(No Model.)

C. JILLSON.

STEAM GENERATOR.

No. 418,187. Patented Dec. 31, 1889.

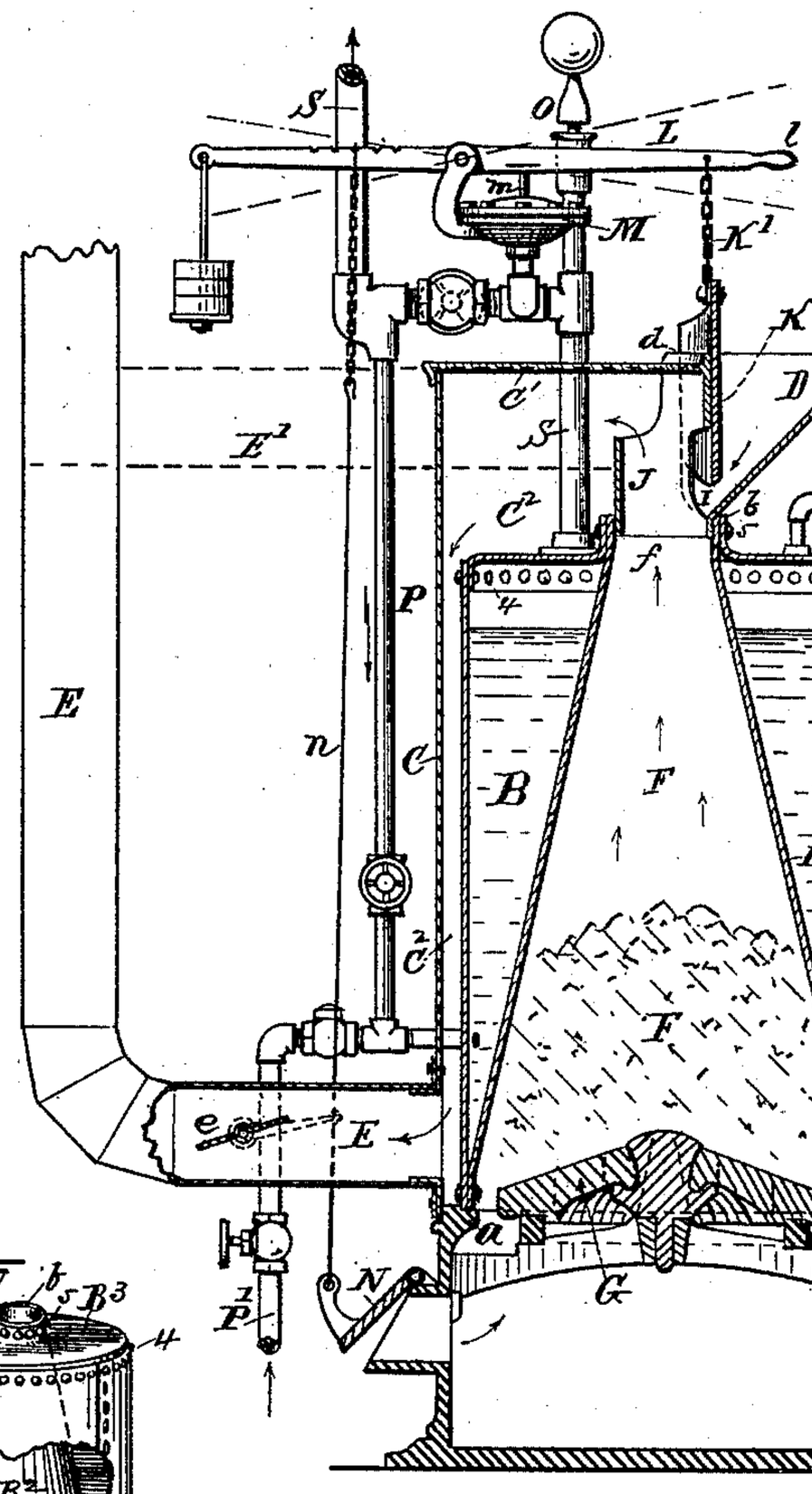

FIG. 1

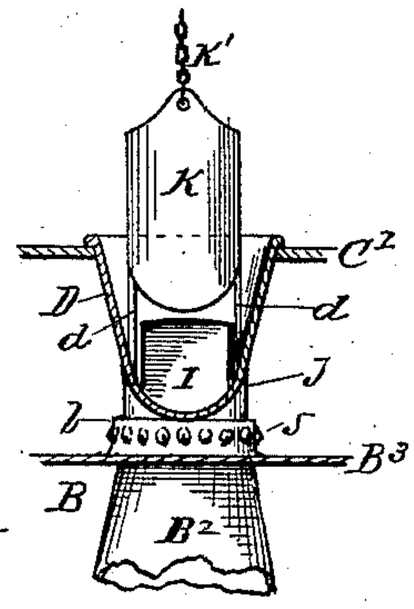

FIG. 2

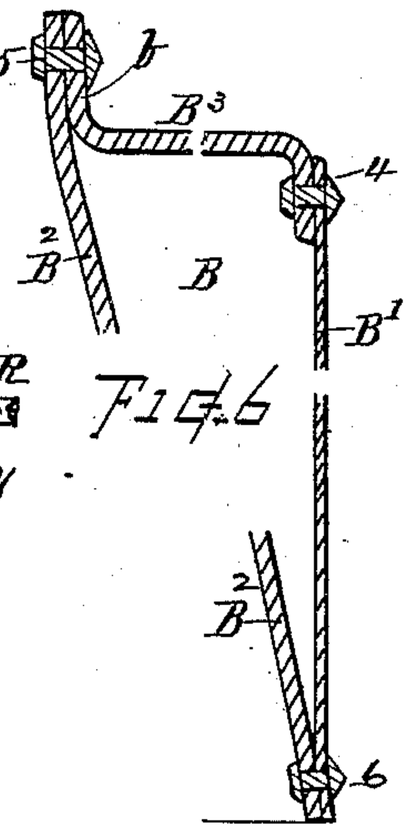

FIG. 6

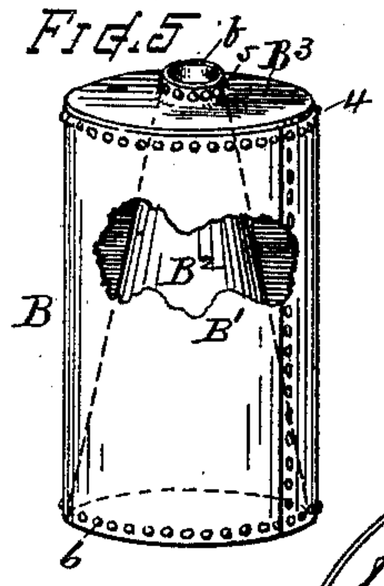

FIG. 5

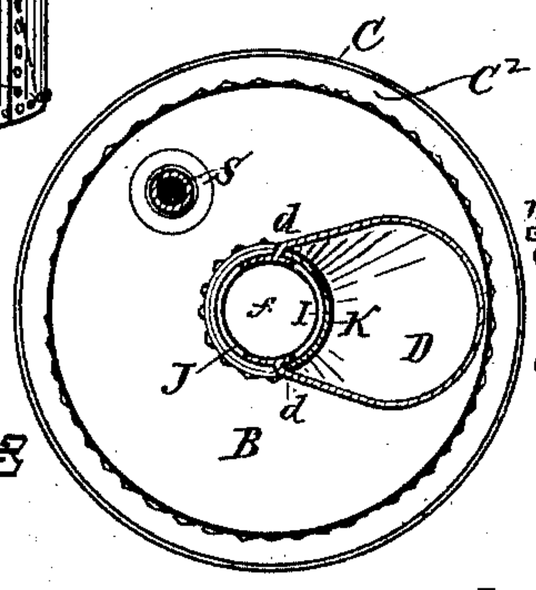

FIG. 8

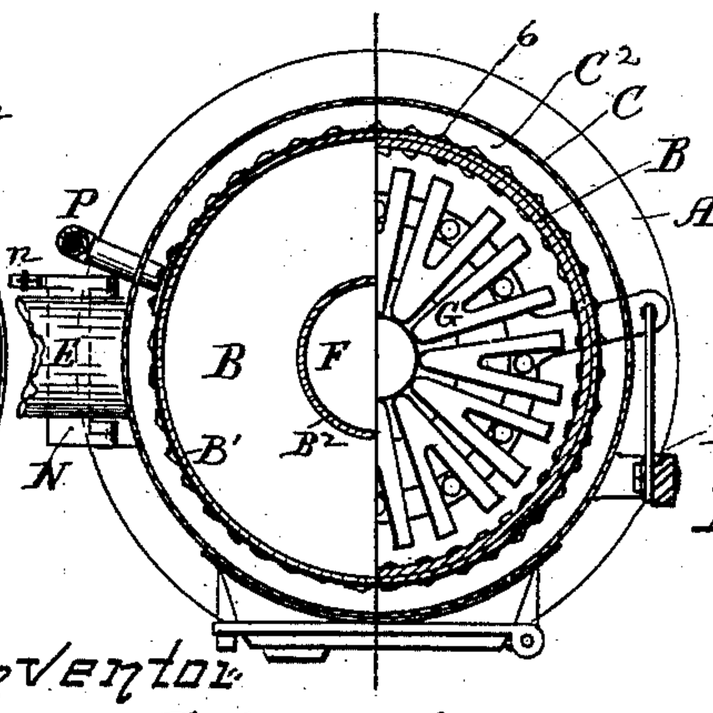

FIG. 4

Witnesses.

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UNITED STATES PATENT OFFICE.

CLARK JILLSON, OF WORCESTER, MASSACHUSETTS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 418,187, dated December 31, 1889.

Application filed November 4, 1889. Serial No. 329,186. (No model.)

To all whom it may concern:

Be it known that I, CLARK JILLSON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Steam-Generators and Heaters, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

My present invention relates more especially to that class of steam-generators or heaters employed for warming buildings and for similar purposes, the prime object thereof being to afford a simple, durable, and efficient boiler which can be manufactured with economy, and which is constructed of the peculiar form described for embracing the fire within a central chamber thereof, and with an upwardly-increasing water-space surrounding said fire-chamber; also, to afford, in combination with the boiler, improved means for facilitating the introduction of fuel and for the regulation of the fire. These objects I attain in the manner and by mechanism such as hereinafter described, the particular subject-matter claimed being definitely specified.

