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Patented Sept. 9, 1902.

G. F. & H. N. GRAY & R. SOUTH.
KILN BURNING APPARATUS.

(Application filed Dec. 30, 1901.)

(No Model.)

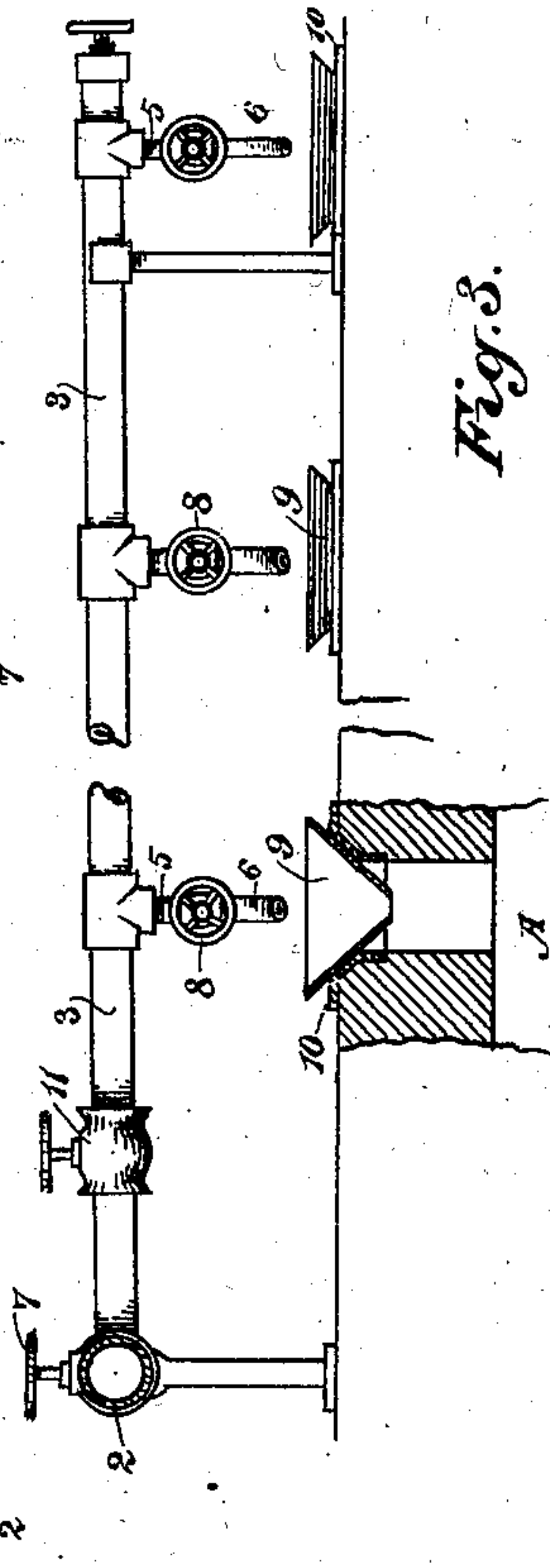
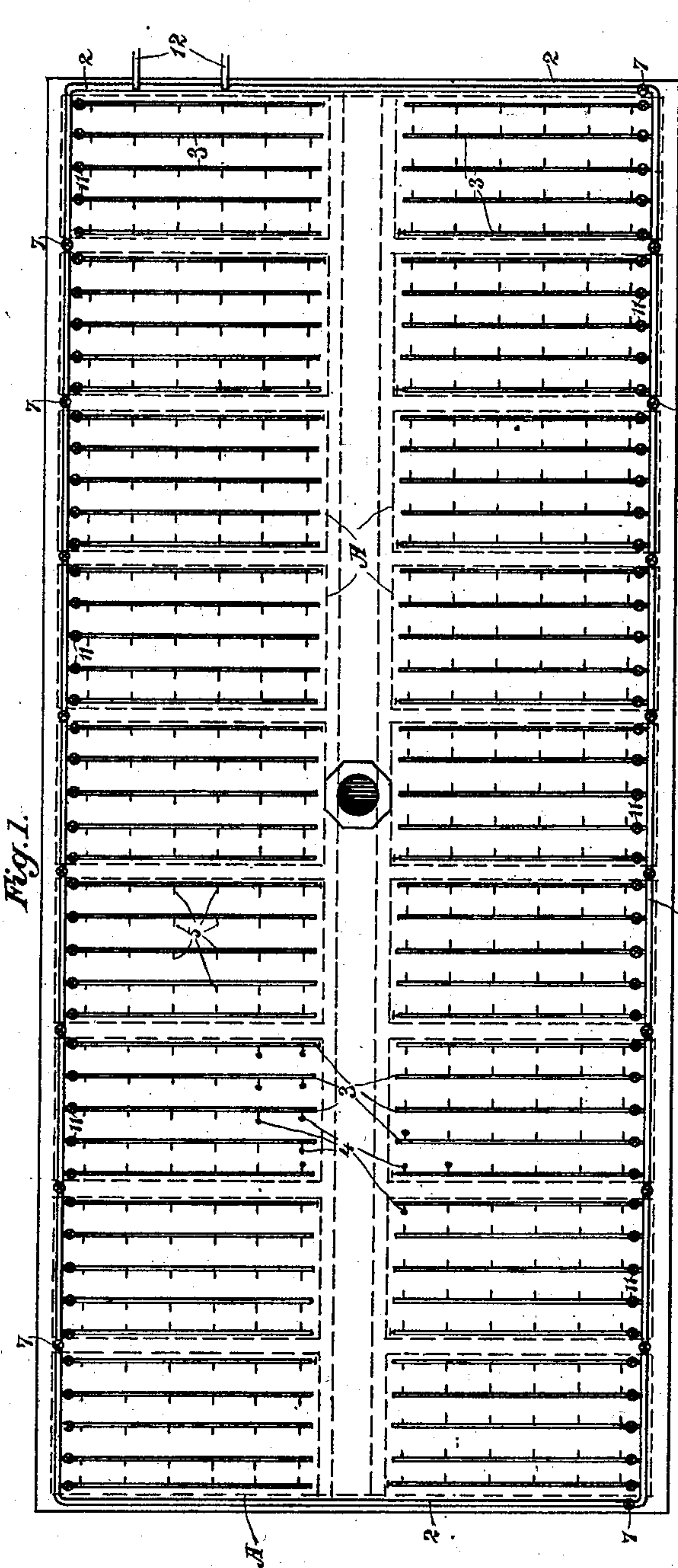
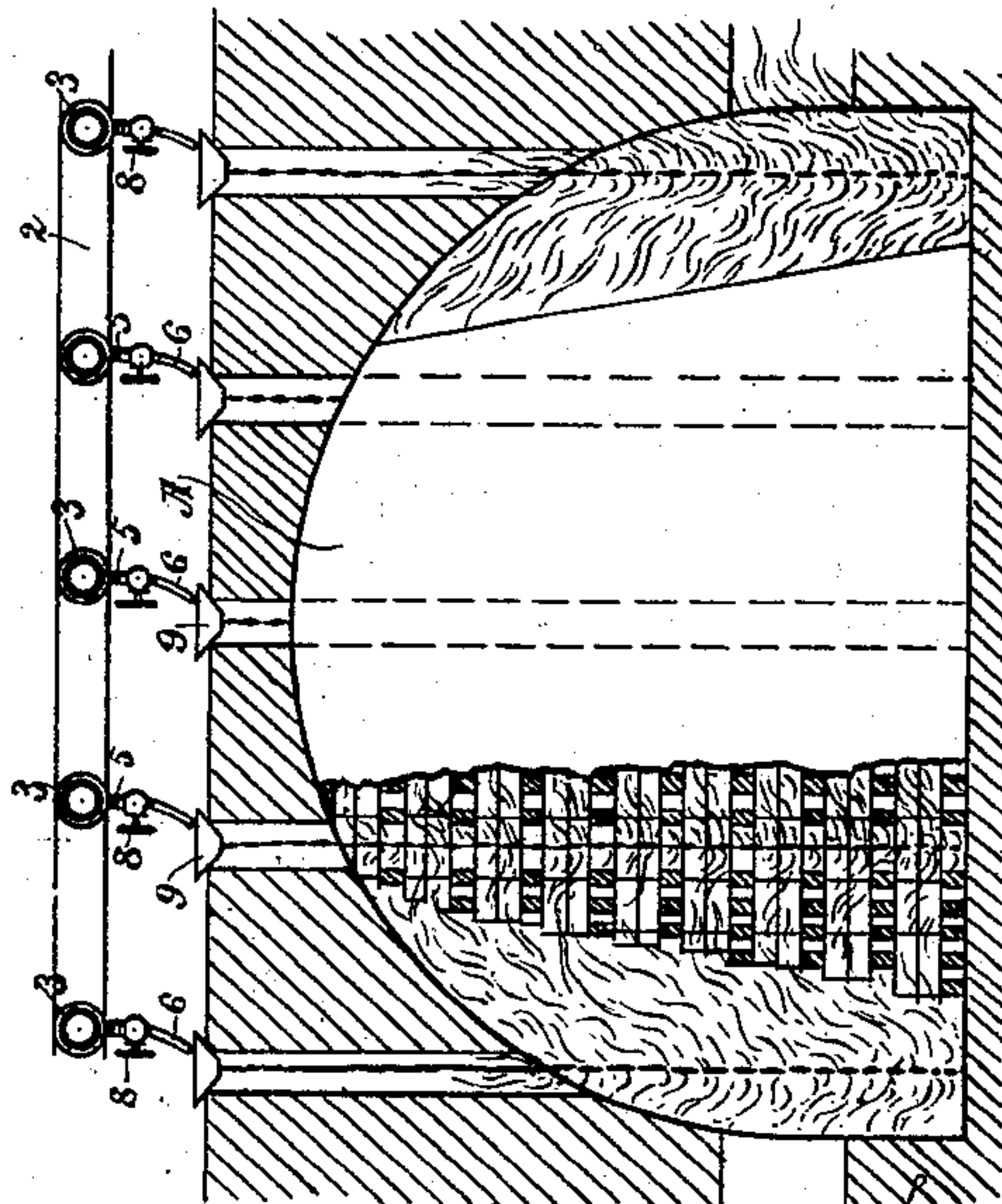


