

No. 880,423.

PATENTED FEB. 25, 1908.

A. O. TATE.
STORAGE BATTERY PLATE.
APPLICATION FILED OCT. 29, 1907.

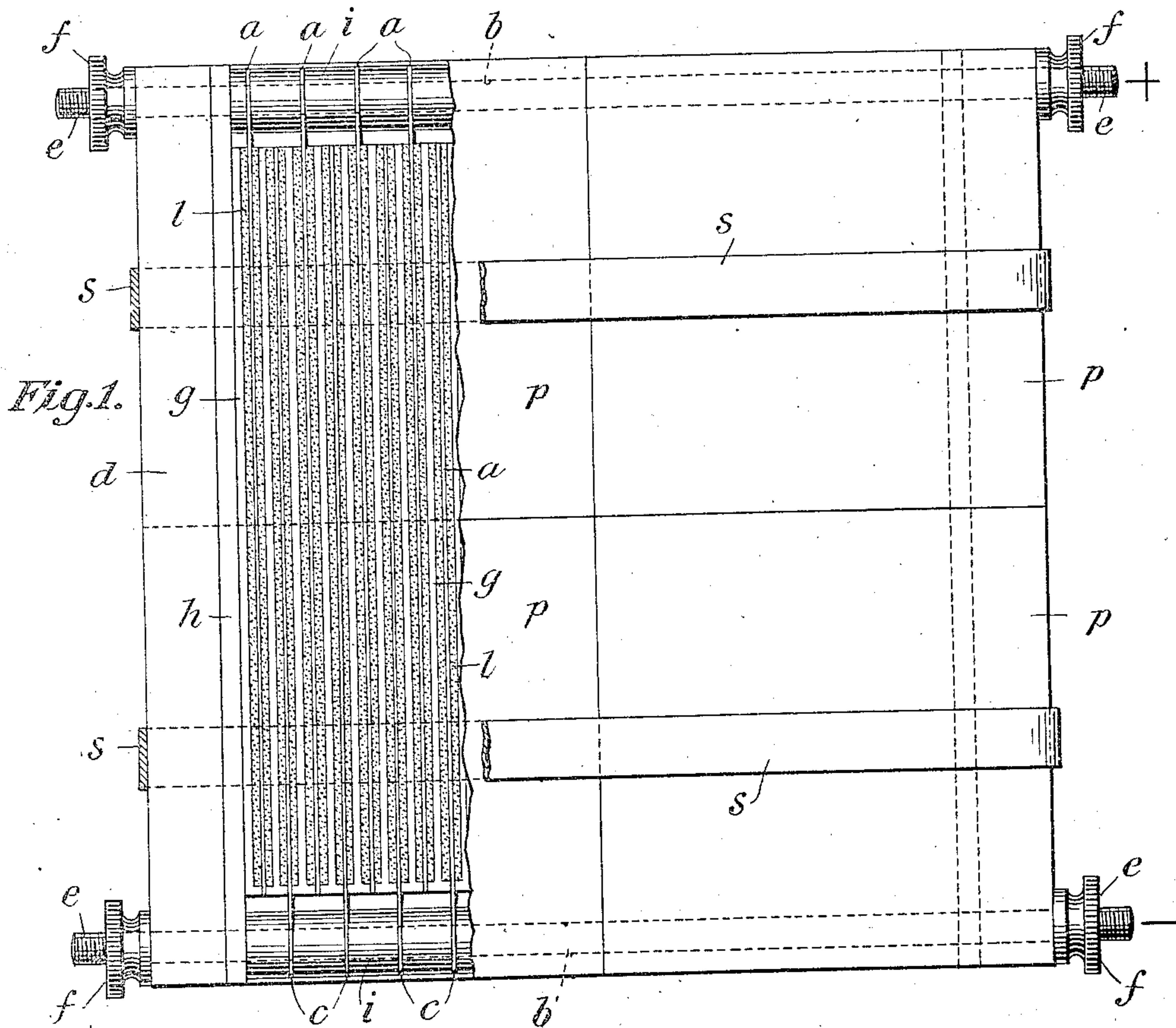
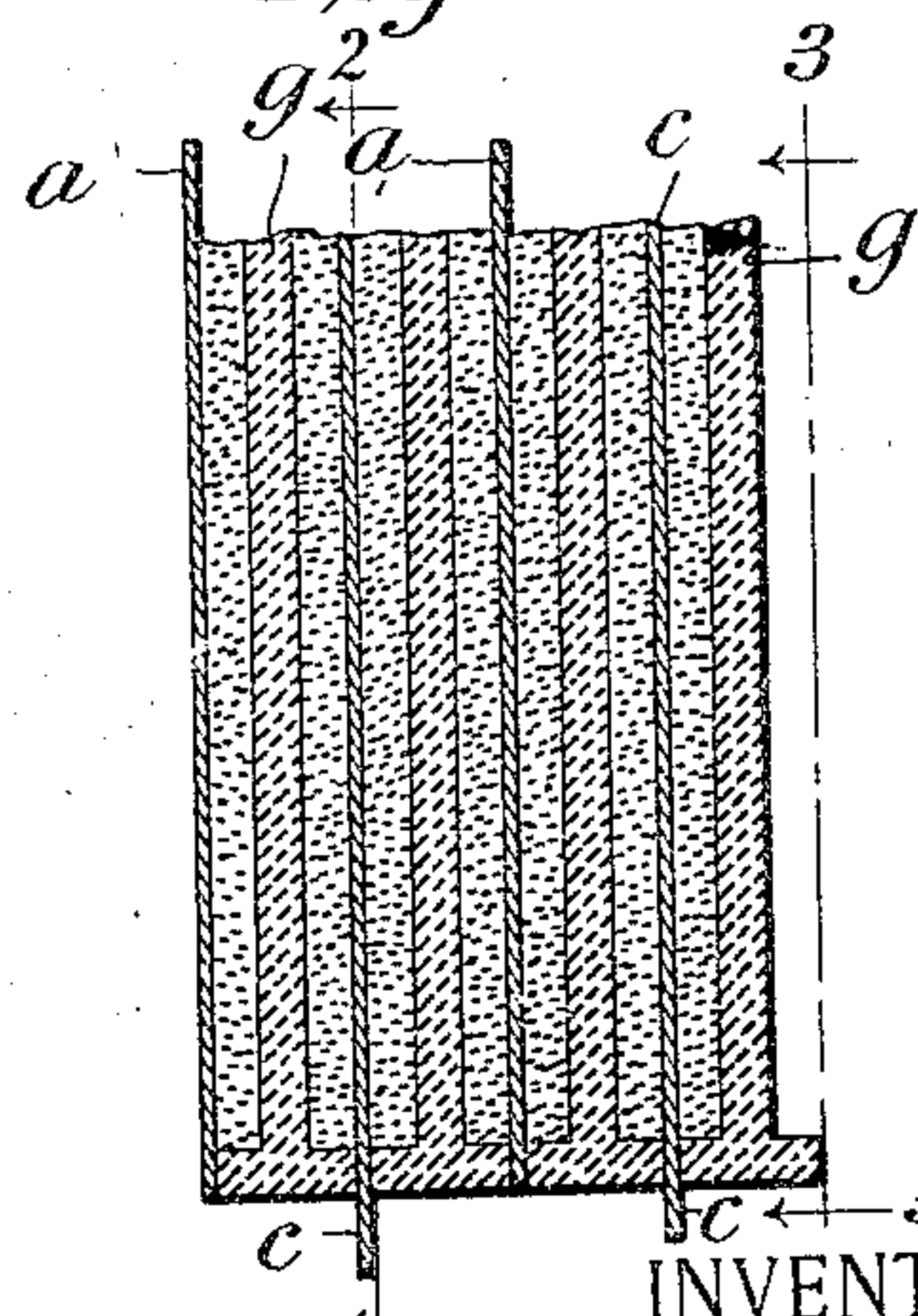
