

No. 696,209.

Patented Mar. 25, 1902.

E. A. SPERRY.
ENVELOP FOR BATTERY ELECTRODES.

(Application filed May 25, 1901.)

(No Model.)

Fig. 1.

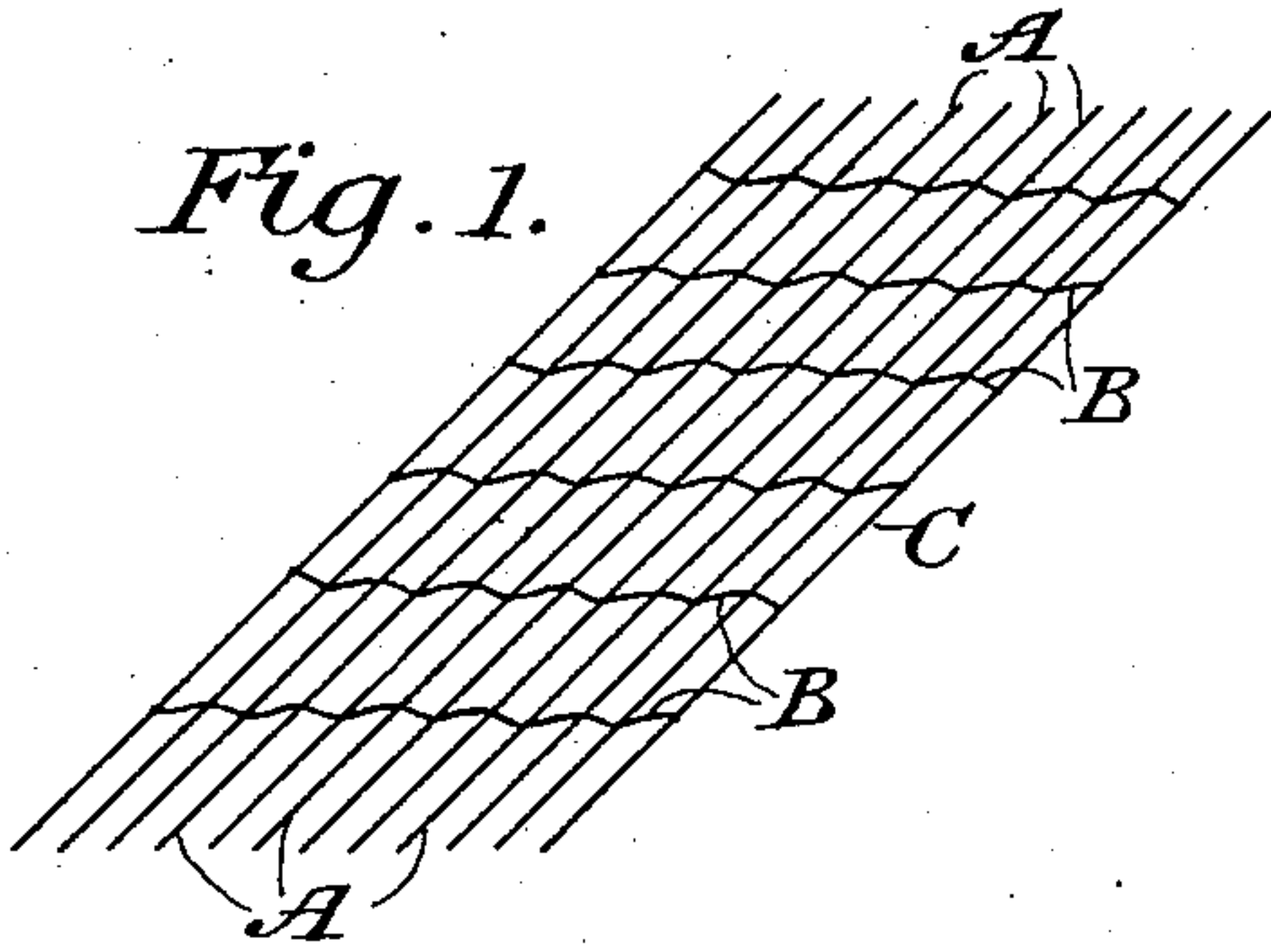


Fig. 2.

