

(No Model.)

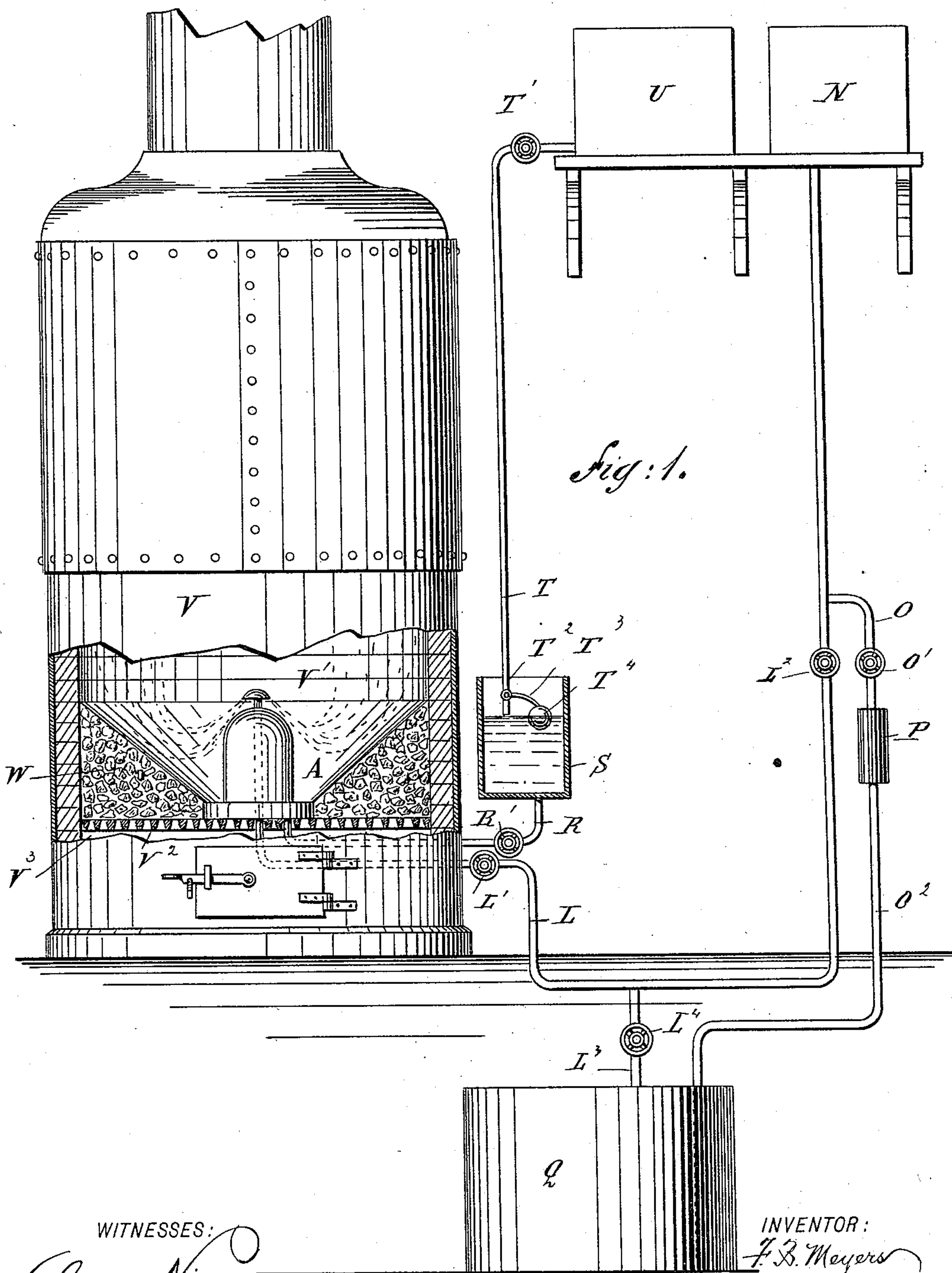
2 Sheets—Sheet 1.

F. B. MEYERS.

COMBINED OIL AND WATER VAPORIZER AND BURNER.

No. 433,870.

Patented Aug. 5, 1890.



