

(No Model.)

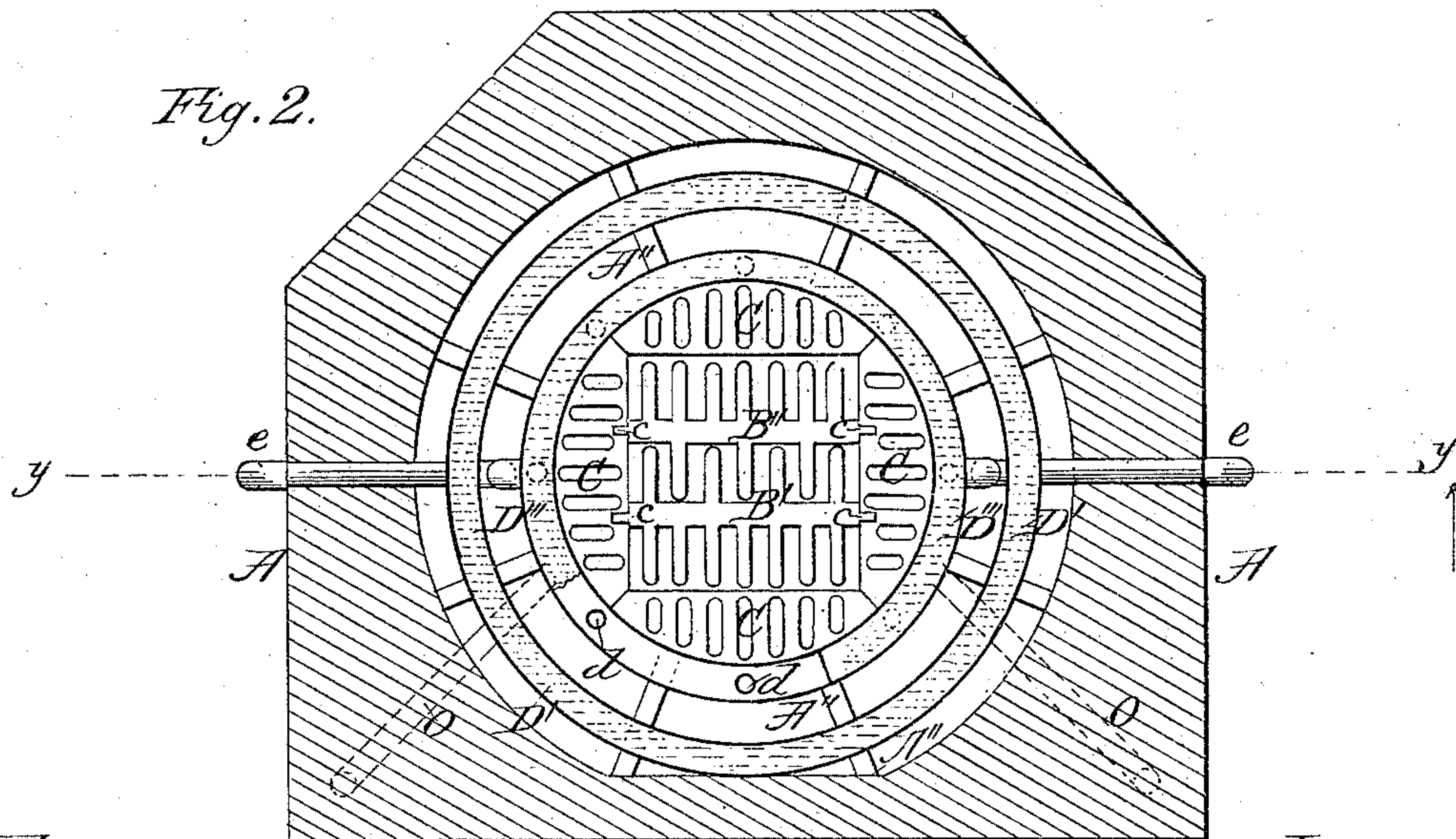
