No. 819,765. PATENTED MAY 8, 1906.

W. KIEL.

CHEMICAL VESSEL.

APPLICATION FILED DEC. 23, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

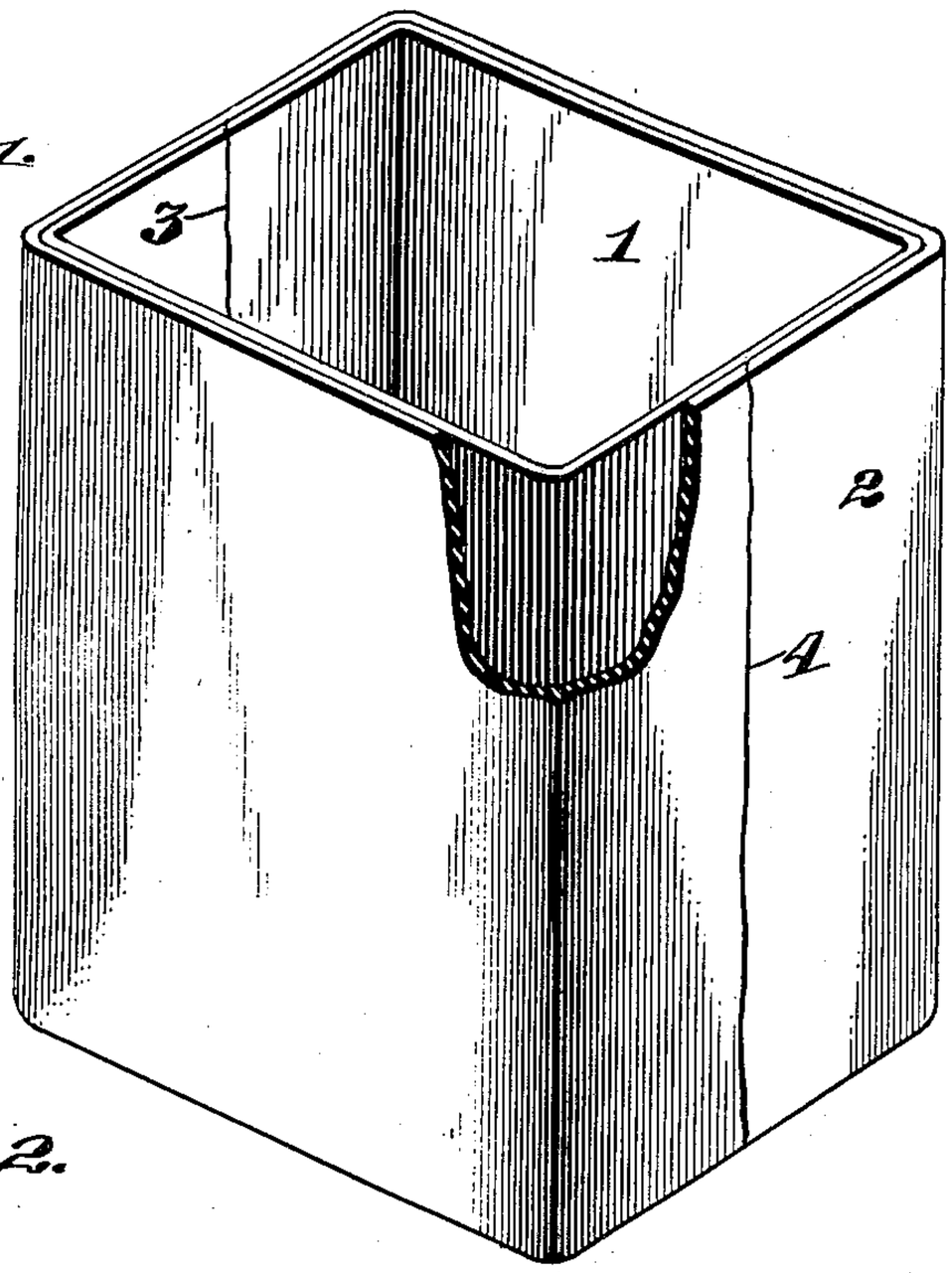


Fig. 2.

