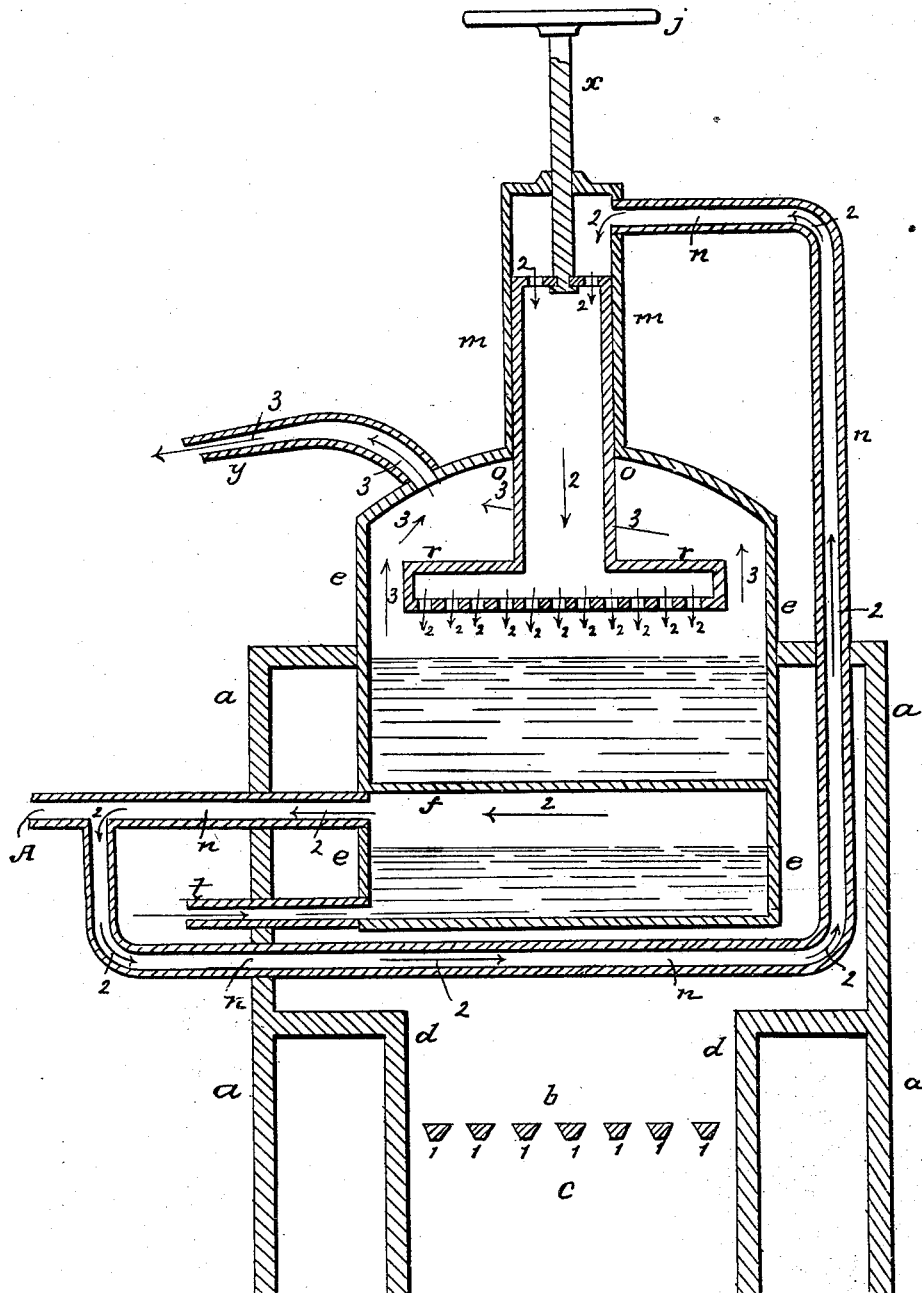


J. J. JOHNSTON.

Apparatus for Evaporating Liquids.

No. 50,935.

Patented Nov. 14, 1865.



Witnessed:
James O. Jarvis
Wiley Johnston

Inventor:
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UNITED STATES PATENT OFFICE.

JAMES J. JOHNSTON, OF ALLEGHENY CITY, PENNSYLVANIA.

