A refrigeration device for compostable materials, comprising, a recycling bin adapted to receive compostable materials, a liner element adapted to receive the recycling bin; and refrigeration means adapted for cooling the liner element wherein when compostable materials are positioned within the recycling bin and the recycling bin is positioned within the liner element, the refrigeration means cools the liner element, the recycling bin and the compostable materials positioned therein.
COMPOSTABLE MATERIALS RECYCLING BIN REFRIGERATION DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 12/386,214, filed on Apr. 15, 2009, the complete contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention
[0003] The present invention relates to compostable materials' recycling bin refrigeration devices, and more particularly, relates to compostable materials' recycling bin refrigeration devices that may be used, for example, in compost recycling programs to reduce the rate and side effects of the decomposition of compostable materials being temporarily stored in a compostable materials recycling bin.

[0004] 2. Brief Description of the Related Art
[0005] Recycling of materials has become an important part of a modern society, and it is desirable to encourage the recycling of materials where possible. The recycling of compostable materials is important to the environment. Accordingly, compostable materials may be collected from households and businesses for subsequent processing or decomposition, for example, into soil products or fertilizer. However, as it is often necessary for the households or businesses to temporarily store compostable materials for a period of time, one impediment to the recycling of compostable materials is the unpleasant reality that decomposing compostable materials may produce unpleasant odors, and may attract pests, such as insects, larvae, maggots, mold, small animals and other creatures.

[0006] It is desirable to reduce the unpleasant odors while temporarily storing compostable materials, particularly if the materials are being stored indoors, or in locations where the unpleasant odors and insects and other pests are a nuisance or hazard. While it is possible to provide an airtight container within which to temporarily store compostable materials, nevertheless, whenever the airtight container is opened, for example, to add additional compostable material to the container, or to remove the compostable material, the individual opening the container is exposed to a significant waft of odor filled air produced by the decomposing compostable material. While it may be possible to mask some or a substantial portion of the odors produced by the decomposition of the compostable material by using, for example, a scented air freshener, scented air freshener's merely mask the odor and often produce substantially unsatisfactory results.

[0007] It is also desirable to reduce the likelihood of an infestation of the temporarily stored compostable materials with insects or other pests.

[0008] It is also desirable to improve the sanitary circumstances associated with the recycling of compostable materials.

SUMMARY OF THE INVENTION

[0009] Accordingly, one object of the present invention is to provide a device which reduces the unpleasant odors associated with the temporary storage of compostable materials.

[0010] Another object of the present invention is to provide a device which reduces the likelihood of an infestation of the temporarily stored compostable materials with insects or other pests.

[0011] Another object of the present invention is to provide a device which improves the sanitary circumstances associated with the recycling of compostable materials.

[0012] According to one aspect of the present invention, there is provided a refrigerator device for compostable materials, comprising, a recycling bin adapted to receive compostable materials, a receptacle adapted to receive the recycling bin, and refrigeration means adapted for cooling the receptacle wherein when compostable materials are positioned within the recycling bin and the recycling bin is positioned within the receptacle, the refrigeration means cools the receptacle, the recycling bin and the compostable materials positioned therein.

[0013] According to another aspect of the present invention, there is provided a refrigeration device for compostable materials, comprising, a recycling bin adapted to receive compostable materials, a liner element adapted to receive the recycling bin and refrigeration means adapted for cooling the liner element, wherein when compostable materials are positioned within the recycling bin and the recycling bin is positioned within the liner element, the refrigeration means cools the liner element, the recycling bin and the compostable materials positioned therein. An advantage of the present invention is that it provides a device which reduces the unpleasant odors associated with the temporary storage of compostable materials.

[0014] A further advantage of the present invention is that it provides a device which reduces the likelihood of an infestation of the temporarily stored compostable materials with insects or other pests.

