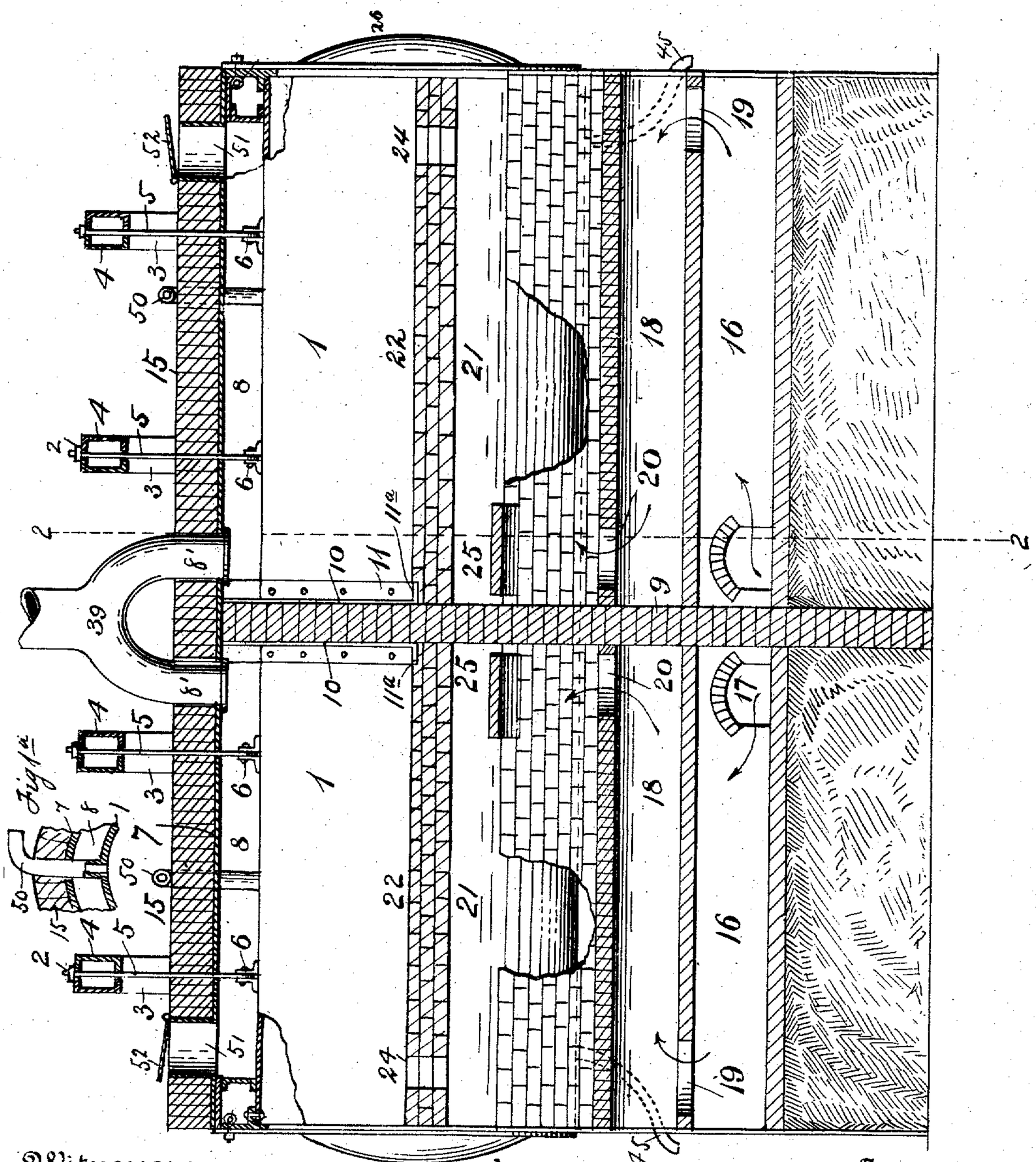
No. 774,261. PATENTED NOV. 8, 1904.

J. C. MALLONEE.

RETORT.

APPLICATION FILED JULY 18, 1903.

NO MODEL. 3 SHEETS—SHEET 1.




Witnesses:
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L. L. Burket.

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NO MODEL. 3 SHEETS—SHEET 2.

