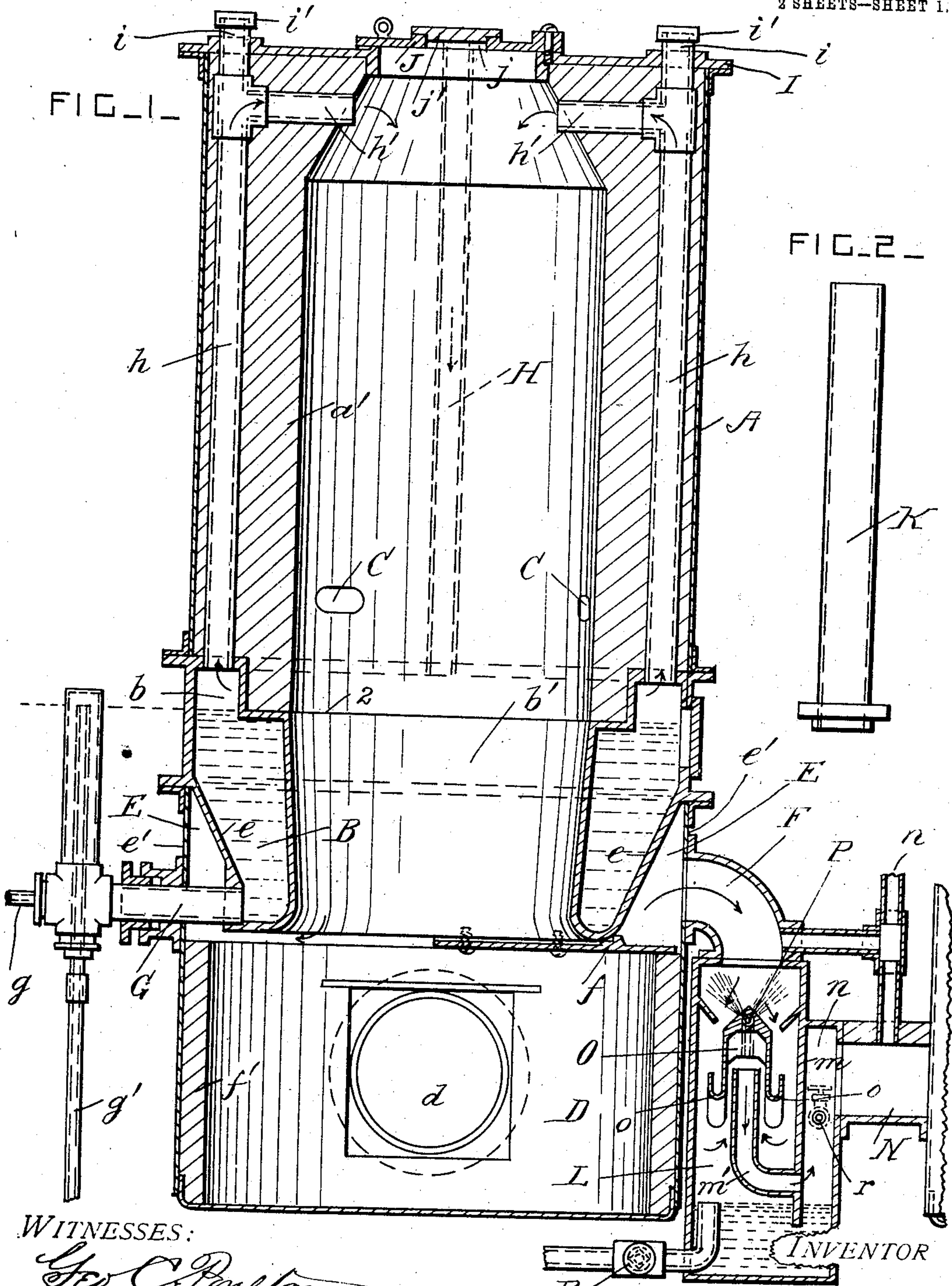


925,415.

Patented June 15, 1909.

