(No Model.) 2 Sheets—Sheet 1.

G. S. LEE.

AIR BRAKE.

No. 557,512. Patented Mar. 31, 1896.

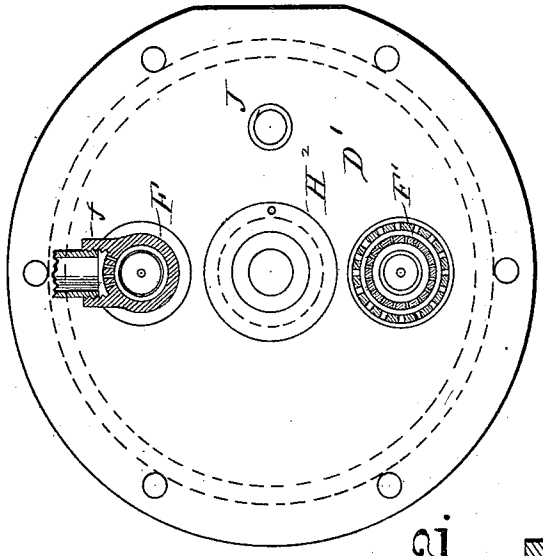

Fig. 2.

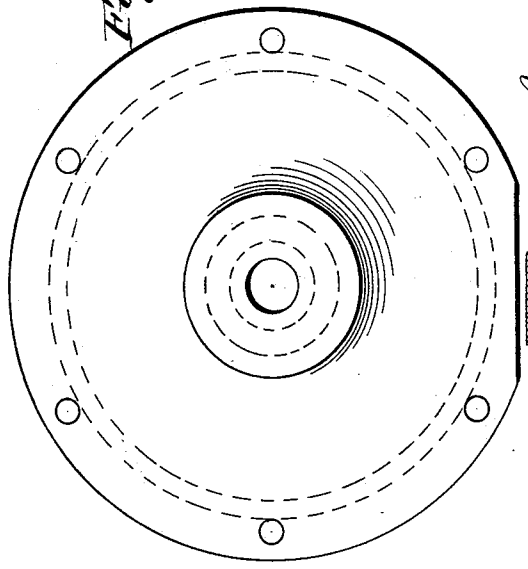

Fig. 3.

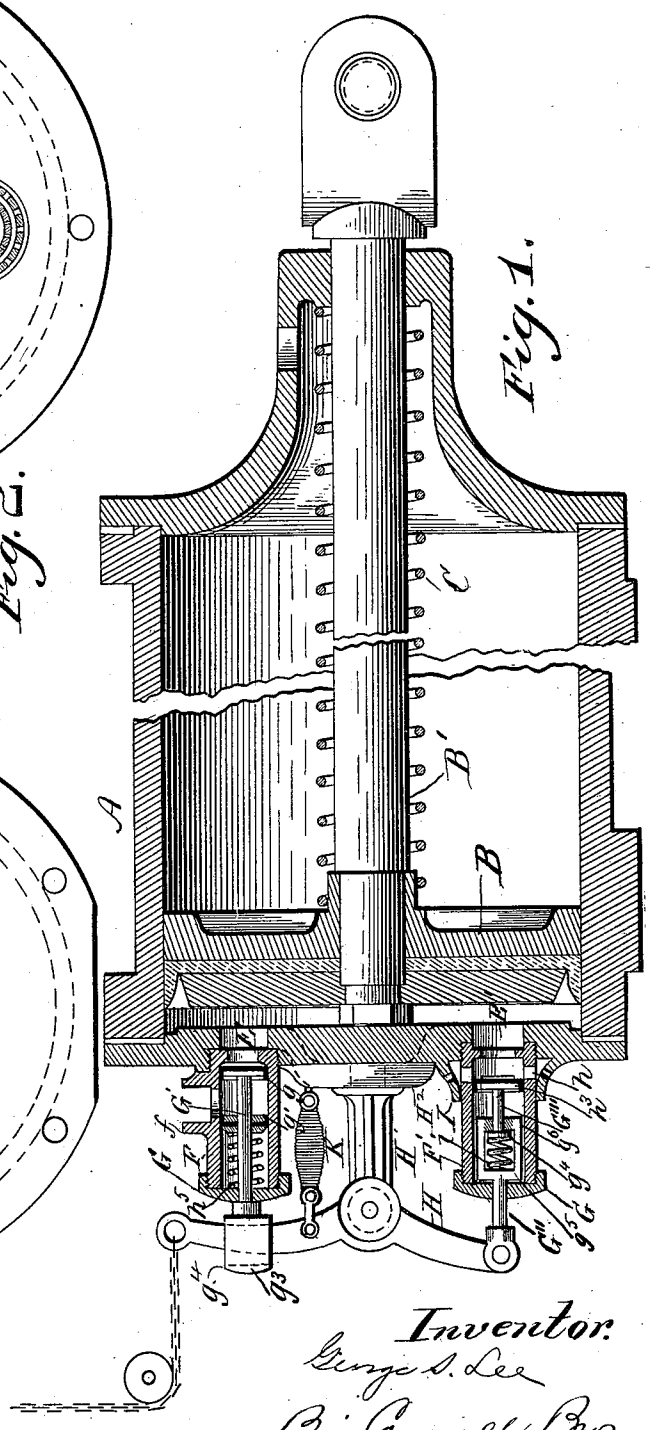

Fig. 1.

