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Canadian Intellectual Property Office

CA 3146499 A1 2021/02/18

(21) 3 146 499

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2020/06/19
(87) Date publication PCT/PCT Publication Date: 2021/02/18
(85) Entrée phase nationale/National Entry: 2022/01/07
(86) N° demande PCT/PCT Application No.: IB 2020/055803
(87) N° publication PCT/PCT Publication No.: 2021/028734
(30) Priorité/Priority: 2019/08/13 (US62/886,087)

(51) Cl.Int./Int.Cl. *B65D 77/06* (2006.01),
B65D 5/42 (2006.01)

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(54) Titre : CAISSES, DECOUPES ET SYSTEMES POUR PRODUITS DISTRIBUES PAR CAISSE-OUTRE
(54) Title: BOXES, BLANKS, AND SYSTEMS FOR BAG-IN-BOX DISPENSED PRODUCTS

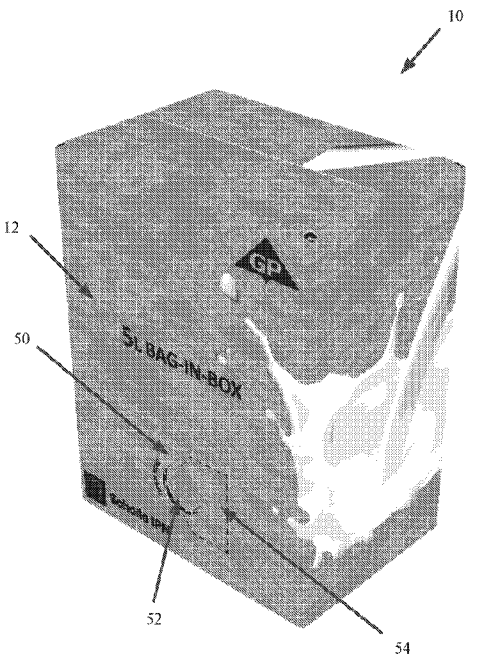

FIG. 1

(57) Abrégé/Abstract:
Corrugated boxes, box blanks, and systems for individually shipping a bag of liquid stored therein and converting into a bag-in-box dispenser are provided. An example system comprises a box with walls defining an opening. A perforation feature is defined on a front wall with a bottom thereof being spaced apart from the box bottom. The perforation feature is removable to enable a dispensing tap of the stored bag to be accessed and positioned to extend past/through the front wall. An insert is designed to be positioned within the box and includes a top surface that is positioned proximate the bottom of the perforation feature to support the stored bag. The box is configured to store a bag of liquid ranging from 2 to 10 liters and is designed to pass individual box shipping test standards, such as ISTA and SIOC test standards. Methods of forming the box are also provided.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 February 2021 (18.02.2021)

WIPO | PCT

(10) International Publication Number
WO 2021/028734 A1

(51) International Patent Classification:
B65D 77/06 (2006.01)

(21) International Application Number:
PCT/IB2020/055803

(22) International Filing Date:
19 June 2020 (19.06.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/886,087 13 August 2019 (13.08.2019) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:
— *with international search report (Art. 21(3))*
— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

(54) **Title:** BOXES, BLANKS, AND SYSTEMS FOR BAG-IN-BOX DISPENSED PRODUCTS

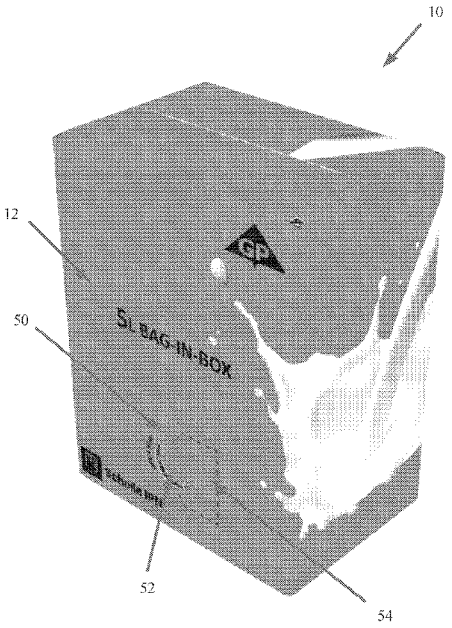

FIG. 1

(57) **Abstract:** Corrugated boxes, box blanks, and systems for individually shipping a bag of liquid stored therein and converting into a bag-in-box dispenser are provided. An example system comprises a box with walls defining an opening. A perforation feature is defined on a front wall with a bottom thereof being spaced apart from the box bottom. The perforation feature is removable to enable a dispensing tap of the stored bag to be accessed and positioned to extend past/through the front wall. An insert is designed to be positioned within the box and includes a top surface that is positioned proximate the bottom of the perforation feature to support the stored bag. The box is configured to store a bag of liquid ranging from 2 to 10 liters and is designed to pass individual box shipping test standards, such as ISTA and SIOC test standards. Methods of forming the box are also provided.

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BOXES, BLANKS, AND SYSTEMS FOR BAG-IN-BOX DISPENSED PRODUCTS

BACKGROUND

[0001] Bag-in-box dispensers provide a user access to dispense liquid product (e.g., soap, oil, cleaner, wine, etc.) from a bag that is held within a box. In some cases, a user accesses a dispensing tap (e.g., opening, nozzle, valve, etc.) on the bag (often extending through a hole in the box) to dispense liquid from the bag, while the majority of the bag is stored within the box. Conventional box designs for bag-in-box dispensers include a corrugated box that is designed to be shipped on a pallet in an upright orientation (e.g., with other like boxes/product). Then, each bag-in-box product is taken off the pallet for use and/or stocking on a shelf for sale. Notably, shipping and handling under such circumstances puts predictable and largely unidirectional stress on the box such that box designs can afford to be limited while still maintaining the box and bag stored inside in working order through distribution to the final destination. For example, the strength characteristics for the box can be designed with the knowledge that the box will only be shipped in the upright orientation.

BRIEF SUMMARY

[0002] Embodiments of the present invention are directed to corrugated box designs that are designed to withstand the individual e-commerce shipping environment, which includes the same shipping and handling that occurs for other types of boxes in this environment (e.g., throwing the boxes, dropping the boxes in all orientations, vibration within a transport vehicle with weight stacked on top). Importantly, in the individual e-commerce shipping environment, there is no predictable orientation for the box design, and all of the above (and other) circumstances occur in all orientations. Thus, while prior box designs for bag-in-box dispensers could predict their orientation (e.g., upright) and had the benefit of relatively safe/professional handling and transfer, the present invention takes into account all of those uncertainties and likely occurrences to still deliver an intact box to the final destination.

[0003] For bag-in-box products, it is very important to keep the box (and any perforations) intact during shipping because otherwise the liquid product in the bag may spill out if the bag breaks, rips, or tears, as the bag is more susceptible to breaking and/or leaking if the box is

compromised/weakened. That situation is of extra concern because spilled liquid can cause significant damage to other boxes or transportation equipment (e.g., trucks, conveyors, warehouse flooring, etc.) during shipping and is difficult to clean (e.g., in comparison to non-liquid products being shipped). In this regard, the box designs of the present invention are engineered to withstand and pass various standardized distribution sequences that are specifically designed to replicate harsh conditions that a box goes through during individual e-commerce shipping (e.g., through various known consumer-based shipping services). Such example safety test standards include the International Safe Transit Association (ISTA) test standards, including the Ship In Own Container (SIOC) test protocols. In such a regard, the resulting box designs of the present invention are the product of significant testing, as many other designs were disregarded after failing such tests.

[0004] Embodiments of the present invention provide example box designs for safely and successfully transporting a bag of liquid and still enabling conversion into a bag-in-box dispenser, where the bag-in-box dispenser is designed to enable dispensing of the liquid product therefrom, such as through a dispensing tap that extends through the front wall of the box. For example, a user may be able to activate the dispensing tap (e.g., press on a lever – though other types of dispensing taps are contemplated) to cause liquid to flow out of the bag. Such example liquid includes wine, juice, coffee, among other liquids that can be dispensed. Notably, the various box designs described herein are designed to hold a bag of liquid with volume ranging from 2 liters to 10 liters (though other ranges are contemplated) and/or a weight ranging from approximately 5 lbs. to 25 lbs. (though other ranges are contemplated). In some embodiments, such box designs may utilize a regular slotted container (RSC), although embodiments of the present invention are not meant to be limited to such a box design. In this regard, notably, embodiments of the present invention provide a box design with various features that are designed to aid in safe transport of the stored bag, while still providing for the conversion into a useful bag-in-box dispenser at the point of intended product usage.

[0005] To achieve such a goal, some embodiments of the present invention provide a system that includes a box and an insert. The box includes a perforation feature on a front wall, where a bottom of the perforation feature is spaced apart from the bottom of the box. The perforation feature is removable and/or movable with respect to the front wall so as to enable a dispensing tap of the bag stored inside to extend past or through the front wall of the box when the box is

converted into the bag-in-box dispenser. The insert includes a top surface and defines a height such that, when it is positioned inside the box, the top surface supports the stored bag and positions the bottom of the bag at a vertical position that is proximate to the bottom of the perforation feature. In this regard, the bag-in-box dispenser can benefit from gravity to help full removal of the liquid contents from the bag (as the dispensing tap is at or near the lowest point of the bag) and is configured to limit the occurrence of the dispensing tap from being dispensed prematurely due to incidental pressure – also known as "burping" in the bag dispensing industry. Notably, upon arrival at the final destination, a user may remove/move the perforation feature and arrange the dispensing tap through the front wall so as to convert the box into the bag-in-box dispenser with the dispensing tap available for use. Various additional features, such as a finger openings in the insert and positioning of a side flange, among others described herein, are contemplated for some embodiments, and may aid in providing safe transport of the stored bag, while still providing for easy conversion into a useful bag-in-box dispenser upon arrival at the final destination.

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

[0006] 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:

[0007] FIG. 1 shows a front, top perspective view of an example corrugated box, in accordance with some embodiments discussed herein;

[0008] FIG. 2 shows a front, top perspective view of another example corrugated box, wherein the perforation feature is highlighted, in accordance with some embodiments discussed herein;

[0009] FIG. 3 shows a rear, top perspective view of the example corrugated box shown in FIG. 2, in accordance with some embodiments discussed herein;

[0010] FIG. 4 shows the example corrugated box shown in FIG. 2 in an open top configuration along with an example insert, in accordance with some embodiments discussed herein;

[0011] FIG. 5 shows a front, top perspective view of the example insert shown in FIG. 4, in accordance with some embodiments discussed herein;

[0012] FIG. 6 shows a rear, bottom perspective view of the example insert shown in FIG. 4, in accordance with some embodiments discussed herein;

[0013] FIG. 7 illustrates a layout of a box blank for the example system including the box and insert shown in FIG. 4, in accordance with some embodiments discussed herein;

[0014] FIG. 8 illustrates an example method of converting an example corrugated box into a bag-in-box dispenser, in accordance with some embodiments discussed herein;

[0015] FIG. 9 shows a front, side perspective view of the example corrugated box shown in FIG. 2, wherein a perforation feature has been removed and the dispensing tap of a bag stored within the box is accessible, in accordance with some embodiments discussed herein;

[0016] FIG. 10 shows a front, side perspective view of the example corrugated box shown in FIG. 9, wherein the dispensing tap has been positioned into a dispensing position to convert the box into the bag-in-box dispenser, in accordance with some embodiments discussed herein; and

[0017] FIG. 11 illustrates a flowchart of an example method of forming a box, shipping the box with a bag stored therein, and converting the box into the bag-in-box dispenser, in accordance with some embodiments discussed herein.

