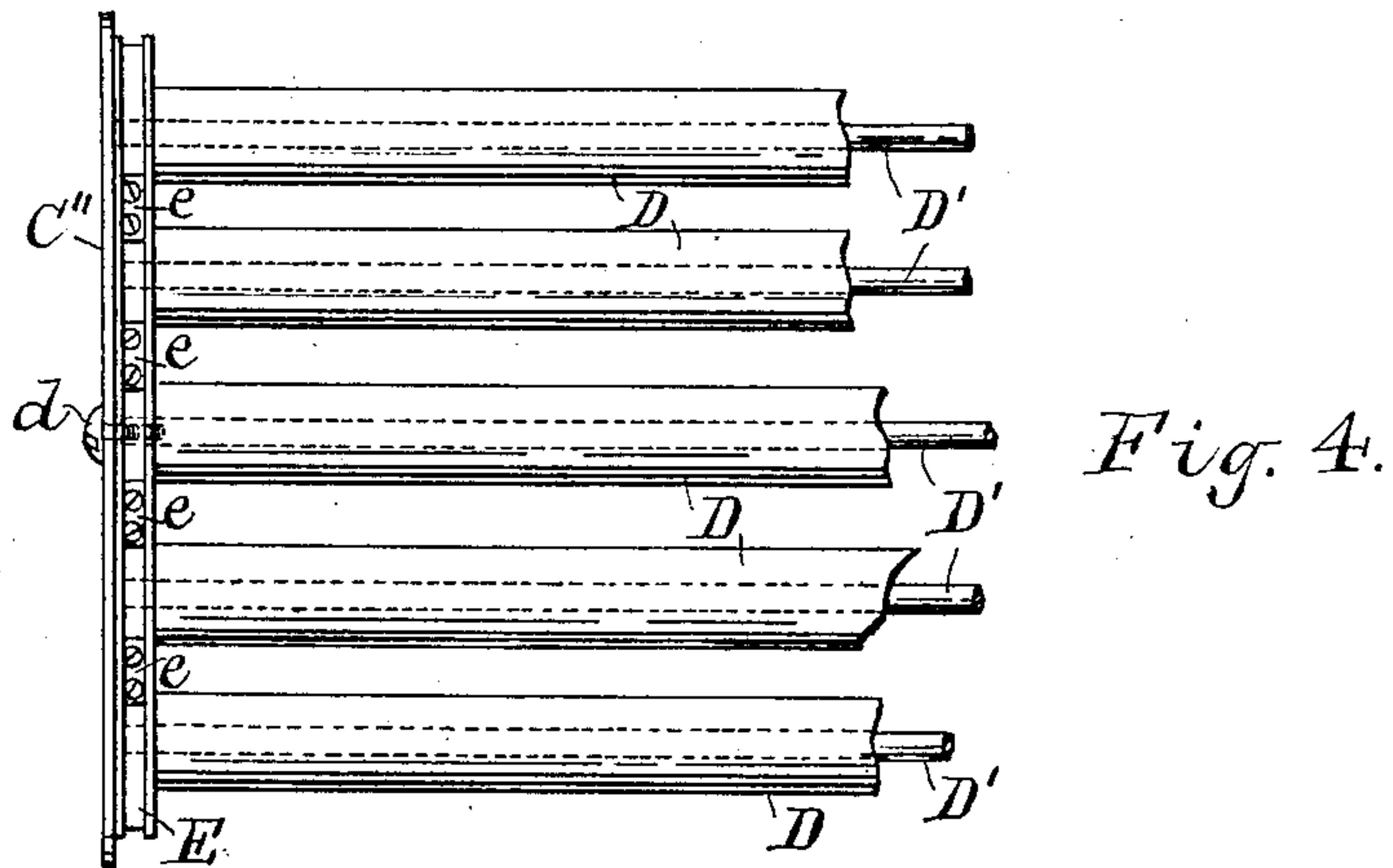
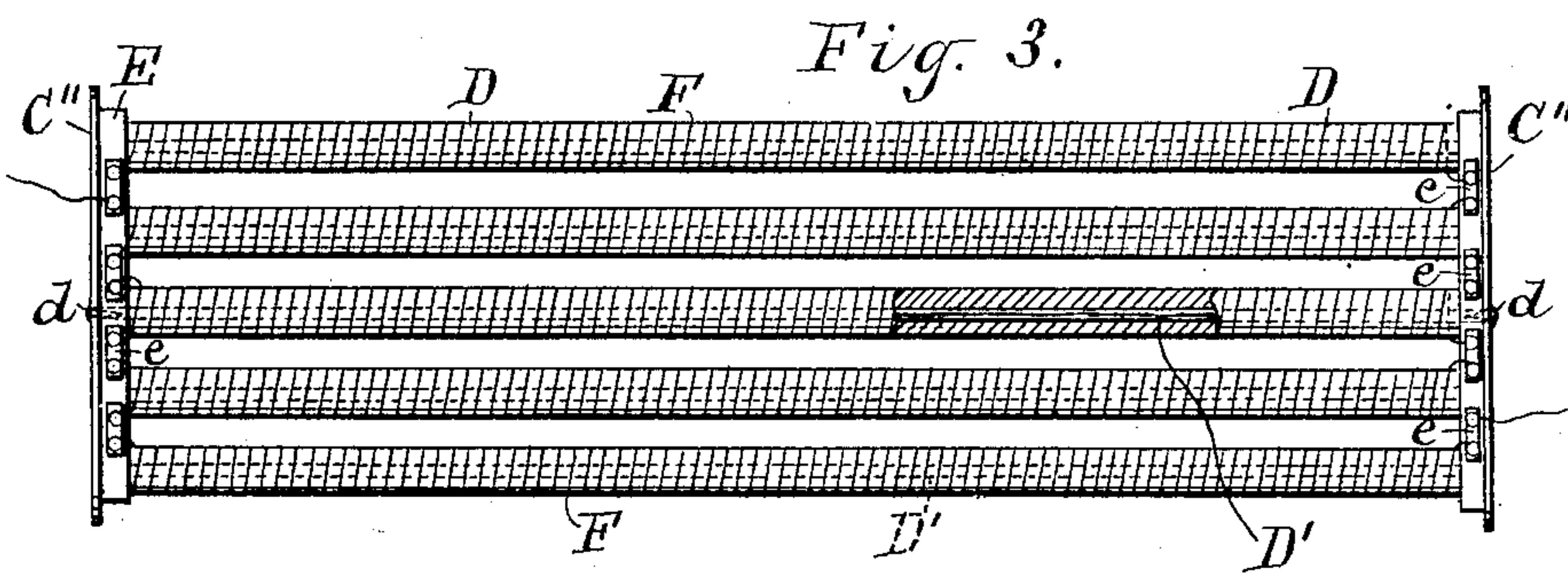
