2 Sheets--Sheet 1.

C. D. SMITH.

Exhaust-Mechanism.

No. 167,131. Patented Aug. 24, 1875.

Fig. 3.

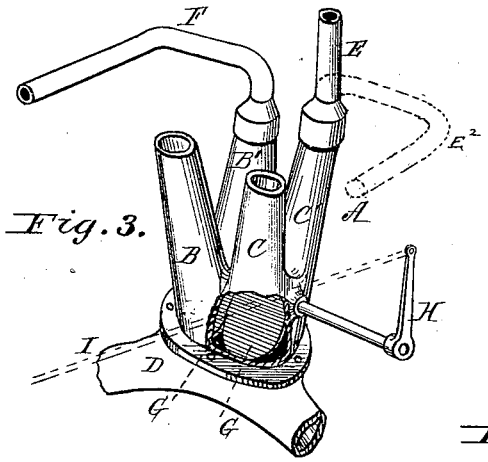
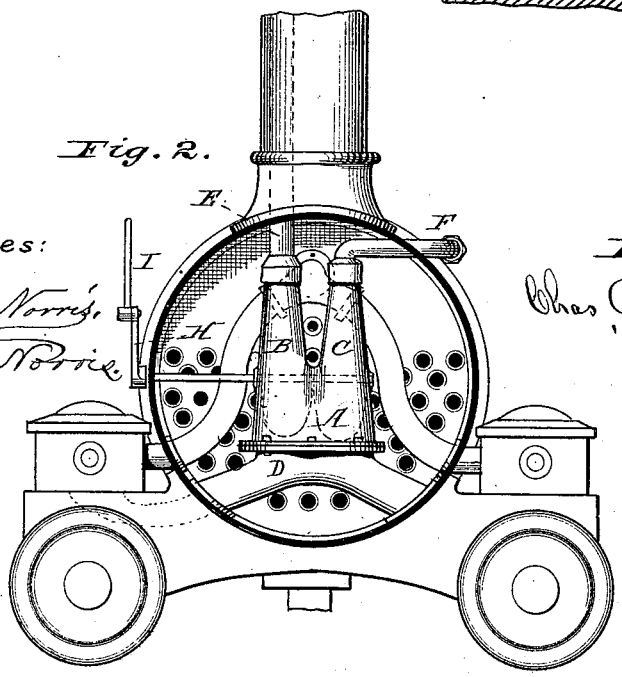


Fig. 1.

Fig. 2.



Witnesses:

James L. Norris.

Albert H. Norris.

Inventor.

Chas. D. Smith

C. D. SMITH.

Exhaust-Mechanism.

No. 167,131. Patented Aug. 24, 1875.

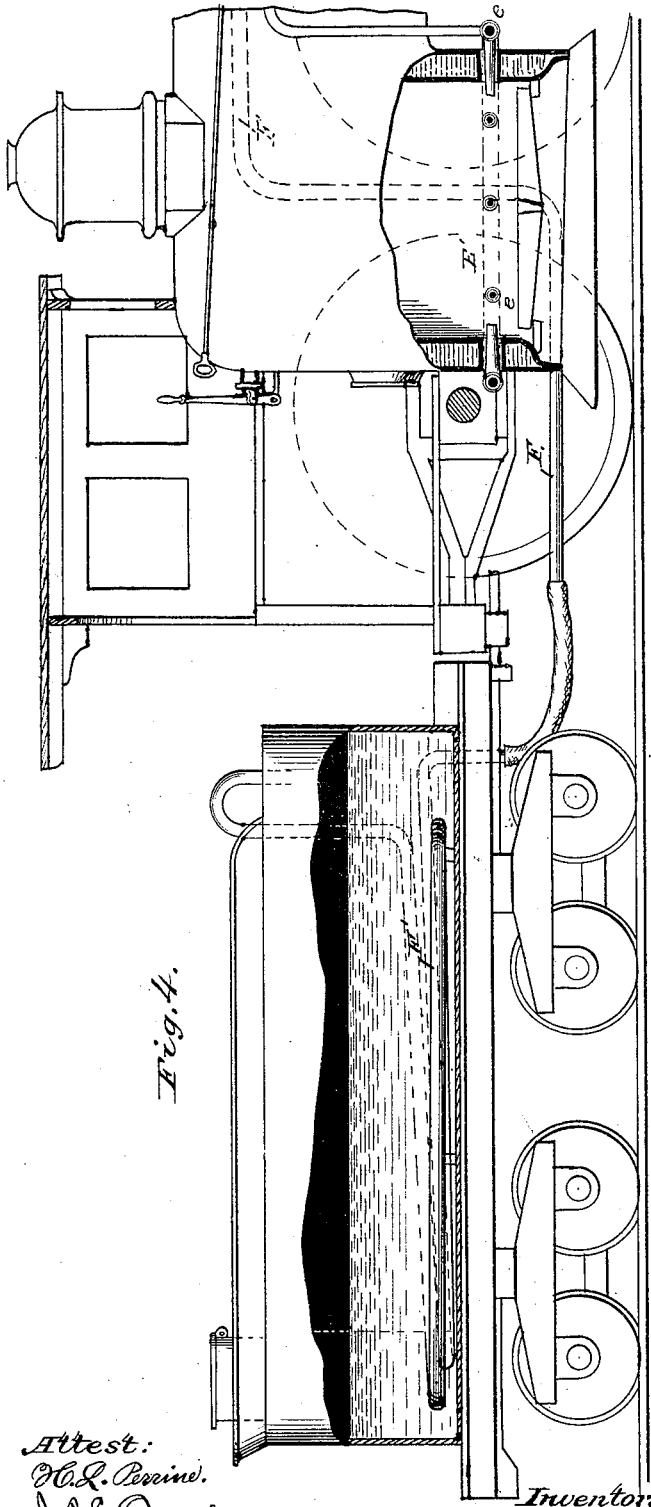


Fig. 4.

