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[54] **CHEMICAL DISPENSER FOR SWIMMING POOLS**  
 16 Claims, 6 Drawing Figs.

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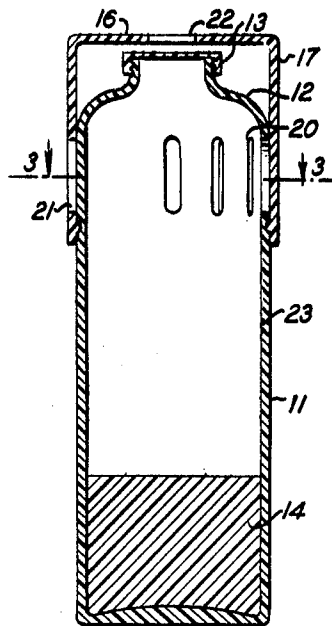
[50] Field of Search..... 239/35, 71;  
 116/114, 114.5, 118; 206/0.5; 23/267 A; 210/242

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**ABSTRACT:** A buoyant container for dispensing a solid chemical composition while floating on the surface of a liquid has a compartment for confining the chemical composition arranged with respect to the center of buoyancy so that the attitude of the container when empty is substantially different than the attitude of the container when the compartment is filled.



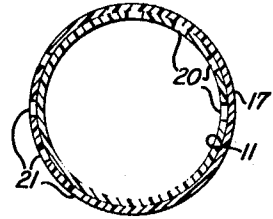
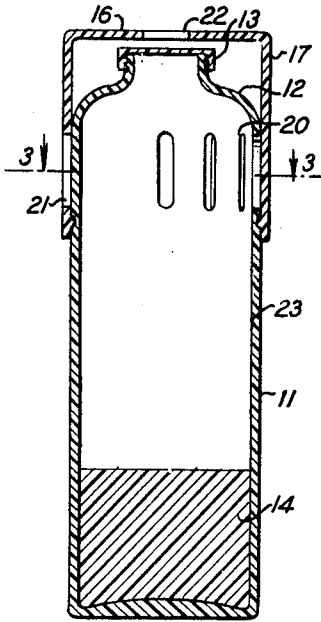
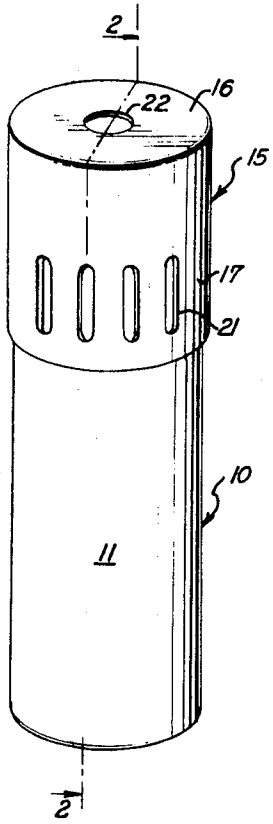


FIG. 3

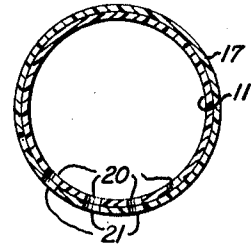


FIG. 4

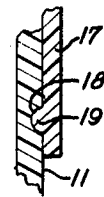
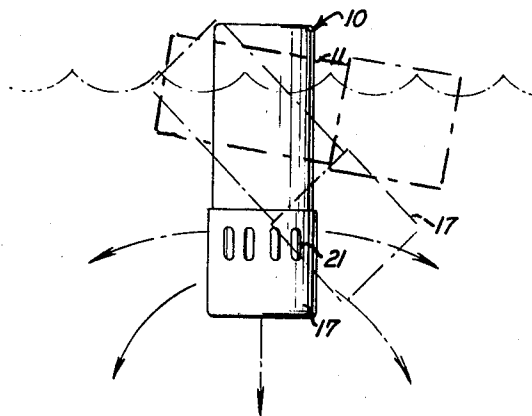


FIG. 5

FIG. 6

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## CHEMICAL DISPENSER FOR SWIMMING POOLS

The present invention relates to dispensing containers and, more particularly, to a container suitable for storage and shipping of soluble tablets of a chemical composition for purifying water in swimming pools but for dispensing the chemical without removal from the container.

One of the objects of the invention is to provide a dispensing container of the character referred to above which will dispense the purifying chemical composition into the body of water in a swimming pool while floating at the surface thereof in view of the fact that, in certain instances, plastic liners are employed in the construction of pools which liners are sometimes subject to discoloration by chemicals which release chlorine, or other chemicals used in the treatment of the water.

It is also an object of the invention to provide a dispensing container for swimming pool treatment chemicals which not only floats at the surface of the water at all times but which, when the composition originally contained has been exhausted by being dissolved in the pool water, will give a visual indication of that fact.

A further object of the invention is to provide a container for solid chemical compositions capable of dissolving in a body of liquid wherein the overall density of the container when filled with the composition is less than the liquid in which the composition is to be dissolved even when the liquid is admitted into contact with the soluble composition within the container.

