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Anderson(10) **Pub. No.: US 2007/0290094 A1**(43) **Pub. Date: Dec. 20, 2007**(54) **VERSATILE CORE SIZE TISSUE DISPENSER**(76) Inventor: **Stephen E. Anderson**, King, NC (US)

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KNOXVILLE, TN 37902 (US)**(21) Appl. No.: **11/746,452**(22) Filed: **May 9, 2007****Related U.S. Application Data**

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Publication Classification(51) **Int. Cl.**
B65H 16/02 (2006.01)(52) **U.S. Cl.** **242/594**(57) **ABSTRACT**

A tissue dispenser is provided by which a user may access one or more rolls of tissue. The dispenser generally includes a base and a cover. The dispenser includes at least one spindle, and preferably left and right spindles, with each spindle being supported by and extending from the base. The dispenser also has a plurality of sleeves 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 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 configured to selectively cover a tissue roll on either the left or the right side of the base. A plurality of snap fittings configured to releasably attach to the door assembly may 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.

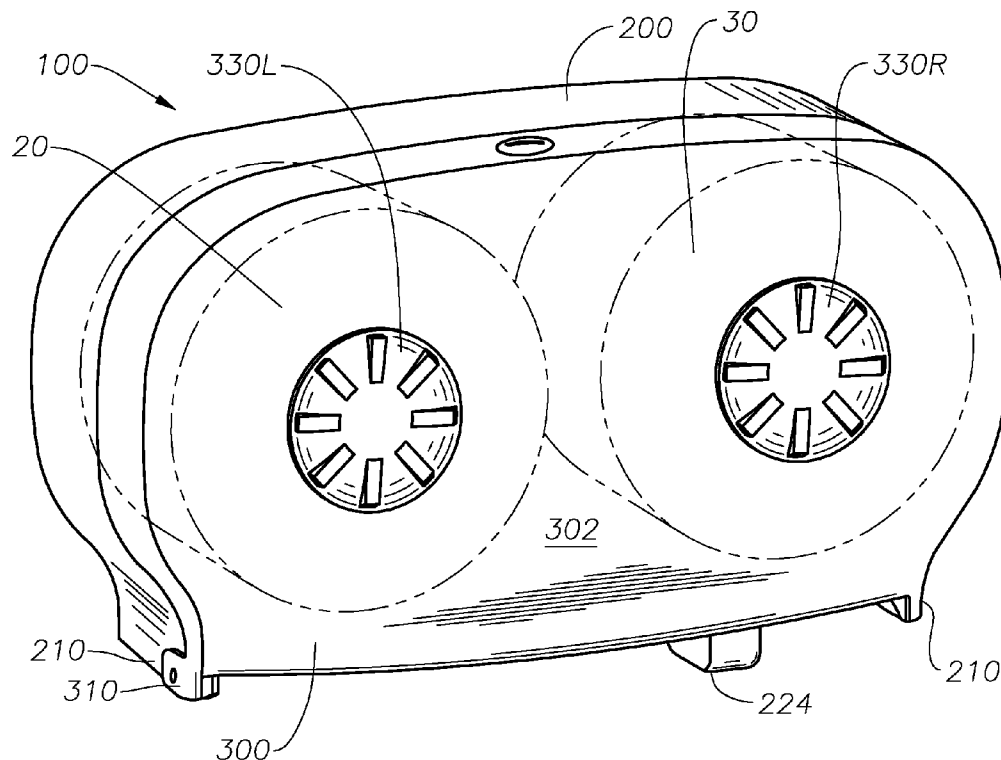


Fig. 1

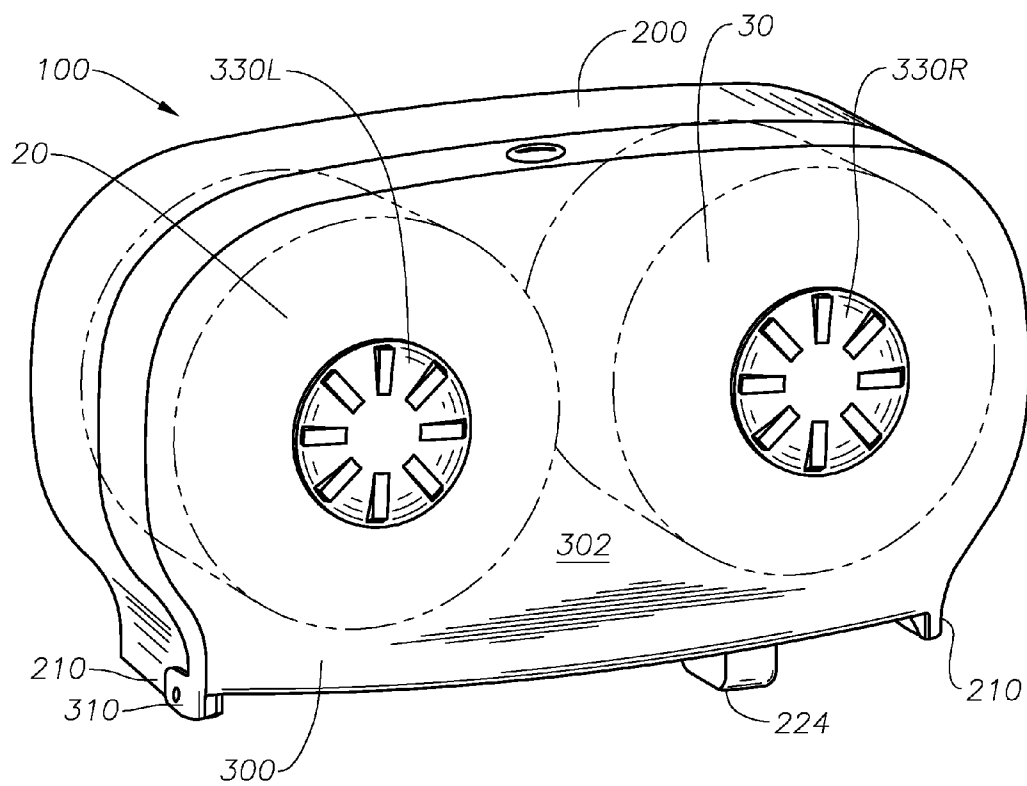


Fig. 4a

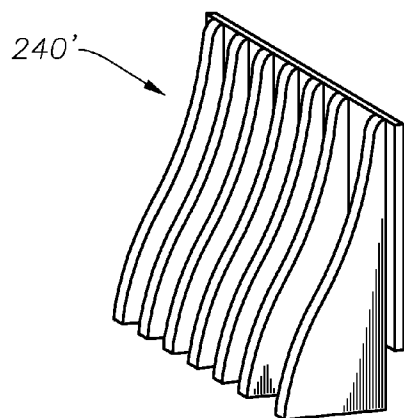


Fig. 4b

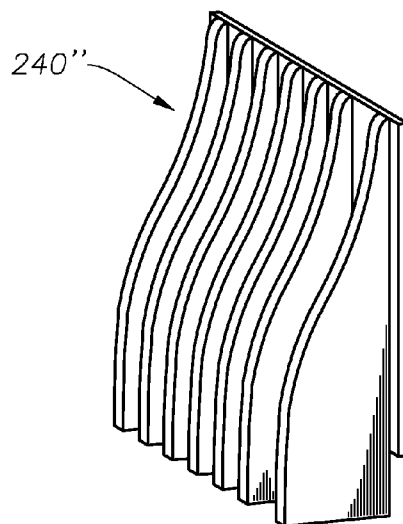
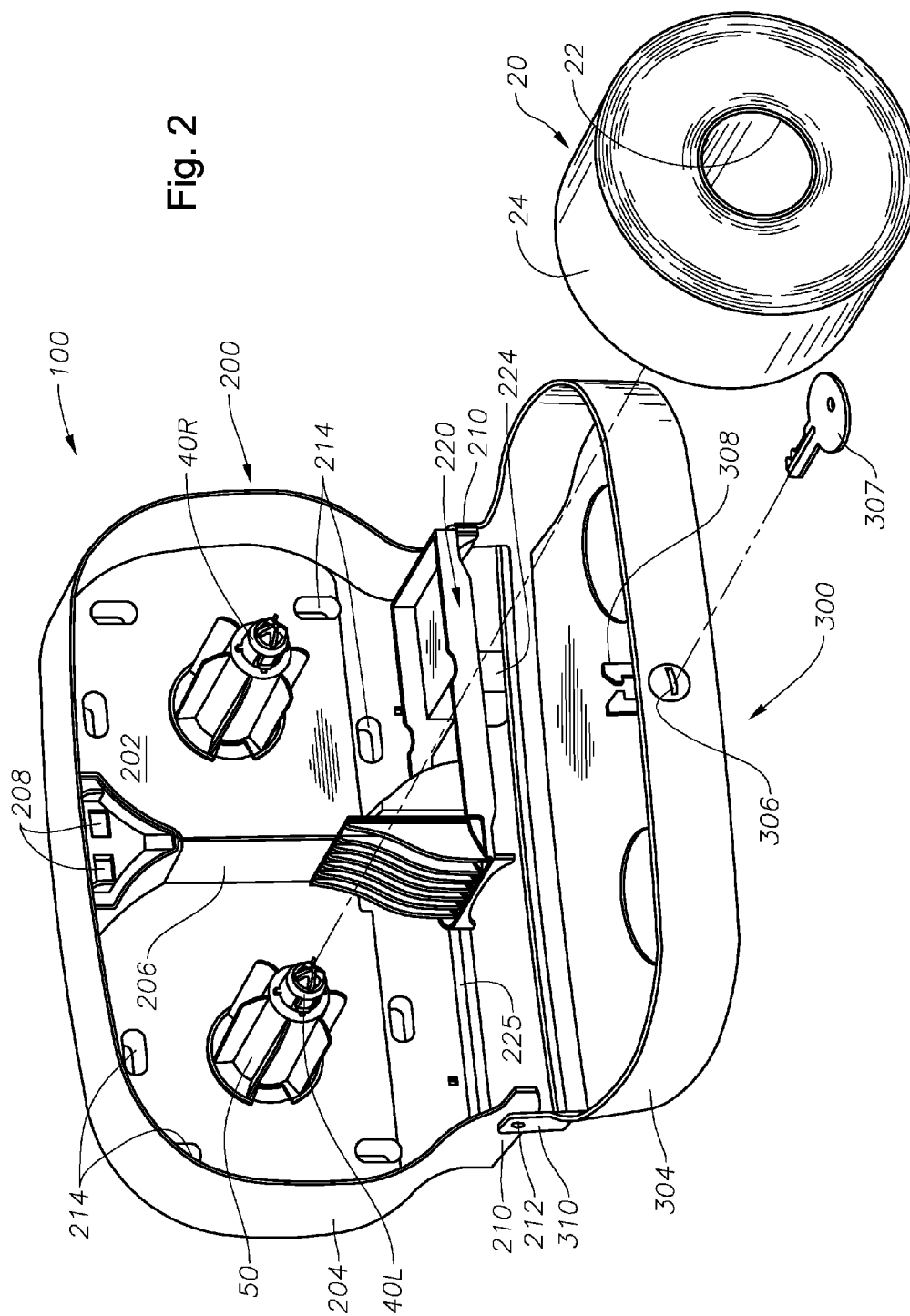


