

CLAIMS

1. An apparatus with a single restrictive access opening for loading, positioning, removing, or accessing one or more items that can be stored, preserved or transported in a presence of dry ice, comprising:

a tapered container with an interior volume defined by an interior body section and an interior neck section, the interior body section comprising at least a first region, wherein the first region is a dry ice chamber, said dry ice chamber adapted to receive substantially all of the dry ice that is selectively directed into the interior volume of the tapered container through the single restrictive access opening located at the interior neck section;

the interior volume of the tapered container further including a second region that is non-overlapping with the first region of the tapered container, wherein the second region is an internal product storage volume contained within a barrier-like structure, the internal product storage volume characterized by a substantial absence of the dry ice, the internal product storage volume configured to be accessed through the single restrictive access opening to remove or load the one or more items;

the barrier-like structure having a first portion and a second portion with the internal product storage volume extending between the first portion and the second portion, said first portion of the barrier-like structure oriented within or towards the single restrictive access opening located at the interior neck section, said barrier-like structure having an opening into the internal product storage volume along the first portion, , wherein said barrier-like structure partitions the interior volume of the tapered container into the first region and the second region, the barrier-like structure situated solely in the interior neck section, solely in the interior body section or within portions of the interior neck section and the interior body section.

2. The apparatus of claim 1, wherein the internal product storage volume is arranged to be separate and distinct from the dry ice chamber such that removal or loading of the one or more items within the barrier-like structure occurs without substantial disruption of

the dry ice chamber, and further wherein the barrier-like structure is configured to prevent migration of the dry ice from the dry ice chamber into the interior product storage volume during storage, preservation or transport of the one or more items in the tapered container.

3. The apparatus of claim 1, wherein the dry ice chamber is characterized by an absence of foam-filled material or absorbent.
4. The apparatus of claim 1, wherein the barrier-like structure is characterized as a flexible bag.
5. The apparatus of claim 4, wherein the first portion of the flexible bag comprises a tether for reducing and enlarging a flexible access opening of the flexible bag, said tether comprising an exposed tether portion that extends out from the interior volume of the tapered container, said exposed tether portion configured to be grasped to access the flexible bag.
6. The apparatus of claim 1, wherein a second portion of the barrier-like structure extends towards a floor of the interior volume of the tapered container within the interior body section and further the barrier-like structure is permanently affixed to the tapered container.
7. The apparatus of claim 1, wherein the barrier-like structure is characterized as a barrier-like receptacle, said barrier-like receptacle having an access opening for accessing an interior region to receive the one or more items, said barrier-like receptacle comprising a retrieval member attached thereto, said retrieval member comprising an exposed retrieval member portion that extends out from or within the interior volume of the tapered container, said exposed retrieval member portion configured to be grasped to access the barrier-like receptacle.

8. The apparatus of claim 1, wherein the barrier-like structure comprises a cap, said cap configured to engage with and disengage from the interior neck section of the tapered container.
9. The apparatus of claim 1, wherein the first portion or the second portion of the barrier-like structure is integrally or operably connected to the interior neck section or the interior body section of the tapered container.
10. The apparatus of claim 1, further comprising a predetermined amount of the dry ice occupying the dry ice chamber and surrounding the barrier-like structure, wherein the predetermined amount of the dry ice extends from a floor of the interior volume of the tapered container within the interior body section to a level in the dry ice chamber that is below the single restrictive access opening of the tapered container.
11. The apparatus of claim 4, said flexible bag having a flexible access opening for accessing an interior region of the flexible bag to receive the one or more items, a first portion of the flexible bag secured to the tapered container, and a second portion of the flexible bag extending at least partially through the single restrictive access opening of the interior neck section so as to remain in a suspended orientation within the interior neck section or the interior body section of the tapered container.
12. A method of preparing an apparatus configured for loading, positioning, removing, accessing or preserving one or more items that can be stored or transported in a presence of dry ice, comprising:
- providing a tapered container with an interior volume defined by an interior body section and an interior neck section, the interior body section extending between a first end and a second end, , the interior neck section having a single restrictive access opening extending into the interior volume of the tapered container;
 - inserting a barrier-like structure through the single restrictive access opening of the interior neck section, said barrier-like structure having a first portion and a second portion

