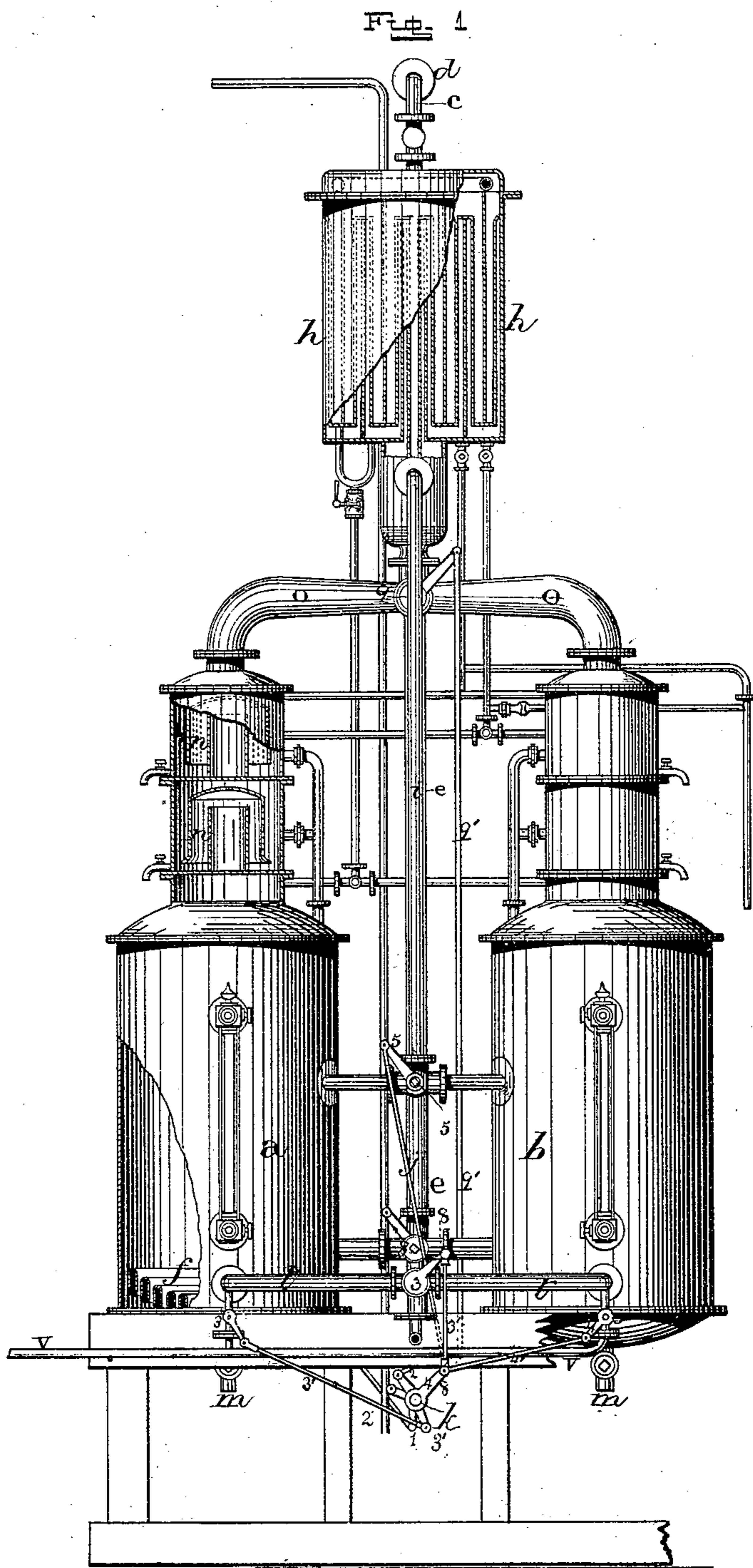


M. M. MONSANTO.  
Still.

No 217.703.

Patented July 22, 1879.



