A package and a method for packaging one or more rolls of material are provided. The package includes a tray defining at least one cavity and at least one compressed roll of material positioned within a respective cavity. The package also includes a lid attached to a surface of the tray covering the cavity to define an enclosed volume and to enclose the at least one compressed roll within the enclosed volume.
COMPRESSED LAYERED ROLL PACKAGE AND ASSOCIATED METHOD

BACKGROUND OF THE INVENTION

[0001] 1) Field of the Invention

[0002] The present invention relates to compressed rolls of wound material and, more particularly, to a package for storing compressed rolls in a compressed form.

[0003] 2) Description of Related Art

[0004] The distribution of rolled paper products represents a multibillion dollar industry in the United States with one of the largest segments represented by the toilet or tissue paper segment, as well as the paper towel or kitchen towel market. The process by which both tissue and towels are made can be broken-up into two general steps. The first step involves the creation of the paper base sheet from pulp, while the second step involves converting the base sheet (from a large jumbo roll) to finished smaller roll products. While tissue is designed to be soft and degrade in septic tanks, kitchen towels are designed to be much stronger for use in absorbing spills, for use as placemats, and for cleaning.

[0005] Tissue and towels are generally made using multiple layers of base sheet. Tissue tends to have minimal glue between the layers, and generally at selected spots, while the individual plies in paper towels are generally adhered across their entire surface area. Both tissue and paper towels are embossed to create patterns which also help in strengthening the paper. The pulp drying process plays a significant role in the creation of the end product, with through air drying (TAD) producing the softest paper. Papers made using the TAD process are used to form the highest quality tissue and towel papers.

[0006] The converting machines used in the second step of the process for making both tissue and towels incorporate unwinders, embossers, rewinders, core handlers, gluers, accumulators, and log saws. Currently, these machines can produce as many as 1000 rolls of toilet paper or 400 rolls of paper towels per minute. Additional steps of wrapping, packing, and case packing are done after the log saw and are generally connected to the converting operation via conveyors.

[0007] The sales of rolled paper products occur through retail stores, bulk discount stores, and more industrial "away from home" markets. One of the major difficulties for retailers involves the disposal of boxes and other packaging used to ship the finished rolls. The inherent bulkiness of rolled paper products also requires stores to order on-demand, with the overall cycle from production to sale occurring over several days (e.g., a 45 day period). Bulkiness also limits the ability of manufacturers to set-up production facilities far from end-users, as transportation of the finished goods can be cost-prohibitive. For end-users, the purchase, transport, and storage of tissue and towels also prove difficult because of the large inherent volume.

[0008] Furthermore, tissue and towels typically include an inner core for dispensing individual rolls. The central core of tissue and towels is generally made of paper and is difficult to collapse without causing significant distortion and separation from the sheet. This is due to the amount of adhesive applied to the paper when attached to the core, as well as the type of adhesive used in forming the core. Additional innovations in the resiliency and fabrication of the core is needed.

[0009] It would therefore be advantageous to provide a package that is capable of storing compressed rolls of material. In addition, it would be advantageous to provide a package that is economical and effectively stores the rolls of material in a compressed form, as well as a package that facilitates individual dispensing of individual rolls. Furthermore, it would be advantageous to provide a core for the compressed roll of material that is capable of collapsing and expanding without significant distortion of the core and/or compressed roll.

BRIEF SUMMARY OF THE INVENTION

[0010] Embodiments of the invention address the above needs and achieve other advantages by providing a package for storing compressed rolls of material. The compressed rolls of material are stored within a tray and sealed under vacuum with a lid, such as a film. Thus, the package reduces the inherent bulkiness associated with conventional packages, which facilitates the storage and transport of the package. Furthermore, a method for forming the package may be employed that includes compressing the rolls of material and sealing the rolls within respective cavities defined in a tray. The compressed rolls may be sealed under vacuum such that the rolls are maintained in their compressed state.

[0011] In one embodiment of the present invention a package is provided and includes a tray defining at least one cavity, as well as at least one compressed roll of material (e.g., a paper roll) positioned within a respective cavity. The package also includes a lid attached to a surface of the tray covering the cavity to define an enclosed volume and to enclose the at least one compressed roll within the enclosed volume.

