

No. 680,736.

Patented Aug. 20, 1901.

G. E. RIBLET.
STEAM GENERATOR.

(Application filed Dec. 24, 1900.)

(No Model.)

2 Sheets—Sheet 1.

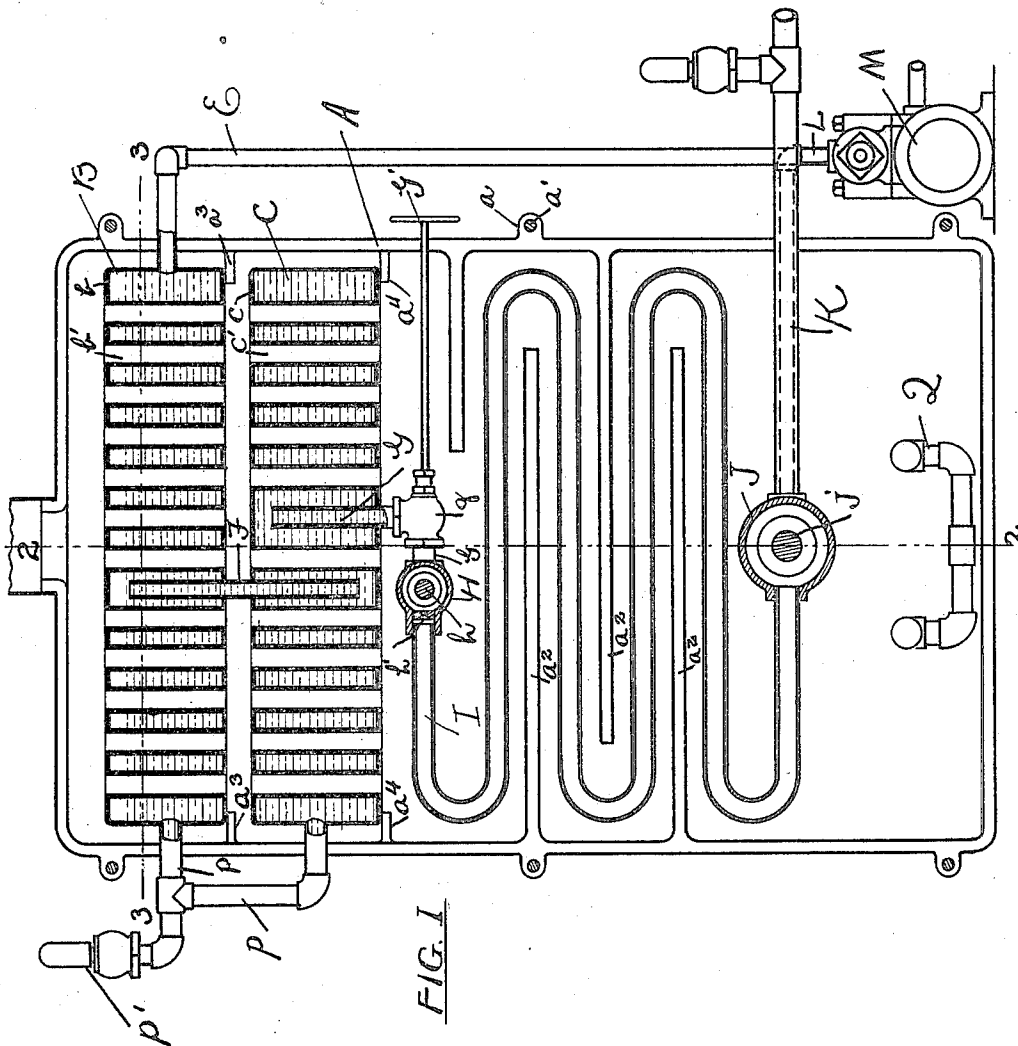


FIG. 1

Witnesses:
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Inventor
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his atty.

