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[Continued on next page]

(54) Title: THREE BUTTON ACTUATED PILL HOLDER/DISPENSER

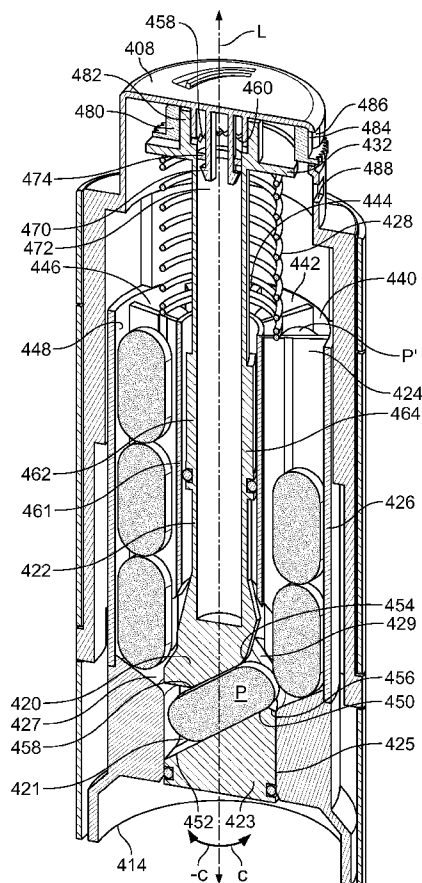


FIG. 6

(57) Abstract: Systems and methods for providing a three button actuated pill holder/dispenser are provided. Such a pill holder/dispenser may include a housing comprising a plurality of apertures, a top button and two side buttons. In response to actuation of the top button, a pill may be dispensed from the pill holder/dispenser. Preferably, the two side buttons lock the top button, such that the top button may only be actuated when the two side buttons are depressed. Alternatively, some other sequence of the buttons may be implemented to cause a pill to be actuated.

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THREE BUTTON ACTUATED PILL HOLDER/DISPENSER

Background of the Invention

[0001] This application relates to a pill holder/dispenser. More specifically, this application relates to a pill holder/dispenser that may incorporate multiple safety features. In particular, the application relates to a dispenser for pills, compacts, capsules (which may contain a solid, a granulated powder, a gel, a liquid or any other suitable substance) and/or caplets, which may be referred to herein as “solid dosage forms.”

[0002] Many pill holders/dispensers incorporate multiple safety features. The safety features that have been incorporated into known pill holders/dispensers make it more difficult for a user to dispense solid dosage forms from the pill holders/dispensers.

[0003] It would be desirable to incorporate one or more safety features into a pill holder/dispenser without substantially reducing the ease-of-use of the holder/dispenser.

Summary of the Invention

[0004] It is an object of the invention to incorporate one or more safety features into a pill holder/dispenser—alternatively referred to herein as a pill container—without substantially reducing the ease-of-use of the holder/dispenser. A pill holder/dispenser is therefore provided. The pill holder/dispenser includes a housing comprising a top button and two side buttons. In response to depression of the top button a pill is caused to be dispensed from the pill holder/dispenser. In some embodiments of the invention, the side buttons lock the top button such that the top button may only be activated when the two side buttons are depressed.

[0005] It should be noted that in accordance with the principles of the invention, pills may be present inside the pill holder/dispenser. The pills may be any pills that are specified in the FDA Orange Book for approved medications.

Brief Description of the Drawings

[0010] The objects and advantages of the invention will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference characters refer to like parts throughout, and in which:

[0011] FIG. 1 is a front perspective view of a pill holder/dispenser according to the invention;

[0012] FIG. 2 is a front view of a pill holder/dispenser according to the invention;

[0013] FIG. 3A is a partial top perspective view of the pill holder/dispenser according to the invention;

[0014] FIG. 3B is a partial top/side perspective view of a pill holder/dispenser according to the invention;

[0015] FIG. 4 is a side view of a pill holder/dispenser according to the invention;

[0016] FIG. 5 is a cut-away view taken along line 5-5 (of FIG. 4);

[0017] FIG. 6 is a cut-away perspective view of a portion of a pill holder/dispenser according to the invention;

[0018] FIG. 7 is schematic diagram of gearing according to the invention;

[0019] FIG. 8 is a perspective view of an actuator assembly and shuttle according to the assembly;

[0020] FIG. 9 is a cut-away view similar to that shown in FIG. 6;

[0021] FIG. 10 is another cutaway view showing more apparatus than that shown in FIG. 9; and

[0022] FIG. 11 is a perspective view of a portion of a pill holder/dispenser such as that shown in FIG. 1.

Detailed Description of the Invention

[0023] A pill container that may dispense pills in response to actuation of three buttons in a predetermined sequence is provided. In some embodiments of the invention, the sequence may require depressing two side buttons in order to unlock a top button. Thereafter, or substantially simultaneously thereto, the top button may be pressed and, in response, a pill may be dispensed.

When a pill is dispensed, certain embodiments of the invention preferably cause a counter to be changed such that the number of pills that have been dispensed is recorded. In some embodiments of the invention, the dispensing of a pill may cause a calendar wheel to be actuated as well. In certain embodiments of the invention, the calendar wheel can be calibrated to the start day of the administration of the dosage. The start day may be a day of a month, such as the 2nd day of June.

[0024] Some embodiments of the invention may include an apparatus for dispensing a solid dosage form. The apparatus may include a housing, a magazine that is at least partially inside the housing, a chamber and a shuttle. The magazine may be fixedly attached, or fixed in position, with respect to the housing. The shuttle may be configured to reciprocate with respect to the magazine to receive the solid dosage form from the chamber and dispense the solid dosage form.

[0025] In some embodiments of the invention, the chamber may be one of several chambers in the magazine. The chambers may form an annulus through which the shuttle is configured to reciprocate.

[0026] In some embodiments of the invention, the magazine may be adapted to be pulled out and refilled with pills. In those embodiments, the magazine may form a portion of a cartridge that is removable from the housing. Alternatively, the magazine may be sealed within the housing such that the pill holder/dispenser is a disposable item that is filled with a certain predetermined number of pills and discarded after use. In such embodiments, a number of such disposable packages may be combined in a single aggregation or package to provide a predetermined dose over a period of time that extends longer than the number of pills in a single package is adapted to contain.

[0027] FIG. 1 is a perspective view of a pill holder/dispenser 102 according to the invention. Pill holder/dispenser 102 may hold pills and provide a mechanism for dispensing the pills at a predetermined rate—e.g., a certain number of pills per button actuation—in response to a predetermined action.

[0028] Pill holder/dispenser 102 may preferably include actuation button 104 and side buttons 106. A locking tab 108 is also shown. Pill holder dispenser may also include housing 110 (which may be formed from a translucent material) and front surface 112 (which may serve as additional space for labeling content). A translucent material provides visibility of the contents

of holder/dispenser 102. Such visibility may provide a visual indicator of the number of remaining pills in holder/dispenser 102.

[0029] FIG. 2 is a front view of a pill holder/dispenser according to the invention. FIG. 2 shows that, in some embodiments of the invention, squeezing side buttons 206 releases locking tabs 208 from butting against a portion of the housing 210. Once locking tabs 208 are freed from butting against housing 210, actuation apparatus 204 may be actuated. Actuation apparatus 204 may be integrated with—i.e., formed together from the same piece of material as—locking tabs 208. An example of the integration of such an actuation apparatus with locking tabs is shown in FIG. 8. Top portion of actuation apparatus 202 may be sufficiently wide as to allow easy actuation when side buttons 206 have been depressed.

[0030] In some embodiments of the invention, the top portion of actuation apparatus 202 can only be depressed when both of side buttons 206 are depressed. In order to dispense a pill, one hand can be used to depress side buttons 206. This is an important safety feature because it may require depressing three buttons in a predetermined order to dispense a pill. In alternative embodiments of the invention, the top portion of actuation apparatus 202 may only be depressed when side buttons 206 have been depressed in a certain predetermined order or sequence such as one after the other or all substantially simultaneously.

