

No. 685,618.

Patented Oct. 29, 1901.

J. W. LE GORE.

KILN.

(Application filed Jan. 12, 1901.)

(No Model.)

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FIG. 1

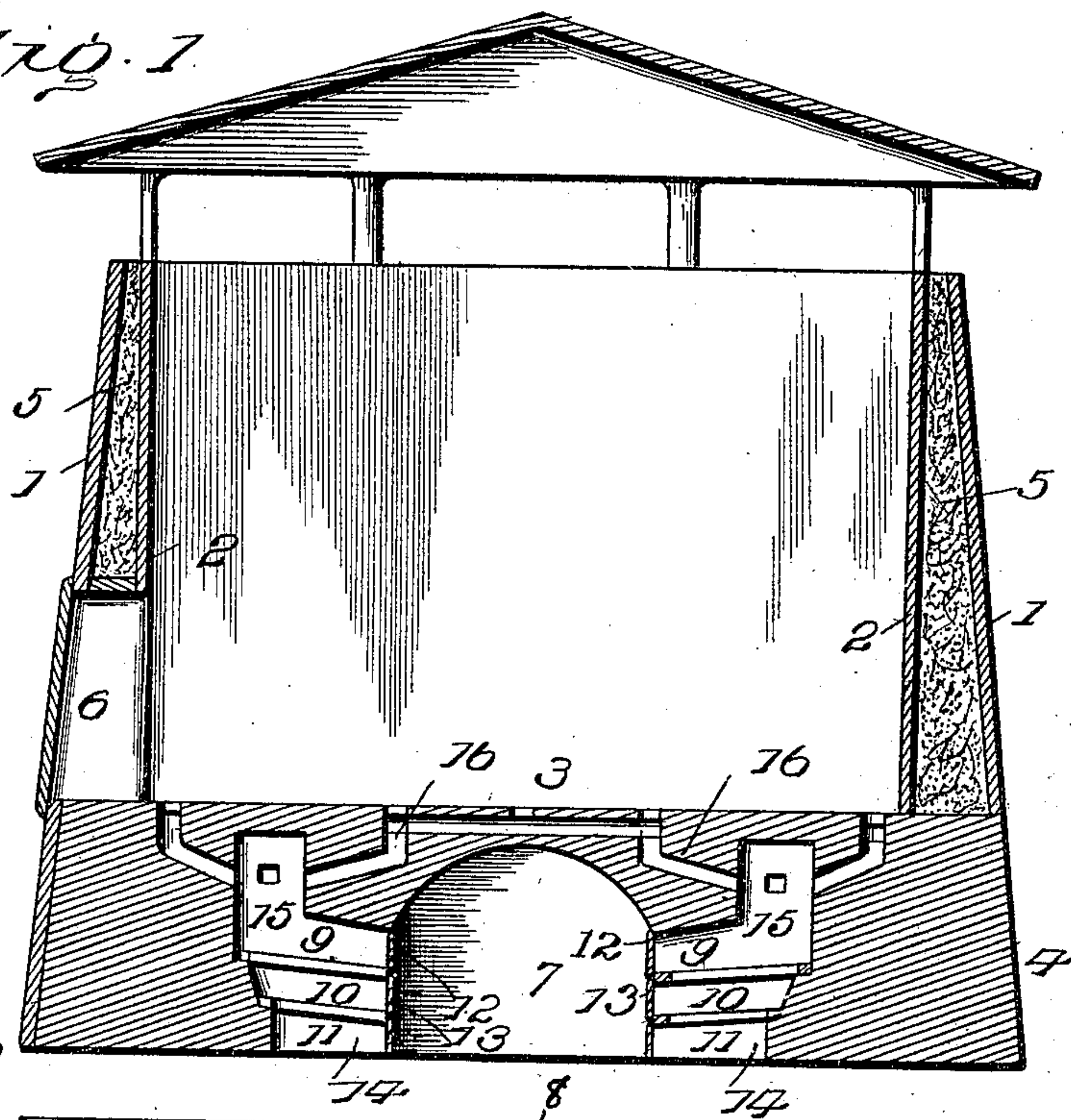
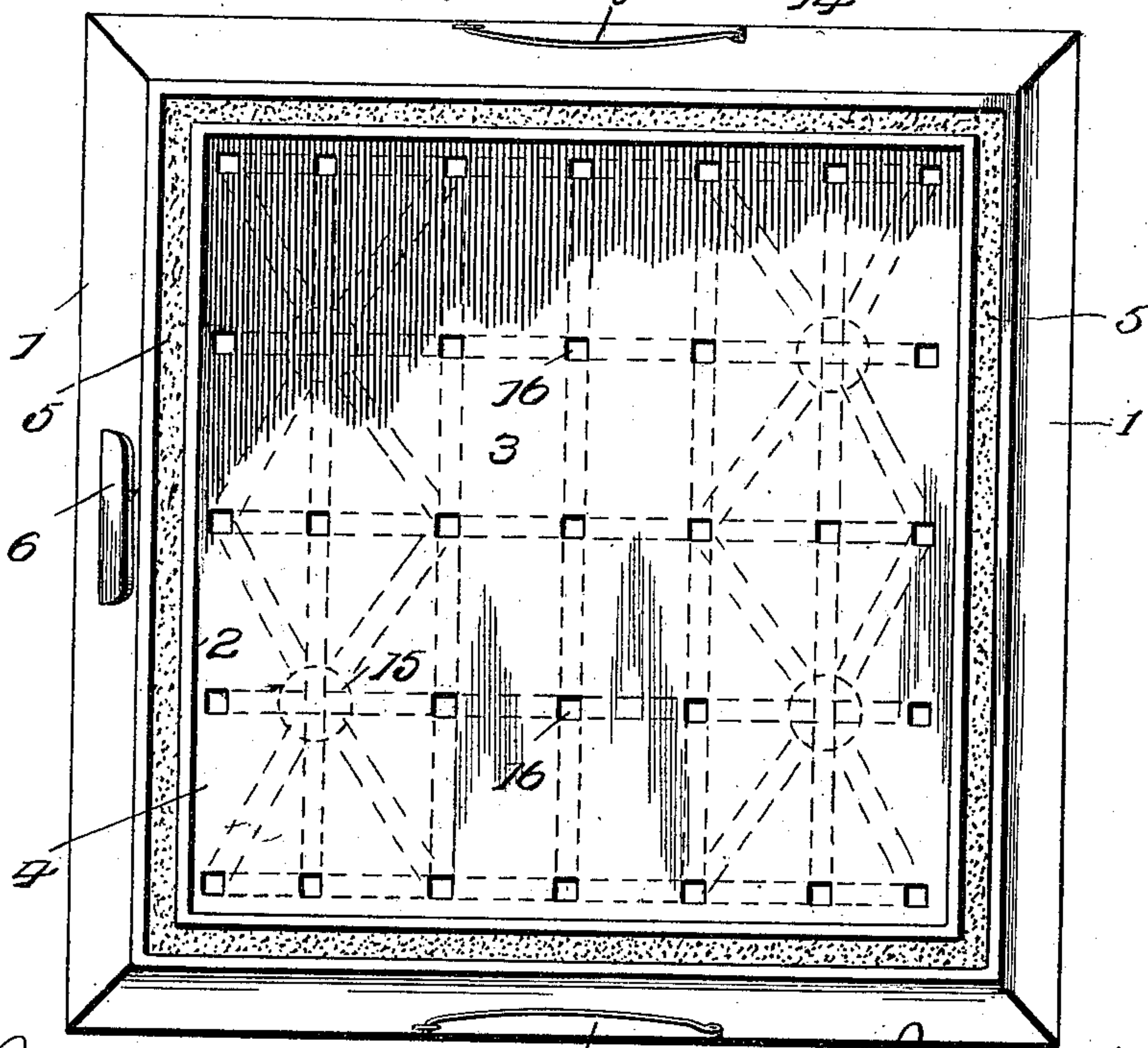


