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⑧ **Dispensing device.**

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EP-A-0 051 898
FR-A-2 424 374
GB-A-2 090 884
US-A-3 715 765
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⑭ Proprietor: RECKITT AND COLMAN PRODUCTS
LIMITED
P.O. Box 26 1-17, Burlington Lane
London W4 2RW (GB)

⑮ Inventor: Collingwood, Keith
117 Rokeby Park
Hull HU4 7QE (GB)

⑯ Representative: Oulton, Richard John et al
H.L. COTTRELL & CO. Kings Building South
Church Side
Hull North Humberside HU1 1RR. (GB)

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Description

This invention relates to a dispensing device intended to be suspended in the flushing tank for a toilet fitting such as a W.C. pan, urinal and the like water flushing fittings (hereinafter referred to as toilet fittings) and, more particularly, to a device which when charged and operating dispenses a dose of aqueous treatment material into the water in the tank at each successive flushing of the tank.

Dispensing devices, for dispensing aqueous treatment material into a flushing tank, are known in the art, and the aqueous treatment is selected to have a cleansing, disinfecting, reodorising and/or deodorising effect in the tank and/or toilet fitting.

Deodorising or perfuming means hereinafter referred to as perfume means associated with such devices have been proposed to impart perfume to the air of the room in which the toilet fitting and the flushing tank are installed in order to counter malodours arising from the use of the toilet fitting.

U.S. Patent No. 3,869,069 which issued to Levey et al on March 4th, 1975 shows a partially immersed dispenser supported on the flushing tank rim by a strip on the exterior portion of which is a fragrance emitting means.

With this construction the perfuming means and the water treatment means are independent, the perfume means is a continuous emission means and, as water with treatment material in solution is heavier than water without the treatment material in solution, the arrangement of openings in the envelope will cause continuous circulation through the device, so that the water treatment is continuously dispensed.

U.S. Patent No. 429,384 which issued to Manwaring on June 3rd, 1890 shows a floating dispenser with, in its uppermost position, a container of fibrous absorbent material saturated with a suitably-volatile disinfecting or antiseptic material. The perfume means and the water treatment are clearly defined as independent and continuous emission arrangements.

U.S. Patent No. 3,715,765 which issued to Yadro on February 13th, 1973 discloses a partially-immersed dispenser for a flushing tank, having an open top closed by a plug of absorbent material containing reodorant or masking perfume and as the dispenser fills so displaced air is forced through the absorbent material into the surrounding atmosphere. Whilst this device dispenses perfume intermittently at each flush, that is as the dispenser fills with water following emptying, it should be observed that the plug of absorbent material is always in communication with the atmosphere outside the container, and thus the vaporisable substance must be continuously leaking from the device.

The Yadro device can thus be defined as a continuous emission device, capable of producing a pulse of perfumed air each time the tank is flushed.

The Yadro device can also include a block of water treatment material but as the water in the container is always above the material and the water entry to the chamber is via an aperture illustrated above the material there will be a continuous loss of heavy treatment-containing water from the device, so that the water treatment aspect must be continuous.

It should also be observed that the perfuming and water treatment operation disclosed by Yadro are independent.

A serious disadvantage of such devices as utilize independent operation of the perfume and water treatment functions arises in that the two functions cannot be afforded the same effective life.

The disadvantage is avoided by both Yadro and Manwaring by providing for recharging of at least the perfuming means but this requires the user to retain and store a recharging container of the perfume means, there are obvious disadvantages in over charging of the device, and the task to a housewife is unpleasant and, for this reason, most housewives prefer a "throw away" device which can be disposed of when one or other of the perfume/water treatment functions is exhausted.

With most flushing tank arrangements the greater part of the water delivered during each flushing passes directly, and quickly, through the toilet facility and water treatment material in the water passing directly through the toilet facility has very little, if any, effect. On the other hand such water as will remain in the toilet facility, that water last washing over the flushed surfaces of the toilet facility and the water remaining as the liquid lock to the drains, requires a strong concentration of water treatment material, sufficient to perform the task for which it is intended.