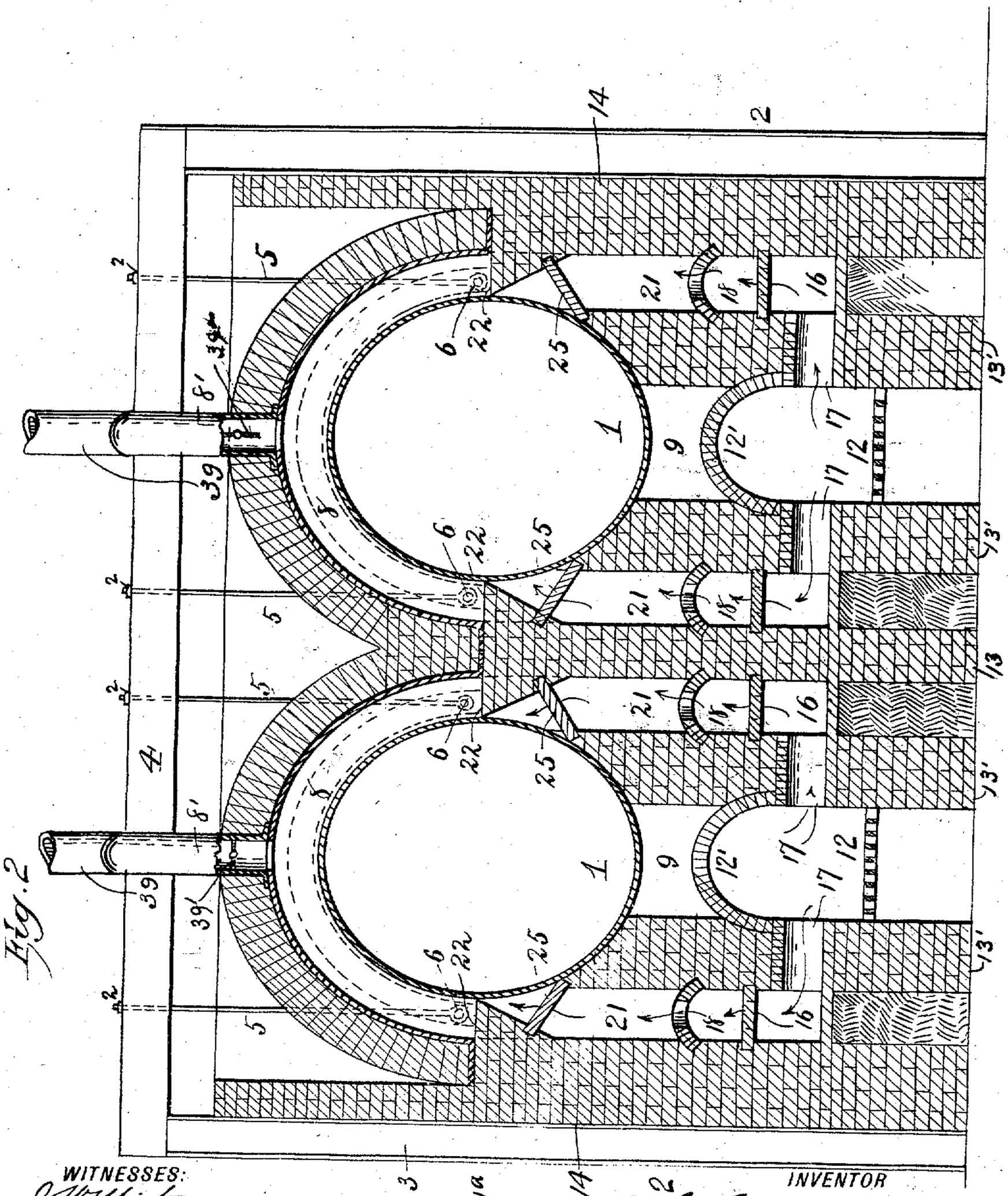


Fig. 2

Fig. 2a

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NO MODEL. 3 SHEETS—SHEET 3.

