

No. 709,788.

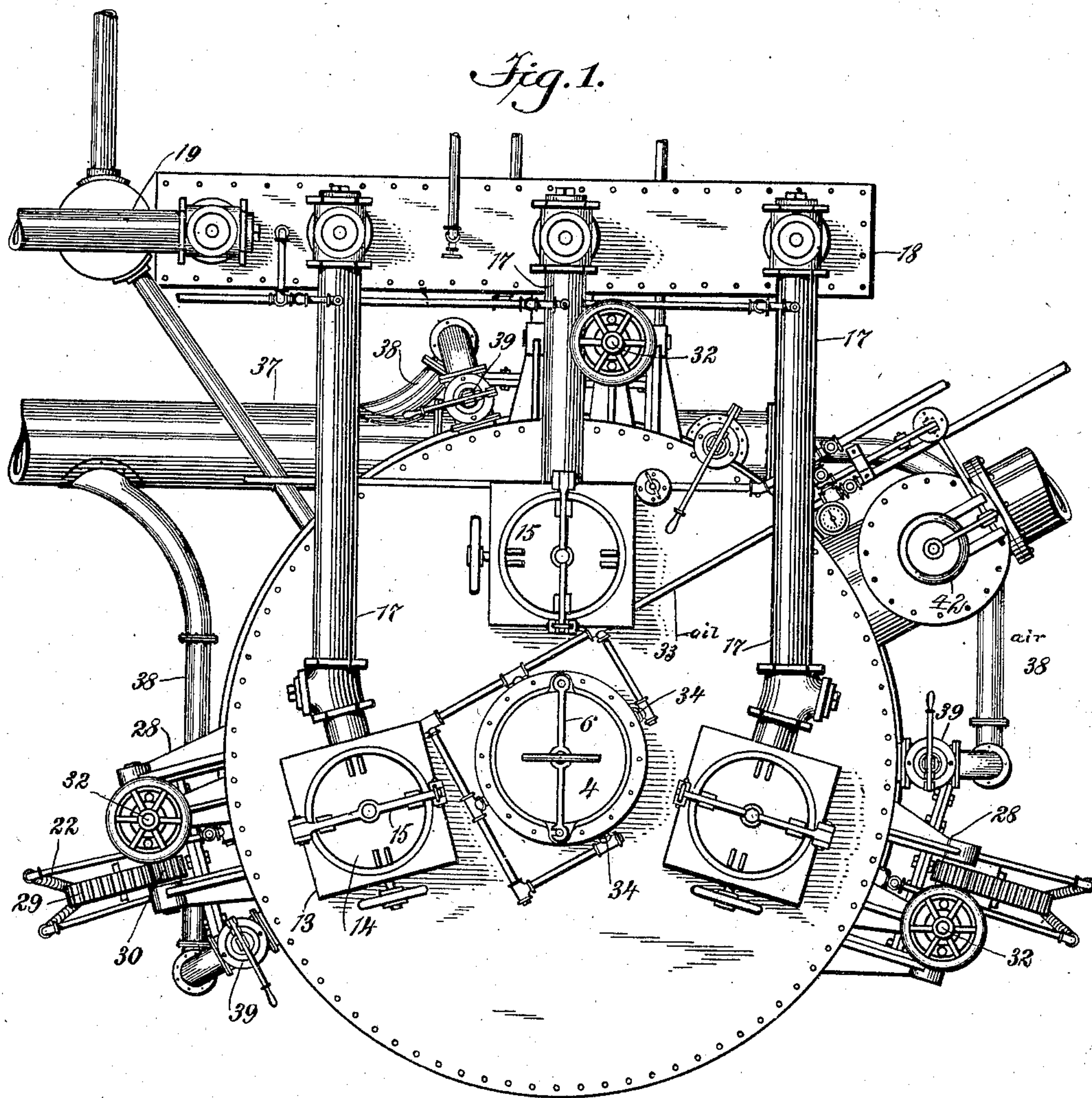
Patented Sept. 23, 1902.

C. J. LUTHER.
GAS GENERATOR.

(Application filed Dec. 4, 1901.)

(No Model.)

3 Sheets—Sheet I.



WITNESSES:

A. R. Appleman Jr.
C. R. Ferguson

INVENTOR

Charles J. Luther

BY

M. W. Munn

ATTORNEYS

No. 709,788.

