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ELECTRIC ACCUMULATOR PLATE.  
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914,657.

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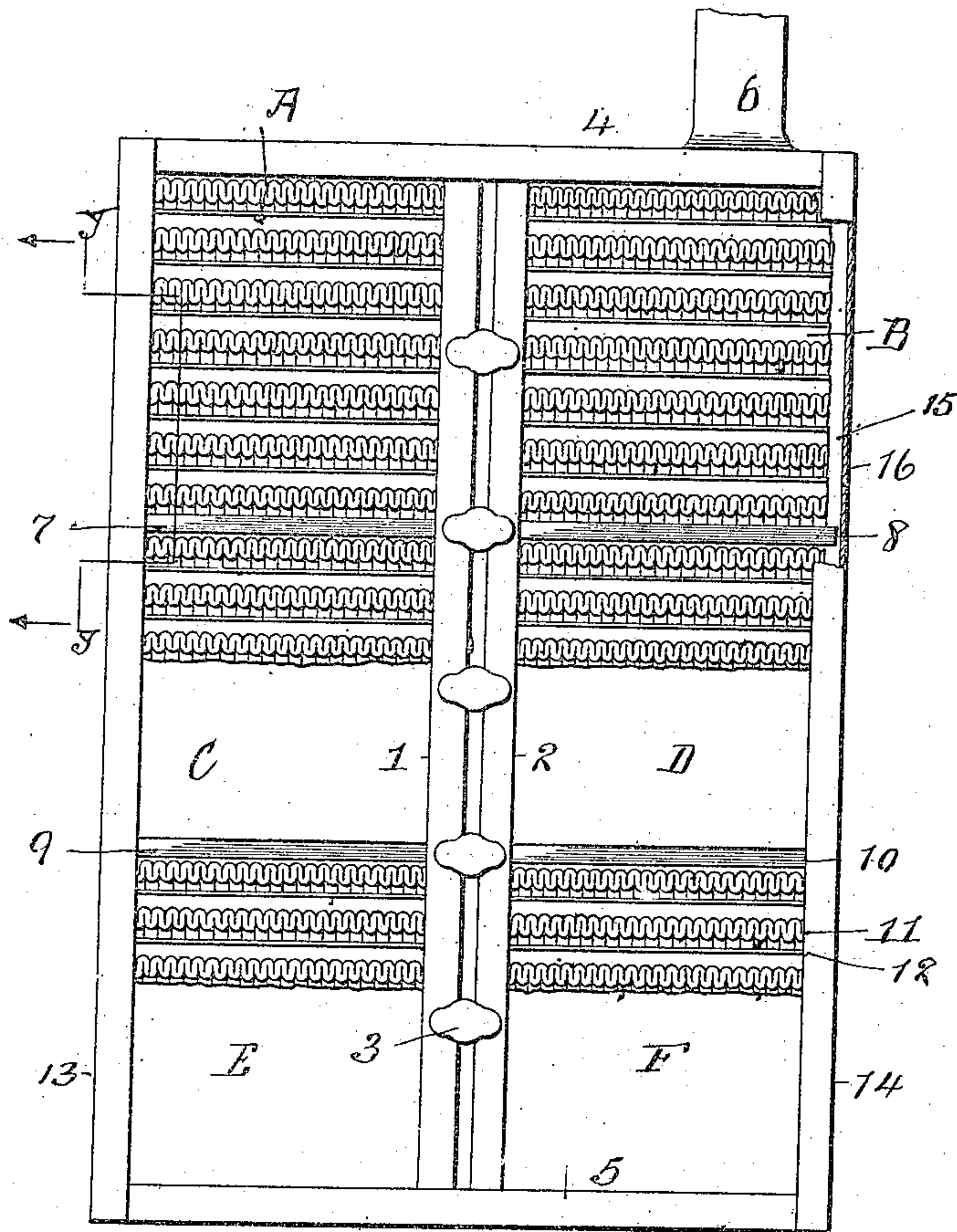


Fig. 1.

