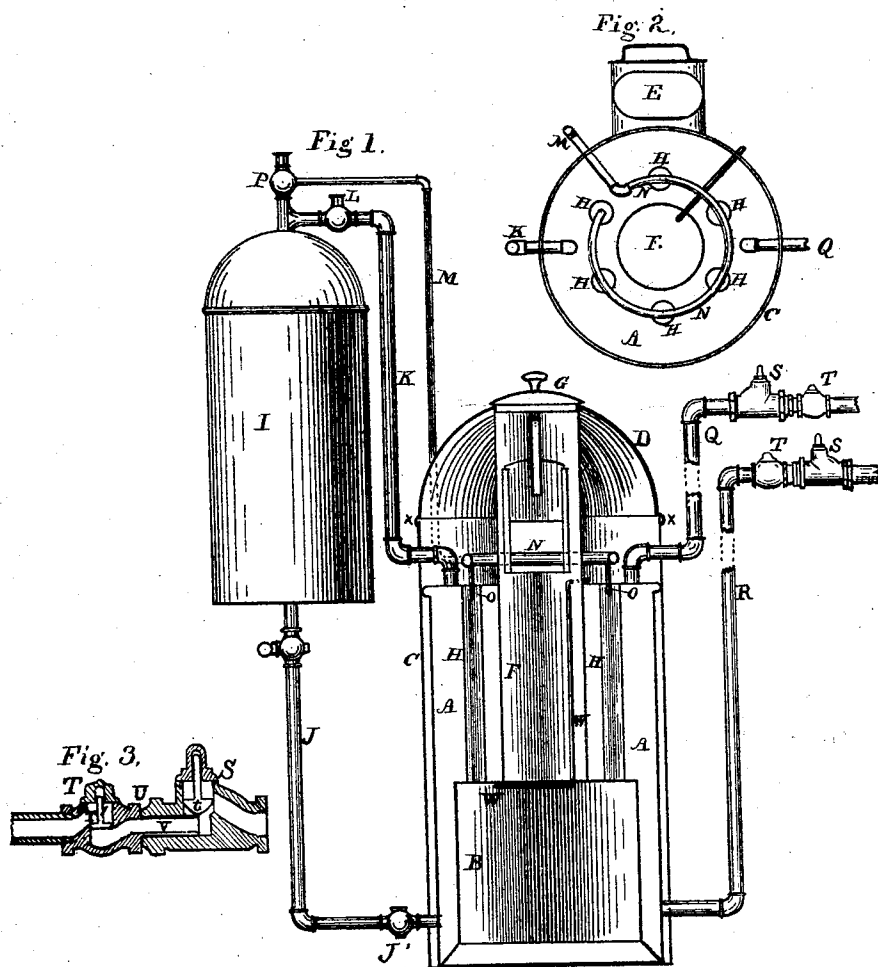


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Feed-Water Heaters for Steam Fire-Engines.

No. 147,081.

Patented Feb. 3, 1874.



Witnesses.
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JOHN VANDEVELDE, OF CLEVELAND, OHIO.

IMPROVEMENT IN FEED-WATER HEATERS FOR STEAM FIRE-ENGINES.

Specification forming part of Letters Patent No. **147,081**, dated February 3, 1874; application filed June 20, 1873.

To all whom it may concern:

Be it known that I, JOHN VANDEVELDE, of Cleveland, Ohio, have invented a new Water-Heater to be Attached to Boilers of Steam Fire-Engines, of which the following is a specification:

The object of my invention is to provide a means of keeping the water at a boiling temperature in the boiler of a steam fire-engine, by combining with the boiler a sub-heater, whereby the water in said boiler is kept hot without the fire in the fire-box of the steamer being used, and in such a manner that when the steamer leaves the house the fire in the steamer may be lighted, and steam be immediately generated for use, thereby saving the time necessary to heat the water for steam, and is also accomplished at much less expense of fuel than would be necessary for keeping up the fire in the steamer for that purpose.