and an opening along the first portion, the opening adapted for loading the one or more items therein;

partitioning the interior volume of the tapered container to create a dry ice chamber and an internal product storage volume located within the barrier-like structure, said dry ice chamber external to and surrounding the internal product storage volume;

blocking the opening of the barrier-like structure; and

selectively filling the dry ice chamber with the dry ice through the single restrictive access opening; and

accumulating the dry ice to a predetermined level within the dry ice chamber without substantial introduction or migration of the dry ice into the internal product storage volume of the barrier-like structure.

13. The method of claim 12, further comprising securing the barrier-like structure to the interior neck section.

14. The method of claim 12, further comprising securing the barrier-like structure to the interior body section.

15. The method of claim 12, wherein the step of selectively filling the dry ice chamber with the dry ice comprises:

extending a guiding assembly through the single restrictive access opening;

engaging the guiding assembly with the first portion of the barrier-like structure situated within the interior volume of the tapered container;

creating a flow path for the dry ice to enter the dry ice chamber but not the internal product storage volume that is contained inside the barrier-like structure;

loading the dry ice through the guiding assembly; and

directing the dry ice along the flow path for the dry ice to enter the dry ice chamber but not the internal product storage volume that is contained inside the barrier-like structure.

16. The method of claim 12, further comprising loading the one or more items into the internal product storage volume without disruption of the dry ice in the dry ice chamber.

17. The method of claim 12, wherein the step of inserting the barrier-like structure into the tapered container, comprises:

engaging a guiding assembly with the barrier-like structure to operably connect the guiding assembly to the barrier-like structure;

lowering the guiding assembly apparatus with the barrier-like structure towards the tapered container so as to enable the step of securing the barrier-like structure to the interior body section or the interior neck section of the tapered container.

18. The method of claim 12, further comprising aligning the barrier-like structure substantially with the single restrictive access opening of the tapered container.

19. A method of preparing an apparatus configured for loading, positioning, removing, accessing or preserving one or more items that can be transported in a presence of dry ice, comprising:

providing a tapered container with an interior volume defined by a dry ice chamber occupying at least an interior body section of the tapered container, the interior volume further including an interior neck section with a single restrictive access opening, the interior body section extending between a first end and a second end, the single restrictive access opening extending into the dry ice chamber of the tapered container;

partially filling the dry ice chamber with the dry ice through the single restrictive access opening;

accumulating the dry ice to a predetermined level within the dry ice chamber to create a partially filled dry ice chamber, wherein the partially filled chamber has sufficient clearance for the partially filled dry ice chamber to accommodate a barrier-like receptacle ;
and

inserting the barrier-like receptacle through the single restrictive access opening in the dry ice chamber.

20. The method of claim 19, further comprising:
securing a first portion of the barrier-like receptacle to the tapered container;
extending a second portion of the barrier-like receptacle at least partially through the interior neck section and into the partially filled dry ice chamber.
21. The method of claim 20, further comprising extending a second portion of the barrier-like receptacle at least partially through the interior neck section so as to remain in a suspended orientation within a portion of the dry ice chamber that is not filled with the dry ice.
22. The method of claim 21, wherein the barrier-like receptacle is a cap, to allow loading the one or more items into a sample holder of the cap.
23. The method of claim 19, wherein the barrier-like receptacle is a flexible bag to allow loading the one or more items into a flexible opening of the flexible bag;
pulling a free end of a tether attached along first portion of the flexible bag;
reducing the flexible access opening; and
tying the free end of the tether to the tapered container.
24. The method of claim 19, wherein the step of filling the dry ice chamber with the dry ice through the single restrictive access opening, comprises:
operably connecting a guiding assembly to the single restrictive access opening, said guiding assembly comprising a funnel with an extended ring;
loading the dry ice through the funnel of the guiding assembly; and
directing the dry ice through an opening of the funnel of the guiding assembly into the dry ice chamber.

