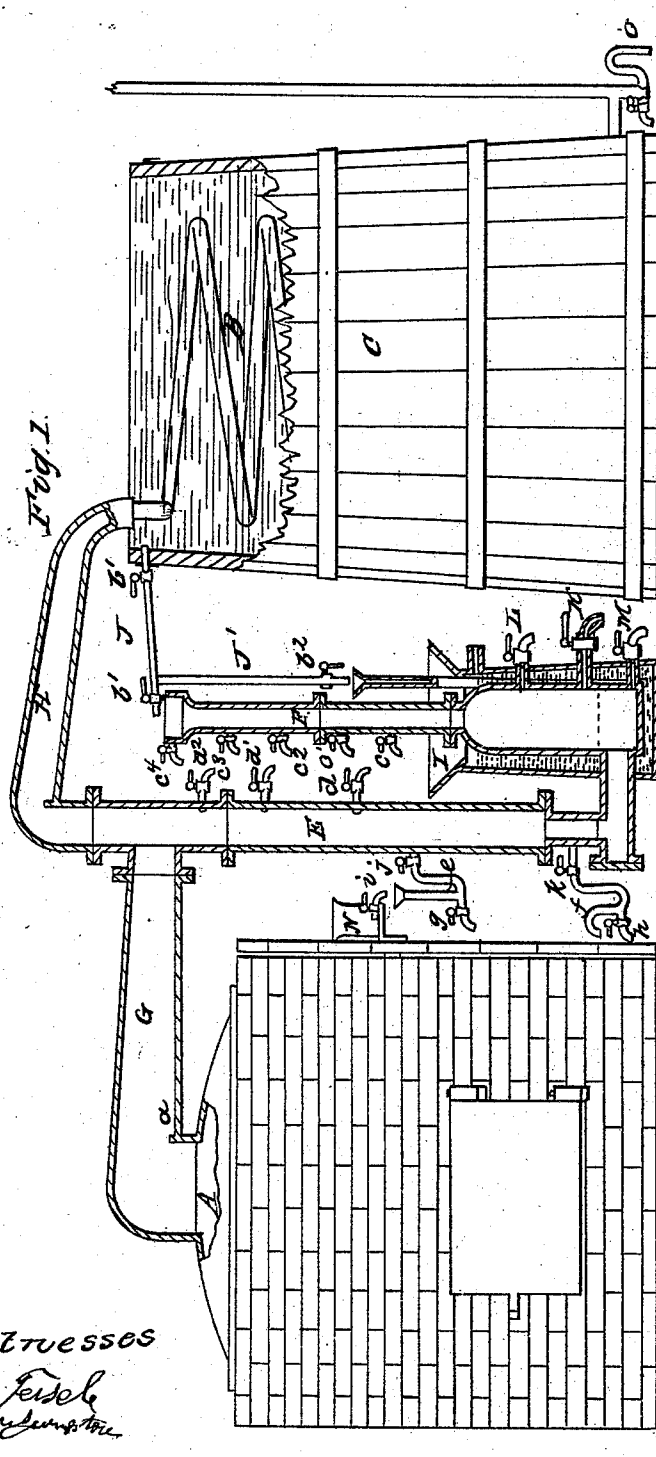


A. QUINN.

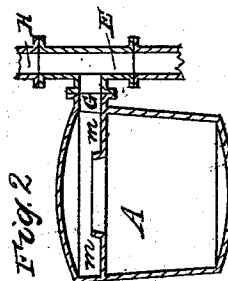
Oil Still.

No. 31,998.

Patented April 9, 1861.



Witnesses
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR DISTILLING OILS.

Specification forming part of Letters Patent No. 31,998, dated April 9, 1861.

To all whom it may concern:

Be it known that I, ABRAHAM QUINN, of the city, county, and State of New York, have invented a new and useful Improvement in Apparatus for Distilling Oils and other Substances; and I 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 an elevation, partly in section, of an apparatus with my invention applied. Fig. 2 exhibits a section of a still-head with a modification of part of my invention.

Similar letters of reference indicate corresponding parts in both figures.

My invention is more especially intended to be applied in connection with apparatus for distilling crude petroleum, but is applicable, also, in connection with apparatus for the distillation of palm and other oils, and for the redistillation and refining of crude coal-oils.

It consists, principally, in the employment of an inverted siphon applied and arranged in combination with the still and the condenser, substantially as hereinafter described, for the purposes, first, of enabling the distilling and refining of the oils to be effected at one operation and by the same heat without the use of agitators, pumps, or analogous machinery; second, of serving as a safety-valve in such cases as when paraffine or palm oil has been allowed to solidify in the worm by the neglect of the operator; third, of serving as a vacuum-chamber to prevent oil boiling over from the still into the condenser and mixing with distilled oil in the receiver; and, fourth, as a means of running back a portion of the oil to the still.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and its operation in the distillation of crude petroleum.

A is the still, made of any well-known or suitable form.

B is the condensing-worm, and C the cooling-tub.

E F is the inverted siphon, which constitutes the principal feature of my invention, and which I call the "rectifier." The leg E of this siphon has connected with it the still-neck G,

and is connected with the condensing-worm by a second neck, H, the latter neck being at the top of the leg and the still-neck being connected at a short distance below. The still-neck has a very slight descent toward the siphon, and the upper end of the leg F should not be quite so high as the little dam *a*, that extends across the upper end of the bottom of the still-neck. The still-neck should have a transverse section of the form of an ordinary coal-gas retort—that is to say, with a flat bottom—that oil may flow over it in a thin sheet. The lower part of the leg F, which is of larger diameter than the part above, is situated in a water-tank, I.