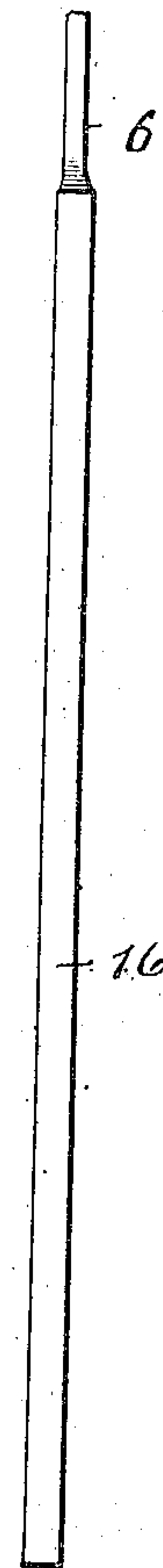


Fig. 2.

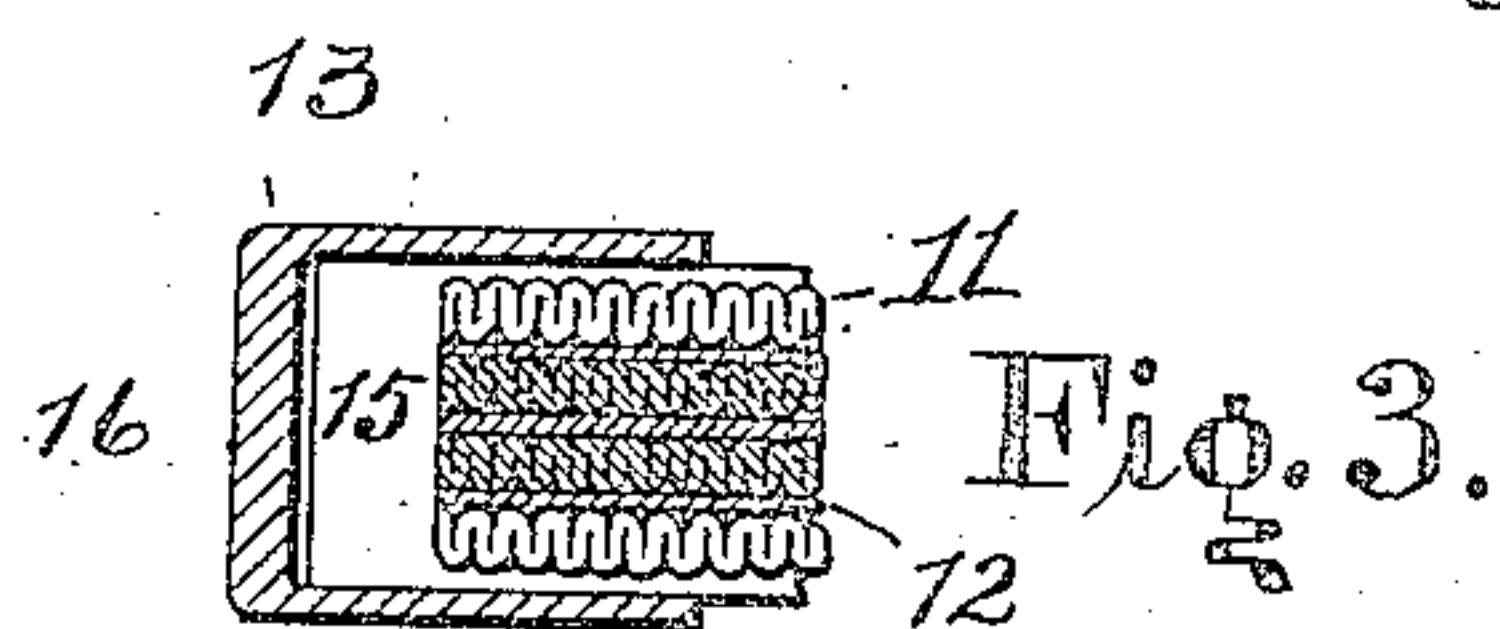


Fig. 3.