Fig. 2



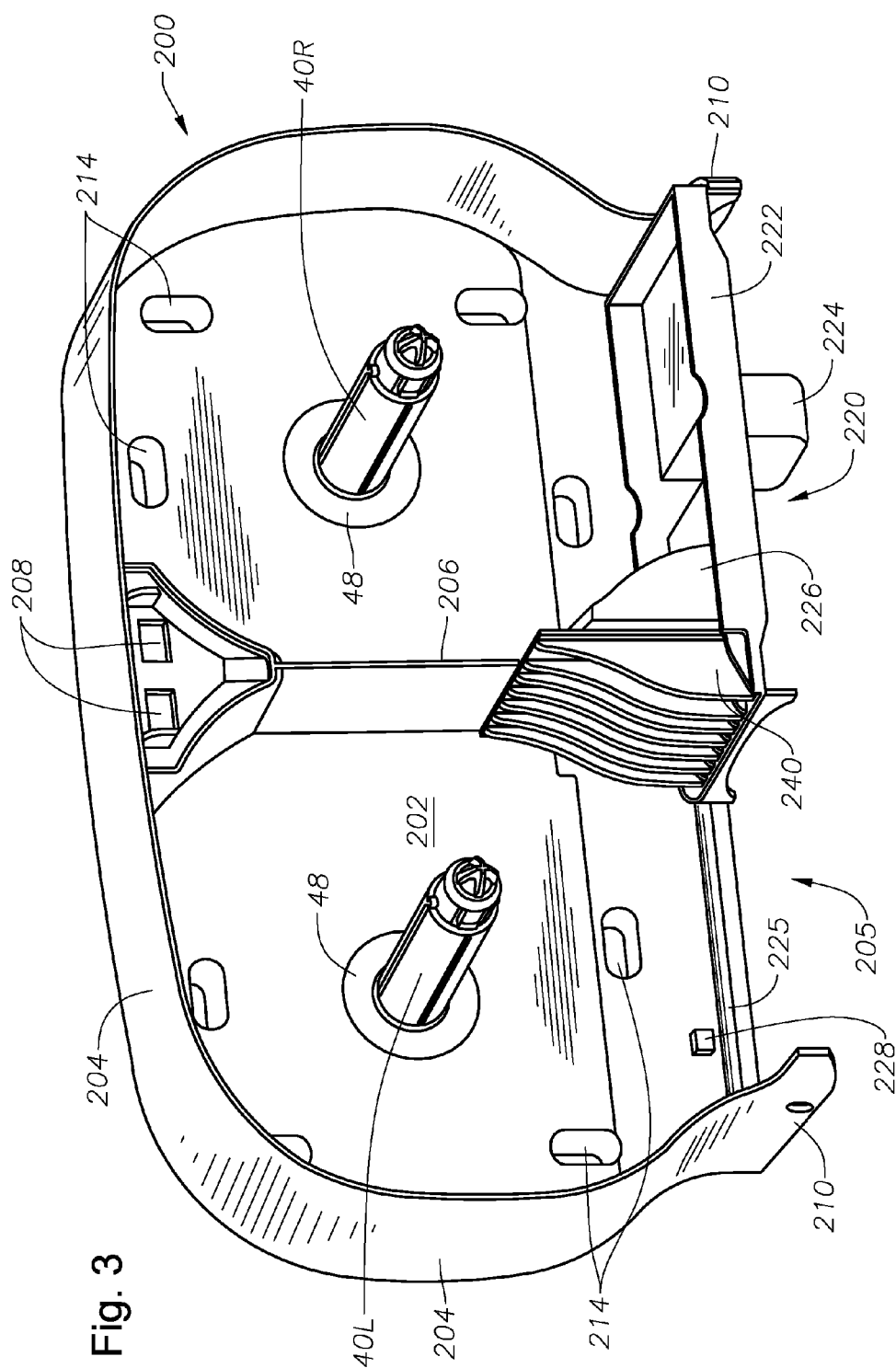


Fig. 8A

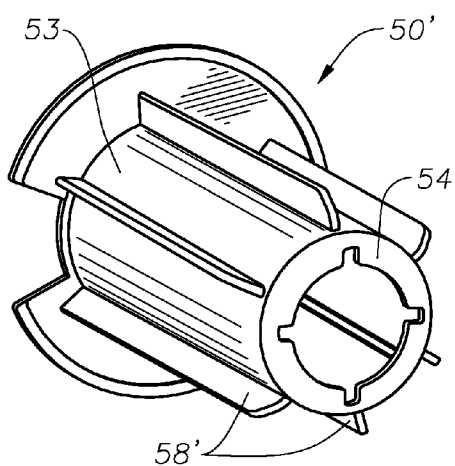


Fig. 8B

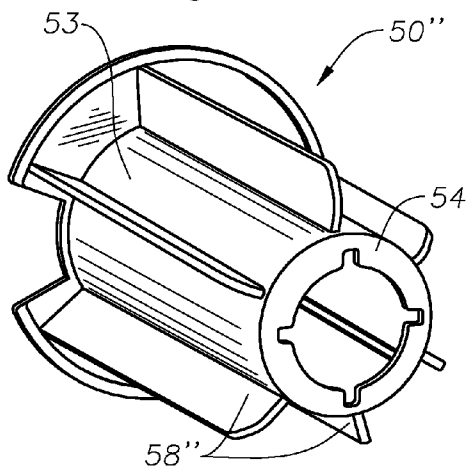
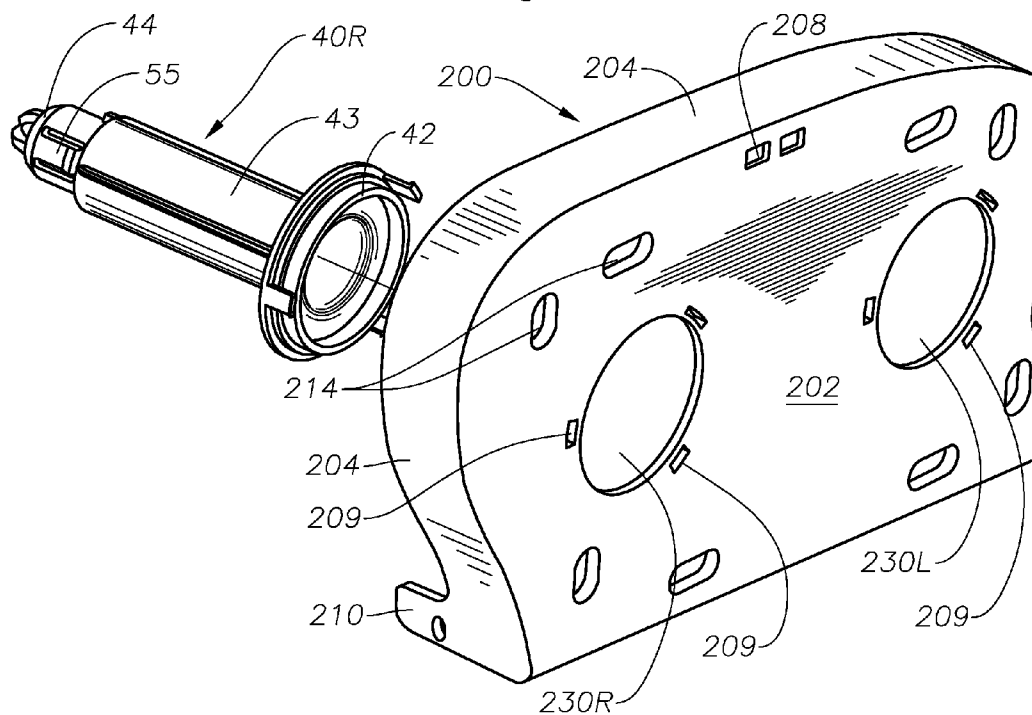


