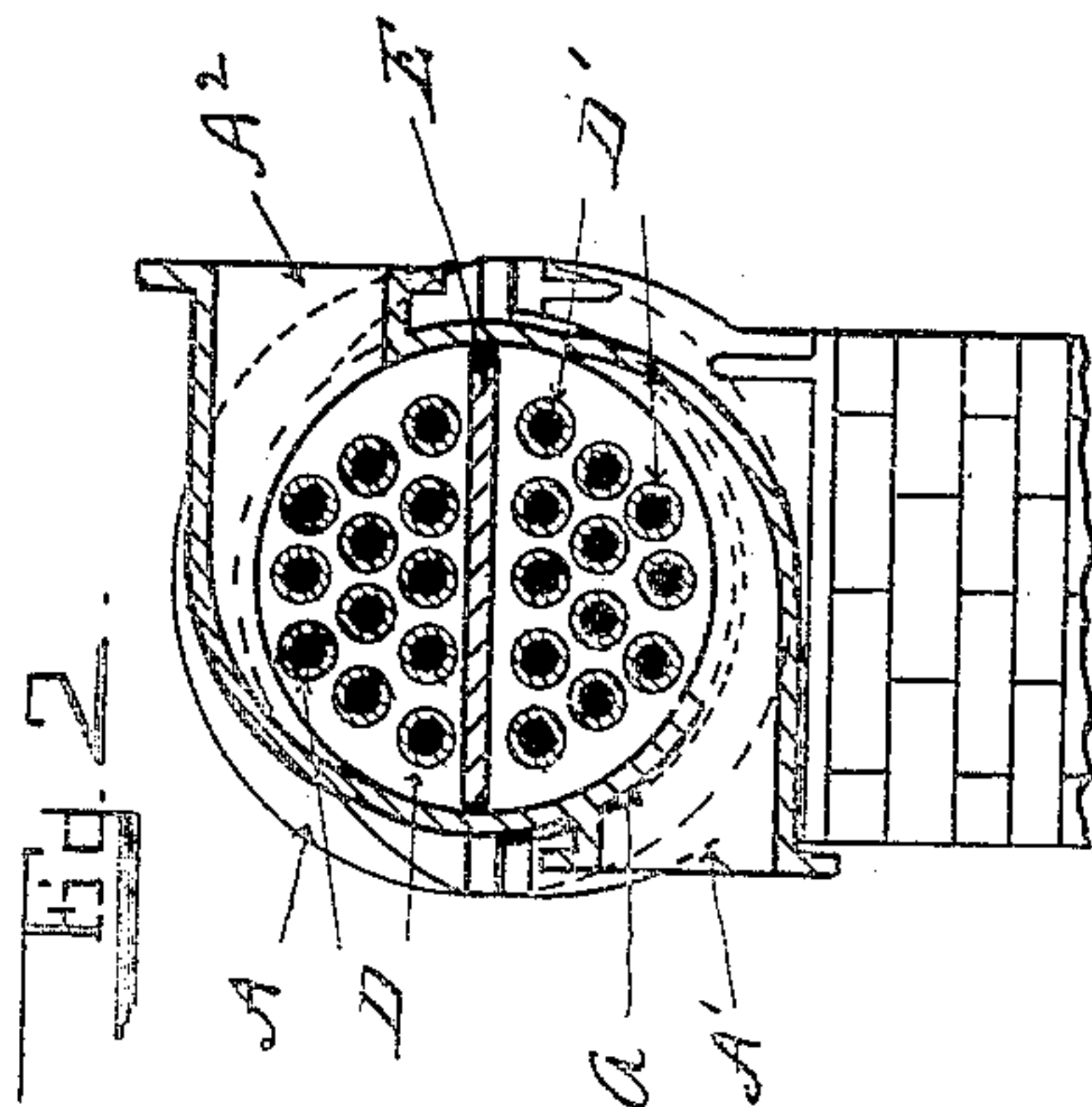
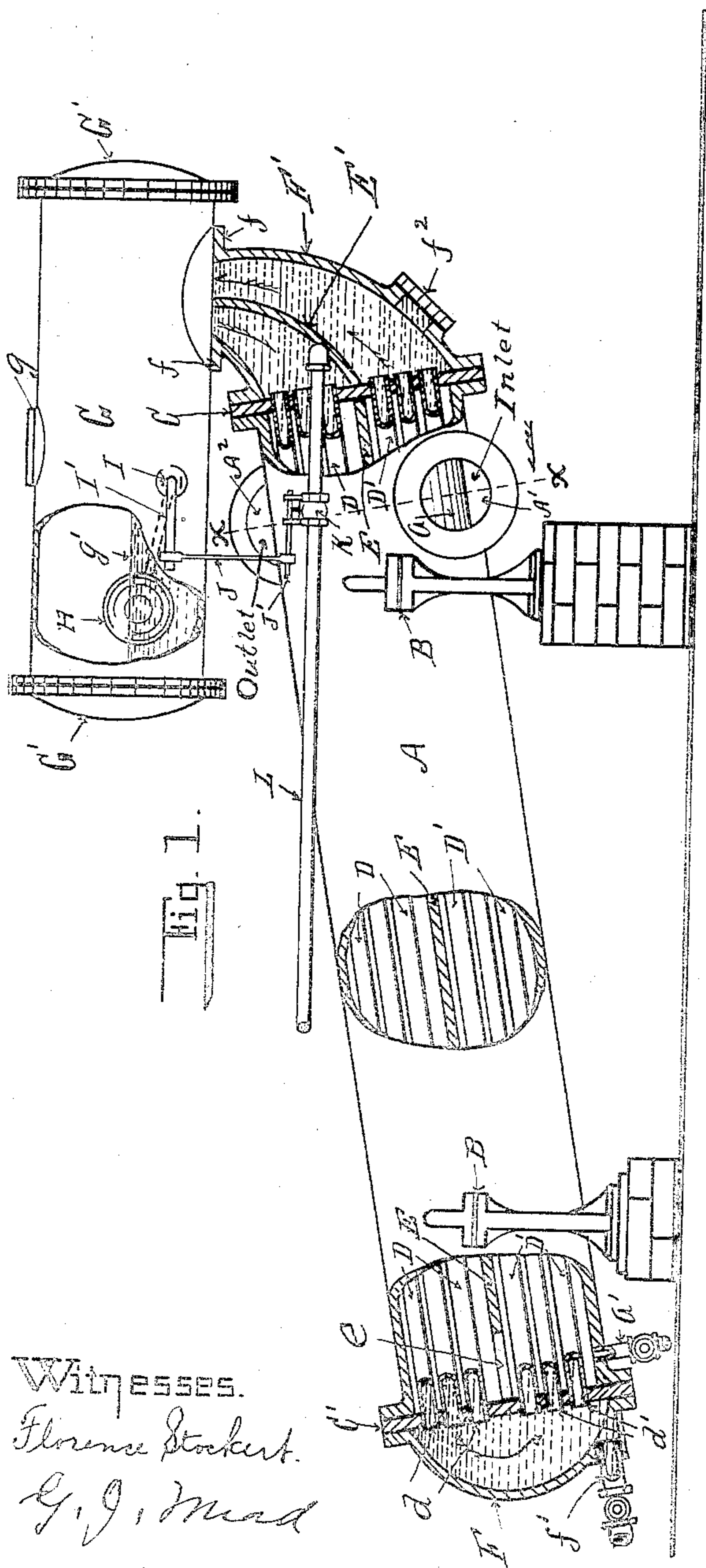


