

J. F. KISTLER.
GAS APPARATUS.
APPLICATION FILED JULY 12, 1909.

946,371.

Patented Jan. 11, 1910.
2 SHEETS—SHEET 1.

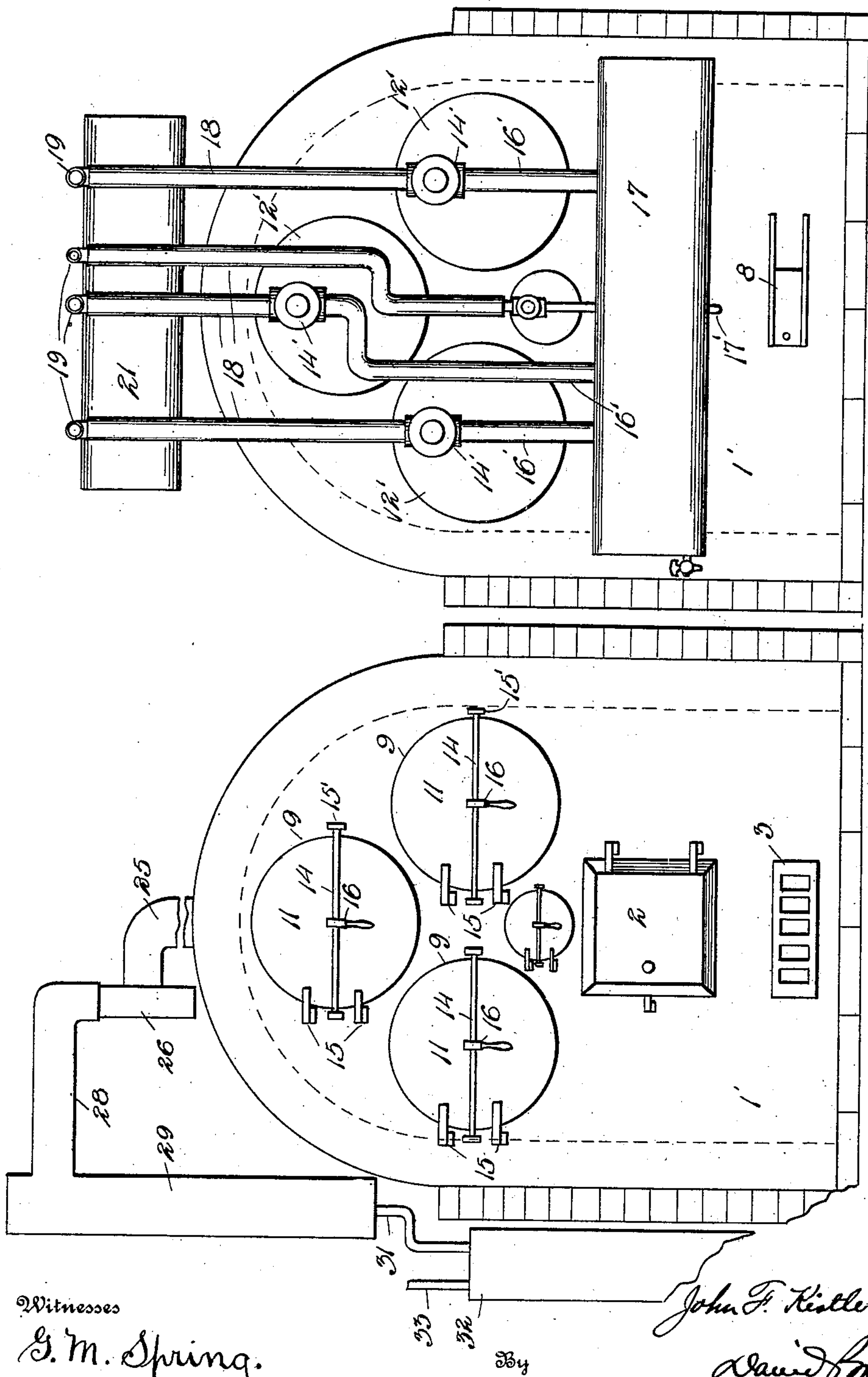


Fig. 2.

Fig. 1.

