W. A. Carns,

Exhaust Valve.

No. 110,008. Patented Dec. 13, 1870.

Fig. 1.

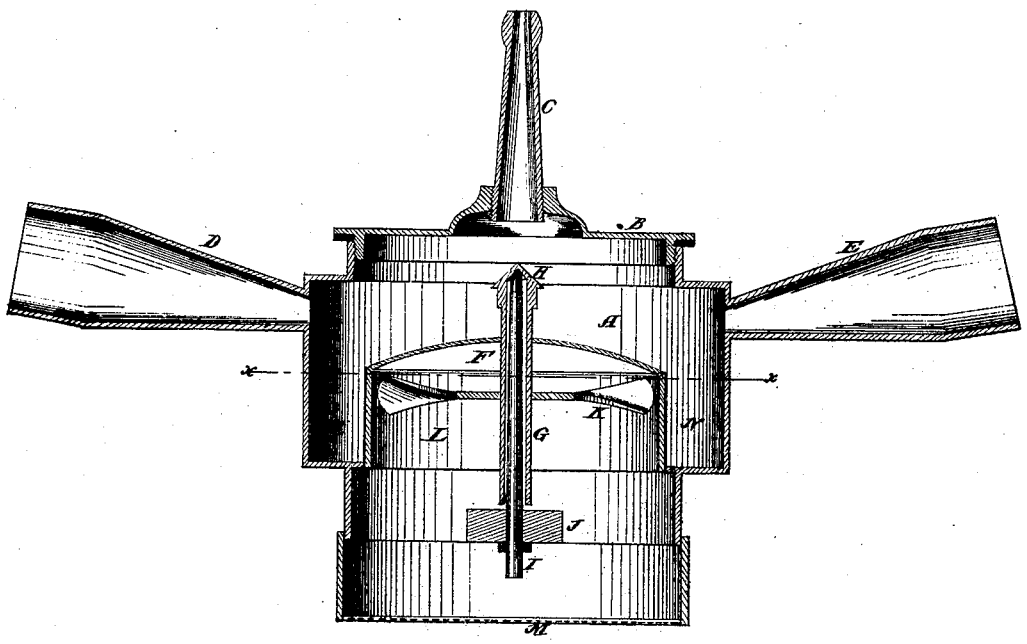
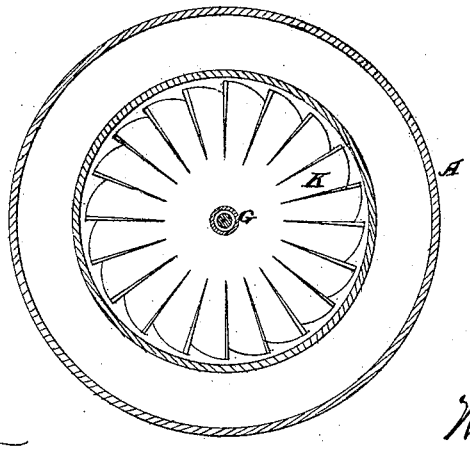


Fig. 2.



WITNESSES:
P. C. Dieterich
L. L. Mabee

INVENTOR.
W. A. Carns
per: Munn & Co
ATTORNEYS.

United States Patent Office.

WILLIAM A. CARNS, OF MALDEN, MASSACHUSETTS.

Letters Patent No. 110,008, dated December 13, 1870.

IMPROVEMENT IN EXHAUST-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM A. CARNS, of Malden, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Exhaust-Valves; 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 make and use the same, reference being had to the accompanying drawing forming part of this specification.

The object of this invention is to prevent sparks and cinders from entering or being drawn into the cylinders of locomotive-engines when the motion is reversed; and

It consists in the construction and arrangement of parts, as hereinafter more fully described.

In the accompanying drawing—

Figure 1 represents a vertical central section of the improvement.

Figure 2 is a horizontal section of fig. 1, taken on the line *x x*.

Similar letters of reference indicate corresponding parts.

A is the exhaust-chamber.

B is the cap.

C is the exhaust-nozzle, through which the exhaust steam is discharged into the smoke-box for increasing the draught.

D and E are exhaust-pipes from the separate engines, which discharge the steam into the chamber A.

F is a valve, which is attached to the tube G.

The tube G has a conical end or cap H.

The tube works on the spindle I, which is screwed or fastened into the base-block J.

K is a fan-wheel on the valve-tube G, and

L is the fan-chamber.

The wall of this chamber forms the seat for the valve. When the engines are running the pressure of the exhaust steam keeps the valve closed, which steam is discharged into the smoke-box. When the motion of the engine is reversed, a current of heated air carrying sparks and cinders, as exhaust-pipes are ordinarily arranged, rushes into the nozzle and into the cylinders through the exhaust-pipes, to fill the vacuum caused by the reverse motion of the pistons. This is the difficulty which it is my object to overcome. Instead of allowing the heated air and cinders to be drawn through the nozzle, I close the nozzle as the motion is reversed, and supply the cylinders with air devoid of cinders or dust.

The vacuum formed when the motion is reversed serves to raise the valve and carry the cone H into the lower end of the nozzle, thus effectually closing the nozzle, while a full supply of pure air enters the exhaust-chamber through the screen M.

The lower portion of the fan-chamber is in communication with the atmosphere, but is covered by the screen so as to exclude dust.

The space N around the fan-chamber receives the water of condensation and is left for drainage.

The valve is kept in position when closed by the spindle I, the end of which enters the concave of the cone H.

The action of the upward current of air upon the fan-wheel K, when a vacuum is formed in the exhaust-chamber, renders the valve more sensitive and causes it to operate more freely.

As the valve is arranged, an opening is made so very large, and the action of the valve is so sudden, that the vacuum is not felt by the exhaust-nozzle, and no sparks or cinders are drawn through it.

By this improvement a fruitful source of trouble in locomotive-engines is avoided, and its advantages must be obvious to all who are acquainted with the subject.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The arrangement of the valve F on the tube G, supported and guided by the spindle I, and operating in the chamber A, substantially as and for the purposes described.

2. The cone H on the valve-tube G, by means of which the exhaust-nozzle is closed as the valve rises, substantially as and for the purposes described.

WILLIAM A. CARNS.

Witnesses:

HENRY POWELL,

A. E. PENNIMAN.