

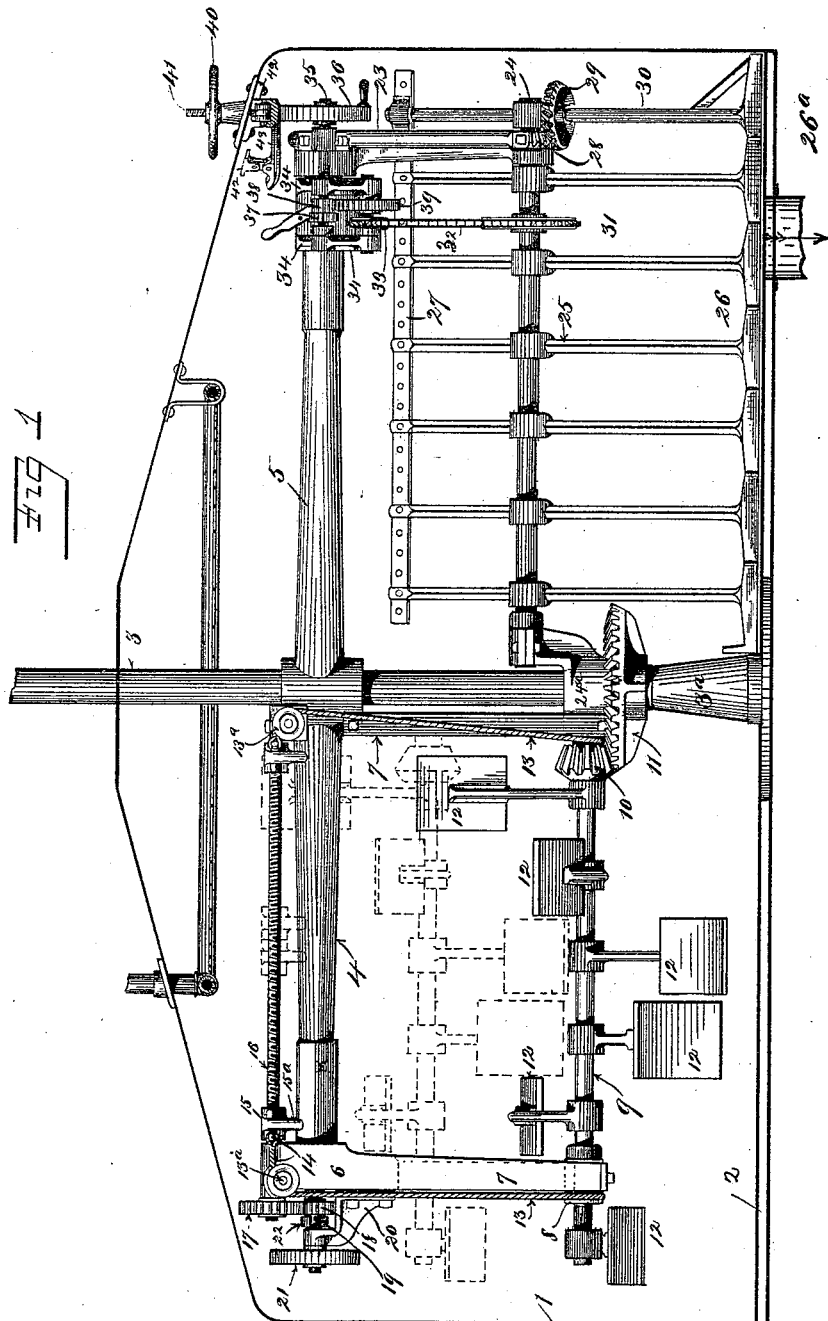
(No Model.)

6 Sheets—Sheet 1.

C. KAESTNER.
MASHING MACHINE.

No. 421,577.

Patented Feb. 18, 1890.