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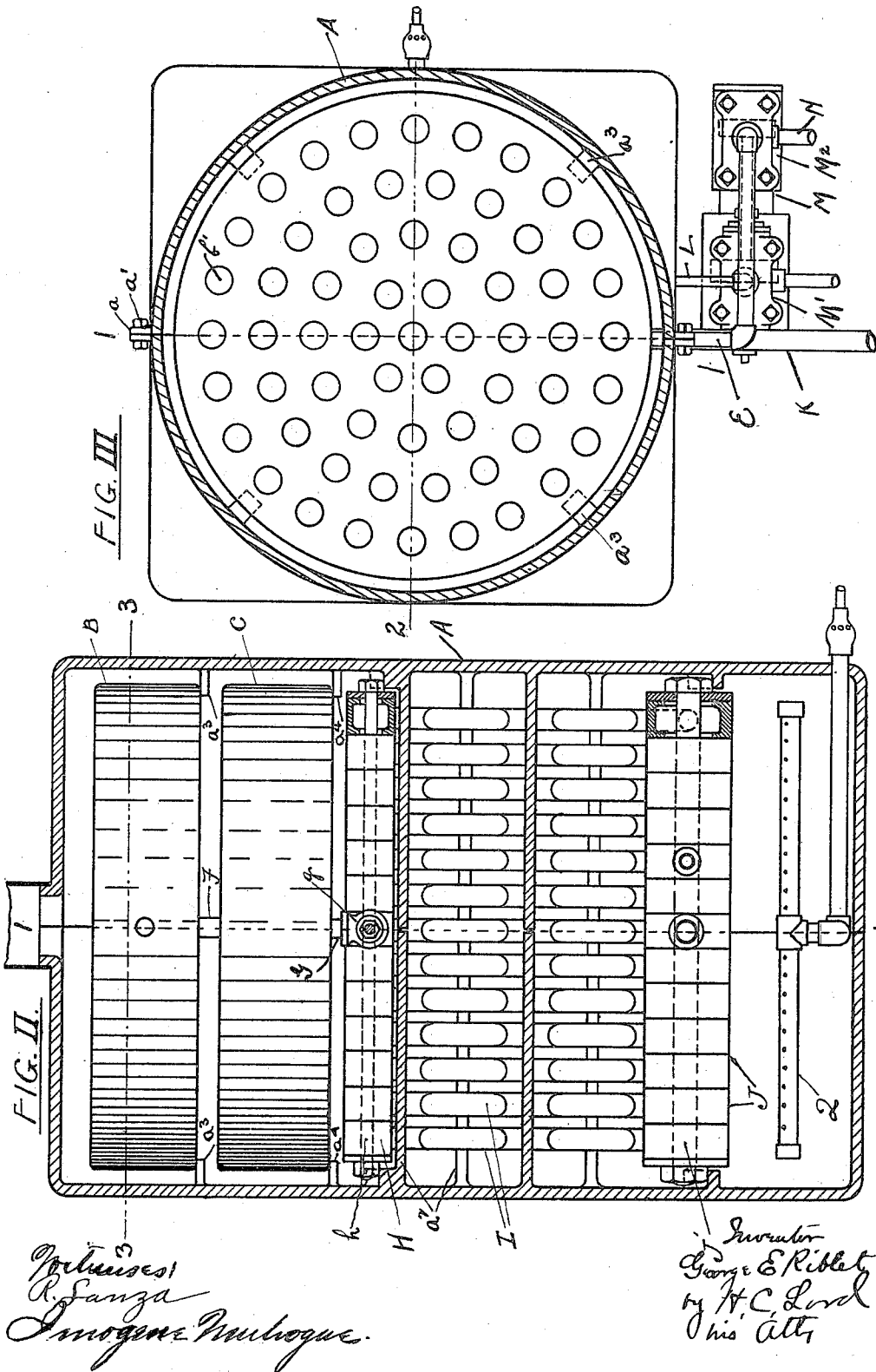
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2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

GEORGE E. RIBLET, OF ERIE, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 680,736, dated August 20, 1901.

Application filed December 24, 1900. Serial No. 40,929. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. RIBLET, 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.

This invention relates to steam-generators; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claims.

The invention comprises two leading features: first, the moving of steam or water in a reversed current to that of the heated gases, so as to deliver the hottest steam of which the device is capable, and, secondly, to form a steam-generator in two compartments, one for the water and the other for the steam, and arranging means for subjecting the water to a pressure that will largely prevent steaming in the water compartment and for maintaining the other compartment at a pressure below which the water will steam at the temperature at which it is subjected in the first compartment, so that water passing from the compartment having the greater pressure will immediately be converted into steam. These leading features are also combined and my invention also consists of other features and details, which will hereinafter fully appear in the description and claims.

