

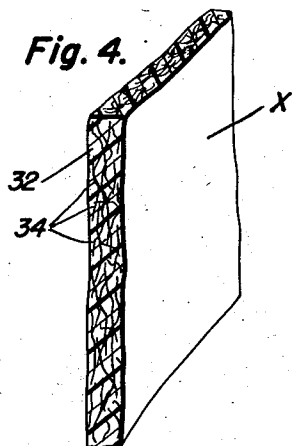
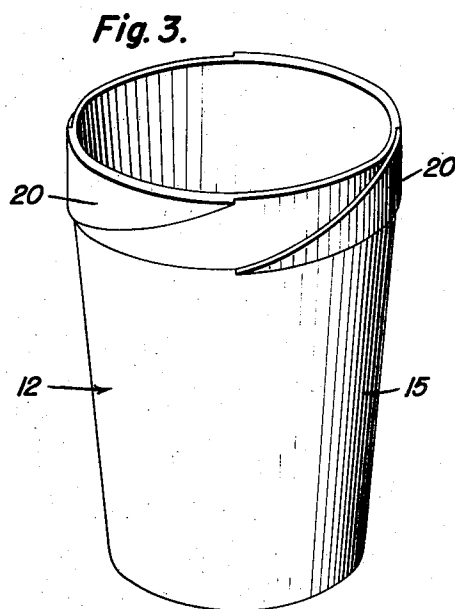
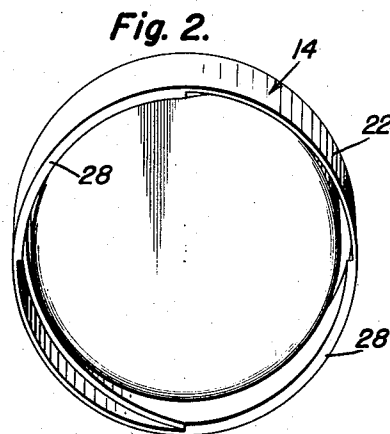
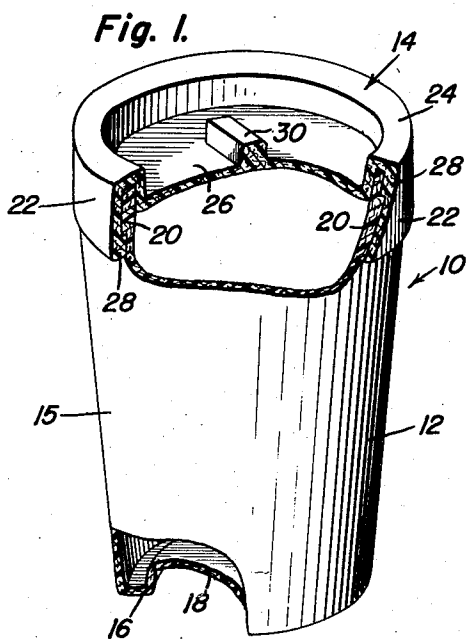
Sept. 28, 1954

F. B. SHAW, JR

2,690,256

BLEACH CONTAINER

Filed June 24, 1952



INVENTOR.
Fred B. Shaw, Jr.
BY George Penahan

UNITED STATES PATENT OFFICE

2,690,256

BLEACH CONTAINER

Fred B. Shaw, Jr., Towson, Md.

Application June 24, 1952, Serial No. 295,379

1 Claim. (Cl. 206—84)

(Granted under Title 35, U. S. Code (1952),
sec. 266)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates generally to storage of bleaching material and specifically to the problem of providing a container for storing bleaching materials for extended periods of time, which is substantially unaffected by the action of chlorine, hydrochloric acid, alkali and nascent oxygen, and which has the structural strength to withstand rigorous conditions of use.

