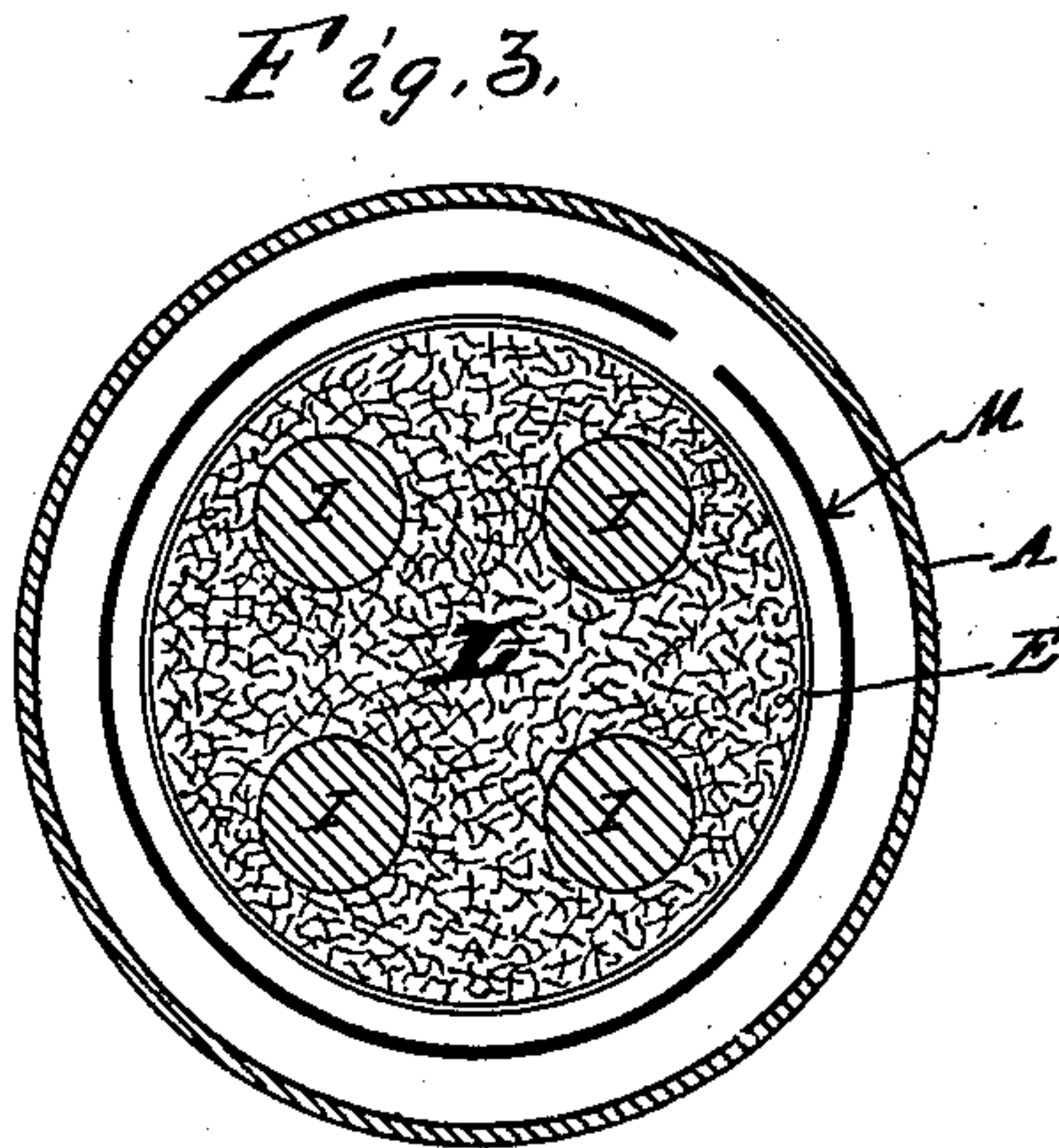