Still another object of the invention is to provide a container for soluble chemical compositions having a buoyancy at all times to maintain it in a floating position at the surface of a body of liquid but whose buoyancy is so distributed with respect to the distribution of the overall mass of the container that the attitude, or position, in which the container floats on the liquid, will provide a signal to indicate the presence, or absence, of chemical composition in the container.

A still further object of the invention is to provide a generally elongated hollow container, which is subdivided internally to provide at one end a compartment for a solid chemical composition soluble in water and having means to permit the entrance of water into said compartment for dissolving said composition, the other end of the hollow container being provided with means to counteract any loss of buoyancy resulting from the entry of water into the first mentioned compartment, whereby the container will remain afloat at all times.

Yet another object of the invention is to provide an elongated hollow container having a portion of the interior thereof capable of admitting water therein, with another portion of the interior designed to exclude any external water, whereby the center of buoyancy of the container as a whole is longitudinally displaced with respect to the center of mass of the container, whereby the angle at which the container will float in a liquid will depend on the extent to which the liquid has gained admission to the interior thereof.

Other objects and advantages of the invention will be apparent to those skilled in the art after reading the following specification in connection with the annexed drawings, in which FIG. 1 is a perspective view of a preferred embodiment of a dispensing container in accordance with the present invention;

FIG. 2 is a cross-sectional elevation of the same;

FIG. 3 is a cross section taken on the line 3—3 of FIG. 2 showing the regulator cap in closed position;

FIG. 4 is a view similar to FIG. 3 but with the cap rotated through an arc to uncover certain of the dispensing slots uncovered;

FIG. 5 is a view in elevation showing the container floating at the surface of a body of liquid to dispense chemical in solid lines; the dotted lines showing the change in attitude as chemical is dissolved, and,

FIG. 6 is a fragmentary vertical cross section showing one example of a means for retaining the dispensing cap attached to the body of the container.

In the drawing the dispensing container made in accordance with this invention is indicated generally by numeral 10 and comprises a receptacle, such as a hollow elongated bottle 11, which may have a constricted open neck 12 at one end with a conventional closure cap 13 having the usual screw-threaded or bayonet-type locking engagement with the neck portion to enable filling the bottle.

Ordinarily, a bottle of this type will float on the surface of the water when water is excluded from the interior thereof but, in this case it is desired that the bottle remain buoyant even when water has been admitted to permit treatment by solution of the solid chemical compound therein which may include tablets of compressed solid compositions such as sodium hypochlorite, HTH (which is the trademark name for a high-test calcium hypochlorite in the form of a dry, stable, readily soluble chlorine carrier containing over 70 percent available chlorine). Other water treatment chemicals could also be contained in the bottle. For this purpose it is preferable to use a lightweight plastic such as polyethylene for molding the bottle. In addition, the bottle is fabricated in such a way that the center of buoyancy is displaced longitudinal with respect to the center of mass for a purpose which will be explained and this may be accomplished by filling one end, such as the bottom, of the bottle with a material, indicated by numeral 14 such as Styrofoam which is a commercial name for foamed polyurethane. Obviously, other foamed plastics may be used, or the end of the cylinder may be completely closed to provide a buoyant chamber. It is desirable that the buoyant material should remain in place and therefore if the material is formed in the shape of a block it should be at least as large as the interior of the bottle so that when compressed to enter the opening at the neck it will expand to frictionally engage the sidewall when pushed further into the interior. Otherwise, it may be secured in place by means of a suitable adhesive. Other types of buoyant material may be used and, in fact, the entire end portion of the bottle may be sealed off by the provision of an interior transverse wall.

In addition to the closure cap 13, the filler end 12 of the bottle is also provided with a regulator cap, indicated generally by numeral 15, which may comprise a cup-shaped element having an end wall 16 and a depending cylindrical skirt portion 17 which will fit snugly over the exterior of the end of the bottle 11. Means is also provided to retain the regulator cap in place while permitting its rotation about the longitudinal axis of the bottle and in a preferred embodiment the inner surface of the skirt portion 17 may be provided with an annular rib 18, while the exterior surface of the bottle will contain an annular cooperating groove 19 into which the rib may be snapped in place when the cap is pushed over the end of the bottle. Obviously, the positions of the rib and groove could be reversed and other means could be substituted.

Access of liquid to the interior of the bottle may be controlled by providing a series of openings, such as the longitudinally extending annularly spaced slots 20 in the bottle near the filler end and a series of complementary registering slots 21 in the regulator cap and, in addition, a central aperture 22 may be provided in the end wall to facilitate circulation of liquid and to prevent the formation of an air trap at the filler end when in use.

Preferably, the materials used to fabricate the bottle 11 and the cap 17 should be such that even the interior chamber 23 of the bottle is filled with the solid chemical compositions to be dispensed whether it be in the form of granules or pellets, the overall density of the device as a whole must be less than that of the liquid to be treated so that the device will have sufficient buoyancy to float at the surface thereof at all times.

