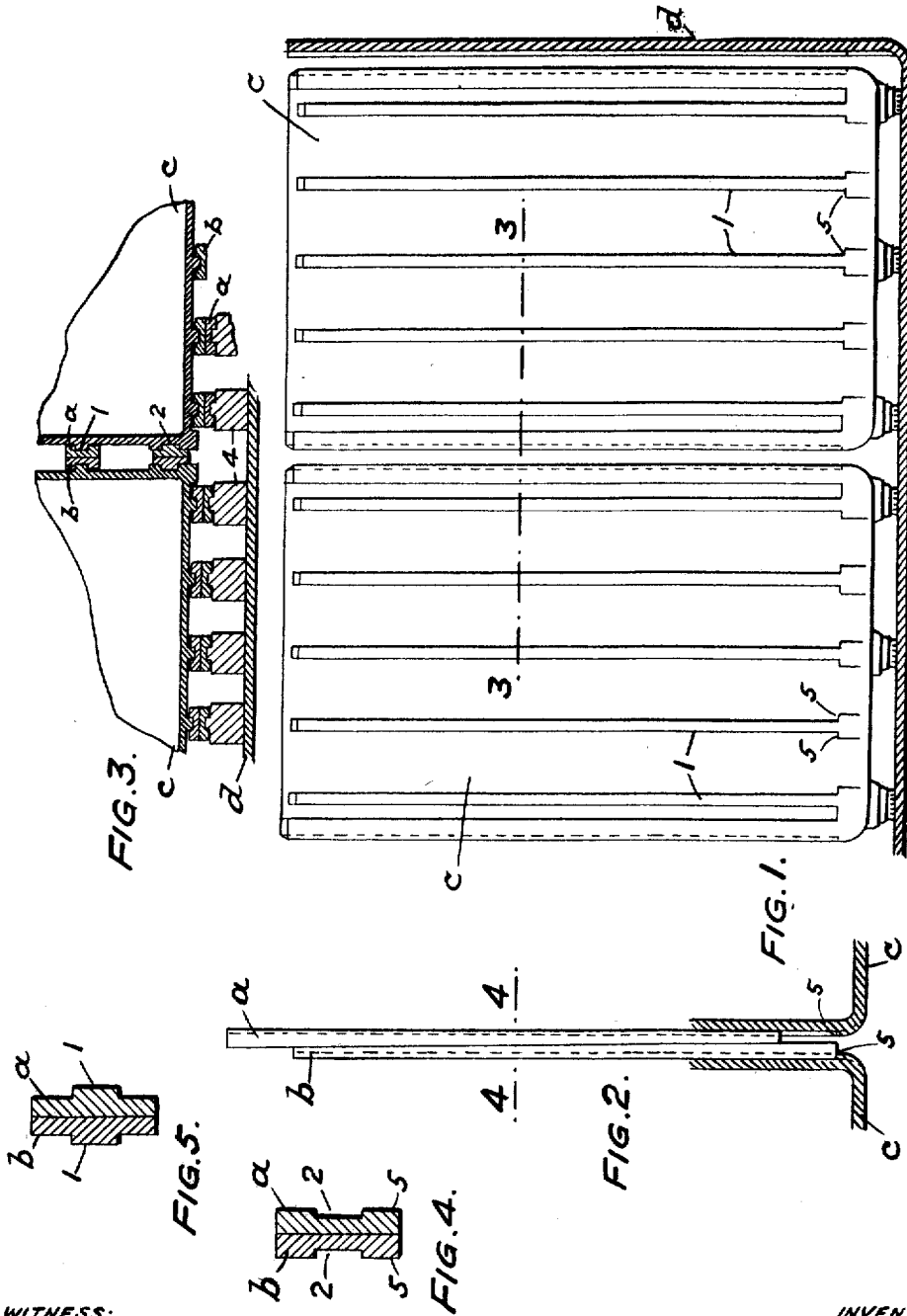


L. H. FLANDERS.
SECONDARY OR STORAGE BATTERY.
APPLICATION FILED SEPT. 29, 1917.

1,305,084

Patented May 27, 1919.
4 SHEETS—SHEET 1.



