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Patented Aug. 6, 1901.

F. W. HEIDENREICH.
KILN.

(Application filed Apr. 29, 1901.)

(No Model.)

2 Sheets—Sheet 1.

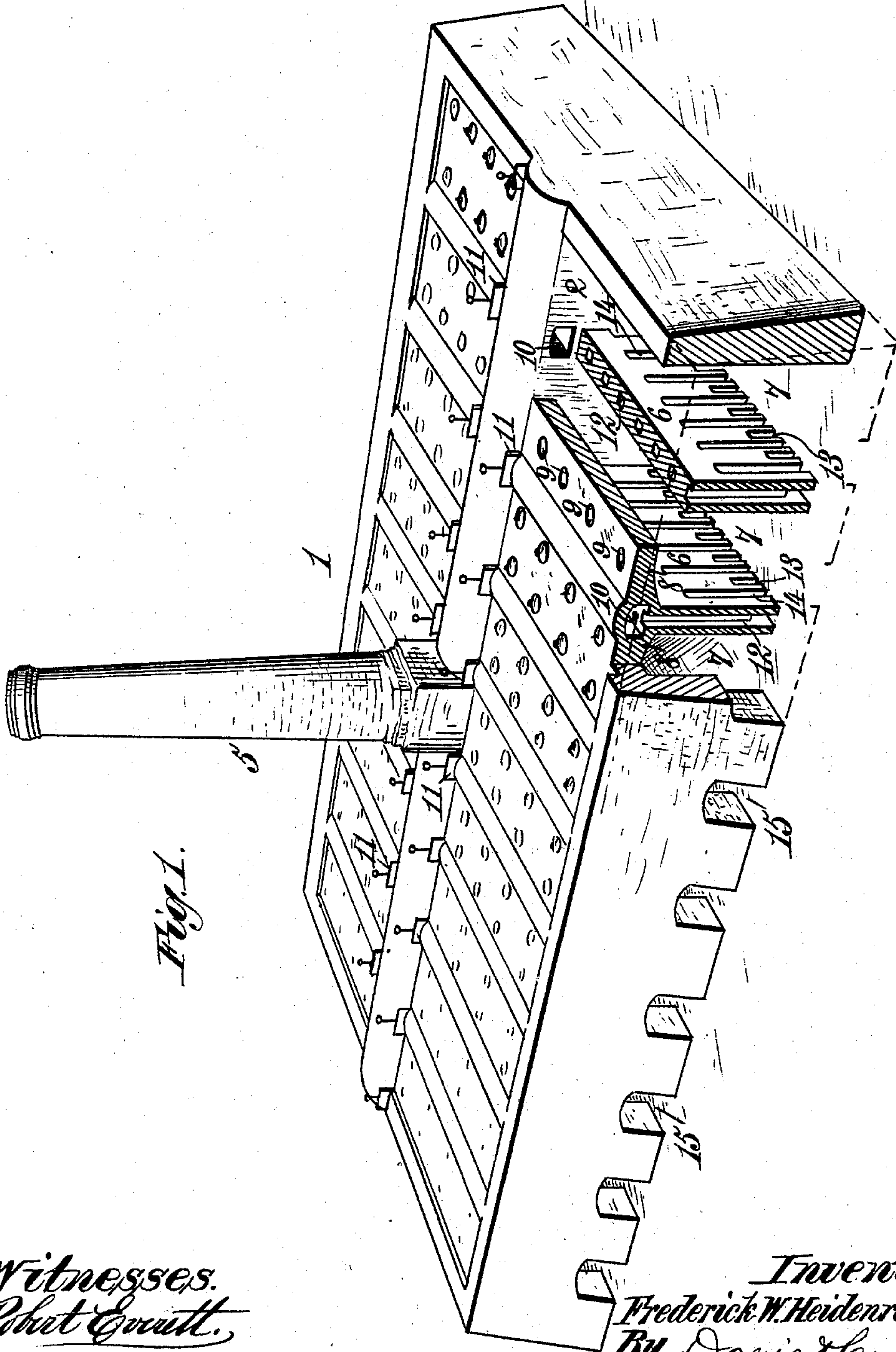


Fig. 1.

