No. 748,361. PATENTED DEC. 29, 1903.

J. W. GAYNER.

GAS PRODUCER SYSTEM.

APPLICATION FILED JUNE 26, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

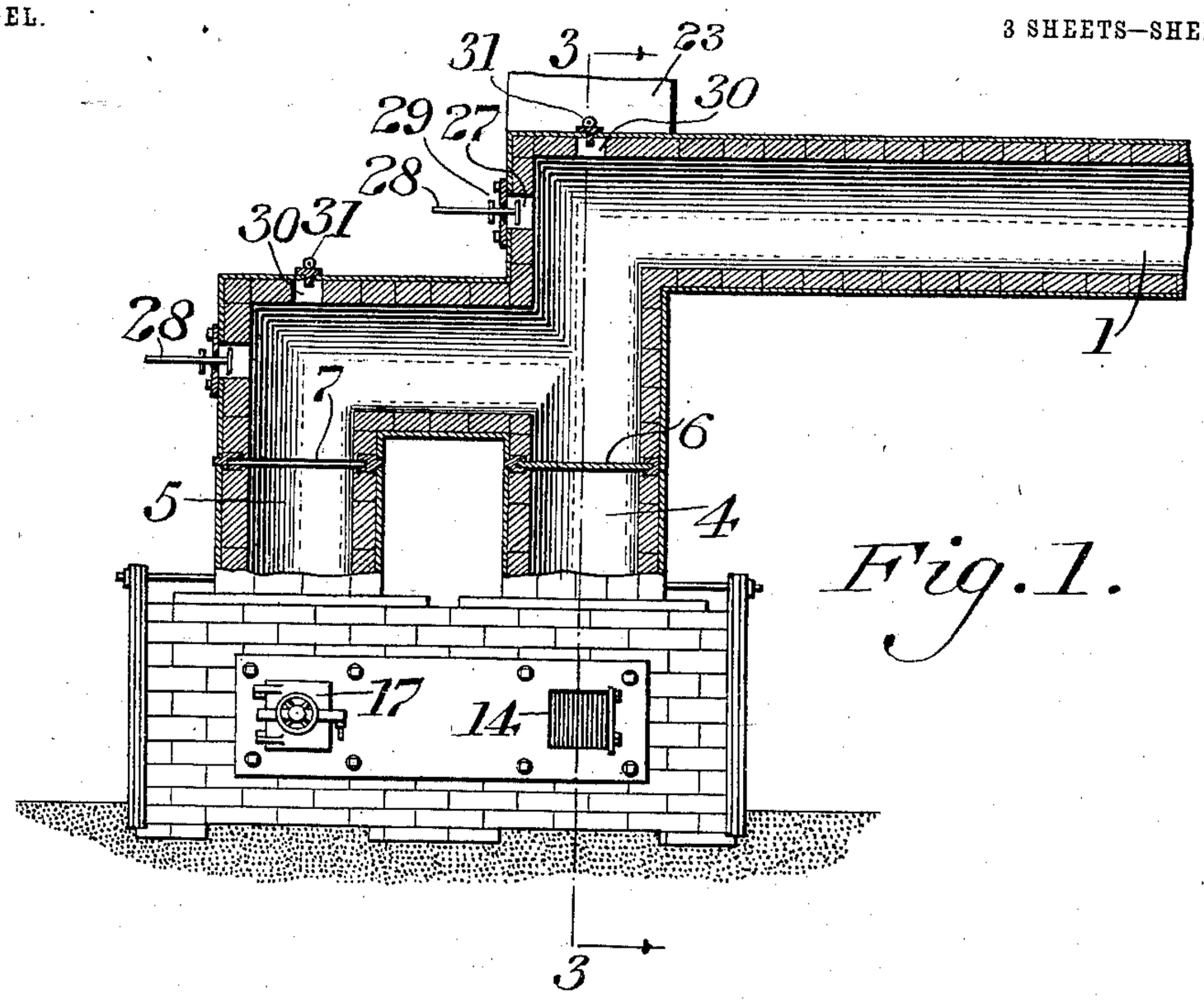
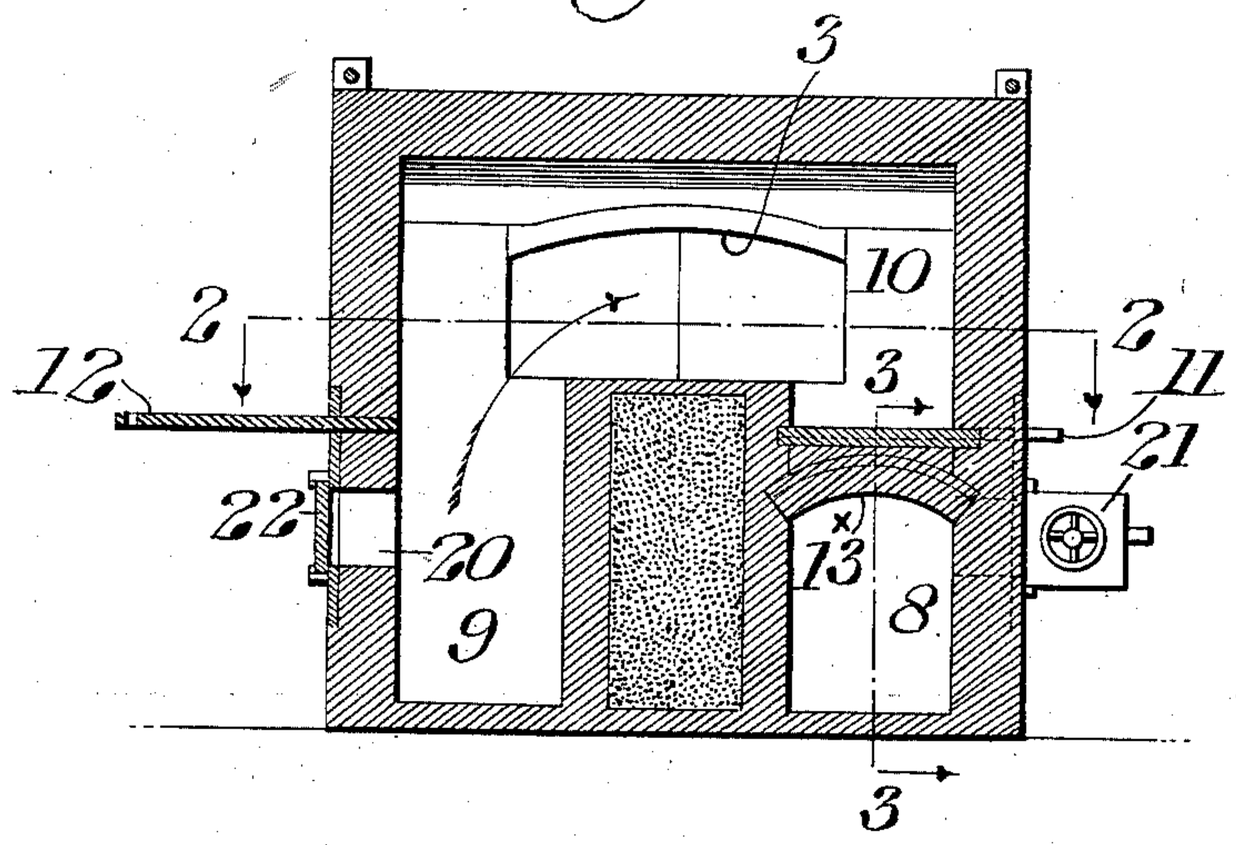