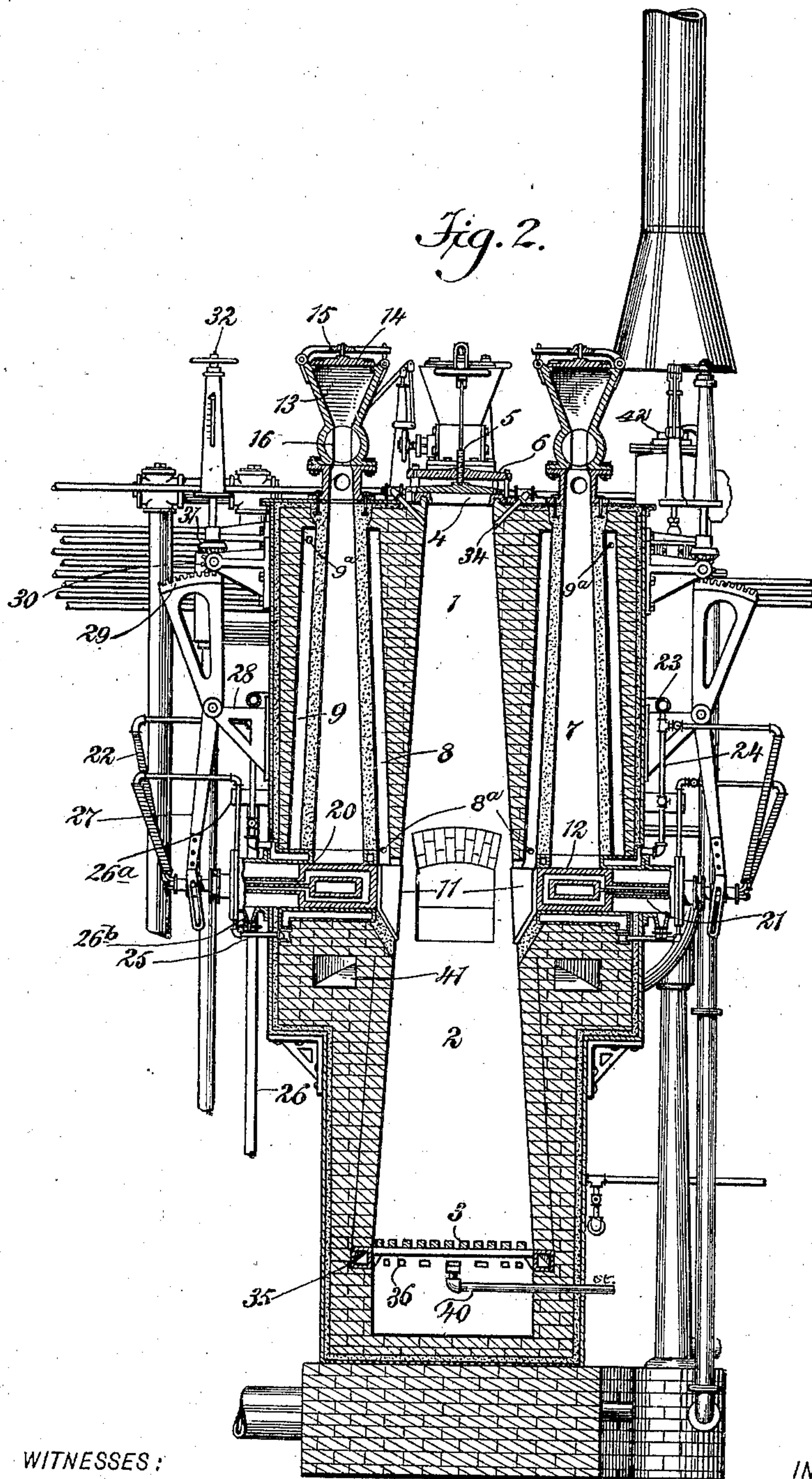
Patented Sept. 23, 1902.

C. J. LUTHER.
GAS GENERATOR.

(Application filed Dec. 4, 1901.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

A. R. Appleman
C. R. Ferguson

INVENTOR

Charles J. Luther

BY

Mumford
ATTORNEYS

No. 709,788.

Patented Sept. 23, 1902.

C. J. LUTHER.
GAS GENERATOR.

(Application filed Dec. 4, 1901.)

(No Model.)

