

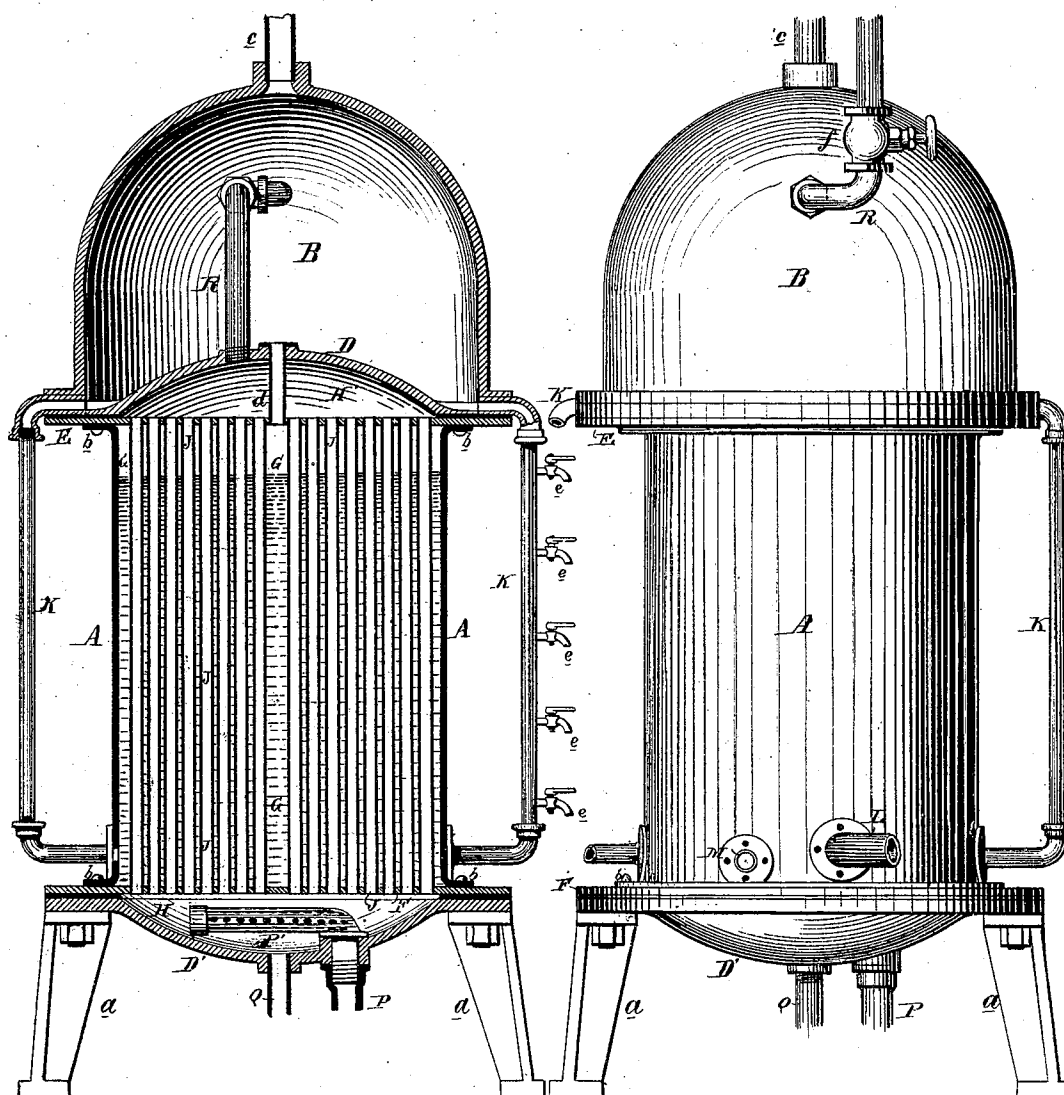
W. H. BURR.
Improvement in Apparatus for Vaporizing Hydrocarbon
Liquids.

No. 132,800.

Patented Nov. 5, 1872.

FIG. 2.

FIG. 1.



WITNESSES

John Parker
Thos. McQuinn

W. H. Burr
by his Atty.
Horison and Son

UNITED STATES PATENT OFFICE.

WILLIAM H. BURR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND EDWARD B. ENGLISH, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR VAPORIZING HYDROCARBON LIQUIDS.

Specification forming part of Letters Patent No. 132,800, dated November 5, 1872.

To all whom it may concern:

Be it known that I, WILLIAM H. BURR, of Philadelphia, county of Philadelphia and State of Pennsylvania, have invented Improvements in Apparatus for Vaporizing Hydrocarbons, of which the following is a specification:

My invention consists of certain improvements, too fully explained hereafter to need preliminary description, in apparatus for vaporizing hydrocarbons to form ignitable gases to be used in the generation of steam and for other purposes, the main objects of the said improvements being to prevent the waste of the hydrocarbon which is produced by the condensation of the vapor before it leaves the apparatus, and to cause a thorough diffusion of steam through the tubes of the heater in order that the hydrocarbon may be thoroughly heated, and unequal contraction and expansion of the tubes prevented.