FIG. 2



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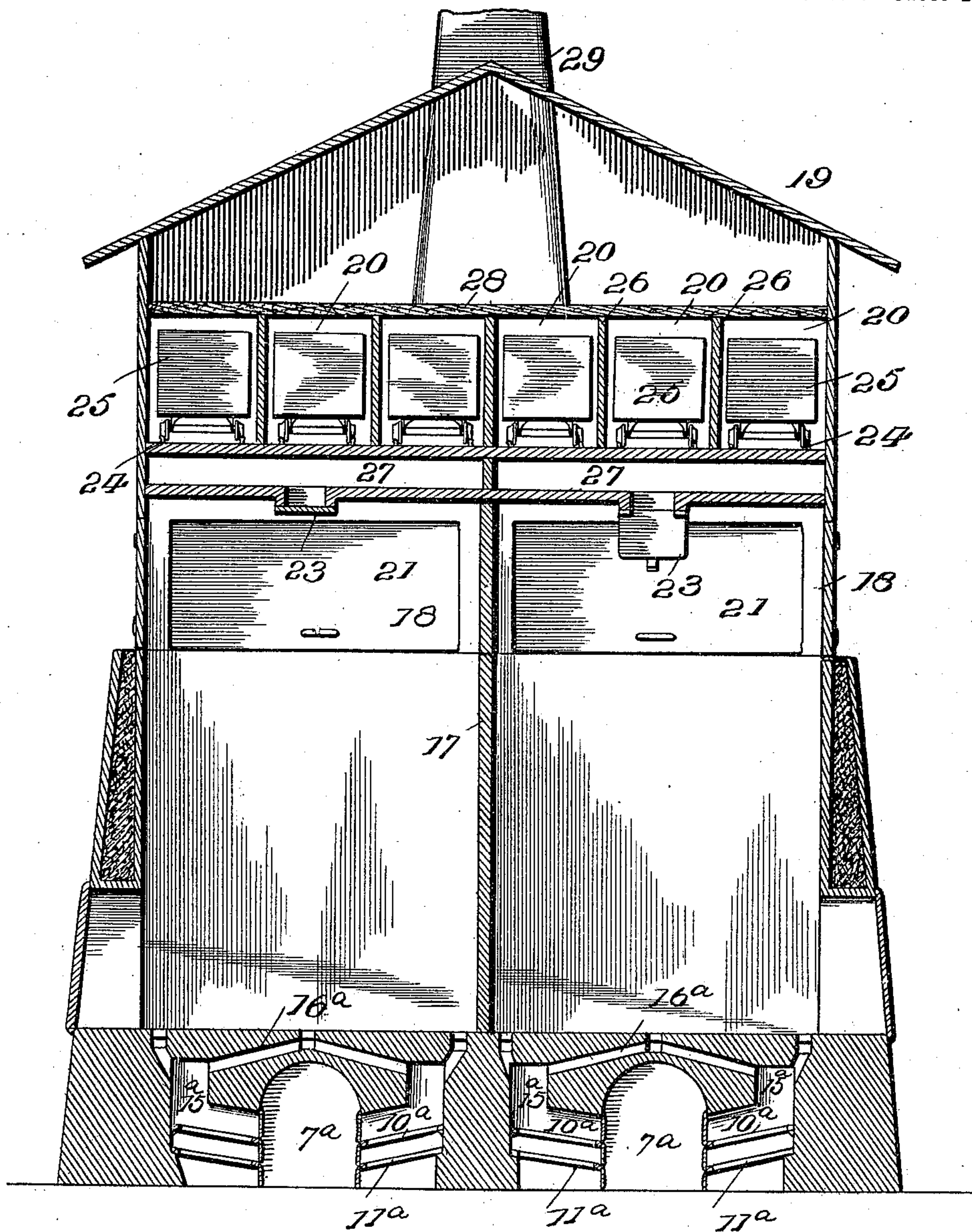


Fig. 3.

