

**No. 710,336.**

**Patented Sept. 30, 1902.**

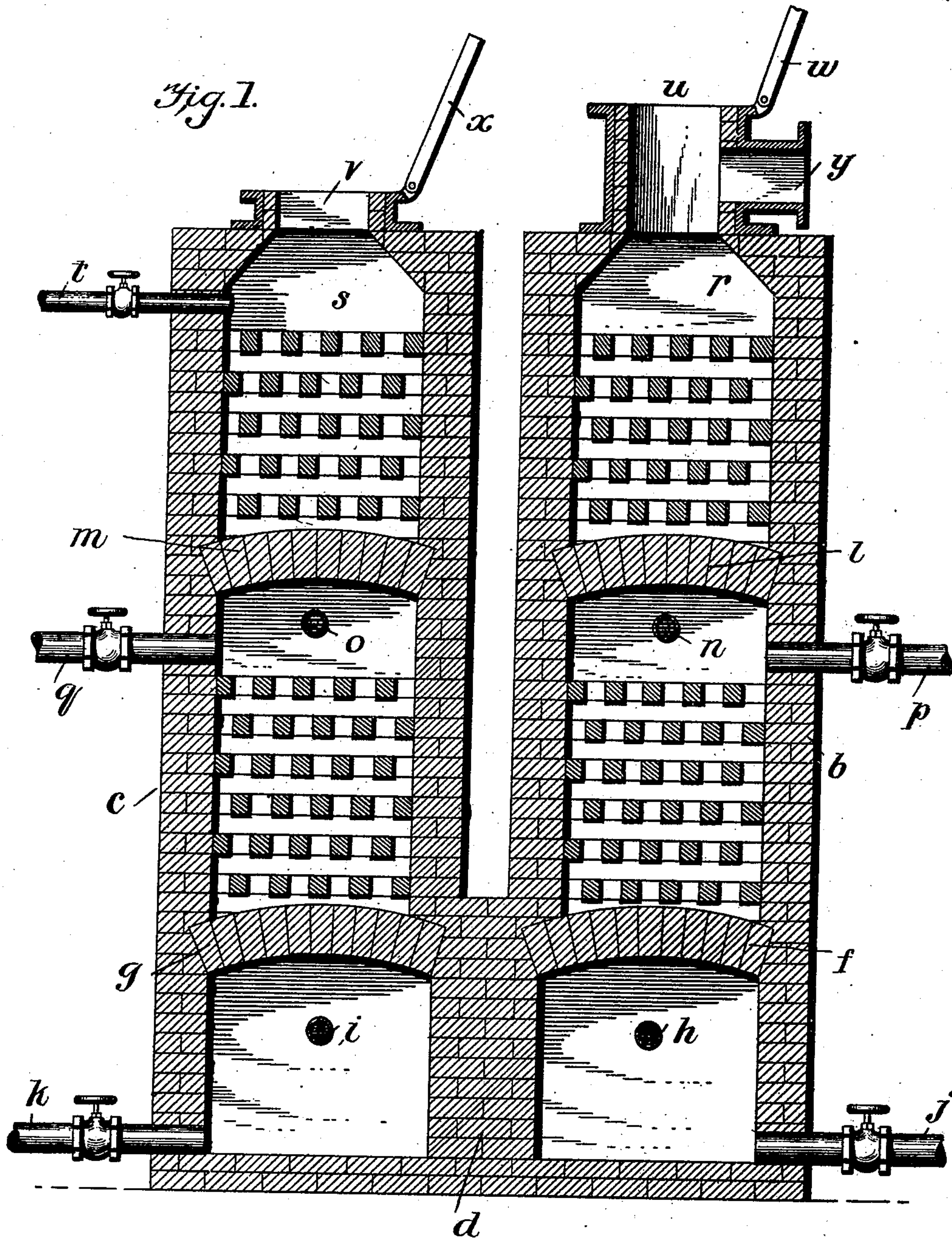
**H. M. PAPST.**

# APPARATUS FOR MANUFACTURING GAS.

(Application filed Dec. 17, 1901.)

(No Model.)

**3 Sheets—Sheet 1.**



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## Witnesses

Witnesses  
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Clarence A. Bateman.



