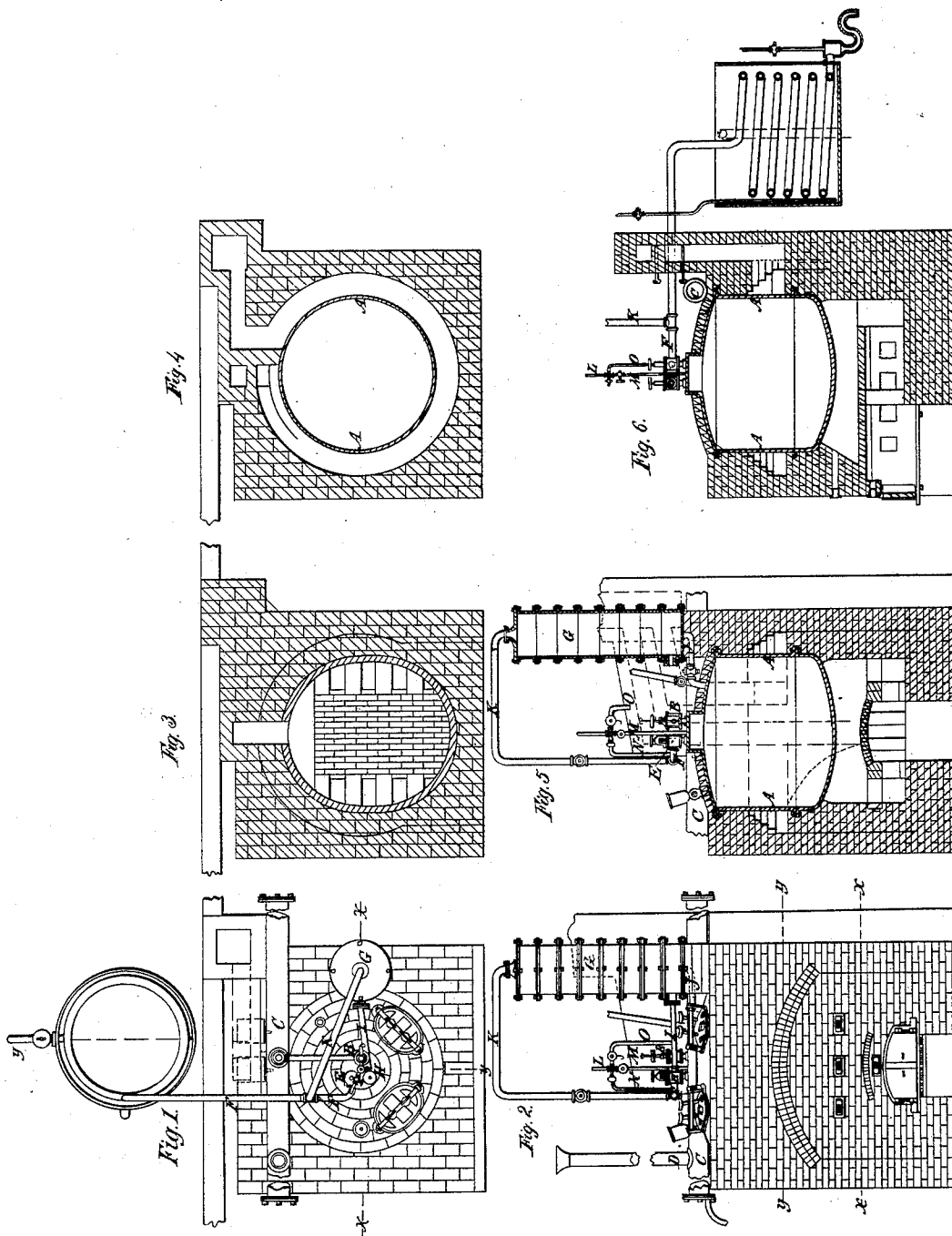


L. ATWOOD.

Oil Still.

No. 28,246.

Patented May 15, 1860.



Witnesses:

H. C. Henderson
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Inventor.

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UNITED STATES PATENT OFFICE.

LUTHER ATWOOD, OF NEW YORK, N. Y.

IMPROVEMENT IN CONSTRUCTION OF APPARATUS FOR THE REDISTILLATION OF COAL-OILS.

Specification forming part of Letters Patent No. 28,246, dated May 15, 1860.

To all whom it may concern:

Be it known that I, LUTHER ATWOOD, of the city and county of New York, and State of New York, have invented certain new and useful Improvements in Apparatus for Distilling Volatile Oils; and I do hereby declare that the following is a full and correct description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference thereon.

The nature of my invention consists in the arrangement of a separating-chamber, in combination with a volatile-oil still and condenser, in manner and for purposes substantially as hereinafter described.

My said improvements are particularly designed and adapted for working a process of producing light thin hydrocarbon illuminating-oils from heavy oils, paraffine, &c., the subject of cotemporaneous Letters Patent of the United States granted to me.

The drawings represent a distilling apparatus, the subject of prior Letters Patent of the United States to me, with the above-mentioned separating-chamber and its adjuncts combined therewith.

