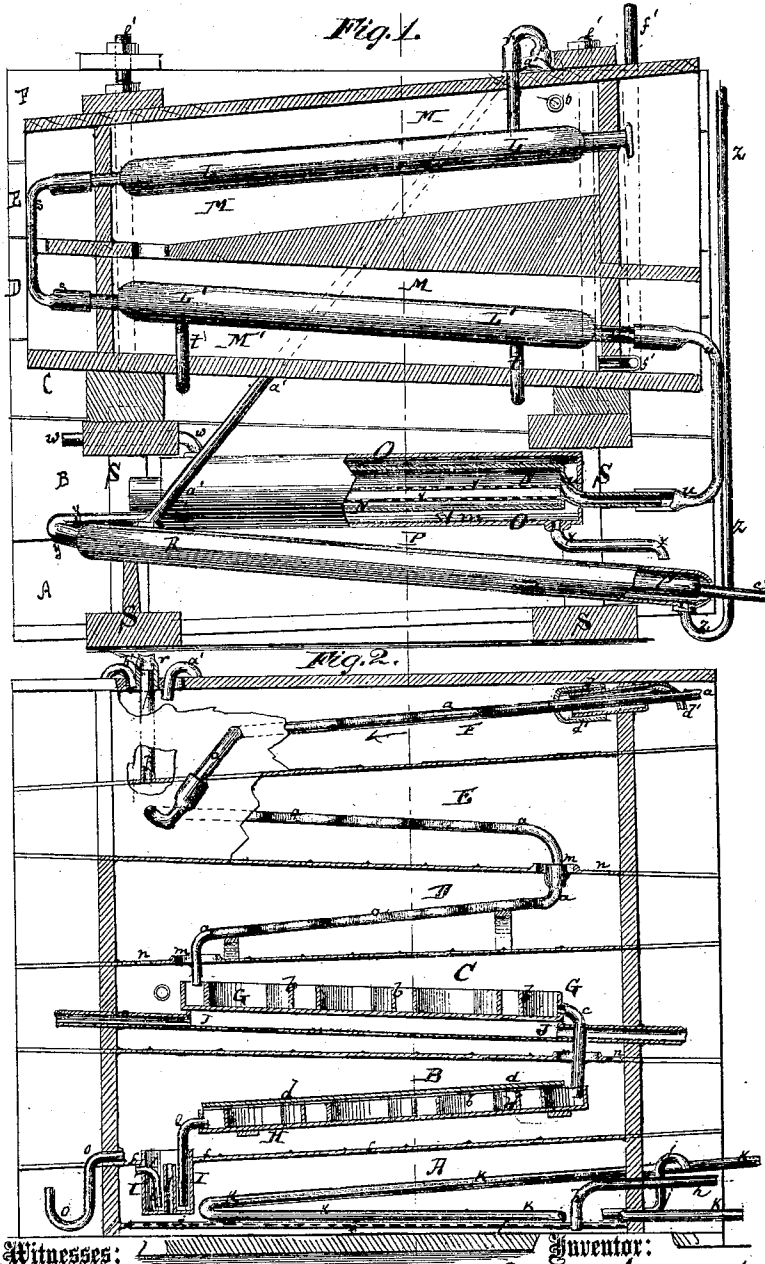


J. M. WEYAND.  
APPARATUS FOR DISTILLING.

No. 102,632.

Patented May 3, 1870.