Fig. 1.

Fig. 4.

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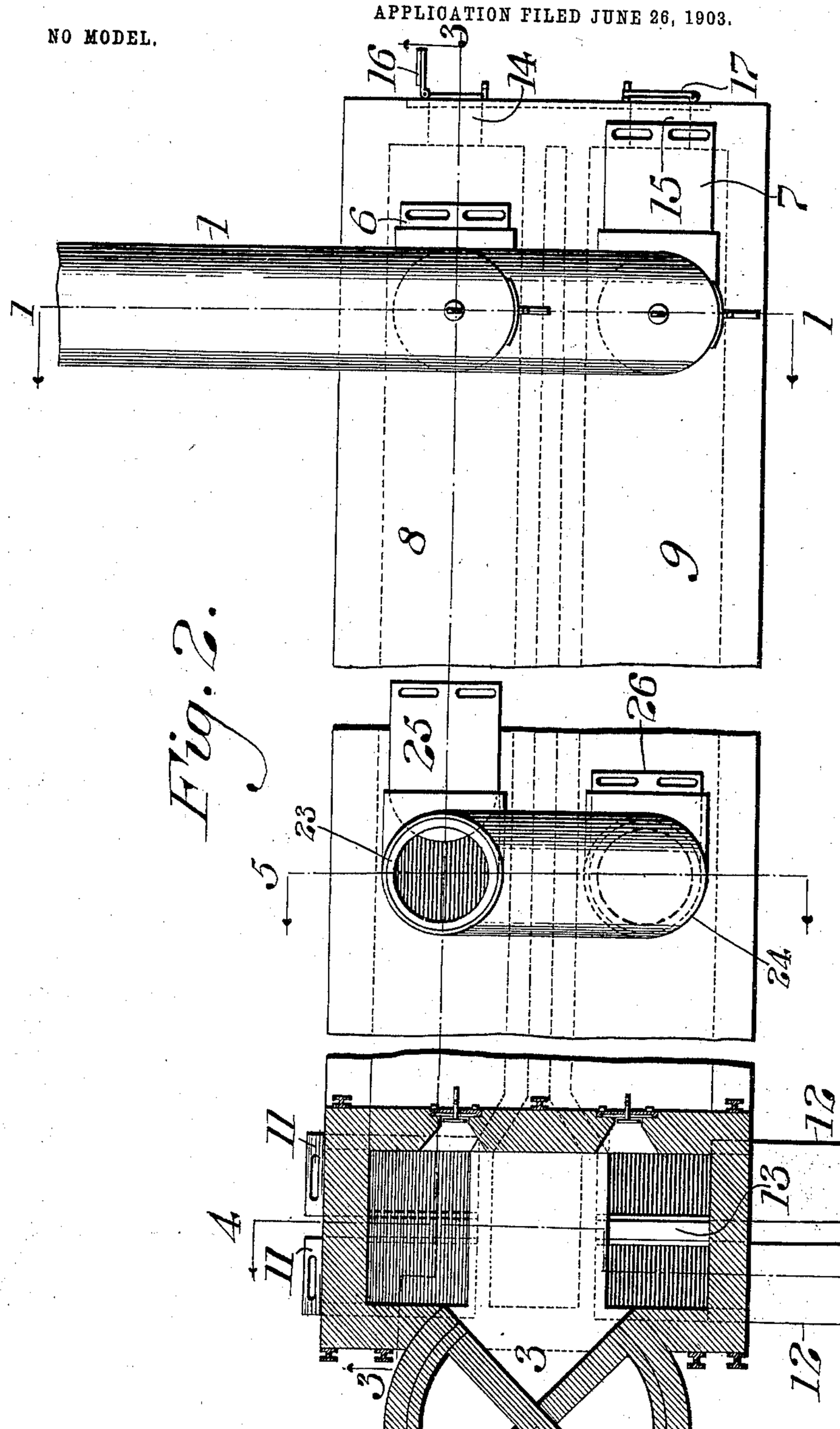
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 3.

