

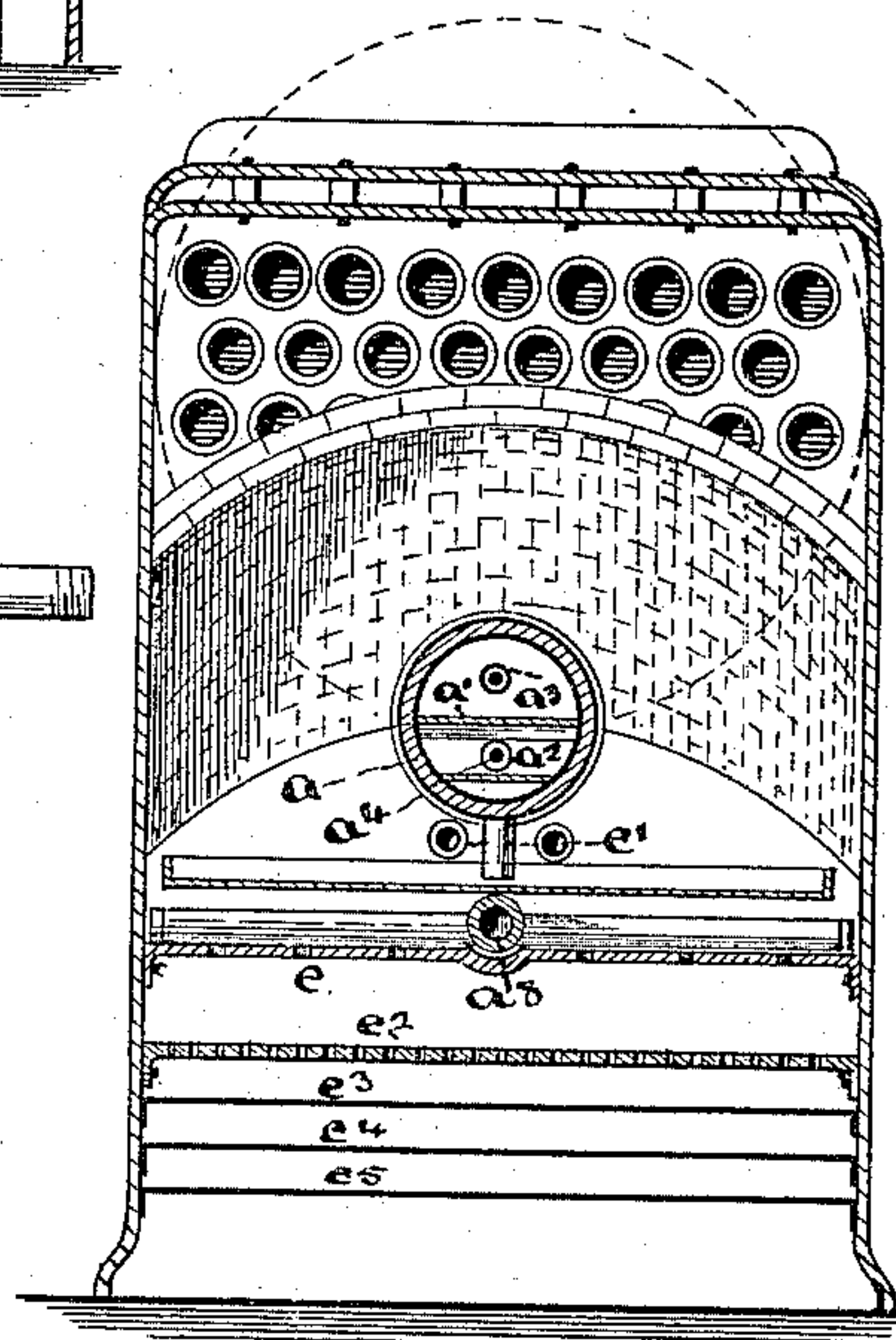