Witnesses:

*J. W. Garner*  
*W. S. D. Barnes*

Inventor:

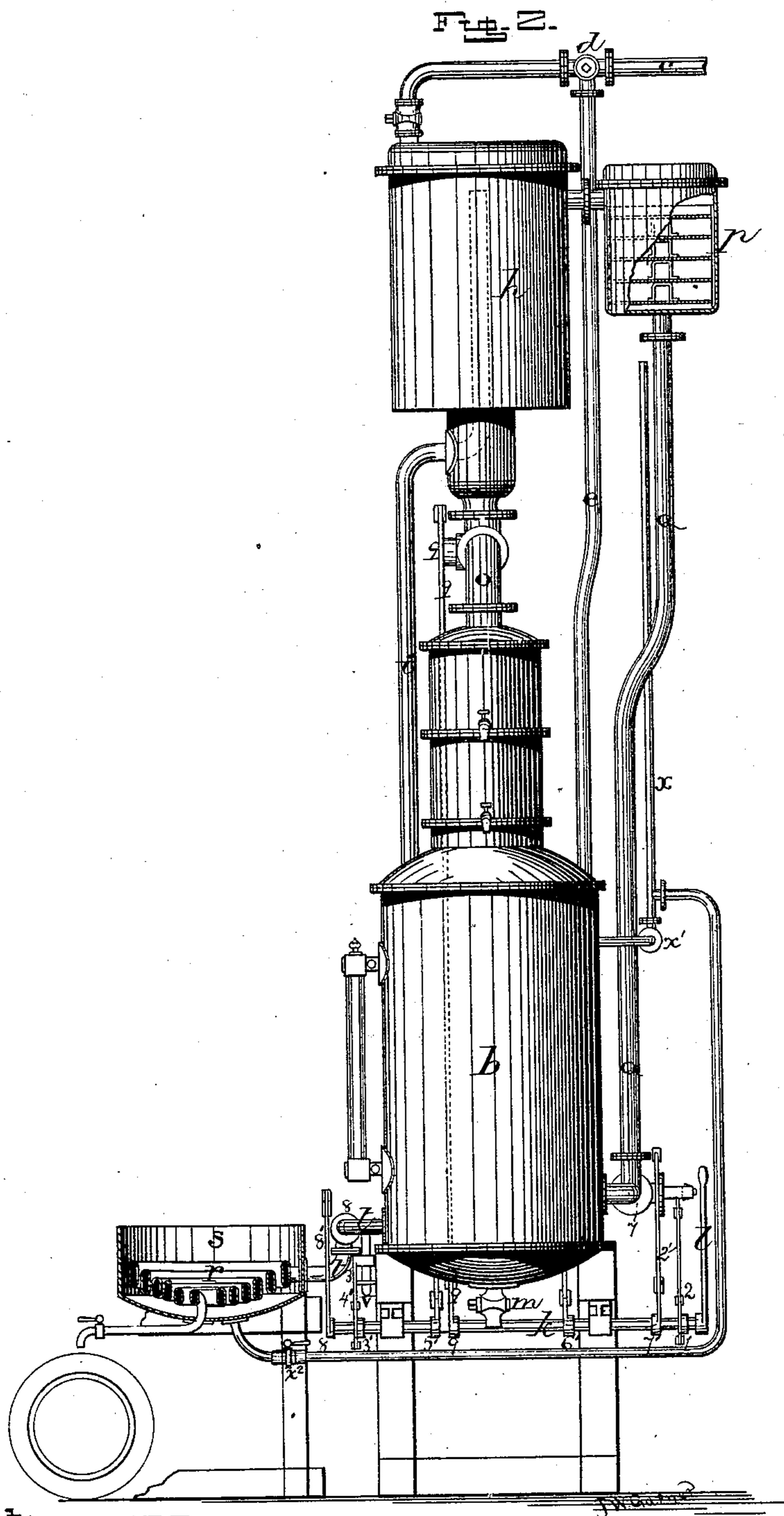
*M. M. Monsanto*  
*per*  
*J. A. Lehmann,*  
*Atty.*