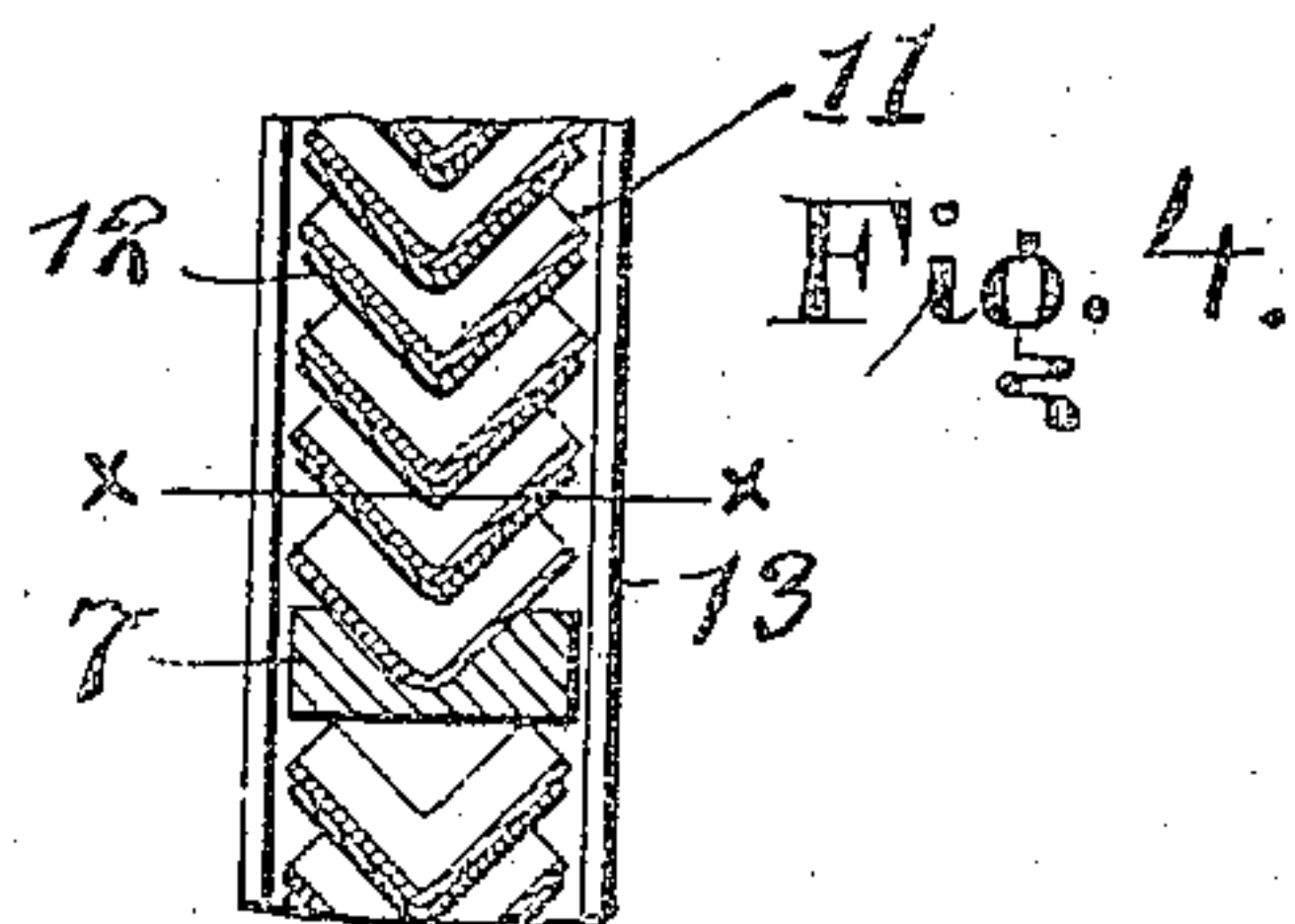


Fig. 4.

