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Paley

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(54) **PACKAGING SYSTEM FOR A HOT WATER HEATER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **18/658,655**

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(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. 17/820,771, filed on Aug. 18, 2022, now Pat. No. 12,006,106.

(60) Provisional application No. 63/234,863, filed on Aug. 19, 2021.

(51) **Int. Cl.**

B65D 5/50	(2006.01)
B65D 81/02	(2006.01)
B65D 85/68	(2006.01)
F24H 1/00	(2022.01)

(52) **U.S. Cl.**

CPC ***B65D 5/5052*** (2013.01); ***B65D 65/44*** (2013.01); ***B65D 85/68*** (2013.01); *B65D 2585/6857* (2013.01); *F24H 1/0018* (2013.01); *F24H 1/0027* (2013.01)

(58) **Field of Classification Search**

CPC B65D 5/50; B65D 5/5052; B65D 65/44; B65D 81/02; B65D 85/64; B65D 85/68; B65D 2585/6857; F24H 1/00; F24H 1/0018; F24H 1/0027

USPC 206/320

See application file for complete search history.

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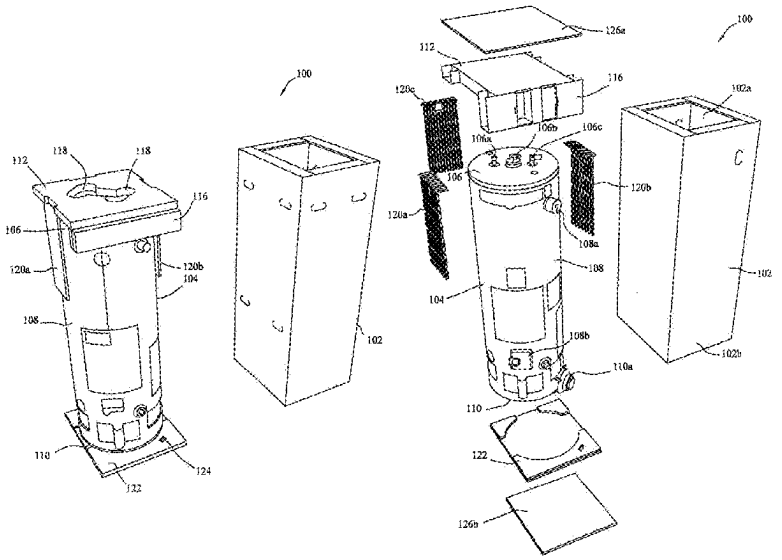
(57) **ABSTRACT**

A packaging system for a hot water heater includes an outer box, a top insert, an offset filler, a base insert, and one or more side panels. The top insert contacts a top surface of the hot water heater and a top inside surface of outer box. The offset filler is coupled to the top insert and is sandwiched between the hot water heater and the outer box. The base insert contacts the bottom surface of the hot water heater and a bottom inside surface of the outer box. The base insert includes raised perimeter structures that form a shape that matches a shape of the bottom surface of the hot water heater. Each side panel includes a raised pattern.

19 Claims, 25 Drawing Sheets



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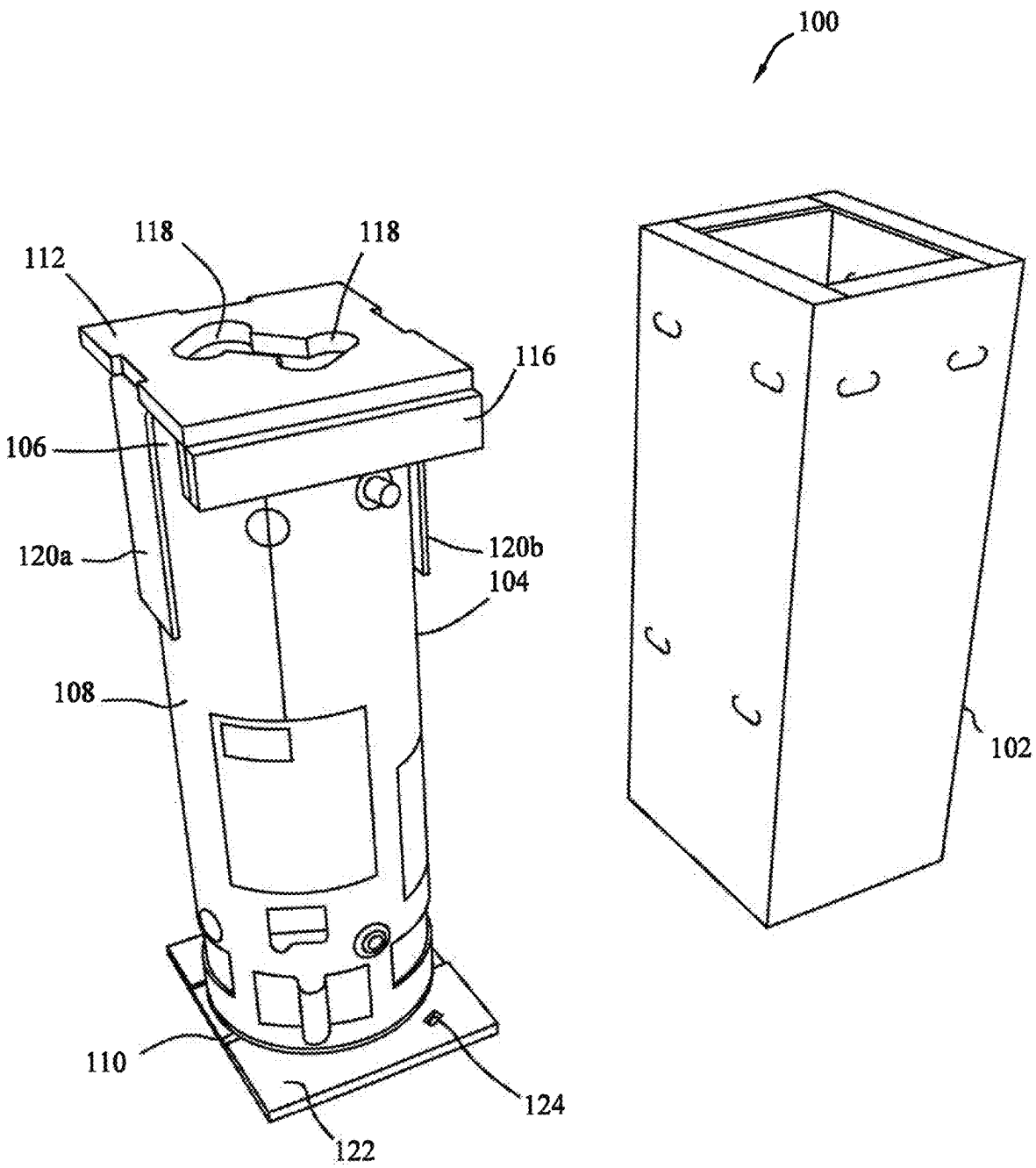
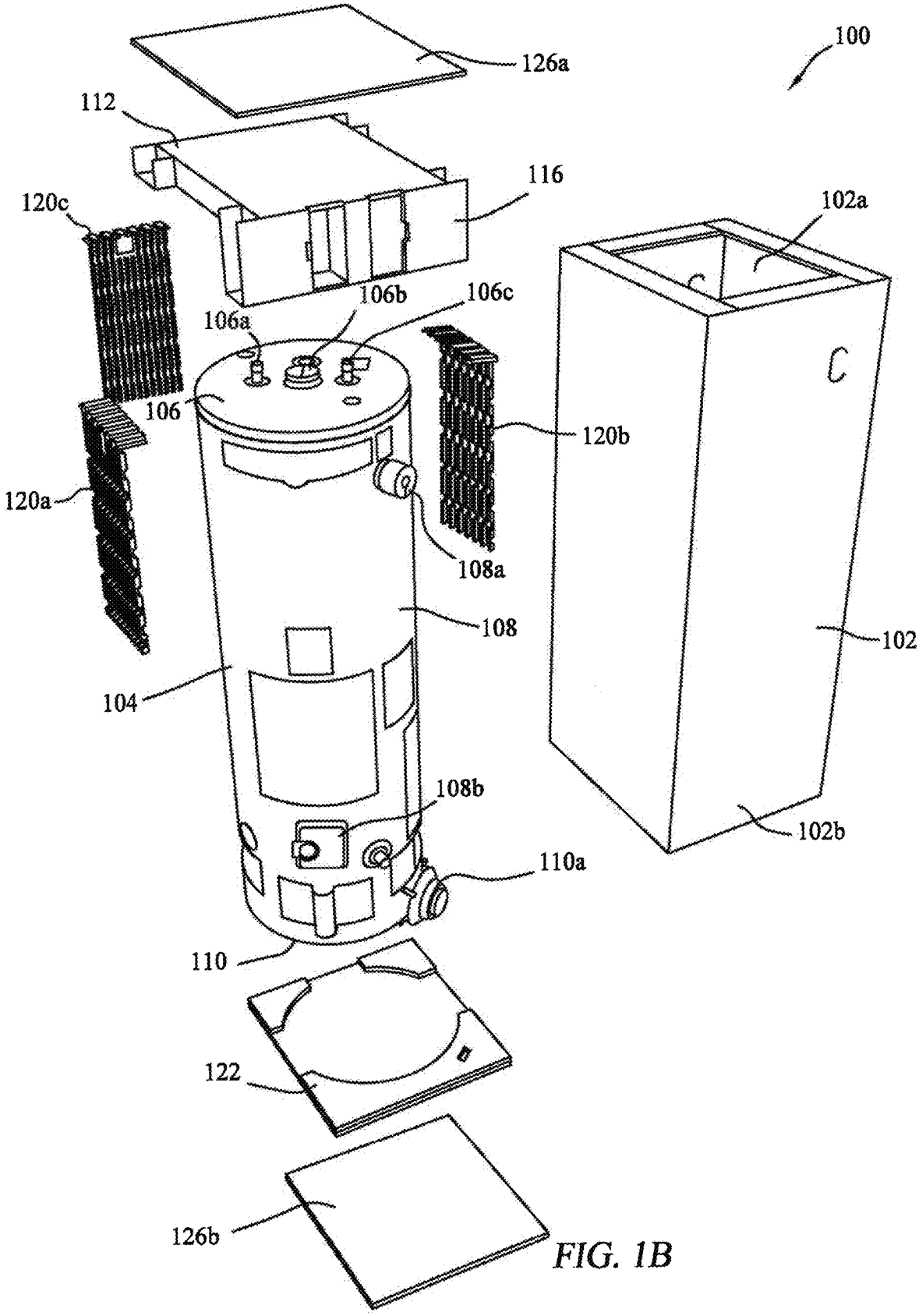