[0031] FIG. 3A is a partial top perspective view of pill holder/dispenser 302 according to the invention. Pill holder/dispenser 302 preferably includes actuation apparatus 304, calendar wheel 306 and housing 308.

[0032] FIG. 3B is a partial top/side perspective view of pill holder/dispenser 302 according to the invention. FIG. 3B shows actuation apparatus 304, calendar wheel 306, housing 308, calendar window 310, and number of pills window 312. The mechanisms for turning calendar wheel 306 and a number of pills wheel (not shown in FIG. 3B), respectively, are shown in more detail in FIGS. 6 and 7.

[0033] The three-button actuation system provided herein is an added safety feature according to the invention because it requires multiple coordinated actions on the part of the user. The three-button system adds an ease-of-use feature at least because it may be operated using one hand. The counter system that only counts the dispensing of a pill when a pre-selected or predetermined button is depressed also acts as a safety feature because it shows the user the number of pills currently in the pill holder/dispenser.

[0034] FIG. 4 shows illustrative pill holder/dispenser 400. Pill holder/dispenser 400 may include some or all of the pill holder/dispenser features shown and described herein. Pill holder/dispenser 400 may include housing 402 and dispensing assembly 404. Housing 402 may include side buttons 403 (one shown; other, on opposite side, not shown), detent edge 406 (one shown; other, on opposite side, not shown) and dispensing end 414. Side buttons 403 may extend from the body of housing 402. Dispensing assembly 404 may include top button 408 and locking tab 410 (one shown; other, on opposite side, not shown). Top button 408 may be connected to locking tab 410 by a biased support arm (not shown). The support arm may be contoured to the inner surface of the housing. The support arm may be biased in radial-outward direction R to maintain locking tab 410 in contact with detent edge 406. This prevents a user from depressing button 408.

[0035] Housing 402 may hold pills in a magazine (not shown) that is substantially annular. The magazine may be substantially centered inside housing 402 about axis L. The magazine may be enclosed in section 412 of housing 402. The magazine may include chambers that hold the pills. The chambers may be arranged circumferentially in the magazine. Each chamber may be configured to hold one or more pills. Pills may be dispensed by a shuttle (not shown) that travels along longitudinal axis L between the magazine and dispensing end 414. The shuttle may be mounted to top button 408. The shuttle may traverse longitudinally through the magazine to dispense pills.

[0036] The shuttle may be moved down (toward dispensing end 414) along axis L by depressing side buttons 403 and then top button 408. Inward-radial motion of side buttons 403 disengages locking tabs 410 from corresponding detent edges 406. When locking tabs 410 are thus disengaged, dispensing assembly 404 may move downward along axis L. Locking tabs 410 may travel downward inside housing 402. The depression of top button 408 may move the shuttle from magazine section 412 to dispensing end 414.

[0037] The magazine and/or the shuttle may be rotated, along directions C and -C, with respect to each other so that the shuttle can receive pills from different chambers along the inner diameter of the magazine. The rotation of the shuttle relative to the magazine may be actuated by the longitudinal motion of dispensing assembly 404. In some embodiments, the shuttle may rotate with respect to housing 402. In some embodiments, the magazine may rotate with respect to housing 402. In some embodiments, both the shuttle and the magazine may rotate with

respect to housing 402. When appropriate, for example, after dispensing a pill, the shuttle may be moved back up (away from dispensing end 414) by any suitable mechanism, for example, a spring.

[0038] FIG. 5 shows the partial cross-sectional view taken along lines 5-5 (shown in FIG. 4). In FIG. 5, dispensing assembly 404 is locked by locking tabs 410 to housing 402. Pill P is present in hollow 421 of carriage 420 in shuttle 422. Pill P was originally held in chamber 424 of magazine 426. When pill P moved into carriage 420, other pills that were present in chamber 424 gravitationally moved down in chamber 424. Dispensing assembly 404 may be unlocked and moved downward toward dispensing end 414 to dispense pill P.

[0039] Spring 428 may thus provide a longitudinally opposing bias that urges shuttle 422 upward along axis L with respect to housing 402. After dispensing pill P, spring 428 may return shuttle 422 to a position along axis L that is higher than dispensing end 414. The bottom of spring 414 may abut flange 430. Flange 430 may be at or near the top of magazine 426. The top of spring 414 may abut flange 432. Flange 432 may be integral with dispensing assembly 404. In some embodiments, flange 432 may be part of shuttle 422.

[0040] FIG. 5 shows shuttle 422 in a “pill-load” position. The spring may return shuttle 422 to the pill-load position. In some embodiments, the spring may return shuttle 422 to an “idle” position. The idle position may be higher along axis L than the pill-load position. When shuttle 422 is in the idle position, shuttle end 423 may move up longitudinally to a position in which cylindrical surface 425 (at the base of shuttle 422) blocks or partially blocks chamber outlets such as chamber outlets 427 and 429.

[0041] FIG. 6 shows partial cross-sectional view, in perspective, of pill holder/dispenser 400 that is similar to the view shown in FIG. 5. In FIG. 6, flange 430 has been removed to show the tops of chambers 424, 440, 442, 444, 446 and 448. The top of pill P' may be seen in chamber 440. Carriage 420 may include entry end 450 and exit end 452. Carriage 420 may have chamfered surfaces 454, 456 and 458 to facilitate the rotation and/or translation of a pill such as P into carriage 420 from magazine 426.

[0042] FIG. 6 shows carriage 420 aligned with chamber 426. Carriage 420 may dispense pill P at dispensing end 414. Carriage 420 may be rotated into alignment with a different chamber, such as chamber 440, to dispense a pill from that chamber. Carriage 420 may be rotated using

any suitable rotation mechanism. For example, carriage 420 may be rotated using a rotation mechanism such as those known in the art of retractable pens.

[0043] In some embodiments, a rotation mechanism for rotating shuttle 420 may include saw-tooth gears 458 and 460. Top gear 458 may be rotationally fixed with respect to top button 408. (Top button 408 is rotationally fixed with respect to housing 402, so top gear 458 may be viewed as being rotationally stationary in pill holder/dispenser 400.) Bottom gear may have an equilibrium position that is offset—or out of phase—from top gear 458. Bottom gear 460 may therefore be misaligned with respect to top gear 458. Bottom gear 460 may extend from the top of shuttle 422. When top button 408 is depressed, top gear 458 may partially mesh with bottom gear 460.

[0044] The misalignment between top gear 458 and 460 may generate a circumferential rotational force that is applied to the top of shuttle 422. A resisting, or counter-rotational, force may be applied to splines such as 462 and 464 that extend radially outward from shuttle 422. When shuttle 422 is in a high position, the splines may travel in grooves (not shown) that run longitudinally along inner diameter 461 of magazine 426. The grooves prevent the rotational force from rotating shuttle 422 until the splines descend (toward dispensing end 414) below the bottoms of the grooves. When the splines descend below the bottom of the grooves, the rotational force from the misalignment of saw-tooth gears 458 and 460 causes the shuttle to rotate.

[0045] The rotation of shuttle 422 may not be sufficient to align carriage 420 with the next chamber. The splines, therefore, may have beveled tops that are deflected by ramp surfaces such as 466 and 468 on inner diameter 461 of magazine 426. The ramp surfaces deflect the splines when shuttle 422 moves back up with respect to magazine 426. The deflection may be sufficient to align carriage 420 with the next chamber.

[0046] A tolerance parallel to axis L may be present between saw-tooth gear 458 and 460 to accommodate the deflection. The deflection should be gauged such that, after the deflection, gears 458 and 460 are again misaligned. The tolerance may be limited by snap hooks 470. Snap hooks 470 may be fixed to top button 408 at the top of snap hooks 470. The bottoms of snap hooks 470 may extend into luminal space 472 inside shuttle 422. Flange 474 may be fixed along the wall of luminal space 472 to catch snap hooks 470 and prevent shuttle 472 from becoming disengaged from top button 408.

[0047] The rotation of shuttle 422 may be used to drive the motion of calendar gears shown and described herein.

