

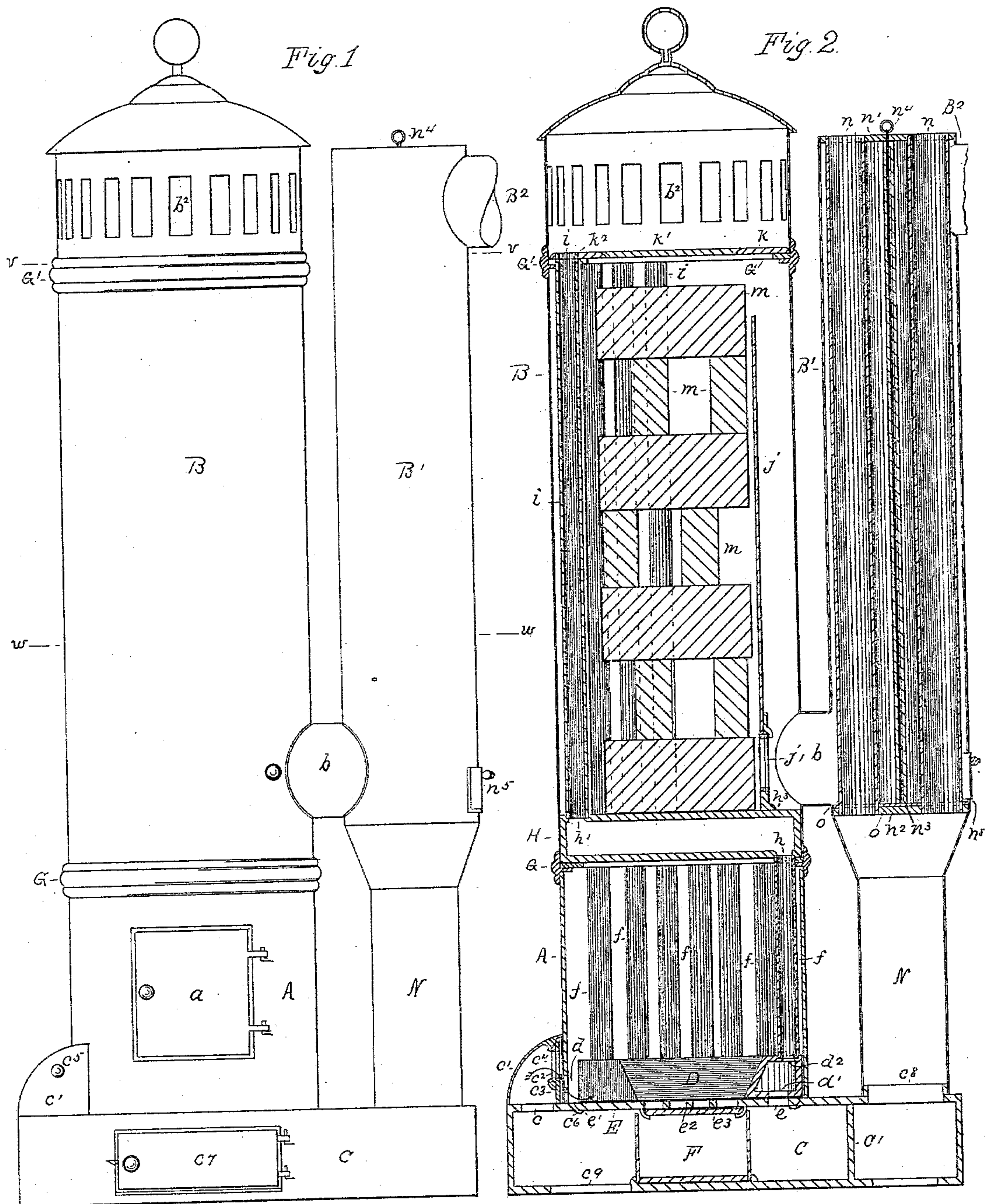
(No Model.)

3 Sheets—Sheet 1.

H. TILDEN.
HEATING STOVE.

No. 359,697.

Patented Mar. 22, 1887.



Witnesses:

W. T. Webb
M. A. Spooner

Inventor:

