

Sept. 4, 1928.

E. C. SMITH

1,682,995

DRY CELL

Filed Feb. 10, 1927

Fig. 1.

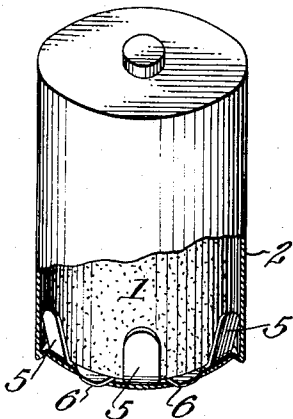


Fig. 2.

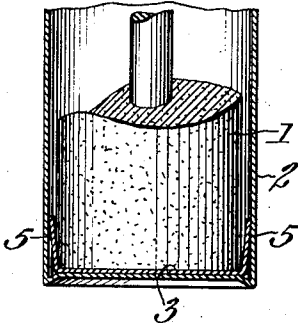


Fig. 3.

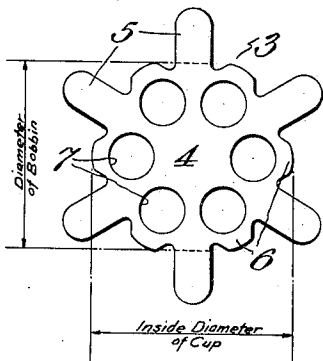
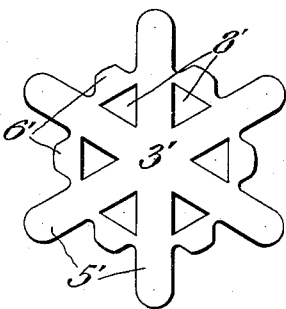


Fig. 4.



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## UNITED STATES PATENT OFFICE.

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## DRY CELL.

Application filed February 10, 1927. Serial No. 167,257.

This invention relates primarily to centering and insulating means for dry cell depolarizing bobbins. More particularly, the invention comprises an improved insulating spacer adapted to receive the bottom of the bobbin and to hold it positively in central position in the zinc container electrode, while permitting a portion of the bottom of the container to be utilized as active electrode surface.

In U. S. Patent 1,585,077, Briggs discloses a spacer for depolarizing bobbins which has corners for engaging the side walls and which carries flexible members for engaging the bobbin. This spacer is commonly made of an insulating material and as a result a variable amount of electrolytic action occurs between the central electrode and the bottom of the container.

I have found that by the use of a skeleton or perforated spacer it is possible to increase the life of the cell due to the fact that a considerable part of the zinc bottom is exposed to chemical action, and experiments have shown that this construction not only adds to the life of the cell but gives a greater uniformity of service.

An object of my invention is to produce a dry cell in which the bobbin shall be accurately centered and which shall have a longer life, due to the fact that a portion of the area of the zinc bottom is used as an electrode.

This and other objects of my invention will be evident from the following description, taken in connection with the accompanying drawings in which

Fig. 1 is a perspective view of a dry cell including the improved spacer, the zinc cup being partly broken away;

Fig. 2 is a vertical section through the cell of Fig. 1;

Fig. 3 is a plan view of the spacer as it appears before insertion in a cell; and

Fig. 4 is a view similar to Fig. 3, showing a modified form of spacer.

Referring to Figs. 1 to 3, numeral 1 denotes a mix bobbin inserted in a zinc cup 2 and adapted to be embedded in electrolyte paste, not shown. The spacer 3, in which the present invention resides, comprises in a preferred form a sheet 4 of suitable insulating material having tangs 5. The sheet has approximately the outline and dimensions of a hexagon inscribed in a circle

having a diameter approaching the inner diameter of the cup. The rounded corners 6 on the sheet therefore lie closely adjacent to the wall of the cup and lateral movement is prevented. Further, the tangs when upturned define a seat adapted to receive snugly a bobbin of average size. The bobbin is accordingly retained in the desired central position, since its seat is positively centered by engagement of the spacer with the cell wall.

In order to utilize part of the bottom of the container as active electrode surface, I provide the central disc of the spacer with a number of perforations 7. These may be of any convenient size and shape, but I have found that if they have an area of about one quarter of that of the entire central disc good results in lengthening the life of the battery are obtained and there is no tendency to weaken the spacer to such an extent as to impair its utility in centering the bobbin.

