

Nov. 3, 1953

T. L. KENDALL

2,658,100

VENT CAP

Filed May 29, 1951

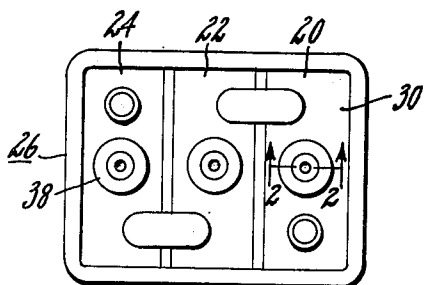


Fig. 1

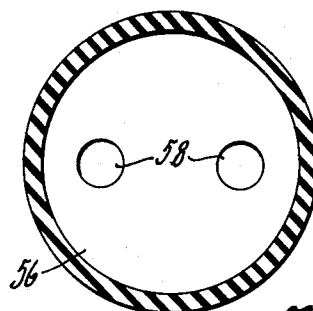


Fig. 4

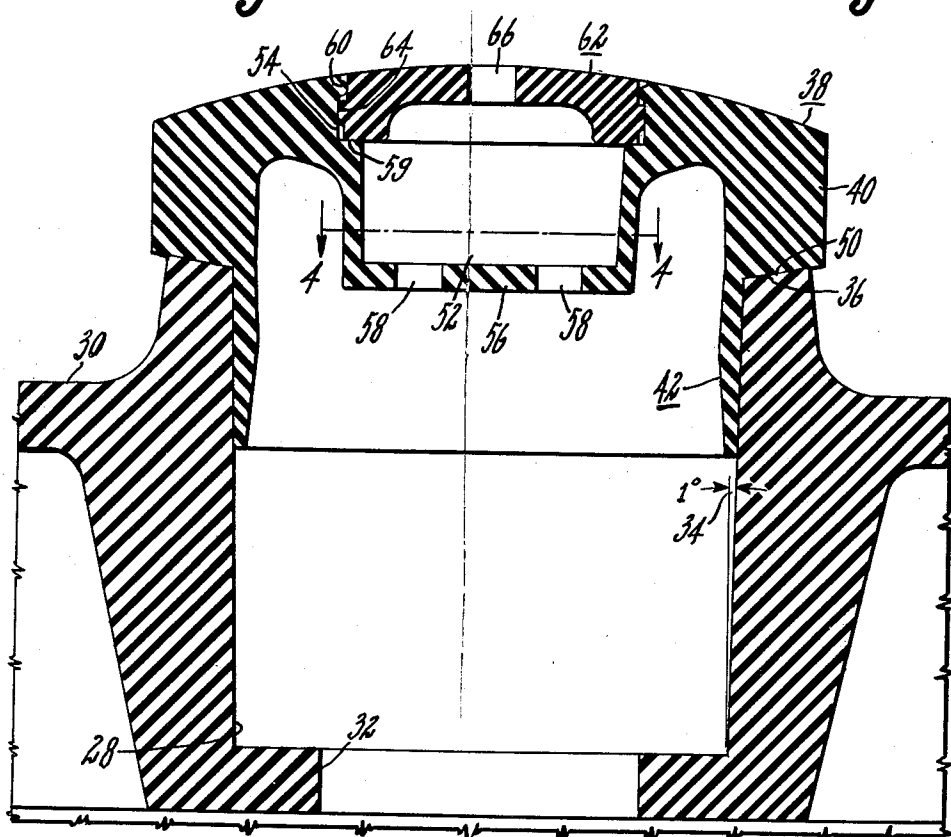


Fig. 2

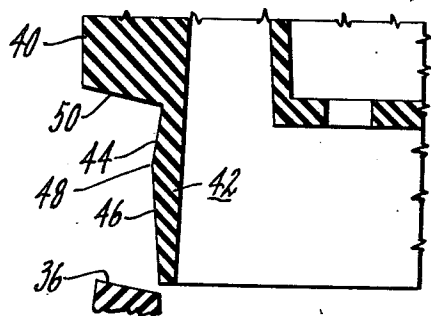


Fig. 3

INVENTOR.
 THOMAS L. KENDALL
 BY *Willis H. Anderson & J. E. Fel*
 his ATTORNEYS

UNITED STATES PATENT OFFICE

2,658,100

VENT CAP

Thomas L. Kendall, Muncie, Ind., assignor to
General Motors Corporation, Detroit, Mich., a
corporation of Delaware

