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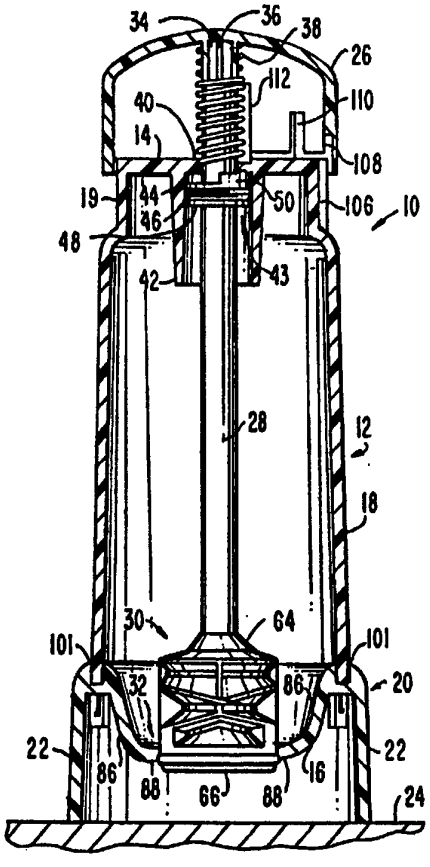
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(57) Abstract

The dispenser (10) has a plunger (28) which is pressed downwardly to dispense condiments, such as salt, pepper, etc. An adjusting device (106, 108, 110, 112) is set to dispense a predetermined amount with each stroke of plunger (28). The plunger (28) has a dispensing head (30) which passes through an outlet opening (32) in the base (20) of the device (10). The head (30) has a plurality of vertically spaced recesses (76, 78, 80) with walls (70, 72, 74) separating the recesses. The walls form an acute angle with the plane of the outlet opening (32). The base (20) can be slipped over a resilient sealing member (68) at the lower end of the dispensing head (30) to remove and replace the base for refilling and cleaning of the dispenser. Resilient seal (43) seals an opening between the housing and the outside air to minimize clogging and jamming of the moving parts of the device from humid air. The plunger (28) is provided with a lock (145, 106, 107) to prevent unwanted dispensing.



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CONDIMENT DISPENSER

This invention relates to dispensers, and particularly to dispensers for dispensing salt, pepper, spices and other condiments.

Plunger-type condiment dispensers have been proposed in the past. Most such dispensers have had relatively little acceptance because of several problems.

One problem with such prior dispensers is that the plunger which passes through an outlet opening in the bottom of the condiment container often jams because the condiment interferes with the movement of the parts.

Another problem is that humid air often enters the container and causes the condiment, such as salt, sugar, etc., to cake and accumulate at the junctions between the moving parts of the device and contribute to jamming. The caked condiment is a nuisance to remove or break up.

Additional problems with such prior devices include the inability to accurately control the amount of condiment dispensed.

The accurate measurement of condiments used in cooking has become increasingly important because of the need to restrict the intake of certain substances in modern diets, such as in salt-restricted diets.

It is an object of the invention to provide a condiment dispenser which solves or alleviates the foregoing problems.

In particular, it is an object to provide such a dispenser which dispenses the condiment in accurately pre-measured amounts.

It is a further object to provide such a device in which variable amounts to be dispensed can be preselected and dispensed quickly and easily.

Another object of the invention is to provide a dispenser, particularly one of the plunger type, which operates relatively free of jamming.

It is a further object of the invention to provide such a dispenser which protects the contents against excess contact with the outside air, and thus minimizes caking and other deleterious effects due to such contact.

It is another object of the invention to provide such a device which is relatively simple in construction, easy to disassemble for filling and cleaning, and easy to use.

It is a further object of the invention to provide such a device which is of relatively inexpensive construction, but which is sturdy and reliable for use over a relatively long period of time.

In accordance with the present invention, the foregoing objects are met by the provision of a condiment dispenser which will dispense one of a plurality of predetermined quantities of condiment with a single stroke or cycle of operation.

Preferably, the dispenser has a condiment container with an outlet opening, and a dispensing member mounted in the container for moving in a reciprocating motion through the outlet opening to dispense a condiment. The dispensing member includes means for metering the quantity of condiment dispensed as a function of the distance the dispensing member moves through the outlet opening. Additionally, means are provided for selecting one of a plurality of predetermined distances for the dispensing member to move through said opening so as to dispense a preselected quantity of condiment with each actuation of the dispensing member.

The dispensing member or head preferably has a plurality of recesses spaced apart from one another in the direction of motion of the dispensing head so that the contents of different ones of the recesses are dispensed through the outlet opening depending upon the distance moved by the dispensing head.

It also is preferred that the walls separating the recesses from one another form an acute angle with the plane of the outlet opening so as to provide a shearing motion to minimize the chances of jamming.

Preferably, an actuating member or plunger extends out of the container for manual movement of the dispensing member. A sliding seal or elastic sealing member or "O"-ring is provided to hermetically seal the condiment container against the atmosphere at the location where the actuating plunger extends out of the container. This seal also minimizes the escape of condiments from the container.

The dispensing head preferably has another elastic sealing member or "O"-ring which normally is seated against the bottom edge of the outlet opening to seal it hermetically. Preferably, the end of the dispensing head at which the sealing ring is located is of a diameter so that it can pass through the opening, while the sealing ring is compressed, so as to facilitate removal of the bottom of the container for refilling and cleaning, etc.

Preferably, the container includes a side wall and a base which is easily detachable from the side wall for filling the container and cleaning its inside surfaces. The side wall preferably has projecting clips fitted through slots in the base to quickly and easily attach and remove the base member by twisting the base and the side walls relative to one another. Screw threads thus are avoided, along with the problem of jamming often found when screw threads are used in such a device.

In a preferred form of the invention, the quantity to be dispensed with each stroke of the actuating member or stem is determined by one of a plurality of stops which can be selected by rotating the cap of the device. Preferably, the stops consist of a plurality of grooves of varying lengths, and at least one

projection which serves as a stop member and operaters to stop the downward motion of the stem when it reaches the end of the groove in which it travels. A detent mechanism is provided to insure that the stop member is aligned properly with one of the grooves.

In accordance with another feature of the invention, the actuating member can be locked with all of the openings of the container shut. This prevents unwanted dispensing of condiments. Also, one or both of the openings to the container is sealed tightly shut by a cam mechanism which forces one or both sealing members against its seal, while locking the stem against movement.

Thus, the stem can be locked and the upper seal closed tightly while the base of the dispenser is removed to allow the interior of the container to be washed with water without the water leaking through the seal into the area under the cap.

The upper seal also can be held tightly shut in this manner to facilitate filling the container without allowing condiment to escape into the area under the cap.

Preferably, the stop mechanism is made to serve a double or triple function. Not only does it serve the function of controlling the quantity of condiment dispensed, but it also performs the detent function, and the locking function described above.

The resulting condiment dispenser meets the objectives set forth above and provides a relatively simple, jam-free measuring dispenser which can be used to accurately measure and dispense pre-determined quantities of condiments, thus improving the diets of the users, as well as serving the convenience of cooks and diners alike.

The dispenser is a sturdy device with a high degree of resistance to the adverse effects of humidity.

This dispenser also is relatively inexpensive to make, easy to take apart for cleaning, and relatively free of leakage when being filled or transported.

The foregoing and other objects and advantages will be set forth in or apparent from the following description and drawings.

In the drawings:

Fig. 1 is a cross-sectional view of a condiment dispenser constructed in accordance with the present invention;

Fig. 2 is an exploded perspective view of a portion of the device shown in Fig. 1;

Fig. 3 is a perspective, partially broken-away view of a portion of the device shown in Fig. 1;

Figs. 4, 5 and 6 are elevation views of a portion of the device shown in Fig. 1 in three different orientations;

Fig. 7 is an exploded perspective view of the dispenser shown in Fig. 1;

Fig. 8 is an elevation view, partially broken-away, of a portion of the device shown in Fig. 7;

Fig. 9 is a cross-sectional enlarged view of a portion of the device shown in Fig. 1;

Fig. 10 is a cross-sectional view of another condiment dispenser constructed in accordance with the present invention;

Figs. 11-15 are enlarged views of portions of the device of Fig. 10; and

Figs. 16-17 are enlarged views of portions of the Fig. 10 device showing another embodiment of the invention.

