H. DE OLÁNETA.

MANUFACTURE OF DRY CELLS.

APPLICATION FILED APR. 1, 1920.

1,430,727. Patented Oct. 3, 1922.

2 SHEETS—SHEET 1.

Fig. 1

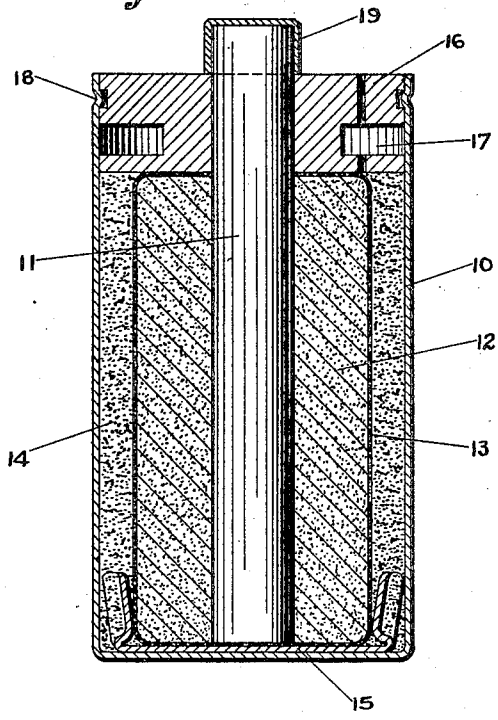


Fig. 3.

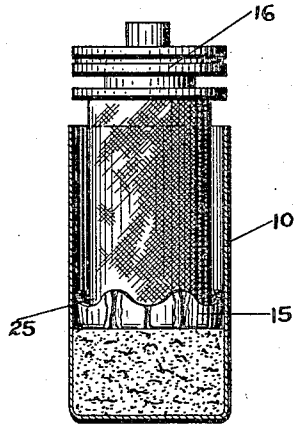


Fig. 4.

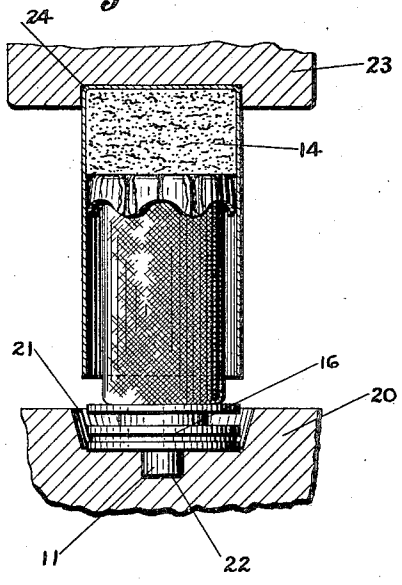
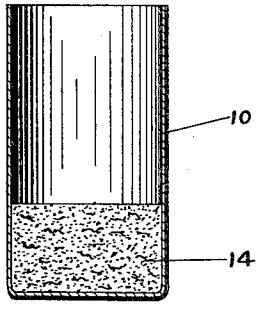


Fig. 2.



Inventor

Manuel de Oláneta

By

Attorney

H. DE OLANETA.

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2 SHEETS—SHEET 2.

Fig. 5.

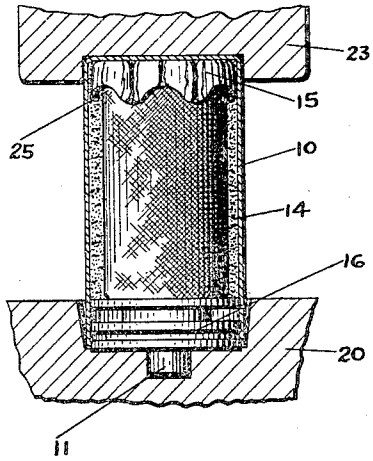


Fig. 6.

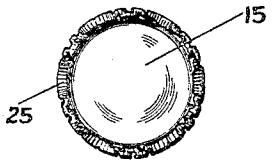


Fig. 7.

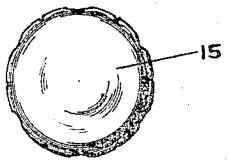


Fig. 8.

