

(No Model.)

E. R. WHITNEY.
SECONDARY BATTERY.

No. 516,253.

Patented Mar. 13, 1894.

Fig. 1.

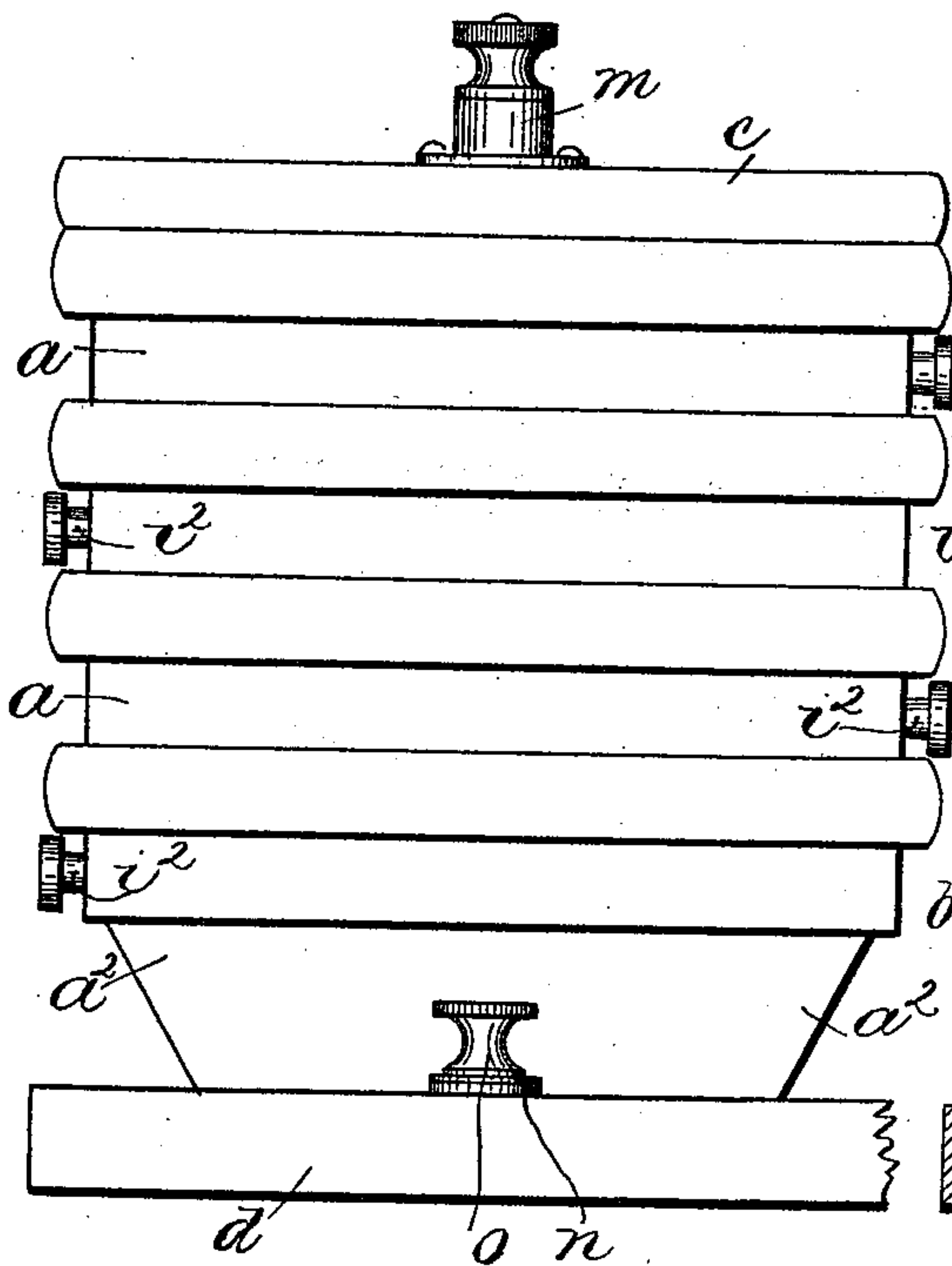


Fig. 2.

