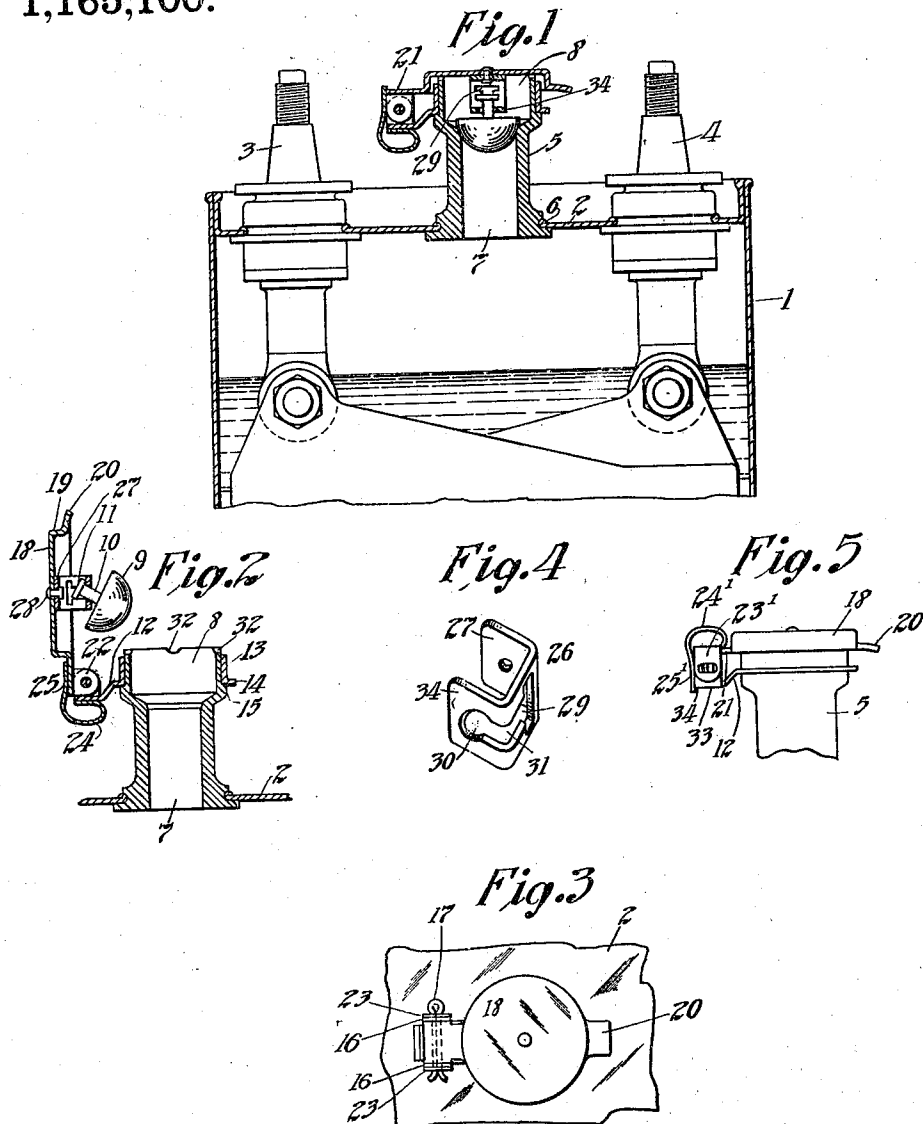


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 COMBINED FILLING AND GAS VALVE FOR STORAGE BATTERIES.
 APPLICATION FILED JUNE 17, 1911.

1,165,100.

Patented Dec. 21, 1915.



Witnesses:

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UNITED STATES PATENT OFFICE.

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COMBINED FILLING AND GAS VALVE FOR STORAGE BATTERIES.

1,165,100.

Specification of Letters Patent.

Patented Dec. 21, 1915.

Application filed June 17, 1911. Serial No. 633,683.

To all whom it may concern:

Be it known that I, WALTER E. HOLLAND, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Combined Filling and Gas Valves for Storage Batteries, of which the following is a specification.

My invention relates to combined means for filling storage batteries with electrolyte and replenishing the same with water, for permitting the escape of gases generated within the storage battery cell, for separating the mechanically entrained globules of electrolyte from the escaping gases and returning the same to the cell, and for excluding dust, dirt and other foreign matter from the cell.

In prior patents to Thomas A. Edison numbered and dated as follows:—764,183, July 5, 1904; 785,297, March 21, 1905; 821,624, May 29, 1906; and 850,913, April 23, 1907, various forms of gas separators are disclosed, but none of these devices is adapted to be used for the purpose of filling the cell, and where they are used, a separate filling means must be employed.

The object of my invention is to provide a simple and efficient device for accomplishing the functions set forth above.

My invention consists also in the combinations and details of construction described and claimed hereinafter.

