

(No Model.)

C. GROHMAN.
CONDENSER AND FEED WATER HEATER.

No. 485,031.

Patented Oct. 25, 1892.

Fig: 1.

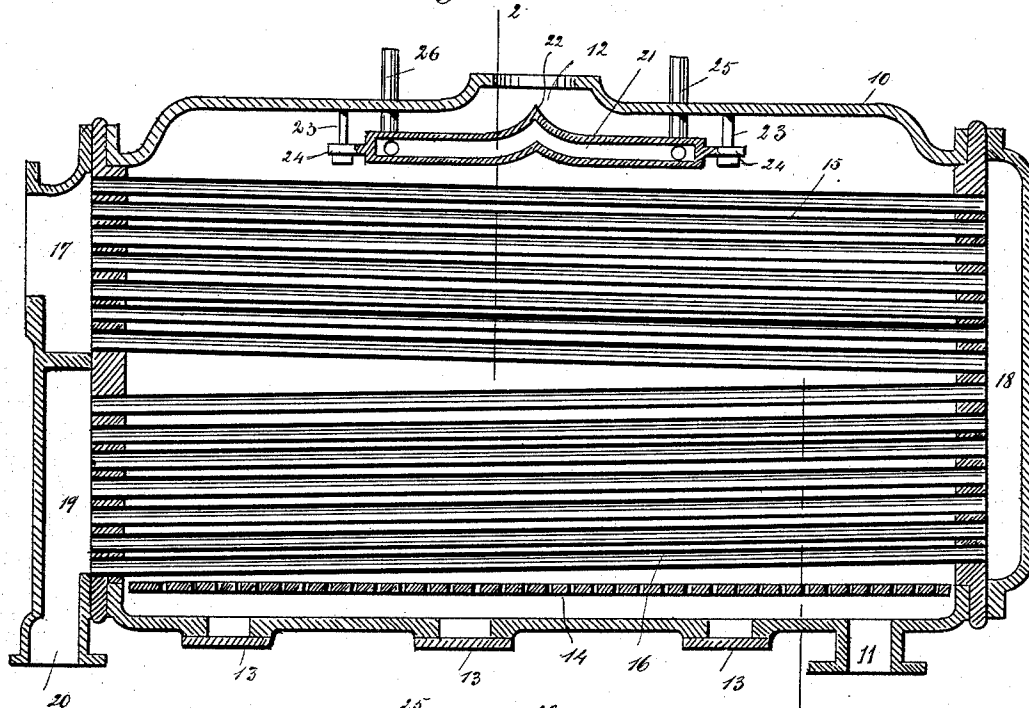
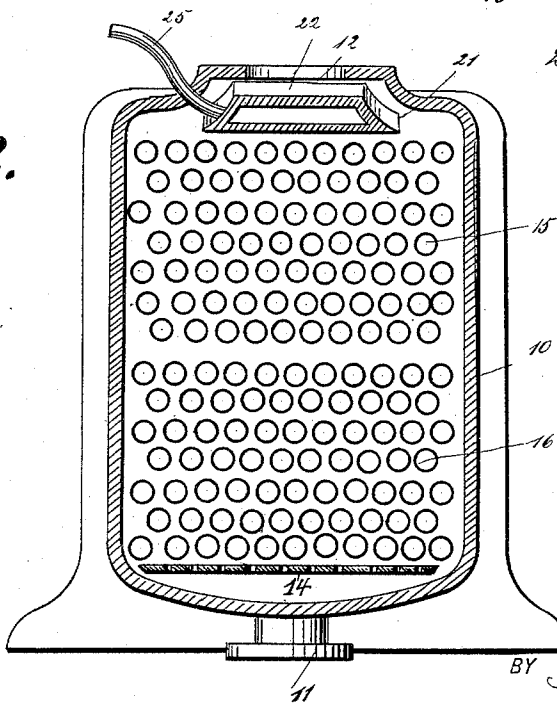


Fig: 2.



WITNESSES:

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CONDENSER AND FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 485,031, dated October 25, 1892.

Application filed August 23, 1892. Serial No. 443,856. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GROHMAN, of Carteret, in the county of Middlesex and State of New Jersey, have invented a new and Improved Condenser and Feed-Water Heater, of which the following is a full, clear, and exact description.

