(No Model.)

L. H. PAGE.

STEAM GENERATOR.

No. 277,848. Patented May 15, 1883.

Fig. 4.

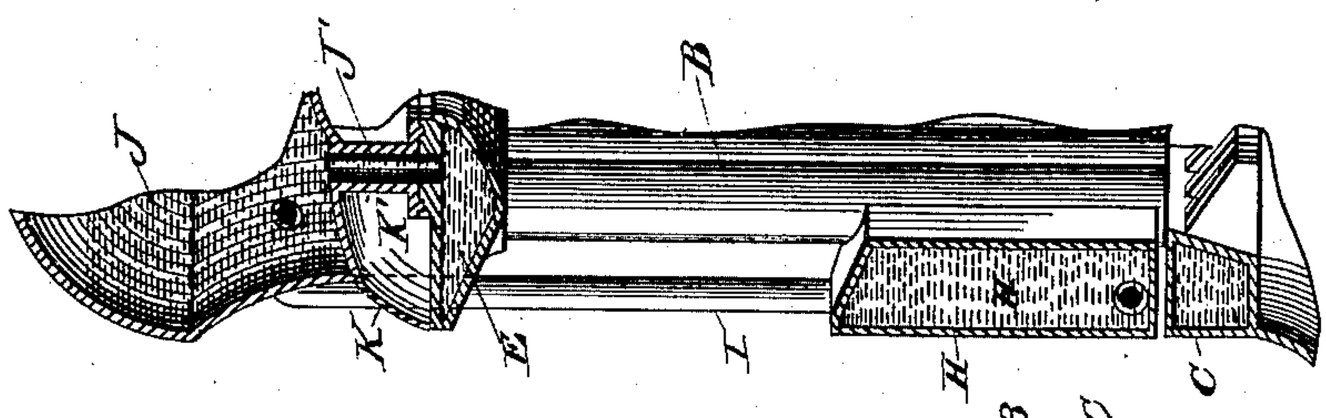


Fig. 2

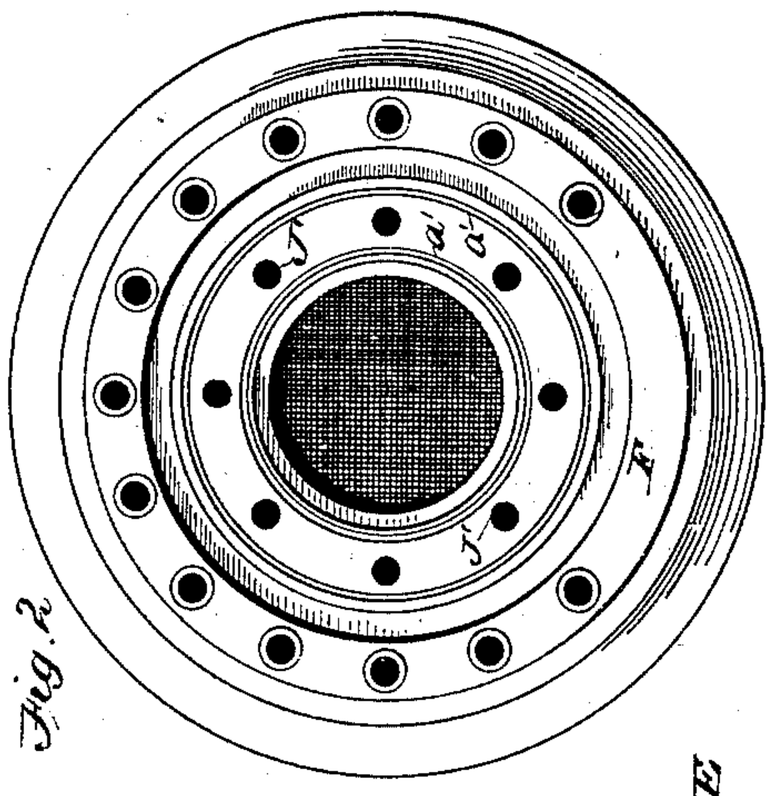


Fig. 3.