Fig. 5



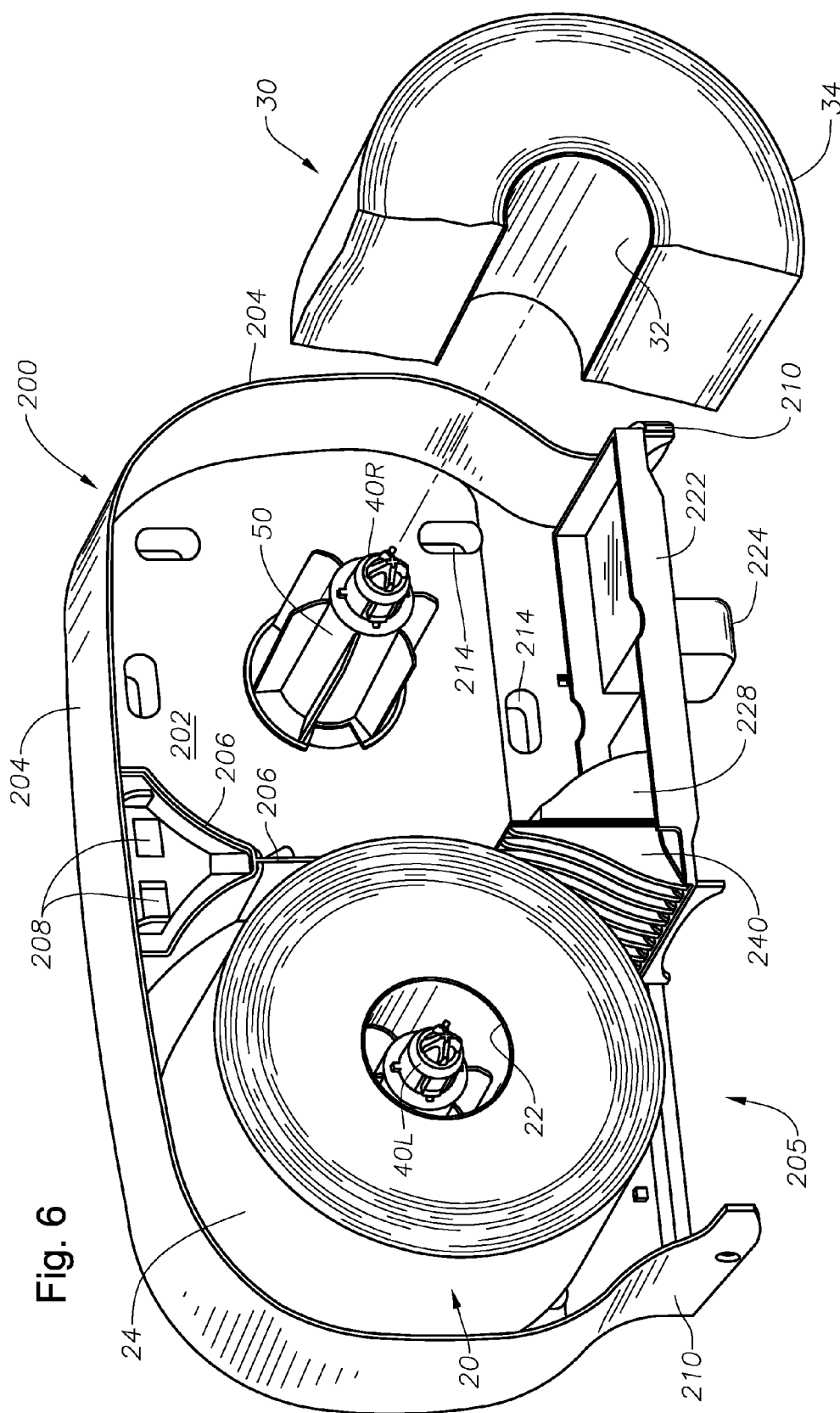
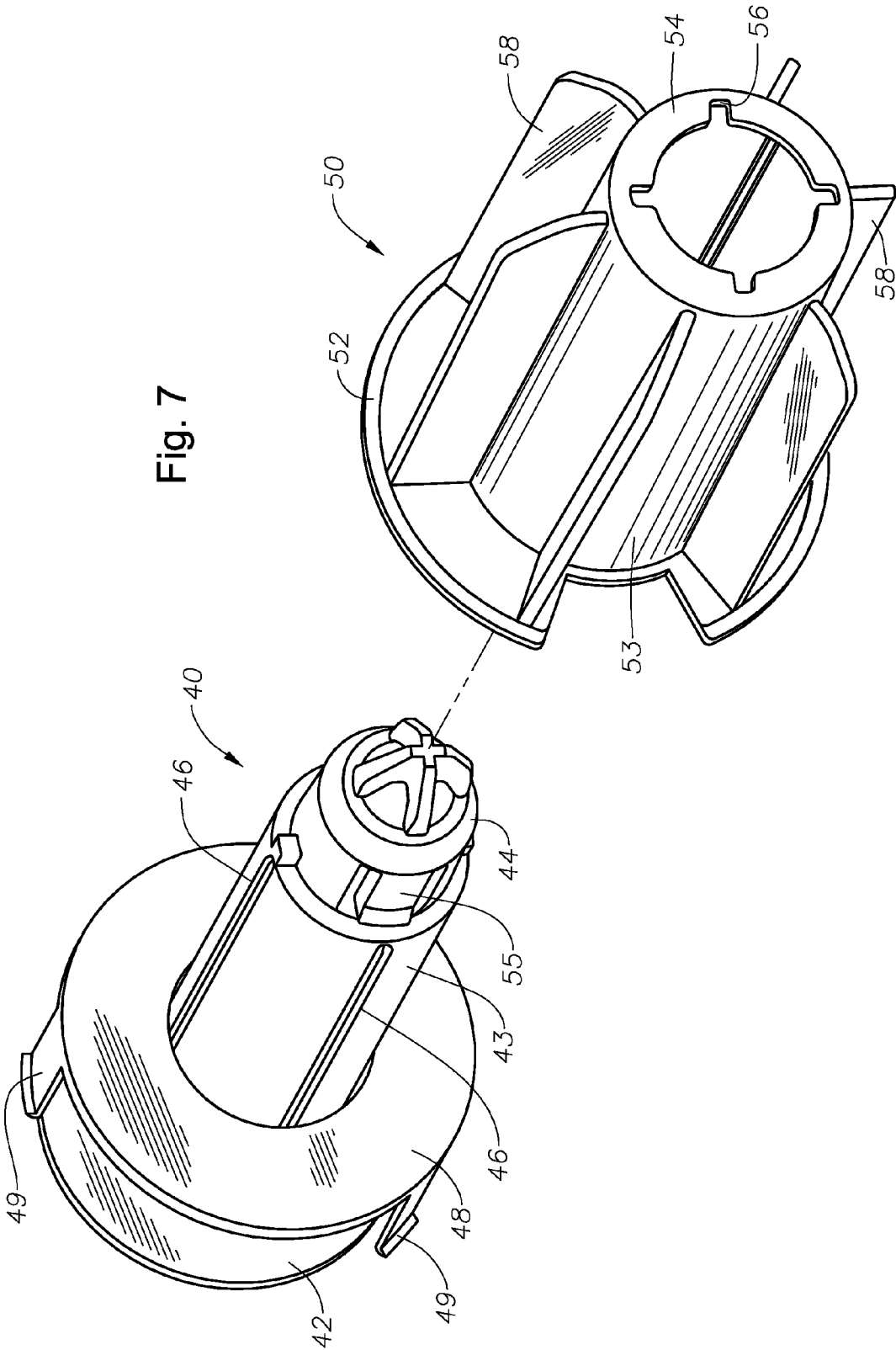