[0012] In various aspects of the package, the package includes a core positioned within the compressed roll. The core could be paper, foam, metallic, elastomeric, and/or thermoplastic materials, or the core could be a polymer core having a strain relief area. In addition, the core may include a plurality of layers of paper, and an elastomeric adhesive may be applied between respective layers of paper. The package could include a supplemental core attached to the tray.

[0013] Further variations of the package provide a tray having a handle defined therein. The tray may be a thermoformable material and may include a plurality of cavities defined therein. At least one compressed roll of material could be positioned within each of the cavities. Furthermore, the tray may include lines of weakening between respective cavities such that each cavity is capable of being separated from the tray along respective lines of weakening. Similarly, the lid may include lines of weakening such that at least a portion of the lid may be removed from the tray to expose at least one of the cavities. The lid could include lines of weakening proximate to each cavity such that each roll may be removed from a respective cavity without affecting the compression and pressure of the rolls within the remaining cavities. The bond between the lid and the tray may have a peel strength to the tray of less than about 0.5 to 4 pounds/
inch such that the lid is peelable from the tray. The tray may include a greater bending stiffness than the lid. The pressure within the enclosed volume may be less than the pressure outside of the enclosed volume, and one or more cavities may be partially evacuated such that the pressure within the package is sub-atmospheric.

[0014] The present invention also provides a method for packaging one or more rolls of material. The method includes providing a tray defining at least one cavity and compressing at least one roll of wound material. The method further includes positioning the compressed roll of material within a respective cavity, and sealing the compressed roll of material within the cavity by attaching a lid to a surface of the tray covering the at least one cavity.

[0015] In various aspects of the method, the method includes cutting a log of rolled material into a plurality of rolls. The positioning step may include positioning each of the compressed rolls of material within a respective cavity. The method may also include providing a tray defining a plurality of cavities, as well as forming lines of weakening in the tray between respective cavities such that each cavity is capable of being separated from the tray along respective lines of weakening. The method could further include forming a sheet of material into a tray defining at least one cavity. The providing step could also include providing a tray having a handle. Moreover, the method may include forming lines of weakening in a portion of the lid such that at least a portion of the lid is removable to expose a compressed roll of wound material positioned within a respective cavity. In addition, the method could include forming lines of weakening in the lid proximate to each cavity such that each roll may be removed from a respective cavity without affecting the compression of the rolls within the remaining cavities.

[0016] Additional aspects of the method include compressing the roll of wound material with a platen. The method may include compressing the roll of wound material radially, while the compressing and positioning steps may occur approximately simultaneously. The method may further include the step of reducing the pressure within the at least one cavity before sealing the lid to the tray, and/or compressing the roll below the surface of the tray prior to sealing the lid to the surface of the tray.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0017] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0018] FIGS. 1a, 1b, and 1c are isometric views generally illustrating the sequence of packaging rolls of material with a tray and a lid according to one embodiment of the present invention;

[0019] FIG. 2 is an isometric view of a compressible core according to one embodiment of the present invention;

[0020] FIG. 3 is an isometric view of a compressible core attached to the package of FIG. 1c according to an additional embodiment of the present invention;

[0021] FIG. 4 is an isometric view of the process for manufacturing the package of FIG. 1a, 1b, and 1c according to one embodiment of the present invention;

[0022] FIG. 5 is an enlarged isometric view of the compression process shown in FIG. 4; and

[0023] FIG. 6 is an enlarged isometric view of FIG. 4 illustrating the conveyors moving rolls of material from a cutoff saw to a vacuum packing area.

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0025] Referring now to the drawings and, in particular to FIGS. 1a-1c, there is shown a package 10 including a plurality of rolls of material 11 disposed therein. In particular, the package 10 includes a tray 12 having a plurality of cavities 13. As shown in FIG. 1b, the rolls 11 may be compressed and are capable of being positioned within a respective cavity 13. The tray 12 may be sealed with a lid 15 such that the rolls 11 are maintained in a compressed configuration while positioned within the cavities 13.

