United States Patent [19]

Herring

[11] **3,867,101**

[45] **Feb. 18, 1975**

[54] **TOILET CLEANSING DEVICE**

[75] Inventor: **Desmond Edward Herring**, Ipswich, England

[73] Assignee: **American Home Products Corporation**, New York, N.Y.

[22] Filed: **Sept. 6, 1973**

[21] Appl. No.: **394,700**

[30] **Foreign Application Priority Data**

Sept. 13, 1972 Great Britain 42423/72

[52] **U.S. Cl.** ..... **23/267 A**, 4/228

[51] **Int. Cl.** **B01d 11/02**

[58] **Field of Search** ..... 252/90, 106; 4/228, 226, 4/229–232; 23/267 A; 137/240, 268

[56] **References Cited**

UNITED STATES PATENTS

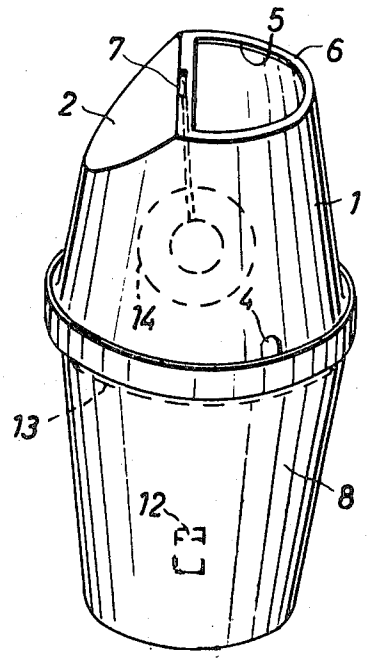
3,504,384	4/1970	Radley et al.	4/228
3,518,343	6/1970	Welsh et al.	252/106 X
3,583,005	6/1971	Kilby	4/228

Primary Examiner—Stanley H. Tollberg
Assistant Examiner—John P. Shannon
Attorney, Agent, or Firm—Joseph Martin Weigman

[57] **ABSTRACT**

The invention provides a device for dispensing a quantity of water-soluble material to a flushing cistern comprising a container which has in the lower part thereof the water-soluble material and within the water-soluble material a tablet containing water-soluble dyestuff from which dyestuff can be released rapidly when water reaches the tablet, thereby indicating that the water-soluble material is exhausted or nearly so.

