No. 687,890.

Patented Dec. 3, 1901.

E. LAMBERT.

KILN.

(Application filed July 13, 1901.)

(No Model.)

3 Sheets—Sheet 1.

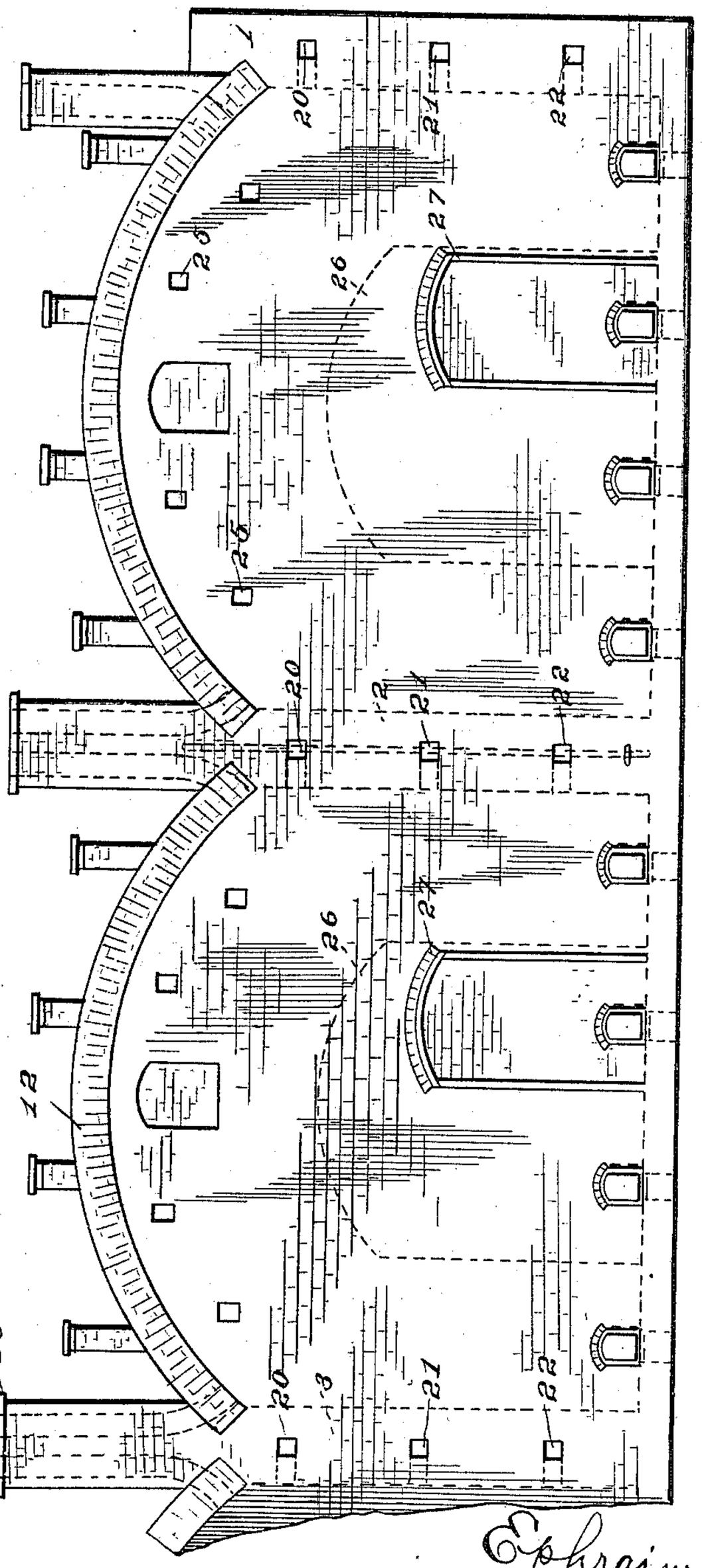

Fig. 1.

