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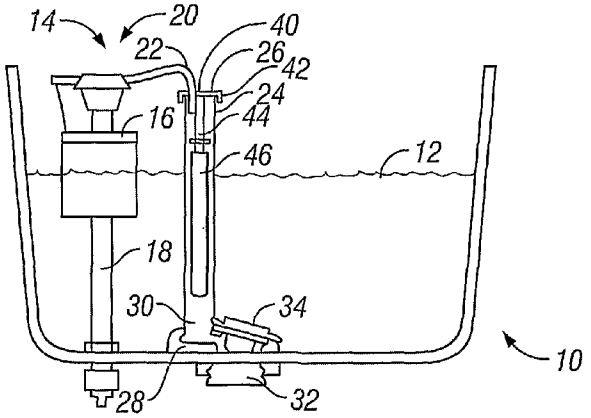
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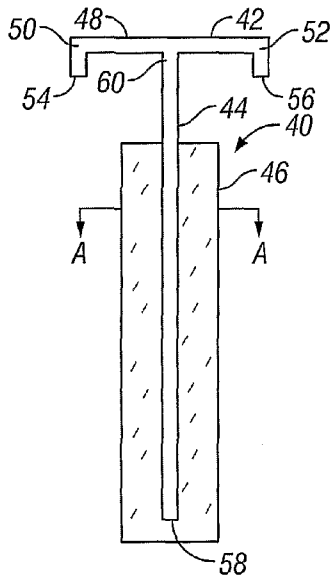
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(54) Title: IMPROVEMENTS IN LAVATORY DISPENSING DEVICES





(57) Abstract: The present invention relates to a lavatory dispensing device (40) comprising: a hanger having a hanger means (42) adapted to be suspended to the end (26) of an overflow tube (24) provided within the cistern or tank (10) of a sanitary appliance, and a compressed solid block composition (46) comprising at least one chemical agent. Said lavatory dispensing device (40) is adapted to be suspended within the interior of the overflow tube (24) . Proximate to the conclusion of a flush interval, during which or subsequent to the time wherein the water from the cistern (10) is released into the toilet bowl, a treatment composition formed by contacting the compressed block (46) with the water supplied to the interior of the overflow tube (24) is delivered into the bowl .

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IMPROVEMENTS IN LAVATORY DISPENSING DEVICES

The present invention relates to improved lavatory dispensing devices. More particularly the present invention relates to improved lavatory dispensing devices which are useful in conjunction with a toilet cistern, as well as a method for delivering a treatment composition to a toilet bowl in toilets provided with a cistern. The said treatment composition contains one or more chemical constituents e.g., coloring agents, cleaning agents, disinfecting agents, anti-lime scalé agents in the form of a block. The treatment composition is formed by water contacting the block of the device coming into contact with the one or more chemical constituents; the block provides for the long term release of the one or more active agents during sequential contacts with water contacting the block of the toilet dispensing device.

Since the advent of sanitary appliances and in particular modern flush toilets, there has been a continuing need in the art to provide effective ways to maintain these appliances in a satisfactory condition between uses. The art is replete with devices which are intended to be used as "in the bowl" (or ITB) or "in the cistern" (or ITC) in order to provide a coloring and/or cleaning and/or fragrancing and/or sanitizing effect to such sanitary devices, particularly toilet bowls.

One common approach known to the art is to provide a device which is at least immersed within the cistern or tank of a toilet, which may be either placed wholly within the interior of the toilet such as by placement at the bottom of a toilet tank so that the entire device is wholly immersed in water when the tank is full, or is at least partially immersed within the water present in a toilet tank, such as wherein such a device is suspended from a part of the toilet tank, such as a lip or rim of the tank. Such are generally referred to as ITC devices.

A shortcoming of such ITC devices known to the art resides in the fact that they are frequently totally immersed in the water present in the cistern. Two technical shortcomings frequently result from such immersed ITCs. First, the compositions of an

ITC are difficult to formulate as many constituents which are desirably present in such lavatory blocks such as many surfactants, particularly higher foaming surfactants including anionic surfactants, are also water soluble or water dispersible. Thus when a solid lavatory block containing surfactants, particularly higher foaming surfactants are immersed in water for a period of time, often the presence of such surfactants undesirably softens the immersed block and reduces the performance characteristics of the block over time, and may even lead to diminish lifespan due to premature dissolution of the solid lavatory block. While this problem may be addressed by the use of different surfactants which are more hydrophobic, such more hydrophobic surfactants are also recognized in the art as having reduced cleaning and/or foaming. Second, the compositions of an ITC block may include constituents such as an active source of oxygen, such as an oxidant compound or composition such as bleach, the presence of the oxidant in the standing water of the toilet cistern frequently chemically attacks any metal parts which are also present in the standing water of the cistern and may induce corrosion, and premature failure of any mechanism which comprises such metal parts. Prominently, flushing mechanisms for releasing or dispensing water to be flushed from the cistern to the toilet, and/or cistern refill devices for refilling the toilet cistern following a flush cycle come into consideration. While this problem may be addressed by the inclusion of corrosion inhibiting compounds or compositions in lavatory block composition adapted to be used in an ITC, or as an ITC, such increases the complexity of such a lavatory block formulation as well as its cost.

Thus, there exists a real and urgent need in the art for improved lavatory dispensing devices which are particularly well adapted to be positioned in a toilet cistern, viz., an ITC device, as well as a method of making such an ITC device as well as methods for the treatment of a toilet bowl via the use of such an improved ITC device.

The present invention, in its various aspects, provides a lavatory dispensing device useful for the delivery of at least one treatment composition, preferably a cleaning composition and/or a sanitizing composition to a sanitary appliance, e.g. a toilet bowl. The device is used as an ITC type device.

According to a first aspect of the invention there is provided a lavatory dispensing device comprising a hanger and a compressed solid block comprising one or more chemical constituents for use with a sanitary appliance.

According to a second aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger and a compressed solid block comprising one or more chemical constituents for use with a sanitary appliance.

According to a third aspect of the invention there is provided a lavatory dispensing device comprising a hanger having a hanger means adapted to be suspended from a part of a sanitary appliance, particularly from the end or lip of an overflow tube provided within the cistern or tank of a sanitary appliance, especially a toilet bowl, as well as a compressed solid block comprising at least one chemical agent, which lavatory dispensing device is adapted to be suspended within the interior of the overflow tube of the sanitary appliance. The dimensions and configuration of the lavatory dispensing device are such that the solid block comprising the one or more chemical constituents are preferably positioned within the path of water which is released or dispensed by the sanitary appliance.

According to a fourth aspect of the invention there is provided a cageless lavatory dispensing device according to the third aspect of the invention.

According to a fifth aspect of the invention there is provided a process for delivering a treatment composition to a sanitary appliance, especially preferably, to the interior of a toilet bowl, which process comprises: providing a lavatory dispensing device according to any of the first through fourth aspects of the invention, and, periodically supplying water about the exterior of the compressed block to elute at least one chemical constituent to form a treatment composition with said water which treatment composition is used to treat a part of the sanitary appliance, preferably the interior of a toilet bowl.

According to a sixth aspect of the invention there is provided a process for delivering a treatment composition to a sanitary appliance, especially preferably, to the interior of a toilet bowl, which process comprises: providing a lavatory dispensing device according to any of the first through fourth aspects of the invention, and proximate to the conclusion of the flush interval during which water from the cistern is released from the cistern to the interior of the toilet bowl, particularly via a valve, delivering the treatment

composition formed by contacting the compressed block with water to the interior of the toilet bowl.

According to a seventh aspect of the invention there is provided a process for delivering a treatment composition to a sanitary appliance, especially preferably, to the interior of a toilet bowl, which process comprises: providing a lavatory dispensing device according to any of the first through fourth aspects of the invention, and subsequent to the conclusion of the flush interval during which water from the cistern is released from the cistern to the interior of the toilet bowl, particularly via a valve, delivering the treatment composition formed by contacting the compressed block with water to the interior of the toilet bowl.

In accordance with a still further aspect of the invention there is provided as a vendible article, a lavatory dispensing device according to the first through fourth aspects of the invention for use with a sanitary appliance, particularly a toilet.

In accordance with a yet further aspect of the invention there are provided lavatory treatment blocks which are dimensioned to be inserted into the interior of an overflow tube present in the cistern of a lavatory appliance which does not require a hanger as described with reference to the first through fourth aspects of the invention, as well as methods for their use in treating a lavatory appliances, particularly toilets.

These and other aspects of the invention will be more evident from a reading of the following specification.

Broadly defined, the present invention provides a lavatory dispensing device comprising a hanger and a compressed solid block comprising one or more chemical constituents for use with a sanitary appliance wherein the lavatory dispensing device is particularly adapted to be used in a cistern, hence may be classed as an ITC type device. The lavatory device of the invention, in its preferred embodiments, is particularly adapted and configured such that the hanger is adapted to provide a support structure for the compressed solid block comprising one or more chemical constituents, whereby the compressed solid block is suspended within the interior of the overflow tube provided within the cistern or tank of a sanitary appliance, especially a toilet bowl. The positioning of the compressed solid block within the interior of the overflow tube isolates the compressed solid block from continuous contact with water, particularly physically

isolates the compressed solid block from continuous contact with the water collected in the cistern of the toilet which is used for providing flush water when the sanitary appliance is flushed. The compressed solid block is intended to be only contacted with water which is provided to the interior of the overflow tube, which is typically provided by the refill mechanism or apparatus which is used to control the inlet of water from an exterior water source when the amount of water containing in the cistern falls below a certain level or amount, such as immediately following flushing of the toilet. Such a refill mechanism typically includes an overflow tube which is used dispense a stream of water during the refill cycle of the refill mechanism during which said refill mechanism allows for entry of water into the cistern (interchangeably referred to as "tank"). During the refill cycle, typically the majority of the volume of water is directed by the refill mechanism to the interior of the cistern, while only a minority of the volume of water is dispensed through an outlet which is typically connected to fluid conduit, wherein the other open end of said fluid conduit is directed into the interior of the overflow tube. In such a manner, while the refill mechanism operates to refill the cistern, the supply of water directed into the fluid conduit and thereafter into the overflow tube is supplied following the closure of the toilet flapper or other valve at the conclusion of the release of flush water used to flush the contents of the toilet bowl downwardly and ultimately out of the toilet bowl. This supply of water supplied via the fluid conduit passes downward through the overflow tube wherein it is allowed to collect at the lowest point of the interior of the toilet bowl, referred to as the "sump", whereby the water level in the sump is reestablished and to reconstitute an airlock between the ambient environment to which the interior of the toilet bowl is exposed, and the soil and drain piping through which waste is carried, downstream and beyond the bend in the toilet bowl through which wastes and flush water exits the toilet bowl.

Typically the volume of water supplied from the stored water in the cistern during a flush cycle is typically several times greater than the volume of water supplied via the refill mechanism and the fluid conduit via the overflow tube and into the toilet sump. Significantly the release of the latter volume of water also occurs at or following the conclusion of the release of the flush water from the cistern, which quickly exits the toilet bowl and enters the soil or drain piping. Thus, the volume of water supplied via the refill

mechanism and the fluid conduit via the overflow tube and into the toilet sump also has the opportunity to collect in the toilet sump wherein it is retained between flush cycles of the toilet.

The present inventors have realized that this pattern of flow dynamics may be advantageously used in order to supply a treatment composition to the interior of a toilet bowl. A treatment composition released directly to the sump of a toilet bowl following the exit of flush water from the toilet bowl has a greater residence time than the residence time of the cistern water used to flush the toilet bowl, the bulk of which normally transits from the cistern, through the toilet bowl and out past the bend of the toilet bowl and into the soil or drain piping in less than 30 seconds, but often in less than 20 seconds, or even in less than 15 seconds. In contrast the treatment composition released directly to the sump of a toilet bowl following the exit of flush water is expected to have a longer residence time, and also, as the volume of water supplied via the refill mechanism and the fluid conduit via the overflow tube and into the toilet sump is frequently significantly less then the flush water, a useful treatment composition useful in treating the toilet bowl can be formed by elution of at least one chemical constituent into such water so to form a treatment composition with said water contacts a compressed lavatory block composition provided in an ITC according to the present invention.

In one aspect the present inventors provide a lavatory dispensing device comprising a hanger adapted to be suspended from a part of a sanitary appliance, particularly from the end or lip of an overflow tube provided within the cistern or tank of a sanitary appliance, especially a toilet bowl, as well as a compressed solid block comprising at least one chemical constituent, said dispensing device is adapted to be suspended within the interior of the overflow tube of the sanitary appliance. The dimensions and configuration of the lavatory dispensing device are such that the compressed solid block comprising the one or more chemical constituents are preferably positioned within an overflow tube present in the cistern of the lavatory appliance, and in the path of water which is released or dispensed by the sanitary appliance, particularly and preferably only the water released from a refill device via an overflow conduit and into the interior of the overflow tube.

The lavatory dispensing devices may excludes or omits a structure surrounding parts of, or all of the compressed solid block which structure functions as a cage, and in such an embodiment may be considered a "cageless" lavatory dispensing device. In certain embodiments such a cageless form of the dispensing device is highly preferred.

In alternate embodiments, the lavatory dispensing devices include a structure surrounding parts of, or all of the compressed solid block where such a structure functions as a cage in supporting all or parts of the compressed solid block. In certain embodiments such a form of the lavatory dispensing device which includes a cage is highly preferred.

The inventors have discovered that cageless lavatory dispensing devices which comprise a hanger and a compressed solid block composition depending from the hanger which solid block compositions include one or more chemical constituents, preferably at least a surfactant composition, which may be formed by a process which contemplates: (a) forming a mass comprising at least one or more chemical constituents; (b) compressing a quantity of the mass to encase a portion of the hanger. Optionally but preferably, the mass comprising the at least one or more chemical constituents is mixed and extruded into a preform shape, thereafter a portion of the hanger is inserted into the preform shape or between a plurality of preform shapes, and subsequently the perform shape(s) may be compressed in a die to provide the final form of the compressed solid block composition of the cageless lavatory dispensing device. The compressed solid blocks may be retained on a part of the hanger without the need of an enclosing cage, as well as without the need of any separate adhesive material or composition which is placed between the compressed solid block and the part of the hanger which the compressed solid block contacts.

In its simplest form the hanger is merely an article which comprises at one end, a hanger means such as a hook which is adapted to or configured to suspend the hanger from a part of a sanitary appliance such that the compressed solid block composition may be suspended in the interior of the overflow conduit (often also known as an "overflow tube") present in the cistern of a lavatory appliance, and a stalk or other element for positioning the compressed solid block composition relative to the hanger. In certain embodiments the hanger includes a hanger means and a stalk or other element depending

therefrom. In certain embodiments the hanger includes a stalk which may include one or more plates which are adapted to be embedded within the compressed solid block composition, or abutting the compressed solid block composition. In certain embodiments the hanger may include on the stalk thereof one or more transverse elements, such as plates which are adapted to be present as part of the hanger but exterior of the compressed solid block composition. In certain preferred embodiments the hanger may comprise as hanger means a hook or a transverse bar, from which downwardly extends a stalk, upon which stalk the compressed solid block composition is located. While the hanger means may be integrally formed to be part of the hanger it is contemplated that in certain embodiments, the hanger may be constituted of two or more discrete parts or elements which may be fastened or affixed together to form the hanger of the invention. For example in such an embodiment the hanger may comprise as a hanger means a hook or transverse bar which may be fitted upon or fitted together with a stalk, upon which stalk the compressed solid block composition is located.

The lavatory dispensing device of the invention may be provided as a multiple-use article, wherein the consumer retains a part said device on the sanitary appliance, but replaces a part of the said device periodically as may be needed. In such a configuration, usually all or part of the hanger means is retained and reused by a consumer, but upon consumption of the compressed solid block, a new compressed solid block is provided to the sanitary appliance where it may be affixed to the hanger means and then reinserted into the interior of the overflow tube in the cistern of a lavatory appliance. Most conveniently however the hanger is a single piece article and the improved lavatory dispensing device according to the invention is a single-use type article.

With regard to the hanger means, it is to be understood that the hanger means can be of any configuration which is suitable to provide a suitable support for the compressed solid block composition within the interior of a sanitary appliance, particularly within the interior of an overflow tube. Such is applicable for both "cageless" embodiments of the invention, as well as "caged" embodiments of the invention. Ideally, the hanger means is configured such that it is adapted to be suspended over at least a part of the end or lip of the overflow tube of a sanitary appliance. The hanger means may be of any suitable dimension, and as it is understood that as the configuration and geometry of sanitary

appliances vary, naturally the hanger means and the hanger itself can be adapted to suit the particular dimensional or geometric configurations of the overflow tubes provided in such sanitary appliances. While the hanger means and/or the hanger may be essentially rigid and inflexible, advantageously the hanger means and/or the hanger is flexible and configurable to adapt to various configurations and geometries so that it may be used with different sanitary appliances. Conveniently however, the part of the hanger which is the hanger means end may be an inverted "U" shaped portion of the hanger such that it may be used to suspend the hanger on at least a part of the lip or end of an overflow tube. Alternately, the part of the hanger which is the hanger means end may be a cross-bar or a "T" shaped portion of the hanger such that it may be used to suspend the hanger on at least a part of the lip or end of an overflow tube, whereby the span of the cross-bar (or top of the "T") is preferably greater than the maximum diameter or maximum cross dimension of the top or end of the overflow tube. Still alternately, the part of the hanger which is the hanger means end may be an upright "U" or "V" shaped portion of the hanger such that it may be used to suspend the hanger on at least a part of the lip or end of an overflow tube., whereby the stalk of the hanger depends from the bottom or lowest part of such a "U" or "V" shaped portion of the hanger. In such a configuration the spanned distance between the two ends of the "U" or "V" is greater than the maximum diameter or maximum cross dimension of the top or end of the overflow tube. In such a configuration the stalk depending from the bottom or lowest part of such a "U" or "V" shaped portion of the hanger and bearing the compressed solid block composition within the interior of the overflow tube is self-centering as the symmetrically configured hanger means is expected to position the stalk of the hanger at about the center line of the overflow tube automatically under the influence of gravity. Similar self-centering benefits are also expected to be provided by providing a hanger means at or near the end of the stalk of the hanger wherein the hanger means is rotationally symmetrical about a central axis and wherein the stalk is coincident with said central axis. Of interest are conic sections such as cones and frustroconical sections as well as spheres, circles and ellipses to name a few.

The hanger means may be provided in a rigid, preformed configuration which is non-flexible or only sparingly flexible in order to accommodate the dimensions of the

overflow tube of a particular model or type of sanitary appliance. For example wherein the hanger means is provided as a rigid, preformed configuration to be used in suspending the cageless lavatory dispensing device in an ITC application the hook may be a discrete element which is dimensioned to have a cross-section which in adapted to accommodate a part of the upper rim or edge of the overflow tube in a toilet cistern or toilet tank. Such a hanger means may merely suspend the hanger from the end or lip of the overflow tube, or the said hanger means may be configured so that when applied it functions as a mechanical clip such that it is generally retained at its point of installation and resists accidental misplacement or movement.

As has been noted above, in many preferred embodiments and indeed, according to most preferred embodiments the hanger comprises a stalk which at or near one end of which is connected to or is integrally formed as the hanger means, and further wherein the compressed solid block composition is affixed to and depends from at least a part of the stalk, usually at a part different from and separate from the hanger means.

The stalk of the hanger may be of any dimension or length, however when used in the ITC type device of the invention, desirably the stalk is of sufficient dimensions, particularly length whereby the compressed block will be insertable within the interior of the overflow tube of a lavatory appliance. The dimensions and in particular the length of the stalk can be varied in order to meet the specific requirements of a specific configuration of a sanitary appliance, particularly the overflow tube of a sanitary appliance. Further, the stalk may be generally rigid and straight as the overflow tubes of toilets in typically found in use in North America are straight vertical tubes. Alternately the stalk may be curved to be insertable within the curved or sloping overflow tubes found in certain European toilets. Of course, different configurations of the hanger and the stalk may be produced in order accommodate the configurations of the overflow tubes of other lavatory appliances, especially toilet bowls.

Advantageously the overall length of the dispensing device is from about 2 cm to about 30 cm, but preferably is from about 10 cm to about 20 cm. Advantageously the maximum width of the portion of the dispensing device which is adapted to be inserted within the overflow tube is from about 0.5 cm to about 3 cm, preferably is from about 1 cm to about 3 cm, but most preferably is about 1.25 to about 2.5cm. Usually, with

respect to said maximum width, in "cageless" dispensing devices as described herein said maximum width usually corresponds to the maximum cross section or diameter of the compressed solid block composition. Usually with respect to said maximum width, in "cage" comprising dispensing devices as described herein said maximum width usually corresponds to the maximum cross section or diameter of the cage containing the compressed solid block composition.