[0048] Any suitable gearing motion may be used to advance calendar wheel 480. For example, calendar wheel 480 may be eccentric to axis L. Annular projection 482 of flange 432 may include teeth (not shown) that engage corresponding teeth (not shown) on the inner diameter of calendar wheel 480. Annular projection 482 is concentric with axis L. When annular projection 482 is advanced by depression of top button 408, annular projection 482 may drive rotational motion of calendar wheel 480. Any suitable reduction of rotational speed from annular projection 482 to calendar wheel 480 may be employed. For example, if magazine 426 includes 10 chambers that each hold 3 pills, three rotations of shuttle 422 are required to exhaust the pill supply. Calendar wheel may have a radius that is selected such that the three rotations of shuttle 422 are reduced to one (or fewer) rotations of the calendar wheel. The calendar wheel can then be used to count the number of days elapsed (or remaining) in a drug regimen. If more than one pill is to be taken per day, greater reduction may be used.

[0049] In some embodiments, it may be desirable to include more than one calendar wheel. Additional calendar wheels may be accommodated, for example, by extending annular projection 482 and adding an eccentric wheel of desired radius for each additional calendar wheel. Indices may be read off of outer surfaces (such as 484) of the wheels through sites such as 486 and 488. Different longitudinal positions of the indices and sites may be provided by including cylindrical extensions that rise up from or hang down from the calendar wheels.

[0050] FIG. 7 shows, schematically, and in greater detail than is shown in FIG. 6, the interaction between saw-tooth gear 458 and saw-tooth gear 460 at a position “behind” axis L (as shown in FIG. 6). Force F_U is applied by a user in the downward direction along axis L. Force F_S is applied by spring 428 (and carousel 426) in the upward direction along axis L. At point T, resulting force F_C moves saw-tooth gear 460 in circumferential direction C. (For the sake of clarity, the teeth of saw-tooth gear 458 are shown in FIG. 7 as having a more acute angle than those of saw-tooth gear 460. In some embodiments of the invention, the tooth angle of saw-tooth gear 458 and the tooth angle of saw-tooth gear 460 may be substantially the same.)

[0051] FIG. 8 shows dispensing assembly 804. Pill Q is shown in hollow 834 of shuttle carriage 836. Top button 808, support arms 809 and locking tabs 810 may be of unitary construction. Shuttle 822 may be connected to top button 808 as described in connection with pill

holder/dispenser 400 (shown in FIGS. 4-6, e.g.). Shuttle 822 may include splines 830 that fit into grooves (not shown) of a corresponding magazine (not shown). Each of splines 830 may include a beveled surface 832. Beveled surfaces 832 may induce a rotation in the C direction about axis L in shuttle 822 when beveled surfaces contact corresponding ramped surfaces (shown in FIGS. 8 and 9) fixed to inner diameter 461 of magazine 426. Shuttle 822 may include annular grooves 838 and 840. Each of grooves 838 and 840 may receive an O-ring. The O-rings may damp oscillations—which may be longitudinal or circumferential—in the motion of shuttle 822.

[0052] FIG. 9 shows portions of pill holder/dispenser 400 from a view similar to that shown in FIG. 6. In FIG. 9, some portions of pill holder/dispenser 400 have been removed to show ramped surfaces 902. Ramped surfaces 902 are positioned circumferentially along inner diameter 461 of magazine 426 (shown in FIG. 4). Ramped surfaces 902 are provided at the lower ends of shuttle spline guides 904. When a shuttle such as 822 (shown in FIG. 8) travels upward along axis L after dispensing a pill, bevels such as 832 (shown in FIG. 8) contact ramped surfaces 902. The contact between the bevels and ramped surfaces 902 forces shuttle 822 to rotate in circumferential direction C. (Ramped surfaces 902 in FIG. 9 are along the “back” portion of inner diameter 461, so direction C appears to be toward the “left.”) After shuttle 822 rotates in direction C, spring 428 urges shuttle 822 upward along axis L. Splines such as 830 (shown in FIG. 8) then slide into spline channels 906.

[0053] In the illustrative embodiment described herein, when the splines move circumferentially and are inserted among spline channels 906, lower saw-tooth gear 460 (shown in FIG. 7) advances circumferentially by a corresponding number of teeth (e.g., one tooth) to a different misaligned position relative to upper saw-tooth gear 458. When a user subsequently depresses top button 408, upper saw-tooth gear 450 can then induce further rotation in lower saw-tooth gear 458, as shown in FIG. 7. Any suitable gearing may be used to induce rotation in shuttle 472 based on longitudinal motion of top button 408.

[0054] FIG. 10 shows a view of pill holder/dispenser 400 that is similar to that shown in FIG. 9. The view in FIG. 10 shows, in addition to that which is shown in FIG. 9, the “back” portion of shuttle 422. FIG. 10 shows spline guides 904 spaced apart by spline channels 906 along inner diameter 461 of magazine 426. Splines 462, 463, 464 and 465 are inserted into spline channels 906. When top button 408 (not shown in FIG. 10) is depressed, splines 462, 463, 464

and 465 are pushed down through spline channels 906. Saw-tooth gear 458 induces torque in shuttle 422. The torque is countered by spline guides 904 until splines 462, 463, 464 and 465 descend below the bottoms of spline guides 906. Then shuttle 422 is free to rotate in circumferential direction C. In some embodiments of the invention, a pill may be released from carriage 420 at or near the time the splines clear the spline guides. When top button 408 is released, spring 428 pushes shuttle 422 back up through magazine 426. The splines are then further rotated by ramped surfaces on the spline guides. The splines then slide into the circumferentially adjacent spline channel.

[0055] FIG. 11 shows a portion of illustrative pill holder/dispenser 1100. Pill holder/dispenser 1100 may include housing 1102. Pill holder/dispenser 1100 may include magazine 1104. Wall 1106 of housing 1102 is illustrated as being transparent so that chambers 1108, 1110, 1112 and 1114, all of which are filled with pills, may be seen. Inner cylindrical wall 1116 of magazine 1104 forms bore 1118 through which a shuttle may reciprocate. Pill holder/dispenser 1100 may include side buttons 1120 and two locking tabs 1122 (one shown, one not shown). A top button (not shown) may be used in conjunction with side buttons 1120 and locking tabs 1122 to unlock pill holder/dispenser 1100 and dispense a pill at dispensing end 1124.

[0056] In alternative embodiments of the invention, the pill attributes such as various pill metrics including height, width, and depth may drive the overall size of the actual device. Additionally, the “counting” functionality may be customized for a particular brand need. Furthermore, the dispensing mechanism as disclosed herein may be tailored to a pill form factor. Finally, the flat areas provide significant brand billboards for brand identification.

[0057] Thus, systems and methods for according to the invention have been provided. Persons skilled in the art will appreciate that the present invention can be practiced by other than the described embodiments, which are presented for purposes of illustration rather than of limitation, and the present invention is limited only by the claims that follow.

WHAT IS CLAIMED IS:

1. An apparatus for dispensing a solid dosage form, the apparatus comprising:
a housing;
a magazine that is at least partially inside the housing and includes a chamber; and
a shuttle configured to reciprocate with respect to the magazine to receive the solid dosage form from the chamber and dispense the solid dosage form.
2. The apparatus of claim 1 wherein:
the chamber is one of several chambers in the magazine; and
the chambers form an annulus through which the shuttle is configured to reciprocate.
3. The apparatus of claim 2 further comprising an actuation assembly that, when activated, causes the solid dosage form to be dispensed from the shuttle.
4. The apparatus of claim 1 wherein the magazine is included in a removable cartridge that houses a plurality of pills.
5. The apparatus of claim 1 wherein the housing is formed from a translucent material.
6. The apparatus of claim 1 further comprising:
a counter; and
an actuation assembly that, when activated, causes the solid dosage form to be dispensed from the shuttle.
7. The apparatus of claim 6 wherein the counter is coupled to the actuation assembly such that the counter counts when the actuation assembly actuates.
8. The apparatus of claim 1 wherein the top button comprises a width that is

greater than half the width of the housing.

