(No Model.)

J. LOCKE & S. O. RICHARDSON, Jr.

APPARATUS FOR MAKING AND BURNING GASEOUS FUEL.

No. 371,956. Patented Oct. 25, 1887.

Fig. 1.

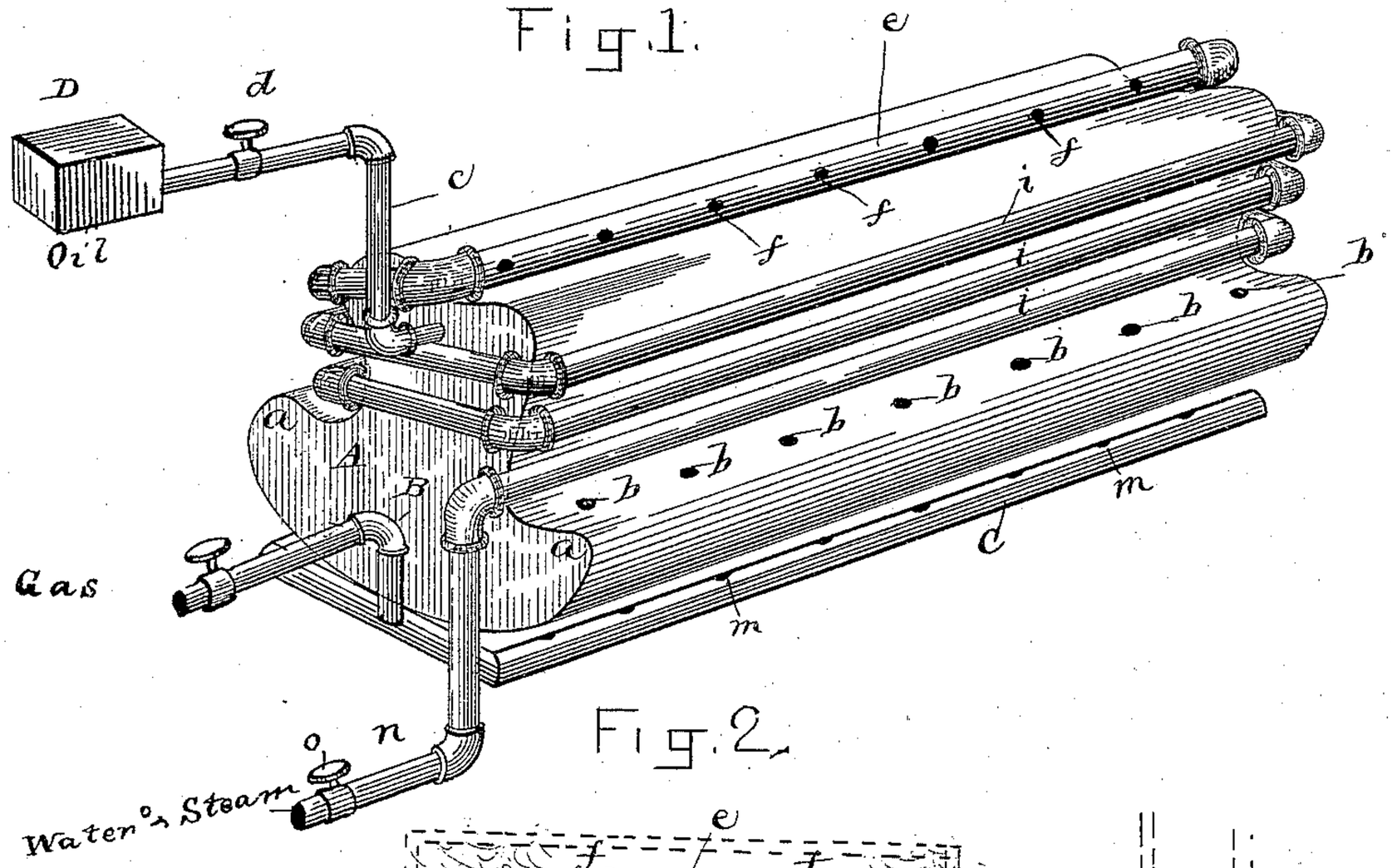
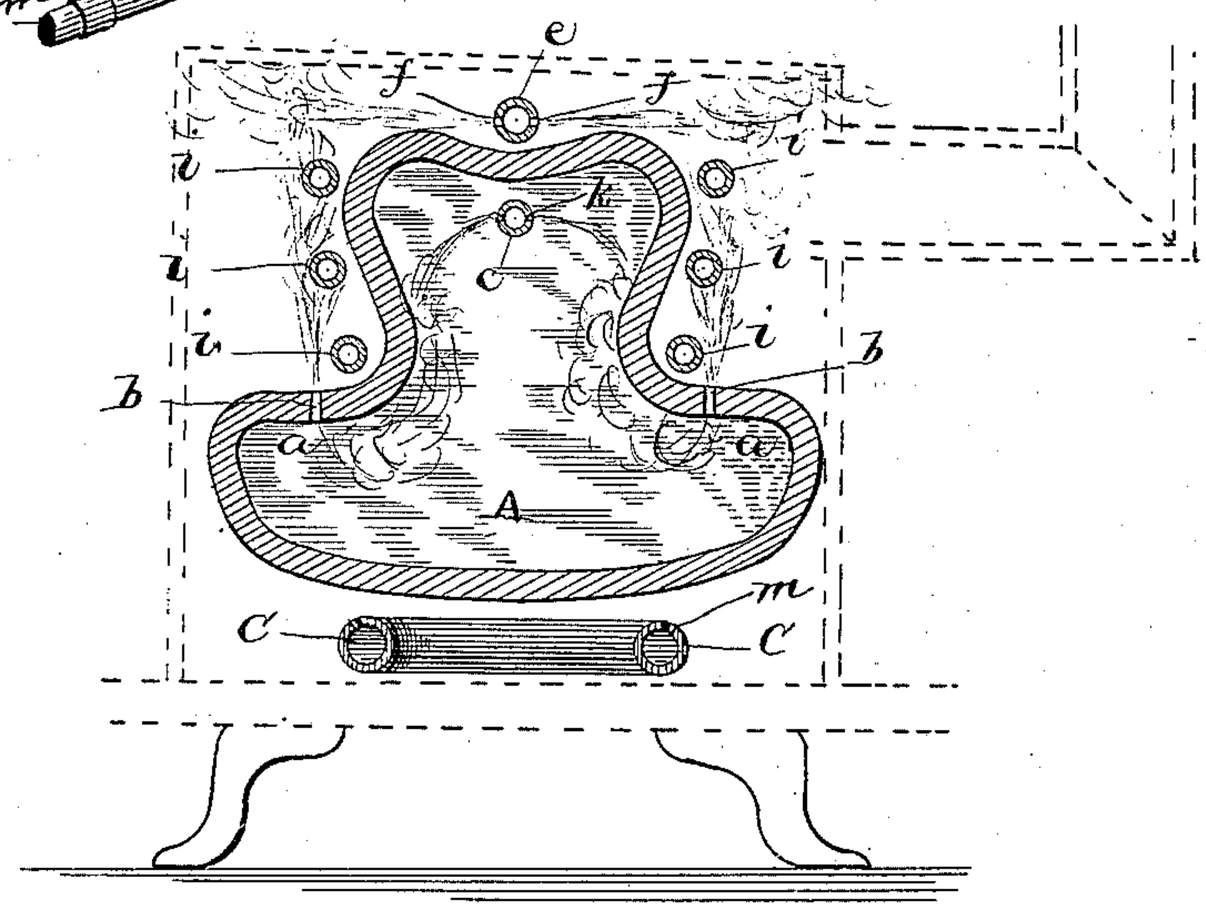