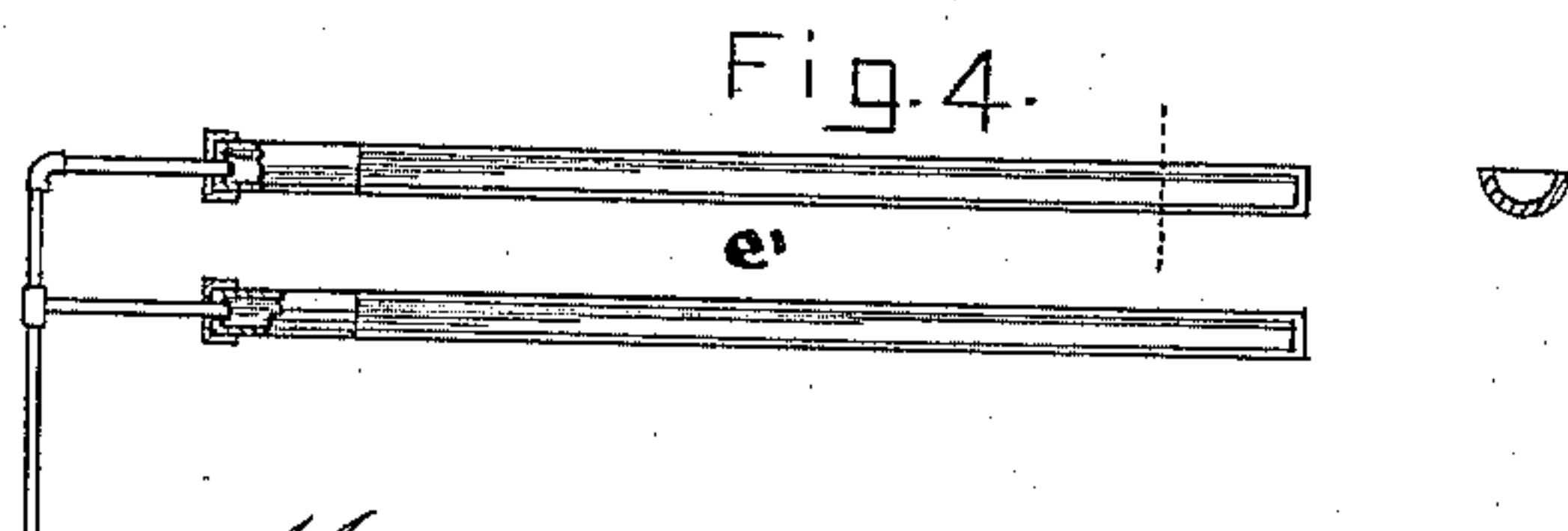
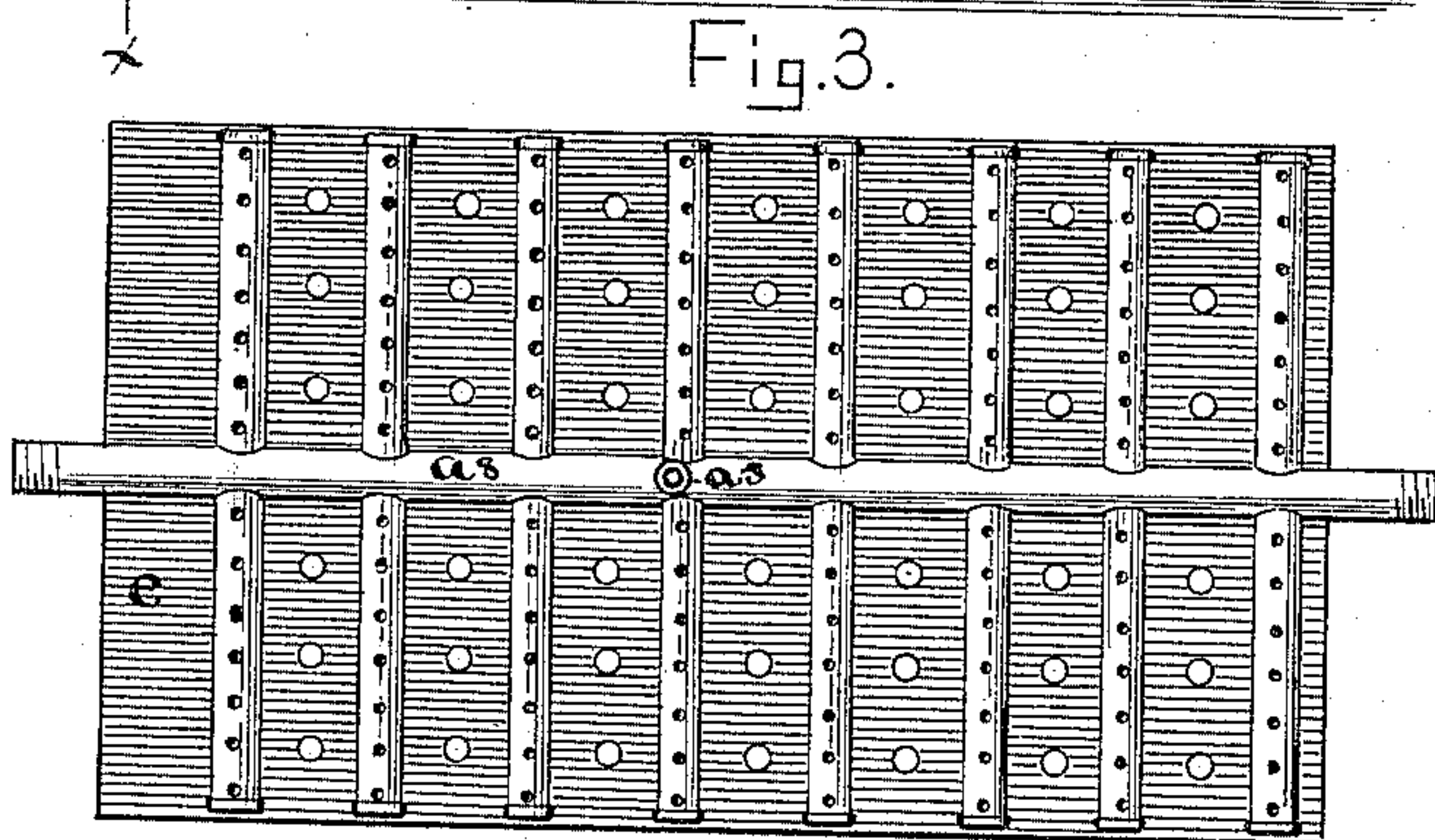