G. A. SIMS.
 STEAM GENERATOR.
 APPLICATION FILED DEC. 14, 1908.

929,887.

Patented Aug. 3, 1909.



Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE A. SIMS, OF ERIE, PENNSYLVANIA.

STEAM-GENERATOR.

No. 929,887.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed December 14, 1908. Serial No. 467,483.

To all whom it may concern:

Be it known that I, GEORGE A. SIMS, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Generators; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to steam generators, and has for its object the production of mechanism whereby the heated gases from the exhaust of a gas engine may be utilized to heat water, and generate steam.

The features of my invention are hereinafter fully set forth and explained and illustrated in the accompanying drawings in which:

Figure 1 is a side view of my improved steam generator partially in elevation and partially in section. Fig. 2 is a cross section of a portion of the same in the line $x-x$ in Fig. 1.

In these drawings, A is a cylindrical heater chamber, preferably mounted on supports B B in an inclined position. This heater is provided with intermediate heads C and C' in which are mounted longitudinal water-tubes D and D', and between the groups of tubes D and D' there is a longitudinal diaphragm E which connects with the head C but does not extend entirely to the head C', so as to leave an opening e between the end thereof and the head C'. To the head C, I secure a cap F so as to form a communication between the ends d and d' of the groups of tubes D and D'. In the heater chamber A near the head C, I make an inlet A' at one side of the diaphragm E to receive the exhaust pipe of a gas engine, and provide therein a curved diaphragm a to prevent the blast of the exhaust striking directly against the tubes D', and preferably opposite the inlet A' at the opposite side of the diaphragm E, I make an outlet opening A² for the escape of the heated gases which are received in the inlet A'. These heated gases entering the heater chamber A at the inlet A' thereof travel along between the tubes D' until they reach the opening e and

thence back between the tubes D until they pass out of the outlet opening A².

