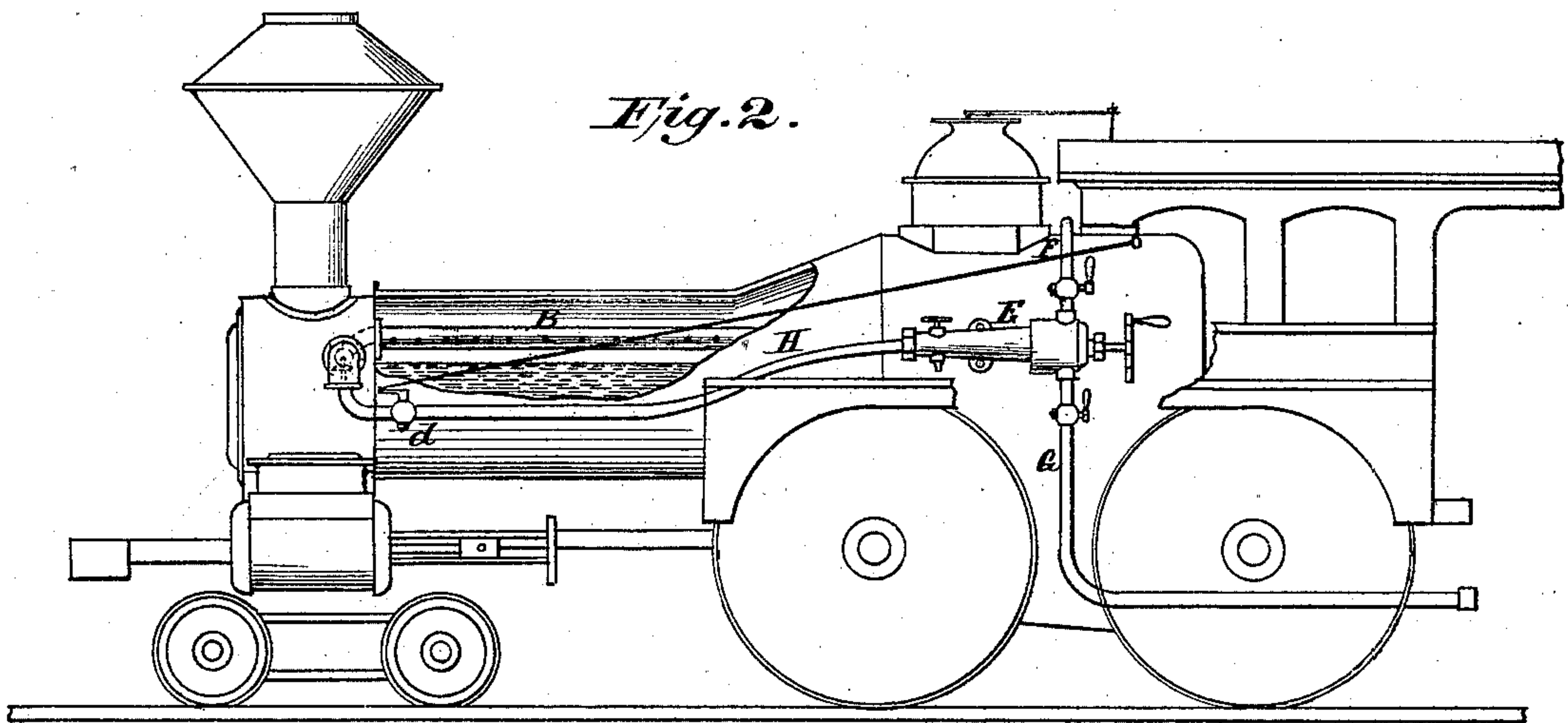
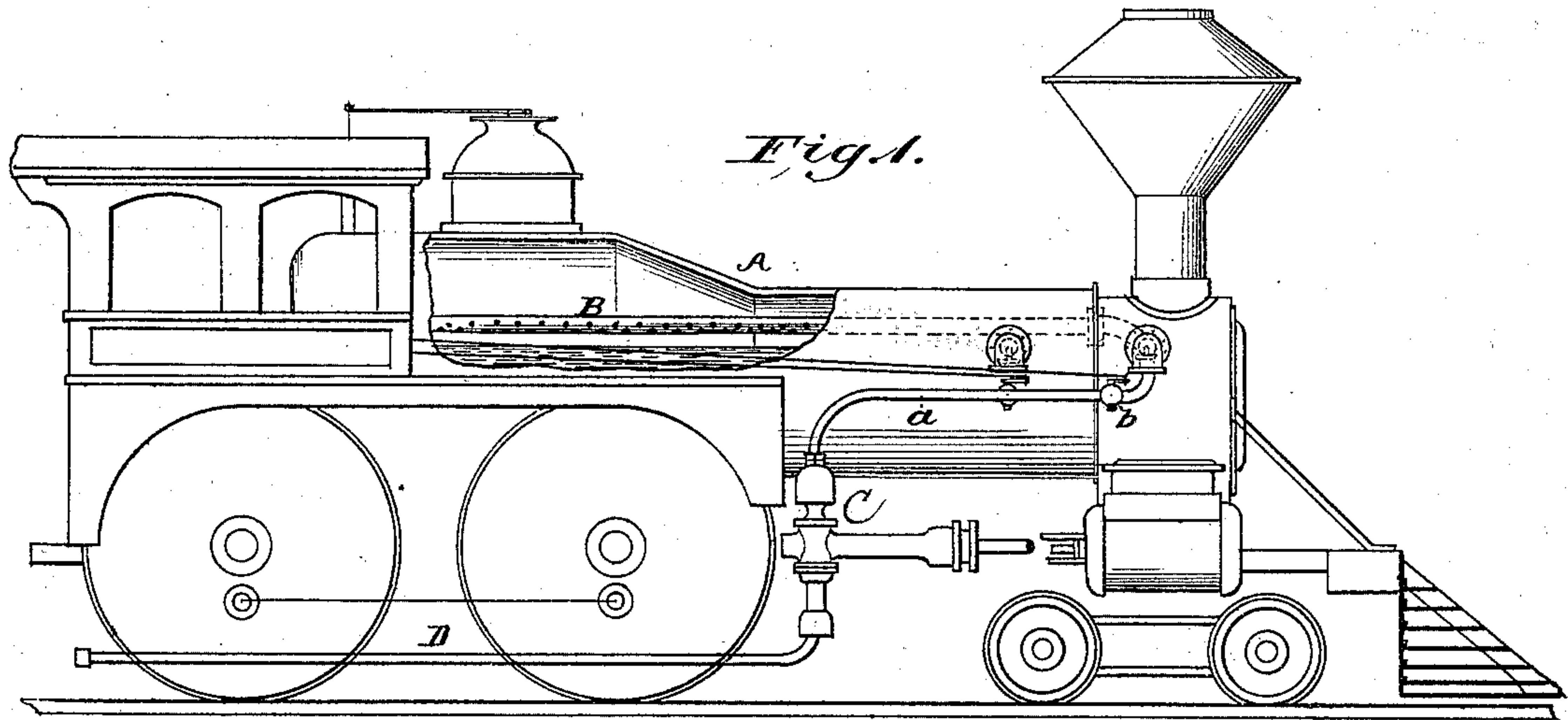


