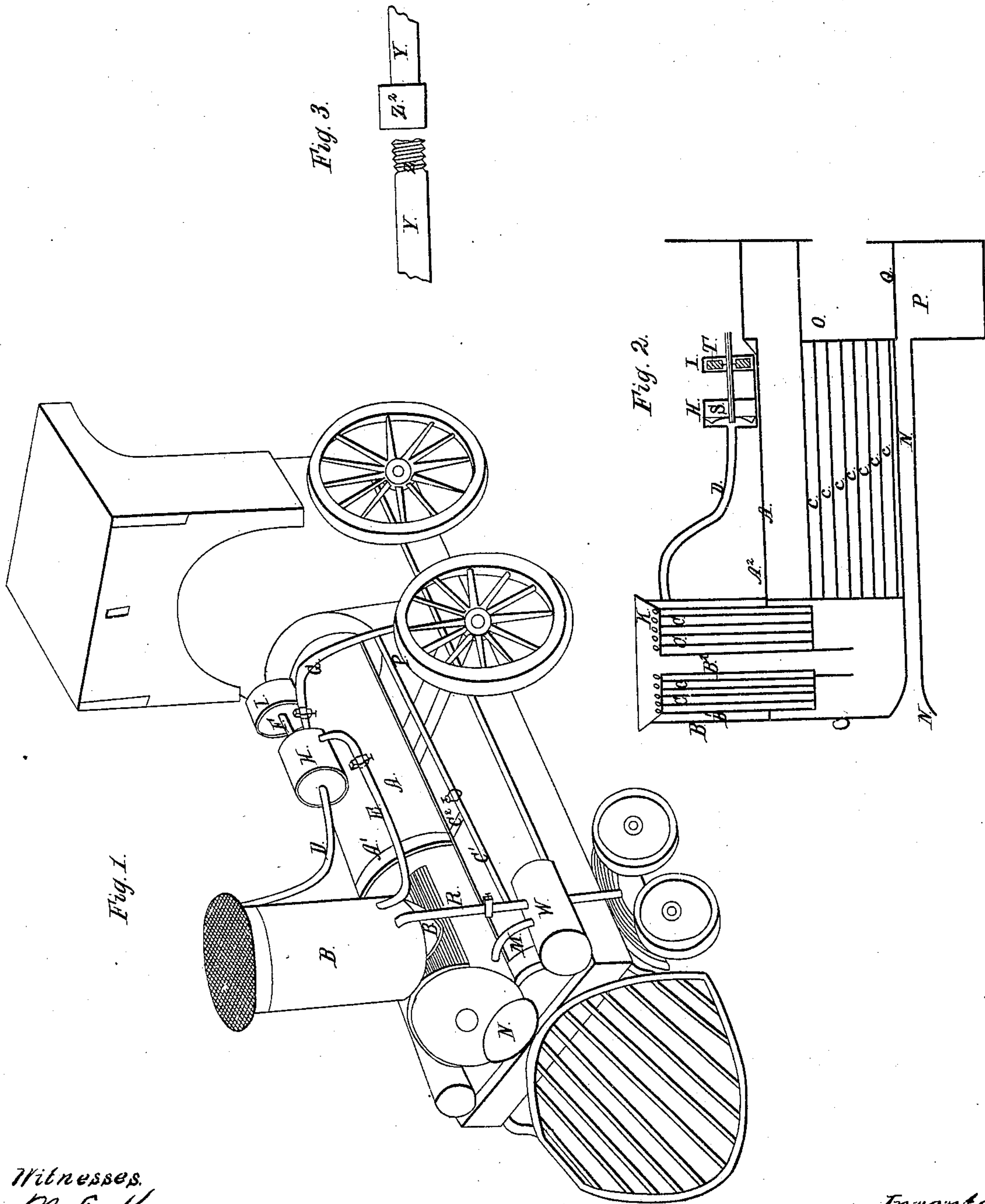


# A. C. Cray.

## Steam Engine.

No. 88,278.

Patented Mar. 30, 1869.



Witnesses.  
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ARCHIBALD C. CRARY, OF UTICA, NEW YORK.

Letters Patent No. 88,278, dated March 30, 1869.

IMPROVED STEAM-ENGINE.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, ARCHIBALD C. CRARY, a resident of the city of Utica, in the State of New York, have invented a new and useful Improvement on Steam-Engines, and on the steam-generator described in patent, No. 77,871.

My invention consists in certain improvements on steam-engines, and on the steam-generator, by means of which a draught is produced in the fire-box of a locomotive, without the aid of exhaust steam, thereby permitting the exhaust steam, in connection with or in lieu of the steam produced in the steam-generator, to be used in warming railway-cars; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification, in which—

Figure 1 is a perspective view of the locomotive, and of the steam-generator.

Figure 2 is a longitudinal sectional view of the boilers A and B, or steam-generators, engine H, and fan-case T.

A, fig. 1, represents the boiler of a locomotive.

B is the external, and B<sup>1</sup>, the internal cylinder of the steam-drum.

D is a pipe from the steam-drum, and connects it with engine H.

The piston-head S, fig. 2, in engine H, is firmly attached to the piston-rod F, which is also attached to fan T.

The piston-head is operated by the steam from the steam-drum in its transit to the cars, and by means of the piston-rod F, causes the fan T to revolve, and thus to produce a current of air, through an air-tube, to the ash-pan P.

D is an induction-pipe, and G, an eduction-pipe of engine H.

The pipe G, in connection with the intermediate pipe Y, fig. 3, conveys the steam received from engine H to the cars.

E, fig. 1, is an eduction-pipe of engine H, which conveys the steam to the vertical outer chamber in the

steam-drum, when it is not applied to warming the cars.

In connection with the current of air which is forced into the fire-box O, fig. 2, by fan T, a second current of air is brought from the front of the locomotive by tube N. This current of air is forced in the funnel-shaped end of tube N, fig. 1, by the motion of the locomotive.

Tube N extends from the front end of the locomotive to the air-tight ash-pan chamber P, and is designed to form a draught in the fire-box. Through steam-pipe R the exhaust steam flows into the vertical chamber of the steam-drum, which is formed by uniting the lower extremity of cylinder B to an air-tight horizontal flange, or ring, to B<sup>1</sup>. This vertical chamber is designed for the passage of the exhaust steam, when it is not used in warming the cars.

M, fig. 1, is the eduction-pipe of cylinder W.

Through this pipe the exhaust steam may be made, by means of stop-cocks, to flow into the lower extremity of cylinder B<sup>2</sup>.

All the exhaust steam may, by means of stop-cocks, be made to flow through pipe R, or it may be caused to flow through the steam-pipes R and M, by means of steam-cocks suitably placed in these pipes.

The pipes in B<sup>1</sup> should be of greater diameter than those in the boiler.

The steam-drum contains, in its centre, cylinder B<sup>2</sup>.

When the exhaust steam is driven through cylinder B<sup>2</sup>, it is to increase the draught in the fire-box.

Having thus described my invention,

What I claim therein as new and useful, and desire to secure by Letters Patent of the United States, is—

The arrangement, with reference to the steam-generator A and drum B, constructed as described, of the engine H, fan T, and tube N, with pipes G and E, the cylinder M, and its pipes R and M, as herein set forth.

ARCHIBALD C. CRARY.

Witnesses:

N. E. KERNAN,  
WM. KERNAN, Jr.