WITNESS:

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4 SHEETS—SHEET 2.

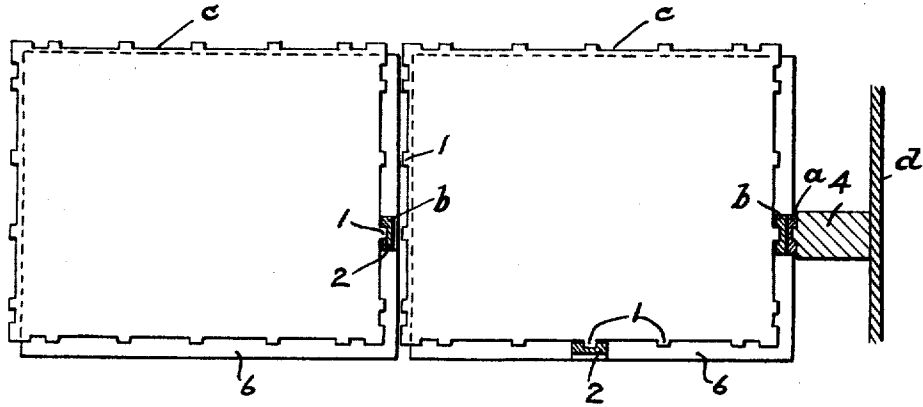


FIG. 7.

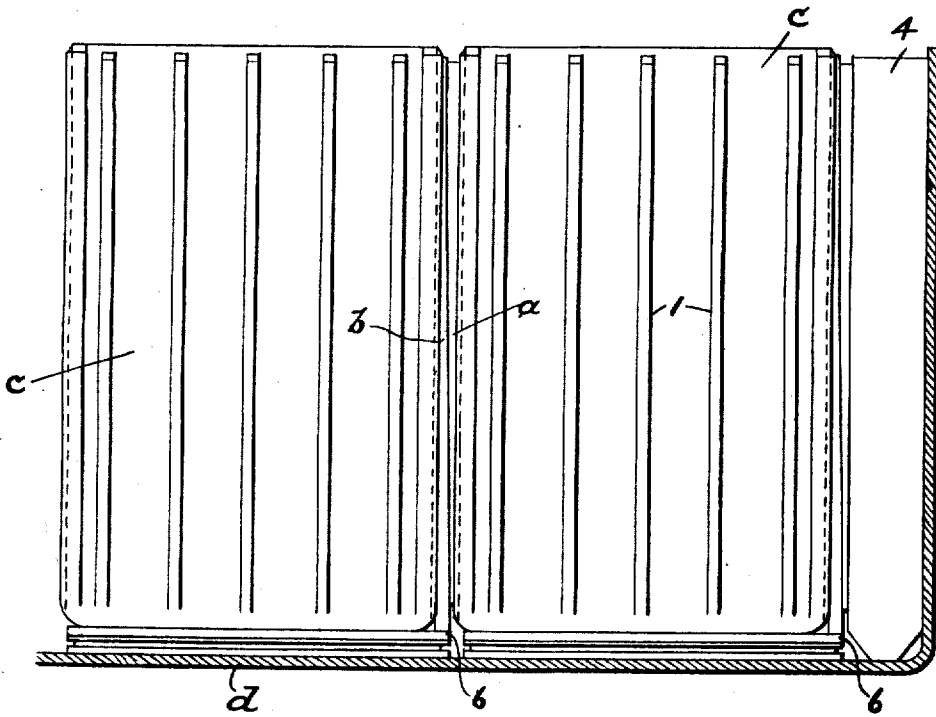


FIG. 6.

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4 SHEETS—SHEET 3.