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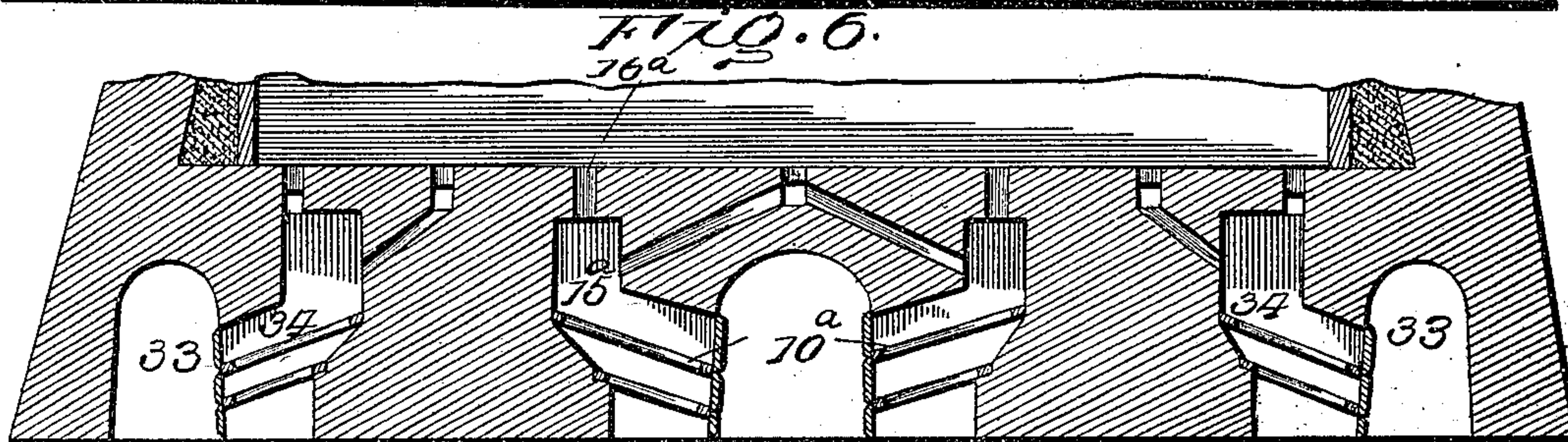
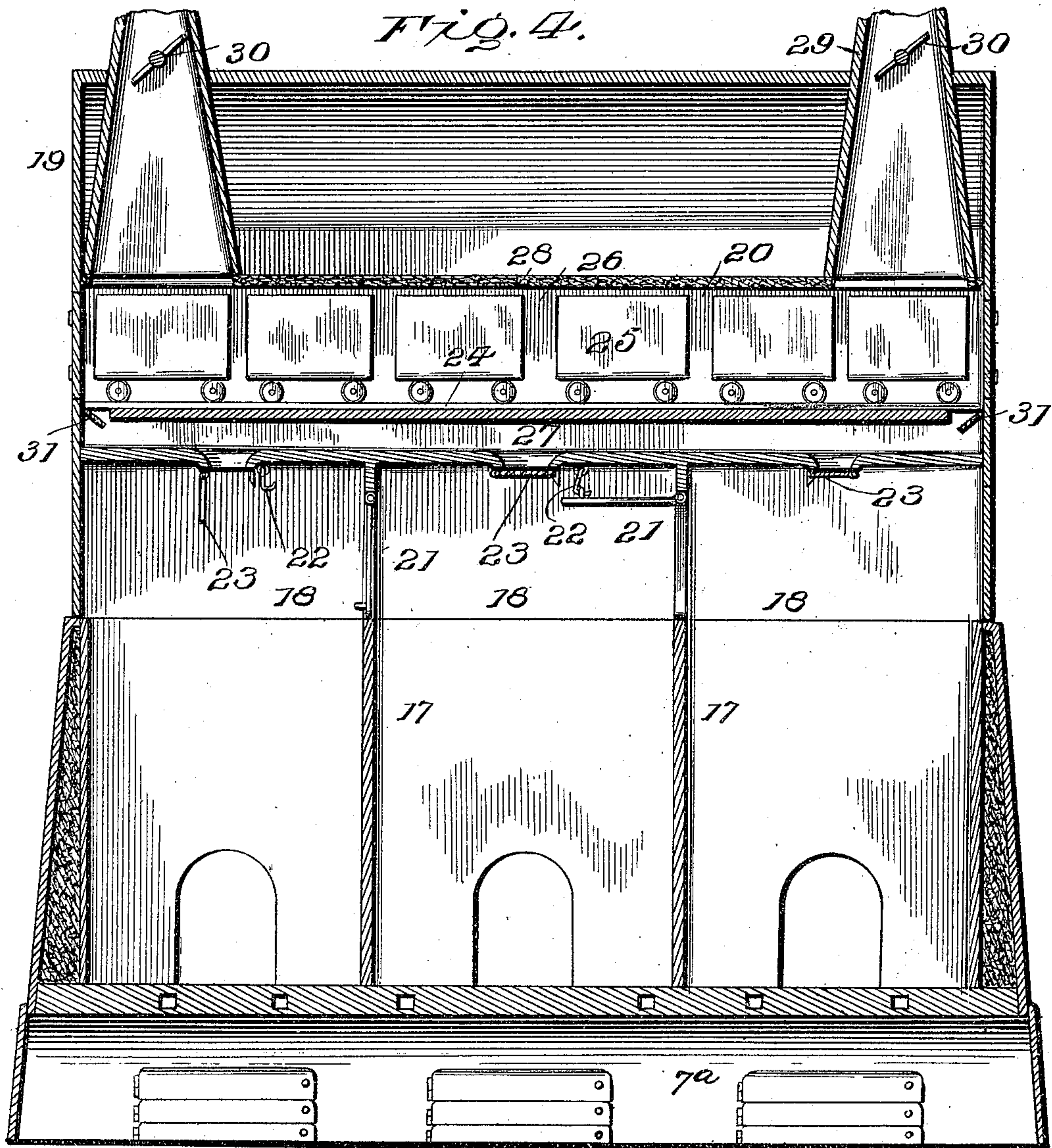
