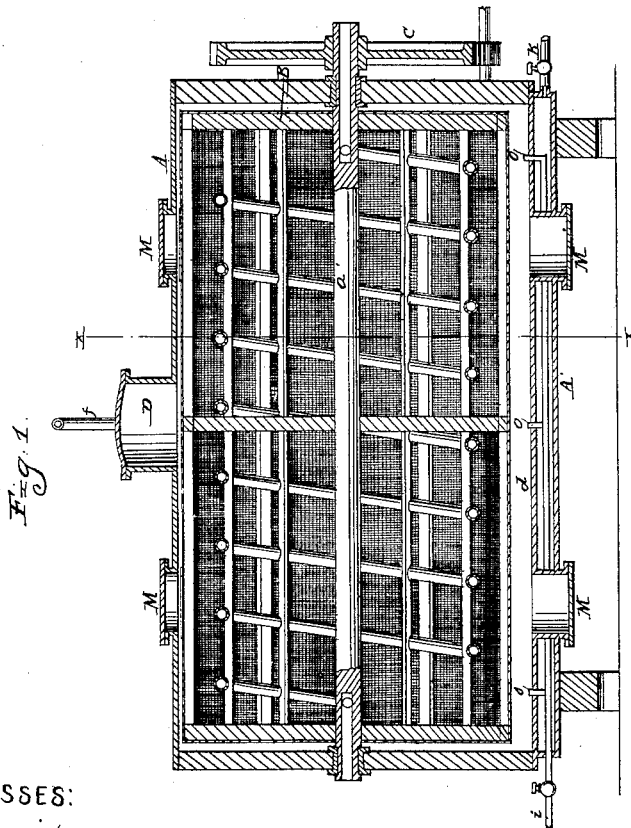
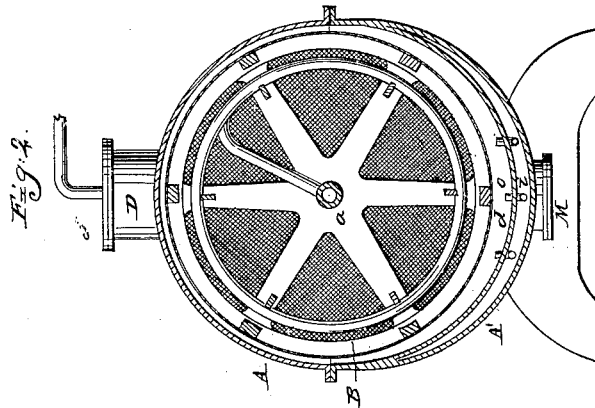


A. KREUSLER.
STEEPING, GROWING, AND DRYING MALT.

No. 49,768.

Patented Sept. 5, 1865.



WITNESSES:
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UNITED STATES PATENT OFFICE.

A. KREUSLER, OF NEW LEBANON, NEW YORK.

IMPROVEMENT IN STEEPING, GROWING, AND DRYING MALT.

Specification forming part of Letters Patent No. 49,768, dated September 5, 1865.

To all whom it may concern:

Be it known that I, A. KREUSLER, of New Lebanon, in the county of Columbia and State of New York, have invented a new and Improved Apparatus for Steeping, Growing, and Drying Malt; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal central section of this invention; and Fig. 2 is a transverse vertical section of the same, the line *xx*, Fig. 1, indicating the plane of section.

Similar letters of reference indicate corresponding parts.

This invention consists in effecting the malting operation by means of an apparatus composed of a wire-gauze cylinder mounted on a hollow shaft, through which steam is admitted to the helical heating-pipe in the interior of the wire-gauze cylinder, in combination with a cylindrical case, one-half of which is surrounded by a jacket in such a manner that the steeping, the growing, and the drying can be effected without removing the malt from the apparatus, and not only much time and labor are saved, but also a better product is obtained than by the ordinary malting process; and, furthermore, the malting operation can be effected in the hot season as well as in winter time.

A represents a cylindrical case, made of galvanized iron or any other suitable material of sufficient strength to carry a vacuum. The lower portion of this case is surrounded by a jacket, *A'*, and access can be had to its interior by four man-holes, *M*, two at the bottom and two at the top. Said case is also provided with a dome, *D*, and it incloses a cylinder, *B*, the outside covering of which is made of strong wire-gauze, with meshes sufficiently large to allow the root-germs to pass through. Said cylinder is secured to an axle, *a*, which has its bearings in suitable stuffing-boxes in the ends or heads of the case *A*, and one end of said axle extends far enough through its box to make room for a cog-wheel, *c*, the diameter of which is equal to that of the cylinder *B*, and to which motion is imparted by a pinion secured to a suitable diastase and rotated by a steam-engine or any other suitable motor.

