

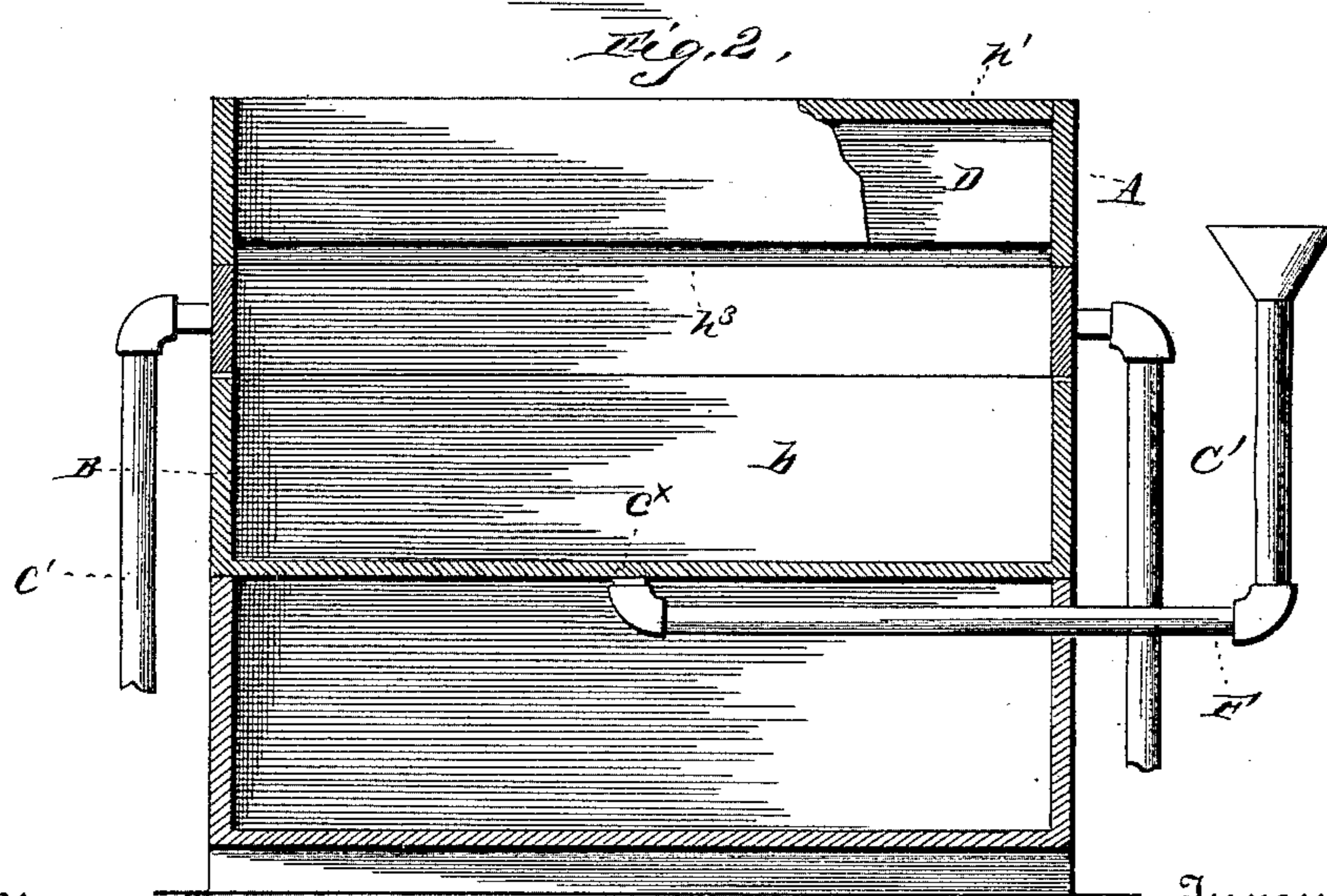
