

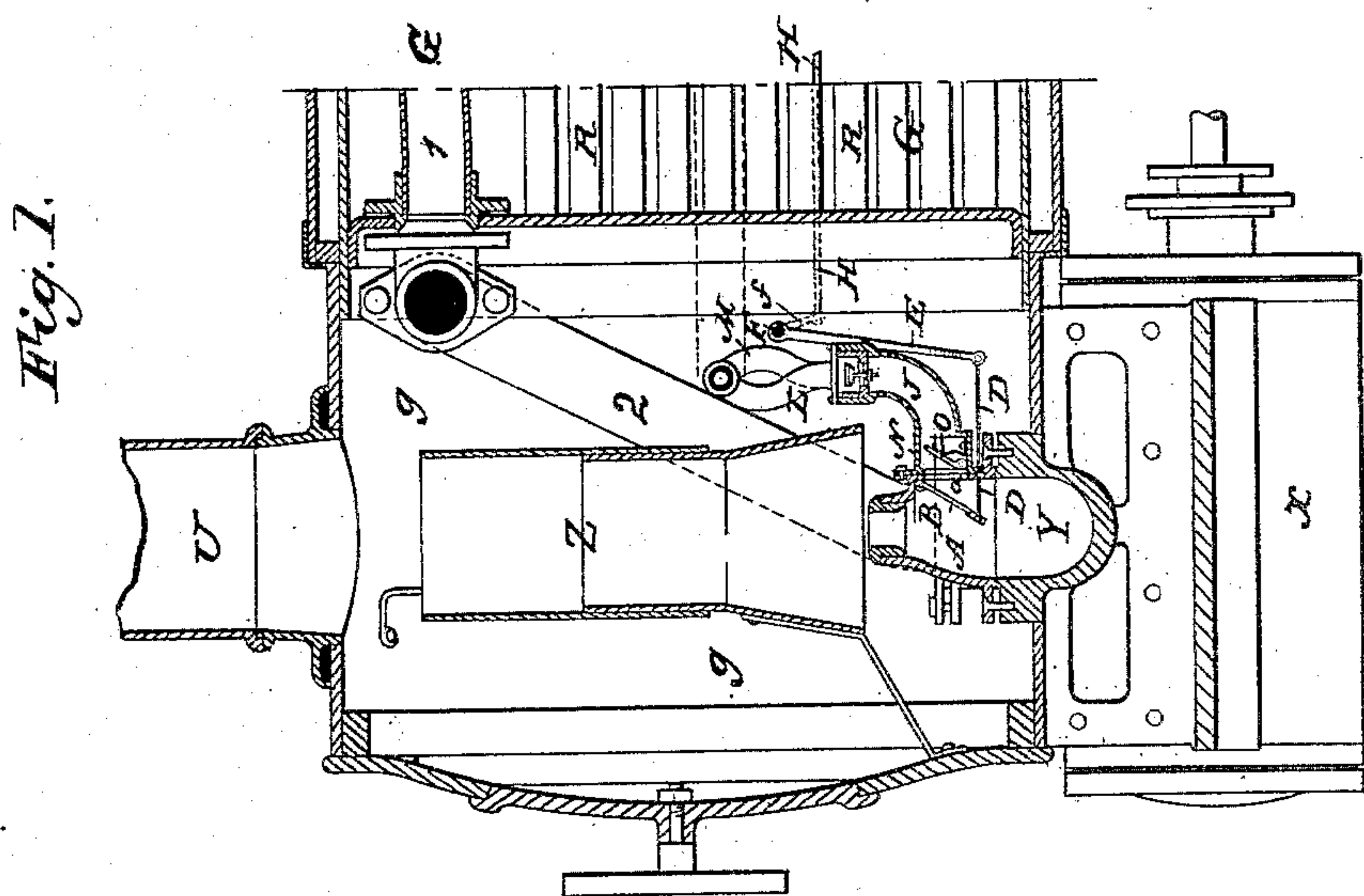
