

No. 865,503.

PATENTED SEPT. 10, 1907.

J. KNOBLOCH.
ELECTRICAL ACCUMULATOR.
APPLICATION FILED DEC. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

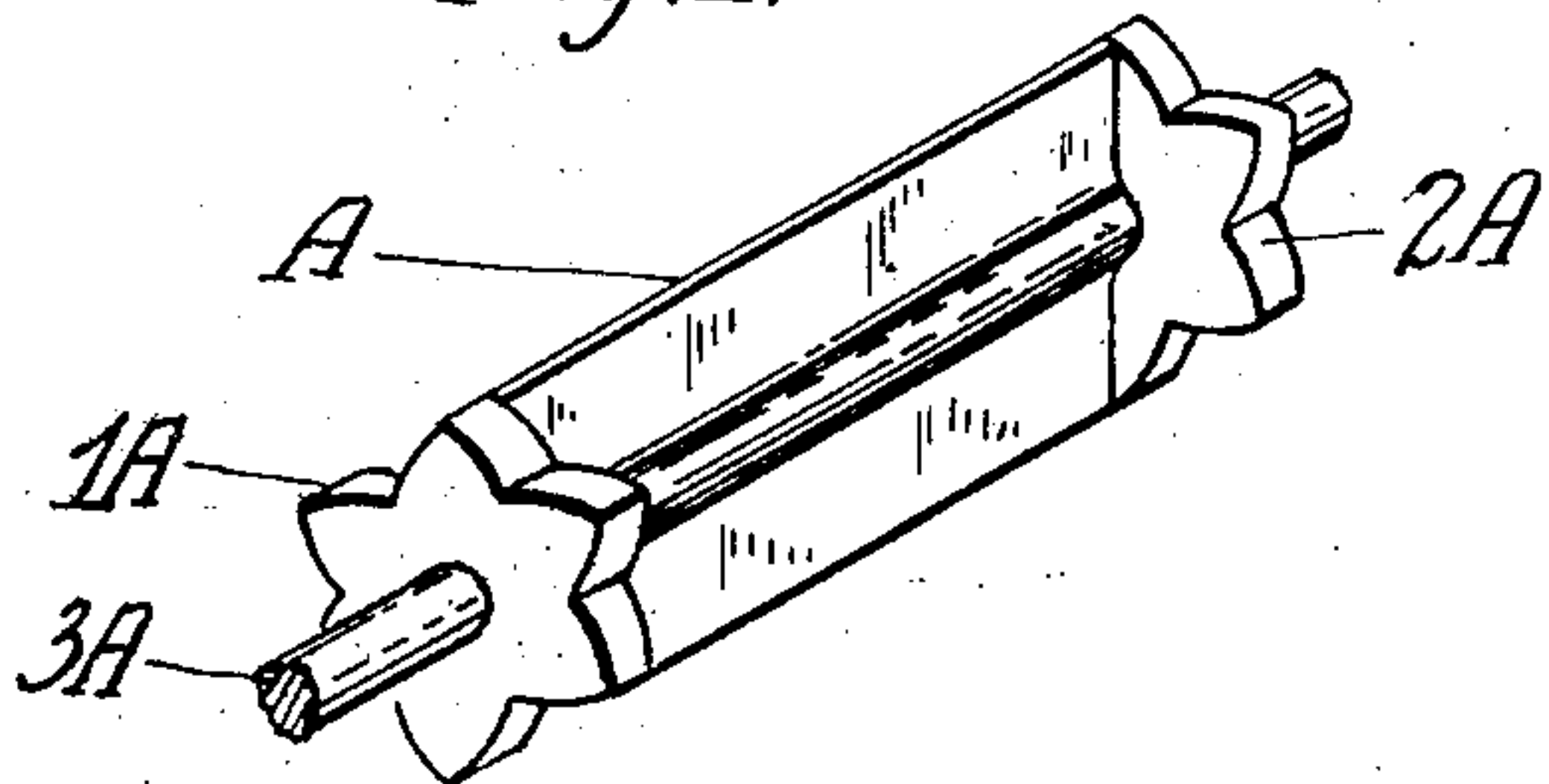


Fig. 2.