GENERAL DESCRIPTION

Fig. 1 is a cross-sectional view of a dispenser device 10 constructed in accordance with the present invention. The device 10 includes a container 12 for containing the condiment to be dispensed. The container

12 includes a round, slightly frustro-conical side wall 18, a top wall 14, and a bottom wall 16.

The bottom wall 16 is the concave top wall of a base 20 which supports the bottom wall 16 above a flat surface 24 on which the dispenser 10 is designed to sit. The base is easily removable from the side wall 18 for refilling or cleaning the dispenser. The base 20 has a vertical side wall 22, and joins with the concave top wall 16 which has an upper steeply sloping portion 86 and a horizontal portion 88 adjacent an outlet opening 32. The outlet opening 32 is shown more clearly in Fig. 7.

Mounted in the housing 12 is a plunger structure including a stem 28, with a dispensing head 30 attached at one end. At the upper end 34 of the stem 28 is secured a cap 26.

A coil spring 38 encircles the joint between the cap 26 and the end 34 of the stem 38, and extends into a slight recess 40 in the top wall 14 which provides a seat for the spring. This spring urges the stem 28 upwardly and returns it to a rest position after it has been released by the user.

The dispensing head 30 has a plurality of vertically-spaced recesses. When the cap 26 is depressed, condiment is dispensed through the outlet 32.

As it is shown in Figs. 1 and 7, a variable stop structure is provided in the cap 26 to limit the depth to which the stem and dispensing head are depressed. Three different stops are provided, each being located circumferentially from the other, to provide for dispensing three different pre=-determined quantities. The quantity to be dispensed can be selected by turning the cap 26 to one of three different positions and thus enable one of the three stops.

Sealing structures are provided at 43 and 68 to seal the container against the entry of humid air at all times except when the dispensing head is depressed to dispense condiments, or when the base is removed for

refilling or cleaning. Thus, the adverse effects of humidity are minimized.

The seals and the construction of the dispensing head 30 also minimize jamming of the dispensing head.

DISPENSING HEAD

The dispensing head 30 is attached to the stem 28 by a tapered section 64 whose shape prevents the accumulation of condiments on the top of the dispenser head.

As it is shown in Fig. 1 and in Figs. 4 through 6, the dispensing head 30 has a bottom end 66 with a neoprene rubber "O"-ring 68 fitted into a circumfrential groove near the bottom end 66. The lower edge of the outlet opening 32 is beveled as shown at 90 in Fig. 5. When the dispensing head is in its rest position, the "O"-ring 68 is thrust upwardly against the beveled edge 90.

The dispensing head 30 has a plurality of vertically-spaced recesses 76, 78 and 80 which are separated and defined from one another and defined by walls 70, 72 and 74.

The lower recesses 76 are relatively small and shallow. There are only two of them. One is shown in Figs. 1, 4, 5 and 6, and there is another, not shown, which is located 180° from the recess 76.

There are four of the intermediate recesses 78. Also, there are four of the upper recesses 80. Only two of the recesses 80 and 78 are shown in Figs. 4-6. Two additional recesses 78 and 80 are located 180° from the ones shown. The location of the recesses not shown is symmetrical with the recesses which are shown.

The recesses 78 and 80 are separated from one another circumfrentially by vertical walls 82, 84 and 85. These vertical walls also help to guide the passage of the dispensing head 30 through the outlet opening 32 smoothly.

In accordance with one highly advantageous feature of the invention, the walls 72 and 70 which separate the recesses vertically from one another form an acute angle of at least 30° with the plane of the outlet opening 32. The advantage of this is that, as the walls pass through the outlet opening 32, the maximum total area of contact between the walls and the edge of the outlet opening at one time is considerable smaller than it would be if the walls were horizontal. This reduces jamming.

Furthermore, the walls 72 and 70 move past the edge of the outlet opening with a shearing action which tends to break up any particles of condiment which might temporarily be caught between the walls and the edge of the opening, thus further reducing jamming.

The dispensing head 30 is cylindrical and is dimensioned so that it makes a relatively close fit with the edges of the outlet opening 32. However, it can pass through the outlet opening completely in both directions.

The bottom wall of each of the recesses also is sloped downwardly so as to discharge the condiments from the recesses readily.

TOP SEAL STRUCTURE

As it is shown in both Figs. 1 and 2, the upper end 34 of the stem 28 is frustro-conical and fits into a similarly shaped recess in the center of the underside surface of the cap 26. The stem 34 is cemented in place, and a spline or key on the inside of the receptacle in the cap fits into a keyway 36 to secure the cap to the end of the stem 28.

A substantially cylindrical sleeve 42 extends downwardly from the top wall 14 by a certain distance. The sealing structure 43 slides on the inner walls of the cylinder 42 to seal the interior of the condiment container from the outside air.

Referring both to Figs. 1 and 2, the sealing structure includes two flanges 44 and 48 which are molded

integrally with the stem 28 so that they are securely attached to the stem. Each flange has a gap 45 or 49. The gap 45 is located 180° from the gap 49. A detent and stop member 50 extends upwardly from the flange 44.

The sealing structure 43 includes a resilient seal assembly 46 (see Fig. 2) which consists of two generally C-shaped rings or washers 51 and 53 made of relatively soft and flexible plastic material. Each ring 51 and 53 has an opening 55 or 56, and a projection 52 or 54. Each ring has a beveled outer edge so that when the two rings are assembled face to face, they form a sealing member which has relatively sharp edges, as it is shown in Fig. 9 of the drawings.

The sealing structure is assembled by inserting the washers 51 and 53 into the space between the flanges 44 and 48. The projection 54 of the washer 53 fits into the recess 49, and the projection 52 of the washer 51 fits into the recess 45, thus locking the washers into position so that they will not rotate relative to one another. The gaps 55 and 56 are located 180° from one another. This construction allows assembly of the sealing structure and provides a circumfrentially continuous seal, despite the gaps 55 and 56.

It should be observed that detent projection 50 also serves as a stop to limit the upward movement of the stem 28 when the cap 26 is released. Thus, the sealing ring 68 is thrust against the bottom edge of the outlet opening 32 with only relatively light force; the major portion of the force exerted by the spring is opposed by the detent structure.

The provision of the flexible seal structure 46 is highly desirable because it serves to wipe away grains of condiment which might stick in the cylinder 42. In fact, the cylinder 42 is not exactly cylindrical; the internal diameter at the bottom is slightly greater than the internal diameter at the top, in order to facilitate molding. The flexibility of the structure 46 ensures

that sealing contact is made continuously, despite the variation of diameter of cylinder 42, as the plunger moves upwardly and downwardly.

QUANTITY SELECTION

As it has been mentioned above, the quantity of condiment to be dispensed with a given stroke of the plunger in the dispenser 10 can be pre-set. In particular, it is preferred that the device can be set to dispense one of at least three different pre-set amounts.

For example, when the device is used to dispense salt, it has one setting which will dispense either a "pinch", or 1/8 teaspoon, or 1/4 teaspoon of salt. A "pinch" is about one forty-eighth of a teaspoon - approximately .104 milliliters and 142 milligrams in weight. One eighth of a teaspoon is approximately .625 milliliters and 850 milligrams. One quarter of a teaspoon is approximately 1.25 milliliters and 1700 milligrams. Some or all of this information can be printed or embossed on the outside of the cap 26 or elsewhere on the dispenser to enable the user to easily select the right amount to dispense. Similarly, the weights and quantities of other condiments can be preset and marked on the dispenser. Of course, larger quantities can be dispensed by pressing the cap several times.