IMPROVED APPARATUS FOR EVAPORATING LIQUIDS.

Specification forming part of Letters Patent No. **50,935**, dated November 14, 1865; antedated November 2, 1865.

To all whom it may concern:

Be it known that I, JAMES J. JOHNSTON, of the city and county of Allegheny, in the State of Pennsylvania, have invented a new and Improved Apparatus for Evaporating Liquids; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The nature of my invention consists in applying heat to the upper and lower surface of liquids to be evaporated or distilled, said heat to consist of steam or heated air, or steam and heated air combined, and used in combination with the apparatus hereinafter described.

In the accompanying drawing, which represent a sectional view of my improved apparatus, *a* represents the furnace, which may be made in any form desired.

b represents the fire-chamber of the furnace.

d represents the fire-walls of the fire-chamber.

l represents grate-bars.

c represents the ash-pit of the furnace.

e represents the still, which is divided into two parts or chambers by means of the partition-bottom, (marked *f*.)

The upper part or chamber is furnished with an ordinary "goose-neck" pipe, (marked *y*,) to which may be attached a condensing pipe or pipes, which may be constructed and arranged in any known manner.

In the center of the top of the still is placed a hollow column, (marked *m*.) Near the upper end of this column is attached a pipe, (marked *n*,) which passes down and through the furnace and connects with the lower part or chamber of the still *e*. The arrangement of and the connections of this pipe *n* will be clearly seen by reference to the drawing.

In the upper part or chamber of the still *e* is placed a diaphragm, (marked *r*,) the lower face of which is furnished with a large number of small holes, and to its upper surface is attached a hollow column, (marked *o*,) which is fitted to the bore of the column marked *m*. The upper end of this column *o* is attached to an elevating and depressing screw, (marked *x*,) the nut or female part of which is in the upper end of the column *m*.

In the upper end of the column *o* are a num-

ber of openings, which lead into the cavity of said column, which cavity leads into the hollow space in the diaphragm *r*.

The part of the pipe *n* which is under the bottom of the still *e* and over the fire-chamber *b* may be made to traverse back and forward a number of times, if so desired.

The operation of my improvement is as follows: I furnish the lower part or chamber of the still *e* with water by means of the pipe marked *t*, and the oil or other liquid to be evaporated or distilled is placed by any known device into the upper part or chamber of the still. I then start a fire in the furnace, which will raise steam in the lower part or chamber of the still. Now, it being a fixed law of steam that it will seek the point where there is the least resistance, (which, in this case, is the goose-neck and condensing-pipe which may be attached to it,) the steam will pass from the lower part or chamber of the still into the pipe *n*, and from it into the cavity in the column *o* and diaphragm *r*, and through the small openings in its lower face, and thereby come in contact with the upper surface of the oil or other liquid in the upper part or chamber of the still.

The arrows marked 2 represent the course of the steam or air through the pipe *n*, column *o*, and diaphragm *r*, and the arrows marked 3 represent the steam or air after it has performed its office on the surface of the oil or other liquid, passing off with vapor evolved from the oil or other liquid into the goose-neck *y*, from which it passes into an ordinary condensing-pipe, which may be attached thereto.

The lower face of the diaphragm *r* should always be near the surface of the oil or other liquid in the upper part or chamber of the still. This can be done by lowering the diaphragm *r* as the oil or other liquid passes off, for it will be readily observed that by turning the screw *x* by means of lever *j* the diaphragm can be raised and lowered at will; and it will also be observed that an air-pump can be attached to the branch marked *A* of the pipe *n*, so that air, or air combined with steam, can be used, if desired, and also that the said branch *A* can be used for conveying steam to an engine, if desired.

I wish it to be clearly understood that I do

not confine myself to any particular size, form, or manner of constructing the various parts herein described and represented.

Having thus described the nature, construction, and operation of my improvement, what I claim as of my invention is—

1. Applying heat by means of steam or heated air, separately or combined, to the upper and lower surface of oil or other liquid, substantially in the manner and by the means herein described, and for the purpose set forth.

2. The use of the adjustable diaphragm *r*, in combination with the still *e* and pipe *n*, said diaphragm, still, and pipe being constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

JAMES J. JOHNSTON.

Witnesses:

JOHN S. HOLLINGSHEAD,
JOHN D. BLOOR.