

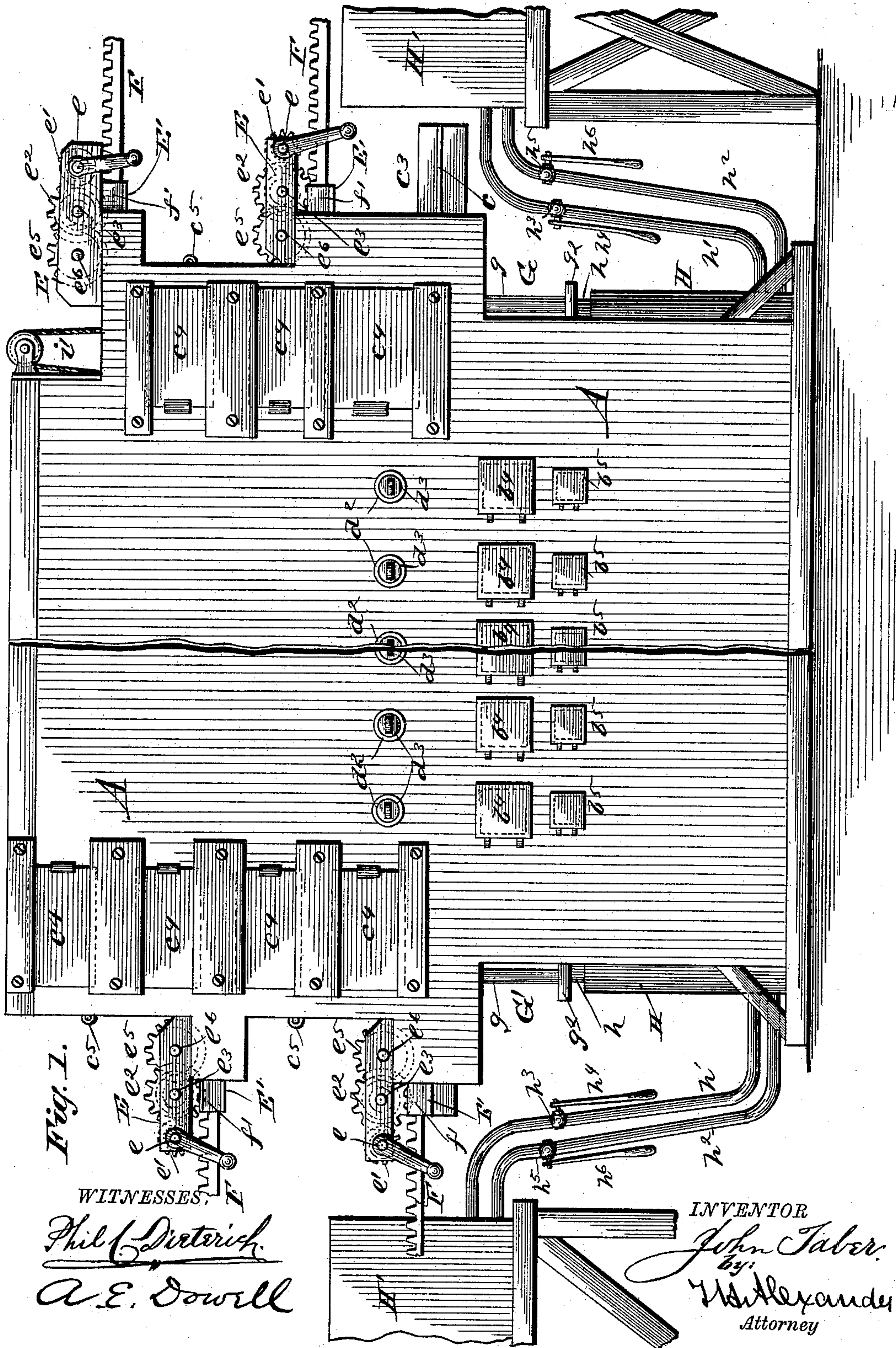
(No Model.)

5 Sheets—Sheet 1.

J. TABER.
BRICK KILN.

No. 396,966.

Patented Jan. 29, 1889.



(No Model.)