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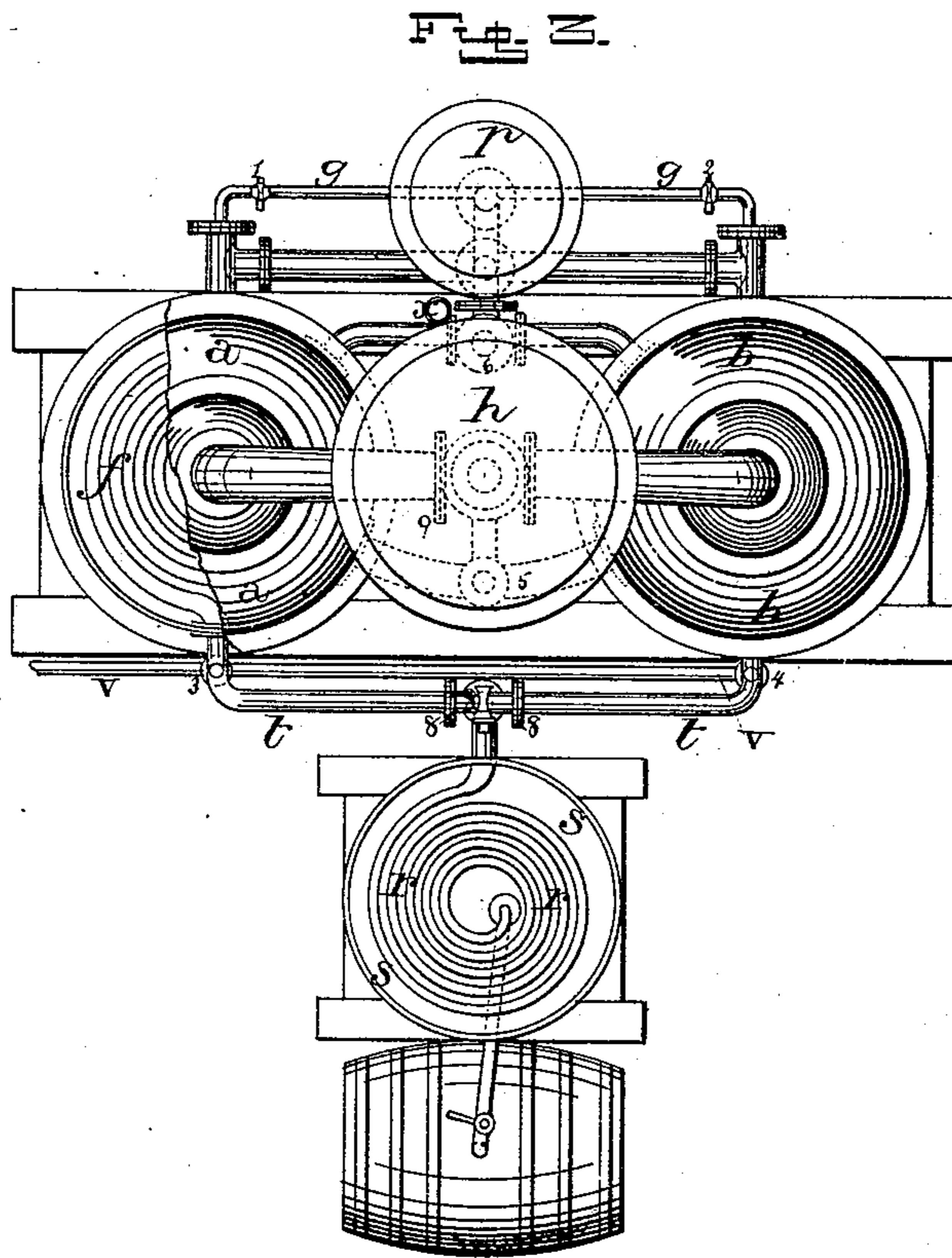
Inventor:

*M. M. Monsanto,*  
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*F. A. Lehmann,*  
*att'y.*

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*Atty.*

# UNITED STATES PATENT OFFICE.

MAURICIO M. MONSANTO, OF BARRANQUILLA, UNITED STATES OF COLOMBIA, SOUTH AMERICA.

