

No. 627,143.

Patented June 20, 1899.

A. B. RECK.
SMOKE CONSUMING FURNACE.

(Application filed May 14, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 3.

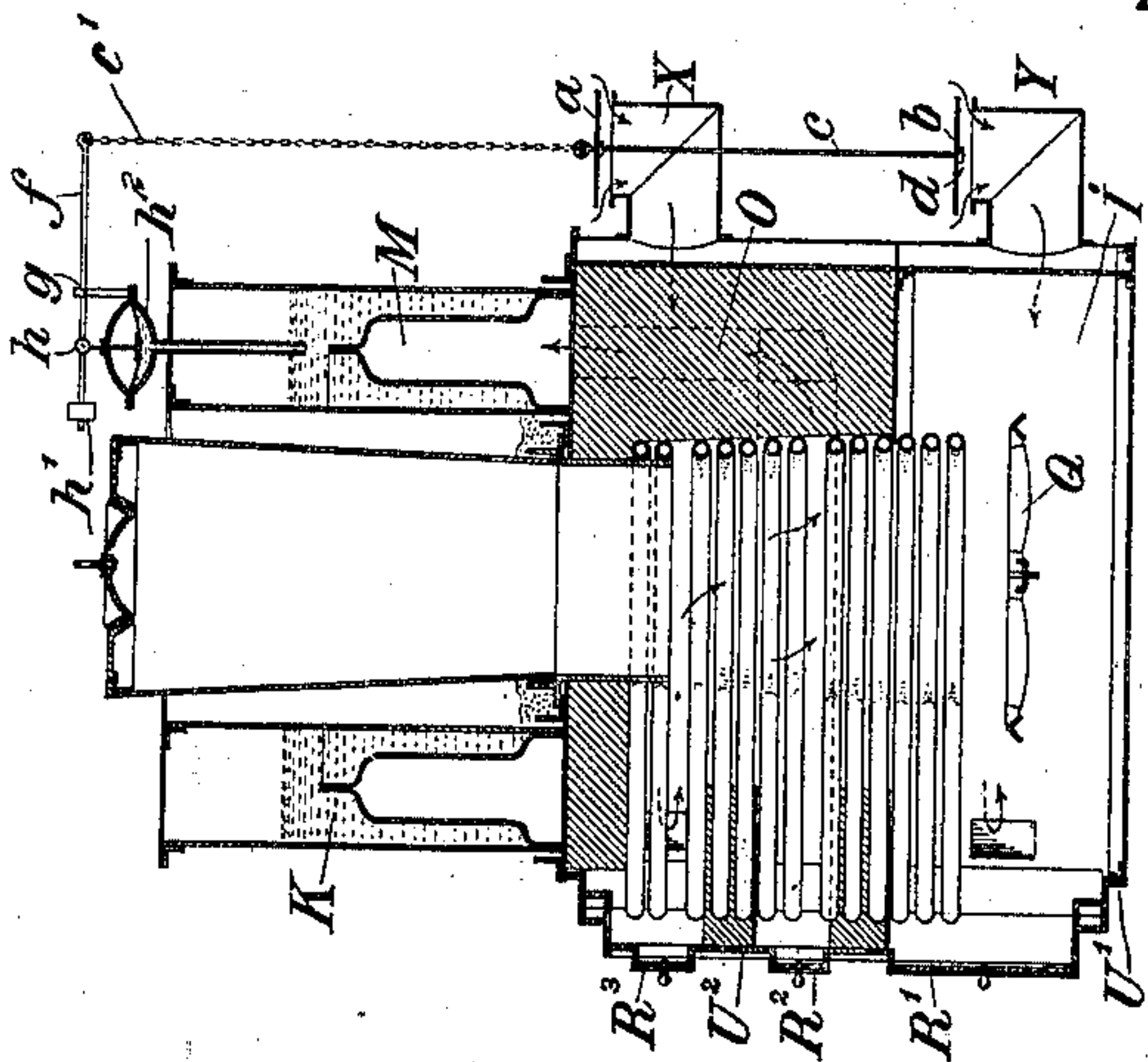


Fig. 2.

