March 2, 1937. H. T. KRAFT 2,072,802

CONTAINER

Filed Nov. 19, 1934 2 Sheets-Sheet 1

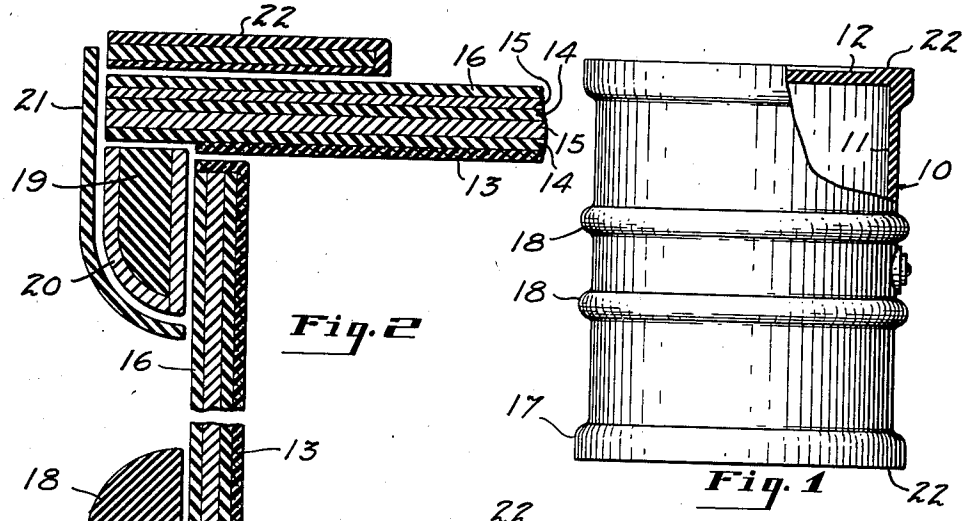
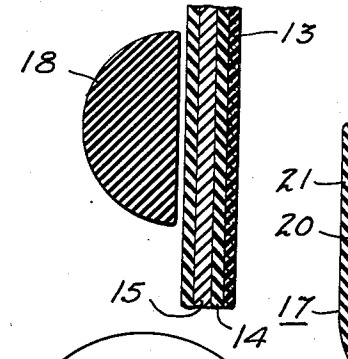