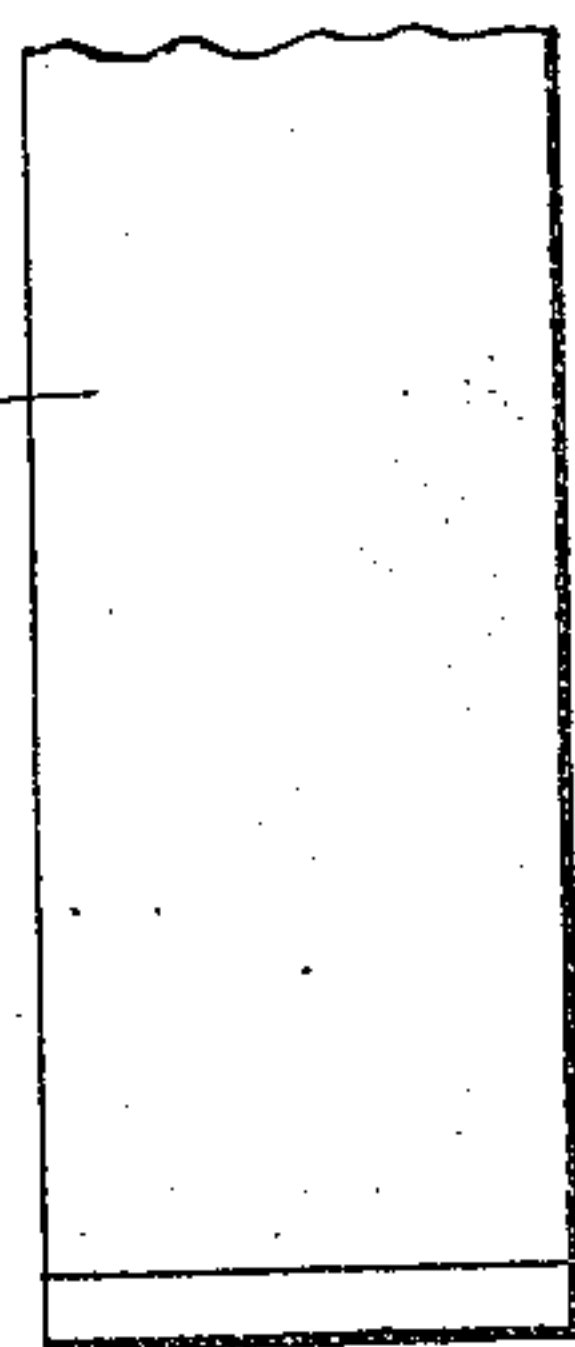
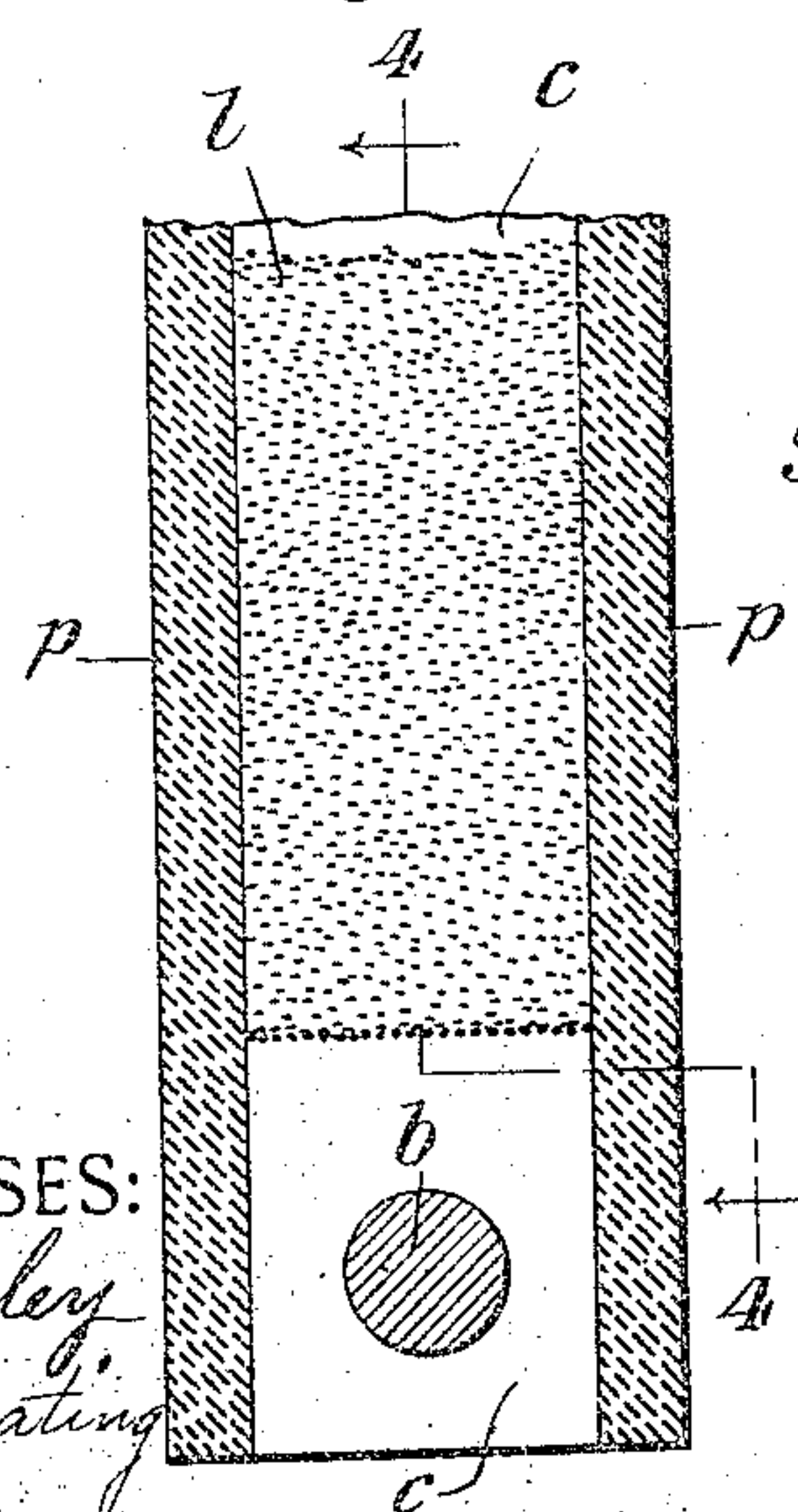