The manner in which the quantity selection is made is as follows. Referring to Fig. 7, the cap 26 has three vertical markings or indicia 114, 116, 118 on its outer rim. Located on the recessed top portion 19 of the side wall 18 of the container is a vertical projection 106 which serves as a stop member. The stop member 106 can be seen by the user of the dispenser.

Referring now to Fig. 1, the inside of the cap 26 has three vertical grooves 108, 110 and 112 cut into the side wall. The groove 108 is the shortest, the groove 110 is of medium length, and the groove 112 is the longest of the three.

Referring again to Fig. 7, the cap 26 can be rotated in the direction of the arrow 122, and in the opposite direction, to bring one of the three markings or indicia 114, 116 and 118 into alignment with the stop 106.

Referring again to Fig. 1, when the cap 26 is depressed downwardly, the top edge of the stop member 106 abuts against the top end of one of the three grooves 108, 110 and 112 to stop the downward motion of the cap at a preselected location.

Referring again to Figs. 4, 5 and 6, the depth of each of the grooves 108, 110, 112 is set so that depression of the cap will cause the dispensing head to descend to one of the three positions shown in Figs. 4 through 6 relative to the edge of the outlet opening 32.

Referring now to Fig. 4, when the shortest groove 108 is aligned with the stop 106, the dispensing head 30 descends no farther than to the position shown in Fig. 4. In this position, the recesses 76 are below the outlet opening 32 so that their contents are discharged. However, the top of the bottom wall 88 is aligned approximately with the lowest point of the recesses 78 so that the contents of recesses 78 and 80 are not discharged.

When the slot 110 is aligned with the stop 106 and the cap 26 is depressed, the dispensing head 30 is allowed to descend further, to the position shown in Fig. 5. At this position, the upper surface of the bottom 88 of the container is just below the lowest point of the recesses 80. However, the lower portions of the recesses 78 are beneath the bottom wall so that their contents are discharged, as well as the contents of the recesses 76. Thus, the total quantity dispensed is the sum of the quantities contained in the recesses 76 and 78.

Finally, when the groove 112 is aligned with the stop 106 and the cap is depressed, the dispensing head is allowed to descend to the position shown in Fig.

6, in which the top of the bottom wall 88 is aligned approximately with the top wall of the recesses 80. Thus, the contents of all of the recesses in the dispensing head are allowed to fall out of the container and be dispensed. This position corresponds to the largest quantity being dispensed (1/4 teaspoon of salt, in the specific example described above).

To assist the user to accurately align one of the grooves 110, 112, 108 with the stop 106, a detent structure is provided as shown in Figs. 2 and 3. Fig. 3 is a broken-away view of the top portion of the container 12 with the container turned upside down. On the underside of the top 14 is a stop element 60 and three cavities 62 to mate with a hemispherical projection on the detent member 50. When the detent member 50 is aligned correctly, the detent projection will be inserted into one of the holes 62 so that the user will feel a "snap" or "click" to know that the cap is properly aligned. The stop 60 is provided to engage with the element 50 on the flange 44 so as to prevent the cap from being rotated beyond one of the three dispensing positions.

REMOVABLE BASE

Another advantageous feature of the invention is that the base 20 of the dispenser structure is easily removable from the dispenser to allow it to be refilled, cleaned, etc.

Referring particularly to Figs. 7 and 8, the upper edge of the base 20 has a circumfrential groove 101 into which the bottom edge of the side wall 18 of the container is inserted.

Extending downwardly from that bottom edge is a pair of clips 92 and 94. Fig. 8 shows the clip 94 in detail. It consists of a vertical, downwardly-projecting portion with a horizontal finger 96 and a second smaller finger 98 which is resilient.

At the base of the groove 101, in the base 20, are two circumfrential slots 102 and 104. In order to attach the base 20 to the dispenser structure, the clips 92 and 94 are inserted through the slots 104 and 102, respectively, and the structure above the base is rotated in the direction indicated by the arrow 124 in Fig. 7 to engage the bottom wall 100 of the groove with the clip as shown in Fig. 8. This creates a secure fastening because the resilient finger 98 brings pressure against the wall 100 to hold the two parts together.

Advantageously, the rubber "O"-ring 68 at the bottom of the dispensing head 30 is sufficiently flexible so that when the base 20 is inserted over the end of the dispensing head 30, the "O"-ring deforms elastically and snaps back into its original shape as the dispensing head passes through the outlet opening.

The upper portion 86 of the recessed top wall of the base 20 is relatively steep. However, the portion 88 adjacent the outlet opening preferably is substantially horizontal. This has been found to minimize the amount of accumulation of granular material at the junction between the dispensing head and the edge of the outlet opening and helps reduce jamming.

The attachment means shown in Figs. 7 and 8 is highly advantageous in that it does not involve the use of screw threads which usually can become jammed due to grains of condiment being caught in them. The relatively large clips 92 and 94 do not easily suffer such a fate.

ALTERNATIVE EMBODIMENT

Figs. 10-15 show an alternative embodiment of the invention. The main difference between the embodiment of Figs. 10-15 and that of Figs. 1-9 is in the upper part. The same reference numerals are used for corresponding parts in the two devices.

A simplified top seal structure is shown at 130 in Figs. 10 and 15. That structure includes a sloping flange 134 extending from the stem 28 and a flexible "O"-

ring seal 132 seated in a groove 135 in the stem 28 (see Fig. 14). The opening 129 (Fig. 11) in the top wall 14 through which the stem 28 passes has a cross-sectional shape, as shown in Fig. 15, in which the upper and lower surfaces diverge, as shown at 133 in Figs. 12 and 15. This forms a concave seat for the "O"-ring 132 to ensure that it forms a tight seal with the steam when it is compressed. The top surface of the flange 134 slopes downwardly to allow condiment grains to fall down into the housing.

A shaft retainer structure above the opening 129 is shown in Fig. 11. A bearing surface for the stem 28 is formed by a plurality of radial ridges 136 with rounded edges. Downwardly sloping surfaces 138 are provided between the ridges. The stem 28 bears against the inner most edges of the ridges 136. The sloping surfaces 138 tend to guide any stray grains of salt or other condiments back into the housing, under the force of gravity, if they should escape from the housing into the area under the cap 26.

This structure also minimizes the thickness of the wall 14 which contacts the stem 28, thus further reducing the chances of grains of condiment becoming caught in the area and jamming the mechanism.

The innermost ends of the ridges bear against the stem 38 to stabilize it and support it, but do not materially increase the chances of jamming.

As it is shown in Fig. 10, the thickness of the wall of the housing 12 increases gradually from the top to the bottom of the housing to a point 21 at which it suddenly decreases to form a ledge overhanging the top edge of the base 2. This seals the crevice between the housing wall and the base to prevent condiment from entering it.

CAP STRUCTURE

The cap 26 is shown in Figs. 13-15, as well as in Fig. 10. In addition to the three grooves 108, 110

and 112, there are six other grooves, 140, 142, 146, 148, 150 and 152, arranged in two groups, each arranged symmetrically with respect to the first group of grooves 108, 110 and 112. There also are two stop members in addition to the stop 106. Only one of the added stops, number 107, is shown in Figs. 10 and 15. Those stops are positioned 120° from one another and from the stop 106.

The stops and grooves are arranged so that when the cap is positioned to select the smallest quantity to dispense, the stop 106 enters the shortest groove 108, and the other two stops enter the other two short grooves 140 and 148 of the same length.

When the cap 26 is rotated to selected the next greatest quantity, each stop enters one of the grooves of the intermediate length 110, 142 or 150.

Finally, when the cap is rotated to select the greatest quantity, each of the longest grooves 112, 146 and 152 is positioned so that one of the stops enters it. The longest grooves also are of equal length.

