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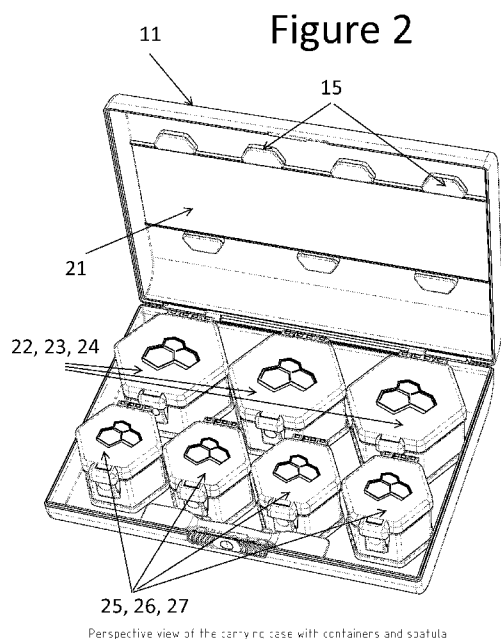
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(57) Abstract: The present disclosure relates to a travel kit which includes a carrying case including a bottom portion and a top portion. The top portion connects to the bottom portion via a fastening means. The kit includes a plurality of containers for the carrying and storage of liquid and similar substances. The containers include a lid with a locking mechanism. The case includes a plurality of securing means attached to the interior wall of the top portion of the carrying case which corresponds to the shape of the plurality of containers and receives the plurality of containers. The case includes a plurality of raised edges attached to the interior bottom wall of the bottom portion of the carrying case. The plurality of raised edges correspond to the shape of the plurality of containers and receives the plurality of containers. The kit includes an instrument for transferring liquid or similar substances into.

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LIQUID CARRYING CASE FOR TRAVEL

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to U.S. Provisional Patent Application 61/788,657, filed on March 15, 2013, the disclosure of which is incorporated herein by
10 reference in its entirety for any purpose whatsoever.

BACKGROUNDField

The present application relates to a travel carrying case for liquid based products
15 used in personal care.

Description of Related Art

In August 2006, the Transportation Security Administration (hereinafter TSA) enacted the "311" rules that stipulate any liquids passing through security checkpoints
20 must be only for personal use, and must be placed in containers of 3.4 ounce or less, and all containers must fit into a 1 quart (QT) bag. The TSA 311 rule = 3 ounces (oz.) liquid, 1 QT plastic baggie, per 1 person.

The TSA's focus has been, and will continue to remain, squarely on managing liquid carry-ons to find explosive weapons, such as those that are carried in ordinary
25 skin cream jars and in liquids containers. For this reason, it is not expected that the TSA will loosen the restrictions on the liquid 311 rules in the near future. In addition, large consumer brands in the personal product space spend millions on developing and

5 enhancing brand loyalty to their products, but they rarely manufacture their products in small convenient travel sizes.

Current inexpensively made travel tubes are hard to fill, difficult to clean, and usually not meant to store liquid products contents over long periods. If the traveler has liquid product left over in the container after the trip, the unused lotion may have to be
10 discarded, thus wasting valuable and expensive skin-care products. Additionally, these travel bottles and tubes may not be watertight sealed and may leak into travel bags. Moreover, other travel tubes and bottles containers currently available are sometimes made from unidentified types of plastics (unless there is a recycling symbol on the bottom) and are made, look and feel inexpensive and are usually not dishwasher safe.
15 The present application provides improvements over the state of the art as described herein.

SUMMARY OF THE DISCLOSED EMBODIMENTS

Advantages of the present disclosure will be set forth in and become apparent
20 from the description that follows. Additional advantages of the disclosure will be realized and attained by the methods and systems particularly pointed out in the written description and claims hereof, as well as from the appended drawings.

The present disclosure relates to a travel kit which includes a carrying case having a bottom portion and a top portion. The top portion connects to the bottom portion via
25 a suitable fastener. The kit includes a plurality of containers for the carrying and storage of liquid and similar substances. The containers include a lid with a locking mechanism. The case includes a plurality of securing connectors attached to the interior wall of the top portion of the carrying case which corresponds to the shape of

5 the plurality of containers and receives the plurality of containers. The case includes a plurality of raised edges attached to the interior bottom wall of the bottom portion of the carrying case. The plurality of raised edges correspond to the shape of the plurality of containers and receives the plurality of containers. The kit includes an instrument for transferring liquid or similar substances into the plurality of containers which is
10 secured to the interior of the carrying case.

The present disclosure relates to a container for holding liquids which includes an upper portion with a top lid with a interior perimeter fitted gasket and a bottom portion with a hollow interior compartment for receiving liquids and similar substances. The bottom portion includes a perimeter for receiving the interior fitted gasket. The
15 container includes a fastening means affixed to the external wall of the bottom portion and a hinge attached to the bottom portion and top lid. The upper portion of the container is sealed to the bottom portion through the interior fitted gasket and further secured by the fastener.

In some implementations, the present application's liquid carrying travel case
20 meets the burden placed on airline travelers by allowing a traveler to pass through TSA security screening checkpoints and travel on the airplane with multiple containers of 3 ounces (oz.) or less of personal liquids, such as shampoo, hair conditioners, skin creams, liquid cosmetics, etc. in compliance with the TSA 311 rules.

The liquid carrying case of the present application benefits a more affluent
25 traveler that is more conscious of and concerned with their appearance, health and status. Such a traveler typically uses more expensive personal liquid products, yet still is cost conscious and unlikely to purchase expensive skin creams when traveling to avoid

5 the TSA rules or checking bags. The target market consumer would rather have some way to bring these expensive products with them in small quantities.

The liquid carrying case is not limited to air travel. The liquid traveling case is used in many other traveling situations where personal liquids (i.e. skin and hair liquid products) may be carried for personal consumption in watertight containers.

10 Illustrative embodiments of the liquid carrying case includes plastic Tritan® material (a type of branded engineering polymer co-polyester plastic from Eastman Chemical Company (Kingsport, TN)) containers which are water-clear, highly durable, chemical and heat resistant while being dishwasher safe, food-grade and BPA-free. The liquid container design is open at the top and the containers are durable and sturdy
15 enough to allow a user to efficiently and completely wash it out using nothing more than ordinary dishwasher detergent. Containers will be very easy to clean by hand or placed into a dishwasher.

If the containers are used for air travel, the cargo hold of any airplane is pressurized but very often unevenly temperature controlled. The cargo hold of the
20 airplane and the airport tarmac in a colder location, could drop to or below freezing and if travel bags are left in those cold environments long enough, the bag's liquid contents could freeze as well, and through liquid freezing and the subsequent container expansion, would present a leaking hazard when the frozen liquids thaw out. The liquid carrying case of the present application solves this problem because the container
25 design has a well built into the bottom of the container and at the top lid to accommodate a liquid freezing inside without breaking the gasket seal.

It is to be understood that the foregoing general description and the following detailed description are exemplary and are intended to provide further explanation of

5 the disclosed embodiments. The accompanying drawings, which are incorporated in and constitute part of this specification, are included to illustrate and provide a further understanding of the disclosed methods and systems. Together with the description, the drawings serve to explain principles of the disclosure.

10 BRIEF DESCRIPTION OF THE FIGURES

Figure 1 is a perspective view of an exemplary carrying case and locking mechanism.

Figure 2 is a perspective view of the carrying case with containers and spatula.

15 Figure 3 is an alternative perspective view of the carrying case with top lid showing the bumpers and mirror.

Figure 4 is a perspective view of the bottom lid of the carrying case showing the securing ridges.

