

No. 665,635.

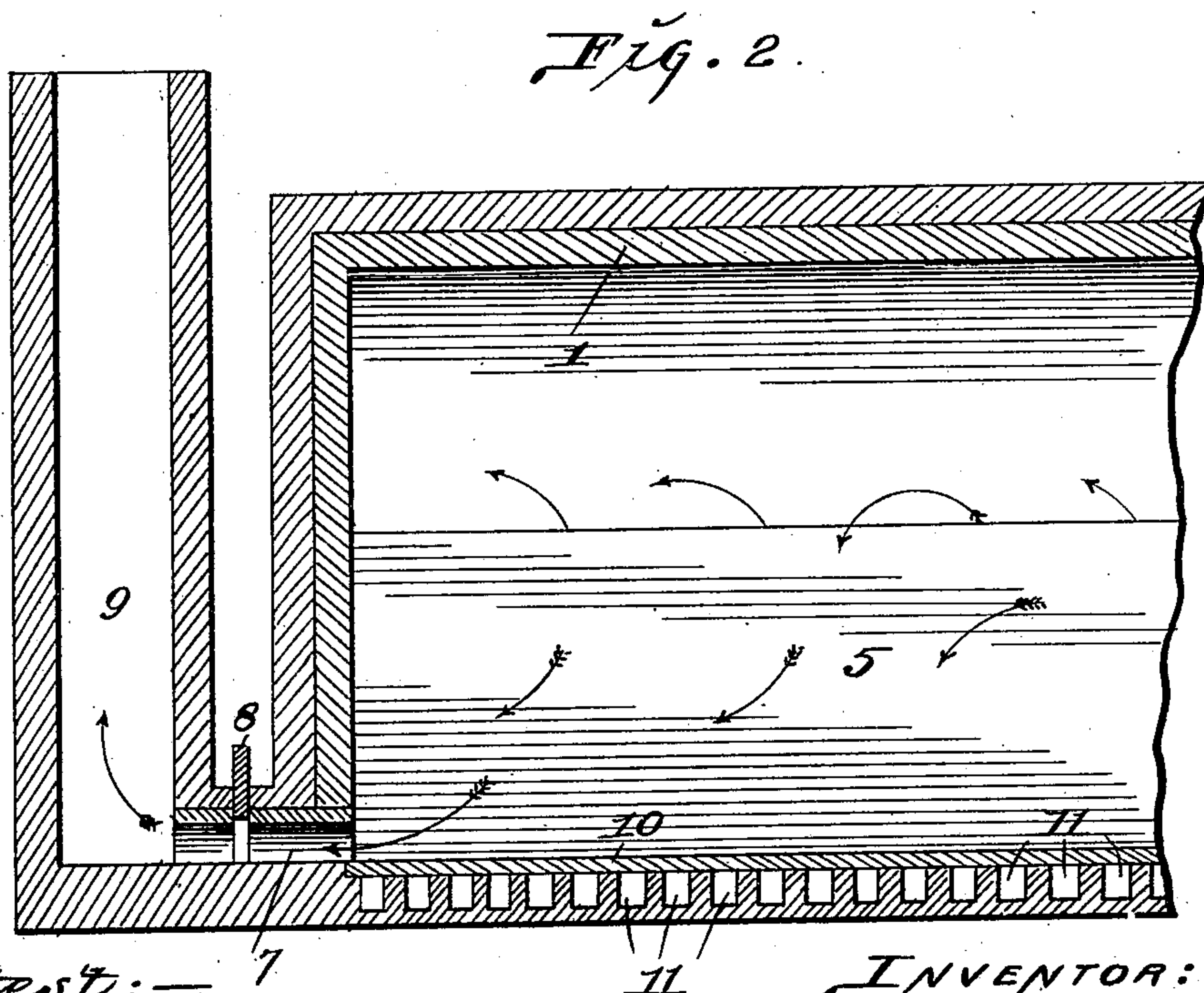