In cageless embodiments of the dispensing device, all of, or only part of the stalk of the hanger of the invention is adapted to be embedded and/or enrobed within the compressed solid block composition. In certain embodiments the stalk may include one or more plates which are adapted to be embedded within the compressed solid block composition. In certain embodiments the stalk may include one or more transverse elements, such as plates which are adapted to be present as part of the stalk but exterior of the compressed solid block composition. Such plates may be integrally formed as part of the hanger, preferably as part of the stalk thereof, or alternately may be discrete elements which may be affixed or fastened to the stalk. Such plates may be essentially of any useful configuration, and may be, the plate is dimensioned such that it is completely encased by the compressed solid block composition. Alternately the stalk may comprise a plate which is of sufficient dimensions to provide a barrier wall between two masses of compressed solid block compositions which said compositions may be the same or may be distinguishable in one or more aspects, e.g., physical, visual or chemical. Such configuration may be used to physically separate two different and chemically incompatible compressed solid block compositions and yet provide them as part of a single dispensing device. Conveniently, one or more plates provided may have a geometry which is symmetrical about the longitudinal center line or axis of the stalk and/or hanger means and may depends directly from the stalk, or alternately directly from the hanger means of the hanger. In one preferred embodiment the stalk includes at least one plate which depends from the stalk and is generally parallel thereto. In another preferred embodiment one or more plates extend in direction which is non-parallel to the stalk but is angled thereto, and according to an especially preferred embodiment such one or more plates are perpendicular to the stalk and extending radially outwardly from said stalk. Such plates may be embedded in the compressed solid block compositions, or may

be configured to lie outside of the region of the hanger or stalk from which the compressed solid block compositions depend.

While said plates, if present, may be generally of a flat, planar configuration, and has a uniform thickness across its surface such is not a limitation and it is also contemplated that the plate may include regions of diminishing thickness i.e. such as tapered sections or margins at or near the boundaries of the plate. Preferably such a plate or plates are of generally uniform in thickness with at least 90%, preferably at least 95% of its surface being of a constant thickness with a variance of not more than +/- 5%.

Such a plate or plates if present need not necessarily be limited to a generally planar, and generally two-dimensional configuration, but may include elements or sections which extend outwardly from the top and/or bottom surfaces of the plate, such as in the form of one or more pegs, studs, pins, fins, rods, loops or the like which might be useful in providing further physical support between the plate, and the compressed solid block composition enrobing it. Alternately, a plate or plates if present may include one or more perforations passing therethrough whereby, upon compression adjacent portions of the solid block composition meet and pass through one or more perforations which may be provided within a plate.

Such a plate or plates if present itself may be of any configuration and when in a planar form can be square, rectangular, triangular, polygonal, ellipsoid, circular, oblate, or for that matter any configuration which may be embedded within the interior of the compressed solid block.

Alternately the plate can be of a configuration other than a planar configuration, e.g., the plate can may be one or more elements such as rods or tubes, which depend from and extend outwardly from the stalk.

In certain preferred embodiments the dispensing devices according to the invention necessarily comprise a plate or similar element which depends from a portion of the stalk and is at a position between the hanger means and a compressed solid block composition. Such a plate is advantageously perpendicular to the stalk and depends therefrom in the manner of a skirt or disk and is advantageously generally circular in configuration. The diameter of such a plate may be at least as great as that of the initial maximum thickness of the compressed solid block composition prior to the use of the

dispensing device, or said diameter may be less. Such a plate is also exterior of the compressed solid block composition and its use may provide some advantage in extending the service life of the dispensing article in partially deflecting the water supplied via the overflow conduit to the interior of the overflow tube within which compressed block of the dispensing device is positioned.

In further preferred embodiments the dispensing devices according to the invention may include a second plate or similar element which depends from a portion of the stalk and is at a position either at or proximate to the end of the stalk opposite to the hanger means of the hanger and a compressed solid block composition. Such a second plate is advantageously perpendicular to the stalk and depends therefrom in the manner of a skirt or disk and is advantageously generally circular in configuration having a diameter at least as great as that of the maximum thickness of the compressed solid block composition although it may also be of a smaller diameter. Such a second plate is also exterior of the compressed solid block composition and its use may provide some advantage in halting the potential slippage of the compressed solid block composition downwardly and off the stalk.

In certain alterative embodiments the hanger includes a hanger means and further includes an element other than a stalk from which, or within which, the compressed solid block composition depends. For example in certain embodiments which are considered "caged" embodiments a basket or pouch having at least one inlet and one outlet (which may be the same element) containing a compressed solid block composition is provided. In such a manner, the compressed solid block composition may be suspended from the hanger means within the interior of an overflow tube. Such embodiments provide alternative configurations which may be useful with certain sanitary appliances which may have specific overflow tubes other than those which may be more widely available.

The hanger, and all elements thereof apart from the compressed solid block composition, whether a single unitary piece or assembled from a composite of discrete pieces or elements may be formed from any of a variety of materials which can be used for the purpose described herein. Exemplary and preferred materials include metals including wires or rods which are bendable and are preferably coated with flexible non-metallic material such as a flexible polymer, a paint or a sheath, as well as one or more

synthetic polymers which are preferred. Preferably the hanger may be formed of any of a number of thermosettable or thermoformable synthetic polymers such as are widely used in casting or injection molding. Exemplary synthetic polymers such as polyamides, polyolefins (e.g., polypropylene, polyethylene) as well as polyalkyleneterephalates (i.e., polyethylene terephthalate, polybutylene terephthalate), polystyrenes, polysulfones, polycarbonates as well as copolymers formed from monomers of one or more of the foregoing being several nonlimiting examples of useful synthetic polymers. Preferably the material of construction is at least somewhat flexible. As to the material of construction of the hanger, the only criteria being that the selected materials used to fabricate the hanger and parts or elements thereof are not deleteriously affected by the chemical constituents of the compressed solid block composition with which part of the hanger, viz., the plate and possibly part of the stalk..

The dispensing devices according to the invention necessarily also comprise a compressed solid block comprising at least one or more chemical constituents such that when the compressed solid block is rinsed or washed with water, one or more chemical compounds or chemical constituents are eluted from the compressed solid block and dispersed or dissolved into said water and thereby forms a treatment composition which is useful in treating a sanitary appliance, particularly a toilet bowl. The treatment composition advantageously provides a cleaning and/or sanitizing benefit to the treated sanitary applicance.

The compressed solid block composition of the invention may include any known art cleaning agents or cleaning constituents known to those of ordinary skill in the relevant art, and without limitation include one or more detersive surfactants selected from anionic, cationic, nonionic as well as amphoteric or zwitterionic surfactants. Certain detersive surfactants may also provide a dual role in providing detergency as well as a disinfecting effect, viz, certain cationic surfactants, which are described hereinafter as a disinfecting agent. These one or more cleaning agents or cleaning constituents may be used with or without other constituents being present in the compressed solid blocks of the invention.

The compressed solid block composition of the invention desirably comprises a surfactant constituent which may be one or more detersive surfactants. Exemplary useful

surfactants include anionic, nonionic, cationic, amphoteric, and zwitterionic surfactants, particularly those whose melting points are sufficiently high, above about 110°F., preferably above 125°F., to permit processing according to known art techniques. However, small amounts of low melting point surfactants and even liquid surfactants may be used in providing the surfactant constituent.

Exemplary useful anionic surfactants which may be used in the compressed solid block composition of the invention can be broadly described as the water-soluble salts, particularly the alkali metal salts, of organic sulfuric acid reaction products having in their molecular structure an alkyl or alkaryl radical containing from about 8 to about 22 carbon atoms and a radical selected from the group consisting of sulfonic acid and sulfuric acid ester radicals. (Included in the term alkyl is the alkyl portion of higher acyl radicals.) Important examples of the anionic surfactants which can be employed in practicing the present invention are the sodium or potassium alkyl sulfates, especially those obtained by sulfating the higher alcohols (C_8 –C_{18} carbon atoms) produced by reducing the glycerides of tallow or coconut oil; sodium or potassium alkyl benzene sulfonates, in which the alkyl group contains from about 9 to about 15 carbon atoms, (the alkyl radical can be a straight or branched aliphatic chain); paraffin sulfonate surfactants having the general formula RSO_3 M, wherein R is a primary or secondary alkyl group containing from about 8 to about 22 carbon atoms (preferably 10 to 18 carbon atoms) and M is an alkali metal, e.g., sodium, lithium or potassium; sodium alkyl glyceryl ether sulfonates, especially those ethers of the higher alcohols derived from tallow and coconut oil; sodium coconut oil fatty acid monoglyceride sulfates and sulfonates; sodium or potassium salts of sulfuric acid esters of the reaction product of one mole of a higher fatty alcohol (e.g., tallow or coconut oil alcohols) and about 1 to 10 moles of ethylene oxide; sodium or potassium salts of alkyl phenol ethylene oxide ether sulfates with about 1 to about 10 units of ethylene oxide per molecule and in which the alkyl radicals contain from about 8 to about 12 carbon atoms; the reaction products of fatty acids esterified with isethionic acid and neutralized with sodium hydroxide where, for example, the fatty acids are derived from coconut oil; sodium or potassium salts of fatty acid amides of a methyl tauride in which the fatty acids, for example, are derived from coconut oil and sodium or

potassium β-acetoxy- or β-acetamido-alkanesulfonates where the alkane has from 8 to 22 carbon atoms.

A preferred class of anionic surfactants are linear alkyl benzene sulfonate surfactant wherein the alkyl portion contains 8 to 16 carbon atoms, and most preferably about 11 to 13 carbon atoms. According to particularly preferred embodiments of the invention, the solid block compositions necessarily include an anionic surfactant.

A further preferred class of anionic surfactants are alpha olefin sulfonates, as well as salts thereof, e.g., alkali metal salts. Preferred are C_8 through C_{22} alpha olefin sulfonates, particularly C_{12} through C_{18}, and especially C_{14}, and C_{16} alpha olefin sulfonates as well as blends of two or more thereof. According to particularly preferred embodiments of the invention, the solid block compositions necessarily include an alpha olefin sulfonate anionic surfactant.

The detersive surfactant constituent of the solid block composition of the invention may include one or more nonionic surfactants. Practically any hydrophobic compound having a carboxy, ehydrat, amido, or amino group with a free hydrogen attached to the nitrogen can be condensed with an alkylene oxide, especially ethylene oxide or with the polyhydration product thereof, a polyalkylene glycol, especially polyethylene glycol, to form a water soluble or water dispersible nonionic surfactant compound. Further, the length of the polyethenoxy hydrophobic and hydrophilic elements may various. Exemplary nonionic compounds include the polyoxyethylene ethers of alkyl aromatic ehydrat compounds, e.g., alkylated polyoxyethylene phenols, polyoxyethylene ethers of long chain aliphatic alcohols, the polyoxyethylene ethers of hydrophobic propylene oxide polymers, and the higher alkyl amine oxides.

One class of useful nonionic surfactants include polyalkylene oxide condensates of alkyl phenols. These compounds include the condensation products of alkyl phenols having an alkyl group containing from about 6 to 12 carbon atoms in either a straight chain or branched chain configuration with an alkylene oxide, especially an ethylene oxide, the ethylene oxide being present in an amount equal to 5 to 25 moles of ethylene oxide per mole of alkyl phenol. The alkyl ehydrate d in such compounds can be derived, for example, from polymerized propylene, diisobutylene and the like. Examples of compounds of this type include nonyl phenol condensed with about 9.5 moles of

ethylene oxide per mole of nonyl phenol; dodecylphenol condensed with about 12 moles of ethylene oxide per mole of phenol; dinonyl phenol condensed with about 15 moles of ethylene oxide per mole of phenol and diisooctyl phenol condensed with about 15 moles of ethylene oxide per mole of phenol.

A further class of useful nonionic surfactants include the condensation products of aliphatic alcohols with from about 1 to about 60 moles of an alkylene oxide, especially an ethylene oxide. The alkyl chain of the aliphatic alcohol can either be straight or branched, primary or secondary, and generally contains from about 8 to about 22 carbon atoms. Examples of such ethoxylated alcohols include the condensation product of myristyl alcohol condensed with about 10 moles of ethylene oxide per mole of alcohol and the condensation product of about 9 moles of ethylene oxide with coconut alcohol (a mixture of fatty alcohols with alkyl chains varying in length from about 10 to 14 carbon atoms). Other examples are those C_6 –C_{11} straight-chain alcohols which are ethoxylated with from about 3 to about 6 moles of ethylene oxide. Their derivation is well known in the art. Examples include Alfonic® 810-4.5, which is described in product literature from Sasol as a C_8-C_{10} straight-chain alcohol having an average molecular weight of 356, an ethylene oxide content of about 4.85 moles (about 60 wt.%), and an HLB of about 12; Alfonic® 810-2, which is described in product literature as a C_8-C_{10} straight-chain alcohols having an average molecular weight of 242, an ethylene oxide content of about 2.1 moles (about 40 wt.%), and an HLB of about 12; and Alfonic® 610-3.5, which is described in product literature as having an average molecular weight of 276, an ethylene oxide content of about 3.1 moles (about 50 wt.%), and an HLB of 10. Other examples of alcohol ethoxylates are C_{10} oxo-alcohol ethoxylates available from BASF under the Lutensol® ON tradename. They are available in grades containing from about 3 to about 11 moles of ethylene oxide (available under the names Lutensol® ON 30; Lutensol® ON 50; Lutensol® ON 60; Lutensol® ON 65; Lutensol® ON 66; Lutensol® ON 70; Lutensol® ON 80; and Lutensol®ON 110). Other examples of ethoxylated alcohols include the Neodol® 91 series non-ionic surfactants available from Shell Chemical Company which are described as C_9-C_{11} ethoxylated alcohols. The Neodol® 91 series non-ionic surfactants of interest include Neodol® 91-2.5, Neodol® 91-6, and Neodol® 91-8. Neodol® 91-2.5 has been described as having about 2.5 ethoxy groups per

molecule; Neodol 91-6 has been described as having about 6 ethoxy groups per molecule; and Neodol 91-8 has been described as having about 8 ethoxy groups per molecule. Further examples of ethoxylated alcohols include the Rhodasurf® DA series non-ionic surfactants available from Rhodia which are described to be branched isodecyl alcohol ethoxylates. Rhodasurf® DA-530 has been described as having 4 moles of ethoxylation and an HLB of 10.5; Rhodasurf® DA-630 has been described as having 6 moles of ethoxylation with an HLB of 12.5; and Rhodasurf® DA-639 is a 90% solution of DA-630. Further examples of ethoxylated alcohols include those from Tomah Products (Milton, WI) under the Tomadol® tradename with the formula $RO(CH_2CH_2O)_nH$ where R is the primary linear alcohol and n is the total number of moles of ethylene oxide. The ethoxylated alcohol series from Tomah include 91-2.5; 91-6; 91-8 – where R is linear $C_9/C_{10}/C_{11}$ and n is 2.5, 6, or 8; 1-3; 1-5; 1-7; 1-73B; 1-9; where R is linear C_{11} and n is 3, 5, 7 or 9; 23-1; 23-3; 23-5; 23-6.5 – where R is linear C_{12}/C_{13} and n is 1, 3, 5, or 6.5; 25-3; 25-7; 25-9; 25-12 – where R is linear $C_{12}/C_{13}/C_{14}/ C_{15}$ and n is 3, 7, 9, or 12; and 45-7; 45-13 – where R is linear C_{14}/ C_{15} and n is 7 or 13.

A further class of useful nonionic surfactants include primary and secondary linear and branched alcohol ethoxylates, such as those based on C_6-C_{18} alcohols which further include an average of from 2 to 80 moles of ethoxylation per mol of alcohol. These examples include the Genapol® UD (ex. Clariant, Muttenz, Switzerland) described under the tradenames Genapol® UD 030, C_{11}-oxo-alcohol polyglycol ether with 3 EO; Genapol® UD, 050 C_{11}-oxo-alcohol polyglycol ether with 5 EO; Genapol® UD 070, C_{11}-oxo-alcohol polyglycol ether with 7 EO; Genapol® UD 080, C_{11}-oxo-alcohol polyglycol ether with 8 EO; Genapol® UD 088, C_{11}-oxo-alcohol polyglycol ether with 8 EO; and Genapol® UD 110, C_{11}-oxo-alcohol polyglycol ether with 11 EO.

Exemplary useful nonionic surfactants include the condensation products of a secondary aliphatic alcohols containing 8 to 18 carbon atoms in a straight or branched chain configuration condensed with 5 to 30 moles of ethylene oxide. Examples of commercially available nonionic detergents of the foregoing type are those presently commercially available under the trade name of Tergitol® such as Tergitol 15-S-12 which is described as being C_{11}- C_{15} secondary alkanol condensed with 9 ethylene oxide units, or Tergitol 15-S-9 which is described as being C_{11} –C_{15} secondary alkanol

condensed with 12 ethylene oxide units per molecule.

A further class of useful nonionic surfactants include those surfactants having a formula:

$$RO(CH_2CH_2O)_nH$$

wherein;

R is a mixture of linear, even carbon-number hydrocarbon chains ranging from $C_{12}H_{25}$ to $C_{16}H_{33}$ and n represents the number of ethoxy repeating units and is a number of from about 1 to about 12.

Surfactants of this formula are presently marketed under the Genapol® tradename (ex. Clariant), which surfactants include the "26-L" series of the general formula $RO(CH_2CH_2O)_nH$ wherein R is a mixture of linear, even carbon-number hydrocarbon chains ranging from $C_{12}H_{25}$ to $C_{16}H_{33}$ and n represents the number of repeating units and is a number of from 1 to about 12, such as 26-L-1, 26-L-1.6, 26-L-2, 26-L-3, 26-L-5, 26-L-45, 26-L-50, 26-L-60, 26-L-60N, 26-L-75, 26-L-80, 26-L-98N, and the 24-L series, derived from synthetic sources and typically contain about 55% C_{12} and 45% C_{14} alcohols, such as 24-L-3, 24-L-45, 24-L-50, 24-L-60, 24-L-60N, 24-L-75, 24-L-92, and 24-L-98N, all sold under the Genapol® tradename.

Further useful non-ionic surfactants which may be used in the inventive compositions include those presently marketed under the trade name Pluronics® (ex. BASF). The compounds are formed by condensing ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol. The molecular weight of the hydrophobic portion of the molecule is of the order of 950 to 4,000 and preferably 200 to 2,500. The addition of polyoxyethylene radicals of the hydrophobic portion tends to increase the solubility of the molecule as a whole so as to make the surfactant water-soluble. The molecular weight of the block polymers varies from 1,000 to 15,000 and the polyethylene oxide content may comprise 20% to 80% by weight. Preferably, these surfactants are in liquid form and particularly satisfactory surfactants are available as those marketed as Pluronics® L62 and Pluronics® L64.

Further nonionic surfactants which may be included in the inventive compositions include alkoxylated alkanolamides, preferably C_8-C_{24} alkyl di(C_2-C_3 alkanol amides), as represented by the following formula:

R_5-CO-NH-R_6-OH

wherein R_5 is a branched or straight chain C_8-C_{24} alkyl radical, preferably a C_{10}-C_{16} alkyl radical and more preferably a C_{12}-C_{14} alkyl radical, and R_6 is a C_1-C_4 alkyl radical, preferably an ethyl radical.

According to certain particularly preferred embodiments the detersive surfactant constituent necessarily comprises a nonionic surfactant based on a linear primary alcohol ehydrate d particularly wherein the alkyl portion is a C_8 to C_{16}, but particularly a C_9 to C_{11} alkyl group, and having an average of between about 6 to about 8 moles of ethoxylation.

One further useful class of nonionic surfactants include those in which the major portion of the molecule is made up of block polymeric C_2-C_4 alkylene oxides, with alkylene oxide blocks containing C_3 to C_4 alkylene oxides. Such nonionic surfactants, while preferably built up from an alkylene oxide chain starting group, can have as a starting nucleus almost any active hydrogen containing group including, without limitation, amides, phenols, and secondary alcohols.

One group of nonionic surfactants containing the characteristic alkylene oxide blocks are those which may be generally represented by the formula (A):

$$HO—(EO)_x(PO)_y(EO)_z—H \qquad (A)$$

where EO represents ethylene oxide,

PO represents propylene oxide,

y equals at least 15,

$(EO)_{x+z}$ equals 20 to 50% of the total weight of said compounds, and,

the total molecular weight is preferably in the range of about 2000 to 15,000.

Another group of nonionic surfactants appropriate for use in the new compositions can be represented by the formula (B):

$$R—(EO,PO)_a(EO,PO)_b—H \qquad (B)$$

wherein R is an alkyl, aryl or aralkyl group,

the alkoxy group contains 1 to 20 carbon atoms, the weight percent of EO is within the range of 0 to 45% in one of the blocks a, b, and within the range of 60 to 100% in the other of the blocks a, b, and the total number of moles of

combined EO and PO is in the range of 6 to 125 moles, with 1 to 50 moles in the PO rich block and 5 to 100 moles in the EO rich block.

Further nonionic surfactants which in general are encompassed by Formula B include butoxy derivatives of propylene oxide/ethylene oxide block polymers having molecular weights within the range of about 2000-5000.

Still further useful nonionic surfactants containing polymeric butoxy (BO) groups can be represented by formula I as follows:

$$RO—(BO)_n(EO)_x—H \qquad (C)$$

wherein R is an alkyl group containing 1 to 20 carbon atoms,

n is about 15 and *x* is about 15.

Also useful as the nonionic block copolymer surfactants which also include polymeric butoxy groups are those which may be represented by the following formula (D):

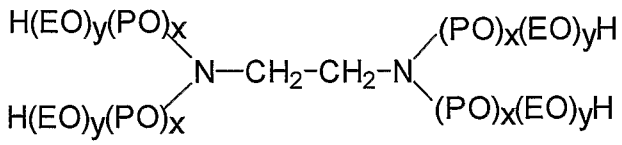
$$HO—(EO)_x(BO)_n(EO)_y-H \qquad (D)$$

wherein n is about 15,

x is about 15 and

y is about 15.

