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CONTAINER FOR CORROSIVE LIQUIDS

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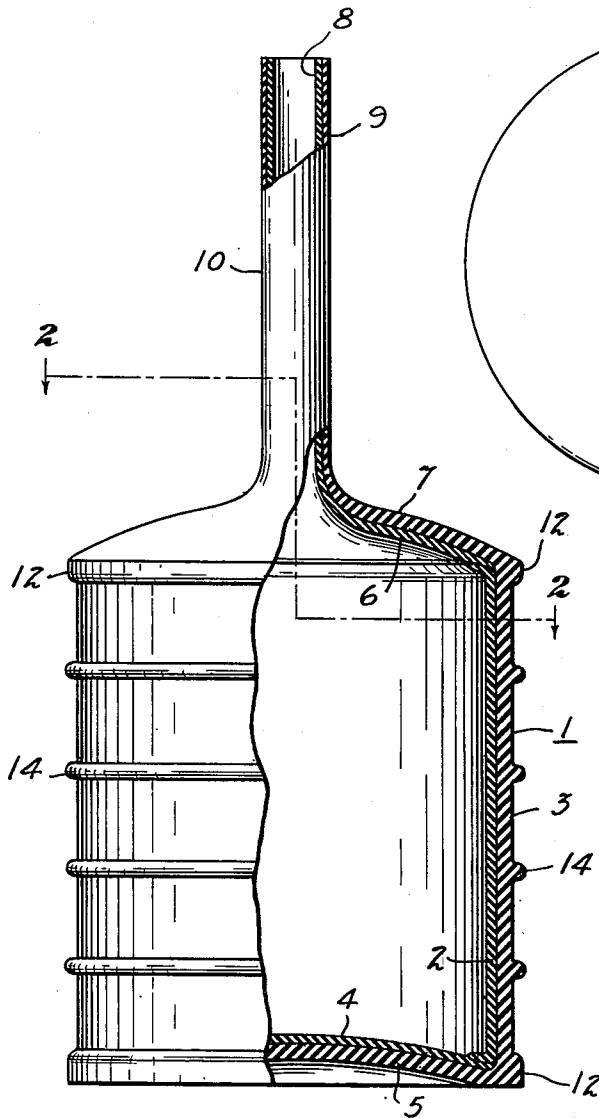


Fig. 1

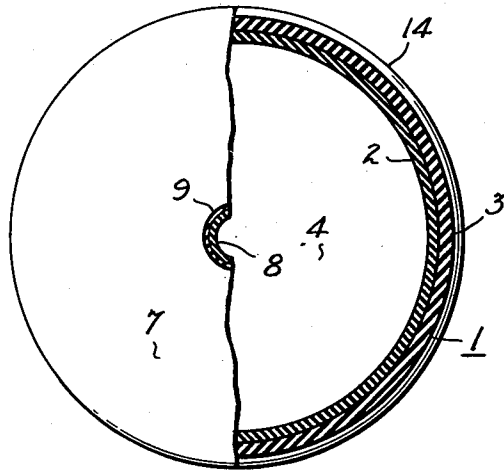


Fig. 2

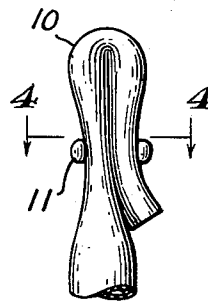


Fig. 3

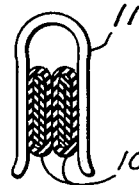


Fig. 4

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CONTAINER FOR CORROSIVE LIQUIDS

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3 Claims. (Cl. 150—1)

This invention relates to containers, and more particularly to containers for holding and shipping corrosive liquids such as acid and the like.

Heretofore the usual method for handling and shipping corrosive liquid such as acid in small quantities has been by means of glass carboys and bottles, and some liquids such as hydrofluoric acid require paraffin or wax and lead containers. There are numerous objections to glass and paraffin containers. For example, they are quite bulky and require a rather elaborate box or crate to protect them during shipment. Furthermore, the cost of shipping such fragile containers is relatively high, and, consequently, increases the cost of materials shipped therein. Another objection is that glass and paraffin containers require special stoppers which often become misplaced or lost, so that it is necessary to secure another before the container can be effectively used.

In chemical or research laboratories where the corrosive materials are used in relatively small quantities the glass or paraffin bottles used to hold corrosive reagents are not considered entirely satisfactory. In the first place, it is difficult to pour out a small quantity of the desired reagent. This often results in the spilling of a small portion, so that the furniture and clothing and often the skin of the chemist or technician are subjected to the deleterious effects of the corrosive material. Since the reagent containers in a laboratory are frequently handled during the repetitious performance of tests and experiments, it is not uncommon for a container to be dropped. A glass or wax container is immediately demolished thereby, resulting not only in a total loss of the container and its contents, but the usually more serious damage to furniture and building and persons who may be present.

