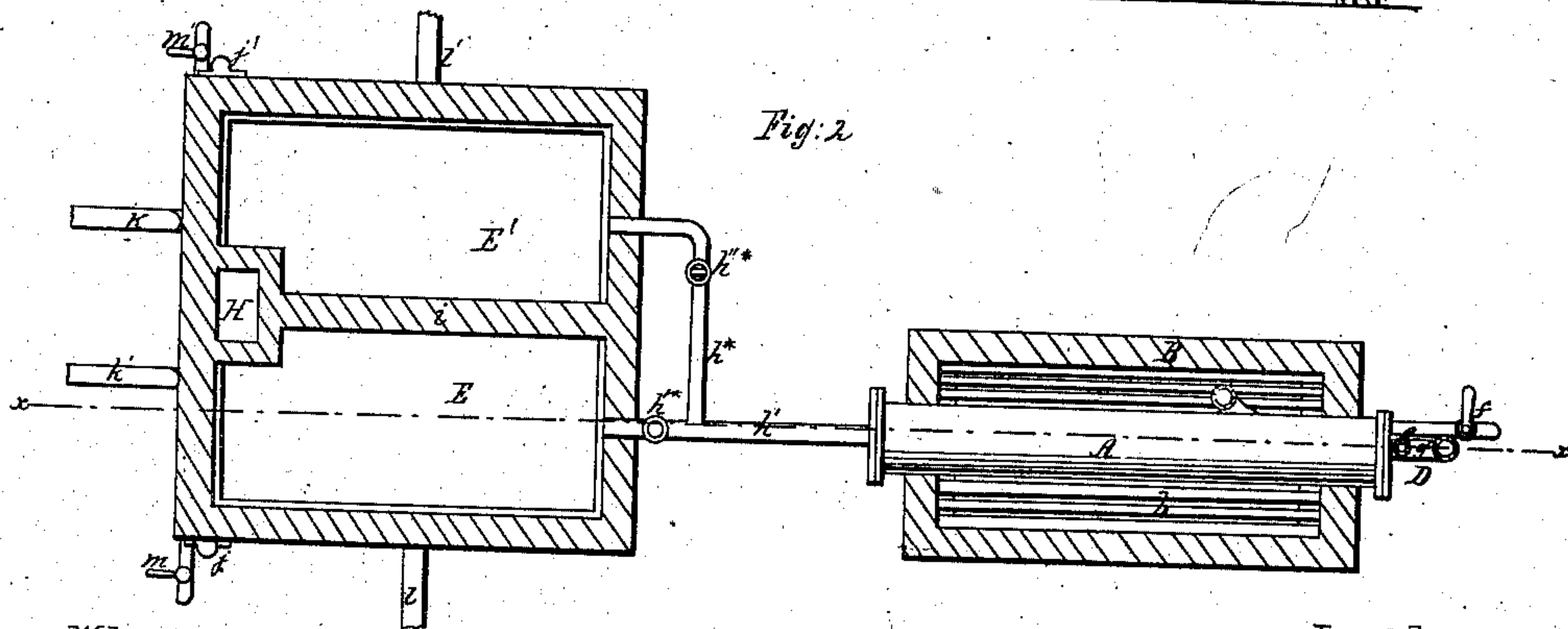
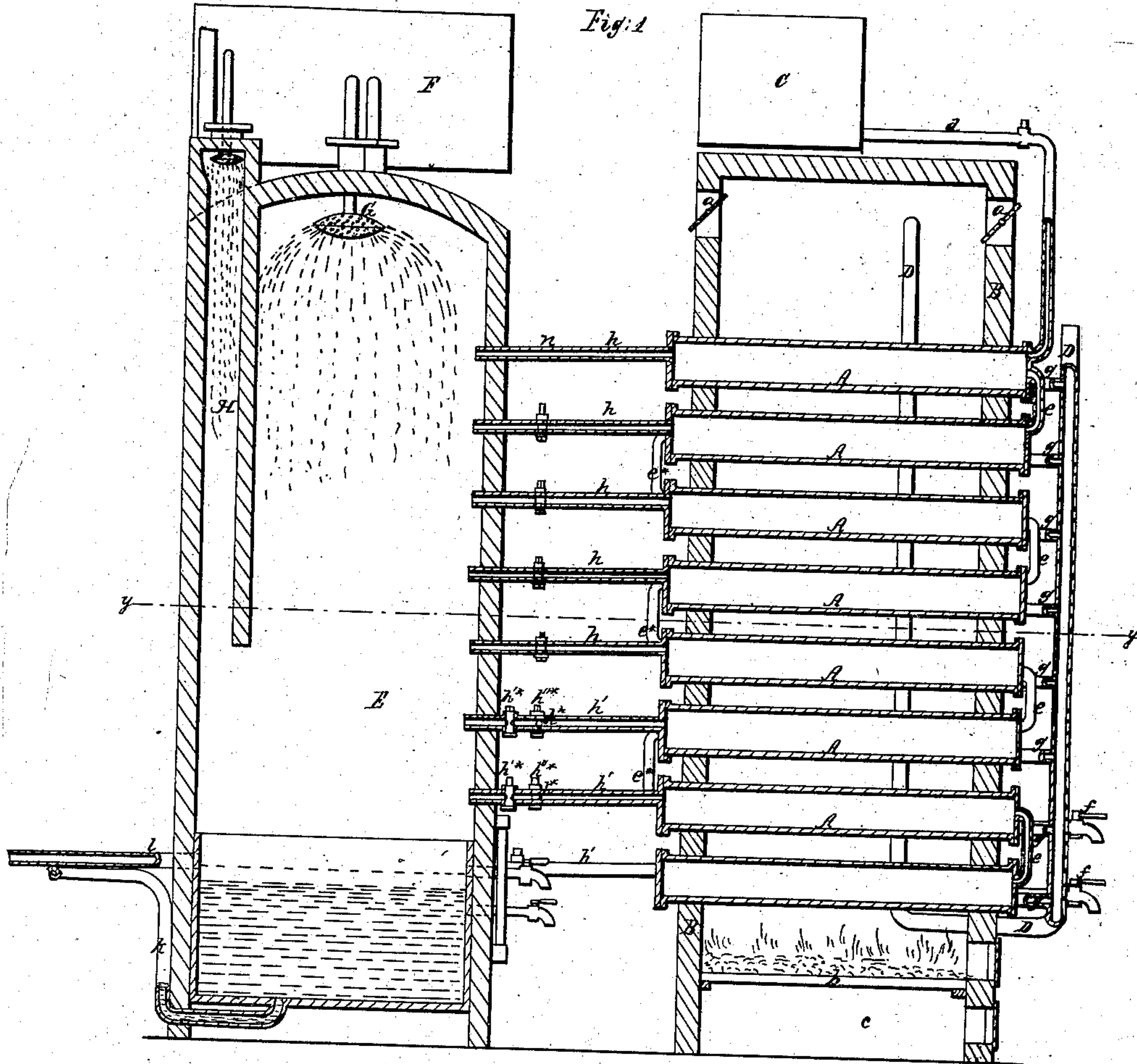


