A. O. SMITH & H. M. OGDEN

Steam and Air Brakes.

No. 134,774. *Fig. 1* Patented Jan. 14, 1873.

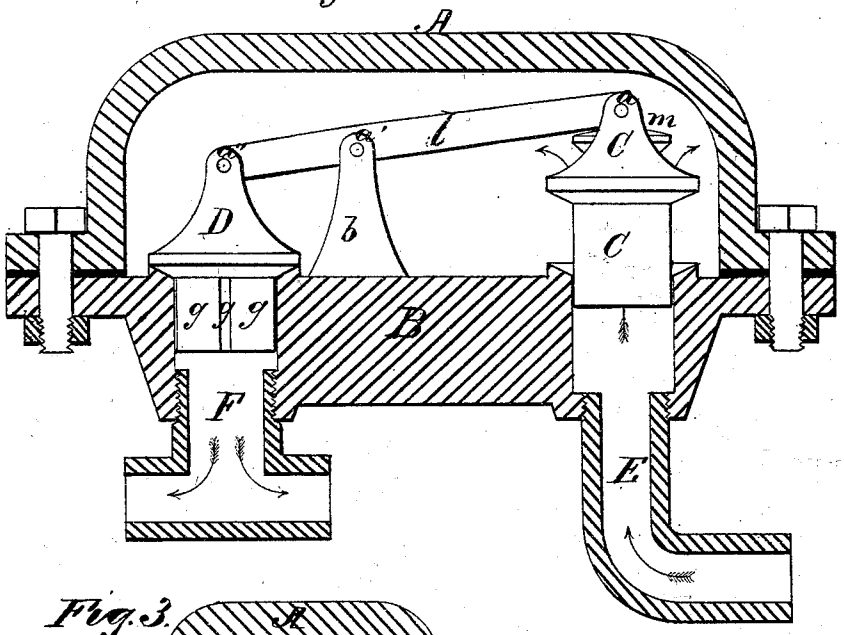


Fig. 5

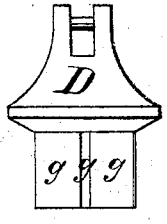


Fig. 3.

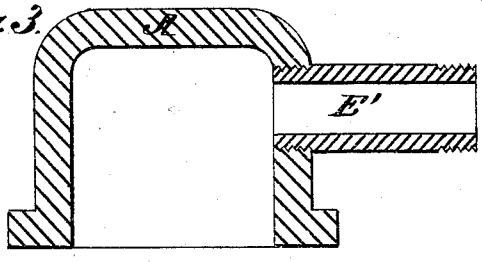


Fig. 4.

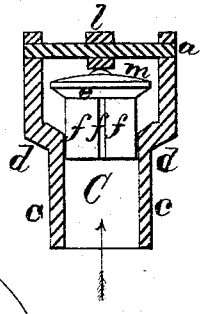
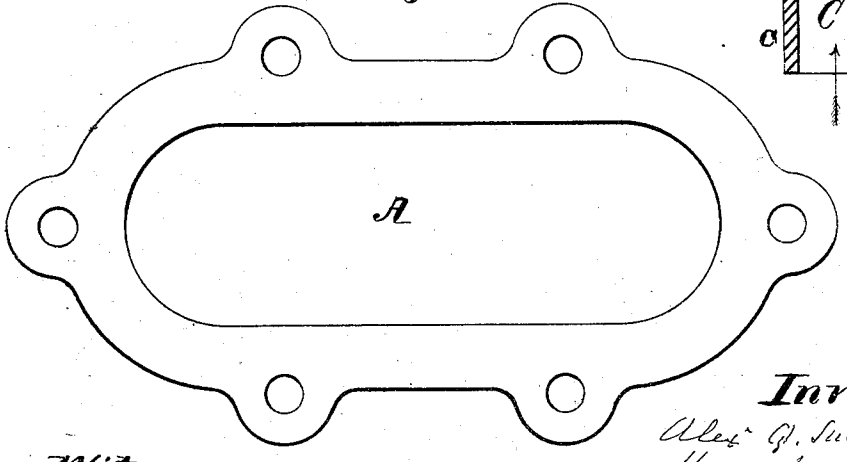


Fig. 2.



Witnesses,
R. Campbell,
J. R. Campbell.

Inventors
Alex. O. Smith
Henry M. Ogden
by
Mann, Brown & Langner

UNITED STATES PATENT OFFICE.

ALEXANDER Q. SMITH AND HENRY M. OGDEN, OF BURLINGTON, IOWA, ASSIGNORS TO THEMSELVES AND DAN. BROWN, OF SAME PLACE.

IMPROVEMENT IN STEAM AND AIR BRAKES.

Specification forming part of Letters Patent No. **134,774**, dated January 14, 1873.

To all whom it may concern:

Be it known that we, ALEXANDER Q. SMITH and HENRY M. OGDEN, both of Burlington, in the county of Des Moines and State of Iowa, have invented a new and useful Improvement in Air-Brakes for Railroad Cars, of which the following is a full and exact description, which will be better understood by referring to the accompanying drawing making part of this specification, in which—

Figure 1 is a vertical longitudinal section of a valve-case used by us, the interior works being represented in profile. Fig. 2 is a plan, from beneath, of the cover of this valve-case. Fig. 3 is a cross-section of that cover, showing a pipe leading to the cylinder. Fig. 4 is a section of a double valve, which is shown in profile at C, Fig. 1; and Fig. 5 is a side view of the valve D, of which a front view is shown at D in Fig. 1.

