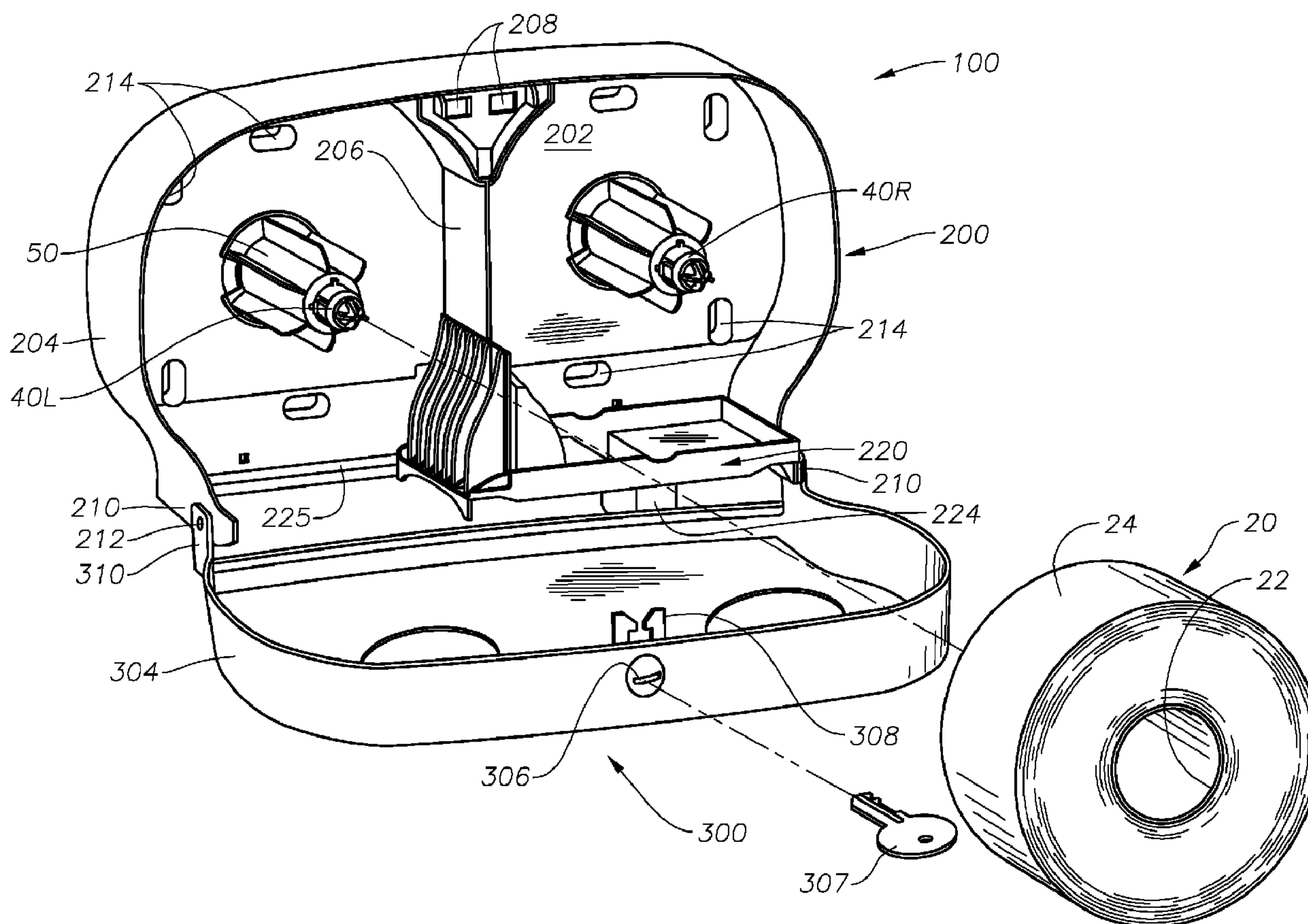




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(57) Abrégé/Abstract:

A tissue dispenser (100) is provided by which a user may access one or more rolls (20) of tissue. The dispenser generally includes a base (200) and a cover (300). The dispenser includes at least one spindle (40), and preferably left and right spindles (40L 40R),

(57) **Abrégé(suite)/Abstract(continued):**

with each spindle being supported by and extending from the base. The dispenser also has a plurality of sleeves (50) interchangeably disposed on the shafts of the spindles. Each sleeve has an inner diameter dimensioned to receive a corresponding spindle, and an outer diameter. A plurality of fins is radially disposed on the outer diameter of the sleeve to circumferentially support the inner diameter of a core (22) of a tissue roll. Different sleeves having different outer diameters to accommodate tissue rolls having different core sizes are provided. The dispenser may also include a door assembly (220) configured to selectively cover a tissue roll on either the left or the right side of the base.

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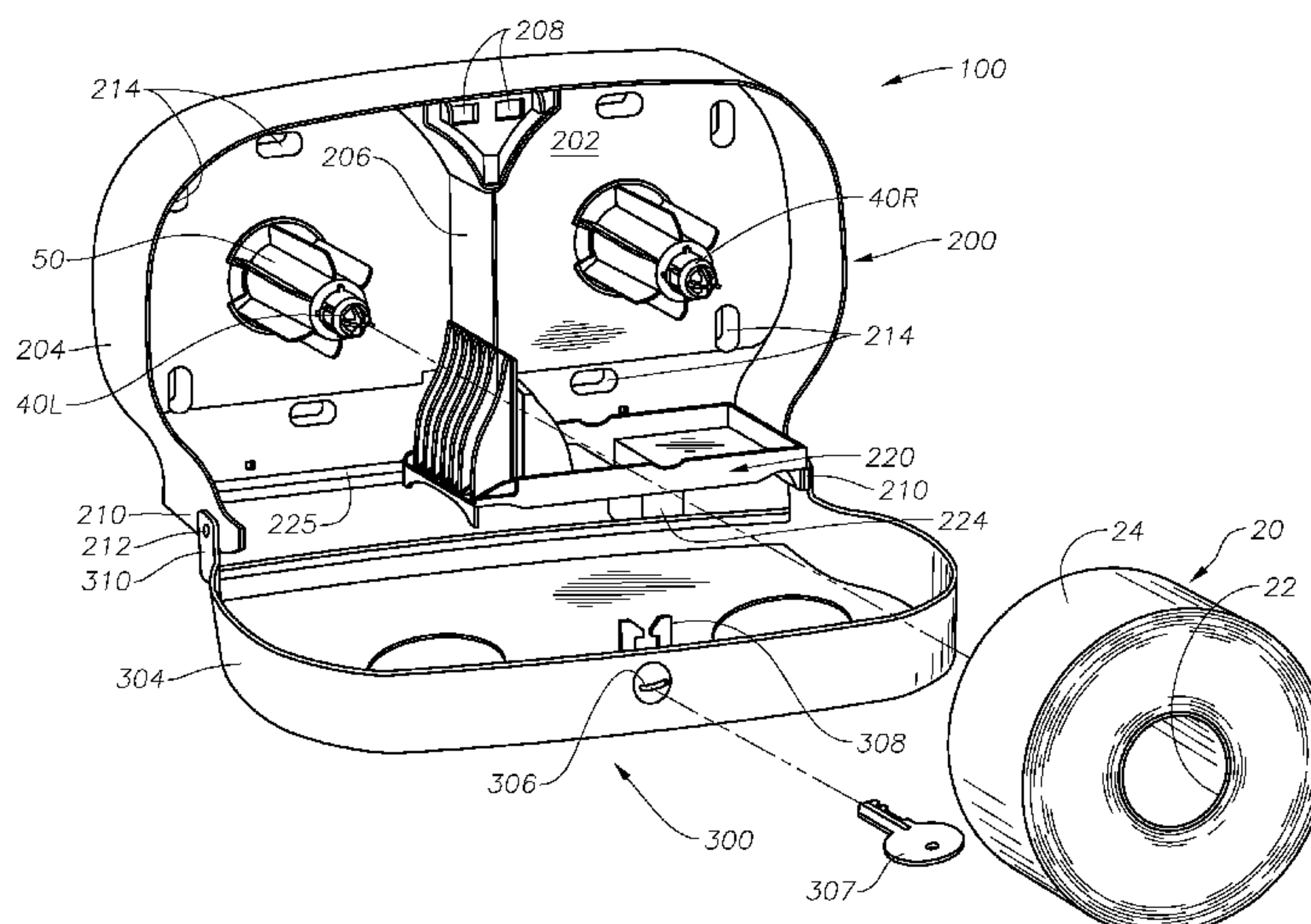
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(54) Title: VERSATILE CORE SIZE TISSUE DISPENSER



(57) **Abstract:** A tissue dispenser (100) is provided by which a user may access one or more rolls (20) of tissue. The dispenser generally includes a base (200) and a cover (300). The dispenser includes at least one spindle (40), and preferably left and right spindles (40L 40R), with each spindle being supported by and extending from the base. The dispenser also has a plurality of sleeves (50) interchangeably disposed on the shafts of the spindles. Each sleeve has an inner diameter dimensioned to receive a corresponding spindle, and an outer diameter. A plurality of fins is radially disposed on the outer diameter of the sleeve to circumferentially support the inner diameter of a core (22) of a tissue roll. Different sleeves having different outer diameters to accommodate tissue rolls having different core sizes are provided. The dispenser may also include a door assembly (220) configured to selectively cover a tissue roll on either the left or the right side of the base.

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VERSATILE CORE SIZE TISSUE DISPENSER

BACKGROUND OF THE INVENTION

5 **Field of the Invention**

The present invention relates to the field of dispensers. More specifically, the present invention relates to dispensers which are capable of accommodating different sizes of tissue rolls and tissue roll cores.

Background of the Invention

10 Toilet tissue is usually manufactured and marketed in rolls. The rolls are attached to dispensers which are mounted on a wall. Toilet tissue rolls used in a commercial setting have core-diameters ranging from 2.54 cm (1 inch) to 10.16 cm (4 inch), while household rolls generally have a more standard core diameter of about 3.81 cm (1.5 inches).

15 In a commercial setting, toilet tissue dispensers oftentimes support multiple rolls. Wall mounted devices for dispensing multiple tissue paper rolls are known in the art. Such rolls typically may support the axis of each roll either parallel to or perpendicular to a mounting wall. For example, U.S. Patent No. 3,294,329 describes a dispenser wherein tissue rolls are mounted in a side-by-side orientation, with the axis of each roll perpendicular to the wall of a washroom. U.S. Patent No. 4,872,601 describes a dispenser wherein industrial sized rolls, as opposed to
20 personal sized rolls, are mounted in a side-by-side orientation.

25 In commercial dispensers, a spindle is provided to support the various tissue rolls. Various spindle arrangements for wall-mounted dispensers exist in the marketplace. Such spindle arrangements may accommodate two, three or four rolls. A two-roll dispenser may have a movable top spindle which drops out of an enclosure either by pressing a button or alternatively being automatically tripped when the lower roll is depleted. Another multiple roll dispenser is in the form of a carousel that allows the user to rotate sequential rolls along the wall of the washroom. Other tissue dispensers, such as that described in U.S. Patent No. 4,807,823, have a top roll holder and a bottom roll holder, both of which have fixed spindles. An enclosure

is provided over the top roll so that the user cannot remove tissue sheets from the top roll until the bottom roll has been depleted.

