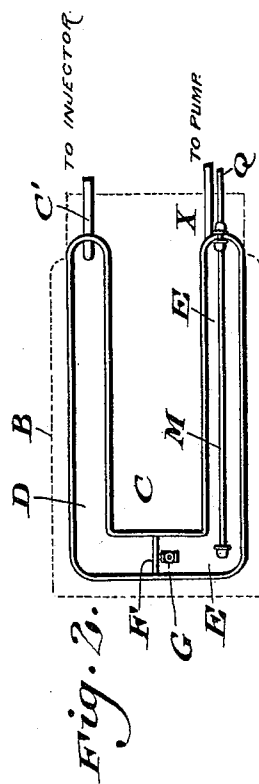
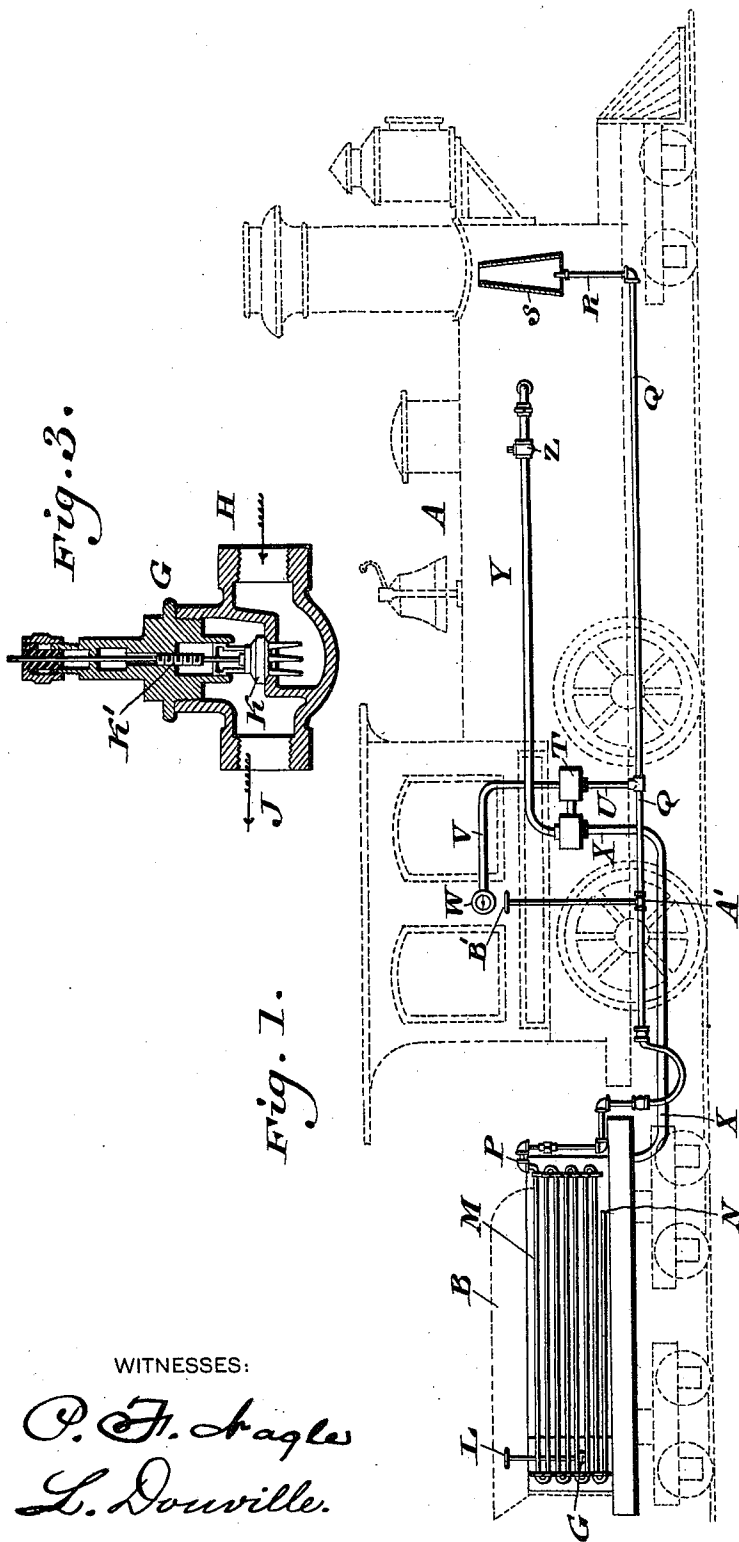


(No Model.)

