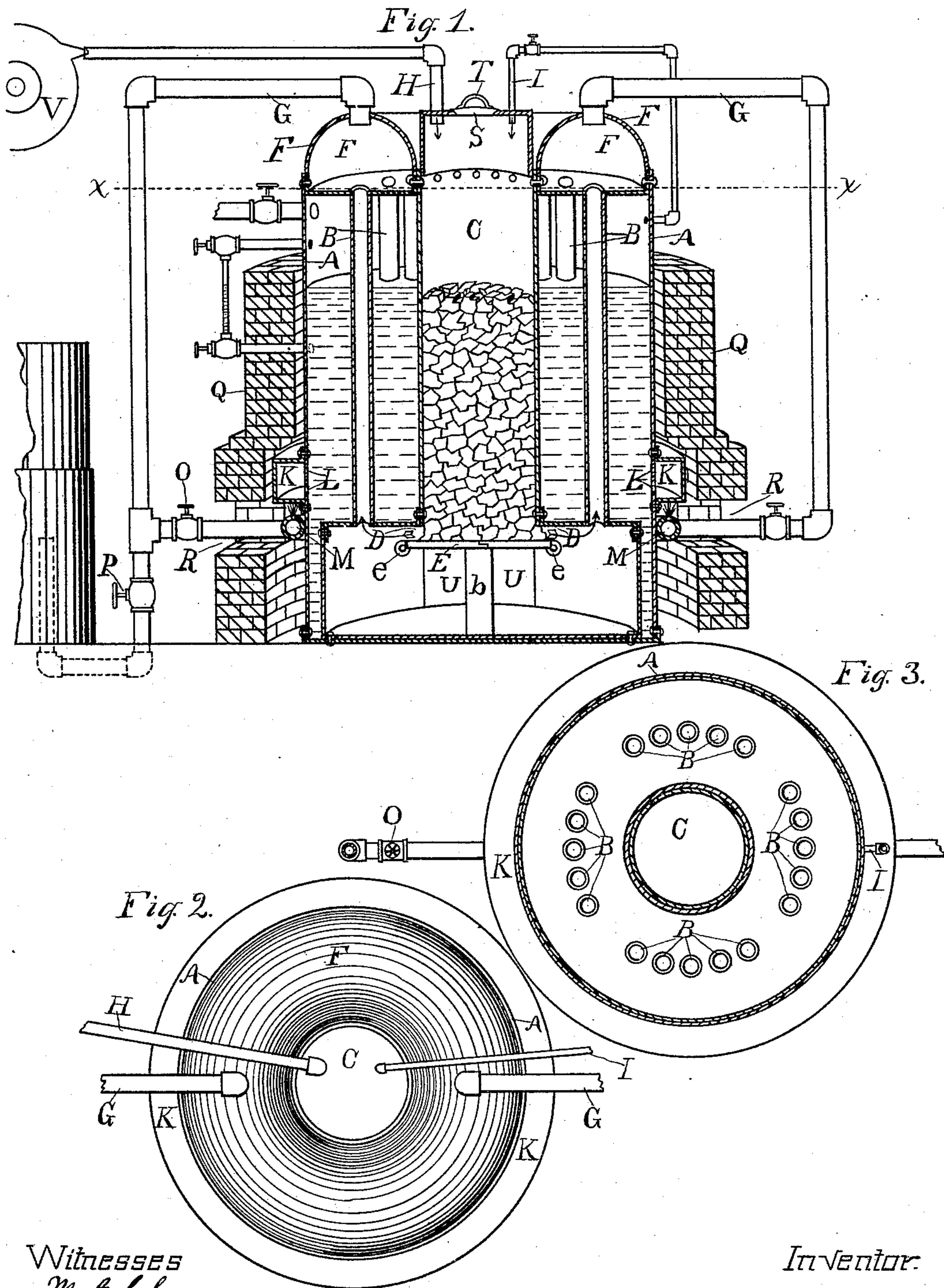


(No Model.)

L. E. FISH.
STEAM AND GAS GENERATOR.

No. 429,900.

Patented June 10, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

LEANDER E. FISH, OF LOS ANGELES, CALIFORNIA.

STEAM AND GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 429,900, dated June 10, 1890.

Application filed January 27, 1890. Serial No. 338,216. (No model.)

To all whom it may concern:

Be it known that I, LEANDER E. FISH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Steam and Gas Generators, of which the following is a specification.

