

A. S. SMITH.

Improvement in Locomotive Exhaust Pipes.

No. 125,414.

Patented April 9, 1872.

Fig. 1.

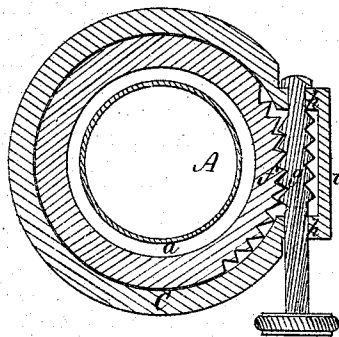


Fig. 2.

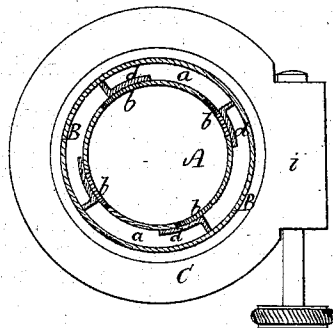
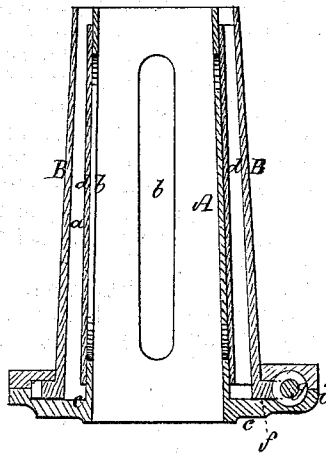


Fig. 3.



Witnesses,
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UNITED STATES PATENT OFFICE.

ALBERT S. SMITH, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN LOCOMOTIVE EXHAUST-PIPES.

Specification forming part of Letters Patent No. 125,414, dated April 9, 1872.

To all to whom these presents shall come:

Be it known that I, ALBERT S. SMITH, of Boston, in the county of Suffolk and State of Massachusetts, have made an invention of certain new and useful Improvements in Locomotive Exhaust-Pipe; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawing making part of this specification, and in which—

Figures 1 and 2 are horizontal sections, and Fig. 3 a vertical section of my invention.

The purpose of this invention is to provide a simple, economical, and durable means of varying the discharging area or outlet of the exhaust-pipe of a locomotive-engine, and in so doing enable the engineer at certain times to free his engine, for instance, when starting a train, or ascending a grade, &c.; and to this end this invention consists in creating in the exhaust-pipe or nozzle a series of ports, and combining therewith a gate or register in such manner that these ports may be opened to a greater or less degree and permit escape of steam through them, which would otherwise ascend through the mouth of the pipe, and, by increasing to this extent the outlet area, give a free passage of steam through and from the cylinders and relieve the piston entirely from the labor of expelling the exhaust steam.

The drawing accompanying this specification represents at A the vertical exhaust-pipe or nozzle of the exhaust-pipe of a locomotive-engine, which is pierced with a number of vertical orifices or ports, *b b*, &c., created in it. Surrounding this pipe A, with an intervening annular space, *a*, is an upright cylinder or tube, B, so mounted upon the base *c* of the exhaust-pipe as to revolve or partially revolve about the latter. To the inside periphery of the cylinder or jacket B I affix a series of valves or plates, *d*, in number and size corresponding with the ports *b*, and coinciding with them when they are to be closed. In order to turn the cylinder B and its valves in the arc of a circle about the pipe A and its ports *b*, I affix to the lower part of such cylinder a segmental toothed rack or gear, *f*, while

meshing into and driving this gear is a horizontal worm or many-threaded screw, *g*, revolving in suitable bearings *h h*, formed in a boss, *i*, making part of the base of the exhaust-pipe. By means of the gear and worm last named, the cylinder B and its valves or gates *d* may be moved in either direction, and close or open the ports *b*, according to circumstances. The opening of the ports *b* enlarges the discharging area of the pipe A and permits of a more free delivery of exhaust steam, the cylinder or jacket B serving to protect and surround this steam and guide it upward.

The sudden blast of steam through the exhaust-pipe of a locomotive, when starting a train, has a tendency to draw ashes and fire-cinders from the furnace. In order to avoid this liability, as well as to "free" the engine when unusual labor devolves upon it, is the purpose of my present invention, and the device shown and explained accomplishes the result in a simple, durable, and efficient manner.

Owing to the arrangement of the cylinder B, valves *d*, screw *g*, and gear *f*, no shake or rattle of the parts ensue, while the quick pitch of the threads of the screw *g* enables the engineer to almost instantly open or close the ports *b*, and thus vary at his pleasure the area of the exhaust-outlet.

Claims.

1. I claim the combination, with the pipe A and its ports *b*, of the surrounding rotating jacket or case B, arranged to leave between it and the pipe A an annular space, *a*, as described, and the valves or gates *d*, carried or operated by said case, substantially as shown and set forth.

2. In combination with the elements named in the preceding clause, arranged and operating as described, I claim the rack or gear *f* and screw *g* or its equivalent, substantially as shown and set forth.

ALBERT S. SMITH.

Witnesses:

FRED. CURTIS,
W. E. BOARDMAN.