Witnesses:

Chas. L. Garman
Frederick Goodwin

Inventor:

Charles Kaestner

By *Offield & Towle*
Attorneys

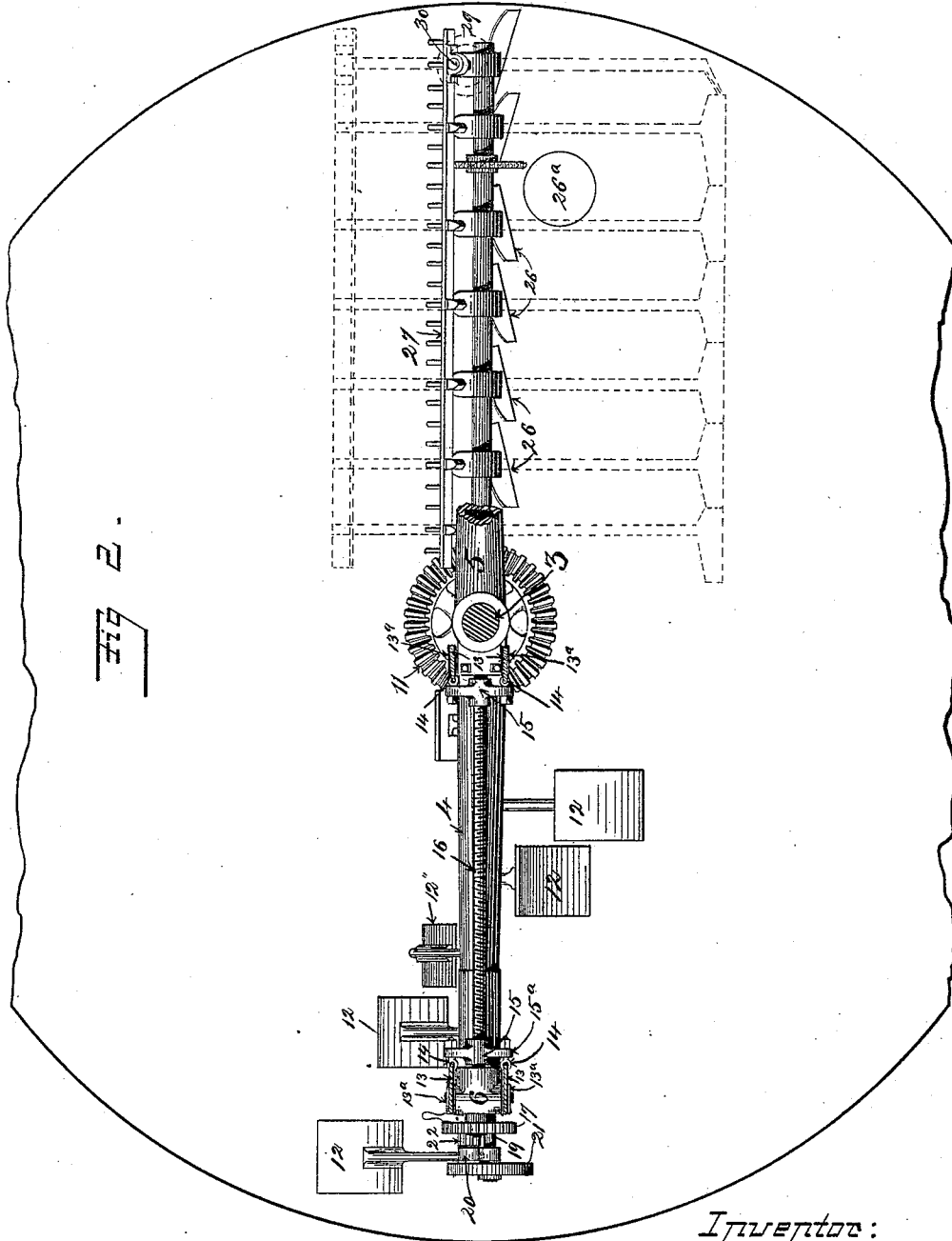
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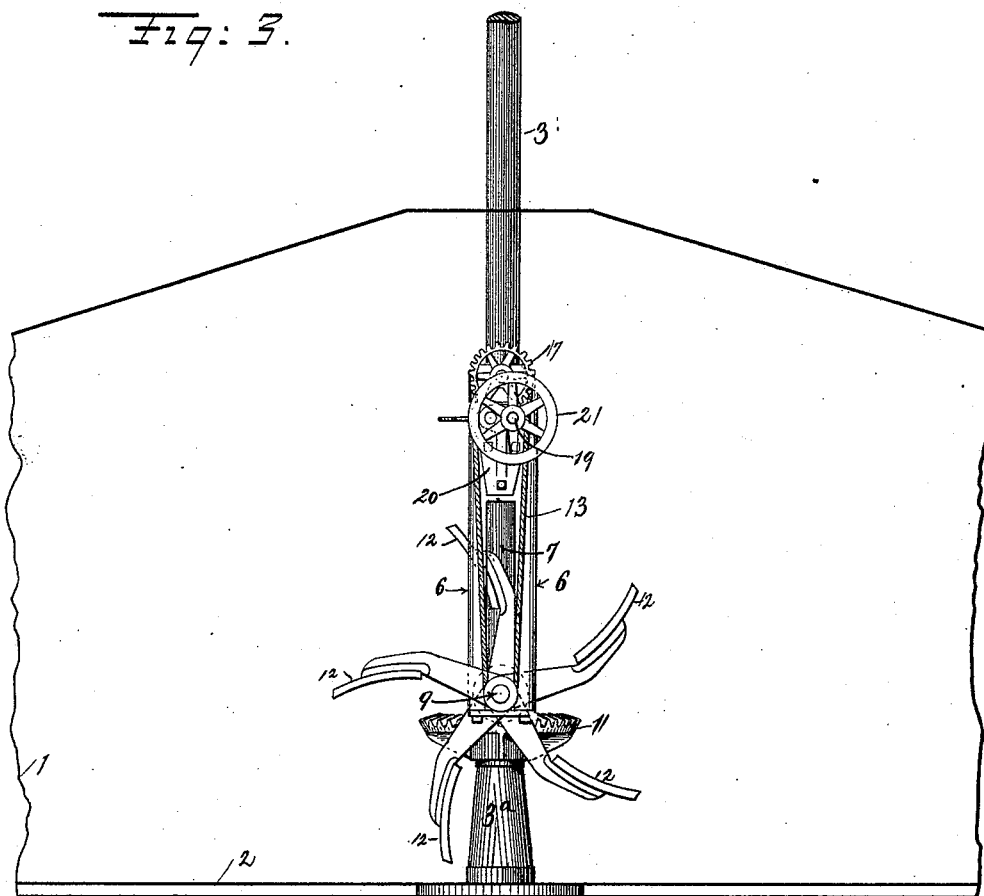
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Fig. 3.



