Nov. 25, 1924. 1,516,632

H. DE OLANETA

METHOD OF MAKING DRY CELLS

Filed June 18, 1920

Fig. 1.

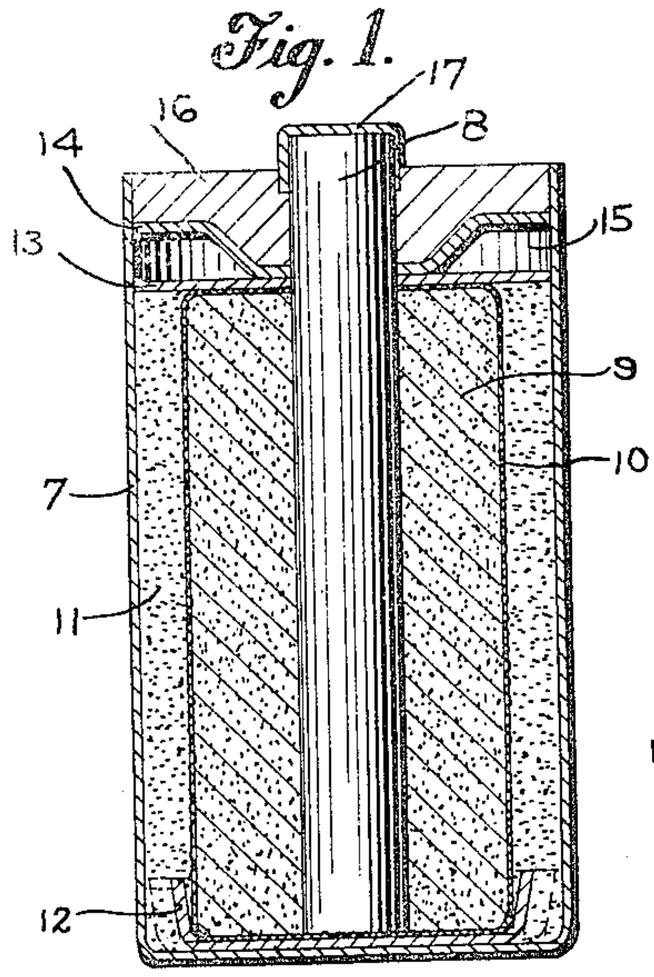


Fig. 2.

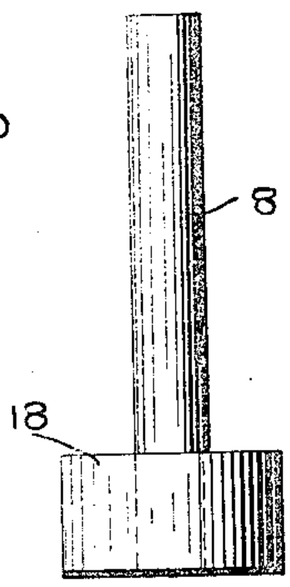


Fig. 3.

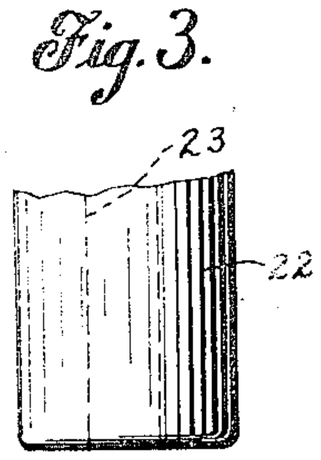


Fig. 4.