WITNESSES:

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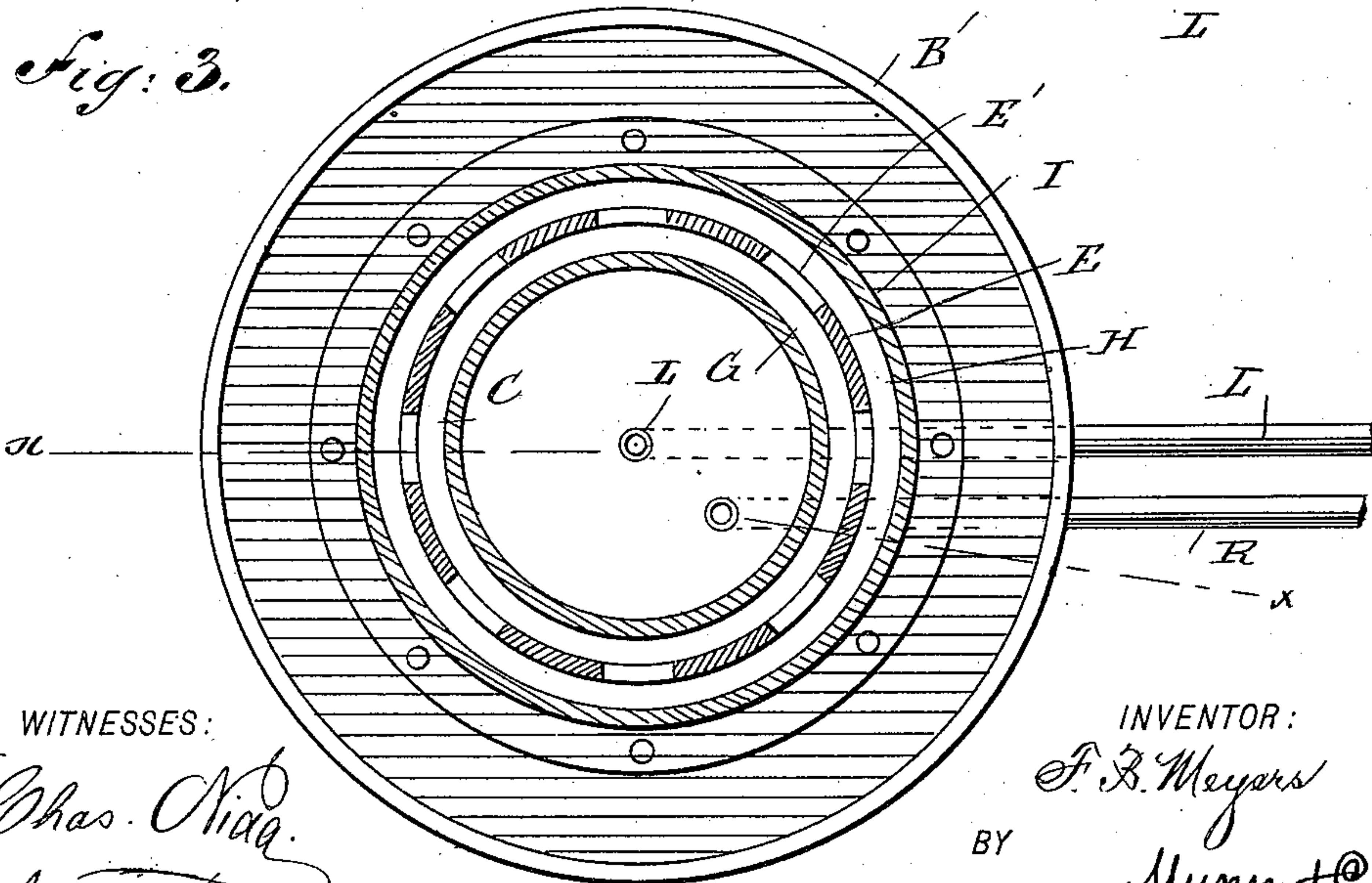