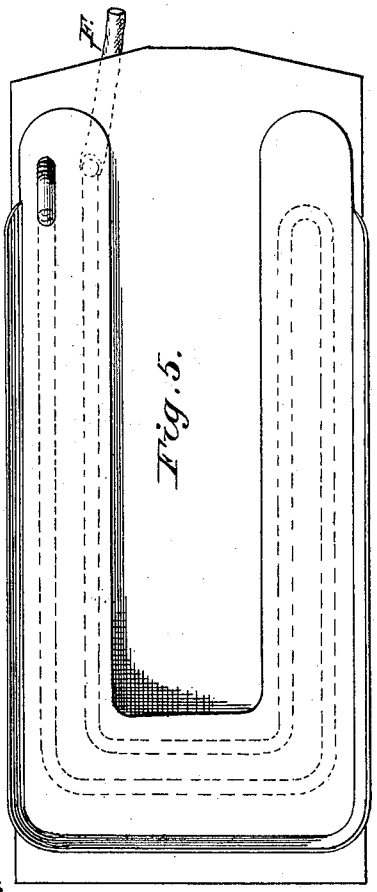


Fig. 5.

Attest:
H. L. Perrine.
W. L. Coombs

Inventor:
Chas. D. Smith
By James L. Norris
Atty

UNITED STATES PATENT OFFICE.

CHARLES D. SMITH, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN EXHAUST MECHANISMS.

Specification forming part of Letters Patent No. **167,131**, dated August 24, 1875; application filed July 8, 1875.

To all whom it may concern:

Be it known that I, CHARLES D. SMITH, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Utilizing the Exhaust of Locomotive and other Engines, of which the following is a specification:

This invention relates to certain improvements in steam-engines, its object being to control and regulate the escape of the waste or exhaust steam from the cylinders in such manner that it may be employed at will to create a draft through the furnace, to direct a blast through the same, to heat the feed-water, or be discharged into the open air, for the purpose of economizing the fuel employed in generating the steam in the furnace.

My invention is designed, principally, for locomotive-engines; and it consists in a series of two bifurcated pipes located in the smoke-box of the engine, the branching members of which extend from a common pipe attached to and forming a continuation of the exhaust-pipe of the engine, and provided with valves for directing the steam through the branches which open into the smoke-stack, or connect with pipes leading into the open air, to the feed-water tank, or for the purposes hereinafter more fully set forth and shown.

In the drawings, Figure 1 represents a part section of a locomotive-engine with my improvements applied; Fig. 2, a transverse section through the fire-box of an engine; Fig. 3, a detached perspective view of the bifurcated pipes; Fig. 4, a view, partly in section and partly in elevation, of a portion of a locomotive and tender, showing my invention; and Fig. 5, a top view of the tender of an engine, showing the coil for heating the feed-water.

The letters B C and B′ C′ represent the members of the two bifurcated pipes, which are arranged side by side and proceed from a common pipe, A, which is attached to and forms a continuation of the exhaust-pipe D, leading from the exhaust-ports of the cylinders.

In Fig. 1 the branch C is represented as opening into the smoke-stack of the engine, and the branch B as connected with the pipe E, leading into the open air.

G represents a damper by which the steam may be directed through either branch, for the purpose of creating a draft through the furnace by a blast of steam in the smoke-stack, or for stopping the same when desired by allowing it to escape into the open air, the valve being controlled by the engineer through the medium of the rod I. The branches B′ and C may be similarly arranged, if desired.

Fig. 2 represents a modification of my invention, in which the pipe C is connected with a pipe, F, leading backward, and connected by a flexible pipe with a coil, F′, which extends several times around the feed-water tank in the tender A′, and terminates in the same, for the purpose of conveying the steam at will to the tank in order to heat the feed-water.

Another modification of my invention is illustrated in Figs. 3 and 4, in which one of the pipes C, instead of terminating in the smoke-stack, is connected with a pipe, E^2, Fig. 3, extending backward to a pipe, E^1, surrounding the furnace, and communicating with the same at various points below the fire-grate by means of a series of nozzles, *e*, for the purpose of directing the steam into the fire-box to force a blast through the furnace when desired.

It is evident that the branches B C and B′ C′ may be differently arranged in relation to smoke-stack and pipes E, E^2, and F. For instance, instead of connecting the pipe with the pipe E, as shown in Fig. 2, it may terminate directly in the smoke-stack, so that the steam may be utilized either to create a blast or to heat the feed-water, instead of being wasted in one operation; or the pipe B′ may be so connected, and the pipe B connected with E, as shown, and the pipe C′ with the blast connecting with the pipe E^2, in order to allow the steam to be applied to either or all of the purposes enumerated.

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

In combination with the exhaust-pipe of a steam-engine, a bifurcated pipe, the branches of which extend from a common pipe connected

with said exhaust-pipe, the upper end of one branch opening into the smoke-stack, and the other into the open atmosphere, or communicating with a pipe extending to the feed-water tank, or to the blast device, the device being provided with a valve at the junction of its two branches, by means of which the steam may be directed through either at will, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

CHAS. D. SMITH.

Witnesses:
JAMES L. NORRIS,
ALBERT H. NORRIS.