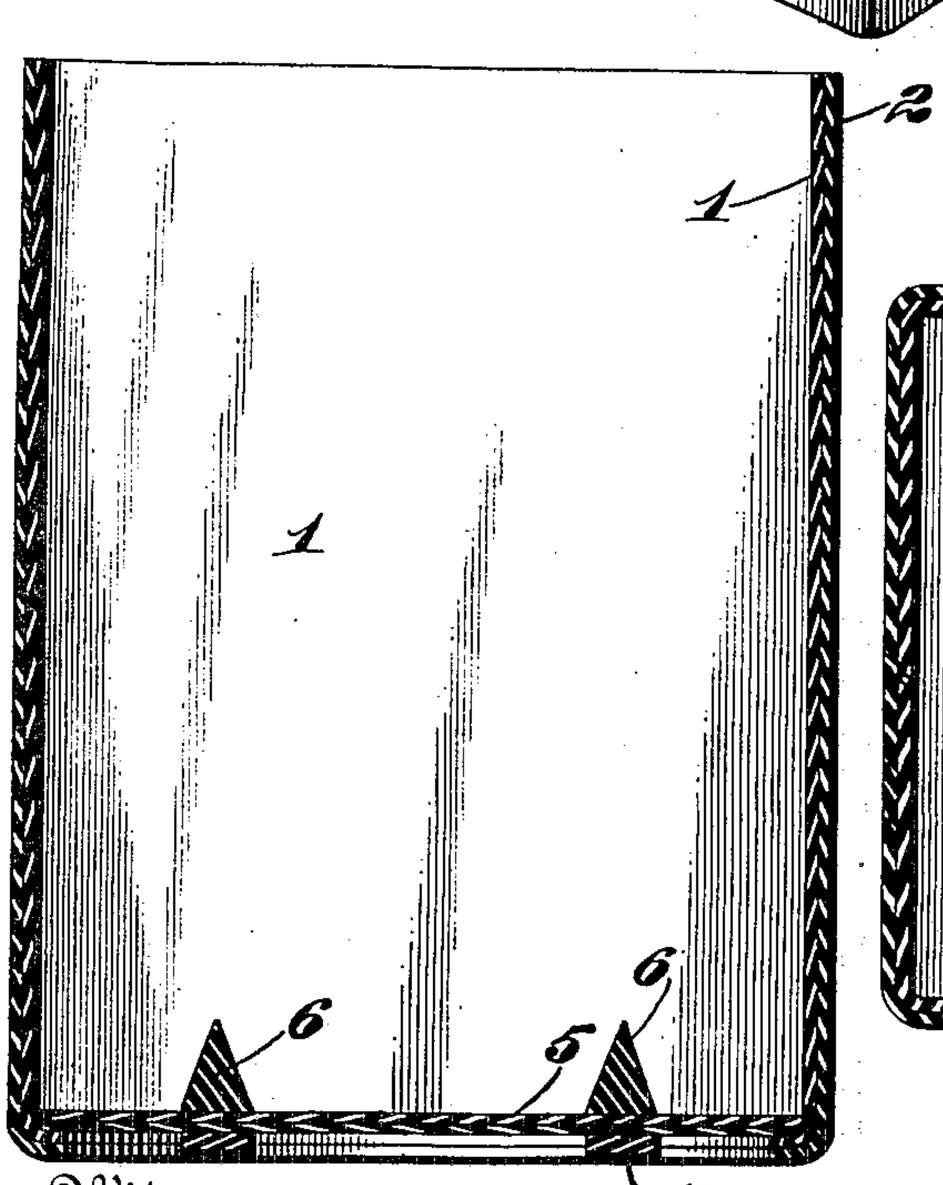
