May 15, 1928. 1,670,158

L. E. KLUG

REENFORCED RUBBER JAR

Filed Jan. 16, 1922

Fig. 1.

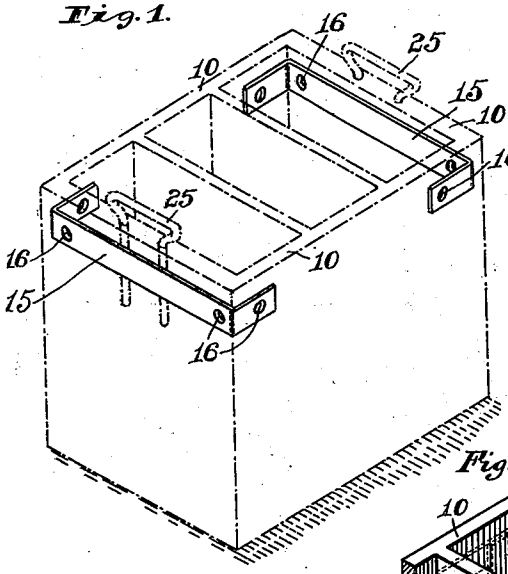


Fig. 2.

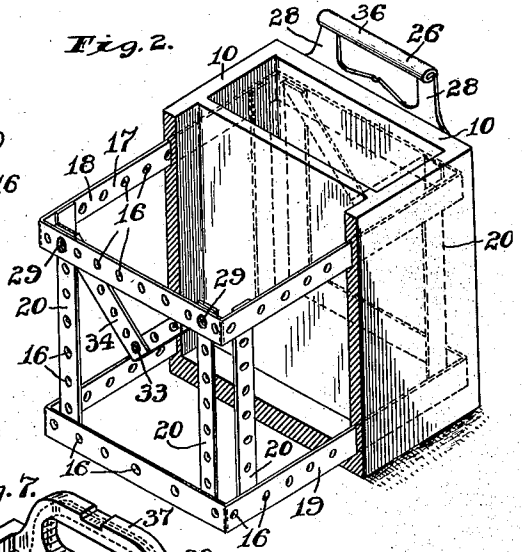


Fig. 7.

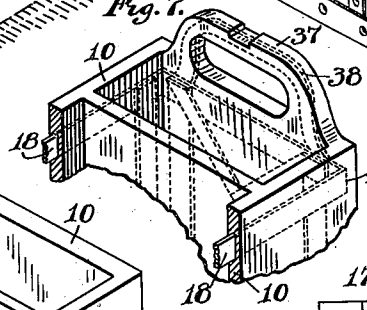


Fig. 4.

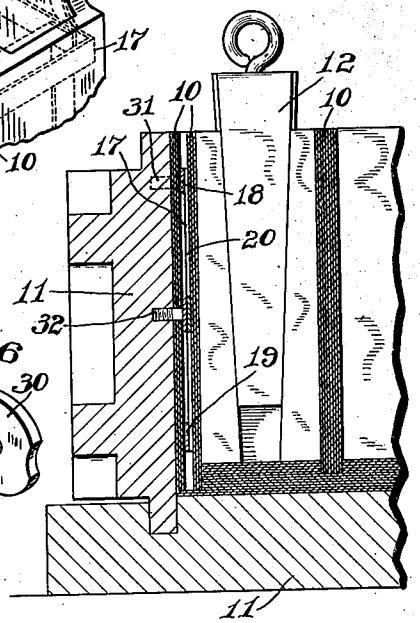


Fig. 3.

