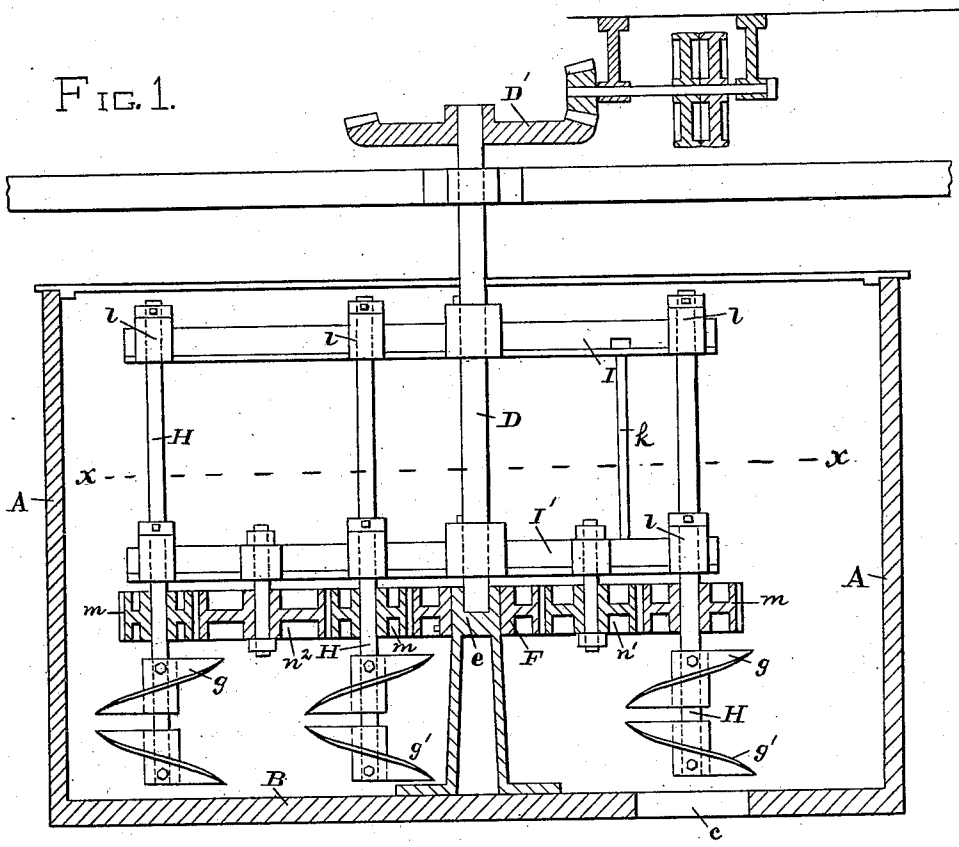
(No Model.)

C. ZIES.

STIRRER FOR MASH TUBS.

No. 364,622. Patented June 7, 1887.

FIG. 1.



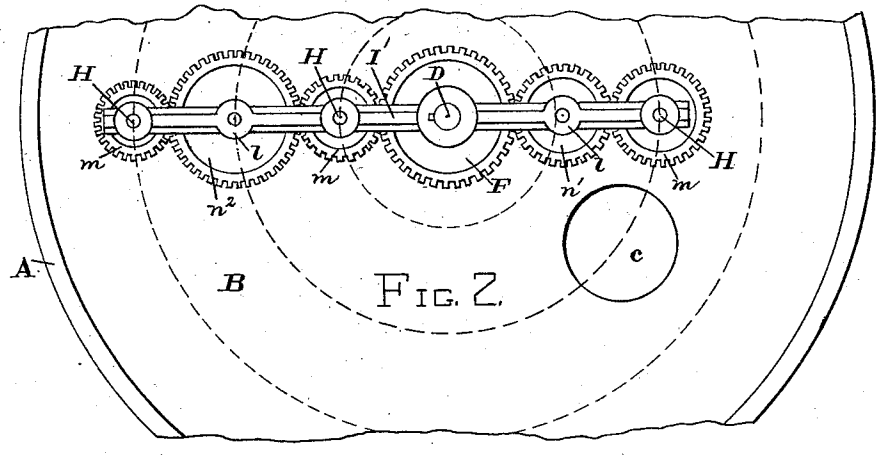


FIG. 2.

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CHARLES ZIES, OF BALTIMORE, MARYLAND.

STIRRER FOR MASH-TUBS.

SPECIFICATION forming part of Letters Patent No. 364,622, dated June 7, 1887.

Application filed March 22, 1886. Serial No. 196,073. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ZIES, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Stirrers for Mash-Tubs, of which the following is a specification.

My invention has reference to improvements in stirrer mechanism for mash-tubs.

The object of this invention is to provide a stirrer which will rotate in a horizontal plane and be adapted to pass in its rotation over every part of the tub-bottom and raise therefrom the malted grain, and to press the malted grain which at first is on the top surface of the mixture down from the top, effect a thorough admixture of the mash, and to do this with the least possible expenditure of power.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a mash-tub and the improved stirrer. Fig. 2 is a plan view of same on the horizontal line *x x*.

