(No Model.)

P. O'REILLY.

HYDROCARBON FURNACE.

No. 250,569. Patented Dec. 6, 1881.

Fig. 1.

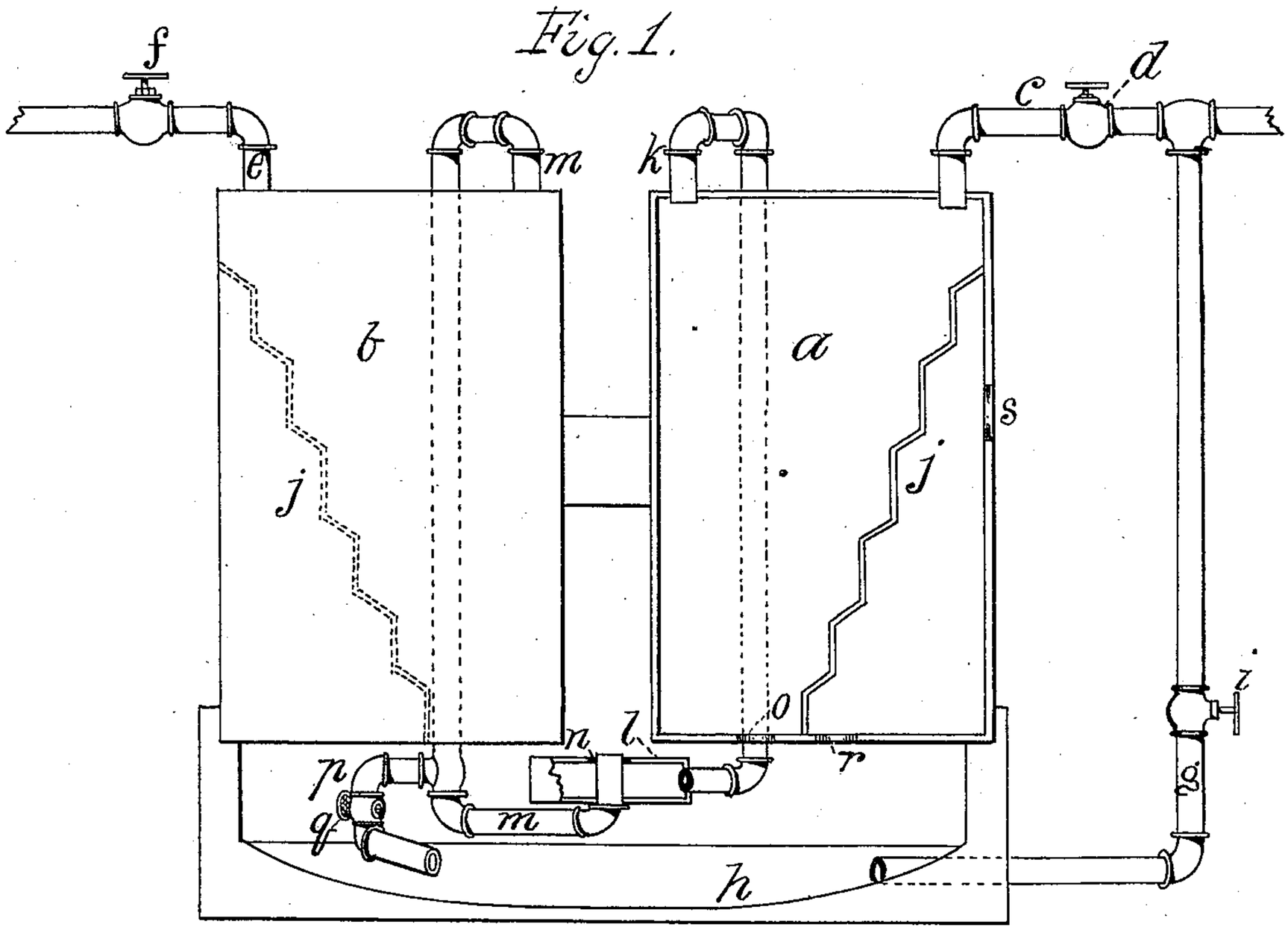
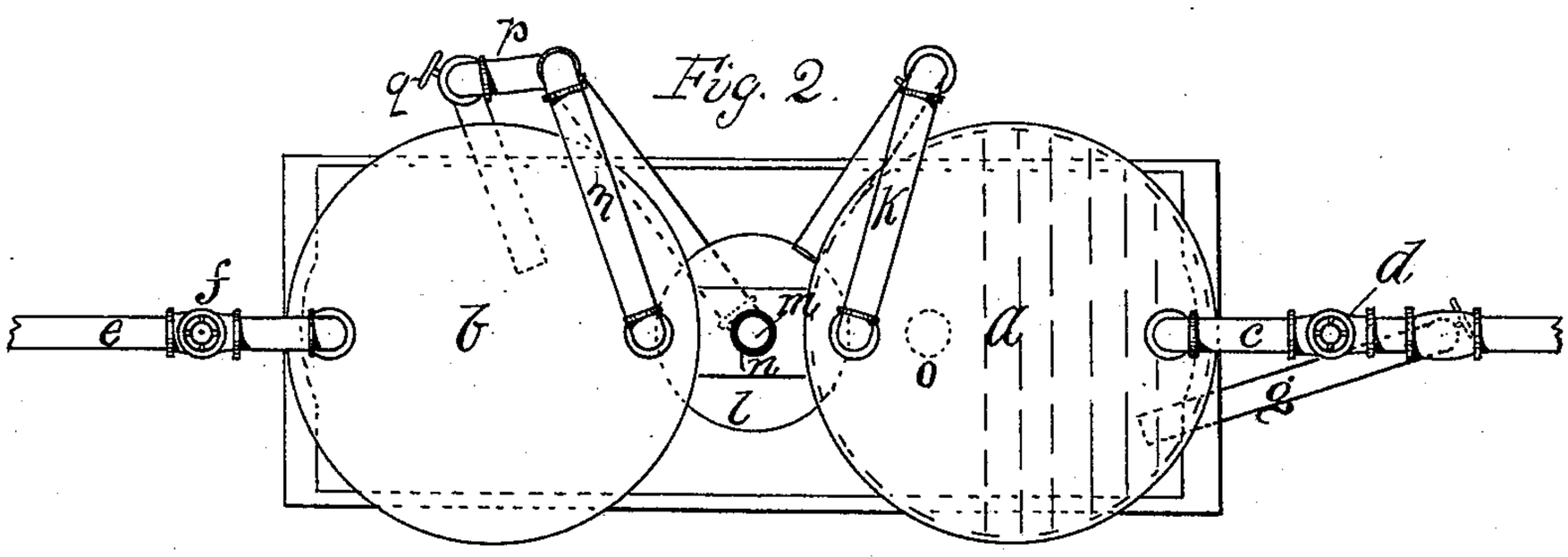