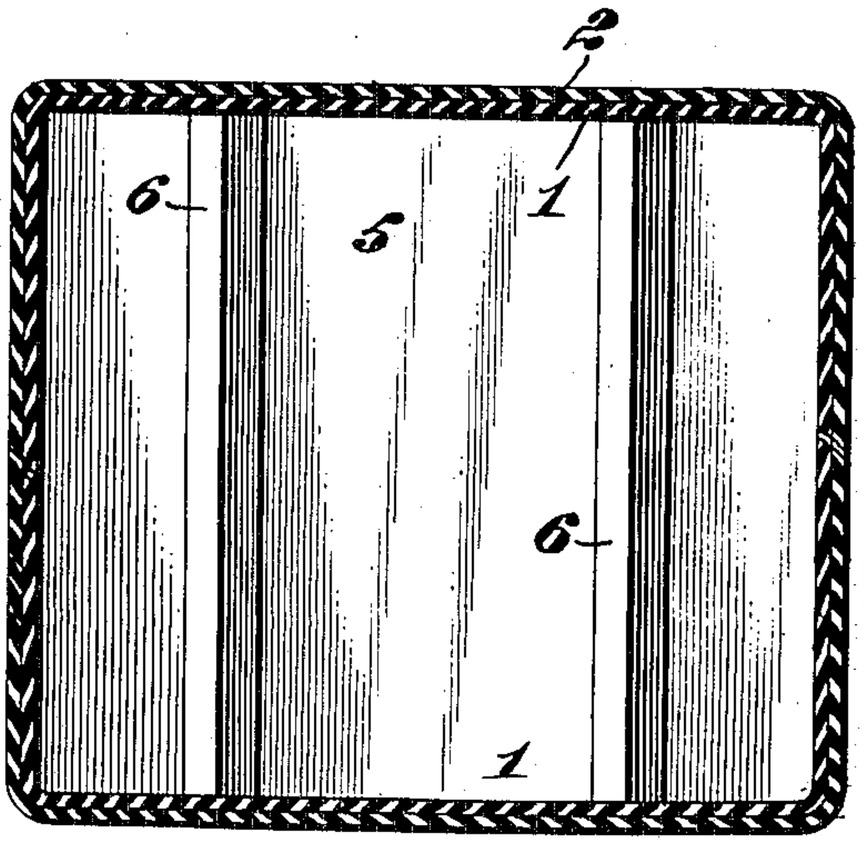


