2 Sheets--Sheet 1.

W. D. JONES.

Air-Brakes.

No. 166,386. Patented Aug. 3, 1875.

Fig. 3.

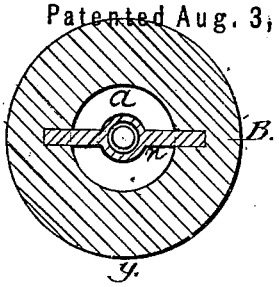


Fig. 1.

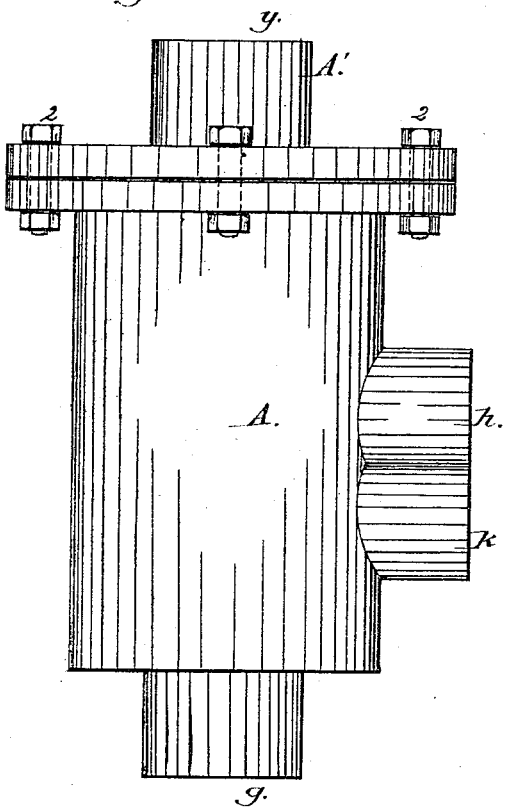


Fig. 2.

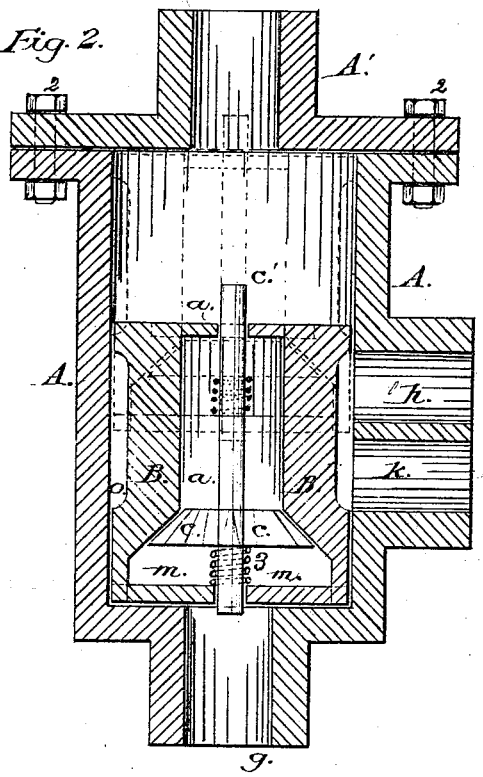
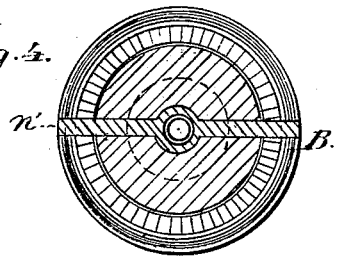


Fig. 4.



Witnesses:

Cyrus Rawlings

Henry E. Gunn

Inventor:

W. Davidson Jones.

2 Sheets--Sheet 2.

W. D. JONES.

Air-Brakes.

No. 166,386. Patented Aug. 3, 1875.

Fig. 5.

