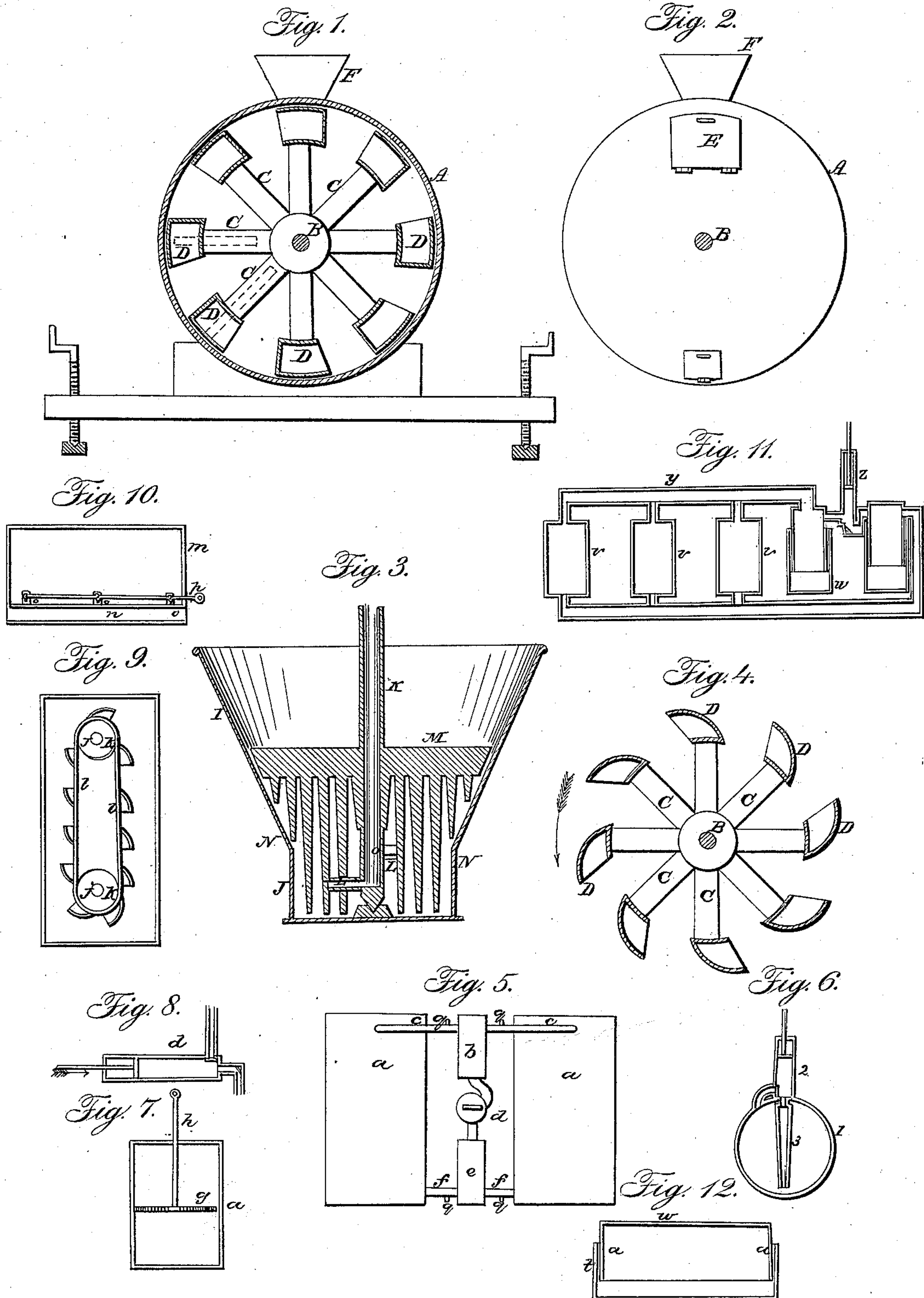


C. C. EDDAY.  
Fermenting Vat.

No. 2,535

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# UNITED STATES PATENT OFFICE.

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## VINOUS FERMENTATION.

Specification of Letters Patent No. 2,535, dated April 1, 1842; Antedated March 4, 1842.

*To all whom it may concern:*

Be it known that I, CHARLES C. EDDAY, of the town of Benton, county of Yazoo and State of Mississippi, have invented an Improvement in Vinous Fermentation, and do hereby declare that the following is a full and exact description thereof, reference being had to the annexed drawing of the same, making part of this specification.

10 Figure 1, is a vertical transverse section of the first plan for perfecting vinous fermentation. Fig. 2, is an end view of the same. Fig. 3, is a vertical transverse section of the scalding apparatus. Fig. 4 is a  
15 section of a wheel with buckets. Fig. 5 is a top view of another method of perfecting vinous fermentation. Fig. 6 is a section of another method of accomplishing the same. Fig. 7, is a section of the sifter as arranged  
20 in the tub. Fig. 8 is a section of a common air pump used in Figs. 5, 6, 10, 11 and 12. Fig. 9, is a vertical transverse section of the endless chain of buckets as arranged in a tub for perfecting vinous fermentation.  
25 Fig. 10, is a vertical longitudinal section of a tub with cylinder and faucets. Fig. 11, is a vertical section of another mode of perfecting vinous fermentation. Fig. 12, is a view of the tub with the inverted top.