It will be seen that such water treatment arrangements as operate on, or permit, continuous emission of treatment material to the water in the tank are either wasteful, if the strength of the solution throughout the water in the tank is at the desired strength required for the water to be retained in the toilet fitting, or inefficient if the strength of the solution in the tank is less than that required for the toilet fitting retained water.

At the same time, as the water in a flushing tank may stand for some time between successive flushings, it may be advantageous in such a case to have a mild solution of water treatment material in the tank, far milder than the solution to be retained in the toilet fitting, in order to avoid the growths and odours associated with stagnant water.

A further serious disadvantage with such continuous emission water treatment arrangements arises from the fact that at each flushing all, or virtually all, the water in the flushing tank is discharged from the tank and replaced with fresh water as the tank charges. If the flushing tank is flushed before the continuous emission of water treatment material has built up the desired

strength of solution required for the toilet-retained water then the toilet-fitting retained water will not be of the desired strength and will be inefficient.

EP—A—0086857, GB—A—1193063, US—A—3618143 and GB—A—2090884 disclose dispensing devices for use in the flushing tank of a toilet. Each comprises a container for a water dispensable treatment material which is dispensed into the tank on flushing the toilet. However, it is not possible in any of these devices to impart perfume from the treatment material to the tank during a flushing operation.

The present invention as described in the claims proposes a dispensing device which, by its construction avoids the greater part of the defects in the prior art devices by allowing the perfume to escape from the device only whilst the water in the tank is below a predetermined level, by containing a volume of water with treatment material in solution and releasing said treatment water only after the tank has started to flush, by retaining a reservoir of water with treatment material in solution during flushing whereby to establish a volume of treated water as the device is recharged with fresh water from the charging tank, and which allows the water treatment and perfuming functions to have a substantially similar effective life.

According to the present invention there is provided a dispensing device, for use in the flushing tank of a toilet fitting, comprising a container intended to be partially immersed in the water in the flushing tank when said tank is charged, drain means which allow water to partially fill said container when the tank is fully charged and allow water treatment material in solution to flow from said container when the tank is flushed, vent means for venting the interior of the container to atmosphere in the tank, and means for supporting perfume material and water treatment material in said container in contact with the water in the container when the tank is charged, characterised in that said vent means comprise a duct which, when the device is in use, has one opening to the interior of the container and one opening to the atmosphere in the tank, the opening to the interior of the container being below the level of water in the container when the tank is fully charged, and the opening to the atmosphere in the tank being always above the level of the water in the tank.

Thus, by this construction, the perfume means release perfume into the atmosphere in the container but the water in the container prevents the release of perfumed air from the container until the tank is flushed and the water level in the container falls below the level of the opening of the vent duct to the interior of the container.

When the drain means comprise a duct certain advantages are obtained in that the cross sectional area of the duct determines the rate at which liquid can flow into and out of the container and, therefore, the said cross sectional area can be selected such that the container continues to discharge treated water up to complete discharge of the water from the tank during a flushing.

Further, by providing a duct instead of an aperture the agitation of the water in the tank is not transmitted to the water in the container, or is effectively reduced, so that the flow of treated water to the tank is relatively small between successive flushings of the tank and such loss of treated water is not detrimental to the strength of the treated water remaining in the container.

Preferably the opening in the drain duct to the tank is higher than the opening in the drain duct to the interior of the container.

This feature has the advantage that the container will only discharge treated water above the opening of the drain duct to the tank, a reservoir of treated water is retained in the tank, fresh water entering the container on recharging of the container will mix with the treated water in the container and be available for discharge at the next flushing, and thereby the time taken to provide an effective solution in the toilet fitting retained water is generally reduced relative to prior art devices.

Preferably the dispensing device is characterised in that said means for supporting said water treatment material and said perfume material comprises a lodgement in the form of a projection from one wall of the container.

This feature offers certain inherent advantages in that by providing a support from one wall of the container the water treatment material and the perfume material are supported above the floor or base of the container. By elevating the block within the container the volume of the container below the block constitutes a substantial reservoir for treated water within the container.

Preferably the container presents two spaced apart markings indicative of the upper and low limits for immersion of the container into a charged tank.

