

No. 837,897.

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A. F. CLARK.

CONNECTOR FOR STORAGE BATTERIES.

APPLICATION FILED MAY 12, 1903. RENEWED SEPT. 11, 1905.

Fig. 1.

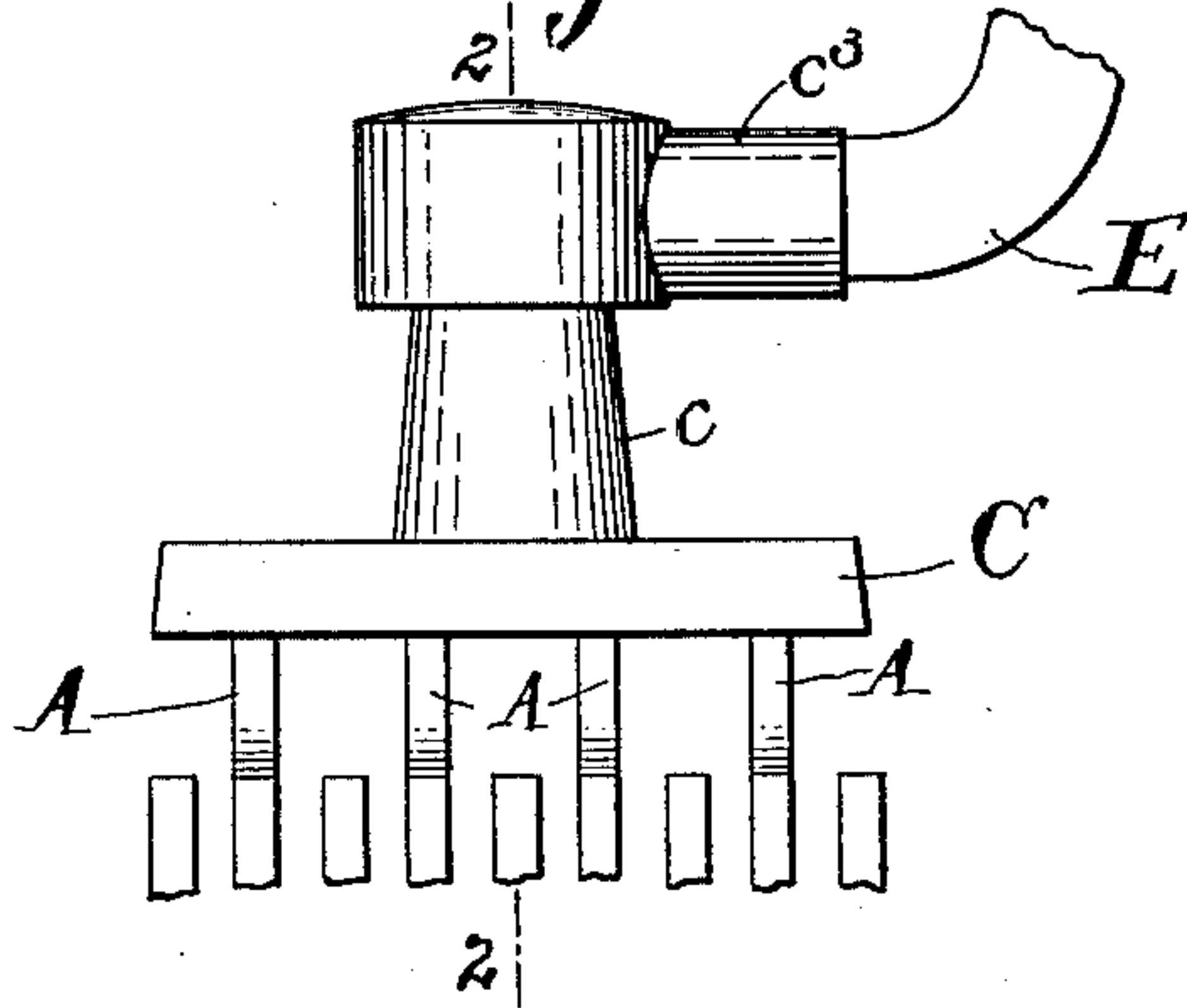


Fig. 2.

