No. 869,446. PATENTED OCT. 29, 1907.

P. L. MEYER.

PROCESS FOR MAKING DRY CELLS

APPLICATION FILED FEB. 19, 1906.

Fig. 1.

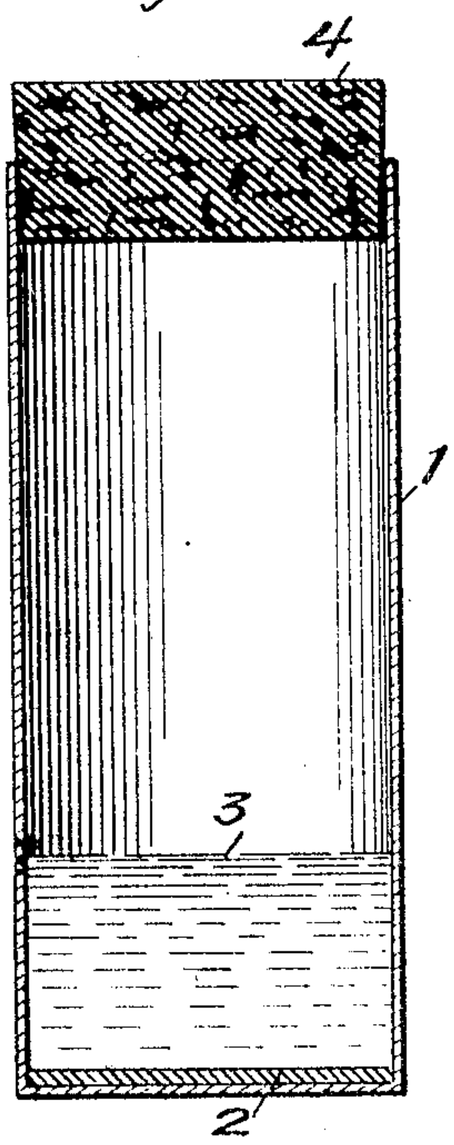


Fig. 2.

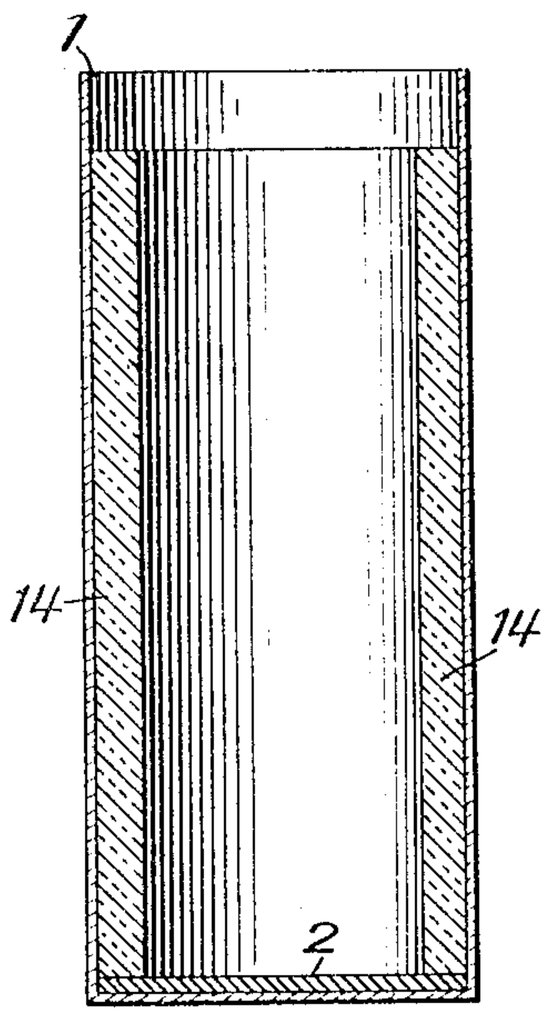


Fig. 3.

