

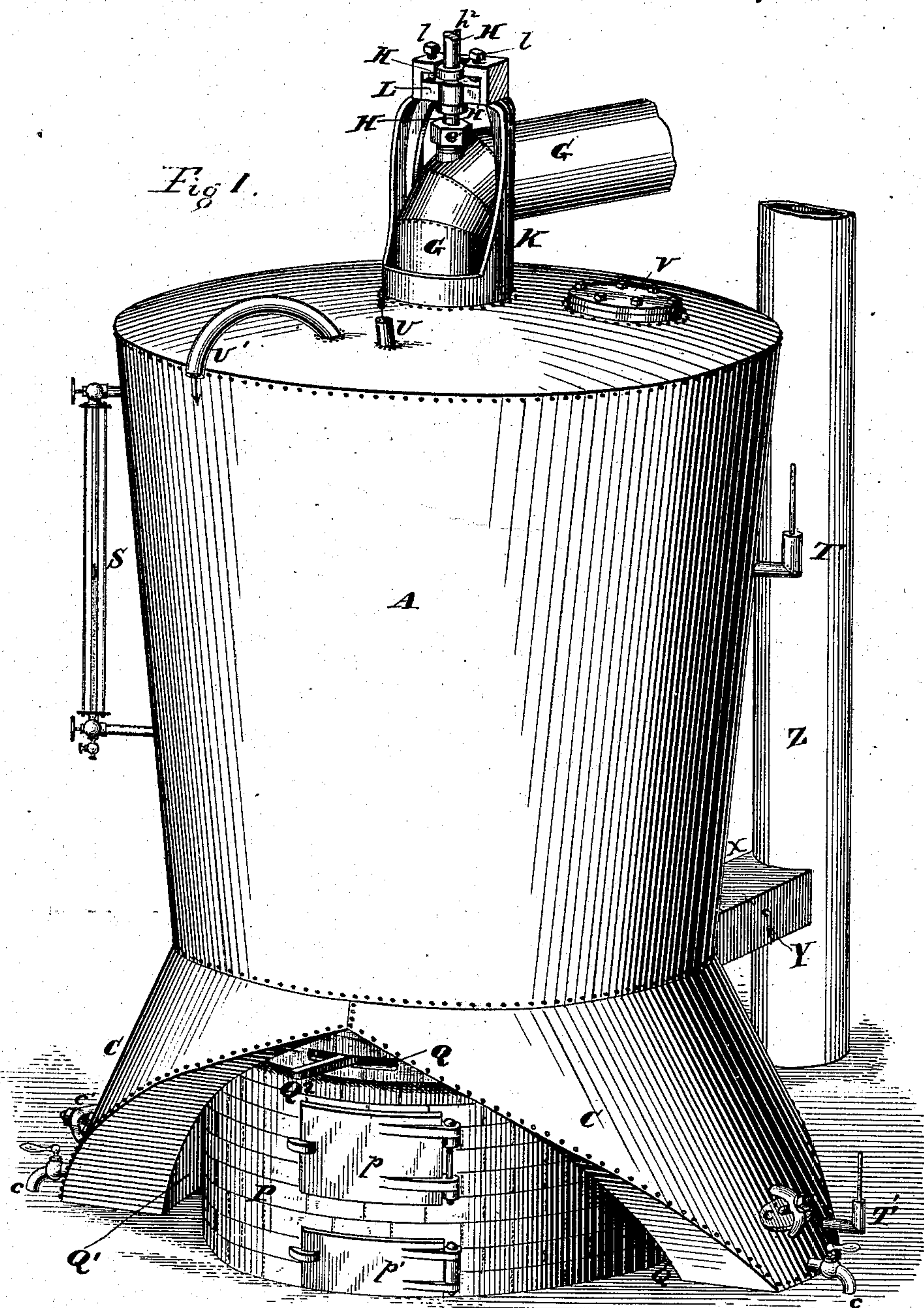
(No Model.)

2 Sheets—Sheet 1.

H. E. LUTZ.
Petroleum Still.

No. 240,914.