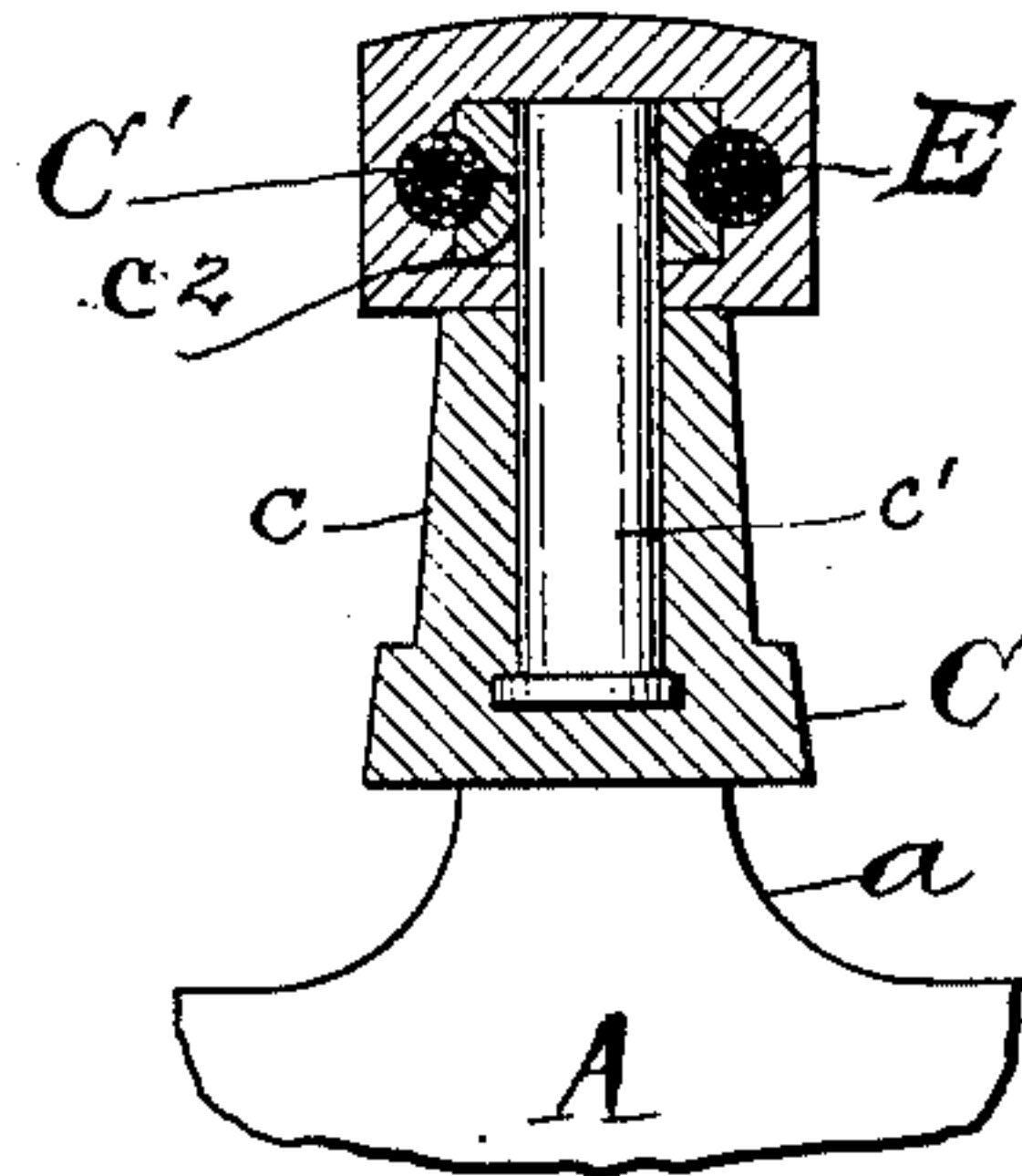


Fig. 3.

