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(54) **IMPROVED INTERNMENT SYSTEM**

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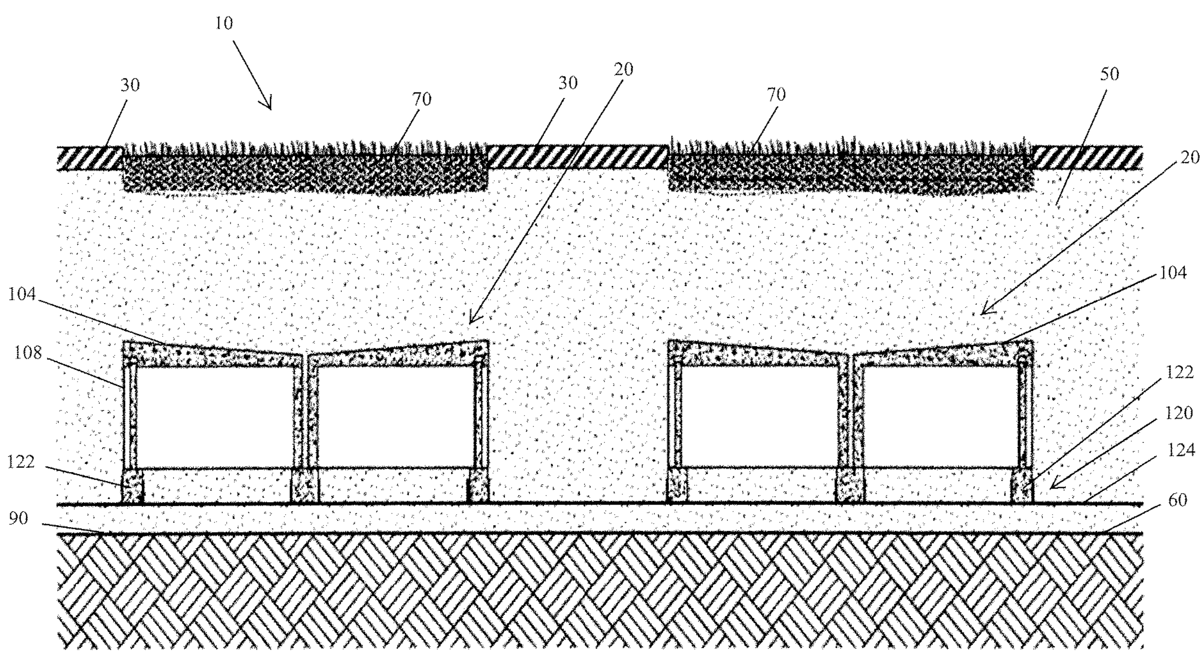
(57) **ABSTRACT**

A system for renewable interment and improved body decomposition, comprising: a vault assembly comprising at least one reusable vault mounted on a raft; the at least one reusable vault comprising a respective removable access wall wherein the removable access wall is selectively removable from the vault to allow access for reuse; wherein the raft comprises at least one footing structure adapted to underlie the at least one reusable vault such that the ground on which the footing structure rests is adapted to function as the floor of the reusable vault; and a porous granular material adapted to at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the at least one reusable vault.



