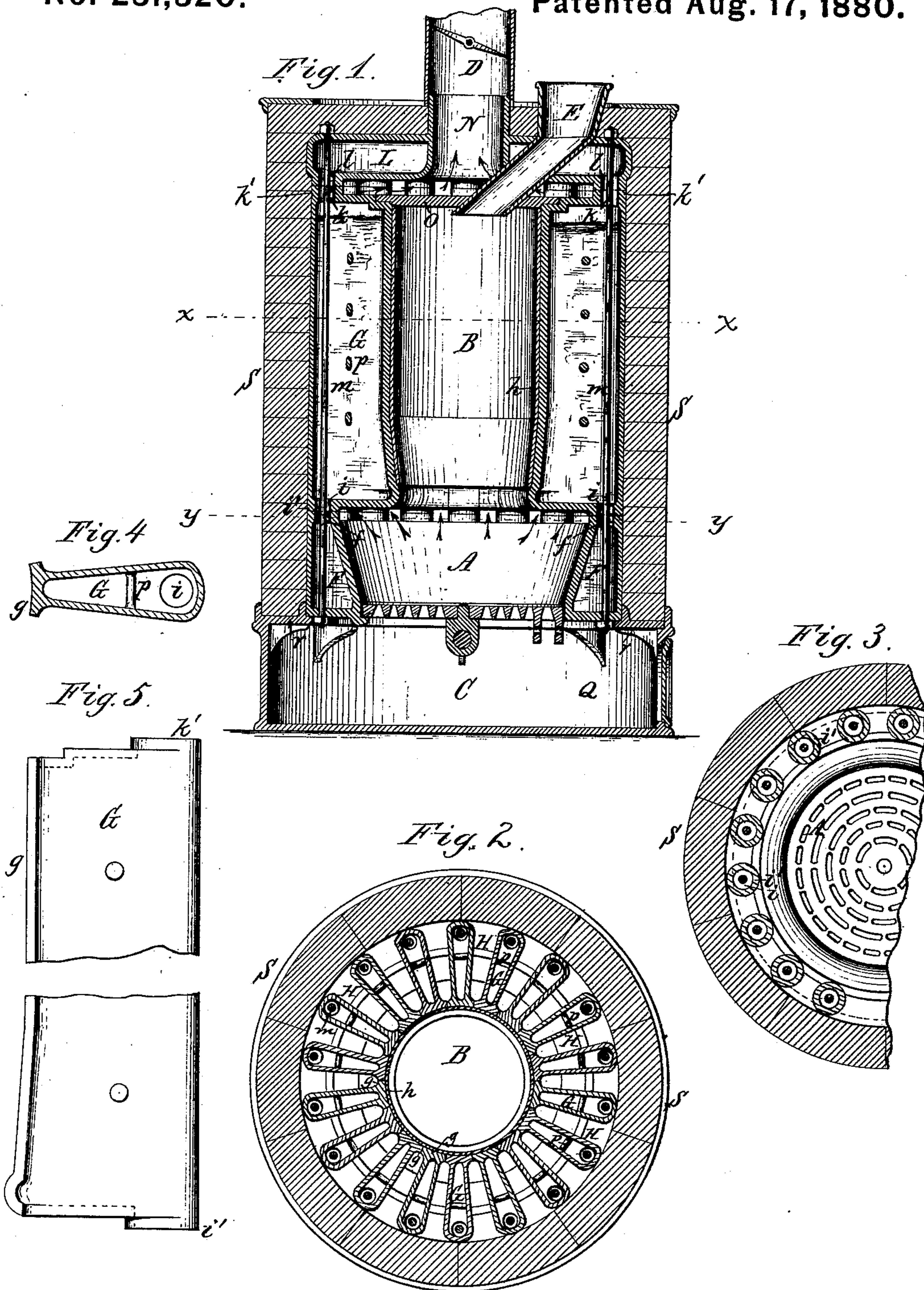


(No Model.)

A. P. HOLCOMB.
Steam Generator.

No. 231,320.

Patented Aug. 17, 1880.



Chas. J. Buchheit.
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UNITED STATES PATENT OFFICE.

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STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 231,320, dated August 17, 1880.

Application filed April 14, 1880. (No model.)

To all whom it may concern:

Be it known that I, ABEL P. HOLCOMB, of Silver Creek, in the county of Chautauqua and State of New York, have invented new and useful Improvements in Steam-Generators, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to a steam-generator which is more especially designed for producing steam under a low pressure for warming buildings and for similar purposes.

The object of my invention is to produce a simple, compact, and efficient steam-generator in which the fire-passages are not liable to become filled with ashes.

My invention consists, principally, of a steam-generator composed of upright water-chambers arranged radially around a common axis with intervening upright fire-spaces or flues, a water-space surrounding the fire-pot and communicating with the lower ends of the upright water-chambers, and a steam-chamber arranged above the upright water-chambers and communicating with the upper ends thereof; also, of various details of construction, as will be fully hereinafter set forth.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved steam-generator. Fig. 2 is a horizontal section in line *x x*, Fig. 1. Fig. 3 is a fragmentary horizontal section in line *y y*, Fig. 1. Fig. 4 is a horizontal section of one of the upright water-chambers on an enlarged scale. Fig. 5 is a fragmentary side elevation of the same on the same scale.

Like letters of reference refer to like parts in the several figures.

A represents the fire-pot of the steam-generator, and B the fuel-magazine, arranged centrally above the same.

C is the ash-pit; D, the smoke-flue; and E, the feed-chute, through which the fuel is introduced into the magazine B.