In the drawings, Figure 1 is a central vertical section of a steam-generator or heater illustrating the features of my invention. Fig. 2 is a sectional view showing the top portion through which the fuel is supplied and the regulating-gate therefor. Fig. 3 is a horizontal section at the position of line *x*. Fig. 4 is a half-section at the position of the water-level line *w* and a half-section at bottom of the boiler at line *y*. Fig. 5 is a perspective view of the boiler separate, (drawn to a smaller scale,) a portion of the outer shell being broken away to show the inner shell; and Fig. 6 is a sectional detail showing the arrangement of the parts and connecting-joints at top and bottom ends of the boiler.

In referring to parts, A denotes the base or supporting-stand containing the ash-chamber, and which may be of any suitable construction.

B indicates the boiler; C, an external casing inclosing said boiler; D, the fuel-feed chute or hopper; E, the smoke-pipe or chimney-flue; F, the furnace or fire-chamber; G, the grate for supporting the fuel therein, and H a hand-lever or means for shaking the grate.

One feature of my invention consists in the peculiar structure of the boiler B. This is composed of an outer shell B′, an inner shell B^2, and an annular top disk or single head B^3. The outer shell is formed as a plain cylinder, while the inner shell is made in the form of a cone, its lower end being of substantially the same diameter as the cylinder B′, while its upper end, which is truncated, is of a reduced diameter suitable to correspond with the central opening in the head or top plate B^3. The head B^3 is flanged on its outer edge and the top end of the cylindrical shell B′ is riveted to the periphery thereof, as at 4. Said head is also made with an upwardly-extending flange *b* about its central opening, and the top end of the conoidal inner shell B^2 is inserted upwardly through the opening and riveted thereon, as at 5, while the lower ends of the cylinder B′ and conical shell B^2 are riveted directly to each other, as at 6, thus producing a boiler having an annular interior space, which space is of considerable thickness at the top and thence downward gradually decreases in thickness until it terminates or vanishes to nothing where the plates meet at the bottom end of the boiler. This upward enlargement of the space or body of water affords facility for the bubbles of steam to rise freely without displacing the water from the fire-sheet, and also gives greater top surface and steam-space in proportion to the volume of water presented to the heating-surface below. This boiler is set in upright position upon the base A, which is provided with a ledge, flange, or seat *a*, that is properly adapted for supporting the shells, and the grate G is disposed across the interior space at or near the lower end of the boiler, the fire-chamber F being within the conical inner shell, as shown.

