(No Model.)

E. R. KNOWLES.

STORAGE BATTERY.

No. 483,563. Patented Oct. 4, 1892.

Fig. 3.

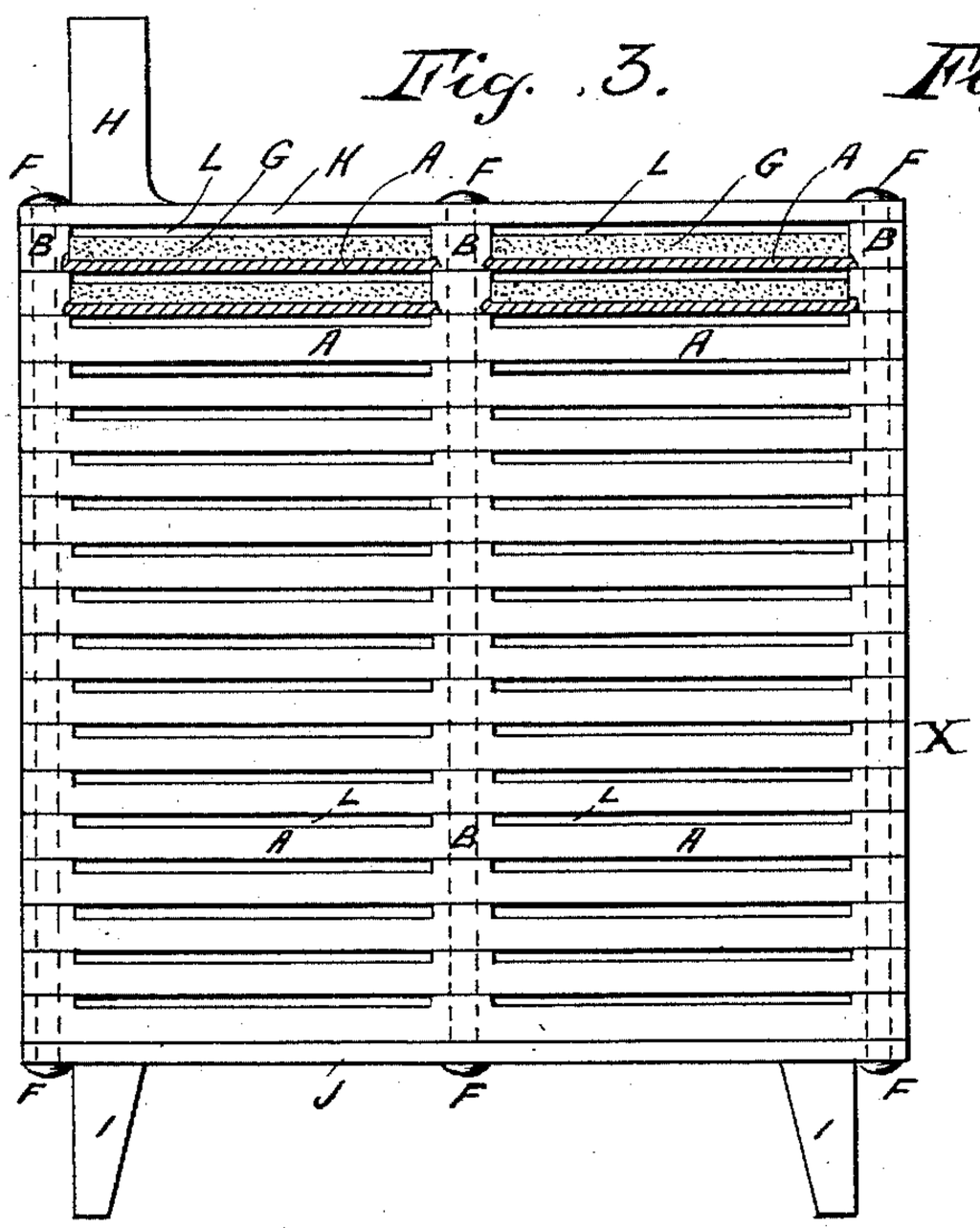

Fig. 5.

