Sept. 22, 1970 S. LEAVITT ETAL 3,529,309

LAVATORY SANITATION BODIES

Original Filed Dec. 29, 1967

Fig. 1.

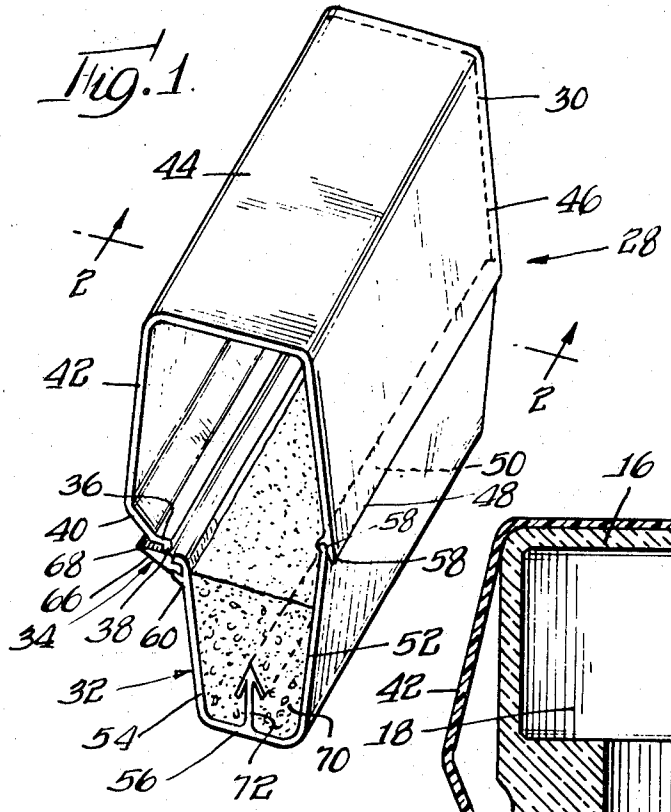


Fig. 4.

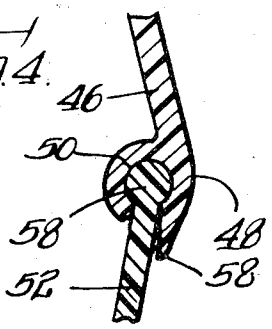


Fig. 2.

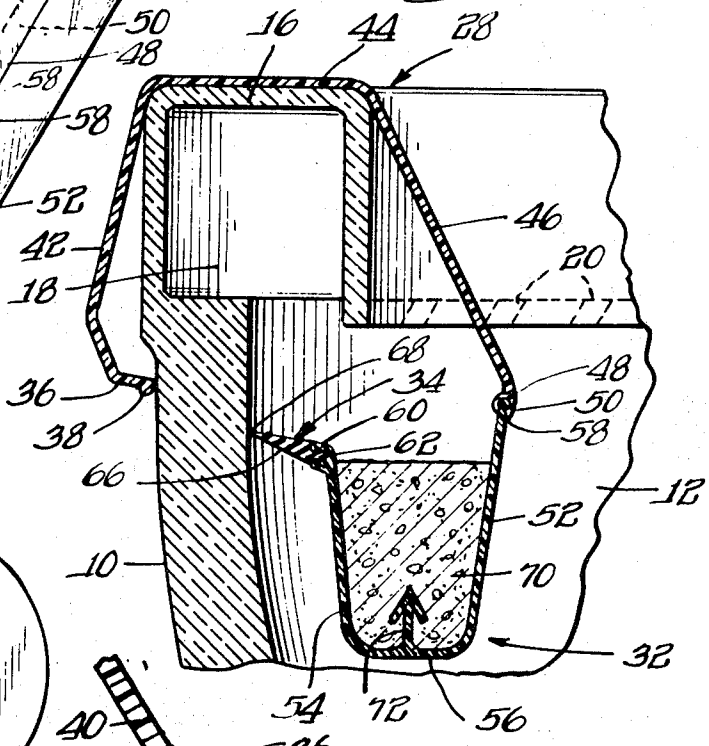


Fig. 3.