Figure 5 is a perspective view of an individual container in a closed position.

Figure 6 is a perspective view of an individual container in an open position.

20 Figure 7 is a perspective view of the large and small individual containers.

Figure 8 is a perspective cross sectional view of the individual container.

Figure 9 is a perspective view of the spatula.

Figure 10 is the perspective views of the internal gasket of the individual container.

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DETAILED DESCRIPTION

As shown in Figure 1, an illustrative liquid carrying case 10 of the present application is a personal liquid carrying case designed to be a luxury travel goods product primarily targeted to female travelers. The purpose of the liquid carrying case is to allow a traveler to pass through TSA security screening checkpoints and travel on the airplane with 3 ounces (oz.) or less of personal liquids, such as shampoo, hair conditioners, skin creams, liquid cosmetics, etc. in compliance with the TSA 311 rules. The liquid travel case usage is not limited to airline travel and the case is used for other types of travel by car or elsewhere to carry hair and skin liquid products.

15 The liquid carrying case 10 includes an external shell case top lid 11 and shell case bottom lid 12 with a sliding latch 13 located on the bottom lid 12 that locks into an indented latch shelf 14 built into the top lid 11. The illustrated case 10 is rectangular and measures approximately 6 inches width by 8 inches length and 1.7" inches in height (6W x 8"L x 1.7"H), but it will be appreciated that these dimensions are non-limiting examples. The internal surface of the top lid has an illustrative logo in raised embossing. In another embodiment, the carrying case can include a variety of shapes and sizes. In another embodiment, the case can be closed by a spring loaded sliding latches, pull up latches, buttons, levers or snaps.

25 An example of a complete travel kit can be equipped with a mirror 21 affixed to the top lid 11 (as shown in Figure 2), seven rubber bumpers 15 on the inside top lid 11 that secure the liquid containers, a separate spatula (as shown in Figure 2 and in Figure 9) that is used to transfer liquid products to the liquid containers, a protective nylon

5 pouch cover (not shown) and an accompanying sheet of clear, white or colored adhesive labels for the containers (not shown).

As shown in Figure 2, the carrying case can be fitted with seven internal containers - 3 large (2 oz.) containers 22, 23, 24 and 4 (1 oz) small containers 25, 26, 27 that are shaped into hexagons. In another embodiment, the case can include other
10 transferring instruments, such as a spoon or a plastic or wooden instrument. In another embodiment, the case can include more or less containers of varying sizes and shapes.

The liquid products are placed into the liquid containers and not within the outer external case. As shown in Figure 3, the top lid 31 of the external case 30 has a mirror attached 32, and seven (e.g., rubber) bumpers 33 to hold the containers in place and a
15 spatula (as shown in Figure 2) that is secured inside the case. In another embodiment, the outer case can be made from either a co-polyester plastic or ABS. The bottom lid of the case 35 can have radius bumps (not shown) for feet to keep the case from sitting directly on a table. The bumps can have an average diameter of $\frac{1}{4}$ " , for example, or any other suitable dimension. In another embodiment, indented discs can be added to the
20 outer case hinge to allow for the top lid to be adjusted into a plurality (2, 3, 4...) different positions. In another embodiment, the outer case can contain a spring for the latch so that when the top lid is closed against the bottom lid, the spring loaded latch seals the top lid to the bottom lid. In another embodiment, the thickness of the top lid of the individual container can be increased by .030" so it does not warp under pressure. This
25 will enhance the container top lid's stability when closed.

In another embodiment, the sides of the outer case, where the top and bottom lids meet, can be longer to further stabilize the case when sealed. In a further

5 embodiment, the carrying case can be imprinted with designs utilizing a hydrographic printing process. The designs are preferably disposed only on the outside of the case.

In another embodiment, the outer case can be square or box shaped and has less curvature in the front. In this embodiment, a flatter (instead of curved front design) outer case design is equipped with a pull-up spring loaded clasp instead of a sliding
10 latch. The pull-up clasp can be attached to prongs on the bottom lid. In another embodiment, the clasp can be metal and may be adorned with decorations. In another embodiment, the bottom lid of the container can include a secondary insert affixed to the interior bottom of the case that would have hexagonal holes corresponding to the size of the liquid containers and designed to hold the liquid containers. This insert can
15 replace the rubber bumpers in the lid to secure the containers during transit.

As shown in Figure 4, the spatula holder 42 can be on the bottom lid and have two sets (4 in total) of prongs protruding from the bottom with ridges to secure the spatula. The spatula can snap into the prong ridges flat horizontally on the bottom of the case. In another embodiment, the prong ridges can be on the top lid such that the
20 spatula is held vertically instead of flat horizontally. In another embodiment, the spatula can slide into the ridge prongs vertically.

Illustrated are two sizes of internal containers - large (2 oz.) and small (1 oz.), wherein both are shaped into a hexagonal external shape. The carrying case can be configured to accommodate different sizes and shapes of containers. In such cases, the
25 corresponding bumpers on the inside of the top portion of the case can be designed to receive and secure the various shaped and sized containers. The case can be equipped with 3 large containers each measuring approximately 2.6"width by 1.5" height with a 2

5 fluid ounce capacity and 4 small containers each measuring approximately 1.9” width by 1.5” height with a 1 fluid ounce capacity.

As shown in Figure 4, each container can be secured on the bottom of the outer case by placing the container into a hexagonal raised edge 44 that lines the interior of the case’s bottom and follow the hexagonal shape of each of the containers. Each individual container can be removable from the raised edges in the bottom of the external shell case. In another embodiment, the hexagonal ridges may contain vertical guides on each side of the ridge of about 3/8 or 1/2” tall that guide the liquid containers into the hexagonal pocket. These vertical guides protrude out from each side of the hexagonal pockets.

15 Figure 5 shows perspective views of illustrative individual closed containers. Figure 6 shows perspective views of the individual containers in an opened position. Figure 7 shows the perspective views in relation to the differences in size between the large container and the small container. Each internal container is preferably sealable and watertight when closed to prevent the personal liquids from leaking out during travel. The lid on each container can be fitted with a hexagonal gasket to ensure watertight sealing. Figure 8 shows the gasket locking mechanism of the containers. Figure 10 shows a front and side perspective view of the gasket. The gasket may be made from silicone, polyurethane, or polyethylene, for example. The containers are preferably made out of a food-grade, free of bisphenol A (BPA), high clarity, highly durable, and dishwasher-safe type of plastic called Tritan (a branded type of copolyester) made by Eastman Chemical Company. In another embodiment, the gasket may be larger on the outside and larger on the inside.

5 The hinge/latch design of the internal containers is a useful design that prevents the containers from popping open unexpectedly during transit and requires a secondary manual motion in order to open the lid. As shown in Figure 6, the hinge 61 is raised and there are reinforcing support ridges 62 that extend to the container body 60 that reinforce the hinge. In another embodiment, the indent on the liquid container latch
10 lever is convex instead of concave so it is easier to open.

 As shown in Figure 6, In a preferred embodiment, the liquid containers are sealed and secured with a flexible external latch lever 63 that extends down the front of the container body 60. When the latch lever 63 is sealed it catches into a latch shelf 65 which is a molded undercut built into the container top lid 64. The external latch lever
15 63 on each container 60 is a separate plastic strip extending the length of the front of the container. In order to open the containers, the top front external latch lever 63 is pressed inwards, which releases it from the undercut latch shelf 65 built into the top lid 64. The top lid 64 is manually pulled up and open in order to open the container. When the container is sealed, the latch lever 63 is secured to the top lid 64 by the molded
20 undercut latch shelf 65.