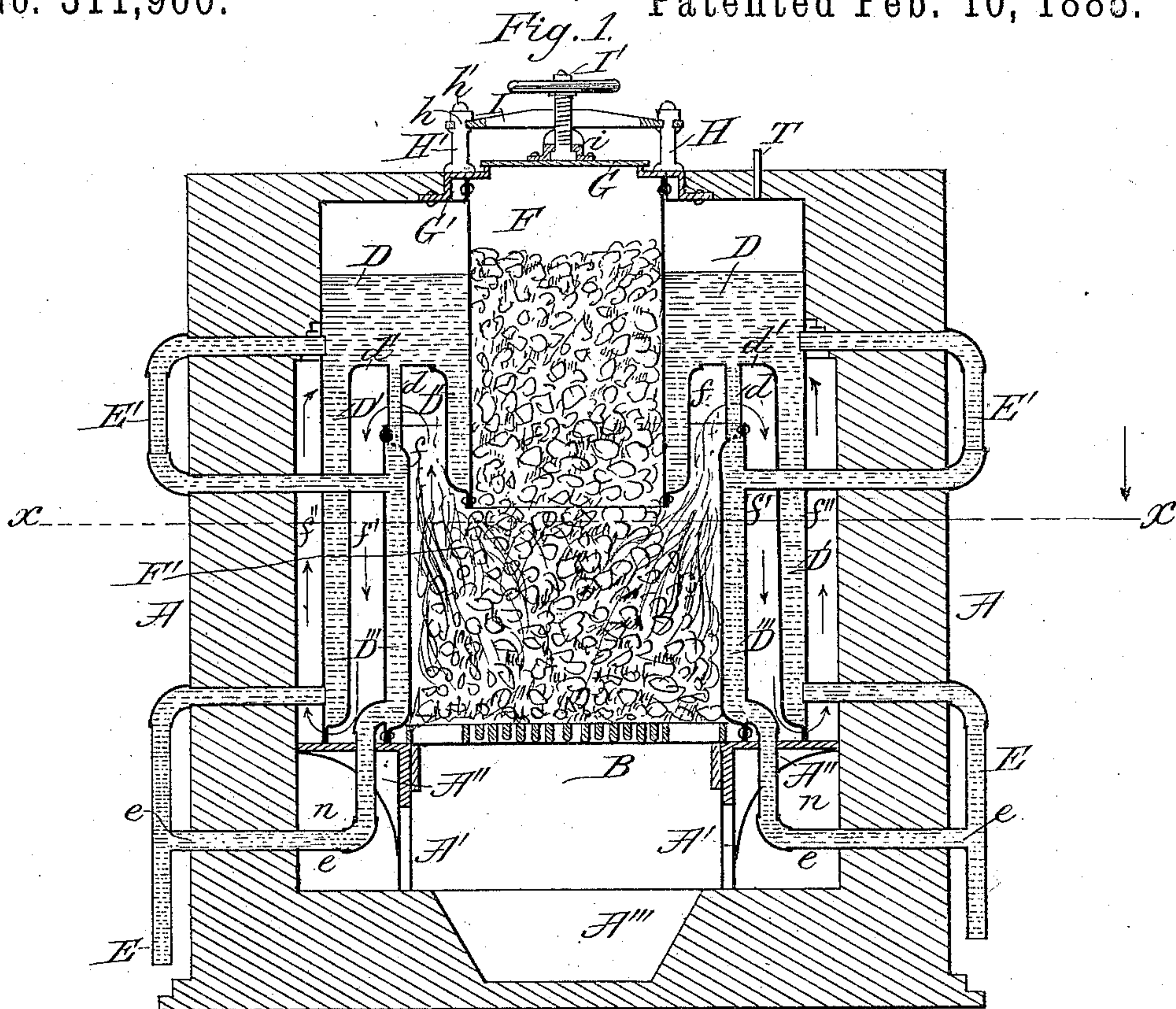
3 Sheets—Sheet 1.