Storage of bleaching material has long been a problem which has plagued industry and our military organizations. The highly corrosive nature of commercial bleaching material and its relative instability have made its storage extremely difficult. In industry, this problem has been largely avoided by coordinating production with use and thereby minimizing periods of storage. This has not solved the problem, it has merely avoided it. For military applications, however, it is necessary to maintain abundant quantities of bleaching material to be immediately available at various geographical locations for decontaminating purposes in the event that gas warfare should suddenly materialize. It is an object of this invention to provide a method and means for storing bleaching material for extended periods of time and to thereby eliminate this very difficult problem.

Historically, since the gravity of this problem become apparent before World War I, research has been conducted more or less continuously to eliminate this problem. One aspect of this research dealt with investigating the cause of the instability of the bleaching material, and attempts to modify it so that it would be more stable and consequently more readily packaged. The second aspect dealt with investigating and developing methods and means of packaging the bleaching material with a view toward providing satisfactory containers. This research established various facts relating to: (1) the first aspect; namely, that the presence of iron and moisture increased the instability of bleaching material, and (2) the second aspect; namely, that the widely used steel containers had to be coated, and resulted in treating the bleaching material and coating the steel containers with red lead in oil. However, these innovations failed to solve the problem, for during the period of procurement for World War II it was found that these coated containers were reduced to unusable condition within a few months.

2

Further investigation, calculated to overcome this failure, indicated that a coating of standard phenolic resin considerably increased the resistance of the steel containers to the action of the bleaching material. This did not solve the basic problem, for (1) the phenolic coating became brittle in time and eventually cracked when the container was subjected to rough handling, thereby leaving portions of the steel container unprotected, and (2) the movement of the coated, steel containers in accordance with military supply procedures resulted in abrasions on the exterior surface of the containers. These abraded spots became contaminated with bleach which eventually hydrolyzed in the presence of atmospheric moisture and produced hydrochloric acid which penetrated the container from the exterior inwardly. Powdering of the exterior of the container is unavoidable for bleach containers are intentionally not hermetically sealed for the purpose of relieving the pressure within the container which constantly develops due to the release of oxygen from the bleach. Further research resulted in improved coatings, but all were defective in some measure and ultimately abandoned.

At this point the advisability of substituting aluminum for steel was considered and rejected. While aluminum was generally a slight improvement over steel, its practical disadvantages of relative high cost and lack of availability outweighed its slight functional advantages. It should be noted that until this time only metallic containers were tried. The reason primarily was that bleach containers used by military organizations are subjected to rough handling and other conditions which necessitate the use of a material that has the structural strength of a mild steel or aluminum. It was concluded by the applicant that coated metallic containers would never fully solve the problem, and that a completely non-metallic container should be used. A preliminary evaluation of a large number of non-metallic materials of construction, including the use of sealed, plastic film bags, both as drum liners and as components of laminated shipping sacks, led to the conclusion that certain polyester resins reinforced with glass-fibers showed maximum promise from both a corrosion-resistant and weight-strength standpoint, and that such compositions were economically feasible.

Bleach containers of glass-fiber reinforced, polyester resin were made, tested and found to be completely satisfactory. Bleach was stored in

the containers for a period of fourteen (14) months being recharged with fresh bleach periodically to assure a high chlorine content throughout the test period. At the conclusion of this period, examination of the containers indicated no deleterious effects and it was therefore concluded that containers made of this material eliminated this long existing problem.

It is a specific object of this invention to provide a method and means for storing bleaching material for extended periods of time wherein containers are utilized which are made entirely of a non-metallic material which is highly corrosion-resistant in that it is substantially unaffected by chlorine, hydrochloric acid, alkali and nascent oxygen, has the structural strength approaching that of a mild steel or aluminum, and is substantially unaffected by temperature changes.

As is apparent from the above discussion, the terms "bleach" and "bleaching material" are used in this specification in their ordinary sense as signifying alkaline hypochlorites, particularly sodium hypochlorite and calcium hypochlorite.

