waste drops under gravity into the composting space 100, away and separate from the toilet assembly 10 and the washroom 165, where it is treated for composting according to methods known in the art.

Composting Space

According to embodiments of the present disclosure, the composting space 100 is an airtight space located on ground-level. In certain embodiments, as shown in FIG. 7, the composting space 100 can be a room adjacent to the washroom 165 where the toilet assembly 10 is located, and having a door 110 to access the interior of the composting space 100. According to embodiments of the present disclosure, the door 110 of the composting space 100 is sized to allow access into the interior of the composting space 100 for maintenance of the toilet assembly and composting process. In a preferred embodiment, the room has a minimum height allowance to provide entry into the space. In one embodiment, the room has a minimum height allowance of up to about 2 meters to allow entry of an average-sized person into the composting space. In certain embodiments, the composting space 100 is provided with a clean access path 135 (see FIG. 3) for easy access into the interior of the composting space 100 without risk of disturbing the compost while allowing clean passage into the composting space. In other embodiments, as shown in FIGS. 8A and 8B, the composting space 100 can be a smaller space adjacent to the washroom 165 and toilet assembly 100, and having a trap door 112 to access the interior of the composting space 100. In such smaller composting spaces, the trap door 112 is positioned to allow a minimum height allowance of at least about 70 cm above the height of the toilet assembly 10. As shown in FIG. 8B, the composting space 100 can be lowered below the level of the toilet assembly 10 to increase the capacity of the composting space 100 to accommodate more frequent usage. For example, in certain embodiments, the composting space 100 can be lowered by at least about 40 cm below the level of the toilet assembly 10. In other embodiments, as shown in FIG. 14, a side access door 140 may be provided for directly accessing the top end 40 of the conveyor belt from the outside for easy maintenance of the conveyor belt without needing to open the door of the composting space.

The ground-level location of the composting space 100 provides versatile options for installation of the toilet assembly 10 of the present disclosure. For example, as shown in FIGS. 8A and 8B, toilet assembly configurations can include one or more toilet assemblies installed on ground-level. FIGS. 9A and 9B, depict further embodiments in which a toilet assembly is installed on levels above the composting space 100. In still further embodiments, as shown in FIG. 10, configurations can include more than one toilet assembly 10 located on different levels, for example, on an upper level above the composting space 100 and on ground-level adjacent to the composting space 100.

Referring to the embodiments illustrated in FIGS. 9A and 9B, for example, toilet assemblies 10 located at an upper level above the composting space 100 may include an extension 103 having an open connection 107 with the composting space 100 located on the ground-level, in order to accommodate a toilet assembly 10 on the upper level. As shown, the extension 103 can be adapted to a composting space 100 designed to be directly below the washroom 160 (FIG. 9A) as well as in cases where the composting space 100 is behind the washroom 160 as shown in FIG. 9B.

In embodiments comprising multi-level toilet assemblies, as shown in FIG. 10 for example, it will be important to ensure that solid waste discharged from the toilet assembly 10 located in the upper level washroom 160 does not interfere with the operation of the toilet assembly 10 located in the ground-level washroom 165. Specifically, it will be important to configure the respective conveyor belts 40 extending into the composting space 100 such that solid waste discharged from the upper level does not collect on the ground-level conveyor belt 40. In one embodiment, the lengths of the respective conveyor belts can be adjusted to avoid such interference in operation. For example, the upper level conveyor belt can be longer in length than the ground-level conveyor belt so as to allow solid waste to be discharged beyond the ground-level belt. In a further embodiment, as shown in FIG. 10, a chute 150 can be positioned between the upper and lower levels to further direct the solid waste discharged from the upper level away from the ground-level conveyor belt.

In order to maintain optimal conditions for composting the solid waste, the composting space 100 is airtight. Accordingly, irrespective of the particular configuration, access to the composting space 100 by each toilet assembly 10 is through a corresponding wall opening 105 sized for sealing engagement with the rear opening 60 of each toilet assembly 10.