J is a pipe to supply water from the cooling-tub C to the leg F of the siphon, with a branch, J', to supply the tank I, such pipes being furnished with cocks *b b'*. The lower and longer part of the leg F is furnished with three faucets, K L M, all projecting through the tank I, and the part above the tank is furnished with faucets *c c' c''*, whose mouths are over the tank I. The leg E is furnished with gage-cocks *d d'*, and also with two small inverted siphon-pipes, *e f*, which are furnished, respectively, with faucets *g* and *h* at their bends and with stop-cocks *j* and *k* close to the leg E. Above the siphon-pipe *e* there is placed a small receiver, N, fitted with a faucet, *i*, to discharge the contents into the funnel-mouth of the said pipe.

The operation is conducted in the following manner: I will first suppose all the faucets in the siphon to be closed. Having filled the still with oil to the desired depth, I kindle the fire in its furnace and continue the heat moderately for some time, during which I open the large faucet K in the lower part of the leg F of the siphon and close the lower one, M, and by opening the cocks *b* and *b'* admit water to the siphon E F till it begins to flow off at K, when I stop it by closing *b*, leaving K open. I then open the cock *k* and faucet *h* in the siphon *f* and place a pail under the said faucet. When the benzole begins to evaporate, some passes over to the worm B, but a portion condenses in the leg E, which I call the "chamber" of the rectifier, and runs out through the siphon *f* into the pail, which I change as often as full, emptying the full one into the small receiver N. During the evap-

oration of the benzole the siphon E F constitutes, as it were, a safety-valve, for in case of the still boiling over the oil passes into the said siphon, from whence it flows by the large cock K or by two or more of such cocks into a crude-oil receiver. When all the benzole has been evaporated, what remains in the still is less liable to boil over, and at this point I close the cock *j* and draw off what remains in the siphon-pipe *e* by the faucet *g*. I then close the faucet K and open *c*, and by opening the cock *b* draw more water into the rectifier, and as soon as it begins to overflow at *c* stop it by shutting *b*, and open the cock *j* of the siphon *e* and open the faucet *i* to run the benzole from the receiver N into the chamber E, in which it is evaporated by the increasing heat emanating from the still, and from which it is thus caused to pass to the worm B to be condensed. When all the oil has passed from the tank F to the rectifier, I close the cock *j* and draw off what remains in the siphon *e* by the faucet *g* and return it for subsequent treatment to the receiver N, which is fitted with a close cover to prevent its contents evaporating spontaneously. As the distillation proceeds the heavier vapors, instead of passing over to the worm, will be condensed in the chamber E, and as the oil accumulates therein the water will rise in F and run out freely through the faucet *c*.

To reduce the quantity of oil in the chamber E, the faucet *c* is closed and one of the higher ones—*c'*, for instance—is opened and water let into F till it overflows at *c'*. This causes the water to drive the oil up the chamber E, makes a smaller space for the oily vapor to condense in, and by bringing the oil in the chamber nearer the still causes it to be exposed to a greater heat to be rectified and carried over to the worm. By closing the faucet *c'* and admitting more water to F the oil may be caused to flow from E back along the flat bottom of the still-neck, where it will present a large surface exposed to still greater heat than in the chamber E. In case, by accident or mistake, all the faucets attached to the rectifier be closed and water still be allowed to flow into F, the oil in the rectifier will rise in E and flow gently along the neck G, and over the dam *a* into the still without impeding the progress of distillation; but the water cannot rise in E above the level of the top of F, but overflows the top of F into the tank I, making noise enough to attract the attention of the distiller. Steam could be generated in sufficient quantity from the water in E to assist in purifying the oil while in a state of vapor. When the oil running from the worm at O begins to change its color from white to yellow, I open the faucet *c* and water runs out until the oil in the chamber E of the rectifier comes down to near the level of the

said faucet. This change makes a large cooling-space in the chamber E for a portion of the dark oily vapor to condense in, and the oil running from the worm improves in color. When it begins to run off yellow again, I open the faucet K, to cause all the oil in the rectifier but what is necessary to remain in the bend of its siphon for the prevention of the escape of vapor to run out. In thus running out the oil a portion of water is liable to get mixed with it, but this is easily separated by the mode usually adopted by oil-distillers for the purpose. When the oil has ceased or nearly ceased running from the faucet K, I draw the fire and let the still cool. I then open the lowest faucet, M, to run out, while warm, the paraffine-oil which remains in the siphon-bend, and which, if allowed to cool and solidify, could not be so easily taken out. In this way petroleum, crude coal-oil, or palm-oil in its natural or decomposed state, for the candle-manufacturer, may be distilled to dryness and leave the interior of the worm sufficiently clean for the operation of a fresh charge. The still-neck should be enveloped with a composition of potter's clay and pounded asbestos, and covered with sheet-iron or otherwise protected with a non-conducting covering to confine the heat within it as much as possible, and obviate the necessity of too high a heat of the still, by which the quantity of permanent gas evolved is increased.

Two or more rectifiers like the siphon E F and its appendages may be combined, the neck H of the first connecting with the next like the still-neck connects with the first, as represented in the drawings, and so on through the series such a series of rectifiers may be employed to bring the oils into contact with chemicals in their chambers, and produce agitation by their own gravity during the process of distillation.

Instead of the still-neck having a dam, *a*, as represented in Fig. 1, the still head and neck may be constructed, as represented in Fig. 2, with a gallery, *m*, round the interior of the head, such gallery presenting a large heating-surface, on which the oil is allowed to run back from the rectifier to be re-evaporated.

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

The rectifier composed of the inverted siphon E F, with its faucets and other appendages, substantially as described, applied, in combination with the still and condenser, in such manner as to be capable of effecting the several operations and purposes herein set forth.

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