Still further useful nonionic block copolymer surfactants include ethoxylated derivatives of propoxylated ethylene diamine, which may be represented by the following formula:



(E)

where (EO) represents ethoxy,

(PO) represents propoxy,

the amount of $(PO)_x$ is such as to provide a molecular weight prior to ethoxylation of about 300 to 7500, and the amount of $(EO)_y$ is such as to provide about 20% to 90% of the total weight of said compound.

Further useful nonionic surfactants include nonionic amine oxide constituent. Exemplary amine oxides include:

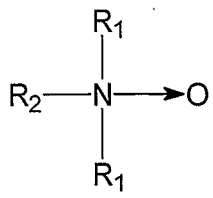
A) Alkyl di (lower alkyl) amine oxides in which the alkyl group has about 10-20, and preferably 12-16 carbon atoms, and can be straight or branched chain, saturated or unsaturated. The lower alkyl groups include between 1 and 7 carbon atoms. Examples include lauryl dimethyl amine oxide, myristyl dimethyl amine oxide, and those in which the alkyl group is a mixture of different amine oxide, dimethyl cocoamine oxide, dimethyl (hydrogenated tallow) amine oxide, and myristyl/palmityl dimethyl amine oxide;

B) Alkyl di (ehydrat lower alkyl) amine oxides in which the alkyl group has about 10-20, and preferably 12-16 carbon atoms, and can be straight or branched chain, saturated or unsaturated. Examples are bis(2-hydroxyethyl) cocoamine oxide, bis(2-hydroxyethyl) tallowamine oxide; and bis(2-hydroxyethyl) stearylamine oxide;

C) Alkylamidopropyl di(lower alkyl) amine oxides in which the alkyl group has about 10-20, and preferably 12-16 carbon atoms, and can be straight or branched chain, saturated or unsaturated. Examples are cocoamidopropyl dimethyl amine oxide and tallowamidopropyl dimethyl amine oxide; and

D) Alkylmorpholine oxides in which the alkyl group has about 10-20, and preferably 12-16 carbon atoms, and can be straight or branched chain, saturated or unsaturated.

Preferably the amine oxide constituent is an alkyl di (lower alkyl) amine oxide as denoted above and which may be represented by the following structure:



wherein each:

R_1 is a straight chained C_1-C_4 alkyl group, preferably both R_1 are methyl groups; and,

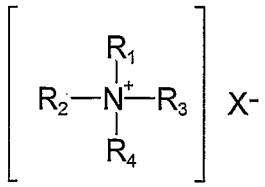
R_2 is a straight chained C_8-C_{18} alkyl group, preferably is C_{10}-C_{14} alkyl group, most preferably is a C_{12} alkyl group.

Each of the alkyl groups may be linear or branched, but most preferably are linear. Most preferably the amine oxide constituent is lauryl dimethyl amine oxide. Technical grade mixtures of two or more amine oxides may be used, wherein amine oxides of varying chains of the R_2 group are present. Preferably, the amine oxides used in the present invention include R_2 groups which comprise at least 50%wt., preferably at least 60%wt. of C_{12} alkyl groups and at least 25%wt. of C_{14} alkyl groups, with not more than 15%wt. of C_{16}, C_{18} or higher alkyl groups as the R_2 group.

Still further exemplary useful nonionic surfactants which may be used include certain alkanolamides including monoethanolamides and diethanolamides, particularly fatty monoalkanolamides and fatty dialkanolamides.

A cationic surfactant may be incorporated as a germicide or as a detersive surfactant in the solid block composition of the present invention, particularly wherein a bleach constituent is absent from the solid block composition. Cationic surfactants are per se, well known, and exemplary useful cationic surfactants may be one or more of those described for example in *McCutcheon's Functional Materials, Vol.2, 1998*; *Kirk-Othmer, Encyclopedia of Chemical Technology,* 4th Ed., Vol. 23, pp. 481-541 (1997), the contents of which are herein incorporated by reference. These are also described in the respective product specifications and literature available from the suppliers of these cationic surfactants.

Examples of preferred cationic surfactant compositions useful in the practice of the instant invention are those which provide a germicidal effect to the concentrate compositions, and especially preferred are quaternary ammonium compounds and salts thereof, which may be characterized by the general structural formula:

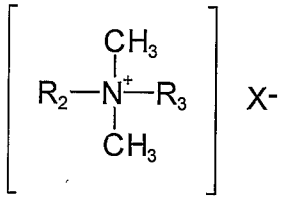


where at least one of R_1, R_2, R_3 and R_4 is a alkyl, aryl or alkylaryl ehydrate d of from 6 to 26 carbon atoms, and the entire cation portion of the molecule has a molecular weight of at least 165. The alkyl substituents may be long-chain alkyl, long-chain alkoxyaryl, long-chain alkylaryl, halogen-substituted long-chain alkylaryl, long-chain

alkylphenoxyalkyl, arylalkyl, etc. The remaining substituents on the nitrogen atoms other than the abovementioned alkyl substituents are hydrocarbons usually containing no more than 12 carbon atoms. The substituents R_1, R_2, R_3 and R_4 may be straight-chained or may be branched, but are preferably straight-chained, and may include one or more amide, ether or ester linkages. The counterion X may be any salt-forming anion which permits water solubility of the quaternary ammonium complex.

Exemplary quaternary ammonium salts within the above description include the alkyl ammonium halides such as cetyl trimethyl ammonium bromide, alkyl aryl ammonium halides such as octadecyl dimethyl benzyl ammonium bromide, N-alkyl pyridinium halides such as N-cetyl pyridinium bromide, and the like. Other suitable types of quaternary ammonium salts include those in which the molecule contains either amide, ether or ester linkages such as octyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride, N-(laurylcocoaminoformylmethyl)-pyridinium chloride, and the like. Other very effective types of quaternary ammonium compounds which are useful as germicides include those in which the hydrophobic radical is characterized by a substituted aromatic nucleus as in the case of lauryloxyphenyltrimethyl ammonium chloride, cetylaminophenyltrimethyl ammonium methosulfate, dodecylphenyltrimethyl ammonium methosulfate, dodecylbenzyltrimethyl ammonium chloride, chlorinated dodecylbenzyltrimethyl ammonium chloride, and the like.

Preferred quaternary ammonium compounds which act as germicides and which are be found useful in the practice of the present invention include those which have the structural formula:



wherein R_2 and R_3 are the same or different C_8-C_{12}alkyl, or R_2 is C_{12-16}alkyl, C_{8-18}alkylethoxy, C_{8-18}alkylphenolethoxy and R_3 is benzyl, and X is a halide, for example chloride, bromide or iodide, or is a methosulfate anion. The alkyl groups recited in R_2 and R_3 may be straight-chained or branched, but are preferably substantially linear.

Particularly useful quaternary germicides include compositions which include a single quaternary compound, as well as mixtures of two or more different quaternary compounds. Such useful quaternary compounds are available under the BARDAC®, BARQUAT®, HYAMINE®, LONZABAC®, and ONYXIDE® trademarks, which are more fully described in, for example, *McCutcheon's Functional Materials* (Vol. 2), North American Edition, 1998, as well as the respective product literature from the suppliers identified below. For example, BARDAC® 205M is described to be a liquid containing alkyl dimethyl benzyl ammonium chloride, octyl decyl dimethyl ammonium chloride; ehydra dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 208M)); described generally in *McCutcheon's* as a combination of alkyl dimethyl benzyl ammonium chloride and dialkyl dimethyl ammonium chloride); BARDAC® 2050 is described to be a combination of octyl decyl dimethyl ammonium chloride/ ehydra dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 2080)); BARDAC ® 2250 is described to be ehydra dimethyl ammonium chloride (50% active); BARDAC® LF (or BARDAC® LF-80), described as being based on dioctyl dimethyl ammonium chloride (BARQUAT® MB-50, MX-50, OJ-50 (each 50% liquid) and MB-80 or MX-80 (each 80% liquid) are each described as an alkyl dimethyl benzyl ammonium chloride; BARDAC® 4250 and BARQUAT® 4250Z (each 50% active) or BARQUAT® 4280 and BARQUAT 4280Z (each 80% active) are each described as alkyl dimethyl benzyl ammonium chloride/alkyl dimethyl ethyl benzyl ammonium chloride. Also, HYAMINE® 1622, described as diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride (50% solution); HYAMINE® 3500 (50% actives), described as alkyl dimethyl benzyl ammonium chloride (also available as 80% active (HYAMINE® 3500-80)); and HYMAINE® 2389 described as being based on methyldodecylbenzyl ammonium chloride and/or methyldodecylxylene-bis-trimethyl ammonium chloride. (BARDAC®, BARQUAT® and HYAMINE® are presently commercially available from Lonza, Inc., Fairlawn, New Jersey). BTC® 50 NF (or BTC® 65 NF) is described to be alkyl dimethyl benzyl ammonium chloride (50% active); BTC® 99 is described as ehydra dimethyl ammonium chloride (50% acive); BTC® 776 is described to be myrisalkonium chloride (50% active); BTC® 818 is

described as being octyl decyl dimethyl ammonium chloride, ehydra dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (available also as 80% active (BTC® 818-80%)); BTC® 824 and BTC® 835 are each described as being of alkyl dimethyl benzyl ammonium chloride (each 50% active); BTC® 885 is described as a combination of BTC® 835 and BTC® 818 (50% active) (available also as 80% active (BTC® 888)); BTC® 1010 is described as ehydra dimethyl ammonium chloride (50% active) (also available as 80% active (BTC® 1010-80)); BTC® 2125 (or BTC® 2125 M) is described as alkyl dimethyl benzyl ammonium chloride and alkyl dimethyl ethylbenzyl ammonium chloride (each 50% active) (also available as 80% active (BTC® 2125 80 or BTC® 2125 M)); BTC® 2565 is described as alkyl dimethyl benzyl ammonium chlorides (50% active) (also available as 80% active (BTC® 2568)); BTC® 8248 (or BTC® 8358) is described as alkyl dimethyl benzyl ammonium chloride (80% active) (also available as 90% active (BTC® 8249)); ONYXIDE® 3300 is described as n-alkyl dimethyl benzyl ammonium saccharinate (95% active). (BTC® and ONYXIDE® are presently commercially available from Stepan Company, Northfield, Illinois.) Polymeric quaternary ammonium salts based on these monomeric structures are also considered desirable for the present invention. One example is POLYQUAT®, described as being a 2-butenyldimethyl ammonium chloride polymer.

Preferred quaternary germicides used in the compressed solid block compositions are those which are supplied in a solid or powdered form, as such greatly facilitates the manufacture of the compressed solid block compositions.

When present in a compressed solid block composition, it is preferred that the germicidal cationic surfactant(s) are present in amounts so to dispense at least about 200 parts per million (ppm) in the water flushed into the sanitary appliance, e.g., toilet bowl, or into the water retained in the sanitary appliance at the conclusion of the flush cycle.

Further detersive surfactants which may be included are amphoteric and zwitterionic surfactants which provide a detersive effect. Exemplary useful amphoteric surfactants include alkylbetaines, particularly those which may be represented by the following structural formula:

$$RN^{+}(CH_3)_2CH_2COO^{-}$$

wherein R is a straight or branched hydrocarbon chain which may include an aryl moiety, but is preferably a straight hydrocarbon chain containing from about 6 to 30 carbon atoms. Further exemplary useful amphoteric surfactants include amidoalkylbetaines, such as amidopropylbetaines which may be represented by the following structural formula:

$$RCONHCH_2CH_2CH_2N^+(CH_3)_2CH_2COO^-$$

wherein R is a straight or branched hydrocarbon chain which may include an aryl moiety, but is preferably a straight hydrocarbon chain containing from about 6 to 30 carbon atoms.

As noted above, preferred detersive surfactants are those which exhibit a melting points above about 110°F., preferably above 125°F., in order to permit convenient processing according to known art techniques. Nonetheless small amounts of low melting point surfactants, i.e., those exhibiting melting points below about 110°F and even liquid surfactants may be used in providing the surfactant constituent of the solid block composition.

The detersive surfactant constituent may be present in any effective amount and generally comprises up to about 60%wt. of the total weight of the solid block composition, and the resultant treatment block formed therefrom. Preferably the detersive surfactant constituent comprises about 10 – 55%wt., more preferably 20-50%wt. of the solid block composition, and the resultant treatment block formed therefrom.

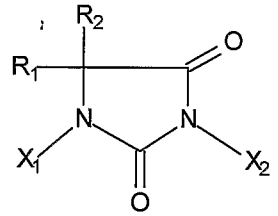
In particularly preferred embodiments the compressed solid blocks of the invention necessarily comprise at least one surfactant, preferably at least one anionic surfactant.

Further exemplary chemical constituents may be one or more sanitizing agents or germicides which may be present with our without other constituents being present in the compressed solid blocks of the lavatory dispensing devices.

The sanitizing agent can be any sanitizing composition known to those of ordinary skill in the relevant art, and without limitation exemplary sanitizing compositions include materials containing alkyl halohydantoins, alkali metal

haloisocyanurates, bleach, essential oils, non-quaternary ammonium based germicidal compounds as well as quaternary ammonium germicidal compounds.

By way of non-limiting example, exemplary a bleach constituent. The bleach constituent is relatively inert in the dry state but, which on contact with water, releases oxygen, hypohalite or a halogen especially chlorine. Representative examples of typical oxygen-release bleaching agents, suitable for incorporation in the solid block composition include the alkali metal perborates, e.g., sodium perborate, and alkali metal monopersulfates, e.g., sodium monopersulfates, potassium monopersulfate, alkali metal monoperphosphates, e.g., disodium monoperphosphate and dipotassium monoperphosphate, as well as other conventional bleaching agents capable of liberating hypohalite, e.g., hypochlorite and/or hypobromite, include heterocyclic N-bromo- and N-chloro-cyanurates such as trichloroisocyanuric and tribromoiscyanuric acid, dibromocyanuric acid, dichlorocyanuric acid, N-monobromo-N-mono-chlorocyanuric acid and N-monobromo-N,N-dichlorocyanuric acid, as well as the salts thereof with water solubilizing cations such as potassium and sodium, e.g., sodium N-monobromo-N-monochlorocyanurate, potassium dichlorocyanurate, sodium dichlorocyanurate, as well as other N-bromo and N-chloro- imides, such as N-brominated and N-chlorinated succinimide, malonimide, phthalimide and naphthalimide. Also useful in the solid block composition as hypohalite-releasing bleaches are halohydantoins which may be used include those which may be represented by the general structure:



wherein:

X_1 and X_2 are independently hydrogen, chlorine or bromine; and,

R_1 and R_2 are independently alkyl groups having from 1 to 6 carbon atoms.

Examples of halohydantoins include, for example, N,N'-dichloro-dimethyl-hydantoin, N-bromo-N-chloro-dimethyl-hydantoin, N,N'-dibromo-dimethyl-hydantoin, 1,4-dichloro, 5,5-dialkyl substituted hydantoin, wherein each alkyl group independently has 1 to 6 carbon atoms, N-monohalogenated hydantoins such as chlorodimethylhydantoin

(MCDMH) and N-bromo-dimethylhydantoin (MBDMH); dihalogenated hydantoins such as dichlorodimethylhydantoin (DCDMH), dibromodimethylhydantoin (DBDMH), and 1-bromo-3-chloro-5,5,-dimethylhydantoin (BCDMH); and halogenated methylethylhydantoins such as chloromethylethylhydantion (MCMEH), dichloromethylethylhydantoin (DCMEH), bromomethylethylhydantoin (MBMEH), dibromomethylethylhydantoin (DBMEH), and bromochloromethylethylhydantoin (BCMEH), and mixtures thereof. Other suitable organic hypohalite liberating bleaching agents include halogenated melamines such as tribromomelamine and trichloromelamine. Suitable inorganic hypohalite-releasing bleaching agents include lithium and calcium hypochlorites and hypobromites. The various chlorine, bromine or hypohalite liberating agents may, if desired, be provided in the form of stable, solid complexes or hydrates, such as sodium p-toluene sulfobromamine trihydrate; sodium benzene sulfochloramine ehydrate; calcium hypobromite tetrahydrate; and calcium hypochlorite tetrahydrate. Brominated and chlorinated trisodium phosphates formed by the reaction of the corresponding sodium hypohalite solution with trisodium orthophosphate (and water, as necessary) likewise comprise useful inorganic bleaching agents for incorporation into the inventive solid block composition and the treatment blocks formed therefrom.

When present, preferably the bleach constituent is a hypohalite liberating compound and more preferably is a hypohalite liberating compound in the form of a solid complex or hydrate thereof. Particularly preferred are chloroisocynanuric acids and alkali metal salts thereof, preferably potassium, and especially sodium salts thereof. Examples of such compounds include trichloroisocyananuric acid, dichloroisocyanuric acid, sodium dichloroisocyanurate, potassium dichloroisocyanurate, and trichloro-potassium dichloroisocynanurate complex. The most preferred chlorine bleach material is sodium dichloroisocyanurate; the ehydrate of this material being particularly preferred.

When present, the bleach constituent may be present in any effective amount and may comprise up to about 90%wt., preferably at least about 0.01 – 60%wt of the compressed solid block composition. More preferably, when present, the bleach constituent comprises about 0.5 – 50%wt., more preferably at least 1-40%wt. of the compressed solid block composition.

Other germicidally effective agents useful as sanitizing agents include sodium dichloroisocyanurate (DCCNa) and sodium dibromoisocyanurate. Further examples of non-quaternary ammonium based sanitizing agents include pyrithiones, dimethyldimethylol hydantoin, methylchloroisothiazolinone/methylisothiazolinone sodium sulfite, sodium bisulfite, imidazolidinyl urea, diazolidinyl urea, benzyl alcohol, 2-bromo-2-nitropropane-1,3-diol, formalin (formaldehyde), iodopropenyl butylcarbamate, chloroacetamide, methanamine, methyldibromonitrile glutaronitrile, glutaraldehyde, 5-bromo-5-nitro-1,3-dioxane, phenethyl alcohol, o-phenylphenol/sodium o-phenylphenol, sodium hydroxymethylglycinate, polymethoxy bicyclic oxazolidine, dimethoxane, thimersal dichlorobenzyl alcohol, captan, chlorphenenesin, dichlorophene, chlorbutanol, glyceryl laurate, halogenated diphenyl ethers, phenolic compounds, mono- and poly-alkyl and aromatic halophenols, resorcinol and its derivatives, bisphenolic compounds, benzoic esters (parabens), halogenated carbanilides, 3-trifluoromethyl-4,4'-dichlorocarbanilide, and 3,3',4-trichlorocarbanilide. More preferably, the non-cationic antimicrobial agent is a mono- and poly-alkyl and aromatic halophenol selected from the group p-chlorophenol, methyl p-chlorophenol, ethyl p-chlorophenol, n-propyl p-chlorophenol, n-butyl p-chlorophenol, n-amyl p-chlorophenol, sec-amyl p-chlorophenol, n-hexyl p-chlorophenol, cyclohexyl p-chlorophenol, n-heptyl p-chlorophenol, n-octyl p-chlorophenol, o-chlorophenol, methyl o-chlorophenol, ethyl o-chlorophenol, n-propyl o-chlorophenol, n-butyl o-chlorophenol, n-amyl o-chlorophenol, tert-amyl o-chlorophenol, n-hexyl o-chlorophenol, n-heptyl o-chlorophenol, o-benzyl p-chlorophenol, o-benzyl-m-methyl p-chlorophenol, o-benzyl-m, m-dimethyl p-chlorophenol, o-phenylethyl p-chlorophenol, o-phenylethyl-m-methyl p-chlorophenol, 3-methyl p-chlorophenol, 3,5-dimethyl p-chlorophenol, 6-ethyl-3-methyl p-chlorophenol, 6-n-propyl-3-methyl p-chlorophenol, 6-iso-propyl-3-methyl p-chlorophenol, 2-ethyl-3,5-dimethyl p-chlorophenol, 6-sec-butyl-3-methyl p-chlorophenol, 2-iso-propyl-3,5-dimethyl p-chlorophenol, 6-diethylmethyl-3-methyl p-chlorophenol, 6-iso-propyl-2-ethyl-3-methyl p-chlorophenol, 2-sec-amyl-3,5-dimethyl p-chlorophenol 2-diethylmethyl-3,5-dimethyl p-chlorophenol, 6-sec-octyl-3-methyl p-chlorophenol, p-chloro-m-cresol, p-bromophenol, methyl p-bromophenol, ethyl p-bromophenol, n-propyl p-bromophenol, n-butyl p-bromophenol, n-amyl p-bromophenol, sec-amyl p-bromophenol, n-hexyl p-bromophenol, cyclohexyl p-

bromophenol, o-bromophenol, tert-amyl o-bromophenol, n-hexyl o-bromophenol, n-propyl-m,m-dimethyl o-bromophenol, 2-phenyl phenol, 4-chloro-2-methyl phenol, 4-chloro-3-methyl phenol, 4-chloro-3,5-dimethyl phenol, 2,4-dichloro-3,5-dimethylphenol, 3,4,5,6-terabromo-2-methylphenol, 5-methyl-2-pentylphenol, 4-isopropyl-3-methylphenol, para-chloro-meta-xylenol, dichloro meta xylenol, chlorothymol, and 5-chloro-2-hydroxydiphenylmethane.