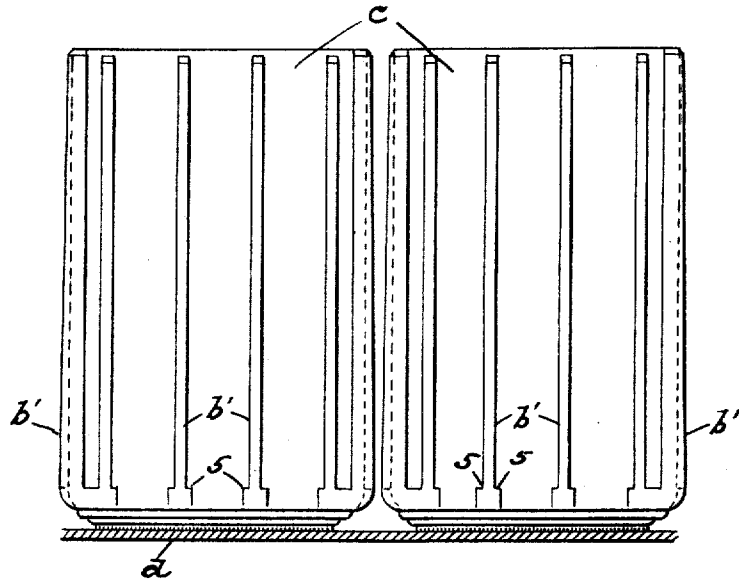


FIG. 8.



FIG. 9.

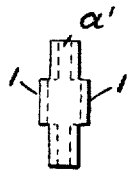


FIG. 10.



FIG. 11.

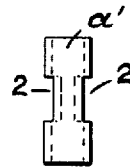


FIG. 12.



FIG. 13.

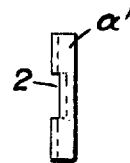


FIG. 14.

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4 SHEETS—SHEET 4.

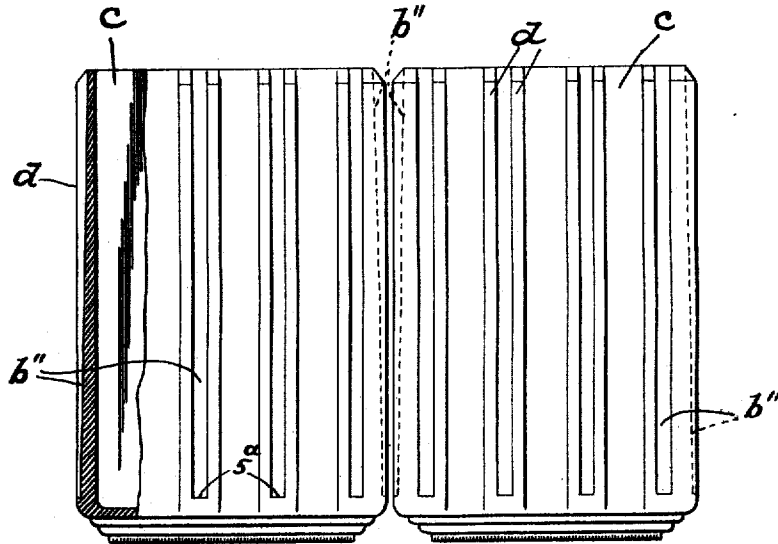


FIG. 15.

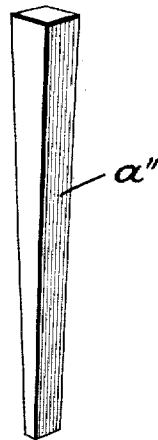


FIG. 16.

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UNITED STATES PATENT OFFICE.

LOUIS H. FLANDERS, OF JENKINTOWN, PENNSYLVANIA.

SECONDARY OR STORAGE BATTERY.

1,305,084.

Specification of Letters Patent.

Patented May 27, 1919.

Application filed September 29, 1917. Serial No. 193,895.

To all whom it may concern:

Be it known that I, LOUIS H. FLANDERS, a citizen of the United States, residing at Jenkintown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Secondary or Storage Batteries, of which the following is a specification.