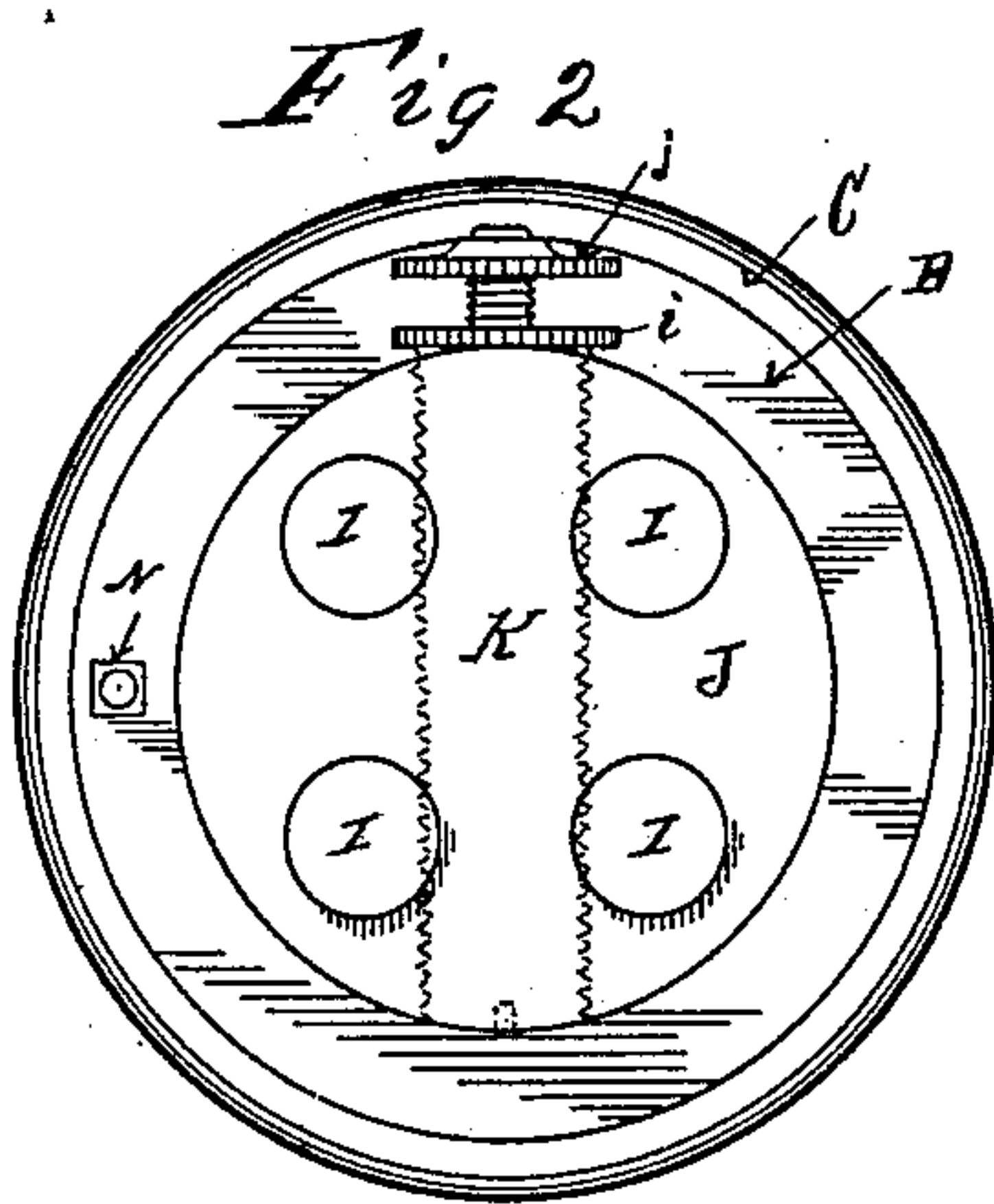
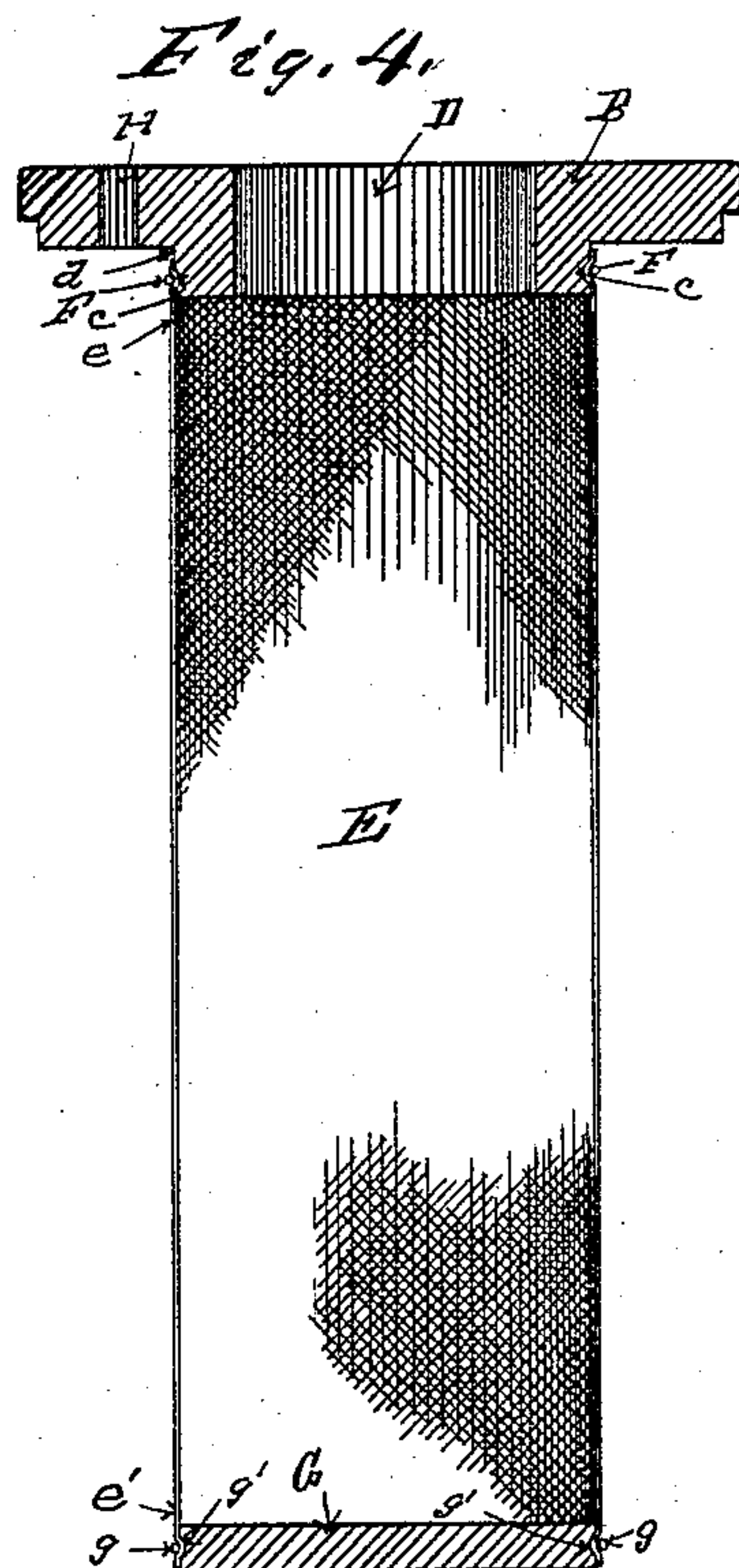