Fig. 3.



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KILN-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,707, dated September 9, 1902.

Application filed December 30, 1901. Serial No. 87,755. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. GRAY, HARRY N. GRAY, and RICHARD SOUTH, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Kiln-Burning Apparatus; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to improvements in brick, pottery, and similar burning-kilns, and is designed to provide a more effectual means for applying the heat and burning the wares within the kiln.

It consists, essentially, in the arrangement of drip-burners or supply-pipes, passages through which fuel-oil may be delivered into the desired portions of the kiln from above and the discharge regulated, and supply-pipes through which the fuel-oil is conducted to the burners.

It also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the top of a kiln such as is used for burning bricks, showing the arrangement of the conducting and burner pipes. Fig. 2 is a transverse section through a chamber. Fig. 3 is a side elevation of a branch pipe and connections.

In the construction of the kiln here illustrated there are two series of chambers arranged parallel with each other and upon opposite sides of a centrally-disposed smoke-chamber which extends longitudinally between the inner ends of the two lines of burning-chambers, and this smoke-chamber communicates with a chimney, so as to provide a sufficient draft to carry off the smoke, moisture, and products of combustion.

The chambers A are arranged in series with suitable connecting-passages, and the brick or other wares to be burned are piled in these chambers, with large open spaces between the piles of brick and the inner walls of the chambers, and sufficient passages are also interspersed through the mass to allow the heat to pass freely into the interior, so as to sufficiently bake all parts. This arrangement of the bricks is especially necessary for the

purpose of using oil as a fuel, since the proper combustion of the oil requires large open spaces where it can meet with the air necessary for its proper combustion. These chambers are arranged in successive series, so that the heat from chambers where the burning or baking is nearly finished is admitted into the next following chambers to gradually raise the temperature, and those chambers in which the green or moist bricks are piled have a sufficient heat admitted to them to first drive off the moisture, which is termed "water-smoke," and this "water-smoke" is conducted away, so as not to condense upon and soften the green bricks before they are ready to be burned.