In the drawings which accompany and form a part of this specification, and in which like reference characters are employed to designate like parts throughout the several views—Figure 1 is a vertical view partly in section showing one embodiment of my improved filling and gas valve applied to a storage battery of the Edison type; Fig. 2 is a vertical sectional view of the device with the lid or cover lifted into filling position; Fig. 3 is a plan view of the device; Fig. 4 is a perspective view of a detail of construction; and Fig. 5 is a side elevation showing a modified arrangement of the spring.

Referring to the drawings, the battery containing can or vessel shown at 1 is provided with a top 2 and with the battery terminals 3 and 4. My improved device includes a plug 5 secured in the top of the bat-

tery can 2 by the flanged edge 6 or in any other suitable manner. The plug 5 has an opening therethrough which is preferably tubular, the lower portion of the said opening being narrow and elongated, as shown at 7, and the upper portion being relatively shorter and wider, as shown at 8. The upper end of the contracted portion of the opening serves as a valve seat for a valve 9, preferably hemispherical in form and provided with a stem 10 and having a disk-shaped head 11. The plug 5 is provided with a bracket 12 which may be secured to the plug by a ring-like member 13 surrounding the same and having a protecting flange 14 and resting upon shoulder 15 of the plug. The bracket 12 is provided with a pair of up-turned projecting lugs 16 having holes for the reception of a cotter pin 17. Pivotaly secured to the bracket 12 by means of the cotter pin 17 is the lid 18 having a flange 19, a handle 20, and a rearwardly projecting portion 21. The projecting portion 21 is provided with projecting lugs 22 which contain holes adapted to register with the holes in the projecting lugs 16 and to receive the cotter pin 17. The lid or cover 18 is pivotaly secured to the bracket 12 by means of the cotter pin 17 and a spring is provided for retaining the lid in either closed position, as shown in Fig. 1, or open position, as shown in Fig. 2. The spring has projecting lugs 23 provided with holes adapted to register with the holes in the projecting lugs 16 and 22 and to receive the cotter pin 17. The spring has a curved portion 24 and a flat portion 25. The flat portion 25 is adapted to press against the flat portions of the projecting lugs 22 of the lid 18, or against the end of the rearwardly projecting portion 21, in such a manner as to hold the lid in closed position, as shown in Fig. 1, and is also adapted to press against the flat rearwardly projecting portion 21 of the lid in order to hold the said lid in open position, as shown in Fig. 2. The valve 9 is loosely secured to the lid 18 by the device 26, shown in Fig. 4. The device 26 is channel-shaped, and is secured to the lid 18 by one flange in any suitable manner, as by means of the rivet 28. The channel-shaped part 26 is provided with an elongated slot 29 in its base and with a rounded opening 30 in the flange 34 which is not in contact

with the lid 18. The slot 29 and the rounded opening 30 are connected by a slot 31. The rounded opening 30 is slightly larger in diameter than the stem 10 of the valve. The slot 30 is of substantially the same width as the diameter of the stem 10 of the valve and the slot 29 has a length and width substantially equal to the diameter and thickness respectively of the disk-shaped head 11 of the valve 9. This construction permits the valve 9 to be placed in position in the device 26 in assembling the parts and permits said valve to have sufficient freedom of movement in the said device without liability of becoming disengaged therefrom. By proper manipulation, however, the valve 9 may be removed from the part 26. The flat surface of the flange 34 of the part 26 cooperates in an efficient manner with the flat upper surface of the valve 9 to reseat the valve in proper operative position. The upper edge of the plug upon which the lid 18 rests is provided with recesses or openings 32 in order to permit gases to escape from the opening 8 into the atmosphere.

My improved filling and gas valve may be made of any suitable material which is unaffected by the electrolyte used. When made for use with alkaline storage batteries, it is preferably made of nickel plated steel.

In Fig. 5 I have shown a modified arrangement of the spring for holding the cover or lid in position. In this modification, the curved portion 24' is placed above the rearwardly projecting portion 21 of the lid. The projecting lugs 23' of the spring extend downwardly and are provided with holes for the reception of the cotter pin. The flat portion 25' of the spring is adapted to press against the rear edge 34 of the bracket 12 when the lid is in closed position, and is adapted to press against the flat under portion 33 of the bracket 12 when the lid is lifted. It will be seen that in this modified arrangement of the spring, the entire spring is moved when the lid is raised.

When the spring is arranged as in Figs. 1, 2 and 3, the lugs 22 of the lid are located between the lugs 16 of the bracket 12, and when the spring is arranged as in Fig. 5, the lugs 16 of the bracket 12 are located between the lugs 22 of the lid. In this manner, friction between the spring and the parts moving relatively to it is reduced to a minimum.