DETAILED DESCRIPTION

[0018] Some example embodiments now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all example embodiments are shown. Indeed, the examples described and pictured herein should not be construed as being limiting as to the scope, applicability or configuration of the present disclosure. Rather, these example embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like reference numerals refer to like elements throughout.

[0019] Notably, while some embodiments describe various positional qualifiers for various features, such as “top”, “bottom”, “front”, “back”, “side”, etc. embodiments described herein are not meant to be limited to such qualifiers unless otherwise stated. Along these lines, and as an example, the “top” is also contemplated to be a “bottom” depending on the box design/orientation or a “front” wall may be a “side” wall depending on the box design/orientation. The directional qualifiers herein are generally used to aid in describing the invention in the context of the drawings and/or description but are not otherwise intended to be limiting.

[0020] While some embodiments describe a "user", use of such a term herein is not meant to be limited to a person or a single person, as the "user" may be an end user, a consumer, a manufacturer, among other types of users along a supply chain in relation to the box design. Further, when utilizing the word "user", the actor(s) may be operating one or more machines/system that cause the intended function (e.g., forming the box or converting the box to a bag-in-box dispenser).

[0021] Various example embodiments of the present invention provide example box designs for safely shipping a bag of liquid and still enabling conversion into a bag-in-box dispenser from the shipped box, where the bag-in-box dispenser is designed to enable dispensing of the liquid product therefrom, such as through a dispensing tap that extends through the front wall of the box. For example, a user may be able to activate the dispensing tap (e.g., press on a lever – though other types of dispensing taps are contemplated) to cause liquid to flow out of the bag. For example, various box designs described herein are designed to hold a bag of liquid with volume ranging from 2 liters to 10 liters (though other ranges are contemplated) and/or a weight ranging from approximately 5 lbs. to 25 lbs. (though other ranges are contemplated). Some examples of possible liquids that may be shipped in such quantity include wine, juice, or any type of liquid that would benefit from being dispensed from the bag-in-box dispenser. Along these lines the term "liquid" used herein may refer to any type of substance in liquid state (e.g., fluid, creams, lotions, gels, water, etc.).

[0022] In some embodiments, such box designs may utilize a regular slotted container (RSC), although embodiments of the present invention are not meant to be limited to such a box design. Other example box designs include telescoping half-slotted containers, wraparounds, overlapping slotted containers, die-cut containers, among others. Various embodiments described herein provide one or more features that alone or in combination with each other provide a suitable box design for providing safe transport of the stored bag, while still providing for easy conversion into a useful bag-in-box dispenser upon arrival at the final destination.

[0023] Notably, example box designs of the present invention are designed to withstand and pass various laboratory distribution tests that are specifically designed to replicate harsh conditions a box goes through during individual e-commerce shipping (e.g., through various known shipping services). Such example safety test standards include the International Safe Transit Association (ISTA) test standards which includes Ship In Own Container (SIOC) test

standards, such as the ISTA Series 6-Amazon.com-SIOC test protocol (i.e., the ISTA Series 6-Amazon.com-SIOC test for 2018, with a version date with a last technical change in March 2018 and a last editorial change in March 2018 – where further details are available at www.ista.org). Based on the packaging weight and/or girth, the box may need to undergo an appropriate Type test (e.g., Type A for under 50 lbs. or Type B for over 50 lbs.). For example, the test standards require that the box be packaged as planned to be shipped and be put through a testing protocol that includes numerous drops from various heights with the box falling on different sides (e.g., walls, faces) and edges. This simulates possible drops that may occur during handling by shipping personnel. Next, the same box undergoes vibration testing that includes prolonged vibration (e.g., for 2.5 hours, although other durations are contemplated) with weight placed on top of the box – again at specified orientations (often required to be on the "weakest" face, e.g., an orientation which the corrugated flutes are not vertically oriented relative to the applied compression forces). This simulates travel within a transport vehicle (e.g., an airplane, train, truck, van, etc.) with other boxes being stacked on top of it. Finally, the same box then goes through more drops of varying height and on varying sides, corners, or edges, with one of the last drops being at a greater height and on the "weakest" side or edge. This once again simulates possible drops that may occur during handling by shipping personnel. Depending on the desired outcome, the box may need to pass certain test criteria in order to pass the tests. Notably, the ISTA Series 6-Amazon.com-SIOC test protocol acceptance criteria includes (i) the product is fully functional in its intended use, (ii) there are no leaks, (iii) any tamper evidence application is not compromised (e.g., seal integrity is intact), and (iv) any secondary packaging that is considered part of the product is free from serious damage/indentations/scratching.

[0024] The box may be designed to pass the ISTA Series 6-Amazon.com-SIOC test protocol or other shipping test protocol (e.g., to be able to ship using individual shipping options – such as the mail, truck delivery, etc.), and also maintain certain form standards that enable it to be converted into the bag-in-box dispenser upon reaching its final destination. In this regard, the box should survive (e.g., withstand) the entire test process while maintaining a desired form such that the flaps and any perforation features are intact, and with the bag maintained within the box without liquid spilling/leaking therefrom, such that the box may be converted into a functioning bag-in-box dispenser as intended. In some embodiments, the box may be considered to maintain a desired form even with some flexing, but without an undesirable degree of bulging, such as

may include significant changes in the shape of the box to limit its function (e.g., cause perforations to tear or release prematurely, cause flaps to tear or open, cause adhesive joints to fail or open prematurely, cause the box to no longer fit in a designated spot at the final destination (e.g., in a storage rack or storage position) or be suitable for stacking or supporting additional loads (e.g., on top of the box), prevent full evacuation of the liquid in the bag, cause decreased overall rigidity or integrity of the box to hinder transportation or manipulation of the box). In such a regard, the resulting box designs of the present invention are the product of significant testing, as many other designs were disregarded after failing such tests.

[0025] An example system including a corrugated box 10 and an insert 40 that accomplishes such advantages, including passing the above noted test standards, is shown in FIGs. 1-4. With reference to FIGs. 1-4, the corrugated box 10 comprises a plurality of walls including four walls (e.g., faces): a front wall 12, a back wall 14, and two opposing side walls 16, 18. Corresponding panels (e.g., a front panel 12', back panel 14', a first side panel 16', and a second side panel 18') can be seen in the box blank form of the box portion 10' shown in FIG. 7. As shown, the box 10 also includes a side flap 15 (notably, the side flap 15 may be attached to any of the walls/panels depending on the desired box design). To form the box 10 shown in FIG. 3, the side flap 15 may be attached, such as using adhesive (although additional or alternative attachment means can be utilized, such as tape, staples, etc.), to a first side wall 16 (although other walls can be used depending on the arrangement of the box blank). When partially formed, the box has an opening 13 (shown in FIG. 4).

[0026] With further reference to FIG. 7, the box 10 also includes top flaps 17a, 17b, 17c, 17d that each extend from corresponding panels 12', 14', 16', 18'. In particular, a top front flap 17a extends upwardly from the front panel 12'; a top back flap 17b extends upwardly from the back panel 14'; a top first side flap 17c extends upwardly from the first side panel 16'; and a top second side flap 17d extends upwardly from the second side panel 18'. Returning to FIG. 2, the top flaps of the box fold from their walls to form a top 87. In this regard, the top first side flap 17c and the top second side flap 17d may fold underneath the top front flap 17a and the top back flap 17b, and the edges of the top front flap 17a and the top back flap 17b may meet together or close together, forming a flap gap 82. Although shown at a mid-point along a width of the top 87, the flap gap 82 may be positioned anywhere along a width of the top 87 (e.g., closer to one side or the other). Likewise, the box design may be formed to include overlapping top or bottom

flaps. One or more pieces of tape 80 may extend across the flap gap 82 to form the top 87 (although additional or alternative attachment means can be utilized, such as adhesive, staples, etc.).

[0027] Returning to FIG. 7, the box 10 also includes bottom flaps 19a, 19b, 19c, 19d that each extend from corresponding panels 12', 14', 16', 18'. In particular, a bottom front flap 19a extends downwardly from the front panel 12'; a bottom back flap 19b extends downwardly from the back panel 14'; a bottom first side flap 19c extends downwardly from the first side panel 16'; and a bottom second side flap 19d extends downwardly from the second side panel 18'. The bottom flaps of the box 10 fold from their respective walls to form a bottom. In this regard, the bottom first side flap 19c and the bottom second side flap 19d may fold underneath the bottom front flap 19a and the bottom back flap 19b, and the edges of the bottom front flap 19a and the bottom back flap 19b may meet together or close together along a flap gap that may be covered by one or more pieces of tape (although additional or alternative attachment means can be utilized, such as adhesive, staples, etc.).

[0028] With reference to FIGs. 4-6, the insert 40 comprises a top surface 42 and a plurality of flaps 44a, 44b, 44c, 44d that extend outwardly from corresponding sides (e.g., fold lines) 42a, 42b, 42c, 42d of the top surface 42. The top surface 42, front flap 44a, first side flap 44b, back flap 44c, and second side flap 44d of the insert 40' can be seen in the box blank form shown in FIG. 7.

[0029] The insert 40, like the box 10, is formed of corrugated web product. The top surface 42 of the folded insert 40, with reference to FIG. 4, is sized to fit within the opening 13 of the box 10 such that the edges 49a-d of the flaps 44a-d rest on the bottom interior surface of the box 10 (such as may be defined by one or more bottom flaps 19a-d). The top surface 42 is, thus, configured to provide a support surface for the bag stored in the box 10, such that a bottom of the bag rests on the top surface 42 when stored in the box 10. In this regard, in some embodiments, the box 10 may be sized so as to receive both the bag and insert.

[0030] In this regard, in the illustrated embodiment, the insert 40 is designed to be formed by folding down at least one flap 44a-d such that it extends downwardly from the top surface 42, such as perpendicularly so as to allow the top surface 42 to be positioned above the flap(s) when installed within the opening 13 of the box 10. For example, with reference to FIG. 4, the plurality of flaps 44a-d may be folded down from the top surface 42 to cause the insert to define

the height (e.g., defined from an edge 49a of the front flap 44a to an edge (e.g., fold line) 42a of the top surface 42 defined by the folding of the front flap 44a). In some embodiments, such as shown in FIG. 7, the side edges of the flaps may be tapered to provide for ease of folding of the flaps (e.g., the side edge 98c of the back flap 44c is tapered leading from the front surface 42 to an edge 49c of the back flap 44c).