The above and other objects will become more apparent from the following description. Referring to the accompanying drawing wherein like reference characters refer to like parts throughout the views: Fig. 1 is a perspective view of a bleach container, portions being broken and shown in section; Fig. 2 is a perspective view of the container closure showing its underside; Fig. 3 is a perspective view of the container bottom; and Fig. 4 is a sectional view of a sample of material of which the container is made.

Referring to Fig. 1, 10 indicates the bleach container generally, which comprises container bottom 12 and container closure 14. Container bottom 12 comprises a tapered, cylindrical side wall 15 and a bottom wall 16 which has upwardly extending, dished portion 18 formed therein. Referring to Fig. 3, it will be seen that the upper portion of the container side wall 15 has a plurality of cams 20 formed thereon for the purpose of facilitating the seating and locking of container closure 14. Referring to Fig. 1, container closure 14 comprises annular side wall 22 and top wall 24 which has downwardly extending, dished portion 26 formed therein. Lugs 28 are formed on the inner side of wall 22 (see Fig. 2), and are adapted to cooperate with cams 20 of the container bottom when the container closure is mounted on said container bottom and screwed thereon into locked position. Dished portion 26 has an upwardly extending enlargement 30 formed on its upper surface which constitutes a handle that is adapted to be gripped and turned in the step of screwing the container closure on or off the container bottom.

From Fig. 1 it will be observed that a two-part container has been provided wherein it is possible to stack one container on top of another. In stacking the containers, the bottom wall of one container bottom is fully seated within the recess formed by the dished portion in the top of the container closure of the container immediately below. Further it will be observed that the closure may be screwed on or off very readily. Fig. 4 illustrates a portion of a sample of ma-

terial of which the container is completely made. The sample, indicated by reference character X, is a glass-fiber reinforced, polyester resin. As illustrated, the material comprises a polyester resin 32 having glass-fibers 34 dispersed and embedded therein. As used in this patent application, the term "polyester resin" is intended to indicate two closely related types of synthetic organic polymers. The first consists of the polymerized allyl-esters of dibasic acids. A typical resin of this type is the polymer of diallyl phthalate. The second and more commonly used polyester resin is that which is prepared by polymerizing the polyhydric alcohol esters of unsaturated dibasic acids. Typical polyhydric alcohols are ethylene glycol, diethylene glycol, propylene glycol and glycerine. Typical unsaturated dibasic acids are maleic acid and fumaric acid. Because of the long period of time required to polymerize compounds of the second type of polyester resins, they are commonly modified by co-polymerizing with up to 16% of an unsaturated monomeric material such as styrene. Polyester resins reinforced with 15% to 35% of glass-fiber produces a material which has the precise properties which are desirable in a bleach container; specifically, they are substantially unaffected by temperature changes and by the action of chlorine, hydrochloric acid, alkali and nascent oxygen, and have the tensile, impact and compressive strength approximating that of mild steel or aluminum.

Bleach containers made of this material are completely satisfactory in all aspects. The long existing problem of container deterioration is eliminated. Further, a bleach container made of this material can withstand the rough handling and wear attendant to the stacking, storing and transportation which is necessary under military supply procedures.

The history of this problem and its solution by the applicant has been set forth in great detail. The gravity of this problem prior to applicant's discovery cannot be over emphasized, and the long history of unsuccessful attempts to solve this problem attests to its importance and to the difficulty of its solution. Applicant's discovery has solved this long existing problem and fills a long felt need.

I claim:

A package of bleaching material comprising a container and closure therefor formed of a glass-fiber-reinforced polyester resin comprising 15% to 35% glass fibers, and an alkaline hypochlorite contained therein.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,431,303	Billmeyer	Nov. 25, 1947
2,513,268	Steinman	June 27, 1950

FOREIGN PATENTS

Number	Country	Date
500,152	Great Britain	Feb. 3, 1939

OTHER REFERENCES

"The Chemical Age," pages 226, 228, Feb. 11, 1950.