## IMPROVEMENT IN STILLs.

Specification forming part of Letters Patent No. **217,703**, dated July 22, 1879; application filed January 13, 1879.

*To all whom it may concern:*

Be it known that I, MAURICIO M. MONSANTO, of Barranquilla, United States of Colombia, South America, have invented certain new and useful Improvements in Stills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawing, which forms part of this specification.

My invention relates to an improvement in stills; and it consists in the combination of two stills, which are connected together by means of pipes which are provided with reversible cocks, whereby one still may be used as a still while the other is used as a condenser, the change from the condenser to the still and from the still to the condenser being instantly made, and the mash to be distilled being the medium of condensation.

The accompanying drawing represents my invention.

*a b* represent two stills of the same size and capacity, which are alternately used as a condenser and a still, so as to dispense with a separate and distinct condenser. The mash passes through the inlet-pipe *c*, which is provided with the three-way cock *d*, which is operated by hand.

A portion of the first mash passes through the pipe *e* directly into the still, so as to fill it to any desired extent, and just enough passes into the condenser to cover the coil of flat pipes *f* in the bottom of the condenser.

While the mash in the still is being acted on by the heat of the steam in the flat coil, the mash continues to run into the condenser, so that by the time the mash in the still is being worked off the condenser is full. The steam passes through the pipe *g*, which is provided with suitable cocks, so that the steam can be passed through the coil of either the still or the condenser.

The coils *f* are made flat, as shown, so that a greater amount of heating and condensing surface is produced, and so that the coil can be more quickly heated.

After the still has been partially filled with mash, the mash passes on through the pipe *c*

into the dephlegmator *h*, where the temperature may be lowered to any desired degree.

After the first charges have been worked off from the still and the condenser, the mash is taken direct from the mash deposit and the dephlegmator through the vertical supply-pipe *e* and the pipe *i*, which connects at its lower end with both the still and the condenser, and is provided with the two-way cock *5*. This cock has connected to it a rod, *j*, which extends down and has its lower end fastened to an arm, *5'*, on the shaft *k*, which is operated by the hand-lever *l*. By turning the shaft the mash may be turned into either the still or condenser at will.

After the mash has been worked off long enough by the steam in the coil, it is discharged through the outlet-pipe *m*. While the charge of mash is being acted upon by the steam in the coil, the alcoholic vapor rises up through the two rectifiers or doublers *n*, up through the pipe *o*, into the dephlegmator *h*. From the dephlegmator the dephlegmatized vapor passes through the aromatizer *p*, down through the vapor-pipe *q* and three-way cock *7*, into the coil of the condenser.

By having the vapor first pass through the rectifiers or doublers and the dephlegmator, all smell of fusel and other oils is taken entirely from the vapors, and hence any aroma or flavor that is desired may be given to the alcohol.

Heretofore the aromatizer has been connected directly to the still, and hence the vapor passing off is full of the vapors of the oils, and these vapors give the rum an unpleasant odor.

While the vapor is passing through the coil *f*, the new charge of mash acts upon the coil, so as to condense the vapor, when it runs out through the pipe *t* in the form of alcohol, into the cooling-coil *r* in the cooler *s*, and from thence into the barrel placed to receive it. When the steam is passed into the coil from which the vapor has just passed, for the purpose of heating the new charge of mash, the steam cleans out the coil, so as to leave it fresh and clean for the next charge of vapor that is to be passed through.

