(No Model.)

P. SMITH.

FEED WATER HEATER FOR FIRE ENGINES.

No. 473,593. Patented Apr. 26, 1892.

Fig. 3.

Fig. 1.

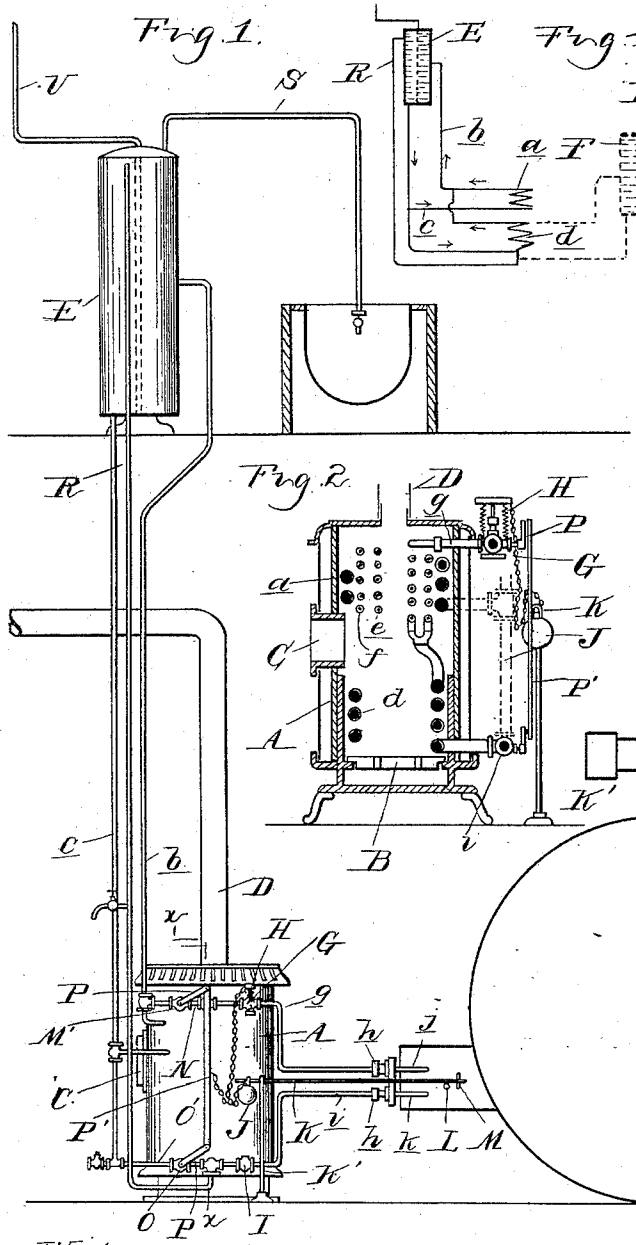

Fig. 4.

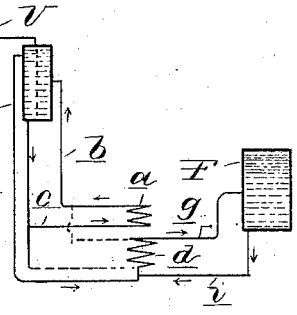

Fig. 2.

Witnesses
A. L. Hobbs
N. L. Lindop

Inventor
Peter Smith
By Thos. G. Sprague & Son
Attys.

UNITED STATES PATENT OFFICE.

PETER SMITH, OF DETROIT, MICHIGAN.

FEED-WATER HEATER FOR FIRE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 473,593, dated April 26, 1892.

Application filed November 7, 1891. Serial No. 411,178. (No model.)

To all whom it may concern:

Be it known that I, PETER SMITH, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Feed-Water Heaters for Fire-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in feed-water heaters for fire-engines, and has for its objects the heating of water to be used in a fire-engine house and maintaining the hot water in the boiler of the engine.

The invention consists in the peculiar construction of the heater and the arrangement of the circuits therefrom and the valves controlling said circuits, whereby the engine may be supplied with hot water from a tank in circuit with the heater and then the circuits to the engine and tank be circulated independently. Further, upon the withdrawal of the engine, the circuit to the engine is automatically cut off, and that part in the heater connected up with the tank, and, further, in the peculiar construction, arrangement, and combination of the various parts.

In the drawings, Figure 1 is an elevation of my heating apparatus. Fig. 2 is a vertical section through the heater on line x x. Figs. 3 and 4 are diagrams illustrating the arrangement of the circuits under the different conditions in which it is designed to operate.

A is a stove or heater; B, the grate therein; C, the feed-door, and D the exit-flue. I have two circuits extending from the stove, a main circuit to heat the water in a tank E, and, if desired, water in radiators for heating purposes, and a circuit for heating the water in the boiler F of a fire-engine. The main circuit comprises a coil a within the stove. b is the exit-pipe extending from the upper part of said coil to the middle of the tank E, and c is the return-pipe from the lower part of that tank to the lower end of the coil a. The engine-circuit comprises a coil d on the lower part of the stove, which at its upper end is divided into the two smaller coils e and f for the purpose of obtaining better heating effects of the water in those coils. These two coils connect at their upper ends into a common exit-pipe g, which at its outer end is provided with a coupler h.

i is the return-pipe connected to the lower end of the coil in the stove and provided with a corresponding coupling h at its outer end. These two couplings connect with the outgoing and return pipes j and k, respectively, which extend to and from the boiler F. These couplings are of any suitable construction, so that when the engine is run out the two parts will separate without damage, so that they may be readily rearranged when the engine comes in.