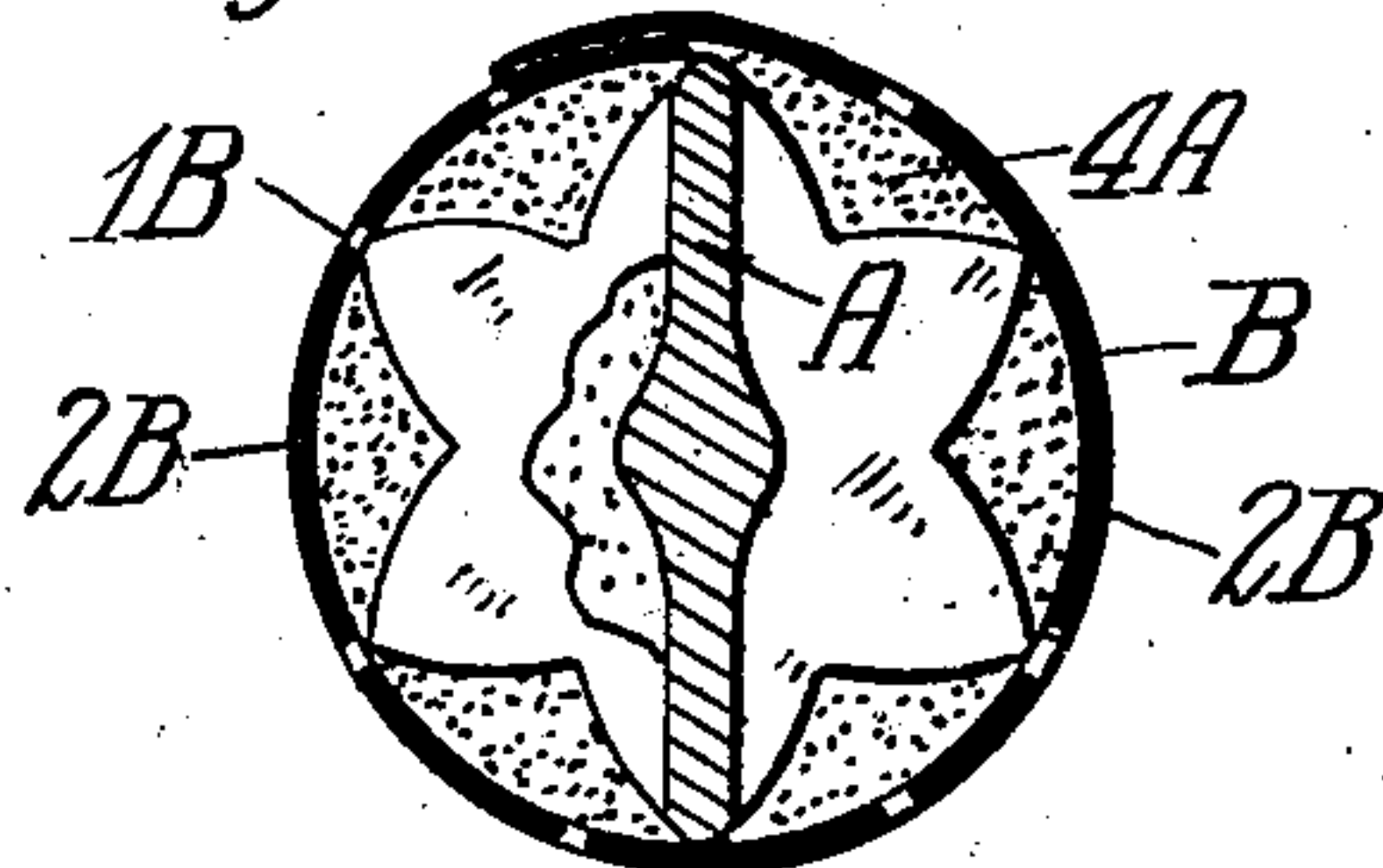


Fig. 6.

