

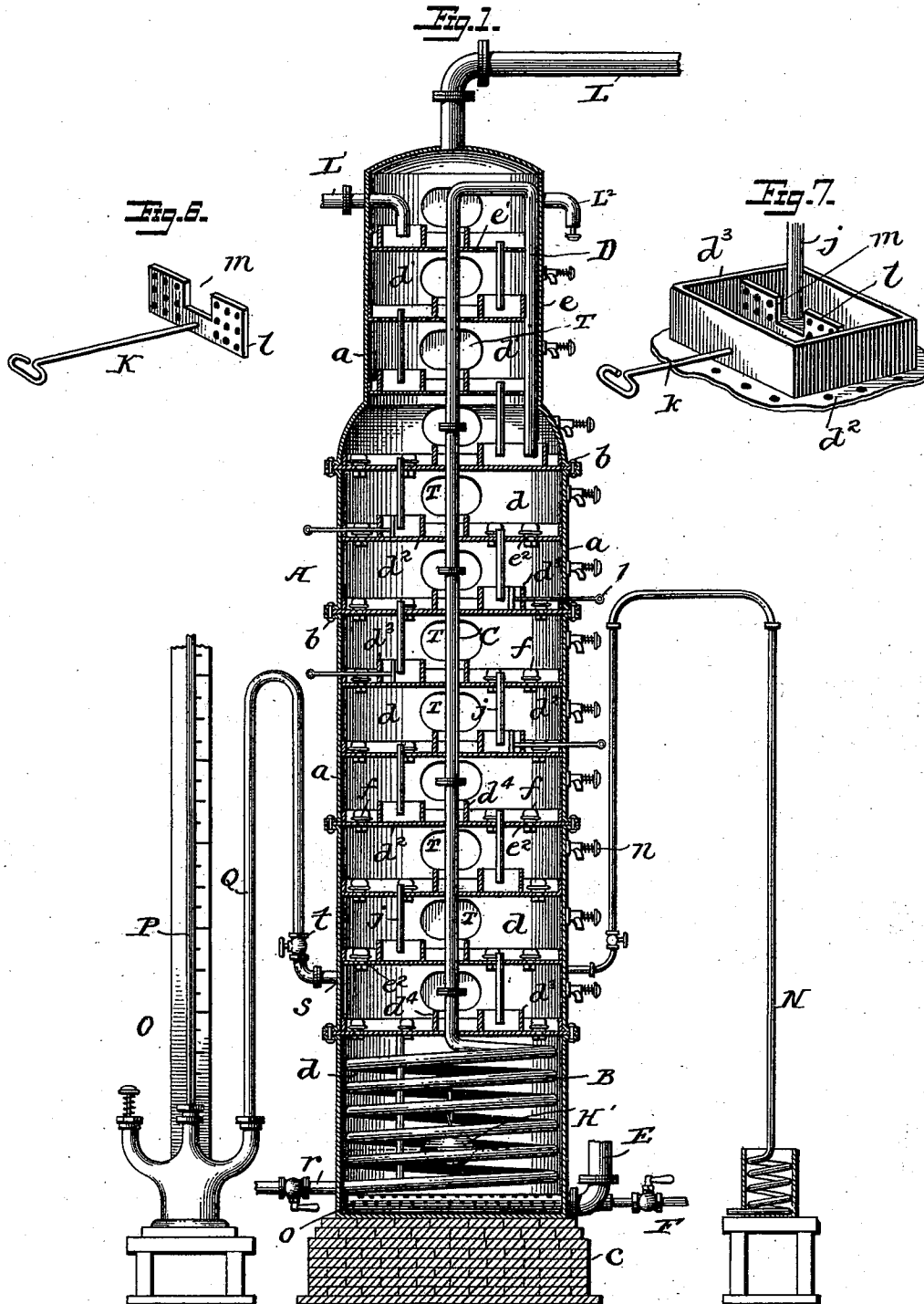
(No Model.)

2 Sheets—Sheet 1.

H. HINZ.  
STILL.

No. 511,424.