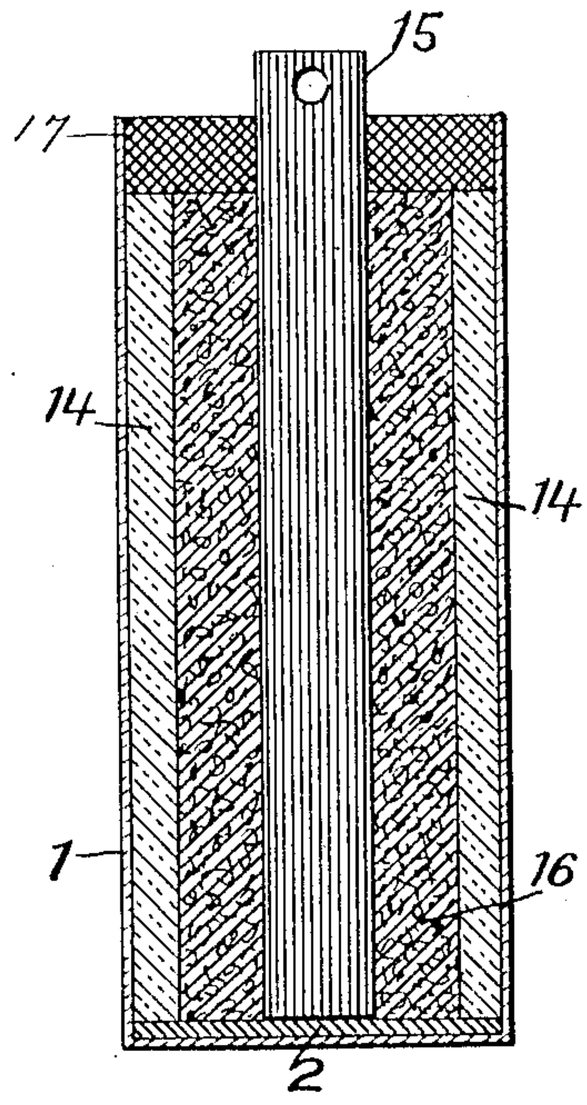


Fig. 4.

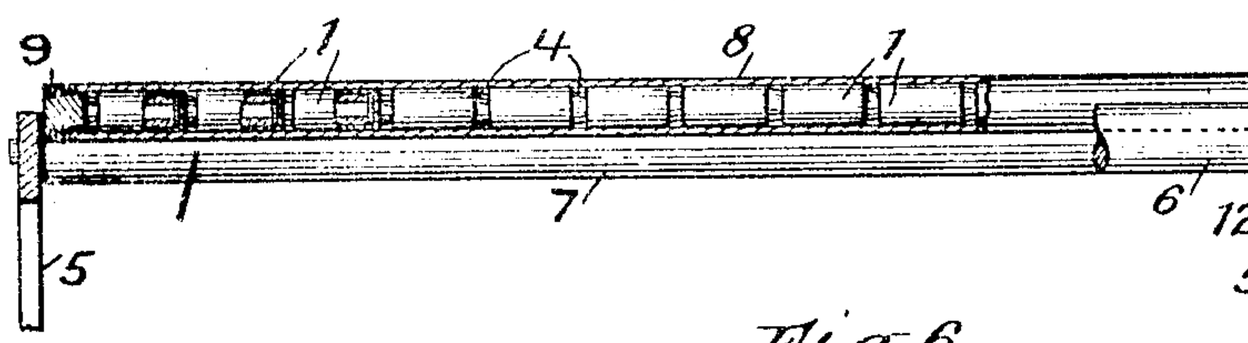


Fig. 5.

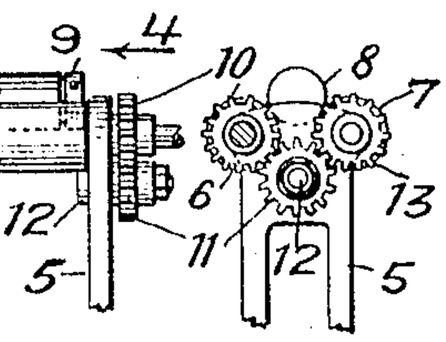
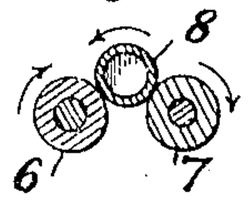


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PROCESS FOR MAKING DRY CELLS.

No. 869,446. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed February 19, 1906. Serial No. 301,962.