9 Claims, 5 Drawing Figures



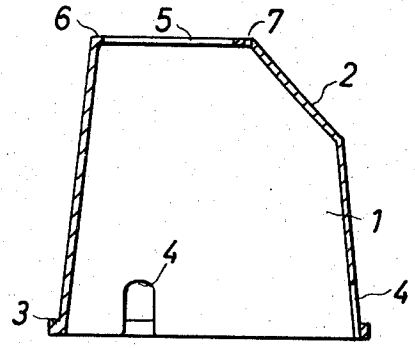


FIG. 1

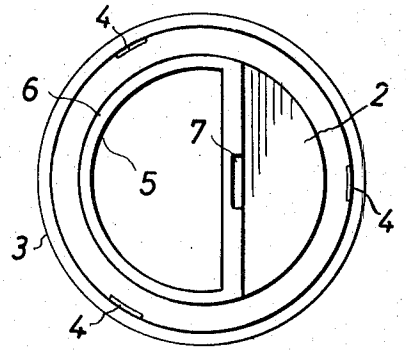


FIG. 2

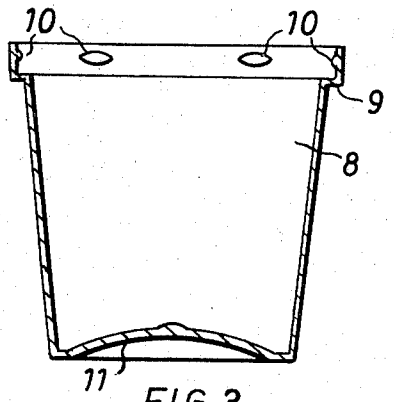


FIG. 3

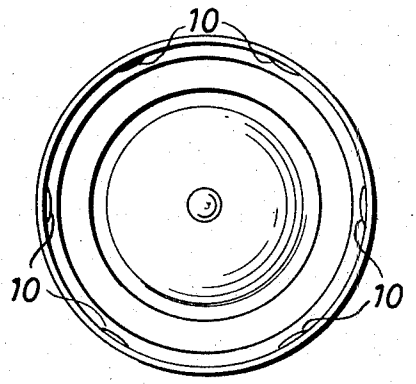


FIG. 4

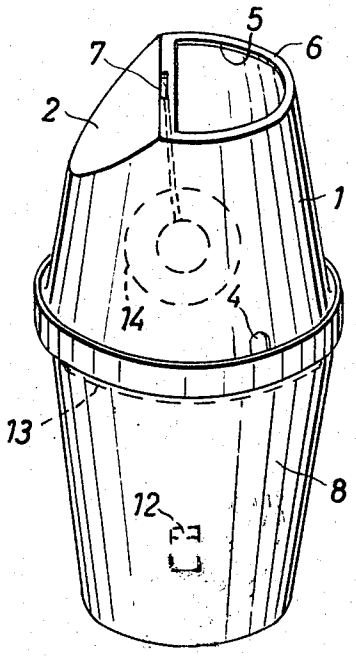


FIG. 5

TOILET CLEANSING DEVICE

This invention relates to devices for use in dispensing a quantity of water-soluble material to a flushing cistern.

Various devices are known for use in dispensing a a quantity of water-soluble material (such as a detergent and/or disinfectant to a flushing cistern, as a means of disinfecting or cleaning lavatory bowls and/or urinals when the cistern is flushed. These devices usually comprise a container containing the solid or pasty water-soluble material, the container being adapted to dispense a quantity of the material to a cistern when immersed in it. The detergent composition contained within the devices in common use usually is coloured by means of a dye thereby colouring the water in the toilet bowl, loss of colour indicating that the detergent composition has been exhausted and that the device requires replacement. I have now discovered a particularly effective way of indicating when the detergent and/or disinfectant medium of such devices has been exhausted, and means for providing a supplementary cleaning action. The present invention is applicable to any kind of device for use in dispensing a quantity of water-soluble material to a flushing cistern, or to any other water tank.

Accordingly the invention provides a device for dispensing a quantity of water-soluble material to a flushing cistern comprising a container for immersion in the water of a flushing cistern, said container having an upper part with at least one aperture in the side wall thereof and a lower non-permeable part; said container having in its lower part water-soluble material selected from the group consisting of solid and pasty water-soluble disinfecting and cleaning materials, and in the bottom of said lower part, within said water-soluble material a readily water-soluble tablet containing a water-soluble dyestuff, said container being adapted to permit upon immersion in the water of the flushing cistern, a quantity of water to flow into the upper part of said container and dissolve a quantity of said water-soluble material thereby forming a concentrated solution of said water-soluble material in the upper part of the container, which solution can flow out of said container when the cistern is flushed, said tablet being adapted to rapidly release the dyestuff into the water when said water-soluble material is exhausted or nearly so, thereby indicating that the device requires replacement.

Preferably the water-soluble material is also coloured with a dyestuff of different colour from that contained in the readily-soluble tablet. In such devices the change of colour indicates when the water-soluble material is exhausted.

It is preferred that the dyestuff is contained in a tablet capable of rapid dissolution in water. Such tablets can be made by techniques which are well-known in the tabletting art. I have found that a particularly effective material which can be incorporated in the tablets to ensure a sufficiently high rate of dissolution is the material known as celutab. Other suitable materials can be found by reference to standard works on tabletting and include starch or sugars such as dextrose and lactose.

The tablet may include other materials capable of enhancing the disintegration rate, e.g., materials which release carbon dioxide on admixture with water such as mixtures of solid carbonates or bicarbonates, e.g.,

those of the alkali metals, especially sodium, and solid acids. As the solid acid the following may be used, oxalic, citric, sulphamic, ascorbic and tartaric acids.

It is preferred that the water-soluble material is coloured by means of a blue dye and the water-soluble dyestuff in the readily water-soluble tablet is a violet or red dye. However any combination of colours can be used as desired.