5 Sheets—Sheet 2.

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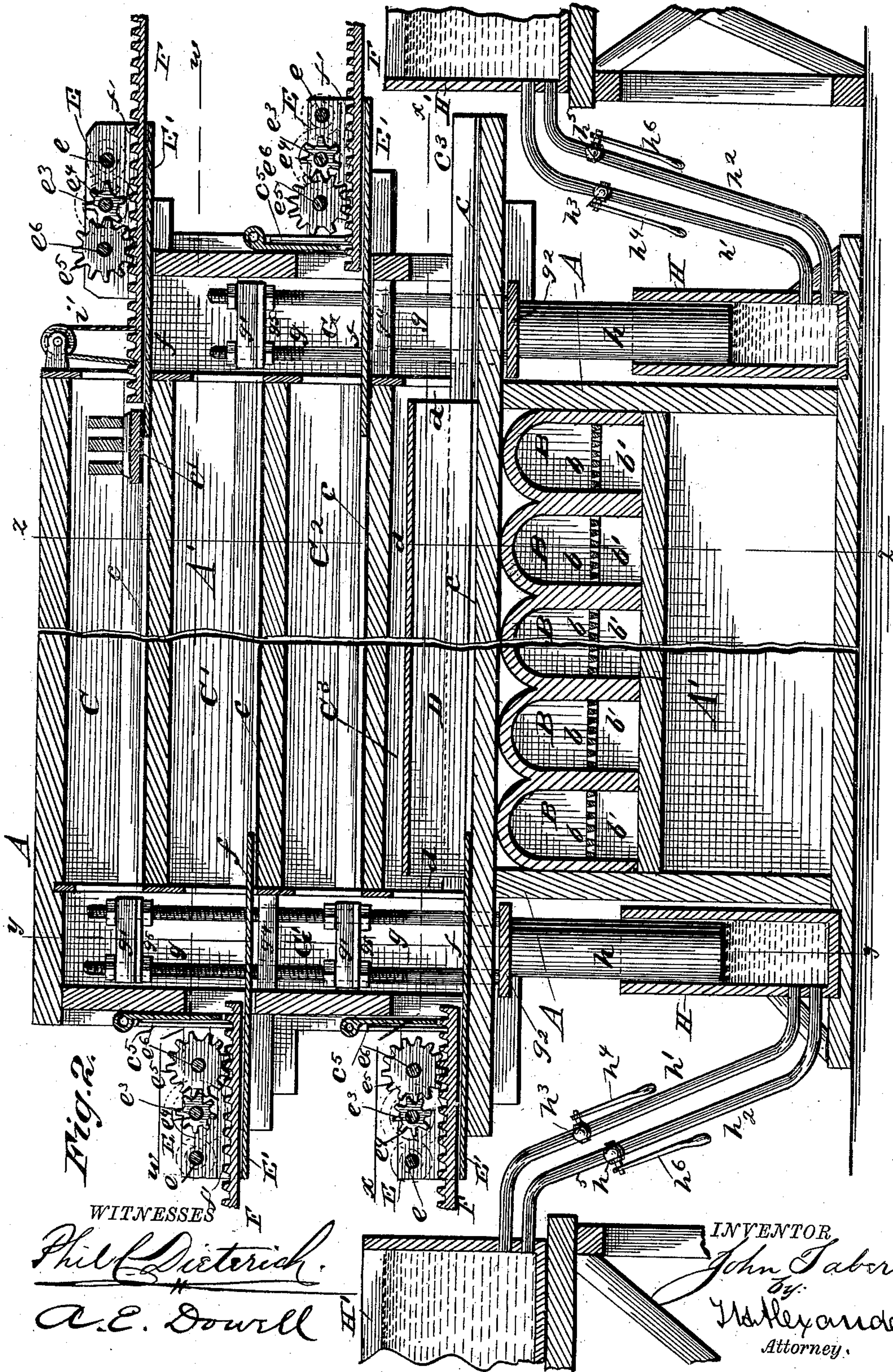


Fig. 2.

WITNESSES

Phil. Dietrich.
A. E. Dowell

INVENTOR

John Taber.
By *W. Alexander*
Attorney.

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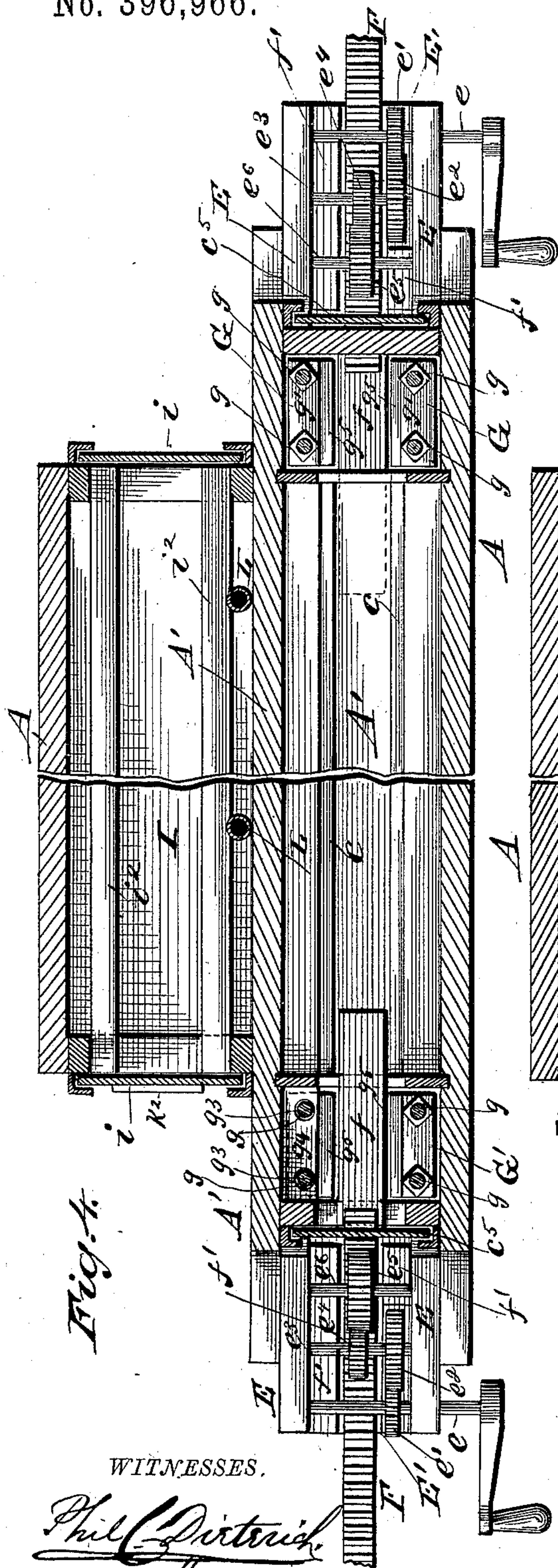