Fig. 7



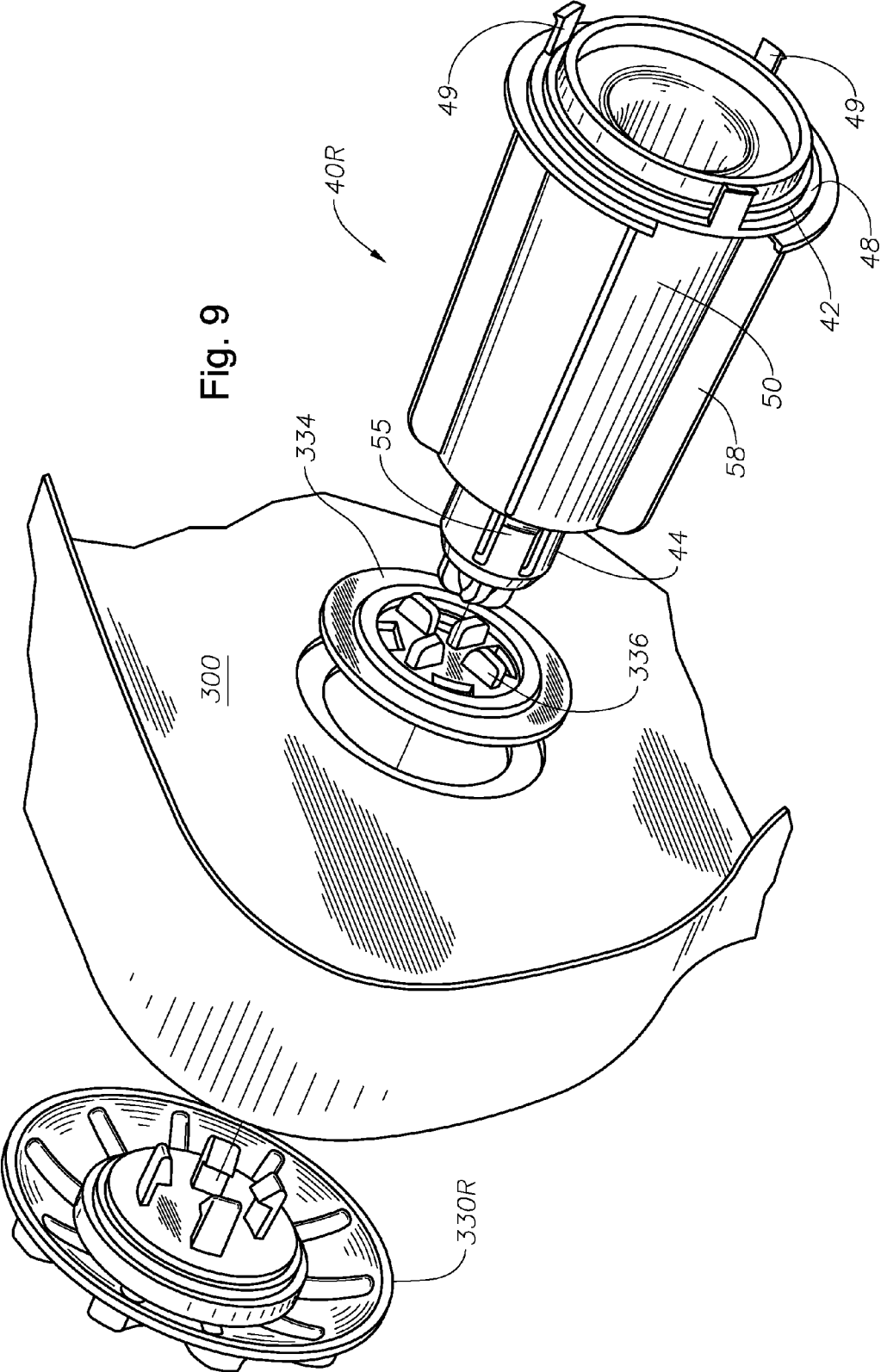
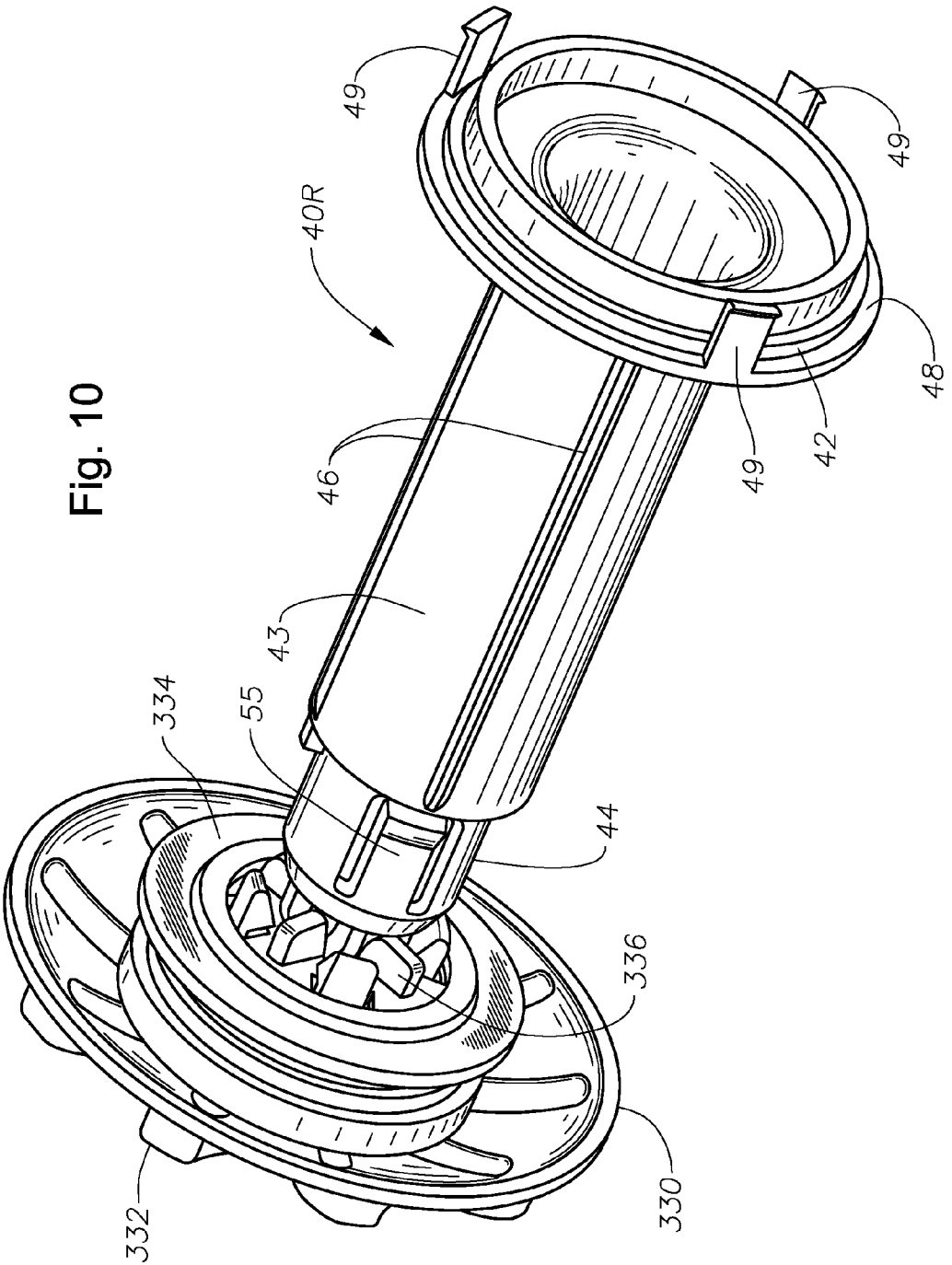


Fig. 10



VERSATILE CORE SIZE TISSUE DISPENSER

STATEMENT OF RELATED APPLICATIONS

[0001] The present application claims priority under 35 U.S.C. §120 to a previous application filed in the United States. That application was filed on Jun. 6, 2006. The application was assigned Ser. No. 60/811,254 by the U.S. Patent and Trademark Office, and was entitled "Versatile Core Size Tissue Dispenser." The provisional application is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] 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.

[0004] 2. Background of the Invention

[0005] 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 one to four inches, while household rolls generally have a more standard core diameter of about one and one-half inches.

[0006] 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. Pat. 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. Pat. No. 4,872,601 describes a dispenser wherein industrial sized rolls, as opposed to personal sized rolls, are mounted in a side-by-side orientation.

[0007] 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. Pat. No. 4,807,823, have a top roll and a bottom roll holder, both of which have fixed spindles. An enclosure is provided over the top roll so that to the user cannot remove tissue sheets from the top roll until the bottom roll has been depleted.

[0008] 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 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.

[0009] U.S. Pat. No. 6,364,245 describes a tissue dispenser with adaptable spindle core support structures that may be used with at least two different diameter cores of toilet roll tissue. 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 friction from a non-rotating core, tissue may prematurely break when pulled, causing inconvenience for a user.

[0010] 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 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

[0011] The benefits and advantages of the present invention are achieved by an improved tissue dispenser capable of accommodating tissue rolls having different inner core sizes and different outer diameters. The dispenser generally includes a base and a cover. Both the base and the cover have a side wall.

[0012] The base of the dispenser has 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.

[0013] 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 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 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 invention, the widths of the fins for the sleeves vary so as to accommodate tissue rolls having different inner core sizes.