Patented May 3, 1881.



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[Signature]
L. J. Matos.

Inventor
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By his atty.
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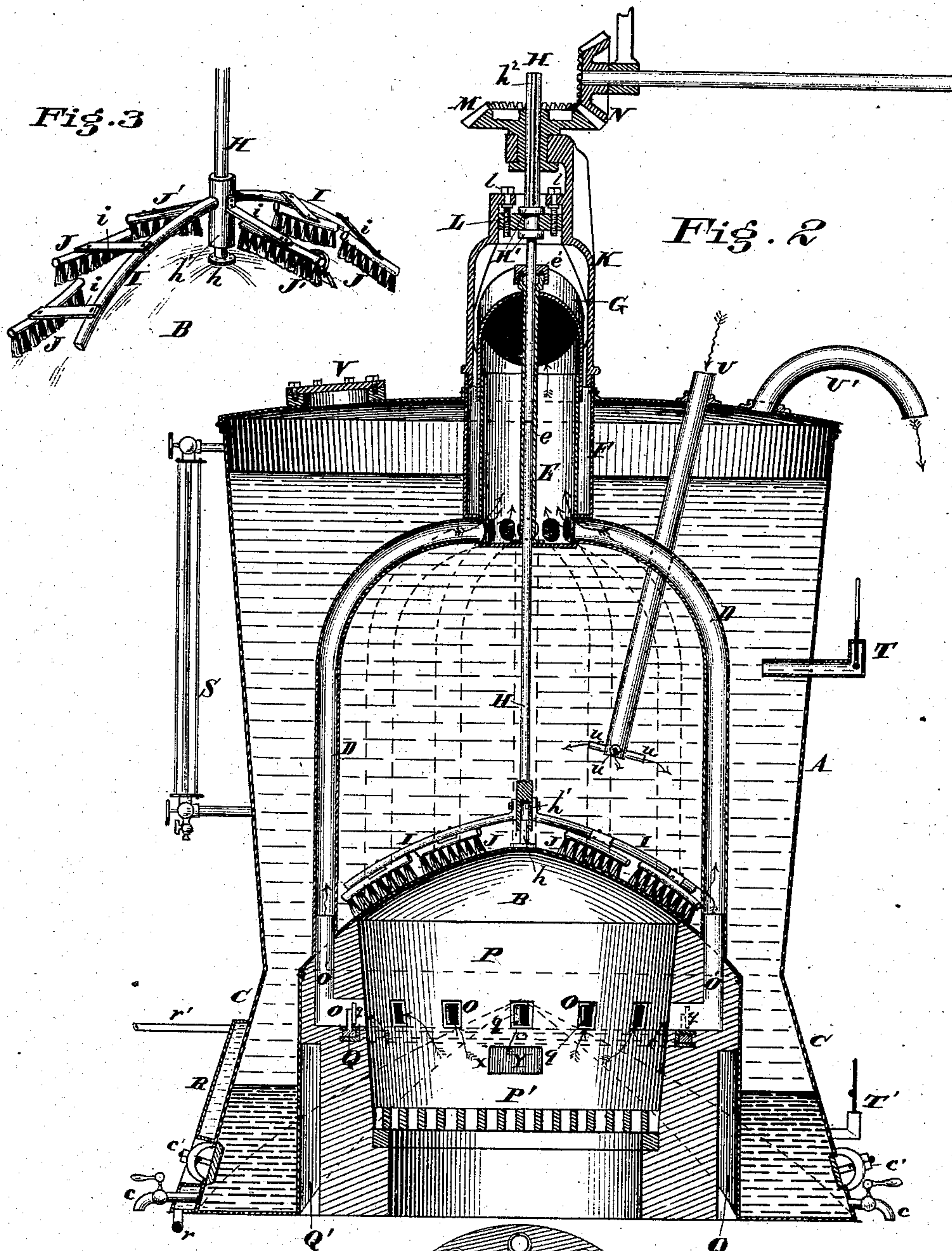
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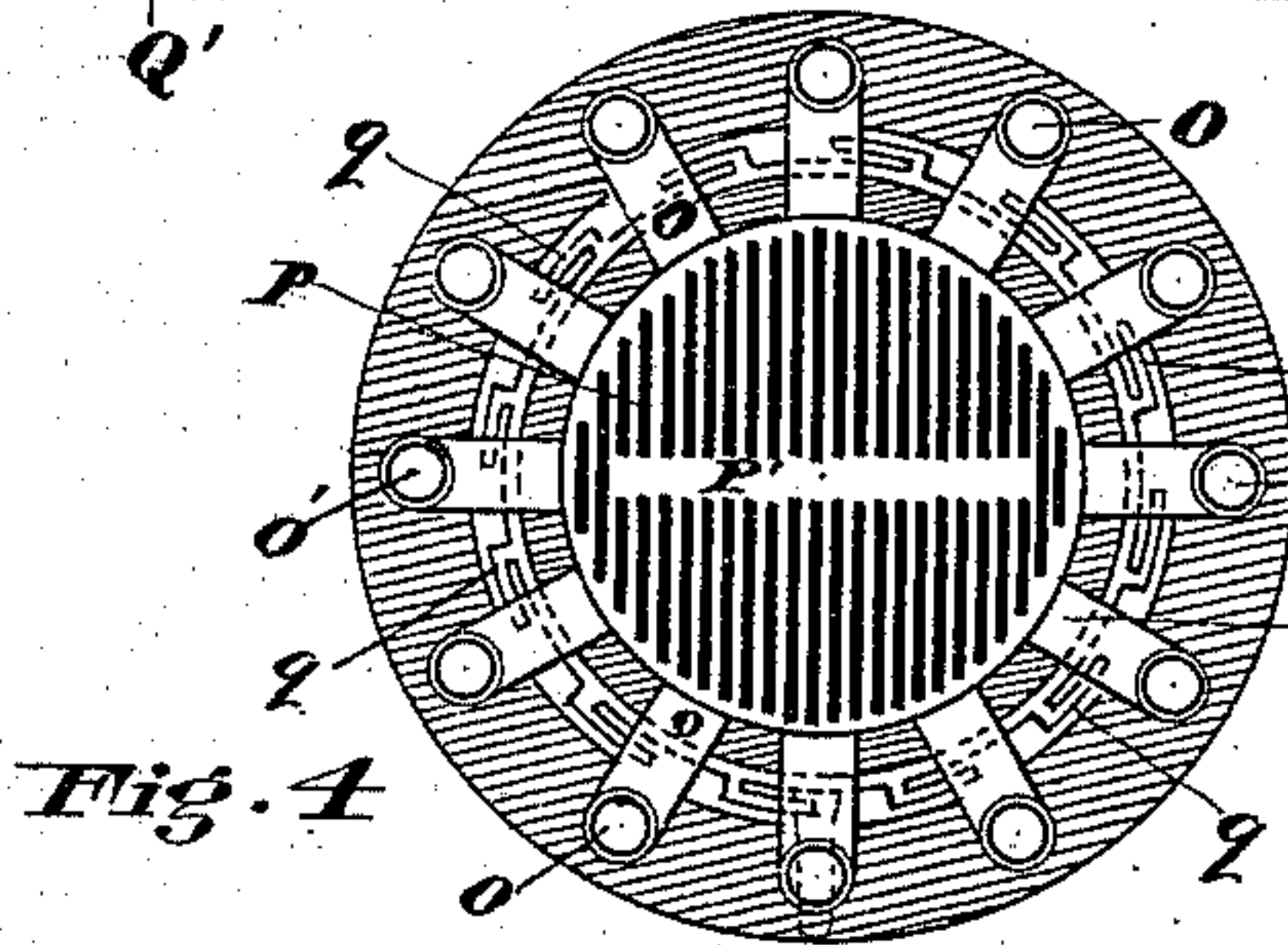
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UNITED STATES PATENT OFFICE.

