US 20090057175A1

(19) **United States**

(12) **Patent Application Publication**

Baumgartner et al.

(10) **Pub. No.: US 2009/0057175 A1**

(43) **Pub. Date: Mar. 5, 2009**

(54) **FLEXIBLE CASE FOR OPTICAL MEDIA**

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(21) Appl. No.: **12/204,532**

(22) Filed: **Sep. 4, 2008**

Related U.S. Application Data

(60) Provisional application No. 60/969,725, filed on Sep. 4, 2007.

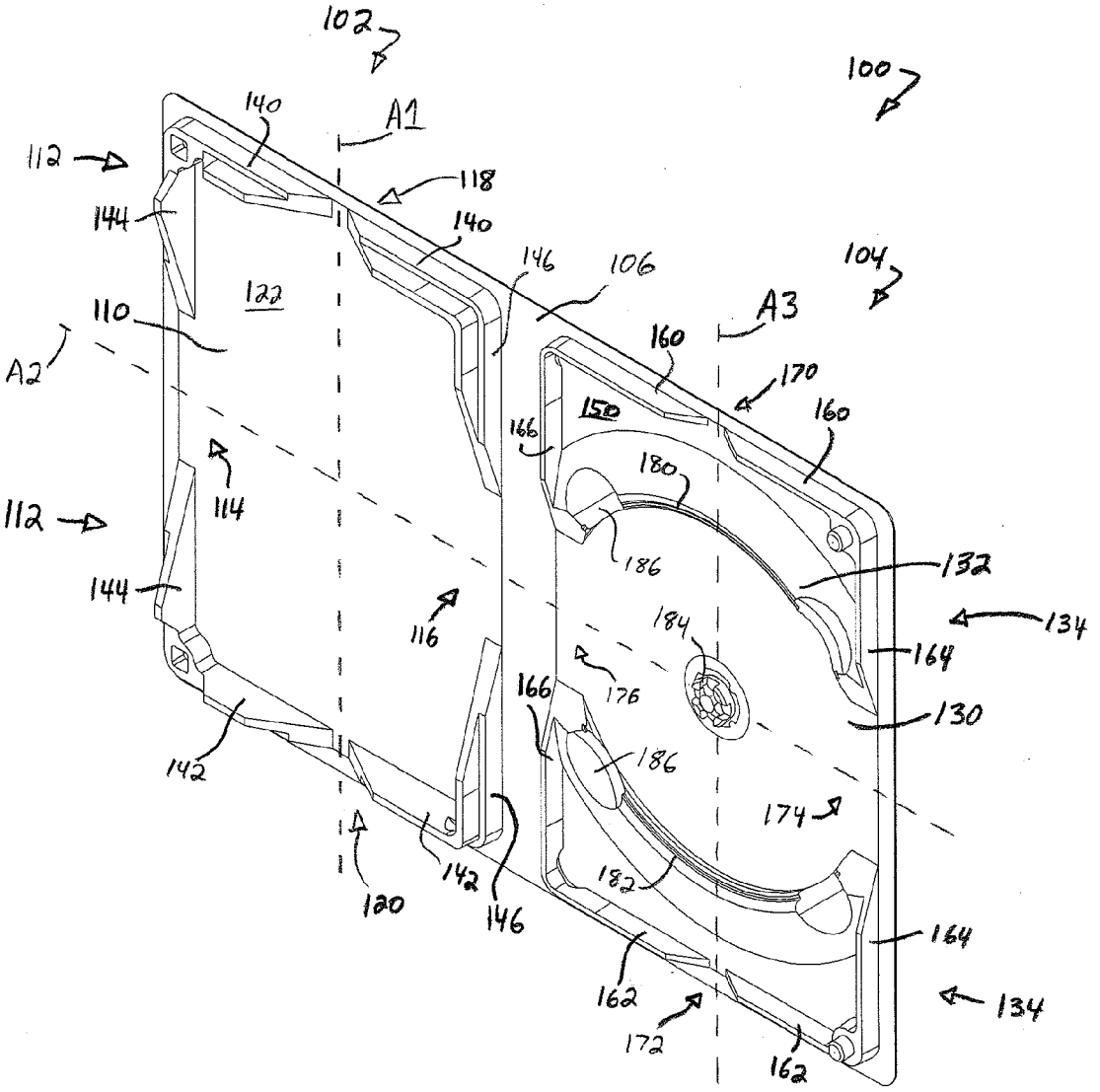
Publication Classification

(51) **Int. Cl.**
B65D 85/57 (2006.01)

(52) **U.S. Cl.** **206/308.1**

(57) **ABSTRACT**

A flexible case is configured to hold an optical medium. The case includes a front casing, a rear casing, and a spine coupling the front casing to the rear casing. The case includes a plurality of sidewalls, and at least one of the sidewalls defines a flex region. The case has increased flexibility at the flex region.



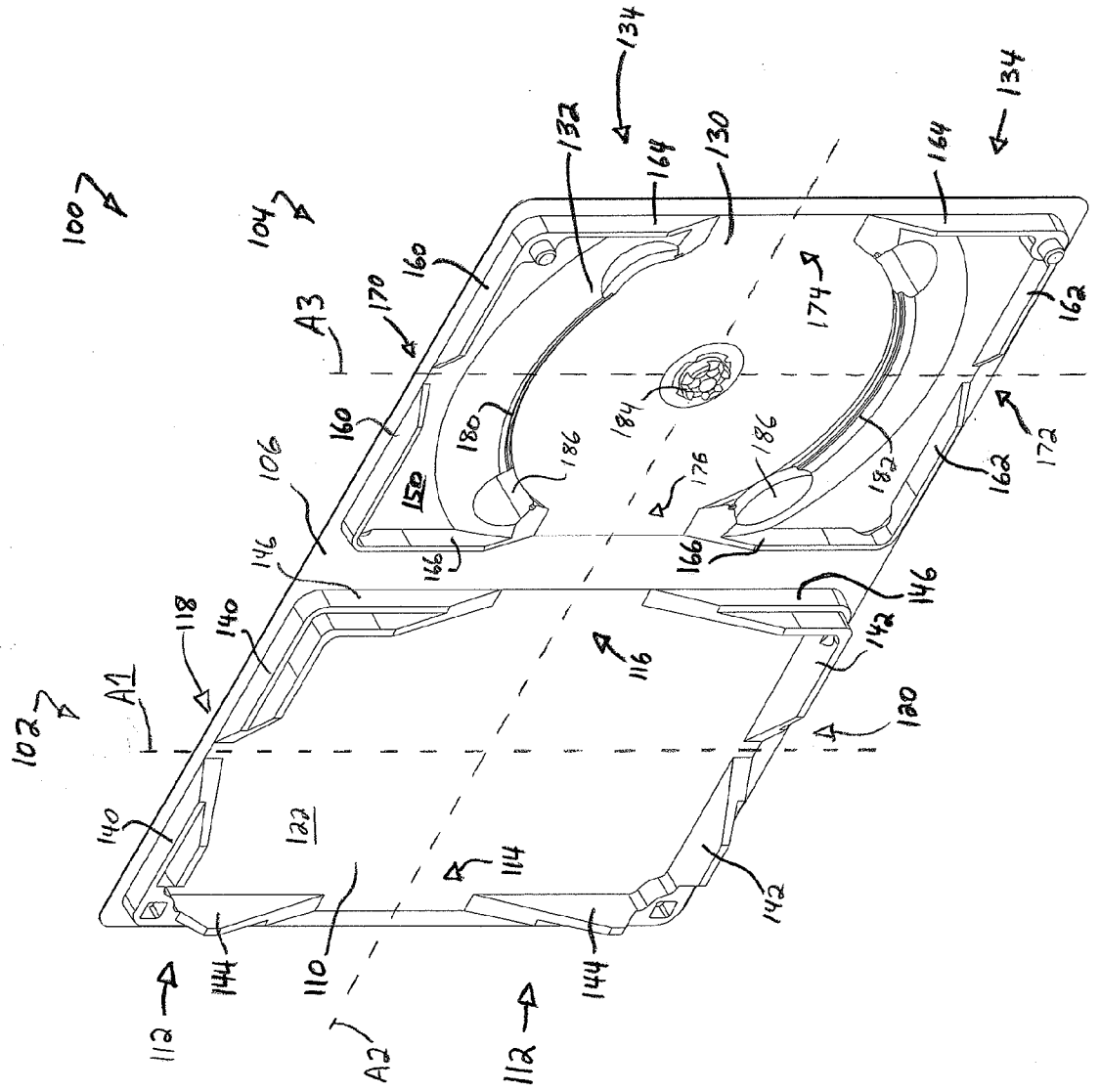

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FIG. 1

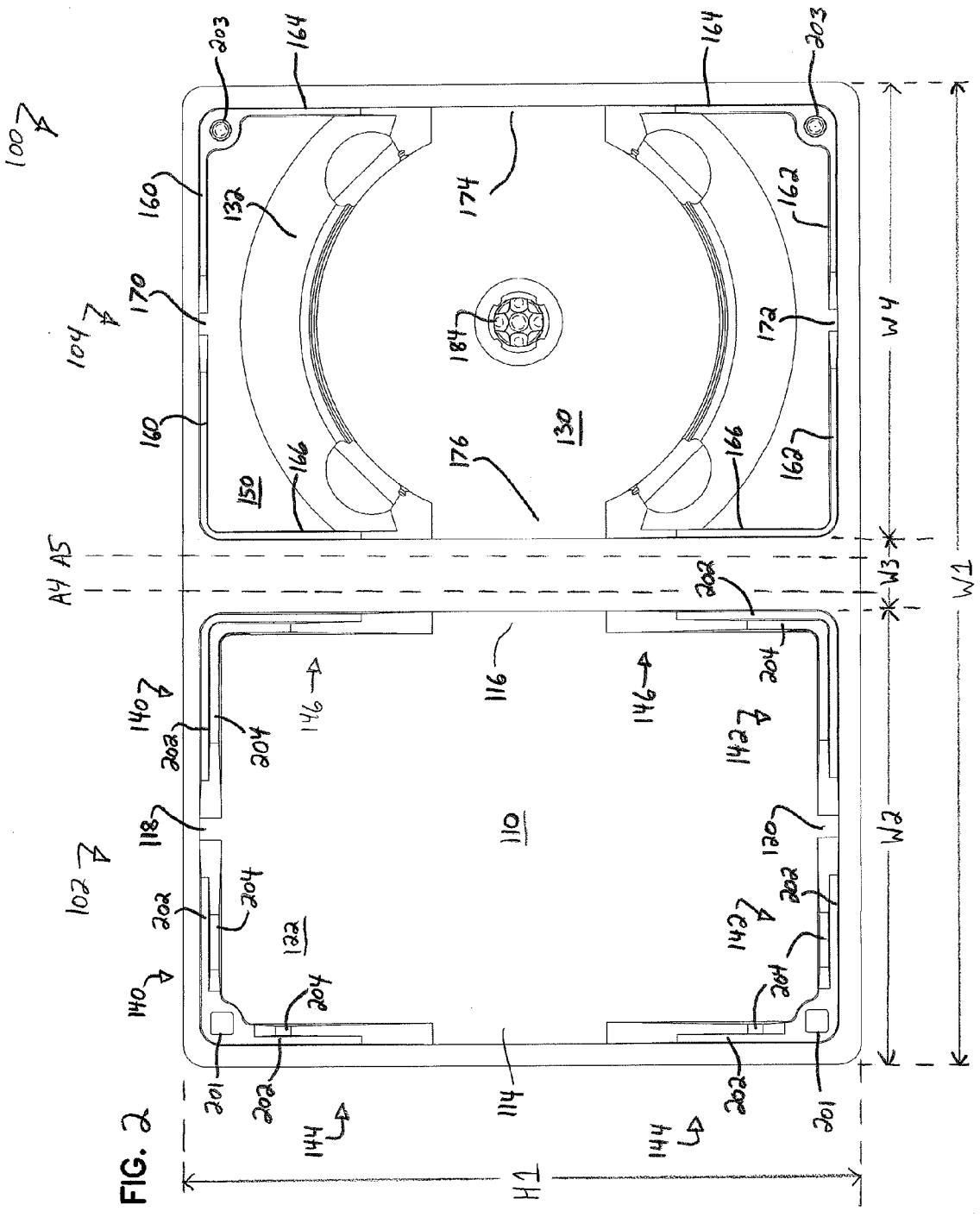
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FIG. 2

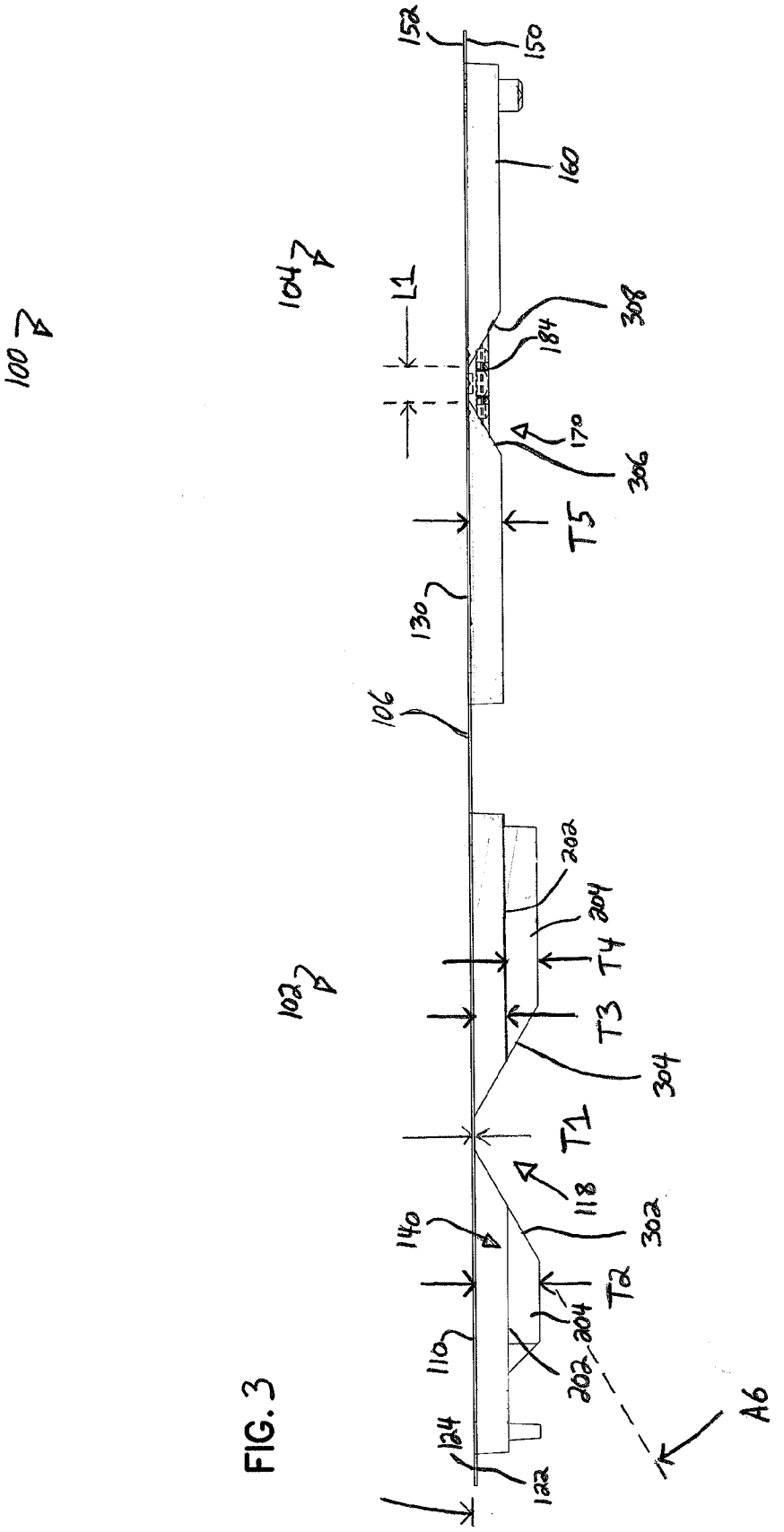
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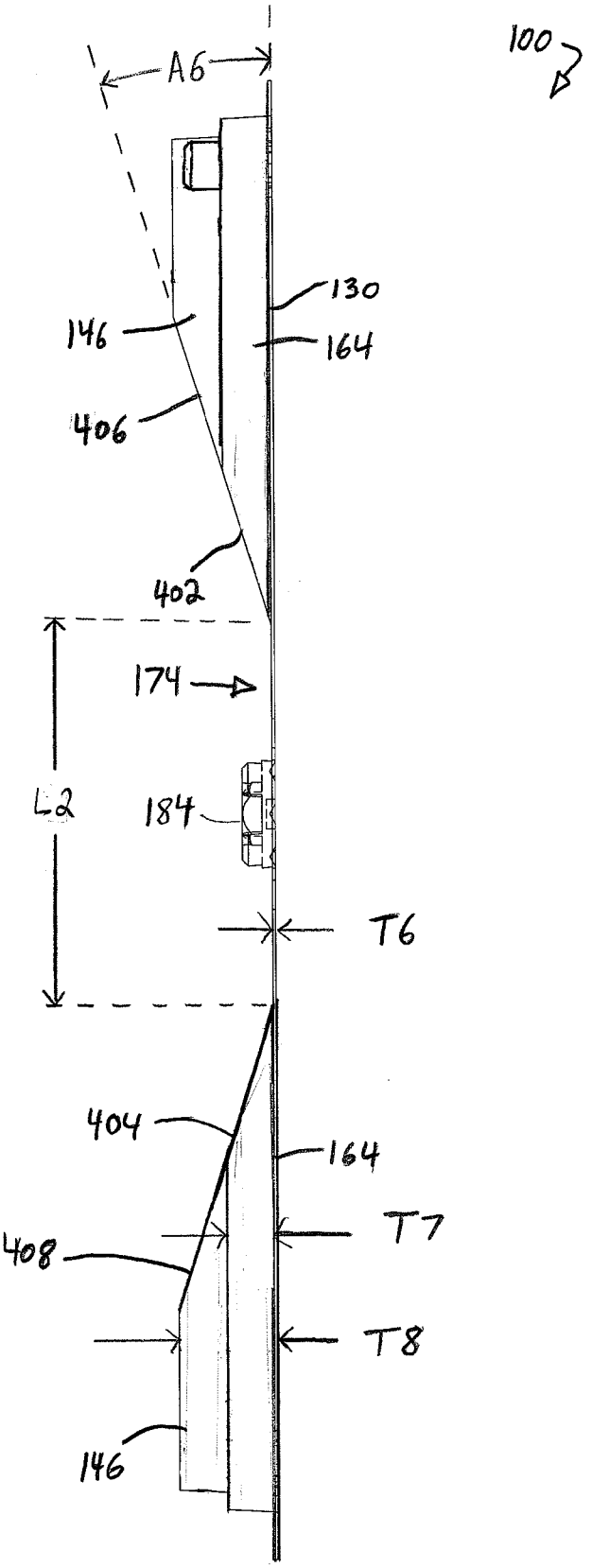
FIG. 3