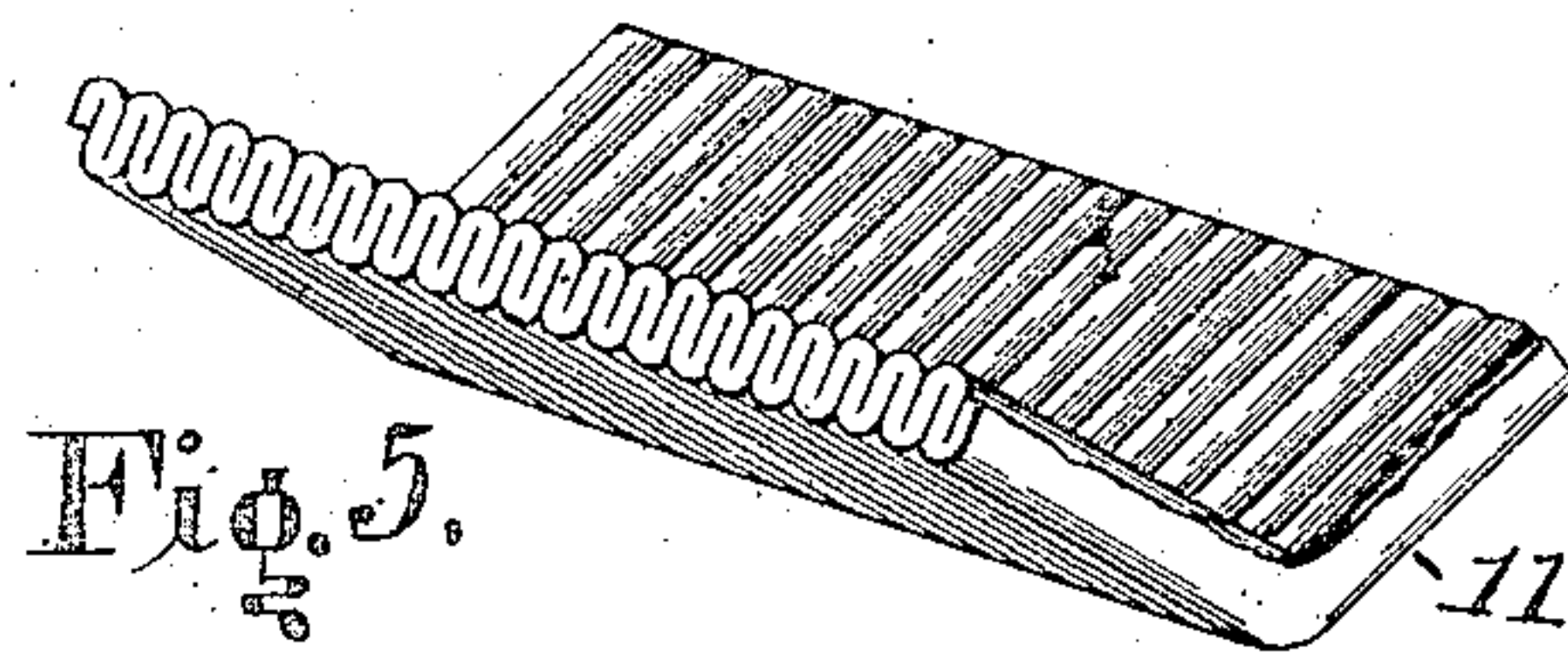


Fig. 5.