Accordingly, it is an object of the present invention to provide a container for shipping and handling corrosive materials, such as acid and the like, which is simple in design and construction and inexpensive to manufacture, and one which is light in weight yet of increased strength and which occupies a minimum of space and weight.

Another object is to provide a container of this character which is yieldable and which is less likely to become broken than glass or wax bottles.

A further object is to provide a container of this character which may be advantageously used in a chemical or research laboratory and

facilitates the handling and dispensing of small quantities of reagents.

With the above and other objects in view, which will become apparent from the following detailed description, the present invention consists of certain features of construction and combinations of parts which may be identified in the accompanying drawing in which a suitable embodiment of the invention is illustrated.

Figure 1 is a side elevation partly in section and with parts broken away of a container constructed in accordance with the present invention;

Fig. 2 is a top plan view, partly in section and with parts broken away of the container shown in Fig. 1;

Fig. 3 is a fragmentary detail view showing the manner in which the container may be sealed; and

Fig. 4 is a fragmentary sectional view substantially on the line 4—4 of Fig. 3.

Referring to the drawing by numerals of reference, which indicate like parts throughout the several views, the container comprises a substantially cylindrical chamber having walls 1 formed of a plurality of laminated rubber layers integrally joined together by vulcanization. The inner lamination or layer 2 of the walls of the container is preferably formed of a pliable corrosion-resistant material such as rubber having paraffin compounded therewith, as described and claimed in my co-pending application for patent Serial No. 14,048 filed April 1, 1935. The outer lamination or cover 3 is formed of a tougher and more wear-resistant rubber than the inner lamination, such as that employed in the tread portion of automotive vehicle tires and the like.

The top and bottom of the container are also formed of a plurality of layers of rubber formed into an integral laminated structure by vulcanization. The inner layer or lamination 4 of the bottom is joined integrally by vulcanization to the inner lamination 2 of the walls of the container and the outer layer or lamination 5 of the bottom is integrally joined by vulcanization to the outer layer 3 of the walls of the container. Likewise, the inner lamination or layer 6 and the outer layer or lamination 7 of the top of the container are integrally joined respectively to the inner and outer laminations of the walls of the container. Accordingly, all of the inner laminations or layers which form the lining of the container are integrally joined to one another by vulcanization to form a smooth, unitary structure. The inner layers 4 and 6 of the bottom and

top respectively are each formed of the same corrosive-resistant material as that used for the inner laminations 2 of the side walls so that the entire lining of the container will be effective to resist corrosive action of liquid reagents.

A tubular conduit or pouring spout preferably constructed with an inner lamination 8 and an outer lamination 9 integrally joined by vulcanization is formed into the central portion or to one side of the top of the container. The inner lamination 8 of the tube is formed of the same corrosive-resisting rubber or the like that forms the inner laminations of the container and is integrally joined by vulcanization to the inner lamination 6 of the top.

The tube is preferably of considerably greater length than diameter so that it may be conveniently used to pour or dispense liquid from the container and also may be readily deformed so that opposite sides of the tube may be brought together to close the aperture thereto and seal the container. Making the tube substantially longer than is necessary to reach from the portion of the top of the container into which it is formed over the marginal portion of the top facilitates the pouring of the reagent or other liquid from the container in small quantities. A suitable tube length when the container is to be used in laboratory work is a length substantially equal to the diameter of the body portion of the container. With the pouring tube of this length it is easy to dispense small amounts from a container as desired. The tube is bent to one side of the top of the container so that it overhangs the wall thereof and without lifting the container from the table or desk on which it rests the container is tilted in the direction the tube is bent so that the liquid may flow out of the tube into a test tube or graduate into which it is to be received. If desired, the tip end of the tube may be pinched so as to restrict the opening therethrough. This will cause the liquid to flow from the container in as fine a stream as desired to more accurately control the quantity being dispensed and avoid spilling of the same.

The elongated bore of the tube or conduit is of additional advantage when sealing the container when it is not in use, such as for storage or shipping. One method of sealing the container is illustrated in Figs. 3 and 4. The tube is bent double so that the tip end lies against the base portion of the tube which is formed into the top of the container. Accordingly, an intermediate portion of the tube indicated by the numeral 10 is deformed so that the inner walls of the tube come together to seal the container. The tube is held in this bent position by a suitable means such as U-clip 11 or a rubber band which is wrapped around the doubled-over portion of the tube. Of course, any means may be used to retain the tube in this doubled-over position, and, accordingly, the loss of the rubber band would not be serious since a piece of string or cord could be substituted therefor or a short section of tubing of a larger diameter could be slipped over the doubled-over portion of the tube.

