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(54) **A dispensing device for a toilet cistern.**

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EP 0 528 073 B1

Description

This invention relates to an improved dispensing device for use in the cistern of a toilet system, wherein the device incorporates a chemical additive, such as a disinfecting and/or deodorising compound, which is arranged to disperse in water present in the device so that water containing the compound is delivered automatically to the toilet bowl when the cistern is emptied.

A dispensing device having the features recited in the pre-characterizing clause of claim 1 is disclosed in GB-A-2067409.

Many further different forms of toilet cistern dispensing devices are known in the art. In this regard, reference is made to Australian Patent Specification Nos. 564163, 261095, 288230 and U.S. Patent Specification No. 3604020. One of the problems associated with the prior art dispensing devices is that the water treatment material or additive (normally in solid form) tends to disintegrate and erode away relatively quickly. This is undesirable in that the working life of the device (normally, in "throw-away" form) is not very long, and also leads to excessive amounts of chemical material being charged with the flushing water resulting in staining of the toilet bowl which is aesthetically unattractive, particularly when the toilet is flushed after a prolonged quiescent period.

In the dispensing device according to GB-A-2067409 the upper side of the cartridge is closed. Dissolution of the compound takes place exclusively through the apertures in the side wall of the cartridge. The annular space between the cartridge and the housing communicates with water present in a toilet cistern through the open top of the housing. Therefore, saturated water in said annular space continuously enters the water mass in the cistern. This entering of water treatment material in flushing water in the cistern is accelerated when flushing water circulates in the cistern during refilling after each flushing, resulting in high concentrations of water treatment material in the cistern, particularly after prolonged quiscent periods.

The inventors have recognised that in order to effectively cleanse, disinfect and/or deodorise the flushing water, only a small amount of water treatment material or additive is needed to be mixed with the flushing water from the toilet cistern.

It is an object of the present invention to provide an improved toilet cistern dispensing device wherein the rate of dispersal of the water treatment material contained therewithin is more efficiently controlled in comparison to prior art devices, which in turn results in the working life of the water treatment material being significantly extended.

It is a further object of the present invention to provide a toilet flushing dispensing device which is of extremely simple design, of low cost and can be readily fitted to and removed from a toilet cistern system.

It is a further object of the present invention to provide an improved dispensing device wherein use is made of a removable cartridge containing the water treatment material, whereby on the material being fully consumed, one need only insert a replacement cartridge, without having to remove the device in total.

According to this invention therefore, a passive incistern dispensing device suitable for being used in dosing a toilet bowl with water treatment material comprising a housing having a closed bottom, a side wall and an open top, said housing coaxially receiving therein a removable cartridge, said cartridge having a closed bottom and a side wall provided with apertures, is characterized by said cartridge having an open top, by a reservoir being formed between the bottom wall of the cartridge and the bottom wall of the housing, an annular gap between the chamber formed by the housing and said reservoir and by a passage way having its lower end in communication with said reservoir, extending at the outside of the housing from the bottom level thereof upwardly, the upper end of said passageway being located below the upper end of the housing.

Preferably, the water treatment material means comprises a removable cartridge having a tubular side wall having a plurality of apertures formed therein, said apertures being spaced along the length of the side wall, a closed bottom wall and an open upper end, the interior of the cartridge being filled (or nearly so) with solid water treatment material, said side wall being spaced from the inner walls of the container or housing so as to form said water flow path means.

Preferably, the lower end of the drain tube connects to the reservoir means via an opening in the side wall of the housing, said opening being spaced a small distance, e.g. 5mm above the bottom wall of the housing.

Preferably, the reservoir means is formed by a space between the cartridge bottom wall and the housing bottom wall so as to permit water to flow freely from the housing into the discharge tube or vice versa.

Preferably, the discharge tube extends upwardly by a distance which is slightly less than half the overall height of the housing or container. The tube may be provided with a flow restrictor in its outlet end for reducing the flow rate of treated water from the device, and in turn the rate of release of the water treatment material.