Fig. 2.

Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ALFRED O. TATE, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO TATE ELECTROLYTIC COMPANY OF AMERICA, A CORPORATION OF NEW YORK.

STORAGE-BATTERY PLATE.

No. 830,423.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed October 29, 1907. Serial No. 399,642.

To all whom it may concern:

Be it known that I, ALFRED O. TATE, a subject of the King of Great Britain, residing in the city of Toronto, Province of Ontario, county of York, Dominion of Canada, have made a new and useful Invention in Storage-Battery Plates, of which the following is a specification.

My invention is directed particularly to improvements upon storage battery plates of the bifunctional type; that is to say, storage battery plates in which the anodes and cathodes are of strip or ribbon like form interleaved and separated from each other by strips of insulating media, the anodes all being connected together to a common conductor at one end and the cathodes similarly connected together at the other end, such, for instance, as is disclosed in a prior application filed by me in the U. S. Patent Office on the 1st day of December, 1905, bearing Serial No. 289,796, and it has for its objects—first, to cheapen and simplify the entire structure. Second, to minimize, as far as possible, the structural size of the plate. Third, to provide detachable means applicable to both of the lateral faces of the electrode plate for holding or securing the active material in place between the anodes and cathodes. Fourth, to provide a structural plate of this type which may be quickly and easily dismantled, if need be.

My invention will be fully understood by referring to the accompanying drawings, in which,

Figure 1 is a side elevational view of one of my complete electrode plates, a part thereof being broken away to better illustrate the internal structure. Fig. 2 is a vertical sectional view taken through the lower part of Fig. 1. Fig. 3 is a detail side elevational view of one of the porous insulating strips which separate the anodes and cathodes from each other and sustain the active material, as seen looking at Fig. 4 from right to left in the direction of the arrows. Fig. 4 is a vertical sectional view taken through Fig. 2 on the broken line 4—4 and as seen looking thereat from right to left in the direction of the arrows, the lower part of the porous protecting plate, however, not being seen in this view of the drawings.

In the above-named application the anodes and cathodes are all described as being of strip or ribbon like form, but grooved in their lateral faces so as to constitute supporting chambers or channels for the active material, and such anodes and cathodes are separated from each other by interleaved or interrelated strips of porous insulating material, such as kaolin, and all of the parts bound together by binding blocks and nuts secured to the opposite ends of the common conductors, the structural arrangement being such that by virtue of the binding action of the parts the active material is held in place by the porous strips and the electrolyte is afforded access thereto upon the lateral faces of the plate through the edges of the porous separating media.

In an application bearing Serial No. 399,641 and filed of even date herewith, I have disclosed a further modification of the before-mentioned invention, in which I have reversed the construction of the anode and cathode strips and the porous insulating media respectively; that is to say, I have constructed the insulating media as of porous strips grooved on their opposite faces so as to constitute the support for the active material, and the anodes and cathodes are in the nature of thin metal strips all held together by binding blocks, the electrolyte having access as before to the active material on the lateral faces of the plate through the porous material.