[0014] The dispenser also preferably includes a door assembly. The door assembly is configured to selectively cover 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 hold the door assembly to a left side after a left tissue roll has been substantially exhausted.

[0015] 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 move-

ment 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 attaches along a horizontal base of the door assembly.

[0016] 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 supported sleeve to rotate.

[0017] In another aspect, this invention provides a tissue dispenser comprising:

[0018] (A) a base;

[0019] (B) at least one spindle, the spindle having an elongated shaft extending from the base and a terminating at a tip distally from the base; and

[0020] (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, and wherein at least two of the plurality of sleeves are configured to support tissue rolls having cores of different inner diameters.

[0021] In one aspect, the sleeves have different outer diameters dimensioned to support tissue rolls having cores of about 2.5 cm to about 11 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.

[0022] 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.

[0023] 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. The spindle may be 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.

[0024] In one embodiment, the tissue dispenser further comprises:

[0025] (D) a cover pivotally connected to the base for selectively covering the left and right sleeves and supported tissue rolls.

[0026] 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.

[0027] In one embodiment, the tissue dispenser further comprises:

[0028] (E) a door assembly configured to selectively cover a tissue roll on either the left or the right side of the base.

[0029] 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.

[0030] In one embodiment, the tissue dispenser further comprises:

[0031] (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.

[0032] The snap fittings preferably attach releasably to the horizontal base of the door assembly.

[0033] In one embodiment, the at least one spindle comprises a left spindle and a right spindle, and the tissue dispenser further comprises:

[0034] (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.

[0035] 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] 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 applications.

[0037] FIG. 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.

[0038] FIG. 2 is a perspective view of the dispenser of FIG. 1, with the cover opened to expose the base. No tissue roll is loaded into the dispenser so that internals of the dispenser may be more clearly seen.

[0039] FIG. 3 is an enlarged view of the base of the dispenser of FIG. 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.

[0040] FIGS. 4A and 4B provide perspective views of two different snap fittings for the base. The snap fitting of FIG. 4A has a height that is shorter than the snap fitting of FIG. 4B.

[0041] FIG. 5 is a rear perspective view of a spindle being moved through the right opening of the base.

[0042] FIG. 6 is an enlarged view of the base of the dispenser of FIG. 1. The cover has been removed from the base for illustrative purposes. A single roll of tissue has been loaded onto the left spindle. A sleeve is seen on the right spindle.

[0043] FIG. 7 provides a perspective view of an exemplary spindle and an exemplary sleeve. The sleeve is exploded away from the spindle.

[0044] FIGS. 8A and 8B provide perspective views of two different embodiments of sleeves. The sleeve of FIG. 8A has fins that are of a smaller width than the sleeve of FIG. 8B.

[0045] FIG. 9 is a perspective view of the inner surface of a portion of the cover of FIGS. 1 and 2. The knob and inner washer are shown exploded away from the right opening of the cover.

[0046] FIG. 10 shows a perspective view of the knob and inner washer of FIG. 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.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

Definitions

[0047] As used herein, the term “tissue” refers to any woven or nonwoven substrate fabricated from cellulosic or synthetic fibers.

[0048] 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

[0049] FIG. 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).

[0050] 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.

[0051] The illustrative dispenser 100 of FIG. 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 visible. 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.

[0052] FIG. 2 demonstrates a perspective view of the dispenser 100 of FIG. 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.

[0053] 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 supporting member about which the tissue 24 is wound or rolled. The tissue roll 20 defines an outer diameter that must fit within the left side of the dispenser 100.

[0054] 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.

[0055] 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.

[0056] 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 FIGS. 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.

[0057] 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.

[0058] 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 user access. A key 307 is shown for manipulating the fingers 308.

[0059] 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.

[0060] 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).

[0061] FIG. 3 presents an enlarged view of the base 200 of FIGS. 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 FIG. 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.

[0062] The door assembly 220 first includes a horizontal base member 222. In the view of FIG. 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 slidable 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.

[0063] 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.

[0064] 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 FIG. 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.

[0065] 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.

[0066] FIGS. 4A and 4B provide perspective views of two different snap fittings 240' and 240". It can be seen that snap fitting 240' of FIG. 4A has a shorter height than snap fitting 240" of FIG. 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 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 FIG. 4B) would be used.

[0067] 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' or 240" could be keyed to the size of the right tissue roll 30 and core 32. This is simply a designer's choice.

[0068] It can be seen from the enlarged view of FIG. 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 paper roll 20 having a smaller core 22 may be accommodated.

[0069] Referring again to FIGS. 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 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.

[0070] In the perspective view of FIG. 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 FIG. 1, the left 20 and right 30 tissue rolls have been loaded onto left 40L and right 40R spindles (spindles seen in FIG. 3). Further, the cover 300 has been pivotally rotated into a locked position with the base 200.

[0071] In order to secure the cover 300 to the base 200, a locking assembly is provided. The locking assembly is seen in FIG. 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 (FIG. 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 FIG. 1 to its opened position in FIG. 2.

[0072] 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 FIG. 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.

[0073] FIG. 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 FIG. 7).

[0074] It can also be seen from the rear perspective view of FIG. 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.

[0075] Moving now to FIG. 6, FIG. 6 presents another enlarged view of the base 200 of FIG. 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. It can also be seen from FIG. 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 FIG. 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.

[0076] 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.

[0077] FIG. 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.

[0078] 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.

[0079] 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 FIG. 7, the tip 44 defines a smaller diameter than the shaft 43. This permits the tip 44 to an end 54 of the sleeve 50, as will be more fully described below.

[0080] 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.

[0081] 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.

[0082] 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 the tissue roll 20 or 30 during dispensing.

[0083] 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.

[0084] 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.

[0085] As also seen in FIG. 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 form each roll 20, 30.

[0086] In accordance with the present invention, sleeves 50 have different outer diameters. In one aspect, this is accomplished by providing different fin sizes. FIGS. 8A and

8B provide perspective views of two different embodiments of illustrative sleeves 50', 50". The sleeve 50' of FIG. 8A has fins 58' that are of a smaller width than the fins 58" of the sleeve 50" of FIG. 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.

[0087] 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 1.5 cm and 11 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.