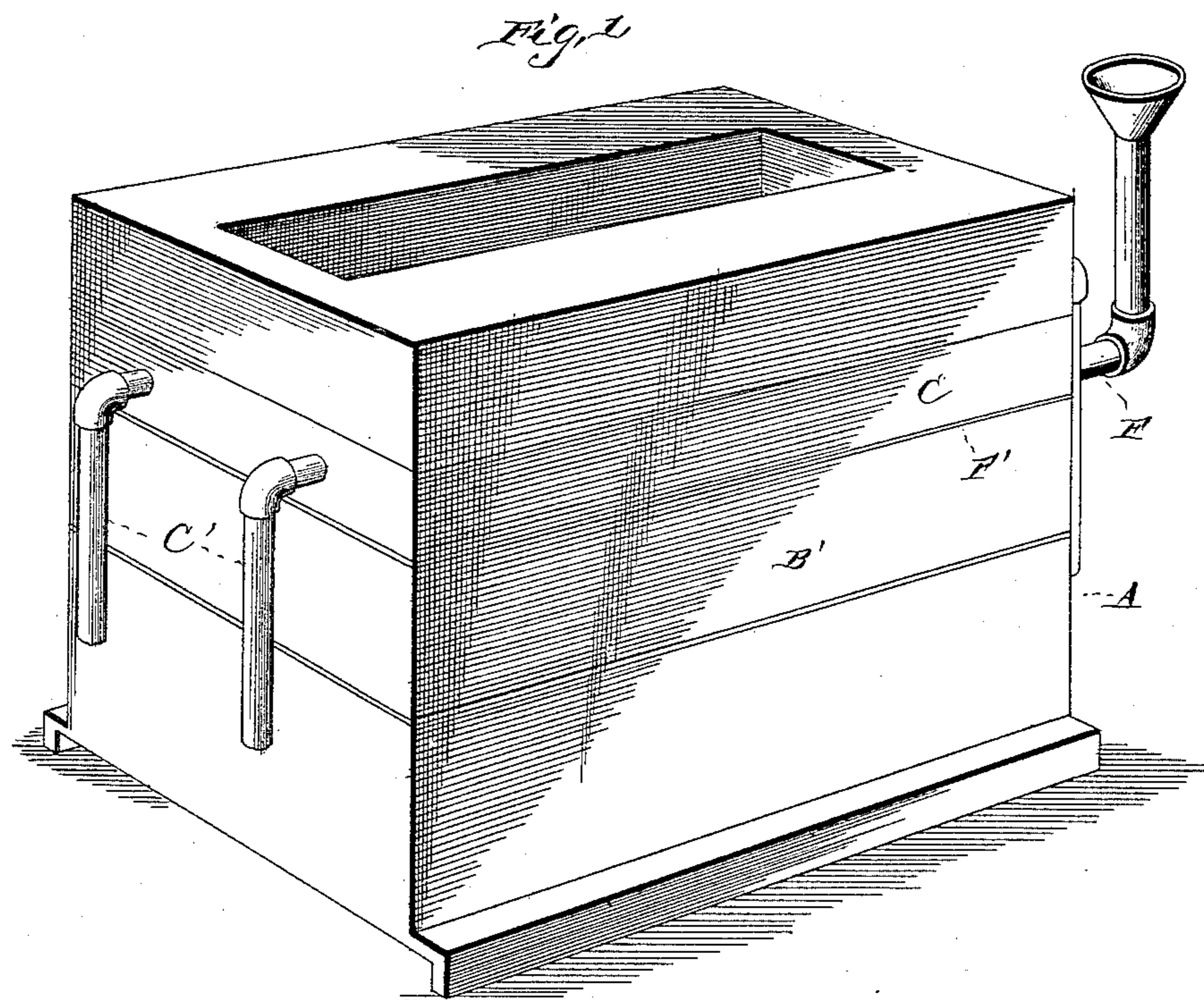
(No Model.)