Patented Dec. 26, 1893.



Witnesses  
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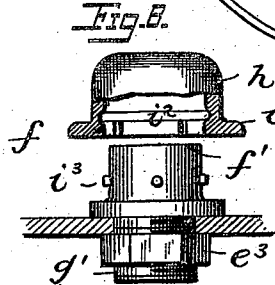
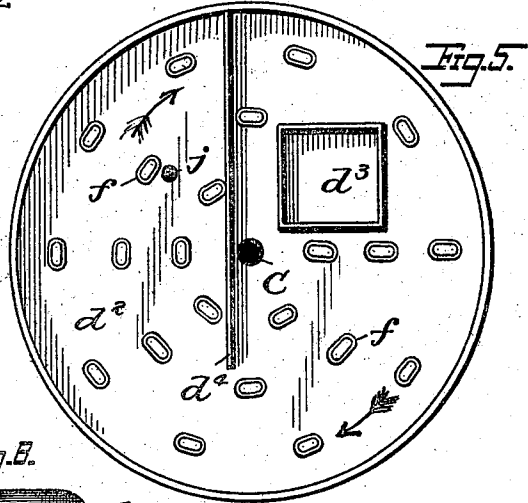
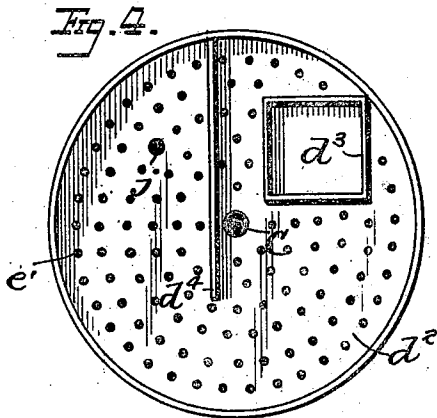
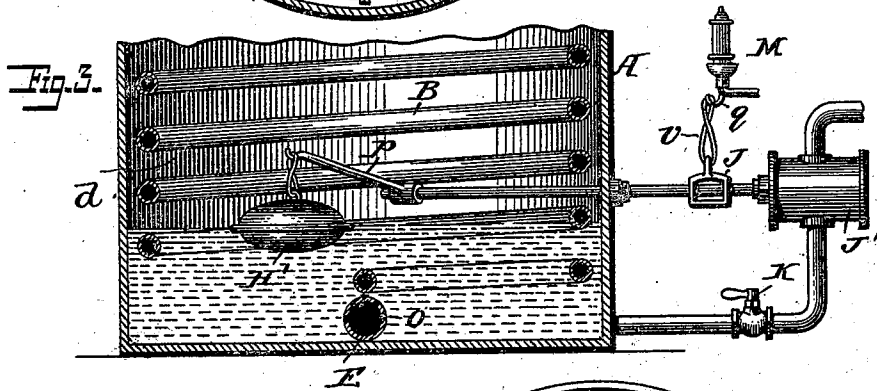
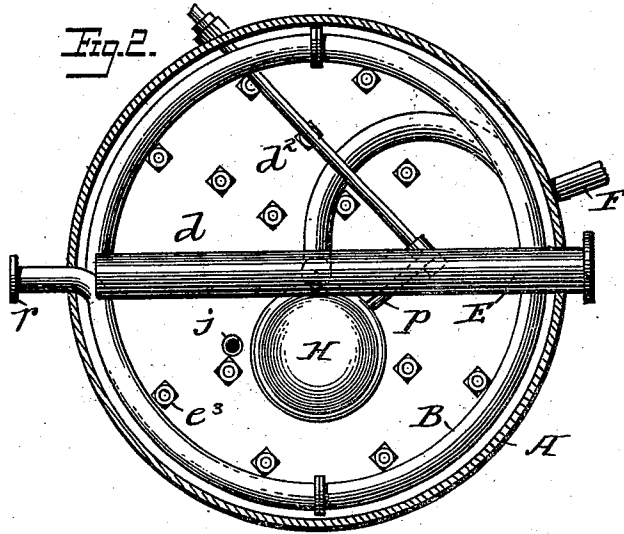
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# UNITED STATES PATENT OFFICE.