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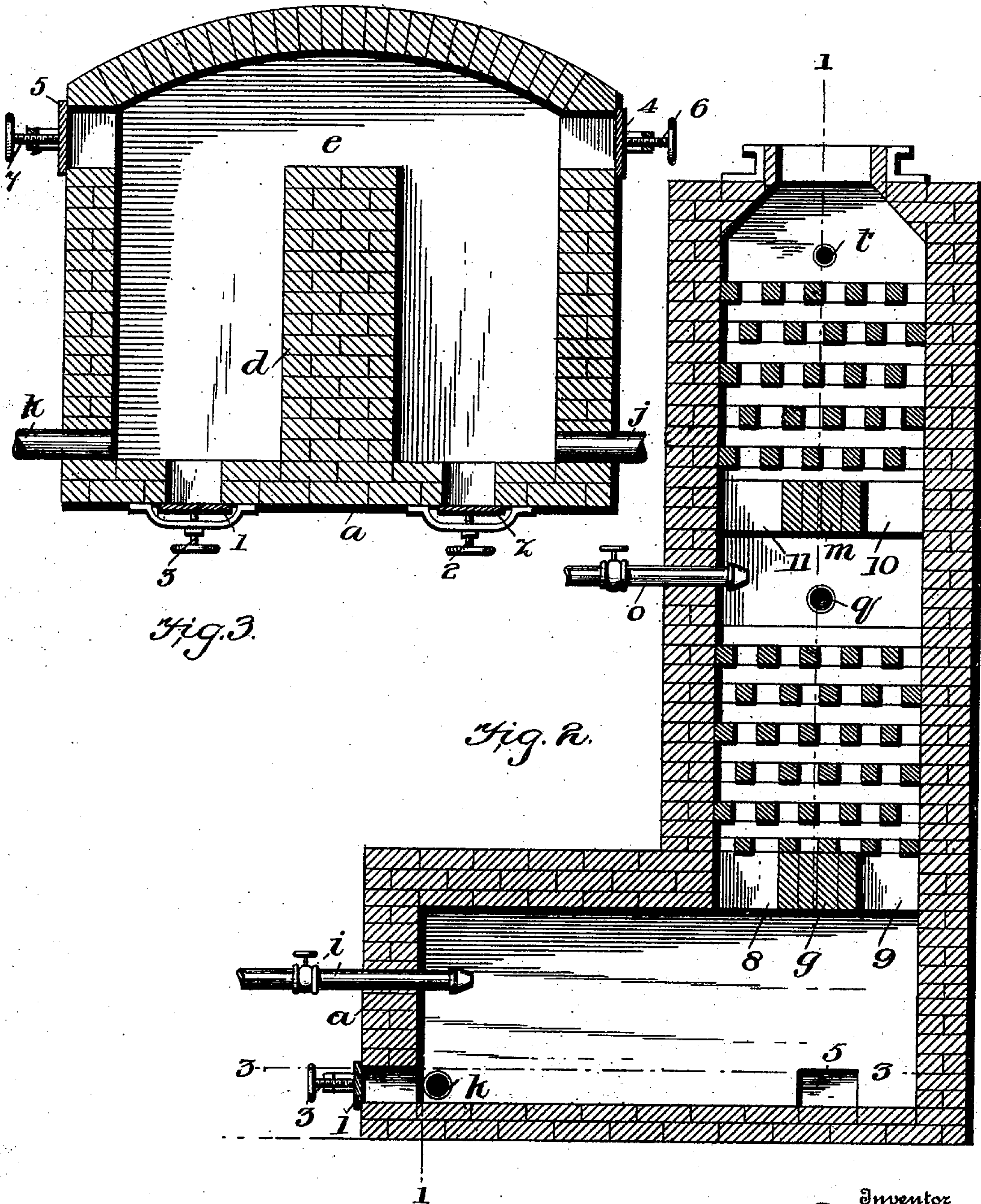
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