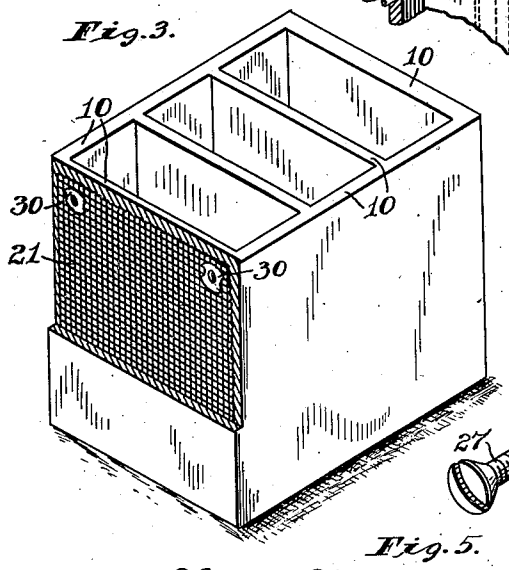


Fig. 6

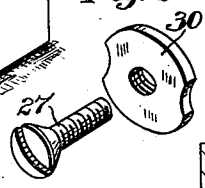
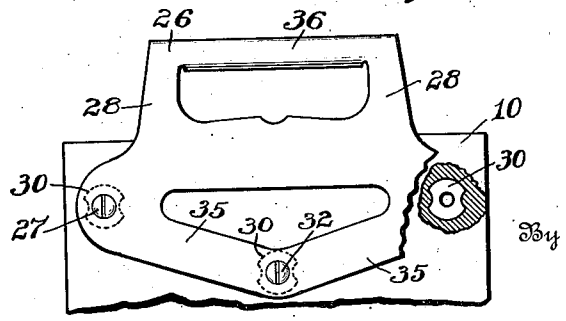


Fig. 5.



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UNITED STATES PATENT OFFICE.

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REENFORCED-RUBBER JAR.

Application filed January 16, 1922. Serial No. 529,731.

It is the object of my invention to reenforce and strengthen a liquid container, and more especially a storage-battery jar, especially at the points where it is most liable to break; and particularly to do so in connection with a battery jar such as that shown in my Patent No. 1,394,558, granted October 25, 1921. It is my further object to provide for the mounting of the handles of the battery jar, preferably in connection with such reenforcement, was to obviate any spring or bulge in the end of the battery jar when a lateral force is brought against the handle, as by the hold-down clamp or by a blow, tending to cause the compound to break away from the end of the jar and permitting the acid to creep out.

In carrying out my invention, I build up the battery jar or other container of sheets of rubber or rubber composition and vulcanize it under pressure as explained in such patent, preferably using sheets which are themselves laminated; and at suitable places I provide reenforcements, which are put in place between the sheets of rubber or rubber composition when the jar or other container is being built up and are embedded in place within the integral whole which is formed from these rubber sheets during the vulcanizing under pressure. Further, I preferably join the handles to the walls of the battery jar close to the edges of the faces to which the handles are attached, so that there will be substantially no tendency to bow the sides of the jar inward or outward in the handling of the battery, as such bowing results in breaking the battery cell at the top, with the well understood difficulties consequent upon such breaking; this handle-jointing feature may be used without the reenforcing feature, but is preferably used in conjunction therewith.

The accompanying drawing illustrates my invention; Fig. 1 is a phantom perspective view of a battery jar embodying my invention, showing a simple reenforcement embedded therein at the most troublesome places, and also showing how this does not interfere with the use of an ordinary simple handle; Fig. 2 is a sectional perspective view showing part of a battery jar embodying more complete reenforcements, with the reenforcements complete though the battery jar walls are broken away; Fig. 3 is a perspective view of a battery jar with one end wall in section to show a screen reenforcement, with embedded grommets near the edges for attaching a handle in accordance with my invention; Fig. 4 is a vertical section showing a fragment of the mold and a three-part core in readiness for the compressing and vulcanizing operation, with the reenforcement in position between sheets of rubber or rubber composition; Fig. 5 is a fragmental end elevation of a battery jar with its lifting handle, with the handle partly broken away, the handle being mounted in accordance with my invention to reduce strain on the battery-jar end; Fig. 6 is a perspective view of the screw and grommet used for attaching the handle of Fig. 5; and Fig. 7 is a fragmental view showing a jar with a reinforced handle in accordance with my invention.

I have illustrated my invention in connection with a plural-cell battery jar. This is made by being built up of sheets 10 of rubber or rubber composition vulcanized into an integral whole within a mold 11 by the pressure exerted by wedging plural-member cores 12, as set forth in my aforesaid patent. Preferably the individual sheets 10 are themselves laminated, as described in my copending application Serial No. 509,828, filed October 24, 1921, though this is not essential to the present invention.