Henry Tilden
By P.H. Gunkel
Attorney

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Fig. 3

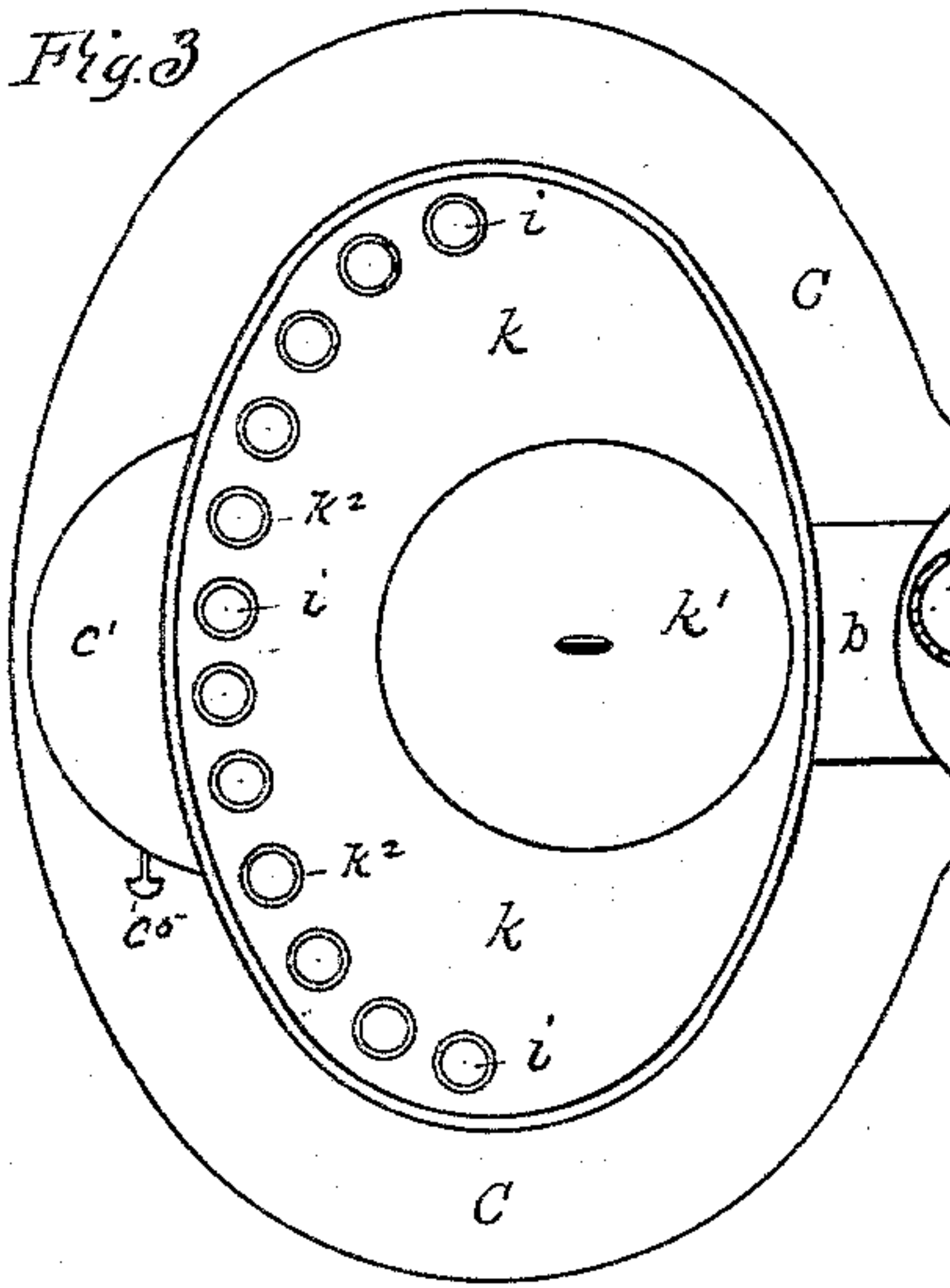


Fig. 5

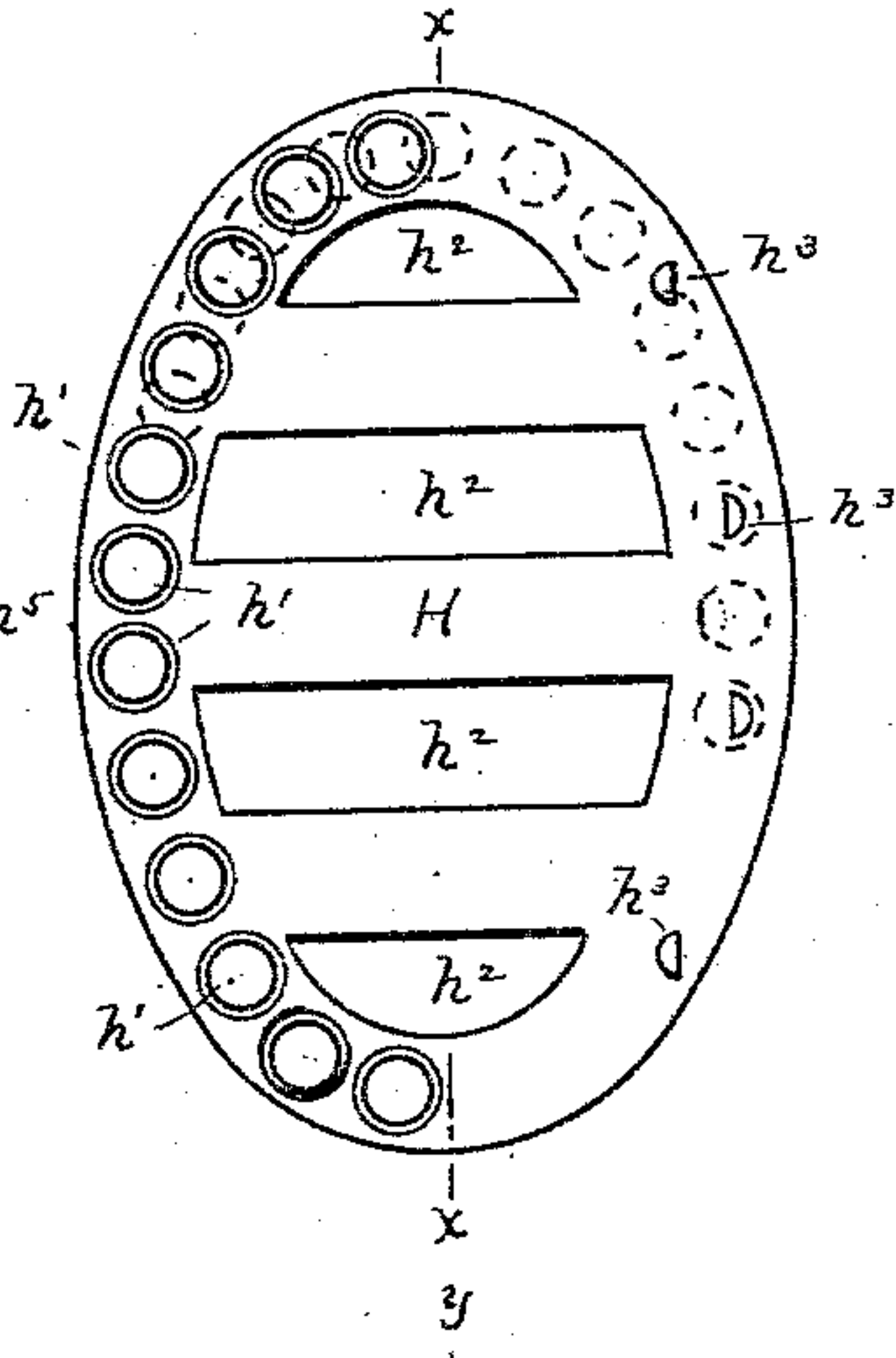


