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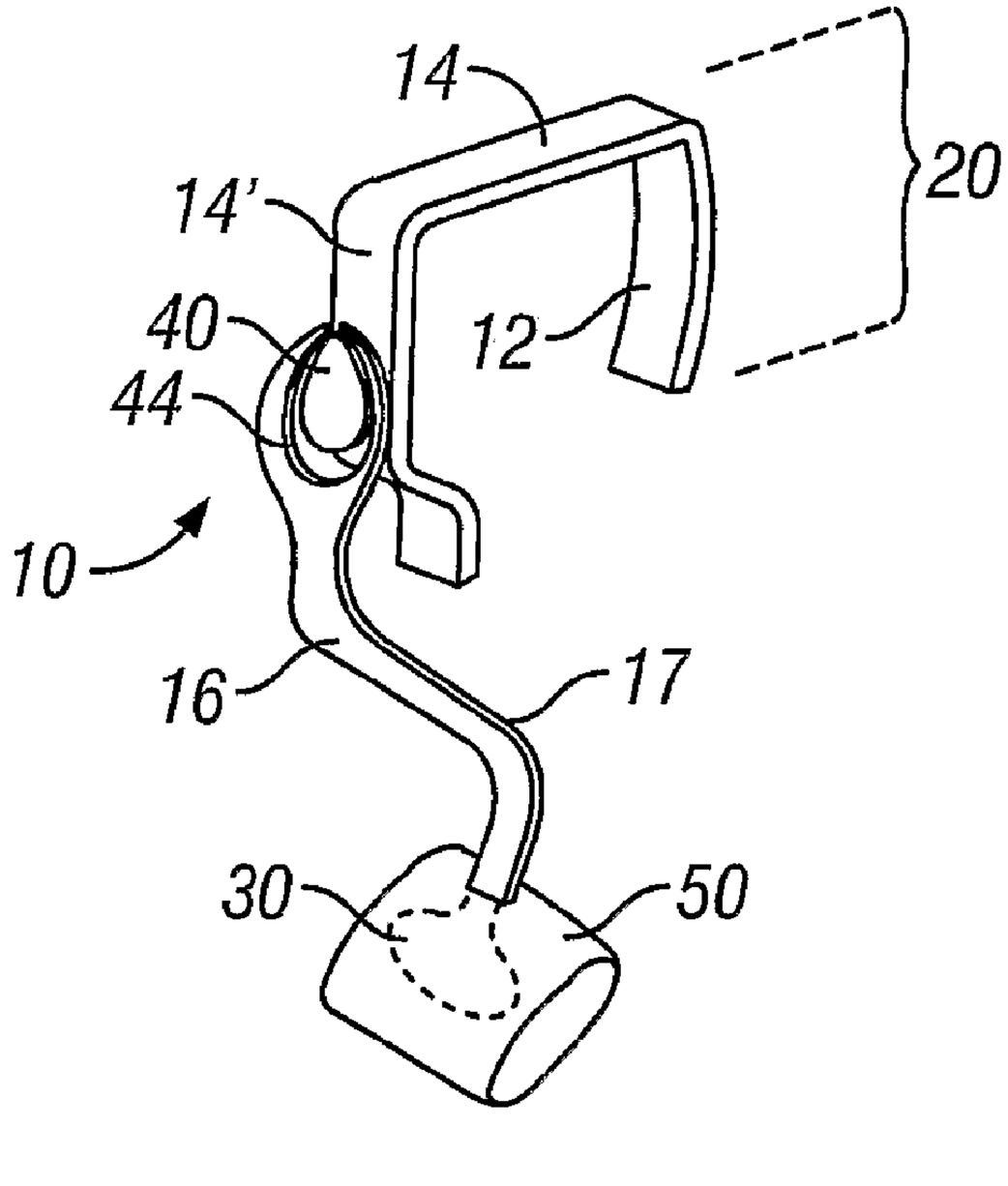
(54) Titre : DISTRIBUTEUR DE SALLE DE BAINS SANS ENVELOPPE COMPRENANT UN BLOC SOLIDE COMPRIME CONTENANT DU DIOXYDE DE TITANE

(54) Title: CAGELESS LAVATORY DISPENSING DEVICE COMPRISING A COMPRESSED SOLID BLOCK COMPRISING TITANIUM DIOXIDE



(57) Abrégé/Abstract:
The present invention relates to a cageless lavatory dispensing devices for use in conjunction with a sanitary appliance, particularly a toilet, wherein said dispensing device comprises a hanger (10) and a compressed solid block; the solid block comprising titanium dioxide.

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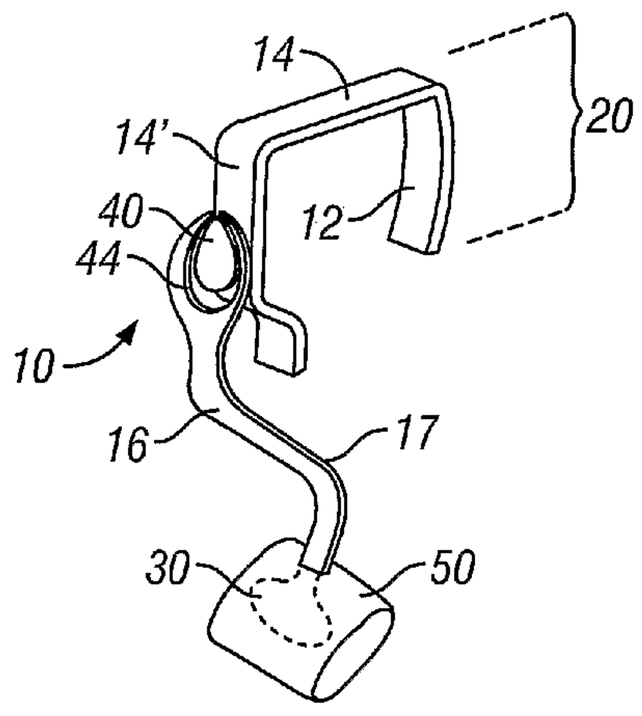

(57) Abstract: The present invention relates to a cageless lavatory dispensing devices for use in conjunction with a sanitary appliance, particularly a toilet, wherein said dispensing device comprises a hanger (10) and a compressed solid block; the solid block comprising titanium dioxide.

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CAGELESS LAVATORY DISPENSING DEVICE COMPRISING A COMPRESSED SOLID BLOCK COMPRISING TITANIUM DIOXIDE

The present invention relates to improvements to a dispensing device. More particularly the present invention relates to a device used to deliver a treatment composition to a sanitary appliance, particularly to a toilet, which treatment composition contains one or more chemical constituents e.g., coloring agents, cleaning agents, disinfecting agents, anti-lime scale 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 further common approach known to the art is to provide a device which is suspended from the rim of the toilet bowl and which is placed at or near the interior

sidewall of the toilet bowl. Such are generally referred to as ITB devices. Such a device is designed to typically dispense a treatment composition to the interior of a toilet when a gel or block compositions is contacted with flushing water, or alternately, dispensing a fragrancing composition to the toilet bowl which is intended to counteract or mask malodors. Typically such devices include a hanger portion which is used to suspend a cage portion from the rim of the toilet bowl, such that the cage portion is positioned within the path of flowing water which is dispensed with each flush operation of the toilet. The cage portion typically comprises a plurality of holes or apertures which permit for the flush water to both enter and to exit the cage portion of the device. Typically a solid block composition or a gel composition is present within the cage. The solid block composition and/or gel composition typically comprises one or more cleaning constituents, e.g., one or more surfactants which provide a good cleaning and/or foaming benefit. Often the solid block composition and/or gel composition comprises a fragrance constituent as well which is provided to provide some degree of malodor suppression. For most such devices, the use of a cage is essential as in the case of a gel compositions, as gels are not self supporting and would not be useful without the physical supporting structure provided by the cage. With regard to solid block compositions, such compositions are notoriously prone to weakening and softening over time and most are known to sell or sag over their lifetime, particularly when approaching the end of their useful service life. The cage acts then as a porous receptacle and support for said blocks which would otherwise prematurely soften or disintegrate and fall into the toilet bowl and be flushed away before their composition is substantially consumed.

While the use of a cage is beneficial, the use of a cage is not without attendant problems. The use of a cage requires increased material costs, and additional manufacturing steps. Further as such ITB devices are typically single use type devices, once the gel or block composition is consumed or otherwise exhausted, the consumer discards the entire ITB device which is wasteful and contributes to the problems associated with proper garbage disposal. With regard to costs, in most conventional rim suspended lavatory devices comprising a hanger portion and a cage portion, the bulk of the material is typically used to form the cage. As such cages are typically fabricated

from a synthetic polymer, such requires specific molding operations in order to form the rim suspended lavatory device, and to fill the cage with the solid block composition and/or gel composition prior to use and or sale.

Known to the art are rim suspended lavatory devices which are lavatory blocks of paradichlorobenzene which provide no cleaning benefit, but provide only a fragrancing benefit. Such blocks typically erode per sublimation of the paradichlorobenzene and/or by contact with flush water. Such rim suspended are lavatory blocks of paradichlorobenzene are typically packaged as a solid block or cake having extending from one side a loop of bendable wire. A portion of the bendable wire is embedded within the paradichlorobenzene block. The consumer is required to form the wire into a hanger appropriate to the particular geometry of their toilet so that the paradichlorobenzene block is positioned with the interior of the toilet bowl.

Apart from the foregoing, while the elimination of a cage from a conventional, rim suspended lavatory device would be beneficial such are not believed to be known. This is due to the fact that surfactant containing solid block compositions are known to soften quickly and this in turn eliminates any reasonable prospect of a useful service life when used in conjunction with a toilet absent the support provided by the cage.

Thus, while certain known-art dispensing devices provide beneficial malodor treatment effects, there is nonetheless a real and continuing need in the art to provide still further improved devices which can provide to a sanitary appliance a useful treatment benefit, preferably a useful cleaning benefit.

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 can be used either as an ITC type device, or an ITB type device for a sanitary appliance such as a urinal, toilet tank or toilet bowl. In certain preferred embodiments the device according to the invention is used as an ITB type device. In certain alternate preferred embodiments the device according to the invention is used as an ITC type device.

According to a first 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 second aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger having a hook end adapted to be suspended from a part of a sanitary appliance, particularly the rim of a toilet bowl, and a compressed solid block comprising at least one chemical agent adapted to be suspended within the interior of the sanitary appliance. The dimensions and configuration of the cageless lavatory dispensing device are such that the solid block comprising the one or more chemical constituents are preferably positioned within the path of flushing water which is released or dispensed by the sanitary appliance.

According to a third aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger having a part adapted to be suspended from a part of a sanitary appliance, and a compressed solid block comprising one or more chemical constituents, wherein the device is adapted to be suspended within the interior of the toilet bowl.

In accordance with a fourth aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger adapted to be suspended from the rim of a sanitary appliance, particularly a toilet bowl, and block comprising at least one or more chemical constituents adapted to be suspended within the interior of the toilet bowl, wherein the block composition is long lasting.

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 cageless lavatory dispensing device comprising a hanger adapted to be suspended from a part of a sanitary appliance, and a compressed block comprising at least one or more chemical constituents adapted to be suspended within the sanitary appliance, and, periodically flushing 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.

According to a sixth aspect of the invention there is provided a process for delivering a treatment composition to a to the interior of a toilet bowl, which process comprises: providing a cageless lavatory dispensing device comprising a hanger adapted to be suspended from a part of a toilet bowl, preferably the rim thereof, where the device further comprises a compressed block comprising at least one chemical constituent, said compressed block adapted to be suspended within the interior of the toilet bowl, and, periodically flushing water about the exterior of the compressed block to elute or release at least one chemical constituent so to form treatment composition with the water which is used to treat at least the interior of the toilet bowl.

According to a seventh aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger having a part thereof adapted to be suspended from a part of a sanitary appliance, particularly from a part a toilet cistern or toilet tank, and a compressed solid block comprising one or more chemical constituents, wherein the device is adapted to be suspended within the interior of said cistern or tank.

In accordance with a eighth aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger adapted to be suspended from the rim of a sanitary appliance, particularly a part of a toilet cistern or toilet tank such as from a part of a rim of a toilet cistern or toilet tank comprising at one or more chemical constituents adapted to be suspended within the interior of said cistern or tank, wherein the block composition is long lasting.

According to a ninth aspect of the invention there is provided a cageless lavatory dispensing device comprising a hanger having a part thereof adapted to be suspended from a part of a sanitary appliance, particularly from a part a toilet cistern or toilet tank, and a compressed solid block comprising one or more chemical constituents which necessarily includes titanium dioxide.

According to a tenth 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 cistern or toilet tank, which process comprises: providing a cageless lavatory dispensing device comprising a hanger adapted to be suspended from the rim of a sanitary appliance, particularly a part of a toilet cistern or toilet tank such as from a part

of a rim of a toilet cistern or toilet tank, and a compressed block comprising one or more chemical constituents adapted to be suspended within the said cistern or tank, and, periodically immersing the exterior of the compressed block in the water within the cistern or tank so to elute at least one chemical constituent to form a treatment composition with the water which is used to treat a part of the sanitary appliance.

According to a eleventh aspect of the invention there is provided a process for delivering a treatment composition to a to the interior of a toilet bowl, which process comprises: providing a cageless lavatory dispensing device to the interior of a toilet cistern or tank comprising a hanger adapted to be suspended from a part of the toilet cistern or tank, preferably from a part of the rim thereof, where said device further comprises a compressed block comprising at least one chemical constituent adapted to be suspended within the water within the cistern or tank so to elute at release at least one chemical constituent an to form a treatment composition therefrom which is used to treat at least the toilet cistern or tank, and preferably to also treat the interior of the toilet bowl when the treatment composition formed is used to flush the toilet bowl.

In accordance with a still further aspect of the invention there is provided as a vendible article, 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, particularly a toilet.

According to one aspect of the present invention, there is provided a cageless lavatory dispensing device comprising a hanger having a hook end adapted to be suspended from a rim of a toilet bowl, and a compressed solid block composition comprising titanium dioxide and at least one chemical agent adapted to be suspended within the interior of the toilet bowl, such that when the block composition is immersed, rinsed or washed with water, said at least one chemical agent is eluted or dissolved into said water and forms a treatment composition which provides one or more of a cleaning benefit, a sanitizing benefit and a disinfecting benefit to the toilet bowl being treated with the treatment composition, wherein the block composition is formed by a process which comprises forming a mass comprising the

at least one or more chemical agent, and compressing a quantity of the mass to encase a portion of the hanger and wherein the block composition comprises: 10-35%wt. of an alpha olefin sulfonate anionic surfactant; 10-35%wt. of a linear monoethanolamide; 5-50%wt. of a linear dodecylbenzene sulfonate anionic surfactant; 5-50%wt. of a sodium sulfate 0.1-15%wt. of silica 0.1-25%wt. sodium lauryl ether sulfate; 0.0001-10%wt. titanium dioxide; optionally to 40%wt further additive constituents, including but not limited to further surfactants, fillers, binders, fragrances, processing aids, lubricants, tableting aids, bleaches, and sanitizing compositions.

According to another aspect of the present invention, there is provided a process for delivering a treatment composition to the interior of a toilet bowl, which process comprises: providing a cageless lavatory dispensing device as described herein, suspending the compressed solid block within the interior of the toilet bowl, and, periodically flushing water about the exterior of the compressed block to elute at least one chemical agent to form a treatment composition with said water which treatment composition provides a cleaning and/or sanitizing and/or disinfecting benefit to the toilet bowl.

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

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view depicting a hanger.

Figure 2 is a side elevational view depicting an alternative embodiment of a hanger.

Figure 3 is a perspective view depicting a further embodiment of a hanger.

Figure 4 is a side elevational view depicting the embodiment of the hanger depicted in Figure 3.

Figure 5 is a perspective view depicting a still further embodiment of a hanger.

Figure 6 is a perspective view depicting a further embodiment of a hanger.

Figures 7A through 7D depict front elevational views of various alternate configurations of plates for hanger.

Figure 8 is a front elevational view of an alternative configuration of a plate for a hanger.

Figures 9A and 9B depict front and side elevational views, respectively, of a further alternative plate for a hanger.

Figures 10A and 10B depict perspective and side elevational views, respectively, of an embodiment of a two-part cageless lavatory dispensing device of the invention.

Figure 11A and 11B depict perspective and top plan views, respectively, of a further embodiment of a two-part cageless lavatory dispensing device of the invention.

Figures 12A and 12B depict front and side sectional views, respectively, of a compressed solid block and a plate depending from a stalk in a further embodiment of a two-part cageless lavatory dispensing device of the invention.

Figure 13 depicts a side sectional view of an embodiment of a two-part cageless lavatory dispensing device of the invention, installed within the interior of a toilet bowl.

Figure 1-P is a photograph of two blocks which omit titanium dioxide which have been suspended from the rim of the interior of a toilet bowl which has been flushed 96 times.

Figure 2-P is a photograph of two further blocks which omit titanium dioxide which have been suspended from the rim of the interior of a toilet bowl which has been flushed 167 times.

Figure 3-P is a photograph of several further blocks subjected to at least 70 flush cycles and then allowed to dry.

Figure 4-P is a photograph of the several further blocks depicted in Figure 3-P which had been allowed to further dry for a further time.

