

(No Model.)

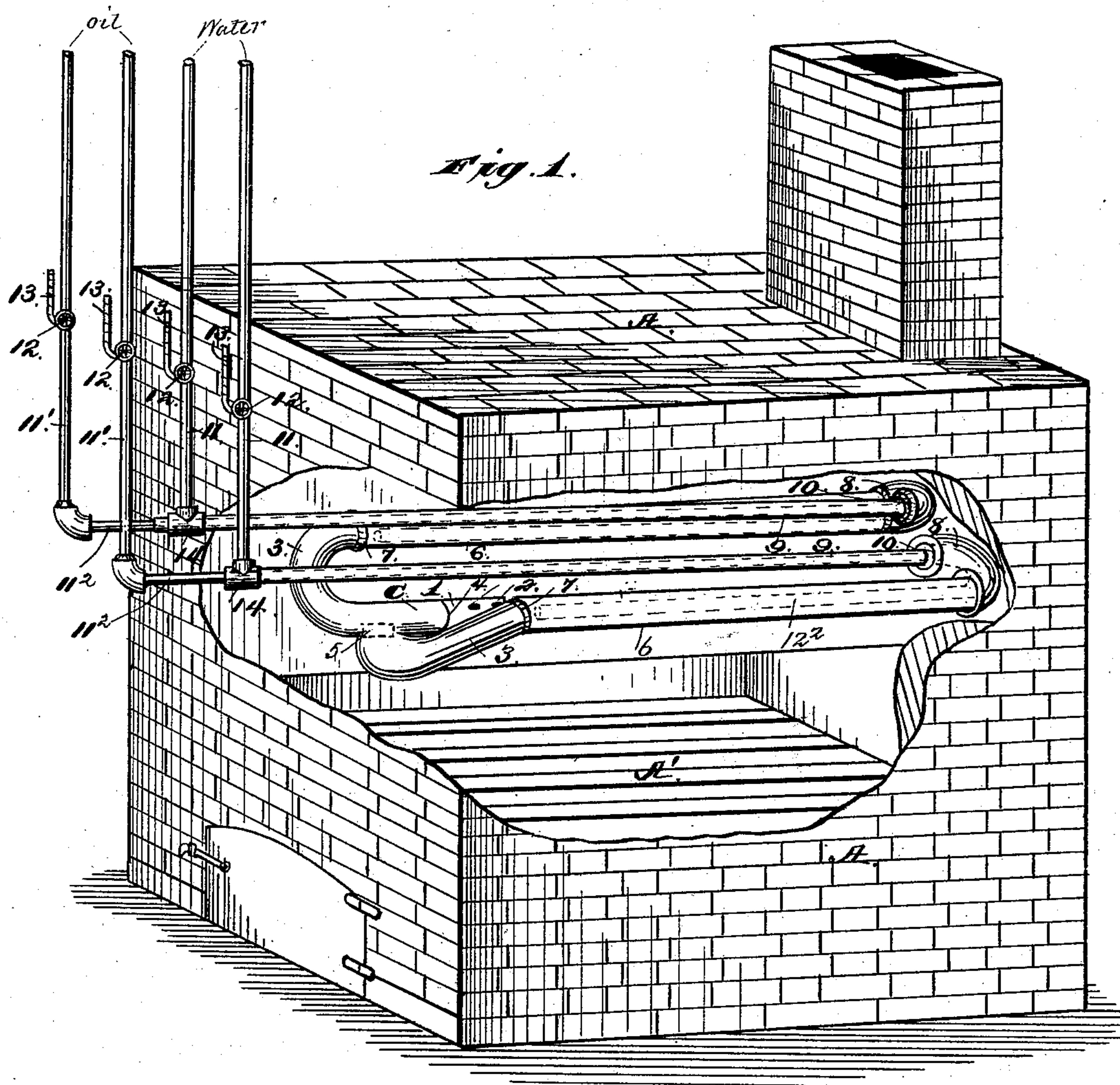
2 Sheets—Sheet 1.

