2 Sheets—Sheet 1.

G. A. CARLSON.

Brick-Kiln.

No. 217,988. Patented July 29, 1879.

Fig. 1.

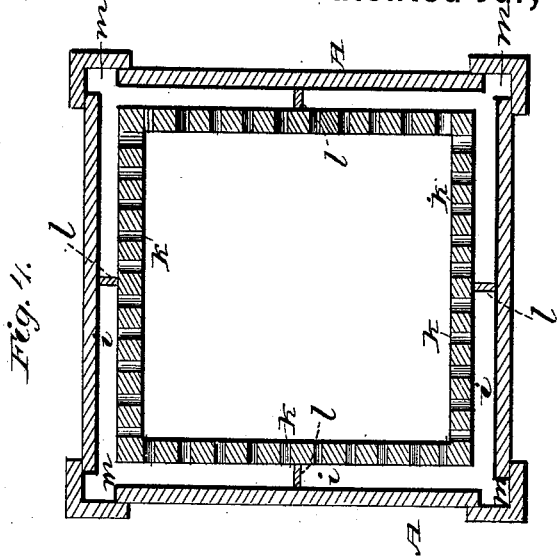
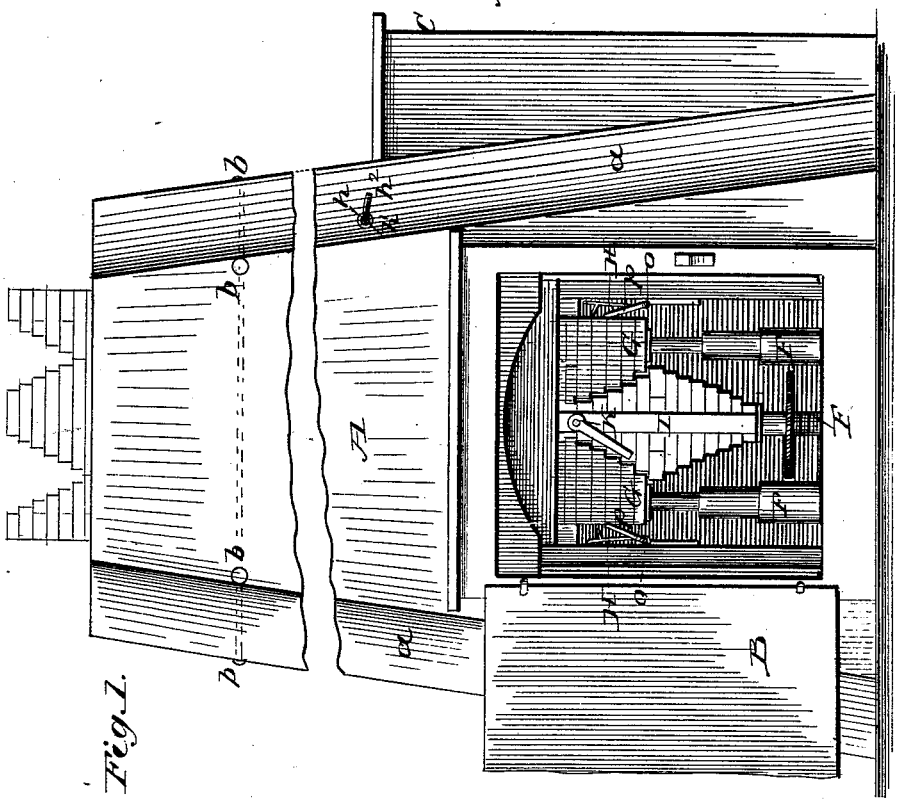


Fig. 2.



Witnesses
Fred. G. Dieterich
Jno. B. Madigan

Inventor
Gustaf Adolph Carlson.
by Louis Bagger & Co
Attorneys.

