

J. F. DORNFELD.
STIRRING AND AERATING APPARATUS.

No. 518,665.

Patented Apr. 24, 1894.

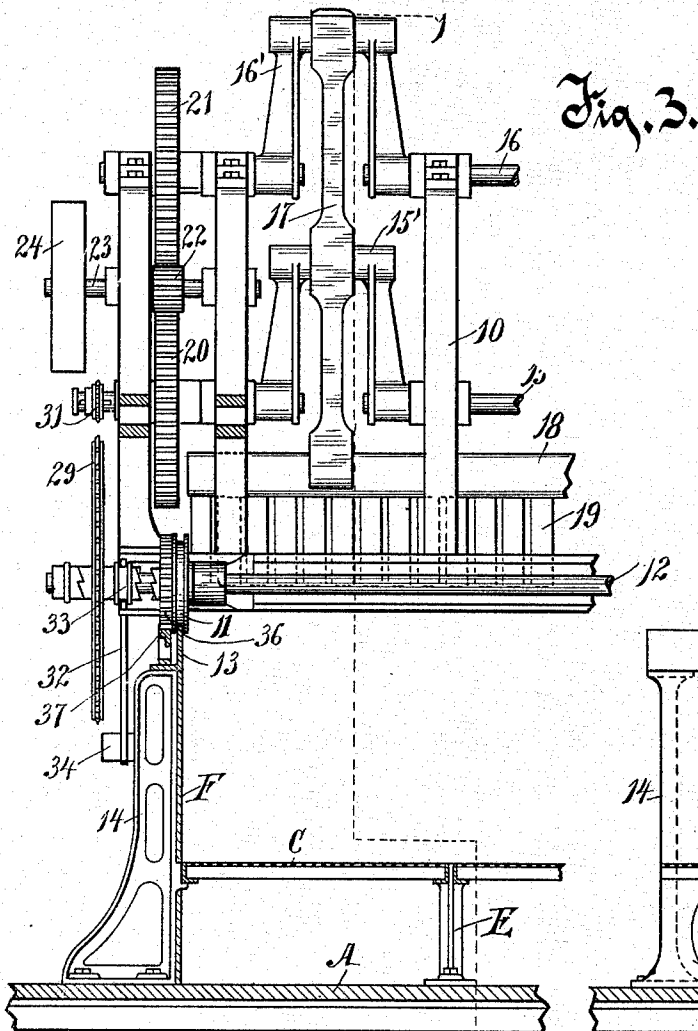


Fig. 3.

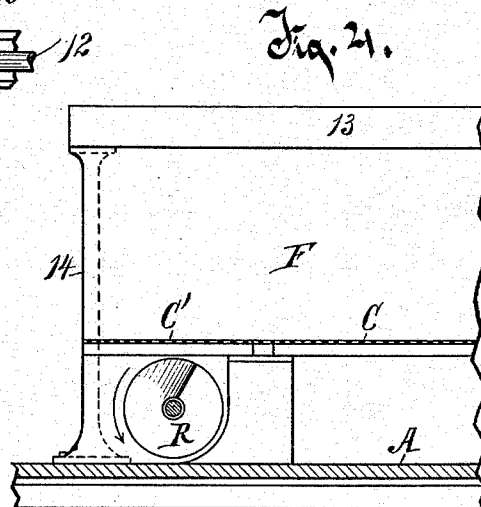


Fig. 4.

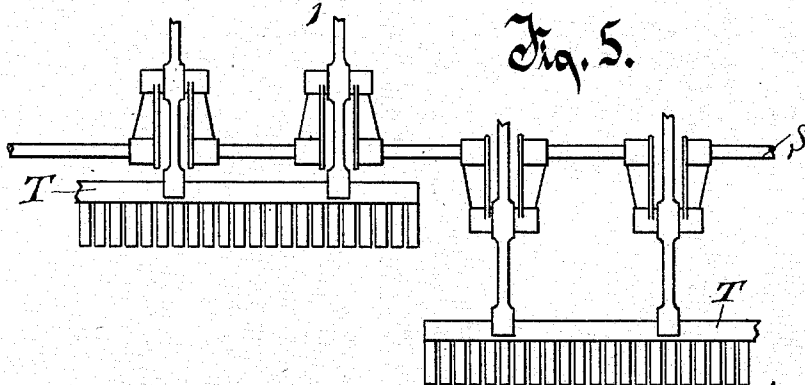


Fig. 5.