J. ROBERTS.

APPARATUS FOR THE MANUFACTURE OF HEATING AND ILLUMINATING GAS.

No. 372,238.

Patented Oct. 25, 1887.



Witnesses:
Edward L. Mills.
Charles F. Fier.

Inventor:
James Roberts.
By *Orin M. Mather*
Atty

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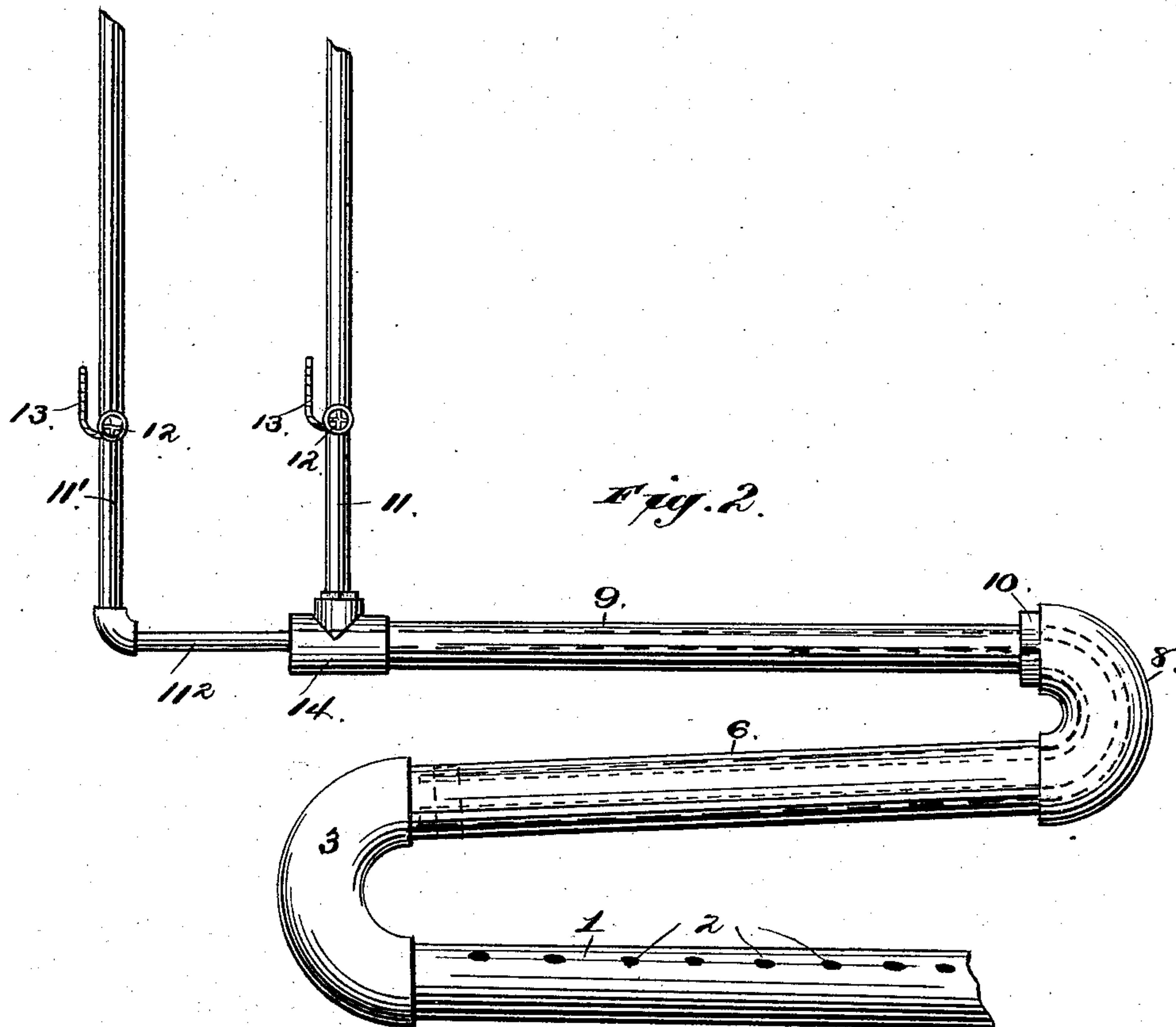


Fig. 2.



