(No Model.)

O. ROTHROCK.

HEATER AND FEEDER FOR BOILERS.

No. 332,561. Patented Dec. 15, 1885.

Fig. 1.

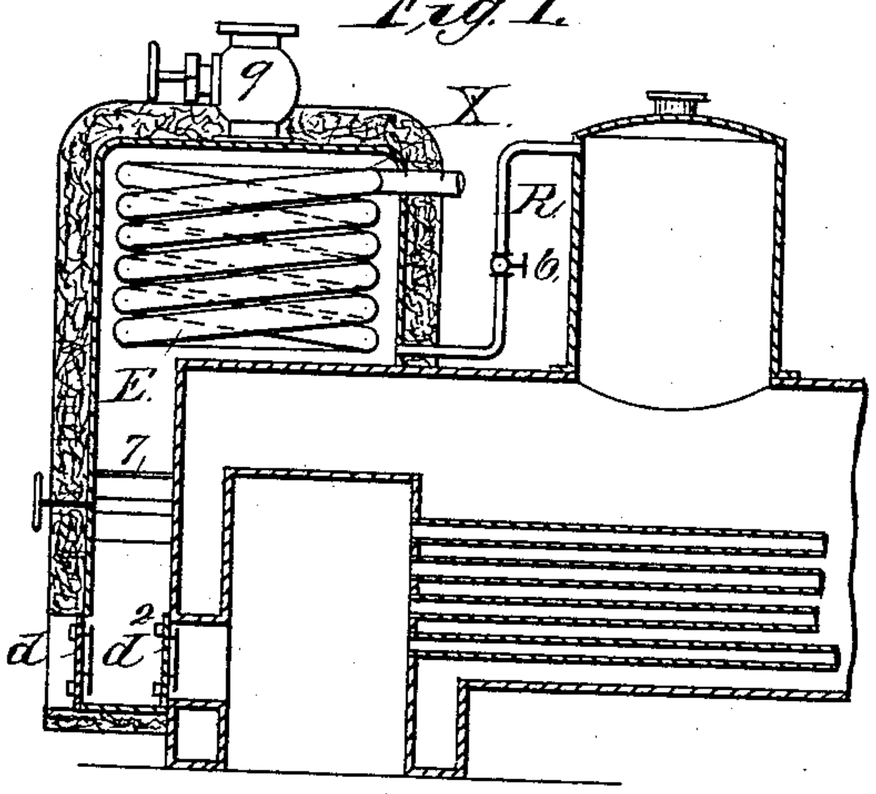


Fig. 2.