The principal objects of the present invention are, first, to insure alinement and consequent facility in driving and uniformity of bearing throughout their lengths of the wedges used for holding storage battery cells securely in place in a battery tank or tray; second, to prevent the wedges from coming into contact with the bottom of the tray or tank thereby avoiding possible short circuiting of the cells, and third, to provide, not only for keeping the cooperating wedge elements in facial contact but also for such relative lateral movement as is necessary by reason of the fact that each of them is guided in respect to a cell, tank or tray-wall in accordance with this invention.

To these and other ends, hereinafter set forth, the invention, generally stated, consists in the combination of tongue and groove elements with the wedges and the cell or tank or tray walls, whereby the wedge members are kept in alinement.

The invention further consists of the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings, forming part hereof, and in which—

Figure 1, is an elevational view, partly in section, of cells and a part of a battery tank showing tongue elements for the backs of the wedges and also stop shoulders on the tongue elements.

Fig. 2, is a similar view showing the groove elements on the backs of the wedges.

Fig. 3, is a section on the line 3—3 of Fig. 1, showing the wedge members in alinement and in place.

Fig. 4, is a sectional view drawn to an enlarged scale and taken on the line 4—4 of Fig. 2.

Fig. 5, is an enlarged sectional view of the wedges shown at the center of Fig. 3, and illustrating a modification in which the tongue element is on the back of the wedges.

Figs. 6 and 7, are respectively a sectional plan and a sectional elevation illustrating a modification of wedge-stopping means.

Fig. 8, is a sectional elevation illustrating

a modification in which one of the wedge members is integral with its cooperating wall.

Fig. 9, is a side view of a wedge suitable for use in the construction of Fig. 8.

Fig. 10, is an end view of the wedge of Fig. 11, drawn to an enlarged scale.

Fig. 11, is a side view of a modification of the wedge shown in Fig. 9.

Fig. 12, is an end view of the wedge of Fig. 9, drawn to an enlarged scale.

Fig. 13, is a side view of another modification of the wedge shown in Fig. 9.

Fig. 14, is an end view of the wedge shown in Fig. 13, drawn to an enlarged scale.

Fig. 15, is a view partly in section of a pair of jars embodying a modification of the invention, and

Fig. 16, is a perspective view of the wedge elements shown in dotted lines in Fig. 15.

In the drawings 1 and 1^a, are tongue elements and 2, are groove elements at the backs of the wedges *a* and *b*, Figs. 1 to 6, and *a*¹, Figs. 8 to 13. These tongue and groove elements hold the wedge members in alinement and cause them to bear uniformly throughout the height of the cells *c*, and to securely hold the cells in the tray or battery tank *d*.

The importance of this is made very clear in the case of a submarine where it is obviously imperative that the cells be securely fastened and relative motion between them be prevented. The wedges correct any bulging of the cell walls and therefore they should bear uniformly throughout the length of the wall. In driving the wedges they must remain in alinement in order to be effective for properly securing the parts in the tank or container and for supporting the jar walls. Bulging of the cell walls is one cause which tends to throw the wedges out of alinement as they are being driven, but by this invention alinement is insured.

The tongue elements may be either on the backs of the wedges as in Figs. 5 and 10, or on the walls with which the wedges cooperate as in Fig. 1, and this is true of the groove elements as will be seen from Figs. 4, and 12, in which the groove elements are on the backs of the wedges and from the middle part of Fig. 3, in which the groove elements are in the cooperating walls. Those of the tongue or groove elements which are formed as ribs on the cell should be ground to flat surfaces upon which the wedges can bear and act. The wedges may be made of hard wood impregnated with paraffin. The

wedges cooperate in pairs and as shown in Figs. 1 to 6, both wedges of each pair are detachable from the walls with which they cooperate. However, in Figs. 8 to 14, one

5 of the wedges b^1 , is fast on or integral with one of the walls and the other wedge a^1 , is loose and not attached to any wall, but in each case the tongue and groove elements are present in respect to one wedge of each
10 pair for preserving alinement of the wedges in respect to each other. In the assembly of a battery the ribs or grooves of the cell, tray or tank wall, frequently do not come exactly opposite each other or opposite the
15 fixed wedge members, but the working faces of cooperating wedge members of a pair remain in contact, because they may partake of some relative lateral movement.