Fig. 6

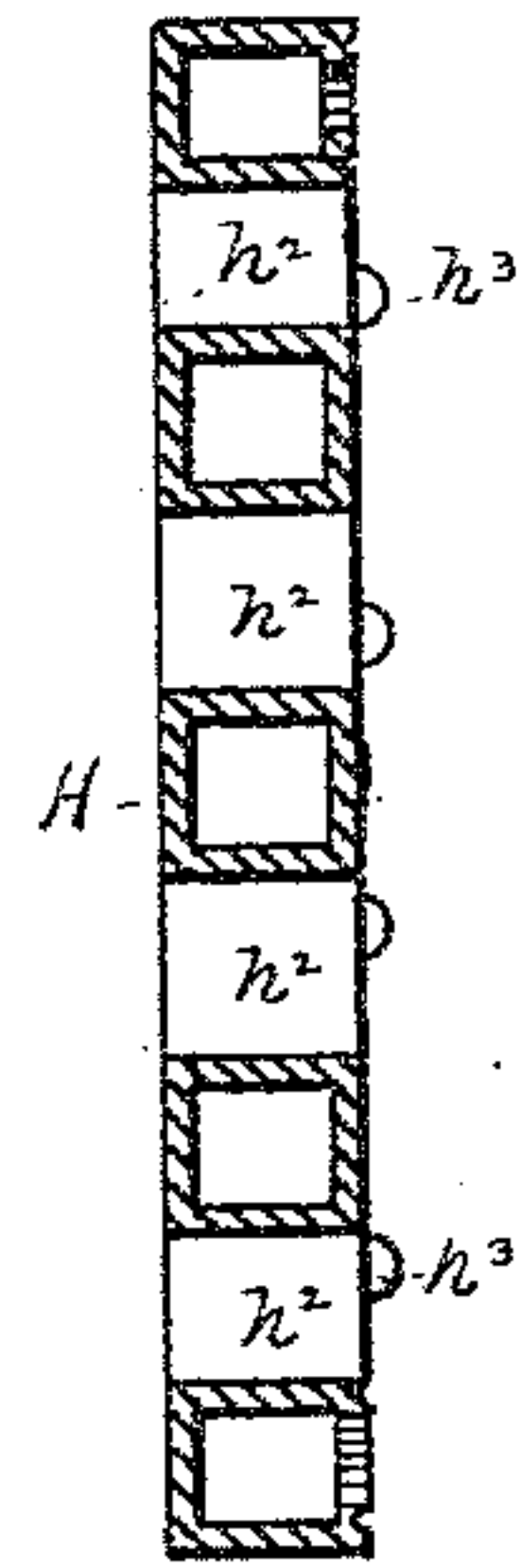


Fig. 4

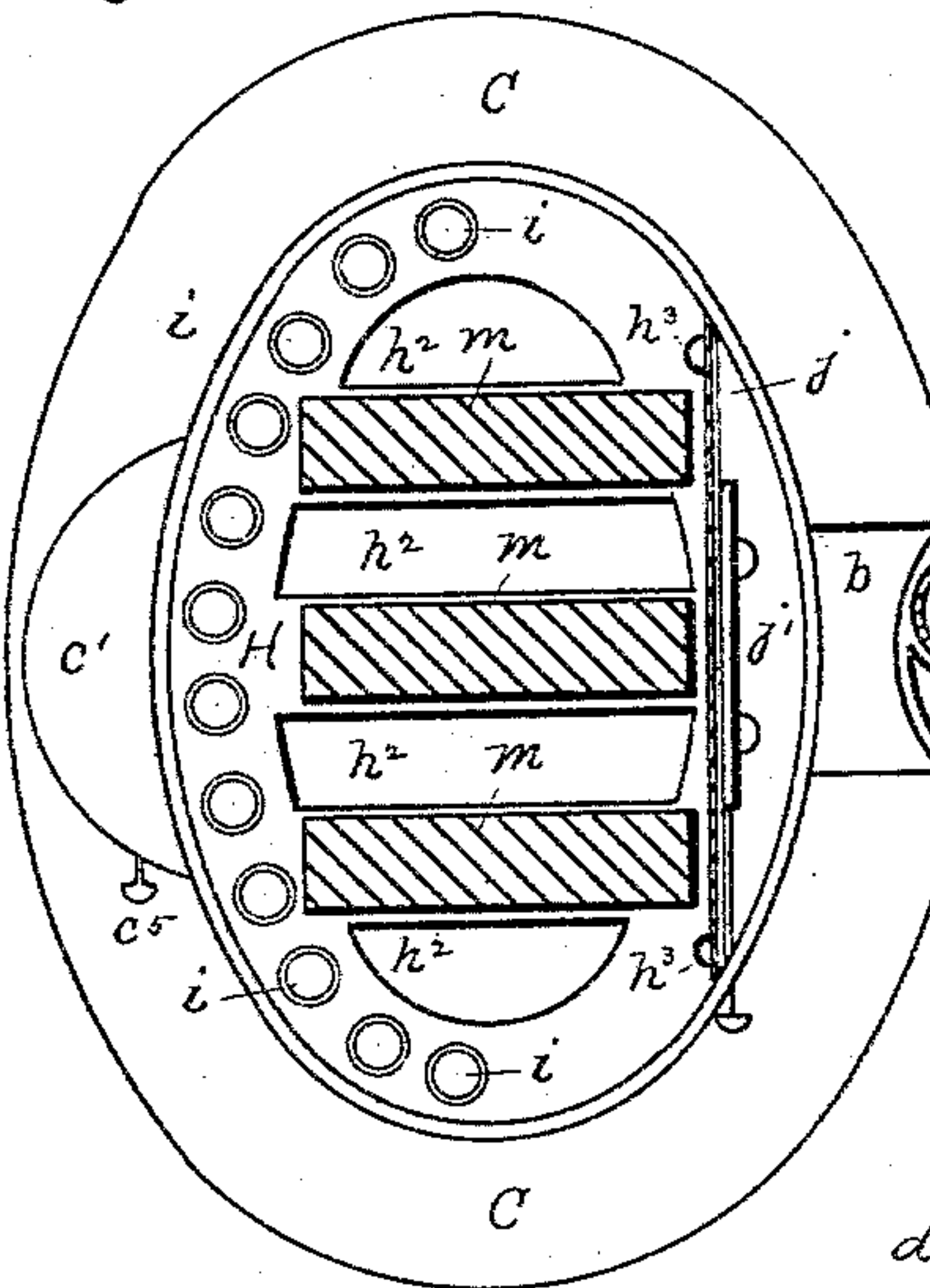


Fig. 7

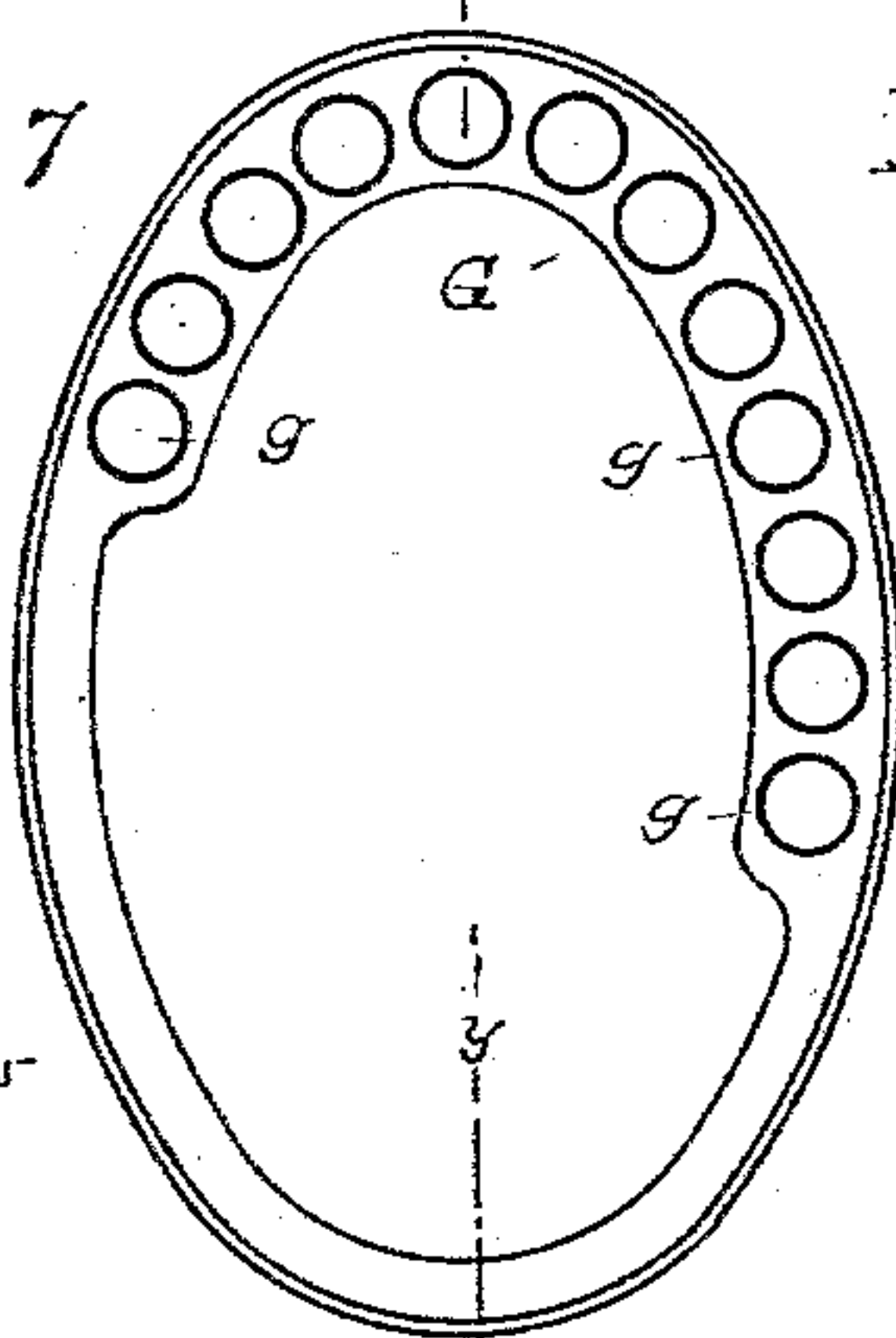


Fig. 8

