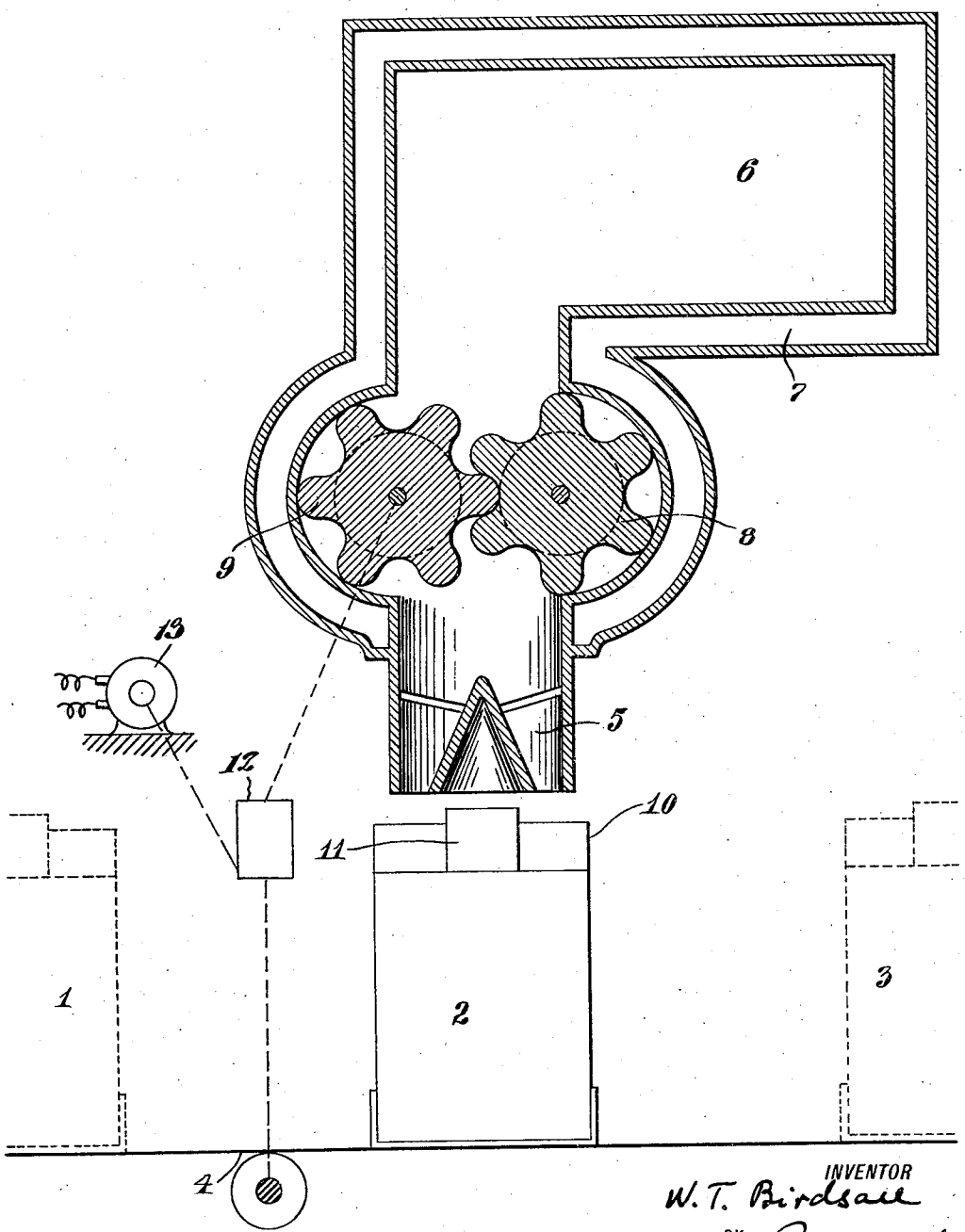
Oct. 13, 1931. W. T. BIRDSALL 1,827,416

DRY CELL SEALING DEVICE

Filed April 27, 1925



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UNITED STATES PATENT OFFICE

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DRY CELL SEALING DEVICE

Application filed April 27, 1925. Serial No. 26,027.

This invention relates to improvements in dry cell manufacture, and more particularly to a new and improved arrangement for sealing dry cells.

