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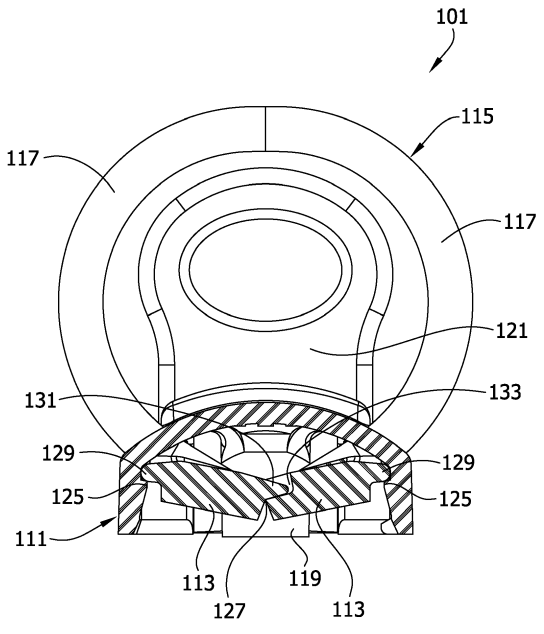
(54) Low-profile ring binder mechanism

(57) A ring binder mechanism for retaining loose-leaf pages includes an elongate housing, a first and second hinge plate, at least one ring for holding the loose-leaf pages, and an actuator mounted on the housing. Each ring includes a first ring member and a second ring member. The first ring member is mounted on the first hinge plate for movement with the hinge plate relative to the housing between a closed position and an opened position. The first hinge plate has a first hinge member and the second hinge plate has a second hinge member. The hinge members are disposed at a distance from the mid-plane that is the same as or less than the greatest distance between the upper surface and the mid-plane. An actuator is mounted on the housing for pivotal movement relative to the housing for moving the rings from their closed position to their opened position.

FIG. 11



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Description

FIELD

[0001] The present invention is directed generally to a ring binder mechanism for retaining loose-leaf pages.

BACKGROUND

[0002] Typical ring binder mechanisms have a plurality of rings for retaining loose-leaf pages, such as hole-punched pages, in a file or notebook. The rings can be selectively opened to add or remove pages from the ring binder mechanism or closed to retain the pages while allowing the pages to be moved along the rings. Each of the rings includes paired ring members mounted on adjacent hinge plates that are joined together at a hinge for pivoting movement about an axis. A housing, which is typically metal and elongate, supports the hinge plates within the housing for pivotal movement relative to the housing about the pivot axis. Often, the housing is generally arch-shaped (e.g., U-shaped or C-shaped) in cross-section, with bent-under rims that hold the hinge plates within the housing.

[0003] The housing of the ring binder mechanism typically has an exposed metal outer surface. This exposed surface often contains nickel plating, to which some people may be sensitive. Additionally, it is difficult and costly to print on a metal surface particularly where the metal surface is nickel-plated. The process of nickel plating can also present some environmental and work hazard issues. Accordingly, it is known in some instances to replace the metal housing with a housing constructed from a polymeric material.

[0004] The metallic or polymeric housing, in an undeformed state, is slightly narrower than the joined hinge plates when the hinge plates are in a coplanar position. As the hinge plates pivot through this coplanar position, they deform the resilient housing laterally outwardly and cause a spring force in the housing to urge the hinge plates to pivot away from the coplanar position, either upward to open the rings or downward to close the rings. When the rings are closed, the spring force of the housing resists hinge plate movement and thereby holds the rings together. Similarly, when the rings are opened, the spring force of the housing holds them apart. Typically, an operator can overcome the spring force of the housing by manually pulling the ring members of the rings apart or pushing them together.

[0005] In order for the rings to open as wide as possible for receiving or removing paper from the rings, the hinge plates to which the rings are attached need to pivot over a substantial distance. However, movement of the hinge plates toward an open position is limited by the underside of the housing. The problem may be exacerbated when polymeric hinge plates are employed that may need to be thicker than metal hinge plates. In the traditional design, the only way to allow the rings to open more fully is to increase the distance between the hinge plates and the bottom of the housing. One would previously only accomplish this task by increasing the height of the housing. However, a higher housing causes a bulkier ring binder mechanism that can interfere with turning pages along the rings in the notebook.

SUMMARY

[0006] In one aspect, the present invention is directed to a ring binder mechanism for retaining loose-leaf pages generally including an elongate housing, first and second hinge plates supported by the housing for pivoting motion relative to the housing, and at least one ring for holding the loose-leaf pages. The first and second hinge plates each have an upper surface, a lower surface, and a mid-plane between the upper and lower surfaces. The ring holds the loose-leaf pages and includes a first ring member and a second ring member. The first ring member is mounted on the first hinge plate and moveable with the first hinge plate relative to the housing between a closed position and an open position. In the closed position, the first and second ring members cooperatively form a substantially continuous, closed loop for allowing loose-leaf pages retained by the rings to be moved along the rings from one ring member to the other. In the open position, the first and second ring members form a discontinuous, open loop for adding or removing loose-leaf pages from the rings. The first hinge plate includes a first hinge member, and the second hinge plate includes a second hinge member engaged with the first hinge member of the first hinge plate. The first and second hinge members having a maximum spacing from the mid-plane that is the same as or less than the greatest distance between the upper surface and the mid-plane away from the first or second hinge member.

[0007] In another aspect, the present intention is directed to a ring binder mechanism for retaining loose-leaf pages, the mechanism generally comprising an elongate housing, a first hinge plate and a second hinge plate, the hinge plates being supported by the housing for pivoting motion relative to the housing. The hinge plates have an inner longitudinal edge margins hingedly engaged with each other to permit the pivoting motion and an outer longitudinal edge margins engaged with the housing. At least one ring for holding the loose-leaf pages including a first ring member and a second ring member. The first ring member is mounted on the first hinge plate and moveable with the first hinge plate relative to the housing between a closed position and an open position. In the closed position, the first and second ring members cooperatively forming a substantially continuous, closed loop for allowing loose-leaf pages retained by the ring to be moved along the ring from one ring member to the other. In the open position the first and second ring members form a discontinuous, open loop for adding or removing loose-leaf pages from the ring. The outer longitudinal edge margins are each rounded to facilitate the

pivoting motion of the first and second hinge plates with respect to the housing.

[0008] Other features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a perspective of a notebook including a ring binder mechanism;
FIG. 2 is a perspective of the ring binder mechanism;
FIG. 3 is an exploded perspective thereof;
FIG. 3A is a perspective of the bottom of a housing of the ring binder mechanism;
FIG. 3B is an enlarged fragmentary portion of the housing of Fig. 3A;
FIG. 4 is a front view of the ring binder mechanism;
FIG. 5 is a right end view thereof;
FIG. 6 is a top view thereof;
FIG. 7 is a bottom view thereof;
FIG. 8 is a section taken in plane including line 8-8 of Fig. 4 with hinge plates exploded directly below the housing;
FIG. 9 is a perspective of a hinge plate and associated ring members;
FIG. 10 is a cross section of the hinge plate and one of the associated ring members;
FIG. 11 is an enlarged section of the ring binder mechanism taken in the plane including line 11-11 of Fig. 2;
FIG. 12 is the enlarged section of Fig. 11 but with the ring binder mechanism in an open position;
FIG. 13 is a section taken in the plane including line 13-13 of Fig. 9;
FIG. 14 is a section taken in the plane including line 14-14 of Fig. 9;
FIG. 15 is a perspective of a cross section of the hinge plate taken through one of the associated ring members;
FIG. 16 is an enlarged, fragmentary cross section of the ring binder mechanism showing engagement of a rounded edge of the hinge plate engaging a housing of the ring binder mechanism in the closed position;
FIG. 17 is an enlarged fragmentary cross section of the ring binder mechanism showing engagement of the rounded edge of the hinge plate engaging the housing in an open position of the ring binder mechanism;
FIG. 18 is an enlarged fragmentary view of the hinge plates with the housing of the ring binder mechanism removed;
FIG. 19 is a perspective of a second embodiment of the ring binder mechanism;
FIG. 20 is a fragmentary longitudinal section thereof;
FIG. 21 is a perspective of a ring binder mechanism of a third embodiment;
FIG. 22 is a bottom view thereof;
FIG. 23 is a front view thereof;
FIG. 24 is an exploded view thereof;
FIG. 25 is an enlarged, fragmentary longitudinal section thereof;
FIG. 26 is an enlarged section taken in the plane including line 26-26 of Fig. 21 showing the ring binder mechanism in a closed and unlocked configuration;
FIG. 27 is the section of Fig. 26 but showing the ring binder mechanism in a closed and locked configuration;
FIG. 28 is the section of Fig. 26 but showing the ring binder mechanism in an open configuration.

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION OF THE DRAWINGS

[0010] Referring now to the drawings and in particular to Fig. 1, one embodiment of a ring binder mechanism, generally indicated at **101,** is mounted on a notebook, which is designated generally at **103.** The notebook **103** has a front cover **105,** a spine **107,** and a back cover **109.** The front and back covers **105, 109** of the notebook **103** are hingedly connected to the spine **107** and are selectively moveable to cover or expose loose-leaf pages (not shown) retained by the ring binder mechanism **101.** In the illustrated embodiment, the ring binder mechanism **101** is shown mounted on the spine **107** of the notebook **103.** It is contemplated, however, that the ring binder mechanism **101** can be mounted on other parts of the notebook **103** (e.g., on the back cover **109),** using different types of fasteners (e.g., prong fasteners, screws), or on surfaces other than a notebook (e.g., a file) without departing from the scope of this invention. It is also contemplated that the ring binder mechanism **101** can be unmounted and be within the scope of the invention. The notebook **103** may have other configurations within the scope of the present invention.

[0011] With reference to Figs. 2-7, the ring binder mechanism **101** has a housing, indicated generally at **111,** a pair of hinge plates **113** disposed with the housing, and three rings, each of which is designated generally at **115.** Each ring comprises two ring members **117** mounted on respective hinge plates **113.** The housing **111** is elongate and comprises a central portion and lateral sides extending downward in generally vertical planes along either side of the central portion between opposite longitudinal ends. The arrangement of the central portion and lateral sides results in the housing having a generally arch-shaped (e.g., U-shaped or C-shaped) cross-section between the longitudinal ends.

[0012] The housing **111** includes two mounting posts **119** for mounting the ring binder mechanism **101** on the notebook **103.** Each of the mounting posts **119** is tubular having a generally cylindrical wall and a passage therein for allowing a fastener, such as a rivet, to pass through the housing **111.** In the illustrated embodiment, one of

the mounting posts **119** is positioned generally adjacent one of the longitudinal ends of the housing **111** and the other mounting post is positioned generally adjacent the other longitudinal end. It is understood that the housing **111** can have more than two mounting posts **119** or only a single mounting post.

[0013] Referring now to Fig. 3, the housing **111** also preferably includes a mount at each of its longitudinal ends mounting a respective actuator **121.** In the illustrated embodiment, the actuators **121** can be used to open and close the rings **115.** The actuators 121 are formed to receiving portions of the hinge plates 113 for pivoting them to open and close the rings 115. The housing **111** further includes a plurality of slots **123** spaced along the length of the housing for allowing the ring members **117** to pass through the housing. In the illustrated embodiment, the housing **111** includes six slots **123** with three of the slots located along one of its lateral sides and three located along the opposite lateral side. It is understood the housing **111** could have more or fewer slots **123** depending on the number of rings **115.**

[0014] Referring to Figs. 3A, 3B, and 16, the housing **111** has a plurality of spaced apart hinge plate supports **125** on the inner surfaces of each of its lateral sides for securing the hinge plates **113** within the housing. Each of the hinge plate supports **125** is generally a wedge-shaped tab that includes a sloped wall and a shoulder **126** for engaging and supporting one of the hinge plates **113.** It is contemplated, however, that the hinge plates **113** could be held in place via some configuration other than having hinge plate supports **125** (e.g., a channel in the housing with a shoulder for receiving the hinge plates).

[0015] The housing **111** is preferably designed to resiliently deform such that the spacing between the lateral sides increases when the hinge plates **113** pass through a coplanar position, which applies an outwardly directed force to the lateral sides of the housing. In the preferred embodiment, the housing **111** is constructed of a resilient polymeric material. Because the housing **111** is preferably constructed of a polymeric material, it can be readily fabricated in a variety of different colors, which is useful for color-coding notebooks. Additionally, text (either raised or imprinted) may be molded into or otherwise formed on the housing **111.** Further, the polymeric material does not require nickel plating (as is usually the case with metal housings for ring binder mechanisms) and is therefore agreeable to people who are sensitive to nickel. In the preferred embodiment, the elongate housing **111,** first and second hinge plates **113,** and ring members **117** are wholly constructed of a resilient polymeric material. For example, the polymeric material can suitably comprise ABS (acrylontrile butadiene styrene). As another example, the polymeric material can suitably be a fiber-reinforced polymeric material. For example, the polymeric material can suitably comprise a mixture of ABS and from about 10 to about 30 percent fiberglass in which case the fiberglass increases strength of the polymeric material.

[0016] In the illustrated embodiment, the entire housing **111** is molded as one-piece. However, the housing **111** can be manufactured in different ways, including by being constructed in multiple pieces that are later joined together to make the housing, without departing from the scope of the invention. The housing **111** can also be made from non-polymeric (e.g., metallic) materials and be within the scope of some aspects of this invention.

[0017] Pivoting movement of the hinge plates **113** in the housing **111** is accompanied by movement of a central hinge **127** upward and downward relative to the housing as well as pivoting movement of outer rounded edge margins **129** of the hinge plates relative to lateral sides of the housing. The hinge plates **113** are interconnected by hinge members **131** and 133. The hinge members **131** and **133** in the illustrated embodiments have an interaction that is illustrated in Figs. 11 and 12. A first hinge member comprises a finger **131** and a second hinge member comprises a receptacle **133** that receives the finger in at least one, and preferably both, of the open and closed positions of the first and second hinge plates **113.** As shown, each hinge plate **113** includes alternating fingers **131** and receptacles **133** along its inner longitudinal edge margin. The fingers **131** and receptacles **133** of the first hinge plate **113** are offset from the fingers and receptacles of the second hinge plate so that the fingers of the first hinge plate are received in the receptacles of the second hinge plate and vice versa. The receptacles **133** open inwardly at the inner longitudinal edges of the hinge plates **113** for receiving the fingers **131** of the opposing hinge plate. The fingers **131** project outwardly from the inner longitudinal edges of the hinge plates **113** to be received by the receptacles **133.** The receptacles **133** of each hinge plate **113** preferably extend from the upper surface of the hinge plate into the thickness of the hinge plate toward the mid-plane **135** of the hinge plates (see, Figs. 13 and 14). The fingers **131** preferably taper in thickness toward the distal end of the finger. The hinge plates **113** preferably have an angular upper surface. The angular upper surface of each hinge plate **113** has a first planar portion **136A** adjacent to the outer longitudinal edge margin, a second planar portion **136B** adjacent to the inner longitudinal axis, and a third planar portion **136C** between the first and second planar portions. The first planar portion **136A** and second planar portion **136B** lie at angles with respect to the third planar portion **136C** (and with respect to each other). The hinge plates **113** could have other shapes (e.g., rounded, rectangular, etc.) and still be within the scope of the invention.

[0018] Referring to Figs. 13 and 14, the fingers and receptacles **131, 133** are disposed at a distance from the mid-plane **135** that is the same as or less than the greatest distance between the upper surface of the hinge plates **113** and the mid-plane. In this case, the third planar portion **136C** of the upper surface is farther away from the mid-plane **135** than the finger **131** or receptacle **133.** Thus, in a horizontal position of the hinge plates **113,** the

hinge members **131, 133** are not the highest part of the hinge plates. Reception of the fingers **131** within the receptacles **133** allows pivoting to occur closer to the midplane **135** of the hinge plates **113.** The highest point of the hinge plates **113** in the open position (Fig. 12) is lower than it would be if the central hinge **127** was at or above the upper surfaces of the hinge plates, as is conventional. This low-profile interaction allows for opening the ring members **117** wider than traditionally available with a housing **111** of the same height.