3 Sheets—Sheet 3.

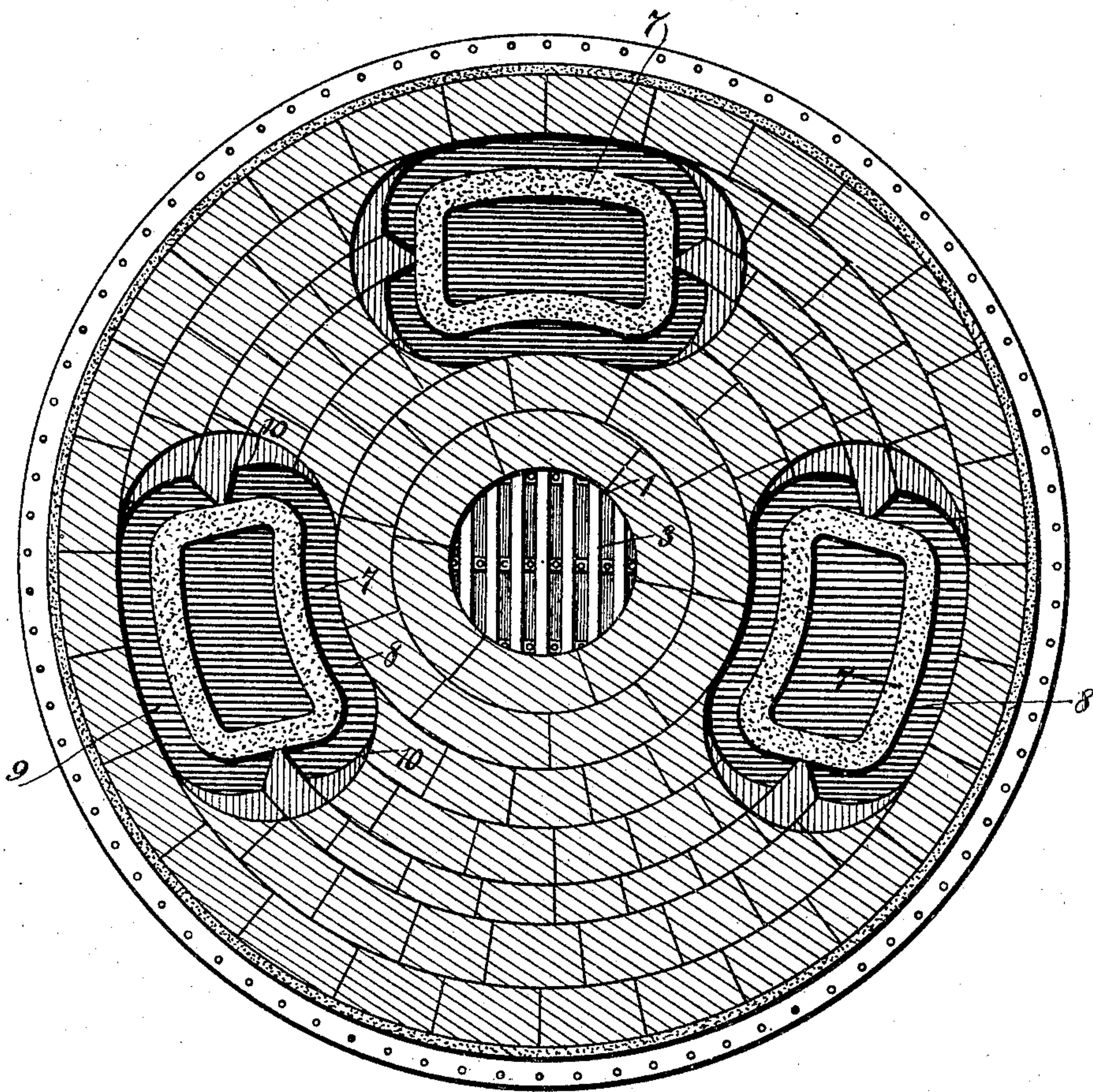


Fig. 3

WITNESSES:

A. R. Appleman Jr.
C. R. Ferguson

INVENTOR

Charles J. Luther

BY

Mann
ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES J. LUTHER, OF REDBANK, NEW JERSEY.

GAS-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 709,788, dated September 23, 1902.

Application filed December 4, 1901. Serial No. 84,666. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. LUTHER, a citizen of the United States, and a resident of Redbank, in the county of Monmouth and State of New Jersey, have invented a new and Improved Gas-Machine, of which the following is a full, clear, and exact description.