[0031] In some embodiments, the insert 40 may be designed such that, when formed and installed within the opening 13 of the box 10, the top surface 42 is angled, such as downwardly toward the perforation feature 50. This may, as described further herein, help encourage full removal of the contents of the bag that is resting on the top surface 42 by utilizing gravity to encourage the liquid to flow toward the dispensing tap (which is positioned through at least a portion of the now removed perforation feature 50). In order to accomplish the angled surface, in some embodiments, the front flap 44a may define a smaller length (e.g., measured from the front edge 49a of front flap 44a to the back edge 42a (e.g., fold line)) than the back flap 44c (e.g., measured from the front edge 49c of back flap 44c to the back edge 42c (e.g., fold line) such that when the front flap 44a and the back flap 44c are folded underneath the top surface 42 and the insert 40 is positioned within the opening 13 of the box 10, the greater length of the back flap 44c causes the back of the top surface 42 to sit at a vertical position higher within the box 10 than the front of the top surface 42 (as the front flap 44a is shorter). In some such embodiments, there may be no side flaps 44b, 44d or the side flaps 44b, 44d may define different lengths along their width, such that a portion of one or more of the side flaps 44a, 44d closer to the back flap 44c is longer than a portion closer to the front flap 44a. Such an embodiment may ensure that there is greater surface area of the edges of the side flaps that rest on the bottom of the box – thereby providing additional support for the bag.

[0032] Although the illustrated embodiment utilizes flaps that fold downwardly from the top surface 42 to enable the top surface 42 to be positioned at the desired height, other structures or ways to obtain the desired height are contemplated, such as forming another box (e.g., a regular slotted container, an upside-down half-slotted container, among others) to be inserted into the bottom of box 10 or assembling multiple distinct structures (e.g., a top surface 42 may be positioned on top of another structure that positions the top surface 42 at the desired height).

[0033] With reference back to FIGs. 1 and 2, the box 10 is designed with a perforation feature 50. The perforation feature 50 is defined by one or more series of perforations 53, 55

(e.g., weak points, cuts, scores, etc.) that help a user with removal thereof, such as through separation of the front wall 24 along the line of perforations. In the illustrated embodiment, the perforation feature 50 is defined on the front wall 12, although it could be defined on other walls/panels of the box depending on the desired configuration.

[0034] In some embodiments, the perforation feature 50 is defined by at least one series of perforations and is removable and/or movable with respect to the front wall to enable a dispensing tap of the bag stored in the box to be positioned into a dispensing position. In this regard, a benefit of the perforation feature 50 is that it facilitates removal of a portion of the box 10 to allow a user to access a dispensing tap 92 (e.g., opening, nozzle, valve, etc.) on the bag 90 that is held within the box 10 and enable repositioning of the dispensing tap 92 to a dispensing position, such as at least partially extending outside of the box 10 (and, thus, accessible by a user for dispensing the liquid from the bag).

[0035] In the illustrated embodiment, the perforation feature 50 comprises a first portion 52 and a second portion 54. Each of the first portion 52 and the second portion 54 is defined by at least one line of perforations 53, 55, respectively. The first portion 52 is defined by a continuous circle of perforations 53 and is removable from a remainder of the front wall 12. The first portion 52 defines a shape that corresponds to a portion 91 of the dispensing tap 92 such that a hole 57 in the front wall 12 formed by removal of the first portion 52 holds the dispensing tap 92 in position when the box 10 is converted into the bag-in-box dispenser (reference FIGs. 8 and 10). The second portion 54 is at least partially separable from the front wall 12, such as along the series of perforations 55 and configured to pivot (e.g., along the dotted line 54a shown in FIG. 7) with respect to the front wall 12 (e.g., shown in FIGs. 8 and 9). In this regard, with reference to FIG. 9, the second portion 54, after separation of the corresponding at least one series of perforations 55, defines a cantilever structure that can be pivoted to enable a user to reach inside the box to access the dispensing tap 92 and reposition the dispensing tap into the dispensing position. Although the illustrated embodiment describes an example perforation feature with two portions, any suitable form of perforation feature that enables positioning of the dispensing tap 92 through the front wall 12 is contemplated.

[0036] With reference to FIG. 4, the perforation feature 50 is positioned on the front wall 12 such that a bottom 93 of the perforation feature 50 (e.g., a bottom 93 of a first portion 52 of the perforation feature 50, corresponding to the position of the dispensing tap 92 upon conversion

into the bag-in-box dispenser) is spaced apart a first vertical distance (H_1) from the bottom 99a of the box 10 (which in some embodiments equates to fold line 12a' shown in FIG. 7). In some embodiments, the first vertical distance may range from 0.5 in. to 6 in. (although any suitable range of distance is contemplated). In such an example, after the box is converted into the bag-in-box dispenser, the bottom of the dispensing tap 92 will be positioned near, but not at the bottom of the box 10 (e.g., shown in FIG. 10). The line L denotes the relative vertical position of the dispensing tap 92 after it is put into the dispensing position (shown also in FIG. 10). In some embodiments, spacing the bottom 93 of the perforation feature 50 (e.g., the bottom 93 of the first portion 52 of the perforation feature 50) away from the bottom 99a of the box 10 helps maintain a desired rigidity (e.g., desired integrity), such that may otherwise be compromised if one or more perforations (e.g., weak points) were positioned at or near the bottom 99a of the box 10. However, still positioning the bottom 93 of the perforation feature 50 (e.g., the bottom 93 of the first portion 52 of the perforation feature 50) near the bottom 99a of the box 10 keeps the dispensing tap 92 near a bottom of the box 10 (once the bag-in-box dispenser is converted) for enabling a larger bag to be positioned within the box 10 – all while still having the dispensing tap 92 positioned near the bottom of the bag to aid dispensing and full removal of the liquid from the bag through gravity.

[0037] As noted herein and with reference to FIG. 4, the insert 40, such as after being formed with folding of the flaps 44a-d, may be designed to be positioned within the opening 13 of the box 10. To install the insert 40, after the bottom of the box 10 has been erected/formed (such as described herein), a user may position the insert 40 within the opening 13 of the box 10 with the top surface 42 facing up and the folded flaps 44a-44d facing down. The user may then push the insert 40 down into the opening 13 until the flaps 44a-d rest on the bottom of the box 10.

[0038] Notably, in some embodiments, the height of the insert (indicated by H_2) may correspond to the first vertical distance (H_1) such that, when the insert 40 is positioned within the box 10, the top surface 42 is proximate to the bottom 93 of the perforation feature 50 (and will, thus, be proximate the bottom of the dispensing tap 92 after conversion of the box 10 into the bag-in-box dispenser). This is illustrated by the visual comparison of the height (H_2) of the insert 40 in comparison to the first vertical distance (H_1) and the relative vertical position of the dispensing tap 92 after being positioned into the dispensing position (illustrated with the line L that is shown in both FIGs. 4 and 10).

[0039] In this regard, in some embodiments, when the insert 40 is positioned within the box 10 and resting on an interior surface of the bottom of the box 10 (e.g., such that edges 49a-d rest on the interior surface of the bottom of the box 10), the top surface 42 of the insert 40 is positioned within a second vertical distance from the bottom 93 of the perforation feature 50. In some embodiments, the second vertical distance is approximately the difference between the first vertical distance H_1 and the height H_2 of the insert 40. Said differently, in some embodiments, the second vertical distance is the distance between the top surface 42 of the insert 40 and the bottom 93 of the perforation feature 50. Notably, in some embodiments, the first vertical distance is greater than the second vertical distance such that the top surface 42 is close to the bottom 93 of the perforation feature 50 (e.g., the bottom 93 of the first portion 52 of the perforation feature 50, such as corresponding to the planned position of the dispensing tap 92 once the box 10 is converted into the bag-in-box dispenser). As an example, in some embodiments, the second vertical distance is 2 inches such that the top surface 42 of the insert 40 is within 2 inches of the bottom 93 of the perforation feature 50. In some embodiments, the top surface 42 of the insert 40 is positioned at a vertical point such that, when the dispensing tap 92 is in the dispensing position, the dispensing tap 92 is aligned with the bottom of the bag. Notably, such example bag-in-box dispensers can benefit from gravity to help full removal of the liquid contents from the bag (as the dispensing tap is at or near the lowest point of the bag) and are configured to limit the occurrence of the dispensing tap from being dispensed prematurely due to incidental pressure – also known as "burping" in the bag dispensing industry.

[0040] In some embodiments, the top surface 42 of the insert 40 may include one or more installation features to aid in installation of the insert 40 into the opening 13 of the box 10. For example, the top surface 42 of the insert may include one or more circular/partially circular scores to create finger openings 46 that are each shaped to receive a finger of a user (or a portion of a machine) so as to enable the user (or machine) to position the insert 40 within the opening 13 of the box 10.

[0041] In some embodiments, the box 10 may include one or more installation guides that are provided to guide or force a specific orientation or position of the insert 40 therein. For example, the box 10 may include one or more tabs or protrusions that work with the shape of the insert 40 to force installation of the insert 40 in a specific manner. In some embodiments, the installation guides may be printed images or instructions (e.g., arrows, etc.) that aid a user in

proper installation of the insert 40. In this regard, the installation guides (whether physical or visual) may help ensure proper positioning of the insert 40, such as may be beneficial if the top surface 42 is angled toward a front flap (such as described herein) so as to ensure that the user installs the insert 40 with the front flap adjacent the front wall 12 (and the perforation feature 50).

[0042] In some embodiments, the box 10 (or portions thereof) and/or insert 40 (or portions thereof) may be formed of single-walled corrugate. However, in some embodiments, the box 10 (or portions thereof) and/or insert 40 (or portions thereof) may be formed of double-walled corrugate to add strength thereto, such as may be beneficial for individual box shipping and/or passing the test standards noted herein. In some embodiments, the box 10 (or portions thereof) and/or insert 40 (or portions thereof) may be formed of additional layers of corrugate (e.g., triple-walled corrugate, or more), such as may be beneficial for further increased strength. In some embodiments, the box 10 (or portions thereof) and/or insert 40 (or portions thereof) may be formed of other types of material, such as cartonboard, microflute corrugate, etc.

[0043] FIG. 8 illustrates an example process an end user goes through to convert the now shipped box 10 into a bag-in-box dispenser. First, a user removes the first portion 52 of the perforation feature 50, such as by pushing the first portion 52 through the front wall 12 (e.g., step 110, which is shown in FIG. 9 in completed form). With reference to FIG. 9, a user then pivots the second portion 54 and reaches into the box 10 to pull the dispensing tap 92 out and position it within the hole 57 formed by removal of the first portion 52. In the illustrated embodiment, the hole 57 is formed from a first partial circular edge 59a that is part of the front wall 12 and a second partial circular edge 59b that is part of the second portion 54 of the perforation feature 50 (e.g., step 120 of FIG. 8). The circular shape of the hole 57 complements the shape of a portion 91 (e.g., a throat) of the dispensing tap 92. Then, the user can simply pivot the second portion 54 to securely engage the dispensing tap 92. Considering step 130 in FIG. 8 and with reference to FIG. 10, with the dispensing tap 92 installed, a user can activate the dispensing tap 92 (e.g., via button 96) to dispense liquid from the bag through the outlet 98. Although the illustrated embodiment utilizes a dispensing tap with a button, other types of dispensing taps are contemplated (e.g., valves, openings, nozzles, etc.).