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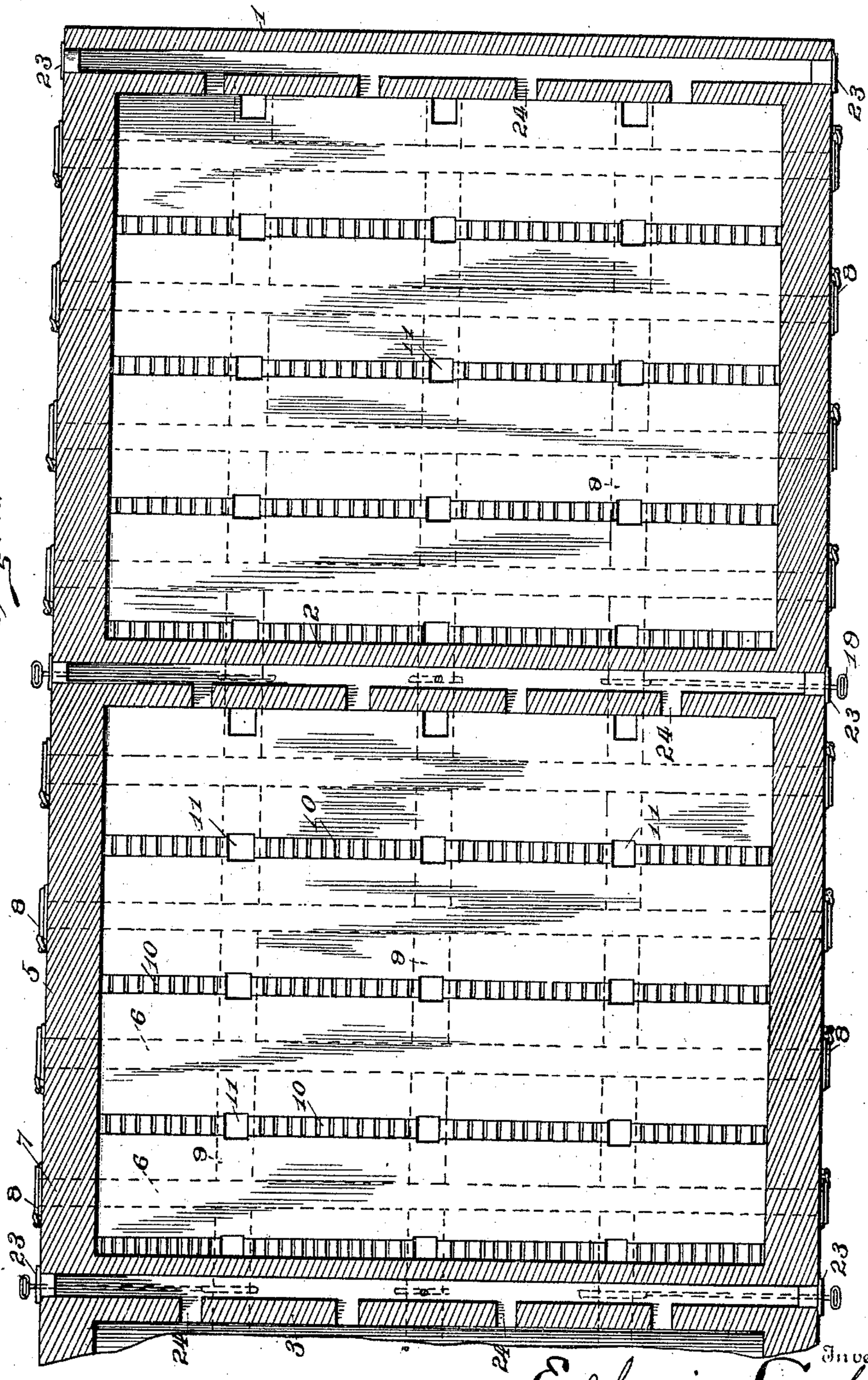
(No Model.) 3 Sheets—Sheet 2.

Fig. 2.



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3 Sheets—Sheet 3.

Fig. 3.