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JOHN F. DORNFELD, OF WATERTOWN, WISCONSIN.

STIRRING AND AERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 518,665, dated April 24, 1894.

Application filed March 13, 1893. Serial No. 465,705. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. DORNFELD, of Watertown, in the county of Jefferson and State of Wisconsin, have invented a new and useful Improvement in Malt Stirring and Aerating Apparatus, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to that class of devices adapted to stir and thereby to break up and open the mass of grain on a malting floor, permitting air either by natural action or by artificial means, to come into contact with all parts of the flooring of grain in the process of malting.

The object of the invention is to provide a strong and durable apparatus, simple in construction, and largely automatic in operation; more convenient in use, more satisfactory in its results, and requiring less attention to operate it than has heretofore been known.

The invention consists of the apparatus and its several parts or their equivalents, herein-after described and claimed.

In the drawings, Figure 1, is a vertical section of the apparatus, in which most of the operative mechanism is seen in elevation, the mechanism being chiefly that at the left of line 1—1 of Fig. 3. Fig. 2, is a horizontal section of a portion of the apparatus, taken on line 2—2 of Fig. 1 looking downwardly. Fig. 3, is an end elevation of a portion of the apparatus. Fig. 4, is a section of a portion of the malting floor, with a conveyer for moving the malt from the malting room. Fig. 5, is a detail of a modified form of shovel.

A is the floor of the malting room.

B is a fragment of the wall of a vertical attemperator flue, at one end of the malting room. This attemperator flue is located at one end of the room medially.

C is the malting floor supported on posts E, the end of which malting floor is preferably turned upwardly as seen at D in a curve corresponding substantially with the sweep of the shovels as hereinafter described. This malting floor C located at a distance above the floor A, is supported on posts E providing an air chamber beneath it and is perforated to permit of the passage of air there-through. Vertical walls F at the sides of the

floor C extending upwardly from the floor close the floor in at its sides, and prevent the grain or malt from escaping from the floor. A carriage 10 provided with grooved wheels 11, 11' fixed on revoluble axles 12, 12' is adapted to travel reciprocally on a track formed by rails 13 supported on the walls F and the reinforcing and supporting posts 14. The rails 13 are preferably constructed of angle iron, the upper edge or tread of which is received in the grooves of the wheels 11 whereby the wheels are retained on the track. Two shafts 15, 16 one above the other are journaled in boxes having permanent positions in the frame so that the axes of the shafts are constant relative to the carriage and to each other and are each provided with double cranks 15' 16'. These shafts near their other extremities have other cranks corresponding to those shown in Fig. 3. It will be observed that only a portion of one side of the malting floor is shown and a corresponding portion of the carriage and the mechanism mounted thereon, as the other side of the carriage and the malting floor are substantially duplicates of the portion shown in Fig. 3. The cranks 15' and 16' are of the same length, the wrists on the cranks being at equal distances from the axes of their shafts respectively and are arranged in similar positions on the shafts and are so geared that in operation the shafts and the cranks rotate isochronously. Vertical arms 17 are pivoted and thus mounted on the wrists of the cranks 15' 16' which arms depend therefrom, and carry fixed in their lower extremities a shovel head 18 in which are fixed a series of vertically arranged shovels 19. In the form of device shown in Figs. 1 and 3 the shovel head 18 is substantially as long as the width of the malting floor C and the series of shovels 19 extends the entire length of the shovel head. These several shovels or shovel blades 19 are preferably a little distance apart, whereby they are better adapted to enter and separate the mass of grain. The relation of the carriage to the malting floor is such that the shovels at the lower limit of their movement come substantially to the malting floor and by the revolution of the cranks are elevated sufficiently to carry them above the mass of grain on the floor. For the purpose of operating

