Jan. 4, 1949. J. W. ALLEN 2,457,800

SELF-SEALING VENT CAP

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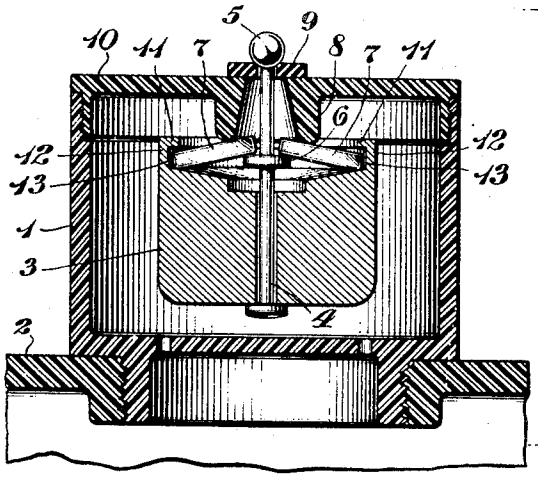


Fig. 1.

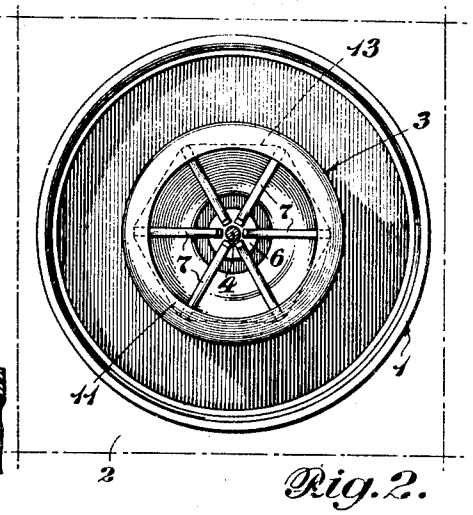


Fig. 2.

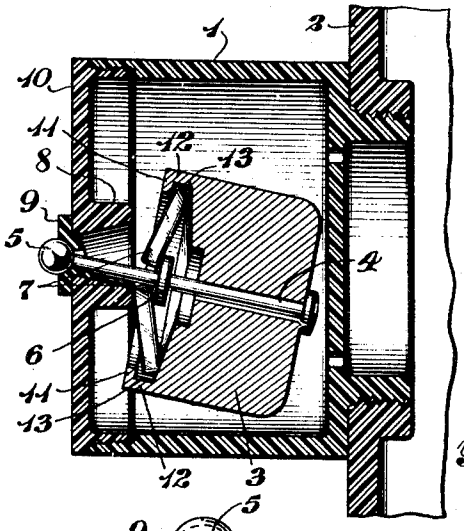


Fig. 3.

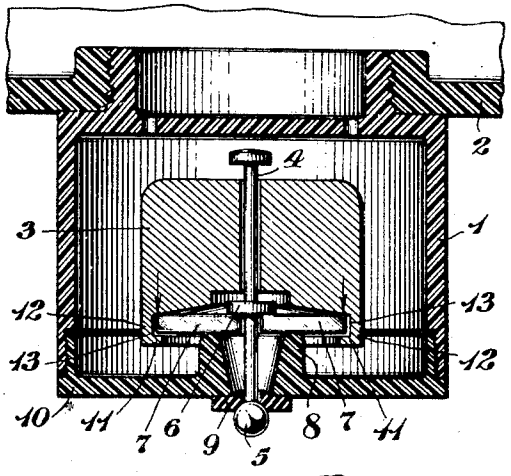


Fig. 4.

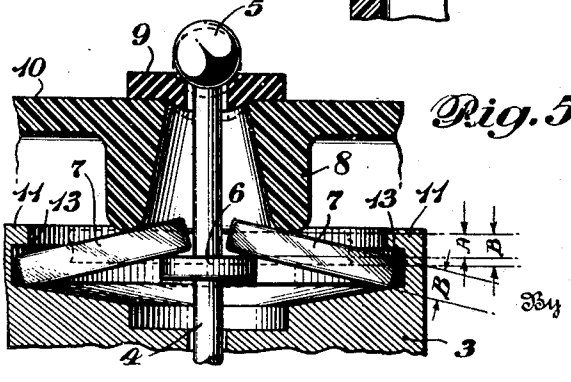


Fig. 5.

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SELF-SEALING VENT CAP

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5 Claims. (Cl. 137—139)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The present invention relates to closures for containers such as storage battery cells which require a cap for the filler opening, of such construction that it will keep foreign matter out of the container and will prevent spilling of the fluid contents if the container is tilted or turned over, yet will provide for relief of any excess pressure built up in the container, regardless of the position of the container.

The object of this invention is to construct a filler cap for a fluid container which will be self-sealing at all times regardless of the position in which the container is held, but will relieve any excess pressures which might be generated therein.

Another object is to provide a weighted valve in the filler cap above referred to, which will maintain a closing pressure on the valve in all positions of the container, the valve closing in an inward direction with respect to said container.

A further object is to provide a valve of the above type which is of simple construction and easily assembled, yet reliable in operation.