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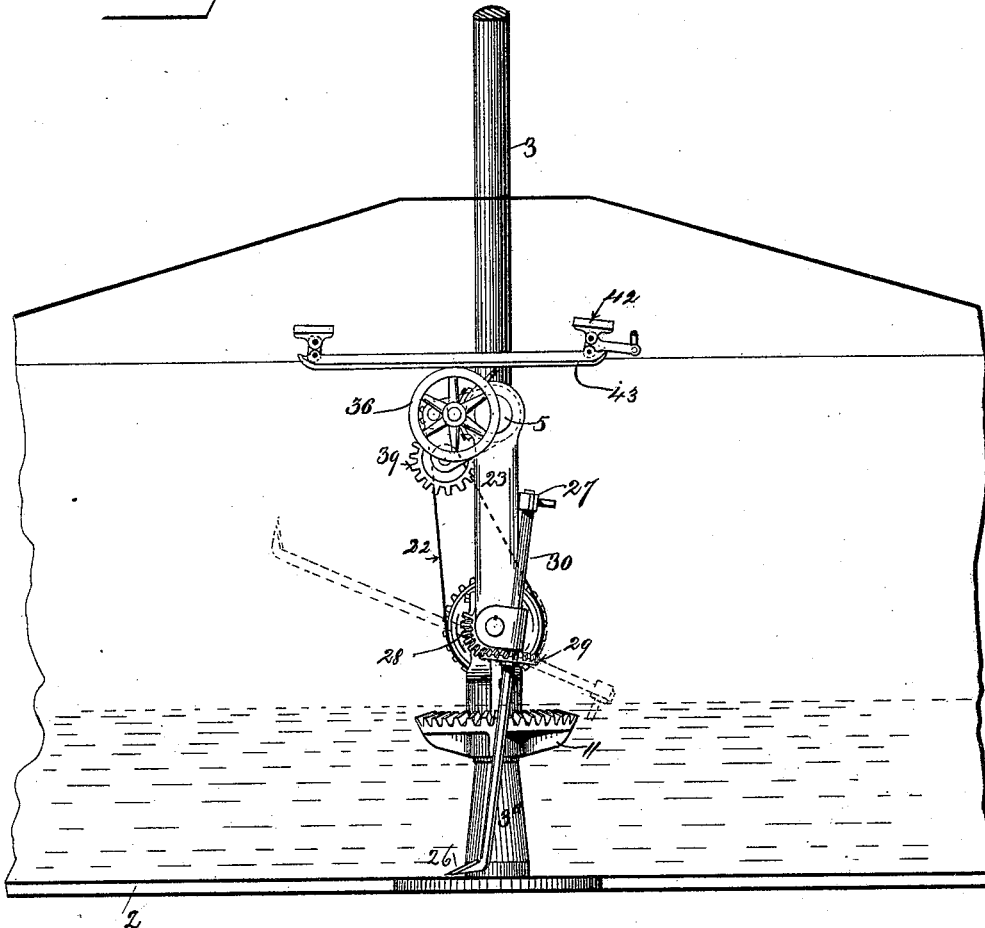
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Fig 4