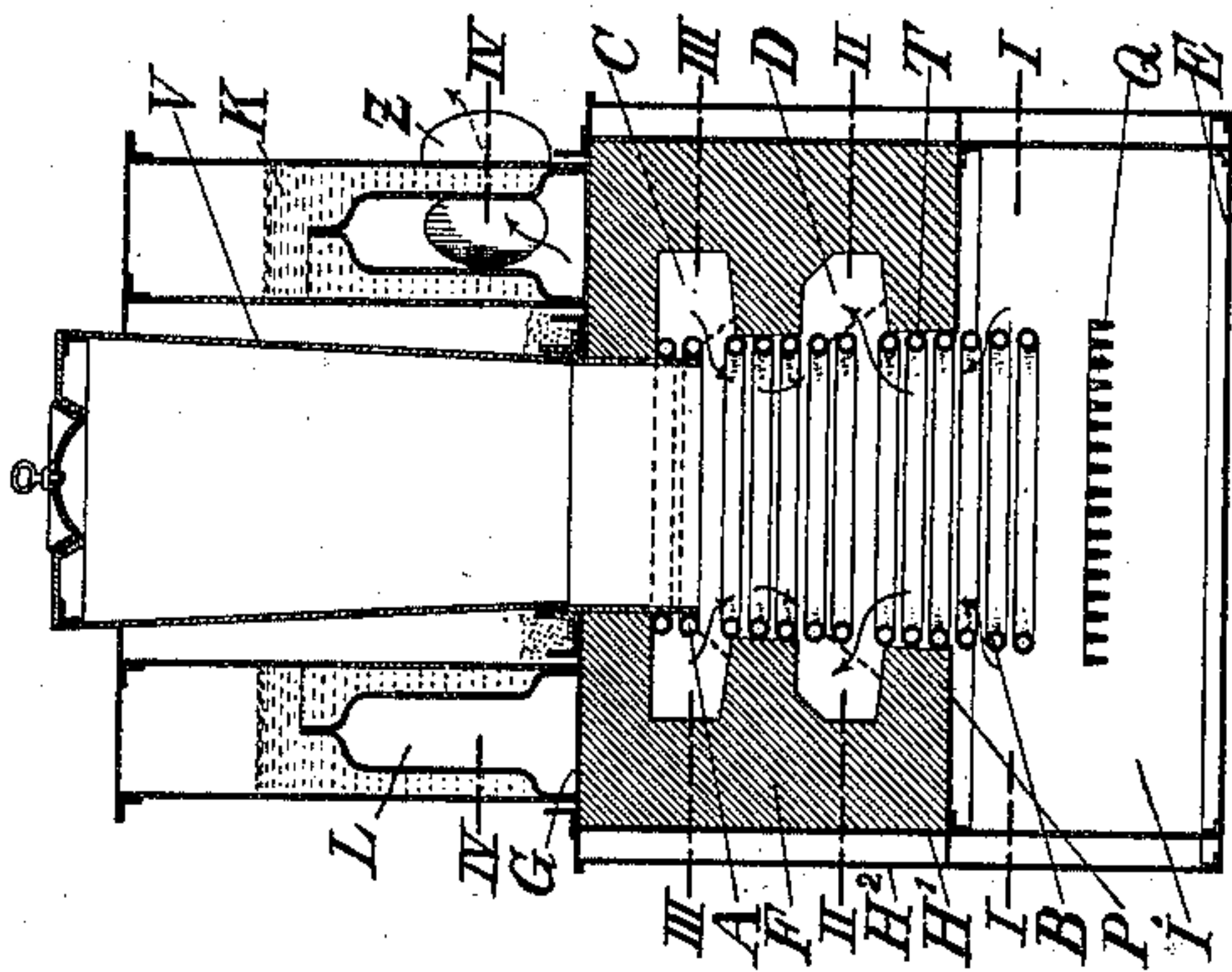
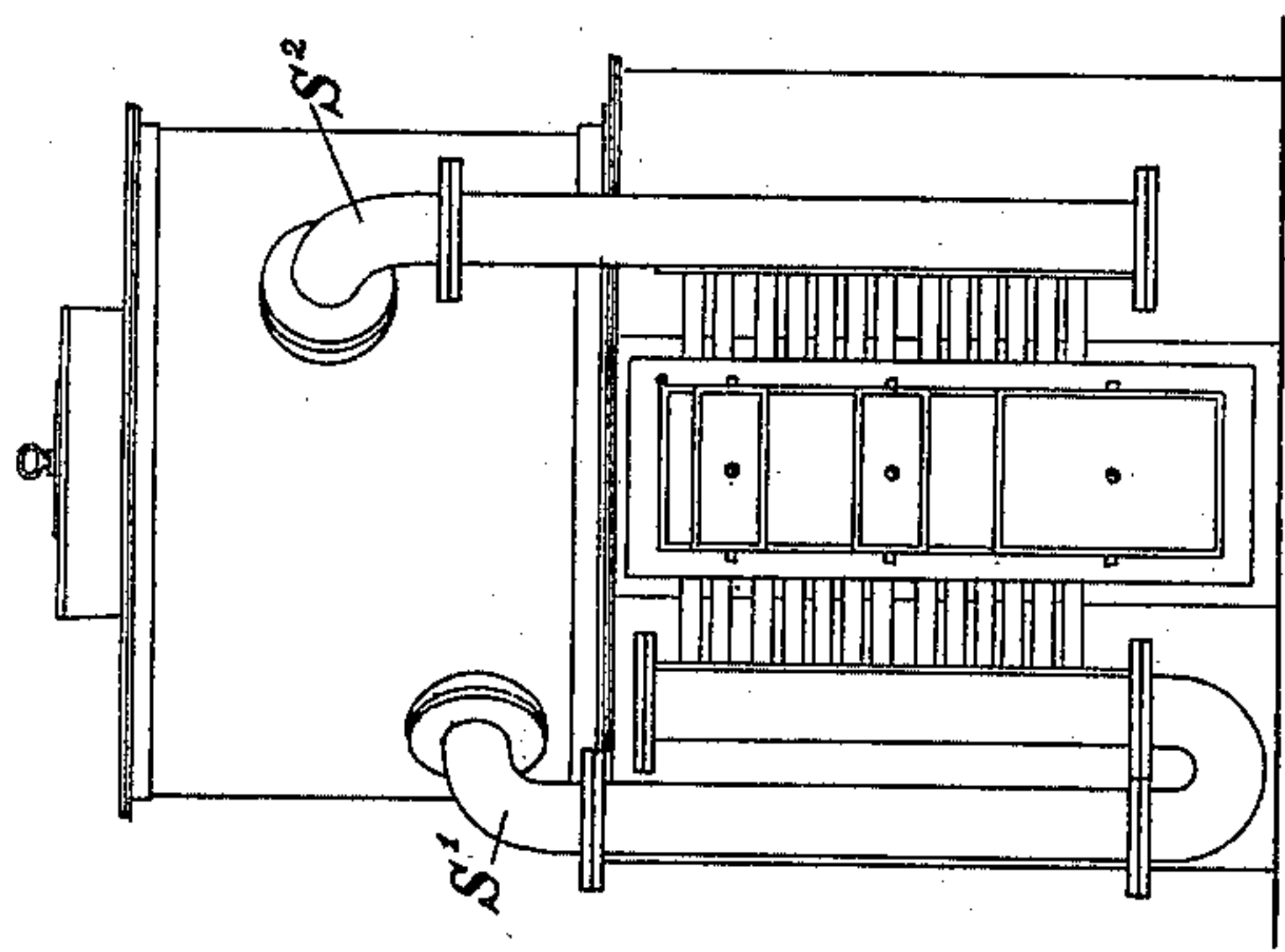


