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54 **Dispersing dispenser devices.**

57 A dispersion control device for use in a toilet tank for dispensing a soluble solid, in solution, in a controlled manner into the tank, includes a cap (1) having a conical portion (3) which extends inwardly and downwardly into the interior of the cap. The cap is attached to a container (11) which contains the soluble solid, and the cap has a plurality of openings (5) in the walls of the conical portion and a hole (7) at the vertex (9) of the conical portion. In operation, the conical portion of the cap defines an intermediate holding chamber (B) which holds and allows dispersion of a specified concentration and predetermined amount of solution into the tank, as a result of the flows that occur during flushing.

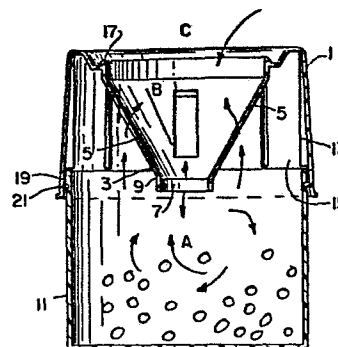


FIG. 3

This invention relates to devices for dissolving and dispensing a solid and for controlling the rate of flow of the solid in solution in a dispersed manner into a toilet tank or bowl.

5 Efforts to affect dispersion of a dissolved solid into a toilet bowl or tank have encompassed many different methods, techniques and devices. The problem with prior art dispensing/dispersing devices has been that they are either incapable of controlling the dispersion and rate of flow of
10 the solid in solution into the tank or, they are too complicated and expensive to manufacture and operate.

 U.S. Patent No. 3,781,926 to Levey discloses just such a device. Specifically, the Levey patent discloses a cap which is usable with a container with the container filled
15 with a water soluble compound. The cap includes an inner and outer shell having orifices at certain locations and the shells are positioned, with respect to each, so as to allow a specified quantity of dissolved solid to flow from the container for every flushing of the tank. The device of Levey however, is
20 not shaped so as to take advantage of the various turbulent flows generated in a tank during flushing and thus, dispersion of the solution into the tank is not as rapid, controlled and efficient as might be desired. Further, the Levey device has a complicated construction and is therefore expensive to
25 manufacture

 U.S. Patent No. 3,895,739 to Buchtel discloses a dispenser for a flush tank. The structure of Buchtel however, requires that a liquid be used in the container. Further, Buchtel shows an entire container assembly and cannot be used
30 in combination with a compact size solid container.

 Other devices, such as the one disclosed in U.S. Patent No. 2,880,077 to Floria, although simple in structure,

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and used for dissolving and dispensing a solid in a liquid, cannot be used in a toilet flush tank or bowl since the structure disclosed is for use by being directly attached to a faucet.

5 Thus, the prior art devices have been either inadequate for providing effective dispersion of a solution which has been created within the devices, or too complicated in structure, and thus very expensive to manufacture.

 According to one aspect of the present invention
10 there is provided a dispersing dispensing cap for use in a toilet tank in combination with a container which contains soluble solid material, said cap comprising a cylindrical body having a hollow interior and an open bottom a generally conical portion integral with said cylindrical body at the
15 top of said body, said conical portion extending into said hollow interior with the vertex thereof extending downwardly into said interior, and engaging means for supporting and holding said cylindrical body on the container, said conical portion having openings which are laterally spaced from each
20 other along the wall of said conical portion and a hole at the vertex of said conical portion, for guiding fluid into and out of the container.

 According to another aspect of the present invention there is provided a dispersing dispenser for use in a
25 toilet tank, said dispenser comprising a container for containing soluble solid material, and a cap for fitting to said container, said cap comprising a cylindrical body having a hollow interior and an open bottom, a conical portion integral with said cylindrical body at the top of said body, said
30 conical portion extending into said hollow interior with the vertex thereof extending downwardly into said interior, and engaging means for supporting and holding said cap on said container, said conical portion having openings which are laterally spaced from each other along the wall of said conical portion and a hole at the vertex of said conical portion,
35 for guiding fluid into said container.