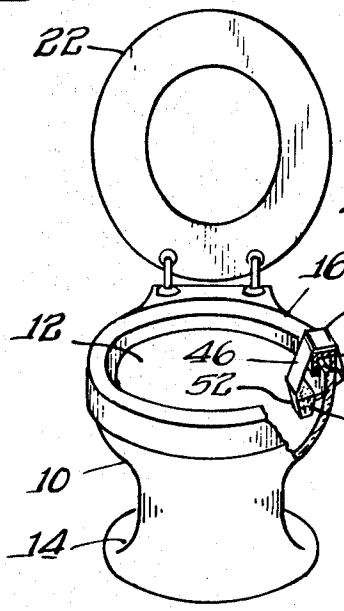
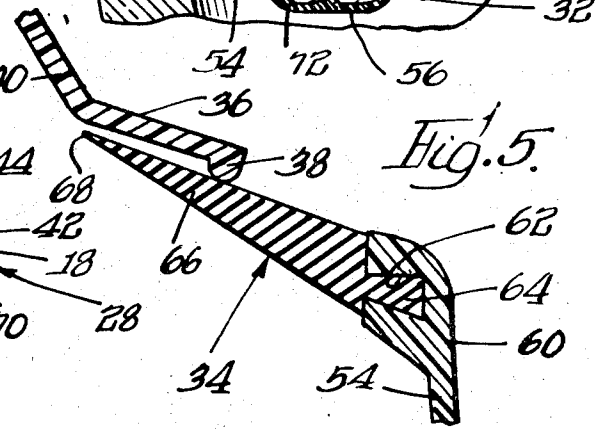


Fig. 5.



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LAVATORY SANITATION BODIES

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Original application Dec. 29, 1967, Ser. No. 693,488. Divided and this application Aug. 12, 1968, Ser. No. 751,889

Int. Cl. E03d 9/02

U.S. Cl. 4—231 12 Claims

ABSTRACT OF THE DISCLOSURE

A body for use in a basin of a toilet bowl lavatory, urinal, or the like, said body comprising a flexible holder for attachment to the rim of the basin of a toilet bowl, or urinal, a compartment formed in said holder for holding a quantity of a solid soluble treatment material in said basin and flexible bowl-engaging means on said holder for diverting flush water into said compartment where it makes direct contact with the solid treatment material, thereby to partly dissolve a portion of the material and to enable said dissolved portion to be carried by the flush water into said basin, said flexible bowl-engaging means being capable of conforming to the shape of said basin at its point of contact therewith, thereby enabling said holder to be used in connection with toilet bowls of differing configurations.

This application is a division of application Ser. No. 693,488 filed Dec. 29, 1967.

This invention relates to lavatory bodies or units for deodorizing, cleaning and sanitizing toilet bowls, urinals and the like.

Toilet bowls, urinals, and the like, require constant care to prevent the buildup of unsightly deposits, both organic and inorganic in origin, to reduce odors and to keep bacteria growth at minimally safe levels. In an effort to cope with at least some of these problems, products such, for example, as paradichlorobenzene, usually in cake form, have been widely used. Paradichlorobenzene cakes, however, function primarily as odor maskants, and, while in certain instances, other ingredients such as disinfectants are incorporated in the cakes, they provide no cleansing action and afford no protection against buildup of undesirable deposits, stains, and encrustations common to sanitary units of the type here under consideration. Heretofore, the only effective method of overcoming the problems encountered with such sanitary units is daily, manual swabbing with, for example, standard powder or granular sanitizing agents.

In accordance with the present invention, there is provided means for enabling continuous and complete protection for toilet bowls, urinals, and the like, against the aforementioned problems without the necessity for daily care by maintenance personnel.

The lavatory body of the present deodorizing invention includes a holder carrying a solid deodorizing, cleaning and the sanitizing material, the holder being positioned in a toilet bowl, urinal, or the like, to enable flush water to come directly into contact with at least a portion of the material carried therein and to dissolve limited amounts thereof each time the toilet or urinal is flushed.

The holders must advantageously mount all within a toilet bowl or elevated type urinal with a portion thereof engaging the rim of the toilet bowl or urinal. Also the holder is self-adjusting so that when mounted it adjusts itself automatically to different shaped toilet bowl or urinal surfaces. It is also preferably inexpensively constituted so that it is a single use disposal unit which can

be thrown away after the contents thereof are used up.