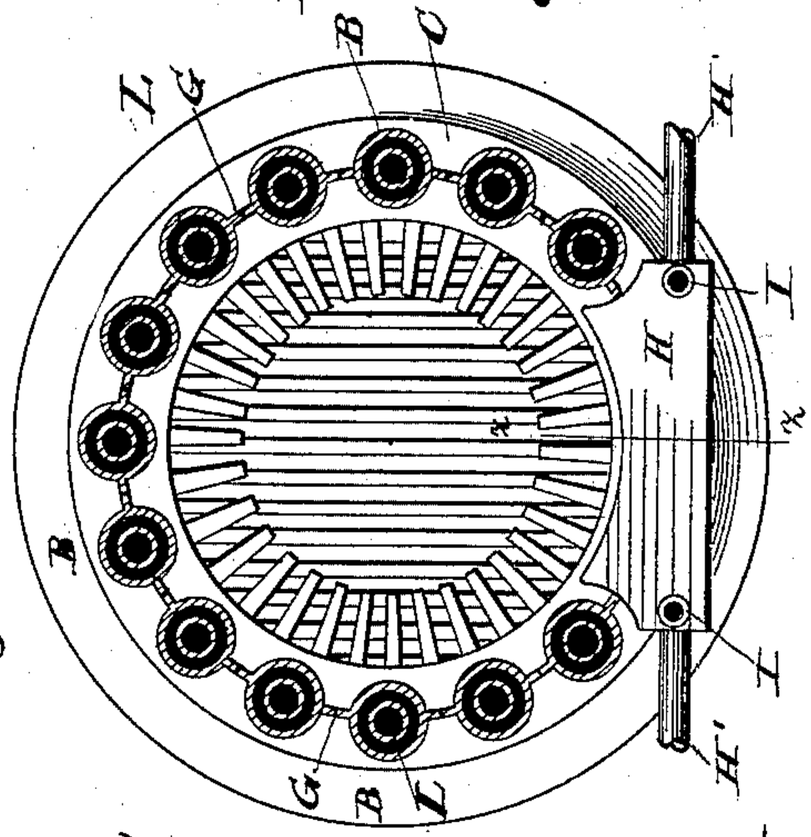