[0019] As illustrated in Fig. 3, the hinge plates **113** are each generally elongate, flat, and rectangular in shape, and are shorter in length than the housing **111** so that they fit within the housing. In other words, ends of each of the hinge plates **113** terminate within the housing **111.** The hinge plates **113** are interconnected in side-by-side arrangement along their inner longitudinal edge margins forming the central hinge **127** for pivoting movement of the hinge plates relative to one another (Figs. 7, 11, and 12). The interconnected hinge plates **113** are disposed between the lateral sides of the housing **111** such that outer edge margins of the hinge plates engage the lateral sides above the shoulders of the hinge plate supports **125,** which retain the interconnected hinge plates in the housing. Each hinge plate **113** has an outer longitudinal edge that is rounded **129** (see, Figs. 16 and 17). Each rounded outer longitudinal edge margin **129** has a thickness that is less than the thickness of the hinge plate **113** inward of the rounded outer longitudinal edge margin **129.** The radius of curvature of the rounded outer longitudinal edge margin **129** is greater than about 0.4 mm and less than about 1.5 mm. This rounded edge **129** prevents scratching of the housing **111,** as well as reducing the resistance force between the hinge plate **113** and the housing during assembly. It will be understood that in some aspects of the present invention, the outer longitudinal edge margins may have different shapes and dimensions.

[0020] The rings **115** are adapted to retain loose-leaf pages (not shown) on the ring binder mechanism **101.** The three rings **115** of the illustrated ring binder mechanism **101** are substantially similar and are each generally circular in shape. As seen in Fig. 2, each ring **115** includes two generally semi-circular ring members **117** formed from a polymeric material and also formed as one piece with the hinge plates **113** and hinge members **131, 133** (Figs. 9, 10, and 15). However, the ring members **117** could alternatively be attached to the hinge plates **113** in different ways, including by being constructed separately and later joined together with the hinge plates, without departing from the scope of some aspects of the invention. The ring members **117** may also be made of a material other than a polymeric material (e.g., steel). The ring members **117** include free ends that are formed to secure the ring members against misalignment when they are closed together (see, Figs. 3 and 12). The rings **115** can alternatively be D-shaped as is known in the art, or shaped otherwise within the scope of this invention. Ring binder mechanisms with ring members formed of different material or having different cross-sectional shapes, for example, oval shapes, do not depart from the scope of this invention. Likewise the number of rings supported by the housing can also vary within the scope of the invention.

[0021] With reference to Fig. 3, one ring member **117** of each ring **115** is formed as a single piece with the first hinge plate **113,** while the other ring member of that ring is formed as a single piece with the second hinge plate. The ring members **117** extend through the slots **123** in the housing **111** and are arranged so their free ends face toward one another above the housing (Fig. 2). The ring members **117** are moveable between an opened position (Fig. 12) in which loose-leaf pages can be added to and/or removed from the ring binder mechanism **101** and a closed position (Figs. 2, 11) in which the free ends of corresponding ring members are joined to retain any loose-leaf pages on the rings **115** in the ring binder mechanism. In the illustrated ring binder mechanism **101,** the ring members **117** of each ring **115** move conjointly with the pivoting movement of the hinge plate **113** on which they are mounted.

[0022] The housing **111** is preferably suitably deformed in the opened and closed positions of the rings **115** so that the housing continuously applies a spring force to the hinge plates **113** for holding the rings in either their opened position or their closed position. Other constructions for biasing the hinge plates **113** or otherwise holding the rings **115** in their opened and/or closed positions may be used within the scope of the present invention.

[0023] It is understood that the ring binder mechanism **101** can be formed with no actuators or a single actuator **121** instead of the two seen in the accompanying drawings. It is also understood that while two actuators **121** are provided on the illustrated ring binder mechanism **101** only one may be needed to move the hinge plates **113** between their downward and upward positions. That is, the rings **115** can be moved between the opened and closed positions using either one of the two actuators **121.** It is further understood that the rings **115** can be moved between their opened and closed position by manually pulling the ring members **117** apart or pushing the rings together whether the ring binder mechanism **101** has zero, one, or two actuators **121.**

[0024] A second embodiment is illustrated generally at **201** in Figs. 19 and 20. Corresponding elements to the first embodiment are denoted by numbers 100 higher than the elements of the first embodiment to which they correspond. The construction of housing **211,** hinge plates **213,** and ring members **217** may be the same as described previously herein for the first embodiment. The second embodiment comprises a single actuator **221** and has a locking mechanism associated with the actuator. As shown in Fig. 20, the locking mechanism comprises a resilient arm **237** projecting from the actuator **221.** An upstanding detent **239** on the free end of the arm **237** is

received in a latching opening formed on the interior of the housing **211** in the closed position and retains the actuator **221** to avoid accidental opening of the rings **215** if the notebook is dropped or otherwise jarred. Application of force to the actuator **221** to pivot to the open position causes the arm **237** to bend downward, releasing the detent **239** from the latching opening thereby unlocking the actuator and allowing the rings **215** to move to the open position. The detent **239** snaps back into the latching opening when the actuator **221** pivots back to the closed position.

[0025] A third embodiment is illustrated generally at **301** in Figs. 21-28. Corresponding elements to the first embodiment are denoted by numbers 200 higher than the elements of the first embodiment to which they correspond. The construction of housing **311,** hinge plates **313,** and ring members **317** may be the same as described previously herein for the first embodiment. The third embodiment preferably comprises a single actuator **321.** The actuator **321** is connected to the housing **311** via a pin **341.** As shown in Figs. 24 and 25, the third preferred embodiment preferably has a travel bar **343** for locking the ring binder mechanism **301** in the closed position. The travel bar **343** includes an elongate bar having three blocking members **345.** The travel bar **343** is connected to the actuator **321** by way of an integrally formed rod **344** of the travel bar so that pivoting of the actuator moves the travel bar lengthwise of the housing **311.** A flexible portion **346** of the travel bar **343** allows for lost motion between the movement of the actuator **321** and the travel bar. In the locked position, the blocking members **345** are disposed over the hinge plates **313,** blocking the hinge plates from pivoting to the open position (Fig. 27). When moved toward the open position, the blocking members **345** are aligned with holes **347** in the hinge plates **313** that allow the hinge plates to pivot upward to the open position. The housing **311** of the third preferred embodiment preferably has an angular shape as opposed to a C-shape or U-shape.

OTHER STATEMENTS OF THE INVENTION

[0026] The following are statements of invention described in the present application. Although not currently presented as claims, they constitute applicant's statement of invention(s) believed to be patentable and may subsequently be presented as claims.

A1. A ring binder mechanism for retaining loose-leaf pages, the mechanism comprising:

an elongate housing;
a first hinge plate and a second hinge plate, the hinge plates being supported by the housing for pivoting motion relative to the housing, the hinge plates having an inner longitudinal edge margins hingedly engaged with each other to permit the pivoting motion and an outer longitudinal edge margins engaged with the housing;
at least one ring for holding the loose-leaf pages, each ring including a first ring member and a second ring member, the first ring member being mounted on the first hinge plate and moveable with the first hinge plate relative to the housing between a closed position and an open position, in the closed position the first and second ring members cooperatively forming a substantially continuous, closed loop for allowing loose-leaf pages retained by the ring to be moved along the ring from one ring member to the other, and in the open position the first and second ring members form a discontinuous, open loop for adding or removing loose-leaf pages from the ring;
the outer longitudinal edge margins each being rounded to facilitate the pivoting motion of the first and second hinge plates with respect to the housing.

A2. The ring binder mechanism as set forth in claim A1, wherein each rounded outer longitudinal edge margin has a radius of curvature that is greater than about 0.4 mm and less than about 1.5 mm.

A3. The ring binder mechanism as set forth in claim A1 wherein the rounded outer longitudinal edge margin of the first hinge plate has a thickness that is less than the thickness of the first hinge plate inward of the rounded outer longitudinal edge margin of the first hinge plate, and the rounded outer longitudinal edge margin of the second hinge plate has a thickness that is less than the thickness of the second hinge plate inward of the rounded outer longitudinal edge margin of the second hinge plate.

A4. The ring binder mechanism as set forth in claim A1 wherein the elongate housing is formed with first and second shoulders engaging the outer longitudinal edge margins of the first and second hinge plates, respectively.

A5. The ring binder mechanism as set forth in claim A4 wherein the elongate housing further comprises a channel, each channel including the shoulder and receiving a respective one of the outer longitudinal edge margins of the first and second hinge plates.

A6. The ring binder mechanism as set forth in claim A1 wherein at least one of the housing and the hinge plates is made of a polymeric material comprising ABS and fiberglass.

A7. The ring binder mechanism as set forth in claim A1 in combination with a cover, the ring binder mechanism being mounted on the cover.

[0027] When introducing elements of the present invention or the preferred embodiments(s) thereof, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to

be inclusive and mean that there may be additional elements other than the listed elements.

[0028] As various changes could be made in the above constructions, products, and methods without departing from the scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Claims

1. A ring binder mechanism for retaining loose-leaf pages, the mechanism comprising:

   an elongate housing;
   a first hinge plate and a second hinge plate, the hinge plates being supported by the housing for pivoting motion relative to the housing, the first and second hinge plates each having an upper surface, a lower surface and a mid-plane between the upper and lower surfaces;
   at least one ring for holding the loose-leaf pages, each ring including a first ring member and a second ring member, the first ring member being mounted on the first hinge plate and moveable with the first hinge plate relative to the housing between a closed position and an open position, in the closed position the first and second ring members cooperatively forming a substantially continuous, closed loop for allowing loose-leaf pages retained by the ring to be moved along the ring from one ring member to the other, and in the open position the first and second ring members form a discontinuous, open loop for adding or removing loose-leaf pages from the ring;
   the first hinge plate including a first hinge member and the second hinge plate including a second hinge member engaged with the first hinge member of the first hinge plate, the first and second hinge members each having a maximum spacing from the mid-plane that is the same as or less than the greatest distance between the upper surface and the mid-plane away from the first or second hinge member.

2. The ring binder mechanism as set forth in claim 1 wherein the second hinge member comprises a receptacle formed in the second hinge plate and receiving the first hinge member in at least one of the open and closed positions of the first and second hinge plates.

3. The ring binder mechanism as set forth in claim 2 wherein the second hinge plate has a thickness, the receptacle extending from the upper surface of the second hinge plate into the thickness of the second hinge plate toward the mid-plane of the second hinge plate.

4. The ring binder mechanism as set forth in claim 3 wherein the second hinge plate includes an inner longitudinal edge, the receptacle opening inwardly at the inner longitudinal edge of the second hinge plate for receiving the first hinge member of the first hinge plate.

5. The ring binder mechanism as set forth in claim 2, wherein the first hinge plate includes an inner longitudinal edge, the first hinge member comprising a finger projecting inwardly from the inner longitudinal edge, the finger being received in the receptacle in at least one of the open and closed positions of the first and second hinge plates.

6. The ring binder mechanism as set forth in claim 5 wherein the finger tapers in thickness generally from the longitudinal edge of the first hinge plate toward a distal end of the finger.

7. The ring binder mechanism as set forth in claim 1 wherein the first ring member is formed as one piece with the first hinge plate and the second ring member is formed as one piece with the second hinge plate.

8. The ring binder mechanism as set forth in claim 7 wherein the first and second hinge plates are made of polymeric material.

9. The ring binder mechanism as set forth in claim 8 wherein the elongate housing is made of polymeric material.

10. The ring binder mechanism as set forth in claim 1 wherein the first and second hinge plates each comprise an outer longitudinal edge engaging the elongate housing for pivoting on the elongate housing, the outer longitudinal edge being rounded.

11. The ring binder mechanism as set forth in claim 1 wherein the first hinge member comprises a finger and the second hinge member comprises a receptacle receiving the finger.

12. The ring binder mechanism as set forth in claim 11 wherein the first and second hinge plates each include plural fingers and plural receptacles.

13. The ring binder mechanism as set forth in claim 12 wherein the fingers and receptacles on each of the first and second hinge plates alternate along a length of the hinge plate.

14. The ring binder mechanism as set forth in claim 1 wherein at least one of the housing and the hinge

plates is made of a polymeric material comprising ABS and fiberglass.

15. The ring binder mechanism as set forth in claim 1 in combination with a cover, the ring binder mechanism being mounted on the cover.