The fuel-supply consists of a heavy hydrocarbon oil which is admitted from a suitable source of supply into pipes 2, which are led around above the upper part of the kiln, and from these pipes 2 branch pipes 3 extend inwardly to points above the openings 4, which are formed in the top of the kiln and serve to admit the fuel-oil thereinto. With the pipes 3 are connected the vertical pipes 5, having the reduced drip-nozzles 6, leading downwardly in line above the openings or passages 4.

7 represents controlling-cocks in the main pipes and by which the delivery of the oil to the different parts of the kiln may be increased or diminished as the burning requires, and 8 are cocks in the drip-burner pipes, by which the supply to each individual burner is regulated. Peep holes or openings are made through which the interior of each chamber may be inspected and the requirements noted. The class of oil used for the purpose is a heavy unrefined petroleum known as "fuel-oil." This oil combines in itself inflammable materials having various degrees of vaporization. Cocks or valves 11 control the flow through each of the pipes 3, as shown.

The operation of burning would be as follows: The oil being allowed to drip through the burner-pipes falls through the openings or passages 4 and into the upper part of the burning-chamber, and the high heat therein immediately vaporizes the lighter portion of the oil, which burns fiercely around the upper

portion of the pile of bricks. The heavier portion of the oil continues to drop through the space between the bricks and the inner wall of the chamber, in line with which the oil-supply is disposed, and the less volatile portions becoming more highly heated during the descent will in their turn become volatilized and ignited until the heaviest residue of the oil has reached the bottom and there burns around the lower part of the pile of bricks. By thus delivering the oil to fall by gravitation through the highly-heated atmosphere of the burning-chamber we are enabled to produce a flame and heat derived from all portions of the oil, from the heaviest to the lightest, and which thus pervades the whole interior of the chamber, and the burning is quickly and evenly effected.

The pipes 2 pass around the periphery of the upper part of the kiln and may be supplied by gravitation or by pump through one or more pipes, as at 12. The cocks 7 are so disposed that by closing the one nearest the inlet, as at the top near the right end of Fig. 1, the oil will be diverted into the transverse pipes 3 and is controlled by the cocks 11 in those pipes and 8 at the delivery and the heat gradually raised in the first chamber of the kiln until the water-smoke has been driven off, when the first cock 7 will be opened to admit oil to the second section of the kiln for a like purpose. By the regulating-cocks 11 and 8 the supply to the first chamber is increased, and thus additional chambers are brought in until the first chamber will be finished, when some chamber in advance, as the fourth, will be commencing. The oil-supply will then be shut off from the completed chamber, which will be cooled down until the contents can be removed and the work thus continued around the kiln, new chambers being filled and burned while the finished ones are being emptied. The transverse pipes 3 preferably incline upwardly from the pipes 2 toward the center of the kiln, as shown in Fig. 3, so as to maintain a pressure throughout these pipes and insure a regular supply

to each of the nozzles 6 from the inner to the outer end.

The openings in which the hoppers or funnels 9 are located are preferably provided with seats or hinges 10 around the top, and the funnels fit these seats, as shown in Fig. 3. The pipes 3 are located at one side of a direct vertical line above the funnels to protect them from the heat, and the nozzles 6 are sufficiently curved to discharge into the funnels, as in Fig. 2.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A brick-kiln comprising a series of chambers containing the bricks; open combustion-chambers between the bricks and interior walls of the chamber; and oil-drip tubes and nozzles located above the roof of the kiln said roof having openings through it in line with the drip-tubes and leading the oil into the upper limits of the combustion-chambers whereby the oil is successively burned while dropping through the vertical height of said chambers.

2. A brick-kiln comprising a series of chambers containing the bricks; open combustion-chambers between the bricks and interior walls of the chamber; oil-drip tubes and curved nozzles located above the roof of the kiln said roof having vertical openings through it and leading the oil into the upper limits of the combustion-chambers whereby the oil is successively vaporized and burned while dropping from roof to floor of the chambers; seats fitting the upper ends of the vertical openings and funnels fitting said seats and receiving the drip from the nozzles.

In witness whereof we have hereunto set our hands.

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Witnesses:

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