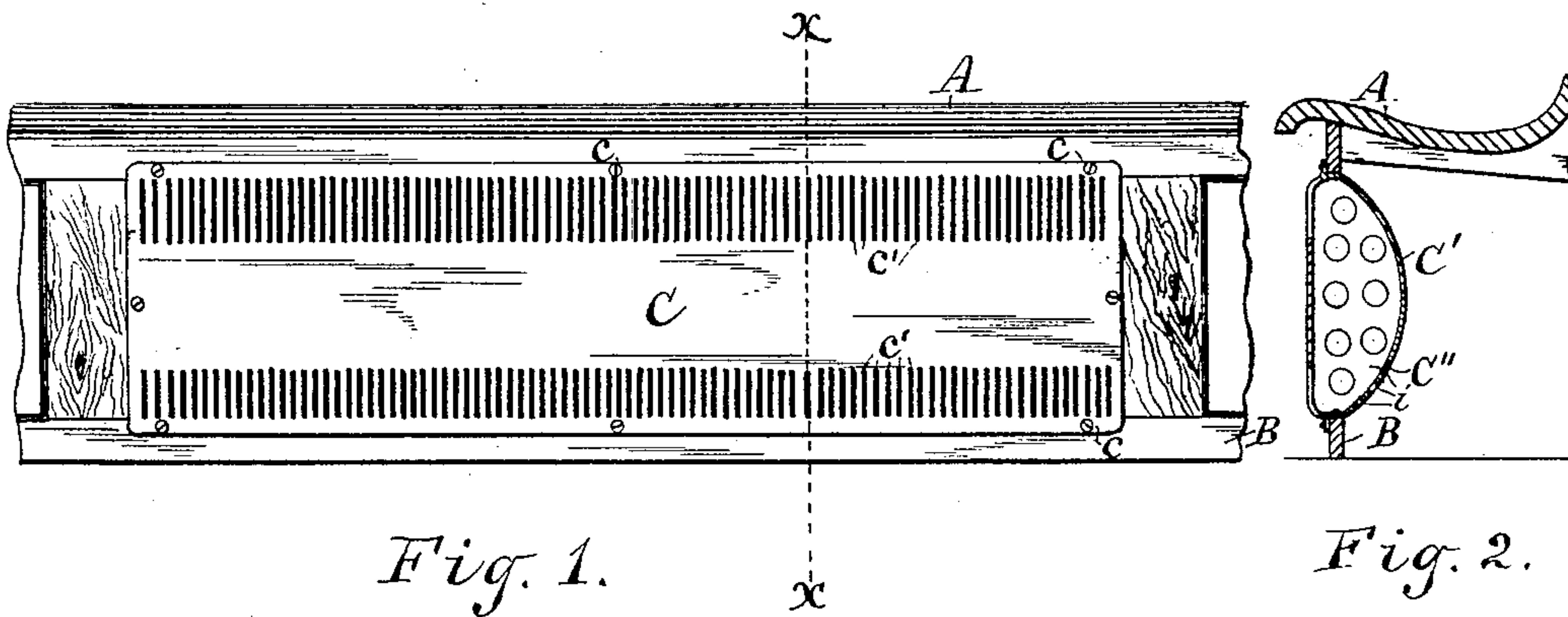