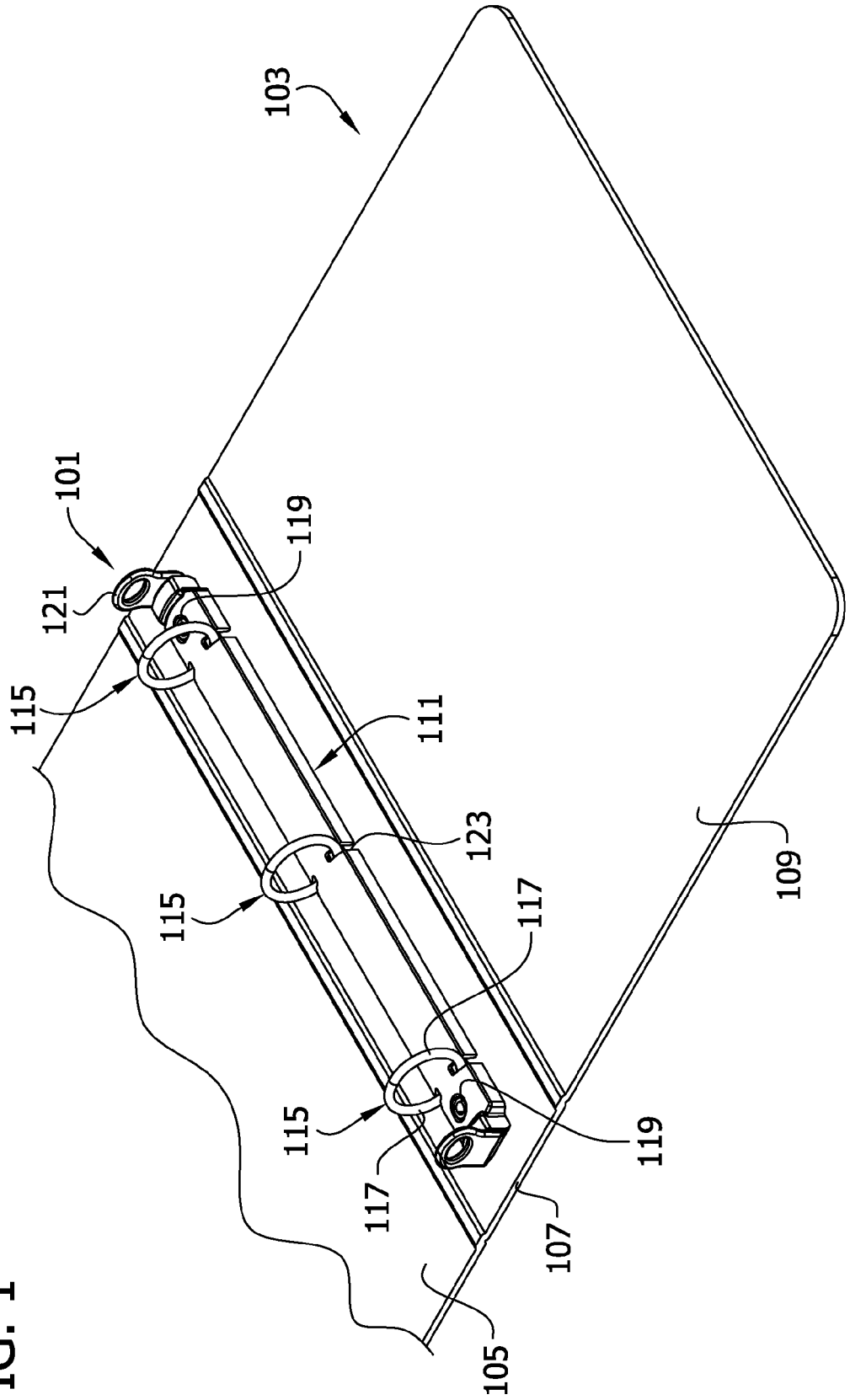

FIG. 1

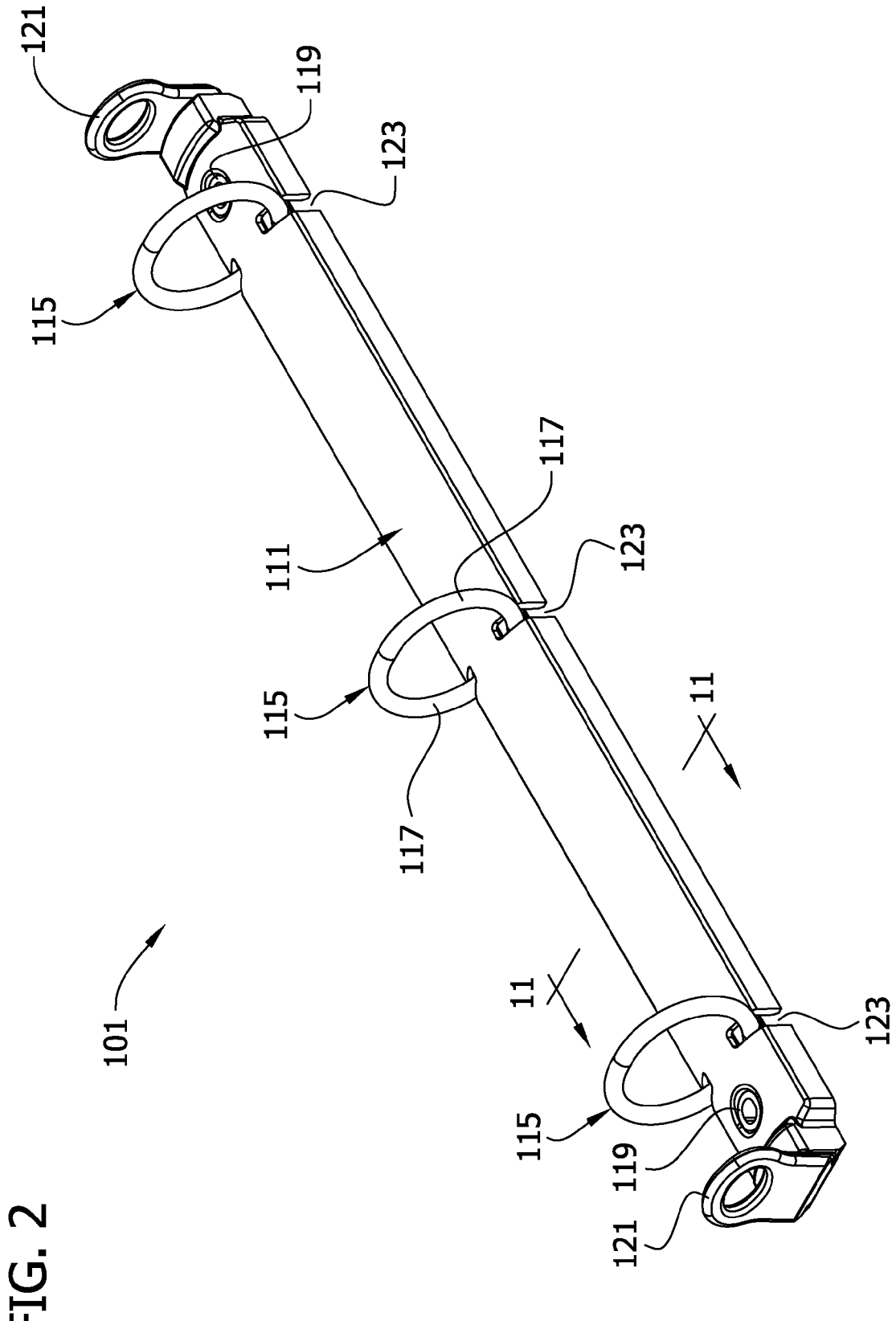

FIG. 2

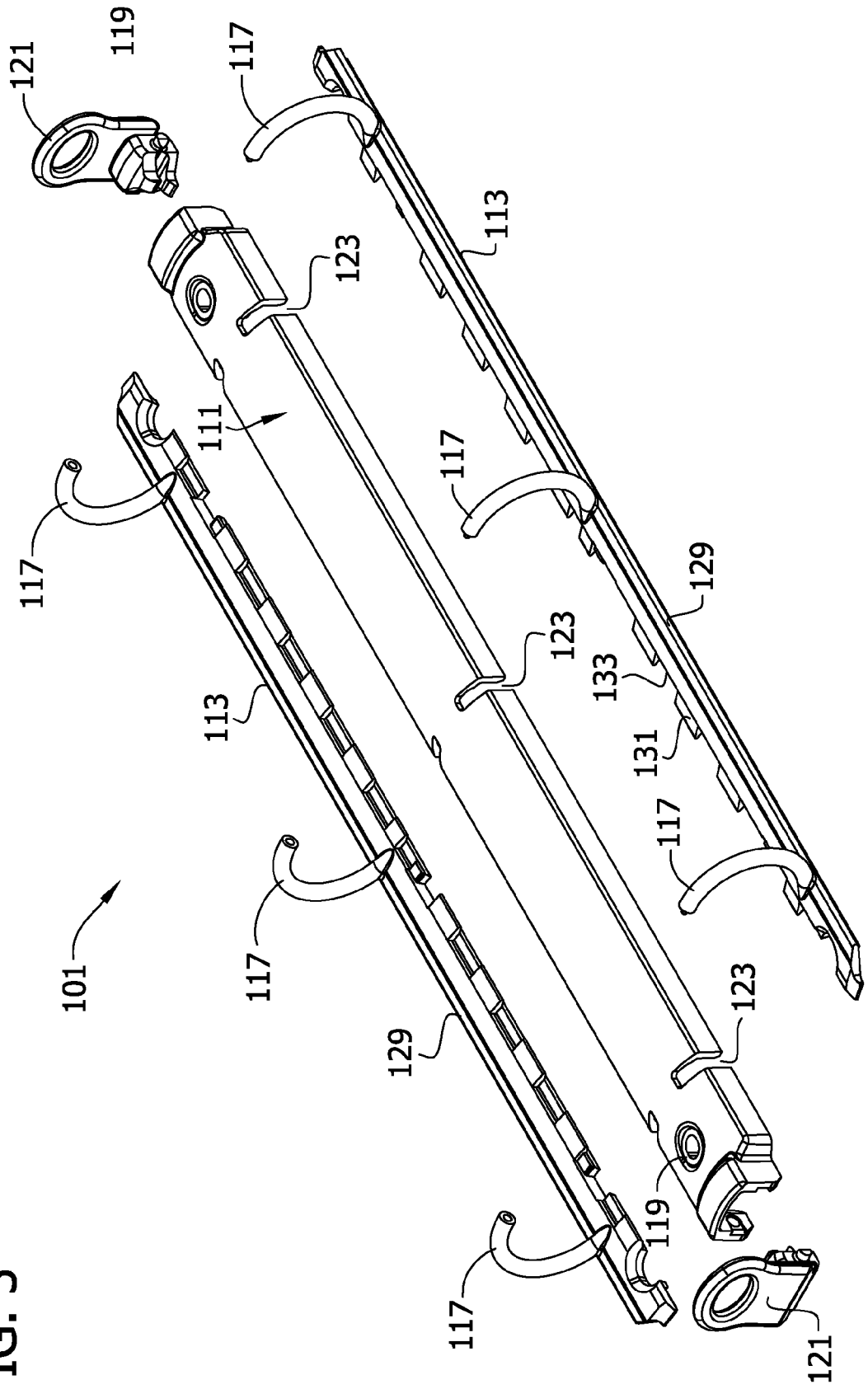
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FIG. 3