 The present invention may be used to provide a

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solution dispenser for a toilet which is simple in construction and costs little to manufacture, yet effectively dispenses and disperses specified quantities of a solution into a toilet tank. The invention may also be used to provide
5 a solution dispenser which can be employed with a variety of soluble solid containing containers.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made by way of example to the accompanying
10 drawings in which

Fig. 1 is a top view of a cap embodying the present invention;

Fig. 2 is a bottom view of the cap shown in Fig. 1;

Fig. 3 is a side view in cross-section of the cap
15 shown in Fig. 1 when mounted on a soluble solid containing container and showing the various fluid flows which occur when the device is in use;

Fig. 4 is a perspective view of the cap shown in Fig. 1;

20 Fig. 5 is a perspective view of a childproof safety cap which can be used in combination with the cap shown in Fig. 1;

Figs. 6A and 6B are a top view and perspective view respectively, of a second cap embodying the present
25 invention; and

Fig. 7 is a view similar to Fig. 3 showing a third cap embodying the present invention.

The dispensing dispersion control cap shown in Fig. 1 is generally designated 1 and includes an inwardly and
30 downwardly extending conical portion 3 which has a plurality of openings 5 or 5' in the wall thereof. The cap 1 also includes a circular hole 7 at the lowermost portion or vertex 9 of the conical portion 3.

Preferably the entire cap is molded as a one piece
35 unit from flexible plastic, and is therefore simple and inexpensive to make and virtually unbreakable. The employment of flexible plastic allows for the cap 1 to be fitted securely on a variety of soluble solid containing containers. Further,

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the fact that it is made of a flexible plastic allows for a tight seal to be maintained at the region where the cap 1 and the container meet.

5 The cap 1 has an inwardly extending protuberance 21 which is received in a groove 19 on the top of the container for securely fastening the cap 1 to the container.

The conical portion 3 of the cap 1 has a vertex 9 as shown in Fig. 3 and Fig. 7. In one embodiment of the invention, as shown in Fig. 3, the vertex tapers into an almost
10 straight vertical drop at the lowermost portion so as to define a substantially vertically extending tube.

The openings 5 are rectangular in shape and are longer in the length-wise direction, or in the direction extending from the top of the cap 1 to the vertex 9. Alternatively, as shown in Figs 6A and 6B, the openings 5' may have
15 an oval shape. The oval openings 5' are used when mold manufacturing, techniques are used to produce the device. In fact, the openings can be of any shape, size or number desired, and all of these factors are determined by the rate
20 at which it is desired to dispense water soluble material from the container.

There are a plurality of rib-like projections 13 extending inwardly from the inner side wall 15 of the cap 1. These projections 13 serve to support the cap 1 in a stable
25 manner on the container 11 as can be seen from Fig. 3 and Fig 7. These serve to keep the cap from slipping too far over the container. Further, any conventional engaging means can also be used to perform this function and to hold the cap on the container.

30 The cap 1 also includes an upwardly extending ridge 17 at the top of the conical portion 3 which serves to engage a childproof cap as shown in Fig. 5 and disclosed in U.S. Patent No. 4,000,839.

Having described the various elements and features
35 of the invention, the operation of the device is as follows.

A container 11 having a soluble solid therein, said container being provided with a cap 1 which is constructed

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as described above, is disposed on the floor of a toilet tank. When the water level of the tank is above the top portion of the cap 1, water will be admitted into the region A within the container 11 as shown in Fig. 3 and Fig. 7. Further,
5 water will also be present in region B as shown in Fig. 3 and Fig. 7.

The arrows in Fig. 3 and Fig. 7 show the various flows occurring in the device of the present invention.

The water in region A serves to dissolve the soluble
10 chemical solid thereinto. While this is occurring, there results different concentrations of the solution and thus, a gravity induced flow or circulation will be created. More particularly, the lesser concentrated quantities of solution will flow out through the openings 5 or 5' which can be, but
15 are not required to be equally laterally spaced from each other and, because of the conical design of the cap 1, will rest or be held in region B as defined by the conical portion 3. The solution which is resting within the conical portion 3 is of a desired concentration which is determined according
20 to the size of the cap and slots used.

When the toilet is flushed, currents are created in the tank. As a result, the solution contained in the conical portion 3 is easily drawn off during the change in outside fluid level and is dispersed throughout the tank.
25 Further, the turbulence also serves to mix the next dose which is then trapped, as described previously, in the conical portion 3.

The openings 5 or 5' regulate the quantity of soluble solid which enters solution and is dispensed from the con-
30 tainer for subsequent dispersion from the region B.

The hole 7 at the lower part of the conical portion 3 serves to direct the water flow from region C into region A for mixing. After or during mixing, the newly prepared solution having the appropriate concentration then flows, in
35 large part, although not totally, through openings 5 or 5', into conical portion 3 and readies itself for dispersion while preventing massive, or highly concentrated, doses from being dispensed during either chemical or mechanical activity.

