(No Model.)

F. W. CARTER.

Hydrocarbon Burner.

No. 235,621. Patented Dec. 21, 1880.

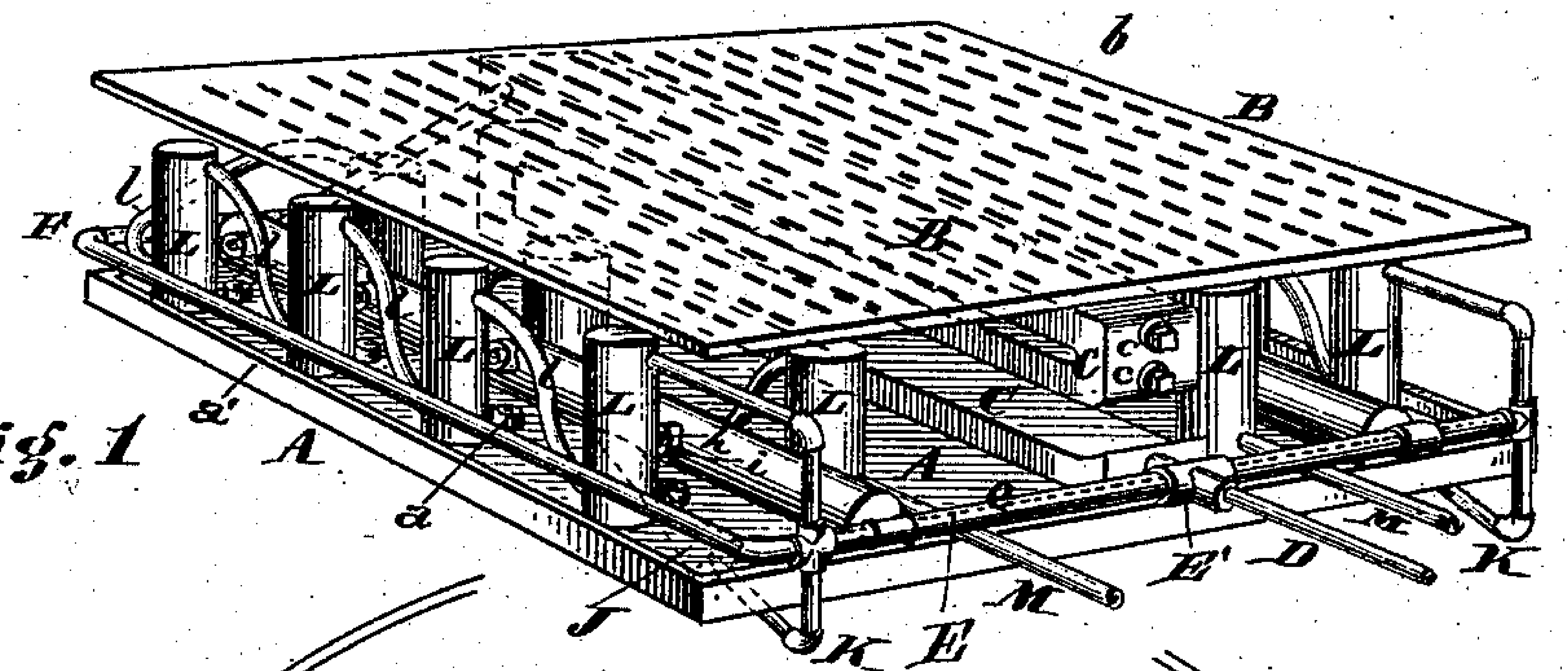

Fig. 1

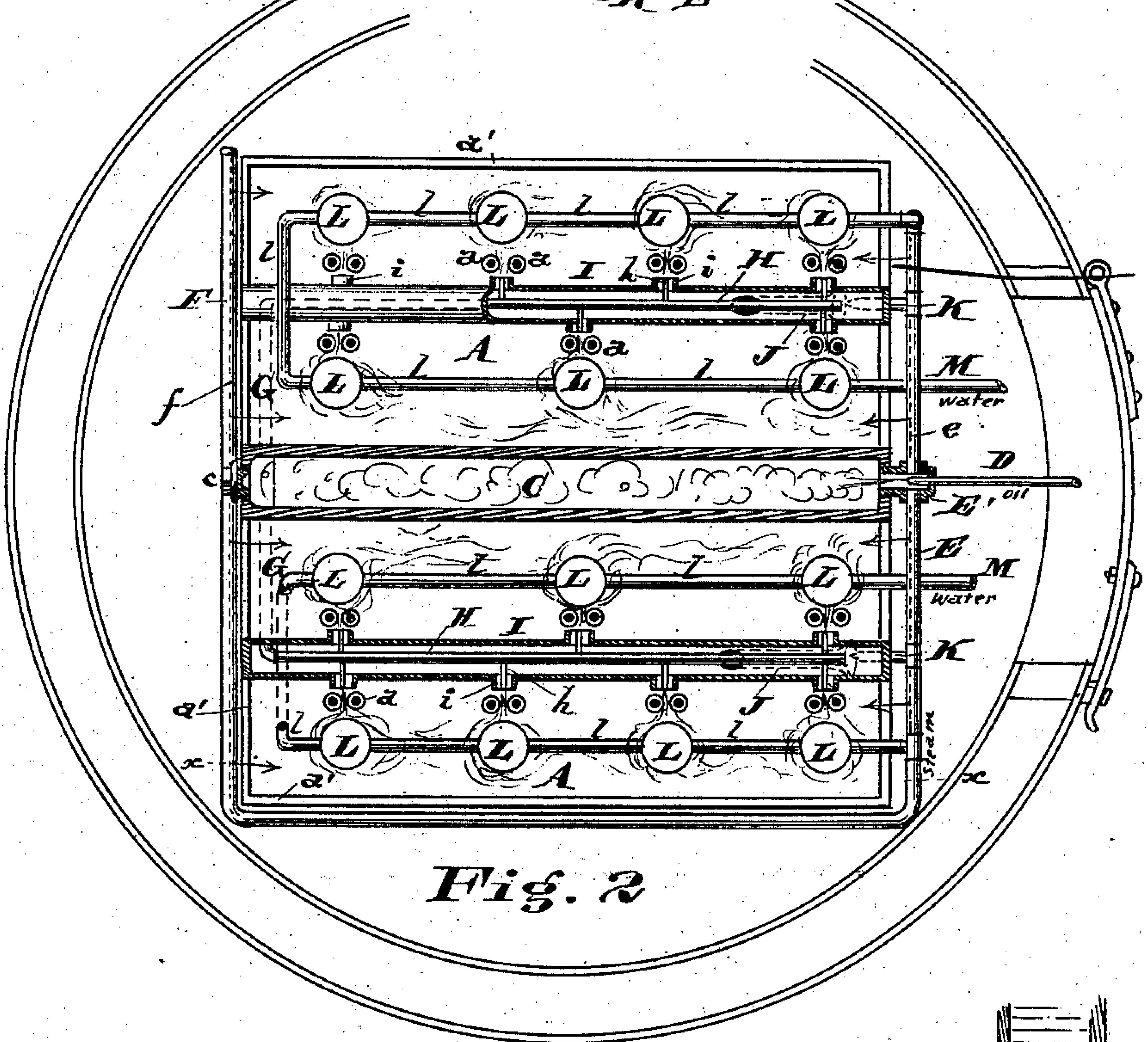

Fig. 2

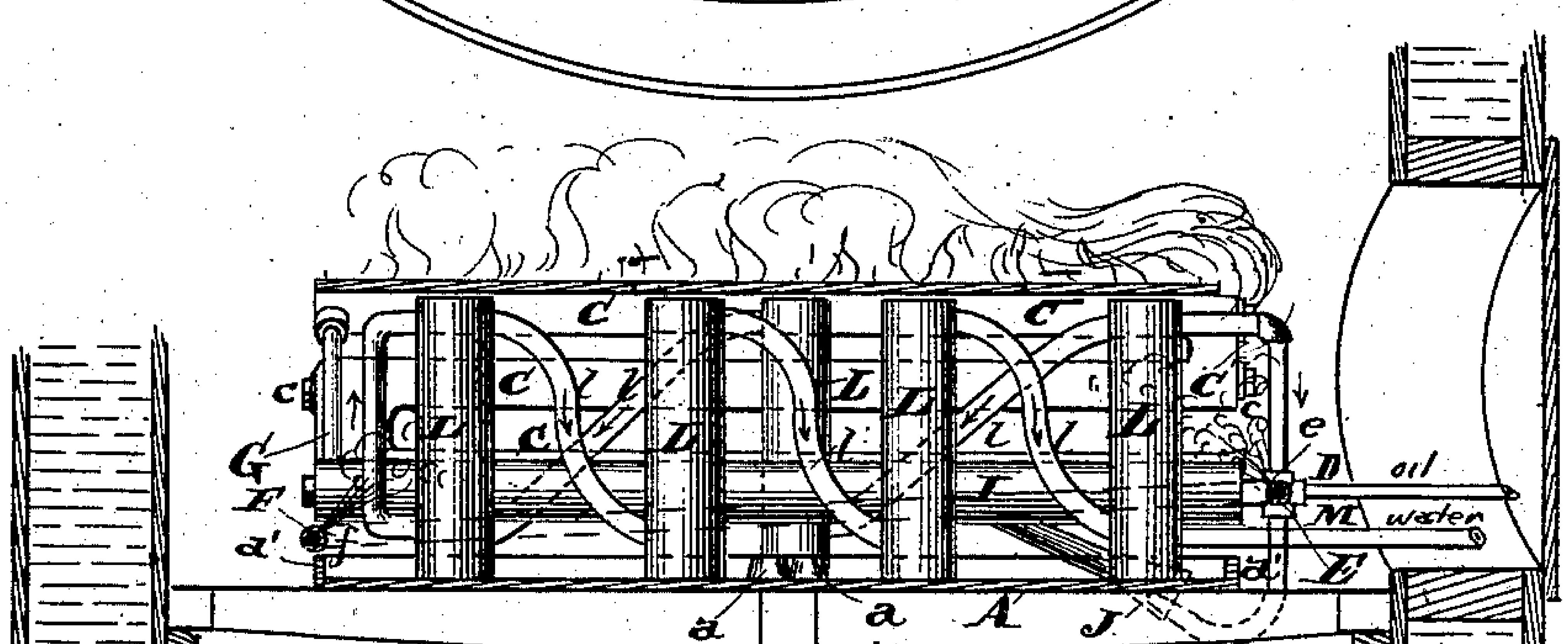

Fig. 3

Attests

L. J. Mátos

Inventor

Frederic W. Carter

By his atty

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FREDERIC W. CARTER, OF CAMDEN, NEW JERSEY.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 235,621, dated December 21, 1880.

Application filed September 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC W. CARTER, of the city and county of Camden, and State of New Jersey, have invented an Improvement in Hydrocarbon-Burners, of which the following is a specification.

My invention relates to apparatus designed to burn fluid hydrocarbons with air and steam; and it consists in apparatus, as set forth in the following specification, shown in the accompanying drawings, and referred to in the appended claims.

In the drawings, Figure 1 is a perspective view of apparatus embodying in it my invention. Fig. 2 is a plan of same with the hydrocarbon-retort and side blast-pipes in section and the top perforated plate removed. Fig. 3 is a cross-section of same on line *x x* of Fig. 2.