J. KANGLEY & W. S. CHERRY.

STEAM GENERATOR.

No. 311,900.

Patented Feb. 10, 1885.



Attest:

H. H. Schott
G. B. Towles

Inventors

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John Kangley
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Fig. 4.

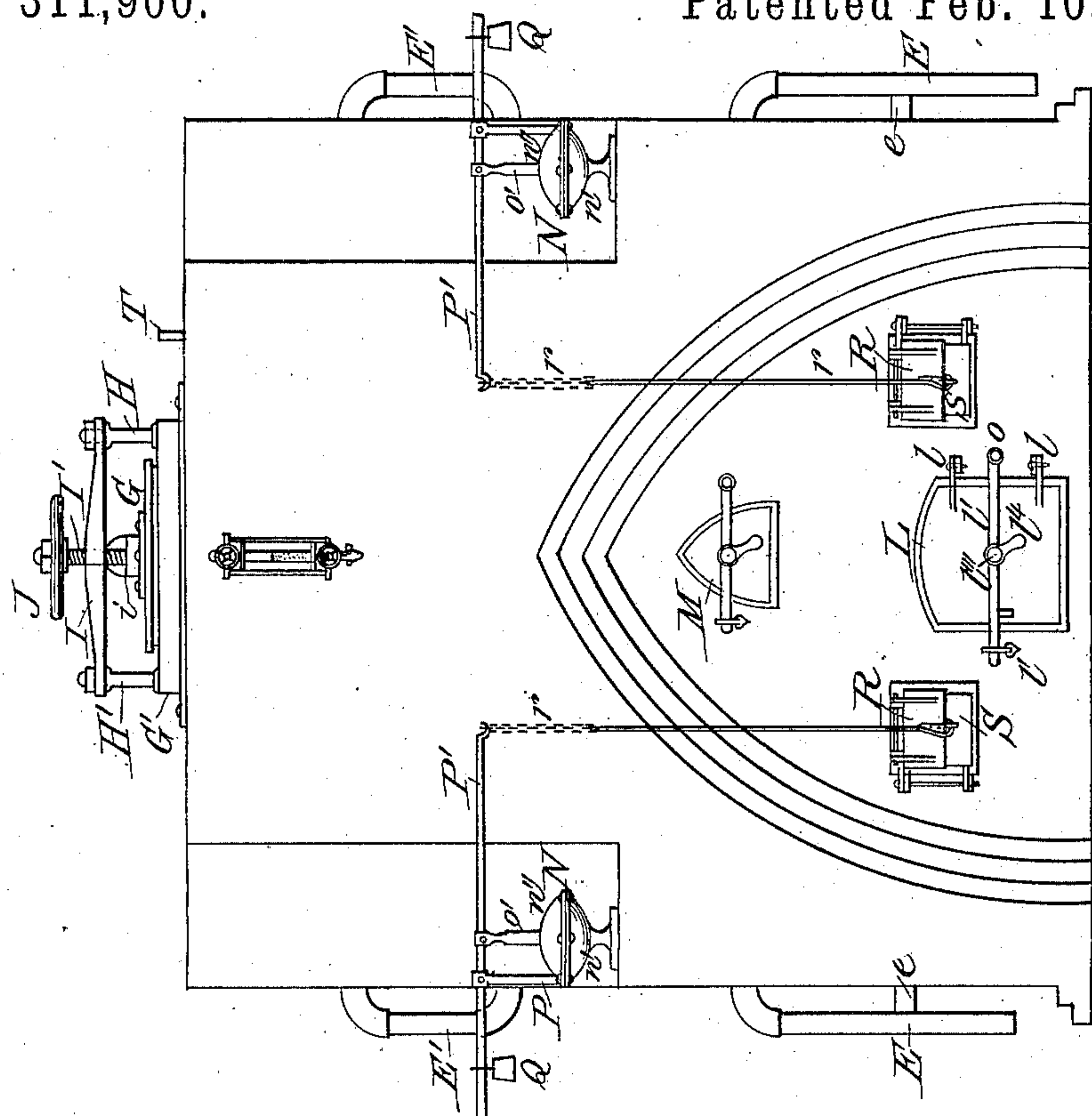
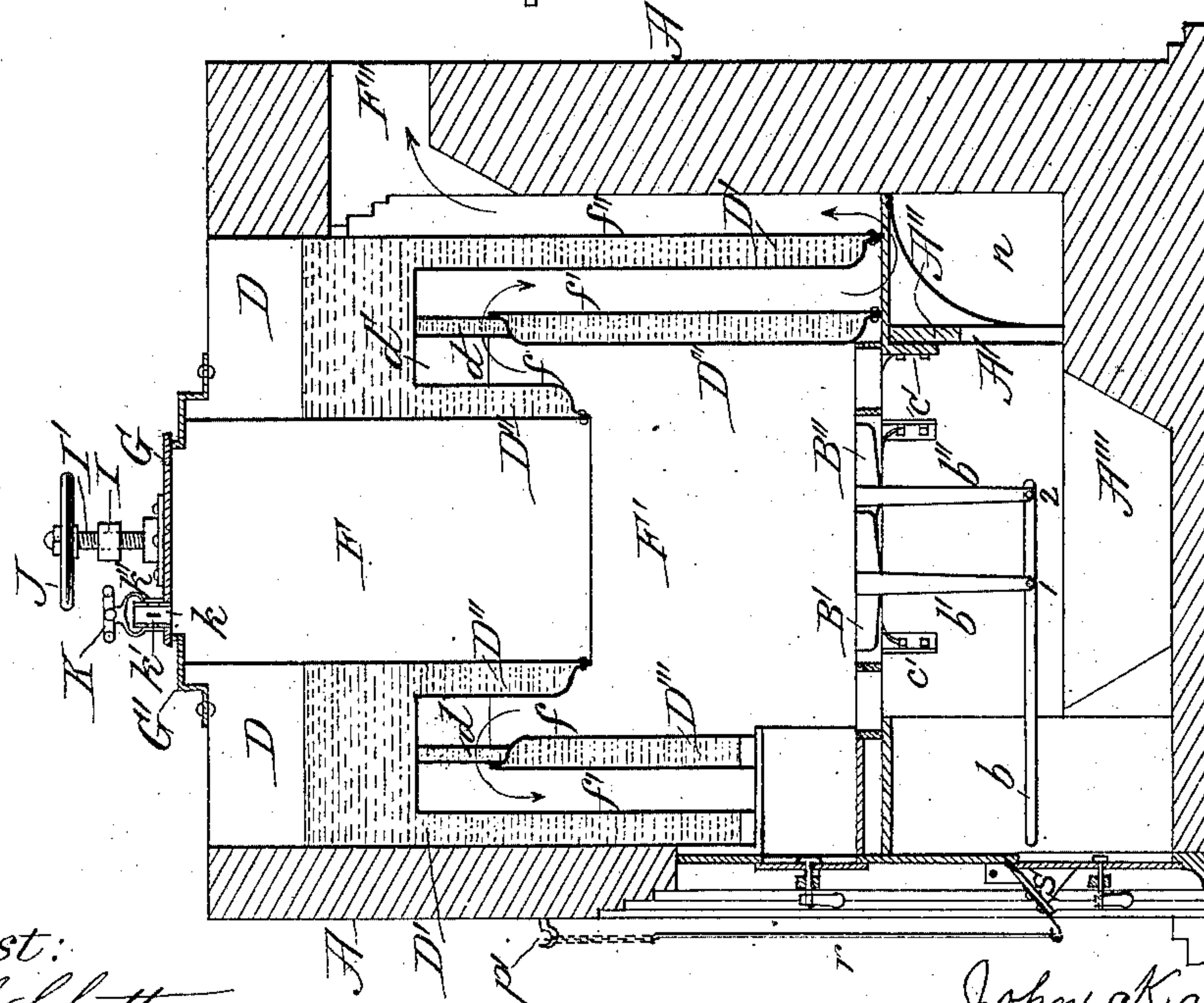