3 Sheets—Sheet 1.

R. P. AMBLER.
HYDROCARBON OIL BURNER

No. 442,163.

Patented Dec. 9, 1890.



Witnesses

Chas. L Taylor,
Philemasi.

Inventor

Russell P. Ambler

By his Attorney

E. W. Anderson.

(No Model.)

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Fig. 3,

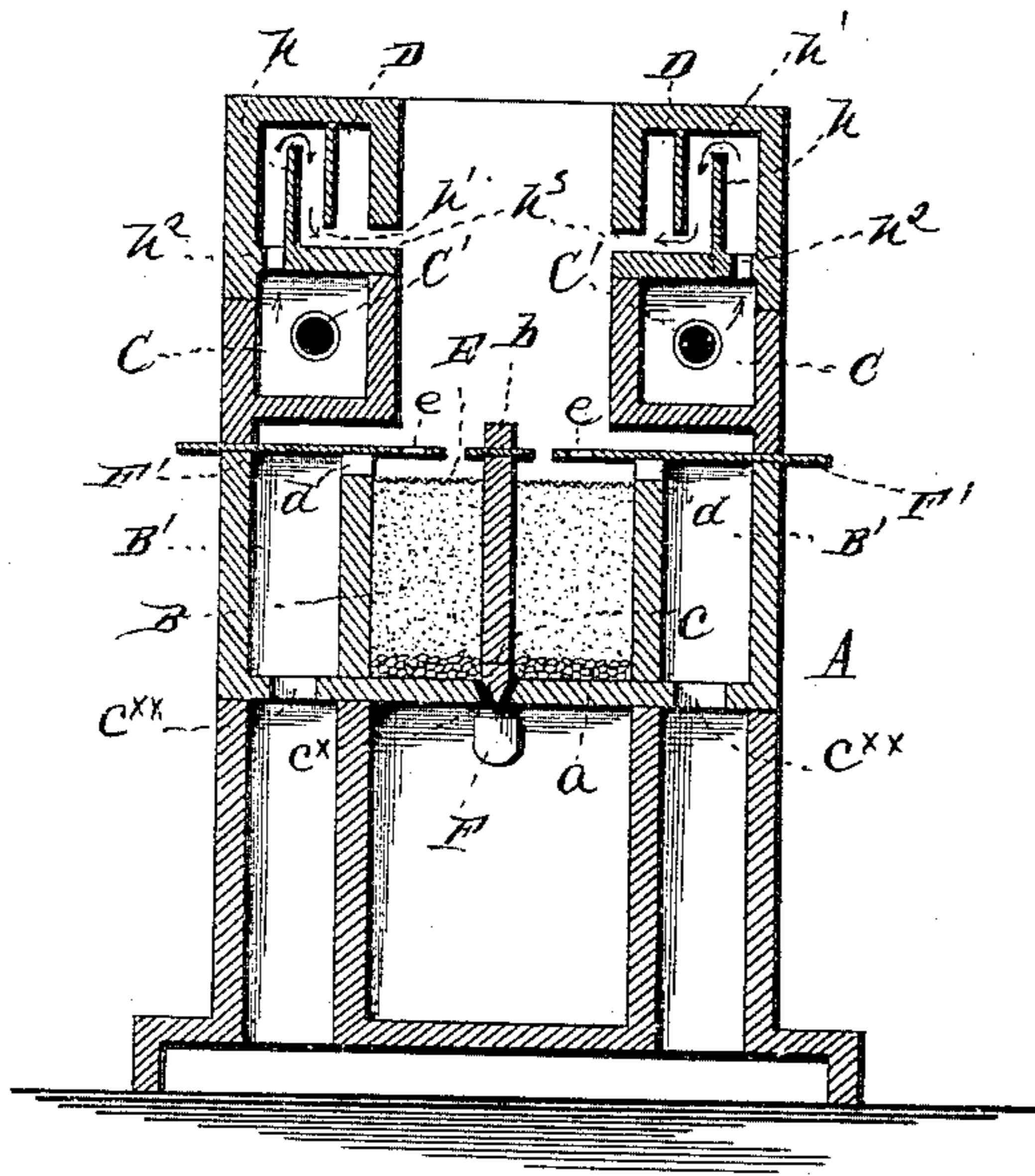
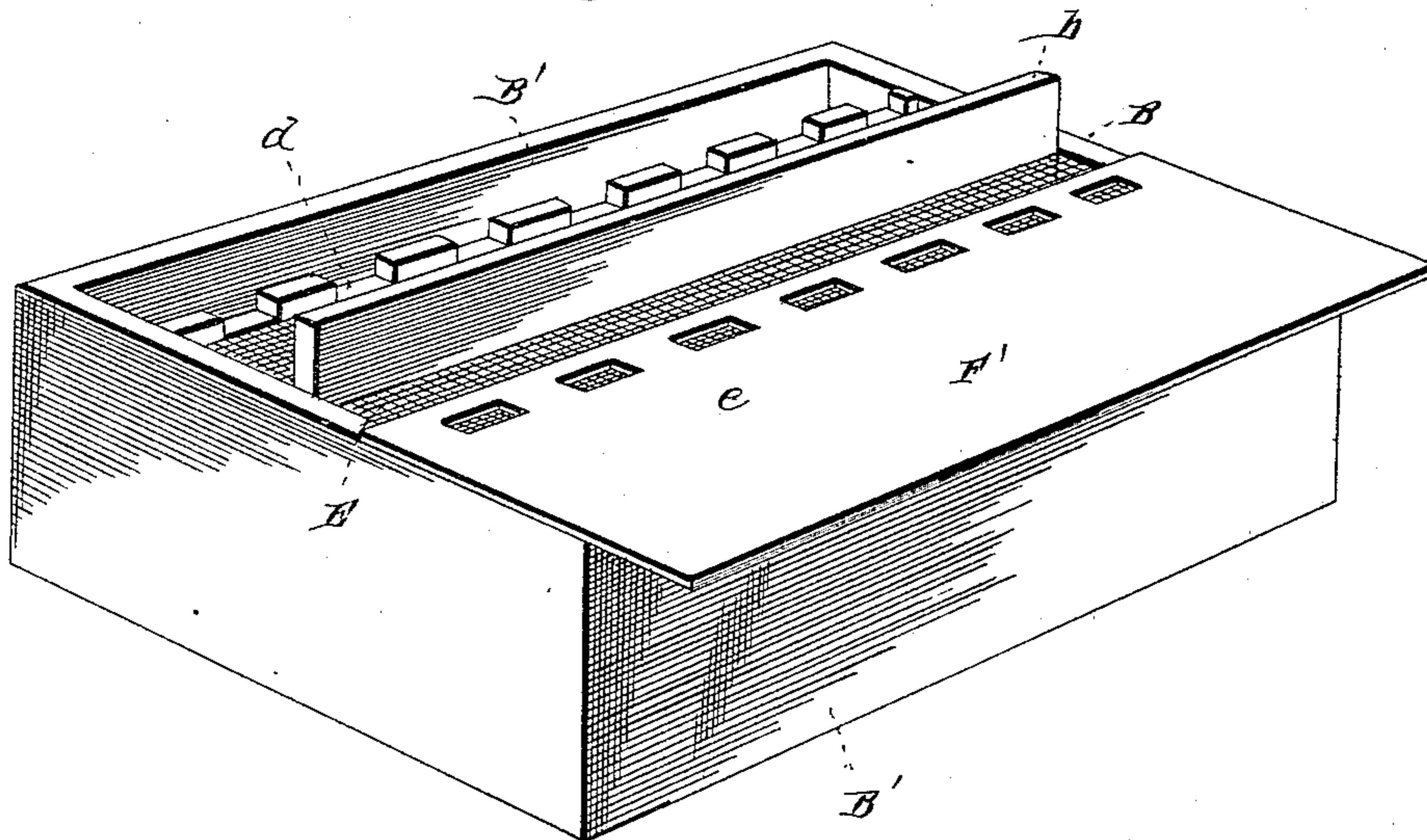