these shovels the shafts 15 and 16 are provided with toothed wheels 20, 21 respectively which mesh with an interposed pinion 22 on a shaft 23 journaled in the frame. The shaft 23 is provided with a band wheel 24 to which motion is communicated from a motor 25 by a belt 26. The motor 25 is mounted on a part of the carriage frame and is actuated by electricity transmitted thereto from a power supply through the conductor 27 and trolley 28. The electric conductor 27 consists of a suitable wire stretched through the malting room above the carriage in the line of its travel. The electric circuit is completed by the contact of the dynamo with the metal frame supporting it, and so through the wheels of the machine and the track on which it runs, to the ground, or may be completed in any of the methods in common use for furnishing an electric circuit through a dynamo or electric motor on a moving carriage. Similar methods are in common use, and as this forms no part of my invention, further description or illustration of the electric circuit is not deemed necessary, especially as I do not purpose to confine my invention to an apparatus including a carriage operated by electricity in every instance.

For reciprocating the carriage on its track, a sprocket wheel 29 loose on the axle 12 is connected operatively by a chain 30 to a pinion 31 splined on the shaft 15. The hub of the wheel 29 is provided with an annular rack or teeth at each end adapted to engage in reverse directions with complementary annular racks fixed on the axle 12 whereby a double clutch is formed adapted to communicate motion from the shaft 15 to the axle 12 in either direction in accordance with the motion of the shaft 15, whereby the carriage is run in the direction desired. The teeth of the clutches are so formed that they engage in one direction only and are adapted, though in contact to slip past each other in the other direction.

For automatically shifting the wheel 29 out of active engagement with the axle 12 when the carriage has reached the limit of its travel a shifting lever 32 is pivoted medially on the carriage frame, one end of which lever is bifurcated, the furcate ends riding in a groove 33 therefor in the hub of the wheel 29, and the other end of the lever being arranged to impinge against and be actuated by an incline 34 when it reaches one limit of its travel and by an incline 35 when it reaches the limit of its travel in the other direction. These inclines 34 and 35 are secured to a fixed support, conveniently to the outside of the wall F below the line of travel of the wheel 29. A toothed wheel 36 fixed on the shaft 12 meshes with a rack 37 secured to the side of the rail 13 on the outside of the wall F, and as the wheel 36 revolves serves to compel the travel of the carriage on its track.

It will be seen by reference to Fig. 1 that as the shafts 15 and 16 are rotated in the directions indicated by the arrows the shovels

will be lifted, carried forward and forced down into the mass of grain (indicated by the dotted line H) which as the shovels are moved rearwardly will be moved in that direction, being thus separated from the mass, and to some extent broken apart and turned over. In the meantime when the shovels are again carried to the front to descend into the mass of grain the carriage will have been moved forward a short distance so that as the shovels descend they will take into the grain and separate and move a small portion thereof from the mass. This is repeated until the carriage reaches the limit of its travel horizontally when the lever 32 impinging against the incline 35 will shift the wheel 29 out of engagement with the axle 12 thereby causing the carriage, for want of propelling power, to stop its travel, though the shovels may still continue to move. At this time the motion of the motor 25 is to be reversed by the attendant, and thereupon the shovels and the carriage will move in the opposite direction, until the lever 32 impinges against the incline 34 when the movement of the carriage again ceases. It will be noted that the inclines 34 and 35 shift the lever 32 only sufficiently far to throw the wheel 29 out of engagement with the clutches on the axle 12 and that it is left for the attendant when he reverses the motion of the motor, to at the same time still further shift the wheel 29 so as to put it into engagement with the axle 12. It will also be noted that if the attendant having reversed the motion of the motor should throw the wheel 29 into engagement with the wrong clutch on the axle 12 that no serious harm would come therefrom as the clutch would merely slip when so engaged.