To all whom it may concern:

Be it known that I, PAUL L. MEYER, a citizen of France, residing at New York city, county of New York, and State of New York, have invented certain new and useful Improvements in Processes for Making Dry Cells, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates generally to improvements in dry cells for batteries and to a method or process of making the same. These dry cells as now usually constructed, comprise a cylindrical zinc receptacle which acts as the negative pole element of the cell and which also forms a holder or container for the contents of the cell. The positive pole element of the cell, usually a carbon rod, is positioned in this zinc receptacle embedded in a depolarizing agent, black oxid of manganese mixed with powdered graphite being ordinarily used, this depolarizing agent being kept from contact with and insulated from the zinc by a layer of plaster of paris interposed between the inner surface of the zinc and the cup (usually of blotting paper or the like) containing the depolarizing agent and carbon. This plaster of paris layer, in addition to its function as a separator or insulator, acts also as a carrier for the electrolyte, the electrolyte being mixed or combined with the plaster when the latter is in a plastic state.

In the methods heretofore employed of forming and positioning the layer of plaster of paris and electrolyte in the cells, a small quantity of the composition is first placed in the zinc receptacle in a plastic condition, usually as a thick paste. The carbon element is embedded in the depolarizing agent which is held in a containing cup or shell of blotting or other porous paper. This paper cup or shell is placed in the zinc receptacle and forced down into the composition which is thus forced upwardly between the paper cup and zinc receptacle. More composition sufficient to fill the cell to the required height is then added, and when it has set, the cell is completed by sealing it up with a tar or pitch seal. This method of making the cell is objectionable and has many serious defects and disadvantages. Unless a great degree of care is used in placing the paper cup or shell containing the carbon and the depolarizer in the zinc receptacle, the cup is not centered, so that the composition is not evenly distributed vertically or horizontally around the cup. Again, the density of the composition varies throughout the cell owing to variations in the viscosity of the successive portions introduced successively into the space between the zinc cell and paper cup, these variations in density interfering with the proper working of the cell. Again this method of putting the composition in the zinc receptacle causes the formation of air holes or air cells in the layer when dried, the presence of which is a serious defect for the reason that the depolarizing agent is very liable to come in contact with the zinc, the effect of such contact being to short circuit the cell and stop its action, the zinc and carbon elements being connected through the depolarizer. Furthermore, this method of building up the cell is very slow and tedious, and, therefore, expensive. These difficulties are overcome by the present invention which provides a method or process by which the zinc container or receptacle is first lined with the composition of plaster and electrolyte so that the lining will be uniformly distributed over the inner surface of the said container or receptacle, will have a uniform density, and, furthermore, so that it will be free from air holes or air cells; such method also resulting in a much more rapid and economical preparation of the cell than is possible by the methods now in use.

For a full understanding of the invention, reference will now be had to the drawings, which show one means for carrying out the process or method of the invention and the product formed by the process, and in which—

Figure 1 is a vertical section of a cell showing the zinc receptacle supplied with the composition with which it is to be lined. Fig. 2 is a similar section of a cell showing the lining formed on the inner surface of the cell. Fig. 3 is a similar section of a completed cell. Fig. 4 is a horizontal section of a mechanism which may be used in the process of lining the cell, certain parts being broken away. Fig. 5 is an end view thereof looking in the direction of arrow 4, Fig. 4. Fig. 6 is a diagrammatic view showing the direction of movement of the turning rolls.

In the drawings, the cylindrical zinc receptacle forming the container or holder for the contents of the cell and acting as the negative pole element, is indicated by the numeral 1.

2 indicates an insulating medium, which may be a paper disk which has been waxed or paraffined, the function of this disk being to insulate the carbon element from the zinc. In carrying out the process, this disk is first placed in the bottom of the zinc receptacle, as shown in Fig. 1. The lining composition of plaster of paris or other suitable material with which a sufficient amount of electrolyte has been mixed, is then placed in the zinc receptacle, the composition being in a suitably fluent condition, a very fluent condition being preferred as the composition, when in such condition, is distributed more evenly and uniformly vertically and horizontally of the receptacle. This lining composition is marked 3 (Fig. 1) and fills the ordinary sized receptacle a little less than one third, as shown in Fig. 1, such an amount in practice having been found sufficient. The receptacle 1 is then temporarily closed or sealed up by a removable sealing means, such, for instance, as an ordinary wood or cork plug 4, shown in Fig. 1, by which the composition is kept within the receptacle. As shown in Fig.

l this seal or plug 4 sets down in the receptacle so that the lining when formed will not reach quite to the top of the cell, as shown in Fig. 2, the purpose of this being to provide a place above the lining for the tar or pitch by which the cell is finally sealed up.