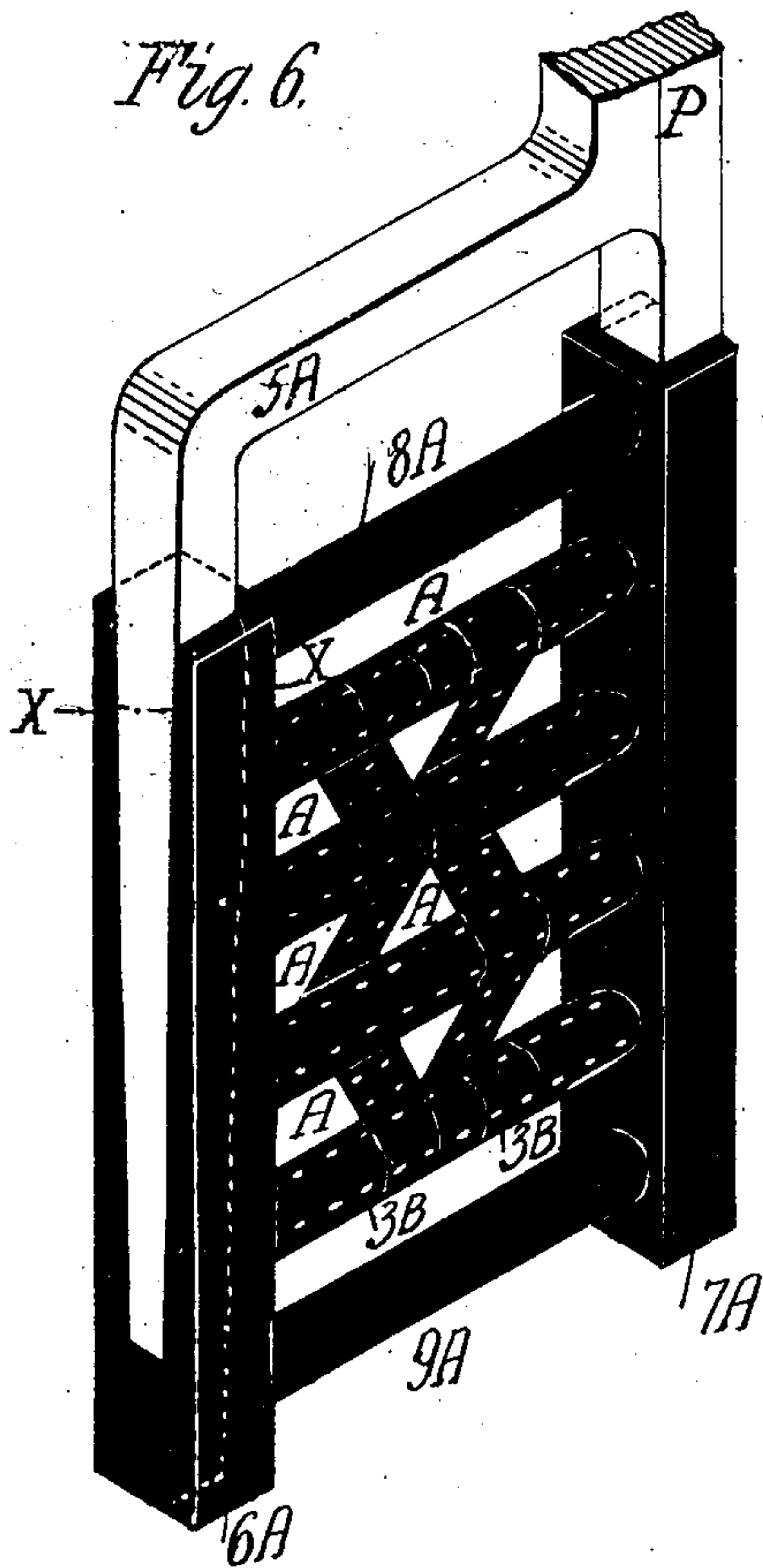


Fig. 3.

