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MACHINE FOR TAMING DRY CELL CARTRIDGES AND THE LIKE

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Inventor

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1,510,835

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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 Machines for Tamping Dry-Cell Cartridges and the like, of which the following is a full, clear, and exact description.

This invention relates primarily to the manufacture of dry cells and it has special reference to a machine for tamping depolarizing material about an electrode, such as a carbon pencil, so as to form a body or cartridge adhering to the pencil. The invention also has particular reference to a machine adapted for the carrying into practice of the method described and claimed in my companion application, Serial No. 390,020 filed June 18, 1920.

While one of the primary objects of the invention is to furnish an improved machine for tamping 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 compact but spongy body or mass that is practically integral with the pencil, it will be obvious that the invention is of broad application and is not in all its aspects limited to a device for forming a dry cell cartridge in the manner described.

Another object which I have in view is the provision of a machine which is well adapted to the manufacture of dry cells of the type in which it is desirable to maintain a certain, definite distance between the top of the depolarizing body and the upper extremity of the carbon pencil.

Another object of the invention is to provide a machine whereby the moist, finely divided depolarizing material can be readily and conveniently tamped in place relatively to a carbon pencil or other part of the battery cell.

Still another object is to furnish a machine whereby the tamping can be so carried out as to protect the projecting end of the electrode from breakage during the tamping operation and to keep such projecting end of the electrode clear of adhering depolarizing material, which would have a prejudicial effect.

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

In the accompanying drawings:

Fig. 1 is a front elevation of a tamping machine embodying my improvements, certain parts being broken away;

Fig. 2 is a side elevation of the machine shown in Fig. 1;

Figs. 3, 4, 5 and 6 are sections on lines 3--3, 4--4, 5--5, and 6--6, respectively, of Fig. 1;

Fig. 7 is a detail elevation of the tamping plunger;

Fig. 8 is a section on line 8--8 of Fig. 7;

Fig. 9 is a detail elevation of the die block;

Fig. 10 is a detail of the spacing block;

Fig. 11 is a vertical section of certain parts, on a larger scale, showing the commencement of the tamping operation;

Fig. 12 is a similar view showing a later stage of the operation;

Fig. 13 shows the cartridge and spacing block removed from the die after the completion of the tamping; and

Fig. 14 is a detail of the cartridge after the spacing block has been removed from around the projecting end of the electrode.

The machine selected for illustration comprises a base 20 having supporting legs 21. On top of the base are parallel guide rods 22 rising therefrom. These rods may be conveniently made of metal. Mounted on the rods, adjacent their lower ends but at some distance above the top of the base 20, is a table 23, which receives the depolarizing material. This material is usually finely divided and may consist of an intimate mixture of manganese dioxide and graphite, moistened, for example, with a solution of electrolyte material such as ammonium chloride. The table is preferably enclosed at the sides and ends so that a fairly large amount of the depolarizing material may be stored thereon without likelihood of being spilled on the floor, and in the form shown, there is a fairly high wall 24 extending up from the table at its rear edge, also front and end walls 25 of less height. Associated with the table is a suitable die 26, wherein the depolarizing material is tamped about the carbon pencil 27 shown in Figs. 11 and 12. Above the die 26 is a co-operating
plunger 28 shown in detail in Figs. 7 and 8. This plunger is removably secured as by means of a set screw 29 in a socket at the lower end of a vertically sliding crosshead or gate 30 mounted on the guide members 22. In the present embodiment, the head 30 consists of a heavy plate of metal having guide clips 31 at the corners thereof embracing the guide rods. This head, which is of appropriate weight for the tamping operation to be effected, may be raised and lowered in any convenient manner. In the case illustrated, it may be raised by means of a leather or canvas strap 32 passing over a pulley 33 and having a loop 34 at its lower end adapted to be grasped by the hand of the operator. The operator pulls down on the strap 32 in order to elevate the head 30 and thereby the plunger 28, and the head is then allowed to fall by gravity, carrying the plunger 28 into the die member 26 of table 23 for tamping the material about the electrode pencil.