The plastic composition having been placed in the zinc receptacle and the latter sealed up with the temporary seal, the receptacle is then rapidly rotated on its axis to subject the composition to the action of centrifugal force, the effect of this force being to spread or distribute the lining over the inner surface of the receptacle. Any suitable means may be employed for rotating the receptacle, but the means shown in Fig. 4 are preferably employed, as by this means a large number of the receptacles may be rotated simultaneously. As shown these means comprise a pair of suitably supported standards 5, in which are journaled a pair of rolls 6, 7, the roll 6 being shown as the driving roll. Resting on these rolls, 6, 7, as shown in Fig. 6, so as to be rotated frictionally thereby, is a hollow tube 8, in which tube the receptacles 1 are placed on their sides, the ends of the tube 8 being closed and the receptacles being held therein by a plug or plugs 9. The driving roll 6, driven from any suitable source of power, is provided with a gear 10 which meshes with an intermediate gear 11 on a short shaft 12 mounted in standards 5. This intermediate gear 11 meshes in turn with a gear 13 on the roll 7 and drives the latter, the rolls 6, 7, thus having the same speed of rotation. The rotation of the tube 8 is continued until the plaster lining has set or hardened sufficiently to prevent it running, or changing its position, which under ordinary conditions is from two to three minutes. The receptacles are then removed from the tube and the temporary sealing corks or plugs removed. Each of the receptacles is now in the condition shown in Fig. 2, having a lining 14 of plaster and electrolyte, evenly distributed and of a uniform density over its inner side walls, the bottoms of the receptacle being without any of the lining, substantially no plaster sticking thereon. The receptacle thus lined is now ready to receive the carbon rod and the depolarizing agent. The carbon rod 15 is placed in the receptacle and the depolarizer 16 firmly tamped in position around the rod, the carbon being insulated from the zinc by the disk 2 as before stated. As shown in Fig. 3 the depolarizer extends upward only as high as the lining. The space above the lining and the depolarizer and below the top of the zinc is then filled in with a seal of tar, pitch or other resinous substance 17, the whole cell being then incased in a paper shell as is usual in this type of cells.

While the substance employed for lining the receptacle has been defined in the claims as being plaster of paris, it will be understood that other suitable substances of like character may be employed in carrying out the invention.

What I claim is:—

1. The herein described method of constructing a dry cell which consists in first placing in the receptacle constituting the negative pole electrode of the cell a charge of a composition of plaster of paris in a suitably fluent condition, rotating the receptacle on its axis till the composition has set to distribute the composition by centrifugal action, positioning the carbon and the depolarizing agent in the receptacle, and then sealing the receptacle up.

2. The herein described method of constructing a dry cell which consists in first placing in the receptacle constituting the negative pole electrode of the cell a charge of a composition of plaster of paris in a suitable fluent condition, temporarily closing the receptacle, rotating the receptacle on its axis till the composition has set to distribute the composition by centrifugal action, positioning the carbon and the depolarizing agent in the receptacle, and then sealing the receptacle up.

3. The herein described method of constructing a dry cell which consists in first placing in the receptacle constituting the negative pole electrode of the cell a charge of a composition of plaster of paris in a suitably fluent condition, temporarily closing the receptacle, rotating the receptacle on its axis till the composition has set to distribute the composition by centrifugal action, opening the receptacle, and then when the lining has sufficiently hardened positioning the carbon element and the depolarizing element in the receptacle, and then sealing the receptacle up.

4. An element for a dry cell battery consisting of a zinc receptacle and a lining of plaster of paris and an electrolyte, said composition adhering to and being supported solely by the inner wall of the receptacle and being centrifugally deposited thereon.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

PAUL L. MEYER.

Witnesses:
P. B. PHILIPP,
J. A. GRAVES.