

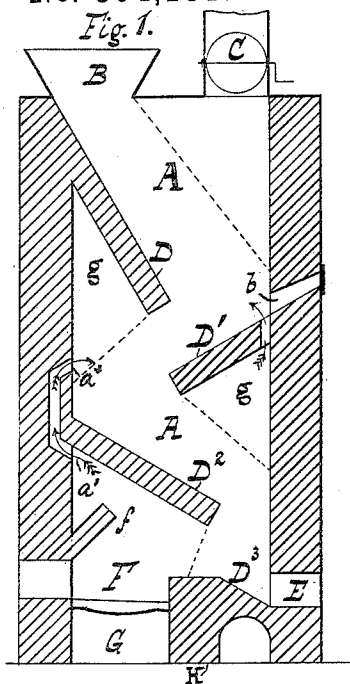
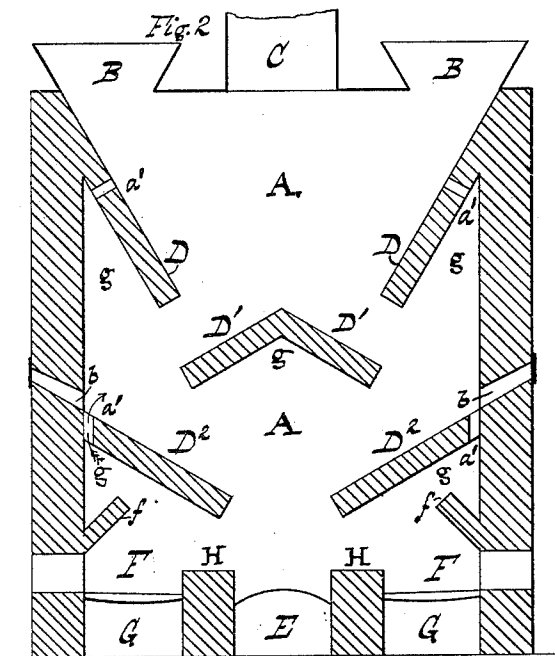
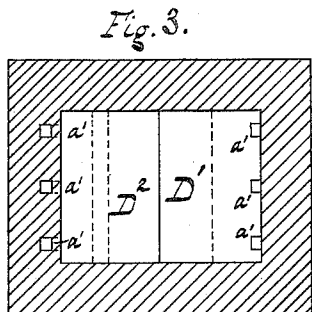
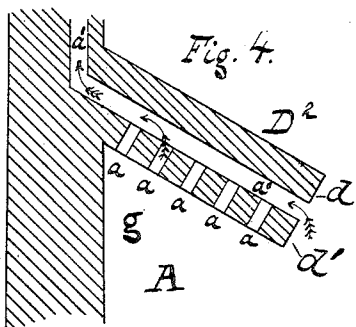
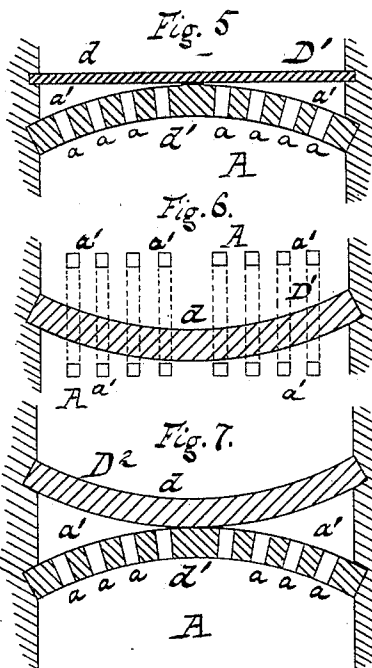
(No Model.)

R. H. BURNS.

LIMEKILN.

No. 394,151.

Patented Dec. 11, 1888.



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LIMEKILN.

SPECIFICATION forming part of Letters Patent No. 394,151, dated December 11, 1888.

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To all whom it may concern:

Be it known that I, ROBERT H. BURNS, a citizen of the United States, residing in Brooklyn, Kings county, and State of New York, have invented certain new and useful Improvements in Limekilns, of which the following is a specification, reference being had to the accompanying drawings.

The object of such improvements is to provide for a free escape of the released vapor, moisture, and carbonic acid arising from the treated limestone or shells; also, to provide sufficient overturning movement and travel of the limestone or shells to assist in the release of the vapor, moisture, or carbonic acid from every portion and side of the material treated.

A further object of the improvements is to provide for the successful and total burning of the gases of the coal and lime; also, where shells are treated, to provide for the thorough burning of the gelatine contained in the shells.

These objects I attain by the use of a furnace or kiln constructed and operated as hereinafter set forth.

Referring to the drawings, Figure 1 represents a vertical section of a single kiln; Fig. 2, a vertical section of a double kiln embodying my improvements; and Fig. 3 represents a horizontal section of a kiln shown in Fig. 1. Figs. 4, 5, 6, and 7 represent enlarged sections showing method of constructing the angular partition guides or trays controlling the movements of both the material and gases, and by their position and construction assisting in the combustion of the released gases of both coal and lime and the heating of the material to be treated.