By providing three symmetrically spaced stops, there always will be at least one, and usually more, stops undreneath the spot at which pressure is applied, even when the cap 26 is depressed by applying pressure at a spot other than the center of the cap. This prevents placing excessive bending pressure on the joint between the cap and the end of the stem and thus avoids premature failure of that joint or other parts of the dispenser structure hich might occur if only a single stop were used.

As is shown in Fig. 13, the lower edge of the cap is cut away at three places on the inside edge as shown at 144. Each cut 144 spans the arc "A" encompassing one of the groups of three grooves. This forms end stops against which the upper end of one of the stops 106, 107, etc., abuts to prevent rotation of the cap for a greater distance then the length of the arc "A".

The detent function of the Figs. 1-9 embodiment is provided by each of the stops 106, 107, etc. which, as it can be seen in Figs. 10 and 15, extends upwardly slightly above the surface 145 formed by the cut 144. Thus, when the cap is rotated, the surfaces 145 ride up onto the tops of the stops. When the next grooves reach the stops, the cap drops down slightly as the stops snap into the grooves. This locates the stops accurately, and informs the user that the cap is properly aligned.

LOCK-SEAL STRUCTURE

In accordance with another feature of the invention, the stem 28 can be locked to prevent unwanted motion, and to hold the upper seal 132 tightly shut. This prepares the dispenser for being transported, perhaps upside-down, or filled, again upside-down, or washed out with water.

When the cap is turned and the surfaces 145 ride up on the tops of the stops, this lifts the stem 28 vertically, forces the flange 134 against the "O"-ring 132, and tightly seals the opening around the stem 28. This seal prevents condiment grains from passing through the opening 129 and getting into the area under the cap 26, even while the container is turned upside-down and shaken during filling or transportation. The distance of movement of the stem is only about 10 to 15 thousandths of an inch (0.25 to 0.38 mm), but this is enough to compress the "O"-ring 132 and form a tight seal.

In fact, the seal is tight enough to resist or stop the flow of water through the hole 129. Therefore, if the bottom is removed, the interior can be washed with water without leakage into the area under the cap.

If the dispenser is used with the bottom 20 in place, the locking action will tend to tighten the seal provided by the "O"-ring 68 between the dispensing head 30 and the outlet opening. Therefore, the dispenser is less likely to leak its contents during transportation.

The tightening of seals provided by the locking feature also helps protect against the adverse effects of moisture in the ambient air.

ROTATABLE CAP ATTACHMENT

The cap 26 is rotatably attached to the upper end of the stem 28, as it is shown most clearly in Figs. 14 and 15.

The upper end of the stem 28 has an integral pair of flexible fingers 158 and 160 with ramp-shaped upper surfaces forming a lower ridge 159 or 161 which seats on a mating inside ledge in a molded cavity 163 in a frustro-conically shaped projection 154 extending downwardly from the upper wall of the cap 26.

The fingers 158, 160 are shaped with a space between them so that the cap can be attached to the stem by simply pressing the fingers 158, 160 into a hole in the bottom of the projection 154. As the fingers enter the hole, the upper ramp-shaped surfaces of the fingers are forced together. Then the fingers snap apart when they enter the cavity 163, and seat themselves on the ledge in the cavity.

A plug 162 is force-fitted into the cavity 163. The plug has a downwardly-extending cylindrical portion 165, and a round central projection 166. A flange 167 is formed at the outer edge.

When the plug is fitted into the cavity 163, the flange 167 rests on a ledge 164. The projection 166 holds the fingers 158, 160 apart to prevent the cap 26 from coming off of the stem, and allows the cap to be rotated without moving the stem. This prevents the stem from rotating when the cap is rotated to select a quantity to be dispensed, and thus prevents leakage of salt or other condiments past the "O"-ring seals 68 or 132 which might be caused if the stem were rotated with the cap.

As it is shown in Fig. 15, the spring 38 has a diameter slightly larger than the largest diameter of the

frustro-conical projection 154. This facilitates attachment of the cap to the stem because the projection 154 fits easily into the top end of the spring coil, but yet the top of the spring coil seats securely at the junction of the projection 154 and the upper wall of the cap.

Figs. 16 and 17 show an alternative top plug 170. This plug, like the one shown in Fig. 14, has a round central projection 172 which fits between the fingers 158 and 160.

The plug 170 is held in place by three flexible L-shaped lugs 174, 176 (only two are shown) located symmetrically around the edge of the plug body. These lugs snap into holes 178, 180, etc., in the wall of the projection to hold the plug in place very securely.

The top of the plug is dished-out at 182. The plug fits into a recess at 184 to make the edge of the plug flush with the top of the cap 26.

MATERIALS

Following are materials which preferably are used in making the various components of the dispenser device shown in the drawings.

The cap 26, the stem 28, the plug in the top of the cap, and the base 20 all are preferably made of opaque ABS thermoplastic resin. Each part is molded. The stem, flanges 44 and 48 (Fig. 1), and the dispensing head 30 preferably are molded as a single unit. The flange 134 and the fingers 158, 160 of the second embodiment also are molded together with the stem and the head 30.

Preferably, the side wall 18 and top wall 14 of the cylinder 42 are a single molded part made of a polycarbonate resin, such as "Lexan" brand resin. Such a material is transparent so that the contents of the dispenser can be seen by the user, and is highly resistant to breakage.

The sealing washers 51 and 53 preferably are made of high density polyethylene or polypropylene with a flex modulus which makes it very flexible so that it can form a tight seal with an interference fit with the interior of the cylinder 42.

The spring 38 preferably is made of stainless or plated spring steel to protect it against corrosion.

The "O"-rings 68 and 132 preferably are made of neoprene rubber.

The shape of the bottom wall 16 preferably is selected so that the top of the base 20 is approximately aligned with the top of the dispensing head 30 so that the user can easily observe when the quantity of material in the dispenser is getting low.

As it can be seen from the foregoing, the dispenser 10 described above amply meets the objectives set forth above. The dispenser can be easily set to one of a plurality of different settings to dispense a selected quantity of condiment. The device has several features which prevent or minimize the chances of jamming, and the device has hermetic seals which amply protect the contents of the container from the adverse affects of moisture. The device can be locked to prevent unwanted dispensing, and to facilitate washing, filling and transportation.

The device can be made of just a few molded parts and seals. It is of relatively simple and inexpensive construction, and yet is highly reliable and easy to use.

The device is a substantial boon to users with salt-restricted or other restricted diets, because they can quickly and easily dispense measured amounts of the condiments, either at the table or while cooking, to maintain their diet and thus maintain good health.

This invention can be practiced in many different forms other than the specific forms described above. These specific forms are described in order to

set forth the best mode presently contemplated for carrying out the invention. However, the protection of this patent should not be limited to those forms and should be interpreted to cover other measuring containers utilizing the spirit and inventive contribution of this invention.

CLAIMS:

GROUP A. Dispenser With Variable Quantity Control

1. A condiment dispenser, said dispenser comprising, in combination, a housing for holding the condiment to be dispensed, said housing having a side wall, a bottom wall and a top wall, one of said walls having an access opening, an outlet opening in one of said walls, a dispensing head mounted in said housing to move through said outlet opening, said dispensing head having a plurality of recesses spaced from one another, an actuator extending through said access opening and manually operable to move said head through said opening to selectively dispense the contents of said recess, and a quantity control device comprising a plurality of stops selectable to limit the movement of said dispensing head through said outlet opening to a pre-selected one of a plurality of distances, each corresponding to a pre-selected quantity of said condiment to be dispensed.

2. A dispenser as claimed in claim 1 in which said dispensing head is shaped and dimensioned to make a relatively close fit with the edge of said outlet opening while moving in said outlet opening, said recesses being separated from one another by walls, said walls forming an acute angle with the plane of said edge.