 The design of the container's lids are preferred for preventing the lids from being jostled open when the liquid carrying case is inserted into a checked travel bag. The hinge/latch design also prevents the lid from being accidentally popped open if liquid contents freeze inside the container when placed into the airplane's cargo hold or left on
25 the tarmac in a cold temperature environment during airplane transfers.

 In another embodiment, the latch can be extended lower down the container by a small distance (e.g., 1/4"). In another embodiment, a small bead (e.g., 1/16") can be

5 located around the container lid on rim of the lid. The bead can be to assist a traveler in prying the container lid open. In another embodiment, the ridge surrounding the container is not included on the front of the container but the ridge is included on all other sides around the perimeter of the container.

As described above, Figure 8 shows a cross sectional view of an individual
10 container. The container 80 includes a latch shelf (a), latch lever (b), internal gasket (c), hinge (d), container top lid (e) and a container body (f). As described above the latch lever fits into the latch shelf to secure the container top lid to the container body. The hinge connects the top lid and the container body and further controls the opening and closing of the top lid. The internal gasket is further show in Figure 10.

15 The cargo hold of any airplane is pressurized but may have uneven temperature control unless there are animals, plants or other temperature sensitive cargo on board. The cargo hold of the airplane, and certainly the airport tarmac in a colder location, can drop far below the freezing point of water, and if travel bags are left in those environments long enough, the bag's liquid contents can freeze as well. The present
20 disclosed embodiments are preferably configured to withstand the pressure changes that occur in a passenger cabin when an airplane takes off and lands.

An airplane will typically normalize its pressure at 8000 ft. (10.9 psia) when ascending into the air. To simulate those conditions, exemplary containers made in accordance with the teachings herein underwent testing in a polycarbonate tank with a
25 vacuum transducer in order to simulate the change in pressure from sea level at 14.7 psia to 8000ft 10.9 psia that is a pressure decrease of 3.8 psi (7.74 Hg), 1 inch of Mercury (Hg) = 0.4911541 psia. The containers were filled about 2/3 full of water and then placed upside down on absorbent paper in the vacuum chamber. The pressure was

5 then decreased inside the chamber to -8 Hg for 30 seconds. The test revealed that no water escaped the container nor did water visually appear on the absorbent paper.

The front external latch lever configuration of the containers has been designed to withstand the expansion pressure caused by freezing liquids. Water is known to expand by about 9% upon freezing and since many personal liquids – particularly
10 shampoos and hair conditioners have a high content percentage of water, they can freeze as well given cold enough temperatures. The external front latch lever configuration prevents the accidental opening of the lid during travels and also adds extra protection against the containers opening when liquids freeze inside.

As a secondary precaution, the containers can also be designed with space for
15 expansion at their bottom and top lids in case the liquids inside may freeze and expand. In the event the liquids do freeze inside the containers, since the external front clasp latch requires a manual effort to open, the lid cannot just pop open as long as the container is not overfilled. It is recommended that containers should be filled no more than the bottom lip of the container's lid.

20 The liquid carrying case is intended to carry personal liquids onto an airplane but is also used for travel anywhere personal liquids need to be taken, for example in a car or to the gym. The illustrated configuration of three large containers and four small containers can be particularly advantageous, based on the types of personal liquids and amounts of each liquid a traveler used during a trip. For example, the three large
25 containers can hold liquids required in larger amounts like shampoo, conditioner and sunscreen lotions. The four small containers can hold liquids used in smaller amounts like liquid cosmetic foundation, and a variety of different skin creams like day cream, night cream, eye creams, etc.

5 Since each container fluid volume capacity is fairly small, the liquid carrying case product is designed for a frequent traveler who may want to carry a variety of personal liquids in small amounts for short trips. The liquid carrying case is used for both the personal and business traveler.

10 All types of travelers, including those who travel for personal purposes as well as business, may also want to use the liquid carrying case if they have at some point in their past travels, had a lot of personal products confiscated at the TSA security checkpoints for non-compliance with the TSA 311 rules.

15 Another benefit of the containers is that, in some embodiments, they can be made from a specially designed plastic called Tritan® plastic, which is a copolyester resin and not a polycarbonate (which contains BPA). The Tritan ® plastic does not contain BPA and therefore will not leach BPA (a harmful chemical) into the skin or hair liquid products. The liquid containers can be made from an FDA food-grade rated version of Tritan copolyester plastic resin. Since this chemical leaching will not occur, and the plastic used is food-grade, the internal compartment containers can also be used
20 for long-term storage of any unused liquid products – i.e. skincare lotions- remaining at the end of trip. Thus, expensive skin creams and the like will not be wasted by having to discard them when the trip is over.

25 The liquid carrying case is useful for the frequent traveler who is a loyal consumer of commercial skin-care lotions and creams, shaving creams, makeup and other liquid personal products. Large consumer brands in the personal product space spend millions of dollars on developing and enhancing brand loyalty to their products, but they rarely manufacture their products in small convenient travel sizes. Many of the commercially available brand skin care product sizes are over 3 oz., or if they are under

5 3oz, the jar is often large and bulky and won't fit into a 1 QT size plastic bag as required by the TSA. Because of the size constraints for traveler's favorite products, many business airline travelers are forced to place their favorite skin creams into checked suitcases that otherwise may be more conveniently carried onto the plane.

10 Alternatively, for the frequent airline travelers who cannot or will not check their bags, they usually won't be able to use their favorite liquid products. These travelers are forced to buy other skin care products, often of inferior quality, or travel sized skin-care products available at pharmacies for their carry-on bags. Applicant intends that the product shall be sold and marketed under the name Airsafe Carryon™.

15 Various other components may be included and called upon for providing for aspects of the teachings herein. For example, additional materials, combinations of materials and/or omission of materials may be used to provide for added embodiments that are within the scope of the teachings herein. In the present application a variety of variables are described, including but not limited to components and conditions. It is to be understood that any combination of any of these variables can define an embodiment
20 of the disclosure. Other combinations of articles, components, conditions, and/or methods can also be specifically selected from among variables listed herein to define other embodiments, as would be apparent to those of ordinary skill in the art.

25 When introducing elements of the present disclosure or the embodiment(s) thereof, the articles "a," "an," and "the" are intended to mean that there are one or more of the elements. Similarly, the adjective "another," when used to introduce an element, is intended to mean one or more elements. The terms "including" and "having" are intended to be inclusive such that there may be additional elements other than the listed elements.

5 While the disclosure refers to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the disclosure. In addition, many modifications will be appreciated by those skilled in the art to adapt a particular instrument, situation or material to the teachings of the disclosure without
10 departing from the spirit thereof. Therefore, it is intended that the disclosure not be limited to the particular embodiments disclosed.

5

CLAIMS

What is claimed is:

1. A travel kit including:
 - a) a carrying case comprised of a bottom portion and a top portion; the top
10 portion configured to connect to the bottom portion via a fastener;
 - b) a plurality of containers for the carrying and storage of liquid and similar
substances, said plurality of containers including a lid with a locking mechanism;
 - c) a plurality of connectors attached to the interior wall of the top portion of
the carrying case, the securing means corresponding to the shape of the plurality of
15 containers and adapted and configured to receive the plurality of containers;
 - d) a plurality of raised edges attached to the interior bottom wall of the
bottom portion of the carrying case having a shape corresponding to the shape of the
plurality of containers and adapted and configured to receive the plurality of containers;
 - e) an instrument for transferring liquid or similar substances into the
20 plurality of containers, the instrument secured to the interior of the carrying case.
2. The travel kit of Claim 1, wherein the plurality of containers include varying sizes
and shapes, and said plurality of containers correspond to the connectors.
- 25 3. The travel kit of Claim 1, wherein the locking mechanism is located in an internal
perimeter of an outer lid of the plurality of containers.
4. The travel kit of Claim 1, wherein the plurality of containers are hexagonal and
provided in two different capacities.