Fig. 1.



Witnesses.
Julius Lutz,
John Lotka

Inventor:
A. B. Reck
By *Munn & G.*
Attorneys.

No. 627,143.

Patented June 20, 1899.

A. B. RECK.
SMOKE CONSUMING FURNACE.

(Application filed May 4, 1898.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.

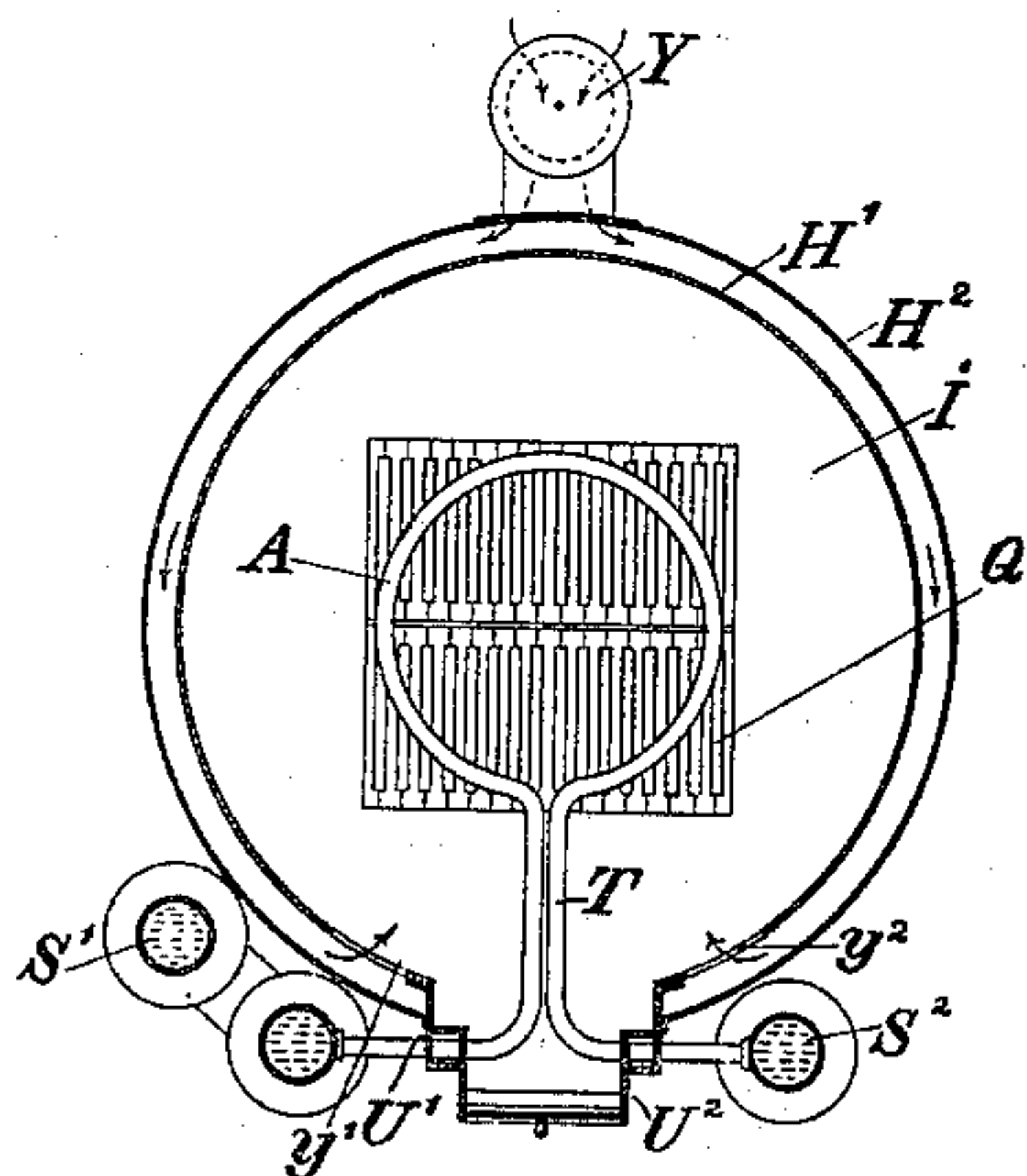


Fig. 5.

