J. C. FARMER.

Exhaust-Pipe for Locomotives.

No. 167,883. Patented Sept. 21. 1875.

Fig. 1.

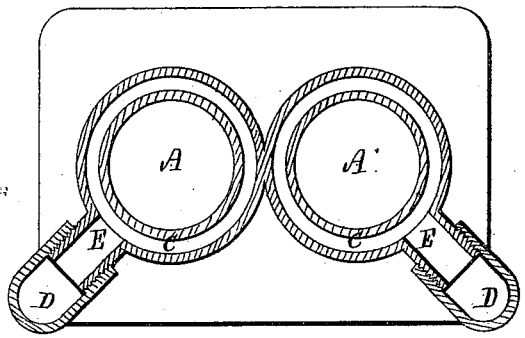


Fig. 2.

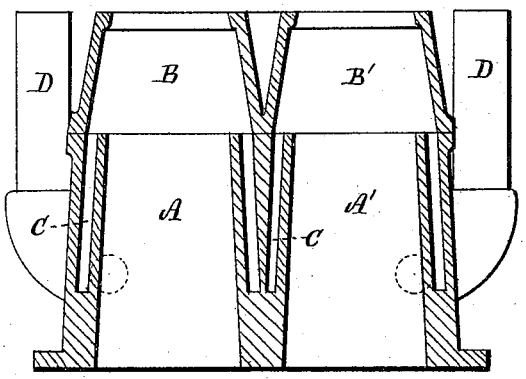
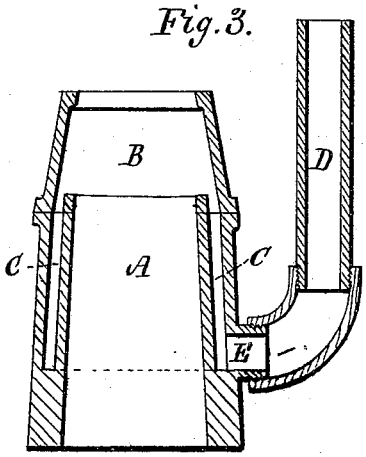


Fig. 3.



Witnesses.

Jm. F. Barrett

W. F. Watson

Inventor.

James C. Farmer

UNITED STATES PATENT OFFICE.

JAMES C. FARMER, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN W. WHITE, OF DEDHAM, MASSACHUSETTS.

IMPROVEMENT IN EXHAUST-PIPES FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **167,883**, dated September 21, 1875; application filed May 14, 1875.

To all whom it may concern:

Be it known that I, JAMES C. FARMER, of the city of Providence, in the State of Rhode Island, have invented an Improvement in Exhaust-Pipes for Locomotives and other similar steam-engines, of which the following is a specification:

The object of my invention is to obviate or greatly diminish the back pressure (so called) upon the piston that results from the obstruction to the escape of the exhaust steam occasioned by the contraction of the nozzle or tip of the exhaust-pipe. This I accomplish by constructing the exhaust-pipe with a relief chamber or chambers, into which the exhaust steam that fails to find a ready exit vertically through the nozzle may be deflected, and thence escape through openings in the chamber connected with suitable escape-pipes.

The ordinary exhaust-pipe is cast in two parts, the main pipe constituti g one, and the detachable nozzle or tip the other part. The main pipe I construct with a double wall, and with an annular space or chamber between the two walls open at the top and closed at the bottom. I make one or more openings in the outer wall, at or near the bottom of the chamber, connecting with escape-pipes that extend alongside the exhaust-pipe, within the smoke-stack, to a height equal to the top of the nozzle when in place. The width of the space between the two walls of the pipe I make about one-half inch, and the diameter of the escape-pipes, of which I prefer two to each chamber, I make about one inch. The nozzle, when in place, is attached to the outer wall of the main pipe.

Figure 1 is a horizontal section (showing two pipes united in the usual way on a locomotive, one for each cylinder) through the point where the escape-pipes connect with the chambers. A A′ are the main exhaust-pipes. C C′ are the annular spaces or chambers between the two walls. E E′ are the openings from the chambers into the escape-pipes, and D D′ are the escape-pipes. Fig. 2 is a vertical section of the same, in which A A′ are the main-pipes, B B′ are the detachable nozzles or tips in place, C C′ are the annular spaces or chambers between the two walls of the main pipes, and D D′ are the escape-pipes. Fig. 3 is also a vertical section of a single exhaust-pipe, in which the same letters denote the same parts as in the other figures, and is intended to illustrate certain variations in construction hereinafter referred to.

The open space or chamber between the walls of the exhaust-pipe may be enlarged by extending it downward to within such distance of the bottom of the pipe as will leave the casting of sufficient strength, or by extending upward the inner wall, as shown in Fig. 3. But I consider the arrangement most efficient when the two walls are of about the same height, as in Fig. 2. I consider a continuous chamber, annular in form, preferable, but not essential. The escape-pipes may be carried up higher than the top of the nozzle, as shown in Fig. 3, or may be made to connect with the water-tank on the tender, and the steam they discharge utilized, but at present I regard these variations as inferior arrangements.

In the application and use of my improvement, as the back pressure begins to operate at or about the point where the nozzle begins to contract, it causes a portion of the steam to overflow the inner wall of the main pipe into the annular-chamber, whence it finds an outlet by means of the escape-pipes described, and I find that neither the upward movement of the exhaust steam through the main pipe and nozzle, nor the blast, is unfavorably affected by the escape-pipes D D′, while, on the other hand, the back pressure on the piston is very greatly relieved by the secondary means of escape my improvement affords to the exhaust steam, and the power of the engine is increased.

I claim as my invention—

An exhaust-pipe for locomotive and other similar engines, constructed with a double wall and intervening relief-chamber, as described, into which relief-chamber a portion of the exhaust steam overflowing the inner wall may be deflected by the back pressure, and thence find an outlet by means of suitable escape-pipes at or near the bottom of the chamber, substantially as and for the purpose hereinbefore set forth.

JAMES C. FARMER.

Witnesses:

JON. F. BARRETT,

W. F. WATSON.