

M. THOMPSON.  
 Manufacture of Alcoholic Spirits.

No. 43,348.

Patented June 28, 1864.

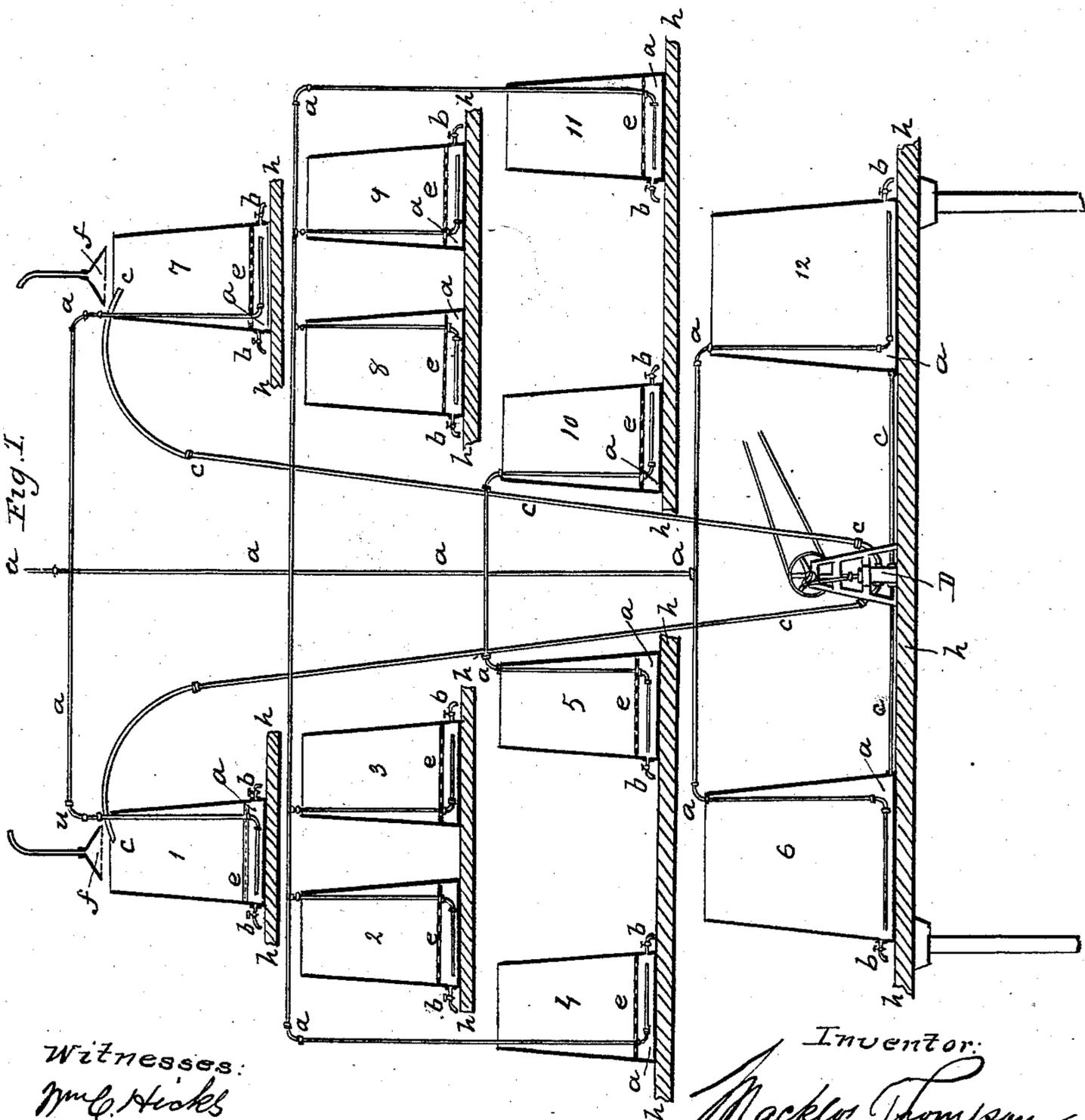
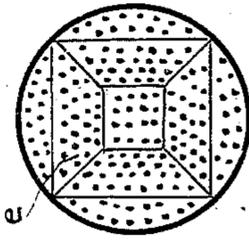


Fig. 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

MACKLOT THOMPSON, OF ST. LOUIS, MISSOURI.