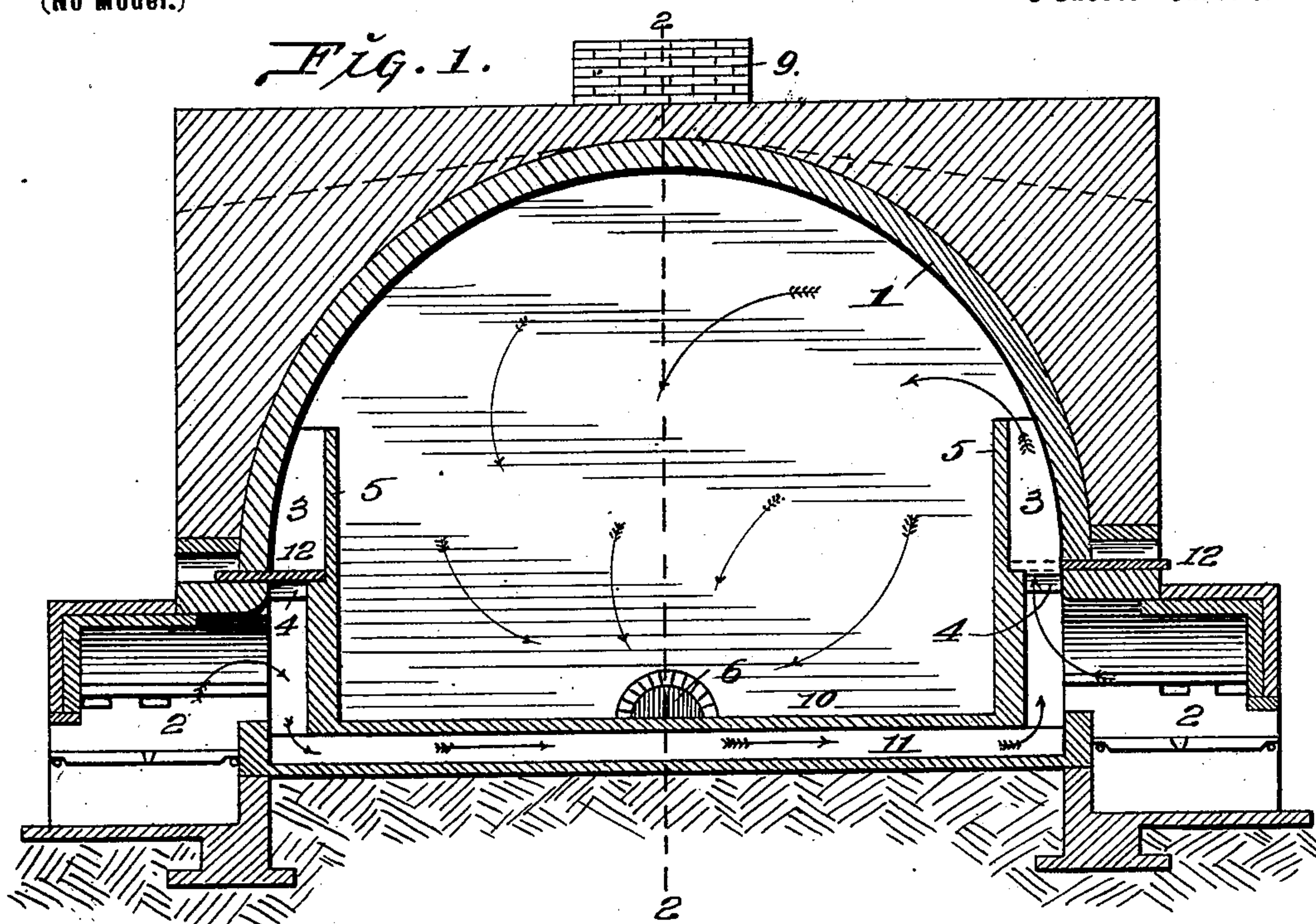
Patented Jan. 8, 1901.

