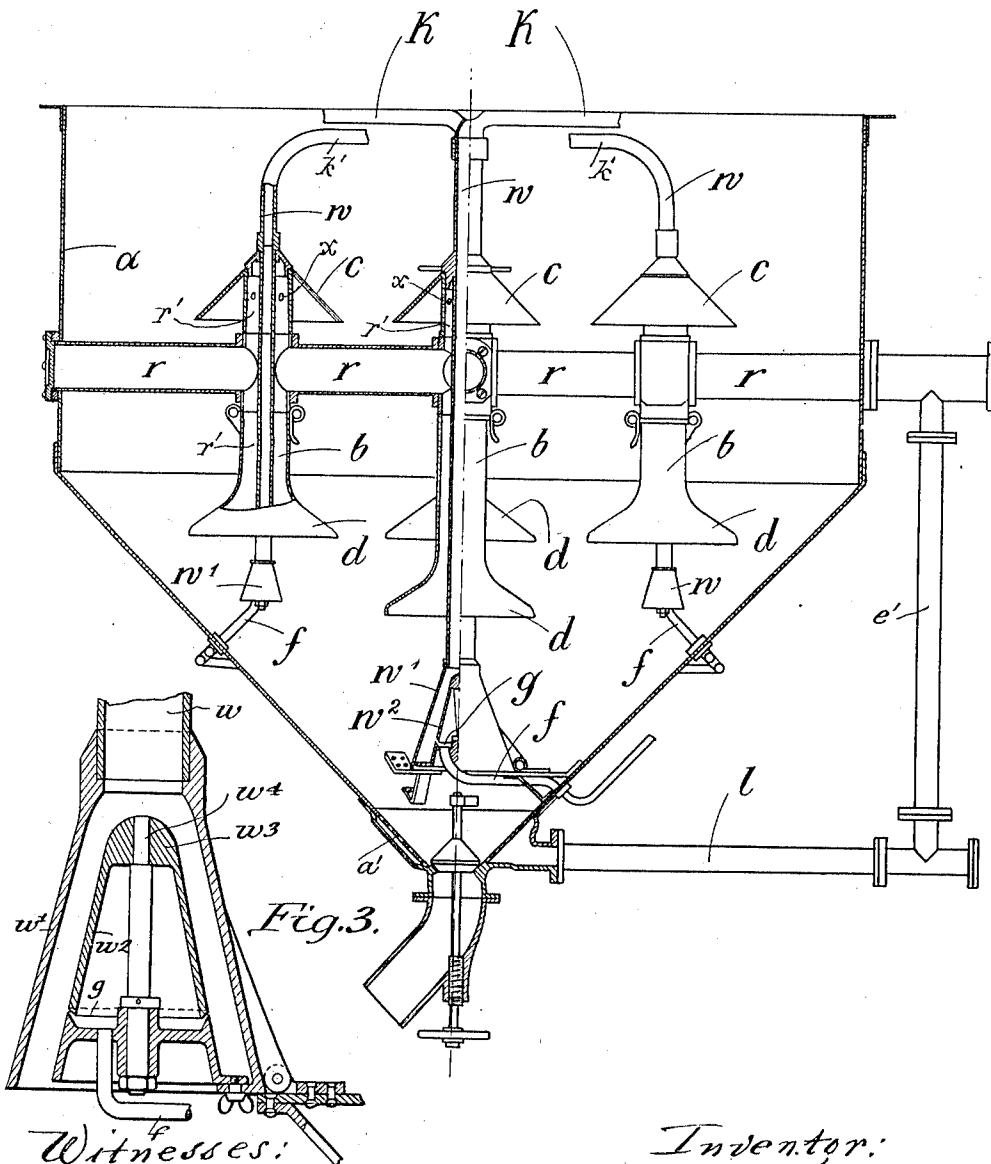


O. WINDE.
GRAIN STEEPING TANK.
APPLICATION FILED MAR. 23, 1911.

1,061,713.