2 SHEETS—SHEET 1.



WITNESSES:

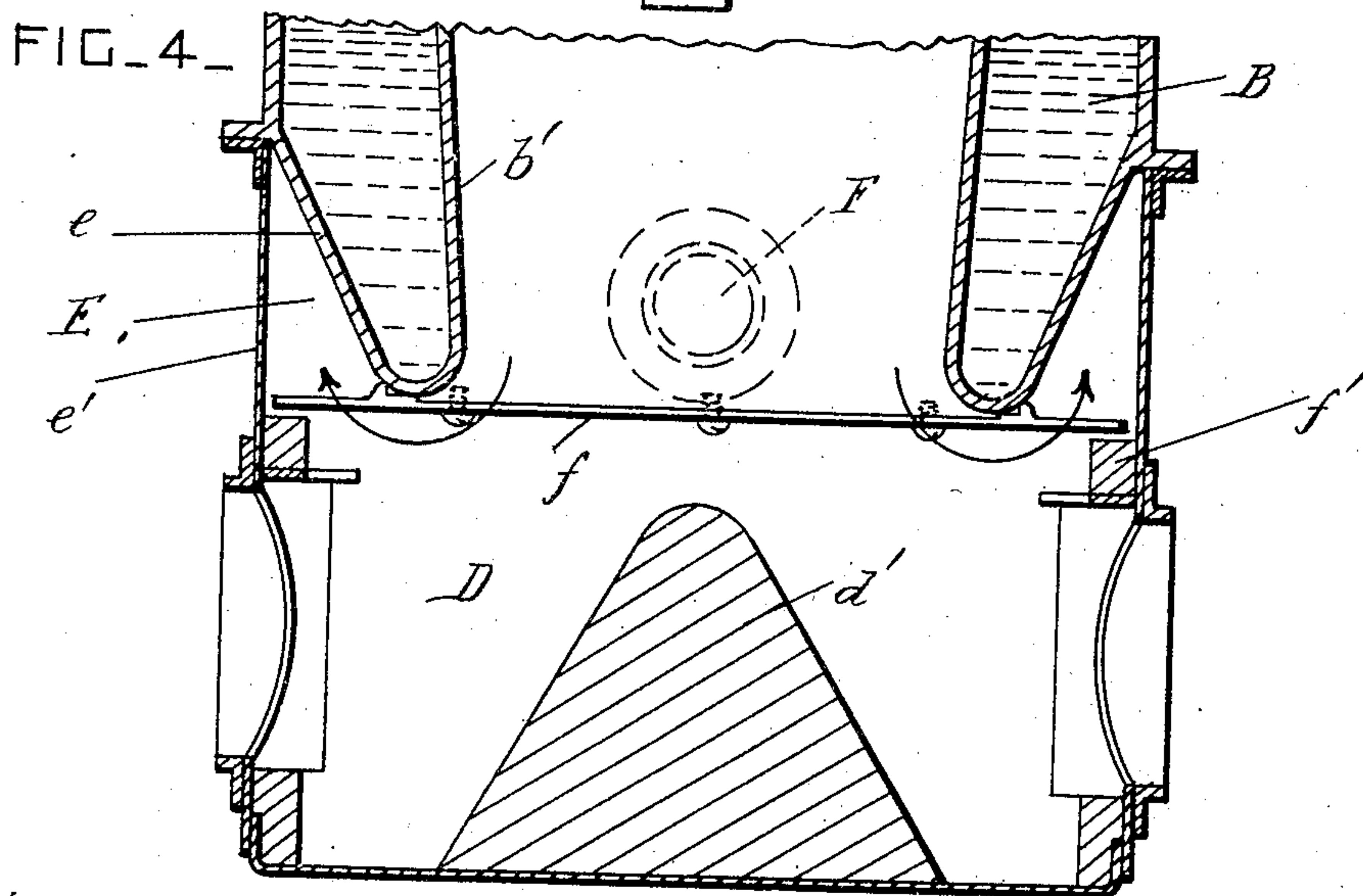