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

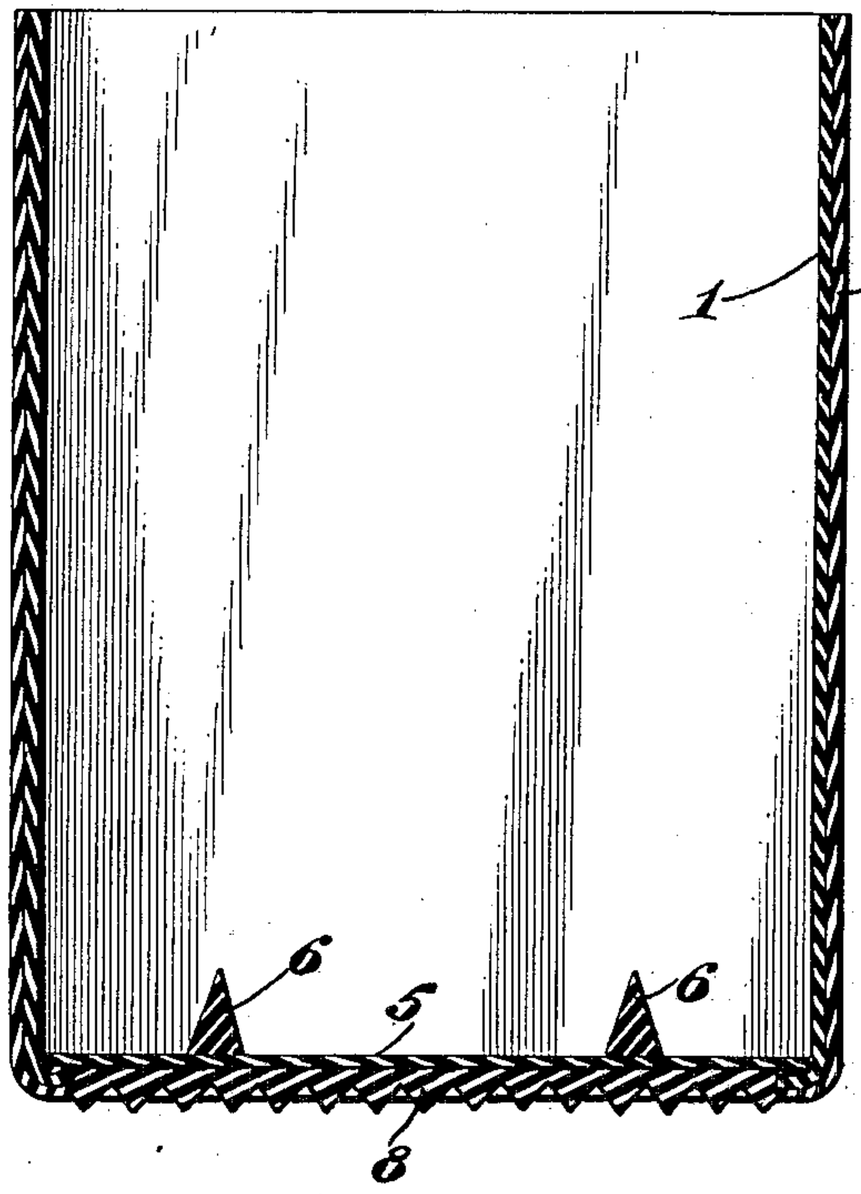


Fig. 5.

