

(No Model.)

2 Sheets—Sheet 1.

P. L. YOUNGREN.
CONTINUOUS KILN.

No. 491,396.

Patented Feb. 7, 1893.

Fig. 1.

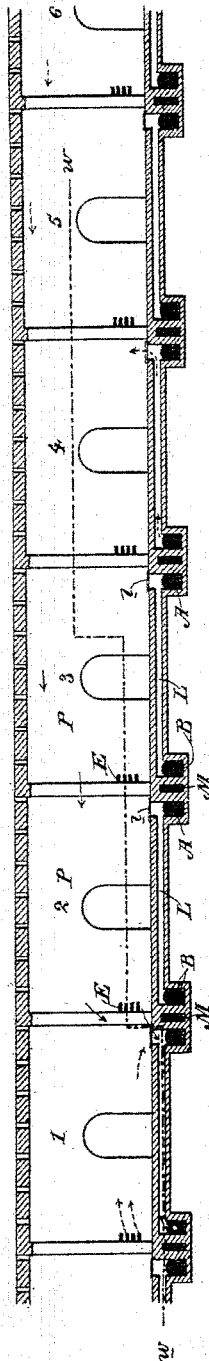
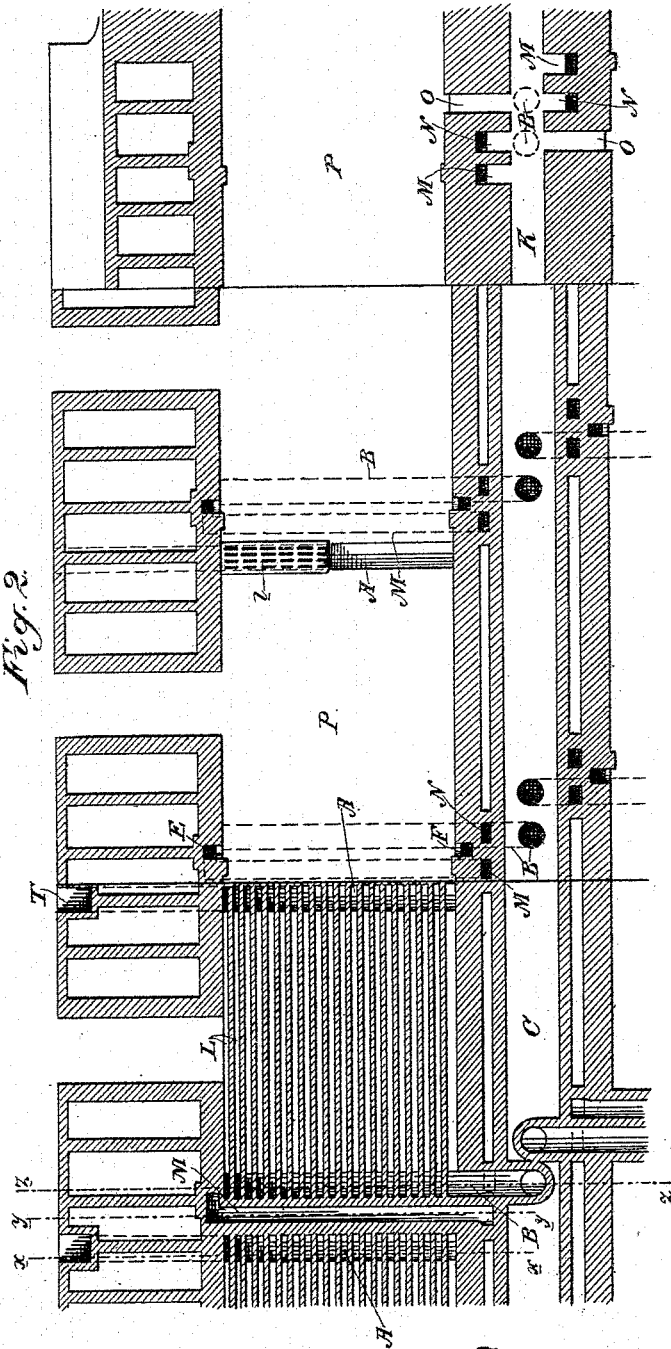


Fig. 2.



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Fig. 3.

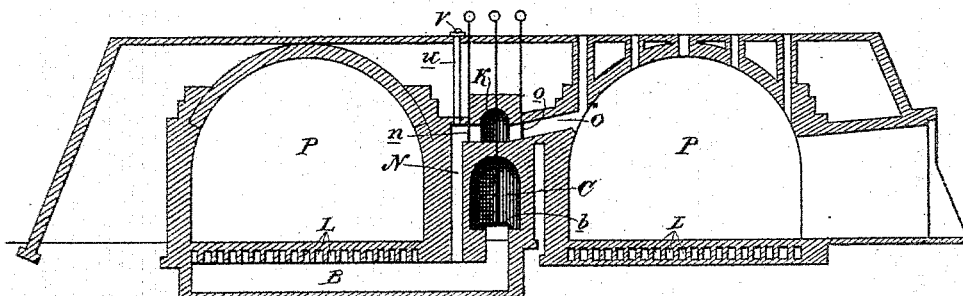


Fig. 4.