HERMANN HINZ, OF FRANKFORT, KENTUCKY.

## STILL.

SPECIFICATION forming part of Letters Patent No. 511,424, dated December 26, 1893.

Application filed July 13, 1893. Serial No. 480,407. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN HINZ, a citizen of the United States, residing at Frankfort, in the county of Franklin and State of Kentucky, have invented certain new and useful Improvements in Stills, of which the following is a specification.

This invention relates to certain new and useful improvements in stills, and it consists substantially in such features of construction, arrangement and combinations of parts as will hereinafter be more particularly described.

The object of the invention is to provide a still in which the process of distillation may be carried on continuously without loss of time incident to the stoppage of machinery or other similar causes.

A further object of the invention is to simplify the construction of this class of apparatus generally, and to provide means for ascertaining at all times the height and condition of the liquor or material being treated.

A still further object of the invention is to provide an apparatus or still in which the process of distillation shall be rendered much more complete; and also to provide for the easy manipulation of parts; as well as the perfect regulation and control of the distillation process, substantially as will more fully appear on reference to the accompanying drawings, in which—

Figure 1, is a vertical elevation, partly in section, of an apparatus or still constructed and arranged in accordance with my improvements. Fig. 2, is a bottom plan view of the lower or primary chamber in which is located the heating coil through which the liquid mash is forced into the apparatus under pressure. Fig. 3, is a view in detail, partly in section, of the blow-off and signal devices. Fig. 4, is a plan view of one of the perforated plates constituting the bottom of the upper contracted chambers or compartments. Fig. 5, is a similar view of the bottom of one of the larger compartments, showing the arrangement of the boiling caps or hoods, this figure, as well as the one preceding, showing the alternate arrangement of the seal or overflow, and the partitions which cause the liquor or material being treated to circulate in opposite directions as the same passes from one chamber or

compartment to the other. Fig. 6, represents a view in perspective of the stirring rake; and Fig. 7, is also a perspective view in detail of one of the seal-boxes or traps, showing the arrangement and working therein of said rake or stirrer. Fig. 8, is a view in detail, respectively, of one of the steam tips in the bottom of each of the larger or main chambers or compartments, and the cap or hood which fits over the same.

In carrying my invention into effect, I provide a suitable column constituted of a number of superposed hollow flanged sections, which are united at their flanges in a perfectly air-tight manner, by means of suitable fastening bolts, and said column is supported at the bottom upon a suitable base or foundation of brickwork. The interior of the column is divided into a number of separate chambers or compartments, each communicating with the other, the lower compartment or chamber being preferably larger than the others and containing a heating coil, the surrounding space of which being constantly heated by an incoming supply of steam. The said column is somewhat smaller or contracted for a suitable distance from the top, and the interior of this contracted portion is likewise divided up into a number of separate compartments or chambers similar to the lower chambers of the main body. The mash to be treated is forced into the heating coil at the bottom and caused to rise to a suitable height within the column, preferably to the top chamber of the column, and thence descends to the upper compartment or chamber of the larger series, where it starts to move or circulate around said compartment, passes below to the next compartment where it is made to travel an opposite course or direction; thence to the next succeeding chamber below, and so on until it has reached the bottom, or slop chamber, the same being made to alternately follow an opposite course, so as to be kept thoroughly agitated in its passage through, and thereby become subjected to the most thorough treatment. Steam passes upwardly into each of the compartments or chambers through the bottom thereof, and the vapor thus formed by its passage through the mash or material, passes into the smaller chambers at the top, which on account of their con-

tracted form give to the vapor an increased pressure before its passage out to the cooler or condenser thereby depriving the vapor of its bad flavor and yielding a greater percentage of alcohol. A suitable float is employed in the slop chamber which at the proper time operates the valve of the blow-off; and in addition, an automatic alarm-whistle is employed to give notice of any irregularity or improper working of the still. Such other appurtenances to the apparatus as are employed, will be referred to more fully hereinafter.

