

Improvement in Means for Operating Car-Brakes.

No. 130,323.

Patented Aug. 6, 1872.

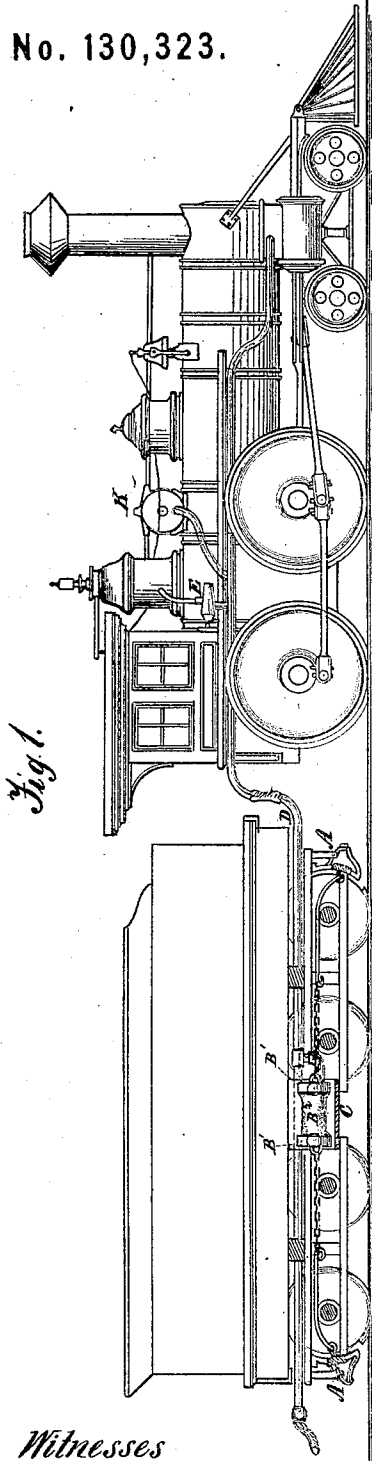


Fig. 1.

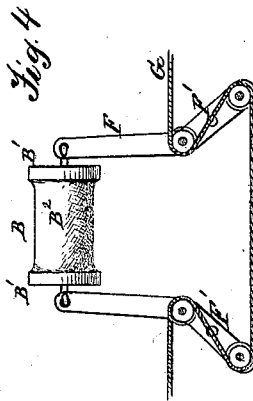


Fig. 4.

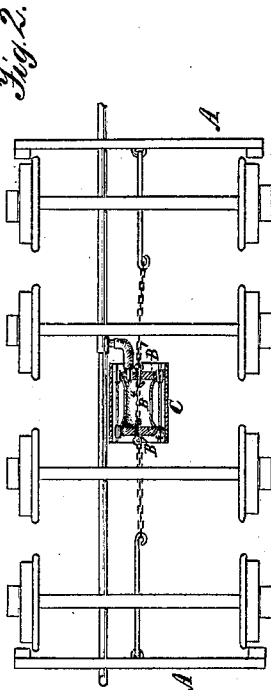


Fig. 2.

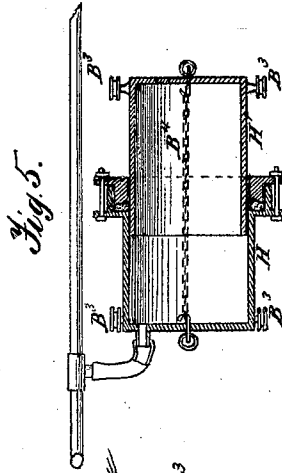


Fig. 5.

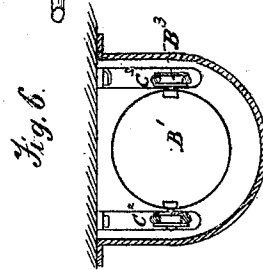


Fig. 6.

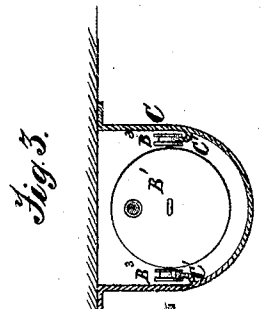


Fig. 3.

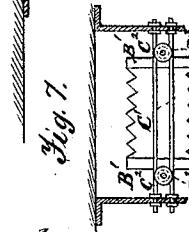


Fig. 7.

Witnesses
 A. Ruppert.
 W. Bradford

J. Y. Smith Inventor.
 D. R. Holloway & Co
 A. T. H.

J. Y. SMITH.

Improvement in Means for Operating Car-Brakes.

No. 130,323.

Patented Aug. 6, 1872.

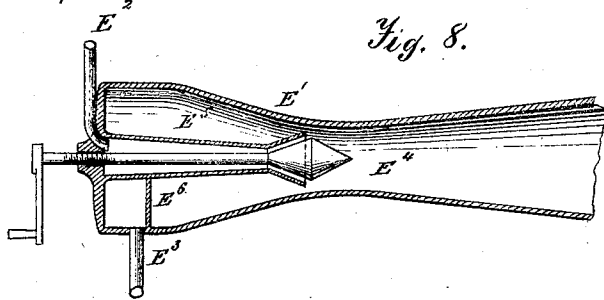


Fig. 8.