Application May 29, 1951, Serial No. 228,825

2 Claims. (Cl. 136—177)

1

This invention relates to a vent cap for a storage battery cell cover and is particularly concerned with a vent cap which is inexpensive to fabricate and which eliminates the necessity of threads in the cell cover and on the vent cap.

It is, therefore, an object of the present invention to provide a vent cap for a storage battery cell cover wherein the vent cap is formed from a resilient material, such as polyethylene, and wherein the said cap, due to the peculiar formation of the annular skirt thereof, is a tight, sliding fit into the cell cover filler hole opening whereby threads are eliminated.

In carrying out the above object, it is a further object to provide the skirt of the vent cap with a reverse taper wherein the central portion of the skirt is the greatest diameter and wherein the smallest diameter portion of the taper is substantially equal to the diameter of the filler hole opening whereby when the cap is forced into the filler hole opening, the skirt firmly grips the cell cover and holds the cap in place while sealing the cell against spilling or leaking.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein preferred embodiments of the present invention are clearly shown.

In the drawing:

Fig. 1 is a top plan view of a conventional storage battery.

Fig. 2 is an enlarged, fragmentary, sectional view taken on line 2—2 of Fig. 1, with the cap in place.

Fig. 3 is an enlarged, fragmentary view similar to Fig. 2, showing a portion of the cap and the cell cover with the cap removed therefrom.

Fig. 4 is a view in section taken on line 4—4 of Fig. 2.

Conventional practice in storage battery manufacture is to provide a filler opening for each cell in the battery, said filler openings being carried by and formed in the cell covers. Conventional automotive batteries generally include three cells as shown in Fig. 1 at 20, 22 and 24 which are series connected and contained in a case to form the completed battery 26. Each cell includes a filler opening as shown in Fig. 2 at 28 through which water and/or acid may be added to the cell as required. This filler opening 28 is in effect a depression in the cell cover 30 and includes an opening 32 at the lower end thereof. The walls of the opening 28 are tapered as at 34 and the upper surface of the opening 28 is tapered inwardly as at 36. The filler cap 38 includes two

2

portions, namely, an upper body portion 40 and an annular skirt 42 dependent thereupon. The skirt 42, as noted in Fig. 3, includes reversed tapers 44 and 46 thereon, both meeting on a common annulus, as at 48, which point is the greatest diameter of the skirt 42. This diameter 48, is greater than the inner diameter of the opening 28, whereas the smallest diameter of tapered portions 44 and 46 is substantially equal to the largest diameter of the filler opening 28. In this manner, as the cap is placed into the opening, it is a tight sliding fit whereby the largest diameter portion 48 causes a binding action which holds the cap in position. When in position, the inside wall of the skirt 42 takes a form similar to that shown in Fig. 2. The body portion 40 of the cap has a shoulder 50 thereon which is tapered a similar angle as the taper on surface 36 so as to form a tight seal therewith. The outer periphery of the portion 40 may be knurled or otherwise shaped so that a good grip may be obtained thereon so that the cap 38 may be removed from the cell cover when desired.

In the body portion 40 of the cap 38 there is formed a depression 52 which includes a groove 54 therearound adjacent the upper part thereof and a horizontal wall 56 at the lower end of the depression. The wall 56 includes a plurality of openings 58 therein which are vent holes. The groove 54 is formed by a shoulder 59 and a ring-like protuberance 60. Into this groove 54 is snapped a disc 62 which has an annular ring 64 therearound of a diameter greater than the diameter of the protuberance 60 so as to interlock therebeneath. The disc 62 bottoms on shoulder 59. It is apparent that this construction may be varied considerably with similar results.