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Fig 5.

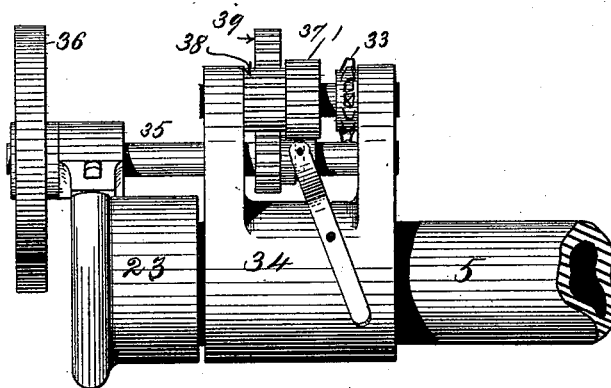


Fig 6.

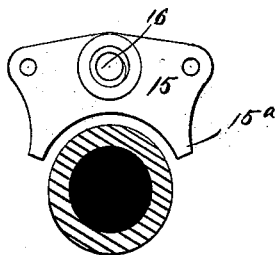
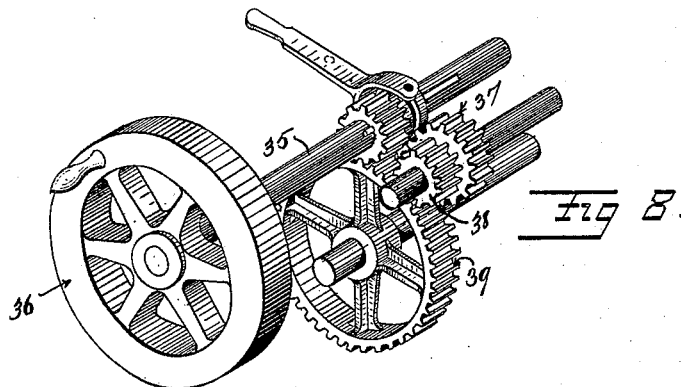
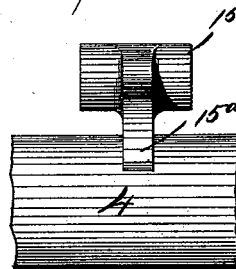


Fig 7.