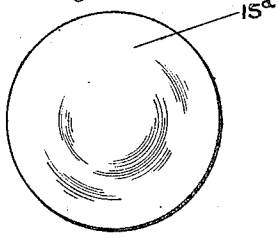
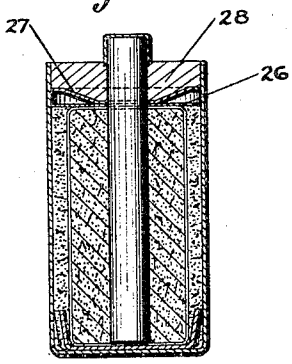


Fig. 9.



Inventor

Manuel de Olaneta

By Albert G. Davis

Attorney

Patented Oct. 3, 1922. 1,430,727

UNITED STATES PATENT OFFICE.

HAROLD DE OLANETA, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO WINCHESTER REPEATING ARMS COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MANUFACTURE OF DRY CELLS.

Application filed April 1, 1920. Serial No. 370,610.

To all whom it may concern:

Be it known that I, HAROLD DE OLANETA, a citizen of the United States, residing in New Haven, New Haven County, Connecticut, have invented certain new and useful Improvements in the Manufacture of Dry Cells, of which the following is a full, clear, and exact description.

This invention relates to dry cells, and is particularly applicable to dry cells of the pocket or miniature type, such as commonly employed in connection with pocket flash-lights, although the invention is not necessarily limited in this respect.

The invention pertains more especially to the method of assembling the several parts of the cell.

One of the primary objects is to provide a simple, convenient and economical method of assemblage.

Another object of the invention is to furnish an improved method of combining the cell parts in cases where a comparatively large cartridge, or in other words, a cartridge of considerable diameter, is used in the zinc cup, with a centering device in the lower end of the cup for centering the cartridge therein, and an electrolytic paste substantially filling the space between the side surface of the cartridge and the inner surface of the side wall of the cup.

Still another purpose which I have in view is the provision of a method whereby the paste can be handled very neatly and conveniently, so that the work of assembling can be done with cleanliness and despatch. The method is very efficient and by its employment the cell itself is improved.

To these and other ends the invention consists in the novel features and steps and procedure to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a vertical central section on an enlarged scale of a flash-light dry cell, made in accordance with the invention,

Fig. 2 is a section on a smaller scale, illustrating the first step,

Figs. 3, 4 and 5 are diagrammatic sectional views illustrating further steps in the assemblage of the parts,

Fig. 6 is a top plan view of the bottom centering disk,

Fig. 7 is a bottom view of said disk,

Fig. 8 shows a blank from which the bottom centering disk is constructed, and,

Fig. 9 is a sectional view of a dry cell of somewhat modified type, in the manufacture of which the invention can be practiced.

Referring to the drawings, and more especially to Fig. 1, it will be observed that I have shown a form of dry cell, in the assemblage of which my new method may be employed to advantage. The zinc cup 10, constituting one electrode, contains a carbon pencil 11, constituting the other electrode. The carbon electrode carries a depolarizing cartridge 12, consisting of suitable depolarizing material tamped about the carbon in order to form a block or cartridge adhering to the same. The cartridge is preferably contained within a porous envelope, such as a bag 13 of cheese-cloth or the like. Between the side surface of the cartridge and the inner surface of the side wall of the zinc cup, is a suitable electrolytic paste 14. In the bottom of the zinc cup is a centering disk 15, which centers the cartridge in the cup or receptacle. At the top of the zinc cup the same is closed in any appropriate manner. In the particular form shown in Fig. 1, the cup is closed at the top by a preformed plug 16 of insulating fibre or other suitable material, constructed as described in my application, Serial No. 321068, said plug having a peripheral gas chamber 17 therein, as disclosed in said application, and being likewise provided with a groove 18, into which the upper end portion of the zinc cup is spun or crimped, as set forth in that application; but it will be seen from the following description that the invention is not limited to the use of such a plug. On the upper end of the carbon electrode 11, is the usual brass contact cap 19.