The capacity of a tissue roll is dependent upon the size of the core diameter and roll width. Most commercial toilet tissue dispensers limit roll size versatility because each dispenser
5 only accepts one core size and/or one tissue roll size. As a result, a dispenser that can accept various sized core diameters would allow a user to load a wide variety of commercial grade tissue rolls. By having one dispenser that can provide tissue from different sized rolls, the need to purchase a plurality of different dispensers to accommodate each core size is eliminated.

U.S. Patent No. 6,364,245 describes a tissue dispenser with adaptable spindle core
10 support structures that may be used with at least two different diameter cores of a toilet tissue roll. The core support structures project from and attach to the back wall of the dispenser. The supports are stationary and do not concurrently rotate with an engaged tissue core. A user pulling the tissue from the roll must exert enough effort to overcome any frictional resistance between the tissue core and the corresponding, stationary core support. As a result of the higher
15 friction from a non-rotating core, tissue may prematurely break when pulled, causing inconvenience for the user.

Therefore, there exists a need in the art for a tissue dispenser having a means for accommodating tissue rolls of various inner core diameters. A need further exists for a tissue dispenser that prevents the premature accessibility of one tissue roll before another roll is
20 substantially exhausted, and that accommodates tissue rolls of different outer diameters. There further exists a need for such a tissue dispenser wherein the support structure rotates with the roll.

SUMMARY OF THE INVENTION

The benefits and advantages of the present invention are achieved by an improved tissue
25 dispenser capable of accommodating tissue rolls having different inner core sizes and different outer diameters. The dispenser generally includes a base and at least one spindle. In one aspect, a first spindle and a second spindle are provided. Each spindle extends from the base, and is rotatable relative to the base. Each spindle has an elongated shaft terminating at a tip distally from the base. Preferably, the tips of the spindles are shaped to operatively engage outer knobs

along the cover. In this manner, a user may rotate the spindles and supported tissue rolls by rotating the knobs external to the dispenser.

The dispenser also has a plurality of sleeves interchangeably disposed on the shafts of the one or more spindles. Each sleeve comprises an elongated shaft with an inner diameter
5 dimensioned to receive the shaft of the spindle. The sleeves optionally have slots to receive a corresponding spline of the spindle. In this way, rotational movement of the spindle imparts rotational movement to the sleeve. Finally, the sleeves may have a plurality of fins radially disposed on the outer diameter. The fins have a width dimensioned to circumferentially support the inner diameter of a core of a tissue roll. In accordance with one aspect of the present
10 invention, the widths of the fins for the sleeves vary so as to accommodate tissue rolls having different inner core sizes.

The dispenser also preferably includes a door assembly. The door assembly is configured to selectively prevent access to a tissue roll on either the first or the second side of the base. Preferably, the door assembly is biased to a right side, and a door catch is provided to selectively
15 hold the door assembly to a left side after a left tissue roll has been substantially exhausted.

A plurality of snap fittings configured to releasably attach to the door assembly may also be provided. Each snap fitting has a different height to prevent the premature movement of the door assembly by the user from one side of the tissue dispenser to the other, depending upon the diameter of the core of the tissue rolls used. Preferably, the selected snap fitting releasably
20 attaches along a horizontal base of the door assembly.

The dispenser preferably has an outer first knob and an outer second knob. Each knob is supported on the cover. The outer first and second knobs are aligned with the tips of the first and second spindles, respectively, such that rotation of the first knob causes the first spindle and supported sleeve to rotate, while rotation of the second knob causes the second spindle and
25 supported sleeve to rotate.

In another aspect, this invention provides a tissue dispenser by which a user may access a role of tissue comprising:

(A) a base;

(B) at least one spindle, the spindle rotating relative to the base and having an elongated shaft extending from the base and terminating at a tip distally from the base; and

(C) a plurality of sleeves interchangeably disposed on the shaft of the spindle, each sleeve comprising an elongated shaft terminating at an end, the shaft having an inner diameter dimensioned to receive the shaft of the spindle, and an outer diameter,

wherein the plurality of sleeves and the elongated shaft of each of the at least one spindle rotate together; and

wherein at least two of the plurality of sleeves are configured to support tissue rolls having cores of different diameters.

Preferably, the shaft of the spindle comprises at least one, and possibly two or three, splines. In addition, each of the plurality of sleeves preferably includes a slot for receiving a corresponding spline so that each of the plurality of sleeves and the elongated shaft of each of the at least one spindle rotate together. In one aspect slots are placed in the end of each of the sleeves.

In one aspect, the sleeves have different outer diameters dimensioned to support tissue rolls having cores of about 2.5 cm to about 11.0 cm in diameter. For instance, the plurality of sleeves may comprise (i) a first pair of sleeves, with each of the sleeves having outer diameters dimensioned to support tissue rolls having a core diameter of about 5.84 cm; and (ii) a second pair of sleeves, with each of the sleeves having outer diameters dimensioned to support tissue rolls having a core diameter of about 8.38 cm.

In one embodiment, each of the plurality of sleeves further comprises at least one fin disposed on the outer diameter of the sleeve. The at least one fin has a width dimensioned to circumferentially support the core of a tissue roll. The at least one fin may comprise a plurality of fins radially disposed around the outer diameter of the shaft of the corresponding sleeve. For some sleeves, the fins provide the outer diameter of the sleeves used to support the tissue rolls.

In one embodiment, the at least one spindle defines a single spindle. The single spindle is configured to rotate relative to the base, and to receive and support a tissue roll having a core diameter of about 2.8 cm. In another embodiment, the at least one spindle defines a left and a

right spindle, with each spindle receiving one of the plurality of sleeves for supporting a tissue roll.

In one embodiment, the tissue dispenser further comprises:

- 5 (D) a cover pivotally connected to the base for selectively covering the left and right spindles and supported tissue rolls.

The base may further comprise a side wall along the base having opposing ends, with each end of the side wall defining a pivot arm, and a pin disposed in each of the pivot arms to provide pivoting connections between the side walls and the cover.

In one embodiment, the tissue dispenser further comprises:

- 10 (E) a door assembly configured to selectively cover a tissue roll on either the left or the right side of the base.

The door assembly may further comprise a horizontal base, and a handle for engaging the door assembly by a user. Preferably, the door assembly is biased to a first side of the tissue dispenser, and further comprises a door stop and a door catch disposed in the base of the tissue dispenser for releasably receiving the door stop and holding it on an opposing second side of the tissue dispenser.

In one embodiment, the tissue dispenser further comprises:

- 20 (F) a plurality of snap fittings configured to releasably attach to the door assembly, with each snap fitting having a different height to prevent the premature movement of the door assembly by the user from a first side of the tissue dispenser to a second side, depending upon the diameter of the core of the tissue rolls used.

The snap fittings preferably attach releasably to the horizontal base of the door assembly.

In one embodiment, the at least one spindle comprises a left spindle and a right spindle, and the tissue dispenser further comprises:

(G) an outer left knob and an outer right knob each supported on the cover, with the outer left and right knobs being aligned with the tips of the left and right spindles, respectively, wherein (i) rotation of the left knob causes the left spindle and supported sleeve to rotate; and (ii) rotation of the right knob causes the right spindle and supported sleeve to rotate.

In this instance, the tips of the left and right spindles each comprises a shaped surface that mates with an inner surface of the left and right knobs, respectively. Preferably, the inner surface of the left and right knobs further comprises a separate washer member.

In another embodiment, a tissue is provided that includes:

(A) a base having a side wall;
 (B) a left spindle and a right spindle, each spindle being supported by and extending from the body and being rotatable relative to the body, and each spindle having an elongated shaft terminating at a tip distally from the base with at least one spline extending along the shaft;

(C) a plurality of sleeves interchangeably disposable on the shafts of the spindles, each sleeve comprising:

an elongated shaft terminating at an end, the shaft having an inner diameter dimensioned to receive the shaft of the spindle,

at least one slot to receive a corresponding spline of the spindle, and

a plurality of fins radially disposed on the sleeves to form an outer diameter, the fins having a width dimensioned to circumferentially support the inner diameter of a core of a tissue roll; and

wherein the plurality of sleeves comprises:

a first pair of sleeves having fins dimensioned to form an outer diameter of each sleeve that is about 5 cm to 7 cm in width; and

a second pair of sleeves having fins dimensioned to form an outer diameter of each sleeve that is about 7 cm to about 10 cm in width,

so as to support tissue rolls having cores of different inner diameters;

(D) a cover pivotally connected to the tissue dispenser base for covering the left and right sleeves;

(E) a door assembly configured to selectively cover a tissue roll on either the left or the right side of the base; and

(F) a plurality of snap fittings configured to releasably attaché to the door assembly, with each snap fitting having a different height to prevent the premature movement of the door assembly by the user from one side of the tissue dispenser to the other, depending upon the diameter of the core of the tissue rolls used.

In one embodiment, the at least one spindle comprises a left spindle and a right spindle. In this instance, the tissue dispenser further includes:

(G) an outer left knob and an outer right knob each supported on the cover, with the outer left and right knobs being aligned with the tips of the left and right spindles, respectively, wherein:

rotation of the left knob causes the left spindle and supported sleeve to rotate; and

rotation of the right knob causes the right spindle and supported sleeve to rotate.

The spindle may optionally further comprise an elastically formed catch at the tip of the spindle. In this instance, each of the plurality of sleeves may further comprise a radial, inwardly formed shoulder for engaging the catch when the inner diameter of the sleeve receives a spindle.

In one arrangement for this embodiment the door assembly is biased to a first side of the tissue dispenser. In this instance, the door assembly comprises a horizontal base, a handle for engaging the door assembly by a user, a door stop, and a door catch disposed in the body of the base of the tissue dispenser for releasably receiving the door stop and holding it on a second opposite side of the tissue dispenser.

The tissue dispenser may further comprise:

(H) a locking assembly for selectively locking and unlocking the cover to the base.

In one particular arrangement,

of the spindles is configured to rotate relative to the base, and to receive and support a tissue roll having a core diameter of about 2.8 cm, without using a sleeve;

each of the sleeves in the first pair of sleeves has an outer diameter dimensioned to support tissue rolls having a core diameter of about 5.84 cm; and

each of the sleeves in the second pair of sleeves has an outer diameter dimensioned to support tissue rolls having a core diameter of about 8.38 cm.

5 BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the features of the present invention can be better understood, certain drawings are appended hereto. It is to be noted, however, that the drawings illustrate only selected embodiments of the inventions and are therefore not to be considered limiting of scope, for the inventions may admit to other equally effective embodiments and
10 applications.

Figure 1 is a perspective view of the dispenser of the present invention, in one embodiment. Two tissue rolls are shown within the dispenser, in phantom.

Figure 2 is a perspective view of the dispenser of Figure 1, with the cover opened to expose the base. No tissue roll is loaded into the dispenser so that internals of the dispenser may
15 be more clearly seen.

Figure 3 is an enlarged view of the base of the dispenser of Figure 1. The cover is removed from the base for illustrative purposes. The door assembly is positioned on the right side of the base. Sleeves have not been positioned on the spindles of the base.

Figures 4A and 4B provide perspective views of two different snap fittings for the base.
20 The snap fitting of Figure 4A has a height that is shorter than the snap fitting of Figure 4B.

Figure 5 is a rear perspective view of a spindle being moved through the right opening of the base.

Figure 6 is an enlarged view of the base of the dispenser of Figure 1. The cover has been removed from the base for illustrative purposes. A single roll of tissue has been loaded
25 onto the left spindle. A sleeve is seen on the right spindle.