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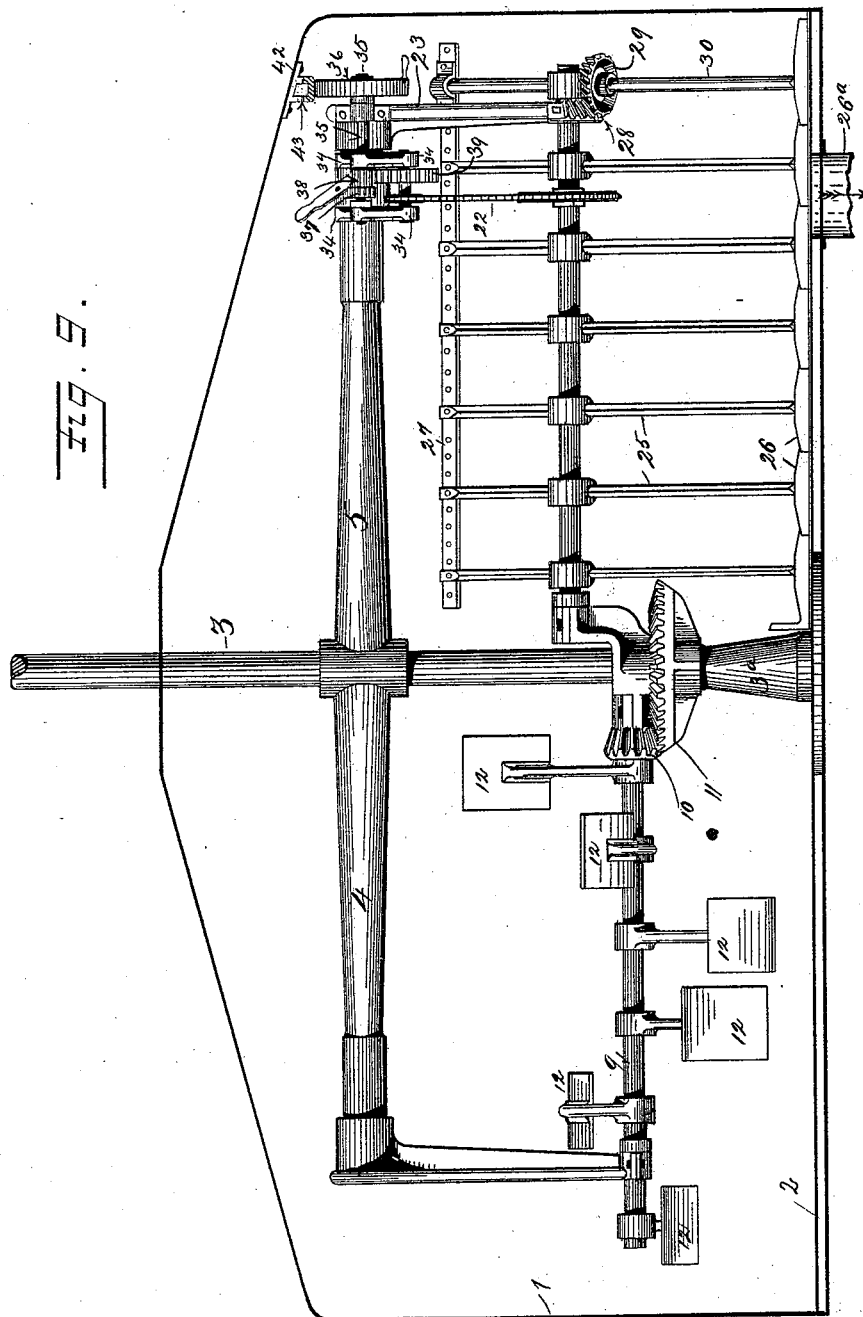
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UNITED STATES PATENT OFFICE.

CHARLES KAESTNER, OF CHICAGO, ILLINOIS.

MASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 421,577, dated February 18, 1890.

Application filed April 7, 1888. Serial No. 269,960½. (No model.)

To all whom it may concern:

Be it known that I, CHARLES KAESTNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mashing-Machines, which I desire to protect by Letters Patent of the United States, of which the following is a specification.

