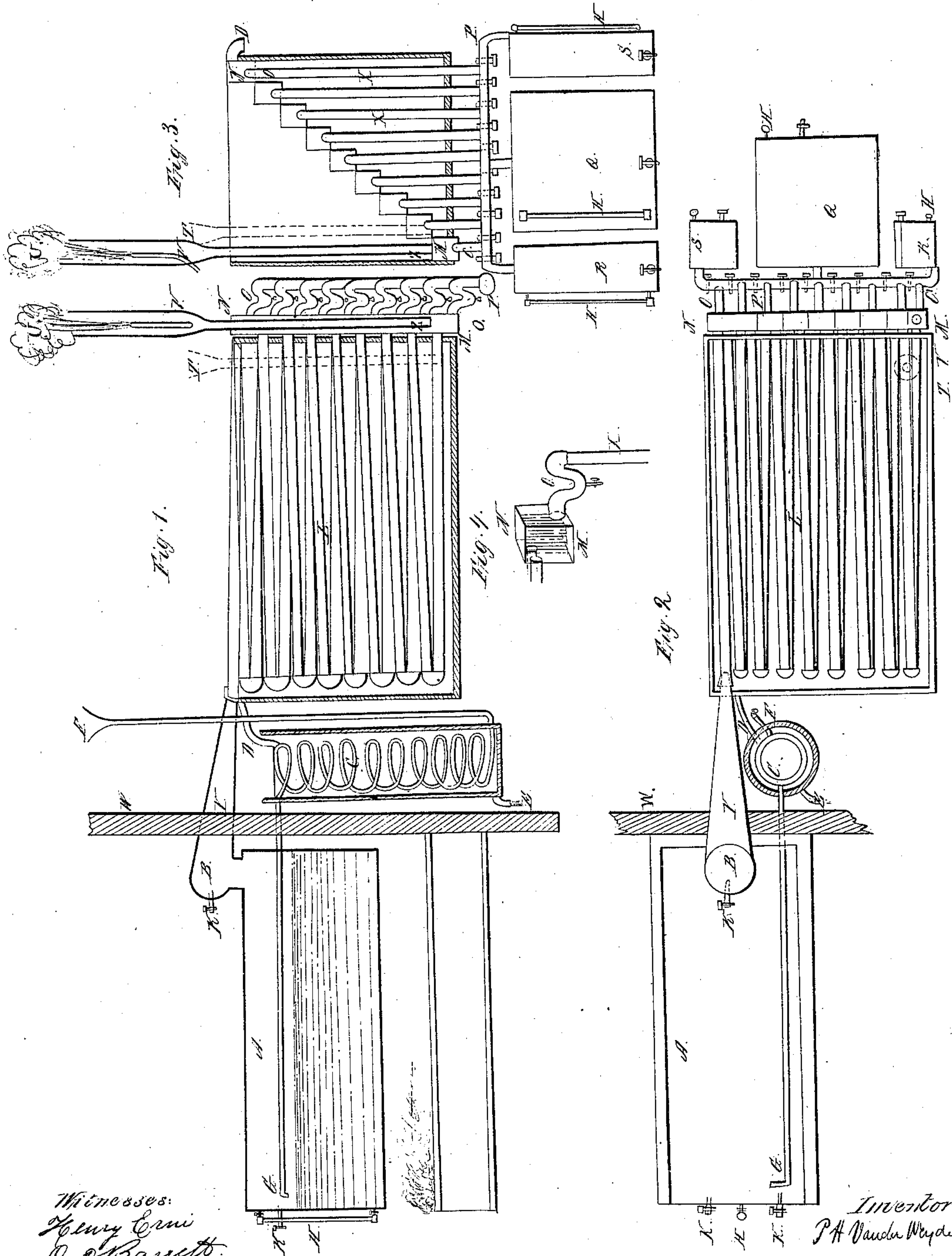


P. H. Van der Weyde, Oil Still,

N^o. 58,005.

Patented Sep. 11, 1866.



UNITED STATES PATENT OFFICE.

P. H. VANDER WEYDE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN DISTILLING PETROLEUM AND OTHER LIQUIDS.

Specification forming part of Letters Patent No. **58,005**, dated September 11, 1866; antedated August 8, 1866.

To all whom it may concern:

Be it known that I, P. H. VANDER WEYDE, chemist, of Philadelphia, in the State of Pennsylvania, have invented an Improvement in Distillation; the nature of which consists, first, in a tubular condenser, through which the vapor is drawn by a steam-jet, centrifugal blower, or other contrivance applied at the upper exit of the tube usually intended for the escape of the non-condensable gases, causing thereby a partial vacuum in the tubes, and hastening the entrance of the vapor from the still in the same, which may be still more promoted by stop-cocks admitting air or passing in said non-condensable gases or other escaping vapors or steam, and thus driving on and condensing more rapidly all vapors; second, in providing the tubular condenser with eight, nine, ten, or more or less, exits for the condensed products, distributed at different distances through its whole length, so as to separate at once the products of different volatility, and not mix them, as thus far was necessarily the case.

