

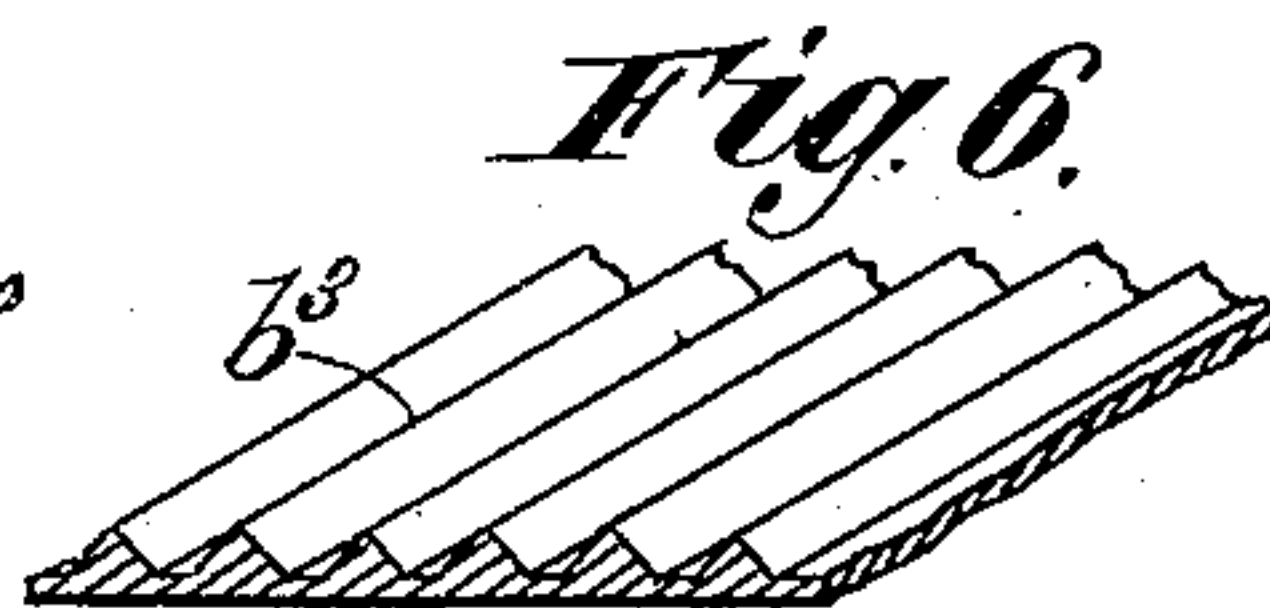