My invention relates to an improvement in the mashing-machine described in the Letters Patent issued to me August 20, 1878, No. 207,283. During the mashing process, after the meal, grain, and liquids are thoroughly mixed by the rotating shovels and revolving mixers, the mash is allowed to soak for a certain time and then the beer or wort is drawn off. During the drawing-off process the grains and meal settle, forming a comparatively solid mass on the bottom of the tub, and a hard crust forms on the surface of the mash, which it is desirable to break up by means of rakes or other devices set so as to operate only to the depth of said crust, which is comparatively thin, in order to avoid breaking the revolving mixers, which are used to assist in discharging the mash from the tub. To do this it is necessary to provide means whereby said mixers may be elevated out of contact with the mash until this crust is broken up. It is also essential in the operation of such machines to provide scrapers which shall lift or raise the grain from the bottom of the tub and work it toward the discharge-opening in said bottom. These scrapers as usually constructed have a broad flat face inclined to the longitudinal axis of their shaft, to which they are commonly rigidly secured, and it is expedient to so construct them that they may be also lifted out of contact with the mash while in the solid or encrusted condition above mentioned.

It is the object of my present invention to so construct the operating parts of the mashing-machine that the revolving stirrers or mixers and the scrapers before mentioned may be lifted out of contact with the mash, and to provide rakes rotating about the axial center of the machine, whereby to break up the crust upon the surface of the body of the mash, whereby the water usually sprinkled upon

the mash to wash out the residue of the beer or wort may more easily penetrate the mass, and also whereby all danger of breaking the stirrers and scrapers is avoided.

In my improvements, hereinafter described, I have combined with the usual scrapers for lifting the mash from the bottom of the tub and also for forcing it out through the discharge-opening in the tub-bottom, the rakes for breaking up the crust of the mash before alluded to, and I have also provided means whereby the combined scrapers and rakes may be reversed, so as to bring the one or the other into position to operate on the mash.

In the accompanying drawings, Figure 1 shows in side elevation a mashing-machine embodying my improvements, the vertical walls of the inclosing-tub being shown in section. Fig. 2 is a plan view of the principal operating parts, the vertical power-shaft being shown in cross-section. Fig. 3 is an end elevation of the working parts, looking in the longitudinal direction of the operating-shafts of the stirrers or mixers and designed to show the guides in which the mixer-shaft travels when it is raised out of contact with the mash. Fig. 4 is an end elevation of the scrapers and rakes, and showing two positions of said scrapers and rakes. Fig. 5 is a detail view of the gearing, whereby the scrapers and rakes are reversed. Figs. 6 and 7 are details of parts of the device used in raising the revolving mixers to clear the mash. Fig. 8 is a perspective view of the gearing used in the raising and lowering of the mixer-shaft, and Fig. 9 shows in side elevation a machine in which non-adjustable mixers are combined with the reversible scraper and rake construction before described.

In the drawings, 1 represents the side wall, and 2 the bottom, of the mash-tub, of the usual form, within which at its axial center is journaled a vertical rotatable shaft 3, rotated by any suitable means. The lower end of the shaft 3 is rotatably secured in a fixed stud 3^a, bolted to the bottom of the mash-tub. Horizontal arms 4 5 project outwardly from the shaft 3 in opposite directions and to equal distances. Arm 4 carries at its outer end a hanger 6, slotted longitudinally at 7 to form a guide for the sliding journal-box 8 of the mixer-shaft 9. This mixer-shaft may extend through the box

8 so as to be provided on its outer end with additional mixers. Its inner end is journaled in a hub or support 24^a, secured to the shaft 3. Shaft 9 carries a bevel-pinion 10, meshed with a bevel-wheel 11, fixed upon the stud 3^a. The usual mixers 12 are provided, set radially upon the shaft 9.

The means for raising the mixer-shaft so that the mixers shall clear the mash comprise cables 13, preferably of wire rope, which are doubled and pass around sheaves at the respective ends of the mixer-shaft 9. The free ends of the cables pass over sheaves 13^a at the upper end of the hanger 6, and are secured, preferably by eye-bolts 14, to traveling nuts 15, located at the respective ends of a worm-shaft 16, the respective halves of which are oppositely threaded. This worm-shaft is rotatably secured in suitable boxes preferably parallel to and above or upon arm 4. (See Figs. 1 and 2 for these connections and Figs. 6 and 7 for details of the nuts.)