3. A dispenser as claimed in claim 1, in which said bottom wall is separable from said housing to facilitate the opening of said housing, a releasable fastening device for fastening said bottom wall to said side wall, said dispensing head being shaped at one end to pass through said outlet opening in either of two directions to allow said bottom wall to be easily removed or replaced.

4. A dispenser as claimed in claim 3, including a resilient sealing member on said dispensing head, said sealing member being positioned to bear against said edge of said outlet opening to seal said outlet opening when said dispensing head is in its un-

actuated rest position, said sealing member being elastically deformable to pass through said opening when said bottom wall is removed or replaced.

5. A dispenser as claimed in claim 1 in which said actuator includes an elongated stem having two ends, said access opening being located in said top wall, said dispensing head being secured to one of said ends of said stem, the other of said ends extending through said access hole, said quantity control device comprising a plurality of circumfrentially-spaced stop elements coupled to said stem to limit its movement, and a selector element rotatable relative to said housing for the selection of one of said stop elements to dispense a pre-determined amount of condiment.

6. A dispenser as claimed in claim 5, said selector element comprising a cap rotatably mounted on said stem adjacent said other end of said stem, one of said caps and said housing having a plurality of circumfrentially-spaced grooves of varying lengths, and the other of said cap and said housing having a projection aligned so that when said cap is depressed said projection enters one of said grooves and stops the movement of said stem when said projection reaches the end of the groove.

7. A dispenser as claimed in claim 1, in which said actuator includes an elongated stem having two ends, said access opening being located in said top wall, said dispensing head being secured to one of said ends of said stem, the other of said ends extending through said access hole, and a flexible seal to seal the junction between said stem and said top wall.

8. A dispenser as in claim 7, including a resilient member attached between said housing and said stem towards said access opening, a resilient seal member on said dispensing head adjacent the end of said head which is farthest from said other end of said stem, and a stop on said stem for limiting movement of said stem

towards said access opening while seating said seal member against the edge of said outlet opening.

9. A dispenser as in claim 5, including detent means for locating said stem relative to said housing at each of a plurality of locations at each of which a selected one of said stop elements is operative.

10. A dispenser as in claim 1, in which said quantity control device has a rotary member rotatably mounted on said housing to enable a selected one of said stops.

11. A condiment dispenser comprising, in combination, a condiment container having an outlet opening, a dispensing member mounted in said container for moving reciprocatingly through said outlet opening to dispense said condiment, said dispensing member including metering means for metering the quantity of condiments dispensed as a function of the distance said dispensing member moves through said outlet opening, means responsive to manual operation for moving said dispensing member through said opening by one of a plurality of pre-determined distances, and selecting means for selecting one of said pre-determined distances.

GROUP B. Dispenser With Angular Wall-Edge Orientation

12. A condiment dispenser, said dispenser comprising, in combination, a housing for holding the condiment to be dispensed, said housing having a side wall, a bottom wall and a top wall, one of said walls having an access opening, an outlet opening in one of said walls, a dispensing head mounted in said housing to move through said outlet opening, said dispensing head having a plurality of recesses spaced from one another, an actuator extending through said access opening and manually operable to move said head through said opening to dispense the contents of said recesses, said dispensing head being shaped and dimensioned to make a relatively close fit with the edge of said outlet opening while moving in said outlet opening, said recesses being

separated from one another by walls, said walls forming an acute angle with the plane of said edge.

13. A dispenser as in claim 12 in which said recesses are spaced from one another in a first direction which is the direction of movement of said dispensing head through said outlet opening, and in a second direction transverse to said first direction, said recesses being separated from one another in said second direction by walls aligned substantially parallel with said first direction.

14. A dispenser as in claim 12 in which said recesses have sloping bottom walls to facilitate discharge of condiments therefrom, and a resilient elastically deformable sealing member adjacent one end of said dispensing head to seal said outlet opening when said head is in a non-dispensing position.

15. A dispenser as in claim 12 in which said bottom wall is concave with a cross-sectional shape which slopes downwardly at a distance from said dispensing head but becomes substantially horizontal adjacent said dispensing head.

GROUP C. Dispenser With Removable Bottom

16. A condiment dispenser, said dispenser comprising, in combination, a housing for holding the condiment to be dispensed, said housing having a side wall, a bottom wall and a top wall, one of said walls having an access opening, an outlet opening in one of said walls, a dispensing head mounted in said housing to move through said outlet opening, said dispensing head having a plurality of recesses spaced from one another, an actuator extending through said access opening and manually operable to move said head through said opening, in which said bottom wall is separable from said housing to facilitate the opening of said housing, a releasable fastening device for fastening said bottom wall to said side wall, said dispensing head being shaped at one end to pass through said outlet opening in either of two

directions to allow said bottom wall to be easily removed or replaced.

17. A dispenser as in claim 16 including a resilient sealing member on said dispensing head, said sealing member being positioned to bear against said edge, said sealing member being elastically deformable so as to pass through said opening when said bottom wall is removed or replaced.

18. A dispenser as in claim 16 including a base to support said dispenser on a flat surface, said bottom wall forming the upper wall of said base, said base including a generally vertically-extending side wall and said upper wall, said upper wall being concave, a groove in said base for receiving the lower edge of said side wall of said housing, a plurality of projections extending downwardly from said housing side walls, each of said projections being shaped to form a resilient clip with an entrance for receiving horizontally and gripping a wall of said base, and a plurality of slots in the bottom of said groove for receiving said projections, whereby said base can be rotated relative to said housing side wall to engage or disengage the wall of said base adjacent said slots with said clips.

GROUP D. Dispenser With Stem Seal

19. A condiment dispenser, said dispenser comprising, in combination, a housing for holding the condiment to be dispensed, said housing having a side wall, a bottom wall and a top wall, one of said walls having an access opening, an outlet opening in one of said walls, a dispensing head mounted in said housing to move through said outlet opening, said dispensing head having a plurality of recesses spaced from one another, an actuator extending through said access opening and manually operable to move said head through said opening in which said actuator includes an elongated stem having two ends, said access opening being located in said top wall, said dispensing head being secured to one of said

ends of said stem, the other of said ends extending through said access hole, and a resilient seal to seal the junction between said stem and said top wall.

20. A dispenser as in claim 19, in which said housing has a tubular guide extending axially from said top wall, said sliding seal comprising a pair of spaced-apart plates secured to said stem, an elastically deformable sealing member mounted between said plates and fitting in said guide with an interference fit.

21. A dispenser as in claim 19, including a push member rotatably secured to said actuator and forming rotatably selectable stops for variably limiting the movement of said actuator to variably control the amount of condiment dispensed with each actuation of said actuator.

22. A dispenser as in claim 19 including a resilient member attached between said housing and said stem towards said access opening, a resilient seal member on said dispensing head adjacent the end of said head which is farthest from said other end of said stem, and a stop on said stem for limiting movement of said stem towards said access opening while seating said seal member against the edge of said outlet opening.

E. Dispenser With Lock/Seal

23. A condiment dispenser comprising, in combination:

a housing having walls, an opening in one of said walls, a closure member, a deformable sealing member positioned to form a deformable seal between said closure member and said one wall to seal said opening, and

a sealing device for urging said closure member against said sealing member.

24. A dispenser as in claim 23 including an actuating member extending out of said housing through said opening for manual actuation, a dispensing opening in another wall of said housing, a dispensing head

movably coupled to said actuating member and movable through said dispensing opening, said other wall and said housing being secured together by releasable fastening means.

25. A dispenser as in claim 23, including an actuating member extending out of said housing through said opening for manual actuation, a dispensing opening in another wall of said housing, a dispensing head movably coupled to said actuating member and movable through said dispensing opening, a metering device mounted on said housing and positioned to control the movement of said actuating member to dispense a pre-selected amount of said condiment for each actuation of said actuating member, said metering device including a cap covering and secured to said actuating member, at least one stop member mounted on one of said cap and said housing, and a plurality of grooves of varying depth in the other of said cap and said housing, said cap being rotatable to align a selected one of said grooves with said stop member, said cap having a cam surface between said grooves, said stop member projecting slightly past said cam surface when aligned with one of said grooves so as to engage with said cam surface to urge said closure member against said sealing member when said cap is rotated, said grooves and said stop member also forming a detent structure to accurately locate said stop member in each of said grooves.