This invention relates particularly to that class of gas machines or apparatus known as "coal and water gas generators;" and the objects of the invention are to obtain a maximum of economy in material consumed, coupled with a maximum efficiency of apparatus employed.

The invention consists, principally, in the combination of devices for carbonizing bituminous coal, the decomposition of steam, and the generation of carbureted hydrogen-gas, the coal-gas passing off in one channel, the water-gas and heavy carbureted gas being successively mixed, fixed, and passed through a separate channel, where it comes in contact with the coal-gas and mixes therewith, the mixed gases being then carried to a separate vessel for use for illuminating or fuel purposes.

I will describe a gas-machine embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a gas-machine embodying my invention. Fig. 2 is a sectional elevation thereof, and Fig. 3 is a cross-section through the vaporizer and retorts.

Referring to the drawings, 1 designates the vaporizing chamber or cupola, below which is the generator 2, and in the lower portion of the generator is a grate 3. The vaporizing-chamber is provided with a cover 4, that may be held tightly in place by any suitable means. I have here shown it as held in place by means of a screw-rod 5, engaging in a bar 6, held in slots at the opposite sides of the vaporizing chamber or cupola. Arranged around the vaporizing-chamber is a series of retorts 7. These retorts are tapered, with the larger diameter at the lower end. This is to prevent the clogging of coke in the retorts. Extending partly around the retorts

and at the side adjacent the vaporizing-chamber are air-spaces 8, and extending partly around the opposite sides of the retort are air-spaces 9. The air-spaces 8 and 9 are separated for a greater portion of their length, but communicate one with the other at the top over bridge-walls 10. The air-spaces 8 communicate with the chamber 2 through ports 11, and these ports are normally closed by valves 12, which will be more fully described hereinafter. On the top of each retort is a feed-hopper 13, provided with a cover 14, held in gas-tight connection with the hopper by means of a lever 15, pivoted to one side of the hopper and having its free end engaged with a hook or other suitable fastening device. Arranged below the hopper is a valve 16 and below the valve 16 is an outlet for gas, or a pipe 17, leading to a hydraulic main 18, from which a pipe 19 extends to a suitable storing device. The valves 12 normally form the bottom closures for the retorts. These valves are made hollow to receive a cooling liquid, such as water, and they are mounted to slide in valve-casings 20, which are water-jacketed, as plainly shown in Fig. 2, these jackets supporting the series of retorts. The hollow stems 21 of the valves 12 extend outward through the end walls of the valve-casings and connect with flexible pipes 22, receiving water-supply from a main pipe 23. Water is also supplied to the water-jackets surrounding the valve-casings through a pipe 24, leading from the main 23. The water-jackets surrounding the valve-casings communicate with the interior of the valve-casings by means of pipes 25, and a discharge-pipe 26 leads from an overflow-tank 26^a, and to carry off dirt or other matter that might gather at the outer ends of the valves I provide hoppers 26^b. The valve-stems are connected to the lower ends of levers 27, fulcrumed to brackets 28, and the upper end of each lever is provided with a segment-rack 29, engaged by a pinion 30, which is rotated by a bevel-gear 31 on the end of an actuating-rod 32. An outlet-pipe 33 communicates with the upper portion of the vaporizing-chamber through branch pipes or tubes 34, four of these branch tubes being indicated in Fig. 1, and through these tubes oil may be admitted to the vaporizing-chamber. An air-flue 35 is arranged in the wall

of the generator underneath the grate 3 and communicates with the ash-pit through ports 36, and this flue 35 is in connection with the air-supply pipe 37 by means of branch pipes 38, in which valves 39 are arranged. A steam-pipe 40 also leads through the wall of the generator and has its nozzle underneath the center of the grate.