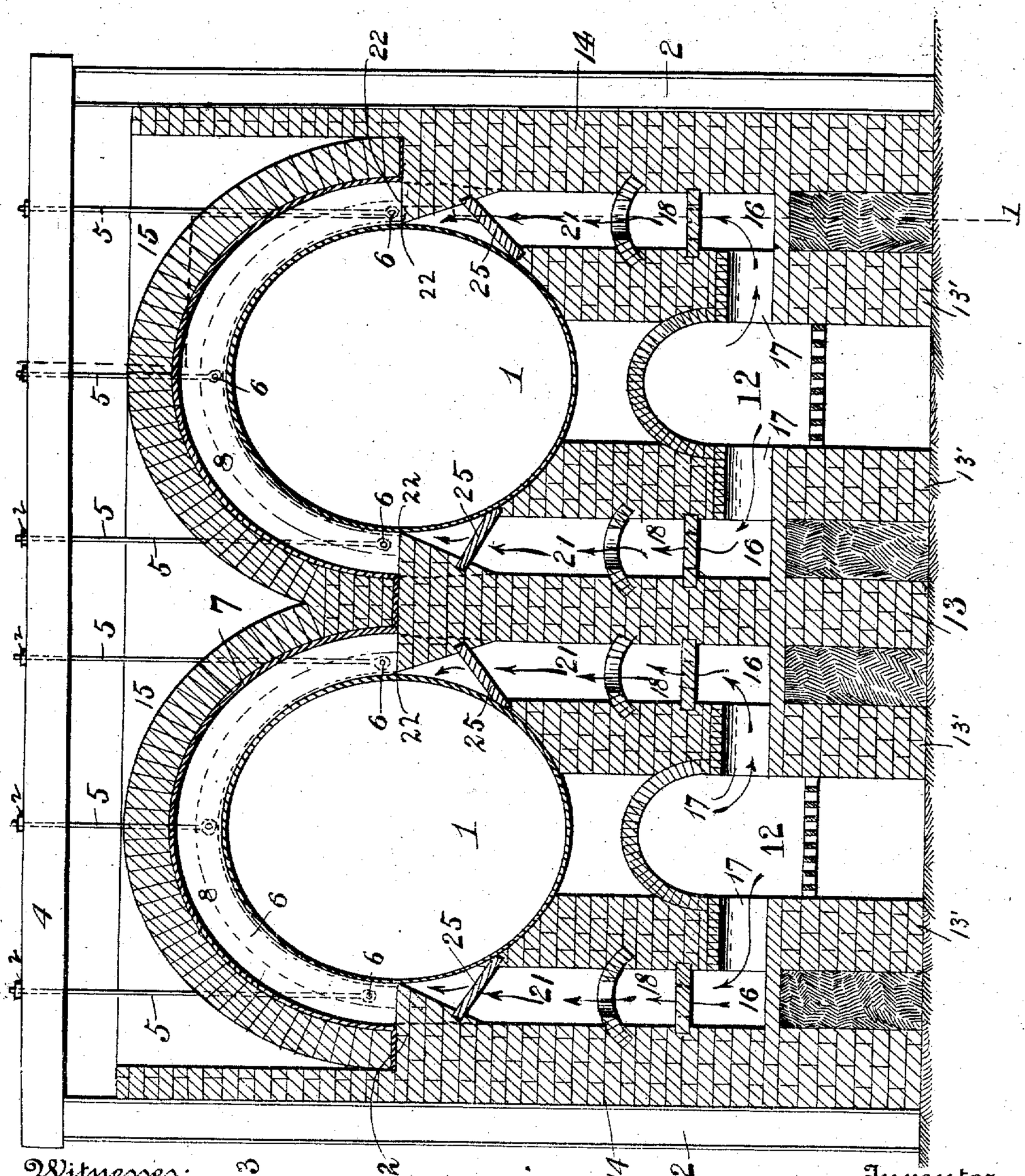


Fig. 3.

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No. 774,261. Patented November 8, 1904.

# UNITED STATES PATENT OFFICE.

JOHN COPLES MALLONEE, OF CHARLOTTE, NORTH CAROLINA, ASSIGNOR OF ONE-HALF TO JOHN JEFFERSON MALLONEE, OF CRICHTON, ALABAMA.

## RETORT.

SPECIFICATION forming part of Letters Patent No. 774,261, dated November 8, 1904.

Application filed July 18, 1903. Serial No. 166,140. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN COPLES MALLONEE, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented new and useful Improvements in Retorts, of which the following is a specification.

My invention has relation to retorts and furnaces generally, and particularly to such as are employed in the distillation of wood.

It is the object of the invention to provide a substantially reorganized apparatus, to the ends of securing economy and compactness in construction and convenience and efficiency in use.

The invention consists of the improved parts and features in an apparatus of the class mentioned hereinafter particularly set forth, reference being had to the annexed drawings, forming a part of this specification, in which like figures of reference designate like parts.

Of the said drawings, Figure 1 is a vertical longitudinal sectional view taken on the line 1 1, Fig. 3. Fig. 1ª is a detail view designed to clearly show the form of the elbow-flues 50. Fig. 2 is a transverse sectional view taken on the line 2 2, Fig. 1, looking toward the left. Fig. 3 is a cross-section taken on the same line as Fig. 2, but looking toward the right. Fig. 2ª is a detail view in perspective of the foot of one of the flanged rims secured to the retorts and supporting the sides of the cross-wall.