W. P. GRATH.
KILN.

(Application filed Apr. 9, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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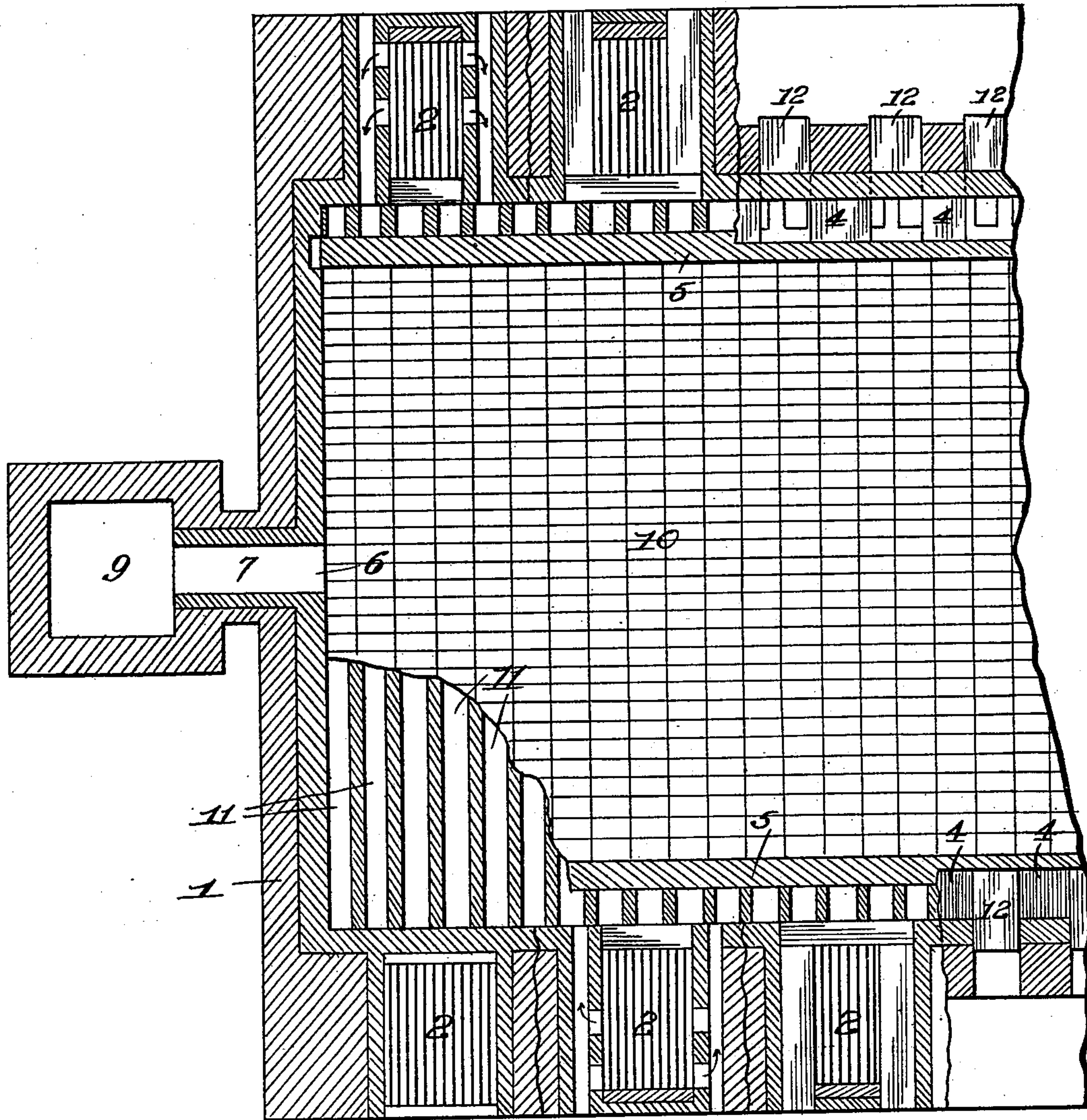
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Fig. 3.



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Fig. 4.

