Dec. 8, 1925. 1,564,766

K. E. EDGEWORTH

CONTAINER FOR CORROSIVE LIQUIDS

Filed Aug. 11. 1924 2 Sheets-Sheet 1

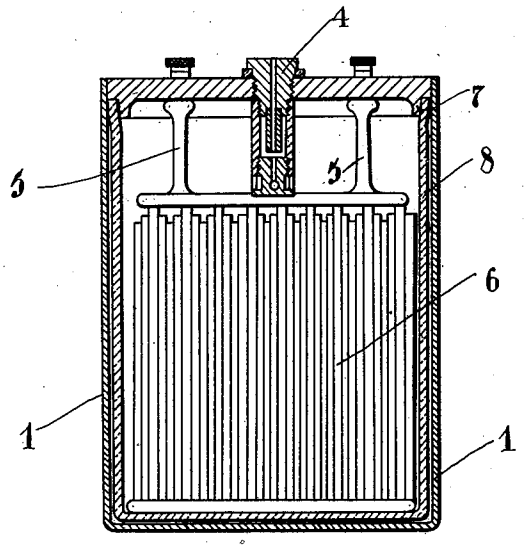


Fig. 1.

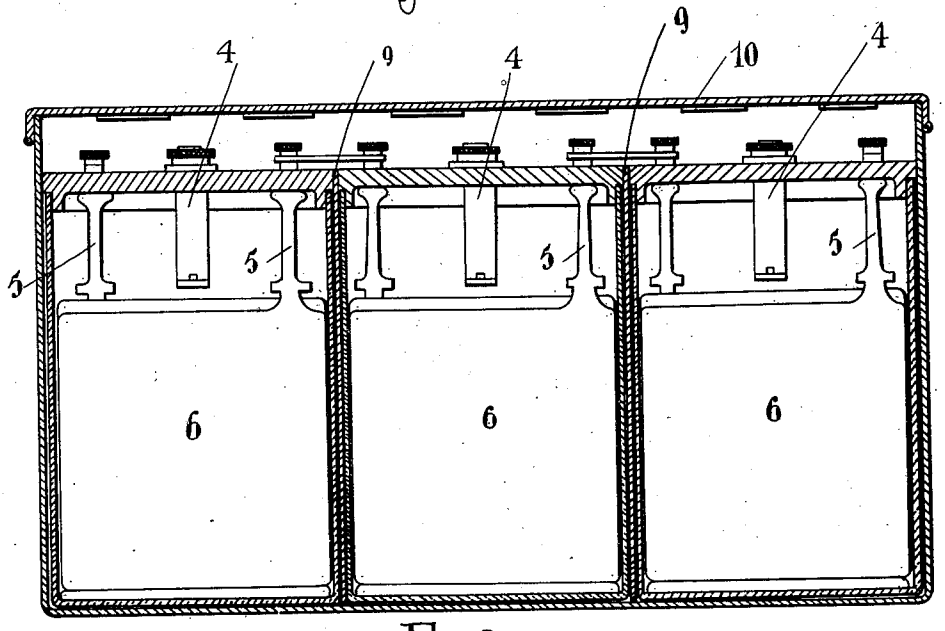


Fig. 2.

