(No Model.)

H. ALTENBRAND.

MALT KILN.

No. 271,184. Patented Jan. 23, 1883.

Fig. 1.

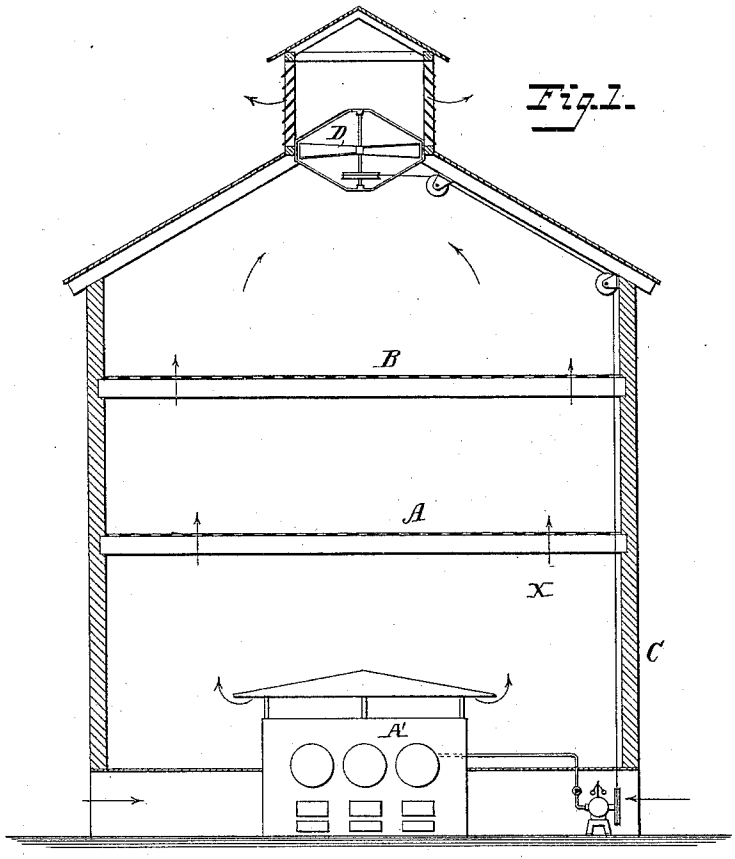
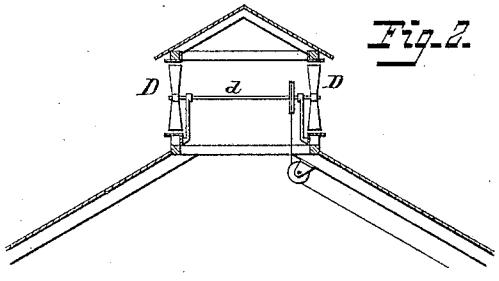


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY ALTENBRAND, OF BROOKLYN, NEW YORK, ASSIGNOR TO LUCIUS G. FISHER, JR., OF CHICAGO, ILLINOIS.

MALT-KILN.

SPECIFICATION forming part of Letters Patent No. 271,184, dated January 23, 1883.

Application filed December 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY ALTENBRAND, of Brooklyn, Kings county, New York, have invented certain Improvements in Malt-Kilns, of which the following is a specification.

My invention consists in means, fully described hereinafter, whereby to create and maintain a continuous current of hot air from the furnace to the upper outlet of a malt-kiln, so as to rapidly extract and expel the moisture from the malt.

In the drawings, Figure 1 is a sectional elevation of a kiln, showing my invention; and Fig. 2 is a section showing a modification.

In Letters Patent granted to me April 17, 1877, I describe an apparatus for drying malt in which a blower and a perforated pipe are used to create a current of hot air and conduct it to the floors.

My present invention consists in means whereby to impart movement to such a body of heated air that it is carried directly from the furnace through the successive floors of a malt-house without the necessary intervention of any pipes or conduits, and whereby I avoid the objections to the employment of a blower, which, by condensing the air and forcing it through the floors in a denser condition, prevents it from absorbing and carrying off the moisture to the extent it otherwise would.

In place of carrying the heated air from the furnace A′ by means of pipes leading to the different floors, I permit the heated air to flow directly into the chamber X below the lower perforated floor, A, of the malt-house C, and instead of using a blower for forcing the air upward from the lower compartment I place an exhaust-fan, D, so as to draw air from one of the upper outlets above the upper floor, so that the air is rarefied, and is carried in a rarefied condition from the furnace through the perforations of the successive floors, and finally expelled through the opening above the fan. By this means I not only avoid the expense incident to the use of long conducting-tubes, but I further avoid localizing the currents, distribute the air over the whole floor, and lift the grain throughout the entire extent of the floors, carrying the air through rapidly, so that there can be little or no condensation of moisture, and the latter is rapidly absorbed into the upflowing currents and carried away from the grain.

The lifting of the grain by the upflowing currents of air renders unnecessary the employment of mechanical stirrers, heretofore employed for such purpose, and not only more thoroughly separates the particles and more rapidly and effectually removes the moisture, but is effected without mashing or injuring the particles, liable to result when mechanical means are employed for stirring. Moreover, the whole body of grain on the rectangular floors is stirred, whereas with ordinary stirrers having a circular sweep the corner portions are not affected.

The use of an exhaust apparatus for lifting the grain is important, for it has been found that an exhaust has a much better effect than a blower, as when the air is propelled from below it will seek the easiest passage out and loses force from leakage in the walls, &c., whereas when an exhaust is arranged above the floors the air is drawn through every portion of the floors, and slight leaks have no detrimental effect.

I am aware that it is not new to pass grain, &c., in drying over perforated screens through and over which hot air is carried, and that exhaust-fans are used for this purpose as well as for drawing air over grain upon malt-floors, and I do not claim broadly the use of an exhaust in a malt-house, my invention being distinguished by the fact that I dispense with mechanical stirrers, and secure the desired rapid drying effect by lifting and stirring the grain by an upward current produced by an exhaust apparatus.

The exhaust-fan can be arranged horizontally in the opening below the cupola, as shown in Fig, 1; or two fans upon one shaft, *d*, may be arranged in opposite openings in the vertical walls of the cupola; or any other desirable arrangement may be adopted. For instance, the fan may be placed in one of the upper windows or in a conduit leading to one of the upper outlets.

It will be evident that any suitable exhaust

device (ejector or other appliance) may be substituted for the exhaust-fan.

I claim—

1. The within-described improvement in drying malt, the same consisting in drawing currents of warm air upward through the body of malt in such manner as to lift and separate the particles thereof.

2. The combination, with the perforated floors of a malt-house and with the furnace thereof, of an exhaust apparatus communicating with the space above the upper floor, and constructed and provided with operating mechanism, as set forth, whereby the air above the malt is rarefied, and the particles of malt are lifted and separated by and exposed to rapidly-ascending warm-air currents, as specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY ALTENBRAND.

Witnesses:

CHARLES E. FOSTER,

THOMSON H. PALMER.