Example Flowchart(s)

[0044] Embodiments of the present invention provide methods and systems for forming a box, shipping the box with a bag stored therein, and converting the box into the bag-in-box dispenser, according to various embodiments described herein. In this regard, associated systems and methods for manufacturing, shipping, and forming example box designs and converting into corresponding bag-in-box dispensers described herein are contemplated by some embodiments of the present invention. Such systems and methods may include various machines and devices, including for example box forming devices (e.g., for folding, gluing, and/or taping boxes, among other things) and/or corrugators. In this regard, known corrugators utilize web product (e.g., liner) and flute medium to form corrugated web product (which may be formed into any number of layered corrugate, such as conventional corrugate (liner, flute medium, liner) or double-walled corrugate (liner, flute medium, liner, flute medium, and liner)). The formed corrugated web product may then be cut (e.g., scored, sliced, perforated, etc.) as needed to form a box blank of the desired box (e.g., any of the box designs described herein). An example corrugator is further described in U.S. Publication No. 2019/0016081, which was filed July 12, 2018, and entitled "Controls for Paper, Sheet, and Box Manufacturing Systems", the contents of which is incorporated by reference herein in its entirety.

[0045] Various examples of the operations performed in accordance with some embodiments of the present invention will now be provided with reference to FIG. 11. In this regard, FIG. 11 illustrates a flowchart according to an example method for forming a box, shipping the box with a bag stored therein, and converting the box into the bag-in-box dispenser according to an example embodiment 200. The operations illustrated in and described with respect to FIG. 11 may, for example, be performed by, with the assistance of, and/or under the control of one or more of a user or a machine for performing the operation (e.g., a corrugator for forming the corrugated box blanks, a box-forming machine for forming the box or portions thereof, a bag loading machine for loading the bag into the box, etc.).

[0046] Operation 202 may comprise forming the corrugated web product, and operation 204 may comprise forming the box blank, such as may include both the box flat 10 and the insert 40. As noted above, such operations may be performed by various known machines/devices, such as a corrugator.

[0047] Operation 206 may comprise erecting (e.g., forming) the box 10 with open top, such as by gluing/folding some panels of the box 10 while leaving the top open, which may occur

using a box forming machine and/or via a user. Similarly, operation 208 may comprise forming the insert, which may also occur using a box forming machine and/or via a user. Operation 210 may include inserting the insert into the opening of the box, and operation 212 may include inserting the bag of liquid into the box and on the top surface of the insert, and forming the completed box with stored bag therein by closing the top of the box. This may be completed by a machine/device and/or via a user.

[0048] Operation 214 may comprise shipping the box with stored bag therein, such as using individual box shipping means described herein. Then, such as upon arrival at the final destination, operation 216 may comprise converting the box into the bag-in-box dispenser, such as described further herein. This may be performed using a machine/device and/or via a user.

Conclusion

[0049] Many modifications and other embodiments of the inventions set forth herein may come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the embodiments of the invention are 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 invention. Moreover, although the foregoing descriptions and the associated drawings describe example embodiments in the context of certain example combinations of elements and/or functions, it should be appreciated that different combinations of elements and/or functions may be provided by alternative embodiments without departing from the scope of the invention. In this regard, for example, different combinations of elements and/or functions than those explicitly described above are also contemplated within the scope of the invention. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

CLAIMS

1. A system for shipping a bag of liquid in a corrugated box and converting the box into a bag-in-box dispenser thereafter, the system including:

the box for shipping the bag of liquid stored therein and converting into the bag-in-box dispenser, the box comprising:

a plurality of walls defining an opening configured to receive the bag of liquid; and

a bottom, wherein the bottom is formed from at least one bottom flap being folded with respect to one of the plurality of walls;

wherein the box defines:

a perforation feature defined on a first wall of the plurality of walls such that a bottom of the perforation feature is spaced apart a first vertical distance from the bottom of the box, wherein the perforation feature is defined by at least one series of perforations and is removable or movable with respect to the first wall to enable a dispensing tap of the bag stored in the box to be positioned into a dispensing position such that the dispensing tap extends at least partially through or past the front wall; and

an insert that is formed of corrugated web product and sized to fit within the opening of the box and rest on the bottom of the box, wherein the insert has a top surface and a height, wherein the height corresponds to the first vertical distance such that, when the insert is positioned within the box and resting on the bottom of the box, the top surface of the insert is positioned within a second vertical distance from the bottom of the perforation feature, wherein the first vertical distance is greater than the second vertical distance, and wherein the top surface is configured to provide a support surface of the bag stored in the box.

2. The system of claim 1, wherein the perforation feature comprises a first portion and a second portion, wherein each of the first portion and the second portion is defined by at least one series of perforations, wherein the first portion is removable from a remainder of the first wall, and wherein the second portion is at least partially separable from the first wall and configured to pivot with respect to the first wall.

3. The system of claim 2, wherein the first portion defines a shape that corresponds to a portion of the dispensing tap such that a hole in the first wall formed by removal of the first portion holds the dispensing tap in position when the box is converted into the bag-in-box dispenser.

4. The system of claim 3, wherein the second portion, after separation of the corresponding at least one series of perforations, defines a cantilever structure that can be pivoted to enable a user to reach inside the box to access the dispensing tap and reposition the dispensing tap into the dispensing position.

5. The system of claim 1, wherein the second vertical distance is 2 inches such that the top surface of the insert is within 2 inches of the bottom of the perforation feature.

6. The system of claim 1, wherein the top surface of the insert is positioned at a vertical point such that, when the dispensing tap is in the dispensing position, the dispensing tap is aligned with the bottom of the bag to facilitate removal of contents of the bag with the aid of gravity.

7. The system of claim 1, wherein the top surface of the insert is angled toward a first flap of the insert, and wherein the insert is designed to be positioned within the box such that the first flap is adjacent to the first wall of the box.

8. The system of claim 1, wherein the insert includes a plurality of flaps that are folded down from the top surface to cause the insert to define the height.

9. The system of claim 1, wherein the top surface of the insert includes one or more openings that are each shaped to receive a finger of a user or a portion of a machine so as to enable the user or the machine to position the insert within the opening of the box.

10. The system of claim 1, wherein the box defines a side flap that is attached to an outside surface of one of the plurality of walls so to form the opening of the box, wherein the side flap is attached to the outside surface of the one of the plurality of walls so as to be separated from the stored bag within the box to avoid damage to the stored bag during shipping.

11. The system of claim 1, wherein the box is configured to store the bag of liquid with volume ranging from 2 liters to 10 liters and keep the bag from damage or leaking during individual box shipping.

12. The system of claim 11, wherein the box is designed to store the bag and pass individual box shipping test standards, including at least the 2018 International Safe Transit Association (ISTA) Series 6-Amazon.com-Ship In Own Container (SIOC) test protocol for Type A.

13. The system of claim 1 further comprising the bag of liquid including the dispensing tap.

14. The system of claim 1, wherein the box is designed to survive individual box shipping such that the perforation feature is intact and the bag is free of damage or leaking so as to enable conversion of the box into the bag-in-box dispenser thereafter.

15. A box blank for a system for shipping a bag of liquid in a corrugated box and converting the box into a bag-in-box dispenser thereafter, wherein the box blank is formed of corrugate and comprises:

a box portion that can be formed into a box for shipping the bag of liquid stored therein and converting into the bag-in-box dispenser, the box portion comprising:

a plurality of panels, wherein, when the box is formed, the plurality of panels define a plurality of walls that define an opening configured to receive the bag of liquid; and

at least one bottom flap, wherein, when folded with respect to one of the plurality of walls, the at least one bottom flap defines a bottom of the box;

wherein the box portion defines:

a perforation feature defined on a first panel of the plurality of panels such that a bottom of the perforation feature is spaced apart a first vertical distance from the bottom of the box when the box is formed, wherein the first panel is a first wall when the box is formed, wherein the perforation feature is defined by at least one series of perforations and is removable or movable with respect to the first wall to enable a dispensing tap of the bag stored in the box, when formed, to be positioned into a dispensing position such that the dispensing tap extends at least partially through or past the first wall; and

an insert that is sized to fit within the opening of the box and rest on the bottom of the box when the box is formed, wherein the insert has a top surface and a height, wherein the height corresponds to the first vertical distance such that, when the insert is positioned within the box and resting on the bottom of the box, the top surface of the insert is positioned within a second vertical distance from the bottom of the perforation feature, wherein the first vertical distance is greater than the second vertical distance, and wherein the top surface is configured to provide a support surface of the bag stored in the box.

16. The box blank of claim 15, wherein the perforation feature comprises a first portion and a second portion, wherein each of the first portion and the second portion is defined by at least one series of perforations, wherein the first portion is removable from a remainder of the first wall, and wherein the second portion is at least partially separable from the first wall and configured to pivot with respect to the first wall.

17. The box blank of claim 16, wherein the first portion defines a shape that corresponds to a portion of the dispensing tap such that a hole in the first wall formed by removal of the first portion holds the dispensing tap in position when the box is converted into the bag-in-box dispenser.

18. The box blank of claim 16, wherein the second portion, after separation of the corresponding at least one series of perforations, defines a cantilever structure that can be pivoted to enable a user to reach inside the box to access the dispensing tap and reposition the dispensing tap into the dispensing position.

19. The box blank of claim 15, wherein the insert defines a plurality of flaps that are configured to fold down from the top surface to cause the insert to define the height.

20. The box blank of claim 19, wherein the plurality of flaps comprises at least a front flap and a back flap, wherein the back flap defines a length that is greater than the length of the front flap such that, when formed, the top surface of the insert is angled toward the front flap.

21. The box blank of claim 15, wherein the top surface of the insert defines one or more openings that are each shaped to receive a finger of a user or a portion of a machine so as to enable the user or the machine to position the insert within the opening of the box.

22. The box blank of claim 15, wherein the box, when formed, is configured to store the bag of liquid with volume ranging from 2 liters to 10 liters and keep the bag from damage or leaking during individual box shipping.

23. The box blank of claim 22, wherein the box, when formed, is designed to store the bag and pass individual box shipping test standards, including at least the 2018 International Safe Transit Association (ISTA) Series 6-Amazon.com-Ship In Own Container (SIOC) test protocol for Type A.

24. The box blank of claim 15, wherein the box, when formed, is designed to survive individual box shipping such that the perforation feature is intact and the bag is free of damage or leaking so as to enable conversion of the box into the bag-in-box dispenser thereafter.

25. A method of manufacturing a box blank for a system for shipping a bag of liquid in a corrugated box and converting the box into a bag-in-box dispenser thereafter, the method comprising:

forming corrugated web product;

cutting out a box portion of the box blank from the corrugated web product, wherein the box portion can be formed into a box for shipping the bag of liquid stored therein and converting into the bag-in-box dispenser, the box portion comprising:

a plurality of panels, wherein, when the box is formed, the plurality of panels define a plurality of walls that define an opening configured to receive the bag of liquid; and

at least one bottom flap, wherein, when folded with respect to one of the plurality of walls, the at least one bottom flap defines a bottom of the box;

wherein the box portion defines:

a perforation feature defined on a first panel of the plurality of panels such that a bottom of the perforation feature is spaced apart a first vertical distance from the bottom of the box when the box is formed, wherein the first panel is a first wall when the box is formed, wherein the perforation feature is defined by at least one series of perforations and is removable or movable with respect to the first wall to enable a dispensing tap of the bag stored in the box, when formed, to be positioned into a dispensing position such that the dispensing tap extends at least partially through or past the first wall; and

cutting out an insert of the box blank from the corrugated web product, wherein the insert is sized to fit within the opening of the box and rest on the bottom of the box when the box is formed, wherein the insert has a top surface and a height, wherein the height corresponds to the first vertical distance such that, when the insert is positioned within the box and resting on the bottom of the box, the top surface of the insert is positioned within a second vertical distance from the bottom of the perforation feature, wherein the first vertical distance is greater than the second vertical distance, and wherein the top surface is configured to provide a support surface of the bag stored in the box.

