S. H. GILMAN.

Feed Water Heater.

No. 196,292. Patented Oct. 23, 1877.

Fig 1.

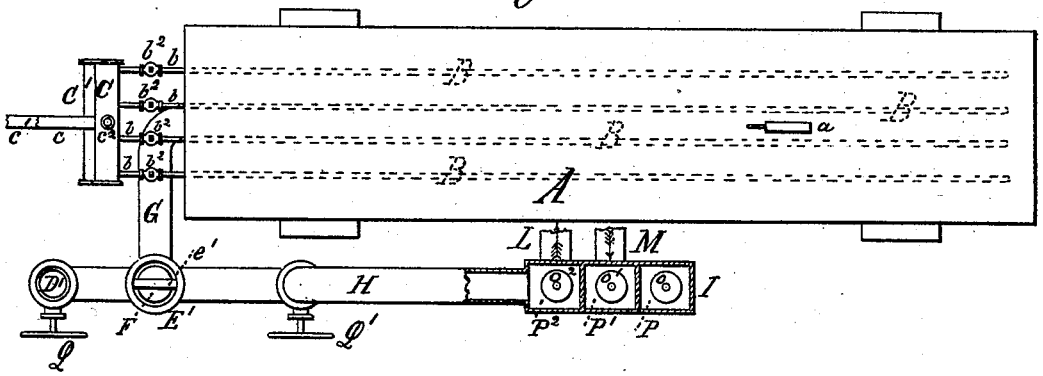


Fig 2.

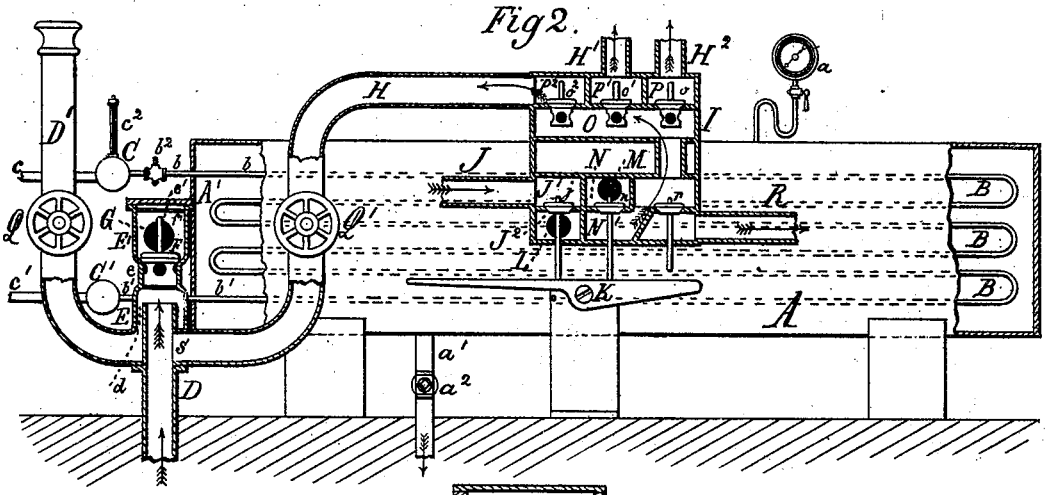
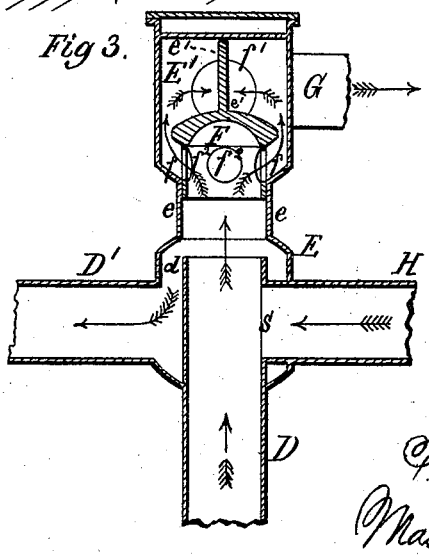


Fig 3.



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UNITED STATES PATENT OFFICE.

SAMUEL H. GILMAN, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **196,292**, dated October 23, 1877; application filed June 14, 1877.

To all whom it may concern:

Be it known that I, SAMUEL H. GILMAN, of New Orleans, in the county of Orleans and State of Louisiana, have invented a new and useful Improvement in Feed-Water Heaters, which improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is a top view and partial section of my improved feed-water heater. Fig. 2 is an elevation and partial section of the same, and Fig. 3 is an enlarged detailed sectional view of the main operating-valve.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, hereinafter fully described and specifically claimed, whereby a feed-water heater is produced which heats the feed-water of a steam-press or other machinery driven by steam, by utilizing a part of the exhaust steam under a certain pressure obtained by means of the impetus of the exhaust steam upon a check-valve at the moment it begins to leave the working cylinder without creating back pressure upon the engine.

By my invention, the pressure of the steam escaping from the steam-press after having done its work is transferred to and retained in a cylindrical vessel, through which the water from the feed-pump or injector is passed in pipes before entering the boiler, and thus the feed-water is exposed to a temperature corresponding to the pressure of steam in the heater, which pressure of steam in the heater I transfer from the exhaust of the steam-press through the agency and by the force of the momentum acquired by the steam in its escape, and without any appreciable increase of back pressure.