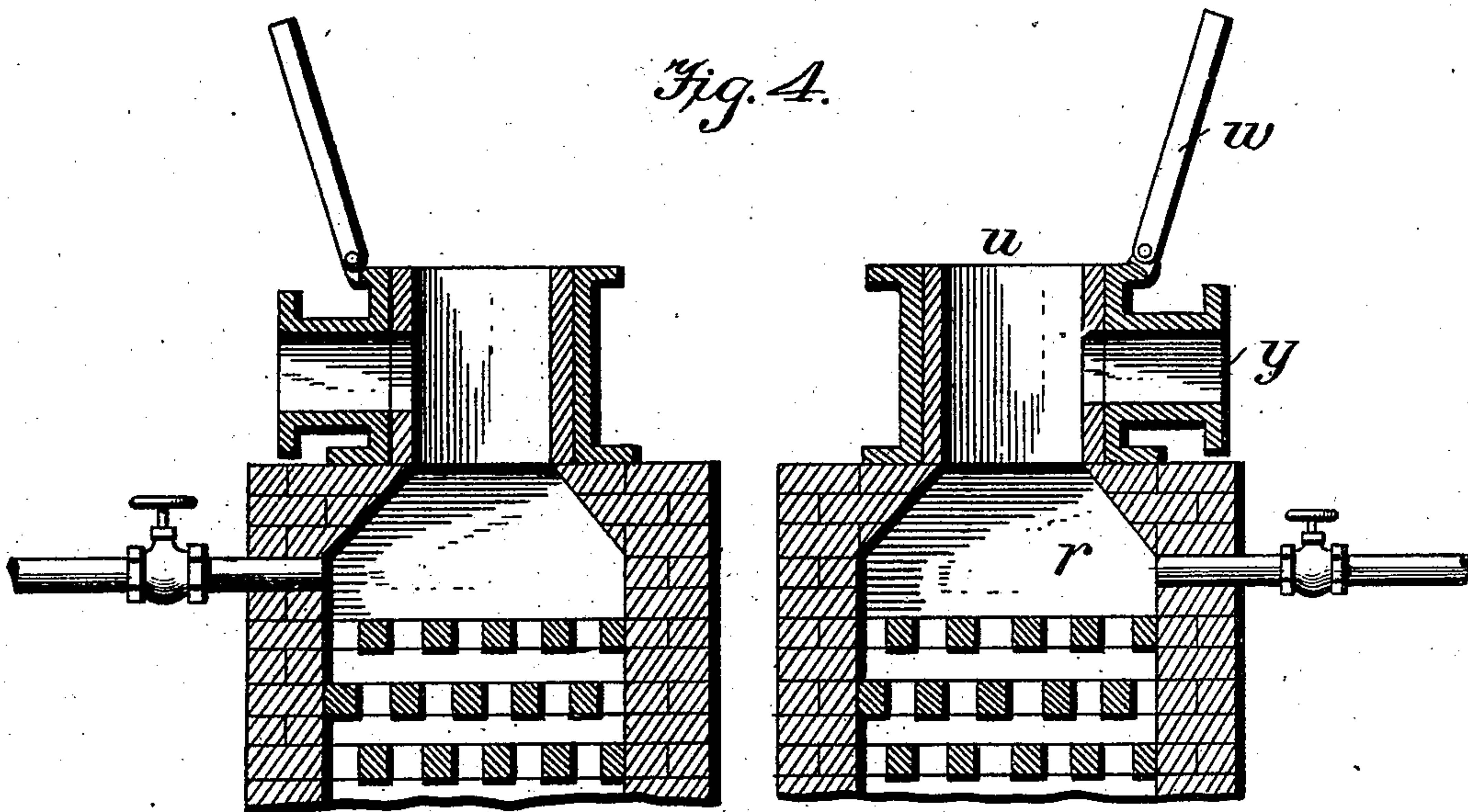
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