Quaternary ammonium based sanitizing agents include any cationic surfactant which is known or may be found to provide a broad antibacterial or sanitizing function; these have been described above with reference to detersive surfactants.

As a further chemical constituent, the compressed solid block compositions of the invention may also comprise a coloring agent which imparts either a color to the compressed solid blocks, to the water in which it comes into contact, but especially which imparts color to the water contained within the sanitary appliance. Where the sanitary appliance is a toilet, desirably the coloring agent imparts a color to the water contained within the cistern, or within the toilet bowl particularly following the flush cycle of a toilet, or may impart a color in both locations. Such coloring agents have great consumer appeal, and indeed any known art coloring agent may be provided in any effective amount in order to impart a coloring effect. Colorants, especially dyes, are preferred when formulated as dry powders to enable direct incorporation into compressed solid blocks of the invention, however, liquid colorants may be employed in conjunction with suitable carriers. Useful colorants include any materials which may provide a desired coloring effect. Exemplarly useful coloring agents include dyes, e.g., Alizarine Light Blue B (C.I. 63010), Carta Blue VP (C.I. 24401), Acid Green 2G (C.I. 42085), Astragon Green D (C.I. 42040) Supranol Cyanine 7B (C.I. 42675), Maxilon Blue 3RL (C.I. Basic Blue 80), acid yellow 23, acid violet 17, a direct violet dye (Direct violet 51), Drimarine Blue Z-RL (C.I. Reactive Blue 18), Alizarine Light Blue H-RL (C.I. Acid Blue 182), FD&C Blue No. 1, FD&C Green No. 3 and Acid Blue No. 9. When a bleach constituent is included in the compressed solid block composition, the colorant, e.g., dye, should be selected so to ensure the compatibility of the colorant with the bleach constituent, or so that its color persists despite the presence in the toilet bowl of a concentration of hypochlorite which is effective to maintain sanitary conditions. Frequently however, a

compressed solid block composition which includes a bleach constituent do not comprise any colorants. Desirably the colorants, when present, do not exceed 15%wt. of the compressed solid block composition, although generally lesser amounts are usually effective. When present, colorants are desirably present in an amount from about 0.1 to 15 percent of the total weight of the compressed solid block composition.

The inventors have also surprisingly discovered that the surface appearance of the compressed solid block composition may be significantly improved wherein there is included in the compressed solid block composition an amount of titanium dioxide. The titanium dioxide included in amounts which are observed to be effective in improving the visible surface appearance following ageing or use of the block in a sanitary appliance, especially following contact with and erosion by water such as flush water of a sanitary appliance. The presence of the titanium dioxide has been observed to minimize or to eliminate the unattractive spotted, streaked, or otherwise unattractive surface appearance of similar blocks, but which exclude titanium dioxide among their constituents. When present, titanium dioxide is desirably present in an amount from about 0.01 to 15 percent of the total weight of the compressed solid block composition.

The compressed solid block compositions may include a fragrance or other air treatment constituent. The fragrance may be any composition which is known to the art to provide a perceptible fragrancing benefit, any may be based on naturally occurring materials such as one or more essential oils, or may be based on synthetically produced compounds as well. Examples of essential oils include pine oil, Anetlhole 20/21 natural, Aniseed oil china star, Aniseed oil globe brand, Balsam (Perui), Basil oil (India), Black pepper oil, Black pepper oleoresin 40/20, Bois de Rose (Brazil) FOB, Bomneol Flakes (China), Camphor oil, White, Camphor powder synthetic technical, Canaga oil (Java), Cardamom oil, Cassia oil (China), Cedarwood oil (China) BP, Cinnamon bark oil, Cinnamon leaf oil, Citronella oil, Clove bud oil, Clove leaf, Coriander (Russia), Counmarin 69°C. (China), Cyclamen Aldehyde, Diphenyl oxide, Ethyl ehydrat, Eucalyptol, Eucalyptus oil, Eucalyptus citriodora, Fennel oil, Geranium oil, Ginger oil, Ginger oleoresin (India), White grapefruit oil, Guaiacwood oil, Gurjun balsam, Heliotropin, Isobornyl acetate, Isolongifolene, Juniper berry oil, L-methyl acetate, Lavender oil, Lemon oil, Lemongrass oil, Lime oil distilled, Litsea Cubeba oil,

Longifolene, Menthol crystals, Methyl cedryl ketone, Methyl chavicol, Methyl salicylate, Musk ambrette, Musk ketone, Musk xylol, Nutmeg oil, Orange oil, Patchouli oil, Peppermint oil, Phenyl ethyl alcohol, Pimento berry oil, Pimento leaf oil, Rosalin, Sandalwood oil, Sandenol, Sage oil, Clary sage, Sassafras oil, Spearmint oil, Spike lavender, Tagetes, Tea tree oil, Vanilin, Vetyver oil (Java), and Wintergreen oil.

Many of these essential oils function as a fragrance agent, which fragrance agent which may be a substance or mixture of various substances including those which are naturally derived (i.e., obtained by extraction of flower, herb, blossom or plant), those which are artificially derived or produced (i.e., mixture of natural oils and/or oil constituents), and those which are synthetically produced substances (odiferous substances). Generally fragrance agents are complex mixtures or blends various organic compounds including, but not limited to, certain alcohols, aldehydes, ethers, alamatic compounds and varying amounts of essential oils such as from about 0 to about 25% by weight, usually from about 0.05 to about 12% by weight, the essential oils themselves being volatile odiferous compounds and also functioning to aid in the dissolution of the other components of the fragrance agent. In the present invention, the precise composition of the fragrance agent desirably emanates a pleasing fragrance, but the nature of the fragrance agent is not critical to the success of the invention.

As noted above, in conjunction with or in the absence of a fragrance constituent, the compressed solid block compositions may comprise an air treatment constituent. Such may be any other material which is useful in providing treatment of ambient air, such as a sanitizing agents . e.g., one or more glycols or alcohols, or materials which are intended to counteract, neutralize, or mask odors in the absence of, or in conjunction with, the fragrance composition of the present invention. Alternatively, the air treatment constituent may be one or more materials which provide and effective insecticide repelling or insecticidal benefit; such would be particularly useful in climates or environments where insects present a nuisance or health hazard.

As further chemical constituents, the compressed solid block compositions of the invention may comprise an anti-limescale agent, which can be generally classified as a cleaning agent in that it provides a cleaning effect to treated lavatory device surfaces. The anti-limescale agent can virtually any known anti-limescale agent compositions known to

those of ordinary skill in the relevant art. For example, compositions containing anionic and/or nonionic surfactants together with typical anti-limescale agents, for example, amidosulfonic acid, bisulfate salts, organic acids, organic phosphoric salts, alkali metal polyphosphates, and the like. Examples of anti-limescale agent compositions can be found in, for example, United States Patent Nos. 5,759,974; 4460490; and 4578207, the contents of which are herein incorporated by reference. Further examples of anti-limescale agents include organic acids (for example, citric acid, lactic acid, adipic acid, oxalic acid and the like), organic phosphoric salts, alkali metal polyphosphates, sulfonic, and sulfamic acids and their salts, bisulfate salts, EDTA, phosphonates, and the like.

The compressed solid block compositions may comprise stain inhibiting materials. The solid block composition of the invention may, for example, include an effective amount of a manganese stain inhibiting agent which is advantageously included wherein the sanitary appliance is supplied by a water source having an appreciable or high amount of manganese. Such water containing a high manganese content are known to frequently deposit unsightly stains on surfaces of sanitary appliances, especially when the solid block composition also contains a bleach source which provides a hypochlorite. To counteract such an effect the solid block composition of the present invention may comprise a manganese stain inhibiting agent, such as a partially hydrolyzed polyacrylamide having a molecular weight of about 2000 to about 10,000, a polyacrylate with a molecular weight of about 2000 to about 10,000, and/or copolymers of ethylene and maleic acid anhydride with a molecular weight of from about 20,000 to about 100,000. When present the satin inhibiting materials may comprise to about 10%wt. of the weight of the compressed solid block composition.

The compressed solid block compositions of the invention may include one or more preservatives. Such preservatives are primarily included to reduce the growth of undesired microorganisms within the treatment blocks formed from the solid block composition during storage prior to use or while used, although it is expected that the such a preservative may impart a beneficial antimicrobial effect to the water in the sanitary appliance to which the treatment block is provided. Exemplary useful preservatives include compositions which include parabens, including methyl parabens and ethyl parabens, glutaraldehyde, formaldehyde, 2-bromo-2-nitropropoane-1,3-diol, 5-

chloro-2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazoline-3-one, and mixtures thereof. One exemplary composition is a combination 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one where the amount of either component may be present in the mixture anywhere from 0.001 to 99.99 weight percent, based on the total amount of the preservative. For reasons of availability, the most preferred preservative are those commercially available preservative comprising a mixture of 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one marketed under the trademark KATHON® CG/ICP as a preservative composition presently commercially available from Rohm and Haas (Philadelphia, PA). Further useful preservative compositions include KATHON® CG/ICP II, a further preservative composition presently commercially available from Rohm and Haas (Philadelphia, PA), PROXEL® which is presently commercially available from Zeneca Biocides (Wilmington, DE), SUTTOCIDE® A which is presently commercially available from Sutton Laboratories (Chatam, NJ) as well as TEXTAMER® 38AD which is presently commercially available from Calgon Corp. (Pittsburgh, PA). When present, the optional preservative constituent should not exceed about 5%wt. of the solid block composition, although generally lesser amounts are usually effective.

The compressed solid block compositions may include a binder constituent. The binder may function in part controlling the rate of dissolution of the tablet. The binder constituent may be a clay, but preferably is a water-soluble or water-dispersible gel-forming organic polymer. The term "gel-forming" as applied to this polymer is intended to indicate that on dissolution or dispersion in water it first forms a gel which, upon dilution with further water, is dissolved or dispersed to form a free-flowing liquid. The organic polymer serves essentially as binder for the tablets produced in accordance with the invention although, as will be appreciated, certain of the polymers envisaged for use in accordance with the invention also have surface active properties and thereby serve not only as binders but also enhance the cleansing ability of the tablets of the invention. Further certain organic polymers, such as substituted celluloses, also serve as soil antiredeposition agents. A wide variety of water-soluble organic polymers are suitable for use in the solid block composition of the present invention. Such polymers may be wholly synthetic or may be semi-synthetic organic polymers derived from natural

materials. Thus, for example, on class of organic polymers for use in accordance with the invention are chemically modified celluloses such as ethyl cellulose, methyl cellulose, sodium carboxymethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methyl cellulose, ethyl hydroxyethyl cellulose, carboxymethyl hydroxyethyl cellulose, and hydroxyethyl cellulose. Another class of organic polymers which may be used include naturally derived or manufactured (fermented) polymeric materials such as alginates and carageenan. Also, water-soluble starches and gelatin may be used as the optional binder constituent. The cellulose based binders are a preferred class of binders for use in the solid block composition and may possess the property of inverse solubility that is their solubility decreases with increasing temperature, thereby rendering the tablets of the invention suitable for use in locations having a relatively high ambient temperature.

The optional binder constituent may also be one or more synthetic polymers e.g, polyvinyl alcohols; water-soluble partially hydrolyzed polyvinyl acetates; polyacrylonitriles; polyvinyl pyrrolidones; water-soluble polymers of ethylenically unsaturated carboxylic acids, such as acrylic acid and methacrylic acid, and salts thereof; base-hydrolysed starch-polyacrylonitrile copolymers; polyacrylamides; ethylene oxide polymers and copolymers; as well as carboxypolymethylenes.

In the case of the organic polymeric binders it may be noted that, in general, the higher the molecular weight of the polymer the greater the in-use life of the treatment block of the invention. When present, the total binder content may comprise up to 75%wt. of the solid block composition, but preferably is from 0.5 to 70% by weight, preferably from 1 to 65% by weight, more preferably from 5 to 60% by weight.

The compressed solid block composition may optionally include one or more dissolution control agents. Such dissolution control agent are materials which provide a degree of hydrophobicity to the treatment block formed from the solid block composition whose presence in the treatment block contributes to the slow uniform dissolution of the treatment block when contacted with water, and simultaneously the controlled release of the active constituents of the solid block composition. Preferred for use as the dissolution control agents are mono- or di-alkanol amides derived from C_8-C_{16} fatty acids, especially C_{12}-C_{14} fatty acids having a C_2-C_6 monoamine or diamine moiety. When included the dissolution control agent may be included in any effective amount, but desirably the

dissolution control agent is present in an amount not to exceed about 600%wt. of the solid block composition, although generally lesser amounts are usually effective. Generally when present, the dissolution control agent is present to about 12%wt., more preferably is present from 0.1 – 10%wt. and most preferably is present from about 3 – 8%wt. of the compressed solid block compositions of which they form a part

The compressed solid block compositions may optionally include one or more water-softening agents or one or more chelating agents, for example inorganic water-softening agents such as sodium hexametaphosphate or other alkali metal polyphosphates or organic water-softening agents such as ethylenediaminetetraacetic acid and nitrilotriacetic acid and alkali metal salts thereof. When present, such water-softening agents or chelating agents should not exceed about 20%wt. of the solid block composition, although generally lesser amounts are usually effective.

The compressed solid block composition may optionally include one or more solid water-soluble acids or acid-release agents such as sulphamic acid, citric acid or sodium hydrogen sulphate. When present, such solid water-soluble acids or acid-release agents should not exceed about 20%wt. of the solid block composition, although generally lesser amounts are usually effective.

The compressed solid block composition may include diluent materials may be included to provide additional bulk of the product solid block composition and may enhance leaching out of the surfactant constituent when the solid block composition is placed in water. Exemplary diluent materials include any soluble inorganic alkali, alkaline earth metal salt or hydrate thereof, for example, chlorides such as sodium chloride, magnesium chloride and the like, carbonates and bicarbonates such as sodium carbonate, sodium bicarbonate and the like, sulfates such as magnesium sulfate, copper sulfate, sodium sulfate, zinc sulfate and the like, borax, borates such as sodium borate and the like, as well as others known to the art but not particularly recited herein. Exemplary organic diluents include, inter alia, urea, as well as water soluble high molecular weight polyethylene glycol and polypropylene glycol. When present, such diluent materials should not exceed about 80%wt. of the compressed solid block composition, although generally lesser amounts are usually effective. Preferably a sulfate salt, e.g., magnesium sulfate, copper sulfate, sodium sulfate, zinc sulfate and the like, and particularly sodium

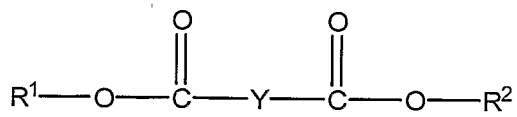
sulfate is necessarily present in the compressed solid block composition and treatment blocks formed therefrom.

The compressed solid block composition and treatment blocks formed therefrom may include one or more fillers. Such fillers are typically particulate solid water-insoluble materials which may be based on inorganic materials such as talc or silica, particulate organic polymeric materials such as finely comminuted water insoluble synthetic polymers. When present, such fillers should not exceed about 30%wt. of the compressed solid block composition, although generally lesser amounts are usually effective.

Advantageously the compressed solid block composition of the invention includes silica. Silica has been observed to aid in the controlling the rate of dissolution of the compressed solid blocks of the invention.

The compressed solid block composition and treatment blocks formed therefrom may include one or more further processing aids. For example, the solid block composition may also include other binding and/or plasticizing ingredients serving to assist in the manufacture thereof, for example, polypropylene glycol having a molecular weight from about 300 to about 10,000 in an amount up to about 20% by weight, preferably about 4% to about 15% by weight of the mixture may be used. The polypropylene glycol reduces the melt viscosity, acts as a demolding agent and also acts to plasticize the block when the composition is prepared by a casting process. Other suitable plasticizers such as pine oil fractions, d-limonene, dipentene and the ethylene oxide-propylene oxide block copolymers may be utilized. Other useful processing aids include tabletting lubricants such as metallic stearates, stearic acid, paraffin oils or waxes or sodium borate which facilitate in the formation of the treatment blocks in a tabletting press or die.

One advantageously utilized processing aid is a diester constituent which may be represented by the following structure:



wherein:

R^1 and R^2 can independently be C_1-C_6 alkyl which may optionally substituted, Y is $(CH_2)_x$, wherein x is 0-10, but is preferably 1-8, and while Y may be a linear alkyl or phenyl moiety, desirably Y includes one or more oxygen atoms and/or is a branched moiety.

Exemplary diester constituents include the following diester compounds according to the foregoing structure: dimethyl oxalate, diethyl oxalate, diethyl oxalate, dipropyl oxalate, dibutyl oxalate, diisobutyl oxalate, dimethyl succinate, diethyl succinate, diethylhexyl succinate, dimethyl glutarate, diisostearyl glutarate, dimethyl adipate, diethyl adipate, diisopropyl adipate, dipropyl adipate, dibutyl adipate, diisobutyl adipate, dihexyladipate, di-C_{12-15}-alkyl adipate, dicapryl adipate, dicetyl adipate, diisodecyl adipate, diisocetyl adipate, diisononyl adipate, diheptylundecyl adipate, ditridecyl adipate, diisostearyl adipate, diethyl sebacate, diisopropyl sebacate, dibutyl sebacate, diethylhexylsebacate, diisocetyl dodecanedioate, dimethyl brassylate, dimethyl phthalate, diethyl phthalate, dibutyl phthalate.

Preferred diester constituents include those wherein Y is $-(CH_2)_x-$ wherein x has a value of from 0 – 6, preferably a value of 0 – 5, more preferably a value of from 1-4, while R^1 and R^2 are C_1-C_6 alkyl groups which may be straight chained alkyl but preferably are branched, e.g, iso- and tert-moieties. Particularly preferred diester compounds are those in which the compounds terminate in ester groups.

A further advantageously utilized processing aid is a hydrocarbon solvent constituent. The hydrocarbon solvents are immiscible in water, may be linear or branched, saturated or unsaturated hydrocarbons having from about 6 to about 24 carbon atoms, preferably comprising from about 12 to about 16 carbon atoms. Saturated hydrocarbons are preferred, as are branched hydrocarbons. Such hydrocarbon solvents are typically available as technical grade mixtures of two or more specific solvent compounds, and are often petroleum distillates. Nonlimiting examples of some suitable linear hydrocarbons include decane, dodecane, decene, tridecene, and combinations thereof. Mineral oil is one particularly preferred form of a useful hydrocarbon solvent. Further preferred hydrocarbon solvents include paraffinic hydrocarbons including both linear and branched paraffinic hydrocarbons. The former are commercially available as NORPAR solvents (ex. ExxonMobil Corp.) while the latter are available as ISOPAR

solvents (ex. ExxonMobil Corp.) Mixtures of branched hydrocarbons especially as isoparaffins form a further particularly preferred form of a useful hydrocarbon solvent of the invention. Particularly useful technical grade mixtures of isoparaffins include mixtures of isoparaffinic organic solvents having a relatively narrow boiling range. Examples of these commercially available isoparaffinic organic solvents include ISOPAR C described to be primarily a mixture of C_7-C_8 isoparaffins, ISOPAR E described to be primarily a mixture of C_8-C_9 isoparaffins, ISOPAR G described to be primarily a mixture of C_{10}-C_{11} isoparaffins, ISOPAR H described to be primarily a mixture of C_{11}-C_{12} isoparaffins, ISOPAR J, ISOPAR K described to be primarily a mixture of C_{11}-C_{12} isoparaffins, ISOPAR L described to be primarily a mixture of C_{11}-C_{13} isoparaffins, ISOPAR M described to be primarily a mixture of C_{13}-C_{14} isoparaffins, ISOPAR P and ISOPAR V described to be primarily a mixture of C_{12}-C_{20} isoparaffins.

When present, such further processing aids are typically included in amounts of up to about 30% by weight, preferably to 20%wt. of the solid block composition, although generally lesser amounts are usually effective.

Optionally but in some cases, preferably one or more of the foregoing constituents may be provided as an encapsulated, particularly a microencapsulated material. That is to say, quantities of one or more constituents are provided covered or encapsulated in an encapsulating material. Methods suitable for such an encapsulation include the customary methods and also the encapsulation of the granules by a melt consisting e.g. of a water-soluble wax, coacervation, complex coacervation and surface polymerization. Non-limiting examples of useful encapsulating materials include e.g. water-soluble, water-dispersible or water-emulsifiable polymers and waxes. Advantageously, reactive chemical constituents, particularly the fragrance composition when present, may be provided in an encapsulated form so to ensure that they do not prematurely degrade during processing of the constituents used to form the compressed solid block composition and that they are retained with minimal degradation in the compressed solid block composition prior to their use. The use of water soluble encapsulating material is preferred as such will release the one or more chemical constituents when the compressed solid block composition is contacted with water supplied either in the cistern or in the toilet bowl.

Ideally the compressed solid block composition exhibit a density greater than that of water which ensures that they will sink when suspended in a body of water, e.g., the water present within a cistern. Preferably the treatment blocks formed from the solid block composition exhibit a density in excess of about 1 g/cc of water, preferably a density in excess of about 1.5 g/cc of water and most preferably a density of at least about 2 g/cc of water.

While the mass of the compressed solid blocks formed from the compressed solid block compositions may vary, and amount of up to an including 500 grams may be practiced, generally the mass of the compressed solid block compositions do not exceed about 250 grams. Advantageously the mass of the compressed solid blocks is between about 50 and 150 grams. It is appreciated that compressed solid blocks having great mass should provide a longer useful service life of the lavatory dispensing devices, with the converse being equally true.

