E. R. STILLWELL.

FEED WATER HEATER FOR BOILERS.

No. 81,117. Patented Aug. 18, 1868.

Fig. 1

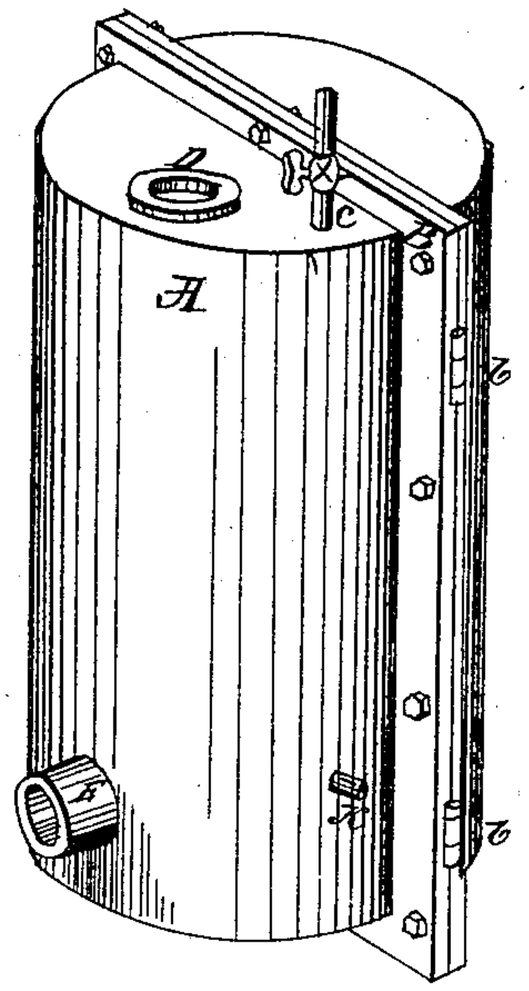


Fig. 2

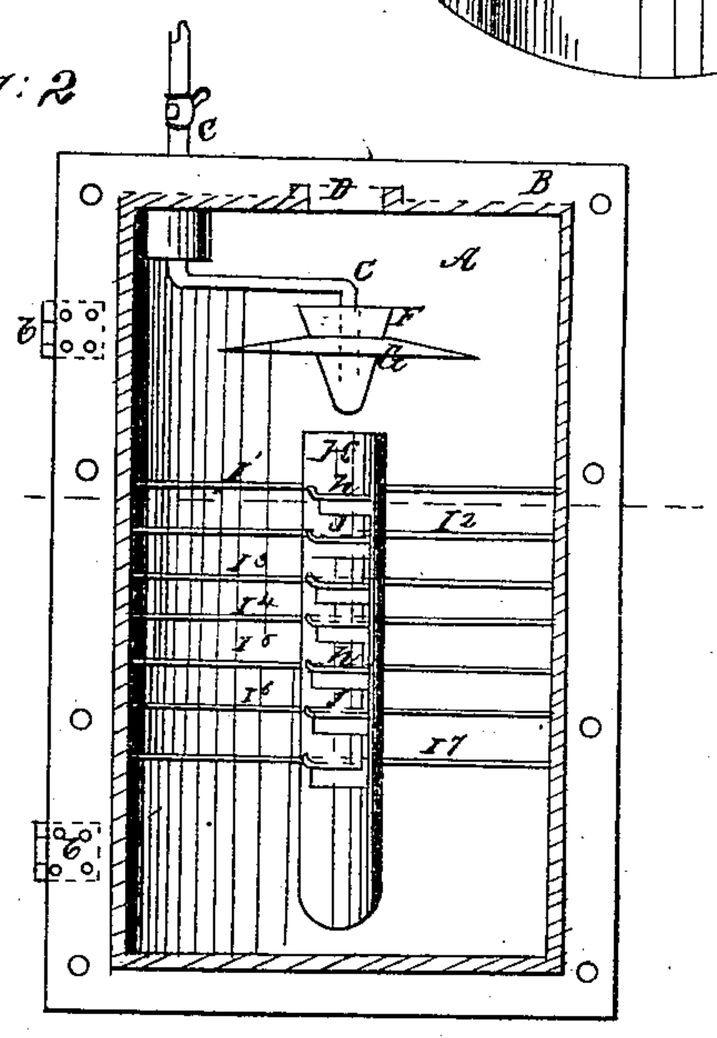


Fig. 3

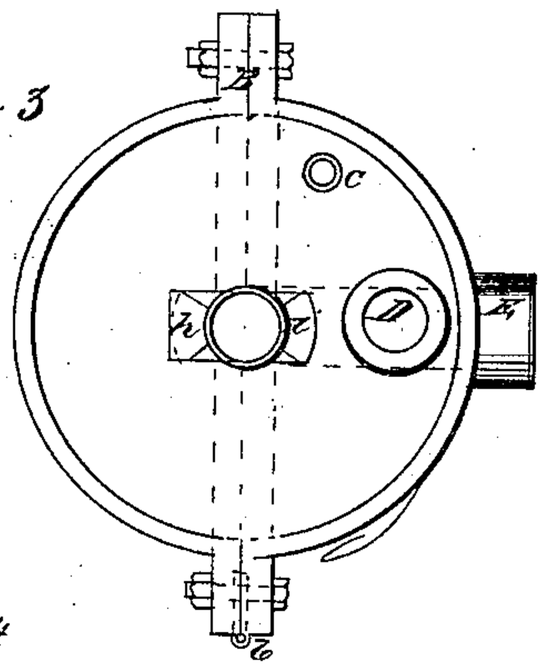
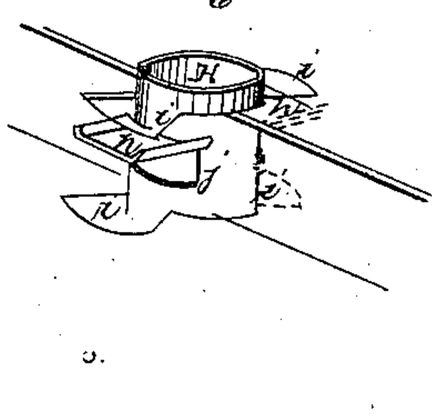


Fig. 4



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EDWIN R. STILWELL, OF DAYTON, OHIO.

Letters Patent No. 81,117, *dated August* 18, 1868.

IMPROVEMENT IN FEED-WATER HEATERS FOR BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWIN R. STILWELL, of Dayton, in the county of Montgomery, and State of Ohio, have invented a certain new and useful Improvement in Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a perspective view of my improved feed-water heater.

Figure 2 is a view of one-half of the interior, as it appears when the heater is opened, for the purpose of removing the lime and other impurities deposited on the shelves.

Figure 3 is a top view of one of the shelves I I.

Figure 4 is a perspective view of the steam-pipe H, showing the openings in the shelves and the steam-pipe and the dripping-troughs *h h*.

The nature of my invention consists—

First, in providing the induction-water pipe of a feed-water heater with a distributing-disk, for the purpose of causing the water to descend in a thin sheet.

Second, in the employment of a series of orifices for the introduction of steam at different levels, so as to bring it simultaneously in contact with the water in all parts of the heater; and

Third, in the details of construction.

In the drawings, A represents the case of a feed-water heater. It is represented as cylindrical, but may be made of any figure, with curved or plane surfaces. E is the induction-steam pipe, connected with the exhaust-valves of the engine, and receiving its steam from them. D is the eduction-steam pipe. C is the induction-water pipe, through which the water to be heated and purified enters the heater. It is provided with a valve, X, which is so operated as to admit water only at each exhaust of steam from the engine, so that the water may enter the heater at intervals simultaneously with the steam. K is the eduction-water pipe for conveying the heated and cleansed water to the boilers. The case may be made in two parts hinged together, and further secured by bolts, or it may be connected by bolts only.