In my apparatus, which is intended for the dry destructive distillation of wood, two cylindrical retorts 1 are employed and are located side by side in the same horizontal plane. In order to support these retorts independently of the brickwork of the furnace, a framework of iron or steel is provided, which comprises several pairs of uprights 3, connected at their upper ends by cross-bars 4. The retorts 1 have a supporting connection with the cross-bars 4 through the medium of rods 5, passing through apertures in the cross-bars and having nuts 2 turned on their upper ends and connected at their lower ends to ears 6, riveted to the retorts. Any other known means of suspending the retorts from the cross-bars will answer as well so long as it permits of the functions hereinafter ascribed to the rods and their connections.

A smoke-cap 7, Fig. 3, is built over the top of each retort and extends the entire length thereof, and since said cap has the form of a half-circle in cross-section it embraces the upper half of each retort, and thereby establishes a passage or flue 8 for the heat and smoke.

The smoke in escaping from the passage 8 of each retort passes through one or the other of the branches 8′, Fig. 1, to and up through the main pipe 39, as will presently more clearly appear.

In order to heat the retorts 1, a furnace is provided for each, which furnace extends below the retort for its entire length and is double-ended and divided in its center by the cross-wall 9, thus making it into practically two furnaces for each retort. A longitudinal wall 13, Fig. 2, separates the two sets of furnaces and their side flues longitudinally, and the two walls 13′ under each retort serve as one side of the said flues and at their upper ends cut off the heat from the flues to the bottom of the retort and provide a safety-support, vertically if need be, for the retorts. Juts or offsets 22 on the two side walls 14, in combination with the same features on the center wall 13, form footings for the semicircular arches 15, sprung over the smoke-caps 7.

The cross-wall 9, as already shown, extends transversely of the retorts and is sprung over the latter at its top, passing to and under the smoke-cap 7 and arch 15, Fig. 1, thus not only dividing the furnaces and their flues centrally, as indicated, but also the heat and smoke passage or arch 8 over the upper half of the retorts as well.

In order to prevent the shattering of the cross-wall 9 by the expansion and contraction of the retorts, semicircular rims 10, provided with lateral flanges 11, (forming, as it were, angle-irons in cross-section,) Figs. 1, 2ª, are arranged on opposite sides of the cross-wall, the flanges 11 being riveted to the retorts,

while the rims or flanges 10 extend up along the sides of the wall to the smoke-cover and bear against the sides of the said cross-wall as lateral supports therefor. The said flanges or angle-irons have feet 11ª formed on their ends, which rest on the juttings 22 of the side walls 14 and center wall 13.

12 represents the furnace-chambers, the rear ends being formed, as stated, by the cross-wall 9 and the front ends being equipped with suitable doors 26. An arch 12′ is sprung over the tops of the furnace-chambers between the walls 13 and 13′, Fig. 2, to prevent the heat of the furnaces from directly heating the bottoms of the retorts and acting upon the liquids therein.

Located upon each side of the furnaces, between the walls 13 and 13′ and 13′ and 14, are flues 16, Fig. 1, which extend parallel to the furnace-chambers 12 and communicate therewith at their rear ends adjacent to the cross-wall 9 by means of passages 17. A flue 18 is located just above each flue 16 and communicates with said latter flues by means of passages 19, formed in the roof of the flues 16 near the forward end thereof. Each of the flues 18 has an aperture 20 in the rear end thereof, which apertures establish communication with passages 21, located above the flues 18, formed by the jutting inward of the walls 14, as at 22, which inward juttings at their inner upper edges touch the sides of the retort throughout their length, with the exception of a small space 24, where they are cut away to permit the smoke and heat to pass through to the smoke-arch 8 at top of the retorts under the caps 7. A slab 25, Fig. 2, is mounted just over the apertures 20 to serve as a deflector to prevent the flames from coming into direct contact with the retorts at substantially one spot above the slabs.

Elbow-flues 50, Fig. 1, connecting the interior of the retorts with the exterior atmosphere, serve to carry off the gases, or the latter may be conveyed to suitable receptacles (not shown) for further use or treatment.

Openings 51, controlled by flaps 52, serve to give access to the smoke-chambers 8 for any needed purpose and to cool off the retort quickly when it is desired to shut it down.