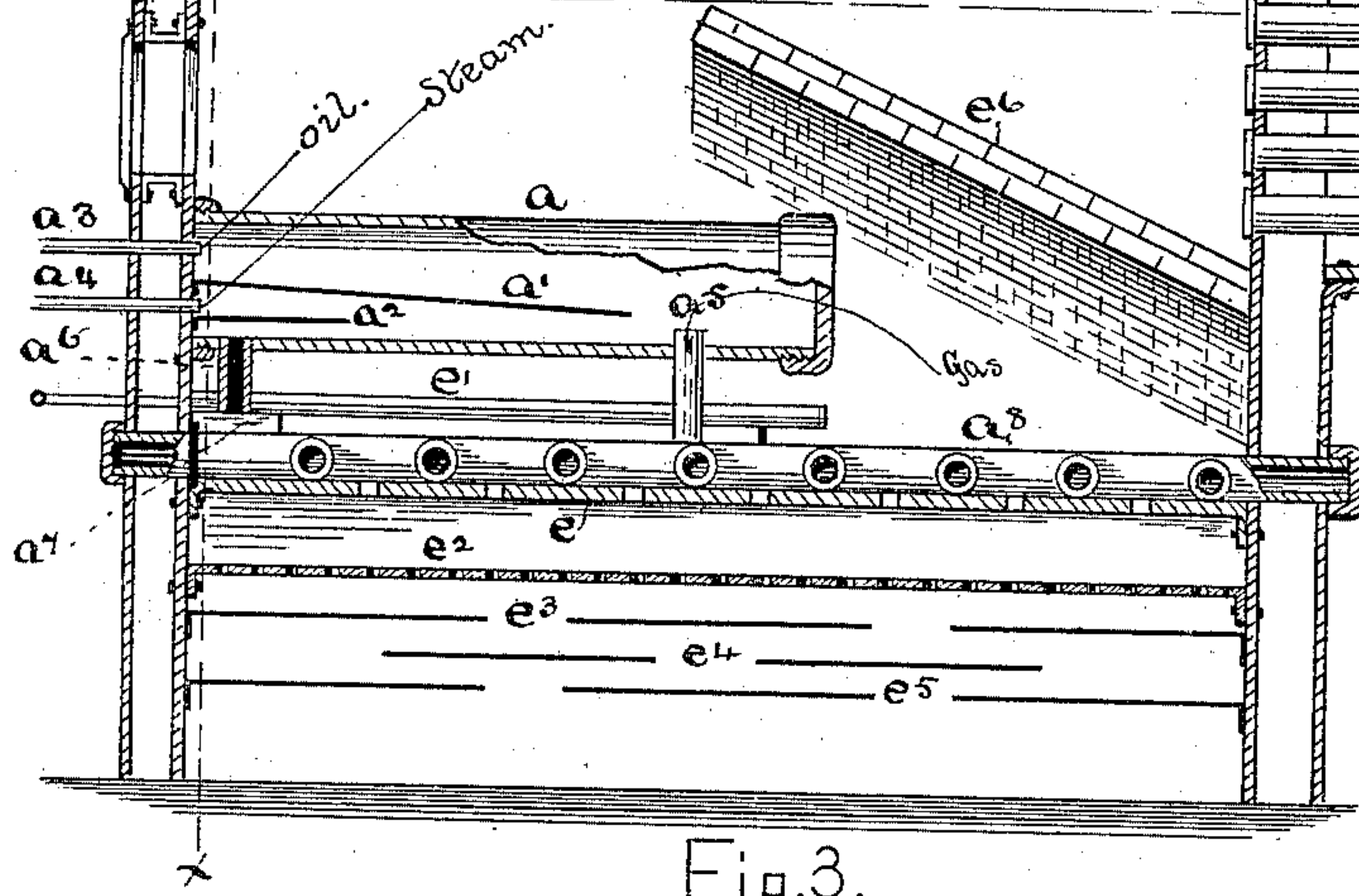
