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GEORGE WESTINGHOUSE, Jr.

Improvement in Exhaust Valves for Steam and Air Engines.

No. 122,544.

Patented Jan. 9, 1872.

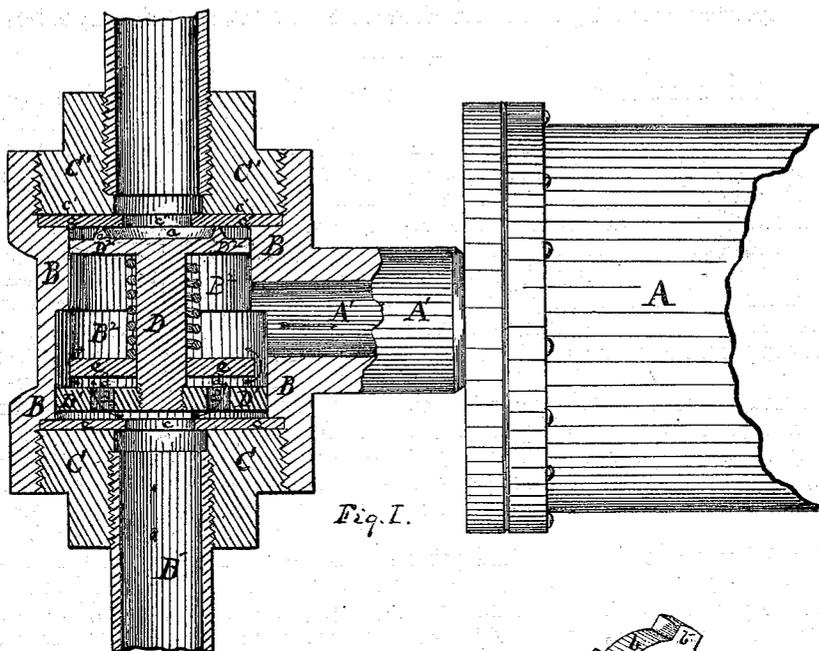


Fig. 1.

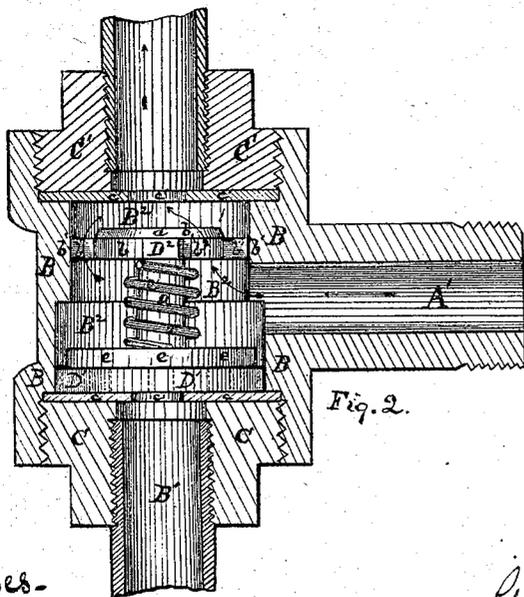


Fig. 2.

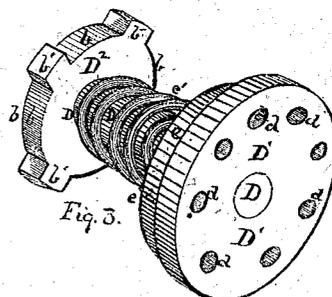


Fig. 3.

Witnesses.
 R. Wrenshall
 James S. Kay

Inventor.
 George Westinghouse Jr.
 by Batewell, Christy & Kerr,
 his Attys.

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN EXHAUST-VALVES FOR STEAM AND AIR CYLINDERS.

Specification forming part of Letters Patent No. 122,544, dated January 9, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Exhaust-Valves and Ports for Steam and Air Cylinders; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figures 1 and 2 are sectional views of my improvement in one form of its application, and showing the double-ended receiving and exhaust valve in each of its two positions; and Fig. 3 is a detached perspective view of such valve.

Like letters of reference indicate like parts in each.

My improved exhaust is more particularly designed for use in connection with the brake-cylinders of steam-power air-brakes; and I will first describe its construction and operation in such use, so as to distinguish the same from other known means of like character, and also enable others skilled in the art to make and use the same.

