2 Sheets--Sheet 1.

G. CLARK.

Apparatus for Drying Malt.

No. 166,913. Patented Aug. 24, 1875.

Figure 1,

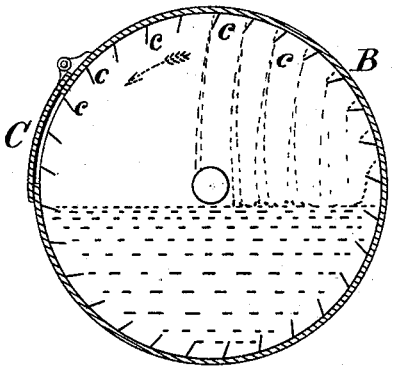
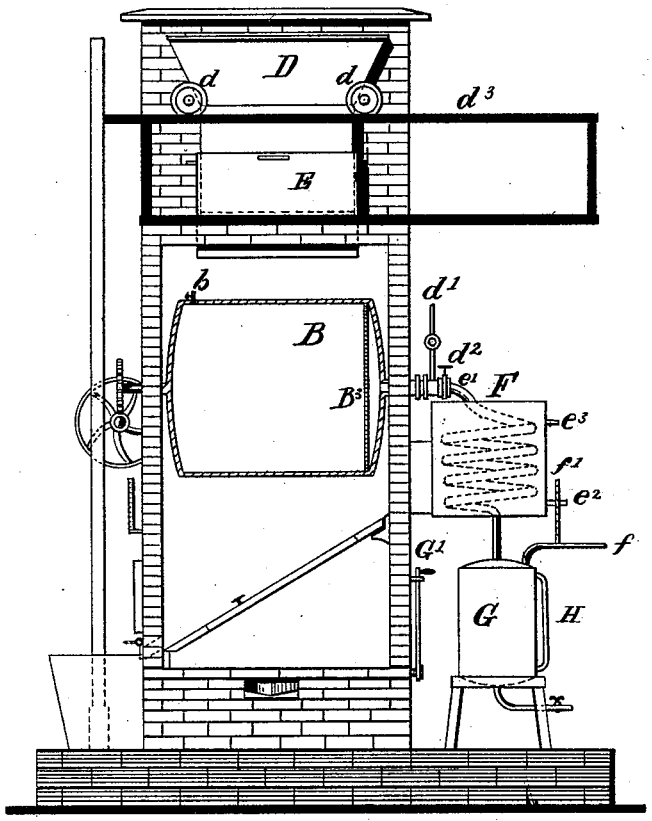


Figure 2,



Witnesses,
Wm. S. Grosvenor
Amos W. Sanford.

Inventor,
George Clark.
By James Sangster
Atty

2 Sheets--Sheet 2.

G. CLARK.

Apparatus for Drying Malt.

No. 166,913. Patented Aug. 24, 1875.

Figure 3,

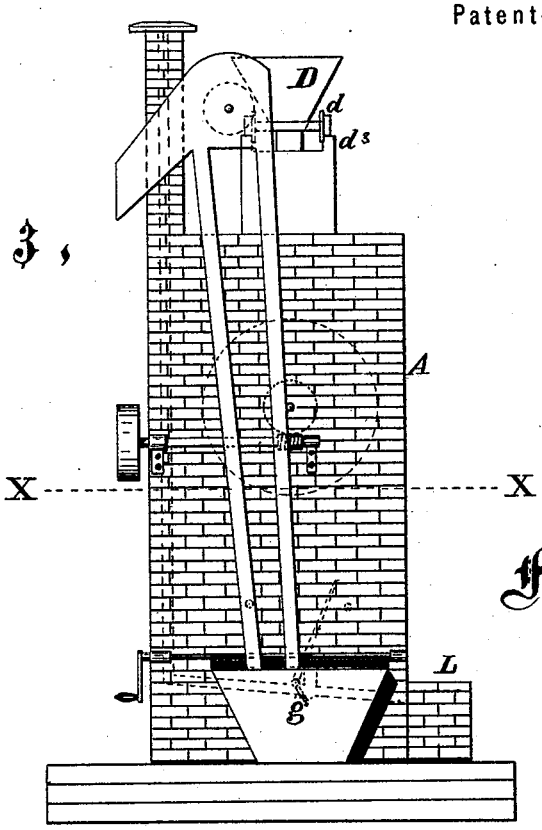


Figure 5,

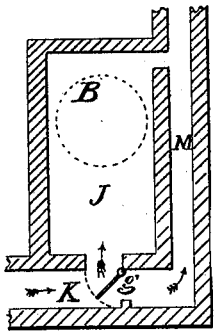
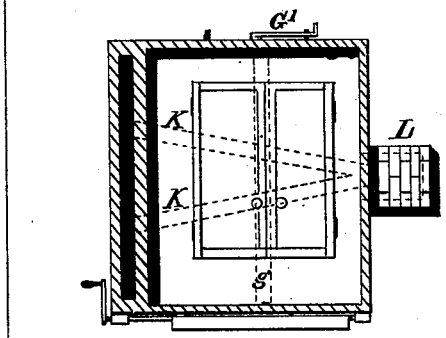


Figure 4,



Witnesses.