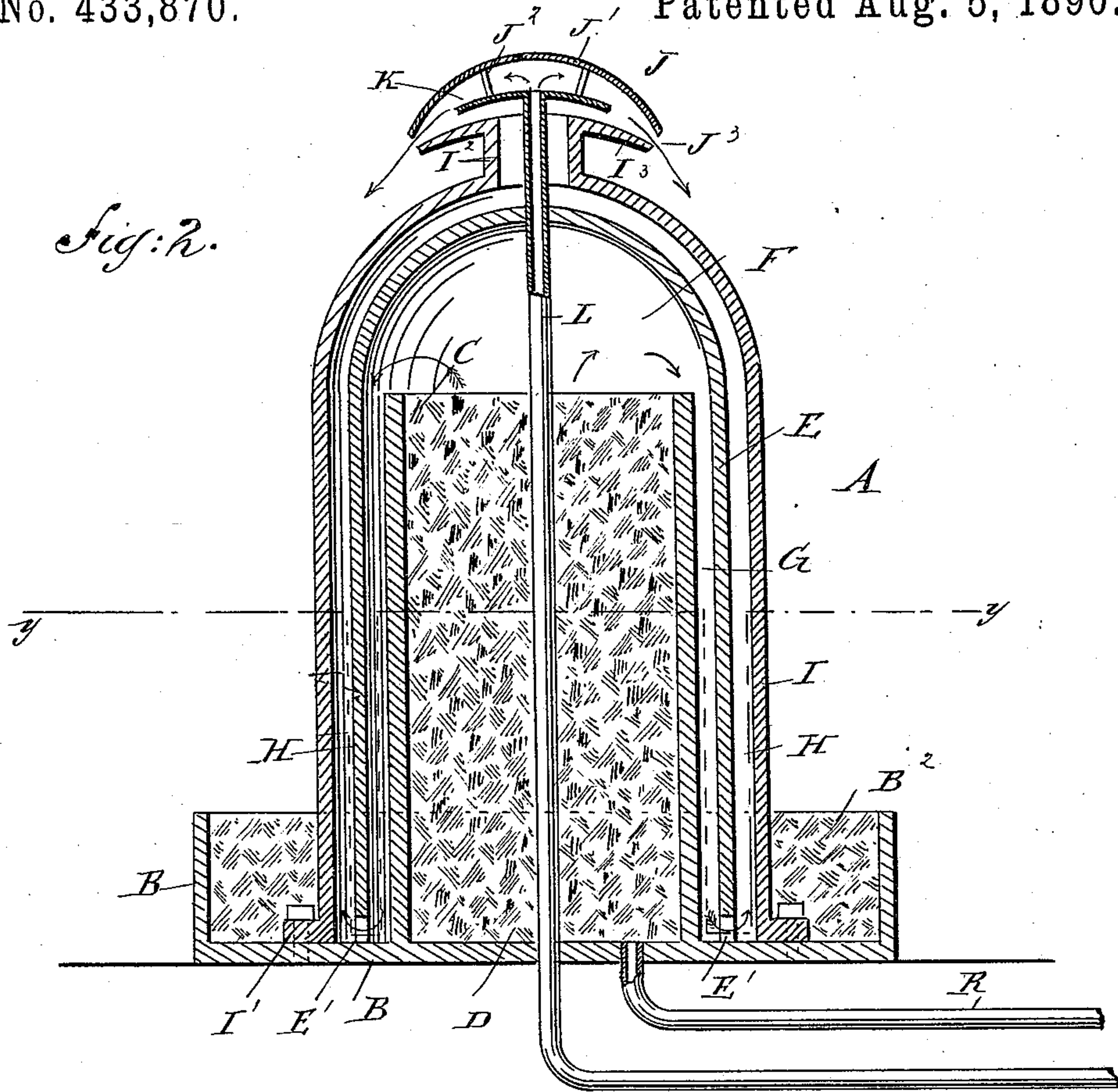
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FRANK B. MEYERS, OF FORT PLAIN, NEW YORK.