[0026] As used herein, the term “package” is not meant to be limiting as the package could be any enclosure capable of storing compressed rolls therein. Thus, the package could be any suitable tray and lid combination that is capable of storing one or more compressed rolls of material. Furthermore, the term “roll” is not meant to be limiting, as the rolls may include various wound materials that are capable of being compressed. For example, the roll could be a paper, tissue, towel, or foam material wound about a core. The roll of material may be compressed into various shapes, but would typically be compressed radially (i.e., perpendicular to the longitudinal axis of the core), as will be explained in further detail below.

[0027] The distortion of the roll 11 once the package is opened and the roll is uncompressed can be appreciable. Through Air Dried tissue with an approximate density of 0.02 lbs/in³ compressed by 30% of its original volume, performs well and can be easily reshaped. However, the rolls 11 may be various materials and densities if desired. For example, the roll 11 could be compressed between 20-70% of its original volume.

[0028] The tray 12 may comprise one or more thermoformable materials such as one or more thermoplastic (e.g., one or more of polyethylene homo- or co-polymers and polypropylene homo- or co-polymers. The tray 12 may define one or more cavities 13 defined therein. Each cavity 13 is sized and configured to receive a respective roll of material 11, and each cavity is separated from adjacent cavities by a divider or boundary 14 for separating individual rolls. As shown in FIGS. 1a and 1b, each cavity 13 includes a rectangular cross section such that a roll of material 11 that is compressed may be positioned therein. Furthermore, the tray 12 may also include a handle 16 that is formed in one end of the tray. Thus, the handle 16 may be integrally formed in the tray 12 or separately attached.
thereto and be used to carry the package 10. The handle 16 could be an aperture extending completely through a portion of the tray 12, or a recess or the like formed in the tray, and could be formed at various locations on the tray. In addition, the tray 12 could include a hanging rack hole (not shown) formed therein such that the package 10 may be placed on hanging racks, such as for retail.

[0029] The lid 15 may comprise a film that is sealed to the tray 12. The lid 15 may be sealed at least about the outer periphery of the tray 12 and may also be sealed along boundaries 14 defining individual cavities 13. Thus, the lid 15 could be a single sheet of material that seals all of the cavities 13. Alternatively, individual lids 15 could be sealed to respective cavities 13 if desired. Various techniques may be employed to seal the lid 15 to the tray 12, such as with an adhesive or by heat sealing. The lid 15 may be permanently affixed or peelable from the tray 12. For example, the peel strength between the lid 15 and tray 12 may be about 0.5 to 4.5 pounds/inch such that at least a portion of the lid is peelable from the tray. The peel strength is measured in accordance with ASTM F88-94. For further discussion of peel strength, see U.S. Pat. No. 6,630,237 to Rivett et al., entitled “Peelably Sealed Packaging, which is incorporated herein by reference.

[0030] The lid 15 may be sealed to the tray 12 to not only maintain individual rolls 11 within respective cavities 13, but also to help maintain a vacuum that is provided within the cavities. Although the seal between the lid 15 and tray 12 may be airtight, generally the seal between the lid and tray is capable of maintaining the pressure within the cavities 13 below atmospheric pressure. For example, the air pressure inside the package 10 may be at least about, and/or at most about any of the following: 14, 13, 12, 10, 8, 6, and 5 psia. In addition, the pressure differential between the external pressure and the internal pressure within the closed chamber may be at most about, and/or at least about any of the following, for example: 0.5, 1, 2, 3, 4, 5, 6, 8, and 10 psia. Furthermore, the pressure inside of the of the enclosed cavities 13 may be less than the pressure outside of the cavities (e.g., 14.7 psia) at least about any of the following number of days: 30, 40, 50, 60, 90, 120, and 180 days. In an additional embodiment of the present invention, the pressure inside of the package 10 may less than the pressure outside of the package at least momentarily. Additionally, the volume of the cavities 13 may be at least partially collapse over time (e.g., 1, 2, 12, and 24 hours) as the inherent counterforce of the rolls 11 against the lid 15 and tray 12 equilibrates.