26. The method of claim 25 further comprising:

erecting the box with an open top from the box blank;

forming the insert from the box blank; and

positioning the insert within the opening of the box when formed.

27. The method of claim 26 further comprising:

inserting the bag of liquid into the opening of the box to rest on the top surface of the insert; and

sealing the top of the box with the bag stored therein.

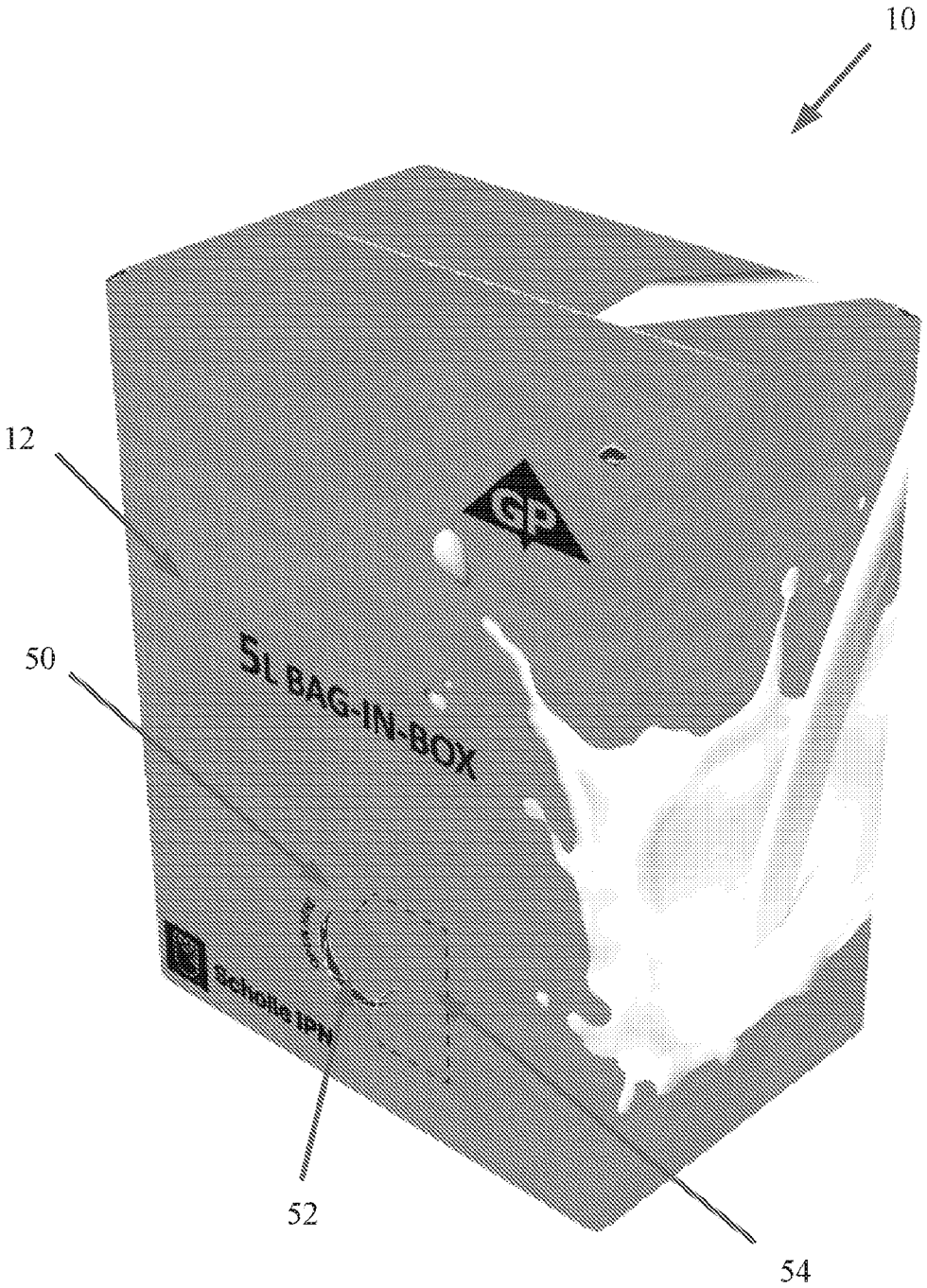