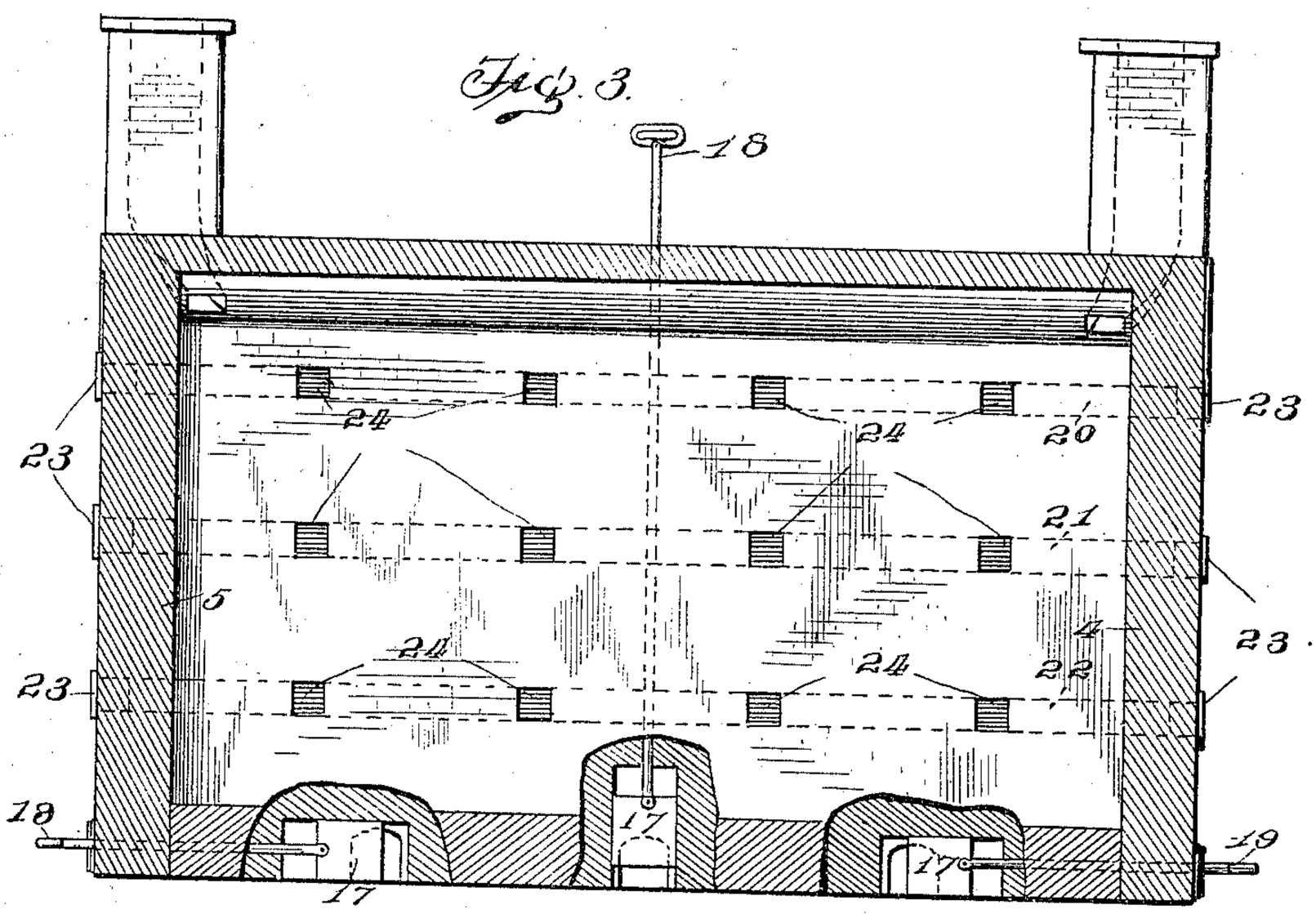