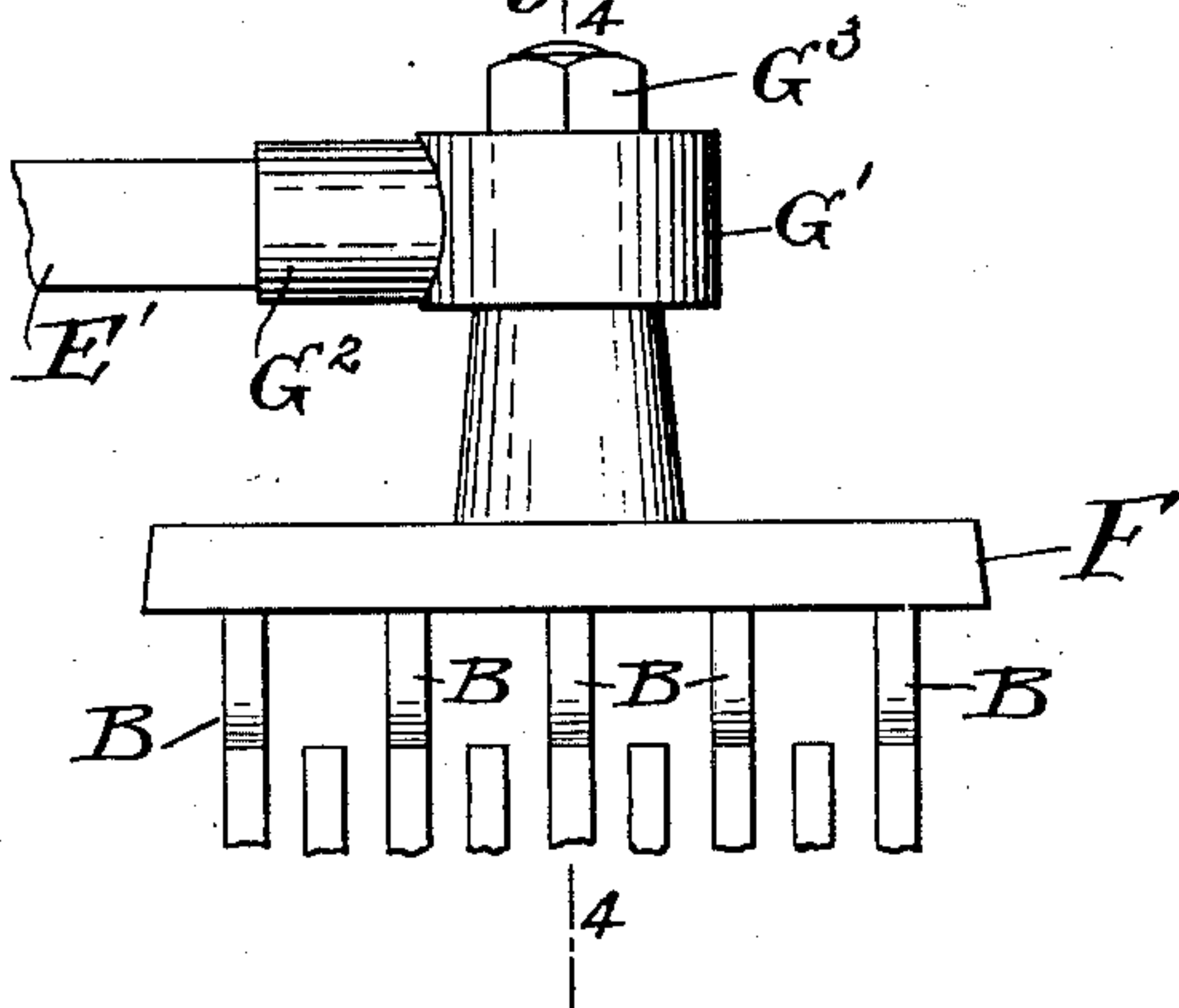


Fig. 4.