C L A I M S

1. A dispersing dispensing cap for use in a toilet tank in combination with a container which contains soluble solid material, said cap being characterized by a cylindrical body having a hollow interior and an open bottom, a generally conical portion (3) integral with said cylindrical body at the top of said body, said conical portion extending into said hollow interior with the vertex (9) thereof extending downwardly into said interior, and engaging means (13) for supporting and holding said cylindrical body on the container, said conical portion having openings (5,5') which are laterally spaced from each other along the wall of said conical portion (3) and a hole (7) at the vertex (9) of said conical portion, for guiding fluid into and out of the container.
2. A cap as claimed in claim 1, characterized by an upwardly extending ridge (17) integral with the top of said conical portion (3), said ridge (17) extending along the entire top edge of said conical portion (3).
3. A cap as claimed in claim 1 or 2, characterized in that said openings (5) are of rectangular shape with the longer sides thereof extending in a direction from the top of said conical portion (3) to the vertex (9) of said conical portion (3).
4. A cap as claimed in claim 1 or 2, characterized in that said openings (5') are of oval shape.
5. A cap as claimed in any preceding claim, characterized in that said openings (5,5') are equally laterally spaced from each other along the wall of said conical portion (3).
6. A cap as claimed in any preceding claim, characterized in that said engaging means (13) comprises laterally spaced ribs which are integral with said cylindrical body, said ribs terminating spaced from the bottom edge of the cylindrical body for supporting said cylindrical body on the container.
7. A dispersing dispenser for use in a toilet tank, said dispenser comprising a container (11) for containing soluble solid material, and a cap for fitting to said con-

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tainer (11), said cap being characterized by a cylindrical body having a hollow interior and an open bottom, a conical portion (3) integral with said cylindrical body at the top of said body, said conical portion (3) extending into said hollow interior with the vertex (9) thereof extending downwardly into said interior, and engaging means (13) for supporting and holding said cap (1) on said container (11), said conical portion (3) having openings (5,5') which are laterally spaced from each other along the wall of said conical portion (3) and a hole (7) at the vertex (9) of said conical portion (3), for guiding fluid into said container (11).

8. A dispersing dispenser as claimed in claim 7, characterized by an upwardly extending ridge (17) integral with the top of said conical portion (3), said ridge (17) extending along the entire top edge of said conical portion (3).

9. A dispersing dispenser as claimed in claim 7 or 8, characterized in that said openings (5) are of rectangular shape with the longer sides thereof extending in a direction from the top of said conical portion (3) to the vertex (9) of said conical portion (3).

10. A dispersing dispenser as claimed in claim 7 or 8, characterized in that said openings (5') are of an oval shape.

11. A dispersing dispenser as claimed in any one of claims 7 to 10, characterized in that said openings (5,5') are equally laterally spaced from each other along the wall of said conical portion (3).

12. A dispersing dispenser as claimed in any one of claims 7 to 11, characterized in that said engaging means (13) comprises laterally spaced ribs which are integral with the inside wall of the body of the cap (1), said ribs terminating spaced from the bottom edge of the body for supporting said cap (1) on said container.

13. A dispersing dispenser as claimed in any one of claims 7 to 12, characterized by protruding means (21) located at the bottom of the body of the cap (1) and recess means (19)

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at the top of said container, said protruding means (21)
being held in said recess means (19) for holding said cap (1)
on said container.

