

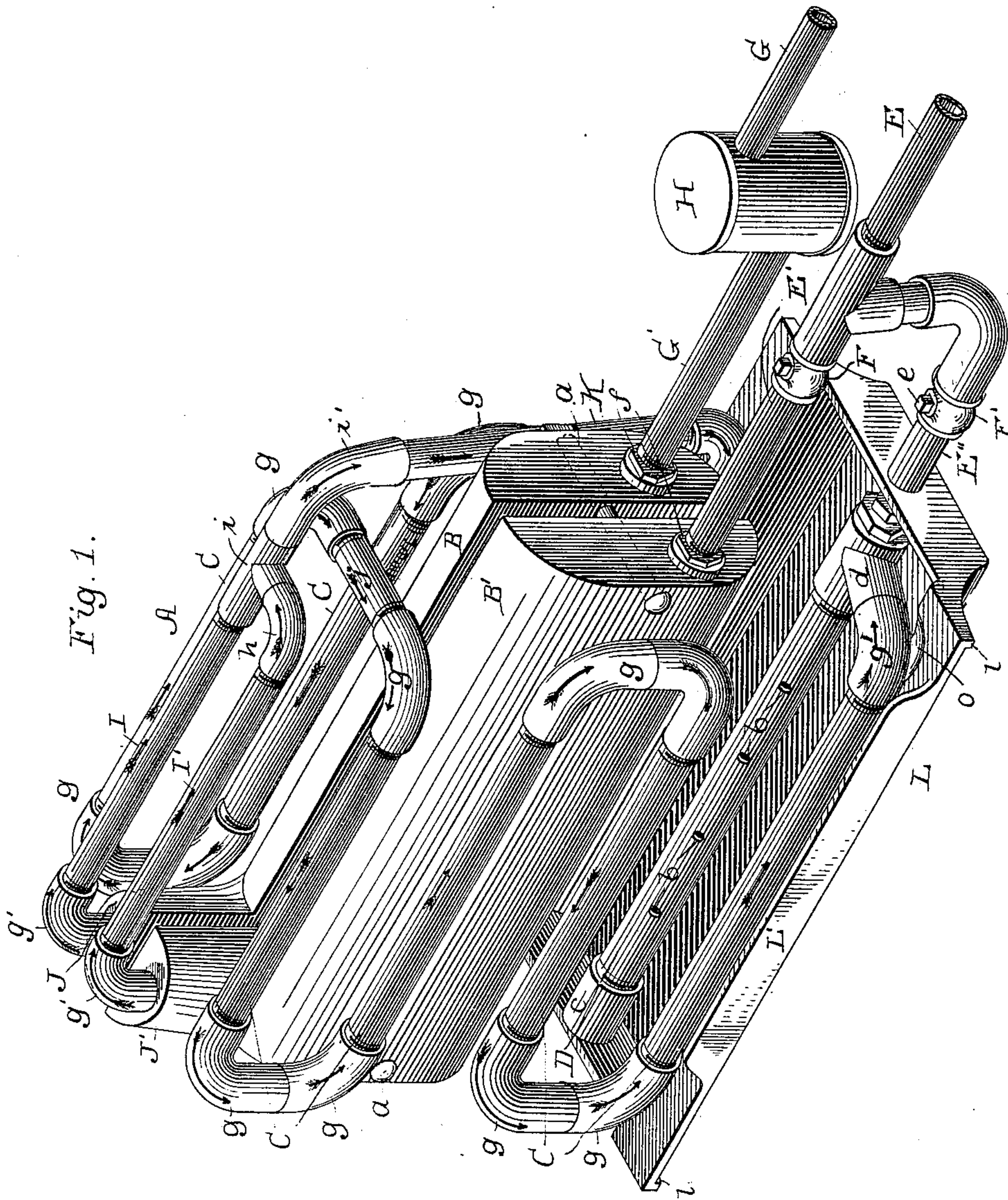
(No Model.)

3 Sheets—Sheet 1.

T. E. HALL.
HYDROCARBON BURNER.

No. 405,884.

Patented June 25, 1889.