Witnesses:
J. B. McGirr.
W. Darrell.

Inventor:
George S. Lee
By Connolly Bro
Attys.

ANDREW B. GRAHAM, PHOTO-LITHO., WASHINGTON, D.C.

(No Model.) 2 Sheets—Sheet 2.

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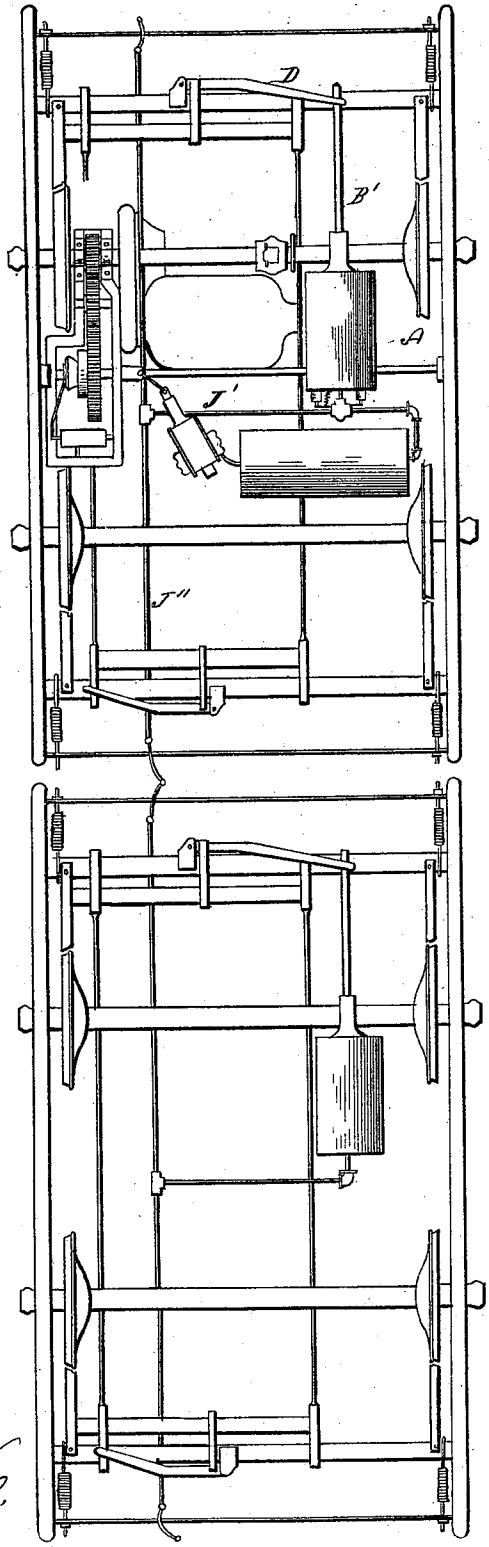
Fig. 4



Witnesses:
J. B. McGirr.
A. Lowell.

Inventor.
George S. Lee
By Connolly Bro
Attys

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

GEORGE S. LEE, OF HAWTHORNE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL AIR-BRAKE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 557,512, dated March 31, 1896.

Application filed December 21, 1895. Serial No. 572,891. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. LEE, a citizen of the United States, residing at Hawthorne, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Air-Brakes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to air-brakes for railway-cars and particularly for the cars of cable or electric railways, and has for its object the provision of novel means for controlling the supply of air to or from the brake or jam cylinder.

My invention consists in the combination, with the brake-cylinder of inlet and outlet valves, of valve controlling and operating mechanism of the peculiar construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a central longitudinal sectional view of a brake-cylinder embodying my improvements. Fig. 2 is a rear end view of the same. Fig. 3 is a front end view of the same. Fig. 4 is an under side plan of a motor-car and trailer.

In the drawings, A designates the brake-cylinder of the usual general construction.

B is the piston; B′, the piston-rod; C, the retracting-spring, and D the float-lever by which the brake-shoes are operated from the brake-cylinder and piston.

For the purpose of my invention I form the rear head D′ of the brake-cylinder with two diametrically-opposite ports E E′, one of which is an inlet and the other an outlet port, and to the head D′, in axial alinement with these ports, I attach the valve-casings F F′, consisting of metallic cylinders having their outer ends closed by screwed caps G G, through which the stems G′ G″ of the valves play and outside of which the stems are connected to an operating-lever H, fulcrumed on a bracket H′, which is screwed into a boss H^2 in the center of the cylinder-head D′.