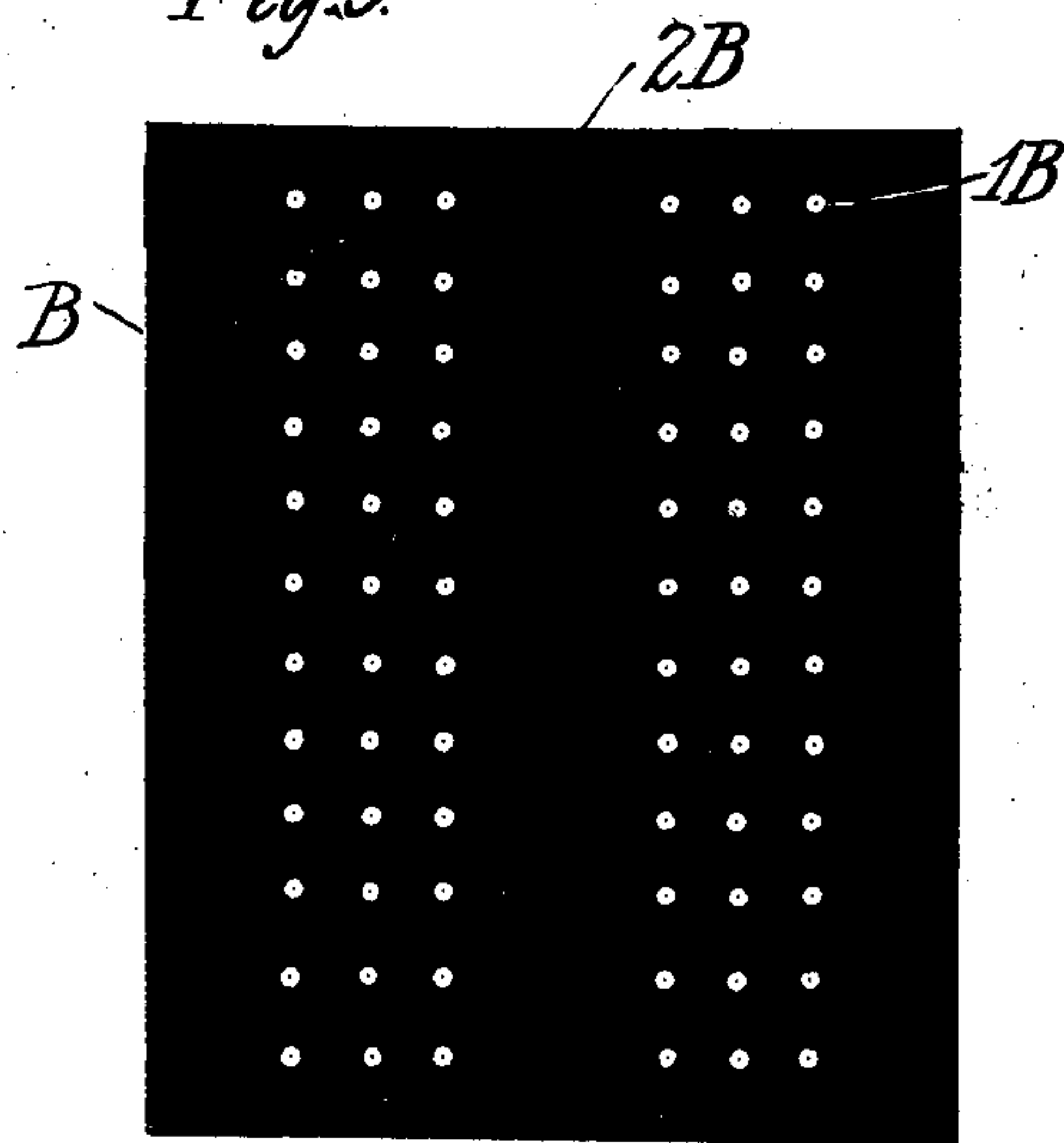


Fig. 4.