In placing in the mold the superposed sheets 10, of which there are a plurality in each outer wall, suitable reenforcements are placed between sheets, and these reenforcements are completely embedded and enclosed within the body of the rubber or rubber composition when the vulcanizing operation under pressure occurs. These reenforcements may take different forms, according to the service the battery jar or other container is to have. In Fig. 1 there is shown a simple reenforcement, consisting of a simple metal bar 15 at each end, such bar extending across the end of the battery jar and preferably having its ends bent to extend part way along the sides of the battery jar. These

bar reenforcements are shown in full lines in Fig. 1, the battery box itself being shown in phantom, but these bars are actually embedded in the walls of the battery jar. Preferably the reenforcing bars are provided with holes 16 at various places, for more securely holding the bars in place, for in the vulcanizing operation under pressure the rubber is forced through such holes 16 and thus additional anchorage is provided. Instead of simple bars 15 such as shown in Fig. 1, I may provide a complete metal frame-work 17, as illustrated in Figs. 2 and 4. This is bult up in any desired form, usually with upper and lower rectangular members 18 and 19 conforming to the shape of the battery jar and of proper size for embedment in the walls thereof, with upright spacing members 20 connecting such upper and lower rectangular members, all these members preferably being provided with holes 16 for additional anchorage as above referred to. The sheets 10 of rubber or rubber composition are placed in the mold 11 with the frame-work 17 between the inner and outer sheets, as is clear from Fig. 4, so that when the vulcanizing operation under pressure occurs such frame-work will be completely enveloped and embedded by the flowing of the rubber under the pressure. If desired, in place of a built-up frame-work 17, a suitable screen structure 21 may be embedded in the walls of the battery jar, by being placed between the sheet forming such walls as the walls are being built up. Such screen, like the frame-work 17, may be on any desired number of sides of the battery jar, and on either the whole or less than the whole of any side, though for simplicity of illustration only one end wall is broken away in Fig. 3 to show the embedded screen.

The reenforcements above described greatly strengthen the walls, and prevent them from bowing and breaking under conditions which would cause such bowing and breaking if the reenforcement were not provided. This bowing and breaking is particularly liable to occur in the end walls, to which the handles are attached, as by a blow or by the pull of the hold-down clamp, and even though the bowing is only temporary it causes the breaking of the seal at the top of the end cell, with the disadvantages which result from such breaking of the seal, such as creeping of the acid. By keeping the seal intact at the top of each cell, the life of the battery is greatly prolonged.

The handle which has ordinarily been provided is of the type of the handle 25 in Fig. 1, consisting of a horizontal handle portion from the ends of which legs project downward for insertion or embedment in holes in the end walls of the battery jar near the middle of such walls. Such handles can be used with the reenforcement above described, but because of their mounting in the end walls near the middle thereof they are liable to cause undue bending strain on such end walls. In order to avoid such bending strain, and thus to make the reenforcement more effective, or even in some instances to make it unnecessary to use reenforcement in the walls, I provide handles such as shown in Figs. 2, 5, and 7 which extend substantially across the end walls of the battery jar and connect with the end walls preferably at or near the vertical edges thereof.

The handle may be a separate handle, suitably mounted, as shown in Figs. 2 and 5; or it may be an integral handle, preferably reenforced, as shown in Fig. 7. If a separate handle, it may be made of a sheet-metal stamping 26, conveniently mounted by screws 27; and these screws 27 extend through the laterally extended ends 28 of the handle 26 into internally threaded members embedded in the battery end-wall near the edges of such end wall. The internally threaded members are preferably the reenforcement themselves when bars or other members capable of taking internal threads are used for the reenforcements, the upper rectangular member 17 in Fig. 2 being shown provided with such threaded holes 29; but if no reenforcements are used, or if a mere screen is used as a reenforcement, such threaded holes are provided in special grommets 30, as is clear from Figs. 3, 5, and 6. These holes also serve to support the frame-work or reenforcement, or to support the grommets 30, in proper position between the sheets during the operation of building up the battery jar, by the use of suitable pins 31 provided in the mold 11 in position to project into such holes and hold the reenforcement or grommet in proper position. In addition to the end screws 27 for mounting the handle 26, a lower central screw 32 may be used if desired, at a point midway of the width of the end wall of the battery jar but lower than the screws 27. This screw may be received in a grommet 30, or in a hole 33 provided in the lower corner of a V-shaped member 34 depending from the upper rectangular member 17, as is shown in Fig. 2. When the screw 32 is used, it extends through a lower portion 35 of the handle, separate from the upper handle-portion which has the hand grip 36, so that it will not partake of the movements which such hand grip may have. With this mounting of the handle, by its outer ends, there is no tendency to pull apart the end walls of the battery by bowing them outward when the handles 26 are forced outward in any way, thus greatly lessening the liability of breaking the seal in the end cells.