Patented May 13, 1913.
2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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Inventor:
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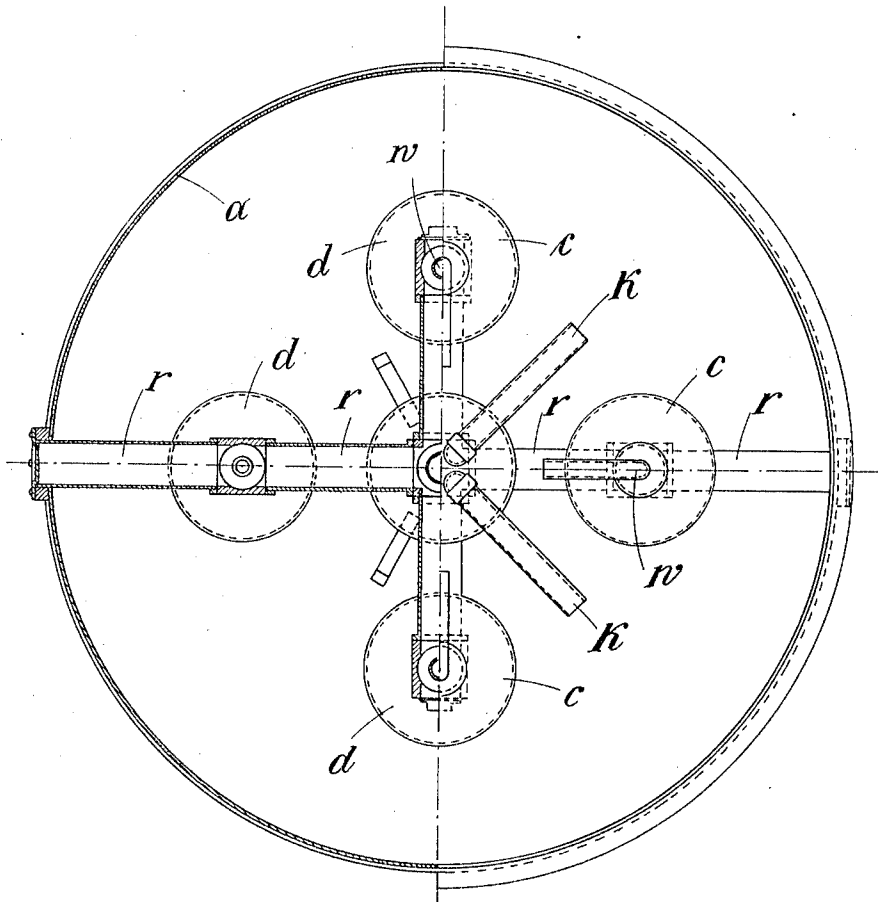
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2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

OSWALD WINDE, OF LUTZSCHENA-LEIPZIG, GERMANY.

GRAIN-STEEPING TANK.

1,061,713.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed March 23, 1911. Serial No. 616,378.

To all whom it may concern:

Be it known that I, OSWALD WINDE, brewer, a subject of the King of Saxony, and residing at Lutzschena-Leipzig, Germany, have invented certain new and useful Improvements in Grain-Steeping Tanks, of which the following is a specification.

This invention relates to the manufacture of malt and has particular reference to grain steeping tanks provided with an aerating and a washing device. The aeration and washing of the steeped goods is well known in itself. For aerating is used a suction or pressure air jet which operates after the discharge of the water, so that it must pass through the steeped material, and the washing is mostly effected by blowing compressed air into a mixture of steeped material and water, through pipes terminating at the inlet in a nozzle. In the known kinds of aeration, the action is, however, an irregular one, as those layers of the steeped material which are near the air inlet or outlet, are naturally more strongly aerated than the layers situated at a greater distance. This drawback is remedied by the new device in which the ventilation is effected exclusively by suction air. Practice has shown that a uniform growth depends on the strength of the ventilation, and that for a thorough ventilation, considerably greater quantities of air are required, than those hitherto used in any of the known apparatus. In order to obtain with suction air the most uniform and powerful action possible, it has been found necessary to separate the steeped material in a suitable manner by means of hollow spaces or chambers which, being in communication with the suction air, offer large surfaces of attack, so that, with a considerably smaller consumption of power than has been necessary hitherto, it is possible, on the one hand, to discharge the products of the reaction such as the vapors of water, carbonic acid, etc., and on the other hand to draw in the required large quantities of air. The hollow spaces or chambers are formed, partly by providing vertical ventilating pipes widening downward in the shape of a funnel, and partly by arranging screen-like projections at the circumference of these pipes, the wall of which, within the portion covered by the screen, is perforated in order to enable the suction air to act on the hollow spaces or chambers. In steeping tanks

of smaller height, it is sufficient, for obtaining the requisite hollow spaces, to use merely the funnel shaped widened portions of the ventilating pipes. In steeping tanks of greater height, it is, however, preferable to arrange also the above mentioned screen-like projections, in order that the steeped material should be uniformly ventilated at the different layers. Into the ventilating pipes are built washing pipes terminating below the funnel-shaped widened portions in washing apparatus, by which the hollow chambers, and therefore the suction surfaces are considerably increased, which still further insures uniform ventilation.

A construction according to this invention applied to a funnel shaped steeping tank, is illustrated in the accompanying drawing, in which—

Figure 1 is a vertical section, Fig. 2 a plan, partially in section, of the steeping tank, and Fig. 3 an enlarged detail view in vertical section.