Fig. 4.

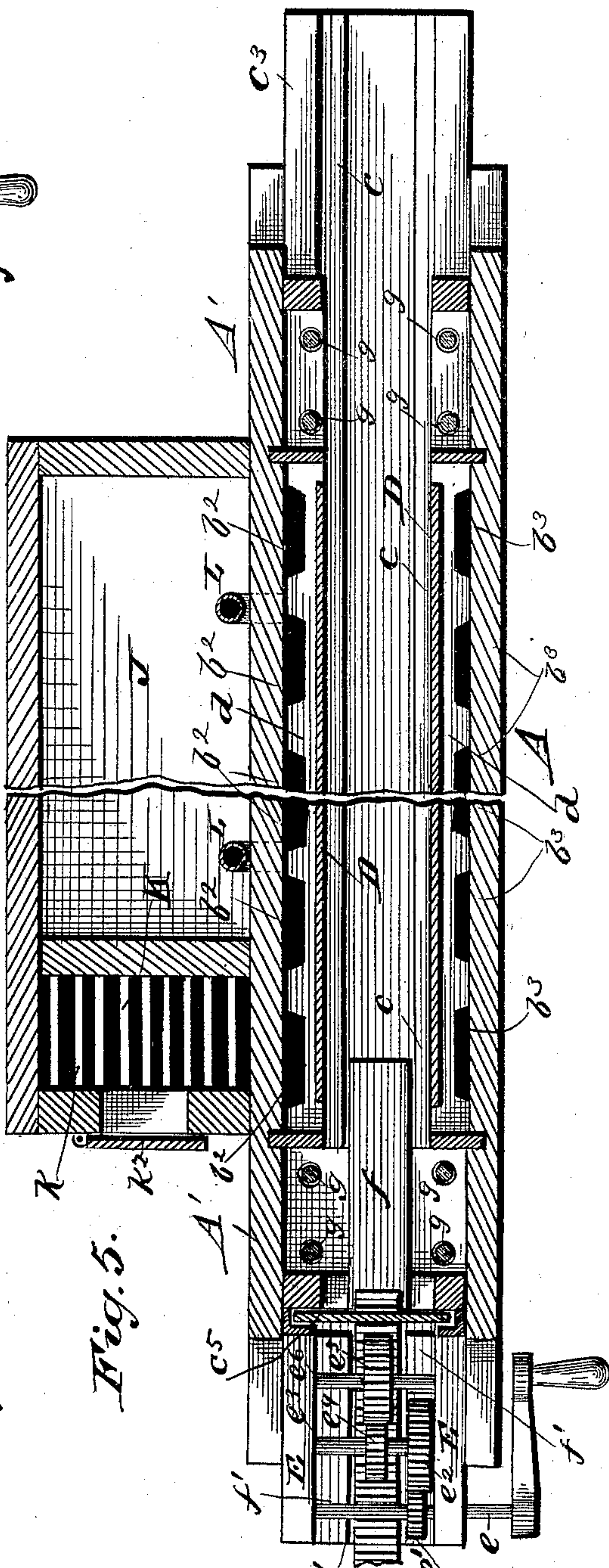


Fig. 5.

WITNESSES.