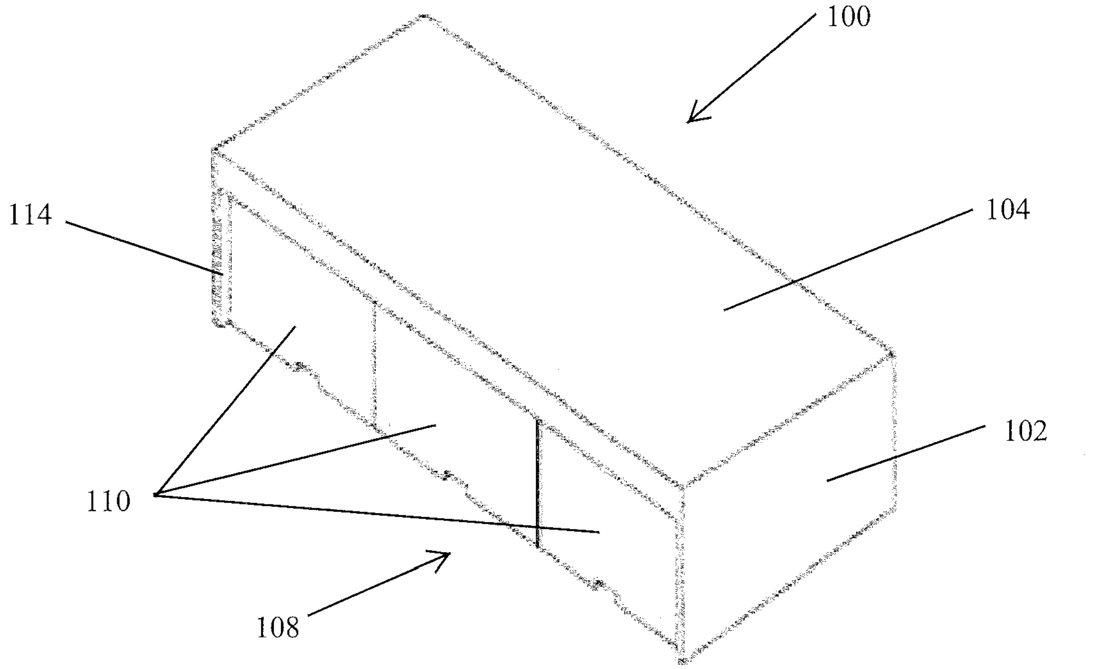


FIGURE 1

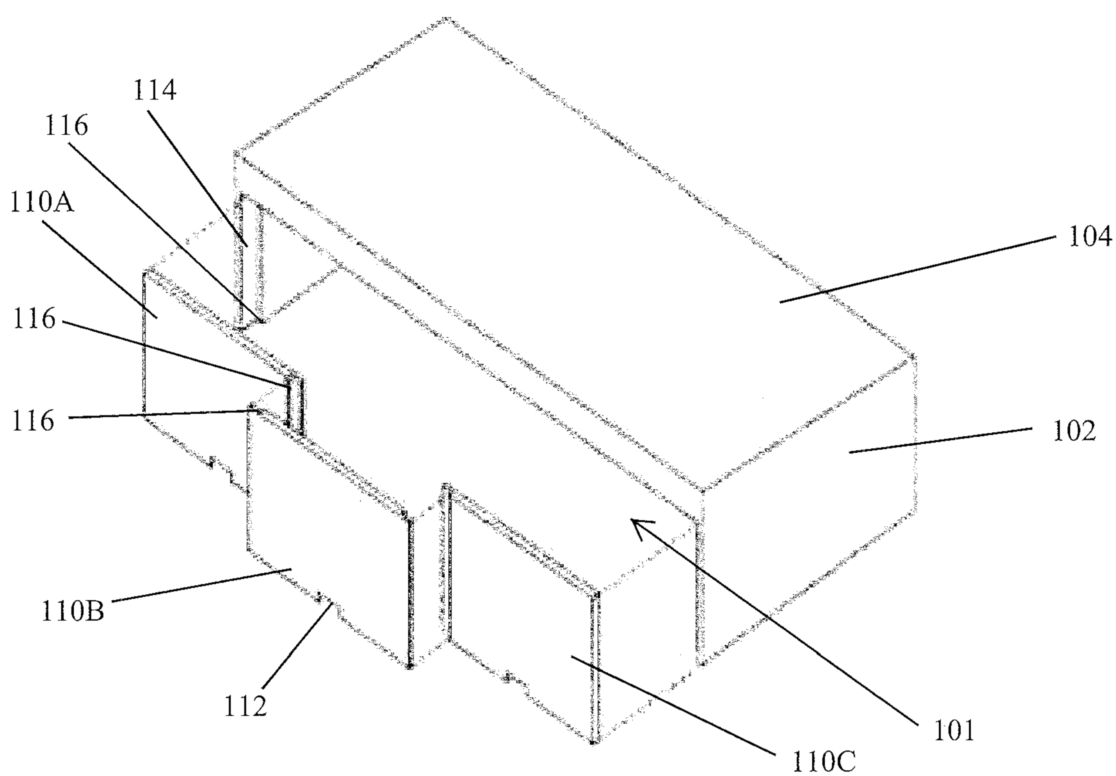


FIGURE 2

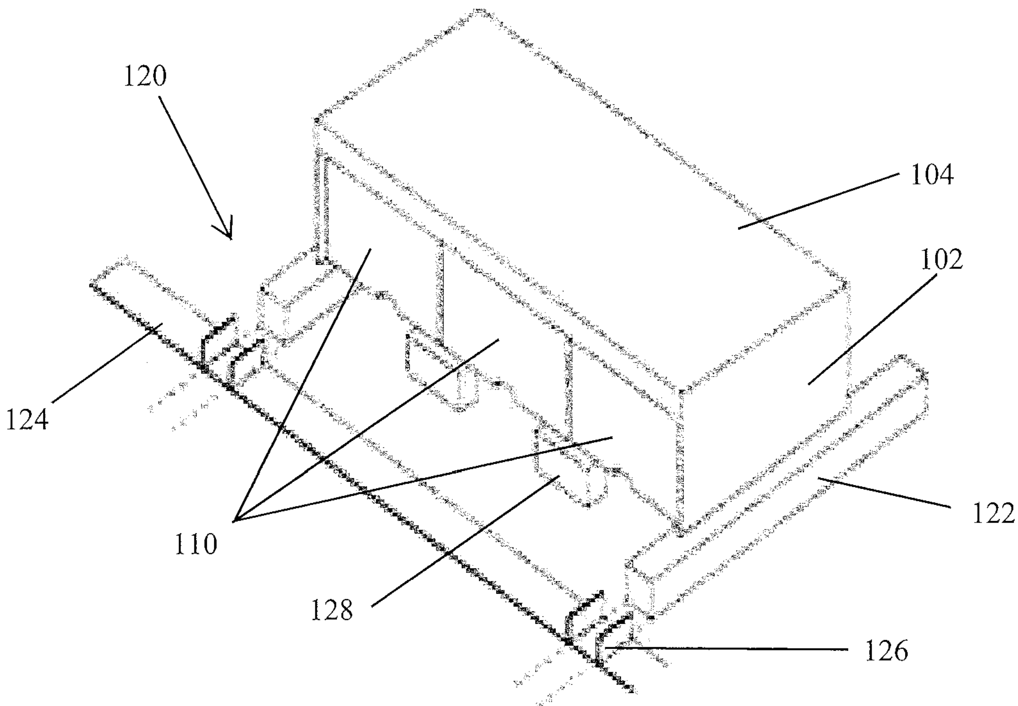


FIGURE 3A

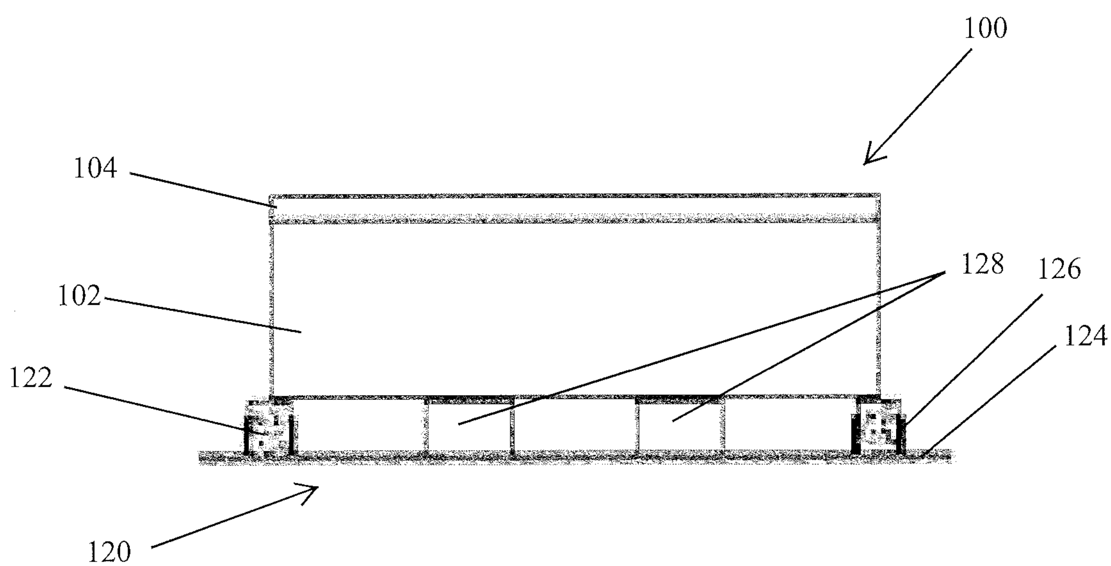


FIGURE 3B

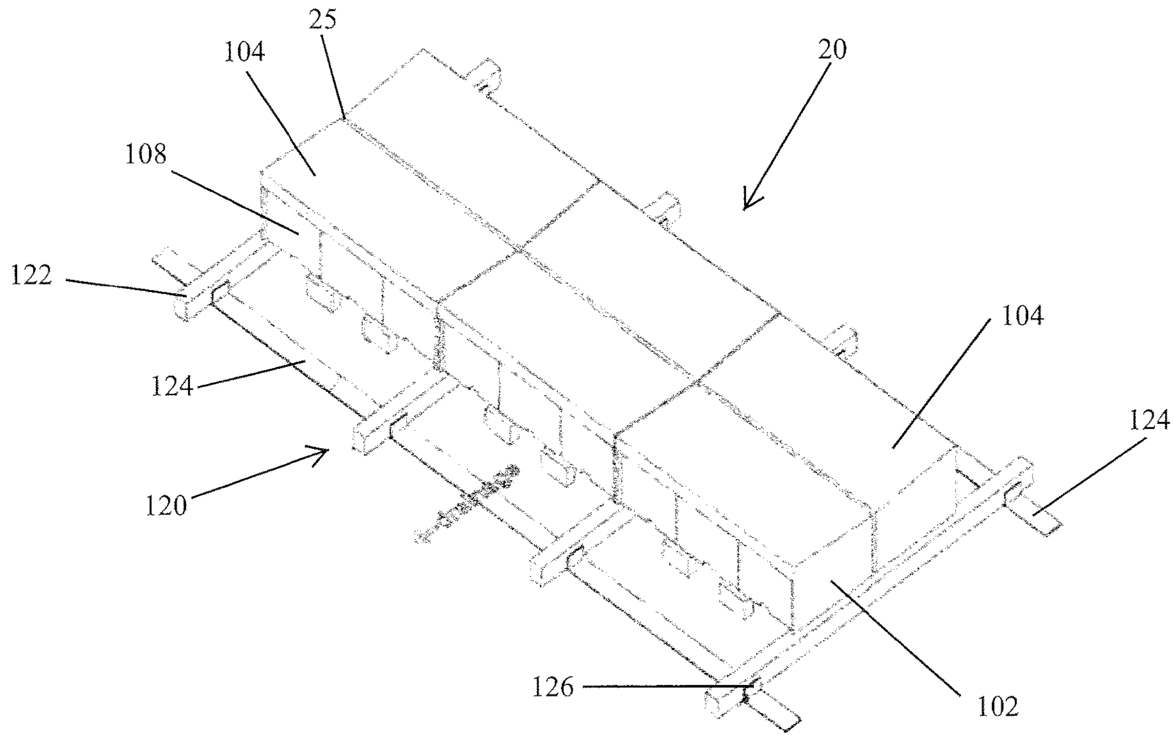


FIGURE 4

