R. d'HEUREUSE.

MALT-DRYING KILNS.

No. 182,274. Patented Sept. 19, 1876.

Fig. 1

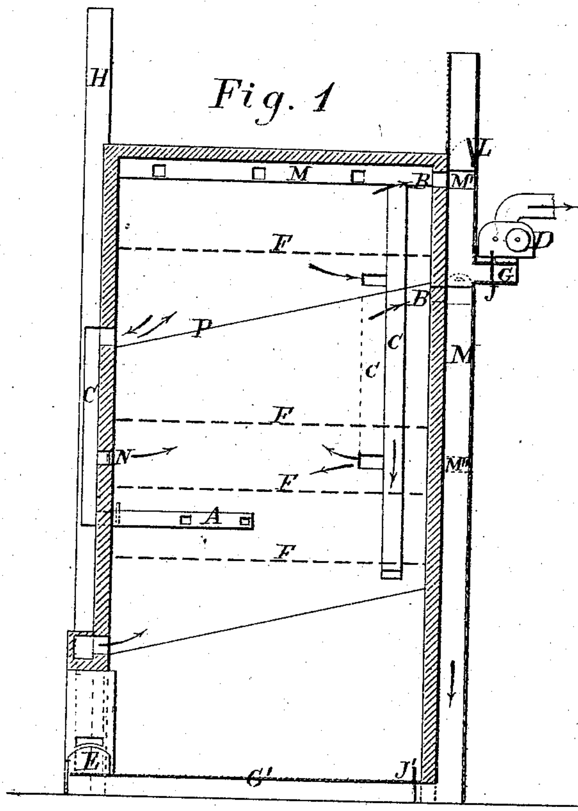


Fig. 2

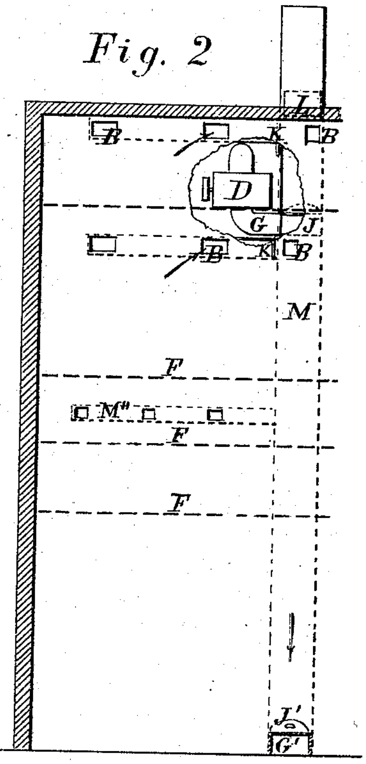
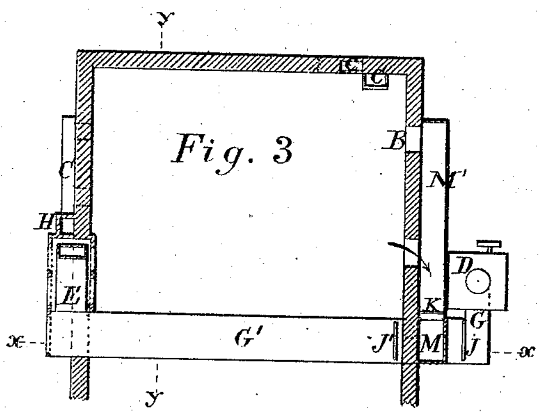


Fig. 3



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2 Sheets—Sheet 2.