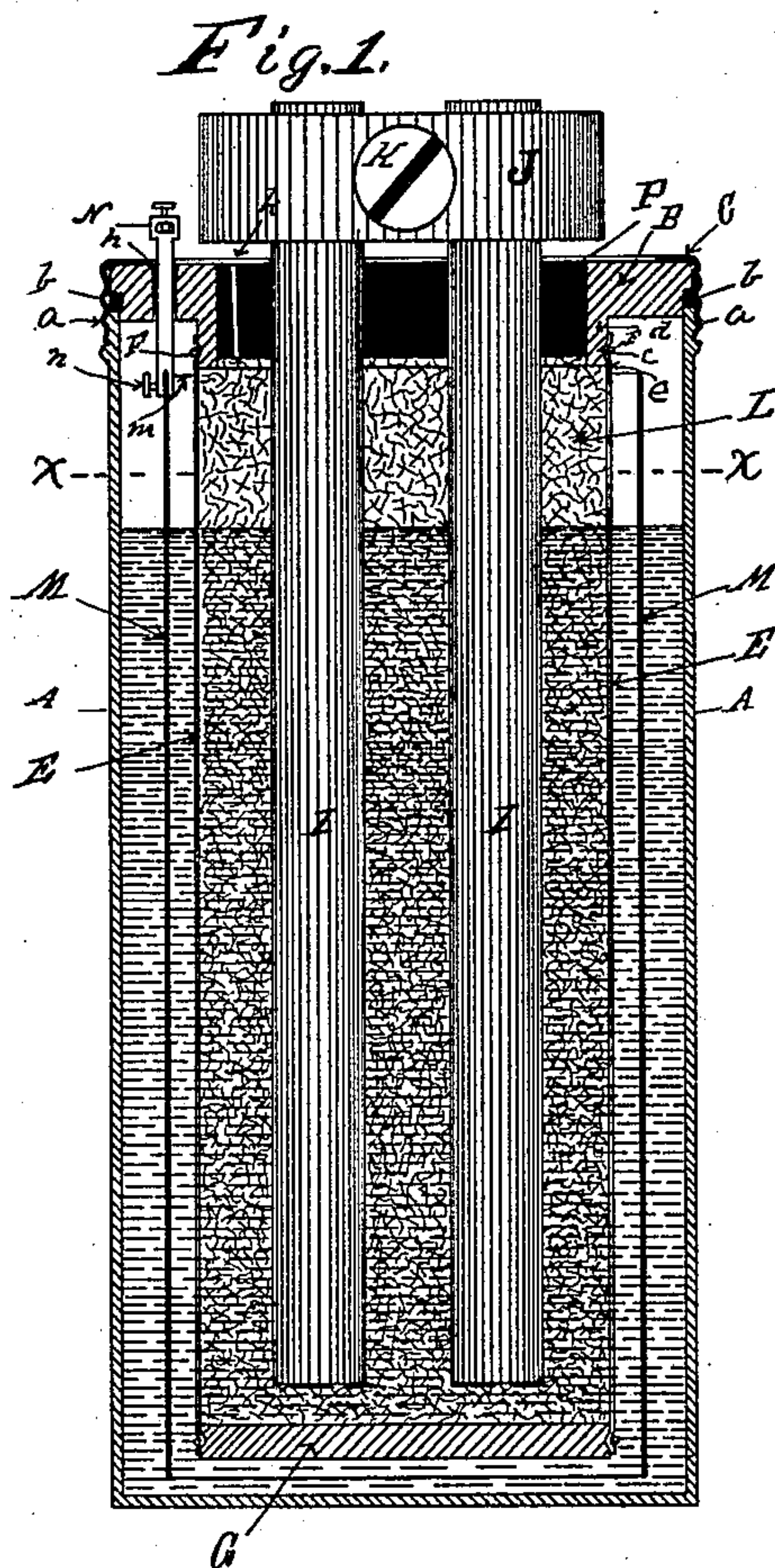


