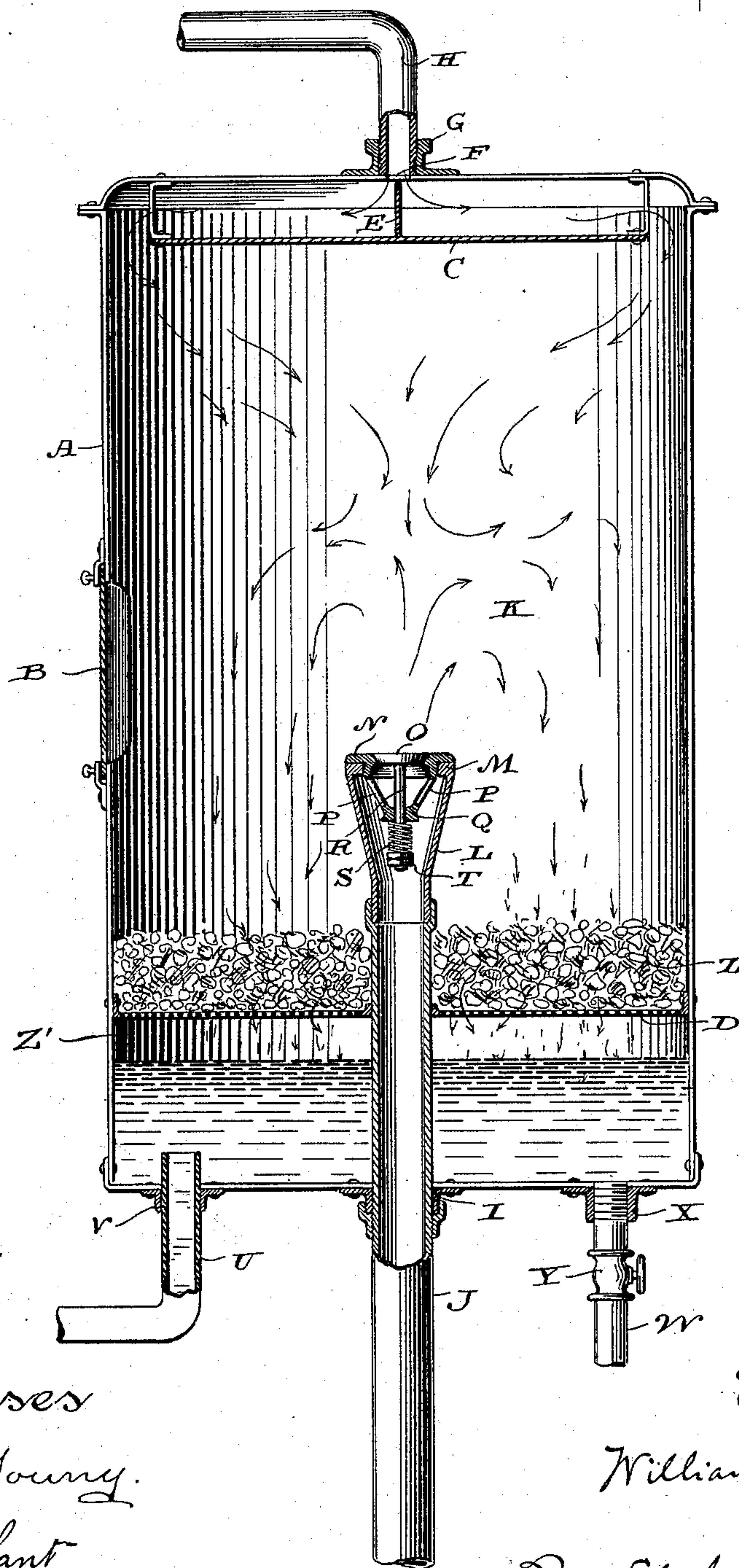


(No Model.)

W. H. BURK.
FEED WATER HEATER.

No. 406,625.

Patented July 9, 1889.



Witnesses
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N. E. Oliphant

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UNITED STATES PATENT OFFICE.

WILLIAM HENRY BURK, OF SHEBOYGAN, WISCONSIN.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 406,625, dated July 9, 1889.