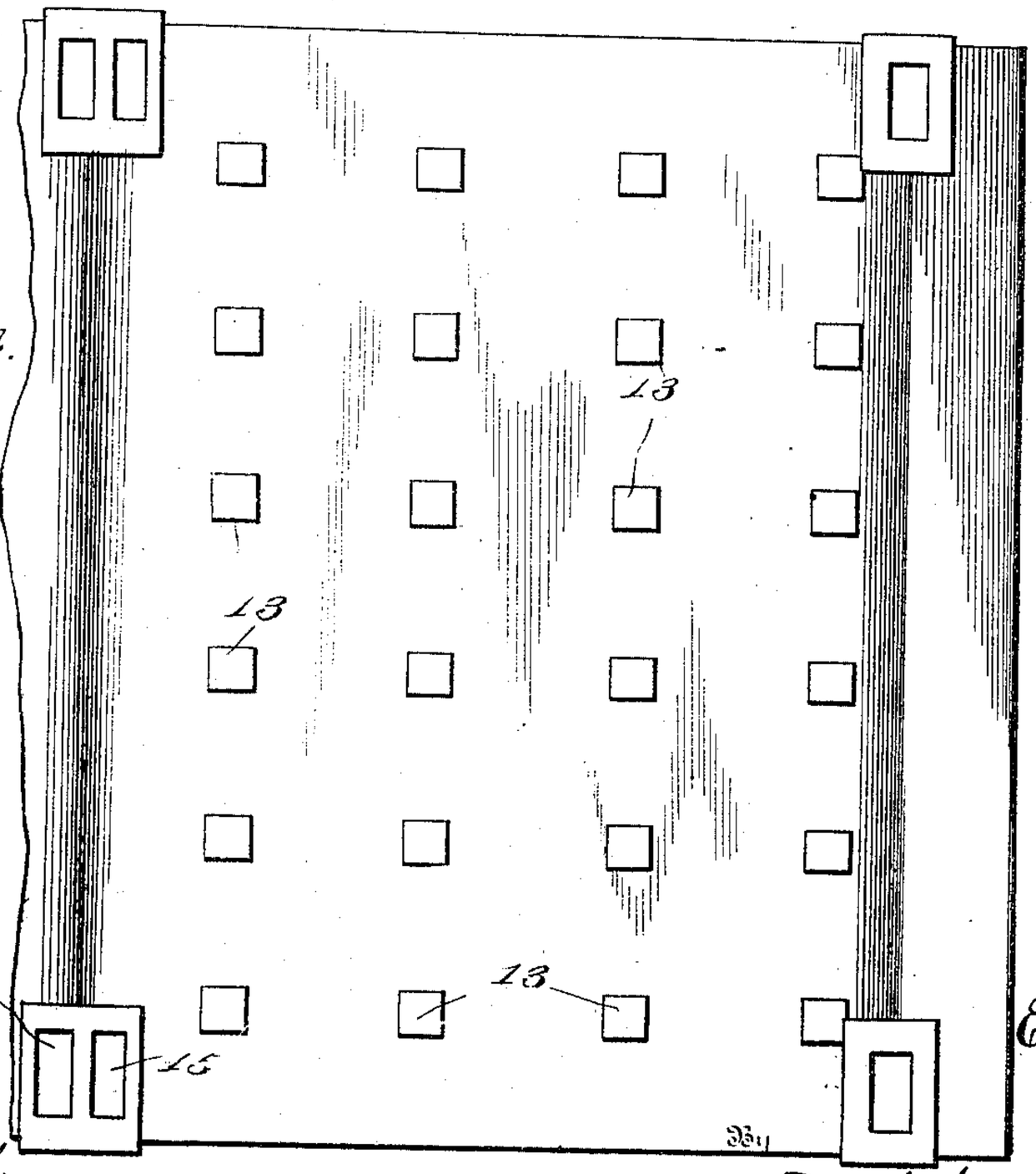