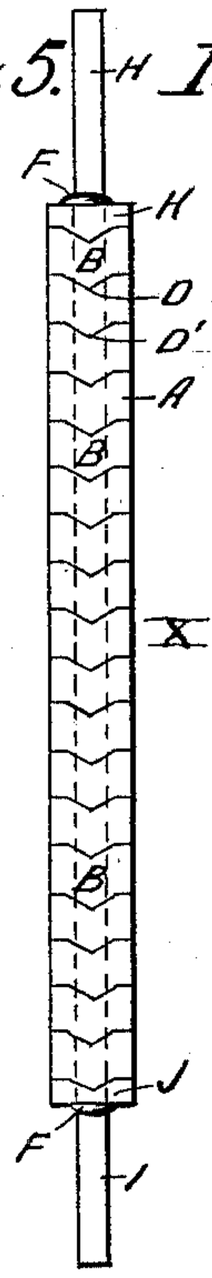

Fig. 4.

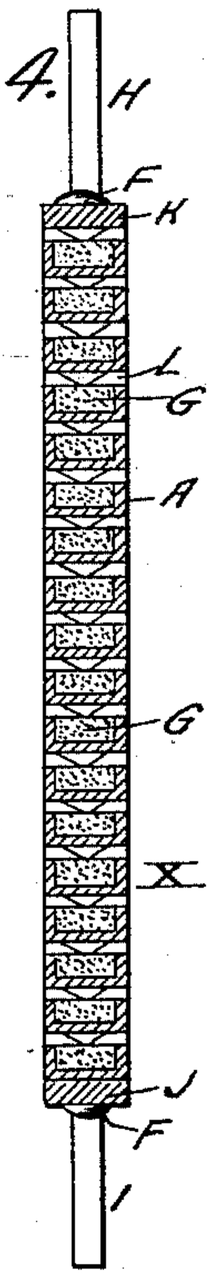

Fig. 2.

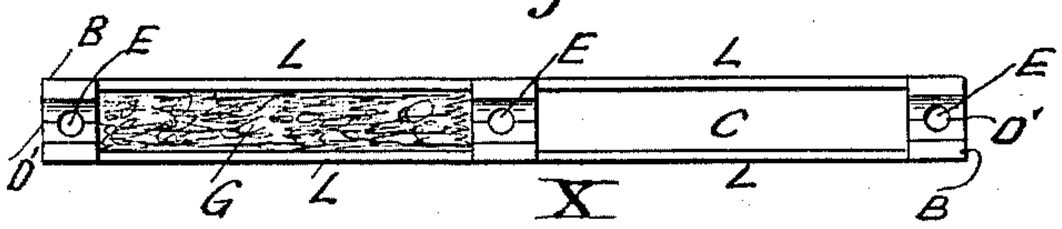

Fig. 1.

Fig. 6

Witnesses:
C. V. Mygatt.
C. L. Burlingame

Inventor:
Edward R. Knowles.

UNITED STATES PATENT OFFICE.

EDWARD R. KNOWLES, OF BROOKLYN, NEW YORK.

STORAGE-BATTERY.

SPECIFICATION forming part of Letters Patent No. 483,563, dated October 4, 1892.

Application filed October 15, 1891. Serial No. 408,823. (No model.)

To all whom it may concern:

Be it known that I, EDWARD R. KNOWLES, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Storage-Batteries, of which the following is a specification.

This invention relates to improvements in storage-batteries, and has for its object the making of a new and improved form of electrode or plate for an electrical accumulator.

The support-plates for storage-batteries as heretofore made are subject to several serious defects, one of which is the difficulty of so making them that they will retain the absorptive material placed in them under all conditions of usage, another is the difficulty of obtaining a maximum of exposed surface of the absorptive material with a minimum of inactive material and yet to so arrange the plate that the absorptive material cannot under any circumstances escape from the plate, and another is the difficulty in so arranging the parts forming the plates that plates of varying sizes can be easily and economically made without change in these parts. I overcome these defects in the following manner, reference being had to the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon.

