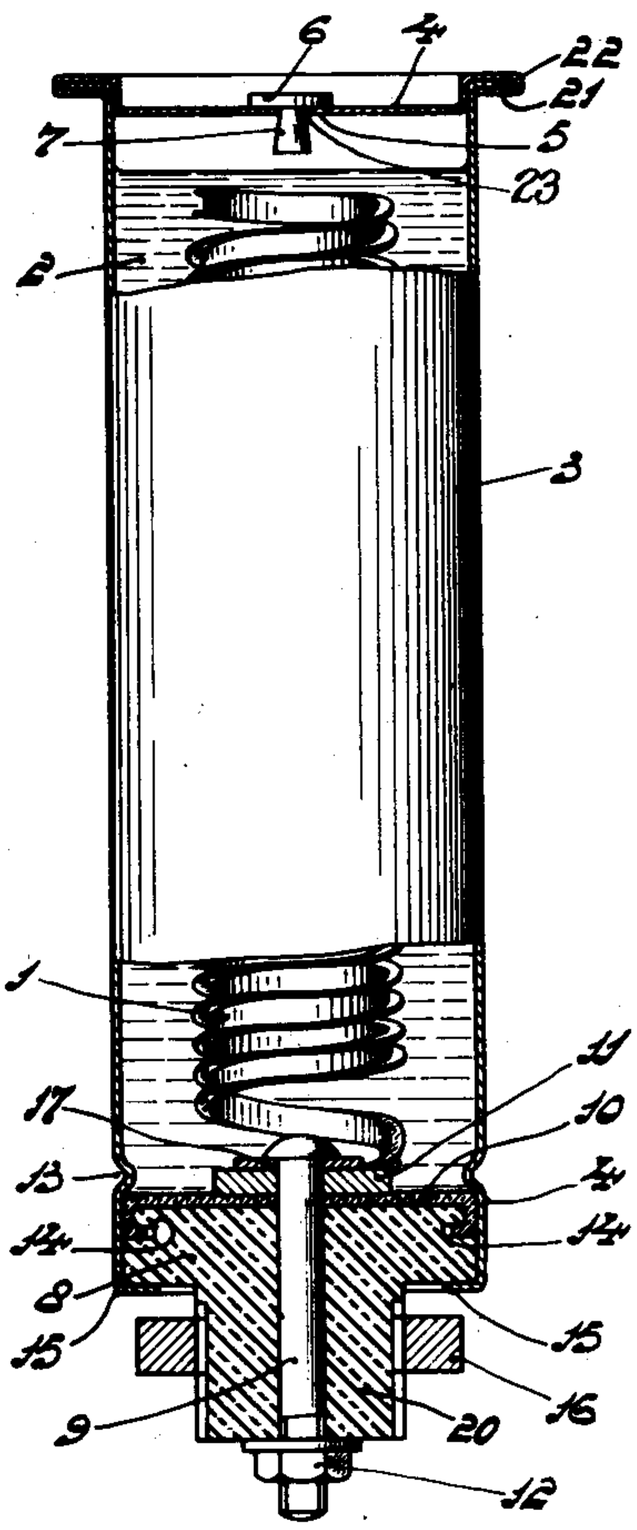
Aug. 20, 1935. H. W. BOESSENKOOL 2,011,890

ELECTROLYTIC DEVICE

Filed Feb. 23, 1933

Fig. 1.



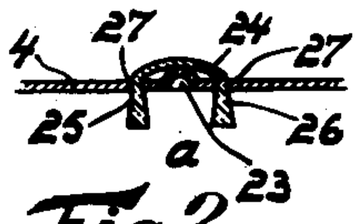


Fig. 2.

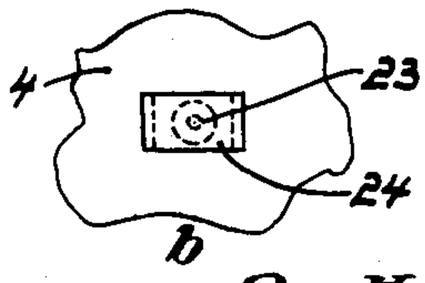


Fig. 3.

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ELECTROLYTIC DEVICE

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6 Claims. (Cl. 175—315)

My invention relates to electrolytic devices and more particularly to a novel valve construction for the same.

My invention will be described with reference to electrolytic condensers, to which it is particularly well adapted, although it is to be understood that it can be applied to other electrolytic cells, for instance to electrolytic rectifiers, batteries, etc.

As is well known, to prevent contamination and evaporation of the electrolyte, the containers of electrolytic condensers are as a rule fully closed, and are also both liquid- and air-tight. However, to permit the escape of the gases which are liberated at the electrodes during the operation of the condenser, venting means must be provided.

The present invention relates to a novel vent valve construction, which is very simple and cheap to manufacture, and at the same time is very reliable in operation.

According to the invention I provide a valve in the form of a rubber flap having one or more integral projections and which is secured to the container by pulling such projection (or projections) through a corresponding aperture (or apertures) of the container.

In its preferred form the flap is mushroom-shaped, the stem forming the projection to be pulled through an aperture of the container, and the cap of the mushroom closing from the exterior, the venthole provided in the container.

