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Maywood, Ill.  
Continuation-in-part of application Ser. No.  
693,488, Dec. 26, 1967, now Patent No.  
3,538,520.

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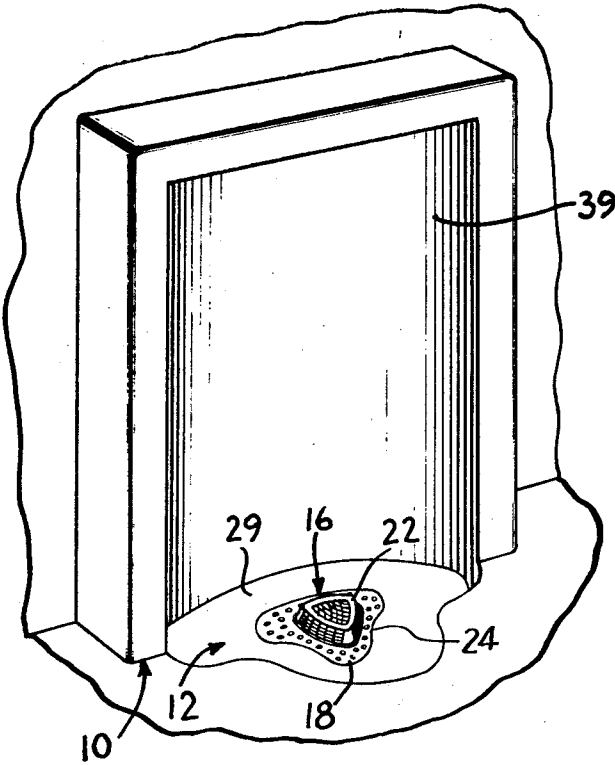
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[54] LAVATORY SANITATION BODIES  
27 Claims, 24 Drawing Figs.  
[52] U.S. Cl..... 4/222  
[51] Int. Cl..... E03d 9/02  
[50] Field of Search..... 4/1, 109,  
231, 293, 294

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**ABSTRACT:** Bodies for use in connection with urinal drains and the like, which are positioned in relation thereto in a manner whereby drain or flush water will come into direct contact with at least a portion of the bodies. The bodies preferably include a solid cleaning and/or sanitizing material which will dissolve in part with each flow of drain or flush water thereby to provide automatic and metered cleaning, disinfecting, deodorizing, and the like, of the urinal. The solid-cleaning and -sanitizing material most useful for urinals is most advantageously in bar or premolded form and comprises, as its essential active ingredients, an intimate admixture of (a) one or more synthetic detergents which are solid at room temperatures, and (b) an acidic agent in the form of one or more acids or acid-forming salts or both, the ratio of the synthetic detergent to the acidic agent in the solid, sanitizing material ranging preferably from about 1 to 100 of the former to about 1 of the latter. The bodies include a holder, which can be placed in a urinal drain or the like, designed to be made economically and to support the cleaning and sanitizing material in a position where drain or flush water will come into direct and extensive contact therewith.



