W. H. THOMAS.

MEANS FOR UTILIZING EXHAUST STEAM.

No. 190,387. Patented May 1, 1877.

Fig. 1.

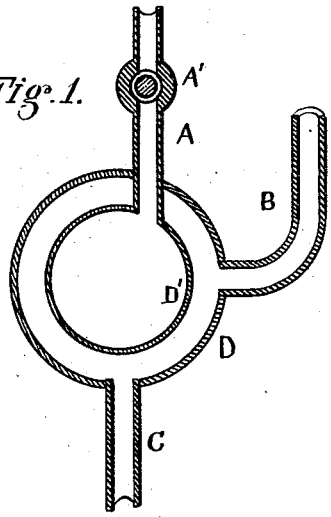


Fig. 2.

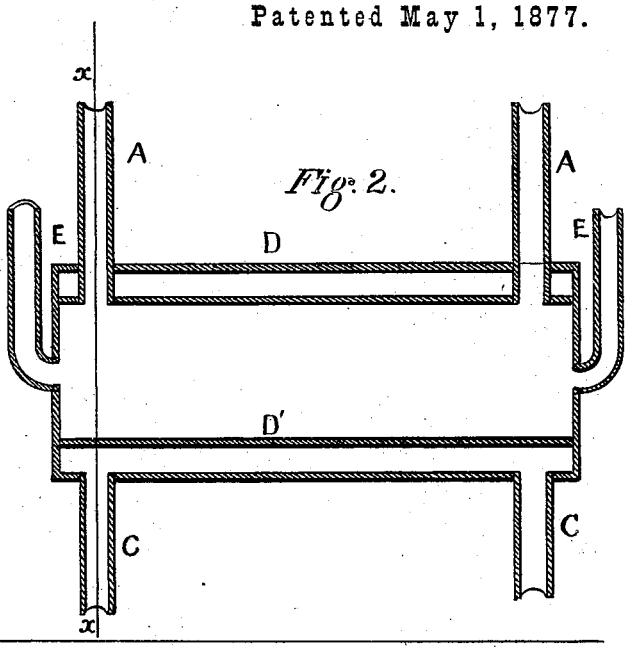
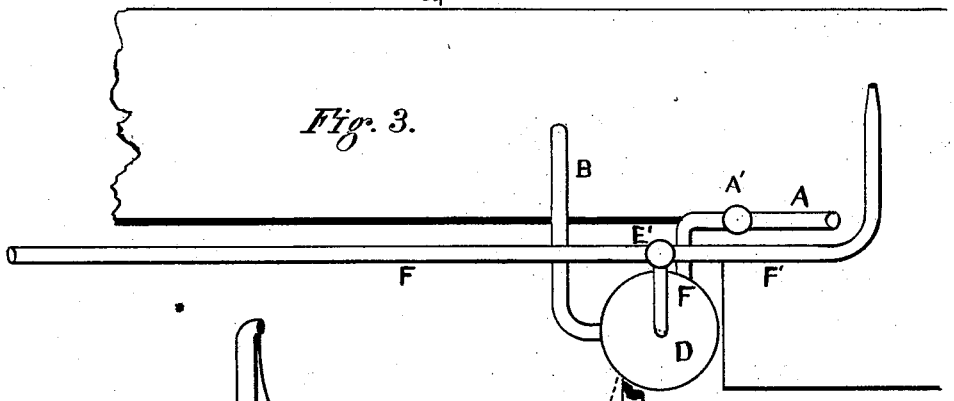


Fig. 3.



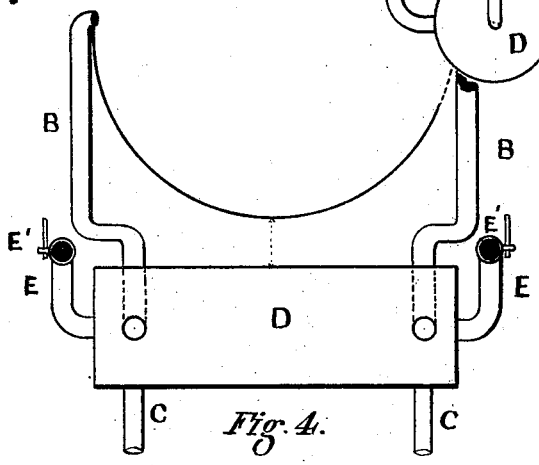


Fig. 4.