Figure 7 provides a perspective view of an exemplary spindle and an exemplary sleeve. The sleeve is exploded away from the spindle.

Figures 8A and 8B provide perspective views of two different embodiments of sleeves. The sleeve of Figure 8A has fins that are of a smaller width than the sleeve of Figure 8B.

5 Figure 9 is a perspective view of the inner surface of a portion of the cover of Figures 1 and 2. The knob and inner washer are shown exploded away from the right opening of the cover.

Figure 10 shows a perspective view of the knob and inner washer of Figure 9, but with the cover removed for illustrative purposes. The tip of a spindle is seen engaging the ridges of the inner washer. The sleeve is not shown.

10 DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

Definitions

As used herein, the term "tissue" refers to any woven or nonwoven substrate fabricated from cellulosic or synthetic fibers.

15 The term "core" means a central, substantially cylindrical opening about which tissue is wound or rolled. The core may be a supporting member or may simply be a reserved opening.

Description of Specific Embodiments

20 **Figure 1** presents a perspective view of a dispenser **100** of the present invention, in one embodiment. The purpose of the dispenser **100** is to dispense tissue (such as toilet tissue) to a user. The dispenser **100** is shown in a vertical orientation, ready for use. In operation, the tissue dispenser **100** is preferably secured to a vertical surface such as a bathroom wall or stall (not shown).

25 The dispenser **100** includes a base **200**, and corresponding cover **300**. The base **200** is secured to the vertical surface (not shown), while the cover **300** pivotally attaches to the base **200**. In one aspect, the tissue dispenser **100** dispenses a single roll of tissue. However, it is preferred that the dispenser **100** be a dual roll dispenser, permitting a pair of tissue rolls to be

dispensed in sequence. Alternatively, the dispenser **100** may accommodate three or more tissue rolls.

The illustrative dispenser **100** of **Figure 1** is a two-roll dispenser. The cover **300** is secured to the base **200** such that internal components of the two-roll dispenser **100** are not accessible. However, a pair of rolls **20**, **30** is shown in phantom and behind the cover **300**. The rolls represent a left roll **20** and a right roll **30**.

Figure 2 demonstrates a perspective view of the dispenser **100** of **Figure 1**, with the cover **300** being opened to expose the base **200**. No tissue roll is loaded onto the dispenser **100**. However, a left roll **20** is seen exploded away from the base **200**. More specifically, a left roll **20** is exploded away from a left spindle **40L** on the left side of the base **200**.

It can be seen that the exemplary left roll **20** comprises two aspects. First, the roll has a circular inner core **22**. Second, the roll **20** has tissue **24** wound over or around the core **22**. The core **22** serves as a central opening or supporting member about which the tissue **24** is wound or rolled. The tissue roll defines an outer diameter that must fit within the left side of the dispenser **100**.

Preferably, the tissue **24** of the tissue roll **20** is a substrate of airlaid, nonwoven fibers held together by a binding agent. A wide variety of natural and synthetic fibers are suitable for use as matrix fibers for the nonwoven tissue. Preferred matrix fibers are cellulosic fibers, though matrix fibers may also be synthetic fibers or a mixture of cellulosic and synthetic fibers. Cellulosic fibrous materials suitable for use in the dispenser **100** include both softwood fibers and hardwood fibers. Desirably, the cellulose fiber for use as a matrix fiber has been derived from a source which is one or more of Southern Softwood Kraft, Northern Softwood Kraft, hardwood, eucalyptus, mechanical, pre- and post-consumer recycled wood fibers and rayon, or Southern Softwood Kraft, Northern Softwood Kraft, or a mixture thereof. Southern Softwood Kraft is most preferred.

Binders suitable for use in the nonwoven material may be various bicomponent binder fibers or mixtures thereof, various latices or mixtures thereof, or bicomponent fibers or mixtures thereof in combination with various latices or mixtures thereof, which may be thermoplastic,

thermosetting or a mixture thereof. However, it is understood that the present invention is not limited by the type or composition of tissue **24** used.

Referring again to the dispenser **100**, and as noted previously, the dispenser **100** first includes a base **200**. The base **200** comprises a body **202** used to secure the base **200** to a supporting surface. The body **202** may be any plate, and preferably is a substantially planar body that supports tissue rolls **20**, **30**. Encompassing at least a portion of the body **202** is a side wall **204**. In the arrangement of **Figures 1** and **2**, the wall **204** is integral to the body **202** and covers the rolls **20**, **30** for aesthetic and hygienic purposes. An opening **205** (seen in **Fig. 3**) is retained along the side wall **204** at the bottom of the body **202** to provide an access to the tissue rolls **20**, **30** by a user.

Within the side wall **204** and central to the body **202** is a central plate **206**. The central plate **206** defines a vertical member that separates the left **20** and right **30** tissue rolls. The central plate **206** serves to prevent contamination between the rolls **20**, **30** and to isolate the right roll **30** while the left roll **20** is being used. The use of the central plate **206** is an optional feature.

Immediately above the central plate **206** is a pair of keyholes **208**. As will be discussed further below, the keyholes **208** are designed to mate with fingers **308** on the cover **300**. The keyholes interact with a lock **306**. Together the keyholes **208**, fingers **308** and lock **306** form a locking assembly to selectively lock the cover **300** to the base **200** so as to prevent unauthorized access. A key **307** is shown for manipulating the fingers **308**.

At opposing ends of the side wall **204** of the base **200** are pivot arms **210**. Each pivot arm **210** contains a pin opening which receives a pin **212**. As will be discussed further below, the pin **212** provides a pivoting connection between the base **200** and the cover **300**.

The base **200** also includes a plurality of connector openings **214**. The connector openings **214** are formed into the body **202** and are preferably oval in shape. Each connector opening **214** is designed to optionally receive a connector (not shown) such as a bolt or screw. In this manner, the base **200** may be secured to a vertical support surface such as a bathroom wall or stall (not shown).

Figure 3 presents an enlarged view of the base **200** of **Figures 1** and **2**. The cover **300** has been removed from the base **200** for illustrative purposes. In this view, various features of the base **200** are more clearly seen. These include the body **202**, the side wall **204**, the central plate **206**, and the keyholes **208**. Also visible in **Figure 3** is an optional door assembly **220**. The door assembly **220** serves to limit a user's access to one side of the dispenser **100** or the other when the cover **300** is over the base **200**. The door assembly **220** would not be needed where the dispenser includes only a single tissue roll.

The door assembly **220** first includes a horizontal base member **222**. In the view of **Figure 3**, the base member **222** is positioned along the right side of the base **200**. In this position, the user does not have access to a roll (not shown) which would be loaded on the right side of the dispenser **100**. The horizontal base **222** is designed to be slideable along the body **202** of the dispenser **100**. To accomplish horizontal movement, a handle **224** is provided below the horizontal base **222** of the door assembly **220**. A channel **225** is further provided along the body **202** in order to afford a track along which the horizontal base **222** may slide.

The door assembly **220** further comprises a door stop **226**. The door stop **226** is a generally triangular piece secured to the horizontal door base **222**. The door stop **226** and connected horizontal base **222** are biased to be in the right side of base **200**. The biasing feature is preferably a spring (not shown), which urges the door stop **226** and base **222** to the right. However, when the left tissue roll **20** is essentially exhausted, the user may slide the door stop **226** and horizontal base **222** towards the left side of the dispenser **100** along channel **225**. As the door stop **226** reaches the left side of the base **200**, it catches a door catch **228** in the body **202**. In this manner, the biasing effect of the door assembly **220** is overcome and the door stop **226** and horizontal base **222** are maintained on the left side of the base **200**. The user may then access the tissue roll **30** on the right side of the dispenser **100**.

An additional optional feature of the door assembly **220** is a snap fitting **240**. The snap fitting **240** also defines a generally triangular member. In the embodiment of **Figure 3**, the snap fitting **240** fits upon a left end of the horizontal base **222**. The snap fitting **240** serves as a barrier to prevent a user from sliding the door stop **226** and connected base **222** until the left roll **20** is substantially exhausted.

The snap fitting **240** is designed to be releasably engaged to the horizontal base **222**. In this way, snap fittings **240** of different sizes, i.e. different heights, may be employed. This, in turn, allows the dispenser **100** to functionally accommodate tissue roll sizes **20**, **30** of different outer diameters or different core sizes.

5 **Figures 4A and 4B** provide perspective views of two different snap fittings **240'** and **240''**. It can be seen that snap fitting **240'** of **Figure 4A** has a shorter height than snap fitting **240''** of **Figure 4B**. In this way, a maintenance person can control when the door assembly **220** can be moved from its right position to its left position, depending upon the diameter of the core **22** of the left tissue roll **20**. Thus, where the tissue roll **20** has a large core **22** and large outer
10 diameter, a shorter snap fitting (such as fitting **240'**) would be used. However, where the tissue roll **20** has a small diameter core **22** and a small outer diameter, then a taller snap fitting (such as fitting **240''** of **Figure 4B**) would be used.

It is noted that the operation of the door assembly **220** could be inverted. In this respect, the door assembly could be biased to the left side of the dispenser **100**, and the snap fitting **240'**
15 or **240''** could be keyed to the size of the right tissue roll **30** and core **32**. This is simply a designer's choice.

It can be seen from the enlarged view of **Figure 3** that the door assembly **220** remains positioned on the right side of the base. A large snap fitting (such as snap fitting **240''**) has been placed on the left side of the horizontal base **222** of the door assembly **220**. In this way, a tissue
20 paper roll **20** having a smaller core **22** may be accommodated.

Referring again to **Figures 1 and 2**, the tissue dispenser **100** includes a cover **300** pivotally secured to the base **200**. As with the base **200**, the cover **300** includes a body **302** and a generally radial side wall **304**. An opening is once again preserved in the side wall **304**, which generally corresponds with the access opening **205** preserved by the side wall **204** of the base
25 **200**. At opposing ends of the side wall **304** is a pair of pivot arms **310**. Pivot arms **310** generally correspond in position and function with pivot arms **210** of the base **200**. Each pivot arm **310** includes a pinhole which receives the pins **212**. In this manner, the pivot arms **310** of the cover **300** are pivotally secured to the pivot arms **210** of the base **200**.

In the perspective view of **Figure 2**, the cover **300** has been pivotally opened relative to the base **200**. In this way, the internal features of the base **200** and cover **300** are exposed. Further in this manner, a tissue roll such as left roll **20** may be loaded onto the base **200**. In the perspective view of **Figure 1**, the left **20** and right **30** tissue rolls have been loaded onto left **40L** and right **40R** spindles (spindles seen in **Figure 3**). Further, the cover **300** has been pivotally rotated into a locked position with the base **200**.

In order to secure the cover **300** to the base **200**, a locking assembly is provided. The locking assembly is seen in **Figure 2** on the cover **300** and includes a lock **306**. The lock **306** operates with a cam (not shown) which transmits pivoting movement to a pair of fingers **308** in response to rotating action of a key **307**. This means that rotation of the key **307** within the lock **306** permits a maintenance person to manipulate the position of the fingers **308**. In operation, the fingers **308** mate with keyholes **208** of the base **200**. Closing the cover **300** against the base **200** (**Figure 1**) causes the fingers **308** to lock into the keyholes **208** in a manner known in the art. Later, when a maintenance person desires to open the cover **300**, the maintenance person turns the lock **306** of the cover **300**, causing the fingers **308** to be released from the keyholes **208**. The cover **300** may then be swung open from its closed position in **Figure 1** to its opened position in **Figure 2**.