Figure 5-P is a photograph of two blocks which comprise titanium dioxide and which have compositions according to E7 of Table 1.

Figure 6-P is a photograph of two further blocks which comprise titanium dioxide and which have compositions according to E8 of Table 1.

Figure 7-P is a photograph of still two further blocks which comprise titanium dioxide and which have compositions according to E10 of Table 1.

DETAILED DESCRIPTION

Broadly defined, the present invention provides 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 but which block composition necessarily comprises titanium dioxide, as well as methods for its use of the cageless lavatory dispensing device in the treatment of sanitary appliances, particularly toilets.

The inventors have surprisingly found that notwithstanding the existing prejudice in the prior art which dictates the use of cages to support and contain lavatory treatment blocks, that it has been discovered by the inventors that it is now possible to fabricate cageless lavatory dispensing devices which comprise a hanger and a compressed solid

block composition depending from the hanger which solid block compositions comprise one or more chemical constituents, preferably at least a surfactant composition, which cageless lavatory dispensing devices are useful in providing a treatment composition to a sanitary appliance over repeated flushes of water and/or repeated immersions in water wherein the compressed blocks to not fall away from or break away from the hanger for a reasonable duration of time. This result is unexpected as the prior art dictates the use of a cage as previously described, and as is also widely known in the art to support a lavatory block composition over its useful lifespan, particularly wherein the lavatory block comprises one or more surfactants. As is known to the art, with repeated flushes of water, many such surfactant containing lavatory blocks tend to swell and/or soften and very frequently disintegrate or slump, thus requiring a cage to contain the lavatory block. Alternately as is known in the art, with long term immersion in water such as in a toilet cistern or toilet tank, such surfactant containing lavatory blocks tend to swell and/or soften and very frequently disintegrate or slump, thus requiring a cage to contain the lavatory block.

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, 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) are 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 are 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.

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 is necessarily present in the inventive compositions and further is preferably 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 dioxide has been observed to minimize or to eliminate the unattractive spotted, streaked, or otherwise unattractive surface appearance of similar block which include sodium sulfate as a constituent, but which exclude titanium dioxide.

In its simplest form the hanger is merely an article which comprises at one end, a hook end which is adapted to or configured to suspend the hanger from a part of a sanitary appliance. The hanger is preferably configured so to permit its use either as an ITB device or as an ITC device. The hanger also includes a plate which is adapted to be embedded within the compressed solid block composition. While the hook end may be integrally formed and approximate to the plate, quite frequently the hanger includes an intermediate stalk connecting the hook end with the plate. The hanger itself may be a single element of a unitary construction, or alternately, may be formed from a plurality of elements which are adapted to be linked or connected together. When the hanger is formed from two or more such discrete elements, the individual elements can be affixed, attached, or linked together to ultimately form the hanger of the invention. The cageless 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 a part of the hanger 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 removably affixed to the retained part of the cageless lavatory dispensing device. Most conveniently however the hanger is a single piece article.

With regard to the hook end, it is to be understood that the hook end of the hanger can be of any configuration which is suitable to provide a hook-type support for

suspending the plate and the compressed solid block within the interior of a sanitary appliance. Ideally, the hook is configured such that it is adapted to be suspended over at least a part of the rim of sanitary appliance. Such may be a rim of a urinal, a toilet bowl, or toilet cistern or tank. The hook may be of any suitable dimension, and as it is understood that as the configuration and geometry of sanitary appliances vary, naturally the hook can be adapted to suit the particular dimensional or geometric configurations of toilets. Alternately and preferably the hook end is flexible and configurable to adapt to various configurations and geometries so that it may be used with different sanitary appliances. Typically however, the hook end may be configured into a "U" shaped portion of the hanger such that it may be used to suspend the hanger and plate bearing the compressed solid block composition.

The hook may be provided in a rigid, preformed configuration which is non-flexible or only sparingly flexible in order to accommodate the dimensions of the hook to a particular sanitary appliance. For example wherein the hook 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 a toilet cistern or toilet tank. Such a hook may merely suspend the device on the rim, or the hook may be configured so that when applied to the part of the upper rim or edge of a toilet it functions as a mechanical clip such that it is generally retained at its point of installation and resists accidental misplacement or movement. Additionally or alternately such a hook may further include a connector element which may take any physical shape or form and which is configured to cooperatively connect with a the remaining element or elements of the cageless lavatory dispensing device so that said remaining element or elements may be removably affixed to such a hook. In such manner, the hook may be retained although the remaining elements, viz., the plate bearing the compressed block and/or the stalk may be replaced a number of times once the compressed block is exhausted. Any suitable mechanical or chemical fastener means may be used to provide such a function. By way of non-limiting example may be used any of a number of cooperating mechanical elements such as clips, hook-and-loop fasteners, pins, springs,

elastic bands, loops, eyelets as well as chemical means including adhesives such as light or medium duty adhesives may be used as the fastener means. Other fastener means not elucidated herein but known to the art may also be used. In one preferred embodiment the hook includes a part which includes a mortise shaped element, which cooperates with the stalk or plate which is configured as a cooperating tenon which is removably insertable into the mortise shaped element. In another preferred embodiment the hook includes a peg or hook, and the stalk or plate includes a cooperating loop or eye from which the stalk and/or plate bearing the compressed block may be suspended. The use of such two-part embodiments of the inventive cageless lavatory block is in certain embodiments of the invention preferred as such provide a great deal of flexibility and also permits for the reuse of at least one element of the cageless lavatory dispensing device multiple times without requiring replacement of the complete cageless lavatory dispensing device when a compressed lavatory block is exhausted. Thus is certain embodiments, certain elements of the cageless lavatory dispensing device may be reused, while others are intended to be single-use elements.

Conveniently however, the hook end is provided as one or more articulated elements which can be flexed or bent from a first or a "folded" configuration to a second or "open hook" configuration. It is to be understood that according to preferred embodiments, in order to minimize the volume of the hanger and in particular the hook end thereof, the hanger may be provided in a collapsed or folded configuration when placed into a package. Upon opening of the package, the consumer is then expected to easily unfold, extend, or otherwise stretch a portion of the hanger in order to form the hook end. A further important advantage is that the degree of flexibility provided into the hanger in order to provide for such a foldable and unfoldable hook end also introduces a degree of tension when the hook end is configured to be hung upon a sanitary appliance, and in particular the rim of a urinal, a toilet tank or cistern, or the rim of a toilet bowl. In such a configuration, the tension actually aids in the gripping of the hook upon the portion of the sanitary appliance upon which it is originally positioned by the consumer. Such tension reduces the likelihood of lateral movement or translation from its initial placement by a consumer unless desired by the consumer. Thus, specific placement of

the cageless lavatory dispensing device, and a reasonable expectation that it will be retained at or near the position in which it was originally installed by a consumer relative upon a sanitary appliance is provided. Furthermore, the tension provided also provides for a degree of resiliency and also aids in the positioning of the compressed solid block at, or near, a specific part of the sloping interior wall of a sanitary appliance, e.g., a toilet bowl. Such can be beneficially particularly due to the fact that flush water from the toilet bowl typically exits from beneath the rim. Utilizing the tensile property of the hanger, the continuous positioning of the compressed solid block within the path of the flowing flush water is assured under most circumstances.

As has been noted above, in certain preferred embodiments and indeed, according to most preferred embodiments a stalk exists to connect the plate with the hook end of the hanger. The stalk itself may be of any dimension or length, however when used in an embodiment of the invention wherein the device is an ITC type device, desirably the stalk is of sufficient length to ensure that the compressed block will be at least partially immersed, but preferably wholly immersed, in the water present in the toilet tank or cistern between flushes. When the stalk is used in an ITB type device, advantageously once the hook end is suspended upon a sanitary appliance, particularly the rim of a toilet bowl, the stalk extends a sufficient length to the plate such that ultimately, the positioning of the hook and the length of the stalk as such that the compressed solid block enrobing the plate is positioned in the path of the flush water. Again, 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 in the case of a toilet bowl, the distance from the top of the rim downwardly into the interior of the toilet bowl, or in the case of a cistern or tank, the distance from the top of the rim of the tank or cistern downwardly such that the plate intersects or is beneath the waterline of the water present in the tank or cistern between flushes. For example, when used as an ITB device, in toilets typically found in use in North America, the interior sloping walls of the toilet bowl are typically of a smaller and a more circular radius, thereby providing a "shallower" distance between the top of the rim of the toilet bowl, and the sump or water outlet at the bottom of the toilet bowl. In such a circumstance, a shorter stalk length is

typically adequate in order to ensure that the compressed solid block is placed within the path of the flush water. In European toilets, typically, the configuration of the toilet bowl and its sloping walls are usually in the form of a more frusto-conical configuration, thus providing a "deeper" toilet bowl as measured from the rim to the top level of the water in the sump. In such configuration, frequently, a longer stalk length then would be required for a North American toilet is typically preferred. Of course, different configurations of other toilet bowls are contemplated as well.

The hanger of the invention also requires a plate which is adapted to be embedded and/or enrobed within the compressed solid block composition. The plate itself is at the end distal to the hook end of the hanger and typically is integrally formed with the stalk, or where a stalk is not provided, with the hook end of the hanger. The plate itself may be essentially of any useful configuration, but desirably, the plate is dimensioned such that it is completely encased by the compressed solid block composition. Conveniently, the plate has a geometry which is symmetrical about the longitudinal center line or axis of the stalk and/or hook and depends directly from the stalk where present, or from the end of the hook end of the hanger. Conveniently, the plate is generally of a flat, planar configuration, and has a uniform thickness across its surface. However, 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.

The plate itself 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, the plate 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 the plate.

The plate 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 may be one or more elements such as rods or tubes, which depend from and extend outwardly from the stalk. While the thickness of the plate may vary, preferably it is between 0.05 – 3 mm thick, preferably between 0.1 and 2 mm thick, and most preferably between 0.25 and 1.5 mm thick. The thickness of the plate may vary across its surface, and in certain embodiments the thickness of the plate decreases across its dimensions with the thickest portion of the plate being near its geometric center, and the thinnest parts of the plate being one or more of the margins or peripheral sections of the plate. Such may be used to form a plate of tapering dimensions. Preferably however the plate is 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%.

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.

The inventors have also unexpectedly observed that the preferred configuration of the plate is a generally planar plate which has sloping top edges which are angled downwardly and form an obtuse angle with the center line (or center-axis) of the stalk or hook of the hanger, as measured from the points from which the edges of plate intersect the stalk or hook end. The downwardly sloping edges may be linear or straight-edged, or arcuate. The inventors have found that downwardly sloping edges are advantageous in resisting pooling of water, and permit for the runoff of water during the service life of the cageless lavatory dispensing devices when the compressed solid blocks may have sufficiently eroded to expose part of the plate from within the interior of the said blocks.

Surprisingly, the inventors have found that the best configuration for the plate is indeed a generally planar plate having a generally uniform thickness across its surface. The dimensions of the plate should be such that when considering the cross-sectional area of the plate with that of the cross-sectional laminar layer of the block within which it is positioned, the percent coverage of the plate area to the laminar compressed solid block area should be not more than about 90%, more preferably the ratio is between about 10%

and 90%, more preferably between about 20% and 80% of the surface area of the laminar layer or plane of the compressed solid block composition within which the plate lies.

The inventors have also surprisingly found that while many plate configurations are possible, the longest service life of the cageless lavatory dispensing devices were observed with generally planar plates which were substantially embedded and enrobed within the interior of the compressed solid block composition. The compressed solid blocks do not require the use of an adhesive substance or material intermediate the plate and the compressed solid block in order to retain the compressed solid block on the faces of the plate. While not wishing to be bound by the following, it was theorized that when used as an ITB type device, during repeated flushes of water coming into contact with the upper surface of the compressed solid block, viz, the region from which the stalk or hook end extends, minimal cracking or delamination of the regions of the block which had been joined together by the compression of the solid block was observed. This reduction of delamination or otherwise observed as splitting of the block in this region ensured the longer term retention of the compressed solid block composition upon the plate, and thereby the improved duration of the service life of the cageless lavatory dispensing device used in conjunction with the sanitary appliance. Surprisingly, it was observed that when perforations, including large diameter circles or other discontinuities were present passing through the plate, the compressed solid blocks mounted upon the plates were observed to often prematurely fail. Again, and while I am not wishing to be bound by the following, it is believed that the formation of miniscule channels in the region of the compressed solid block which had been laminated may have formed during repeated flush cycles, and these channels passing into the interior of the block formed cavities and/or otherwise soften the interior of the compressed solid block in the region of such discontinuities in the plate, thereby mechanically softening the block and weakening its hold upon the plate. Similarly, it is also observed that when the plate had a more three-dimensional shape, that is to say included elements such as studs, or pins extending outwardly from one or more faces of the plate, that again, premature failure of the compressed solid block compositions was observed. Again, it is believed that a similar phenomenon also occurred, namely in the formation of microchannels in the region of the

lamination of portions of the block were formed, and provided for the flow of flush water into the interior of the block and to the region of the plate and particularly to the regions surrounding the extended studs or pins. Again, this was believed to be responsible for premature softening of the interior of the compressed solid block, and its premature failure.

Thus, in particularly preferred embodiments, the plate configuration is absent any perforations, as well as being absent of any elements or protrusions extending outwardly from one or more faces of the plate.

The hanger, 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 is 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. contacts.

The cageless lavatory 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 block is immersed, rinsed or washed with water, said chemical constituents are eluted or dissolved into said water and forms a treatment

composition which is useful in treating a sanitary appliance, and particularly a toilet tank or cistern or a toilet bowl.

As chemical constituents the compressed solid block 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 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_3M, 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, hydroxy, 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 hydroxy 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 substituent 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:

$$R_5\text{-CO-NH-}R_6\text{-OH}$$

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 ethoxylate 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.

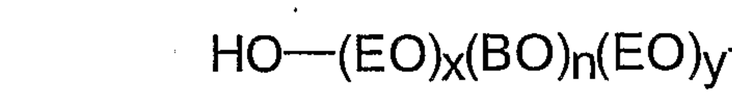
Still further useful nonionic surfactants containing polymeric butoxy (BO) groups can be represented by formula (C) as follows:

$$RO—(BO)_n(EO)_x—H \qquad (C)$$

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):



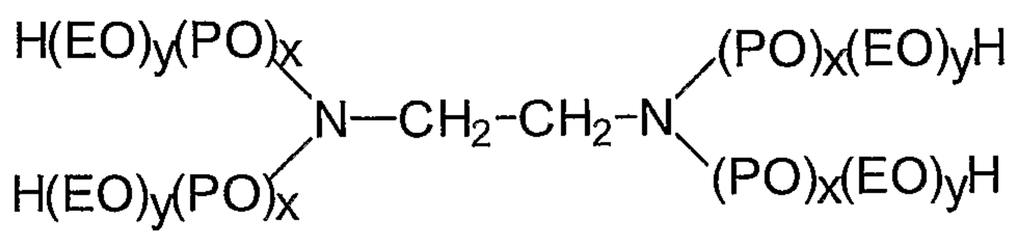
$$HO—(EO)_x(BO)_n(EO)_y-H \qquad (D)$$

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:



$$H(EO)_y(PO)_x\diagdown \quad \diagup(PO)_x(EO)_yH$$
$$N—CH_2-CH_2-N \qquad (E)$$
$$H(EO)_y(PO)_x\diagup \quad \diagdown(PO)_x(EO)_yH$$

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:

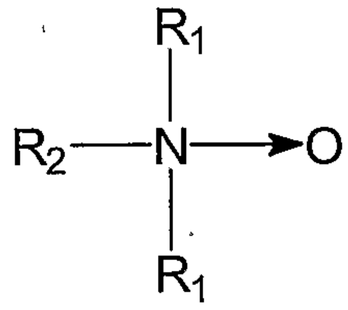
A) Alkyl di (lower alkyl) amine oxides in which the alkyl group has about 10-20, and preferably 12-16 carbon atoms, and can be straight or branched chain, saturated or unsaturated. The lower alkyl groups include between 1 and 7 carbon atoms. Examples include lauryl dimethyl amine oxide, myristyl dimethyl 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 (hydroxy 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,

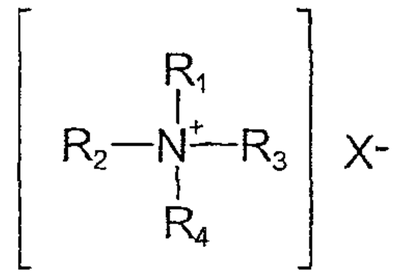
R_2 is a straight chained C_8-C_{18} alkyl group, preferably is C_{10}-C_{14} alkyl group, most preferably is a C_{12} alkyl group.

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). These are also described in the respective product specifications and literature available from the suppliers of these cationic surfactants.

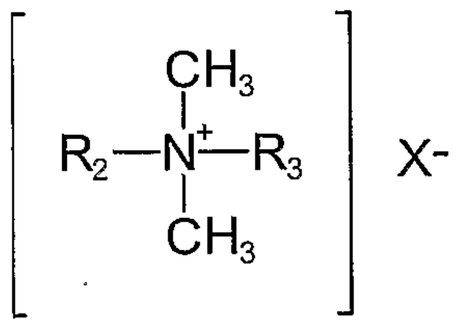
Examples of preferred cationic surfactant compositions useful in the practice of the instant invention are those which provide a germicidal effect to the concentrate compositions, and especially preferred are quaternary ammonium compounds and salts thereof, which may be characterized by the general structural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



where at least one of R_1, R_2, R_3 and R_4 is a alkyl, aryl or alkylaryl substituent 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; didecyl 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/didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 2080)); BARDAC ® 2250 is described to be didecyl 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 didecyl 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, didecyl 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 didecyl 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.