Various dyestuffs can be used, including disulphine blue VN150, or Rhodamine B extra, or various mixtures of Coomassie Violet 2RS, Carbolan Yellow, Verdigreen, Solway Green G 150, Naphthol Green BSN, Tartrazine Yellow N200. As dyestuff in the water-soluble medium it is preferred to use Rhodamine B extra. However, any other water-soluble dyestuffs may be used.

As stated above the device of the present invention is primarily intended for dispensing a quantity of water-soluble detergent and/or disinfectant. As detergent I prefer to use ethylene oxide condensates, for example condensates with nonylphenol containing from 16 to 100, preferably 18 to 35 ethylene oxide residues, with octylphenol, e.g., containing 16–100 ethylene oxide residues, dodecyl phenol-ethylene oxide condensates, for example containing from 16 to 100 ethylene oxide residues, dinonylphenol-ethylene oxide condensates containing 20 to 100 ethylene oxide residues; aliphatic alcohol-ethylene oxide condensates containing from 18 to 100 ethylene oxide residues and in which the alkyl group has from 12 to 20 carbon atoms and may contain an unsaturated link and ethylene oxide/propylene oxide condensates.

Ethylene oxide condensates of various types, biodegradable in water, with dissolving rates of 0.1 to 10.0 grams per day may also be used as the detergent.

In general a convenient detergent is one which is in solid or dense paste form at room temperature. Preferably the detergent has a melting point within the range 40°C to 70°C.

If the water-soluble material is or contains a disinfectant this may conveniently be a chlorinated xylenol, for example dichlorometaxylenol; a quaternary ammonium salt or hexachlorophene.

The device may also include a readily soluble cleaning substance which is contained in a readily water-soluble medium, said medium being so positioned as to release the cleaning substance immediately the device is immersed in the cistern. The readily soluble tablet or cleaning substance also include a perfume, e.g., allyl caproate, red thyme oil, eucalyptus, ethyl vanillin, celery seed oil, gamma decalactone, cinnamon, methyl salicilate or methyl β-methyl thiopropionate.

The cleaning substance may be used in high concentration since it will remain in contact with the cistern only until the cistern is flushed. Thus a rapid and concentrated cleaning action will be provided in the lavatory bowl shortly after the device is immersed. Preferably the cleaning substance is oxalic acid. This procedure has the advantage that the lavatory bowl can be automatically given a concentrated cleaning action every time a new device is installed. The fact that the cleaning substance will be dissolved substantially completely and used at one flushing of the cistern enables one to use a higher concentration than could be permitted to remain permanently in contact with the cistern due to the necessity of avoiding corrosion problems.

The cleaning substance may be coloured by a dyestuff, Any normal anionic or cationic dyestuffs of which the following are examples; Lissamin Green V200, Carbolane Green or Carbolan Yellow, may be used.

The device may be constructed in any convenient manner to achieve the desired effect. However, a preferred construction comprises a container having a lower portion capable of containing a solid mass of the water-soluble material and an upper portion provided with holes whereby water has access to the water-soluble material when the device is immersed in the water of a flushing cistern. Preferably the water-soluble medium contains a dyestuff as indicating means in the form of a tablet placed on the bottom of the lower portion of the container and the water-soluble material is a normally solid material which has a relatively low melting point such that it can be melted and poured into the container to cover the tablet of dyestuff. The container may simply be a cylindrical or tubular vessel with an opening at the top and provided with means whereby the container can be suspended in the cistern.

Such devices preferably include a water-soluble cleaning substance, in a tablet attached to the upper portion of the device. The tablet may be suspended inside or outside the device, e.g., inside the device above the surface of the water-soluble material.

The devices of the present invention may include perfumes or deodorants.

If a tablet is used as the water-soluble medium it is preferred that it contains from 15 to 60 percent by weight of the dyestuff, from 15–40 percent of disintegrating agent e.g., celutab, from 0–20 percent of carbonate or bicarbonate and from 0–20 percent of solid acid.

A preferred device according to the invention will now be described with reference to the accompanying drawings which

FIG. **1** is a side view, partly sectional, of the upper portion of the device;

FIG. **2** is a plan view of the top of the upper portion;

FIG. **3** is a side view, partly sectional, of the lower portion of the device;

FIG. **4** is a plan view of the lower portion taken from the bottom and

FIG. **5** is a perspective view of the assembled device.