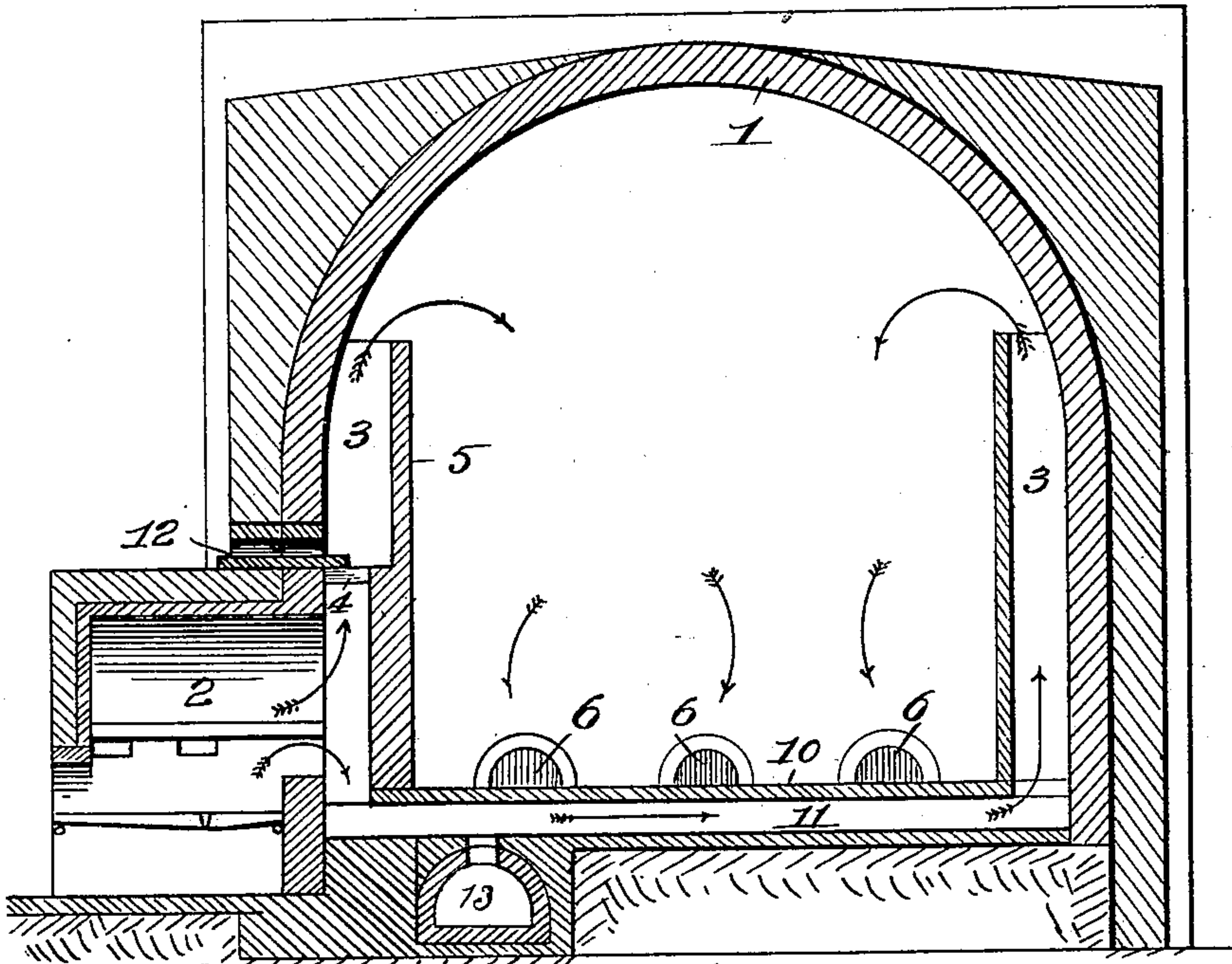


Fig. 5.