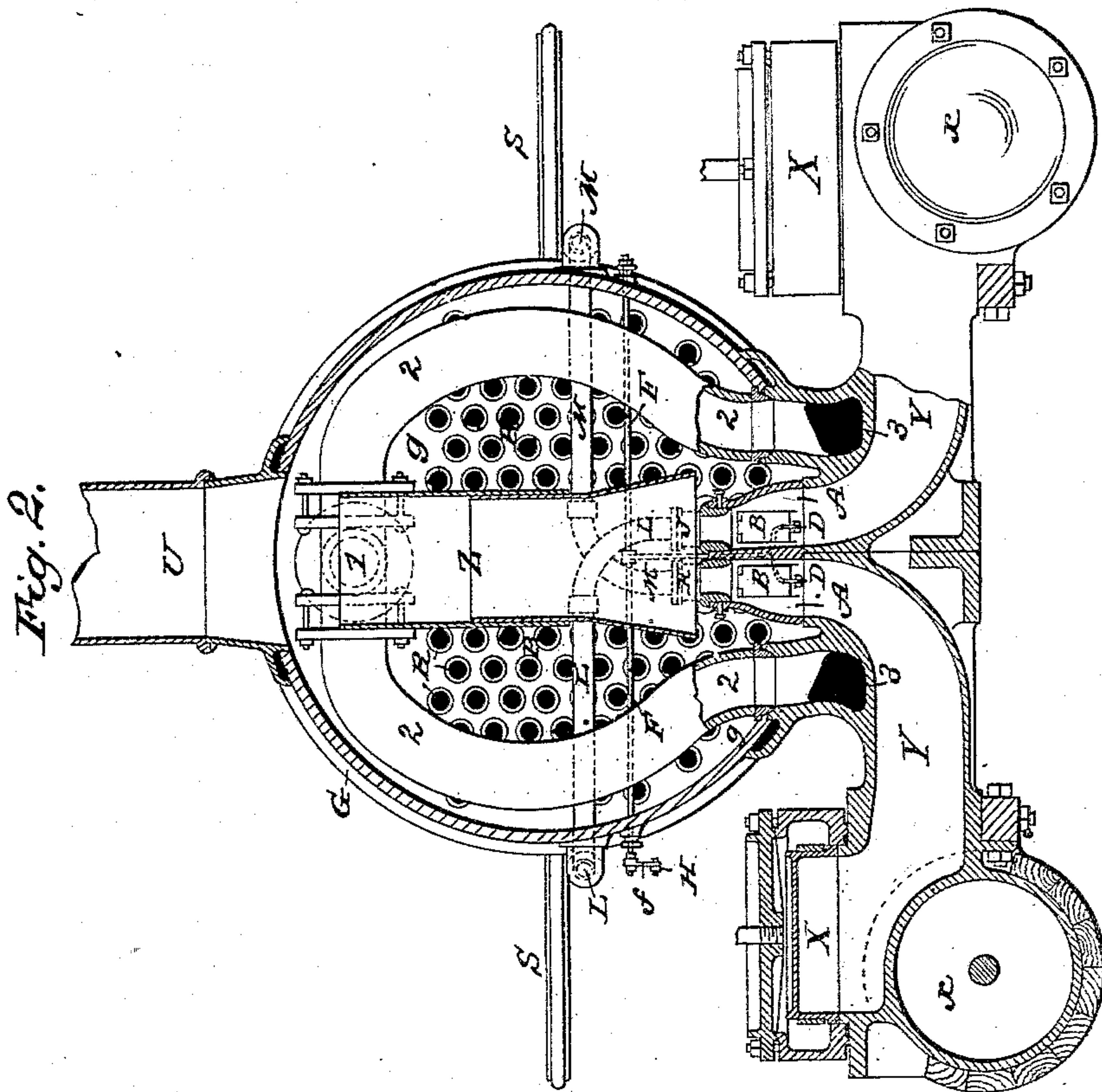
(No Model.)

