

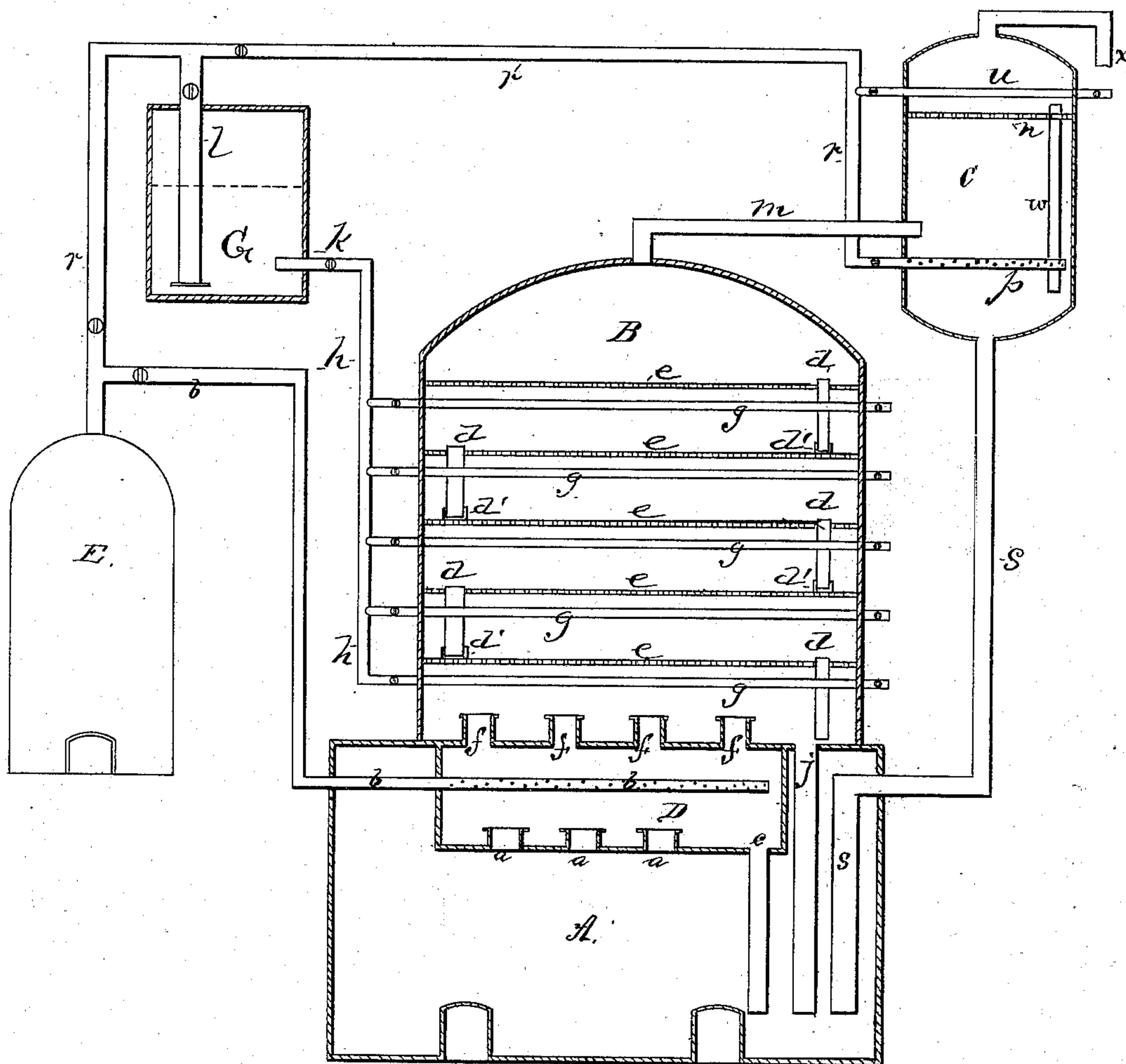
(No Model.)

L. DAUL.

APPARATUS FOR RECTIFYING PETROLEUM.

No. 258,284.

Patented May 23, 1882.



Witnesses.
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR RECTIFYING PETROLEUM.

SPECIFICATION forming part of Letters Patent No. 258,284, dated May 23, 1882.

Application filed January 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, LOUIS DAUL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have made certain Improvements in Apparatus for Rectifying Petroleum, of which the following is a specification.

This invention relates to improvements in the construction of the still, the rectifier, and purifier, by which an improved effect is obtained in all these in rectifying crude petroleum into a pure white oil, as hereinafter fully explained.

In the drawing the figure is a vertical section of the still, rectifier, and purifier.

A is a still, in which the crude petroleum is put; B, the column or rectifier, situated above the still, and receiving the oil-vapor therefrom, and which, after rectification, goes into the purifier C.