The top and bottom of the container are of slightly greater diameter than the body portion so that they overhang the latter to form reinforcing chimes 12. These chimes may be formed of the same type of rubber as that constituting the outer laminations 3, 5 and 7. They are merely thickened sections of rubber and serve to strengthen the container and assist in retaining its shape. Desirably a number of reinforcing

rings 14 are formed circumferentially on the outer surface of the laminations 3 of the walls of the container. These rings serve to prevent collapse of the walls 1 and give rigidity and stability to the container.

In manufacturing a container in accordance with the present invention, the laminations 2 and 3 forming the walls of the container are made from uncured sheeted rubber compound and are built-up on a suitable cylindrical mandrel or building drum. Preformed head laminations 6 and 7 and bottom laminations 4 and 5 are next joined to the side walls, making sure that the lining material of the sides and ends is well joined. The formed pouring tube laminations 8 and 9 are built up around a hollow core part that is used to inflate the container and joined to the head before the head is joined to the side walls. The assembled unit is placed in a suitable mold having a cavity formed to the desired surface contour of the finished container and the container is inflated for curing. Heat is applied to the closed mold and a suitable fluid such as carbon dioxide gas is applied under pressure to the interior of the container through the hollow core for the pouring tube or directly through the pouring tube. In this manner the several parts are integrally united by vulcanization into a single unitary structure.

The chimes 12 and reinforcing rings 14 may be formed of additional layers of rubber placed about the raw rubber fabricated units before vulcanization or they may be formed by flowing portions of the respective outer laminations into suitable cavities in the mold provided to form the chimes and rings during the vulcanization process.

Containers thus formed are of improved construction and highly resistant to corrosive liquids such as acid and alkali reagents used in laboratory work. They are sturdy and rugged in construction and will stand considerable abuse and relatively high pressures. Because of their nonbreakable characteristics the containers can be shipped at considerably lower rates than glass or wax containers of like volume. In addition, the containers are lighter in weight and occupy less space than glass or wax containers of like volume so that a further saving in shipping and transportation costs may be realized.

Although but a single embodiment of the present invention has been shown, it is to be understood that it is given for purposes of illustration and description only, and numerous modifications and alterations are contemplated and intended to be included within the scope of the appended claims.

I claim:

1. A soft pliable rubber container for corrosive liquids comprising a molded and vulcanized article having self-sustaining side walls composed of a plurality of integrally united rubber laminations, a top wall and a bottom wall each of which is composed of a plurality of integrally united rubber laminations, the interior lamination of the top, bottom and side walls being formed of corrosion resistant rubber of a different composition than the outer lamination of said walls and the walls defining a substantially constant volume fluid receiving chamber, and a tubular rubber conduit of laminated construction having a length several times its external width secured to the top wall and communicating with the fluid receiving chamber, the inner lamination of said conduit being formed of corrosion-resistant rub-

ber of a different composition than the outer lamination thereof, said corrosion resistant inner lamination of the tubular conduit being integrally secured to the corrosion resistant inner lamination of the top wall.

2. A soft pliable rubber container for corrosive liquids comprising a molded and vulcanized article having self-sustaining side walls composed of a plurality of integrally united rubber laminations, a top wall and a bottom wall each of which is composed of a plurality of integrally united rubber laminations, the interior lamination of the top, bottom and side walls being formed of corrosion resistant rubber of a different composition than the outer lamination of said walls and the walls defining a substantially constant volume fluid receiving chamber, and a tubular rubber conduit of laminated construction having a length several times its external width secured to a central part of the top wall and communicating with the fluid receiving chamber, the length of said tube being sufficient so that upon being bent laterally the outer extremity thereof extends materially beyond the side wall of the container to facilitate the pouring of liquids therefrom, the inner lamination of said conduit being formed of corrosion resistant rubber of a different composition than the outer lamination thereof, said corrosion resistant inner lamination of the tubular

conduit being integrally secured to the corrosion resistant inner lamination of the top wall.

3. A soft pliable rubber container for corrosive liquids comprising a molded and vulcanized article having self-sustaining side walls composed of a plurality of integrally united rubber laminations, a top wall and a bottom wall each of which is composed of a plurality of integrally united rubber laminations, the interior lamination of the top, bottom and side walls being formed of corrosion resistant rubber of a different composition than the outer lamination of said walls and the walls defining a substantially constant volume fluid receiving chamber, and a tubular rubber conduit of laminated construction having a length several times its external width secured to the top wall and communicating with the fluid receiving chamber, the inner lamination of said conduit being formed of corrosion resistant rubber of a different composition than the outer lamination thereof, said corrosion resistant inner lamination of the tubular conduit being integrally secured to the corrosion resistant inner lamination of the top wall, and the rubber composition of which the tubular conduit is formed being of a consistency sufficiently stiff so that the said conduit normally retains itself in an upright position above the top wall of the chamber.

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