

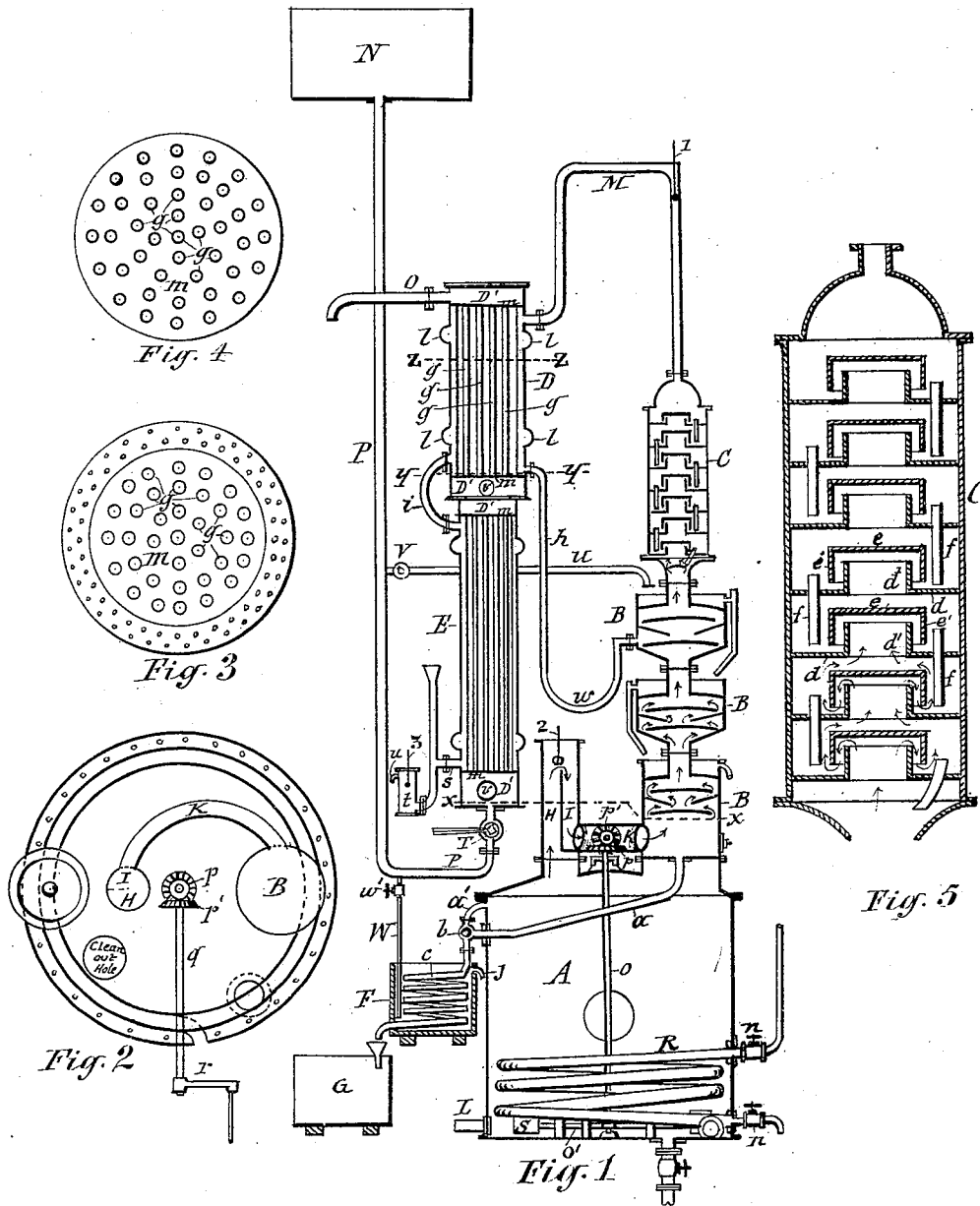
(No Model.)

C. J. T. BURCEY.

ALCOHOL STILL.

No. 265,304.

Patented Oct. 3, 1882.



WITNESSES -  
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# UNITED STATES PATENT OFFICE.

CHARLES J. T. BURCEY, OF BINGHAMTON, NEW YORK.

## ALCOHOL-STILL.

SPECIFICATION forming part of Letters Patent No. 265,304, dated October 3, 1882.

Application filed May 18, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES J. T. BURCEY, of Binghamton, in the county of Broome, in the State of New York, have invented new and useful Improvements in Alcohol-Stills, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention is designed as a further improvement on the wood-distilling apparatus for which I have pending another application for United States Letters Patent.

My present invention relates more particularly to an improved arrangement of the ducts by which the vapor is conducted from the still or heating-tank to the condensers, which are mounted directly on said tank.