Embodiments of the present disclosure may include accessories for improving the operation of the assembly. For example, managing the generation of odours emanating from the assembly can be included in certain embodiments. The composting space 100 can further include means for managing odours emanating from the solid waste. Air constantly circulates from the toilet assembly 10 to the composting space 100 where it is then evacuated to the exterior. In one embodiment, the composting space 100 can include a ventilation system such as an air duct 115 (see FIG. 6) running
from the composting space 100 to the exterior environment. In such embodiments, the air duct can include a fan for circulating the air. In other embodiments, the ventilation system can be joined with the air-evacuation system of the existing infrastructure. In further embodiments, the attraction of flies in the assembly may be managed by including a fly trap in certain embodiments.

While the composting toilet assembly of the present disclosure can be adapted for composting the solid waste using a variety of known methods known in the art, in a preferred embodiment, the composting toilet assembly is adapted for vermi-composting of the solid waste. Accordingly, in such embodiments, the composting space comprises conditions suitable for vermi-composting of solid waste disposed into the composting space. Conditions required for vermi-composting is within the knowledge of persons skilled in the art.

In embodiments in which vermi-composting is relied on for composting the solid waste, the ground surface area of the composting space 100 must be designed to facilitate the composting process and reduce maintenance frequency. In certain embodiments, the ground surface area of the composting space is about 4 meters². In other embodiments, the ground surface area of the composting space is adjusted to accommodate the frequency of use of the toilet assembly and the corresponding volume of solid waste expected to be processed. In preferred embodiments, the ground surface of the composting space 100 is divided into three separate zones (see FIGS. 11A, 11B, 12A and 12B) corresponding to zone A 120, located directly underneath the top end 40 of the conveyor belt 25 where the fresh solid waste initially falls into the composting space 100; zone B 125, occupied by solid waste undergoing the first phase of composting, i.e., drying of the solid waste; and zone C 130, occupied by solid waste that has fully composted and is ready for removal and use. As illustrated in FIGS. 11A, 11B, 12A and 12B, the configuration of the ground surface can take a variety of forms that can be designed for compatibility with the existing infrastructure of the site. In alternative embodiments, the composting space 100 may be configured to include additional zones to accommodate for frequent usage and large production volumes of solid waste. For example, as shown in FIG. 11B, the composting space 100 can include an additional zone B 126.

In operation, vermi-composting of the solid waste is achieved by moving the solid waste through the zones as the solid waste undergoes the different phases of composting. For example, as shown in FIG. 11A, fresh solid waste is disposed into the composting space 100 through the wall opening by falling directly from the top end 40 of the conveyor belt into zone A 120. The solid waste in zone A 120 is moved to zone B 125 where worms are introduced to begin the composting process. In certain embodiments, and depending on the amount of solid waste to be composted, about two dozen worms are introduced into the solid waste occupying zone B to begin the composting process. Material in zone B 125 and/or C 130 is allowed to then undergo vermi-composting after which the material is moved to zone C 130 where it is kept for storage until use. The material may be manually moved through the zones using an appropriate tool such as a shovel or a rake. Cycling of the material through the zones is carried out after sufficient time is allowed to vermi-compost the solid waste. The amount of time required for vermi-composting and the frequency of cycling through the zones will depend on the frequency of usage and is within the knowledge of persons skilled in the art to determine.

As is known in the art of vermi-composting, sufficient moisture conditions are needed in order to maintain the worms. According to embodiments of the present disclosure, moisture conditions are maintained by introducing sufficient amounts of water into the composting space 100 at zones B 125 and/or C 130 to maintain the necessary moisture levels and humidity for vermi-composting. In certain embodiments, the dampened zones may require covering with plastic or straw to maintain the humidity essential for the earthworms.

The disclosures of all patents, patent applications, publications and database entries referenced in this specification are hereby specifically incorporated by reference in their entirety to the same extent as if each such individual patent, patent application, publication and database entry were specifically and individually indicated to be incorporated by reference.

Although the invention has been described with reference to certain specific embodiments, various modifications thereof will be apparent to those skilled in the art without departing from the spirit and scope of the invention. All such modifications as would be apparent to one skilled in the art are intended to be included within the scope of the following claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A composting toilet assembly comprising:
   a separating means for separating liquid and solid waste entering the toilet assembly, the separating means comprising a sloping conveyor belt actuated by control means and serving to separate the liquid waste from the solid waste by means of gravity, wherein the liquid waste is diverted to a bottom end of the sloping conveyor belt and the solid waste is diverted to a top end of the sloping conveyor belt;
   a receptacle attachable at the bottom end of the sloping conveyor belt for collecting the diverted liquid waste for disposal; and
   a housing shaped as a pedestal toilet seat and sized to house the separating means, wherein the toilet seat comprises an opening aligned with the sloping conveyor belt through which the liquid and solid waste enters the toilet assembly, and wherein the housing further comprises a rear opening through which the top end of the sloping conveyor belt diverts the solid waste for disposal away from the toilet assembly.