W. BURNLEY.  
ELECTRICAL BATTERY.

No. 397,965.

Patented Feb. 19, 1889.



Witnesses.

G. J. Mead.

G. A. McDannell.

Inventor.

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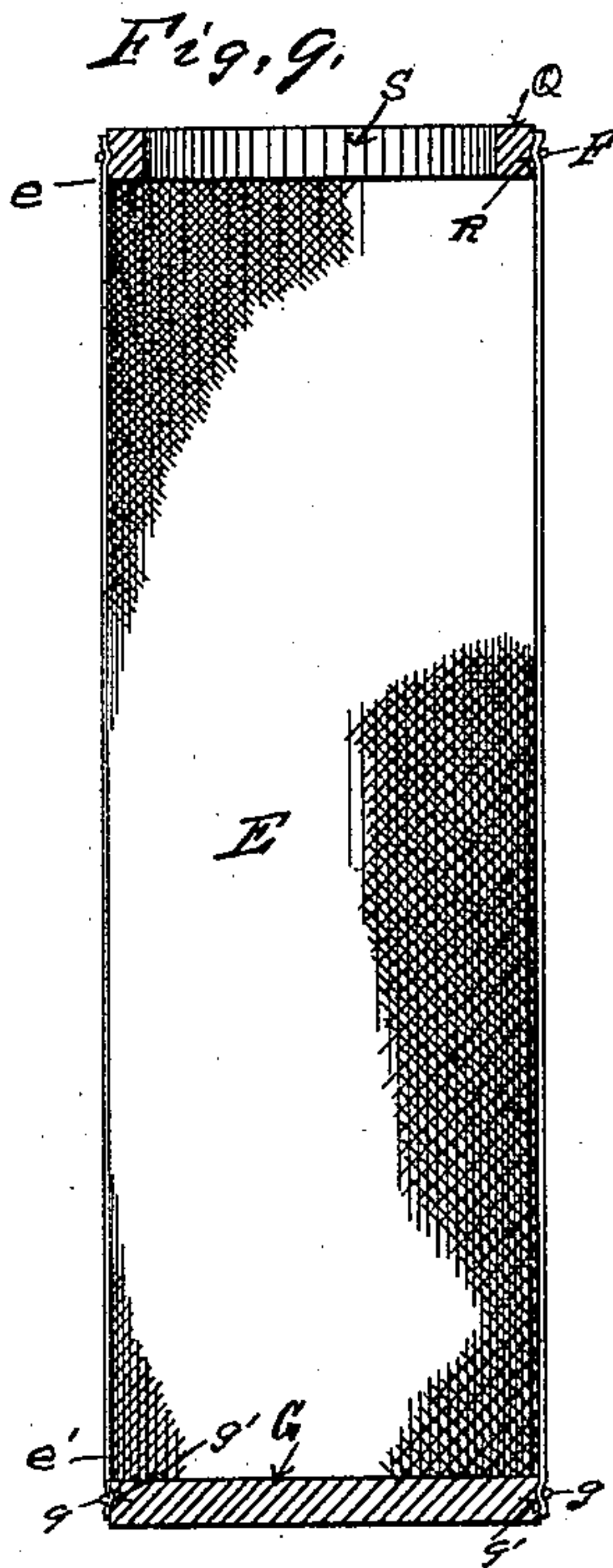
