

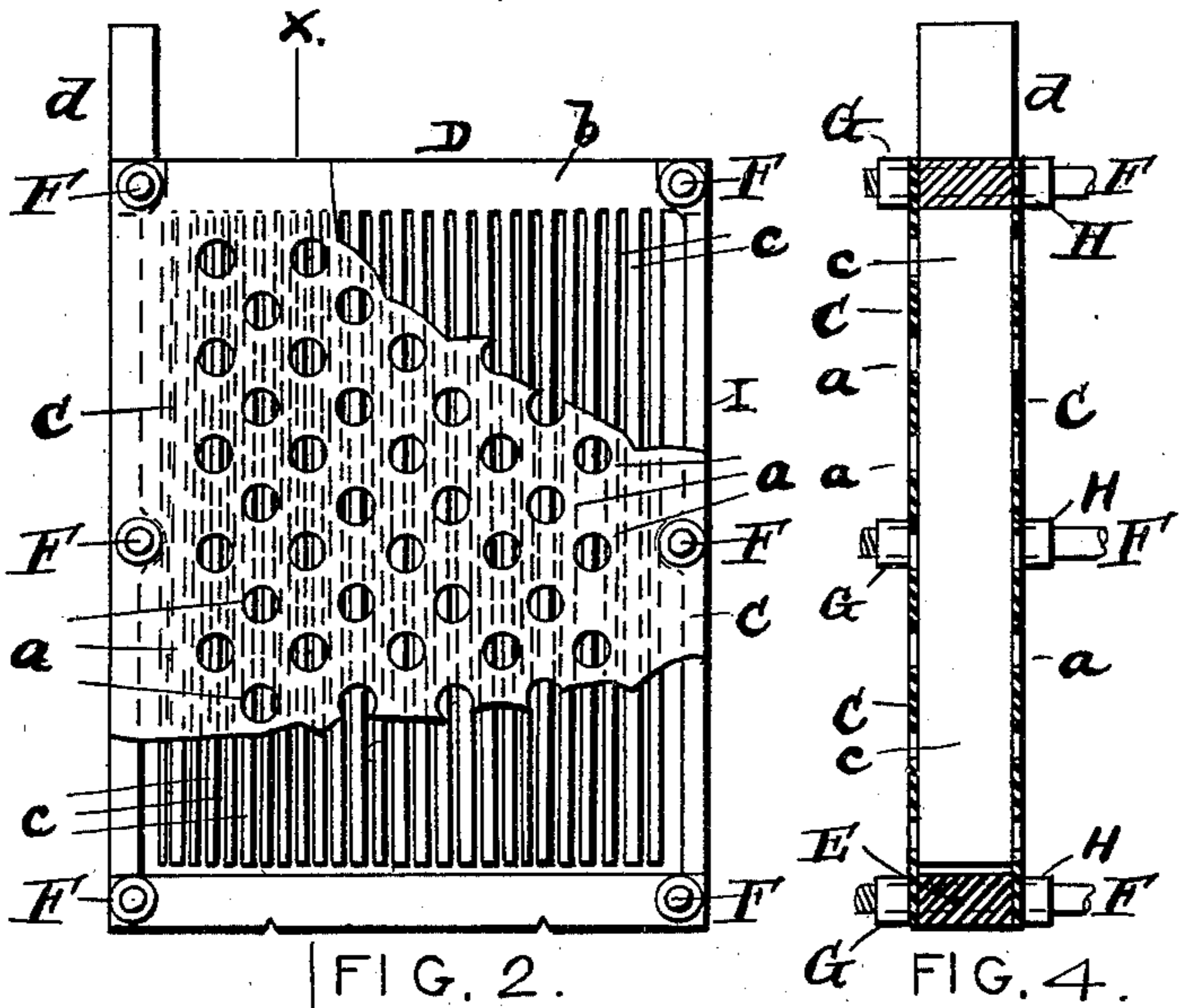