2 Sheets—Sheet 1.

W. M. SCOTT.  
HEATING RAILWAY CARS.

No. 381,647.

Patented Apr. 24, 1888.



WITNESSES:

*O. W. Beyer*

*C. Seagwick*

INVENTOR:

*W. M. Scott*

BY

*Munn & Co*

ATTORNEYS.

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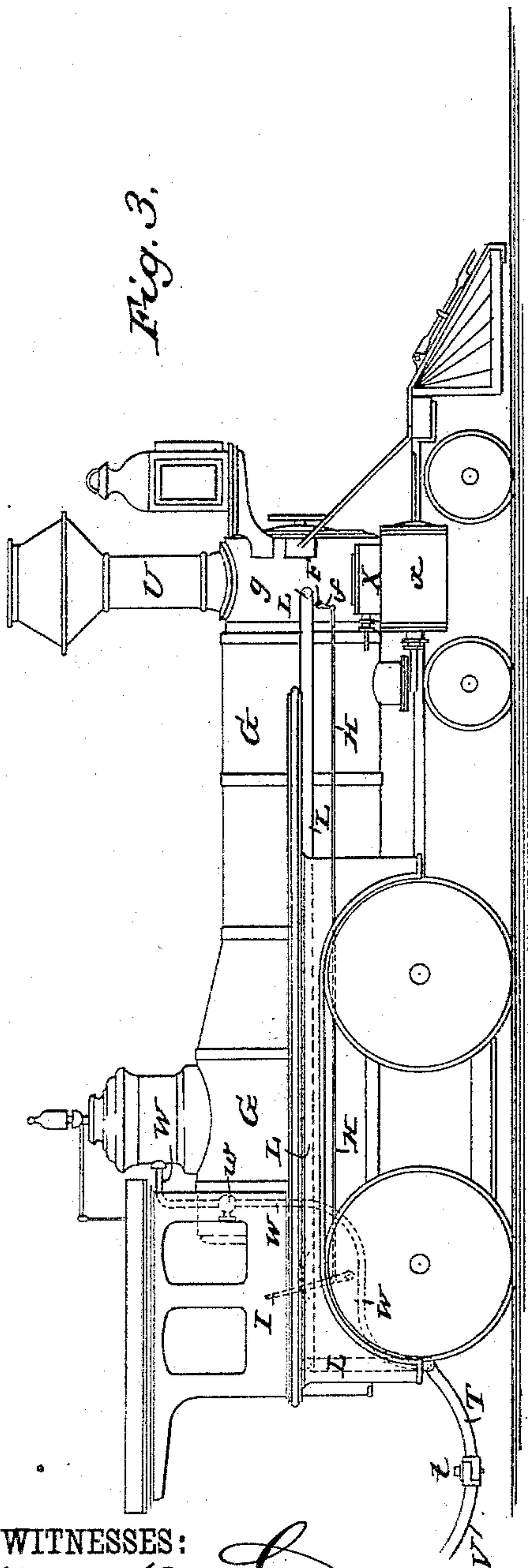


Fig. 3.

Fig. 5.