FIG. 1A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126b

FIG. 1B

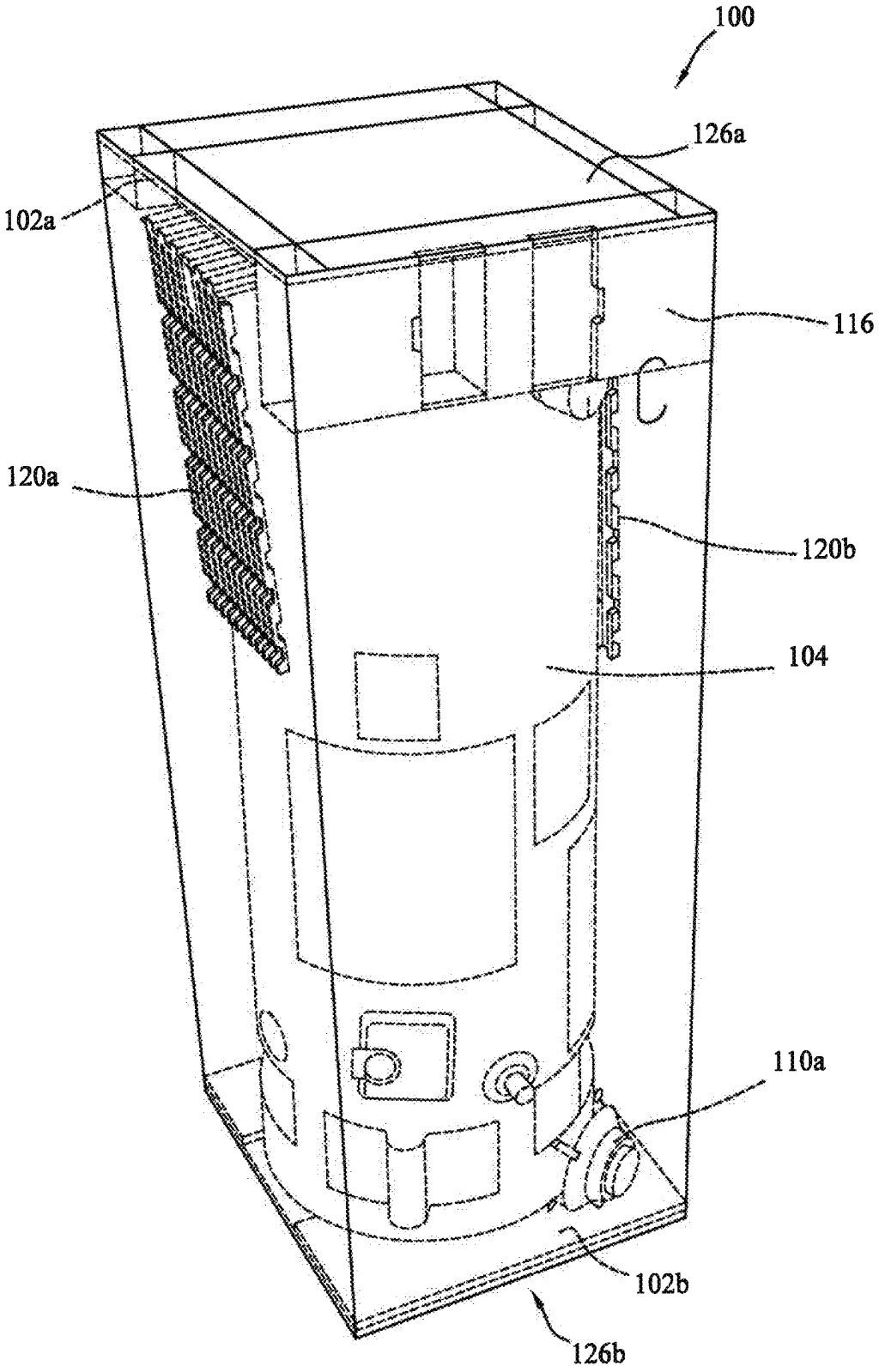

FIG. 1C

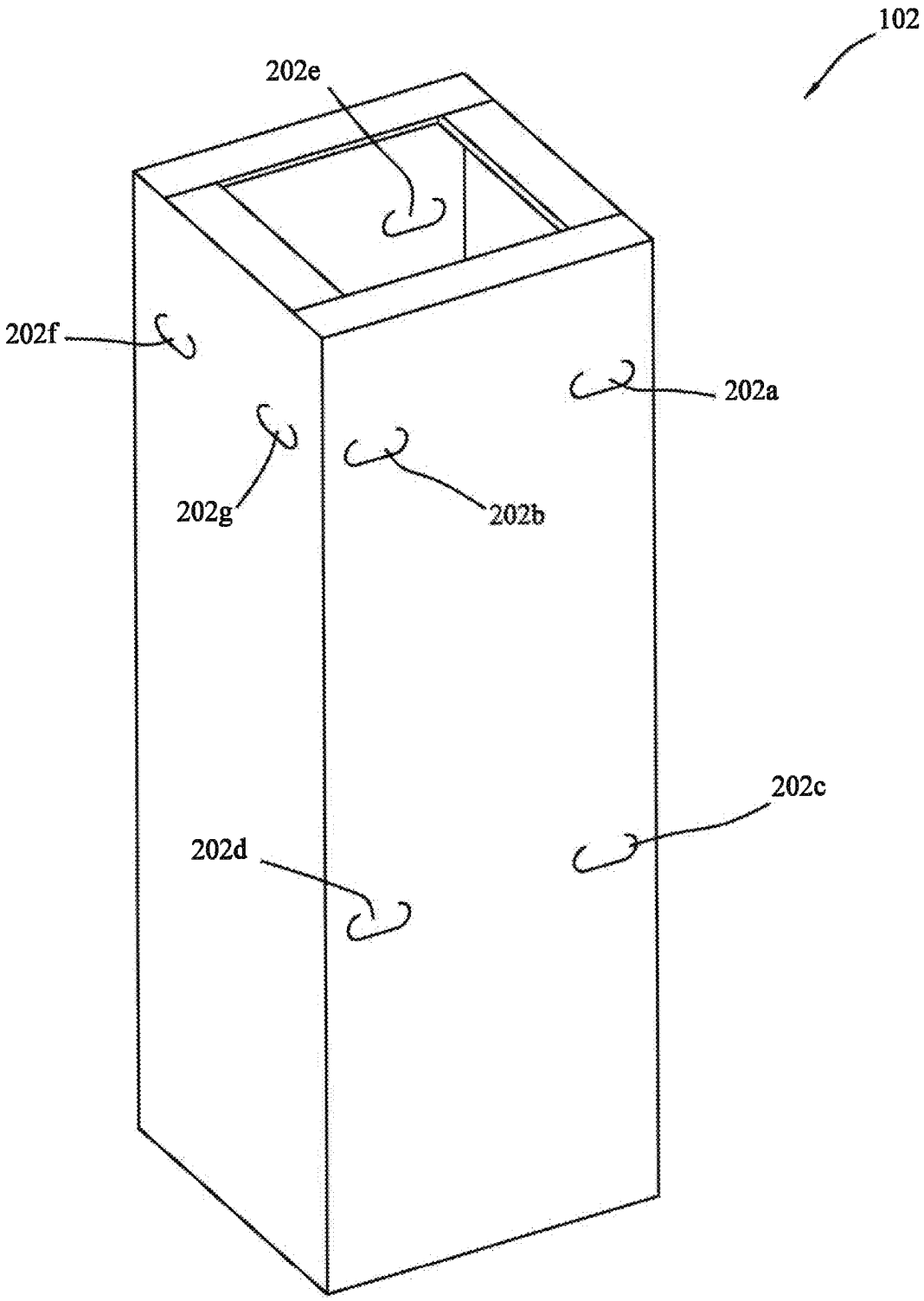

FIG. 2A

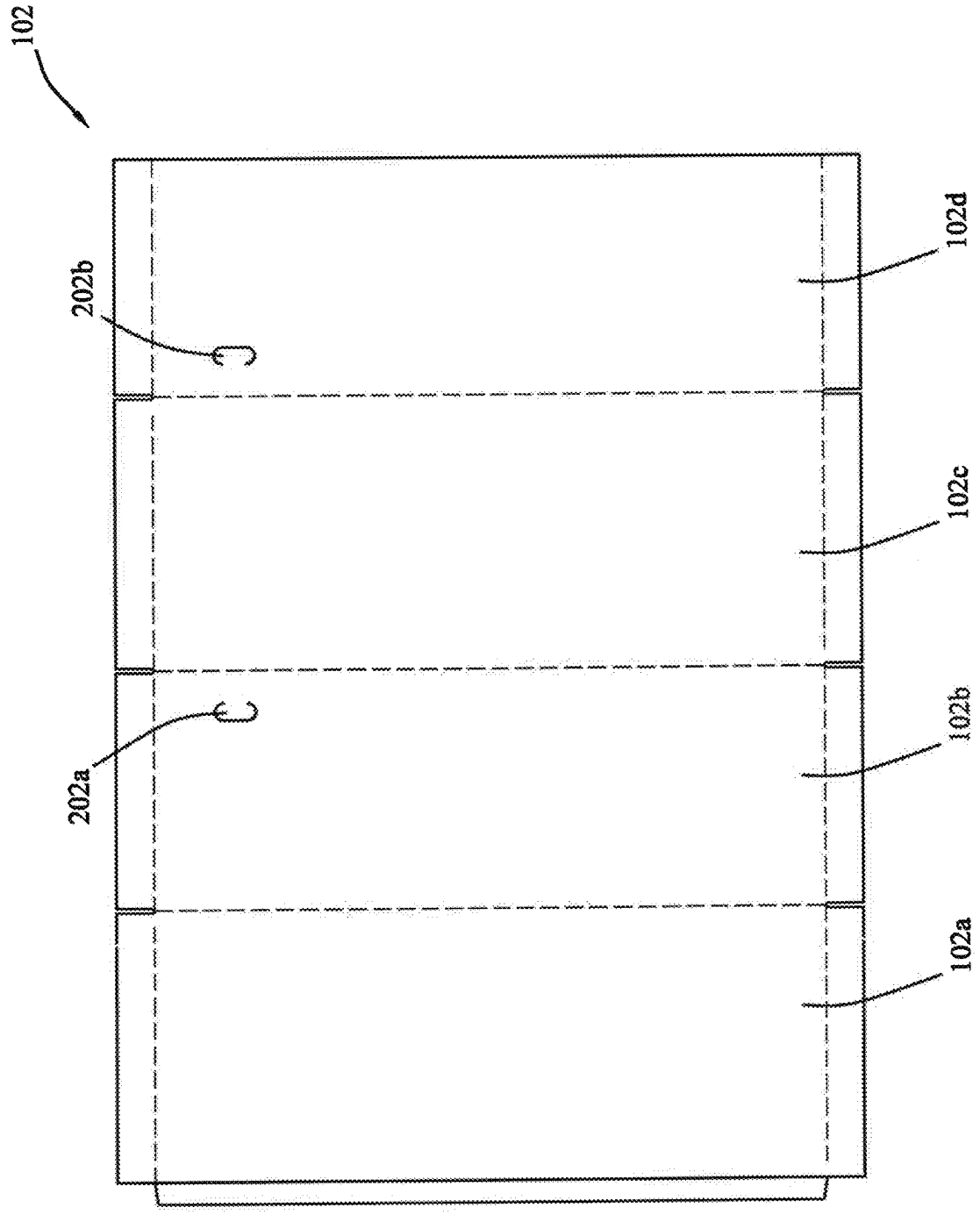

FIG. 2B

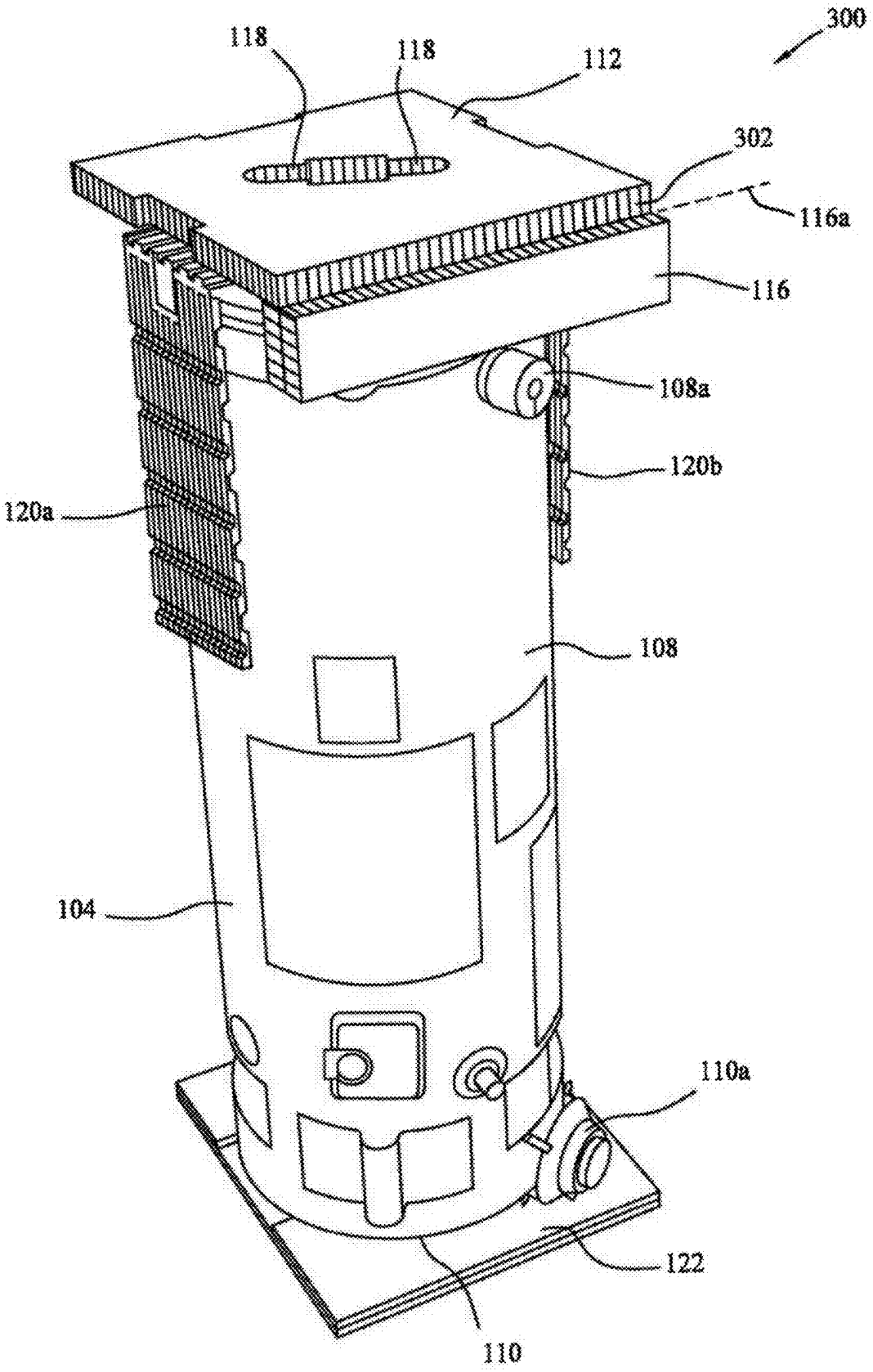
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FIG. 3A