In the present invention I have further simplified such a bifunctional electrode plate, as will be made apparent on inspection of the drawings and especial reference thereto, in which,

a, a represent thin narrow conducting anode strips and *c, c*, similar conducting cathode strips connected, one set at one end to the upper conducting bar or rod *b* and the other set to the lower bar or rod *b*. These bars or rods are screw-threaded at their opposite ends at *e, e, e, e* and provided with nuts *f, f, f, f*, *d, d* being binding blocks as before and *i, i*, spacing blocks.

g, g, represent relatively thin strips of porous insulating material, such as kaolin, and preferably of the same width as the anode and cathode strips *a* and *c*: said insu-

lating strips being provided with ledges or shoulders at their lower ends adapting them to sustain the active material *l*.

p represents a porous medium, preferably
 5 a thin kaolin plate adapted to cover the lateral faces of the electrode plate proper, the entire plate when assembled in the manner shown in Fig. 1 being such that these plates, one or more on each face, will fit accurately
 10 against the lateral edges of the anode and cathode strips *a, a, c, c*, and the insulating porous strips *g, g*, so as to constitute retaining means for preventing the active material from dropping out. These plates are illus-
 15 trated as being held in position in the present instance by flexible rubber bands *s, s*, two or more. The entire structural plate when assembled is bound together by the bars or rods *b, b*, and nuts *f, f*, acting upon the binding
 20 blocks *d, d*, and the soft rubber cushions *h, h*, in the same manner as disclosed in the before-mentioned application, *i, i* being conducting spacing washers on the rods *b, b*. It will be apparent that such a structural electrode
 25 plate is of so simple a nature that it may be entirely dismantled, if need be, and any part thereof repaired or replaced. It will also be apparent that by reason of the compact nature of the anode and cathode strips
 30 and of the plane surfaces thereof and corresponding plane surfaces of the insulating media or the strips *g, g*, an electrode plate of a given capacity may be of relatively smaller area than either of the electrode plates dis-
 35 closed in the before-mentioned applications. Such a structural electrode plate also permits of a free and ready examination of any part thereof at any time on removal of the protecting plate or plates *p, p*.

40 I do not limit my invention to the specific structural means of protecting or retaining the active material between the anode and cathode strips of a bifunctional electrode plate, as I believe I am entitled broadly to
 45 claim means which is not primarily a part of such plate and which means shall be so constructed as to wholly cover the entire lateral faces of the plate, whether the same be in the nature of porous plates like those disclosed
 50 in the drawings, or of any material which will by capillary action convey the electrolyte to the active material between the anodes and cathodes, and at the same time act mechanically to prevent the active ma-
 55 terial from falling out from between the anodes and cathodes and the porous insulating media, and my claims are generic as to this feature.

60 Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is—

1. A bifunctional storage battery plate, embracing elements comprising anode and
 65 cathode strips and interleaved porous insulating media; in combination with porous

retaining plates adapted to be held against the edges of said elements, substantially as described.

2. A bifunctional storage battery plate, embracing elements comprising anode and
 70 cathode strips and interleaved porous insulating strips, all bound together in one compact mass; in combination with porous retaining plates provided with means for
 75 securing them in place against the edges of said elements, substantially as described.

3. A bifunctional storage battery plate, embracing elements comprising anode and
 80 cathode strips separated from each other by thin porous insulating strips; in combination with active material between said sets of strips, and means for securely binding or
 85 holding the same in compact relation; together with means applied to the edges of said elements for preventing the active material from being released, substantially as described.

4. A bifunctional storage battery plate, embracing elements comprising interleaved
 90 anode and cathode strips supported each set by a separate conducting bar or rod; porous insulating strips of like width located between the first-named strips and active material located on the opposite faces of the
 95 anode and cathode strips; in combination with means for binding said strips firmly together, and means applied to the edges of the said elements for holding the active material in place, substantially as described.

5. A bifunctional storage battery plate, embracing elements comprising interleaved
 100 anode and cathode strips and similar porous insulating strips; independent conducting bars or rods for the anode and cathode strips, and means applied to the edges of said ele-
 105 ments for preventing the active material from being released, substantially as described.

6. A bifunctional storage battery plate, embracing elements comprising interleaved
 110 anode and cathode strips separated by porous insulating strips; in combination with liquid conveying protecting means applied to the edges of said elements, substantially as described.
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7. A bifunctional storage battery plate, embracing elements comprising strip like
 120 anodes and cathodes connected in multiple to independent conducting bars or rods and separated from each other by porous insulating media; in combination with retaining means detachably secured to the edges of the elements, substantially as described.

8. A bifunctional storage battery plate, embracing the following elements; inter-
 125 leaved anode and cathode strips separated from each other by porous insulating strips of like width; a conducting bar or rod at each end of the plate connected one to the anode strips and the other to the cathode
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strips; flexible cushions and binding blocks at the edges of the plate; binding means secured to the bars or rods, and porous retaining plates provided with means for securing them against the edges of said strips, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

ALFRED O. TATE.

Witnesses:

WM. G. CHITTICK, Jr.

C. J. KINTNER.