The following is a correct description of this invention, which will enable all others skilled in this business to make or use it, reference being had to the accompanying drawings.

A is the still, of the usual form, provided with a dome, B, and a stop-cock, K, opposite the exit Y, and intended to admit, as well as the other stop-cocks K at the opposite end of the still, air or steam, or gases and vapors escaping from the tube V. H is a glass tube indicating the height of the liquid in the still, and W a brick wall separating the fire-room from the rest of the establishment.

The operation of the still is intended to be continuous. Therefore a feeding-tube, G, conducts the crude oil or other substance in the still, after it has passed through C, containing the hot condensing-water, entering at D and escaping at E. This crude liquid ascends by the pressure in the column F through the coil C, and passes finally along or around the still A, in order to be heated before entering. During this heating process vapors will arise and enter the still, as the direction of this tube is continually upward from E to G.

The condenser is constructed of a rectangular water-tank filled with a number of straight

iron tubes of the same length, connected at one end by a U and at the other end by a square cast-iron box, which is the principal feature of this invention, and therefore represented on a larger scale in Fig. 4. This box serves to collect and separate from the vapors all liquids condensed thus far, and to lead them, by O, X, and P, to their reservoir, and to give occasion to the non-condensed, and therefore more volatile, substances to pursue their course through the rest of the condensing-tubes.

The box N M, Fig. 4, has two openings at the upper part at the back—one to admit vapor and liquid, the other to discharge alone vapor. The liquid is discharged from the box in front through O and X, and in order to cause liquid particles floating in the vapor to remain in this box, and to guard against them being mechanically carried onward with the vapors, a vertical wire-gauze is contrived, dividing this box into two parts between the two openings, so that all the vapor passes, as it were, through a sieve, and is more perfectly freed of liquid particles.

The tube T admits, as usual, cold water to the bottom of the tank, and it has its exit at the opposite upper end of the tank, at D, and serves then, as before remarked, to heat the ascending column entering the still. It is clear that by this arrangement the least volatile products, being first condensed, will collect in the box N, and by the tube X pass to the reservoir S for lubricating-oil. The more volatile portions will continue their course and gradually condense in the rest of the tubes, and we will find in the different successive boxes liquids of different degrees of volatility, till, finally, the most volatile substance will not be condensed before reaching the last box, M. This box is provided with the usual tube for the escape of the non-condensable gases, made, however, of the same caliber as the other tubes. At its upper part it is wider, to admit of the apparatus for exhausting, which may be an air-pump, or simply a steam-pipe, V, in its center, blowing a jet of steam upward. This steam, carrying with it the air in the tube, causes a partial vacuum behind it, and consequently a strong draft, in the same manner as it is produced in the

smoke-pipes of locomotive-engines; and in order that this partial vacuum shall act on the whole length of the condensing-tubes and still, the connections of the tubes X X with the reservoirs are air-tight or hermetically sealed; and before any liquid from the reservoirs can be drawn off the exhaust in V V is temporarily suspended. If an air-pump is used, its exit with safety-valve may be connected with the stop-cocks K, to drive in the vapors escaping in V, or V may simply be connected with the stop-cocks K, and the air-pump be placed between the still and condenser.

Finally, in order to lead the different liquids to their proper reservoirs, the connecting-tube P is provided with a stop-cock between each of the descending tubes X X, so that if some kinds of petroleum produce much light oil, two or three of the tubes X may be connected with R; or if, to the contrary, the petroleum produces much heavy oil, two or three of the longer tubes X X, at the other extremity of P, may be connected with the tank S. The product of the middle portion, being always free from the too heavy and too light portions, runs always in the middle tank, Q. The quality of each portion descending through each tube X may be tested by samples drawn off by the small cocks in the bend O. It is clear that by this my arrangement we succeed to separate by one single, very rapid, and con-

tinuous distillation any kind of petroleum or other substance in products of graduated different volatility, which, by the stop-cock in the connecting-tube P, we may at once mix, as necessary, or separate, if we choose.

What I claim as my invention is—

1. The production of a partial vacuum by suction produced in the still by a pump, either between it and the condenser, or at the end of the tube intended for the escape of the non-condensable products, which vacuum may be filled by those non-condensable products—vapor, air, or steam—led to and admitted from the other end of the apparatus, provided with a safety-valve.

2. The peculiar arrangement of the fractional condenser and its collecting and separating boxes, producing at one single operation liquids of different degrees of volatility, as above described.

3. A series of stop-cocks at different places in the still and condenser, for the purpose of admitting a current of air, or of conducting the escaping gases and vapors or steam, over or through the liquid during the process of exhaustion.

P. H. VANDER WEYDE, M. D.

Witnesses:

EDMUND WILCOX,

ALONZO P. RUTHERFORD.