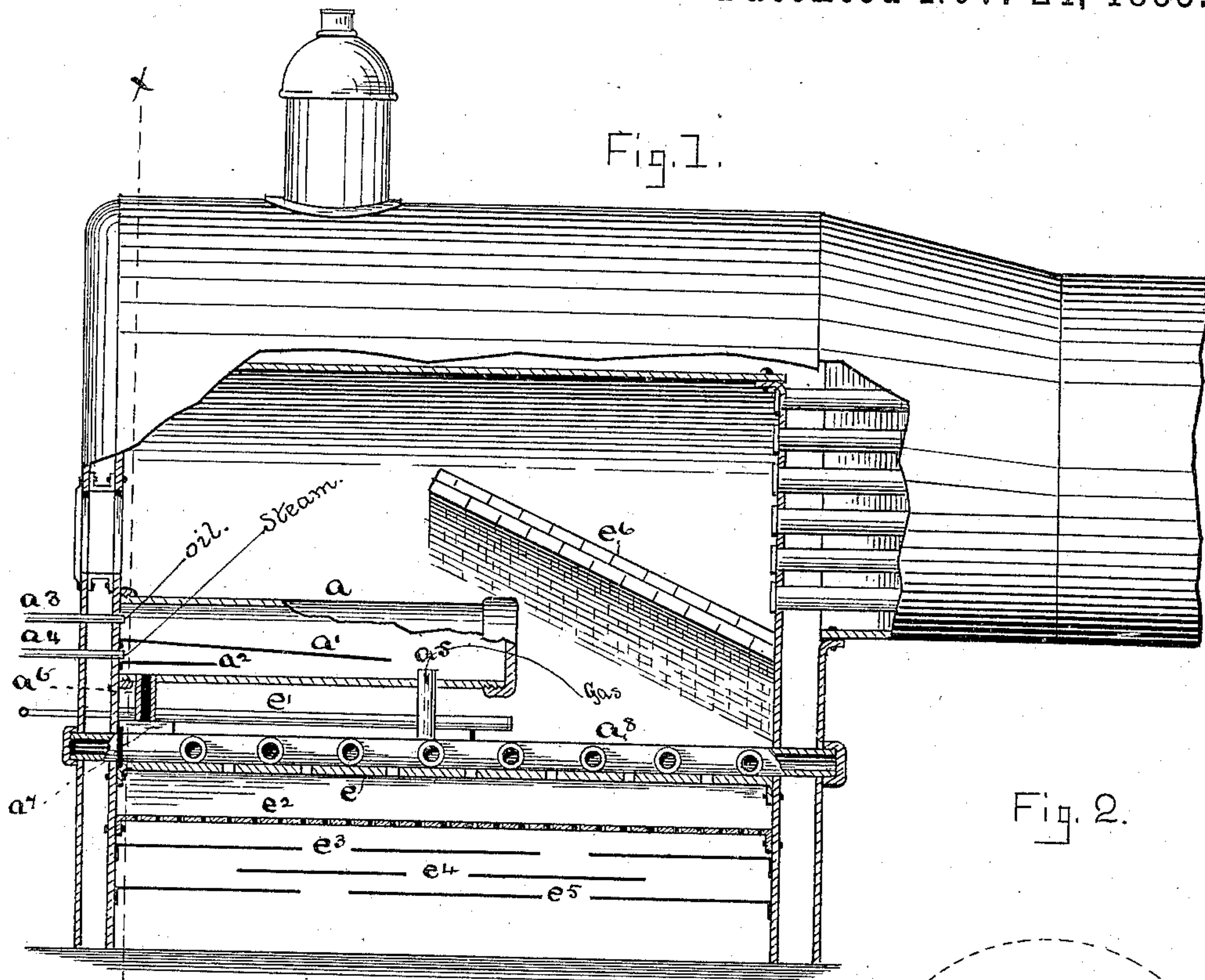
(No Model.)