In the first mentioned embodiments, the holder and encloser has a relatively soft plastic or rubbery water-deflecting lip or blade engageable with the inner surface of the toilet bowl or urinal perfectly which acts to divert a portion of the flush water into direct contact with the solid (sanitizing) material carried thereby and to conform to the inner curved wall of a toilet bowl thereby to enable the holder to be used in connection with a wide variety of differently shaped toilet bowls or urinals. In the preferred form of this embodiment of the holder a trough-like portion is provided for securely retaining a solid mass of the deodorizing, cleaning, and the sanitizing material therein. In use, the trough-like portion of the holder is positioned in relation to the flush water channel and its associated openings of a toilet bowl or urinal in a manner to enable a portion of the flush water to be directed into contact with the solid mass of (sanitizing) material held thereby by the bowl conforming plastic or rubbery lip or blade. Thus, with each flushing of the bowl, a portion of the solid sanitizing material will be dissolved thereby releasing the active ingredients into the bowl.

Although, in accordance with the broad aspect of the invention, the material carried by the holder can vary widely, it is most preferably a material which is initially fluid when placed in the trough-like portion of the holder which acts as part of a mold cavity, and which hardens in the holder. The trough-like portion of the holder is filled in this way by the manufacture of the lavatory body. Also the material is most advantageously one containing as essential active ingredients an intimate admixture of (a) one or more synthetic detergents of the nonionic, cationic or amphoteric type, or mixtures thereof, which, preferably, are solid at room temperature, and (b) an acidic or hydrogen ion furnishing agent in the form of one or more acids or acid-forming salts or both. (As employed in the description and claims, the term "acidic agent" is intended to encompass both acids and acid-forming salts, and compatible mixtures thereof, having utility in the practice of the present invention. The term "acid-forming salt" as used herein is intended to include salts which in the presence of water are acid reacting or are capable of forming an acid reacting chemical.) The solid material, upon contact with flush water is dissolved in part thereby automatically metering into the water with each use of the sanitary unit a quantity of active ingredients capable of effectively cleansing, deodorizing, de-staining, de-germing, and removing inorganic and organic deposits and encrustations not only in the sanitary unit itself but in the drain conduits associated with the unit. Thus, in a unitary body, there is provided means for overcoming all of the daily sanitation problems encountered with sanitary units such as toilet bowls, urinals, and the like, without the need for swabbing or other unpleasant manual contact with the units. The active ingredients of the bodies of this invention, while capable in themselves of providing the cleansing and other action mentioned, can, as will be described hereafter in detail, incorporate other agents which serve to enhance, augment and complement the action of the active ingredients thereof.

The above and other features and advantages of the invention will become apparent upon making reference to the specification, claims and drawings wherein:

FIG. 1 is a view in perspective of an embodiment of a lavatory body of the present invention;

FIG. 2 is an enlarged fragmentary vertical sectional view taken substantially along line 2—2 of FIG. 3:

FIG. 3 is a view in perspective, partly broken away, showing said embodiment mounted on a toilet bowl;

FIG. 4 is an enlarged fragmentary view corresponding

to the view of FIG. 3 showing details of a portion of said embodiment; and

FIG. 5 is an enlarged fragmentary vertical sectional view showing details of the flexible lip or blade of said embodiment.

As shown in FIGS. 2 and 3, the embodiment of the lavatory sanitizing body there illustrated is mounted in operative position on a conventional commode. It should be understood that the lavatory body can also be similarly mounted on an elevated type urinal having a similar rim. The commode comprises a molded or cast bowl **10** having a basin **12**. The bowl **10** is provided with a pedestal **14** which rests on a supporting surface such as a floor to which the pedestal is affixed by screws or bolts. The top of the bowl is formed into a rim **16**, the walls of which define a flush water channel **18** desirably extending completely around the bowl. The channel **18** has a plurality of water distributing openings or holes **20** which admit water to the basin **12**. A seat **22** is hingeably secured to the bowl **10** at the rim **16** thereof.