It will be appreciated that the height of the discharge tube is a factor which determines the volume of water discharged from the device, and

that a reservoir of water containing water treatment material, will always be stored within the device, i.e. it never drains completely.

In use, the device is partially immersed in the cistern water to a depth just below the upper end of the housing, whereupon water enters the chamber from the reservoir means, via the discharge tube, and a head of water is formed in the cartridge above the upper level of the water treatment material, which then becomes dispersed or dissolved in the water. Some of the dissolved material will diffuse into the water of the reservoir means ready for discharge into the cistern. When the cistern is flushed, treated water will be dispensed into the cistern once the level of water in the cistern falls, and such discharge will continue until the level of the water in the chamber drops to the level of the upper end of the discharge tube. A reservoir of treated water thus remains in the reservoir means ready for the next flush.

With this arrangement, the water within the dispenser is maintained in a relatively quiet state which minimises the loss of water treatment material particularly when the toilet is not in use (i.e. during quiescent periods). Preferably, the water within the device contacts substantially only the upper surface of the water treatment material, whereby the rate of release of the material is very much controlled during the flushing/refilling cistern cycles and this significantly extends the working life of the dispensing device (without having to replace the water treatment material), and avoids any problems which normally arise owing to excessive discharge of such material during flushing, e.g. unsightly stains within the toilet bowl.

In a preferred embodiment, as the water treatment material gradually dissolves away and the level of its upper surface slowly drops, further apertures in the side wall of the cartridge are progressively "exposed", whereby water which collects within the cartridge during the dispensing cycle of the device, will drain from the cartridge through the "exposed" apertures and flow downwardly through the annular space between the container side wall and the cartridge and eventually dispense through the discharge tube into the cistern.

The water treatment material may be a solid block, and compositions for same are well known in the art. The composition can contain components for controlling the rate of release of the "active" material into the water.

Preferably, the material is contained in disposable cartridges, or in a protective wrapping which dissolves in water. Refills can thus be simply inserted in the device without having to remove it from the cistern.

In order to more fully explain the applicants' invention, an embodiment is described hereunder in some further detail with reference to and illustrated in the accompanying drawings in which:

Fig. 1 is a schematic illustration of a dispenser installed in a toilet cistern;

Fig. 2 is a vertical sectional view of the dispenser assembly of this embodiment;

Fig. 3 is an "exploded" view of the assembly shown in Fig. 2; and

Fig. 4 is a perspective view of the inner cartridge shown in Fig. 3 containing the chemical additive.

In this embodiment, a toilet cistern dispensing device 10 comprises a hollow cylindrical container or housing 11 having a tubular side wall 12 defining a chamber 14, a closed bottom wall 13 and an open top, and a removable cylindrical cartridge 15 slidably located within the chamber 14, the housing 11 and cartridge 15 being dimensioned so that with the cartridge 15 housed in the chamber 14, a small annular clearance 17 exists between the side walls thereof.

The housing 11 is formed of water impervious plastics material, and has attached to its side wall a hanger strap 18, for hookingly attaching the housing 11 to a side wall of the toilet cistern 19, or to the inlet tube 20 of the cistern 19, the positioning of the housing 11 being selected so that when the cistern 19 is filled with water, the housing 11 projects slightly above the level of the water in the cistern (refer Fig. 1).

The container 11 is provided with an upwardly extending discharge tube 21 which in this embodiment, has its lower end connected to an aperture 22 in the side wall 12 of the container 11 near to its bottom wall 13, the tube 21 extending approximately parallel to the side wall 12 of the container 11 exteriorly thereof and contiguous therewith. The tube 21 terminates at its upper end at a level which is slightly below the mid-region of the container 11.

The removable cartridge 15 comprises a cup-shaped outer casing 25 of plastics material, the diameter of which is slightly less than the diameter of the cylindrical housing 11, the tubular side wall of the casing 25 having a plurality of axially spaced, horizontal rows of apertures 27 formed therein, the apertures 27 in each row being spaced circumferentially around the casing 25, the apertures 27 in each adjacent row being in staggered relationship.