- 5 5. The travel kit of Claim 1, wherein the top and bottom portions are made from plastic.
6. The travel kit of claim 1, wherein the instrument for transferring liquid is a spatula.

Figure 1

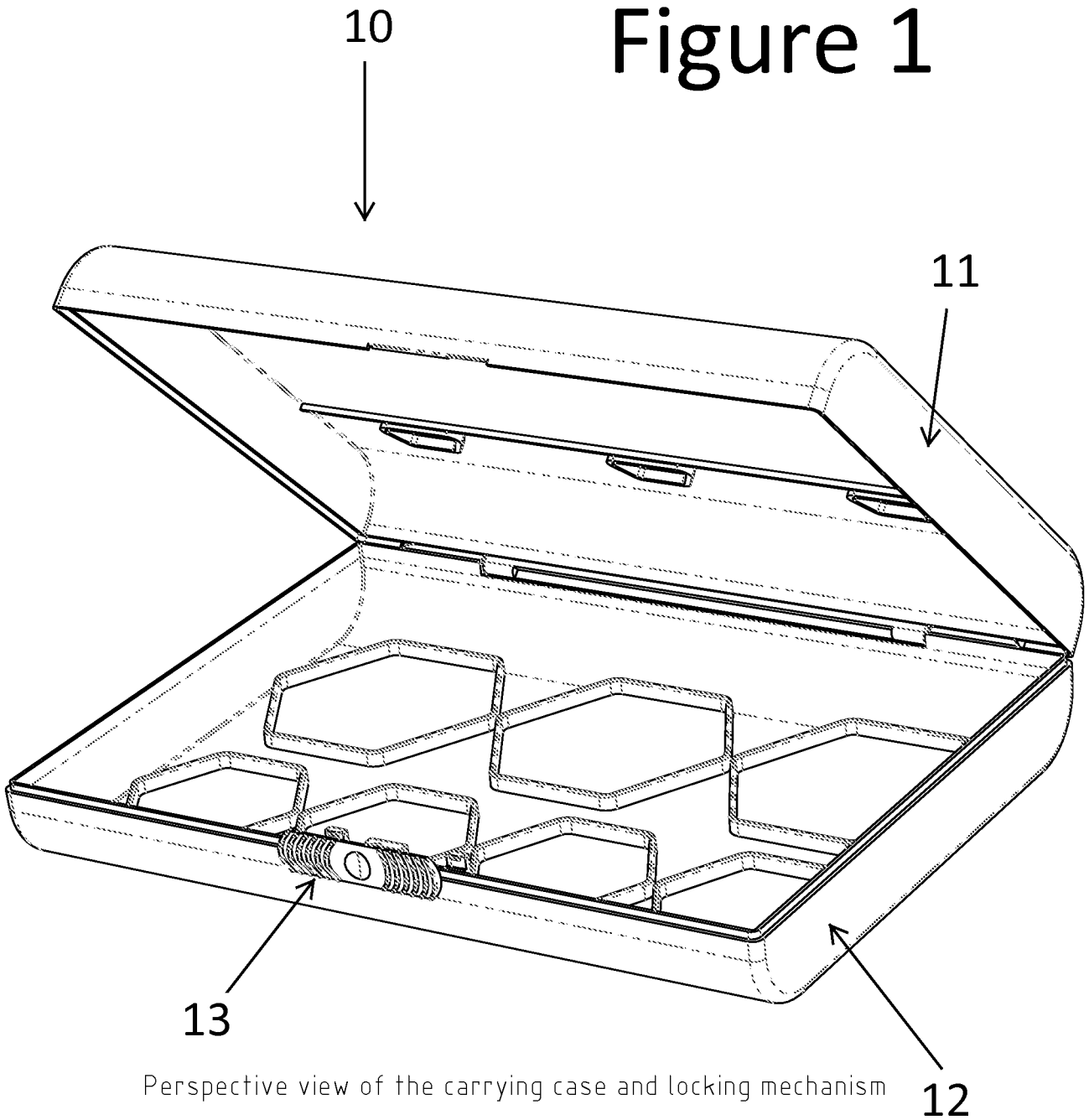
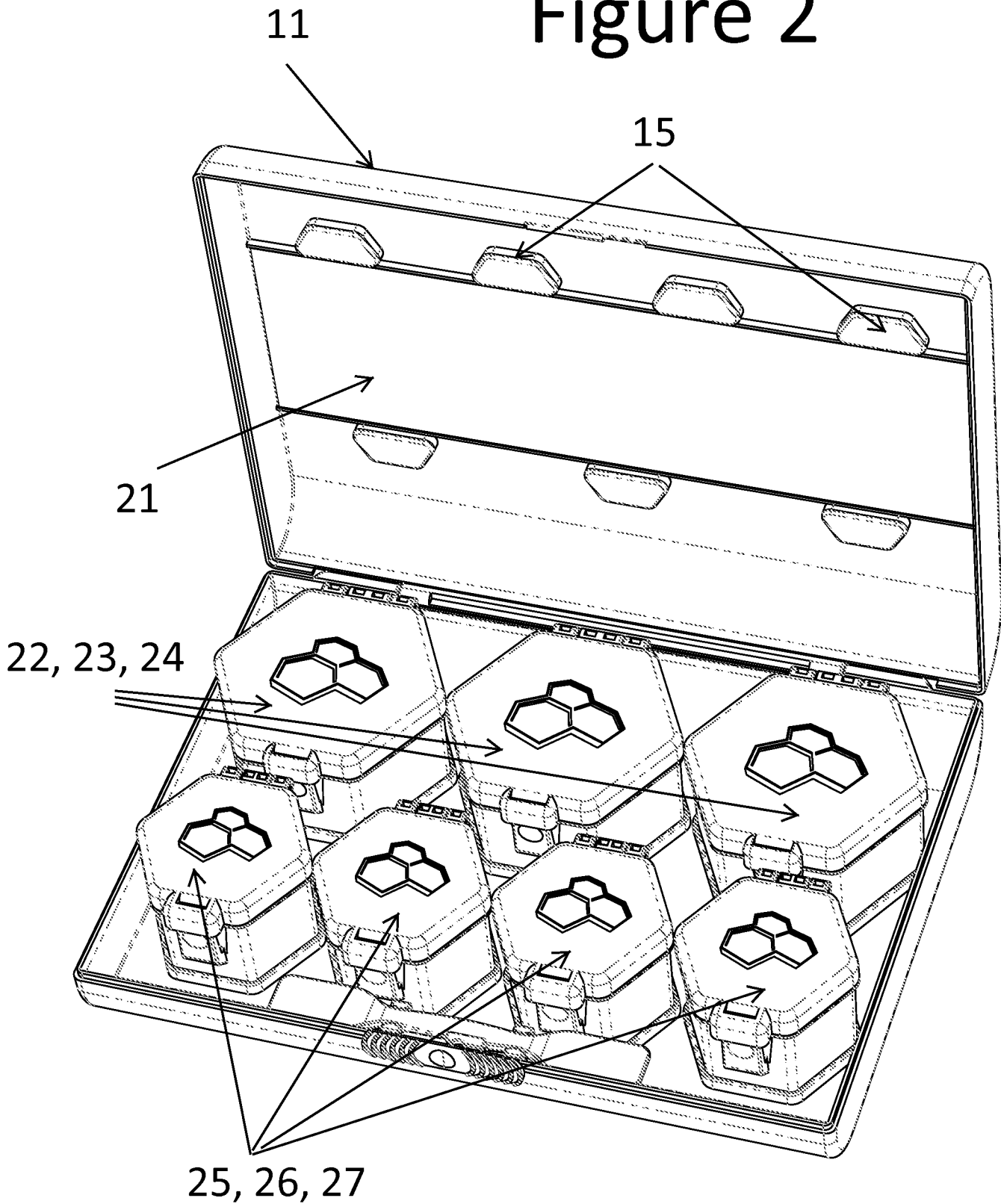
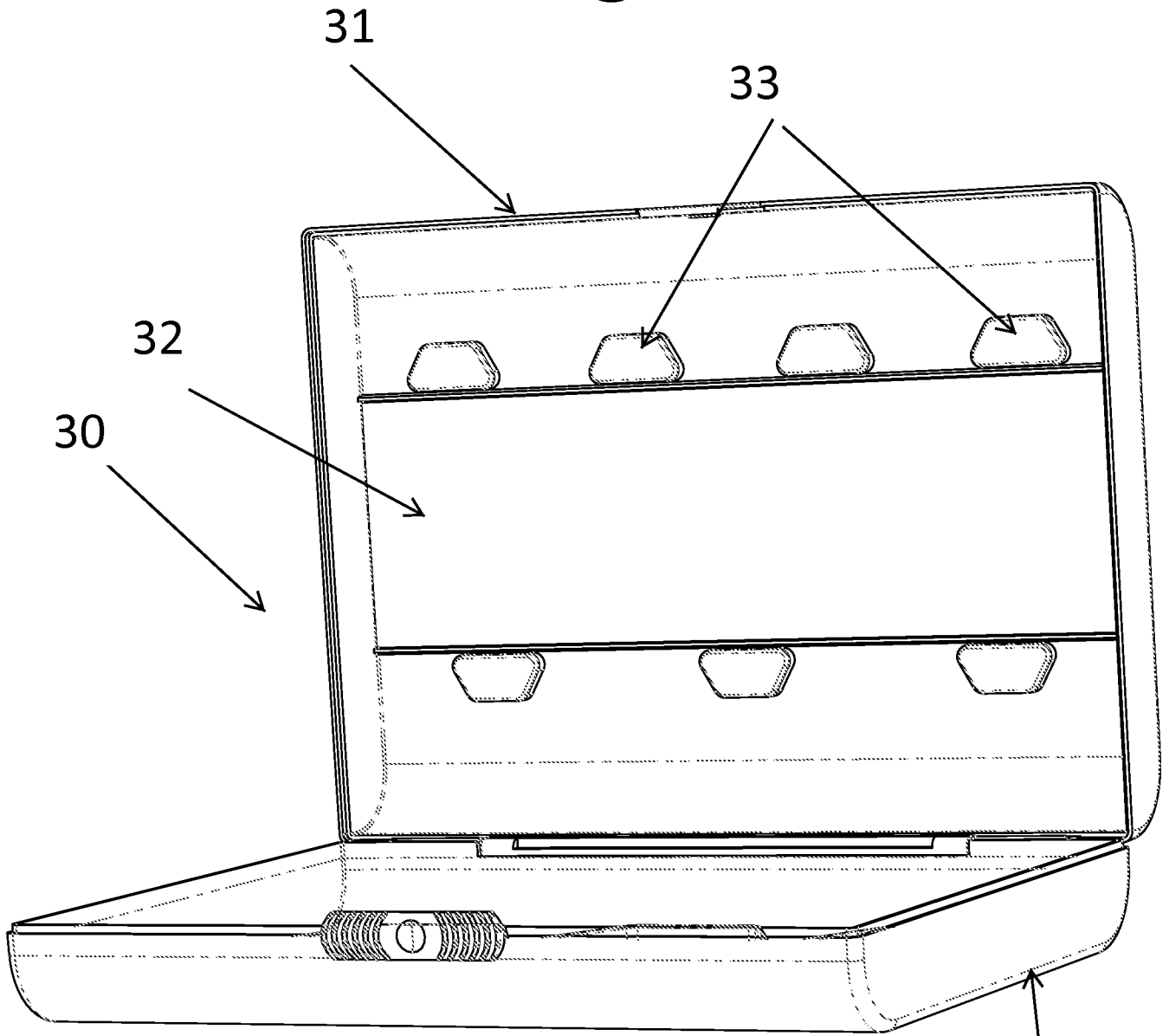