In order to alternately use one still as a con-

denser and the other as a still, the cocks in the pipes are made reversible and connected together, so that they can all be opened simultaneously. For this purpose the shaft *k* extends across under the center of the two stills, and is provided with a series of levers or arms for attachment to the different cocks, so that when the shaft *k* is turned a quarter-revolution by means of the lever *l* all of the cocks will instantly turn also. Of these cocks there are nine, all of which are connected to the shaft. At the junction of the two large vapor-pipes *o*, through which the vapor passes from the stills, is placed the three-way cock 9, which is operated by the rod 9', so that it will close the pipe of the still that is being used as a condenser and open the other to allow the vapor to pass through. The cock 5 in the pipe *i* is also made three-way, so that the mash can be turned into either still *a b*.

In the lower end of the vapor-pipe *q* is another three-way cock, 7, connected to the shaft by the rod 7', so that the vapor can be turned into the coil *f* of either one of the stills that is being used as a condenser.

In the pipe *t*, through which the alcohol runs into the cooling-coil *r*, is placed another three-way cock, 8, which is connected to the shaft *k* by the rod 8', so that the alcohol can run freely from one coil, while the steam is prevented from escaping from the other.

The exhaust-steam pipe *v* is provided with the two cocks 4 3, which are connected to the shaft *k* by means of the rods 4' 3', so that the steam can be exhausted from either still at a time, but not from both at once. In the water-pipe *x* are also placed two cocks,  $x^1 x^2$ , which are operated by hand, so that the water can be alternately admitted to either still.

In the lower end of the mash-supply pipes is another three-way cock, 6, which is connected with the shaft *k* by the rod 6'.

By the arrangement and combination of parts here shown and described the vapors from the still are first passed through the dephlegmator, where the essential oils are condensed and separated, thus allowing the alcoholic vapor in an almost pure condition to pass on to the aromatizer. By this means much time and labor are saved in separating the oils from the alcohol, enabling me to produce a purer and better article of rum at a much less cost. Where the aromatizer is connected directly to the still this cannot be done.

By combining the two stills, so that one can be used as a still and the other as a condenser, the still is made continuous in its action, as the mash is being raised almost to a boiling-point in the condensing-still, and as the reverse action of the cock is made instantaneous.

Every atom of alcohol contained in the mash can be exhausted by this process, as the exhaustion of the alcoholic vapors can be carried to any degree desirable.

By making the charges small in comparison with the actual working capacity of the stills, and every charge being run off rapidly, the formation of acetic acid is thereby avoided during distillation, and the result is consequently a purer product than can be produced in stills where large charges of mash have to be worked off at the same time, or in continuous stills where the mash is exposed for too long a time to the action of heat. As the steam is passed through each of the coils *f*, as soon as the vapor is condensed and carried away the inner surfaces of the coils are thoroughly cleaned after every charge, so that no essential oils will remain in the coils, and thus give the rum a disagreeable taste and odor.

As the essential oils are separated from the alcoholic vapors in the dephlegmator, the lees can be used for resetting the fresh mash, and will contain all the convenient bitter aromatics which flavor and attenuate the fermentation in hot climates.

Where the vapors are not dephlegmatized the lees contain fusel-oil, which unfits them for further use in the still, as the oil would flavor the rum, and either cause the additional work of separating them, or cause the rum to be of an inferior quality.

I am aware that two stills have been used together, and that the vapors of one have been passed through the other, and this I disclaim.

Having thus described my invention, I claim—

1. The combination of the two stills *a b* and connecting-pipes for supplying mash, steam, and water, the pipes being provided with cocks that are connected to a reversing-shaft, whereby the supply may be instantly reversed from one still to the other, substantially as shown.

2. In distilling apparatus, the combination of the two stills *a b*, coils *f*, and connecting-pipes, whereby the alcoholic vapor is passed from the still into the coil of the other still that is being used as a condenser, the incoming mash serving as a means of condensation, substantially as specified.

3. The combination of one or more stills, *a b*, dephlegmator *h*, and aromatizer *p*, the three being connected together by pipes, as described, whereby the alcoholic vapors first pass through the dephlegmator to condense the essential oils before passing into the aromatizer, and the alcoholic vapors are only aromatized after having been dephlegmatized, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of April, 1878.

M. M. MONSANTO.

Witnesses:

R. M. BARR,

F. A. LEHMANN.