Application filed February 9, 1889. Serial No. 299,295. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY BURK, of Sheboygan, in the county of Sheboygan, and in the State of Wisconsin, have invented certain new and useful Improvements in Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to feed-water heaters, being designed as an improvement on the device set forth in my patent, No. 321,338, issued June 30, 1885; and it consists in certain peculiarities of construction and combination of parts, to be hereinafter described with reference to the accompanying drawing and subsequently claimed.

The drawing represents a vertical transverse section of a feed-water heater constructed according to my invention.

Referring by letter to the drawing, A represents a shell closed at both ends and provided with a man-hole B, suspended deflecting-diaphragm C, and a perforated plate D, similar in general arrangement to like parts shown and described in my former patent, the diaphragm being in turn provided with a division-plate E at right angles thereto, as is also shown and described in said patent.

The top of the shell A is centrally provided with an inlet-opening F, that extends equally on opposite sides of the partition E, and surrounding this opening is a nipple G, into which is fitted a pipe H, that serves as a conductor for live steam. The bottom of the shell A is also provided with a central opening surrounded by a nipple I, and to the latter is coupled a water-inlet pipe J, that extends up through the perforated plate D into the separating or live-steam chamber K, and detachably connected to the upper end of said inlet-pipe is a casing L, having an inwardly-extended and screw-threaded flange M to engage a screw-threaded and flanged seat N for a valve O, said seat being in turn provided with depending arms P, that support a sleeve or guide Q for the stem R of the said valve, and below the sleeve Q a spiral spring S is retained on said valve-stem and adjusted as to tension by means of jam-nuts T.

Extended up through the bottom of the shell A for a certain distance is the feed-wa-

ter-delivery pipe U, held in place by engagement with a screw-threaded nipple V, and a blow-off pipe W is also connected to said bottom of the shell by engagement with another screw-threaded nipple X, the latter pipe being provided with a valve Y.

The operation of my device is as follows: Feed-water is forced in through the pipe J against the resistance of the valve O, and thus when the latter is forced off its seat said water is distributed in the form of spray, and is met by the live steam that enters the chamber K through the pipe H, and is distributed by means of the diaphragm C and division-plate E. The water, being in the form of spray, and being met by the hot live steam, is instantaneously heated as hot as the steam itself, and the lime held in solution by said water is separated through the agency of the heat. The separated lime and heated water fall together upon a bed of filtering material Z, supported on the perforated plate D, and thus the water is free to percolate through this material, while the lime is arrested thereby. The filtered water comes to rest in the chamber Z' below the perforated plate D, and any fine impurities that may be in said water will settle on the bottom of the shell A below the top of the delivery-pipe U.

At any time it is desirable to cleanse the water-chamber Z' the valve Y in the pipe W is opened, and thus said chamber is blown out by the force of the steam.

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

1. The combination of a shell, a filter-bed arranged to divide the same into steam and water chambers, a steam-pipe communicating with the steam-chamber, a water-inlet pipe passed up through the water-chamber and filter-bed into said steam-chamber, a spring-controlled valve arranged on the latter pipe, and a delivery-pipe communicating with said water-chamber, substantially as set forth.

2. The combination of a shell, a filter-bed arranged to divide the same into steam and water chambers, a steam-pipe communicating with the steam-chamber, a water-inlet pipe passed up through the water-chamber and filter-bed into said steam-chamber, a spring-

controlled valve arranged on the latter pipe, a delivery-pipe communicating with said water-chamber, and a blow-off pipe for the latter, substantially as set forth.

- 5 3. The combination of a shell provided with a suspended diaphragm, a filter-bed dividing the shell into steam and water chambers, a steam-inlet pipe communicating with said shell above the diaphragm, a division-plate
10 arranged on the diaphragm to intercept the steam-pipe, a water-inlet pipe passed up through the water-chamber and filter-bed into

the steam-chamber, a spring-controlled valve arranged on the pipe, and a delivery-pipe communicating with said water-chamber, substantially as set forth. 15

In testimony that I claim the foregoing I have hereunto set my hand, at Sheboygan, in the county of Sheboygan and State of Wisconsin, in the presence of two witnesses.

WILLIAM HENRY BURK.

Witnesses:

JULIUS KROOS,

W. R. WILLIAMS.