9. A pill container comprising:
a housing comprising two side buttons; and
a top button;

wherein the pill container dispenses a pill in response to actuation of the three buttons in a predetermined sequence.

10. The pill container of claim 9 further comprising a pill shuttle that restrains a pill from being dispensed when the top button is not actuated and that releases the pill in response to activation of the top button.

11. The pill container of claim 9 further comprising a removable cartridge that is adapted to house a plurality of pills.

12. The pill container of claim 9 wherein the housing is formed from a translucent material.

13. The pill container of claim 9 further comprising a counter.

14. The pill container of claim 13 wherein the counter is coupled to the top button such that the counter counts only when the top button is activated.

15. The pill container of claim 9 wherein the top button comprises a width that is greater than half the width of the housing.

16. The pill container of claim 9 further comprising:
a magazine that is at least partially inside the housing and includes a chamber; and
a shuttle configured to reciprocate with respect to the magazine to receive the pill from the chamber and dispense the pill.

17. The pill container of claim 16 wherein:
the chamber is one of several chambers in the magazine; and

the chambers form at least a half of an annulus through which the shuttle is configured to reciprocate.

18. The pill container of claim 17 wherein the top button comprises an actuation assembly that, upon actuation, causes the pill to be dispensed from the shuttle, the actuation assembly that dispenses the pill only when the side buttons are depressed.

19. The pill container of claim 9 further comprising pills.

20. A method for dispensing solid dosage forms from a magazine, the magazine being at least partially housed inside a housing, the magazine that includes a chamber, the method comprising:

transferring a solid dosage form from the chamber into a hollow in a shuttle;

moving the shuttle with respect to the magazine;

dispensing the solid dosage form from the hollow.

21. The method of claim 20 wherein the chamber is one of several chambers in the magazine, the method further comprising reciprocating the shuttle through an annulus formed by the several chambers.

22. The method of claim 20 further comprising activating an actuation assembly that, upon activation, causes the solid dosage form to be dispensed from the hollow in the shuttle.

23. The method of claim 20 further comprising activating an actuation assembly that, upon activation, causes the solid dosage form to be dispensed from the housing.

24. The method of claim 23 wherein the activation further causes indexing of a counter.

25. The method of claim 20 further comprising locking the magazine at least partially within the housing.

26. The method of claim 20 further comprising replacing an empty magazine with a full magazine, the full magazine that stores a plurality of solid dosage forms.

27. The method of claim 20 further comprising forming the housing from a translucent material.

28. A method for assembling a pill holder/dispenser, the method comprising:
forming a housing;
locking a magazine at least partially within the housing, the magazine that includes a plurality of chambers, the chambers that form an annulus, at least one of the chambers holding a solid dosage form; and
reciprocating a shuttle with respect to the annulus such that the shuttle may travel along a longitudinal axis within the annulus, receive a solid dosage form from one of the chambers and, following the extension of the shuttle from the annulus, dispense the solid dosage form.

29. The method of claim 28 wherein the shuttle further comprises a carriage, the method further comprising receiving the solid dosage form in the carriage and dispensing the solid dosage form therefrom.

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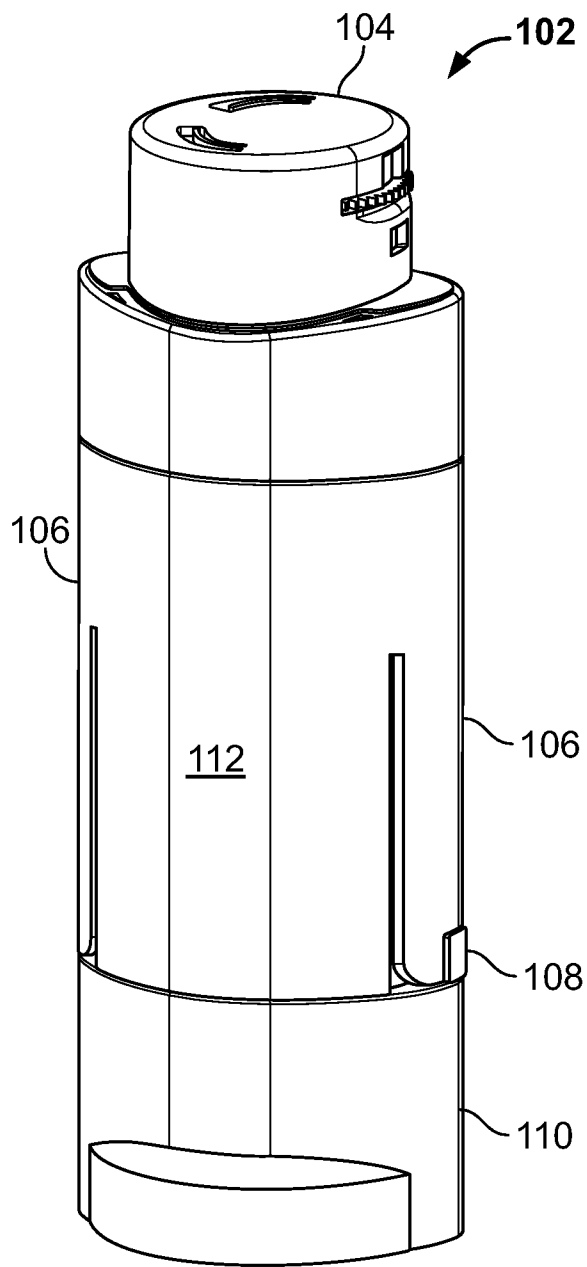