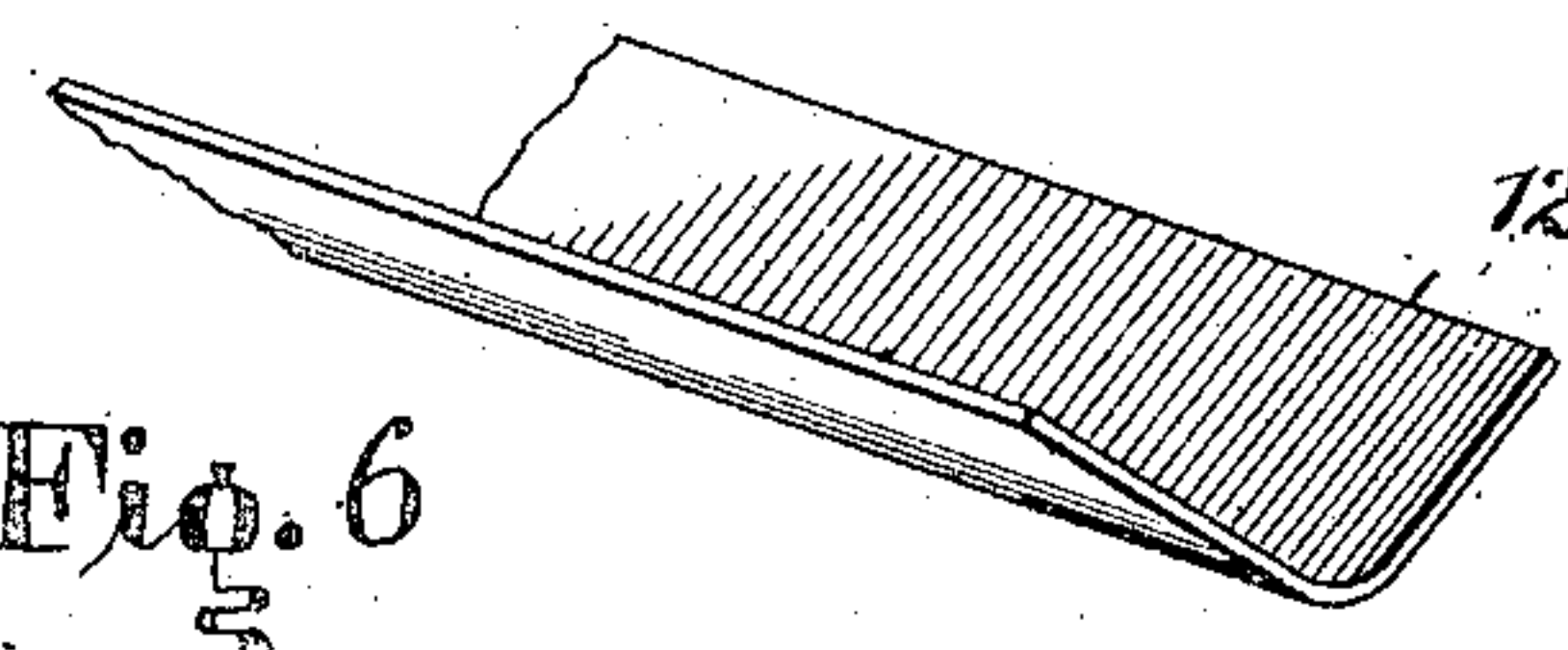


Fig. 6.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

CHARLES F. GUYON AND ROBERT WILLIAM VICAREY, OF NEW YORK, N. Y., ASSIGNORS TO INDUSTRIAL STORAGE BATTERY COMPANY, A CORPORATION OF NEW JERSEY.

## ELECTRIC ACCUMULATOR-PLATE.

No. 914,657.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed October 30, 1908. Serial No. 460,204.

*To all whom it may concern:*

Be it known that we, CHARLES F. GUYON, a citizen of the United States, and ROBERT WILLIAM VICAREY, a subject of the King of Great Britain, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Electric Accumulator-Plates, of which the following is a specification.

The invention relates to electrical accumulator plates of the Planté type.

In U. S. Re-issued Letters Patent No. 12195 to Chaimsonovitz P. Elieson and Vladimir de Bobinsky, dated January 26, 1904, is set forth an accumulator plate in which thin strips of lead, alternately corrugated and straight, project laterally, like the vanes of a feather, from a vertical rib or backbone of the same metal. The active material adhering to the surface of the corrugated strips and expanding laterally opens out said corrugated strips, so that after said material is formed, the distance from the central rib to the extremity of the strip is considerably increased, and hence, by reason of the leverage, said strips tend to drop or separate and the whole plate becomes more or less buckled and irregular.

Our present invention depends, among other things, upon our discovery that where the corrugations in the corrugated strips are closed, we not only obtain additional active surface, but by reason of the reduction in the horizontal component of force tending to elongate the strips, we prevent the undue expansion and deformation before noted. We also make the strips both corrugated and plain, in V or channel form, and dispose them one within the other, with the openings upward, thereby not only strengthening the strips, but providing for free escape of gas from between them. We also construct the plate in sections separated by transverse metal ribs, so that any possible undue buckling of the strips in one section does not affect the strips in an adjoining section, and we provide a channeled guard bar on the edges of the plate, which, while not interfering with the free elongation of the strips, also assists in keeping said plate in shape.

In the accompanying drawings—Figure 1 is a side elevation of our improved plate, a portion of the strip in the four lower sections being omitted. Fig. 2 is an edge view.

Fig. 3 is a section on the line  $x, x$ , of Fig. 4. Fig. 4 is a section on the line  $y, y$ , of Fig. 1. Fig. 5 is a perspective view of a portion of one of the corrugated strips, and Fig. 6 a similar view of one of the non-corrugated strips.

Similar numbers and letters of reference indicate like parts.