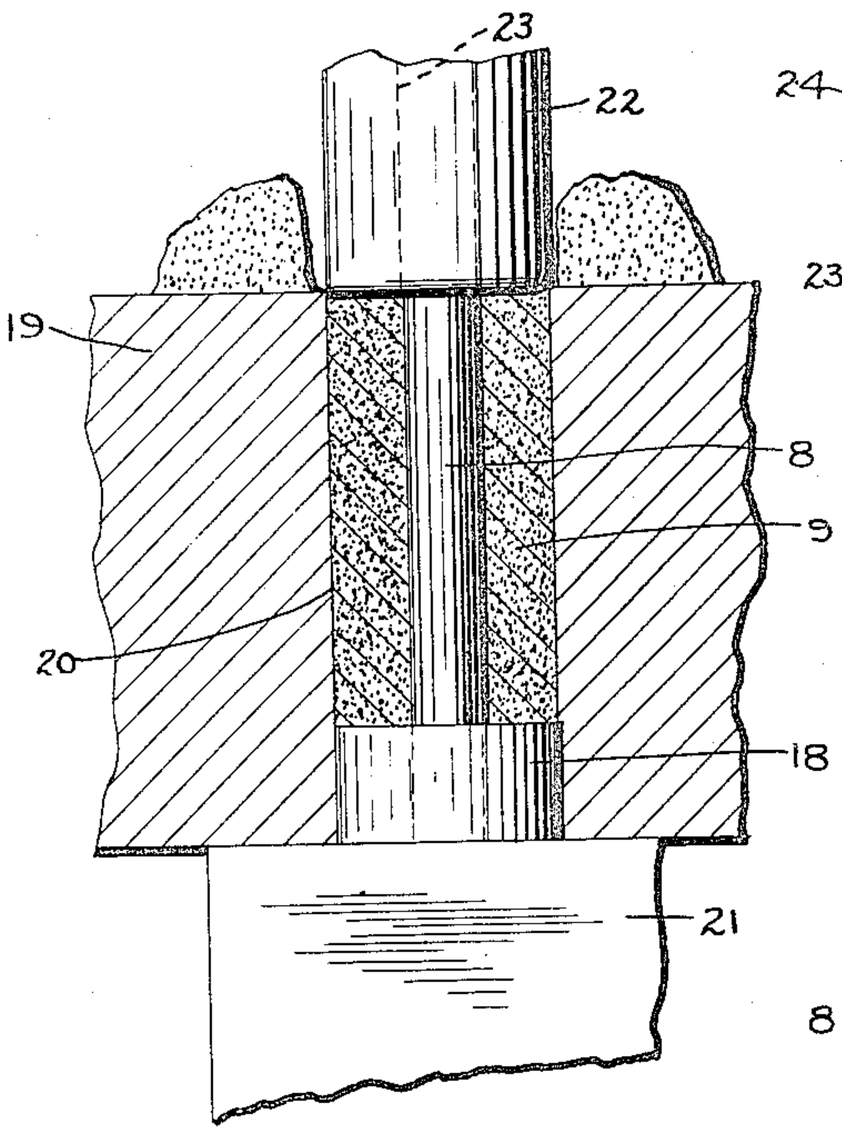


Fig. 7.

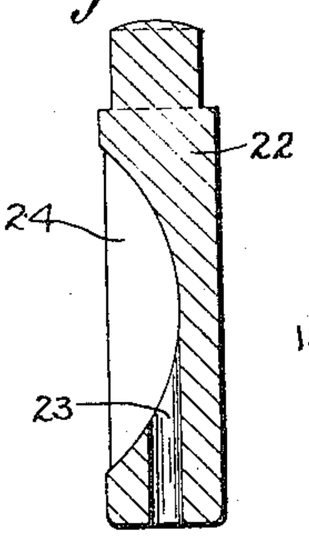


Fig. 6.