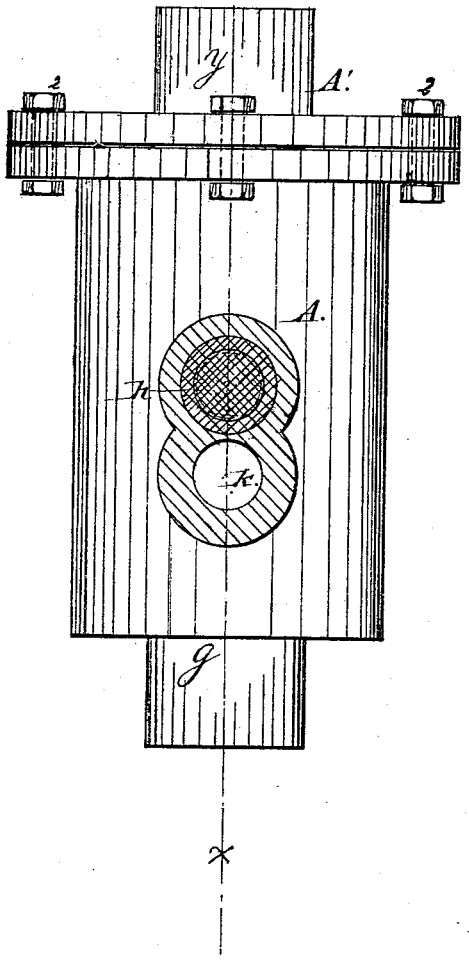
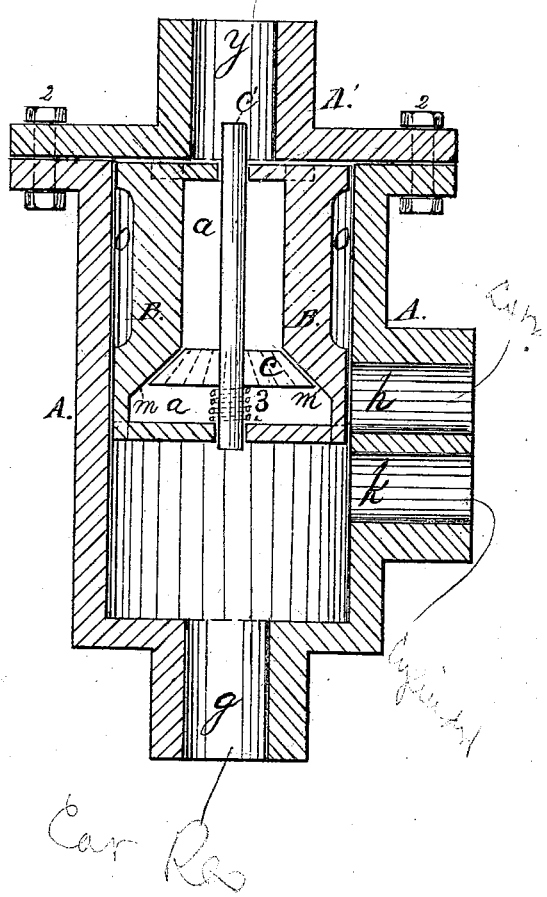


Fig. 6.



Witnesses:

Wm. M. Cawley

Henry E. Greene

Inventor:

W. Davidson Jones

UNITED STATES PATENT OFFICE.

W. DAVIDSON JONES, OF HAGAMAN'S MILLS, NEW YORK.

IMPROVEMENT IN AIR-BRAKES.

Specification forming part of Letters Patent No. **166,386**, dated August 3, 1875; application filed July 27, 1875.

To all whom it may concern:

Be it known that I, W. DAVIDSON JONES, of Hagaman's Mills, in the county of Montgomery and State of New York, have invented a new and useful improvement in automatic-supply relief-valves for operating compressed air-brake cylinders; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of the valve. Figs. 2 and 6 are sectional views of Fig. 1, on the plane of the line *x x* in Fig. 5, showing the induction and eduction ports, the compound trunk-valve B B, and valve *c* on the stem *c'*, held to its seat *m m* by springs 3 3. Fig. 3 is a transverse section of the end of trunk-valve B B, showing the passage *a* and valve-stem guide *n*. Fig. 4 is a transverse sectional view of the opposite end of the compound trunk-valve B B, showing the valve *c* and valve-stem guide *n'*. Fig. 5 is an elevation of the valve, looking at the ports *h* and *k*.

Like letters and figures of reference indicate like parts in each drawing or figure.