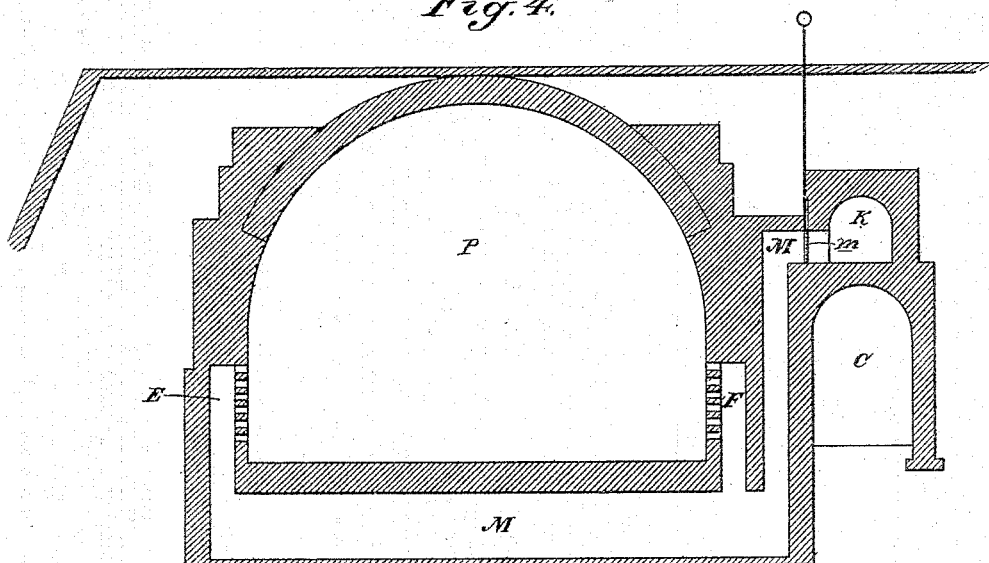
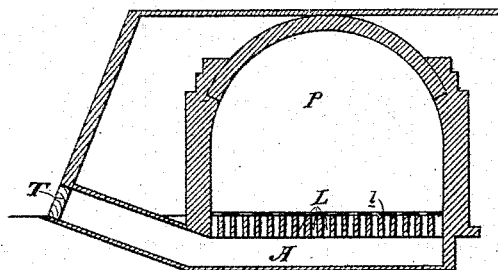


Fig. 5.



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UNITED STATES PATENT OFFICE.

PETER L. YOUNGREN, OF OAKLAND, CALIFORNIA.

CONTINUOUS KILN.

SPECIFICATION forming part of Letters Patent No. 491,396, dated February 7, 1893.

Application filed August 4, 1892. Serial No. 442,169. (No model.)

To all whom it may concern:

Be it known that I, PETER L. YOUNGREN, a citizen of Sweden, residing in Oakland, Alameda county, State of California, have invented an Improvement in Continuous Kilns; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of continuous kilns for burning bricks and other wares, and it consists in the novel arrangement and combinations of flues and passages hereinafter fully described and specifically pointed out in the claims.

The object of my invention is to provide a kiln of such construction that the heat may be advanced and the ware dried and burned in the lower part of the compartment as well as in the top part of it, a result which is found impossible in other kilns of this type; and also provide for a perfect combustion of the fuel in the bottom portion of the kiln.

Referring to the accompanying drawings for a more complete explanation of my invention,—Figure 1 is a longitudinal central vertical section of the kiln compartments. Fig. 2 is a horizontal section on the irregular line $w-w$ of Fig. 1. Fig. 3 is a cross section on line $z-z$ of Fig. 2. Fig. 4 is a cross section on line $y-y$ of Fig. 2. Fig. 5 is a cross section on line $x-x$ of Fig. 2.

I construct a drying floor by forming the bottom of the kiln P into a series of longitudinal passages L opening into the compartment at one end and into a transverse exit passage B at the other end, and arranged in sections, each section preferably adapted to correspond to a kiln compartment, and having its separate connection with the stack and with the hot air flue. The communication between the longitudinal passages L and the compartment is through a perforated portion of the floor shown at L. Directly below the perforations I construct a transverse cleaning channel A and extend the same out under the outside wall of the kiln and provide the opening with a temporary cover T, by the removal of which the ashes and sand falling down through the perforations may be removed with a scraper. The transverse exit passages B communicate with the smoke chamber C, said communication being controlled by dampers b.