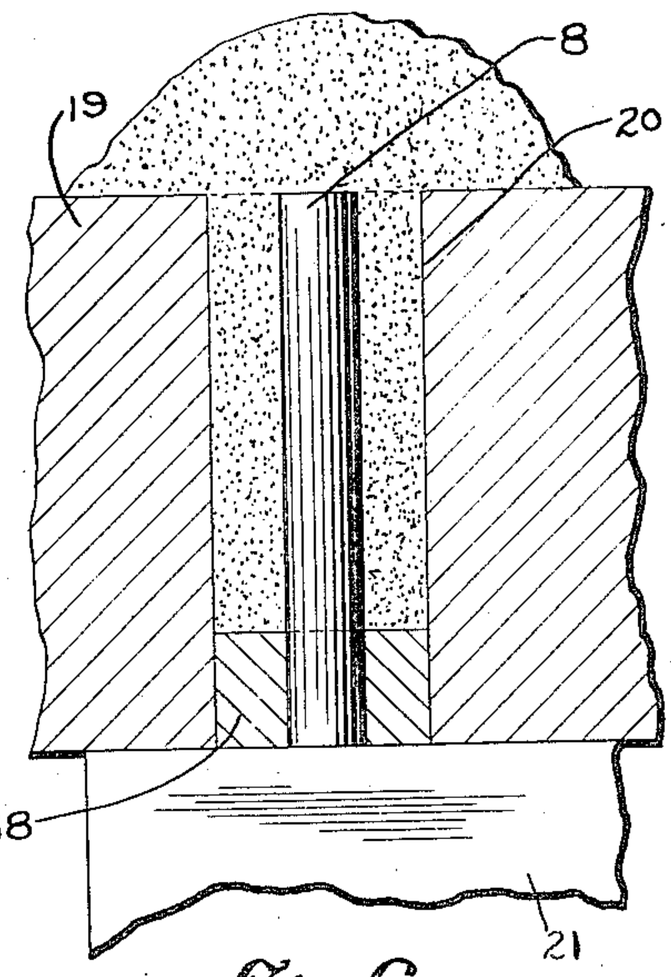
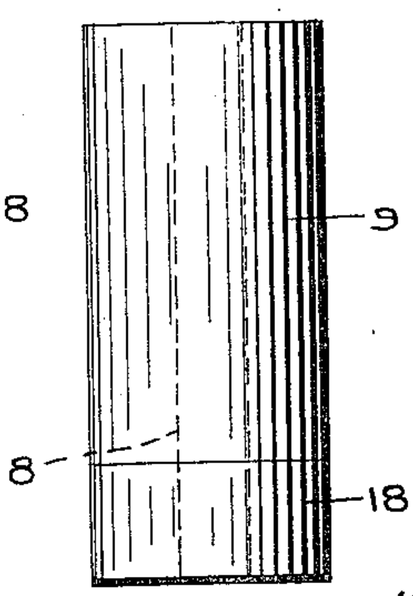
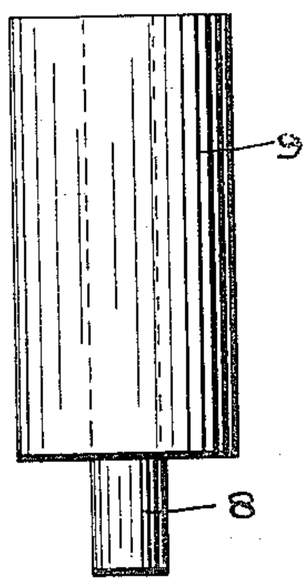


Fig. 5.





Inventor

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By Albert G. Davis

His Attorney

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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.

METHOD OF MAKING DRY CELLS.

Application filed June 18, 1920. Serial No. 390,020.

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 Methods of Making Dry Cells, of which the following is a full, clear, and exact description.

This invention relates to the manufacture of dry cells and it has more particular reference to the making of a cell wherein the carbon pencil located within a zinc cup carries a body or cartridge of depolarizing material. The invention also pertains especially to the tamping of the depolarizing material or so-called depolarizing mix about the carbon electrode so that it will adhere to the same in the form of a body or mass that is practically integral with such electrode, although such mass is customarily separated from the side wall of the zinc cup by a layer or blanket of paste that serves as a carrier or vehicle for the electrolyte. However, my improvements may be employed to advantage in the tamping of depolarizing or other material in dry cells of other types without departure from the present invention in certain of its phases or aspects.

One of the primary objects of the invention is to provide an improved method of tamping the depolarizing material.

Another object which I have in view is to furnish a method which is admirably adapted to the manufacture of dry cells of the type in which a depolarizing cartridge surrounds the carbon pencil or other electrode member, but does not extend to the top of such electrode, the upper end of the electrode being disposed or embedded within a suitable top closure for the cell, such as a pitch seal or the like.

In the manufacture of dry cells of the kind to which I have referred, the tamping pressure is usually under the control of the operator, the machine being in the nature of a drop press, and owing to variations in the pressure and in the kind and condition of the mixture being treated different cells will have the material packed dissimilarly within certain limits. In other words, as conditions are variable, the depolarizing mix of one cell may be packed more tightly for example than that of another cell. Another factor which is encountered in practice is a variation in length of the carbon pencils. Very often these will pass inspection when they are say a sixteenth of an inch longer or shorter than they should be. As a result of the foregoing variations it has been common in the past to have variations in the distance between the upper surface of the cartridge and the top surface of the carbon electrode. This causes certain difficulties in the assembling of the cell, owing to the fact that the top closure has to be somewhat differently located in different cells of the same size, and there is apt to be considerable variation in the cells themselves, which is a matter of serious disadvantage, as it is important that the cells should be of standard size.

