2 Sheets—Sheet 1.

F. GENDEBIEN.

STEAM MOTORS FOR TRAMWAYS, &c.

No. 176,618. Patented April 25, 1876.

Fig. 1

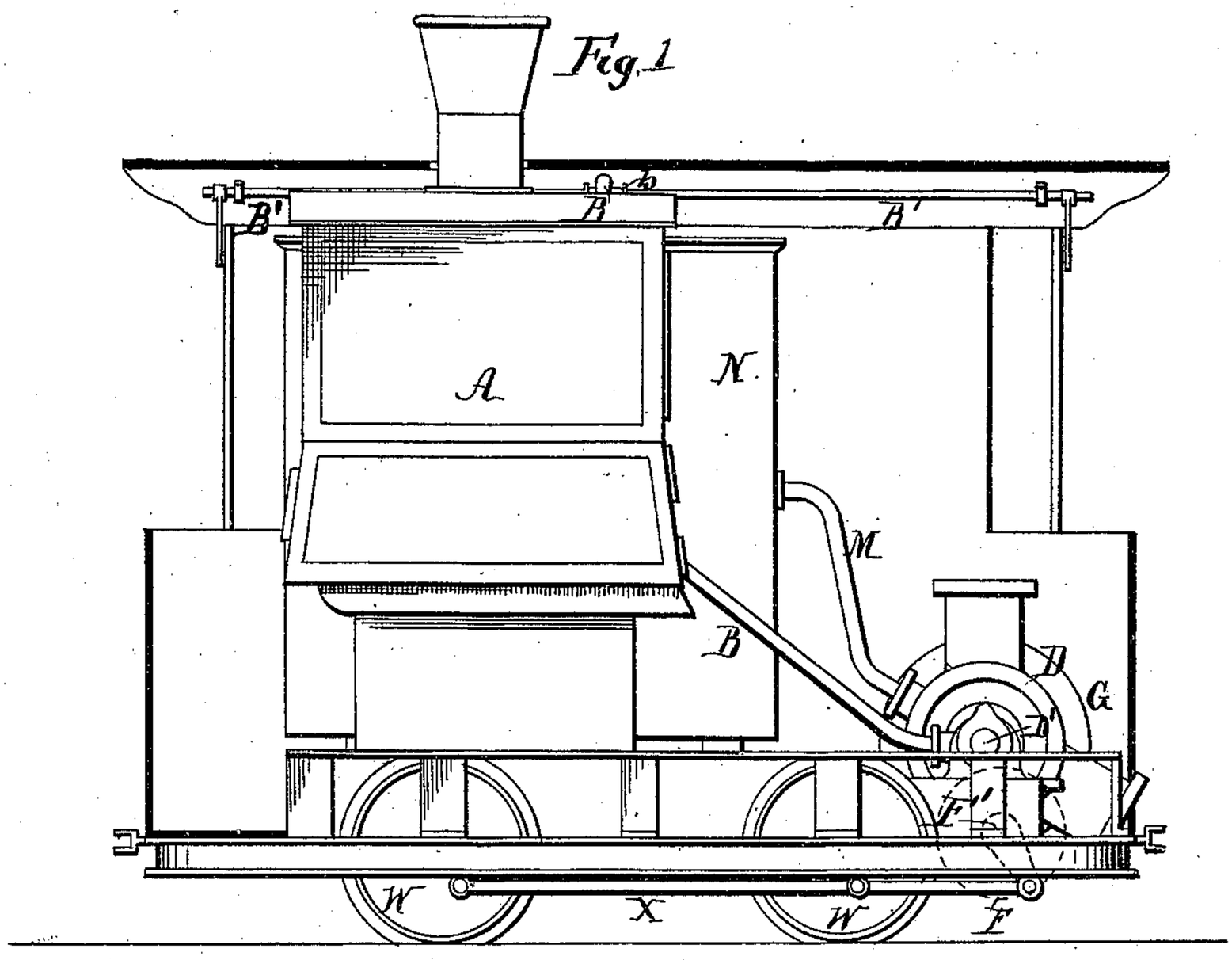
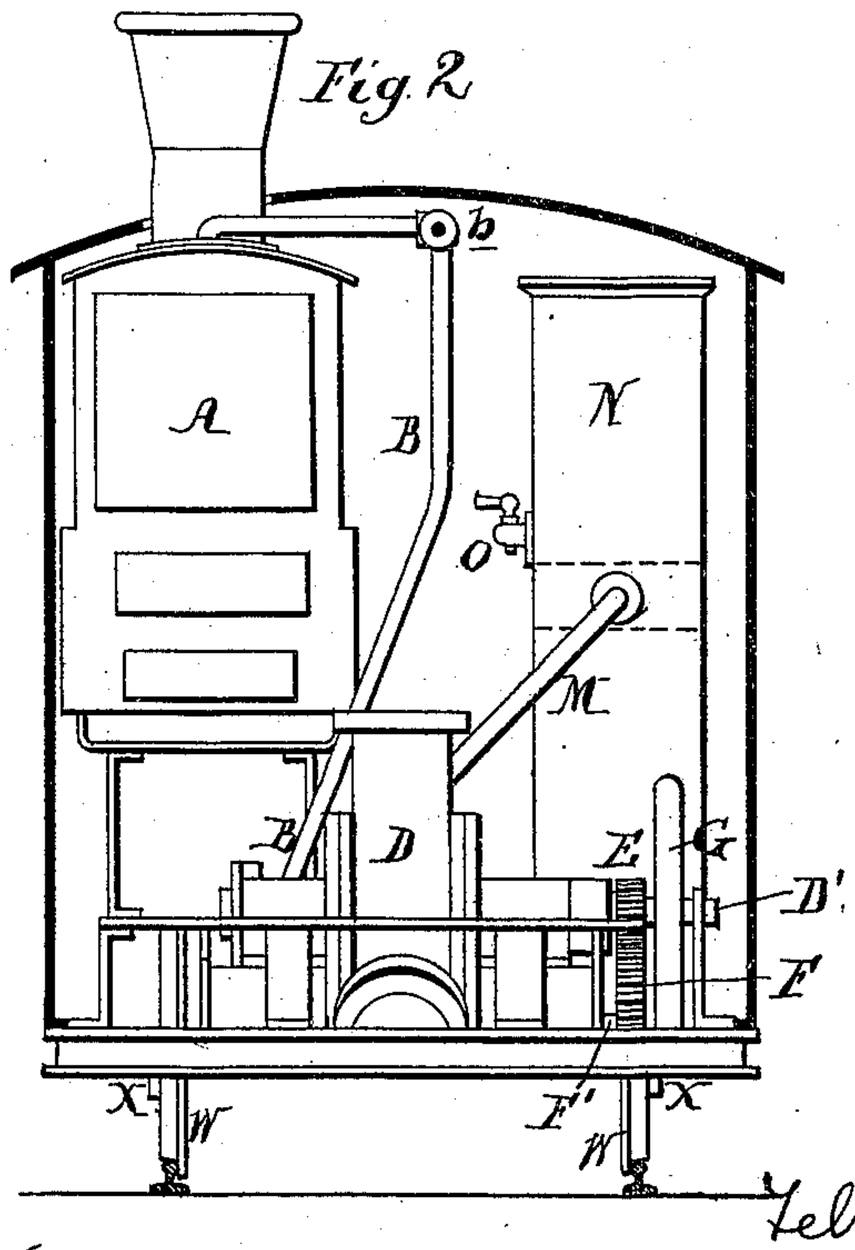