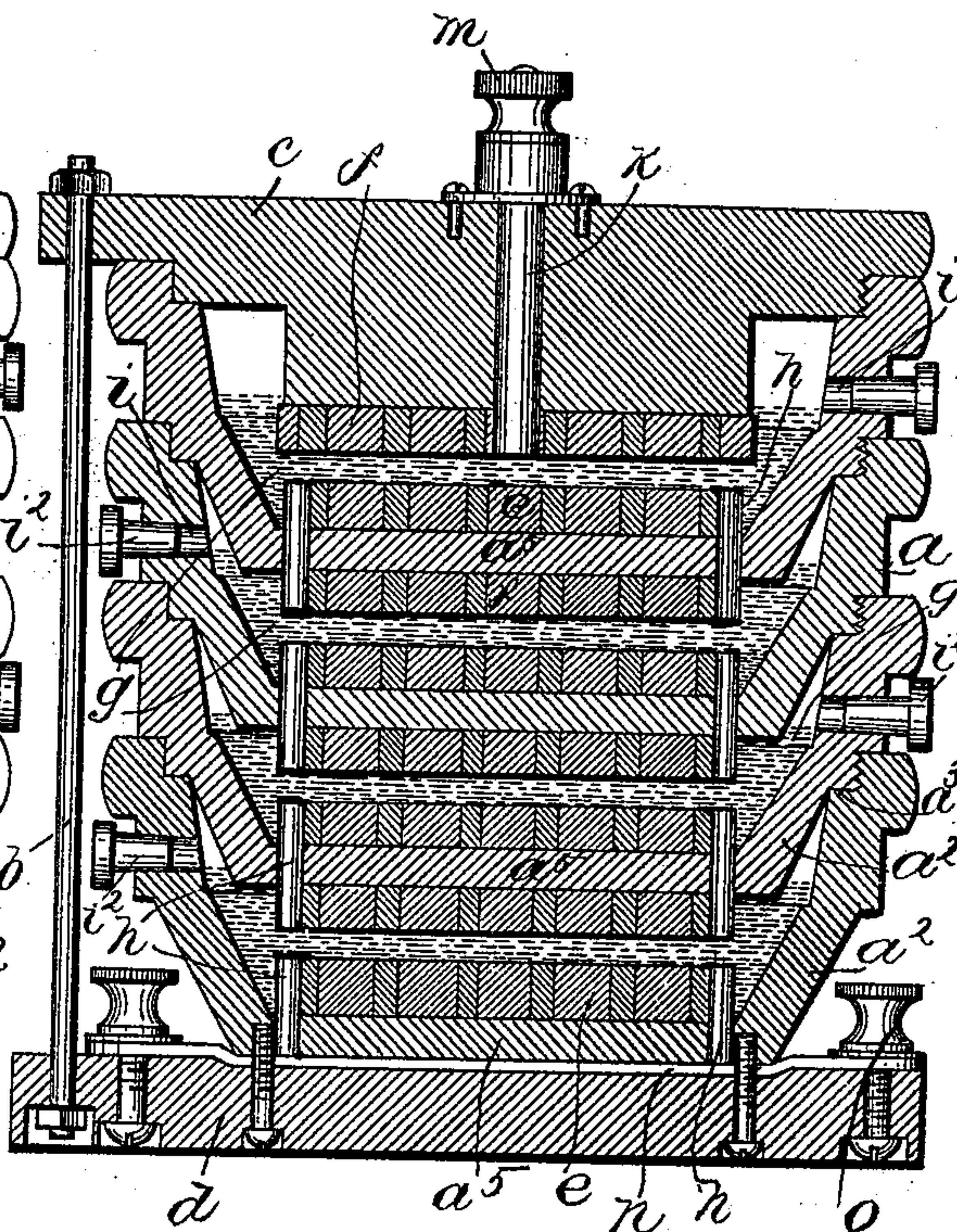
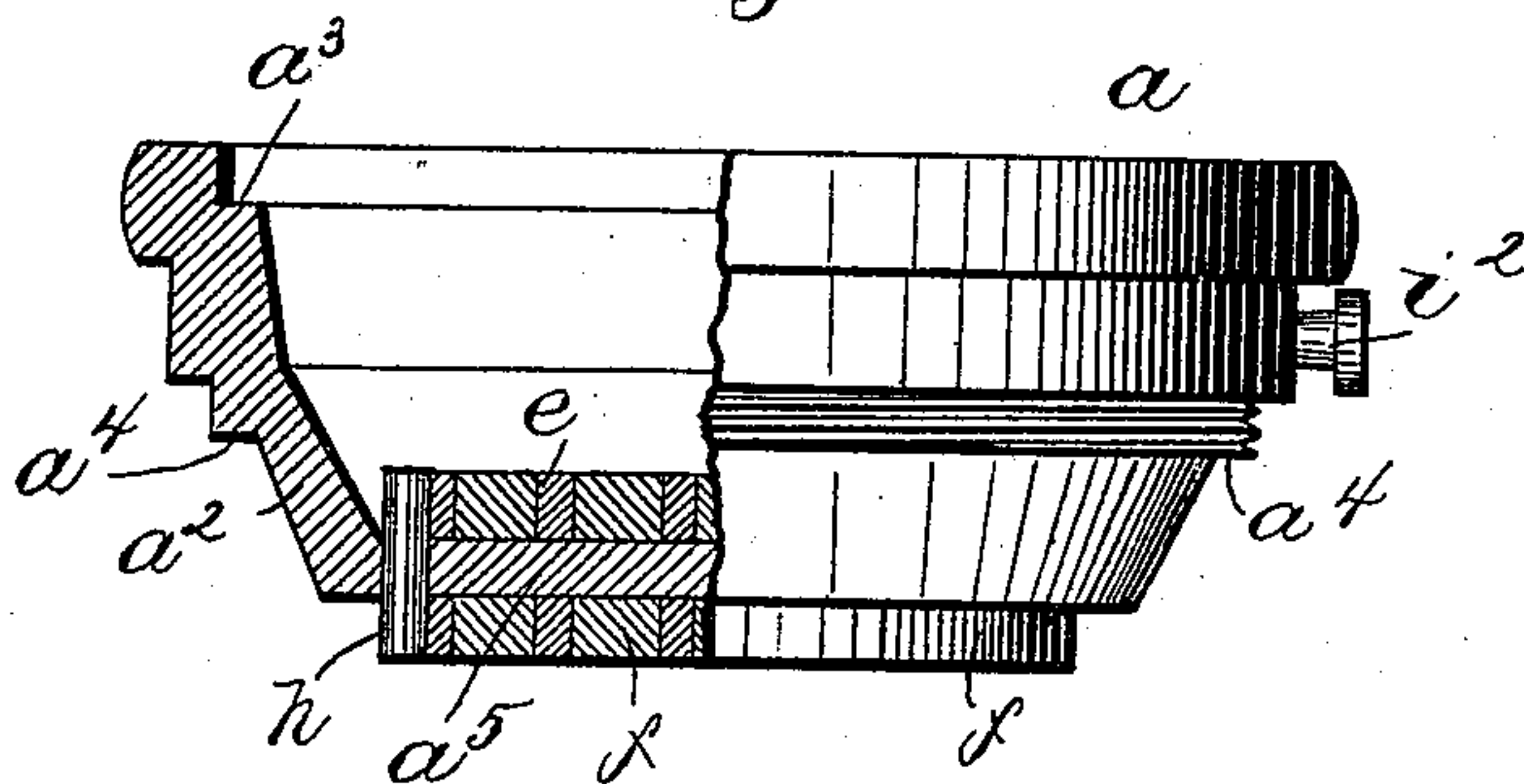