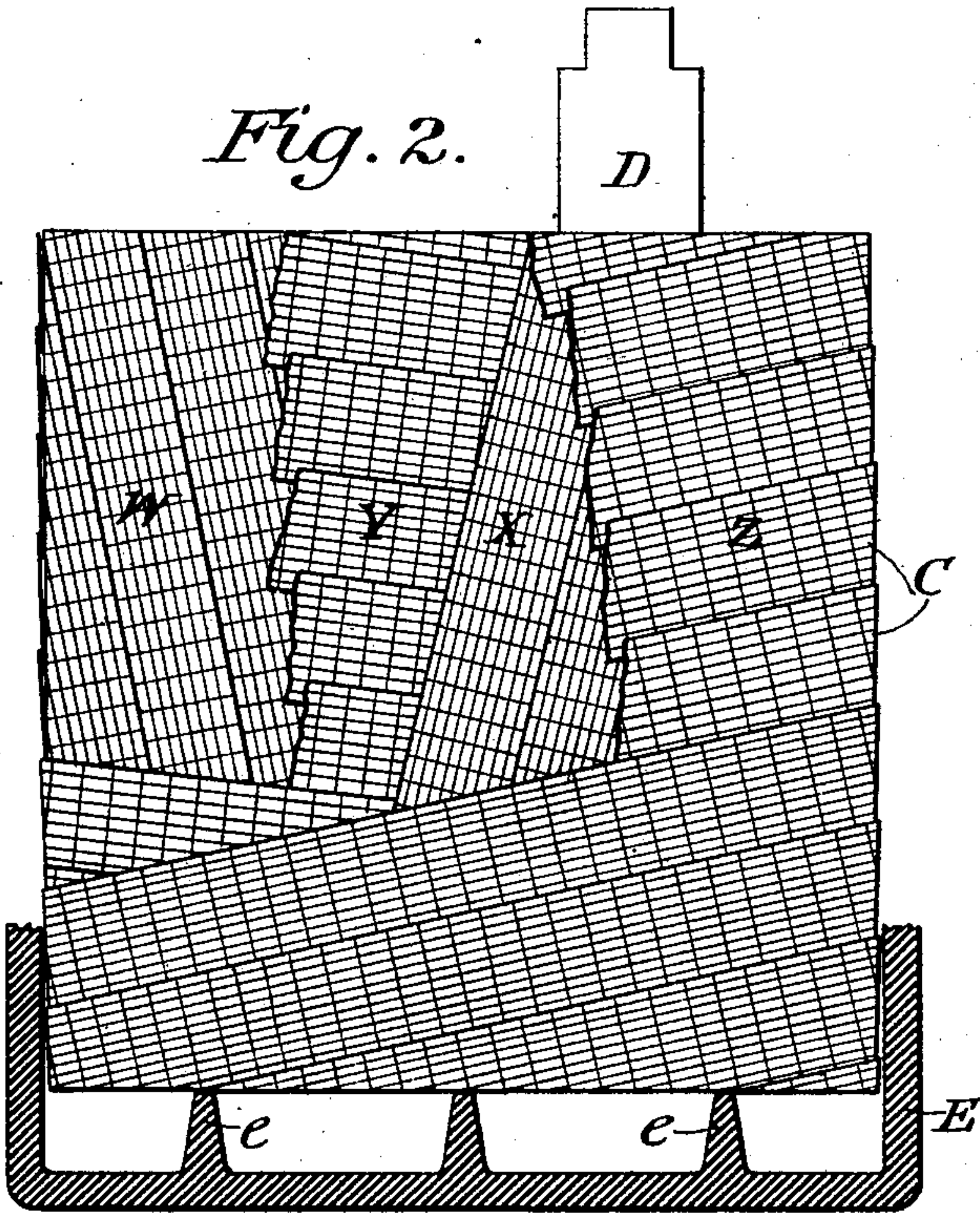


Fig. 3.