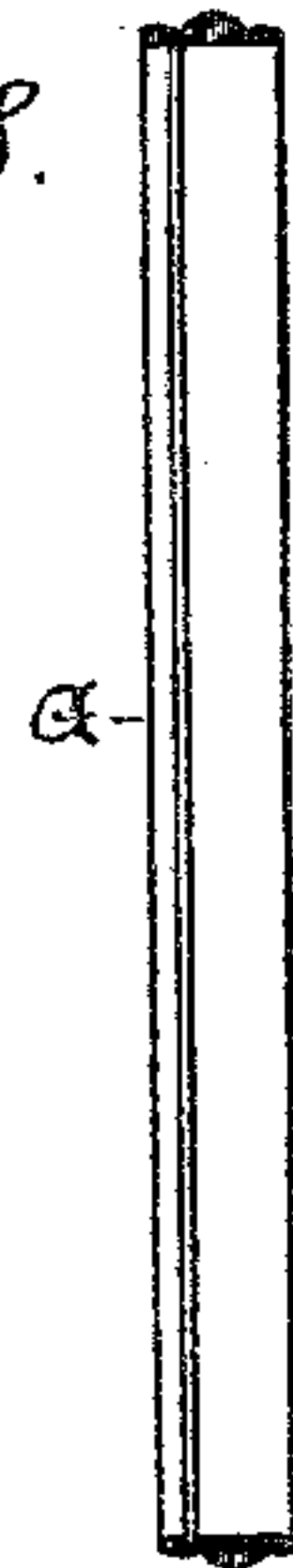


Fig. 9

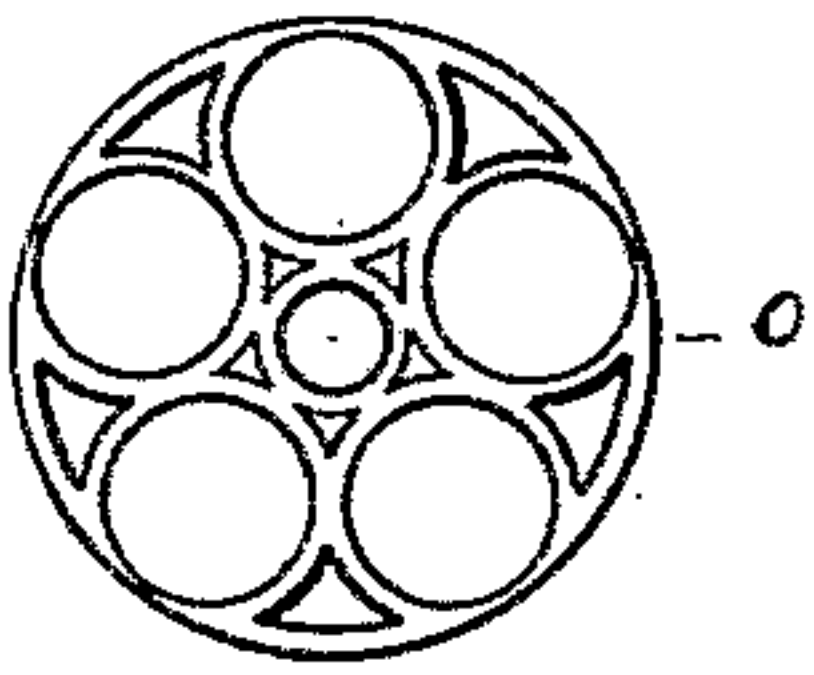


Fig. 12

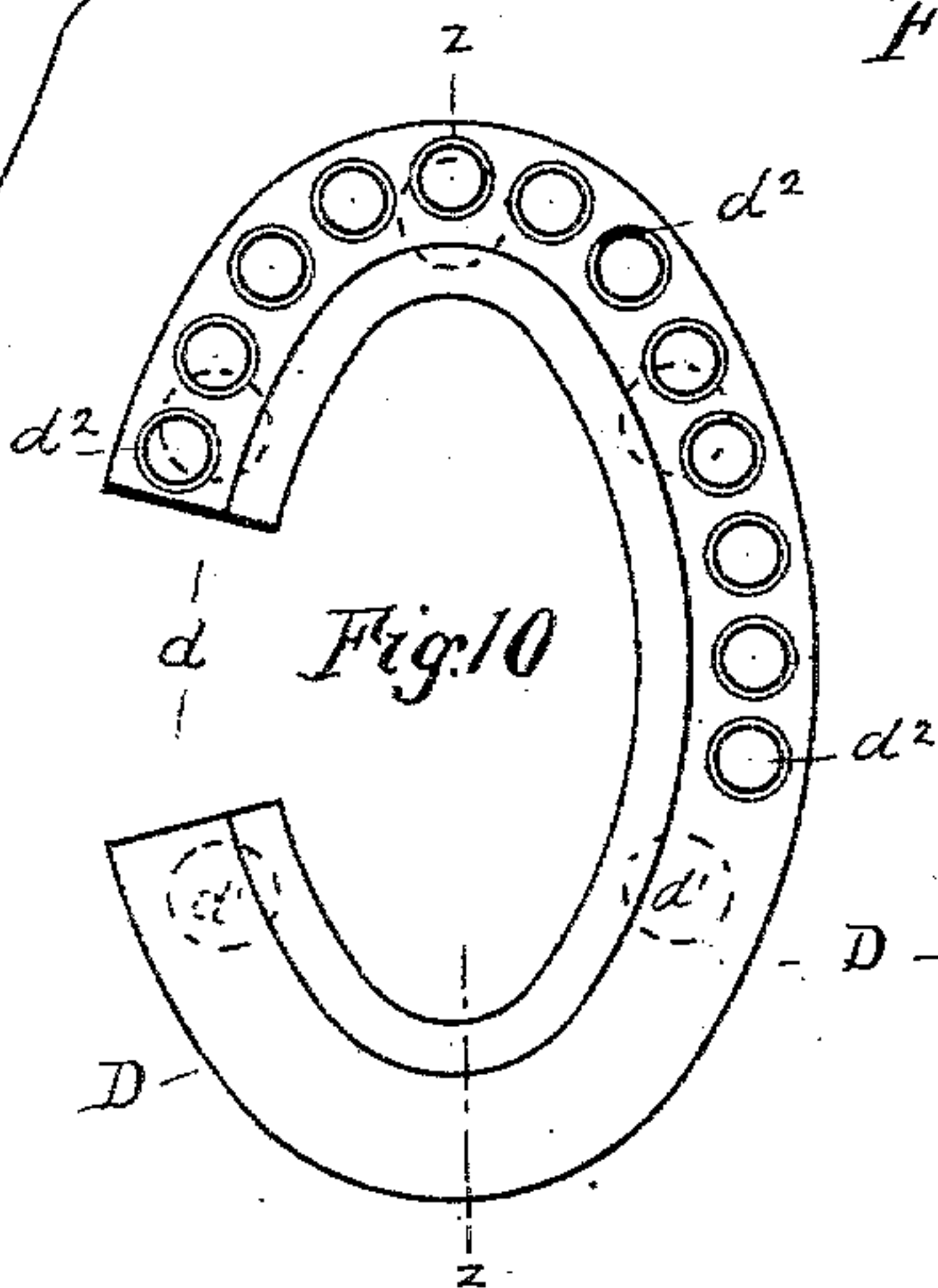
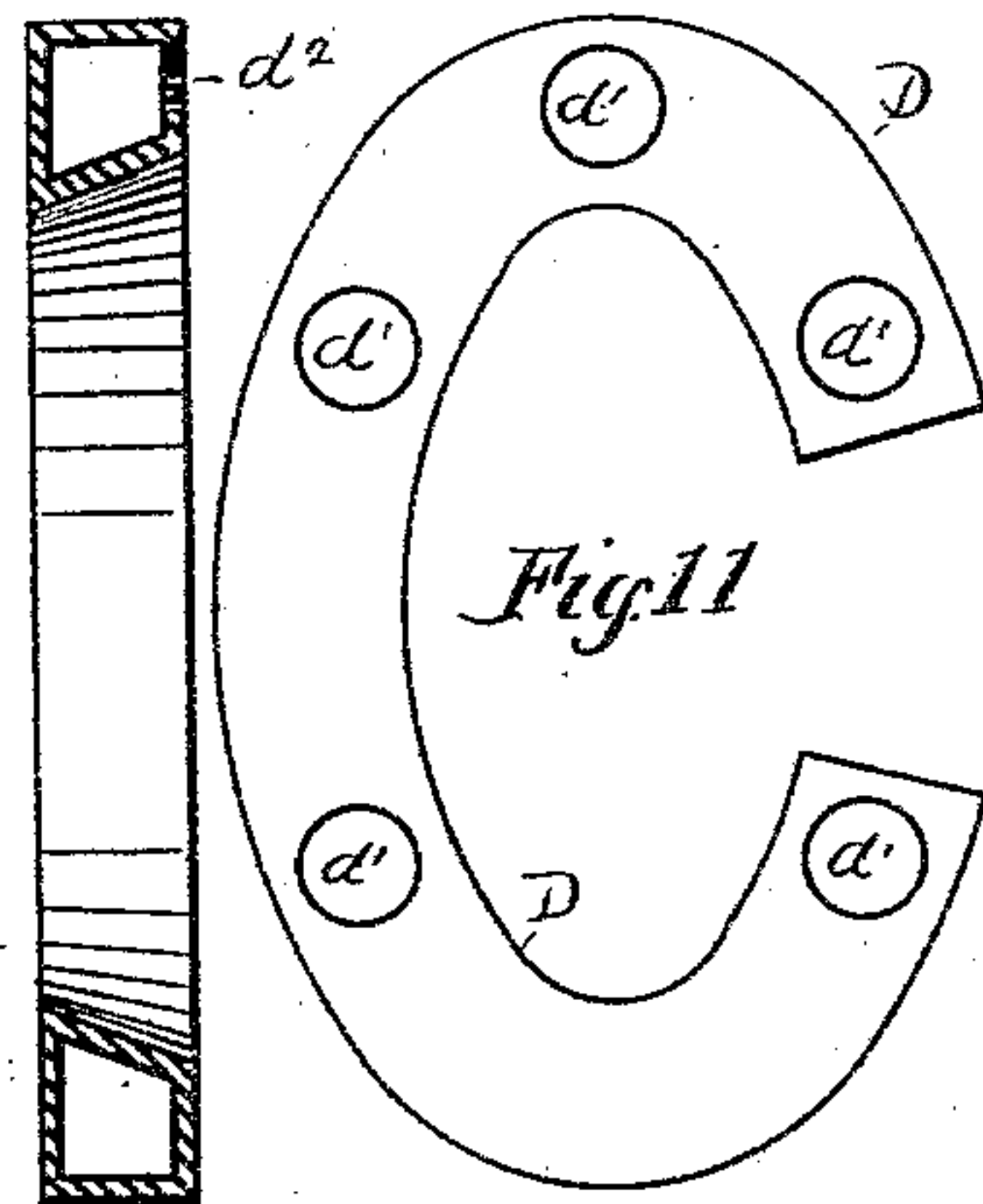