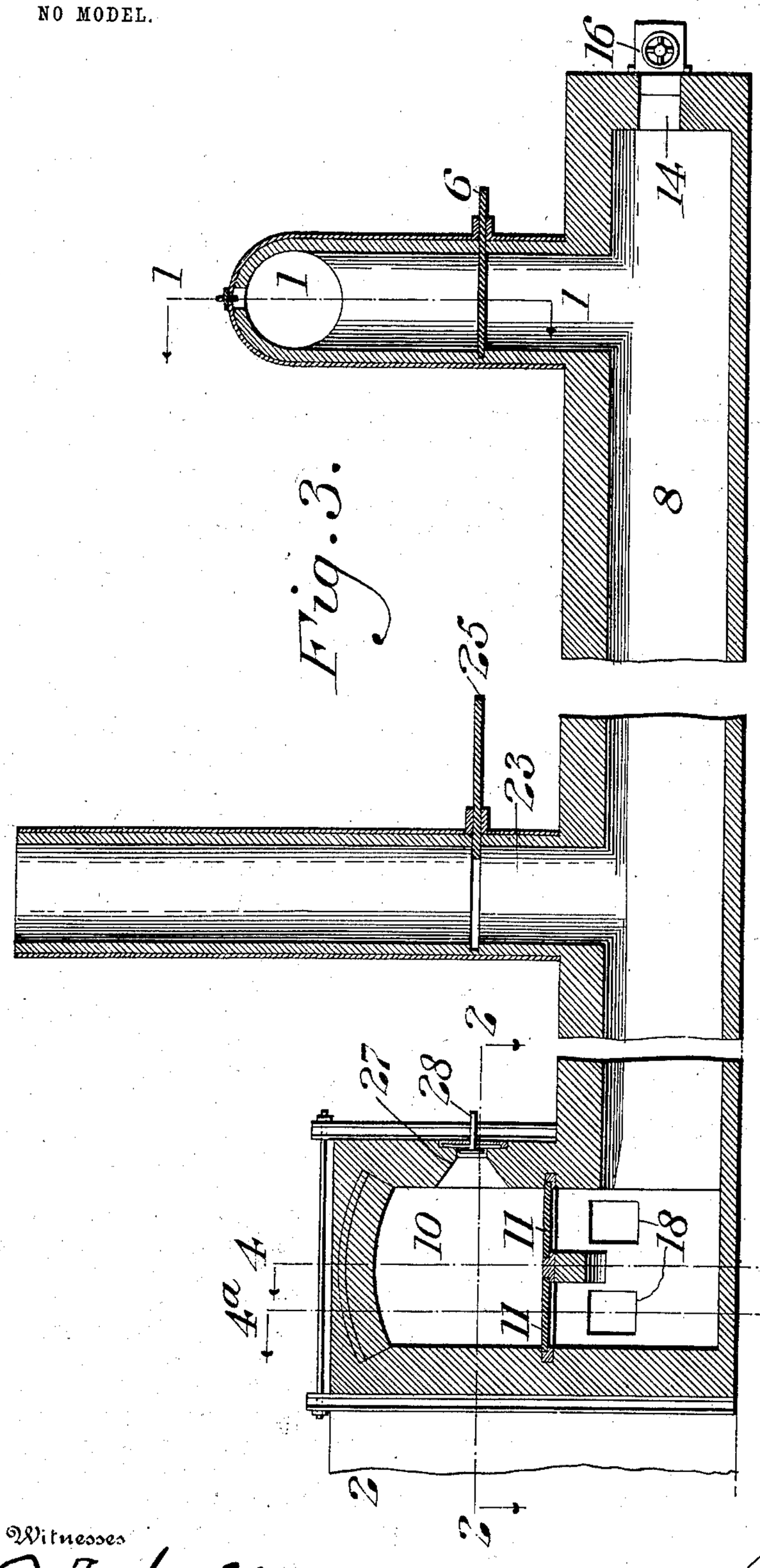


Fig. 3.

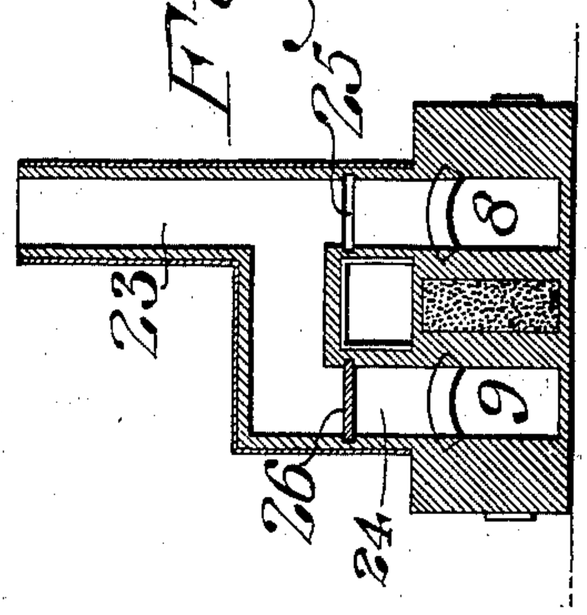


Fig. 5.

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# UNITED STATES PATENT OFFICE.

JOHN WILLIAM GAYNER, OF SALEM, NEW JERSEY, ASSIGNOR TO AMERICAN PRODUCER-GAS FURNACE CO., A CORPORATION OF NEW JERSEY.

## GAS-PRODUCER SYSTEM.

SPECIFICATION forming part of Letters Patent No. 748,361, dated December 29, 1903.

Application filed June 26, 1903. Serial No. 163,211. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WILLIAM GAYNER, a citizen of the United States, residing in the city and county of Salem, State of New Jersey, have invented a new and useful Improvement in Gas-Producer Systems, of which the following is a specification.

My invention has reference to a gas-producer system, and more particularly to means for removing the accumulations of soot in the conduit leading from the gas-producer to the place of comsumption, having for its object the removal of these accumulations without cutting off the supply of gas, whereby a continuous and uninterrupted supply may be maintained at the place of consumption.