Witnesses

L. G. Liseher
A. A. Higdon

Inventor
Thomas E. Hall

By his Attorney J. Higdon

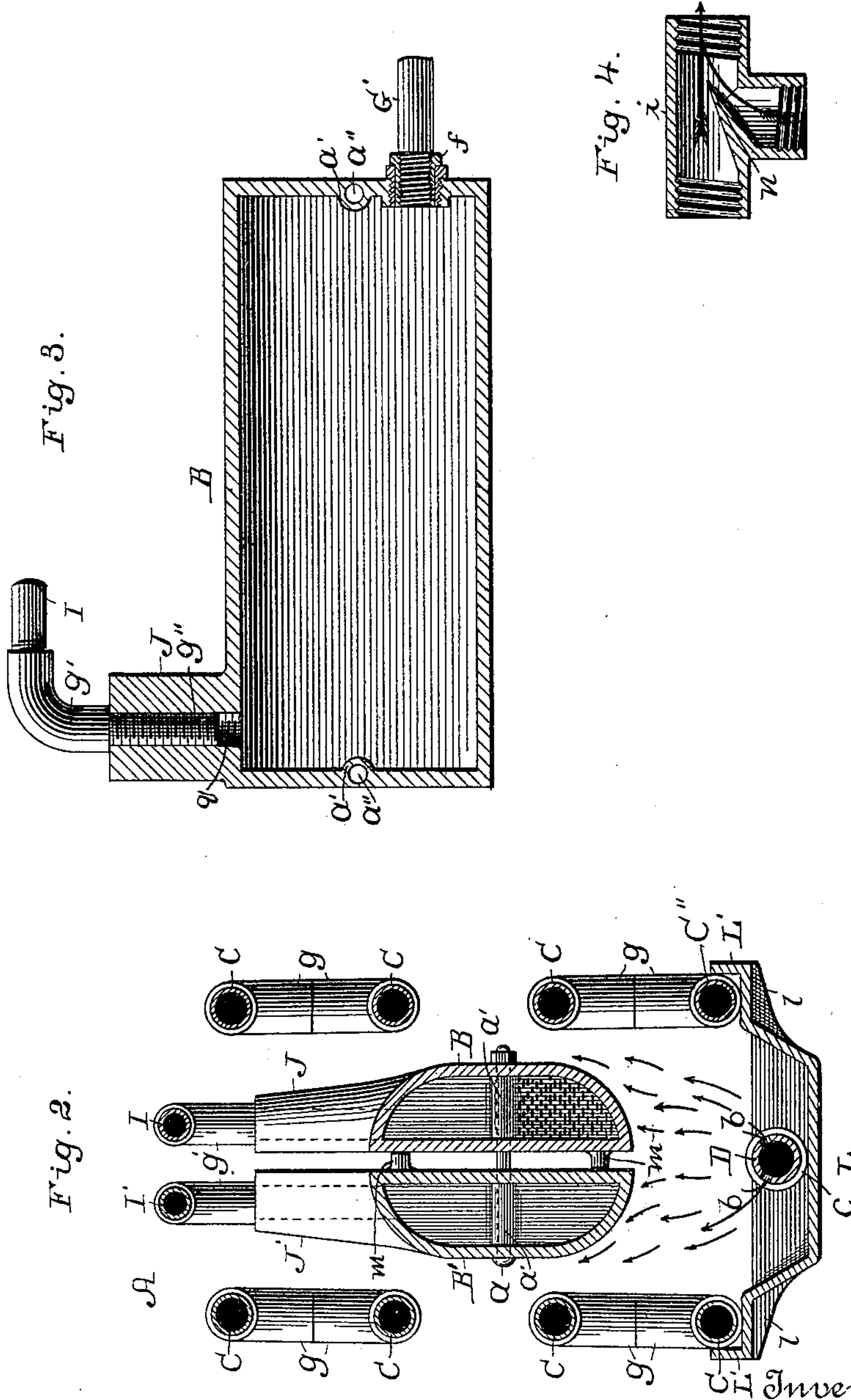
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T. E. HALL.
HYDROCARBON BURNER.

No. 405,884.

Patented June 25, 1889.



Witnesses

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(No Model.)