The compressed solid blocks according to the present invention may also be provided with a coating of a water-soluble film, such as polyvinyl acetate following the formation of the treatment blocks from the recited solid block composition. Such may be desired for improved handling, however such is often unnecessary as preferred embodiments of the compressed blocks exhibit a lower likelihood of sticking to one another following manufacture than many prior art treatment block compositions.

It will be appreciated by those of ordinary skill in the art that several of the components which are directed to provide a chemical composition can be blended into one chemical composition with the additional appreciation that potential blending of incompatible components will be avoided. For example, those of ordinary skill in the art will appreciate that certain anionic surfactants may have to be avoided as some may be incompatible with certain sanitizing agents and/or certain anti-lime scale agents mentioned herein. Those of ordinary skill in the art will appreciate that the compatibility of the anionic surfactant and the various sanitizing and anti-limescale agents can be easily determined and thus incompatibility can be avoided in the situations.

The compressed solid blocks may be formed of a single compressed solid block composition, or may formed of two (or more) different compressed solid block composition which may be provided as separate regions of a solid block, such as a first

layer of a solid block consisting of a first compressed solid block composition, alongside a second layer of a second compressed solid block composition which is different than the first compressed solid block composition. The compressed solid block may also be formed of two or more separate blocks which are simply layered or otherwise assembled, without or without the use of an adhesive. Further layers of still further different chemical compositions may also be present. Such compressed solid blocks formed having two or more discrete layers or regions of, respectively, two or more different chemical compositions or different compressed solid block compositions may be referred to as composite blocks.

The compressed solid block according to the present invention may also be formed of two or more separate blocks which are simply layered or otherwise assembled, without or without the use of an adhesive. Alternately the compressed solid block may be physically separated from one another such as by a plate or other physical barrier element forming part of the hanger, or more simply, by providing a simple gap between two masses or bodies of compressed lavatory block compositions when they are applied to, or supplied to a hanger. Such latter embodiments provide a technique for using two chemically incompatible compressed solid block compositions as parts of a single dispensing device according to the invention.

Any form of the compressed solid blocks may also be provided with a coating film or coating layer, such as a water soluble film which is used to overwrap the chemical composition provided in the device which film provides a vapor barrier when dry, but which dissolves when contacted with water. Alternately the compressed solid blocks may be oversprayed or dipped into a bath of a water soluble film forming constituent, and thereafter removed and thus allowing the water soluble film forming constituent to dry and form a coating layer on the compressed solid block.

Exemplary materials which may be used to provide such a coating on some or all of the surfaces of the compressed solid block compositions include one or more of the following: Rhodasurf TB-970 described by its supplier to be a tridecyl alcohol having a degree of ethoxylation of approximately 100 having an HLB of19, and exhibiting a melting point in the range of 52-55°C; Antarox F-108 which is described to be an EO-PO block copolymer having a degree of ethoxylation of approximately 80% and having a

melting point in the range of 54-60°C; further materials including those identified as Pluriol Z8000, and Pluriol E8000 which are believed to be optionally substituted, high molecular weight polyethylene glycols ("PEG") having a sufficiently high molecular weight such that they have a melting point of at least 25°C, preferably a melting point of at least about 30°C may also be used. Other water soluble materials, desirably those which have a melting point in the range of about 30 – 70°C, and which may be used to provide a water soluble or water dispersible coating on the compressed solid blocks are also contemplated to be useful, especially synthetic or naturally occurring waxy materials, and high molecular weight polyalkylene glycols, especially polyethylene glycols. Certain of these coating materials may be surfactants. Generally such materials may be provided as a dispersion in water, an organic solvent or in an aqueous/organic solvent, but preferably are used as supplied from their respective supplier and are heated to at least their melting points in order to form a liquid bath. Conveniently, the compressed solid blocks affixed to the plate of a hanger are then conveniently dipped into the said bath, thereby providing a coating layer to the compressed solid blocks. Alternately, the coating materials may be sprayed, brushed on or padded onto at least part of the surfaces of the previously formed compressed solid blocks.

The application of a water soluble film or coating is preferred in certain embodiments of the invention as the surface film may facilitate the handling of the blocks during packaging and storage prior to use of the dispensing devices described herein particularly when such are cageless dispensing devices. Further, the application of a water soluble film or coating is preferred in some instances as certain water soluble film former compositions may impart a desirable surface gloss to the compressed solid blocks.

Preferably the compressed solid block compositions useful in the dispensing devices include those which comprise at least one surfactant, preferably at least one anionic or nonionic surfactant.

Exemplary compositions which can be used to form the compressed solid blocks of the present invention are shown in the following table below; the amounts indicates are in %wt. of the "as supplied" constituent used to form an example block compositions, labeled A through F.

Component	A	B	C	E	F
Dodecyl Benzene Sulfonate Na[1]	25	10	40	35	35
Alfa Olefine Sulfonate Na[2]	25	10	5	32	32
Lauryl monoethanolamide[3]	10	8	5	2	5
Sodium Lauryl Ether Sulfate[4]	10	-	-	4.5	5
Pluronic 68[5]	10	-	-	3	-
Na Sulfate	20	-	-	21.5	21
Pluronic 87 or 88[6]	-	70	50	-	-
Alcohol ehydrate d C_9-C_{11} 6EO[7]	-	2	-	-	-
Silica	-	-	-	2	2
Titanium dioxide	0.0001 – 10	0.000 1 – 10	0.000 1 – 10	0.000 1 – 10	0.000 1 – 10

[1] Dodecyl Benzene Sulfonate Sodium (80-90% active) – anionic
[2] Alpha Olefin Sulfonate Sodium – anionic
[3] Lauryl Monoethanolamide – non-ionic
[4] Sodium Lauryl Ether Sulfate (70% active) – anionic
[5] Polyoxyethylene (160) polyoxypropylene (30) glycol – non-ionic
[6] Pluronic 87 E_{61} $P_{41.5}$ E_{61} – Molecular Weight 7700 – HLB 24 – non-ionic
Pluronic 88 E_{98} $P_{41.5}$ E_{98} – Molecular Weight 10800 – HLB 28–non-ionic
[7] Alcohol ehydrate d C_9-C_{11} 6EO – non-ionic

Further exemplary bleach containing compositions which can be used to form compressed solid blocks useful in the present invention include compositions indicated on the next table having the general ranges as follows:

	%w/%w
alpha olefin sulfonate	0- 35
Sodium lauryl ether sulfate	3.0-6.0
Bleaching agent (e.g., DCCNa or Hydantoin)	0.5 – 25
Lauryl monoethanolamide	2.0-5.0
Dodecyl benzene sulfonate Na	50-70
Na sulfate anhydrous	15-25
Silica	1.0-2.0
Titanium dioxide	0.0001 – 10

Further exemplary preferred embodiments of compressed solid block compositions which are useful as compressed solid blocks of the present invention include those which comprise:

10 – 35%wt., preferably 15-30%wt. of an alpha olefin sulfonate anionic surfactant;

10 – 35%wt., preferably 15-30%wt. of a linear monoethanolamide;

5 – 50 %wt., preferably 15-35%wt. of a linear dodecylbenzene sulfonate anionic surfactant;

5 – 50%wt., preferably 20-35%wt. of sodium sulfate

0.1 – 15 %wt., preferably 0.5-5%wt. of silica

0.1 – 25%wt., preferably 1-10%wt. sodium lauryl ether sulfate

0.0001 – 10, preferably 0.01 – 0.5%wt. titanium dioxide

optionally to 40%wt. further additive constituents, including but not limited to further surfactants, fillers, binders, fragrances, processing aids such as lubricants and tabletting aids, bleaches, sanitizing compositions and the like.

Yet further exemplary compositions which include a bleach constituent which find use as in compressed solid block compositions of the present invention include those recited on the following tables, and labeled as G through N:

	G	H	I	J	K	L
dodecylbenzene sulfonate, sodium salt (80%)	27.0	22.0	32.0	35.00	37.8	32.0
sodium C14/C16 olefin sulfonates (80%)	15.0	20.0	15.0	22.0	23.62	20.0
silica	2.0	2.0	2.0	2.0	1.89	2.0
lauramide monoethanol amide (98%)	30.0	30.0	25.0	15.00	12.28	20.0
sodium sulfate	20.5	20.5	20.5	20.50	18.90	20.5
dichlorocyanurate ehydrate, sodium salt (56% bleach)	2.5	2.5	2.5	2.4	2.41	2.5
paraffinic hydrocarbons	3.0	3.0	3.0	3.1	3.09	3.0

	M	N	O
dodecylbenzene sulfonate, sodium salt (80%)	35.0	37.0	32.0
sodium C14/C16 olefin sulfonates (80%)	22.0	25.0	20.0
silica	2.0	2.0	2.0
lauramide monoethanol amide (98%)	15.0	10.0	20.0
sodium sulfate	20.5	20.5	18.5
dichlorocyanurate ehydrate, sodium salt (56% bleach)	2.5	2.5	2.5
paraffinic hydrocarbons	3	3	5
titanium dioxide	0 – 10	0 – 10	0 – 10

The identity of the constituents used to form the foregoing compressed solid blocks G – O are identified more specifically on the following table.

dodecylbenzene sulfonate, sodium salt (80%)	anionic surfactant, dodecylbenzene sulfonate, 80%wt. actives
sodium C14/C16 olefin sulfonates (80%)	anionic surfactant, sodium C14/C16 olefin sulfonates, 80%wt. actives

silica	filler anhydrous silica, 100%wt. actives.
lauramide monoethanol amide (98%)	solubility control agent, lauramide monoethanol amide, 98%wt. actives
sodium sulfate	diluent, sodium sulfate, 100%wt. actives
dichlorocyanurate ehydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate ehydrate, sodium salt, 56%wt. bleach actives
Isopar M	hydrocarbon solvent, isoparaffinic organic solvents, 100%wt. actives
mineral oil	hydrocarbon solvent, mineral oil, 100%wt. actives
paraffinic hydrocarbons	hydrocarbon solvent, white paraffin oil, 100%wt. actives
titanium dioxide	titanium dioxide

Still further exemplary compositions which include diisopropyl adipates which find use as compressed solid blocks of the present invention include those recited on the following tables, and labeled as P through W:

	P	Q	R	S
dodecylbenzene sulfonate, sodium salt (80%)	55.85	58.85	62.51	62.51
silica	2.41	2.41	2.56	2.56
lauramide monoethanolamide (98%)	6.01	6.01	6.38	6.38
sodium sulfate	12	12	12.75	12.75
dichlorocyanurate ehydrate, sodium salt (56%)	14.63	14.63	9.32	9.32
diisopropyl adipate	6.1	6.1	6.48	6.48

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	T	U	V	W
dodecylbenzene sulfonate, sodium salt (80%)	58.61	67.27	69.25	70.83
silica	2.40	1.91	1.96	2.01
lauramide monoethanolamide (98%)	5.98	4.74	4.88	4.99
sodium sulfate	11.95	17.37	17.88	18.29
dichlorocyanurate ehydrate, sodium salt (56%)	14.6	4.98	2.41	0.55
diisopropyl adipate	6.46	3.73	3.61	3.33
titanium dioxide	0 – 10	0 – 10	0 – 10	0 – 10

The identity of the constituents used to form the foregoing compressed solid blocks labeled P through W are identified more specifically on the following table:

dodecylbenzene sulfonate, sodium salt (80%)	anionic surfactant, dodecylbenzene sulfonate, 80%wt. actives
silica	anhydrous silica, 100%wt. actives.
lauramide monoethanolamide (98%)	solubility control agent, lauramide monoethanolamide, 98%wt. actives
sodium sulfate	diluent, sodium sulfate, 100%wt. actives
dichlorocyanurate ehydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate ehydrate, sodium salt, 56%wt. bleach actives
diisopropyl adipate	diester constituent, diisopropyl adipate, 100%wt. actives

Titanium dioxide	Titanium dioxide, 100%wt. actives

Yet further exemplary compositions which include paraffinic hydrocarbon solvents or mineral oil which find use as compressed solid blocks of the present invention include those recited on the following tables, and labeled as AA through AK:

	AA	AB	AC	AD	AE
dodecylbenzene sulfonate, sodium salt (80%)	65.8	65.8	65	64.17	69.25
silica	2.69	2.69	2.66	2.63	1.96
lauramide monoethanolamine (98%)	6.72	6.72	6.64	6.55	4.88
sodium sulfate	13.42	13.42	13.26	13.09	17.88
dichlorocyanurate ehydrate, sodium salt (56% bleach)	8.89	8.89	8.78	9.57	2.41
Isopar M	2.47	2.47	--	--	--
mineral oil	--	--	3.66	3.99	3.61
titanium dioxide	0 – 10	0 – 10	0 – 10	0 – 10	0 – 10

	AF	AG	AH	AI	AJ	AK
dodecylbenzene sulfonate, sodium salt (80%)	70.83	69.25	69.25	69.25	70.83	68.31
silica	2.01	1.96	1.96	1.96	2.01	2.90
lauramide monoethanolamine (98%)	4.99	4.88	4.88	4.88	4.99	4.88
sodium sulfate	18.29	17.88	17.88	17.88	18.29	17.88
dichlorocyanurate ehydrate, sodium salt (56% bleach)	0.55	2.41	2.41	2.41	0.55	2.41
Isopar M	3.33	3.61	3.61	--	--	3.61
mineral oil	--	--	--	3.61	3.33	--
titanium dioxide	0 – 10	0 – 10	0 – 10	0 – 10	0 – 10	0 – 10

The identity of the constituents used to form the foregoing blocks AA through AK are identified more specifically on the following table:

dodecylbenzene sulfonate, sodium salt (80%)	anionic surfactant, dodecylbenzene sulfonate, 80%wt. actives
silica	filler anhydrous silica, 100%wt. actives.
lauramide monoethanolamide (98%)	solubility control agent, lauramide monoethanolamide, 98%wt. actives
sodium sulfate	diluent, sodium sulfate, 100%wt. actives
dichlorocyanurate ehydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate ehydrate, sodium salt, 56%wt. bleach actives
Isopar M	hydrocarbon solvent, isoparaffinic organic solvents, 100%wt. actives
mineral oil	hydrocarbon solvent, mineral oil, 100%wt. actives
titanium dioxide	titanium dioxide, anhydrous (100%wt. actives)

Yet further and particularly preferred embodiments of compressed solid blocks and their compositions include those which are recited on Table 1.

The manufacture of the cageless dispensing device first contemplates mixing the constituents of the block composition into a generally homogenous mass such as by noodling, as well as by plodding, but preferably by extruding, and thereafter forming a "preform" from a measured quantity of the homogenous mass. Usually all of the solid ingredients are mixed in any suitable blending equipment followed by the addition of liquid ingredients under blending conditions. In an extrusion process a mixture of the chemical constituents used to ultimately form the compressed solid block composition is made, followed by extrusion of this mixture into a rod or bar form which is then cut into appropriately sized pieces or blocks which are to be used in the subsequent, separate compression process. These pieces or blocks of extrudate are the preforms. When the compressed solid block is formed from a single perform it is required to provide a cavity, channel or recess within the preform of suitable dimensions to accept at least a part of the stalk of the hanger. Conveniently a channel may be provided by cutting a slot in the preform of sufficient depth and width such that the plate may be fully inserted into the interior of the preform prior to the subsequent compression process. The channel may be cut, or carved such as by the use of a saw, or other cutting device which will either split or shape the preform adequately to provide such a suitable sized channel or recess. Alternately a channel may be providing by extruding through a die which includes a blade or other cutter means which extends into the open cross-section of the die such that as the extrudate exits the die, it is provided with such a channel which partially splits the extrudate into the legs of a "V", which remain attached however at the base of each leg. Such a channel may extend across the length of the preform and through the ends thereof. Alternately, subsequent to extrusion a tool such as a plunging blade may be used to partially split a portion of a preform in order to provide a cavity or slot which is of sufficient width and depth to accommodate at least the plate of the hanger. Such a cavity formed by such blade typically does not extend across the length of the preform nor through the ends thereof.

In a preferred embodiment, wherein the stalk is a rod or strip, the preform is extruded from a die which extrudes a hollow tube-like preform wherein the inner cavity

or diameter of the preform is approximately equal to or slightly larger than the diameter or maximum dimension of the cross-section of the stalk, such that the stalk may be inserted into the interior of cut segments of such a preform, and thereafter compressed thereby encasing or enrobing a part of the stalk of the hanger..

In a next process step, the stalk of a hanger is inserted within the interior of the channel or cavity such that the stalk is at least partially encased within the interior of the preform, and thereafter the preform is compressed in a die to form the compressed solid block composition on the stalk.

Alternately the extrudate may be of an alternate configuration, e.g., a semicircular, rectangular, square polygonal, elliptical or oblate cross-sectional configuration, which is formed into preforms. A semi-circular cross-section is particularly preferred. A cavity, channel or recess within the preform is not required as in an alternative process to the above, two or more discrete preforms are used together with then plate of the hanger positioned intermediate two adjacent preforms which are subsequently compressed. Thus, when two semi-circular preforms are to be compressed in a suitable die, a portion of the stalk is positioned between the two facing flat faces of the respective two semi-circular preforms which is then compressed resulting in a compressed solid block composition enrobing or encasing a part of the stalk of the hanger having a generally rod-like configuration.

The preform comprising the hanger is then compressed in a die which imparts the final shape to the compressed solid block. This compression step may be practiced as a single compression operation or as a series of compression steps, i.e., with two or more stamping or compression operations. Advantageously the preform(s) are positioned in a die such that the plane of the plate of the hanger is parallel to the opposing major faces of the compression dies which are brought together. Optionally a mold release agent, such as a waxy material or an oil, such as a paraffin oil or mineral oil may be applied to one or more surfaces of the die. Such may improve the ease of release of the compressed solid block, and/or aid in the formation of a smooth external surface to the compressed solid block. Following compression the compressed solid block are affixed onto the hanger, and may be removed from or ejected from the die. The cageless delivery device thus formed is ready for use.

As noted previously the preform used to form the compressed solid blocks may be formed from a plurality of preforms which are conveniently layered in register, with the hanger inserted between two preforms in the orientation as described above. For example, two or more physically separate preforms may be layered in register to form a laminated compressed solid block. Such may be desired when it is intended that the compressed solid block be formed from two or more masses having different chemical compositions. For example, it is contemplated that the compressed solid mass may be formed from a first preform having a first chemical composition, compressed to a second preform having a second chemical composition which is different than the first chemical composition. By way of non-limiting example, the first preform may be of a first color, while the second preform may be of different, second color so that when compressed the preforms are compressed to form a single compressed solid block having two different colored layers. Of course, three or more preforms may be compressed to form a single compressed block. Again the chemical compositions of the first, second and third preforms may be of the same, similar or of different compositions.

During the compression step, several simultaneous technical effects occur. The block compositions are densified due to the compression, and concurrently the embedded hanger is sealed and mechanically anchored within the interior of the block. Preferably the of the compressed solid block as at least 1.5% greater than the density of the density of the extrudate. Preferably the density of the compressed solid block is at least 2%, more preferably at least 3% greater than the density of the preform or extrudate from which it is formed. Additionally during the compression step, the channel, slot or recess which had been formed to accept the hanger is sealed to form a smooth surface. Still further the exterior surface of the block composition takes on the volume configuration and the surface shape of the die. Such is particularly advantageous when the interior surface of the die is smooth walled which will, in preferred embodiments, impart a smooth exterior surface to the compressed solid block.

In certain particularly preferred embodiments the compressed solid blocks of the present invention weigh from 25 to 250 grams, preferably from about 50 to about 150 grams. Preferred forms of the compressed solid block compositions are circular, oval or elliptical in cross-section of which those having a circular cross-sectional profile are

preferred. Such cross-sectional profiles are preferred as most known overflow tubes are circular in cross-section.

The dimensions of the compressed solid block composition on the blocks are typically rod like in shape, having a length of from about 2 to about 30 cm, preferably about 10 to about 20 cm.

The service life of the compressed solid blocks should be from about 10 to about 30 days, based on approximately 12 flushes per day. Preferably the service life of the compressed solid blocks is at least about 14 days when installed in the overflow tube in the cistern, or tank, of a lavatory device, especially a toilet. Preferably the temperature of the water which is flushed is in the range of 16 – 24°C. The length of service life of the dispensing device of the invention will of course depend on a variety of factors including product formulation, water temperature, the number and frequency of flushes over the period of use and the volume of the water which contacts the compressed solid blocks of the dispensing device.

Various configurations of dispensing devices according to the present invention, including certain particularly preferred embodiments, are depicted on the following figures. In the accompanying figures, like elements are indicated using the same numerals throughout the figures.