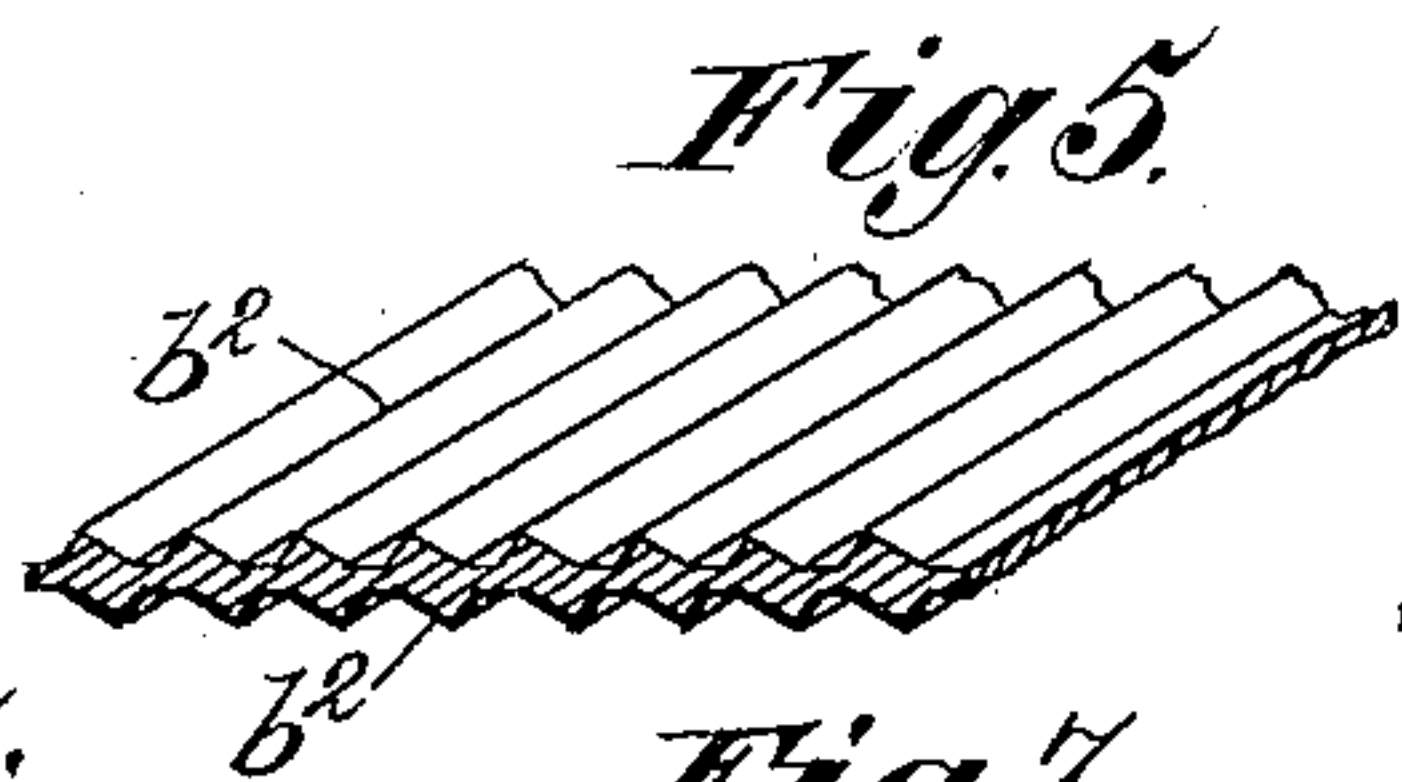
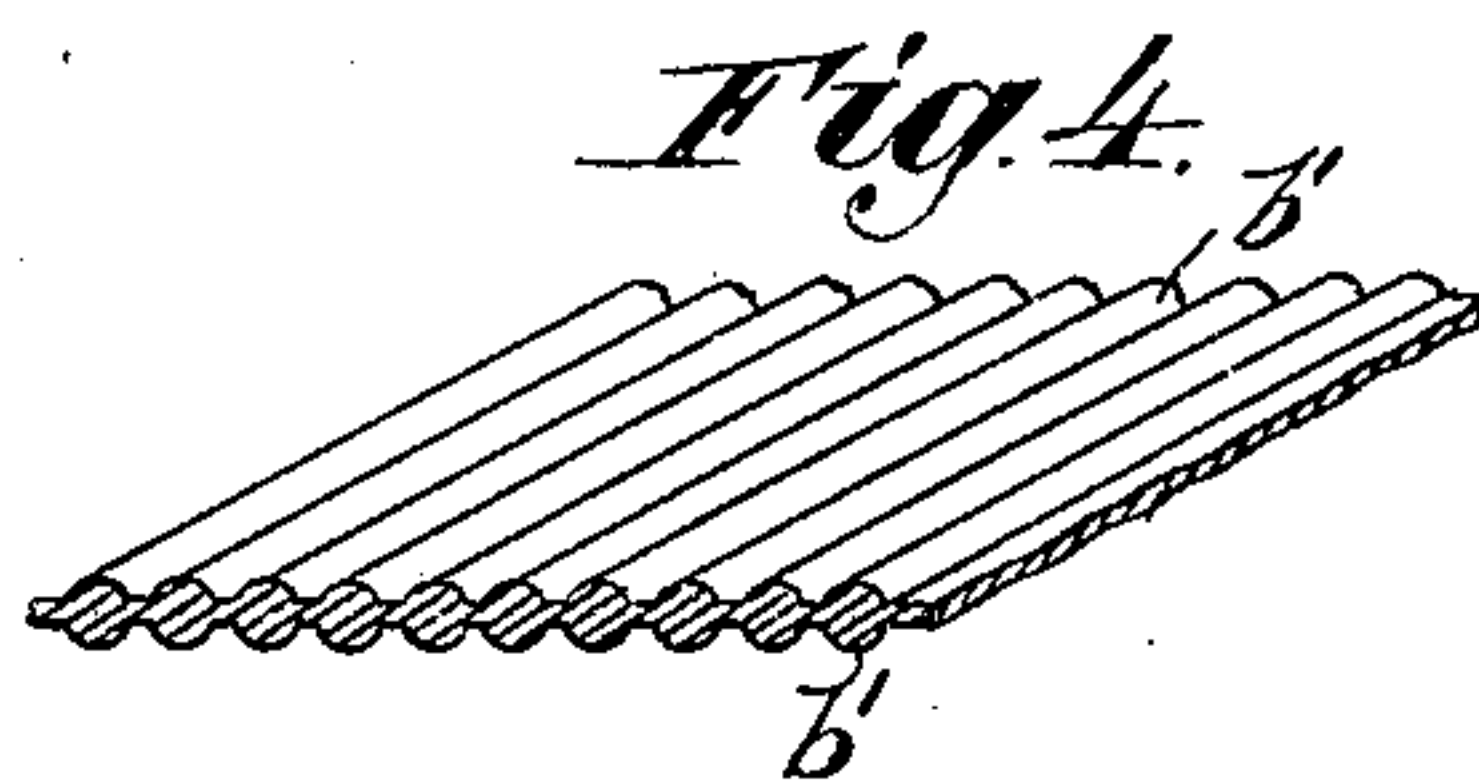