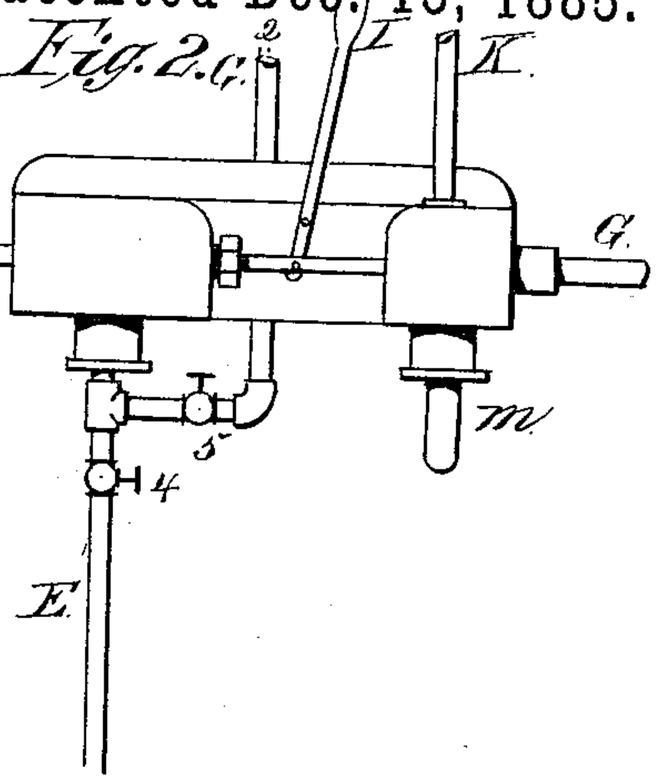


Fig. 3