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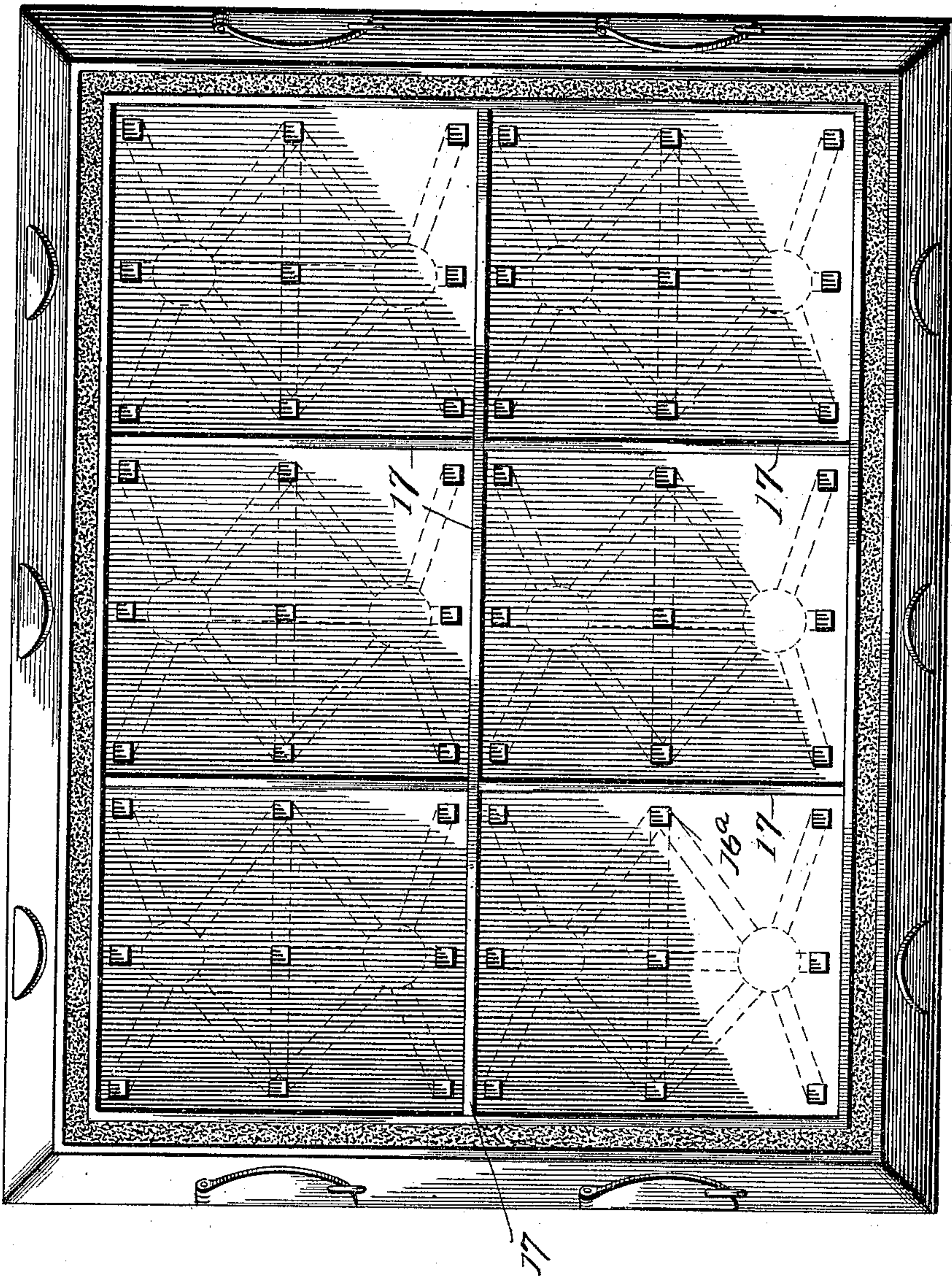
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Fig. 5.