3 Sheets—Sheet 3.

T. E. HALL.
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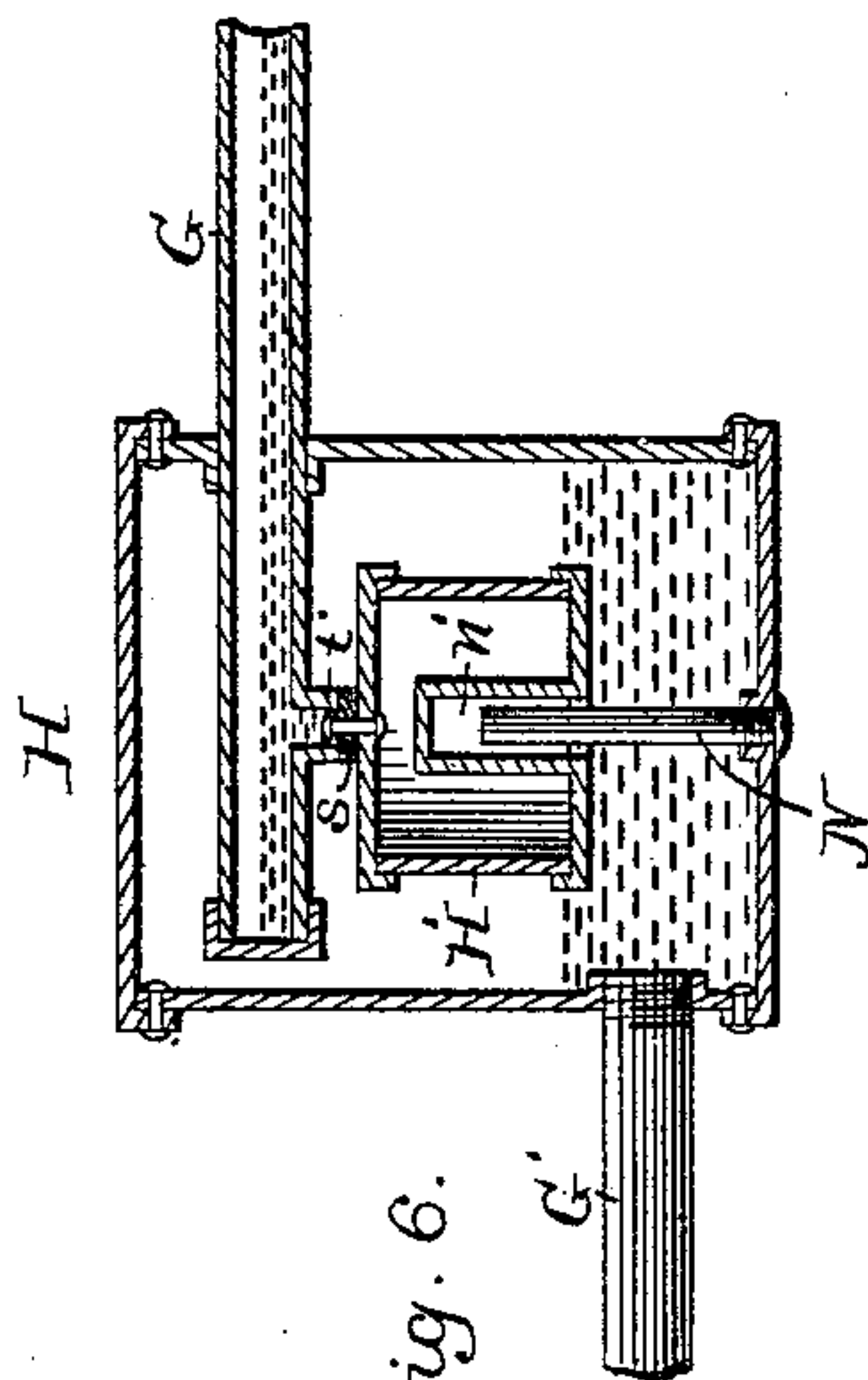


Fig. 6.

Fig. 7.

