G. M. MULLEN.

Improvement in Feed Water Heaters.

No. 124,373. Patented March 5, 1872.

Fig. 1.

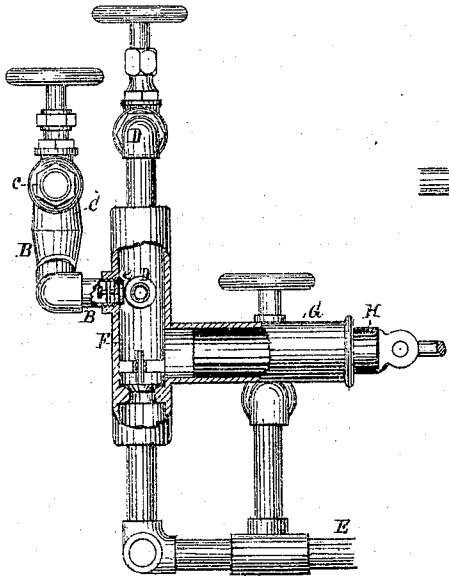


Fig. 2.

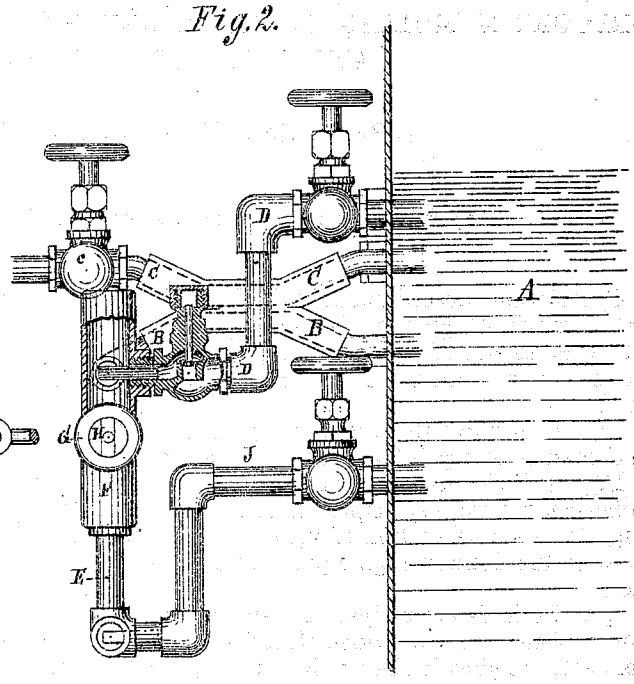
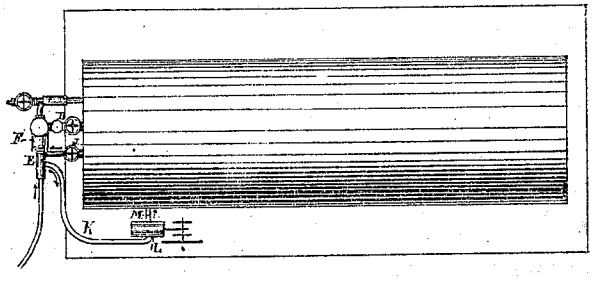


Fig. 3.



Witnesses:

G. Mathys.

Thos. D. L. Durand

Inventor:

Gregory M. Mullen

Per

Attorneys.

UNITED STATES PATENT OFFICE.

GREGORY M. MULLEN, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF AND JOHN COYNE, OF SAME PLACE.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. 124,373, dated March 5, 1872.

Specification describing a Feed-Water Heater for Donkey-Engines or Feed-Pumps, invented by GREGORY M. MULLEN, of Baltimore, in the county of Baltimore and State of Maryland.

The invention will first be fully described, and then clearly pointed out in the claims.

Figure 1 of drawing is a front elevation of boiler-head with my improvement attached. Fig. 2 is a side elevation of same. Fig. 3 is a view of the donkey-engine pump and connections.

B is the feed-water pipe. A represents the boiler of an engine provided with feed-pipe B, connecting therewith below the water-line, and having an inlet check-valve, *c*. C is a blow-off pipe, entering the boiler at or near the water-line, and provided with a stop-cock, *c*. D is a hot-water pipe, having an outlet-valve and also a stop-cock, while E is a pipe which enters the sea. The pipes B D E all connect with a pump-receiver, F, that is provided with a cylinder, G, in which works the pump-piston H. The receiver has an inlet-valve at its lower end.

The mode of operation is as follows: When the piston H is retracted, a vacuum is created in the receiver F, the valve in feed-pipe is closed, and those in bottom of receiver and in hot-water pipe D are opened; hence the cold sea-water rushes up through pipe E into receiver F, while the hot water from boiler rushes down into the receiver through pipe D, the two becoming thus thoroughly intermixed. As soon as the piston H begins to move back, the valves that open from the boiler and from the sea are closed, while that of feed-pipe B, opening into boiler, is opened; hence the heated sea-water is now discharged into the boiler. When the engine is working, the blow-off is always open; but the stop-cock is closed at other times.

The sea-pipe E is also connected with boiler by a hot-water pipe, J, and with a double-acting donkey-engine pump, L. The cylinder of this pump is itself connected with the boiler by a feed-pipe, M, and is provided with suitable check-valves on each side of piston.

The mode of operation is as follows: When the large engine is not at work, and the donkey-engine is required to supply the boiler with water, every stroke of the pump L draws sea-water and boiler-water through the pipes J E K and to one side of the piston, while the next stroke of the piston injects this heated water through pipe M into the boiler.

Having thus described all that is necessary to a full understanding of my invention, what I esteem to be new, and desire to secure by Letters Patent, is—

1. The pump F G H, connected with a boiler by means of pipes B D E, when all are constructed, arranged, and combined substantially as and for the purpose described.

2. The donkey-engine pump L, connected with a boiler by means of pipes J E K, when all are constructed, arranged, and combined substantially as and for the purpose described.

3. The blow-off pipe C *c*, arrranged, in connection with the feed-pipe B and the boiler, as and for the purpose set forth.

GREGORY M. MULLEN.

Witnesses:

SOLON C. KEMON,

CHAS. A. PETTIT.