F represents an annular water-chamber surrounding the fire-pot A, and preferably cast in one piece therewith. The chamber F is closed at the bottom and sides, and provided at its top with a number of circular openings, *f*.

G represents the upright water-chambers, arranged radially around the fuel-magazine B, with their inner sides touching each other, and with their outer sides separated, so as to form intervening upright spaces or flues H, through which the flame and hot gases pass from the fire-pot to the smoke-exit. The chambers G are constructed in the form of hollow flat leaves or boxes, somewhat contracted from their outer to their inner sides, and provided at their inner sides with laterally-projecting ribs or flanges *g*, which fit closely against each other when the leaves G are put together, and the inner surfaces of which are curved in the arc of a circle, so that the contiguous inner sides of all the chambers G form a cylindrical fuel-magazine.

If desired, the magazine may be provided with an interior lining, *h*, of sheet-iron or other suitable material.

i represents an opening formed in the bottom of each chamber G, near its outer end, and surrounded by a downwardly-projecting boss or collar, *i'*. These bosses *i'* rest upon the annular top of the water-chamber F, which surrounds the fire-pot, and the openings *f* are so arranged in the top of the fire-pot that they communicate with the openings *i* in the bottom of the chambers G.

k are similar openings formed in the upper ends of the chambers G, in a vertical line with the openings *i* in the bottom of each chamber, and surrounded by a boss or collar, *k'*.

L represents an annular steam chamber or space arranged above the water-chambers G, and provided in its bottom near its periphery with openings *l*, communicating with the openings *k* in the tops of the water-chambers G.

m are vertical stay-bolts, which pass through the water-chambers F and G and the steam-chamber L and the openings *f i k l* thereof and secure the parts together.

N is a smoke-exit tube, arranged centrally in the steam-chamber L, and connecting at its upper end with the smoke-flue D, which leads to the chimney.

O is a cover or horizontal plate, which closes the upper end of the magazine B, with the exception of the feed-chute E, which penetrates this cover.

The steam-chamber L is arranged at such a distance above the upper ends of the vertical water-chambers G that a horizontal passage is formed between the under side of the steam-chamber L and the upper sides of the water-chambers G and the cover O of the magazine, through which the hot gases can pass from the flues H to the exit-pipe N.

p are horizontal stay-bolts, arranged at proper distances apart in the hollow chambers G for connecting the flat sides thereof and preventing the expansion of the same by the internal steam-pressure to which they are subjected.

The chambers G are preferably constructed of cast-iron, and the bolts *p* are preferably cast in one piece with the chambers; but, if desired, they may be screwed and riveted to the side walls of the chambers G in the same manner in which such stay-bolts are applied to ordinary steam-boilers.

Q represents the hollow base which incloses the ash-pit C. The base Q is provided with an annular horizontal top flange, *r*, upon the inner edge of which the boiler proper is supported, as clearly shown in Fig. 1.

S represents the inclosing wall or jacket of the boiler, constructed of brick or other suitable non-conductor of heat, and supported upon the top flange, *r*, of the base Q. The jacket or brick-work S rests against the outer sides of the water-chambers G, and forms, in connection therewith, the upright flues H.

The boiler is supplied with the water-feed pipes, steam-pipes, safety-valves, and other necessary appurtenances in any ordinary and well-known manner.

The flame and hot gases generated by the burning fuel in the fire-pot A pass from the fire-pot A upward into and through the vertical flues or fire-passages H, between the vertical water-chambers G, and thence into the horizontal space below the steam-chamber L, thence inwardly over the cover of the magazine B to the central exit-pipe, N, whence they escape into the smoke-flue D. In their passage from the fire-pot to the smoke-flue the gases are effectually deprived of the heat contained in them by the thin bodies of water contained in the vertical chambers G, which expose a very large surface to the action of the hot gases.

The upright flues H, formed between the chambers G by the smooth vertical sides of

these chambers, insure a good draft and prevent the lodging of ashes on the same, thus presenting at all times a free unobstructed surface of metal for the absorption of heat from the hot gases passing through these flues.

I am aware that it is not new, broadly, to form vertical flues between the vertical water-spaces, and that it is not new, broadly, to arrange vertical water-chambers in communication with the water-foot and steam-chamber, and I do not lay claim thereto; but

What I claim as my invention is—

1. In a steam-generator, the separate vertical and elongated water-spaces G, arranged radially around the fuel-magazine B, with their inner sides in contact, and forming a continuous surface around said magazine, and their outer sides separated, in combination with an inclosing jacket or casing, S, whereby vertical flues are formed between the vertical water-spaces, and a thin compartment of water with an extended surface is presented to the action of the fire, substantially as and for the purpose set forth.

2. The fire-pot A, provided with annular water-chamber F, in combination with the intermediate vertical elongated water-spaces, G, arranged radially around the magazine B, steam-chamber L, and surrounding jacket S, substantially as and for the purpose set forth.

3. The vertical water-chambers G, constructed at their inner sides with laterally-projecting flanges *g*, by means of which the chambers come in contact with each other and are held in their proper position, substantially as set forth.

4. In a steam-generator, the combination of a fire pot, A, provided with a surrounding water-chamber, F, having openings *f* in its upper side, vertical water-chambers G, arranged radially around a magazine, B, and having openings *i* in their undersides, communicating with the openings *f* of the water-chamber F, said openings *i* being arranged near the outer sides of the water-chambers G, so that the inner sides of these water-chambers project inwardly over the fire-pot, and a steam-chamber, L, communicating with the upper ends of the water-chambers G, substantially as set forth.

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Witnesses:

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