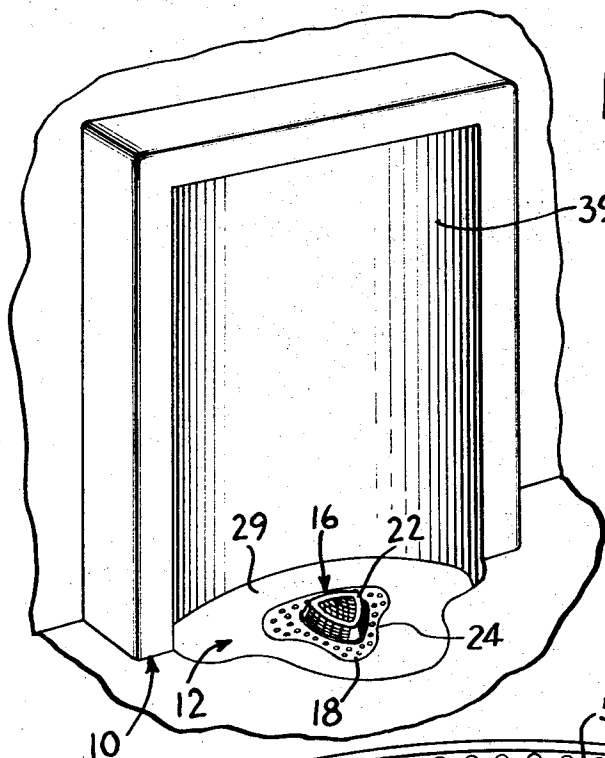


FIG. 1

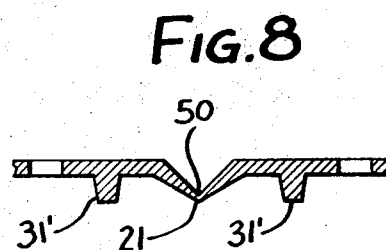


FIG. 8

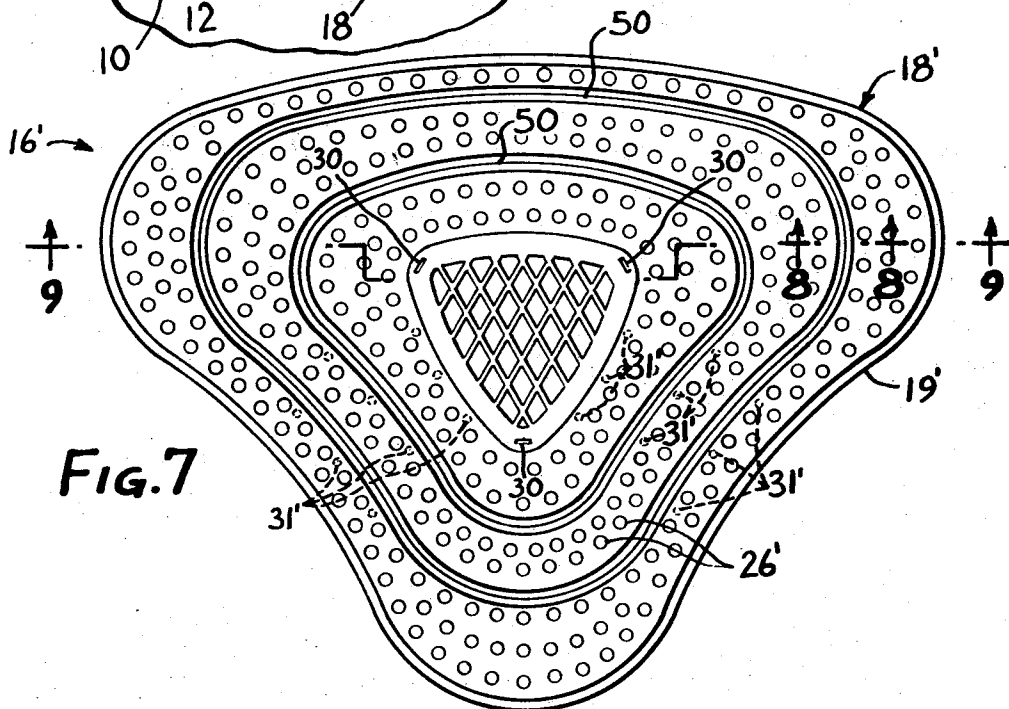


FIG. 7

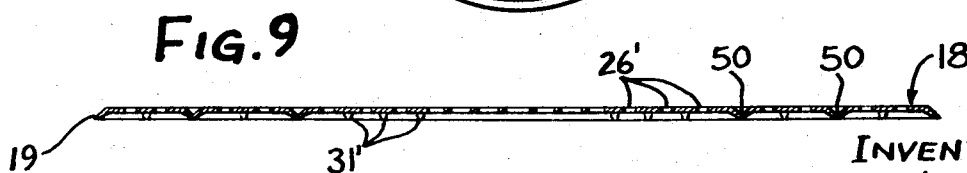
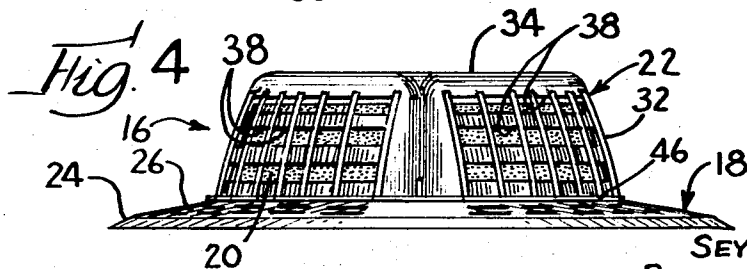
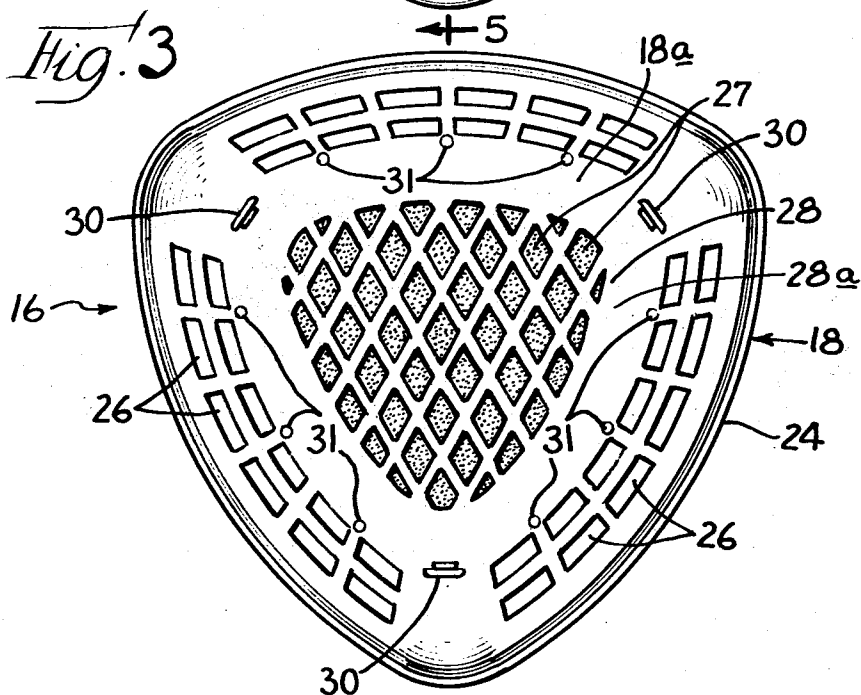
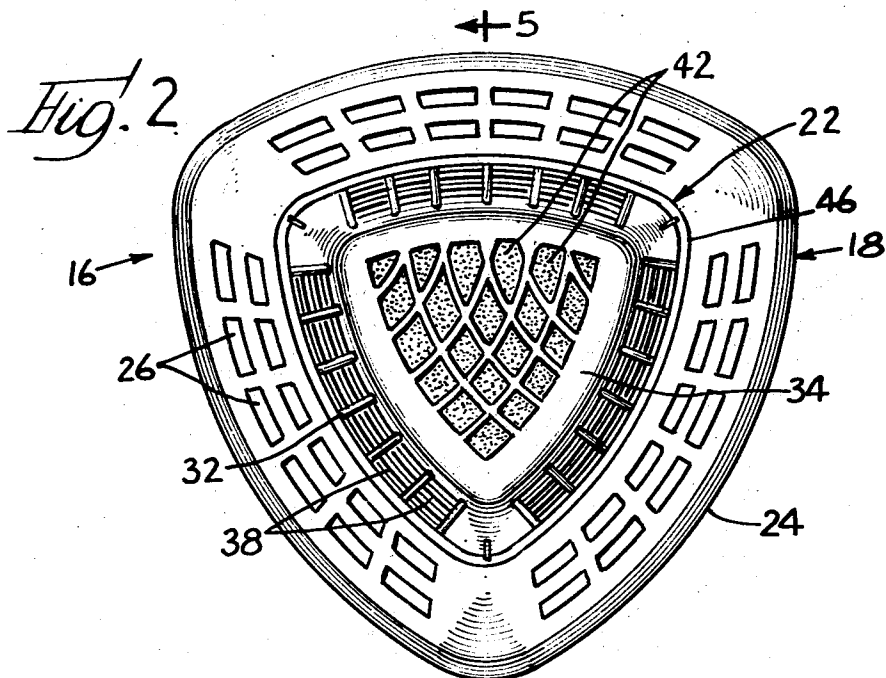