A is the bed plate or pan, and consists of a plate of iron having raised edges *a'* about its periphery, and provided with small perforated projections *a* for blast, as hereinafter set forth. This pan-shaped casting A allows it to hold a little oil or fluid hydrocarbon, which, when ignited, heats up the entire apparatus and sets it in action.

B is a top plate or cover, and may be made of perforated cast-iron or asbestus or analogous material. Between this plate B and the pan A is located the apparatus to heat and volatilize the oil and water, and the combination-chamber in which to burn them.

C is the boiling-retort for the oil or fluid hydrocarbons with the injected steam, and is made of three longitudinal chambers, forming an S, the lower leg of which is in communication with the oil-pipe D and the steam-pipe E, and the upper leg of which is in connection with the hydrocarbon-gas tubes H. This retort is secured in the middle between the pan A and plate or cover B. The oil is fed in by a small pipe, D, the nozzle of which projects into the steam-nozzle E', which is in communication with the steam-pipe E, and by the suction produced by the steam the oil is drawn in and forced in the form of spray into the boiling-retort.

The steam-pipe E is parallel to the front of the apparatus, and is situated a short distance away, and is provided with series of small steam-jet holes *e* along its upper side and slightly toward the plate B. This steam-pipe E is in connection with another and similar one, F, situated close to the back of the apparatus, with small jet-holes *f* pointing toward the front edge of the plate B. The rear steam-pipe, F, is situated at a lower level than the front tube, E.

The upper leg of the S boiling-retort C is connected on either side with gas-tubes H, which are provided with burners or nozzles *h*, projecting horizontally from either side along their length. The tubes H are incased or inclosed by air-tubes I, which are provided with corresponding blast-nozzles *i*, through which the gas-nozzles project. The tubes I are provided at the bottom with bell-mouthed tubes J, into which the nozzles of the steam-pipes K project. These pipes K are in connection with the steam-pipe E. The small perforated projections *a* in the pan A are located immediately under the gas-nozzles *h* and blast-nozzles *i*.