Fig. 4.



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UNITED STATES PATENT OFFICE.

EPHRAIM LAMBERT, OF MARYVILLE, MISSOURI.

KILN.

SPECIFICATION forming part of Letters Patent No. 687,890, dated December 3, 1901.

Application filed July 13, 1901. Serial No. 68,149. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM LAMBERT, a citizen of the United States, residing at Maryville, in the county of Nodaway and State of Missouri, have invented certain new and useful Improvements in Kilns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the construction of kilns which while primarily designed for burning brick will also be found very desirable and efficient for all of the uses for which a kiln is useful, as for burning pottery, tile, &c.; and my invention consists of certain novel features of construction and combination of parts, the preferred embodiment whereof will be fully set forth in the following specification and illustrated in the accompanying drawings, made a part hereof.

The prime object of my invention is to so construct the kiln that the line of draft during the operation of burning the contents of the kiln may be reliably placed under the control of the operator to the end that the brick, tile, or other contents may be subjected to a uniform burning temperature, thereby producing a uniformity of appearance and density so desirable in bricks, tile, &c.

By reason of the absolute control which I have provided for the draft I am enabled to utilize the heat from a kiln which has been completely burned and direct it into an adjacent kiln, thereby preventing the absolute loss of such heat, as is now common. I prefer, therefore, to provide a number of kilns located side by side and separated only by a suitable partition-wall, said wall having connecting openings provided with suitable dampers and means to regulate the position of said dampers.

In the accompanying drawings, Figure 1 is a front elevation showing two coöperating kilns located side by side and also showing a portion of the arch of another adjacent kiln. Fig. 2 is a horizontal section of the two kilns illustrated in Fig. 1, taken on a line with one of the flue-openings located in the partition-walls. Fig. 3 is a vertical section taken on line $x\,x$ of Fig. 1, showing the position of the wall and also showing a sectional view of one of the kiln-arches and a section of the roof-arch and vents therein.

For convenience in designating the several features of my invention and coöperating parts numerals will be employed, of which 1 indicates the end wall, while 2 and 3 indicate, respectively, the second and third partition-walls, the front and rear walls being respectively designated by the numerals 4 and 5. All of said walls are constructed substantially in the usual manner and are of the proper thickness to resist the high temperature created within the burning-chambers thus formed, except the novel features hereinafter specifically pointed out.

I prefer to so construct the floor of my series of kilns that it will be slightly above the surface of the earth, thereby making it more convenient to attend to the fires and also prevent the fires from becoming flooded, as might be possible if they were located below the surface-line. This feature, however, is not material to the successful carrying out of my invention.

The fire-arches or the chambers wherein the fire is built are indicated by the numeral 6, provided with suitable grate-bars 7, said firing-chambers being formed by throwing a suitable arch of masonry, said arches extending from rear to front wall and are each provided with suitable doors 8, whereby the openings in the ends thereof may be tightly closed, as desired. The fire-chambers 6 are connected by a series of main flues (indicated by dotted lines) designated by the numeral 9, said connecting-flues being formed of any preferred size and in any desired manner deemed most suitable for the purpose.

Between the firing-chambers 6 and parallel therewith I locate the connecting or trench-like flues indicated by the numeral 10, said connecting-flues being so disposed as to intersect the main flues 9, thereby disposing said connecting and main flues in direct communication with the fire-chambers 6. The main flues 9 are provided with a vertically-disposed opening extending upward and communicating with the interior of the kiln at a point where the connecting-flues intersect said main flues, said openings being desig-

nated by the numeral 11 and are designed for the purpose of permitting the heat to pass upward into and through the mass of brick, tile, pottery, or the like within the burning-chamber.

It will be understood that the brick, pottery, tiling, or other subject-matter to be burned shall be so located or disposed within the burning-chamber of the kiln that proper interstices or spaces will be left between each individual brick or the like to permit the heat to pass freely therethrough, thereby insuring that the entire contents of the kiln may be uniformly acted upon by the heat and efficiently burned.

The trench-like flues 10 are of sufficient width to be spanned by a brick laid endwise thereon, which I have indicated in Fig. 2 of the drawings, it being understood that the bricks thus disposed are to be placed a half-inch apart, more or less, in order that the heat may pass freely upward through said openings into the mass above.