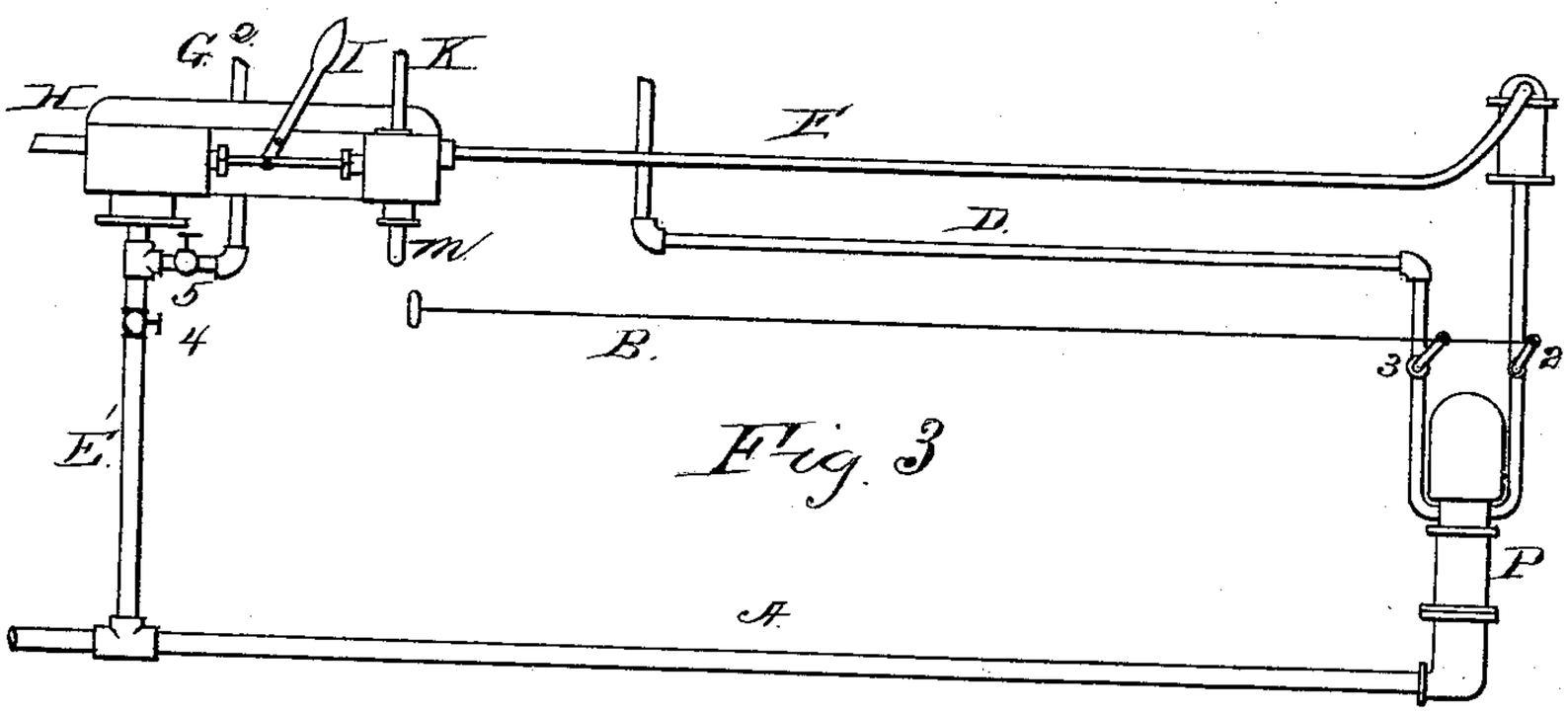
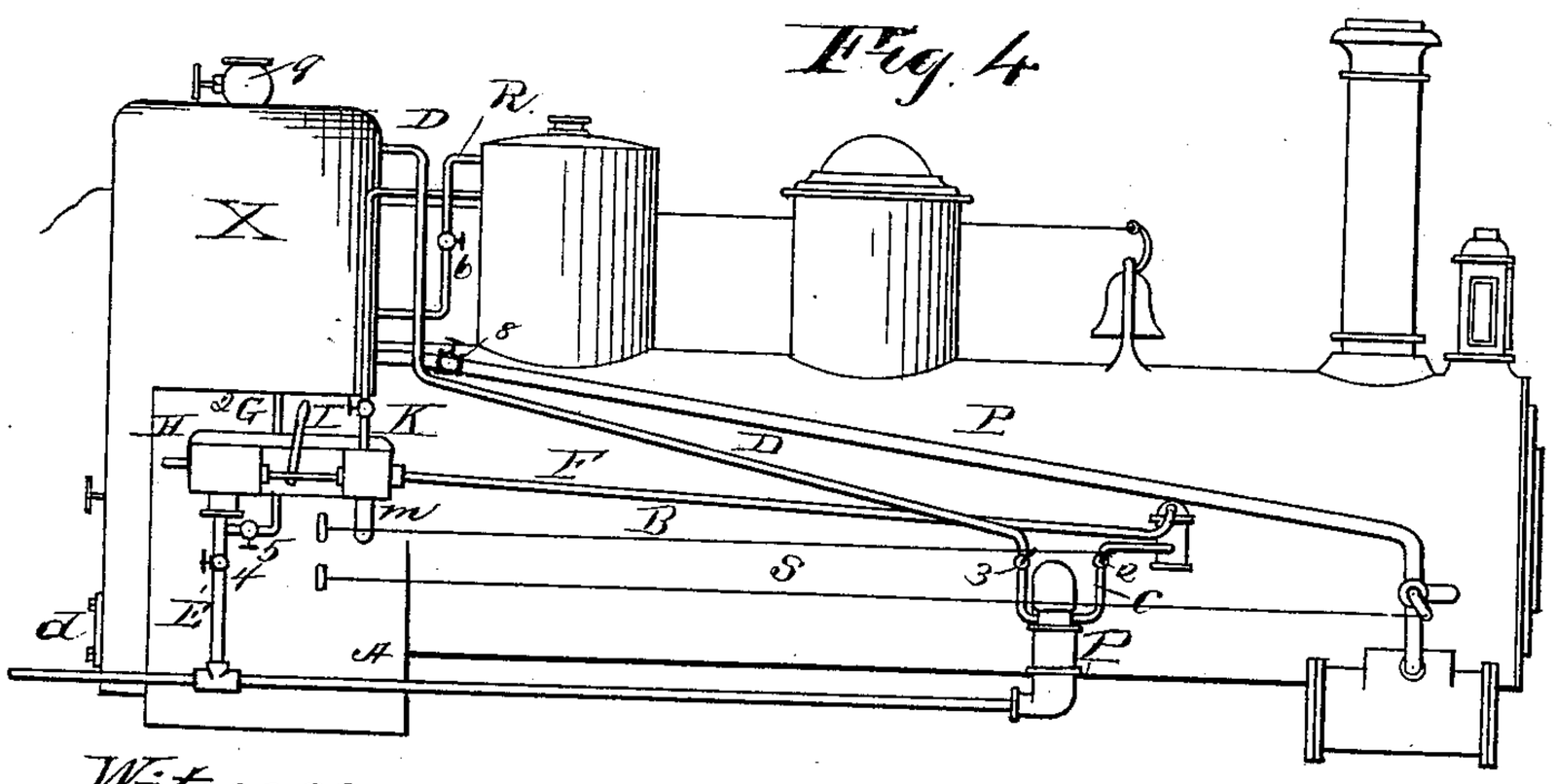