H. A. THOMAS.
ELECTRIC HEATER.

No. 561,294.

Patented June 2, 1896.



Witnesses:

Mark W. Dewey
Chas. S. Dewey.

Inventor.

Harry A. Thomas
By C. H. Duell,
his Attorney.

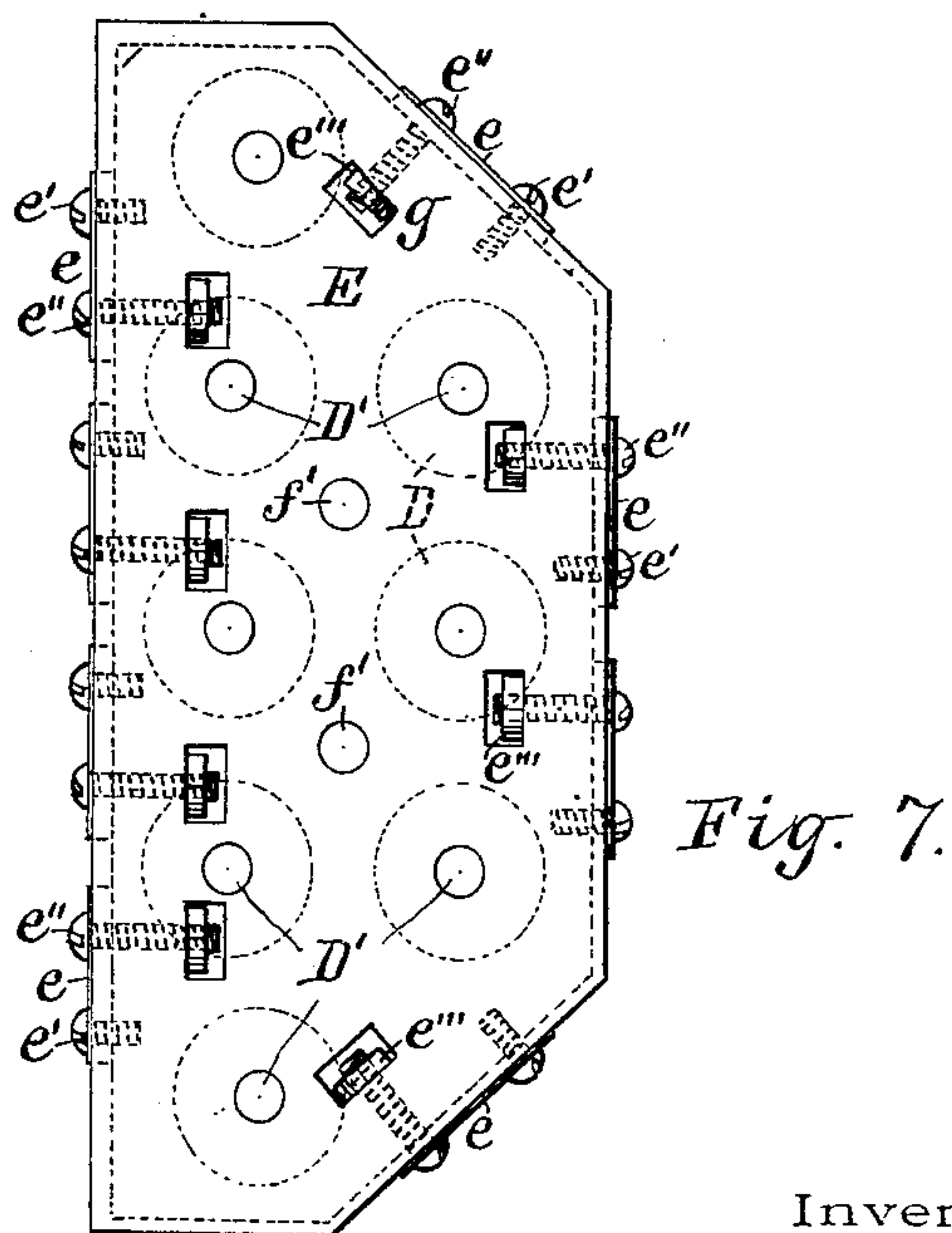
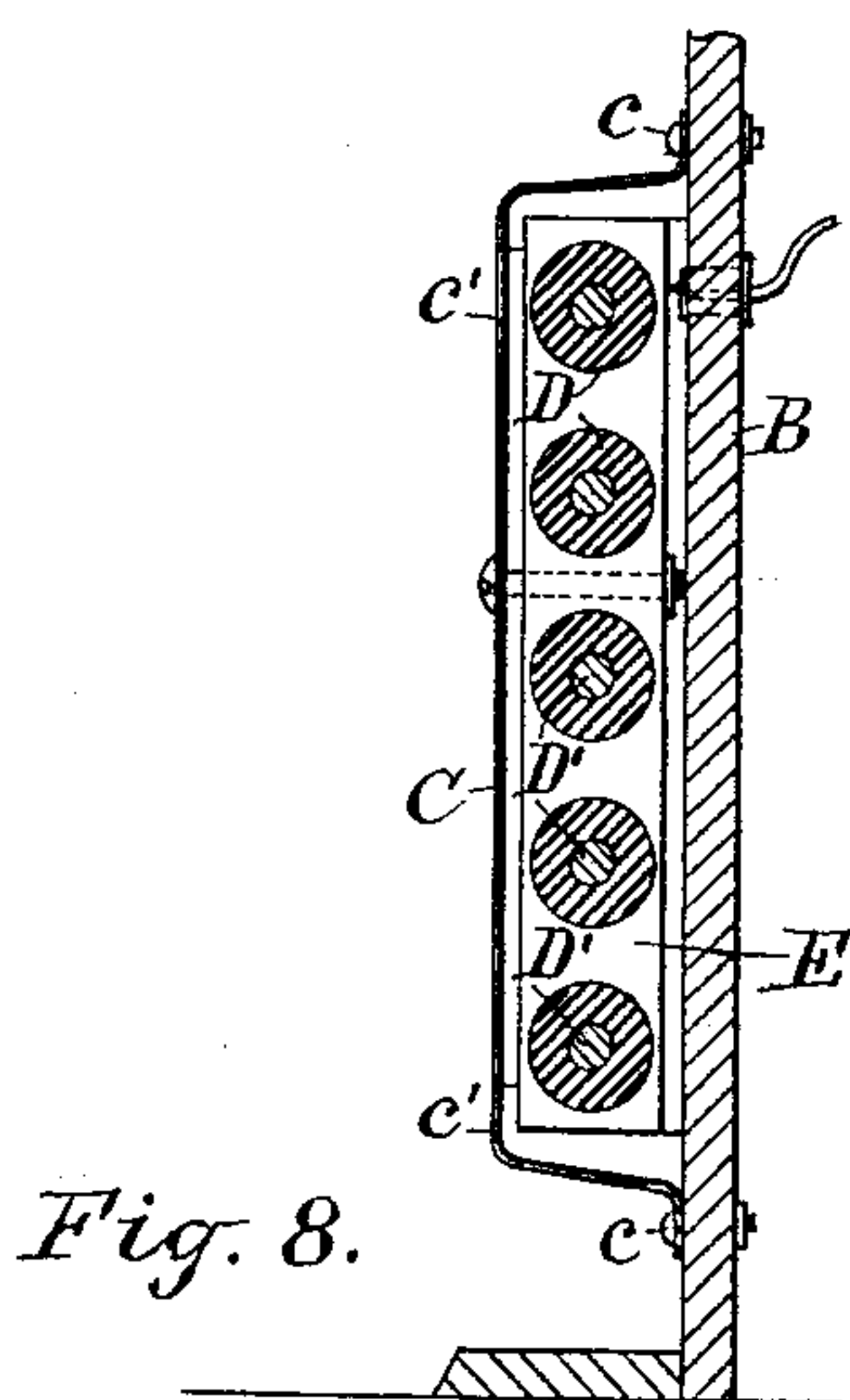