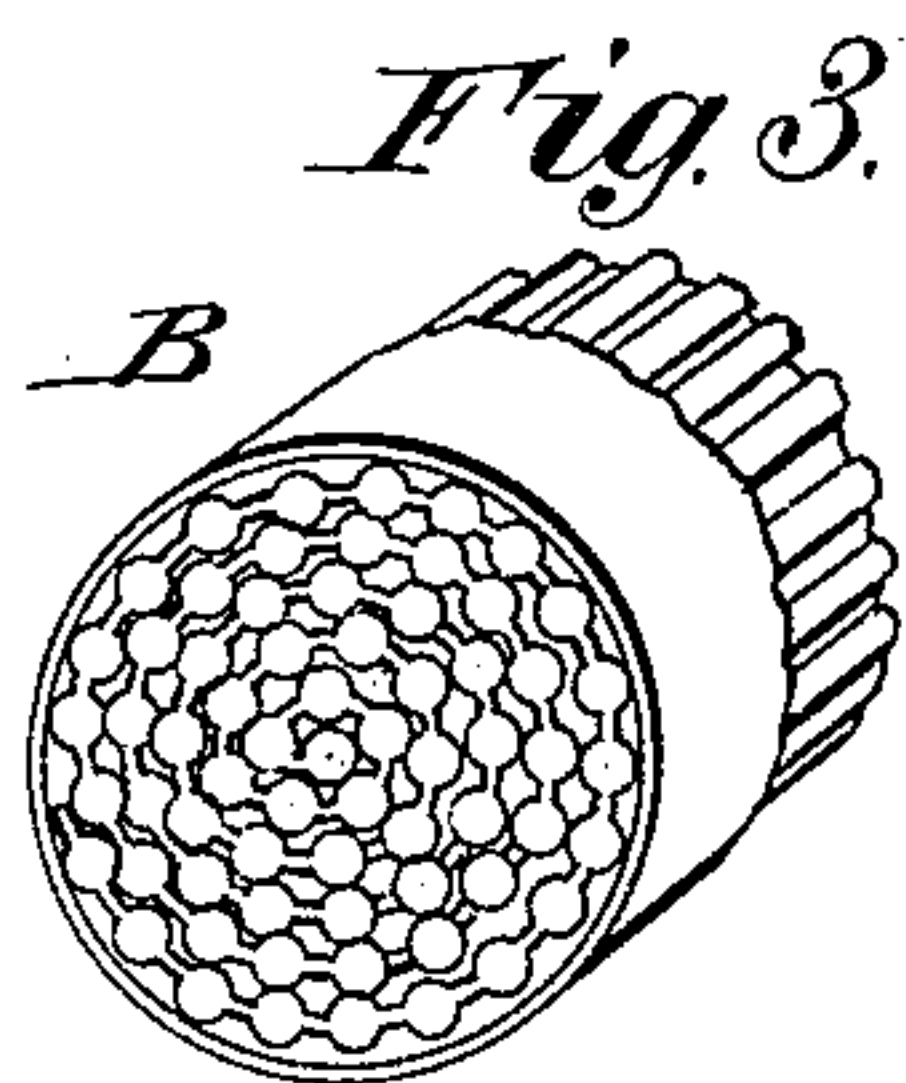