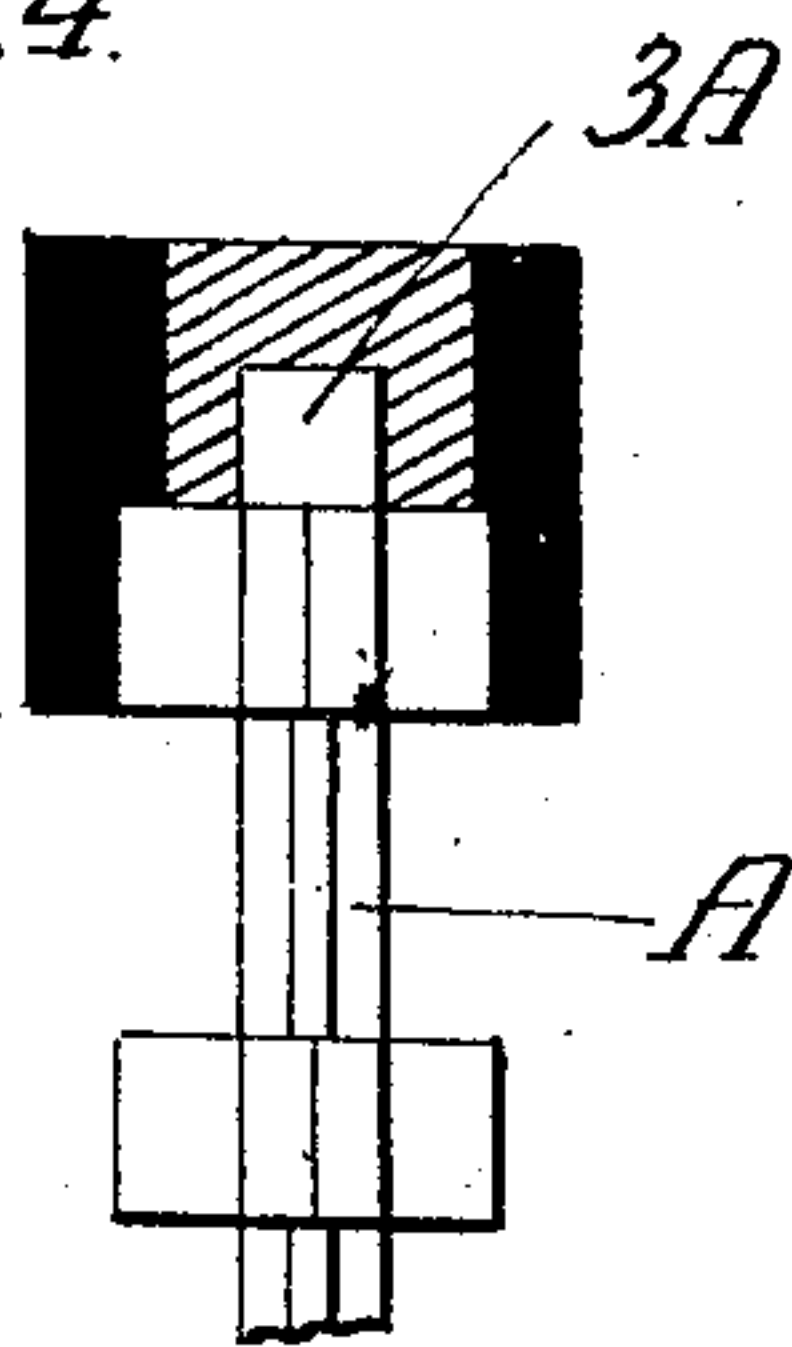
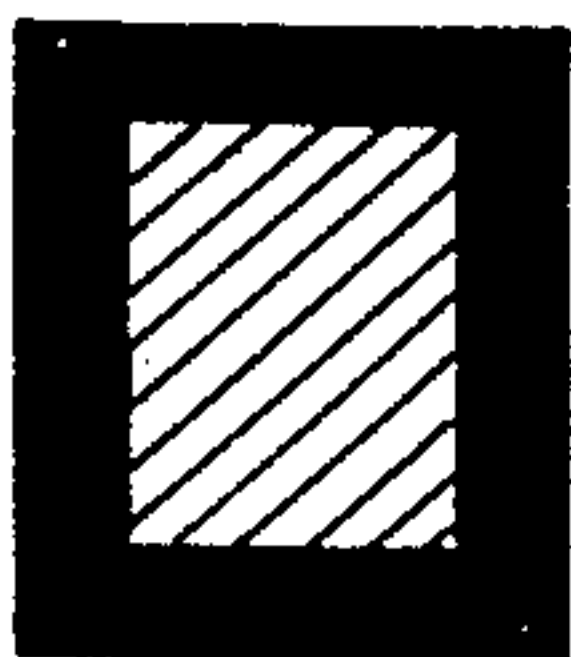


Fig. 5.