The lavatory body consists of a holder **28** which essentially comprises an upper, bowl rim engaging or resilient clamping portion **30**, a lower trough-like solid sanitizing material supporting portion **32** and a flexible basin wall conforming lip or edge portion **34**. The portions **30** and **32** are each preferably made of extruded plastic material having the same cross-section throughout the length thereof. Exemplary of plastic materials having utility in this connection are polystyrene, polyethylene, polypropylene, and the like. The upper portion **30** has a narrow, inwardly extending end panel **36**, the outer free edge **38** of which is thickened and engages the outer wall of the bowl **10** when the holder **28** is mounted thereon. The panel **36** is joined along its inner margin to an upwardly and outwardly extending panel **40** which, in turn, is joined to the lower margin of an upwardly extending, relatively wide panel **42**. The panel **42** is joined along its upper margin to a substantially horizontal, toilet bowl rim engaging panel **44**. The panel **44**, in turn, is joined to a relatively large, downwardly and outwardly extending panel **46**, the lower edge **48** of which is formed into a rounded, open-ended channel **50** which is slit along its entire length. The panel **46** hides the contents of the trough-like portion **32** from view and acts as a guard to prevent human waste materials from coming into contact with said contents.

The trough-like lower portion **32** of the holder **28** comprises generally upwardly and outwardly extending walls **52** and **54** joined at their lower margins to a relatively narrow bottom wall **56**. The upper edge of the wall **52** has a bead **58** formed thereon which is received in the slitted channel **50** in the lower edge **48** of the panel **46** and is heat sealed therein. The upper edge **60** of the wall **54** is thickened, and is provided with substantially rectangularly shaped channel **62**. The flexible lip bottom **34** of the holder **28** advantageously is fabricated of a relatively soft, rubbery or plastic material such as vinyl plastic, or the like, and is provided with an elongated narrow, rectangularly shaped extension **64** which is snugly frictionally engaged in the channel **62** at the upper edge **60** of the wall **54**. Joined to the inner margin of the extension **64** is wedge-shaped blade **66**, the highly flexible free edge **68** of which engages and conforms to the wall of the basin **12** of the commode. The flexible character of the blade **66** enables the holder to be used on commodes having basin walls of widely varying curvature. Apart from this function, the blade **66** acts also to divert flush water passing through openings **20** of the channel **18** onto the exposed surfaces of a mass of solid santizing material **70**.

The material **70** may be granular or particulate in character. However, in accordance with the preferred aspects of the present invention, the material **70** advantageously is a solid, unitary mass which has been poured directly into the lower, trough-like portion **32** of the holder placed in a suitable mold cavity supplying temporary end walls to the portion **32**. In the embodiment shown,

the solid, molded mass of material **70** is retained in the portion **32** by means of an upwardly extending, arrow-shaped elongated projection **72** joined to the lower wall **56** of the portion **32**. The projection **72**, of course, is only exemplary of any of various means for anchoring the mass of material **70** in position. Thus, for example, inwardly extending projections joined to the walls **52** and **54** could serve a like purpose.

The material **70** may comprise any of the known solid sanitizing materials, including paradichlorobenzene cakes. In accordance with a particularly preferred embodiment of the holder, however, the material **70** most advantageously is formed of a solid material containing as its essential active ingredients (a) one or more synthetic detergents of the nonionic, cationic or amphoteric type, or mixtures thereof, and (b) one or more acidic agents. Such a material can be readily poured and solidified in the portion **32**, and will provide long lasting protection for the commode against the problems previously outlined as being common to such sanitary units.

When the holder **28** is fabricated, the edge **38** of the panel **36** of the upper portion **30** of the holder is contiguous to the blade **66** at the end of the trough-like portion **32** of the holder. To mount the holder **28** on the rim **16** of the toilet bowl **10**, the panel **42** is pulled outwardly to separate the same from the edge **66**, and the upper porion of the holder is hooked over the rim of the toilet bowl, as best shown in FIG. 22. The edge **38** of the panel **36** preferably engages under the projecting portion of the rim **16**, and the panel **44** preferably fits upon the upper surface of the rim **16** and preferably bends snugly around the edges of the rim, as shown. In such case, the panel **46** is placed under a tension which forces the trough-like portion **32** of the holder against the inner surface of the toilet bowl **10**, thereby forcing the blade **66** tightly against this inner surface to form a seal therewith. The lip portion **34** and the lower, solid material supporting portion **32** of the holder will be positioned below the openings **20** of the flush water channel **18**. With each use of the commode, flush water passing through the openings **20** adjacent the holder **28** will be diverted by the lip portion **34** onto exposed surfaces of the solid material **70**. The water will dissolve a portion of the material **70** which will then be carried into the basin **12** and circulated therearound.

