

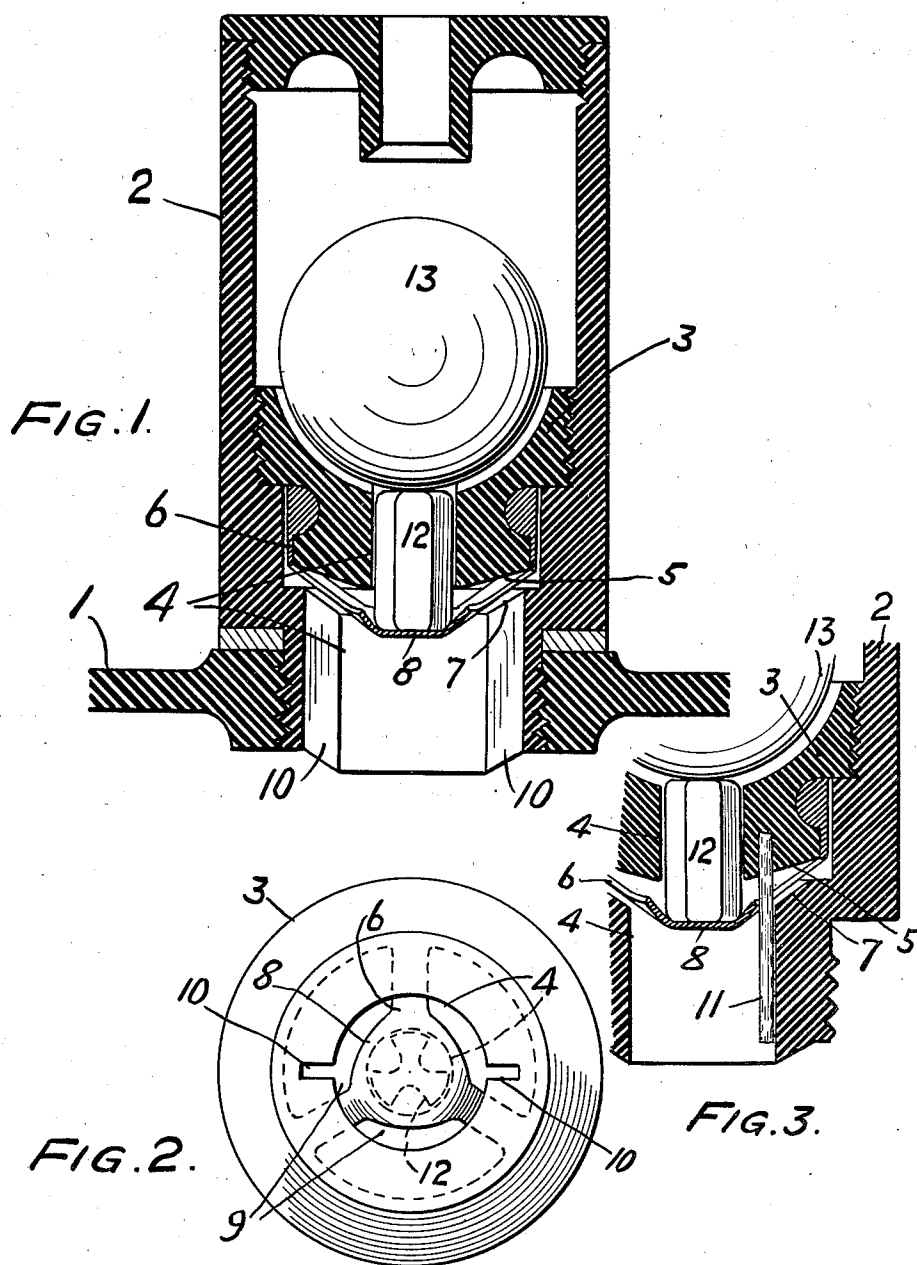
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NONSPILL VENT PLUG FOR STORAGE BATTERIES

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NON-SPILL VENT PLUG FOR STORAGE
BATTERIES

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4 Claims. (Cl. 136—178)

The present invention is an improvement on or applicable to the vent plug described in my application Serial No. 19,638, of May 3, 1935. In the operation of the vent plug disclosed in said application sometimes liquid collecting in the interior of the plug above the diaphragm valve does not drain back into the cell when the latter is restored to its vertical position.

It is the principal object of the present invention to overcome that defect or disadvantage. I have observed that the failure to drain properly, above referred to, occurs when slight gaseous pressure develops in the cell, and the present invention consists in the provision of means for establishing a capillary path extending below the diaphragm valve from a point in proximity with a perforation, which operates to oppose effect of such pressure and to ensure proper drainage.