The casing F, which is part of the inlet-valve, is bossed at *f* for connection with the supply-pipe leading from the air-reservoir. The valve-stem G′ carries a balanced valve consisting of two packed heads or disks *g g′*, the former seating on the rim or flange of the inlet-port and the latter located beyond the inlet-boss *f*, so that the air-pressure on both is the same. The stem G′ of the inlet-valve has attached to its outer end a block g^3, slotted at g^4 for the play of the lever H, which is allowed a certain amount of motion without affecting the inlet-valve, so that the outlet or escape valve may be closed tightly before the inlet-valve is opened. A spring h^5 is located between the disk *g* and the cap G of the inlet-valve casing.

The outlet-valve casing F′ is formed with a series of air-openings *h* around its base, and at this point is embraced or encircled by a bell-shaped cage I, also pierced or slotted, so that the escaping air from the cylinder will be distributed and caused to issue at a number of ports, so as to avoid the noise incident to the sudden and forcible escape of air at one point. The valve-stem is made in two relatively-movable parts, the inner part G‴ having attached to its inner end the packed valve-head h^3, seating on the edge of the cylinder-port and having on its outer end a head or collar g^4. A hollowed yoke g^5, having inwardly-projecting flanges or lugs g^6, is coupled to the stem-section G‴, and to the outer end of this yoke is connected the outer section G″ of the stem. Within the slotted or recessed portions g^7 of the yoke a spring *i* is arranged so as to bear on the head g^4.

The lever H being connected to the chain leading to the valve-operating mechanism on the car-platform, when it is desired to admit air to the brake-cylinder to operate the brakes the first or initial pull on the chain closes the outlet-valve, the yoke, spring, and inner section of the valve all moving together. While the valve is being closed the lever moves through the slot g^4 in the block g^3 and does not therefore operate the inlet-valve; but as soon as the escape-valve is fully closed the continuation of the pull on the valve-chain opens the inlet-valve, admitting air from the reservoir to the cylinder to operate the piston, and this continuation in the movement of the lever is taken up in the escape-valve by the independent movement of the yoke g_2

and spring *i*, the valve proper being incapable of further closing movement.

A powerful spring K is located between and attached at opposite ends to the cylinder head and lever, and when the pull on the chain is released this spring closes the inlet-valve and at once opens the outlet-valve, thus discharging the cylinder and allowing the piston to be retracted by its spring.

Trailer: In order to adapt the brake-cylinder to the brakeage of trailers, I provide in the head of the main brake-cylinder, under the motor-car, a port J, and connect thereto a branch J′, leading to a train-pipe J″, located under the car. Each car is provided with a like section of train-pipe leading to both ends of the car, and the trailers are each provided with an ordinary brake-cylinder without valves, and the train-pipe communicates with each brake-cylinder. The train-pipes are furnished with suitable stop-cocks at each end, and the sections of train-pipe are coupled together when a train is made up by suitable hose and flexible connections, such as are usually employed in air-brake systems in steam-operated railways. The train-pipe cocks on the extreme ends of the train are closed when the train is in running order. Now when the motorman operates the valves on the main brake-cylinder, the air is first admitted to the latter and from the same a part escapes to the train-pipe and is admitted to each brake-cylinder on the train, so that all the brake-cylinders on the train are operated simultaneously by the valve mechanism under the motor-car.

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a brake or jam cylinder, of separate supply and exhaust valves mounted on the head of the cylinder, and a valve-operating lever coupled to said valves by yielding connections, which will allow the lever by an initial movement to fully close the exhaust-valve without moving the supply-valve and by a further movement to open the supply-valve, after the exhaust-valve is fully closed.

2. The combination with a jam or brake cylinder for air-brakes of reciprocating supply and exhaust valves, coupled together by an operating-lever, the exhaust-valve being formed with a divided telescopic stem, and an interposing spring, so constructed and arranged that the parts move together when the valve is approaching its seat and that the movement of one section of the stem may be continued, after the seating of the valve, substantially as described.

3. The combination with the jam or brake cylinder of an air-brake, of reciprocating supply and exhaust valves, coupled together by an operating-lever for conjoint action, the supply-valve being connected to the operating-lever by a yielding connection which will allow the lever to be partially moved without operating the valve, and the exhaust-valve provided with a divided, telescopic stem, substantially as described.

4. The combination with the jam or brake cylinder having supply and exhaust valves attached thereto, and having a supplementary outlet-port, of a train-pipe running lengthwise of the motor-car and coupled to said port and provided with means for connecting the same with corresponding pipes in the trailer-cars, the latter being in connection with brake-cylinders, the whole being so constructed that the brakes on each car are simultaneously operated when the air is admitted to the main brake-cylinder by the operation of a single inlet-valve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE S. LEE.

Witnesses:
THOMAS A. CONNOLLY,
ANTHONY A. CONNOLLY.