25. A method of filling dry ice into an apparatus configured for loading, removing, accessing, positioning or preserving one or more items that can be stored or transported in a presence of dry ice, comprising:

providing a tapered container comprising an interior body section and an interior neck section, the interior body section extending between a first end and a second end, the interior body section at least partially defining an interior volume of the tapered container, the interior neck section having a single restrictive access opening extending into the interior volume of the tapered container;

inserting a barrier-like structure through the single restrictive access opening of the interior neck section;

partitioning the interior volume of the tapered container into a dry ice chamber and an interior product storage volume, wherein interior product storage volume is located within or affixed to an interior of the barrier-like structure, the interior product storage volume adapted to be accessed for a removal or introduction of the one or more items therein without discarding dry ice from the dry ice chamber, said dry ice chamber located external to the barrier-like structure, the dry ice chamber adapted to receive the dry ice occupying at least a portion of the second end;

placing a guiding assembly into the single restrictive access opening to operably connect to a portion of the barrier-like structure that is oriented towards the single restrictive access opening so as to create a pathway for dry ice to be guided into the dry ice chamber and not the internal product storage volume;

introducing the dry ice into the guiding assembly apparatus; and

directing the dry ice into the dry ice chamber but not the interior product storage volume.

26. The method of claim 25, further comprising loading the one or more items into the internal product storage volume prior to or after the step of introducing the dry ice into the guiding assembly apparatus.

27. A method of loading and positioning one or more items into an apparatus configured for preserving one or more items in a presence of dry ice, comprising the steps of:

- providing a tapered container comprising an interior body section and an interior neck section, the interior body section extending between a first end and a second end, the interior body section at least partially defining an interior volume of the tapered container, the interior neck section having a single restrictive access opening extending into the interior volume of the tapered container;

- inserting a barrier-like structure through the single restrictive access opening of the interior neck section;

- partitioning the interior volume of the tapered container into a dry ice chamber and an internal product storage volume, wherein the internal product storage volume is located within or affixed to an interior of the barrier-like structure, the internal product storage volume adapted to be loaded with the one or more items, said dry ice chamber located external to the barrier-like structure, the dry ice chamber adapted to receive the dry ice occupying at least a portion of the second end;

- securing the barrier-like structure to the tapered container along the interior neck section or the interior body section; and

- loading the one or more items into the internal product storage volume without disruption of the dry ice chamber.

28. A guiding assembly apparatus for selectively introducing dry ice into a dry ice chamber of a tapered container without disruption of an internal product storage volume of the tapered container, comprising:

- a removable cap structure;

- a funnel-like structure;

- an extended ring; and

- an elongated portion having a first end integrally or operably connected to the funnel-like structure, and a second end integrally or operably connected to the removable cap structure;

wherein said funnel-like structure comprises tapered walls adapted to capture and receive dry ice therethrough without substantial spillage of said dry ice from the funnel-like structure; and

wherein said removable cap structure is configured to engage with a barrier-like structure so as to prevent dry ice from entering into an interior of the barrier-like structure, and further wherein an outer surface of the removable cap structure is flared outwardly so as to provide a selected pathway of dry ice into a dry region external to the barrier-like structure.

29. The guiding assembly apparatus of claim 28, wherein the extended ring has an opening substantially similar in size to a single restrictive access opening of a tapered container having an interior neck section.