Helley & Tait

Oil Still

No
32,568.

Patented Jan. 18, 1861.



Witnesses
Chas. Thompson
 Lewis A. Tucker

Inventors
E. H. Helley
A. C. Tait

UNITED STATES PATENT OFFICE.

E. G. KELLEY, OF NEW YORK, N. Y., AND A. H. TAIT, OF JERSEY CITY, N. J.

IMPROVEMENT IN APPARATUS FOR DISTILLING OILS.

Specification forming part of Letters Patent No. 32,568, dated June 18, 1861.

To all whom it may concern:

Be it known that we, E. G. KELLEY, of the city, county and State of New York, and A. H. TAIT, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Apparatus for Distilling Oil; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of our invention, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a horizontal section of the same, taken in the plane indicated by the line *y y*, Fig. 1.

Similar letters of reference in both views indicate corresponding parts.

This invention consists in the arrangement of a series of retorts one above the other in the same furnace, in combination with a suitable supply-pipe, and with overflow-pipes, and with a steam-pipe, the steam passing through which is superheated by running it down through the interior of the furnace, and which communicates with each of the retorts in such a manner that the crude oil supplied to the uppermost retort, and running from the same by the overflow-pipes to the lower retorts, is gradually heated, and the vapors of the oil mixed with the superheated steam are carried into one or more condensing-chambers, where both the vapors of the oil and the steam are condensed by the action of one or more jets of water introduced through suitable roses, and that by thus mixing the vapors of the oil with steam and condensing them simultaneously with the steam the oil is refined and deodorized by one operation.

It consists also in connecting the several retorts by means of pipes in such a manner that the vapors formed in all the retorts are returned to the highest retort, from which they pass off into the condensing-chamber.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation with reference to the drawings.