FIG. 1

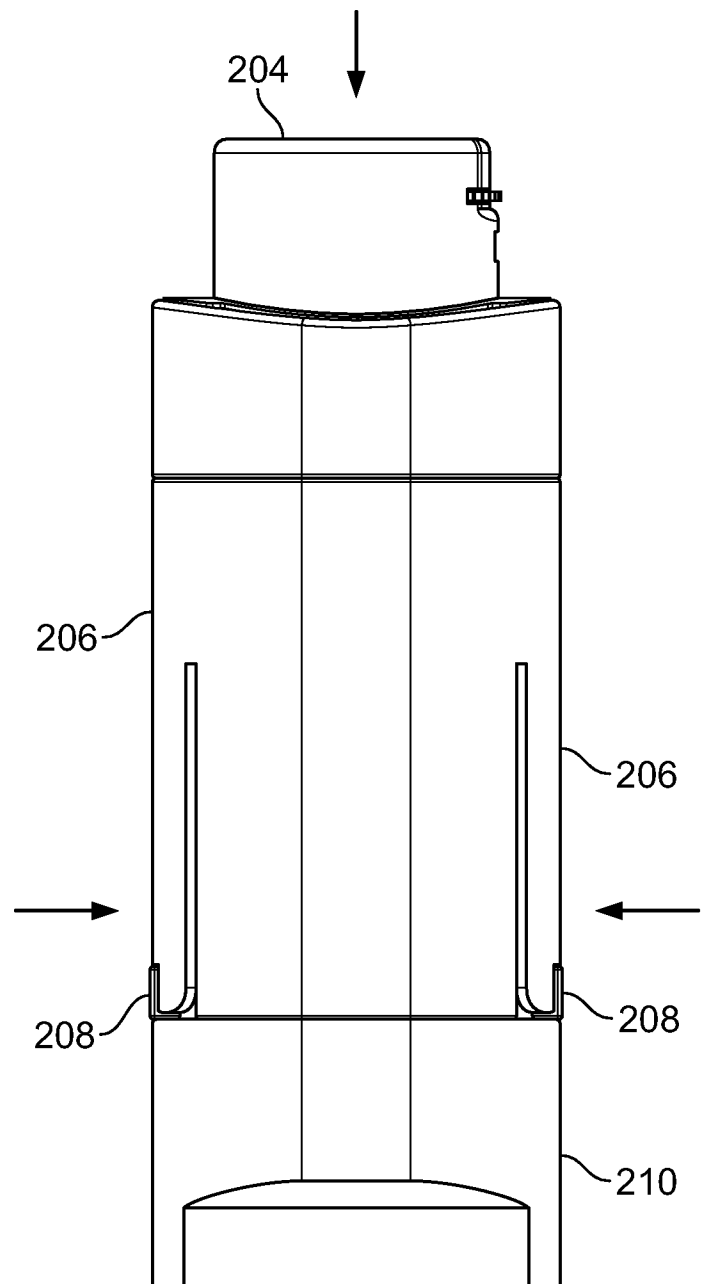


FIG. 2

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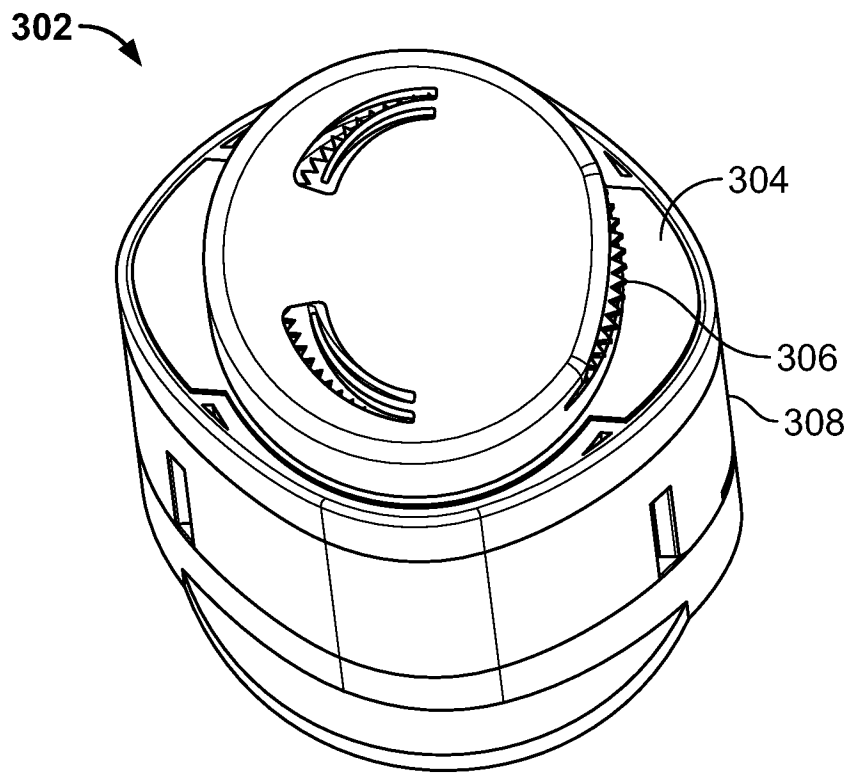