Referring to the drawings, A represents a vertical column constituted of a number of superposed hollow flanged sections *a* united at their flanges by means of fastening bolts or rivets *b*, and which column is supported at its base or bottom upon a suitable foundation of brickwork *c*. The said column is divided up into a number of separate chambers or compartments *d*, the one at the bottom being preferably a little higher or larger than the rest, so as to accommodate the heating coil, while the remaining ones are of practically the same height and dimensions throughout. The sides of the columns are somewhat contracted for a suitable distance from the top, as shown by the letter *e*, and the surrounding portion is also divided up into a number of separate chambers or compartments *d'* in like manner. The number of each set of compartments may be varied to suit particular requirements, but preferably of the compartments *d* I have herein selected nine, while of the compartments or chambers *d'*, I have selected three. Each of the compartments *d* and *d'* is provided with a bottom *d<sup>2</sup>*, which is formed or provided with an overflow box *d<sup>3</sup>*, the arrangement of such boxes alternating with each other, as shown and for the purpose to be described. The bottoms of the chambers *d'* are provided with a number of openings or perforations *e'*, while secured in suitable openings *e<sup>2</sup>* in the bottoms of the compartments or chambers *d* is a number of steam tips *f*, each being open at the top *f'* for the escape or passage of steam therethrough. The said tips are provided with a threaded part *g'* for receiving the nuts *e<sup>3</sup>*, which secure them in place in the bottoms of the compartments; and fitting over the top of each of said tips is a cap or hood *h* having a flaring lower edge, as shown at *i* so as to cause the steam escaping from the open tops of the tips to spread outwardly all around. These caps are placed in position through the manholes hereinafter referred to and are maintained in position over the tips by virtue of the connection formed between the groove *i<sup>2</sup>* formed on the inner sides of the caps into which small projections *i<sup>3</sup>* on the sides of the tips enter when said caps are slipped into place. The said caps or hoods become heated as the steam issues from the tips and they thus serve to cook the material as it passes over the bottoms of the compartments *d*, and thereby yield much greater results from the liquor

or material being treated. That part of the tip entering the bottom of the chamber is circular or round, while the upper portion thereof is oval, as shown, the caps being of corresponding shape to fit them. These are preferable to perfectly round tips at the top, and, as shown, it will be seen that the arrangement in each chamber is such as to form channels or spaces through which the mash passes on its way to the outlet pipe. To enable the caps or hoods to be slipped into place over the projections *i<sup>3</sup>*, small vertical grooves or slots are provided, as shown at *i<sup>4</sup>* in Fig. 8. The bottom of each chamber or compartment *d* and *d'* is provided with a discharge or outlet pipe *j*, which occupies a position about centrally of the overflow box of the next succeeding chamber, the lower ends of these pipes terminating a short distance above the bottoms of the boxes, so that in practice, as the mash or liquor passes from one chamber to the other through said pipes, a trap or seal is formed which prevents the steam entering the compartments from passing up through said pipes, which if it did might cause the pipes to become clogged from the heavier matters which combine with the steam as it passes up through the liquor being treated. In this way, an alternate arrangement of discharge pipes and overflow boxes or troughs is created, the purpose of which will be understood more fully hereinafter.

Entering each overflow box or trough through the side of the column is the handle *k* of a perforated rake or stirrer *l*, which is intended to be moved back and forth in the box or trough, whenever the same may become clogged or packed up by accumulating mash, and thus always enable the distilling operation to be carried on without interruption from such a cause. The said stirrer is cut out or notched at *m*, so as to pass free of the discharge pipe which depends from above. Each of the chambers or compartments *d* and *d'* is provided with a test cock *n* which is for the purpose of ascertaining which of said chambers has been stopped up or clogged, as above explained. Whenever an imperfect operation or working of the apparatus is experienced, the said cocks are opened until the proper chamber has been found in which the employment of the rake is needed. If the liquid flows from the chambers freely, they will be found in perfect working order, but if not, it will be an indication that the mash should be moved away from the lower end of the discharge pipe.

