

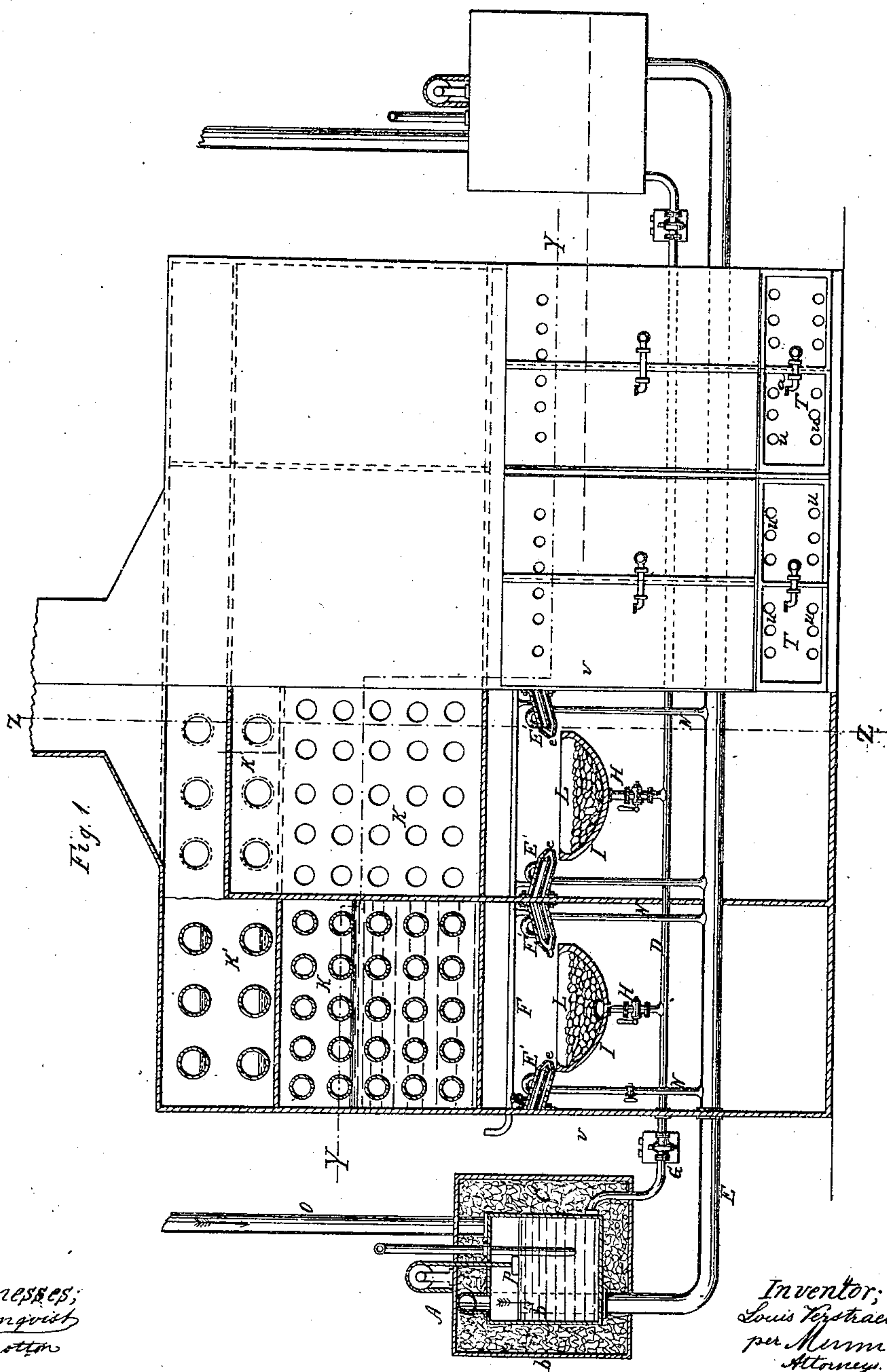
L. Verstraet,

2 Sheets, Sheet 1.

Burning Hydrocarbon.

N^o 84,234.

Patented Nov. 17, 1868.



Witnesses;
A. W. H. M. G. v. S.
G. L. G. v. S.

Inventor;
Louis Verstraet
per H. M. G. v. S.
Attorney.

L. Verstraet,

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Fig. 2.