A series of retorts, A, of cast iron, clay, or any other suitable material, are arranged in the interior of a furnace, B, built of brick sufficiently high to admit eight (more or less) retorts, one above the other, as clearly shown

in Fig. 1 of the drawings, and so constructed that it also serves as chimney. Two or more dampers, *a*, at or near to its upper extremity serve to regulate the draft of the fire, and a grate, *b*, with an ash-box, *c*, completes the furnace. A tank, C, on the top of the furnace, and supported by suitable braces, receives the crude oil, and a pipe, *d*, forms the communication between this tank and the uppermost retort. The several retorts communicate with each other by means of overflow-pipes *e*, that are so arranged that a continuous flow of the oil downward is effected, and a regular depth maintained in each retort. The lowest retort or retorts are furnished with discharge-cocks, *f*. The oil in the retorts is mixed with superheated steam, that is introduced through a pipe, D, the upper end of which connects with a steam-boiler, and which enters the furnace at or near its top, and after passing down through the entire height of the same emanates at or near its bottom, whence it bends upward, communicating with the several retorts through branch pipes *g*, as clearly shown in the drawings. In passing down through the interior of the furnace the steam is superheated, and as it reaches the several retorts its temperature is equal, or nearly so, to that of the oil contained in the same, and it readily mixes with the vapors of the oil and passes off with them through the pipes *h h'* into the condensing chamber or chambers E E'. These chambers, which like the furnace are built up of brick or of any other suitable material, are separated from each other by a partition, *i*, and they are used one to condense the light and the other the heavy oils.

To effect the separation of the oils the pipes *h'*, which conduct the vapors from the lower retorts to the condensing-chambers, are provided with branch pipes *h** and stop-cocks *h** and *h''**, so that by shutting the cocks *h** and opening the cocks *h''** the vapors from these retorts pass into the condensing-chamber E'. The condensation is effected by jets of water introduced from a water-tank, F, through roses G into the chambers E E'. As the cold water comes in contact with the vapors of the oil and steam the latter are condensed simultaneously, and the condensed water and oil, together with the condensing-water, accumulate on the bottom of the cham-

bers E E', the water below and the oil on its surface, the quantity of oil and water contained in said chambers being indicated by glass gages *j j*, that are inserted into the sides of the chambers. The non-condensable or very volatile gases contained in the vapors of the oil and steam pass off through the chimney H, and a rose, I, which allows of throwing cold water into said chimney, serves to condense such condensable vapors, which may yet be mixed with the gases passing off through the chimney. The water which accumulates at the bottom of the chambers E E' runs off through the overflow-pipes K K', and the oil through the pipes *l l'*, with faucets *m m'* to draw off the light oil from one and the heavy oil from the other chamber.

The principal advantages of this apparatus are derived in the first place from the manner of arranging the retorts in the furnace, one above the other, and from the connecting overflow-pipes, whereby the oil is gradually heated as it descends from the highest to the lowest retort, and an explosion is rendered almost impossible. Furthermore, by the introduction of superheated steam the evaporation is facilitated, and the vapor of the oil is made to pass readily with the steam into the condensing-chambers, and as the vapor of the oil is brought in direct contact with the condensing-water, and condensed simultaneously with the steam, the miasms or atoms which are the cause of the disagreeable smell of the oil are precipitated with the water, and the oil is refined and deodorized by one operation. Besides this, the light and the heavy oils can be separated from each other by the aid of my apparatus in a very convenient and expeditious manner.

In some cases it may be desirable to rectify the oil without the aid of steam; and in such

cases the pipes *e** are used in combination with the connecting-pipes *e* to cause the vapors from all the retorts to pass up to the highest retort, from which the whole mass of vapors is conducted to the condensing chamber or chambers. In this case—that is, when it is desired to use the pipes *e e** for the purpose of returning the vapors to the highest retort—all the pipes *h' h*, with the exception of that pipe which connects the highest retort with the condensing-chambers, have to be closed by suitable stop-cocks, as indicated by red outlines in Fig. 1 of the drawings. By stopping these pipes the vapors are compelled to pass up through the pipes *e e**, while at the same time the oil drips down through the pipes *e*.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of a vertical range of retorts, A, in an upright furnace, B, in combination with the supply-pipe *d*, connecting overflow-pipes *e*, steam-pipe D, and branch-pipes *g*, all constructed and operating in the manner and for the purpose shown and described.

2. The combination of the vertical range of retorts A, steam-pipes D, and one or more condensing-chambers, E E', substantially as and for the purpose described.

3. The arrangement of the pipes *e** in combination with the vertical range of retorts A, and connecting-pipes *e*, as and for the purpose set forth.

E. G. KELLEY.
A. H. TAIT.

Witnesses:

M. M. LIVINGSTON,
LEWIS A. TUCKER.