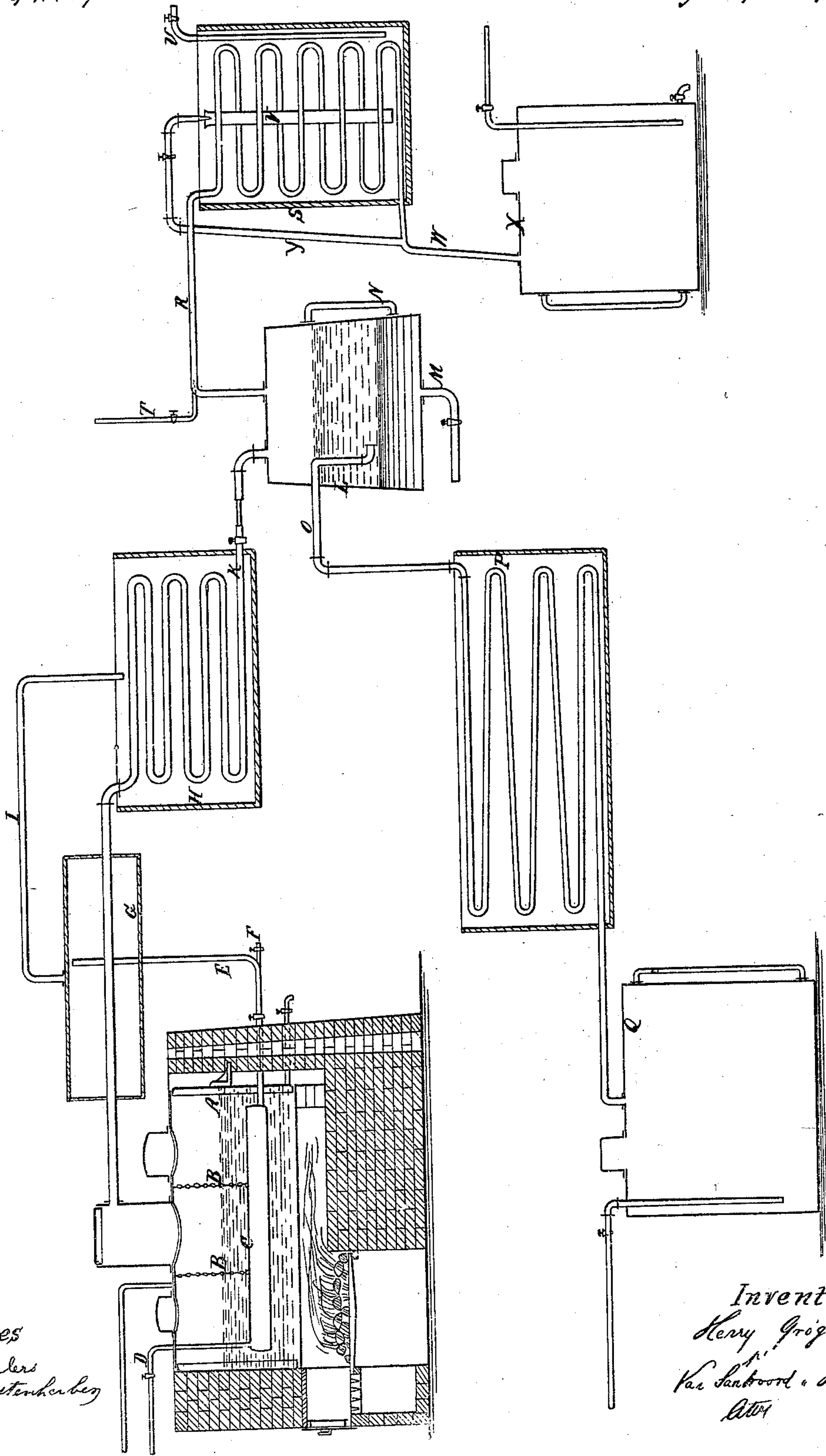


*Oil Still.*

N<sup>o</sup> 94.409.

*Patented Aug. 31, 1869.*



*Witnesses*

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# United States Patent Office.

HENRY GROGAN, OF FLATBUSH, NEW YORK.

Letters Patent No. 94,409, dated August 31, 1869.

## IMPROVED STILL.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, HENRY GROGAN, of Flatbush, in the county of Kings, and State of New York, have invented a new and useful Improvement in Atmospheric-Stills; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, which drawing represents a sectional side elevation of this invention.

This invention relates to a still, which is intended particularly for distilling petroleum, or other liquids of a similar nature. The liquid in the still is heated by superheated steam, or heated air, passing through a heater secured in the interior of the still, in addition to the fire which acts on the external surface of said still; in such a manner that, by the heat of the superheated steam or hot air, the light constituents of the liquid to be distilled are driven out, and the coking of the heavy liquids is prevented.

The vapors emanating from the still pass through one or more condensers, and they discharge, in a partially-condensed state, into a distillate-separator, from which emanates a pipe to carry off the light vapors through an additional condenser, while a siphon-pipe serves to carry off the liquid resulting from the condensation of the heavy vapors, through an additional condenser or cooler, into the receiving-tank.

The discharge of the light vapors from the distillate-receiver is facilitated by a jet of steam injected into the discharge-pipe, and the vapors which are still uncondensed after having passed through the additional condenser, are separated from the liquid by the suction of the overflow of the water, which serves to cool the condensing-coil.

