F. W. WILLARD.

ROTARY STILL.

No. 27,503. Patented Mar. 13, 1860.

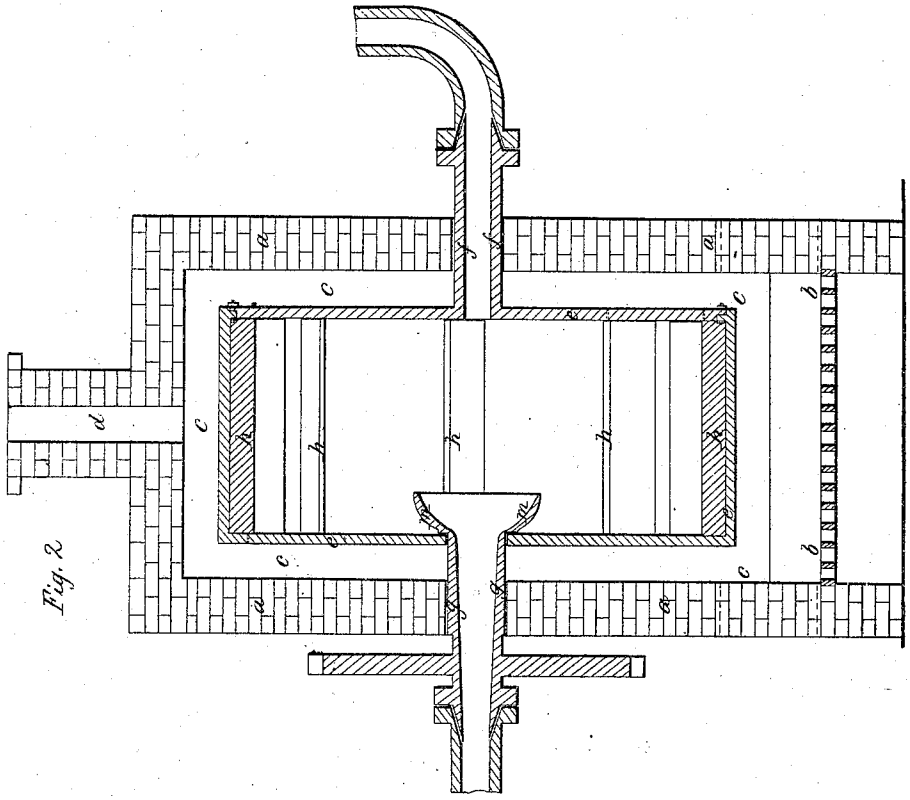


Fig. 2

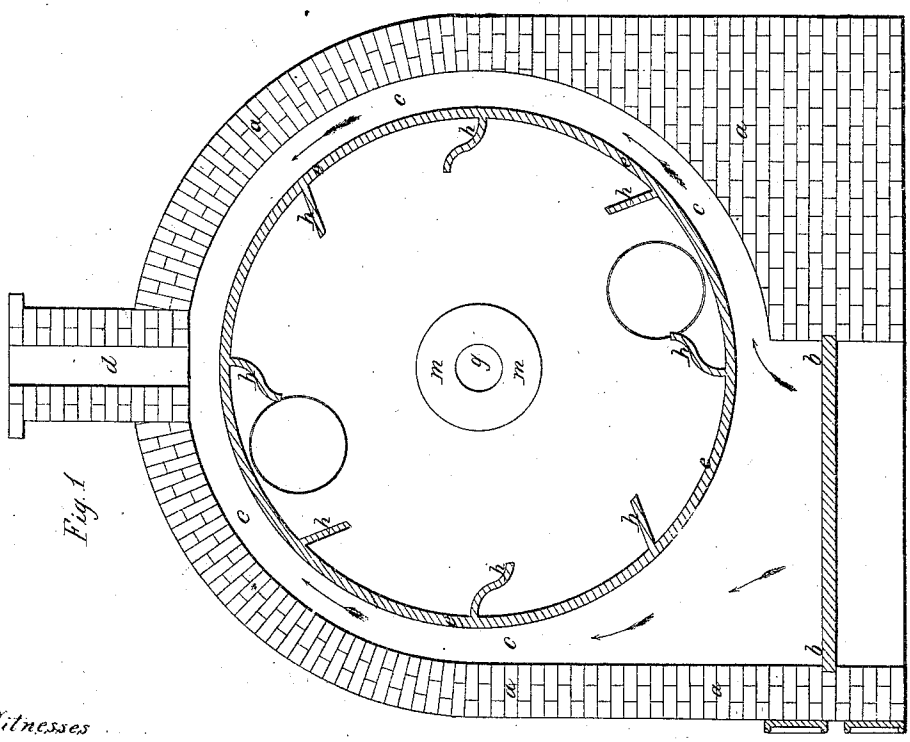


Fig. 1

Witnesses

Joseph Gavett

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FRANKLIN W. WILLARD, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND E. G. ALLEN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN APPARATUS FOR DISTILLING.