The die member 26 is preferably constructed in two parts, there being an outer part or block 26 (Fig. 9) of wood or steel, for example, and a suitable non-corrosive and smooth lining 26 of hard rubber, porcelain or the like. The die opening proper is constituted by the inner, cylindrical surface of the lining member 26. The die member 26 is suitably supported in the upper end of an arm or standard 35 rising from the base or body 20. At its upper end the member 26 has a shoulder 36, which fits within an opening 37 in the bottom of table 23, the upper surfaces of the member 26, the member 20, and the bottom board of the table, being substantially flush with each other so as to present a smooth surface over which the depolarizing material may be conveniently pushed or scraped in order to carry it into the die opening. The member 26 is supported upon the laterally projecting upper end of the standard 35, which has an opening therein that receives the body portion of member 20, the shoulder 36 of the die member resting on the upper surface of the standard 35 around the opening in the latter. The lining member 26 is secured in the block 26 in any convenient manner, which it is not necessary to illustrate in detail. The standard 35 may be secured to the rear part of the body 20 by screws 38, as shown in Figs. 2 and 4.

Interposed between the table 23 and the body 20 and shiftable in a horizontal plane with regard to the frame of the machine, is a suitable supporting member 39, which is adapted to constitute the bottom of the die. In the form shown, this member 39 is a cylindrical block mounted to swing in a horizontal plane, the same being carried by an elbow lever 40 pivoted to the base 20 at 41, and having an operating extension 32 with a handle 43 easily accessible at the front of the machine. The block 39 also carries directly a manipulating handle 44 projecting laterally therefrom. The lever 40 is extended around one of the guide rods 22, as shown in Fig. 4. The block 39 is secured to the lever 40 by a screw 45 passing through a threaded socket in the block into engagement at its inner end with the end portion of lever 40, as shown in Fig. 4. The block 39 is adapted to be swung in relatively to the machine frame so as to carry the block directly beneath the die opening, as shown by the full lines in Fig. 4, and to be swung out from vertical alignment with the die opening, as indicated by the dotted lines in Fig. 4. In order to provide an adjustable stop for limiting the rearward movement of the block 39, a limiting screw 46 may be set in a threaded socket 47 in standard 35 so that its head will be engaged by the block 39 when the latter is in the desired position beneath the die in table 23. Movement of the block 39 in the opposite direction is also limited, by preference, and for this purpose the head of screw 45 may make contact with a stop pin 48 on the bed.

The plunger 28, which is shown in detail in Figs. 7 and 8, is of generally cylindrical shape and its lower part is sleeve-like in form, having a bore to receive the electrode pencil 27. It is preferred in practice to make the plunger 28 of two sections, the lower section 28 being constructed of hard rubber. This portion has a bore 28 therein. The upper section 28 of the plunger may be conveniently made of metal. At one side of the plunger the same has a lateral opening or window 28, which is in communication with the upper end of the bore 28, thus permitting the lateral ejection of material from the plunger, as hereinafter described. The bottom portion of the plunger is usually made of hard rubber or similar material, so that it will not be affected by the chemicals in the depolarizing mix and preferably the whole lining of the bore 28 will be of the same material. The outer surface of the plunger is smooth and adapted to conform closely to the cylindrical inner surface of the lining member 26 of the die.

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 manganese dioxide and 12 units of finely divided graphite, these two ingredients being mixed together as intimately as possible to form a homogeneous, powdery mass. The mass may be moistened with a suitable electrolyte material such as an ammonium chlorid solution of appropriate density. The moist mix is dumped upon
the table 23 for tamping into the die around the carbon pencil 27. Before the carbon pencil is placed in the die, however, a spacing member 49 is placed about one end of the same, as shown in Figs. 11 and 12. 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 cartridge and the top surface of the pencil. The height of the die opening is approximately equal to the length of the pencil. The spacing block 49 is located in the bottom part of the die opening so as to center the pencil therein, the pencil and block being introduced into the die opening through the bottom of the latter, the supporting block 39 being shifted out of the way for that purpose. After the pencil and block have been located in the die, the block 39 is shifted back so as to form the bottom of the die. It then engages the bottom of the spacing block 49 and the lower extremity of the pencil and supports these parts in the die.