It also relates to an improved arrangement for returning from the condensers to the heating-tank the heavy products of distillation, and, furthermore, relates to a novel construction of a condensing-cylinder, whereby the same is relieved of undue strain, all as hereinafter fully described, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical section of my invention. Fig. 2 is a horizontal transverse section on line *x x* in Fig. 1. Figs. 3 and 4 are enlarged transverse sections, respectively, on lines *y y* and *z z*, and Fig. 5 is an enlarged vertical transverse section of one of the vapor condensing and separating appliances.

Similar letters of reference indicate corresponding parts.

A represents the tank into which the liquid spirits to be treated are introduced, together with such chemicals as may be deemed necessary or desirable, said tank being heated by a coil-pipe, B, having a steam-inlet and a steam-outlet at opposite ends, controlled by stop-cocks or valves *n n*. At or near the bottom of the interior of the tank A is arranged a horizontal rotary sweep or agitator, S, connected to a vertical shaft, *o*, which is extended through the top of the tank, and is provided on its outer end with a miter-pinion, *p*, which meshes in a miter-gear, *p'*, connected to a horizontal shaft, *o'*, which is provided with a crank, *r*, by means of which rotary motion can be imparted to the

agitator S when desired, the object of said agitator being to stir the spirits under treatment, and also to assist in cleaning the tank when emptied of the spirits.

L denotes an auxiliary steam-heating pipe, entering the bottom of the tank A, and employed to complete the vaporization of the liquid in case the same is too low in the tank or too heavy to be easily distilled.

From the top of the tank A rises a vapor-duct, H, which communicates at its upper end with a descending duct, I. From the base of the latter is extended a horizontal duct, K, which communicates with the base of a series of condensers, B B, mounted directly upon the top of the tank A, and constructed and arranged similar to the superstructed condensers shown in my Patent No. 229,585, of July 6, 1880, said condensers consisting of chambers provided with a series of deflecting-plates, which compel the vapor to pass through said chambers in a sinuous or tortuous course, and by the resultant retardation of the passage of the vapor cause the heavy products of distillation to precipitate and return to the tank A below, while the lighter and purer spirit vapor is allowed to ascend. Each of the condensing-chambers B is provided on its top with a receptacle for cooling water, which is conveyed to the receptacle of the uppermost condenser B by a pipe, U, as hereinafter described, each of the receptacles being provided with an overflow-pipe, by means of which the cooling water is conducted successively from one condenser B to the other in the manner described and shown in my prior patent, hereinbefore mentioned. The vapor-exit of the uppermost condenser B communicates with another condensing and separating cylinder, C, which is superstructed on the column of condensers B B, and is provided with a series of annular diaphragms, *d d*, secured air-tight to the inner circumference of the cylinder, and having at their center an upward-projecting duct, *d'*, reaching part way the height between two of the said diaphragms. Over the top of the duct *d'*, and a short distance from the same, is arranged a deflector, *e*, in the form of a horizontal disk projecting over the sides of the duct *d'*, and having a pendent flange, *e'*, surrounding said duct, thus causing the vapor,

after ascending through the duct  $d'$ , to be deflected down on the exterior of said duct, from whence it circulates around the exterior of the flange  $e'$  of the deflector and up through the succeeding duct  $d'$ , the course of the vapor being thus forced to follow a tortuous course throughout the height of the cylinder C. The deflection of the vapor by the deflectors  $e$  causes the heavier products of distillation to condense and precipitate on top of the successive diaphragms  $d$   $d$ . An overflow-pipe,  $f$ , passing through the diaphragm, allows the liquid or heavy vapor to descend successively from one diaphragm to the other and pass through the subjacent condensers B B to the base thereof, from whence the said liquid and heavy vapor is conducted to another condensing apparatus and receptacle, hereinafter described. The aforesaid overflow-pipes  $f$  have their upper end somewhat higher than the base of the flange  $e'$  of the deflector  $e$ , so as to cause the latter to be partly submerged in the heavy and condensed products of distillation accumulated on top of the diaphragm  $d$ , and thus compel the lighter vapor to pass through the said condensed vapor, thereby promoting the process of distillation.