As the performance requirements of the compressed solid blocks may differ according to their use as either an ITB or as an ITC block, the amounts of the constituents present in the block may vary as well depending upon the final intended use of the treatment block.

When intended for use as an ITB block, the detersive surfactant constituent may be present in any effective amount and generally comprises up to about 90%wt. of the total weight of the solid block composition, and the resultant treatment block formed therefrom. Preferably the detersive surfactant constituent comprises about 20 - 90%wt., more preferably 35-80%wt. of the solid block composition, and when used as an ITB block the detersive surfactant constituent most preferably comprises about 50 – 75%wt. of the solid block composition, and the resultant treatment block formed therefrom. When intended for use as an ITC block, 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.

As noted previously, 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. According to the present invention titanium dioxide is necessarily present in the compressed solid block compositions described herein. The present inventors have observed that the inclusion of titanium dioxide beneficially improves the visual surface appearance of the compressed solid block compositions particularly following contact with and erosion by water such as flush water of a sanitary appliance. This surprising and unexpected effect has been observed with various compressed solid block compositions and particularly pronounced reduction or elimination of an unattractive spotted, streaked or speckled surface appearance due to the inclusion of the titanium dioxide. The inclusion of titanium dioxide, particularly in the preferred amounts indicated herein exhibit a reduction in the amount of visible white spots at the surface of the block as it erodes. It is believed that these white spots or streaked may be crystallized and/or agglomerated silica which are visibly discernible and provide a mottled surface appearance when ordinarily observed. Such is highly undesirable from a consumer standpoint and is most desirably avoided. Surprisingly the he inclusion of titanium dioxide in the block composition appears to minimize and/or inhibit the formation of such visible white spots or surface regions to a significant degree. This surprising benefit has been specifically observed with compressed solid blocks which also comprise a sulfate salt, especially sodium sulfate as a further constituent. The distinctions between similar compressed solid block compositions, one containing titanium dioxide and sodium sulfate, the other containing sodium sulfate but excluding titanium dioxide are strikingly apparent particularly after such blocks are eroded by flush water and thereafter allowed to dry. Such an effect is more apparent with increased amounts of erosion due to increased flush cycles. Thus, the inclusion of titanium dioxide as an essential constituent of the compressed solid block composition provides such

blocks which have a much more attractive appearance to the unaided eye of an observer, particularly following repeated use of the compressed solid block composition and cageless lavatory dispensing devices which include such titanium dioxide comprising lavatory block compositions.

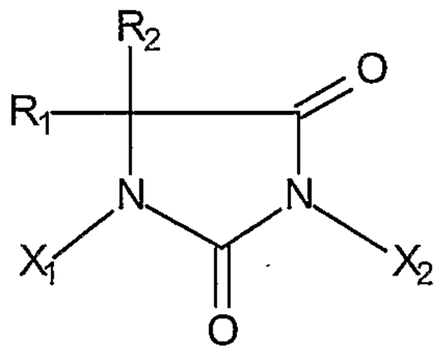
While the precise mechanism for such improvements in the surface of the compressed lavatory blocks is unknown, and while not wishing to be bound by the following hypothesis, it is suspected by the inventors that the presence of the titanium dioxide in effective amounts may interfered with the crystallization process of the sulfate salt, particularly sodium sulfate as the compressed solid block composition is washed with, and eroded by water. The reduction in the rate of, or prevalence of the crystallization of the sulfate salt per an interaction with the titanium dioxide may reduce the size of the crystals formed, or the distribution of the crystals form, or both, which limits their size to one which is imperceptible or only poorly perceptible to the unaided eye of an ordinary human observer. Of course, other mechanisms as yet not clearly understood may be responsible for the minimization and/or inhibition of such visible white spots in the lavatory block compositions of the invention.

Thus, the compressed solid block compositions necessarily comprise between about 0.001%wt. to about 10%wt, preferably between about 0.01%wt. and about 5%wt., yet more preferably comprise between about 0.05%wt. and about 1.5%wt., but most preferably comprise between about 0.05%wt. and about 0.5%wt. of the lavatory block compositions of which they form a part.

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 cageless 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 dihydrate; 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 dihydrate 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 0.1 - 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 chemical 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 vanilin, 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 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. 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 inventive 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 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 wherein the treatment block is to be used in an ITB application 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 solid block compositions, as well as in the treatment blocks formed therefrom. Generally wherein the treatment block is to be used in an ITC application the dissolution control agent is present to about 50%wt., more preferably is present from 1 – 50%wt. and most preferably is present from about 10 – 40%wt. of the solid block compositions, as well as in the treatment blocks formed therefrom.

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 compositions 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

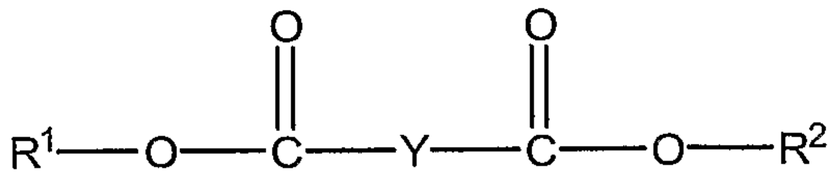
should not exceed about 80%wt. of the compressed solid block composition, although generally lesser amounts are usually effective. Preferably a sulfate salt, e.g., magnesium sulfate, copper sulfate, sodium sulfate, zinc sulfate and the like, and particularly sodium sulfate is necessarily present in the 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.

Preferably the compressed solid block 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 blocks 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 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 150 grams. Advantageously the mass of the compressed solid blocks is between about 20 and 100 grams. It is appreciated that compressed solid blocks having great mass should provide a longer useful service life of the cageless 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 chemical composition, or may formed of two (or more) different chemical compositions which may be provided as separate regions of a solid block, such as a first layer of a solid block consisting of a first chemical composition, alongside a second layer of a the solid block consisting of a second chemical composition which is different than the first chemical composition. The 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 solid blocks formed having two or more discrete layers or regions of, respectively, two or more different chemical compositions may be referred to as composite blocks.

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 cageless lavatory dispensing devices. Further, the application of a water soluble film or coating is preferred as certain water soluble film former compositions may impart a desirable surface gloss to the compressed lavatory blocks.

Preferably the compressed solid block compositions useful in the cageless lavatory 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.

25448-717

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 ethoxylate 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 ethoxylate C_9-C_{11} 6EO -- non-ionic

Further exemplary bleach containing compositions which can be used to form the compressed solid blocks of 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 blocks 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 compressed solid blocks 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 dihydrate, 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 dihydrate, sodium salt (56% bleach)	2.5	2.5	2.5
paraffinic hydrocarbons	3	3	5
titanium dioxide	0.0001 – 10	0.0001 – 10	0.0001 - 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	anionic surfactant, dodecylbenzene sulfonate,

(80%)	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 dihydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate dihydrate, 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 dihydrate, sodium salt (56%)	14.63	14.63	9.32	9.32
diisopropyl adipate	6.1	6.1	6.48	6.48

5

	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 dihydrate, sodium salt (56%)	14.6	4.98	2.41	0.55
diisopropyl adipate	6.46	3.73	3.61	3.33
Titanium dioxide	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 - 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 dihydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate dihydrate, 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 dihydrate, 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	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 - 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 dihydrate, 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	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 – 10	0.0001 - 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 dihydrate, sodium salt (56%)	bleach constituent, dichlorocyanurate dihydrate, 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 lavatory 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 the plate of a 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 next process step, the plate of a hanger is inserted within the interior of the channel or cavity such that the plate is preferably wholly encased within the interior of the preform. Preferably also the hanger extends outwardly from the preform at an angle which is approximately perpendicular to, more specifically 90° +/- 10°, preferably 90° +/- 5° with respect to tangent of the surface from which point the hanger extends outwardly therefrom. Such ensures that consistent loading and proper weight distribution of the hook, and proper placement of the cageless device in the sanitary appliance, especially a toilet is maintained.

Advantageously the cavity, channel or recess is essentially planar in configuration and is situated within the compressed solid block such that the plate is not placed within the symmetrical center or the mid-plane of the said block but rather is positioned to be parallel to a face or surface of the block such that the plate is positioned within a plane which is at a distance between 10% -80%, preferably 30% – 70% of the distance between the face of surface of the said block, and the symmetrical center or the mid-plane of the said block. Further preferably, the hanger and the compressed solid block is so positioned with respect to one another that the face of the said block nearest to the embedded plate is on the side opposite of the hook end of the hanger.

Alternately the extrudate may be of an alternate configuration, e.g., a rectangular, square or oblate cross-sectional configuration, which is formed into preforms. 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.

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 15 to 150 grams, preferably from about 20 to about 75 grams. The blocks are typically oblate in shape, having a length of from about 1 to about 4 inches and having a thickness of from about 0.5 – 1.5 inches.

The service life of the compressed solid blocks should be from about 10 to about 90 days, based on 12 flushes per day. Preferably the service life of the compressed solid blocks is at least about 14 days when installed on the rim of a toilet bowl such that the said block is positioned adjacent to the sloping interior sidewall of the toilet bowl and is subjected to between 6 - 12 flushes per day. Preferably the temperature of the water which is flushed is in the range of 16 - 24°C. The length of life of the compressed solid blocks will of course depend on a variety of factors including product formulation, water temperature, tank size, the number of flushes over the period of use and the volume of the water which contacts the compressed solid blocks.

Various configurations of the cageless lavatory dispensing device, 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 a hanger 10 comprising a hook end 20 comprising an end member 12 flexibly attached to a top member 14 as well as part of the stalk 16. Depending from the end of the stalk 16 distally from the hook end 20 is a plate 30. As can be seen from the perspective view provided by Figure 1, the plate itself is generally rectangular in configuration, and it is coplanar with the ribbon-type or strip-type configuration and construction of both the stalk 16 and hook end 20. The plate 30 has a width dimension "W1" as well as a height dimension "H1" and as depicted, desirably the

width is greater than the height. As is visible from the figure, the hanger 10 is generally symmetrical about a center line "CL" which is drawn with respect to the midline of the stalk 16. The center line does not exist as an actual element of the device but is illustrated for the sake of convenient reference. While not illustrated with sufficient particularity in the figure, it is of course understood that the plate, stalk 16 and the hook end 20 all have a thickness which may be consistent throughout, or which can vary.

Figure 2 depicts a side view of a further embodiment of the hanger 10 of Figure 1. As is more clearly seen in this figure, the hook end 20 is formed from first and second elements 12, 14 and part of the stalk 16. Depending from the stalk 16 is the plate 30. In this embodiment the plate 30 has a thickness "T1" which is greater than the thickness "T2" of the stalk 16 and the hook end 20. Of course, it will be understood that each of the hook end, stalk, and plate can have different thicknesses or can all share the same thickness as illustrated in Fig. 1.

Figure 3 depicts a further embodiment of a hanger 10 according to the invention, in which the hook end 20 is a flexible element. As can be seen from the figure, the hook end is comprised of a first element 12 flexibly connected to a top element 14 which in turn is flexibly connected to the stalk 16. At the end opposite the hook end, depends the plate 30. With regard to the hook end, as can be seen, at the terminal end of the first element 12 is seen a broadened region which is referred to as a "pad" 15. The pad region is of the same thickness as the first element 12, but is slightly broader. The width of the pad end 15 is greater than the width of the first element 12. This increased width is sometimes useful to stabilize the hook end of the cageless lavatory dispensing device when suspended upon part of a sanitary appliance. As is further visible from Figure 3, the plate 30 is substantially planar in configuration has a width W1 as well as height H1 and is symmetric around the center line CL of the stalk 16. The plate has a generally linear bottom edge 39 at opposite ends thereof to generally straight end walls 36, 38 which end walls proceed and extend to the stalk 16 via sloping top walls 32, 34.

Figure 4 depicts the hanger 10 of Figure 3 in both a "folded" as well as in an "unfolded" configuration.

As seen from the solid line elements depicted on Figure 4, the hanger 10 on the folded configuration illustrates, that when the hook end and the stalk are untensioned, the hook end 20 is retained in a closed configuration. In the unfolded configuration, as depicted by the elements depicted in a broken line format, the first element 12' and the pad 15' are extended away from the stalk 16 and are more distantly positioned with respect to the stalk than in the prior, folded configuration. Typically, this also causes a degree of translation of the top element 14' which may extend down to, include a portion of the stalk 16' as well. When made of a flexible material, in the unfolded configuration as depicted in Figure 4, the elastic bias of the material of construction, such as a polymer, tends to cause the hook end to seek to return to the folded configuration. However, when placed about the rim of a portion of a sanitary device, i.e. a toilet bowl, this action causes the hook end to impart a degree of gripping to that portion of the rim upon which it is mounted. This is turn helps retain the relative position of the hook end, as well as that of the cageless lavatory dispensing device until repositioned, or removed by a consumer.

Figure 5 depicts a still further embodiment of a hanger 10. In this embodiment, the hanger includes a coiled hook end 20 comprised of the first element 12, the second element 13 and a top element 14 which is in a compressed, coiled arrangement thus making it particularly convenient to include in a consumer package. The top end of the top element 14 extends to a stalk 16 having at its opposite end a depending plate 30. In this configuration, the plate 30 is oblate in shape and is generally symmetrical about a center line (CL). The plate has a width dimension (W1) as well as a height dimension (H1). Further, the plate illustrates that it can be produced with perforations passing there through. Here, two similarly shaped, generally triangular passages 33, 33' are provided. As has been discussed previously in the specification, while it is contemplated that the plate of the hanger may include one or more perforations passing there through, for reasons observed although not yet fully understood by the applicants, it is believed that the use of plates having such perforations passing there through are to be preferably avoided as such may undesirably reduce the service life of the cageless lavatory dispensing device.

Figure 6 depicts a still further embodiment of a hanger 10 according to the invention. As is shown, the hanger includes a hook end which is comprised of the first element 12, flexibly connected to a second element 13, which is in turn flexibly connected to a top element 14, which in turn is flexibly connected to a part of the stalk 16. The opposite end of the stalk terminates in a generally oblate shaped plate 30 having a width dimension (W1), a height dimension (H1) wherein the plate is generally symmetrically about the center line (CL) as depicted in the dotted line drawn on Figure 6. Whereas the hanger is depicted in a folded or otherwise coiled configuration, it is to be understood that the hook end can be extended by a user of the hanger and the cageless lavatory dispensing device to reconfigure said hook end 20 to form a hook end which can be used to suspend the hanger and the cageless lavatory dispensing device upon a part of a sanitary device particularly a toilet bowl rim. The embodiment according to Figure 6 also illustrates that, according to preferred embodiments, the plate 30 is substantially planar and as is shown in Figure 6, it is of generally uniform thickness. The embodiment depicted in Figure 6 is preferred in that the hook end is particularly well coiled when in its folded configuration, but when uncoiled or in its unfolded configuration, provides a significant degree of tension which is useful in retaining the respective position of the cageless lavatory dispensing device when installed upon a sanitary appliance, particularly when the hook is affixed on a part of a toilet bowl rim. Furthermore, Figure 6 depicts that that embodiment also includes a slanting neck 17 formed as part of the stalk 16 and immediately adjacent to the region of the plate 30 which is connected to the stalk 16. As depicted, the neck positions the plate at a position which is beneath the major portion of the stalk 16 but is parallel thereto. This positioning beneath the major part of the stalk 16 is beneficial and ultimately, it acts to also thereby position the compressed solid block enrobing the plate 30 such that when mounted upon a toilet bowl, the compressed solid block is in contact with, or is in very proximity to the interior sloping side wall of a toilet bowl. Such positioning is advantageous in that it ensures that the compressed solid block remains in the flow path of the flush water throughout the useful service life of the cageless lavatory dispensing device.

Figures 7A through 7D depict various alternate configurations which may also be used for the plate 30 for the hanger as described herein. Figure 7A depicts a diamond-shaped plate 30 depending at one vertex from the stalk 16. Figure 7B depicts a substantially circular plate 30 depending from one part of its circumference from the stalk 16. Figure 7C depicts an equilateral-triangular shaped plate 30 depending at one vertex from the stalk 16. Figure 7D depicts a further plate 30 which is generally rectangular but having two opposite semi-circular ends depending from the stalk 16. In each of the foregoing, it is seen that the configuration of the plates is generally symmetrical about the center line, CL.

Figure 8 depicts an embodiment of a portion of the hanger wherein the plate 30 includes a series of perforations 33 passing there through. As is depicted, the perforations are not symmetrical with respect to either the center line CL or the configuration of the semi-circular shaped plate 30. As noted above, plates 30 having perforations passing there through are less preferred embodiments of the hangers and useful with the cageless lavatory dispensing devices taught herein.

Figures 9A and 9B depict in two views an embodiment of a plate 30 depending from a stalk 16 wherein the plate comprises at least one, here a plurality of projections 35 extending outwardly from the generally planar and opposite faces 37, 37' of the plate. As is seen in particular in Figure 9B, the projections 35 are in the form of generally cylindrical studs having a base coincident with the respective face 37, 37' of the plate 30. The studs terminate at flat ends. The studs have a height which is approximately equal to, or slightly greater than thickness of the plate 30. Again, while these figures depict the utility of outwardly extending elements extending outward from the plate, again, as noted above embodiments of the hanger having such outwardly extending elements from the plate are less preferred.

