

No. 610,554.

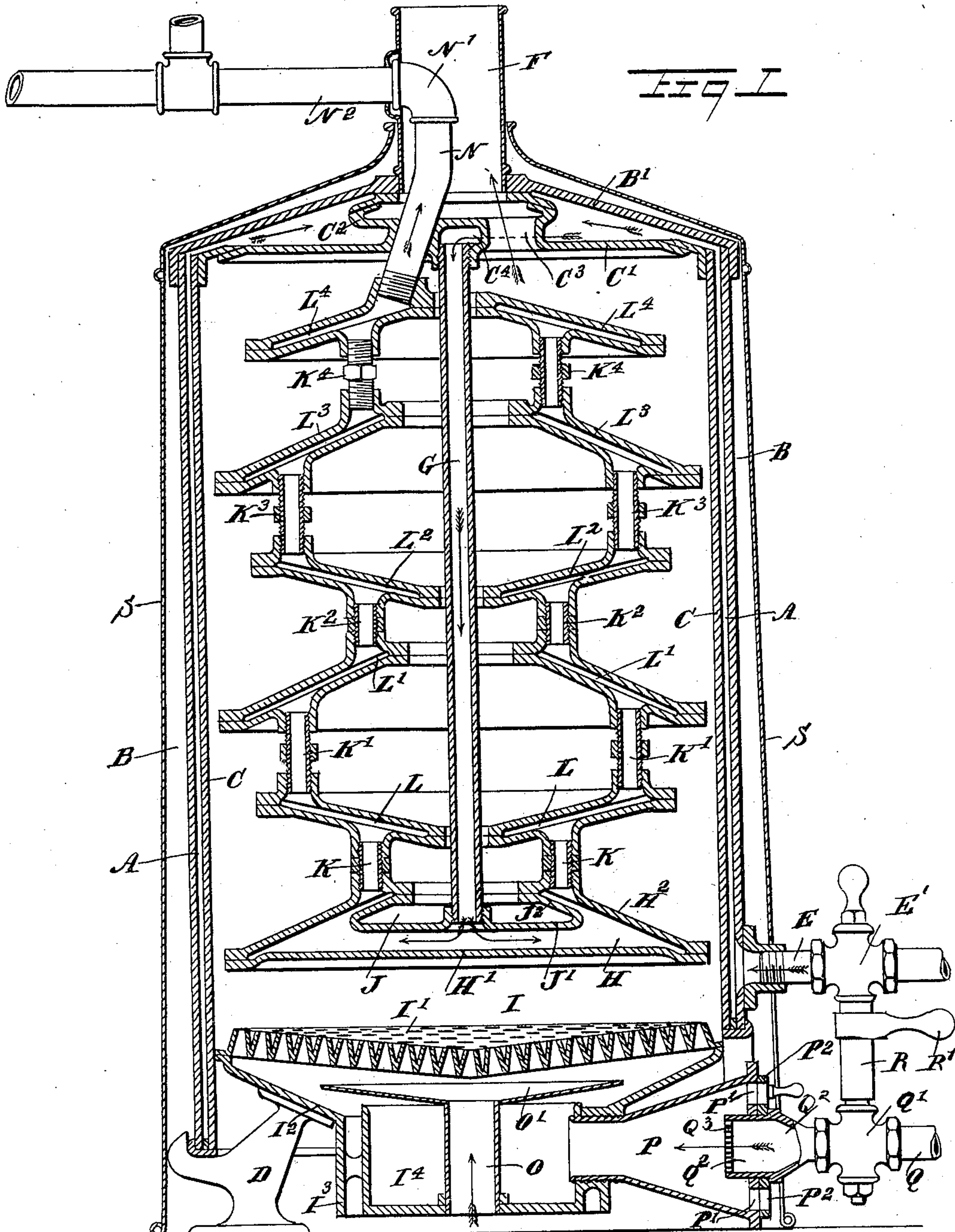
Patented Sept. 13, 1898.

J. McCARTNEY.

WATER HEATER AND STEAM GENERATOR.