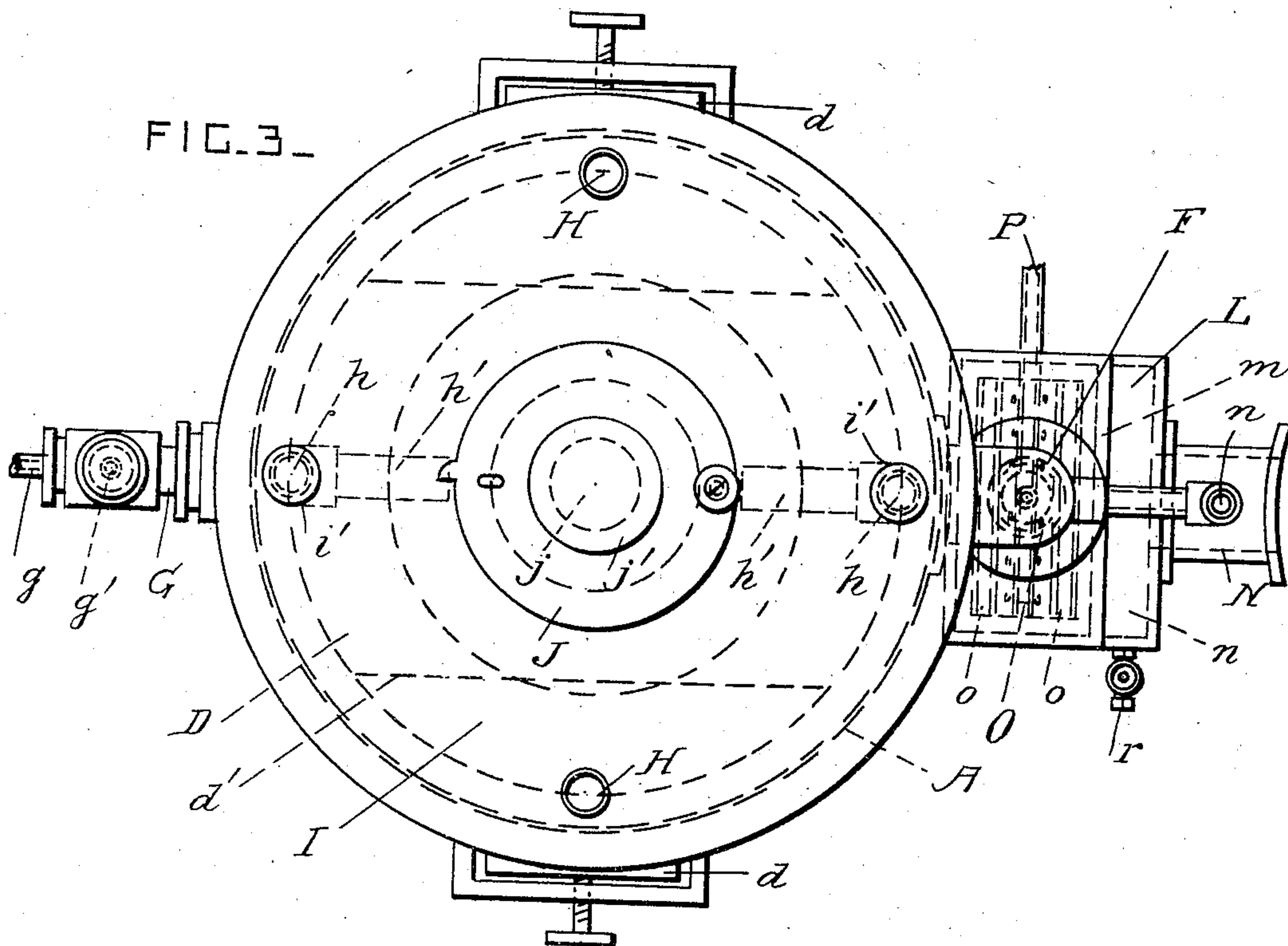
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2 SHEETS—SHEET 2.