My kiln is provided, as is common, with the roof-arch 12, which is provided at suitable intervals with a series of preferably regularly disposed apertures or vent-openings 13, suitable caps or covering-dampers therefor being also provided, as is common, while in each corner of the kiln I locate the chimney having the flues 14 and 15, one of said flues extending into the chamber upon one side of the partition-wall and the other flue communicating with the kiln upon the other side of said partition-wall.

A suitable hood or damper 16 is also provided for the chimneys, the purpose of said hoods provided for the chimneys and the vent-openings 13 being to enable the operator to thoroughly control the burning of the contents of the kiln, as will be hereinafter referred to. The construction of said dampers and vents, chimneys, and walls may be varied in accordance with the requirements of each individual case, as the essential feature of my invention resides in the means hereinafter described for enabling the draft and the second burning of the kilns to be absolutely controlled by the burner, said result being accomplished by so forming the main flues, which in this instance are three in number, that they will be coextensive in length with the length of all the kilns placed side by side, said main flues being disposed below the floor-line of each kiln.

Each of the main flues is provided at each partition-wall with a controlling-damper 17, whereby the line of draft in the flue may be confined in any portion thereof, whereas in this instance the middle main flue is provided and I am enabled to place the dampers therefor under the control of the operator by extending the controlling-rod 18 upward through a suitable opening in the wall, so that the handle will extend above the roof-line at a convenient point for the operator, while the two outer flues are similarly connected to the controlling-rod 19, said rods being disposed horizontally through a suitable opening in the wall, thereby enabling the dampers to be readily manipulated to close or open the main flues, for a purpose hereinafter fully described.

It will be understood that the dampers 17 are properly mounted in a suitable frame or guideways, whereby they may be easily moved, while the rod 18 may be secured in an elevated position in any preferred way, as by a suitable brace (not shown) extending from the roof of the kiln upward in engagement with the handle or otherwise.

In each of the partition-walls and in the end wall 1 I form a plurality of preferably horizontally disposed openings 20, 21, and 22, which may be increased in number, as desired, each opening extending throughout the entire length of the wall and is provided at each end with a cap or other form of closure 23, whereby the ends of said opening may be wholly or partially closed. Each of the openings 20, 21, and 22 is provided at intervals with the laterally-extending vents 24, thereby providing direct and unobstructed communication from the outside atmosphere into the burning-chambers, as it is by such means that I am enabled to provide the initial draft necessary to start a downward draft in the burned kiln in order that the heat contained in the burned kiln may be directed into the next adjacent unburned kiln.

It will be understood that each partition-wall is provided with the dampers 17, said dampers and other coöperating frames or guideways being built in the wall when the latter is first constructed. It is further obvious that any preferred number of coöperating adjacent kilns may be formed and that a continuous burning process may be set up and maintained until all of the series of kilns have been successively and successfully burned.

In the present instance the apertures or vents 24 extend into communication with the next adjacent kiln to the left, this arrangement being necessary when the burning of the series of kilns is accomplished from right to left; but it will be readily apparent that if the burning of the series of kilns is to begin upon the left end of the series and extend to the right end then and in that event the said vents 24 would open to the right.

My improved kilns may be constructed of any preferred size.

By thus providing a plurality of kilns located adjacent to each other and in intimate communication the continuous process of burning may be readily maintained, inasmuch as the firing process may be begun in the first kiln to the right while the next adjacent kiln is being filled with green brick or other subject-matter to be treated, the other succeeding kilns being also filled.

When the first kiln has been filled with bricks, the fire is started in the usual manner, it being understood that the dampers 17 are disposed in a closed position, so that the heat cannot communicate with the next adjacent kiln until later on in the process of burning.

The contents of the first kiln may be very uniformly and completely burned by a proper manipulation of the dampers or hoods upon the chimneys thereof and upon the vent-openings 13, as it is obvious that the line of draft may be easily directed from one part of the kiln to another by a proper disposition of said hoods or dampers.