In assembling the cell, a measured quantity of the paste 14 is first placed in the bottom of the cup 10, so as to fill the same up to a certain level, as shown in Fig. 2. The carbon electrode 11, carrying the cartridge 12, has the centering disk 15 applied to the lower end of the same and the two

elements, that is to say, the cartridge and the centering disk, are dropped into the zinc cup so as to rest on top of the paste, as shown in Fig. 3. The end closure disk or plug 16 is dropped on to the upper portion of the electrode, which engages a central opening in said closure or plug, and the bottom of the plug rests on the top of the cartridge. The article thus assemled is then inverted and placed in a suitable press, as shown in Fig. 4. This press has a suitable bed 20, with a die 21 therein to receive the end closure or plug 16. The projecting end of the electrode 11 is received in a correspondingly shaped socket 22 within the die. The gate or movable part 23 of the press is adapted to move downwardly into engagement with the bottom of the inverted zinc cup and the movable press member may have a socket 24 to receive the adjacent portion of the zinc cup and center the same, although this may not be necessary in all cases

The parts being in the position shown in Fig. 4, a lowering of the gate 23 of the press causes the zinc cup to be moved downwardly with respect to the cartridge and the plug 16, which remain stationary. By the operation of the press the zinc cup is forced down into the position shown in Fig. 5, which is the assembled position. In this operation the paste is squeezed out of the upper portion of the cup (Fig. 4) and caused to flow downwardly over the side surface of the centering disk 15, and down into the space between the side surface of the cartridge and the opposing surface of the cup.

After the operation shown in Figs. 4 and 5, has been completed, the brass contact cap 19 is applied to the projecting end of the carbon electrode and the metal at the mouth of the cup is spun into the groove in the end plug 16, as described in my prior application. The particular order and also the particular manner in which the brass contact cap is applied, and the metal at the mouth of the cup spun into the locking groove, are not material so far as the present invention is concerned.

The bottom centering disk 15 is preferably made of paper, coated with paraffin. Preferably the upper edge of the cupped centering disk is provided with scallops 25, or other indentations, the purpose of which is to increase the amount of paste which may act on the zinc cup and the cartridge at the lower portion of the cell. The centering disk may be conveniently made from a disk-like paper blank 15ª, shown in Fig. 8. This blank is cupped in a convenient manner and in the cupping operation suitable projections on the cupping tool are brought down to engage the upper edge of the cup and thereby form the depressions or scallops 25.

In the drawing, I have shown the centering cup as of somewhat tapering form, that is to say, with its lower end of less diameter than its upper end. This is a feature of advantage in the assembling of the cell, inasmuch as it permits the paste to readily flow over the side wall of the centering disk or cup from the position shown in Fig. 4 to that shown in Fig. 5. It is to be observed, however, that the invention is not limited to the use of a cupped centering disk of tapered form, as in certain cases the side wall of the centering cup may be perpendicular to the bottom, or otherwise arranged, without departure from the invention.

It will be observed that the diameter of the cartridge 12 is equal to more than half the inside diameter of the zinc cup and in the cases illustrated it has a diameter equal to approximately three-fourths of the inside diameter of the cup.

Notwithstanding this fact and notwithstanding also the use of the bottom centering disk, as described, the method of assembling, herein described, can be carried out to great advantage. The paste is of a comparatively thick consistency, but it can be readily flowed down past the centering cup 15, in the manner described. In one case, a batch of paste was made by mixing together 12.5 kilograms of wheat flour, 50 litres of zinc chlorid solution at 27° Baumé, and 12.5 grams of mercuric chlorid. These ingredients were all mixed together thoroughly and the mass was stirred while being cooked until a stiff paste was formed. The cooking was effected before the paste was placed in the cell. The stiffness of the cooked paste did not, however, interfere with the assemblage of the cell in the manner previously described. In the particular case now under discussion, all the ammonium chlorid contained in the cell was initially placed in the depolarizing cartridge, the zinc chlorid on the other hand being initially in the paste only. One advantage of separating the chlorids in this manner arises from the fact that the paste will keep better, as the zinc chlorid is a preservative for the cereal material. Various changes may be made in respect to these matters, but in the preferred practice the paste will be of the pre-cooked variety, as stated, and will be quite stiff and will be, when placed in the cell, devoid, or substantially devoid, of ammonium chlorid or other matter which would prevent the paste from keeping, or would increase the difficuly of manipulating the same.