Figures 10A and 10B depict two views of an embodiment of a two-part cageless lavatory dispensing device 10 of the invention. Figure 10A depicts a perspective view of a hook end 20 comprising a first element 12, a top element 14 and a front element 14' having extending from a part thereof a hanger peg 40. The hook end 20 is configured to be suspended upon the rim of a toilet bowl "WC" and may be used a single time but

desirably is used several times by a consumer. The second part of the cageless lavatory dispensing device of the invention 10 includes a stalk 16 having at a proximal end an eyelet or loop 44 which is sufficiently sized so that the stalk 16 may be removably affixed to and suspended from the hanger peg 40. The stalk 16 extends downwardly from the proximal end to the distal end and includes a slanting neck 17, which terminates in plate 30 which is encased in a compressed solid block 50. This second part may be installed by a user, and when the compressed solid block 50 is consumed, this second part may be removed by the consumer and replaced with a further second part with a new compressed solid block 50 and utilized.

As is more clearly depicted on Fig. 10B, the hook end 20 is mounted upon a part of a rim "R" of a toilet bowl "WC". The second part is suspended by eyelet 44 such that the compressed solid block 50 is positioned adjacent to or upon the inner sidewall "SW" of the toilet bowl WC. In this manner, flush water released from the rim downwardly into the toilet bowl WC contacts the compressed solid block 50 to form a treatment composition which is used to treat the toilet bowl.

While a cooperating hanger peg 40 and eyelet 44 exemplified one embodiment of a useful fastener means which may be used to assemble a cageless lavatory dispensing device 10 within the meaning of the invention, it is contemplated that any other effective means, particularly mechanical means and/or chemical means may be used as well and is considered to be within the scope of the invention, although not specifically depicted in the figures.

Figures 11A and 11B depict two views of an embodiment of a two-part cageless lavatory dispensing device 10 of the invention configured for use as an ITC device.

Fig 11A depicts a perspective view of a two-part cageless lavatory dispensing device 10 comprising a first part, a rigid hook end 20 adapted to be suspended upon the rim "R" of a toilet cistern "C", and a second part, a stalk 16 having a sloped, tenon-shaped proximal end 46 inserted in a suitably shaped mortise 19 present in the hook end 20, and at its distal end a plate 30 encased by a compressed solid block 50. The stalk 16 is of sufficient length that between flushes of the toilet to which it is attached, the block

50 is submerged beneath the water line "WL" so that the water contacts the block 50 to form a treatemtn composition within the cistern C.

Figure 11B depicts a top view of the two-part cageless lavatory dispensing device 10 of Fig. 11A. As is more clearly visible the mortise 19 includes two sloped mortise sidewalls 19' which abut correspondingly shaped tenon sidewalls 46' of the proximal end 46 of the stalk 16. Further, as is more apparent from Fig. 11A the tenon sidewalls 46' of the proximal end 46 of the stalk 16 are seen to taper inwardly toward one another as well, as well as the two sloped mortise sidewalls 19' which are configured to correspondingly conform.

Figure 12A and Figure 12B depict respectively a front sectional view of a compressed solid block 50 encasing/enrobing a plate 30 which depends from a stalk 16, while Figure 12B depicts the side view of the foregoing. As is depicted on Figure 12B, there is depicted a compressed solid block 50 encasing the plate 30 as well as the stalk 16 extending outwardly from the compressed solid block. The compressed solid block has a thickness "TB" as well as a height "HB". Fig. 12B illustrates a preferred embodiment of the invention, namely wherein the plate 30 is positioned on the interior of the block 50 and is in a plane parallel to the mid-plane "MP" which bisects the block 50 and is between the mid-plane MP and the front face 53 of the block 50. The front face 53 of the block 50 is the face which faces the interior of a sanitary appliance, here the interior of a toilet bowl WC, while the back face 55 is intended to be positioned adjacent to or abutting the interior sidewall SW of the toilet bowl WC.

Further depicted on Figure 12B is a sectional line "ZZ" which is intended to indicate a cross section of the block 50 coincident with a face of the plate 30. Returning to Figure 10A, this sectional view referred to is depicted. As can be understood with reference to the figure, the cross sectional area of the base has dimension 30A, which is less than about half of the surface area AB of the section of the compressed solid block 50 which is coincident with the face of the plate 30. More accurately, it should be understood that the calculation of respective ratios of the plate area, 30A to the cross sectional area of the block, AB, is made with the plate 30 being removed from the compressed solid block so that the area AB is unobscured.

Figure 13 illustrates a sectional view of a cageless lavatory dispensing device according to the invention installed within the interior of a toilet bowl WC. The embodiment illustrated on the following Figures 14A, 14B and 14C. As is visible from the Fig. 13, the block is positioned adjacent to the interior sidewall SW of the toilet bowl WC. During the flush cycle, the flow of flush water (indicated by arrows "F") flows about the block 50 wherein the water dissolves at least part of the compressed solid block 50 composition to form a treatment composition which is used to treat the toilet bowl WC.

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:

Compressed solid blocks according to the invention were produced from the described on the following tables; examples according to the invention are indicated by a letter "E" preceding one or more digits. Several comparative compositions were also produced and are indicated by a letter "E" preceding one or more digits; these do not include titanium dioxide. The compressed solid blocks were produced in the manner described above and where affixed to a hook generally in accordance with Fig. 3.

The compositions recited on Table 1 demonstrate non-bleach containing lavatory block compositions according to the invention.

Table 1								
	E1	E2	E3	E4	E5	E6	E7	E8
sodium dodecyl benzene sulfonate (85%)	23	23	23	23	23	23	23	23
C_{14}/C_{16} olefin sulfonate, sodium salt (80%)	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4
anhydrous sodium sulfate	41.9	42	41.946	41.940	41.947	41.949	41.997	41.993
anhydrous silica	2	2	2	2	2	2	2	2
fragrance	4	4	4	4	4	4	4	4
colorant (pigment)	--	0.04	0.0035	0.01	0.0025	0.0008	0.0025	0.0065
mineral oil	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
titanium dioxide	0.2	0.06	0.15	0.15	0.15	0.15	0.10	0.10

Table 1								
	E9	E10	E11	E12	E13	E14	E15	E16
sodium dodecyl benzene sulfonate (85%)	23	23	23	24.03	23	21.7	23	23
C_{14}/C_{16} olefin sulfonate, sodium salt (80%)	26.4	26.4	26.4	27.59	26.4	24.91	26.4	26.4
anhydrous sodium sulfate	41.998	41.998	41.998	39.06	37.31	35.21	42.297	42.297
anhydrous silica	2	2	2	2.09	2	1.89	2	2
fragrance	4	4	4	4	4	4	4	4
colorant (pigment)	0.0018	0.0012	0.0018	0.018	0.09	0.09	0.0022	0.003
mineral oil	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2
titanium dioxide	0.10	0.10	0.10	1.0	5	10.0	0.10	0.10

5

Table 1A				
	C1	C2	C3	C4
sodium dodecyl benzene sulfonate (85%)	23	23	23	23
C_{14}/C_{16} olefin sulfonate, sodium salt (80%)	26.4	26.4	26.4	26.4

anhydrous sodium sulfate	42.099	42.098	42.097	42.097
anhydrous silica	2	2	2	2
fragrance	4	4	4	4
colorant (pigment)	0.0005	0.0018	0.0025	0.0023
mineral oil	2.5	2.5	2.5	2.5
titanium dioxide	--	--	--	--

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
mineral oil	technical grade mineral oil; technical grade paraffin oil

Certain of the foregoing example compositions were subjected to service life testing to evaluate compressed solid block compositions used as ITB cageless lavatory dispensing devices. In accordance with the tests, ITB cageless lavatory dispensing device were produced in accordance with the foregoing discussion in the specification wherein a mass of the compressed solid block compositions were extruded into a preform, a slot was provided in the preform, and a hanger generally in accordance with that illustrated in Fig. 3 was provided such that the plate of the hanger was fully inserted into the slot of the preform. The preform was then subjected to a single compression operation in a suitable

die to compress and form the compressed solid block composition .

The initial mass of the compressed solid block composition varied slightly from sample to sample, but initial mass is indicated on the following table.

In accordance with the test sample ITB cageless lavatory dispensing devices were supplied to a toilet, a "Remo" model toilet bowl, (ex. Shires Co., Ireland) or a "Jacob Delafon" toilet bowl (ex. Delafon, France).. The test samples were subjected to an "accelerated" testing protocol wherein the toilets were flushed 40 times per each day of the test. The placement of the ITB device varied but once positioned prior to the test was not moved until the test was concluded. The test was performed over a number of successive days, and all testing was performed at approximately room temperature (19 - 22°C). Each of the toilets were periodically and automatically flushed by a machine-controlled device which operated the toilets to flush 40 times daily at intervals of approximately 30 minutes between flushes. The appearance of the compressed solid blocks during the duration of the test were observed, and prior to testing and the initial flush each of the ITB cageless lavatory dispensing devices were weighed, and then placed suspended from the rim of a toilet bowl. At the conclusion of 315 flush cycles, the test sample ITB cageless lavatory dispensing devices were removed and allowed to dry for at least 60 minutes, and thereafter weighed. In this manner, the loss of the mass of generally dry compressed solid blocks were evaluated. In the following test, sample devices including a compressed solid block composition according to several of the example compositions according to Table 1, as well as the example compositions according to Table 1A were tested. The results of the test are indicated on the following Table 3.

Table 3

Sample #/ composition	Initial mass of compressed solid block (grams)	Final mass of compressed solid block (grams) following 315 flushes	% mass loss of compressed solid block following 315 flushes
1/E8	44.30	9.50	78.55
1/E9	44.30	16.73	62.23
2/E9	44.30	8.77	80.20
3/E9	44.30	7.44	83.20

4/E9	44.30	8.22	81.44
5/E9	44.30	7.38	83.34
1/E7	44.30	15.49	65.03
2/E8	44.30	7.22	83.70
3/E8	44.30	4.24	90.42
6/E9	44.30	11.66	73.67
1/E10	44.30	17.97	59.43
2/E7	44.30	3.45	92.21
1/C1	44.30	3.94	91.10
1/C2	44.30	5.08	88.53
1/C3	44.30	4.79	89.18

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 plate notwithstanding multiple flush cycles wherein flowing water delivered from the rim of the toilet impinging directly on the plate and the respective compositions. The compositions also delivered an effective amount of the surfactants present in the blocks as evidenced by the formation of bubbles or foam at the waterline of the toilet bowl following a flush cycle.

The disparities in the rate of dissolution of the tested sample devices at like numbers of flushes may often attributed to the placement of the sample with respect to specific positions on the rim of the toilet bowl, as in some positions greater volumes of water were released with each flush and tended to erode or dissolve the compressed block composition more quickly than at other positions. Such is not considered to be a detriment, but rather permits the consumer to selectively place the ITB cageless lavatory dispensing devices to provide a degree of control over the useful life of the block, and upon the degree of foaming which is desired following individual flushes of the toilet bowl.

On visual observation the surface appearance of the blocks, as formed and prior to the above test were substantially smooth with a generally uniform color. Such was observed for the blocks according to the invention as disclosed in Table 1 as well as the comparative block compositions according to Table 1A which excluded the titanium dioxide. However, following the test and after the blocks had been allowed to dry, the sample blocks according to Table 1A had a pronounced and unattractive spotted or

speckled surface appearance with significant amounts of sodium sulfate crystals (or agglomerates) very plainly visible to the unaided eye. In contrast, the similarly tested and dried sample blocks of the invention according to Table 1 were generally smooth and uniform in surface appearance with little surface speckling or spotting visible to the unaided eye.

Figure 1-P is a photograph of two blocks which omit titanium dioxide which have been suspended beneath the rim of a toilet bowl which has been flushed 96 times, at a frequency of 12 times per day, the photograph the photograph being taken prior to the next successive flush with the block having been allowed to dry in this position between 30 and 120 minutes. The block "B1-C4" is a block having a composition according to formula "C4" of Table 1A, and the block "B2-C3" having a composition according to formula "C3" according to Table 1A. As is particularly evident from the darker colored block B1-C4, the surface thereof has very visible and distinct mottled whitish regions "MS".

Figure 2-P is a photograph of two further blocks which omit titanium dioxide which have been suspended beneath the rim of a toilet bowl which has been flushed 167 times, at a frequency of 12 times per day, the photograph the photograph being taken prior to the next successive flush with the block having been allowed to dry in this position between 30 and 120 minutes. The block "B3-C3" is a block having a composition according to formula "C3" of Table 1A, and the block "B4-C3" having a composition according to formula "C3" according to Table 1A, albeit with a different colorant and fragrance than that of block B3-C3.. As is particularly evident from the figure, both the darker pigmented block B3-C3, as well as the lighter pigmented block B4-C4 include on their surfaces thereof very visible and distinct mottled, streaked whitish regions MS.

Figure 3-P is a photograph of several further blocks all of which have been subjected to at least 70 flush cycles after which, flushing was terminated and the blocks allowed to dry as suspended from the rim of the toilet bowl as illustrated at 56 hours following contact with flush water, but in contact with ambient air humidity. The darker pigmented blocks, B5-C4, B7-C4, B8-C4, B9-C4 all had compositions in accordance

with composition C4 of Table 1A. The lighter pigmented blocks B6-C3 and B10-C3 all had compositions in accordance with compositions C3 of Table 1A. As is very evident from the photograph, all of the block surfaces included mottled, streaked or spotted whitish regions MS.

Figure 4-P is a photograph of the same blocks as in Figure 3-P, however the blocks had been further permitted to dry without contact with flush water but in contact with ambient air humidity for 72 hours. As is very evident from the photograph, all of the block surfaces included mottled, streaked or spotted whitish regions MS, most of which increased in relative size or surface area in relation to the total surface of the block.

Figure 5-P is a photograph of two blocks B11-E7, B12-E7 having block compositions which comprise titanium dioxide having compositions according to E7 of Table 1. The blocks have been suspended beneath the rim of a toilet bowl which has been flushed 82 times, at a frequency of 12 times per day, the photograph being taken prior to the next successive flush with the block having been allowed to dry in this position between 30 and 120 minutes. As is seen from the photograph, little or no surface mottling or spotting

Figure 6-P is a photograph of two blocks B13-E8, B14-E8 having block compositions which comprise titanium dioxide having compositions according to E8 of Table 1. The blocks have been suspended beneath the rim of a toilet bowl which has been flushed 147 times, at a frequency of 12 times per day, the photograph being taken prior to the next successive flush with the block having been allowed to dry in this position between 30 and 120 minutes. As is seen from the photograph, little or no surface mottling or spotting

Figure 7-P is a photograph of two blocks B15-E10, B16-E10 having block compositions which comprise titanium dioxide having compositions according to E10 of Table 1. The blocks have been suspended beneath the rim of a toilet bowl which has been flushed 147 times, at a frequency of 12 times per day, the photograph being taken prior to the next successive flush with the block having been allowed to dry in this

position between 30 and 120 minutes. As is seen from the photograph, little or no surface mottling or spotting

It is to be specifically noted that each of the foregoing tested sample ITB cageless 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 plate 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; the scope of the claims should not be limited by the preferred embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description ads a whole.

25448-717

CLAIMS:

1. A cageless lavatory dispensing device comprising a hanger having a hook end adapted to be suspended from a rim of a toilet bowl, and a compressed solid block composition comprising titanium dioxide and at least one chemical agent adapted to be suspended within the interior of the toilet bowl, such that when the block composition is immersed, rinsed or washed with water, said at least one chemical agent is eluted or dissolved into said water and forms a treatment composition which provides one or more of a cleaning benefit, a sanitizing benefit and a disinfecting benefit to the toilet bowl being treated with the treatment composition, wherein the block composition is formed by a process which comprises forming a mass comprising the at least one or more chemical agent, and compressing a quantity of the mass to encase a portion of the hanger and wherein the block composition comprises:

10-35%wt. of an alpha olefin sulfonate anionic surfactant;

10-35%wt. of a linear monoethanolamide;

5-50%wt. of a linear dodecylbenzene sulfonate anionic surfactant;

5-50%wt. of a sodium sulfate

0.1-15%wt. of silica

0.1-25%wt. sodium lauryl ether sulfate;

0.0001-10%wt. titanium dioxide;

optionally to 40%wt further additive constituents.

2. A device according to claim 1, wherein the further additive constituents comprise one or more components selected from the group consisting of further surfactants, fillers, binders, fragrances, processing aids, lubricants, tableting aids, bleaches, and sanitizing compositions.

25448-717

3. A device according to claim 1 or 2, wherein the hanger having the hook end comprises a stalk depending therefrom and a plate depending from the stalk.

4. A device according to claim 3, wherein the stalk comprises a standoff section.

5. A device according to claim 1 or 2, wherein the compressed solid block composition enrobes or encases part of the hanger.