[0015] A further advantage of the present invention is that it provides a device which improves the sanitary circumstances associated with the recycling of compostable materials.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] A preferred embodiment of the present invention is described below with reference to the accompanying drawings, in which:

[0017] FIG. 1 is an exploded view, partially in ghost, of one embodiment of the present invention;

[0018] FIG. 2 is an exploded view, partially in ghost, of an alternative embodiment of the present invention;

[0019] FIG. 3 is an exploded view, partially in ghost, of a further alternative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] In a preferred embodiment of the present invention, as illustrated in FIGS. 1 and 2, a removable compost bin or pail 2, preferably made of stainless steel, aluminum, plastic or other material known to a person skilled in the art, and preferably having a handle 4 which can be rotated (as indicated by the arrow 7) from the vertical orientation illustrated in FIG. 1 about pivot pins or bolts 10 (or other suitable pivot devices known to a person skilled in the art) to a substantially horizontal orientation 8, the handle when in the vertical orientation allowing the compost bin to be lowered into or lifted from the inner liner element 12 or other receptacle, which inner liner element 12 is preferably a cylindrical shape as illustrated.
in FIG. 1, or alternatively, where a box-shaped bin is used, an open box-shaped inner liner element (the box preferably having four sides and a bottom) as illustrated in FIG. 2, preferably made of stainless steel, aluminum, or other suitable material known to a person skilled in the art, which inner liner element is adapted to receive and support the compost bin or pail 2 when inserted therein, and which is adapted to transfer heat from the compost bin or pail 2 as more fully described herein.

[0023] In a preferred embodiment of the present invention, cooling coils 14 are securely positioned in contact with or in close proximity to the outside walls of the inner liner element 12 as illustrated in FIGS. 1 and 2, the cooling coils 14 being preferably made of copper or steel or other suitable material known to a person skilled in the art and being adapted to receive and circulate a coolant gas, it being understood that many alternative gases or liquid coolants may be used as would be understood by a person skilled in the art.

[0022] In a preferred embodiment of the present invention, the coolant gas passes through and is compressed by a compressor 20 (the compressor preferably being powered by an electrical power source 18 or by such other method known to a person skilled in the art) powered by a power cord 19 (preferably in the manner described below), the coolant gas thereafter passing through (as indicated by the arrows 17A) a condenser circuit 19, preferably in the form of a length of coolant tubing or radiator (not shown) to dissipate heat from the compressed coolant gas, in one embodiment of the present invention, the condenser circuit 19 being securely attached to the outside wall of the outer casing or shell referred to below, the cooled compressed coolant gas (which may now be in the form of a liquid at this stage depending on the gas and pressures utilized) thereafter passes through an expansion valve 21 and is permitted to expand and cool, and thereafter passes (as indicated by the arrow 17B) through the cooling coils 14 to cool the outer surface of the inner liner element 12 (and thereby cool the inner surface of the inner liner element 12 and its contents, including the compost bin 2 and any compostable materials contained therein) by absorbing heat from the inner liner element 12 and providing a cooling effect to the inside of the inner liner element 12 and the compost bin 2 and any compostable materials contained therein. The coolant gas is thereafter returned to the compressor (as indicated by the arrow 17C) to repeat this cycle.

[0023] In the preferred embodiment of the present invention, an On/Off switch 24 is provided which is electrically or otherwise connected 23 to the compressor 20 (by way of the power supply 18) to allow the user to turn off the compressor when the device of the present invention is not in use (and, when placed in the "On" position, to allow the compressor to be turned on when activated by the thermostat as described hereinafter).

[0024] In a preferred embodiment of the present invention, a thermostat 22 is also provided and electrically or otherwise connected to the power supply 18 for the compressor 20 (electrically connected to the power supply 18 and the On/Off switch 24), the thermostat 22 being positioned such that when the On/Off switch 24 is in the "On" position, it will sense the temperature on the surface of or alternatively within the inner liner element 12 and, in the event that the temperature is above a predetermined amount (such as, for example, 10 degrees C.), the thermostat 22, on sensing the temperature being above the predetermined amount will activate the compressor 20 in a conventional manner and circulate coolant gas as described above, until the temperature on the surface of, or alternatively within the inner liner element 12 falls to below a predetermined amount (such as, for example, 5 degrees C.), thereby maintaining the compost bin 2 and its contents within a range of between, for example, 5 degrees C. and 10 degrees C. (it being understood that different temperature ranges may be set or programmed into an appropriately settable or programmable thermostat in a manner known to a person skilled in the art).

[0025] In a preferred embodiment of the present invention, insulation 26 is positioned to substantially enclose and surround the walls and bottom of the inner liner element 12 and cooling coils 14 to reduce the amount of heat transferred from the inner liner element 12 and cooling coils 14 to the area outside of and immediately surrounding the device of the present invention.