In Fig. 7, 4 is a filler shown in connection with the use of the invention.

20 The shoulders 5, on the tongue elements 1, Figs. 1 and 8, serve as stop means for preventing the wedges from contacting with the bottom of the tray or tank and the projecting portions 6, of the insulating plates,
25 Figs. 6 and 7, spaced above the bottom of the tray or tank and arranged to be in effect parts of the cells, serve the same purpose.

In assembling a battery and tightening
30 up the cells in place in the tank or tray, one of the wedges of a pair, Figs. 1 to 7, inclusive, is inserted with its broad end toward the bottom and with the tongue and groove elements at its back in proper engagement.
35 The bottom of the wedge rests upon the stop means 5, Fig. 1, or 6, Fig. 6, which prevents the wedge from coming into contact with the lead lining of the tank or tray. The other wedge of the pair is then inserted
40 with its narrow end down and with the tongue and groove elements at its back in proper engagement. Wedges are thus loosely inserted in pairs throughout a row of cells and the projecting wedges are gradually
45 driven home throughout the battery until the battery is wedged in place. In case the wedges project above the jars they can be withdrawn and their bottoms sawed off to proper lengths and then put in again.

50 In Figs. 8 to 14, the wedge of each pair which has its broad end toward the bottom is integral with or fastened to one of the walls Fig. 8, so that all that is required is to drive in the other and loose wedge of the pair Figs. 9 to 14 with the tongue and groove
55 elements at its back in proper engagement, and this last mentioned wedge is prevented by the stop means 5, from reaching the bottom of the tank or tray. It may be remarked that the wedges of a pair may shift
60 laterally in respect to each other to accommodate themselves to any lack of alinement of the grooves or ribs with each other or

with fixed wedges, such as is almost certain to occur in the assembly of a battery. 65

In Fig. 15, the wedge b^{11} , is fast on or integral with one of the walls and the other wedge a^{11} , is shown in Fig. 16. The tongue and groove elements are provided by the ribs d , on the walls, and 5^a, are the stop
70 shoulders.

What I claim is:

1. In a storage battery the combination of cells, a receptacle for the cells, vertically disposed wedge members of which at
75 least one is drivable for securing the cells in the receptacle and which are mounted for slight lateral movement, and tongue-and-groove elements at the backs of the wedge members for holding them in substantial
80 alinement and causing them to bear uniformly throughout the height of the cells, and one of said elements being on the jars, substantially as described.

2. In a storage battery the combination 85 of cells, a receptacle for the cells, wedge members for holding the cells in the receptacle and mounted for slight relative lateral movement, stop means on the cells for keeping the wedges above the level of the bottom
90 of the receptacle, and tongue and groove elements at the backs of the wedge members for holding them in substantial alinement and causing them to bear uniformly throughout the height of the cells, and one
95 of said elements being on the jar, substantially as described.

3. In a storage battery the combination of cells, a receptacle for the cells, wedge members for holding the cells in the receptacle, stop shoulders on one of said elements
100 for keeping the wedges above the level of the bottom of the receptacle, and tongue and groove elements at the backs of the wedge members for holding them in alinement and
105 causing them to bear uniformly throughout the height of the cells, substantially as described.

4. In a storage battery the combination of cells, a receptacle for the cells, vertically
110 arranged wedge members of which at least one is drivable for holding the cells in the receptacle, and tongue and groove elements consisting of ribs on the cells and grooves on the back of the wedge members, substantially
115 as described.

5. In a storage battery the combination of ribs projecting from the cell walls and provided with stop shoulders, and wedges movable and drivable in respect to the walls
120 and provided at their backs with grooves for the accommodation of the ribs and adapted to have their ends abut on the shoulders.

LOUIS H. FLANDERS.