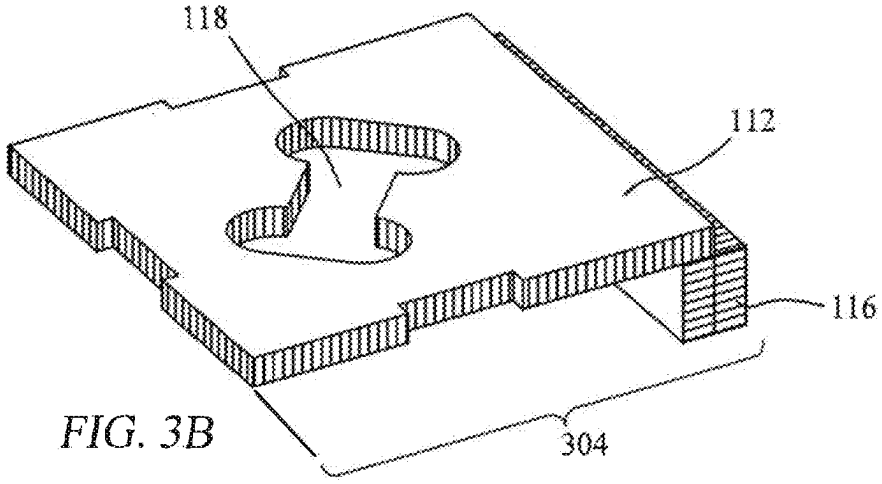

FIG. 3B

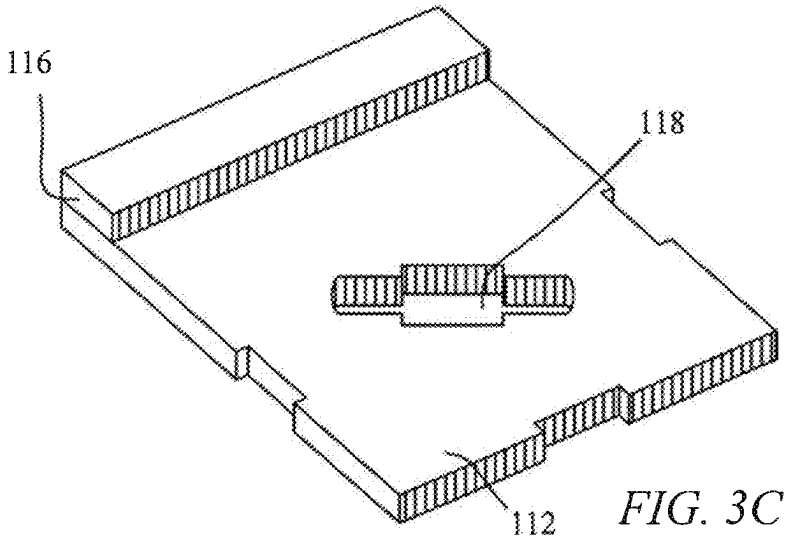

FIG. 3C

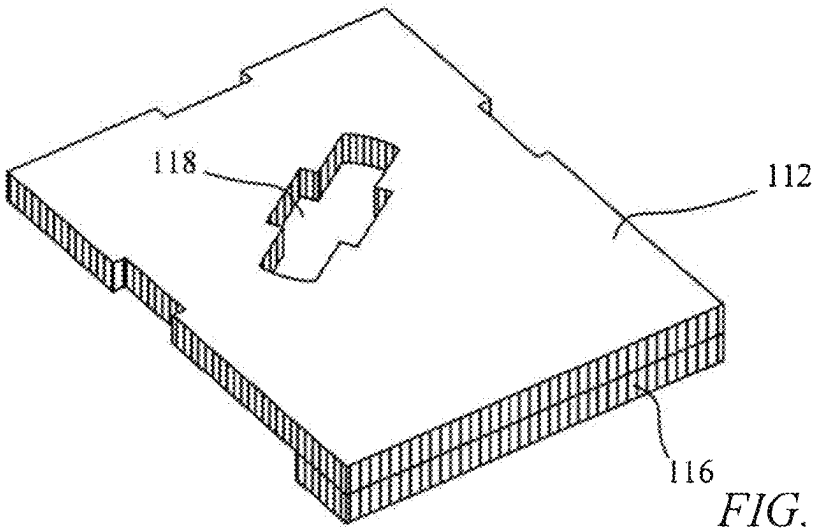

FIG. 3D

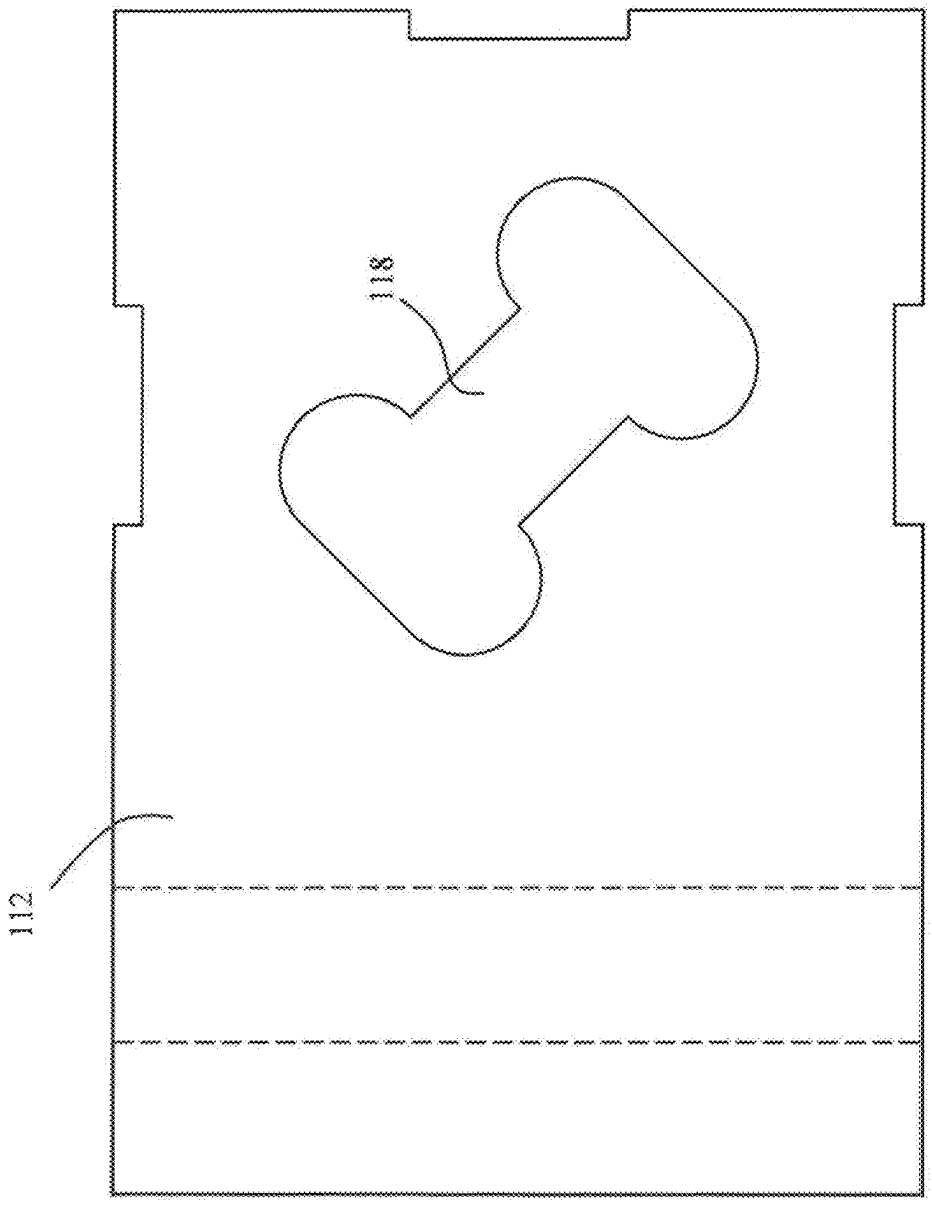

FIG. 3E

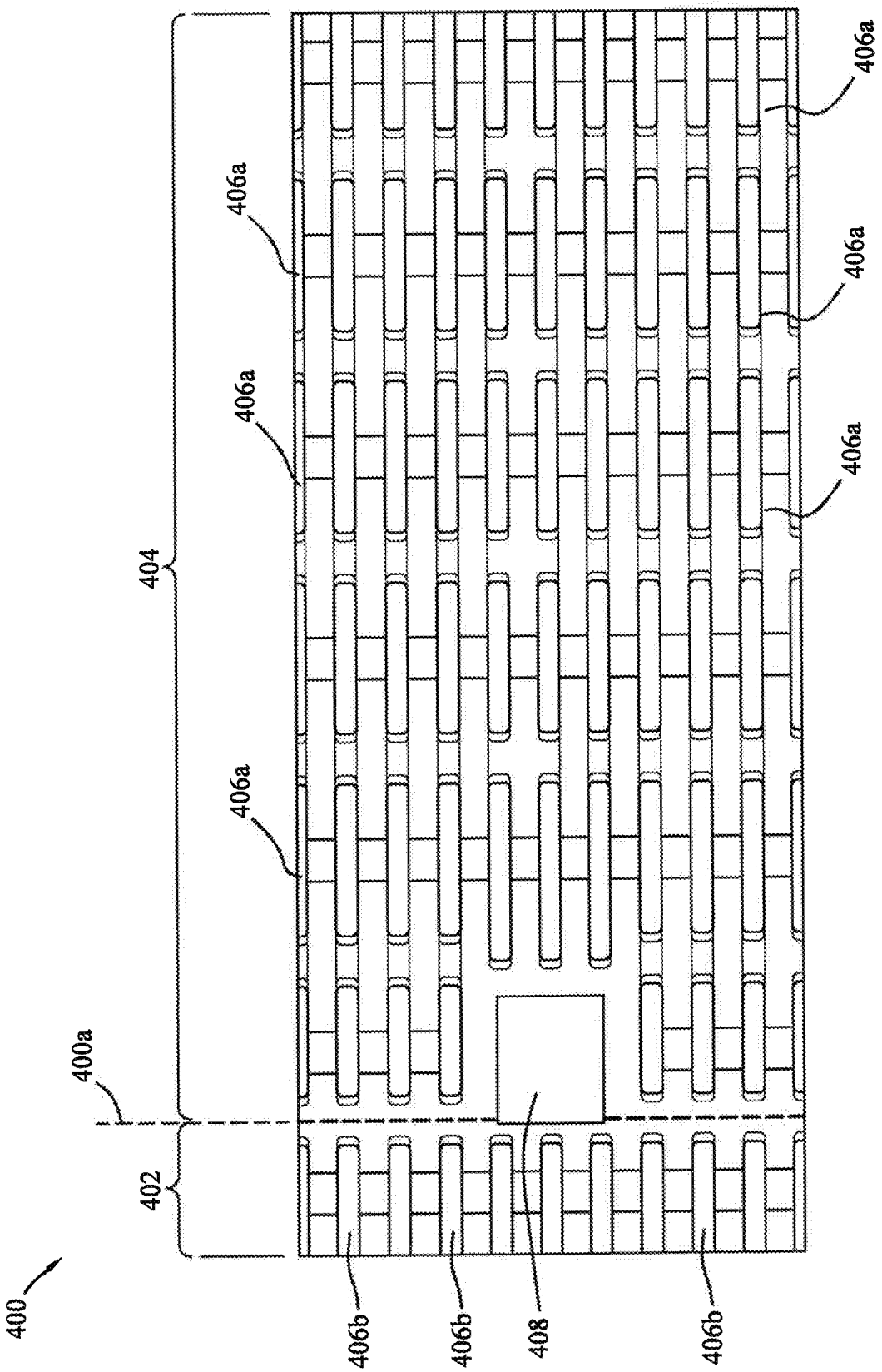

FIG. 4A

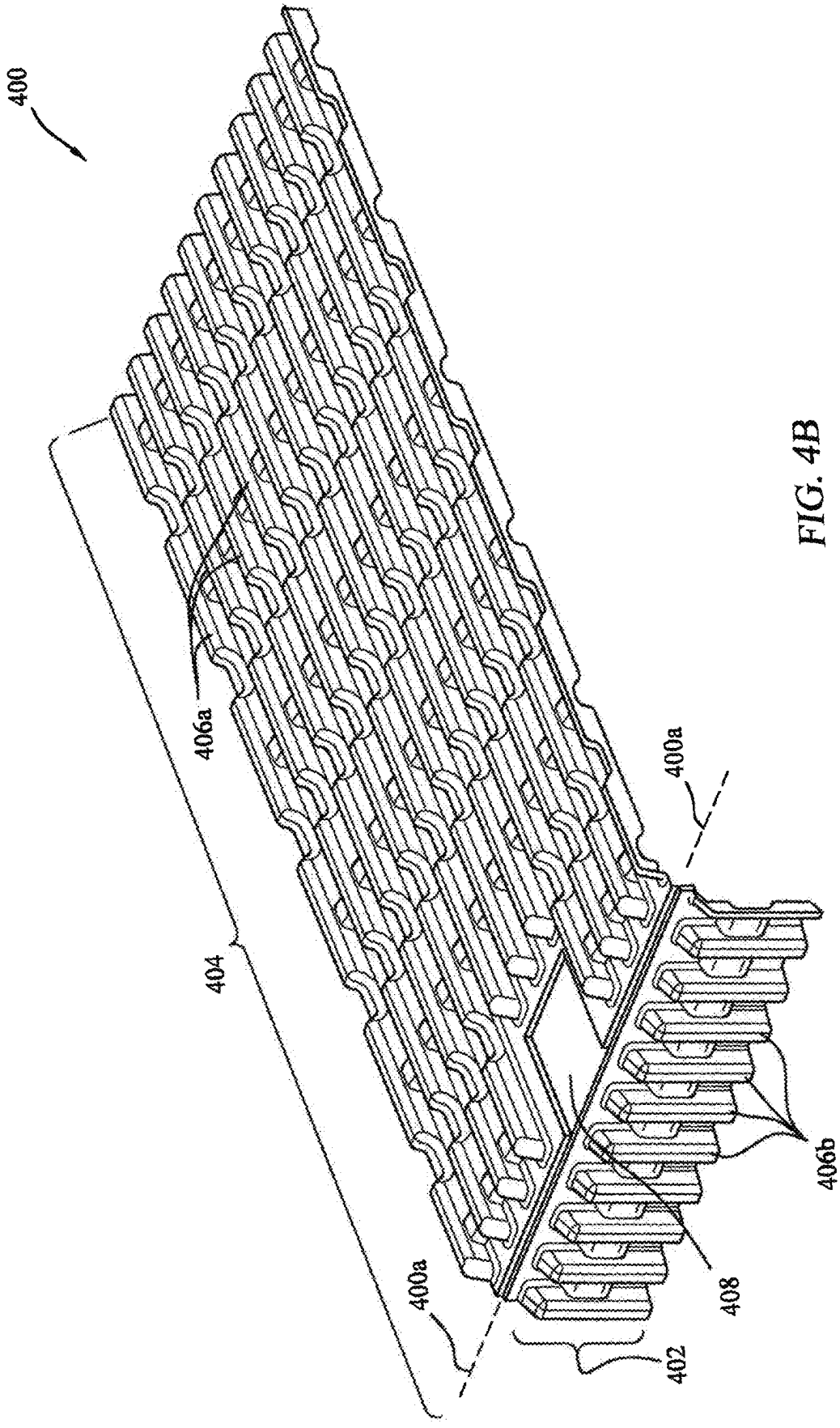

FIG. 4B

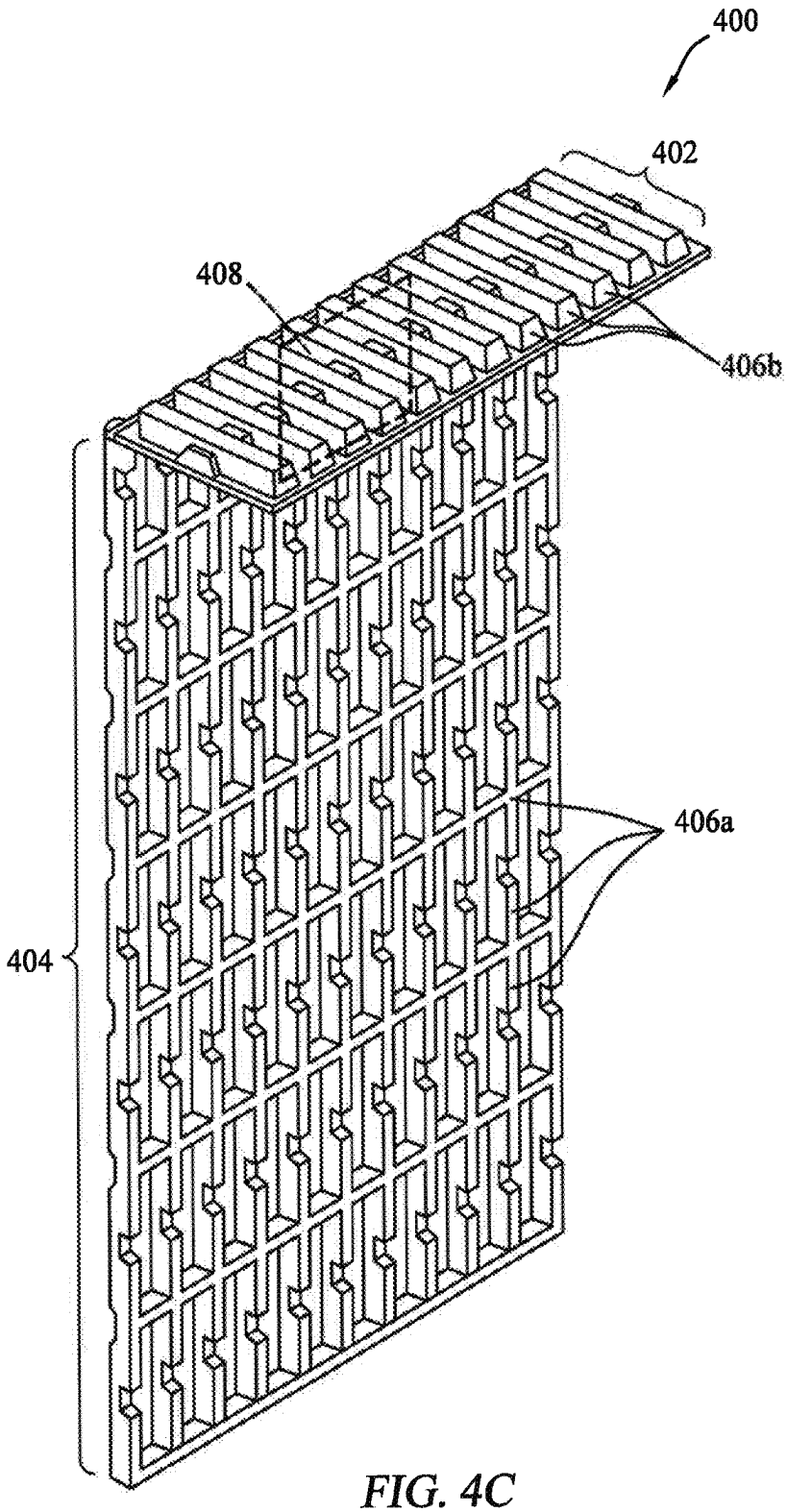

FIG. 4C

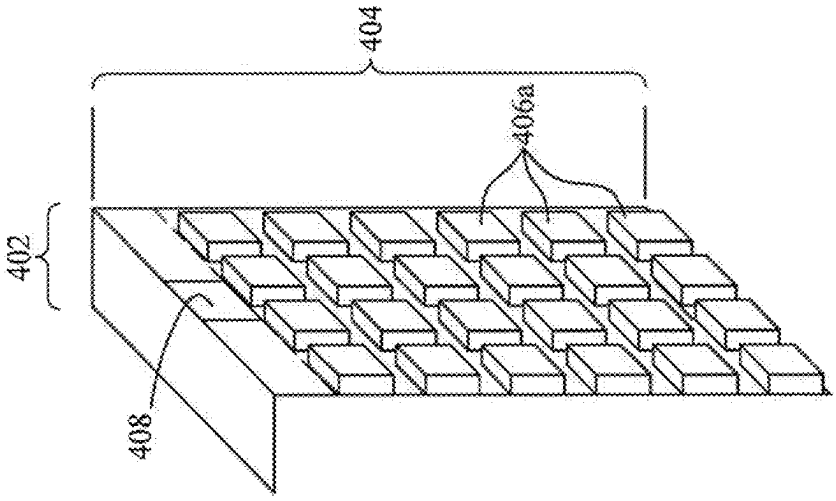

FIG. 4E

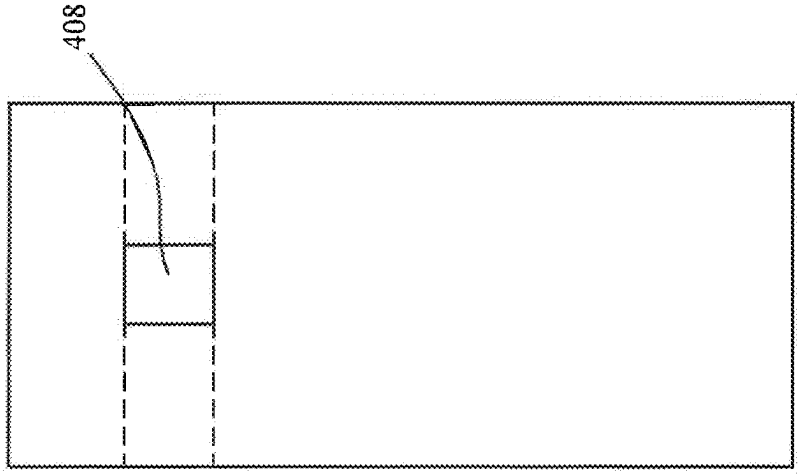

FIG. 4D

