W. DAWSON.
Feed-Water Heater.

No. 204,953. Patented June 18, 1878.

Fig. 1.

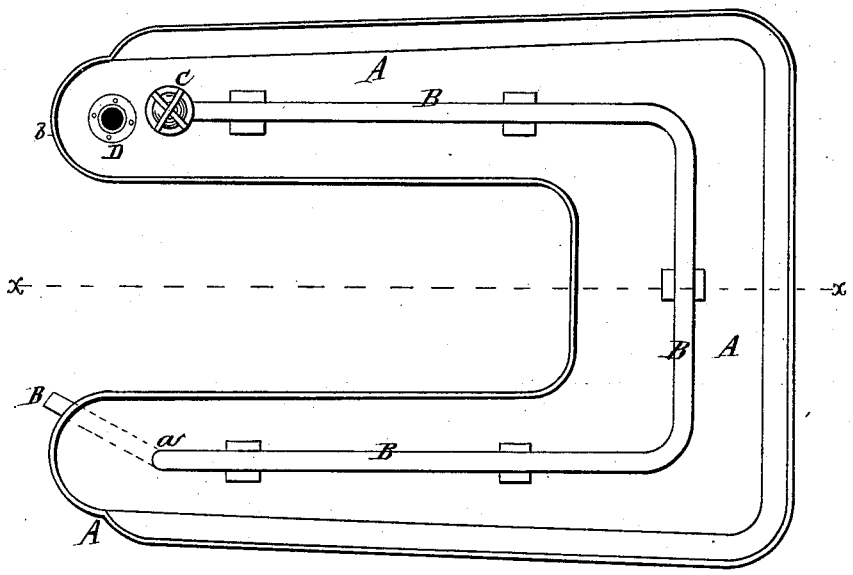


Fig. 2.

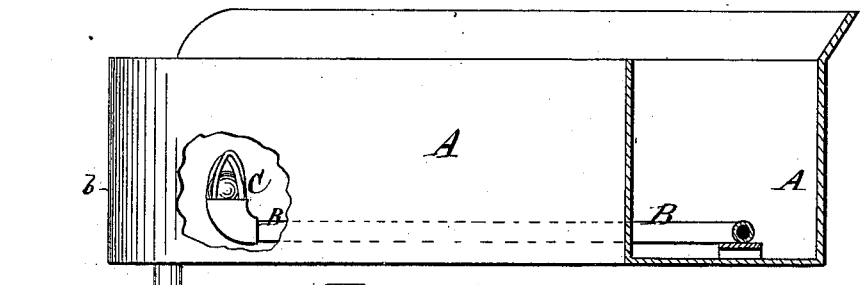
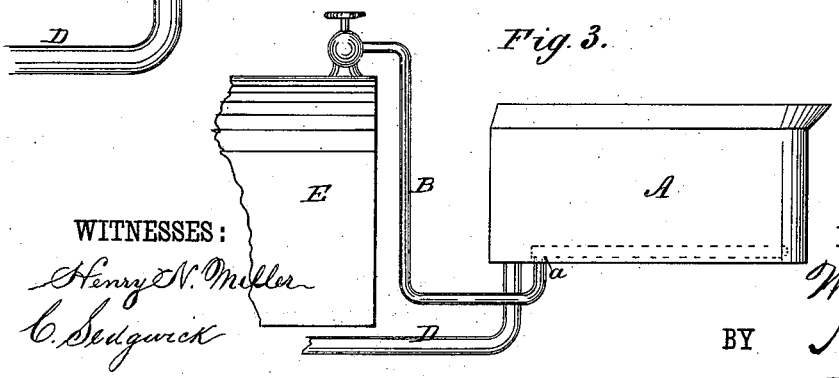


Fig. 3.



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WALTER DAWSON, OF SCRANTON, PENNSYLVANIA.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **204,953**, dated June 18, 1878; application filed March 20, 1878.

To all whom it may concern:

Be it known that I, WALTER DAWSON, of Scranton, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Feed-Water Heater, of which the following is a specification:

My invention is an improvement in the class of feed-water heaters for locomotives in which the surplus steam is conducted from the boiler and discharged into the tender through a pipe suitably arranged for the purpose, thereby effecting a considerable economy of fuel by heating the water preparatory to its entering the boiler by means of the surplus steam which is not required for working the engine.

My improvement consists in the particular arrangement of parts whereby the surplus steam, after being conducted through the body of water contained in a locomotive-tender, is discharged at or near the point where the boiler feed-pipe connects with the tender, as and for the purpose hereinafter set forth.

In the accompanying drawings, forming part of this specification, Figure 1 is a top view of a locomotive-tender provided with my improvement. Fig. 2 is a sectional elevation of the same on line *x x*, Fig. 1. Fig. 3 is an elevation representing the connection of the surplus-steam pipe with a locomotive-boiler.

A is the tender or water-tank of a locomotive, and B a pipe which, leading from the steam-space of boiler E, enters tank B on the left-hand side, at the front end, and through the bottom at *a*, and continues through the whole water-space of the tender to the front end of the right-hand portion or leg *b*, where it terminates in close proximity to the water-eduction orifice or mouth *c* of the boiler feed-pipe D.

An automatic check-valve, C, is connected with such outlet end of the steam-pipe B, which prevents water entering the latter, but is raised by the pressure of steam and permits its escape into the water—that is to say, the valve C opens when the steam-pressure suffices, and closes by its own gravity when steam is shut off. The admission of steam is controlled by a suitable valve placed in pipe B at a point contiguous to the boiler.

It is obvious that steam can be admitted to the tank A all the time, even when the locomotive is running, or it may be done when the train halts at a station or elsewhere, and the locomotive-boiler requires to be relieved of the surplus steam generated during such time.

The valve in pipe B is then opened, and the steam, which would otherwise escape into the air and be wasted, is passed through said pipe and discharged into the water in the tank at a point immediately contiguous to the eduction-orifice or mouth of the feed-pipe D, which is shown attached, as usual, to the right side or leg *b* of the tender. The general effect is to heat the body of water as a whole, but by my particular arrangement I secure a special advantage—to wit, that portion of the water surrounding the outlet of the steam-pipe, or rather that portion which fills the front part of the right leg *b* of the tender, is kept heated to a much higher degree than the remaining portion, and hence enters the contiguous mouth of pipe D, and is by it delivered into the boiler E at a temperature approximating as nearly as practicable that of the water contained in the boiler.

An economy is thus obviously effected, since a correspondingly smaller quantity of fuel is required to keep the water in the boiler raised to the required degree for producing the required amount of steam.

Incidentally to the extension of steam-pipe B through the water-space, the advantage results that, since the steam has to pass through the whole length of pipe before coming in actual contact with the water, its temperature and pressure are reduced, so that a much larger quantity may be allowed to pass into the water in a given time without danger of straining or bursting the hose which connects the locomotive and tender, as would be liable to happen if the pipe B terminated at the point *a* where it enters the tender, and the

steam consequently had to encounter the water at nearly the same temperature and pressure as it had on leaving the boiler.

What I claim is—

As the improvement hereinbefore described, the combination, with the locomotive-boiler and the tender, having feed-pipe D attached, as specified, of the surplus-steam pipe connected with the steam-space of the boiler and extending through the water-space of the tender and terminating in the end of the right side or leg *b* thereof, contiguous to the exit-orifice of feed-pipe D, as shown and described, for the purpose specified.

WALTER DAWSON.

Witnesses:

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