30. A method of removing one or more items from an apparatus configured for storing, preserving or transporting one or more items in a presence of dry ice, comprising the steps of:

receiving an apparatus comprising:

a tapered container and barrier-like structure;

the tapered container comprising an interior body section and an interior neck section, the interior body section extending between a first end and a second end, the interior body section at least partially defining an interior volume of the tapered container, the interior neck section having a single restrictive access opening extending into the interior volume of the tapered container;

the barrier-like structure disposed at least partially within the interior volume of the tapered container, said barrier-like structure partitioning the interior volume of the tapered container into a dry ice chamber and an internal product storage volume;

said internal product storage volume located within or affixed to an interior of the barrier-like structure, the internal product storage volume containing the one or more items; and

said dry ice chamber located external to the barrier-like structure, the dry ice chamber filled with at least a portion of the dry ice;

opening the tapered container;

directing a removal tool through the single restrictive access opening;

grasping the barrier-like structure using the removal tool;

withdrawing the removal tool with the barrier-like structure attached thereto without discarding the dry ice contained in the dry ice chamber, wherein the one or more items are contained in the internal product storage volume that is located inside of the barrier-like structure.

31. The method of claim 30, further comprising removing the one or more items from the internal product storage volume of the barrier-like structure.

32. The method of claim 30, further comprising disconnecting the barrier-like structure from the tapered container to create a detached barrier-like structure using the removal tool.

33. A method of removing one or more items from an apparatus configured for storing, preserving or transporting one or more items in a presence of dry ice, comprising the steps of:

receiving an apparatus at a first destination site, said apparatus comprising:

a tapered container and barrier-like structure;

the tapered container comprising an interior body section and an interior neck section, the interior body section extending between a first end and a second end, the interior body section at least partially defining an interior volume of the tapered container, the interior body section transitioning into the interior neck section, the interior neck section having

a single restrictive access opening extending into the interior volume of the tapered container;

the barrier-like structure disposed at least partially within the interior volume of the tapered container, said barrier-like structure partitioning the interior volume of the tapered container into a dry ice chamber and an internal product storage volume;

said internal product storage volume located within or affixed to an interior of the barrier-like structure, the internal product storage volume containing the one or more items; and

said dry ice chamber located external to the barrier-like structure, the dry ice chamber filled with at least a portion of the dry ice;

accessing the tapered container from the interior neck section;

directing a removal tool through the single restrictive access opening;

grasping the one or more items located within the internal product storage volume of the barrier-like structure using the removal tool;

withdrawing the removal tool with the one or more items attached to the removal tool without removal of the barrier-like structure and without discarding the dry ice contained in the dry ice chamber.

34. The method of claim 33, wherein the dry ice is maintained within the dry ice chamber.

35. The method of claim 32, further comprising introducing one or more items into the internal product storage volume of the barrier-like structure.

36. The method of claim 35, further comprising:
capping the tapered container;
preparing the apparatus for transport to a second destination site.

37. An apparatus with a single restrictive access opening for loading, positioning, removing, or accessing one or more items that can be stored, preserved or transported in a presence of dry ice, comprising:
- a tapered container with an interior volume defined by an interior body section and an interior neck section, the interior body section comprising at least a first region, wherein the first region is a dry ice chamber, said dry ice chamber adapted to receive substantially all of the dry ice that is selectively directed into the interior volume of the tapered container through the single restrictive access opening located at the interior neck section;
 - the interior volume of the tapered container further including a second region that is non-overlapping with the first region of the tapered container, wherein the second region is an internal product storage volume contained within a barrier-like structure, the internal product storage volume characterized by a substantial absence of the dry ice, the internal product storage volume configured to be accessed through the single restrictive access opening to remove or load the one or more items;
 - wherein said barrier-like structure partitions the interior volume of the tapered container into the first region and the second region, the barrier-like structure situated solely in the interior neck section, solely in the interior body section or within portions of the interior neck section and the interior body section;
 - further wherein the barrier-like structure is characterized as a barrier-like receptacle, said barrier-like receptacle having an access opening for accessing an interior region to receive the one or more items, said barrier-like receptacle comprising a retrieval member attached thereto, said retrieval member comprising an exposed retrieval member portion that extends out from or within the interior volume of the tapered container, said exposed retrieval member portion configured to be grasped to access the receptacle.