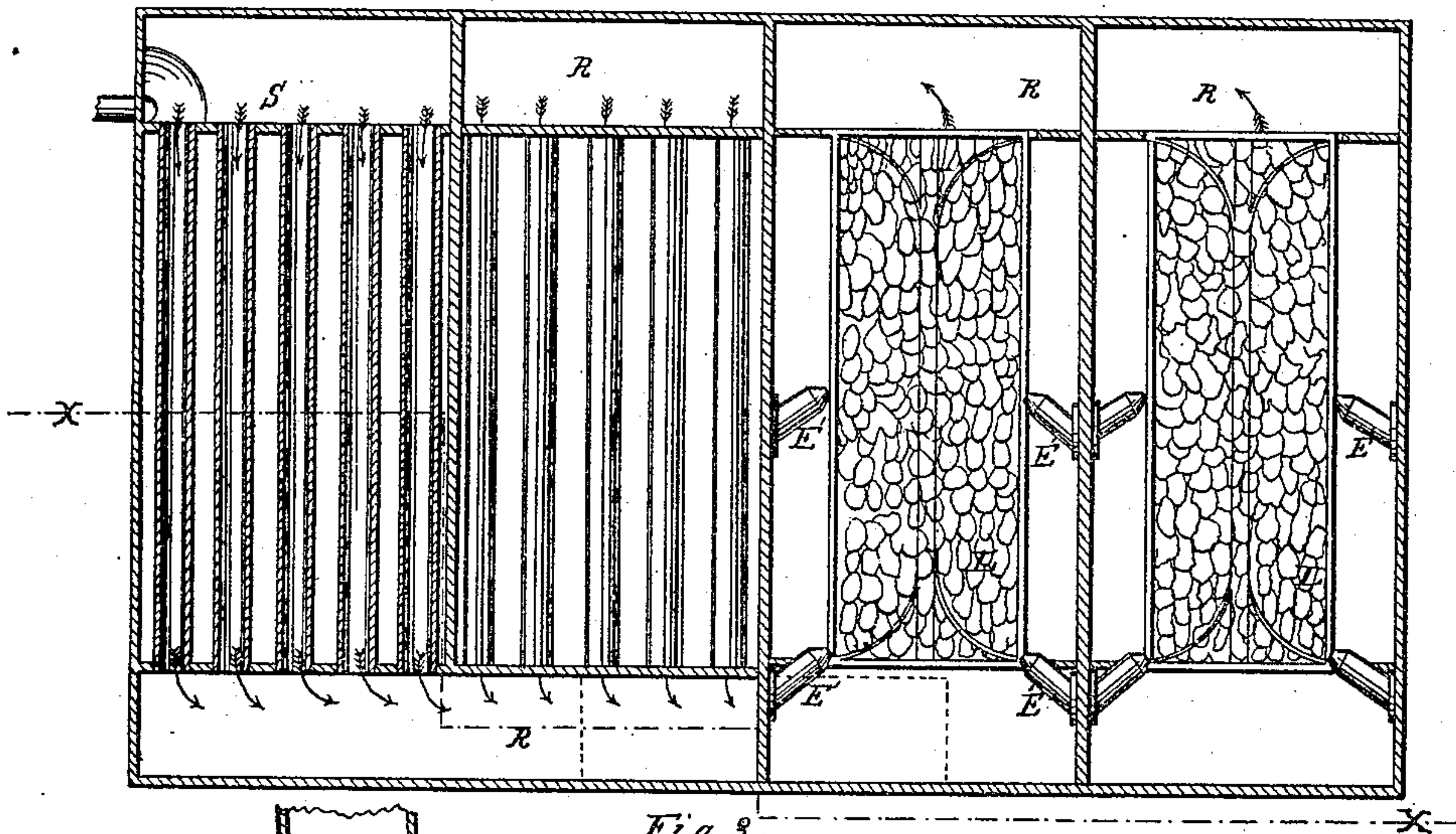


Fig. 3.

