

(No Model.)

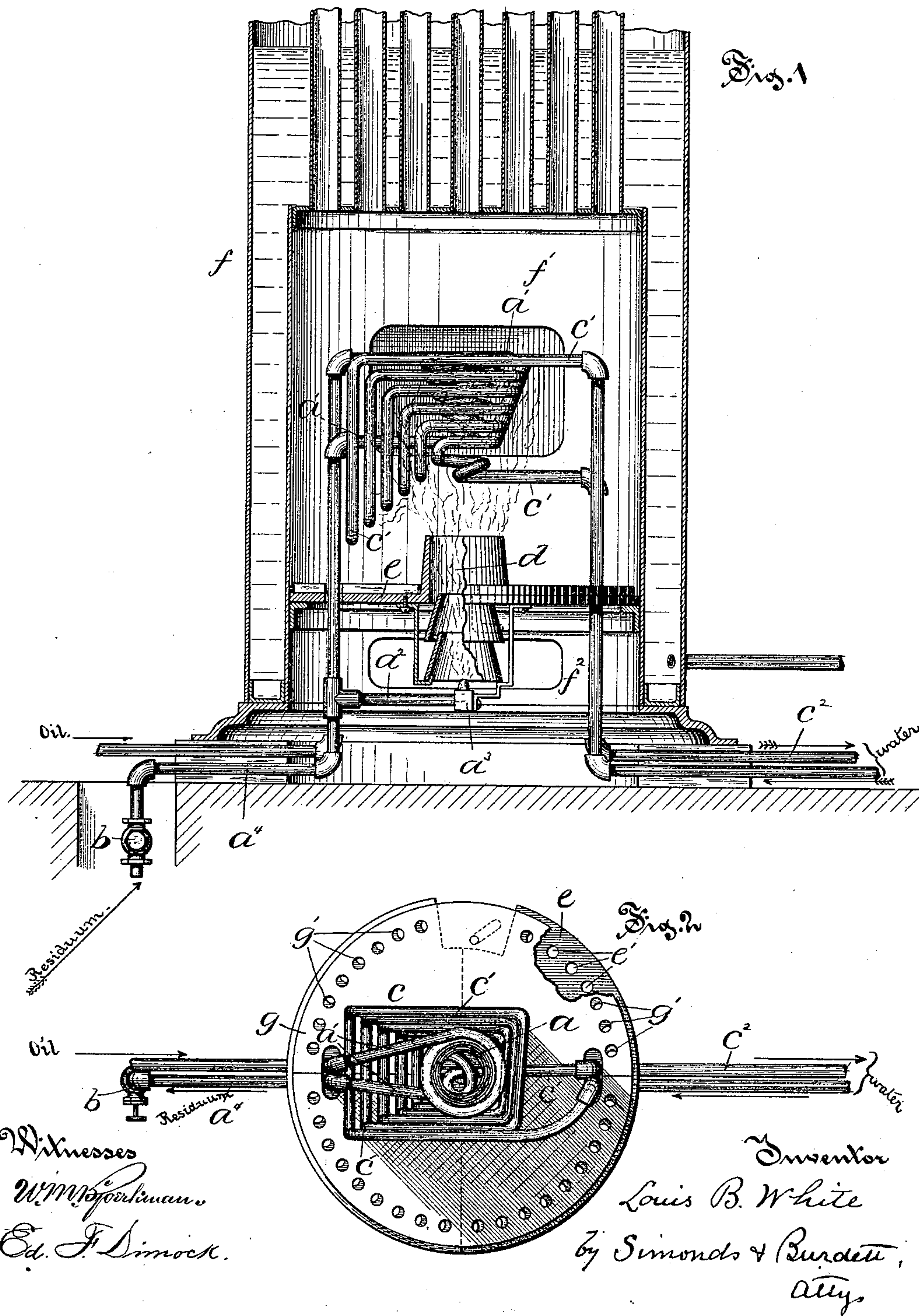
2 Sheets—Sheet 1.

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APPARATUS FOR BURNING HYDROCARBONS.

No. 329,985.

Patented Nov. 10, 1885.