The nuts 15 have wings 15^a, (see Figs. 6 and 7,) which engage the shaft 4 and prevent them from turning with the worm-shaft and cause them to move along the same when it is rotated. The rotation of the worm-shaft in either direction is effected by means of the gear-wheels 17 18, secured, respectively, on the end of the worm-shaft and upon a short shaft 19, carried by a bracket 20. A driving-wheel 21 is fixed to the shaft 19, and may be rotated by hand or by means of the friction devices hereinafter described in connection with the rake and scraper-reversing mechanism. By means of a pinion 22, feathered on the shaft 19, the direction of rotation of the worm-shaft is reversed and the mixer-shaft is lowered.

To the arm 5 is secured a hanger 23, in the lower end of which is journaled one end of a rock-shaft 24, the other end of said shaft being journaled in a hub 24^a, secured upon the shaft 3. Upon this rock-shaft 24 is secured, in line, arms 25, bearing at one end the scrapers 26 and at the other the rakes 27. The rakes may be set in line with their shaft 24; but the scrapers, as shown, are set angularly with reference thereto and in position to discharge the grain through the orifice or valve 26^a in the bottom of the mash-tub. This shaft has toward its outer end a segmental bevel-gear 28, which meshes with a bevel-pinion 29, the latter keyed to the arm 30 of the last scraper. This arm 30 is adapted to rotate so as to turn its scraper inwardly at a more acute angle to the shaft 24 than that of the other scrapers and rakes, whereby it is prevented from striking the wall of the tub when the shaft is rocked. The upper end of the arm 30 turns freely in the rake-head. A sprocket-wheel 31 is also fixed to the shaft 24 at some convenient point, and a link belt or other driving medium 32 passes over it and over another sprocket-wheel 33, carried upon a shaft supported by a bracket 34, depending from the arm 5. A short driving-shaft 35, pro-

vided with a driving-wheel 36, carries the pinions 37 38, which may be brought alternately into gear with a gear-wheel 39, keyed on the shaft carrying the sprocket-wheel 33. The rotation of the shaft 35, acting through this train of gearing and the drive-belt 32, operates to rock shaft 24, and with it the rotatable arm 30, in one direction or the other, according as the pinions 37 or 38 are brought into mesh with the gear 39. The extent of the rocking of this shaft 24 is about one-quarter of a revolution, and hence the rakes and scrapers perform also a quarter-revolution. Thus, if the scrapers be in the position shown in Fig. 1 and it be desired to throw them out of contact with the mash and to bring the rakes into position to operate upon the crust, the shaft 24 is rocked and the scrapers and rakes assume the positions shown by dotted lines in Fig. 4. They are brought back to their original position by shifting the gearing as above indicated.

The wheels 21 and 36 may be driven by means of the friction device shown applied to the wheel 36 in Fig. 1, a side elevation of parts of which is shown in Fig. 4. In this device I employ a hand-wheel 40, secured to a vertically-acting screw 41, the lower end of which rests upon a seat 42. (See Fig. 4.) This seat is vertically movable, and the turning down of the screw acts through it upon a pivoted friction clamp or bar 43, which latter is thereby brought into frictional contact with the surface of the wheel 36 and causes the latter to rotate. The friction clamp or bar 43 is secured in the path of the wheels 21 and 36, and is forced down to engage the said wheels as they reach it in their circuit around the tub whenever it is desired to raise or lower the mixer-shaft or reverse the scrapers and rakes.