My invention relates to that class of compressed air-actuated car-brakes in which the air is conveyed back to reservoirs beneath each car by a pipe from a main reservoir on the engine, the compressed air from the auxiliary reservoirs on each car of the train operating a movable piston within a cylinder, thereby applying the brake-blocks to the wheels, as is commonly done. By the interposing of my invention in close connection therewith, and between or by its use forming the connections between the auxiliary reservoir, the cylinder containing the piston, and the branch-pipe from the main supply-pipe, the brakes may be rapidly and readily applied, and as rapidly and readily released, at the will of the engineer, or automatically set on all the cars of the train, should the cars become uncoupled, or the main supply or branch pipes become broken, as will be hereinafter fully set forth.

My improved automatic-supply relief-valve for connecting the branch induction-pipe with the auxiliary reservoir, and at the same time closing connections with the brake-cylinder, and at the will of the engineer (or in case of accident uncoupling of cars, or rupture of main pipe from the reservoir on the engine or tender) to close such connections, and to automatically open connections between the auxiliary reservoir and the brake-cylinder, thereby allowing the compressed air to pass to said cylinder, actuating the piston thereof and applying the brakes, as is usually done, and as readily relieving the cylinder of the compressed air, and discharging it by opening communication from the cylinder with the atmosphere, and at the same time restoring the connection between the main supply-pipe and auxiliary reservoir by decreasing and increasing the pressure in the main supply-pipe running the whole length of the train.

My invention may be used to operate the pistons of brake-cylinders attached to each car where there is no auxiliary reservoir employed, and discharge the compressed air directly from the cylinder, after doing its work, into the atmosphere, without returning it to the engine through the supply-pipe, the same being done by simply cutting off the supply or pressure from the main supply-pipe.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is a valve-case, made substantially as shown, and provided with a cap, A', containing the induction port or passage *y*, said port connecting with the main supply-pipe from the engine, and being also provided with eduction pipe or port *g*, to which is connected the auxiliary reservoir and eduction-induction port *k* communicating with the brake-cylinder, and eduction-port *h* communicating with the atmosphere. The cap A' is secured to the shell-case A by bolts 2.

The compound trunk-valve B, Figs. 2 and 6, is made of proper form, substantially as shown, having the circumferential depression *o*, Figs. 2 and 6, and valve-seat *m*, valve *c* on valve-stem *c'*, is held in position by valve-stem guides *n n*, Figs. 3 and 4. Said valve *c* is held to its seat *m*, Figs. 2 and 6, by spiral spring 3.

The operation of my invention is as follows: With the port *y*, Figs. 1, 2, 5, and 6, connec-

tion is made with the supply-pipe leading from the main reservoir on the engine. With the port *g* connection is made with the auxiliary reservoir. With the port *k* connection is made with the brake-cylinder, operating a piston within, and port *h* communicating with the atmosphere.

Compressed air being admitted from the main reservoir attached to the engine, through a three-way cock, into the supply-pipe and its branches to each car of a train, the compound trunk-valve B would be driven by the compressed air to the rear or lower end of the case A, and closing port *k* leading to the brake-cylinder, as shown in Fig. 2, the strength of the spiral spring 3 holding valve *c* to its seat *m* sufficiently firm to carry the compound trunk-valve B to the lower end, as shown in Fig. 2; the pressure would then unseat valve *c* on stem *c'* and allow the air to pass, through port *y*, passage *a*, and port *g*, into the auxiliary reservoir. The pressure in the auxiliary reservoir would be about equal to the pressure in the main reservoir and supply-pipes. The brake-cylinder would communicate with the atmosphere through port *k*, circumferential depression *o*, and eduction-port *h*, thereby leaving the piston free to return to the back of the cylinder by the action of the throw of springs attached to the brake-blocks, or through any other suitable agency.

When the engineer wishes to put on the brakes he turns the three-way cock near to him in the supply-pipe, cutting off communication with the main reservoir and opening communication with the atmosphere in that portion of the supply-pipe in rear or back of the three-way cock, thereby reducing the pressure in that portion of the supply-pipe and its branches leading to each automatic-supply relief-valve, which, by the excess of pressure retained in the auxiliary reservoir, would force a current of compressed air backward, closing firmly on its seat the valve *c*, Figs. 2 and 6, and driving the compound trunk-valve B into the forward part of valve-case A, as indicated by the dotted or broken lines in Fig. 2, and fully shown in Fig. 6, thereby opening full and free communication from the auxiliary reservoir, through ports *g* and *k*, into the brake-cylinder, thereby moving the piston, and, by suitable connections from said piston to the brake-blocks, applying the brakes.