In the steeping tank *a* are built the vertical ventilating pipes *b* provided with downwardly flaring projections *c*, the perforations *x* being arranged in the pipe wall below them, said pipes being moreover formed with inverted funnel shaped widened portions *d*. These pipes are arranged to communicate with each other and with the suction point by means of pipes *r*. Into the ventilating pipes *b* are inserted washing pipes *w* carrying at their lower ends the washing apparatus consisting, in each case, of an outer hollow cone *w'* and an inner hollow cone *w''*. The outer cone *w'* opens at its upper end into the washing pipe *w*, the inner cone *w''* is closed at the top and consists of two parts separated from each other by a horizontal joint *g*, the upper part *w'''* being slightly movable on a vertical guide spindle *w⁴*. When washing by means of compressed air, the latter is introduced through the pipe *f* into the upper portion of the inner cone *w''* and raises the latter, so that the joint *g* is increased to an annular slot through which the air, in accordance with the piston stroke of the compressor, escapes intermittently into the space between the two hollow cones *w'* and *w''*, and during the further operation, into the washing pipe, carrying with it the mixture of water and steeped material. In the construction illustrated, the central washing pipe *w* is shown

arranged to eject the steeped material toward the outer edge of the steeping tank *a* through the distributing pipe *k* while the lateral washing pipes *w* throw it toward the center by the upper outlets *k'* in order to insure uniformity of treatment during the washing.

In funnel shaped steeping tanks in which the lowest points of the steeping tanks must be specially well ventilated, there is provided a suitable connection *e'* between the ventilating pipe *r* for the air and the discharge pipe *l*, which at the same time is used for discharging the dirty water from the different points of the tank *a*.

The operation of the steeping tank hereinabove described is as follows: Water is introduced into the steeping tank either through the foraminated plates *a'* at the tank bottom or from above, and thereupon the barley is poured into the tank, the barley being then washed by agitating the water by means of compressed air introduced through the pipes *f*. This compressed air enters the chamber inclosed by the outer hollow cone *w²* and lifts the upper movable portion somewhat, so as to open the annular slot *g* through which it issues or bubbles into the space inclosed between the outer and inner cones *w'* and *w²*; and from this chamber it enters the washing pipe *w* communicating therewith. From the washing pipe *w* it escapes through the radiating distributing pipes *k*. This is the action which takes place for the central washing pipe *w*, which is the largest of the five washing pipes shown. Substantially the same operation takes place in the other four washing pipes, and the parts coöperating therewith. The air may be introduced into these washing pipes separately or in common. By the pulsation of the introduced compressed air the water is naturally agitated, formed into eddies and caused to circulate vigorously through the material to be steeped which action results in a thorough cleansing of the same from dirt and impurities. After a number of washings and changes of the wash water, the material to be steeped is ventilated by means of suction air, for which purpose the water is completely drained from the tank. For this purpose the air enters at the top, passes under the downwardly flaring projections or funnel-shaped portions *c*, *d* and escapes from under these projections through the perforations *x* into the pipes *r'* whence it passes on into the suction tube *r* through which it is drained from the apparatus. The air is drained from the bottom of the steeping tank through the tube *l*, the foraminated portion *a* of the said

bottom permitting the exit of the air while retaining the material to be steeped.

A thorough and uniform washing and ventilation of the steeped material in a steeping tank provided with the device described, by removing all substances preventing germination after the termination of the steeping process, produces an exceedingly quick and energetic growth, whereby a saving of at least two days is effected in the germinating process, and the quality of the malt is improved.

Having thus fully described my invention what I claim is:—

1. In a device of the character set forth, a steeping tank provided with a washing pipe having a lower downwardly flaring orifice, in combination with a ventilating pipe having downwardly opening and flaring screens or fenders, the ventilating pipe being provided with air-outlets at the portions protected by the screens, whereby a large surface of the material is exposed to the action of the fluid used in treating the same.

2. In a device of the character set forth, a steeping tank, in combination with a washing pipe having at its lower end an inner and an outer hollow downwardly flaring cone, so arranged as to form between them an annular conical space communicating with the upper part of the washing pipe, the inner cone being divided at an intermediate portion to form an annular slot, the part of the said inner cone above the slot being arranged slidably in a longitudinal direction over the lower part of said cone to vary the width of the slot, and means for introducing fluid into the interior of the inner cone.

3. In a device of the character set forth, a ventilating pipe provided with downwardly flaring screens and perforations in the portions protected by said screens, in combination with a washing pipe, provided at its lower portion with a pair of concentric hollow cones, inclosing a space communicating with the upper part of the washing pipe, the inner cone being divided at an intermediate portion to form a slot; the upper portion of said inner cone being longitudinally slidable to vary the width of the slot, and means for introducing fluid under pressure into the interior of the inner cone.

Dated this 7th day of March, 1911.

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

OSWALD WINDE.

Witnesses:

ALBERT R. MORAWETZ,
RUDOLPH FRICKE.