## IMPROVEMENT IN THE MANUFACTURE OF ALCOHOLIC SPIRITS.

Specification forming part of Letters Patent No. 43,348, dated June 28, 1864.

*To all whom it may concern:*

Be it known that I, MACKLOT THOMPSON, of St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in the Manufacture of Alcoholic Spirits from Grains, Roots, Tubercules, &c.; and I hereby declare that the following is a full, clear, and exact description of the same.

In an application for Letters Patent of the United States filed in the month of April, 1864, I have described a new method of macerating grains, roots, tubercules, and other vegetable matter capable of producing alcoholic spirits, consisting in the employment of acidulated water in combination with a certain degree of heat, whereby the extraction of the saccharine matter is or may be effected without previously crushing the grain or substance to be treated, and the whole maceration performed in less time and more economically than this could heretofore be done. In working the said process I have found it advantageous to avoid pressure, which, when operating on a level, is necessary in order to force the liquid from the one into the other tubs.

The present invention is based upon that method, and has for its object to still further reduce the time in which the maceration is effected and attain greater results of economy in the working of the said process by increased saving in labor and steam, while a more thorough saccharification of the matter acted upon is obtained; and this invention consists, first, in the general disposition of macerating-tubs and method of working the same, so that the liquid is caused to descend by its own gravity from one tub to another, and in its descent become charged with saccharine matter, being discharged at intermediate points only when the wort shall have acquired the requisite degree of density; second, in the method of working macerating-tubs in batteries arranged in cascade fashion, and in connecting said batteries so that the work of one may be continued into the other; third, in the method of working the macerating-tubs of each battery at the temperatures of 212° and 150° Fahrenheit, respectively, at the periods and in the manner hereinafter set forth.

To enable others to make and use my invention, I shall now proceed to describe the man-

ner in which the same is or may be carried into effect.

The apparatus used for the purposes of my invention is composed of mashing-tubs of ordinary or suitable construction, of pipes for conveying steam and water, and faucets or cocks to draw from the tubs the saccharine juices, or to empty them, as the case may be. In the details of my apparatus, therefore, there is no novelty.

The distinguishing feature of my invention consists in the peculiar arrangement of the tubs, pipes, &c. Any ordinary distillery may therefore be arranged to operate in accordance with my invention. I work the macerating-tubs by batteries or groups. In the annexed drawings two groups or batteries are shown; but one single battery or a series of batteries may be used, according to the importance of the manufacture.

In the said drawings, Figure 1 represents a sectional elevation of a double battery. The tubs constituting each battery are numbered 1, 2, 3, 4, 5, and 7, 8, 9, 10, 11, respectively. The tubs are arranged, as shown, in pyramidal forms, of which 1 forms the apex and 4 and 5 the base. They may rest on girders or supports *b*, or each tub may be provided with trunnions and hung upon them in suitable brackets or supports, so that the tubs may be swung with ease upon the trunnions for the more convenient emptying them when the slops or residues are to be removed therefrom. In the center of each group or battery, and under the lowermost tubs, is arranged a receiver, numbered 6 in the one and 12 in the other battery. (Shown in the drawings.) The macerating-tubs, as before said, may be of any suitable or ordinary construction. Those I prefer to use are proportioned as to depth and diameter as shown, and are each provided with a false bottom, *e*, consisting of a skeleton frame lined or covered with a perforated sheet of lead. For convenience of and economy in construction, I make the false bottom in sections, as shown in plan view in Fig. 2. Steam is conveyed into each tub by means of a system of pipes, *a*, branching off from a main supply-pipe. The steam-pipes are carried down the tub through the false bottom and arranged horizontally between the solid bottom and the perforated bottom. Each pipe may be provided with cocks