T. M. EYNON.
FEED WATER HEATER.

No. 582,628.

Patented May 18, 1897.



WITNESSES:

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THOMAS M. EYNON, OF PHILADELPHIA, PENNSYLVANIA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 582,628, dated May 18, 1897.

Application filed December 27, 1895. Renewed March 27, 1897. Serial No. 629,575. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. EYNON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Feed-Water Heaters for Locomotives, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a novel construction of feed-water heaters for locomotives in which a tank, subdivided into compartments, is mounted upon a locomotive-tender, said compartments being designed to contain hot and cold water, respectively, and provision being made for heating the water in said tanks by means of connections from the exhaust-nozzle of the locomotive, such as a calorific transfer-coil or plain jet discharging into the tank.

It also consists in providing connections from the cold-water tank or compartment to the injector, and in further providing a connection from the hot-water tank or compartment to a suitable feed-pump, whereby the water is pumped into the boiler, means being also provided for enabling the contents of the hot-water compartment to flow into the cold-water compartment according to requirements.

It further consists of novel details of construction, all as will be hereinafter set forth.

Figure 1 represents a side elevation of a feed-water-heating apparatus for locomotives embodying my invention and a portion of a locomotive and tender to which the same is applicable. Fig. 2 represents a plan view of the tender, showing the relative position of the tank with its water-holding compartments. Fig. 3 represents, on an enlarged scale, a sectional view of a combined check and stop valve employed.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates a locomotive, and B the tender thereof, the above parts being of the usual construction.

C designates a tank mounted on said tender, the same being divided into the compartments D and E by means of the partition F.

G designates a special valve employed, which is mounted on the partition F, so as to form a communication between the compartments, the construction of said valve being seen in Fig. 3, the same having an inlet H and an outlet J, which leads to and from the partition F.

K designates the valve proper, which has a casing of usual construction and is mounted upon a suitable seat, and is adapted to be automatically raised, so as to allow water to flow from the inlet H to the outlet J according to requirements, provision being also made by means of the stem K' and hand-wheel L for enabling the valve to be lifted clear of its seat when it is desired, so that a free passage can be had through the same when desired.

M designates a heating-coil which is located in the compartment E, the terminal N of said coil being open, if desired, to allow the exhaust-steam to pass therefrom directly into the water in the compartment E, provided animal-oils are not used in lubricating the engine-cylinders, or said terminal N may lead outside said compartment, if desired, and discharge into the atmosphere, it being further evident that, if desired, an oil-separator may be placed in the pipe leading to the heating-coil, in which latter case there will be no objection to allowing the coil to discharge directly into said compartment E.

P designates a branch of the coil M, the same having communicating therewith the pipe Q, which has a branch R in communication with the exhaust-nozzle S of the locomotive, whereupon it will be seen that so long as the engine is running a portion of the exhaust will be conducted through the pipes R, Q, and P into the coil M.

T designates a pump which may be of the usual construction, and is suitably supported upon the side of the locomotive, the exhaust-pipe U of said pump leading into the pipe Q, attached to the coil M.

V designates the steam-supply pipe to said pump, the same being regulated by a suitable valve W.

X designates a suction-pipe which leads from the hot-water compartment E to the

pump and thence discharges by means of the pipe Y into the boiler, a suitable check-valve Z being located in said discharge-pipe, as is customary.

5 A' designates a cock or valve in the pipe Q, by means of which the passage of the exhaust to the feed-water heater M is cut off, according to requirements, by means of the stem and hand-wheel B'.

10 C' designates a pipe leading from the cold-water compartment C to the injector, the latter being omitted from the drawings for clearness of illustration.