To the head C there is secured a curved head member F' provided with a central diaphragm E' coinciding at its lower end with the diaphragm E, and extending upward to a collar f formed on its upper end, by means of which it is secured to a horizontal steam drum G provided with heads G' G' and an outlet g and adapted to retain water and steam. In this drum G, I preferably provide a float H connected to a rock-shaft I extending through the side of the drum G, and provided with an arm I' from which a rod J extends to the operating arm J' of a valve K in a feed-water pipe L which preferably enters the head member F' at one side of the diaphragm E' therein. In the lower end of the heater chamber A and head member F', I provide the usual blow-off pipes f' and a' , and in the lower part of the head member F' there is also a hand-hole f^2 for convenient access to the interior thereof.

In operation the water-tubes in the heater chamber A and the drum G are filled with water so that it stands at approximately the normal water line g' of the drum G. Then when the exhaust pipe of a gas engine is connected to the inlet A' of the heater chamber and the engine is operated, the heated gases exhausted into the heater A at one side of the diaphragm E pass along between the group D' of tubes to the opening e in the diaphragm E and back on the opposite side of said diaphragm between the group of tubes D to the outlet A², thereby heating the water in the tubes D and D' and generating steam therefrom, and as the heat delivered to the tube D' at the inlet side of the diaphragm E is greater than that delivered to the tubes D at the opposite side of the diaphragm the circulation of the water therein will be in the direction of the arrows in Fig. 1, and the steam generated will pass up into the drum G from whence it can be utilized as desired.

In the drawings and above description, I have shown and described a convenient mechanism for utilizing my invention. I do not, however, desire to confine myself to the exact form and arrangement of mechanism shown, as it is obvious that many modifications can be made therein without departing from the spirit of my invention.

Therefore what I claim as new and desire to secure by Letters-Patent is:

1. The combination in a steam generator, of a heater chamber, a longitudinal diaphragm therein having an opening there-
5 through at one end thereof, longitudinal water-tubes at each side of said diaphragm, a head member at one end of said heater chamber connecting the tubes at both sides
10 of the diaphragm, an inlet for a heating fluid and an outlet for same at opposite sides of said diaphragm, a head member on the opposite end of the heater chamber, a diaphragm therein coinciding with the diaphragm in the heater chamber, and a steam-
15 drum secured to said head member, substantially as set forth.

2. The combination in a steam generator, of an inclined heater chamber, a longitudinal
20 diaphragm having an opening therethrough at the lower end thereof, water-tubes at each side of said diaphragm, a head member on the lower end of the heater chamber connecting the lower ends of the water-tubes,
25 an inlet at the opposite end of the heater chamber below the diaphragm, a curved diaphragm in said inlet opening, an outlet opening above the diaphragm approximately opposite the inlet opening, a head member
30 on the upper end of the heater chamber, a diaphragm therein coinciding with the diaphragm in the heater chamber, and a steam-drum secured to the upper end of said upper head member, substantially as set forth.

35 3. The combination in a steam generator, of a heater-chamber, a central longitudinal diaphragm therein having an opening there-
through at one end thereof, water-tubes at
40 each side of said diaphragm, a head member on the end of the heater chamber where said

opening is through the diaphragm forming a connection between the water-tubes at each side of said diaphragm, inlet and outlet openings in the opposite end of the heater chamber at opposite sides of the diaphragm
45 therein, a curved diaphragm in said inlet opening, a head member on the end of the heater chamber adjacent to the inlet and outlet openings therein, and a diaphragm therein coinciding with the diaphragm in the
50 heater-chamber, substantially as set forth.

4. The combination in a steam generator, of a cylindrical heater chamber, a central longitudinal diaphragm therein having an opening through one end thereof, water-
55 tubes at each side of said diaphragm, a head member on the end of the heater-chamber adjacent to said opening through said diaphragm forming a connection between the tubes at each side of said diaphragm, inlet
60 and outlet openings in the opposite end of the heater-chamber at opposite sides of the diaphragm therein, a curved diaphragm in said inlet opening, a head member on the heater chamber adjacent to the inlet and out-
65 let openings therein, a diaphragm in said head member coinciding with the diaphragm in the heater chamber, a steam-drum secured to said head member, a feed-water inlet entering said head member at one side of
70 the diaphragm therein, a valve in said inlet, and a float mechanism in said steam-drum connected to and operating said valve, substantially as set forth.

In testimony whereof I affix my signature, 75
in presence of two witnesses.

GEORGE A. SIMS.

Witnesses:

HENRY SIMS,

H. M. STURGEON.