

1256 478

PATENT SPECIFICATION

(11) 1256 478

DRAWINGS ATTACHED

- (21) Application No. 38401/70 (22) Filed 10 Aug. 1970
(31) Convention Application No. 12556 (32) Filed 12 Sept. 1969 in
(33) Sweden (SW)
(45) Complete Specification published 8 Dec. 1971
(51) International Classification H 01 m 1/06, 7/06, 45/06
(52) Index at acceptance H1B D10C D5 D8J



(54) IMPROVEMENTS IN VENT PLUGS FOR USE IN FILLING OPENINGS OF ELECTROLYTE-CONTAINING BATTERY CELLS

(71) I, BERTIL LENNART OLSSON, of 6 Halstorsvägen, S 212 32 Malmö, Sweden, a Swedish subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a vent plug of the kind (hereinafter called "the kind defined") which is intended for use in a filling opening of an electrolyte-containing cell of an electric storage battery and is provided with means for facilitating visual checking of the relative level of electrolyte in the cell.

Many batteries are used in motor vehicles and are placed so that they are rather difficult to inspect. Even when the batteries are easily accessible many car owners prefer to refrain from touching the batteries, especially the vent plugs.

The present invention is intended to provide an improved vent plug of the kind defined which does not necessitate the cycle of operations consisting of removing the plug, checking of the level of the electrolyte, adding water as required, and then reinserting the plug.

According to the present invention there is provided a vent plug of the kind defined and having two or more separate channels leading from the atmosphere outside the battery to the interior of the cell, wherein one of said channels extends through a frusto-conical protuberance.

The invention is defined in the Claims hereinafter and how it may be performed is described in more detail with reference to the accompanying drawing which shows a diagrammatic vertical section through an upper part of an electric storage battery provided with a vent plug according to the invention.

The battery shown comprises a number of lead plates 1 immersed in electrolyte 2 the surface level of which is designated as 3. A cover 4 is provided with a screw-threaded filling opening into which the vent plug according to the invention is screwed.

The vent plug comprises a screw-threaded

housing 5 made of non-transparent material. An annular cover 6 having diametrically opposite channels 7 and 8 is fixed in the top of the housing 5 and is also made of a non-transparent material. The housing 5 is provided with a number of openings 9. A rod 10 of generally cylindrical shape and made of a transparent material, for example polystyrene, is fitted in corresponding axial openings in the housing 5 and the cover 6. The housing 5 also comprises two vertically extending walls 11—shown in dotted lines—at opposite sides of the rod 10. Thus a partition separating the channel 8 from the channel 7 is formed partly by the rod 10 and partly by the walls 11. The lower end of the rod 10 is frusto-conical so that the angle of a cone surface 12 relative to the vertical direction is about 45 degrees. However, the lowermost portion 13 of the rod 10 is cylindrical and terminates in a horizontal surface.

The described vent plug will function as follows:

In case the level 3 of the electrolyte 2 is above the cone surface 12 as shown in the drawing, all the light transmitted into the battery cell through the rod 10 will be passed into the electrolyte 2 and no light will be reflected. Thus the upper end surface of the rod 10 will be fully dark and have the appearance of a black disc in the middle of the cover 6.

In case the level 3 of the electrolyte is below the cone surface 12—either at the cylindrical portion 13 or below the said cylindrical portion 13—the cone surface 12 will reflect much of the incoming light and the upper end surface of the rod 10 will appear as a brilliant annular surface having a black spot at the centre. The black spot appearance is caused by the plane end surface of the cylindrical portion 13 which will not reflect much light—whether it is immersed in liquid or not.

Distilled water may be supplied through the channel 8 as a flexible tube or spout can easily be applied to a frusto-conical protuberance 14 through which the channel 8 extends, and

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the channel leading therefrom through the openings 9 to the interior of the cell, while a corresponding amount of air may escape through the other channel 7. During the filling the apparent size of the black spot will increase and as soon as the appearance of the brilliant annular surface has disappeared the level 3 is correct.

Various modifications may be made, for example there may be two or more openings 7 for the escape of air.

WHAT I CLAIM IS:—

1. A vent plug of the kind defined and having two or more separate channels leading from the atmosphere outside of the battery to the interior of the cell, wherein one of said channels extends through a frusto-conical protuberance.

2. A vent plug according to Claim 1, characterised in that a partition separating one of the said channels from the rest is partly formed by a generally cylindrical rod of transparent material and the remaining walls of the channels are made of non-transparent material.

3. A vent plug according to Claim 1 or 2, characterised in that it comprises a transparent rod, the lower end of the transparent rod being frusto-conical and terminating in a smaller cylindrical portion having a plane surface parallel to the surface of the electrolyte.

4. A vent plug of the kind defined, constructed and arranged substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1971.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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