Fig. 3.

Witnesses:

Edward L. Mills.
Lewis F. Fier.

Inventor
James Roberts.

By

Curran & Mitchell
Attys.

UNITED STATES PATENT OFFICE.

JAMES ROBERTS, OF NEW YORK, N. Y.

APPARATUS FOR THE MANUFACTURE OF HEATING AND ILLUMINATING GAS.

SPECIFICATION forming part of Letters Patent No. 372,238, dated October 25, 1887.

Application filed July 14, 1886. Serial No. 208,007. (No model)

To all whom it may concern:

Be it known that I, JAMES ROBERTS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Manufacturing Heating and Illuminating Gases; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement of the apparatus disclosed in the Letters Patent granted to me July 13, 1886, No. 345,649, for process of and apparatus for manufacturing heating and illuminating gases; and it consists in the construction and arrangement or combination of parts which will be more fully hereinafter described, and definitely pointed out in the claim.

One object of my improvement is to economize space and at the same time provide means which shall effectually prevent the oil, when in a cold state, from coming in contact with the superheated pipes, thereby avoiding the danger caused by the greater expansion of the hydrocarbon vapor which might ensue from any back pressure exerted by said gas.

A further object of my invention is to provide means for the admission of a greater amount of air to the compound gas while it is burning, thereby increasing the size of the flame and producing a more intense heat.

I attain these objects by the mechanism illustrated in the accompanying drawings, wherein the same letters and numerals of reference indicate the same parts, and in which—

Figure 1 is a perspective view of a bench of a furnace, partly broken away, showing the series of inclined pipes and burner arranged therein, the two series of feeding-pipes, the oil-pipes being indicated in dotted lines as passing through the inclined pipes. Fig. 2 is a side elevation of one of the series of inclined pipes, showing the manner of constructing the feed-pipes. Fig. 3 is a detail perspective view showing the arrangement of the air-feeding pipes to the burner.

In the drawings is shown my present improvement added to the older form of my in-

vention, as described in the above-mentioned patent.

A indicates a bench of a furnace having a suitable grate, A', mounted therein.

The apparatus consists, essentially, of a burner, 1, provided with a row of apertures, 22, on each of its sides, as is shown in Fig. 3, situated radially at right angles to the center of the burner 1. To the front portion of this burner 1 a chamber, C, is connected by the coupling 4. Two elbows, 3 3, extend in the form of a V and unite in this chamber C. Where these elbows 3 3 join, a short partition, 5, is constructed, as shown in dotted lines in Fig. 1, and adapted for a purpose which will be more fully hereinafter described. To the elbows 3 3 are secured pipes 6 6 by couplings 7 7, said pipes 6 6 extending rearwardly in a longitudinal direction, and are secured to the elbows 8 8. To the other side of these rear elbows, 8 8, pipes 9 9, of smaller diameter, are secured, being held in the said coupling 8 8 by bushings 10 10. These pipes 9 9 extend forward and have connected to their front ends the small feed-pipes 11 11, provided with valves 12 12 and suitable gages, 13 13. The pipes 11 11 connect with the pipes 9 9 by means of unions 14 14, in the form of T-couplings, and are adapted to feed water to the said pipes. The pipes 11' 11' are continued by being coupled to extensions 11² 11², which pass into the pipes 9 9, through the couplings 3 3, into and through the pipes 6 6, and into the elbows 8 8, into which they may extend as far as is necessary for practicable results. These pipes 11' 11', with their extensions 11² 11², are adapted to be fed with oil from suitable tanks, as are also the pipes 11 11 with water from a suitable source. The pipes 11² 11² are constructed of any suitable metal, preferably copper, and may be supported by any suitable means in the pipes and couplings through which they pass.