As indicated above, the tissue rolls **20**, **30** are supported by left **40L** and right **40R** spindles. The spindles **40L**, **40R** are more clearly seen in the enlarged perspective view of **Figure 3**. The two spindles **40L**, **40R** are preferably identical in configuration and dimension. The spindles **40L**, **40R** are designed to freely rotate relative to the body **202** of the base **200**. However, in one optional embodiment a level of friction may be selectively applied between the spindles **40L**, **40R** and the body **202** in order to impose a degree of difficulty in the rotation of the supported tissue rolls **20**, **30**.

Figure 5 provides a rear perspective view of a spindle **40R** being moved into the base **200**. More specifically, an exemplary spindle **40R** is being inserted into a right opening **230R** of the body **202** of the base **200**. It can be seen that the spindle **40R** has a base **42** that is designed to fit into the right opening **230R**. The circumference of the base **42** defines a bearing surface

for rotation within the right opening **230R**. The base **42** and connected spindle **40R** are secured to the body **202** by a locking washer **48** (seen in **Figs. 3** and **7**).

It can also be seen from the rear perspective view of **Figure 5** that the base **200** has a left opening **230L**. It is understood that the left opening **230L** will also receive a spindle (spindle **40L**) and a locking washer **48**. Each spindle **40L**, **40R**, in turn, will receive a core **22**, **32** of tissue rolls **20**, **30** respectively.

Moving now to **Figure 6**, **Figure 6** presents another enlarged view of the base **200** of **Figure 1**. The cover **300** has again been removed from the base **200** for illustrative purposes. It can be seen in this view that the left tissue roll **20** has been placed onto the left spindle **40L**. However, the roll **30** for the right spindle **40R** has been exploded away from the dispenser **100** and cut open. It can also be seen from **Figure 6** that the right spindle **40R** has a sleeve **50** positioned over its length. The sleeve **50** has a plurality of fins (seen at **58** in **Figure 7**) which engage the core **32** of a tissue roll **30** when it is placed onto the spindle **40R**. This means that while a sleeve **50** cannot be seen over left spindle **40L**, it is present but obscured by the left roll **20**.

In operation, sleeves **50** and connected fins **58** will receive cores **22**, **32** of the tissue rolls **20**, **30**. The sleeves **50**, in turn, are preferably secured to the spindles **40L**, **40R** so that there is no relative rotational movement. Stated another way, when spindle **40R** rotates, the sleeve **50** and connected tissue roll **30** likewise rotate. Similarly, when spindle **40L** rotates, the sleeve **50** and connected tissue roll **20** likewise rotates. However, the locking washers **48** do not rotate, but secure the spindles **40L**, **40R** to the body **202**.

Figure 7 shows a perspective view an exemplary spindle **40** and an exemplary sleeve **50**. The sleeve **50** is exploded away from the spindle **40**. Relative features of the spindle **40** and the sleeve **50** are more clearly seen.

First, concerning the spindle **40**, it can be seen that the spindle **40** includes a base **42**, and an elongated shaft **43** that terminates at a tip **44**. The base **42** of the spindle **40** engages an opening (such as left opening **230L**) in the body **202** of the dispenser **100**. A circumference of the base **42** serves as a bearing surface within the body **202** of the base **200**.

The shaft **43** of the spindle **40** extends outwardly from the body **202** of the base **200**. The shaft **43** preferably has a circular profile, although other profiles may be used. The shaft **43** terminates at a tip **44**. In the illustrative embodiment of **Figure 7**, the tip **44** defines a smaller diameter than the shaft **43**. This permits the tip **44** to mate with an end **54** of the sleeve **50**, as
 5 will be more fully described below.

Along the outer diameter of the shaft **43** is one or more splines **46**. The splines **46** engage mating slots **56** at the end **54** of the sleeve **50**. The end **54** of the sleeve defines a radially inward shoulder that includes slots **56**. The slots **56** receive the splines **46**. In this manner, relative rotation of the spindle **40** and the sleeve **50** is prohibited.

10 The tip **44** of the spindle **40** optionally includes an elastically formed catch **55**. The catch **55** is designed to interact with the radial, inwardly formed shoulder defining the end **54** of the sleeve **50**. In this way the sleeve **50** is secured onto the spindle **40** during operation. The catch **55** can be released by a maintenance person by pressing the catch **55** inward to clear the shoulder **54**.

15 Along an outer diameter of the spindle **40** is placed the locking washer **48**. The locking washer **48** has a circular profile. Along its outer diameter are tabs **49** configured to snap into corresponding openings **209** in the body **202**. In one optional arrangement, the washer **48** provides a degree of friction against the rotation of the spindle. In such an arrangement (not shown), the washer **48** may optionally be adjusted to increase or decrease the inertial rotation of
 20 the tissue roll **20** or **30** during dispensing.

Referring again to the tip **44** of the spindle **40**, the tip **44** defines a shaped surface. In the preferred embodiment, the shape is a cross fabricated from two, transverse and intersecting ridges. As will be discussed further below, these ridges mate with a shaped surface on the inner surface of an exterior knob **330**.

25 Turning next to the sleeve **50**, the sleeve **50** includes a base **52**, and a shaft **53** terminating at the end **54**. The shaft **53** of the sleeve **50** defines a hollow member having an inner diameter configured to receive the shaft **43** of the spindle **40**. Further, the end **54** of the sleeve **50** includes an opening which receives the tip **44** of the spindle **40**. As noted, the end **54** of the sleeve **50**

defines an inward, radial shoulder having slots **56**. The slots **56** mate with the splines **46** along the outer surface of the shaft **43** of the spindle **40**.

As also seen in **Figure 7**, the sleeve **50** includes a plurality of fins **58**. The fins **58** are radially spaced about the shaft **53** of the sleeve **50**. Preferably, the fins **58** frictionally engage the inner diameter of the cores **22**, **32** of tissue rolls **20**, **30**. The fins **58** form an outer diameter that support the tissue roll core for each roll **20**, **30**.

In accordance with the present invention, sleeves **50** have different outer diameters. In one aspect, this is accomplished by providing different fin sizes. **Figures 8A** and **8B** provide perspective views of two different embodiments of illustrative sleeves **50'**, **50''**. The sleeve **50'** of **Figure 8A** has fins **58'** that are of a smaller width than the fins **58''** of the sleeve **50''** of **Figure 8B**. As with snap fittings **240'**, **240''**, different sizes of sleeves **50'**, **50''** may be used depending upon the size of the tissue roll **20**, **30**. Once again, a driving factor in the size determination is the inner diameter of the cores **22**, **32**.

In the commercial context, tissue roll cores typically run from about 2.5 cm to about 10.5 cm. Preferably, various sets of sleeves **50** having different outer diameters between about 1.5 cm and 11.0 cm are provided to accommodate core sizes within this range. In one aspect, one set of sleeves **50'** forms an outer diameter that is 5.84 cm (2.3 inches) in diameter, while another set of sleeves **50''** forms an outer diameter that is 8.38 cm (3.3 inches) in diameter. Further, it is preferred that the outer diameter of the supporting spindle **40** have a diameter of 2.8 cm (1.1 inches). In this way, at least three different core-diameters are readily accommodated.

In one aspect, the plurality of sleeves comprises a first set of sleeves, each sleeve having fins that form an outer diameter of about 2.8 cm (1.1 inches), a second set of sleeves with each sleeve forming an outer diameter of about 5.84 cm (2.3 inches), a third set of sleeves where each sleeve forms an outer diameter of about 8.38 cm (3.3 inches), and a fourth set of sleeves that each provide an outer diameter of about 10.16 cm (4 inches). However, any variation of diameters may be provided between about 1.1 cm and 11.0 cm. Again, it is preferred that the outer diameter of the supporting spindle **40** itself have a diameter of 2.8 cm (1.1 inches) to support the smallest cores.

An additional feature of the tissue dispenser **100** is the ability of the user to rotate a spindle **40** and connected sleeve **50** and tissue roll (**20**, **30**) from outside of the dispenser **100**. This may be done by rotating outer knobs **330L**, **330R** on the cover **300** (seen in **Figure 1**). **Figure 9** provides a perspective view of the inner surface of a portion of the cover **300** of **Figures 1** and **2**. Right knob **330R** is shown exploded away from an opening **332** of the cover **300**. A rear of the knob **330R** is seen. In addition, an inner washer **334** is seen exploded away from the cover **300**.

It can be seen that the knob **330R** provides a mating relationship with the washer **334**. The washer **334**, in turn, provides a mating relationship with the tip **44** of the spindle **40R**. In this way, rotation of the knob **330R** from outside of the cover **300** imparts rotational movement to the spindle **40R**.

Figure 10 is a perspective view of the outer knob **330R** and inner washer **334** of **Figure 9**. In this view, the cover **300** is removed for illustrative purposes. The tip **44** of a spindle **40R** is seen engaging corresponding ridges **336** of the inner washer **334**. In this way, rotational movement of the outer knob **330R** transmits rotational movement to the spindle **40R**. The spindle **40R**, in turn, rotates the secured sleeve **50** and supported tissue roll **30**.

It is noted that in **Figures 9** and **10**, the right spindle **40R** is presented. The arrangement is the same though for the left spindle **40L** and left outer knob **330L**. Also, no sleeve **50** is shown in **Figures 9** and **10**. This is purely for illustrative purposes; the dispenser **100** may operate with sleeves **50** on spindles **40L**, **40R**.

An improved dispenser **100** is provided. While it will be apparent that the invention herein described is well calculated to achieve the benefits and advantages set forth above, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the spirit thereof.

CLAIMS

What is claimed is:

1. A tissue dispenser by which a user may access a roll of tissue, comprising:
 - (A) a base;
 - 5 (B) at least one spindle, the spindle rotating relative to the base and having an elongated shaft extending from the base and terminating at a tip distally from the base; and
 - (C) a plurality of sleeves interchangeably disposed on the shaft of the spindle, each sleeve comprising an elongated shaft terminating at an end, the shaft having an inner diameter dimensioned to receive the shaft of the spindle, and an outer diameter,
 - 10 wherein each sleeve and a respective connected elongated shaft of each of the at least one spindle rotate together; and
 - wherein at least two of the plurality of sleeves are configured to support tissue rolls having cores of different diameters.
- 15 2. The tissue dispenser of claim 1, wherein:
 - the shaft of the spindle comprises at least one spline; and
 - each of the plurality of sleeves further comprises a slot for receiving a corresponding spline so that each of the plurality of sleeves and the elongated shaft of each of the at least one spindle rotate together.
- 20 3. The tissue dispenser of claim 1, wherein:
 - the shaft of the spindle comprises at least two splines; and
 - corresponding slots in each of the plurality of sleeves are placed in the end of each of the sleeves.
- 25 4. The tissue dispenser of any one of claims 1-3, wherein the at least one spindle is configured to receive and support a tissue roll without receiving one of the plurality of sleeves.
5. The tissue dispenser of claim 4, wherein the at least one spindle is configured to receive
 - 30 and support a tissue roll having a core diameter of about 2.8 cm.