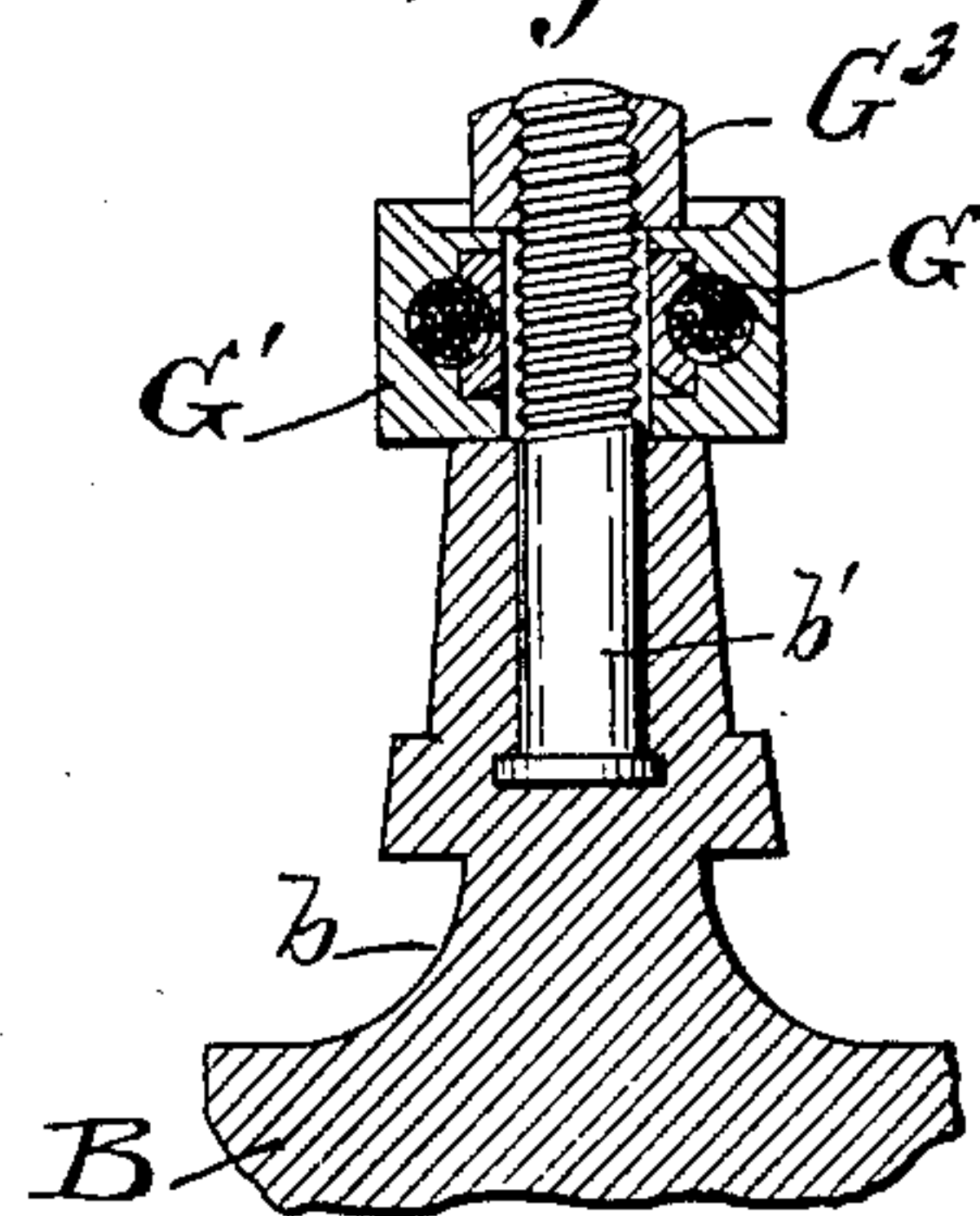


Fig. 5.