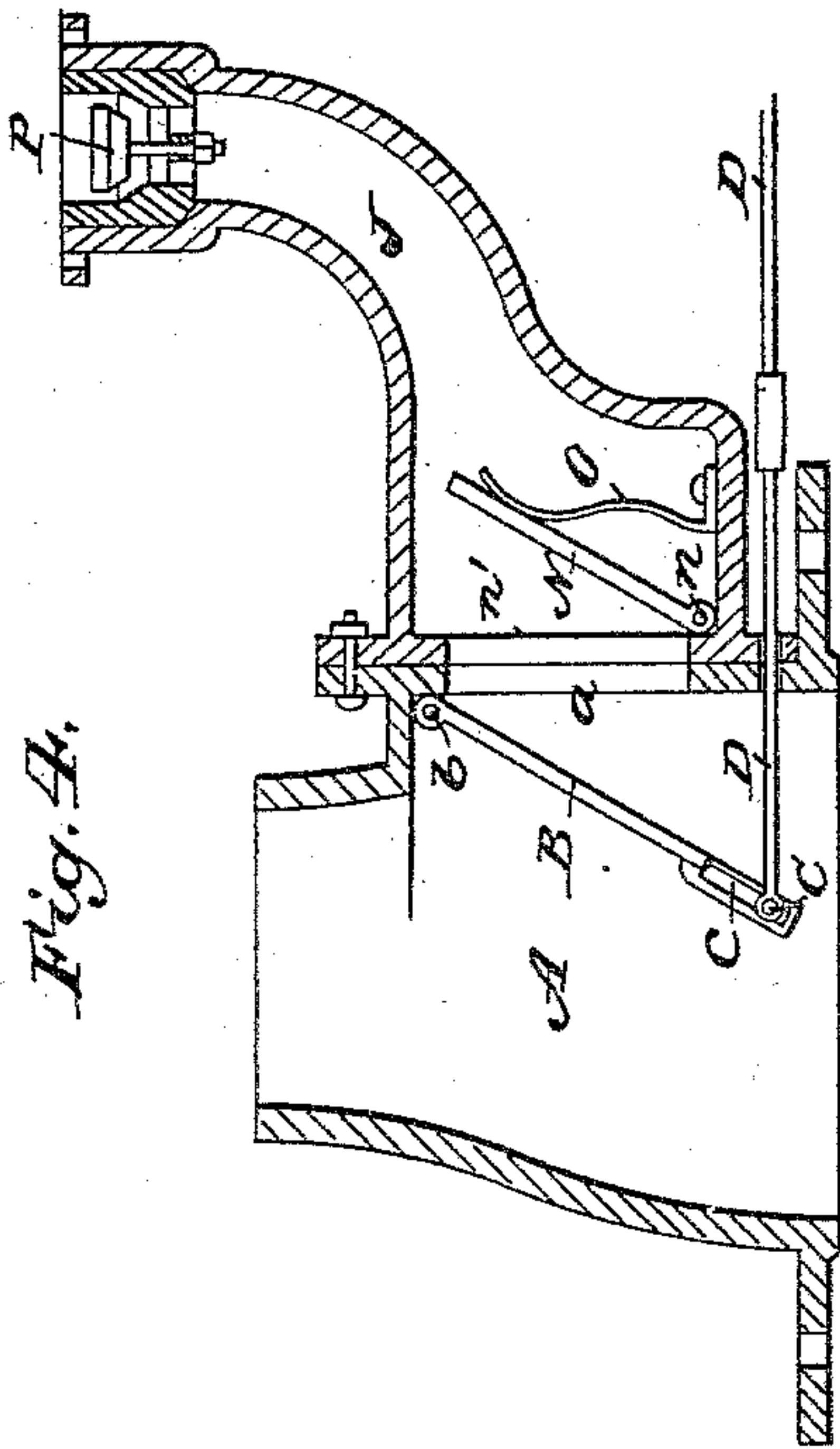