Whenever the gases developed during the operation of the condenser have accumulated sufficient pressure to lift the valve, the gases escape, after which the valve is reseated.

Preferably the vent-valve is mounted at one end of the container, for instance in a re-entrant end-cover thereof.

In order that my invention may be clearly understood and readily carried into effect, two embodiments thereof will be described with reference to the accompanying drawing in which Fig. 1 is a side elevation, partly in section of a condenser embodying my invention; Fig. 2 is a detail of a condenser containing a modified vent valve in cross-section; and Fig. 3 is a plan view of the arrangement of Fig. 2.

In the drawing, the electrode 1 consists of a helically-wound profiled rod or wire of film-forming metal, for instance aluminium, tantalum or the like, provided with an electrolytically-formed oxide film. The electrode 1 is immersed in a suitable electrolyte 2, for instance, an aqueous solution of borax and boric acid, constituting the other electrode.

The open-ended cylindrical container 3, which may be of film-forming or non-film-forming metal, constitutes the supply conductor for the electrolyte 2, and at its upper end is provided with a flange 21, around which is crimped in air-tight manner the flange 22 of a re-entrant cover lid 4.

The lid 4 is provided with a vent-hole 5 for the escape of the gases. The vent-hole 5 is normally closed by the cap 6 of a mushroom-shaped rubber flap valve, the slightly tapered stem 7 of which is forced through a hole 23 of the lid 4.

It should be understood that the stem 7 is slightly deformed when pulled through aperture 23. The stem 7 is originally made of such length that it can be easily gripped to position the valve, after which if desired, part of the stem may be cut off. The pressure of the cap 6 on the aperture 5 can also be regulated by pulling the stem through the cover to a greater or lesser extent.

In this manner a very simple and efficient valve arrangement is obtained which permits the passage of the gas through the vent-hole without the simultaneous passage of the liquid electrolyte. At the same time the valve construction is well adapted for mass production.

At its lower end, the container 3 is closed by a bottom piece, which is of suitable insulating material, for instance, hard rubber, artificial resin or the like. The upper portion 8 of the bottom piece forms a disc snugly fitting in the container, while its lower portion forms a neck 20 of reduced diameter. A rubber disc 10 placed on top of the bottom piece acts as a gasket and slightly overlaps the latter, its overlapping portion 28 being bent around the upper portion 8 and engaging an annular groove 14 provided therein.

The disc 8 with its washer 10 is tightly clamped between an annular recess 13 of the container 3 and the crimped-over end portion 15 thereof. A conducting rod 9 passes through the disc 8 and its neck 20 and is electrically connected with the electrode 1 at 17. At its other end the rod 9 carries a nut 12 for the outside connection of the electrode 1. The washer 10 is clamped between a disk 11 and the bottom piece 8.

The neck 20 is threaded to carry a nut 16, by means of which the condenser may be attached to a suitable base.

Various modifications of my invention may suggest themselves. For instance, instead of providing the flap valve with a single projection, a plurality of projections can be provided. In this case the flap may consist for instance of a strip of rubber 24, shown in Fig. 2 in cross section and in Fig. 3 in top view, the ends 25 and 26 of which are pulled through slits 27 provided on

the container wall 4. The middle portion of the strip 24 covers the vent-hole or holes 23. To improve further the seating of the valve, the vent-hole 23 forms a protruding valve seat on the container.

What I claim is:

1. An electrolytic cell comprising a container having a vent hole therein, an electrolyte in said container, and a valve provided on said container and normally closing said vent hole from the exterior, for the escape of gases which may develop in the electrolyte during the operation of the cell, said valve consisting of a flap having an integral projection and an aperture on said container, said projection tightly extending through said aperture to secure the valve to the container, and the flap of said valve normally closing said vent hole from the exterior.

2. An electrolytic device comprising a container, a venthole in said container, and an aperture in the proximity of said hole, a mushroom-shaped valve comprising a flexible flap which is adapted to close said venthole, and a stem integral with said flap and forcibly pulled through said aperture and fixedly securing said valve to the container.

3. An electrolytic cell having a container and two slit-shaped apertures in said container, a rubber strip, the two end portions of which are pulled through said two slits, said container having a venthole between said slits, said rubber strip normally closing said venthole and being adapted to be lifted from said hole by the pressure of accumulated gases which are liberated during the operation of the cell.

4. In an electrolytic device a container, a venthole and an aperture, a rubber member adapted to close said venthole, and having an integral portion projecting through said aperture, said projection securing said member to said container.

5. An electrolytic cell having a container and an end member, said end member having a venthole provided therein, and a valve cooperating with said hole, said valve comprising a rubber flap closing said venthole, said flap having an integral projection, said end member having an aperture therein through which the projection is securely tied to said container.

6. In an electrolytic device comprising a container having an aperture and a venthole in the proximity thereof, and a mushroom-shaped valve for said container, said valve comprising a disc-like rubber flap adapted to normally close said venthole and an integral stem projecting substantially centrally therefrom, said stem being adapted to be pulled through said aperture.

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