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Lillian Olsen

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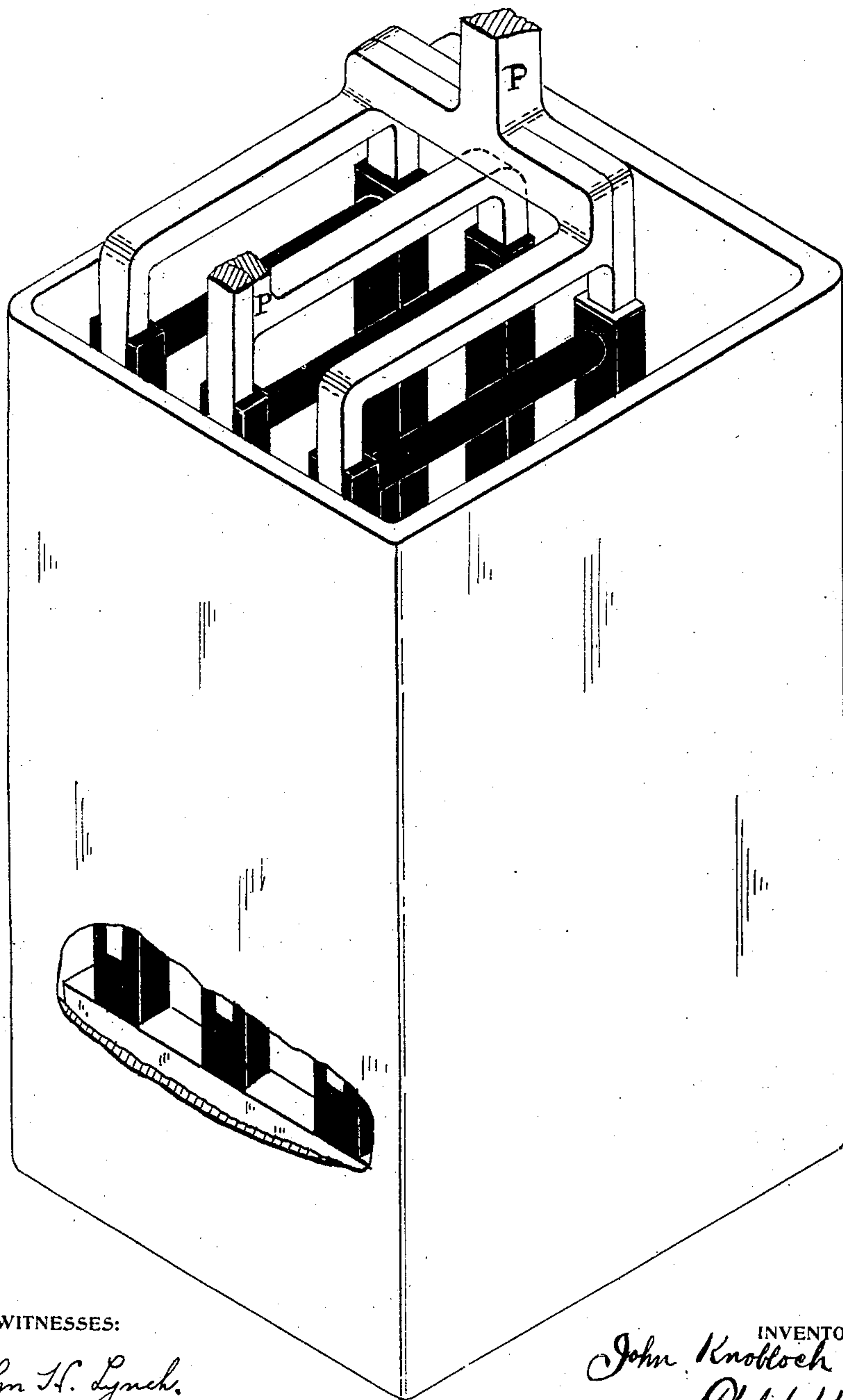
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2 SHEETS—SHEET 2.

Fig. 7.



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ELECTRICAL ACCUMULATOR.

No. 865,503.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed December 28, 1906. Serial No. 349,400.

To all whom it may concern:

Be it known that I, JOHN KNOBLOCH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Accumulators, of which the following is a specification.

My invention in electrical accumulators relates to that class, wherein a plurality of elements constituting respectively the anode and cathode, which elements are built up of a plurality of units, are electrically connected with a suitable non-corrosive conducting frame or support. Relative to the types of electrical accumulators embraced by this class, my invention has particular reference to the manner in which the active and inactive material is electrically connected with the support and to a means for permitting, within certain limits, freedom of expansion of the said material during electrolysis and a means for insulating the units and the support of the elements with respect to each other.

The object of my invention is to provide a more durable and a more reliable element than those in vogue and previous to my invention, in so far as I am at present aware, and the features characteristic of my invention, whereby I am enabled to attain this object, lie in the construction of the element itself, the units containing the active material of which the element is composed and the manner of insulating the units and retaining the active material in contact with its support during expansion due to electrolysis and electro chemical action.