The invention is illustrated in the accompanying drawings, as follows:

Figure 1 shows a section on the line 1 1 in Figs. 2 and 3. Fig. 2 shows a section on the line 2 2 in Figs. 1 and 3. Fig. 3 shows a section on the lines 3 3 in Figs. 1 and 2.

The shell A of the generator is preferably made in two sections. It simply incloses the steaming devices and directs and confines the heated gases. Arranged in the upper end of the case is the water-chamber B. This rests, preferably, on the lugs a^3 in the case. The chamber is provided with the shell b and the flues b' . In fact, this chamber is similar in construction to an ordinary upright boiler. Immediately below the chamber B is a second chamber C, formed by the shell c and having the flues c' therein. It is similar in con-

struction to the chamber B and rests upon lugs a^4 , similar to the lugs a^3 . If desired, the number of these chambers may be increased. Connected with the upper chamber is a feed-water pipe E, and connecting the upper part of the chamber B to the lower part of the chamber C is a pipe F. The purpose of so connecting the two chambers is to prevent circulation between them. Extending from these upper chambers are the pipes P, which pass to an ordinary safety-valve P'. Extending from the chamber C is an outlet-pipe G. The passage through this pipe is controlled by a valve g , the stem g' of which extends out through the case A, so that the valve may be operated. The pipe G passes into a manifold H. This manifold is formed in sections, which are clamped together by means of a bolt h extending through the center of the manifold. Connected with each section of the manifold is a pipe I. It preferably has several loops or coils, and they pass into the manifold J, which is formed of a series of sections secured together by a bolt j' extending through the center of the section. Passing out of the manifold is a steam-pipe K. The burner Q is arranged, preferably, below the manifold J. Any desired burner or ordinary furnace may be used. Extending between the loops or coils are a series of deflectors a^2 for directing the heated gases by the pipes I. It will be noted that the heated gases nearest the fire contact the outgoing portion of the steam-pipe and that the current of the heated gases as it passes through the generator is in a reverse direction to that of the steam passing out of the generator and that the water-chambers, which are in one sense generators, are also reversed in this same order, so that the hotter gases contact the chamber nearer the steam-outlet. By this arrangement the water in the chamber C is maintained at a higher temperature than that in the chamber B, and the steam as it passes along the coil I is superheated to the highest degree possible by the arrangement of the reverse currents thus described. A pipe L also is connected with the steam-supply, preferably with the generator, and passes to a steam-pump M. This pump comprises the cylinder M' and pump-chamber M². The pump-chamber has the usual intake-pipe N,

and the pump has the ordinary valve and incident mechanism. The pump is arranged for direct action and the steam-piston is of a sufficiently larger area than that of the pump-plunger to effect the difference in pressure desired between that maintained in the steam-pipes I and the chamber C.

By the mechanism so arranged the water in the water-chamber is maintained at a pressure which will largely prevent steaming in the water-chambers at the temperature at which they are subjected. At the same time the water in the said chambers is heated to such a point that it will immediately pass into steam on being delivered into the pipes I at the smaller pressure maintained in the said pipes. In this respect this generator is distinguished from that class known as "flash-boilers" in that the steam is generated not so much by immediate contact with the walls of the pipes I as by the difference of pressure maintained in the pipes I and the water-chamber. The steam as it passes through the coils is superheated. Of course an important feature is that there should be a difference of pressure in the chambers C and the coils I and that the water be heated, so as to steam somewhere between those pressures. As the pressure is increased the temperature may be increased.

What I claim as new is—

1. In a steam-generator, the combination of a series of connected water-chambers arranged to give a passage of water in reverse direction to the passage of gases; and means for directing the gases by said chambers.

2. In a steam-generator, the combination of the water-chambers, B and C; flues arranged in the said chambers; a connection between the said chambers; an outlet from the chamber, C; an intake connected to the chamber, B; and means for directing heated gases by the said chambers, first in contact with the chamber, C, and then after passing the chamber, C, with the chamber, B.

3. In a steam-generator, the combination of the water-chambers, B and C; flues arranged in the said chambers; a connection between the said chambers preventing a circulation from the chamber, C, to the chamber, B; an intake connected to the chamber, B; and means for directing heated gases by the said chambers, first in contact with the chamber, C, and then after passing the chamber, C, with the chamber, B.