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Fig. 2.

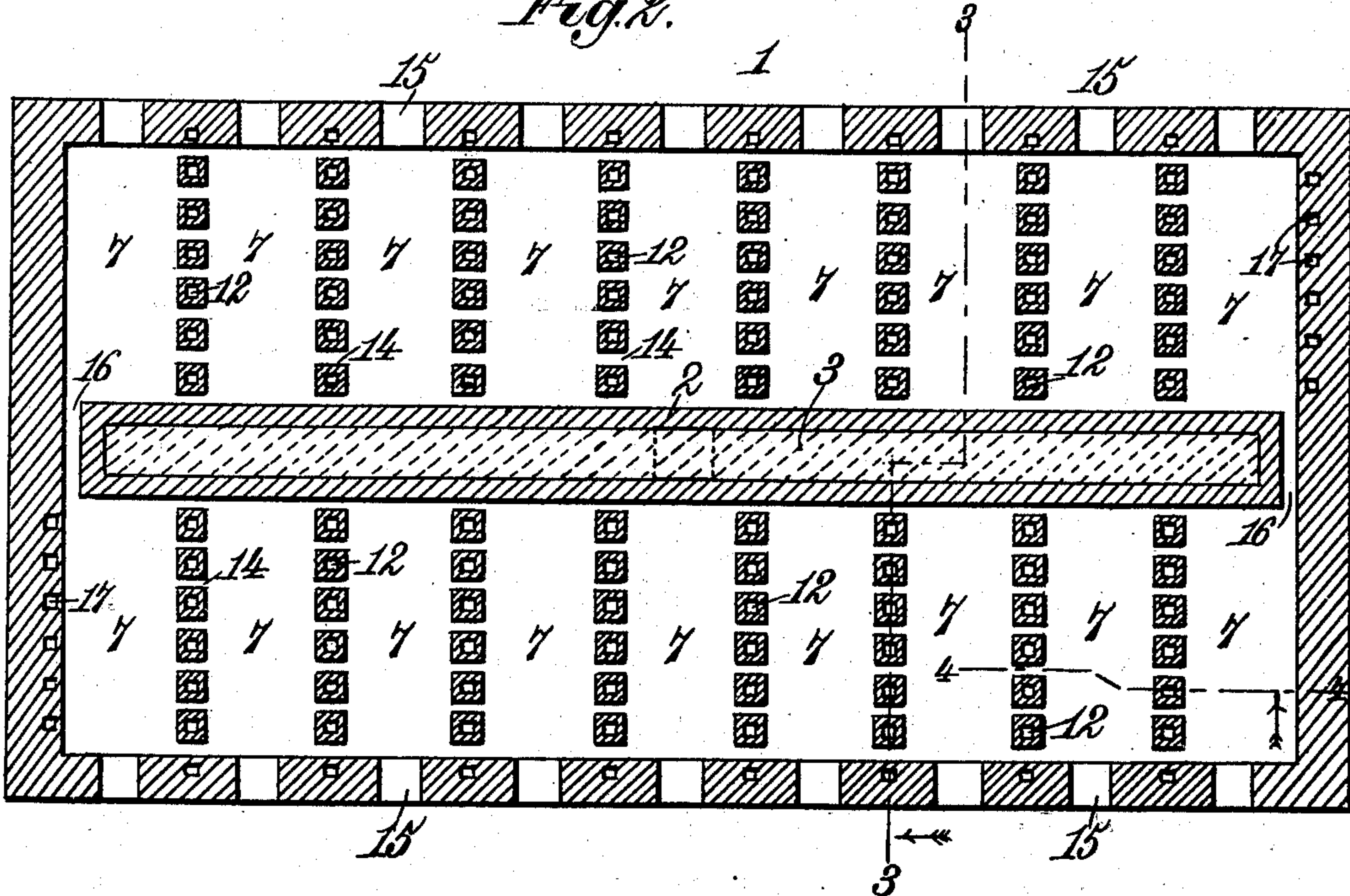


Fig. 3.