Fig. 2



WITNESSES:

E. L. Nottingham

J. L. Skidmore

Felix Gendebien
by his attorneys
Howson and Son

2 Sheets—Sheet 2.

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Fig 3.

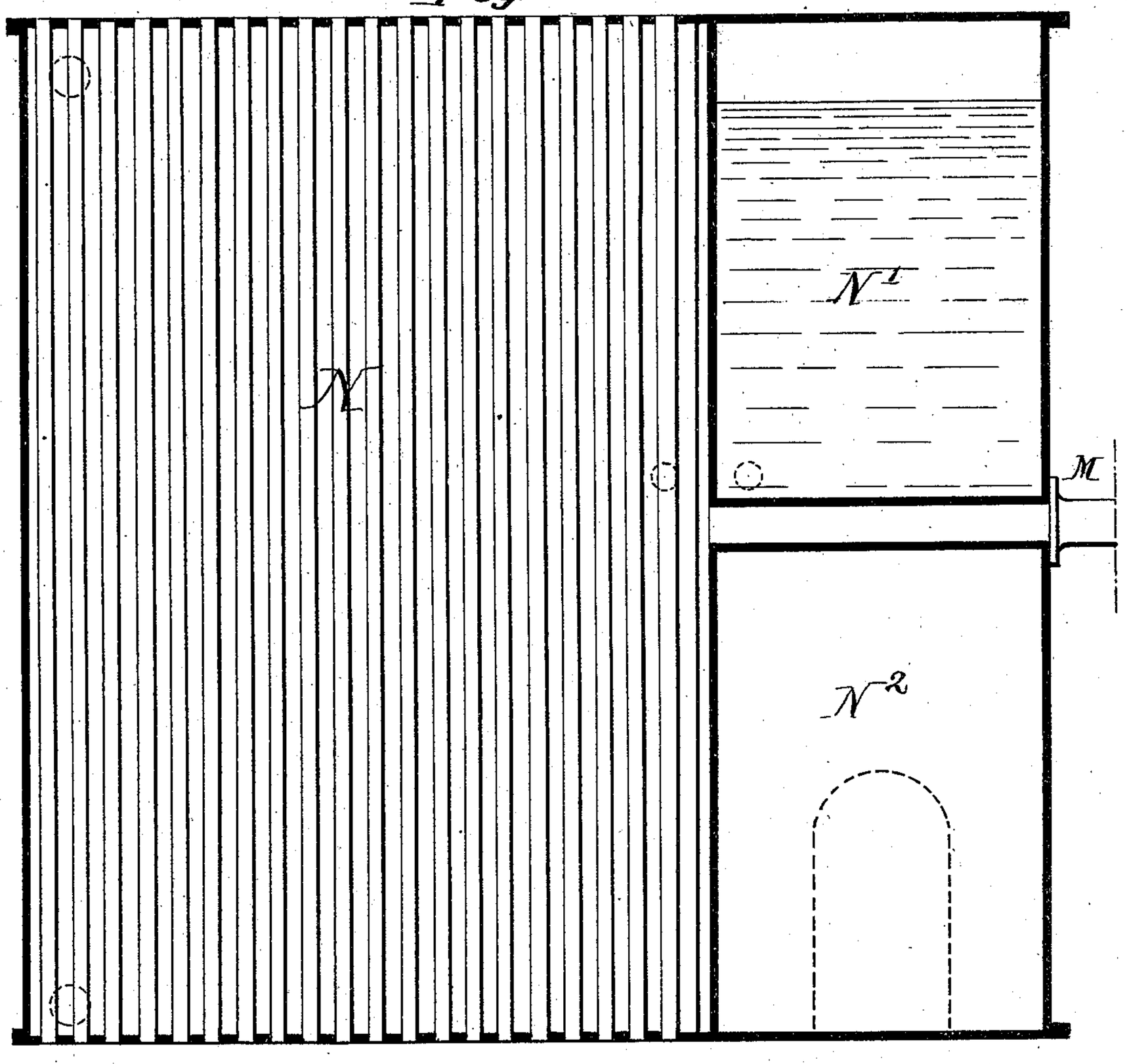
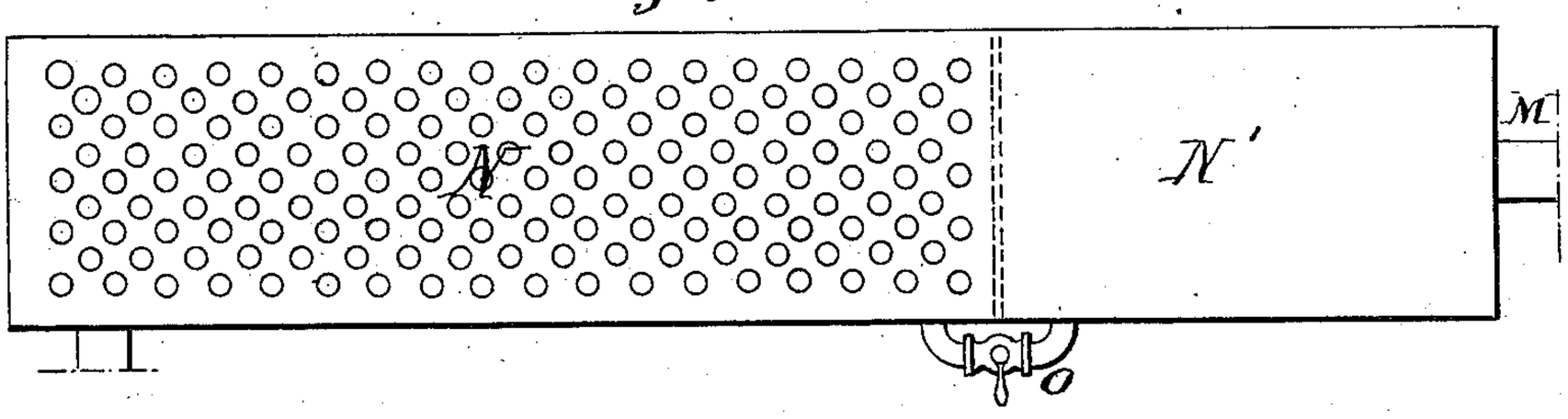