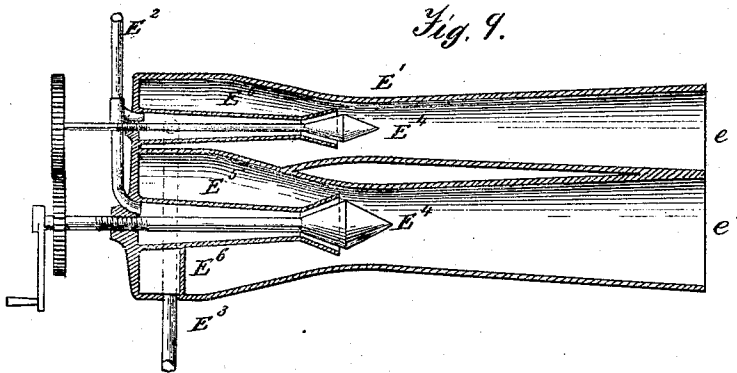


Fig. 9.

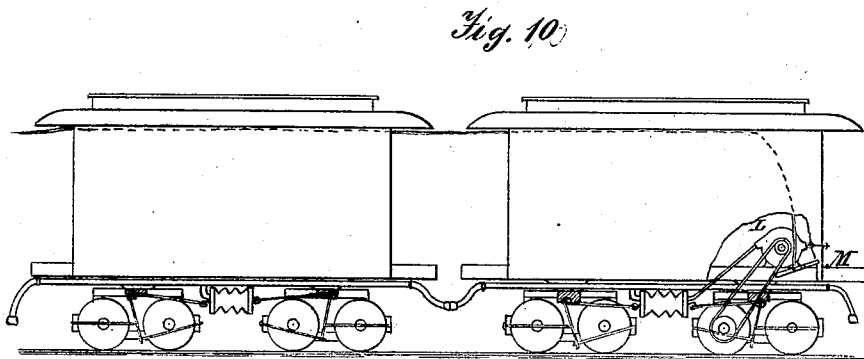


Fig. 10.

Witnesses:
 A. Ruppert.
 Ch. Bradford.

J. Y. Smith
 Inventor.
 D. P. Holloway & Co
 Attys.

UNITED STATES PATENT OFFICE.

JOHN Y. SMITH, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MEANS FOR OPERATING CAR-BRAKES.

Specification forming part of Letters Patent No. 130,323, dated August 6, 1872.

Specification describing an Improvement in Vacuum-Brakes for Railway Cars, invented by JOHN Y. SMITH, of Pittsburg, in the county of Allegheny and State of Pennsylvania.

This improvement is in the means of operating the brakes of railway cars by means of atmospheric pressure obtained by producing a partial vacuum, and applied to the operative mechanism connected with the brakes. It consists in the use of a cylinder of thin flexible material, instead of the diaphragms heretofore employed; also, in connecting the heads by a chain, or equivalent means, for controlling the outward movement of the heads; also, in the use of a shield for protecting the flexible material, and supporting or inclosing ways upon which the heads are supported; also, in combining, with the means for producing a partial vacuum, carried upon the locomotive, and operated by the engineer, a pump to be located on the rear car of the train, and operated from the axle or by hand to exhaust the air and apply the brakes to the wheels of such cars as may become detached; also, in combining, with mechanism for operating the brakes, new and improved means of exhausting the air; also, in combination of parts to be hereinafter specifically indicated in the specification and claims.

In the annexed drawing, Figure 1 is a side elevation of a locomotive and tender having the brake mechanism attached. Fig. 2 is a bottom view of a car with brake mechanism attached. Fig. 3 is a transverse section of the shield, showing the cylinder-heads. Fig. 4 is an elevation, showing one mode of operating the brakes. Fig. 5 is a longitudinal section of a vacuum-chamber formed by two metallic cups. Fig. 6 is a section of the shield, showing, also, ways attached to standards instead of to the shield, as in Fig. 3. Fig. 7 is a sectional elevation, showing the mode of constructing the ways. Fig. 8 is a longitudinal section of an improved device for exhausting the air. Fig. 9 is a similar section of a further improvement therein; and Fig. 10 is an elevation of the rear cars of the train, the sides of one being broken away to show the mechanism for applying the brakes independently of the engineer.

The same letters are employed in all the figures in the designation of identical parts.