30 Similar letters refer to corresponding parts.

The nature of my invention consists in bringing up the heavier portion of the grain or fermentable matter from the bottom to  
35 the top and conveying down the lighter and more fermentable matter from the top to the bottom, or suspending the heavier portion at the top or at any point within the tub that may be desired and carrying the lighter  
40 or more fermentable part of the fermentable matter to the bottom or suspending it at any point within the tub at pleasure and thus acting on every part alike at the same time until all has undergone thorough fermentation. To effect this I have several  
45 methods or modes of operating. First is as follows: A tub or vat, A, Figs. 1 and 2, is constructed and is made of any size or dimension from three to ten feet in diameter  
50 and from ten to forty feet in length and may be constructed in the form of a barrel or may be of the same diameter throughout and they should be made of plank from three (3) to six (6) inches thick and from  
55 four (4) to eight (8) inches in width and grooved together and hooped with the best

iron or copper bands. These bands should be three (3) or four (4) inches in width and one half inch thick. These hoops or bands are placed within three (3) feet of  
60 each other so as to make the tub perfectly tight and strong. This tub should be lined with thin copper through from end to end. There is to be a shaft, B, Figs. 1, 2 and 4, to pass through one end of said tub so as  
65 to enable the gearing to be attached to the same; upon this shaft there are arms C, extending nearly the full diameter of the tub leaving only room to turn with perfect ease. Upon these arms buckets D are placed  
70 similar in form to those of the common overshot water wheel so constructed as to bring the heavier portion of the grain or fermentable matter and empty it in the center of the tub or vat at the top and carry  
75 the lighter and more fermentable matter from the top and empty it in like manner at the bottom and using the carbonic acid gas as a ferment instead of using yeast. These buckets should be concave on the up-  
80 per side and convex on the under side, and they may run the whole length of the shaft or may be from three (3) to five (5) feet in length and from four (4) to six (6) inches in breadth and from twelve (12) to eighteen  
85 (18) inches deep. The buckets may be made either of wood, copper, iron or tin. These buckets may be permanently attached to the arm. After this tub is filled and fermentation thoroughly established, this wheel is  
90 to be turned very slowly during the entire process of fermentation or around at intervals of one half hour each during the entire process of fermentation. At one end of this tub is to be the "manhead" E, while the  
95 place for filling the tub is on the top at F.

2. Another method of perfecting vinous fermentation is as follows: At the bottom of the tub or vat is placed a screen or sifter  
100 g, see Fig. 7, made with wire or sheet or copper punched full of holes which fills the entire circle of the tub or vat, and when mash or fermentable matter is put into this tub and the heaviest part has fallen to the bottom this screen or sifter is to be raised  
105 by hand or other means to the top by means of a rod N passing through at the top and held there in order that the gas may pass through and act upon the heavier part until all has undergone a thorough fermentation.  
110 The gas may be taken out of this tub and forced in again at the bottom by a common



force pump arranged on the inside or outside of the tub.

3. Another method of effecting this is to place the screen or sifter  $g'$  at the top and strain the mash or fermentable matter through this sifter and retain the heavier portion of the grain or fermentable matter at the top. The gas may be taken out at the top of the tub and thrown in at the bottom by a pump as before described.

4. Another method of effecting this is to suspend the heavier portion of the grain at any point between the top and bottom of the tub or vat as seen at  $a$ , Fig. 7, and conveying the gas by a force pump as before described out of the tub and passing it in at the bottom of the same and thus acting on and bringing up the heavier portion that remains or passes through the sifter and settles at the bottom of the tub.

5. The same principle may be applied to perfect vinous fermentation by constructing a tun or vat  $i$ , Fig. 9, from five (5) to twelve (12) feet in diameter and from ten (10) to thirty feet (30) in length. This tun or vat is to stand upright and is to be made in every respect like the horizontal tub before described and at the top and bottom of this tub there is a shaft,  $j$ , running across the tub. The upper shaft is to pass through at one end for the purpose of attaching a crank or gearing to turn the same. Upon each of these shafts is to be placed a drum  $k$ . Bands,  $l$ , are passed around these drums with buckets so constructed as to bring up the heavier portion of the fermentable matter from the bottom to the top and carrying down the lighter and more fermentable matter to the bottom and emptying it as in the first instance described.