COMBINED OIL AND WATER VAPORIZER AND BURNER.

SPECIFICATION forming part of Letters Patent No. 433,870, dated August 5, 1890.

Application filed December 6, 1889. Serial No. 332,802. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. MEYERS, of Fort Plain, in the county of Montgomery and State of New York, have invented a new and Improved Combined Oil and Water Vaporizer and Burner, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hydrocarbon-burner specially designed for boilers and like apparatus, and which permits of using oil and steam as fuel in a very simple, inexpensive, and effective manner.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied to an upright boiler, parts being in section. Fig. 2 is an enlarged sectional side elevation of the burner proper on the line $x x$ of Fig. 3, and Fig. 3 is a sectional plan view of the same on the line $y y$ of Fig. 2.

The improved hydrocarbon-burner is provided with a burner proper A, having a base B, on which is secured the upwardly-extending cylinder C, filled with mineral wool D or other suitable material. The cylinder C is inclosed in a shell E, rounded on top and placed with its end on the base B, so as to form above the cylinder C a dome F and on the outside of the cylinder C a chamber or channel G, which communicates by apertures E' in the lower end of the said shell E with a second channel H, formed by an exterior shell I, held concentric with the cylinder C and the shell E, and of a similar shape to the said shell E.

On the lower end of the outer shell I are formed annular flanges I', secured by bolts or other suitable means to the base B. The channel H leads at its upper end, on top of the shell E, into a short pipe I², from the upper end of which extends the annular flange I³, slightly curved downward, as is plainly shown in Fig. 2. This annular flange I³ forms part of the nozzle J, which is also pro-

vided with an inverted concaved or dished disk J', supported by stays J² from a slightly-dished disk K, held between the annular flange I³ and the disk J', as is plainly shown in Fig. 2. This disk J' and the annular flange I³ are somewhat larger in diameter than the disk K, and they also form an annular outlet J³, through which the mixture of oil and steam passes.

The disk K is supported in its middle on the under side by an oil-supply pipe L, which opens onto the top of the disk, so that the oil flows over the downwardly-curved disk into the space formed between the disk J' and the annular flange I³, to be mixed with the steam generated by the burner, and as hereinafter more fully described.

The supply-pipe L extends through the short pipe I². The top of the shell E passes through the mineral wool in the cylinder C and then passes through the base B and is provided with a valve L' and a second valve L², and then leads into an oil-supply tank N, suspended a suitable distance above the burner proper A, so that the oil flows by gravity and under a certain pressure into the burner proper A—that is, onto the top of the disk K.

From the pipe L above the valve L² extends a pipe O, provided with a valve O' and connecting with an oil-pump P of any approved construction, and connected by a pipe O² with a large reservoir Q, containing oil, which is pumped into the tank N to keep the latter supplied with the necessary oil. A pipe L³ also leads from the pipe L into the reservoir Q, and is provided with a valve L⁴, which when opened permits of withdrawing all the oil from the pipe L and the tank N in case the burner is not used for some time.

Into the bottom of the cylinder C leads a water-supply pipe R, passing through the base B and provided near its outer end with a valve R', and leading to the water-supply tank S, which contains water having a constant level to correspond with the top of the cylinder C, so that when the valve R' is opened water flows from the tank S through the pipe R into and through the mineral wool D in the cylinder C to the top of the latter.

In order to keep the water in the tank S at the same level, a supply-pipe T leads into the

said tank S and is connected with a water-supply tank U, placed a suitable distance above the tank S, preferably on the same shelf or bracket with the oil-supply tank N, as shown in Fig. 1. The pipe T is provided at its upper end with a valve T' and with a regulating-valve T² near its lower end, the valve-stem of the lower valve T² being connected by an arm T³ with a float T⁴, floating in the water in the tank S and serving to automatically open and close the valve T², so as to admit water into the tank S to keep the water in the latter at a constant level.

On the base B is secured an annular upwardly-extending rim B', forming a receptacle for the exterior shell I and for the reception of the mineral wool or other suitable material B², for a purpose hereinafter more fully specified.

The burner proper A, when applied to a boiler V, as shown in Fig. 1, is set in the middle of the fire-box V' on top of the grate-bars V², which latter support loose fire-brick W, preferably arranged in the manner shown in Fig. 1, so as to form a cone-shaped bottom in the fire-box V'. Below the grate-bars V² is arranged the usual ash-pit V³, through which passes the oil-supply pipe L and the water-supply pipe R to the outside of the boiler, and through the said ash-pit V³ passes air to supply the fire-box V', the said air mixing with the burning gas generated by the burner A. It is understood that this air from the outside passes through the grate-bars V² and the loose fire-brick W before it enters the cone-shaped bottom of the fire-box V'.