The letter A designates the side walls, and B the bottom, of an ordinary mash-tub, having the usual opening, *c*, for the discharge of the grain after the wort has been extracted. The driving-shaft D is supported in the usual manner—that is, its lower end rests on a centrally-placed step-bearing, *e*, which has at its top a fixed gear-wheel, F. At the top the driving-shaft carries a wheel, D′, which connects with suitable gearing. In the present instance three stirrers are used. Each stirrer consists of a vertical shaft, H, having two screw or spiral blades, *g g′*, oppositely or reversely pitched. In other words, one spiral blade winds to the right and the other to the left.

The two spiral stirrer-blades are entirely separate devices, and each may be adjusted independent of the other up or down on the vertical shaft H. This is important, as the upper blade must be set so as to press down the malt on the top surface of the mixture, while the lower blade must be set to raise the malt from the strainers at the bottom.

The shafts of the several stirrers *g g′* are carried on a suitable frame which is mounted on the driving-shaft D, and is arranged to rotate in a horizontal plane. The frame in the present instance consists of two horizontal bars, I I′, made fast one above the other to the driving-shaft. One or more rods, *k*, connect the said two bars. Bearings *l* are on the two bars for the stirrer-shafts H, two of which latter are at one side of the driving-shaft D and one at the other side.

Each stirrer-shaft H has fixed to it a gear-wheel, *m*, just below its lower bearing, and the lower bar, I′, of the frame carries two pinions, *n′* and n^2. One of these, *n′*, gears with the fixed gear-wheel F on the step-bearing, and also with the wheel *m* of one stirrer-shaft. The wheel *m* of the middle stirrer-shaft also gears with the fixed gear-wheel F and the pinion n^2, while the latter on the opposite side gears with the gear-wheel *m* on the remaining shaft. One of these rotary stirrers and a suitable rotary carrier may be used.

By having two stirrers mounted on the rotary frame at one side of the driving-shaft and one at the other side each of the three stirrers in rotating around the driving-shaft will traverse a path of its own, and thereby, it will readily be seen, every part of the tub-bottom will be passed over.

This machine operates in the following-described manner: The tub is first supplied with water or other liquid, and then the malt is entered upon this liquid. The stirrers H *g g′* being set in motion, each stirrer revolves independently on its own vertical axis, and also all the stirrers rotate around the vertical driving-shaft. The effect is, that the upper spiral blade, *g*, presses down the malt which is on the top surface, while the lower spiral blade, *g′*, winding in a reverse direction from the upper one, tends to raise the malt or force it to the top again. Thus each stirrer produces an up-and-down whirl, of which each stirrer-shaft H is the center. As a stirrer for malt this motion is very effective. An important advantage, also, of these several "up-and-down whirls," all arranged to rotate around the tub-center, is, that thereby a continuous whirl or revolution of all the mass around the center shaft is avoided. Where the entire mass of malt and liquid is made to revolve around the tub-center—as in the case of many malt-stirrers heretofore used—a bad effect is produced, to wit: a centrifugal tendency toward the tub-walls is imparted to the malted grain, and when the stirring mech-

anism is stopped the entire mass continues for some time thereafter its revolving movement. This results in the grain being forced and packed against the strainers or perforated bottom with which all mash-tubs are provided, and in consequence the wort or liquid extract cannot flow off freely.

The important advantage referred to, which is obtained by my several up-and-down whirls and the rotary frame, is, that by this device there is no continuous revolution of the entire mass, no centrifugal tendency, and no packing of the grain; but, on the contrary, when these stirrers are stopped, the motion of the mass in the tub quickly subsides and the grain settles down slowly in a loose spongy condition on the tub-bottom, and thereby an increased quantity of liquor is obtained, and it can drain off promptly.

I am aware that it is not broadly new to employ more than one vertical shaft in a mash-stirring apparatus, each shaft being provided with stirrer-blades arranged spirally, the blades on each shaft pitching or winding in opposite directions. I am also aware that it is not broadly new to combine several shafts carrying mash-stirring blades with gearing whereby said shafts are connected one to another. I do not broadly claim either of the above constructions and combinations; but,

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the mash-tub, a central vertical driving-shaft, D, a frame mounted on the shaft to rotate in a horizontal plane, three vertical stirrer-shafts, H, two mounted on the frame at one side of the said driving-shaft and one at the other side, gearing for giving each of these shafts independent motion, and two spiral blades, $g g'$, which pitch or wind in an opposite or reverse direction and separately mounted on each stirrer-shaft, so as to admit of each being adjusted independently of the other, for the purpose set forth.

2. A stirrer mechanism having in combination a frame with means to rotate the same in a horizontal plane, and two or more vertical shafts, each provided with two spiral blades which pitch or wind in an opposite or reverse direction, whereby the rotary motion does not impart a centrifugal tendency to the entire mass, as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES ZIES.

Witnesses:
JNO. T. MADDOX,
JOHN E. MORRIS.