The cylinder *B* fits close into the upper part of the case, so, however, that it revolves in the same without friction; but between the lower part of the case and outer surface of said cylinder a crescent-shaped space, *d*, is left, as clearly shown in Fig. 2 of the drawings. The cylinder *B* is provided with two apertures, which are closed by suitable slides or doors, and by opening these slides access can be had to the interior of the cylinder.

The barley from which the malt is to be manufactured is introduced through the man-holes and apertures aforesaid into the cylinder *B* and covered with water. After being steeped the mass should not occupy more than two-thirds of the cylinder. In order to support this cylinder in the middle, one or more rollers may be placed under the middle ring of the same. By imparting to the cylinder *B* a rotary motion and renewing the water from time to time, the barley can be washed as clean as may be desired, and after this object has been accomplished the water is run out by a suitable cock. A thermometer, applied to the case and made to extend down into the barley, indicates the increase of heat created during the operation. When the temperature has reached from 65° to 70° Fahrenheit the cylinder *B* is again revolved until a thorough mixing of the grain is effected. This object is obtained by the rotary motion of the cylinder without bruising or crushing the grains, which cannot be avoided if the grains are worked by shovels in the ordinary manner. After this object has been accomplished the growing process commences, and in order to obtain perfect control over this process the dome *D* is connected by a pipe, *f*, with an air-pump, all the man-holes being hermetically closed.

Should the contents of the cylinder grow too hot, the air-cock *K* is opened and the air-pump as well as the cylinder are put in motion. The warm air is thus drawn out of the case *A* and substituted by cool air from the outside, which passes through a serpentine pipe, *i*, inside the jacket and discharges through spouts *o* into the case *A*, passing through the barley and cooling it on its way. In order to still further increase the cooling effect in the hot season, the jacket *A* is filled with cold water, and the air passing through the serpentine pipe in the jacket will enter the case *A* cooled down to the temperature of the water.

Should the temperature of the barley rise too slowly, steam is admitted into the jacket A through the pipe *i*, the air-cock *k* is opened, and the air-pump and cylinder B are set in motion, and thus the desired degree of heat is obtained in a short time. By closely observing the thermometer and turning the cylinder B at suitable intervals, the grain soon arrives in such a state that a sample taken out of the cylinder shows the desired length of the germs when the operation of growing is completed.

Should, by any accident, the malt dry out so much as to endanger and prohibit the perfect growth of the germs or roots, a little water sprinkled through the upper man-holes while the cylinder is revolved will be the remedy.

After the roots have grown long enough the drying operation begins. This operation is effected by putting the air-pump and the cylinder B in motion and admitting steam into the steam-jacket, leaving the air-cock *k* open at the beginning of the operation. After the lapse of an hour the malt will be dry enough for applying more heat, and then the air-cock is closed and more steam is admitted to the jacket until the temperature rises gradually to the desired point.

It is evident that by this process a very quick evaporation of the watery parts of the malt is effected, and during this process the heat is applied, so that the diastase of the malt is not in the least endangered.

By keeping the malt constantly in motion new grains are constantly brought in contact with the hot air, and the malt dries more rapidly and more uniformly than in common kilns. Furthermore, the malt obtained is free from all germ-roots, which, by the very motion imparted to the malt, are caused to break off and fall through the meshes of the wire-gauze cylinder.

It is evident that the maltster has it in his power to shorten or prolong the drying process without deteriorating the quality of the product by applying too great a heat.

In order to accelerate the drying process toward the end, a steam-coil, P, is arranged in the interior of the cylinder B, which communicates with a hollow shaft, so that steam admitted at one end of said shaft will pass through the coil and exhaust at the opposite end.

For the purpose of emptying the apparatus the man-holes, and also the slides or doors in the cylinder B, are opened and the cylinder is put in motion until all the malt has passed through the lower man-holes. An aperture in each head of the case serves to remove the precipitated root-germs and dust, which are swept out through the man-holes by a common broom or any other suitable device. These holes are closed by covers, which are fastened to the heads of the case by bolts or other suitable means.

By this apparatus all the operations of malting are concentrated in a small space, steeping-tubs, cellars, and kilns are rendered unnecessary, the largest part of the hard labor is saved, and the operation of malting can be carried on in the hot season as well as in winter.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The within-described method of effecting the steeping, the growing, and the drying of malt in an apparatus composed mainly of a wire-gauze cylinder revolving in a case with a jacket, substantially in the manner set forth.

A. KREUSLER.

Witnesses:

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