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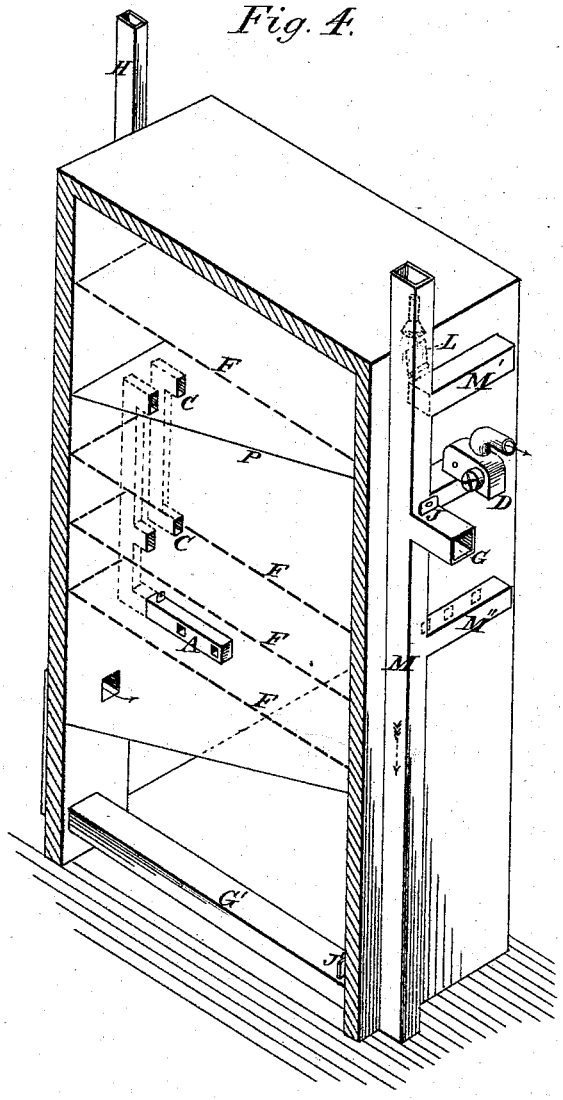
Fig. 4.



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UNITED STATES PATENT OFFICE.

RUDOLPH D'HEUREUSE, OF NEW YORK, N. Y.

IMPROVEMENT IN MALT-DRYING KILNS.

Specification forming part of Letters Patent No. **182,274**, dated September 19, 1876; application filed February 3, 1876.

To all whom it may concern:

Be it known that I, RUDOLPH D'HEUREUSE, of the city, county, and State of New York, have invented a new and useful Improvement in Kilns for Drying Malt or other substances, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing.

My invention consists in certain combinations of parts whereby air can be drawn from one drying chamber or kiln into another, and exhausted from one or more kilns or chambers at the same time, by means whereof the full effect of the air admitted into the drying-chambers can be had, and the direction, volume, and velocity of the air and spent air and vapors through and from the kilns or drying-chambers are placed under the control of the operator, and whereby a portion of the vapors are condensed, and the downward passage of the air and gases facilitated, all of which will be hereinafter fully set forth.

Flues with dampers are introduced at convenient places to control the direction and volume, as well as the velocity, of the air-currents, so as to exact the fullest amount of work from the air compelled to pass from one kiln to the other. Savings are also effected by turning the spent air and vapors otherwise to account, by condensing a portion of the moisture by sprays of cold water; and scorching of the malt by too dry and hot air is prevented by causing it to absorb some moisture.

Figures 1 and 2 of the drawing, in which like letters indicate like objects, represent sectional elevations of a kiln or set of kilns in the lines *x x* and *y y* of ground plan Fig. 3. Fig. 4 represents a perspective view of the kiln, showing the connection of the flues.

The open kiln-floors F F, upon which the malt or other substances are placed for drying, are constructed in any manner suitable for the purpose, either singly or several kilns above one another, and each kiln-floor separated from that next above by partition P, or several floors in the same inclosed space. M M′ M″ are ventilator-flues, running vertically or horizontally, or vertically and horizontally, are closed (or made to close at option) toward the outside air, either permanently or by damper or dampers L, and communicate with the corresponding kiln or kilns by openings. They are, however, provided with dampers K K, to control thereby the exit of spent air and vapors from the kiln or kilns.

The flue G is to carry the air and vapors from the kiln or kilns to the mechanical exhaust D, where this mode is applied, or flue G′ to the furnace E, while in either case the damper or dampers L are closed.

H is the smoke-stack of the furnace or furnaces.

Separate flues M may serve for the ventilation of each kiln; or several kilns may ventilate into the same flue directly or by horizontal flues M′ M″; and dampers are suitably arranged to connect or disconnect at will the ventilation of each kiln, by flue or flues G, to the mechanical exhaust D, if such is employed, or, by flue or flues G′, with the furnace or furnaces E; or, finally, by closing dampers J or J′, or J and J′, as the case may be, and opening dampers L, the escape of the air and vapors from the kiln or kilns to the outer air in the usual way may be effected at option.