WITNESSES:

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GUSTAF AKERLUND, OF WILKINSBURG, PENNSYLVANIA.

GAS-PRODUCER.

No. 925,415.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed August 28, 1908. Serial No. 450,649.

To all whom it may concern:

Be it known that I, GUSTAF AKERLUND, a citizen of Sweden, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Producers; 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.

This invention relates to devices for producing gas from coal; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a vertical section through the gas producer. Fig. 2 is a side view of the stack-pipe. Fig. 3 is a plan view of the gas producer. Fig. 4 is a vertical section through the bottom part of the gas producer turned around one-quarter from the position shown in Fig. 1.

A is the shell of the coal receiver which is provided with a lining a' of fire-brick or other similar material.

B is the vaporizer which supports the coal receiver. This vaporizer consists of an annular chamber for holding water which has an offset annular space b for steam and air at its upper part. The central portion b' of the vaporizer forms the ash-pot, which is of substantially the same diameter as the coal receiver above it. This ash-pot is kept filled with ashes up to about the level of its top edge 2. The fire is arranged to burn close above the level of the top edge 2, and the coal receiver is filled with coal to any desired level.

C are poke-holes in the sides of the coal receiver at its firing zone, which are provided with suitable closures.

D is the ash-pit under the vaporizer. This ash-pit is provided with two doors d , one on each side of it, through which the ashes may be removed from time to time, and it has a wall or bridge d' extending across its middle part between the said doors.

E is an annular gas-chamber which encircles the lower part of the vaporizer, and which is formed by the conical outer side portion e of the vaporizer and a cylindrical shell e' which is arranged in line with the shell A of the coal receiver. The ash-pit D is formed of a continuation of the shell e' , and it is lined with fire-brick f' or other similar material.

F is the gas-outlet pipe which is connected to one side of the gas-chamber E, and f is a horizontal partition plate secured under one-half of the ash-pot b' adjacent to the outlet pipe F. This plate f constrains the gas to pass from the middle part of the ash-pot to the outlet pipe, and prevents the gas from being drawn chiefly from one side of the ash-pot, which would make the producer operate in an undesirable way.

G is a pipe connected to the vaporizer and provided with a water-supply pipe g and a drain-pipe g' so that the water in the vaporizer is maintained at a substantially uniform level, but any other approved means for this purpose may be used.

H are two inlet pipes for air arranged within the lining of the coal receptacle and having their lower ends connected to the steam space b of the vaporizer. These pipes H extend vertically through the top plate I of the gas producer. Two pipes h are also connected to the steam space b , and are arranged between the two inlet pipes H. The upper ends of the pipes h are provided with branches h' which connect them with the upper part of the coal receiver above the level of the coal. The pipes h have also branches i which project through the top plates I and which are provided with removable caps i' .

The top plate I is provided with a central charging door J through which the coal is fed, and this door has a hole j which is usually closed by a plate j' . When the fire is to be started up in the producer, the plate j' is removed, and a small stack-pipe K, shown in Fig. 2, is connected to the top plate I. Air is then forced upwardly through the ash-pot, by any suitable means, and the products of combustion pass off by the stack-pipe, until a sufficient quantity of fuel has become incandescent in the lower part of the coal receiver.

L is a water-trap which is connected to the gas-outlet pipe F. This trap is provided with a partition plate m , and m' is a curved pipe which connects the upper space of the trap, into which the gas is discharged, with the gas-space n on the other side of the said partition plate.

N is an outlet-pipe for connecting the trap L with a scrubber, and n is a branch pipe for connecting the trap with a gas blower or exhaustor of any approved construction.

O is a cup arranged over the open upper end of the pipe m' , and provided with chutes o at its sides.

P is a spray-pipe for water connected to the upper part of the cup, or otherwise arranged in any approved manner, to spray water within the upper part of the water-trap.

R is a water outlet valve at the lower part of the water-trap, which is normally open so that the water stands in the trap below the lower end of the curved pipe m' . A small valve r is connected to one side of the water-trap above the lower end of the pipe m' , and is normally closed.

When the gas producer is to be laid off, the valve R is closed, and the valve r is opened. The water from the spray pipe P rises until it flows out of the valve r . The whole apparatus is then stopped, and the valve r is closed. The pipe m' being closed by the water in the trap, no air can enter the gas producer, and no gas can pass out of it. The water spray cools the gas in the water-trap, and settles the dust, which flows with the water down the chutes and accumulates in the bottom of the water-trap. The water-trap is provided with any approved door or hand-hole so that mud can be removed periodically.