The operation of my improved filling and gas valve is as follows: When it is desired to fill the battery cell with electrolyte or replenish the same with water, the lid is lifted and it is retained in raised position, as is shown in Fig. 2, by the spring, and at the same time the valve is moved out of its seat and out of line with the opening in the plug, so that the electrolyte or water may be easily poured through the opening in the plug. After filling or replenishing has been effect-

ed, the cover or lid is closed, and it is then retained in closed position by spring pressure, as is illustrated in Figs. 1 and 5. When gases are generated in the cell, as is the case particularly during charging, the valve 9 is lifted from its seat whenever the gas pressure becomes great enough, and the gases escape through the opening 7 around the sides of the valve 9 into the opening 8 and out through the openings 32 in the upper part of the plug and between the plug and the flanges 19 of the lid or cover. As the gases pass into the enlarged opening 8, their velocity is reduced and the mechanically entrained globules of electrolyte are deposited on the walls of the plug and other exposed surfaces, or are entrapped by the film of liquid covering the said walls and surfaces, and drip back into the cell.

By making the opening 7 in the lower part of the plug relatively long and narrow, the electrolyte is prevented from being splashed into the space above the valve when the battery cell is shaken or otherwise agitated, as may occur when such batteries are used upon automobiles or other vehicles. It is also to be observed that the cover 18 and its flange 19, together with the flange 14, are so arranged as to prevent dust, dirt, or other foreign matter from entering the cell. In fact cells provided with my improved filling and gas valve may be washed by means of a hose without causing any appreciable amount of water or foreign matter carried thereby to enter the cell. It is also to be noted that should an explosion take place within the cell, the cover being spring pressed, is enabled to open sufficiently to relieve the pressure and prevent the distortion or rupture of the containing can or vessel.

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

1. A combined filling and gas valve for a storage battery comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, and a cover for the opening of the plug, the said cover having a depending flange surrounding the top of the plug, the said plug and cover having an opening therebetween to permit escape of gas, and the valve being connected with the cover, whereby the valve is moved out of its seat when the cover is lifted, substantially as described.

2. A combined filling and gas valve for a storage battery comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, and a spring pressed cover for the opening of the plug, the said cover having a depending flange surrounding the top of the plug, the said plug and cover having an opening therebetween to permit escape of gas, and the valve being connected with the cover, whereby the

valve is moved out of its seat when the cover is lifted, substantially as described.

3. A combined filling and gas valve for a storage battery, comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, and a cover for the opening of the plug, and a spring adapted to retain the cover in either open or closed position, substantially as described.

4. A combined filling and gas valve for a storage battery, comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, and a cover for the opening of the plug, a spring adapted to retain the cover in either open or closed position, and means for connecting the valve loosely with the cover, substantially as described.

5. A combined filling and gas valve for a storage battery comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, a cover for the opening of the plug hinged thereon, the said cover having a depending flange surrounding the top of the plug, said plug and cover having an opening therebetween to permit escape of gas, and the valve being connected with the cover, whereby the valve is moved out of its seat when the cover is lifted, substantially as described.

6. In a storage battery, the combination of a plug having an opening therethrough, the said opening being narrow and elongated in the lower part of the plug and wide in the upper part, and the said plug being provided with a valve seat at the upper part of the narrow opening, a valve therefor, a cover for the wide portion of the opening, and a spring adapted to retain the cover in either open or closed position, substantially as described.

7. In a storage battery, the combination of a plug having a tubular opening therethrough, said opening being of sufficient extent to serve as a filling opening for the battery and being enlarged in the upper part of the plug to form a valve seat, a valve therefor, and means preventing the influx of foreign matter above the valve but permitting the efflux of gas therethrough, and including a hinged, spring-pressed cover having a depending flange surrounding and spaced apart from the exterior of the upper part of the plug, substantially as described.

8. A combined filling and gas valve for a storage battery comprising a plug having an opening therethrough and provided with a valve seat, a valve therefor, the lower portion of the valve having a substantially spherical surface for engagement with the valve seat, and a hinged cover for the opening of the plug, the valve being loosely connected with the cover, whereby the valve is permitted to be seated by gravity when the cover is closed and is moved out of its seat when the cover is lifted, substantially as described.

9. A combined filling and gas valve for a storage battery, comprising a plug having an opening therethrough of sufficient extent to serve as a filling opening for the battery and provided with a valve seat, a valve therefor, and a hinged cover for the opening of the plug, the valve being so connected with the cover that the valve is moved out of its seat to leave the opening unobstructed by movement of the cover on its hinge, substantially as described.

10. In a storage battery, the combination of a plug having an opening therethrough and provided with a valve seat, a valve therefor, a cover for the opening of the plug, and means for connecting the valve to the cover to insure the placing of the valve in proper operative position with respect to its seat when the cover is in closed position and to cause the valve to be moved out of its seat when the cover is lifted, substantially as described.

11. A combined filling and gas valve for a storage battery comprising a plug having an opening therethrough and provided with a valve seat, a gravity-seated valve therefor having a curved lower surface and a flat upper surface, and means for loosely connecting the valve to the cover, whereby the valve is moved out of its seat when the cover is lifted, said means having a surface adapted to cooperate with the flat upper surface of the valve to reseat the same in proper operative position when the cover is closed, substantially as described.

This specification signed and witnessed this 15th day of June, 1911.

WALTER E. HOLLAND.

Witnesses:

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