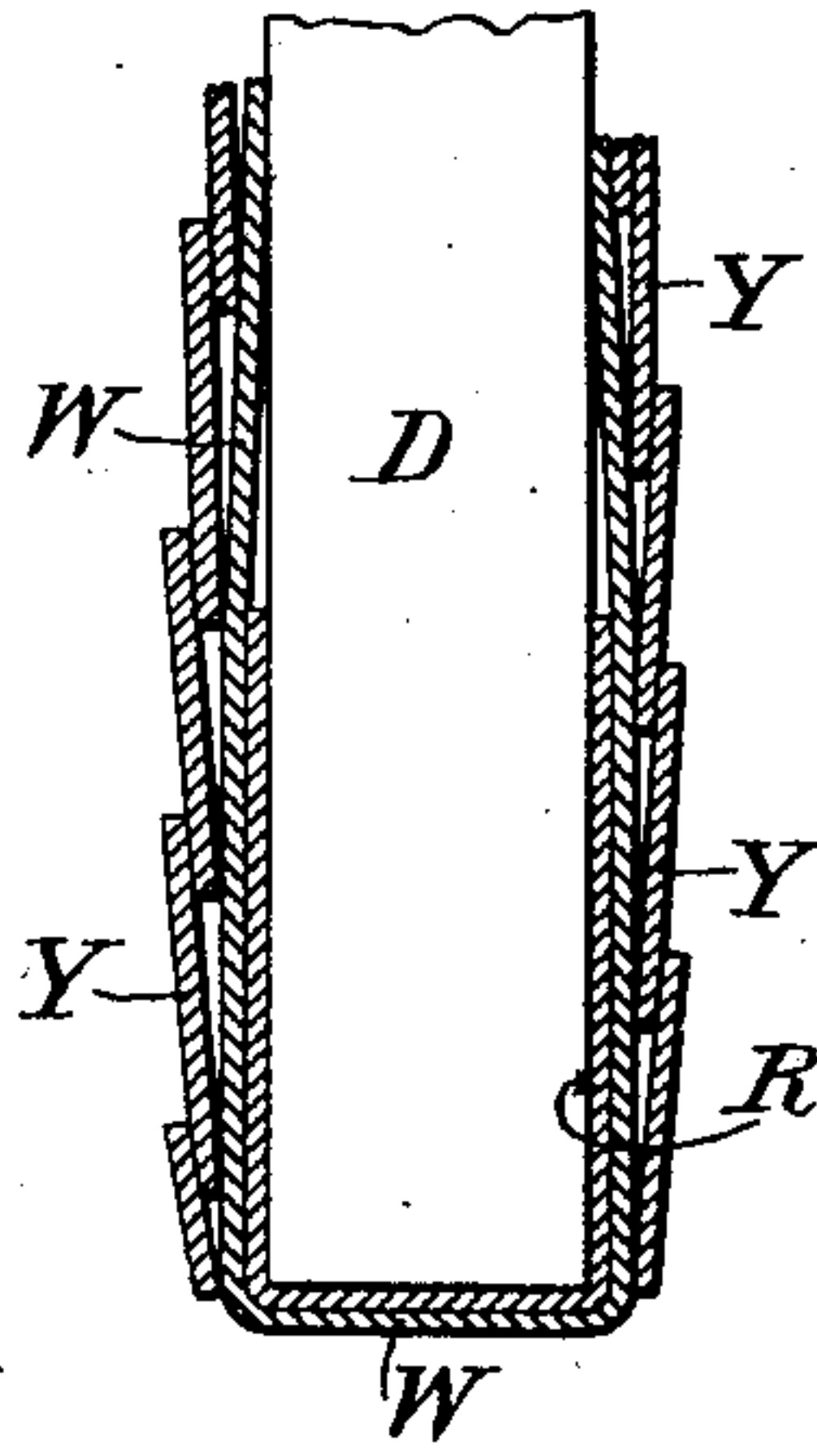
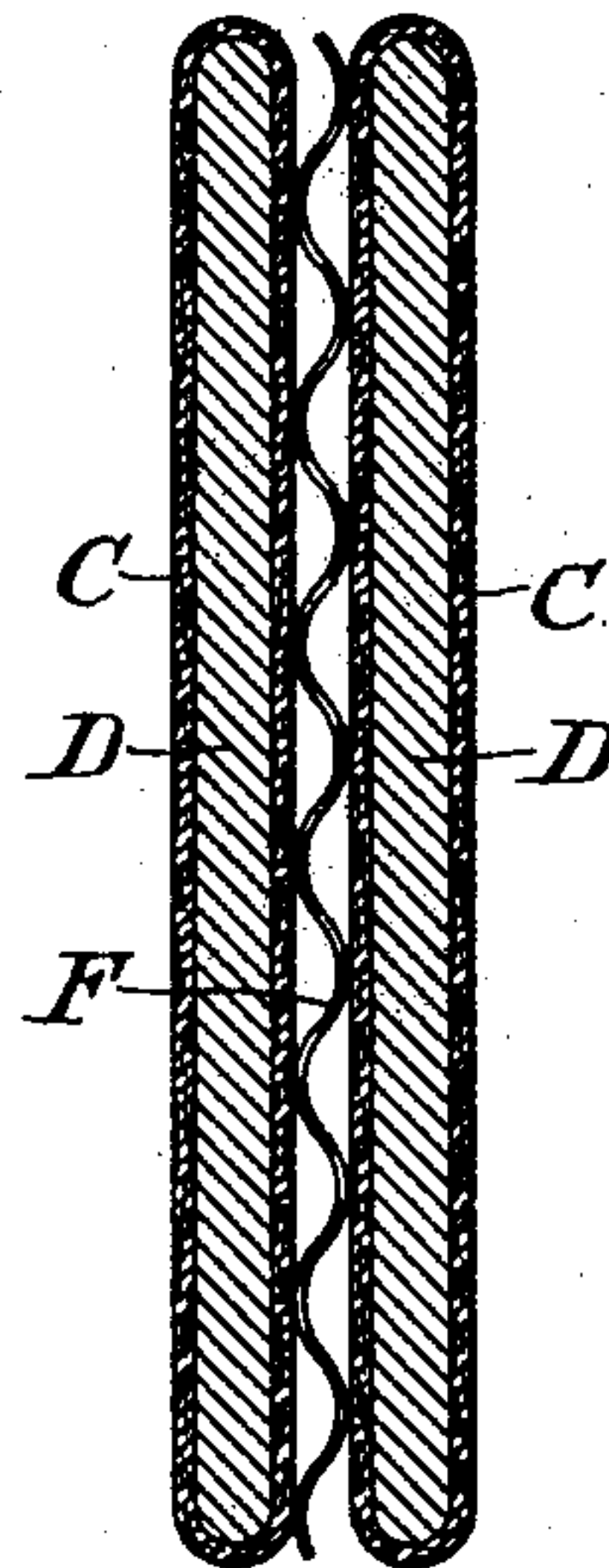