1 and 2 are ribs of lead connected together by bars 3 of solder or other suitable material, and secured at their ends to the transverse upper and lower bars 4, 5, the upper bar 4 carrying the terminal 6. Joined at their inner ends to ribs 1 and 2 are substantially rigid bars 7, 8, 9, 10, which divide the whole area of the plate into six sections, A, B, C, D, E, F. The outer ends of bars 7, 8, 9, 10 are free and on the upper side of each is a V-shaped channel.

Soldered at their inner ends to the ribs 1 and 2 are alternate corrugated strips 11, and non-corrugated strips 12, made of thin sheet lead. These strips in cross section are in the form of a V and are disposed one within the other, the corrugated and non-corrugated strips alternating. The lowest strips in the sections A, B, C, D rest in the channels in the bars 7, 8, 9, 10. The lowest strips in the sections E, F rest in similar channels formed in the bottom transverse bar 5. The outer ends of the strips 11, 12 are free.

Attention is particularly called to the corrugations in the strips 11, their construction being such that the opposing metal surfaces, due to the bending of the strip, come in contact and do not stand apart as shown in the aforesaid Elieson and Bobinsky patent. We find that when the corrugations are thus formed, the tendency of the strip to expand longitudinally is greatly reduced, while at the same time sufficient expansion takes place to permit the strip to accommodate itself to the changing bulk of the active material, during the charging and discharging of the cell. Also by reason of the closeness of the corrugations, we are enabled to give to each strip a greater active surface. With the lateral expansion of the strips thus reduced, it becomes possible to provide the plate with strengthening bars 13, 14 which are made in channel shape so as to overlap the edges of the strips, as shown in Fig. 3, and to provide a space 15 in which the strips are free to expand. The ends of the bars 13, 14



are secured to the transverse bars 4, 5. The width of the space 15 is to be sufficient to provide for an elongation of the strips sufficient to avoid buckling of the plate, before the free extremities of said strips reach the backs 16 of said bars. In order further to stiffen the strips, we make them in V form, substantially as shown, with the openings upward, so that the gases generated may freely escape from between said strips. By reason of the division of the plate into sections separated by the rigid bars 7, 8, 9, 10, any possible buckling or deformation of the strips in one section does not affect the strips in any other section.

We claim:

1. In an electric accumulator plate comprising a conducting rib and a plurality of strips of thin metal alternately corrugated and non corrugated laterally projecting therefrom, and free at their outer ends: the said strips being formed so that the opposing surfaces produced by said corrugations shall lie in contact.

2. In an electric accumulator plate comprising a conducting rib and a plurality of strips of thin metal alternately corrugated and non-corrugated laterally projecting therefrom, and free at their outer ends: the said corrugated strips being formed so that the opposing surfaces produced by such corrugations shall lie in contact.

An electric accumulator plate comprising transverse bars, a conducting rib extending between said bars, a plurality of strips of thin metal alternately corrugated and non-corrugated laterally projecting from said rib, and free at their outer ends, and a channeled guard secured to the ends of said bars and receiving the free ends of said strips.

4. An electric accumulator plate compris-

ing a conducting rib and a plurality of V shaped strips of thin metal alternately corrugated and non-corrugated laterally projecting from said rib, and free at their outer ends.

5. An electric accumulator plate comprising a conducting rib and a plurality of V-shaped strips of thin metal alternately corrugated and non-corrugated laterally projecting from said rib, and free at their outer ends: the said corrugated strips being formed so that the opposing surfaces produced by such corrugations shall lie in contact.

6. An electric accumulator plate comprising transverse bars, a conducting rib extending between said bars, a plurality of groups of strips of thin metal alternately corrugated and non-corrugated laterally projecting from said rib, and free at their outer ends, and substantially rigid bars also laterally projecting from said rib between said groups.

7. An electric accumulator plate comprising transverse bars, a conducting rib extending between said bars, a plurality of groups of strips of thin metal alternately corrugated and non-corrugated laterally projecting from said rib, and free at their outer ends, substantially rigid bars disposed between said groups, laterally projecting from said rib and free at their outer ends, and a channeled guard bar secured on the edge of said plate and receiving the free ends of said strips and separating bars.

In testimony whereof, we have affixed our signatures in presence of two witnesses.

CHARLES F. GUYON.  
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Witnesses:

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