FIG. 3A

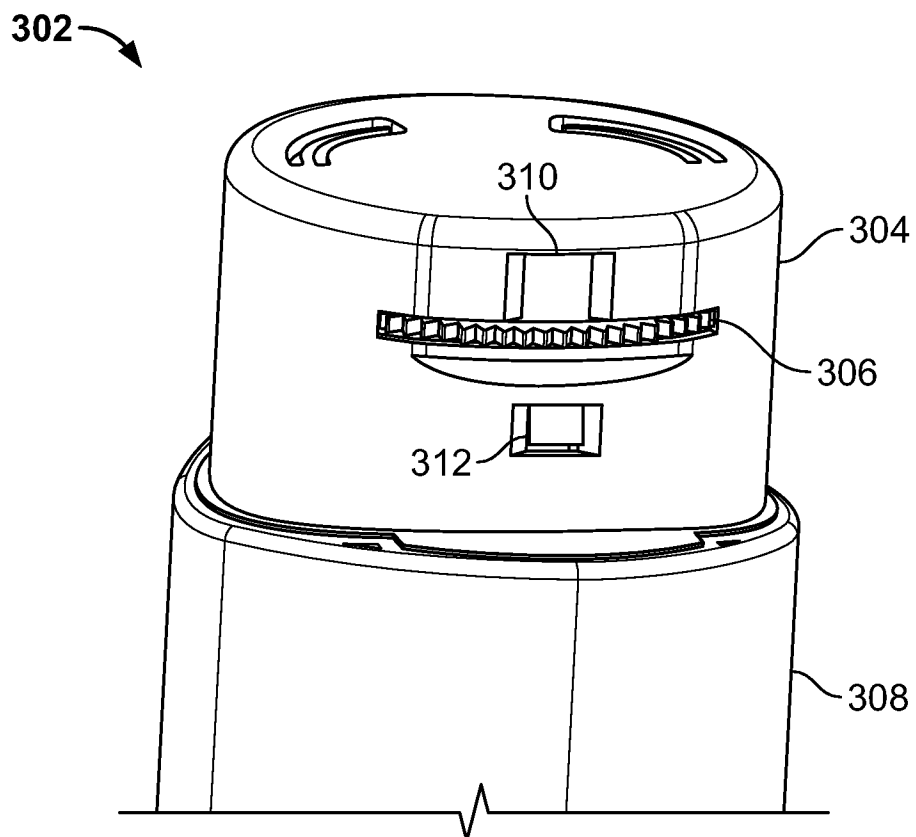


FIG. 3B

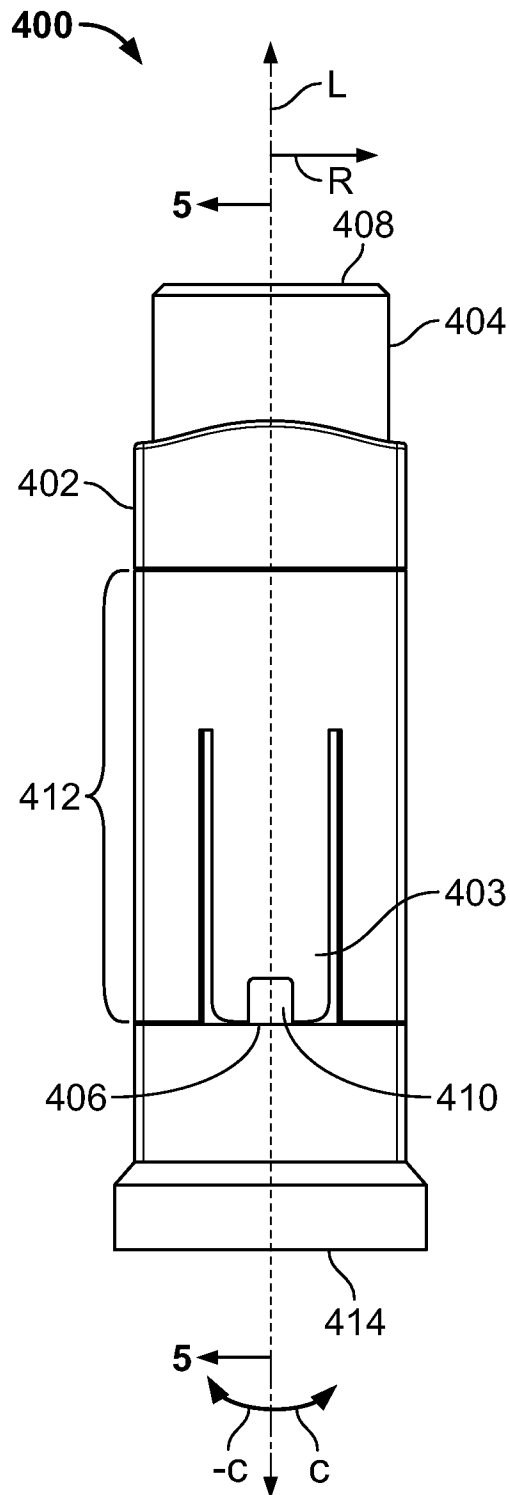


FIG. 4

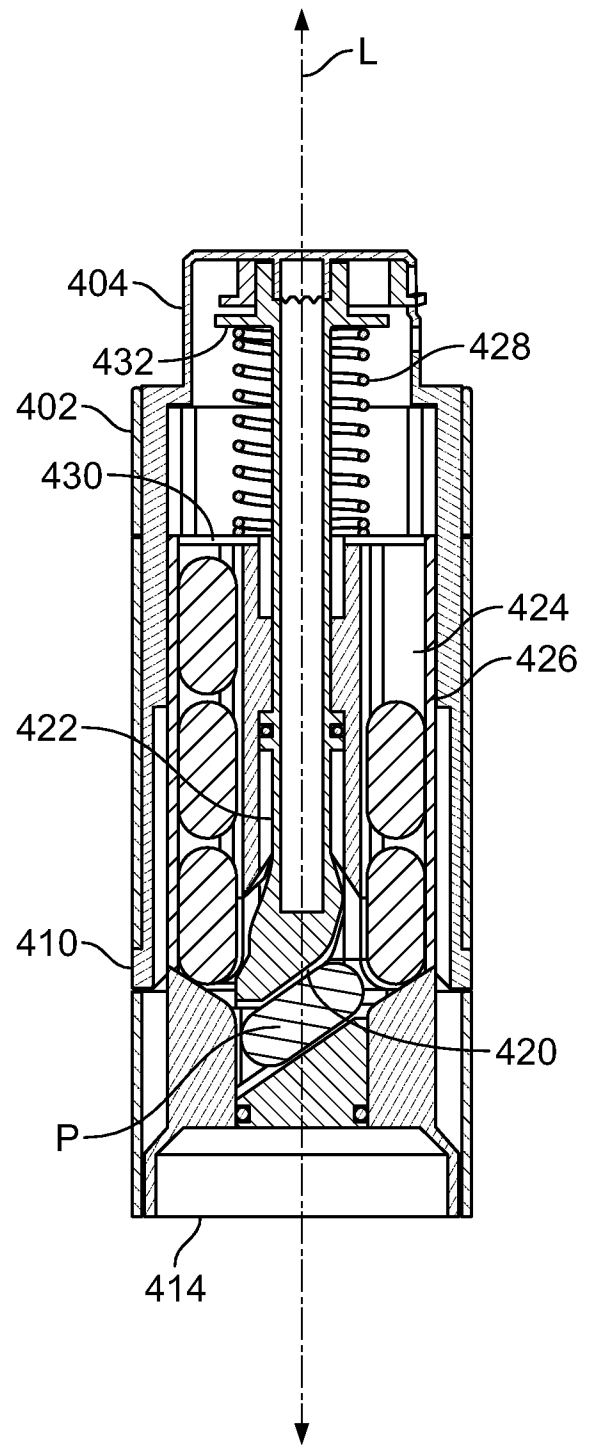


FIG. 5

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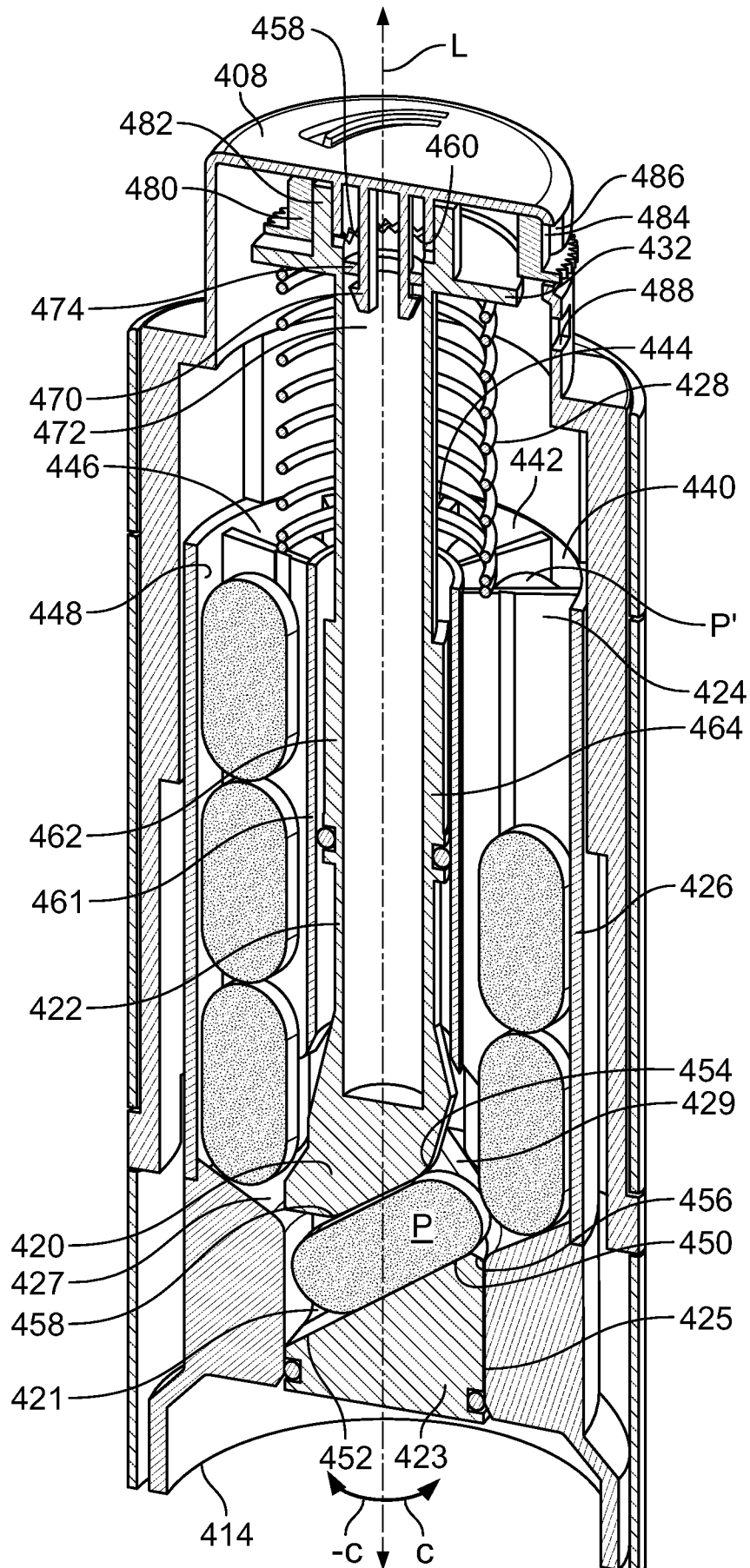