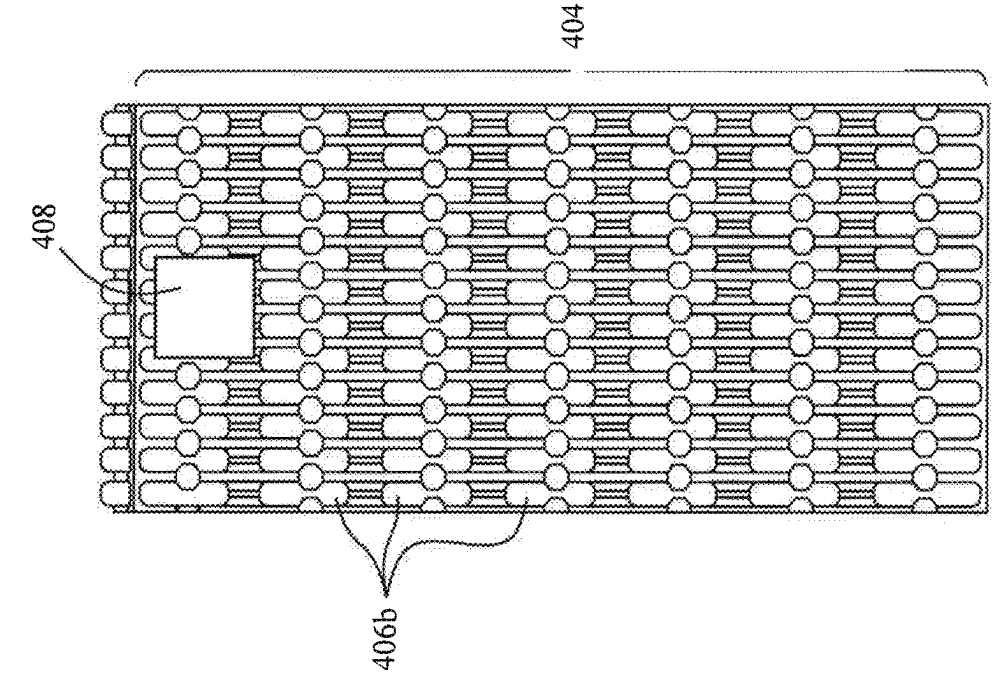

FIG. 4H

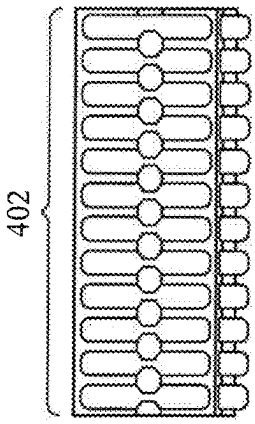

FIG. 4F

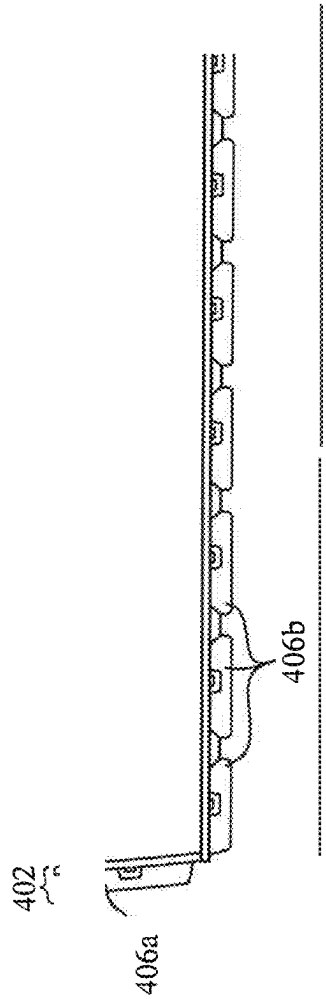

FIG. 4G

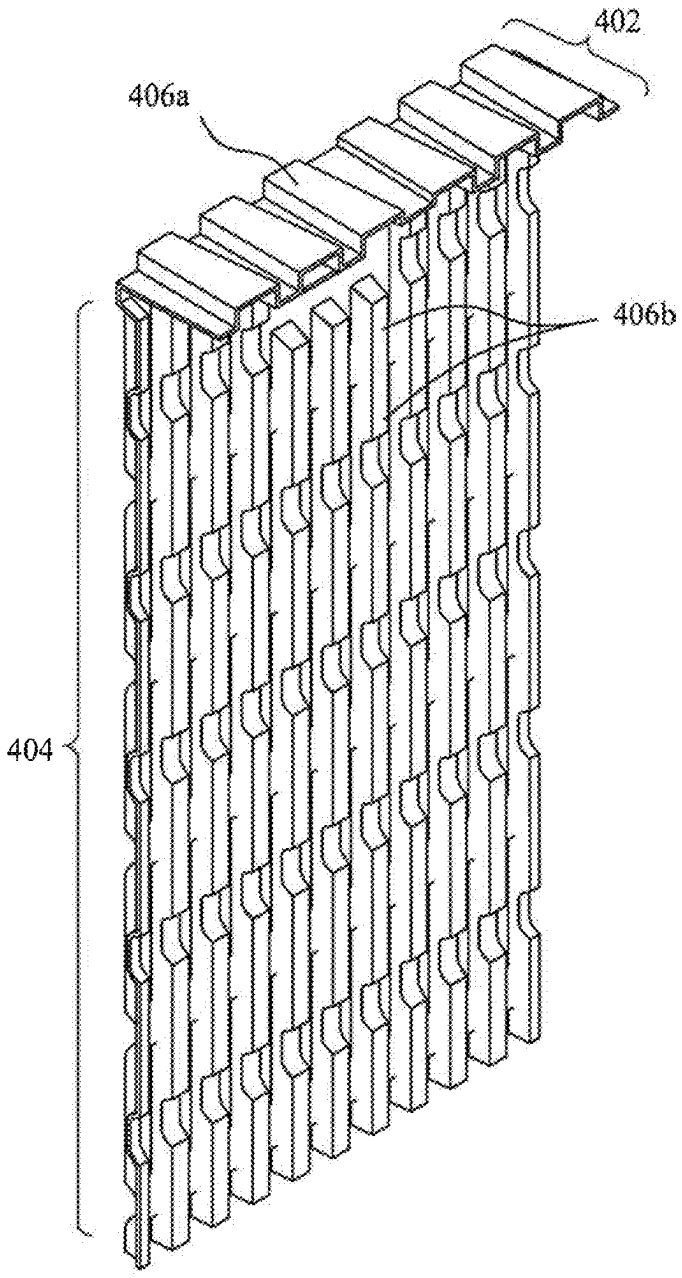

FIG. 4I

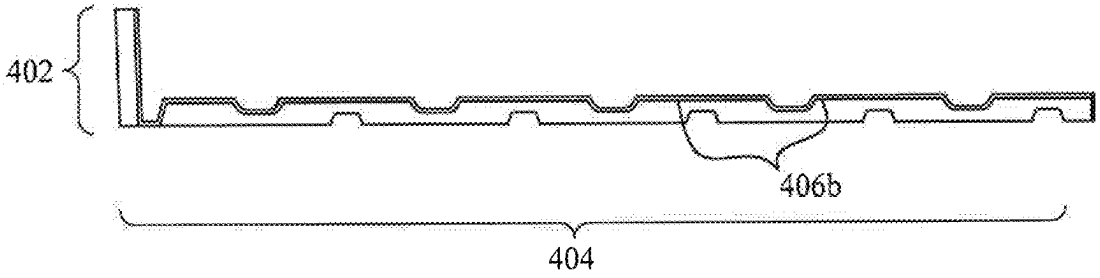

FIG. 4J

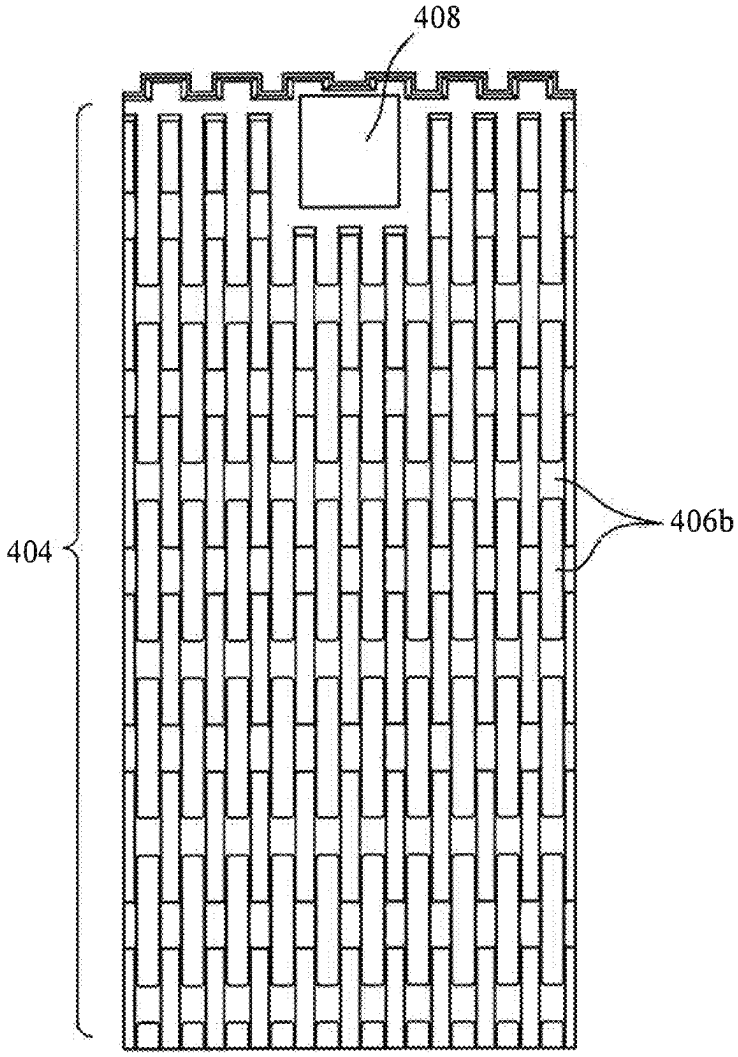

FIG. 4K

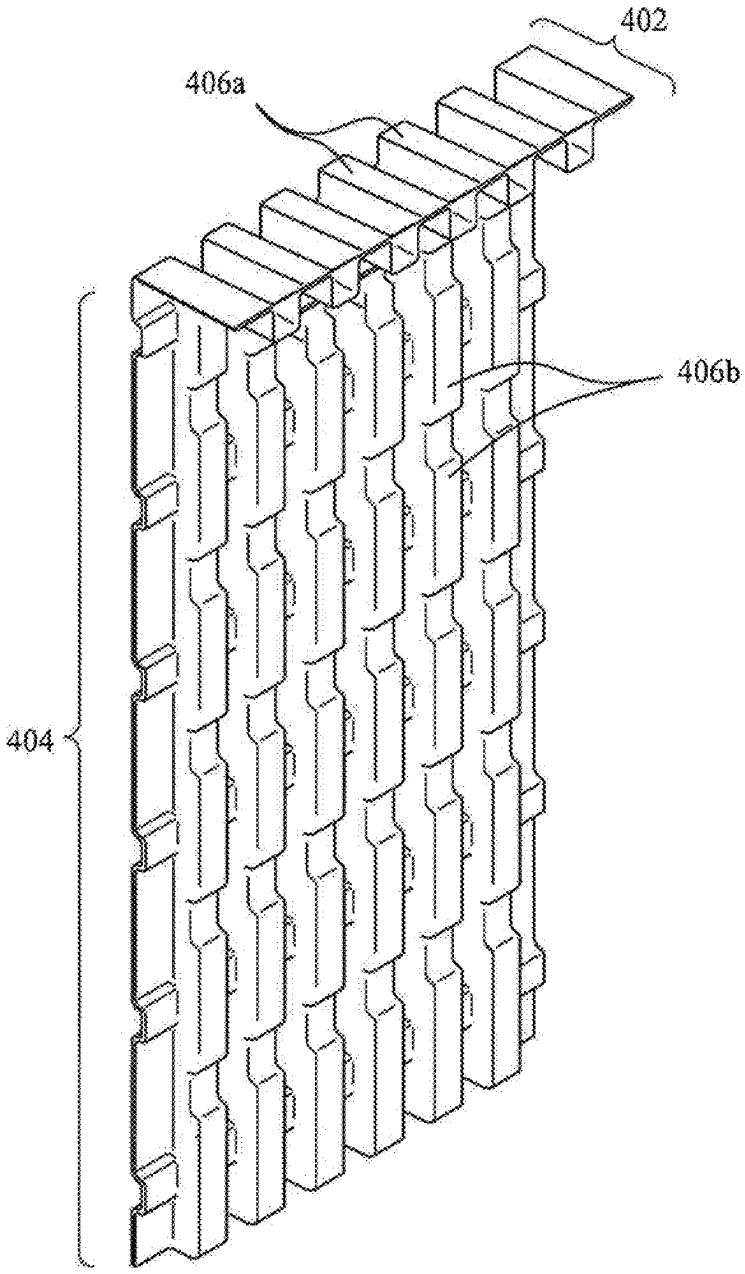

FIG. 4L

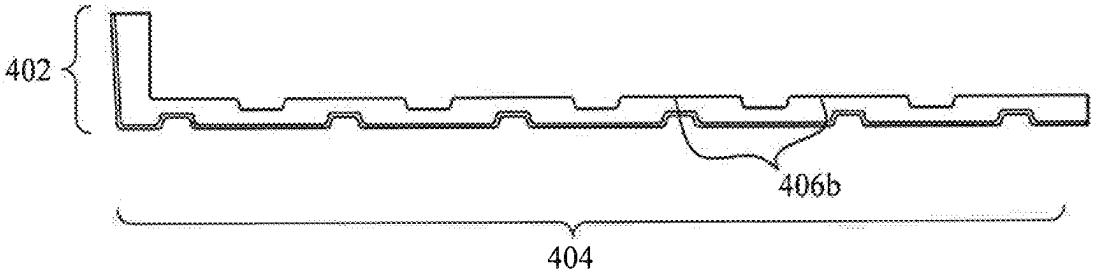

FIG. 4M

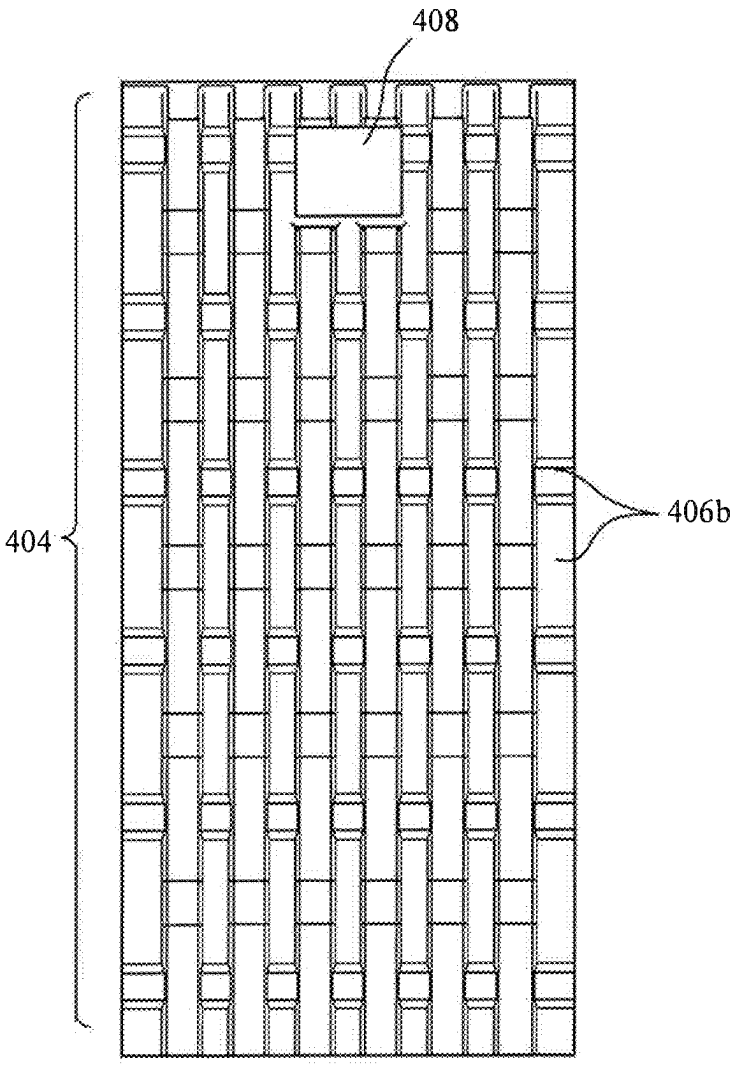

FIG. 4N

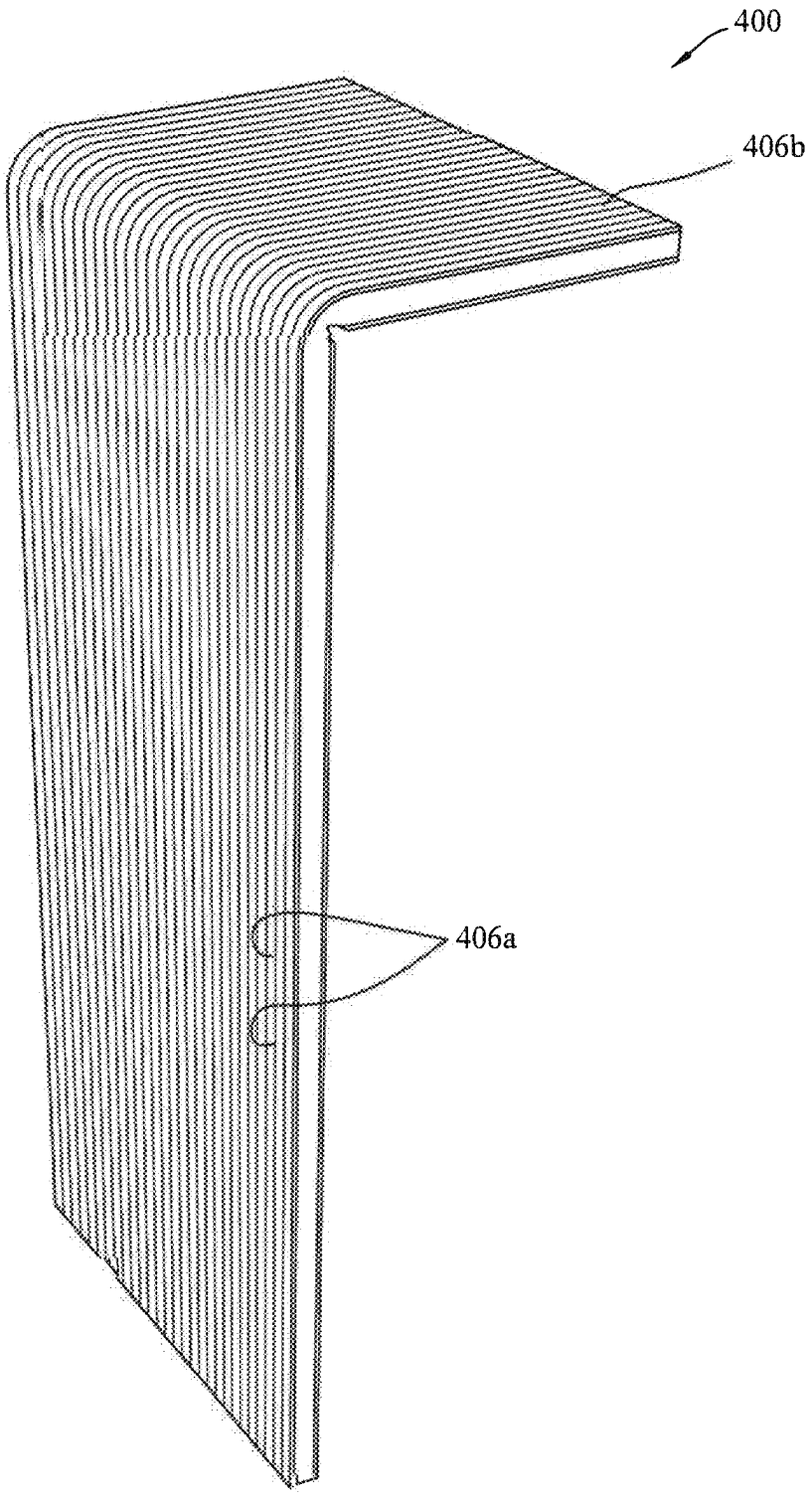