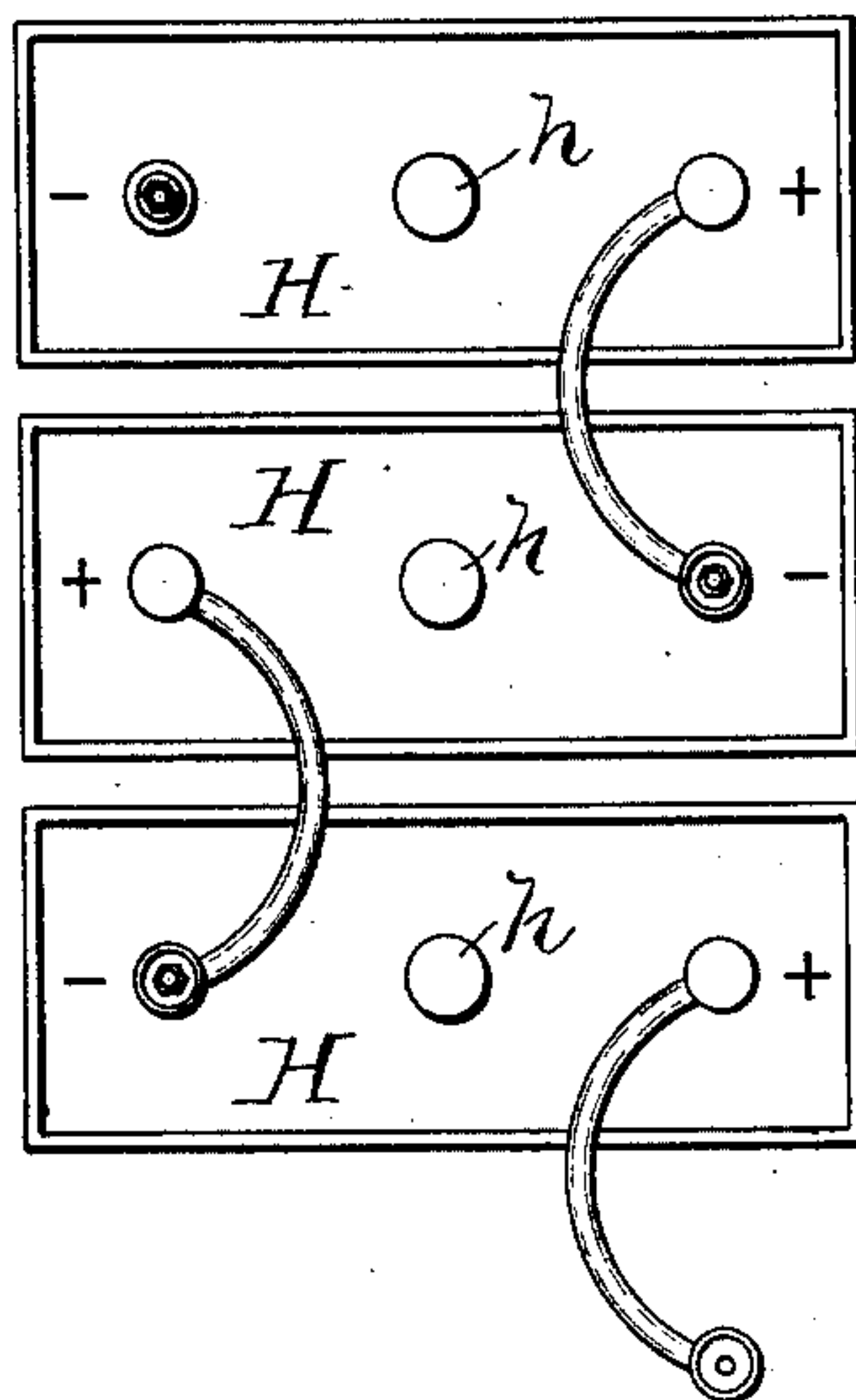
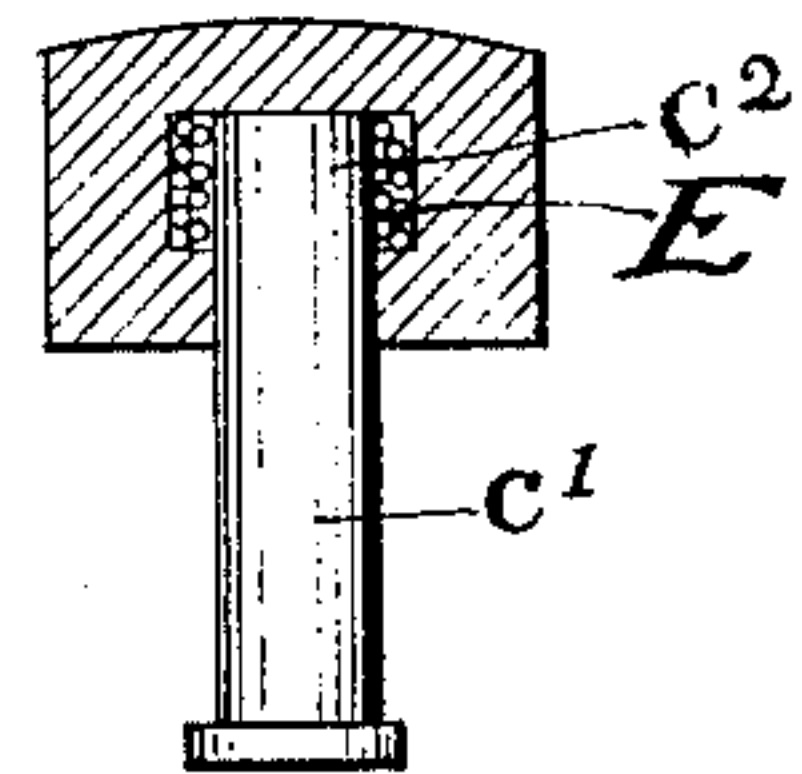