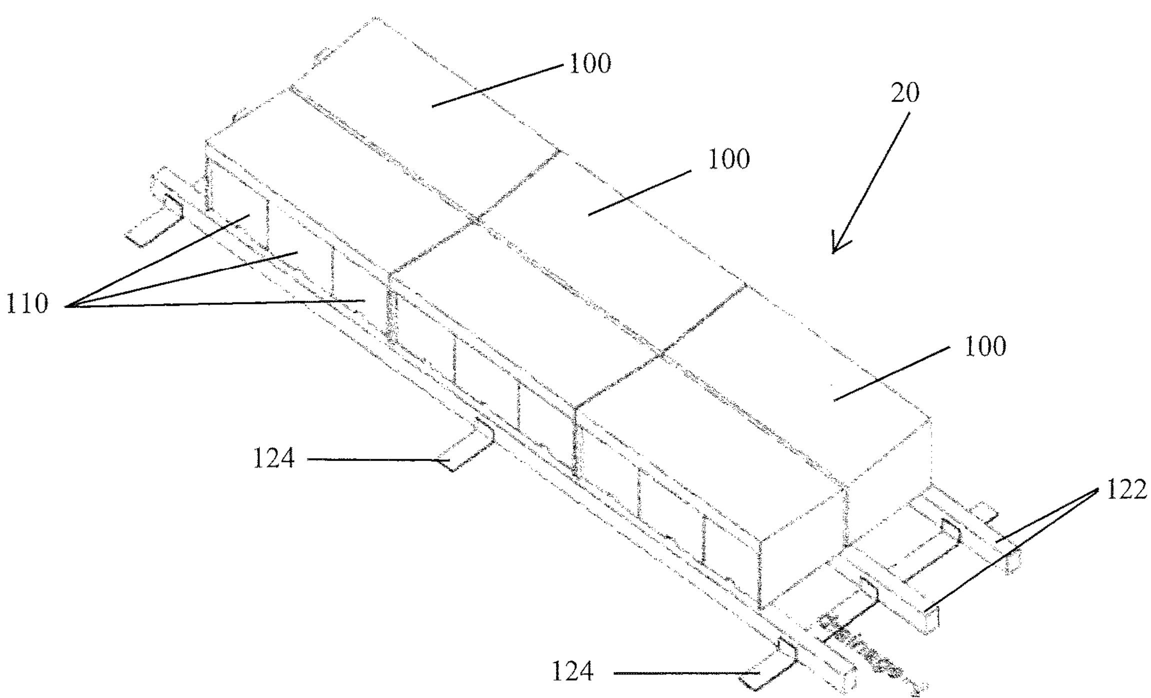


FIGURE 5

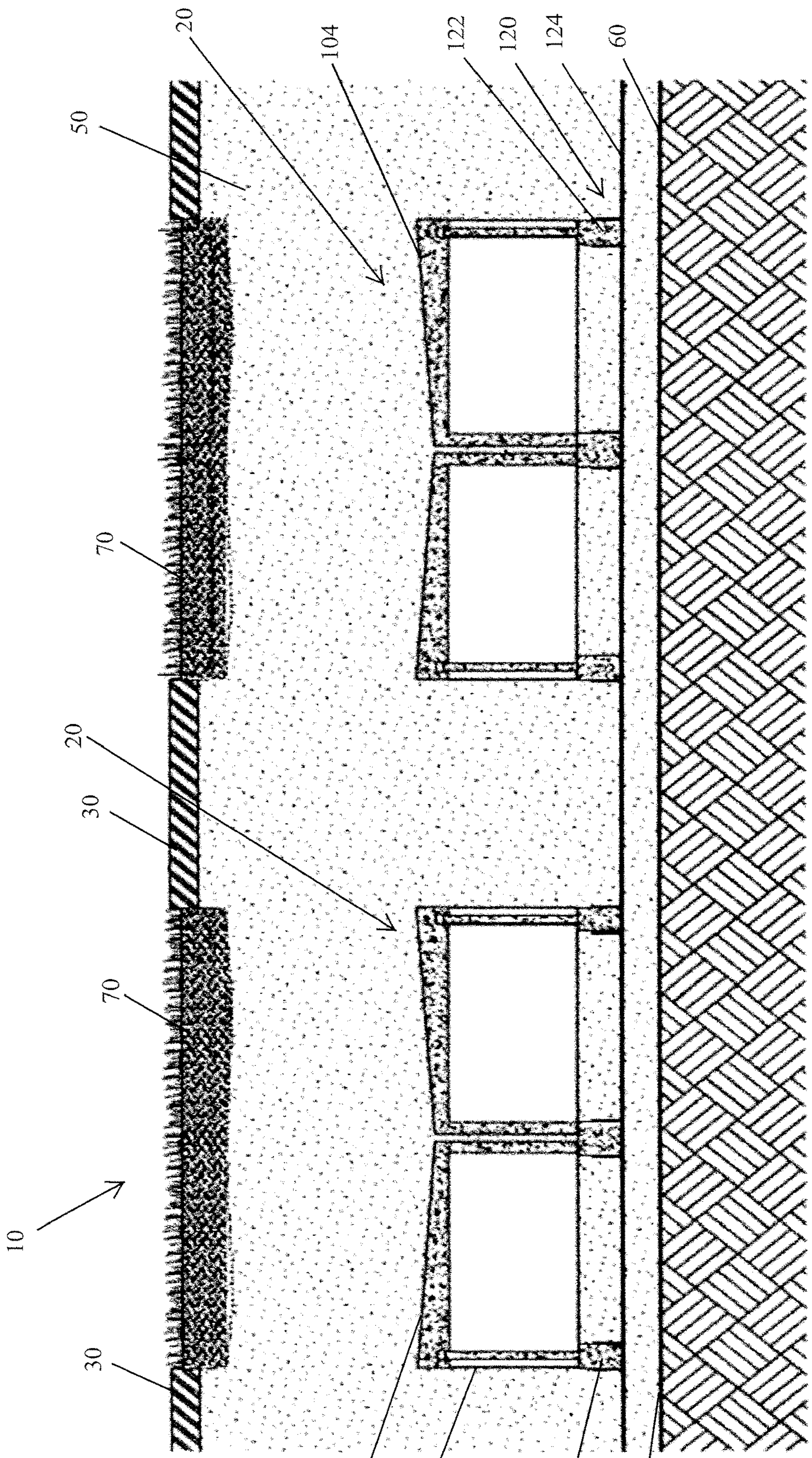


FIGURE 6A

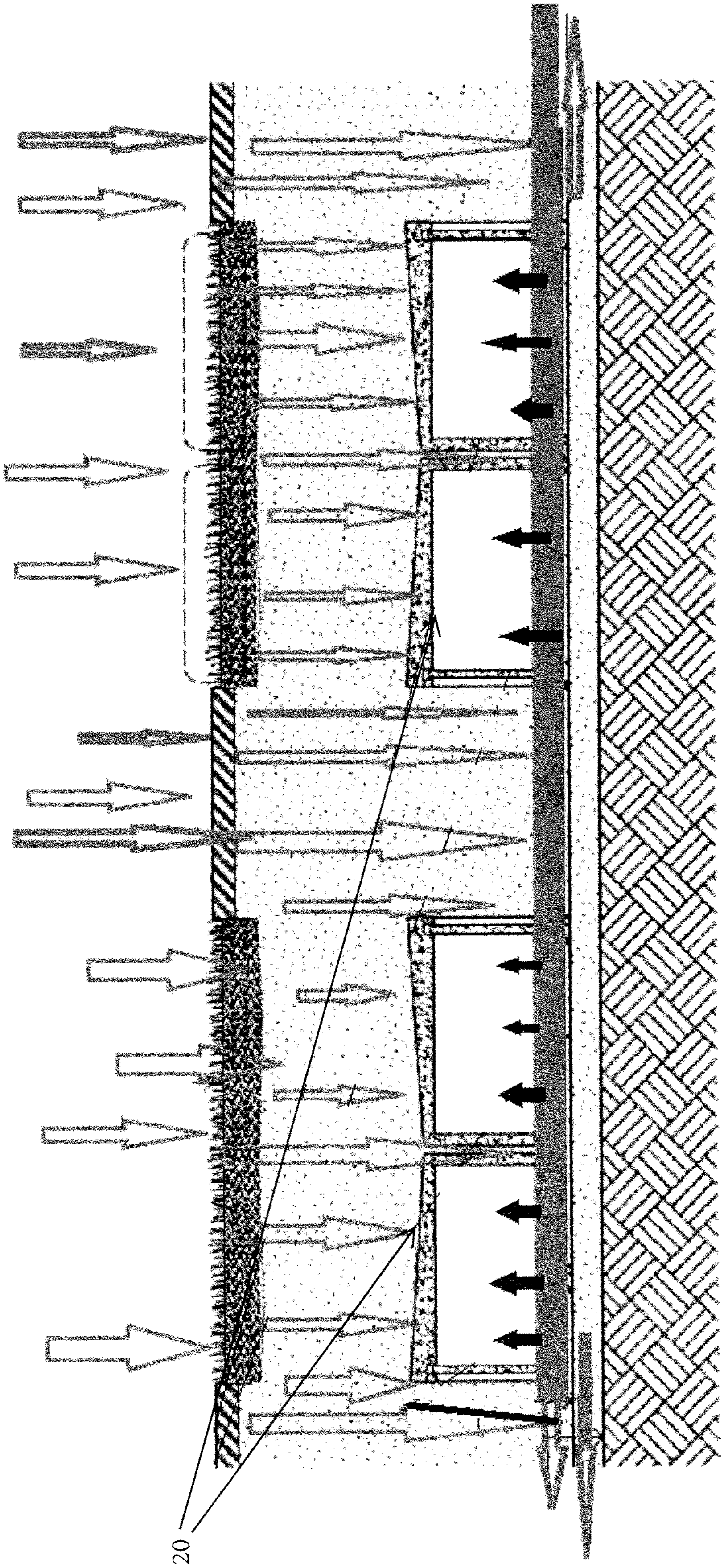


FIGURE 6B

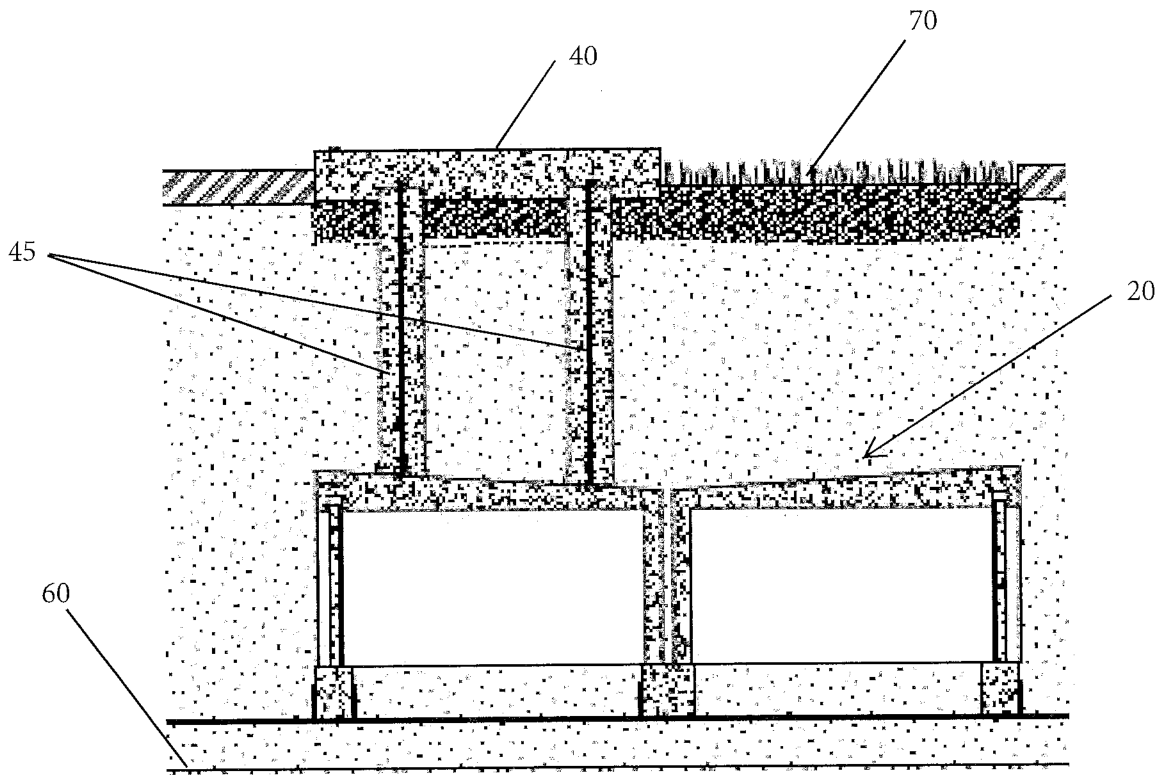


FIGURE 6C

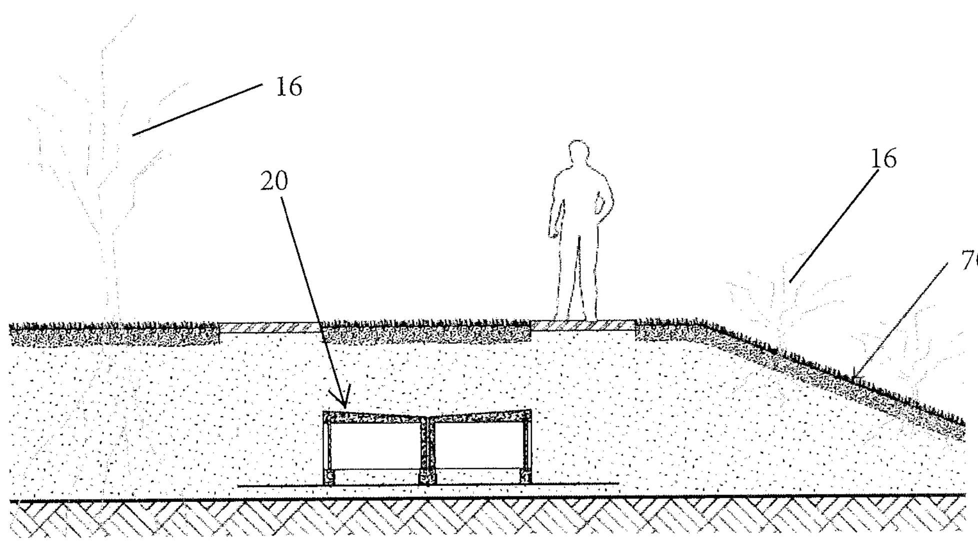


FIGURE 6D