Fig. 3.



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Fig. 5.

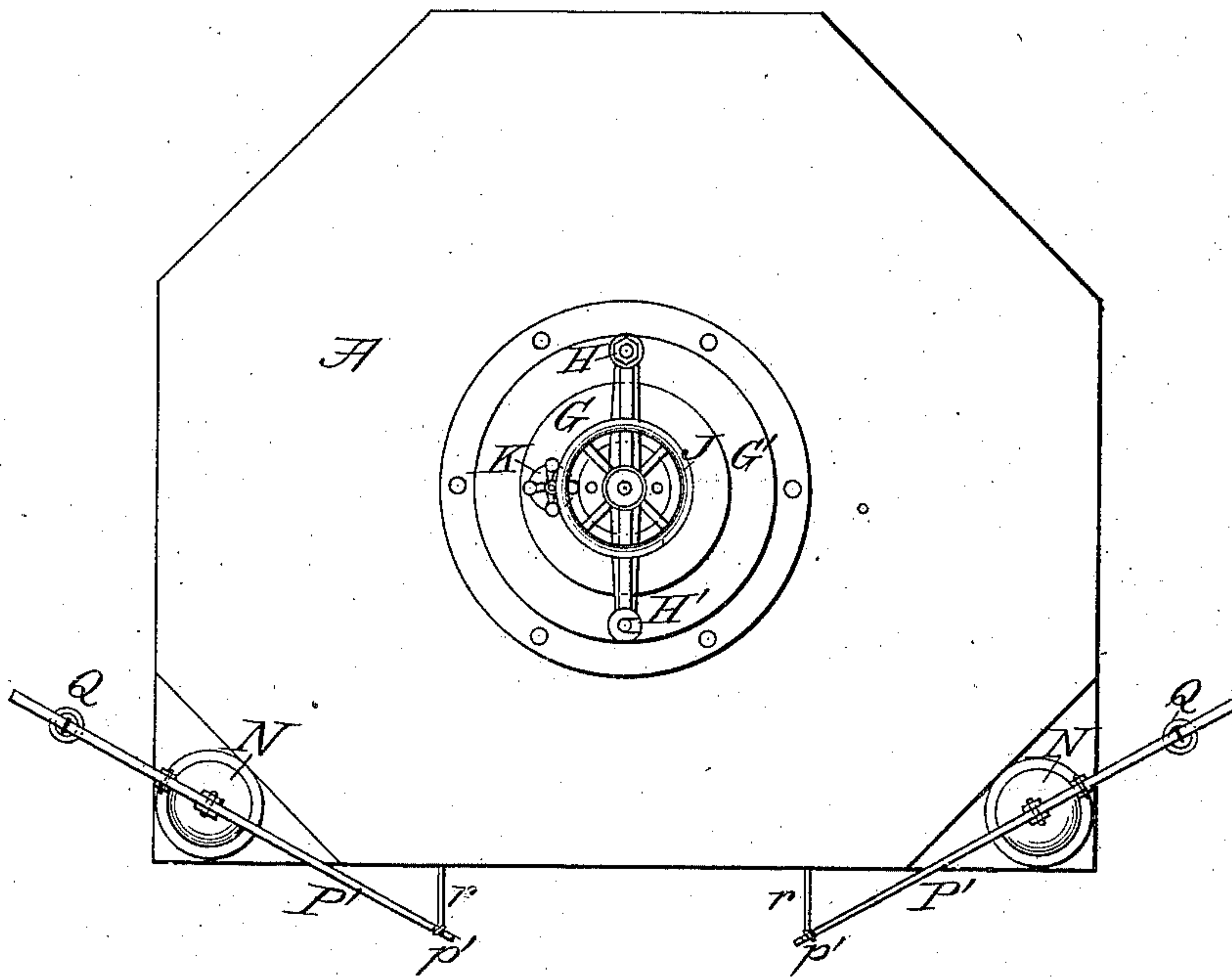
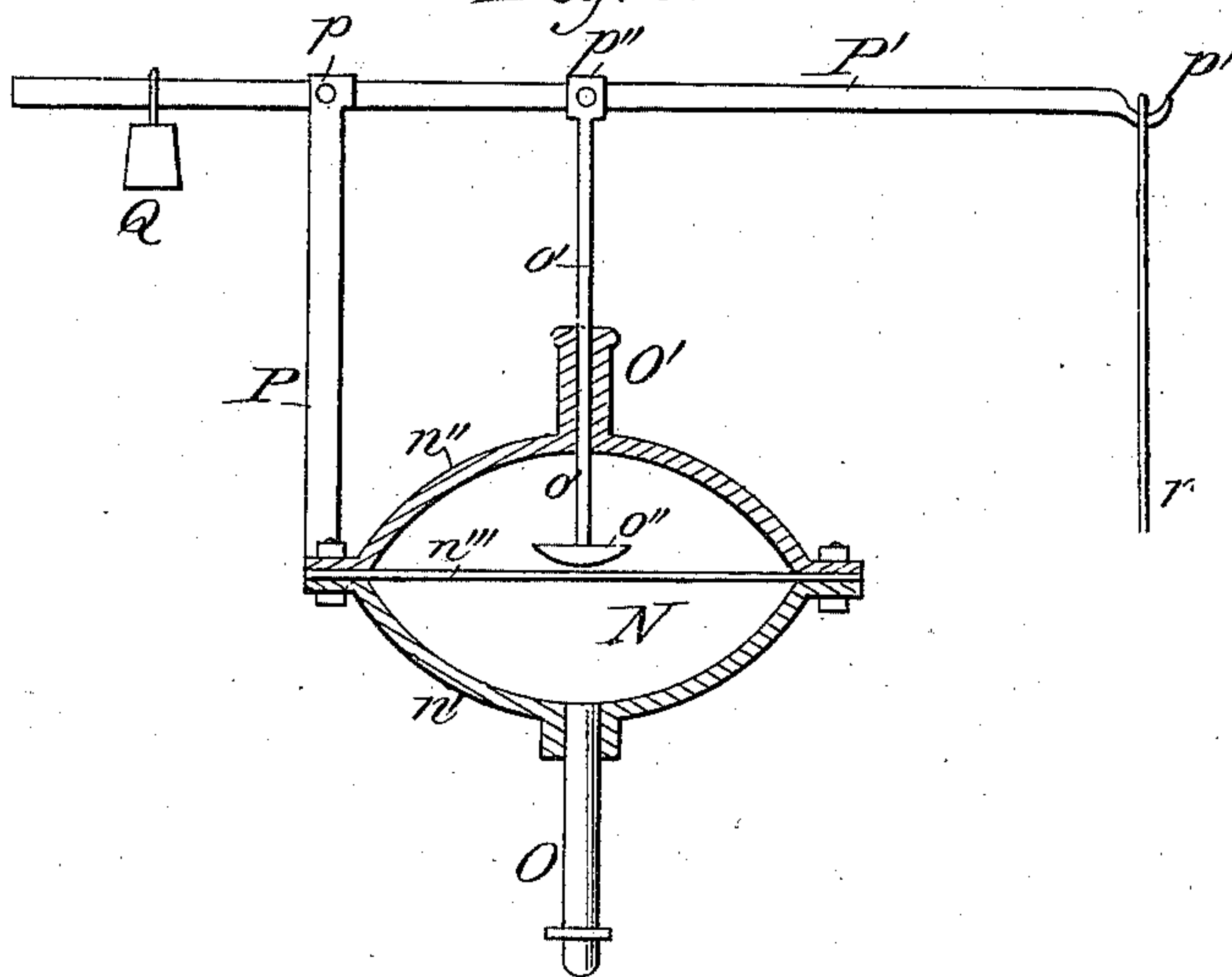