Fig. 10

Fig. 11



Witnesses:

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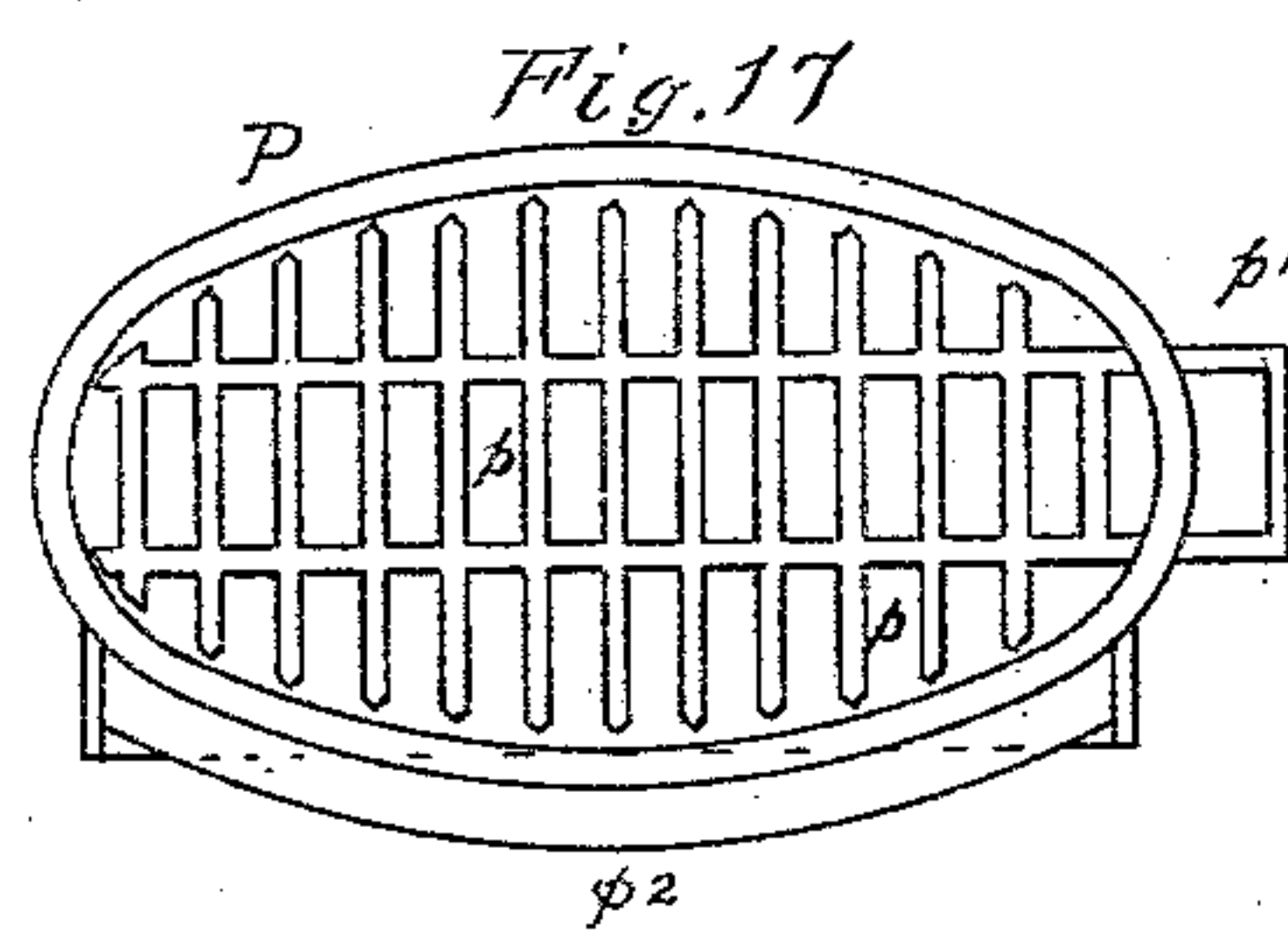
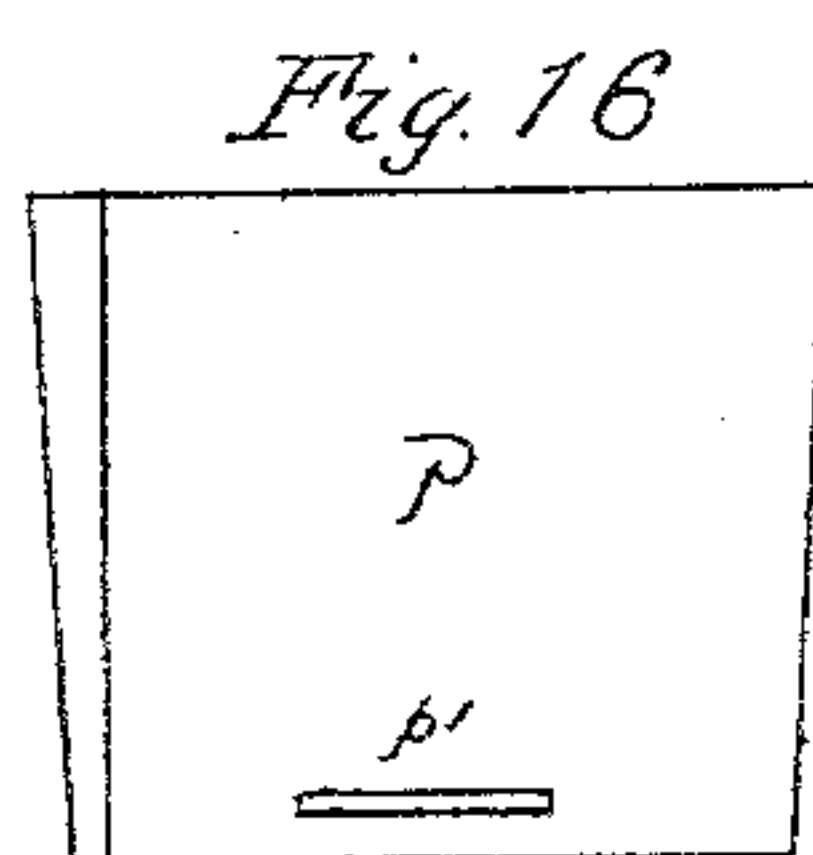
