A. WINTON.

STEAM GENERATOR.

No. 186,511. Patented Jan. 23, 1877.

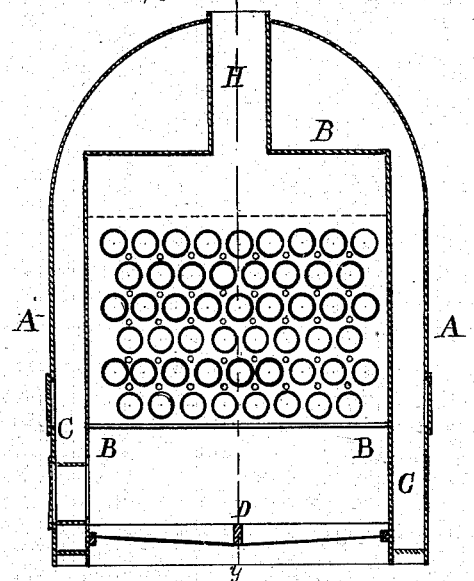

Fig. 1.

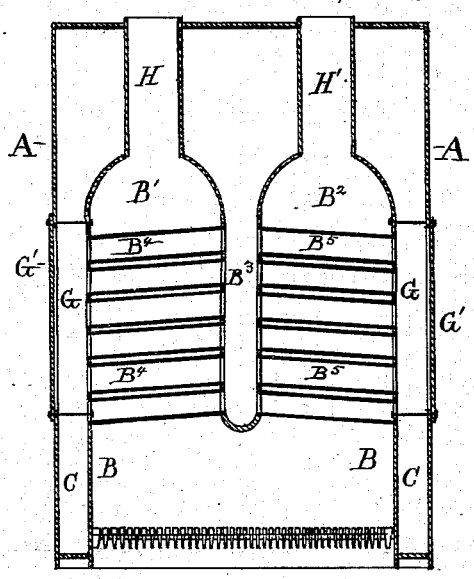

Fig. 2.

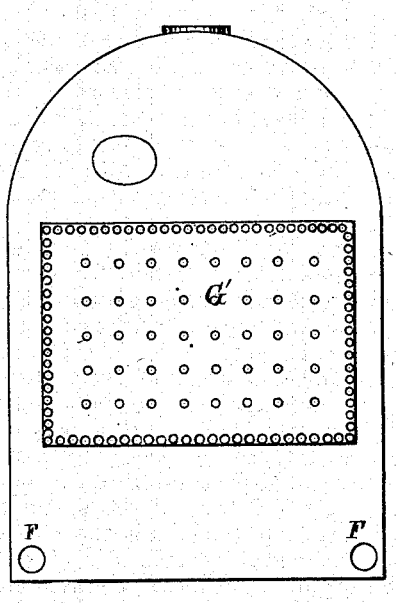

Fig. 3.

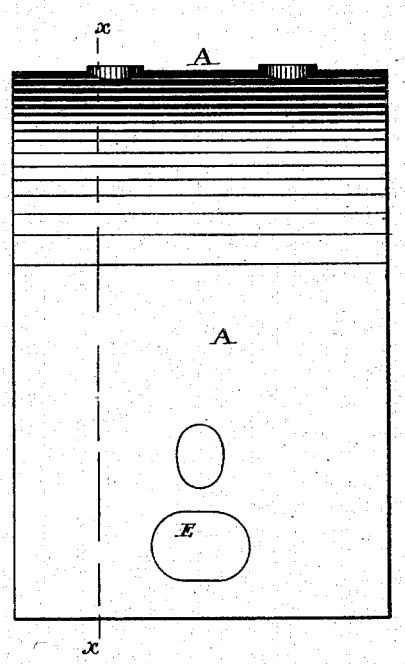

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

ALBERT WINTON, OF HAGERSTOWN, MARYLAND.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **186,511**, dated January 23, 1877; application filed November 28, 1876.

To all whom it may concern:

Be it known that I, ALBERT WINTON, of Hagerstown, in the county of Washington and State of Maryland, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which 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, which form a part of this specification.

Figure 1 is a sectional elevation on line *x x* of Fig. 3; Fig. 2, a transverse vertical section on line *y y* of Fig. 1; Fig. 3, an end elevation, and Fig. 4 a side elevation.

