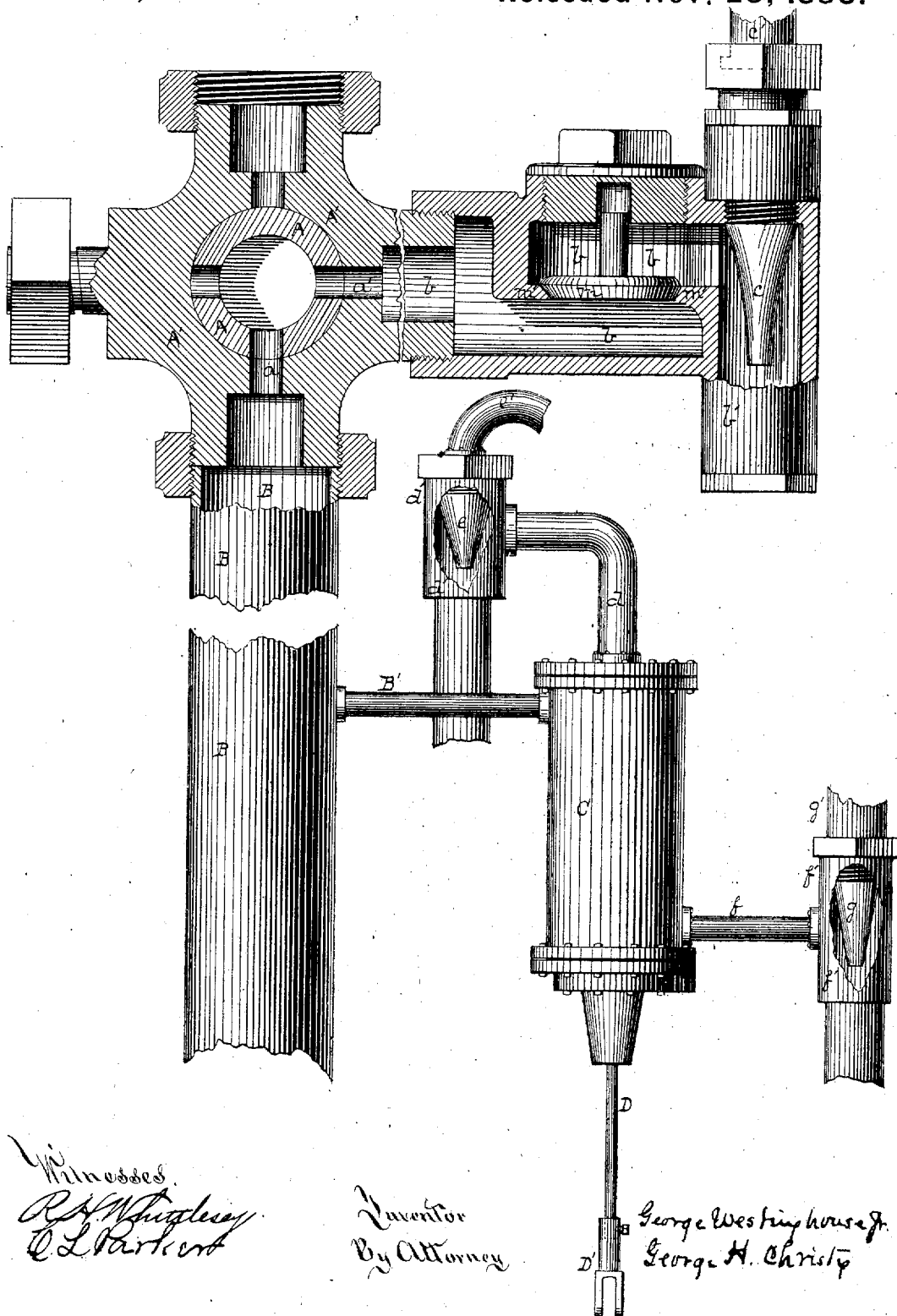


Assignor to WESTINGHOUSE AIR BRAKE CO.

No. 9,478.

Reissued Nov. 23, 1880.



Witnesses.
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UNITED STATES PATENT OFFICE.

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TO WESTINGHOUSE AIR BRAKE COMPANY, OF SAME PLACE.

STEAM-POWER CAR-BRAKE APPARATUS.

SPECIFICATION forming part of Reissued Letters Patent No. 9,478, dated November 23, 1880.

Original No. 115,667, dated June 6, 1871; Reissue No. 5,506, dated July 29, 1873. Application for reissue filed October 18, 1880.

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 Steam-Power Car-Brake Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, showing, by views partly in section and partly in plan, certain detached parts of my air-brake apparatus already patented to me and illustrative of the improvement for which I now desire Letters Patent.