This is relatively important in that the device essentially requires the water level in the container to rise above the opening of the vent duct to the interior of the container and, at the same time, the water level must leave sufficient atmosphere in the container as to allow the perfume to be effective.

Preferably the dispensing device is of two part construction, a first planar form with the vent duct and drain duct openings to the tank formed therethrough, and a second part of moulded construction having a single recess therein and which recess defines, when the two parts are assembled, the chamber and the vent and drain ducts.

This construction is advantageous in producing a simple and cheap device which can be thrown away and replaced by a new device.

As the present invention seeks to provide a perfuming means and water treatment means having substantially the same effective life the device is advantageously used with a block of the type which dissolves in water, said block incorporating said water treatment material and said perfume material dispersed therethrough.

The block may conveniently comprise a "carrier" block with the water treatment material and the perfume material dispersed therethrough

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or a block of suitable water treatment material with the perfume means dispersed therethrough.

As such a block is dissolved by the water in the container water treatment material and perfume material will continue to be dispersed throughout the life of the block.

The present invention is further illustrated, by way of example only, by the following description which has reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of the shaped side of one embodiment of the invention, and

Fig. 2 is an elevation of the plane side of the same embodiment but with the flat member removed, to expose the interior.

Referring now to the drawings, the dispensing device generally designated 10 comprises in combination a shaped member 20 and a planar member 20' joined together. The shaped member is conveniently formed by moulding, stamping, pressing or vacuum forming a thin sheet of plastics or deformable waterproof material, and in combination with the planar member 20', defines a container including a treatment composition 30 and an aqueous treatment material dispersion or solution reservoir 40, partly separated by a lodgement 50. The shaped member 20 also provides two small cross-section side compartments or ducts, the upper one (in operative position as shown) 60, comprises a vent duct having as its lower end an opening 70 to the lowermost portion of the treatment material compartment 30 and the lower side compartment or duct 80, comprising a drain duct having at its lower end an opening 90 to the lowermost portion of the treatment solution reservoir 40. A vent opening 100 is provided in the top of the vent duct 60 and an opening 110 similarly in the drain duct 80.

Those portions of the shaped member 20 which are not deformed to provide the shaping for the main and side compartment constitute land areas all lying in a common plane bordered by the margins of the device so that the shaped member 20 and the planar member 20' may be readily joined as by, for example, adhesive, heat-sealing, R.F. welding and the like.

The shaped member 20 is also provided externally with markings 120 indicating the upper and lower limits for the correct immersion level for the device. No particular suspension means has been shown as a considerable variety of such means are known in the prior art.

The completed dispensing device, containing a block of treatment composition 130 as shown, is suspended in the flushing tank of a toilet fitting and the suspension means are adjusted so the device is so suspended in the tank that when the tank is fully charged the water level lies between the markings 120 of the device.

The block of treatment composition 130 may conveniently comprise a block of water soluble material with water treatment material and perfume agent uniformly distributed therethrough but when the water treatment material has the

facility to dissolve in water over a period of time (conveniently over one or two weeks or more) the block 130 may comprise water treatment material with perfume agent uniformly dispersed therethrough. The block 130 has dimensions in the horizontal plane less than the horizontal dimensions of the container so that water can flow around the block 130.

As the device is immersed in the water in the tank the water enters the device via opening 110, drain duct 80 and opening 90, displacing air in the device which escapes from the device via opening 70, vent duct 60 and opening 100 until vent duct 60 is blocked by the rising water in the device.

The water level rises in the device, fully charging the aqueous treatment material dispersion or solution reservoir 40 below lodgement 50 and rising around lodgement 50 up the treatment material compartment 30, surrounding the lower regions of the block 130 and filling the lower regions of duct 60 to isolate the interior of the compartment from the surrounding atmosphere. With the atmosphere in the container isolated from the surrounding atmosphere the water level in the container will continue to rise, compressing the atmosphere in the container, until a state of equilibrium is achieved.

In this condition the block 130 has its lower regions immersed in the water in the container and as the block 130 dissolves water treatment material is released into the water in the container and perfume agent is released to perfume the atmosphere in the container.