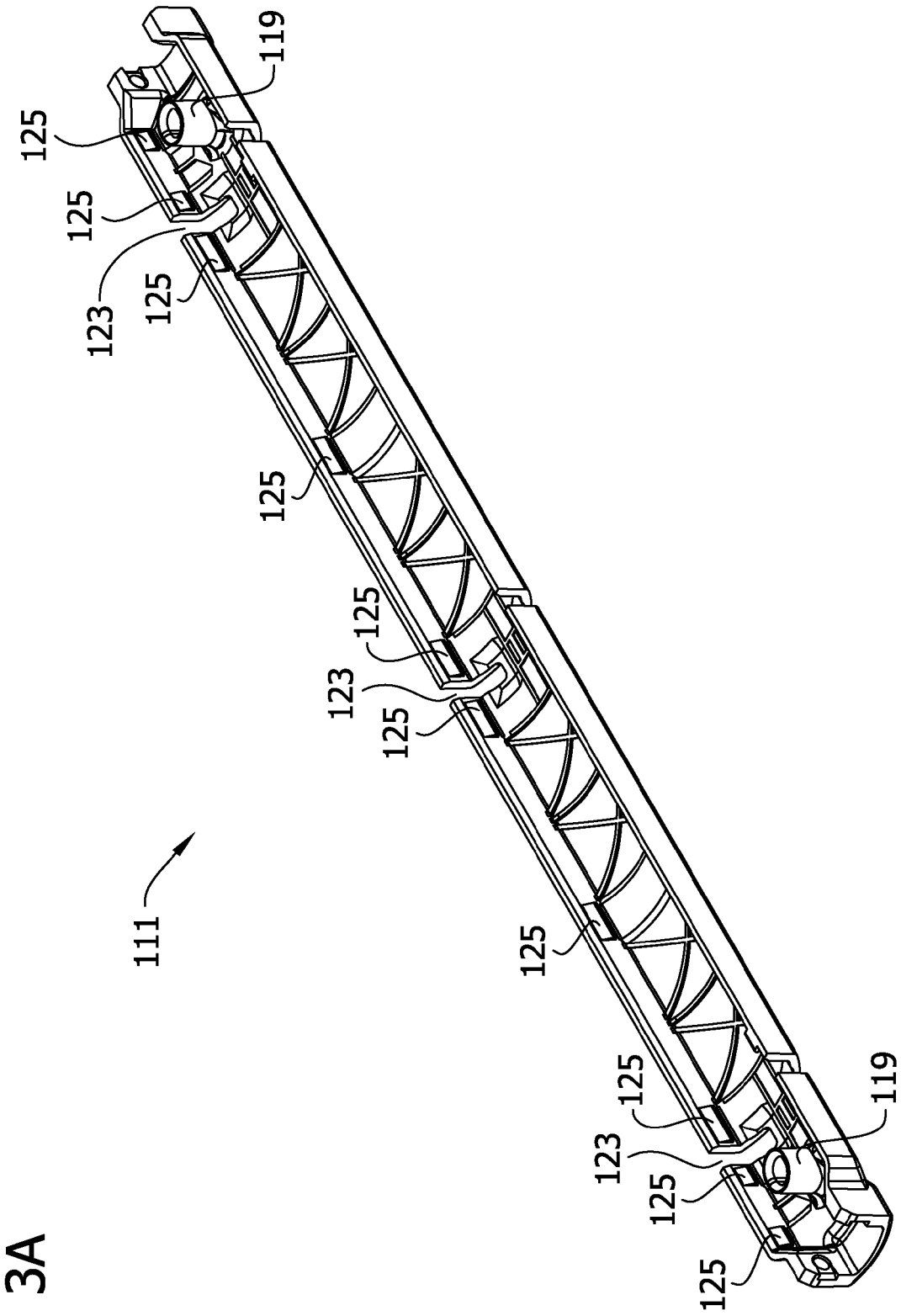


FIG. 3A

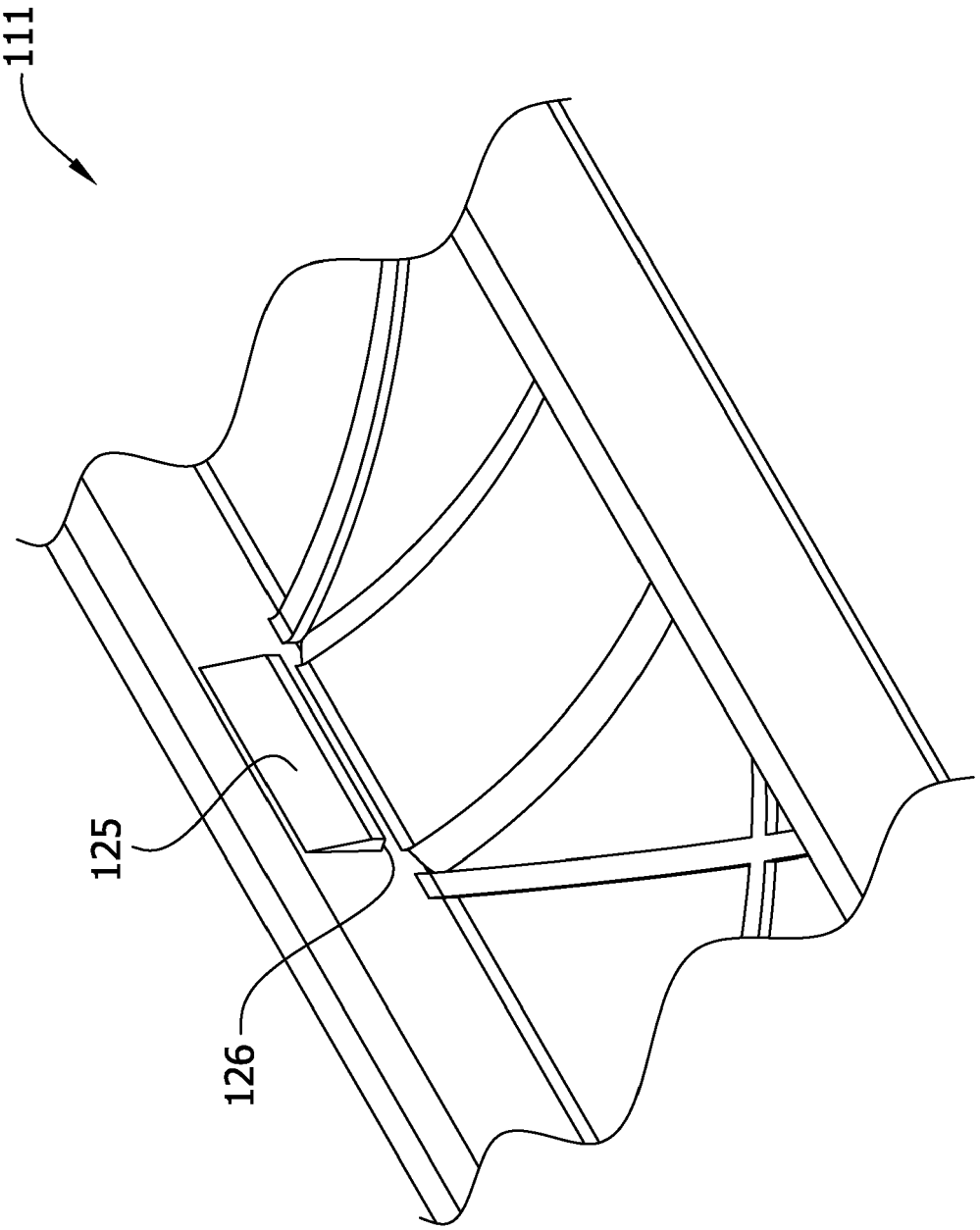


FIG. 3B

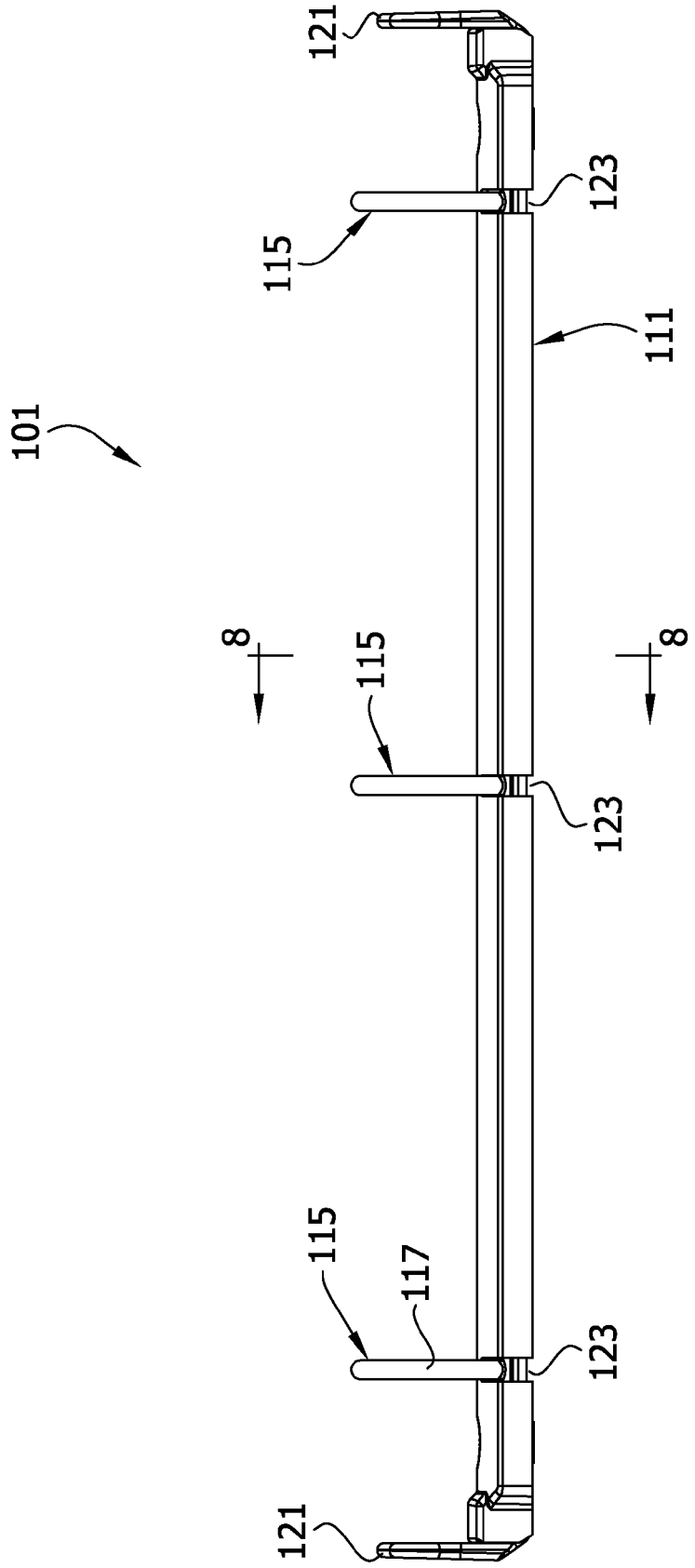
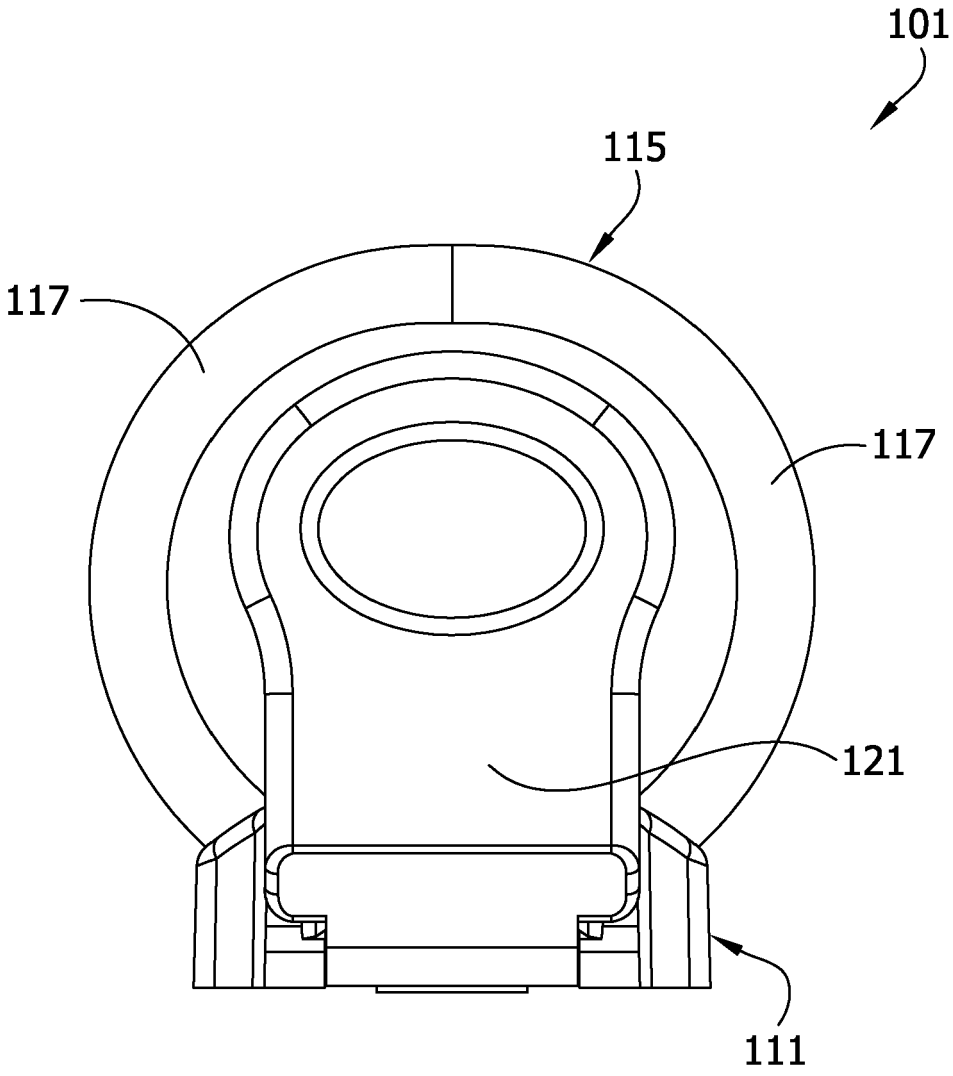