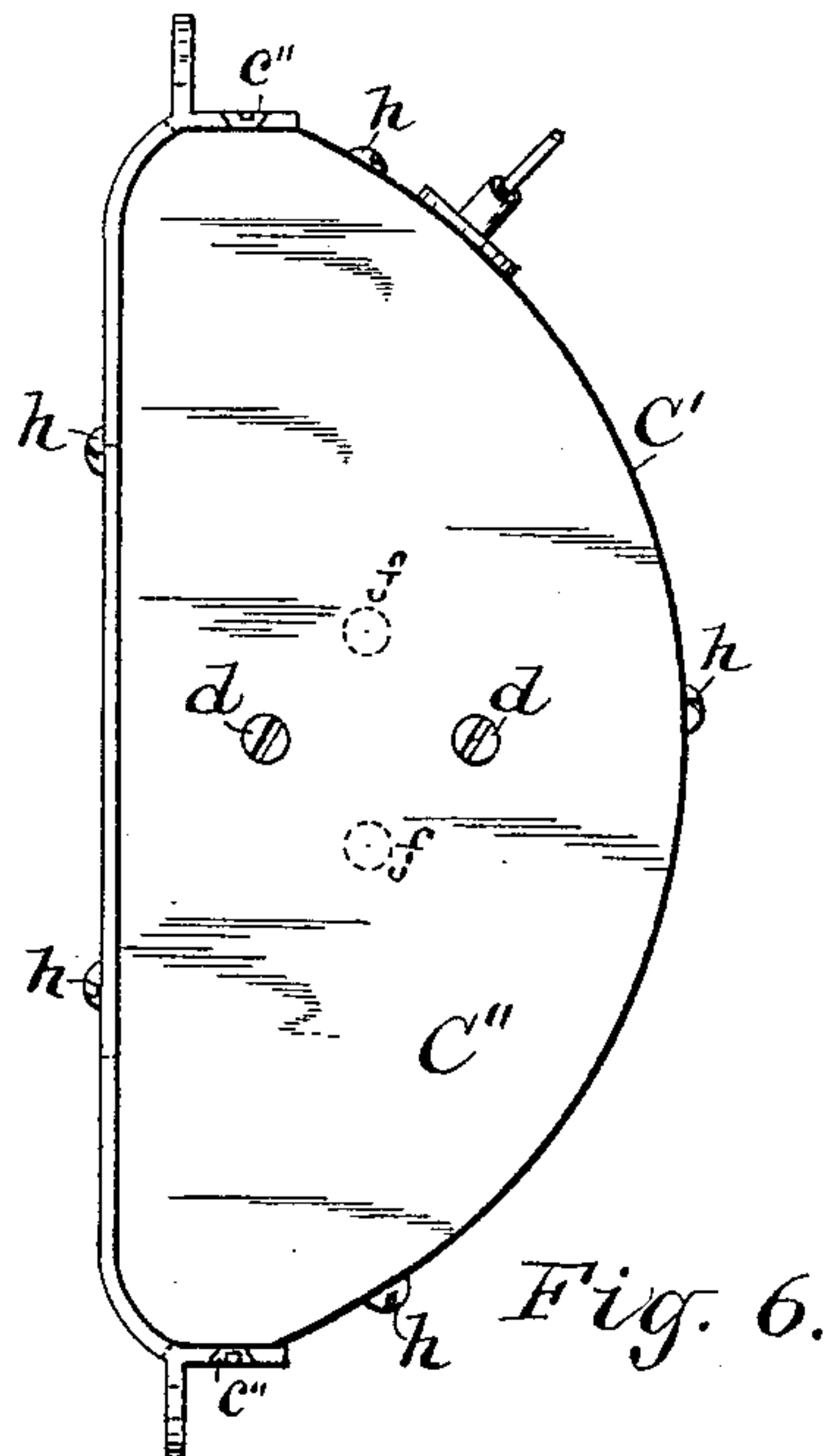
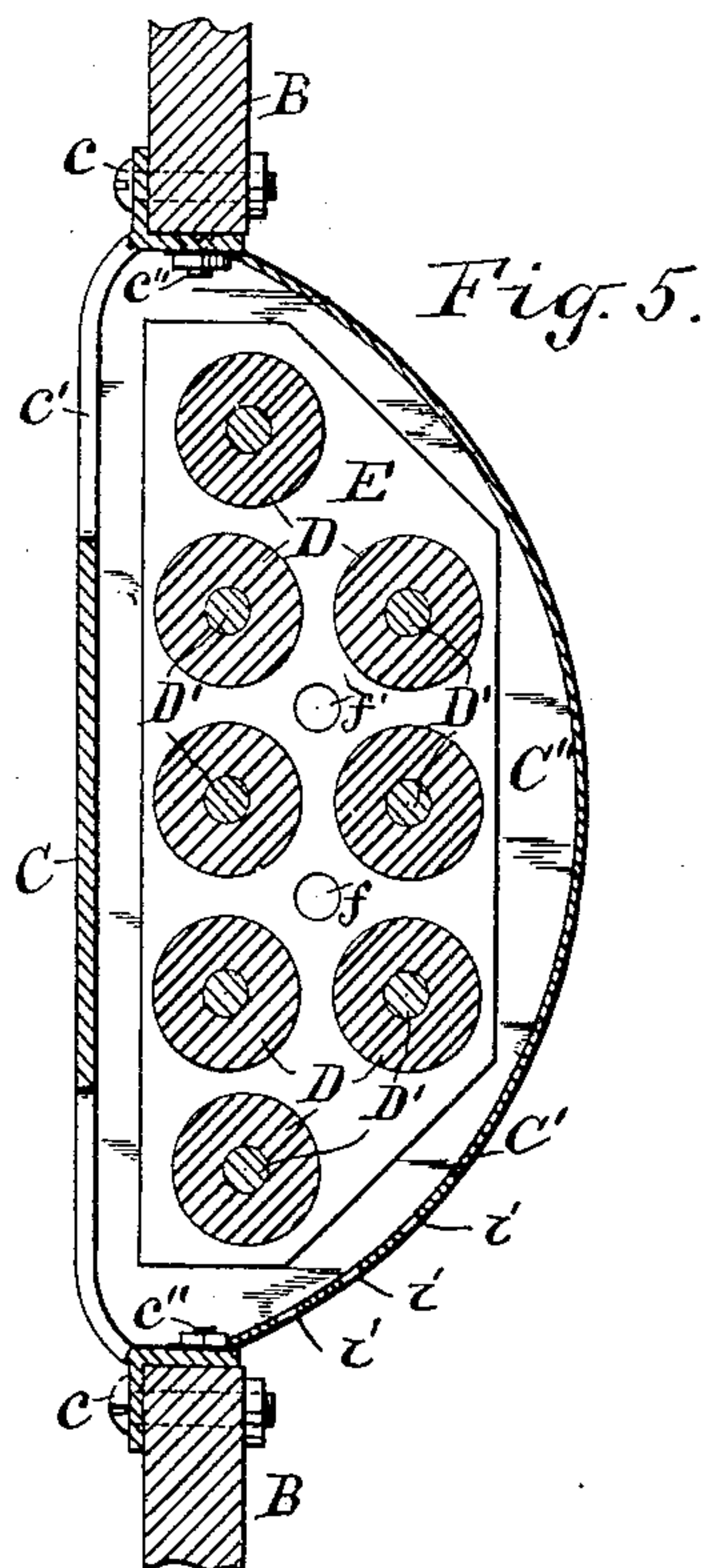
(No Model.)