6. A device according to any one of claims 1 to 5, wherein the device further comprises an air treatment dispenser.

7. A process for delivering a treatment composition to the interior of a toilet bowl, which process comprises:

providing a cageless lavatory dispensing device according to any one of claims 1 to 6,

suspending the compressed solid block within the interior of the toilet bowl, and,

periodically flushing water about the exterior of the compressed block to elute at least one chemical agent to form a treatment composition with said water which treatment composition provides a cleaning and/or sanitizing and/or disinfecting benefit to the toilet bowl.

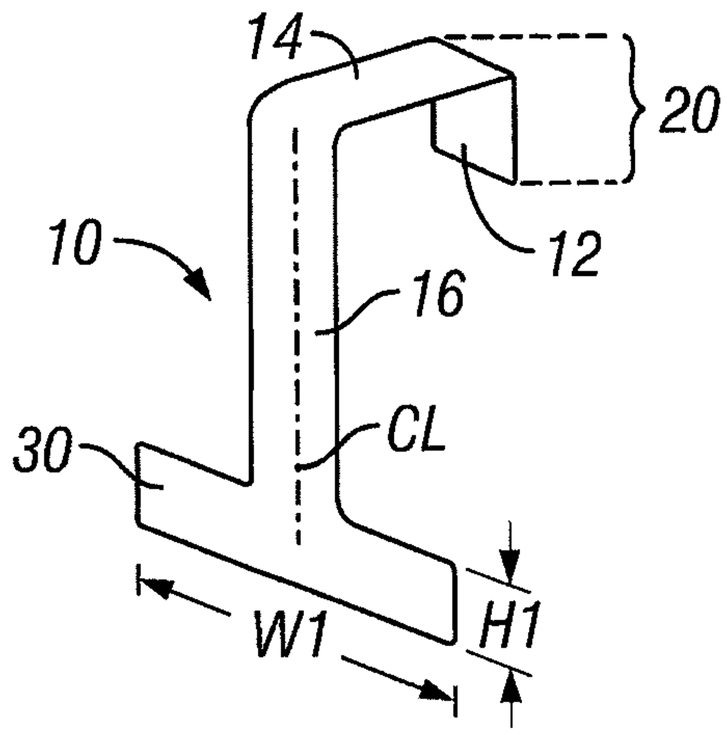


FIG. 1

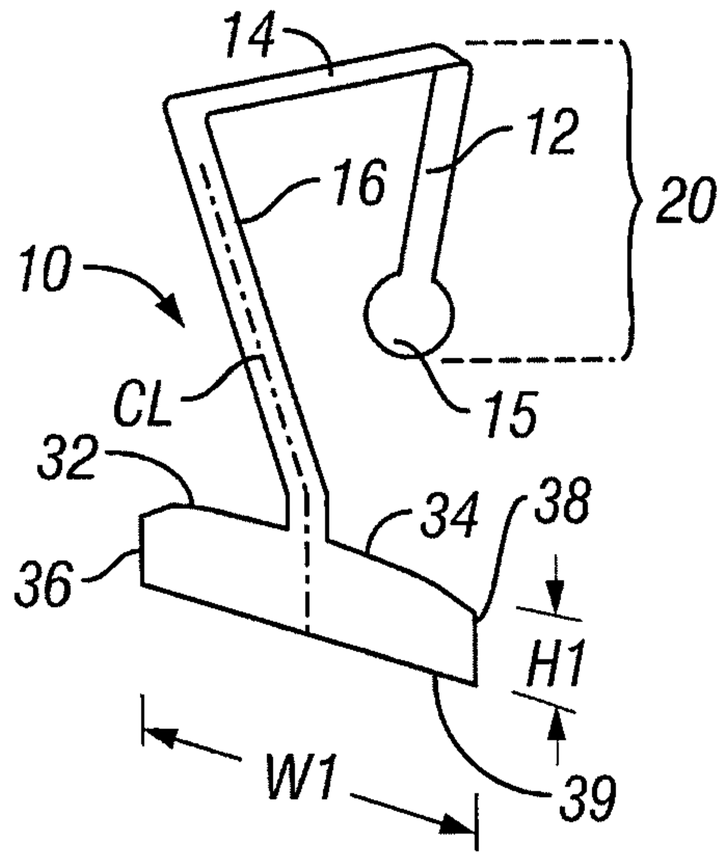


FIG. 3

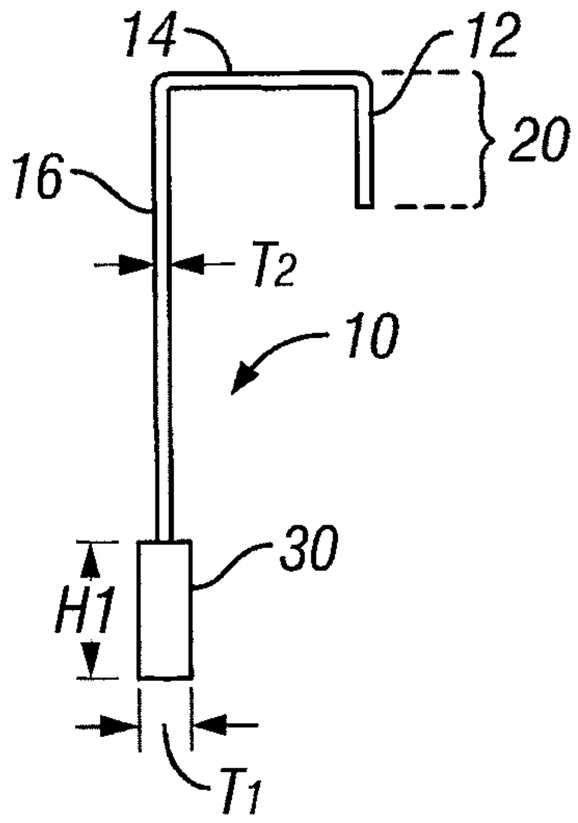


FIG. 2

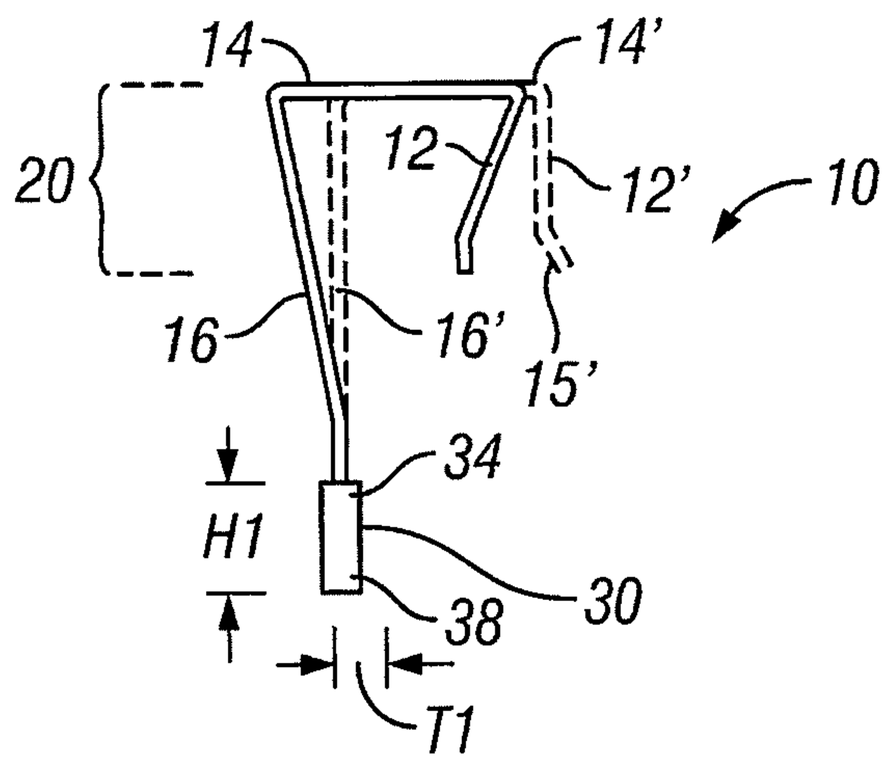


FIG. 4

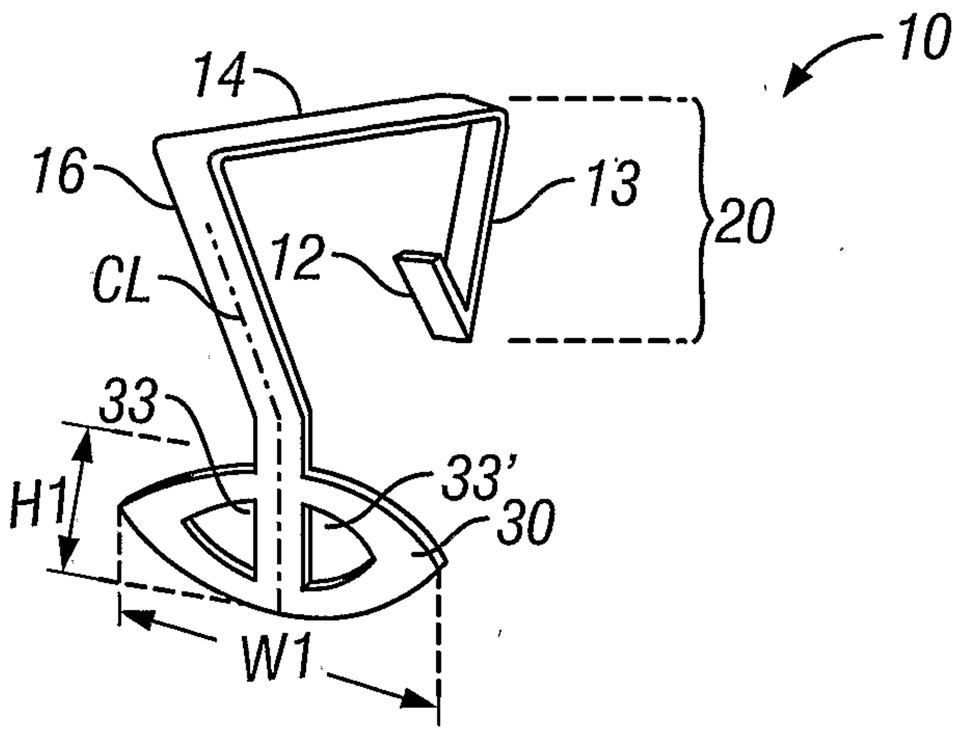


FIG. 5

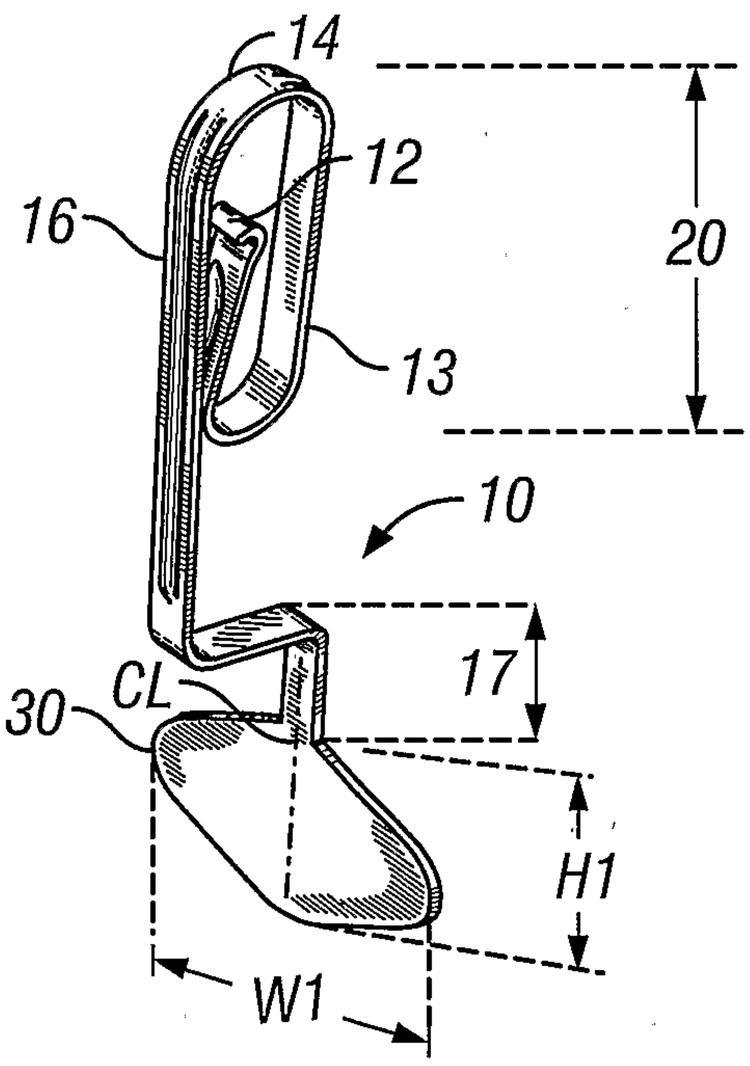


FIG. 6

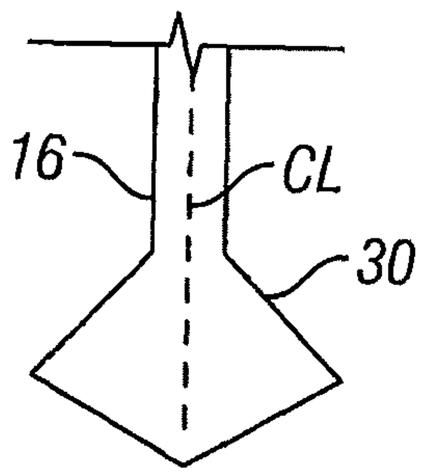


FIG. 7A

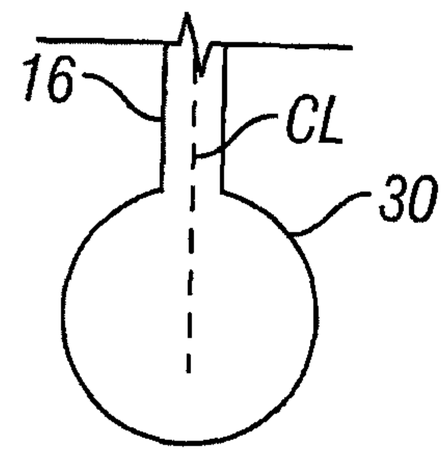


FIG. 7B