The disc 62 includes a central aperture 66 therethrough and in this connection it is important that this aperture 66 is staggered or misaligned with respect to the vent openings 58 in the horizontal wall 56. This design is followed so that mist or spray from the cell is baffled so as not to be vented through the opening 66. It is apparent that two or more openings may be used in both the wall 56 and disc 62, such modifications being a matter of choice, but in all cases, any opening, such as 66 in disc 62, must be misaligned with the openings 58 in the wall 56.

The vent cap 38, as disclosed herein, eliminates many problems in the manufacture of both the cell cover and the vent cap. The molding of threads is difficult and produces production problems which are completely eliminated here. The use of gaskets and similar sealing devices are also

3

eliminated since the cap is of a resilient nature and may be forced down into tight sealing relation with the cell cover whereupon a peculiar design of the skirt 42 thereof holds the cap in position.

The cap is easily removed and replaced which facilitates maintenance operations when the battery is installed in close quarters, such as in trucks and buses. A still further advantage resides in the fact that screw type caps frequently become loose through vibration and become lost, permitting acid spray to corrode the surrounding battery compartments. In the present instance, due to the resilient nature of the cap, it is maintained in place under many and all operating conditions and such problems are therefore eliminated.

It is to be understood here that although polyethylene, such as is sold under the trade name "Polythene" (extrusion grade) is preferred in the manufacture of this cap, other resilient materials, such as rubber, either natural or synthetic, and other resilient plastics may be used, providing the resiliency is properly controlled and providing the material used is acid resisting and does not age harden appreciably.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In combination with a storage battery cell cover having a filler hole opening which includes inwardly tapered side walls toward the bottom thereof and an inwardly tapered upper surface peripherally arranged therearound, a vent cap for use with said cell cover made from resilient material and comprising a body portion consisting of the upper part of said cap and of a diameter greater than the diameter of the said filler hole and having a lower surface with a taper thereon similar to the taper on the upper surface around said filler hole, said body portion having a centrally disposed depression therein including a plurality of vent holes therethrough, said depression including an annular groove therearound adjacent the upper part thereof, a disc adapted to be snapped into said groove, said disc having an aperture therethrough which is out of alignment with the vent holes in said central depression, and an annu-

4

lar skirt integral with the body portion and having an appreciable length and including a smooth tapered inner bore and opposed external tapers thereon, both of which have their greatest diameter at the central part of said skirt, said greatest diameter being larger than the diameter of the filler hole opening whereby the skirt is a tight sliding fit within the filler hole opening.

2. A vent cap for use in combination with a storage battery cell cover which includes a filler hole therethrough having a slightly tapered wall therein with the largest diameter portion adjacent the top of the cell cover, said vent cap comprising in combination, a resilient polyethylene body member consisting of upper and skirt portions, the upper portion thereof being of a diameter greater than the diameter of said vent hole opening and the skirt comprising an annular outer wall having reversed tapers thereon with the greatest diameter being at the central point of said skirt and a smooth tapered inner bore, said skirt being a tight sliding fit into the filler plug opening wherein the diameter thereof is less than the greatest diameter of said skirt, a downwardly extending cavity carried by the body portion including an annular groove therearound adjacent the top and a horizontal wall at the bottom thereof, said wall including a plurality of vent holes therethrough, and a disc adapted to be snapped into said groove for holding the disc in place, said disc having an aperture therethrough which is misaligned with said vent holes.

THOMAS L. KENDALL.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,367,594	Ford	Feb. 8, 1921
1,368,817	Marko	Feb. 15, 1921
2,558,654	Kendall et al.	June 26, 1951
2,571,893	Kendall	Oct. 16, 1951

FOREIGN PATENTS

Number	Country	Date
225,334	Great Britain	Dec. 4, 1924
706,854	France	Apr. 4, 1931
906,666	France	May 22, 1945