FIG. 4



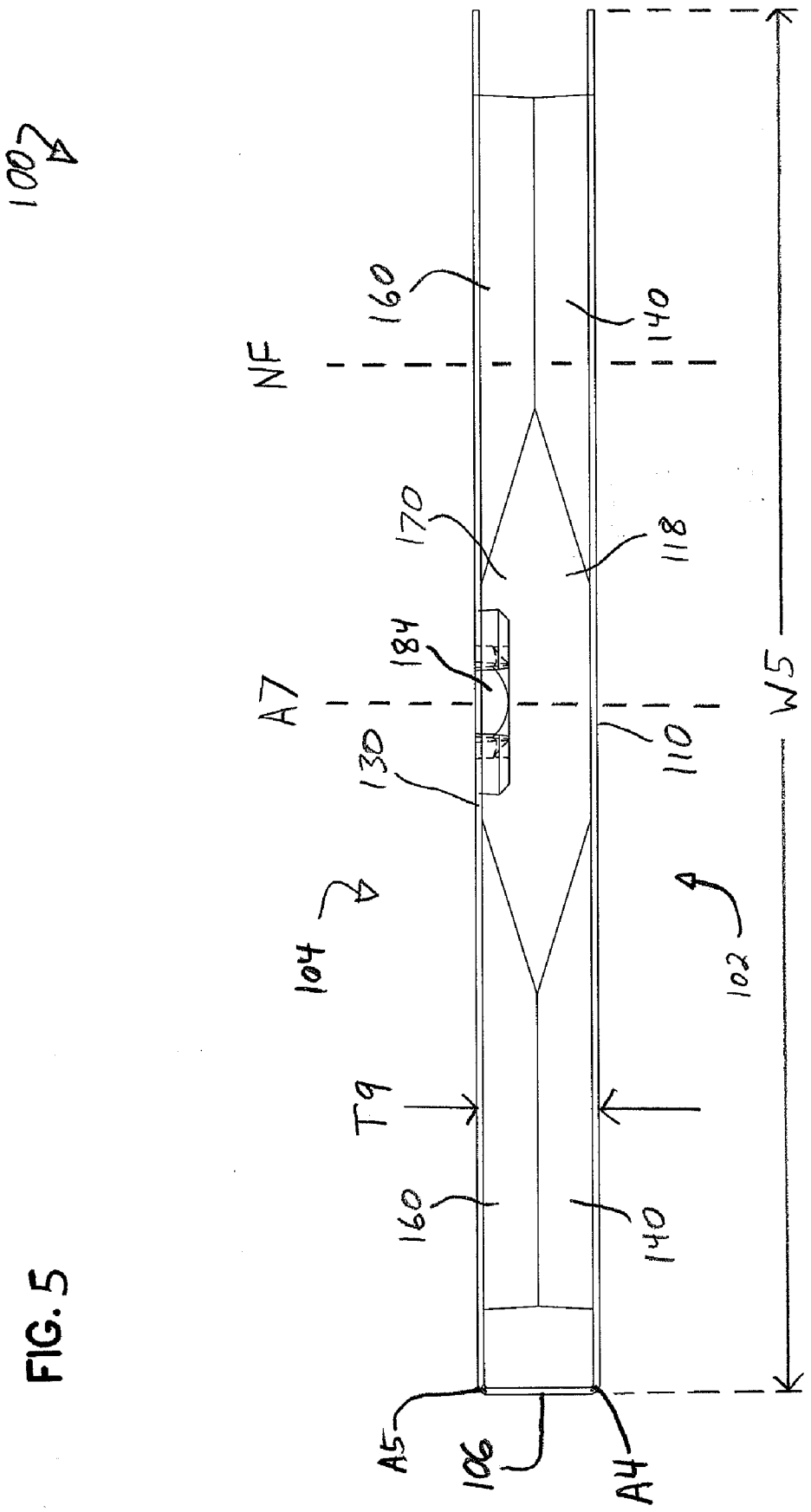

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FIG. 5

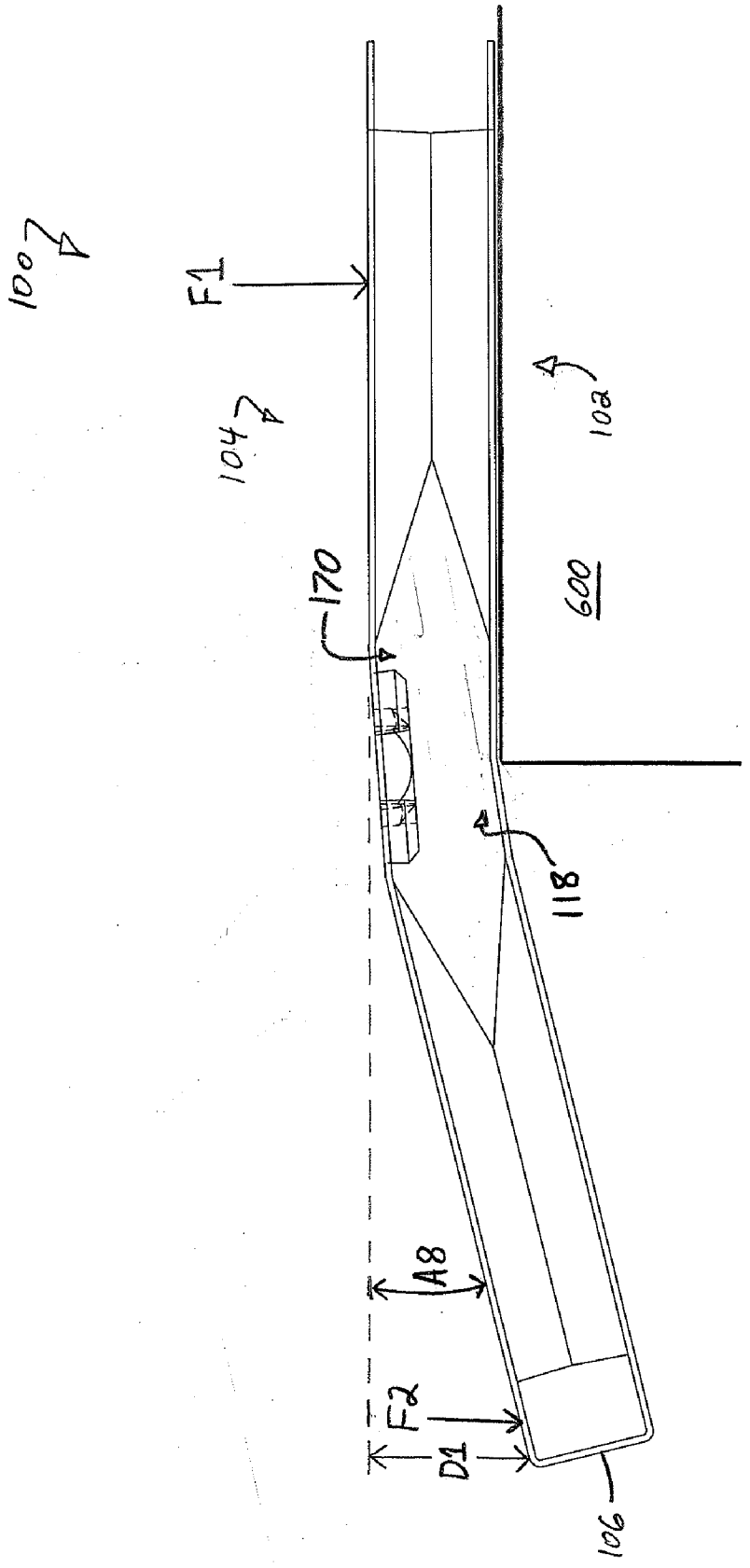

FIG. 6

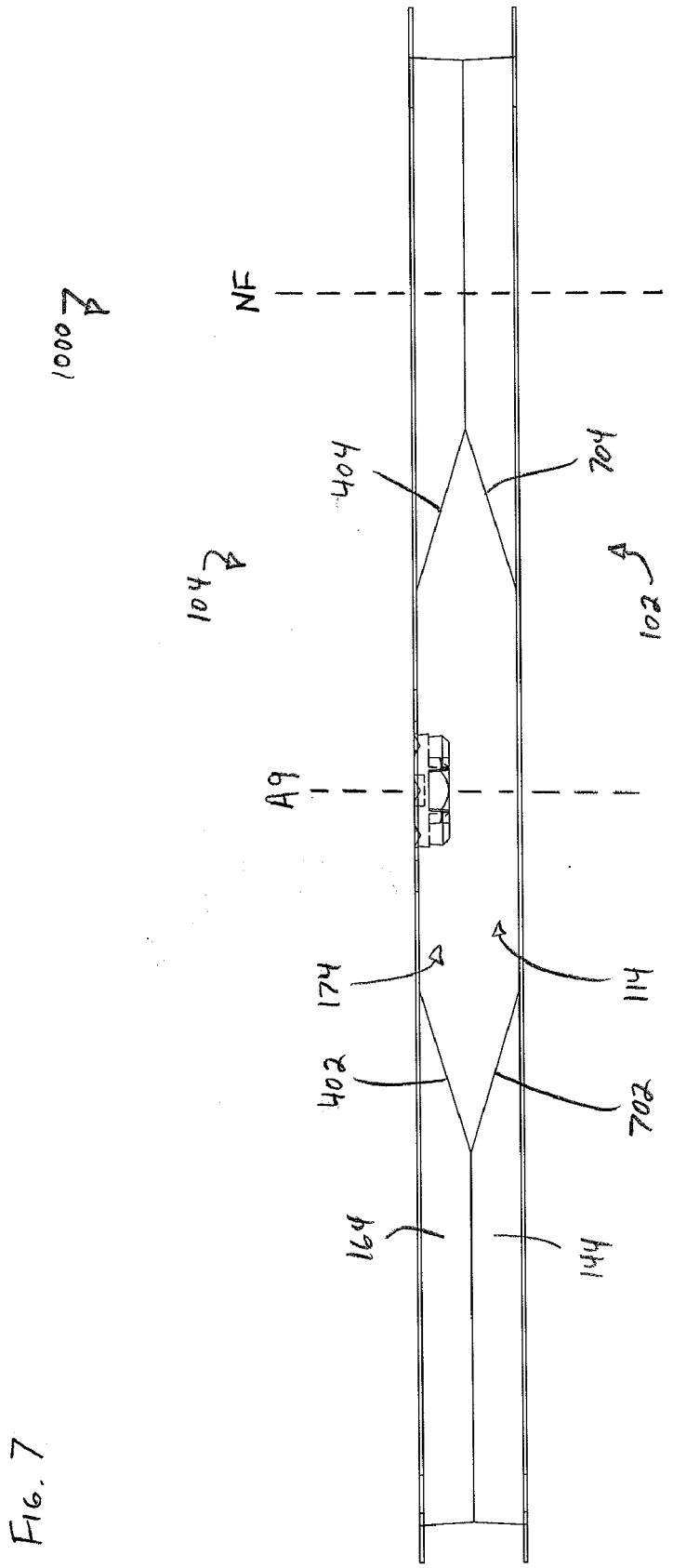

FIG. 7

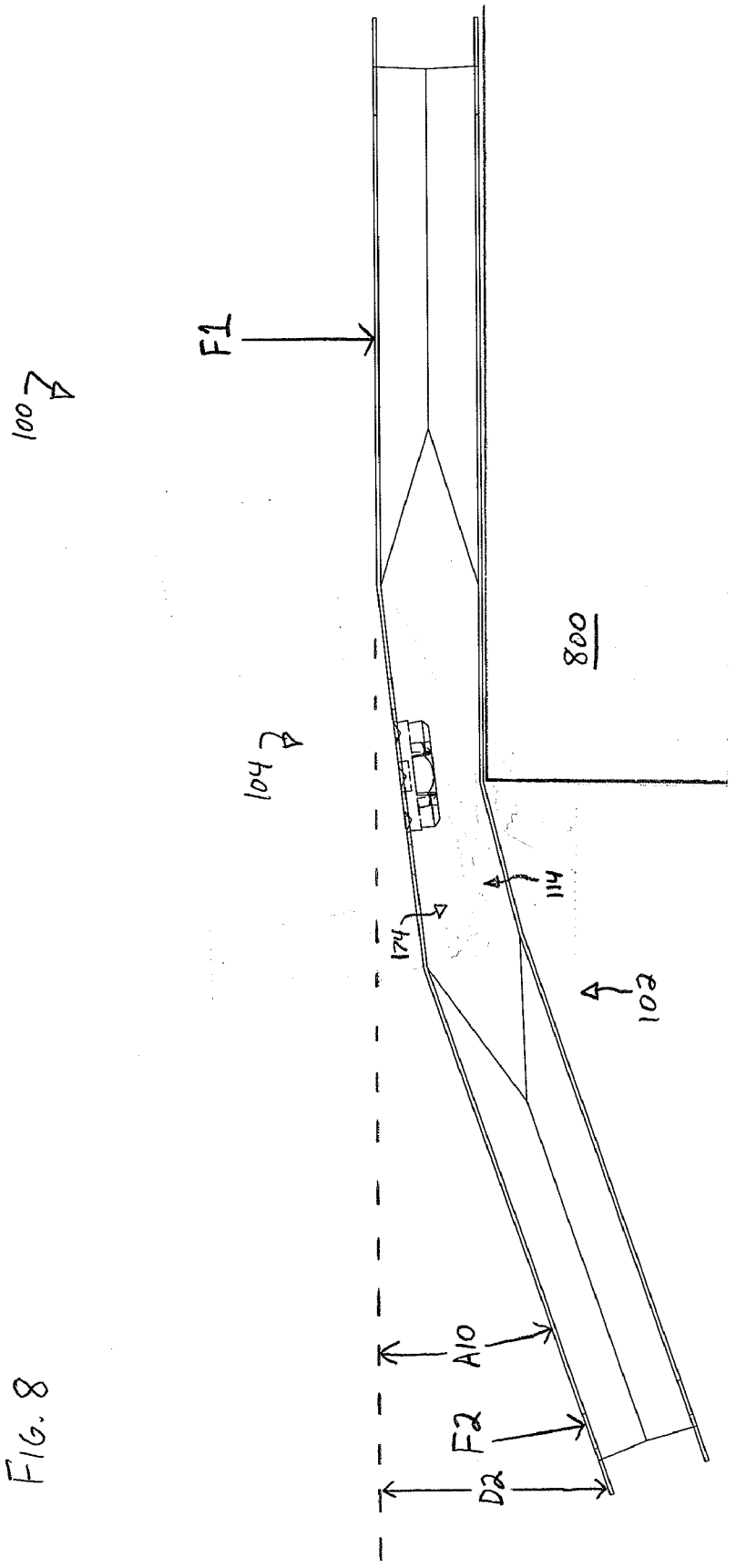

FIG. 8

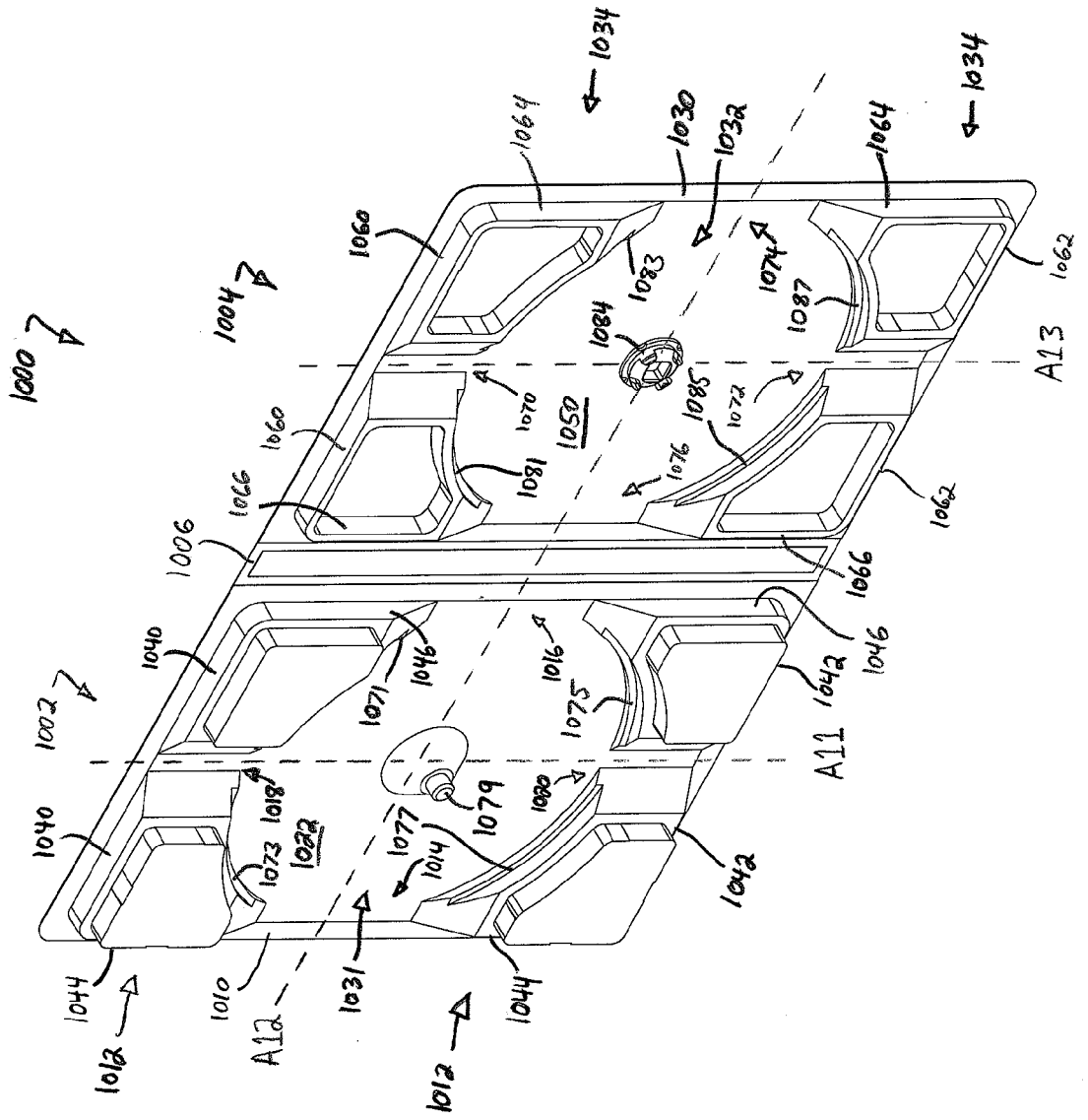
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FIG. 9

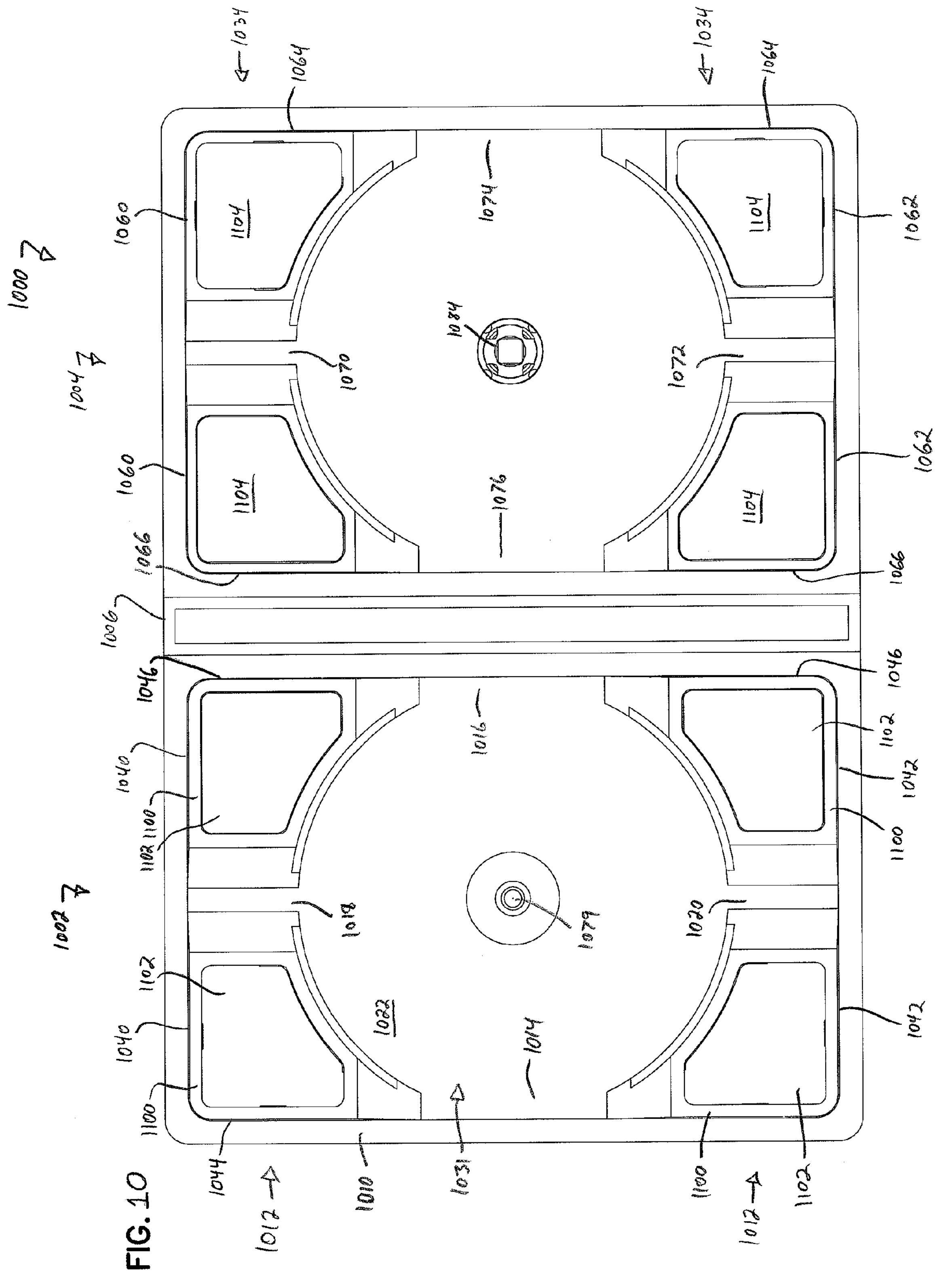
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FIG. 10