Figure 1 depicts in a cross sectional view a toilet cistern (toilet tank). As is seen therein, the cistern 10 is a vessel adapted for a containing a quantity of water 12 which is used to flush a toilet bowl or other sanitary appliance which is attached to the toilet cistern 10. Interior of the cistern 10 is provided a refill apparatus 14 which comprises a float 16 an inlet tube 18 and a control device 20 which operates to permit the inflow of water from an outside source into the interior of the cistern 10. The control device 20 also operates to permit or to deny the delivery of water through an overflow conduit 22 which exits the refill apparatus 14 via the overflow conduit 22, here depicted as a flexible tube, into the interior of the overflow tube 24. As is visible from Fig. 1 and as is well recognized in the art, the overflow tube 24 has a top end 26 open to the interior of the cistern 10 and at the opposite end thereof is second bottom end 30 in a mating, liquid tight connection to a valve 28 frequently referred to in the art as a "Douglas" valve. This bottom end 30 of the overflow tube 24 is typically connected to a portion of the body of

the Douglas valve 28 by a liquid tight connection that passage of the cistern water 12 is denied, (except when a failure of the refill apparatus 14 occurs). As is seen, the bottom open end 30 is in fluid communication with the interior cavity 32 of the Douglas valve 28 such that, as is readily appreciated any water flowing into the upper open end 26 of the overflow tube 24 falls downwardly through the bottom open end 30, past the flap valve 34 and downwardly through the open cavity 32 wherein it ultimately passes to the bowl of a toilet or of a sanitary appliance (not shown).

As has been discussed previously in specification, during a flush cycle, the majority of the water 12 present in the tank cistern 10 is released by displacement in an upward direction of the flap valve 34 whereby, due to the difference in hydrostatic pressure, the bulk of the water 12 is suddenly released into the Douglas valve 28 where it flows outwardly from the cistern 10 and downwardly and into a toilet or other sanitary appliance. This concurrently causes the float 16 to fall downwardly and as the water 12 exits the cistern, the refill device 14 operates to admit water in order to reinstate the prior level of water within the cistern 10. As the flush cycle, that is to say the release of the bulk of the water 12 from the cistern 10 by opening the flap valve 34 is quite rapid and typically is on the order of the less than approximately 30 seconds, typically less than 20 seconds, a relatively small amount of water is admitted by the refill device 14 during the time that the flap valve 34 open. After the release of most of the water, the flap valve 34 closes under the influence of gravity and such signals the conclusion of the release phase of the flush cycle, and indicates the initiation of the refill phase of the flush cycle wherein water being admitted into the cistern 10 via the refill device 14 begins refilling of the cistern 10 as the flap valve 34 is closed thereby stopping the passage of water 12 out of the cistern 10. The operation of the refill device typically divides the quantity, that is to say the volumetric quantity, of water entering into a major portion which is normally directed into the interior cavity of the cistern 10 so that it can be rapidly refilled, and a minor portion being diverted through the overflow conduit 22 and into the overflow tube 24. Such diversion and division of the volumetric quantity being admitted is purposeful in that at or near the end of the release phase of the flush cycle, as the sump of toilet is emptied by virtue of the flushing water 12, it is desirable to refill the level of water in the toilet sump (not shown) and this is readily done by admitting a stream of water during the

refill phase via the overflow conduit 22 into the overflow tube 24 where it flows downwardly and ultimately refills the sump of the toilet bowl or sump of other lavatory device. Water is admitted into the interior of the cistern 10 as well as through the overflow conduit 22 until the level of the float 16 rises and cuts of the supply of water, at which time all supply of water to the cistern 10 ceases. Sch ceases the supply of water to the overflow conduit 22 and the overflow tube 24, and also signals the end of the refill phase of the flush cycle as well as the end of a flush cycle. Thus, it is readily understood that water enters the overflow tube only intermittently during the operation of the lavatory device, namely only during a flush cycle. Therefore, between flush cycles a dispensing device according to the invention is physically shielded and isolated from the bulk of the water 12 present in cistern 10. Such also permits for the compressed solid block composition to dry between flush cycles which may extend the useful life of the compressed solid block composition.

During the refill phase of a flush cycle, the flow of water being admitted via the overflow conduit 22 into the overflow tube 24 contacts the exterior of the compressed solid block composition and thus causes the elutes at least one chemical constituent from the compressed solid block composition which in combination with water forms a treatment composition which is provided directly into the sump of the toilet or other sanitary appliance. This treatment composition thus formed may be a cleaning composition and/or a sanitizing composition, or any other composition which provides a treatment benefit to the toilet or other sanitary appliance . Thus, by virtue of the sequence of timed events, the delivery of a treatment composition is provided to the sump of a toilet bowl or other sanitary appliance at a particularly beneficial point in the flush cycle, namely primarily during the said refill phase of the flush cycle which thus provides that the resultant treatment composition may be resident in the sump of the toilet bowl between uses of the toilet or sanitary appliance, more specifically between flush cycles.

Figure 1 depicts the preferred mode of placement of the dispensing device according the invention with respect of the overflow tube 24. As is seen in the cross sectional view provided, the hanging means 42 of the dispensing device 40 suspends the said device from the open top end 26 of the overflow tube 24 such that the compressed solid block composition 46 is suspended within the interior of the overflow tube 24. As

is seen from the drawing, all the elements recited to depend downwardly from the hanger means 42 and the stalk 44 and the compressed solid block composition 46Are seen to be within the interior of the overflow tube 24 and are thus isolated from the bulk of the water 12 present in the cistern 10. Figure 1 depicts the preferred mode of installation and use of the preferred embodiments of the present invention in all manner and forms as described in the following figures, although it is recognized that alternative methods of supplying the dispensing device of the invention within an overflow tube may also be practiced.

Turning now to Figure 2, therein is depicted in a cross sectional view a first preferred embodiment of a dispensing device fully according to the present invention. As is seen thereon, there is provided a hanger means 42, here, a generally horizontal bar segment 48 having at each of two ends 50, 52 thereof a downwardly extending tabs 54, 56, and further a stalk 44 extending downwardly from and depending from a portion of the bar 48 at approximately the midpoint thereof. Downwardly from the bar element 48 and encasing a portion of the stalk 44 is a compressed block composition 46. The compressed solid block composition 46 is depicted herein has a generally circular cross sectional configuration, and is to be noted that the distal end 58 of the stalk 44, which is then end opposite to the proximal end 60 of the stalk is encased by a portion of the compressed solid composition 46.

Such an embodiment as depicted in figure 2 is representative of an initial configuration of this embodiment of the dispensing device 40 of the present invention prior to its use in the manner described with reference to figure 1. As is to be readily understood the use of the dispensing devices in the manner described will ultimately and eventually cause the erosion of the compressed solid block composition 46 in such a manner that portions of the stalk 44 which may have originally been encased or enrobed by the compressed solid block composition 46Are expected to be exposed during the service life of the dispensing device 40.

Figure 2A depicts a cross sectional view the dispensing device according to line segment A-A. As is readily seen hereon, the compressed solid block composition 46 is generally circular in cross section. Also as is seen thereon, the stalk 44 is also generally circular in cross section, and concentric with the compressed solid block composition 46.

Figure 3 depicts a further preferred embodiment of a dispensing device 40 in according to the present invention. As seen thereon, the embodiment according to figure 3 is quite similar in most respects embodiment according to figure 2, but is differentiated in that the compressed solid block composition is provided as two separate compressed solid block compositions, each being spaced apart from one other by discontinuity or a gap 62 present therebetween. The first compressed solid block composition 46A encases or enrobes a portion of the stalk 44 and is at a point closer to the proximal end 60 of the stalk 44. A small intermittent space, provides a discontinuity, viz., a physical gap 62 which separates it from a second compressed solid block composition 46B which is more distally located enrobing or encasing a portion of the stalk 44. As is visible from the instant embodiment, the distal end 58 of the stalk 44 is however exposed and extends beyond the body of the second compressed solid block composition 46B.

Figure 3A depicts a cross section of the dispensing device 40 according to figure 3 illustrating that the second compressed solid block composition 46B is approximately circular in cross section and similarly, that the stalk 44 is also approximately circular in cross section and is essentially concentric with the second compressed solid block composition 46B. Although, not directly indicated on figure 3A, it is to be understood that the placement of the first compressed solid block composition 46A is positioned in a similar manner.

An advantage of the embodiment according to figure 3 resides in the fact that the separate compressed solid block compositions may have different physical and or chemical characteristics, most notably may have different chemical compositions, may be easily combined within a dispensing device 40 according the present invention. Such a possible configuration as illustrated on figure 2 offers the advantage in that incompatible masses of chemically distinguishable compressed solid block composition can be provided within a single dispensing device 40. For example, a bleach containing block composition can be provided as one of the compressed solid block compositions while the other compressed solid block composition may include constituents which are poorly compatible or incompatible with the bleach. Alternately, it is to be understood that while two discrete masses of compressed solid block compositions are depicted with references to figure 3, that three, four, or even a further plurality of discrete compressed

solid block compositions may be combined in a dispensing device according to the present invention.

Figure 4 depicts a further embodiment of a dispensing device 40 according the present invention. In the embodiment depicted, the hanger means 42 is seen to have a "V"-shaped cross section that is to say the proximal end 60 of the stalk 44 depends from the bottom most point, namely the vertex 64 of the hanger means 42. Extending symmetrically and upwardly from the vertex 64 are two angled arms 66, 68, which taper upwardly and outwardly from the junction of the stalk 44 and the vertex 64 of the hanger means 42 until they terminate at respective ends 50, 52. Depending from the ends are downwardly extending tabs 54, 56. As seen from the figure, configuration of the two angled arms 66, 68 are symmetrical about the central axis (defined as the center line of the stalk 44) of the dispensing device and the uniform angle or uniform taper as the arms 66, 68 extend upwardly is advantageously used as "self-entering" form of the hanger means 42 according to the invention. It is to be understood the following insertion of the dispensing device 40 into an overflow tube parts of each of the two angled arms 66, 68 rest upon end or lip of the top open end 26 of the overflow tube 24 such as depicted with reference to figure 1. Such placement is expected to automatically cause the center line of the dispensing device to be approximately coincident with the center line of the overflow tube 24. This is particularly true if the dispensing device 40 is subject to motion during its service life, as is expected to be the case wherein water being supplied via the overflow conduit 22 and into the overflow tube 24 may cause temporarily displacement or motion of the dispensing device. Following cessation of the entry water via the overflow conduit 22, the dispensing device 40 is expected to come to rest in a static position. During the motion of the dispensing device 40, the influence of gravity is expected to draw the dispensing device 40 downwardly and toward the center line of the overflow tube 24.

Figure 4 also depicts an embodiment of the invention wherein extending radially outwardly from the stalk 44 is a pair of plates 70, 72 which depend from the stalk 44 wherein the plates are diametrically opposed on opposite sides of the stalk 44. Advantageously, each of these plates 70, 72 is formed integrally with the stalk 44 so that there are no continuities therewith. Ideally also, as is depicted in figure 4 as well as

accompanying 4 A, the respective ends 74, 76 of the plates 70, 72 extend sufficiently outwardly from the stalk 44 such that the compressed solid block compositions 46A, 46B are physically isolated from one another in the dispensing device 40. The embodiment according to figure 4 illustrates an alternative embodiment of the invention wherein two chemically or physically distinguishable compressed solid block compositions may be provided within a dispensing device. The embodiment according to figure 4 and figure 4A is particularly advantageously practiced wherein the compressed solid block composition 46A, 46B are chemically incompatible with one another both prior to contact with water and/or following contact with water.

With reference to figure 4 it is significant to note that the overall cross-sectional geometry as viewed according to line C-C and depicted on figure 4A is non-circular in profile. As is seen, the separate first, and second compressed solid block compositions 46A, 46B are approximately rectangular and form half of a square cross-section whereon, when these compressed solid block compositions 46A, 46B are applied on to the appropriate parts of the stalk 44 and plates 70, 72, an overall square cross - sectional profile may be provided as depicted in figure 4 A.

With reference to figure 4A, it is to be understood, that a non-cross circular cross-sectional profile may be advantageously used in conjunction with the invention. Indeed, in certain embodiments such as particularly advantageous in that whereas most overflow tubes have a circular or elliptical cross sectional and are typically circular in cross-section, the construction of a dispensing device 40 according the invention wherein the compressed solid block composition(s) depending from the stalk are non-circular in cross-section but may be, for example, triangular, rectangular, square, pentagonal or other polygonal section, helical or may be any other geometry or shape which provides a non-circular cross-sectional profile is that such may provide additional spaces or gaps between the compressed solid block composition and the overflow tube. Such additional gaps or spaces should not unduly block or undesirably impede the flow of water passing through the overflow conduit 22.

A further embodiment of a dispensing device 40 is disclosed on Figure 5. The embodiment depicted on figure 5 includes many common elements to those described in prior figures 2-4 as is readily understood from an inspection of the figure. Figure 5

includes a hanger means 42 which is in the form of a laterally extending bar 78 having one and terminating with and coincident with the proximal end 60 of the stalk 44 and the opposite, distal end 82 distally spaced from the stalk 44. Depending downwardly from the distal end 82 is a downwardly directed tab element 84 as shown. The presence of downwardly directed tab such as shown in the present embodiment and in other embodiment is useful in limiting the movement of a hanger means with respect to the open end of an overflow conduit. As is further visible in figure 5, the compressed solid block composition 46 is comprised of a first compressed solid block composition 46A, and a second compressed solid block composition 46B which together encases or enrobes a major portion of stalk 44.. As is also visible, the distal end 58 of the stalk 44 is shown as extending downwardly and out beyond the compressed solid block composition 46A, 46B. Although the cross-sectional profile of the compressed solid block composition 46 is not specifically indicated, it may be circular in cross-section or may be a polygon such having a square cross-section.

The embodiment depicted in figure 5 depicts a further arrangement of a dispensing device 40 according to the present invention whereby two different compressed solid block composition 46A, 46B can be combined provided wherein said compressed solid block composition 46A, 46B may be chemically, and or physically distinguishable from one another. Typically, the chemical composition of the constituents of the compressed solid block composition 46A differs from the compressed solid block composition 46B, although this need not be the case. Nevertheless, in the embodiment depicted in figure 5, the first compressed solid block composition 46A and the compressed solid block composition 46B are seen to be laminated one another, and are in direct physical contact at an interfacial plane or wall 86. Such an embodiment, as opposed to the embodiment depicted with reference to figure 4, is convenient for production and for use of dispensing devices wherein the constituents or compositions of the first compressed solid block composition 46A and the second compressed solid block composition 46B are chemically compatible and/or physically compatible with one another. The use of the construction depicted in figure 5 provides an alternative embodiment wherein multiple compressed solid block compositions may be layered together without the need for a barrier separating adjacent compressed solid block

compositions, i.e. the need for an intermediate plate or plates such as depicted in figure 4, with reference to plate 70, 72 and/or by providing a discontinuity or gap, such as gap 62 as depicted in figure 3. It is to be understood that while the embodiment of fig. 5 illustrates two compressed solid block compositions it is to be understood that a greater plurality of distinguishable compressed solid block compositions may also be used.

Turning now to figure 6 there is depicted a further preferred embodiment according to the present invention. Therein, a dispensing device 42 comprises a hanger means 42 in the shape of an inverted hollow conical element 88 having dependent from its apex 89 a stalk 44. Further as is visible from figure 6 are illustrated 4 masses of compressed solid block compositions here in the form of four discrete spheres 100, 102, 104, 105. These spheres are each positioned with respect to the stalk 44 which passes through portions of each of the respective spheres in the form of a central axis which results in a "stacked" arrangement of the spheres. The composition of the spheres 100, 102, 104, 106 as depicted in these embodiments are present in the dispensing device in an alternating matter. That is to say, the chemical composition of the first sphere 100 and third sphere 104 is the same and is represented by a first compressed solid block composition 46A. The alternating spheres, that is to say the second sphere 102, and the fourth sphere 106 are of second different compressed solid block composition, 46B. The spheres may be separated from one another by a discontinuity or a gap 62, or may be touching or abutting one another. According to such an arrangement, a plurality of different compressed solid block compositions may be provided within a single dispensing device according to the invention. It is also to be understood that whereas four spheres are described and depicted with reference to figure 6, and only two distinguishable compressed solid block compositions are discussed, it is to be understood that each of the spheres may be formed of the same chemical composition, a further plurality of compressed solid block compositions can be provided as part of the inventive dispensing device. Again, the embodiment depicted in figure 6 provides certain advantages which are common to the embodiments according to figure 3, namely in that two or more different compressed solid block compositions may be provided in a single dispensing device of the invention.

Turning now to figure 6A there is provided a top view of the hanger means 42 according to figure 6. The hanger means 42 being an inverted conical section also provides a "self-centering" benefit as has been discussed with reference to figures 4 and 4A. Unlike the hanger means of figure 4A however, the inverted conical section 88 of the hanger means 42 extends for 360° degrees or a full circle about the centerline or axis of the stalk 44. The hanger means 42 also accommodates certain specific requirements in order to ensure that the dispensing device 40 is useful in conjunction with an overflow tube. Namely, the sidewall 108 of the hanger means 42 includes a plurality of perforations 90 which pass through the sidewall 108 of the hanger means 42. The purpose of the perforations 90 is to permit for the passage of cistern water 12 which may enter into the top of the overflow tube from within the cistern 10 such as which may occur when there is fault condition in the operation of the refill apparatus 14. Provision of the perforations 90 ensures for passage of water from the interior of the cistern 12 and into the overflow tube 24 and thus ensures the safe operation of the toilet or of the sanitary device within which the overflow tube is found. Optionally, but desirably the hanger means 42 includes a further overflow conduit perforation 92, here is visible the form of a generally elliptical whole passing through the sidewall 108 the overflow conduit peroration 92 is preferably configured to receive the end of the overflow conduit 22. Nevertheless, it is understood that such may be omitted and the end of the overflow conduit 22 may be inserted through one of the other passages 90.

With reference to the previous drawings, it is understood that the various developed dimensions of each of the elements of the dispensing devices may be varied in order to meet the requirements of particular dispensing device 40 as well as the requirements of the overflow tube and/ or the toilet and/or lavatory device within which the dispensing device 40 is used. That is to say, that a way of example not by way of limitation, the distance and dimension of the hanger means 42 should be configured to be sufficiently large to span the open end of an overflow tube, or be otherwise configured so to retain the compressed solid block composition in a suspended position above the bottom open end 30 of the overflow tube. Further, the dimensions of the compressed solid block composition(s) 46 should be such whereby its maximum transverse dimension should not be sufficiently large so as to either deny the entry or insertion of the

compressed solid block composition 46 into the interior of the overflow tube, or make the end/ or when position therein so as to block the passage of water being supplied from the overflow conduit 42 downwardly around the exterior of the compressed solid block composition 46 and further downwardly and outwardly until it ultimately reaches the toilet bowl or other sanitary appliance.

Figure 7 depicts a further embodiment of a dispensing device according to the present invention which embodiment includes "end-of-life" indicator means. The embodiment of the dispensing device 40 as depicted on figure 7 is very similar to that of the dispensing device discussed with reference to figure 2 and includes common elements therewith.

As can be seen with reference to figure 7, the dispensing device 40 includes a hanger means 42 in the form of a bar 48 having depending therefrom a stalk 44 and a major portion of said stalk 44 being encased by a compressed solid block composition 46. Further visible is an "end-of-life" indicator means, here in the form of a compressed indicator mass 110 similarly enrobing or encasing a portion of the stalk 44 near the distal end 58 thereof. As can be seen, the compressed solid block composition 46 encases both portions of the stalk 44 and significantly and importantly encases the indicator mass 110. The indicator mass 110 can be chemically similar to the chemical composition of the compressed solid block composition 46 or may be different. Desirably, the indicator mass 110 includes an indicator means, which can a discernible constituent which, when contacted with water and released to the sump of a toilet bowl or other sanitary appliance, provides a discernible indicator to a user. Such a discernible indicator is usually sensory, such as a visual indicator, e.g., a color, or a olfactive indicator, e.g., a fragrance or odor. In certain embodiments the chemical composition of the compressed solid block composition 46 and that of the indicator mass 110 are essentially the same, except that the indicator mass 110 includes the indicator means. As useful indicator means, use of a water soluble and or a water dispersible dye comes into favorable consideration. Also, the use of a fragrance which is water dispersible or water soluble or for that means need not necessarily be water soluble or water dispersible but merely be hydrophobic in nature may be used. Other indicator means which can also be utilized include solid indicators which may be entrained by the water passing from the overflow tube and into the sump,

e.g., particulate materials including but not limited to colored articles such as beads or flakes, reflective materials such as particulate materials which exhibit a light reflecting or light scattering quality including metal flakes or metallized flakes, opacifying materials which cause the water in the sump to become murky, milky or opaque such as may be achieved by the release of terpenes or terpenols into the water. In any case, the indicator mass 110 releases its indicator means when the compressed solid block composition 46 is sufficiently eroded to permit its release either into the toilet or into the ambient environment. Such release of the indicator means provides a signal to the consumer that the dispensing device 40 should change the dispensing device 40 and replace it with a new dispensing device 40.

Further, with reference to figure 7 while the indicator mass 110 is shown to be concentric about the stalk 44 near the proximal end thereof 50, it is to be understood that the it can be placed anywhere with reference to the stalk. Further, the relative dimensions, that is to say the thickness and or the diameter of the portion of the indicator mass 110 need not be specifically as depicted in figure 7 with reference to the remaining elements of the dispensing device 40. For example, it can be substantially smaller and/or alternately can be larger both in width (diameter) and/or height with respect to the stalk 44 and or with respect to the compressed solid block composition 46.