Whilst the water in the container is in communication with the surrounding water in the tank the communication is via the duct 80 so that agitations in the water in the tank are not transmitted to the water in the container, or are severely dampened by the duct 80, and a quiescent volume of water is established in the container. Further, as the density of water with treatment material in solution is greater than that of fresh water, very little, if any, water with treatment material will flow up the duct 80. Over a long period of time between flushings some treatment material will diffuse into the water in the tank from the saturated reservoir 40 but this loss of treatment solution will occur only when the water in reservoir 40 is saturated with treatment material in solution and such treatment material as does escape to the long standing water in the tank will be advantageous in preventing growths and malodours associated with stagnant water.

When the toilet fitting is flushed and the level of water in the tank falls gravity and the air pressure acting on the free surface of the water in the container cause the treated water in the container to discharge via opening 90, drain duct 80 and opening 110 until vent duct 60 is clear of water, when gravity alone is responsible for the discharge of water via the drain duct 80. In all events, the rate of flow of treated water along drain duct 80 is such that the greater part of the treated water as can be discharged from the container is released into the latter part of the water to be

discharged from the tank and, as this said latter part of the water will comprise the toilet fitting retained water, there is little less of treatment material via the water first flowing through the toilet fitting, the water with treatment retained in the toilet fitting will be of the desired strength, and a most efficient usage of water treatment material is achieved.

Further, due to the fact that the opening 110 of the drain duct 80 is above the floor or bottom of the container, the container will not be fully drained of water with water treatment material in solution so that, when the tank is recharged with fresh water, the water flowing into the container will mix with the treatment water in the reservoir to form a volume of water with treatment material in solution which not only reduces the time required to bring the volume of water in the container to saturation with treatment material in solution but also ensures that if the toilet fitting is flushed twice in succession some treatment material will be available for the second flushing.

As the water level in the container falls during flushing of the tank to open duct 60 the highly reodorised air previously trapped in the treatment composition compartment 30 comes into communication with the air in the tank surrounding the device and diffuses into it.

As the tank refills, water enters the device via port 110, and as the water level rises in the container heavily reodorised air is displaced from the container until the duct 60 is again closed by the rising water.

The heavily perfumed air released from the container first disperses into the atmosphere within the tank and is then displaced from said tank as the tank recharges with water to permeate the atmosphere of the room in which the toilet fitting is installed.

Thus, on each flushing of the toilet fitting, a part of the contained aqueous treatment material dispersion or solution passes into the water in the tank and hence to the toilet fitting, whilst reodorant emanating from the block is confined to the device until flushing when a portion is allowed to diffuse into the outer air.

Modifications of the illustrated device will be apparent to the skilled person in the light of the disclosure herein.

Claims

1. A dispensing device (10), for use in the flushing tank of a toilet fitting, comprising a container (20, 20') intended to be partially immersed in water in the flushing tank when said tank is charged, and to receive a block (130) of water treatment material containing perfume material, means (50) for supporting said block (130) of water treatment material in an upper part (30) of said container (20, 20') in contact with the water in the container (20, 20') when the tank is charged, drain means (110) to allow water partially to fill said container when the tank is fully charged and allow water treatment material (130)

in solution to flow from said container (20, 20') when the tank is flushed, vent means (100) communicating with the interior of the container (20, 20') at the level of the water treatment material support means (50) for venting the interior of the container (20, 20') to atmosphere in the tank, characterised in that said drain means (110) comprises a duct (80) which at its lower end (90) communicates with the interior of the container (20, 20') at the lowermost level thereof, and extends upwardly, terminating at its upper end (110), below the level of the water treatment material support means (50), in a port (110) to permit communication with the exterior of the container.

2. A dispensing device according to claim 1, characterised in that said means (50) for supporting said water treatment material and said perfume material comprises a lodgement (50) in the form of a projection from one wall of the container.

3. A dispensing device according to claim 1 or claim 2, characterised in that the container presents two spaced apart markings (120) indicative of the upper and low limits for immersion of the container into a charged tank.