Fig. 4,



Witnesses
Chas. L. Taylor,
Phil. Massi.

Inventor
Russell P. Ambler

By his Attorney

E. W. Anderson

(No Model.)

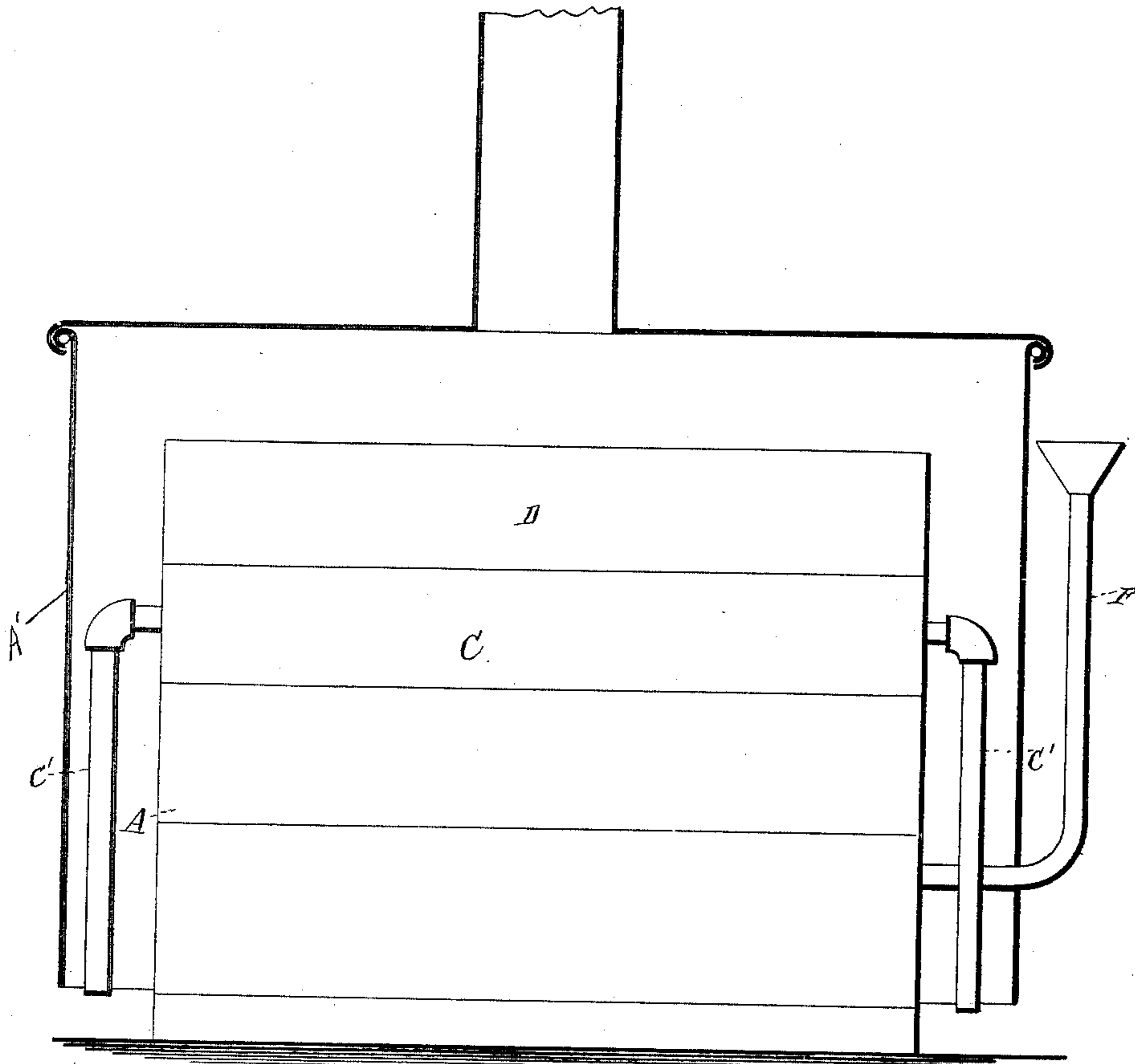
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Fig. 5.