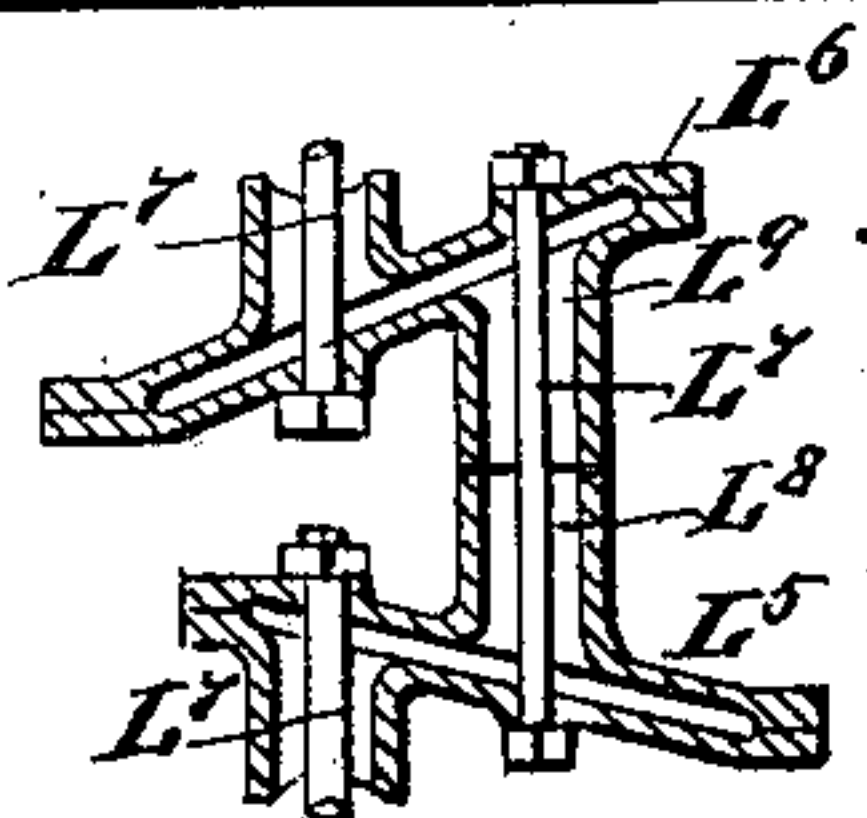
(Application filed Nov. 6, 1897.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES McCARTNEY, OF OAKLAND, CALIFORNIA.

WATER-HEATER AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 610,554, dated September 13, 1898.

Application filed November 6, 1897. Serial No. 657,675. (No model.)

To all whom it may concern:

Be it known that I, JAMES McCARTNEY, of Oakland, in the county of Alameda and State of California, have invented a new and Improved Water-Heater and Steam-Generator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved water-heater and steam-generator, arranged to insure a proper circulation of the water, which when the heat is applied to the best advantage causes a quick heating of the water at a comparatively small expenditure of fuel.

The invention consists principally of a conical water-chamber the base of which is arranged directly over the burning fuel in the fire-box and a spreader within the said chamber above the said base and having a central inlet for the water to enter the chamber, the sides of the spreader forming, with the sides of the chamber, an upwardly-extending outlet for the heated water.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both figures.

Figure 1 is a sectional side elevation of the improvement, and Fig. 2 is a like view of a modified form.

The improved water-heater is provided with an annular water-inlet chamber A, formed by vertically-disposed spaced walls B and C, set at their lower ends on a suitable base D, which supports the entire heater. The chamber A is very narrow, as is plainly indicated in Fig. 1, and is provided near its lower closed end with an inlet-pipe E, connected with a suitable water-supply or with the return-pipes of a hot-water-heating system, so that the water entering the chamber A rises therein and flows between the tops C' B' of the walls C and B around a head C², extending centrally between the tops C' and B', the said head being provided with a smoke and gas outlet opening C³, connecting the interior of

the fire-box formed by the wall C with a smoke-flue F, as is plainly shown in the drawings. In the head C² is also formed a channel C⁴ for allowing the water between the tops C' B' to flow into a downwardly-extending pipe G, opening at its lower end centrally into a conical water-chamber H, the base H' of which is arranged directly over a burner I, supported by the base D, previously mentioned, the burner being arranged in the lower end of the fire-box formed by the wall C.

The conical water-chamber H is provided with a spreader J, likewise made conical and arranged with its base J' directly over the base H', so that the water passing through the pipe G into the space between the bases J' H' is caused to spread in all directions in the said space to finally pass upward between the sides J² H² of the spreader J in the chamber H to short pipes K, connecting the sides of the said chamber H with the interior of a dished section L, connected in turn near its upper end by pipes K' with an inverted dished section L², connected by pipes K² with a section L³, similar to the section L. This section L³ is connected by pipes K³ with an inverted dished section L⁴, and pipes K⁴ connect the upper end of this section with an inverted top section L⁵, from which leads an outlet-pipe N, connected by an elbow N' with a distributing-pipe N² for carrying the water or steam to a desired place. The outlet-pipe N extends through the head C² into the smoke stack or flue F, through the side of which extends the distributing-pipe N².

Now by the arrangement described the elbow N' can be turned in any direction to bring the distributing-pipe N² into the desired position, it being understood that the flue F, on account of being movable in the top B', allows such adjustment.

It is evident that when the water passes into the chamber H it is quickly heated by the heat emanating from the burning fuel, and the water readily flows up between the sides J² H² and rises through the pipes K into the next section L, from which the water rises to the pipes K' to the following section. This is repeated until the water finally reaches the outlet-pipe N. As all the sections are dis-

posed in the fire-box formed by the wall C, it is evident that the heat arising in the fire box or chamber comes in contact with the outer surfaces of the several sections and pipes, and consequently continually takes up the units of heat, finally reaching the outlet-pipe N in a highly-heated state or in the form of steam, as the case may be.