Figure 1 represents an end elevation, partially in vertical section, on the line 1 1 of Figs. 2 and 3 of a gas-producer system constructed in accordance with my invention. Fig. 2 represents a plan view thereof, partially in horizontal section, on the lines 2 2 of Figs. 3 and 4. Fig. 3 represents a vertical longitudinal section taken on the line 3 3 of Figs. 1 and 2 and partially the line 3 3 of Fig. 4. Fig. 4 represents a vertical transverse section taken on the line 4 4 of Fig. 2, the right-hand side of Fig. 4 being taken on line 4 4 of Fig. 3 and the left-hand side of Fig. 4 being taken on the line $4^a$ of Fig. 3. Fig. 5 represents, on a reduced scale, a vertical transverse section taken on the line 5 5 of Fig. 2.

Similar numerals of reference indicate corresponding parts in the figures.

A large amount of soot accumulates in the conduits leading from gas-producers and to such an extent as to reduce the conduit area and impair the operation of the system. When these accumulations are to be removed, in some systems it is necessary to shut down the plant, which is undesirable, for obvious reasons; and it is the object of this invention to produce a gas-producer system wherein the soot accumulations can be removed without interfering with the operation of the gas-producer or the furnace or plant supplied with fuel thereby.

In accordance with the broad principle involved by my invention I employ a divided conduit leading from the gas-producer to the place of consumption with means for opening and closing one of the divisions with respect to the division through which the gas is passing and means for removing the accumulations from the division so closed. In this way the gas can pass uninterruptedly and continuously from the gas-producer to the place of consumption while the soot is being removed, thereby obviating the necessity of shutting down the plant.

My invention is of course susceptible of many specific embodiments, not only in the arrangement and function of the longitudinal divisions of the conduit, but in the manner of removing the soot, and therefore, except in the claims, for the specific embodiment I show and describe in this application, I am not limited thereto, as the same is selected for the purpose of illustrating the broad principle of my invention. For instance, I have shown specifically an underground conduit system with a longitudinal wall dividing the structure, which is of course the equivalent of two independent pipe-conduits that would be used in an overhead system—that is to say, masonry conduits are preferably employed in an underground system and pipe-conduits in an overhead system similar to the conduits employed in the single conduit systems now in use—and I have also shown specially each longitudinal division of the conduit as adapted to convey the gas and means for closing each when gas is passing through the other, so that the deposit of the soot is due to the passage of the gas therethrough, this being a conveniently and highly efficient construction; but I do not consider that my invention is limited thereto, but that it embraces any longitudinal division of the conduit between the gas-producer and place of consumption, with means for depositing soot in one division and closing the same with respect to the conduit through which the gas is passing and then removing the soot from the closed division. Again, I have shown a construction including means for converting one of the divisions into a furnace by which the soot is removed by burning; but it is obvious that after closing the division with respect to the conduit any means can be employed to remove the soot

and still be within the scope of my invention. With this statement explanatory of the broad principle of my invention I will now describe the said specific embodiment I have selected to illustrate the same.

The main conduit 1 leads from the gas-producer, the latter not being shown, as it does not *per se* form a part of my invention. Also at the other end of the conduit system I have shown an ordinary gas-distributing valve 2, to which the outlet end 3 of the conduit system leads, although this distributing-valve 2 is not shown in detail, as it is of ordinary construction and forms no part of my invention. As before stated, between the gas-producer and the outlet 3 of the conduit system there is a longitudinally-divided conduit provided with means for opening and closing one of the divisions relative to the conduit system through which the gas passes and with means for removing the soot accumulations from this division when it is closed relative to the conduit system. It is understood, of course, that one of these divisions could be employed merely for the accumulation of soot and the other division for the conveyance of gas; but conveniently I employ both divisions for conveying the gas, as well as for the accumulation of soot, and I will now describe this specific structure which I have illustrated for the purpose of explaining my invention, although it is understood that my invention is not limited to the specific embodiment shown.