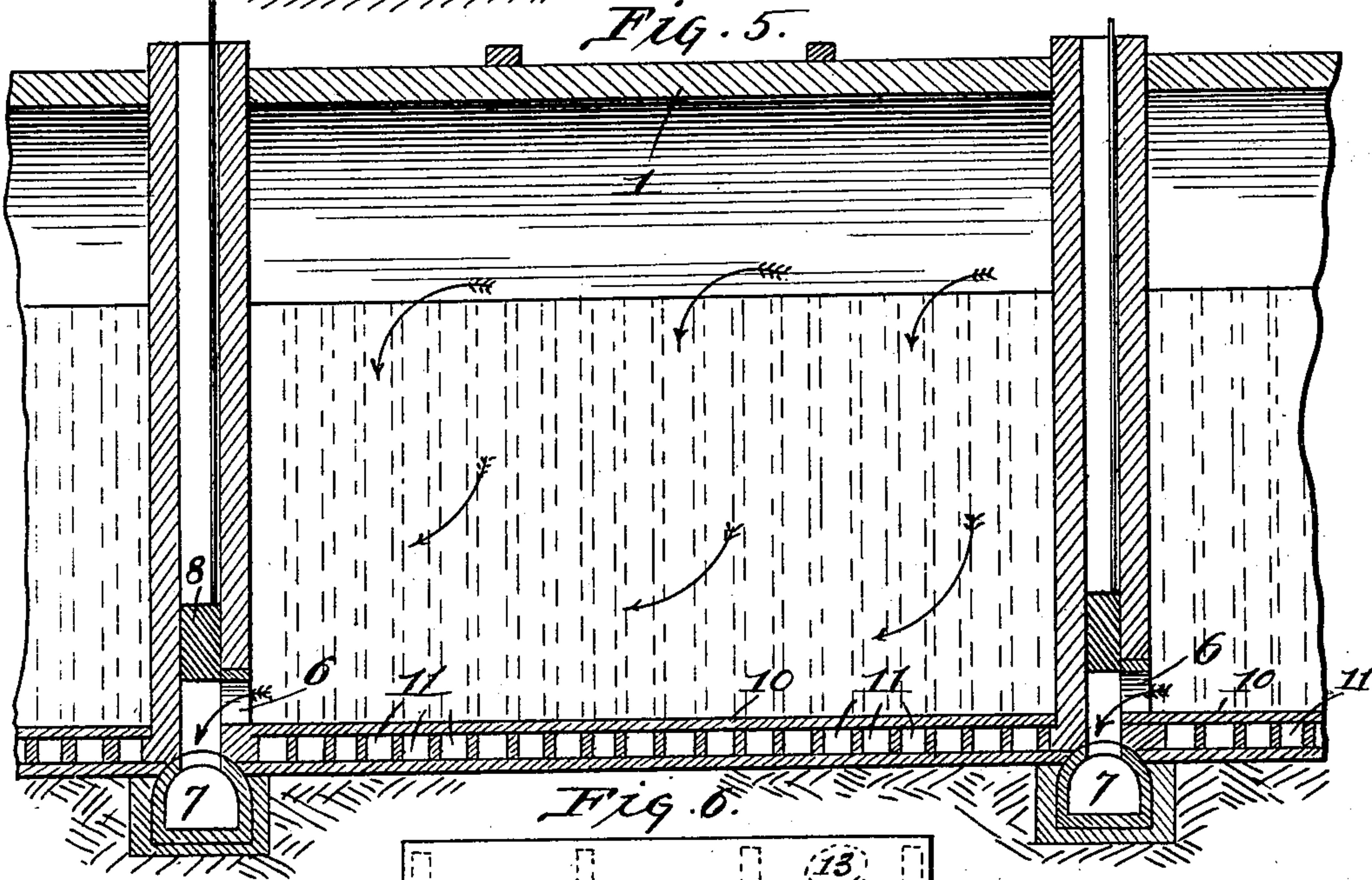