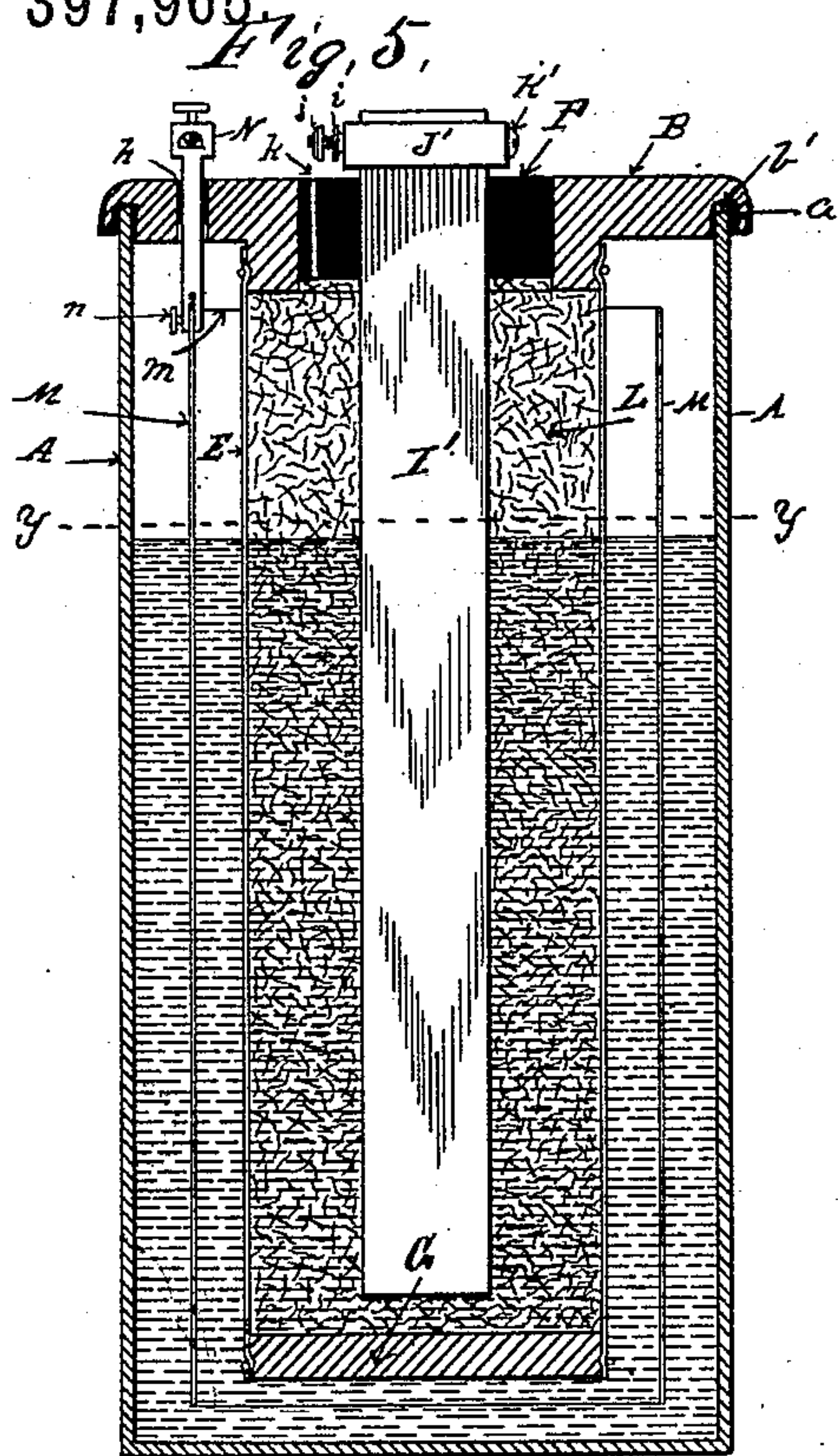
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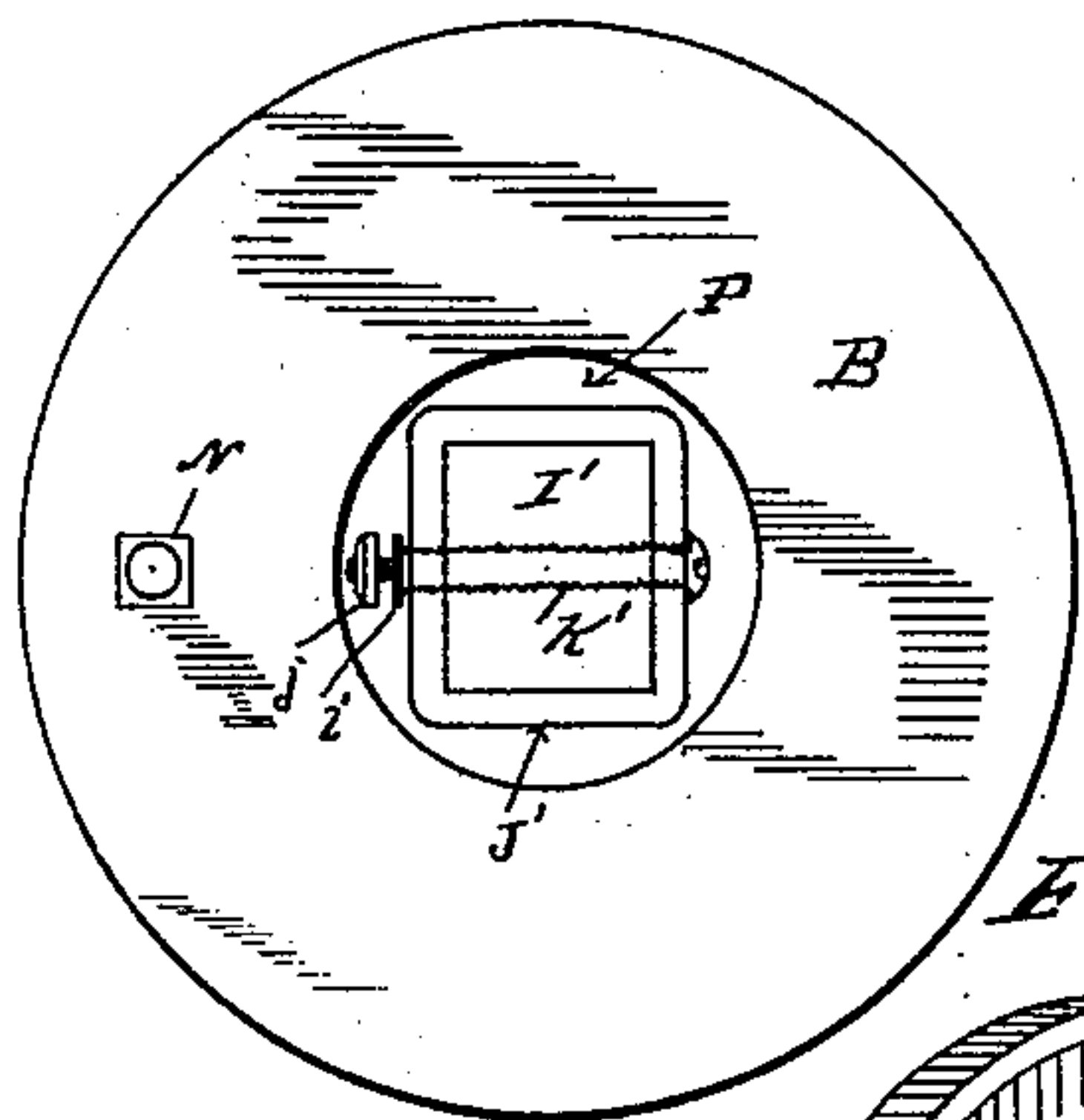
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