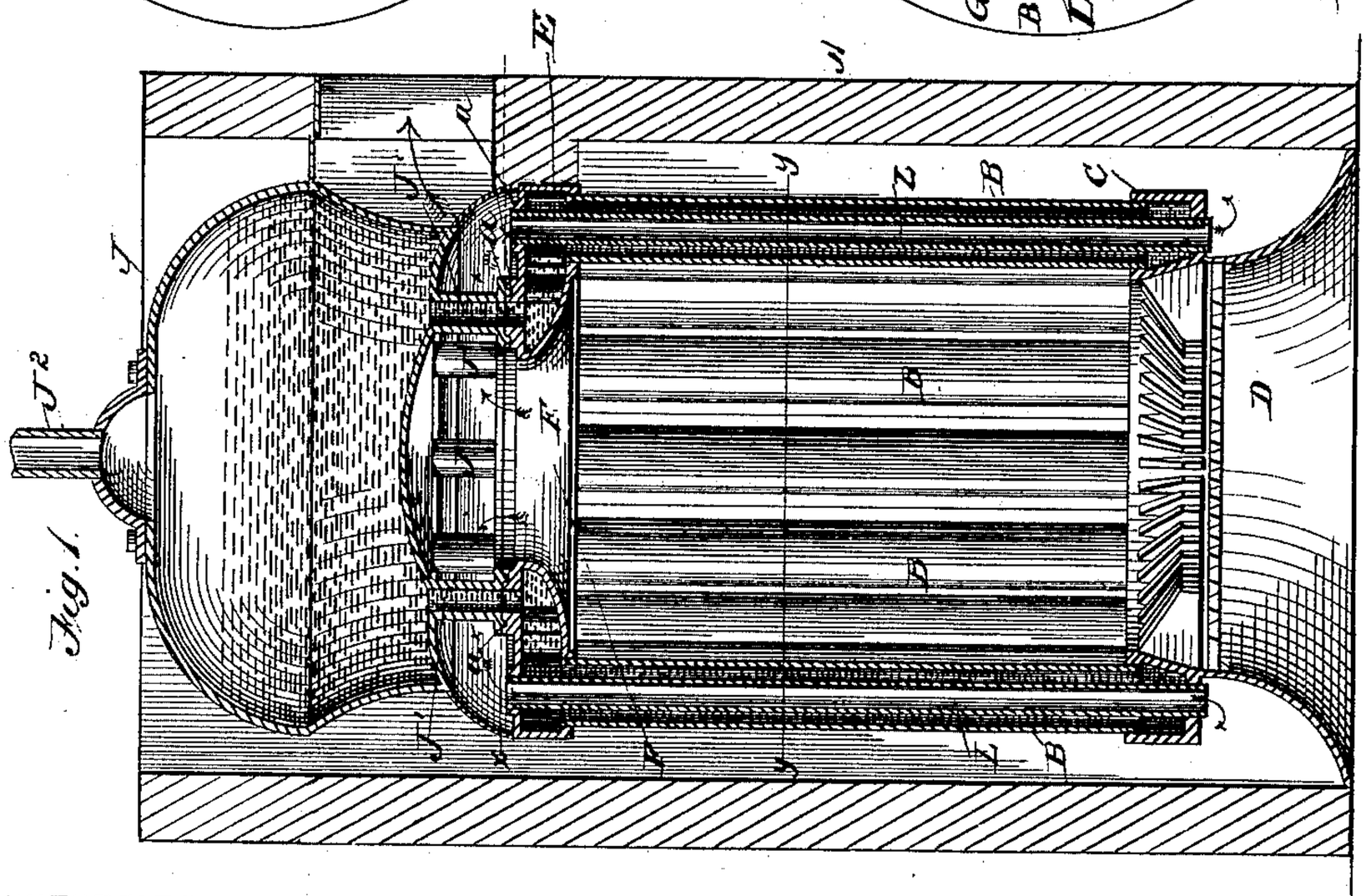