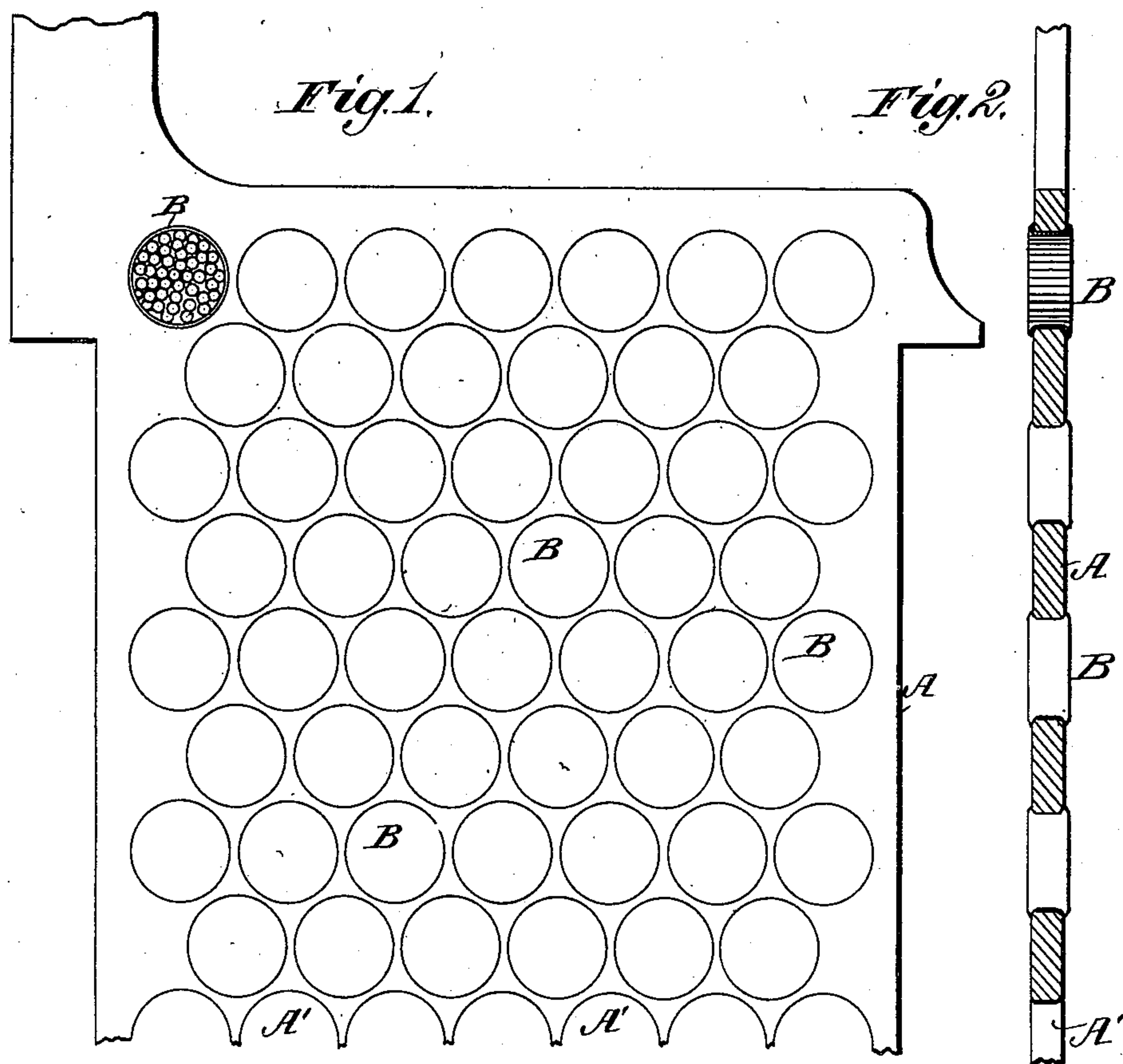
(No Model.)