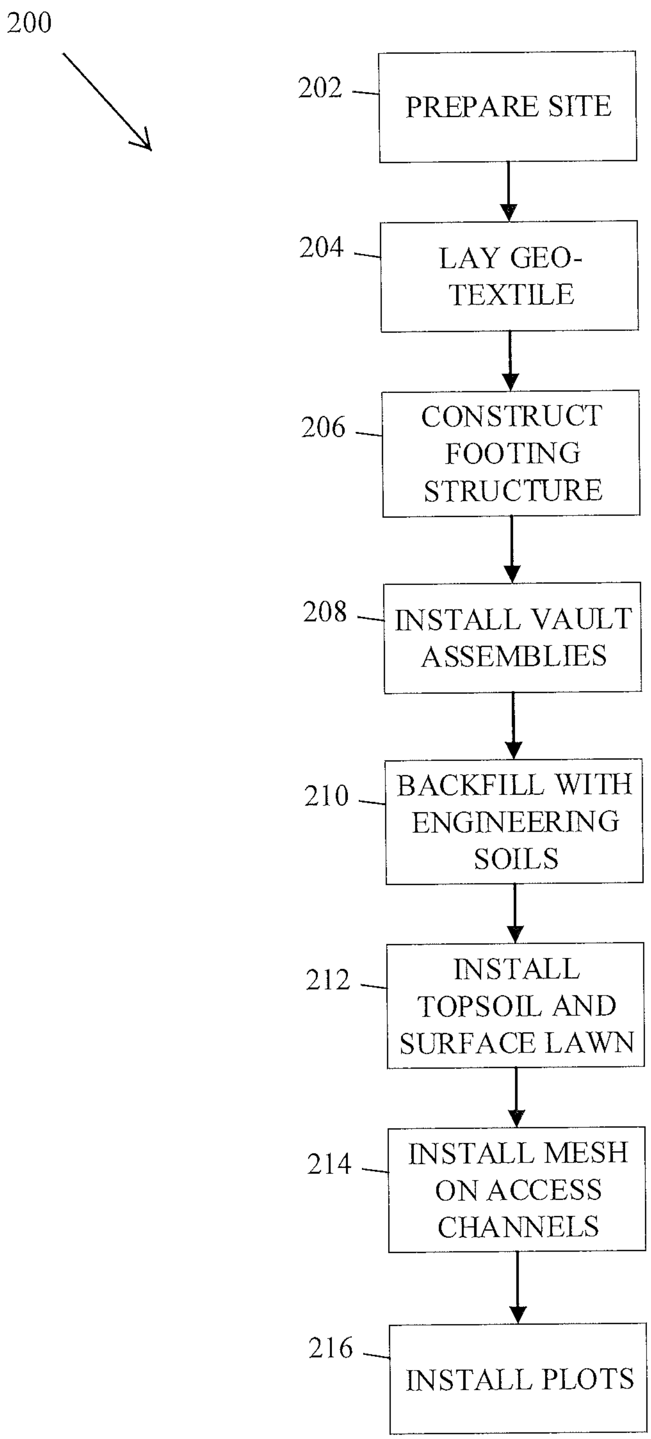

200
202
PREPARE SITE
204
LAY GEO-TEXTILE
206
CONSTRUCT FOOTING STRUCTURE
208
INSTALL VAULT ASSEMBLIES
210
BACKFILL WITH ENGINEERING SOILS
212
INSTALL TOPSOIL AND SURFACE LAWN
214
INSTALL MESH ON ACCESS CHANNELS
216
INSTALL PLOTS