Figure 1 represents one of the trays for containing the absorptive material of which the plate is composed. Fig. 2 is a plan view of the same. Fig. 3 is a side view of the complete plate. Fig. 4 is a sectional end view of the same. Fig. 5 is an end view of the same. Fig. 6 is a section of one of the trays at the point where the rivet passes through.

The complete plate, as shown in Fig. 3, is made up of trays or boxes X, one of which is shown in Fig. 1. These trays are formed of any suitable metal, but preferably of an inoxidizable alloy of lead and other metals, such as antimony and tin. They are made in the form of receptacles, as shown at C C, Fig. 1, into which receptacles is placed the absorptive material, preferably in the form of bricks or plates. The trays may also be filled by pasting the absorptive material into them while it is in a plastic condition, or the absorptive material may be used in the form of a powder and compressed into these receptacles. The ends and center of these trays are thickened up, as shown at B B B′; but the central portion B′ may be dispensed with if so desired. These thickened portions are perforated at E E E and are provided on the top with a groove D′ and on the bottom with a peaked projection D. These projections are so arranged that they register the one with the other, so that when one is placed upon the other and riveted together by the rivets F F F, as shown, they cannot move or slide one over the other and the whole will be bound together into one rigid mass. There are other ways in which this can be accomplished, and I do not wish to confine myself to this particular method so long as this end is accomplished. It will be seen that the sides of these trays are made lower between the thickened portions B B B, as shown at L L L L, than the height of the parts B B B, so that when mounted up the one on the other, as shown in Fig. 3, there will be an open space L L L between the bottom of each tray and the top of the next one below. The walls and bottoms of these trays may be perforated, if desired. The absorptive material G G, in the form of cakes made in any suitable manner, is placed in the receptacles C C, and the trays A are then placed the one on the other and united together, as shown, forming when finished a plate, as shown in Figs. 3 and 4. The absorptive material G is exposed to the action of the electrolyte through the openings L L between the trays A A and also the perforations in the walls of the trays. The absorptive material G is also securely held in place and cannot be jarred or forced out of the plate. The lug H and the feet I I are on the plain strips J and K, preferably composed of an inoxidizable metal or alloy, and are placed, respectively, at the top and bottom of the plate and form the edges of the same. These trays or receptacles and all the parts of this plate may be cast in suitable molds or pressed into shape by suitable dies, and being all of one shape and size can be built up into plates of various sizes, as may be desired, thus greatly simplifying and cheapening the making of such a plate. By these means I am enabled to make an electrode for electric accumulators which is very simple and cheap in construction and durable, exposing a large mass of ab-

sorptive material to electric action and yet in such a way that it cannot fall or be forced out of the plate by any mechanical or electric shock to which it may be subjected.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A support-plate for the absorptive material of a storage-battery, consisting of a series of containing trays or boxes having at each end on the bottom a peaked projection and at each end on the top an angular groove, said trays or boxes being arranged one on top of the other, said peaked projections upon the bottom of the one tray or box fitting into the angular grooves upon the top of the next tray or box, substantially as described.

2. A support-plate for the absorptive material of a storage-battery, consisting of a series of containing trays or boxes having at each end on the bottom a peaked projection and at each end in the top an angular groove, said peaked projections upon the bottom of the one tray or box fitting into the angular grooves upon the top of the next tray or box, said trays or boxes having their upper edges cut away in such a manner that when they are assembled together there shall be an open space between the top of one tray or box and the bottom of the next tray or box, all being united together, substantially as described.

3. In a storage-battery, a containing tray or box X, forming an elementary part of a support-plate for the absorptive material, having thickened ends B B and a central rib B′, substantially as described.

4. An electrode for electric accumulators, consisting of series of containing trays or boxes arranged in column, one on top of another, in combination with a superposed strip K, provided with a lug H, substantially as described.

5. An electrode for electric accumulators, consisting of a series of containing trays or boxes arranged in column, one on top of another, in combination with a bottom strip J, provided with supporting-feet I I, substantially as described.

Signed at New York, in the county of New York and State of New York, this 10th day of May, A. D. 1891.

EDWARD R. KNOWLES.

Witnesses:
E. V. MYERS,
J. B. SABINE.