The quantity of paste initially placed in the bottom of the cup, as shown in Fig. 2, should be such that when the operations shown in Figs. 3, 4 and 5, have been completed and the cell removed from the press, the side space in the cell intended for the paste will be neatly filled without overflowing. In the operation shown in Figs. 4 and 5, the end closure 16 serves as a stop

for the paste, to limit the displacement or movement thereof in a vertical direction. When a portion of the paste strikes the under surface of the end closure, it is, of course, displaced in a lateral direction, the result being that when the parts reach the fully assembled position shown in Fig. 5, the paste will completely fill the side space intended for it, the outer surface of the cartridge being covered by a uniformly thick layer or blanket of paste, which nicely fills the space between the side surface of the cartridge and the opposing surface of the zinc cup.

The form of dry cell shown in Fig. 9 may also be assembled in accordance with my invention. In this case the top end closure, during the steps corresponding to those shown in Figs. 3, 4 and 5 of the drawing, is constituted by a comparatively thin paper washer 26 having a central opening whereby it may be fitted over the upper end of the carbon pencil. Of course some slight changes will be necessary in the machine in this case so as to adapt the same to the thinner end closure member. After the parts have been assembled in substantially the manner previously described, an additional paper washer 27 is inserted and a pitch seal 28 poured in on top of the washer 27, as described in my application, Serial No. 368,324.

Various changes may be made in the parts of the cell itself and in the details of procedure, as herein particularly described, without departure from the scope of my invention, as set forth in the claims.

It will be understood that where I refer to squeezing the cartridge into the paste, I intend to cover a process wherein the paste is flowed into place either by movement of the zinc cup with respect to the stationary cartridge, as herein described, or by movement of the cartridge relatively to a fixed cup, or by any other similar procedure which will bring about the desired positioning of the paste.

I do not claim herein a dry cell provided with a preformed end plug of insulating material having a gas chamber therein as a part of its structure, as claimed in my application, Serial No. 221,060; nor do I claim herein the feature of placing all of the zinc chlorid in the paste and all of the ammonium chlorid in the depolarizing cartridge, as claimed in my application, Serial No. 346,694, nor do I claim specifically herein the method of assembling a cell of the kind shown in Fig. 9, as the same is claimed in my application, Serial No. 379,514; nor do I claim herein the means for assembling the cell parts as claimed in my application Serial No. 382,471.

What I claim is:

1. The method of making a dry cell having a containing cup, a carbon pencil with a depolarizing cartridge adhering thereto, and a closure for the upper end of the cup, which comprises introducing into the lower end portion of the cup a measured quantity of thick pre-cooked paste and then squeezing the cartridge into the paste.

2. The method of making a dry cell having a containing cup, a cartridge whose diameter is more than half the inside diameter of the cup, and a closure member for the upper end portion of the cup, which comprises introducing a measured quantity of a thick paste into the bottom portion of the cup and then squeezing the cartridge into the same.

3. The method of making a dry cell having a containing cup, a cartridge, and a closure for the upper end portion of the cup, which comprises introducing a measured quantity of paste into the lower end of the cup and then squeezing the cartridge into the paste while the end closure is located against the upper end of the cartridge, whereby said end closure serves as a stop for the paste, as described.

4. The method of making a dry cell having a containing cup, a cartridge, a centering disk in the cup for the lower end of the cartridge, and a closure for the upper end of the cup, which comprises introducing a quantity of paste into the bottom of the cup, then dropping the bottom centering disk and the cartridge into the cup on top of the paste in the proper relation, and then squeezing the article to bring the parts into the assembled relation.

5. The method of making a dry cell having a containing cup, a cartridge therein, a centering member for the cartridge in the bottom of the cup, and a closure member for the top portion of the cup, which comprises introducing a quantity of paste into the bottom of the cup, then introducing into the cup on top of the paste the bottom centering member, the cartridge and the top closure in the proper relation, and then effecting relative displacement between the cup on the one hand and the cartridge, bottom centering member and top closure on the other hand, to flow the paste into the desired position.