2 Sheets—Sheet 2.

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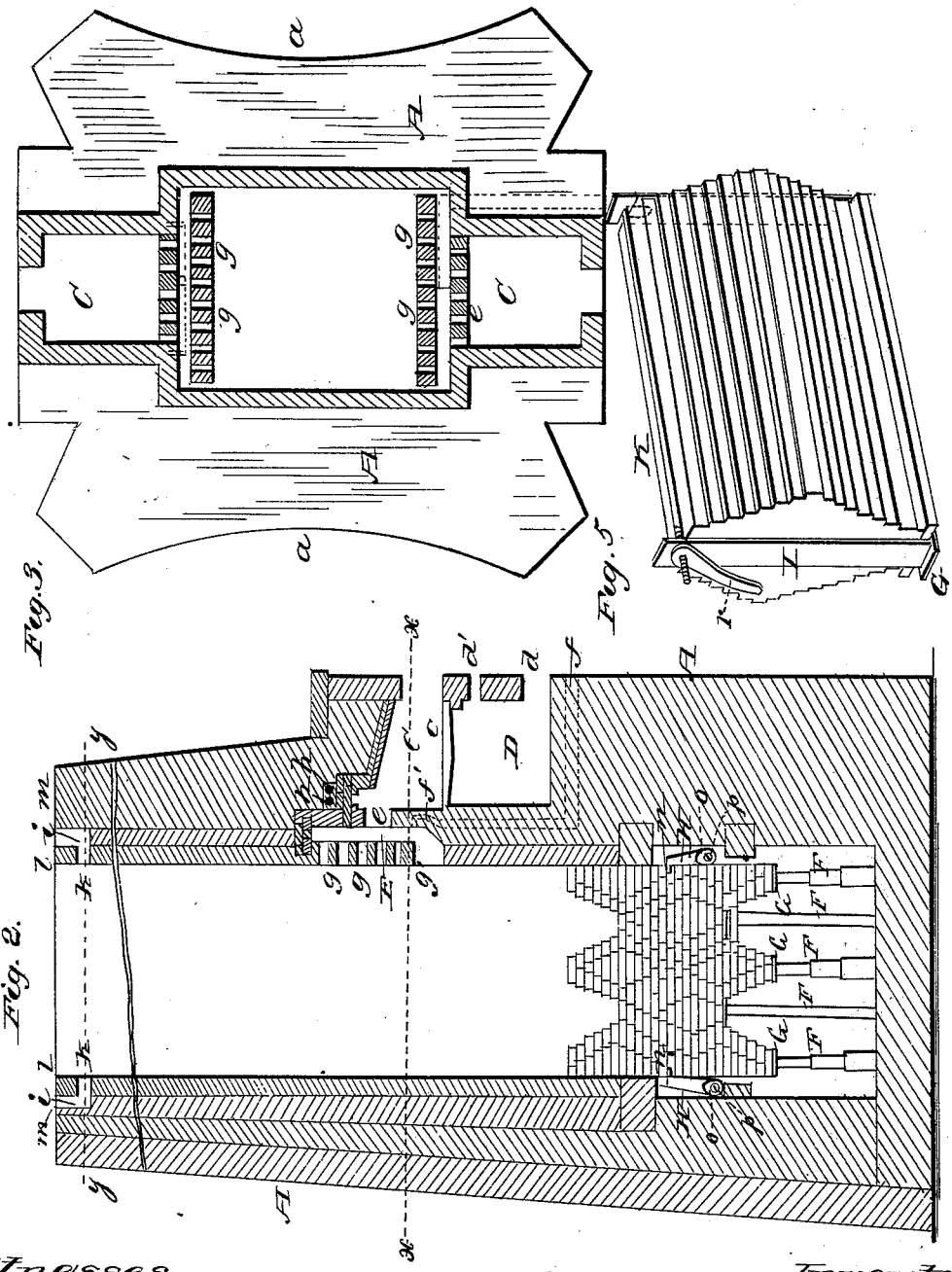

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Inventor
Gustaf Adolph Carlson
by Louis Bagger & Co
Attorneys.

UNITED STATES PATENT OFFICE.

GUSTAF A. CARLSON, OF RED WING, MINNESOTA.

IMPROVEMENT IN BRICK-KILNS.

Specification forming part of Letters Patent No. **217,988**, dated July 29, 1879; application filed December 18, 1878.