6. The tissue dispenser of any one of claims 1-4, wherein the at least one spindle defines a single spindle.
- 5 7. The tissue dispenser of any one of claims 1-6, wherein the sleeves have different outer diameters dimensioned to receive and support tissue rolls having cores of from about 2.5 cm to about 11 cm in diameter.
8. The tissue dispenser of any one of claims 1-4 and 6-7, wherein the plurality of sleeves
10 comprises:
a first pair of sleeves, with each of the sleeves having outer diameters dimensioned to support tissue rolls having a core diameter of about 5.84 cm; and
a second pair of sleeves, with each of the sleeves having outer diameters dimensioned to support tissue rolls having a core diameter of about 8.38 cm.
- 15 9. The tissue dispenser of any one of claims 1-8, wherein the at least one spindle defines a left spindle and a right spindle, with each spindle capable of receiving one of the plurality of sleeves for supporting a tissue roll.
- 20 10. The tissue dispenser of any one of claims 1-9, wherein each of the plurality of sleeves further comprises:
at least one fin disposed on the outer diameter of the sleeve, the at least one fin having a width dimensioned to circumferentially support the core of a tissue roll.
- 25 11. The tissue dispenser of claim 10, wherein:
the at least one fin comprises a plurality of fins radially disposed around the outer diameter of the shaft of the corresponding sleeve; and
the fins frictionally engage the core of the received tissue roll.
- 30 12. The tissue dispenser of claim 11, wherein:

the fins of each sleeve in a first set of sleeves form a diameter of about 2.8 cm to about 7 cm; and

the fins of each sleeve in a second set of sleeves form a diameter of about 5 cm to about 11 cm.

5

13. The tissue dispenser of any one of claims 1-12, wherein:

each spindle further comprises an elastically formed catch proximate the tip of the spindle; and

10 each of the plurality of sleeves further comprises a radial, inwardly formed shoulder for engaging the catch when the inner diameter of the sleeve receives a spindle.

14. The tissue dispenser of any one of claims 1-13, further comprising:

(D) a cover pivotally connected to the base for selectively covering the - sleeves and supported tissue rolls.

15

15. The tissue dispenser of claim 14, wherein the base further comprises:

a side wall along the base having opposing ends, with each end of the side wall defining a pivot arm; and

20 a pin disposed in each of the pivot arms to provide pivoting connections between the side walls and the cover.

16. The tissue dispenser of any one of claims 14-15, further comprising:

25 (E) a door assembly configured to selectively cover a tissue roll on either the left or the right side of the base.

25

17. The tissue dispenser of claim 16, wherein the door assembly comprises:

a horizontal base; and

a handle for engaging the door assembly by a user.

30 18. The tissue dispenser of any one of claims 16-17, further comprising:

(F) a plurality of snap fittings configured to releasably attach to the door assembly, with each snap fitting having a different height to prevent the premature movement of the door assembly by the user from a first side of the tissue dispenser to a second side, depending upon the diameter of the core of the tissue rolls used.

5

19. The tissue dispenser of claim 18, wherein the snap fittings releasably attach to the horizontal base of the door assembly.

10

20. The tissue dispenser of claim 14, wherein the at least one spindle comprises a left spindle and a right spindle; and the tissue dispenser further comprises:

(G) an outer left knob and an outer right knob each supported on the cover, with the outer left and right knobs being aligned with tips of the left and right spindles, respectively, wherein:

15

rotation of the left knob causes the left spindle and supported sleeve to rotate; and
rotation of the right knob causes the right spindle and supported sleeve to rotate.

21. The tissue dispenser of claim 14, further comprising:

(H) a locking assembly for selectively locking and unlocking the cover to the base.

20

22. The tissue dispenser of claim 1, wherein:

(A) the base has a side wall;

(B) the at least one spindle comprises a left spindle and a right spindle, each spindle being supported by and extending from the body and rotating relative to the body, and each spindle having an elongated shaft terminating at a tip distally from the base with at least one spline extending along the shaft;

25

(C) each sleeve comprises:

an elongated shaft terminating at an end, the shaft having an inner diameter dimensioned to receive the shaft of the spindle,

at least one slot to receive a corresponding spline of the spindle, and

a plurality of fins radially disposed on the sleeves to form an outer diameter, the fins having a width dimensioned to circumferentially support the inner diameter of a core of a tissue roll; and

wherein the plurality of sleeves comprises:

5 a first pair of sleeves having fins dimensioned to form an outer diameter of each sleeve that is about 5 cm to 7 cm in width; and

a second pair of sleeves having fins dimensioned to form an outer diameter of each sleeve that is about 7 cm to about 10 cm in width,

so as to support tissue rolls having cores of different inner diameters; and

10 wherein the tissue dispenser further comprises:

(D) a cover pivotally connected to the tissue dispenser base for covering the left and right sleeves;

(E) a door assembly configured to selectively cover a tissue roll on either the left or the right side of the base; and

15 (F) a plurality of snap fittings configured to releasably attach to the door assembly, with each snap fitting having a different height to prevent the premature movement of the door assembly by the user from one side of the tissue dispenser to the other, depending upon the diameter of the core of the tissue rolls used.

20 23. The tissue dispenser of claim 22, further comprising:

(G) an outer left knob and an outer right knob each supported on the cover, with the outer left and right knobs being aligned with the tips of the left and right spindles, respectively, wherein:

rotation of the left knob causes the left spindle and supported sleeve to rotate; and

25 rotation of the right knob causes the right spindle and supported sleeve to rotate.

24. The tissue dispenser of claim 22, wherein:

the spindle further comprises an elastically formed catch at the tip of the spindle; and

30 each of the plurality of sleeves further comprises a radial, inwardly formed shoulder for engaging the catch when the inner diameter of the sleeve receives a spindle.

25. The tissue dispenser of any one of claims 22-24, wherein the door assembly is biased to a first side of the tissue dispenser, and comprises:

a horizontal base;

a handle for engaging the door assembly by a user;

5 a door stop; and

a door catch disposed in the body of the base of the tissue dispenser for releasably receiving the door stop and holding it on second opposite side of the tissue dispenser.

26. The tissue dispenser of any one of claims 22-25, further comprising:

10 (H) a locking assembly for selectively locking and unlocking the cover to the base.

27. The tissue dispenser of any one of claims 22-26, wherein:

each of the spindles is configured to rotate relative to the base, and to receive and support a tissue roll having a core diameter of about 2.8 cm, without using a sleeve;

15 each of the sleeves in the first pair of sleeves has an outer diameter dimensioned to support tissue rolls having a core diameter of about 5.84 cm; and

each of the sleeves in the second pair of sleeves has an outer diameter dimensioned to support tissue rolls having a core diameter of about 8.38 cm.

20 28. A tissue dispenser by which a user may access a role of tissue, the tissue dispenser having:

a base;

at least one spindle having an elongated shaft extending from the base and terminating at a tip distally from the base;

25 characterized by

the at least one spindle rotating relative to the base,

a plurality of sleeves which are interchangeably disposable on the shaft of the spindle, the spindle being adapted to carry one sleeve at a time, and each sleeve comprising an elongated shaft terminating at an end with the shaft of each sleeve having an inner diameter dimensioned to receive the shaft of the spindle, and an outer diameter,

30 the shaft of the spindle comprising at least one spline;

each of the plurality of sleeves further comprising a slot for receiving a corresponding spline so that each of the plurality of sleeves and the elongated shaft of each of the at least one spindle are rotationally connected; and

5 at least two of the plurality of sleeves having respectively different outer diameters to enable the use of tissue rolls having cores of different diameters.

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Fig. 1

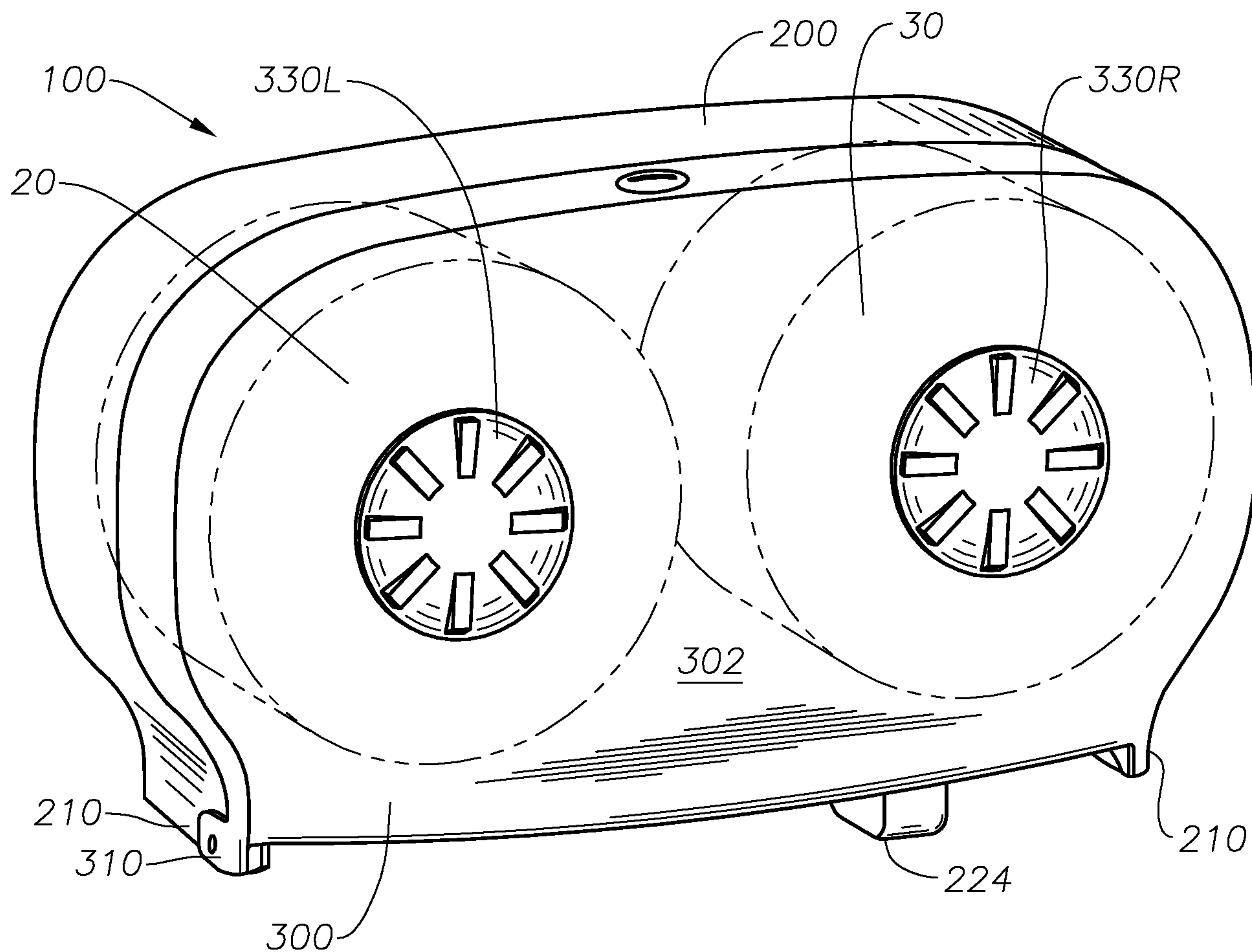
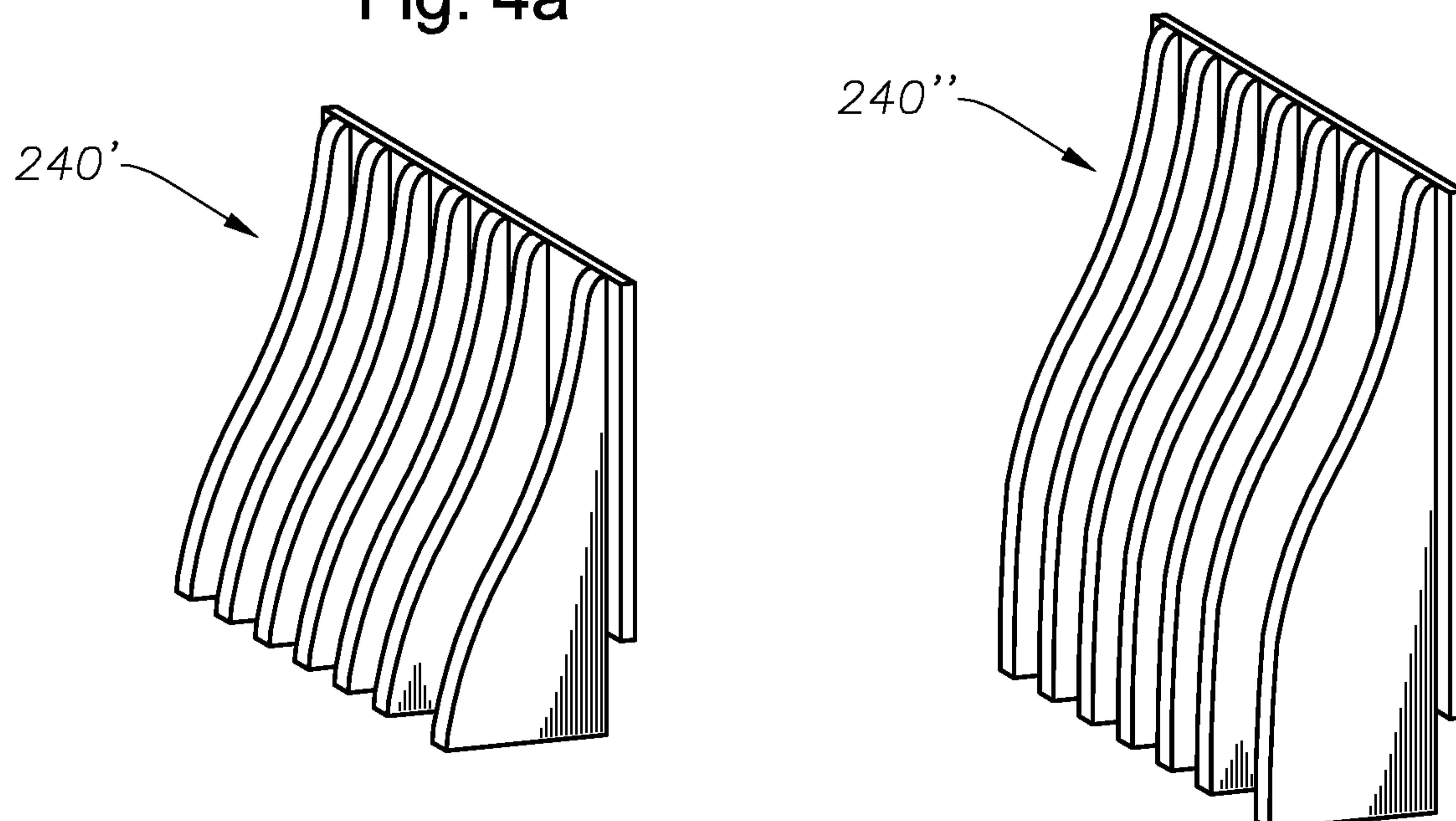