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN KANGLEY AND WILLIAM S. CHERRY, OF STREATOR, ILLINOIS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 311,900, dated February 10, 1885.

Application filed May 13, 1884. (No model.)

To all whom it may concern:

Be it known that we, JOHN KANGLEY and WILLIAM S. CHERRY, citizens of the United States, residing at Streator, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to the construction of boilers, and especially to that class used for generating steam to heat buildings, the object being to increase the area of the heating-surface of the boiler containing the water and to quicken the circulation of the water or steam with the least amount of fuel; and it consists in the construction of the boiler, its relation to the heating device, its support, the means for keeping up a rapid circulation into and through the boiler of the proper amount of water, and means for regulating the air-drafts to produce automatically a uniform heat in the boiler.

In the drawings, Figure 1 represents a vertical section on line *y y*, Fig. 2. Fig. 2 represents a horizontal view on line *x x*, Fig. 1. Fig. 3 represents a vertical section at a right angle to Fig. 1. Fig. 4 represents a front view. Fig. 5 represents a top or plan view, and Fig. 6 represents details of the construction of an automatic air-regulator to a steam generator or heater.

A represents the inclosing walls or casing to the heater, which may be of masonry or other proper material for such purpose.

A' is the base-support to the boiler and the fire-grate, and is formed by the riveting of two sheets of iron to the radial cast-iron brackets A'' in the form of a ring, which ring will form the walls of the ash-pit A'''.

B is the fire-grate, composed of two rocking sections, B' B'', to vibrate on trunnions *c* in bearings in the opposites of the four segment-grates C C, that are permanently bolted to the supporting-ring A' by means of the brackets *c'* *c'* and brackets A''.

b' and *b''* are arms depending from the under side of the two sections B' B'' of the grate B, and arm *b'* is pivoted to lever *b* at 1, and arm *b''* is pivoted to the inner end of lever *b* at 2, as seen in Fig. 3, so that by reciprocating the lever *b* back and forward the sections B' and B'' will be partially rotated on their trunnions *c*.