Witnesses

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IMPROVEMENT IN MEANS FOR UTILIZING EXHAUST STEAM.

Specification forming part of Letters Patent No. **190,387**, dated May 1, 1877; application filed February 17, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. THOMAS, of Wilmington, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Variable Exhausts for Locomotives; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification—

Figure 1 being a transverse section on line *x x* of Fig. 2, showing one of the steam-exhaust pipes, the feed-water heater connected therewith, and pipes for the introduction of water thereto, and its escape therefrom. Fig. 2 is a horizontal section, showing the parts above enumerated. Fig. 3 is a side view of a portion of a steam-generator, and an end view of a heater, and showing pipes for conducting the steam and water to and from the heater; and Fig. 4 is a transverse vertical section, showing a portion of the steam-generator, the feed-water heater, the pipes containing the variable exhaust-valves, and the pipes for conducting water to and from the heater.

Corresponding letters denote like parts in the several figures.

This invention relates to devices for utilizing the exhaust steam from a locomotive-engine for the purpose of heating the feed-water thereof, and for promoting the combustion of the fuel in the furnace; and it consists in the combination and arrangement of the parts of which it is composed, as will be more fully explained hereinafter.

In constructing my improved apparatus, and in applying it to locomotives, I attach to the exhaust passage or pipes, at any suitable point between the valve-seats and the end of said pipes, branch pipes A A, in such a manner that a suitable portion of the steam passing through them will be diverted from its direct course and made to pass through said branch pipes, in which are placed cocks or valves A′ A′, so arranged that they can be operated separately, so as to allow all of the steam from one of the cylinders of the engine to pass into the heater, and all of the steam from the other to pass into the smoke-stack to keep up the draft in the furnace; or they may be connected by rods or bars of metal, which shall be under the control of the engineer, and so that they may be operated simultaneously by him.

In practice these cocks or valves may be opened more or less, so as to cause a large proportion of the steam to pass through them to the heater; or they may be so adjusted as to allow but a small portion to pass through them, it being the intention to so regulate them as not to diminish the draft of the engine to any injurious extent when it is desirable to use it for the purpose of increasing the amount of steam generated, but to enable the person in attendance to reduce the draft due to the exhaust at times when a less amount of steam is required, and to use a portion of the exhaust steam at such times to increase the temperature of the feed-water before it enters the generator.

The heater with which this variable exhaust is connected may consist of a drum or cylinder closed at both of its ends, a smaller cylinder, D′, being placed within it, as shown in Figs. 1 and 2; or a coiled pipe may be used, and the interior cylinder D′ dispensed with, said pipe being connected with the pipes B and C in such a manner as to give the proper direction to the water.

When the heater is constructed as shown in the drawings the steam enters through the pipes A A and cocks or valves A′ A′ to the interior cylinder D′, and escapes through the pipes E E, which are provided with two-way cocks E′ E′, as shown in Figs. 3 and 4, so that the steam, in passing from the heater, may be directed through the pipe F to the tender, or through the branch F′ to the smoke-box of the generator.

In order that provision may be made for conducting the feed-water to and from the heater, pipes B B are connected with the space between the two cylinders composing the heater, said pipes in practice extending to, and being connected with, the check-valves of the generator, pipes C C being also connected with said space, and extending therefrom to the pumps of the engine, for the purpose of conducting the old water to the heater, through

which it passes, and from which it is conducted to the generator by the pipes B B, before alluded to.

It will be seen from the above description that by the use of this arrangement of devices the engineer has perfect control of the exhaust of his engine, and that he can so manage it as to utilize all that portion thereof not necessary for the production of the requisite draft in heating the feed-water before it enters the generator, and that such use of the steam will result in economy of fuel is a self-evident fact.

Without intending to limit the location of the heater, it is suggested that a convenient place for it is just in the rear of the cylinders of the engine, and under the cylindrical portion of the generator, as in this position the pipes for both steam and water may be readily connected with it and with the other parts of the engine to which they are necessarily united.

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

A feed-water heater provided with pipes and valves to convey and direct the uncondensed steam either to the chimney or to the vessel containing the feed-water supply.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM H. THOMAS.

Witnesses:

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