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING AND BURNING GASEOUS FUEL.

SPECIFICATION forming part of Letters Patent No. 371,956, dated October 25, 1887.

Application filed September 11, 1886. Serial No. 213,277. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH LOCKE, of Glenwood, and SOLON O. RICHARDSON, Jr., of Wakefield, both in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Making and Burning Gaseous Fuel, of which the following is a specification.

This invention is an improvement on the apparatus shown in our Letters Patent of the United States, dated September 14, 1886, No. 349,228, said apparatus consisting of, first, an externally-heated oil-vaporizing chamber or retort having means for the discharge of oil in jets against its inner surface, the oil being vaporized within the externally-heated retort, and orifices for the escape and combustion of the vaporized oil, and, secondly, a steam-pipe communicating with a suitable steam-generator and extending for a portion of its length substantially parallel with and in close relation to the orifices in the vaporizing-retort, whereat the vaporized oil is discharged and consumed. Said steam-pipe is highly heated by the heat supplied by the apparatus, so that the steam therein is superheated. The steam-pipe is provided with orifices or nozzles for the escape of the steam in jets coinciding with the jets of flame from the vaporized oil, so that the gases of the steam enter the flames of the vaporized oil and make the combustion of the latter more perfect and produce a very high degree of heat. The union of the steam with the flame and products of combustion of the vaporized oil takes place after the latter is ignited.