Fig. 1.



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UNITED STATES PATENT OFFICE.

LEWIS H. PAGE, OF PRESTON, CONNECTICUT.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 277,848, dated May 15, 1883.

Application filed February 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. PAGE, a citizen of the United States, residing at Preston, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Steam-Generators; and I do 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 and figures of reference marked thereon, which form a part of this specification.

This invention pertains to improvements in steam-generators, having for its object to increase the area of the steam-heating surface, utilization to the greatest possible extent of the water, and its ready conversion into steam; and the invention consists in the combination and arrangement of parts, substantially as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a sectional elevation of my generator. Fig. 2 is a horizontal section on the line *x x* of Fig. 1. Fig. 3 is a similar section on the line *y y* of the same figure. Fig. 4 is a part sectional elevation on the line *x x* of Fig. 3.

In carrying out my invention I construct the generator of an outer cylinder or casing, A, of suitable thickness to confine the heat or prevent the radiation thereof. Within this casing is arranged a series of circularly-disposed water-pipes, B, supported upon a hollow annular drum or chamber, C, cast with the foot or base D around the grate, as shown. The upper ends of these pipes are let into and suitably secured to a similar drum or chamber, E, formed or cast with the crown-sheet F, the latter flaring downward at its lower end, and being contracted at its upper end, the products of combustion passing through the same from the combustion-chamber, as indicated by arrows in Fig. 1. These pipes are cast with vertical flanges G, which unite and close the intervening spaces between the pipes, constituting, with the pipes, a cylinder, which, with the base and crown-sheet, forms the combustion-chamber. At the front, near the base of the heater, is a supplementary chamber, H, into which the water is first passed from the supply or service pipes through the pipes H′, the water thus passing, partially heated, from the chamber H through the pipes I, into the upper water-chamber, J, to prevent serious results. This superposed water-chamber J is cast at its bottom with short tubes J′, which communicate with the water drum or chamber E of the crown-sheet, and have flanges *a*, provided with ribs *a′* on the lower side, said ribs entering sockets or cavities in raised surfaces of the crown-sheet, as seen in Fig. 1, whereby the said water-chamber is portably connected to the crown-sheet. The water-chamber may be secured to the crown-sheet by bolts passing through the flanges *a* and the crown-sheet, or in any suitable manner.

K is an annular casting or ring closing the space between the superposed water-chamber J and the crown-sheet drum or chamber E, forming thereby a heating-chamber, K′. L L are a series of heating-tubes, of any desired shape, arranged within the water pipes or tubes B, with their upper ends opening into the heat-chamber K′, and their lower ends opening into the space inclosed by the casing A, whence the unconsumed products of combustion from said tubes are passed out through the smoke exit or pipe.

In setting my boiler two courses of brick are thrown in on a line just below the smoke-exit, partially around the boiler, so that its products of combustion must pass in front thereof before reaching the exit leading to the chimney.

The steam and hot-water chamber J has a pipe, J^2, to which is designed to be connected, steam-tight, a pipe leading to wherever it is desired to conduct the steam for use for heating or other purposes.

From the foregoing it will be observed that I obtain a great area of water-heating surface, thoroughly utilizing the water and effecting its ready conversion into steam.

I am aware that changes can be made in size, form, and arrangement of parts composing my invention without deviating from the principle or sacrificing the advantages thereof. I would therefore have it understood that I do not limit myself to the exact construction shown and described, but hold myself at liberty to make such alterations and changes as fairly fall within the scope of my invention.

I claim and desire to secure by Letters Patent—

1. In a steam-generator, a series of pipes con-

nected by flanges and arranged to form the walls of the fire-chamber, a pipe of smaller diameter being arranged centrally and concentrically in each pipe to form a water-space connecting with water-chambers above and below, the products of combustion being adapted to pass through the inner pipes, as and for the purpose set forth.

2. In a steam-heater, the water-chamber having the contracted portion F, in combination with a superposed steam-dome, the interior of which is connected to said water-chamber by short tubes J′, as described, whereby the heated gases may bathe the outer surfaces of the chamber E, the crown-sheet, and said tubes in its passage, substantially as and for the purpose set forth.

3. In a steam-generator, the superposed steam-chamber, with its bottom provided with short tubes, said tubes having at their lower ends flanges *a*, provided with studs or projections *a′*, in combination with the crown-sheet water-chamber, having sockets in raised surfaces thereon, substantially as shown and described.

4. In a steam-heater, the combination, with upper and lower water-chambers, of the water-tubes B, joined together by flanges G, and arranged to form a furnace-wall, the said tubes connecting both upper and lower chambers, and means, substantially as described, for directing the products of combustion longitudinally through such tubes B, as set forth.

5. In combination with the upper and lower water-chambers and the steam-dome connected therewith by short tubes J′, the concentric pipes B and L, and the combustion-chamber, whereby the products of combustion, in their passage to the pipes L, envelop largely the surfaces of the water-containing vessels, as set forth.

6. In combination with the dome J, the upper and lower chambers and connecting-pipes, as described, the receiving-chamber H, arranged as shown, to form a portion of the furnace-wall and a seat for the furnace-door, and connecting with said dome by pipes I, whereby the water, after heating, is passed to the steam-dome and sudden contraction of the smaller tubes is avoided, as set forth.

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

LEWIS H. PAGE.

Witnesses:

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