Referring to the FIGS. **1** and **2** of the drawings the device comprises an upper portion **1** of generally frusto-conical shape but having a bevelled edge **2** on one side and provided at its base with a circumferential flange or lip **3** and slots **4** on opposite sides of the upper portion. The upper portion has an open top **5** surrounded by an inwardly projecting flange **6.** As shown in FIG. **2** the top of the upper portion has a slit **7,** situated in the flange **6,** by which the device may be suspended in a flushing cistern, with a strap, band or other suspending means (not shown).

Turning to FIG. **3,** the lower portion of the device **8** is of inverted frusto-conical shape and is provided with a circumferential flange **9** which projects outwards and then upwards. The flange **9** is provided with internal beads or lugs **10** spaced at intervals around its circumference (see FIG. **4.**). The lower portion has a well **11** at its bottom. Referring to FIG. **5** a tablet **12** containing dyestuff is placed on the bottom of the lower portion **8** and the lower portion is then substantially filled with a molten detergent and/or disinfectant composition **13,** which is normally solid at room temperature. The upper portion is then joined to the lower portion by push-fitting the upper portion into the flange **9** of the lower portion, the lip **3** having a friction grip on the inside of the flange **9,** which is assisted by the beads or lugs **10** disposed around the circumference of the interior of the flange **9.**

A strap member or other suitable attachment is attached to the slit **7** and by means of this the device is suspended in the flushing cistern. In use water enters the device through the open top **5** and dissolves some of the detergent and/or disinfectant material contained in the device. When the cistern is flushed the solution of detergent and/or disinfectant leaves the device through the holes **4** to clean and/or disinfect the lavatory bowl. The cistern refills, water pours into the device through the open top **5** and more disinfectant and/or detergent is dissolved. When the device is nearly empty of detergent and/or disinfectant, water from the flushing cistern reaches the tablet of dyestuff. This, being made of material which is readily soluble, rapidly dissolves in the water and releases the dyestuff to colour the water in the flushing cistern. When the cistern is next flushed the colour in the lavatory bowl indicates the device requires replacement.

As mentioned previously this can be achieved by having a colourless detergent and/or disinfectant medium, so that the colour of the dyestuff in the lavatory bowl in the tablet indicates by provision of colour that the device requires replacement. Alternatively the detergent and/or disinfectant may be coloured with a dyestuff of one colour and the tablet with a dyestuff of a different colour, the change in colour indicating that the device requires replacement.

In a typical device according to the invention the composition employed was a detergent medium comprising the following:

Conox J. 309 (Ethylene oxide condensate with nonylphenol containing 30 ethylene oxide residues)., detergent.	92.7%
Dichlorometaxylenol (which serves as disinfectant and detergent).	3.5%
Disulphine Blue VN 150 (dye).	3.8%

The dyestuff used as indicator was made up in the form of a tablet comprising 30 percent celutab and 50 percent Rhodamine B extra 10 percent of sodium bicarbonate and 10 percent of oxalic acid all percentages being by weight. These materials were compressed to 200 lbs. per sq. in. gauge to form the tablet.

The tablet weighing 1 gram was placed in the bottom of the lower portion and the detergent and disinfectant composition was melted and poured into the lower portion to provide 56 grams of this material in the device. In this example exhaustion of the detergent and disinfectant material in the device was shown by changing of the dye from blue to red colour.

In a preferred form of the above embodiment the device includes an additional releasing means for rapidly releasing a cleaning substance into the cistern immediately the device is immersed in it. The releasing means is in the form of a tablet in the shape of a ring **14** (FIG. **5**) suspended from inside the top **1** of the container. However, this tablet may alternatively be attached to the outside of the container e.g., to the hanging strap.

A suitable composition for the ring-shaped tablet is:

Allyl Caproate	30%
Silica	20%
Celutab	25%
Oxalic acid	15%
Sodium bicarbonate	10%
	100%

Celutab is a commercial product comprising 90–2 percent dextrose, 3–5 percent maltose, the remainder being higher glucose saccharides.