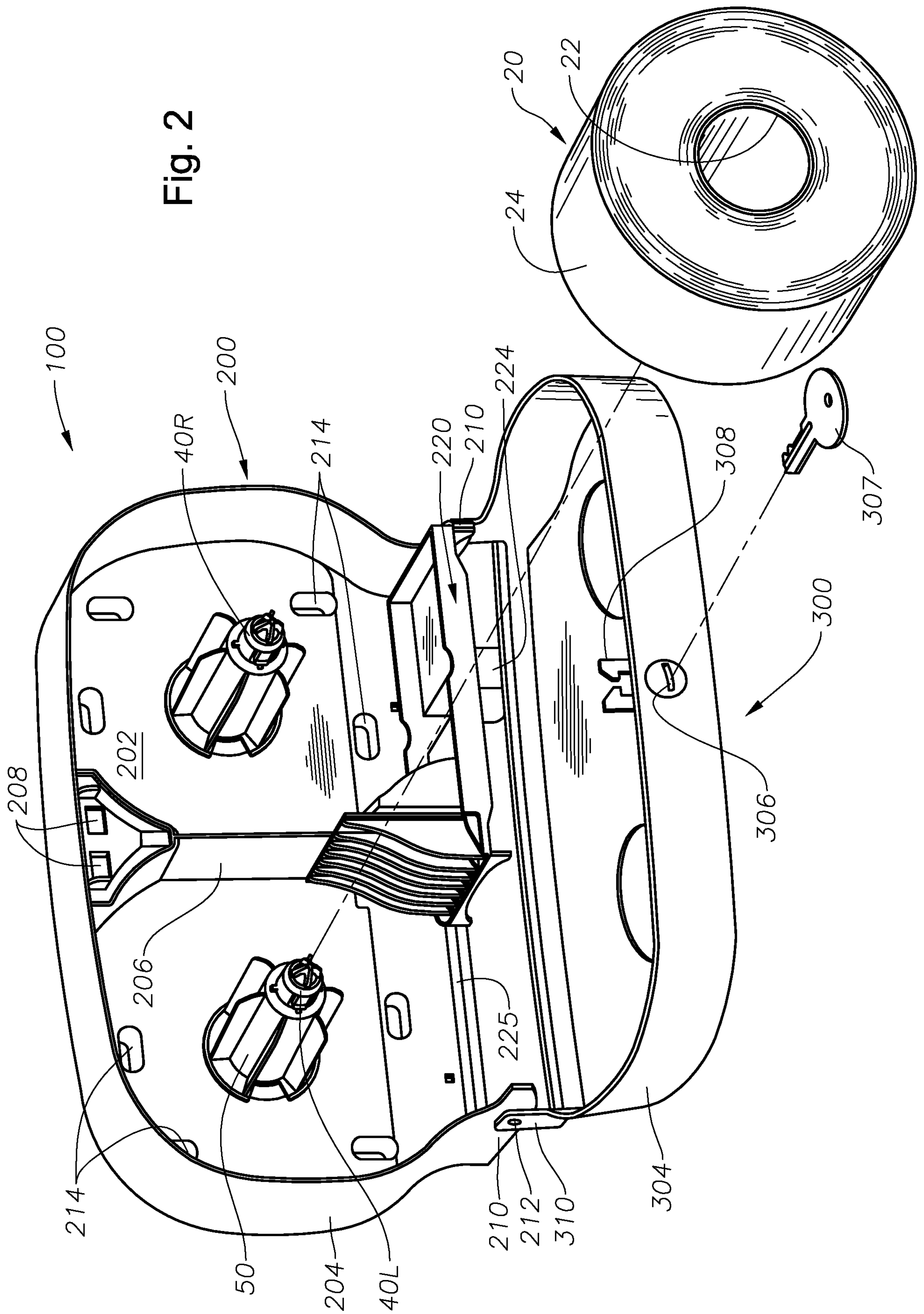
Fig. 4b

Fig. 4a



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Fig. 2



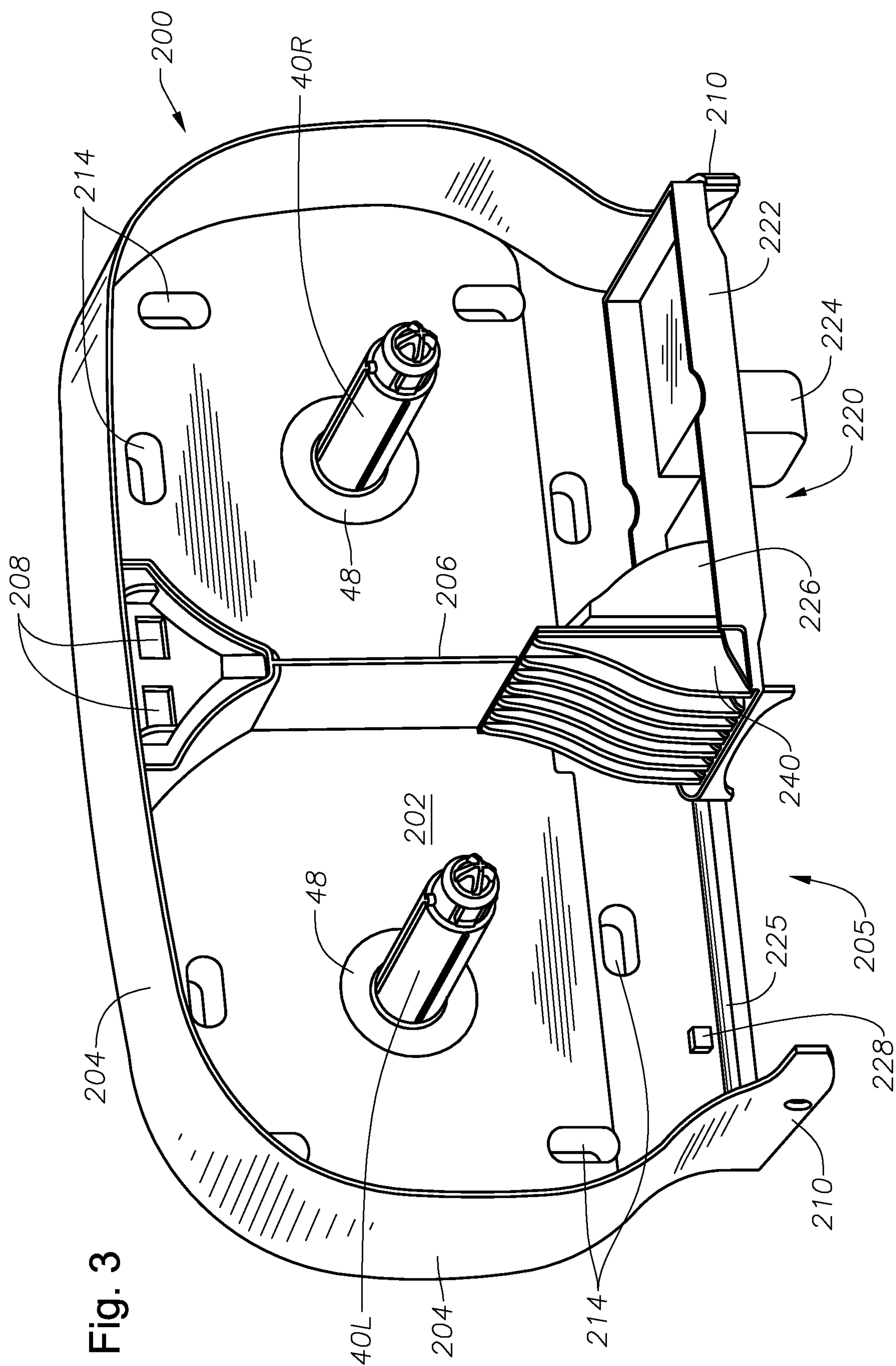
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Fig. 3