FIG. 1

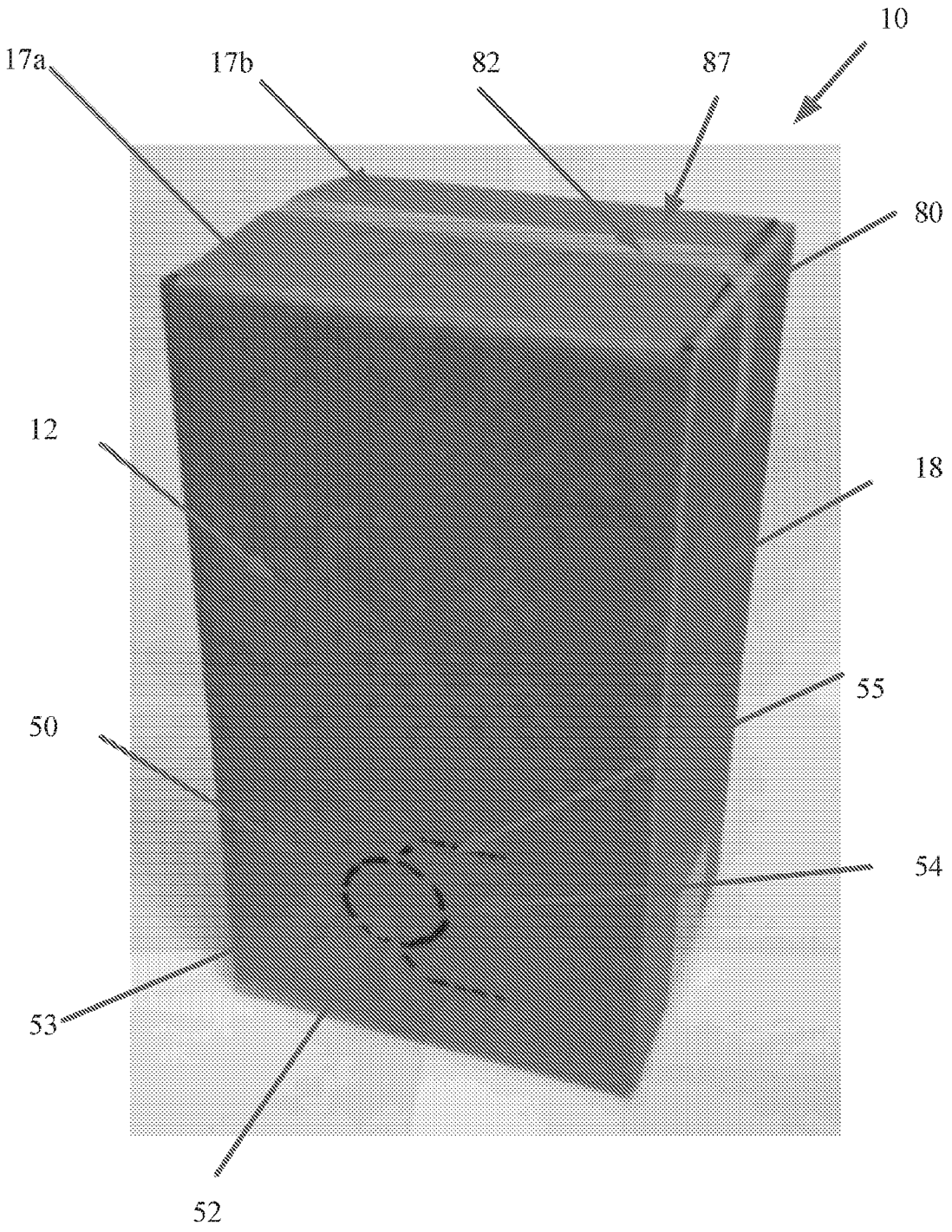

FIG. 2

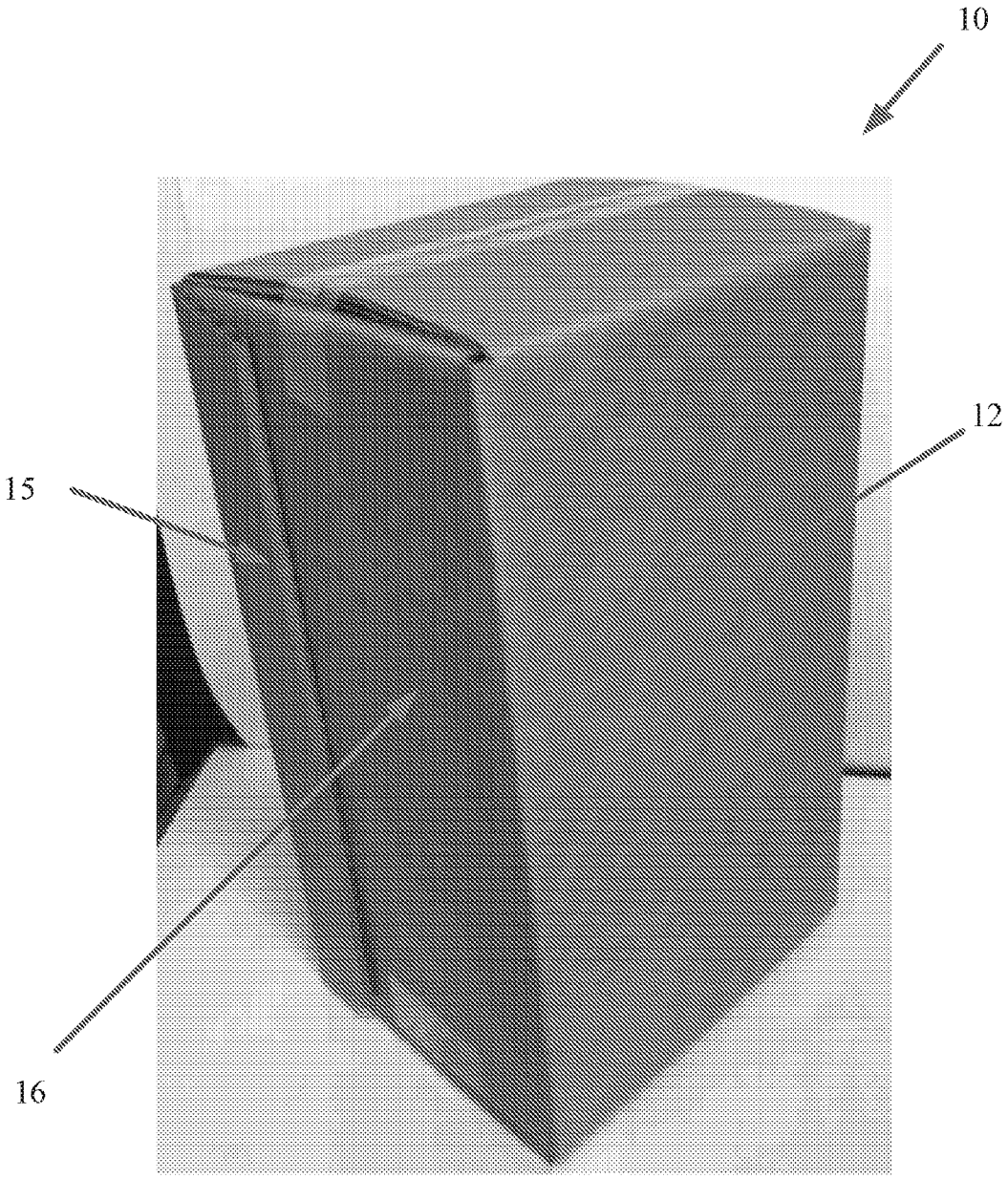

FIG. 3

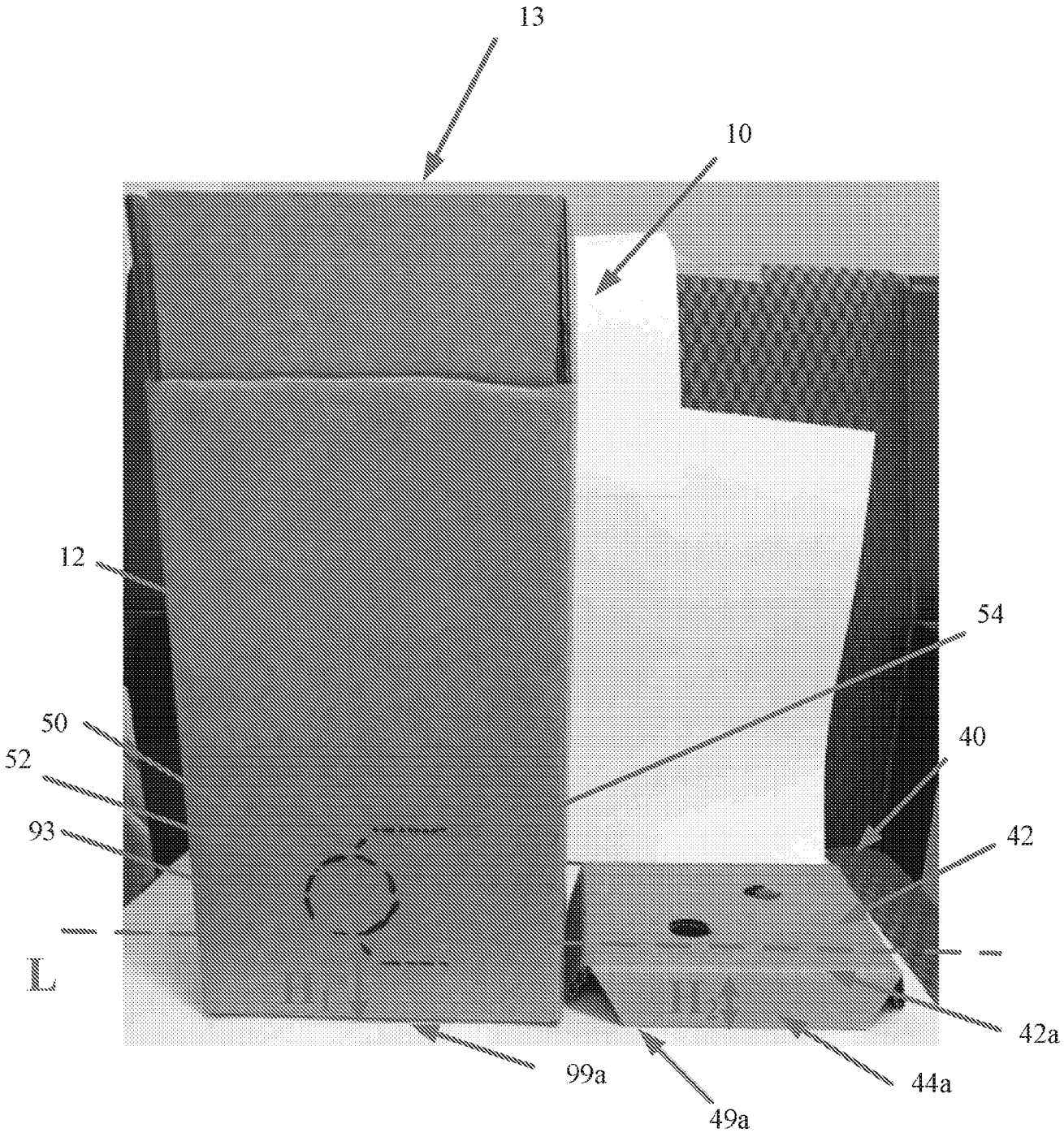

FIG. 4

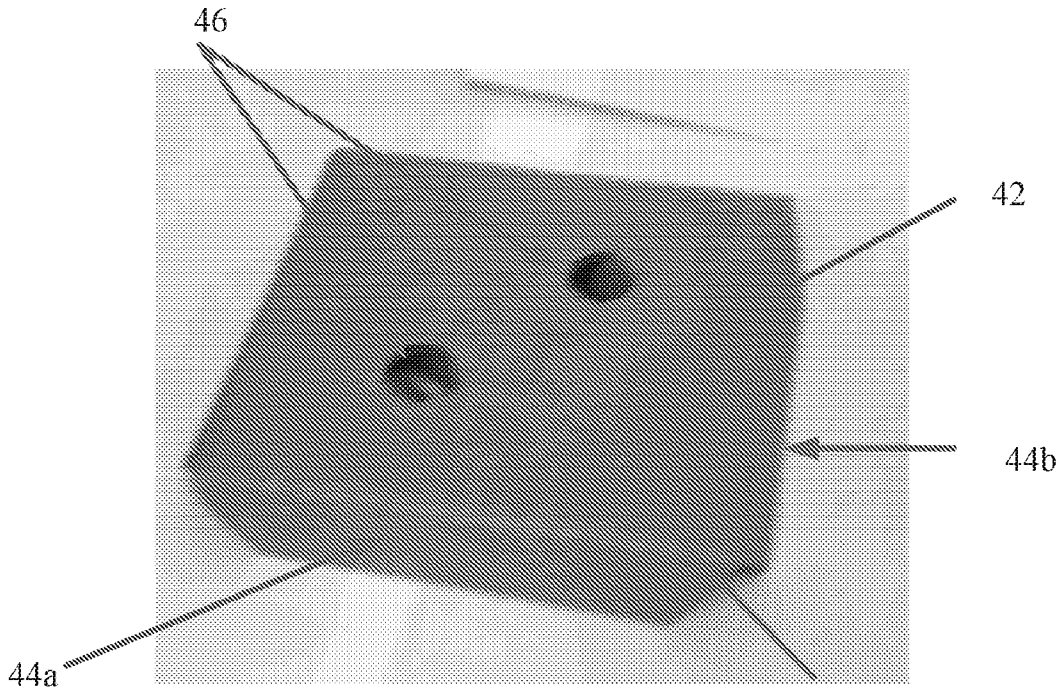

FIG. 5

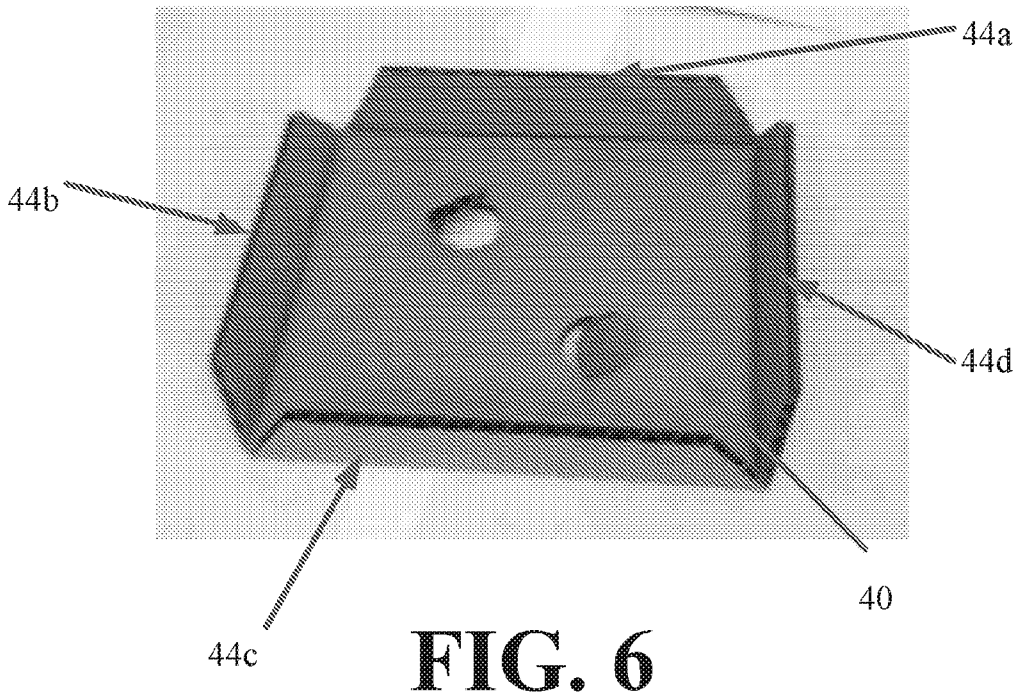

FIG. 6

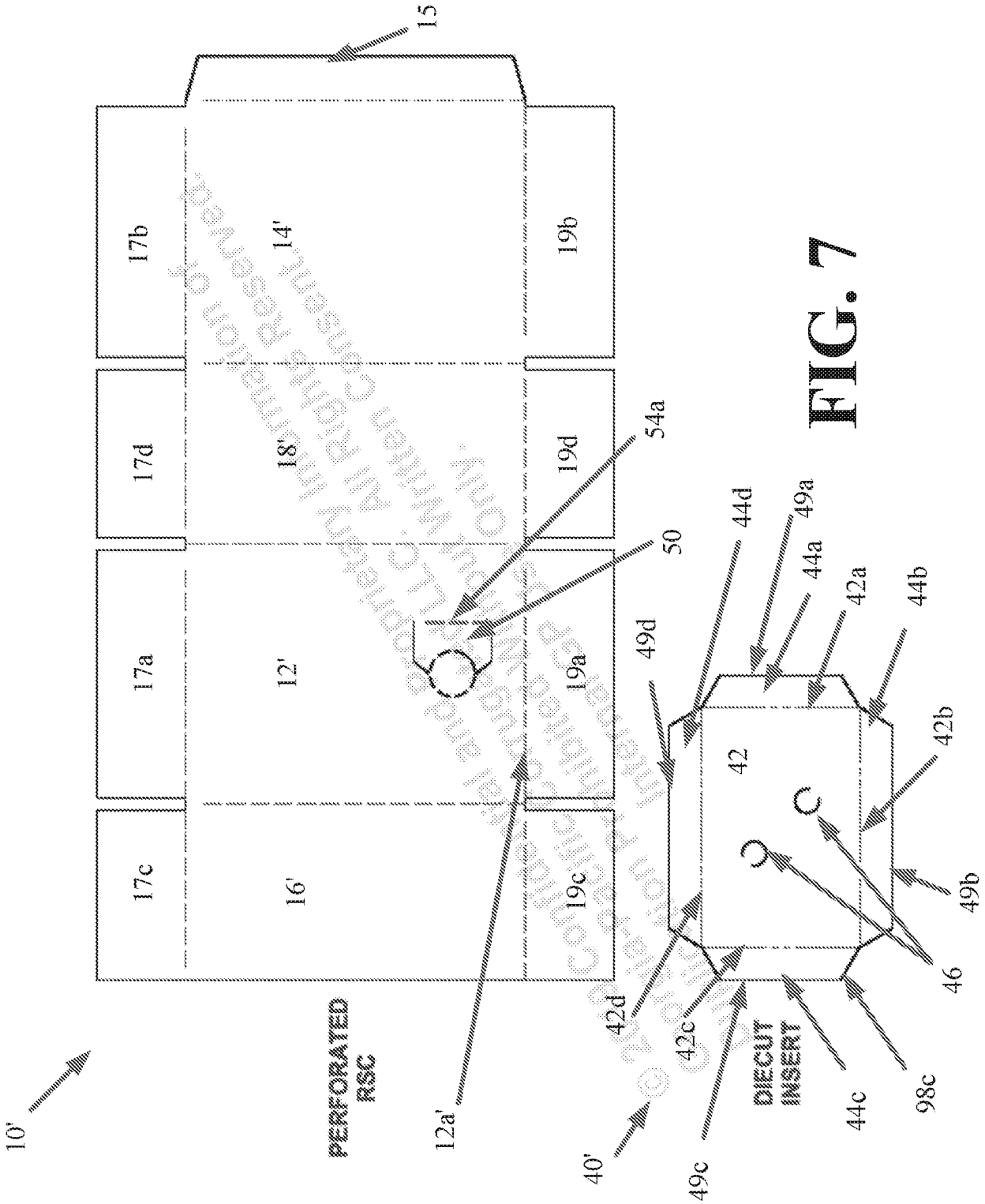
10'
PERFORATED RSC
12a'
40'
42d
42c
49c
DIECUT INSERT
44c
98c
46
49b
42b
42a
44b
44a
49a
44d
42
49d
50
54a
15
17b
14'
19b
17d
18'
19d
17a
12'
19a
17c
16'
19c