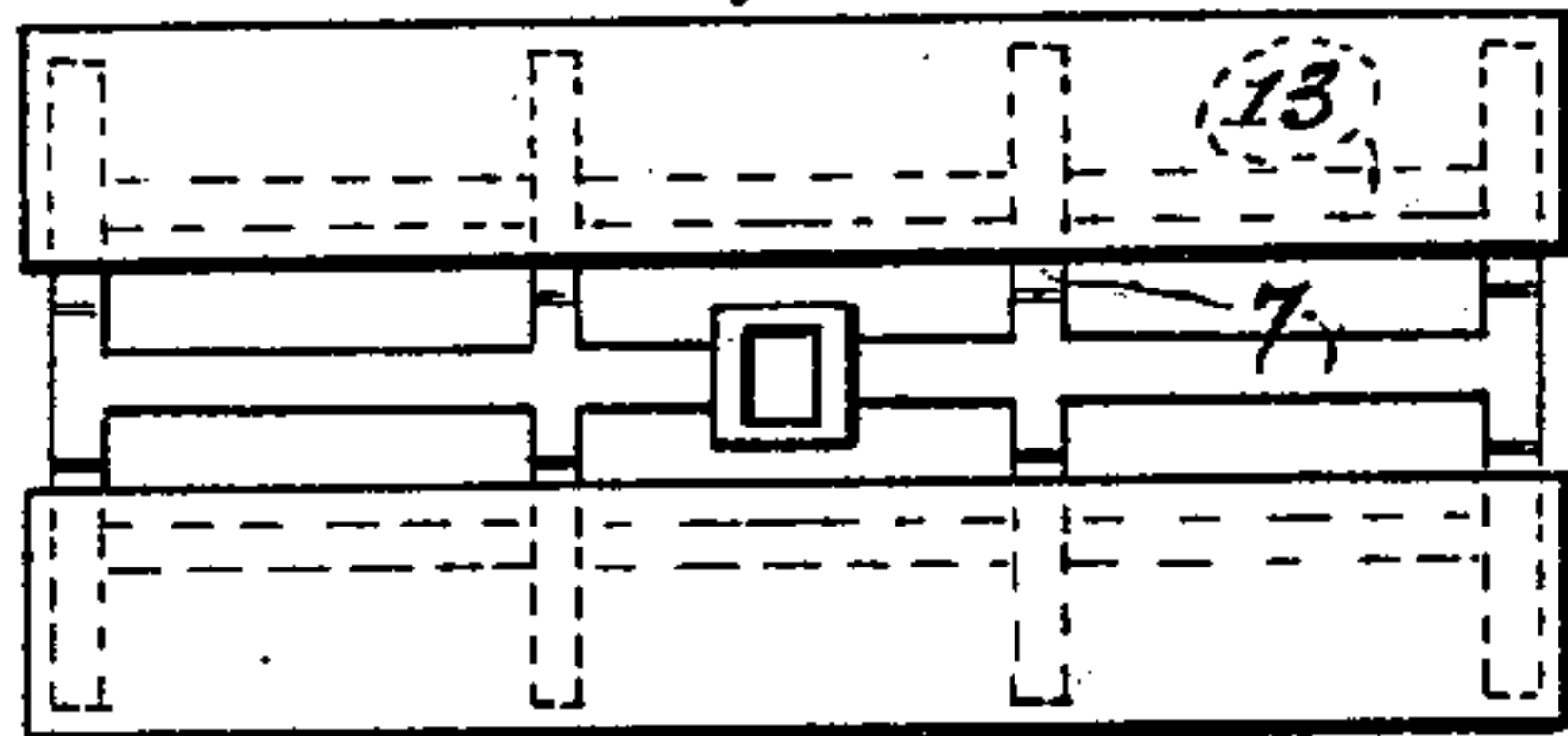


