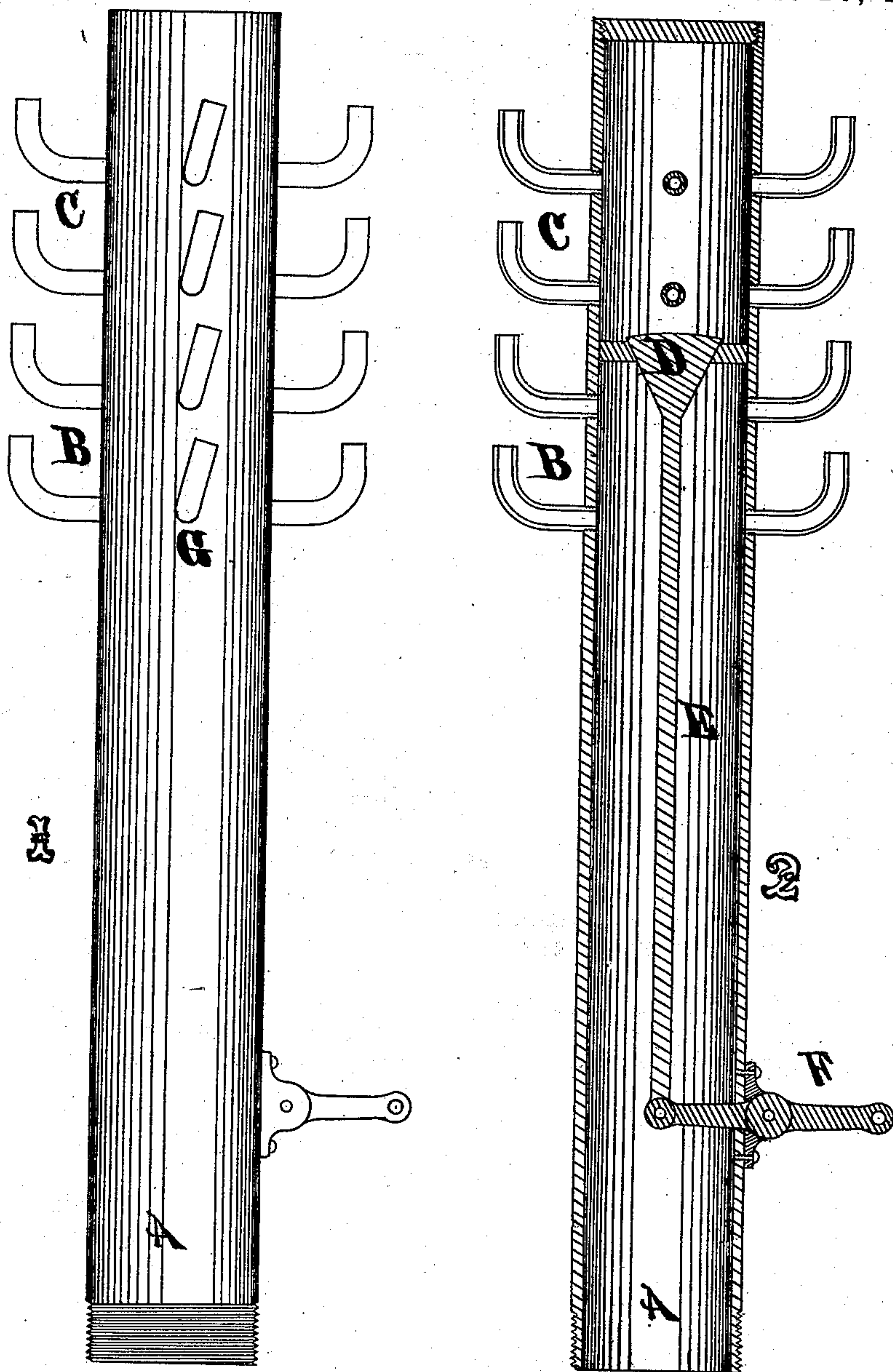


T. SHAW.  
EXHAUST-NOZZLE.

No. 187,780.

Patented Feb. 27, 1877.



Witnesses

Wm. Garwood  
Wm. Hughes. By

T. Shaw

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# UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN EXHAUST-NOZZLES.

Specification forming part of Letters Patent No. **187,780**, dated February 27, 1877; application filed December 20, 1876.

*To all whom it may concern:*

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented a new and Improved Method of Arranging and Controlling Exhaust-Nozzles of Steam-Engines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists in the provision of a valve, controlled by hand or otherwise, and in giving the jets an angular location, so as to give a spiral twist to the ascending current, all of which is an improvement upon my patents of December 8, 1874, and August 10, 1875.

The object of the invention is to make the exhaust of a variable character, subject to the control of the engineer, and to give the passing gases a spiral twist, which is favorable for arresting sparks.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawing, which forms part of this specification, Figure 1 is a side view, and Fig. 2 a vertical section through the center of the same.

Similar letters refer to similar parts, of which A is the main pipe, closed at its upper end, and provided with a screw-thread at its lower end. D is a valve, closing an aperture in partition secured in pipe A at this point. Said valve is controlled by rod E and lever F, that has connection with suitable rods lead-

ing to the most convenient point of operation for the engineer. Said valve and partition separate two sets of jets, B and C, as shown in Fig. 2. The jets are all given an angular location, as shown at G, which causes the current of steam to shoot in a spiral direction, giving the passing gases a rotation to the right or left, according to the direction of the jet, which causes the sparks to drop in the ordinary spark-receiver provided in small stacks.

The prime object of valve D is to contract the area of outlet or reduce the number of jets by shutting off a portion, in order that the fewer remaining operating jets shall, by the increased pressure, caused by the contracted area, give a proportionate increased draft, which at times is desired on locomotives burning anthracite coal. This same object can be effected by one or more valves, if desired, and can be variously located without any alteration in the result.

What I claim, and desire to secure by Letters Patent, is—

1. An exhaust-pipe provided with jets set at an angle, to give a spiral motion to the ascending current.

2. A jet exhaust-pipe provided with a valve, by which steam is shut off from a portion of the jets, and the draft increased through the remaining jets.

THOMAS SHAW.

Witnesses:

WM. HUGHES,  
WM. GARWOOD.