Witnesses

G. M. Spring.
M. C. Moore.

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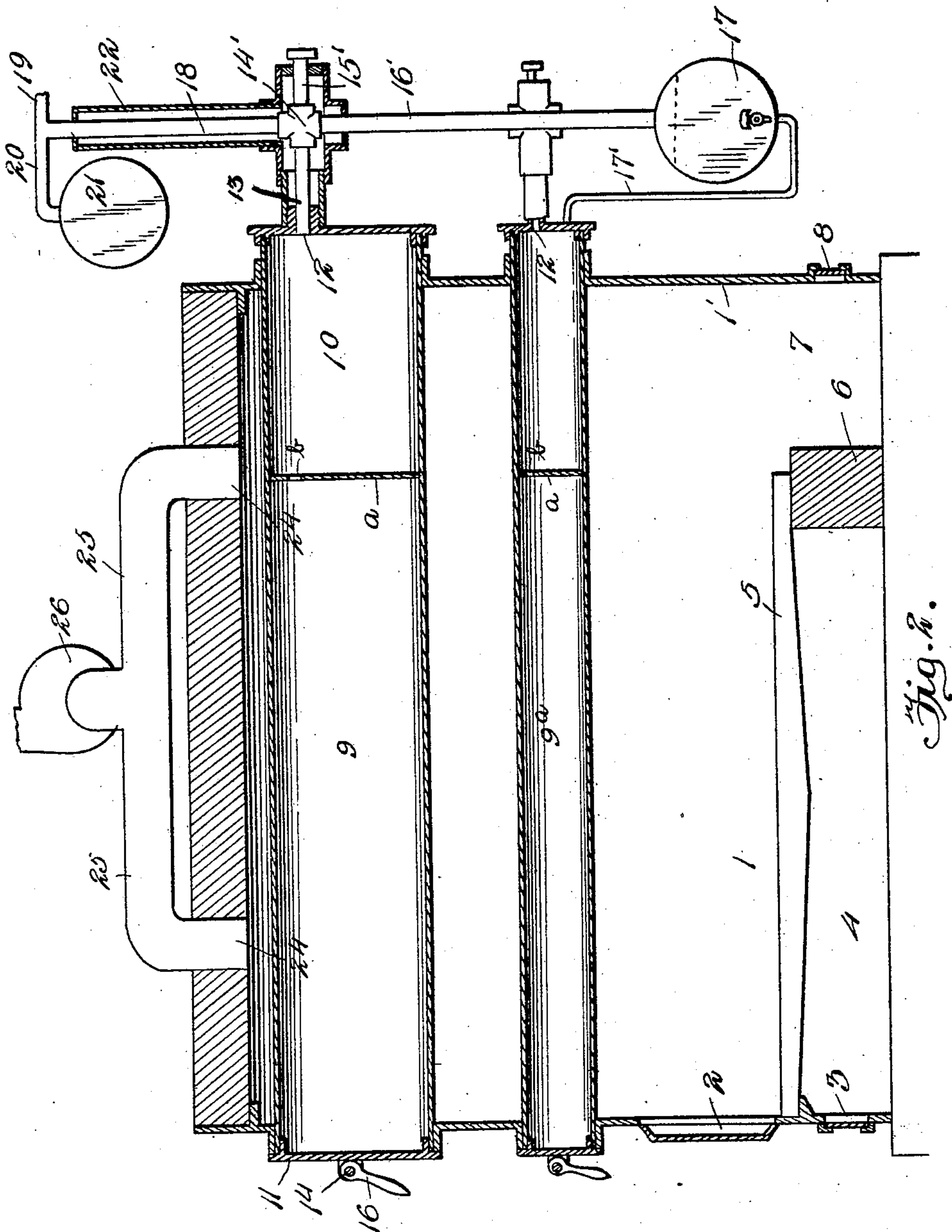


Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN F. KISTLER, OF SAN FRANCISCO, CALIFORNIA.

GAS APPARATUS.

946,371.

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To all whom it may concern:

Be it known that I, JOHN F. KISTLER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Gas Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to an improved gas generator, incinerator and crematory, and is specially designed to be used in the manufacture of gas for illuminating, fuel, heat and power purposes, and is adapted and designed to extract the maximum amount of gas from coal, crude or refined oil, wood, vegetable matter, garbage or refuse from houses, stables, abattoirs, streets, and farms, corn stalks, cobs, hay, straw, and in fact any carbonaceous material that can be burned or decomposed by heat.