Our invention is an improvement upon what is known as the Westinghouse air-brake for railroad cars, the chief object being to release the car-wheels from their gripe with sufficient promptness.

The old plan is to release the brake by opening the 'scape of the three-way cock at the engine in the pipe through which all the compressed air is driven for the purpose of closing the brakes. In a long train of cars it would take some minutes before the wheels were entirely freed from the brakes, which would often cause delay in the movement of the train. We propose to allow each cylinder which works the respective brakes of the several cars to discharge itself with much less delay into the open air whenever it is desired to release the brakes.

To accomplish our purpose we use an air-tight valve-case, A B, shaped as shown in the drawing, and provided with contrivances which we shall now describe. In the bed B of this valve-case we construct cylindrical receptacles in which the valves C and D may work freely. The stem of the valve D is provided with wings or flanges *g g g*, which serve as guides to this valve and leave free opportunity for the air to escape through the pipe F as soon as the valve D is raised from its seat. The valve C is made with a puppet-valve, *m*, working within it, as shown in Fig. 4. The stem of the valve C is made cylindrical and fills its receptacle as full as is consistent with ease of motion in rising or falling. The interior valve *m* is constructed with wings or flanges *f f f*, which guide it in its motions up and down. The spaces thus left allow a free passage of air as soon as this valve is raised from its seat, which is not the case with the valve C. We usually construct the body of the valve-case of cast-iron, and the valves which come in frictional contact with this iron are made of brass; but we do not confine ourselves to the use of any particular metal in either case. The pipe E is a branch from the main pipe, which runs fore and aft through the train. The pipe F is an escape-pipe into the open air, while the pipe E′ connects the interior of the valve-case with the cylinder which works the brakes of the car to which it is attached. Connected with the valves C and D is the lever *l*, working on a fulcrum at *a′*, and having the arm which connects with the valve C much longer than the other, which connects with the valve D. When there is no air-pressure in the valve-case A B both the valves C and *m* sink to their respective seats. The valve D would then be open. But when the condensed air is admitted into the pipe which extends throughout the train it will rush through the branch pipe E with such force as not only to raise the valve *m* from its seat, but also to carry with it the valve C, and thus close the valve D, as shown in the drawing. While the pressure within the valve-case continues the valve D will be kept closed and the valve C will remain raised from its seat, as shown in the drawing, but the valve *m* will fall back into its seat as soon as the current of air ceases to flow through the pipe E.

If a spring was attached to some portion of the lever *l* of just sufficient power to raise the long arm of that lever, and thus close the valve D when there was no pressure in the valve-case, there would be a saving of some of the compressed air which would otherwise be, in a small degree, wasted, but we prefer the arrangement as shown in the drawing.

If, when the brakes are "hard on," the engineer wishes to release them from their hold upon the wheels he will open the 'scape of the three-way cock, which is placed in the main pipe leading throughout the train at or near

its connection with the reservoir of compressed air. The escape of air from the pipes will soon relieve the chief pressure therein; and if the long arm of the lever *l* is twice the length of the short arm, then, when the pressure in the pipe E becomes less than one-half as great as that in the valve-case A B, the valve C will descend so as to open the valve D, and thus the cylinder, which is connected with this valve-case, will discharge itself directly into the open air through the pipes E′ and F. In order that these valves C and D may work with greater ease, we construct a slot or oblong hole through each end of the lever *l*, through which the pivots *a a″* are inserted. A short link or pitman might be used for the same purpose, but we prefer the first-named arrangement.

It is true that after the pressure in the pipe E is released in ever so great a degree the pressure within the valve-case upon the valves C and D will be of the same intensity, but a pound of pressure upon C will hold in equilibrium a much greater amount of pressure upon D on account of its having a greater leverage. When, therefore, the downward pressure upon the valve C ceases to be resisted, in part, by a sufficient upward pressure in the pipe E, a preponderance will be given to the valve C, and the valve D will be raised. The same result would be produced by making the two arms of the lever *l* of equal length, and then constructing the net surface of the valve C of a much greater area than that of the valve D. We generally combine both methods.

Instead of being constructed as above represented, the valve-case may be made in a greater or less degree as a portion of the cylinder-head, with which it is attached.

We also contemplate the use of our improvement in any of its forms as an appendage to a steam-brake, when it would operate in substantially the same manner as above represented.

We make no broad claim to the use of any and every contrivance by which all the cylinders in the Westinghouse brake may be simultaneously discharged into the open air in order to release the several brakes with great promptness; but

What we do claim as new, and desire to secure by Letters Patent, is—

The valves C D, attached, respectively, to the arms of a lever, *l*, the said valves and lever being constructed and applied to operate substantially as and for the purpose set forth.

ALEXANDER Q. SMITH.
HENRY M. OGDEN.

Witnesses:
JOHN N. MASON,
J. M. KING.