D is the boiler, of any suitable form in horizontal section, but by preference we adopt the circular; is made of the usual boiler-plate, having an outer depending water-leg, D', that extends down to and rests upon the brackets A'', and an inner depending water-leg, D'', the inner plate of which forms the outer wall of the circular magazine that contains the fuel for heating the water, and extends as low downward as the said magazine.

D''' is an annular upright water leg or heater of proper width, and is supported upon brackets A'', the inner wall of which forms the sides of the fire-pot to the heater and receives the greatest and most intense heat from the burning fuel in the fire-pot.

d d are upright small water-pipes firmly attached to the upper edge of the annular water-leg D''', thence go upward through the crown-sheet *d'* into the boiler D.

E E are pipes to supply water to the boiler by means of the upright water-leg D' and annular water-heater D''', and the branching horizontal pipes *e e*, that supply water into the base or near the base of the annular water-heater D''', and the bent pipes *e' e'* at the upper end of pipes E, that supply water to the water-leg D' at or near its base. The supply of water through pipes E into the water-heater D''' and leg D' is kept up and regulated by any of the well-known devices for such purpose.

E' E' are water or steam circulating pipes, connected at their inner ends to or near to the top edge of the annular water-heater D''', thence extending outward in a horizontal direction through leg D' a proper distance, then bent upward, then returning horizontally, and ending in the boiler D through proper thimbles at a point above the crown-sheet *d'*. Such construction and arrangement of water-supply pipes and circulating-pipes with the water-heater D''' and water-leg D' affords an easy and rapid way of keeping up the circulation and equalizing the temperature of the water or steam in all of the compartments of the boiler, and where the amount of heated water or steam is small the small upright pipes *d* at

the top of the water-heater D''' may be dispensed with, as under such conditions the circulation may be sufficient when only the circulating-pipes E' are used.

5 F is the fuel-magazine, and occupies the central or annular space in the boiler D , and is centrally located over the fire-pot or combustion-chamber F' of the furnace or heater, but of less diameter than fire-pot F' , its outer
10 wall being the inner plate of the depending annular water-leg D'' , and by its construction it is suspended centrally in the boiler D . The fire-pot F' being greater in its inner diameter than the magazine F , the wall of which is the
15 annular heater D''' , which extends a little higher than the bottom of the annular leg D'' , forms a flue or passage, f , for the products of combustion and heat to pass from the burning
20 fuel upward outside of the depending leg D'' , striking the crown-plate d of the boiler, then downward through flue f' between the leg D' , water-heater D''' , then passing under the annular leg D' upward in flue f'' between the
25 leg D' and the outer wall or jacket of the heater, into a horizontal flue around the boiler D , to the exit F'' , then into a common stack or chimney.

G is a swinging lid or cover over the opening at the top of the fuel-magazine, and is
30 made to fit upon or in the annular plate or ring G' , that is securely bolted to the top of the magazine or to the top of the boiler D .

H and H' are posts on opposite sides of the fuel-opening F''' of the magazine, and are firmly
35 secured to the ring G' and rise a distance above ring G' . Each of the posts have a neck at h , and an enlarged cap, h' , above the neck, as is shown in Fig. 1.

I is a swinging cross-bar placed horizontally
40 from post H to post H' , one end having an eye to surround the neck on post H , and around which it turns, resting on a shoulder of the post below the neck, and kept in position by the shoulder of the enlarged cap above the bar
45 on the same post, while at the opposite end of the bar the eye is slotted or the eye is opened at one side to allow the bar to be swung around, and the open eye can engage the neck beneath the cap of post H' . Cross-bar I has
50 a screw-threaded opening in the center of length to receive the screw-rod I' , that is seated in a thimble, i , which thimble is fast to the lid G , and so constructed that the screw-rod may rotate within it, but cannot be released therefrom without detaching the thimble from the lid.
55

J is a wheel to rotate the screw-rod I' , made fast thereto, so that by turning the screw in one direction it will force the lid firmly down
60 upon the ring G' and make a tight joint, and by turning the screw-rod in reverse direction the lid is free and can be swung around to open the mouth of the magazine.