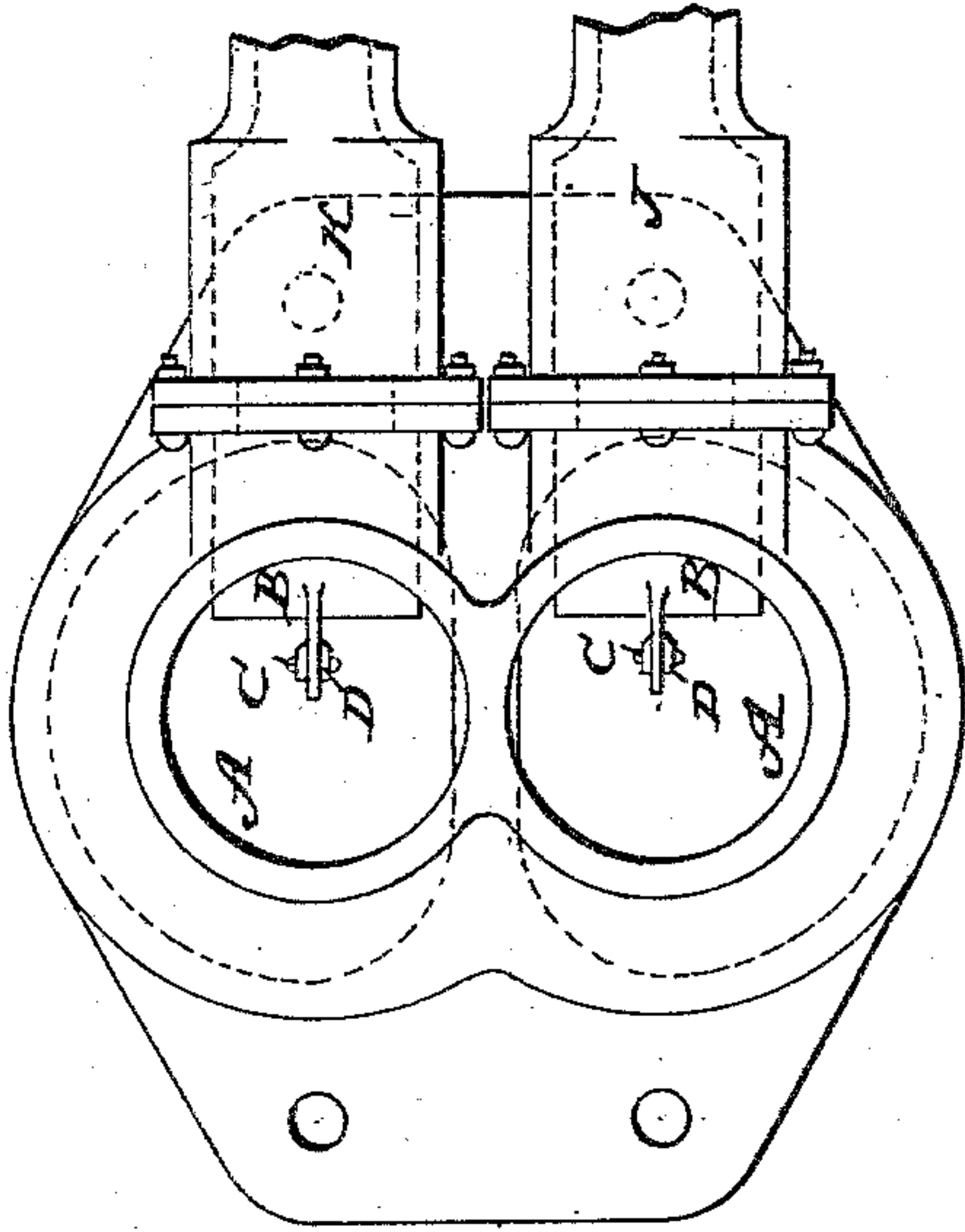