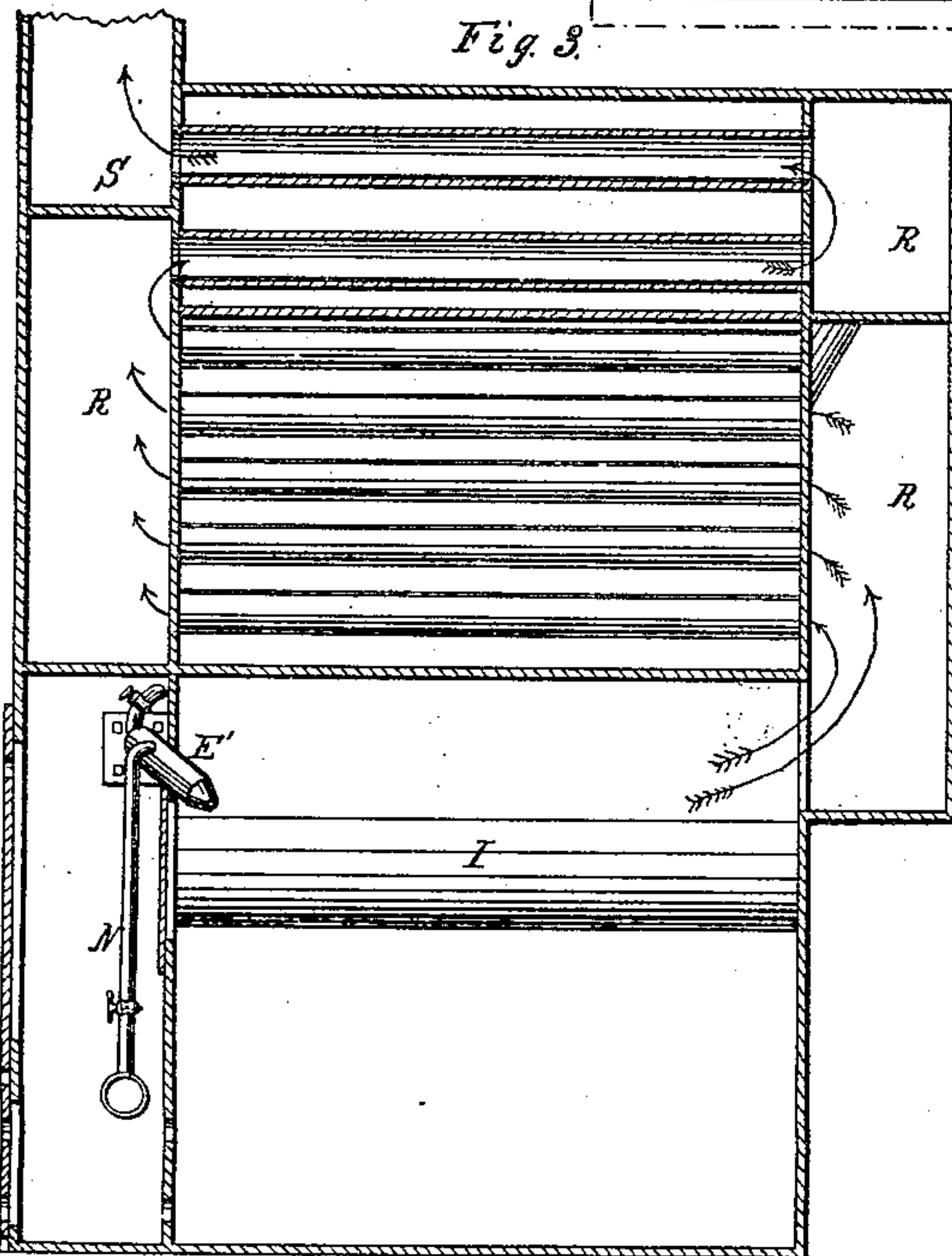


Fig. 4.