[0088] 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 1.1 cm and 11 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.

[0089] 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 FIG. 1). FIG. 9 provides a perspective view of the inner surface of a portion of the cover 300 of FIGS. 1 and 2. A knob 330R is shown exploded away from the right opening 330R 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.

[0090] 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 40. In this way, rotation of the knob 330R from outside of the cover 300 imparts rotational movement to the spindle 40R.

[0091] FIG. 10 is a perspective view of the outer knob 330R and inner washer 332 of FIG. 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.

[0092] It is noted that in FIGS. 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 FIGS. 9 and 10. This is purely for illustrative purposes; the dispenser 100 operates with sleeves 50 on spindles 40L, 40R.

[0093] 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.

1. A tissue dispenser by which a user may access a role of tissue, comprising:

- (A) a base;
- (B) at least one spindle, the spindle 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, and

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

2. The tissue dispenser of claim 1, wherein the at least one spindle is configured to receive and support a tissue roll without receiving one of the plurality of sleeves.

3. The tissue dispenser of claim 2, wherein the at least one spindle is configured to receive and support a tissue roll having a core diameter of about 2.8 cm.

4. The tissue dispenser of claim 3, wherein the at least one spindle rotates relative to the base.

5. The tissue dispenser of claim 1, wherein the at least one spindle defines a single spindle.

6. The tissue dispenser of claim 5, wherein the spindle is configured to rotate relative to the base, and to itself receive and support a tissue roll without a sleeve.

7. The tissue dispenser of claim 6, wherein the spindle is configured to receive and support a tissue roll having a core diameter of about 2.8 cm.

8. The tissue dispenser of claim 1, 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.

9. The tissue dispenser of claim 1, wherein the plurality of sleeves 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.

10. The tissue dispenser of claim 1, wherein the at least one spindle is supported by the base.

11. The tissue dispenser of claim 10, wherein the at least one spindle defines a left and a right spindle, with each spindle capable of receiving one of the plurality of sleeves for supporting a tissue roll.

12. The tissue dispenser of claim 10, 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.

13. The tissue dispenser of claim 12, wherein the at least one fin comprises a plurality of fins radially disposed around the outer diameter of the shaft of the corresponding sleeve.

14. The tissue dispenser of claim 13, wherein the plurality of sleeves comprises:

a first set of sleeves, each sleeve having fins that form an outer diameter of about 5.84 cm; and

a second set of sleeves, each sleeve having fins that form an outer diameter of about 8.38 cm.

15. The tissue dispenser of claim 13, wherein the fins of each sleeve in a first set of sleeves form a diameter of about 2.8 cm to about 7 cm.

16. The tissue dispenser of claim 15, wherein the fins of each sleeve in a second set of sleeves form a diameter of about 5 cm to about 11 cm.

17. The tissue dispenser of claim 12, wherein the fins frictionally engage the core of the received tissue roll.

18. The tissue dispenser of claim 17, wherein the spindle rotates relative to the base.

19. The tissue dispenser of claim 10, 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.

20. The tissue dispenser of claim 19, wherein the slot in each of the sleeves is disposed in the end of each sleeve.

21. The tissue dispenser of claim 20, wherein:

the shaft of the spindle comprises at least three splines; and

corresponding slots in each of the plurality of sleeves are placed in the end of each of the sleeves.

22. The tissue dispenser of claim 20, wherein:

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

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.

23. The tissue dispenser of claim 11, further comprising:

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

24. The tissue dispenser of claim 23, 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

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

25. The tissue dispenser of any of claim 23, further comprising:

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

26. The tissue dispenser of claim 25, wherein the door assembly comprises:

a horizontal base; and

a handle for engaging the door assembly by a user.

27. The tissue dispenser of claim 26, wherein 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.

28. The tissue dispenser of any of the claim 25, 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.

29. The tissue dispenser of claim 28, wherein the snap fittings releasably attach to the horizontal base of the door assembly.

30. The tissue dispenser of claim 23, 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 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.

31. The tissue dispenser of claim 30, wherein 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.

32. The tissue dispenser of claim 31, wherein the inner surface of the left and right knobs further comprises a separate washer member.

33. The tissue dispenser of claim 31, wherein the shaped surface of the respective left and right spindles comprises a cross-shaped ridge.

34. The tissue dispenser of claim 23, further comprising:

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

35. A tissue dispenser by which a user may access roles of tissue, comprising:

(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 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.

36. The tissue dispenser of claim 35, 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
- rotation of the right knob causes the right spindle and supported sleeve to rotate.

37. The tissue dispenser of claim 35, wherein the fins frictionally engage the inner diameter of the core of the received tissue roll.

38. The tissue dispenser of claim 35, wherein:

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

39. The tissue dispenser of claim 35, wherein the base further comprises:

- a pivot arm disposed at opposing ends of the side wall; and
- a pin disposed in each of the pivot arms to provide pivoting connections between the base and the cover.

40. The tissue dispenser of any claim 35, wherein the door assembly is biased to the right side of the tissue dispenser, and 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 the left side of the tissue dispenser.

41. The tissue dispenser of claim 35, wherein the snap fittings releasably attach to the horizontal base.

42. The tissue dispenser of any claim 35, wherein 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.

43. The tissue dispenser of claim 33, further comprising:

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

44. The tissue dispenser of claim 35, 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.

45. The tissue dispenser of claim 44, wherein:

- 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.

46. A tissue roll support device, comprising:

(A) a spindle having:

- a base rotationally connected to a tissue dispenser,
- an elongated shaft, and
- a tip having a shaped surface for engaging an outer knob of the tissue dispenser such that rotation of the knob causes the spindle to rotate; and

(B) a sleeve having:

- an elongated shaft defining an inner diameter and an outer diameter, the inner diameter being dimensioned to receive the shaft of the spindle, and
- at least one fin on the outer diameter of the sleeve having a width dimensioned to frictionally engage a core of a tissue roll.

47. The tissue roll support device of claim 46, wherein:

- the spindle further comprises at least one spline along an outer diameter of the shaft; and
- the sleeve further comprises an end having one or more slots to receive a corresponding spline on the spindle