[0026] In a further alternative embodiment of the device of the present invention, as illustrated in FIG. 3, a Peltier device 28 or other solid state refrigerator or other refrigerating device known to a person skilled in the art, is positioned in contact with or in close proximity to the outside walls or bottom of the inner liner element 12 as illustrated in FIG. 3, electrical power for the Peltier device or other solid state refrigerator or other refrigerating device being provided by way of an electrical power source, which may be connected to an On/Off switch and thermostat in a conventional manner. The other exposed surfaces of the inner liner element may be covered in insulation 29.

[0027] In a preferred embodiment of the present invention, as illustrated in FIGS. 1, 2 and 3, a pleasantly shaped outer shell or casing 30 (preferably made of metal or rigid plastic or other material known to a person skilled in the art) is provided which preferably substantially surrounds the inner workings of the device described herein, the outer shell or casing providing the device with a pleasant overall appearance and an easy to clean outer surface. In alternative embodiments of the present invention, differently colored outer shells or casings may be provided to the user with a range of possible colors.

[0028] In a preferred embodiment of the present invention, a hinged or removable lid 13 is provided as illustrated in FIGS. 1, 2 and 3, which preferably provides an air-tight seal between the lid 13 and the opening 15 in the outer shell or casing (the hinged lid 13 being movable between an open and closed position as illustrated by the arrow 33). In an alternative embodiment of the present invention, a hinged or removable lid 13 is provided which provides an air-tight seal between the lid 13 and the opening in the inner liner element 12.

[0029] In an alternative embodiment of the present invention, large compost bins may be used, for example, in a commercial setting that receives and temporarily stores large volumes of compostable materials, the device of the present invention being suitably scaled in size to receive, support and refrigerate such large compost bins.

[0030] In operation, a person may open the lid 13 and insert a compost bin 2 into the inner liner element 12 and thereafter rotate the handle 4 to the horizontal orientation and close the lid 13 (and turn the On/Off switch 24 to the "On" position, setting the thermostat as desired), opening the lid as needed to insert or remove compostable materials from the compost bin 2 as needed or desired. Subsequently, the bin 2 may be removed for the easy removal of the compostable materials, and for cleaning of the bin as needed.

[0031] When the compostable material is maintained at a cool temperature, the rate of decomposition of the com-
postable materials may be significantly reduced, resulting in a corresponding reduction in odors, and a corresponding reduction in the attractiveness of the compostable materials to pests, such as insects, larvae, maggots, mold, small animals and other creatures. Furthermore, by reducing or eliminating many of the drawbacks to recycling compostable materials, users may be more inclined to recycle compostable materials. Additionally, as the device of the present invention may reduce or substantially eliminate odors emanating from the compostable materials temporarily stored therewithin, it is possible to extend the length of time in which the compostable materials are temporarily stored by the user (thereby reducing the frequency of the need to empty the compostable materials from the device of the present invention).

[0032] The present invention has been described herein with regard to preferred embodiments. However, it will be obvious to persons skilled in the art that a number of variations and modifications can be made without departing from the scope of the invention as described herein.

What is claimed is:

1. A refrigeration device for compostable materials, comprising:
   a. a recycling bin adapted to receive compostable materials;
   b. a liner element adapted to receive the recycling bin; and
   c. refrigeration means adapted for cooling the liner element wherein when compostable materials are positioned within the recycling bin and the recycling bin is positioned within the liner element, the refrigeration means cools the liner element, the recycling bin and the compostable materials positioned therein.

2. A device according to claim 1, wherein the recycling bin and the liner element are cylindrically shaped.

3. A device according to claim 1, wherein the recycling bin and the liner element are box-shaped.

4. A refrigeration device for compostable materials, comprising:
   a. a recycling bin adapted to receive compostable materials;
   b. a liner element adapted to receive the recycling bin; and
   c. refrigeration means adapted for cooling the liner element further, the refrigeration means comprising a cooling coil securely positioned proximate the liner element and means for circulating cooled coolant through the cooling coil;
   wherein when compostable materials are positioned within the recycling bin and the recycling bin is positioned within the liner element, the refrigeration means cools the liner element, the recycling bin and the compostable materials positioned therein.

5. A device according to claim 1, wherein the coolant is a gas, wherein means for circulating cooled coolant through the cooling coil comprises:
   a. a compressor adapted to compress the gas;
   b. a condenser adapted to dissipate heat from the compressed gas, and c. an expansion valve adapted to permit the expansion and cooling of the compressed gas.

6. A device according to claim 1, wherein refrigeration means comprises a solid state refrigerator.

7. A device according to claim 1, wherein the solid state refrigerator is a Peltier device.

* * * * *