The first operation is to work out the gasoline and naphtha in the usual manner, which, after going through the rectifier and purifier, passes out of the latter by a pipe, *x*, into a small condenser, especially for naphtha and gasoline, the heavy parts returning to the still A by a return-pipe and the oil going direct to the water-box. These parts are not shown, not having any particular bearing on the invention. After the gasoline and naphtha are

worked out the rectification of the oil in vapor in still A commences. It first passes into the chamber D through openings or pipes *a a a* in the bottom thereof. This chamber or box is of metal, and at or near the top of the still, or forms part thereof. Into this chamber is set a perforated steam-pipe, *b*, bringing direct steam from the boiler E. This steam acts instantly on the vapor therein, cutting therefrom the heaviest part—a sort of fine coke—also paraffine, tarry and coloring matter, all of which drop to the bottom of the box D, and thence down through the pipe *c* to the bottom of the still, where it remains, forming a sediment which is not forced up again into the chamber D. This steam-pipe in the chamber D in the still is an important improvement, as it prevents to a very great extent the coke, tarry parts, &c., from getting into the rectifier B and blocking up the plates *e e e*, pipes *d*, and cups *d'* therein, as in the usual construction, besides

giving the oil-vapor an important rectification before it gets into the rectifier proper, B. The vapor in the chamber D rises through openings or pipes *f f f* into the rectifier B and strikes against the perforated plates *e e e*, a portion passing through them gradually from one to the other. Under each of these plates is a coil of pipes or worms, *g g g*, each of which receives and contains hot water through a feed-pipe, *h*, leading from a supply-tank, G. The hot water in these coils, being cooler than the oil-vapor, condenses the heavy parts, consisting of tar, paraffine, coke, &c., in the vapor, which drops on and through the perforated plates *e e e*, that on the upper one returning by its pipe *d* into its cup *d'*, which overflows, and so on to the next until it reaches the bottom of the rectifier B, and thence through pipe *j* to the bottom of the still A. These coils *g g g* are about four inches below each plate *e*, and the water must have a certain temperature, according to the gravity of the oil, which runs from 60° to 40° Baumé. Therefore the hot water must have a temperature of from 85° to 200° Fahrenheit. The heavier the oil the warmer the water in the coils *g* must be. This gives a double rectification in the rectifier—first, as is usual, by the perforated plates *e e*, next by condensation by the coils of hot water.

I am aware that steam in pipes has been introduced into rectifiers; but this merely aided in boiling the vapor, and does not work satisfactorily.

Each coil under each plate is connected to a union-pipe, *h*, outside the rectifier, and has a cock to shut off the water in any of the coils, and a cock, *k*, near the tank G is to shut off the water-supply entirely when desired to run gasoline through the rectifier. The water in the tank G is made and kept hot by a steam-pipe, *l*, tapped into the main steam-pipe *r*, leading from boiler E. The lighter parts in vapor, after passing through the rectifier B, go out through the dome by a pipe, *m*, direct into the purifier C, which is a separate device, being a tight metal box having near the top a single perforated plate, *n*. The feed-pipe *m* comes in near the bottom, as shown, and just below this is situated a steam perforated pipe, *p*, receiving direct steam from the pipe *r* from

boiler E, the other steam-pipe, *b*, tapping pipe *r*^x at or near the boiler. Steam is thus constantly acting on this vapor in the purifier C, and the heavy part that is here cut out by the steam falls to the bottom and down through pipe *s* back to still A, to be worked over again. The light vapor rising in the purifier passes through the perforated plate *n* and comes in contact with a coil or worm, *u*, just above the plate *n*, which is constantly filled with steam, which condenses a portion of the vapor. This purifier thus gives three purifications, viz: first, by the direct steam acting on the vapor as it enters; next, through the perforated plate *n*; and, finally, by the steam-worm *u*. The steam in said coil is received by passing through a pipe which taps pipe *r*. What is condensed by this coil *u* falls to the bottom through pipe *w* and out at pipe *s* back to the still A, the purified vapor passing out at top of purifier C by pipe *x* to the usual water-box, where the result is a pure white oil.

By my process all the crude oil good for anything is utilized, leaving but little residuum to be drawn off. The steam-pipe *b* in chamber D aids this greatly, as it gives therein a primary and strong action on the oil and prevents clogging the plates or cups and pipes of the rectifier, as before explained.

I claim—

1. In an apparatus for rectifying crude petroleum, in combination with still A and rectifier B, the separating-chamber D at the top of said still, provided with openings *a a a* and *f f f*, the steam-pipe *b*, and discharge-pipe *c*, all arranged and operating substantially as specified.

2. In an apparatus for rectifying petroleum, in combination with the main portion or walls, the perforated plates *e e e*, pipes *d*, and cup *d'*, the coils or worms *g g g*, situated just beneath plates *e*, and the hot-water tank G, and pipe connecting the worms with such tanks, all substantially as specified.

3. In an apparatus for rectifying petroleum, the purifier C, provided with pipes *p* and *u*, and perforated plate *n*, in combination with the steam-generator and connecting-pipe, as described, a distillation chamber, and a pipe connecting the still and purifier, said connecting-pipe entering the purifier above the pipe *p* and below the perforated plate, all substantially as and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LOUIS DAUL.

Witnesses:

J. R. DRAKE,
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