In the drawings, I represents the valve-chamber of a steam-press patented to me May 30, 1876, and numbered 178,139, for pressing cotton-bales.

The fresh steam is supplied through a pipe, J, and enters a compartment, J^1, from which a puppet-valve, *j*, operated by a hand-lever, K, admits it into a compartment, J^2, whence a pipe, L, conducts it to the main cylinder of the press. The exhaust-pipe M conducts the exhaust steam from the cylinder to the compartment N, which is closed by a puppet-valve, *n*, operated by the hand-lever K. Through the valve *n* (which answers to the exhaust-port of a steam-engine) the steam enters the compartment N′ and the therewith-connected compartment O, which is provided with three puppet-valves, $o\ o^1\ o^2$, of equal diameter and weight. The exhaust steam lifts the valves $o\ o^1\ o^2$, and enters their respective upper compartments P $P^1\ P^2$. From compartment P the pipe H^2 conducts the exhaust steam to the reversing-cylinder. From compartment P^1 the pipe H^1 conducts the steam to the jacket of the main cylinder; and from compartment P^2 the pipe H conducts the steam to the chamber E, whence the pipe G conducts it to the heater A. The heater A has the shape of a boiler, which boiler is of suitable dimensions, and it contains a set of vertical pipe-coils, B, of ordinary construction, arranged horizontally next to each other, so that their upper and lower end parts $b\ b^1$ run in the same direction through the head A′ of the heater. The upper ends *b* are connected with a transverse drum, C, and the lower ends b^1 with a transverse drum, C′. The upper ends *b* are or may be provided with valves or cocks b^2, to cut off the circulation of the water when the demand for it is small, or when a coil is out of order.

The fresh feed-water is introduced into the lower drum C′ through a feed-pipe, c^1, from a pump, injector, or other suitable means. From the drum C′ the water passes through the pipes b^1 into the coils B, thence, through the pipes *b* into the upper drum C, wherein it arrives heated to a proper degree, and from where a pipe, *c*, conducts it to the steam-boiler close by.

There is a twofold advantage in the described construction, viz., the feed-water, being heated between the pump and the boiler, does not lose any of its heat by radiation, as it would by passing through a pump after being heated. The water passes through the pump with a cold temperature and free from steam, and the valves of the pump are thereby caused to act freely at all times.

I prefer to provide the upper drum C with a thermometer, c^2, and the heater A with a manometer or steam-gage, *a*, which serve as guides for the adjustment of the stop-cocks b^2, in order to obtain the highest degree of heat for the feed-water.

The lower part of the heater A is provided

with a drain-pipe, a^1, which has a cock, a^2, whereby the condensed steam or steam-water is from time to time withdrawn, and which cock must be opened to admit water or air into the heater, in order to prevent its collapse by the pressure of the outer atmosphere when the boiler becomes cool.

In the drawings a pipe, D, is shown connected with the pipe H, which pipe D may serve as an exhaust-pipe from another steam-press, or a steam-engine, or a steam-pump.

As the valve o^2 and compartment could not well be attached to the cylinder or steam-chest of a steam-engine or steam-pump, I substitute the valve o^2 by a similar valve, F, at some suitable place between the said engine or pump in a chamber, E′, which has a contraction, *e*, serving as guide to the leg or lower cylindrical part of the valve F, and also containing the valve-seat *f*.

The valve F is provided with an upper spindle, f^1, which passes through a cross-bar, *e*, in the chamber E′, and serves as a central guide of the valve, while the said cross-bar *e* serves as a stop. The lower part of the valve F has a number of openings, f^2, through which the steam passes up into the chamber E′. The contracted part *e* is connected with a lower chamber, E, which surrounds the upper end of the pipe D centrally, affording sufficient space around it for collecting waste steam. A pipe, D′, conducts the said waste steam into the air outside of the building. The pipe G conducts the steam from the chamber E′ to the heater A.

In using this combined arrangement it will be necessary to apply a stop-cock, Q′, to the pipe H, and another one, Q, to the pipe D′. This enables the operator to make use of the exhaust steam of one or more steam-presses for heating the feed-water by closing the valve Q, while the valve Q′ would have to be closed when the exhaust of a steam-engine or steam-pump is used, in order to keep the waste steam from entering the pipe H and chamber P^2.

When the exhaust steam of a steam-engine or steam-pump is used, the eccentric of the steam-engine or the tappet of the steam-pump serves the same purpose which the hand-lever K serves in the steam-press; and as the valve o^2 is lifted by the first rush or impetus of the exhaust steam of the steam-press, so is the valve F lifted by the first rush or impetus of the exhaust steam of the steam-engine or steam-pump.

Having described my invention, what I claim is—

1. The combination of the exhaust-passage M of a steam-engine, the steam-heating chamber A, water-circulating pipes B, check-valve located between the chamber A and the exhaust-pipe, and arranged in a chamber which is in communication with the chamber A and with the atmosphere, the valve-chamber I of a press, and the valves and pipes connected therewith, all substantially as and for the purpose described.

2. Chamber I, having the valves o o^1 o^2, and provided with connecting-pipes, as described, in combination with the exhaust-pipe of an engine, a check-valve, and a feed-water heater, A B, substantially as described.

Witness my hand in the matter of my application for a patent for improved method of heating the feed-water of steam-boilers.

SAMUEL HIDDEN GILMAN.

Witnesses:
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