Instead of separate handle 20, I may use

an integral handle 37, made of the same material as the battery-jar itself and if desired formed of the same sheets of which the end-walls are built up. The handle 37 is connected to the end walls near the lateral edges thereof, or near the ends of the top edges of the end walls, and is separated from such end walls throughout the intermediate part of such top edges, as is clear from Fig. 7. The handle 37 is preferably reenforced, conveniently by a central rod or wire 38 which projects downward from the ends of the handle into the end wall and which preferably overlaps or joins the end-wall reenforcement if there is any.

I claim as my invention:

1. A liquid container, having side and end walls formed of vulcanized rubber material, a reenforcing strip embedded in a wall of said container near the top thereof and extending from the ends of such wall into adjacent walls, a second reenforcing strip embedded in such wall near the bottom thereof and extending into adjacent walls, said reenforcing strips being narrow relative to the height of said wall to leave the major portion of said wall consisting solely of rubber material, said reenforcing strips being put in place prior to vulcanization so that they are embedded during the vulcanization period.

2. A liquid container, having side and end walls formed of vulcanized rubber material, a reenforcing strip embedded in a wall of said container near the top thereof and extending from the ends of such wall into adjacent walls, said reenforcing strip being narrow relative to the height of said wall to leave the major portion of said wall consisting solely of rubber material, said reenforcing strip being put in place prior to vulcanization so that it is embedded during the vulcanization period.

3. A liquid container, having side and end walls formed of vulcanized rubber material, a reenforcing strip embedded in a wall of said container and extending from the ends of such wall into adjacent walls, said reenforcing strip being narrow relative to the height of said wall to leave the major portion of said wall consisting solely of rubber material, said reenforcing strip being put in place prior to vulcanization so that it is embedded during the vulcanization period.

4. The combination set forth in claim 1 with the addition of a vertically extending strip embedded in said wall near each end thereof and joined to said other strips.

5. A liquid container, having side and end walls formed of vulcanized rubber material, a continuous reenforcing strip embedded in such walls and extending around said container near the top thereof, a second continuous reenforcing strip embedded in such walls and extending around said container near the bottom thereof, and vertically disposed strips also embedded in such walls and extending between said top and bottom strips.

6. A liquid container comprising a bottom and side and end walls of vulcanized rubber material, and reenforcements which are embedded in opposite walls thereof and extend into walls adjacent to said opposite walls, and handles on said opposite walls and connected to reenforcements therein.

7. A liquid container, having side and end walls formed of vulcanized rubber material, a reenforcing strip embedded in a wall of said container near the top thereof, a second reenforcing strip embedded in such wall near the bottom thereof, said reenforcing strips being narrow relative to the height of said wall to leave the major portion of said wall consisting solely of rubber material, said reenforcing strips being put in place prior to vulcanization so that they are embedded during the vulcanization period.

8. A liquid container comprising a bottom and side and end walls of vulcanized rubber material, and reenforcements which are embedded in opposite walls thereof, and handles on said opposite walls and connected to the reenforcements therein.

9. A battery jar having a bottom and side and end walls, and a handle on each of two opposite walls of said jar, each end of each of said handles being connected to its associated wall much nearer the side edges of such wall than the middle of such wall.

10. The combination set forth in claim 7 with the addition of a vertically extending strip embedded in said wall near each end thereof and connected to said other strips.

11. A battery jar having a bottom and side and end walls, and a handle on each of two opposite walls of said jar, each of said handles projecting upward from its associated wall with the upwardly projecting handle-part joined to such wall much nearer the side edges thereof than the middle thereof and free from the intermediate part of such wall.

12. A liquid container, having side and end walls formed of vulcanized rubber material, a continuous reenforcing strip embedded in such walls and extending around said container, said reenforcing strip being narrow relative to the height of said wall to leave the major portion of said wall consisting solely of rubber material, said reenforcing strip being put in place prior to vulcanization so that it is embedded during the vulcanization period.

13. A storage battery container formed of plastic material and having handle inserts embedded in the walls thereof, said inserts having portions extending substantially the width of said walls so as to stiffen the same and prevent the outward bowing.

14. A hard rubber storage battery con-

tainer having handle inserts embedded in the end walls thereof, said inserts having portions extending substantially the width of said walls near the top thereof.

15. A hard rubber storage battery container having handle inserts embedded in the end walls thereof, said inserts having portions extending substantially the width of said walls near the top thereof, said inserts having threaded openings and handles connected to said inserts by screws extending into the openings.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 12th day of January, A. D. one thousand nine hundred and twenty-two.

LOUIS E. KLUG.