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELMER A. SPERRY, OF CLEVELAND, OHIO, ASSIGNOR TO NATIONAL BATTERY COMPANY, OF CLEVELAND, OHIO, AND JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ENVELOP FOR BATTERY-ELECTRODES.

SPECIFICATION forming part of Letters Patent No. 696,209, dated March 25, 1902.

Application filed May 25, 1901. Serial No. 61,849. (No model.)

To all whom it may concern:

Be it known that I, ELMER A. SPERRY, a citizen of the United States, residing at Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Envelops for Battery-Electrodes, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to envelops for storage-battery electrodes; and it consists in a novel arrangement and disposition of threads of pyroxylin which may or may not be woven; and it further consists in a peculiar arrangement and adjustment of the various portions of the envelop with reference to the electrode and in provisions for holding the envelop in place.

The object of the invention is to more effectually secure the active material to the plate or grid constituting the support for the material.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which for purposes of explanation it is illustrated, and in which—

Figure 1 shows a band made of parallel pyroxylin threads, preferably spun. Fig. 2 shows a plate overwrapped with a band or ribbon of pyroxylin in accordance with the invention. Fig. 3 is a detail view, on a larger scale, showing a plate to which reinforcing strips or pieces of pyroxylin fabric are applied. Fig. 4 is a detail view in section, illustrating more particularly means for holding the envelop in place.

It is known in the art that pyroxylin when properly prepared from pure cotton fiber or fabric will still possess a large proportion, if not the whole, of its original strength and density, at the same time being inactive in the acid and under the more or less severe electrolytic conditions present in batteries and especially as found to exist in lead storage batteries. In the present case it has been found that the tension which may be given to an envelop by the simple winding of pyroxylin fabric having such strength and density in narrow bands around and around the

plate is a valuable factor in retaining the active material in close contact with the grid, especially when an elastic separator is employed between the electrodes or against the surface of the envelop with suitable means for causing it to press closely against the surface of the envelop.