Fig 4.



WITNESSES:

E. A. Nottingham

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Felix Gendebien
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Howson and Son

UNITED STATES PATENT OFFICE.

FELIX GENDEBIEN, OF BRUSSELS, BELGIUM.

IMPROVEMENT IN STEAM-MOTORS FOR TRAMWAYS, &c.

Specification forming part of Letters Patent No. **176,618**, dated April 25, 1876; application filed January 10, 1876.

To all whom it may concern:

Be it known that I, FELIX GENDÈBIEN, of Brussels, Belgium, engineer, have invented certain Improvements in Locomotives, of which the following is a specification:

The object of my invention is to so construct a locomotive, more especially adapted for street-cars, that the waste steam may be utilized, and the locomotive rendered comparatively noiseless. This object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1, Sheet 1, is a side view of the locomotive; Fig. 2, an end view, partly in section; Fig. 3, Sheet 2, a vertical section of the condenser; and Fig. 4, a plan of the same.

A is the steam-boiler and furnace, which may be of any desired character, and the steam-space of this boiler communicates through a pipe, B, with the engine D, a regulating-valve, *b*, in this pipe being controlled from either end of the locomotive by means of the rod B′. I prefer to make the motive-engine D a high-speed three-cylinder engine, as shown in the drawing, for a purpose explained hereafter. On the end of the shaft D′ of the engine is a cog-wheel, E, of small diameter, gearing into a cog-wheel, F, of about four times the diameter, on a shaft, F′. The wheels W W of the locomotive are operated from the shaft F′, through the medium of connecting-rods X X. On the end of the engine-shaft D′ is a fly-wheel, G, under the control of some suitable brake. The exhaust steam from the engine passes through the pipe M to the condenser N, first passing below the water-reservoir N^1, which is thereby heated. The portion N^2 of this casing is preferably employed as a fuel-receptacle. The condenser N is traversed by a series of vertical tubes, in the interior of which cold air circulates freely, so as to cause rapid condensation of the steam.

The suction-pipe of the boiler-pump communicates with the lower part of the condenser, and the water of condensation is pumped back into the boiler, while the incondensable vapors pass through a suitable pipe to the chimney of the locomotive, and, being there reheated, pass off into the atmosphere without making any appreciable noise.

When the water of condensation is not sufficient to supply the boiler, the cock O is opened and the partially-heated water from the reservoir N^1 supplies the deficiency.

It will thus be evident that the exhaust steam is thoroughly utilized, and the locomotive rendered comparatively noiseless by the above arrangement.

I claim as my invention—

The combination of the water-reservoir N^1 with the steam-passage below the same, the condenser N, and pipe O, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FELIX GENDEBIEN.

Witnesses:

ARTHUR DU ROY,

G. BIEBUYCK.