In considering the difficulties attending the maintenance of the active and inactive material in accumulators of the class to which my invention relates, as well as those encountered in the endeavor to secure adequate contact between the material and the support and sufficient insulation to obviate local action; my attention was directed to a means of constructing the units, whereby the material, which is carried by the support, may be retained in contact therewith, and in thus considering the construction of the units, my invention is directed.

In the main, my invention provides a unit comprising a suitable support of conducting material, having a somewhat extensive surface to which is applied the material; the units of the anode being coated with the active material, and the units of the cathode being coated with the inactive material, and a perforated wrapper composed of an insulating material, which is insoluble in the electrolyte, formed about the whole, in a manner so as to inclose the material, and maintain it in position on the support.

My invention also consists in the provision of a suitable supporting insulating material for the element, as a whole, and the manner in which I reduce my invention to practice, is illustrated in the drawings hereto attached, which forms part of this specification, and

is described in the detailed description relative thereto, and the distinctive features of novelty are finally pointed out in the claims, concluding the specification.

With reference to the drawings:—Figure 1, is an enlarged detailed isometrical projectional view of a portion of the support of one of my improved units, illustrating the configuration of the surface to which the material is applied. Fig. 2, is an enlarged detailed transverse sectional view of one of my improved units, illustrating the disposition of the material, as applied to the support and the manner of retaining the active material by a wrapper of insulating material. Fig. 3, is an enlarged detailed view of one of my improved wrappers. Fig. 4, is a fragmentary top plan view of the support for the unit, and an enlarged view of a section of the conducting portion, to which the unit is electrically connected. Fig. 5, is a transverse cross-sectional view of a portion of the frame, taken on the line $x-x$ of Fig. 6, illustrating the manner in which the frame is incased by an insulating material. Fig. 6, is an isometrical projectional view of one of my improved elements, illustrating the units somewhat spaced with relation to each other and the manner by which they are supported, and Fig. 7, is a similar view to that of Fig. 6, illustrating the frame-work of the elements forming the anode and cathode of my improved accumulator, disposed in a cell.

In the several figures, similar characters of reference are employed to designate the same parts throughout, wherein:—

A, 1A, 2A and 3A designate respectively, the body, lateral heads and the connecting spindle of one of the sections of a unit support, in accordance with my invention; these sections I prefer to form in a bar of lead, by casting the molten material into a suitable mold in a well-known manner; the body portion A of each section, which has the form of a web is preferably disposed throughout the unit, in a manner so as to lie in the same plane, and is positioned as in Fig. 1, vertically.

The heads 1A, 2A of each section are preferably formed hexagonally, or each of the hexagon sides are provided with further configuration in a manner as illustrated in Figs. 1 and 2, whereby, when the unit is cast in a mold, and the web A lies in a plane, in which the mold is parted, the two longitudinal halves thereof diametrically opposite the web may be readily removed. It will be thus observed that, upon the inspection of Fig. 2, considerable surface is presented to contact with the active material, while the web A provides to a marked extent, the rigidity of the structure against vertical displacement.

Interposed between the web A and the heads 1A, 2A of each section, and circumscribing each of said heads, is the active material for the anode units, consisting preferably of lead oxid (PbO) which is mixed

in a well-known manner with some suitable solvent, such as glycerin, saccharin or glucose, molasses or the like, in the form of a paste 4A, and is applied in a suitable mold, or by merely pasting it to the sections of the unit, or is disposed in the manner illustrated in Fig. 2, so as to be interposed between the heads 1A, 2A and between the projection of the said heads, in a manner so as to form a continuous coating over the surface of the unit support as well as being deposited between the interstices, or pockets thus presented by the heads 1A, 2A and the web A. The units thus constructed and pasted, are enveloped by a suitable insulating wrapper B, provided with perforations as 1B. These perforations may be irregularly arranged, or may be substituted by a suitable pervious material applied to the finished unit Fig. 2, in lieu of the wrapper B; for this wrapper, I prefer to employ thin sheets of perforated hard rubber, as is usually employed for battery separators, and wrap the same about each unit, in the manner depicted in Fig. 2, whereby impervious portions 2B will be diametrically oppositely situated and perpendicular to the vertical position of the web A. The purpose of the impervious portion 2B of the envelop or wrapper B, is to guard against the so-called bridging tendency of the material of the juxtaposed elements, and the deleterious results, due to local action.