6. Another plan of applying this principle is to construct a tub,  $m$ , as seen at Fig. 10, of any size or dimension and through the bottom of this tub or vat, there is a copper cylinder or pipe,  $n$ , with cocks,  $o$ . At different places along the sides of this cylinder or pipe, these cocks are turned by drawing back and forth the attached rod  $p$ , running through the tub for that purpose. This pipe or cylinder is to be filled with gas by means of a force (such as before described) pump. This pump is to take the gas out of the top of the tub and force it into the cylinder within the tub from which any quantity made may be used by means of the cocks. The gas may be retained in this cylinder from one fermentation to another.

7. Another method of perfecting vinous fermentation is by placing a row of tubs or vats,  $a$ ,  $a$ , Fig. 5, side by side with a cylinder,  $b$ . In the center of the row from each tub a pipe,  $c$ , is connected with this cylinder the pressure created in each tub throws the gas into this cylinder from which it is

taken by a force pump,  $d$ , as before described and thrown into another cylinder  $e$ , where sufficient pressure is created to throw it into the bottom of each tub by pipes  $f$ , which are to connect with this cylinder as in the case described, in the first cylinder upon each pipe connected with the cylinders there is to be a faucet or cock,  $g$ , for the purpose of letting on or shutting off the gas as may be desired.

8. Another method of adopting the same principle is to arrange the tubs  $q$  as seen at Fig. 11, in a horizontal or upright form and at a suitable distance from these tubs or fermentating tuns is a large tub  $w$ . This tub is to be filled with water and within this tub is placed an inverted vessel  $x$ , or gas receiver into this inverted vessel the gas is to be first condensed by a pipe  $y$ , running from the top of each fermenting tun to the top of this inverted vessel here the gas is first condensed by the weight of water which it displaces in the inverted vessel and the gas may be taken out of this inverted vessel by a pump  $z$ , for that purpose and condensed in another of greater depth of water when the gas is condensed sufficient to pass in at the bottom of the fermenting tuns during the entire process of fermentation it is to be (the gas) conducted from one end of the fermenting tun to the other by a copper pipe for that purpose from which the gas may be let out at pleasure. By this process the gas may be retained in the cylinder and used as a ferment instead of yeast from one fermentation to another.

9. Another method for perfecting vinous fermentation for distilling or brewing is to construct a fermenting tun  $t$  seen at Fig. 12, six (6) to eight (8) feet deep and from six (6) to eight (8) feet in width and from ten (10) to thirty (30) feet in length this fermenting tun may be made circular on the bottom and straight on the sides or it may be made spare this fermenting tun may be covered by an inverted top  $u$ , this top is shut down on the inside of the fermenting tun and this inverted top is to pass down below the surface of the mash, or fermentable matter or in other words, this inverted top is to have a rim around it of which  $a$   $a$  shows a vertical section that is to pass down on the inside like inverting one vessel into another and when the fermentable tun is filled ready for fermentation this inverted top is to be let down on the fermentable matter so as to exclude the atmospheric air entirely and as fermentation goes on the top is made to rise according to the different degrees of pressure in this fermenting tun on the inside of this fermenting tun may be placed a shaft with arms and buckets as described above and represented in Fig. 4, across the top of this tub may be placed a screen or



sifter similar to the one shown at Fig. 7 which retains the heavier portion of the grain or fermentable material for the gas to act upon at the top until fermentation is completed by the rising and falling of this top the gas is forced out into an inverted vessel or receiver where it may be forced into the same tub at the bottom as heretofore described in section 9, and represented in Fig. 12.

10. Another method is by taking the gas out of the top of the tub 1 and forcing it into the bottom of the same by means of a pump 2 or it (the pump) may be placed on the inside of the tub and the gas forced to the bottom through a pipe 3.

*Description of the tub for scalding and preparing for vinous fermentation.*—This tub see Fig. 3, is to be made funnel shape. The bottom J is to be four or six feet in diameter and from six to ten feet at the top, E, and six feet in depth in the center of this tub there is to be placed a cast iron shaft K. This shaft is to be hollow through which the steam is to pass and let upon the grain or mash at the bottom through holes or small pipes L for that purpose and upon this shaft is to be a cross piece or an arm M that is to fill the circle of the tub in this arm are to be placed teeth N so as to form a rake to go down to the bottom of the tub this arm or cross piece is permanently at-

tached to the shaft and turns around with the same by this process the steam is let upon every part of the grain alike through the pipes or apertures L in the shaft.

What I claim in the foregoing is—

The mode of accelerating and perfecting vinous fermentation in close vessels herein set forth that is to say I claim the returning of the lighter and more fermentable matter which floats on the surface of the mash in the fermenting tun to the bottom of the same and bringing up from the bottom to the top the heavier parts of the fermentable matter and exposing it to the action of the gas while it is emptied out of the buckets into the center of the tub and also the returning or forcing of the gas by means of force pumps or any and all the modes herein set forth and returning the gas as a ferment and to all other purposes to which it may be converted. Using the wheel with the buckets or the cylinder with the gas or any other mode herein set forth substantially the same also the horizontal tub and the method of applying the steam through the hollow shaft for scalding the grain or fermentable material.

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Witnesses:

EDW. MAHER,  
I. WM. KING.