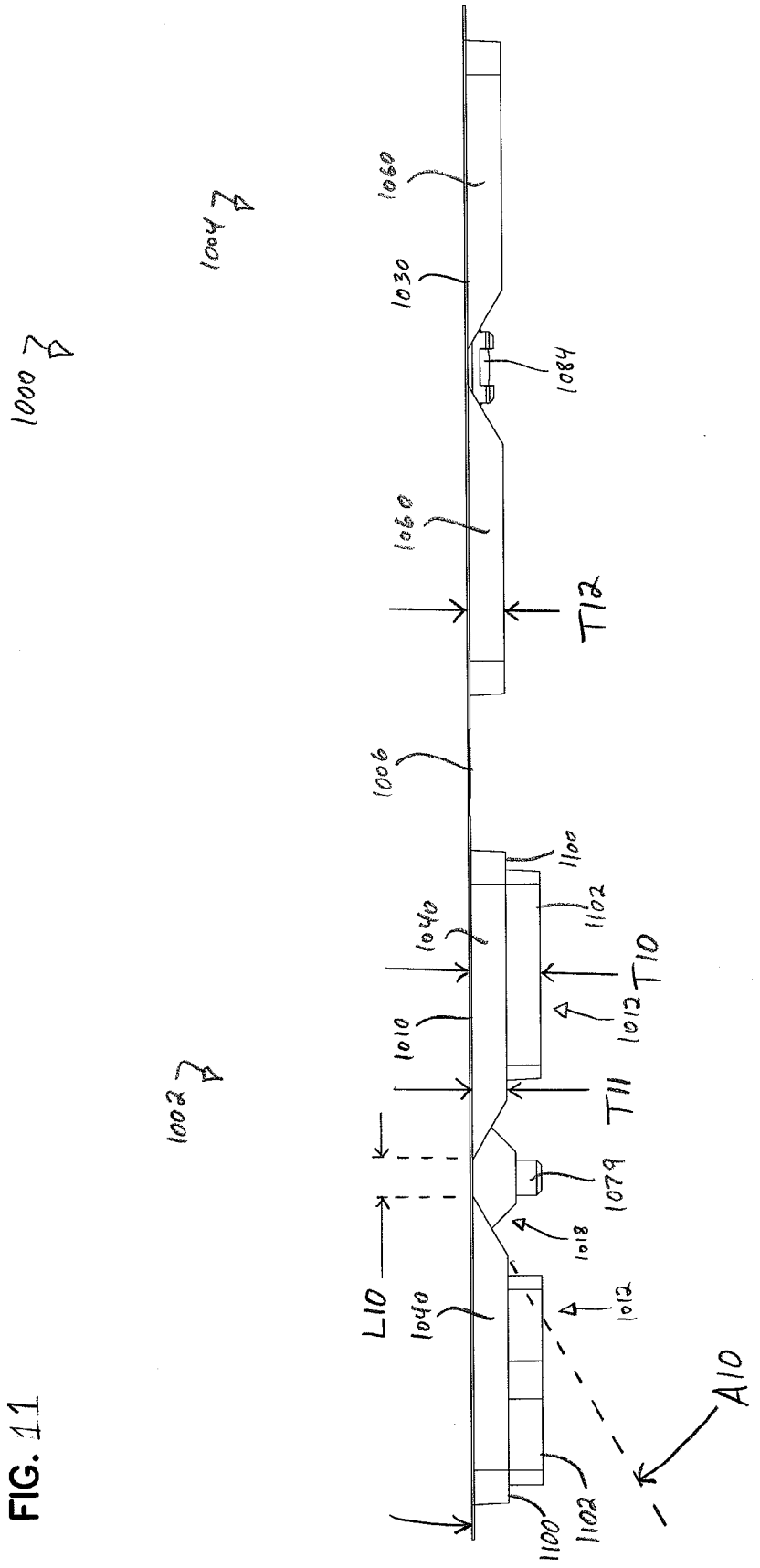
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FIG. 11

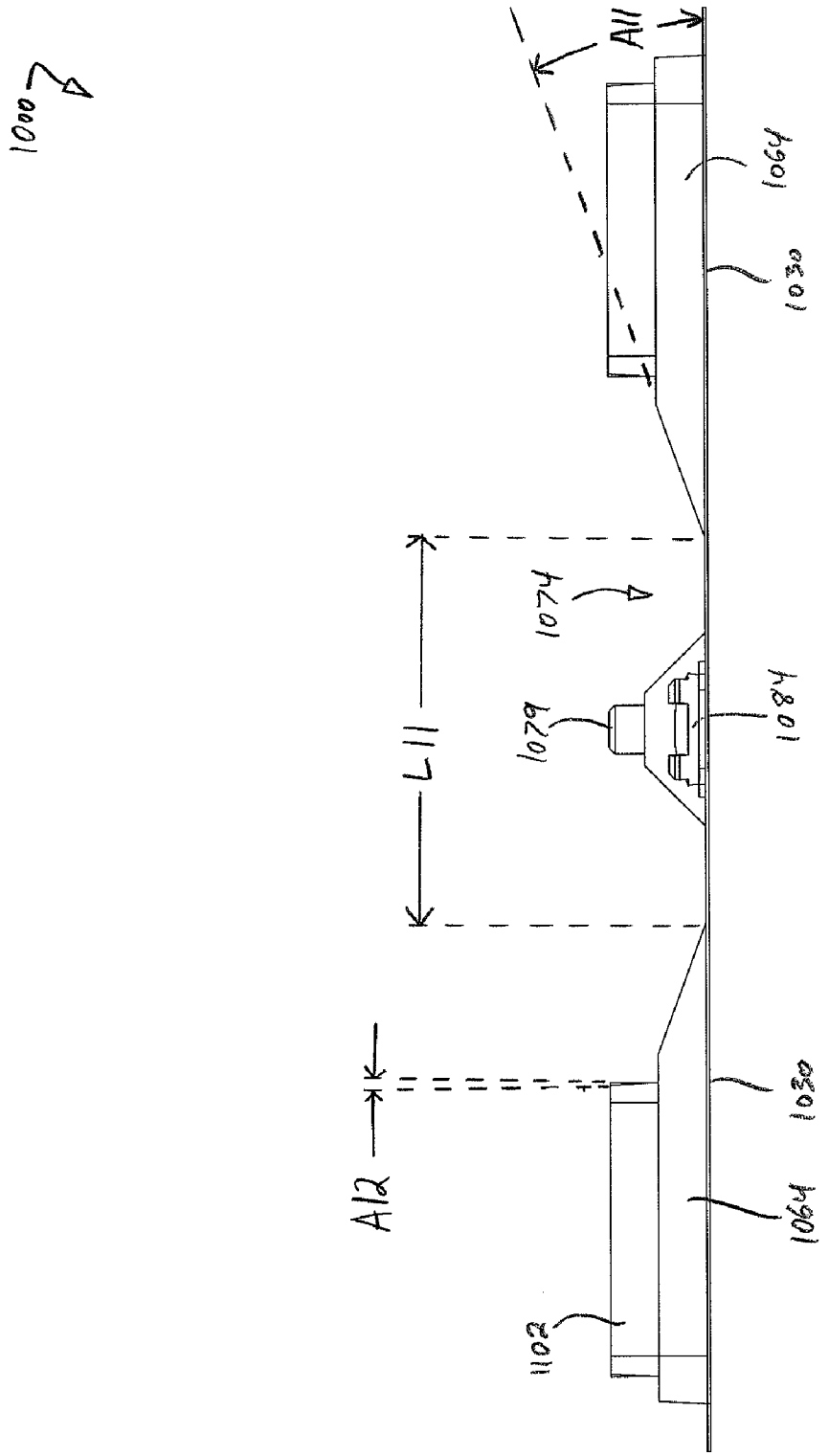

FIG. 12

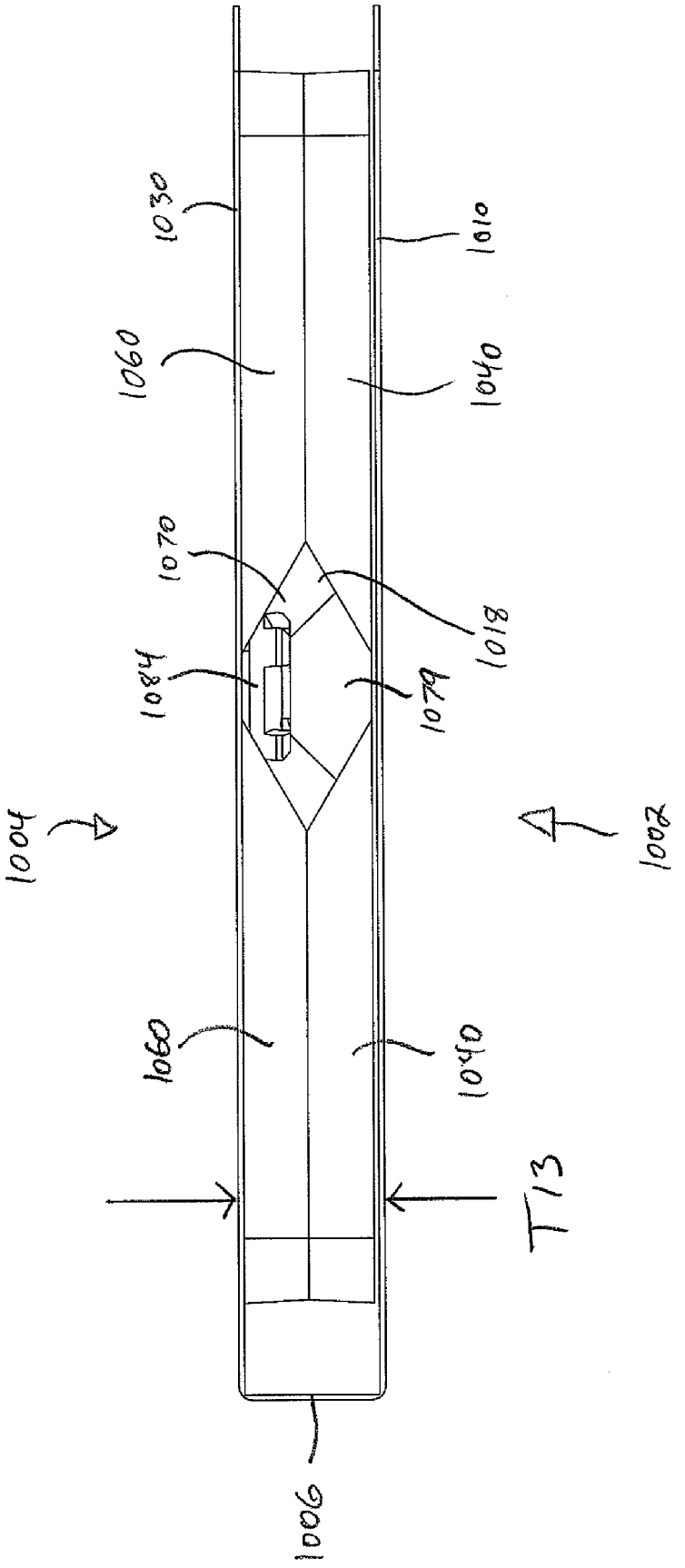
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FIG. 13

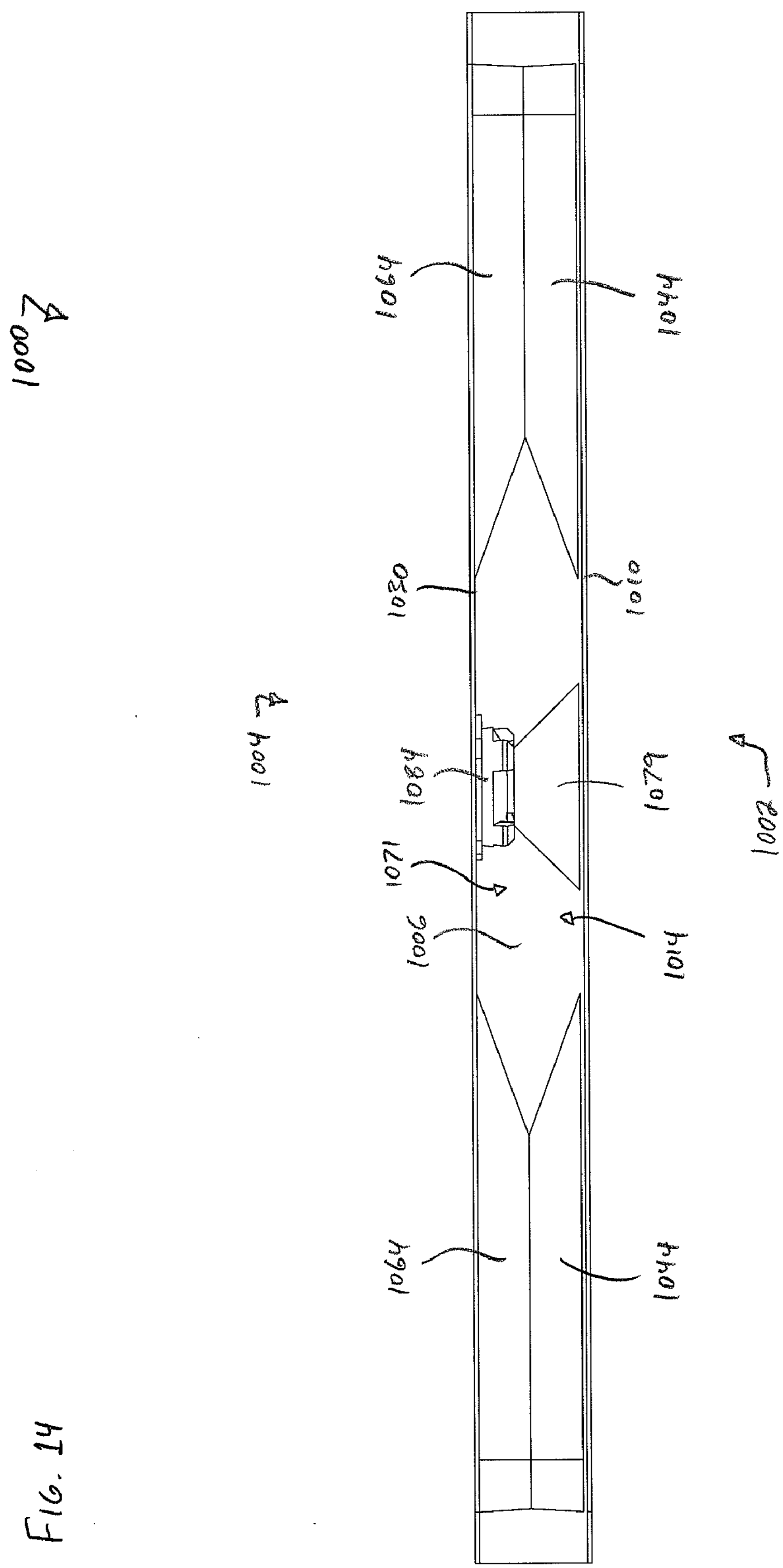
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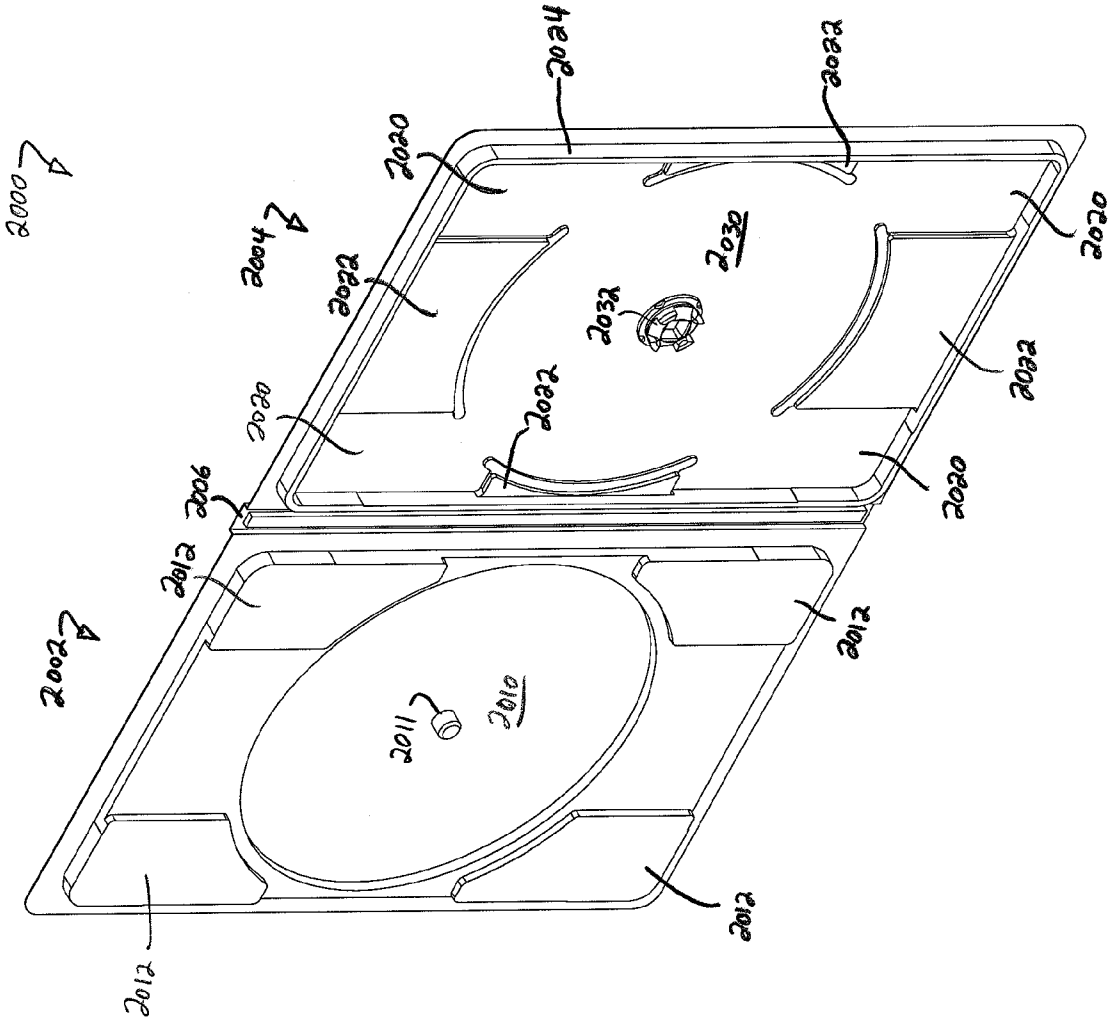
FIG. 14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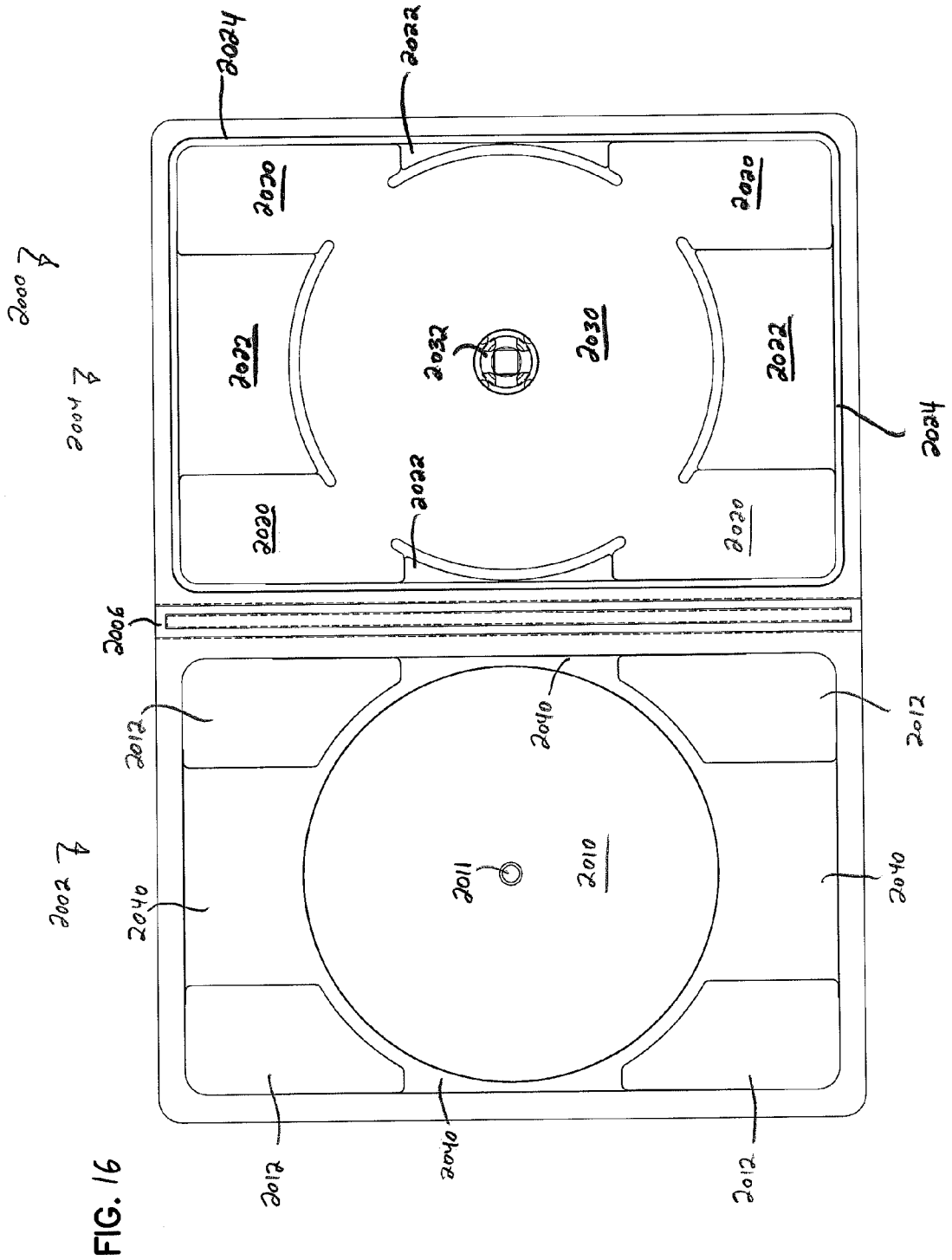
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FIG. 16