Combined with the boiler at its top end there is arranged a tubular part J, disposed concentric with and in continuation of the passage *f* through the boiler-head. Said tubular part has an opening I in its side, and the chute or hopper D is disposed in connection therewith for directing or facilitating the introduction of fuel to the interior or fire-

chamber through the passage I. A movable door or gate K is provided for closing the opening I, which is best arranged to slide up and down in suitable guideways *d d* in or upon said tubular part. The gate K serves both as a door for the introduction of fuel and as an air-draft for controlling the admittance of air to the interior, and is connected by chain or link K′ to the lever L of a regulating mechanism M, whereby said gate is opened or closed in accordance with the variation of steam-pressure in the boiler. The regulator M can be of the well-known type of diaphragm damper-regulators, such as are in common use, and the air-valve N into the base-chamber is also connected by link *n* with the regulator-lever L for simultaneous action with the gate K. When the pressure rises, the gate K is opened and valve N is closed for deadening the fire, and when pressure decreases the gate K is closed and valve N opened more or less, according to the requirements. The tubular part J in the present instance opens beneath the cap-plate C′ into the chamber or space C^2 between the boiler B and outer casing C, so that the hot products of combustion pass downward around the boiler to the pipe or flue E, that leads out from the lower part of said chamber. If in any instance it is desired to employ the boiler without the outer casing or chamber C^2, then the smoke-pipe can be led directly from the tubular part J, as indicated by dotted lines at E′, all other parts being substantially as shown.

When it is desired to add fuel, the attendant raises the gate K by lifting the end *l* of the lever, which simply rests on the pin *m* of the diaphragm. This at the same time closes the valve N and opens the damper *e* in pipe E if the latter is connected to the link *n*, as indicated.

S indicates the steam-delivery pipe, O the safety-valve, P the return-pipe, P′ the pipe for feed-water supply, R the blow-off, and T the gage, which several parts may be arranged, connected, and provided with cocks substantially as indicated, or in any well-known or convenient manner, as they are not essential elements in my present invention.

What I claim as my invention, to be herein secured by Letters Patent, is—

1. The within-described boiler, composed of an outer shell formed as a cylinder of equal diameter at its top and bottom ends, the single annular head disposed at right angles to said cylindrical shell, the top end of said outer shell riveted to the periphery of said head, and the inner shell embracing an interior fire-chamber formed as a cone and having its larger end riveted directly to the bottom end of said outer shell and its upper end riveted to the flange about the central opening in said annular head, all as shown and described.

2. The boiler composed of the upright outer shell formed as a straight cylinder, the annular head disposed at right angles to said cylinder and having the upward flange about its central opening, and the conoidal inner shell secured to the outer shell at its lower end and to the flanged head at its upper end, containing the upwardly-tapered fire-chamber, in combination with the supporting-base having a ledge for sustaining said shells and the external casing surrounding said cylinder, affording an annular chamber between the casing and boiler, and the fire-grate disposed across the interior space at or near the lower end of said boiler, substantially as shown and described.

3. The tubular top extension having the opening I and the chute or hopper for directing fuel thereinto, in combination with the boiler having an interior fire-chamber, the gate movable in guides in or upon said tubular part for opening and closing said opening, and the pressure-actuated regulator and connections for opening and closing said gate, substantially as set forth.

4. The combination, substantially as described, of the base-frame A, provided with an ash-chamber and an inlet-valve, the upright cylindrical boiler having the conical inner shell with upwardly-tapering internal fire-chamber, the fire-grate across the bottom of said chamber, the outer casing inclosing said boiler with a surrounding space, the tubular part extending upward from the top of the fire-chamber within the casing and having a side opening I, the chute or hopper converging into said opening, the movable gate K, the pressure-actuated regulator, its lever L, with connections for simultaneously moving said gate and air-inlet valve, substantially as set forth.

Witness my hand this 31st day of October, A. D. 1889.

CLARK JILLSON.

Witnesses:
CHAS. H. BURLEIGH,
ELLA P. BLENUS.