Fig. 6.



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## CONNECTOR FOR STORAGE BATTERIES.

No. 837,897.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed May 12, 1903. Renewed September 11, 1905. Serial No. 278,039.

*To all whom it may concern:*

Be it known that I, ABSOLAM F. CLARK, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Connections for Storage-Battery Cells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide a novel connection for bridging the terminals of successive battery-cells of a storage battery which makes the connection of the respective terminals positive and negative, more certain and fixed, and also enables the connection between the positive and negative terminals of successive cells to be readily disconnected for substitution and repair.

I will first describe the embodiment of my invention illustrated in the accompanying drawings and then point out the invention in the claims.

In the drawings, Figure 1 is an end view of the plates of a battery-cell, the positive battery-terminal, and the connection of the positive plates to the positive battery-terminal. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is an end view of the plates of a battery-cell, the negative battery-terminal, and the connection of the negative plates to the negative battery-terminal. Fig. 4 is a section on the line 4 4, Fig. 3. Fig. 5 is a top plan view of a three-cell battery set up, showing terminal connections. Fig. 6 is a sectional view of pin and head, showing modified construction with cable wound directly upon pin.

A A are a series of positive plates of a storage-battery cell having the terminals *a*.

B B B are a series of negative plates of a storage-battery cell having the terminals *b*.

Speaking first of the positive-plate terminal connections of a battery-cell, Figs. 1 and 2, C is a cast-lead terminal plate having the projection *c*, in which is secured during casting the pin *c'*, whose head *c<sup>2</sup>* extends above the projection. The terminals *a* are inserted into the mold during the casting of the plate C and while the plate is still fluid and are cast or welded onto the flat surface of said plate. The pin *c'* has upon it the thimble *C'*. The connecting-wires of a cable E are bent directly around the thimble *C'* to form a loop,

and lead is cast around the loop, thus embedding the cable or the cables surrounding the thimble in lead having the socketed projection *c<sup>3</sup>*. The head *c<sup>2</sup>* of the pin *c'* is placed in this loop and is secured by cast-lead poured on the top.