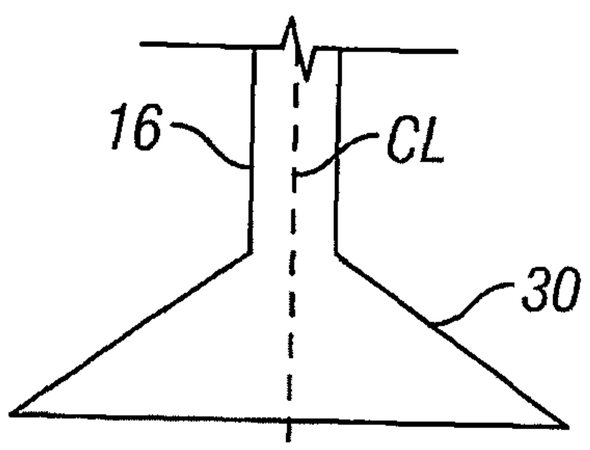


FIG. 7C

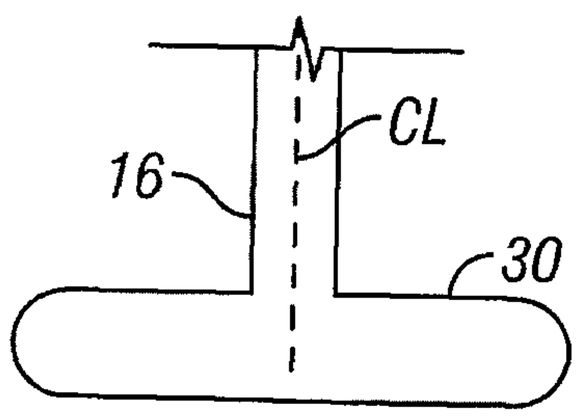


FIG. 7D

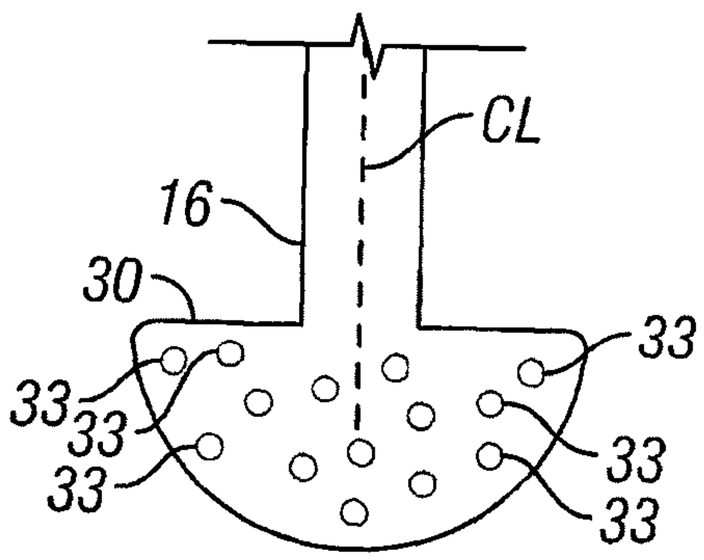


FIG. 8

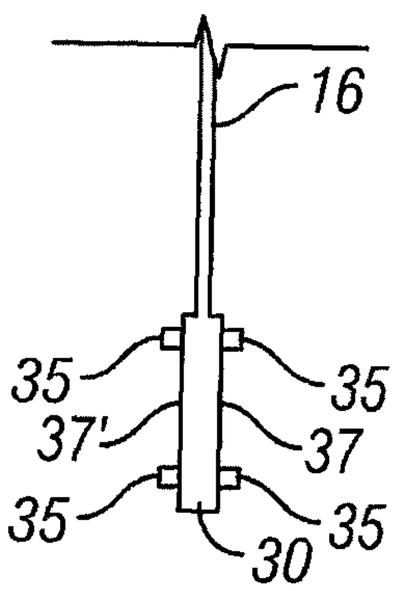


FIG. 9B

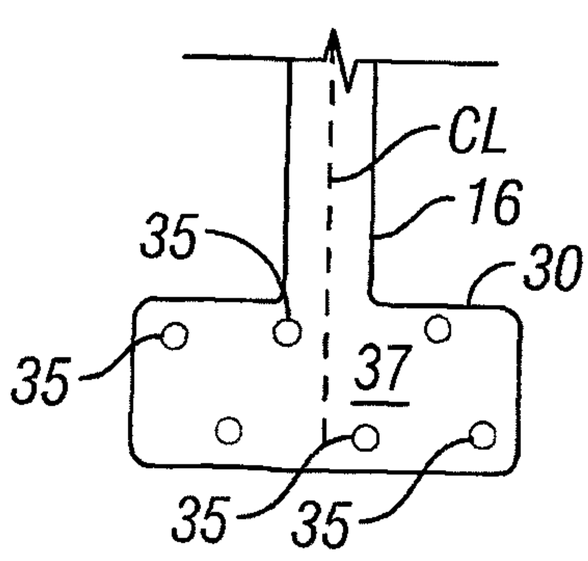


FIG. 9A

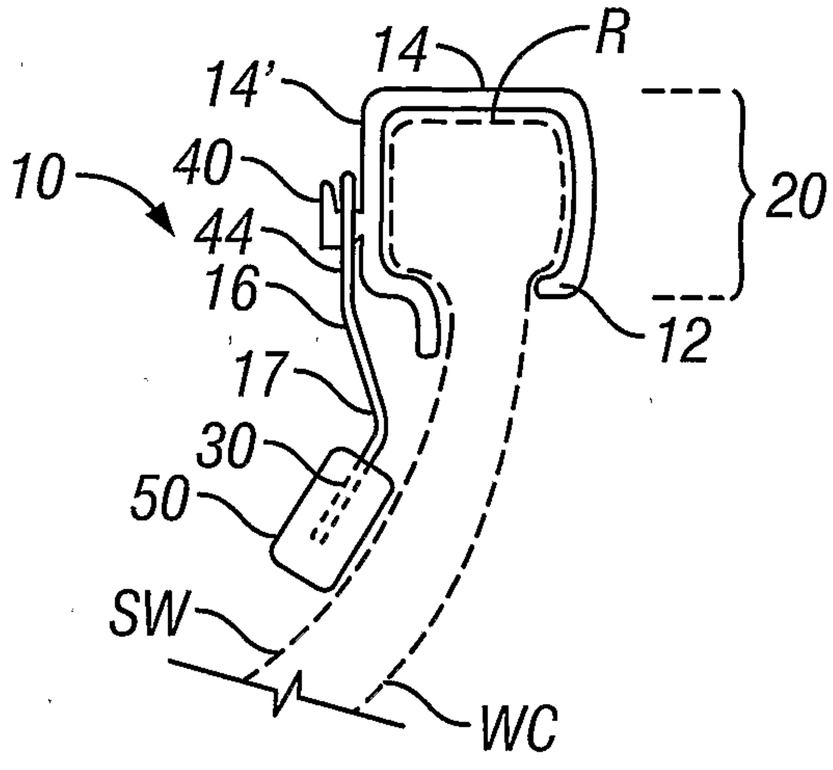


FIG. 10B

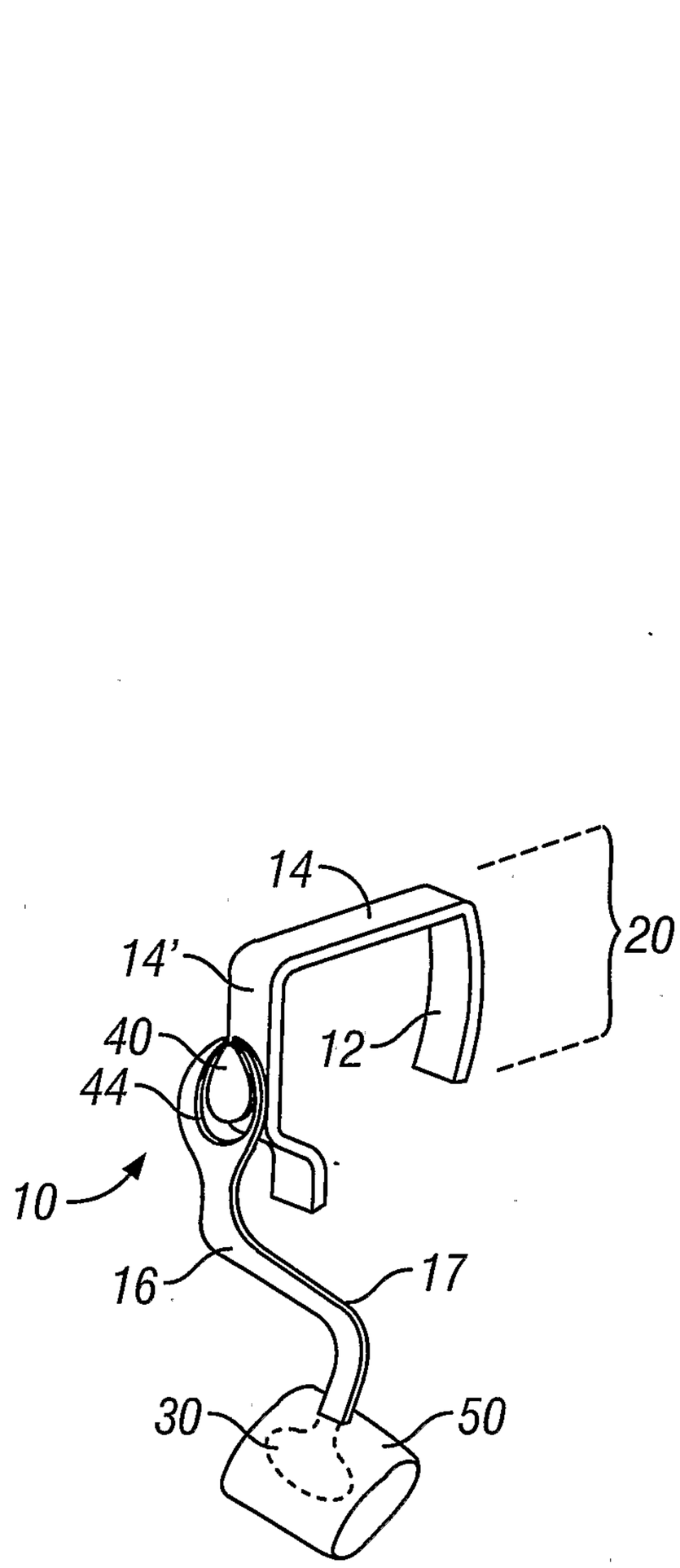


FIG. 10A

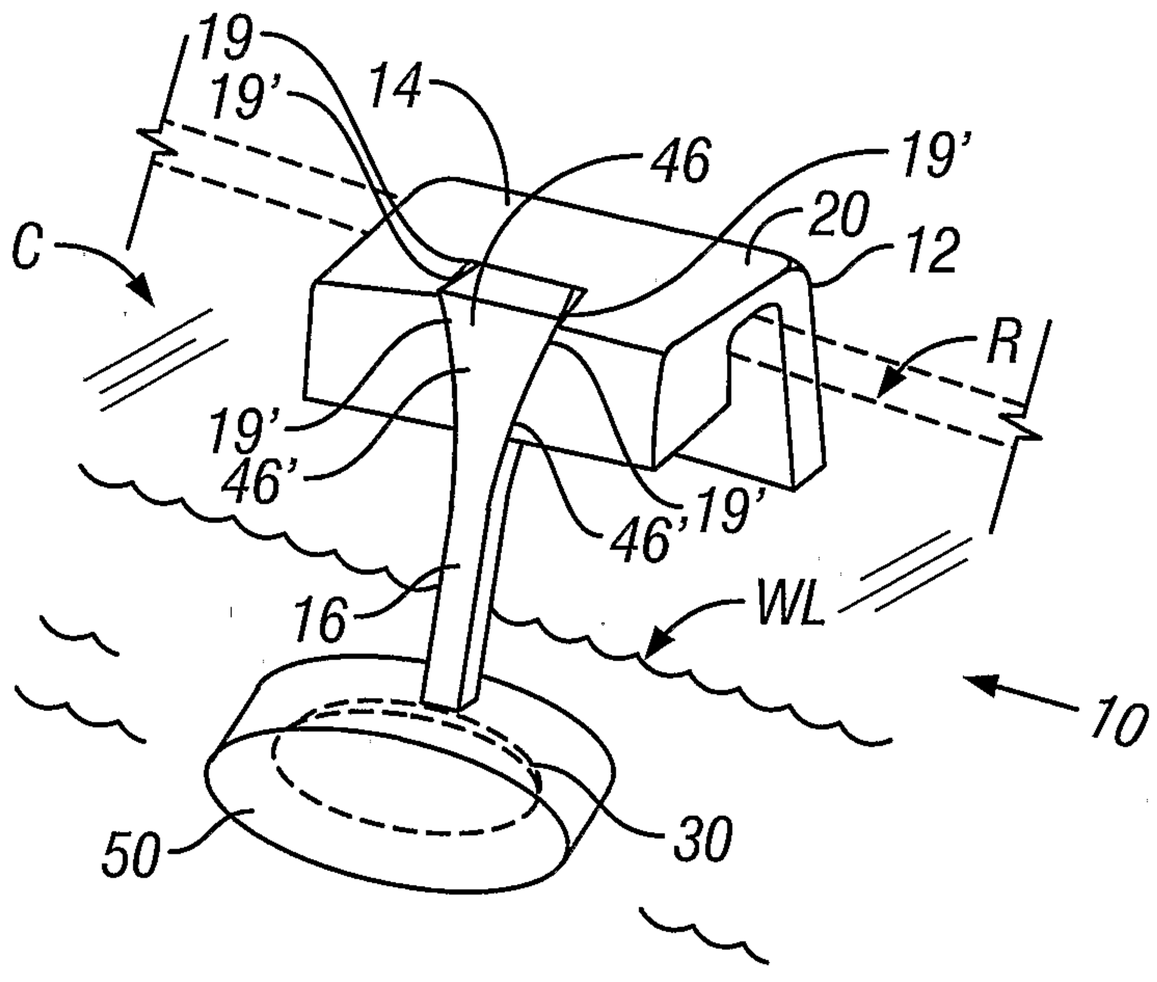


FIG. 11A

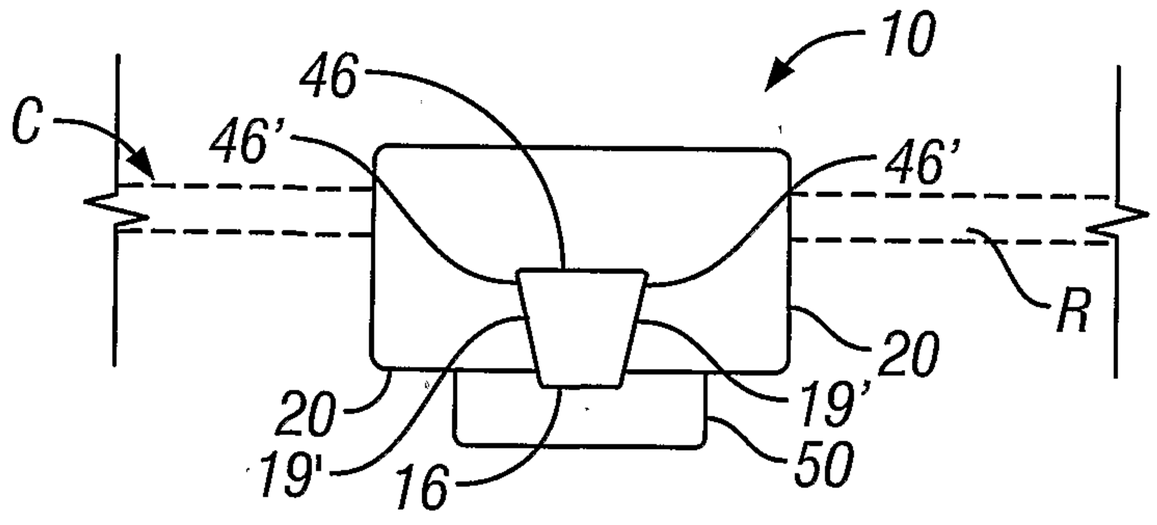


FIG. 11B

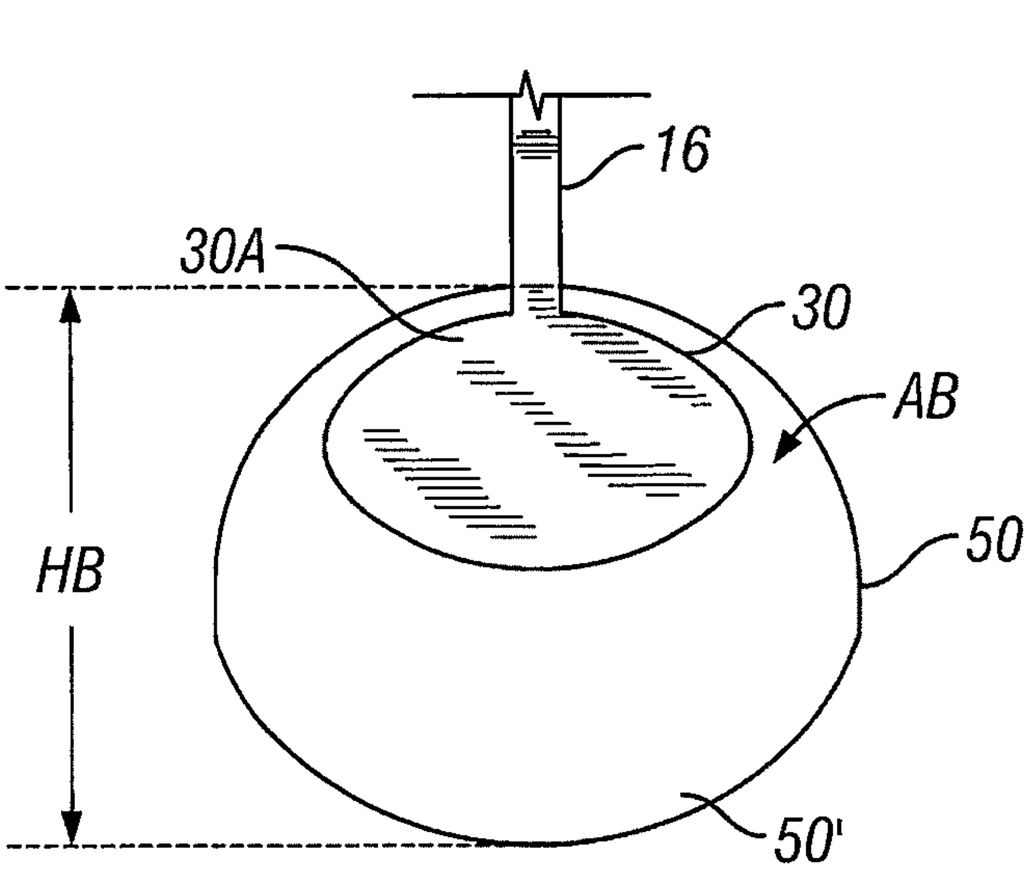


FIG. 12A

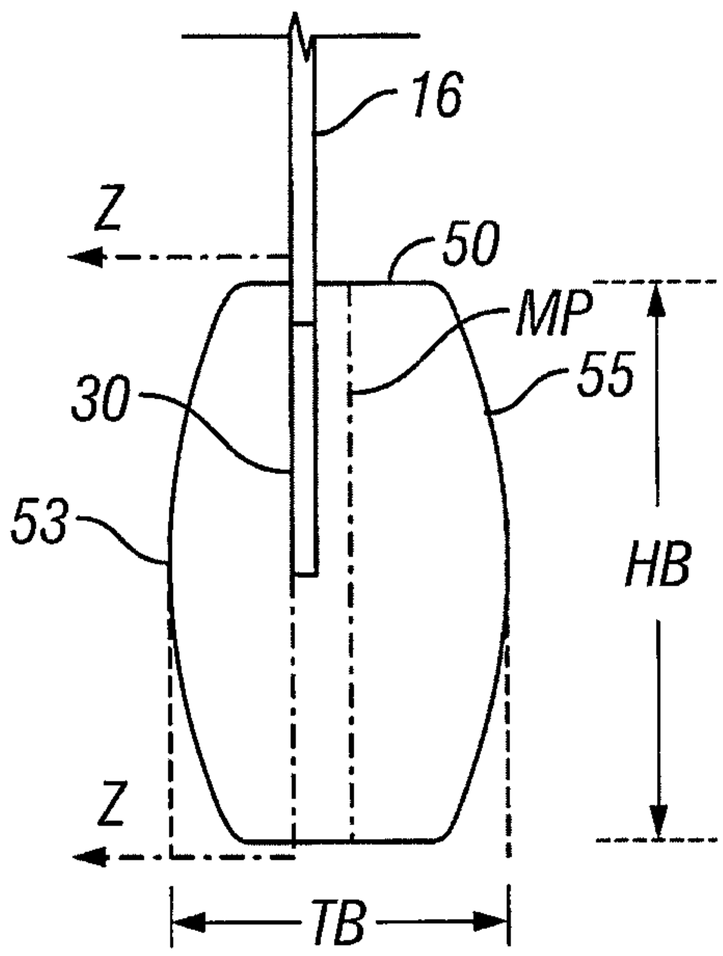