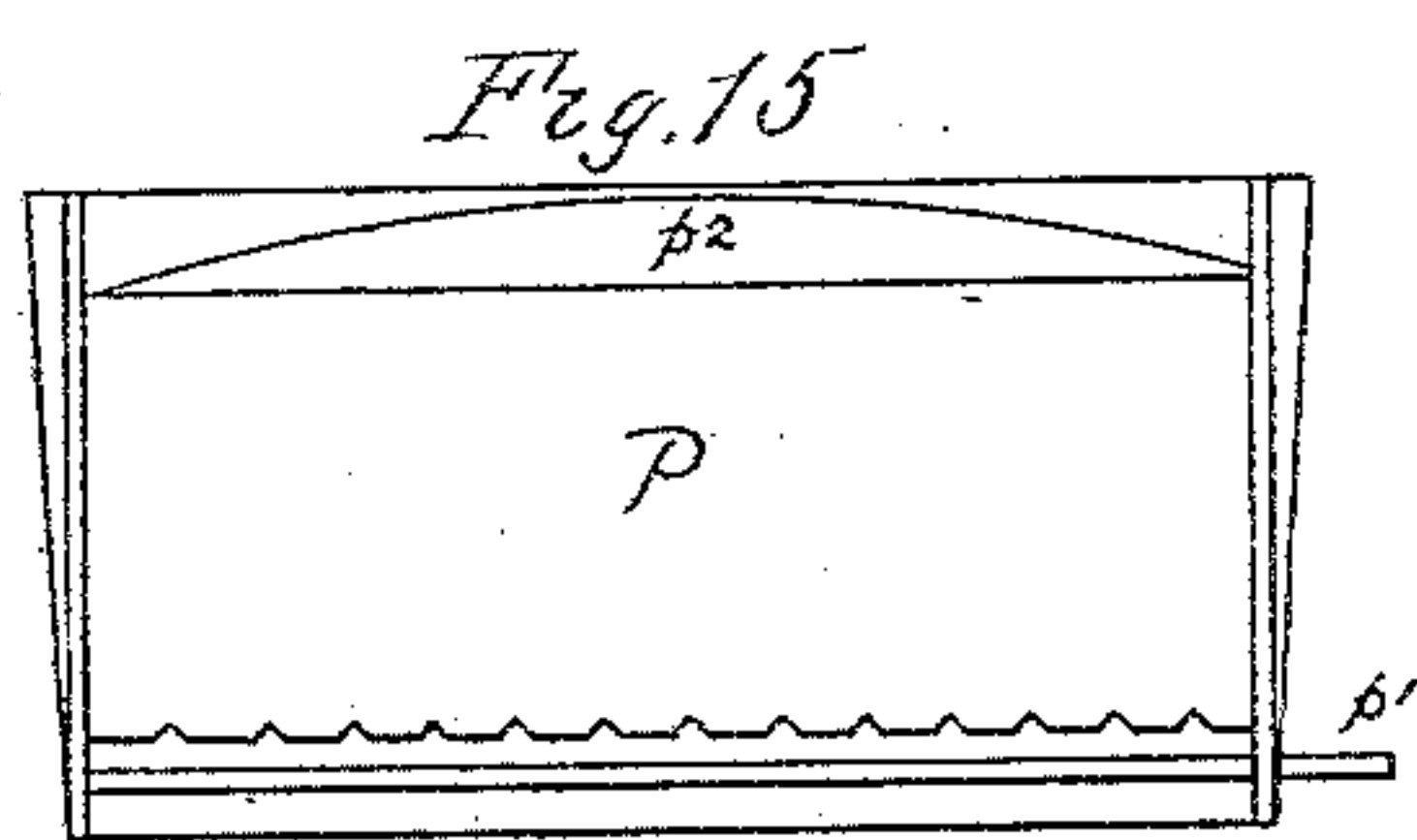
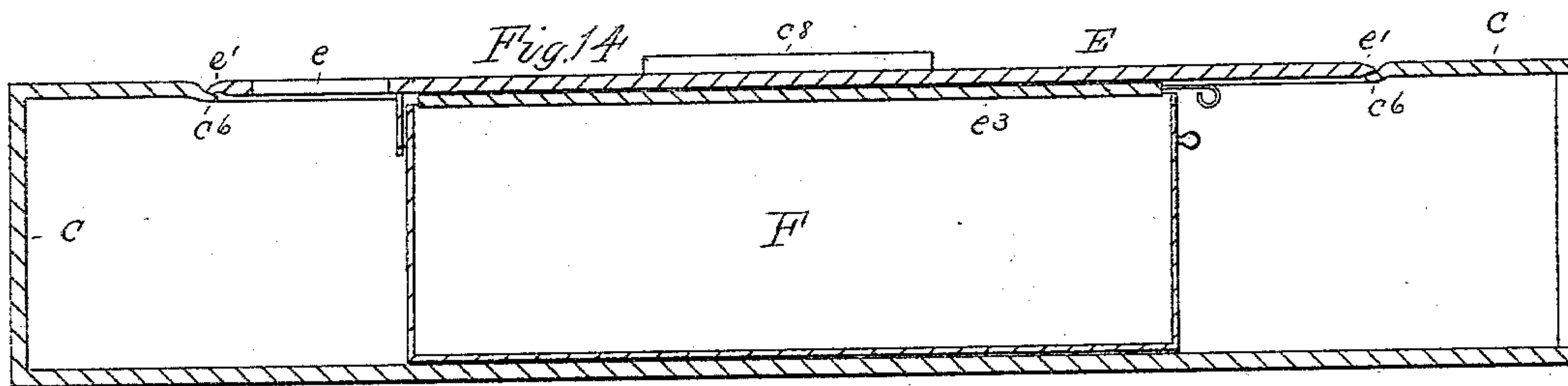
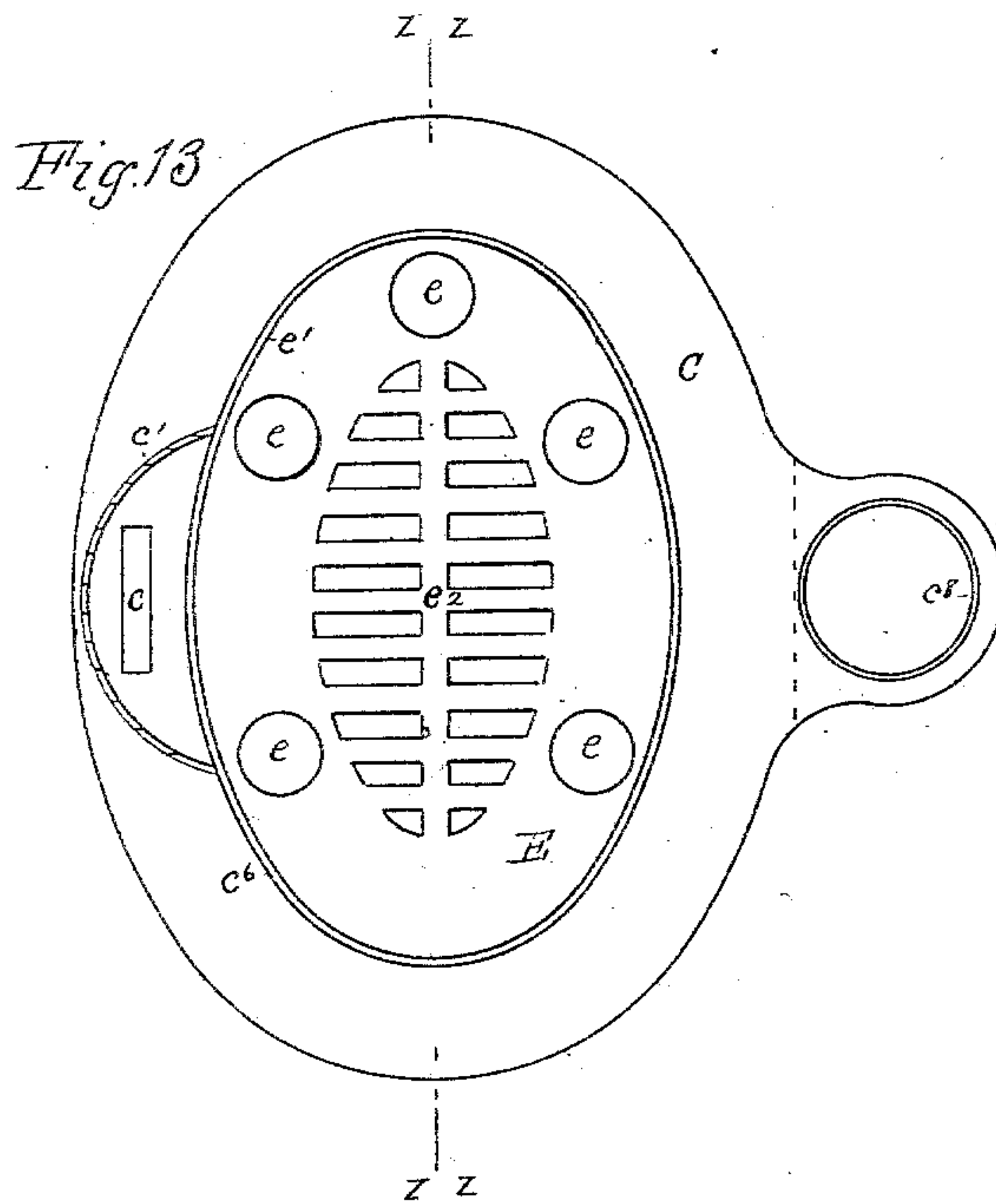
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UNITED STATES PATENT OFFICE.