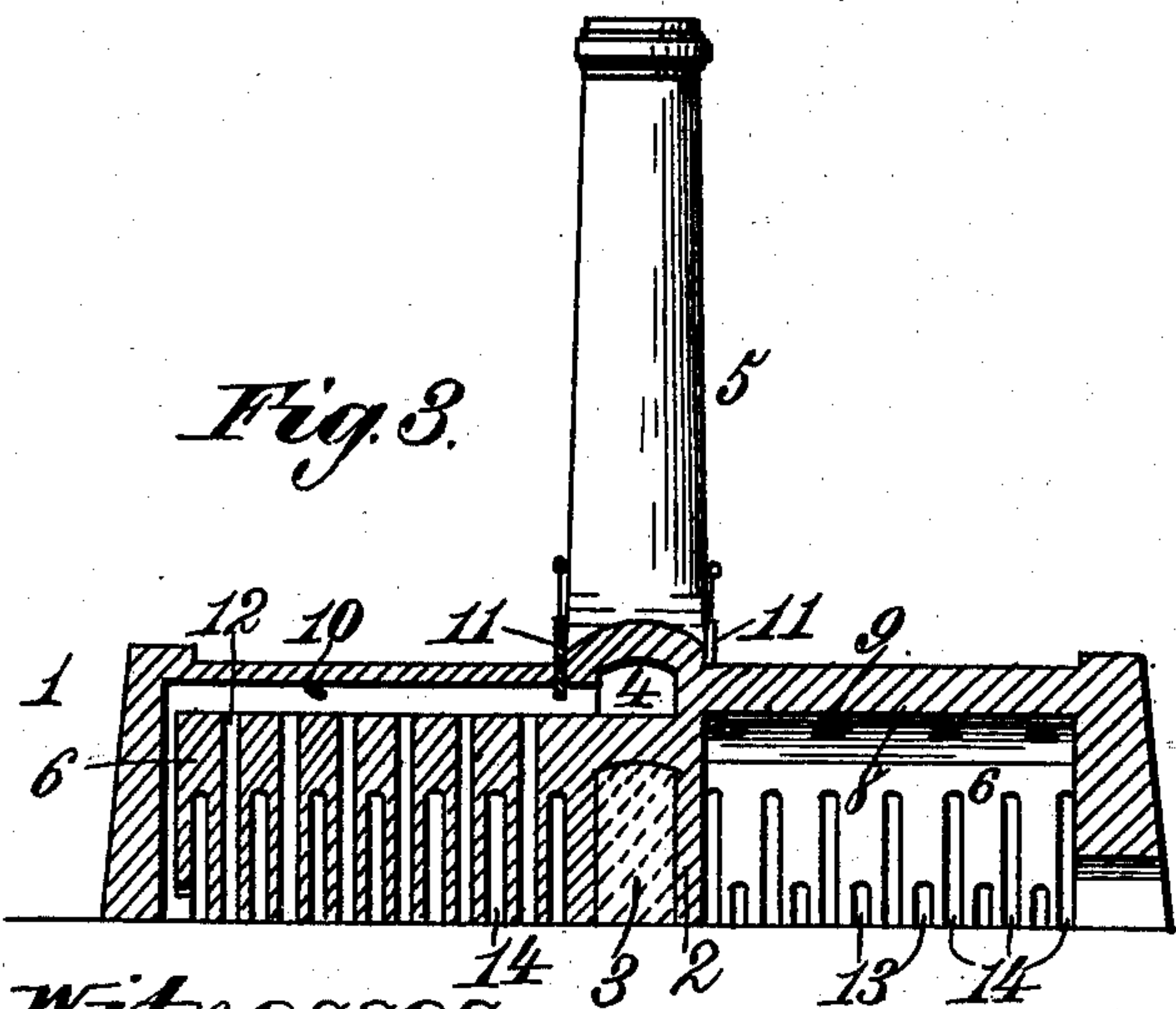