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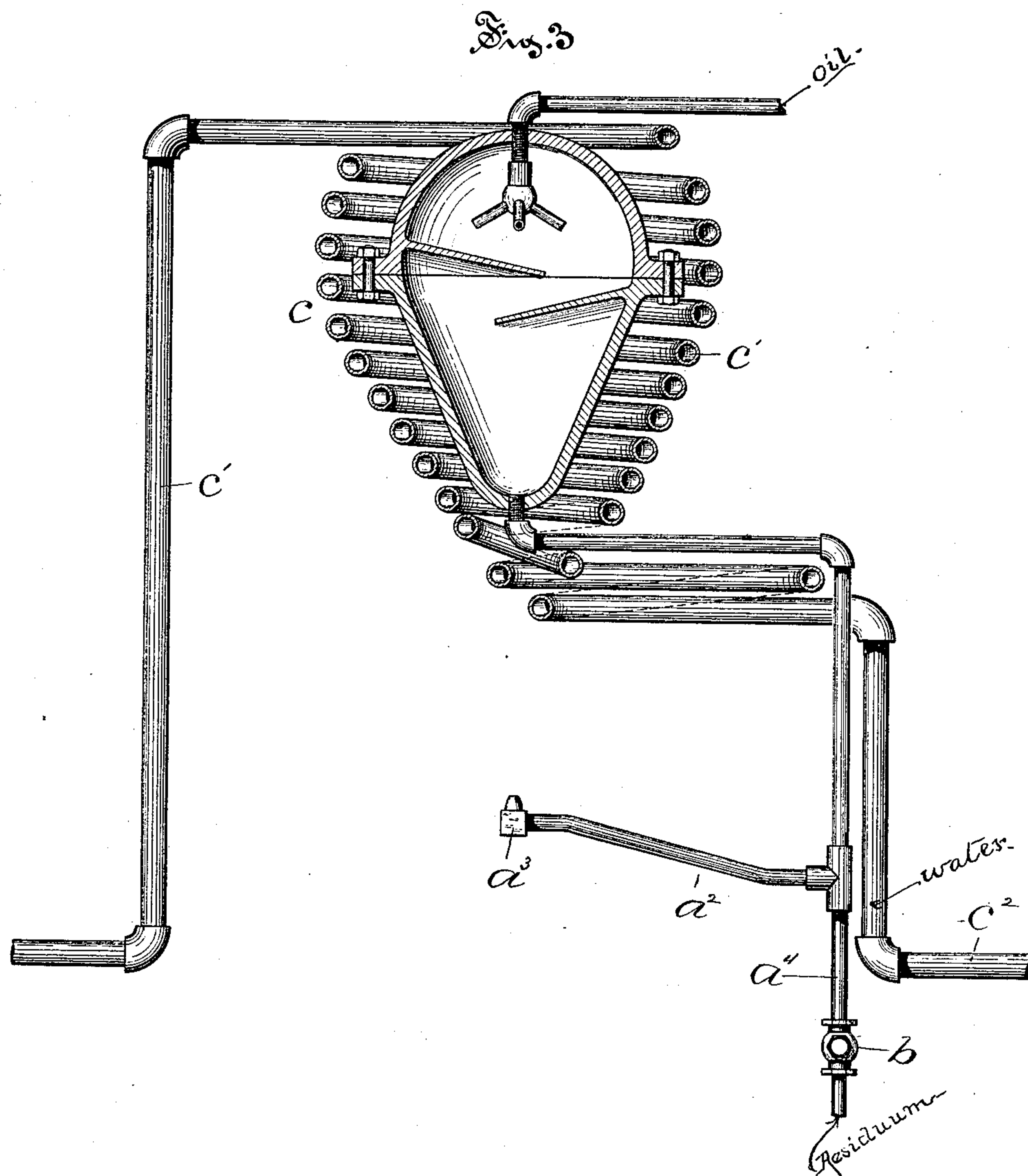
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Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING HYDROCARBONS.

SPECIFICATION forming part of Letters Patent No. 329,985, dated November 10, 1885.

Application filed August 13, 1884. Serial No. 140,404. (No model.)

To all whom it may concern:

Be it known that I, LOUIS B. WHITE, of New York, in the county and State of New York, have invented certain new and useful
5 Improvements in Apparatus for Burning Hydrocarbons; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and
10 to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

Figure 1 is a view in vertical central cross-section of the apparatus embodying my improvements, and showing the same as arranged to heat an upright vertical boiler. Fig. 2 is a plan view of the apparatus as removed from the boiler, with parts broken away to show
20 construction. Fig. 3 is a view in vertical central section of an alternate form of my device, showing a chambered retort.

In devices for burning hydrocarbons great difficulty has been experienced from the presence of a residuum, that has formed the greatest obstacle to the successful operation of such devices.

My improvement relates more particularly to that class of devices for burning hydrocarbons in which this fuel is vaporized before it issues from the nozzle of the burner end of the supply-pipe.

It consists in combining the retort in which the hydrocarbon is heated with a protecting layer or stream of flowing water that is interposed to a greater or less extent between the retort and the flame from the burning vapor; in means for separating the gaseous and the liquid portions of the fuel, and in the devices
40 for regulating the supply of air to the flame.

My improvements are herein described and illustrated as applied to a steam-boiler, to which they are particularly applicable; but they are not limited to such particular use or arrangement of parts, being capable of a wide application in the special art to which they relate and of various embodiment by obvious changes that are not of substance.