The bottom wall 28 of the casing 25 is closed and sits on top of a support ring 30. The cartridge 15 is thereby supported clear of the bottom wall 13 of the container 11, and above the lower end of the tube 21. The space 31 forms a reservoir for water which enters the housing 11 through the tube 21. The ring 30 is provided with openings 32 in its side

wall to permit water to flow freely through the reservoir 31 into the tube 21 and vice versa.

Water treatment material 34 containing cleansing, colouring, disinfecting and/or perfumed agents, is contained in the cartridge 15, to a level below the upper end of the casing 25, so that a space is formed above the material 34 in the casing 25 and which forms a well in which water can collect. In this initial state, only a small number of the apertures 27 in the outer casing side wall 25 are "open" or "exposed".

In this embodiment, the material is in solid or paste form and fills the interior of the cartridge 15 so that essentially only its upper surface makes effective contact with water, the apertures 27 being sufficiently small so that the contact between the water and the material 34 by virtue of the holes 27, does not have any significant effect on the dissolving or dispersion of the material 34. The material is desirably formulated so that it slowly dissolves in water, the pattern of holes 27 being effective to ensure that the material 34 is consumed evenly, so that its upper surface slowly drops substantially horizontally.

The upper end of the cartridge 15 is provided with a tab 35 which serves as a handle for manually grasping the cartridge 15 to facilitate its insertion and withdrawal from the housing 11, e.g. when a replacement cartridge 15 needs to be fitted, without having to remove the device in its entirety.

In use, the dispensing device 10 is suspended in the tank of the toilet cistern 19, for example by simply engaging its hanger strap 18 over the side wall of the cistern 19, the housing 11 being located so that it is immersed over the majority of its length. As the device 10 is immersed in the water within the cistern 19, water enters the housing 11 via the tube 21 and flows upwardly through the gap between the housing side wall 12 and the cartridge side wall 25, and into the interior of the cartridge 15 via the "exposed" apertures 27, whereupon it comes in contact with the exposed upper surface of the water treatment material 34, the water within the device 10 continuing to rise up to the level of the water in the cistern tank 19.

When the toilet cistern is flushed, a charge of water from the device (containing the water treatment material 34) is displaced through the discharge tube 21 into the cistern 19, whereupon it mixes with the water in the cistern tank and in turn is flushed into the toilet bowl. If water is emptied from the cistern tank quicker than the rate of discharge of water from the dispensing device, water from the device will also meter into the cistern during the initial stages of refilling. The level of water within the container 11 drops until it coincides with the level of the upper end of the tube 21. Upon the cistern being refilled, the water in the container 11 returns to its previous level.

As the water treatment material 34 is consumed and the level of its upper surface drops, "new" apertures 27 in the side wall of the cartridge casing 25 become "exposed" to thereby permit water collected within the casing to drain therefrom during the flushing cycle. Desirably, water within the housing 11 makes contact with the water treatment material 34 essentially only across its upper surface, this permitting the rate of dispersion of the water treatment material 34 to be effectively controlled.

In order to maintain the annular gap 17 between the housing 11 and the cartridge 15, the upper end of the casing 25 is provided with outturned tabs 36 which engage the inner wall of the housing 11. This minimises the likelihood of blockages forming in the flow path between the housing wall 12 and the casing side wall, e.g. caused by build-up of particles from the material 34. Any other form of spacer means so as to centralise the cartridge within the housing may be employed.

In variation to the above embodiment, the tube or conduit 21 may be formed to have an horizontal leg portion which projects into the bottom region of the housing 11 and serves as a support member for the cartridge 15 (in lieu of the ring 30). The horizontal leg portion is preferably formed with holes in its wall to assist water flow into the tube.

In another variation, the chamber 14 for receiving the cartridge 15 can be separated from the walls defining the reservoir 31, whilst in yet a further variation, the tube 21 can be formed as an integral part of the wall of the housing (so as to define a passageway) rather than as a separate element.

A brief consideration of the above-described embodiment will indicate that the invention provides for an extremely simple yet very effective toilet cistern dispensing device which allows the water treatment material contained therewithin to be efficiently consumed in a way which greatly extends the working life of the dispensing device (for a given amount of material) and which allows a replacement cartridge to be fitted easily and quickly, without having to remove the container or housing for the cartridge from the cistern.