One of the objects of my invention is to overcome the above mentioned drawbacks by providing a tamping method whereby the upper end portions of the various cells of the same size may be more readily made of the same shape, size and construction.

Another object of the invention is to provide a method of tamping, wherein the breakage of the carbon pencils, and more particularly of the projecting ends of such pencils, is reduced to a minimum.

Another object is to provide a method of tamping which can be practiced with neatness and despatch and wherein in particular the projecting end of the carbon can be readily kept clear of any adhering depolarizing material which would interfere with the placing of the brass contact cap on top of the electrode, or cause corrosion.

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

In the accompanying drawing:

Fig. 1 is a vertical central section of a dry cell having a depolarizing cartridge formed by my improved method;

Fig. 2 is a detail view of the carbon pencil and spacing member;

Fig. 3 is a diagrammatic sectional view showing the commencement of the tamping operation;

Fig. 4 is a similar view showing a later stage of the tamping operation;

Fig. 5 shows the parts as they are removed from the die;

Fig. 6 shows the pencil with the adhering body of depolarizing material as the article is removed from the die; and

Fig. 7 is a somewhat diagrammatic vertical section on a smaller scale of the tamping plunger.

In the dry cell shown in Fig. 1, the zinc cup 7 contains the usual central carbon pencil or electrode 8, to which adheres a cartridge body or mass 9 of depolarizing material, which is usually enclosed by a porous envelope 10. A layer or blanket 11 of paste is interposed between the side surface of the cartridge and the side wall of the cup and serves as a carrier or vehicle for the electrolyte. The particular kind of material used for the depolarizing mix is not important so far as the present invention is concerned, but it may be assumed for purposes of description that the mix comprises say 36 units of powdered MnO_2 and 12 units of finely divided graphite, these two ingredients being mixed together as intimately as possible to form a homogeneous mixture, and being moistened with a suitable electrolyte material as for example an ammonium chlorid solution of appropriate density. The mix is quite moist so that when tamped about the carbon pencil it forms a fairly compact but spongy body that is practically integral with the pencil, adhering closely to the same.

In the particular form shown the cartridge is centered in the bottom of the cell container by means of a cupped centering washer 12 and at the top of the cell the cartridge is centered by lower and upper paper washers 13 and 14 respectively, having central openings through which the pencil 8 passes, there being a gas space 15 between the two washers and the pocket above the upper cupped washer 14 being substantially filled with a body 16 of pitch or the like that is poured in on top of the washer 14. On top of the pencil is the customary brass contact cap 17, which, in this embodiment, is embedded at its lower edge portion in the pitch seal. It will be understood from the following description, however, that various changes may be made in the construction of the cell without departing from the scope of the present invention, which is especially concerned with the tamping of the depolarizing material in place, and more particularly with the formation of the depolarizing material into a cartridge or body adhering to the carbon pencil.

In forming this body, I first take a carbon pencil 8, as shown in Fig. 2, and place about one end of the same a spacing member 18. This spacing member may be conveniently formed of wood or rubber or other material which will not be affected by the mix, and it is preferably in the form of a cylindrical block having a central opening adapted to fit snugly over the pencil. The upper and lower surfaces of the block are flat and the distance between them is equal to the distance which it is desired to maintain between the top surface of the mix and the top surface of the pencil, as hereinafter pointed out. The pencil and block in the relation shown in Fig. 2 are then placed in a suitable die generally indicated at 19 in Fig. 3. This die 19 has a cylindrical opening 20 extending therethrough from top to bottom, the diameter of the die being equal to the diameter of the cartridge to be formed. In this instance the distance from the top surface of the die to the bottom is approximately equal to the length of the carbon pencil. The spacing block 18 is located in the bottom part of the opening 20 so as to center the pencil therein, and after the pencil and block have been placed in the position shown in Fig. 3, a support 21 is positioned immediately beneath the opening 20 so as to have its upper surface abut the bottom surface of the block and thereby support the block with its lower surface substantially flush with the lower surface of the die. The lower end of the pencil is also supported on the member 21 with the block 18 surrounding the lower end portion of the pencil and centering the pencil with approximate accuracy in the die.