J. S. GIBSON.

Combined Condensers and Feed-Water Apparatus.

No. 144,331.

Patented Nov. 4, 1873.



Witnesses.
W. L. Perrine
J. J. Peyton

Inventor.
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Per James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

JEREMIAH S. GIBSON, OF MARTINSBURG, WEST VIRGINIA.

IMPROVEMENT IN COMBINED CONDENSERS AND FEED-WATER APPARATUS.

Specification forming part of Letters Patent No. **144,331**, dated November 4, 1873; application filed October 17, 1873.

To all whom it may concern:

Be it known that I, JEREMIAH S. GIBSON, of Martinsburg, in the county of Berkeley and State of West Virginia, have invented certain new and useful Improvements in Combined Condenser and Feed-Water Apparatus, of which the following is a specification:

This invention relates to combined condensers and feed-water apparatus, more especially adapted to locomotives, portable engines, &c.; and it consists in a novel arrangement of devices by which the feed-water from the tender or tank is heated before it enters the boiler, and thereby assists in generating the steam more rapidly. The pipe leading from the tender to the pump passes along the furnace, and is thereby heated, and the delivery-pipe from the pump connects with a perforated pipe arranged in the boiler near the water-line. The water, being fed through the small perforations in this pipe in innumerable jets along its entire surface, is very rapidly converted into steam, and also superheated, and thus effecting a considerable saving of fuel.