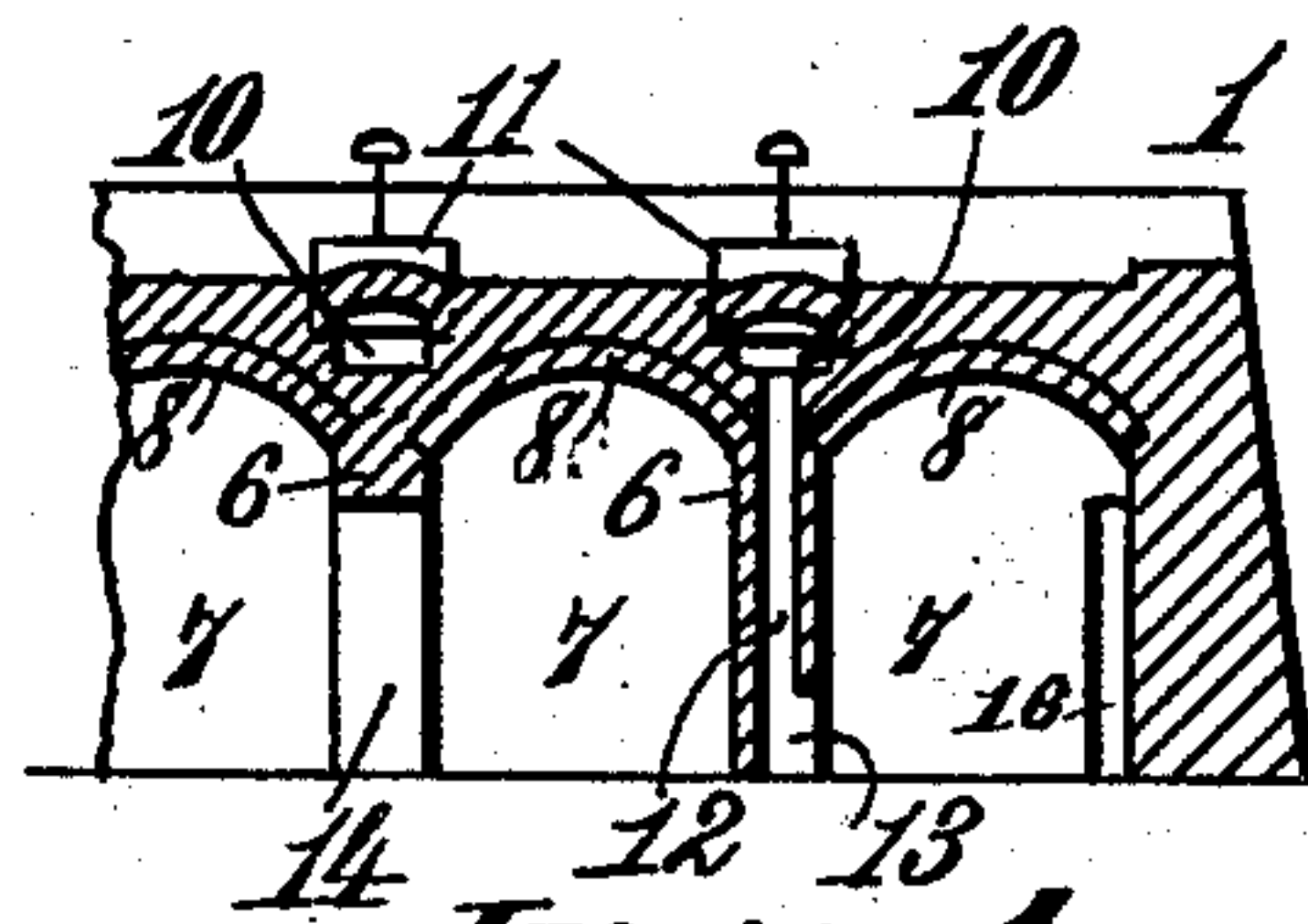