FIGURE 7

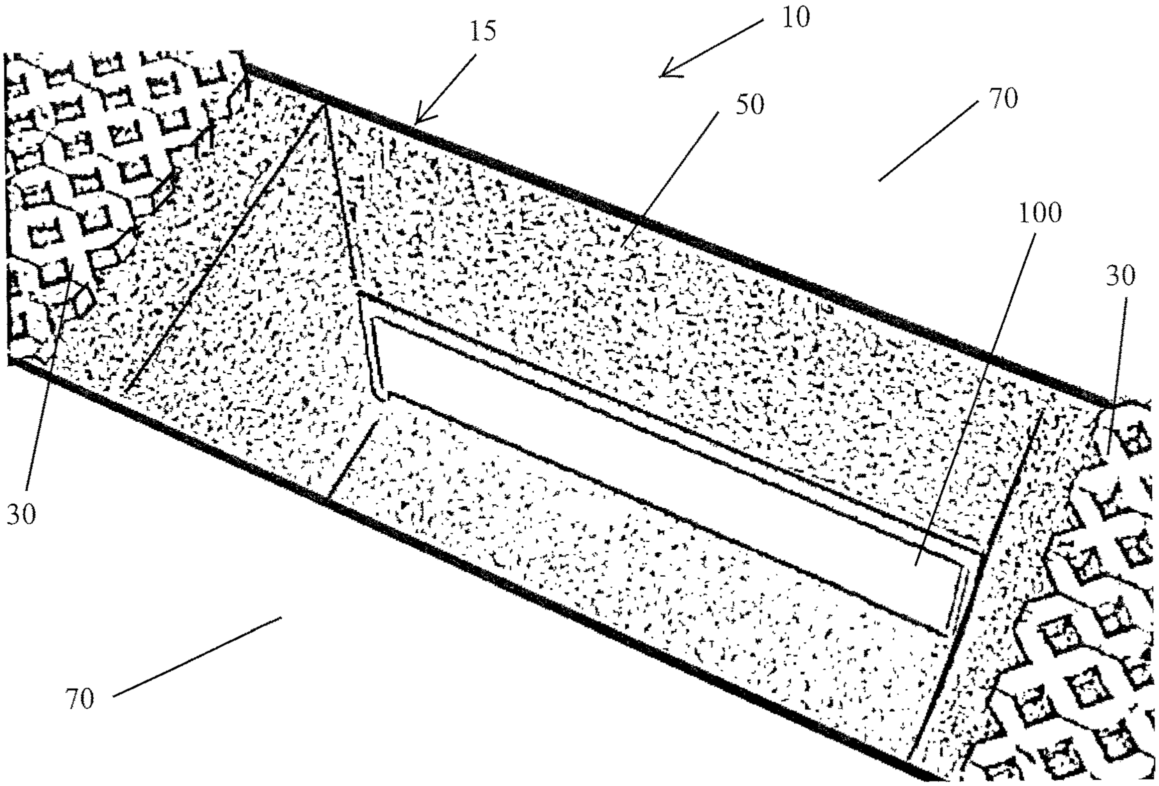


FIGURE 8

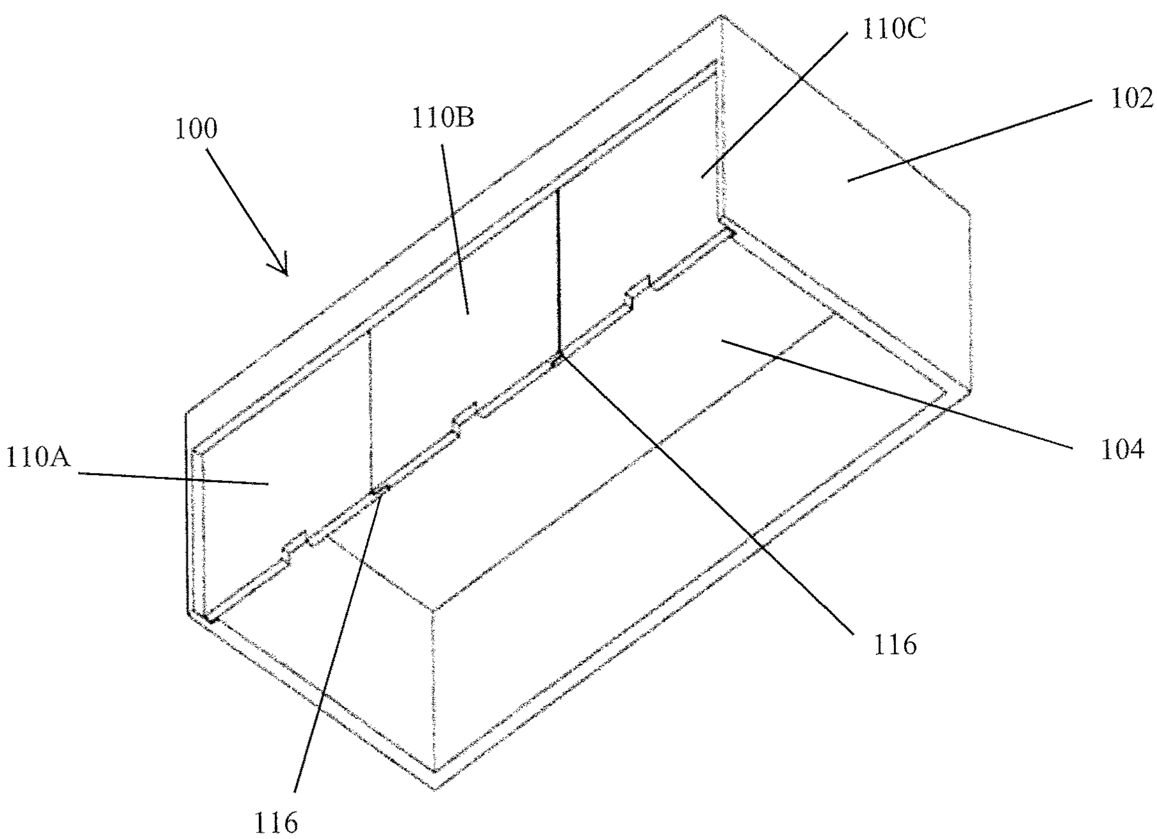


FIGURE 9

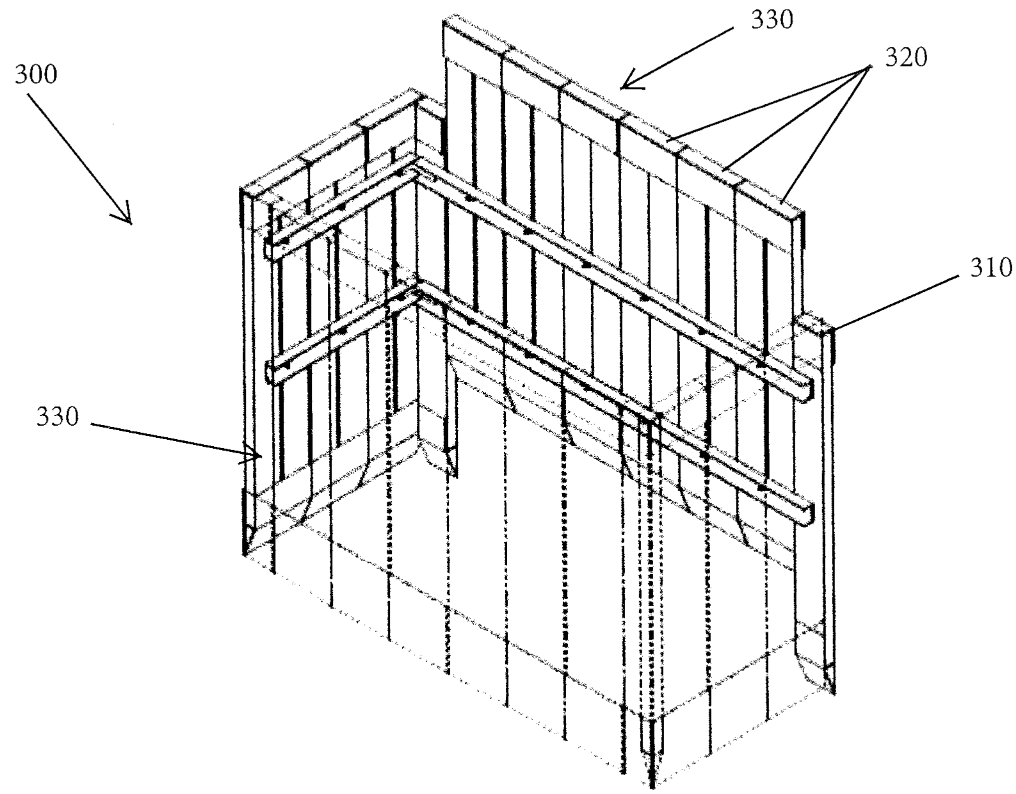


FIGURE 10

IMPROVED INTERNMENT SYSTEM

TECHNICAL FIELD

[0001] The present invention relates to an improved interment system. More particularly, the present invention is directed towards an interment system which is renewable, sustainable and/or affordable and improves body decomposition.

BACKGROUND

[0002] There are two common methods of care used in relation to deceased persons; burials and cremation. However, cremation services may not be suitable for a particular religion, or may be undesired, but due to shortages in grave plots availability and the high cost of burials customers are opting for cremation as alternative method. As such, traditional in ground burials are still a common method for laying to rest a deceased person., and in fact this may be the only methods for specific religions.

[0003] There are also two common type of burials methods; in a coffin and out of coffin, in-coffin type of burial is a deceased person lay to rest in a coffin, in bottom of the trench and soil is backfilled. In contrast, out of coffin requires that the deceased person be wrapped in cloth (shroud) and lay to rest in pre-built chamber (tomb). Irrespective of the type of burial performed, cemetery land is consumed and the cost liability of long term maintenance is incurred.

[0004] However, with growing populations and larger numbers of deceased persons annually, the space for which to bury these persons is increasingly becoming more and more scarce and therefore more expensive. Further, as population increases within popular cities and suburban areas through high density living, no expansion planning to cemeteries to equal population growth, this has put a strain on old and existing cemeteries to keep up with demand and in fact, cemeteries with high populated cities and suburban areas are closed or facing closure.

[0005] It is common practice by cemetery operators in some countries to revive and prolong the life of cemeteries by re-using grave plots. This practice poses many health, ethical and environmental challenges, due to partially decomposed human bodies. This is despite the fact that the buried human bodies are decades old. To re-use a grave plot, partially decomposed bodies are exhumed and buried deeper to make room for new human remains. This practice is likely to increase soil and groundwater pollution as referred to in the 1998 World Health Organisation report EURICP/EHNA 01 04 01(A). Human body remains can take up to 100 years to fully decompose, pending type of soil, porosity, oxygen, temperature and coffin type. The practice of re-using grave plots is deemed to be unsustainable in most conditions and can often exacerbate the problem.

[0006] The most common form of burial is a trench burial system in which a vertical trench is dug and a casket can be placed in the bottom of the trench. Another, less used, form of burial is an Al-Lahad type burial, in which a trench is dug in an L shape which comprises a vertical trench and a portion of the wall is undercut allowing for placement in the undercut portion of the trench.

[0007] Currently, some countries are wrapping bodies with plastics and using plastic for the inner lining of coffins or other similar materials to improve hygiene when handling the body or being near to the body up until burial. This has also been found to drastically decrease the decomposition times after burial.

[0008] Another system currently proposed to deal with the increasing deceased and the reduced cemetery spacing is to construct high-rise structures which can accommodate a plurality of caskets. In this way these structures are more similar to above-group crypts, however these structures are incredibly expensive and again may not be desired by particular cultures or religion and neither satisfies tradition “dust to dust” beliefs. Further, the time required to construct these above ground structures is significant and may not effectively deal with growing numbers of deceased, and therefore not a sustainable permanent solution.

[0009] There are also systems which allow for stacking caskets to be mounted on each other to form a stacked burial arrangement. Such a stacked burial arrangement is discussed in U.S. Pat. No. 3,230,674 which discloses a combination burial liner and vault and method of burial. This particular device does not resolve the problems faced with common systems, as the device does not promote decomposition of a body, but rather would increase the time for decomposition.

[0010] As such, there is a need to resolve the consumption of cemetery space, and also improve current systems for burials. There may also be a need for a more effective interment system which is more sustainable relative to known systems.

[0011] Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

SUMMARY

Problems to be Solved

[0012] It may be advantageous to provide for an improve interment system which allows for faster body decomposition.

[0013] It may be advantageous to provide for a burial system which may allow for re-use of a plot after burial.

[0014] It may be advantageous to provide for a burial system which reduces potential health risks.

[0015] It may be advantageous to provide for a system which assists with decomposition of a body which has been buried.

[0016] It may be advantageous to provide for a system which reduces the need for expanding cemeteries.

[0017] It may be advantageous to provide for a sustainable burial system which may reduce the use of resources.

[0018] It may be advantageous to provide an affordable burial system in accordant with different cultures, tradition or beliefs.

[0019] It may be advantageous to provide one resting place for family present and future members.

[0020] It may be advantageous to minimize or reduce cemeteries up-keep and ongoing maintenance cost.

[0021] It may be advantageous to minimize and eliminate water and soil contamination.

[0022] It may be advantageous to eliminate the need to dispose contaminated soils left over from digging a grave plot.

[0023] It may be advantageous for families to know that their loved one is NOT submerged in water and body partially preserved.

[0024] It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

Means for Solving the Problem

[0025] In a first aspect there may be provided a system for renewable interment and improved body decomposition, the system comprising a vault assembly comprising at least one reusable vault mounted on a raft; the at least one reusable vault comprising a respective removable access wall, wherein the removable access wall is selectively removable from the vault to allow access for reuse; wherein the raft comprises at least one footing structure adapted to underlie the at least one reusable vault such that the ground on which the footing structure rests is adapted to function as the floor of the reusable vault; and a porous granular material adapted to at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen- carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the at least one reusable vault.