The second part of my invention consists in the condenser or cooler, by which the foaming or priming in the boiler is prevented. A siphon or steam-injector is arranged on the side of the locomotive, and connects at one side with the steam-space of the boiler, and at the other with the pipe leading to the tender, and the outlet-pipe leads to the perforated pipe arranged near the surface of the water, through which innumerable jets of cold water may be thrown into the boiler, by which the steam is condensed, the water cooled, and the foaming or priming prevented which occurs when the engine is descending heavy grades or standing still at stations, &c., and when the steam is not used, but generated more rapidly than it is used or can be blown off by the safety-valve, by which explosions are often caused, as the water and steam flash into gas very suddenly when they are at a high temperature. By my condensing or cooling apparatus this can be regulated by the engineer, and it prevents the necessity of opening the furnace or smoke-box doors, by which cold air is admitted into the furnace and it cooled off, and the boiler-flues are liable to become leaky from their sudden cooling and contracting.

A valve in the pipe is operated by a rod or cord leading to the engine-cab to admit steam and water, as desired, and giving the engineer full control of the boiler. The condenser should be used just as the engine starts or stops; for when the water in the boiler foams the mud rises to the surface, when the throttle-valve is opened and steam withdrawn. As is well known, foaming often occurs also when the water is in a very high state of temperature, by which the particles of steam are liberated much faster than the steam is consumed.

In the drawing, Figure 1 is a side elevation, partly in section, of an engine, showing the pump connecting to the tender and the perforated pipe. Fig. 2 is a reverse side elevation, partly in section, of the engine, with the injector and pipes in position.

In the drawing, A is the boiler of the locomotive, of the usual construction, having a part broken out to show the perforated pipe B in the interior. The pump C is arranged in the usual manner, and is connected with the suction end by the pipe D to the tender, from which the water is drawn. This pipe passes through the lower part of the furnace or ash-pan, and the water is thereby heated, and again as it passes through the pipe *a* in smoke-arch of the locomotive, before it enters the perforated pipe B arranged near the water-line in the boiler. A stop-cock or check-valve, *b*, is arranged in the pipe *a*, to regulate the flow of the water, and is operated by a rod or cord leading to the cab; and when it is desired to use the condenser or cooler, the valve *b* is closed. On the reverse side of the engine is arranged the injector or siphon E, of the well-known construction, having one nozzle and pipe, F, connected to the steam-space in the boiler, and another nozzle and pipe, G, leading from the tender, and its outlet-nozzle and pipe H connected to the perforated pipe B, through which, in case of foaming or priming, innumerable jets of cold water may be thrown on the surface of the water in the boiler, and said water may be cooled off and the steam condensed.

As is well known, the force with which the water is drawn and forced by the injector into the boiler and through the perforated pipe

also tends to beat down the ebullitions of the boiling water and quiets its surface. A valve, *d*, is arranged in the pipe H, to be operated from the cab by the engineer by a cord or rod when not in use, and cocks or valves are also arranged in the pipes F and G, to control the flow of the steam and water through the respective pipes.

It will be readily seen that by my apparatus the steam and water in the boiler are under the perfect control of the engineer, and that it is very simple and not liable to get out of order; and that it can be very readily and easily attached to any locomotive or other engine now in use.

What I claim is—

1. The pipe *a*, having its front end passing through the smoke-arch and connected with

the perforated pipe B in the boiler, in combination with the pump C and supply-pipe D, substantially as and for the purpose described.

2. The combination of the injector E and pipes F, G, and H with the perforated pipe B, arranged in a boiler, as and for the purpose herein set forth.

3. The combination of the pump C and its pipes with the perforated pipe B and the injector E, with its pipes, arranged substantially as shown, and for the purpose herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 6th day of September, 1873.

J. S. GIBSON.

Witnesses:

WM. J. PEYTON,
A. H. NORRIS.