WITNESSES

Chas. K. Taylor
Phil. C. Masi

INVENTOR

R. P. Ambler
by E. W. Anderson.
Attorney

UNITED STATES PATENT OFFICE.

RUSSELL PERKINS AMBLER, OF DE FUNIAK SPRINGS, FLORIDA.

HYDROCARBON-OIL BURNER.

SPECIFICATION forming part of Letters Patent No. 442,163, dated December 9, 1890.

Application filed January 18, 1890. Serial No. 337,302. (No model.)

To all whom it may concern:

Be it known that I, RUSSELL PERKINS AMBLER, a citizen of the United States, and a resident of De Funiak Springs, in the county of Walton and State of Florida, have invented certain new and useful Improvements in Hydrocarbon-Oil Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a perspective view. Fig. 2 is a vertical longitudinal section. Fig. 3 is a cross-section. Fig. 4 is a perspective in detail of chambers B and B' B'. Fig. 5 is a view showing my invention as applied for use.

The object of this invention is to produce a fuel of a purely gaseous character which shall be derived from the divided or atomized vapor of kerosene-oil mixed in such proportions with the oxygen of air as to produce perfect combustion.

In the use of kerosene-oil as fuel practical difficulties have arisen on account of its tendency to emit smoke, due to the large quantity of carbon present. To a certain extent this tendency has been counteracted by feeding the oil to the flame through wicking, the air being fed thereto by means of a suitable chimney; but in all devices of this character the flame is restricted within certain limits; otherwise smoke is a result. Such difficulties must always be experienced whenever oil, or even the vapor of oil, is consumed in a body, since in such a condition it cannot, if used in any considerable quantity, combine with a sufficient proportion of oxygen to make combustion perfect. I have therefore adopted the method of minutely dividing the oil-vapor and passing it up through small interstices, and then of so introducing the air to it in this finely-divided state that its minutest parts are surrounded and permeated with the oxygen which readily combines with it.

To carry out the aforesaid objects I employ the apparatus consisting of the novel combination and construction of parts, as will ap-

pear from the following description and accompanying illustrations.

In the embodiment of my invention I employ a closure or receptacle A, arranged as shown in connection with the stove A', containing a lower central chamber B, two air-heating chambers C C, arranged above and one at each side of the chamber B, and two air-superheating chambers D D, said chambers C having connected to them air-inlet pipes C'.

In the chamber B, resting upon its bottom, is placed a quantity of animal charcoal *a*, about half an inch in depth, to spread and evenly distribute the oil. Upon the animal charcoal *a* is placed a mixture of fine salt and sand, which is used on account of its great heat-transmitting quality.

Over and secured to the top edge of the chamber B is arranged a wire gauze or screen E to prevent the flame reaching the oil in said chamber, and to divide up the oil-vapor into minute parts and to effect the thorough admixture of the air with the vapor.

Arranged centrally and longitudinally in the chamber B is a vertical metal partition or plate *b*, which is adapted, as hereinafter described, to radiate the heat through and heat the salt and sand compound to enable it to rapidly vaporize the oil, passing, as presently seen, through said mixture, continuously sustaining the flame.

F is the kerosene-feeding pipe, having a bowl or mouth on its outer end to receive and permit the ready feeding of the kerosene therein, while its inner end enters and is capped in the bottom of the chamber B, as at *c*^x, two upward and outwardly deflected passages *c* being formed in said cap and leading from the inner end of said pipe to feed the kerosene into said chamber and up through the charcoal and salt and sand compound or filling.

At the sides of the chamber B are air-chambers B' B', up through apertures *c*^{xx}, in the bottoms of which the air is admitted.

In the upper edges of the dividing-walls between the vaporizer-chamber B and air-chambers B' B' are provided, at short intervals apart, series of recesses forming air-passages *d*, through which the air from below passes above the chamber B on its way into the central flame-chamber.