Figure No. 1 is a plan view of the apparatus; Fig. No. 2, a front elevation; Fig. No. 3, horizontal section through dotted line *x x*, Fig. 2; Fig. No. 4, horizontal section through dotted line *y y*, Fig. 2; Fig. No. 5, transverse section through dotted line *x x*, Fig. 1; Fig. No. 6, vertical longitudinal section through dotted line *y y*, Fig. 1.

Letter A represents a cast-iron still suitable for distilling volatile oils, set in brick-work, and provided with furnace, &c., for heating man-holes and filling-pipes; also, with a safety-valve, B, connecting by a blow-off pipe with the main *c* and exit-pipe D.

E is an angle-valve connecting the dome of the still directly with the worm-condenser by the pipe F. This angle-valve E must be closed when the separating-chamber is used.

Letter G represents a vertical chamber or receiver, which I call a "separating-chamber," its office being to receive the vapors from the still and contain them while the lighter bodies separate from the heavier by difference of temperature and specific gravity. The height of the separating-chamber is about four times its diameter. It is composed of a number of short cast-iron cylinders secured together by flanges

and screw-bolts, and made tight with suitable packing or cement. At top and bottom are heads secured to the ends by flanges and screw-bolts. The bottom or base of this chamber rests on a cylindrical pier of brick-work built up from the wall or casing of the still sufficiently high to sustain the base of the chamber at an elevation a little above the top of the dome of the still.

Letter H is an angle-valve on the dome of the still, connecting the still with the separating-chamber by the superior pipe I at the side and near the bottom of the chamber.

J is an inferior pipe provided with a stop-cock, connecting the bottom of the separator with the still.

K is a pipe connecting the top part of the separating-chamber with the pipe F, leading to the worm-condenser. The pipe K is furnished with a stop-cock, which is to be closed when the still is used with the separating-chamber shut off, to prevent gas, &c., from backing up into it.

L is a steam-pipe, shown broken off, but to be connected with a steam-boiler, and by means of a $\perp$ -coupling to supply steam, when required, to the body of the still through the pipe M to the condenser when the angle-valve E is closed by the pipe N, and to the separating-chamber and its passages by the pipe O.

The operation of the apparatus is as follows: The heavy oil is placed in the still, the man-holes secured and luted, the filling-pipes, safety-valve, and angle-valve E closed, and the connections between the still and separating-chamber, and from thence to the worm-condenser, opened. Sufficient external heat is applied to the still by means of a fire in the furnace to form oleaginous vapors and fixed gases, which pass up to the separating-chamber. The vapors so formed differ in character, a part being lighter and of a lower boiling-point than the rest, the boiling-point of the lighter being about 600° Fahrenheit, and the heavier considerably above that degree of temperature. The separating-chamber is heated only by the vapors from the still, and is exposed externally to the moderate temperature of the atmosphere of the still-room. The internal temperature is therefore below the point at which the heavier bodies can be maintained any considerable time in a state of vapor. They therefore gradually liquefy and fall to the bot-

tom of the separating-chamber, and are returned to the still *via* the inferior pipe J. The lighter bodies and permanent gases gradually rise to the top of the separating-chamber, and go over to the worm-condenser through the pipe K. If sufficient heat be not applied to the still to form vapors with such rapidity as to keep up the heat in the separating-chamber to a point high enough to maintain the lighter bodies in a state of vapor, so that they will rise above the heavy bodies and pass over to the worm-condenser, they will of course condense and fall back to the still, and this will also be the case if the separating-chamber be placed in a situation remote from the still, and so that the vapors cool on their passage to it. If the separating-chamber be not of sufficient capacity and height to permit of the gradual separation of the lighter from the heavier bodies, a great part of the latter will be forced over to the worm-condenser. The arrangement, situation, and proportion of the separating-chamber relative to the still, as shown in the drawings, I consider best for a still body or boiler such as figured of about seven feet in diameter. With such an apparatus I can run over thin oil from heavy oil at the rate of about ten gallons per hour, continually returning the heavy oil not decomposed to the further action of the heat until the contents of the still are exhausted.

When desirable to clean the separating-chamber and its passages, I close the angle-valve H and admit steam from the pipe O.

When I wish to use the still without the sepa-

rating-chamber, I close the angle-valve H, the stop-cock in the inferior pipe J, and the stop-cock in the pipe K, and open the angle-valve E.

The sides or barrel of the separating-chamber may be one entire cylinder, if desired, the use of the short flanged sections being merely a matter of convenience, for the purpose of readily increasing or diminishing its height and capacity.

The pipe K, instead of being connected with a worm common also to the connection from the still through the angle-valve E, may be connected with a separate and independent worm in the same or another worm-tub, and this arrangement will be best when the still is often used without the separating-chamber.

I do not limit myself to the precise form and proportion of the separating-chamber herein shown; but

I claim as my invention—

A separating-chamber constructed substantially as described, when arranged and combined with a volatile-oil still and condenser in such manner as to gradually separate and condense the heavier parts of the oleaginous vapors formed and continuously return them to the still for a further action of the heat, and at the same time preserve the lighter vapors and pass them over to the condenser, substantially as herein described, and substantially for the purposes hereinbefore set forth.

LUTHER ATWOOD.

Witnesses:

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