In the patent of Nehemiah Hodge, of 1860,

he proposed to use a bellows-formed chamber made of leather or other equivalent material for operating his brakes by exhausting the air therefrom, the contraction of the chamber causing the casing to fold at the angles formed therein. Instead of this comparatively expensive structure, I propose to connect the iron heads B^1 by means of a cylinder of flexible material, B^2 , forming the vacuum-chamber B for operating the brakes A. The heads are carried on the friction-wheels B^3 , and the chamber is inclosed in a shield, C, on the inside of which are ways C^1 , on which the friction-wheels B^3 rest. Instead of having the ways attached to the shield, rods C^2 , as shown in Figs. 6 and 7, may be fastened to standards or hangers bolted to the bottom of the car within the shield, and the friction-wheels B^3 placed between them. A chain, B^4 , connects the heads and prevents their being drawn apart so as to strain the casing B^2 by the tension of the springs of the brakes A. Instead of the chain, stops may be placed outside of the heads to limit their outward motion; but I prefer the chain, as it will keep open the connection between the ends of the chamber and prevent the entire collapsing of the flexible cylinder B^2 . A pipe, D, extends from the locomotive under all the cars of the train, being coupled by flexible connections, and fitted with valves to close automatically, when the cars are disconnected, so as to cut off communication from both ends of the cars thus separated with the open air. As devices for this purpose are well known and are, some of them, in common use, they need not be herein described. This pipe or system of connected pipes communicates with the chambers B. The air may be exhausted through the pipe D by means of an air-pump on the locomotive; or the cylinder of the locomotive may be made to do duty as an air-pump when the steam is shut off; or an exhaust-jet, operating on the principle of a Geffard injector, may be employed alone or in connection with another form of air-pump.

I have shown, in Figs. 8 and 9, an improved form of steam-exhaust which I prefer to use for this purpose. In this apparatus E^1 is a cylindrical casing, formed substantially as shown, into which the steam is introduced through a pipe, E^2 . The air is exhausted through the pipe E^4 . The force of the jet is regulated by

a conical plug, E⁴, operated by a set-screw, determining its relations to the conical nozzle of the steam-induction pipe E⁵. This mode of regulation is not new; but in the injectors heretofore in use the plug has been advanced against a tapering nozzle to shut off the steam. This form of eduction-opening concentrates the current of steam in the center of the eduction-pipe of the injector; whereas mine, by giving the hollow conical jet of steam a divergent direction, drives it across the current of air, and consequently hastens its condensation and the consequent efficiency of the apparatus. In the lower semi-diameter of the injector I place a partition, E⁶, which, catching the water of condensation, prevents its flowing back into the induction-pipe E³, thereby performing the function of the check-valves heretofore employed. I also prefer to use the double injector shown in Fig. 9, one being larger than the other, and so constructed that, while the larger one will more rapidly exhaust the air, the smaller, with greater power or intensity but less capacity, will carry on the work of exhaustion when the larger one would no longer draw out the air, thereby producing a more perfect vacuum, but at the same time securing rapidity of action at the commencement of the work of exhaustion.

In the pneumatic brakes heretofore used or known no provision has been made for applying brakes to cars which may become separated from the train, and consequently the trains are furnished with hand-brakes and a full complement of brakemen to provide against accidents. I propose to put in the coupling-hose double valves or sets of valves, so that when the connection is broken both ends of the pipes shall be automatically closed. In the rear car I place a rotary pump, L, to be operated by hand or from a pulley on an axle, by means of which the air can be exhausted from the brake-cylinders, and the brakes applied independently of the connection with the locomotive. A bell-cord may be carried from the locomotive to the lever of a belt-tightener on the driving-belt of the auxiliary pump, so that the brake may be set by the engineer, or automatically when the bell-cord is broken on the separation of the cars. Rotary air-pumps K, driven by

rotary steam-pumps, taking steam from the locomotive, placed side by side on one shaft, may also be used for exhausting the air from the vacuum-chambers.

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

1. In combination with the car-brake, a vacuum-chamber formed by solid heads connected by a cylindrical tube of impervious material, substantially as described.
2. In combination with the solid heads of a flexible vacuum-chamber, chains or stops for controlling the outward movement of the heads, substantially as set forth.
3. In combination with the heads of the vacuum-chamber and the cylindrical and tubular casing B², the chain B⁴ for maintaining the communication between the ends of the chamber, substantially as set forth.
4. In combination with the flexible vacuum-cylinder, the shield C, supporting or inclosing guides C¹, substantially as set forth.
5. In combination with the brakes and vacuum-chamber, double steam-exhausts E⁴ E⁴, of different capacity, substantially as and for the purpose set forth.
6. In combination with the shell and induction air and steam pipes of the injector, the conical plug E⁴, arranged in relation to the flaring nozzle of the steam-induction pipe E⁵, substantially as set forth.
7. In combination with air-exhausting apparatus carried upon the locomotive, and vacuum-chambers, a supplemental air-pump, L, carried on the train, and valves for closing the pipes on the rear and front ends of the cars, which are separated when the train is broken apart, substantially as set forth.
8. In combination with the air-pump and tightener M, a cord for automatically acting on the latter when the train is broken, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN Y. SMITH.

Witnesses:

T. C. CONNOLLY,
RICH. COVINGTON.