26. A condiment dispenser comprising, in combination, a housing, a dispensing opening in said housing, a dispensing member mounted for movement in said dispensing opening, an actuating member connected to said dispensing member, and a locking device for locking said actuating member to prevent its movement in said opening when dispensing is not desired.

27. A dispenser as in claim 26 in which said actuating member extends out of said housing, and said locking device includes a cap connected to said actuating

member, and camming means for holding said actuating member in a retracted position in response to rotation of said cap.

FIG. 2

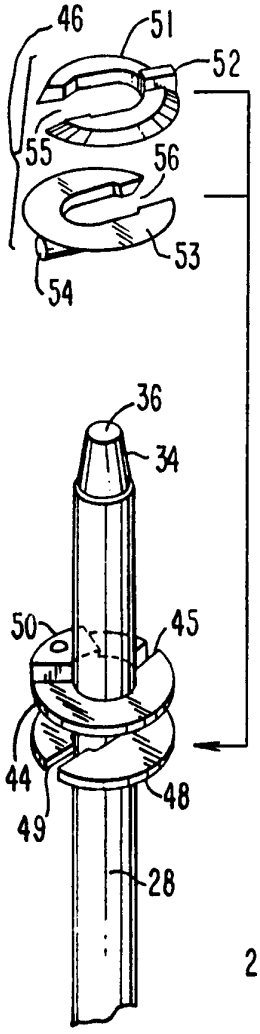


FIG. 1

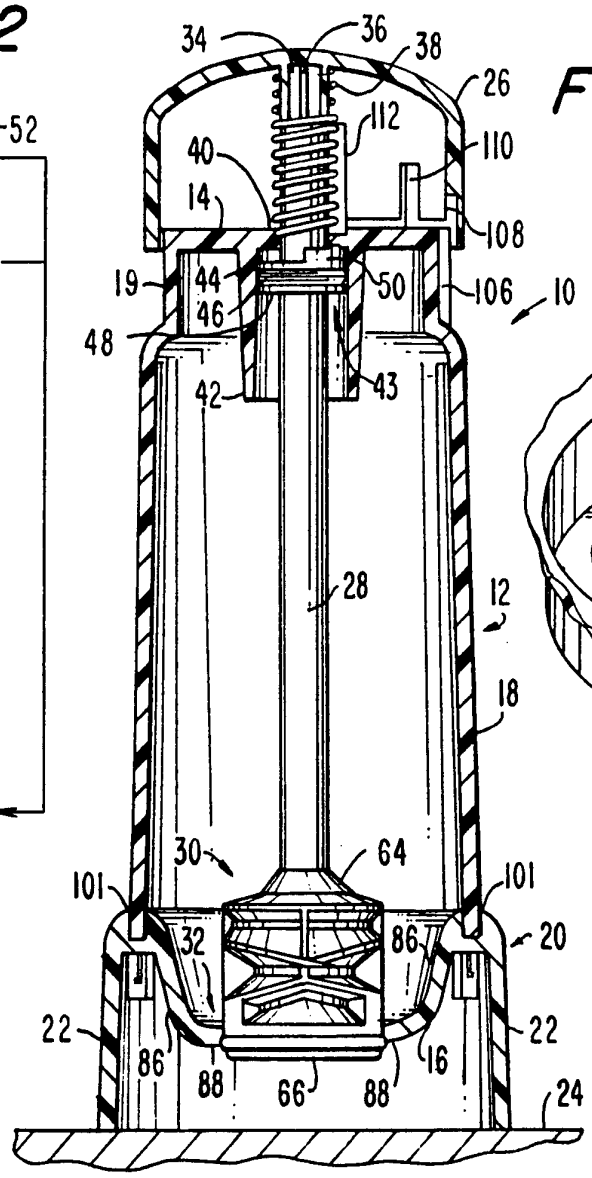
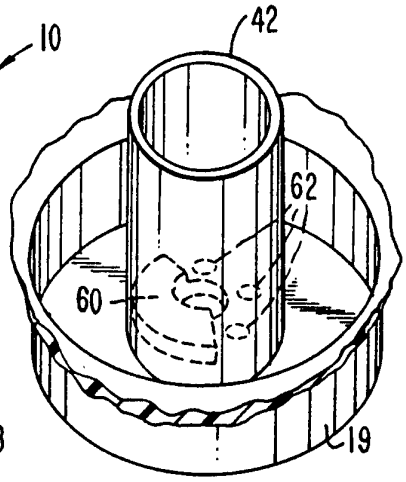