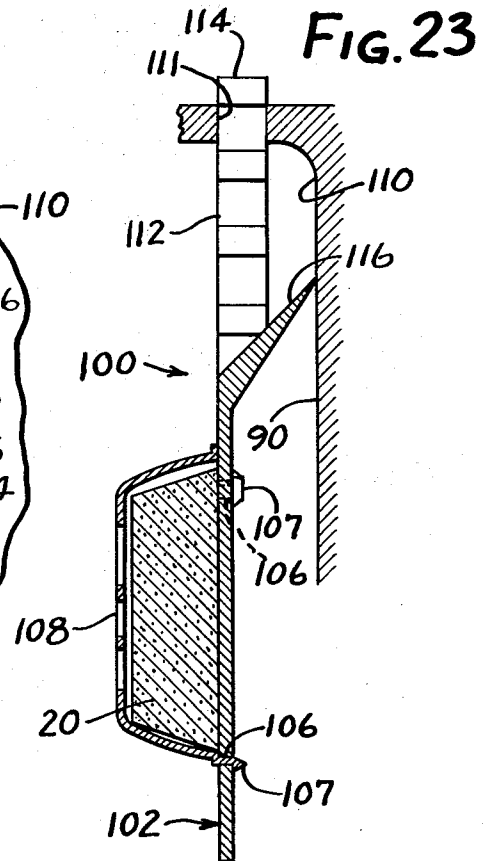
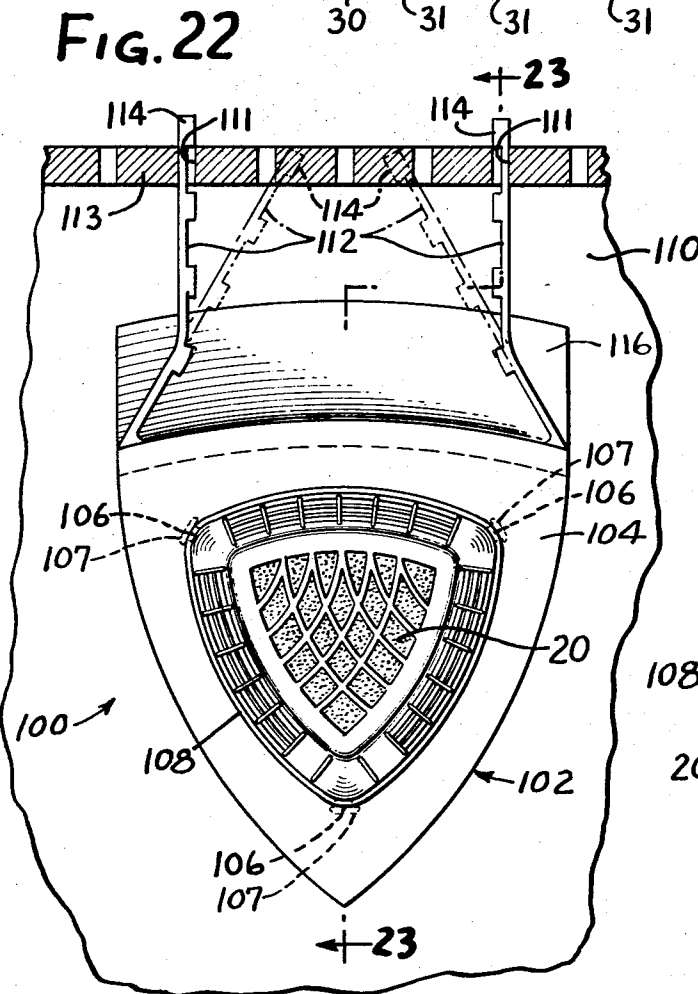
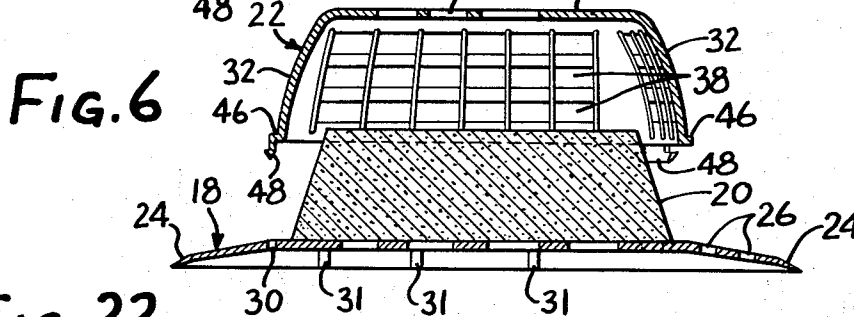
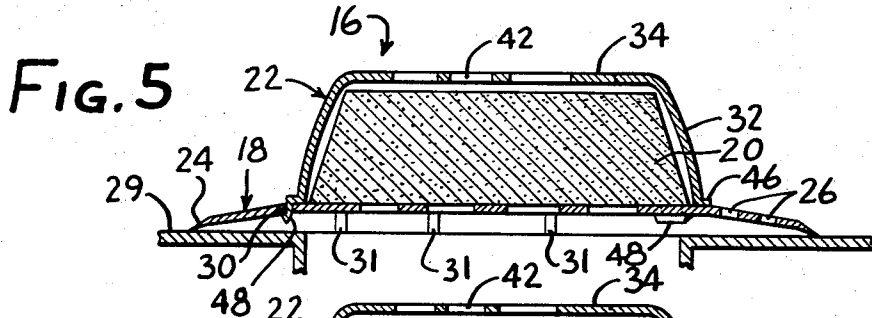
FIG. 9

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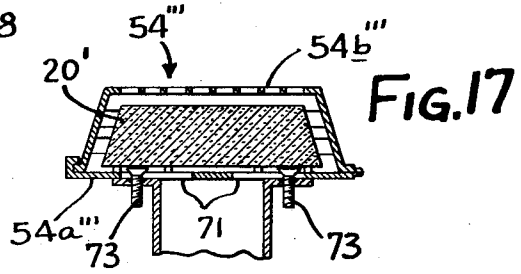
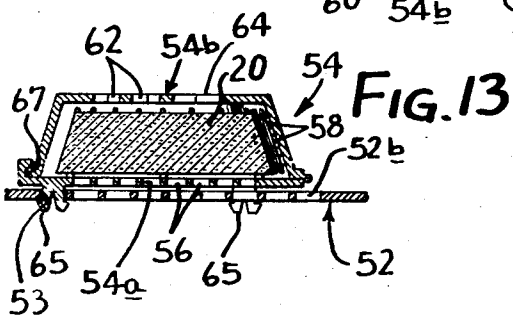
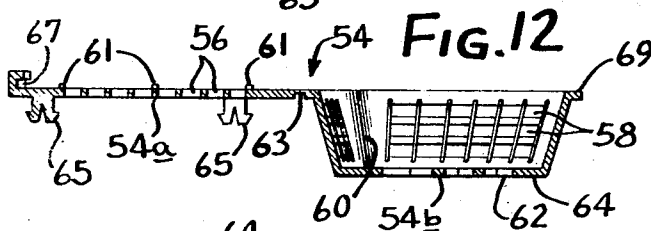
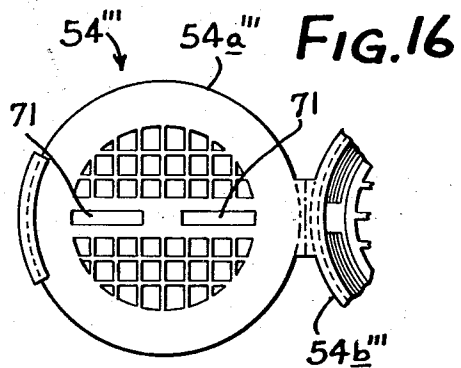
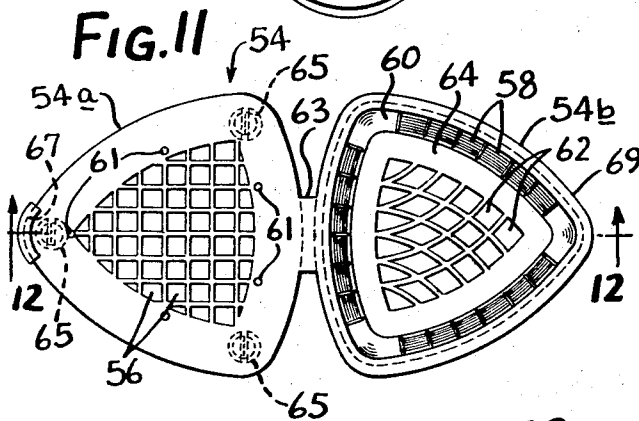
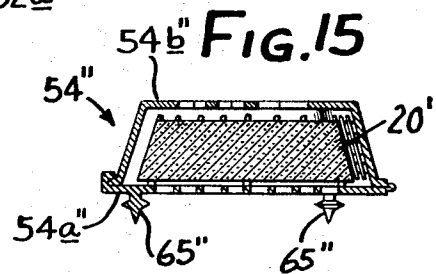
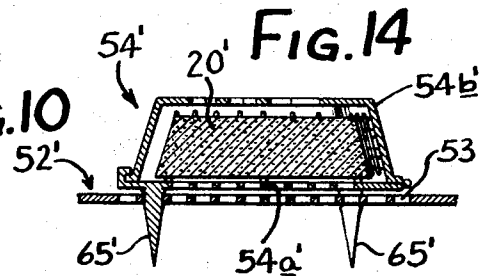
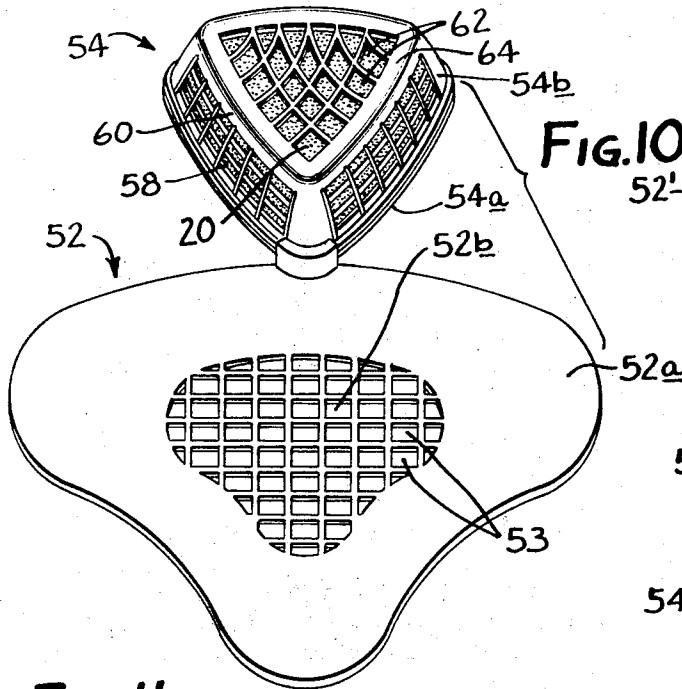


