

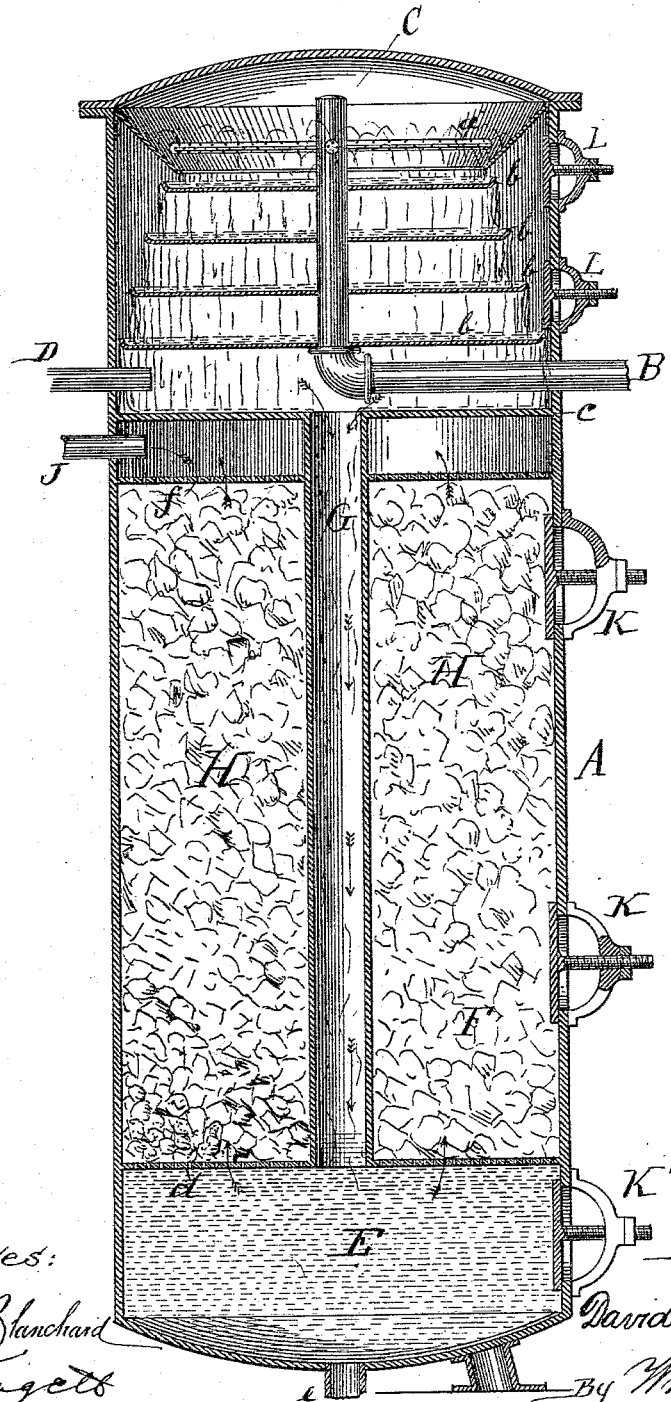
(No Model.)

D. BOURGEOIS.

FEED WATER HEATER AND FILTER.

No. 301,663.

Patented July 8, 1884.



Witnesses:

Frank Blanchard
M. J. Coates

Inventor:

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UNITED STATES PATENT OFFICE.

DAVID BOURGEOIS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
KROESCHELL BROTHERS, OF SAME PLACE.

FEED-WATER HEATER AND FILTER.

SPECIFICATION forming part of Letters Patent No. 301,663, dated July 8, 1884.

Application filed February 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID BOURGEOIS, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feed-Water Heaters and Filters, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in precipitators and filters, and is more especially designed as an improvement on the invention described in Letters Patent No. 271,025, granted to me on the 23d day of January, 1883. The object of this invention is to raise the water to be introduced to boilers to a high temperature, and at the same time to cleanse it of all impurities; and to that end the invention consists of the novel devices and combination of devices, as will be described and claimed.

Reference will be made to the accompanying drawing, which represents a sectional view of the precipitator and filter.

A represents the cylindrical shell. Through an opening formed in the side of the shell, and at the point shown, a pipe, B, is inserted, which extends to about the center of the precipitator, and is connected by suitable coupling to a vertical pipe, C. Pipe B communicates with any suitable pump or supply, and through it and pipe C water is fed to the precipitator.

To the upper end of pipe C there is secured a horizontal pipe, *a*, provided with a number of small openings, through which the water passes, said water being thus introduced to the precipitator in sprays.

Secured to pipe C at points below pipe *a* are a series of shelves, *b*, all of different sizes, the smallest shelf being the first below pipe *a*, and each shelf thereafter being gradually increased in size. A pipe, D, which connects with the steam-drum of the boiler, is inserted through the side of the shell at a point slightly below the bottom shelf *b*.

By means of the construction and arrangement thus far described, the water-sprays ejected through pipe *a* fall upon the several shelves *b*, and by them are retarded until acted upon by the steam entering through pipe D until they are raised to the temperature at

which all mineral substances are separated therefrom and precipitated to a chamber, E, hereinafter referred to.

A plate or disk, *c*, is secured to the inner face of the precipitator-shell, and at a point slightly below the pipe B, all of the space above said disk being the steam-space. Secured to the inner face of the shell, and at a suitable point above the bottom thereof, is a perforated disk, *d*, the space between said disks *c d* being filled with any suitable filtering material, F, such as coke.

At or about the center of each disk *c d* there is provided an opening, which are connected by a pipe, G, which passes through a disk, to be hereinafter referred to, and the filtering-chamber H, formed between said disks, and forms communication between the upper or steam space and the mud-chamber E, before referred to, and which is formed by the perforated disk *d* and the bottom of shell A. Chamber E is provided with an outlet, *e*, closed by a suitable valve, and through which, at certain intervals, the impurities therein deposited are drawn off. A pipe, I, which connects with the boiler, is inserted through the shell into chamber H, and at a point near the top thereof, and through said pipe the water, after passing through the filtering material F, as will be described, is fed to the boiler.

At a suitable point below pipe I there may be provided in chamber H a perforated disk, *f*, to prevent the coke from entering said pipe.

Suitable man-holes, K K', may be provided, through which access may be gained to chambers H E and hand-holes L, for gaining access to the steam-space. As the heated and purified water falls from the lowest shelf *b* it passes through pipe G to chamber E, and thence, as indicated by arrows, up through the filtering material, through pipe I, to the boiler, being during its passage thoroughly purified and raised to a proper temperature.

It will be understood that my improved precipitator and filter may be used in connection with heaters, or may be connected direct with the supply.

What I claim is—

1. In a precipitator provided with a steam-space, the combination, with water and steam

supply pipes, of a series of shelves of different dimensions, mounted upon the water-supply pipe and adapted to retard the water in its flow, as and for the purpose set forth.

5 2. In a precipitator provided with a steam-space, the combination, with water and steam supply pipes, of a series of shelves of different dimensions, mounted upon the water-supply pipe, and a perforated pipe secured to the top
10 thereof, as and for the purpose set forth.

3. In a precipitator provided with a steam-space, the combination, with water and steam

supply pipes, of a series of shelves of different dimensions, mounted on said water-supply pipe and adapted to retard the water in its flow, 15 and a filtering-chamber situated below said steam-space, as and for the purpose set forth.

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

DAVID BOURGEOIS.

Witnesses:

M. J. CLAGETT,
LOUIS NOLTING.