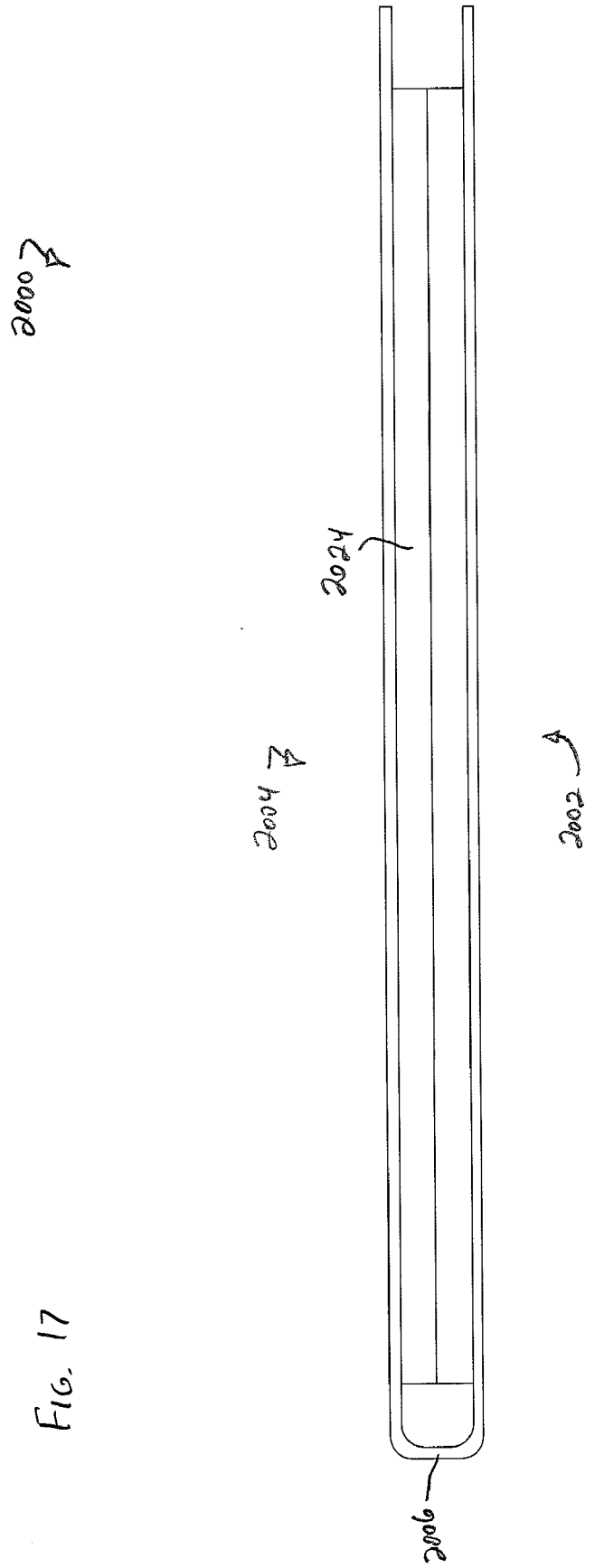

FIG. 17

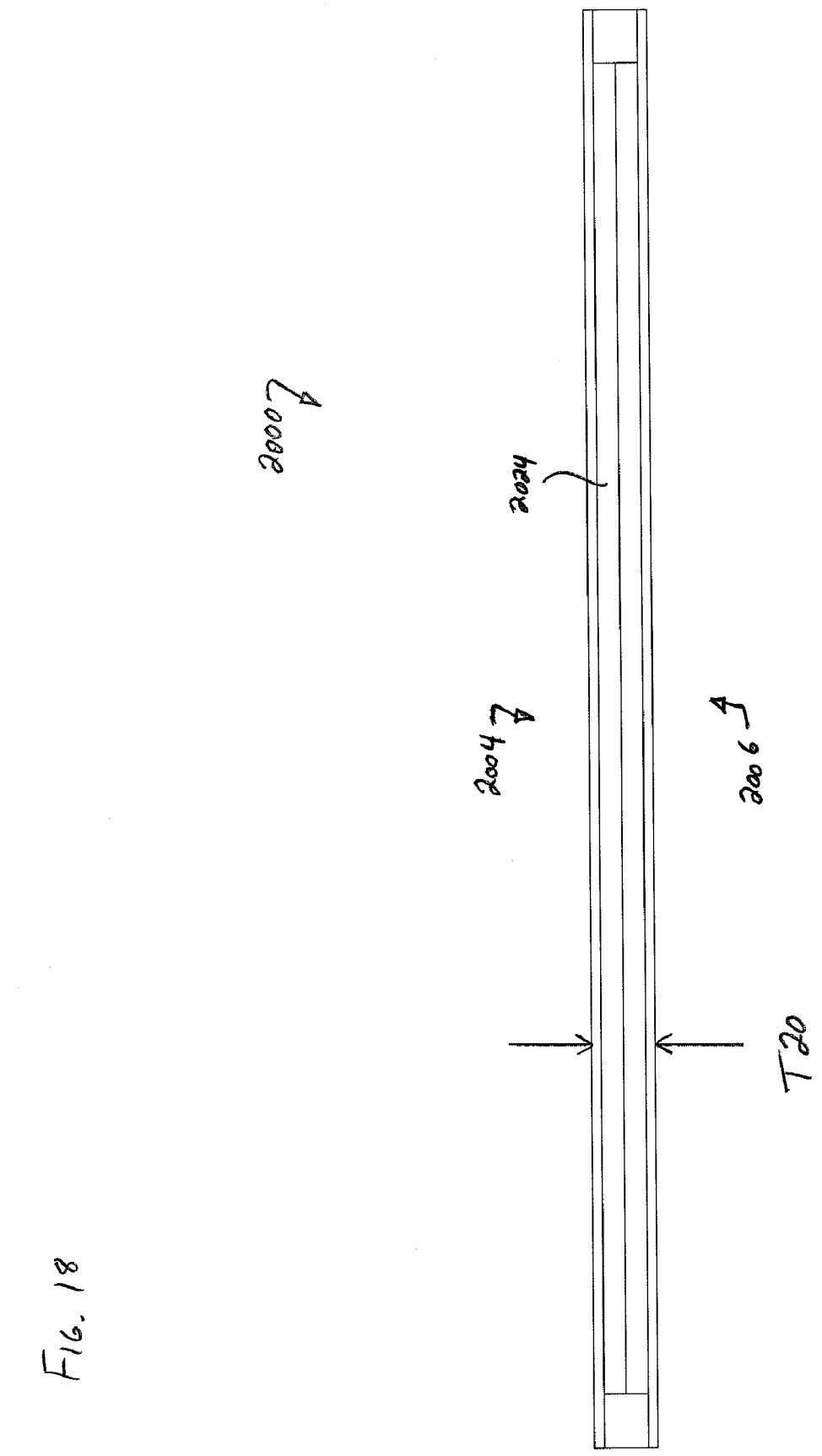

FIG. 18

FIG. 19

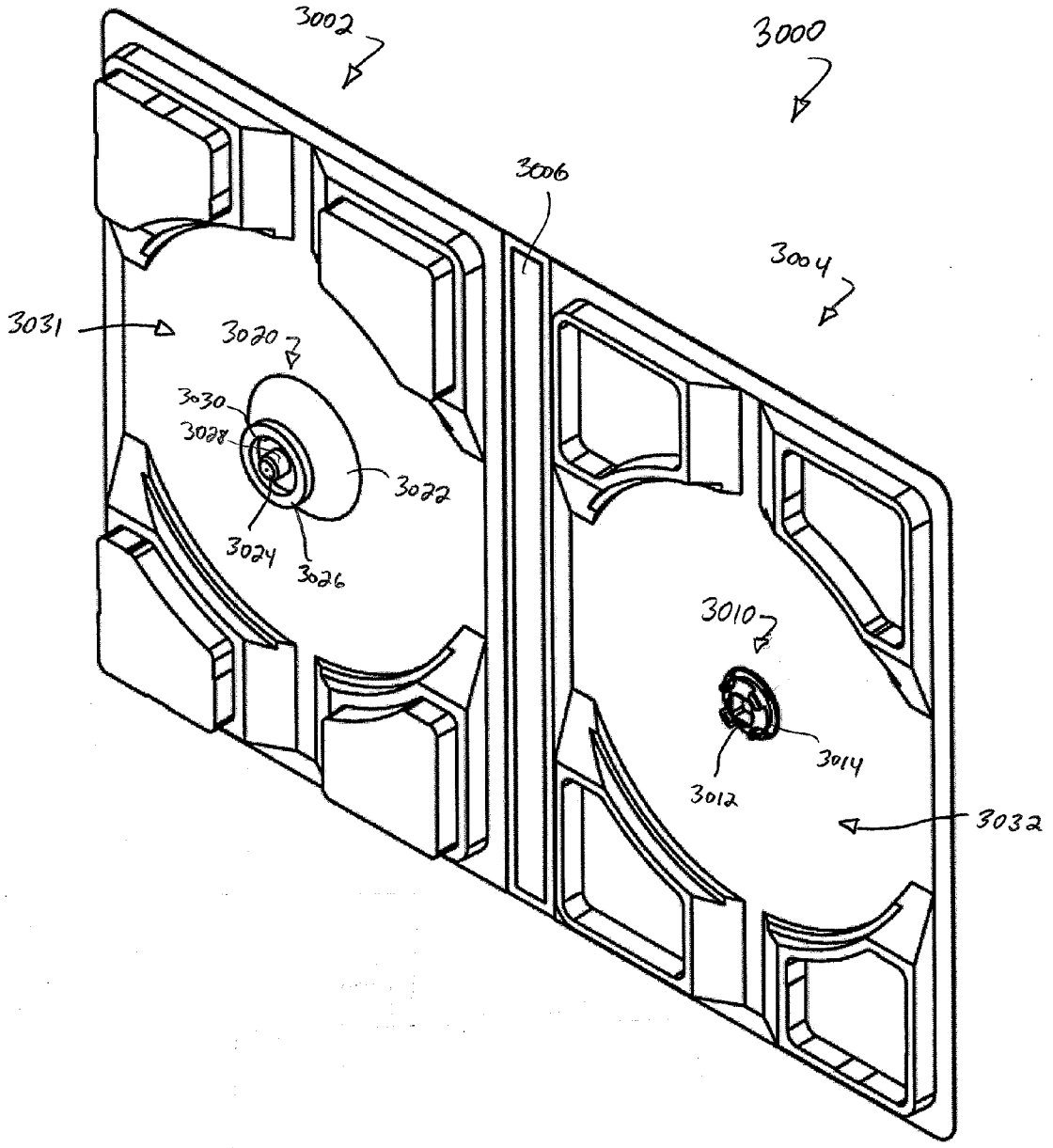
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FIG. 20

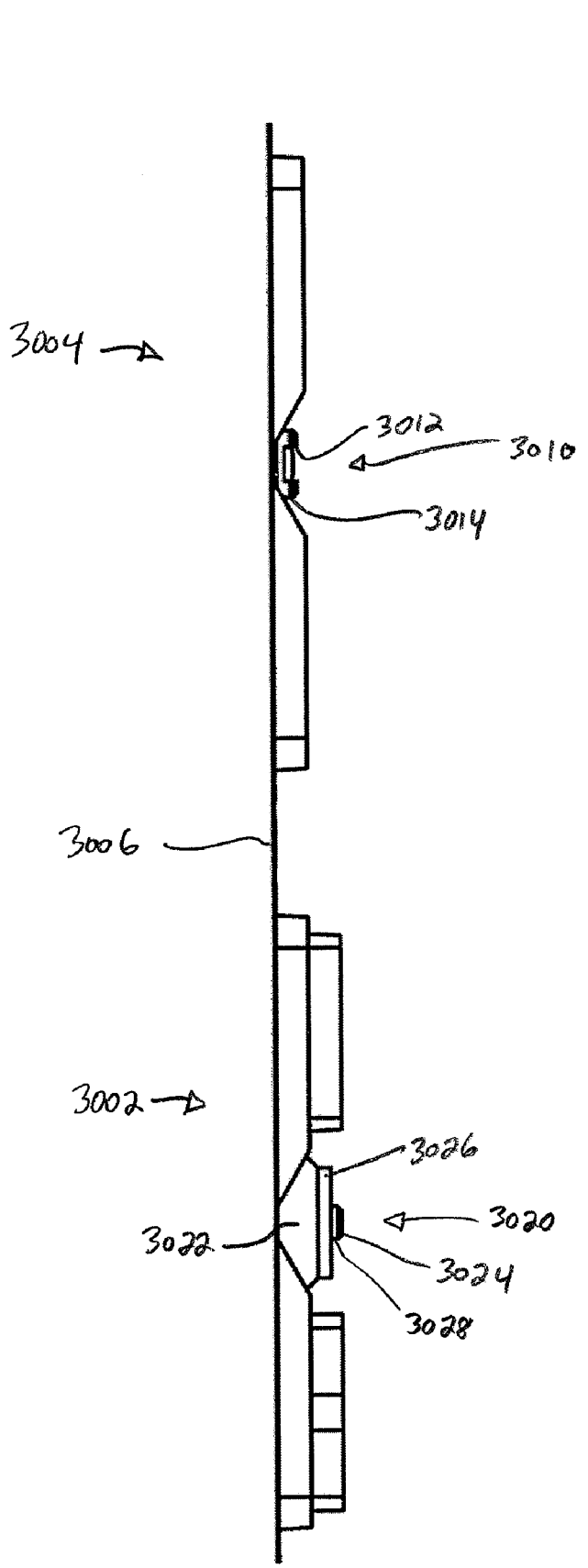
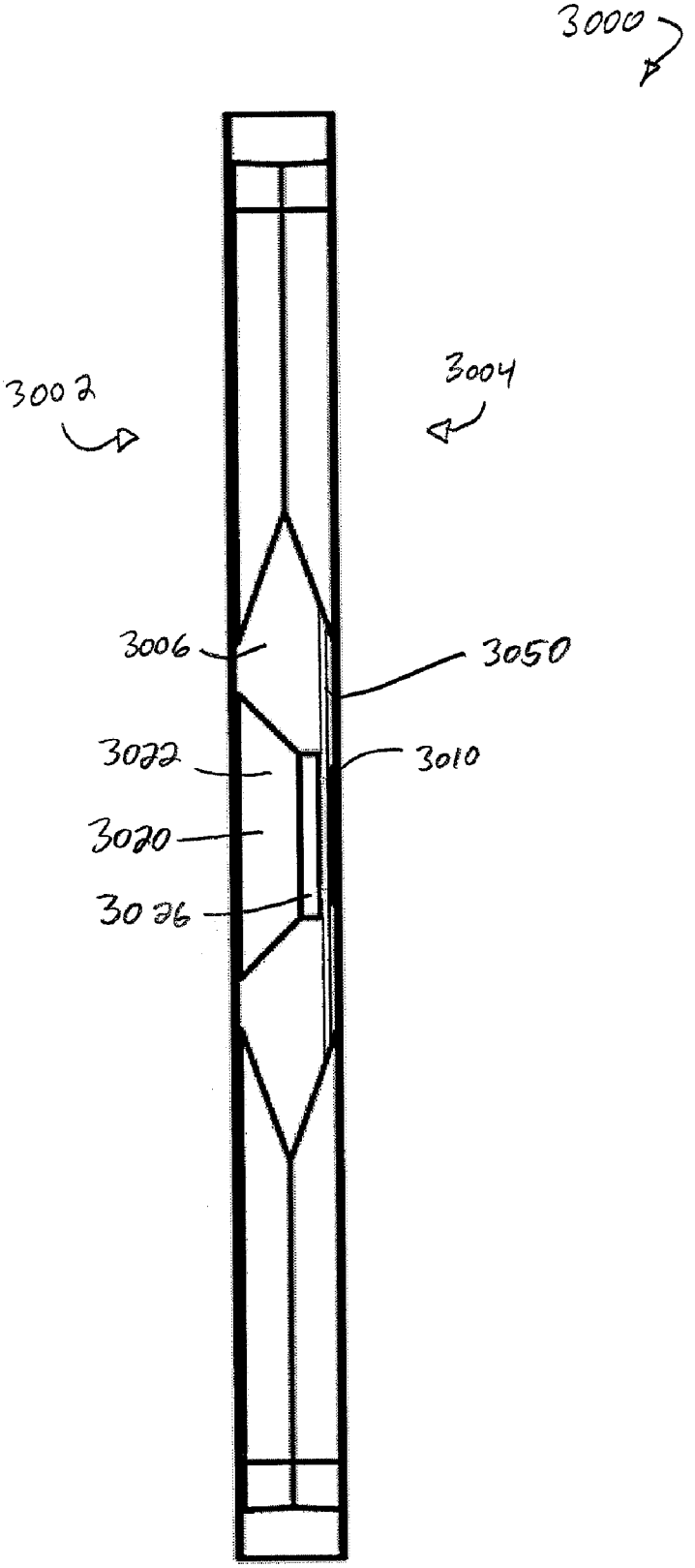