HILMAN M. PAPST, OF SAN FRANCISCO, CALIFORNIA.

## APPARATUS FOR MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 710,336, dated September 30, 1902.

Application filed December 17, 1901. Serial No. 86,325. (No model.)

*To all whom it may concern:*

Be it known that I, HILMAN M. PAPST, (having declared my intention of becoming 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 Apparatus for Manufacturing Gas; 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 improvements in manufacturing gas, which gas may be used either for illuminating or heating purposes.

My apparatus is designed especially to make water-gas from the heavy California oil, which is now being produced in large quantities. This water-gas can then be used directly for heating purposes, or, preferably, it may be enriched and used for lighting purposes.

The object of my invention is to effect increased economy and efficiency in an apparatus for water-gas; and with this object in view my invention consists in the construction and combination of parts, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal section of my apparatus, taken on the line 1 1 of Fig. 2. Fig. 2 is a cross-section thereof, taken through the center of one of the two superheaters. Fig. 3 is a horizontal section taken on the line 3 3 of Fig. 2; and Fig. 4 is a cross-section of the top of my apparatus, showing the means whereby the same may be used reversibly.

$a$  represents a rectangular base or shell divided into two equal parts by the wall  $d$ , made of fire-brick. In fact, the whole structure is built of refractory material. Over each of the chambers formed in the shell  $a$  by the partition  $d$  are arches  $f$   $g$ , and a passage  $e$  connects the two chambers thus formed at the rear of the shell  $a$ . On the rear part of the shell  $a$  are mounted two parallel cylindrical superheaters  $b$  and  $c$ , the lower part of which is filled with checker-work or refractory material.

$h$  and  $i$  represent valved oil-injectors, of the usual type, discharging into the chambers below the arches  $f$  and  $g$ , and  $j$  and  $k$  represent

valved air-pipes delivering into the same chambers.

Arches  $l$  and  $m$ , about half-way up the cylindrical shells  $b$  and  $c$ , are sprung across said shells, leaving chambers below, into which the valved oil-injectors  $n$   $o$  and the valved air-pipes  $p$  and  $q$  deliver. Above these arches in each of the shells there is another checker-work, of brick, which, however, does not reach quite to the top of said shells, leaving chambers  $r$  and  $s$ , into the latter of which a valved pipe  $t$  for the inlet of superheated steam enters.

$u$  and  $v$  represent pipes through which waste gases may be discharged into the stack, and  $w$  and  $x$  represent the usual swinging stack-valves.

$y$  is a pipe which connects with the chamber  $r$ , through which the gas is conducted off to the holder. The shell  $a$  is provided with four openings, closed, respectively, by the doors  $z$ , 1, 4, and 5, which doors are held in place by the screws 2, 3, 6, and 7, respectively. Passages 8, 9, 10, and 11 are left in the arches for the free upward passage of gas.

The operation is as follows: Oil is admitted through the pipes  $h$  and  $i$  and ignited. At the same time air is blown in through the pipes  $j$  and  $k$ . The gases from the combustion of the oil pass upward through the shells  $b$   $c$ , and the valves  $w$  and  $x$  being open waste gases pass through the stack. (Not shown.) After the apparatus has been heated up the oil-injectors  $h$  and  $i$  and air-injectors  $j$  and  $k$  are closed. The stack-valves  $w$  and  $x$  are also closed. The valve in the steam-pipe  $t$  is opened and oil is admitted through the oil-injector  $o$ . If the proper degree of heat has been reached in the shell  $c$ , the carbon of the oil admitted through  $o$  will be disassociated from the other elements in the oil and will be converted into solid carbon or lampblack. The superheated steam in the presence of this carbon will be disassociated, and the resulting gases—hydrogen and carbon monoxide—will pass down through the checker-work in the shell  $c$ , through the passage  $e$ , around the brick arch  $f$ , into the shell  $b$ , which acts as a superheater.

If it is desired to make illuminating-gas, oil is admitted through the injector  $n$ , and



the gas is carbureted to any desired extent. By adding another steam-pipe, having it deliver into the chamber *r*, and another delivery-pipe, like the pipe *y*, connected with the pipe *v*, it is obvious that the apparatus shown  
5 can be used reversibly, as shown in Fig. 4. I have found, however, that after once thoroughly heating up the shells *b* and *c* I can go on making either illuminating or heating gas  
10 for a long time without having the heat in said shells come down so low that it is necessary to blast them up again.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—  
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1. In an apparatus for manufacturing gas, the combination of a base divided into two chambers connected by a passage in said base, whereby a continuous combustion-chamber  
20 is formed, and regenerative or fixing devices supported on said base.

2. In an apparatus for manufacturing gas, the combination of a base, having a wall extending partly through said base, forming  
25 two chambers united together, whereby a con-

tinuous combustion-chamber is formed, regenerative devices, located over each of said chambers, and inlet-pipes for steam, air and oil, leading into said combustion-chambers and regenerative devices.

3. In an apparatus for manufacturing gas, the combination of a base, a wall passing partly through said base, forming two chambers united together at the rear, whereby a continuous combustion-chamber is formed, a  
35 cupola-like structure located over each of said chambers, each of said structures being divided into two parts, each having checker-work therein, inlet-pipes for air and oil leading into each of said chambers in said base,  
40 inlet-pipes for steam, air and oil, leading into each of said regenerative or fixing structures and outlet-pipes for the product of said apparatus.

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

HILMAN M. PAPST.

Witnesses:

FRANCIS J. HENEY,  
STATIA REARDON.