In accordance with the present invention the flow of molten pitch or the like on top of the dry cell mixture is controlled by means of a gear pump, whereby the flow may be more accurately controlled than is possible with valve arrangements. The main objection to valve arrangements is that even after the valve is closed, the viscous pitch will continue to drip from the nozzle onto the platform on which the dry cells are positioned. This is overcome in accordance with the present invention by operating the gear pump first in one direction to permit the flow of a predetermined amount of pitch through a nozzle onto the dry cell mixture, and then in the opposite direction for holding back by suction the pitch still in the nozzle from dropping on the platform.

The invention is schematically illustrated in the drawing in which a plurality of dry cells 1, 2, 3 are mounted on a platform 4 which is moved below an annular nozzle 5 through which pitch may flow from a reservoir 6 suitably heated; e. g., by steam or hot oil flowing through a jacket 7. The gear pump consists essentially of intermeshing cogwheels 8 and 9. By rotating the cogwheels away from each other, i. e., cog 8 in a clockwise and cog 9 in a counter-clockwise direction, depending on the number of revolutions performed by the wheels, a definite quantity of pitch will be permitted to flow from the reservoir through the nozzle 5. This pitch will fill up the annular space between the top of a zinc electrode 10 and a central carbon electrode 11 of a dry cell. The annular space in the cell is slightly wider than the nozzle. When the sealing space in the dry cell is filled, the cog-wheels 8 and 9 are rotated in the opposite direction, i. e., towards each other, which will prevent the pitch clinging to the walls of the nozzle 5 from dropping down on the platform 4.

The operation of the gear pump should be, of course, timed with the moving of the belt 4. The belt is moved in successive stages so as to maintain a dry cell centered below the nozzle for a predetermined length of time, sufficient to deposit the sealing material. While the belt is moving dry cell 2 away from under the nozzle and until dry cell 1 arrives under the nozzle, the gear pump is operated in the opposite direction to prevent dripping. This is accomplished by means of a transmission 12 driven by a motor 13 and adapted through any well known form of gearing to advance the cells and operate the pump intermittently in forward and reversed directions.

Obviously, the invention is capable of various modifications and embodiments which will readily suggest themselves to those skilled in the art. For the sake of clearness the spout of nozzle 5 is illustrated in the drawing as being of a relatively large diameter. In practice, this spout should be small, good results having been obtained with a spout of a diameter of $\frac{3}{32}$ of an inch. With a small spout the surface tension will allow the sealing fluid to arch across the bore of the spout without dripping. When the pump is reversed so as to draw the pitch away from the bore of the spout, the pitch clinging to the walls of the nozzle will drip in time, the reversal of the pump serving to draw the pitch into the bore of the spout. A further advantage of using a small spout is that it assists in causing the viscous sealing material to spread itself evenly around the top of the cell, which allows the seal to be filled high without overflowing at one spot.

What I claim is:

1. In a device for sealing dry cells having centrally exposed electrodes, a reservoir of sealing material, a gear pump, a connection between said reservoir and said gear pump, an annular nozzle leading from said gear pump toward a dry cell to be sealed, means for moving said dry cell into registry with said nozzle, said pump being effective to rotate in one direction to exert pressure on the material in said nozzle only while said dry cell is stationary, and to rotate in the opposite direction to apply suction to said material to prevent it leaving the nozzle only while said dry cell is in motion.

2. In a device for sealing dry cells, a conduit for sealing material leading towards the dry cells and having a bore so small that surface tension will allow the material to arch across the bore without dripping, a gear pump for controlling the flow of said material through said passageway, means for operating said pump for forcing said material from said conduit and reversing the operation of said pump so as to create a vacuum, in synchronism with the movement of the dry cells past said conduit.

3. In a device for sealing dry cells, a vertical pipe for conducting viscous fluid sealing material, a gear pump positioned intermediate the ends of said pipe for controlling the flow of sealing material in said pipe when the cell is stationary, and means for operating said pump for forcing said material from said conduit and reversing the operation of said pump so as to create a suction on the material in the lower end of the pipe, during movement of the dry cells.

4. The method of applying sealing material to dry cells which comprises storing a quantity of said material in a heating chamber, ejecting material from said container to dry cells at intervals, and confining the discharge to such a small dimension that the heated material is prevented from dripping, between said intervals, by its own surface tension.

In testimony whereof, I have signed my name to this specification this 23rd day of April, 1925.

WILFRED T. BIRDSALL.