A quantity of the powdered depolarizing mix is next dumped on to the table or bed of which the die 19 is a part, so as to fill the remaining space within the die opening 20, as shown in Fig. 3. A suitable plunger 22 is then brought down within the opening 20 from above so as to tamp the material. The member 22 is of cylindrical shape, having a bore 23 therein, the bore being of such size that its cylindrical surface conforms closely to the carbon pencil and the outer surface of the plunger 22 being smooth and adapted to conform closely to the inner surface of the die opening. Suitable provision is also made for permitting the escape from the plunger of material located between it and the upper end of the carbon pencil. For this purpose the plunger 22 may be of the shape shown in Fig. 7. Here the bore 23 is in communication with a window 24 in the side of the plunger, through which the material may be ejected in a lateral direction as the plunger 22 is forced downwardly. In practice the plunger 22, which will form the movable element of a suitable press, may be brought down into the die opening 20 say three or four times until the material has been packed in said opening sufficiently to have the required density. After the first descent of the plunger the same is raised again and then additional material is piled over the die opening and heaped up substantially as shown in Fig. 3. After three or four operations of the press, as indicated,

the plunger on the last operation having been brought down substantially flush with the upper surface of the die, as indicated in Fig. 4, the pencil with its adhering body of depolarizing mix and with the spacing block 18 still surrounding the lower end of said pencil is removed from the die through the bottom thereof, the supporting member 21 being shifted out of the way. The material is at this time densely packed in place about the pencil, as shown in Figs. 5 and 6. The spacing block 18 is then removed from the lower end of the pencil (which becomes the upper end in the battery) and the cartridge is then ready to be covered with the fabric envelope 10 in case such an envelope is to be used.

It will be seen that by my new method, as herein described, a certain definite distance is preserved in all cases between the top surface of the pencil, or that surface which eventually becomes the top surface, and the top surface of the depolarizing material. This is due to the employment of the spacing block 18, or its equivalent, in tamping all of the cartridges. In this manner the shape, size and construction of the upper end portion of the cell may be more readily standardized, as will be manifest, regardless of the tamping pressure and regardless also of the length of the carbon pencil. In my method, as distinguished from prior methods, the cartridge is tamped while in an inverted position, that portion which is to subsequently form the top being tamped in place first. In other words, the operation is begun at the top of the cartridge and is finished at what becomes the bottom of the cartridge. This procedure, with the employment of the spacing block associated with the outwardly projecting part of the carbon, reduces to a minimum the breakage of the projecting carbon ends, which has been a matter of serious disadvantage in prior manufacture. Again, as the spacing block is placed on the end of the pencil before the latter is positioned in the die, such end of the pencil is enclosed and protected from the depolarizing material. Thus the material in question does not adhere to the projecting end of the pencil when the cartridge is finished and as a result the operation of assembling the brass contact cap 17 is facilitated and the liability of corrosion in the locality of the cap is reduced considerably.

Various changes may be made in the details of the procedure, as herein described, without departing from the scope of my invention as defined in the claims.

I do not claim herein a tamping apparatus as the same is claimed in my application Serial No. 390,021, filed June 18, 1920.

What I claim is:—

1. The method of tamping the depolarizing mix of a dry cell having a carbon pencil, which comprises positioning the pencil within a suitable space, placing the loose material around and in contact with the pencil and over one end of the latter and then tamping such material around and against the pencil with a perforated tamping member which conforms to such pencil.

2. The method of tamping the depolarizing mix of a dry cell having a carbon pencil, which comprises positioning the pencil within a suitable die opening, dumping loose depolarizing material into the die opening around the pencil, tamping such material around and against the pencil by means of a suitable sleevelike plunger, and ejecting some of the material from the plunger.

3. The method of tamping the depolarizing mix of a dry cell having a carbon pencil, which comprises positioning the pencil within a suitable space with a spacing member around one end, placing the loose depolarizing material around the pencil and over the other end thereof and tamping the material against the pencil and the spacing member.

4. The method of tamping the depolarizing mix of a dry cell having a central electrode, which comprises positioning the electrode within a suitable space, placing the loose material around and over the upper end of the electrode within said space and tamping it in place, and causing the material to adhere to a portion of the electrode and the latter to project a definite distance from the body of tamped material.

5. The method of forming a dry cell cartridge for insertion in a dry cell cup, which comprises positioning a pencil within a suitable die with a spacing member around one end of the pencil, placing the loose depolarizing material around the pencil and over the other end thereof, and tamping the material to cause it to adhere to the pencil throughout the length of the latter except for that portion which is surrounded by the spacing member.