In the accompanying drawing, Figure 1 is an exterior view, and Fig. 2 is a sectional elevation, of my improved apparatus for vaporizing hydrocarbons.

The apparatus, viewed from the exterior, consists mainly of a flanged casing, A, supported upon legs *a*, and surmounted by a large semi-spherical drum, B. The casing A has at its upper and lower ends concavo-convex flanged heads D and D', between which and the said casing intervene tube-plates E and F, the whole being secured together by bolts or rivets *b*, and the joints being suitably packed to prevent leakage. The tube-plates E and F separate the interior of the casing into three chambers, G, H, and H', the two latter of which are connected together by and communicate freely with each other through a number of tubes, J, secured at their opposite ends to the tube-plates and arranged closely together within, and occupying the interior of the central or oil chamber G. The drum or vapor-chamber B has an outlet, *c*, at the top, and communicates with the upper portion of the oil-chamber G through a tube or tubes, *d*, and with the lower portion of the said chamber through two or more pipes, K, arranged on the outside of the apparatus, one of the said pipes K being furnished with a number of cocks, *e*, so that it may serve as a gage to indicate the height of the oil in said chamber G. The latter is supplied with oil through a

pipe, L, and steam is admitted into the chamber H at the bottom of the apparatus through a pipe, P, and is diffused in the said chamber through perforations in a branch, P', secured to the end of the pipe. A drip-pipe, Q, is attached to the bottom of the chamber H to carry off the water of condensation, and a circulating-pipe, R, for the steam communicates with the upper chamber H', extends through the side or top of the drum B, and is provided outside of the latter with a valve, *f*.

In using the apparatus the chamber G is filled nearly to the top with the benzine, light oil, or other hydrocarbon from which it is desired to produce an ignitable vapor, and steam is then admitted into the chamber H through the pipe P and its perforated branch P' for the purpose of heating and vaporizing the said hydrocarbon. This steam, owing to the manner in which it is admitted into the chamber H, is thoroughly diffused through the latter, and is distributed uniformly to all of the tubes J, through which it rises, and after having filled the upper chamber H' passes off through the pipe R, the valve *f* in the latter being opened or closed to a greater or less extent as circumstances may require, in order to accelerate or retard the passage of the steam. The steam passing through the tubes J will quickly heat the oil in the chamber G, from which the vapor passes through the drum B and through the pipe *c* to the point of ignition to be used in the generation of steam or for other purposes.

There is always more or less condensation of vapor in the drum B, and the accumulation of oil upon the bottom of the same, owing to this condensation, has been one of the principal objections to other apparatus of this class, in which no provision has heretofore been made for carrying off or returning the oil to the generating-chamber, so that there is invariably a great loss of material. Attempts have been made to prevent condensation, and thus overcome this objection, by surrounding the apparatus with casings, through which steam is caused to circulate; but this increases the number of joints and the liability of leakage, and also adds to the cost of the apparatus and to the difficulty of obtaining access to the interior of the same when repairs are necessary. I have effectually overcome this difficulty by

the use of the pipe K, through which the oil as it accumulates in the drum is conducted back into the generating-chamber G to be again vaporized.

Heretofore steam has been introduced from the bottom of the apparatus into the tubes, there to remain until condensed, resulting in an unequal and ineffectual heating of the oil; or it has been introduced directly at the upper ends of the tubes, where, not being surrounded by the oil, they become overheated, and are speedily cut and eaten away. I overcome these difficulties by introducing the steam at the bottom, where the tubes are always surrounded and protected by the oil, by permitting the steam to escape from the pipe R, so that there is a continuous upward flow through the tubes, and by so diffusing the steam in the lower chamber that it shall flow uniformly into all of the tubes. The apparatus is also simplified, and constructed with one joint less at each end than usual, by the use of the concavo-convex heads D and D'.

I claim as my invention—

1. The combination, substantially as de-

scribed, of a return tube or tubes, K, with the generating-chamber and drum B of a vaporizing apparatus.

2. The combination, with one of the said return-tubes K, of cocks *e e*, arranged as set forth.

3. A vaporizing apparatus in which the steam is introduced at the lower end and flows continuously upward and through a pipe, R, substantially as specified.

4. A vaporizing apparatus in which steam is diffused, substantially in the manner described, in a chamber communicating with the tubular heater, prior to its passage into and through the tubes of the said heater.

5. The combination of the concavo-convex heads D and D' with the tube-plates E and F and casing A, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM H. BURR.

Witnesses:

JOHN PARKER,

ALFRED W. HANN.