The nonionic, cationic and amphoteric synthetic detergents having utility in the present invention form a wide group. As stated, the detergents used advantageously are solid at room temperatures and should be soluble, or at least partly soluble, in cold water. Exemplary of nonionic synthetic detergents useful in the formation of the solid sanitizing materials of this invention are ethylene oxide adducts of straight chain fatty acids, long chain fatty acid alkanolamides, ethylene oxide adducts of long chain fatty acid alkanolamides, fatty acid dialkyl amine oxides, and the like. In addition, commercially available proprietary products such as those sold under the trademarks "Detergent MXP," a built polyoxyethylene ester (Monsanto Chemical Co.) and "Alrosol C," a fatty alkylolamide condensate (Geigy Industrial Chemical Co.) can be used. Exemplary of cationic synthetic detergents that can be employed are fatty acid heterocyclic tertiary amine salts, quaternary ammonium derivatives of long chain fatty acid substituted imidazolines, and the like. Proprietary products such as the one sold under the trademark "Vantoc DP," a built quaternary ammonium compound plus a nonionic detergent (Imperial Chemical Industries) also can be used.

Examples of amphoteric synthetic detergents having utility in the practice of the preferred form of this invention are the sodium salts of higher fatty acid amine propionates such as disodium N-lauryl beta-iminodipropionate, the disodium salt of N-tallow beta-amino dipropionate, the sodium salt of N-coco beta-amino propionate, and the like. Of the numerous nonionic synthetic detergents having utility for the purposes of the preferred

form of the invention, coconut oil fatty acid alkanolamides, particularly coconut oil fatty acid or lauric or myristic acid amides of monoethanolamine and of diethanolamine are preferred. Of the cationic synthetic detergents, long chain fatty acid, especially C_{14}–C_{22} fatty acid, quaternary imidazolinates are preferable. Of the amphoteric synthetic detergents, the product sold under the trademark "Deriphat 151" (General Mills, Inc.), a sodium salt of N-coco beta-amino propionate, is preferred. The synthetic detergents act not only as cleansing and lime soap dispersing agents, but especially in the case of the cationic detergents, also function as bactericidal and/or bacteriostatic agents when released by the flush water. In addition, the synthetic detergents, in certain instances, provide an abrasive or scrubbing action in the flush water due to the fact that not all of the detergent dislodged in the flushing action goes into solution. The nondissolved crystals of the detergent thus serve as minute scrubbers or abraders as they are propelled around the sanitary unit by the flush water.

The acidic agents utilized in the solid material **70** of the preferred form of this invention also may be selected from a wide group. Included in this group are mineral acids such as phosphoric acids, notably orthophosphoric acid, hydrochloric acid, boric acid, orthoboric acid, perchloric acid, acetic acid, cresotinic acid, and the like; and acid-forming salts such as monosodium phosphate, sodium bisulfate, and the like; and compatible mixtures thereof. Of the aforementioned acidic agents, orthophosphoric acid, or a phosphoric acid-producing salt such as monosodium phosphate, and citric acid provide especially effective solid sanitizing materials. Orthophosphoric acid, for example, readily removes hard water scale, adhering organic matter, and dissolves uric acid crystal deposits. In addition, it acts as a disinfectant and a deordorizer. Citric acid, on the other hand, is an excellent sequestering and chelating agent, and acts to combine with iron, calcium, magnesium and other metal ions present in the flush water to form soluble salts thereby preventing build-up of mineral salt deposits in the sanitary unit and the drain conduits associated with it. Various of the acids also exhibit bactericidal and/or bacteriostatic effects which are helpful in eliminating malodors in and around the sanitary unit.

The proportions of synthetic detergent and acidic agent utilized in forming the solid material **70** of the preferred form of the invention are variable. The generally optimum results however, are attained with ratios, basis weight, of the synthetic detergent to the acidic agent of the order of about 1 to about 100 of the synthetic detergent to about 1 of the acidic agent.