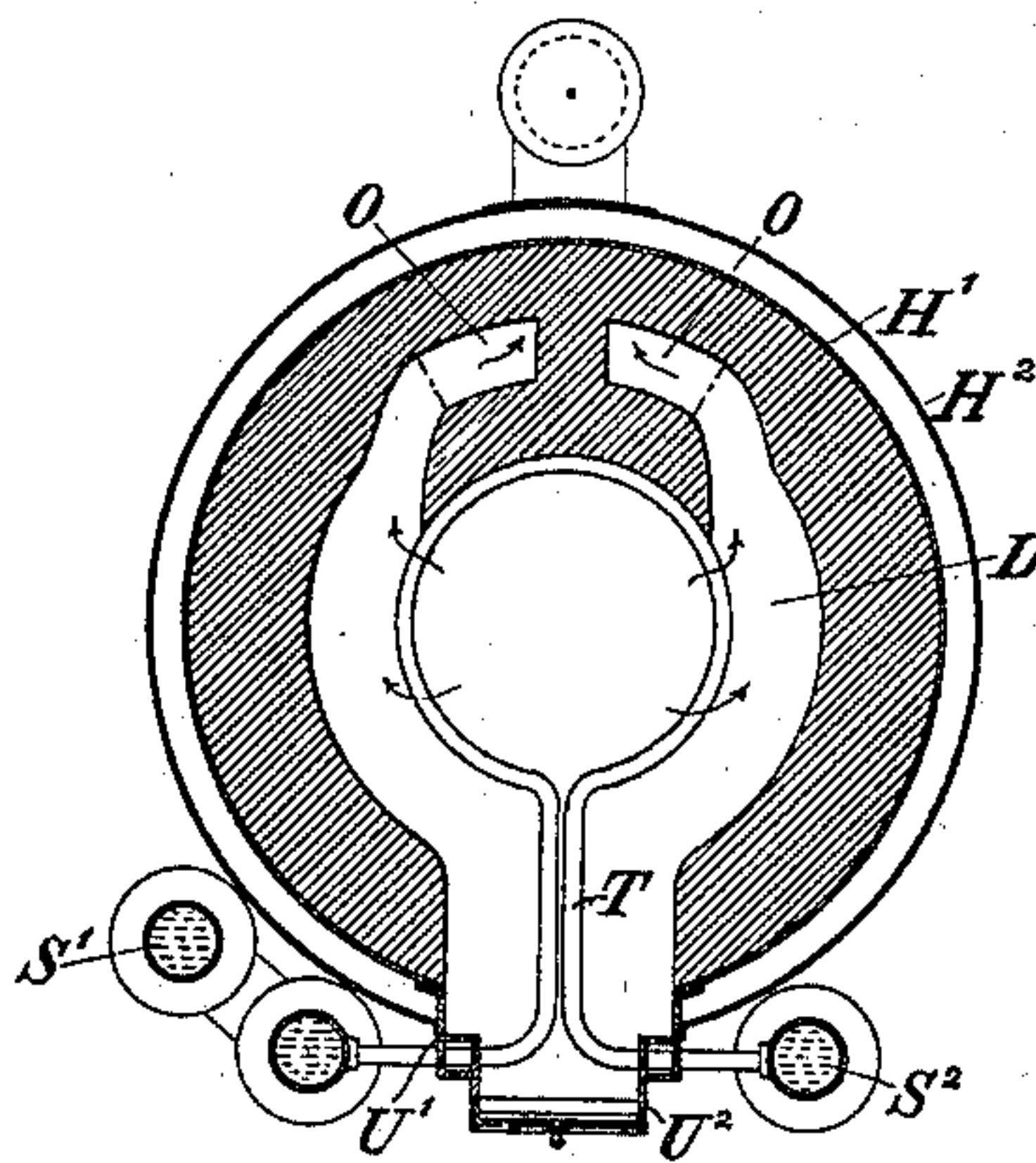


Fig. 6.