The invention also comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawing forming part hereof and in which,

Figure 1 is a view partly in central section and partly in elevation drawn to a very much enlarged scale of a vent plug embodying features of the invention.

Figure 2 is a plan view looking upward in Figure 1 with parts omitted; and

Figure 3 is a view similar to Figure 1 illustrating a modification.

Referring to the drawing, 1 indicates the cover of a storage battery cell and it is known that pressure above atmosphere develops in the cell. The vent plug 2 is internally sub-divided by an annular partition 3 providing an axially disposed vent passage 4 and also providing on its inner face a diaphragm valve seat 5. The plug is equipped with a weight-operated elastic diaphragm 6 as of rubber stressed toward the seat and provided with an imperforate center portion 8 for sealing the passage 4 when the device is tilted. The diaphragm is also provided with perforated portions 9 for affording access to the passage 4 for venting the cell and from the passage for drainage when the device is upright. Back pressure in the cell operates to oppose drainage. There are means for establishing a capillary path extending below the diaphragm from a point in proximity with a perforation, and these means operate to obviate the effect of the back pressure. As shown in Figures 1 and 2 these means comprise slots 10 provided in the wall of the vent passage and they extend downward from points near perforations 9 in the

diaphragm. In Figure 3 there is shown a modified form of capillary path and it consists of a fibrous wick 11 whose upper end is fastened by insertion into the annular partition and whose lower end extends downward by one of the perforations 9 in the diaphragm. The wick lies close to the wall of the passage 4.

As to the mode of operation it may be suggested that the defective drainage in the device of the prior application was due to the uniform distribution of pressure over all of the surfaces of the liquid entrained in the passage around the plunger 12 and between the diaphragm and the valve seat when the cap is depressed by the weight of the ball 13. It is to be understood that back pressure is assumed to exist in the cell and beneath the cover 1. Drainage of this liquid is effected against such gaseous pressure by unbalancing the pressure and the capillary path described extending from some point on the surface of the entrained liquid above the diaphragm operates to produce that result so that drainage is effected.

It will be noted that the slots extend to an internal shoulder 7 located in close proximity with the soft rubber diaphragm when the latter is depressed by the weight of the ball. It will also be noted that the vent passage 4 is non-capillary while the capillary path indicated by the slots 10 in Figure 1 or the wick 11 in Figure 3 is in parallel relation with the non-capillary vent passage 4 below the diaphragm 8.

I claim:

1. A vent plug of the type recited having an axially disposed vent passage through it and equipped with a weight-operated resilient diaphragm provided with an imperforate portion for sealing the outlet of the passage when the device is in tilted position and with a perforated portion for affording access to the passage when the device is in upright position, a non-capillary passage below and communicating with the perforated portion of the diaphragm, and means for establishing a capillary path paralleling said non-capillary passage and extending below said diaphragm from a point in proximity with a perforation in the diaphragm.

2. For storage battery cells a non-spill vent plug having an annular partition sub-dividing its interior and providing an axially disposed vent passage and also providing on its inner face a diaphragm valve seat, said plug equipped with a weight-operated elastic diaphragm stressed toward said seat and provided with an imperforate center portion for sealing said pas-

sage when the device is tilted and with a perforated portion for affording access to the passage for venting the cell and from the passage for drainage when the device is upright, said
5 plug having walls defining a non-capillary passage below said diaphragm, back pressure in the cell operating to oppose drainage, and a slot in the wall of said lower passage for establishing a capillary path extending below the diaphragm
10 from a point in proximity with a perforation thereof and adapted to obviate the effect of the back pressure.
3. In combination in a non-spill vent plug for a battery cell in which gas is evolved, walls defining a hollow chamber vented into the atmosphere, a non-capillary passage from the chamber adapted to communicate with the interior of the cell, a valve intermediate said passage, adapted to close said passage upon tilting of the cell and a
15 capillary path adjacent said passage and said
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valve for connecting the chamber with the interior of the cell when said valve is open, said capillary path adapted to drain liquid from the chamber into the cell against the flow of gas from the cell into the chamber.

4. In combination in a non-spill vent plug for a battery cell in which gas is evolved and develops pressure, a valve normally open to provide for the escape of gas when the cell is in upright position but adapted to be closed by the tilting of the cell, walls defining a confined space above the valve, vented into the atmosphere, wherein liquid may be trapped, and a capillary and a non-capillary path in parallel relation between the valve and the interior of the cell whereof the latter provides for the escape of gas and the former provides for drainage of the trapped liquid against gas pressure.

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