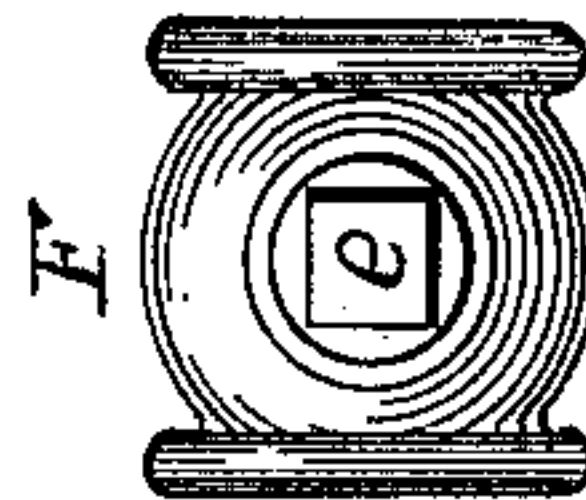
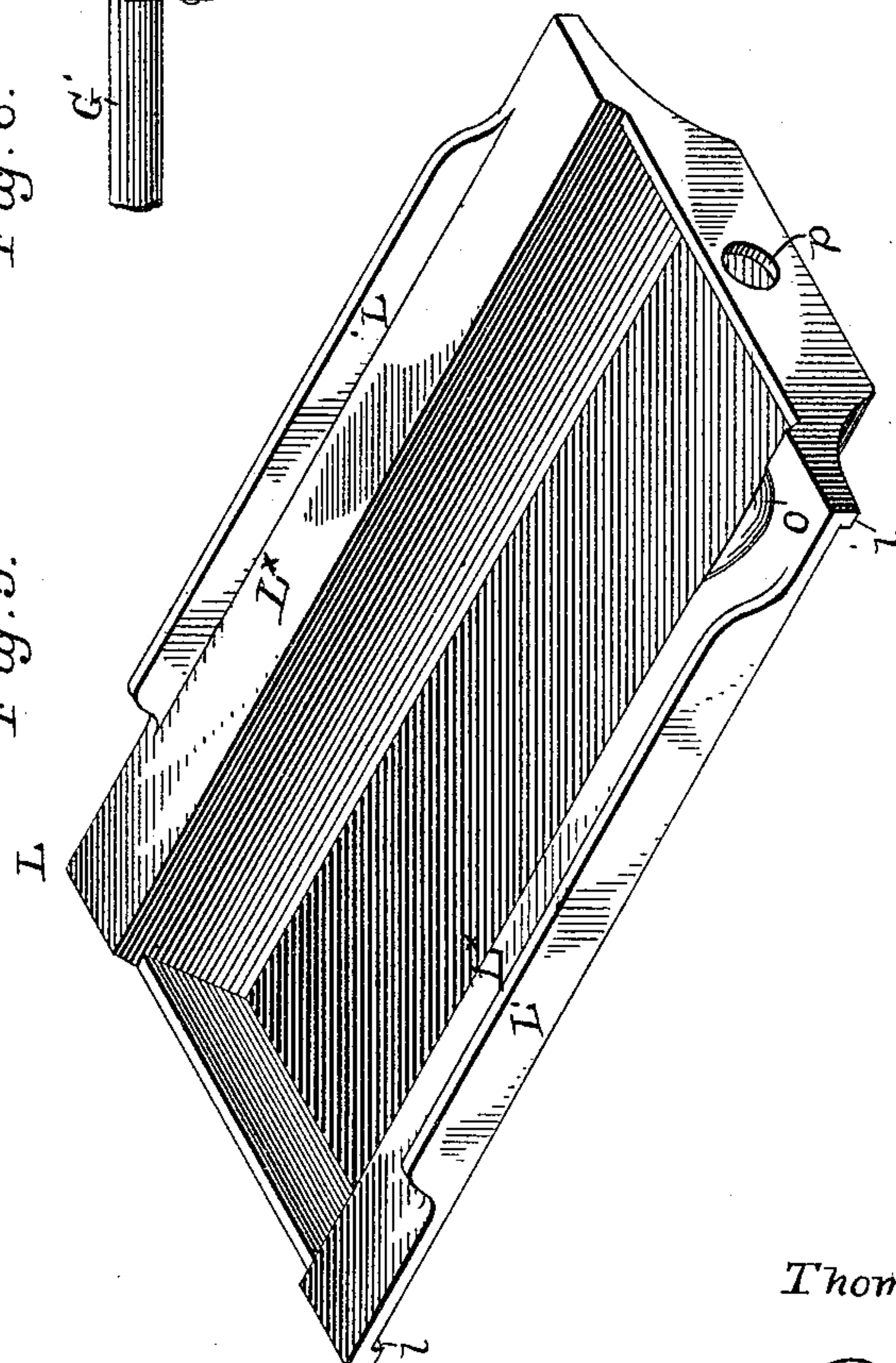


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS E. HALL, OF KANSAS CITY, MISSOURI.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 405,884, dated June 25, 1889.