Figure 2



Perspective view of the carrying case with containers and spatula

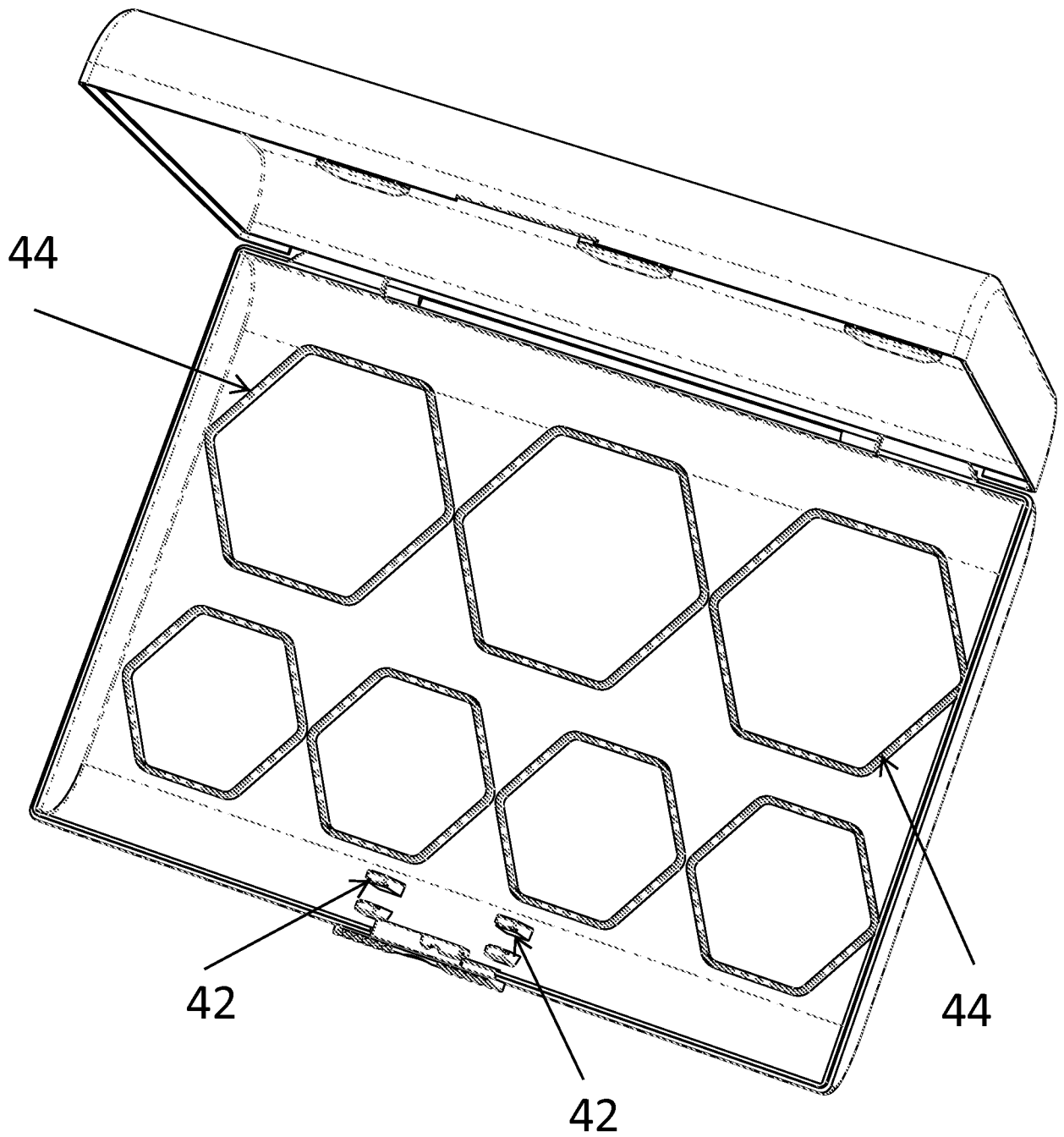
Figure 3



Alternative perspective view of the carrying case with top lid showing the bumpers and mirror

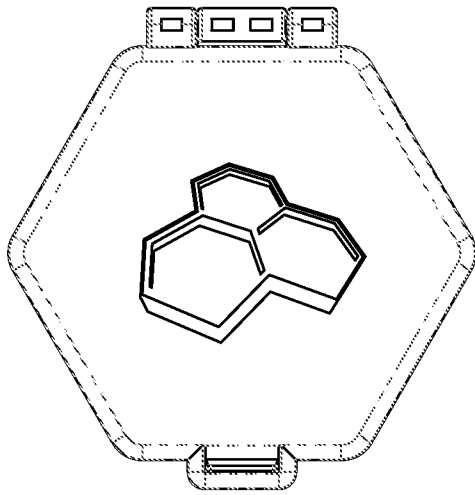
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Figure 4

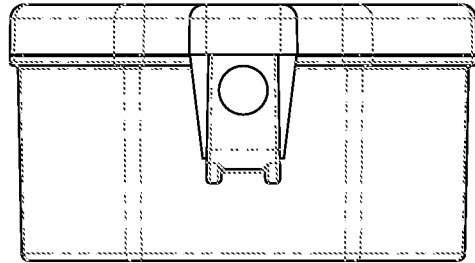


Perspective view of the bottom lid of the carrying case showing the securing ridges