FIG. 21



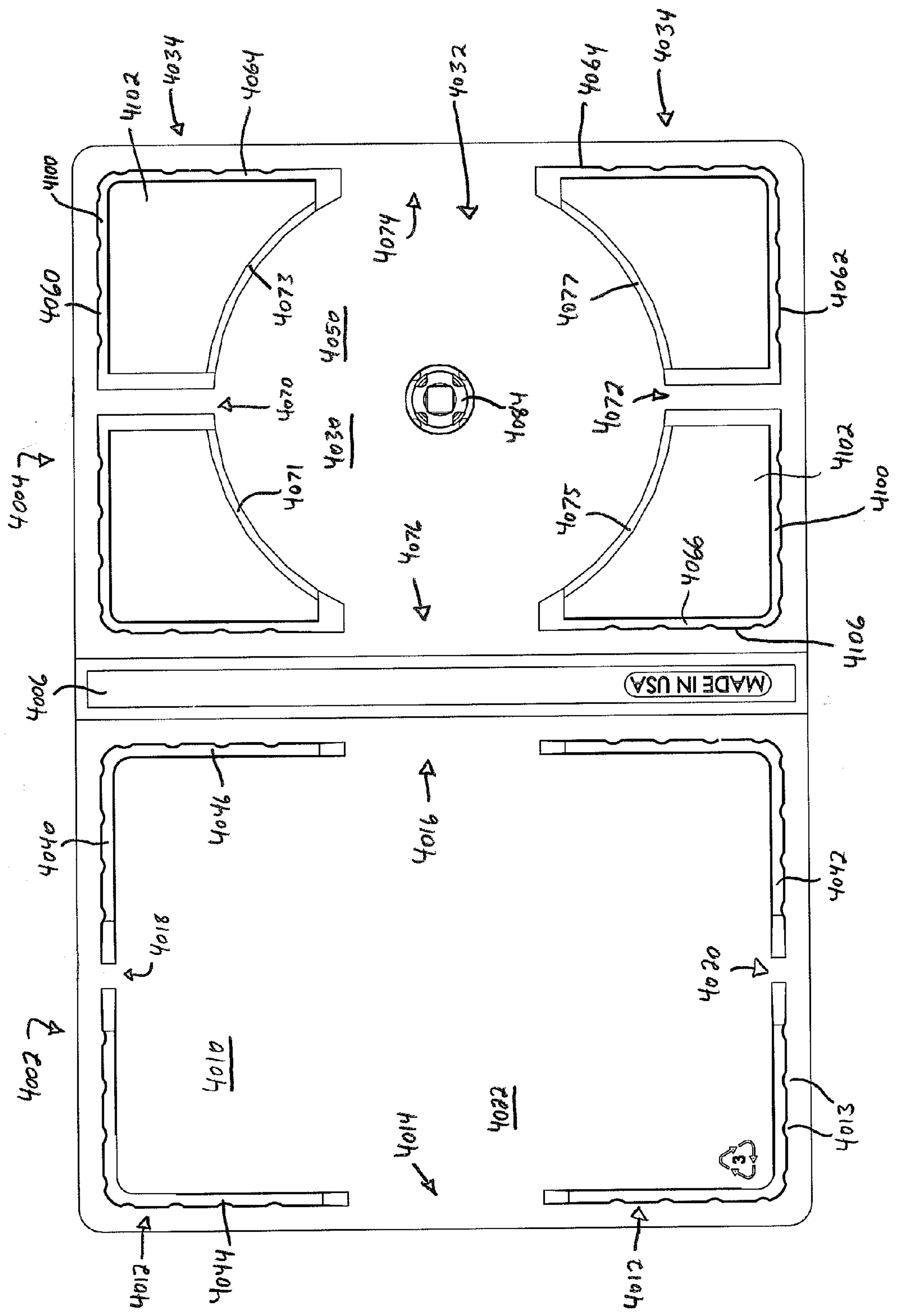

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FIG. 22

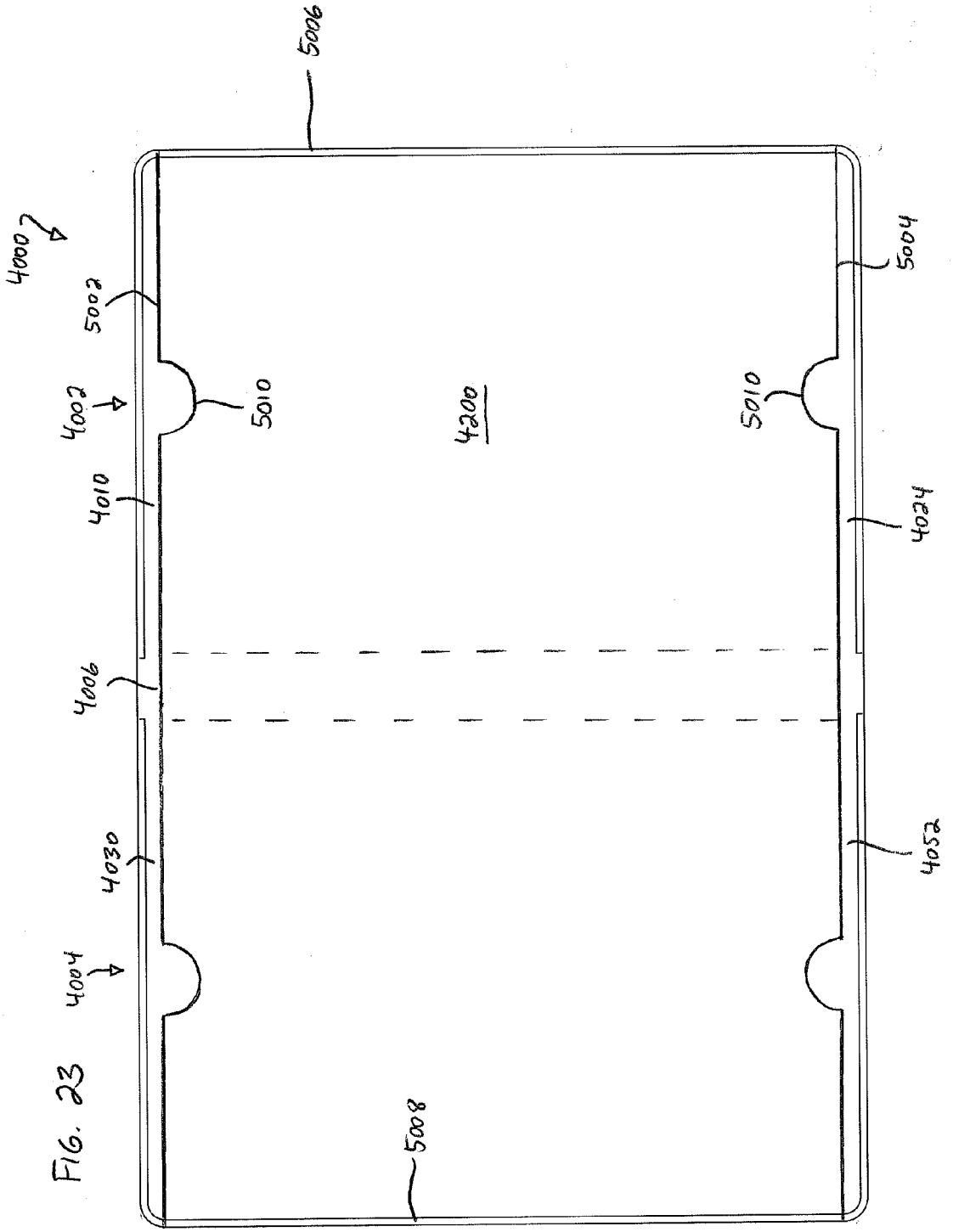
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FIG. 23

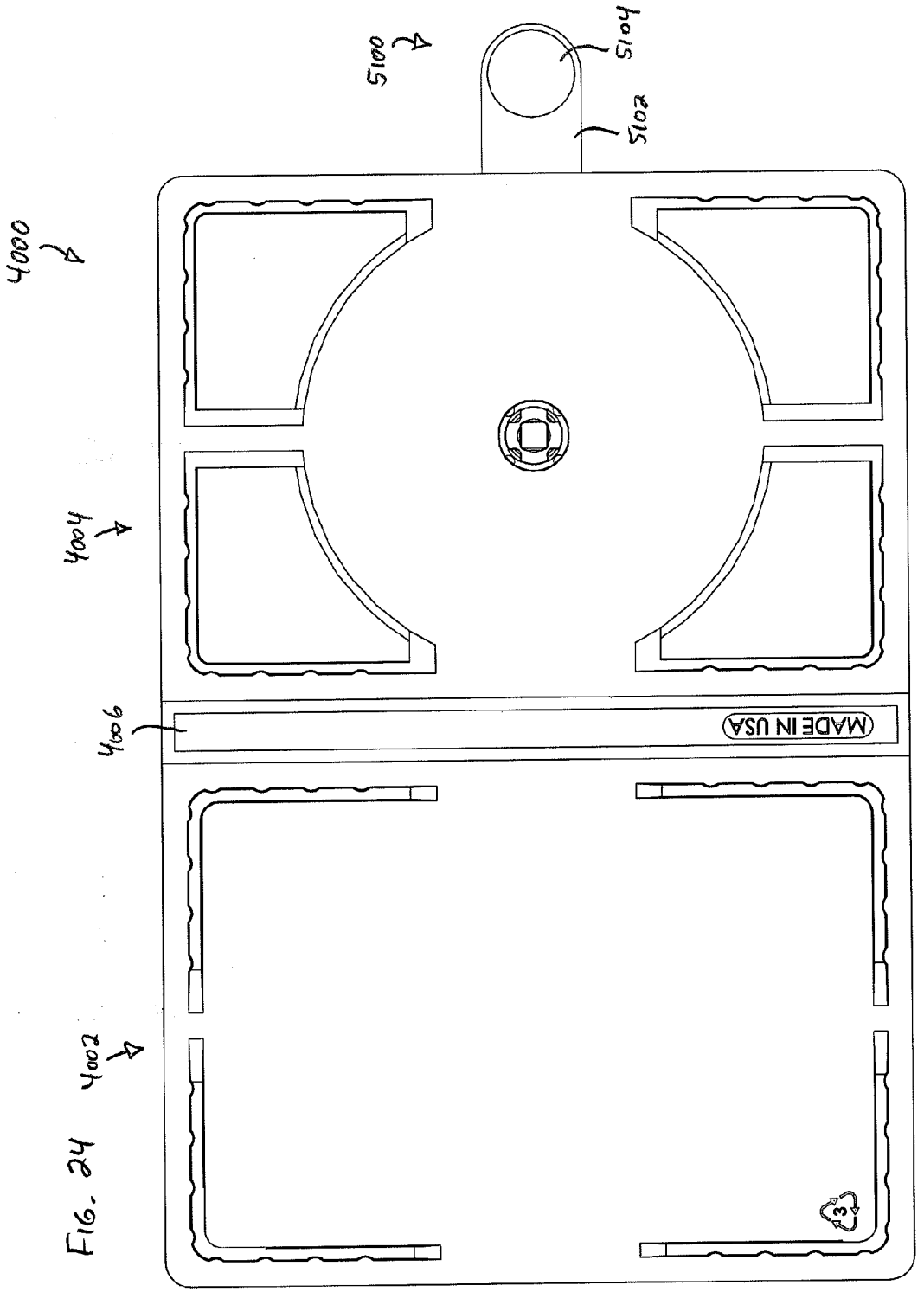

Fig. 24

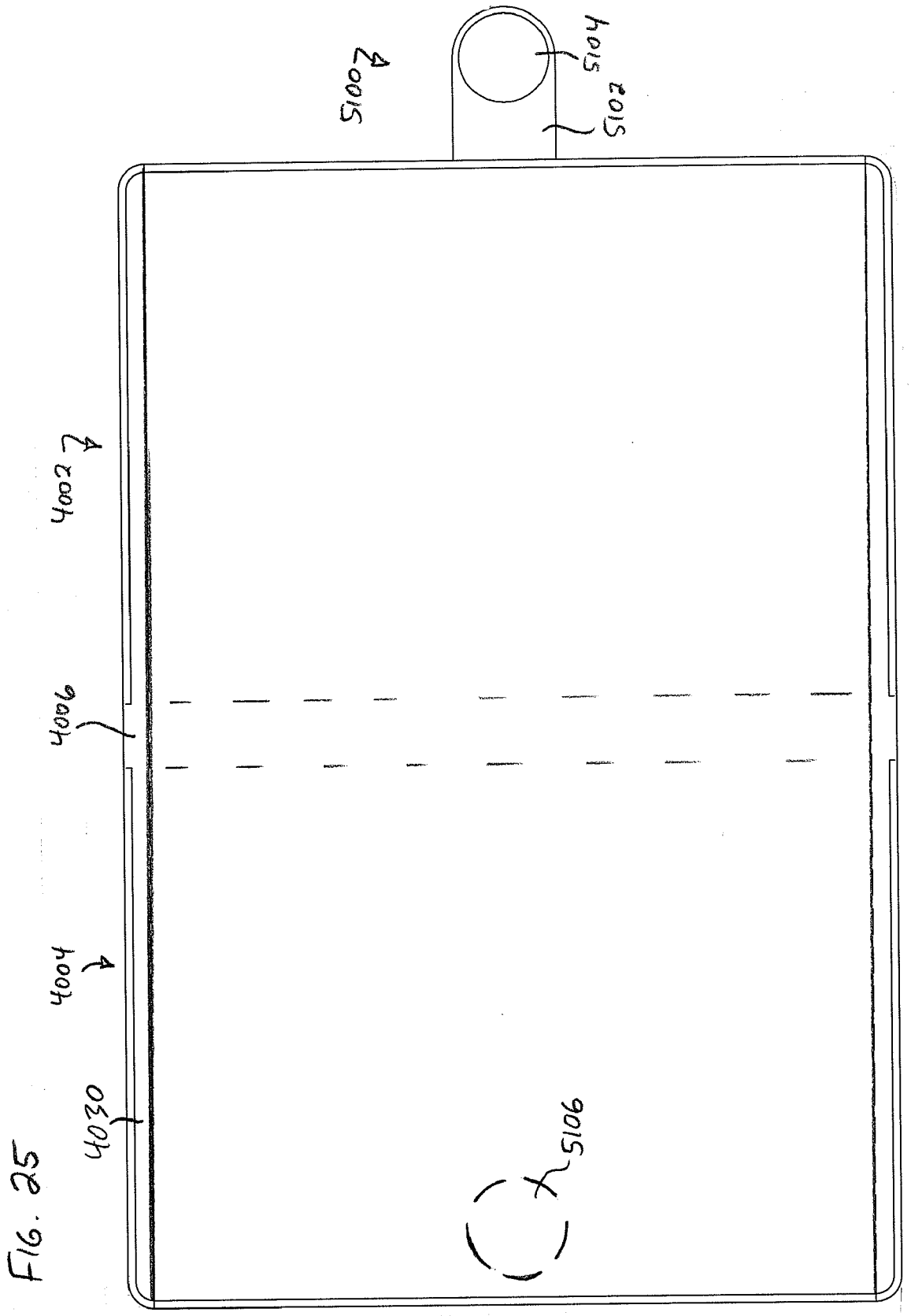

FIG. 25

FLEXIBLE CASE FOR OPTICAL MEDIA

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application Ser. No. 60/969,725 filed on Sep. 4, 2007 and entitled FLEXIBLE CASE FOR OPTICAL MEDIA, the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] The present disclosure is related to media cases, and more particularly to flexible media cases, such as for holding optical media.

BACKGROUND

[0003] Digital data is commonly stored on optical media, such as a compact disc (CD) or a digital versatile disc (DVD), sometimes also referred to as a digital video disc. Such optical media is typically in the form of a flat polycarbonate plastic disc having a recording surface on one side and a printed surface on the other, although some optical media include recording surfaces on both sides. Various types of digital data can be stored on such optical media, including movies, music, documents, software applications, or a variety of other types of digital data. An aperture is typically formed in the center of the optical media for connection with a drive mechanism of an optical reader, such as a CD-ROM drive, CD player, DVD player, or other optical readers. Such optical readers typically include a light source (such as a laser) and an optical detector. The optical detector (sometimes called an optical pickup) detects variations in optical reflections from the optical media to read the data stored on the disc. Optical discs come in a variety of sizes and shapes, including standard (about 120 mm diameter), mini (about 80 mm diameter), business card, and other non-standard sizes and shapes. Writeable and rewriteable optical media are also available.

[0004] It is often desirable to protect optical media in a case or other enclosure. One type of case that has gained popularity is referred to as a jewel case. A jewel case is typically a three piece plastic case measuring 142 mm×125 mm×10 mm. It includes two opposing transparent halves hinged together at a joint and a media tray connected to one of the halves that is configured to hold a CD. The joint includes two brittle arms. Jewel cases are typically formed of injection molded polystyrene. Both the structure and the material used to make jewel cases causes them to be prone to cracking and breaking.

[0005] Another common case is referred to as keep case (sometimes also referred to as an AMARAY® case). A keep case is typically slightly taller than a jewel case, and includes two opposing halves connected together by a spine. One or both halves of the keep case typically includes a tray for holding the optical medium. Keep cases are commonly formed of a polypropylene plastic that is less brittle than the polystyrene plastic used to form jewel cases. Both jewel cases and keep cases are designed to resist bending and flexing to protect the optical media contained within the case.

SUMMARY

[0006] A flexible case is configured to hold an optical medium. In one embodiment the case includes a front casing, a rear casing, and a spine connecting the front casing to the rear casing. The case includes a plurality of sidewalls, and at least one of the sidewalls defines a flex region. The case has increased flexibility at the flex region.

[0007] One aspect is a flexible case includes a first casing, a second casing, and a spine. The first casing includes a generally planar first backing. The second casing includes a second backing, a first sidewall, and a second sidewall. The second backing is generally planar and includes a first surface. The first sidewall extends at least partially in a direction normal to the first surface and defines a first flex region. The second sidewall extends at least partially in a direction normal to the first surface and defines a second flex region, wherein the first and second flex regions are aligned with a flex axis. The spine couples the first casing with the second casing.

[0008] Another aspect is a case for holding an optical medium. The case comprises a first casing, a second casing, and a spine. The first casing has a first interior surface and a first pair of sidewalls connected to and extending from the first interior surface and at least partially in a direction generally normal to the interior surface. The first pair of sidewalls includes a first sidewall and a second sidewall, wherein the first sidewall defines a first flex region and wherein the second sidewall defines a second flex region. The second casing has a second interior surface and a second pair of sidewalls connected to and extending from the second interior surface and at least partially in a direction generally normal to the second interior surface. The second pair of sidewalls includes a third sidewall and a fourth sidewall, wherein the third sidewall includes a third flex region and wherein the fourth sidewall defines a fourth flex region. The first, second, third, and fourth flex regions are aligned along a flex axis. The spine couples the first casing with the second casing, wherein the first and second casings are movable between an open position and a closed position, and wherein when the case is in the closed position the case defines an interior space sized to support the optical medium therein.