Phil Dietrich
A. E. Dowell

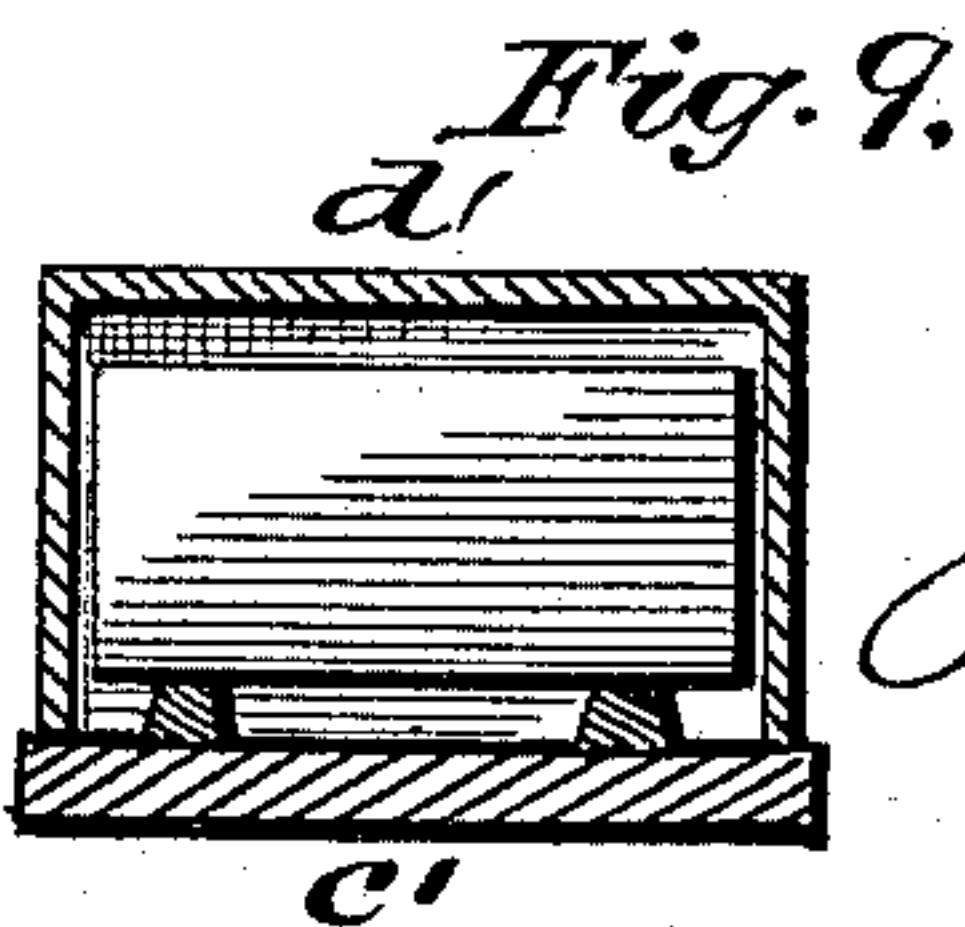
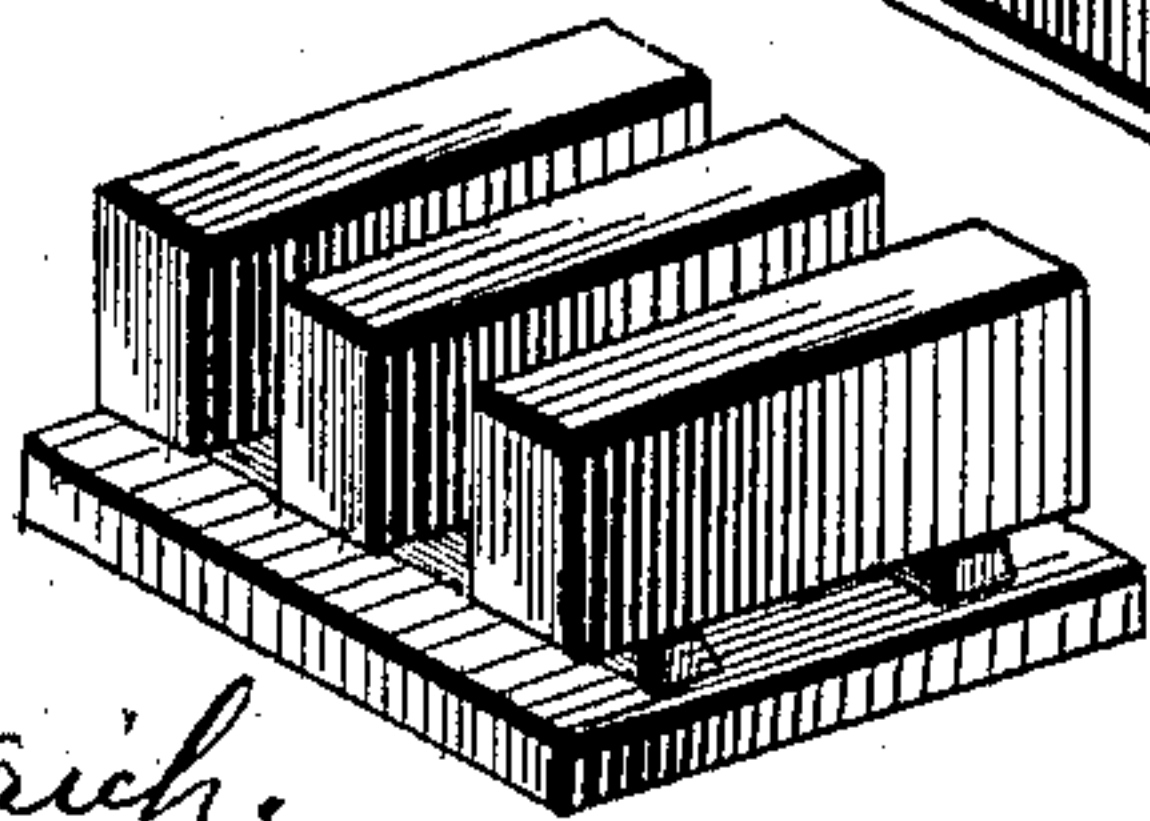