6. The method of forming a dry cell cartridge, which comprises positioning a pencil within a suitable die with a spacing member around the lower end of the pencil, placing loose material in the die around the pencil and over the upper end of the latter, and tamping the material against the pencil by a succession of tamping blows.

7. The method of forming a dry cell cartridge, which comprises positioning a pencil with a spacing member around one end, adding loose material around the remaining portion of the pencil, as needed, and tamping the material against the pencil until it adheres to and covers the entire pencil length with the exception of that part surrounded by the spacing member.

8. The method of forming a dry cell cartridge, which comprises positioning a pencil

within a suitable die with a spacing member around the lower end of the pencil, introducing loose depolarizing material into the die around the pencil and over the upper end thereof, and tamping the material against the pencil by a succession of tamping blows.

9. The method of forming a dry cell cartridge, which comprises positioning a pencil within a suitable die with a spacing member around the lower end of the pencil, introducing loose depolarizing material into the die around the pencil and over the upper end thereof, and tamping the material against the pencil by a succession of tamping blows until it adheres to the pencil substantially to the upper end of the latter.

10. The method of making a depolarizing cartridge having a projecting electrode, which consists in enclosing one end portion of the electrode, then supplying loose depolarizing material around the remaining portion of the electrode as needed, and tamping such material against the electrode by a succession of tamping blows until such material adheres to the electrode substantially up to the other end thereof.

11. The method of making a depolarizing cartridge having a projecting pencil, which comprises positioning one end of the pencil snugly within a suitable orifice, supplying loose material around another part of the pencil as needed, and then moving a suitable tamping member up and down relatively to the pencil while the latter remains stationary until the other end of the pencil is substantially surrounded by adhering compact material.

12. The method of making a depolarizing cartridge having a projecting pencil, which comprises inserting one end of the portion of the pencil in a spacing block, placing the block in the bottom of a die with the pencil projecting upwardly from the block in the die, piling up the material around and above the pencil and tamping the material around the pencil with a suitable perforated plunger, which ejects some of the material piled up over the pencil.

13. The method of making a dry cell cartridge, which comprises utilizing a spacing block to maintain a definite distance between the top surface of the carbon pencil and the top surface of the cartridge, and tamping the cartridge upside down with a perforated tamping member conforming to the pencil and through which a portion of the material is ejected in the tamping operation.

14. The method herein described, which comprises piling up loose material over a pencil and tamping depolarizing material around the pencil by a hollow movable tamping member through which a portion of the material overlying the pencil is ejected.

15. The method of making a dry cell cartridge having a projecting pencil, which consists in tamping about the pencil, at a point adjacent but not at one extremity thereof, a quantity of a mix, which eventually becomes the top part of the cartridge, adding mix as needed and then tamping around the pencil up to the other extremity thereof the material forming what is eventually the bottom part of the cartridge.

16. The method of making a depolarizing cartridge having a projecting pencil which comprises inserting one end of the pencil in a perforated spacing block, locating the pencil and block in a suitable die, filling the die opening with loose depolarizing material then tamping the material in the die against the spacing block and adding loose material as needed while tamping, thereby forming a compact mass of desired density adhering to the pencil.

17. The method of making a depolarizing cartridge having a projecting pencil, which comprises positioning the pencil in a die by means of a suitable spacing block, filling the die opening with loose depolarizing material, tamping the material in the die against the spacing block adding loose material as needed while tamping whereby a compact mass adhering to the pencil is formed and then ejecting the formed cartridge and spacing block through the bottom of the die opening.

18. The method of making a depolarizing cartridge having a pencil electrode, which comprises positioning the pencil centrally relatively to and within the considerably larger opening of a suitable die, supplying loose depolarizing material about the pencil, tamping the material while supplying the same to form a compact mass and then ejecting the formed cartridge downwardly through the bottom of the die opening.

19. The method of making a depolarizing cartridge having a projecting pencil which comprises centrally locating the pencil in a cartridge die, supplying loose material around the pencil, tamping the material while supplying additional material as needed, until the upper end of the pencil is entirely surrounded by adhering compact material, and ejecting the cartridge downwardly through the die.

In witness whereof, I have hereunto set my hand on the 16th day of June, 1920.

HAROLD DE OLANETA.