F' F' are movable plates or slides which are arranged to slide over the air-passages d and abut against the plate b and project through openings in the sides of the closure or receptacle A, their outer longitudinal edges serving to permit the ready or convenient manipulation thereof. These plates or slides have in each of them a series of oblong or rectangular openings e , through which the gas or vapor, with the commingled air, issue into flame, perfect combustion resulting at these points. The plates F' are movable, to permit uncovering the air-passages d , as found desirable and necessary when starting the operation of the apparatus and until it has become somewhat heated, after which they are closed, the flame then issuing from the aperture e .

The superheaters d are each provided with in their chambers with a series of closely-disposed plates h , having at alternately opposite ends air-passages h' , to give the air admitted thereto through passages h^2 in their bottoms from the chambers C a circuitous passage therethrough, to thoroughly heat the air, which is finally discharged through passages h^3 in the bottoms of the superheaters into the flame, as will appear from Figs. 2 and 3. The air, having thus, as intimated, been thoroughly heated, is in condition to readily combine with the carbonaceous elements of the flame, thus promoting combustion and intensifying the heat.

The mode of operation is as follows: A small portion of gasoline mixed with an equal quantity of kerosene is poured into the upper cup-shaped end of the pipe F until the filling of the said chamber becomes saturated. A lighted match is applied at the screen E, and ignition of the fluid takes place, and in a few minutes the flame, acting on the central plate or radiator b , communicates its heat to the surrounding mixture of salt and sand, thus converting the contained oil or fluid into vapor, and so preparing fuel for the flame. Meanwhile ordinary kerosene-oil, preferably of the grade known as "110 test," is conveyed in drops from a tank conveniently placed through the pipe F, and lifted by hydrostatic pressure through the subdividing and heat-radiating material in the form of the sand and salt in the chamber B. Here it is vaporized by the heat already produced, and the vapor passes upward through the screen E, and at this point, being supplied with a suitable proportion of air from the air-conduits d , it appears in the form of a clear gas-flame without smoke or smut. Sustaining itself by the means already described, the flame now becomes continuous and is regulated by the quantity of oil supplied, being less or greater according to the frequency with which the oil is allowed to drop into the bowl or cup at the outer end of the pipe F. The air received into the air-heating chamber C passes upward through the passage h^2

and enters the superheater above, and after passing through the several compartments thereof is finally discharged slowly and uniformly through the passages h^3 into the flame, the supply of air being regulated by the flame itself, an increase in the latter having the effect of drawing more air, and vice versa, by this process air, or more properly the oxygen contained in it, becoming an important part of the fuel by which the flame is sustained and by which heat is generated.

The advantages of this invention are that, owing to the large admixture of air with the oil-vapor, a great heating capacity is developed with a comparatively small expenditure of oil; that the flame produced, being without smoke, can be used for purposes and under conditions to which ordinary fuel would be inapplicable; that because the operation of the apparatus is largely automatic in character, it is convenient to use and easy to manage, requiring but little attention, and that in practice it is entirely and absolutely safe, the gases which feed the flame having a free outlet and being consumed as rapidly as they are generated.

Having described my invention, what I claim is—

1. In an oil-burner, the combination, with the chamber having a filling of mixed material, of the central division-plate or radiator arranged in said chamber, the bottom plate of said chamber having a passage divided into channels by the bottom tapered edge of said division-plate, substantially as and for the purpose set forth.

2. In an oil-burner, the combination, with the closure or receptacle having the central oil-chamber and lateral air-chambers, the upper edge portions of which are provided with series of air-passages, the central division-plate or radiator in said chamber, and the slides or plates extending through the sides of said receptacle and arranged over said air-passages, and each having a series of flame-passages and engaging at its inner edge said division-plate or radiator, substantially as set forth.

3. In an oil-burner, the combination, with the casing or closure having a central heating or oil chamber and lateral air-chamber above said oil-chamber, hot-air chambers arranged at the sides of said flame-chamber and having air-inlets and superheating air-chambers communicating with said hot-air chambers and with said central flame-chamber, said superheating air-chambers having tortuously-arranged partitions between their inlet and discharge openings, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

RUSSELL PERKINS AMBLER.

Witnesses:

HENRY DEITZ,

JOSEPH N. STEPHENS.