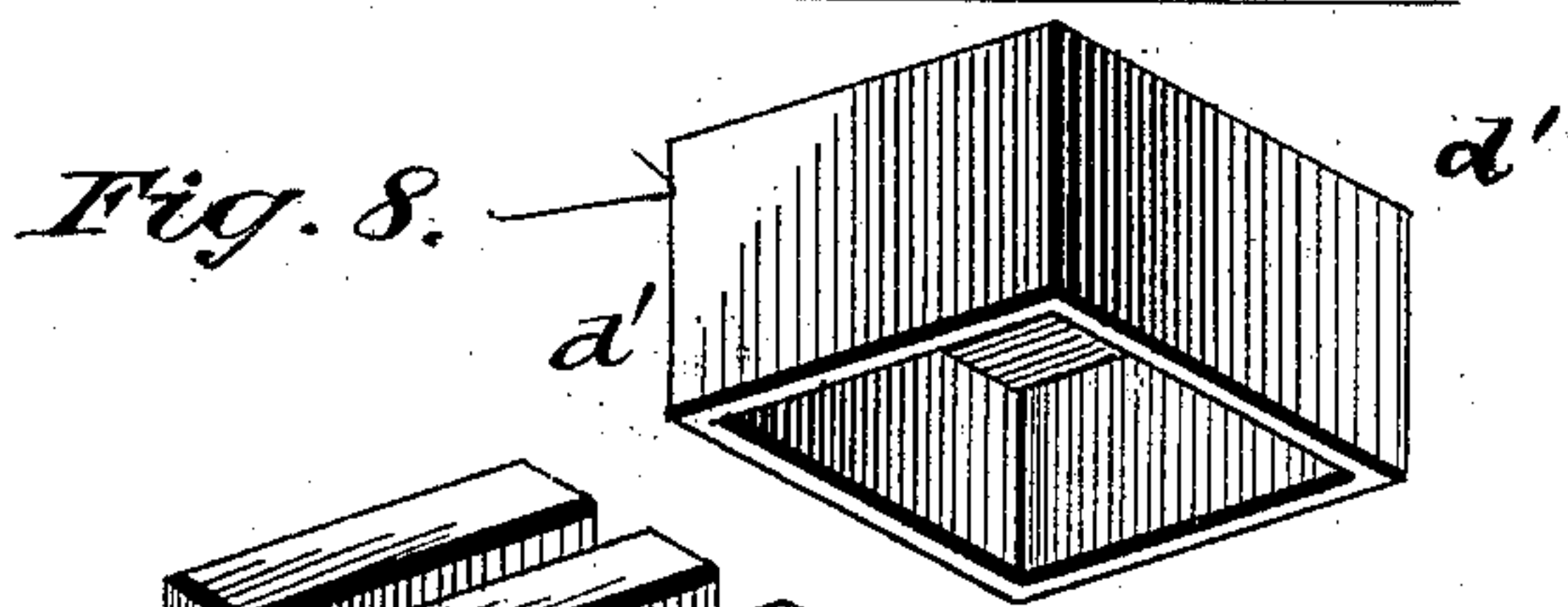
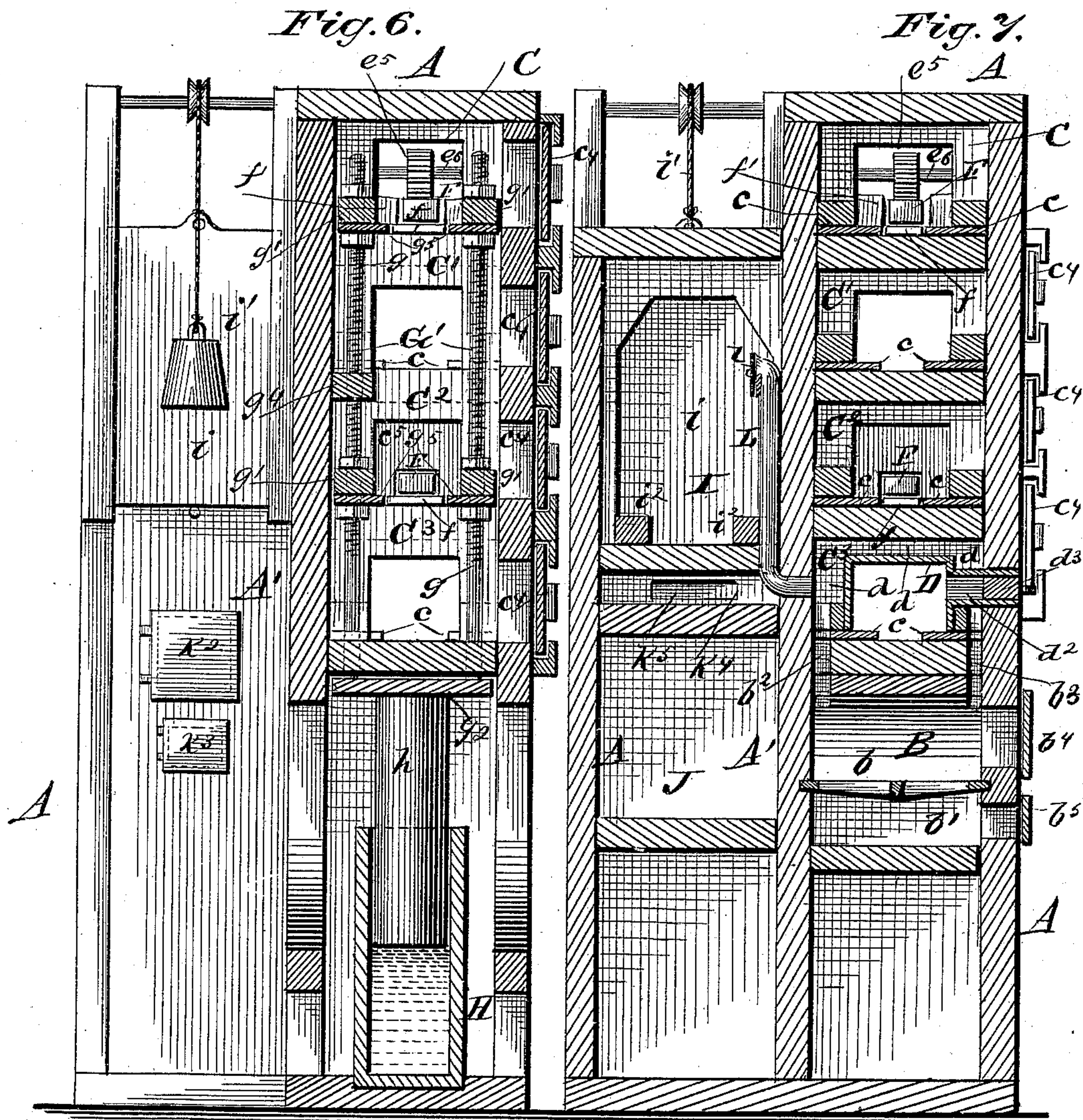
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WITNESSES