for the purpose of shutting off or turning on the steam, according to the requirements of the work. Each tub is also furnished with one or two, or more, discharge-cocks. The uppermost tub has one cock on each side, emptying the contents thereof into either or both the tubs immediately underneath. Tubs 2 and 3 have their discharge-cocks arranged on the outside, so that the contents of the tubs may be drawn therefrom into tubs 4 and 5, while the latter have their discharge-cocks arranged on the inside, so that both tubs may discharge their contents into the receiving-tub, which is common to both. It will be obvious that this cascade system may be repeated in front and in the rear as well as upon the sides, in which case tub No. 1 would have four cocks discharging the contents into four symmetrically-arranged tubs underneath, which in their turn will be emptied into four tubs below, which, by means of cocks arranged on the interior line of the circle, may discharge the contents of the respective tubs into a common receiver below. Connection is established between the receiver of each battery and the uppermost macerating-tub by means of pipes *c*, starting from a pump, *D*, whose valves are so arranged that the liquid is drawn by the action of the pump from the receiver and forced into the first macerating-tub. The apparatus is completed by the arrangement of a hot-water tank and a spout or shower, *f*, which supplies the water necessary for the operation.

The apparatus, arranged as described, is operated in the manner as follows: All the macerators of the battery are charged with uncrushed grain to about one-third of their depth. Water is then allowed to run into the tubs until the grain is completely submerged. The tubs are then closed and steam is admitted through the pipes *a*, so as to elevate the temperature in tub No. 1 to about 212° Fahrenheit, while in tubs Nos. 2, 3, 4, and 5 it is raised to a temperature not to exceed 150° Fahrenheit. When the grain in tub No. 1 is sufficiently boiled or cooked, acid is added, as described in my application before referred to. The tub is then closed again, and the temperature is maintained at 212° Fahrenheit until the saccharification is completed. When this is done the steam is shut off and the discharge-cocks *b* opened and the wort or juice conveyed directly to the fermenting-tubs. (Not exhibited in the drawings.) When the wort or juice of the proper density is all drawn from the first macerating-tub a stream of hot water is then opened through the shower *f* into tub No. 1, which becomes charged with saccharine matter and runs into tubs Nos. 2 and 3 until the grain contained in the latter is covered to a depth of six inches, more or less. While this is going on the temperature in tub No. 1, and

until the grain is completely exhausted, must be maintained at 150° Fahrenheit. The cocks *b* in tub No. 1 are then shut and the tubs Nos. 2 and 3 are closed and the temperature therein raised to 212° Fahrenheit. When the saccharification is completed in these tubs, as before described with reference to tub No. 1, the wort or juice is sent directly to the fermenting-tubs. When all the wort of the requisite density is abstracted, then tub No. 1 is again opened upon tubs Nos. 2 and 3, and these latter on tubs Nos. 4 and 5, until the grain in the latter is covered to a depth of six inches, more or less. When this is done tubs Nos. 2 and 3 are shut off from tubs Nos. 4 and 5 and the temperature in the latter two is raised to 212° Fahrenheit. When the saccharification is completed the wort and juice are then drawn off directly into the fermenting-tubs, all in the manner as described with reference to tub No. 1 and tubs Nos. 2 and 3. The intermediate macerating-tubs, Nos. 2 and 3, are again opened upon the tubs 4 and 5, which are allowed to discharge into the fermenting-tubs until the wort or juice falls to four degrees density. At that point the discharge is changed to receiver No. 6, and the liquid is thence forced back to tub No. 1, which is supposed by this time to be recharged, the former having been exhausted. If two or more batteries are worked, the liquid of inferior density may be forced up into the uppermost tub of the next battery or group of tubs, and so on. The extraction of saccharine matter in tubs 2, 3, 4, and 5 is continued until the grain in the whole battery is exhausted.

Having thus fully described my invention, I claim—

1. The general disposition of macerating-tubs and method of working the same, so that the liquid is caused to descend by its own gravity from one tub to another, and in its descent become charged with saccharine matter, being discharged at intermediate points only when the wort shall have acquired the requisite degree of density.

2. The method of working macerating-tubs in batteries arranged in cascade fashion, and connecting said batteries, so that the work of one may be continued into the other.

3. The method of working the macerating-tubs of each battery at the temperatures of 212° and 150° Fahrenheit, respectively, at the periods and in the manner hereinbefore set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

MACKLOT THOMPSON.

Witnesses:

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WM. KUTELHOUGH.