HIRAM E. LUTZ, OF PHILADELPHIA, PENNSYLVANIA.

PETROLEUM-STILL.

SPECIFICATION forming part of Letters Patent No. 240,914, dated May 3, 1881.

Application filed November 8, 1880. (No model.)

To all whom it may concern:

Be it known that I, HIRAM E. LUTZ, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Petroleum-Stills, of which the following is a specification.

My invention relates to stills designed to distill petroleum, but more particularly that class known as "continuous" stills, and which are used to separate the last distillate from the tar and associated residuum; and it consists in the construction of apparatus to cause the tar to become separated from the oil and run off in a continuous manner, thereby obviating the necessity of cleaning the still after every charge of petroleum, as required in the old method; further, in mechanism and apparatus to cause a continuous and perfect circulation of the heat and the liquid, and mechanism for governing the same, all of which is more fully set forth in the following specification, shown in the accompanying drawings, and referred to in the appended claims.

The object of my invention is to treat the petroleum-oil, after the benzine and naphtha have been removed, for the purpose of separating the burning-fluid of high specific gravity from the tar, in a continuous manner, and in such a way that as the oil is continuously distilled off fresh oil is admitted, and the tar is continuously separated from the oil without stopping or cleaning the still.

In the drawings, Figure 1 is a perspective view of a still embodying in it my invention. Fig. 2 is a vertical section of same. Fig. 3 is perspective view of the steel brushes which sweep the tar from the bottom of the still and deposit it into the tar-receptacles. Fig. 4 is a plan of the fire-box with the still removed.

A is the body of the still, and B is a convex crown-sheet, which forms its bottom and extends up somewhat into the body, leaving an annular space, into which the auxiliary receptacles open.

C C are auxiliary receptacles or pockets, located one on each side of the body, opening into the annular space and extending downward on each side of the fire-box P, from which they are separated by the air-spaces Q'. These receptacles are narrow at the bottom, but completely encircle the body at the top, as shown

in Fig. 1, and as is indicated by dotted lines in Fig. 2, the bottom plates being inclined, so as to catch all the tar discharged from the bottom B and feed it down to the narrow bottom of the receptacles. These receptacles are, preferably, of the shape shown in Fig. 1, in which they are curved laterally, so as to conform with the bottom of the still, and are made wedge-shaped in elevation, the narrow part pointing downward. These receptacles are furnished with cocks at the bottom to run off the tar, and hand-holes *c'* immediately above them, and, if desired, thermometric tubes *T'*, for the insertion of thermometers to indicate the temperature of the tar. In some cases it may be desirable to use means for cooling the auxiliary receptacles, in which case the receptacle may be either partly or wholly surrounded with a water-back, R, provided with cold-water inlet *r* and outlet *r'*; or the tar may be run through a condensing-worm, or may be cooled by any other suitable means.

Entering the convex crown-sheet B, near its periphery, are a series of tubes, D, which are bent over at an angle of forty-five degrees and enter a central flue, E, closed at the bottom, which enters the smoke-stack G, and is surrounded by a second tube, F, leaving an air-space between the two.

Situated in the center of the flue E, and secured to its bottom, is a small tube, *e*, which extends up through the smoke-stack, and is provided with a stuffing-box, *e'*. Working through this tube *e* is a rod or shaft, H, provided at the bottom with brushes, and kept in position above the crown-sheet B by a pin, *h*, secured to said crown-sheet, working in a hole, *h'*, in the end of shaft H, which hole is deep enough to allow vertical movement to the shaft.

Extending from the shaft H, and curved to conform with the shape of the bottom, are arms I, to which are secured steel brushes J, through the agency of springs *i*. Also secured by springs *i* to the shaft, at the bottom, are brushes J'. These brushes are so arranged as to cover the entire surface of the bottom in one-half a revolution. Instead of the brushes an ordinary scraper may be used, or a scraper and brush combined.