The invention herein described embodies the principle of a steam and gas generator described by me in my application for Letters Patent filed in the United States Patent Office March 5, 1889, Serial No. 301,984, which said application was required by the examiner to be divided.

The purpose of my invention is to economize fuel in the production of steam and gas, and to produce a cheap, simple, and compact steam and gas generator, which can at will be used solely for generating steam or solely for generating gas, or can be used for the generation of both steam and gas at the same time.

My invention comprises the combination of a vertical annular tubular boiler having a vertical internal fuel-magazine and combustion-chamber extending therethrough, a fuel-support beneath such magazine, an air-pipe leading into the top of the fuel-magazine, a steam-pipe leading from the upper part of the boiler into the top of the fuel-magazine, a passage leading from the bottom of the fuel-magazine to the tubes of the boiler, a dome communicating with the top of the tubes, a gas-exit from such dome, and means for forcing air downward through the magazine.

My invention also comprises other features hereinafter set forth.

The accompanying drawings illustrate my invention.

Figure 1 is a perspective vertical mid-section of my generator. Fig. 2 is a top view of the same; and Fig. 3 is a horizontal cross-section on line xx , Fig. 1.

A is the vertical annular tubular boiler. B B are the tubes passing vertically there-through. C is the vertical fuel-magazine extending through the boiler.

D is the passage between the magazine and

the tubes. This passage is a part of the ash-pit in which the fuel-support E is mounted.

F is the dome, and G the gas-exit therefrom.

H is the air-pipe leading into the fuel-magazine.

I is the steam-pipe leading from the upper part of the boiler into the fuel-magazine.

K represents an annular drum secured to the outside of the boiler below the water-line and communicating with the boiler through perforations L.

M is a perforated gas-pipe arranged beneath the drum K and connected with the dome through gas-discharge pipes G G', one of which is connected with a gas-receiver N. Valves O P control the flow of gas through pipe G.

When the machine is to be used solely as a gas-generator, valve O is closed and P is opened, thereby allowing the gas to flow into the receiver. When it is desired to generate steam, the valve P is closed and O is opened, thereby causing the gas to flow into the annular perforated pipe M and out through the perforations, where it is ignited, and the heat therefrom heats the water in the drum K and boiler A. The lower part of the boiler is surrounded by a suitable wall Q, to confine the flame produced by the gas from the perforated pipe. Air-holes R are provided through the wall to supply air for the combustion of such gas.

S is an opening in the top of the magazine for the introduction of fuel. T is a lid fitted to close such opening.

U U are the doors of the ash-pit.

The operation is as follows: The fuel-magazine C is ignited from the top and air is forced downward through the magazine either by means of a blower V or by other suitable means. The draft thus created carries the heat down through the mass of fuel and causes incomplete combustion, the products of which are carried off through the tubes, dome, and exit-pipe G. The heat generated by the incomplete combustion in the magazine generates steam in the boiler. A supply of steam flows from the boiler into the magazine through pipe I and becomes dissociated by

the heat, and the oxygen and hydrogen mingle with the carbonic oxide produced by the incomplete combustion, and the whole flows off through passage D, flues B, dome F, and
 5 exit-pipes G, through which it is conducted to perforated annular pipe M, to further heat the boiler for the generation of steam; or it is conducted to a suitable gas-receiver, from whence it may be drawn to be used in the
 10 ordinary manner. The fuel-support E is preferably made of two hinged plates *e e*, held in place by a prop *b*, so that the fuel can be conveniently drawn from the magazine when necessary.

15 Now having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a vertical annular tubular boiler having a vertical internal fuel-
 20 magazine and combustion-chamber extending therethrough, a fuel-support beneath such magazine, an air-pipe leading into the top of the magazine, a steam-pipe leading from the boiler into the top of the magazine, a passage
 25 leading from the bottom of the magazine to

the tubes of the boiler, the dome communicating with the top of such tubes, and a gas-exit from such dome, and means for forcing air downward through the magazine.

2. The combination of a vertical annular 30 tubular boiler having a vertical internal fuel-magazine and combustion-chamber extending therethrough, a fuel-support beneath such magazine, an air-pipe leading into the top of the magazine, a steam-pipe leading from the 35 boiler into the top of the magazine, a passage leading from the bottom of the magazine to the tubes of the boiler, the dome communicating with the top of the tubes, the annular drum communicating with the boiler below 40 the water-line, the perforated gas-pipe arranged beneath such drum, and a gas-pipe connecting such perforated pipe with the dome.

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Witnesses:

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