These and other more specific objects will become more apparent as the description of the details of this invention proceeds, having reference to the accompanying drawings, wherein:

Fig. 1 is a sectional view of an illustrative form of the present invention, showing a part of the container wall in which it is mounted,

Fig. 2 is a plan view of the weighted portion of the valve as seen from the section line 2—2 of Fig. 1,

Fig. 3 is a sectional view of the cap when turned over 90° from the normal upright position of Fig. 1,

Fig. 4 is a sectional view of the cap when turned completely over into an up-side-down position, and

Fig. 5 is an enlarged detail view partly in section of a portion of the valve stem and operation levers.

The device essentially consists of a compartment 1, arranged to screw into the tapped opening of a container 2, a weight 3 supported by a valve stem 4 having a sealing knob 5 and a shoulder 6, levers 7 suitably arranged for action between the shoulder 6 of the stem 4 and the projection 8 acting as a fulcrum and an elastic sealing washer 9. The use of a sealing washer is considered preferable to an accurately dimensioned seat between the sealing knob 5 and the opening in the compartment cover 10. With a sealing knob and elastic washer, the knob may be of a diameter just passing through the opening in the

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compartment cover, and a seal may be obtained by pushing the elastic washer over the knob and compressing it against the edge of the opening in the compartment cover without permitting the sealing knob to pass through the opening.

In the normal upright position of the container the weight provides a slight seal at all times preventing evaporation of the liquid but permits release of excessive pressures in the container.

The relation between the shoulder on the stem, the projection acting as a fulcrum and the levers is such that the thickness B of the lever 7 (Figure 5) is greater than the space A between edge of fulcrum and face of shoulder. As the container is tilted, the pull of gravity on the weight moves the shoulder toward the fulcrum as shown in Fig. 3, and causes the sealing knob to be pulled into the elastic washer providing an increased sealing pressure. In the inverted position the action of the weight on the shoulder through the levers also pulls the sealing knob into the sealing washer as shown in Fig. 4.

The levers 7 are arranged to be retained loosely in the weight 3 as indicated in Fig. 2 to provide free movement. The assembly of the levers can be accomplished by spinning or pressing the edge 11 of a suitably provided lip 12 to form a retaining channel or groove 13.

In Fig. 5 the dot-dash lines indicate the position of the lever and the shoulder when providing a seal in an inverted position.

An advantage of the sealing means described is that if necessary the relation of weight, leverages and displacement may be arranged so that the seal will release at excessive pressures rather than have a seal which is held more firmly as container pressures increase, as would be the case if the valve seated in the outward direction with respect to the container.

Obviously many modifications in detail structure may be made without departing from the spirit and scope of the present invention as defined in the appended claims.

This invention may be manufactured or used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. In a self-sealing vent cap for storage battery cells or the like having a hollow cap with an opening for establishing communication between the cap and the atmosphere; a resilient external valve seat for said opening, a valve for said seat, and weight means in said hollow for

releasably holding said valve on its seat in either the upright or inverted positions of said cap.

2. In a self-sealing vent cap for storage battery cells or the like having a body with a screw connection for mounting in the filler opening and a compartment with an inverted funnel shaped passage in its top surrounded by an inwardly projecting ridge; a round headed valve, the head of said valve being small enough to clear through the small end of said funnel shaped passage, a stem on said valve having a collar and a weight element hung on it below the collar, lever means between the weight acting as the applied force, the projecting ridge acting as the fulcrum and the collar for receiving the resultant force and transmitting it to the valve head whenever the cap is sufficiently tilted or turned over, and a resilient washer for stretching over the valve head after the latter is inserted from inside the compartment through the funnel shaped passage to serve as a seat for the valve head, said washer having a normal inner diameter larger than said stem and an outer diameter larger than said small end of the passage.

3. In a self-sealing vent cap for storage battery cells or the like having a hollow body with a vent opening and an outer resilient valve seat thereabout a spherical valve for said valve seat having a stem extending into said hollow, a weight loosely mounted on said stem and means between said weight and said valve for transmitting a force component from the weight to said valve in its closing direction in substantially any position of said cap.

4. In a self-sealing vent cap for storage battery cells or the like having a hollow body with a funnel shaped passageway extending inwardly therethrough; a resilient external valve seat around the small end of said passage and a ridge projecting inwardly forming the wide end of said funnel, a round headed valve for said valve seat having a stem extending inwardly through said passage, a weight hung loosely on said stem, and lever means between said weight and said valve for transmitting a force component from said weight to said valve for resiliently urging it against the valve seat whenever the cap is sufficiently titled or turned over.

5. In a self-sealing vent cap for the filler opening of a storage battery cell or the like; an opening with a resilient valve seat in said cap, an inwardly closing valve on said valve seat, a weight loosely hung on said valve, and means for transmitting a component force from said weight to said vale in substantially a closing direction in any position of said cap.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,683,338	Evinrude	Sept. 4, 1928
1,984,175	Clay	Dec. 11, 1934
2,092,214	Janko	Sept. 7, 1937
2,357,634	Crites	Sept. 5, 1944