FIG. 4

FIG. 5



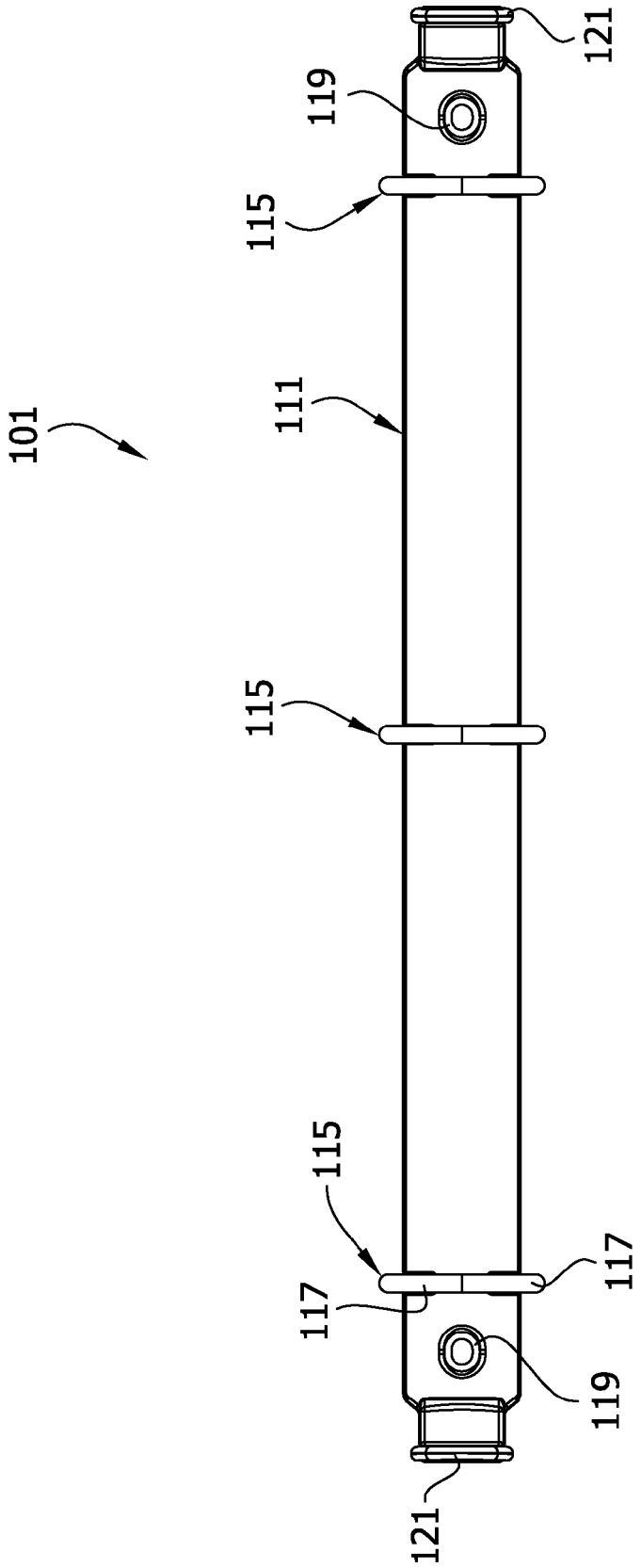


FIG. 6

FIG. 7

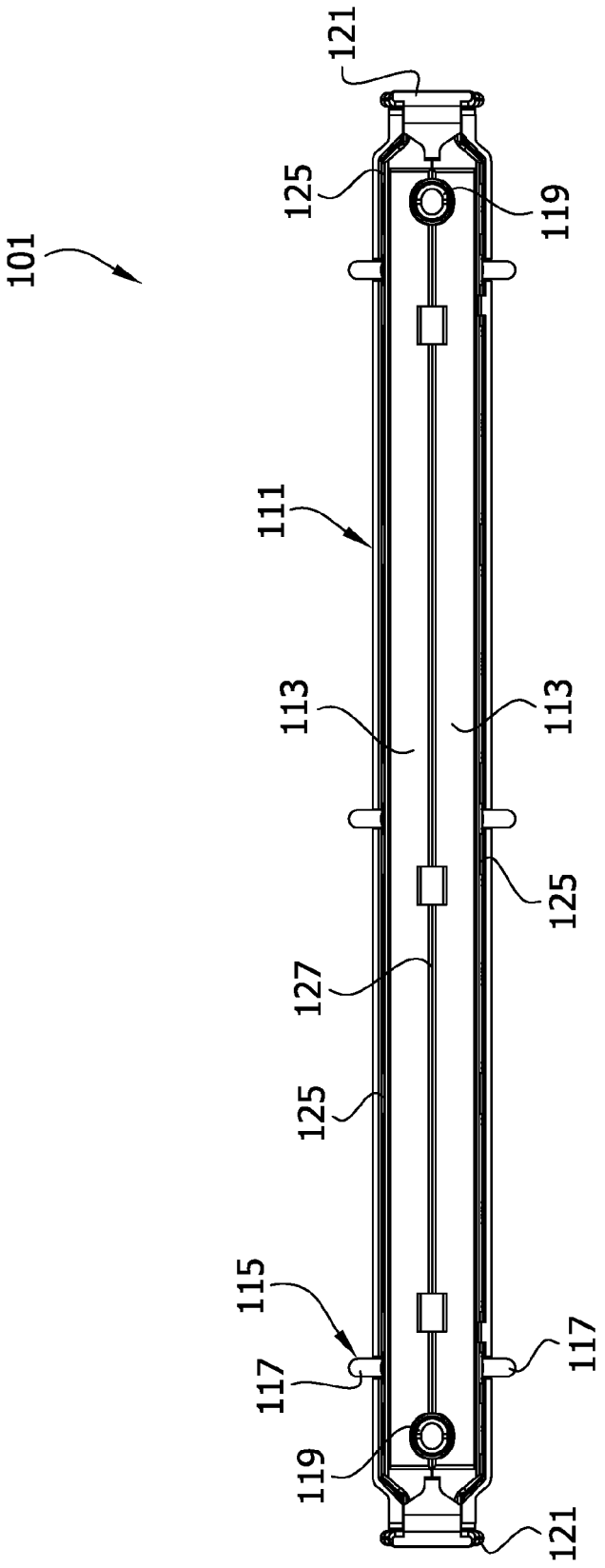


FIG. 8

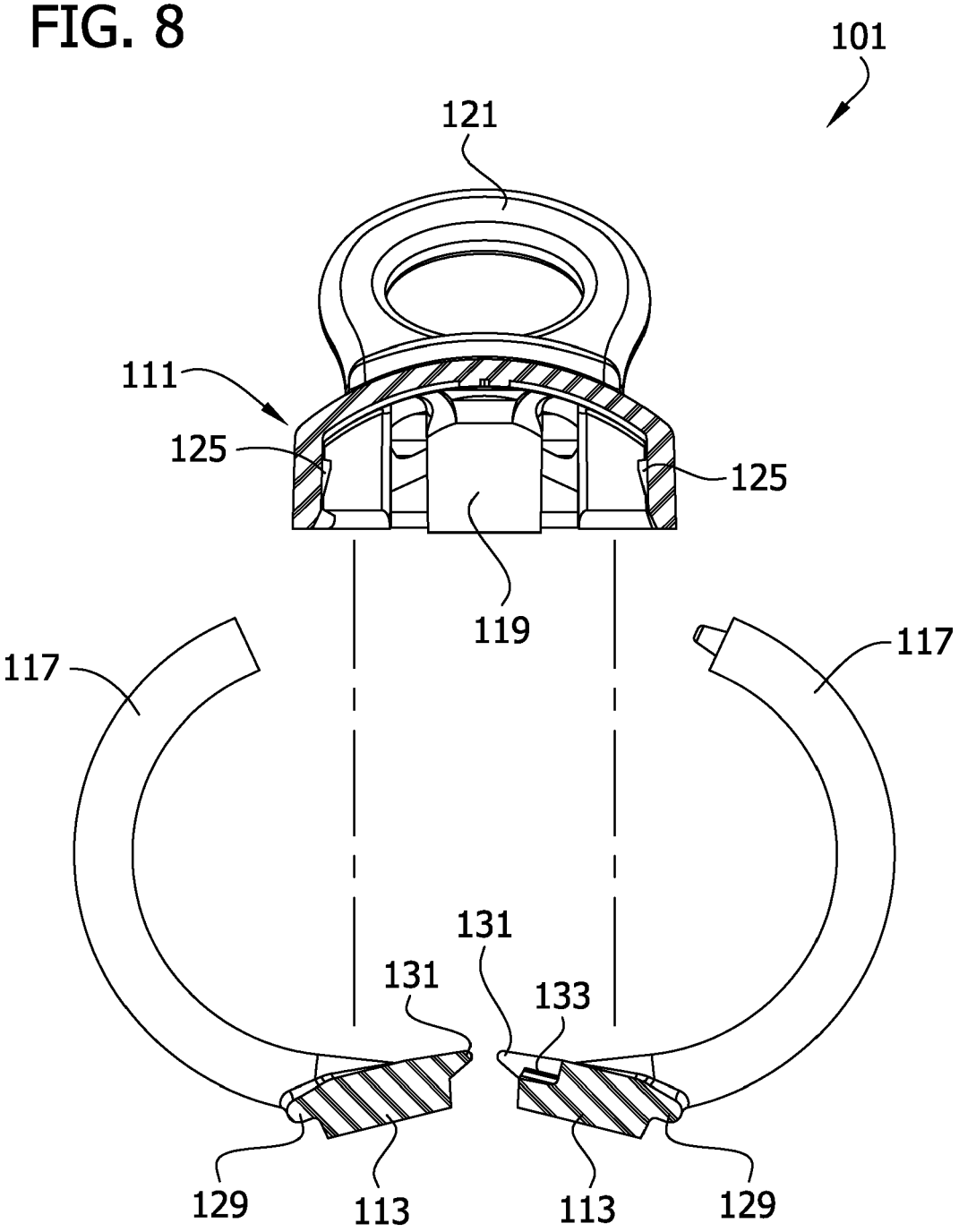


FIG. 9

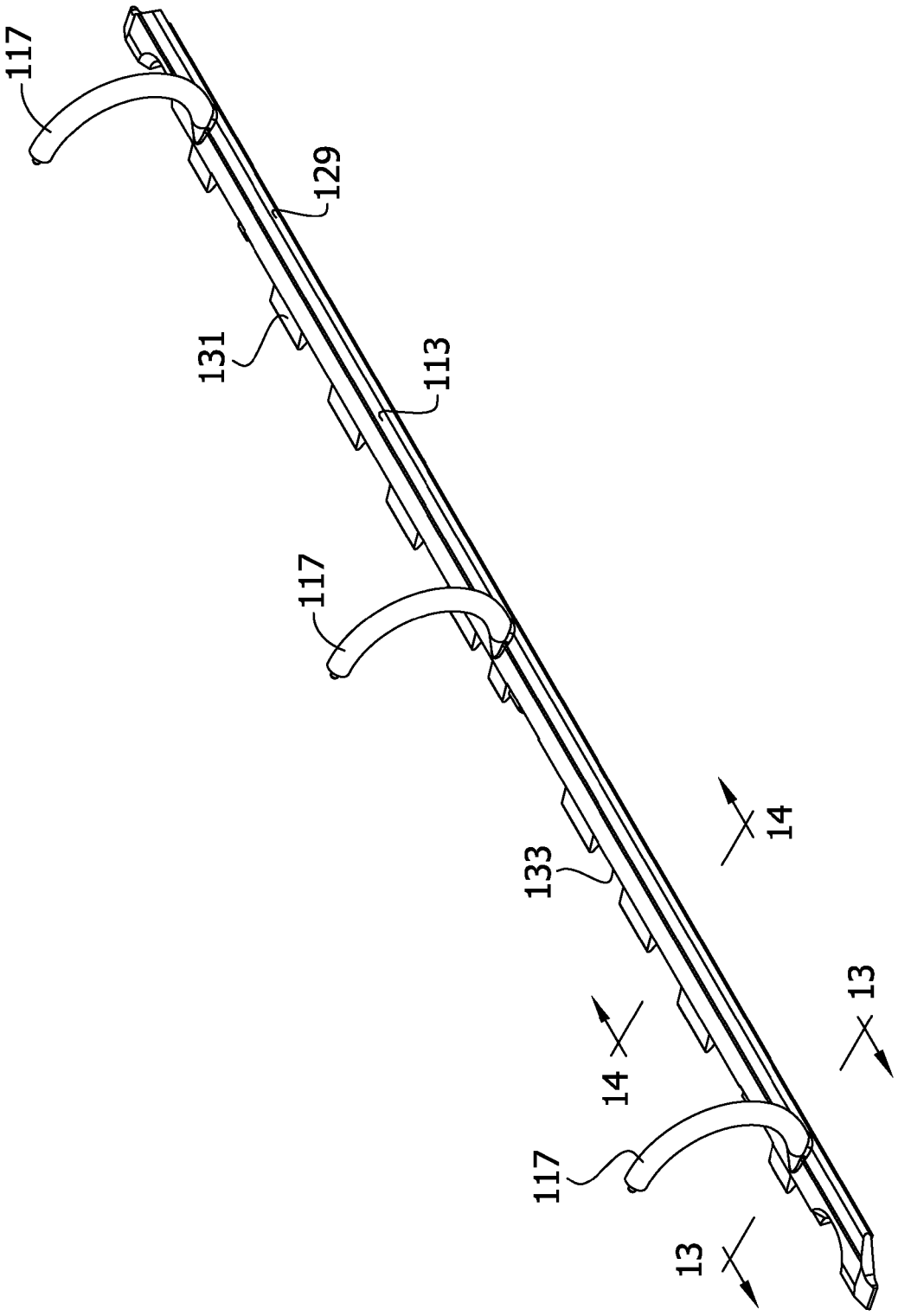


FIG. 10

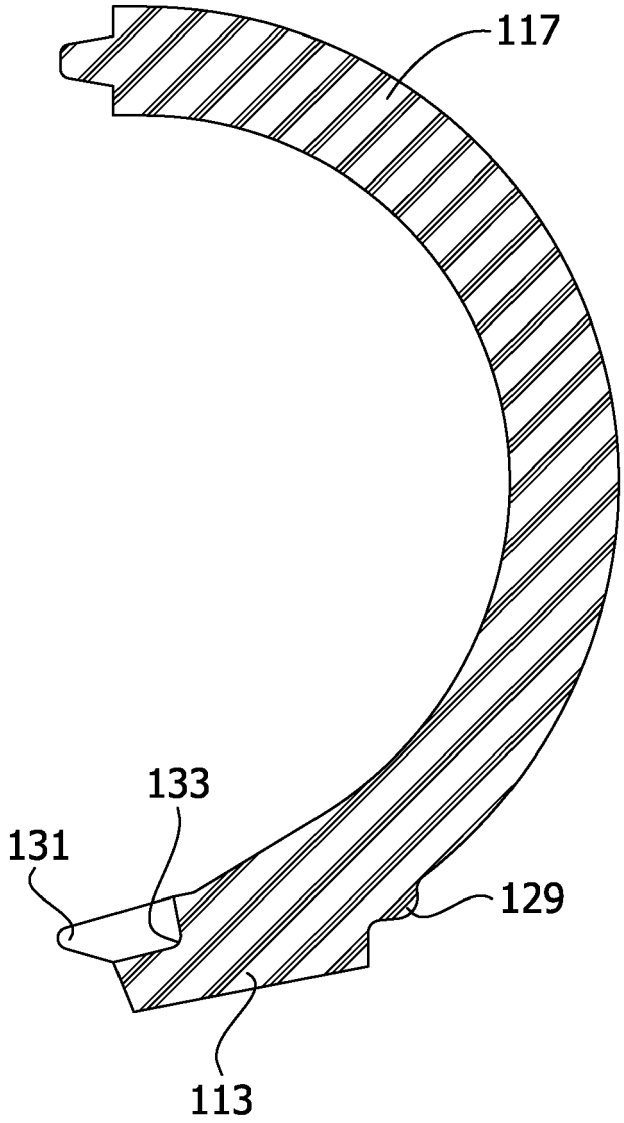


FIG. 11

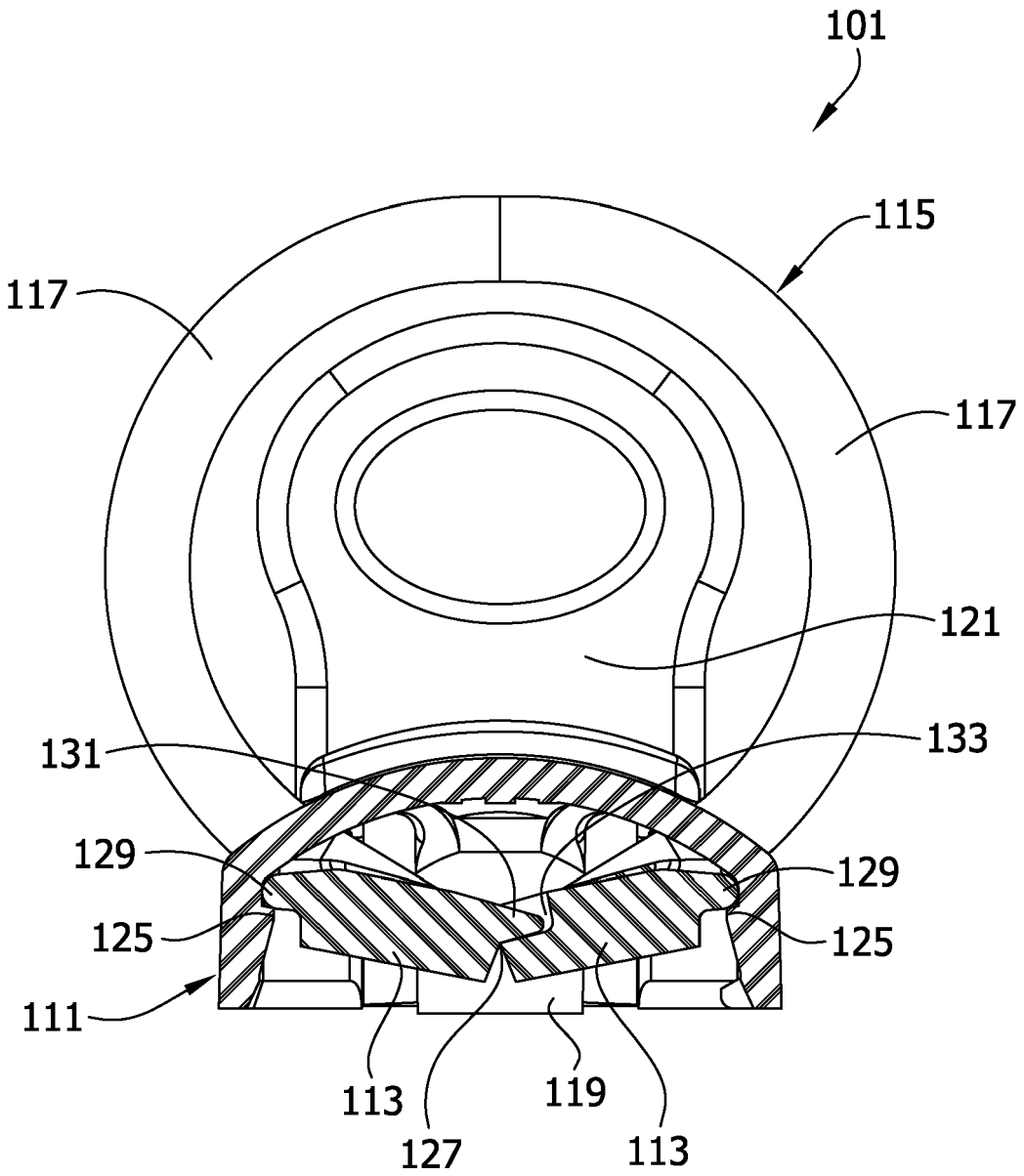


FIG. 12

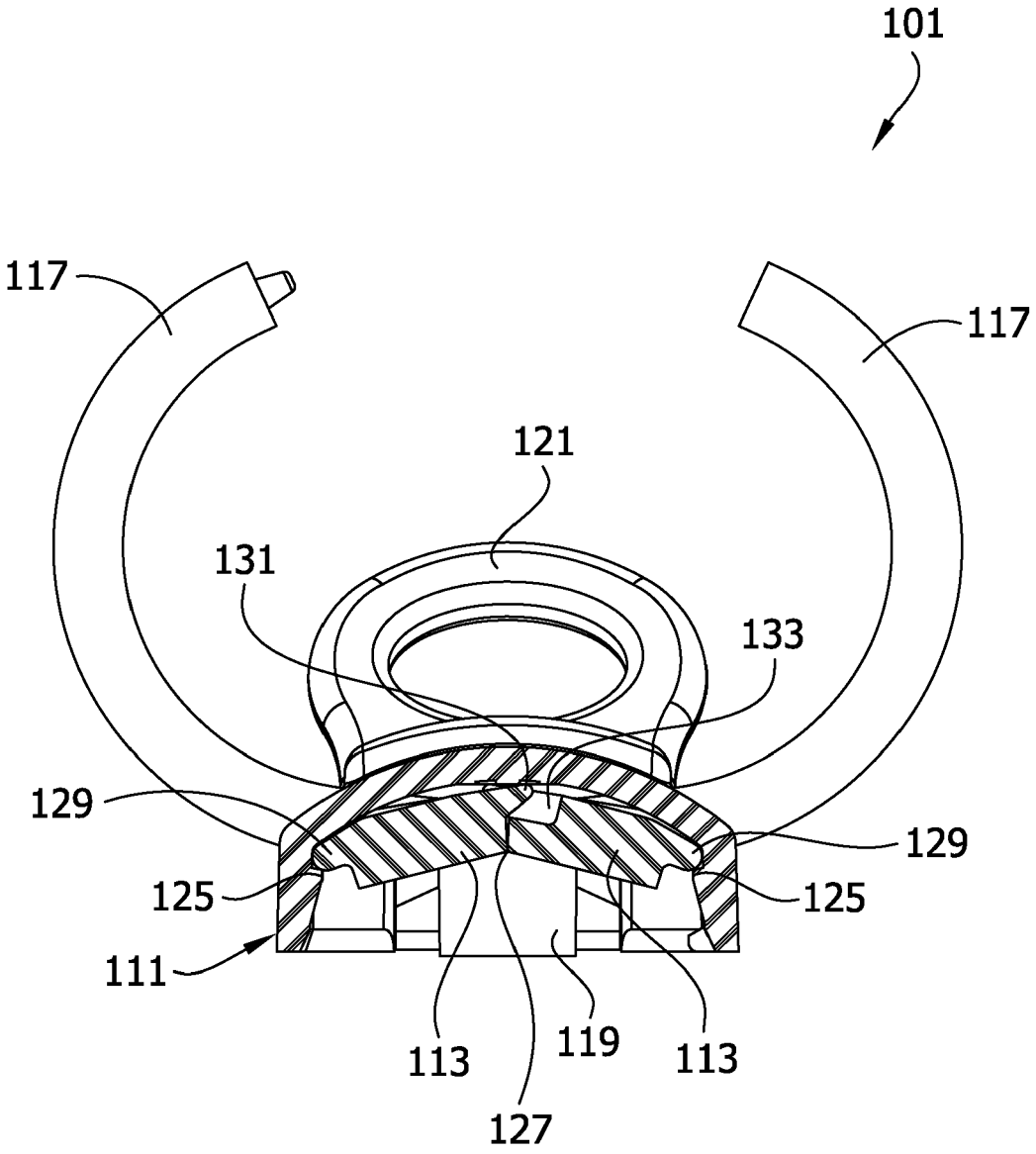


FIG. 13

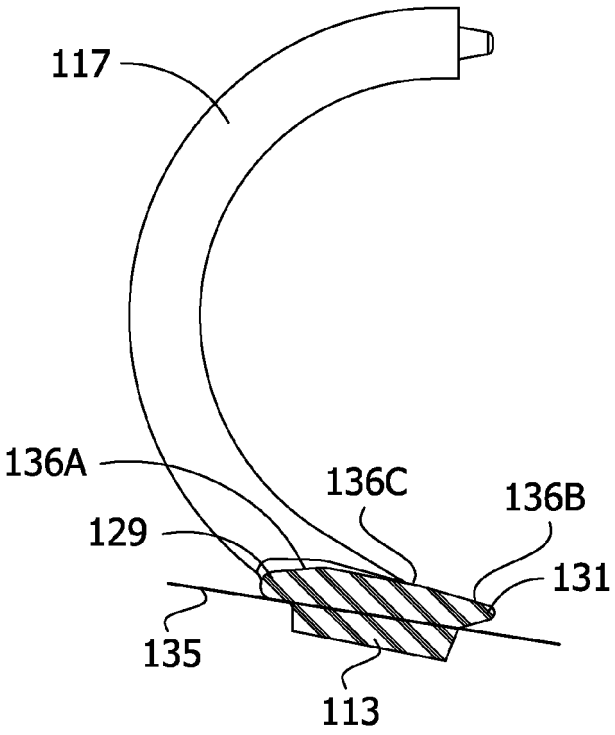

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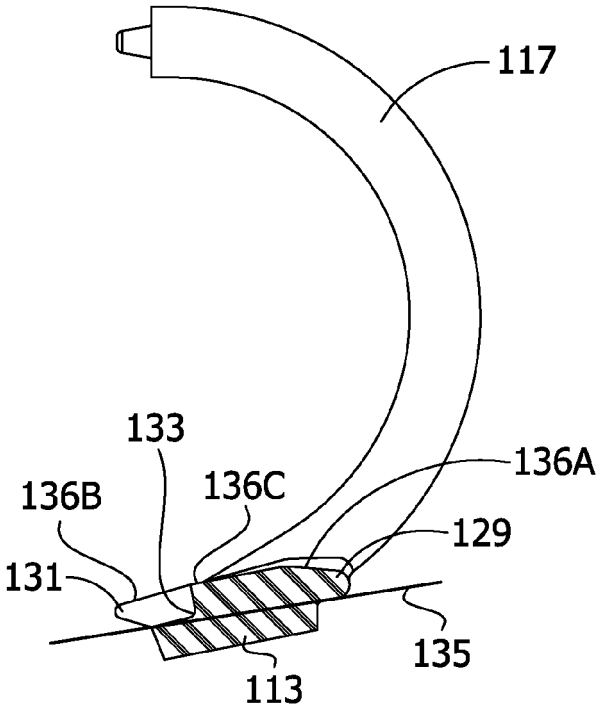
FIG. 14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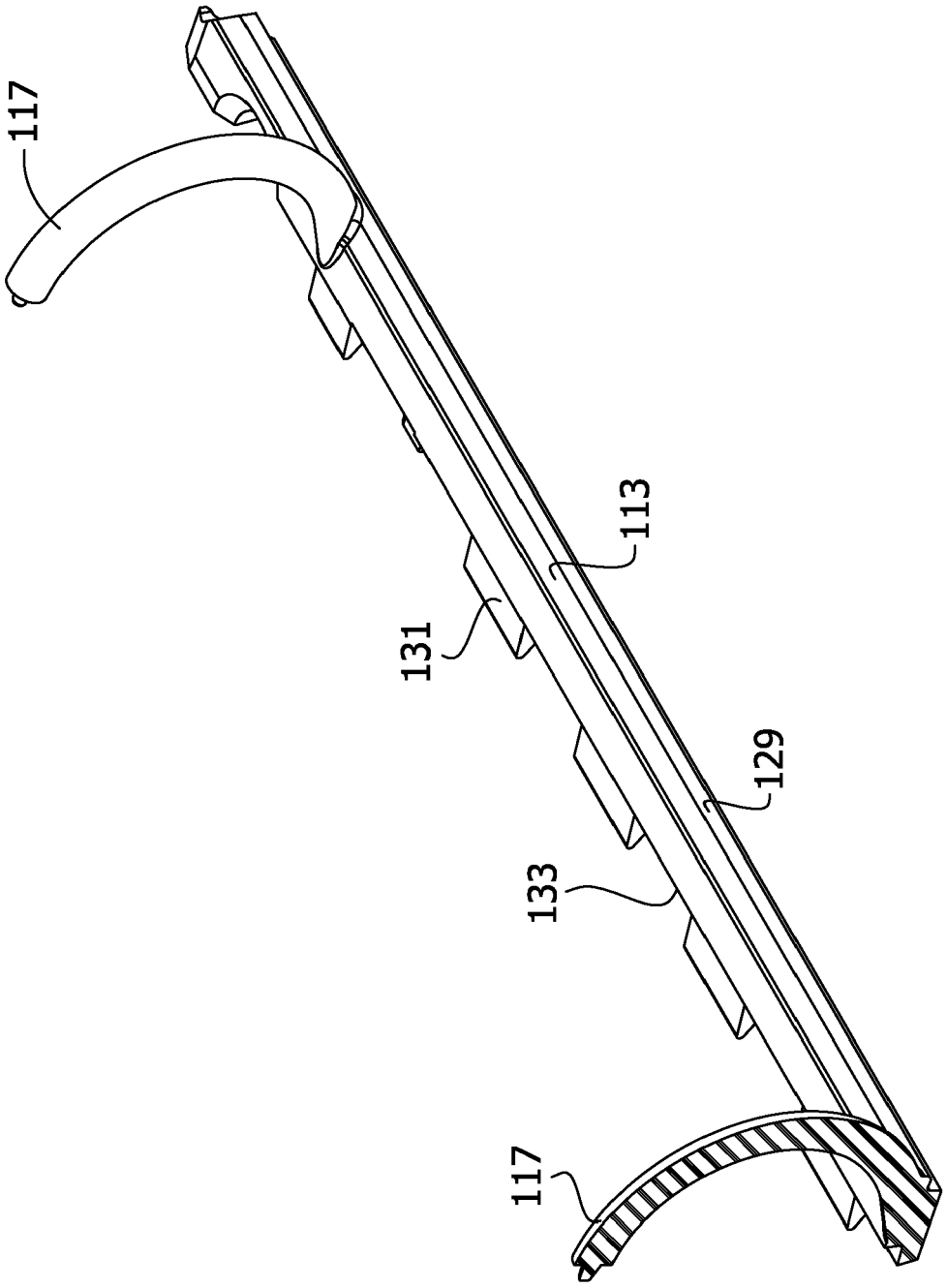