My invention relates to improvements in surface steam-condensers and feed-water heaters; and the object of my invention is to produce an efficient and simple condenser which will also operate as a feed-water heater.

To this end my invention consists in certain features of construction and combinations of parts, as will be hereinafter described and claimed.

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

Figure 1 is a vertical longitudinal section of the apparatus embodying my invention, and Fig. 2 is a vertical cross-section on the line 2 2 in Fig. 1.

The condenser is provided with a main case 10, having a suitable base to support it, and this case has near one end and on the under side a water-inlet 11 and an outlet 12 at the top, although the conditions may be reversed, as hereinafter described, so that the steam may be let into the top and the water of condensation pass out of the bottom. The case is provided on the bottom with several hand-holes 13, which enable it to be easily cleaned out, and extending longitudinally through the lower portion of the case is a perforated spreader-plate 14, through which the water must pass to the tubes above, and it also serves as a check to the dirt which enters with the water, causing the same to be retained on the under side of the plate, where it may be easily cleaned out through the hand-holes. Arranged longitudinally in the case are groups of tubes 15 and 16, through which steam or water may pass, as hereinafter described. The inlet ends of the tubes 15 are arranged immediately opposite the inlet 17 in the upper portion and at one end of the case, and the tubes have a downward inclination and lead into a chamber 18 at the opposite end of the case. From this chamber 18 the lower group of tubes 16 leads to a chamber 19,

which is arranged immediately below the inlet 17, and the tubes 16 are inclined downward so that the steam or water may flow quickly through both the tubes 15 and 16, and thus afford no chance for stagnant water and nothing to induce rapid rusting. From the chamber 19 opens an outlet 20; but in every instance the openings to the case may be used as either inlets or outlets, as desired. Immediately beneath the opening 12 is a hollow deflector 21, which also serves as a feed-water heater, and this deflector is curved upward in the center, as shown at 22, so that when steam is permitted to enter the opening 12 it will be deflected to both ends of the case 10. The deflector is supported by bolts 23, which are secured to the case-top and engage lugs 24 on the ends of the deflector; but the deflector may be supported in any convenient way. The deflector is provided on one side and at opposite ends with inlet and outlet pipes 25 and 26, which lead outward through the case and are adapted to connect with a water-supply and with a boiler in the usual way.

When the condenser is used simply as a condenser and without reference to heating the feed-water, the opening 11 is connected with a source of cold-water supply and the openings 17 and 20 serve as an inlet and outlet, respectively, for steam and condensed water. When the water is permitted to enter the inlet 11, it is spread by the plate 14 and passes upward through the perforations of the plate, so as to strike and cool all the tubes 16 and 15, the water passing out at the top through the opening 12. It will thus be seen that the steam which enters the inlet 17 and passes through the tubes 15 and 16 will be rapidly condensed and the condensed water will run freely out of the outlet 20.

When the condenser is used to serve the double purpose of a condenser and feed-water heater, the conditions are reversed. In this case the cold water is permitted to enter the inlet 17 and flow through the tubes 15 and 16 and out through the outlet 20, thus making the tubes cold. The steam connections are then made so that the steam will enter the opening 12 and pass down between the tubes 15 and 16 and the steam will be condensed by contact with the tubes and the water will pass out through the opening 11. The feed-water

is permitted to enter the hollow deflector 21 through the pipe 25 and it passes out through the pipe 26; but as the steam which enters the case strikes the deflector before it is condensed by contact with the tubes the deflector will be kept constantly hot and the feed-water will be well heated.

From the foregoing description it will be seen that the condenser and feed-water heater is of very simple construction, and that it may be made to perform one or both of the functions described, as desired.

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

1. The combination, with the main case having openings for steam or water connections at the top and bottom and the condensing-tubes extending longitudinally through the case and having an inlet and outlet independ-

ent of the openings in the top and bottom of the case, of a hollow deflector arranged beneath the top opening of the case and feed-water pipes connected with the deflector, substantially as described.

2. The combination, with the main case having openings for steam or water connections at the top and bottom and the condensing-tubes leading longitudinally through the case and having an inlet and outlet independent of the connection openings of the case, of a hollow deflector supported within the case above the tubes, the deflector being curved upward at a point beneath the top opening of the case, and feed-water pipes connected with the deflector, substantially as described.

CHARLES GROHMAN.

Witnesses:

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CHAS. PAUL.