4. In a steam-generator, the combination of a series of water-chambers; a steam-pipe leading from one of the said chambers; and means for directing the heated gases by the said steam-pipe, then by the chamber connected with the said steam-pipe, and then by the companion water-chamber.

5. In a steam-generator, the combination of the water-chambers, B and C; a steam-pipe leading from the chamber, C, said steam-pipe being arranged in loops or coils; a case inclosing the said steam-pipes; deflectors ar-

ranged between the said loops or coils; and means for supplying the heated gases of said generator by the outgoing steam-pipe, then by the said deflectors along said steam-pipes and by the said water-chambers.

6. In a steam-generator, the combination of a water-chamber; a steam-chamber; means for subjecting the water in the water-chamber to a greater pressure than that of the steam-chamber; means for subjecting the water in the water-chamber to a higher temperature than is sufficient to convert it into steam at the pressure maintained in the steam-chamber; and a connection between the said water-chamber and the said steam-chamber.

7. In a steam-generator, the combination of a water-chamber; a steam-chamber; means for subjecting the water in the water-chamber to a greater pressure than that maintained in the steam-chamber; means for subjecting the water in the water-chamber to a higher temperature than is sufficient to convert it into steam at the pressure maintained in the steam-chamber, but not sufficiently high to convert it into steam at the pressure maintained in the water-chamber; and a connection between the water-chamber and the said steam-chamber.

8. In a steam-generator, the combination of a water-chamber; a steam-chamber; means for subjecting the water in the water-chamber to a greater pressure than that of the steam-chamber; means for subjecting the water in the water-chamber to a higher temperature than is sufficient to convert it into steam at the pressure maintained in the steam-chamber; and a jet connection between the said water-chamber and the said steam-chamber.

9. In a steam-generator, the combination of a water-chamber; a steam-chamber; means for subjecting the water in the water-chamber to a greater pressure than that of the steam-chamber; means for subjecting the water in the water-chamber to a higher temperature than is sufficient to convert it into steam at the pressure maintained in the steam-chamber; and a steam-chamber composed of a series of pipes.

10. In a steam-generator, the combination of a water-chamber; a steam-chamber; connections between said chambers; means for maintaining a greater pressure in the water-chamber than in the steam-chamber; means for heating the water in the water-chamber to a higher temperature than is sufficient to convert the water into steam at the pressure maintained in the steam-chamber; and means for carrying the supply of heat, first by the said steam-chamber and then by the said water-chamber.

11. In a steam-generator, the combination of a water-chamber; a steam-chamber; of connections between the said chambers; means for maintaining a greater pressure in the water-chamber than in the steam-chamber; means for heating the water in the water-

chamber to a greater temperature than is sufficient to convert the water into steam at the pressure maintained in the steam-chamber; and means for conveying heat by the steam-chamber in a reverse direction to the passage of steam through the said chamber and then by the said water-chamber.

12. In a steam-generator, the combination of the water-chambers, B and C; and connections between the said chambers, said connections being arranged to prevent a circulation from the chamber, C, to the chamber, B; a steaming-chamber; connections between the steaming-chamber and the chamber, C; and means for subjecting the chamber, C, to a greater pressure than to the steaming-chamber; means for heating the water in the chamber, C, to a higher temperature than is sufficient to convert it into steam at the pressure maintained in the steaming-chamber, said heating means being passed first by the steaming-chamber, then by the chamber, C, and then by the chamber, B.

13. In a steam-generator, the combination of the case, A, having the deflectors, a^2 , therein; the chambers, B and C, arranged in the said case, the said chambers being formed

of the shells, b and c , respectively, and having therein the flues, b' and c' , respectively; the pipe, F, connecting the upper end of the chamber, B, with the lower end of the chamber, C; the inlet-pipe, E, connected with the chamber, B; the outlet-pipe, G, connected with the chamber, C; the manifold, H, connected with the pipe, G; the pipes I, connected with the manifold, H, said pipes having coils or loops passing by the deflectors, a^2 , the passage between the said pipes and manifold being provided with the jet-opening, h' , the manifold, J, into which the pipes, I, pass; the outlet-pipe, K; the pipe, L, connected with the steam-supply and steam-pump, M, said pump being arranged to produce a greater pressure at its outlet than is contained in the pipe, L, said pump connected with the intake-pipe, E; and means for supplying heat to the said case.

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

GEORGE E. RIBLET.

Witnesses:

H. C. LORD,
R. LANZA.