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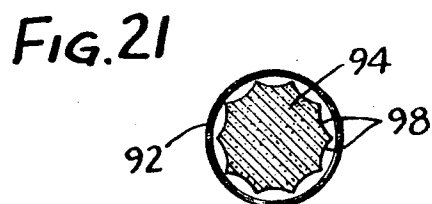
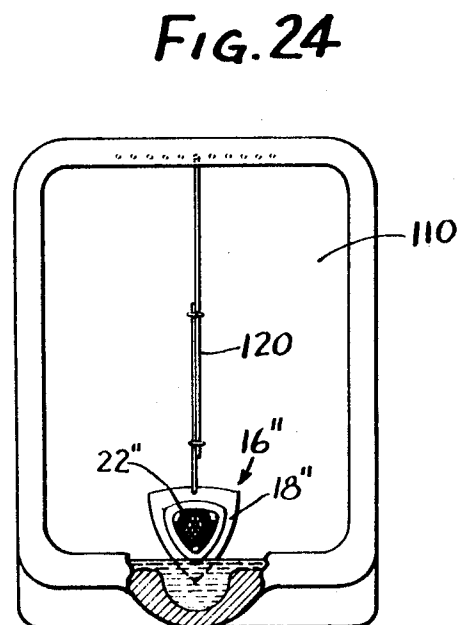
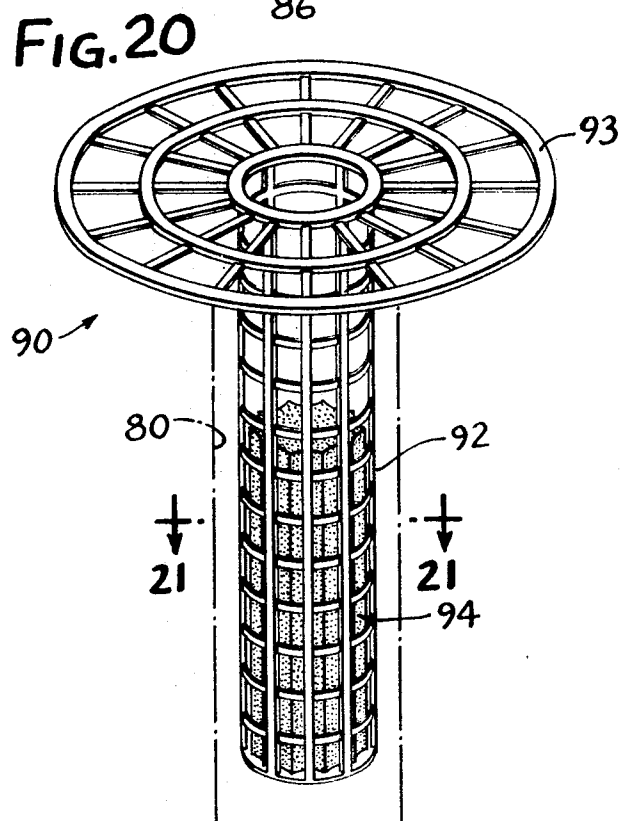
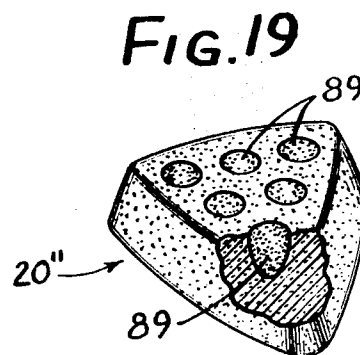
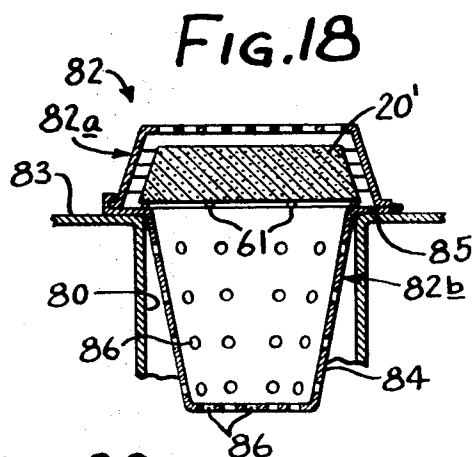
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## LAVATORY SANITATION BODIES

This application is a continuation-in-part application of application Ser. No. 693,488, filed Dec. 26, 1967, now U.S. Pat. No. 3,538,520.

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 or descaling 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 urinals and the like, against the aforementioned problems without the necessity for daily care by maintenance personnel.

