E. LONGSTRETH.

EXHAUST APPARATUS FOR LOCOMOTIVES.

No. 186,587. Patented Jan. 23, 1877.

Fig. 1.

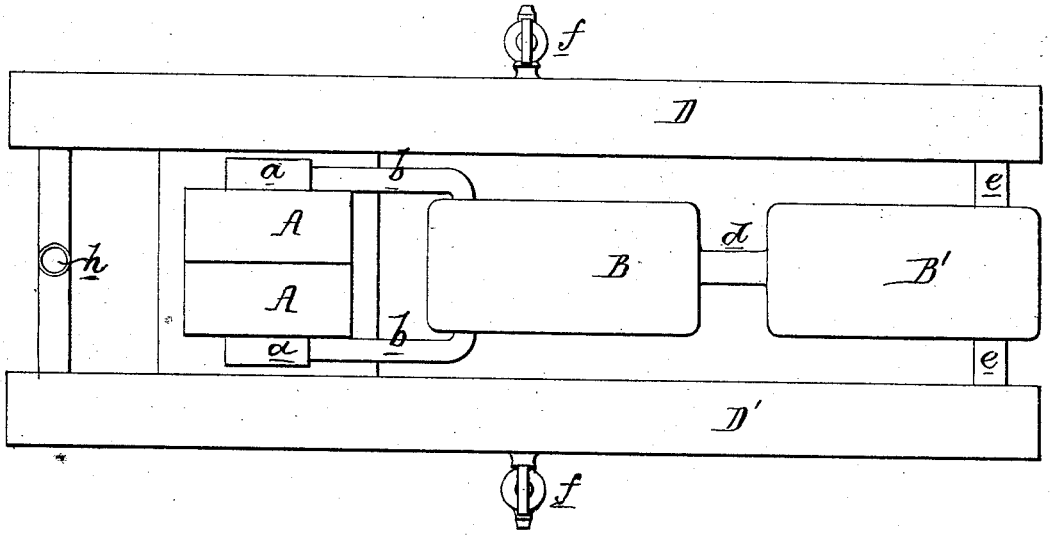
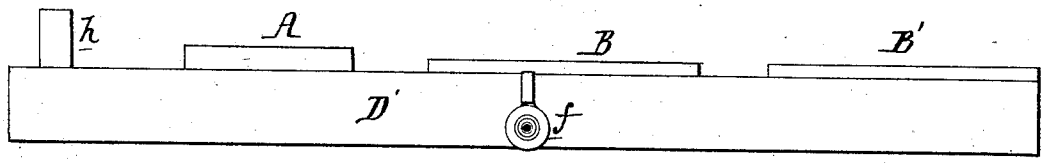


Fig. 2.



Witnessies
Harry Hawson Jr
Harry Smith

Edward Longstreth.
by his Attorneys
Howson and Son.

UNITED STATES PATENT OFFICE.

EDWARD LONGSTRETH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, GEORGE BURNHAM, CHARLES T. PARRY, EDWARD H. WILLIAMS, WILLIAM P. HENSZEY, AND JOHN H. CONVERSE, OF SAME PLACE.

IMPROVEMENT IN EXHAUST APPARATUS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **186,587**, dated January 23, 1877; application filed January 6, 1876.

To all whom it may concern:

Be it known that I, EDWARD LONGSTRETH, of Philadelphia, Pennsylvania, have invented certain Improvements in Exhaust Apparatus for Locomotives, of which the following is a specification:

The object of my invention is to so dispose of the exhaust steam of locomotive-engines, and especially of the engines used in and near towns and cities, that its discharge shall not be accompanied with the disagreeable noise which tends to frighten horses, and has hitherto prevented the use of locomotives on street-railways.

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 is a plan view, and Fig. 2 a side view, illustrating the apparatus with which I carry my invention into effect.

A A represent the two cylinders of the engine, and *b b* the two exhaust-pipes, each of which communicates with a vessel, B, the latter communicating, through a contracted neck, *d*, with a like vessel, B′, and the latter, through two branches, *e e*, with pipes D D′, each of which is furnished with a cock, *f*, the latter being under the control of the engineer, these two pipes communicating with the discharge-tube *h*. It should be understood that each of these vessels B and B′ is closed, excepting at the inlets and outlets.

The sharp intermittent noises which accompany the movements of locomotive-engines, and which are generally attributed to the escape of puffs of exhaust steam from the top of the chimney, are created at the point where the steam is first forcibly expelled through the exhaust-ports of the cylinder, the chimney being simply a conductor of the sound.

I have ascertained that this noise may be prevented by permitting the exhaust steam to suddenly expand at a point as near as possible to that where the sound originates, and after expansion to pass through a contracted outlet.

Thus the exhaust steam discharged through the pipes *b* is suddenly expanded on reaching the vessel B, whence it escapes through the contracted neck *d* into a similar vessel, B′, the escape of the steam from which would be accompanied with comparatively little noise. I prefer, however, to still further continue this treatment of the exhaust steam by causing it to pass from the vessel B′ through contracted branches *e e* into pipes D D′ of large diameter, wherein part of the steam is condensed, the remainder passing noiselessly through the pipe *h*, and thence through the chimney.

The water of condensation may be discharged from the pipes D D′, from time to time, by opening the cocks *f*.

One vessel, B, only may be used, providing it be of sufficient capacity, but the construction of the locomotive may demand two or even more of these vessels.

It is essential to my invention that the outlet of each vessel should be restricted to a size not larger than sufficient to permit the free escape of the exhaust steam, for it is the sudden expansion of this steam and its momentary confinement in the vessel which tends to absorb the noise, creating shocks.

Practical tests have determined the efficacy of the above-described appliances.

It will be understood that the arrangement of vessels B B′ and pipes D D′ will depend upon the construction of the engine, and, therefore, that I do not desire to confine myself either to any specified number of vessels B or to the precise construction and arrangement of the parts shown.

Although I have alluded to the disposal of exhaust steam, it will be evident that my invention is applicable to the disposal of the compressed air or gases, which may be used in place of steam in locomotive-engines.

I claim as my invention—

The combination, in a locomotive-engine, of the two exhaust-pipes and a vessel or vessels, B, each having a contracted outlet, with the pipes D and D′, and connecting-branches, substantially as and for the purpose set forth.

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

EDWARD LONGSTRETH.

Witnesses:

HARRY HOWSON, Jr.,

HARRY SMITH.