Fig. 2

Fig. 1



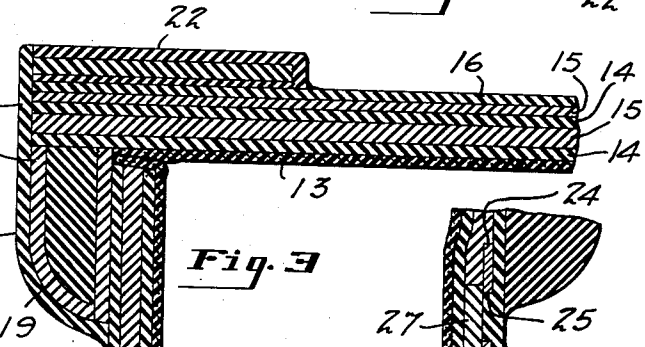


Fig. 3

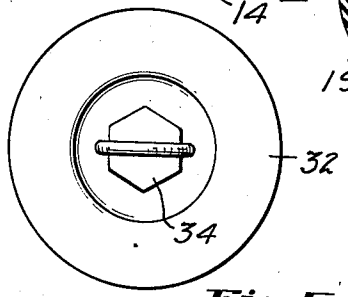


Fig. 5

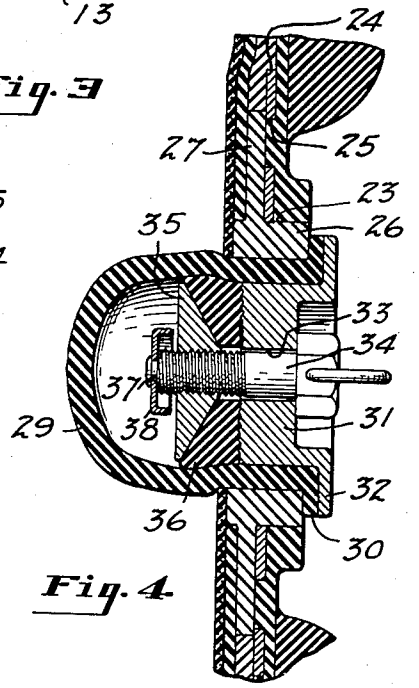


Fig. 4

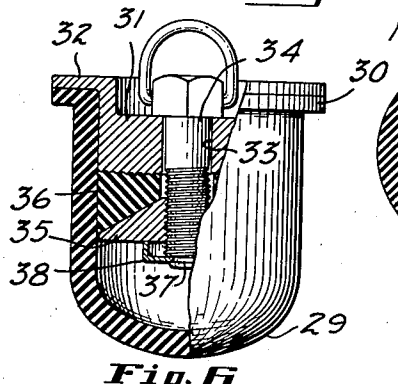
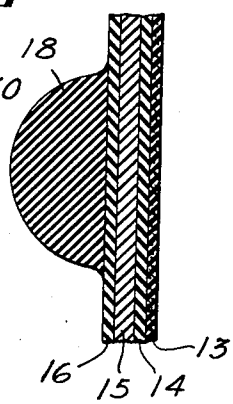