Fig. 2.



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HYDROCARBON-FURNACE.

SPECIFICATION forming part of Letters Patent No. 250,569, dated December 6, 1881.

Application filed July 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, PATRICK O'REILLY, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Hydrocarbon-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of the same.

The object of my improvement is to render the process of heating and vaporizing more rapid and perfect, and also to provide means for consuming the waste tar; and to attain this end my invention consists, first, in heating and vaporizing tanks provided with a series of stairs, over which the liquid fuel is conveyed, with means for heating the same; secondly, in means for facilitating the removal of the tar residuum and reducing it to a liquid state; and, thirdly, in the general construction and combination of devices hereinafter more fully set forth.

My invention is fully illustrated by the accompanying drawings, in which Figure 1 is a vertical section of the retorts and connecting parts, and Fig. 2 a plan view of the same.

a b represent two retorts, similar in general construction and preferably of cylindrical form, each being cast solid in one piece. Both are designed as heating and vaporizing tanks, one for oil and the other water, and the operation of each is separate and independent.

c indicates a pipe through which the retort *a* is charged with hydrocarbons. A cock or valve, *d*, regulates the flow of liquid to the retort. A similar pipe, *e*, leads into the retort *b* for conveying water thereto, the supply being controlled by valve *f*.

With the oil-supply pipe *c* is connected a pipe, *g*, which leads into a hollow open pan, *h*, arranged beneath the retorts, through which oil may be conveyed directly to the pan when required for starting the fire, the flow being regulated by a valve, *i*.

Each of the retorts *a b* is provided with a zigzag partition or stair-case, *j*, extending from the top at a point directly beneath the supply-pipes to the bottom of the tank, so that the liquid, as it flows in from pipes *c* and *e*, will first fall upon the upper stair, and from thence trickle slowly down the zigzag way, the stairs being kept at a high degree of heat by means hereinafter to be described.

k is a pipe provided in the top of the retort *a*, which leads down beneath the retort and into a hollow circular pan, *l*, arranged centrally under both retorts. Through this pipe all the oil vapor or gas generated in the retort *a* is conveyed to the vapor-pan *l*. The steam generated in the water-retort *b* is conducted through pipe *m* to the top of the pan *l*, where it mingles with the oil-vapor and is burned. The steam-pipe *m* leads down to and underneath the pan *l*, and thence through it centrally, discharging the steam at the top of the pan. Here the oil-vapor issuing from the pan *l* through the annular opening *n*, which surrounds the steam-pipe, unites with the steam, and in this condition is burned at a high degree of heat.

In the bottom of the oil-retort *a* is provided an opening, *o*, through which the tar and other similar matter evolved during the process of heating may escape from the tank into a pan, *h*, arranged beneath the retorts. As the tarry matter accumulates in the pan, steam is admitted into the pan through a pipe, *p*, which is connected with the pipe *m*, the flow being regulated by a cock or valve, *q*. By the action of the hot steam the tar is reduced to a liquid state, in which condition it is burned beneath the retorts and is made thereby a heating agent.

In the bottom of each retort, behind the stairs *j*, is provided an opening, *r*, and in the outer side is made a similar opening, *s*, the purpose of which is to permit the flame beneath to enter the retorts and pass up and out at the side, behind and in direct contact with the stairs *j*. A current of flame is thus constantly passing through the retorts, and the stairs are kept in a highly-heated condition as the liquid trickles over them, and thus the process of vaporization is greatly facilitated.

The retorts *a b* are arranged preferably side by side, but with sufficient space between to permit the flame beneath to encompass their entire surface, and thus keep all portions of the cylinders at a uniform heat.

The operation is as follows: A supply of oil having been admitted to pan *h*, it is lighted and the retorts become hot. Valves *d* and *f* being then opened, oil and water will flow into the respective retorts *a b*, and the gaseous

products rising will be conveyed by pipes *k* and *m* down to the pan *l*, at the top of which they unite and are burned.

My device is more particularly adapted for burning crude petroleum; but it may be used with equal advantage to burn any one of the carbon oils.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-furnace, a heating-retort having a continuous stairway arranged therein, and having openings in the walls thereof, whereby the flame is caused to impinge directly upon said stairway, substantially as set forth.

2. A heating and vaporizing tank having a zigzag partition or series of stairs arranged therein, and having an opening in the bottom and side of said tank, whereby the flame is caused to pass through the tank and in direct contact with the stairs, substantially as described.

3. The combination of two separate and independent retorts, having suitable supply-pipes in the top thereof, with a vapor-vessel arranged centrally beneath said retorts, a steam-pipe leading from one retort through said pan and discharging at the top thereof, and an oil-vapor pipe discharging into said pan, the said pan being provided with an aperture surrounding the steam-pipe for the escape of the oil-vapor, substantially as set forth.

4. In a hydrocarbon-furnace, an oil-heating tank provided with an opening in the bottom for the escape of tar, in combination with a suitable receptacle arranged beneath said tank for burning the tar, substantially as set forth.

5. The combination, with the retorts *a* and *b*, supply-pipes *c e*, and vapor-pipes *k m*, of the pan *h* and pipes *p* and *g*, all arranged to operate substantially as set forth.

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