FIG. 15

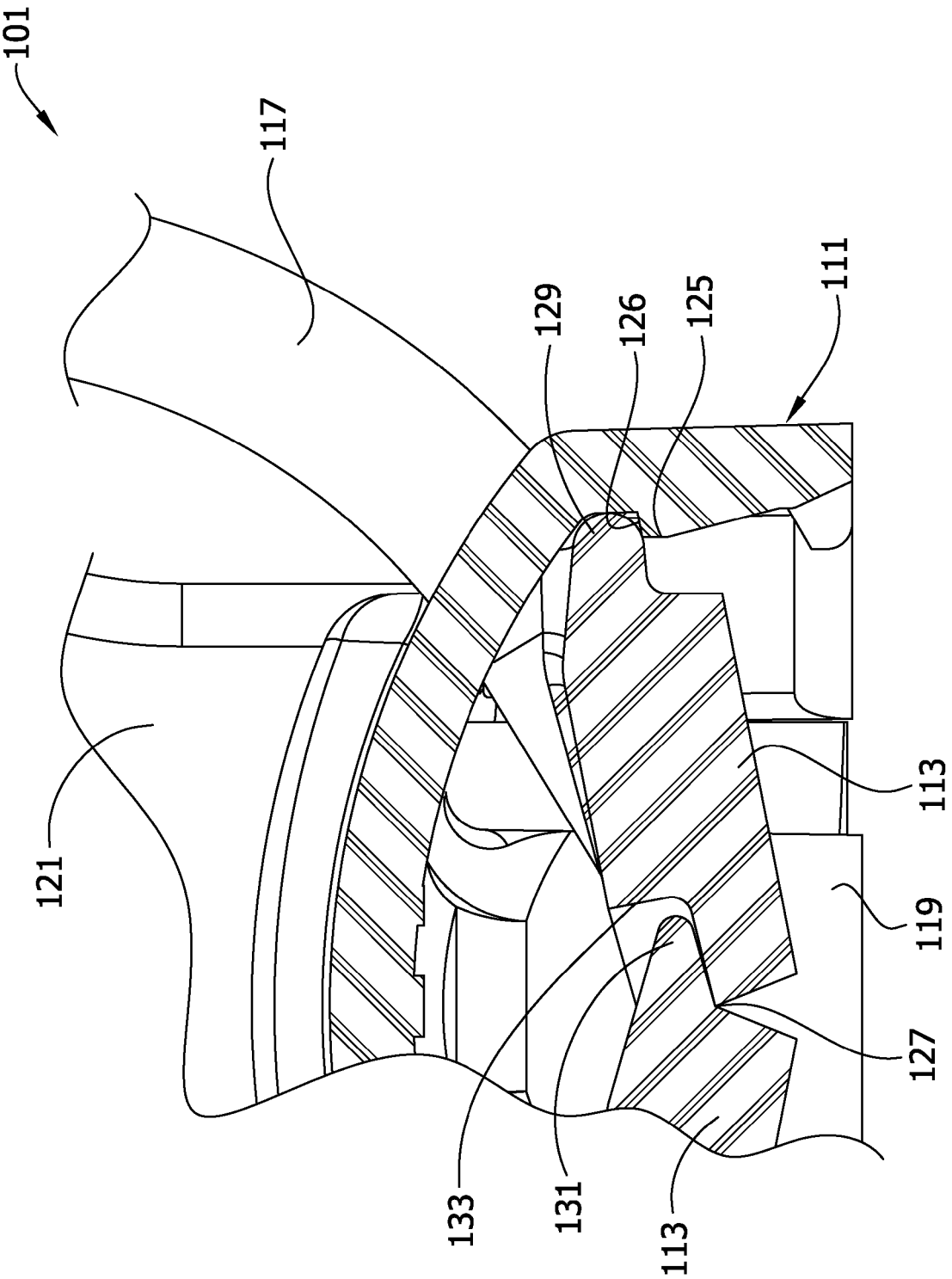


FIG. 16

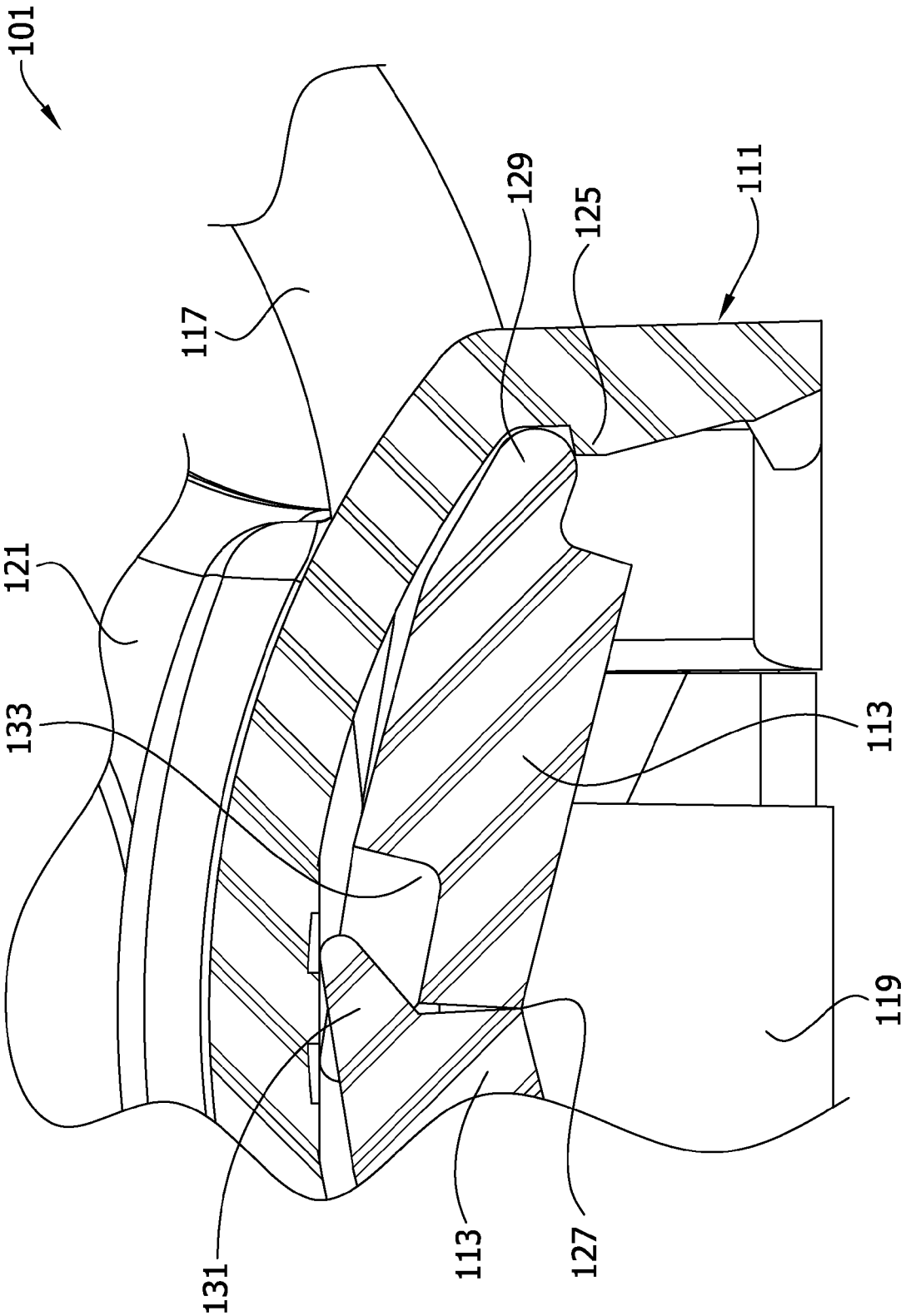


FIG. 17

FIG. 18

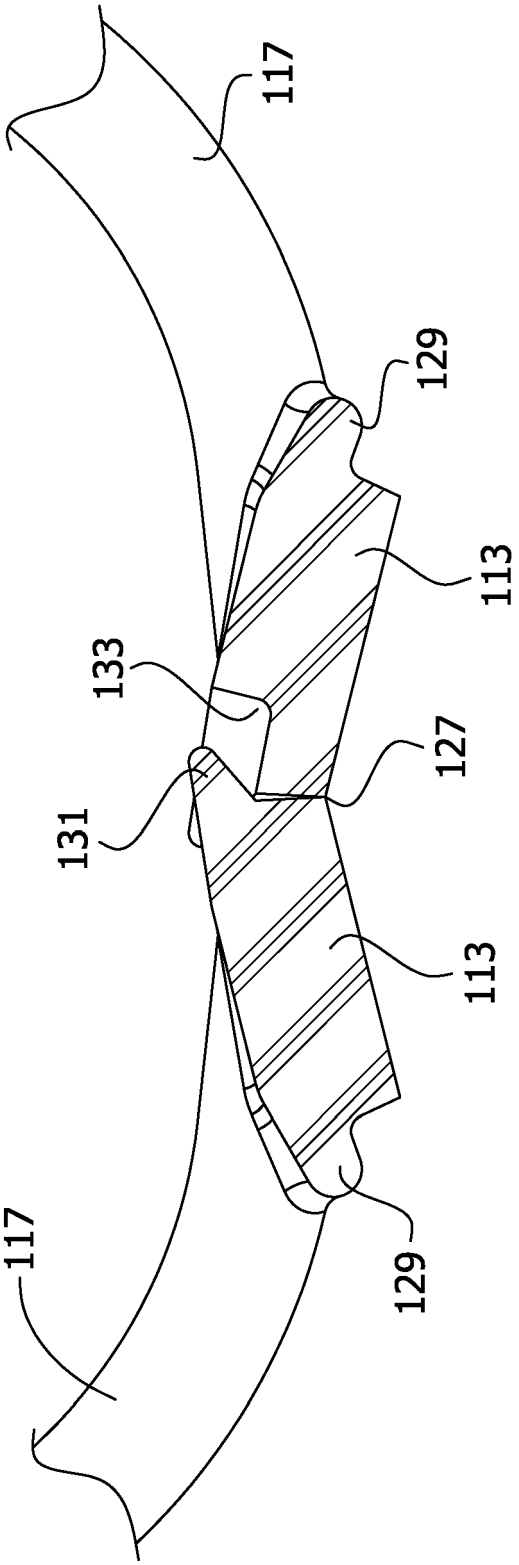


FIG. 19

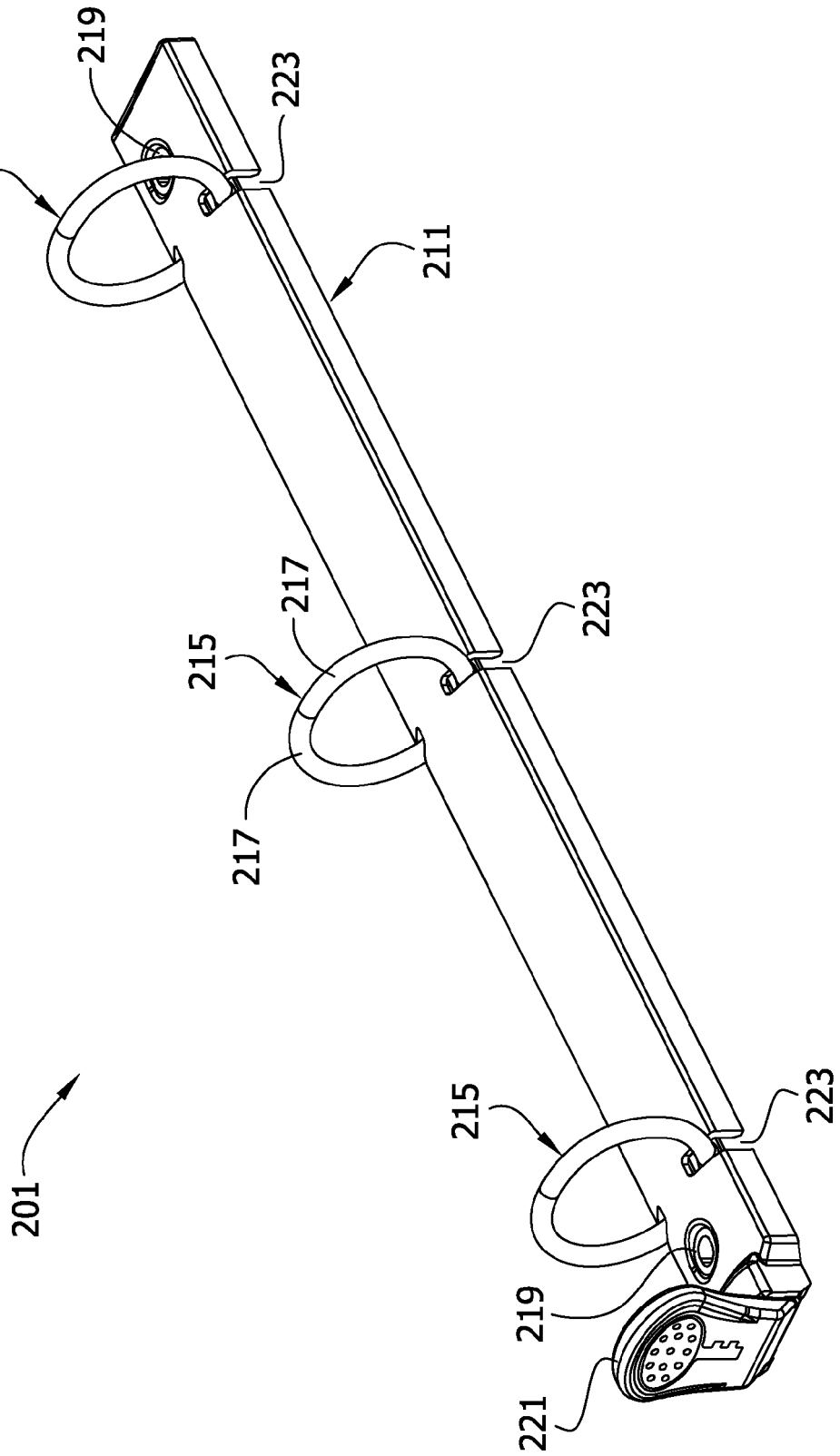
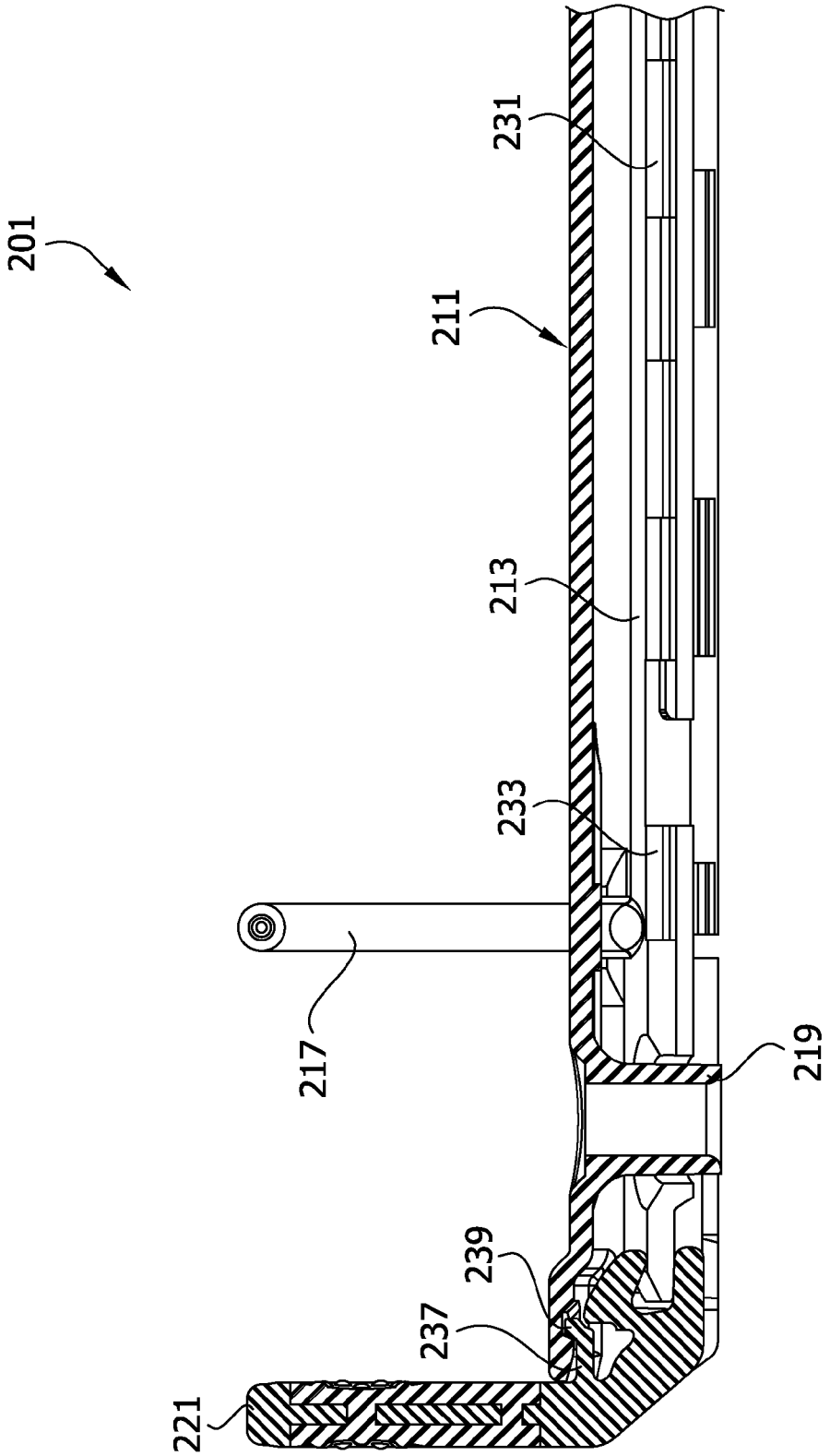