This invention relates to that class of steam-generators which are constructed with a view of causing an active circulation of the water contained in them when they are in use; and it consists, first, in the combination of a double-arched fire-box, with an intervening circulating water-space, into which the water which passes through the tubes enters, and from which it is distributed to the other parts of the device; and, secondly, in combining with the pendent water-circulating space a series of inclined circulating-tubes, all as will be more fully explained hereinafter.

In constructing generators with my improvements attached, I make the shell A of rectangular or other suitable form, its upper surface being of the arched form shown in Figs. 1, 3, and 4. The dimensions of the shell A will vary according to the amount of steam which it is desirable to generate in it; but in all cases it will be of sufficient size to receive within it a fire-box, B, and leave between the two a space, C, for water. The generator is to be supplied with grates D, and with a fire-door, E, and with hand-holes F, all of which may be of any approved form, and be so located as to afford the greatest convenience for use, the hand-holes being covered with plates, in the usual manner. In order that access may be had to the outer ends of the tubes, for the purpose of cleaning or repairing them, apertures G G are formed in the shell of the generator, as shown, said aperture being covered by plates G′ G′, which are bolted to the shell A, and are stayed to the tube-sheets by bolts passing through them and screwed into said sheets. At each end of the circulating water-space an aperture is formed, which is covered by plates, which may be removed to permit a person to enter said space, for the purpose of removing or repairing the tubes; and man-holes and plates may be provided at any other points where occasion may require.

In order that the greatest amount of steam may be generated with the least possible amount of fuel, it is necessary that provision be made for an active circulation of the water in the different parts of the generator; and that this function may be performed by my devices I arrange within the shell A a fire-box, B, the lower portion of which is a single compartment, which is supplied with grates for supporting the fuel. The upper portion of the fire-box is divided into two compartments, B^1 and B^2, they being separated by an intervening water-circulating chamber, B^3, which extends downward sufficiently far to allow it to receive the inner ends of the two series of tubes soon to be described. The upper surface of the fire-box consists of two arched surfaces, which are arranged at right angles to the arched portion of the shell A, as a consequence of which the crown-sheets are rendered much stronger, and less liable to be changed in form by the pressure of the steam upon them, owing to the fact that the circle described by their upper surfaces is of smaller diameter than it would be if it extended entirely across the fire-box.

These arches, as well as the lower portion of the water-circulating chamber, may be strengthened, if necessary, by stay-bolts passing down through the crown-sheets.

In order that provision may be made for an active circulation of the water, two series of tubes, B^4 B^5, are provided, the outer ends of each series being secured in the side walls of the fire-box, and their inner ends in the side walls of the circulating-chamber B^3, said inner ends being elevated, as shown in Fig. 2, so as to cause them to stand at an angle from the horizon, and thus cause the water to flow from the spaces outside of said fire-box through the tubes, and into the circulating-chamber

B^3, from which it will be distributed to the space above, and again return to the outer ends of the tubes preparatory to being again passed through them.

It will be seen that as arranged the fire passes around the tubes, and comes in contact with the interior surface of the arches of the fire-box, from which point the smoke and heated gases pass to the atmosphere through conduits H H′, in doing which they superheat the steam in the steam-space which surrounds them to such an extent as to cause a considerable increase of its force, and without the expenditure of any extra fuel. These conduits may be provided with suitable dampers for regulating the draft.

Some of the advantages due to this form of generator may be enumerated as follows: First, it makes a generator which presents a large amount of heating-surface within a small compass; second, it provides for an active circulation of the water, and thus increases the steam-generating capacity of the surfaces exposed to the heat of the burning fuel; thirdly, it provides for the construction of large generators with strong crown-sheets; and, fourthly, it allows of a direct and strong draft for the furnace.

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

1. The combination of the arched compartments B^1 B^2, having outlet-passages for the heated gases passing through the steam-space of the generator, and the centrally-located circulating-chamber B^3, forming a division of the fire-box into chambers B^1 B^2, and by which it is separated transversely, the parts being arranged to operate substantially as and for the purpose set forth.

2. The combination of the double-arched fire-box, arranged transversely across the generator, two series of inclined water-circulating tubes, and a central water-circulating space, the parts being constructed and arranged as shown and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ALBERT WINTON.

Witnesses:
ELIAS E. ROHRER,
THEO. C. BEELER.