The objectives of the present invention, in part, are achieved with cleaning and sanitizing units including water dissolvable cleaning and sanitizing material preferably in the form of solid bars held in a holder mountable in relation to a urinal, drain or the like to enable drain or flush water to come directly into contact with a sufficient portion of cleaning and sanitizing material to dissolve a small but sufficient amount thereof effectively to carry on the cleaning and sanitizing functions required. The bars of cleaning and sanitizing material most advantageously contain, 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-cleaning and sanitizing material, upon contact with drain or 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, destaining, degerming, and removing inorganic and organic deposits and encrustations not only in the urinal unit itself but in the drain conduits associated with the unit. Thus, the present invention provided means for overcoming all of the daily sanitation problems encountered with urinals, drains and the like, without the need of frequent attention by maintenance personnel. The active ingredients of the cleaning and sanitizing material preferably used in 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 cleaning and/or sanitizing unit of the invention used for urinals most advantageously includes a holder for a bar of cleaning and sanitizing material which holder comprises a basketlike assembly which fits over the urinal drain and has a cover portion and a base portion for holding a bar of the solid-cleaning and sanitizing material. In the preferred form of the invention, the base portion of the assembly extends outwardly beyond the cover portion and has a flexible annular outer lip which conforms to the walls of the urinal thereby preventing solid foreign matter and refuse from getting beneath the as-

sembly blocking the drain. The base and cover portion of the holder are apertured so that splashing of urine is minimized and flush water gains ready access to the cleaning and sanitizing material whereby with each flushing a portion of the solid-sanitizing material will be dissolved and released into the urinal.

Other forms of the invention to be described include unique holders which are adapted for ready mounting within drains, on the sides of urinals and directly upon drain screens of various sizes and shapes.

The nonionic, cationic, and amphoteric synthetic detergents having the greatest utility with 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 the 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) can also be used. Examples of amphoteric synthetic detergents having utility in the practice 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 in this 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<sub>14</sub>-C<sub>22</sub> fatty acid, quaternary imidazonlinates are preferable. Of the amphoteric synthetic detergents, the product sold under the trademark "Deriphath 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 cleaning and sanitizing materials preferably used with 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, sulfuric acid, and the like; organic acids exemplified by citric 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 deodorizer. 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 buildup of mineral salt deposits in the sanitary unit and the drain conduits associated with it. Various of the acids also exhibit bacteriacidal 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-sanitizing material are variable. The generally optimum objectives of the invention, 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-cleaning sanitizing material used with 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 abietylamine 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 percent, 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-cleaning and sanitizing material 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-sanitizing material into a solid, integrated body. In addition, they act as absorbing and/or adsorbing agents for foreign matter present in the sanitary unit. 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 percent, by weight, of the finished solid sanitizing body, more desirably from about 10 percent to about 20 percent, by weight, thereof.

In forming bars or molded bodies from the synthetic detergents and acidic agents, they desirably are first placed in a suitable container and then heated until molten. The molten mass is stirred to form a substantially homogeneous mixture and then poured into molds of any desired shape or configuration. After cooling, the shaped bodies can be packaged for shipment.

The following example is illustrative of various active ingredients which can be used as the cleaning and sanitizing material of the present invention but they are not to be construed in any way as limitative of the full scope of the invention 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 <sub>14</sub> -C <sub>22</sub> fatty acid imidazoline salt | 20 |
| Citric acid                                                                                       | 80 |
| Example 4:                                                                                        |    |
| Quaternary derivative of substituted C <sub>14</sub> -C <sub>22</sub> fatty acid imidazoline salt | 95 |
| Citric acid                                                                                       | 5  |
| Example 5:                                                                                        |    |
| Citric acid                                                                                       | 20 |
| Monosodium phosphate                                                                              | 20 |
| Ethylenediamine tetraacetic acid                                                                  | 15 |
| Orthophosphoric acid (85%)                                                                        | 5  |
| Coconut monoethanolamide                                                                          | 25 |
| Nonylphenoxypoly (ethyleneoxy)                                                                    |    |

|                                                                                                   |      |
|---------------------------------------------------------------------------------------------------|------|
| ethanol (IGEPAL CO-990)                                                                           | 5    |
| Quaternary derivative of substituted C <sub>14</sub> -C <sub>22</sub> 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 <sub>14</sub> -C <sub>22</sub> 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 <sub>13</sub> ) imidazoline phosphate                                   | 0.5  |
| Benzyl dimethyl tetradecyl ammonium chloride                                                      | 0.2  |
| Tributyltin chloride complex of ethoxylated abietylamine condensate                               | 0.1  |
| IGEPAL CO-990                                                                                     | 85.2 |
| Example 8:                                                                                        |      |
| Sodium salt of N-coco beta-amino propionate (Deriphat 151)                                        | 30   |
| Monosodium phosphate                                                                              | 70   |

Referring now to the drawings:

FIG. 1 is a view of the preferred form of cleaning and sanitizing unit of the invention positioned over a urinal drain;

FIG. 2 is a top plan view of the embodiment shown in FIG. 1;

FIG. 3 is a bottom plane view of the embodiment of the invention shown in FIG. 1;

FIG. 4 is a front elevational view of the embodiment shown in FIG. 1;

FIG. 5 is a sectional view through FIG. 2 taken along section line 5-5 therein;

FIG. 6 is an exploded sectional view showing the cover and base portions of the embodiment illustrated in FIG. 1;

FIG. 7 is a top plan view of a modified base portion for the cover portion of the embodiment of FIGS. 6-6;

FIG. 8 is a greatly enlarged, fragmentary sectional view taken along section line 8-8 in FIG. 7;

FIG. 9 is a sectional view, taken along section line 9-9 in FIG. 7;

FIG. 10 is an exploded perspective view of a further modified cleaning and sanitizing unit and a conventional urinal screen into which the unit fits;

FIG. 11 is a top plan view of the self contained bar containing unit shown in FIG. 10 with the cover portion thereof in an opened position;

FIG. 12 is a vertical sectional view of the opened unit shown in FIG. 11, taken along section line 12-12 thereof;

FIG. 13 is a vertical sectional view of the unit shown in FIG. 11 mounted upon the urinal screen shown in FIG. 10;

FIG. 14 is a vertical section view of the cleaning and sanitizing unit like that shown in FIGS. 10-13, but with modified mounting pins thereon, mounted on a conventional urinal screen;

FIG. 15 is a vertical sectional view of the cleaning and sanitizing unit like that shown in FIGS. 10-13, but with still further modified mounting pins;

FIG. 16 is a plan view of a circular cleaning and sanitizing unit in its open condition, the base portion thereof being designed to permit the mounting thereof in place of a metal grill commonly covering the urinal drain;

FIG. 17 is a vertical sectional view of the unit shown in FIG. 16 mounted over the urinal drain;

FIG. 18 is a vertical sectional view of a modified circular form of the invention adapted to be mounted directly within a drain;

FIG. 19 is a perspective view, partly broken away, of a bar of cleaning and sanitizing unit useable with the forms of the cleaning and sanitizing units shown in FIGS. 1-18 of the drawings;

FIG. 20 a perspective view of a still further modified form of a cleaning unit adapted to be mounted in a drain;

FIG. 21 is a horizontal sectional view through the form of the invention shown in FIG. 20, taken along section line 21-21 thereof;

FIG. 22 is a sectional view through the upper portion of a urinal showing a modified form of the invention supported in position against the rear wall of the urinal;

FIG. 23 is a sectional view through FIG. 22 taken substantially along section lines 23-23; and

FIG. 24 is a side elevational view of a urinal with a further modified form of the invention mounted on the rear wall of a urinal.