4. A dispensing device according to any one of the preceding claims, characterised in that the device is of two part construction, a first planar (20') part with the vent duct and drain duct openings to the tank formed therethrough, and a second part (20) of moulded construction having a single recess therein and which recess defines, when the two parts are assembled, the chamber and the vent and drain ducts.

5. A dispensing device according to any one of the preceding claims, in combination with a block (130) of the type which dissolves in water, said block incorporating said water treatment material and said perfume material dispersed there-through.

Patentansprüche

1. Verteilvorrichtung (10) zur Verwendung im Spülkasten einer Toiletanlage, bestehend aus einem teilweise im Wasser des gefüllten Spülkastens eingetauchten Behälter (20, 20') zur Aufnahme eines Stückes (130) Duftstoffe enthaltendes Wasseraufbereitungsmaterial, aus Organen (50) zur Halterung des Stückes (130) Wasseraufbereitungsmaterial im oberen Bereich (30) des Behälters (20, 20') sowie bei gefülltem Spülkasten in Kontakt mit dem im Behälter (20, 20') befindlichem Wasser, aus Durchflußelementen (110) zum teilweisen Befüllen des Behälters (20, 20') mit Wasser bei völlig gefülltem Spülkasten und zum Ausströmen einer Wasser-Wasseraufbereitungsmaterial-Lösung aus dem Behälter (20, 20') bei Entleerung des Spülkastens, und aus mit den Inneren des Behälters (20, 20') auf dem Niveau der Halterungsorgane (50) für das Stück Wasseraufbereitungsmaterial in Verbindung stehenden Lüftungselementen (100) zur Entlüftung des Inneren des Behälters (20, 20') zur

Atmosphäre im Spülkasten, dadurch gekennzeichnet, daß die Durchflußelemente (110) einen Kanal (80) aufweisen, dessen unteres Ende (90) mit dem Inneren des Behälters (20, 20') an dessen untersten Niveau in Verbindung steht und der sich nach oben erstreckt sowie an seinem oberen Ende (110) unter dem Niveau der Halterungsorgane (50) für das Stück Wasseraufbereitungsmaterial in einem Durchlaß (110) zur Verbindung mit der Außenseite des Behälters (20, 20') endet.

2. Verteilvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Halterungsorgane (50) für das Stück Wasseraufbereitungsmaterial sowie Duftstoffe einen Sitz (50) in Form eines von der Behälterwand vorspringenden Vorsprunges aufweisen.

3. Verteilvorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Behälter (20, 20') zwei im Abstand angeordnete Markierungen (120) zur Anzeige der Ober- bzw. Untergrenze des Eintauchens des Behälters in den gefüllten Spülkasten aufweist.

4. Verteilvorrichtung nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß die Vorrichtung aus zwei Teilen besteht, u. zw. einem ebenen ersten Teil (20'), in dem die Lüftungskanal- und Durchflußkanalöffnungen zum Spülkasten ausgebildet sind, und einem gegossenen zweiten Teil (20) mit einer einzigen Ausnehmung, die bei zusammengesetzten Teilen die Kammer, den Lüftungskanal und den Durchflußkanal begrenzt.

5. Verteilvorrichtung nach Anspruch 1 bis 4, gekennzeichnet durch die Kombination mit einem in Wasser löslichen Stück (130), das das Wasseraufbereitungsmaterial sowie die von diesem verteilten Duftstoffe enthält.

Revendications

1. Dispositif de distribution (10), utilisé dans le réservoir de chasse d'un appareil de toilettes, comportant un récipient (20, 20') prévu pour être partiellement immergé dans l'eau dans le réservoir de chasse lorsque celui-ci est rempli, et pour recevoir un bloc (130) d'un produit traitant de l'eau contenant un produit parfumé, des moyens (50) pour supporter le bloc (130) de produit traitant dans une partie supérieure (30) du ré-