A current of air is caused to flow through the gas producer by any approved means, such as a gas-exhauster, connected to the branch-pipe n . The cold air enters the pipes H, and is heated in its downward passage through them into the steam-space of the vaporizer. The water in the vaporizer is heated by the hot ashes in the ash-pot, and the steam and vapor thus formed is mixed with the hot air, and passes upward through the pipes h and their branches h' into the top of the coal receiver. The air is drawn through the coal in the coal receiver, and supports combustion therein. The steam regulates the temperature of the furnace, more or less, and is decomposed in the furnace and is mixed with the gases of distillation which undergo certain changes. The mixed gases are drawn through the ashes in the ash-pot, in which the tar and other waste products are deposited, and the partly clean gas passes out by the outlet-pipe F and water-trap as hereinbefore described. The hot air and steam is superheated in its upward passage through the pipes h . The peculiar form of the bridge-wall d' in the ash-pit not only supports the fuel but divides the ashes into two streams and facilitates the cleaning out of the ash-pit.

What I claim is:

1. In a gas producer, the combination, with a coal receiver, of a vaporizer arranged below the fire-zone of the said coal receiver, the central portion of the said vaporizer constituting an ash-pot, means for supporting the ashes in the said ash-pot, a cover closing

the top of the receiver and preventing the entrance of cold air, inlet pipes for warm air arranged in contact with the said receiver and connected to the said vaporizer, pipes for hot air and vapor of atmospheric pressure also arranged in contact with the said receiver and connecting its upper end portion with the said vaporizer, and a closed receiver for ashes and gas arranged below the said ash-pot and provided with an outlet pipe for the gas.

2. In a gas producer, the combination, with a coal receiver provided with means for closing its upper end, of a vaporizer provided with an air-inlet and arranged below the fire-zone of the said coal receiver, the central portion of the said vaporizer constituting an ash-pot, means for normally retaining the ashes in the said ash-pot, a pipe for air and heated vapor of atmospheric pressure having its lower end connected to the said vaporizer and its upper end connected with the atmosphere and having a lateral branch discharging into the upper part of the said coal receiver, a removable closing device for the upper end of the said pipe above the said branch, and a gas-outlet for receiving the gas after it has passed through the ashes in the said ash-pot.

3. In a gas producer, the combination, with an annular vaporizer provided with an air-inlet and having a central ash-pot, of a coal receiver supported above the said vaporizer and provided with a lining or wall of heat-resisting material, a vapor pipe extending longitudinally through the said lining and provided at its upper end with branches connecting it with the atmosphere and with the upper part of the receiver and having its lower end connected to the said vaporizer, and means for preventing the water in the said vaporizer from rising within the said vapor pipe.

4. In a gas producer, the combination, with an annular vaporizer provided with a central ash-pot, of a coal receiver supported on the said vaporizer and provided with a lining of heat-resisting material, air-inlet pipes extending through the said lining and connected to the said vaporizer, vapor-outlet pipes connected to the said vaporizer and arranged in the said lining and between the said air-pipes and having branches at their upper ends for connecting them with the upper part of the said coal receiver and with the atmosphere, and a gas-outlet connected with the lower end of the said ash-pot.

5. In a gas producer, the combination, with an annular vaporizer provided with a conical lower part and having a central ash-pot, of an ash-pit arranged below the said vaporizer and forming an annular gas-chamber around its conical lower part, a gas-outlet pipe connected to one side of the said gas-chamber, a plate secured to the bottom of

the said vaporizer adjacent to the said gas-outlet pipe and operating to draw the gas from the middle part of the ash-pot, a coal receiver arranged over the said vaporizer, 5 and means for admitting air into the said vaporizer.

6. In a gas producer, the combination, with a gas-discharge chamber having a gas outlet-pipe, of a water-trap connected to the 10 said gas outlet-pipe and having a partition which extends into its water space and having also a connecting-pipe secured to the said partition and normally connecting the said

outlet-pipe with the gas space of the water-trap on the other side of the said partition, 15 and two valves for regulating the height of the water in the water-trap, said valves being arranged respectively above and below the outlet of the said connecting-pipe.

In testimony whereof I have affixed my 20 signature in the presence of two witnesses.

GUSTAF AKERLUND.

Witnesses:

L. H. McCABE,

C. H. JACKSON.