It is also specially designed for cremating dead animals and other refuse.

A further object is to so construct the apparatus, that no smoke is permitted to escape into the air, therefore producing a sanitary apparatus, which can be operated in or near a city with perfect safety, as to health.

I have also particularly designed my apparatus, so that it can be used in connection with any established gas-works, thus making it advantageous for any city or gas company to install, for the refuse from the city can be used to great advantage and thus turn a waste into a useful by-product.

With my apparatus, it is possible to manufacture a gas for approximately 10¢ per 1,000 cubic feet, and the by-products, I have found will practically pay the operating expenses.

To more clearly illustrate the invention, and bring out the many points of advantage of the same, attention is invited to the accompanying drawings, in which:—

Figure 1 is a front elevation of my invention, showing the arrangement of draft and furnace door, and front view of the four retorts. Fig. 2 is a horizontal sectional view of the retorts, the furnace being in elevation. Fig. 3 is a rear elevation.

Referring to the drawings:—the numeral 1 designates the fire-box, which is inclosed at its two ends with cast iron front and back 1', both of which are lined with asbestos. The sides and arch may also be of cast iron asbestos lined, or they may be of

fire clay or brick. The fire-box is provided with a fire door 2, draft door 3, ash pit 4, and grate bars 5, the said grate bars being provided with suitable rests. The brick pier 6 supports the rear end of the grate bars, and forms a combustion chamber 7, having clean-out 8, and mounted in the front and rear walls and within the combustion chamber are the retorts 9, and super-heaters 10. The retorts are provided with the doors 11, in front, while the super-heaters are provided with the rear covers or caps 12'. The front doors 11, are hinged as at 15, and in order to hold them tightly closed, I provide the lugs 15 which are adapted to receive the rod 14, whose cam lever 16 bears against the face of the door 12, and when turned, forces the door inward and the rod 14 outwardly, thus firmly locking and holding the door closed. This rod 14 is bodily removable from the lugs 15', when it is desired to open the doors 11.

It will be seen that the retorts are separated from the super-heaters by means of the partition *a*, having opening *b*, for passage of gases, and that the combined retorts and super-heaters are so mounted within the front and rear walls of the combustion chamber as to permit of easy repair, and quick removal and substitution. These retorts are made of a wrought iron lining and cast iron or clay for an outside casing, thus producing a more durable retort. It will thus be seen that the substance from which the gas is to be made is placed within the forward end of the retorts, which may be in any number to suit the size of the apparatus, and when heated, the gas passes from the main retort 9, into the auxiliary retort or super-heater 10, where the gas is superheated and allowed to pass through the exit 12, of the covers or caps 12', into the pipe 13, which is connected to the four-way coupling or tee 14', in whose opposite outlet is the blow-out pipe 15'. Mounted in the lower outlet of the coupling is the pipe 16', which enters and terminates above the bottom of the cylindrical tank or condenser 17, which is adapted to contain water approximately at the height of the dotted line. Connected to the upper member of the coupling is the pipe 18, whose upper end is connected to the clean-out pipe 19, and the goose-neck pipe 20, which enters and empties into the gas main 21. Surrounding the coupling, and the various pipes leading therefrom is a

water jacket 22, which cools the gas before it enters the main 21.

Supported in the front and rear walls of the combustion chamber is the small cylindrical retort 9^a, in which I decompose or volatilize the tar, this retort being similar in construction to the larger retorts 9. Leading from the top of the combustion chamber are the smoke outlets 24, whose pipes 25 enter the fan-chamber 26, of what I term my smoke consumer, which is shown here combined with my gas apparatus, but I would have it understood, that it may be used in connection with power plants, furnaces of all descriptions, and in fact in any place where the creation of smoke is a nuisance, that must be abated. In the fan-chamber, I mount a belt driven fan, and from this chamber I lead a pipe or flue 28, which empties or leads into the upper end of the smoke condensing tank 29, which has a series of vertical flues mounted therein. The lower end of this tank 29, is connected by a pipe 31, to the upper end of a settling or cleaning tank 32, which is filled with water, and is provided with the outlet vent 33.