Claims

1. A passive in-cistern dispensing device (10) suitable for being used in dosing a toilet bowl (19) with water treatment material comprising a housing (11) having a closed bottom (32), a side wall (12) and an open top, said housing (11) coaxially receiving therein a removable cartridge (15), said cartridge (15) having a closed bottom (28) and a side wall (25) pro-

vided with apertures (27), characterized by said cartridge (15) having an open top, by a reservoir (31) being formed between the bottom wall (28) of the cartridge (15) and the bottom wall (13) of the housing (11), an annular gap (17) between the chamber (14) formed by the housing (11) and said reservoir (31) and by a passage way (21) having its lower end in communication with said reservoir (31), extending at the outside of the housing (11) from the bottom level thereof upwardly, the upper end of said passageway being located below the upper end of the housing (11).

2. A dispensing device according to claim 1, wherein both the housing (11) and the cartridge (15) comprise cylindrical tubes, characterized by the diameter of the cartridge (15) is slightly less than the diameter of the housing (11), the narrow annular gap (17) forming a water flow path between the upper side of the cartridge (15) and the reservoir (31) below the cartridge (15).

3. A dispensing device according to claim 1 or 2, characterized by said apertures (27) in the side wall (25) of the cartridge being so small so that the contact of water with the treatment material through the apertures (27) is neglectable in relation to the contact of water with exposed upper the water treatment material.

4. A dispensing device according to claim 3, characterized by said apertures (27) being arranged in vertically spaced circumferential rows along the length of the cartridge (15).

5. A dispensing device according to any one of the preceding claims, characterized by said passage way (21) being a tube extending upwardly by a distance which is slightly less than half the overall height of the housing (11).

6. A dispensing device according to any one of the preceding claims, characterized by a locating ring (30) fixed to the bottom (13) of the housing (11), centrally thereof, the side wall of said ring being provided with openings (32) around its lower edge to assist water flow through said reservoir (31).

Patentansprüche

1. Passive, in einem Wasserbehälter befindliche Dosiervorrichtung (10), dafür geeignet, zum Eindosieren von Wasserbehandlungsmaterial in eine Toilettenschüssel (19) benutzt zu werden, welche ein Gehäuse (11) mit einem geschlossenen Boden (32), einer Seitenwand (12) und einem offenen oberen Ende aufweist, wobei das Gehäuse (11) koaxial eine entfernbare Kassette (15) aufnimmt, wobei die Kassette (15) einen geschlossenen Boden (28) und eine Seitenwand (25), die mit Öffnungen (27) versehen ist, hat, gekennzeichnet durch ein offenes oberes Ende der Kassette (15), durch einen Vorratsbehälter (31), der zwischen der Bodenwand (28) der Kassette (15) und der Bodenwand (13) des Gehäuses (11) gebildet ist, einen ringförmigen Spalt (17) zwischen der Kammer (14), gebildet durch das Gehäuse (11), und dem Vorratsbehälter (31), und durch einen Durchlaß (21), dessen unteres Ende mit dem Vorratsbehälter (31) kommuniziert und sich an der Außenseite des Gehäuses (11) von dessen unterem Level nach oben erstreckt, wobei das obere Ende des Durchlasses unterhalb des oberen Endes des Gehäuses (11) liegt.

2. Dosiervorrichtung nach Anspruch 1, bei der sowohl das Gehäuse (11) als auch die Kassette (15) zylindrische Rohre aufweisen, dadurch gekennzeichnet, daß der Durchmesser der Kassette (15) etwas geringer ist als der Durchmesser des Gehäuses (11), wobei der enge ringförmige Spalt (17) einen Wasserflußweg zwischen der oberen Seite der Kassette (15) und dem Vorratsbehälter (31) unterhalb der Kassette (15) bildet.

3. Dosiervorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Öffnungen (27) in der Seitenwand (25) der Kassette so klein sind, daß der Kontakt des Wassers mit dem Behandlungsmaterial durch die Öffnungen (27) verglichen mit dem Kontakt des Wassers mit dem freiliegenden oberen Teil des Wasserbehandlungsmaterials vernachlässigbar ist.

4. Dosiervorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Öffnungen (27) in vertikal beabstandeten Reihen am Umfang entlang der Länge der Kassette (15) angeordnet sind.

5. Dosiervorrichtung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Durchlaß (21) ein Rohr ist, das sich nach oben über einen Abstand erstreckt, der etwas geringer ist als die Hälfte der Gesamthöhe des Gehäuses (11).

6. Dosiervorrichtung nach einem der vorangehenden Ansprüche, gekennzeichnet durch einen Positionierring (30), der am Boden (13) des

Gehäuses (11) mittig befestigt ist, wobei die Seitenwand des Ringes mit Öffnungen (32) um seine untere Kante versehen ist, um den Wasserstrom durch den Vorratsbehälter (31) zu unterstützen.

Revendications

1. Un dispositif de distribution passif dans un réservoir (10) apte à être utilisé pour le dosage d'un produit de traitement de l'eau dans une cuvette de W.-C.(19) comprenant un boîtier (11) ayant un fond fermé (32), une paroi latérale (12) et une partie supérieure ouverte, ledit boîtier (11) recevant coaxialement à l'intérieur une cartouche amovible (15), ladite cartouche (15) ayant un fond fermé (28) et une paroi latérale (25) pourvue d'orifices (27), caractérisé en ce que ladite cartouche (15) comprend une partie supérieure ouverte, qu'un réservoir (31) est formé entre la paroi de fond (28) de la cartouche (15) et la paroi de fond (13) du boîtier (11), qu'un intervalle annulaire (17) entre la chambre (14) est formé par le boîtier (11) et ledit réservoir (31) et qu'un passage (21) dont l'extrémité inférieure est en communication avec ledit réservoir (31) se prolonge vers le haut à l'extérieur du boîtier (11) à partir du niveau du fond de ce dernier, l'extrémité supérieure dudit passage étant située au dessous de l'extrémité supérieure du boîtier (11).

2. Un dispositif de distribution selon la revendication 1, dans lequel le boîtier (11) et la cartouche (15) comprennent tous deux des tubes cylindriques, caractérisé en ce que le diamètre de la cartouche (15) est légèrement inférieur au diamètre du boîtier (11), l'intervalle annulaire rétréci (17) formant un passage d'écoulement d'eau entre le côté supérieur de la cartouche (15) et le réservoir (31) au dessous de la cartouche (15).

3. Un dispositif de distribution selon la revendication 1 ou 2, caractérisé en ce que lesdits orifices (27) de la paroi latérale (25) de la cartouche sont suffisamment petits pour que le contact de l'eau avec le produit de traitement à travers les orifices (27) soit négligeable comparativement au contact de l'eau avec la partie supérieure exposée du produit de traitement de l'eau.

4. Un dispositif de distribution selon la revendication 3, caractérisé en ce que lesdits orifices (27) sont disposés en rangs circonférentiels espacés verticalement dans la longueur de la cartouche (15).

5. Un dispositif de distribution selon l'une quelconque des précédentes revendications, caractérisé en ce que ledit passage (21) est un tube dirigé vers le haut sur une distance légèrement inférieure à la moitié de la hauteur hors-tout du boîtier (11).

6. Un dispositif de distribution selon l'une quelconque des précédentes revendications, caractérisé en ce qu'un anneau de positionnement (30) est fixé sur le fond (13) du boîtier (11), au centre de celui-ci, la paroi latérale dudit anneau étant pourvue d'orifices (32) autour de son bord inférieur pour faciliter l'écoulement de l'eau à travers ledit réservoir (31).