J. G. A. RHODIN.

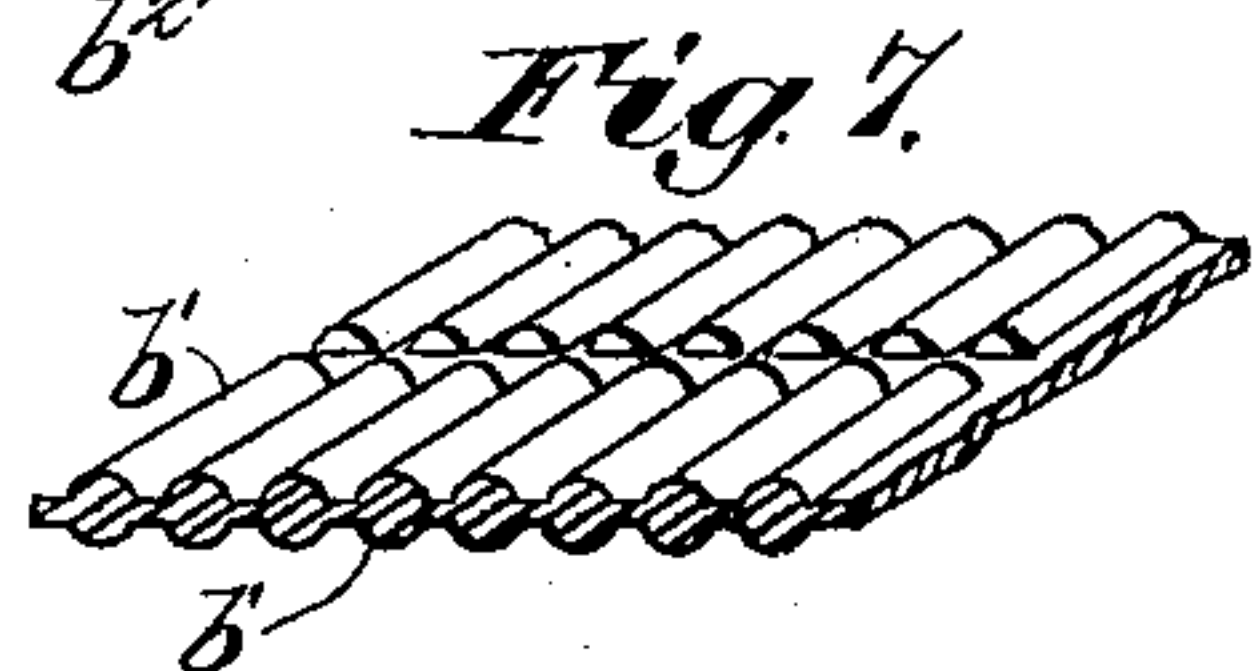
PLATE FOR SECONDARY VOLTAIC BATTERIES.

No. 567,045.

Patented Sept. 1, 1896.



Witnesses,
Robert G. Smith.
Geo. W. Rea.



Inventor:
John G. A. Rhodin.
By *James L. Norrig.*
Atty.

UNITED STATES PATENT OFFICE.

JOHN G. A. RHODIN, OF CLIFTON HALL, ENGLAND, ASSIGNOR TO THE
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PLATE FOR SECONDARY VOLTAIC BATTERIES.

SPECIFICATION forming part of Letters Patent No. 567,045, dated September 1, 1896.

Original application filed September 25, 1895, Serial No. 564,966. Divided and this application filed April 23, 1896. Serial No. 588,815. (No model.) Patented in England May 2, 1895, No. 8,728; in France September 4, 1895, No. 250,070; in Belgium September 7, 1895, No. 117,303; in Cape Colony September 26, 1895, No. 492; in Hungary September 29, 1895, No. 3,723; in New South Wales October 14, 1895, No. 6,121; in Italy October 22, 1895, LXXVIII, 99; in Victoria October 22, 1895, No. 12,611; in Austria November 6, 1895, No. 45/4,197; in Canada November 9, 1895, No. 50,530, and in Spain November 25, 1895, No. 17,936.