FIG. 6

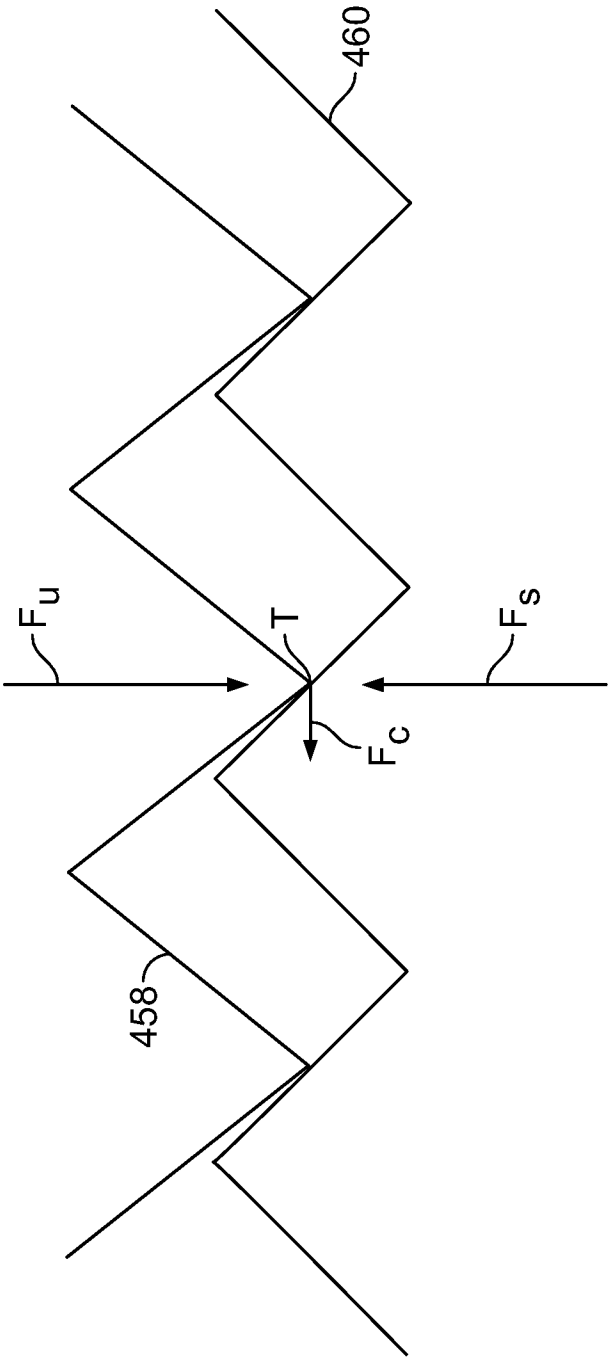


FIG. 7

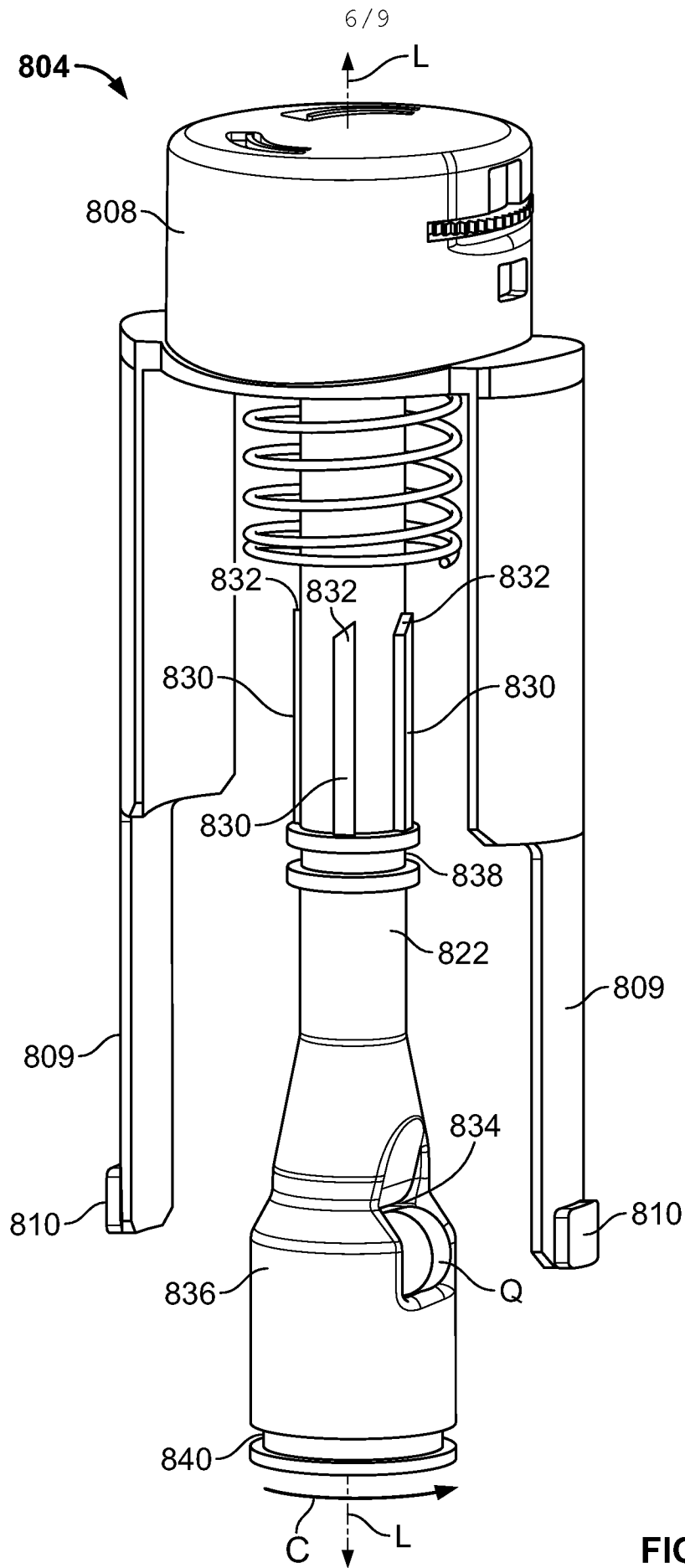


FIG. 8

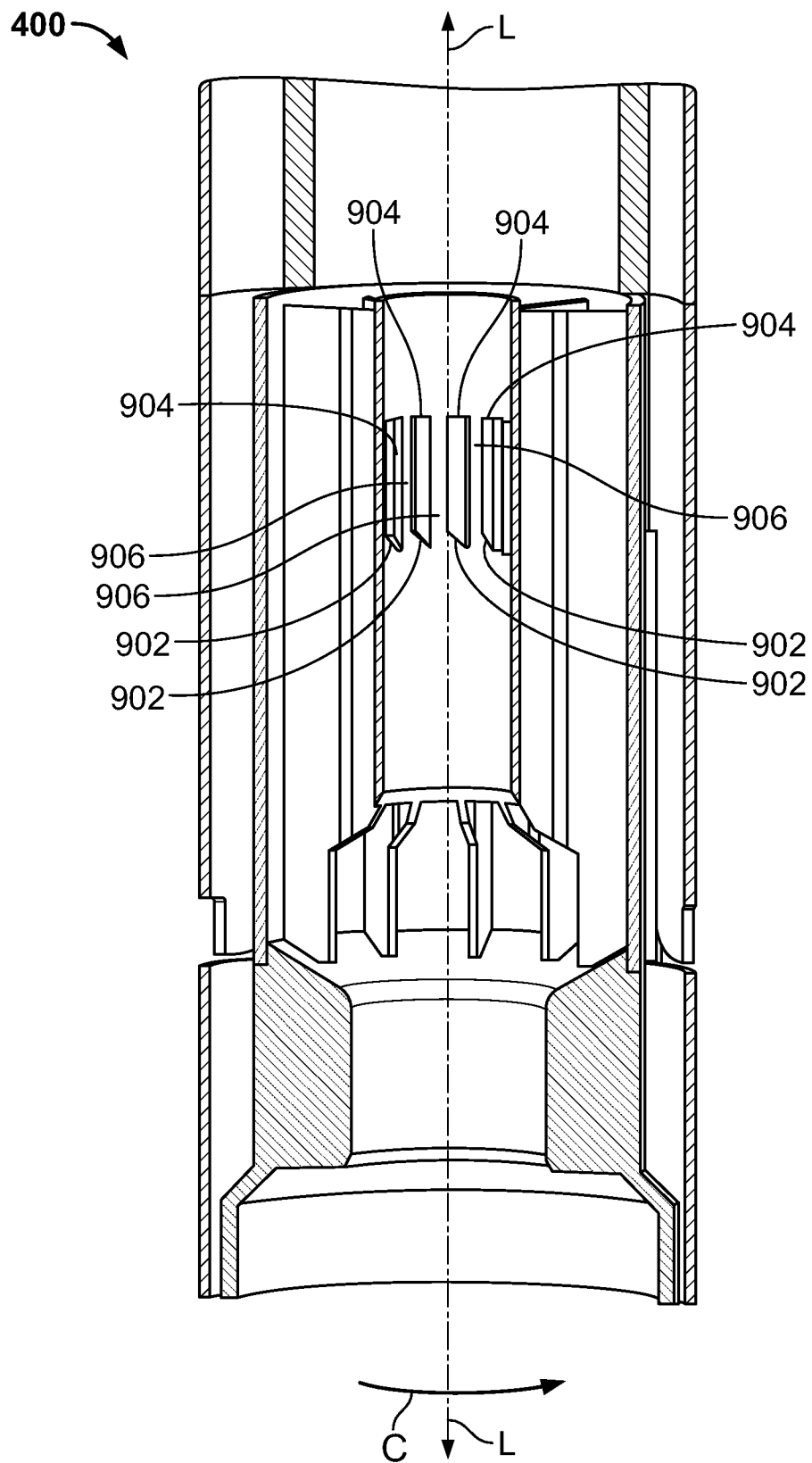


FIG. 9