Centrally above the smoke chamber C I arrange a hot air flue K which I provide with three distinct series of branch flues M, N and O. Branch flues M connect the hot air flue K with the inner and outer side of the kiln compartments, extending first downward and then under and across said compartments and having upward extensions E, F, opening into the kiln compartments. Branch flues N connect the hot air flue K with the exit passages B of each compartment, and have upward extensions u connecting with the outside air and provided with a cover V. Branch flues O connect the hot air flue K with the upper part of the kiln compartments. One or more of each of these branch flues may be provided for each compartment. Suitable dampers m , n and o control these flues.

The operation of the kiln is as follows:—Assuming that compartments 4 and 5 are being fired, the products of combustion are allowed to pass ahead as shown by the arrows, through the green bricks in compartments 3 and 2, their exit dampers b being closed, until the capacity of said products for absorbing moisture is exhausted. They are then caused to pass down through the perforated floor l in compartment 1 into the longitudinal passages L and into the exit passage B and thence into the smoke chamber C. In passing under the floor a portion of the heat is radiated through the same and into the green bricks in the lower part of the kiln compartment 1. The hot air flue K is put in connection with the top of the compartments 6 or the others behind it, through the branch flue O, and at the same time flue K is opened into that branch flue M which enters compartment 1. The hot air then passes along in the space formed by the settling of the burned bricks in compartment 6 and the others behind it, and will find its way through these flues O and M into compartment 1 from both sides and traverse the lower part of same in opposite direction to the main draft of the kiln. These hot air currents will be superheated by contact with the hot floor, and will carry off the moisture in this portion directly to the draft passages without traversing other and cooler portions of the kiln. In other kilns of this type the water-smoke or steam from the bricks is first gen-

erated at the top of the kiln owing to the tendency of the heated gases to rise; it passes along the arch until opposite the exit passage where it is forced down through colder and unheated portions of the ware where the greater part of the steam it carries is condensed and deposited on the brick, thereby producing a sluggish movement of the water-smoke, clogging of the kiln at the bottom and discoloration of the ware. By arranging my drying floor and hot air passages, as I have described, it will be seen that this very serious objection to the successful operation of the kiln is entirely avoided, as the floor and lower portion of the kiln is first heated, and the moisture expelled, and thereby preparing a free vent for the draft when it is desired to advance it to the next chamber ahead.

Another feature of my invention is the provision made for the perfect combustion of the fuel and promotion of the fire in the lower part of the kiln.

In other kilns the forward portion of the fire, as in compartment 4, and particularly the bottom of the same, burns sluggishly and is smothered owing to deficiency of oxygen, as this portion only receives the non-combustible products of the back fire. To aid the fire here, I connect the hot air flue K through branch flue N, with the draft passage B of compartment 4. A portion of the current of hot air passing from the cooling brick will now pass under the floor of compartment 4, become superheated and enter the compartment through the perforated floor. Or by opening the cover V I can let a portion of fresh air enter through the flue *u* and enter the bottom of the kiln in the same manner.

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

1. In a continuous kiln the combination of longitudinal flues disposed below its compartment floors and communicating with said compartments, and a hot air flue K having branch, damper-controlled communications with the tops of the compartments and with said longitudinal flues, substantially as herein described.

2. In a continuous kiln, the combination of a hot air flue K and the branch flue M communicating with said hot air flue and extend-

ing down below the floor and communicating with the outside and inside of the kiln compartment, substantially as herein described.

3. In a continuous kiln, the combination of the flues L under the compartment floors and communicating with said compartments, the transverse exit passages B communicating with said flues L and with the smoke chamber, the hot air flue K and the damper controlled branch flues M from said hot air flue, said branch flues passing under the kiln compartments and having communications with the inner and outer sides thereof, substantially as herein described.

4. In a continuous kiln, the combination of the flues L under the compartment floors, and communicating with said compartments, the transverse exit passages B communicating with said flues L and with the smoke chamber, the hot air flue K, the damper controlled branch flues O from said hot air flue and communicating with the upper portions of the kiln compartments, and the damper controlled branch flues M from said hot air flue, said branch flues passing under the kiln compartments and having communications with the inner and outer sides thereof, substantially as herein described.

5. In a continuous kiln the combination of the flues L under the compartment floors and communicating therewith, the transverse passages B communicating with flues L, the hot air flue K, the damper controlled flues O communicating with the hot air flue and with the kiln compartments, and the damper controlled flues N communicating with said hot air flue and with the transverse passages B, substantially as herein described.

6. In a continuous kiln, the combination of the flues L under the compartment floors and communicating therewith, the transverse passages B communicating with flues L, the flues N communicating with the passages B and the cover controlled flues *u* communicating with the flues N and with the outer air, substantially as herein described.

In witness whereof I have hereunto set my hand.

PETER L. YOUNGREN.

Witnesses:

S. H. NOURSE,

J. A. BAYLESS.