Fig. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK W. HEIDENREICH, OF HEDRICK, IOWA.

KILN.

SPECIFICATION forming part of Letters Patent No. 679,842, dated August 6, 1901.

Application filed April 29, 1901. Serial No. 58,016. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HEIDENREICH, a citizen of the United States, residing at Hedrick, in the county of Keokuk and State of Iowa, have invented new and useful Improvements in Kilns, of which the following is a specification.

My invention relates to kilns for burning vitreous products, such as bricks, and is of that type of kiln known as "continuous" kilns, being characterized by a series of intercommunicating chambers or ovens in which the burning takes place, such chambers being so arranged as that the operation of the kiln will be progressive and continuous after being once started, thus permitting of the withdrawal of the burned brick from certain of the chambers and their refilling with green brick while the succeeding chambers are in process of burning.

It is with the object of improving upon this class of kilns that I have devised the present construction; and my invention relates not only to certain novel and advantageous features of general structure, but also to minor details and devices, which will be fully set forth in the following specific description of construction and operation, and particularly pointed out in the claims appended hereunto, reference being made to the drawings accompanying and forming a part of this specification, in which—

Figure 1 is a perspective view of a kiln built in accordance with my invention, portions of the structure being broken away and shown in section to bring out more clearly the interior arrangements. Fig. 2 is a horizontal sectional view of the kiln to show the relation of the burning-chambers and the arrangement of flues and communicating passages. Fig. 3 is a sectional view on line 3 3 of Fig. 2 looking in the direction of the arrow; and Fig. 4 is a detail view of a portion of the kiln on line 4 4, Fig. 2, looking in the direction of the arrow.

Referring to the drawings by reference-numerals, like characters indicating like parts in the several views, 1 designates the entire kiln structure, which, as shown clearly in Fig. 1, is rectangular in shape and has an outer wall of any desired thickness to prevent conduction of heat from the interior.

The kiln is divided in the direction of its greatest length by a partition-wall 2, which for cheapness of construction is preferably formed hollow and filled with dirt, as indicated at 3, Fig. 3. In the top of said wall 2 is the main flue 4, which is closed at its ends and delivers into a stack 5, placed midway the ends of the flue, so as to insure an even uniform draft. Running from said central division-wall 2, on either side thereof, to the outer side walls of the kiln are a series of pier-walls 6, placed at regular intervals, so as to form a plurality of chambers 7 on both sides of the central division-wall 2 of the kiln. Said pier-walls 6 serve to support the arches 8 over each chamber 7, which form the top of the kiln, said top being provided with stoke holes or openings 9, having suitable covers, through which the fuel is fed to the chambers 7 during the burning process.

In the top of each of the pier-walls 6 is formed a branch flue 10, which is closed at its outer end by the outer wall of the kiln 1 and delivers at its inner end into the main flue 4, dampers or cut-offs 11 being provided at the inner ends of the branch flues to shut off communication between said branch flues 10 and the main flue 4 when desired. The said pier-walls are provided also with a series of vertical flues 12, placed at regular intervals, said pier-wall flues 12 entering the branch flues 10 at the top of the pier-walls 6 and being provided at their lower ends, on one side only of the pier-wall, with draft-openings 13, communicating with one of the chambers 7, so that each of said chambers 7 will be in communication with a series of pier-wall flues 12 and through the branch flues 10 with the main flue 4 (when dampers 11 are open) and stack 5, whereby a downdraft will be created in each chamber to draw the heat through the mass of bricks therein and carry off the products of combustion and the water-smoke, and it will be seen that this construction avoids the use of horizontal passages or flues in the lower part of the kiln, which are objectionable, for the reason that they are likely to clog the draft and retard the removal of the heavy products of combustion and water-smoke from the burning chambers. It will be noted also that by constructing the pier-wall flues 12 so that they have draft-openings

13 at one side only the draft and movement of the heat will always be in one direction and the action of the kiln progressive, this construction avoiding danger of draft backward or in the direction of the chambers already burned and insuring the passage of the heat to the unburned chambers.