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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 685,618, dated October 29, 1901.

Application filed January 12, 1901. Serial No. 43,052. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. LE GORE, a citizen of the United States, residing at Le Gore, in the county of Frederick, State of Maryland, have invented a certain new and useful Improvement in Kilns, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improvement in kilns for drying and burning bricks, tiles, lime, &c.; and one of the objects is to provide a kiln in which the furnaces are located directly under the burning-chamber, whereby the heat which is usually spent in heating outside walls is imparted to the lower wall of the burning-chamber and thereby utilized, and to so arrange the furnaces that they may be cut off from suddenly rising winds.

Another object is to arrange a drying chamber or chambers over the burning-chamber, so that the heat may be led from the latter to the drying chamber or chambers located above them.

These two main objects go well together, inasmuch as this arrangement of the furnaces directly under the burning-chambers enables me to form a number of kilns into a square block joined together and to easily conduct the hot air therefrom to the drying-chambers.

With these main objects in mind and others which will be hereinafter described my invention consists in the novel constructions and arrangements of parts, as will now be described, and then definitely set forth by the claims at the end hereof.

In the drawings accompanying this application, Figure 1 is a vertical section of a simple form of kiln without a drying-chamber. Fig. 2 is a top plan with the roof removed. Fig. 3 is an end elevation showing an arrangement which contemplates a number of burning-chambers with drying-chambers over them. Fig. 4 is a section of the same at right angles thereto. Fig. 5 is a horizontal section taken along the top line of the burning-chambers, and Fig. 6 is a modification of Figs. 1 and 2 to be used for extremely wide kilns.

Referring now to the details of the drawings by numerals and particularly to Figs. 1 and 2, 1 represents the outer wall of the simplest form of my kiln, which may be made of brick or any suitable material, and 2 the

inner wall, the lower part of which may be best built of or partly of fire-brick and the upper part of common brick or silica rock. The outer wall preferably extends to the base of the kiln; but the inner wall extends only to the base of the burning-chamber 3 and rests on a firm foundation of solid earth or broken rock 4. Between the walls 1 and 2 is a filling 5 of earth, lime, or sand, or any suitable material, and in one side or end of the furnace is a door 6, the opening for the same extending through both the walls and the filling 5, as seen in Fig. 1.

In the base of the kiln and running from one side to the other is an arched passage-way 7, which is preferably high enough to permit a man to walk therein to feed the furnaces, whose doors are on its sides. The ends of this passage 7 are provided with doors 8, arranged so that either may be closed to shut out the wind.

In the simplest form of my invention two furnaces 9 9 are situated on each side of this passage-way and are formed immediately under the burning-chamber, as seen best in Figs. 1 and 2. Each of these furnaces is preferably formed with two grates 10 and 11, one immediately over the other, the doors 12 and 13 of which are kept closed except for feeding purposes, so that no air is admitted to them except through the ash-pit 14, and in this way only heated air can ever find its way to the burning-chamber. At or near the rear end of the upper grate is formed an enlarged or combustion chamber 15, and from this chamber a multiplicity of hot-air flues 16 divide and separate the hot air, and thus lead it into the burning-chamber at a number of different points. This feature is best shown in Fig. 2, where the enlarged circles represent the combustion-chambers 15 and the straight lines the flues 16, leading to the full lines, where they enter the burning-chamber. The large combustion-chamber 15 is preferably closed directly over the furnace, so as to spread the heat and distribute it more regularly over the bottom of the burning-chamber, and thus prevent burning the brick too hard.