The main conduit 1 is provided with downwardly-extending branches 4 and 5, the latter conveniently consisting of upright and horizontal portions having the valves 6 and 7, although it is understood that in an overhead system these branches would project upwardly and continue as independent pipes similar to the pipes used in a conduit system employing a single pipe and that the divisions leading therefrom would also be elevated. These branches are the beginning of the longitudinal divisions of the conduit and at their lower ends communicate with horizontal conduits 8 and 9. At the other end of these conduits 8 and 9 and situated above the same is a chamber 10, with which said conduits 8 and 9 communicate through openings in the bottom of said chamber 10. These openings between the conduits 8 and 9 and chamber 10 are controlled by valves 11 and 12 sliding in suitable guides at the sides of the chamber and upon a central guide 13 about midway between the ends of the chamber that is supported by an arch $13^{\times}$. (Best seen in Figs. 3 and 4.) Thus it is seen that the main conduit 1 divides at the branches 4 and 5 and then extends by longitudinal divisions 8 and 9 to the chamber 10, where these longitudinal divisions unite and pass to the valve 2 through the outlet 3.

Adjacent the branches 4 and 5 and conveniently at the ends of the conduits are the valved openings 14 and 15, the valves for these openings being conveniently in the form of doors 16 and 17, respectively. At the other end of each of the longitudinal divisions 8 and 9 of the conduit are also valved openings 18 and 20, the valves for these openings being in the form of doors 21 and 22 and situated just below the valves 11 and 12.

The chimneys or stacks 23 and 24 lead from each of the longitudinal divisions 8 and 9 of the conduit conveniently about midway between the ends of the conduit, these stacks being provided with valves 25 and 26, the stack 24 communicating with the stack 23 above the valve 25.

With the construction above described by opening the valves at the ends of the division in which the soot has accumulated and opening the communication between said division and the stack or chimney a furnace is created and the soot is removed by being burned out; but it is obvious that such burning would not remove the soot above the valves 6 and 7 and 11 and 12, and as practically all portions of the walls of the conduit system from the gas-producer to the valve 2 accumulate soot I have shown means for conveying the same manually to a point below these valves. For instance, opposite the end of the main conduit 1 is an opening 27, through which extends a hoe or scraper 28. The handle of this scraper is short, but may be given the necessary length by additional sections suitably secured thereto. The blade of the scraper extends within the opening 27 permanently, being held by a pin 29 passing through the handle thereof, which is removed when the hoe is to be manipulated. Opposite the end of the horizontal portion of the branch 5 is another hoe 28, arranged as above described, while situated above the vertical portions of the branches 4 and 5 are the openings 30, closed by removable caps 31, and through which a suitable rod or poker may be inserted to dislodge the soot in these vertical portions. On the inner end wall of the chamber 10 are arranged a plurality of openings 27, into which hoes 28, like those above described, are inserted and by means of which the walls of these chambers can be scraped to deposit the soot below the valves 11 and 12, it being noted that the openings through which the handles of the hoes 28 extend are flaring, so that the hoes may be manipulated laterally to reach the parts of the conduits and chambers into which they are inserted.

With the parts thus constructed the operation is as follows: I have shown the parts in the position they assume when the soot is being removed or being burned out from the longitudinal division 8 of the conduit, it being noted that the gas has just been flowing through this conduit to the place of consumption, in which case the position of all the valves would be reversed. When the accumulation of the soot in this longitudinal divi-

sion 8 necessitates its removal, the first step is to open the valves 7 and 12 and to close the valves 17, 26, and 22, it being understood that the corresponding valves on the other side of the system are in the same position. This is done to permit the circulation of the gases before cutting out the conduit 8. Then the hoes or scrapers 28 are manipulated to remove the soot in the main conduit 1 and the horizontal portion or branch 5 into the vertical portion or branch 4, a bar also being inserted in the opening 30 at the upper end of the branch 4 to remove the accumulations on the vertical side of this branch. Then the valve 6 is closed. After manipulating the hoe 28 in the chamber 10 on the side of the longitudinal division 8 to remove the accumulations therein into the end of the division 8 the valves 11 are closed. Then the gas is passing from the main conduit 1 through branch 5, the longitudinal division 9, and chamber 10 to the outlet 3. When the soot is to be burned out, the valve 25 in stack 23 is opened to give an outlet from the division 8, and then the doors or valves 16 and 21 at the ends of these longitudinal divisions 8 are opened to create a furnace, whereby combustion takes place, burning out the accumulated soot in the well-known manner. The gas is allowed to pass through the division 9 until the accumulations therein necessitates removal, whereupon the valves are manipulated reversely and the same operation carried out on the side of the system corresponding to the division-line, as above described.