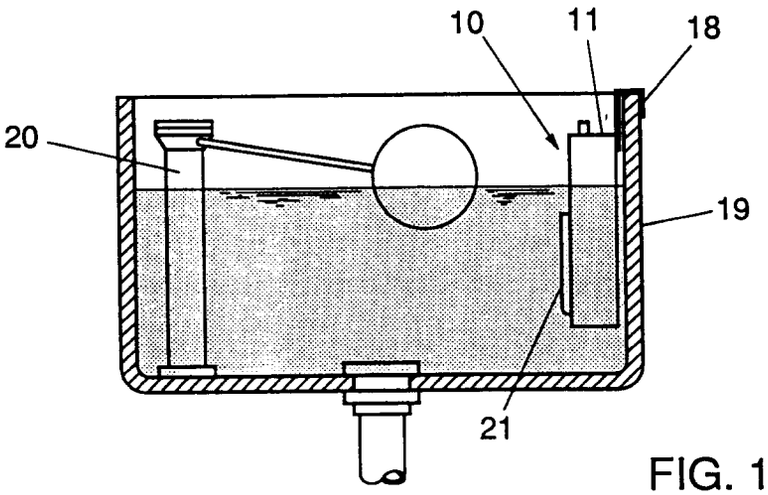

10
11
18
20
19
21

FIG. 1

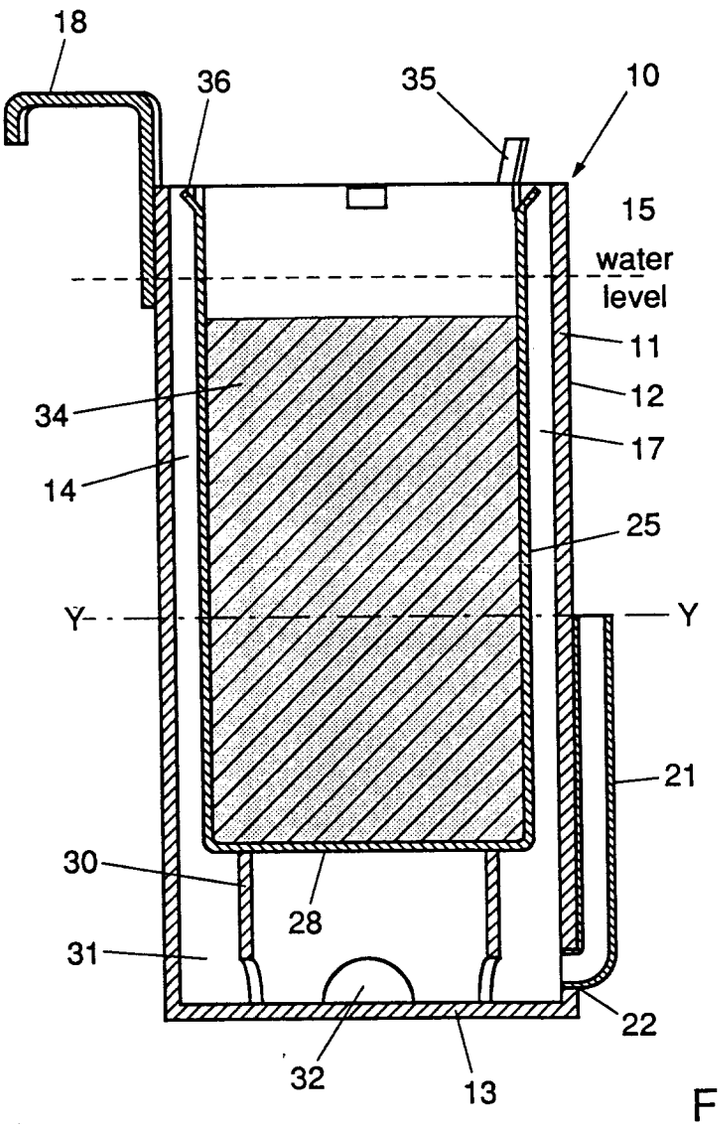

18
36
35
10
15
water
level
11
12