It will be seen that by the arrangement described the water is free to circulate through the several sections without danger of being left therein, and it is also evident that the water rising in the chamber A is heated by the heat passing up the fire-box and heating the inner wall C', so that the incoming water takes up considerable heat before it flows down the pipe G into the chamber H, in which it is subjected to the intense heat from the burner I, owing to the location of the burner relatively to the chamber.

Suitable burner devices must be provided for—such, for example, as those described below, which are preferred.

The burner I (shown in Fig. 1) is provided with a perforated top plate I', supported on a dished bottom I², resting on the base D, and from the bottom I² extends downwardly a cylindrical offset I³, containing an inner chamber I⁴, having a closed bottom with an air-inlet pipe O, provided at its top with a conical flange O', extending under the burner-plate I'. This burner forms the subject of a separate application filed by me February 24, 1898, Serial No. 671,526.

Into the chamber I⁴ opens the reduced end of a gas-mixing chamber P, connected at its base with a gas-supply pipe Q, having a suitable valve Q' and a head Q² extending centrally into the mixing-chamber P and having its inner end plate Q³ formed with perforations, as is plainly shown in Fig. 1. The valve Q' has its stem connected by a rod R with the stem of the valve E' on the water-supply pipe E, and on the rod R is secured a handle R' for turning the rod and the valves E' and Q' simultaneously to turn on the water and the gas at the same time. The base of the chamber P is also provided with apertures P' for the admission of air and controlled by a perforated damper P², mounted to turn on the inner end of the pipe Q, as shown in the drawings.

Now by the arrangement described air can be mixed directly with the gas in the chamber P, and this mixture passes through the chamber I⁴ under the flange O' to the burner-plate I' to pass through the same with an additional air-supply from the pipe O, the entire mixture being burned on the top of the plate I' directly under the base H' of the water-chamber H. A pilot-light coming from the gas-valve Q' may be employed for igniting the mixture on the top of the plate I'.

By having the perforated damper at the inlet of the mixing-chamber P, I am enabled to

conveniently shut off the air-supply completely at the mixing-chamber when lighting the burner, so as to prevent a sudden explosion in the chamber and an igniting of the gas issuing through the perforation in the end plate Q³. When the gas is lit, then the damper or air-valve P² is opened to admit air to the mixing-chamber and insure a perfect blue flame of high heating qualities. In extinguishing the flame at the burner the air valve or damper is first closed to turn off the air-supply, and then the valve Q' is closed to allow the pure gas-flame to die out slowly.

As shown in the drawings, the chamber H and the different sections L L' L² L³ L⁴ are made in parts bolted or otherwise fastened together, one section being connected with the other by pipes, as before described, whereby the hot air is free to pass to both the outer top and bottom surfaces and up through the open centers of the sections to insure a proper heating of the water as it rises in the sections. The adjacent sections L⁵ and L⁶ may also be fastened together by suitable bolts L⁷, passing through hollow connecting-lugs L⁸ L⁹, forming part of the adjacent sections L⁵ L⁶, respectively, as indicated in Fig. 3.

The entire apparatus is preferably inclosed within a suitable shell S, as indicated in Fig. 1.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A water-heater comprising a water-inlet chamber formed by vertically-disposed spaced walls, of which the inner wall forms a fire-box containing a burner or grate, the said walls being spaced to allow the water to rise from the chamber to the said space, a pipe depending from the top of the inner wall, to allow the water to pass from the space into the pipe and down the same, a conical water-chamber arranged with its base directly over the burning fuel in the said fire-box, and a spreader within the said chamber above the said base, and having a central inlet connected with the said pipe, to allow the water to enter the chamber, the sides of the spreader forming with the sides of the chamber an upwardly-extending outlet for the heated water, substantially as shown and described.

2. A water-heater comprising a water-inlet chamber formed by vertically-disposed spaced walls, of which the inner wall forms a fire-box containing a burner or grate, the said walls being spaced to allow the water to rise from the chamber to the said space, a pipe depending from the top of the inner wall, to allow the water to pass from the space into the pipe and down the same, a conical water-chamber arranged with its base directly over the burning fuel in the said fire-box, a spreader within the said chamber above the said base, and having a central inlet connected with the said pipe, to allow the water to enter the chamber, the sides of the spreader forming with

the sides of the chamber an upwardly-extending outlet for the heated water, and dished sections arranged one above the other, and connected with each other by pipes, the lower-
5 most section being connected with the upper end of the said chamber, to allow the water to circulate from the chamber up through the

several sections, substantially as shown and described.

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Witnesses:

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