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

1. In a gas-producer system, a main conduit, a divided conduit communicating therewith, means for closing one of said divisions relative to the main conduit, and means for removing the soot accumulations from the closed division.

2. In a gas-producer system, a main conduit, a divided conduit communicating therewith, means for closing one of said divisions relative to the main conduit, and means for opening said closed division to the atmosphere.

3. In a gas-producer system, a main conduit, a divided conduit communicating therewith, means for closing one of said divisions relative to the main conduit, and means for opening the end portions of said closed division and for opening said closed division between its ends.

4. In a gas-producer system, a main conduit, a divided conduit communicating therewith, means for opening and closing one of said divisions relative to the main conduit, and means for removing soot accumulations from said division when the conduit is closed relative to the main conduit.

5. In a gas-producer system, a branched conduit for leading the gas to the place of consumption, means for closing the communication between said branches, whereby the gas passes through only one of said branches to the place of consumption, and means for removing soot accumulations from the other branch.

6. In a gas-producer system, a main conduit leading to the place of consumption and branched between its ends, and means for closing the communication between said branches and for opening one of said branches to the atmosphere.

7. In a gas-producer system, a branched conduit leading the gas to the place of consumption, and means for closing the communication between said branches, and for opening one of said branches to the atmosphere.

8. In a gas-producer system, communicating conduits between the gas-producer and the place of consumption, and means for closing the communication between said conduits and for opening one of said conduits to the atmosphere.

9. A longitudinally-divided gas-producer conduit having means for closing one of such divisions as against the passage of gas, means for introducing a supply of air to such closed division, and means for taking therefrom gaseous products of combustion.

10. A longitudinally-divided gas-producer conduit having means for closing one of such divisions as against the passage of gas, and means for introducing a supply of air to such closed division and a stack connected with such closed division.

11. A longitudinally-divided gas-producer conduit having means for closing one of such divisions as against the passage of gas, a plurality of apertures for introducing a supply of air to such closed division, and a stack connecting such division intermediate said apertures.

12. A gas-producer conduit longitudinally divided throughout a substantial portion of its length and having means for closing one of said divisions as against the passage of gas, means for opening such closed division to the atmosphere, and means adjacent an end of the undivided portion for removing soot or the like therefrom.

13. A gas-producer conduit longitudinally divided throughout a substantial portion of its length and having means for closing one of said divisions as against the passage of gas, means for opening such closed divisions to the atmosphere, and means adjacent an end of the undivided portion for transferring soot or the like from such undivided portion to one of such divisions.

14. A gas-producer conduit longitudinally divided throughout a substantial portion of its length and having means for closing one of said divisions as against the passage of gas, means for opening such closed divisions to

the atmosphere, and a closured tool-introducing aperture adjacent an end of such undivided portion.

15. A gas-producer conduit divided into a plurality of branches and having gas-closure valves and air-admission apertures adjacent the ends thereof.

16. A gas-producer conduit divided into a plurality of branches and having gas-closure valves and air-admission apertures adjacent the ends thereof and closured apertures in its wall exterior of said valves.

17. A gas-producer conduit divided into a plurality of branches and having gas-closure valves and air-admission apertures adjacent the ends thereof and an outlet for gaseous products of combustion in said branches.

18. A gas-producer conduit having a plurality of branches each of which includes in its length a furnace portion having air-apertures adjacent its end and a stack common to such furnaces.

19. A gas-producer conduit having a plurality of branches each of which includes in its length a furnace, a chamber at the outlet end of said branches and valves between each of said branches and said chamber.

20. A gas-producer conduit having a plurality of branches each of which includes in its length a furnace, a chamber at the outlet end of said branches, valves between each of said branches and said chamber and closured inlet-apertures in said branches adjacent said valves.

21. A gas-producer conduit having a plurality of branches each of which includes in its length a furnace and a stack common to all said furnaces and valves between each of said furnaces and said stack.

22. In a gas-producer, a branched conduit for leading the gas to the place of consumption, means for conveying into said branched conduit the soot accumulating beyond the ends of the same, means for closing the communication between said branches, whereby the gas passes through one of said branches, and means for removing the soot accumulations from the other of said branches.

23. In a gas-producer system, a main conduit leading from the gas-producer, a divided conduit communicating therewith at one end and with a common outlet at the other end, means for closing either of said divisions with respect to the main conduit and the common outlet, and valved inlet and outlet openings for said divisions for opening the same to the atmosphere when the same are closed with respect to said main conduit and common outlet.

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