It will be understood that, as a rule, it is not intended to employ in the same malt or drying house both a mechanical exhaust and furnace for vacuating the kiln or kilns of foul air, but that generally one or the other of the stated devices would be employed.

Any of the ordinary kilns with ventilator chimney or chimneys can be operated on the above plan by closing the chimney permanently, or by damper or dampers L, at such times when the weather interferes with the satisfactory draft; and the damper J to the flue G, or damper J′ to flue G′, being opened, the foul air is drawn from the kiln or kilns by the ventilator-flues M M′ M″, respectively, to the mechanical exhaust D, or to the furnace or furnaces E, the damper or dampers K to each kiln permitting perfect control of the draft from each kiln.

It is hardly necessary to mention that the flue G′ connecting ventilator-flue M or M′ with the furnace E has to serve only to exhaust by the furnace-draft the air and vapors from the kiln or kilns when required. The use of a mechanical exhaust device permits of the opportunity to either discharge the spent air and

vapors immediately or to convey the same to such place where their heat or other valuable properties may be utilized. A spray of cold water may be admitted at or near the top of the ventilator-chimney M into the same, to condense a portion of the vapors and to facilitate the downward passage of the air and gases. As by the described mode of ventilation the hot air, even if nearly saturated with moisture, receives the assistance of the exhaust to move and leave the kiln, the same amount of air will obviously effect more work and a corresponding saving in time, fuel, and labor. The place or places of exit of the spent air and vapors from the kiln by my mode of exhausting the same have not necessarily to be above the kiln-floors and the substance to be dried, as in the drying-kilns ordinarily in use; but they may be below the floor, (as indicated by flue M″, Fig. 2,) the heated air then being supplied above the floor, and where several floors are arranged in the same compartment or kiln the vapors may leave the kiln below or between the several floors as well as above, as may be deemed preferable. On this plan of artificial draft it is a very easy matter to cause the air and vapors to pass from any one kiln to any other, above or below, to complete the full work it is able to effect, and air communications or flues C C, Figs. 1 and 3, for that purpose, provided with dampers between the several kilns, can be constructed so as to allow the most absolute control of the use of the air employed. These air-passages connecting the kilns with one another may be through the roof of the kilns or at the sides, within or without the inclosing walls. In kilns constructed with several floors in the same compartment the air is now admitted below the lowest floor only, and at no place between or above the floors, permitting the exit of the vapors only at or near the top of the kiln.

At some period of the work the accession of new heated air between the floors is of advantage, and for that purpose I have arranged dampered openings N or conduits A between the floors to admit or adjust the supply of the required air from the furnace or from some other kiln. Other dampered openings for the exit of the vapors between or below the floors are provided, as stated above.

Heated, very dry, air, acting upon malt and some other substances, has an injurious scorching effect, which is overcome by moderating the excessive dryness of the air without impairing the desired drying-action of the same. This is done by causing the air to pass, on its way from the furnace, over some water or moistened couch, to be placed either within the flues that conduct the air to the kiln or near the openings by which the air enters the kilns, by a spray of water, or in any other mode allowing the air to absorb moisture enough to reduce the difference between the temperature of the air and that of its dew-point to not exceed 30° to 40° Fahrenheit.

What I claim, and wish to secure by Letters Patent, is—

1. In malt-kilns, two or more drying-chambers communicating substantially as shown, in combination with flue M communicating with one or more of the chambers, and exhaust D, whereby air can be drawn from one drying-chamber into another, and be exhausted from one or more of the chambers at one or different points at the same time, substantially as and for the purpose set forth.

2. In malt-kilns, two or more communicating drying-chambers, in combination with flue M, communicating with one or more of the chambers, flue G′, and furnace E, substantially as and for the purpose set forth.

3. In malt-kilns, two or more drying-chambers communicating by flue or flues C, in combination with flue M, communicating with one or more of the chambers, substantially as and for the purposes described.

4. As an improvement in malt-kilns, the flue M, provided with a sprinkler, substantially as and for the purpose set forth.

R. D'HEUREUSE.

Witnesses:
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