FIG. 7

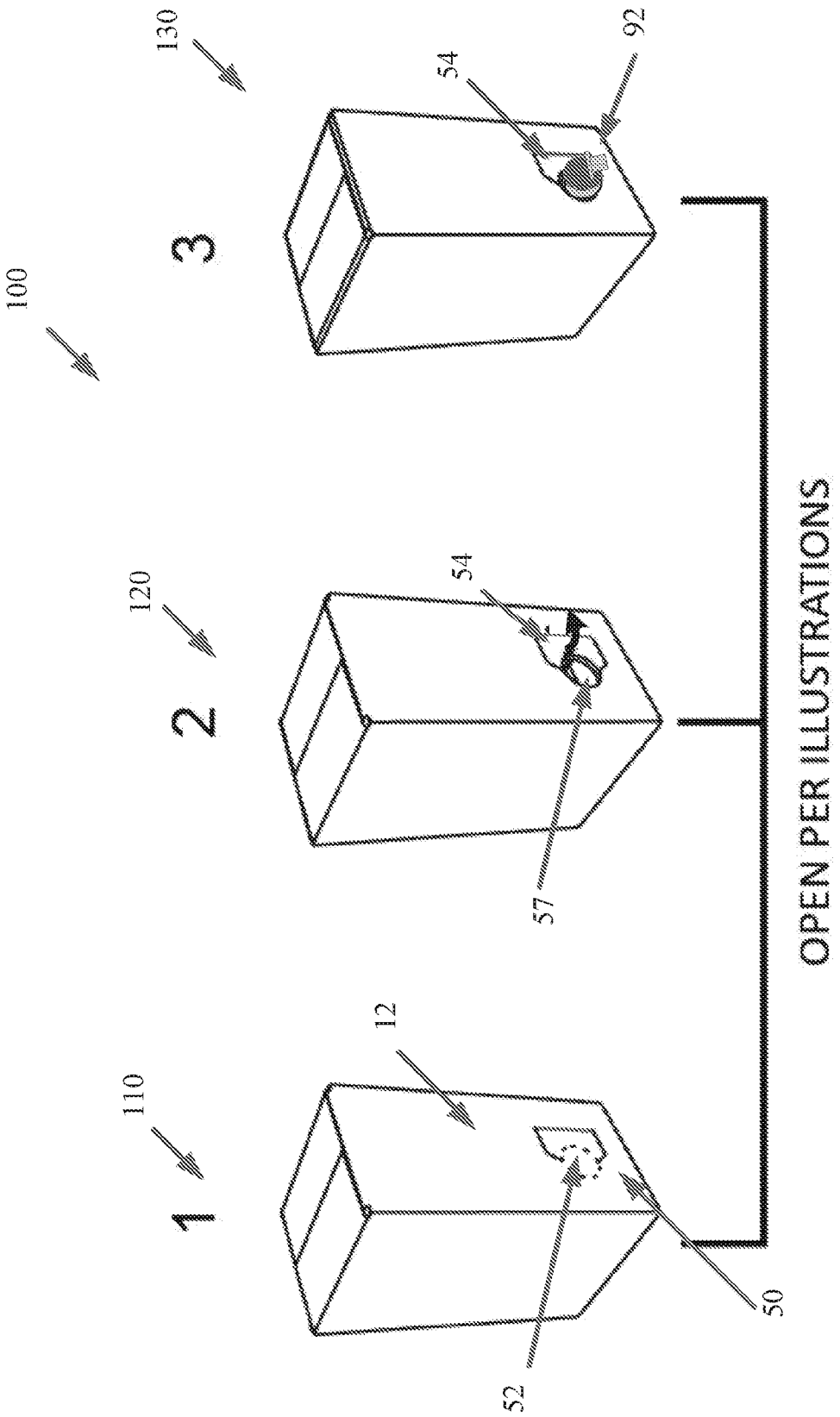

FIG. 8

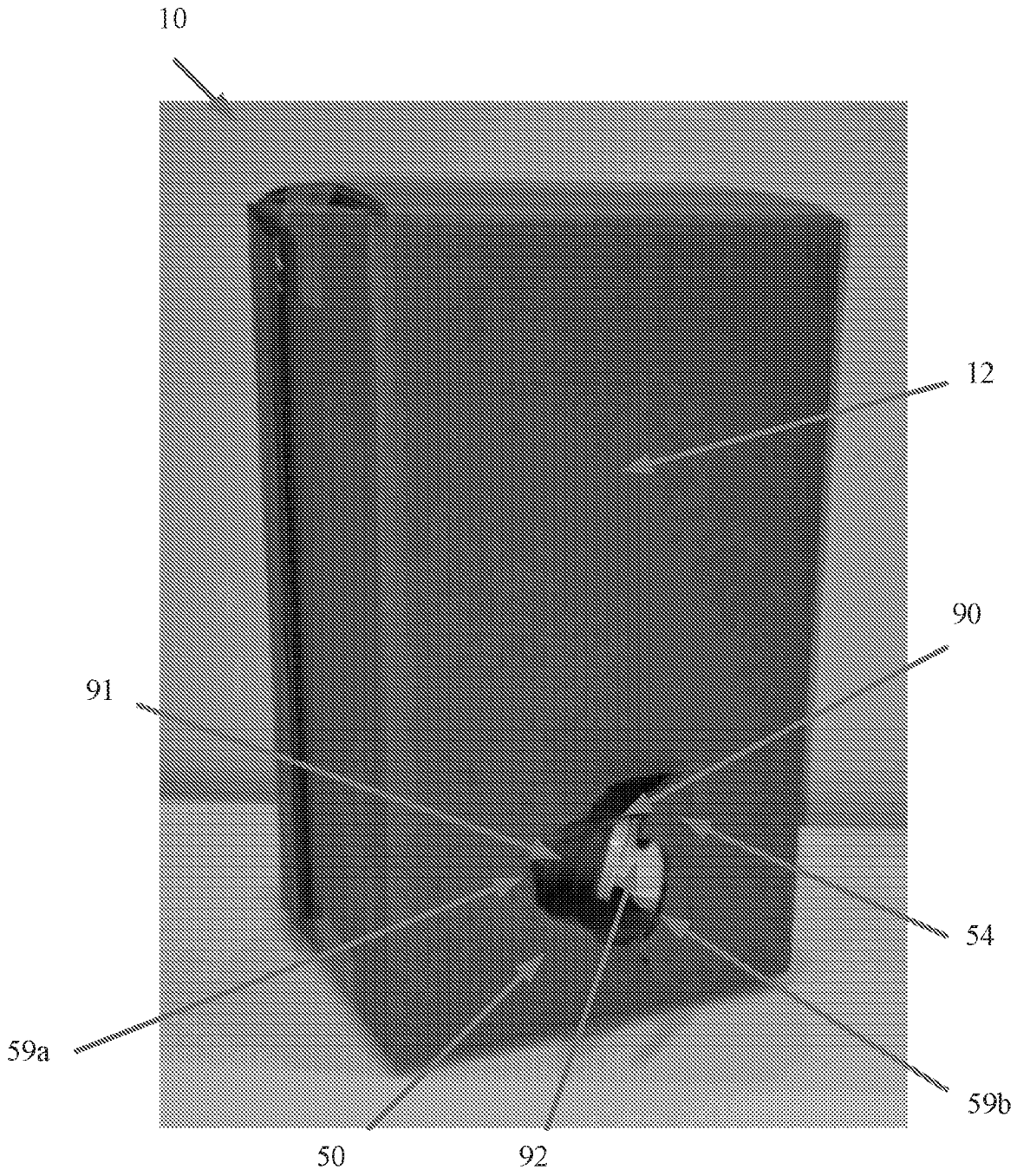

FIG. 9

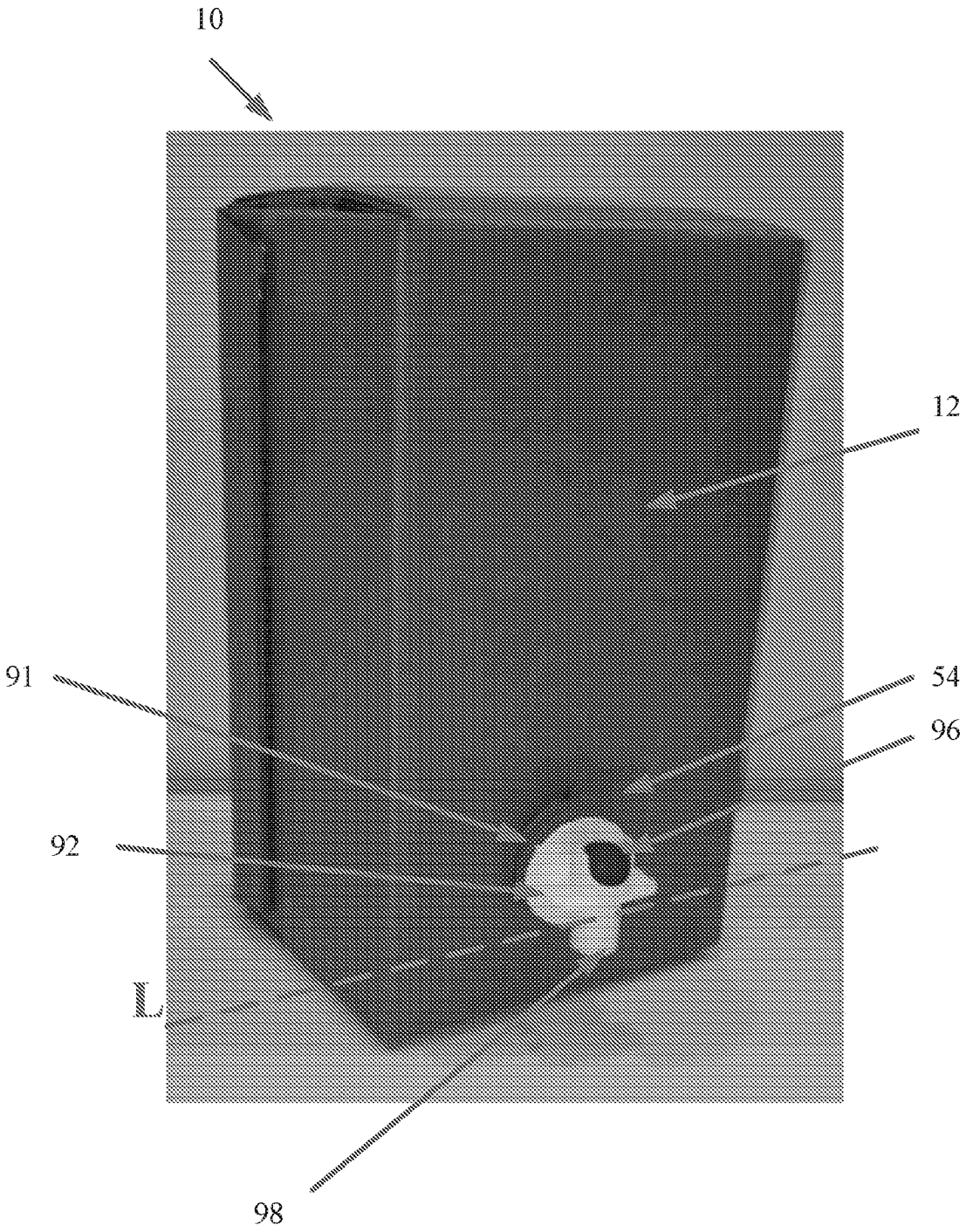

FIG. 10

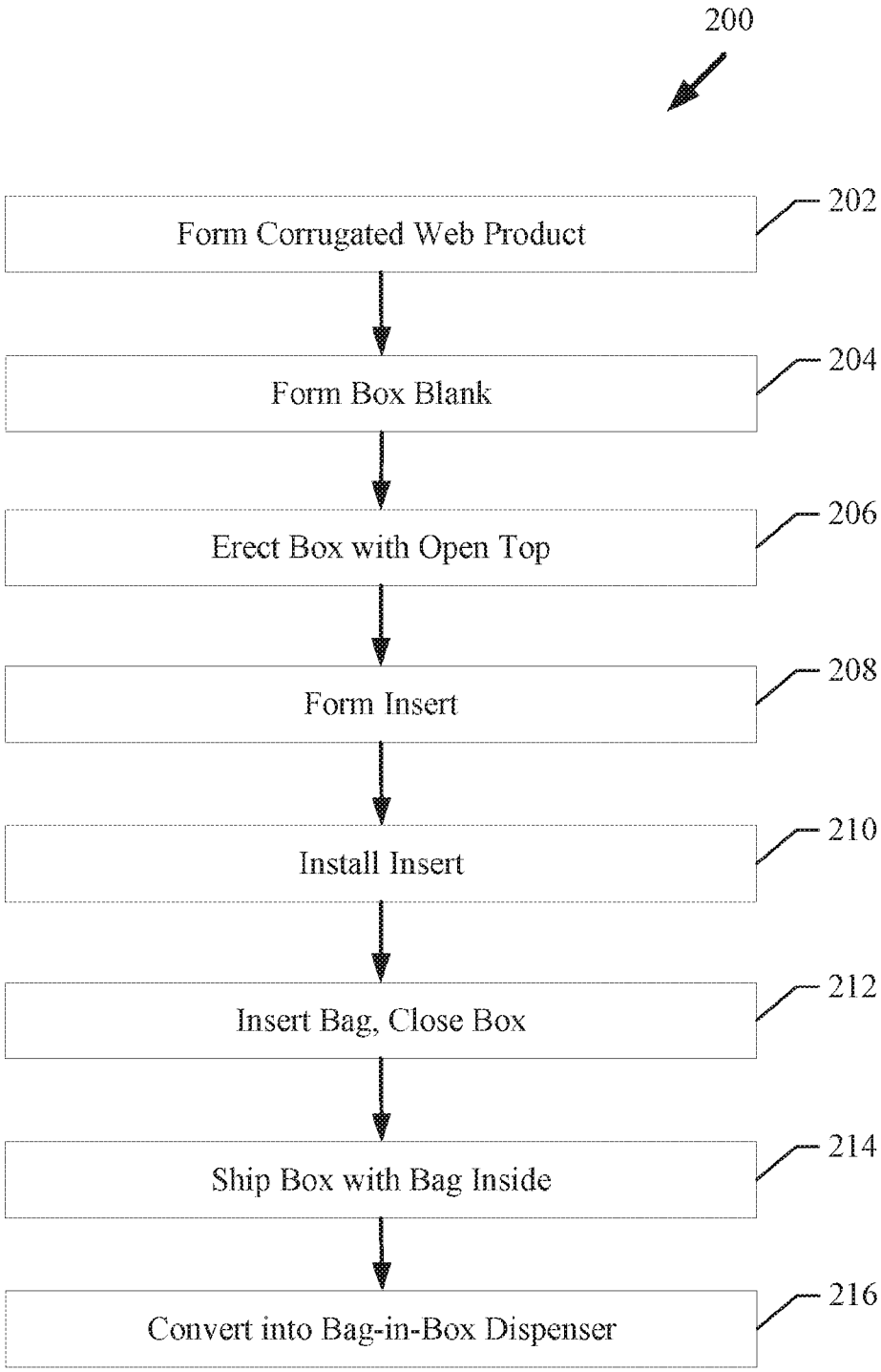
200
Form Corrugated Web Product
202