Wm. S. Grosvenor.
Amos W. Sawyer.

Inventor.

George Clark.
By James Sawyer
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UNITED STATES PATENT OFFICE.

GEORGE CLARK, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOSEPH KAST AND CHARLES F. BITTER, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR DRYING MALT.

Specification forming part of Letters Patent No. **166,913**, dated August 24, 1875; application filed July 17, 1875.

To all whom it may concern:

Be it known that I, GEORGE CLARK, of the city of Buffalo, in Erie county and State of New York, have invented a new and Improved Apparatus for Drying Malt or other wet material, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of this invention is to rapidly and properly dry malt or other wet material; and it consists, first, of an air-tight cylinder, which turns slowly on its axis by means of a worm or other equivalent gear, and is provided with longitudinal buckets attached to its inner circumference, which project just far enough to take and carry up as thick a layer of the grain from the surface of the cylinder, next to the circumference, as the necessary and required temperature can penetrate, thereby throwing the heated grain from the circumference to the center of the cylinder as it revolves, and thus bring all portions successively in contact with the heated surface, the buckets being inclined at such an angle that they will hold portions of the grain until carried beyond the highest point within the cylinder during its revolution, and so that the heated grain will gradually fall therefrom, thereby continually carrying away a thin layer of hot grain as fast as it becomes heated.

The second part of my invention consists in a division of the flue for carrying off the heat and smoke into two flues, which afterward unite again, in one of which flues the revolving cylinder is placed, the whole being combined with a single damper, by which the entire control and exact regulation of the heat are effected, the arrangement of the damper being such, and so placed, that as the passage into one flue is enlarged the passage in the other is proportionately contracted.

In said drawings, Figure 1 represents a vertical section through the cylinder, showing the arrangement and operation of the buckets in carrying the grain from the center to the circumference as it revolves. Fig. 2 is a front elevation of the apparatus, showing a portion of the front wall taken away, so as to expose the cylinder, which is shown in vertical longitudinal section. Fig. 3 is a side elevation. Fig. 4 represents a plan view below line X X, Fig. 3; and Fig. 5 is a section through the flues, showing the damper for regulating the supply of heat.

A is the brick wall for inclosing the cylinder B, which is constructed of wrought-iron, and sufficiently strong to resist the pressure of the atmosphere. It is provided with the buckets *c*, which are arranged on its inner circumference at such an angle that the grain will be carried up during its revolution nearly to the top, and thrown down toward the center, substantially as shown in Fig. 1. C represents a door, which, when closed, is fastened air-tight by any well-known means. d^1 is a steam-pipe for conducting steam to the cylinder. d^2 represents a valve for shutting off communication between it and the condenser. *b* is a stop-cock for destroying the vacuum. The steam is admitted for the purpose of heating the whole mass of the grain up to a certain temperature, which it will readily do by permeating or forcing its way through the interstices of the material without calcining the exterior parts of the same. As soon as the mass has been thoroughly heated up to, say, 212°, the steam is shut off, and a partial vacuum is formed by opening the valve d^2, which communicates with a vacuum-pump. D represents a hopper supported upon wheels *d*. E is a sleeve connected therewith, and arranged to slide on the lower part of the hopper, which is let down when charging the cylinder. It is placed upon the ways d^3, along which it is moved. F is the condenser; e^1, the worm; e^2 and e^3, the outlet and inlet pipes. G represents the reservoir; *f*, the vacuum-pump pipe; *f'*, the vacuum-gage. G', in Figs. 2 and 4, is an arm for regulating the damper *g*. (Shown in Figs. 3, 4, and 5.) Back of this arm is arranged a scale, along which it is moved, and to which it may be set so as to control the heat at any point desired. H is a glass indicator-tube on the reservoir, for showing the amount of condensed water therein. This enables the operator to see when the material is dry, as then the flow of water from the condenser ceases.

In Fig. 5 the arrangement of the flues is better shown. The cylinder B is represented

by dotted lines in the larger flue J, the arrows indicating the passage of heat and smoke, which is controlled, as shown and before mentioned, by the damper *g*. K represents the flues leading to the chimney-flue M from the furnace L, Figs. 3 and 4, in which they unite, as shown by the dotted lines, Fig. 4, at K K, both of which are controlled by the damper *g*.

I claim as my invention—

1. The combination of the cylinder B, condenser F, reservoir G, and glass indicator-tube H, as and for the purposes specified.

2. The combination and arrangement of the flues K K M and damper *g*, substantially as and for the purposes set forth.

GEORGE CLARK.

Witnesses:

JAMES SANGSTER,

CHAS. F. BITTER.