In FIGS. 1-6 of the drawings there is illustrated a form of a sanitizing body 16 particularly adapted for use in a urinal of either the floor or wall mounted type. The urinal shown in FIG. 1 is a floor mounted type and comprises a bowl 10 having a basin 12. Such basins may have flush water released into them at regular intervals by automatic control means, or manual or pedal operated flush controls may be provided.

The embodiment of the cleaning and sanitizing unit 16 shown comprises a relatively flexible base portion 18 for supporting a bar or cake 20 (FIG. 5) of a solid-sanitizing material, and a rigid cover portion 22. The base portion 18 advantageously is fabricated of a corrosion and water-resistant flexible rubbery plastic such as vinyl for reason that will become clear as the description proceeds. The cover portion 22, on the other hand, desirably is fabricated of a high impact strength, corrosion and water-resistant flexible rubbery plastic such as polyethylene, polypropylene, polystyrene, or the like, to provide a protective shield for the bar or cake 20. As illustrated, the base portion 18 is a molded one-piece flattened body of generally triangular shape having a tapered or wedgelike, relatively wide, flexible peripheral guide edge or lip 24. The flexible character of the lip 24 enables the holder 16 to readily conform to the configuration of the urinal in the area of the drain thereof and provides an effective seal with the wall of the basin 12 to prevent solid foreign matter or refuse from reaching the drain and blocking it and to guide flush or drain water into the unit 16. Inwardly of the lip 24 there are provided groups of openings or holes 26 of a size to permit fluids readily to pass therethrough but to prevent discarded foreign matter such as a cigarette butts and chewing gum from passing through. The triangularly shaped center area 28 (FIG. 3) of the base portion 18 desirably is imperforate at the triangular imperforate marginal portion 28a thereof and perforated with diamond-shaped openings or holes 27 within this portion to enable flush water to pass directly downwardly into the drain of the urinal. At each of the apices of the center area 28, straight slots 30 are provided for a purpose which will become clear as the description proceeds. Between the apices of the triangular imperforate marginal portion 28a of the center area 28, downwardly extending projections 31 are provided to raise the base portion 18 above the urinal floor 29 (FIG. 5) to enable urine and flush water readily to reach the urinal drain located beneath the central area 28.

The cover portion 22, like the base portion 18, is generally triangular in shape. The sidewalls 32 of the cover portion 22 extend upwardly and inwardly where they are joined to a top wall 34. Each of the sidewalls 32 of the cover portion 18 has a plurality of substantially rectangular openings or holes 38. The top wall 34 similarly is provided with openings or holes 42 therethrough. The openings in the sidewalls 32 and top wall 34 of the cover portion 22 minimize splashing and enable flush water both to come into contact with the bar or cake 20 and to carry dissolved portions thereof into the basin 12 of the urinal. The openings 26 in the peripheral portion of the base portion 18 and openings 27 in the center area thereof prevent backup of the large amount of flush water which flows into the basin 12. A substantial quantity of the flush water running down the rear urinal wall 39 flows and splashes into the unit sidewall openings 38 to contact the bar or cake 20.

The lower margins of the sidewalls 32 have an outwardly extending, base portion-engaging flange 46 from the apices of which depend legs 48. The legs are preferably T-shaped and are adapted to be snapped into engagement with base portion 18 through the slots 30 provided therein, thereby to securely hold the cover portion 22 on the base portion 18.

In utilizing the holder 16, a bar or cake 20 of a solid sanitizing material is first positioned on the center area 28 of the base portion 18. The cover portion 22 is then secured on the base portion 18 by engaging the legs 48 in the slots 30. A rod with a hook on the end thereof (not shown) may be used to position or remove the unit 16 upon or from the urinal. As previously indicated, the bar or cake 20 utilized in connection with the holder 16 most advantageously comprises a solid-sanitizing material comprising as its essential active ingredients one or more synthetic detergents of the nonionic, cationic, and/or amphoteric type, or mixtures thereof, and one or more acidic agents in specified proportions, as described hereinabove. Such a material, with each use of the urinal, provides automatic and metered release of agents which effectively control essentially all of the sanitizing problems encountered in such sanitary units.

Refer now more particularly to the embodiment of the invention shown in FIGS. 7-9 and identified by reference numeral 16'. This embodiment in the invention has a centered cover portion (not shown) which is identical to the cover portion 22 of the cleaning and sanitizing unit 16 in FIGS. 1-6, and a modified base portion 18'. The outer margins of the base portion 18' follow a generally triangular shape and is of a size of fit into the largest urinal basin. The margin of the base portion 18' inclines downwardly to form a continuous basin-engaging edge 19'. As best shown in FIG. 8, there is formed within the margin of the base portion 18' one or more V-shaped severance recesses 50 which reduce the thickness of the body of the base portion so that the base portion may be readily manually severed along each recess. The bottom surface of the base portion at each recess immediately below the opening of each V-shaped recess (FIG. 8) is pointed at 21 and is in the same plane as the basin-engaging edge 19' so that severance thereof produces a near similar basin-engaging edge. Each of the recesses 50 falls along a continuous generally triangularly shaped curve which encloses an area of a different size having the same shape as the margin of the base portion 18'. These areas are all centered about a common point so that by severing the base portion along a selected severance recess 50, a base portion of a desired size is readily formed to fit within a basin of a given size smaller than the largest size accommodated by the unsevered base portion. In this manner, the dealer does not have to stock a number of different sized cleaning and sanitizing units, since any cleaning and sanitizing unit 16' can be readily formed into the desired size by severing the base portion along a selected severance recess 50. The base portion 18' is perforated substantially throughout to form groups of drain openings 26' which perform the same function as the similarly numbered openings 26 in the cleaning and sanitizing unit 16 of FIGS. 1-6. Similarly, depending projections 31', whose bottom surfaces are located on either side of and in the same plane as the pointed parts or ribs 21 of the base portion 18', are formed along each group of perforations 26 so that the base portion rests properly on the bottom of any urinal after the unit has been severed to the desired size.

Urinal screens are often placed in the bottom of urinals. These urinal screens resemble the base portions 18 and 18' of the embodiments of the invention previously described, except for the absence of the perforations 26. FIG. 10 illustrates such a conventional urinal screen identified by reference numeral 52. As there shown, the urinal screen has an imperforate peripheral portion 52a and a screen-containing central portion 52b with drain openings 53 which portion fits over the urinal drain. In accordance with another aspect of the invention, a self-contained bar-containing unit 54 is provided (which unit may be sometimes referred to as a cover portion

so it may be equated to the cover portion 22 in the embodiment of the invention shown in FIGS. 1-6). The self-contained unit 54 has a base portion 54a with drain openings 56 therein and an inverted cup-shaped upper portion 54b which has openings 58 in the sidewalls 60 thereof and openings 62 in the top wall 65 thereof. As best illustrated in FIGS. 11 and 12, the upper portion 54b is secured to the bottom portion 54a and 54b of the unit 54 together with the hinge-forming portion 63 may be a single integral molded synthetic plastic unit. A bar 20 of cleaning and sanitizing material rests on upwardly extending pins 61 on the base portion 54a to provide clearance spaces for the liquid running into the drain. The bottom portion 54a has depending therefrom three inwardly deformable projections 65-65 which may be compressed into a size to fit through the openings 63 of the screen-containing central portion 52b of the urinal screen 52. FIG. 13 shows the self-contained unit 54 attached to the screen-containing portion 52b of the urinal screen 52. Any suitable means may be provided for interlocking the upper and lower portions 54b and 54a of the self-contained unit 54. For example, the lower portion 54a of the self-contained unit 54 has an inwardly opening peripheral groove 67 on the top side thereof into which groove the peripheral flanged portion 69 of the upper portion of the self-contained unit 54 may be tucked.