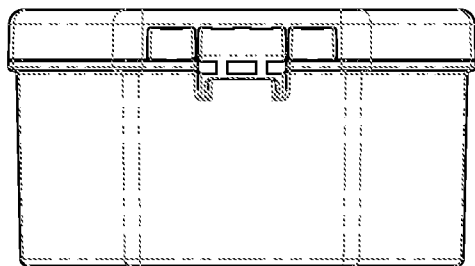
Figure 5



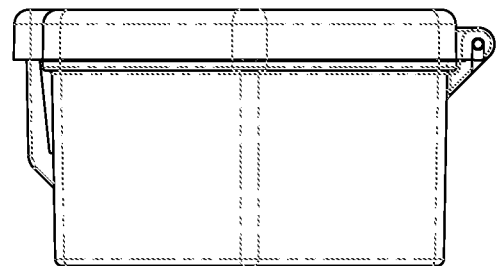
- top down perspective



- front perspective



- back perspective



- side perspective

Perspective view of an individual container in a closed position

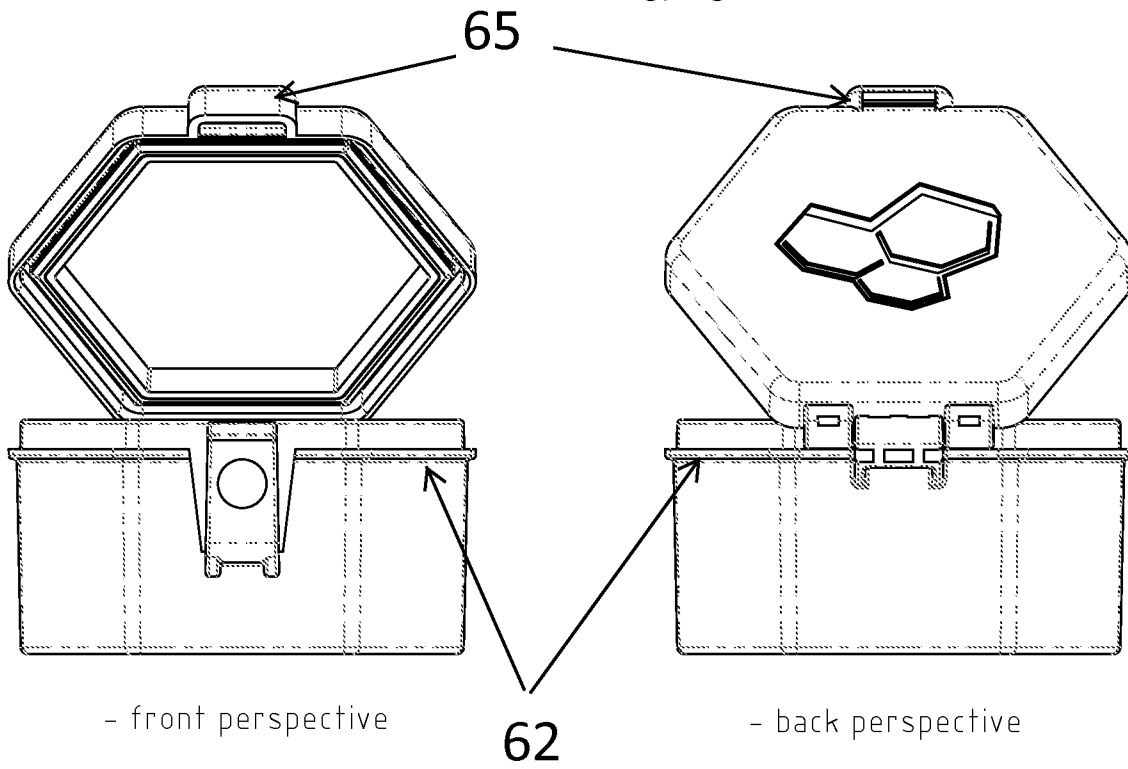
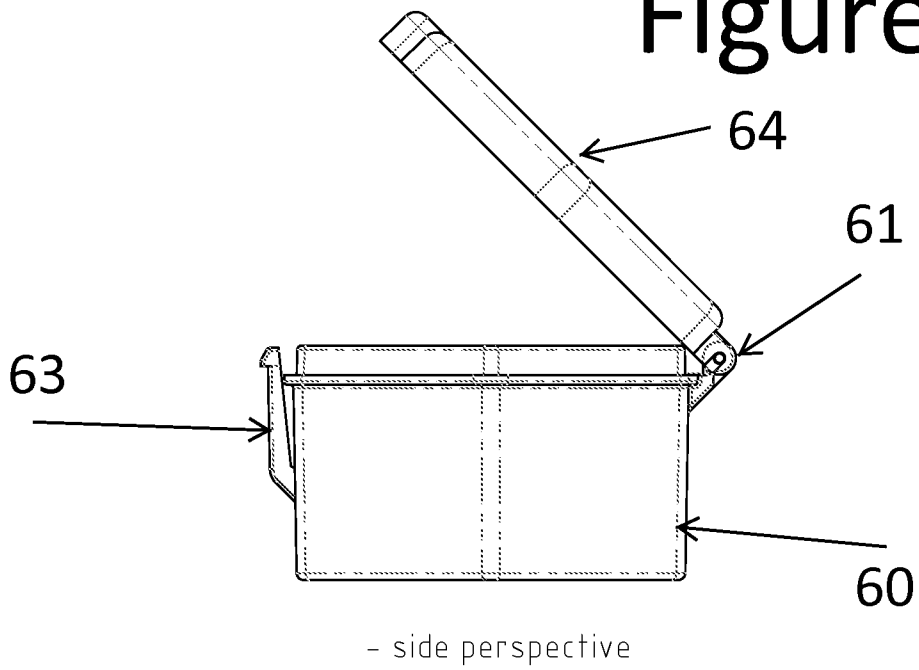
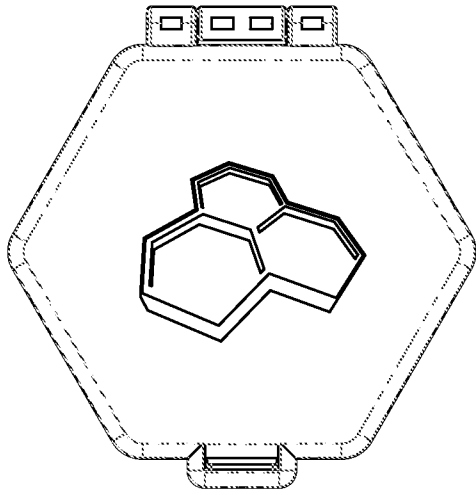