It is evident that the parts being connected up, as described, the water will circulate from the coil a to and from the tank E and from the coil d and its upper branched portion to and from the boiler F.

In order to shut off the water from circulating through the engine-circuit when the engine is run out, to throw the circulation from the coil d into the tank-circuit, I employ the following mechanism: G is a valve in the outlet-pipe g, being held normally open by means of the springs H, and I is a check-valve in the return-pipe i, constructed to allow the passage of the water from the engine to the stove but prevent the return of the water from the stove to the engine.

J is a weight connected by a chain to the valve-stem of the valve G and normally suspended on the end of a rod K, which is supported in the standard K′ at one end and at the other end upon the pin L on the engine. A cross-head M is provided at the end of this rod, so that when the engine runs out it will strike the pin L and carry the rod with it until the rod is withdrawn from the standard, slipping off the weight J, which in falling closes the valve G and prevents the water from going out in the pipe g, the check-valve I preventing the water from passing out from the heater through the return-pipe i.

M′ is a shut-off valve in the pipe N, which connects the outgoing pipe b of the tank-circuit with the outgoing pipe g of the engine-circuit, and O is a valve in the pipe O′, which connects the return of the tank-circuit with the return of the engine-circuit. These two valves are preferably rocking valves, and are provided with cranks P, connected together by means of a connecting-rod P′, to which a

chain from the weight J is attached, all so arranged that when the weight falls, as previously described, it will rock the valves to their open position, allowing the water in the coil *d* to pass upward through the exit-pipe *g*, the connecting-pipe N, into the outgoing pipe *b* of the tank-circuit, and returning through the return-pipe *c* and connecting-pipe O′ to the bottom of the coil.

In Fig. 3 I show the circuit when the engine is withdrawn, and in Fig. 4 the circuit when the engine-circuit is open and both circuits are in operation.

U is a supply-pipe for filling the tank.

R is a supply-pipe from the top of the tank E, and connected into the return-pipe *i* between the check-valve I and the coil in the stove.

When the engine returns after being used, it is desirable to flow off the water from the boiler, as it is ordinarily obtained from outside sources and contains impurities, and when this is done, in refilling the boiler of the engine, after the engine has been connected up to the outgoing and return pipes of the circuit, the valves M′, O, and G, being open, the water will flow through the supply-pipe R into the lower part of the coil *d*, and from thence through that coil and the outgoing pipes *g* into the boiler until it is filled, it thus being necessary that the water in passing from the tank shall pass through the heater before entering the boiler of the fire-engine.

Under ordinary circumstances after the engine has been out, the water in the tank E will be very hot and the boiler of the engine be filled with boiling water, and then when the valves M and O are closed that water will be retained at its high heat by being circulated through the independent circuit thus formed.

If while the engine is out, the water in the tank E be lowered by drawing it off, for instance, through the pipe S, shown as connected to a bath-tub, or for other purposes, whereby the water in the tank is cooled, the fresh water passing into the boiler will necessarily pass through the heater and be raised to a reasonably high temperature before reaching the boiler. Thus I provide a means for supplying the boiler with hot water and for maintaining that water at a reasonably high temperature under all circumstances.

What I claim as my invention is—

1. In a hot-water heater for fire-engines, the combination, with a heater, of two independent coils passing through the heater, independent circulating systems connected with the coils, two coupling-sections between the respective coils, and valves for directing the water independently through each coil and system or through both coils and one system only, substantially as described.

2. In a hot-water-heating apparatus for fire-engines, the combination, with the heater, of two independent coils located within the heater, a circuit from one coil to the engine, a detachable coupling in said circuit, a circuit from the other coil to a tank, connecting-pipes between the two circuits, and mechanism for closing the engine-circuit and connecting the coil of said circuit with the tank-circuit, substantially as described.

3. In a hot-water-heating apparatus for fire-engines, the combination, with a heater, two independent coils therein, circuits from each coil, an engine-boiler in one circuit, a detachable coupling in said circuit, valved connections between the outgoing and return pipes of both circuits, means for closing the engine-circuit when the engine is withdrawn, means for opening the valves in the connecting-pipes, controlled by the movement of the engine, substantially as and for the purpose described.

4. In a hot-water-heating apparatus for fire-engines, the combination, with the heater, the engine-circuit, the tank, and its circuit, of the pipe R, connecting the tank with the return of the engine-circuit, and a check-valve in said circuit between the engine and said pipe, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

PETER SMITH.

Witnesses:
M. B. O'DOGHERTY,
N. L. LINDOP.