Fig. 4.

WITNESSES:  
*Otto Beyer*  
*C. Sedgwick*

INVENTOR:  
*W. M. Scott*  
BY *Munn & Co*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

WILLIAM M. SCOTT, OF CAMBRIDGE, VERMONT.

## HEATING RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 381,647, dated April 24, 1888.

Application filed April 11, 1887. Serial No. 234,412. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. SCOTT, of Cambridge, in the county of Lamoille and State of Vermont, have invented a new and useful Improvement in Heating Railway-Cars, of which the following is a full, clear, and exact description.

My invention relates to a system of heating railway-cars mainly by exhaust-steam from the cylinders of the locomotive-engine, and has for its object to provide a simple, inexpensive system and apparatus for comfortably heating the cars, and without danger of firing the cars in case of accident, and allowing easy and safe control of the apparatus by the engineer in the engine-cab.

The invention will first be described, and then particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a central longitudinal sectional elevation of the forward part of a locomotive-engine boiler with my improvements applied. Fig. 2 is a front view thereof in vertical sectional elevation. Fig. 3 is a side view of a locomotive engine drawn to a smaller scale and with the improvement applied. Fig. 4 is an enlarged vertical sectional view of the exhaust-steam valves and conduits in the smoke-box of the boiler; and Fig. 5 is a plan view of the exhaust steam outlets from the locomotive-cylinders, and with the exit-pipes leading therefrom to the heater-pipes partly broken away.

In carrying out my invention I make openings *a a* through the walls, preferably the rear walls, of the two nozzles *A A*, which receive the exhaust-steam almost directly from the exhaust-passages of the locomotive-engine cylinders, and over these openings *a a* valves *B B* are fitted, said valves being preferably hinged at *b* at their upper ends within the nozzles *A A* in a manner to close the exhaust-outlets *a*. Each of the valves *B* is provided at its free end with a lug having a slot, *c*, into which passes a bolt or pin, *C*, by which a rod, *D*, is connected to the valve. The rods *D D* of both valves range rearward through the walls of the nozzles *A A*, and are pivoted to the forked end of a lever, *E*, which is fixed at

its other end to a rock-shaft, *F*, which is journaled in suitable bearings on the engine-boiler *G*, and passes transversely through the smoke box or bonnet *g* of the boiler.

To one end of the shaft *F* is fixed a crank-arm, *f*, to which is attached the forward end of a rod, *H*, which passes backward along the boiler *G* into the engine-cab, where it is connected to a lever, *I*, in reach of the engineer, who, by working the lever, may readily open the valves *B* in the nozzles *A* more or less, as may be required to control the quantity of exhaust-steam passing from the nozzles *A* through their openings *a* into chambers or pipes *J K*, with which the steam-heater pipes *L M* are connected.

The forward ends of the steam-chambers *J K* are connected by flanges and bolts to the rear walls of the nozzles *A A*, and are provided with openings *a*, and in each of these chambers *J K* a flap-valve, *N*, is pivoted at one end at *n*, so as to close upon the seat or wall *n'* of the chamber and cut off backflow of exhaust-steam from the chambers into the nozzles. The valves *N* are normally closed by springs *O*, held in the chambers. At the top of each of the chambers *J K* is placed an ordinary check-valve, *P*, which opens outward and prevents backflow of exhaust-steam from the pipes *L M* to the chambers. It will be noticed that the valves *N* are hinged at the ends next the free ends of the opposite inlet-valves *B*; hence exhaust-steam passing the valves *B* will have direct effect to open the valves *N* easily against the tension of their springs *O* to admit the exhaust-steam to the chambers *J K* beyond.

The steam-pipe *L*, connected to the chamber *J*, ranges therefrom across the inner end of the steam-pipe *M*, and after passing laterally through the smoke-box *g* in front of the fire-tubes *R* of the boiler and through the box-wall ranges rearward and preferably beneath the foot-board *S* at the right-hand side of the engine, and is turned downward and inward at the engine cab to connect with a flexible pipe, *T*, through which the steam passes to and through suitable coupled pipes to the cars of a train to be heated. The pipe *M*, connected to the steam-chamber *K*, ranges therefrom across the inner end of the steam-pipe *L*, and after passing laterally through the smoke-box



g in front of the fire-tubes R ranges rearward at the left-hand side of the engine, and preferably beneath the foot-board S at that side, and is turned downward and inward to connect, like the pipe L, with the pipe T, and for a similar purpose. By crossing the pipes L M in the smoke-box a greater length of the pipes is exposed to the heat of the products of combustion escaping through the fire-tubes R on their way to the smoke-stack U of the engine, and whereby a maximum superheating effect on the exhaust-steam in the pipes L M is assured as the steam passes through the pipes from the chambers J K on its way to the cars. The pipes L M will preferably be jacketed where exposed to the outer air, to prevent condensation of the steam in them and consequent loss of heat. Suitable couplings, *t*, will be provided by which to connect the pipe T with a flexible pipe, V, on the tender or on a passenger-car behind the engine, and heating-pipes with radiators or other appliances will be suitably arranged in the cars for heating them.

