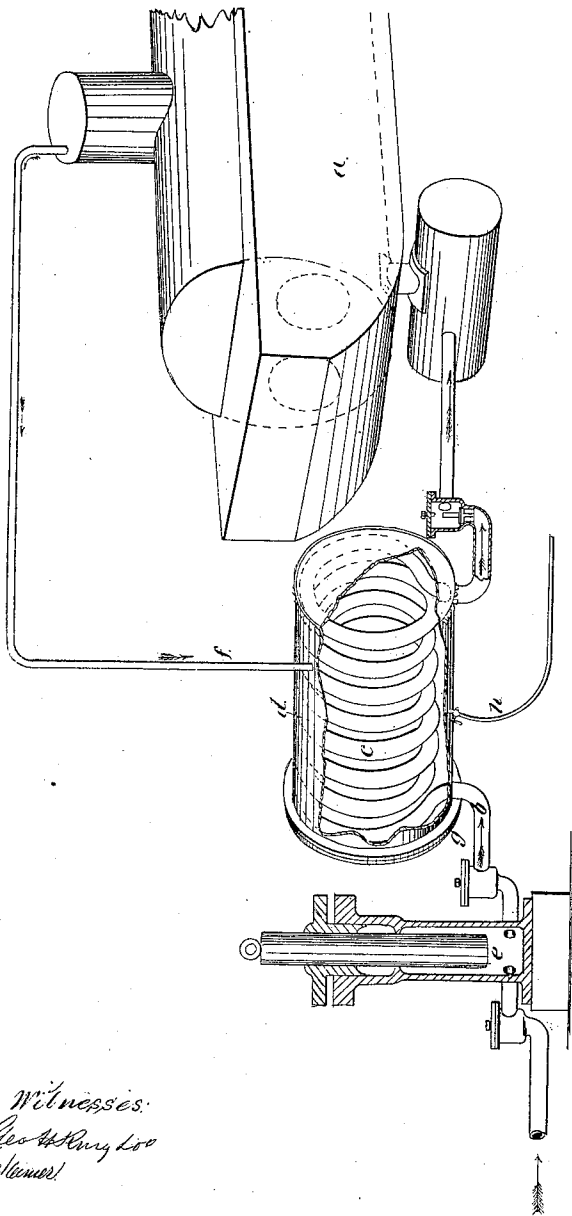


J. T. BROOKS.
 FEED WATER HEATER FOR STEAM BOILER.
 No. 24,094. Patented May 24, 1859.



Witnesses:
 Geo. H. Rung Lee
 J. H. Rung Lee

Inventor:
 John S. Brooks

UNITED STATES PATENT OFFICE.

JOHN T. BROOKS, OF NEW ALBANY, INDIANA.

IMPROVED APPARATUS FOR HEATING FEED-WATER OF STEAM-BOILERS.

Specification forming part of Letters Patent No. 24,094, dated May 24, 1859.

To all whom it may concern:

Be it known that I, JOHN T. BROOKS, of New Albany, Floyd county, Indiana, have invented an Improved Arrangement for Heating Feed-Water for Steam-Boilers; and I do hereby declare the following to be a full and exact description thereof, reference being had to the annexed drawing, making part of this specification, and in which a machine embodying my improvements is represented by a perspective view.

The main object of this improvement is to lessen the liabilities to leakage and explosion by avoiding the introduction of cold or partially cold water into contact with the plates and seams of a heated boiler, particularly at the period of starting the engine, at which critical time the ordinary heater is almost entirely inoperative, and also by preserving a proper hygrometric condition of steam within the boiler. The feed-water pipe *b* on its way from the water-supply pump *e* to the boiler *a* traverses in the form of a coil *c* (or its equivalent) a box *d*, into which a pipe *f* conducts steam from the highest part of the boiler, (usually the steam-dome.) *h* is a pipe through which condensed water is returned to the boiler.

The described arrangement of apparatus for heating feed-water possesses the following advantages:

First. The lower plates and joints of the boiler are exempt from the weakening action incident to the sudden cooling and contraction thereof by the introduction of cold or imperfectly heated feed-water as is common with high-pressure boilers.

Second. Steam is prevented from entering or forming within the barrel of the pump, and a fertile source of explosion thereby avoided. It is well-known that in supply-pumps which act upon heated water steam frequently accu-

mulates within the barrel to such an extent as to prevent the entrance of water, so that the pump becomes entirely inoperative, the steam-cushion below the plunger keeping the suction-valves closed.

Third. The absence of the defect last alluded to and the greater density of the feed-water admits of the use of smaller plungers, presenting less area in opposition to the boiler-pressure, and consequently requiring less force to drive them.

Fourth. The action of the heater is continuous and uniform, whether the engine be in motion or at rest, and the water first injected into the boiler at starting is always at the highest temperature.

Fifth. The proper hygrometric condition of steam within the boiler is maintained and undue superheating thereof prevented.

Sixth. The apparatus is free from the violence incident to the sudden alternations of temperature and pressure of exhaust-steam.

I do not claim any of the parts of the apparatus separately considered; but

I claim as new and of my invention herein and desire to secure by Letters Patent—

The described relative arrangement of the force-pump *e*, water-supply pipe *b*, heater *d*, and steam-pipe *f*, conveying steam from the upper part of the boiler or steam-dome to the heater, the whole operating together in the manner set forth to heat feed-water on its passage between the pump and the boiler by means of living steam and inject it into the lower region of the boiler.

In testimony of which invention I hereunto set my hand.

JOHN T. BROOKS.

Witnesses:

GEO. H. KNIGHT,
C. STEEMER.