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Fig. 8A

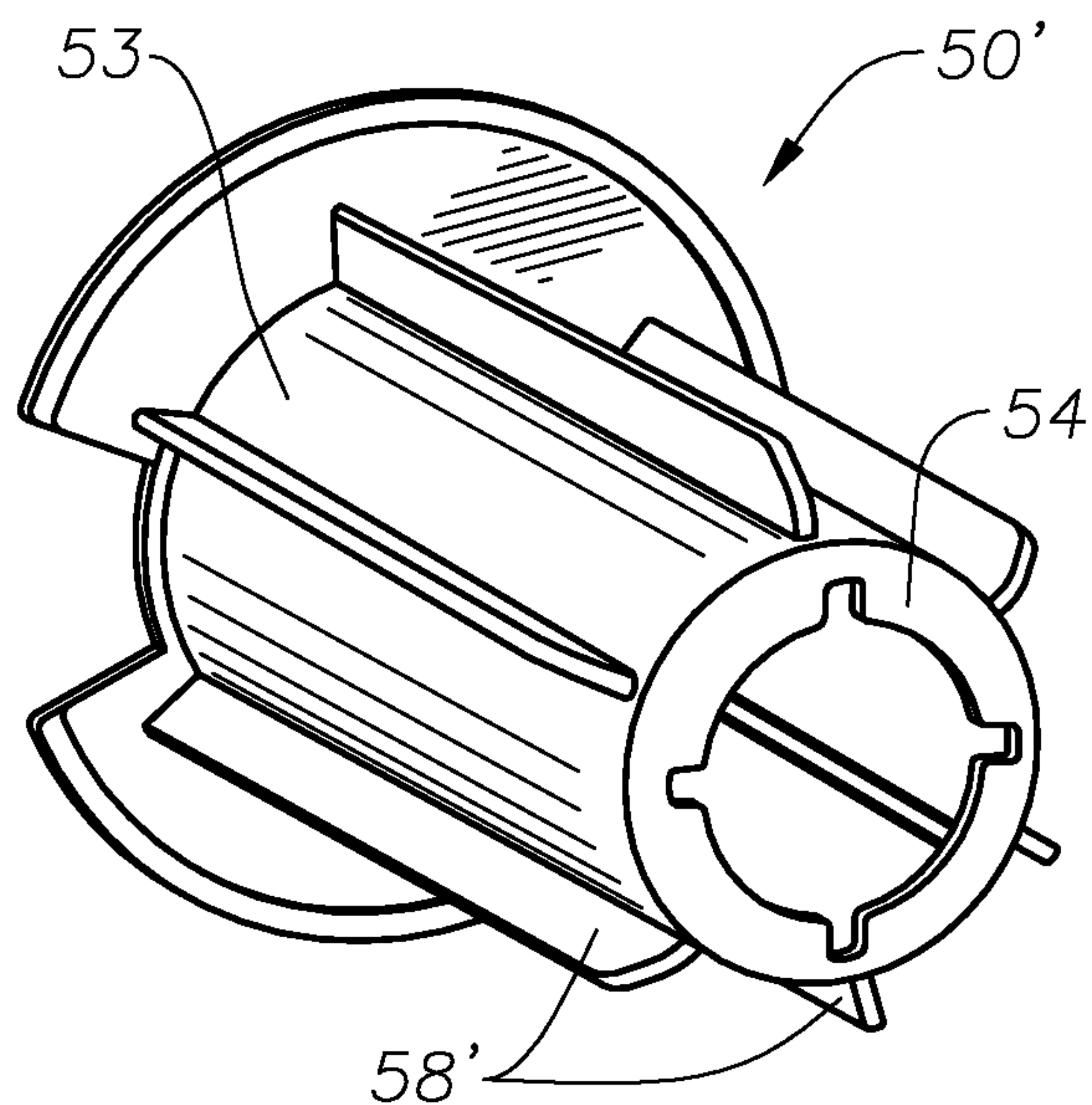


Fig. 8B

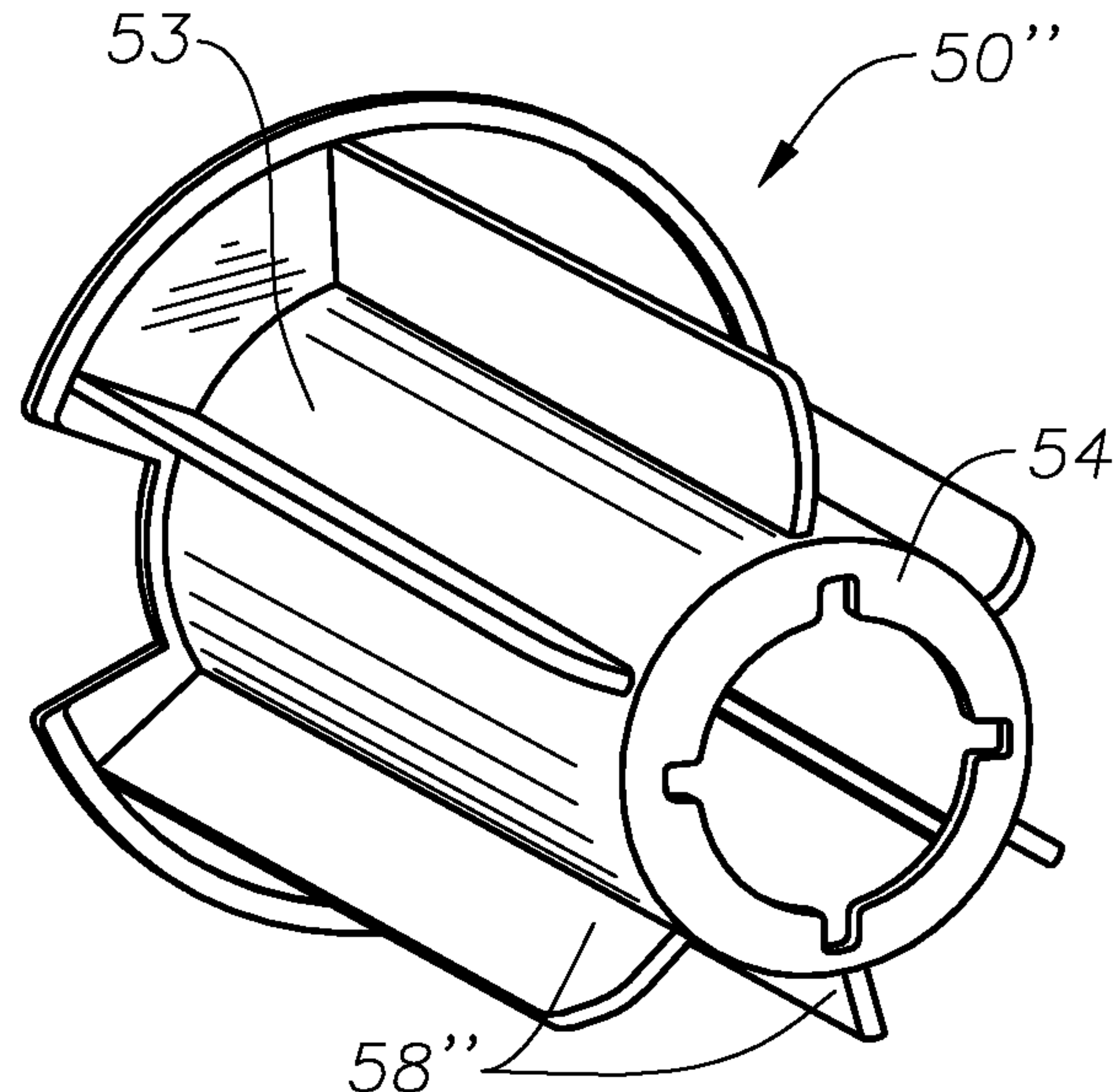
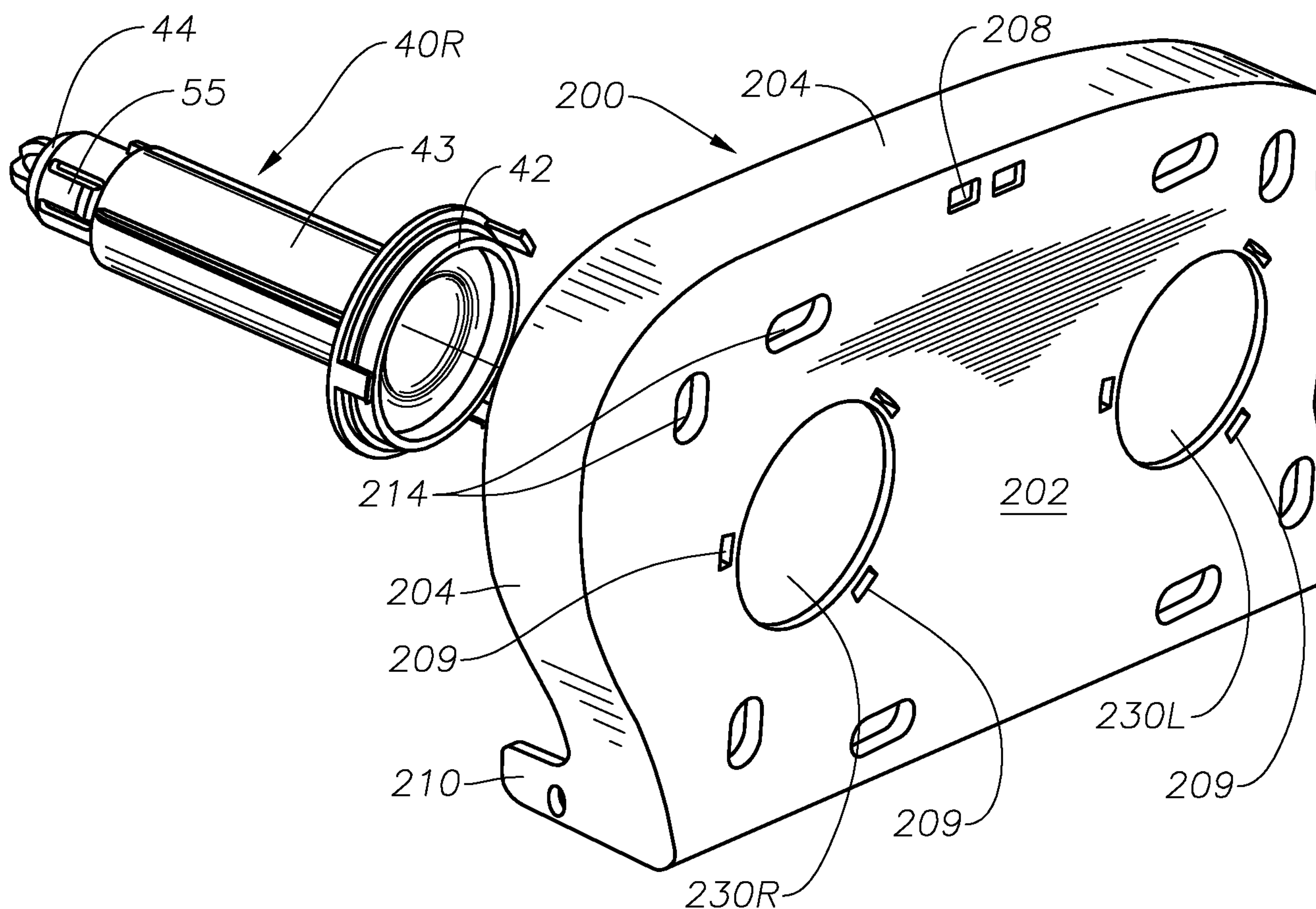
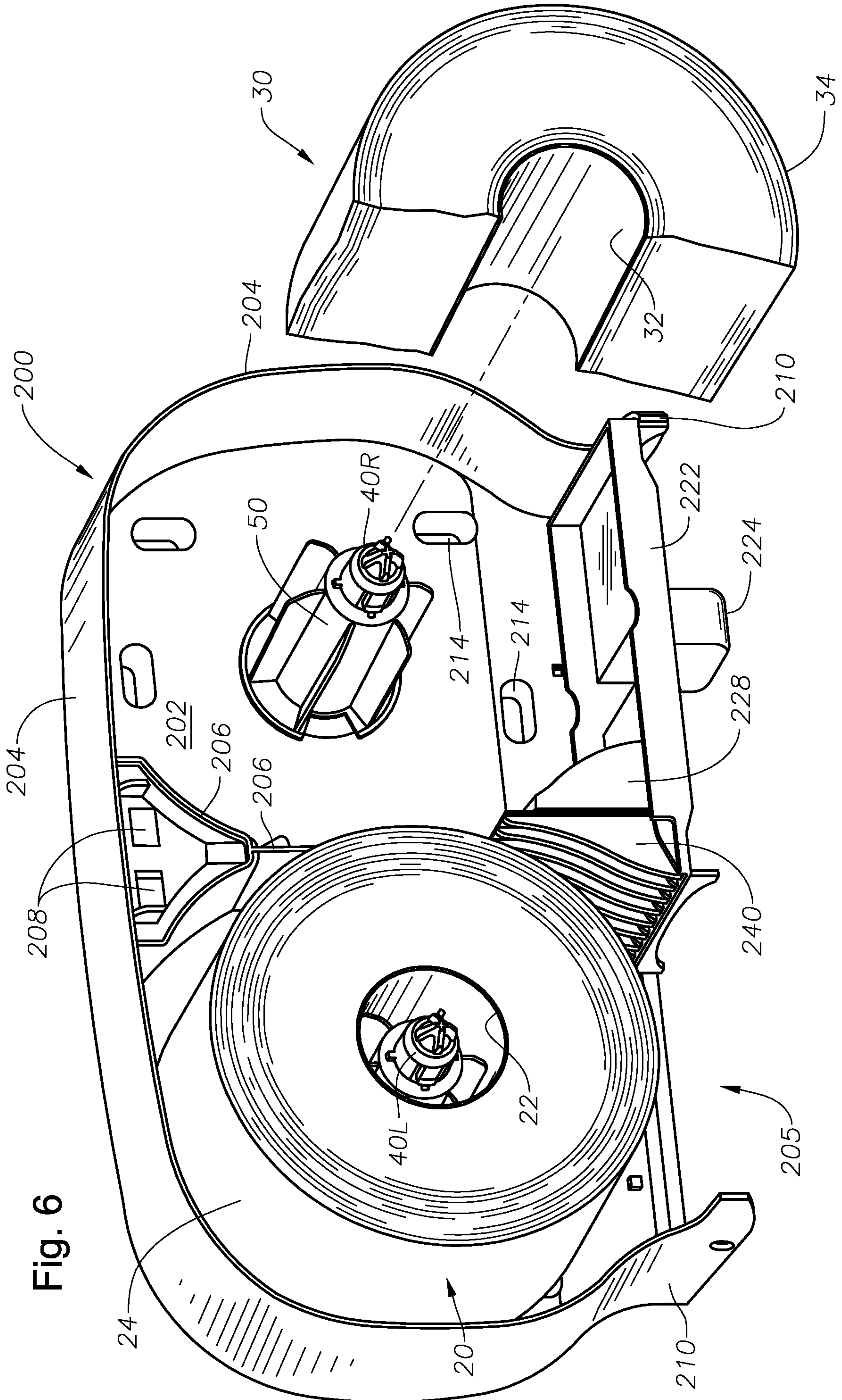