Witnesses:  
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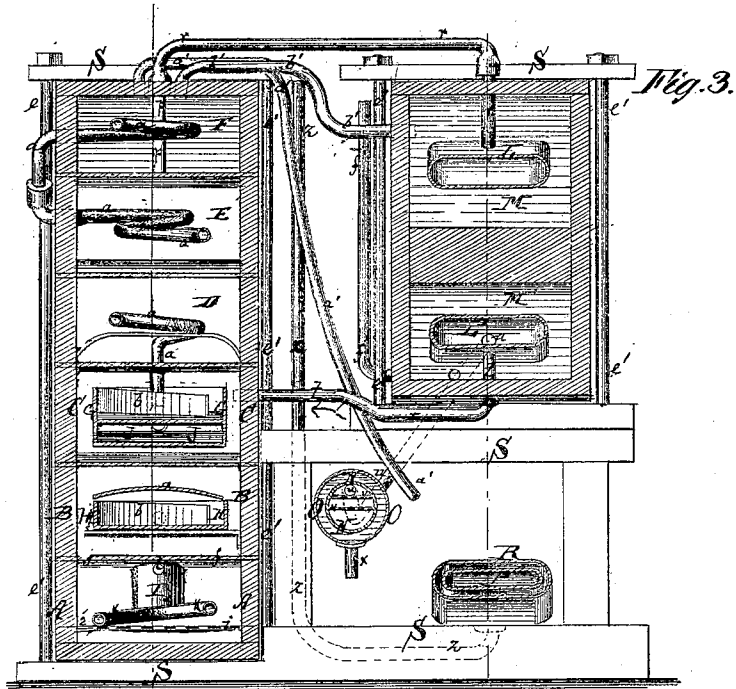


Fig. 3.

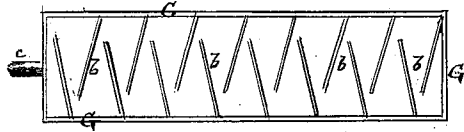


Fig. 4.

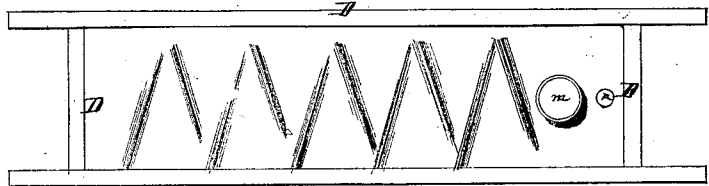


Fig. 5.

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# United States Patent Office.

JOHN M. WEYAND, OF ST. LOUIS, MISSOURI.

Letters Patent No. 102,632, dated May 3, 1870.

## IMPROVEMENT IN APPARATUS FOR DISTILLING.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN M. WEYAND, of St. Louis, in the county of St. Louis and State of Missouri, have invented a new and improved Distilling-Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

The object of this invention is to facilitate the generating, dephlegmatizing, aromatizing, and refrigerating of alcoholic vapors, and to thereby simplify and economize the process of distillation.

The main feature of the present invention is to so construct the apparatus that steam and mash are made to pass continually in opposite directions through the same compartments, the steam taking up, and the mash giving off alcohol during such uninterrupted passage. By this method the temperatures can be so completely regulated, that spirits of the requisite grade and proof can be produced with great exactness.

The invention consists also in a novel construction and arrangement of the generating compartment, in which the mash is absolutely mingled with steam and brought in contact with heated surfaces to evaporate all its alcoholic contents; also, in a new arrangement of combined evaporating and condensing chambers of a novel dephlegmatizing, aromatizing, and refrigerating or condensing apparatus, all as hereinafter more fully described and specified.

In the accompanying drawings—

Figure 1 represents a vertical longitudinal section of the dephlegmatizing, aromatizing, and refrigerating apparatus.

Figure 2 is a vertical longitudinal section of the generating and evaporating apparatus.

Figure 3 is a vertical transverse section of the entire apparatus.

Figure 4 is a plan view of a mash-chamber.

Figure 5 is a plan view of a chamber for conducting the products of condensation.

Similar letters of reference indicate corresponding parts.

The entire apparatus consists of two series of compartments placed side by side, the first series serving to produce the alcoholic vapor, while in the second series the same is purified, aromatized, and condensed.

The first series consists of six or more compartments A, B, C, D, E, and F, which are placed one above the other, as in figs. 2 and 3, in form of wedge-shaped boxes with inclined bottoms, as shown.