In Fig. 3 are shown perforated atmospheric air-pipes 14' 14', which extend to the outside of the furnace, (not shown in Fig. 1, to avoid confusion,) the apertures thereof being situated adjacent to the apertures in the burner 1, thereby feeding the flame, by affinity, with oxygen, and producing a stronger flame and a more intense heat. The ends of these pipes 14' 14' may be supplied with suitable regulat-

ing-dampers, as may also the feeding-apertures therein. By this means the flow of air may be regulated at the entrance, as well as at the outflow or feeding apertures of the said
5 pipes. As shown in the drawings, the pipes 11² 11² extend to within a short distance of the elbows 3 3; but, if desired, they may be extended into the said elbows 3 3, being proportionately increased in diameter.

10 The main improvement upon my invention, for which Letters Patent were issued to me, as above mentioned, resides in carrying the oil-pipes through the water-pipes, and thereby heating the oil more gradually, all danger of
15 back pressure being avoided, and the process expedited. The arrangement also economizes space, as it will be readily understood that the water and oil pipes together now occupy little, if any, more space than one water-pipe.

20 The pipes having been heated, as described in my patent aforesaid, the water and oil are allowed to pass through their respective pipes, as described, and each will be volatilized in consequence of the high degree of temperature of
25 the pipes through which they pass. When the gas and steam pass down through the elbows 3 3 and reach the chamber C, they unite in one volume and pass into the burner 1, and are ignited or carried away to a suitable receiver.

30 When the gases are ignited at the burner, the air is thrown from the air-pipes 14' 14' onto the point of combustion, and the flame thereby greatly increased in size and in intensity of heat. This form of double pipes can be used
35 either unitedly or separately, as may be desirable for the best results, as the door 5 closes communication between the elbows. Moreover, each separate volume of gas is apart from the other until the said mixing-chamber is
40 reached, when unitedly they pass into the burner with increased force.

Thus I am enabled to use one half of the fluids in each side of the apparatus, obtaining the same relative degree of heat upon each
45 side of the apparatus as in the other and providing for a single or double effect in the same apparatus.

I do not herein broadly claim apparatus for manufacturing gas from water and hydrocar-
50 bon by passing each through separate heating-pipes of increasing diameters and finally mix-

ing the two vapors, as protection for the same has already been granted me in my patent aforesaid; nor do I claim the arrangement of a gas-pipe within an air-pipe, nor, broadly, the
55 arrangement of an oil-pipe within a water-pipe, being aware that an oil-conducting pipe surrounded by a steam-pipe has been arranged spirally around a mixing-chamber, and that perforated oil-pipes have been surrounded by
60 steam-pipes; but these constructions and arrangements differ from mine, in that the interior and exterior pipes are not arranged at opposite inclinations in the heating-chambers and do not increase in diameter from front to
65 rear, or as they approach the burner. In my invention the back-and-forth inclination of the pipes within the heating-chamber permits an unimpeded flow of the oil, and their increasing diameters result in gradual and greater
70 expansion of the gas and increase of pressure of the same as it passes into the burner. Single pipes thus constructed and arranged are disclosed in my former patent; but I have discovered that better results follow from my
75 present new combination of old devices than are incident to my former invention. Furthermore, the combination of the oil and water pipes, constructed and arranged as described, with the burner and the laterally-arranged
80 air-pipes for directing streams of air onto the apertures of the burner, I believe to be entirely new and productive of better results, as above stated.

What I do claim are the following improvements upon said apparatus: 85

The combination of a heating-chamber, two or more water pipes of increasing diameters provided with elbows and arranged at an inclination within said chamber, oil-pipes of in-
90 creasing diameters within said water-pipes, a mixing chamber, a burner comprising a gas-pipe provided with apertures, and lateral air-pipes for directing air onto the apertures in the burner, substantially as described. 95

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

JAMES ROBERTS.

Witnesses:

DANIEL SUGHRUE,
JOHN S. ANDREWS.