The letter A designates the still, within which I suspend, by chains or rods B, a steam-heater, C, at such an elevation in the still as to be immersed in the charge or body of oil to be acted upon.

The heater is supplied with steam through the steam-supply pipe D, and the steam is discharged therefrom through the pipe E, which, after passing beyond the wall of the still, is carried upward into a hot-water condenser, G, through which the gooseneck of the still is conducted on its way to the condenser H.

The steam-pipe E is provided, at its lowest point, with a water-cock and pipe, F, in the usual manner, for the purpose of blowing off the water of condensation therefrom.

The hot-water condenser G is supplied with water in any suitable manner, and the water is warmed or heated by means of the steam discharged from the discharge or exhaust-pipe E, the vapor or steam from the hot-water condenser or drum G being conducted

thence through the exhaust-pipe I to the condenser H, where its open end is immersed in the water contained in the tank of that condenser, and a constant circulation or flow of the exhaust steam through the pipes E and I is maintained.

The condenser H is made in any usual or suitable manner, and the oil and uncondensed vapors are discharged therefrom through the pipe K, which is made in whole or in part of transparent material, so that the condition of the oil discharged through it can be seen by the attendant.

From the pipe K the oil and uncondensed vapors pass into a vessel, which I call a distillate-separator or receiver, L, into which, at or near its bottom, I introduce a steam-pipe, M, for the purpose of heating its contents to the temperature of about 150° Fahrenheit, the temperature being indicated by an indicating-apparatus or gauge, N, arranged in the side of the separator.

The heavier oils or matters which are collected in the separator L are conducted thence through a siphon-pipe, O, which enters the side of the separator near its top, and is carried downward therein toward its bottom, its open end terminating at a suitable height above the bottom.

The outer and longer leg of the siphon-pipe O, outside of the separator, is connected with the worm of a condenser or cooler, P, and, after passing through the same, the oils or liquids which are thus obtained from the separator are discharged into a receiving-tank, Q.

The uncondensed vapors which are collected in the separator L are discharged or drawn off therefrom by means of a pipe, R, going out of the top of the separator, and leading into the worm of the condenser S, the discharge of such vapors being facilitated by means of a jet of steam injected into the pipe R from a steam-pipe, T, so as to produce a partial vacuum in the pipe R, at or near the top of the separator.

The condenser S is supplied with cold water through a supply-pipe, U, and its overflow is discharged from the tank of the condenser through a vertical pipe, V, set in said tank, whose mouth is a little below the top of said tank.

The lower end of the worm of the condenser S is connected, after it passes out of the condenser, with a bent pipe, W, which conducts the liquids discharged from the worm into a receiving-tank, X, the uncondensed vapors that pass from the worm being drawn away from pipe W into the connecting-pipe Y, which rises therefrom, as shown in the drawing, and is carried to the top of the condenser, where it is bent down and passed down into the overflow-pipe V a sufficient distance to allow its open end to be immersed in the volume of the overflow-water that runs through said pipe V, whereby a partial vacuum is created in the



pipe Y, and the said uncondensed vapors are sucked or drawn into and through it, and finally carried off with the overflow-water.

The steam-drum or heater C, within the still, enables me to vaporize and drive off the lighter constituents of the charge, and thereby facilitate the evaporation of the heavier parts, and lessen or prevent the burning or coking thereof by the action of the fire.

The recondensation of the vapors which pass off from the still in such a manner as to obtain the liquids of heavier gravity in a separate state from the lighter liquids, is facilitated by means of my hot-water condenser G, the temperature of which will be always lower than that proceeding from the fire of the furnace or from the heater C, since its heat is obtained from the exhaust steam coming through the discharge-pipe E. The vapors that come off from the still through the gooseneck, are subjected to the condensing action of the warm contents of the condensing-drum G, and a portion of the heavier vapors are thereby condensed into a liquid before they can reach the condenser H.

The separation of the oils of different gravities is further facilitated and effected by means of the subsequent stages of my process, and the devices employed by me therein, among which is the vessel which I call the distillate-separator, whence the condensed liquids are drawn off through the siphon O, the operation of said siphon being automatic, since, whenever the liquid in the separator rises above the level of the top of the pipe, as indicated by the line  $\alpha$ , the liquid will rise in the pipe O to the top thereof, and the liquid will con-

sequently begin to flow through the pipe down to the condenser or cooler P, and, as the longer leg of the siphon is outside of the separator, the flow, once established, will be maintained so long as the mouth of the siphon is immersed in the liquid collected in the separator.

Having thus described my invention,

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

1. The hot-water condenser G, in combination with the suspended drum C, pipe E, and the gooseneck of the still, whereby the water in said condenser is heated by means of the steam discharged from the drum, substantially as and for the purpose described.

2. The distillate-separator L, combined, substantially as described, with a siphon for discharging the liquids therefrom, and also combined with a vapor-discharge pipe, R, operating in conjunction with a steam-jet, T, substantially as above set forth and described.

3. The combination, with a condenser, of an overflow-pipe, V, for carrying off the surplus water from the tank of the condenser, and a vapor-discharge pipe, Y, whose discharge-end is inserted in the mouth of the overflow-pipe V, substantially as and for the purposes above described.

HENRY GROGAN.

Witnesses:

W. HAUFF,

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