By the use of my improved stirrers or rakes, I obviate the necessity of stopping the machinery and the opening of the man-holes, together with the necessity of cleaning out the several compartments by hand. It is obvious that these rakes or stirrers possess considerable advantage in this respect.

Each of the compartments *d*, *d'*, is further provided with a partition *d<sup>3</sup>*, extending partly through or across the same, the said parti-

tions being so disposed as that the over-flow troughs and discharge pipes of the several chambers will alternate on opposite sides of said partitions, for the purpose more fully hereinafter explained.

Located in the bottom or lowermost compartment or chamber *d* is a heating coil B which terminates in a vertical portion C extending up through all of the chambers or compartments, about centrally thereof, until it reaches the top chamber, where it takes a bend downwardly, as shown at D, and terminating at near the bottom of the upper chamber *d* and entering the over-flow box thereof, as shown. The said heating coil is connected at *r* to any suitable apparatus for forcing the mash into the coil and causing said mash to be discharged or emptied from the depending portion D of said pipe. The space surrounding the coil is kept constantly supplied with steam which enters through a pipe E and escapes through a series of perforations *o* in said pipe. This pipe may be employed to supply live steam to the chamber in which the coil is placed, and preferably an additional pipe F is sometimes employed for supplying exhaust steam thereto, accordingly as desired. By thus increasing the height of the bottom or lowermost chamber, and locating the heating coil B within said chamber, I economize very materially in the amount of space consumed by the apparatus, as compared with other constructions heretofore in use.

Heretofore, it has been common to place the heating coil in a wooden tub or tank located to one side of the apparatus or still proper, which arrangement has not only been found expensive, but has given rise to much trouble in keeping the same clean, and in proper working condition.

By the use of my invention, no trouble is experienced with the use of the coil, and the expense of the construction and arrangement is considerably reduced. By extending the coil or portion C thereof upward, to the upper smaller compartment of the still and thence downwardly into one of the upper, larger compartments, the passage of the material forward will not be quite so rapid, and therefore, much better results are obtained than if the material was caused to pass more rapidly, as is the case with many former inventions on this subject.

The lowermost chamber *d* surrounding the coil, is the one constituting the slop chamber, and within this chamber is contained a float H', which has a movable connection *p* uniting the same with the key J, which opens the valve J' of a blow-off K. The said connection has also attached to it a hook *q*, held by the end of a loop *v* which depends from an automatic steam-whistle or alarm M. The use of this automatic whistle or alarm M is quite an important feature in this class of apparatus, since as soon as any improper working of the still occurs, an alarm is instantly

sounded, whereupon the defects may be remedied, and the operation of the still continued, whereas in former plans of distilling apparatus, the constant watch of an attendant has always been found necessary. By the use of the alarm, no other attention is required than that of which the whistle gives notice. If, from any improper working of the still or apparatus, the float sinks or descends, a pull upon the loop will effect a sounding of the whistle and thus give notice to the operator.

Connecting with the apparatus, is an ordinary testing apparatus N which is operated in the usual way at the time of starting the still, to ascertain whether any "singlings" or low wines have been left in the still.

O represents a pressure gage connected with the still, which is for the purpose of ascertaining at all times the amount of pressure within the still or apparatus. This gage consists of a vertical tube P which is kept nearly filled with water, and which communicates with a curved pipe Q leading upwardly from the bottom of the same, thence downwardly and entering the side of the still at *s* at near which point said pipe is provided with a cock *t*. The vertical support of the tube P may be graduated in degrees if desired, and then to determine the amount of pressure the cock *t* is simply turned on, whereupon the column of water in the tube will rise to a height corresponding to pounds pressure.

The top of the still is provided with a pipe L, leading off to any suitable cooler or condenser, not shown, while L' represents a pipe for the return of the liquor from such cooler.