FIG. 4O

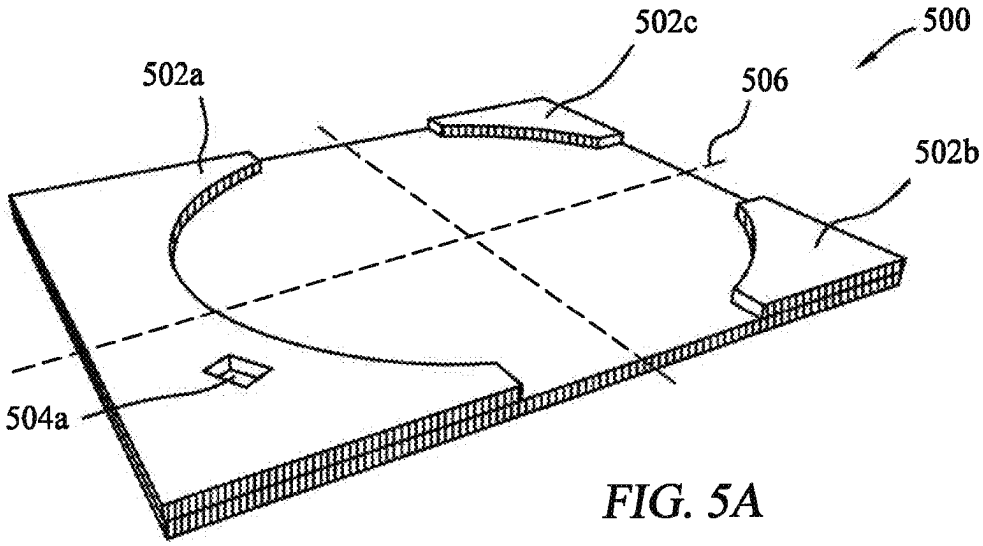

FIG. 5A

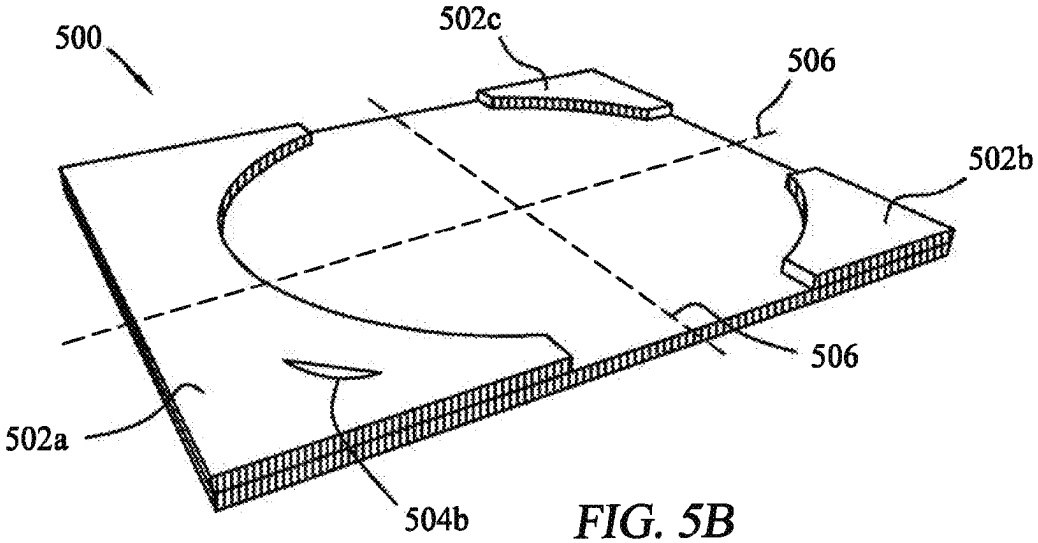

FIG. 5B

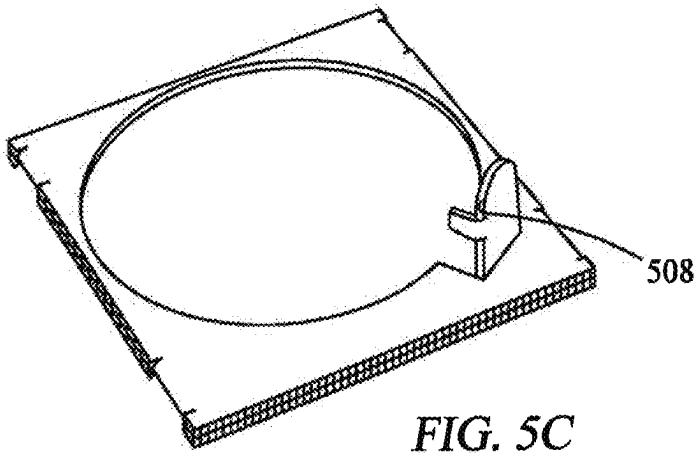

FIG. 5C

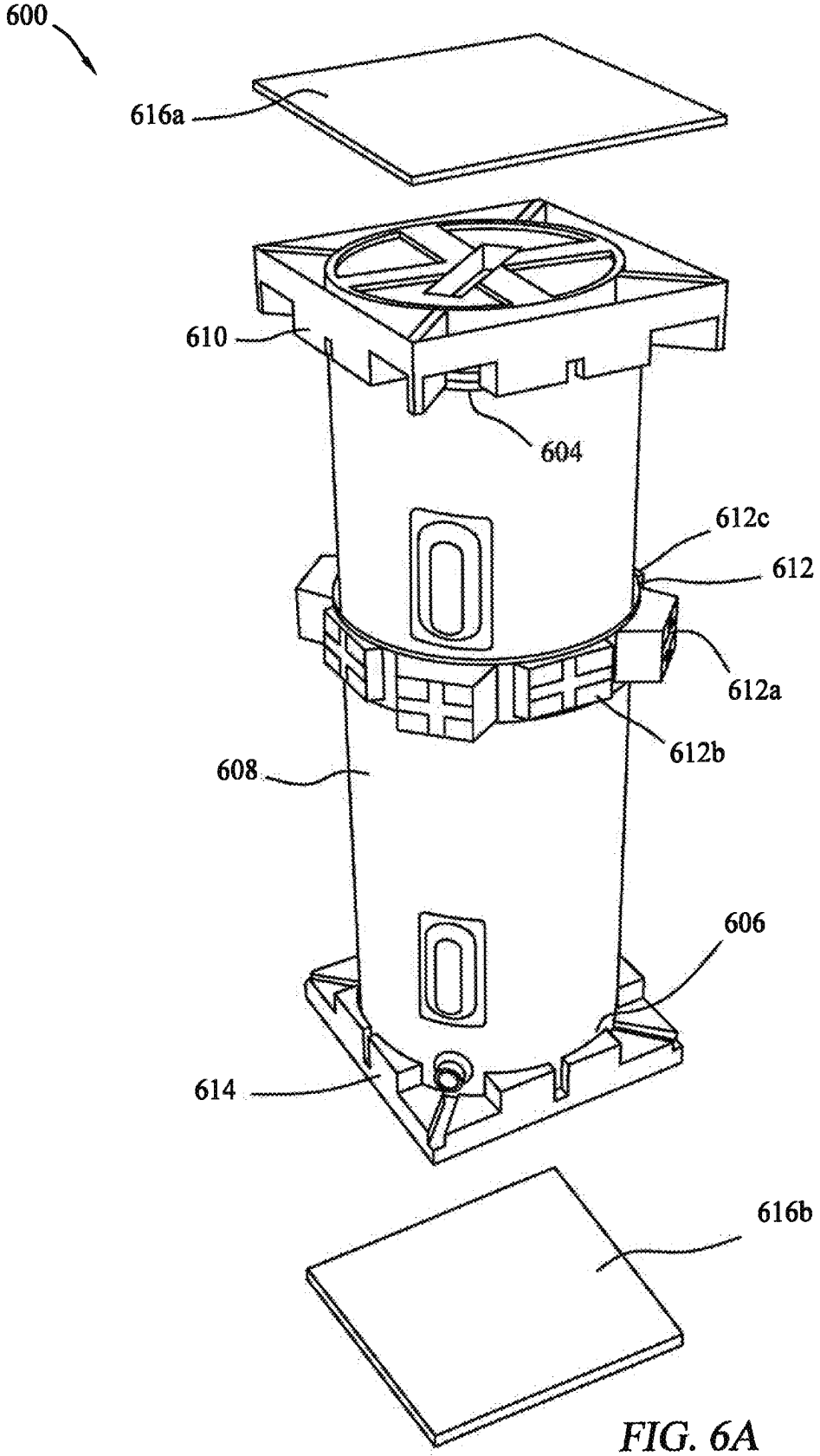

FIG. 6A

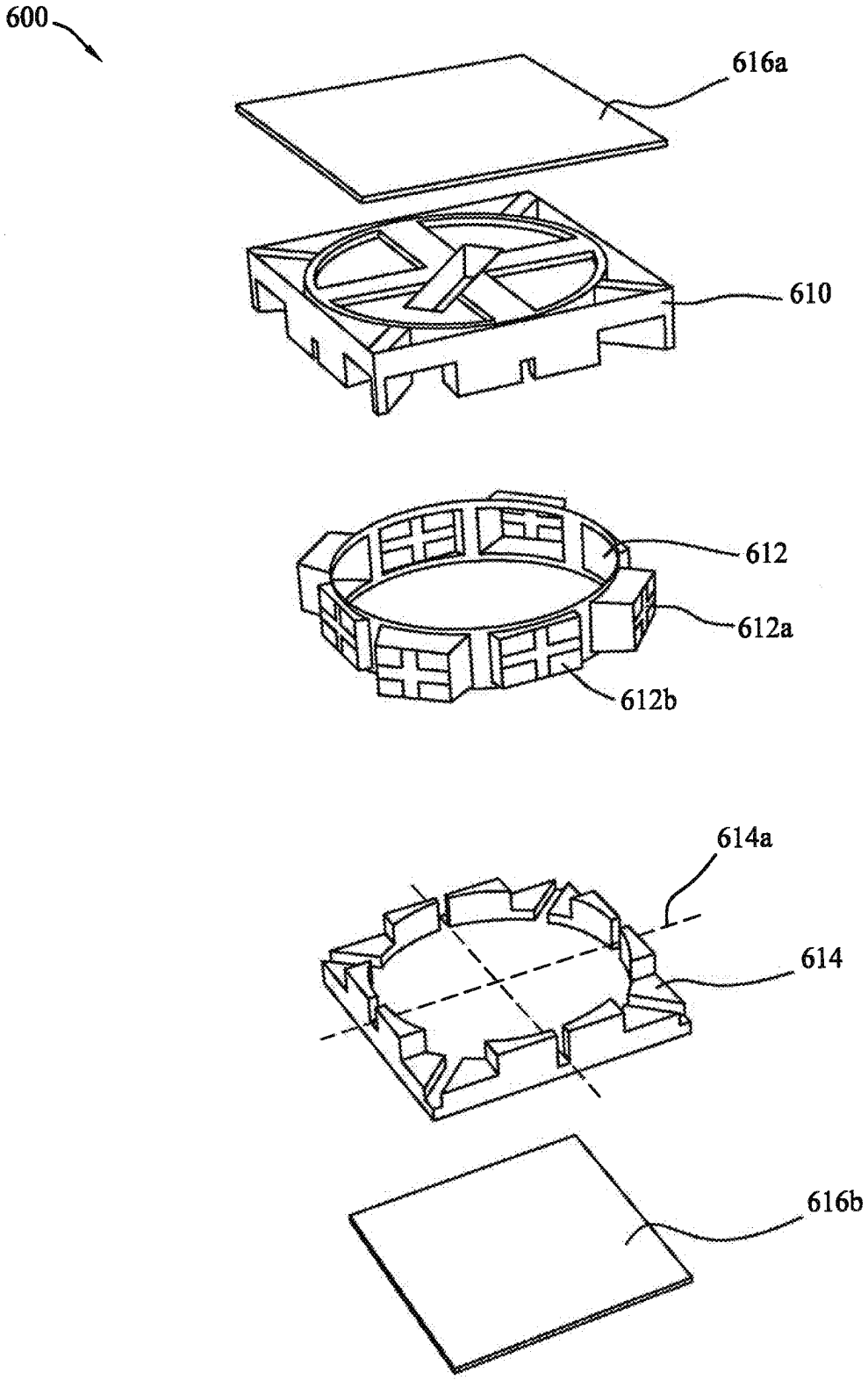

FIG. 6B

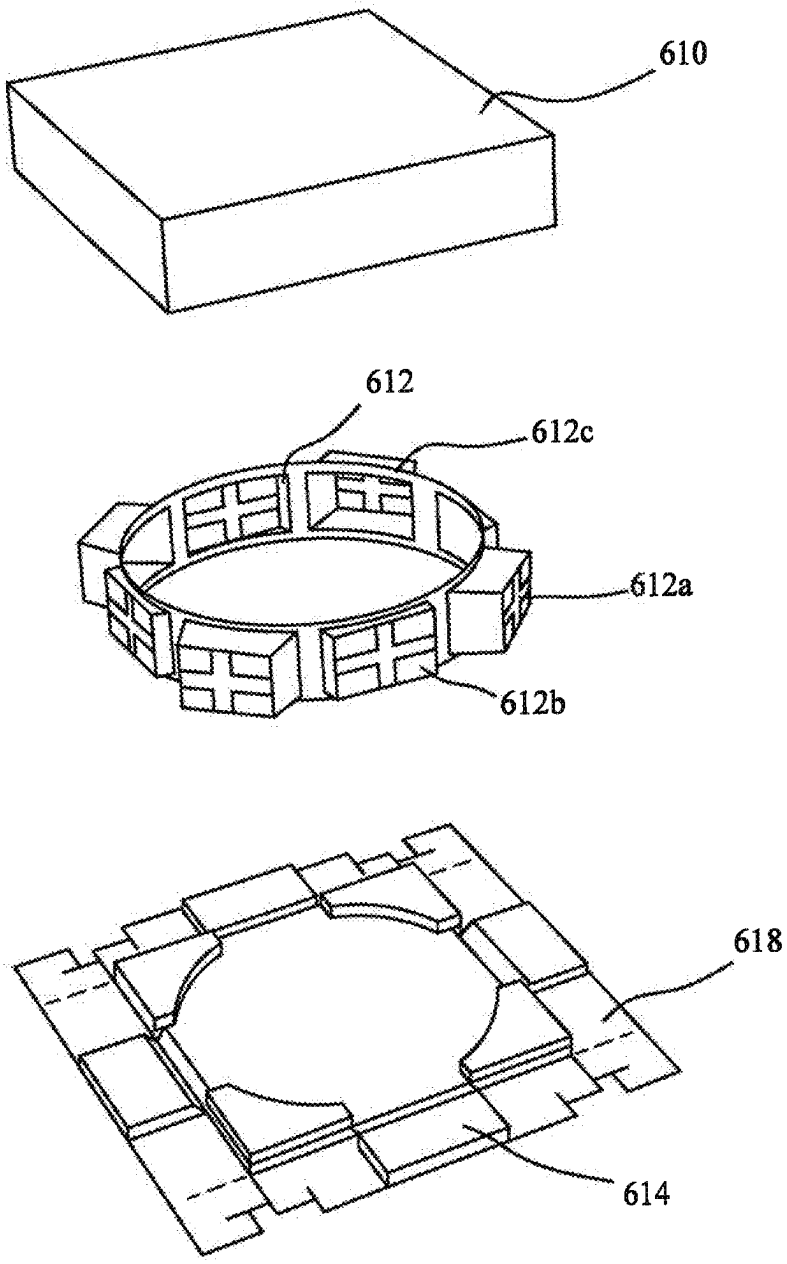

FIG. 6C

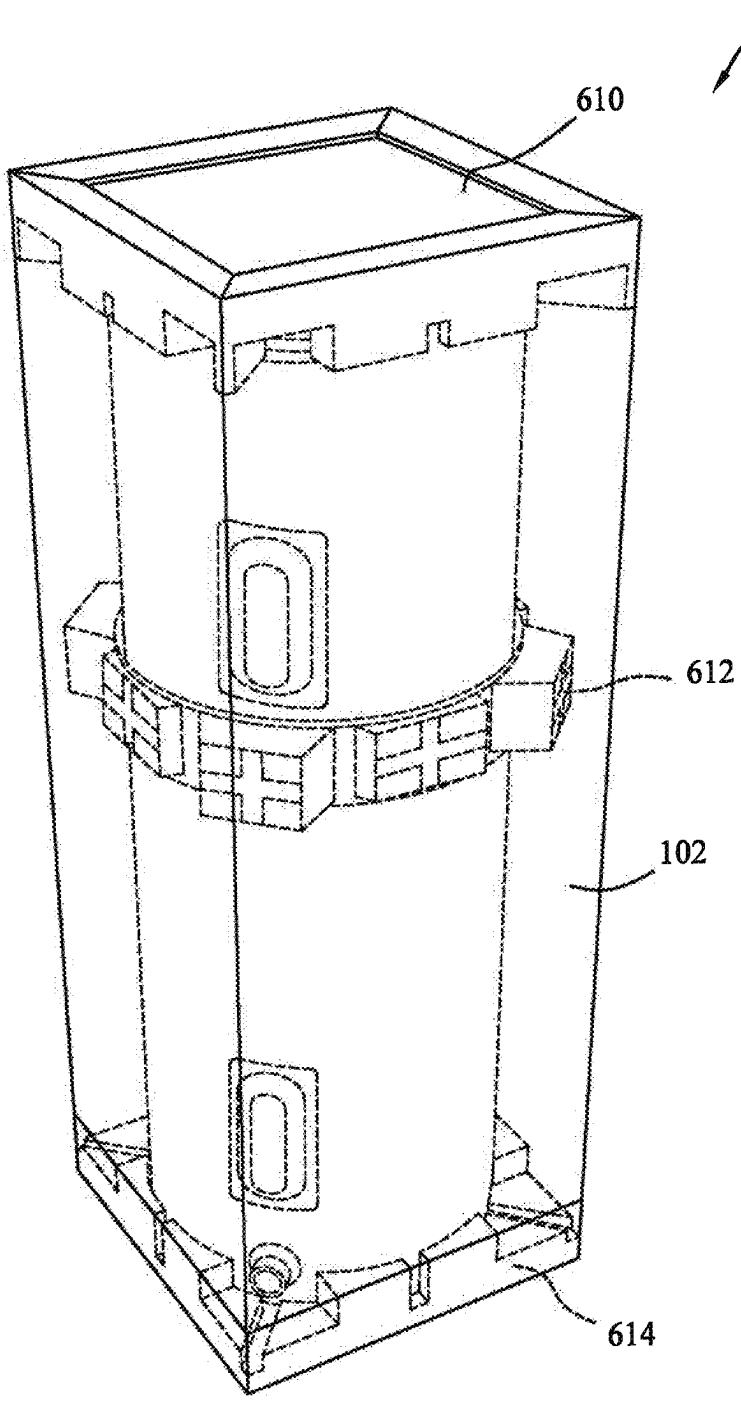

FIG. 6D

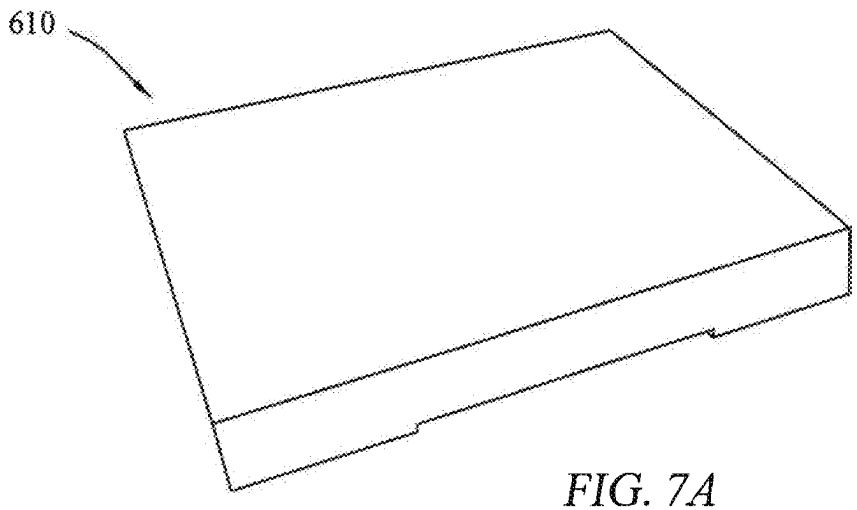

FIG. 7A

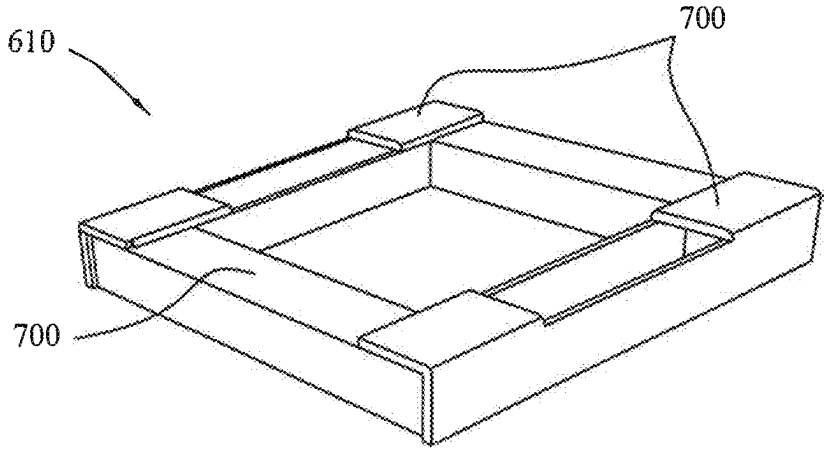

FIG. 7B