This preferred form of device functions as follows: The ring shaped tablet **14** dissolves immediately the device is placed into the cistern, discharging a powerful cleaner into the water, and giving off a definite, powerful and pleasant odour. This will be replaced fairly quickly by a pale blue cleaning solution, and will operate for a period of about six weeks. At this point the water contacts the dyestuff tablet **12,** and rapidly releases an intense red dye into the water, thus indicating that a new unit is required.

In this embodiment the oxalic acid, present in the ring-shaped tablet, serves the dual purpose of providing a strong cleaning action and an acid to release carbon dioxide from the sodium bicarbonate, thereby assisting rapid disintegration of the tablet.

I claim:

1. A device for dispensing a quantity of water-soluble material to a flushing cistern comprising:

A. A container for immersion in the water of a flushing cistern said container being comprised of an upper part and a lower non-permeable part;

B. At least one aperture defined in the top of said upper part;

C. At least one aperture defined in the side of said upper part;

D. A water soluble tablet containing a dyestuff supported at the bottom of said lower part; said tablet being adapted to permit rapid solution of the said dyestuff upon contact with water;

E. A water-soluble material selected from the group consisting of solid and pasty disinfecting and cleaning materials supported in said lower part covering said tablet;

whereby in use water passing through said apertures first dissolves and carries away said water soluble material and then dissolves and carries away the material of said tablet whereby the exhaustion of said water soluble material is evidenced.

2. A device as claimed in claim **1,** wherein said water-soluble tablet comprises 15 to 60 percent of dyestuff, and a disintegrating agent.

3. A device as claimed in claim **2** wherein the disintegrating agent is dextrose or lactose.

4. A device as claimed in claim **2,** wherein the disintegrating agent is a mixture of a solid acid and a carbonate or bicarbonate.

5. A device as claimed in claim **4** wherein the solid acid is selected from the group consisting of oxalic, citric, sulphamic, ascorbic and tartaric acids and the carbonate or bicarbonate is selected from the group consisting of alkali-metal carbonates and bicarbonates.

6. A device as claimed in claim **1,** wherein the water-soluble material is coloured with a dyestuff of a different colour from that contained in said water-soluble tablet.

7. A device for dispensing a quantity of water-soluble material to a flushing cistern comprising:

A. A container for immersion in the water of a flushing cistern, said container being comprised of an upper part and a lower non-permeable part;

B. A least one aperture defined in the top of said upper part;

C. At least one aperture defined in the side of said upper part;

D. A first water soluble tablet supported in said upper part said tablet containing a cleaning agent;

E. A second water soluble tablet containing a first dyestuff supported at the bottom of said lower part; said tablet being adapted to permit rapid solution of the said dyestuff upon contact with water;

F. A water-soluble material selected from the group consisting of solid and pasty disinfecting and cleaning materials and containing a second dyestuff, the said water soluble material being supported in said lower part covering said second tablet;

whereby in use water passing through said apertures first dissolves and carries away the material of said first tablet thereby providing an initial cleaning solution and then dissolves and carries away said water soluble material and then dissolves and carries away the material of said second tablet whereby the exhaustion of said water soluble material is evidenced.

8. A device as in claim **7** wherein said dyestuff in said second tablet is red and said dyestuff in said water soluble material is blue.

9. A device for dispensing a quantity of water-soluble material to a flushing cistern comprising:

A. A container for immersion in the water of a flushing cistern, said container being comprised of an upper part and a lower part;

B. At least one aperture defined in the top of said upper part;

C. At least one aperture defined in the side of said upper part;

D. A first water soluble tablet supported in said upper part said tablet containing a cleaning agent and a first dyestuff;

E. A second water soluble tablet containing a second dyestuff supported at the bottom of said lower part;

F. A water-soluble material selected from the group consisting of solid and pasty disinfecting and cleaning materials supported in said lower part covering said second tablet;

whereby water passing through said apertures first dissolves and carries away the material of said first tablet thereby providing an initial cleaning solution and an indication of initial activity and then dissolves and carries away said water soluble material and then dissolves and carries away the material of said second tablet whereby the exhaustion of said water soluble material is evidenced.

* * * * *