As indicated above, the solid material **70** of the preferred form of the present invention may incorporate ingredients which serve to enhance, augment and complement the essential active ingredients thereof. To this end, germicidal and/or bacteriostatic agents such as benzyl dimethyl tetradecyl ammonium chloride and the tributyltin chloride complex of an ethoxylated abiethylamine condensate, chelating agents exemplified by ethylenediamine tetraacetic acid, perfumes and coloring agents may be added to the basic formulation. Generally speaking, such additives will usually comprise only a minor proportion, usually less than 5%, by weight, of the solid material.

While, as stated, the synthetic detergents employed provide some scrubbing or abrasive action in the flush water, this action can be substantially increased by replacing a portion of one or both of the essential ingredients of the solid material **70** with one or more solid inert substances exemplary of which are volcanic ash, diatomaceous earth, clays, asbestos, and the like. These substances, in addition to providing excellent scrubbing or abrading action, serve also to bind the solid material **70** into a solid, integrated body. In addition, they act as absorbing and/or absorbing agents for foreign matter present in the lavatory body. The quantity of inert substances used in the formulation of the solid sanitizing material is somewhat variable. Generally speaking, the quantity thereof used in lieu of one or both of the essential ingredients will be below about 50%, by weight, of the finished solid sanitizing body, more desirably from about 10% to about 20%, by weight, thereof.

The following examples are illustrative of the various compositions for the solid material **70**, but they are not to be construed in any way as limitative of the full variations thereof since various changes and modifications can be made in the light of the guiding principles and teachings disclosed herein. The quantities recited are in terms of weight percent.

EXAMPLE 1

Coconut oil fatty acid monoethanolamide	20
Monosodium phosphate	80

EXAMPLE 2

Coconut oil fatty acid monoethanolamide	99
Monosodium phosphate	1

EXAMPLE 3

Quaternary derivative of substituted C_{14}–C_{22} fatty acid imidazoline salt	20
Citric acid	80

EXAMPLE 4

Quaternary derivative of substituted C_{14}–C_{22} fatty acid imidazoline salt	95
Citric acid	5

EXAMPLE 5

Citric acid	20
Monosodium phosphate	20
Ethylenediamine tetracetic acid	15
Orthophosphoric acid (85%)	5
Coconut monoethanolamide	5
Nonylphenoxypoly (ethyleneoxy) ethanol (Igepal Co–990)	5
Quaternary derivative of substituted C_{14}–C_{22} fatty acid imidazoline salt	10

EXAMPLE 6

Citric acid	5
Monosodium phosphate	20
Ethylenediamine tetraacetic acid	5
Orthophosphoric acid (85%)	5
Coconut oil fatty acid monoethanolamide	35
Nonylphenoxypoly (ethyleneoxy) ethanol (Igepal CO–990)	5
Quaternary derivative of substituted C_{14}–C_{22} fatty acid imidazoline salt	5
Diatomaceous earth	20

EXAMPLE 7

Monosodium phosphate	6
Orthophosphoric acid (85%)	6
Citric acid	1
Orthoboric acid	1
1-hydroxyethyl-2-alkyl (C_{13}) imidazoline phosphate	0.5
Benzyl dimethyl tetradecyl ammonium chloride	0.2
Tribultyltin chloride complex of ethoxylated abiethylamine condensate	0.1
Igepal CO–990	85.2

EXAMPLE 8

Sodium salt of N-coco beta-amino propionate (Deriphat 151)	30
Monosodium phosphate	70

It should be understood that various modifications may be made in the illustrative embodiments of the present invention described above without deviating from the broader aspects of the invention.

We claim:

1. A lavatory body for use in a basin of a toilet bowl, urinal, or the like, said body comprising a flexible holder for attachment to the rim of the basin of a toilet bowl or urinal, a compartment formed in said holder for holding a quantity of solid soluble treatment material in said basin, and flexible basin-engaging lip means on said holder for engaging the inner side wall of said basin to divert flush water into said compartment where it makes direct contact with the solid treatment material, thereby to partly dissolve a portion of the material and to enable said dissolved portion to be carried by the flush water into said basin, said flexible basin-engaging lip means being capable of flexing to conform to the shape of said basin at its point of contact therewith, thereby enabling said holder to be used in connection with toilet basins of differing configurations.