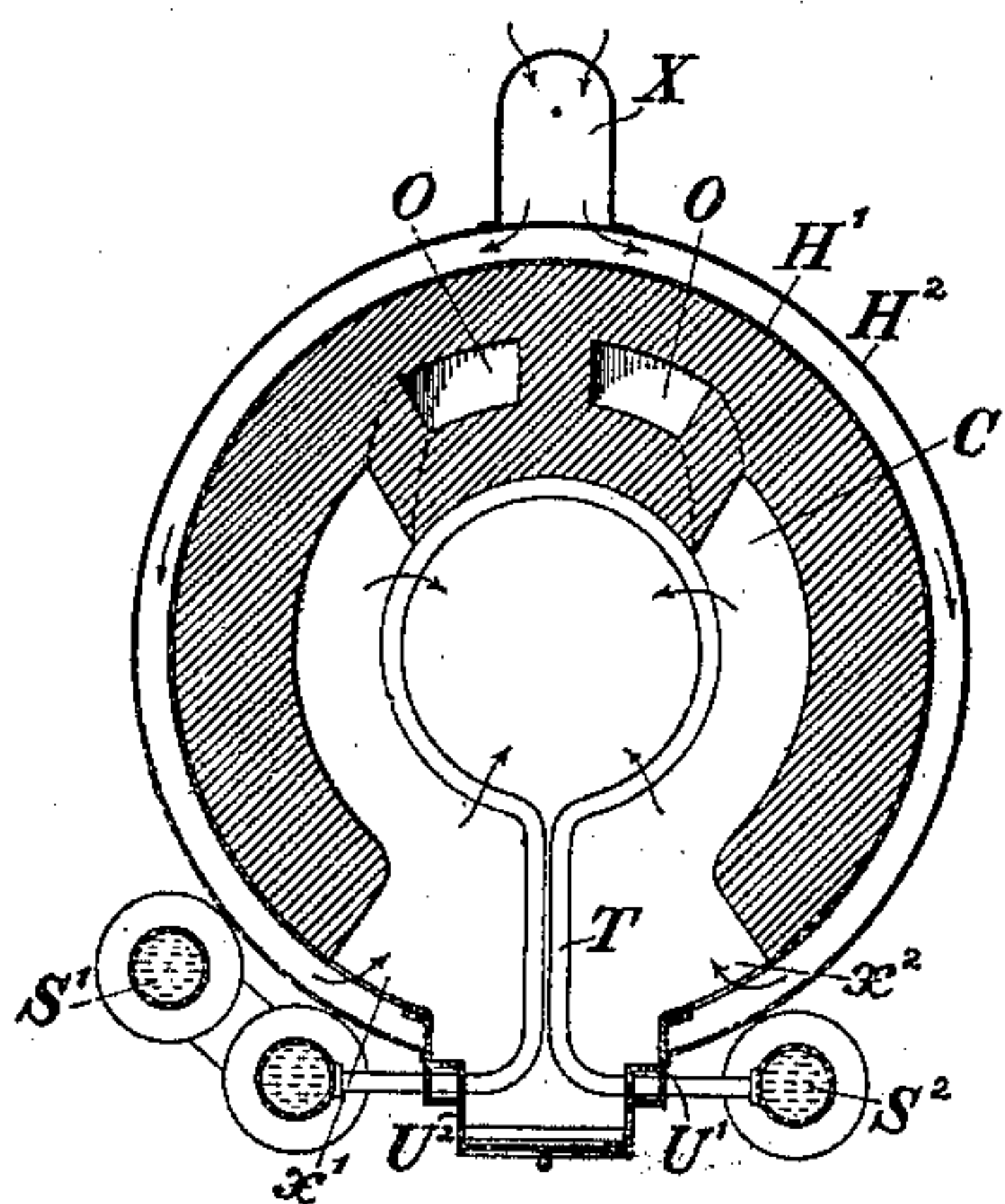