To all whom it may concern:

Be it known that I, JOHN GUSTAF ADOLF RHODIN, a citizen of Sweden, residing at Clifton Hall, near Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Plates for Secondary Voltaic Batteries, (for which I have obtained patents in the following countries, viz: Austria November 6, 1895, No. 4,197/45; Belgium September 7, 1895, No. 117,303; Canada November 9, 1895, No. 50,530; Cape of Good Hope September 26, 1895, No. 492; France September 4, 1895, No. 250,070; Great Britain May 2, 1895, No. 8,728; Hungary September 29, 1895, No. 3,723; Italy October 22, 1895, LXXVIII, 99; New South Wales October 14, 1895, No. 6,121; Spain November 25, 1895, No. 17,936, and in Victoria October 22, 1895, No. 12,611,) of which the following is a specification.

This invention relates to the construction of plates and of plugs for secondary batteries, and is a division of my application for Letters Patent filed September 25, 1895, and numbered in serial 564,966.

The invention consists in the novel construction of battery-plates and of the plugs of active material therefor as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation of part of a plate constructed in accordance with my invention. Fig. 2 is a cross-section. Fig. 3 is a detail of the plug of active material. Fig. 4, 5, 6, and 7 are perspective views of sections of different forms of sheets which when rolled form plugs of active material.

In the said drawings, the reference-letter A designates the frame-plate alloyed with a little antimony and provided with perforations A' for the reception and retention of the plugs of active material, the edges of said perforations being preferably chamfered off, as

shown in Fig. 2, to facilitate the introduction of the plugs.

The reference-letter B designates a plug of active material to fit the perforations A' of the plate A. This plug of active material is constructed with projecting solid ribs, as shown in the drawings. These projecting solid ribs may be given different forms, such as illustrated at b' , b^2 , and b^3 , and instead of being continuous, as in Figs. 4, 5, and 6, they may be discontinuous, as in Fig. 7, and the ribs may be formed upon both sides of the strip of lead, as shown in Fig. 4, or upon one side thereof only, as in Figs. 5 and 6. The projecting ribs are joined together by a film, which serves to keep them together. These plugs are inserted in the respective perforations and are acted upon by the electrolyte for production of the requisite active material or peroxid.

In the preferable practice the frame-plate is laid on a flat bed and preferably the ends of the roll-plug inserted into one of the holes and cut off level with the face of the plate, and this is continued until each perforation is occupied.

The plate when prepared in accordance with my invention to be used as a positive plate is then treated by any of the well-known methods for the formation of peroxid on the plugs, the expansion under such action serving to secure the plugs firmly in place.

The invention is equally applicable to negative plates.

The plugs constructed in accordance with my invention have great regularity of structure and are sufficiently permeable to allow passage for the electrolyte through them, and they admit of expansion without injury to the frame-plate. They have good conducting contact with the frame, and the method of construction is simple, economical, and perhaps preferable to the construction of

plugs of separate wires or rods, as described in my application for Letters Patent of which this is a division.

5 In Fig. 6 I have illustrated a form of plug wherein the projecting solid ribs are formed upon one side only of the sheet or strip, the other side being flat.

10 Having thus described the nature of this invention and in what manner the same is to be performed, I claim—

15 1. The herein-described plate for secondary batteries consisting of a perforated frame-plate, in combination with plugs composed of a roll of lead provided with projecting solid ribs joined by a thin film of lead, said plugs filling the perforations of said frame-plate and

producing permeable plugs to the interstices of which the electrolyte has access, substantially as described.

2. The herein-described plug for secondary- 20 battery plates consisting of a roll of lead provided with projecting solid ribs joined by a thin film of lead, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of 25 two subscribing witnesses, this 8th day of April, A. D. 1896.

JOHN G. A. RHODIN.

Witnesses:

JAS. S. BROADFOOT,
PERCY W. HOLT.