Situated on either side of the pipes I and J, and immediately in front of the gas-nozzle *h*, is a series of boilers, L. Entering into those two next to the front end of the boiling-retort are pipes M, which supply water to the bottom of the boilers. As the water from these two boilers is converted into steam it is carried from the top to the bottom of the next, and so on through the entire series of boilers or heaters, and finally the steam in a superheated state enters the pipe E, hereinbefore explained. The ends of the legs of the boiling-retort may be supplied with plugs *c*, which may be removed for cleaning purposes.

This apparatus may be used to heat a boiler, or for other purposes, as desired. In the drawings it is shown as placed upon the fire-grate of a steam-boiler.

The operation is as follows: Some oil is placed in the pan A and ignited. The heat generated therefrom soon produces steam in the boilers or heaters L, and then the apparatus is ready for work. Oil is now turned on from the pipe D, and the steam from the pipe E draws it in and forces it in a spray and in a thoroughly mixed condition into the boiling-retort C, where it undergoes volatilization without the usual deposition of hydrocarbons in a solid form upon the interior of the retort,

which prevent the proper volatilization afterward. This is accomplished by forcing in the oil or fluid hydrocarbon mixed thoroughly with superheated steam. The volatilized hydrocarbon and steam then pass through the retort C and pipes G into the gas-tubes H, and out through the nozzles *h*, where it meets blast and steam from the surrounding nozzles *i* and air from the perforated projections *a*. The steam from boilers L passes from pipe E through pipe K into the bell-mouth J, where it forces air mixed with steam into the tube I, and the burning gases from nozzles *h* and *i* impinge upon the boilers or heaters L, keeping their contents always at a high temperature, and produce the required quantity of steam. As these gases and vapors (hydrocarbon vapor, steam, and air) burn and blaze up they heat the boiling-chamber and retort C, and as the heat passes to the front a second jet from holes *e* in pipe E forces it obliquely upward toward the middle of the crown-sheet of the boiler and just over the front edge of the top perforated plate, B, through which part of the flame passes. By this method of burning a most intense and perfect combustion is set up and heat produced.

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

1. The boiling-retort C, into which steam and hydrocarbon oil are admitted for the purpose of volatilizing the hydrocarbon oil and preventing the deposition of a carbonized mass upon the interior of the retort, in combination with steam-pipes to supply highly-heated steam to burn the vapor after it escapes from the retort, substantially as shown and described.

2. The boiling-retort C, into which steam and hydrocarbon oil are admitted for the purpose of volatilizing the hydrocarbon oil and preventing the deposition of a carbonized mass upon the interior of the retort, in combination with a hydrocarbon pipe, H, located on either side and inclosed by a blast-pipe, I, for steam and air, said pipes being respectively provided with gas-nozzles *h* and blast-nozzles *i*, all constructed substantially as and for the purpose specified.

3. The boiling-retort C, into which steam and hydrocarbon oil are admitted for the purpose of volatilizing the hydrocarbon oil and preventing the deposition of a carbonized mass upon the interior of the retort, in combination with a hydrocarbon-pipe, H, located on either side and inclosed by a blast-pipe, I, for steam and air, said pipes being respectively provided with gas-nozzles *h* and blast-nozzles *i*, steam generators or boilers L, located in front of each of the gas-nozzles, pipes *l*, steam-pipes E and F, steam-nozzle K, suction-cone J, perforated plate B, and pan A, provided with raised edges *a'*, substantially as and for the purpose specified.

4. The combination of plate B, of perforated material capable of resisting heat, pan A, provided with raised edges *a'*, steam-pipes E and F, and apparatus to generate gas and steam, located between this plate B and pan A, substantially as and for the purpose specified.

5. The combination of S boiling-retort C, steam-nozzle E', oil-pipe D, pipes G, gas-pipes H, provided with gas-nozzles *h*, blast-pipes I, provided with blast-nozzles *i*, surrounding the gas-nozzles, pan A, provided with raised edges *a'* and raised blast-holes *a*, suction-cone J, opening into pipe I, and steam-pipe K, substantially as and for the purpose specified.

6. The combination of plate B, of perforated refractory material, pan A, and steam-pipes E and F, provided respectively with jet-holes *e* and *f*, substantially as shown, and for the purpose of controlling the direction of the draft and flame.

7. The combination of boilers L, pipes *l*, and water-supply pipe M with gas-pipe H, provided with nozzles *h*, and blast-pipe I, provided with nozzles *i*, surrounding the gas-nozzles, for the purpose of intimately mixing steam, gas, and air and burning them against each of the boilers, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

FREDERIC W. CARTER.

Witnesses:
R. M. HUNTER,
WM. F. HARRITY.