To allow the passage of the heat from one chamber to another, the pier-walls are pierced intermediate the flues 12 with openings 14, which place the chambers 7 in communication with one another, so as that the heat may pass from a burning chamber to the next chamber beyond and dry out and heat the green bricks therein preliminary to the starting of the fire in that chamber. It is of course essential that the said communicating openings 14 be temporarily closed in order to cut off the heat in the particular chamber that is burning, and this may be done by sealing such openings 14 with combustible material, such as heavy paper, which when the heat in the burning chamber has become excessive and the mass of bricks therein is approaching incandescence will burn away and allow the heat to pass into the chamber beyond and begin the burning of the bricks therein.

The outer wall 1 of the kiln is provided with openings or doors 15, through which access may be had to the chambers 7 for the purpose of filling with green brick and removing the burned brick, suitable temporary sealing-walls being built into said openings during the operation of the kiln.

In order that proper communication may be provided between the end chambers of each series on either side of the central division-wall 3, an opening 16 of sufficient width is left between the ends of said wall 3 and the end walls of the kiln 1, said openings 16 during the operation of the kiln being sealed with paper or other suitable combustible material in a manner similar to that described in connection with the openings 14 connecting the chambers 7. One of the said end chambers of the two series has its vertical flues 17 corresponding to the pier-wall flues 12, formed in the end walls of the kiln, as shown in Fig. 2, these flues 17 in the kiln-walls communicating with their branch flue, which in turn enters the main flue 4, as in the manner described hereinbefore in connection with the pier-wall flues, the branch flue being provided with a controlling-damper, as shown in Fig. 1, such damper being similar in all respects to that shown and described in connection with the other branch flues 4.

The operation of the kiln is as follows: The chambers 7 being filled with loosely-ranked green brick, upon which is platted a couple of layers of burned brick with a covering of dirt, suitable draft-apertures being left therein to allow access of heat to the interior of the mass of green brick and the openings 14 being sealed with paper, the dampers or cut-offs 11 of the branch flues are closed. A fire

is then started in the chamber 7, (shown at the lower right-hand corner in Fig. 2,) this chamber being left empty when starting the kiln and the openings 14 between said chamber and the next succeeding chamber being left unsealed. In starting the fire in the first chamber it is preferable to build temporary fire-pockets in front of the openings 14, so as to insure the conducting of the heat from the fires built in said pockets into the second chamber. The damper 11 of the said second chamber being then opened, the warming up of the bricks in this chamber will begin. When the mass of bricks in the second chamber has been raised to a high heat and is approaching a state of incandescence from the fire in the first chamber, fuel will be introduced through the stoke-holes 9, fine coal being preferably used, and fire is started on top of the mass of bricks. The bricks are soon raised to a state of incandescence, and the combustible material forming the seals between the second and third chambers being burned away the damper controlling the branch flue of chamber 3 will then be opened, and the heating of the bricks in said third chamber from the fire in the second chamber will then begin. Into said third chamber at the proper time fuel will be introduced and fire started in the same manner described in connection with chamber 2, the dampers 11 controlling the series of chambers being opened as the seals between the chambers burn away and the burning progresses and being closed in the chambers already burned, so as to insure an even progressive burning of the chambers. When the burning has progressed sufficiently to permit, the first chamber is filled with green brick ready for burning, when the progressive process of burning shall have gone through the entire series of chambers and reached the starting-point—viz., the first chamber. It will be apparent that as the several chambers are burned and cooled the bricks may be withdrawn and a fresh charge inserted in readiness for burning when the process of burning has again reached that chamber, so that after the kiln is once started its operation is continuous.

It will be understood that the number of chambers may be increased or diminished, as desired, in constructing the kiln in accordance with my invention, and so the capacity of the kiln varied to suit different requirements.

