(No Model.)

D. HANNA.

WATER PURIFIER FOR STEAM BOILERS.

No. 306,606. Patented Oct. 14, 1884.

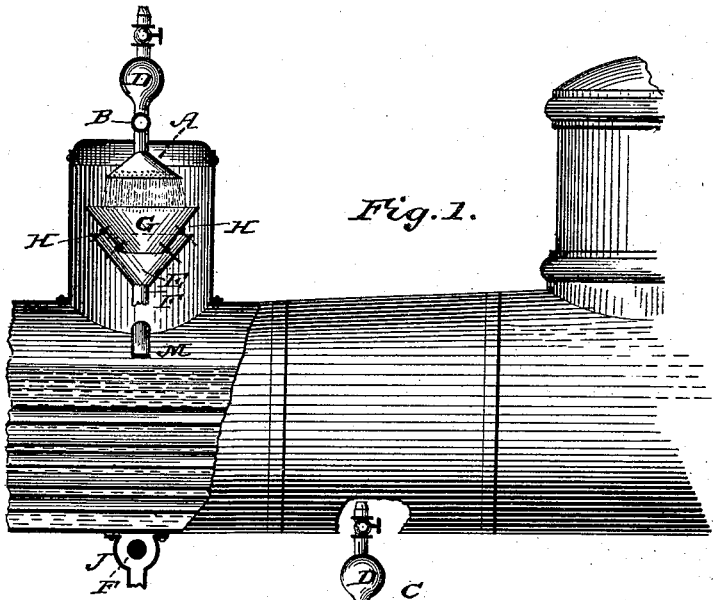

Fig. 1.

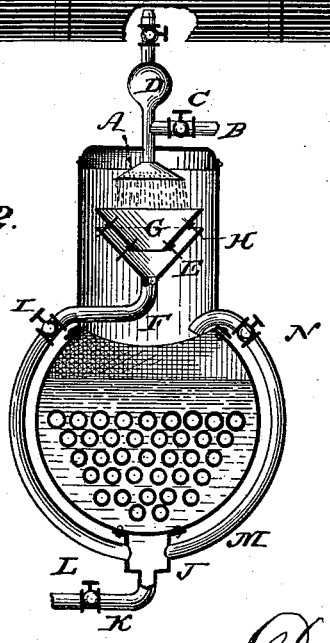

Fig. 2.

WITNESSES:

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DAVID HANNA, OF OGDENSBURG, NEW YORK.

WATER-PURIFIER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 306,606, dated October 14, 1884.

Application filed January 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID HANNA, a citizen of the United States, and a resident of Ogdensburg, in the county of St. Lawrence and State of New York, have invented a certain new and useful Process of and Apparatus for Purifying the Feed-Water for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which my invention relates to use and make the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side view of a portion of a steam-boiler, the shell being broken away in part to show the apparatus; and Fig. 2 is a vertical transverse section of the boiler through the steam-dome, showing the apparatus at right angles to the view represented in Fig. 1.

Like letters of reference indicate corresponding parts in both the figures.

My invention has relation to means for purifying the water fed to steam-boilers or steam-generators; and it consists, first, in an improved process or method of separating the impurities from the feed-water; and, secondly, in an improved apparatus or device for effecting this object, substantially as will be hereinafter more fully described and claimed.

Reference being had to the accompanying drawings, A denotes a rose or spraying-nozzle, suitably secured at the lower end of the feed-water pipe B, which is provided with a stop-cock, C, and may have an air-chamber, D, provided with a blow-off cock at the top. A funnel-shaped vessel or basin, E, is secured some distance below the spraying-nozzle, but above the water-line and within the steam-space of the boiler. This vessel has an outlet-pipe, F, at its lower end, which passes out of the boiler, and is also provided with an inside funnel-shaped vessel or basin, G, which has an aperture at its lower end larger than the aperture or outlet in the outside vessel, E. The flaring upper edge of the inside vessel, G, projects above the top of the outside vessel, E, the two vessels E and G being connected by bolts H or other suitable means, so as to be fixed in their proper relative position, with the upper edge of the inner vessel extending outside of the limits of the spray. The outlet-pipe F has a stop-cock, I, and is continued around the side of the boiler, opening into a sediment-receptacle, J, which has an outlet or blow-off pipe, K, provided with a stop-cock, L. A return-pipe, M, leads from the sediment-receptacle to the steam-space of the boiler, and is provided with a stop-cock, N.

The operation of the apparatus is as follows: As the feed-water enters the steam-space of the boiler through the rose or spraying nozzle, the spray will, by the heat in the boiler, be converted into steam before it reaches the water already contained therein, separating the impurities and foreign matter from the feed-water, which impurities fall down into the funnel-shaped upper vessel, from the sides of which they slide down into the lower funnel and into the pipe F, which conveys them outside of the boiler to the receptacle J, the stop-cock I being open. To blow off the sediment, the stop-cock N in pipe M and L in pipe K are opened, while I is closed. The upper funnel-shaped vessel being placed within and above the lower funnel-shaped vessel, which is provided with the outlet or discharge pipe, causes the sediment to be conducted directly to the lowest point of the two vessels into the discharge-pipe; and if the boiler is rocked or moved, as in the case of a marine boiler or locomotive-boiler, (especially on switching-engines, which are liable to frequent shocks and concussions,) the fluid sediment which may adhere to or settle upon the outside of the upper vessel will not be washed off into the water in the boiler, but will flow down into the lower vessel and be discharged through pipe F.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The process of separating the impurities from the feed-water for steam-boilers, which consists in injecting the water into the steam-space of the boiler in the form of fine spray, vaporizing the spray before it reaches the water in the boiler, separating the impurities from the spray while being vaporized, collecting the impurities as they are separated from the spray, and conducting them outside of the boiler, substantially as described.

2. In a water-purifier for steam-boilers, the combination of a feed-water-spraying device

arranged within the steam-space of the boiler, with a collecting vessel or basin having walls adapted to separate the contents of said vessel, and having an open top above high-water mark within the boiler, and a pipe leading from the vessel outside of the boiler, substantially as and for the purpose shown and set forth.

3. In a water-purifier for steam-boilers, the combination of a feed-water-spraying device arranged within the steam-space of the boiler, a collecting vessel or basin having walls adapted to separate the contents of said vessel, and having an open top above high-water mark within the boiler, a pipe having a stop-cock and leading from the bottom of the said vessel outside of the boiler, a sediment-receptacle having the said pipe opening into it, and provided with a blow-off pipe and cock, and a pipe connecting the sediment-receptacle with the steam-space of the boiler, and provided with a stop-cock, substantially as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

DAVID HANNA.

Witnesses:

FRANCIS E. DUANE,

GEORGE B. SHEPARD.