In Fig. 6 the thimble *C'* is dispensed with and the cable or cables bent directly around the pin-head.

The negative terminals *b* are connected to a cast-lead terminal plate B (see Figs. 3 and 4) in like manner as the positive terminals *a* are connected to the cast-lead terminal plate C. In the projection *b* of this plate is likewise secured a pin *b'*, which, unlike the pin *c'*, is threaded at its top. The connecting-wires of the cable E are alike with reference to the positive pole, either bent into a loop or surrounding a thimble G, the loop or the thimble being embedded in lead forming a casting *G'*, having the projecting socket *G<sup>2</sup>*. The pin *b'* passes through the loop and is secured against the lead surface *G'* by the nut *G<sup>3</sup>*. In either case instead of wire cable the terminal conductor may be of lead.

In assembling up the cells of a battery the following is the method: The positive and negative plate terminals of a given cell are connected to their corresponding plate and respectively to the positive and negative terminals of a cell, as described. Over each cell is then placed the rubber cover H, Fig. 5, which is orificed to pass over the battery-terminals. In each plate H is a central orifice provided with a cap or cover *h*, the orifice being for the purpose of admitting the battery liquid. The cable E is then attached as described, one end to the positive terminal of one cell, the other end to the negative terminal of the other cell. By this arrangement the plate-terminals of a given cell are connected with certainty to the corresponding cell-terminals, and the connection between battery-cells is made in such a way as to readily enable the connections to be changed when it is necessary to cut out a cell or change the arrangement.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast,



a pin cast in said plate, a terminal conductor into which said pin extends, and a lead structure in which both the pin and terminal conductor are incased.

5 2. In a storage battery, the combination with the plates of one pole of a cell, a lead terminal plate to which said plates are cast, a pin cast in said plate, a brass thimble, a terminal conductor surrounding said thimble,  
10 said thimble and terminal conductor being embedded in lead, said pin passing through said thimble and means to secure said pin and thimble together.

3. In a storage battery, the combination  
15 with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, a terminal conductor surrounded with lead through which said pin passes, said pin being secured in position by  
20 cast-lead.

4. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, a brass thimble, a terminal conductor surrounding said thimble,  
25 said thimble and terminal conductor being embedded in lead, said pin passing through said thimble, said pin being secured in position by cast-lead.

30 5. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, a thimble having a terminal conductor surrounding it embedded in cast-lead, said cast-lead having a hollow projection through which the terminal  
35 wire passes, said pin passing through said thimble and being secured therein.

6. In a storage battery, the combination  
40 with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, a terminal conductor embedded in lead, said lead having a hollow projecting portion through which the terminal  
45 wire passes, said pin passing through said terminal wire and being secured thereto.

7. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast,  
50 a pin cast in said plate, a thimble having cast-lead surrounding it, said cast-lead having a hollow projection in which the terminal wire of one pole of a cell is adapted to be inserted, said pin passing through said thimble and  
55 being secured therein by lead.

8. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, a terminal conductor  
60 embedded in lead, said lead having a hollow projecting portion through which the terminal wire passes, said pin passing through said terminal wire and being secured thereto by lead.

65 9. In a storage battery, the combination

with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast in said plate, said pin having one exposed threaded end, a thimble having a surrounded terminal conductor surrounded  
70 with lead through which said threaded end of the pin extends, and a nut for securing said pin.

10. In a storage battery, the combination with the plates of one pole of a cell, of a lead  
75 terminal plate to which said plates are cast, a pin cast in said plate, said pin having one exposed threaded end, a thimble having a surrounded terminal conductor surrounded with lead through which said threaded end of  
80 the pin extends, a terminal conductor surrounded with lead through which said threaded end of the pin extends and a nut for securing said pin.

11. In a storage battery, the combination  
85 with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast to said plate, said pin having an exposed threaded end, a thimble having a surrounded terminal conductor surrounded with  
90 lead through which said threaded end of the pin extends, said surrounding lead having an orificed projecting portion through which the terminal conductor passes and a nut for securing said pin.