[0026] Preferably, the fluid drains through the porous granular material towards the bottom of the vault. In a preferred embodiment, the system comprises a plurality of reusable vaults. The vaults of the vault assembly preferably comprise two side walls, a rear wall and a ceiling which are integrally formed and define a vault receptacle, wherein the vaults are constructed without a floor. The vault and raft may be wholly buried by the porous granular material. In a preferred embodiment, the porous granular material is an engineering soil fill.

[0027] The removable access wall of the vault may comprise a plurality of panels and at least one access means. The footing structures can be retained in a predetermined spacing by a spacer, further comprising retaining flanges in which the footing structures are mounted. The ceiling of the reusable vault may be tapered towards the rear wall to direct liquids away from the removable wall. A lip can be provided in the vault to mount the removable access wall. In a preferred embodiment, the raft elevates the vault above a natural ground level. The oxygen-carrying fluid can be water, such as rain water.

[0028] In another aspect, there may be provided a system for renewable interment and improved body decomposition, the system comprising; a vault assembly comprising at least one reusable vault mounted on a raft, the at least one reusable vault comprising two side walls and a ceiling defining a receptacle; the reusable vault further comprising at least one removable access wall to allow access to the receptacle for reuse; wherein the walls are supported on at least one footing of the raft, and wherein the at least one footing is retained in a predetermined position by at least one spacer; and wherein a porous granular material is adapted to at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the reusable vault.

[0029] Preferably, the system comprises a plurality of reusable vaults. The spacers may be perpendicular to the footings; and the vault may further comprise a rear wall which opposes the removable access wall. The removable wall may comprise a plurality of panels.

[0030] In a further aspect, there may be provided a method for constructing a renewable interment and improved body decomposition system, the method comprising; mounting a footing structure on a ground surface; fixing at least one reusable vault to the footing structure to form a vault assembly in which a bottom of the reusable vaults is exposed to the raft; burying at least a portion of the vault assembly with a porous granulated engineering soil so as to at least at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the reusable vault; and installing a topsoil section over the engineering soil relatively above the vault assembly.

[0031] The footing is preferably mounted on a geotextile on the ground surface to minimize loss or integration of the porous granulated engineering soil into natural ground. A plurality of vault assemblies are preferably constructed in parallel in which respective topsoil sections are installed relatively above respective vault assemblies of the plurality of vault assemblies, and at least one pathways is constructed between the topsoil sections. The pathways may be removable such that a trench can be excavated to install a resident into the vault assemblies.

[0032] In the context of the present invention, the words "comprise", "comprising" and the like are to be construed in their inclusive, as opposed to their exclusive, sense, that is in the sense of "including, but not limited to".

[0033] The invention is to be interpreted with reference to the at least one of the technical problems described or affiliated with the background art. The present aims to solve or ameliorate at least one of the technical problems and this may result in one or more advantageous effects as defined by this specification and described in detail with reference to the preferred embodiments of the present invention.

BRIEF DESCRIPTION OF THE FIGURES

[0034] FIG. **1** illustrates an isometric view of an embodiment of a vault for an interment system which is adapted to house a casket or body;

[0035] FIG. **2** illustrates an exploded view of FIG. **1** in which the access panels of the vault are removed;

[0036] FIG. **3**A illustrates an isometric view of an embodiment of an interment system footing and drainage system for excess water runoff;

[0037] FIG. **3**B illustrates a side of the embodiment of FIG. **3**A;

[0038] FIG. **4** illustrates an isometric view of an embodiment of a drainage system based on natural landscaping for use with the interment system;

[0039] FIG. **5** illustrates an isometric view of an embodiment of another drainage system based on natural landscaping for use with the interment system;

[0040] FIG. **6**A illustrates an embodiment of an interment system installed above a natural ground level;

[0041] FIG. **6**B illustrates an embodiment which shows rain water flow and oxygen supply to inner vaults;

[0042] FIG. **6**C illustrates an embodiment of a system and monuments with soil stability support;

[0043] FIG. **6**D illustrates an embodiment of soil retention plantation means for water absorbent and sand stability support;

[0044] FIG. **7** is a flowchart an embodiment for installation of the system;

[0045] FIG. **8** illustrates an isometric view of an embodiment of the system in which a trench has been excavated to access a vault;

[0046] FIG. **9** illustrates a bottom view of an embodiment of a vault with a plurality of access panels; and

[0047] FIG. **10** illustrates an example of a shoring cage used when excavating, which may be used in a trench such as that exemplified in FIG. **8**.

DESCRIPTION OF THE INVENTION

[0048] Preferred embodiments of the invention will now be described with reference to the accompanying drawings and non-limiting examples.

LIST OF FEATURES

[0049] **10** System
[0050] **15** Trench
[0051] **16** Plants
[0052] **20** Vault assemblies
[0053] **25** Gap
[0054] **30** Pathway
[0055] **40** Monuments
[0056] **45** Piers
[0057] **50** Engineering soil
[0058] **60** Geotextile
[0059] **70** Topsoil
[0060] **90** Natural ground
[0061] **100** Vault
[0062] **101** Vault room
[0063] **102** Walls
[0064] **104** Ceiling
[0065] **106** Open side
[0066] **108** Removable wall
[0067] **110** Panels
[0068] **112** Access means
[0069] **114** Lip
[0070] **116** Mating arrangement
[0071] **120** Raft
[0072] **122** Footing
[0073] **124** Spacer
[0074] **126** Retaining flange
[0075] **128** Supports
[0076] **200** Method for installation of system
[0077] **202** Step **1** of method
[0078] **204** Step **2** of method
[0079] **206** Step **3** of method
[0080] **208** Step **4** of method
[0081] **210** Step **5** of method
[0082] **212** Step **6** of method
[0083] **214** Step 7of method
[0084] **214** Step **8** of method

[0085] Referring to FIG. **1** there is illustrated an embodiment of a vault **100** for an interment system **10**. A system **10** can be formed from a plurality of vaults **100** which form receptacles for caskets or wrapped bodies. Preferably, the plurality of vaults **100** form vault assemblies **20** in combination with a raft **120** (see FIGS. **4** to **6**). The vaults **100** may be formed from concrete, stone, granite, composite, galvanised steel, coated steel, c01 Tosion resistant metal, polymers, or any other material which can reside in a buried and/or partially submerged state for a period of at least 3 years. More preferably, the vaults are designed to remain in a fit for use state while buried and/or partially submerged for between 5 years to 100 years, or 5 years to 80 years, or 5 years to 50 years, or 5 years to 20 years, for example. Each vault **100** of the system **10** may be formed separately, such that vaults **100** can be replaced if a vault **100** fails during use, while allowing adjacent vaults **100** to remain unaffected if they are in a structurally sound condition.

[0086] Each vault **100** may comprise at least two walls **102** and a ceiling **104**. The two walls**102** are connected to the ceiling, or integrally formed therewith. Preferably, the vault comprises three walls, with two being side walls **102** and the third being a rear wall **102**, with one side of the vault **100** defining an open side **106**. The walls **102** and ceiling may be formed from the same material, or may be formed from different materials as the ceiling **104** of the vault will be designed to carry a compressional load across the length of the ceiling **104**, while the vault walls **102** will be used to suppoli the ceiling **104**. A removable wall **108** can be installed in the open side **106** to allow for selective sealing of the vault **100**, and can be removed to allow access to the interior of the vault **100** when desired.

[0087] The removable wall **108**, as shown in FIGS. **1** and **2**, is formed from a series of panels **110** which can be installed side by side to form a contiguous removable wall **108**. Optionally, the panels **110** (**110**A, **110**B, **110**C) may be fitted with seals or mating arrangements **116** to allow for a superior fit in the vault open side **106** to ensure that the panels **110** experience little movement within the system **10** when in use. Each panel **110** may be fitted with a handle **112** or other access means **112** to assist with removal of the panels **110**. The panels **110** may be fitted within a lip **114** of the vault **100** which may also comprise mounting means to assist with mounting the panels **110** to the open side **106**. A mating arrangement **116** may be formed at the sides of each panel **110** and adapted to prevent or reduce ingress of fluids and engineering soils into the receptacle of the vault **100** during use. In this way a constant supply of oxygen can be provided to inner vault to accelerate decomposition, relative to known methods.

[0088] The bottom of the walls of the vault **100** can be suppolied by a raft **120**. Preferably, the vault does not include a floor, however, the backfill of sand partially covering the rafts may be used as the vault floor, such that moisture or liquid entering into the vault **100** can saturate sand in the bottom of vault and excess water can drain through to the raft **120** supporting the vault **100**. The raft **120** acts as a support structure for the vault **100** and forms a gap between the underside of the vault **100** and natural ground **90**, bedrock or other relative ground level. The raft **120** can be secured to the natural ground **90** by spikes, pins, anchors, bolts, or any other desired securing means (not shown). In another embodiment, the vault **100** raft "floats" on a geotextile **60** which can be used to reduce movement of vault assemblies **20** and also reduce engineering soil losses.

[0089] The ceiling **104** of the vault **100** comprises a sloped upper surface which is adapted to direct liquids over the ceiling and preferably away from the open side **106** (see FIG. **6**A for example). The lower ceiling portion forms part of the receptacle and is preferably parallel with the raft structure footings **122**. The sloped upper surface of the ceiling may also have cannels formed therein or a textile to more effectively channel liquids and direct liquids. The ceiling may allow fluids to be more readily diverted from above the vault **100** and down towards the raft **120** of the vault assembly **20**. Diverting fluids to the raft **120** will allow fluids to move along the natural ground **90** and out of the system **10** which is not known in conventional interment systems. In this way the vaults **100** can be kept in a moist and/or oxygenated state during rain fall, which may allow for decomposition of residents without disruption.