6. The method of making a dry cell having a containing cup, a cartridge therein, whose diameter is more than half the inside diameter of the cup, a thick paste interposed between the side surface of the cartridge and the inner surface of the side wall of the cup, and a closure for the upper end portion of the cup, which comprises placing a measured quantity of paste in the bottom of the cup, then depositing in the cup on top of the paste the cartridge, placing the end closure on top of the cartridge, and effecting relative displacement between

the cup on the one hand and the cartridge and end closure on the other hand, to flow the paste into the desired position, such end closure constituting a stop for arresting the paste, as described.

7. The method of making a dry cell comprising a containing cup or receptacle, a carbon pencil therein having a depolarizing cartridge adhering to the same, with the upper end of the pencil projecting out of the cartridge, a paste interposed between the side surface of the cartridge and the inner surface of the side wall of the receptacle, and a perforated closure member for the upper end portion of the cup, which comprises placing a measured quantity of paste in the bottom of the cup, then introducing the cartridge so that the latter rests on top of the paste, placing the perforated end closure member around the projecting part of the carbon pencil in the proper relation, and then effecting a relative displacement between the containing cup or receptacle on the one hand, and the cartridge, carbon pencil and end closure on the other hand, so that the paste is flowed into the desired position at the side of the cartridge, the end closure in this operation serving as a stop to limit the movement of the paste in one direction and to distribute it in another direction.

8. The method of making a dry cell having a containing cup or receptacle, a central electrode therein, having a depolarizing cartridge adhering thereto, the upper end of the electrode projecting out of the cartridge, a cap-like centering member for the cartridge in the bottom of the cup or receptacle, a paste located between the side surface of the cartridge and the opposing surface of the cup, and a closure member in the upper end portion of the cup surrounding the projecting end of the electrode, which comprises introducing a measured quantity of paste into the bottom of the cup, then placing the bottom centering member and the cartridge in the cup on top of the paste in the proper relation, and then squeezing the article so assembled, in order to flow the paste over the centering member into the proper position at the side of the cartridge.

9. The method of making a dry cell having a containing cup, a cartridge and a centering disk in the cup for the lower end of the cartridge, which comprises introducing a quantity of paste into the bottom of the cup, then placing the centering disk on top of the paste and the cartridge on top of the centering disk, and then applying pressure to force the paste into the space at the side of the cartridge.

10. The method of making a dry cell having a containing cup, a cartridge whose diameter is more than half the diameter of the inside of the cup, and a centering disk in the cup for the lower end of the cartridge, which comprises introducing a quantity of thick paste into the cup bottom, then inserting the bottom centering disk and cartridge into the cup against the paste in the proper relation, and then producing relative displacement between the cup and the cartridge for flowing the paste into a layer or blanket at the side of the cartridge.

11. The method of making a dry cell having a containing cup, and a cartridge therein, which comprises the introduction of a measured quantity of paste into the cup bottom, and the movement of the cup relatively to the cartridge.

12. The method of making a dry cell having a containing cup, and a cartridge therein, which comprises the introduction of a measured quantity of paste into the cup bottom, and the movement of the cup relatively to the cartridge while the latter remains stationary.

13. The method of making a dry cell having a containing cup, and a cartridge therein, which comprises placing the paste in the bottom of the cup, then introducing the cartridge, then inverting the article, and then pushing downwardly on the cup bottom while the cartridge remains stationary.

14. The method of making a dry cell having a containing cup, and a cartridge therein, which comprises introducing a quantity of paste into the bottom of the cup, then introducing the cartridge, and then applying pressure on the bottom of the cup to flow the paste into position at the side of the cartridge.

15. The method of making a dry cell having a containing cup, and a cartridge therein, which comprises introducing a quantity of paste into the bottom of the cup, then introducing the cartridge, and then applying pressure on the bottom of the cup to flow the paste into position at the side of the cartridge, the cartridge meanwhile being held stationary.

16. The method of making a dry cell having a containing cup, and a depolarizing cartridge therein, which comprises placing a quantity of paste in the cup bottom, then inserting a cartridge with a closure member on top of the same, and then flowing the paste into the proper position along side the cartridge by producing a relative movement between the cup on the one hand and the cartridge and closure member on the other hand.