Situated over the packing or stuffing box *e'*, and supported upon uprights K, attached to

the tube F, are guideways, in which slides a box, L, which box is raised or lowered by screws l l or other equivalent devices. The shaft H passes through the box L, and is prevented from vertical movement therein by the collars H'. The upper part of the shaft H is provided with a feather, h^2 , and works in a bevel-gear wheel, M, which is supported on a bracket forming part of the uprights K, and meshes with a small bevel-gear, N, which is the driver. By raising or lowering the box L the shaft H and brushes can be moved vertically without displacement to any other part.

The top of the still is provided with a man-hole, V, an inlet-pipe, U, which extends down into the middle of the still, and is provided at the bottom with distributing-nozzles u , thereby causing an even distribution of the cooler oil with that which is highly heated, and a goose-neck, U', for the volatilized product to pass off.

Upon the side of the body is a gage, S, to indicate the quantity of oil in the still, and a thermometer to indicate its temperature.

The fire-box P is made of brick-work, and is situated immediately under the convex crown-sheet. P' are the grate-bars, and p is the fire-door, and p' is the ash-box door.

Built into the fire-brick forming the fire-box are a series of L-tubes, O O', the tubes O' of which project up into the tubes D, previously described, and the parts O are provided with valve-seats, against which the valves q work. These valves q are secured to a ring, Q, provided with a handle, Q². By moving the handle Q² to the right the valves are opened, and when moved to the left they are closed. The brick-work incloses these tubes O O', and is built against the upper edge of the auxiliary receptacles C, and against the under side of the crown-sheet B, and near its periphery, and shutting the joints between the tubes D and crown-sheet away from direct contact with the fire. By the insertion of the tube O' the flame is carried past the joint. The lower part of the fire-box P is not built in contact with the receptacles C, but leaves a space, Q', between them for the purpose of allowing the tar to be kept comparatively cool. Extending backward and opening from the fire-box P is a flue, X, provided with a valve, Y, which enters a stack, Z.

The operation is as follows: The still being nearly filled with the oil and tar left after distilling off the lighter oils, such as benzine and naphtha, the fire is started on the grate P' in the fire-box P. The valves q are opened to any desired extent at will, to keep the oil at a given temperature, indicated by the thermometer T. The heat passing up through the tubes D heats the oil uniformly and quickly, and finally escapes through the flue E and stack G. As the oil distills over from the goose-neck U', fresh oil is admitted by the tube U, and distributed in various directions by the jet-pipes or distributors u . During the distillation the shaft

H is slowly turned, making about one revolution in every six minutes, causing the brushes J J' to sweep the crystallized and deposited tar from the crown-sheet to the annular space, from which it settles down into the receptacles or pockets C, and is fed down to a narrow opening, from which it can be withdrawn from time to time. In general one hundred barrels of oil will give about five barrels of tar. As the oil distills off and the tar settles down and is deposited in the pockets fresh oil is run in, bringing in fresh tar.

By this method of distillation the expense is much reduced, the oil is purer, there is a considerable saving in the crude product, and less acid and alkali is required to purify the distillate by carbonization, less labor is required to distill a given quantity of the crude oil, there is a considerable saving in expense of running the still, and the temperature is more easily regulated. If no heat is required in the still the valves q are shut and valve Y opened, and the heat passes out through the flue X into the stack Z, which may communicate with the stack G.

An important feature of my invention lies in the fact that I expose a larger surface of the still to the action of heat, and draw off all the tar from every part of the still, and cause all of it to pass to the lowest and smallest part of the pockets, from which it can be withdrawn during distillation without allowing any of the oil to escape.

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

1. In an oil-still for continuous distillation of petroleum, one or more pockets or auxiliary receptacles to collect the separated tar from every part of the still and feed it to one or more points forming part of said pockets, said receptacles or pockets being wide and circular or curved at the top, where they open into the annular space of the still, and being pointed, or nearly pointed, at the bottom, as shown and described.

2. In an oil-still for continuous distillation, the combination of the vertical cylindrical body A, circular crown-sheet B, leaving an annular space between them, and auxiliary receptacles or pockets C, which open into the annular space at top and are narrowed down at the bottom for the purpose of collecting the tar at one or more points, substantially as and for the purpose specified.