[0031] The lid 15 may include one or more lines of weakening 17 (e.g., lines of a plurality of perforations or lines of scoring) such that individual cavities 13 can be opened along the lines of weakening without opening adjacent cavities. Thus, individual rolls 11 may be removed without affecting the compression of adjacent rolls. In other words, the remaining unopened cavities 13 remain closed, compressed, and under vacuum such that the rolls are also remain protected from contaminants. The lines of weakening 17 may be located along one or more edges or boundaries 14 about the periphery of the tray 12 or between each cavity 13, or at any other desired location such that a roll 11 is capable of being accessed and removed via the lines of weakening. In addition or alternatively, the package 10 may include lines of weakening extending between each cavity 13. Lines of weakening between cavities 13 allows for the separation of individual cavities from adjacent cavities.

[0032] The tray 12 and lid 15 can be various sizes, configurations, and materials in various aspects of the present invention. For instance, the tray 12 and lid 15 could be a thin flexible film or a thick and substantially inflexible material, but are generally capable of withstanding a vacuum that is drawn from the tray. For example, the tray 12 and lid 15 could be any of the following thicknesses: 0.25, 0.5, 1, 2, 4, 5, 8, 10, 12, 15, and 20 mls. Generally, the tray 12 includes a greater bending stiffness than the lid 15 to provide support and facilitate transport and storage of the packages 10. Moreover, although FIGS. 1a-1c illustrate a tray 12 having four cavities 13, the tray may include one or more cavities. In addition, although the tray 12 and cavities 13 are illustrated as having a rectangular cross section, the tray and/or cavities could be various cross sections, such as a square or circle, and could be capable of receiving compressed rolls 11.

[0033] Furthermore, each of the tray 12 and lid 15 can include one or more barrier resins to reduce the air (i.e., oxygen) permeation rate through the tray and lid. For example, the tray 12 and lid 15 could include ethylene/vinyl alcohol copolymer (“EVOH”), polyvinyl alcohol (“PVOH”), vinylidene chloride polymers (“PVdC”), polyolefin carbonate, polyester (e.g., PET, PEN), polyacrylonitrile (“PAN”), and polyamide. The tray 12 and lid 15 may include various amounts of barrier resins such as, for example, 50%. For a more detailed discussion of barrier resins, see U.S. Pat. No. 6,769,227 to Mumppower et al., entitled “Package Including a Ldstock Laminate,” which is incorporated herein by reference. The tray 12 and lid 15 could also be metallized or include a foil laminate to decrease the air permeation rate.

[0034] Each roll of material 11 is wound about a respective core 19. The core 19 is typically cylindrical having a hole defined along its longitudinal axis, where the hole may receive a spindle of a dispenser or other mechanism for facilitating unrolling of the roll 11. The core 19 could be various materials such as a paper, foam, metallic, elastomeric, or thermoplastic material. The core 19 is capable of being compressed, as well as expanding when the lid 15 is removed from the tray 12. An external force, such as pushing radially on the roll 11, may be required to aid in expanding the core 19 to its original shape or near original shape. However, the core 19 may experience some distortion during the compression and expansion of the roll 11.

[0035] FIG. 2 illustrates a modified extruded plastic core 19 with a strain relief area 28 designed to store the energy during collapse of the tissue core in direction 29. The strain relief area 28 extends parallel to the longitudinal axis of the core 19 and provides a flexible hinge for facilitating compression of the core. For example, the strain relief area 28 could be made by extruding a hinge along the inner wall of the core, where the hinge comprises a small flexible section of plastic with a “V” notch located at its bending point such that the hinge may bend about the “V” notch. In addition, paper cores including a plurality of layers of paper secured together with elastomeric adhesives may be employed to prevent disintegration or peeling when compressing the rolls 11 and cores 19. Moreover, the core 19 could be configured to self-expand to its original shape or near original shape without any external force.
While replacement of the core 19 with a more compressible energy-storing core is possible, it is typically not practical to do so. Instead, a modified insertion core can be provided as an adjunct to the package. For example, FIG. 3 shows the attachment of an extra core 19' to the package 10 to form a package 30. The extra core 19' is provided to allow consumers to either replace the core currently positioned within the roll 11, or position the core within the existing core to maintain consistent rolling characteristics in a dispenser. In one embodiment of the present invention, an additional cavity may be formed in the tray 12 for accommodating the core 19'. Furthermore, although the core 19 and extra core 19' are typically hollow, the core could be solid in order to achieve a desired resiliency and/or to provide additional support for a particular material.