Phil C. Dörnerich.

A. E. Dowell

INVENTOR

John Taber

W. Alexander
Attorney.

UNITED STATES PATENT OFFICE.

JOHN TABER, OF SOUTH WOLFBOROUGH, NEW HAMPSHIRE, ASSIGNOR TO HIMSELF, WILLIAM EMERY, OF ALFRED, MAINE, AND GEORGE M. STEARNS, OF BOSTON, MASSACHUSETTS.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 396,966, dated January 29, 1889.

Application filed May 11, 1886. Renewed July 5, 1888. Serial No. 279,154. (No model.)

To all whom it may concern:

Be it known that I, JOHN TABER, of South Wolfborough, in the county of Carroll and State of New Hampshire, 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a front elevation of my improved brick-kiln complete. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a sectional rear elevation. Fig. 4 is a horizontal section on line *w w*, Fig. 2. Fig. 5 is a similar section on line *x x*, Fig. 2. Fig. 6 is a vertical transverse section on line *y y*, Fig. 2. Fig. 7 is a similar section on line *z z*, Fig. 2. Fig. 8 is a perspective view of the bricks and the pans. Fig. 9 is a vertical section of the same.

This invention relates to improvements in kilns for burning and glazing brick, tile, and other earthenware; and it consists in the construction and novel arrangement of parts hereinafter described, illustrated in the drawings, and pointed out in the appended claims.

The kiln is composed of four main parts, which are the heating-chambers and ways therein over which the bricks or other articles successively pass, the mechanism for moving the same over said ways, the mechanism for lowering the bricks from one heating-chamber to the next lower one, and the furnaces and flues for firing and glazing the articles. The kiln also contains drying-chambers.

For a better understanding of the case a general description of the whole construction will be first given, and afterward a separate description of the four main parts.

In the accompanying drawings, A designates the housing of the kiln, the vertical wall A' separating the kiln from said chambers and forming the rear wall of the kiln proper. The kiln has its various chambers lined with the tile and fire-brick. In the lowest part of the kiln are the fire-boxes B, preferably eight in number, with their accompanying grates *b* and ash-pits *b'* below the same,

as shown. Vertically above the fire-boxes are the horizontal heating or firing chambers, preferably four in number, and designated, respectively, from above downward by the letters C C' C² C³. At the alternate ends of the heating-chambers are the mechanisms for passing the brick through the chambers, and just to the interior of said mechanisms are the two vertical frames for lowering the bricks from chamber to chamber. The drying-chambers are to the rear of the kiln proper.

The following is the construction of the heating-chambers and their attachments: Each of the heating-chambers C C' C² C³ is provided with the ways *c*, over which the carriages or pans *c'*, bearing the bricks, travel. The pans are moved successively into the chamber C and moved from end to end therein. Each pan is then successively lowered to the chamber C' and moved therein in the opposite direction, the first pan being driven inward more and more by each successive pan as it enters the chamber, so that all the pans pass the same amount of time in each chamber. They are then lowered and passed through chambers C² C³ in the same manner and leave the latter chamber at its extended end *c*³, whence they pass to any proper receptacle.