The water, upon entering the heater through the pipe C, is discharged within and near the bottom of the overflow-box F, fills the box, and flows out upon the distributing-disk G, from which it would fall in a thin sheet upon the upper shelf I^1, if it were not met by a current of steam from the top of the steam-pipe H, which dashes it into spray and throws it outward toward the inner walls of the case. It then falls upon shelf I^1, and flows inward toward the opening *i*, near the pipe H. Descending through this opening, it falls toward the second shelf, I^2, but in passing the orifice *j* in the steam-pipe, it is met by a current of steam, and again dashed into spray, and thrown toward the circumference of the shelf. If desired, and to prevent all possibility of the water entering the orifices of the steam-pipe, and to check a too rapid descent of the falling water, dripping-troughs or supplementary shelves, *h h*, may be attached to the steam-pipe, just below the opening in each shelf, and just above the orifice in the steam-pipe, projecting toward the case far enough to throw the water beyond the outer edge of the opening in the shelf below. I do not, however, consider these shields or dripping-troughs essential.

The water having descended, as described, to the second shelf, continues to fall from shelf to shelf in the same manner, meeting, as it passes through each opening, with a fresh current of steam, which separates it into spray, greatly agitates it, heats it, and cleanses it from lime and other impurities, which are deposited on the shelves. In this way it will be seen that a series of steam-currents is in simultaneous action below each shelf, and acting upon each fall of water, which is thus thoroughly heated and purified.

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

1. A distributing-disk, located above the series of shelves, to receive and distribute the water from the induction-water pipe, substantially as described.

2. A series of shelves to check the flow and receive the impurities of water, in combination with a steam-pipe or pipes, arranged substantially as described, and provided with a series of orifices for introducing the steam at different levels, so as to bring several currents of steam into fresh and simultaneous action upon the water, substantially as described.

3. The induction-steam pipe H, entering below the series of shelves, and provided with a series of openings for the escape of steam, substantially as described.

4. The dripping-troughs *h h*, arranged substantially as and for the purpose described.

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