Application filed March 20, 1889. Serial No. 304,008. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. HALL, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Retort Vaporizers and Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to certain improvements in retort vaporizers and burners, having for their object to promote the process of vaporizing and superheating the hydrocarbons and otherwise improve the operation of the burner; and to these ends the nature of the invention consists of the novel combination of parts and their construction, as will fully appear from the following description and accompanying illustration, in which—

Figure 1 is a perspective view of my improved hydrocarbon-burner. Fig. 2 is a transverse sectional elevation of the same. Fig. 3 is a detail sectional view thereof, showing more especially the steam generator or retort. Fig. 4 is a detail sectional view of the coupling connecting the two retort discharge-pipes. Fig. 5 is a detail perspective view of the oil-pan. Fig. 6 is an enlarged sectional view of the water-supply-regulating valve; and Fig. 7 is also an enlarged view, in detail plan, of the oil-retort supply-pipe valve.

In the embodiment of my invention I employ two retorts B B', one for the water and the other for the hydrocarbon or oil, each being a separate and independent chamber in itself, but connected together, preferably as shown. The connection between the two retorts is or may be effected by bolts a a, one applied at each end of the retorts and passing through the same, tubes or shelves a' a', cast integrally with the retorts, being provided within the latter to envelop the bolts and prevent leakage around the same where they pass through the sides of the retorts, as also to avoid the contents of the retorts affecting the bolts. The retorts are held a suitable distance apart by means of asbestos or projections m, cast, it may be, one or more upon the opposite or inner side of each retort.

The retorts B B' are provided upon their upper surfaces, at the rear ends, with vertical extensions or castings J J', which are provided with bores g, with which are connected

through screw-threaded elbows or coupling g', the pipes I I', one I being the steam-pipe and the other I' the oil or hydrocarbon pipe. The pipe I' connects with the pipe I by means of a curved elbow h and a coupling i. The coupling i has upon its inside a deflector or guard n, cast therein so as to stand outward in the steam-passage, as also in alignment with the oil-passage, thus guarding the latter to prevent steam from entering it, yet at the same time permitting of a union of the oil and steam, as indicated by the arrows, as seen in Fig. 4, and where commences the superheating process. The coupling i has an arm i', which connects with a pipe K, in turn connecting with the series of superheating-pipes C upon one side, extending back and forth and one above the other and carried above and across the retorts and connecting by a coupling j with a second series of superheating-pipes C, similarly arranged, but disposed upon the opposite side of the retorts. These pipes are of course formed of sections coupled together by curved elbows g g. The bottom section d of the latter series of pipes is connected by an elbow g' and a coupling d with the burner D, said elbow g' resting in a cavity o in one of the plates of the pan L, which plates will be presently referred to.

The burner D has the usual jet-apertures b b where the process of ignition takes place, producing a sheet of flame, and is disposed in the oil-pan L immediately centrally of the retorts, thus subjecting the latter to the action of the flame of the burner. The burner D is connected to a pipe section or coupling c at one end to the rear end of the oil-pan L, while its opposite end beyond the coupling d has connection with the supply-pipe E'', resting in and passing through the front end of the oil-pan, and having the valve F' provided with an angular stem e. This pipe E'' connects by a curved elbow and T-coupling with the oil-supply pipe E, also provided with a similar valve F where it connects with a pipe E', connecting with and supplying the oil-retort B' with oil or hydrocarbon. The pipe E leads from a suitable tank (not shown) containing the hydrocarbon or oil. The pan L has at its sides horizontal plates L^x, provided at their outer edges with flanges L' to prevent the burner slipping off the pan. The plates L^x of

the pan L are thickened at their outer corner edge, as at *l*, to strengthen the same.

G is a water-supply pipe, which leads from a suitable tank (not shown) containing water, and connects with a supplementary tank or chamber H, connecting by a pipe G' with the steam-generator B. Within the tank or chamber H is centrally disposed a hollow float-valve H', guided in its movement upon a stem or post N, screwed at its lower end into the bottom of the tank and received at its upper end into a tubular chamber *n'* in said valve. The upper end or top of the float or valve H' has applied to it an elastic or rubber seat *s*, which engages or closes and opens the discharge outlet or nozzle *t'* of the supply-pipe G, which, as shown, extends into the tank H. It will be observed that by this arrangement the supply of water to the steam generator or retort is rendered regular and kept at a uniform height, while its supply of water can never be exhausted. This is obvious from the fact that when the water in the tank H which supplies the retort feed-pipe G' with water falls to a level never below said pipe the float or valve H' will of course fall with it, and thus open the discharge outlet or nozzle *t'* of the pipe G, and permit of the feeding of the tank until the water has regained its former level, the float or valve rising therewith and again closing the nozzle or outlet.