[0090] The walls **102** and ceiling **104** are preferably formed with a reinforcing structure, such as rebar or another common steel structure, which assists with maintaining the integrity of the vault, particularly for regions of the vault which experience tensile forces which may reduce the effectiveness of concrete structures or structures formed from materials with a low ultimate tensile strength.

[0091] The walls **102** of the vault **100** are preferably pre-stressed concrete sections which are manufactured off-site before installation in the system **10**. Optionally, post-stressed concrete may be used instead.

[0092] FIG. **2** illustrates the exploded embodiment of FIG. **1**, in which the removable wall **108** formed from panels **110** have been removed from the vault **100**. As can be seen, the mating arrangement **116** of the vault is such that the middle panel **110**B is to be removed before the side panels **110**A, **110**C can be removed. A flange at the ends of the middle panel **110**B mates with a respective and complimentary flange of the side panels **110**A and **110**B. The panels can be received in the lip **114** which is defines by the side walls **102**, and optionally the ceiling **104**. It will be appreciated that other panel mating arrangements **116** can also be used to form the removable wall **108**. In one embodiment, the removable wall is a single panel which can be installed and removed as desired. In another embodiment, the removable wall **108** is a frangible or sacrificial wall which can be destroyed to access a receptacle when desired.

[0093] The structure supporting the vault **100** is a raft **120**, which comprises a footing structure **122** and a plurality of spacers **124** which retain the footings in a location relative to the vaults **100**. The raft spacer **124** may be directly mounted onto a natural ground level **90** or onto a geotextile disposed on a natural ground level **90**. The raft spacer comprises a plurality of retaining flanges **126** which are adapted to seat the footings **122** which support the vault **100**.

[0094] The walls **102** of the vaults **100** can be directly mounted onto the footings **122** as shown in FIG. **3**A and **3**B, and the footings can be retained by the spacers **124**. Additional supports **128** can be provided to support the vault **100** if footings **122** are not provided. Reducing the number of footings may assist with improving liquid flows and drainage of the system **10**. Footings **122** may be fixed to spacers **124**, with the configuration of the raft being such that the footings **122** run perpendicular to the spacers **124**. The footings can be constructed of metals, metal alloys, concretes, polymers or any other desired materials. Similarly, the spacers may be constructed of metals, metal alloys, concretes, polymers or any other desired materials, but more preferably a metal or metal alloy is used. The spacers **124** of the raft **120** can be galvanised or to be protected from liquid corrosion.

[0095] Referring to FIGS. **4** and **5**, there are shown embodiments of a vault assembly **20** with different drainage structures formed by the raft **120**. In FIG. **4**, the direction of flow is perpendicular to the plane of the removable wall **108**. The footings **122** are disposed in a direction which is substantially parallel to the flow of liquids and may assist with directing said liquids.

[0096] FIG. **5** represents an embodiment in which the footings are parallel to the plane of the removable wall **108** and also parallel to the flow of liquids. In this embodiment additional supports **128** are not required as the footings extend along the rear wall **102** and the removable wall **108**. Preferably, the raft **120** has a larger footprint than that of the vaults and acts similar to a pad footing. Optionally, weep holes or other fluid apertures (not shown) may be disposed in the footings **122** of the raft **120**.

[0097] A sectional view of an embodiment of the system **10** with a plurality of vault assemblies **20** is shown in FIG. **6**A. Each of the vault assemblies **20** are supported on respective rafts **120**. The rafts **120** are preferably supported by natural ground **90**, bedrock, or material which is not backfill. Liquids entering into the system **10** may be allowed to flow to the natural ground level **90** and along said ground level out of the system by passing from the topsoil **70** and pathways **30** through the engineering soil **50**, as can be seen in the embodiment of FIG. **6**B. In this way more efficient drainage can be provided to the system **10**. Engineering fill is preferably provided above the vault assemblies **20** and in the access channels (between vault assemblies). Topsoil can be provided above vault assemblies to allow for installation of lawn and monuments or other memorial devices. Monuments**40** may also be used to record information about the burial and dates.

[0098] Monuments **40** and other memorial structures can be supported by piers **45**, which may be drilled holes filled with concrete into the sand and down to the top of vault, as seen in the example of FIG. **6**C, these piers **45** will contribute to sand stabilise. The piers **45** may be of any predetermined construction and may also assist with maintaining the structural integrity of the vault in the event of concrete cancer or other vault failures. A variety of trees and plants with the ability to thrive on sand can be planted to further stabilise the system, trees and plants will also play a significant role as an absorbent to water within the system. Further, the root structure of these plants **16** will assist with reduction of slope soils and soils within the system from migrating due to environmental factors. An example of this retention system can be seen in FIG. **6**D. Preferably, if sands are used as engineering soils, the sands can be treated with a binder or other product to increase the adhesion between the sand particles such that the sand stiffness or adhesiveness can be improved. In this way vaults may be supported by the sands in the event of failures after prolonged use.

[0099] Plots or monuments **40** may be positioned to identify a burial location. Plots or monuments **40** may be positioned on topsoil sections of the system **10**. The topsoil sections may be imported fill suitable for growing organic matter. When vaults are not being used, the topsoil may be used for growing organic matter, such as grass, trees or flowers, for example. Between topsoil sections a pathway **30** may be constructed. The pathways may cap a section which can be excavated to form a trench to access the vaults **100** of the system **10**. The pathways **30** may be constructed from paving materials, ceramics, concrete or other removable structures such that the pathways can be removed to form a trench.

[0100] Optionally, the pathways **30** may be formed from a mesh which can be partially embedded within the engineering soil backfilling the system **10**. The mesh may be formed from a durable and flexible material, such as PVC, PP, PE, aramid composites, rubbers or any other predetermined material. The mesh may have a thickness of between **10**mm to **150**mm, depending on the structure. An embodiment of the mesh is illustrated in FIG. **8**, in which a portion of the mesh has been removed to allow a trench **15** to be constructed. Portions of the pathway may be removable and may align with a vault **100** of the system such that removing predetelmined a portion of the mesh or pathway will indicate the location of a removable wall of the vault **100**. A shoring cage **300** is illustrated in FIG. **10**, in which the cage comprises four veliical walls used to retain cut batters of excavated walls. The cage **300** comprises corner posts **310** which can be hammered into the ground at a desired location. After the corner posts have been hammered into position, the shoring panels **320** can be hammered into position between respective corner posts **310**. Once the panels have been hammered to the desired depth, the engineering soil can be excavated. After excavation, one of the walls **330** formed by the shoring panels can be raised to allow for access into a vault. The panels **320** can be locked into position during use.

[0101] While PVC may be used for paving access channels (which can be excavated to form a trench **15**) for the vaults **100**, other materials may be used which are more resistant to UV radiation. For example, ceramics or composite materials may be used which are resistant to weather conditions, and also have suitable compressional propeliies for heavy machinery to be mounted on.

[0102] The vaults **100** are positioned such that the open sides **106** of the vaults **100** are accessible when a trench **15** is dug between vault assemblies **20**, or when the access channels are excavated. Trenches **15** will typically be dug in the region below the walkways of the system **10**. It is preferred that any cuts are shored or retained as trenches **15** are dug. Optionally, an anchor location may be provided on the ceiling **104** of the vaults **100** to which retaining means can be mounted while a trench **15** is open.

[0103] As discussed above, the ceilings **104** of the vaults **100** preferably comprise a sloping upper surface to direct liquids permeating through the engineering soil to the vaults **100**. The sloping upper surface of the ceiling **104** preferably slopes away from the open side **106** and down towards the rear of the vault **100** towards gap **25**. The vault assemblies **20** of the embodiment have a rear wall, which opposes the open side **106**. A pair of vaults **100** may be disposed in a vault assembly **20** such that the rear walls **102** are adjacent (see FIGS. **4** and **5**). Optionally, the same footing **122** may be used to support the adjacent rear walls **102** as is illustrated in FIG. **6**. In this configuration, the sloping surfaces of the ceilings **104** direct liquids to gap **25** between the vaults **100** and the liquids can then flow down to the raft **120** supporting the vault **100**. Liquids may drain more efficiently compared to known systems **10** and improve oxygen flow into the vaults in a relatively shorter amount of time.

[0104] The drainage path of the liquids is preferably in the direction of natural water runoff, which will typically be parallel to the slope of the natural ground or underlying bedrock as can be seeing in FIG. **6**B. In this way, the footings **122** are not impeding the flow of liquids and inadvertently retaining fluids below the vaults **100**. The footings **122** preferably raise a vault between **50**mm to **400**mm from the underside of the spacer **124** to allow for the free movement of fluids there-under.

[0105] A flowchart is shown in FIG. **7** showing a method for constructing the system **10**. Firstly a site for the system **10** is selected and prepared **202** for system **10** installation. The site is preferably cleared to form a generally planar top surface which is suitable for mounting vault assemblies **20**. The planar top surface may be the natural ground surface stripped of organic material and/or top soil, and is referred to herein as the natural ground level **90**. Geotextiles **204** may be laid on the natural ground level **90** to form a base for rafts **120** to be constructed **206**. The rafts **120** are used as a footing structure for the vault assemblies **20** and are installed over sections of the geotextile. Once the footing structures or rafts **120** have been constructed, the vaults **100** can be installed onto said structures **208**. A plurality of vaults **100** installed may be referred to as a vault assembly **20**.