In such brakes air is compressed into, or when compressed is admitted into, a brake-cylinder, A, at such point with reference to a piston therein that, by the movement of the piston, the brake-shoes will be applied to the wheels. To relieve or "let off" the brakes it has been common to turn a cock at the engine and let the compressed air escape at that point. This, in a long train, requires an appreciable interval of time, which it is desirable to avoid. I hence have devised a relief or exhaust valve of such construction that when the air is discharged from the brake-pipes the valve will, by the pressure of the air in the cylinder, be opened at the cylinder and the compressed air be allowed to escape directly from each cylinder, instead of having first to pass the entire length of the train, as heretofore. From the compressed-air pipe, which extends back through the train under the cars, a branch pipe, B¹, leads to the valve-case B. This valve-case is open at both ends, and has an enlarged valve-chamber, B², from which an air-pipe or

port, A', leads to the brake-cylinder A. The outer ends of the valve-case B are closed by screw-nuts C C', the nut C being at the air-entrance end, and the other, C', at the exhaust end. The valve-chamber B² is made of a little shorter diameter at the exhaust end than at the other. Under the nut C is a packing-ring, c, of India rubber or other suitable material, and under the other nut, C', is a like ring, c', both resting on shoulders in the valve-case, and held in place by their respective nuts, as shown, and both having central openings, through which air can enter and leave chamber B². In this chamber I arrange a double-ended piston-valve, more fully shown in Fig. 3. On the opposite ends of a stem, D, I attach the piston-valves D¹ D², the valve D¹ at the air-entrance end being a little larger than the other, and the entire length from outside to outside being a little less than the length of the chamber B² between the packing-rings c c'. The valve D¹ has a series of holes, d d, through which the air can pass in entering the chamber B², and these holes or air-ports are opened or closed by means of a valve-plate, e, which is loosely arranged on the stem D, and is pressed against or toward the piston D¹ by means of a spring, e'. The other valve has a similar series of air-exhaust holes, or, as shown, its periphery is notched or serrated, as at b, for the egress of air, the projections b' between the notches acting as guides in the chamber B² to keep the valve in line. Its lower face has an annular ring a, V-shaped in cross-section the better to enable it to make an air-tight joint when seated on its gasket e'.

The operation is as follows: When it is desired to apply the brakes the compressed air is admitted, as illustrated by arrows in Fig. 1, by the pipe B¹ through the gasket c and air-ports d against the face of the valve-plate e, which valve-plate is raised or forced back by the pressure, so that the air passes on into the chamber B² and by the port A' into the brake-cylinder A, where it does its work. The other valve, D¹, is at the same time, by the pressure of the air, seated on its gasket e'. When the brakes are to be released and the train started, connection with the air-reservoir is cut off and the air allowed to escape from the pipes

which extend through the train. The effect then is that the spring e' forces the valve-plate e against the valve D^1 and closes the ports d . Also the compressed air in the chamber B^2 , exercising a greater force against the larger valve D^1 , causes it to be seated on its gasket e , whereby the other valve D^2 is raised clear of its gasket e' , when the devices are in the position shown in Fig. 2. The air then passes out freely, as indicated by arrows, from the cylinder A , chamber B^2 , through the notches b , gasket e' , and nut C' , and so escapes almost instantly. The opening and closing of the inlet and exhaust ports are thus automatically effected. The valve D^1 acts in part as a check-valve and in part as a lifting device to the valve D^2 . If it is desired to let off the brakes only in part, it may be done by letting out of the brake-pipes only a portion of the compressed air contained in them and then closing the cock. The air will in such case pass out from the cylinder through the exhaust until the pressure in the cylinder falls a little below the reduced pressure in the pipes, and then the exhaust-valve D^2 will be and remain seated. In this way the force with which the brake-shoes are applied to the wheels may be graduated at pleasure. The valve-plate e and spring e' may be dispensed with, and the ports d be closed by the valve C coming against the gasket e ; but this construction renders it necessary to make the ports d smaller than would otherwise be necessary; and in apply-

ing the brakes large air-entrance ports are desirable. The same devices are applicable in use as an exhaust for air, gas, steam, and water cylinders generally, with only such variations in their arrangement with reference to the cylinders as will readily suggest themselves to the skilled mechanic, and such uses I include among other purposes of my invention.

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

1. A double-ended piston-valve having ends of different areas exposed to an inside pressure, provided with inlet-ports at one end and exhaust-ports at the other alternating in use, substantially as and for the purposes set forth.

2. The double-ended piston-valve of the preceding claim in combination with a cylinder from which the power is to be applied, substantially as described.

3. An exhaust-valve, D^2 , lifted from its seat by the pressure and against the pressure of the fluid to be exhausted, substantially as described.

4. The valves D^1 D^2 arranged on a single stem, in combination with the valve-plate e and spring e' , substantially as set forth.

In testimony whereof I, the said GEORGE WESTINGHOUSE, Jr., have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

Witnesses:

A. S. NICHOLSON,

G. H. CHRISTY.

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