FIG. 12B

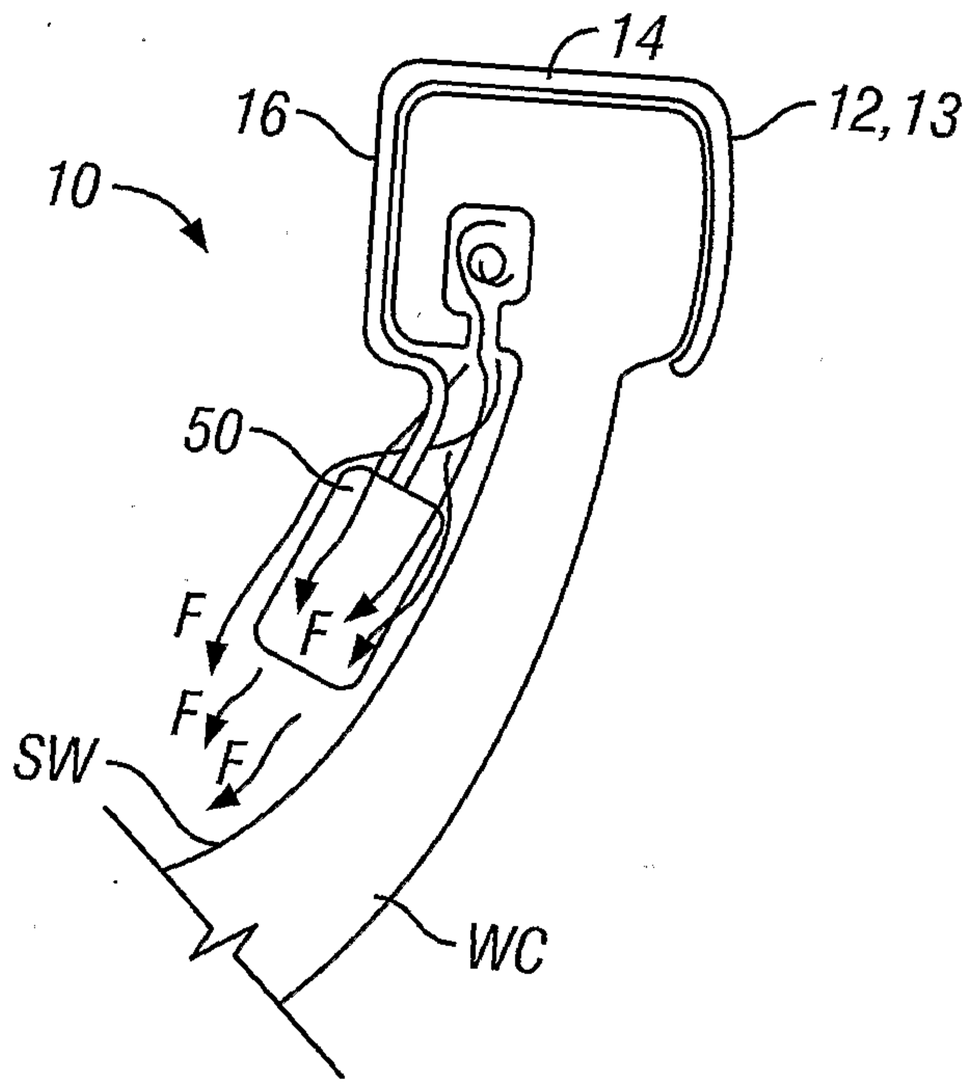


FIG. 13

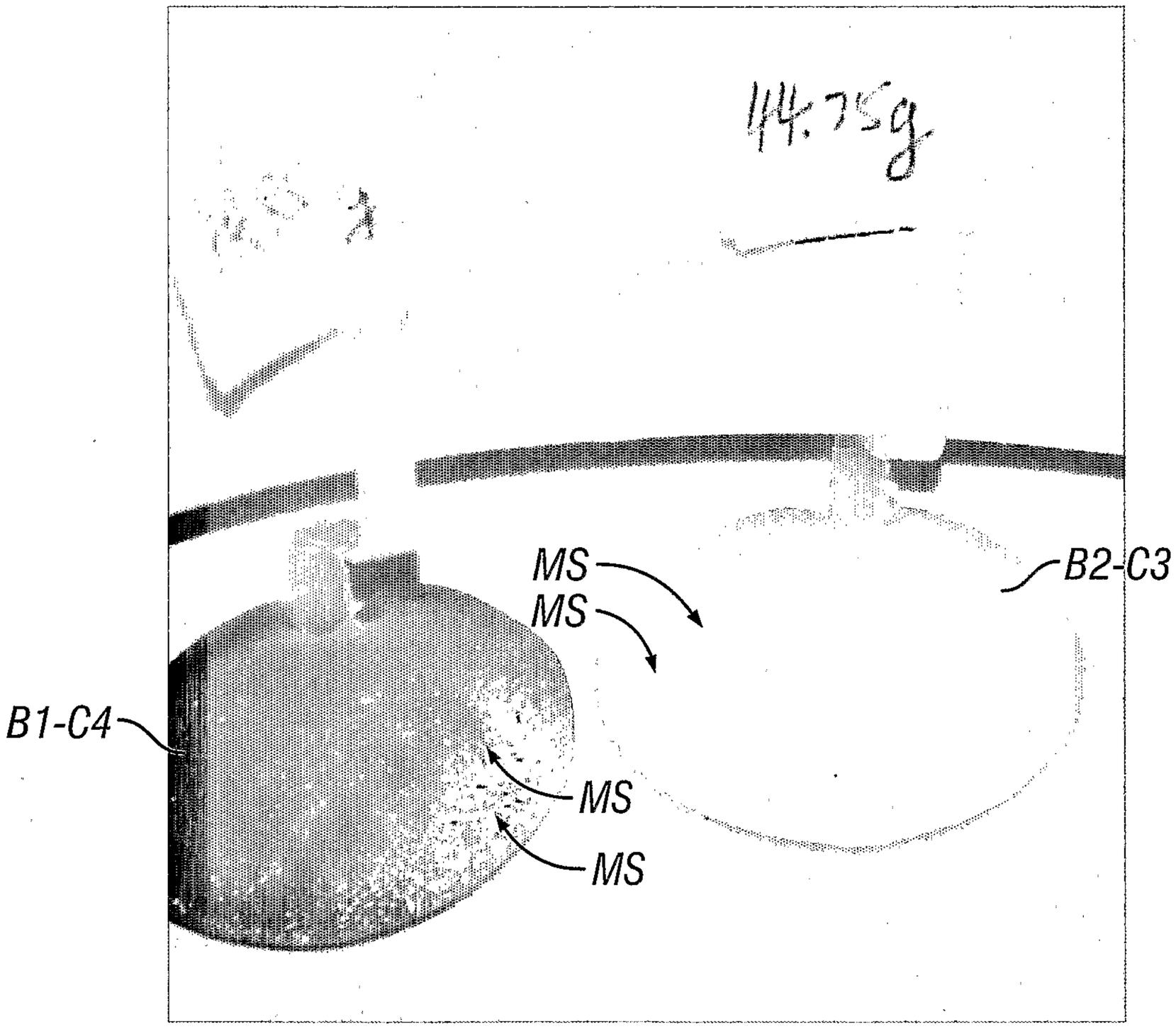


FIG. 1-P

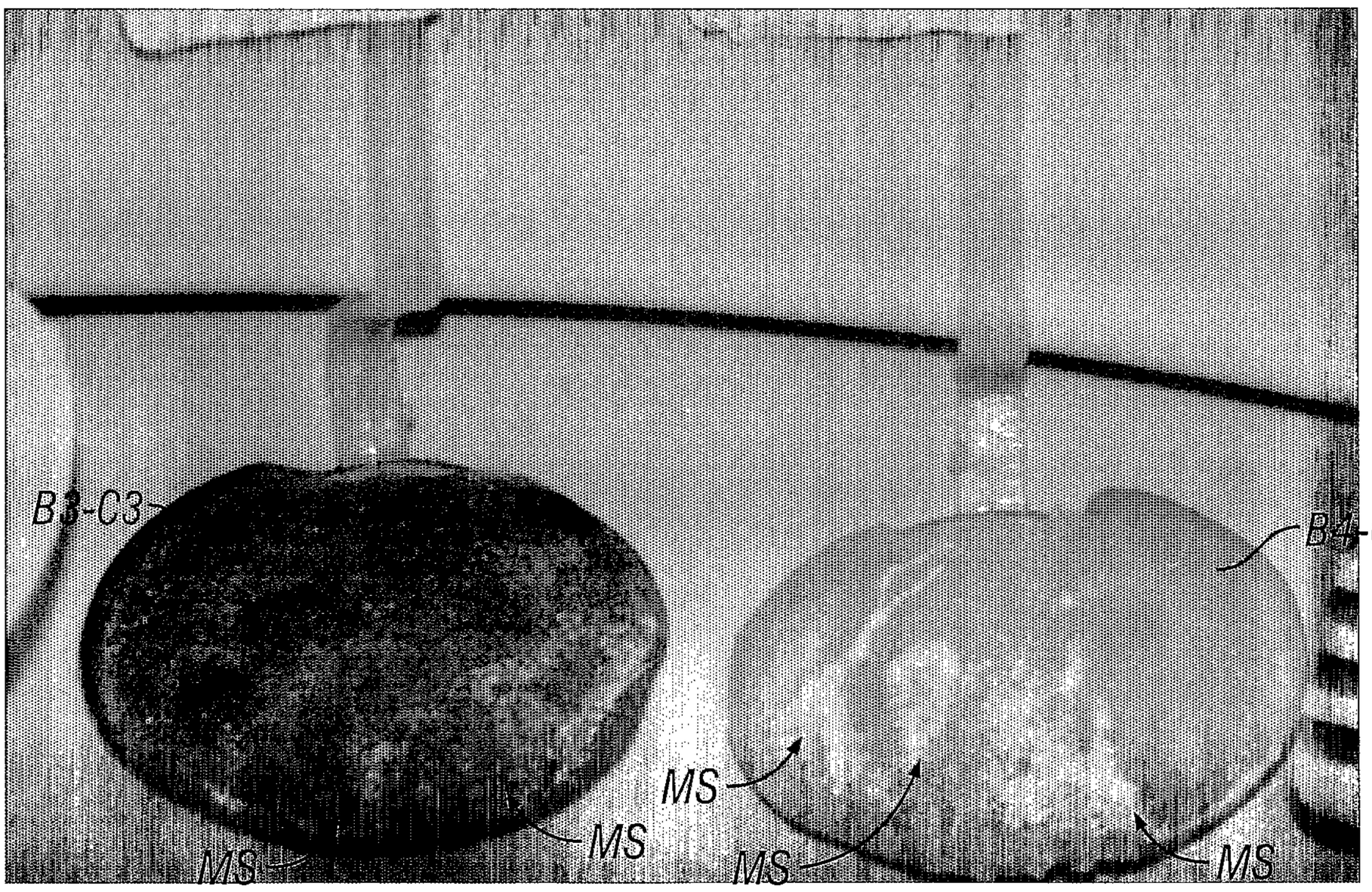


FIG. 2-P

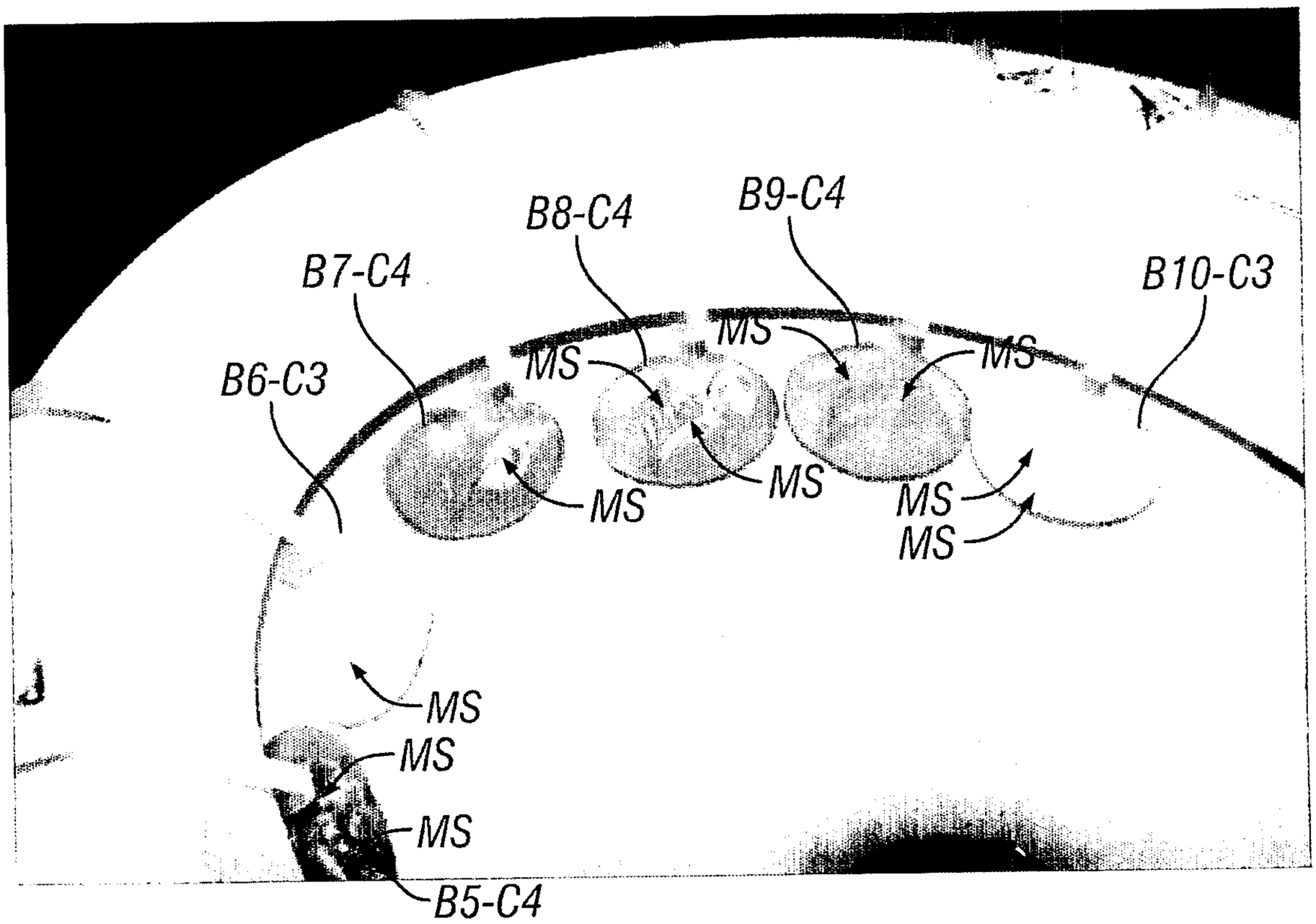


FIG. 3-P

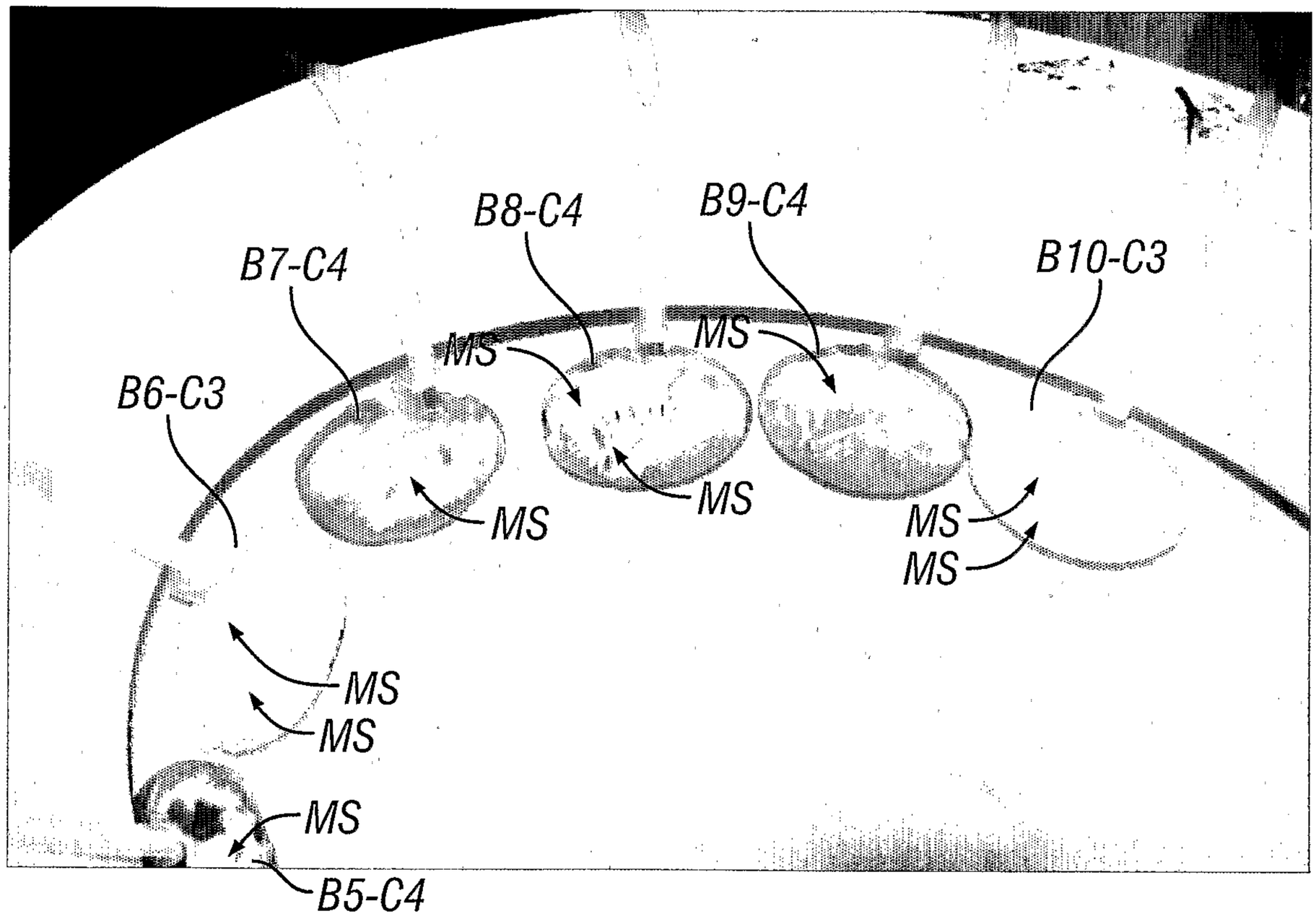


FIG. 4-P

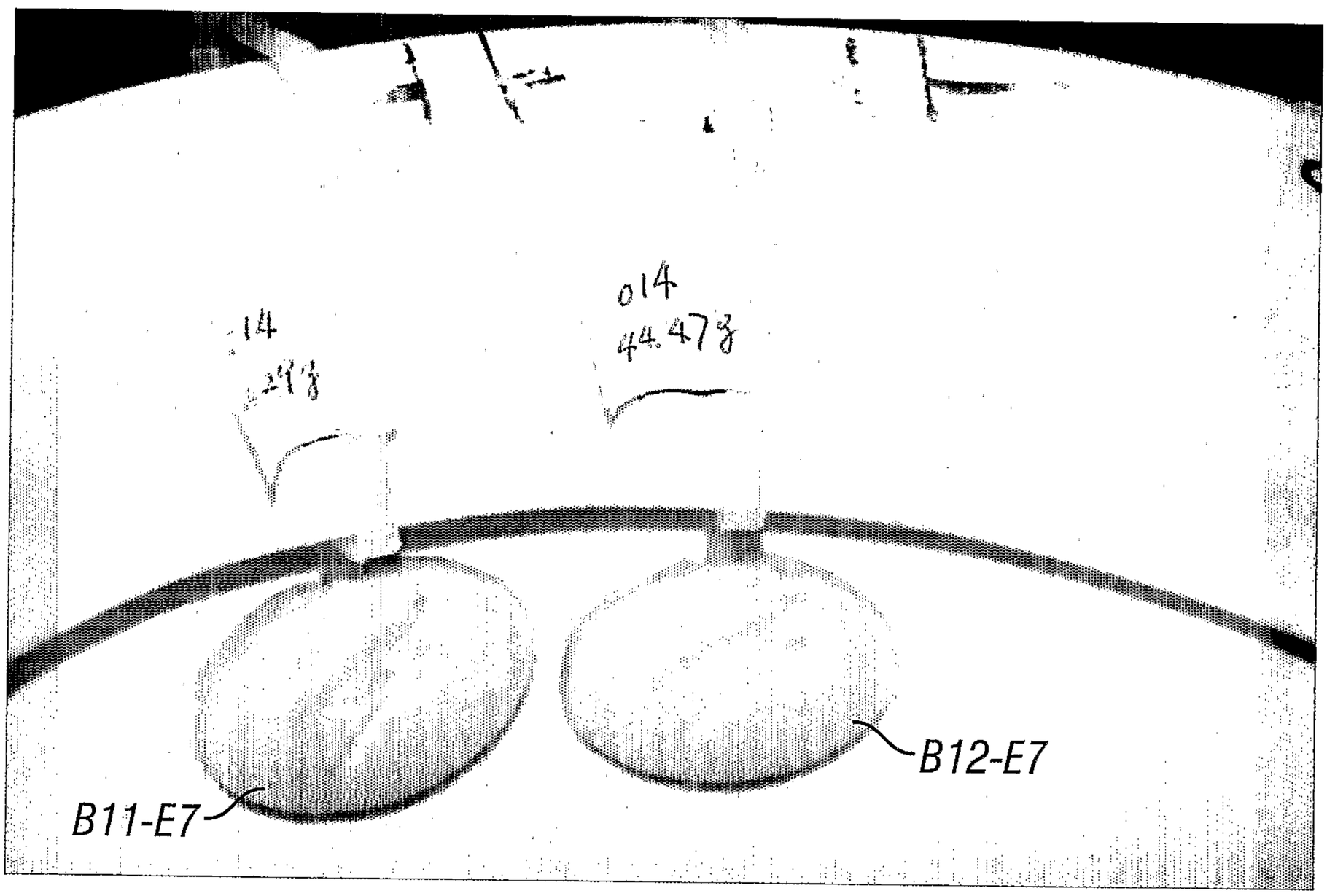


FIG. 5-P

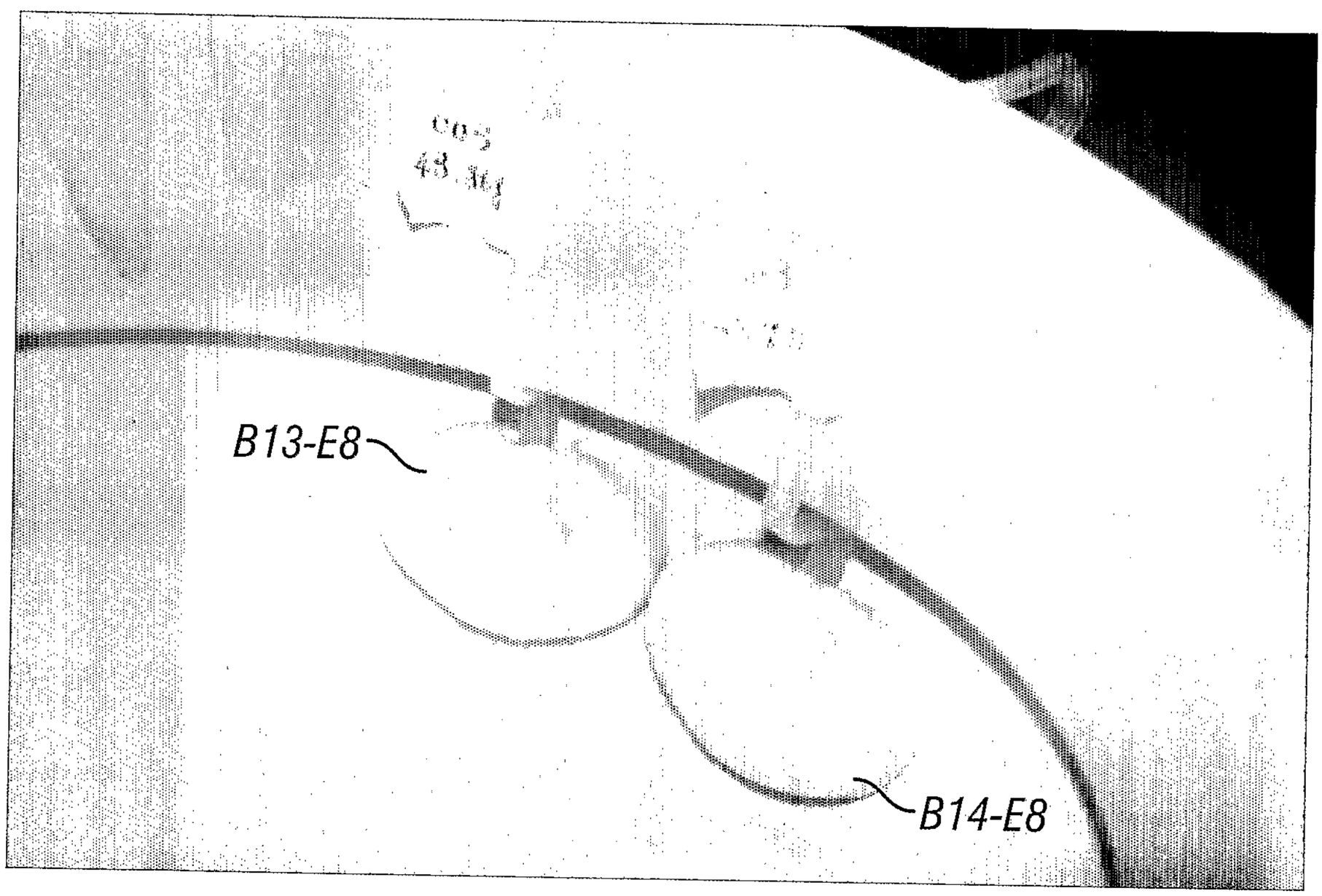


FIG. 6-P

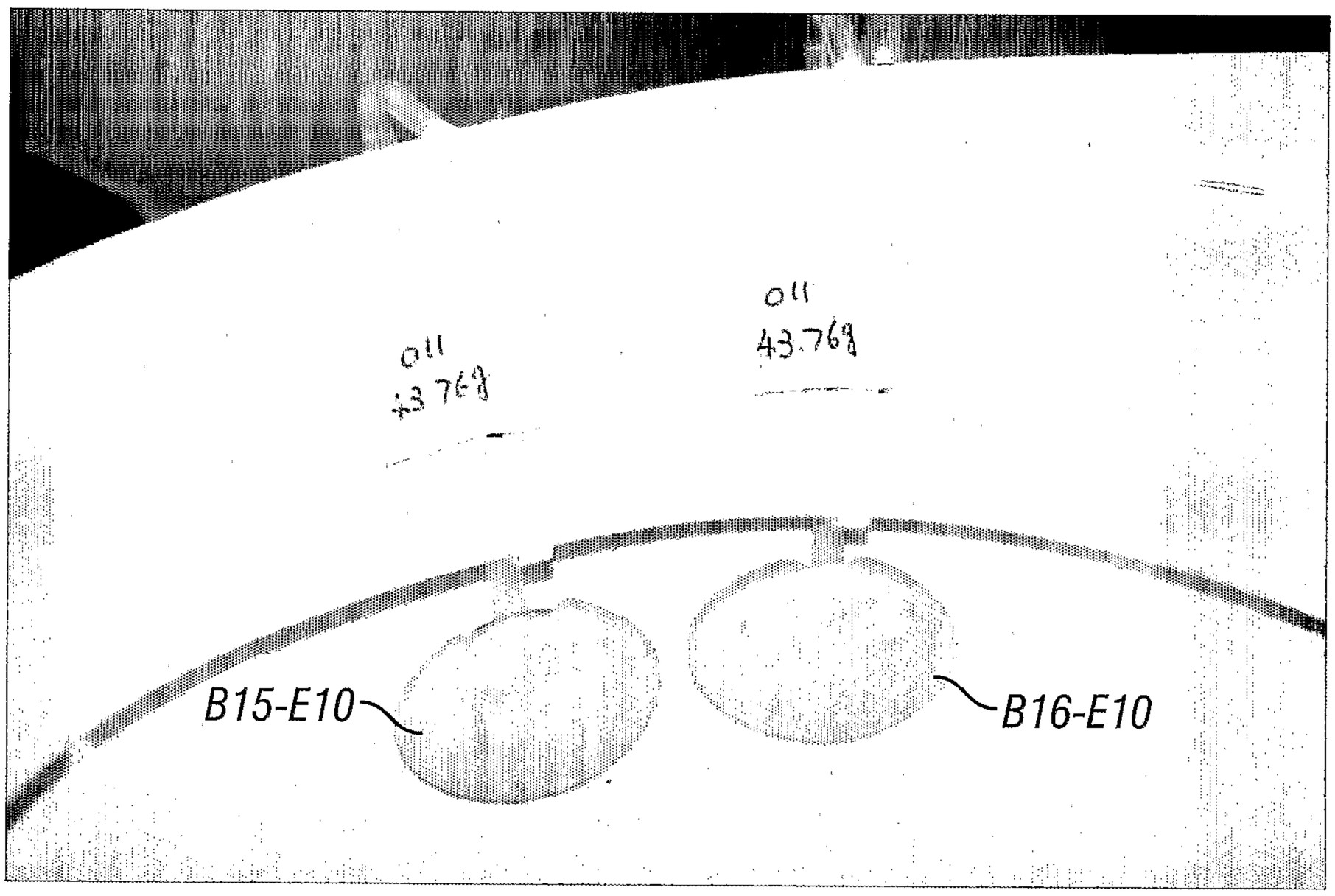
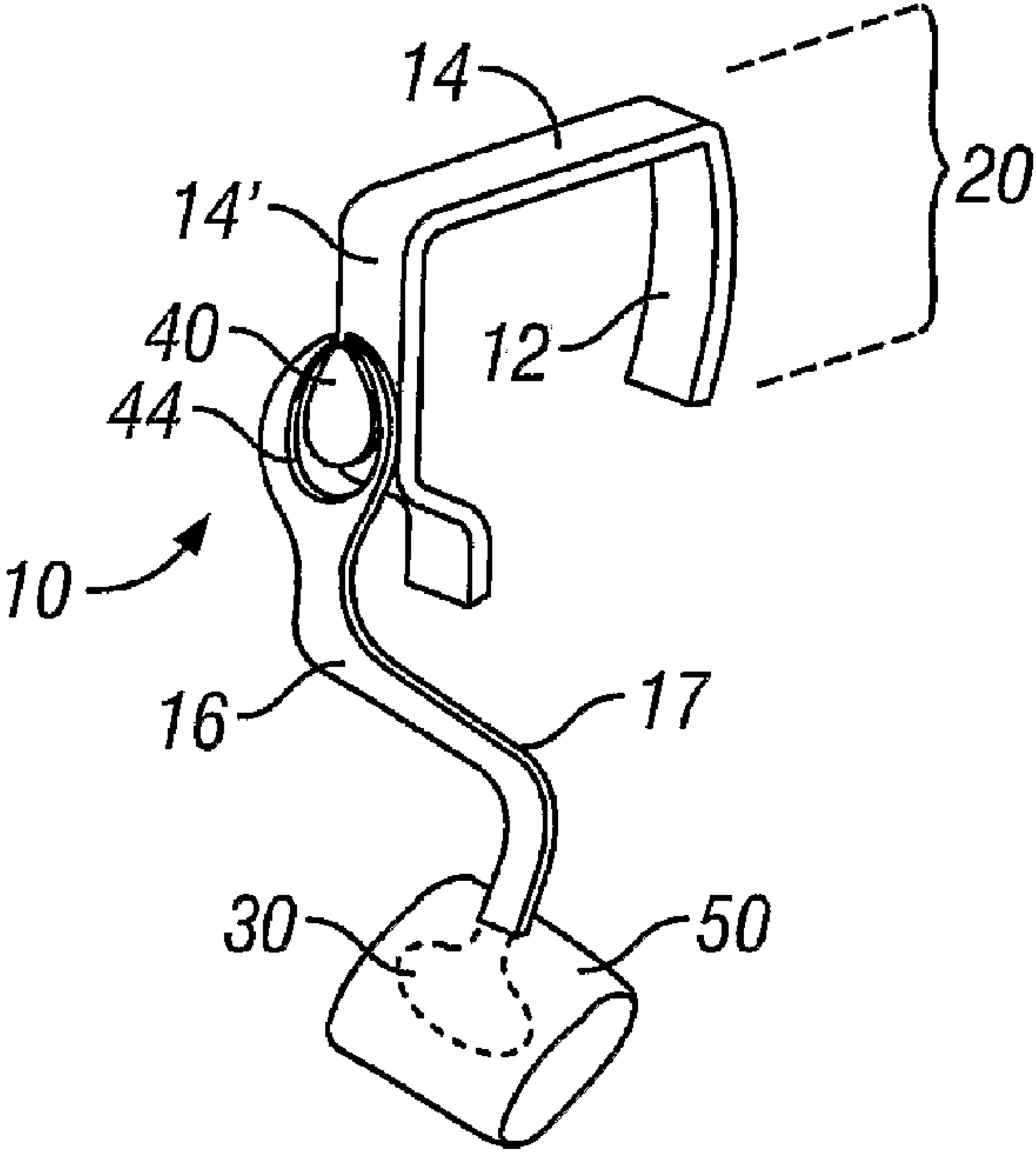


FIG. 7-P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