3. In an oil-still for continuous distillation, the combination of the body A, convex crown-sheet B, brushes or scrapers to feed the deposited tar to the annular space between the crown-sheet and body, and auxiliary receptacles or pockets opening from said annular space and narrowed down at the bottom, substantially as shown and described.

4. In an oil-still for continuous distillation, the combination of body A, convex crown-sheet B, auxiliary wedge-shaped receptacles C, pro-

vided with cocks *c*, shaft *H*, carrying brushes or scrapers, and rotating above the crown-sheet, fire-box *P*, tubes *O O'*, valves *q*, tubes *D*, flue *E*, smoke-stack *G*, and tube *e*, provided with
5 packing-box *e'*, through which the shaft *H* works, substantially as and for the purpose specified.

5. In an oil-still for continuous distillation, the following parts in combination, viz: the
10 body *A*, provided at the bottom with convex crown-sheet *B* and an annular space about the periphery of the crown-sheet, auxiliary receptacles or pockets opening from said space, and secured one on each side to the body and
15 crown-sheet respectively and separated from the fire-box, cocks *c*, fire-box *P*, tubes *O O'*, valves *q*, air-spaces *Q'*, tubes *D*, smoke-flue *E*, shaft *H*, provided on the bottom with brushes or scrapers, a goose-neck, *U'*, and an inlet, *U*,
20 provided at the bottom with distributing-nozzles *u*, all constructed substantially as and for the purpose specified.

6. An auxiliary receptacle to catch and collect the tar from oil-stills, which consists of a
25 long downwardly-projecting pocket, pointed, or nearly pointed, at the bottom, where it is provided with a cock or equivalent device for running off the tar, and wide at the top, curved laterally and encircling the cylinder forming
30 the body of the still, for the purpose of collecting the tar from a large portion of the still, in combination with the body of the still, a fire-box, and an air passage or space between the pocket and fire-box, substantially as and for
35 the purpose specified.

7. In an oil-still for continuous distillation, the receptacle *C*, curved laterally or made semi-circular or circular at the top, and pointed, or nearly so, at the bottom, in combination with
40 the body of the still *A*, and apparatus to cool the tar in said receptacle, substantially as and for the purpose specified.

8. In an oil-still, the body *A*, provided with

a convex crown-sheet, *B*, near the periphery of which are secured flues *D*, extending upward, 45 said flues being bent over and all uniting in a large central flue, *E*, which extends a short distance below the liquid-line and is connected to the smoke-stack at the top, substantially as and for the purpose specified. 50

9. In an oil-still, the combination of the vertical body *A*, provided at the bottom with a convex crown-sheet, *B*, vertical flues *D*, opening under the oil-line into a central flue, *E*, and connected with flues *O'* and *O* at the bottom, 55 said flues being arranged in a circle about the fire-box and provided with valve-seats for seating the valves *q*, secured and operated all at once by the ring-piece *Q*, stack *Z*, flue *X*, and valve *Y*, all constructed substantially as shown 60 and described.

10. In an oil-still, the combination of the vertical body *A*, convex bottom or crown-sheet *B*, tubes *D*, entering the crown-sheet near its periphery, and bent over at the top and entering 65 the short central flue, *E*, provided with an air-space about it, substantially as shown and described.

11. In an oil-still for continuous distillation, the combination of the body *A*, convex crown-sheet *B*, receptacles *C*, shaft *H*, carrying 70 brushes, or their equivalent, at the bottom, mechanism to rotate the shaft and brushes, and mechanism to adjust them vertically, substantially as and for the purpose specified. 75

12. In a continuous still, the convex bottom *B*, shaft *H*, provided with arms *I*, springs *i*, and brushes *J*, or their equivalent, substantially as and for the purpose specified.

In testimony of which invention I hereunto 80 set my hand.

HIRAM E. LUTZ.

Witnesses:

R. M. HUNTER,
THOS. J. HUNT.