From the foregoing description, the operation of my apparatus, is clearly understood, but briefly stated, it is as follows:—The fire is made in the furnace, and when the retorts 9, are sufficiently heated, the doors 11 are opened and the wood, or other material to be used is then placed in the retort 9, the door being closed after a sufficient quantity has been placed in the retort. The substance being heated, gives off gas, which passes into the super-heaters 10, and from them into the pipe or condenser 18, the gas being separated from the tar or semi-solid matter, and passing upwardly into the main 21, and thence to the proper holder. The condensed tar and water together with all others impurities collect in the receiver 17, where the tar is separated, or if desired automatically enters the rear of the small retort 9^a through the pipe 17', where it is reduced further to a gas, and passes from this retort through its rear cover 12', into a condenser 18. The remaining liquid in the tank 17, may be separated by distillation or other chemical action. When the gas is all extracted, the doors 11 are opened, and the charcoal, coke or ash is removed.

It is evident from the foregoing that I provide a very simple, durable and inexpensive gas generator, which can also be employed as an incinerator or crematory, thereby producing a thoroughly efficient and practical apparatus.

What I claim, as new is:—

1. In a gas apparatus, the combination of a furnace having a combustion chamber, a series of horizontal cylinders mounted in the furnace and disposed within the combus-

tion chamber, said cylinders each being divided into a main and an auxiliary communicating retort, means for the admission of the gas producing substance into the main retorts, means for receiving the gas and by-products from the auxiliary retorts and condensing the same, and a small retort disposed in the walls of the furnace below the series of cylinders, said small retort having a gas outlet and being also connected with the receiving and condensing means.

2. In a gas apparatus, the combination of a furnace having a combustion chamber, a series of cylinders mounted in the walls of the furnace and disposed within the chamber, said cylinders being each divided into a main and an auxiliary communicating retort, a single cylinder of small diameter mounted in the walls of the furnace below the series of cylinders and divided into a main and an auxiliary communicating retort, said auxiliary retort having a gas outlet, means for admitting the gas producing substance into the main retorts, and condensing means in communication with the auxiliary retorts of all cylinders.

3. In combination with a furnace having a combustion chamber, of a series of large cylinders removably mounted in the walls thereof and open at the front and rear ends, a smaller cylinder mounted in the walls below the other cylinders and open at their front and rear ends, closures for said ends, said cylinders being divided into a communicating main and auxiliary retort, the main retort being provided with a door, and a cover for the auxiliary retort provided with a condenser coupling.

4. In combination with a furnace having a combustion chamber, of a series of large cylinders mounted in the walls thereof and open at the front and rear ends, a small cylinder also mounted in the walls below the larger cylinders and open at its front and rear ends, closures for said ends, a main retort in the front end, and an auxiliary communicating retort in the rear end of each cylinder, a door for sealing the front end of the cylinder, a cover for the rear end, a condenser connected to said cover, and a liquid receiver connected to the condenser and also in communication with the auxiliary retort of the small cylinder.

5. In combination with a furnace having a combustion chamber, of a series of cylinders mounted in the walls thereof and open at their ends, said cylinders, each being divided into a main and an auxiliary retort, a door for the main retorts, a cover for the auxiliary retorts, a condenser connected to each of the covers, a receiver, below and in communication with the condenser, a small cylinder mounted in the furnace and in communication with the receiver for receiving the liquid by-products from the receiver,

said small cylinder being a retort, and a condenser connected to said small retort.

6. In combination with a furnace having a dome forming the combustion chamber, of
5 three large cylindrical retorts arranged in triangular formation in the front and rear walls of the furnace and in the dome thereof, the front and rear ends of the retorts being open and extending exterior of the walls, a
10 smaller cylindrical retort mounted below and between the two lower of the large retorts and mounted in the walls so that its open ends extend without the walls of the furnace, each of said retorts being divided

into a large forward main and a small rear- 15
ward auxiliary retort, removable seating means for the open ends of all retorts, a condenser common to each cylinder and connected to the auxiliary retorts thereof, and a pipe leading from the bottom of the con- 20
denser to the auxiliary retort of the small cylinder, as and for the purpose described.

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

JOHN F. KISTLER.

Witnesses:

RICHARD G. SLOANE,
W. EISELEN.