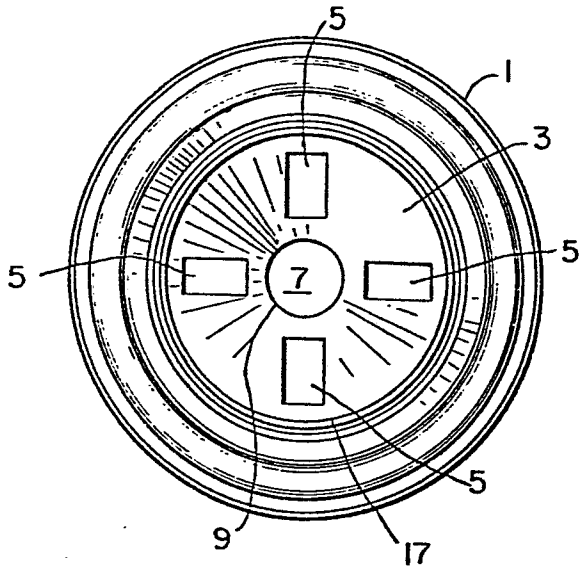


FIG. 1

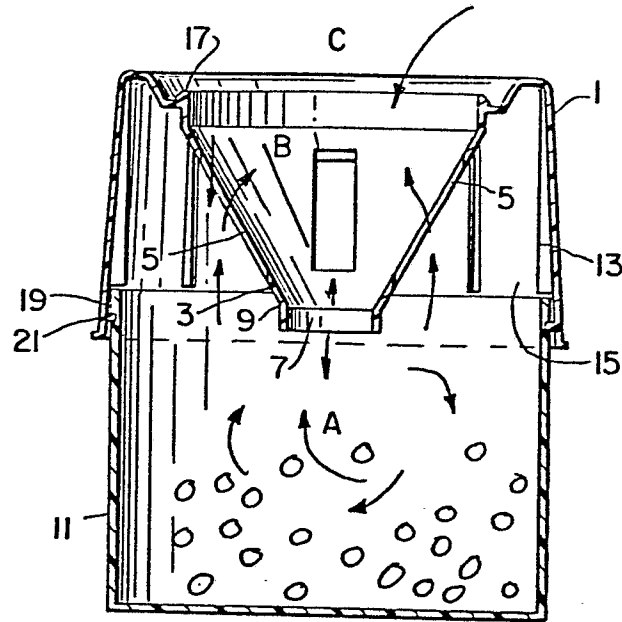


FIG. 3

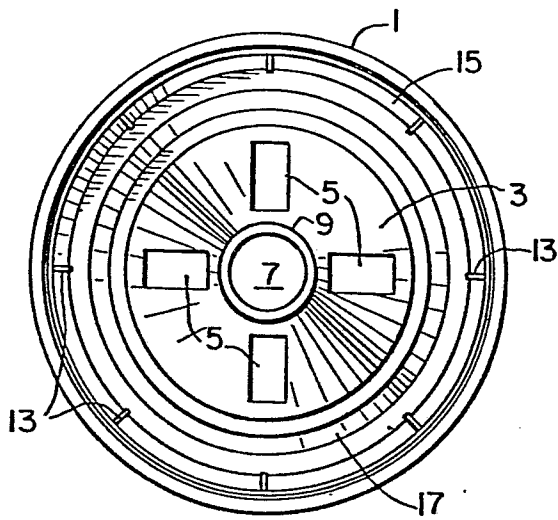


FIG. 2

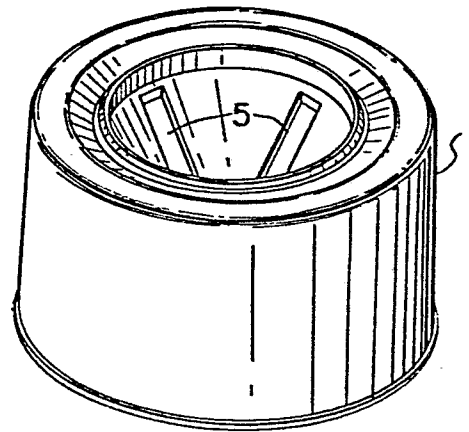


FIG. 4

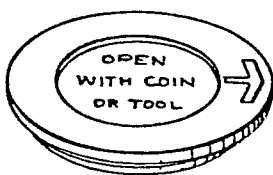


FIG. 5

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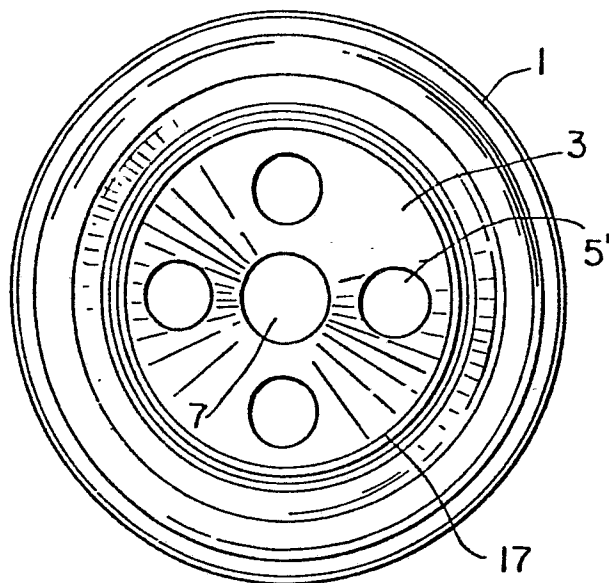