cipient (20, 20') en contact avec l'eau dans le récipient (20, 20') lorsque le réservoir de chasse est rempli, des moyens de décharge (110) pour permettre à l'eau de remplir partiellement le récipient lorsque le réservoir de chasse est complètement rempli et pour permettre au produit traitant (130) en solution de s'écouler hors du récipient (20, 20') lorsque le réservoir de chasse se décharge, des moyens de mise à l'air libre (100) communiquant avec l'intérieur du réservoir (20, 20') au niveau des moyens supportant le produit traitant (50) pour faire communiquer l'intérieur du récipient (20, 20') avec l'atmosphère dans le réservoir de chasse, caractérisé en ce que les moyens de décharge (110) comportent un conduit (80) qui, à son extrémité inférieure (90), communique avec l'intérieur du récipient (20, 20') au niveau de son extrémité inférieure, et s'étend vers le haut en se terminant à son extrémité supérieure (110), en dessous du niveau du support (50) du produit traitant, en une ouverture (110) pour permettre la communication avec l'extérieur du récipient.

2. Dispositif distributeur selon la revendication 1, caractérisé en ce que les moyens (50) pour supporter le produit traitant et le produit parfumé comportent un point d'appui (50) sous la forme d'une saillie d'une paroi du récipient.

3. Dispositif distributeur selon la revendication 1 ou la revendication 2, caractérisé en ce que le récipient présente deux repères espacés (120) indiquant les limites respectivement supérieure et inférieure pour l'immersion du récipient dans le réservoir de chasse rempli.

4. Dispositif distributeur selon l'une quelconque des revendications précédentes, caractérisé en ce que le dispositif est construit en deux parties, une première partie plane (20') à travers laquelle sont formées les ouvertures du conduit de mise à l'air libre et du conduit de décharge communiquant avec le réservoir de chasse, et une deuxième partie (20) de structure moulée comportant un seul évidement, lequel définit, lorsque les deux parties sont assemblées, la chambre et les conduits de mise à l'air libre et de décharge.

5. Dispositif distributeur selon l'une quelconque des revendications précédentes, en combinaison avec un bloc (130) du type qui se dissout dans l'eau, ce bloc contenant le produit traitant de l'eau et le produit parfumé dispersé à l'intérieur.

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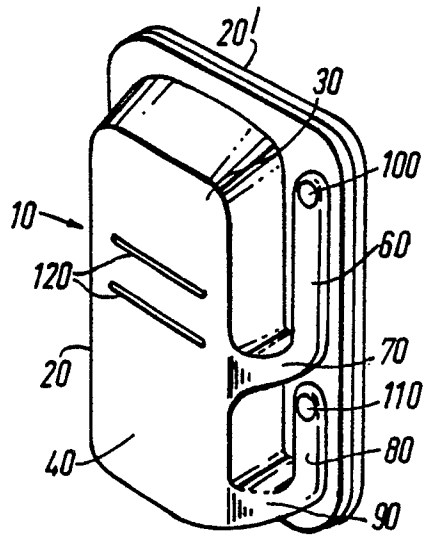


FIG. 1

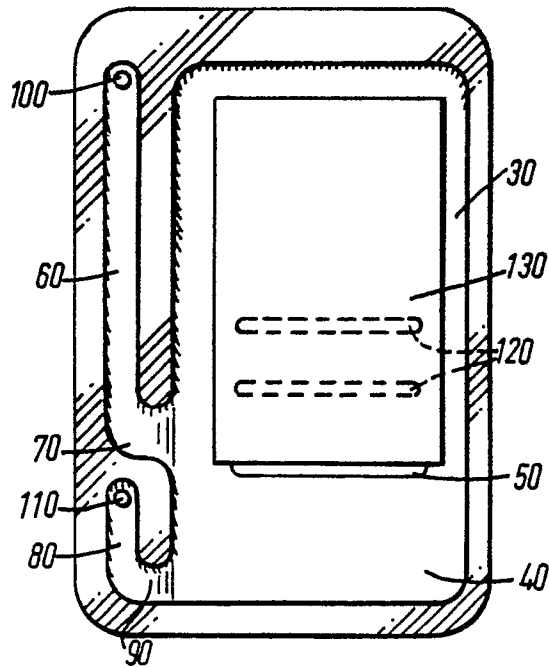


FIG. 2