The chemicals to be dispensed usually have a density in the solid form greater than water and this fact contributes to the successful operation of the device. In general, it may be considered that molded plastic, such as polyethylene, or polypropylene, are eminently suitable for fabrication of the bottle 11 and regulator cap 17, since even when the material 23 itself is heavier than the liquid, the presence of the buoyant end portion defined by the foamed plastic 14 ensures that the overall buoyancy will be sufficient to cause the device to float.

In operation, the chamber 23 will be filled with soluble tablets through the opening at the top of the bottle and the cap 13 will be attached to keep them in place. The regulator cap is also snapped in place by engagement of the rib 18 with the groove 19 and turned so that the slotted openings 21 in the skirt are disposed out of registry with the slots 20 in the bottle in order to close the interior of the bottle for storage and shipment. To ensure this closure will be maintained, it may be desirable to cover the slots with a length of adhesive tape (not shown) which could be extended down below the bottom of the skirt to also engage with the exterior of the bottle to prevent turning of the regulator cap.

When the chemical is to be dispensed, the tape is removed (if it has been previously applied) and the regulator cap 15 is turned so that one or more of the slots 21 will register with one or more slots 20, and the whole container dropped into a body of fluid to be treated, such as a swimming pool. When a state of equilibrium has been established the container will float in an upside down position, as shown in solid lines in FIG. 5, and water will enter and fill the chamber 23 and begin to dissolve the chemical materials contained therein, as indicated by the arrows. However, as the chemical tablets dissolve, the weight of the tablets themselves gradually decreases with the result that the center of mass of the container and its contents shifts nearer to the center of buoyancy until such time as the chemicals are completely dissolved and the container floats in a substantially horizontal plane, as shown in successive positions by dotted lines in FIG. 5. Thus, when the container lies horizontally it serves as an indication that the chemicals have been depleted and the container should be refilled, or replaced.

Having described one form in which the invention may be practiced it will be evident that various modifications and improvements may be made which would come within the scope of the annexed claims.

I claim:

1. A dispensing container for a solid chemical composition soluble in a liquid and having a specific gravity greater than said liquid in a solid state, said container having a specific gravity less than said liquid, said container having an interior compartment for confining said solid chemical composition, the overall specific gravity of said container and said composition contained therein being less than that of said liquid whereby said container will float adjacent the surface of said liquid at all times, said interior compartment being displaced with respect to the center of buoyancy of said container when empty whereby when said compartment contains said solid composition the container will be angularly displaced with respect to the disposition of said container when the compartment is empty.

2. The invention defined in claim 1 wherein said container is provided with port means for admission of liquid into said compartment when the container is floating therein.

3. The invention defined in claim 2 wherein said port means includes an opening in said container for admitting liquid to the interior of said compartment, and means for controlling the size of said opening.

4. The invention defined in claim 3 wherein at least a portion of said container is circular in cross section and said means for controlling the size of the opening in the container includes an exterior concentric skirt having another opening positioned for registry with the first opening when the skirt is revolved.

5. The invention defined in claim 1, wherein said container is cylindrical in configuration and means is provided within the container to exclude solid chemical composition in said compartment from one end portion of the container.

6. The invention defined in claim 5, wherein said means to exclude said composition includes a foamed plastic material positioned within said one end portion of the container.

7. The invention defined in claim 5, wherein said container is provided with an opening adjacent the other end for communication with the interior of the container and means for closing said opening.

8. The invention defined in claim 7, wherein said means for closing the opening includes regulator cap means revolvably secured to the exterior of said other end of the container, said cap means being provided with an opening for registry with the opening communication with the interior of the container.

9. The invention defined in claim 8, wherein said regulator cap means is cup shaped to provide a cylindrical skirt portion overlying the cylindrical exterior of the container.

10. The invention defined in claim 9, wherein said opening in the cap means is disposed in said skirt portion.

11. The invention defined in claim 10, wherein said container and said skirt portion are each provided with a plurality of longitudinal extending circumferentially spaced slotted openings for successive registry with one another.

12. The invention defined in claim 10, wherein said marginal portion of the interior surface of the skirt portion and a portion of the exterior surface of the container are disposed in freely slidable engagement with one another, at least one of said two members being fabricated from a plastic material, one of said surfaces being provided with an annular groove, the other of the surfaces having an annular ridge engaging with said groove to retain the regulator cap means in place on the container.

13. The invention defined in claim 10, wherein said other end of the container includes a reduced neck portion for a filler cap means communicating with the interior of the container, and the transverse end surface of the cup-shaped regulator cap means overlies the neck portion, said end surface also being provided with an opening to admit fluid to the space between the neck portion and end wall.

14. The invention defined in claim 10, wherein said means to exclude solid chemical composition from said one end of the container includes the provision of a barrier of buoyant material within the container at said one end.

15. The invention defined in claim 14, wherein said barrier comprises cellular material.

16. The invention defined in claim 14, wherein said barrier comprises a block of foamed plastic material.

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