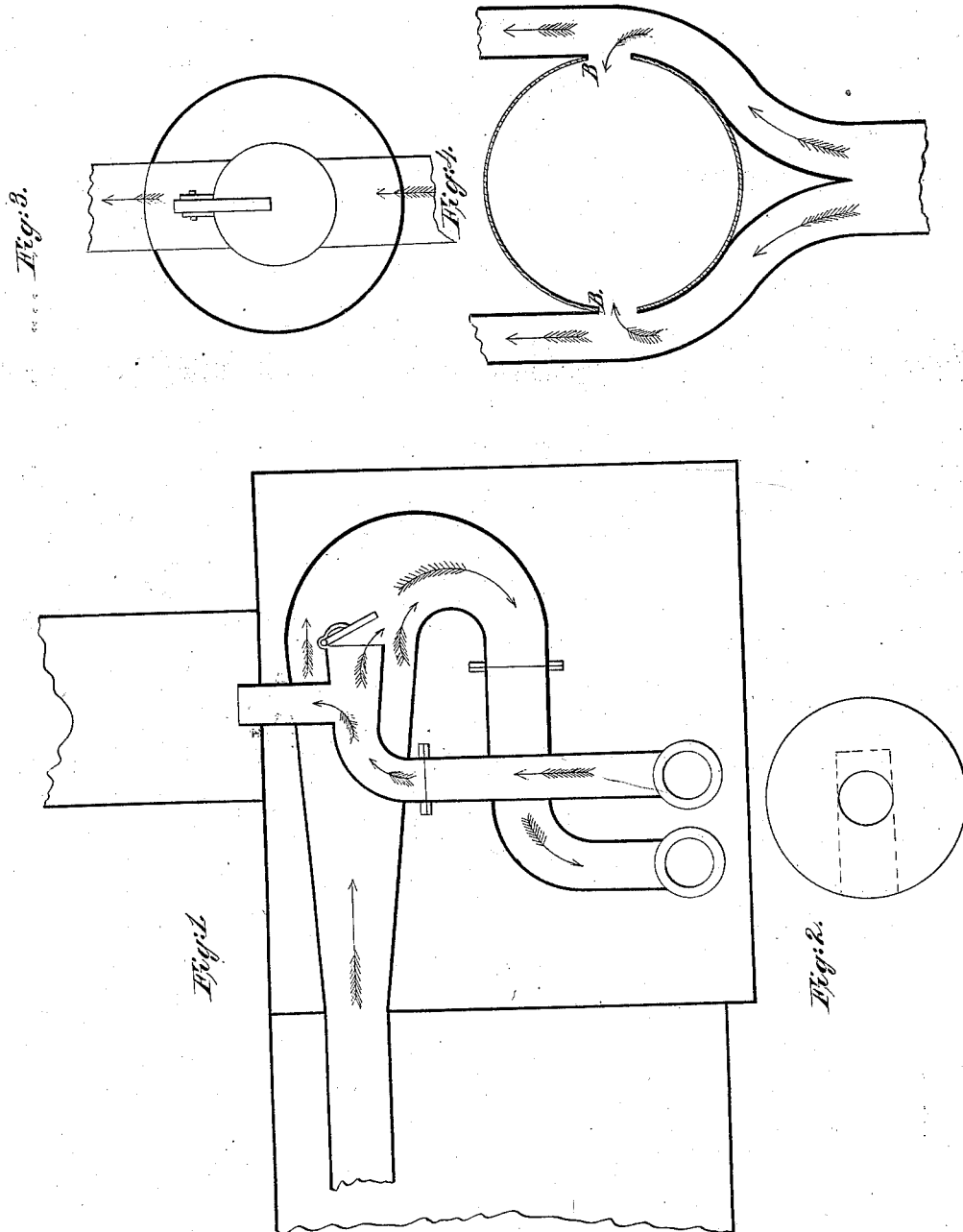


*G. H. Hoagland,*

*Exhaust Pipe for Locomotives.*

*N<sup>o</sup> 7,190.*

*Patented Mar. 19, 1860.*



# UNITED STATES PATENT OFFICE.

GEORGE H. HOAGLAND, OF PIERMONT, NEW YORK.

## METHOD OF EMPLOYING EXHAUST-STEAM.

Specification of Letters Patent No. 7,190, dated March 19, 1850.

*To all whom it may concern:*

Be it known that I, GEORGE H. HOAGLAND, of Piermont, Rockland county, New York, have invented a new and useful Improvement in the Steam and Exhaust Pipes of Steam-Engines; and I hereby declare that the following is a full and exact description of the same.

To enable others to make and use my improvement I proceed to describe its construction and operation, reference being had to the annexed drawings which make part of this specification.

Figure 1, section of boiler showing a longitudinal section of the pipes; Fig. 2 view from the smoke flue upon the steam pipe and escape; Fig. 3 enlarged section across the steam pipe; Fig. 4 another cross section with the exhaust pipes outside.

My invention consists of arrangements by which a portion of the exhaust steam is drawn into and mingled with the steam from the boiler oftentimes a third part of it.

In the smoke box of a locomotive engine boiler the steam pipe and the exhaust pipe are brought together to effect the purpose of this invention. The preferable mode is to unite the two exhaust pipes from the cylinders just under the steam pipe and conduct them united into and through it, to allow of the exhaust steam escaping into the flue. The steam pipe is enlarged at this place to double its size so that there will be the same space as before for the passage of the steam to the cylinders.

When the exhaust steam pipe has entered the main steam pipe it extends along a few inches horizontally in the direction of the course of the steam and ends in that direction with a perpendicular valve. Starting from the top of this horizontal part the exhaust pipe at right angles, it extends out of the steam pipe into the smoke flue, see Fig. 1.

Another arrangement to produce the same effect is to pass the exhaust pipe out side of the main steam pipe, on one or both sides,

with a valve or valves opening into the main pipe. The shape of the main pipe might remain the same in this case, and the exhaust pipes would unite beneath the steam pipe and unite again above it, so that with the stroke of either piston both valves might operate, see Fig. 4. The effect of this arrangement is that when the engine has started and is working rapidly and when consequently the course of the steam from the boiler is almost continuous and so of the exhaust steam, the greater power of the hot steam and its more rapid passage, opens the valve and absorbs into its volume part of the exhaust steam. In the application of this principle I use a variety of valves. I use the simple and plain valve hung perpendicularly, or hung at such an angle under that it would naturally remain open.

I use different shapes convex and concave and tunnel shaped. I use the valves also to cover the surface only of the end of the pipe or extending over so as to be opened by the passage of the steam past it. But I prefer the simple valve, hung perpendicularly as delineated in the drawing and made to open by the want of equilibrium between the hot steam and the exhaust.

The advantages of this invention are not confined to the saving of fuel and steam. It decreases the pressure of the exhaust so that the sparks are not thrown out so violently and it regulates the draft.

What I claim as my invention and desire to secure by Letters Patent is—

The running the exhaust pipe into the main steam pipe, curving it, and providing it with an aperture and valve, substantially as herein described, by which the current of steam from the boiler has a tendency to open the valve at intervals and draw into the steam pipe a portion of the exhaust steam.

GEO. H. HOAGLAND.

Witnesses:

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A. HOAGLAND.