FIG. 1a illustrates rolls of material 11 placed above a thermoformed tray 12 with corresponding cavities 13 and an integrated handle 16. The rolls 11 are compressed into the form shown in FIG. 1b and positioned into cavities 13. The rolls 11 are shown as having a rectangular cross section; however, the rolls could be compressed to various cross sections (e.g., oval) depending on the type of material or the amount and/or direction of the compressive force on the roll. The process of compressing the rolls 11 can be done outside or inside of the cavity 13 and, in some cases, may be used to create the shape of the cavity 13. A lid 15 is secured to the outer edges 18 of the tray 12 forming the completed package 10. Upon removal of the lid 15, the roll 11 may expand outwardly to its original shape or to a shape that includes some distortion due to the compression of the roll and core 19.

Moreover, sequential cavities 13 can be formed, filled, and sealed to produce a completed cluster of compressed rolls 11 stored within the package 10. Filling of the cavity 13 with a compressed roll 11 may be performed in such a manner to prevent the roll from expanding past the open top end of the cavity. The roll 11 may be compressed to a greater degree than required due to the fact that the roll may expand towards its original shape before the roll is sealed within a cavity 13. Therefore, during the time the roll 11 expands to the open top end, the top end may be sealed with the lid 15 while the pressure is released.

FIGS. 4, 5, and 6 illustrate one embodiment of the present invention, which provides a production system for forming and filling the package in the sequence described in FIGS. 1a, 1b, and 1c. The production of the package 10 is typically situated immediately after a log cutter 50 that slices tissue logs 24 into individual rolls, and the rolls 11 are transported in groups 31 via a conveyor 25 to a station 22 for compressing the rolls within respective packages. Base material 60 is unwound from roll 61 and formed at station 21 into trays 12. Individual cavities 13 are formed within each tray, and a handle 16 may also be formed therein if desired. The rolls 11 are compressed in group 31 at station 22 by a platen 40 and forced into cavities 13. A top layer 26 (i.e., lid 15) is sealed to the tray 12 at station 23 while the rolls 11 are compressed and air is evacuated from the cavities 13. Station 25 may also print, cut, and perforate both the top layer 26, as well as the tray base material 60 between cavities 13. In some cases, station 27 applies a supplementary core 41 to the package 10 to form the package 30. The package 10 or 30 exits at area 70. Transport of the finished packages 10 or 30 can be done directly on a pallet without the need for additional boxes or cartons and further avoiding additional wrapping. Multiple assemblies of packages 10 or 30 can also be bundled into groups and shrink wrapped. The production system may comprise a thermoforming machine that may produce at least about 500 cavities/minute, or the production system may comprise a plurality of thermoforming machines to meet the desired production rate.

Various processes or techniques may be employed to form the packages 10 and 30. For example, the rolls 11 could be compressed with the platen 40 before positioning the rolls within respective cavities 13 (FIG. 5), or stations 21 and 22 (FIGS. 4 and 5) could be combined into a single operation such that compressing the rolls while positioned on the tray base material 60 also forms individual cavities. Furthermore, rolls 11 may be cut, compressed, and/or sealed individually rather than as a group 31. Trays 12 may be formed using various processes such as thermoforming or injection molding. Moreover, additional processes may be employed such as a converting process for making rolls of tissue or towels.

The present invention may provide one or more advantages. For example, the package 10 stores compressed rolls of wound material, such as rolled tissue and towels, which significantly reduces the inherent bulk of these products and facilitates the purchase, transport, and storage of the rolls. Thus, packages are aesthetically pleasing, and the amount of packaging required to ship the rolls of material from a manufacturing facility to a retailer is reduced. The packages may be formed consistently into regular shapes such that handling and storage of the packages, such as by stacking multiple packages, is improved. In addition, the process for packaging the compressed rolls of material may be integrated with current manufacturing processes generally used to make rolls of material. Moreover, the package can maintain the compressed rolls in a compressed state without bulging, and each compressed roll may be stored within individual cavities defined in the tray. The package may provide for individual opening of sequential cavities of the package, as well as the separation of a cavity from the tray itself. When removed from the tray, the compressed rolls of material and/or core may expand to a usable form. The core may be specifically configured to collapse and expand between compressed and uncompressed positions, which reduces the incidence of damage to the core and/or roll of material.