Fig. 6



INVENTOR
Herman T. Kraft
BY
Evans & McCoy
ATTORNEYS

March 2, 1937. H. T. KRAFT 2,072,802

CONTAINER

Filed Nov. 19, 1934 2 Sheets-Sheet 2

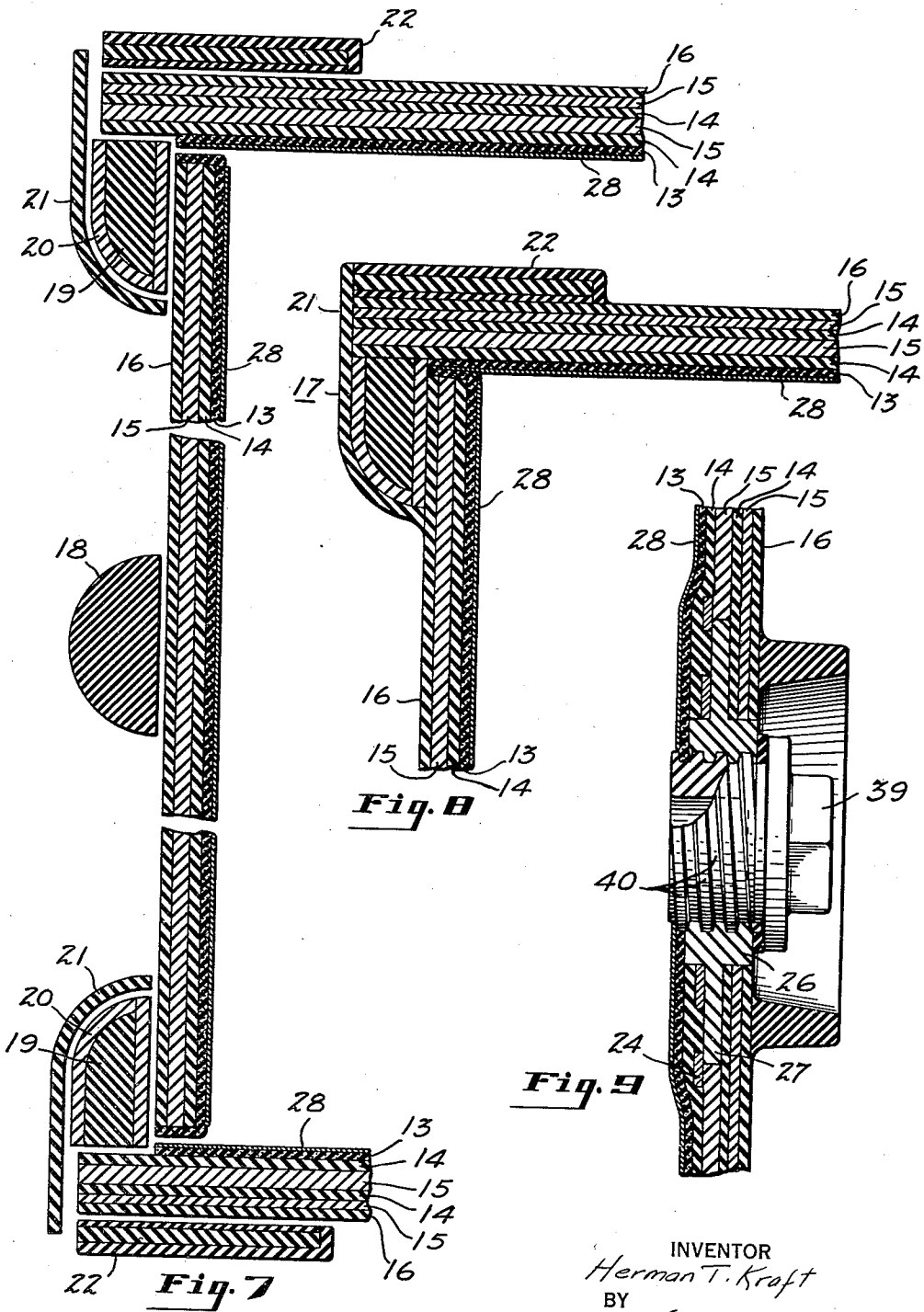


Fig. 7

Fig. 8

Fig. 9

INVENTOR
Herman T. Kraft
BY
Evans & McCoy
ATTORNEYS

Patented Mar. 2, 1937 2,072,802

UNITED STATES PATENT OFFICE

2,072,802

CONTAINER

Herman T. Kraft, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

Application November 19, 1934. Serial No. 753,719

4 Claims. (Cl. 206—2)

This invention relates to containers and more particularly to containers for holding and shipping acids and the like.

Heretofore it has been the practice to ship acids in glass carboys which require careful handling and which, with the cumbersome box necessary for holding the same during shipment, are relatively heavy and occupy considerable space. Furthermore, the freight rate for shipping boxed glass carboys is relatively high.

One of the objects of the present invention is to provide a container for shipping acids and the like, which is light in weight as compared with containers heretofore employed and which occupies less space for the same volume of liquid.

Another object is to provide a container for shipping acids, which is of such construction that the cost of shipping will be less than for containers heretofore employed.

Another object is to provide a container for shipping acids, which will withstand greater pressures than glass carboys.

A further object is to provide a container for shipping acids and the like, which is of durable and unbreakable construction and which can be easily handled.

With the above and other objects in view, the present invention consists of certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed.

Referring to the accompanying drawings, which illustrate suitable embodiments of the invention,

Figure 1 is a side elevation of the container, a portion of the same being shown in section;

Fig. 2 is an enlarged fragmentary section showing the general arrangement of the sheets of material used in constructing the container;

Fig. 3 is a view similar to Fig. 2 but showing the parts of the container in their assembled relation;

Fig. 4 is a section taken through the bung opening of the container showing a removable plug therefor;

Fig. 5 is a plan view of the plug shown in Fig. 4;

Fig. 6 is a side elevation partially in section of the plug shown in Fig. 4;

Fig. 7 is a view similar to Fig. 2 showing the use of an additional lining of ebonite or similar material;

Fig. 8 is a view similar to Fig. 3 showing the lining of ebonite or similar material; and

Fig. 9 is a section similar to Fig. 4 but showing a modified type of closure plug.

Referring to the accompanying drawings in which like numerals refer to like parts throughout the several views, the container of the present invention is an improvement upon the container shown in my co-pending application Serial No. 705,525, filed January 6, 1934, and is particularly adaptable for transporting a large volume of acid or other liquid.