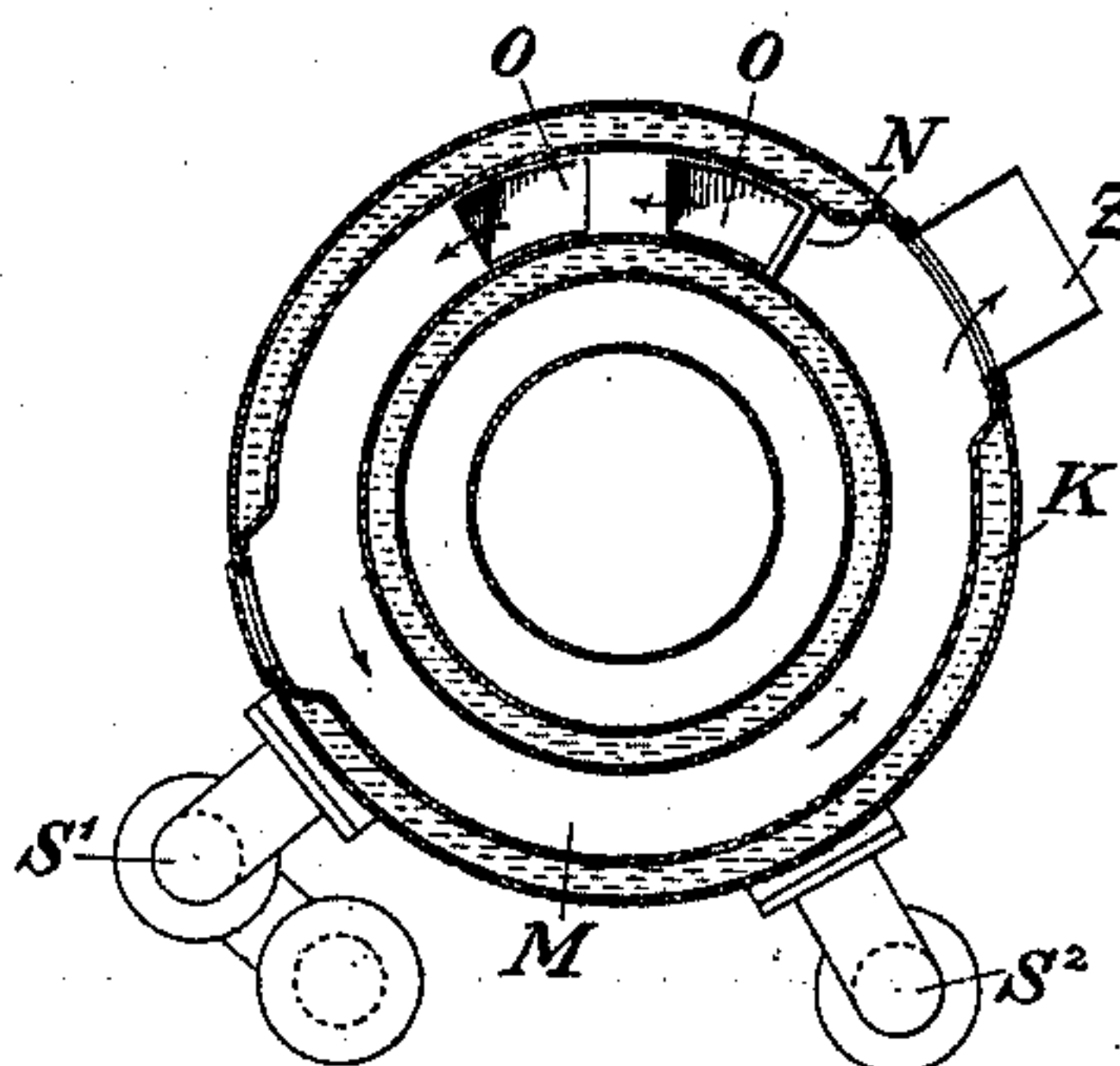