2 Sheets—Sheet 2.

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Mark W. Dewey
R. D. Lacey

Inventor.

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his Attorney.

UNITED STATES PATENT OFFICE.

HARRY A. THOMAS, OF NIAGARA FALLS, NEW YORK, ASSIGNOR OF ONE-HALF TO EDWARD B. WYMAN, OF HIGHWOOD, NEW JERSEY.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 561,294, dated June 2, 1896.

Application filed February 6, 1895. Serial No. 537,440. (No model.)

To all whom it may concern:

Be it known that I, HARRY A. THOMAS, of Niagara Falls, in the county of Niagara, in the State of New York, have invented new and useful Improvements in Electric Heaters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to electric heaters, particularly such heaters as are used to heat electric cars, and the object is to construct the heater so that it can contain a great length of bare wire suitably insulated without increasing its size materially or causing it to occupy valuable space.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is the front side elevation of my improved heater. Fig. 2 is a vertical transverse section on line *xx* of Fig. 1. Fig. 3 is an enlarged view of the heater with the front and back sides of the case removed. Fig. 4 is a view of a portion of Fig. 3, still more enlarged, showing the front edge of one of the insulating end blocks more clearly. Fig. 5 is an enlarged cross-section of the heater. Fig. 6 is an end view. Fig. 7 is a side view of one of the insulating end blocks provided with the connection-plates and binding-screws; and Fig. 8 is a cross-sectional view of a modification of the heater, the same being secured to one side of the riser without projecting through the same.