Similar letters of reference designate like parts or portions in all the figures.

The letter A designates the kiln-chamber.

B designates the hopper through which the limestone or shells to be treated are fed or supplied.

C designates an uptake or chimney for the discharge of the products of combustion.

D D² D³ designate in their numerical order, counting from the top, the several angular partition guides or trays upon and along which, from the feed-hopper and from one to another, the material drops and slides in its

movement through the kiln. These trays are constructed alike and are numbered to distinguish their relative positions in the kiln-chamber. At E the burned lime is withdrawn.

F designates a furnace to furnish the heat.

G is the ash-pit of the furnace; H, the furnace bridge-walls.

a a designate small holes for the passage of the heat from below to the upper portion of the angular partition-trays, as shown in Figs. 4, 5, and 7.

a' a' designate small flues or passages constructed within the angular partition guides or trays of the double partitions or within the side walls of the kiln, as specially shown in Figs. 1 and 2, where single angular partitions are used.

b b designate sight-holes through which the condition of local materials may be seen, or through which a bar may be inserted for loosening the material when jammed, or, again, which may be used to admit additional atmospheric air to the combustion-chambers when necessary.

f designates a guide for furnace products of combustion, and g g designate the combustion-chambers within the kiln-chamber for the burning of the gases.

In Fig. 4 a sectional view of the angular partition guides or trays is shown. d designates the upper portion, and d' the lower portion, of the partition. The upper portion is to hold or slide the shells upon. The lower portion is to shield the upper from the direct attack of the heat, but is perforated with holes a a to permit of a passage of the heat to the tray. The two portions are separated to form a flue, a', between.

Fig. 5 is a view in section at right angles to that of Fig. 4. Here the upper portion is flat and the lower portion is arched, forming the two flues a' a'. The perforations for the passage of heat are also shown at a a.

Fig. 6 shows the partition guide or tray formed of but one portion, and that curved in a downward direction across the kiln-chamber, to facilitate the movement of the limestone or shells while under treatment. In this case the flues for connecting the associate combustion-chambers are formed within the walls of the kiln or at the junction of the partitions

with the walls, as shown in Figs. 1, 2, and 4 at *a'*.

Fig. 7 shows a double partition guide or tray in section, formed of two reverse arches, *d* and *d'*. The lower arch is perforated for heating the upper one. Flues *a' a'* are formed between the pair of arches and connect with the combustion-chamber above, as shown in Figs. 1, 2, and 4, either direct through tray-arch or through the kiln-walls. Within the angles formed between the partition-guides *D* and the walls of the kiln combustion-chambers *g* and outlets *a'* are provided, as shown in Figs. 1, 2, and 4.

In the regular operation of the kiln a fire is started in the furnace and the kiln-chamber gradually filled with the limestone or shells to be burned. The portion generally occupied by the shells is outlined in Fig. 1 by dotted lines. As the furnace-fire develops and the walls and partitions, as also the lime, become heated, carbonic acid is released, comes in contact with the flame and gases from the furnace, or with the walls and partitions when at a white heat, and, being ignited, burns and escapes through the flues to the uptake or chimney, giving out heat to the shells and partitions in their passage. By the burning of all the gases an offensive feature of the limekiln is done away with, and the kilns may be located without injury to surrounding premises in any portion of a large city where any surplus heat may be made use of. The flues *a' a'* may of course be omitted, and the products of combustion and gases forced to pass through the lime while being treated. Such method would not, however, be as efficient as with the smaller flues, *a' a'*.

The depth or size of chamber *A* is not limited. It may be made higher and additional angular partition-guides inserted for a longer process of burning. Where the flues *a' a'* are not used and the partition-trays made double, the lower portion is preferably per-

forated to admit heat to the space between, and a few edge holes inserted in the upper portions, similar to the partition-holes at *a'* in Fig. 2.

What I claim as new, and desire to secure by Letters Patent, is—

1. A partition guide or tray for limekilns, consisting of an upper and a lower portion separated from each other in a vertical direction, the lower portion being perforated to permit heat to pass through to the upper portion, substantially as and for the purposes specified.

2. A partition guide or tray for limekilns, consisting of an upper and a lower portion separated vertically from each other to form a space or flue between them, in combination with a flue communicating with the combustion-chamber above, whereby a constant movement and combustion of the gases is kept up within said flues and combustion-chamber, substantially as set forth.

3. A partition guide or tray for limekilns, consisting of an upper and a lower portion, either one or both of which is arched toward or approaches the other to form side flues or spaces communicating direct with the combustion-chamber above, substantially as set forth.

4. A partition guide or tray for limekilns, consisting of an upper solid portion and a lower perforated portion, either one or both of which is arched toward or approaches the other to form side flues or spaces, whereby direct communication is effected from one combustion-chamber, through the perforations in lower portion of partition guide or tray, through side flues or spaces to combustion-chamber above, as and for the purposes specified.

ROBERT H. BURNS.

Witnesses:

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