[0009] Yet another aspect is a method of making a flexible case. The method includes forming a first sheet of material including a first surface and a second surface opposite the first surface to define a front casing, a rear casing, and a spine, the front casing and the rear casing including a plurality of sidewalls connected to and extending from the first surface, wherein at least two of the plurality of sidewalls include flex regions aligned along a flex axis; and fastening a second sheet of material across the second surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. **1** is a perspective view of an example case in an open position.

[0011] FIG. **2** is a front view of the example case shown in FIG. **1**.

[0012] FIG. **3** is a top view of the example case shown in FIG. **1**.

[0013] FIG. **4** is a right side view of the example case shown in FIG. **1**.

[0014] FIG. **5** is a top view of the example case shown in FIG. **1**, in a closed position.

[0015] FIG. **6** is a top view of the example case shown in FIG. **1**, wherein the case is in a flexed condition.

[0016] FIG. **7** is a right side view of the example case shown in FIG. **1**, in the closed position.

[0017] FIG. **8** is a right side view of the example case shown in FIG. **1**, wherein the case is in a flexed condition.

[0018] FIG. **9** is a perspective view of another example case in an open position.

[0019] FIG. **10** is a front view of the example case shown in FIG. **9**.

[0020] FIG. **11** is a top view of the example case shown in FIG. **9**.

[0021] FIG. **12** is a right side view of the example case shown in FIG. **9**.

[0022] FIG. **13** is a top view of the example case shown in FIG. **9**, wherein the case is in a closed position.

[0023] FIG. **14** is a right side view of the example case shown in FIG. **9**, wherein the case is in the closed position.

[0024] FIG. **15** is a front perspective view of another example case in an open position.

[0025] FIG. **16** is a front view of the example case shown in FIG. **15**.

[0026] FIG. **17** is a top view of the example case shown in FIG. **15**.

[0027] FIG. **18** is a right side view of the example case shown in FIG. **15**.

[0028] FIG. **19** is a front perspective view of another example case in an open position.

[0029] FIG. **20** is a top view of the example case shown in FIG. **19**.

[0030] FIG. **21** is a right side view of the example case shown in FIG. **19**, including an optical medium.

[0031] FIG. **22** is a front view of another example case arranged in an open position.

[0032] FIG. **23** is a rear view of the example case shown in FIG. **22**.

[0033] FIG. **24** is a front view of another example case arranged in an open position and including a secondary closure device.

[0034] FIG. **25** is a rear view of the example case shown in FIG. **24**.

DETAILED DESCRIPTION

[0035] Optical media are often packaged in a box or case to protect the optical media during shipping, such as when shipped by a mail processing and delivery service. Examples of mail processing and delivery services include the U.S. Postal Service, Federal Express, United Parcel Service, DHL, private couriers, and the like. Mail processing services often use automated processing machines to efficiently sort and direct mail. These machines exert bending forces on the mail along the width or length dimensions of the case or both dimensions depending on the type of machine and the orientation of the case. If a mailed case cannot bend adequately to be processed by the processing machines, other often less efficient mail handling processes must be used. As a result, some mail processing and delivery services provide reduced fees if a piece of mail is able to meet certain flexibility requirements.

[0036] One test that can be used to determine whether or not a case is adequately flexible is illustrated and described below with reference to FIGS. **6** and **8**. During this test, a bending force is applied to the case to determine whether or not the case can sufficiently bend without being damaged. In some embodiments, damage includes ripping, tearing, cracking, or otherwise breaking. In other embodiments, damage includes permanent creasing or permanent bending, such that the case does not automatically return to a generally straight orientation. In other embodiments, damage is measured by determining whether an optical medium within the case is damaged or disengages from a media tray.

[0037] Nearly all materials have some degree of flexibility, or ability to deform. Deformation is sometimes categorized into three types, including elastic deformation, plastic deformation, and fracture. Elastic deformation is a reversible deformation in which no permanent change occurs in the material. Plastic deformation often follows elastic deformation, and involves a permanent change to the material, such as stretching or bending of the material. A fracture is the physical separation in a material that is not reversible. Some embodiments of the flexible case are damaged when they exceed the range of elastic deformation. Other embodiments of the flexible case are damaged when they exceed the range of plastic deformation. Still other embodiments of the flexible case are considered damaged when the optical medium contained within becomes damaged.

[0038] It has been found that a case can be designed that is both flexible and adequately protects an enclosed optical medium from damage. These benefits are realized by some embodiments according to the present disclosure.

[0039] FIG. **1** is a perspective view of an example case **100** in an open position. In the illustrated embodiment, case **100** includes front casing **102**, rear casing **104**, and spine **106**. Front casing **102** includes backing **110**, sidewalls **112**, lateral flex regions **114** and **116**, and longitudinal flex regions **118** and **120**. Rear casing **104** includes backing **130**, sidewalls **134**, lateral flex regions **174** and **176**, and longitudinal flex regions **170** and **172**.

[0040] In some embodiments, front casing **102** is generally a front half of case **100** that is configured to engage with rear casing **104** to at least partially enclose an optical medium (not shown in FIG. **1**). Front casing **102** includes backing **110** having an interior surface **122** and an exterior surface **124** (not visible in FIG. **1**). In one embodiment, backing **110** is formed of a single layer of material. Alternatively, backing **110** is formed of multiple layers of one or more materials. Example materials for backing **110** include plastic, such as polyvinyl chloride (PVC), vinyl, fabric, leather, paper, cardboard, paperboard, wood, or various other suitable materials and combinations of materials. In the illustrated embodiment, backing **110** is a generally planar surface in the absence of an applied force.

[0041] Sidewalls **112** extend from interior surface **122**, and in the illustrated embodiment include top sidewall **140**, bottom sidewall **142**, right sidewall **144**, and left sidewall **146**. (In this example, the terms "left" and "right" refer generally to the respective sides of case **100** as viewed from the front, when case **100** is in the closed position, such as shown in FIGS. **5** and **7**.) In some embodiments, sidewalls **112** extend generally in a direction normal to interior surface **122**, and toward backing **130** of rear casing **104** when case **100** is in the closed position. In some embodiments, sidewalls **112** partially enclose sides of front casing **102**. In some embodiments, sidewalls **112** provide support to backing **110** to maintain backing **110** generally planar in the absence of an applied force. In the illustrated embodiments, sidewalls **112** include flex regions. In this embodiment, flex regions are flexible locations within sidewalls **112** that enable front casing **102** to flex or bend along or around a respective flex axis.

[0042] Top and bottom sidewalls **140** and **142** include longitudinal flex regions **118** and **120**, respectively. Longitudinal flex regions **118** and **120** are located adjacent to flex axis **A1**. In the illustrated embodiment, flex axis **A1** is an axis extending through and generally perpendicular to top and bottom edges of backing **110**. Similarly, right and left sidewalls **144**

and **146** include lateral flex regions **114** and **116**. Lateral flex regions **114** and **116** are located adjacent to flex axis A**2**. In the illustrated embodiment, flex axis A**2** is an axis extending through and generally perpendicular to right and left edges of backing **110**.

[0043] In some embodiments, rear casing **104** is generally a rear half of case **100** that is configured to engage with front casing **102**. Rear casing **104** includes backing **130** having an interior surface **150** and an exterior surface **152** (not visible in FIG. **1**). In one embodiment, backing **130** is formed of a single layer of material. Alternatively, backing **130** is formed of multiple layers of one or more materials. In some embodiments, backing **110** and **130** are formed at the same time of the same material or materials. In embodiments having multiple layered backing **110** and/or **130**, the edges of the layers are fastened together, such as by heat sealing, folding, adhesive, or other known methods of fastening material layers.

[0044] Sidewalls **134** extend from interior surface **150**, and in the illustrated embodiment include top sidewall **160**, bottom sidewall **162**, right sidewall **164**, and left sidewall **166**. In some embodiments, sidewalls **134** extend generally in a direction normal to interior surface **150**, and toward backing **110** of front casing **102** when case **100** is in the closed position. In some embodiments, sidewalls **134** partially enclose sides of front casing **102**. In some embodiments, sidewalls **134** provide support to backing **130** to maintain backing **130** generally planar in the absence of an applied force. In the illustrated embodiments, sidewalls **134** include flex regions that enable rear casing **104** to flex or bend along the respective flex axis.

[0045] Top and bottom sidewalls **160** and **162** include longitudinal flex regions **170** and **172**, respectively. Longitudinal flex regions **170** and **172** are located adjacent to flex axis A**3**. In the illustrated embodiment, flex axis A**3** is an axis extending through and generally perpendicular to top and bottom edges of backing **130**. Similarly, right and left sidewalls **164** and **166** include lateral flex regions **174** and **176**. Lateral flex regions **174** and **176** are located adjacent to flex axis A**3**, in the same way that lateral flex regions **114** and **116** are located adjacent to flex axis A**3**. In the illustrated embodiment, flex axis A**3** also extends through and generally perpendicular to right and left edges of backing **130**.

[0046] In the illustrated embodiment, rear casing **104** also includes media tray **132**. In one embodiment, media tray **132** includes edge supports **180** and **182** that support edges of an optical medium. Media tray **132** also includes hub **184**. Hub **184** includes a generally circular projection that is sized to releasably engage within an aperture in the optical medium to hold the optical medium in place in media tray **132**. In some embodiments, the hub has an outer diameter in a range from about 10 mm to about 20 mm, and preferably in a range from about 14 mm to about 16 mm. An optical medium typically has an aperture with a diameter in a range from about 10 mm to about 20 mm, and preferably in a range from about 14 mm to about 16 mm. Other embodiments include other dimensions. The illustrated embodiment of media tray **132** is configured to hold a circular optical medium. Other embodiments are configured to hold optical media having other shapes. Optionally, one or more recesses **186** are formed in media tray **132** to provide easier access to the edge of the optical medium, such as to remove the optical medium from media tray **132**.

[0047] In the illustrated embodiment, spine **106** connects front casing **102** with rear casing **104**. In the illustrated embodiment, spine **106** connects between sides of backing **110** and backing **130**. In some examples, when case **100** is in an open position, spine **106** extends in the same plane as backing **110** and backing **130**. In some examples, spine **106** is formed of the same material or materials as backing **110** and backing **130**. In yet further examples, spine **106** is formed of the same piece of material or materials as backing **110** and backing **130**. When case **100** is closed, spine **106** folds at axis A**4** and A**5** (shown in FIG. **2**) to allow front casing **102** and rear casing **104** to engage with each other at sidewalls **112** and **134**, respectively. In this closed position (not shown in FIG. **1**), spine **106** forms a side of case **100**.

[0048] FIG. **2** is a front view of example case **100** in an open position. Case **100** includes front casing **102**, rear casing **104**, and spine **106**. Front casing **102** includes backing **110**, sidewalls **140**, **142**, **144**, and **146**, lateral flex regions **114** and **116**, and longitudinal flex regions **118** and **120**. Rear casing **104** includes backing **130**, media tray **132**, sidewalls **160**, **162**, **164**, and **166**, lateral flex regions **174** and **176**, and longitudinal flex regions **170** and **172**.

[0049] Case **100** is shown in FIG. **2** in the open position. In the illustrated embodiment, case **100** is able to fold at spine **106** into a closed position. More specifically, case **100** is able to fold along axes A**4** and A**5**. In some embodiments, however, spine **106** does not include folds at any particular location, but rather spine **106** bends to enable case **100** to be placed into the closed position. In other possible embodiments, spine **106** includes a single fold, or more than one fold located anywhere along or adjacent to spine **106**.

[0050] The illustrated embodiment of case **100** is configured such that sidewalls **140**, **142**, **144**, and **146** are able to engage with sidewalls **160**, **162**, **164**, and **166**, respectively. In this embodiment, sidewalls **140**, **142**, **144**, and **146** each include a recess **202** and a protrusion **204**. Recesses **202** are region of sidewalls **160**, **162**, **164**, and **166**, and are adjacent to protrusions **204**. Protrusions **204** extend a greater distance from backing **110** than recesses **202**. In the illustrated embodiment, recesses **202** are generally along an external side of sidewalls **160**, **162**, **164**, and **166** and protrusions **204** are generally along an internal side of sidewalls **160**, **162**, **164**, and **166**. In some embodiments, recesses and protrusions are formed on one or more of the sidewalls. In other embodiments recesses **202** are arranged at an internal side of one or more sidewalls and protrusions are arranged at an external side of one or more sidewalls.

[0051] In the illustrated embodiment, protrusions **204** are arranged and configured to fit against internal sides of sidewalls **160**, **162**, **164**, and **166**, such that protrusions **204** frictionally engage with the internal sides of sidewalls **160**, **162**, **164**, and **166** to hold case **100** in a closed position (shown in FIG. **5**).

[0052] In some embodiments, case **100** includes one or more pins and receptacles that operate to engage front casing **102** with rear casing **104**. In the illustrated embodiment front casing **102** includes a pair of receptacles **201**, and rear casing **104** includes a pair of pins **203**. Pins **203** are positioned at corners of sidewalls (e.g., at the intersections of sidewalls **160**, **162**, and **164**) and extend away from backing **130**. Receptacles **201** are positioned at the intersections of sidewalls (e.g., sidewalls **140**, **142**, and **144**) and are shaped to receive and frictionally engage with pins **203**. In some embodiments, pins **203** are slightly larger than receptacles **201** to provide an interference fit when engaged. In some embodiments, one or more pairs of pins **203** and receptacles

201 are not required because the sidewalls of front and rear casings **102** and **104** provide sufficient engagement. In other embodiments, a separate engagement mechanism or fastener is used to connect front casing **102** with rear casing **104**, such as a label, tab, or adhesive tape.

[0053] Some alternative embodiments do not include pins and receptacles. Rather, in some embodiments the intersections of sidewalls **140**, **142**, and **144** mirror the intersections of sidewalls **140**, **142**, and **146** and of sidewalls **160**, **162**, and **164** mirror the intersections of sidewalls **160**, **162**, and **166**.

[0054] In some embodiments, sidewalls **140**, **142**, **144**, and **146** are segmented into two or more segments to define flex regions **118**, **120**, **114**, and **116**, respectively. In some embodiments, sidewalls **140**, **142**, **144**, **146**, **160**, **162**, **164**, and **166** provide stability to casing **102** and **104**, and at least partially resist bending and flexing of backing **110**. Flex regions **118**, **120**, **114**, **116**, **170**, **172**, **174**, and **176**, on the other hand, are arranged and configured to allow case **100** to bend and flex. In the illustrated embodiment, flex regions include either a reduced sidewall or no sidewall, such that backing **110** and **130** has increased flexibility in these regions. As a result, some embodiments of case **100** exhibit increased flexibility over conventional media cases. Flex regions are illustrated and described in more detail herein.

[0055] Example dimensions for the illustrated embodiment of case **100** are shown. W**1** is the overall width of case **100** when in the open position, as shown. W**1** is typically in a range from about 3 inches to about 18 inches, and preferably from about 10 inches to about 14 inches. W**2** is the width of front casing **102**. W**2** is typically in a range from about 2.5 inches to about 9 inches, and preferably from about 5 inches to about 7 inches. W**3** is the width of spine **106**. W**3** is typically in a range from about 0.2 inches to about 4 inches, and preferably from about 0.5 inches to about 1.5 inches. W**4** is the width of rear casing **104**. W**4** is typically in a range from about 2.5 inches to about 9 inches, and preferably from about 5 inches to about 7 inches. H**1** is the height of case **100**. H**1** is typically in a range from about 3 inches to about 20 inches, and preferably from about 6 inches to about 9 inches.

[0056] FIG. **3** is a top view of the example case **100**. Case **100** includes front casing **102**, rear casing **104**, and spine **106**. Front casing **102** includes backing **110**, sidewall **140**, and longitudinal flex region **118**. Rear casing **104** includes backing **130**, hub **184**, sidewall **160**, and longitudinal flex region **170**.

[0057] In the illustrated embodiment, sidewall **140** includes recess **202** and protrusion **204**. In addition, sidewall **140** includes edges **302** and **304** that define sides of flex region **118**. In the illustrated embodiment, edges **302** and **304** include a gradual slope. An advantage of some embodiments having gradually sloping edges **302** and **304**, as opposed to edges formed at a right angle to backing **110**, is that the sloping edges **302** and **304** provide increased space for flexing at flex region **118**. In other words, edges **302** and **304** will not contact each other to inhibit flexing unless front casing **102** is severely flexed at flex region **118**. A**6** is an angle formed by edge **302** and backing **110**. In some embodiments, A**6** is typically in a range from about 10 degrees to about 90 degrees, and preferably from about 20 degrees to about 45 degrees. In some embodiments, edge **304** includes a similar slope to edge **302**, except that it slopes in the opposite direction, as shown. In other embodiments, edges **302** and **304** are curved or irregular.

[0058] In the illustrated embodiment, rear casing **104** includes sidewall **160** having edges **306** and **308**. In this embodiment, edges **306** and **308** also have a gradual slope, similar to edges **302** and **304** of sidewall **140**. Edges **306** and **308** define opposite edges of flex region **170**, to allow rear casing **104** to flex at flex region **170**. Some other embodiments include edges **306** and **308** that are curved or irregular.

[0059] Example dimensions will now be described with reference to the illustrated embodiment. T**1** is the thickness of backing **110**. T**1** is typically in a range from about 0.01 inches to about 0.2 inches, and preferably from about 0.04 inches to about 0.08 inches. In some embodiments, the thickness of backing **110** is the same as the thickness of spine **106**, and backing **130**. Other embodiments include other thicknesses. T**2** is the overall thickness of sidewall **140**. T**2** is typically in a range from about 0.2 inches to about 4 inches, and preferably from about 0.3 inches to about 0.7 inches. T**3** is the thickness of sidewall **140** at recess **202**. T**3** is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.1 inches to about 0.4 inches. T**4** is the thickness of protrusion **204**. T**4** is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.1 inches to about 0.4 inches. T**5** is the thickness of sidewall **160**. T**5** is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.1 inches to about 0.4 inches. L**1** is the distance between edges **306** and **308**. L**1** is typically in a range from about 0.01 inches to about 3 inches, and preferably from about 0.2 inches to about 0.5 inches.

[0060] FIG. **4** is a right side view of example case **100** in the open position. In the illustrated embodiment, case **100** includes backing **130**, sidewall **164** (of rear casing **104**), sidewall **146** (of front casing **102**), and hub **184**. Sidewall **164** includes edges **402** and **404**. Edges **402** and **404** are sloped, having an angle A**6** with backing **130**. In some embodiments, angle A**6** is typically in a range from about 10 degrees to about 90 degrees, and preferably from about 20 degrees to about 45 degrees.

[0061] Example dimensions are illustrated for some embodiments. T**6** is the thickness of backing **130**. T**6** is typically in a range from about 0.01 inches to about 0.2 inches, and preferably from about 0.04 inches to about 0.08 inches. T**7** is the thickness of sidewall **164**. T**7** is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.1 inches to about 0.4 inches. T**8** is the overall thickness of case **100** when in the open position. T**8** is typically in a range from about 0.2 inches to about 4 inches, and preferably from about 0.3 inches to about 0.7 inches. L**2** is the distance between edges **402** and **404**. L**2** is typically in a range from about 0.01 inches to about 5 inches, and preferably from about 1 inch to about 3 inches.

[0062] Although some embodiments of case **100** have tapered edges **404** and **406**, other embodiments include other designs. For example, edges **404** and **406** are alternatively oriented approximately 90 degrees to backing **130**. Other embodiments include edges **404** and **406** that are curved or irregular. In another embodiment, flex region **174** includes a plurality of teeth. The teeth are protrusions extending from backing **130** and along a line passing through sidewall **164**, and having a thickness, for example, approximately equal to T**7**. The teeth add strength to flex regions **174** but include spaces between the teeth to enable the flex region to bend. In another embodiment, sidewall **164** extends entirely across flex region **174** but is thinner within flex region **174**. In another embodiment, sidewall **164** extends entirely across

flex region **174** but is shorter within flex region **174**. In another embodiment, sidewall **164** is formed of a different material within flex region **174** than in non-flex regions. For example, sidewall **164** is formed of a fabric, paper, elastic, plastic or other flexible type of material within flex region **174**. Although these example alternate embodiments are described with reference to flex region **174**, all or some of the other flex regions can be similarly designed and constructed.

