Jan. 1, 1929.

1,697,353

A. GARRISON

BATTERY CAP

Filed Aug. 22, 1927

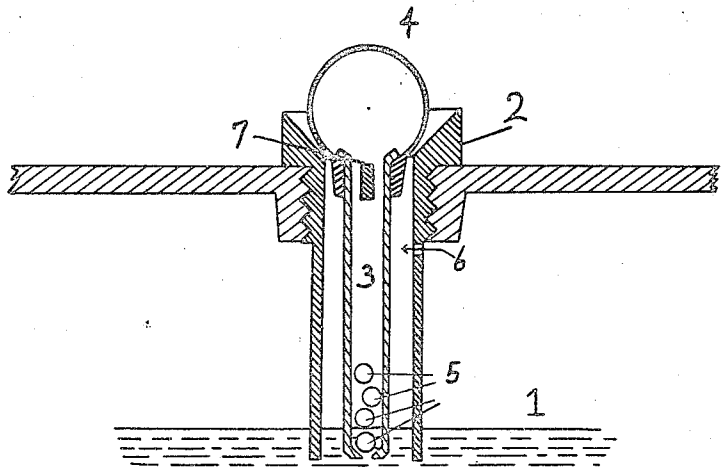


Fig 1

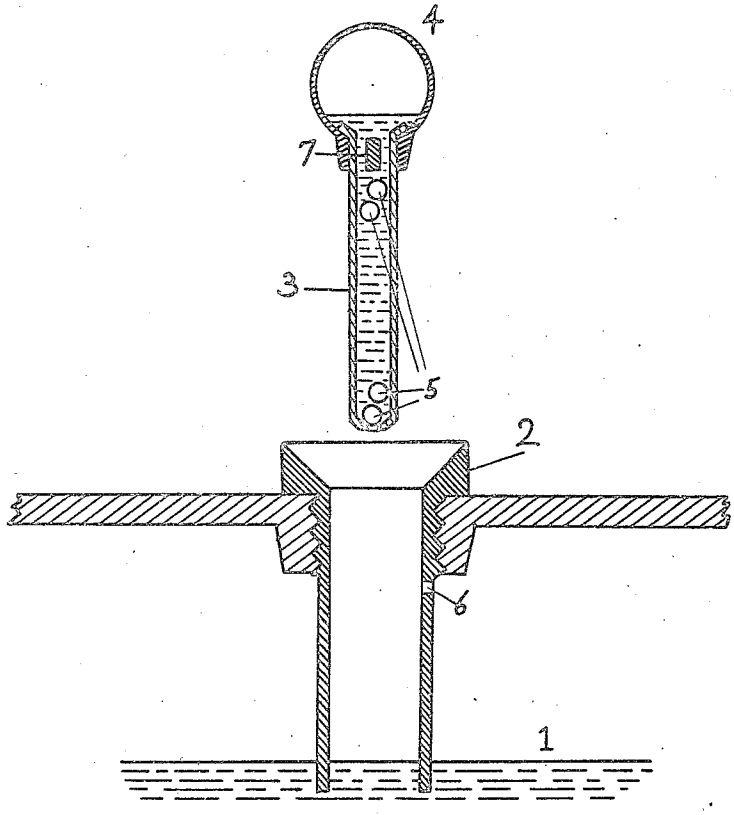


Fig 2

Inventor:

Allen Garrison.

Patented Jan. 1, 1929. 1,697,353

UNITED STATES PATENT OFFICE.

ALLEN GARRISON, OF HOUSTON, TEXAS.

BATTERY CAP.

Application filed August 22, 1927. Serial No. 214,660.

My invention relates to improvements in the caps on storage batteries. These caps are usually threaded so that they may be removed for testing the quantity and the composition of the liquid in the battery, and they usually have a small hole for the escape of gases generated in the battery. The objects of my improvements are, first, to provide in the filling opening of the battery a hydrometer, for conveniently testing both the specific gravity and the level of the liquid in the battery, without removing the cap; second, to cause the hydrometer to also serve as a valve, for the release of the gases, and as a baffle, for the condensation of liquid spray; third to attain these objects with a very simple and inexpensive device of few parts which occupies no more space than an ordinary battery cap.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a vertical section of the assembled device; Figure 2, a vertical section of the assembled device with the element which operates as combination hydrometer and valve lifted to the position assumed when inspecting the liquid in the battery.

Similar numerals refer to similar parts throughout.

(1) represents the liquid at approximately its normal level in the battery.

The cap (2) differs from the usual cap in two respects as follows: first, a cylinder constitutes the lower part of the cap, is of the same material as the cap and cast in one piece with it, and when in place in the battery, extends to a point just below the proper level of the liquid in the battery; second, the cap has a hole extending through it, of the same diameter as the inside of the cylinder and flared at its upper end to form a valve seat. It is upon this valve seat that the element operating as a valve and hydrometer rests.

The small opening (6), in the wall of the cap, above the level of the liquid in the battery, permits the gases and liquid spray to pass into the cap below the valve seat.

The shape of the top and the outside of the cap, above the valve seat, is not important in the operation of the device and may be varied to satisfy different requirements. The top of the cap illustrated is funnel shaped.

It is not important in the operation of the device that the cap be removable since the opening through the cap is large enough for the filling operation; therefore it is optional whether it be threaded as illustrated or cast in one piece with the cover.

The element comprisng the combination hydrometer and valve consists of a glass cylinder (3), tapered or otherwise partly closed at the bottom and just long enough to dip below the surface of the liquid when in operation; an elastic bulb (4); spheres of graded specific gravity (5), in the illustration there are four spheres; a plug (7) in the upper part of the glass cylinder to prevent spheres from entering the elastic bulb.

The glass cylinder and contents serve as a valve stem, the elastic bulb serves as a valve head and supports the weight of the element; the glass cylinder must be smaller than the opening in the cap leaving an annular space between it and the cap and the elastic bulb must fit snugly over the opening.

The shape of the elastic bulb, with the exception that it must fit the valve seat, is not important in the operation of the device, it may be made low and flat if a particularly low cap is desired. It may be made as low as the common variety of cap.

When the element is in place it completely closes the opening into the battery. The gases generated in the battery and entering the small hole (6) are automatically released by lifting the valve from its seat.

The liquid spray entering the small opening at 6 must change the direction of its course abruptly to enter the narrow annular space between the glass cylinder and the cap. The combination thus serves as a baffle and tends to condense any spray of liquid, the force of gravity causing it to flow back down along the walls of the annular space.

When the device is in place and one desires to inspect the level of the liquid or measure its specific gravity, the elastic bulb may be compressed, released and the element lifted for inspection. If the liquid in the battery is up to its proper level the glass cylinder will be filled with the liquid. The specific gravity of the spheres in the cylinder may be so graded that they will all float if the battery is fully charged, they will all sink if the battery is entirely discharged, and the relative number of spheres which float will give the relative charge in the battery if it is only partly charged.

I am aware that, prior to my invention,

hydrometers and valves have been combined in battery caps, and hydrometers have been made with the floating sphere principle. Therefore I do not claim these features broadly. The design of my invention is a distinct improvement over any previous devices in obtaining, first extreme simplicity of construction, second, economy of space, the height of the cap being no more than the common variety of cap designed only to close the filling opening.

I claim:

The combination, with a battery cap or with the filling opening of a battery, of an element consisting essentially of a glass cylinder, an elastic bulb attached to the glass cylinder and a hydrometer device contained in the glass cylinder, said element operating partly within the battery, the bulb closing the opening into the battery and held against the opening by the weight of said element.

ALLEN GARRISON.