The operation of my invention is as follows: The mash or liquor to be treated is forced into the heating coil under pressure, and at the same time steam is admitted into the chamber surrounding such coil. The mash or liquor passed up through the vertical pipe C, and then descends through the depending portion D, thereof, and is discharged into the overflow box of say, for instance, the upper one of the chambers or compartments *d*. The mash or liquor overflows the said box and spreads over the surface of the bottom of the chamber until it reaches the opening leading into the outlet or discharge pipe of said chamber; thence it passes into the overflow box of the next succeeding chamber, again spreads out over the bottom of this chamber in like manner, and so on until it has passed through all of the chambers *d* to the bottom or slop chamber. During this passage of the material through the several chambers or compartments, the steam from below is all the while issuing through the perforations of the tips in the bottoms of the chambers, and is caused to spread out all around said tips and pass up through the material in an obvious manner, to take up with or become mixed or intermingled with the alcoholic or other vapors. The steam heats the caps or hoods fitting over the tips, so that as the material passes from one chamber to the other it becomes

cooked most thoroughly, so as to be caused to part with all its desirable constituents, and in this way the results obtained are perfect. As the liquor or material flows over the sides of the boxes in the chambers and comes into contact with the hot or heated caps, it becomes agitated to a degree and begins to flow in the direction indicated by the arrows—Fig. 5—and in this way, the passage from one chamber to the other takes place without any trouble. The overflow boxes being kept constantly filled, forms a liquid seal at the lower ends of the pendent discharge pipes, so that no steam can pass up through the same. The arrangement of the steam tips and their hoods or caps is a regular one, as shown, thus creating passages between them which the liquor or material follows in its course or circulation toward the point of discharge from one chamber to the other. By reason of the alternate arrangement of discharge pipes and overflows, the material is caused to travel in opposite directions as it leaves one chamber and enters another, thus tending to increased results in the treatment. The commingled vapor and steam passes up into the smaller chambers *d'* where it becomes reduced in volume, or somewhat compressed thereby becoming deprived of its nauseous vapor which passes out through pipe *L*<sup>2</sup> provided with a let off valve as shown, and thence the mixture passes through the pipe in the top of the still to any suitable form of condenser or cooler. After being condensed, it is returned to the still through the pipe *L*<sup>1</sup>, in the nature of low wine, which passes through the perforated bottoms of the chambers *d'*, until the upper chamber *d* is reached, when it may be either drawn off or passed back through the still, as may be desired.

It should be remarked that each separate compartment is provided with a man-hole *T*, properly closed over, and that the several pipes may be provided with the usual cut-off or regulating cocks or valves. The entire apparatus is very compact, consumes but little space, and gives the best results in use.

What I claim is—

1. In a still, the combination of a number of superposed main compartments or cham-

bers, and a series of separate smaller compartments located above said main compartments and provided with perforated bottoms, discharge pipes pendent from the bottoms of both sets of compartments in alternate arrangement, an overflow box or trough for each pipe, a heating coil in the lowermost chamber, and a vertical pipe leading from said coil to the top of the still, thence downwardly and terminating within the upper chamber of the main series; substantially as described.

2. In a still, the combination of a series of superposed compartments communicating with each other by the discharge pipes disposed in alternate arrangement, the overflow boxes or troughs located beneath the ends of each pipe, rakes or stirrers located within said troughs or boxes and provided with handles passing through the side of the still; substantially as described.

3. In a still, the combination of a series of superposed compartments, the discharge pipes leading from the bottom of one compartment to a suitable point within the compartment below it, an overflow box for each pipe, partitions extending partly across each chamber, and steam tips entering the bottoms of the chambers, the said tips being open at the top and provided with the hoods formed with flaring bottoms, a heating coil, and the vertically extending pipe terminating in one of the upper chambers; substantially as described.

4. In a still, the combination of a series of superposed compartments or chambers each provided in its bottom with a depending discharge pipe, and having an overflow trough into which said pipe discharges, and a rake or stirrer entering such troughs from the sides of the still and provided with the cut-out portion to permit the passage thereof beneath the discharge pipe, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN HINZ.

Witnesses:

J. S. BRISLAN,  
GRANT GREEN.