Fig. 6.



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UNITED STATES PATENT OFFICE.

WALTER P. GRATH, OF ST. LOUIS, MISSOURI.

KILN.

SPECIFICATION forming part of Letters Patent No. 665,635, dated January 8, 1901.

Application filed April 9, 1900. Serial No. 12,137. (No model.)

To all whom it may concern:

Be it known that I, WALTER P. GRATH, a citizen of the United States, and a resident of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Kilns, of which the following is a specification.

My invention relates to kilns, and has for its principal object to secure a greater uniformity of heat throughout the kiln, and thereby a greater uniformity of ware. Another principal object is to arrange a series of kilns in such a manner that the waste heat from one kiln may be utilized for the preliminary heating of one or more other kilns of the series, and thereby effect a great economy of fuel.

My invention consists principally in a kiln provided with one or more side bags and bottom flues communicating with one or more of the furnaces and arranged for use alternately or simultaneously.

It also consists in arranging a series of kilns each with its own furnace or furnaces and provided with such an arrangement of flues that the products of combustion from its own furnace passes through the kiln and thence into flues having connections passing beneath the floors of one or more of the other kilns.

It also consists in the arrangements and combinations as hereinafter described and claimed.

In the accompanying drawings, which form part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a vertical cross-section of my kiln. Fig. 2 is a vertical longitudinal section thereof on the line 2 2 of Fig. 1. Fig. 3 is a horizontal sectional view with parts broken away to expose the underlying parts on different planes. Fig. 4 is a vertical cross-section of one of a group of kilns arranged to constitute a continuous kiln. Fig. 5 is a vertical longitudinal section showing the arrangement for a continuous kiln, and Fig. 6 is a diagrammatic plan of the continuous-kiln arrangement.

The body 1 of my kiln consists of an arch or dome of fire-brick or other suitable material bricked in, as usual.

The kiln is provided with one or more furnaces 2, arranged along the side thereof or

arranged along two opposite sides of the kiln. Each furnace 2 communicates with a bag or side flue 3, located at the side of the kiln next to said furnace and opening at its top into the interior of the kiln. In order to spread the products of combustion with some degree of uniformity throughout the interior of the kiln, deflecting-plates 4 are arranged in each vertical bag, and the flash-wall 5 of said bag is extended high enough to insure a proper downward and lateral deflection of the products of combustion from the surface of the arch or dome. The outlet or outlets 6 for the products of combustion are located at one end of the kiln, at or near the bottom thereof, and open into a horizontal flue 7. This horizontal flue 7 communicates past a damper 8 with a smoke-stack 9.

The floor 10 of the kiln is solid or imperforate and has a series of flues 11 beneath it and arranged to heat the contents of said kiln, each flue extending from a furnace to the vertical bag at the opposite side of the kiln. Each furnace 2 thus communicates with two vertical bags arranged on two opposite sides of the kiln; but it is noted that the communication with the adjacent bag is a direct communication, whereas the communication with the opposite bag is through one or more of the floor-flues. In order to control the course of the draft, a damper or dampers 12 are arranged in the vertical bags. When the damper in the vertical bag next to the furnace is open, the draft from that furnace will pass directly into the kiln, at the top thereof, but when the damper is closed the draft is diverted through the bottom flues into the vertical bags on the opposite side of the kiln. When the damper is partially open, the draft is divided, so that part of the products of combustion passes directly into the bag, while part passes under the floor before entering the kiln. By this arrangement the heat may be applied mainly to the ware in the upper portion of the kiln or mainly to the ware in the lower portion of the kiln or applied with tolerable uniformity throughout the kiln. This arrangement also affords a means for preventing a destruction of the floor by excess of heat in the floor-flues.

My kiln is capable of use either singly or in groups to constitute a continuous kiln.

When used singly, it is preferable to have the furnaces arranged on opposite sides of the kiln, in which case the floor-flues and the vertical bags may be used in common by the two furnaces.

When a series of kilns or chambers is arranged to form a continuous kiln, the horizontal outlet-flue communicating with the smoke-stack is provided with a branch flue 13, which communicates with the floor of one of the adjacent kilns or chambers.

Any suitable form of furnace may be used with this kiln, but I prefer to use the furnace described in Letters Patent No. 636,037, granted to me October 31, 1899, as such furnace has the economical advantage of being adapted to burn soft coal or screenings and produces a greater uniformity of heat throughout the kiln and is comparatively free from smoke and cinders, and for these reasons the ware throughout the kiln is burned uniformly, and the risk of becoming specked, flashed, or discolored is reduced considerably.