Briefly stated, the container of the present invention comprises a hollow drum 10 of nonmetallic material having a circular body portion 11, head portions 12 and a lining 13 of acid resistant material, such as gum rubber or a relatively hard rubber composition, such as ebonite or the like. The body and head parts and the lining of the drum are so arranged and vulcanized together into a one-piece unit as to provide a non-breakable, leak-proof construction.

In the aforesaid co-pending application I have shown a container in which the head and body parts are formed of a number of layers of nonmetallic material, such as sheets made from clippings of rubberized fabric used in the manufacture of pneumatic tires.

In the construction of the present invention I employ in the body portion 11 an inner layer 14 formed of the rubberized fabric material, hereinafter called "fiber stock", an intermediate layer 15 of "nail stock" which is a relatively hard rubber fibrous material, and an outer layer 16 of "tread stock", which is a softer rubber material. In the head portions 13, I preferably employ additional layers 14 and 15 of the fiber stock and nail stock respectively. However, any desired number of layers of the fiber and nail stock may be employed in the body portion 11 as well as in the heads 12.

The container is also provided with outer chimes 17 and one or more intermediate chimes 18 which facilitate the handling of the container. Also, the heads 12 are strengthened by an annular projecting portion 22 which is integrally united to the heads adjacent the periphery thereof as shown in Fig. 3. The annular portion 22 is preferably comprised of layers of the nail stock and tread stock and the outer chimes 17 are each preferably comprised of a preformed section 19 of rubber abutting against the projecting portion of the heads and which is surrounded by a layer 20 of fiber stock and covered with a layer 21 of thread stock which extends over the peripheral face of the container head.

The lining 13, which in the construction shown in Figs. 2 and 3, is of pure gum rubber, is suitably stitched to the body and head portions,

and the lining 13 which is carried by the head portions, is of greater diameter than the internal diameter of the body portion, so as to be interposed between the ends of the body portion and the head portions, as shown in Fig. 2.

During the manufacture of the container the body portion 10 is preferably formed to circular shape on a suitable building drum, and is then disposed between the head portions, after which the chimes 18 and 19 and the projecting annular portion 22 are arranged in position. The assembled container is then positioned within a suitable mold or heater and axially compressed, which shortens the body portion, and is then vulcanized while the interior of the container is subjected to pressure through the introduction of CO_2 gas under pressure, or a suitable liquid under pressure. If desired, the lining for the container may be resin glazed.

Also, during the formation of the body portion 10 the body portion is provided with a bung opening 23 and surrounding this opening is an annular ring 24, disposed between layers of the body material, and having apertures 25 therein, into which the body material may project.

Also, arranged within the bung opening 23 is an annular ring 26 preferably of hard rubber having a circumferential flange 27 extending between layers of body material.

During the vulcanizing operation the various parts previously described are integrally united providing a one-piece unit which is of nonbreakable and leakproof construction.

The acid container formed in the manner described is rugged in construction and will withstand relatively high pressures. Furthermore, because of their nonbreakable construction, the containers will come within a third or fourth class freight rate classification and can be shipped at a much lower rate than glass carboys of the same volume. Furthermore, the containers occupy about one-half the space required by, and are approximately one-half the weight of, glass carboys of the same volume, and it is thus obvious that greater quantities of acid can be shipped in one car.

Another important feature is that the containers do not have to be so carefully handled as glass carboys and can be subjected to a greater pressure, thus providing a greater factor of safety.

It has been found that a lining of ebonite or similar hard rubber material is more acid resistant for particular acids than gum rubber, and I have shown in Fig. 8 a construction similar to Fig. 3, in which lining 28 of ebonite or similar material is provided. This lining is applied in any suitable manner to the gum rubber lining previously described. However, since the ebonite lining will not withstand longitudinal pressure it is necessary in constructing the container to have the length of the same slightly less than the length of the body portion as indicated in Fig. 7, to compensate for the shortening of the body portion when it is subjected to axial pressure.