The operation is as follows: The exhaust-steam is conducted from the nozzle S by means of the pipes R, Q, and P to the exhaust-coil M, whereby the water in the compartment E is heated to the desired degree, it being evident that, as stated, the exhaust may be allowed to discharge directly into the said compartment E, or it may be conducted to the exterior thereof, as may be desired. In order to permit the employment of the injector in connection with the tender equipped with a feed-water-heating device, as described, it is necessary to provide means whereby part of the water may be kept comparatively cool, which is done by providing a cold-water compartment D, whereby it will be seen that the cold water is supplied to the injector from said compartment D, while the hot water is supplied to the pump from the compartment E, according to requirements. In order that all of the water contained in both compartments may be used by the pump or the injector, a special valve is provided, as shown in Fig. 3, the same under ordinary working conditions acting as a check-valve, as is evident, and permitting water to enter the hot-water compartment E from the cold-water compartment D as the water-level is lowered in E by the water being fed into the locomotive-boiler by the pump, said valve, however, preventing the heated water from said compartment E from entering the compartment D.

If it is desired at any time to use all the water in the heating apparatus to supply the injector, the valve K is raised clear from its seat by means of the stem K' and the hand-wheel L, whereby free communication is at once established between the compartments D and E, it being remembered that when this is done the exhaust-steam is shut off from the heater-coil by closing the valve A', which can be readily done by the engineer, as is evident.

It will of course be apparent that, if desired, the injector may be replaced by a pump, or the position of the pump and injector may be varied according to requirements, thereby enabling two pumps or two injectors to be employed, as may be desired.

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

65 1. In a feed-water heater for locomotives,

the combination of a locomotive and its tender, with a tank on said tender, having a plurality of compartments D and E, a pipe leading from the steam-exhaust of said locomotive to said compartment E, for the purpose of heating the contents thereof, a check-valve in said compartment, normally allowing the flow of water from the compartment D to the compartment E, but preventing any flow in the reverse direction and means for withdrawing water from either of said compartments at will, substantially as described. 70 75

2. In an apparatus of the character described, a tank having the compartments D and E, a partition therebetween, pipes leading from the steam-exhaust of the locomotive to a coil within the compartment E for the purpose of heating the contents thereof, a valve-casing supported adjacent to said partition, and having a port H leading from the compartment E, and a port J leading into the compartment E, the valve K having a seat in said casing, and means for limiting the movement of said valve, the latter normally preventing any flow from port J to port H, and means for withdrawing the water from either of said tanks at will, substantially as described. 80 85 90

3. In an apparatus of the character described, a locomotive and a tender, a plurality of compartments upon said tender, a check-valve controlling the flow of water between said compartments, and an injector and a feed-pump mounted on said locomotive in combination with a connection from said cold-water compartment to the injector, and a connection from the hot-water compartment to the pump, substantially as described. 95 100

4. In combination with a locomotive and a tender, a tank on the latter, a partition in said tank dividing the same into a plurality of compartments, a combined check and stop valve mounted in said partition, a heating-coil in one compartment, connections from said coil to the exhaust-nozzle of the locomotive, a pump and injector mounted on said locomotive and connections from the cold and hot water compartments thereto respectively, substantially as described. 105 110

5. A locomotive and a tender, a tank mounted on the latter, a partition in said tank dividing the same into compartments, a combined check and stop valve mounted in said partition, a heating-coil in one of said compartments, a connection from the blast-nozzle of the locomotive to said heating-coil, an injector mounted on the locomotive, a connection therefrom to said cold-water compartment, a pump also mounted on said locomotive, a connection therefrom to said hot-water compartment, a discharge leading from said pump to said boiler, and a valve in the connection between the exhaust-nozzle and heating-coil, substantially as described. 115 120 125

6. A locomotive and a tender, a tank mount- 130

ed on the latter and having a plurality of compartments, means for controlling the flow of water between said compartments, a heating-coil in one of the latter, a connection from the locomotive-exhaust to said heating-coil, an injector mounted upon the locomotive, a connection from said injector to the cold-water compartment, a pump mounted on the loco-

motive, a connection therefrom to the hot-water compartment, and means for controlling the flow of exhaust-steam to said heating-coil, substantially as described.

THOMAS M. EYNON.

Witnesses:

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