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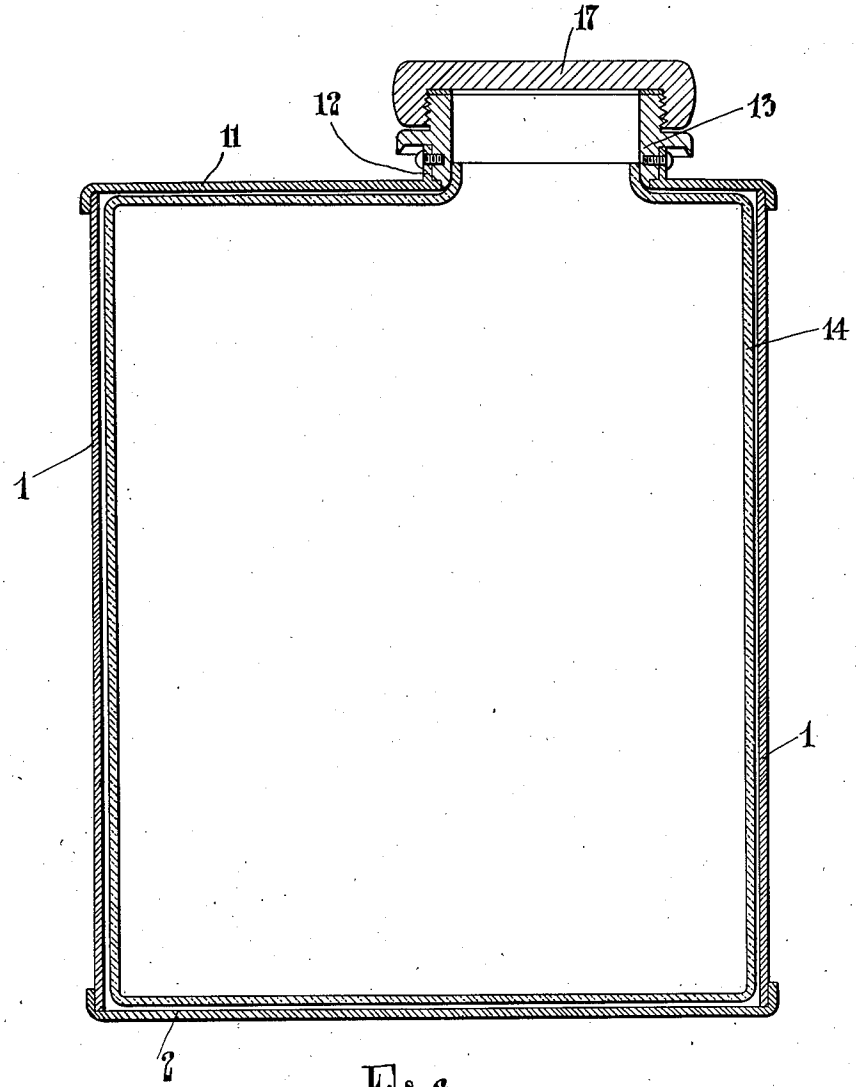


Fig. 3.

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UNITED STATES PATENT OFFICE.

KENNETH ESSEX EDGEWORTH, OF LONDON, ENGLAND.

CONTAINER FOR CORROSIVE LIQUIDS.

Application filed August 11, 1924. Serial No. 731,510.

To all whom it may concern:

Be it known that I, KENNETH ESSEX EDGEWORTH, a British subject, and residing at Signals Experimental Establishment, Woolwich Common, London, S. E. 18, England, have invented certain new and useful Improvements in and Relating to Containers for Corrosive Liquids, of which the following is a specification.

This invention relates to containers for corrosive liquids, such as sulphuric acid, and particularly to containers for secondary cells or batteries of such cells.

The object of the invention is to provide a container which will be relatively strong and at the same time light and resistant to the action of corrosive liquids.

As is well known, a satisfactory container for portable lead secondary batteries should be light, mechanically strong and acid-proof. Celluloid has been extensively used in forming such containers, as this material may be obtained of a sufficient thickness to withstand careful handling. It is, however, necessary to place such containers in a wood or metal box for further protection from mechanical damage. Celluloid is, moreover, open to objection on the ground of its inflammability while other materials which it has been attempted to use hitherto have not proved entirely satisfactory.

The invention consists broadly in a container for corrosive liquids comprising a member formed of ebonite or like acid-resisting rigid material in which the filling aperture is formed, a soft and flexible rubber bag, a vulcanized joint between the mouth of the bag and said member, and a casing of rigid material which is not necessarily resistant to the corrosive action of the liquid enclosing the bag and rigidly connected to the member furnished with the filling aperture.

Thus, a container for a portable secondary cell in accordance with the invention will comprise a top plate to which are attached the plates of the cell and in which the vent and filling hole are formed, a soft and flexible rubber bag open at the top, the peripheral edge of which is vulcanized to the top plate, and a casing of metal, wood or other suitable material, also open at the top, which completely encloses the rubber bag and to which the top plate is rigidly attached by screws or other suitable means.

Similarly, a battery of several cells will comprise a top plate for each cell, a rubber bag for each cell and a single casing divided into compartments by partitions, each partition forming a support for the sides of two adjacent cells.

Preferably, the external surface of the rubber bag is secured by means of a suitable adhesive to the interior walls of the casing and to the partitions if these are provided.

In forming a secondary cell in accordance with the invention the battery plates and the separators are assembled and associated with the top plate in which the vent and filling hole and the like are provided.