To all whom it may concern:

Be it known that I, GUSTAF ADOLPH CARLSON, of Red Wing, in the county of Goodhue and State of Minnesota, have invented certain new and useful Improvements in Brick-Kilns; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a front elevation. Fig. 2 is a vertical section. Fig. 3 is a horizontal section taken on the line *x x* in Fig. 2. Fig. 4 is a similar section on line *y y* in the same figure; and Fig. 5 is a perspective view of one of the detachable clamps, showing the method of stacking or piling the brick in the kiln.

Similar letters of reference indicate corresponding parts in all the figures.

My invention relates to that class of brick-kilns in which the kiln is charged with green or fresh brick from the top, which are burnt during the passage gradually of the whole body of brick through the kiln, and the burnt brick withdrawn from below—a class of kilns technically known as "perpetual" kilns; and it consists, first, in an improved construction and arrangement of the furnace, combustion-chamber, and air-pipes arranged in connection therewith; secondly, in the construction and arrangement of vapor-channels located in the upper part of the kiln; thirdly, in the construction and arrangement of the devices for moving, or gradually lowering, the body of brick within the kiln; fourthly, in the construction and arrangement of the device for securing together in one body all the brick forming one clamp or section, so that each clamp of burnt brick may be readily handled without coming apart; and, lastly, it consists in the method or manner of building or forming the said clamps or detachable bodies of brick, which are stacked or piled in a peculiar manner, especially adapted for this perpetual process of burning brick, substantially as and for the purpose hereinafter more fully set forth.

In the drawings, A is the kiln, the exterior walls of which are built in inverted arcs *a a*, braced by iron anchors *b*, to add strength to the structure and prevent bulging of the walls. In the front wall of the kiln is the door B, through which the burnt brick are removed, in the manner to be hereinafter described; and about half-way the height of the kiln, on opposite sides, are the fire-boxes C C, one of which only (both being constructed and operated exactly alike) is shown in Fig. 2.

Each of the furnaces or fire-boxes C is constructed with grate-bars *c*, opening down into the ash-pit D, which has two openings, one, *d*, for the removal of the ashes and cinders, and the other, *d'*, is a draft-hole to supply the under side of the grate with air. The flame and products of combustion pass through an opening, *e*, into the flame-chamber E, to which air is fed from the outside through a branched pipe, *f*, narrowed at its upper branched end, as shown at *f'*. The narrow branched part of this pipe, being located in the wall between the fire-box C and flame-chamber E, is subjected to considerable heat, which causes a constant draft through it into the flame-chamber, thus insuring perfect combustion. The heat enters the kiln from chamber E through a series of apertures, *g g g'*, made in the wall, which cause its even and equal distribution over a large area, thus effecting the even and thorough burning of the brick.

Located in the wall of the kiln, above the fire-box, are one or more horizontal pipes, *h h*, in which the air for the drier is heated. Each of these pipes communicates at one end with a branched pipe of about half its diameter, as shown at h^1 h^2, so that the aggregate capacities of these two pipes h^1 and h^2 will be equal to that of *h*. In operating the kiln, pipe h^1 is closed by a stop-cock and air forced into pipe *h* through h^2. When the heating-pipe *h* is thoroughly charged with air, pipe h^2 is closed and h^1 is opened, thus causing a stream of air to flow continually from the outside through the heater, from which the hot air is delivered through a system of pipes to the drier, which is located in close proximity to the kiln.

In the upper part of the kiln is made a channel, *i*, opening up into the interior of the kiln through a series of apertures, *k k k*. The channel *i* is divided by cross-walls *l* into four separate sections, each of which is provided at its angle or corner with a chimney or outlet,

m. The object of this channel will be hereinafter described.

In the bottom part of the kiln is arranged a series of hydraulic jacks, F F F, or their equivalent, which support shelves G G G, arranged parallel to each other. Pivoted in the sides of the kiln are dogs H H, the upper ends of which bear against or impinge upon the flat or straight sides of the clamps of bricks, which are built in a diamond shape, each clamp or section diverging from the bottom upward till its greatest width is attained, and then again inclining or tapering, so that a vertical section of each clamp or section forms a diamond in shape.