Fig. 3.



Witnesses

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EDWIN R. WHITNEY, OF MANCHESTER, NEW HAMPSHIRE.

SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 516,253, dated March 13, 1894.

Application filed February 4, 1893. Serial No. 460,943. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. WHITNEY, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Secondary Batteries, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a secondary battery the object being to produce a compact, efficient, and easily handled battery.

The invention is embodied in a battery composed of a number of shallow pans or trays made of insulating material capable of resisting the action of the battery liquids, the said trays being adapted to be arranged in a vertical stack or pile each tray supporting the column of other trays above it. The lower part of each pan or tray tapers toward the bottom so that it can sit down into the pan below it and the bottom portion of each pan has mechanically connected with it a positive and negative plate one being on the upper surface or inside of the pan, and the other being on the lower surface or outside of the pan. The plate at the top or inside of one pan together with the plate on the outside of the bottom of the pan above constitute a couple, and the several couples are electrically connected together in series by means of connecting and fastening devices which pass through openings in the bottom of the trays and fasten the plates above and below the bottom together and at the same time afford an electrical connection between them. The said fastening devices are preferably pins or rivets made of lead which thus rivet together the two plates while the bottom of the tray intervening between the said plates prevents local electrolytic action between them. The trays may be of any desired shape preferably round, or rectangular, and when round they may screw together so as to make substantially a cylindrical chamber or reservoir divided horizontally into a number of separate cells, and if trays of rectangular shape are used they may merely stand supported on one another, or if desired the column may be fastened together by being interposed between top and bottom plates clamped together by bolts or other-

wise. The side walls of the trays are provided with openings which may have movable plugs or stoppers by means of which openings electrolytic liquid may be introduced into the battery by merely immersing the complete column in a body of suitable liquid.

Figure 1 is a side elevation of a secondary battery embodying this invention; Fig. 2, a longitudinal vertical section thereof, illustrating at the right hand of the figure the construction in which the trays are round and are screwed directly together, and at the left hand the construction in which the column of trays may be of any desired shape and are secured together by fastenings connecting the top and bottom of the column, and Fig. 3 a side elevation partly in section of one of the trays and the plates connected thereto.