The mash enters a pipe, *a*, in the upper compartment F, and is in that pipe carried from end to end of such compartment F, thence through the compartments E and D, successively. The pipe *a* is coiled or

bent in the three aforesaid compartments to have its length increased, and to expose the mash therefore to the heat in the said compartments, so that the alcoholic contents of the mash may be ready to evaporate as soon as the mash leaves the pipe *a*.

The pipe *a* discharges the mash into the higher end of an inclined box, G, which is placed into the compartment C.

On the bottom of this box is set up a series of projecting flanges *b*, as in fig. 4, which detains the mash as it slowly flows toward the lower end of the box to allow its alcoholic contents to evaporate.

A pipe, *c*, conducts the mash from the lower end of the box G, into the upper end of a similar box, H, which is arranged in the compartment B, and which is also inclined and provided with detaining flanges, as shown.

The box H is provided with a cover, *d*, which prevents the products of condensation from dropping into the box.

A pipe, *e*, conducts the mash, which by this time is almost entirely spent, *i. e.*, dealcoholized into a drum or pot, I, that is suspended from the bottom *f* of the compartment B into the narrow end of the compartment A.

From the bottom of the drum I projects into the same a pipe, *g*, which is open at both ends, and to the upper end of which the mash must rise in the drum before it can flow out through such pipe *g* into the compartment A.

Steam enters the compartment A through a pipe, *h*, under a perforated false bottom, *i*, which is placed into the compartment for the purpose of properly distributing the steam.

The mash entering the compartment A, fills the same almost entirely before it can escape through an S-shaped pipe, *j*, and is, while in the compartment, exposed not only to the heated surfaces of steam-pipes *k*, which pass through A, but also to actual contact with the steam, and agitated by the same, so that it will give off all the alcoholic contents that may have remained in it. The mash is so thoroughly heated, not only in the pipe *a* and boxes G H, but also in the compartment A that its alcohol, which evaporates much quicker than water, must be all evaporated and separated before the mash is allowed to escape.

The vapors thus produced, *i. e.*, the mixture of steam and evaporated alcohol, enter the tub I through a pipe, *l*, which conducts them to the bottom of said tub, so that they will have to pass entirely through the mash therein, and absorb the alcohol contained therein.

The vapors now ascend in the compartment B, pass through an aperture, *m*, in the cover of B and C, thence into D and E successively, they always traversing the entire length of each compartment before leaving the

same. As they ascend, the vapors gradually cool and give off their heat to the mash, which becomes gradually warmer as it descends. As the vapors ascend, they come in contact with the cooler top plates of the several compartments, and some of their aqueous contents are thereby condensed. These products of condensation drop down from the said covering plates and fall upon the inclined bottoms of the compartments on which they flow down.

In order to detain the phlegm descending on the lower plates of the compartments, the plates are ribbed or corrugated, as in fig. 5. The progress of the phlegm is thereby retarded and the bottom plates are cooled, to condense as much as possible the aqueous contents of the ascending vapors.

At the lower part of each bottom plate is an aperture, *n*, through which the phlegm passes into the compartment next below. The apertures *m* are surrounded by projecting flanges to prevent the phlegm from passing through the same.

As the products of condensation arrive in the lower part of the compartment B, they are carried off by a pipe, *o*.

The temperatures in the several compartments can be so regulated that noxious contents of the vapors will be condensed with the water before the vapors leave the compartment E.

Under the box G is arranged a steam-box, J, through which steam is constantly passed for the purpose of evaporating as much as possible the contents of the mash that pass through the same. The vapors thus produced from the mash become mixed with those ascending from the compartment A, and become partly purified before they leave the compartment E.

The vapors pass from the compartment E in a short straight pipe, *p*, through the compartment F with the contents of which they are not brought in contact, and are then, by a pipe, *r*, carried to the second series of compartments in the dephlegmator.