For making gas, the hoppers 13 are to be charged with coal and the covers tightly closed. Upon opening the valves 16, the coal will drop into the retorts, and as fast as the coal becomes carbonized by the heat and gases from the generator 2 which passes up through spaces 8 where it comes in contact with an air-blast 8^a at the bottom of the spaces 8 which forms a combustion, then passes through spaces 9 at the top of which it comes in contact with another air-blast 9^a which forms a secondary combustion. This heats the retorts and distils the coal into a carbonized state, then the gas passes off through the pipes 17 to the hydraulic main 18, and thence to the holder. The valves 12 are now to be drawn outward by means of their levers, permitting the coke to drop down into the valve-chambers inward of the valves. After this the valves are to be moved inward, which will force the coke which is in an incandescent state through the ports 11 into the generator. In starting a fire in the generator, which is preliminary to the operation, the lid or cover 4 is to be opened and a suitable charge of coal passed in. After this preliminary heating, however, the generator is fed from the retorts. When first starting the fire in the generator, air is admitted through the flue 35, and this air passes through the grate where it comes in contact with the coke and then forms a combustion in the generator, then the heat and gas pass through the ports 11 and into the air-spaces 8 where it comes in contact with an air-blast at the bottom 8^a, and then passes up and over the bridge-walls and into the spaces 9, where it is met—that is at the top of the bridges—with another supply of air at 9^a, which forms a second combustion to heat the retorts as the gas passes down through the spaces 9. If any one of the retorts should heat more rapidly than another, this can be diminished by operating its valve 12, passing the upper portion of said valve across the lower open end of the air-space 8. After the heat reaches the desired degree the air-controlling valves and the purge-valve 42 are to be closed and steam is admitted through the pipe 40. The steam passes through a suitable superheating device, not shown, and then through the coke of incandescent heat in the generator. At this time oil is admitted through the pipe 33 and branches 34 into the vaporizing-chamber, where it mingles with the gas at ports 11. Then this gas passes up through the spaces 8, over the bridge-walls, and then through the spaces 9, where the oil becomes decomposed and is made into a fixed gas, and this fixed gas passes through a flue

41 in the wall of the generator and through an escape-pipe to the holder, where the coal and water gases become mixed ready for consumption.

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

1. In a gas-machine, a generating-chamber, a vaporizing-chamber above the generating-chamber, means for directing liquid to the vaporizing-chamber, vertical retorts surrounding the vaporizing-chamber, there being gas-spaces around the retorts and having communication with the generating-chamber, and valves for normally closing the lower ends of the retorts and adapted to close the gas-spaces, substantially as specified.

2. In a gas-machine, a generator, a vaporizer above generator, means for directing liquid thereto, a series of vertical retorts around the vaporizer, the said retorts being tapered, the larger end being downward, and valves normally closing the lower ends and serving as a means for forcing material into the generator, substantially as specified.

3. A gas-machine comprising a vaporizing-chamber, means for directing liquid to the chamber, retorts surrounding the vaporizing-chamber and having gas-spaces at opposite sides and communicating one with the other at the top, the said gas-spaces communicating with the vaporizing-chamber, hoppers on said retorts, valves in the retorts below the hoppers, and pipes leading outward from the upper ends of the retorts, substantially as specified.

4. A gas-machine comprising a generator, a vaporizing-chamber, means for directing liquid to the chamber, retorts arranged vertically around the vaporizing-chamber and having gas-spaces at their opposite sides, the said gas-spaces communicating one with the other at the top only, and at the bottom with the generator, valve-casings, and valves for operating in said casings and forming the bottoms of the retorts and serving to force material into the generator, substantially as specified.

5. A gas-machine comprising a generator and a vaporizing-chamber, means for directing liquid to the chamber, retorts surrounding the vaporizing-chamber, valves forming the bottoms of the retorts, levers connecting with the stems of the valves, segment-racks on said lever, and operating-gearing engaging with said racks, substantially as specified.

6. A gas-machine comprising a generator and a vaporizing-chamber, means for directing liquid to the chamber, retorts surrounding the vaporizing-chamber, there being gas-spaces between the retorts and the said vaporizing-chamber and communicating with the generator, valves for closing the bottoms of the retorts and also for closing said gas-spaces, and means for directing air to the lower portion of the generator, substantially as specified.

7. A gas-machine comprising a generator,
a vaporizing-chamber above the same, verti-
cal retorts around the vaporizing-chamber,
water-jacketed valve-casings supporting the
5 retorts, valves movable in said casings and
adapted to contain water, means for direct-
ing water into said valves, and gearing for
operating the valves, substantially as speci-
fied.

10 8. In a gas-machine, the combination with
a vaporizing-chamber and a generator, of re-
torts, water-jacketed valve-casings support-
ing the retorts, discharge-pipes leading from
the casings, hollow valves operating in the

casings and serving to close the lower ends 15
of the retorts, means for supplying water to
the hollow valves, and means for operating
the said valves to force material dropping
from the retorts to the generator, substan-
tially as specified. 20

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

CHARLES J. LUTHER.

Witnesses:

DELANEY W. WILLGUSS,
RALPH O. WILLGUSS.