[0063] FIG. **5** is a top view of example case **100** in a closed position. In the illustrated embodiment, case **100** includes front casing **102**, rear casing **104**, and spine **106**. Front casing includes **110** and top sidewall **140**. Rear casing includes backing **130**, top sidewall **160**, and hub **184**. Top sidewall **140** and top sidewall **160** each include flex regions **118** and **170**, respectively.

[0064] Example case **100** is shown in the closed position in which spine **106** is folded along axes A**4** and A**5**, such that front casing **102** and rear casing **104** come together to at least partially enclose media tray **132**, such as shown in FIG. **2**, and an optical medium, if any. In the illustrated embodiment, sidewalls (e.g., **140**) of front casing **102** and sidewalls (e.g. **160**) of rear casing **104** engage with each other when in the closed position.

[0065] Flex region **118** of front casing **102** is aligned with flex region **170** of rear casing **104** along axis A**7** that runs along a center of flex regions **118** and **170**. The alignment of flex regions **118** and **170** enables case **100** to have a flexible region at a location of both front casing **102** and rear casing **104**, such that casing **102** can flex in that region. In this embodiment, all flex regions of front casing **102** are aligned along an axis with a corresponding flex region in rear casing **104**. As shown in FIG. **1**, each flex region is also aligned with another flex region on an opposite side of case **100**. For example, flex regions **118** and **170** are aligned along axes A**1** and A**3** with flex regions **120** and **172**. Such alignment and pairing of flex regions is not required in all embodiments.

[0066] Example dimensions are illustrated for some embodiments. T**9** is the overall thickness of case **100**. T**9** is typically in a range from about 0.3 inches to about 4 inches, and preferably from about 0.4 inches to about 0.8 inches. W**5** is the overall width of case **100**. W**5** is typically in a range from about 2.5 inches to about 9 inches, and preferably from about 5 inches to about 7 inches.

[0067] Case **100** has increased flexibility at flex regions (e.g., **170** and **118**) than at non-flex regions. In this example, flex regions are generally aligned along axis A**7**. A non-flex region is a region of case **100** that is aligned with sidewalls and does not include a flex region, such as the region aligned with non-flex axis NF. Case **100** has greater flexibility along axis A**7** than along the non-flex axis NF.

[0068] FIG. **6** is a top view of example case **100**, such as shown in FIG. **5**. Some embodiments of case **100** include flex regions, such as flex regions **118** and **170**. Flex regions enable case **100** to flex at or around the flex region. Flexibility characteristics of the example case **100** are illustrated in FIG. **6** with respect to a lateral flex test. In this example, case **100** is placed partially on top of a generally flat surface **600**, such that approximately half of case **100** is above the flat surface **600** and approximately half of case **100** extends out from the edge of flat surface **600**. A force F**1** is applied to the portion of case **100** above flat surface **600** to prevent that portion from moving. For example, a block, clamp, or human hand can be used to press down on the portion of case **100** at any location above surface **600**. A second force F**2** is then applied to an end (or other location) of the portion of case **100** that extends out from the edge of the flat surface **600**. The force F**2** causes case **100** to bend at flex regions **118** and **170**. The amount of flexing can be measured by angle A**8** and distance D**1**.

[0069] Example angles and dimensions are provided to illustrate the flexibility of one embodiment of case **100**. In this example, angle A**8** is the angle at which case **100** can bend without permanently damaging case **100**. Angle A**8** is typically in a range from about 0 degrees to about 90 degrees, and preferably from about 5 degrees to about 45 degrees, and more preferably from about 20 degrees to about 30 degrees. Flexing within the more preferred range does not typically result in damage to the optical medium. D**1** is a distance of displacement of an end of case **100** when bent, without causing permanent damage to case **100**. D**1** is typically in a range from about 0 inches to about 3 inches, and preferably from about 0.5 inches to about 1.5 inches. In some embodiments, D**1** is in a range from about 1 inch to about 1.5 inches.

[0070] Other embodiments of case **100** are larger or smaller than that illustrated in FIG. **6**. Some of these embodiments will have an increased or decreased displacement due to the increased size. As a result, some embodiments have a flexibility that is defined by an amount of displacement per unit of length. For example, some embodiments have a displacement in a range from about 0.2 inches of displacement per inch of bending length to about 0.5 inches of displacement per inch of bending length. The bending length is, for example, the distance that case **100** extends out from the edge of flat surface **600**. Other embodiments have a displacement in a range from about 0.3 inches per inch of bending length to about 0.4 inches per inch of bending length.

[0071] However, bending of case **100** is not uniform along case **100** in all embodiments. Rather, the flex regions **118** and **170** have an increased flexibility as compared with the structural regions (e.g., those regions including structural sidewalls). In some embodiments, the flexibility of case **100** across the flex regions per unit of bend length is typically in a range from about 1.5 to about 100 times the flexibility of case **100** per unit of bend length in the structural regions, and preferably from about 30 to about 70 times.

[0072] In some embodiments the same flexibility test illustrated in FIG. **6** can be repeated with case **100** flipped over, such that rear casing **104** rests on surface **600** and forces F**1** and F**2** are applied to front casing **102**. Some embodiments of case **100** are adequately flexible in either orientation.

[0073] FIG. **7** is a right side view of example case **100** in the closed position. In the illustrated embodiment, case **100** includes front casing **102**, rear casing **104**, and spine **106**. Front casing includes sidewall **144**. Sidewall **144** includes edges **702** and **704** that define edges of flex region **114**. Rear casing **104** includes sidewall **164**. Sidewall **164** includes edges **402** and **404** that define edges of flex region **174**.

[0074] Flex region **114** of front casing **102** is aligned with flex region **174** of rear casing **104** along axis A**9** that runs along a center of flex regions **114** and **174**. The alignment of flex regions **114** and **174** enables case **100** to have a flexible region at a location of both front casing **102** and rear casing **104**, such that casing **102** can flex in that region.

[0075] FIG. **8** is a right side view of example case **100**, such as shown in FIG. **7**. Some embodiments of case **100** include flex regions, such as flex regions **114** and **174**. Flex regions enable case **100** to flex at or around the flex region. The flexibility is illustrated in FIG. **8** with respect to a longitudinal flex test. In this example, case **100** is placed partially on top of

a generally flat surface **800**, such that approximately half of case **100** is above the flat surface **800** and approximately half of case **100** extends out from the edge of flat surface **800**. A force F**1** is applied to the portion of case **100** above flat surface **800** to prevent that portion from moving. For example, a block, clamp, or human hand can be used to press down on the portion of case **100** at any location above surface **800**. A second force F**2** causes case **100** to bend at flex regions **114** and **174**. The amount of flexing can be measured by angle A**10** and distance D**2**.

[0076] Example angles and dimensions are provided to illustrate the flexibility of one embodiment of embodiment of case **100**. In this example, angle A**10** is the angle at which case **100** can bend without permanently damaging case **100**. Angle A**10** is typically in a range from about 0 degrees to about 90 degrees, and preferably from about 10 degrees to about 60 degrees, and more preferably from about 20 degrees to about 45 degrees. In some embodiments, angle A**10** is in a range from about 20 degrees to about 30 degrees. D**2** is a distance of displacement of an end of case **100** when bent, without causing permanent damage to case **100**. D**2** is typically in a range from about 0 inches to about 4 inches, and preferably from about 0.5 inches to about 1.5 inches. In some embodiments, D**2** is in a range from about 1 inch to about 1.5 inches. The flexibility can also be defined as an amount of deformation per unit of bend length. Bend length is, for example, the length of case **100** that extends out from the edge of surface **800**. For example, the deformation is in a range from about 0.2 inches per inch of bend length to about 0.5 inches per inch of bend length, and preferably from about 0.3 inches per inch of bend length to about 0.4 inches per inch of bend length.

[0077] In some embodiments the same flexibility test illustrated in FIG. **8** can be repeated with case **100** flipped over, such that rear casing **104** rests on surface **600** and forces F**1** and F**2** are applied to front casing **102**. Some embodiments of case **100** are adequately flexible in either orientation.

[0078] FIG. **9** is a perspective view of another example case **1000** arranged in an open position. Case **1000** includes front casing **1002**, rear casing **1004**, and spine **1006**. Front casing **1002** includes backing **1010**, corner supports **1012**, lateral flex regions **1014** and **1016**, and longitudinal flex regions **1018** and **1020**. Rear casing **4004** includes backing **1030**, sidewalls **1034**, lateral flex regions **1074** and **1076**, and longitudinal flex regions **1070** and **1072**.

[0079] In some embodiments, front casing **1002** is generally a front half of case **1000** that is configured to engage with rear casing **1004** to at least partially enclose an optical medium (not shown in FIG. **9**). Front casing **1002** includes backing **1010** having an interior surface **1022** and an exterior surface **1024** (not visible in FIG. **9**). In one embodiment, backing **1010** is formed of a single layer of material. Alternatively, backing **1010** is formed of multiple layers of one or more materials. In the illustrated embodiment, backing **1010** is a generally planar surface in the absence of an applied force.

[0080] Corner supports **1012** extend from interior surface **1022**, and in the illustrated embodiment form a plurality of sidewalls, including top sidewall **1040**, bottom sidewall **1042**, right sidewall **1044**, and left sidewall **1046**. In some embodiments, corner supports **1012** extend generally in a direction normal to interior surface **1022**, and toward backing **1030** of rear casing **1004** when case **1000** is in the closed position. In some embodiments, corner supports **1012** partially enclose sides of front casing **1002**. In some embodiments, corner supports **1012** provide support to backing **1010** to maintain backing **1010** generally planar in the absence of an applied force. In the illustrated embodiments, corner supports **1012** define flex regions. In this embodiment, flex regions are flexible locations between corner supports **1012** that allow case **1000** to flex or bend along or around a respective flex axis.

[0081] Top and bottom sidewalls **1040** and **1042** each include a space for longitudinal flex regions **1018** and **1020**, respectively. Longitudinal flex regions **1018** and **1020** are located adjacent to flex axis A**11**. In the illustrated embodiment, flex axis A**11** is an axis extending through and generally perpendicular to top and bottom edges of backing **1010**. Similarly, right and left sidewalls **1044** and **1046** include lateral flex regions **1014** and **1016**. Lateral flex regions **1014** and **1016** are located adjacent to flex axis A**12**. In the illustrated embodiment, flex axis A**12** is an axis extending through and generally perpendicular to right and left edges of backing **1010**.

[0082] In some embodiments, rear casing **1004** is generally a rear half of case **1000** that is configured to engage with front casing **1002**. Rear casing **1004** includes backing **1030** having an interior surface **1050** and an exterior surface **1052** (not visible in FIG. **9**). In one embodiment, backing **1030** is formed of a single layer of material. Alternatively, backing **1030** is formed of multiple layers of one or more materials. In some embodiments, backing **1010** and **1030** are formed the same material or materials. In embodiments having a multi-layered backing **1010** and/or **1030**, the edges of the layers can be fastened together, such as by heat sealing, folding, adhesive, or other known methods of fastening material layers.

[0083] Sidewalls **1034** extend from interior surface **1050**, and in the illustrated embodiment include top sidewall **1060**, bottom sidewall **1062**, right sidewall **1064**, and left sidewall **1066**. In some embodiments, sidewalls **1034** extend generally in a direction normal to interior surface **1050**, and toward backing **1010** of front casing **1002** when case **1000** is in the closed position. In some embodiments, sidewalls **1034** partially enclose sides of front casing **1002**. In some embodiments, sidewalls **1034** provide support to backing **1030** to maintain backing **1030** generally planar in the absence of an applied force. In the illustrated embodiments, sidewalls **1034** include flex regions that enable case **1000** to flex or bend along the respective flex axis.

[0084] Top and bottom sidewalls **1060** and **1062** include longitudinal flex regions **1070** and **1072**, respectively. Longitudinal flex regions **1070** and **1072** are located adjacent to flex axis A**13**. In the illustrated embodiment, flex axis A**13** is an axis extending through and generally perpendicular to top and bottom edges of backing **1030**. Similarly, right and left sidewalls **1064** and **1066** include lateral flex regions **1074** and **1076**. Lateral flex regions **1074** and **1076** are located adjacent to flex axis A**13**, in the same way that lateral flex regions **1014** and **1016** are located adjacent to flex axis A**13**. In the illustrated embodiment, flex axis A**13** also extends through and generally perpendicular to right and left edges of backing **1030**.

[0085] In the illustrated embodiment, front casing **1002** and rear casing **1004** include media tray **1031** and media tray **1032**, respectively. Media trays **1031** and **1032** form opposite sides of a media receptacle for supporting one or more optical media. In one embodiment, media tray **1031** includes edge supports **1071**, **1073**, **1075**, and **1077**, which are each formed in one side of corner supports **1012**. Media tray **1031** also includes center support **1079**. Media tray **1032** includes **1081**,

1083, **1085**, and **1087**, which are each formed in one side of corner supports **1034**. Edge supports are each configured to support an adjacent edge of an optical medium. Media tray **1032** also includes hub **1084** that is sized to releasably engage within an aperture in the optical medium to hold the optical medium in place in media tray **1032**. Center support **1079** is configured to engage with hub **1084** to reduce the chance of the optical medium becoming inadvertently disengaged from hub **1084**.

[0086] Spine **1006** connects front casing **1002** with rear casing **1004**. Spine **1006** also connects between sides of backing **1010** and backing **1030**. In some examples, when case **1000** is in an open position, spine **1006** extends in the same plane as backing **1010** and backing **1030**. In some examples, spine **1006** is formed of the same material or materials as backing **1010** and backing **1030**. In yet further examples, spine **1006** is formed of the same piece of material or materials as backing **1010** and backing **1030**. When case **1000** is closed, spine **1006** folds at axis A**14** and A**15** (shown in FIG. **9**) to allow front casing **1002** and rear casing **1004** to engage with each other at corner supports **1012** and sidewalls **1034**, respectively. In this closed position (shown in FIGS. **13** and **14**), spine **1006** forms a side of case **1000**.

[0087] One method of making case **1000** is as follows. This method can also be used to make other example cases described herein (such as case **100** or case **2000**). First, a sheet of material is thermoformed to form the desired features, such as shown in FIG. **9**, including corner supports **1012** and **1032** and media trays **1031** and **1032**. Alternatively, the features are formed by other processes, such as molding, carving, cutting and the like. As one example, the material is a sheet of polyvinyl chloride (PVC). In some embodiments, the PVC has a thickness that is typically in a range from about 0.001 inches to about 0.2 inches, and preferably from about 0.005 inches to about 0.02 inches. Alternatively, other materials are used, such as plastic, vinyl, paper, fabric, wood, metal, or other materials. Next, a second sheet of material is connected across exterior faces of the first sheet. The second sheet is connected to the first sheet, such as by heat sealing the edges. Alternatively, an adhesive or other fastener is used. As one example, the second sheet is made of vinyl. In some embodiments, the vinyl is typically in a range from about 0.001 inches to about 0.2 inches, and preferably from about 0.04 inches to about 0.08 inches.

[0088] If desired, one edge (such as a top edge) of the second sheet can remain unconnected, such as to enable a sheet of printed material to be inserted between the first and second sheets. Alternatively, a third sheet is connected to the second sheet, with one edge remaining unconnected, to enable a sheet of printed material to be inserted between the second sheet and the third sheet. Neither a second sheet nor a third sheet is required in all embodiments. In addition, there is no requirement that case **100** be made from sheets, and can instead be made from liquid or solid materials in some embodiments.

[0089] Some embodiments of case **1000** will include features the same or similar to case **100** thoroughly discussed herein. Therefore, these features and alternative embodiments are not separately repeated with reference to case **1000**. In addition, some embodiments of case **1000** have similar dimensions as case **100** described herein. For example, some embodiments of case **1000** are flexible, such as shown and described with reference to FIGS. **6** and **8**.

[0090] FIG. **10** is a front view of the example case **1000** in the open position. Case **1000** includes corner supports **1012** and **1034**. Corner supports **1012** and **1034** include one or more sidewalls, such as sidewalls **1040**, **1042**, **1044**, **1046**, **1060**, **1062**, **1064**, and **1066**. Corner supports **1012** include recess **1100** and protrusion **1102**. Corner supports **1034** include recess **1104**. Protrusions **1102** of corner supports **1012** are sized and shaped to fit within recesses **1104** of corner supports **1034**. In some embodiments, sides of protrusions **1102** and recesses **1104** are counter tapered relative to each other to resist disengagement of protrusions **1102** from recesses **1104**. An example taper of protrusion **1102** is shown in FIG. **12**, where protrusion **1102** tapers outward. Recesses **1104** can also include a taper, such that the edges taper inward. These counter tapers provide additional resistance to unintentional disengagement when case **100** is in the closed position. In one embodiment, the edges typically have a taper in a range from about 1 degree to about 15 degrees, and preferably from about 3 degrees to about 7 degrees.

[0091] FIG. **11** is a top view of the example case **1000** in the open position. Case **1000** includes front casing **1002**, rear casing **1004**, and spine **1006**. Some embodiments have dimensions as illustrated. T**10** is the thickness of front casing **1002**. T**10** is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.2 inches to about 0.8 inches. T**11** is the thickness of sidewall **1040** from backing **1010** to recess **1100**. T**11** is typically in a range from about 0.05 inches to about 1 inch, and preferably from about 0.1 inches to about 0.4 inches. T**12** is the thickness of rear casing **1004**. T**12** is typically in a range from about 0.05 inches to about 1 inch, and preferably from about 0.1 inches to about 0.4 inches. Angle A**10** is an angle formed by edges of sidewall **1040** adjacent to flex region **1018**. Angle A**10** is typically in a range from about 10 degrees to about 90 degrees, and preferably from about 20 degrees to about 45 degrees. L**10** is the distance of flex region **1018** between portions of sidewall **1040**. L**10** is typically in a range from about 0.01 inches to about 3 inches, and preferably from about 0.2 inches to about 0.5 inches.

[0092] FIG. **12** is a right side view of the example case **1000** in an open position. Case **1000** includes backing **1030**, sidewall **1064**, protrusion **1102** (of front casing **1002**), hub **1084**, and center support **1079** (of front casing **1002**). Example dimensions are illustrated for some embodiments. Angle A**11** is the angle formed between an edge of sidewall **1064** and backing **1030**. A**11** is typically in a range from about 10 degrees to about 90 degrees, and preferably from about 20 degrees to about 45 degrees. Angle A**12** is the taper or draft formed by the edge of protrusion **1102** and a line normal to a surface of backing **1010** (shown in FIG. **11**). A**12** is typically in a range from about 1 degree to about 15 degrees, and preferably from about 3 degrees to about 7 degrees. L**11** is the distance of flex region **1074** between portions of sidewall **1064**. L**11** is typically in a range from about 0.01 inches to about 5 inches, and preferably from about 1 inch to about 3 inches.

[0093] FIG. **13** is a top view of the example case **1000** in a closed position. Case **1000** includes front casing **1002**, rear casing **1004**, and spine **1006**. Front casing **1002** includes backing **1010**, sidewall **1040**, and center support **1079**. Rear casing **1004** includes backing **1030**, sidewall **1060**, and hub **1084**. When in the closed position, the some embodiments

have a thickness T13. T13 is typically in a range from about 0.2 inches to about 4 inches, and preferably from about 0.3 inches to about 1 inch.

[0094] FIG. **14** is a right side view of the example case **1000** in the closed position. Case **1000** includes front casing **1002**, rear casing **1004**, and spine **1006**. Front casing **1002** includes backing **1010**, sidewall **1044**, and center support **1079**. Rear casing **1004** includes backing **1030**, sidewall **1064**, and hub **1084**. Flex regions **1014** and **1071** are also shown.