A pipe, W, provided with a valve, *w*, is connected at one end with the steam dome or space of the boiler G, and at its other end is connected to the common outlet-pipe T for both the pipes L M, thus allowing live steam to pass from the boiler directly to the pipe T, to maintain heat in the cars when the engine is not working or exhausting steam from its cylinders into the pipes L M, as above described.

The operation of the apparatus is as follows: When the engine-cylinders *xx* are taking steam from the boiler through the ordinary pipes, 1 and 2 2, and induction-ports 3 3, the exhaust from the cylinder steam chests X X will escape into the passages Y Y, and thence to and through the communicating nozzles A A into the petticoat-pipe Z, and out through the smoke-stack U, to increase the draft of the boiler in the usual manner. It is obvious that when the valves B are opened a portion of the exhaust steam hot from the cylinders will be forced past the valves N by the pressure of the exhaust into the chambers J K, and thence to and through the pipes L M T V to the cars to be heated. When the engine-cylinders are not taking steam, and consequently are not exhausting steam into the heater-pipes L M, the engineer, by opening the valve *w* of pipe W, may maintain a supply of live steam direct from the boiler G to the pipes T V, and thence to the heating-pipes in the cars to assure comfortable warming of the cars; but this draft upon the live steam direct from the boiler will not often be necessary.

This system of heating cars involves very little expense, both as regards the cost of fitting the apparatus to the engine and in the operation of the apparatus, and more particularly in the latter feature, as the exhaust-steam mainly used for heating has already done its usual work in propelling the engine. Furthermore, the volume of exhaust-steam trapped or abstracted from the nozzle A is not sufficient to interfere seriously, if at all, with the

draft-promoting function of the exhaust escaping from the nozzles into the petticoat-pipe and smoke-stack of the engine.

In case of disaster on the rail it is obvious that a wreck of the engine will cut off supply of exhaust-steam to the pipes L M, and thence to the cars; and as the live-steam pipe W is rarely open, or if it be open it may be almost instantaneously closed at the valve *w*, hence there would be little or no escape of steam into the cars to scald the passengers, and as stoves or other heaters having fires are entirely dispensed with the wrecked cars cannot be burned, thereby promoting the saving of life and property.

I do not confine myself to the use of both valves N P to prevent backflow of exhaust-steam from the heater-pipes, as either may be used alone for this purpose; but the use of the two valves, as above described, assures the smoother working of the apparatus, and they are therefore preferred in practice.

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

1. The combination, with locomotive smoke-box, the exhaust-nozzle within the smoke-box, and provided at one side with an opening, *a*, and the valve B, opening inward therefrom, of the chamber J, also within the smoke-box, and having an opening, *n'*, registering with the opening *a*, the valve N within the chamber closing said opening, and having a spring for throwing it toward the valve B, substantially as set forth.

2. In a railway-car heating apparatus, the combination, with the locomotive smoke-box, the exhaust-nozzle within the same and provided with side opening, *a*, and inward-opening valve B, of the chamber J, also within the smoke-box, and having an opening, *n'*, registering with nozzle-opening *a*, the valve N, hinged at its lower end within the chamber to close the opening *n'*, the spring O, the check-valve P at the outer end of the said chamber, and the pipe leading from said outer end and adapted to connect with the cars, substantially as set forth.

3. A car-heating apparatus comprising the two exhaust-flues A A within the smoke-box of a locomotive, and provided with openings *a* in their opposite sides, and inward-opening valves B for said openings, the chambers J between the ends of the boiler-flues and the said nozzles and communicating with said nozzles, the check-valves within said chambers, and the pipes connected at their inner ends with the outlet ends of said chambers, crossed in front of the boiler-flues, and leading rearward from opposite sides of the smoke-box for connection with the cars, substantially as set forth.

WILLIAM M. SCOTT.

Witnesses:

MARION L. GRISWOLD,  
WILLARD H. GRISWOLD.