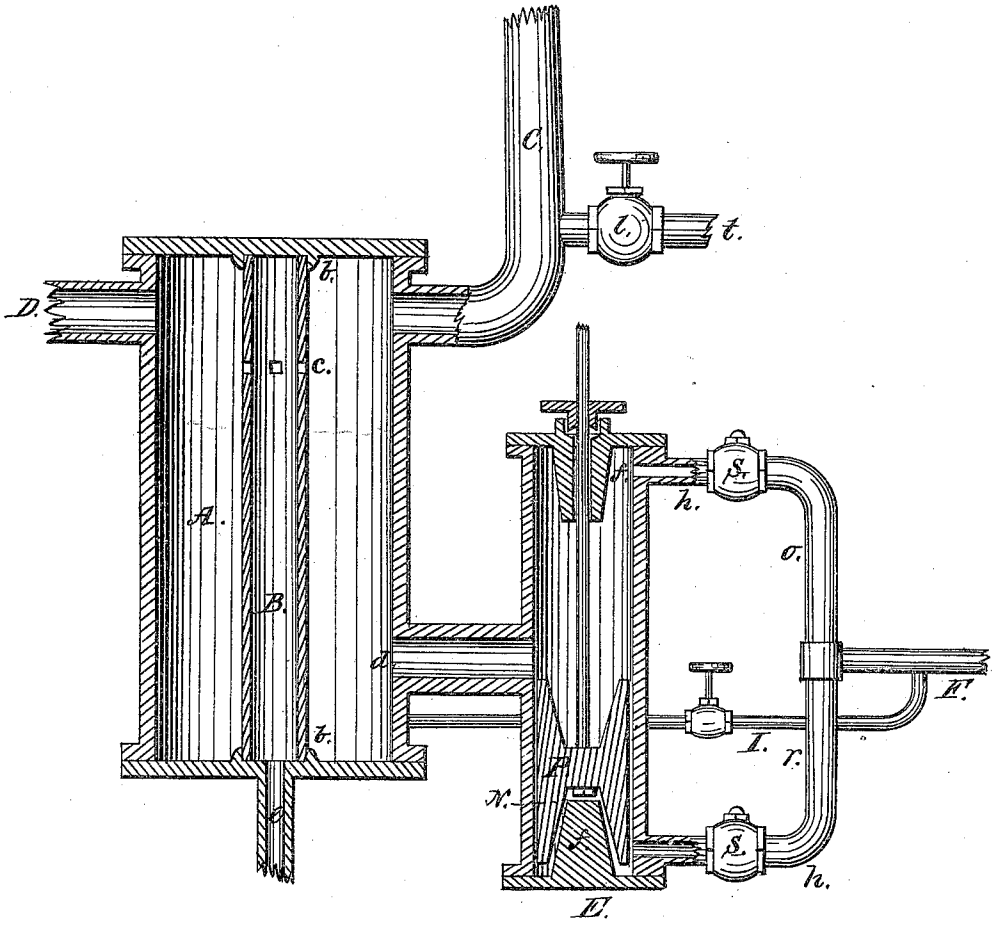
J. A. T. OVEREND.

FEED WATER HEATER AND PUMP.

No. 172,580. Patented Jan. 25, 1876.



Witnesses:

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JOHN A. T. OVEREND, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN FEED-WATER HEATERS AND PUMPS.

Specification forming part of Letters Patent No. **172,580**, dated January 25, 1876; application filed September 29, 1875.

To all whom it may concern:

Be it known that I, JOHN A. T. OVEREND, of the city and county of San Francisco and State of California, have invented a new, useful, and Improved Heater and Condenser, in connection with an Improved Double-Acting Hollow Plunger-Pump; and do hereby declare the following to be a full, perfect, and complete description of the same, with reference to the drawing for illustration.

Figure 1 of the drawing is a side elevation, in section, showing the condensing-chamber and heater, the pump-cylinder and piston, with the pipes and openings.

The object of my invention is to construct a simple, cheap, and durable heater, condenser, and pump combined, requiring but very little power to operate it, and saving a large per cent. of fuel and water, by mingling the exhaust steam from engines directly with the cold feed-water, thereby heating the feed-water and condensing the exhaust steam, and forcing, with the pump, into the boiler a sufficient quantity of water thus obtained to supply it at about 212° of heat.

In my invention, referring to the drawing, A shows a cylinder, with cops adjusted, and its inside pipe B set in the center of the heads, held by the grooves *b*, cast in the inner part of the heads. This pipe is provided with the openings C, four or more in number, above the water-line in the condensing-chamber, which allows any surplus steam or water to flow into it and be drawn off through the pipe *e*. C shows the exhaust-pipe from the engine, with the feed-pipe connecting it about four feet from the condensing-chamber, more or less. D shows the exhaust discharge-pipe from the condensing-chamber, to carry off the exhaust steam not condensed. *d* shows the opening in the condensing-chamber and heater leading to the pump. E shows the pump complete. The cylinder is connected to the condensing-chamber by flange or pipe. The heads are provided with cones on the inner surfaces *f f*, which are a little smaller than the hollow ends, and which displace any air, water, or vapor, and ease the stroke of the pump-piston to give clearance. *h h* show the branch discharge-pipes forming the main discharge-pipe F. I is a branch pipe leading back to the condensing-chamber from the main feed-pipe, in which surplus water not needed for the boiler is returned to the heater and condensing-chamber. The check-valves *s s* on the pipes *h h* hold the water during the strokes of the piston. I construct the piston of this pump of suitable metal, hollow at both ends, with the piston-rod connected in the middle through the solid part, held by the nut N. P represents the piston, which is about one-half the length of the cylinder inside, and, when working, passes the inlet *d* from the condensing-chamber, to allow the water to fill the end of the cylinder not then occupied by the piston, and which, on the return of the piston, is forced through branch pipe O into the main discharge-pipe F to the boiler, and on its descending stroke, in the same manner, through branch pipe.

The exhaust steam passes into the condensing-chamber and heater through pipe C. The feed-water enters this pipe, also, through pipe *t*, regulated in quantity sufficient to feed the boiler by cock *l*. In this way the cold feed-water comes in direct contact and mingles with the exhaust steam, which drives it into the condensing-chamber and heater, heating the water and condensing the steam. This feed-water—part cold water heated, and part steam condensed—is then forced into the boiler at about the heat before mentioned, in the manner already described.

I can use this pump separate from the condensing-chamber and heater, if desired, for pumping cold water or liquids; and I also use it for a hand-pump as well as by power.

I have adopted this style of pump and heater, and use it outside the condensing-chamber, and prefer it to that previously made by me, and patented July 20, 1875, and in my type-casting machine patented February 18, 1873, reissued June 22, 1875.

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

1. The combination, in a pump, of the two

outlet-pipes *h*, provided with check-valves S, the single inlet *d* in the center of the cylinder, and the piston P, hollow at both ends, substantially as and for the purposes set forth.

2. In combination with the pump, the condensing-chamber A, provided with the exhaust and feed pipes C, D, and *l*, opening *d*, interior pipe B, with its openings C and *e*, for the purposes herein described and claimed.

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Witnesses:
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