My kiln may be used with an open top or with a simple roof or cover over it, as shown in Fig. 1, or, as I prefer to use it, with dry-

ing-chambers over the burning-chambers, as shown in Figs. 3 to 5. In this last form I prefer to use a plurality of burning-chambers—say six—with a passage-way under each row, as shown particularly in Figs. 3 and 4. Referring now to these figures, 7^a represents these passage-ways running under the kilns from one side to the other or, as in Figs. 1 and 2, which passage-ways are provided with double furnaces comprising grates 10^a and 11^a, over the ends of which are combustion-chambers 15^a and flues 16^a, leading therefrom to the burning-chambers. These burning-chambers are preferably six in number, as seen in Fig. 5, although the number may be varied to suit various conditions. These burning-chambers are all separate and distinct and are separated by walls or partitions 17. The outer wall of the kiln is continued up above the level of the burning-chambers, forming a series of communicating chambers 18, and between these chambers 18 and the roof 19 are located the drying-rooms 20. The intermediate chambers have swinging doors 21 between them, provided with hooks 22, by which they may be fastened open, and each chamber has a damper 23 in its top or ceiling, the purpose of which will be described. In the drying-chambers there are, in the form shown in Fig. 3, six tracks 24, running lengthwise of the kilns and designed to support cars 25, which are to carry the bricks being dried. These tracks and cars are in separate chambers, separated by partitions 26. Immediately under the tracks is a hot-air chamber 27, into which the air enters through the dampers 23, and from this chamber 27 the heated air goes to the rooms 20, containing the bricks or other articles to be dried. Over the rooms 20 is a filler of earth or sand 28 to retain the heat. After the heat is utilized in the drying-chambers it is conducted out of the stacks 29. These stacks are provided with dampers 30, so that the heated air entering the compartments 20 from the hot-air chamber 27 may be caused to go from one end of the compartments 20 to the other in order to get to the stack by which it escapes, one of the stack-dampers being open and the other shut to cause this effect. Of course dampers 31 are arranged in the hot-air chamber 27 to cause the heated air to take the course the operator decides upon.

The above is a description of the preferable form of my combined kiln and drier, and its operation is as follows: Suppose, for example, that the kiln at the left hand of Fig. 4 is filled and brick is being burned therein and the intermediate kiln is being filled, the door 21, between the two chambers over these kilns, is closed, as shown, and the damper over the first one is open and the other one is closed. The heated air from the first kiln must now pass through the intermediate chamber, through the damper to the hot-air chamber 27, and from this to the chamber or room 20, containing the cars of bricks to be dried.

After the second burning-chamber is fed or filled the swinging door 21 may be lowered and the damper opened, when the heat from the furnaces under this burning-chamber may also be utilized to dry the bricks or other articles in the room above. It will thus be seen that one chamber can be entirely cut off while another is being fed, and in this way my multiplex kilns can be operated practically continuously.

From the foregoing and the accompanying drawings it will be seen that I have invented a combined kiln and drier in which the furnaces are located directly under the burning-chambers, so that no heat is unnecessarily wasted and that my manner of placing the furnaces in arches under the kilns makes it possible to place any number of kilns in a square block joined together, so that a drier of any desired capacity can be placed on top of the kilns at very little additional cost, which thus utilizes the heat escaping from the kilns to dry the bricks, tiles, &c. By my arrangement of the kilns and their drying-chambers, dampers, and partition-doors my kilns can be filled and burned rapidly. Some can be burning while some are emptied and others are being filled. The furnaces produce a very thorough and economical combustion of the fuel, and a much greater heat can be produced with a comparatively small amount of fuel. A superior quality of brick can be produced, owing to having a confined combustion-chamber below the bottom of the kiln, making a direct updraft possible and allowing the intense heat to be divided and separated by a multiplicity of divergent flues spreading well over the bottom of the burning-chambers. The direct heat from the furnaces is thus scattered and separated before it can come in direct contact with the brick, and therefore a superior article can be burned by my arrangement.