HENRY TILDEN, OF MINNEAPOLIS, MINNESOTA.

HEATING-STOVE.

SPECIFICATION forming part of Letters Patent No. 359,697, dated March 22, 1887.

Application filed March 1, 1886. Serial No. 193,594. (No model.)

To all whom it may concern:

Be it known that I, HENRY TILDEN, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Heating-Stoves, of which the following is a specification.

My invention relates to stoves or heaters for warming buildings; and the object of the invention is to economize fuel and effect a better warming of the apartment by a more thorough utilization of the heat of the volatile products of combustion in their course to the chimney than is attained by ordinary forms of stoves and heaters. This object I accomplish by the construction and arrangement of devices illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved heating-stove. Fig. 2 is a central sectional elevation of the same. Fig. 3 is a horizontal sectional view on the line *v v* of Fig. 1. Fig. 4 is a horizontal section on the line *w w* of Fig. 1. Fig. 5 is a detached view of the hollow grate used over the combustion-chamber, and Fig. 6 is a sectional view of the same on the line *x x* of Fig. 5. Fig. 7 is a detail view of the perforated rim used for holding the interior pipes in place while the stove is being set up, and Fig. 8 is a section of the same on the line *y y* of Fig. 7. Fig. 9 is a detached view of a loose perforated plate used in the secondary heater for cleaning the heater and its tubes. Figs. 10 and 11 are respectively top and bottom views of the fresh-air receiver used in the combustion-chamber, and Fig. 12 is a section of the same on the line *z z* of Fig. 10. Fig. 13 is a plan of the stove-bottom and of the box beneath it, and Fig. 14 is a sectional view of the same on the line *zz zz* of Fig. 13; and Figs. 15, 16, and 17 are respectively front, end, and top views of a fire-pot for burning coal in the stove illustrated.

In the several views, A represents the combustion-chamber, and B a sheet-iron drum.

B' is a secondary drum, connected with the drum B, near their bases, by a draft-pipe, *b*, and the drum B' has an escape-flue, B², near its top.

The stove stands upon a box, C, of suitable form and dimensions, and the air-supply, both for combustion and convection through the

air-pipes, is admitted through the box C, as hereinafter more fully described.

D is a receiver of the fresh air to be warmed and distributed in the apartment, and is of curved form or other suitable shape, to fit around the interior of the combustion-chamber, and it has an open space, *d*, toward the front of the stove for the passage of the draft to the fire. Air is admitted to the receiver or heater D through holes *d'* in the under surface, which holes coincide with holes *e* in the stove-bottom E. This stove-bottom E is a plate having a slight downward flange, *e*, around its edge, and the flange fits into a corresponding groove, *e'*, on the top of the box C and inside of the walls of the combustion-chamber. By this arrangement if the stove-bottom becomes broken it may be replaced through the box C without removal of the stove.