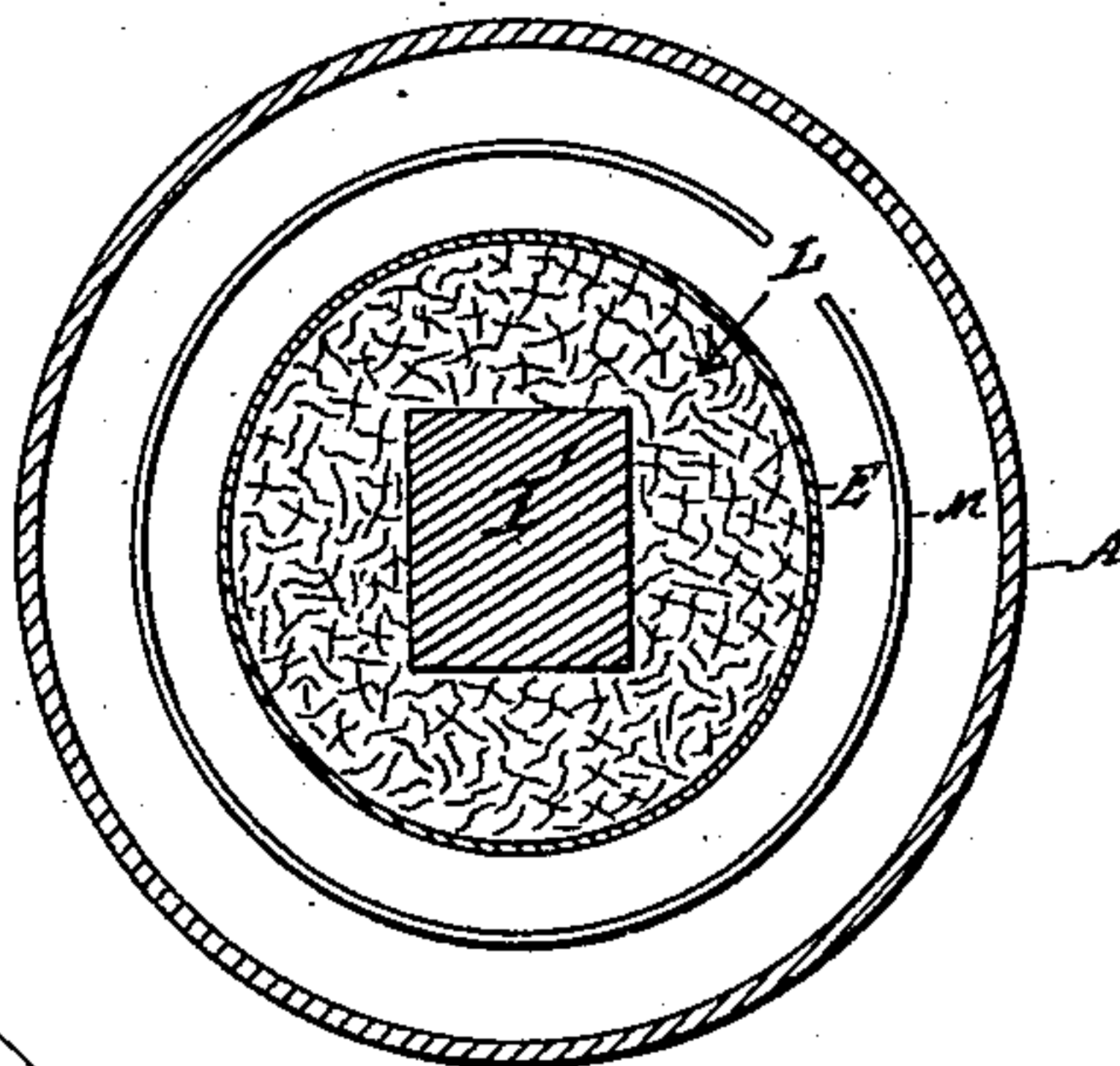
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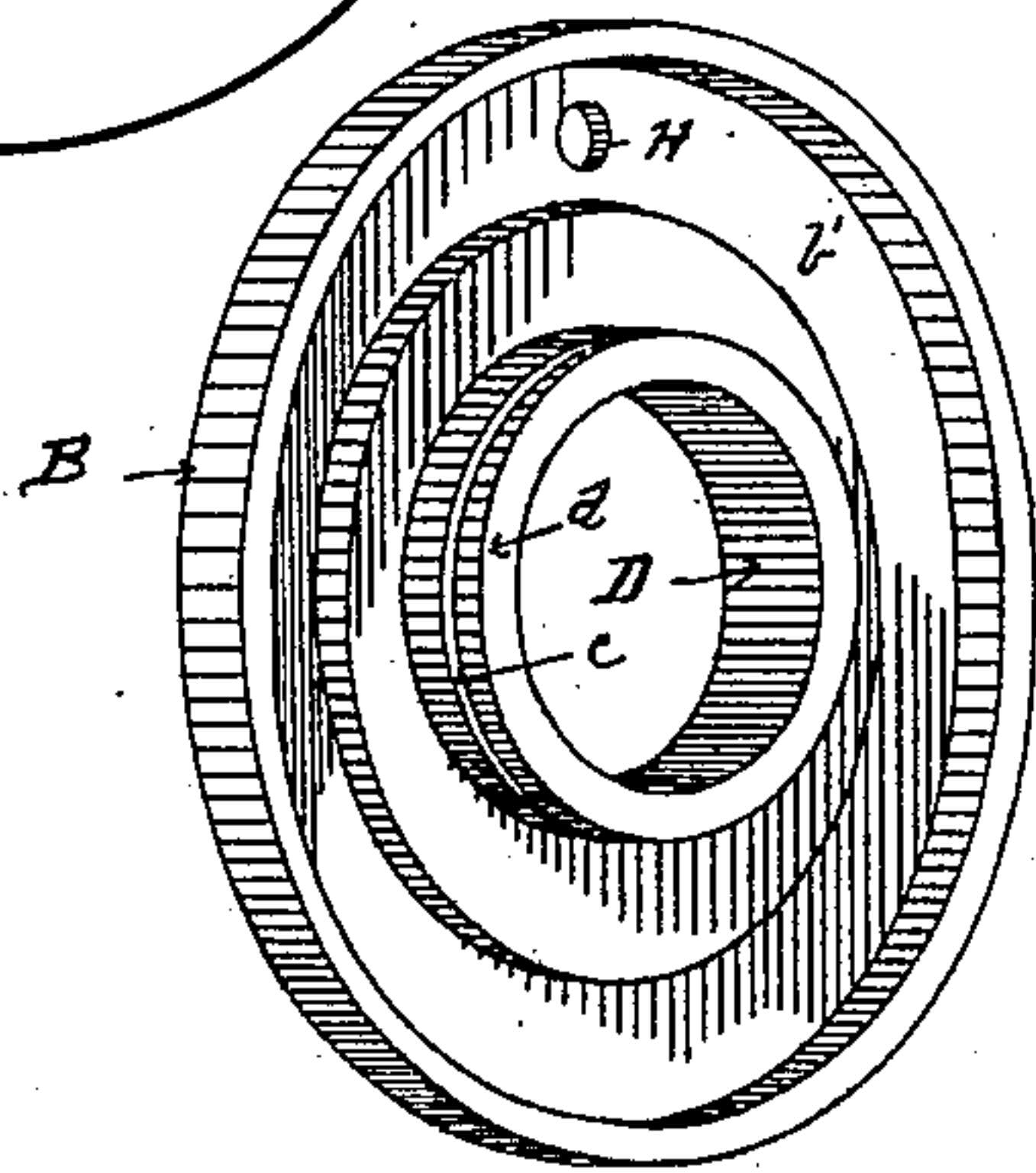
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