Refer now to FIGS. 14 and 15 which illustrate further modifications of the self-contained unit 54. In FIG. 14, the modified self-contained unit identified by reference numeral 54' has, instead of the projections 65-65, downwardly tapering projections 65'-65' which are readily adapted to be pushed into openings 53 of a urinal screen like 52 having a wide variation in the size of the openings 53. The unit 54' thus has upper and bottom portions 54b' and 54a' identical to the correspondingly numbered portions of the cleaning and sanitizing unit 54 in FIGS. 10-13.

FIG. 15 shows a self-contained unit 54'' having interlocked upper and bottom portions 54b'' and 54a'' for carrying the bar 20 of cleaning and sanitizing material where the projections 65' in FIG. 14 are replaced by arrow-shaped projections 65''.

FIGS. 16 and 17 shows a self-contained unit 54''' containing a circular cleaning and sanitizing bar 20' which unit has a circular upper portion 54b''' similar to the triangular upper portion 54b of the unit 54 in FIGS. 10-13. The unit 54''' has a circular bottom portion 54a''' similar to the triangular bottom portion 54a of the unit 54 except it has no depending projections. Instead, the bottom portion 54a''' includes elongated slots or openings 71-71 adapted to receive screws 73-73 (FIG. 17) for anchoring the same to the top surface of a urinal drain or the like. The bottom portion 54a' replaces the usual metal grill which covers the urinal drain. The elongated openings 71-71 permit the self-contained unit 54''' to be mounted over urinal drains of varying size where the grill screw holes are spread apart varying distances.

Refer now to the embodiment of the invention shown in FIG. 18 which is adapted to be mounted within a drain pipe 80. The cleaning and sanitizing unit there shown and identified by reference numeral 82 may have an inverted, circular, cup-shaped, upper portion 82a identical to the upper portion 54b''' of the unit 54''' of FIGS. 16-17 and a base portion 82b which includes a groove-containing flanged section 85 corresponding to the grooved rim of the bottom portion 54b of the unit 54 and joining a hollow downwardly tapering conical section 84 having drain openings 86. The base portion 82b is made of deformable rubberlike material so the conical section fits within the drain opening of a variety of drain sizes and the flanged section 86 seals against the urinal surface 83 and guides flush and drain water into the side opening of the unit 54. The bar 20' rests on the top of the flanged section 86 and is enclosed by the upper portion 82a.

In the various forms of the invention just described, the cleaning and sanitizing bars have smooth regular outer surfaces. In FIG. 19, a modified bar construction 20'' is shown wherein recesses 89 are formed in the upper surface of the bar

so that bodies of water or other liquid will remain in the bar recesses to form quantities of already dissolved cleansing material ready immediately to be washed into the drain. In this form of the invention, the bar 20'' does not have to be made of a material which is as readily dissolvable as the bars 20 and 20'.

Reference should now be made to FIGS. 20 and 21 which illustrate a further embodiment of the invention adapted to be mounted directly within a drainpipe 80 like that shown in FIG. 18. The unit shown in FIG. 20 and identified by reference numeral 90 includes a perforated screenlike main cylindrical body portion 92 which is of a size to fit within the smallest of the drain pipes 80 with which it is to be used. The main body portion 92 contains a fluted bar 94 of material which may be similar to the material out of which the aforementioned cleaning and sanitizing bars 20 are made or can contain material only for descaling purposes. The main body portion 92 terminates in a flange 92 which engages the surface about the drain. It is apparent that, in the other forms of the invention described, there is movement of flush or drain water against a bar 20 which is positioned above the drain involved, so that some of the dissolved bar is washed over the urinal basin or other surface surrounding the drain to aid in deodorizing and cleansing the surface areas surrounding the drain. However, in the form of the invention shown in FIG. 20, since the bar 94 is positioned completely within the drain 80, this form of the invention is more suitable for floor drains not requiring any substantial sanitizing or deodorizing operations. The fluting in the bar of cleaning material 94 identified by reference numeral 98 is for the purpose of increasing the surface area contacted by the drain water and to provide additional clearance spaces for the quick draining of liquid into the drain 80.

Refer now to FIGS. 23 and 24, which shows a cleaning and sanitizing unit 100 supported against the rear wall 110 of a urinal. The cleaning and sanitizing unit 100 there shown has a supporting or base portion 102 made of a flexible rubberlike material which can readily conform to the shape of the vertical wall 110 of the urinal. The base portion 102 has holes 106 into which extends locking projections 107 of a cover portion 108 identical to the cover portion 22 shown in FIGS. 1-6 and holding a cleaning and sanitizing bar 20.

The base portion 102 of the cleaning and sanitizing unit 100 is anchored in flush water holes 111 in the top wall 113 of the urinal by means such as by normally upwardly converging, flexible, suspending arms 112-112 extending from the base portion 102 of the unit 100. The arms 112-112 are spread apart, and the inwardly projecting end portions 114-114 thereof are passed into a pair of the flush water holes 111, the resiliency thereof causing the arms ends to snugly interlock with the urinal. The base portion of the unit 100 has at the top thereof an upwardly and inwardly extending lip 116 which engages the vertical urinal wall 110 to guide the flush water running down the same into the cover portion thereof where the water contacts the bar 20.

Refer now to FIG. 24 which shows a further modified form of the invention supported on the rear wall 110 of the urinal. In this form of the invention, a cleaning and sanitizing unit 16'' is supported in a vertical position by an adjustable rod assembly 120 whose upper end hooks into water outlet holes in the upper portion of the urinal. The unit 16'' has an imperforate base portion 18'' made of a rubbery material sealably to engage the urinal wall 110 and a cover portion 22'' (like cover portion 22 in FIGS. 1-6) apertured on all upwardly and downwardly facing sides thereof to catch flush water running down the wall 110 and to enable the same to drain into the urinal bottom. The bottom corner of the cover portion 22'' is imperforate so a body of dissolved cleaning and sanitizing material is ready to be flushed into the urinal bottom.

It should be understood that numerous variations may be made in the forms of the invention described above without deviating from the broader aspect thereof.