Form Box Blank
204
Erect Box with Open Top
206
Form Insert
208
Install Insert
210
Insert Bag, Close Box
212
Ship Box with Bag Inside
214
Convert into Bag-in-Box Dispenser
216

FIG. 11

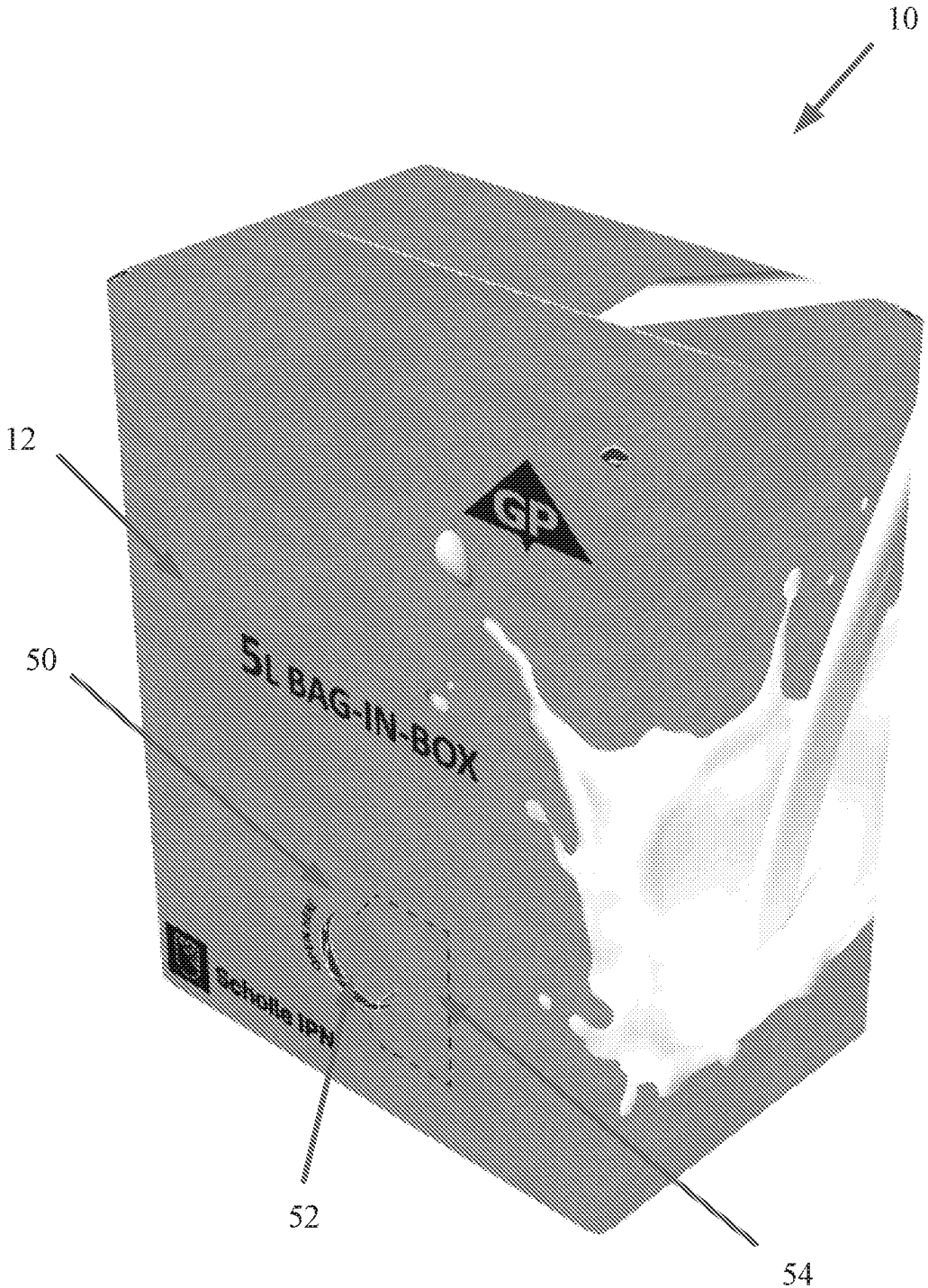

FIG. 1