34
17
14
25
Y
Y
21
30
28
31
22
32
13

FIG. 2

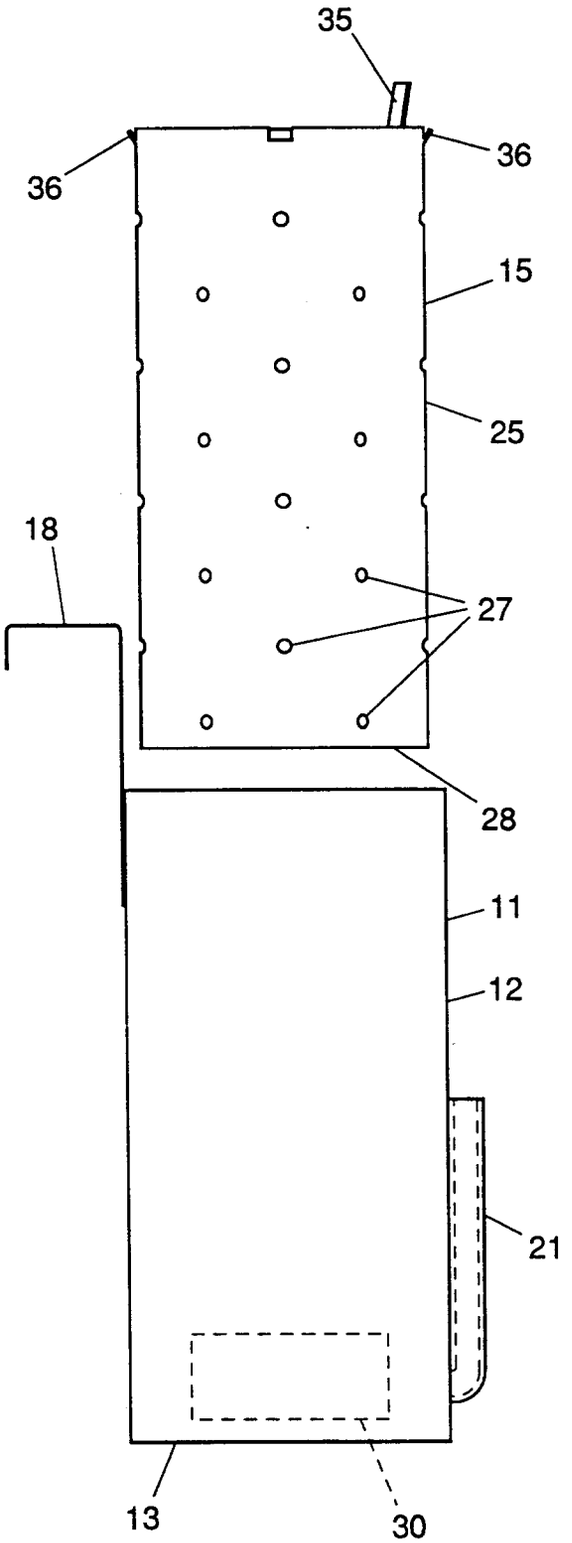


FIG. 3

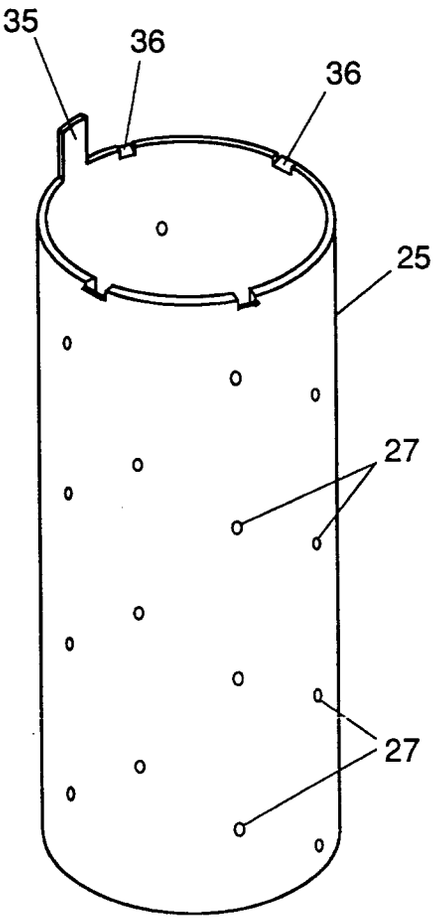


FIG. 4