It is to be noted that the heat is carried from the furnaces by a zigzag course through flues at the sides of the retorts to the upper portion thereof and is kept away from the bottom. This construction is provided for the purpose named in the order to dissipate the flames as far as need be and distribute the heat as evenly as possible along the sides and over the tops of the retorts.

That the construction may be clearly understood, it is repeated that the division-wall 9 forms the rear or inner end of each furnace, or, in other words, separates what would otherwise be two furnaces into four. The said wall 9 also divides the flues at their longitudinal center, so that the flues of each furnace is independent of the other. As the flanges 10 extend up to and, indeed, in a measure support the caps of the small flues 8 and the space between the flanges is filled in with brickwork coincident with and, as it were, a continuation of the division-wall 9, the smoke space or arch 8 is divided at its longitudinal center, so that each chimney in side elevation is constructed at its bottom in the form of an inverted **Y**, one branch communicating with the smoke-arch on one side of the division-wall and the other with the other side. A damper is arranged in each branch so that should one furnace get out of order the damper may be turned to shut it off from the other and work proceed with the furnace or furnaces in working condition. There is one main smoke-stack 39 for each retort, as shown in Fig. 3.

The retorts 1 are not divided centrally, but have a door 26 at each end, by which full access may be had thereto. Furthermore, each retort is equipped with means, such as tar-outlets 45, (shown in dotted lines,) to render them practicable.

In use the retorts 1 may be filled with pine wood, to the distillation of which they are particularly adapted, through the doors 26 at each end of the retort and by any suitable means. As before stated, the said doors are made steam and air tight. Fire is started in each of the four furnaces 12 and maintained at a substantially even rate in each, so as to not only furnish heat of high degree and in great quantity to reduce the wood in the retorts, but to secure this end with substantial uniformity throughout the mass under treatment. From the furnaces 12 the heat and products of combustion pass to the rear and through ports 17 in the opposite side walls to the passage 16, thence forward and up through the ports 19 in the ceiling of passage-way 16 and into passage-way 18, thence to the rear of the latter passage-way up through the ports 20 into the passage-way 21, extending along the sides of the retort. Above the ports 20 are the deflecting-slabs 25, which operate to deflect or turn the heat or flame so that it is not so liable to strike the retort with absolute directness or in one spot. After passing along the chamber 21 the heat and products of combustion distribute themselves through the smoke-arch 8 and finally pass out through the stack 39. This action will of course take place in the four furnaces and their passages on both sides of each to the smoke-arch of each, the smoke passing from each smoke-arch through its branch pipe 8′ to the main stack or pipe 39.

By the means described the wood in the retorts will be reduced, the tar and other substances obtainable therefrom will settle to the bottom of the retorts and be taken out through the tar-outlets described, while the gas will escape through the gas-outtakes 50. The

bottoms of the retorts where the tar settles are quite sufficiently protected from the high heat of the furnace.

The invention is presented as an improvement upon the means to which it relates in that it economizes space, is readily controlled, is more efficient for the purposes for which it is designed, and performs its functions more speedily, because of its compactness and conservation of heat energy to efficient uses, besides being more durable.

I claim—

1. The combination, with the retort and means for suspending it independently of the brickwork, of the arch sprung over the retort and angle or flanged irons secured to the retort and bearing against the sides of the arch to support the latter in place against the contraction and expansion of the retort.

2. The combination, with the retort, of the party-arch sprung thereover, and the flanged or angle iron having one flange secured to the retort and the other bearing against the side of the arch.

3. The combination, with the retorts, of the side walls provided with juts or offsets at about the central longitudinal line of the retorts, and the center wall, the smoke-cap arranged over the retorts and having its footings on said offsets and central wall, and an arch sprung over the smoke-cap and also bearing on the said central wall and juts or offsets of the side walls.

4. The combination, with the two separated retorts and their furnaces, of the center and side walls provided with juttings, which at their tops touch the retorts along their entire length, a smoke-arch over each retort, zigzag flues through which the heat and smoke passes from the furnaces to the smoke-arch, the construction and arrangement being such that the said juttings will form the top of the flue next the smoke-arch.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN COPLES MALLONEE.

Witnesses:

J. A. AMMONS,

B. F. JORDAN.

## Correction in Letters Patent No. 774,261.

It is hereby certified that the name of the patantee in Letters Patent No. 774,261, granted November 8, 1904, for an improvement in "Retorts," was erroneously written and printed "John Coples Mallonee," whereas the said name should have been written and printed *John Caples Mallonee;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of December, A. D., 1904.

[SEAL.]

F. I. ALLEN,

*Commissioner of Patents.*

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