From the top of the cylinder C is extended a vapor-duct, M, which, after rising a certain height, is deflected and connected with the upper end of another condensing-cylinder, D, placed in a vertical position. This cylinder has at opposite ends water-spaces D' D', formed of plates or flue-sheets  $m$   $m$ , extended across the interior of the said cylinder, said water-spaces communicating with each other by vertical flues  $g$   $g$ , extended from one flue-sheet to the other and firmly secured thereto. The duct M enters the cylinder D below the upper flue-sheet  $m$ , and thus causes the vapor from said duct to circulate between the flues  $g$   $g$ . Another duct,  $i$ , tapping the cylinder D a short distance above the lower flue-sheet, conveys the vapor from the base of the condensing-cylinder D to still another condensing-cylinder, E, having water-spaces and water-flues similar to the preceding cylinder, D, the water-spaces of the two cylinders communicating with each other. The vapor-duct  $i$  enters the cylinder E below the upper flue-sheet  $m$  thereof, and thus allows the vapor to circulate between the flues of said cylinder. Immediately above the lower flue-sheet of the cylinder E a pipe,  $s$ , draws the distilled spirits into the bottom of a chamber,  $t$ , which is provided at or near its top with an outlet,  $u$ , for said spirits.

N represents the reservoir for the water employed for condensing the spirits in process of distillation. It is placed in an elevated position, so as to produce the requisite circulation of the water through the hereinbefore-described condensers D and E, the water being conducted to the base of the cylinder E by a pipe, P, provided with a stop-cock, T, for controlling the flow of water. An overflow-pipe, O, connected to the upper water-space D' of the

condensing-cylinder D, allows the water to escape at that point and maintains the current thereof. By means of a branch pipe, U, extended from the pipe P to the water-receptacle of the uppermost condenser B, the latter and its subjacent condensers receive their condensing medium. A stop-cock, V, connected with the pipe U, serves to control the flow of water through said pipe. A pipe,  $h$ , extended from the condensing-cylinder D, immediately above the lower flue-sheet  $m$  thereof, to the uppermost condenser B, allows the heavy products of distillation to return from the cylinder D to the tank A through the condensers B B. By a downward deflection of the intermediate portion of the pipe  $h$  a trap,  $w$ , is formed to prevent the escape of the vapor from the condensers B directly to the condensing-cylinder D. The lower water-spaces D' of the condensing-cylinders D and E are each provided with a hand-hole,  $v$ , through which said water-spaces can be cleaned.

F represents a water-tank, which receives water from the pipe P by a pipe, W, provided with a stop-cock,  $w'$ . An overflow,  $\beta$ , at or near the top of the tank, maintains the water at a uniform level in said tank.

$a$  is a pipe which taps the base of the series of condensers B B and passes out down into the tank A and out through the side thereof, and is at the exterior of the same combined with a two-way cock,  $b$ , having a branch pipe,  $a'$ , communicating with the upper part of the interior of the tank A. The other outlet of the two-way cock communicates with a coil-pipe,  $c$ , arranged in the water-tank F, the end of which coil-pipe communicates with a tank or receptacle, G, which collects for subsequent redistillation the heavy products of distillation drawn from the base of the condensers B B by the pipe  $a$ , as hereinbefore set forth, and conducted to the receptacle G by the worm or coil-pipe  $c$ . The arrangement of the pipe  $a$  inside of the tank A serves to keep hot the substance passing through said pipe until it reaches the two-way cock  $b$ . When it is found that the substance carried off by the pipe  $a$  is of a consistency to admit of its being returned direct to the tank A the two-way cock  $b$  can be turned to close its communication with the coil  $c$  and open the way through the pipe  $a'$ , thereby causing the products of distillation drawn from the base of the condensers B B to flow to the tank A.

1, 2, and 3 represent thermometers applied to the distilling apparatus at different points for the purpose of ascertaining the temperature of the spirits under treatment.

The cylinders D and E, I construct with a circumferential swell or distention,  $l$ , near each end of the vapor-space, as shown in Fig. 1 of the drawings. The object of this construction is to allow the cylindrical shell to expand and contract without straining and loosening the connection of the flues  $g$   $g$  with the flue-sheets  $m$   $m$ , which effect would be produced if the ex-

ternal shell were a true cylinder, inasmuch as the said shell, by its being impinged by the hot vapor, is subject to greater expansion than the flues *g*, through which the cold water circulates.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the tank A and the condensers B, mounted directly on top of said tank, as shown, of the vertical duct H, rising from the top of the tank A, and the descending duct I, extended from the top of the duct H, and the horizontal duct K, extended from the foot of duct I to the condensers B at their base or junction with the tank A, substantially in the manner described and shown.

2. The combination, with the tank A and the condensers B, mounted directly on top of said

tank, as shown, of the pipe *a*, tapping the base of said condensers and extended through the tank, the two-way cock *b*, connected to the outer end of pipe *a*, and the pipe *a'*, extended from the two-way cock to the upper part of the tank A, substantially as described and shown.

3. The cylinder D, provided with the circumferential distention *l*, in combination with the flue-sheets *m m* and flues *g g*, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 8th day of April, 1882.

CHARLES J. T. BURCEY. [L. S.]

Witnesses:

WM. C. RAYMOND,  
C. BENDIXON.