Specification forming part of Letters Patent No. **27,503**, dated March 13, 1860.

To all whom it may concern:

Be it known that I, FRANKLIN W. WILLARD, of New York, in the county and State of New York, have invented certain new and useful Improvements in Apparatus for Distilling Liquids, and more particularly Pyrogenic Oils; and I do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a central longitudinal vertical section of my new apparatus. Fig. 2 is a transverse vertical section of the same.

In all processes for distilling liquids it is highly important to keep the still and its contents at one uniform temperature throughout its whole extent, the degree of heat desired to be always maintained being that at which vaporization takes place. In distilling pyrogenic oils this is particularly essential, as too great a degree of heat produces gases which cannot be reconverted into oily vapors, and are, therefore, lost, and the presence of which, moreover, injures the color and quality of the resultant liquid. To produce vapors rapidly it is also desirable to have as large an extent of heating-surface as possible, and to expose every portion of the liquid to precisely the same degree of heat. In the ordinary construction of stills these *desiderata* are manifestly impossible to be attained, as the material to be acted upon remains in one body, and the heat is applied only at the bottom, and this is the case even where devices have been introduced to agitate the liquid in stationary stills—which I am aware has been done—the effect being merely to give motion to the liquid without separating its particles, and therefore expose one portion of it to a greater degree of heat than another.

The above desired results, which have never before been successfully attained, are the objects aimed at and secured by my invention. To accomplish these results I use a revolving still, in which the material to be acted upon is placed, having attached to or within its interior a series of rotating buckets of any desired form or capacity, the heat being applied to the apparatus in any proper manner. By these means the still is not only kept at one uniform temperature throughout, but every portion of the material to be acted upon is taken up and separated, as it were, into thin films or particles, which are exposed to an additional heating-surface, thereby, of course, producing vaporization much more rapidly than where the liquid is allowed to remain in one body, or nearly so, as has heretofore been the case in all similar processes, the buckets, which necessarily receive the same degree of heat as the revolving still, adding very materially to the extent of the heating-surface of the same. By this method is prevented also the formation of deposits, which in ordinary distilling apparatus adhere to the surface of the still, and the removal of which is very difficult, especially in distilling coal-oils, where the residue is a carbonaceous matter, which can be separated from the still only by the use of forcible means, and the presence of which in time weakens and destroys the metal of which it is composed.

a a a in the drawings represent a brick furnace, of which *b b* is the fire-chamber, *c c* the flues, and *d* the chimney or exit-passage for the products of combustion, which pass through and around the flues *c c*, as shown by arrows in Fig. 1.

Within the furnace *a a a* is a cylindrical still, *e e*, resting upon tubular bearings *f f g g*, and made to revolve in any suitable manner. The liquid to be evaporated is fed in through the tube *f f* from a reservoir.

To the interior circumference of the still *e e* are attached a series of floats or buckets, *h h*, &c., of any desired shape or capacity. These buckets may revolve either with the still or independently of the same and operate, as hereinabove stated, to take up the liquid to be evaporated and carry a portion of it partially around the still, thereby separating it into thin films, which become rapidly vaporized.

The buckets thus take up a portion of the liquid and by their revolution drop or spill in small particles or showers that which is not vaporized by the heat of the still and its buckets, the liquid thus falling being prevented from passing out of the exit-tube *g g* of the apparatus by means of a funnel, *m*, which projects into the still. This funnel, it will be seen, while preventing the discharge or escape of such portions of the liquid as are unvaporized, yet allows the vapors to pass out freely, after which their condensation can be effected by any suitable method.

Having thus described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

The method herein described of distilling and evaporating liquids, the same consisting in the employment of a revolving still provided within its interior with a series of buckets, whereby while the still is maintained at a uniform temperature the liquid which is to be acted upon is kept in motion, and portions of the same successively separated, taken up, and returned to the mass in thin films, substantially as specified and for the purposes set forth.

FRANKLIN W. WILLARD.

Witnesses:
JOSEPH GAVETT,
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