In Figs. 4 and 6, I have shown one form of plug which may be used for sealing the container. This plug comprises a cup-shaped member 29 of soft rubber having a circumferential flange 30 at its open end. This member 29 is arranged to be disposed within the annular ring 26 with the flange 30 abutting against the end face of the ring. Disposed within the member 29 is a metallic member 31 having a flange 32 disposed to seat against the flange 30. The member 31, however, does not project beyond the inner surface of the container when in position and is provided with a central opening 33 through which a bolt 34 is arranged to extend. The threaded end of the bolt receives a frusto-conical part 35 and disposed between the frusto-conical part and the member 31 is an annular member 36 of rubber, the member 36 extending beyond the inner surface of the container as shown in Fig. 4. The inner end of the bolt 34 is provided with a reduced portion 37 which carries a rotatably mounted cup-shaped part 38 which prevents the bolt from being threaded out of the member 35. After the plug is inserted within the annular ring 26 the bolt 34 is rotated and caused to thread itself through the member 35 which has a tendency to expand the rubber member 36 radially outwardly. This expansion of the member 36 causes the cup-shaped member 29 to expand radially outwardly adjacent the inner edge of the opening in the ring 26 as shown in Fig. 4, to form a fluid tight seal.

Preferably the contacting surfaces of the member 31 and rubber member 36 are corrugated or roughened, as well as the contacting surfaces of the member 36 and the member 35, to prevent rotation of the member 35 during the rotation of the bolt 34.

In Fig. 9, I have shown an optional plug construction which comprises a hard rubber member 39 having threads 40 thereon arranged to be threaded into the annular ring 26.

Although a single embodiment of the invention has been herein shown and described it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined in the following claims.

What I claim is:

1. A nonmetallic acid container having integral body and head portions of nonmetallic laminated vulcanizable material, one of said portions having a bung opening therein and an annular member of hard rubber material within said opening, said member having a circumferential flange disposed between the laminations of said vulcanizable material.

2. A container of the character described comprising a substantially cylindrical body portion composed of laminations of rubber integrally united by vulcanization, certain of the laminations being relatively hard and others relatively soft, spaced reinforcing rings upon the exterior of the body portion, said rings being composed of rubber and integrally united by vulcanization to the body, two of said reinforcing rings being at the ends of the body portion, and heads composed of laminations similar to the laminations of the body portion, each head being of a diameter greater than that of the body and being integrally united by vulcanization to the end reinforcing rings of the body.

3. A container of the character described comprising a substantially cylindrical body portion composed of laminations of rubber integrally united by vulcanization, certain of the laminations being relatively hard and others relatively soft, spaced reinforcing rings upon the exterior of the body portion, said rings being composed of rubber and integrally united by vulcanization to the body, two of said reinforcing rings being at the ends of the body portion, heads composed of laminations similar to the laminations of the body portion, each head being of a diameter greater than that of the body and being integral-

ly united by vulcanization to the end reinforcing rings of the body, and a layer of relatively soft rubber covering said end rings and the peripheral edges of the head and integrally united by vulcanization to the rings and heads.

4. A container of the character described comprising a substantially cylindrical body portion composed of laminations of rubber integrally united by vulcanization, certain of the laminations being relatively hard and others relatively soft, spaced reinforcing rings upon the exterior of the body portion, said rings being composed of rubber and integrally united by vulcanization to the body, two of said reinforcing rings being at the ends of the body portion, said end rings projecting slightly beyond the edges of the laminated body, a lining of vulcanizable material covering the interior of the body portion and extending over the end edges thereof, a lining of vulcanizable material upon the inner face of each head portion, the marginal edge of which overlies an end edge of the body portion, the linings of the head and body portions being integrally united by vulcanization in the spaces between the end edges of the body portion and the inner faces of the head portions.

HERMAN T. KRAFT.