Our present invention has for its object, first, to so arrange the ignition and heating devices, in connection with a single retort, that the latter will be uniformly heated, and the partial condensation or non-vaporization of the hydrocarbon at one side, as in the case where the ignition devices are located in one side only, is prevented; secondly, to increase the capacity of the retort and its accompanying steam-pipe, so that more flame may be produced by the conjoint action of a single retort and steam-pipe than in any former apparatus; and, thirdly, to enable the heat produced by the combustion of the vaporized oil to generate the steam that is employed to facilitate the combustion, thus making the apparatus available at points where there is no steam-boiler.

To these ends our invention consists, first, in the combination of an externally-heated oil-vaporizing chamber or retort having two series of burners or orifices—one at each side—means for discharging hydrocarbon in jets against its inner surface, and a steam-supply pipe arranged over said retort and having two series of orifices coinciding with the two series of orifices in the retort, the arrangement being such that the two series of flames from the vaporized oil intersect and mingle with the two series of jets from the steam-pipe.

The invention also consists in the combination, with the retort, of a water pipe or pipes extending along the same and arranged to be heated by the flames from the burners thereof and communicating with the perforated steam-pipe, steam being generated in said pipe or pipes and supplied thereby to the perforated steam-pipe, all of which we will now proceed to more fully describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a perspective view of our improved apparatus. Fig. 2 represents a transverse section of the same, showing by dotted lines a heater-casing surrounding the apparatus.

The same letters of reference indicate the same parts in all the figures.

In the drawings, A represents an iron chamber or retort, preferably of the form in cross-section shown in Fig. 2, its base or lower portion being enlarged to form two outwardly-projecting portions, *a a*, one at each side of the retort. In the upper side of each portion *a* are formed a series of orifices or burners, *b*, where the vaporized oil from within the retort is ignited, as in our apparatus above referred to.

c c represent pipes connected to a suitable source of hydrocarbon-oil supply, D, controlled by a suitable valve, *d*, and entering the upper portion of the retort, within which they are provided with perforations *k*, arranged to discharge the oil in jets against the heated inner sides of the retort, the oil being vaporized in the retort. The vapor passes out through the burners *b b* and is there ignited.

e represents a steam-pipe placed over the center of the retort and extending lengthwise thereof. Said pipe receives steam from any suitable generator, and has two series of orifices, *f f*, coinciding with the burners *b b* of the retort and arranged to direct jets of steam into the flames rising from said burners, the two series of flames being supplied with steam from a single pipe, as shown in Fig. 2.

It will be seen that by providing the retort with two series of burners and the steam-pipe with two series of discharge-orifices we get a large amount of flame and heat in an apparatus of small compass.

Means such as are described in our former patent may be used for the purpose of heating the retort before the apparatus is in operation.

In the drawings of the present case we have represented a gas-supply pipe, B, provided with and controlled by a suitable valve, *l*, and having two parallel branches, C C, extending horizontally beneath the chamber A, and each provided with a series of orifices, *m*, through which gas passes for ignition.

In a case, as in our former patent, where the vapor-ignition orifices are at one side only of a retort, the same becomes more heated at said side than at the other, and in consequence the entering hydrocarbon does not completely vaporize on the least-heated side, thus causing a proportion of said hydrocarbon to flow to and rest upon the bottom of the retort. In the present case such an objection is not possible, for the reason that the retort is uniformly heated throughout by the gas and vapor devices, and the hydrocarbon is thus uniformly vaporized.

When the apparatus is to be used at points where there is no steam-boiler, we extend a water pipe or pipes, *i*, along the side or sides of the retort above the burners *b*, so that they will be subjected to the flames from the retort, said pipe being connected at one end, *n*, with a source of water-supply and at the other end with the perforated steam-pipe *e*. A valve, *o*, controls the source of water or steam supply. Steam is generated in the pipe *i* by the flames from the burners *b*, and supplied thereby to the perforated pipe *e*.

It is obvious that the last-described improvement can be used with the apparatus described in our former patent.

We claim—

1. The combination, with a single retort having orifices at each side thereof, as described, of an external gas-pipe having orifices and adapted to externally heat said retort, a pipe extending into the retort and provided with orifices to adapt it to spray oil in jets therein, and a steam or water pipe having two series of orifices adapted to discharge steam into the flames from both series of retort-orifices, substantially as set forth.

2. The combination, with a single retort having a series of orifices at each side thereof, of means for discharging oil in jets against the inner surface of said retort, and a water-pipe coiled above the retort-orifices to be heated by the flames therefrom and having two series of discharge-orifices to discharge jets of steam into the flames from the retort-orifices, substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 3d day of September, 1886.

JOSEPH LOCKE.
SOLON O. RICHARDSON, JR.

Witnesses:
C. F. BROWN,
ARTHUR W. CROSSLEY.