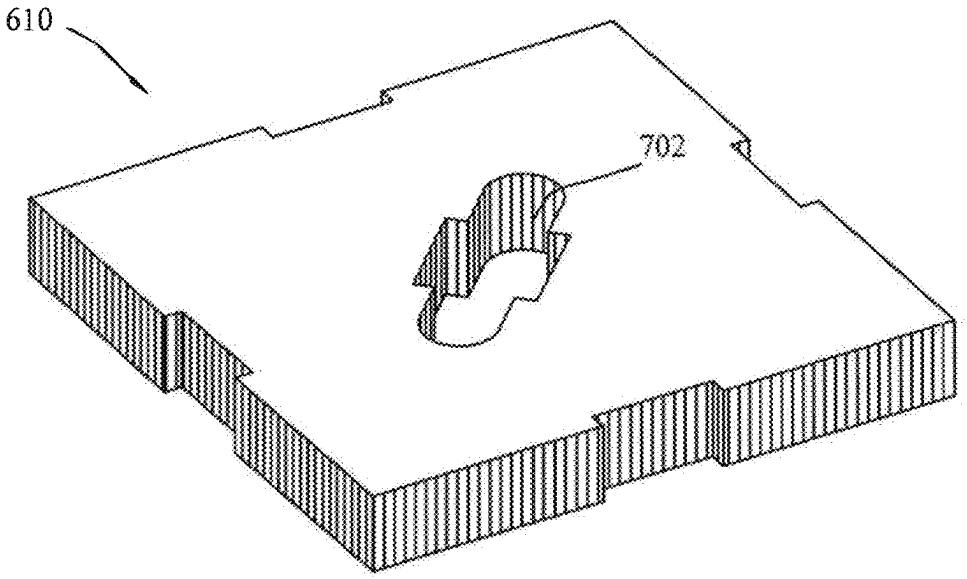

FIG. 7C

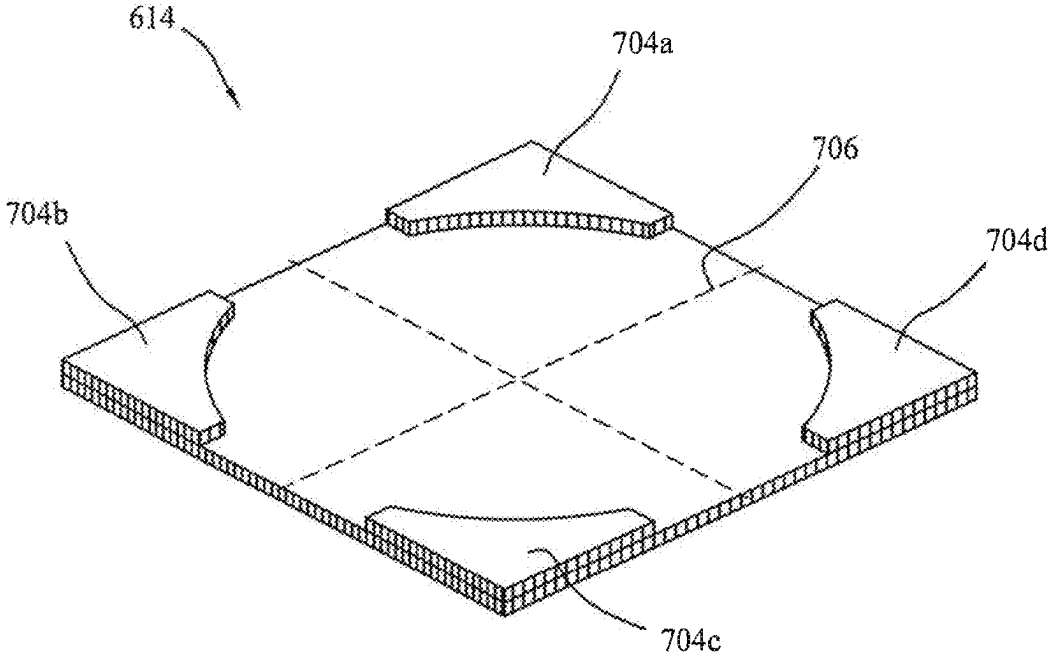

FIG. 7D

PACKAGING SYSTEM FOR A HOT WATER HEATER

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. patent application Ser. No. 17/820,771, filed Aug. 18, 2022 which claims the benefit of provisional application No. 63/234,863, filed Aug. 19, 2021, the entire contents of which are hereby incorporated by reference for all purposes as if fully set forth herein, under 35 U.S.C. § 119(e).