In the central part of the bottom E is a grating, *e²*, corresponding in shape with the space between the sides of the heater D, and beneath this grating is a sliding grating, *e³*, by means of which ashes may be made to fall into an ash-pan, E, in the box C; or, when practicable, an ash-chute may be provided from the box C to an ash-pit in the cellar of the building. Access to the shaker *e³* can be had through the door *e'* of the box C, through which, also, the ash-pan can be removed.

A series of pipes, *f*, ranged around the walls of the combustion-chamber, connect with the heater D through the holes *d'* in its upper side.

G is a flanged ring resting on the top of the combustion-chamber, and serves by means of the holes *g* to hold the upper ends of the pipes *f* in position to coincide with the holes in the hollow grate while the stove is being set up, and it serves also as a seat for the stove-drum B. If desired, this flange may be cast integrally with the combustion-chamber.

H is a hollow grate over the combustion-chamber, and is connected with the pipes *f* by means of the holes *h* in its under surface.

h² are the interstices in the grate for the passage of the smoke and gases from the combustion-chamber to the drum.

Pipes *i*, around the front wall of the drum B communicate with the air-space of the grate H through holes *h'* in its upper surface, and the pipes pass through the plate *k* in the upper portion of the drum, and thence discharge

their heated air into the head of the drum to be diffused through the openings b^2 . The plate k has a hole with a lid, k' , to permit access to the interior of the drum for placing or removing the internal parts.

G' is a flanged ring similar to the ring G , and serves to hold the pipes i in position before the plate k is put in place, so that the pipes will coincide with the holes k^2 when the plate is put on. It is mounted on the drum B , and supports the upper section of the drum.

j is a partition held in place by the walls of the drum and lugs h^3 on the grate H , and divides the drum into front and rear compartments. A sufficient space is left for a draft-passage from the front to the rear compartments over the top of the partition. In the lower part of the partition are draft-openings controlled by a slide, j' , having like openings. This draft-passage is usually kept closed, so that the draft will be upward through the front portion of the drum and downward through the rear portion; but, when desired, the slide may be shifted to give a direct draft from the combustion-chamber through the grate H and partition j into the flue b . The partition is preferably placed within a few inches of the back of the drum.

$m m$ are fire-bricks laid in irregular courses from the grate H into the upper part of the drum, so as to form a zigzag or irregular passage for the smoke and gases.

B' is a secondary heater or drum, through which the products of combustion pass from the pipe b and escape through the flue B^2 .

$n' n^2$ are plates, respectively forming the upper and lower heads of the drum, and n^3 is a central rod supporting them.

$n n$ are air-pipes passing through the drum B' and through holes in the heads $n' n^2$.

N is a pipe for supplying air to the pipes n , and is fitted to the base of the drum B and seated over a rim, c^8 , on the rear portion of the box C .

O is a skeleton disk fitting within the sides of the drum B' and around the pins n , and is designed for removing accumulated soot from the drum and pipes by being raised and lowered by means of a wire or chain, n^4 , extending through the top of the drum. A slide-door, n^5 , at the base of the drum can be opened for the removal of soot that has been thus deposited.

P is a fire-pot for burning coal in the stove illustrated, and is adapted to be set on the top of the heater D , within the circle of the pipes f . The fire-pot can be readily inserted through the stove-door a , and the stove be thus converted into a coal-burning stove, and it can be again removed, when desired, without interfering with other parts of the stove.

p is a shaking grate in the bottom of the fire-pot, and has a projecting handle, p' , access to which can be had through the door a , and p^2 is an outward flange at the front of the fire-pot to fit up to the wall of the combustion-

chamber to prevent air from passing upward through the space d outside of the fire-pot.

The air-supply for combustion is drawn through an opening, c , in the front portion of the box C outside of the combustion-chamber, this portion of the box C being inclosed by a cover, c' , forming an air-tight compartment over the box, and thence through an opening, c^2 , in a division-plate, c^3 , and downward through openings in the front wall of the combustion-chamber (as indicated by arrows) to the lower portion of the chamber. A slide, c^4 , having a handle, c^5 , protruding from the cover c' , is provided for regulating the supply. This manner of admitting the air-supply prevents ashes from closing the draft-openings or falling into the box beneath through these openings.

The object in drawing the air-supply for combustion through the box C and the chamber formed over it by the cover c' is to prevent as far as possible a suction of the air in the apartment toward the stove. The supply of air for the box C may be taken through a pipe run beneath the floor from the outside of the building and connected with the box through the opening c^9 , and the draft for the combustion may be taken from this fresh-air supply, or, preferably, warm air may be drawn through a pipe running under the floor to the draft-opening c from some point in the room remote from the stove. The supply of air for the pipe N may also be drawn through a pipe communicating with the apartment away from the stove and extending under the floor to the portion of the box C cut off by the partition C' ; but obviously the partition C' may be dispensed with and the pipe N have its air-supply in common with the other portion of the stove.

I do not claim in this application any patentable subject-matter other than that specifically set forth in the claims, but reserve to myself the right to claim the same in an application filed by me March 1, 1886, and No. 193,657.

What I herein claim is—

1. In a heater, the combination of a combustion-chamber, a superimposed drum, a partition in said drum for creating an upward draft in one portion and a downward draft in another portion thereof, a hollow grating between said chamber and drum, air-inlets leading into the passage of said grate, and ducts in said chamber and drum connected with the air-space of said grating for the convection of air through said heater, substantially as set forth.

2. In a heater, the combination, with a fire-chamber and superimposed drum, of an intermediate hollow grating, a zigzag draft-passage above said grating formed in said drum by irregular courses of fire-bricks, and ducts in said chamber and drum communicating with the air-space of said grating, substantially as and for the purpose set forth.

3. The combination, in a heating-stove, with

a combustion-chamber and superimposed drum, of an intermediate hollow grating, an air-heater in the lower portion of the combustion-chamber, pipes connecting said heater and grating, and pipes leading thence through said drum, substantially as set forth.

4. In a heating-stove, the combination, with a combustion-chamber and superimposed drum and an intermediate hollow grating, of a partition extending upward from said grating into said drum for creating an upward draft in one portion of said drum and a downward draft in the other portion thereof, a devious draft-passage formed of fire-brick in said drum, and pipes in said combustion-chamber and drum communicating with said hollow grating, substantially as and for the purpose set forth.

5. In combination, in a heating-stove, a combustion-chamber, a superimposed drum, an intermediate hollow grating, a partition dividing said drum, except the upper portion thereof, into front and rear compartments, an escape-flue connected with the lower portion of said rear compartment, draft-openings in the lower portion of said partition, a damper for controlling the same, and pipes in the combustion-chamber and drum communicating with the hollow of said grating, substantially as set forth.

6. The combination, in a heating-stove having a fire-chamber, a drum, and an intermediate hollow grating, of a partition dividing said drum, except the upper portion thereof, into front and rear compartments, an escape-flue near the base of said rear compartment, draft-openings in the lower portion of said partition, a damper for controlling the same, pipes in said fire-chamber and drum communicating with the hollow of said grating for the convection of air through the stove, and fire-bricks arranged in said drum to form a devious draft-passage therein, substantially as set forth.

7. In a stove having a combustion-chamber, a drum, and an intermediate hollow grating, the combination, with said hollow grating and combustion-chamber, of the ring G and pipes f, substantially as and for the purpose set forth.

8. In a heating-stove, the combination of the air receiver and heater D, having inlets d' and outlets d'' , the pipes f, and the removable stove-bottom E, having air-inlets e' , all constructed and arranged substantially as set forth.

HENRY TILDEN.

Witnesses:

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P. H. GUNCKEL.