C. HOLLAND, Jr.

APPARATUS FOR FIRING FURNACES.

No. 331,197.

Patented Nov. 24, 1885.



Witnesses:
Chas. Houghton
F. L. Houghton

Inventor:
Chas. Holland Jr.

UNITED STATES PATENT OFFICE.

CHARLES HOLLAND, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO
FREDERICK L. HOUGHTON, TRUSTEE, OF SAME PLACE.

APPARATUS FOR FIRING FURNACES.

SPECIFICATION forming part of Letters Patent No. 331,197, dated November 24, 1885.

Application filed February 16, 1885. Serial No. 156,128. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HOLLAND, Jr., of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful Improvement in Apparatus for Firing Furnaces, of which the following is a specification.

My invention relates to the production and combustion of gas-fuel in the furnace to be fired; and it consists in the devices hereinafter described.

In the drawings annexed, Figure 1 shows a vertical longitudinal sectional view in the furnace of a locomotive-boiler provided with my devices for producing gas in it and there burning the gas as fuel for firing the furnace. Fig. 2 shows a vertical transverse sectional view of the same on the line x in Fig. 1. Fig. 3 shows a top plan of the device for distributing the gas-fuel uniformly over the whole floor of the furnace for combustion. This consists of a longitudinal gas-conductor having a series of horizontal hollow arms on both sides of it extending over nearly the whole floor of the furnace and resting upon the floor, which is perforated for the passage of air to sustain and promote combustion. Fig. 4 shows a view of the kindling device detached.