In connection with this stirring and aerating apparatus I provide means, which is sometimes desirable, for spraying with water the air that is to be passed through the grain. This means consists of a box or chamber I, formed in and made the duct for the passage of air from the attenuator flue B through the aperture K into the air chamber beneath the floor C. This chamber I is provided with a cold water pipe L extending through it horizontally near the floor, which pipe is provided with a series of apertures or spraying nozzles M, so that water in the pipe under pressure will be discharged in a spray into the chamber I, where it mingles with the air and cools it to such extent as is desired. It is sometimes desirable to hermetically close this passage for air through the chamber I, and for that purpose I provide a cover N having a downwardly turned flange O adapted to fit in a channel or groove P about the top of the aperture into the box I. This groove P is provided with water and the cover N being let down and the flange O being inserted in the water, a hermetically sealed joint is formed.

At the other extremity of the malting floor from that shown in Fig. 1 a section of the floor C is made removable, and beneath this re-

movable section of the floor there is a transverse channel or trough, in which a revolving spiral conveyer R is arranged, which conveyer by its revolution is adapted to move or convey the malt dumped into the trough from the floor C, laterally to a desired place of deposit.

In Fig. 5 there is shown a shaft S having two sets of double cranks, the cranks being arranged in sets in reverse directions, which shaft may be adopted and used instead of the shafts 15 and 16 for mounting two sets of shovels T T thereon, instead of one set as shown in Figs. 1 and 3. This form of device is desirable when the malting floor is quite wide, and the advantage of having shovels so arranged is to a considerable extent, to balance the movement and strain on the machine, as in this form of device there is more constantly and steadily a resistance to the movement, because one or the other set of shovels is nearly constantly in the grain.

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

1. The combination in a malt stirring apparatus, of a carriage reciprocable over a malting floor, a plurality of shafts journaled in the carriage distant from but parallel with each other, each shaft revolving about a distinct and constant axis, cranks on the several shafts, wrists on the cranks at equal distances from the axes of their shafts respectively, and vertically disposed shovels mounted on the wrists of the cranks, whereby by the synchronous revolution of the shafts the shovels are revolved in a constantly vertical position, substantially as described.

2. In a malt stirring apparatus, a malting floor, a track adjacent to the floor, a carriage arranged to travel on the track, vertically disposed shovels mounted transversely of the floor in an arm or arms pivoted on the wrists of a plurality of cranks revolving isochronously and describing equal arcs about differ-

ent parallel and distant axes in the carriage, all combined substantially as described.

3. In a malt stirring apparatus, the combination with a traveling carriage, of a plurality of horizontal parallel shafts, cranks on the shafts, wrists on the cranks at equal distances from the axes of their shafts, an arm or arms mounted on the wrists, and vertically disposed shovels fixed in the arm or arms so as to move in vertical circles in vertical positions constantly, substantially as described.

4. In a malt stirring apparatus a traveling carriage, a plurality of horizontal cranked shafts journaled in the carriage unitedly carrying vertically disposed shovels moving in a circle vertically and adapted to dip intermittently into and stir the grain, cog wheels on the shafts, an interposed pinion meshing with the cog wheels, means for communicating motion to the pinion, and means connected operatively to one of said shafts and to an axle of the carriage, for reciprocating the carriage adjacent to the grain, substantially as described.

5. In combination with a perforated malting floor and a malt-stirring apparatus, a device for cooling and attemperating the air admitted thereto, consisting of a chamber in the passage for air thereto, a water pipe through the chamber, which pipe is provided with a series of spraying nozzles or apertures, a cover for the chamber having a flanged rim, and a groove about the top aperture of the chamber adapted to receive the flange on the cover and also water therein, whereby the chamber can be hermetically sealed, substantially as described.

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

JOHN F. DORNFELD.

Witnesses:

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OTTO LUEBKERT.