12. In a storage battery, the combination with the plates of one pole of a cell, of a lead terminal plate to which said plates are cast, a pin cast to said plate, said pin having an exposed threaded end, a terminal conductor  
100 surrounded with lead through which said threaded end of the pin extends, said surrounding lead having an orificed projecting portion, through which the terminal conductor passes and a nut for securing said pin.

13. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, a thimble having a surrounding terminal conductor incased in lead in which the other end  
110 of said pin enters and is secured.

14. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, a terminal conductor, and a lead structure in  
115 which both the terminal conductor and the other end of the pin are incased.

15. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, a  
120 thimble having a surrounding terminal conductor incased in lead in which the other end of said pin enters and is secured, said thimble-inclosing lead having an orificed projecting portion through which the terminal conductor  
125 is adapted to pass.

16. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, a terminal conductor incased in lead in which  
130



the other end of said pin enters and is secured, said incasing lead having an orificed projecting portion through which the terminal conductor is adapted to pass.

5 17. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, the other end of said pin being threaded, a thimble having a surrounded terminal conductor  
10 incased in lead through which the threaded end of the pin passes and a nut for securing said pin to the incasing lead.

18. A terminal for the plates of the pole of a storage-battery cell, comprising a plate of  
15 lead in which one end of a pin is secured, the other end of the pin being threaded, a terminal conductor into which the threaded end of said pin extends, cast-lead into which both the terminal conductor and the threaded end  
20 of the pin extend, and a nut engaging the threaded end of the pin for securing the pin in the surrounding lead.

19. A terminal for the plates of one pole of a storage-battery cell, comprising a plate of  
25 lead in which one end of a pin is secured, the other end of said pin being threaded, a thimble having a surrounded terminal conductor, incased in lead through which the threaded end of the pin passes and a nut for securing  
30 said pin to the incasing lead, said thimble-incasing lead having an orificed projecting portion through which the terminal conductor passes.

20. A terminal for the plates of one pole of  
35 a storage-battery cell, comprising a plate of lead in which one end of a pin is secured, the other end of said pin being threaded, a terminal conductor incased in lead through which the threaded end of the pin passes and  
40 a nut for securing said pin to the incasing lead, said terminal-conductor incasing lead having an orificed projecting portion through which the terminal conductor passes.

21. In combination with the plates of un-  
45 like polarity of successive cells of a pair of storage-battery cells, of a terminal plate of

lead to which the plates of like polarity of one cell are cast, having a projecting portion, a pin, one end of which is embedded in the projecting portion of said plate, a thimble sur- 50 rounded by one end of a terminal conductor embedded in lead, in which the other end of said pin is secured, a second terminal lead plate to which the plates of a successive cell, of unlike polarity to the first-mentioned 55 plates, are cast, said last-mentioned terminal plate having a projecting portion, a pin embedded in said projecting portion and having an exposed threaded end, a thimble, surrounded by the other end of said terminal 60 conductor, embedded in lead, through which said threaded end of the pin extends and a nut for securing said pin to said embedding lead.

22. In combination with the plates of un- 65 like polarity of successive cells of a pair of storage-battery cells, of a terminal plate of lead to which the plates of like polarity of one cell are cast, having a projecting portion, a pin, one end of which is embedded in the projecting portion of said plate, one end of the 70 terminal conductor embedded in lead, to which the other end of said pin is secured, a second terminal pin, to which the plates of a single cell of unlike polarity to the first-mentioned plates are cast, said last-mentioned 75 terminal plate having a projecting portion, a pin embedded in said projecting portion and having exposed threaded ends, the other end of said terminal conductor being embedded 80 in lead and through which end embedded in lead the threaded end of the pin extends and a nut for securing said pin to said embedding lead.

In testimony of which invention I have 85 hereunto set my hand, at Philadelphia, on this 7th day of May, 1903.

ABSOLAM F. CLARK.

Witnesses:

M. F. ELLIS,

M. M. HAMILTON.