FIG. 20



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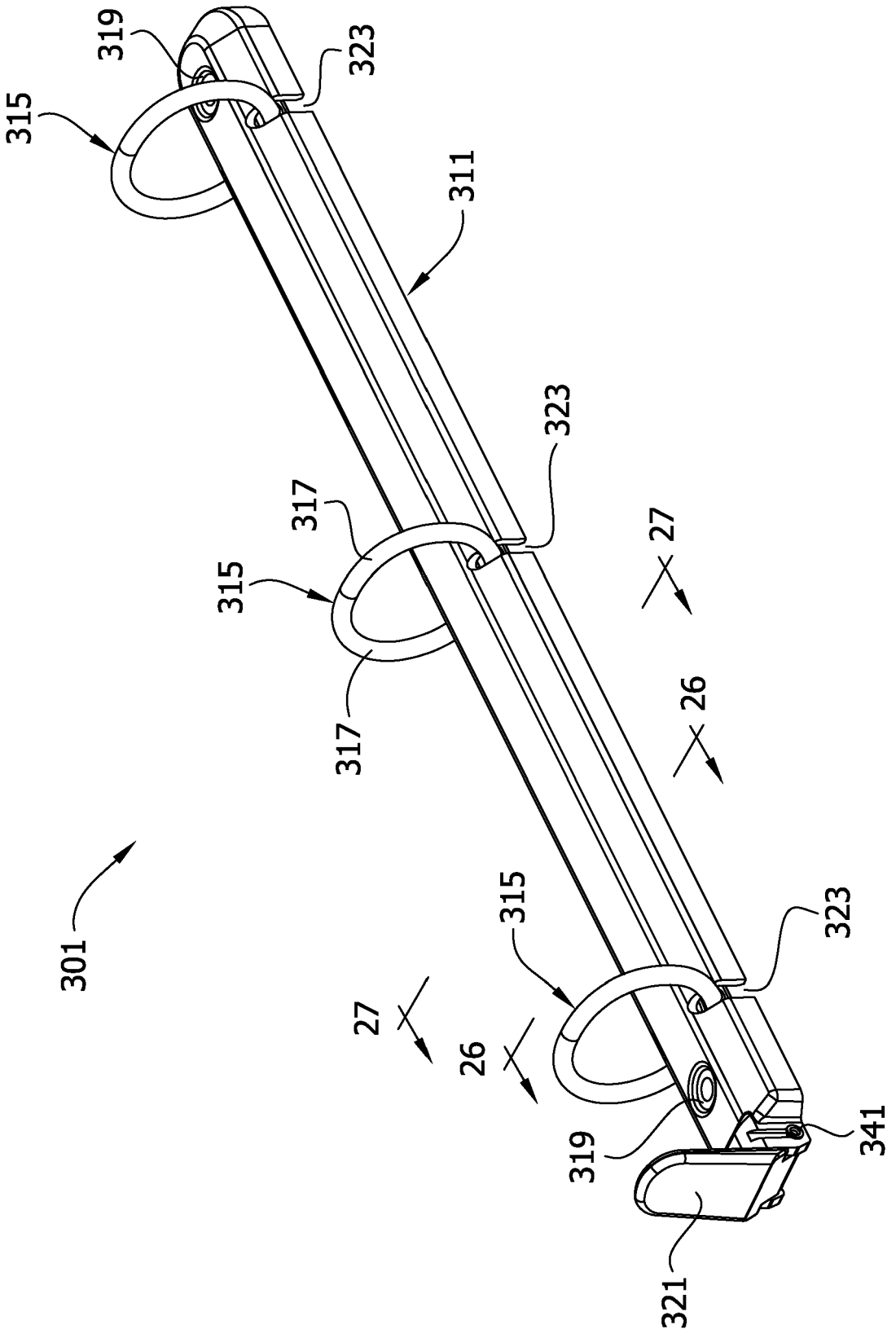
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FIG. 22

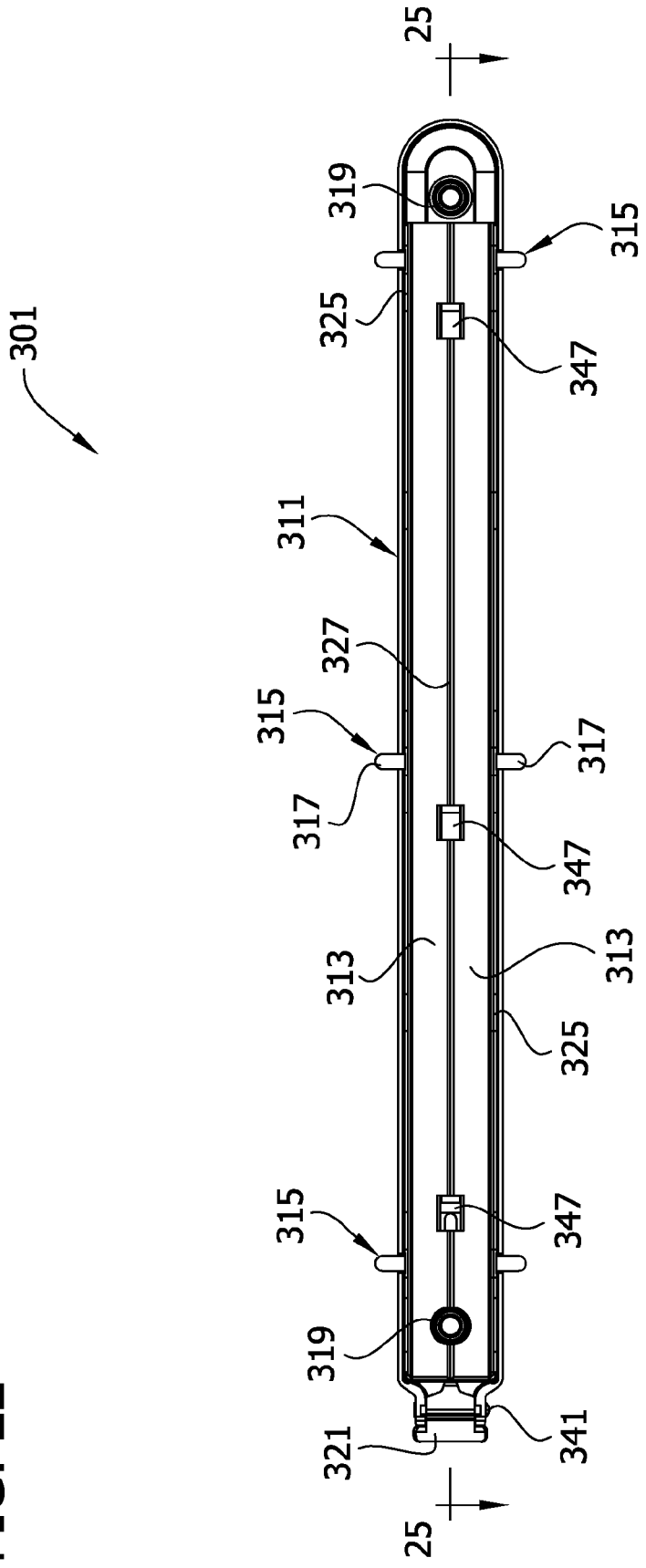
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FIG. 23

