

UNITED STATES PATENT OFFICE.

BENJAMIN GARVIN, OF OSHKOSH, WISCONSIN.

IMPROVEMENT IN STEAM-BOILER FEED-WATER HEATERS.

Specification forming part of Letters Patent No. 120,959, dated November 14, 1871.

To all whom it may concern:

Be it known that I, BENJAMIN GARVIN, of the city of Oshkosh, Wisconsin, have invented certain Improvements in Feed-Water Heaters and Steam-Generators for Locomotive-Boilers, of which the following is a specification:

The invention consists in the construction and arrangement of a number of metal tubes or pipes in such a manner that they can be used as a feed-water heater and steam-generator. The object of the invention is to utilize and make available the escape heat for heating the water before it passes into the boiler and afterward converting a portion of it into steam.

Figure 1 is an end view of a locomotive-boiler, (with the smoke-arch removed,) showing the location and arrangement of the heater and steam-generator. Fig. 2 is a side view of the same, showing pipes B, C, and D with their stop-cocks and valves, together with the steam and exhaust-pipes.

This heater and steam-generator is located in the smoke-arch between the steam-pipes and flue-sheet, and is formed by connecting the pipes together in pairs by means of a return joint, the whole forming a coil or number of folds, as will be seen in Fig. 1. The lower pipe of the coil is connected with the boiler by means of the injection-pipe B, which pipe has a stop-cock, E, which must always be open whether the pump is in operation or not, except in case of injury to the heater, when it would have to be closed. The upper pipe of the heater is connected with the pump by pipe D, which has a check-valve, as seen at O. The upper tube or pipe of the heater is also connected with the steam-chamber of the boiler by means of pipe C, which is for the purpose of conveying the steam from the heater to

the boiler when the pump is not in operation. The connecting-pipe C has a stop-cock, F, as seen in Fig. 2, which must be closed when the pump is in operation and opened when the pump is not in operation.

The above-described arrangement of pipes serves as a feed-water heater in the following manner: With the pump in operation water will be forced up through connecting-pipe D into the upper pipe of the heater and through it and injection-pipe B into the boiler. During its circuitous passage through the heater the water will be heated by the escape heat to nearly the boiling point before it enters the boiler.

The same arrangement of pipes acts as a steam-generator in the following manner: When the pump is not in operation the escape heat will be sufficient to convert the water in the heater into steam, which will pass through connecting-pipe C into the steam-chamber of the boiler. As the water in the heater is made into steam, the heater is replenished with water from the boiler flowing back through injection-pipe B. Thus the heater will be kept full whether the pump is in operation or not.

Having described my invention, what I wish to secure by Letters Patent, is—

The construction and arrangement of the coil or pipes A A A A with injection-pipe B, connection-pipes C and D, stop-cocks E and F, and check-valve O, when used in combination with a steam-boiler, as described, and for the purposes set forth.

BENJAMIN GARVIN.

Witnesses:

CHR. SWAN,
R. H. BORMON.

(148)