The battery is composed essentially of a number of pans or trays a of insulating material, hard rubber being well adapted for this purpose, each of which trays has the bottom portion a^2 smaller than the upper portion so that the bottom portion of one tray will set down into the top portion of another similar tray below as clearly shown in Fig. 2. The top of each tray is constructed to engage with and support a tray above it, being shown as provided with a rabbet or shoulder a^3 which engages with a corresponding shoulder a^4 above the reduced portion a^2 of the tray above. As shown in Fig. 1, and at the right of Fig. 2, the trays are round so that when supported one above the other they form a substantially cylindrical column and the side walls of the shoulders a^3 , a^4 , are screw-threaded so that each tray may screw into the tray below, thus securely fastening the said trays together, and if it is desirable to make the trays of rectangular shape or any other shape than round, the construction shown at the left hand of Fig. 2 may be adopted, being the same as that shown at the right of Fig. 2, except that the shoulders are not screw threaded and may consequently be slipped into engagement with one another without rotary movement of one with relation to the other. In this construction the column may be securely fastened together by bolts b or equivalent fastenings connecting

top and bottom plates *c* and *d* between which the series of pans or trays are thus securely clamped so as to form substantially a rigid receptacle.

5 The bottom portion *a*⁵ of each tray has connected with its opposite surfaces positive and negative plates *e*, *f*, which may be of any material and construction suitable for secondary batteries, and when the trays are fastened together in column, as shown, the plate *e* at the inside of the bottom of one tray will be inclosed in the same space with the plate *f* at the outside of the bottom of the next tray above, being both contained in the cell or space inclosed between the two trays and being supported at a short distance from one another so that when the said space is filled or partially filled with the exciting liquid of the battery as indicated at *g* the electrolytic action will go on between the said plates in the well known manner. In order to provide the electrical connection between the couple thus contained in one cell of the battery and the couple contained in the next cell so as to form an electric series of the said couples, and at the same time to mechanically connect the plates *e*, *f*, with the tray, metallic connecting pins *h*, preferably of metallic lead, are passed through registering openings in the plates *e*, *f*, and in the bottom of the corresponding tray the said pins being if necessary riveted or upset at their ends so as to securely fasten the plates together, and at the same time to preclude the liquid of the battery from acting between the plates *e*, *f*, of two adjoining couples.

The exciting liquid *g* may be introduced into the different cells in the process of putting them together or building up the battery, but in order to facilitate the introduction of the liquid without taking apart or disconnecting the different trays of which the battery is composed, the said trays may be provided with openings *i* in their side walls above the level at which the bottom of the next tray normally stands, said openings being provided with removable plugs or stoppers *i*² and by removing the said plugs and immersing the entire battery in a body of the exciting liquid, it will run into the cells and fill them to the level of the openings *i* when the battery may be removed from the body of the liquid with its cells properly charged and the plugs *i*² inserted. In this condition the walls are all tightly closed and the battery may stand in any position not necessarily with the trays in a vertical column.

In order to complete the battery and provide for connection with an external circuit the top plate *c* that closes the uppermost tray is provided with a plate *f* of the same polarity as those on the outside of the bottom of the several trays which is fastened to the top-piece by a conducting rod *k* connected with a suitable clamp or binding post *m* to receive

one of the external circuit terminals; and the plate *e* in the lowermost tray is connected with an outside conductor *n* that connects with a wire clamp or binding post *o* to receive the other terminal of the external circuit. 70

The herein described battery is simple, efficient, and strong, and may be handled without danger of spilling the exciting liquid, and is consequently especially well adapted for use on moving objects, such as vehicles or boats. 75

I claim—

1. A battery composed of a number of pans or trays of insulating material, the bottom portion of each of which enters and closes the top portion of the one below, the said trays having positive and negative plates supported on the inner and outer surfaces thereof, and connected therewith by electrical connectors passing through the bottom of the tray, substantially as described. 80 85

2. A battery composed of a number of pans or trays of insulating material, the bottom portion of each of which enters and closes the top portion of the one below, the said trays having positive and negative plates supported on the inner and outer surfaces thereof, and connected therewith by electrical connectors passing through the bottom of the tray, and fastenings by which a number of said trays are securely fastened together, substantially as described. 90 95

3. A battery composed of a number of pans or trays of insulating material, the bottom portion of each of which enters and closes the top portion of the one below, the said trays having positive and negative plates supported on the inner and outer surfaces thereof, and connected therewith by electrical connectors passing through the bottom of the tray, the said trays being provided with lateral openings for the introduction of the exciting fluid into the space between two consecutive trays, substantially as described. 100 105

4. A battery composed of a number of pans or trays of insulating material, the bottom portion of each of which enters and closes the top portion of the one below, the said trays having positive and negative plates supported on the inner and outer surfaces thereof, and connected therewith by electrical connectors passing through the bottom of the tray, and a cap piece for closing the mouth of the uppermost tray having a plate connected with it inside the tray and an external wire clamp or binding post connected with the said tray, substantially as described. 110 115 120

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN R. WHITNEY.

Witnesses:

FRED T. DUNLAP,
DAVID A. TAGGART.