2. The composting toilet assembly according to claim 1, wherein the receptacle is connectable to a wastewater disposal system for disposing the diverted liquid waste.

3. The composting toilet assembly according to claim 1, wherein the receptacle comprises an overflow conduit for diverting overflow liquid waste through the rear opening of the housing.

4. The composting toilet assembly according to claim 1, wherein the sloping conveyor belt is disposed on top of a support for positioning the sloping conveyor belt at an incline sufficient for diverting the liquid waste from the solid waste.

5. The composting toilet assembly according to claim 1, wherein the sloping conveyor belt comprises anti-splash edges.
6. The composting toilet assembly according to claim 1, wherein the sloping conveyor belt comprises an upper cover with an opening aligned with the toilet seat for receiving the liquid and solid waste.

7. The composting toilet assembly according to claim 6, wherein the opening of the upper cover comprises a bowl for directing the liquid and solid waste to the separating means.

8. The composting toilet assembly according to claim 1, wherein the sloping conveyor belt comprises one or more scrapers fixedly positioned at the top end to dislodge solid waste that has stuck to the sloping conveyor belt.

9. The composting toilet assembly according to claim 8, wherein the one or more scrapers are hingedly fixed to resiliently press against the surface of the sloping conveyor belt during return movement.

10. The composting toilet assembly according to claim 1, wherein the sloping conveyor belt is actuated by a mechanical foot pedal.

11. The composting toilet assembly according to claim 1, wherein the top end of the sloping conveyor belt extends through the rear opening of the housing and into a composting space into which the diverted solid waste is disposed.

12. The composting toilet assembly according to claim 11, wherein the composting space is an airtight room accessed by the top end of the conveyor belt through a wall opening, the wall opening being in sealing engagement with the rear opening of the housing.

13. The composting toilet assembly according to claim 12, wherein the composting space is adjacent to the toilet assembly.

14. The composting toilet assembly according to claim 12, wherein the composting space is below the toilet assembly.

15. A composting toilet installation comprising:
   an airtight composting space having at least one wall opening;
   and
   one or more toilet assemblies, each toilet assembly comprising:
   a separating means for separating liquid and solid waste entering the toilet assembly, the separating means comprising a sloping conveyor belt actuated by control means and serving to separate the liquid waste from the solid waste by means of gravity, wherein the liquid waste is diverted to a bottom end of the sloping conveyor belt and the solid waste is diverted to a top end of the sloping conveyor belt;
   a receptacle attachable at the bottom end of the sloping conveyor belt for collecting the diverted liquid waste for disposal; and
   a housing shaped as a pedestal toilet seat and sized to house the separating means, wherein the toilet seat comprises an opening aligned with the sloping conveyor belt through which the liquid and solid waste enters the toilet assembly, and wherein the housing further comprises a rear opening through which the top end of the sloping conveyor belt diverts the solid waste for disposal;
   wherein the rear opening of each toilet assembly is in sealing engagement with the wall opening of the airtight composting space and the top end of the conveyor belt extends therethrough to divert the solid waste for disposal into the composting space.

16. The composting toilet installation according to claim 15, wherein the composting space comprises conditions suitable for vermi-composting of solid waste disposed into the composting space.

17. The composting toilet installation according to claim 16, wherein the composting toilet installation comprises one toilet assembly, the toilet assembly installed adjacent to the composting space.

18. The composting toilet installation according to claim 17, wherein the composting toilet installation comprises one toilet assembly, the toilet assembly installed above the composting space.

19. The composting toilet installation according to claim 18, wherein the composting toilet installation comprises one toilet assembly installed above the composting space and another toilet assembly installed adjacent to the composting space.

20. The composting toilet installation according to claim 19, wherein the composting space comprises a door opposite from the wall opening to provide access to the composting space.

21. The composting toilet installation according to claim 20, wherein the composting space comprises an air circulation means for evacuating air to the exterior of the composting space.

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