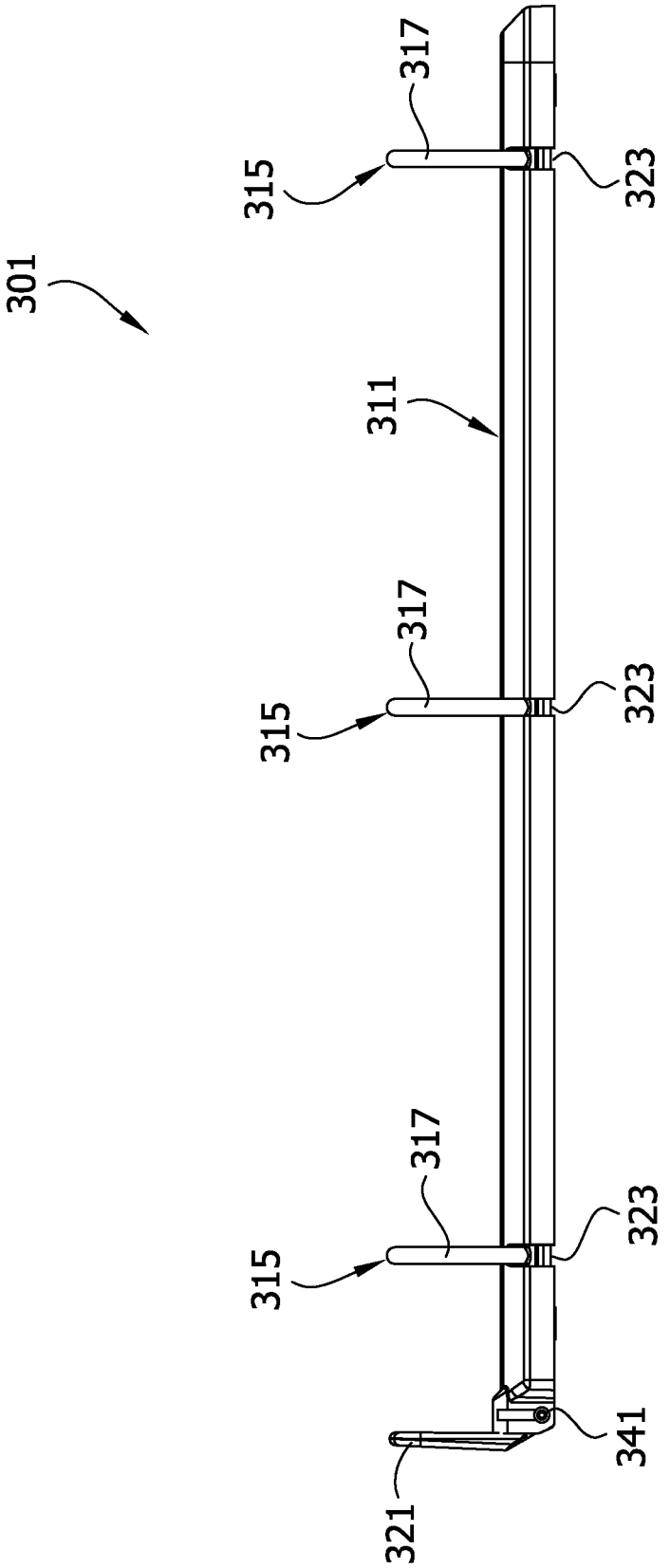

FIG. 24

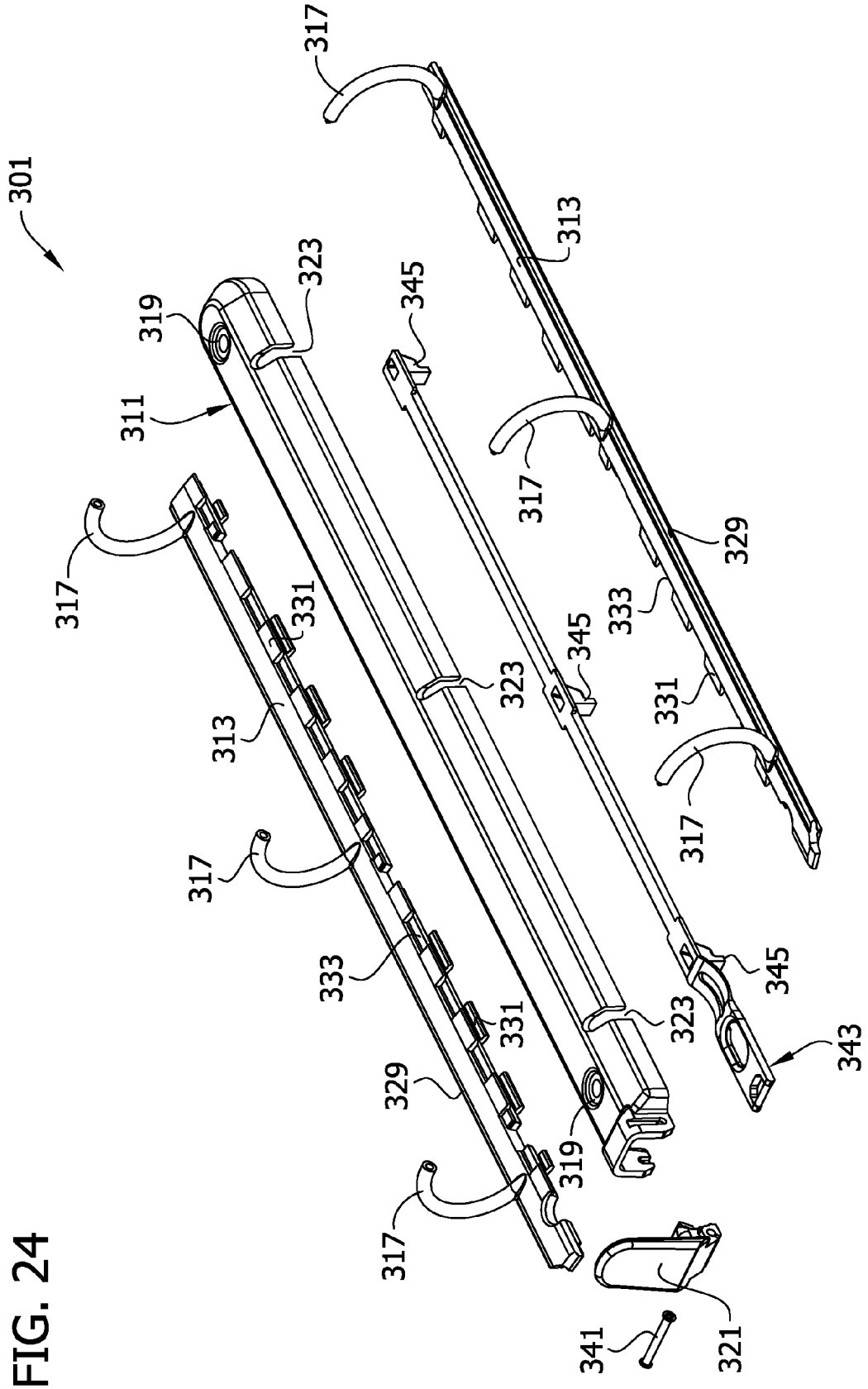

FIG. 25

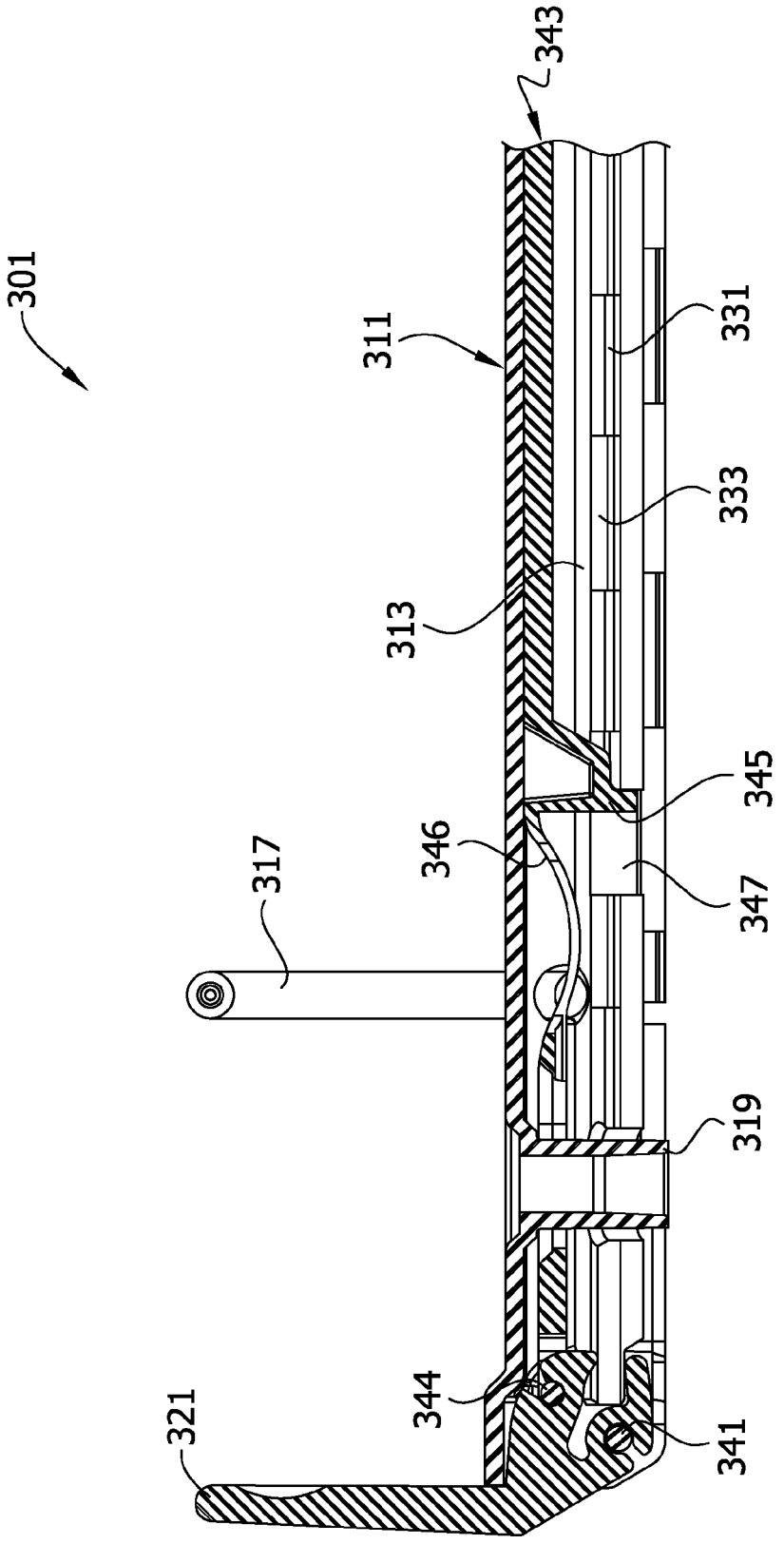

FIG. 26

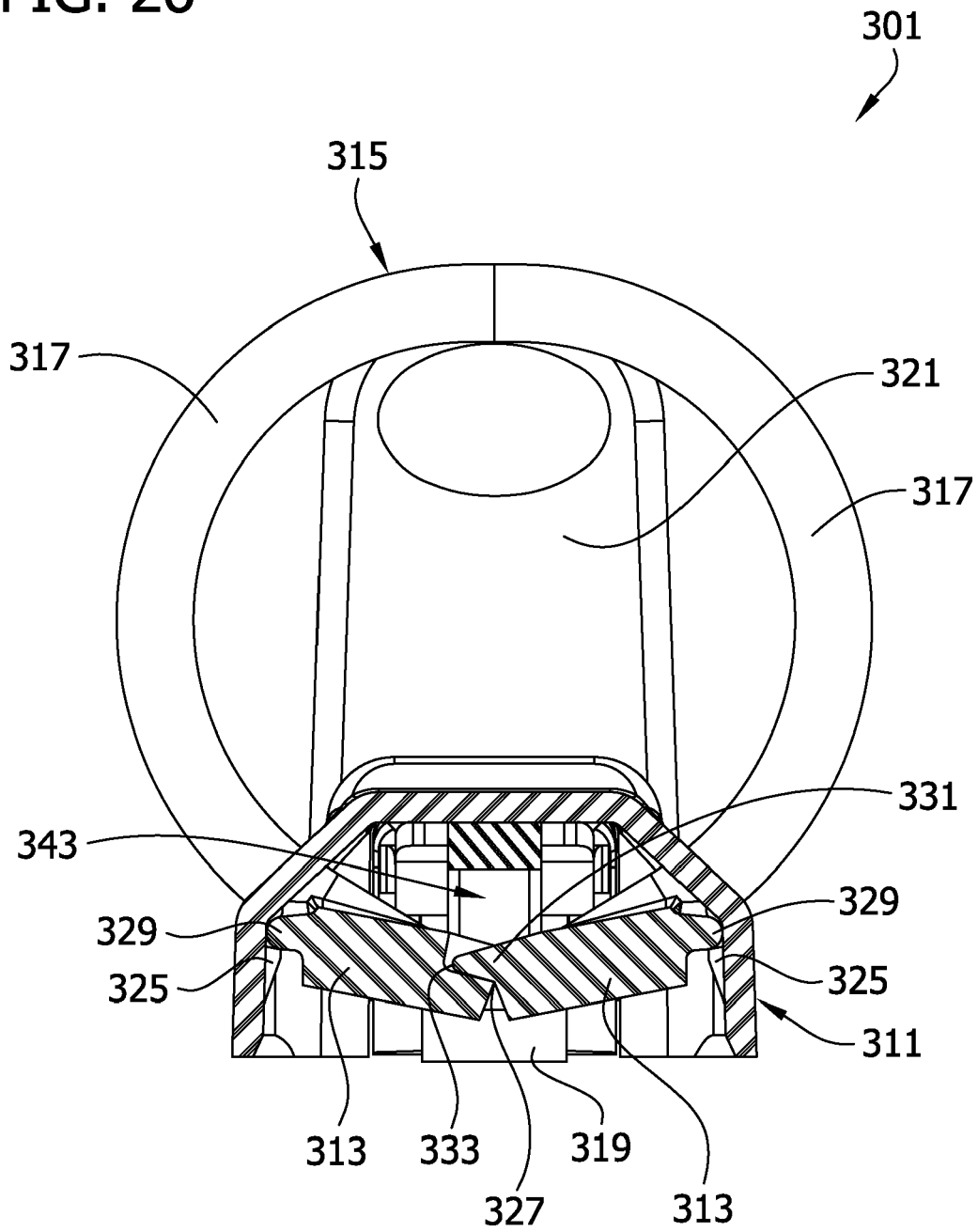
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FIG. 27

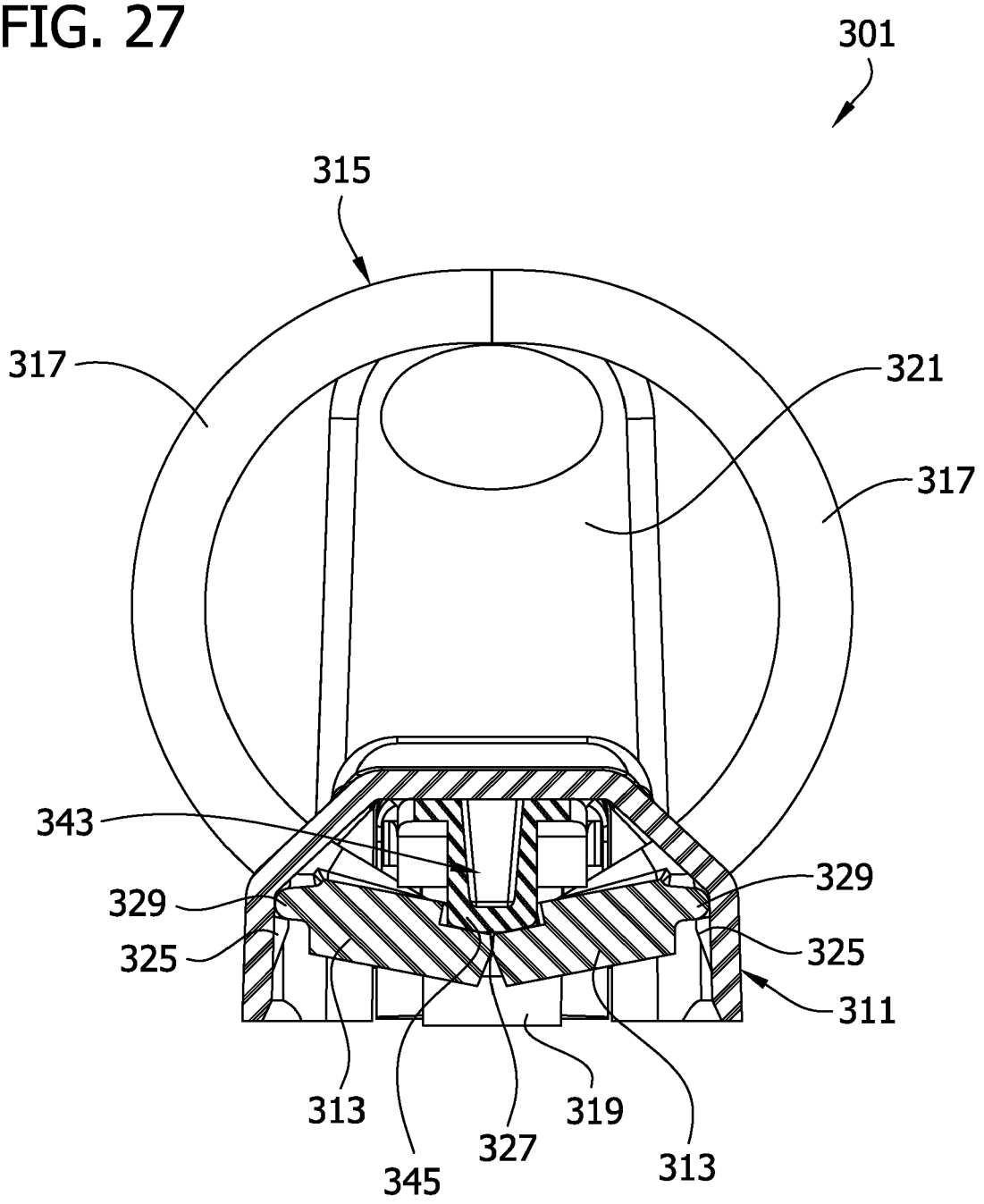
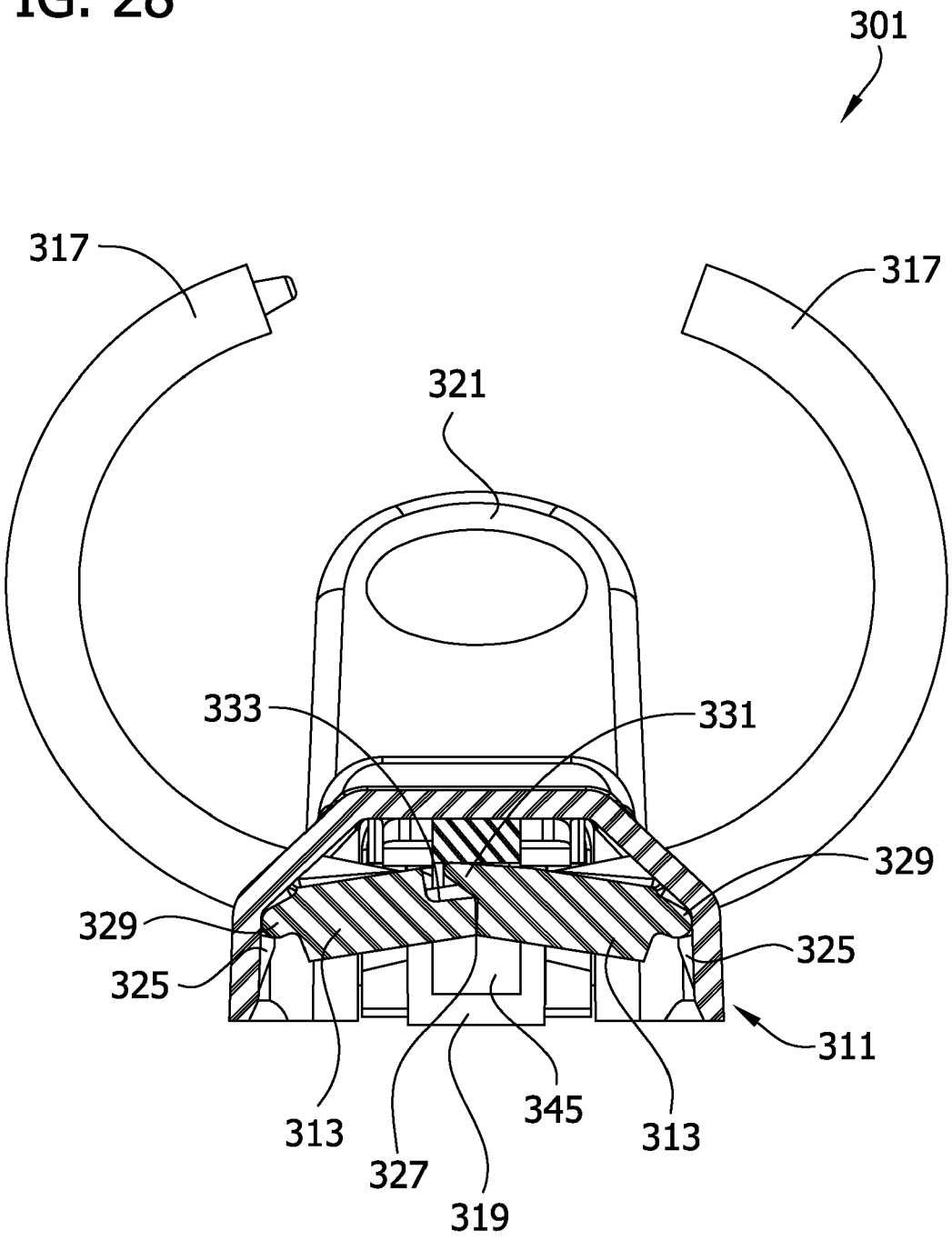


FIG. 28



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Application Number
EP 14 18 6275

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X Y	EP 1 795 367 A2 (KING JIM CO LTD [JP]) 13 June 2007 (2007-06-13) * column 2, paragraph 9 - column 13, paragraph 55; figures 1-22b * -----	1-4,7-15 5,6	INV. B42F13/22 B42F13/38
X	WO 2012/066818 A1 (KOKUYO KK [JP]; KOIKE SEIICHI [JP]; ONISHI HARUKO [JP]) 24 May 2012 (2012-05-24) * figures 1-41 * -----	1-4,7, 10-13,15	
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Y	WO 02/36359 A2 (WORLD WIDE STATIONERY MFG CO [CN]; HEDELY NICHOLAS JAMES MATTHEW [GB];) 10 May 2002 (2002-05-10) * page 4, line 13 - page 17, line 13; figures 1-20b * -----	1-15	

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B42F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 March 2015	Kelliher, Cormac

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