The rubber bag is then placed over the battery plates, the upper edge of the bag being vulcanized to the top plate which may be provided with a flange to facilitate connection in this way. The casing is coated inside with an adhesive material, such as rubber solution, and the top plate and bag are inserted therein, the air inside the bag being sucked out if desirable to facilitate this operation. The top plate is then secured in the casing in its appropriate position by screws or other means, and air is blown into the mouth of the bag through the vent or filling hole so as to expel the air between its external surface and the internal surface of the walls of the casing and to cause the bag to adhere to the casing.

After the adhesive has hardened as, for instance, by the evaporation of the solvent the cell may be put into use. Where there is a plurality of cells each cell is assembled in its own compartment in the manner already described.

In forming a vessel intended purely for the transport of corrosive liquids the casing may be formed from metal and be of any convenient shape or size and it may be in contradistinction to the casing employed in forming a storage battery provided with a top portion of metal or like rigid material permanently secured to its side walls. In such case, an aperture will be provided in the top of the casing in which a tubular member formed of ebonite or other acid-resisting material may be secured, a cap, stopper or like closing means being arranged to co-operate with this tubular member to form a closure for the vessel. With this construction a rubber bag of suitable form provided with an opening more or less corresponding with the cross-sectional area of the tubular member will be employed and the edges of the wall of the bag adjacent to

this opening will be connected to the tubular member as, for instance, by a vulcanizing operation. The bag may then be deflated and inserted into the casing, the internal surface of the walls of which have been optionally covered with an adhesive. After insertion the bag may be inflated to expel the air between its walls and the casing; the tubular member forming the inlet and outlet of the vessel may be secured to the casing in any convenient manner and it may be internally or externally screw threaded in order that a cap or stopper may be engaged therewith.

Certain constructions in accordance with the invention are illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a cross-section of a single cell, and

Figure 2 is a longitudinal section of a battery comprising three cells furnished with a removable lid;

Figure 3 being a view in sectional elevation of a vessel adapted to be employed purely in the transport or storage of corrosive liquids.

In the drawings, the side walls of the casing are indicated by the reference 1, while 2 indicates the bottom of the casing.

Referring to Figures 1 and 2, 3 is the top plate provided with a filling hole and vent 4 and apertures in which the terminal lugs 5 of the battery plate 6 are engaged. The top plate is provided with a flange 7 extending downward and to this flange the mouth of the bag 8 is vulcanized. The top plate with the plates and the bag secured thereto is inserted in the casing and rigidly connected with the walls thereof, or with the walls thereof and with partitions 9 in the constructions illustrated in Figure 2 in which, as will be observed, the walls of the casing extend above the top plates and a lid 10 is provided.

As stated above, the walls of the bag may be cemented to the walls of the casing and to the partitions if these are provided.

Referring to Figure 3, the casing comprises a top plate 11 provided with a flange 12 extending upward. Within the flange a tubular member 13 which is formed, for instance, of ebonite and vulcanized to the walls of the rubber bag 14 adjacent to the aperture 15 therein is secured by means of screws 16. This tubular member is externally screw threaded and is adapted to be engaged by a cap 17.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A container for corrosive liquids, comprising a member formed of ebonite or like acid-resisting rigid material in which the filling aperture is formed, a soft and flexible rubber bag, a vulcanized joint between the mouth of the bag and said member, and a casing of rigid material which is not necessarily resistant to the corrosive action of the liquid enclosing the bag and rigidly connected with the member furnished with the filling aperture.

2. A container for a portable secondary cell comprising a top plate to which are attached the plates of the cell and in which the vent and filling hole are formed, a soft and flexible rubber bag, a vulcanized joint between the peripheral edge of the bag and the top plate, and a casing formed of wood or metal enclosing the bag and rigidly attached to the top plate.

3. A container for a battery of portable secondary cells comprising a single casing, partitions in said casing dividing the same into a plurality of compartments, a cell in each of said compartments, said cell including a top plate to which the electrodes of the cell are secured and in which the vent and filling hole are formed, a soft and flexible rubber bag connected to said top plate by a vulcanized joint between the peripheral edge of the bag and the top plate, and a rigid connection between the top plate and the walls of the compartments with which it is associated.

In testimony whereof I have signed my name to this specification.

KENNETH ESSEX EDGEWORTH.