The operation is as follows: In starting, the valves O' and L⁴ are closed and the valves L' and L² in the pipe L are opened, and the valves R' and T' in the pipes R and T, respectively, are also opened, so that water flows from the tank S through the pipe R into the water-cylinder C, saturating the mineral wool D contained in the water-cylinder C. The oil from the supply-tank N flows through the pipe L into the nozzle J, passes over the disk K down onto the annular flange I³, and from the latter flows over the outer shell I into the mineral wool B², held on the base B, thus saturating the said mineral wool. The operator then ignites the oil on the mineral wool B², so that the burner proper A is heated, whereby steam is generated from the water in the mineral wool D, which steam passes upward into the dome F, then downward through the channel G and through the openings E' into the channel H, up the latter into the pipe I², and through the latter against the under side of the disk K, to be deflected onto the annular flange I³, where it mixes with the oil dripping down the disk K, so that the mixture flows from the nozzle J at the opening J³ and is ignited by the burning oil on the base B. The burning gases, after leaving the nozzle J, pass downward in the fire-box V' of the boiler V, to be deflected upward by the cone-shaped bottom, made of fire-brick W, in the

said fire-box, so as to heat the boiler in the usual manner to generate steam from the water. It will be seen that by this device no separate fire is necessary in the fire-box V' in order to start the apparatus, as the burning oil in the mineral wool B² on the base B heats the burner proper A to generate steam from the water, so that the said steam, after passing through the channels G and H, mixes with the oil in the nozzle J, so that a mixture of oil and steam passes out of the nozzle and burns on the outside of the burner A to heat the boiler.

By the use of the mineral wool in the water-cylinder C the water is prevented from boiling over the upper end of the cylinder C, also preventing the steam from puffing out into the dome F, as the steam passes in a steady stream from the mineral wool into the dome F, and from the latter passes through the channels G and H into the nozzle J. It will further be seen that as the outer shell I is kept hot by the burning gases the steam passing up the channel H is superheated before it reaches the nozzle J. The amount of water passing to the burner proper A is regulated by the valve R', and the amount of oil discharged into the nozzle J is regulated by the valves L' and L². The float T⁴ in the tank S to insure a constant level of the water in the said tank, and consequently of the water in the cylinder C, is filled to about its upper edge constantly with water, so that a constant supply of steam is generated.

When the burner is in operation, the oil passing through the supply-pipe L is readily transformed into vapors by the steam surrounding the upper part of the pipe L in the dome F and pipe I², so that the steam readily mixes with the said vapors in the nozzle J, thus insuring complete combustion of the gases after they leave the nozzle and are burning in the fire-box. It is further understood that in starting the device oil or other inflammable substance may be placed in the outer part of the base B and burned to heat the shells I and E and the cylinder C to generate steam for starting. It will also be seen that the hydrocarbon-burner is always ready for use, and is quickly set in operation to generate its own steam to be mixed with the oil, the mixture being burned in the fire-box of the apparatus to which it is applied.

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

1. In a combined vaporizer and burner, the combination, with the inner or water cylinder, of the intermediate and outer shells surrounding the inner or water cylinder and forming concentric steam-channels, the outer shell terminating in a nozzle into which discharge the said channels, and an oil-supply pipe located in said nozzle, substantially as described.

2. In a combined vaporizer and burner, the combination, with the inner or water cylinder,

der having a filling of non-combustible material and a water-supply-pipe, of the intermediate and outer shells surrounding the inner or water cylinder, forming concentric channels for steam, the outer shell terminating at its upper end in a contracted nozzle into which discharge the said channels, and an oil-supply pipe located in said nozzle, substantially as described.

10 3. In a combined vaporizer and burner, the combination, with the water-cylinder adapted to contain a filling of non-combustible material, and a water-supply pipe, of the intermediate and outer shells surrounding the water-
15 cylinder and forming concentric steam-channels, the outer shell terminating in a nozzle into which discharge the said channels, an oil-pipe located in the nozzle, and a receptacle surrounding the lower part of the outer
20 shell and adapted to contain a non-combustible material, substantially as herein shown and described.

4. In a hydrocarbon-burner, a nozzle comprising a pipe connected with the steam-supply, an annular flange held on the said steam-supply pipe, an oil-supply pipe opening into

the nozzle above the said flange, a curved disk held on the said oil-supply pipe and on the top of which discharges the said oil-pipe, and an inverted concave disk suspended above 30 the said curved disk and forming an outlet-opening with the said flange, substantially as shown and described.

5. In a combined vaporizer and burner, the combination, with a water-cylinder, of intermediate and outer shells surrounding the water-chamber and forming steam-channels, the outer shell being provided at its upper end with a short pipe having an annular flange and into which pipe the steam-channels discharge, an oil-pipe extending through the water-chamber and short pipe of the outer shell and provided with a curved disk on its end above the annular flange, and a concave disk supported from and above the curved 45 disk of the oil-pipe, substantially as herein shown and described.

FRANK B. MEYERS.

Witnesses:

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C. SEDGWICK.