While the holes may vary in size, shape, number and arrangement, I have found such an arrangement as shown in Fig. 3 very satisfactory. I have illustrated another arrangement in Fig. 4, in which 3' is a spacer having tangs 5', corners 6' and triangular holes 8'. I may use a large number of small holes evenly distributed over the entire area of the disc. I prefer not to have a hole in the center of the disc since the central electrode might be driven through this hole against the zinc and cause an internal short circuit. Also, since the protruding end of the electrode of one cell often engages with the bottom of the next cell at the center, it is desirable that there should be no chemical action at the center.

In order to reinforce the bottom of the cell the bottom of the cup may be thickened or reinforced, as described in an application of G. W. Heise and E. A. Schumacher, Serial No. 680,249, filed December 12, 1923.

The spacer may be placed in the bottom of the zinc cup before pouring in the electrolyte paste and inserting the bobbin, but the preferred method of assembly is as follows: The required amount of paste is poured into the cup, the spacer is pushed into the cup to a point about one-half inch below its brim, and the bobbin is then placed on the spacer and forced into the cup. The paste flows upward between the

tangs into operative position about the bobbin. Other procedures are suitable such as fitting the spacer over the bobbin before inserting it in the cup.

- 5 My improved spacer is especially adapted for use with dry cell bobbins not provided with surface protecting means. The spacer tends to prevent the bottom of the bobbin from crumbling, which frequently occurs  
10 when unprotected bobbins are used. The spacer is of course advantageous in other constructions including wrapped bobbin assemblies. While primarily intended as a spacing and centering means for small dry  
15 cells of the Le Clanche type, the improved spacer may be used with numerous other cells in which similar results are sought.

I am aware that it has been proposed to make the spacers of a pervious material but  
20 in order to expose the bottom of the cup to electrolytic action the spacers must be inserted while wet. Wet pulpboard spacers can not be handled by machinery as dry jute board spacers can. Thus it will be  
25 evident that I have devised a battery which will have as long a life as one employing a wetted pervious spacer, which can be assembled by machinery and which will center the bobbin more certainly.

30 I claim:

1. A galvanic cell comprising a container electrode, a depolarizing bobbin therein, and a spacer comprising a sheet having edge portions adapted to engage the side walls of  
35 the container electrode, said sheet having tangs upturned between the edge portions and adapted to receive the bobbin snugly therebetween, said spacer having perforations in the portion below the bobbin.

- 40 2. A galvanic cell comprising a container electrode, a depolarizing bobbin therein, a spacer comprising a member with marginal portions lying substantially on the circumference of a circle having a diameter ap-  
45 proaching the inner diameter of the con-

tainer electrode, whereby substantially lateral movement in said container electrode is prevented, said member having further marginal portions defining a central area approximating that of the base of the bobbin  
50 and adapted to retain the same in such central area, said spacer also having perforations in said central area.

3. A dry cell comprising a zinc cup, a depolarizing body therein, a spacer comprising  
55 a sheet having in general the outline of a polygon inscribed in a circle of a diameter approaching the inner diameter of the cup, said sheet having perforations within the polygon, said sheet also having bobbin retaining portions thereon defining a central  
60 area approximating that of the base of the bobbin and adapted to retain the same in such central area.

4. A dry cell comprising a zinc cup having a thickened bottom, a depolarizing bobbin therein, a spacer comprising a generally hexagonal perforated sheet of insulating material shaped to fit snugly within the cup and  
65 having tangs thereon at points between the vertices of the hexagonal defining a central seat for the bobbin.  
70

5. A dry cell comprising a zinc cup having a thickened bottom, a depolarizing bobbin therein, a spacer comprising substantially  
75 rigid portions adapted to engage the side walls of the cup and to fit snugly therein, and flexible portions adapted to bend upwardly about the bobbin and hold it in central position, said spacer being provided with  
80 perforations in said rigid portion.

6. A dry cell comprising a zinc cup, a depolarizing bobbin therein, a spacer comprising a perforated member of relatively stiff  
85 insulating material having portions adapted to contact with the side walls of the cup, and flexible portions defining a central seat for the bobbin.

In testimony whereof, I affix my signature.

EDWARD C. SMITH.