[0095] FIGS. **15-18** illustrate an example case **2000**, according to the present disclosure. FIG. **15** is a front perspective view of example case **2000** in an open position. FIG. **16** is a front view of example case **2000** in the open position. FIG. **17** is a top view of example case **2000** in a closed position. FIG. **18** is a right side view of case **2000** in the closed position. Case **2000** includes front casing **2002**, rear casing **2004**, and spine **2006**. Front casing **2002** includes corner protrusions **2012** that protrude toward an interior of case **2000**. Front casing **2002** also includes media tray **2010** with center support **2011** that is configured to engage with hub **2032**. Flex regions **2040** are formed in front casing **2002** between corner protrusions **2012**. Rear casing **2004** includes corner recesses **2020** separated by elevated regions **2022**. Sidewalls **2024** extend around the edges of rear casing **2004**. Rear casing **2004** also includes media tray **2030** with hub **2032**. In this embodiment, flex regions are not included in rear casing **2004** because sidewalls **2024** are thin enough so as to provide adequate flexibility to case **2000** with flex regions **2040** being formed in only front casing **2040**. In other embodiments, rear casing **2004** can include flex regions at various locations along sidewall **2024**.

[0096] Case **2000** is shown in FIGS. **15** and **16** in an open position, and in FIGS. **17** and **18** in a closed position. When in the closed position, corner protrusions **2012** are received into corner recesses **2020** and engage with sides of elevated regions **2022** and sidewalls **2024**. In some embodiments, corner protrusions **2012** and/or elevated regions **2022** and/or sidewalls **2024** include tapered edges, such as to resist unintentional disengagement of front casing **2002** from rear casing **2004**. Some embodiments of example case **2000** benefit from having a reduced thickness, such as illustrated in FIG. **18**. The thickness of example case **2000** is illustrated as T20. T20 is typically in a range from about 0.1 inches to about 2 inches, and preferably from about 0.2 inches to about 0.5 inches.

[0097] FIGS. **19-21** illustrate an example embodiment of case **3000**. FIG. **19** is a perspective view of example case **3000** arranged in an open position. FIG. **20** is a top view of example case **3000**, also arranged in an open configuration. FIG. **21** is a right side view of case **3000** arranged in a closed position. Case **3000** is nearly the same as example case **1000**, such as shown in FIGS. **9-14**, except that case **300** includes an alternative hub configuration. Case **3000** includes front casing **3002**, rear casing **3004**, and spine **3006**, which are similar to front casing **1002**, rear casing **1004**, and spine **1006** previously described herein.

[0098] One of the problems that can arise with a flexible case design is that an optical medium (e.g., optical medium **3050** shown in FIG. **21**) stored within the flexible case can sometimes come disengaged from the media hub. This can occur, for example, when forces applied during bending are sufficient to overcome the frictional and/or interference fit of the hub with the optical medium. If disengagement occurs, the optical medium might slide out from the media tray, which can result in damage to the optical medium or possibly separation of the optical medium from the flexible case.

[0099] In addition to the embodiments described herein, case **3000** illustrates another embodiment having an alternative hub and center support configuration. Rear casing **3004** includes hub **3010**. Hub **3010** includes a central orifice defined by interior surface **3012**. Hub **3010** also includes an external surface **3014**. Hub **3010** is configured to releasably engage within an aperture in the optical medium, such as by a frictional and/or interference fit with the optical medium.

[0100] Front casing **3002** includes center support **3020**. Center support **3020** includes an extension region **3022**, pin **3024**, and support ring **3026**. Extension region **3022** is, for example, a frustoconical region extending from the interior surface of front casing **3002**. Extension region **3022** extends center support **3020** out from the interior surface and toward the optical medium **3050**, when case **3000** is in a closed position. Pin **3024** and support ring **3026** extend from extension region **3022** opposite from the interior surface of front casing **3002**. Pin **3024** is, for example, a generally cylindrical protrusion having a closed end. Pin **3024** includes an engagement surface **3028** that surrounds pin **3024**. Engagement surface **3028** is arranged to engage with interior surface **3012** of hub **3010** when case **3000** is in a closed position.

[0101] Center support **3020** further includes support ring **3026** connected to extension region **3022** and generally spaced from and surrounding pin **3024**. Support ring **3026** includes interior surface **3030** facing toward engagement surface **3028** of pin **3024**. Interior surface **3030** is arranged to engage with external surface **3014** of hub **3010**, to resist inadvertent disengagement between hub **3010** and center support **3020**.

[0102] When case **3000** is in the closed position, hub **3010** is inserted into center support **3020**, such that hub **3010** is engaged between pin **3024** and support ring **3026**. The optical medium is held in position by hub **3010**. Support ring **3026** provides a force to a side of the optical medium **3050** (shown in FIG. **21**), opposite rear casing **3004**, to provide additional, resistance to inadvertent disengagement of the optical medium from hub **3010**.

[0103] In the illustrated embodiment, front casing **3002** and rear casing **3004** include media tray **3031** and media tray **3032**, respectively. Media trays **3031** and **3032** form opposite sides of a media receptacle for supporting one or more optical media. In some embodiments, media trays **3031** and **3032** are the same as media trays **1031** and **1032** described herein.

[0104] FIG. **22** is a front view of another example case **4000** arranged in an open position. Case **4000** includes front casing **4002**, rear casing **4004**, and spine **4006**. Front casing **4002** includes backing **4010**, sidewalls **4012**, lateral flex regions **4014** and **4016**, and longitudinal flex regions **4018** and **4020**. Rear casing **4004** includes backing **4030**, corner supports **4034**, lateral flex regions **4074** and **4076**, longitudinal flex regions **4070** and **4072**, and media tray **4032** including hub **4084**.

[0105] Front casing **4002** includes backing **4010** having an interior surface **4022** and an exterior surface **4024** (not visible in FIG. **22**). Sidewalls **4012** extend from interior surface **4022** at least partially in a direction normal to a interior surface **4022**. Sidewalls **4012** include top sidewall **4040**, bottom sidewall **4042**, right sidewall **4044**, and left sidewall **4046**. (Right and left are defined by viewing exterior surface **4024** in a front view when case **4000** is arranged in the closed position.) In some embodiments, sidewalls **4012** extend generally in a

direction normal to interior surface **4022** and toward backing **4030** of rear casing **4004** when case **4000** is in the closed position. In some embodiments, sidewalls **4012** partially enclose sides of front casing **4002**. In some embodiments, sidewalls **4012** provide support to the backing **4010** to maintain backing **4010** generally planar in the absence of an applied force. In some embodiments, flex regions are defined by portions or edges of sidewalls **4012**. In this embodiment, flex regions are flexible locations between edges of sidewalls **4012** that allow case **4000** to flex or bend along or around a respective flex axis.

[0106] In some embodiments, sidewalls **4012** include ribs **4013**. In this embodiment, ribs **4013** formed in an external side of sidewalls **4012** to provide added strength and stability to case **4000**, such as to increase the strength of sidewalls **4012** against buckling or crushing. In other embodiments, ribs include other shapes or configurations and can be included on any one or more surfaces of sidewalls **4012**. In some embodiments, corner supports **4034** or portions of corner supports **4034** (such as sidewalls **4060**, **4062**, **4064**, and **4066**) include ribs **4013**.

[0107] Rear casing **4004** includes backing **4030** having an interior surface **4050** and an exterior surface **4052** (not visible in FIG. **22**), corner supports **4034**, and media tray **4032** including hub **4084**. Corner supports **4034** extend from interior surface **4050**, and in the illustrated embodiment form a plurality of sidewalls, including top sidewall **4060**, bottom sidewall **4062**, right sidewall **4064**, and left sidewall **4066**. In some embodiments, corner supports **4034** extend from backing **4030** at least partially in a direction normal to interior surface **4050**, and toward backing **4010** of front casing **4002** when case **4000** is in the closed position. In some embodiments, corner supports **4034** partially enclose sides of rear casing **4004**. In some embodiments, corner supports **4034** provide support to backing **4030** to maintain backing **4030** generally planar in the absence of an applied force. In some embodiments, flex regions are defined by portions or edges of sidewalls **4012**. In this embodiment, flex regions **4070**, **4072**, **4074**, and **4076** are flexible locations between edges of corner supports **4034** that allow case **4000** to flex or bend along or around a respective flex axis.

[0108] In some embodiments, corner supports **4034** include recesses **4100** and protrusions **4102**. Protrusions **4102** extend a greater distance away from interior surface **4050** than recesses **4100**. Protrusions **4102** of corner supports **4034** are sized and shaped so as to fit adjacent to interior surfaces of sidewalls **4012** when case **4000** is in the closed position. In some embodiments, corner supports **4034** and sidewalls **4012**, when closed, have a frictional or interference fit with each other to resist disengagement so as to maintain case **4000** in the closed position. In some embodiments, sides of protrusions **4102** and interior sides of sidewalls **4012** are counter-tapered relative to each other to provide further resistance disengagement of protrusions **4102** from sidewalls **4012** when in the closed position.

[0109] Rear casing **4004** includes media tray **4032**. Media tray **4032** is a media receptacle for supporting one or more optical media. Media tray **4032** includes edge supports **4071**, **4073**, **4075**, and **4077**, which are each formed in one side of corner supports **4034**. Media tray **4032** also includes hub **4084** that is sized to releasably engage within an aperture in the optical medium to hold the optical medium in place in media tray **4032**.

[0110] Spine **4006** connects front casing **4002** with rear casing **4004**. Spine **4006** also connects between sides of backing **4010** and backing **4030**. In some embodiments, backing **4010** and **4030** are pivotally connected to spine **4007**. In some embodiments, when case **4000** is in an open position, spine **4006** extends in the same plane as backing **4010** and backing **4030**. When case **4000** is closed, spine **4006** folds to allow front casing **4002** and rear casing **4004** to engage with each other at sidewalls **4012** and corner supports **4034**, respectively. When in this closed position, spine **4006** forms a side of case **4000**.

[0111] FIG. **23** is a rear view of the example case **4000** in the open position. Case **4000** includes front casing **4002**, rear casing **4004**, and spine **4006**. Front casing **4002** includes backing **4010** having an exterior surface **4024**. Rear casing **4004** includes backing **4030** having an exterior surface **4052**. Case **4000** also includes cover sheet **4200**.

[0112] In some embodiments cover sheet **4200** is provided to cover at least part of exterior surfaces **4024** and **4052** of backing **4010** and **4030**. Cover sheet **4200** functions in some embodiments to hold a sheet of printed material between cover sheet **4200** and backing **4010** and **4030**. In one example, backing **4010** includes a top edge **5002**, a bottom edge **5004**, a side edge **5006**, and a side edge **5008**.

[0113] In this example, cover sheet **4200** is fastened to backing **4010** at side edge **5006** and to backing **4030** at side edge **5008**. Side edges **5006** and **5008** are not fastened to backing **4010** or **4030** in some embodiments. In other embodiments, any three edges of cover sheet **4200** are fastened to backing **4010** and/or backing **4030**. Further, in some embodiments cover sheet **4200** is fastened to spine **4006**. In some embodiments, cover sheet **4200** is only fastened to backing **4010** and **4030** at edges to allow one or more sheets of printed material to be inserted between cover sheet **4200** and backing **4010** and **4030**. In this way, cover sheet **4200** supports the one or more sheets of printed material along exterior surfaces **4024** and **4052** so that they are visible through cover sheet **4200**. In some embodiments, cover sheet **4200** is transparent, to permit printed material to be seen through cover sheet **4200**.

[0114] Cutout regions **5010** are formed in top edge **5002** and bottom edge **5004** in some embodiments. Cutout regions **5010** allow an edge of a sheet of printed material to be more easily grasped to remove the sheet of printed material from behind cover sheet **4200**. In some embodiments, cutout region **5010** has a semicircular shape, although other shapes are used in other embodiments. A benefit of the semicircular shape is that it does not include sharp corners, thereby increasing the strength and resistance to tearing of cover sheet **4200**. Some embodiments do not include cutout region **5010**.

[0115] FIGS. **24-25** illustrate an example secondary closure device **5100**. FIG. **24** is a front view of case **4000** in the open position. FIG. **25** is a rear view of case **4000** in the open position. Case **4000** includes front casing **4002**, rear casing **4004**, and spine **4006**.

[0116] In some embodiments, case **4000** further includes a secondary closure device **5100**. The secondary closure device **5100** operates to connect right sides of front and rear casings **4002** and **4004** together when case **4000** is in the closed position. In one example, secondary closure device **5100** includes flap **5102**, fastener **5104**, and fastener **5106**. Flap **5102** is connected to the right side of rear casing **4004** and extends from rear casing **4004** in a direction away from front casing **4002** when case **4000** is in the open position. Flap **5102**

is typically formed of a flexible material, such as fabric or a flexible plastic. One or more fasteners are used to releasably connect flap **5102** to front casing **4002**. In this example, the fastener includes a pair of fasteners **5104** and **5016**.

[0117] Fastener **5104** is connected to flap **5102** and spaced from rear casing **4004**. In some embodiments fastener **5104** is contained within flap **5102**. In other embodiments fastener **5104** is fastened to an exterior surface of flap **5102**. In yet another embodiment, fastener **5104** extends through flap **5102**.

[0118] Secondary closure device **5100** also includes fastener **5106** in some embodiments. In some embodiments, fastener **5106** is connected to or formed integral with backing **4030** of rear casing **4004**. In other embodiments fastener **5106** is connected to another layer, such as to cover sheet **4200**. In other embodiments, fastener **5106** is connected to backing **4030** but extends through an aperture in one or more other layers, such as through cover sheet **4200**. Once case **4000** is placed into the closed position, secondary closure device **5100** is operable to maintain case **4000** in the closed position. A removal force is applied to one or more of fastener **5104**, **5106**, or flap **5102** to disengage fastener **5106** from front casing **4002**. After disengagement of the secondary closure device **5100**, case **4000** can be arranged in the open position, such as to access or insert an optical medium in case **4000**.

[0119] A variety of suitable fasteners can be used. In one embodiment, fasteners **5104** and **5106** are magnets. Placement of fastener **5104** in the vicinity of the oppositely polarized fastener **5106** causes fasteners **5104** and **5106** to engage with each other. The fasteners are releasable by applying a removal force to fastener **5106** relative to fastener **5104**. Other examples of fasteners include hook and loop fasteners, snaps, buttons, string, latches, clips, or other fasteners. In some embodiments only a single fastener **5104** or **5106** is needed. In other embodiments two or more fasteners are provided. In some embodiments fastener **5104** is flap **5102**, such as in an embodiment where flap **5102** is a string and fastener **5106** is a string connection device.

[0120] Although specific flex region designs have been described, various other flex region configurations are used in other embodiments to perform the same function. In addition, flex regions need not be located along central axes (e.g., A**1**, A**2**, or A**3** shown in FIG. **1**) of the case (e.g., **100**, shown in FIG. **1**), but rather could be located at any desired location, and in any number of locations.

[0121] The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. It is noted that all of the features characterized herein need not be incorporated within a given arrangement for the arrangement to include improvements according to the present disclosure.

What is claimed is:

1. A flexible case comprising:

a first casing including a generally planar first backing;

a second casing comprising:

a generally planar second backing including a first surface;

a first sidewall extending at least partially in a direction normal to the first surface, the first sidewall defining a first flex region; and

a second sidewall extending at least partially in a direction normal to the first surface, the second sidewall defining a second flex region, wherein the first and second flex regions are aligned with a flex axis; and

a spine coupling the first casing with the second casing.

2. The flexible case of claim **1**, wherein the first and second sidewalls are selected from left and right sidewalls, or top and bottom sidewalls, and wherein the first and second sidewalls are generally parallel.

3. The flexible case of claim **1**, wherein the first flex region divides the first sidewall into a first portion and a second portion, wherein the first portion is spaced from the second portion.

4. The flexible case of claim **3**, wherein the first portion is spaced from the second portion a distance in a range from about 1 inch to about 3 inches.

5. The flexible case of claim **1**, wherein the first flex region is a region having no wall portion, a region having a wall portion with reduced height relative to the first sidewall, a region having a wall portion with reduced width relative to the first sidewall, or a region having a material with increased flexibility relative to the material of the first sidewall.

6. The flexible case of claim **1**, wherein when the flexible case is arranged in a closed position, the flexible case has increased flexibility about the flex axis as compared to flexibility about a non-flex axis.

7. The flexible case of claim **6**, wherein when the flexible case is subjected to a flex test, such that that flex axis of the flexible case is aligned at an edge of a generally flat surface, the flexible case is movable between a rest position and a flexed position without permanently damaging the flexible case.

8. The flexible case of claim **7**, wherein when the flexible case is moved between the rest position and the flexed position, a distal end of the flexible case is displaced a distance in a range from about 0.5 inches to about 1.5 inches.

9. The flexible case of claim **7**, wherein the flexible case has a flex angle in a range from about 20 degrees to about 30 degrees as measured between the rest position and the flexed position.

10. The flexible case of claim **1**, wherein the flexible case is flexible about a second flex axis generally perpendicular to the common flex axis.

11. The flexible case of claim **1**, wherein the first casing further comprises a media tray including a hub, and wherein the first and second casings fold at the spine to define an open position and a closed position, wherein when the flexible case is in the closed position, the flexible case defines an interior volume sized to support an optical medium on the hub therein.

12. The flexible case of claim **11**, wherein the optical medium is of a type having an aperture with an aperture diameter in a range from about 14 mm to about 16 mm.

13. The flexible case of claim **1**, further comprising a cover sheet extending across exterior surfaces of the first casing, the second casing, and the spine to support printed material between the exterior surfaces and the cover sheet.

14. The flexible case of claim **1**, wherein the first and second sidewalls define portions of corner supports.

15. A case for holding an optical medium, the case comprising:

a first casing having a first interior surface and a first pair of sidewalls connected to and extending from the first interior surface and at least partially in a direction generally normal to the interior surface, the first pair of sidewalls including a first sidewall and a second sidewall, wherein the first sidewall defines a first flex region and wherein the second sidewall defines a second flex region;

a second casing having a second interior surface and a second pair of sidewalls connected to and extending from the second interior surface and at least partially in a direction generally normal to the second interior surface, the second pair of sidewalls including a third sidewall and a fourth sidewall, wherein the third sidewall includes a third flex region and wherein the fourth sidewall defines a fourth flex region, wherein the first, second, third, and fourth flex regions are aligned along a flex axis; and

a spine coupling the first casing with the second casing, wherein the first and second casings are movable between an open position and a closed position, and wherein when the case is in the closed position the case defines an interior space sized to support the optical medium therein.

16. The case of claim **15**, wherein the first casing further comprises first, second, third, and fourth corner supports, wherein the first pair of sidewalls are portions of the first, second, third, and fourth corner supports, and wherein each of the corner supports defines a protrusion and a recess, and wherein when the case is in the closed position, the second pair of sidewalls are received in the recesses and adjacent the protrusions of the corner supports.

17. The case of claim **16**, wherein the protrusions and the second pair of sidewalls are counter tapered to resist unintentional disengagement of the second pair of sidewalls from the protrusions when the case is in the closed position.

18. The case of claim **15**, wherein the first casing further comprises a pin extending from the first sidewall, and wherein the second casing further comprises a receptacle arranged and configured to receive the pin when the case is in the closed position to resist unintentional separation between the first and second casings.

19. A method of making a flexible case, the method comprising:

forming a first sheet of material including a first surface and a second surface opposite the first surface to define a front casing, a rear casing, and a spine, the front casing and the rear casing including a plurality of sidewalls connected to and extending from the first surface, wherein at least two of the plurality of sidewalls include flex regions aligned along a flex axis; and

fastening a second sheet of material across the second surface.

20. The method of making a flexible case, wherein forming the first sheet comprises thermoforming, and wherein the first sheet of material is polyvinyl chloride having a thickness in a range from about 0.005 inches to about 0.02 inches.

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