Upon the swinging lid G is an air-valve, K ,
65 to admit air into the magazine when necessary, and it is formed by inserting an open

pipe, k , through lid G and securing it in position thereto and raising its upper end a sufficient distance above the lid to have air openings k' laterally through its sides, and an outside revolving thimble, k'' , to revolve around the pipe k , having openings through the sides of the thimble to be coincident with the holes in the pipe; but by turning the thimble the spaces between the openings thereof will cover the openings in the pipe and shut off the passage of the air, or the same result can be obtained by screw-threads within the thimble to work on screw-threads on the outside of the pipe, so as to bring the air-openings coincident.
70 75 80

The front of the heater or furnace is provided with the usual ash-pit door, L , hinged at l , a bar, l' , swiveled at o to the front, so as to turn therefrom, a bracket-catch, l'' , fast to the front, a screw-pin, l''' , attached to the lever-handle l^4 , to be screwed into the door to hold the door securely in place against the front. The fire-door M in the front is constructed to be secured to the front of the furnace tightly, in substantially the same way as the ash-pit door L .
85 90

N N are the automatic steam-dampers, to regulate the admission of cold air into the flue
95 n around the support of the boiler, then up through flue f'' . These dampers are composed of two convex plates, n' and n'' , firmly bolted together with a yielding diaphragm, n''' , of rubber or other as good material, secured between the two convex plates. The lower
100 plate, n' , has an opening in its bottom to receive steam-pipe O , that is connected with the water-heater D''' , while the upper plate, n'' , has an upwardly-projecting thimble, O' , with a straight bore through it to receive a valve-rod, o' , with a valve, o'' , at its lower end, which projects into the interior, so as to be a small distance above the diaphragm n''' .
105

P is a post firmly secured to the outer edge of each of the dampers, and rises a considerable distance upward, and at its top at p is pivoted a horizontal bar, P' . The inner end of this bar has a hook or eye, p' , thereon, and at about one-third the distance from the point p to hook p' the valve-rod o' is pivoted to bar P' at p'' , and upon that portion of bar P , that extends outside of the post P is an adjustable weight, Q , and upon hook p' is a chain or rod, r , that extends down to and is firmly attached to hinged door or damper R of door S , that admits cold air into flue n around the boiler-supports when necessary, or to remove dust or ashes from said flue n . This construction of the diaphragms and valves, with the adjusting-weight upon the pivoted bar and the bar connected to the damper-door, and steam entering the steam-box N under the diaphragm from any part of the boiler, will of itself automatically open and close the damper-door under desired adjustment of the pressure and let the cold air into the flues around the legs of the boiler when too much heat is applied,
110 115 120 125 130

and as it cools off the damper-doors will close of themselves, because there is not sufficient pressure under the diaphragm to hold the valve up and the bar, with the damper-door, falls.

5 Consequently, the damper-door closes and shuts off the current of cold air, when the heat will again be increased in the boiler. Steam generated in this manner and occupying the steam-space in the boiler above the hot water
10 is forced out through the exit-pipe T, when it is conducted and distributed into and through any building for heating radiators or other known appliances for warming buildings in the usual manner.

15 Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, in a steam-heater, of the annular boiler D, having an outer depending annular water-leg, D', and inner depending annular water-leg, D'', extending to the
20 bottom of, around, and forming the wall of the fuel-magazine, the ascending annular flue f, the descending annular flue f', and the ascending annular flue f'' outside of water-leg D', with a base-burning furnace composed of the central upright fuel-magazine, F, and combustion-chamber F', all the parts constructed

and arranged with relation to each other substantially as described.

2. The combination, in a steam-heater, of the annular upright water-heater D''', forming the outer walls of the combustion-chamber or fire-pot F', water-supply pipes E e e, circulating-pipes E', with the annular boiler D, having the water-legs D' D'', and a base-burning
35 furnace, F F', substantially as described.

3. The air-valve K, composed of the pipe k, having openings k', thimble k'', having openings therein, in combination with the swing-
40 ing lid G of the magazine F, as and for the purposes described.

4. In a steam-heater, the base-support A' and brackets A'', in combination with the boiler D, having annular leg D' and the inner
45 depending leg D'', and the water-heater D''', forming the fire-pot, as and for the purposes described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN KANGLEY.

WILLIAM S. CHERRY.

Witnesses:

BENJAMIN F. SWEET,
HUGH HALL.