The use of two separate and independent retorts is not, I am aware, broadly new. Neither is it new to combine the vapor of water with that of the hydrocarbon to intensify the heat; but in burners heretofore constructed it has been the practice to combine said vapors either at or near the point of combustion, whereas in my burner the vapors are united immediately after leaving their respective retorts, and are conducted through a long series of superheating-pipes, which are maintained at a high temperature. This causes the vapors of the water and hydrocarbon to become intimately mingled and brought to the same temperature, which I have found to be very effective in producing an intense heat at the point where the combustion takes place. Further, the pipes which lead from the retorts to the burner-tube are entirely free and unobstructed, thereby offering no resistance which might lead to an explosion. Further, the superheating-pipes, which convey the united vapors, are arranged on opposite sides of the retorts and over the oil or combustion pan, thereby economizing space and enabling said pipes to be heated by the combustion in said pan. Further, the superheating-pipes bear on and are supported by the pan, which is provided with side plates and flanges to accommodate the same and prevent displacement.

The operation is as follows: The fire is started by turning the valve F', which permits oil or hydrocarbon to enter pipe or burner D, and from the latter to flow through its apertures into the pan L, where it (the oil) is

ignited. After properly heating the retorts and steam is generated, the valve F' is closed and the valve F is opened, permitting the oil to flow directly into the oil-retort, where it is quickly vaporized. In this form it passes up through the bore *q* of the extension J' and into the pipe I', thence passing through the coupling *i* into the pipe K, where, as before stated, the superheating process begins. The commingled steam and vaporized oil or hydrocarbon now pass through the two series of superheating-pipes CC and into the burner and through its jet-openings *b b*, where it issues in the form of a continuous sheet of flame, thus exposing the retorts to a great or augmented heat.

It is also observed that this burner or heater has especial qualities to recommend its use in connection with railroad-trains, since in the event of the overturning of the heater the water in the steam-boiler will rush through the jet-openings of the burner, and thus wholly extinguish the fire, and consequently prevent the cars from taking fire. Further, the parts of the improved burner are simple and readily connected. The retorts are preferably semi-cylindrical in cross-section, and are disposed with their flat or plane sides facing each other, thereby presenting the general appearance of a single cylindrical retort. The advantage of this shape of retort is that it is stronger, and is better adapted to withstand the great internal strain incident to the vaporization of the water and hydrocarbon. The flat or plane sides of the retorts are arranged close together, (they must be sufficiently separated to allow the heat to come in contact with the entire surface of both retorts,) and are held out of contact by the projections *m m*. The retorts are bound firmly together by the through-bolts *a a*, which pass through suitable integral casings, as described. This construction causes the retorts to be almost, if not quite, as strong as a single cylindrical retort, space is economized, and a large amount of surface is exposed to the heat.

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

1. In a retort vaporizer and burner, the combination, with the independent retorts for water and hydrocarbons and a burner arranged thereunder, of a single continuous superheating-pipe connected to both retorts and to the burner and doubled on itself back and forth on opposite sides of the retorts and over the burner, whereby it is heated by the combustion at the said burner, substantially as specified.

2. In a retort vaporizer and burner, the combination, with a horizontal oil-pan having a burner located therein, of the independent retorts provided with water and hydrocarbon-supply pipes and located centrally over said pan, and the single continuous superheating-pipe connected at one end to both retorts and

at the other end to the burner and doubled
back and forth parallel with and on opposite
sides of the retorts and above the oil-pan,
whereby said pipe is heated by the combus-
5 tion in the pan, substantially as specified, for
the purpose set forth.

3. In a retort vaporizer and burner, the
combination of an oil-pan provided at oppo-
sitesides with horizontal plates having flanges,
10 and also provided with a central longitudinal
burner, the two independent retorts arranged
side by side over the center of the oil-pan,
and the single continuous superheating-pipe,

connecting both retorts with the burner, ex-
tending back and forth in a zigzag direction 15
at opposite sides of the retorts and bearing on
and supported in said position by the flanged
side plates of the oil-pan, substantially as
specified.

In testimony whereof I affix my signature in 20
presence of two witnesses.

THOMAS E. HALL.

Witnesses:

F. G. FISCHER,
A. A. HIGDON.