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

1. In a brick-kiln, the combination with an outer inclosing wall, of a central partition-wall dividing said kiln longitudinally into sections, and provided with a main flue along its top, a stack into which said flue delivers, pier-walls extending from said central partition-wall to the side walls of the kiln and dividing the sections of the kiln into independent chambers, said pier-walls supporting the

arches or roof of the kiln and being provided with openings leading from one chamber to another, branch flues in the tops of said pier-walls in communication with said main flue, dampers in said branch flues, and a series of vertical flues in said pier-walls communicating with said branch flues and provided with draft-openings communicating with one of said chambers.

2. In a brick-kiln and in combination, side and end walls, a central partition-wall dividing said kiln longitudinally into sections and provided along its top with a main flue, a stack midway said flue into which the said flue delivers directly, a series of pier-walls extending from said central wall on either side thereof to the side walls of the kiln to form independent burning-chambers, arches forming the roof of the kiln supported by said pier-walls, a series of heat-conducting openings piercing said pier-walls so as to establish communication between said chambers, branch flues at the tops of said pier-walls entering said main flue, dampers at the inner ends of said branch flues, and a series of vertical flues in said pier-walls delivering into said branch flues and provided with draft-openings at their lower ends on one side only of said pier-walls.

3. In a brick-kiln and in combination, side and end walls, a central partition-wall dividing the kiln longitudinally into two sections and provided with a main flue along its top, a stack midway said flue into which the said flue delivers directly, communicating passages between the two sections at either end of the kiln, a series of pier-walls extending from said partition-wall to the side walls of the kiln so as to form independent burning-chambers, said pier-walls supporting the roof-arches of the kiln, intercommunicating passages between said chambers adapted to be temporarily sealed, branch flues in the tops of said pier-walls closed at their outer ends and entering said main flue, dampers controlling said branch flues, and a series of vertical flues in said pier-walls delivering directly into said branch flues and having draft-openings at their lower ends on one side only of said pier-walls.

4. In a brick-kiln, the combination with inclosing side and end walls, of a central partition-wall dividing said kiln longitudinally into two sections, said partition-wall having passages at its ends to afford communication

between said sections, a main flue in the top of said partition-wall closed at its ends and emptying midway its length into a stack, a series of pier-walls extending from said central partition-wall to the side walls of the kiln, said pier-walls serving to support the roof-arches of the kiln, said pier-walls being provided along their tops with branch flues closed at their outer ends and delivering into said main flue, dampers at the inner ends of said branch flues, a series of alternately-arranged openings and vertical flues in said pier-walls, whereby intercommunication may be established between said chambers, said passages being adapted to be temporarily closed during the operation of the kiln, and draft-openings at the lower ends of said vertical pier-wall flues communicating with a chamber on one side only of said pier-wall.

5. In a brick-kiln, the combination with side and end inclosing walls, of a central partition-wall dividing said kiln longitudinally into two sections, said partition-wall being of less length than the kiln to form communicating passages between the two sections, a main flue traversing the top of said partition-wall, said main flue being closed at its ends, a stack midway said flue into which said flue delivers, a series of pier-walls extending from said partition-wall to said side walls, roof-arches provided with stoke-holes supported by said pier-walls, branch flues traversing the tops of said pier-walls, said branch flues being closed at their outer ends and delivering to said main flue, dampers at the inner ends of said branch flues to control their delivery to the main flue, a series of alternately-arranged chamber-connecting openings and vertical flues in said pier-walls, said connecting-openings being adapted to be temporarily closed by suitable combustible material during operation of the kiln, said vertical pier-wall flues delivering into said branch flues and being provided at their lower ends on one side only of said pier-walls with draft-openings, and a series of vertical flues in each of the end walls of the kiln connecting one of the end chambers of each section with a branch flue leading to the said main flue.

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

FREDERICK W. HEIDENREICH.

Witnesses:

HARRY C. LYNN,
W. H. YOUNG.