In carrying out the invention it is preferred to use spun pyroxylin threads A, which may or may not be provided with warp or cross threads B, Fig. 1, which may be prepared by the usual method of nitration and which, after being carefully washed, are treated with soda for the neutralization of any acid elements that may still be present. These bands C of pyroxylin are then applied to the plate D by winding, as shown in the drawings, preferably back and forth in a plurality of layers W, X, Y, and Z, as indicated in Fig. 2. When the plates are quadrangular, it is preferred to wind the ribbon C about the four edges, making the layers W X to cross layers Y Z at approximately right angles, as shown in Fig. 2, which, it will be observed, places a tension upon the surface both crosswise and up and down. Where the plates are subjected to severe usage, shocks, and jars, it is found best to place upon one or more edges an extra layer or reinforcing portion R. (Shown at the bottom of Fig. 3.) This prevents the bursting of the bands by the outward pressure of any mass of active material that may tend to collect at this point and also prevents cutting through the envelop as a whole by the plate-supports. Furthermore, it performs a valuable function as a cushion between the plate as a whole and its support or supports. Some layers may be of different texture from the others, and it is preferable to make the reinforcing portion R of a peculiar matted and semifelted pyroxylin fabric, which may be obtained by nitrating a substance—such, for instance, as canton-flannel or similar fabric—wherein the woven matrix is supplemented by an intermeshed and interlocking mass of fine fibers which close the interstices. A reinforcing or extra layer formed of such material prevents the shifting or permeation of fine particles or active

material, which are excellent electrical conductors, forming a bag or pocket in which such particles are retained and kept from creeping along the floor of the battery box or jar E or along the supports e, which are preferably formed on the bottom of such box or jar. It is found that this kind of pyroxylin fabric possesses superior qualities as an insulator under the general conditions of battery operation.

It will be evident that if the sides of the electrode are flat and have considerable area it might not be practicable to put such tension upon the bands as to insure their pressing closely against the active material except near the edges of the plate. It is therefore desirable to combine with the bands a device which will insure the pressing of the bands against the electrode at intermediate points. Such a device is shown in position in Fig. 4 of the drawings. As there represented it is a corrugated perforated separator F, preferably made of some material which is resilient as well as inactive, such as hard rubber. It is arranged to press against the envelop at intervals between the edges of the electrode, the lines of contact being preferably arranged transversely, although not necessarily at right angles, to the direction of winding of the band with which contact is made. A device of this character, if not itself possessed of sufficient stiffness, may be held to its work by any suitable support. As indicated in Fig. 4, each separator-plate may be placed between two adjacent electrodes and therefore be held in contact with the envelop of each electrode by the support afforded by the other electrode. Such a separator, being perforated and making contact with the envelop in lines only, offers no obstruction to the proper action of the battery and while holding each envelop in place at intervals, so that the portions of the envelop between the lines of contact are tense, like the string of a bow, also serves to prevent possible contact between the envelops of adjacent electrodes.

It will be readily understood that the application of the pyroxylin fabric may be varied considerably without departing from the spirit of the invention and that some of the essential features may be employed without the others.

I claim as my invention—

1. The combination of a battery-electrode and an envelop therefor consisting of threads or fibers of pyroxylin under tension wrapped around and around the electrode, substantially as and for the purpose set forth.

2. The combination of a battery-electrode and an envelop therefor consisting of a band of threads or fibers of pyroxylin under tension wrapped around and around the electrode, the said band being of a width materially less than the dimension of the electrode measured on a line normal to the direction of winding, substantially as and for the purpose set forth.

3. The combination of a battery-electrode

and an envelop therefor consisting of a band of threads or fibers of pyroxylin under tension wrapped around and around the electrode, the said band being of a width materially less than the dimension of the electrode measured on a line normal to the direction of winding and the windings of said band overlapping at their edges, substantially as and for the purpose set forth.