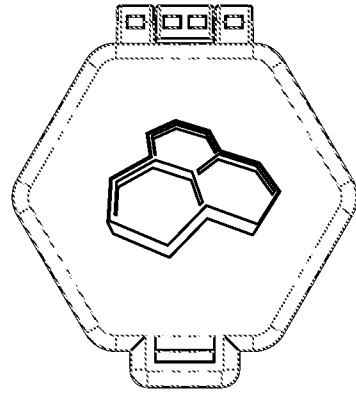
Figure 6



Perspective view of an individual container in an open position

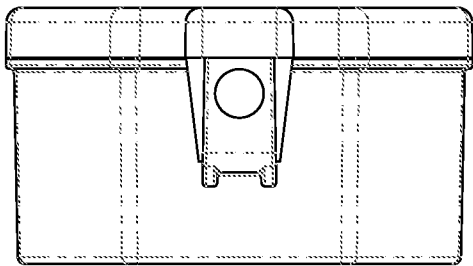


- large container

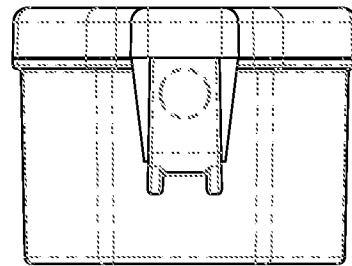


- small container

Top down perspective

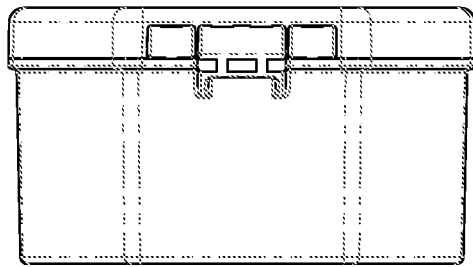


- large container

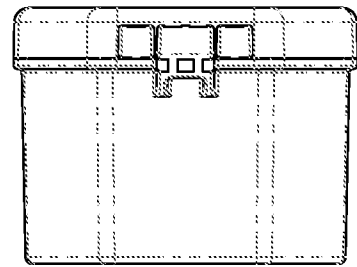


- small container

Front perspective

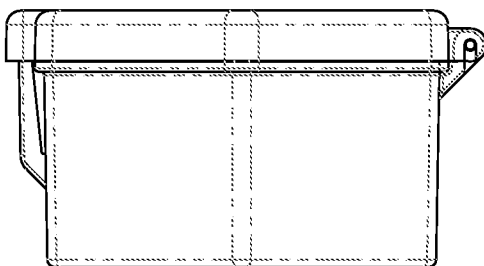


- large container

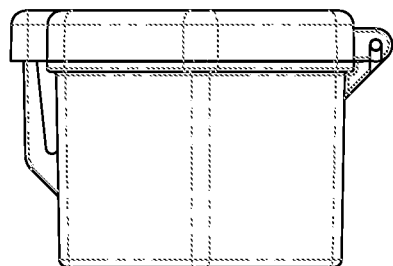


- small container

Back perspective



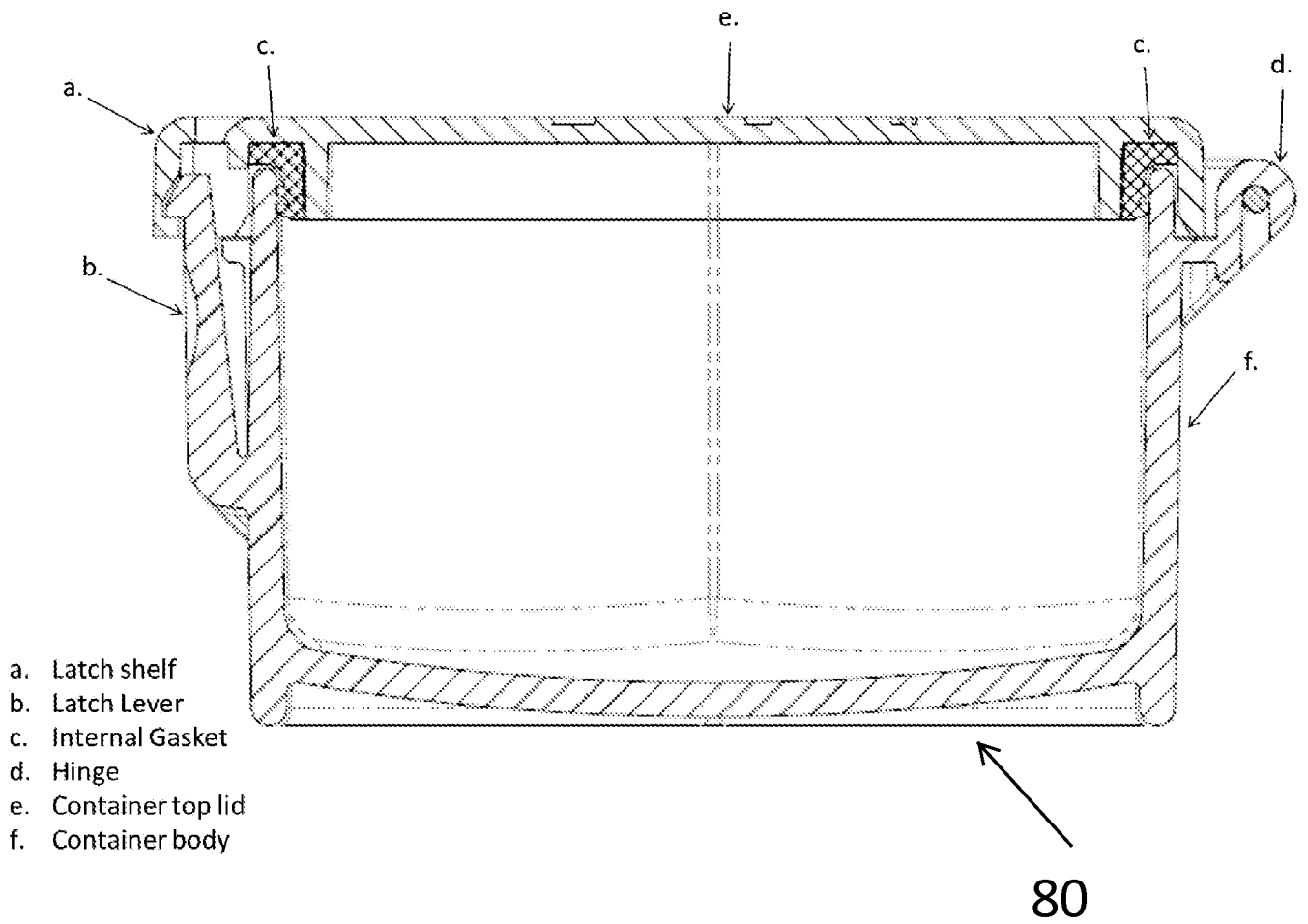
- large container



- small container

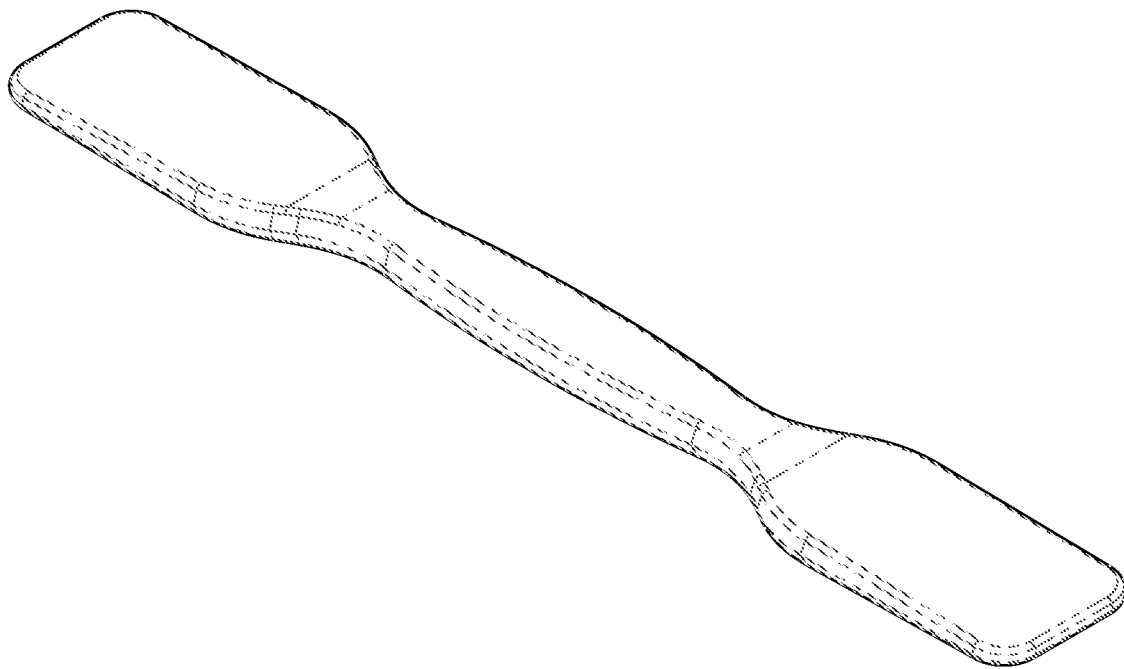
Side perspective

Perspective view of the large and small individual containers

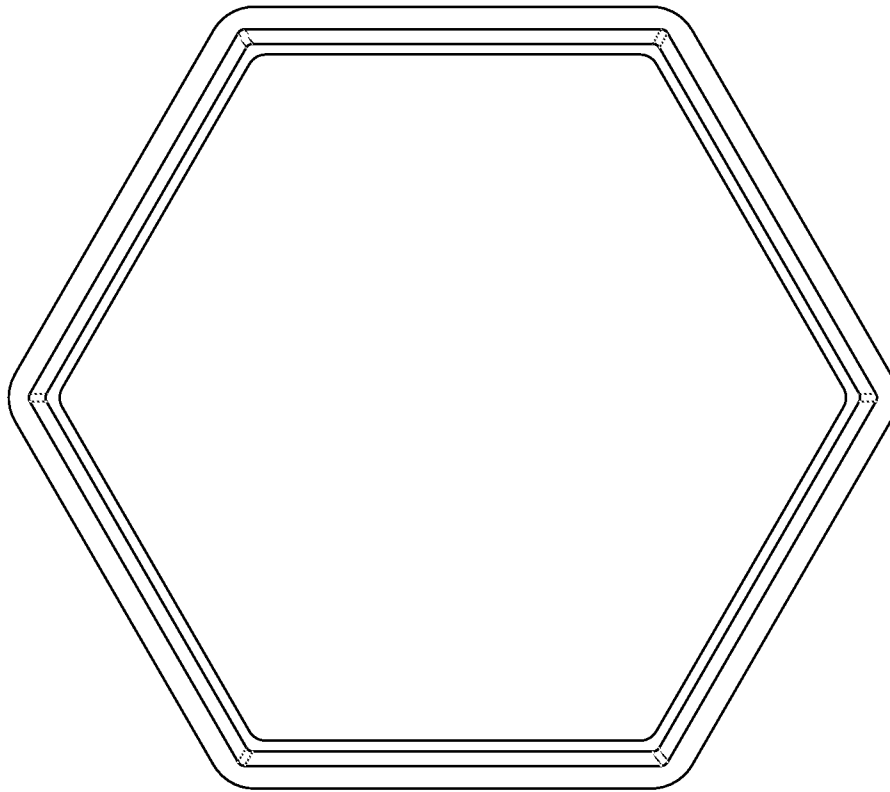


Perspective view cross section of the individual container showing the locking mechanism, hinge and gasket

Figure 9



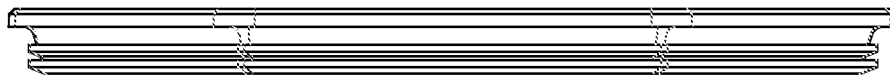
Perspective view of the spatula



- front perspective



- section view



- side perspective

Perspective views of the internal gasket of the individual container

Figure 10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US14/30674

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A45C 11/20 (2014.01)

USPC - 190/111; 206/546