The series of kilns arranged as above described constitutes, in effect, one continuous kiln, the operation of which is as follows: The brick or ware to be burned is first placed in one of the kilns or chambers of the series and submitted to a preliminary heating by the hot products of combustion passing through the flues under the solid floor of said kiln or chamber. These products of combustion at the inception of the operation of the continuous kiln may be derived from an independent furnace especially provided for the purpose or may come from either of the furnaces belonging to this kiln, for which purpose the regular outlet flue or bag for the furnace is closed by means of the damper and the products of combustion caused to pass beneath the floor. When the damper in the bag or side flue is open, the products of combustion pass up said bag, and when the damper is partly open the products of combustion pass partly up the side flue and partly through the heating-flues under the floor. Thus the course of the draft is completely controlled by the damper in the side bag or flue and the heat throughout the kiln may be regulated by the change of draft. The preliminary heating is preferably effected by having the products of combustion pass through the flues under the floor until the ware is dried and in condition to withstand the stronger heat. Then the products of combustion are caused to pass up the bag or side flue and partially to burn the uppermost ware, and then the draft is so divided that the lowermost ware is submitted to the stronger heat, after which the damper is regulated to keep all parts of the kiln or chamber at a tolerably uniform heat.

What I claim is—

1. A kiln comprising a main body portion and a solid floor with flues extending across said kiln beneath said floor and with a vertical bag at one side of said kiln, and a furnace located at the same side of said kiln and

communicating directly with said vertical bag, and said bottom flues communicating with a source of heat, substantially as described.

2. A kiln comprising a main body portion and a solid floor and a furnace located at a side of the kiln, said kiln having heating-flues extending across said kiln beneath said floor and a vertical bag at its said side, said furnace communicating directly with said bag and with said floor-flues respectively, substantially as described.

3. A kiln comprising a main body portion and a solid floor and a furnace located at a side of the kiln, said kiln having heating-flues beneath said floor and a vertical bag at its said side said furnace communicating directly with said bag and with said floor-flues respectively and means for controlling the draft in said bag and floor-flues, substantially as described.

4. A kiln comprising a main body portion and a solid floor, said kiln having bags or side flues opening into its upper portion on opposite sides of said kiln and a furnace located at one of said sides and communicating directly with the adjacent bag and communicating through heating-flues under said floor with the opposite bag, and an outlet-flue near the bottom of said body portion, substantially as described.

5. A kiln comprising a main body portion and a solid floor, said kiln having bags or side flues opening into its upper portion on opposite sides of said kiln, furnaces located at said sides and having direct communication with the adjacent bags and with heating-flues located beneath said floor and opening into the opposite bag, and means for controlling the draft in said bags, substantially as described.

6. A continuous kiln comprising a plurality of chambers each comprising a main body portion and a solid floor and a furnace located at one side of the chamber, said chamber having heating-flues beneath said floor and a vertical bag at its side, said furnace communicating directly with said bag and with said floor-flues respectively, and the outlet-flue of one chamber communicating with the floor-flues of another chamber, substantially as described.

7. A continuous kiln comprising a plurality of chambers each comprising a main body portion and a solid floor and a furnace located at one side of the chamber, said chamber having heating-flues beneath said floor and a vertical bag at its side communicating with said floor-flues, said furnace communicating directly with said bag and with said floor-flues respectively, and means for controlling the draft in said bag, and the outlet-flue of one chamber communicating with the floor-flues of another chamber, substantially as described.

8. A continuous kiln comprising a plurality of chambers, each comprising a main body portion and a solid floor, and a furnace located

at one side of the chamber, said chamber having heating-flues beneath said floor, and vertical bags communicating with said floor-flues and located at the side of the chamber
5 next to said furnace and at the side opposite thereto, said furnace communicating directly with the adjacent bag and with said floor-flues, and the outlet-flue of one chamber communicating with the floor-flues of another chamber, and means for controlling the course of the drafts, substantially as described.

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Witnesses:

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WILLIAM P. CARR.