Fig. 4



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HEATER AND FEEDER FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 332,561, dated December 15, 1885.

Application filed October 19, 1885. Serial No. 180,465. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ROTHROCK, a citizen of the United States of North America, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Feeders and Heaters for Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures and letters of reference marked thereon, which form a part of this specification.

My invention relates to feeders for locomotive, stationary, and other boilers; but is especially adapted to locomotives and portable boilers. Its object is to supply steam-boilers with feed-water of high temperature, utilizing the waste heat from the furnace, the exhaust-steam or live steam to heat the water, and to so arrange a pump and injector and their connections that the boiler can be supplied with hot or cold water, as circumstances may require.

That part of the present device for heating water I have made application for patents on June 9, 1885, Serial No. 168,167, and September 8, 1885, Serial No. 176,519, and therefore do not claim any part of the same in this application.

My new improvements consist in minor details in the construction of the heater, its suitable conducting-pipes, pump, and injector for feeding water to and from the heater to the steam-boiler, and to provide a means for throwing either cold or hot water directly into the boiler, as circumstances require. In this instance the heater is provided with a valve within the space or box (marked W in the drawings,) and with a pipe carrying live steam from the boiler into the heater box or shell, (marked R,) the latter also being provided with a valve, by which means I may use the steam already made to heat the water as it is forced through the coils, and by simply opening a valve at the top, (marked No. 9 in the drawings,) and closing the valve in live-steam pipe, the exhaust may be blown through the shell. In other words, I can by these means heat the water by the steam already made by the exhaust from the cylinders or by the products of combustion from the fire-box, separately or all together, and force it into the boiler or boilers at a very high temperature. A closed shell without the valves 7 and 9, into which the live steam is conducted by the pipe R, is an effective heater.

In the drawings, Figure 1 is a longitudinal vertical section of a boiler and heater with inner and outer fire-doors, *d' d''*. These doors are hinged in this instance. Valve No. 7 is an emery-ground door or valve closing the space *w*, or, in other words, closing the mouth of the box, heater, or structure around the fire-door opening. R is the pipe carrying live steam from the dome to heater-shell, and valve No. 6 the cock closing it. E are the coils through which the water is being forced, and the position for valve No. 9 is indicated by the dotted line. (Has been shown in other cases.)

Fig. 2 shows the injector detached from the heater and boiler. E' is a pipe from the cold-water supply to injector with its valve No. 4. F is the pipe from injector to boiler. G'' is the pipe from the coils from within the heater-chamber or from the water-supply within the hot-water tank, as the case may be, with its valve No. 5 to the injector. I is the lever. H is the steam-pipe. K is a steam-pipe for throwing a jet into the tube *m* when necessary.

Fig. 3 shows the pump, the injector, and the conducting-pipe. A is the pipe from cold-water supply to pump. B is the rod to open and close the cocks or valves Nos. 3 and 4 in the pipes C and D. C is the pipe from pump to boiler direct for use in emergencies, &c. D is the pipe for conducting the water from pump to the coils or supply within the heater-chamber. E' is the extra injector-pipe for use in emergencies, &c. F is the pipe for delivering the hot water from injector to boiler. G'' is the pipe delivering the hot water from the coils or heated tank to the injector for delivery through the pipe F. H is the steam-pipe. K is steam-pipe to throw jet into the tube *m* when necessary. I is the injector-lever, which may or may not be supplied.

Fig. 4 shows a portion of a locomotive with the heater, pump, and injector, &c., in position.

P is the pipe carrying exhaust-steam into the tank or heater-shell, as described elsewhere, and *s* is the rod for opening and closing the valve to throw the exhaust through heater or up stack, as also described and claimed elsewhere. X is the heater shell or tank, as the case may be. B is the rod for controlling the flow of water through the pump to heater or boiler, with the valves Nos. 3 and 4 shown connected to it. F is the injector-pipe to boiler; G″, the pipe from heater to injector, &c.

Similar letters refer to the same parts in all the figures.

It will be understood that the pump is in circuit between cold water and the tank containing the water to be heated, or coils within the heater-chamber through which it passes to be heated, and the injector in the circuit between the hot water and the boiler.

Describing the devices more minutely, over the furnace or fire-box, or in front and over the fire-box portion of the boiler, is riveted or tap-bolted a box structure, tank, or chamber made of any suitable material, usually of steel or iron plate, and covered with the usual lagging when applied to locomotives or in exposed positions, into which the live steam, the exhaust-steam, and the heat of the furnace may be conducted separately or together to heat the water carried in this case through the coils held in position within the said shell or chamber. The heating from the furnace direct being controlled by opening or closing the inner fire-door, *d″*, and the valve No. 7, both doors *d′* and *d″* are opened to supply fuel, &c. Entering each side of the chamber are the pipes P, carrying exhaust-steam, the same to be controlled by the rod and valve, all of which has been described in other divisions of these patents. By all of these means I secure a superior feeder for boilers and effect a heavy saving in fuel.

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

1. In a feeder for steam-boilers, the combination of the heater, and the pump for supplying water to the heater, with the injector for feeding the hot water to the boiler, substantially as shown and described.

2. In a feeder for steam-boilers, the combination of the pump, provided with valves by which the water can be fed into the boiler or heater, with the heater and the injector, the latter so arranged as to feed hot or cold water to the boiler, substantially as shown and described.

3. In a feeder for steam-boilers, the combination of the pump P, pipes C D, and valves 2 3 with the heater X, the injector, pipes G″, F, and E′, and valves 4 5, substantially as shown and described.

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

OSCAR ROTHROCK. [L. S.]

Witnesses:

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