Fig. 7.



Witnesses
Julius Lutz
John Lott

Inventor.
A. B. Reck
By Munn & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

ANDERS BORCH RECK, OF COPENHAGEN, DENMARK.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 627,143, dated June 20, 1899.

Application filed May 14, 1898. Serial No. 680,735. (No model.)

To all whom it may concern:

Be it known that I, ANDERS BORCH RECK, of Copenhagen, Denmark, have invented new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a full, clear, and exact description.

My invention relates to smoke-consuming furnaces, and has for its object to provide a device of the above-indicated class which will be simple in construction and capable of utilizing soft coal.

The invention will be fully described hereinafter and the features of novelty pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improved furnace. Figs. 2 and 3 are sectional elevations thereof, taken at right angles to each other. Figs. 4, 5, 6, and 7 are sectional plans taken, respectively, on the lines I I, II II, III III, and IV IV of Fig. 2.

F is the cylindrical body of the furnace, having a bottom or base E and a top plate G.

I is the ash-pit, and Q the grate, upon which is adapted to rest the fuel in the magazine A B, which consists of a series of tubes T, with a funnel or hopper V above said tubes.

P is a fireproof wall or partition at the top of the ash-pit I and surrounds the lower part of the fuel-magazine V A B.

R' is a door opening into the ash-pit I, and R² R³ are doors opening into the channels C D, which surround the magazine, as shown in Figs. 5 and 6.

K is a boiler of annular shape resting on top of the body F and spaced from the hopper V. Within said boiler is located a shell forming a ring-shaped space M, which by means of the uptake-flues O communicates with the channel D. A tube S' connects with the boiler and extends first down to the bottom of the furnace and then up to the level of the uppermost tube T. One end of each tube T communicates with said tube S', Figs. 4, 5, and 6, and the other end connects with the tube S², reaching down from the upper part of the boiler. It will be understood that a circulation of water will be obtained from the boiler

through pipe S', tubes T, and pipe S² back to the boiler.

The furnace has concentric walls H' H², a frame or walls U', extending vertically at each side of the space, through which the tubes T pass into and out of the furnace-body, and a front plate U², in which the doors R' R² are provided. The space between the walls U' and plate U², so far as it is not occupied by the tubes T, is filled with fireproof putty or like material, so as to prevent the passage of air.

The jacket formed by the walls H' H² is divided into an upper and a lower chamber by the partition P, each of which chambers has a bent air-inlet tube, as at X and Y, said tubes being located at the rear of the furnace and being open at their upper ends. These ends are adapted to be closed by plates or valves *a* and *b*, respectively. The upper valve *a* is rigidly secured to a vertically-movable rod *c*, while the lower valve *b* is loose upon the rod, so that the latter can slide through the valve *b*. The rod *c* has a shoulder or knob *d* below the valve *b* and at such a distance from the valve *a* that when the valve *b* rests on said knob and the rod *c* moves downward the valve *b* will close the air-inlet tube Y before the valve *a* reaches its seat to close the air-inlet tube X. The rod *c* is connected by a chain *c'* to a lever *f*, fulcrumed at *g* to a pressure-regulator *h'*, comprising a casing *h²*, in which is a diaphragm *h*, connected with the lever *f*. The lower chamber of the casing *h²* communicates with the boiler K.