[0106] Once all vaults **100** have been installed, the system **10** can be backfilled with engineering soil **50**. The engineering soil **50** may be granular, coarse or fine material, such as sand, gravel, granular concrete, construction aggregate or blue metal, which allows for relatively consistent drainage of liquids entering into the system, such as from rain or irrigation systems. Preferably, the engineering soils have a predetermined particle size or distribution which may be used to form gaps or voids between particles of the engineering soil **50**. Preferably, the engineering soil is at least one of; a homogenous material, a uniform material or uniform mixture of materials which has at least one desired engineering property. It is preferred that the engineering soil is substantially free from natural soils from the site, unless said soils meet the engineering soil propeliies. For example, a system **10** constructed in sand dunes. The desired engineering propeliy may be a desired drainage, a desired compaction, a desired static effect or any other desired propeliy. However, any desired engineering soil **50** backfill may be provided to the system to assist with directing the flow of fluids. After backfilling with engineering soil is complete, topsoil sections can be installed, which are generally above the buried vault assemblies **20** (see FIG. **6**, for example). Adjacent to the topsoil sections a paving or pathway **30** can be installed **214**. The pathway **30** is preferably installed above an access channel, which can be excavated to form a trench **15**. The trench **15** may then be used to access the vaults when needed. When a vault is occupied, at least one plot can be disposed on the topsoil section **216** indicating the occupant of a vault.

[0107] Referring to FIG. **8**, there is shown an embodiment of a trench **15** what has been formed in the system **10**. The paving of the pathway **30** has been partially removed to form the trench the access the vault **100**. The removable wall **108** can be removed at the bottom of the trench **15** and an occupant can be placed within the vault and/or decomposed remains can be moved aside within the tomb, but preferably not removed from tomb and allow for another occupant to be placed within the vault. The cut batters of the trench **15** may be supported by any desired means, such as a retaining wall or sheet piles, to temporarily support a cut batter such that a person working at the bottom of a trench **15** is not accidentally buried if there is a collapse of the trench. In another embodiment, a degradable cement binder is injected into the engineering fill before excavation to provide a more stable trench **15**.

[0108] A bottom view of an embodiment of a vault **100** is illustrated in FIG. **9**. As shown, the bottom of the vault is free of a floor. Optionally, the engineering soil can be backfilled such that a floor is constructed from the engineering soil and/or the footings **122**. As such, a casket or wrapped body, or other material to decompose can be mounted onto sand or footings **122** or supports **128** within the receptacle. It is preferably that the vaults are formed without floors to increase the air flow into the vaults to assist with decomposition.

[0109] The system **10** of the present disclosure may allow for decomposition of a body in a period of between 5 to 12 years, depending on rainfall, moisture and humidity of the environment. Preferably, the engineering soils **50** installed in the system **10** allow for the moisture to be transported out of the system relatively quickly to oxygenate the system **10** to accelerate decomposition.

[0110] The walls **102** and ceiling **104** of the structure are preferably formed with sufficient concrete cover to ensure that internal reinforcing is covered during use and therefore concrete cancer is less likely to occur. Preferably, the concrete cover of the walls is between 5 mm to 100 mm depending on the volume of sand above the structure.

[0111] The volume of sand or engineering fill above the structure may be of a minimum depth such a requirement by the health authorities.

[0112] Preferably, the system improves the oxygen exposure to the casket which may assist with decomposition of a body with a casket. Further, the system may also provide for moisture removal to keep caskets more dry for longer periods of time. It will be appreciated that drainage systems for caskets may be used to assist with drying soils adjacent to the casket.

[0113] Preferably, geotextiles are laid at the surface to allow for a more stable structure and reduce movement of the rafts which may occur during settlement or with high volumes of fluids in the system **10**. The geotextiles may be a woven or non-woven fabric which may assist in preventing the loss of sand or other engineered soil and prevent sand or engineered soil to mix with clay soil.

[0114] Backfilled soils may comprise granular materials which readily allow for moisture to be drained through from the system **10**. Preferably, the backfill materials are sands or gravels which can be compacted or have minimal settlement issues after backfill.

[0115] Optionally, in-situ soils above the casket can be replaced with engineering soils which allows for improved drainage around the vaults **100**. However, in one embodiment, only the trenches **15** to access vaults are replaced with engineering soils and the natural soils above the vaults **100** are retained in their natural position. This may reduce the need for removal of materials, and also reduces the overall environmental impact due to burial. In addition, having engineering soils within only trenches may assist with directing liquids from the system if the trenches comprise further drainage structures below the level of the raft **120**. For example, drains may be installed below the raft **120** and be used to more efficiently direct liquids, such as water, from the system **10**.

[0116] Optionally, other drainage structures may be used to reduce moisture content, such as wick drains. These drainage structures may require minimal maintenance and be effective over a period of decomposition. Preferably, any drainage structure is replaced when tombs are accessed. This may allow for more effective removal of moisture within the system.

[0117] After a known period of time has elapsed, a grave can be opened safely with the body having decomposed due to the system. For example, the period of time may be between 5 to 12 years, depending on experienced weather conditions of the system **10**. The vault **100** may then be reused and the system can begin again. This allows for a reduction of land usage as vaults **100** can be used more than once in a relatively short period of time. Further, as the decomposition rate of bodies can be accelerated, the need for further land consumption can also be reduced.

[0118] In another embodiment, the system comprises a vault stacks which can block residents of the vaults **100** in a predetermined plan vertically in addition to horizontally. If vaults are stacked, each vault will be positioned on a respective support structure such that fluids can easily be removed from the vault stacks and more readily increase oxygen levels to increase a rate of decomposition.

[0119] It is preferred that the receptacles of the vaults **100** are free from, or substantially free from, engineering soil **50** when in use. Allowing a larger volume of oxygen near to a body will allow for a faster rate of decomposition and therefore the vault **100** can be reused more quickly.

[0120] It will be appreciated that accelerating the decomposition of bodies may allow for reuse of a vault **100** when the resident has decomposed such that one bones remain within the vault receptacle. In this way the vaults can be used more effectively and less space is wasted as further cemetery spaces are not required or vastly reduced.

[0121] Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms, in keeping with the broad principles and the spirit of the invention described herein.

[0122] The present invention and the described preferred embodiments specifically include at least one feature that is industrial applicable.

1. A system for renewable interment and improved body decomposition, the system comprising;

a vault assembly comprising at least one reusable vault mounted on a raft; the at least one reusable vault comprising a respective removable access wall,

wherein the removable access wall is selectively removable from the vault to allow access for reuse;

wherein the raft comprises at least one footing structure adapted to underlie the at least one reusable vault such that the ground on which the footing structure rests is adapted to function as the floor of the reusable vault; and

a porous granular material adapted to at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the at least one reusable vault.

2. The system as claimed in claim **1** wherein the fluid drains through the porous granular material towards the bottom of the vault.

3. A system as claimed in claim **1** wherein the system comprises a plurality of reusable vaults.

4. The system as claimed in claim **1**, wherein the vaults of the vault assembly comprise two side walls, a rear wall and a ceiling which are integrally formed and define a vault receptacle, wherein the vaults are constructed without a floor.

5. The system as claimed in claim **1**, wherein the vault and raft are wholly buried by the porous granular material.

6. The system as claimed in claim **5**, wherein the porous granular material is an engineering soil fill.

7. The system as claimed in claim **1**, wherein the removable access wall of the vault comprises a plurality of panels and at least one access means.

8. The system as claimed in claim **1**, wherein the footing structures are retained in a predetermined spacing by a spacer, further comprising retaining flanges in which the footing structures are mounted.

9. The system as claimed in claim **4**, wherein the ceiling is tapered towards the rear wall to direct liquids away from the removable wall.

10. The system as claimed in claim **1**, wherein a lip is provided in the vault to mount the removable access wall.

11. The system as claimed in claim **1**, wherein the raft elevates the vault above a natural ground level.

12. The system as claimed in claim **1** wherein the oxygen-carrying fluid is water.

13. A system for renewable interment and improved body decomposition, the system comprising;

a vault assembly comprising at least one reusable vault mounted on a raft,

the at least one reusable vault comprising two side walls and a ceiling defining a receptacle;

the reusable vault further comprising at least one removable access wall to allow access to the receptacle for reuse;

wherein the walls are supported on at least one footing of the raft, and wherein the at least one footing is retained in a predetermined position by at least one spacer; and wherein a porous granular material is adapted to at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the reusable vault.

14. The system as claimed in claim **13** comprising a plurality of reusable vaults.

15. The system as claimed in claim **13**, wherein the spacers are perpendicular to the footings; and wherein the vault further comprises a rear wall which opposes the removable access wall.

16. The system as claimed in claim **13** wherein the removable wall comprises a plurality of panels.

17. A method for constructing a renewable interment internment and improved body decomposition system, the method comprising:

mounting a footing structure on a ground surface;

fixing at least one reusable vault to the footing structure to form a vault assembly in which a bottom of the reusable vaults is exposed to the raft;

burying at least a portion of the vault assembly with a porous granulated engineering soil so as to at least at least partially bury the at least one footing structure and at least partially surround the at least one reusable vault to direct oxygen-carrying fluid through and out of the vault assembly such that the growth of decomposition bacteria is supportable within the reusable vault; and

installing a topsoil section over the engineering soil relatively above the vault assembly.

18. The method as claimed in claim **17**, wherein the footing is mounted on a geotextile on the ground surface to minimize loss or integration of the porous granulated engineering soil into natural ground.

19. The method as claimed in claim **17**, wherein a plurality of vault assemblies are constructed in parallel in which respective topsoil sections are installed relatively above respective vault assemblies of the plurality of vault assemblies, and at least one pathways is constructed between the topsoil sections.

20. The method as claimed in claim **19**, wherein the pathways are removable such that a trench can be excavated to install a resident into the vault assemblies.

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