It is obvious that many changes may be made without departing from the spirit of my invention, and I therefore intend the following claims to cover any and all modifications and variations that would naturally suggest themselves or come within the lines of my invention. One such modification is shown in Fig. 6, in which in addition to the central arch and its double row of furnaces, side arches 33 and furnaces 34 are used, one set on each side of the central arch and furnaces. In this form I have shown very thick outer walls. Of course this arrangement has the same advantage as that of Figs. 1 to 5, that of shutting out the wind from the furnaces by closing the doors of the side arches 33. It is obvious that the central passage-way and its furnaces may be dispensed with, if desired, and only the side arches and furnaces used, but this makes it impossible to feed both batteries of furnaces from a single passage-way, as in Figs. 1 and 2.

What I claim as new is—

1. In a kiln, a burning-chamber, a passage-

way located directly under said burning-chamber, and a furnace on each side of said passage, the furnaces having their doors entering said passage-way and arranged to be fed therefrom and each of said furnaces also being directly under the said burning-chamber and having divergent flues which scatter the direct heat; whereby substantially all the heat therefrom is utilized, substantially as described.

2. In a kiln, a burning-chamber having its outlet at the top thereof, a passage-way located directly under said burning-chamber, and a furnace on each side of said passage-way; the furnaces having their doors arranged to enter said passage-way and arranged to be fed therefrom and each of said furnaces also being directly under said burning-chambers; whereby substantially all the heat from said furnaces passes directly into said furnaces and upward out of the top thereof, substantially as described.

3. In a kiln, a burning-chamber, a drier located over said burning-chamber and arranged to receive heat therefrom, a passage located directly under said burning-chamber, and a furnace on each side of said passage; said furnaces having their doors entering said passage and arranged to be fed therefrom, and each of said furnaces also being located directly under said burning-chamber, whereby substantially all the heat passes from said furnaces directly upward into the burning-chamber, and from said chamber to the drier, substantially as described.

4. In a device of the character described, a block of kilns, a passage-way leading directly under the burning-chambers thereof, stationary furnaces also directly under said burning-chambers having their feed-doors opening into said passage-way and arranged to be fed therefrom, whereby substantially all the heat from said furnaces passes upward into said burning-chambers, substantially as described.

5. In a device of the character described, a block of kilns having a series of driers located over the burning-chambers thereof, a passage-way leading directly under said burning-chambers; stationary furnaces also directly under said chambers having their feed-doors opening directly into said passage-way and arranged to be fed therefrom; whereby substantially all the heat from said furnaces passes upward into said burning-chambers and from said chambers to the driers, substantially as described.

6. In a device of the character described,

blocks of kilns arranged in rows, a passage-way under each row of said kilns and directly under the burning-chambers thereof, furnaces also arranged under said burning-chambers on opposite sides of each of said passage-ways and having their doors entering therein and arranged to be fed therefrom, whereby substantially all the heat from said rows of furnaces passes upward into the burning-chambers, substantially as described.

7. In a device of the character described, blocks of kilns arranged in rows, a series of driers over the burning-chambers of said rows of kilns, a passage-way directly under each row of kilns, stationary furnaces also directly under said burning-chambers and having their feed-doors opening into said passage-ways and arranged to be fed therefrom; whereby all the heat from said furnaces passes directly up into said burning-chambers and from thence up into the driers, substantially as described.

8. In a device of the character described, a block of kilns having stationary furnaces directly thereunder, a passage-way also under said block of kilns having the feed-doors of the furnaces leading therein, a drier situated over the block of kilns and having a series of compartments therein, an intermediate chamber between said kilns and the drier, and means for intercommunication between the kilns, the intermediate chamber and the driers, substantially as described.

9. In a kiln, a block of kilns situated side by side and having furnaces thereunder, a drier situated over said block of kilns, and an intermediate chamber having adjustable partitions therein whereby the heated air from said kilns may be directed to the drier or shut off therefrom, substantially as described.

10. In a kiln, a block of kilns situated side by side and having furnaces thereunder, a drier situated over the block of kilns and having a series of compartments therein, tracks in said compartments, and an intermediate chamber situated between said drier and said kilns and having dampers and movable or adjustable partitions whereby heated air may be directed into the compartments of the drier as desired, substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 29th day of December, 1900.

JAMES W. LE GORE.

Witnesses:

W. B. STAMBAUGH,
EZRA M. SHANK.