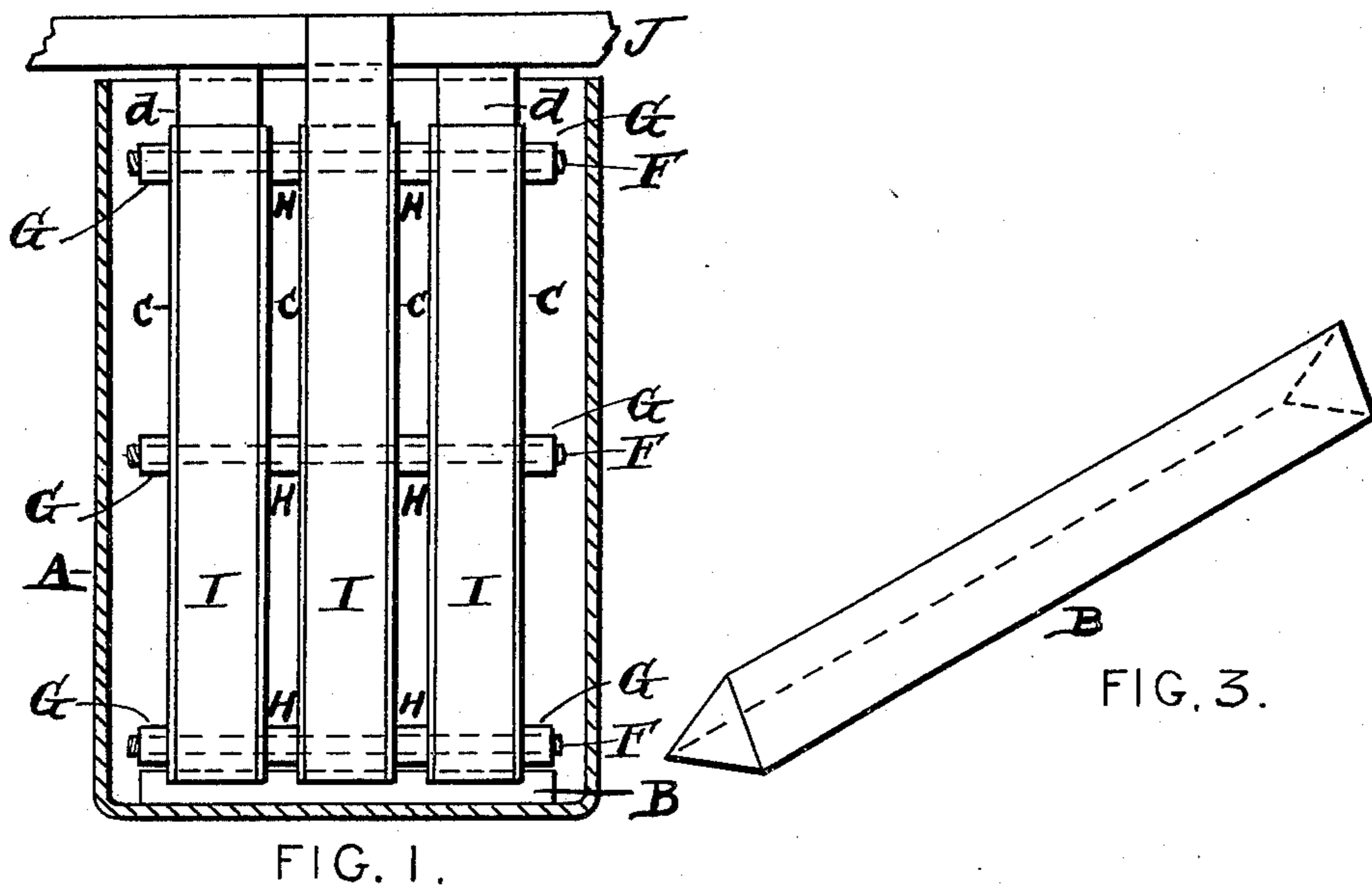
No. 673,287.