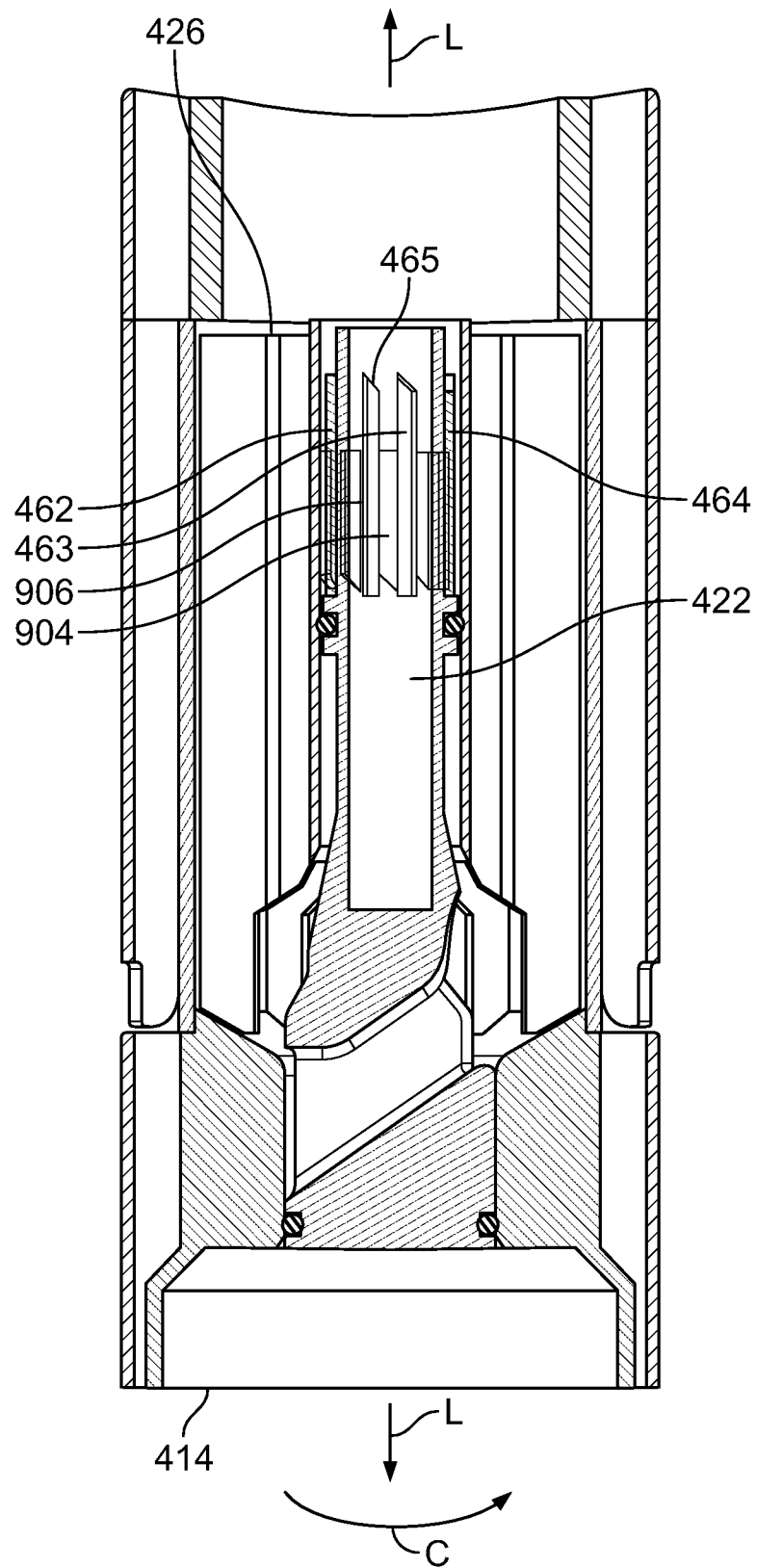


FIG. 10

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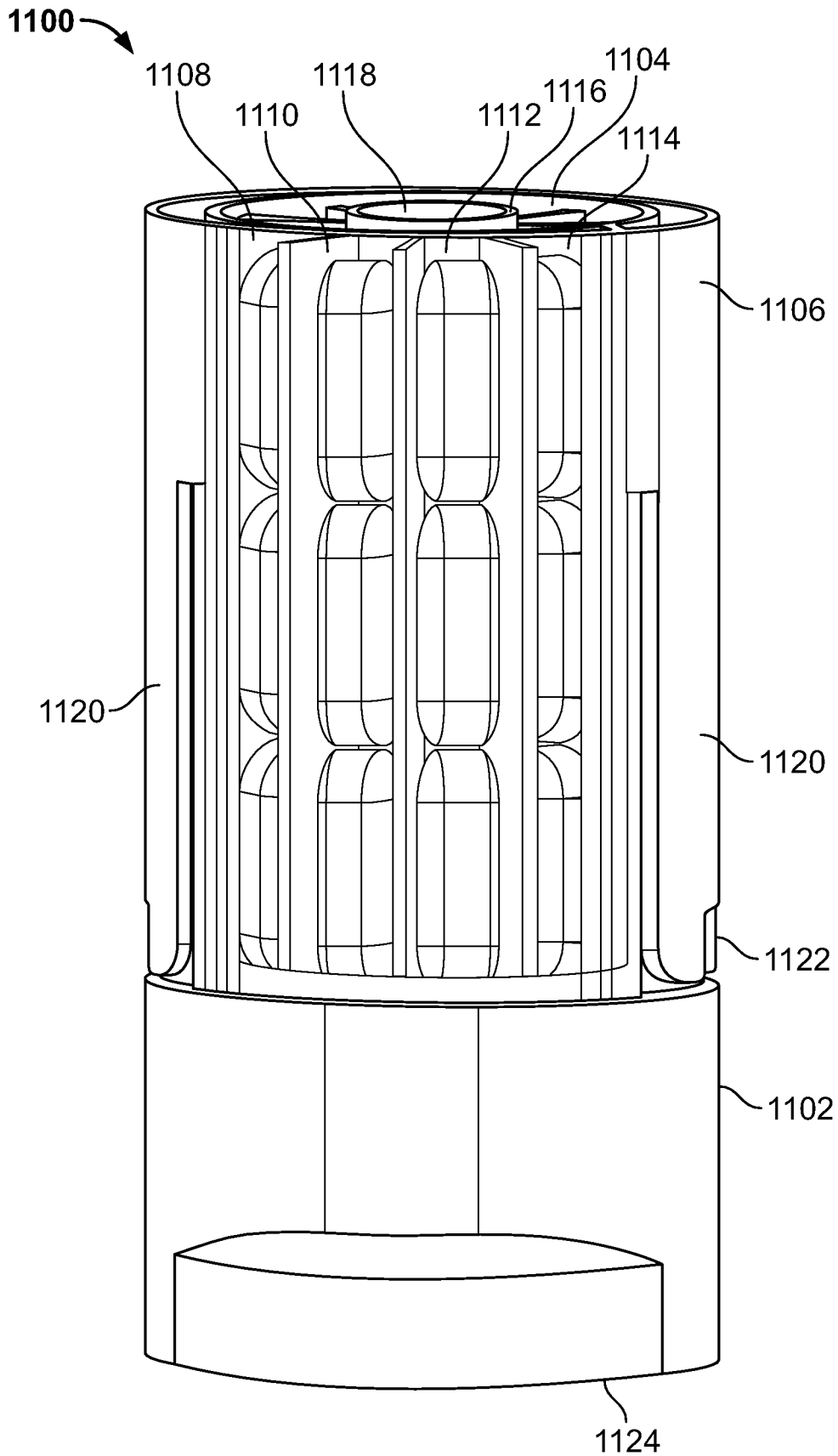


FIG. 11