In operation, after the wort is drawn off from the mash and the latter settles, forming a compact mass or body, the mixer-shaft 9 is elevated by means of the devices before described, and the shaft 24 is rocked to bring the rakes into contact with the crust, as shown in Fig. 4. These rakes are preferably provided with sharp teeth of such length as to penetrate and break up the crust. After this is accomplished water is sprayed from the circular perforated pipe located in the top of the mash-tub, as seen in Fig. 1, and this water will readily find its way into the body of the mash. After the water runs off the shaft 24 is rocked back to bring the scrapers 26 into action, the rakes being thrown up out of contact. These scrapers are arranged, preferably, as shown in my former patent above mentioned, and operate upon the grain so as to cause it to move from all points toward the valve or orifice 26^a in the bottom of the mash-tub, whereby it is rapidly discharged.

A mash-tub constructed as above described possesses features of utility not heretofore attained, in that the mash, after it assumes the solid condition above described, is rapidly

discharged from the tub with a small expenditure of power and without any danger of breaking the mixers and scrapers. The vertical adjustment of the mixer-shaft substantially in the manner above described permits the rigid connection of the supporting horizontal arm to the vertical power-shaft, and thereby permits said arms to be placed close to the top of the tub, which is an important element in the economical construction of mash-tubs. The adjustability of the rakes and scrapers in the manner and for the purpose specified is an important feature in the construction and operation of mashing-machines, resulting in the thorough accomplishment of the work with a minimum expenditure of power.

Of course the details of construction of parts herein shown and described for elevating the mixer-shaft and reversing the scraper-shaft may be made within wide limits without departing from the spirit of my invention, and I do not, therefore, confine myself to said details.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, in a mashing-machine, with a centrally-located rotatable power-shaft, of a rigid arm projecting angularly from said shaft, guides depending from said arm, a mixer-shaft vertically adjustable along said guides, a shaft secured above the upper limit of the movement of the mixer-shaft and having its ends oppositely threaded toward its middle, nuts for each end of the shaft and correspondingly threaded and adapted to move along said shaft from its respective ends toward its middle, cables secured to said nuts and passed around the mixer-shaft, and suitable means whereby to rotate the worm-shaft to operate the mixer-shaft.

2. In a mashing-machine, the combination, with the rotatable power-shaft, of a rigid arm projecting angularly from said shaft and carrying depending hangers at its respective ends, slotted to form guides, a mixer-shaft journaled in suitable boxes in said hangers and vertically adjustable in said guides, and the worm-gear, nuts, cables, and driving-gears, substantially as described.

3. In a mashing-machine, the combination, with the power-shaft having a rigid arm projecting angularly therefrom, of a counter-

shaft adapted to rotate with said rigid arm and to be rocked in its bearings, said counter-shaft provided with arms secured intermediate their ends to the counter-shaft and carrying at one end scrapers and at the other rakes, and suitable means for rocking said counter-shaft, whereby to bring the scrapers or the rakes into operative contact with the mash as desired, substantially as described.

4. The combination, in a mashing-machine, with a centrally-located rotatable shaft having a fixed arm projecting angularly therefrom and having a depending hanger toward its outer end, a counter-shaft having its outer end journaled in said hanger and adapted to rock in its bearings, arms secured intermediate their ends upon said counter-shaft and carrying at one end scrapers and at the other end rakes, a train of gears secured upon the rigid arm, a driving-pulley secured upon the counter-shaft, and a belt operated by said train of gears, whereby to rock said counter-shaft, substantially as and for the purpose described.

5. In a mashing-machine, the combination, with a vertical power-shaft, of a rigid arm extending horizontally from said shaft, a counter-shaft carrying fixed arms provided with scrapers and rakes, as described, a train of gears carried by said fixed arm, a belt-pulley secured upon said counter-shaft, a belt, moved by the train of gears, passing over said pulley, a friction-wheel secured to the driving-shaft of the train of gears, and a friction-clamp secured to a fixed portion of the machine and adapted to bear upon said friction-wheel, whereby to drive said gears and rock the counter-shaft.

6. In a mashing-machine, the combination, with a counter-shaft having arms secured thereto intermediate their ends and provided with rakes and scrapers and adapted to be rocked in its bearings, of a rotatable arm secured at the outer end of said shaft, said arm carrying a scraper at one end, adapted to operate close to the wall of the tub, and suitable gearing adapted to rotate said shaft as the counter-shaft is rocked, substantially as and for the purpose described.

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