The path of the air will be seen best in Fig. 6. When the valve *a* is open, air will pass through the inlet-tube X into the upper compartment of the jacket H' H² and will travel around the furnace-body from rear to front until it reaches the channels *x' x²*, which lead to the segmental channel C, surrounding the magazine A B. From the channel C the air passes into said magazine through the spaces between the tubes T and thence downward (see Figs. 2 and 3) until it passes again, with the combustion-gases, between the tubes T to enter the channel D, Fig. 5, from which the air passes to the chamber M through the flues O. A vertical partition N, located in the chamber M, compels the air and combustion-

gases to travel around the chamber M in order to reach the smoke-flue Z, Fig. 7.

When the valve *b* is open, another current of air passes through the inlet-tube Y into the jacket H' H² and reaches the ash-pit I through the ports or channels *y'* *y*², Fig. 4. The air then passes through the fuel, reaching the same through the grate Q and through the spaces between the lowermost tubes T, and finally passes out into the channel D, flues O, chamber M, and smoke-flue Z, as above described. It will therefore be seen that when both valves *a* and *b* are open an upward current of air passes through that part of the fuel which is below the channel D and a downward current of air passes through that part of the fuel which is above the channel D. This particular direction of air-currents and their meeting in the fuel-magazine at the level of the channel D insure a very thorough combustion of the fuel.

When kindling the fire, the door R' is opened, (doors R² R³ are opened only for repairs or cleaning,) and when the blaze reaches the upper edge of channel D the door R' is closed, the air to support combustion being then supplied exclusively through the tubes X and Y.

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

1. In a furnace, a fuel-chamber whose walls are composed of superposed bars surrounding a central space and spaced from each other, in combination with a body surrounding said fuel-chamber in proximity to said bars, the body having air inlet and outlet channels immediately adjacent to said bars, so that said channels communicate with the central space of the fuel-chamber through the spaces between the bars thereof.

2. The combination of the fuel-chamber having apertured walls, an air-inlet channel leading to the upper part of said apertured walls, another air-inlet leading to the bottom of the apertured walls, and an air-outlet channel extending around the fuel-chamber at a level between said air-inlet channels, whereby air will pass upwardly and downwardly from the ends of the apertured walls through the fuel to the central part of the fuel-chamber.

3. The combination of the annular boiler,

the fuel-chamber located axially relatively to the boiler and extending below the same, the annular smoke-chamber projecting into the boiler and spaced both from the inner and from the outer wall of said boiler so that there is a water-space both on the inside and on the outside of the smoke-chamber, a smoke-flue leading from said smoke-chamber, a channel connecting the fuel-chamber with the smoke-chamber, and means for supplying air to the smoke-chamber.

4. The combination with the furnace-body having a jacket and a partition dividing said jacket into an upper and a lower chamber, of a fuel-chamber within the furnace-body, inlet-channels leading inward from each of the chambers of the jacket to the fuel-chamber, and an outlet-channel leading from the fuel-chamber between said inlet-channels.

5. The combination, in a furnace, of a fuel-chamber, air-inlet channels leading respectively to the upper and the lower part of said chamber, and connected valves arranged to close said channels, the valve for the lower air-inlet channel being capable of a limited movement relatively to the other valve.

6. In a furnace, a fuel-chamber located within the furnace-body, the walls of said chamber being composed of tubes whose central portions surround the chamber, while their end portions extend outwardly through the furnace-body, a frame secured to the furnace-body at each side of the space through which the end portions of the tubes pass out, and a plate for closing the outer side of said space.

7. The combination of a boiler, a furnace comprising a body, a fuel-chamber located therein, the walls of said chamber being composed of tubes whose central portions surround the chamber, while their end portions extend outwardly through the furnace-body, a frame secured to the furnace-body at each side of the space through which the end portions of the tubes pass out, a plate for closing the outer side of said space, and circulation-pipes connected with the boiler and with the ends of said tubes.

ANDERS BORCH RECK.

Witnesses:

JULES BLOM,
CHARLES HUDE.