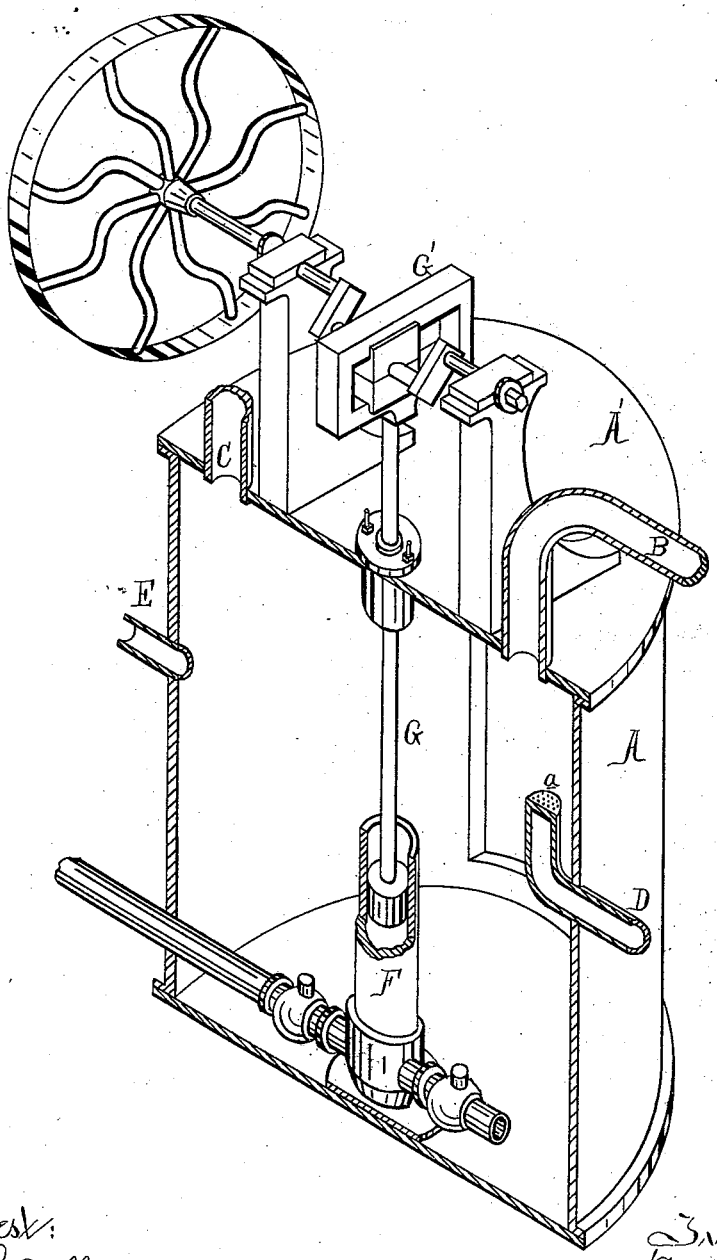
D. E. RICE.

FEED-WATER HEATER AND PUMP COMBINED.

No. 193,617. Patented July 31, 1877.



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DELOS E. RICE, OF DETROIT, MICHIGAN.

IMPROVEMENT IN FEED-WATER HEATER AND PUMP COMBINED.

Specification forming part of Letters Patent No. **193,617**, dated July 31, 1877; application filed May 23, 1877.

To all whom it may concern:

Be it known that I, DELOS E. RICE, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in a Combined Feed-Pump and Heater, of which the following is a specification:

The object I have in view is to raise the temperature of the feed-water to the boiling-point by contact with and partial condensation of the exhaust steam, and to deliver the feed-water at or near this elevated temperature to the boiler.

To this end my invention consists in the combination, construction, and arrangement of the several parts composing my heater, as more fully hereinafter set forth.

In the drawing, which is a sectional perspective view, A represents a cylindrical heater-tank, having a detachable head, A′, and a man-hole in the side, through which access is had to the interior.

B is the inlet for the exhaust steam, and C is the escape-pipe, through which the uncondensed portion issues.

D is the feed-water-inlet pipe, with its inner part upturned, and provided with a jet-plate, *a*, at its extremity, which is directly under the steam-inlet.

E is the overflow-pipe, through which the surplus water flows out after filling the tank to that level.

As the water is discharged from the pipe D in jets, these latter are met by and mingle with the exhaust steam entering at B, which results in raising the temperature of the water, and condensing the greater proportion of the volume of exhaust steam, (in some cases condensing it all,) and thus insures a supply of water at or very near the boiling point.

F is a plunger feed-pump, placed in the bottom of the tank, so that it is wholly submerged, and consequently can only be supplied with "solid" water, thereby avoiding the difficulty and uncertainty of action heretofore experienced in attempting to pump very hot water.

The plunger is attached to a rod, G, playing through a stuffing-box in the head A′, and terminating in a slotted yoke, G′, reciprocated by a sliding block on a cranked shaft, which is slowly rotated from any convenient source of power.

The door or man-hole in the tank gives access therein for cleaning it out, or examining the check-valves of the pump. By removing the head A′ all the working parts, except the pump-valves, come with it, and being permanently attached to the head, there is no liability to get out of line.

Preferably I cast the shaft-brackets with the head; but they may be made separately, and be bolted on subsequently, if desired.

What I claim as my invention is—

The feed-water heater described, consisting of the cylindrical tank A, the submerged reciprocating pump F, exhaust-steam-inlet pipe B, feed-water-inlet pipe D, having its end covered by a perforated plate, *a*, and in line with the said steam-inlet pipe, steam-escape C, and overflow E, all constructed, arranged, and combined substantially as described and shown.

DELOS E. RICE.

Witnesses:
H. F. EBERTS,
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