*c*⁴ *c*⁴ are horizontally-sliding doors in the front wall of the kiln adjacent to the ends of the chambers, through which access can be had to the lifting mechanism, and *c*⁵ *c*⁵ are vertically-sliding doors in the end walls, through which access may be had to the interiors of the chambers.

The chamber C³, being just above the arches of the fire-boxes, is the glazing-chamber, and contains an interior boxing or casing, D, around which, within the chamber C³, is the fire space or flue *d*, extending over the top and both sides of the casing, as shown. The interior of the casing is the glazing-chamber proper, in which there must be great heat, but no flame or products of combustion.

The bricks are arranged upon the pans on edge upon supports and are separated from each other, as shown, so that the heat can surround them on all sides. To prevent them from cracking when they come into the open air, they are covered upon the pans on which

they rest after leaving the furnace by a pan, d' . Each of the pans on which the bricks rest is provided with an outstanding flange around its edge, so that it may hold a layer of mortar and be prevented from burning while in the kiln.

The projections on which the bricks rest when on the pans are of fire-clay pointed and set in mortar, there being two for each brick, so that the heat can entirely surround the same.

The casing D has extending outward from its front surface the tubes d^2 through the inside lining of the front wall of the kiln. $d^3 d^3$ are stoppers or plugs passing through the outer part of said wall and having handles; by which they may be removed to have access to the brick within the casing.

The flames and products of combustion pass through the openings b^2 at the rear upper corners of the fire-boxes into the fire space or flue d , surrounding the casing D, and entirely fill the same. They then descend therefrom, first through the flues b^3 , and then pass rearward to the chimney or flue running between the heater and kiln proper in the wall A' , whence they pass to the chimney situated on the roof of the kiln. In the front wall of the kiln are the hinged doors $b^4 b^5$ of the fire-boxes and ash-pits, respectively.

The mechanisms for causing the pans containing the bricks to travel through the heating-chambers are as follows: In frames E, secured upon platforms E' , extending horizontally outward from the end walls of the kiln at points on a level with the floors of the heating-chambers and opposite the alternate ends thereof, are journaled the crank-shafts e , each of which has a pinion, e' , which meshes with a gear-wheel, e^2 , upon a shaft, e^3 , journaled in the frame E parallel to the shaft e . The shaft e^3 bears a pinion, e^4 , which meshes with a gear-wheel, e^5 , on a shaft, e^6 , journaled in the frame parallel to the other shafts. The gear-wheel e^5 meshes with a straight rack, F, that moves upon a plank or platform, f , extending from the floor of the adjacent heating-chamber to the platform E' , the sides of the rack being supported and directed by the guide-blocks f' upon the platform E' . The ends of the racks impinge upon the pans bearing the bricks and move them inward. After each pan has been moved a proper distance inward the racks are retracted, and another pan placed before, which is moved inward in the same manner till the chamber is full. If this should be the lowest or glazing chamber, the pans pass out on the extension c^3 of its floor; but should it be one of the upper chambers they are lowered, as described, by the lowering mechanism, which is constructed as follows:

G G' are frames, each composed of the four vertical bars g , passing at proper points through the horizontal front and rear bars g' , which are held upon the former bars by nuts above and below, the bars g being threaded

at proper parts for this purpose. The bars g rise from a base-plate, g^2 , and pass through guide-openings g^3 in the bars g^4 , extending between the inner surfaces of the ends of the walls of the kiln and the outer surfaces of the end walls uniting the heating-chambers. The frames G G' travel up and down in the spaces between said surfaces. The frame G travels at the end of the kiln in which the pans enter, and the frame G' at the opposite end. Consequently the latter has two sets of bars, g' , as it has to deliver from the chamber C to the chamber C', and also from the chamber C² to the chamber C³, while the frame G delivers from the chamber C' to the chamber C² only.

$g^5 g^5$ are sections of ways or tracks secured to the sides of the bars g' and corresponding to the ways c of the chambers, so that the pans can be pushed from said ways onto the sections g' to be lowered by the frames G G' from one heating-chamber to another.

The mechanism for elevating the frames G G' is as follows:

II H are vertical water-cylinders, in which move pistons or plunger-blocks $h h$, the upper ends of said plungers or pistons being secured to the center of the base-plates $g^2 g^2$ of the frames G G'. The upper ends of said cylinders are so situated that when the frames are at their lowest points the plates g^2 will be but a slight distance above the cylinders and supported by brackets of frames extending from the ends of the kiln, as shown. The lower end of each cylinder is connected by two tubes, $h' h^2$, with a large water receptacle or reservoir, II', which is sufficiently above the cylinders for the water-pressure to cause each piston h to move upward in its cylinder when the frames G G' are empty, but not to prevent it from moving downward when a pan is on the corresponding frame. Each tube h' is provided with a valve, h^3 , opening toward the cylinder and controlled by the lever h^4 , and each tube h^2 with a valve, h^5 , and controlled by the lever h^6 , which opens toward the receptacle II'. When either frame is at its lowest point, the valve h^3 of the tube h' of the corresponding cylinder is opened, and the water-pressure causes the frame to rise to its highest position. A pan is then pushed on, and, the former valve being closed, the valve h^5 is opened, and the frame descends with its pan, as described.