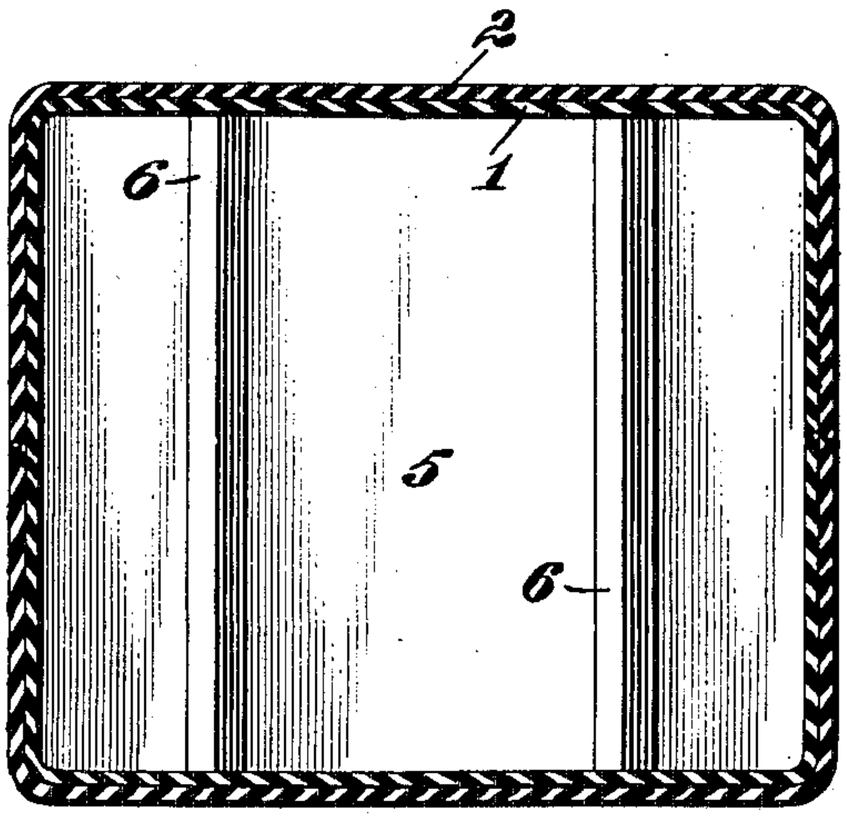
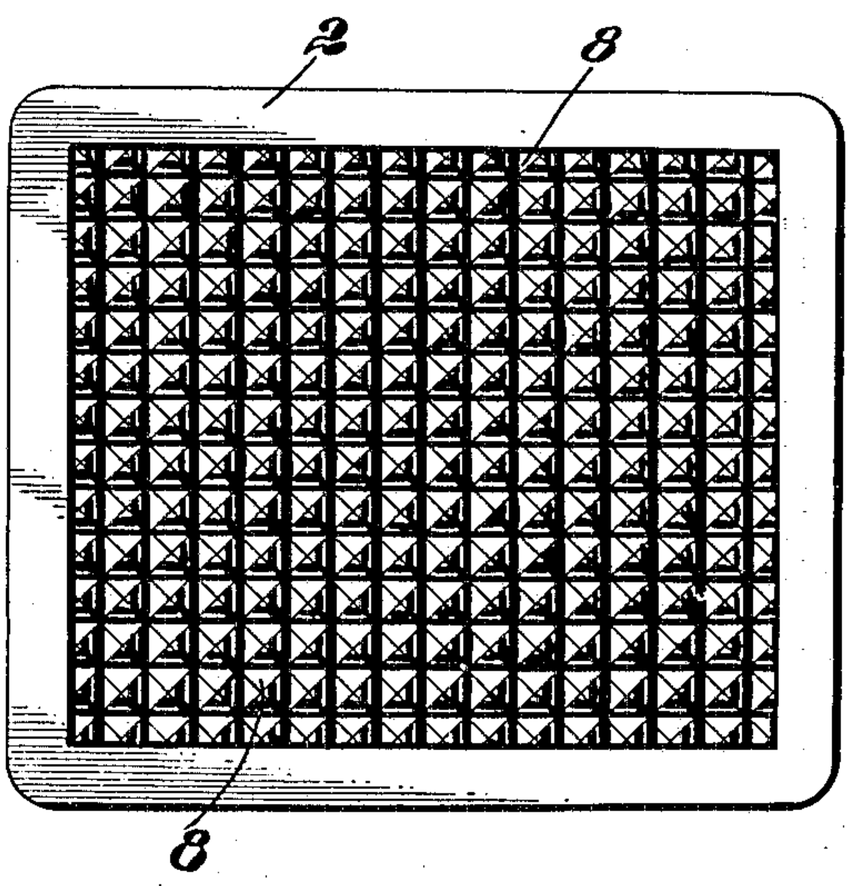


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CHEMICAL VESSEL.

No. 819,765. Specification of Letters Patent. Patented May 8, 1906.

Application filed December 23, 1904. Serial No. 238,057.

To all whom it may concern:

Be it known that I, WILLIAM KIEL, a citizen of the United States, residing at Butler, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Chemical Vessels, of which the following is a specification.

This invention relates to chemical vessels.

By the term "chemical vessels" I include battery-cells, photographic trays and baths, acid-tanks, and other vessels of the sort, although it is of course understood that my invention is applicable to vessels without regard to the purpose for which they are to be used.

The object of the invention is to reduce the liability of such vessels to breakage and to prevent disastrous effects from any accident which may occur to them.

Other objects of the invention will appear in the course of description and will be pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a battery-cell in part broken away to show its construction. Figs. 2 and 3 are respectively vertical and horizontal sections of the same. Figs. 4, 5, and 6 are respectively vertical and horizontal sections and a bottom plan view of a somewhat modified form of the cell.