Patented Apr. 30, 1901.

A. REUTERDAHL.  
STORAGE BATTERY.

(Application filed Oct. 10, 1900.)

(No Model.)



WITNESSES. X.

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# UNITED STATES PATENT OFFICE.

ARVID REUTERDAHL, OF PROVIDENCE, RHODE ISLAND.

## STORAGE BATTERY.

SPECIFICATION forming part of Letters Patent No. 673,287, dated April 30, 1901.

Application filed October 10, 1900. Serial No. 32,633. (No model.)

*To all whom it may concern:*

Be it known that I, ARVID REUTERDAHL, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a certain new and useful Improvement in Storage Batteries, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to secondary batteries for the accumulation and distribution of electricity, and is an improvement of the device shown and described in Letters Patent of the United States, No. 653,883, issued to me July 17, 1900.

It consists of the novel construction and arrangement of the several parts, as hereinafter particularly described, and as specifically set forth in the claims.

Figure 1 is a side elevation of my improved storage battery with the jar or retaining vessel in which the electrodes are inserted seen in vertical section. Fig. 2 is a front elevation of one of the composite plates, consisting of a bottom strip and two side strips, a lead top bar with depending lead ribbons, and the perforated side pieces. Fig. 3 is a perspective view of one of the wedge-shaped supports upon which the composite plates rest. Fig. 4 is a view of one of the composite plates as seen partly in side elevation and partly in section on line *x x* of Fig. 2.

In the accompanying drawings like letters indicate like parts.

A represents a retaining-jar, made of rubber, glass, or other suitable material. At the bottom of the jar are wedge-shaped supports B, made of an acid-proof material which is a non-conductor of electricity, arranged parallel with each other for the purpose of supporting in position the composite plates, hereinafter described, at a distance above the bottom of the jar in order to provide a space for the acid beneath said composite plates. The composite plates each comprise two parallel flexible side pieces or holding-plates C, of thin sheets of hard rubber, celluloid, or other suitable acid-proof material. These side pieces C have a series of numerous small perforations *a*.

The electrode D consists of a lead top bar *b*, with depending lead ribbons *c*, which them-

selves constitute the active material, and which extend therefrom in close parallel strips. One of these lead ribbons *c* is seen in side elevation in Fig. 4. The edges of each lead ribbon *c* are in direct contact with the holding-plates C.

A strip of wood E (or other suitable material which is not a conductor of electricity) is placed between the parallel holding-plates C, at the bottom thereof, to keep said plates properly spaced, and the top bar *b* of the electrode D, being of the same width as said strip E, is inserted between said plates C at the top for the same purpose. Bolts or rods F, made of hard rubber, wood, or other material which is not a conductor of electricity, pass through apertures in said holding-plates C and are screw-threaded at their ends for the engagement of nuts G therewith of like material. Washers H, made of a material which is not a conductor of electricity, are mounted on said rods or bolts F between the holding-plates C and keep the composite plates properly spaced from each other. The nuts G serve to clamp together the couples made up of the several composite plates, as shown. At each end of the composite plate a strip I of wood or other suitable acid-proof material which is not a conductor of electricity, of the same width as the strip E, is inserted between the holding-plates C. The holding-plates C are held from displacement by notches in the bottom thereof, which receive the upper edge of the supports B, as seen in Figs. 1 and 2. Each electrode D is provided with an upward projection *d*, and said projections of the electrodes are connected by bus-bars J, extended to be in contact therewith in the same manner and combinations as heretofore used in storage batteries.

It is obvious that instead of using the rods F and nuts G to clamp the composite plate together other holding means, bands or clamps, may be employed for the same purpose.

The advantages of a construction of storage batteries in which flexible holding-plates are used have been set forth in my said Letters Patent No. 653,883, to the device in which this present invention is an improvement, and therefore they are not repeated here at length; but, in brief, it may be stated that

storage batteries of this construction are much lighter in weight, smaller in size, free from the liability of local or short circuits, and afford a better and elastic support for the active material than others made as heretofore.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a storage battery, the composite plate consisting of two parallel and perforated sheets of a material which is not a conductor of electricity, a strip of a material which is not a conductor of electricity inserted between said parallel sheets along the bottom thereof, an electrode comprising a top bar as wide as said strip inserted between said sheets at the top of the same, lead-ribbon strips extending from said top bar, which constitute the active material and which pass between said sheets, in contact therewith and means adapted to hold said composite plate together, substantially as specified.

2. In a storage battery, a composite plate

consisting of two parallel and perforated sheets provided with apertures, a strip inserted between said parallel sheets along the bottom thereof, an electrode comprising a top bar as wide as said strip inserted between said sheets at the top of the same, lead-ribbon strips extending from said top bar, which constitute the active material and which pass between said sheets in contact therewith, rods screw-threaded at their ends and passing through said apertures of the two sheets and nuts engaging the ends of said rods, said sheets, bottom strip, rods and nuts being made of a material which is not a conductor of electricity, arranged substantially as shown and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ARVID REUTERDAHL.

Witnesses:

WARREN R. PERCE,  
LEONARD H. CAMPBELL.