4. The combination of a battery-electrode and an envelop therefor consisting of a cross-connected band of threads or fibers of pyroxylin under tension wrapped around and around the electrode substantially as and for the purpose set forth.

5. The combination of a battery-electrode and an envelop therefor consisting of a fabric of pyroxylin threads under tension wrapped around and around the electrode, substantially as and for the purpose set forth.

6. The combination of a battery-electrode and an envelop therefor consisting of a band of threads or fibers of pyroxylin wrapped around and around the electrode in a plurality of superimposed layers, each of which wound layers practically covers the surface of the electrode, substantially as and for the purpose set forth.

7. The combination of a battery-electrode and an envelop therefor consisting of a band of threads or fibers of pyroxylin under tension wrapped around and around the electrode in a plurality of superimposed layers wound at intersecting angles, the said band being of a width materially less than the dimension of the electrode measured on a line normal to the direction of winding, substantially as and for the purpose set forth.

8. The combination of a battery-electrode and an envelop therefor consisting of threads or fibers of pyroxylin under tension wrapped around the electrode and an independent reinforce layer of threads or fibers of pyroxylin placed upon the electrode, substantially as and for the purpose set forth.

9. The combination of a battery-electrode and an envelop therefor consisting of threads or fibers of pyroxylin under tension wrapped around the electrode and an independent reinforce layer of pyroxylin threads located upon the electrode beneath the said wrapping, substantially as and for the purpose set forth.

10. The combination of a battery-electrode and an envelop therefor consisting of semi-felted woven fabric of pyroxylin fibers, substantially as and for the purpose set forth.

11. The combination of a battery-electrode and an envelop therefor consisting of a plurality of layers of pyroxylin fabric under tension wound about the electrode, the said layers of fabric being of texture differing from each other, substantially as and for the purpose set forth.

12. The combination of a battery-electrode, an envelop therefor comprising threads or fibers of pyroxylin under tension wrapped

around and around the electrode, and means to support the envelop against the electrode at intervals between the edges of the electrode, substantially as and for the purpose set forth.

5 13. The combination of a battery-electrode having flat sides, an envelop therefor consisting of threads or fibers of pyroxylin under tension wrapped around and around the electrode, and means to support the envelop
10 against the electrode at intervals between the edges of the electrode, substantially as and for the purpose set forth.

14. The combination of a battery-electrode, an envelop therefor consisting of threads or
15 fibers of pyroxylin under tension wrapped around and around the electrode and a resilient support for contact with the envelop at intervals between the edges of the electrode, substantially as and for the purpose set forth.

20 15. The combination of a battery-electrode, an envelop therefor consisting of a band of threads or fibers of pyroxylin under tension wrapped around and around the electrode, the
25 said band being of a width materially less than the dimension of the electrode, measured on a line normal to the direction of winding, and means to support the envelop at intervals between the edges of the electrode in lines substantially transverse to the direction of winding of said band, substantially as and for the
30 purpose set forth.

16. The combination of a battery-electrode, an envelop therefor consisting of threads or
35 fibers of pyroxylin under tension wrapped around and around the electrode, a resilient

separator-plate to support the envelop at intervals between the edges of the electrode, and means to support said separator-plate, substantially as and for the purpose set forth.

17. The combination of a plurality of bat- 40 tery-electrodes, an envelop for each of said electrodes consisting of threads or fibers of pyroxylin under tension wrapped around and around the electrode, and a resilient separator-plate interposed between adjacent electrodes 45 and supporting the envelop of each at intervals between the edges of the electrode, substantially as and for the purposes set forth.

18. The combination of a battery-electrode, a pyroxylin fabric forming a bag or pocket 50 about the said electrode, and an envelop consisting of threads or fibers of pyroxylin under tension wrapped around and around the electrode, substantially as and for the purpose set forth.

19. The combination of a battery-electrode, a box or jar having formed upon its bottom supports for the electrode, a pyroxylin fabric forming a bag or pocket and cushion about the bottom of the electrode, and an envelop 60 consisting of threads or fibers of pyroxylin under tension wrapped around and around the electrode, substantially as and for the purpose set forth.

This specification signed and witnessed this 65 21st day of May, A. D. 1901.

ELMER A. SPERRY.

In presence of—

H. C. STEVENS,
K. E. GRIFFIN.