The pans, with their contents, descend continuously through the chambers, and are continuously lowered from one chamber to another, all remaining in each chamber an equal length of time and gradually becoming more heated as they descend.

To the rear of the wall A' are the drying-chambers I J, the former being at the house-ing for said chambers and extending transversely entirely across the same. At the ends of the chamber are vertically-sliding doors $i i$, with weights $i' i'$ attached, running over pul-

leys to counterbalance them, as shown, and it has upon its floors the ways i^2 , upon which cars containing undried brick may be moved into the chamber and have a portion of their moisture removed. The chamber J has also a sliding door, j , with counterbalancing-weights at one end, but has no ways, it being more especially adapted to drying earthenware vessels and such articles. To one end of the chamber J is a fire-box, K, having a grate, k , and ash-pit k' .

k^2 k^3 are hinged doors in the end wall of the housing respectively for the fire-box and ash-pit.

The heat and products of combustion pass from the fire-box through a horizontal flue, k^4 , between the floor of the chamber I and roof of chamber J, and pass thence by a proper opening, k^5 , in the side of the housing, as shown. Both chambers are thus sufficiently heated. The fire-box K is not used, however, except when the kiln is not hot enough to properly heat the drying-chambers. When the kiln is sufficiently heated, enough heat comes from the wall for drying purposes.

L L are tubes or flues running through the wall A', from the fire chamber or flue d into the drying-chamber, and provided with the dampers l l, which, when the heat is too great from the kiln, may be opened, so as to allow some heat to escape into the drying-chamber.

In the above method, besides the great rapidity of baking the brick, the fact that they are gradually brought to the hottest baking-chamber, and that the greatest heat is therefore gradually applied, prevents the water that they may retain from bursting them, the water being evaporated as they descend.

It is obvious that different mechanisms may be used for raising and lowering the frames and moving the pans—such, for instance, as steam-power and gearing. I therefore do not limit myself to the use of hydraulic power only to effect the objects.

Having described my invention, I claim—

1. In a kiln to burn brick or other articles, the combination of the fire-boxes, the parallel heating-chambers successively approximating the same, but not receiving any of the flame or products of combustion therefrom, and mechanism, substantially as described, whereby the bricks are brought continuously nearer and nearer the fire-boxes and then discharged from the kiln.

2. In a kiln to burn brick or other articles, the combination of the fire-boxes, the parallel heating-chambers successively approximating the same, the racks, gearing, and crank-axes by which the pans bearing the brick are successively moved into the chambers, and mechanism, substantially as described, whereby the pans are lowered from the alternate ends of the heating-chamber to the next lower chamber and brought continuously near the fire-boxes, substantially as specified.

3. In a kiln to burn brick or other articles, the combination of the fire-boxes, the parallel

heating-chambers successively approximating the same, the racks, gearing, and crank-axes by which the pans bearing the brick are successively moved into the chambers, the frames reciprocating between the end walls of the kiln and the end walls of the heating-chambers and lowering the pans from one chamber to another, and mechanisms, substantially as described, whereby said frames are actuated.

4. In a kiln to burn bricks or other articles, the combination of the fire-boxes, the parallel heating-chambers successively approximating the same, the racks, gearing, and crank-axes to move the brick-carrying pans into the chambers, the vertical reciprocating frames to lower said pans from each chamber to the next lower one, the vertical water-cylinders below said frames, the plungers or pistons moving therein and supporting the reciprocating frames, the reservoir situated sufficiently high above the cylinder, and the pipes h' h^2 , connecting the reservoir and cylinders and controlled, respectively, by the valves h^3 h^5 , substantially as specified.

5. In a brick-kiln, the combination of the fire-boxes, the parallel heating-chambers C C' C² C³, successively approximating the same, the mechanism, substantially as described, to move the brick continuously through the chambers, and a casing, D, within the chamber C³ and having around it the fire space or flue d , in which the flame and products of combustion of the fire-box penetrate, but not within the casing D, substantially as specified.

6. In a brick-kiln, the combination of the fire-boxes, the parallel heating-chambers successively approximating the same, the fire space or flue d in the lower chamber, C³, the drying-chamber separated by the vertical wall A' from the kiln proper and the flues L, running through said wall A', and the valves l , by means of which heat can be admitted into the drying-chambers when the kiln is too hot, substantially as specified.

7. In a kiln for bricks or other articles, the combination of the fire-boxes, the parallel heating-chambers C C' C² C³, all provided with the ways c , the pans c' , moving on said ways, the pans constructed, substantially as described, to cover the brick on said pans, the crank-axes, the gearing, and racks to move the pans into the chambers, and platforms f , on which the racks move, the vertically-reciprocating lowering-frames having upon them the sections of ways g^5 to receive the pans from the ways c of the heating-chambers, and mechanisms, substantially as described, to actuate said frames.

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

JOHN TABER.

Witnesses:

FRED W. PRINDALL,
CHAS. H. PARKER.