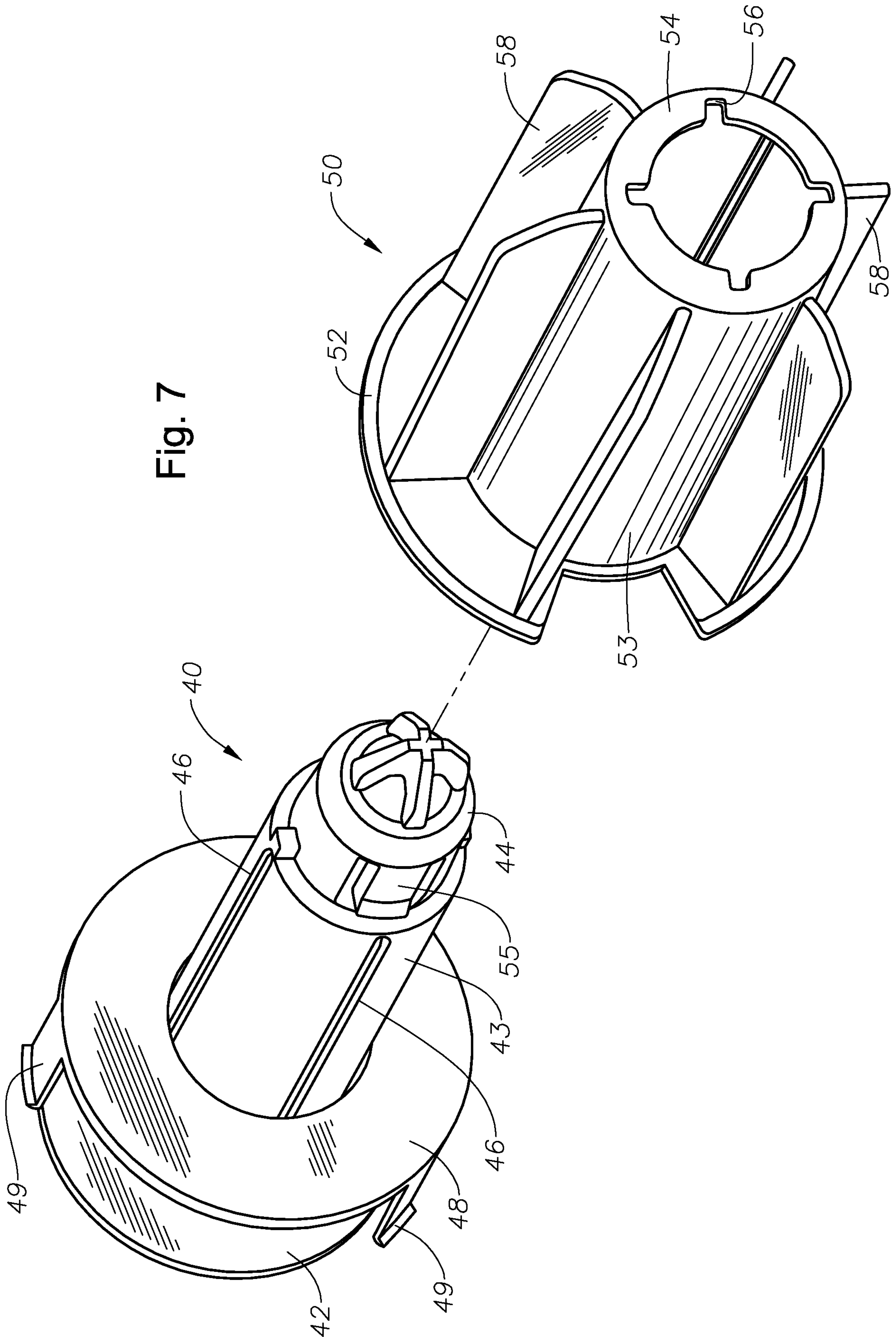
Fig. 5



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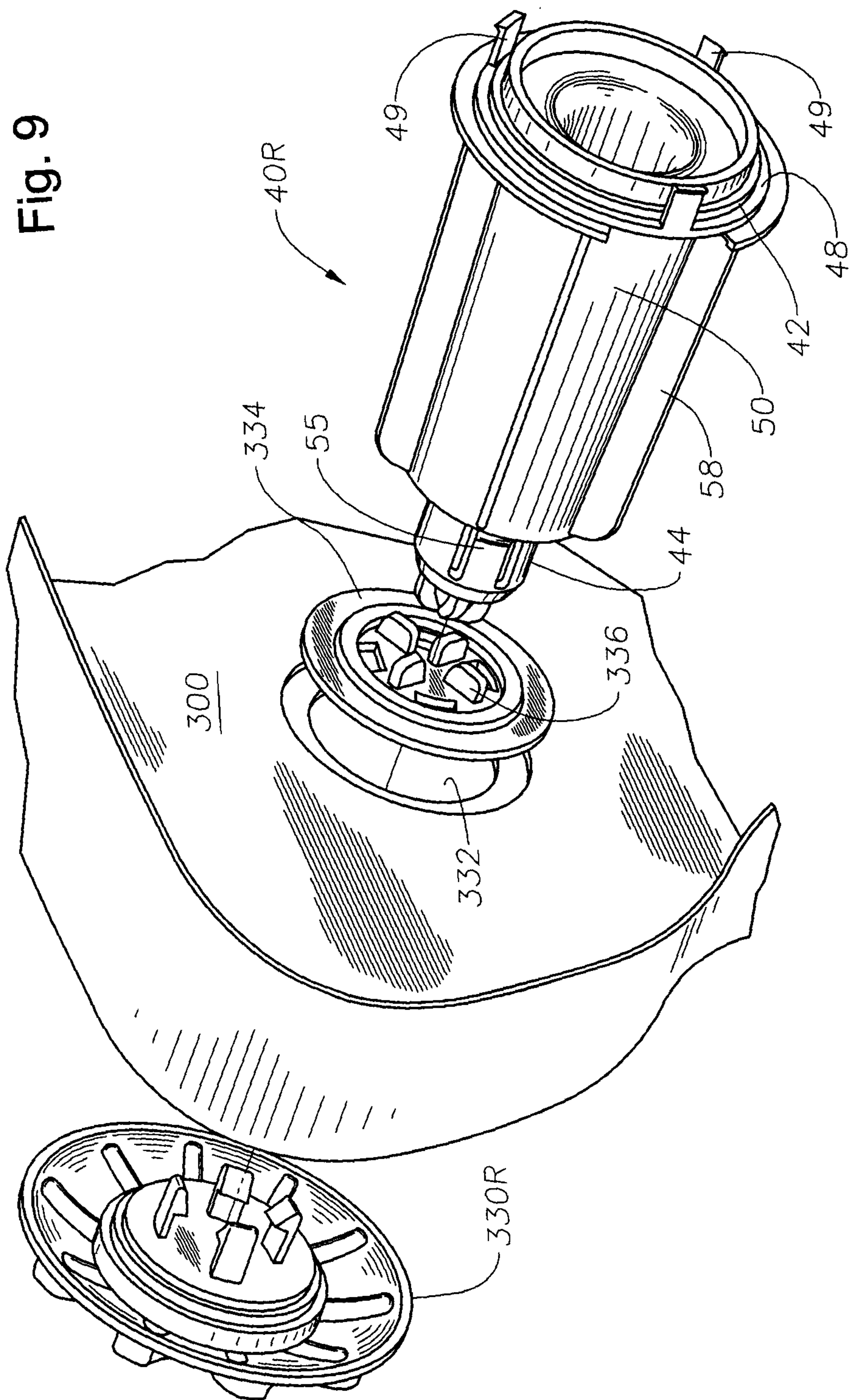


Fig. 9

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Fig. 10