Many modifications and other embodiments of the invention set forth herein will come to mind to one skilled in the art to which the invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed:
1. A package comprising:
   a tray defining at least one cavity;
   at least one compressed roll of material positioned within a respective cavity; and
a lid attached to a surface of the tray covering the at least one cavity to define an enclosed volume and to enclose the at least one compressed roll within the enclosed volume.

2. The package according to claim 1, wherein the compressed roll of material comprises a paper roll.

3. The package according to claim 1, further comprising a core positioned within the compressed roll.

4. The package according to claim 3, wherein the core comprises one or more of paper, foam, metallic, elastomeric, and thermoplastic materials.

5. The package according to claim 3, wherein the core comprises a polymer core having a strain relief area.

6. The package according to claim 3, wherein the core comprises a plurality of layers of paper, and wherein an elastomeric adhesive is applied between respective layers of paper.

7. The package according to claim 1, further comprising a supplemental core attached to the tray.

8. The package according to claim 1, wherein the tray comprises a handle defined therein.

9. The package according to claim 1, wherein the tray comprises a thermoformable material.

10. The package according to claim 1, wherein the lid has a peel strength to the tray of less than about 0.5 to 4 pounds/inch.

11. The package according to claim 1, wherein the tray comprises a plurality of cavities defined therein.

12. The package according to claim 11, wherein at least one compressed roll of material is positioned within each of the plurality of cavities.

13. The package according to claim 11, wherein the tray comprises lines of weakening between respective cavities such that each cavity is capable of being separated from the tray along respective lines of weakening.

14. The package according to claim 11, wherein the lid comprises lines of weakening such that at least a portion of the lid may be removed from the tray to expose at least one of the cavities.

15. The package according to claim 14, wherein the lid comprises lines of weakening proximate to each cavity such that each roll may be removed from a respective cavity without affecting the compression and pressure of the rolls within the remaining cavities.

16. The package according to claim 1, wherein a pressure within the enclosed volume is less than a pressure outside of the enclosed volume.

17. The package according to claim 16, wherein the at least one cavity is partially evacuated such that the pressure within the package is sub-atmospheric.

18. The package according to claim 1, wherein the tray includes a greater bending stiffness than the lid.

19. A method for packaging one or more rolls of material comprising:

   providing a tray defining at least one cavity;
   compressing at least one roll of wound material;
   positioning the compressed roll of material within a respective cavity; and
   sealing the compressed roll of material within the cavity by attaching a lid to a surface of the tray covering the at least one cavity.

20. The method according to claim 19, further comprising cutting a log of rolled material into a plurality of rolls.

21. The method according to claim 20, wherein positioning comprises positioning each of a plurality of compressed rolls of material within a respective cavity.

22. The method according to claim 19, wherein providing comprises providing a tray defining a plurality of cavities.

23. The method according to claim 22, further comprising forming lines of weakening in the tray between respective cavities such that each cavity is capable of being separated from the tray along respective lines of weakening.

24. The method according to claim 19, further comprises forming lines of weakening in a portion of the lid such that at least a portion of the lid is removable to expose a compressed roll of wound material positioned within a respective cavity.

25. The method according to claim 24, wherein forming comprises forming lines of weakening in the lid proximate to each cavity such that each roll may be removed from a respective cavity without affecting the compression of the rolls within the remaining cavities.

26. The method according to claim 19, wherein compressing comprises compressing the roll of wound material with a platen.

27. The method according to claim 19, wherein compressing comprises compressing the roll of wound material radially.

28. The method according to claim 19, wherein the compressing and positioning steps occur approximately simultaneously.

29. The method according to claim 19, further comprising reducing the pressure within the at least one cavity before enclosing the at least one cavity with the lid.

30. The method according to claim 19, wherein providing comprises providing a tray comprising a handle.

31. The method according to claim 19, further comprising forming a sheet of material into a tray defining at least one cavity.

32. The method according to claim 19, further comprising compressing the roll below the surface of the tray prior to sealing the lid to the surface of the tray.

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