17. The method of making a dry cell having a containing cup, and a depolarizing cartridge therein with an upwardly projecting electrode, and a closure member having an opening adapted to engage said electrode, which comprises placing a measured quan-

tity of paste in the cup bottom, then inserting the cartridge, placing the closure member about the projecting end of the electrode, and then producing a relative movement between the cup on the one hand and the cartridge and closure member on the other hand.

18. The method of making a dry cell having a containing cup, and a depolarizing cartridge therein with an upwardly projecting electrode, and a closure member having an opening adapted to engage said electrode, which comprises placing a measured quantity of paste in the cup bottom, then inserting the cartridge, placing the closure member about the projecting end of the electrode, and then producing a relative movement between the cup on the one hand and the cartridge and closure member on the other hand by holding the second named members stationary and applying pressure to the cup bottom from the outside.

19. The method of making a dry cell having a containing cup, a depolarizing cartridge therein, and a preformed end plug in the upper end of the cup, which comprises introducing into the cup bottom a measured quantity of paste and then squeezing the cartridge into the paste while the end plug abuts the cartridge.

20. The method of making a dry cell having a containing cup, a depolarizing cartridge therein with a projecting electrode, and an end closure member for the upper end of the cup, which comprises introducing a quantity of paste into the cup bottom, then positioning the cartridge in the cup with a closure member surrounding the electrode and then flowing the paste into position at the side of the cartridge by applying pressure to the cup and to the end closure member.

21. The method of making a dry cell having a containing cup, a cartridge therein, and an end plug for the upper end of the cup, which comprises introducing a quantity of paste into the cup bottom, then squeezing the cartridge into the paste while the end plug is in fixed relation to the cartridge, and then securing the mouth portion of the cup to the end plug.

22. The method of making a dry cell having a containing cup, a cartridge therein, and a closure member, which comprises introducing into the bottom of the cup all of the paste which is to be used in the cell, placing the cartridge in the cup on top of and against the paste, and then squeezing the cartridge into the paste while the closure member occupies an assembled relation with respect to the cartridge, whereby such closure acts as a stop for the paste.

23. The method of making a dry cell having a containing cup, a cartridge therein, and a closure member, which comprises introducing into the bottom of the cup the total quantity of paste which is to be used in the cell, introducing the cartridge into the cup on top of and against the paste, and then sliding the cup and cartridge relatively to each other for squeezing the cartridge into the paste while the closure member occupies an assembled relation with respect to the cartridge.

24. The method of making a dry cell having a containing cup, a cartridge therein, and a closure member, which comprises introducing into the bottom of the cup all of the paste to be used in the cell, then placing the cartridge in the cup on top of the paste, placing the closure member against the upper end portion of the cartridge, and then squeezing the cartridge into the paste while said closure member maintains a fixed position with respect to the cartridge, whereby the closure member acts as a stop for the paste, until the closure member is frictionally driven into the upper end portion of the cup, and then spinning the metal of the cup at the mouth thereof to lock the closure member therein.

25. The method of making a dry cell having a containing cup, a cartridge therein, and an end closure disk, which comprises introducing into the bottom of the cup the entire content of paste to be used in the cell, placing the cartridge in the cup on top of the paste, and then squeezing the cartridge into the paste, while the disk occupies a fixed position with respect to the cartridge until the disk is pressed firmly into the mouth portion of the cup.

26. The method of making a dry cell having a containing cup, a cartridge therein with an upwardly projecting pencil, and a perforated closure disk, which comprises introducing into the bottom of the cup the total quantity of paste to be used in the cell, placing the cartridge in the cup on top of and against the paste, and squeezing the cartridge into the paste by a sliding non-rotative movement with the disk encircling the upper end portion of the pencil above the cartridge, whereby the disk acts as a stop for the paste, until the disk has been forced into the mouth of the cup.

27. The method of making a dry cell having a containing cup and a cartridge with an upwardly projecting pencil, which comprises introducing into the bottom of the cup the entire quantity of paste which is to be used in the cell, placing a centering member for the cartridge in the cup on top of the paste, introducing the cartridge into the cup so that its lower end engages the centering member, and then squeezing the cartridge into the paste so that the latter flows into place at the side of the cartridge.