TECHNICAL FIELD

This disclosure generally relates to a packaging system, and more specifically to a packaging system for a hot water heater.

BACKGROUND

Transporting hot water heaters requires care and proper packaging to protect the hot water heater from damage. Typical packaging for hot water heaters is bulky, expensive, and may not be recyclable. Thus, there is a need to provide packaging for a hot water heater that is streamlined and recyclable as well as improves the protection of the hot water heater during transport.

SUMMARY OF PARTICULAR EMBODIMENTS

According to some embodiments, a packaging system for a hot water heater includes an outer box, a top insert, an offset filler, a base insert and one or more side panels. The hot water heater includes a top surface, a bottom surface, and an elongated portion. The outer box is configured to contain the hot water heater and includes a top inside surface and a bottom inside surface. The top insert is configured to contact the top surface of the hot water heater and the top inside surface of the outer box. The top insert includes a slot configured to align with a component on the top surface of the hot water heater. The offset filler is coupled to the top insert and is configured to be sandwiched between the elongated portion of the hot water heater and the outer box. The base insert is configured to contact the bottom surface of the hot water heater and the bottom inside surface of the outer box. The base insert includes one or more raised perimeter structures configured to form a shape that matches a shape of the bottom surface of the hot water heater. The one or more raised perimeter structures on the base insert and the offset filler are configured to position the hot water heater off-center with respect to a center axis of the outer box. Each of the one or more side panels includes a raised pattern and an L-shape that includes a short portion and a long portion. The short portion of the L-shape in each of the one or more side panels is configured to be inserted between the top insert and the top surface of the hot water heater. The long portion of the L-shape in each of the one or more side panels is configured to be sandwiched between the elongated portion of the hot water heater and the outer box.

According to some embodiments, a packaging system for a hot water heater includes an outer box, a top insert, a base insert, and a center collar. The hot water heater includes a top surface, a bottom surface and an elongated portion that includes a mid-portion. The outer box is configured to contain the hot water heater and includes a top inside surface and a bottom inside surface. The top insert is configured to contact the top surface of the hot water heater and the top inside surface of the outer box. The top insert includes a slot that is configured to align with a component on the top surface of the hot water heater. The top insert includes one or more first raised perimeter structures that are configured to form a first shape that matches a shape of the top surface of the hot water heater. The base insert is configured to contact the bottom surface of the hot water heater and the bottom inside surface of the outer box. The base insert includes one or more second raised perimeter structures. The one or more second raised perimeter structures are configured to form a second shape that matches a shape of the bottom surface of the hot water heater. The one or more second raised perimeter structures are further configured to position the hot water heater at a center axis of the outer box. The center collar is coupled around the mid-portion of the elongated portion of the hot water heater. The center collar includes one or more raised patterns. The one or more raised pattern of the center collar is configured to contact the outer box.

According to some embodiments, a packaging system for a hot water heater includes an outer box, a top insert, a base insert, and one or more side objects. The hot water heater includes a top surface, a bottom surface, and an elongated portion. The outer box is configured to contain the hot water heater. The top insert is configured to be placed between the top surface of the hot water heater and the outer box. The top insert includes a slot that is configured to align with a component on the top surface of the hot water heater. The top insert includes a first perimeter structure that is configured to form a shape that matches a shape of the top surface of the hot water heater. The base insert is configured to contact the bottom surface of the hot water heater and a bottom inside surface of the outer box. The base insert includes a second perimeter structure that is configured to form a shape that matches a shape of the bottom surface of the hot water heater. Both the first perimeter structure of the top insert and the second perimeter structure of the base insert are configured to position the hot water heater intact with respect to a center axis of the outer box. Each of the one or more side objects include a raised pattern and is configured to be sandwiched between the elongated portion of the hot water heater and the outer box.

Technical advantages of certain embodiments may include providing a packaging system that is inexpensive, quick to assemble, easy to use, and is recyclable. The packaging system may permit the system to be easily and quickly assembled. The packaging system includes a top insert and a base insert that may have perforations, apertures, and cutouts to accommodate one or more components (e.g., valves, vent hoods, etc.) of the hot water heater. Additionally, the perforations, apertures, and cutouts reduce the amount of time and effort to pack the hot water heater and contain it in the outer box. The packaging system may be made from recyclable materials such as cardboard (e.g., corrugated or honeycomb cardboard). The honeycomb base eliminates the current base assembly process and helps in keeping the hot water heater unit in place as well as providing kick resistance and cushioning during an impact/accidental fall.

Other technical advantages will be readily apparent to one skilled in the art from the following figures, descriptions, and claims. Moreover, while specific advantages have been enumerated above, various embodiments may include all, some, or none of the enumerated advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1A-1C** illustrate a packaging system for gas hot water heater, according to certain embodiments.

FIGS. **2**A-**2**B illustrate an outer box, according to certain embodiments.

FIGS. **3**A-**3**E illustrate a top insert, according to certain embodiments.

FIGS. **4**A-**4**O illustrate side panels, according to certain embodiments.

FIGS. **5**A-**5**C illustrate a base insert, according to certain embodiments.

FIGS. **6**A-**6**D illustrate an electric hot water heater packaging system, according to certain embodiments.

FIGS. **7**A-**7**D illustrate a top insert and base insert for an electric hot water heater, according to certain embodiments.

DESCRIPTION OF EXAMPLE EMBODIMENTS

Transporting hot water heaters requires care and proper packaging to protect the hot water heater from damage. Typical packaging for hot water heaters is bulky, expensive, and may not be recyclable. Thus, there is a need to provide packaging for a hot water heater that is streamlined and recyclable as well as improves the protection of the hot water heater during transport.

As a specific example, a hot water heater, which typically includes a gas hot water heater and/or an electric hot water heater, requires a tight packaging system that can keep the hot water heater safe from accidental falls, damage, and impacts by packing the hot water heater in a packaging box in which it is shipped or transported. In some conventional systems, a common packaging is utilized for both kinds of hot water heaters which fail to accommodate additional components of hot water heater such as vent hoods, valves, and some electric components. In this way, the hot water heater may be prone to impacts and damages.

To address these and other problems with existing packaging, the teachings of the disclosure provide a packaging system that includes a top insert, a base insert, side panels, a center collar and an offset filler that are inexpensive and easy and quick to assemble and are made from recyclable materials (e.g., corrugated or honeycomb cardboard). Some disclosed embodiments include offset filler that fills the space between the hot water heater and an outer box i.e., the packaging box. The usage of the offset filler provides protection to the hot water heater and aids in positioning the hot water heater at a proper location within the outer box. In some embodiments, a center collar is used to protect the electric hot water heater from damages. Additionally, some embodiments include a top insert and a base insert with perforations, apertures, and cutouts which help in accommodating additional components (e.g., vent hoods, valves etc.) of the hot water heater. This reduces the amount of time and effort to pack the hot water heater and contain it in the outer box. In some embodiments, various system components are configured differently for different types of hot water heaters which are explained in later sections herein.

FIGS. **1**A, **1**B, and **1**C illustrate a packaging system for a gas hot water heater; FIG. **2**A illustrates an outer box and FIG. **2**B illustrates a lay-flat outer box that when assembled forms the outer box of FIGS. **1**A and **2**A; FIGS. **3**A-**3**E illustrate a top insert and its configurations along with an offset filler coupled to the top insert of FIGS. **1**A-**1**C; FIGS. **4**A-**4**O illustrate side panels of FIGS. **1**A-**1**C; FIGS. **5**A-**5**C illustrate a base insert of FIGS. **1**A-**1**C and its configurations; FIGS. **6**A-**6**D illustrate a packaging system for an electric hot water heater; and FIGS. **7**A-**7**D illustrate a top insert and a base insert for an electric hot water heater, according to certain embodiments.

FIG. **1**A illustrates a packaging system **100**, according to certain embodiments. Packaging system **100** may include an outer box **102**, a hot water heater **104**, a top insert **112**, an offset filler **116**, a base insert **122**, and one or more side panels **120** (e.g., **120***a* and **120***b*). In some embodiments, each of the outer box **102**, the top insert **112**, the offset filler **116**, the base insert **122**, and the one or more side panels **120***a* and **120***b* may be made from recyclable materials including, but not limited to, cardboard, fiberboard, linerboard, and the like. In some embodiments, each of the outer box **102**, the top insert **112**, the offset filler **116**, the base insert **122**, and the one or more side panels **120***a* and **120***b* may be corrugated cardboard or honeycomb cardboard as shown in FIGS. **2**A-**2**B, FIGS. **3**A-**3**E, FIGS. **4**A-**4**O, and FIGS. **5**A-**5**C.

In particular, a packaging system **100** containing the top insert **112**, base insert **122**, side panels **120***a*, **120***b*, and offset filler **116** provides an inexpensive and easy- and quick-to-assemble packing assembly. Packaging system **100** provides a quicker and more convenient solution to packaging gas hot water heaters than typical systems. Packaging system **100** reduces the amount of time and effort to pack the hot water heater and contain it in the outer box **102**, which prevents damage from impacts and falls during shipping.

In some embodiments, outer box **102** may be made from recyclable materials such as cardboard (e.g., corrugated or honeycomb cardboard). Outer box **102** may be a predefined shaped box including, but not limited to, a cube shaped box, a rectangular shaped box, and a rectangular cuboid shaped box. Outer box **102** has any appropriate dimensions to accommodate any type of hot water heater (e.g., a gas or electric hot water heater).

FIGS. **2**A and **2**B illustrate various embodiments of outer box **102**. FIG. **2**B illustrates an outer box cutout before folding and assembling into the outer box **102** of FIG. **1**A and FIG. **2**A. In an exemplary embodiment, in FIG. **2**B, the outer box cutout includes four cutouts **102***a*, **102***b*, **120***c* and **102***d*. Each cutout is rectangular in shape with dimensions best suited for gas hot water heater **104**. In an embodiment, the outer box cutout may include one or more perforations **202***a*, **202***b*, **202***c*, **202***d*, **202***c*, **202***f*, and **202***g* that may align with objects on hot water heater **104** and/or to provide locations for a person to lift outer box **102**.

The hot water heater **104** includes a top surface **106**, an elongated portion **108** and a bottom surface **110** as shown in FIGS. **1**A and **1**B. The top surface **106** may include components **106***a*, **106***b*, and **106***c*, as an example, that may be located on a typical hot water heater. Similarly, the elongated portion **108** of the hot water heater **104** may include components either protruded outwards and/or inwards. As an example, FIG. **1**B shows components **108***a* and **108***b* (e.g., electrical components or water connection components) coupled to or attached to the elongated portion **108**, where such components represent any components that typically exist in the elongated portion of any hot water heater.

The top insert **112** may be made from recyclable materials such as cardboard (e.g., corrugated or honeycomb cardboard). In some embodiments, the top insert **112** may be formed from corrugated cardboard and placed on top of the top surface **106** of the hot water heater **104** as depicted in FIGS. **1**A, **1**B, and **1**C, or top insert **112** may be formed from honeycomb cardboard as depicted in FIG. **3**A. In some embodiments, the top insert **112** may be in a rectangular shape, circular shape, oval shape, or square shape. In FIGS. **1**A-**1**C and FIGS. **3**A-**3**E, the top insert **112** is shown in a rectangular shape, as an example, and may be of any appropriate dimensions and scale in order to adequately

contact the top surface **106** of the hot water heater **104** as illustrated in FIGS. **1**A-**1**C and **3**A-**3**D. In some embodiments, top insert **112** may include one or more raised perimeter structures that are predefined to form a shape that matches a shape of the top surface **106** of the hot water heater **104**. The one or more raised perimeter structures in the top insert **112** may form a circular shape in order to match a circular shape of the top surface **106** of the hot water heater **104**. In some embodiments, the one or more raised perimeter structures forming the shape to match with the shape of the top surface **106** may vary depending on the type of the hot water heater **104** (e.g., gas hot water heater and electric hot water heater).

The top insert **112** may be placed to contact the top surface **106** of the hot water heater **104** and a top inside surface **102***a* of the outer box **102** as illustrated in FIGS. **1**B and **1**C. In some embodiments, the top insert **112** may include a slot **118** that is configured to align with one or more components (e.g., **106***a*, **106***b*, **106***c*) coupled to the top surface **106** of the hot water heater **104**, as shown in FIG. **1**A. In some embodiments, the slot **118** of the top insert **112** is formed using a punch-cut and crush down process in order to remove portions of the honeycomb cardboard as shown in FIGS. **3**B, **3**C, **3**D, and **3**E. FIGS. **3**C and **3**D illustrate alternate views of FIG. **3**B, specifically, **3**C shows an inverted view of FIG. **3**B and FIG. **3**D shows a front view of offset filler **116** of FIG. **3**B. FIG. **3**E shows top insert **112** with cut-through slot **118** before assembling on the hot water heater **104**. The slot **118** may vary in shape, dimensions, and size depending on the one or more components on the top surface **106** of the hot water heater **104** (which in turn may depend on the type of the hot water heater). In embodiments where hot water heater **104** is a gas hot water heater, top insert **112** in combination with slot **118** and offset filler **116** may position and hold hot water heater **104** off-center within outer box **102** to accommodate additional components of the hot water heater **104** (e.g., **110***a*). FIG. **1**B shows additional components **106***a*, **106***b*, and **106***c* on the top surface **106** of hot water heater **104** that fit inside slot **118**.

Packaging system **100** may include an offset filler **116** that may be made from recyclable materials such as corrugated or honeycomb cardboard. Offset filler **116** may, in some embodiments, be in a rectangular shape and be configured to match certain dimensions of top insert **112**. More particularly, offset filler **116** may be coupled to top insert **112** (e.g., using adhesives, tape, and the like) such that offset filler **116** is perpendicular to top insert **112** as illustrated in FIGS. **1**A-**1**B, and FIGS. **3**A, **3**B, **3**C and **3**D. As illustrated in FIGS. **1**A-**1**C, offset filler **116** may be formed from corrugated cardboard and then coupled to corrugated patterned top insert **112**. In other embodiments, such as illustrated in FIGS. **3**A, **3**B, **3**C and **3**D, offset filler **116** may be honeycomb cardboard that is coupled (e.g., using adhesives, tape, and the like) to the honeycomb patterned top insert **112**.

Offset filler **116** is configured to be sandwiched between the elongated portion **108** of the hot water heater **104** and the outer box **102** as illustrated in FIGS. **1**B and **1**C. In general, offset filler **116** fills the space between hot water heater **104** and outer box **102** as illustrated in FIG. **1**C. This helps to properly position and secure hot water heater **104** within outer box **102**.

In some embodiments, a packaging system **100** includes one or more side panels **102** (e.g., **102***a*, **102***b*, and **102***c*) as illustrated in FIGS. **1**A and **3**A. In particular embodiments, packaging system **100** includes three side panels **120***a*, **120***b* and **120***c* as illustrated in FIG. **1**B. Each side panel **120** may be made from recyclable materials such as corrugated or honeycomb cardboard. Each side panel **120** may be in a rectangular shape. In some embodiments, each side panel **120** may be a molded pulp panel insert that is used with corrugated top insert **112** and honeycomb base insert **122** and functions to provide cushioning and protection to hot water heater **104**. The raised panels of side panels **102** offer protection against accidental falls and clamping operations.