It will only be necessary to mark by letter and describe the parts of the drawings which relate to or show my improved devices.

a is a retort in which the gas is generated. It is a piece of iron or steel tube, about three to five feet long and six to ten inches in diameter, placed horizontally in the front part of the furnace and extending toward the back part of it. The ends of it are closed. Into this retort I introduce petroleum, crude or otherwise, and superheated steam at the same time, and by heat produced by combustion of the gas generated in it burned below it a fixed gas is generated, which as it is burned develops a large amount of free caloric.

a' is a shelf or diaphragm within the retort a , extending across its entire diameter, and affixed to its inner sides and along about two-thirds of its length. Upon the upper side of this shelf the petroleum to be used is forced

from outside of the furnace through a pipe which is marked a^3 .

a^2 is another diaphragm in the retort a , located below the diaphragm a' and extending across the arc of the lower half of the retort a and along it about one-third of its length. Just over this diaphragm a pipe enters the retort, which conducts the steam used within it, which is marked a^4 .

a^5 is the pipe which conducts the gas generated in the retort to and into the gas-distributing device below the retort. The upper end of this pipe is made to extend within the shell of the retort a an inch or more, so that fluid or semi-fluid residuum in the bottom of the retort cannot enter it and flow to the gas-distributing device below.

a^6 is a pipe arranged to admit the flow of the fluid or semi-fluid residuum in the bottom of the retort a into a pan placed below to receive and hold it until it is consumed.

a^7 is a pan into which through the pipe a^6 the semi-fluid residuum from the retort a flows, and in which it is wholly consumed by heat.

a^8 is the gas-distributing device. It consists of a central longitudinal pipe, extending from outside the front wall of the furnace along the floor of it to and through the walls at the back part of it, fitted with a removable screw-cap at both ends, and having a number of hollow horizontal arms extending from both sides of it to the sides of the furnace, the whole resting upon the floor of the furnace, and the horizontal arms perforated on the upper side with many fine holes, through which the gas generated in the retort a passes to combustion.

e is a perforated metallic floor extending entirely along and across the lower part of the furnace, upon which the gas-distributing device a^8 is supported, and through the perforations of which air passes to maintain combustion of the gas burned above it.

e' is what might properly be called a "kindling" device, for starting the generation of gas in the retort a . It consists of two tubes or troughs, located just under and a little on either side of the middle line of the retort a and extending through the end wall of the

furnace, so that they may be supplied with oil or other suitable inflammable fluid, which being ignited soon produces sufficient heat to generate gas in the retort, when the supply-pipes for this device are closed, and no further kindling will be required, unless the fire is extinguished and the retort allowed to cool.

e^2 is another perforated metallic floor, placed a little way below the floor e , and similarly constructed, but provided with more openings for the passage of air.

e^3 , e^4 , and e^5 are deflecting-plates, extending entirely along and across the length and breadth of the furnace below the perforated floor e^2 , with large openings through them for the passage of air, the openings in one plate being opposite to the plate of the next, the object of them being to break the direct flow of air upward toward the fire.

e^6 is a deflecting-arch in the rear part of the combustion-chamber, made of brick, to throw the heat up against the crown-shell, but is not a part of my invention.

To practice my invention, I construct the devices described in a boiler or other furnace and provide a reservoir of petroleum conveniently located with pumping devices, by which the amount of oil required will be injected into the retort a through the pipe a^3 . Steam superheated is admitted to the retort through the pipe a^4 . When the retort is

heated to a degree which will convert the petroleum and steam into a fixed gas, the gas passes through the pipe a^5 into the distributing-pipes a^8 , from whence it issues through the openings provided for that purpose, and is burned, heating the retort and continuing the production of gas and heating the furnace. The semi-fluid residuum from the petroleum flows along the bottom of the retort to the pipe a^6 into the pan below, where it is consumed by the heat of the burning gas, so that nothing remains but a small quantity of dry ashes, which may be from time to time removed.

I claim as new and my invention—

The above-described apparatus for firing furnaces with a fixed gas-fuel generated from the vapor of petroleum and steam in the combustion-chamber of the furnace where it is burned, consisting of the retort a , having within it the diaphragms a^1 a^2 , the induction-pipes a^3 a^4 , the eduction-pipes a^5 a^6 , the gas-distributing device a^8 , the perforated floors e e^2 , the deflecting-plates e^3 e^4 e^5 , and the kindling device e^6 , all substantially as described, for the purposes specified.

CHAS. HOLLAND, JR.

Witnesses:

CHS. HOUGHTON,
F. L. HOUGHTON.