In Fig. 2 of the drawings I have represented four complete diamond sections and four half-sections, two on each side, impinging upon the walls of the kiln. In this manner the interior of the kiln is filled with brick stacked or piled in the manner described, the brick composing each clamp or diamond section being so piled that each clamp will separate readily from its neighbors, notwithstanding that the whole forms one compact mass within the kiln. The lowermost sides of the clamps or diamond and half-diamond sections in the bottom of the kiln are supported upon the shelves G of jacks F, and these jacks being operated simultaneously, it follows that by lowering them the whole body of brick in the kiln will be lowered to a like extent. The fresh or green brick is piled from the top of the kiln, so that one half-section will always project up above the upper rim or edge, which facilitates the stacking.

As the burnt sections or clamps of brick are withdrawn from the bottom by lowering the jacks by which they are supported, the superimposed side sections are supported upon the dogs H, which will of themselves fall in place by the lowering of the section against which they rest, as shown in Fig. 2. An open space or channel to receive the bent head of the dog is left between each of the side sections, as shown at *n*, by the piling of the brick in a diamond shape, as described; and in order to release the dog when it is desired to lower the side sections each of the dogs H is pivoted upon a sleeve or disk, *o*, which is again pivoted eccentrically upon a supporting bolt or beam, *p*, so that by turning the eccentric *o* the dog is lowered a little, in which position it may readily be swung back, so as to permit the adjoining section to pass until the next channel *n* is reached, when, the dog and its eccentric *o* having been readjusted in the meantime, the same operation is repeated.

During the operation of withdrawing the burnt sections from the kiln the adjoining sections are supported upon their jacks, which remain stationary in the meantime. The intermediate sections are supported upon the arcs formed by the adjoining sections on the under side, so that the withdrawal of any one section will not disturb the other sections. One section having been lowered in the manner described, it is placed between uprights I I, one of which is firmly secured at a right angle at one end of the shelf, and the other inserted into a slot in the front end of the supporting-shelf G, and united at the top by a cross-bar, K, screw-threaded at one end, and provided with a key, *r*, so that the whole mass of burnt brick forming one clamp or section may readily be lowered into a car provided in its bottom with rollers to receive it without falling apart, and transported to the storehouse.

As the fresh or green brick is piled or stacked, in the manner described, in the top of the kiln, the vapors created by their drying will escape through the apertures *k* into the channels *i* in the top of the kiln and out through the chimneys *m*. The channels or vapor-chambers *i* also serve, by the heat imparted to them through these vapors, as a drier for the upper layers of brick in their descent downward into the kiln, so as to gradually prepare them for the heat of the furnaces.

It will also be observed that the lowermost series of the apertures, marked *g'*, opening from the flame-chamber into the kiln is larger than the rest, which is for the purpose of directing the flame from chamber E laterally into the body of the kiln instead of in an oblique or upward direction.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a brick-kiln, the construction and arrangement of the fire-box or furnace C, air-pipes *h h*, flame or combustion chamber E, feed-pipe *f f'*, and kiln A, having apertures *g g'* opening up from the combustion-chamber into the body of the kiln, substantially as and for the purpose herein shown and described.

2. In a brick-kiln, the construction and arrangement of the vapor and heating channels *i*, constructed with a series of apertures, *k*, opening up into the body of the kiln near its top, and the outlets *m*, substantially as and for the purpose herein shown and described.

3. In combination with the kiln A, constructed substantially as described, the hydraulic jacks F F F, arranged upon the same horizontal plane within the opening or throat of the kiln, and operating in conjunction with the automatically-operating dogs H H, substantially as and for the purpose herein shown and specified.

4. The wedging device for securing together in one body the burnt brick of each diamond-shaped section or clamp, consisting of the horizontal supporting-shelf G, having rigidly secured at one end the upright I, in combination with the detachable opposite upright I, screw-threaded connecting rod or bar K, and locking-key *r*, substantially as and for the purpose herein shown and specified.

5. The herein-described process of burning brick perpetually, by forming the green brick

into diamond-shaped sections or clamps, so built and arranged relative to each other within the body of the kiln that the upper sections shall, during the progress or descent of the compact body of brick formed by the several sections within the kiln, be supported at the discharge end or drawing-chamber in the lower part of the kiln, upon the arcs or inclined sides of the sections next below and adjacent to them, substantially in the manner described, for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GUSTAF A. CARLSON.

Witnesses:

LOUIS BAGGER,

AUGUST A. PETERSON.