My present invention relates in part to certain improvements in steam-power air-brake patented to me 13th April, 1869. Of the parts described in that patent the accompanying drawing contains the three-way cock A A', (shown in horizontal section through the ports,) the air-pipes B B' leading thence to the brake-cylinder C, which latter, as in that patent, is furnished with a piston, piston-stem D, and bifurcated head D' all operated as in said patent set forth.

In the patent referred to the brakes are described as being released or let off simply by turning the three-way cock to the position shown in the accompanying drawing. The air in the cylinder C in front of the piston then passes out by the pipes B' B through the inlet-port *a* and out at the escape-port *a'*.

I have found in practice that while the compressed air readily escapes in this way it does not always release the brake-shoes from their hold on the wheels as instantaneously as could be desired on a train which has only time to make short stoppages in case the piston and stem happen to work with some friction.

For the purpose of guarding against the occurrence of this, I have combined with the devices named what is commonly known as the "steam siphon pump or ejector," by the action of which the air is almost instantaneously exhausted from the cylinders down to or below ordinary atmospheric pressure, and thereby the brake-piston is forced back and the brake-shoes are as instantaneously released or let off.

To enable others skilled in the art to make and use my improvement, I will proceed to

describe its construction and mode of operation.

The air-outflow or waste pipe *b* communicates directly with the escape-port *a'*. On the outer end of it is a T-pipe, *b'*, in one end of which I screw a nozzle, *c*, which, by a pipe, *c'*, communicates with either the steam-boiler, for the injection of steam, or with the air-reservoir described in my patent of 13th April, 1869, for the injection of air. The arrangement of the conical nozzle *c* with reference to the air-outflow or waste-pipe may be varied at pleasure, according to the known laws governing the operation of such devices. The nozzle *c* may be arranged directly in the waste-pipe *b*, but discharging in the direction of the outward flow of air.

When it is desired to let off the brakes the cock A is turned to the position shown. A jet of steam or compressed air, preferably the former, is turned into the pipe *c'*, which, passing out through the nozzle *c*, exhausts the air from the brake-cylinder C through the communicating pipes and ports, and almost instantaneously lets off the brakes.

As a modification thereof I have shown a pipe, *d*, leading direct from the end of the cylinder C in front of the piston, onto which is fastened a T-pipe, *d'*. In the latter is arranged a nozzle, *e*, similar in construction to that last described, taking steam or compressed air through a pipe, *e*, in like manner and with like effect, and capable of like modifications as to form and arrangement. By reversing the arrangement of the brake-levers this combination may also be applied to put on as well as let off the brakes.

The steam siphon pump or ejector may be otherwise combined with the brake-cylinder so as to apply or put on the brakes by means of the exhaustion of the air from the cylinder back of the piston—i. e., on the side toward which it moves in applying the brakes—instead of by the compression of the air in the cylinder in front of the piston. To illustrate this I have shown a pipe, *f*, leading from the end of the cylinder C toward which it is desired the piston should travel in applying the brakes. The outer end of this communicates with a T-pipe, *f'*, in which is arranged a con-

cal nozzle, *g*, as already described, and capable of like modifications. Compressed air or steam then being passed through the pipe *g'* and nozzle *g*, the air will be exhausted from the cylinder C back of the piston, which will cause the latter to travel back, and through its stem D to operate the brake-levers and apply the brakes, as in my previous patent set forth.

If steam be used in exhausting the air from the cylinder C, it will be found sometimes that after the exhaustion has been carried below atmospheric pressure a reaction will take place, which, if not provided against, will carry some of the steam back through the air-outflow pipes into the cylinder C, where it condenses, and where the presence of water is objectionable. To prevent this inflow of steam I arrange at any desired point back of the steam-discharging pipe and between it and the cylinder C a check-valve, *m*, seat it in a diaphragm, *m'*, and guide it by a stem, *n*, or in other known way.

As shown, the valve *m* seats itself by its own weight, but it may be placed in any desired position and be seated by a spring or other equivalent device. Such a valve may be arranged in any of the pipes *b d f*. As thus arranged it permits at all points of its motion clear of its seat the outflow of air, but

prevents the inflow of steam when the reaction of atmospheric pressure takes place.

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

1. In a fluid-pressure brake apparatus, whether operating by the introduction or by the exhaustion of air, an ejector arranged to exhaust air from the operating cylinder, in combination with a check-valve operating within the air-outflow passage and arranged to seat against the inflow and be incapable of seating against the outflow of air from the cylinder, substantially as set forth.

2. In a power-brake apparatus, a brake-cylinder and piston in which air-pressure is applied to the piston both to apply and release the brakes, in one case by means of compressed air as against atmospheric pressure and in the other by means of atmospheric pressure as against a vacuum or partial vacuum, substantially as set forth.

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

GEORGE WESTINGHOUSE, JR.

Witnesses:

R. H. WHITTLESEY,

GEORGE H. CHRISTY.