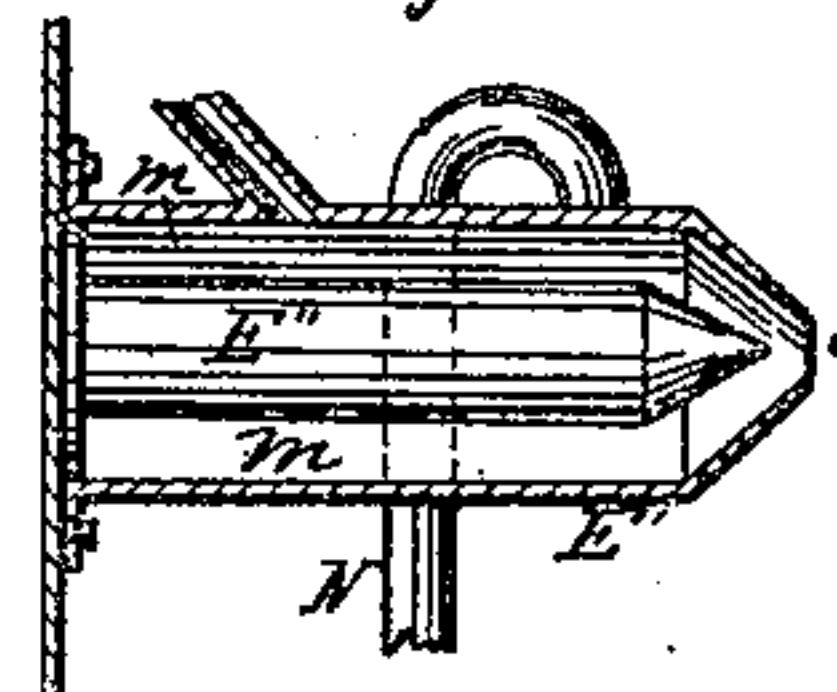
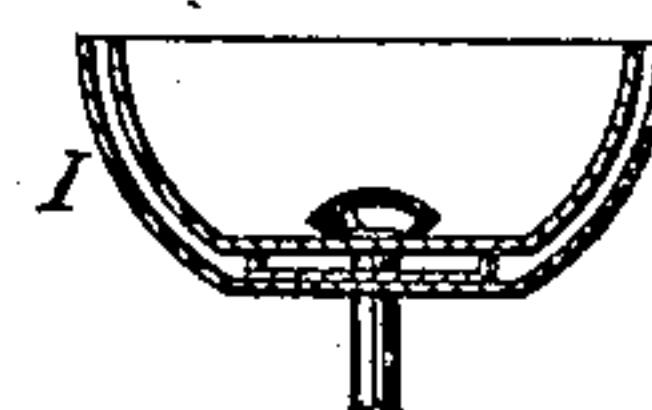


Fig. 5.



Witnesses;

A. W. Langrish
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United States Patent Office.

LOUIS VERSTRAET, OF PARIS, FRANCE.

Letters Patent No. 84,234, dated November 17, 1868.

IMPROVEMENT IN HYDROCARBON-BURNERS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, LOUIS VERSTRAET, of Paris, in the French Empire, have invented a new and useful Improvement in Apparatus for Burning Petroleum; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in the use of petroleum or other mineral-oils for fuel for generating steam in steam-boilers, and for other purposes; and

It consists in the peculiar construction and arrangement of the furnaces, air-discharge tubes, and oil-reservoirs; in the use of air which has been saturated with the vapor of the petroleum in the reservoir, in combination with the petroleum in the process of combustion; and in supplying the boiler, in part, with the water condensed from the vapors evolved in the process of combustion on their passage through the smoke-flues of the boiler.

Figure 1 is a vertical section of a steam-boiler, showing the construction and arrangement of the furnaces, the carburetted-air-supply pipes connected therewith, and the construction and arrangement of the oil-reservoir, with the oil and air-supply pipes connected with the furnaces.

Figure 2, sheet 2, is a horizontal section of fig. 1, through the line *yy*, giving a longitudinal view of the furnaces and fire-flues and the receptacle for the water of condensation.

Figure 3 is a vertical section through the line *zz* of fig. 1.

Figure 4 is a longitudinal section of the carburetted-air-discharge tube.

Figure 5 is a vertical section of the furnace.

Similar letters of reference indicate corresponding parts.

A is the reservoir for the petroleum or other mineral-oil.

This reservoir is made with a double wall or casing, *b b'*, the space between which is filled in with some good incombustible absorbent material, so that the contents of the reservoir would be readily taken up or absorbed in case the reservoir were penetrated or fractured by a shot, thereby preventing all danger of explosion.

This filling, which is marked C, is also designed to be of sufficient thickness or body and tenacity to resist or deaden a shot, so that, in ordinary cases, the contents of the reservoir would not be disturbed.

D represents the pipe which supplies the furnaces with the oil.

E represents the pipe which conveys the air which has been carburetted or passed through the reservoir in contact with the oil, containing the vapors which rise in the reservoir.

F represents the pipe through which atmospheric air

is forced into the furnace, in combination with the carburetted air.

G is a cock in the pipe D, for stopping the flow or discharge of oil to the furnace when desired.

H represents branch pipes, supplied with cocks, connected with the pipe D, for supplying each of the furnaces with oil.