FIG. 3



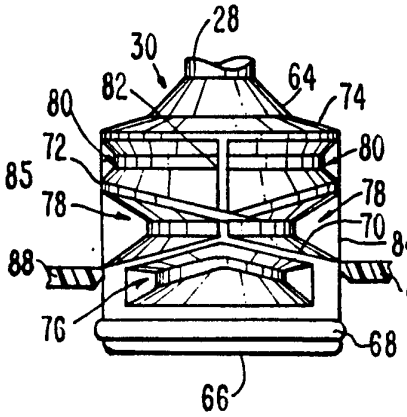


FIG. 4

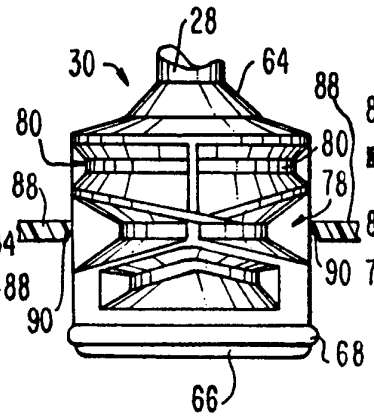


FIG. 5

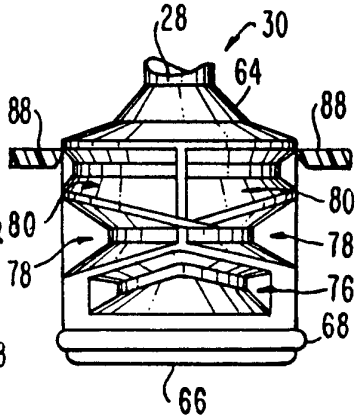


FIG. 6

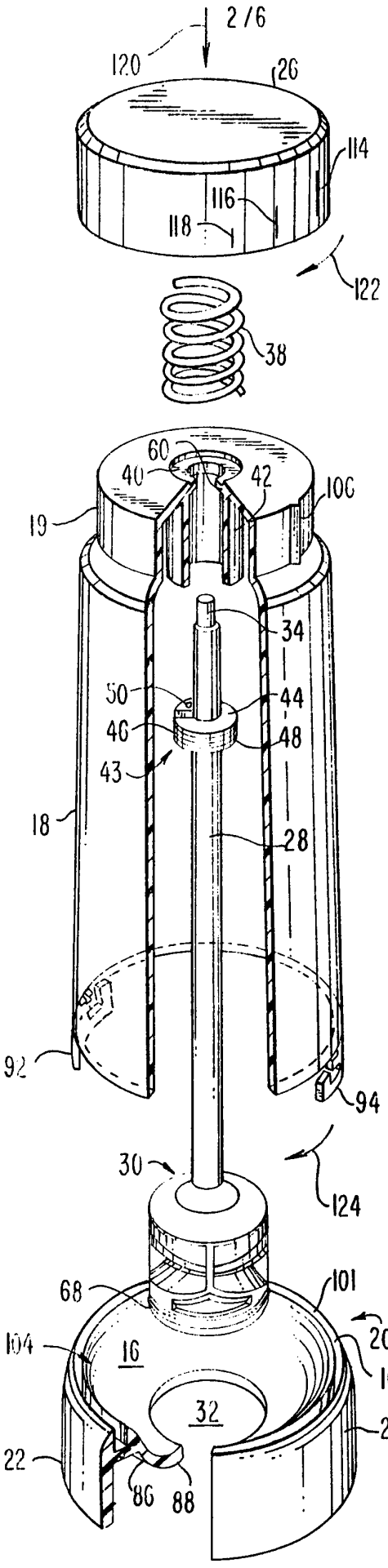


FIG. 7

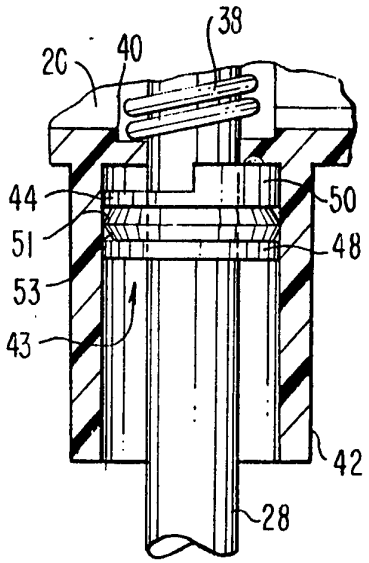


FIG. 9

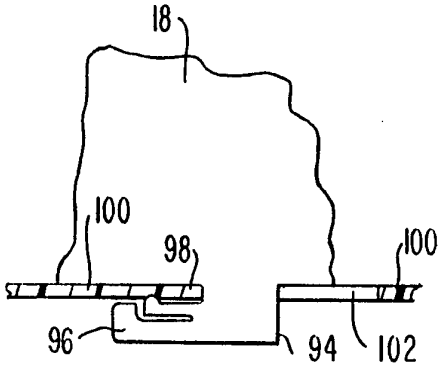


FIG. 8

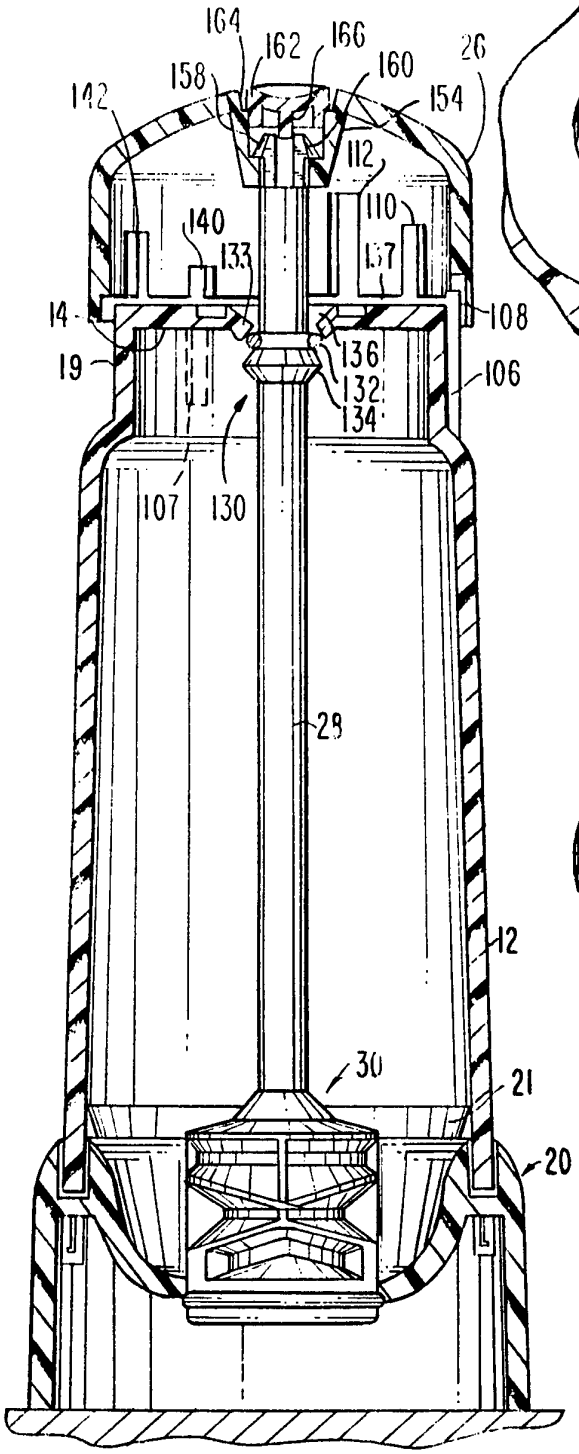


FIG. 10

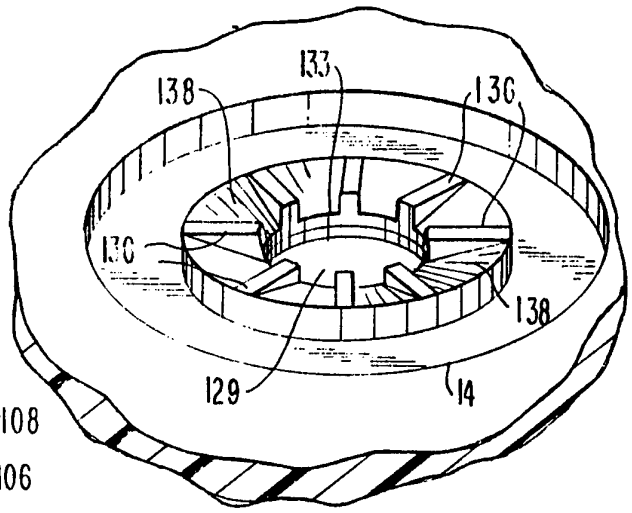


FIG. 11

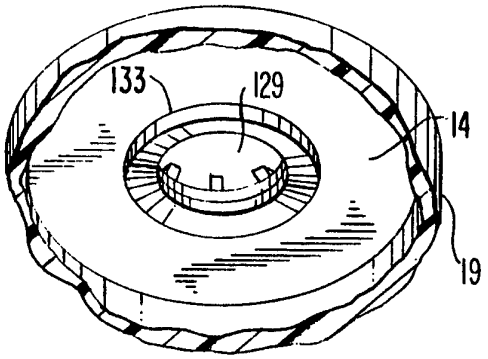


FIG. 12

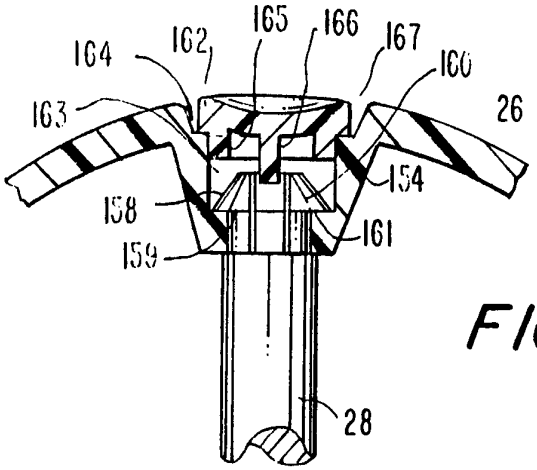

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FIG. 14

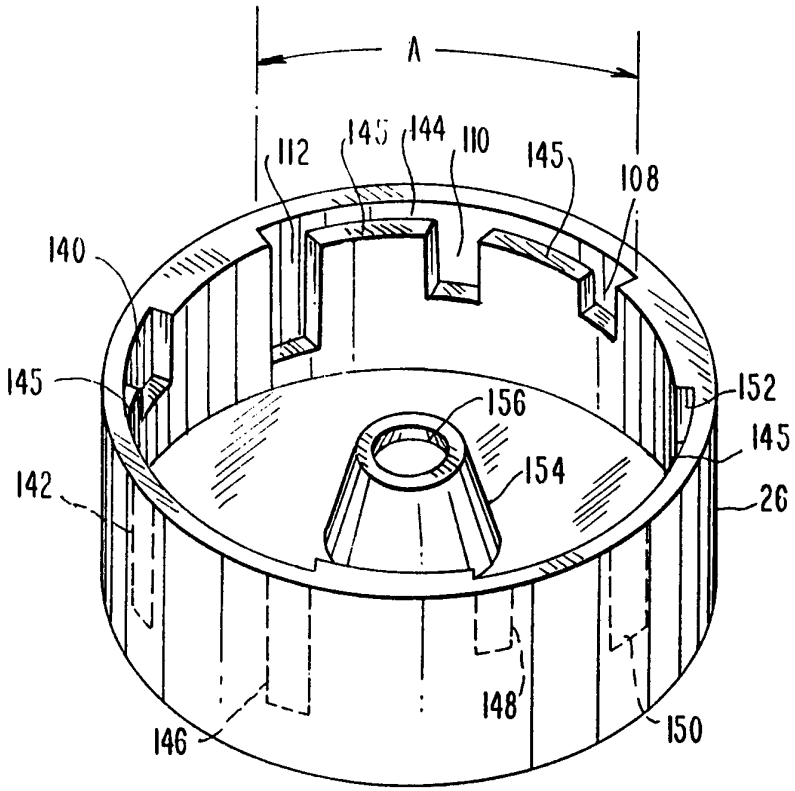

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FIG. 13

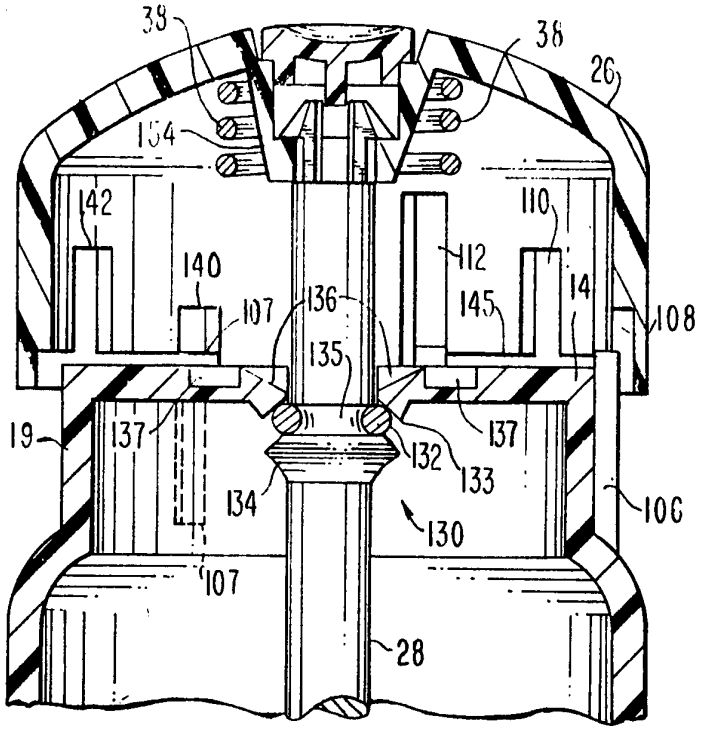

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FIG. 15

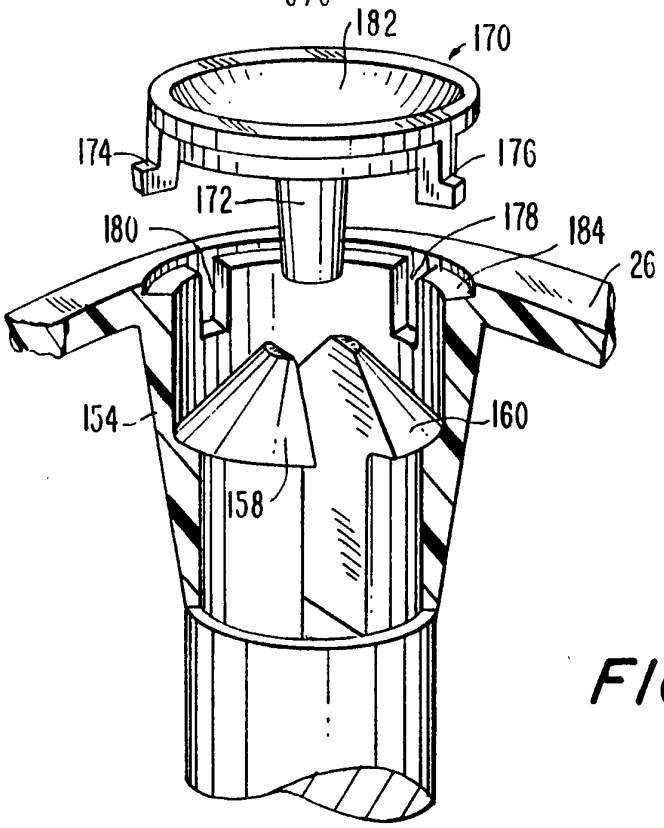

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FIG. 16

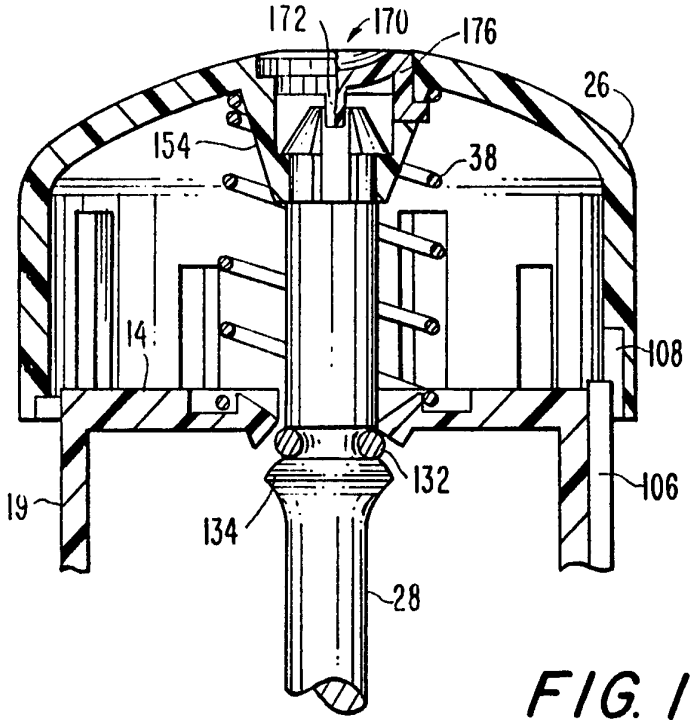

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FIG. 17

INTERNATIONAL SEARCH REPORT

In. ational application No.
PCT/US95/00229

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :G01F 11/18
US CL :222/153, 282, 365
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 222/153, 284, 287, 365

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 3,040,937 (LANTERY) 26 June 1962, see the entire document.	11
X	US, A, 1,171,575 (ZSIDAKOVITZ) 15 February 1916, see the entire document.	12
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Y		13, 14, 16, 19, 20
X	FR, A, 1,031,451 (LETORD) 24 June 1953, see the entire document.	12
X	CH, A, 355,268 (PEYER) 15 August 1961, see the entire document.	12, 15

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search 20 FEBRUARY 1995	Date of mailing of the international search report 06 MAR 1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer KEVIN P. SHAVER Telephone No. (703) 308-1113

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/00229

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	CA, A, 681,646 (THORNHILL) 10 March 1964, see the entire document.	23 ---------- 14, 19, 20
X	US, A, 2,847,147 (LAND) 12 August 1958, see the entire document.	26
Y	US, A, 2,357,387 (DUDLEY) 05 September 1944, see the entire document.	13
Y	US, A, 2,198,499 (JENNINGS) 23 April 1940, see the entire document.	16, 20
A	US, A, 5,138,979 (BAIRD ET AL.) 18 August 1992 .	