When the train is stopped and the engineer wishes to take off or release the brakes, he turns the three-way cock so as to close communication with the atmosphere and open communication from the main reservoir on the engine with the supply-pipe, and to each automatic-supply relief-valve, which, by the excess of pressure in the main reservoir and supply-pipe over the reduced pressure of the expanded air in the auxiliary reservoir and brake-cylinder, causes a current of air to pass into the port *y*, Figs. 2 and 6, and, by the spring 3, holding valve *c* on its seat *m*, the compound trunk-valve B, Figs. 2 and 6, is driven from the position just described and fully shown in Fig. 6 to the position shown in Fig. 2, at the bottom or back end of the valve-case A, and simultaneously closing port *k* from communication with port *g*, Fig. 2, the compressed air from the supply-pipe unseating valve *c* and passing into the auxiliary reservoir until the equilibrium is restored, and, with the return of the compound trunk-valve B to the position shown in Fig. 2, communication is opened from the brake-cylinder, through port *k*, circumferential depression *o* on the compound trunk-valve B, and port *h*, Fig. 2, with the atmosphere, thereby allowing the air in the brake-cylinder to instantly escape, releasing at once, through the medium of the piston and connections, the brake-blocks.

It is evident that my invention can be used as a simple relief-valve, without any auxiliary reservoirs, by placing it between the brake-cylinder under each car and the branch-pipe leading from the supply-pipe, and making the following connections, that is, connecting the branch-pipe to the induction-port *y*, Figs. 2 and 6, and the brake-cylinder to port *g*, plugging port *h*, as shown in Fig. 5, by cross shading, to prevent dust and like matter from entering, as that port is not used.

The operation as a simple relief-valve is as follows: When the engineer wishes to put on brakes he turns the three-way cock in the supply-pipe, thereby closing communication with the atmosphere and opening communication from the reservoir to each car through the supply-pipe and branch to port *y*, Figs. 2 and 6, forcing the trunk-valve B to the back end of the case A, thereby closing eduction-port *k*, as shown in Fig. 2, when the compressed air will unseat valve *c* and pass from the branch-pipe through port *y*, air-passages *a*, and port *g*, into the brake-cylinder, actuating the piston and putting on the brakes.

To release the brakes the engineer turns the three-way cock so as to close communication with the reservoir and open communication with the supply-pipe running back through the train with the atmosphere. As soon as the pressure in the supply-pipe is reduced the back flow from the brake-cylinder commences, driving the compound trunk-valve B into the forward part of case A, as shown in Fig. 6, and opening communication from the brake-cylinder, through ports *g* and *k*, into the open air, thereby releasing the brake-cylinder piston and, through its connection, the brake-blocks.

The compound trunk-valve B may be packed at each end to prevent the leaking and injury, if so desired, and the valve-seat *m* may also be packed with suitable packing.

This supply relief-valve is automatic in its operation, is durable, and is free from liability to get out of order.

A stop-cock may be placed in the pipes leading from the auxiliary reservoirs to the valve-ports *g* on each car, so as to close the same in

case a car is to be removed from the train to prevent the brakes from being set.

The port *h* may be placed on any side of the case A A A′, retaining its position lengthwise, without changing the nature of my invention.

The manner of its use and operation will be readily understood by those skilled in the art.

I am aware that it is not new in air-brakes to use a hollow piston-valve having a supplemental valve working therein, the latter opening against the pressure, and hence I make no claim to the same; but

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

The combination, with the valve-casing having ports *y*, *g*, *h*, and *k*, of the hollow piston-valve and check-valve inclosed therein, to open with the pressure, the ends of the piston-valve having perforated cross-bars to support the stem of the check-valve, substantially as and for the purposes specified.

W. DAVIDSON JONES.

Witnesses:

WM. M. PAWLINGS,

HENRY E. GREENE.