I represents the furnaces. These furnaces are distributed either in or under a boiler, corresponding in number with the size of the boiler.

In this example of my invention, the oil is consumed in long semi-cylindrical furnaces, with water-legs to the boiler on each side, and the fire and smoke-flues K K' above.

The furnaces I are partially filled with calcined and purified pumice-stone or other good incombustible absorbent, L. The greater portion of the pumice-stone is exposed above the oil, for absorbing the vapors which rise in the process of combustion, and subjecting them to the action of the currents of air, which are made to mingle therewith.

The depth of the oil in the furnaces is designed to remain uniform at all times, the supply being constant, and regulated by the cocks, so that the oil will pass only as fast as it is consumed.

The construction of the air-discharge tube E' is seen in fig. 4.

E' is closed at its base, and has a conical perforated end, *e*, through which the air is discharged in small jets in contact with the burning petroleum.

E'' is a cylinder, with a conical end, and entirely closed at both ends.

m represents an annular space around E''.

F is the pipe, through which compressed air is forced from a blowing-cylinder or pump, which pipe is seen in fig. 1.

N represents branch-pipes from the pipe E, which convey the carburetted air into the annular space *m*.

The strong current of air which is forced through the pipe F, and discharged through E' at *e*, produces a draught of air into the reservoir through the vertical pipe *o*.

This draught of air, as it leaves the reservoir, takes with it the vapor which is constantly rising from its volatile contents, which vapor is conducted to the furnaces, as before stated, thus preventing any accumulation of dangerous vapors or gases in the reservoir.

By thus withdrawing the light and volatile portions of the oil, they are utilized, instead of being suffered to escape and contaminate the atmosphere.

P represents a float, so arranged as to regulate the supply of oil to the reservoir.

The air-discharge tubes or truncated cones E' are connected with the ends of the boiler or furnaces, and they may be placed at intermediate points, if desired or, if it should be found necessary, in order to supply the requisite quantity of air to produce a perfect combustion.

In the vertical section, fig. 3, the course of the products of combustion is indicated by the arrows.

R represents the smoke-chambers.

When the products of combustion have passed through the boiler and smoke-tubes, and thereby been reduced in temperature, condensation will take place, and water be formed in the smoke-tubes, which will find its way into the chamber S, from whence it is withdrawn, and discharged by a force-pump into the boiler.

T represents the ash-pit doors, beneath the furnaces, through which are holes, *u*, for supplying cold air to the furnaces.

V is a horizontal line, which is designed to indicate the height of the oil in the furnaces.

In the application of my invention I do not confine myself to any particular kind or description of boiler, although the advantages to be derived from the use of liquid fuel will perhaps be more fully realized in marine boilers than in locomotives or land-engine boilers.

The principal objections hitherto urged against the use of petroleum or other mineral-oils, is the danger of explosion from the accumulation of inflammable gases or vapors in the oil-tanks or reservoirs, and also the disagreeable and injurious effluvium which escapes from the oil.

In war-vessels it is urged that, should a shot penetrate the reservoir, certain destruction to the vessel would be the consequence, from the combustion which must inevitably ensue.

It will be seen that, in my invention, all these objections have been met and obviated.

I claim as new, and desire to secure by Letters Patent—

1. The reservoir A, constructed with a double casing or wall, and filled in with the absorbent C, substantially as and for the purposes described.

2. Withdrawing the vapor which rises from the petroleum, or other mineral-oil or liquid, from the reservoir, preventing thereby its escape into the atmosphere, and the accumulation thereof in the reservoir, substantially as described, and for the purposes set forth.

3. Collecting and using in the boiler the water produced by the condensation of the vapors in the smoke-flues, substantially as described.

4. Discharging into the furnace, and utilizing as fuel, the vapors rising from the oil in the reservoir, substantially as shown and described.

5. Producing a current of air through the reservoir, in contact with the oil therein, substantially as and for the purposes described.

6. The filling C, in combination with an oil-reservoir, substantially as and for the purposes described.

7. The air-discharge tube E', closed at its base, having a conical end, perforated at *e*, and surrounding the closed conical-ended tube E'', in such a manner as to leave an annular space, *m*, between them, and arranged, with relation to the air-supply pipe F and gas-pipe N, as herein described, for the purpose specified.

LS. VERSTRAET.

Witnesses:

A. GUION,
DEMOS.