Witnesses.

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# UNITED STATES PATENT OFFICE.

WILLIAM BURNLEY, OF NORTH EAST, ASSIGNOR OF TWO-THIRDS TO SAMUEL A. DAVENPORT, OF ERIE, AND CHARLES A. HITCHCOCK, OF NORTH EAST, PENNSYLVANIA.

## ELECTRICAL BATTERY.

SPECIFICATION forming part of Letters Patent No. 397,965, dated February 19, 1889.

Application filed June 11, 1888. Serial No. 276,771. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM BURNLEY, a citizen of the United States, residing at North East, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Batteries; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention consists in the improvements in electrical batteries, hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is a view of my improved battery partially in elevation and partially in section. Fig. 2 is a top or plan view of the same. Fig. 3 is a cross-section of the same on the line  $x x$  in Fig. 1. Fig. 4 is a vertical cross-section of the battery-cover and the permeable sack suspended therefrom. Fig. 5 is a view of another form of my improved battery partially in section and partly in elevation. Fig. 6 is a top or plan view of the same. Fig. 7 is a cross-section of the same on the line  $y y$  in Fig. 5. Fig. 8 is a perspective view of my improved cover for electric-battery jars. Fig. 9 is a central vertical section of a modified form of permeable sack-supporting mechanism.

Like letters refer to like parts in all the figures.

In the construction of my improved electrical battery (shown in Figs. 1, 2, 3, and 4) A is a jar, preferably of glass, earthenware, or other non-absorbent material, open at its upper end, and provided with a screw-thread,  $a$ , around the outside thereof. B is a jar-cover made of glass, earthenware, or other non-absorbent material, and is of suitable diameter to fit the top of the jar A, where it is secured in place by means of a screw-threaded cap, C, adapted to engage with the screw-thread  $a$  on the top of the jar A, an annular gasket,  $b$ , of rubber or other suitable material, being inserted between the top of the

jar A and the under surface of the cover B, making a water-tight joint between them when the screw-cap C is screwed down into place. Through the center of the cover B, I make a circular opening, D, of sufficient size to permit the negative elements of the battery being placed therein, and on the under face of the cover B, surrounding the opening D, I make a downwardly-projecting sleeve,  $d$ , having a groove,  $c$ , around the periphery thereof. To this sleeve  $d$ , I secure a permeable sack, E, made, preferably, of textile fabric or other suitable porous material, the upper end,  $e$ , of the sack E being secured to the sleeve  $d$  by means of a small cord, F, passed around and clamping the upper end,  $e$ , of the sack in the groove  $c$  around the sleeve  $d$ , thereby firmly securing the two together, the lower end,  $e'$ , of the sack E being closed by means of a disk, G, of suitable size, secured therein by means of a cord,  $g$ , passed around and clamping the lower end,  $e'$ , of the sack into the groove  $g'$  around the periphery of the disk G. Thus it will be observed that the cover B and sack E are so secured together that they are substantially one. At one side of the downwardly-projecting sleeve  $d$ , I make a small opening, H, through the cover B, through which connection may be made with the positive or zinc element of the battery.