The dephlegmator consists of two or more metal cases L L', of oval cross-section, set inclined into boxes M M', which receive cold water at the lower end through a pipe, *f*'.

As the vapors enter the cases L thus cooled, their aqueous contents will condense and will flow on the inclined bottoms of such cases and through the pipe *s* connecting the same, while the vapors pass on above the phlegm.

The latter is, from the lower case L', carried back to the vessel O in pipes *t t*, and becomes there mixed with the products of condensation previously mentioned.

The alcoholic vapors pass from the lower case L' through a pipe, *u*, into the aromatizer N, which is a slightly inclined cylinder, containing perforated shelves *v v*, upon which the fragrant ingredients to be used are placed.

The cylinder N is surrounded by an annular steam-chamber, O, which receives steam through a pipe, *w*, and discharges it through a pipe, *x*. The heat of the steam causes the ingredients on the shelves to give off their ethereal oils, which are absorbed by the alcoholic vapors passing through the cylinder N. The water from the dephlegmator is carried by a pipe, *v*', into the chamber F.

The vapors are thus aromatized. They pass from the cylinder N through a pipe, *y*, into the refrigerator P. The same is an inclined metal case surrounded by a water-chamber, R.

Water is carried to it in a pipe, *z*, at the lower end, and gradually ascends as it gets warmer, until it is finally discharged into the case F by a pipe, *a*'. The vapors passing through the cold chamber P will be condensed, and can be drawn off through a pipe, *c*'. If desired, the water from the refrigerator may be carried into the dephlegmator, as the latter should not be cooled, so as to condense the alcohol. The water as it ascends both in the refrigerator and in the dephlegmator, becomes warmed by the heat of the vapors, and is in the pipes *a' b'* carried to the chamber F, which is entirely filled by it, so that the mash-pipe *a* will, in such chamber, be entirely surrounded by the same. The mash as it enters the apparatus will therefore be first warmed by this water, and then in the lower compartments by the ascending vapors. The water escapes from the compartment F through an annular pipe, *d*', which surrounds the upper part of the pipe *a*, as shown.

The cases L L' should have openings at the ends to facilitate the cleaning of the vapor passages. In case the aromatizer is not required, the refrigerator is directly connected with the dephlegmator.

It is evident that the number of cases in the first series of compartments may be varied at will in accordance with the size of apparatus used, and amount of liquid to be distilled. The several compartments may be secured in a suitable frame-work, S, and connected by bolts *e*', or otherwise, in suitable manner.

Having thus described my invention.

I claim as new and desire to secure by Letters Patent—

1. The chamber A containing the heating surfaces *k*, the steam-pipe *h*, and perforated false bottom *i* to disturb and agitate the mash and evaporate its alcoholic contents, as set forth.

2. The drum I, receiving the mash and steam, the latter near the bottom, so that it will agitate the mash, as set forth.

3. The mash-evaporating pan G, combined with the steam-chamber J, substantially as and for the purpose herein shown and described.

4. The chamber B C D E, arranged as described, to let the mash and phlegm pass slowly downward, and the alcoholic vapors upward, as set forth.

5. The chamber F receiving the mash-tube *a* and water from the dephlegmator and refrigerator, or either, and discharging the water through a pipe *d*' around the pipe *a*, as specified.

6. The dephlegmator L L', connected by the pipes *t* with one of the evaporating chambers O to return the phlegm to the same, as set forth.

7. The aromatizer N containing the perforated shelves *v v*, and arranged within the annular steam-chamber O, substantially as herein shown and described to operate as set forth.

8. The refrigerator P, arranged within the inclined cold-water chamber R, and connected with the aromatizer or dephlegmator, substantially as herein shown and described.

9. The herein described combination with each other of the several compartments A B C D E F, dephlegmator L L', and refrigerator P, all arranged to operate as set forth.

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