FIGS. **4**A-**4**O illustrate various embodiments of a side panel **400** which may be used as side panel **120**. In some embodiments, each side panel **400** may include a raised pattern. The raised pattern is depicted as **406***a* and **406***b* in FIGS. **4**A-**4**O. The raised patterns **406***a* and **406***b* provide a cushioning effect to the elongated portion **108** of the hot water heater **104** with respect to the outer box **102** during an impact or fall. Raised patterns **406***a* and **406***b* may be any appropriate shape or pattern. In some embodiments, raised patterns **406***a* and **406***b* are rectangular-shaped or square-shaped raised elements that are arranged in an array as illustrated in FIGS. **4**A-**4**O.

Each side panel **400** may be an L-shape side panel (e.g., two rectangular portions **402** and **406** that are generally perpendicular to each other). Each side panel **400** may include a short portion **402** and a long portion **404**. In some embodiments, short portion **402** includes raised pattern **406***b* and long portion **404** includes raised pattern **406***a*. In some embodiments, the short portion **402** may be separated from the long portion **404** through a pre-folded cut or partial cut depicted as **400***a* (e.g., cut to a certain depth) that permits easy folding of short portion **402** or long portion **404** into an L-shaped side panel **400**. In other embodiments, short portion **402** is affixed perpendicular to long portion **404** (e.g., using adhesive and the like) along line **400***a*. In general, short portion **402** is configured to contact top surface **106** of hot water heater **104** and long portion **404** is configured to contact elongated portion **108** of hot water heater **104**.

In some embodiments, short portion **402** may be inserted between top insert **112** and top surface **106** of hot water heater **104**. Long portion **404** may be sandwiched between elongated portion **108** of hot water heater **104** and outer box **102**. Short portion **402** holds the side panel **400** in place within outer box **102** and allows long portion **404** of side panel **400** to hang down one side of hot water heater **104** in order to provide cushioning during an impact as illustrated in FIGS. **1**A-**1**C.

In some embodiments, each side panel **400** may include a cutout **408** configured to align with one or more components coupled to elongated portion **108** of hot water heater **104** (e.g., component **108***a* in FIG. **1**B). Cutout **408** may be in the shape of a square, rectangle, circle, or any other appropriate shape. Cutout **408** may be in any appropriate location on side panel **400**. In some embodiments, side panel **400** may include multiple cutouts **408**.

Referring to FIGS. **4**D and **4**E, certain embodiments of side panel **400** may include a short portion **402** without any raised patterns and a long portion **404** that includes raised pattern **406***a* along with a cutout **408**. FIGS. **4**F-**4**N show different views of side panel **400**. In each FIG. **4**F-**4**N, the short portion **402** includes raised pattern **406***a* and long portion **404** includes raised pattern **406***b* along with a cutout **408**. As an example, FIGS. **4**I-**4**N show pulp raised pattern **406***a* on short portion **402** and **406***b* on long portion **406***b*. FIG. **4**O illustrates an alternate side panel **400** for packaging system **100**. Side panel **400** of FIG. **4**O is formed of a single piece of cardboard with continuous ridges that is formed (e.g., by folding) into an L shape.

FIGS. **5**A-**5**C illustrate a base insert **500** that may be used as base insert **122** in packaging system **100**. Base insert **500**

may be made from recyclable materials such as honeycomb cardboard as illustrated in FIGS. **5**A and **5**B and/or corrugated cardboard as illustrated in FIG. **5**C. In general, base insert **500** provides a cushioned base for bottom surface **110** of hot water heater **104** and functions to align hot water heater **104** within outer box **102**. For example, corrugated base insert **500** of FIG. **5**C includes a raised edge **508** to help keep hot water heater **104** in place within outer box **102**. In some embodiments, base insert **500** may include raised features in a circular shape or an oval shape to match the shape of bottom surface **110** of hot water heater **104**. In particular, base insert **500** may include one or more raised perimeter structures **502** (e.g., **502***a*, **502***b*, and **502***c*) that are predefined to form a shape that matches a shape of the bottom surface **110** of hot water heater **104**. In some embodiments, perimeter structures **502** may form a circular shape to match a circular shape of the bottom surface **110** of hot water heater **104**. For example, a gas hot water heater **104** may have a circular bottom surface **110** and the raised perimeter structures **502** may together form some or all of a circle shape to match with the circular shape of the bottom surface **110** of the gas hot water heater **104**. In some embodiments, the one or more raised perimeter structures **502** are configured to position the hot water heater **104** off-center with respect to a center axis depicted as the intersection of dashed lines **506** of outer box **102**. In some embodiments, the one or more raised perimeter structures **502** form a shape to match with the shape of the bottom surface **110**. The shape formed by raised perimeter structures **502** may vary depending on the type of the hot water heater **104** (e.g., a gas hot water heater or an electric hot water heater).

The base insert **122** may be placed to contact the bottom surface **110** of the hot water heater **104** and a bottom inside surface **102***b* of the outer box **102** as shown and illustrated in FIGS. **1**B and **1**C. In some embodiments, the base insert **122** may include an aperture **504***a* that may be configured to align with a component on or proximate to the bottom surface **110** of the hot water heater **104**. For example, in FIGS. **1**A-**1**C, the component **110***a* proximate to the bottom surface **110** may be configured to be placed in the aperture **124** as shown in FIG. **1**A-**1**C and in the aperture **504***a* as shown in FIG. **5**A. In some embodiments, aperture **504***a* may be of any shape and dimensions that may be configured according to the component to align with on the bottom surface **110** of the hot water heater **104**, which in turn may depend upon the type of the hot water heater (e.g., gas or electric hot water heater).

Referring to FIGS. **1**B and **1**C, packaging system **100** may further include one or more pads **126***a* and **126***b*. Pad **126***a* may be a top pad **126***a* that may be placed between the top insert **112** and the top inside surface **102***a* of the outer box **102**, as illustrated in FIG. **1**C. Pad **126***b* may be a bottom pad **126***b* that may be placed between the base insert **122** and the bottom inside surface **102***b* of the outer box **102**, as illustrated in FIGS. **1**B and IC.

FIGS. **6**A-**6**D illustrate a packaging system **600** for an electric hot water heater **602**. Electric hot water heater **602** includes a top surface **604**, a bottom surface **606**, and an elongated portion **608**. Like packaging system **100**, packaging system **600** includes a top insert **610** and a base insert **614**. However, packaging system **600** includes a center collar **612** instead of or in addition to side panels **120**.

Referring to FIGS. **7**A and **7**B, FIG. **7**A shows a top view of the top insert **610** and FIG. **7**B shows an inverted or upturned view of the top insert **610** with respect to FIG. **7**A. The top insert **610** may include one or more raised perimeter structures depicted as **700**. The one or more raised perimeter structures may be configured to form a shape that matches a shape of the top surface **604** of electric hot water heater **602**. In some embodiments, the top insert **610** may be formed from honeycomb cardboard as illustrated in FIG. **7**C. The top insert **610** may include a slot **702** that is configurable to align with a component (e.g., valves, pins, and the like) on the top surface **604** of the hot water heater **602**.

Base insert **614** may be formed from honeycomb or corrugated cardboard and may include one or more second raised perimeter structures **704** (i.e., **704***a*-**704***d*) as illustrated in FIG. **7**D. The second perimeter structures **704** form a shape that matches a shape of the bottom surface **614** of the hot water heater **602**. The shape formed by second raised perimeter structures **704** may be square or a circle for electric hot water heater **602**. FIGS. **6**A-**6**E and **7**D show second raised perimeter structures **704** to be a circular shape. In some embodiments, one or more second raised perimeter structures **704** are configured to position the hot water heater **602** centered about a center axis depicted as the intersection of lines **706**.

Referring to FIG. **6**A, packaging system **600** may further include a center collar **612**. The center collar **612** may be coupled around a mid-portion of the elongated portion **608** of the hot water heater **602** and may include one or more raised patterns **612***a*-**612***c*. The one or more raised patterns **612***a*-**612***c* of center collar **612** are configured to contact the outer box **102**. Packaging system **600** may use center collar **612** in place of side panels **112** or, in some embodiments, may use center collar **612** in addition to side panels **112**.

FIG. **6**B illustrates a molded pulp top insert **610**, base insert **614** and center collar **612**. The center collar **612** functions as a clamping support, along with damage prevention from accidental falls. The base insert **614** may be elevated to protect portions of electric hot water heater **602** (e.g., venting areas) and may function to stabilize electric hot water heater **602** within outer box **102**. In some embodiments, outer box **102** features a zipper rule for easy opening.

In some embodiments, packaging system **600** may include a top pad **616***a* and a bottom pad **616***b*, which may be identical to one another. The top pad **616***a* may be configured to be placed between the top insert **610** and the top inside surface **102***a* of the outer box **102**. The bottom pad **616***b* may be configured to be placed between the base insert **614** and the bottom inside surface **102***b* of the outer box **102**.

FIG. **6**C illustrates a molded pulp center collar **612**, a honeycomb top insert **610**, and a honeycomb base insert **614**. The molded pulp center collar **612** may function as a clamping support, along with damage prevention from accidental falls. This embodiment offers a self-locking feature for the top insert **112** and base insert **122** by aligning with components of top surface **106** and bottom surface **110** of hot water heater **104** once assembled and ready for containing in the outer box **102** placement. Base insert **614** may include trays **618** that provide a surface for a flanged tube glue operation. In some embodiments, base insert **614** has panels that serve as vent protection and kicking resistance.

FIG. **6**D illustrates an assembled version of the packaging system **600** in the outer box **102**.

Herein, "or" is inclusive and not exclusive, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, "A or B" means "A, B, or both," unless expressly indicated otherwise or indicated otherwise by context. Moreover, "and" is both joint and several, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, "A and B" means "A and B,

jointly or severally," unless expressly indicated otherwise or indicated otherwise by context.

The scope of this disclosure encompasses all changes, substitutions, variations, alterations, and modifications to the example embodiments described or illustrated herein that a person having ordinary skill in the art would comprehend. The scope of this disclosure is not limited to the example embodiments described or illustrated herein. Moreover, although this disclosure describes and illustrates respective embodiments herein as including particular components, elements, functions, operations, or steps, any of these embodiments may include any combination or permutation of any of the components, elements, functions, operations, or steps described or illustrated anywhere herein that a person having ordinary skill in the art would comprehend. Furthermore, reference in the appended claims to an apparatus or system or a component of an apparatus or system being adapted to, arranged to, capable of, configured to, enabled to, operable to, or operative to perform a particular function encompasses that apparatus, system, component, whether or not it or that particular function is activated, turned on, or unlocked, as long as that apparatus, system, or component is so adapted, arranged, capable, configured, enabled, operable, or operative.

What is claimed is:

1. A packaging system for a hot water heater, the packaging system comprising:

an outer box configured to contain the hot water heater that comprises a top surface, a bottom surface, and an elongated portion;

a top insert configured to contact the top surface of the hot water heater and a top inside surface of the outer box, the top insert comprising a slot configured to align with a component on the top surface of the hot water heater;

an offset filler coupled to the top insert, the offset filler configured to be sandwiched between the elongated portion of the hot water heater and the outer box;

a base insert configured to contact the bottom surface of the hot water heater and a bottom inside surface of the outer box, the base insert comprising one or more raised perimeter structures configured to form a shape that matches a shape of the bottom surface of the hot water heater; and

one or more side panels, each side panel comprising:

a raised pattern; and

an L-shape that comprises a short portion and a long portion, wherein the short portion is configured to be inserted between the top insert and the top surface of the hot water heater, and wherein the long portion is configured to be sandwiched between the elongated portion of the hot water heater and the outer box.

2. The packaging system of claim **1**, wherein the hot water heater is a gas hot water heater.

3. The packaging system of claim **1**, wherein the top insert comprises a predefined perimeter structure to form a shape that matches a shape of the top surface of the hot water heater.

4. The packaging system of claim **1**, wherein each of the offset filler, the top insert, and the base insert are formed from honeycomb cardboard.

5. The packaging system of claim **1**, wherein the long portion of each of the one or more side panels provides a cushioning effect to the hot water heater with respect to the outer box.

6. The packaging system of claim **1**, wherein each side panel comprises a square-shaped or rectangular-shaped cutout.

7. The packaging system of claim **6**, wherein the cutout is configured to align with one or more components coupled to the elongated portion of the hot water heater.

8. The packaging system of claim **1**, wherein the shape formed by the one or more raised perimeter structures is a circle.

9. The packaging system of claim **1**, wherein the base insert comprises an aperture configured to align with a component on or proximate to the bottom surface of the hot water heater.

10. The packaging system of claim **1**, further comprising a first pad and a second pad, wherein the first pad is configured to be placed between the top insert and the top inside surface of the outer box, and wherein the second pad is configured to be placed between the base insert and the bottom inside surface of the outer box.

11. A packaging system for a hot water heater, the packaging system comprising:

an outer box configured to contain the hot water heater that comprises a top surface, a bottom surface, and an elongated portion;

a top insert configured to contact the top surface of the hot water heater and a top inside surface of the outer box, the top insert comprising one or more first raised perimeter structures configured to form a first shape that matches a shape of the top surface of the hot water heater;

a base insert configured to contact the bottom surface of the hot water heater and a bottom inside surface of the outer box, the base insert comprising one or more second raised perimeter structures configured to form a second shape that matches a shape of the bottom surface of the hot water heater; and

a center collar configured to wrap around a mid-portion of the elongated portion of the hot water heater and comprising a plurality of raised patterns, wherein each of the plurality of raised patterns of the center collar is configured to contact the outer box.

12. The packaging system of claim **11**, wherein the hot water heater is an electric hot water heater.

13. The packaging system of claim **11**, wherein each of the top insert and the base insert are formed from honeycomb cardboard.

14. The packaging system of claim **11**, wherein the shape formed by the one or more raised perimeter structures comprises a square or a circle.

15. The packaging system of claim **11**, further comprising a first pad and a second pad, wherein the first pad is configured to be placed between the top insert and the top inside surface of the outer box, and wherein the second pad is configured to be placed between the base insert and the bottom inside surface of the outer box.

16. A packaging system for a hot water heater, the packaging system comprising:

an outer box configured to contain the hot water heater comprising a top surface, a bottom surface, and an elongated portion;

a top insert configured to contact the top surface of the hot water heater and a top inside surface of the outer box, the top insert comprising a first perimeter structure configured to form a shape that matches a shape of the top surface of the hot water heater;

a base insert configured to contact the bottom surface of the hot water heater and a bottom inside surface of the outer box, the base insert comprising a second perim-

eter structure configured to form a shape that matches a shape of the bottom surface of the hot water heater; and

a side object comprising a raised pattern and configured to be sandwiched between the elongated portion of the hot water heater and the outer box;

wherein the first perimeter structure and the second perimeter structure are configured to position the hot water heater off center with respect to the center axis of the outer box.

17. The packaging system of claim **16**, further comprising an offset filler coupled to the top insert, the offset filler configured to be sandwiched between the elongated portion of the hot water heater and the outer box.

18. The packaging system of claim **16**, wherein the side object comprises a side panel or a center collar, wherein:

the side panel comprises:

a raised pattern; and

an L-shape that comprises a short portion and a long portion, wherein the short portion is configured to be inserted between the top insert and the top surface of the hot water heater, and wherein the long portion is configured to be sandwiched between the elongated portion of the hot water heater and the outer box; and

the center collar is configured to be coupled around a mid-portion of the elongated portion of the hot water heater and comprises one or more raised patterns, wherein the one or more raised patterns of the center collar is configured to contact the outer box.

19. The packaging system of claim **16**, wherein:

the hot water heater is a gas hot water heater or an electric hot water heater;

each of the offset filler, the top insert, and the base insert are formed from honeycomb cardboard; and

each side panel comprises a square-shaped or rectangular-shaped cutout.

* * * * *