In the accompanying drawings, the letter *a*
50 denotes a retort that is formed of metallic

pipe *a'*, wound in form of a conical helix with the apex downward, and this pipe leads from a reservoir or source of fuel supply, (crude petroleum is preferably used) that is placed at any convenient distance, but is not shown
55 in the drawings. From the apex of the helix the pipe extends laterally and then downward, and also outward to a cock or valve, *b*, on the main stem; but before this point is reached a branch, *a''*, leads inward from the
60 main pipe and terminates at a suitable distance directly below the retort and in line with its axis in an open and upturned burner or jet, *a'''*. Another metallic pipe, *c'*, is arranged about the retort *a*, to the outline of which it
65 closely conforms, and which it substantially surrounds in such position that a space is left between the retort *a* and its jacket *c*, the latter protecting the outer surface of the retort from too great contact with the flames of the
70 burning vapor.

It has been explained that the caking up of the tubular retort with the residuum of the hydrocarbon is due to the heating of the retort and contained fuel to a degree that is in
75 fact much greater than is needed to vaporize the hydrocarbons, and my object in interposing the water-jacket is to carry off the excess of heat produced by the flame and keep the temperature of the fuel at a point where the
80 residuum remains liquid. This I successfully accomplish, and the residuum is drawn off by means of the valve *b* as often as required. The vapor from the fuel flows through the branch pipe *a''* to the jet *a'''*, and, mixing with
85 atmospheric air in the injector *d*, is consumed with more or less freedom from smoke or unburned carbon. This arrangement of retort and water-jacket serves as a feed-water heater for the boiler, the outlet-pipe *c''* of the protecting-jacket leading to the feed-pump and
90 thence into the boiler, so that in this special device a double function is served by the combination of the retort and water-jacket.

The bed-plate *e* fits into the fire-pot *f'* of the furnace *f*, and occupies the place of the ordinary grate, and the plate is provided with a number of vertical perforations, *e'*. Over this bed-plate, and resting on it, is a damper, *g*—
that is, a disk-like plate having a number of
100

holes, g' , that register with those in the bed-plate or slide past them as the damper is turned, as by means of a handle that is fast to it and conveniently arranged for access, as
 5 near the door of the space f^2 (usually termed the "ash-pot") below the fire-pot. The damper may be turned to cover or uncover the openings through the bed-plate, and so regulate the supply of air.

10 In the device shown the bed-plate and damper are made in sections to allow of more ready insertion through the door of the fire-pot.

The main object of my improvements is to
 15 provide means for removing the residuum from the retorts, and also to keep it from solidifying and so choking up the passages as to prevent the flow of oil or gas. The part of the outlet-pipe from the retort that is below
 20 the point of divergence of the gas branch a^2 forms a receptacle, a^4 , into which the residuum flows and collects, and from which it may be withdrawn whenever necessary by opening the valve b .

25 In the alternate form of apparatus shown in Fig. 3 the retort, instead of being made in the tubular coil already described, is made of a hollow cone-shaped vessel arranged apex downward, and having within it one or more
 30 shelves on which the oil is dropped from the inlet-pipe. The coil of jacket-pipes c' for the cooling medium surrounds the retort in a similar manner as in the first form.

I keep the temperature of the retort below
 35 a certain degree of heat (about 700° Fahrenheit) at which the residuum solidifies by means of the protecting-jacket of flowing water; but while the particular construction and arrangement of these parts shown is preferable, I do
 40 not limit myself to such.

The function or office of the water that flows through the jacket interposed between the retort and the flame is to carry off the surplus heat, and it is evident that cold air can be
 45 used to effect the same purpose by blowing it through pipes surrounding the retort, but not, perhaps, in so effective a manner as when water is used as a vehicle for the surplus heat.

I claim as my invention—

1. In a device for burning hydrocarbons, in
 50 combination, a retort having inlet and outlet pipes, a protecting water-jacket through which a stream of water flows, the supply-pipe to the retort connecting it to a source of fuel-supply, and the outlet-pipe having means for drawing
 55 off the residuum, and also a branch pipe through which the gas flows to the jet or burner, all substantially as described.

2. In a device for burning hydrocarbons, a retort having an inlet and outlet pipe and a
 60 protecting water-jacket, the outlet-pipe of the retort having one branch for the outflow of the residuum and another for the outflow of the vaporized fuel, all substantially as described.

3. The combination of the helical tubular
 65 retort with a supply-pipe and an outlet-pipe for the outflow of the residuum, and a branch pipe through which the gas flows to the jet or burner, and the water-jacket surrounding and protecting the retort, all substantially as
 70 described.

4. In a device for burning hydrocarbons, a fire-pot, a retort arranged and supported within the fire-pot and having inlet and outlet
 75 pipes, a water jacket covering and protecting the retort in a measure from contact with the flames, means for withdrawing liquid residuum from the outlet-pipe of the retort, and the perforated bed-plate and the damper, whereby the supply of air to the fire-pot is regulated, all
 80 substantially as described.

5. In combination, in a steam-generator, a retort for vaporizing hydrocarbons, a water-jacket protecting the retort and having pipes
 85 connecting the water jacket and the boiler of the generator, whereby heated feed-water is supplied to the boiler and the temperature of the hydrocarbon in the retort reduced, all substantially as described.

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Witnesses:

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