Turning now to figure 8 there is depicted a further alternative embodiment of dispensing device 40 according to the present invention which includes a further indicator means. The dispensing device includes many elements common to figure 2 discussed previously. Figure 8 differs from the embodiment in figure 2 in that it additionally includes an indicator means 112 which is shown to be adhered to, or applied against the stalk 44. In the embodiment depicted, the indicator means 112 takes form of a sleeve, covering, or coating of a portion of the stalk 44 which is embedded or encased by the compressed solid block composition 46. The indicator means 112 is intended to be a material or an element which contains a material which, upon contact with water provides a discernible indicator to a user. For example, the sleeve may be a polymer coating which includes a water soluble or water dispersible dye or pigment, and/or includes a water dispersible, or even for that matter a hydrophobic fragrance constituent. The coating may be applied by any suitable technical means for example, such as by providing a bath

containing a liquid composition into which are dipped portions of the stalk 44 prior to the insertion of the same between or into pre-forms of the compressed solid block composition (s); providing a discrete element such as a sleeve containing said indicator means and first inserting the portions of the stalk 44 into said sleeve and only there after providing said sleeved stalk 44 between pre-forms of the compressed solid block composition (s); or any other means which is shown to be technically effective. In use, it is intended that upon sufficient erosion of the compressed solid block composition 46 by the water being supplied via the overflow conduit 22 and impinging on the portions of the stalk 44 which has now been exposed the indicator means 112 may be released to provide a discernible indicator, usually sensory such as a visual signal or an olfactive signal to the user. Such a visual signal may be a change of color or the presence of color of in the toile bowl, particularly in the water of the sump where they can be visually sensed such as by sight. An olfactive indicator may be the release of a scent such as a fragrance or odor into the toilet bowl or sanitary appliance, or release of a scent or fragrance in the ambient environment of the toilet bowl or other sanitary appliance. Such a discernable indicator signals the user that the dispensing device 40 should be replaced.

Turning now to figure 9 there is depicted a still further embodiment of a dispensing device 40 a still further embodiment of the invention which also includes an indicator means. The embodiment of the dispensing device 40 depicted on figure 9 includes many elements common to the unit dispensing device 40 discussed with reference with figure 2. The embodiment depicted on figure 9 includes a stalk 44 which is to be understood as to be of a generally plate-like configuration as opposed the generally circular stalk 44 depicted on figure 2 although, it is to be understood that notwithstanding this distinction of the configuration including a circular configuration as depicted in figure 2 or a generally square configuration of the stalk 44 such as depicted in figure 4 are also contemplated to be useful. Indeed, the transverse geometry of the stalk 44 plays no important role and this plays no important limitation with respect to the current embodiment. Included near the distal end 58 of the stalk 44 is included a cavity or passage 114 which contains an indicator element 113. The indicator element can be an indicator mass 110 as per figure 7, or an indicator element 112 as described with reference to figure 8. Additionally, the indicator element 113 according to figure 9 can

also be a discrete element such as sachet or capsule which includes a water soluble or water dispersible material which has contained therein an indicator composition which can be any material or chemical composition which, when dispersed or released into the water entering a toilet bowl or other lavatory appliance provides a discernible indicator to a consumer. Such a discernible indicator, for example be way of example a visually discernible dye or pigment and/or may be a fragrance which can be discerned or detected. For example, such as sachet or pouch can be formed of a water soluble material such as poly(vinylalcohol) based homopolymers, copolymers or graft polymers, polyethylene oxide and cellulose derivatives, or may be a capsule such as formed from a gelatin or other water soluble material which provides a container for containing a quantity of an indicator composition. The indicator composition can be a solid or a liquid, gel, for that matter can be a gas. The pouch, sachet, or capsule can be hard or soft, that is to say can be flexible, or can be essentially rigid. Advantageously all of the pouch, sachet, or capsule can be formed of any water soluble or water dispersible material although it is not necessary that all of the pouch, sachet or capsule be formed of such material although such is preferred; it is necessary that only that at least a portion of the pouch, sachet, or capsule is breached by contact with water such as the breach releases the contents of the pouch, sachet, or capsule into the water provided by the overflow conduit which then ultimately reaches the toilet bowl of lavatory appliance, and preferably the sump of toilet bowl. Upon its release, user then is prompted to replace the dispensing device 45.

Turning now to figure 10 there is depicted a particularly preferred embodiment of dispensing device 40 according to the present invention. The dispensing device 40 includes a hanger means 42 having a hanger bar 48 having two ends 50, 52 having downwardly depending tabs 54, 56 depending from respective ends 50,52. Approximately centrally located and depending from the bar 48 is a downwardly extending stalk 44 which is attached at is proximal end 60 to approximate midpoint of the bar 48. Extending outwardly and transversally with respect to the stalk is roof plate 116. The roof plate 116 is positioned approximately equidistant from the proximal end 60 and the distal end 58 of the stalk. Further, adjacent to, or coincident with the distal end 58 of the stalk 44 is also a base plate 118 which extends outwardly and transversely from the stalk 44. Between the roof plate 116 and the base plate 118 is positioned a compressed

solid block composition 46 which is essentially circular in cross section enrobing a part of the stalk 44. Inclusion of the roof plate 116 shields the upper end 46C adjacent to, proximal tube, or budding the shell plate 116. The bottom end 46D of the compressed solid block composition 46Abuts, or rests upon the bottom plate 118.

Turning now to figure 10A there is shown a cross-sectional transverse view along line D-D of the roof disk 116. Therein is seen that at the roof disk has a generally circular outer periphery 118 and includes 6 equally sized placed apart lobes 120. The lobes are separated by approximately 60 degree which respect to each adjacent lobe. Paired gaps 122 between each lobe 120 are also present and as depicted in the specific embodiment these gaps 122 are "V" shaped. The presence of these gaps 122 interrupt the shielding effect of water flowing down and over the roof disk 116 and allows water to pass between the lobes 120 and into the gaps 122 and thereby directly contact the top 46C of the compressed solid block composition 46.

While a six-lobed roof disk 116 has been depicted it is to understood that many other configurations included disks which are perforated, and/or alternately include no gaps may also be contemplated as being useful in conjunction and may be preferred in certain instances.

The depiction according to figure 10B illustrates a cross-sectional view along line E-E of figure 10 of the compressed solid block composition. As is seen thereon, the compressed solid block composition 46 is essentially circular in cross-sectional geometry and as is further visible, the stalk 44 is also circular and is concentric with the compressed solid block composition 46.

With respect now to figure 10 C there is depicted a base disk 118 which is seen to be mounted around the periphery of the distal end 58 of the stalk 44. As can also be seen, the diameter of the base plate 118 is somewhat smaller than that of the diameter of the compressed solid block composition 46. In such configuration, the small diameter of the base disk 118 does not impede the downward flow of the water coming into contact with the exterior surfaces of the compressed solid block composition 46, merely provides a support therefore in case of slumping of the compressed solid block composition.

It is also to be understood that whereas the base disk 118 is shown to be as a solid disk having no perforation, or interruptions at any part thereof saved for the central hole

which is adapted to be fastened or mounted a portion of the stalk 44, it is to be understood that different configurations including non-solid configurations, i.e. inclusion of gaps, holes, perforations, and the like may be present.

Figure 11 depicts a alternative embodiment of the present invention in the form of dispensing device 40 which includes a "cage". As seen thereon the dispensing device includes a hanger means 42 which comprises a generally rectangular bar 48 having two respective ends 50, 52, said respective ends having depending therefrom downwardly extending tabs 54, 56. Depending from the approximate center part of the horizontal bar 48 are a pair of straps 130 from which, depend cage 131. The cage is hollow and includes a sidewall 132 having passing therethrough at least one, but preferably as shown in the figure, a plurality of perforations 134. The hollow interior of the cage 131 is suitably adapted to retain therein a quantity or quantities of the compressed solid block composition 46. In the embodiment shown herein, a plurality of spheres each formed of compressed solid block composition 46 are depicted. While not shown, it is to be understood that preferably the inlet 136 of the cage 131 is suitably dimensioned so to permit for the introduction and admission of the compressed solid block composition 46 into the interior of the cage 31. This is easily accomplished by merely providing an open end to the cage 31. Similarly, preferably the bottom 138 of the cage includes one or more perforations which permit for the exit of water and/or treatment composition formed by the contact of water coming into contact with the compressed solid block composition 46 to entrain at least one chemical composition in the water which passes outwardly from and downwardly from the cage 131. Although the bottom 138 of the cage 131 need not include any perforations, desirably one or more such said perforations are present.

An advantage of the embodiment according to figure 11 is that it is easily refillable by a consumer and can be used as a "multiple-use" dispensing device. Whereas the embodimenst according to figure 2-10 are advantageously used as "single-use" dispensing devices, which are intended to be discarded of the bulk of or all of the compressed solid block composition has been eroded and consumed, and the remaining portions of the dispensing devices merely discarded, the embodiment according to figure 11 is easily refillable. For example, once all, or some (preferably, most) of the compressed solid block composition 46 have been consumed, a consumer or user of the

dispensing device 40 can merely withdraw part or all of the dispensing device 40 so as to expose the open end 136 of the cage, or reinsert a fresh supply of the compressed solid block composition therein. It is to be understood that while spherical compressed solid block compositions 46 are shown in the figure, this is to be understood as a preferred embodiment, not a limitation. Easily, a compressed solid block composition of a different geometry such as a generally rod-shaped configuration such as is depicted with reference to figures 2 through 10 can be used and be inserted by consumer. Additionally, it also contemplated that refilling, or even the initial supply of the compressed solid block composition can include a compressed solid block composition which is made of two or different compressed solid block compositions. For example, with reference to figure 3, 4, and 5 the compressed solid block composition can be comprised of separate discrete bodies having different chemical and/or physical compositions which is distinguishable form each other. Additionally, and specifically with reference to figure 5, the compressed solid block composition can be a laminated construction such as depicted with reference to figure 5 such a laminated construction need not be limited to a cylindrical rod as described with reference to figure 5 but can be laminated constructions of other geometry such as seers as described with reference to any of figures 2 through 10.

Turning now to figure 12 there is depicted a further embodiment of dispensing device 40 according with the present invention which includes a "cage". In accordance with the depicted embodiments, the cage 131 is formed of flexible sleeve material, here in the form of a plastic tube which comprises a tube wall 132 having a plurality of perforation 134 passing therethrough. The perforations 134 expose the interior of the tube 131 and permit for the passage of water flowing over the tube wall 132 of the cage 131 pass into the interior thereof, and to come into contact with compressed solid block composition 46 contained within. The cage 131 includes two closed ends, a proximal end 138 which may be removably affixed, or permanently affixed to the generally rectangular bar 48 of the hanger means 42, and a distal end which includes a seal 136. The seal can be any form and can be a physical, mechanical, or chemical seal such as may be formed by an adhesive, by heat-sealing an open end of the tube, by crimping an open end of the tube, by providing a fastener such as a band or staple around the tube or passing through

the tube, or simply can be a knot. At the proximal end of the tube 138 there is also included a second seal 160 which can be the same as, and/or be different from the seal 136. In the depiction shown, the seal is conveniently provided by a knot. As can be further seen from a review of figure 12 the hanger means includes a generally horizontal bar segment 48 and although while not clearly depicted there is understood to be a gap or passage through a portion of the bar 48 and generally near the center thereof through which a portion of the tube 131 passes, at the opposite side of which the tube 131 terminates in the knot 160. Alternately the tube 131 may be conveniently fastened by any suitable means to the bar 48 of the hanger means 42 such as by the use of knot 160 as disclosed, with any appropriate fastening means or attachment means can be practiced.

The embodiment according to figure 12 provides a further convenient and low cost "single-use" embodiment of the dispensing device 40. The embodiment provided in figure 12 includes the sleeve 131 as the "cage" which acts as a support and suspends the compressed solid block composition 46 within it interior, permits for the convenient handling thereof, and permits access of water being provided via the overflow conduit with 22 to flow downwardly and to come into contact with the compressed solid block composition 46. The embodiment according to figure 12 minimizes the amount of injection molded or formed plastic material which may be otherwise required by the embodiments depicted in the prior figures disclosed herein.

Figure 13 discloses a further embodiment according to the present invention which includes a compressed solid block composition 46 which is partially encased and suspended in a "cage". The "cage" is in the form of a formed strap 140 which includes a first strap sidewall 40, 142 a second parallel spaced apart second strap sidewall 144 connected via an intermediate strap base 146. At the opposite end of the strap side wall 142, 144, and strap base 146 are hanger means 42 here in the form of "U" shaped forms which include a first strap top 148 and a second strap top 150 having respectively depending therefrom strap tabs 152, 154. As will be understood by reference to figure 13, all the elements of the strap hanger 140 are essentially continuous and can be readily formed from any suitably formable material such as a polymer or plastic materials which can be molded or bent into such a shape or alternately may be a metal material such as a metal element such as a bent strip, or a stiff metal foil. Such a strap hanger 140 needs to

be only sufficiently rigid such that it does not collapse when placed within the interior of an overflow tube 24 during the useful life of the dispensing device 40. As seen in the figure, the compressed solid block composition 46 is generally rod shaped and has a generally square cross section. As is shown with reference to figure 13, the strap side walls 142, 144 abut opposite faces of the compressed solid block composition, the strap base 146 supports the bottom of the square-rod shaped compressed solid block composition and provides a support therefor. As further seen from figure 13 several faces, namely the faces of the compressed solid block composition 46 intermediate the strap side walls 142, 144 are exposed as well as is the top of the compressed solid block composition intermediate to strap tops 148, 150. The embodiment of the dispensing device is easily inserted into the interior of an overflow tube whereby the top end 26 of the overflow tube 24 provides support for the underside of the strap tops 148, 150 between the respective strap sidewalls 142 and strap tab 152, and corresponding strap tab 144 and strap tab 154. This embodiment provides a particular "semi-cage" embodiment of the dispensing device according to the invention which requires that the block can be wholly separately formed, and compressed prior to insertion into the strap-type hanger. It is to be further understood with reference to figure 13 that while a strap-type hanger is provided as disclosed in the figure which has a geometry which is suitably dimensioned to accommodate a compressed solid block composition 46 having a square-rod configuration, that both the configuration of the strap-type hanger as well as the compressed solid block composition can be different i.e. can be circular-rod type configuration as is generally described with reference to figure2, and that the dimensions of the strap-hanger can be modified to accommodate the same. Additionally, although not depicted in figure 13, it is contemplated that the use of a compressed solid block composition 46 having two different masses of compressed solid block compositions such as laminated compressed solid block composition such as generally described with reference to figure 5 and/or "stacked" compressed solid block composition as generally described with reference to figure 3 are also specifically intended to be encompassed and understood to be within the scope of the present invention.

Turning now to figure 14, there is depicted still a further embodiment of dispensing device 40 according to the present invention which is shown in partial cross-

sectional and partial phantom view. As is depicted thereon, a generally tubular cage 16 is provided which has an open end 162 said open end being approximate or adjacent to the hanger means 42, and a distal end 164 at the opposite end thereof. The distal end includes a plurality of perforations passing therethrough and is conveniently depicted as a screen 166. The screen 166 depends from the side wall 168 of the tubular cage 160. The side wall 168 of the embodiment shown in figure 14 does not include perforations passing therethrough as is believed that the inclusion of the perforation of the bottom thereof, namely the screen 166 is still to be understood that one or more perforations can be provided passing through the sidewall 168 is so desired. Contained within the interior of the cage 160 or a plurality of compressed solid block compositions 46 in the form of discrete spheres which are loosely stacked together in random order. Such can be easily achieved by simple dispensing or pouring in a desired number of such spheres of this compressed solid block composition 46 through the open end of 162. As can be seen, the overall configuration of the cage 160 is tubular, inclusive of the open end thereof 162. Extending outwardly from the open end 162 of the cage 160 is a top wall 164 which is generally flat and extends radially outwardly from the open end 162 and transversely with respect to the tube. Top wall 164 terminates at a margin 166 and extends downwardly that is to say distally from the open end 162 acting currently in the direction of the screen 166 is a depending skirt wall 168. A gap 170 is formed between the side wall 168 of the cage 160 and the downwardly depending skirt 168. Preferably, the dimensions of the gap, that is to say its maximum and minimum diameter are such that the top end 26 of an over tube 24 can be accommodated within.

In use, the embodiment of the dispensing device according to figure 14 is conveniently slipped upon and into the overflow tube where the top end 26 thereof comes to rest within the interior gap 170. The overflow conduit 22 can be easily then replaced and extended into the interior of the cage 160.

Again, with respect to the compressed solid block composition 46 shown in figure 14, such can be provided as spheres or as any other element including, but not limited to powders, pills, granules but are preferably three dimensional solids such as spheres, cubes, or reds having square, circular or any polygonal cross section. Further, it has been discussed with reference to the embodiment according to figure 11 the compressed solid

block composition can be formed from two or more different compressed solid block compositions which differ in chemical and/or physical constitution.

With regard to the foregoing embodiments described herein it is to be understood that part or elements of one embodiment can be substituted for related part or elements in different embodiments. For example, it is to be recognized that hanger means, various configurations of hanger and/or stalk portions as well as various configurations and compositions of compressed solid block compositions can all be generally interchanged amongst many of these various embodiments described herein.

In a further aspect of the present invention there is also provided a process for delivering a treatment composition to a sanitary appliance, especially preferably, to the interior of a toilet bowl, and still more preferably to the sump of the toilet bowl or other sanitary appliance. This process includes the steps of: providing a lavatory dispensing device as described hereinabove to the cistern of a toilet or other lavatory appliance having an overflow tube wherein at least a part of the lavatory dispensing device is inserted in to the interior of the overflow tube, and, periodically supplying water about the exterior of the compressed solid block composition to elute at least one chemical constituent to form a treatment composition with said water which treatment composition is used to treat a part of the sanitary appliance downstream of the overflow tube, preferably the interior of a toilet bowl. Preferably the foregoing process is performed wherein water supplied about the compressed solid block composition of the dispensing device is provided via an overflow conduit.

The foregoing process may be practiced to provide a cleaning treatment and/or a sanitizing or disinfecting treatment to the toilet bowl or a part thereof, or alternately to a part of a sanitary appliance.

Preferably the foregoing process is practiced such that at least 60%, preferably at least 70%, and more preferably at least 80% of the water provided to the overflow tube during a flush cycle is provided subsequent to the release of water from the cistern to the interior of the toilet bowl, particularly via a valve, whereby at least 60%, preferably at least 70%, and more preferably at least 80% of the treatment composition formed by contacting the compressed solid block composition with water is provided to the toilet bowl or lavatory appliance following the closing of the valve during the flush cycle.

It is to be understood that cageless the lavatory device according to the invention may also have a different geometry, configuration or and appearance than the embodiments described in the Figures and still be considered to fall within the scope of the invention.

In order to further illustrate the present invention, various examples of preferred embodiments of the invention are described, following. In these examples, as well as throughout the balance of this specification and claims, all parts and percentages are by weight unless otherwise indicated.

Examples:

Dispensing devices according to the invention were produced using a compressed solid block composition as is described on Table 1:

Table 1	%wt.
sodium dodecyl benzene sulfonate (85%)	23
C14/C16 olefin sulfonate, sodium salt (80%)	26.4
anhydrous sodium sulfate	43.92
anhydrous silica	2
anhydrous titanium dioxide	0.08
colorant (pigment)	0.10
fragrance (proprietary composition)	4.5

The identity of the constituents used to form the forgoing compressed solid blocks are identified more specifically on the following Table 2. The individual constituents were used "as supplied" from their respective suppliers and may constitute less than 100%wt, or 100%wt. of the named compound, as indicated on Table 1. If less than 100%, the amount of actives present in the "as supplied" material are indicated in Table 1 and 2.

Table 2	
sodium dodecyl benzene sulfonate (85%)	sodium dodecyl benzene sulfonate (85% wt. actives), supplied as UFARYL DL85, or other source
C_{14}/C_{16} olefin sulfonate, sodium salt (80%)	C_{14}/C_{16} olefin sulfonate, sodium salt (80% wt. actives), supplied as LSS 480/H, or other source
anhydrous sodium sulfate	anhydrous sodium sulfate

anhydrous silica	supplied as MICROSIL ED, or other source
fragrance	proprietary composition of its respective supplier
colorant (pigment)	proprietary pigment composition of its respective supplier

The forgoing example composition according to Table 1 was formed by mixing of the constituents which were then extruded through a round die which formed a continuous extrudate. Segments measuring approximately 4 cm long, and approximately 1.9 cm in diameter were cut to provide preforms, which were then inserted on the distal ends of a hanger and stalk configurations generally in accordance with those depicted on Fig. 10.

In a first "Type A" configuration a hanger and stalk were used which included a roof disk as depicted on Fig. 10A. With reference to Fig. 10, the hanger and stalk had the following dimensions: the stalk had an overall length of 21 cm, and had a circular cross-section having a uniform diameter of 05 cm. The width of the hanger bar 48 was 4.5 cm. The length of the stalk from the junction of the stalk with the hanger bar to the midpoint of the roof disk was 10 cm, and the remaining length of the stalk from the midpoint of the roof disk to the distal end of the stalk was 11 cm. The diameter of the roof disk was 2.5 cm, and it had a thickness of about 0.25 cm. The roof disk had six equally sized lobes which were equally radially spaced apart from one another; the roof disk had the geometry of lobes and intermediate gaps as disclosed with reference to Fig. 10A. The roof disk was integrally formed with the stalk.