A quantity of the depolarizing mix on the table is next scraped or pulled over the die opening so as to fill the space therein above the spacing block 49 and around the pencil, as shown in Fig. 11, the mix being heaped up somewhat over the mouth of the die opening. The plunger 28 is then brought down by gravity or otherwise into the die opening as hereinbefore described. This plunger tamps the material around the pencil against the spacing block, as will be understood. The material which is located between the upper end of the pencil and the lower end of the plunger is permitted to pass up into the bore 28' and to escape laterally from the plunger through the window 28'' in practice, the plunger is brought down into the die opening several times, say, three or four times, until the desired amount of material has been packed into the die opening. It will be understood that after the first descent of the plunger, the same is raised and then additional material is piled over the mouth of the die and heaped up as before, and this process is repeated until sufficient material has been tamped in place. When this has been brought about, the supporting block 39 is shifted to the inoperative position so as to permit the removal of the cartridge and spacing block from the die. In case these parts tend to stick in the die opening, the plunger 28 may be used as an ejector for moving the cartridge out through the bottom of the die opening. When the pencil with its adhering body of mix is taken out of the die, the spacing block 49 is still in place, as indicated in Fig. 13. The spacing block is then removed from the lower end of the pencil (which becomes the upper end in the battery) and the cartridge in then ready to be covered with a fabric envelope, in case such an envelope is to be used.

It will be seen that with my new machine as herein described, the cartridge is tamped while in an inverted position, that portion which is eventually to form the top of the cartridge being tamped in place first. In other words, the operation of tamping 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 pencil, reduces to a minimum the breakage of the projecting pencil ends, and it also keeps the ends of the pencils clean, as the depolarizing material is prevented from contacting with and adhering to the same.

Various changes may be made in the details of the construction without departing from the scope of my invention as defined in the claims.

What I claim is:

1. Apparatus for tamping dry cell cartridges, comprising a die, a sleeve-like reciprocating tamping plunger cooperating therewith, and means for successively reciprocating said plunger to pack depolarizing material about an electrode pencil.

2. Apparatus for tamping dry cell cartridges, comprising a die open at the top and bottom, means for closing off the die at one end, a sleeve-like tamping plunger movable into the other end of the die, and means for successively reciprocating said plunger to pack depolarizing material about an electrode pencil.

3. In apparatus such as described, a die open at the top and bottom, a shiftable member for closing the die at the bottom, said member supporting a pencil centering device within said die, and a plunger movable into the die from above to cause successive tamping upon material in said die.

4. In apparatus such as described, a die open at the top and bottom, a laterally shiftable member adapted to close off the die, and a sleeve-like tamping plunger movable into and out of the die to successively tamp material as received into the opening in said die.

5. In apparatus such as described, a stationary die member having a through opening, a laterally shiftable block adapted to close off the die opening at one end, and a sleeve-like tamping plunger adapted to be moved into and out of the die at the other end to successively tamp material as received in the opening in said die.
6. In a dry cell cartridge tamping machine, a die, means in the die to support and center an electrode pencil, and a tamping plunger adapted to conform to said pencil and having an opening for the ejection of the surplus of the material added during the tamping operation.

7. In a machine for tamping dry cell cartridges, a die, and a sleevelike reciprocating tamping plunger cooperating with the die and having a lateral opening through which a portion of the material is ejected during the tamping operation.

8. In a machine for tamping dry cell cartridges of the type in which a body of depolarizing material surrounds and adheres to a carbon pencil, a die, means therein to center a pencil and a sleevelike plunger cooperating with the die and having a central opening adapted to conform to a pencil within the die, said plunger being provided with a lateral opening for the ejection of the surplus of the material added during the tamping operation.