28. The method of making a dry cell having a containing cup, a cartridge with an

upwardly projecting pencil, and a perforated closure member positioned above the cartridge, which comprises introducing into the bottom of the cup the entire quantity of paste which is to be used in the cell, then placing in the cup on top of and against the paste a centering member for the cartridge, introducing the cartridge into the cup so that its lower end engages and rests on the centering member, placing the perforated closure member around the upwardly projecting end of the pencil, and then squeezing the cartridge into the paste so that the latter flows into place at the side of the cartridge.

29. The method of making a dry cell having a containing cup, a cartridge with an upwardly projecting pencil, inverting the partly assembled elements, and a perforated closure member positioned above the cartridge, which comprises introducing into the bottom of the cup the entire quantity of paste which is to be used in the cell, then placing in the cup on top of and against the paste a centering member for the cartridge, introducing the cartridge into the cup so that its lower end engages and rests on the centering member, placing the perforated closure member around the upwardly projecting end of the pencil, and then squeezing the cartridge into the paste so that the latter flows into place at the side of the cartridge, until all of the paste has flowed out from beneath the centering member and the latter abuts the bottom of the cup.

30. The method of making a dry cell having a containing cup and a cartridge with an upwardly projecting pencil, which comprises introducing into the bottom of the cup a quantity of paste, inserting the cartridge into the cup so that it rests on the paste, placing a perforated closure member around the upper end of the pencil, and then squeezing the cartridge into the paste, while the perforated closure member maintains a fixed position relatively to the cartridge.

31. The method of making a dry cell having a containing cup and a cartridge with an upwardly projecting pencil, which comprises introducing into the bottom of the cup a quantity of paste, inserting the cartridge into the cup so that it rests on the paste, placing a perforated closure member around the upper end of the pencil, and then squeezing the cartridge into the paste, while the perforated closure member maintains a fixed position relatively to the cartridge, until the paste is squeezed out of the space beneath the cartridge and contacts with the closure member and until said closure member has been forced into the mouth of the cup.

32. The method of making a dry cell having a containing cup and a cartridge with an upwardly projecting pencil, which comprises introducing a quantity of paste into the bottom of the cup, introducing a cartridge into the cup. placing a perforated closure member around the upper end of the pencil, inverting the parts, and then squeezing the cup and cartridge until the paste, cartridge and closure member reach their assembled positions.

33. The method of making a dry cell having a containing cup and a cartridge therein, which comprises introducing a quantity of paste into the bottom of the cup, then placing the cartridge in the cup on top of the paste, then placing the partly finished cell in a press in an inverted position and then squeezing the cartridge into the paste.

34. The method of making a dry cell having a containing cup and a cartridge therein, with an upwardly projecting pencil, which comprises depositing a quantity of paste in the bottom of the cup, placing a centering member for the cartridge on top of the paste, inserting the cartridge into the cup in engagement with the centering member, placing a perforated closure member around the upper end of the pencil, placing the partly finished cell in a press, and then squeezing the cartridge into the paste and the perforated closure member into the cup mouth.

35. The method of making a dry cell having a containing cup and a cartridge therein, with an upwardly projecting pencil, which comprises positioning the cartridge against an abutment with the projecting end of the pencil free from contact with such abutment, introducing a quantity of paste into the cup, and subjecting the cup and cartridge to pressure for bringing them into assembled relation.

36. The method of making a dry cell having a containing cup and a cartridge therein, which comprises the introduction into the bottom of the cup of the total quantity of paste to be used in the cup, placing the cartridge in the cup on top of the paste, and squeezing the cartridge into the cup by a sliding non-rotative movement until substantially the entire paste content is flowed into position alongside the cartridge.

In witness whereof, I have hereunto set my hand on the 31st day of March, 1920.

HAROLD DE OLANETA.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,430,727, granted October 3, 1922, upon the application of Harold de Olaneta, of New Haven, Connecticut, for an improvement in "The Manufacture of Dry Cells," an error appears in the printed specification requiring correction as follows: Page 6, lines 18 and 19, claim 29, strike out the words and comma "inverting the partly assembled elements," and insert the same to follow the word "pencil," line 30; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of November, A. D., 1922.

[SEAL.] KARL FENNING,

Acting Commissioner of Patents.