Believing that the construction and combination of the various parts of my improved kiln will be fully understood from the foregoing description, the operation thereof may be briefly stated, as follows: We will suppose that the first kiln has been filled with bricks, tile, or other subject-matter, the same being properly disposed within the burning-chamber so that suitable openings throughout the mass will be formed, whereby the heat may pass freely through when the covers or dampers upon the chimneys and vent-openings 13 are removed, so as to leave said parts open to permit the free exit of the smoke and heat during the initial process of burning the kiln, it being understood that the contents are inclosed by closing up the arched wagon and wheeling doors or openings, the arches of which are designated, respectively, by the numerals 26 and 27, the former referring to dotted lines in Fig. 1, said openings being of temporary location, as is usual. The fires are then started and maintained until the contents are thoroughly burned, which result may be determined by looking through the peep-holes 25. After the kiln shall have been completely burned the mass or contents within the kiln will be at a white heat, and it becomes very desirable to conserve this great amount of heat, which I am able to do by directing the same into the next adjacent kiln, which I accomplish as follows: I first prepare the next adjacent kiln by opening the vent-holes 13 and the chimneys and starting a temporary fire from such light combustible material as shavings or kindling-wood, and after the initial draft has thus been induced I bank up or seal the doors and ash-pits and at the same time leave the vent-holes and chimneys open. After the fire-doors and ash-pits have thus been sealed and the initial draft started I open or partly open one or more of the closures or caps 23 in the end wall 1, and at the same time open the dampers 17 in the partition-wall between the burned kiln and the next adjacent kiln, and it will be clearly apparent that inasmuch as the line of draft has already been started in the second kiln the heat may be drawn from the burned kiln through the opened dampers 17, and thereby insure that the heat from the burned kiln will pass into the main flues of the next kiln and from thence upward through the openings 11 into and through the mass forming the contents of the kiln above. The result will be that the heat from the burned kiln will in order to escape be drawn downward through the openings 11 and thence along the main flues and upward therefrom, and thereby enable the new kiln to be partly burned. After the heat from the burning kiln shall have thus been drawn into the unburned kiln, and thereby exhausted from the burned kiln, the dampers between said kilns may be closed and the fires rekindled in the burning chambers or flues and the burning process completed in the usual manner. After the dampers between the burned and unburned kiln have been closed the vents and chimneys of the burned kiln may be opened, thus facilitating the cooling process, thereby making it possible to readily gain access to the contents of the burned kiln, which may be removed and replaced by green brick or other subject-matter to be treated. In like manner after the second kiln has been burned the heat therein may be directed into the next adjacent kiln and filled with green contents and such contents partly burned, as before described, the process being continued until all of the series of kilns shall have been acted upon, it being understood that the kiln first burned may in the meantime have been replaced by green brick ready for the process to be again begun and continued as before.

It will be desirable when directing the initial quantity of heat from a burned kiln into a green kiln to regulate the supply, so as not to heat the green brick too rapidly, thereby preventing injury to the same. The quantity of heat from the burned kiln into an unburned kiln may be easily controlled, as is obvious, by a proper adjustment of the dampers 17 and the closures 23.

While I have described the preferred combination and construction of parts deemed necessary to exemplify my invention when placed in practical use, I desire to comprehend in this application all substantial equivalents and substitutes which may be considered as fairly falling within the scope of my invention.

Having thus fully described the construction, combination, and manner of operating my improved kiln, further description is deemed unnecessary.

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

The herein-described kiln for bricks, tile, pottery or the like, comprising a series of individual kilns separated by partition-walls; suitable chimneys and vent-apertures therefor; a plurality of fire-chambers; a series of main flues intersecting the fire-chambers and extending throughout the length of said series of kilns; a plurality of connecting-flues

between and parallel with the fire-chambers; a series of dampers for each of said main flues located within the partition-walls; in combination with a longitudinally-disposed opening or openings 20, 21 and 22 each communicating at intervals with the interior of its respective kiln and suitable means to operate the dampers in said main flues whereby the heat may be directed from the burned to an unburned kiln, all substantially as specified and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EPHRAIM LAMBERT.

Witnesses:
CHAS. M. MCNEAL,
FRANK E. WALTS.