The sub-heater is located at some convenient place in the house, and is so connected with the steamer that when the steamer leaves her place the connecting-pipes immediately separate, and, by a peculiar arrangement of valves in the pipes, the detached ends are all immediately closed.

The following is a full description of its construction and operation.

In the accompanying drawings, Figure 1 is a vertical sectional view of my aforementioned heater. Fig. 2 is a top view, with the dome removed, in line *x x* of Fig. 1. Fig. 3 is a detached and enlarged view of the valves in the pipes which connect the steamer with the heater.

A is a round upright boiler, in the lower part of which is located the fire-box B, the water surrounding said fire-box, except at the bottom. Surrounding the boiler A is an outer case, C, reaching a little above the boiler, and is surmounted by a dome, D, which forms a smoke-chamber, and from which a smoke-pipe, E, leads to a chimney. Through the central part of the boiler is an upright cylinder, F, connected with the fire-box, and reaching up through the top of the dome D, and is covered by a removable cap, G. This cylinder forms a fuel-magazine for feeding the fire-box. Vertically through the boiler A,

also, are draft-flues H H, encircling the magazine, connecting the fire-box B with the chamber under the dome D. I is a tank containing water for feeding the boiler A, which stands on a level with the top of the boiler. From the bottom of said tank is a pipe, J, connecting it with the lower part of the boiler, by which water is conducted to the boiler. A pipe, K, connects the top of the boiler with the top of the tank, through which the hot water from the boiler passes to the tank. This tank is provided as a means of circulation for the water in the boiler when the steamer is detached. Q is a pipe connecting the top of the boiler A with the upper part of the water in boiler of the steamer. R is a pipe, also connecting the lower part of the water in the boiler A with the lower part of the steamer's boiler. These pipes Q and R are arranged to break connection, when the steamer leaves the house, by an arrangement of check-valves S and T, provided with passages controlled by valve-buttons T *t*, which closes them when disconnected. The check-valves S and T are illustrated, on a larger scale, in section in Fig. 3. At U, Fig. 3, will be seen the place of connection, which is made by a pipe, V, entering the shell of the valve T, and which reaches under the valve-seat, and pushes and holds up the valve-button *t*, and this keeps the passage always open. But when the pipe V is withdrawn the button *t* falls of its own gravity, and closes the passage. These valves are arranged in reverse order in the two pipes Q R, in accordance with the course in which the water flows.

When these connections are made, the heated water rises, and flows through the pipe Q into the boiler of the steamer; and the cold water passes downward, through pipe R, to the lower part of boiler A, and thus a steady circulation is kept up, and the water in the steamer's boiler kept hot.

When the steamer is disconnected from the boiler A, the tank I is brought into use, there being a valve, L, in the pipe K, which is set with a spring, and which, when the pressure of steam arises at a given point, lifts the valve, and exhausts into the tank. A check-valve, J', in the pipe J, also yielding, conducts the cold water into the boiler.

In case the steam-pressure becomes great, a

safety-valve, P, is provided, in connection with a pipe, M, which passes down into the smoke-chamber, and connects with a circular pipe, N, lying over the draft-flues H H, and having small open pipes leading down a short distance in said flues. The object of this is that, if the pressure of steam in the tank arises to a given point, the valve P opens, and the steam blows down the flues, and puts out or reduces the fire. By this means the heater regulates itself.

A small pipe, W, is provided, to convey a draft of air to the top of the fire-box, to consume the gas.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with the boiler A, the pipes Q R, valves S, having passages capable of being controlled by valve-buttons *t*, and valve T, constructed with passages controlled by valve-buttons T', and provided with pipes V, arranged and operating substantially as shown and described.

2. The combination, with the tank I, of the valve P, pipes M N O, draft-flues H, and fire-box B, substantially as and for the purpose shown and described.

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Witnesses:

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