FIG. 6A

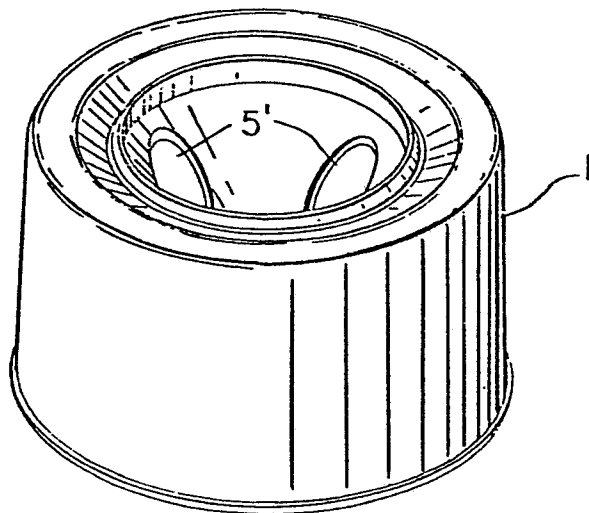


FIG. 6B

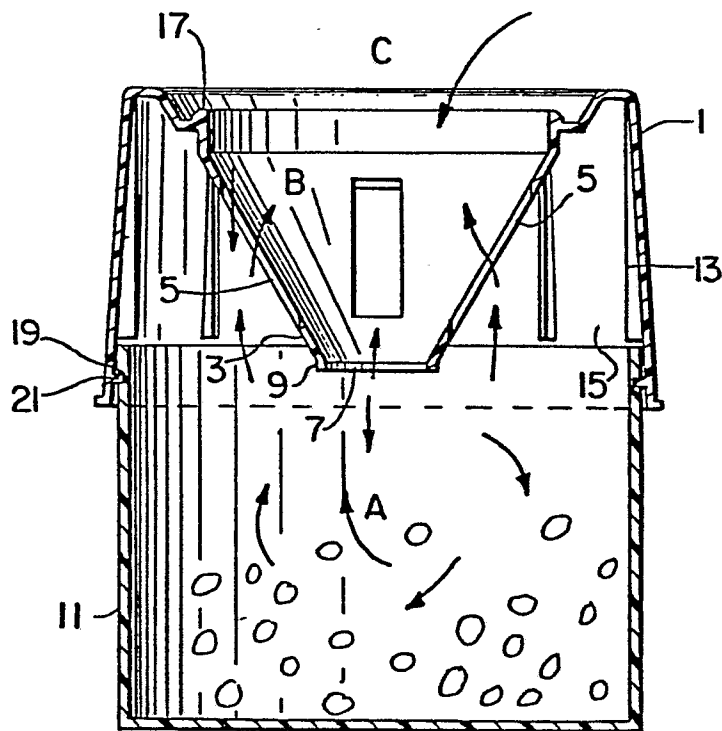


FIG. 7



European Patent
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EUROPEAN SEARCH REPORT

0044034

Application number

EP 81 10 5306.5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	GB - A - 1 367 309 (KOBAYASHI PHARMACEUTICAL CO. LTD) * complete document *	1,3,4, 7,9,10, 13	E 03 D 9/03

	AU - A - 37 080/71 (N.L. ROSS) * fig. 1 to 3 *	1,7	

D	US - A - 4 000 839 (TECCO et al.) * fig. 1 to 5 *	2,8	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

A	US - A - 3 769 640 (CASTRONOVO)		E 03 D 9/00

A	AU - A - 59 460/69 (A.E. TOMS)		

A,D	US - A - 3 781 926 (LEVEY)		

A,D	US - A - 2 880 077 (FLORIA)		

A	DE - C - 72 266 (GEORG)		

A	US - A - 3 949 900 (CHAPEL)		CATEGORY OF CITED DOCUMENTS
	---		X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
A	BE - A - 674 090 (KÜPPERS)		&: member of the same patent family, corresponding document

<div style="border: 1px solid black; padding: 2px;"> X The present search report has been drawn up for all claims </div>			
Place of search		Date of completion of the search	Examiner
Berlin		05-10-1981	PAETZEL