The preform was supplied to the stalk by sliding the distal end and the preform into a central bore present in the preform, until the end of the preform abutted the roof disk. Thereafter the preform was compressed in place on the stalk by grasping the perform and compressing it in the hand which compressed the preform onto the stalk. Subsequently a base disk as disclosed in Fig. 10C was attached to the distal end of the stalk 44 as disclosed on Fig. 10. The base disk had a diameter of 1.9 cm and a thickness of about 0.4 cm. All elements of the foregoing "Type A" configuration, apart from the compressed block composition, were formed from a synthetic polymer.

In a second "Type B" configuration of a dispensing device, the foregoing steps were repeated, however, a further base disk having the same dimensions as described was used in place of the roof disk. All other dimensions and compositions were the same as described with reference to the "Type A" configuration.

The thus manufactured dispensing devices were then subjected to lifespan and chemical delivery testing.

In accordance with the "Type A" and "Type B" dispensing devices were inserted in to the overflow tubes of two otherwise identical toilets, namely "Cadet 13L" model toilet, (ex. American Standard Inc.) and the tube which functioned as the overflow conduit was clipped to the top edge of the overflow tube and directed downwardly and in the direction of the compressed solid block of each dispensing device. Each of the toilets were periodically and automatically flushed by a machine-controlled device which operated the toilets to flush 24 times daily at intervals of approximately 60 minutes between flushes. It was determined by measurement that during each flush cycle, approximately 2.3 litres of water was provided via the overflow conduit and into the overflow tube in which the dispensing device was suspended. Prior to testing the mass of the compressed solid blocks were evaluated (based on subtracting the mass of the total dispensing device from the known mass of the hanger and stalk) and the mass of the compressed solid blocks was also evaluated at certain intervals. At such intervals the blocks were withdrawn from the overflow tube, patted dry with a disposable laboratory paper towel to remove water, and weighed. At the same time, an aliquot of the contents of the toilet sump were withdrawn and analyzed for the contents of a surfactant, sodium dodecyl benzene sulfonate, on order to evaluate the chemical delivery characteristics of the compressed solid block composition at this point in its service life. Thereafter the dispensing device was reinserted into the overflow tube and the test resumed.

The initial total mass of the "Type A" dispensing device was 44.63 grams.

The initial total mass of the "Type B" dispensing device was 45.03 grams.

The results of the foregoing test are indicated on the following Table 3.

Table 3

"Type A" dispensing device

Number of flushes	Total mass of dispensing	Mass of compressed solid block composition	Content of sodium dodecyl benzene sulfonate in aliquot

	device (grams)	present in dispensing device (grams)	(parts per million)
4	43.95	37.61	49.6
10	37.04	30.7	30.7
44	34.83	28.49	27.9
67	26.6	20.26	--
95	27.42	21.08	21.5
108	24.25	19.71	6.7
"Type B" dispensing device			
Number of flushes	Total mass of dispensing device (grams)	Mass of compressed solid block composition present in dispensing device (grams)	Content of sodium dodecyl benzene sulfonate in aliquot (parts per million)
4	45.17	38.32	31.8
6	--	--	20.8
10	41.68	34.83	16.8
44	37.27	34.42	7.8
67	29.68	22.83	9.6
95	21.33	14.48	8.4
108	15.7	8.85	6.8

"—" indicates not evaluated during test

As can be seen from a review of the foregoing results, the dispensing devices of the invention provided good performance characteristics.

During the test and following the conclusion of the test, no breaking off of the compressed solid block compositions were observed, demonstrating surprisingly effective adhesion of the compositions to the stalk notwithstanding multiple flush cycles wherein flowing water delivered from the overflow conduit and impinging on the dispensing device. The compositions also delivered an effective amount of the surfactants present in the compressed solid block as evidenced by reported results on Table 3 based on the testing of aliquots of the toilet bowl sump water following a flush cycle.

It is to be specifically noted that each of the foregoing tested sample lavatory dispensing devices exhibited a satisfactory service life and none of the tested samples exhibited breakage or delamination of the compressed solid block composition from the stalk of the hanger.

While the invention is susceptible of various modifications and alternative forms, it is to be understood that specific embodiments thereof have been shown by way of

example in the drawings which are not intended to limit the invention to the particular forms disclosed; on the contrary the intention is to cover all modifications, equivalents and alternatives falling within the scope and spirit of the invention as expressed in the appended claims.

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Claims:

1. A lavatory dispensing device comprising:

a hanger having a hanger means adapted to be suspended from a part of a sanitary appliance, preferably from the end or lip of an overflow tube provided within the cistern or tank of a sanitary appliance, preferably a toilet bowl,

and, a compressed solid block comprising at least one chemical agent, which lavatory dispensing device is adapted to be suspended within the interior of the overflow tube of the sanitary appliance.

2. A lavatory dispensing device according to claim 1 which excludes a cage.

3. A lavatory dispensing device according to claim 1 which comprises a cage.

4. A lavatory dispensing device according to claims 1 or 2 which comprises a hanger which includes a hanger means, and a stalk which stalk is at least partially encased by the compressed solid block composition.

5. A lavatory dispensing device according to any of claims 1 – 4 wherein the compressed solid block composition comprises one or more of: surfactants, coloring agents, disinfecting agents, and anti-lime scale agents.

6. A lavatory dispensing device according to claim 5 wherein the compressed solid block composition comprises an anionic surfactant.

7. A lavatory dispensing device according to claim 5 wherein the compressed solid block composition comprises a sanitizing composition.

8. A process for delivering a treatment composition to a sanitary appliance, especially preferably, to the interior of a toilet bowl, which process comprises:

providing a lavatory dispensing device according to any of claims 1 – 7 to the interior of an overflow tube present in the said device which overflow tube is in fluid communication with the interior of said toilet bowl, and proximate to the conclusion of the flush interval during which or subsequent to the time wherein water from the cistern is released from the cistern to the interior of the toilet bowl, delivering a treatment composition formed by contacting the compressed block with water supplied to the interior of the overflow tube by the sanitary appliance.

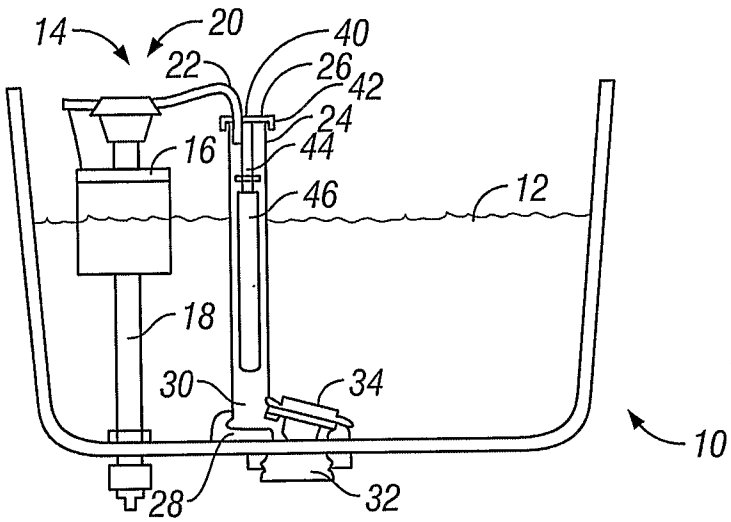


FIG. 1

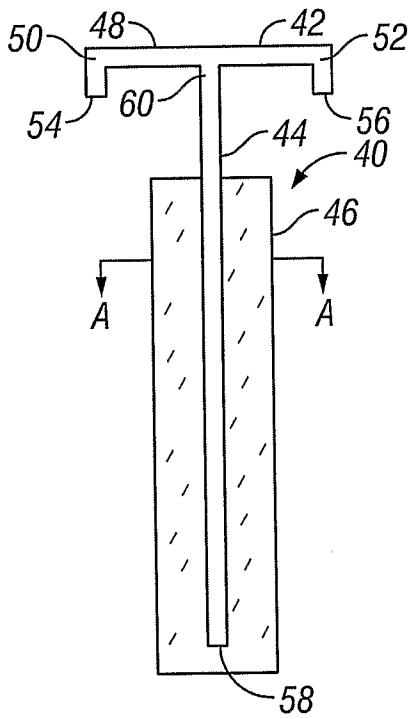


FIG. 2

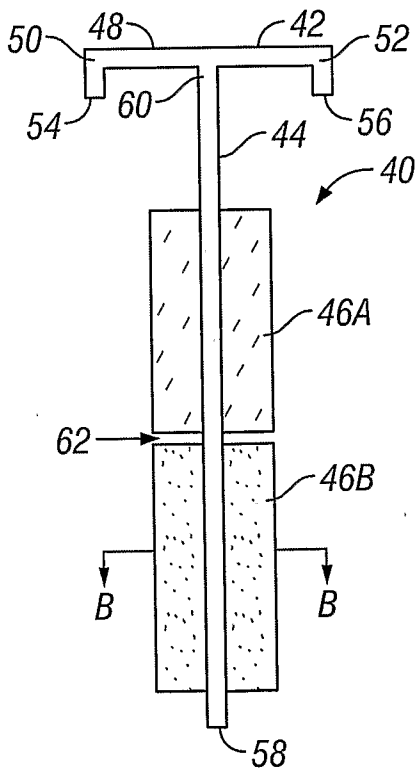


FIG. 3

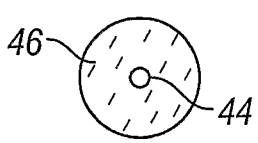


FIG. 2A

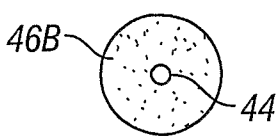


FIG. 3A

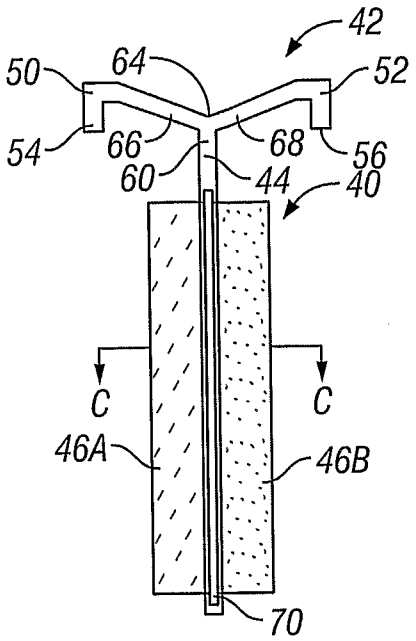


FIG. 4

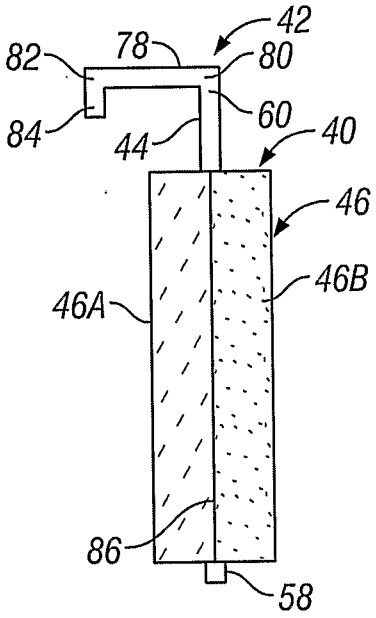


FIG. 5

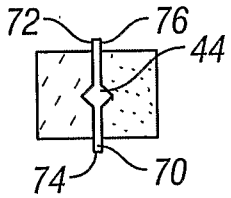


FIG. 4A

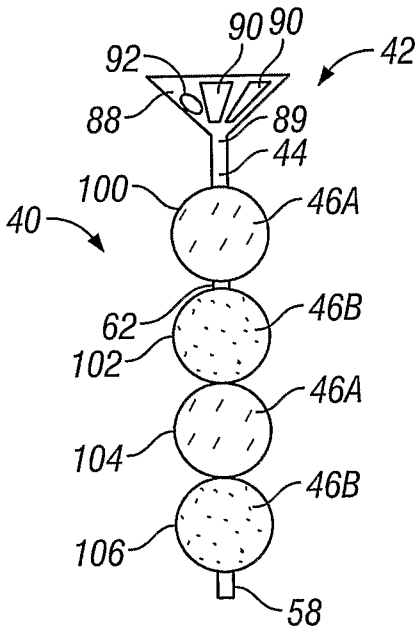


FIG. 6

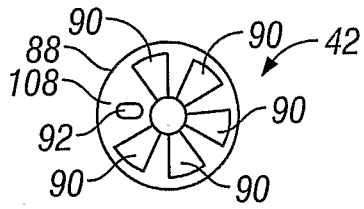


FIG. 6A

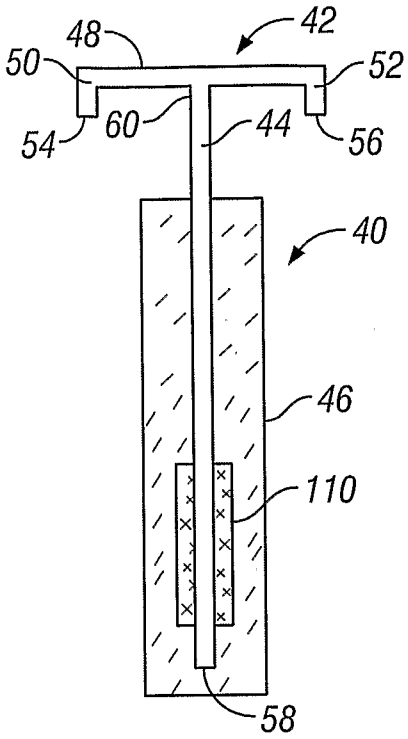


FIG. 7

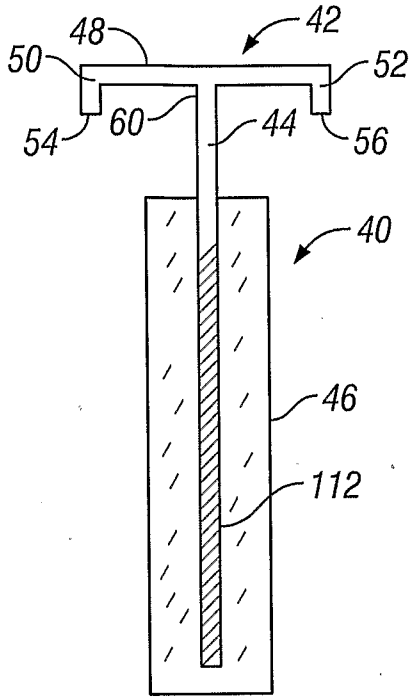


FIG. 8

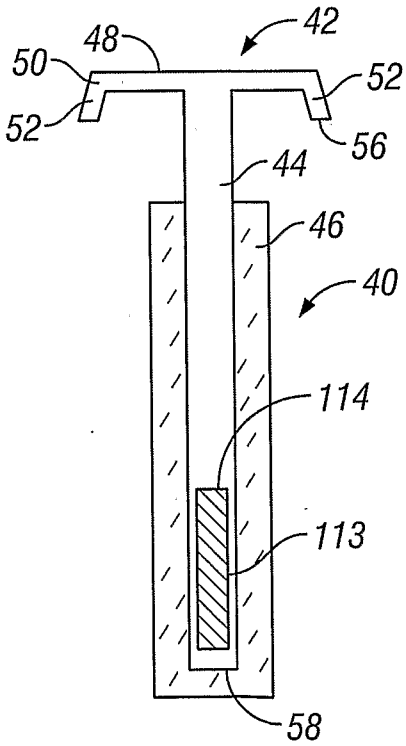


FIG. 9

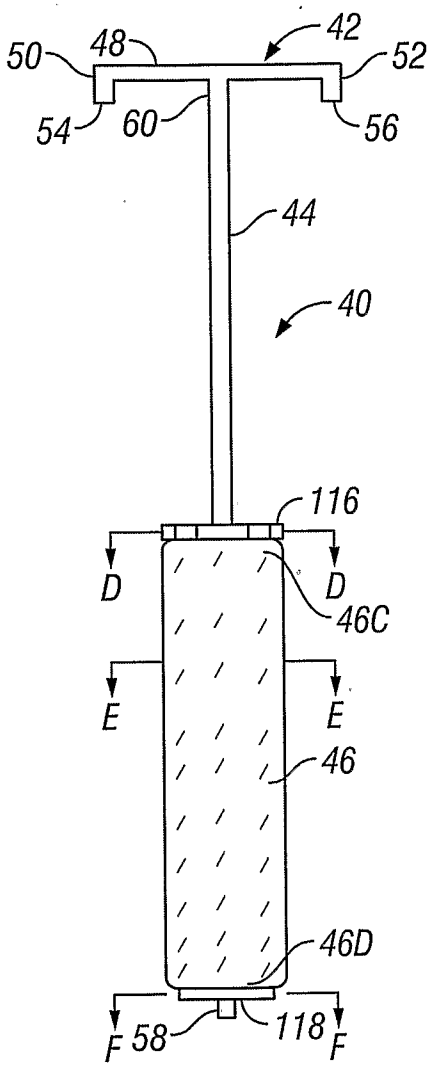


FIG. 10

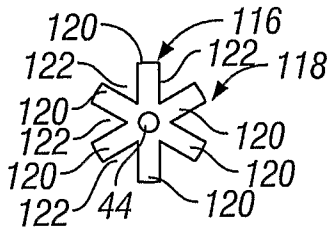


FIG. 10A

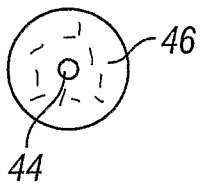


FIG. 10B

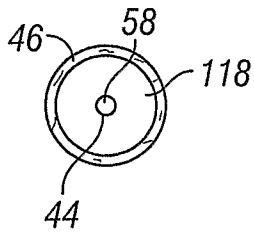


FIG. 10C

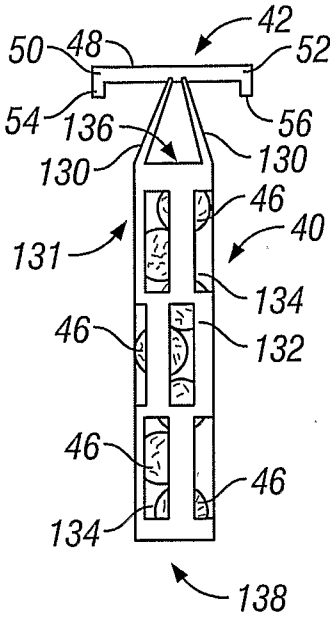


FIG. 11

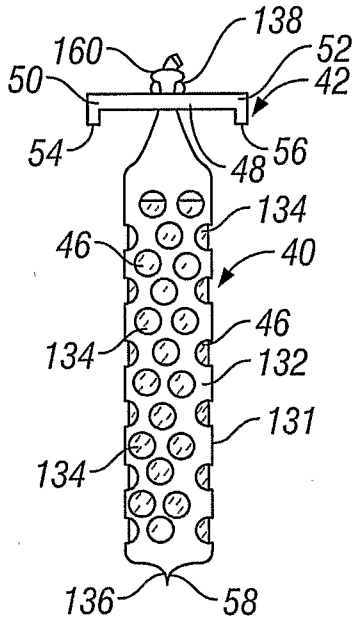


FIG. 12

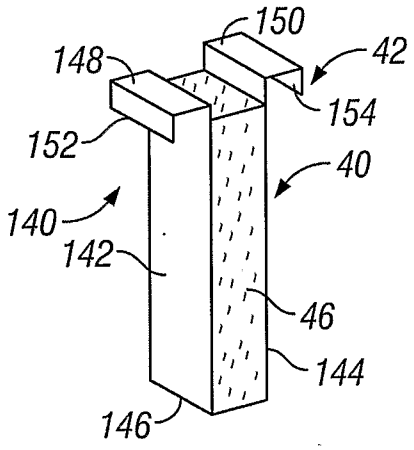


FIG. 13

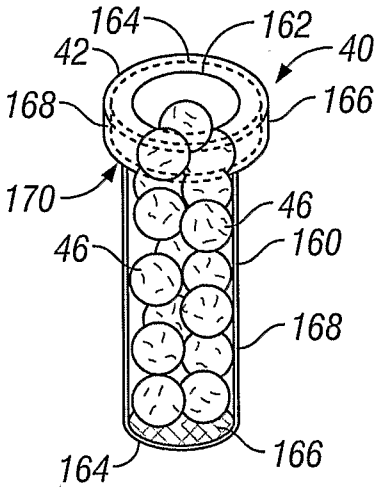


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2007/001031

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D17/00 E03D9/03

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E03D A61L C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 987 655 A (SMET STEPHEN J [US]) 23 November 1999 (1999-11-23) column 2, line 67 - column 3, line 8 column 3, line 60 - column 4, line 2 figures	1-5,7,8 6
Y	US 5 759 974 A (MENKE RONALD [DE] ET AL) 2 June 1998 (1998-06-02) cited in the application column 3, line 40 - line 44	6
X	US 6 192 524 B1 (BLACK ROBERT H [US]) 27 February 2001 (2001-02-27) figure 5	1-8

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 June 2007	26/06/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Isailovski, Marko

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2007/001031

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 821 346 A (JONES GREGORY R [US]) 18 April 1989 (1989-04-18) figures 1,2 column 3, line 58 - column 4, line 33	1,3,8

2

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2007/001031

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5987655 A	23-11-1999	NONE	
US 5759974 A	02-06-1998	NONE	
US 6192524 B1	27-02-2001	US 6211128 B1	03-04-2001
US 4821346 A	18-04-1989	NONE	