We claim:

1. A self-metering cleaning unit for urinal, drains or the like, said unit including: a perforated holder for a mass of solid-cleansing material and mountable upon a urinal, drain or the like and having openings through which flush or drain water can reach said mass of solid-cleansing material and then flow into the urinal, drain or the like; a mass of solid-cleansing material in said holder which material dissolves in part only in flush water admitted to the unit, thereby automatically providing a metered quantity of the cleansing material in the urinal, drain or the like during each flushing or draining thereof, said cleansing material being a solid at room temperature and dissolving and solubilizing inorganic and organic deposits and encrustations in the drain.

2. The self-metering cleaning unit as claimed in claim 1 wherein said holder has a base portion where said guide means are peripheral portions of the base portion which sealingly engage the surface of the urinal around a drain, and a cover portion with perforated sidewalls extending upwardly from said base portion and surrounding said mass of cleansing material, the perforated sidewalls permitting splashing flush or drain water to contact said mass of cleansing material.

3. The self-metering cleaning unit of claim 2 wherein said cover portion has a top wall perforated to allow urine dropping therein readily to contact said mass of solid-sanitizing material.

4. The self-metering cleansing unit of claim 2 wherein said base portion of the holder extends outwardly of said cover portion where it is perforated to allow some but not all of the flush or drain water to fall beneath said base portion, and said base portion of the holder having means providing spaces for flush or drain water dropping through the perforations to reach the urinal drain.

5. The self-metering cleansing unit of claim 1 wherein said holder fits within said urinal drain or the like.

6. The self-metering cleaning unit of claim 2 wherein said base portion of the holder is a urinal screen with a perforated central portion overlying the drain, and said cover portion of the holder is a separate self-contained unit completely enclosing and supporting said mass of cleansing material, and said cover portion of the holder having anchoring means fitting into the openings of the perforated portion of the urinal screen.

7. The self-metering cleaning unit of claim 6 wherein said anchoring means are downwardly tapering projections adapted snugly to fit into urinal screens of a large range of sizes.

8. The self-metering cleaning unit of claim 6 wherein said anchoring means are deformable projections depending from said cover portion.

9. The self-metering cleaning unit of claim 2 wherein said base portion of the holder is securable over a drain hole in place of a drain grill, said base portion being perforated and having screw-receiving openings for receiving screws spread apart varying distances to be mountable on drains of various sizes.

10. The self-metering cleaning unit as claimed in claim 2 wherein said base portion and covering portion of the holder are provided with cooperating interlocking means.

11. The self-metering cleaning unit of claim 2 wherein said peripheral portions of the base portions of the holder are flexible to enable the same to conform to the configuration of the urinal bottom or the like at its point of placement therein.

12. The self-metering cleaning unit of claim 2 wherein said base portion and the cover portion of the holder are provided with openings therethrough of a size to enable flush water to come into direct contact with said mass of solid-cleansing material and to substantially prevent large particles of foreign matter from entering the area of the unit directly below the base portion of the holder.

13. The self-metering cleaning unit of claim 1 wherein said mass of solid-cleansing material contains, as essential active ingredients, an intimate admixture of a synthetic detergent which is solid at room temperature 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, as a means for dissolving and/or solubilizing inorganic deposits and encrustations in the drain.

14. The self-metering cleaning unit of claim 2 wherein said base portion of the holder has a size to fit within the bottom or a urinal basin or the like of a relatively large size, and said base portion of the holder having a number of weakened areas each forming a continuous severance line surrounding a similarly shaped but differently sized area fitting within differently sized urinal basins or the like, and said cover portion of the holder being centered within the smallest sized area of said base portion of the holder to overlie the urinal drain or the like of the differently sized urinal.

15. The self-metering cleaning unit of claim 1 wherein said holder comprises a hollow perforated bottom portion fitting down within the urinal drain or the like and a flanged upper portion surrounding the urinal drain or the like.

16. The self-metering cleaning unit of claim 15 wherein said upper flanged portion of the holder extends upwardly above the urinal drain or the like and forms an enclosure for said mass of solid cleansing material.

17. A self-metering cleaning unit of claim 15 wherein said lower portion of the holder forms an enclosure for said mass of solid cleansing material.

18. The self-metering cleaning unit of claim 1 provided with support means for supporting the cleaning unit against the back wall of a urinal along which wall flush water flows in to the urinal drain or the like, and including means for engaging said rear wall of the urinal and directing flush water flowing along the rear wall to said openings in the holder.

19. The self-metering cleaning unit of claim 18 wherein said support means is a vertical variable length means carrying said holder at the bottom end thereof and including means at the top thereof for engaging with the upper portion of the urinal.

20. The self-metering cleaning unit of claim 1 wherein said mass of solid-cleansing material is a single integral bar of such material and wherein at least one of the side and top surfaces of the bar has recesses therein increasing the exposed area thereof.

21. The self-metering cleaning unit of claim 1 wherein said mass of solid-cleansing material is a single integral bar of such material and the upper surface of said bar has recesses therein extending only part way down through the bar so that a body of liquid remains in each of the recesses to form a ready supply of dissolved cleansing material to be dispensed during the next flush or draining operation.

22. The self-metering cleaning unit of claim 18 wherein said support means includes an adjustable length vertical rod assembly secured to the holder at the bottom end thereof and extending into holes of the urinal at the top thereof.

23. The self metering cleaning unit of claim 18 wherein said support means are flanged arms normally inclining inwardly, and upwardly toward one another and which are separated when inserted into openings in the top of the urinal to hold the cleaning unit in place on the urinal.

24. The self metering cleaning unit of claim 1 wherein said holder has a flexible base portion for supporting said mass of solid-cleansing material and a removable cover portion for enclosing said cleansing material, said base portion having a flexible margin which is capable of conforming to the shape of a support surface around a drain unit at its point of placement thereon and which forms a seal with said surface, said cover portion having openings in the side thereof for enabling flush and drain water to contract said cleaning material, and said base portion having drain openings beneath said cover portion to permit liquid to fall into the drain.

25. The self-metering cleaning unit of claim 24 wherein the base portion extends outwardly beyond the cover portion where it is apertured, and means for spacing the base portions inwardly of said margin thereof above said margin thereof above said support surface.

26. The self-metering cleaning unit of claim 24 wherein the cover portion of the holder is provided with openings at the top thereof to permit urine dropping thereon to come into direct contact with the solid-cleansing material supported on the base portion.

27. A self-metering cleaning unit for urinal drains or the like, said unit including a holder for a mass of solid-cleansing material which holder is mountable upon a urinal drain or the like and includes openings through which flush or drain water can reach the mass of solid-cleansing material and then flow into the urinal drain or the like, said holder having a lower perforated portion adapted to direct liquid flowing into the unit down the urinal drain or the like and an upper portion which is perforated to enable flush or drain water and urine to come

into contact with said mass of solid-cleansing material, said mass of solid-cleansing material being supported between said upper and lower portions of the holder and being dissolved in part only in the flush or drain water admitted to the holder, thereby automatically providing a metered quantity of the cleansing material in the urinal drain or the like with each flushing or draining thereof, the dissolved cleansing material dissolving and solubilizing inorganic deposits and encrustations in the drain, said upper and bottom portions of said holder being connected by a hinge permitting the same to be moved between confronting and separated positions and having means for releasably holding said upper and lower portions of the holder together.

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