In Fig. 6, I have illustrated the disposition of four of my improved units assembled in the formation of an element; these are in the illustration somewhat exaggerated in the spacing, at the instance of clearness. The manner of assembling the units, as illustrated in Fig. 6, may be best understood by reference to the detailed Fig. 4, wherein it will be observed that the spindle 3A is introduced to a socket in the frame. The connection between the spindle 3A and the frame 5A may be effected in the well-known manner of burning the material together or by casting the frame 5A into a suitable mold in which the units and the insulating material therefor are assembled, after said units have been pasted, in which event care must be taken to exclude the air from the mold, in order to prevent the burning of the insulating material, when the same is of a combustible nature.

In order to space the lateral and oppositely situated members of the frame, the sides 6A and 7A are rigidly maintained in position by parallel transverse braces of insulating material 8A, 9A respectively situated at opposite extremities of the frame. These may be integrally or otherwise formed with the sides 6A and 7A to maintain the rigidity of the frame and resist the buckling tendency thereof, due to the expansion and contraction of the units, resulting from the activity thereof during electrolytic action.

In order to maintain the wrappers B in their position about the units, which they envelop and at the same time support the intermediate portions thereof, I provide the strips of insulating material 3B which are passed over and under the series of units, in the manner of weaving, as illustrated in Fig. 6, thus bracing the entire structure against vertical and lateral displacement. The binding strips 3B, I prefer to form of suitable sheets of thin hard rubber or narrow shreds thereof and when in the form of strips, I prefer to perforate them as illustrated at 1B, Fig. 3 and

also Fig. 6, whereby ample circulation of the electrolyte may be permitted through the envelop or wrapper B.

The metallic frame-work 5A which is electrically connected with the units in the manner aforesaid, I prefer to construct of lead or some conducting material, which is inactive in the electrolyte and graduate the cross-section of the same as illustrated in Figs. 6 and 7, whereby the electrical resistance of the same will vary as the number of elements toward the pole P of the frame.

I am aware that prior to my invention, electrical accumulators have been constructed, whereby the elements thereof were built up of a number of units and I am also aware that these have been arranged in the form of transverse substantially parallel bars, and I therefore do not claim such constructions as thoroughly within the scope of my invention, the spirit of the invention being rather confined to the particular construction of the unit and plurality thereof of which the element is built up and in the manner of supporting both the units and the element as a whole in overcoming the difficulty of distortion due to electrolytic action, as well as to the construction which provides for the maintenance of contact between the paste and the supporting structure and

Having fully described my invention, I claim as new and desire to secure by Letters Patent of the U. S.:

1. In an electrical accumulator having an element comprising a plurality of units, said units consisting of a conducting support, having consecutive compartments, and a suitable electrolytically active paste carried thereby, a perforated envelop of insulating material, surrounding the whole, together with a frame of insulating material to support the element and a woven binder of insulating material, embracing and securing the units.
2. In an electrical accumulator, provided with elements, built up of units, units formed of a conducting support, provided with a plurality of interstices, a transverse brace, adapted to resist the bending of the unit, said unit adapted to contain a quantity of divided conducting material and to be exposed to electrolytic action, an insulating wrapping of pervious material surrounding the unit and means for securing the same in contact therewith.
3. In an electrical accumulator, wherein the anode and cathode elements are built up of a plurality of units, the combination with an element of pervious insulating support secured to and surrounding the units and embracing the structural portion of the element, together with lateral braces of insulating material to support the structure.
4. In an electrical accumulator provided with anode and cathode elements, built up of units, a conducting support, constituting the frame-work, electrically uniting the units and having a variable cross-section, together with an envelop of insulating material, having pervious and impervious portions, the former surrounding the units and secured thereto and the latter embracing the frame-work.
5. In an electrical accumulator, provided with anode and cathode elements, built up of units, a conducting support constituting the frame-work electrically uniting the units and having a variable cross-section, together with an envelop of insulating material, having pervious and impervious portions, the former surrounding the units and secured thereto and the latter embracing the frame-work, and a weaving of insulating material about the units.

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

JOHN KNOBLOCH.

Witnesses:

WM. J. HAMMOND,
W. WISSEN.