Referring specifically to the drawings, A indicates a portion of a car-seat.

B is the riser or paneled support extending from the car-floor upward to and near the front edge of the seat, and C is the front plate of the heater secured to the front side of the said riser and extending back through the riser beneath the car-seat.

The heater is preferably of a size to fit in one of the panels of the riser after the panel is removed. The front side of the case is secured to the riser by screws or bolts *c c*, &c., passing through its upper and lower edges, is shaped to project outward slightly from the riser, and is provided with perforations or slots *c' c'*, &c., near its upper and lower edges for the purpose of allowing the air to circulate therethrough.

The rear side of the case C' is preferably formed convexly on its outer side and made of metal, such as tin or sheet-iron, and is secured to the front side by short screws or bolts *c''* passing through its upper and lower edges, as clearly shown in Fig. 5 of the drawings. The lower portion of the rear side is also preferably perforated by perforations *i i* to allow an increased circulation of air.

The horizontal parallel bars of insulating material D are formed of pipes of pressed asbestos coated with a suitable non-conducting substance or enamel that will resist moisture. These pipes are of even length and are mounted on metal rods D', which pass through the pipes and extend beyond the ends thereof. The ends of the said pipes pass through the insulating-blocks E E of porcelain at the ends of the heater and abut against the end plates C'' C'' of the heater. These end plates C'', blocks E, and rods D' are held together by screws *d d*, passing through the end plates into the ends of the two central rods D' D', as shown in Figs. 3, 4, and 6.

In order to hold the insulating-block E and the pipes more securely in place, I provide one or more projections *f* on the inside of the end plate to enter the perforations *f' f'* in the insulating-block.

The insulating-blocks E E are preferably provided with grooved edges, so that the metal connecting-plates *e* may be held therein securely. The plates *e* are rectangular in shape and are each provided with a pair of screws *e'* and *e''*, which not only serve to secure the plate to the block E, but form binding-screws for the ends of the terminals of the coils or spirals F F, &c., mounted on the cores D. One of the screws *e'* simply passes through the plate *e* and enters the block a short distance, but *e''* extends into a square aperture *g* in the block and is provided therein with a nut *e'''* to hold the connecting-plate *e* to the block. Any number of connecting-plates desired may be secured to the blocks.

When the blocks are constructed for eight coils, I preferably form each block for the same number of connecting-plates, so that a block of the same form may be used for the opposite end of the heater. Although the block shown in Fig. 7 has eight plates thereon,

in practice only four are applied, the other four being applied to the opposite block E. The blocks E E are preferably made of porcelain.

5 In some cases I prefer to support the coils in a single vertical plane, as shown in Fig. 8, in which case it is unnecessary to cut out a panel in the riser, as the heater is thin and will not project beyond the front edge of the
10 seat. When the coils are arranged in a single vertical plane, any suitable and well-known form of case may be used to inclose them.

I do not desire to be limited to the number
15 or the exact form of connecting devices shown, nor to the method of connecting the coils together, as they may be connected together in various ways—that is, in series, parallel or multiple series—without departing
20 from my invention.

Screws *h h*, &c., pass through the front and back of the case at the ends thereof to hold the end plates securely in place.

Having described my invention, what I claim as new, and desire to secure by Letters 25 Patent, is—

In an electric heater, the combination of a plurality of pipes of insulating material extending parallel with each other, spirals of bare wire wound on said pipes, blocks of por- 30 celain at the ends of the pipes, metal rods passing through the pipes and blocks and secured thereto, said blocks of porcelain being provided with grooves in the edges of the blocks, connection-plates in the grooves, a 35 pair of binding-screws in each plate connected to the terminals of the spirals, perforations in the blocks, and nuts in said perforations on the ends of one of each pair of screws, substantially as described and shown. 40

In testimony whereof I have hereunto signed my name.

HARRY A. THOMAS. [L. S.]

Witnesses:

EDW. B. WYMAN,
R. S. JEROME.