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) Classification(s): A45C 11/20, 13/02; B65D 21/02, 77/26 (2014.01)

USPC Classification(s): 190/108, 109, 111; 206/6.1, 546, 547

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

MicroPatent (US Granted, US Applications, EP-A, EP-B, WO, JP, DE-G, DE-A, DE-T, DE-U, GB-A, FR-A); Google; Google Scholar; ProQuest; IP.com; keywords: container, box, case, spoon, spatula, ladle, liquid, water, solvent, alcohol, gel, lock, latch, plastic, hexagon, fluid

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7,607,540 B2 (BALLARD D) October 27, 2009; abstract; figures 1, 3, 5, 6; column 4, lines 40-45; column 5, lines lines 35-45, 50-60, 65-68; column 6, lines 1-10; claim 17	1-6
A	US 5,111,919 A (HAMATANI T et al.) May 12, 1992; entire document	1-6
A	US 5,024,067 A (MAIER II S E) June 18, 1991; entire document	1-6
A	US 5,082,115 A (HUTCHESON S R) January 21, 1992; entire document	1-6
A	US 5,579,914 A (THORE S) December 3, 1996; entire document	1-6
A	US 7,331,461 B2 (MACKINNON M A) February 19, 2008; entire document	1-6

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

23 July 2014 (23.07.2014)

Date of mailing of the international search report

13 AUG 2014

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