The negative element of my improved battery I make, preferably, of a number of carbon pencils, I. In the battery shown in Figs. 1, 2, and 3 I show four of these pencils. These pencils I, I secure together at their upper ends by means of a disk, J, of lead or other suitable metal, preferably cast thereon. Through this disk J, from side to side, I make a screw-threaded opening in such shape that it cuts into all of the carbon pencils I, secured in the head J. In this opening I screw a threaded metal plug, K, having on one end thereof a collar,  $i$ , and a nut,  $j$ , adapted to operate as a binding-screw for a conducting wire thereto; and the screw-plug K being in electrical connection with all of the carbons I and the metallic disk or cap J, in case the electrical communication between the carbons I and the collar J becomes clogged, because of the carbons I be-



coming incrustated with salts by absorption, or if from any other cause the electrical communication becomes interrupted, a slight turn of the screw-plug K will immediately re-establish the communication. The carbons I thus secured together are then inserted into the sack E through the opening D in the cover B, and the sack E is then filled with depolarizing material, L, consisting of, preferably, a mixture of granulated carbon and peroxide of manganese, so that the carbon pencils are completely surrounded thereby up to the lower end of the sleeve *d* on the cover B. I then fill the opening D in the cover B around the carbons I with bituminous, resinous, or other non-conducting substance P, which will seal up the opening D and firmly cement the carbons I therein, so that when completed, as described, the carbons I are hermetically sealed in the cover B, except as to a very small air-opening, *k*, therein, the cover B, bag E, carbons I, and depolarizing material, L, being all secured together.

In the jar A, I place, as the positive element M of the battery, a sheet of zinc bent into the form of a cylinder, so as to surround the permeable sack E, thereby presenting the greatest possible surface to the action of the attacking-salts employed in the battery.

Through the opening H in the cover B, I insert a binding-post, N, which is preferably removably secured to the upper edge, *m*, of the positive element M by means of a small binding-screw, *n*, or in any other convenient manner, the binding-post N being perfectly sealed in the opening H by means of a bituminous or resinous substance, *h*, placed in the opening H in the cover B around the binding-post N, so that when the battery is charged with attacking-salts and water, and the top B secured in place by means of the screw-cap C, the whole is substantially hermetically sealed up, so that it is portable and can be handled or transported, as desired, without spilling the contents of the jar A or in any wise wasting away by the evaporation of the fluids used therein.

In Figs. 5, 6, and 7 I show a modified form of my improved battery. In this case the jar A is not provided with a screw-threaded top; but the cover B is provided with a groove, *b'*, which fits down on the upper ends of the jar *a'*, so as to retain it in place thereon. In other respects the cover B and sack E, secured to the collar *d* thereof, are the same as hereinbefore described. In this form of battery, however, I use but a single carbon, I', which is provided with a metallic head, J', and a screw-plug, K', tapped through the metallic head J' and carbon I', so as to constitute a movable metallic conductor, as and for the purpose hereinbefore described. The carbon I' is likewise, as hereinbefore described, cemented into the opening D in the cover B by means of a bituminous or resinous substance, P, so as to prevent the fluid passing up the carbon I' by absorption or ca-

pillary attraction. The zinc element M and the binding-post N are the same as hereinbefore described. In case it is desired to hermetically seal this form of battery I place hot cement in the groove *b'* of the cover B and press it down on the top of the jar A, and when it cools the parts adhere together. I then cement the binding-post opening H around the binding-post N with cement, *h*, so as to completely prevent the evaporation of the fluids placed in the jar A.

In Fig. 9 I show a modified construction of the sack-supporting mechanism of my battery. In this case I use a ring, Q, provided with a circumferential groove, R, around which I secure the upper end, *e*, of the sack E by means of a cord, F, in like manner as hereinbefore described, the opening S in the ring Q serving the same purpose as the opening D in the head B, hereinbefore described. I use this construction of sack when I use an ordinary cover for the battery-jar in lieu of the cover B, hereinbefore described.

Having thus fully described my invention, so as to enable others to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in an electrical battery, of a permeable sack secured to and suspended from an opening in the jar-cover, with carbons and depolarizing material inclosed within said permeable sack, and non-conducting material filling and sealing the opening in the jar-cover and the mouth of said sack around the carbons therein, substantially as and for the purpose set forth.

2. The combination, in an electrical battery, of the carbon element having a metallic head or collar thereon, with a screw-threaded plug passing through said metal head and contacting with the carbon element, substantially as and for the purpose set forth.

3. The combination, in an electrical battery, of a permeable sack sealed into an opening in the jar-cover with a non-conducting material, and containing the carbon and depolarizing elements of said battery, and non-conducting material filling and sealing the mouth of the sack around the carbon element, with a cylinder of zinc surrounding said permeable sack, and a jar inclosing and containing said zinc cylinder and said elements and an attacking-liquid, substantially as and for the purpose set forth.

4. The combination, in an electrical battery, of a negative element consisting of a number of carbon pencils secured together at their upper ends by passing through a metallic disk or plate, and a metallic screw-plug passing transversely through said disk or plate and contacting with all of the pencils secured therein, a permeable sack for retaining the depolarizing material between and surrounding the said carbon pencils, and non-conducting material filling and hermetically sealing the mouth of said sack around said



carbons with a positive element consisting of a cylinder of sheet-zinc surrounding the negative element of said battery, thereby presenting the maximum surface for the generation of electrical currents, substantially as and for the purpose set forth.

5 5. The combination, in a hermetically-sealed electric battery, of an outside jar, A, provided with a screw-cap, C, and gasket *b*, with a  
10 cover B, adapted to fit the top of the jar A, and having openings D and H therein, and non-conducting material, P and *h*, filling and sealing said openings around the carbons I and the binding-post N therein, substantially as  
15 and for the purpose set forth.

6. The combination, in an electrical battery, of a retaining-jar, A, with a cover, B, having openings H and D therein, and a downwardly-projecting sleeve, *d*, surrounding the opening D, and a groove, *c*, around said sleeve 20 *d*, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM BURNLEY.

Witnesses:

H. M. STURGEON,  
H. J. CURTZE.