2. A lavatory body as claimed in claim 1 wherein the holder has shielding means for concealing the solid sanitizing material from view and for preventing human waste material and other foreign matter from coming into direct contact therewith.

3. A lavatory body as claimed in claim 1 wherein the holder includes an upper rim engaging portion shaped to hook over the rim of said basin, and a lower trough-like portion for supporting a quantity of said treatment material.

4. A lavatory body as claimed in claim 3 wherein the lower trough-like portion has retaining means formed therein for preventing the solid treatment material from being dislodged therefrom.

5. A lavatory body as claimed in claim 1 wherein said compartment contains said solid treatment material which will dissolve in part in flush water admitted to said compartment, thereby providing a metered quantity of the solid material for treating the basin with each flushing thereby, said solid treatment material containing as essential active ingredients an intimate admixture of a synthetic detergent which is a solid at room temperatures and an acidic agent, the synthetic detergent serving, among other things, to cleanse, deodorize and disinfect the sanitary unit, and the acidic agent serving, among other things, to remove, dissolve and/or solubilize inorganic and organic deposits and encrustations in the sanitary unit and its associated drain conduits, and to prevent and/or arrest the growth of bacteria, and the like.

6. The lavatory body of claim 1 wherein said holder includes a resilient clamping portion which extends around the rim of said basin and resiliently grasps the inner and outer surfaces of the basin, the resilient force of said clamping portion forcing said flexible basin engaging lip means against the inner surface of said basin.

7. The lavatory body of claim 3 in combination with a basin of a toilet bowl, urinal, or the like having a rim with an undercut portion below the rim, said rim-engaging portion of the holder hooking around and contacting said undercut portion of the basin, said lower trough-like portion of said holder being forced by the resiliency thereof toward the inner surface of said basin to make sealing contact therewith.

8. A lavatory body for use in connection with sanitary units such as toilet bowls, urinals, and the like, which is positioned in relation thereto to enable flush water to come directly into contact with at least a portion of he body, said body including a holder having walls forming an open compartment open at the top and containing a quantity of solid soluble treatment material, which material will dissolve in said open compartment part in flush water admitted thereto, thereby providing a metered quantity of the solid material for sanitizing said unit with each flushing of the sanitary unit over a prolonged period of time, said holder including means forming a shield means to prevent human waste material from coming into direct contact with the mass of solid sanitizing material.

9. A lavatory body for use in a basin of a toilet bowl, urinal, or the like, said body comprising a holder for attachment to the rim of the basin of a toilet bowl or urinal, said holder having a compartment for holding a quantity of solid soluble treatment material in said basin, an upper hook-shaped plate-like rim-engaging portion shaped to hook over the rim of said basin and a lower open-top trough-like portion for supporting a quantity of said treatment material said plate-like rim-engaging portion forming an extension of one side of said trough-like portion, said trough-like portion having on an opposite side thereof a free edge which constitutes a basin-engaging lip means for engaging the inner side wall of said basin to divert flush water into said compartment where it makes direct contact with the solid treatment material and at least one opening whereby flush water containing dissolved solid soluble treatment material can drain into said basin, the end of the hook-shaped rim-engaging portion and said free edge of said trough-like portion initially being contiguous and being separable against a resilient restoring force, wherein, upon application of the hook-shaped rim-engaging portion around the rim of said basin while the basin-engaging lip means engages the basin, the basin-engaging lip means is resiliently forced against the basin, thereby to cause said lip means sealingly to engage said inner side wall of said basin.

10. The lavatory body of claim 9 wherein said lip means is made of a soft flexible and resilient material capable of conforming to the shape of said basin at its point of contact therewith, thereby enabling said holder to be used in connection with toilet bowls of differing configurations.

11. The lavatory body of claim 9 wherein said trough-like portion has spaced main side walls, one of which terminates at the top thereof in said basin-engaging lip means and the other of which joins an upwardly extending section of said upper rim-engaging portion of the holder which section overlies and covers the open top of the trough-like portion to form a splash shield therefor.

12. The lavatory body of claim 11 wherein said trough-like portion and upper rim-engaging portion of the holder are interlocking bodies.

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