Referring first to Figs. 1, 2, and 3, 1 and 2 represent, respectively, the inner and outer layers of the double wall of the cell, the inner of which may be made of relatively hard vulcanizable material, such as a rubber compound, and the outer of a relatively softer material of the same or similar composition, the two being firmly adhered together preferably by the process of vulcanizing. As these cells with vertical walls shown are conveniently made from sheets of vulcanizable material bent to the proper form, it is of great advantage that the seams or joints by which the edges of the sheets are joined should not be superposed in the two layers, or, in other words, so that the arrangement should be such that the seam of each layer, and particularly that of the inner layer, should be covered by a continuous portion of the other layer. As shown in Fig. 1, the seam 3 of the inner layer and the seam 4 of the other layer are at diametrically opposite sides of the vessel. I have shown the outer layer 2 as formed of a sheet of sufficient length to extend to the upper edge of the inner layer 1 and to fold under the perimeter only of the bottom 5 of the cell. The battery-cell shown may be conveniently provided with wedge-shaped ribs 6, secured upon its bottom 5, and I preferably attach immediately beneath these and on the lower side of the base 5 of the vessel strips 7, which may well be of the same relatively soft material as that of which the wall 2 is composed.

In the form of construction shown in Figs. 4, 5, and 6 the bottom 5 of the vessel is shown as exteriorly covered with a layer 8 of artificially corrugated or roughened material softer than that comprising the inner layer 1 of the cell and adapted to form a somewhat yielding cushion for the cell as well as to prevent slipping upon any smooth surface.

While my invention relates primarily and especially to a cell of relatively hard rubber covered by an outer layer of a softer rubber, it is obvious that the invention broadly considered is not limited to the particular materials described, but consists in a vessel having walls in a plurality of layers, the inner of which is relatively harder than the other, the layers being firmly and permanently adhered together. It is also evident that my invention is not limited to any particular form of vessel or to the purpose to which it is to be afterward applied.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A vessel having a wall composed of layers of vulcanizable material, one layer of which is harder than the other.

2. A vessel having a wall comprised of layers of vulcanizable material, the inner layer of which is harder than the other.

3. A vessel having a wall comprised of layers united by vulcanizing, one of said layers containing a greater proportion of plastic material than the other.

4. A vessel having a wall comprised of layers united by vulcanizing, the inner of said layers containing a greater proportion of plastic material than the other.

5. A vessel having a wall of hard rubber covered with a relatively soft material permanently adhered thereto.

6. A vessel having a wall composed of layers of rubber compound of different grades of hardness permanently adhered together.

7. A vessel having a wall composed of layers of rubber compound of different grades of hardness vulcanized together.

8. A vessel having a wall composed of layers of rubber compound, the inner of which is harder than the outer.

9. A vessel having a wall composed of layers of rubber compound, the inner of which contains a smaller proportion of rubber than the other.

10. A vessel having walls of relatively hard material and a layer of relatively soft material covering and adhered to its side walls and extending under the periphery only of its base.

11. A vessel having walls of relatively hard material, a layer of relatively soft material covering and adhered to its side walls and extending under the periphery only of its base, and a separate portion of relatively soft material secured to its base.

12. A vessel having walls of relatively hard material, a layer of relatively soft material covering and adhered to its side walls and extending under the periphery only of its base, and a separate portion of relatively soft material secured to and covering its base.

13. A vessel having walls of relatively hard material, a layer of relatively soft material covering and adhered to its side walls and extending under the periphery only of its base, and a separate portion of relatively soft and artificially-roughened material secured to its base.

14. A vessel having an outer layer of artificially-roughened soft rubber secured to its base.

15. A vessel having an outer layer of artificially-roughened soft rubber secured to and approximately covering its base.

16. A receptacle for chemicals having its walls formed of an inner layer of hard rubber and an outer layer of soft rubber.

17. A receptacle for chemicals formed of a layer of hard-rubber compound and a layer of soft-rubber compound vulcanized together, the hard rubber being upon the interior and the soft rubber upon the exterior.

18. A receptacle for chemicals having its walls formed of composite material, namely, soft and hard rubber composition, vulcanized.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM KIEL.

Witnesses:

PAUL WITLOCK,

GEORGE J. FRITZ.