9. In a machine of the character described, means for positioning an electrode pencil within a suitable space with a spacing member enclosing one end, means for providing for the introduction of material into the space around the pencil, and guided means for successively tamping the material against the spacing member and about the pencil.

10. In a machine of the character described, a die, means for enclosing one end portion of an electrode pencil to center it within the die, means for successively tamping depolarizing material as added around the remainder of the pencil, and means to guide said member in its movement.

11. In a machine of the character described, a die, means for positioning an electrode pencil within the die, means for successively tamping material as added about such pencil, and operating means for said tamping means.

12. In a machine of the character described, a die, means for positioning an electrode pencil therein, a reciprocating member and means carried thereby for successively tamping material as added around the pencil to form a uniformly packed mass adhering to the pencil.

13. In a machine of the character described, means for positioning an electrode pencil with one end enclosed, and means for successively tamping material as added about the pencil to form a body adhering to the same.

14. In apparatus such as described, means for positioning an electrode pencil with one end enclosed and pointing downwardly, and means for successively tamping material as added about the remaining portion of the pencil.

15. In a machine such as described, means for positioning an electrode pencil with one end enclosed and a sleevelike plunger adapted to conform to the pencil and to successively tamp the material as added about the remaining portion thereof.

16. In a machine of the character described, a die, means within the die to enclose and center one end portion of an electrode pencil, means to close one end of the die and to support said pencil enclosing and centering means mounted under the other end of the die, and means to successively tamp material as received in said die about said pencil.

17. In a machine of the character described, a die having an opening therethrough, means to position an electrode pencil centrally within the opening in the die, means to close the opening in said die at the bottom and to support said pencil positioning means, and means to successively tamp material as received into the opening at the upper end of said die about and into close contact with the pencil held therein.

18. In a machine of the character described, a die having an opening therethrough, means to position within the opening thereof an electrode pencil, an imperforate member closing the lower end of the opening and supporting said pencil positioning means, and a hollow tamping plunger cooperating therewith at the other end of the opening, adapted to successively tamp material received in said die about said pencil.

19. In a machine of the character described, a die having an opening in which a carbon pencil may be positioned, an imperforate shiftable member to close the lower end of the die to support said pencil, and a hollow reciprocating tamping plunger co-operating therewith through the other end of the opening, to successively tamp material received in said die about said pencil, to cause the same to adhere to said pencil.

20. In a machine of the character described, a die having an opening, means within said opening for positioning an electrode pencil, an imperforate shiftable member to close the lower end of the opening and to support said pencil positioning means and said pencil, and a hollow tamping plunger reciprocably mounted above the die and operating therewith through the upper end of the opening therein, said plunger adapted to successively tamp material received in said die about said pencil, to cause the material to adhere to said pencil, said positioning means spacing the material so tamped from one end of said pencil.

21. In a machine of the character described, a die, means in the die to support and center an electrode pencil, and a tamping plunger adapted to conform to said pencil and having an opening for the ejection of the surplus of the material added during the tamping operation.
scribed, a die having an opening there-through, means to position an electrode pencil centrally within the opening in the die, means to close the opening in said die at the bottom and to support said pencil positioning means, and means to successively tamp material as received into the opening at the upper end of said die about and into close contact with the pencil held therein, said positioning means being adapted to enclose one end of the pencil and to space the tamped material from the enclosed end thereof.

22. In a machine of the character described, a die having an opening there-through, means to position an electrode pencil centrally within the opening in the die, means to close the opening in said die at the bottom and to support said pencil and pencil positioning means, and means to successively tamp material as received into the opening at the upper end of said die about and into close contact with the pencil held therein, said positioning means being adapted to enclose one end of the pencil and to space the tamped material from the enclosed end thereof, said opening closure means being movable to allow the expulsion of said positioning means and said pencil with the tamped material thereabout, from the opening in said die.

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

HAROLD DE OLANETA.