(No Model.)

G. WESTINGHOUSE, Jr.

APPARATUS FOR RELIEVING PRESSURE IN BRAKE CYLINDERS.

No. 300,543. Patented June 17, 1884.

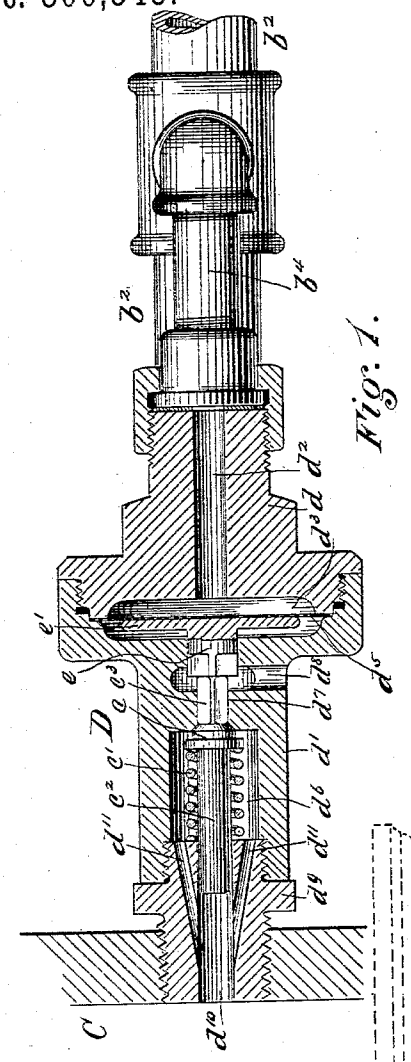

Fig. 1.

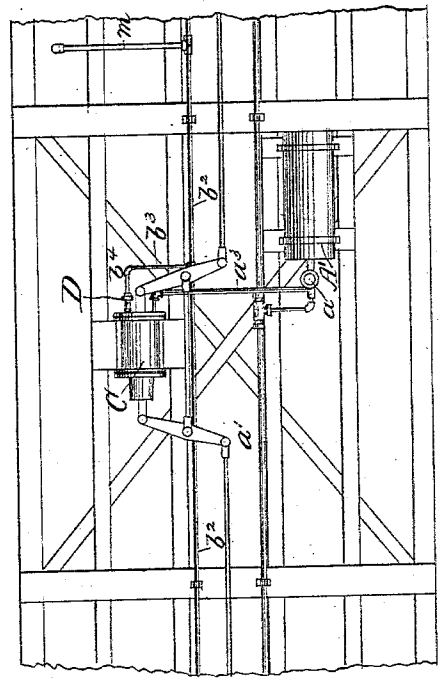

Fig. 2.

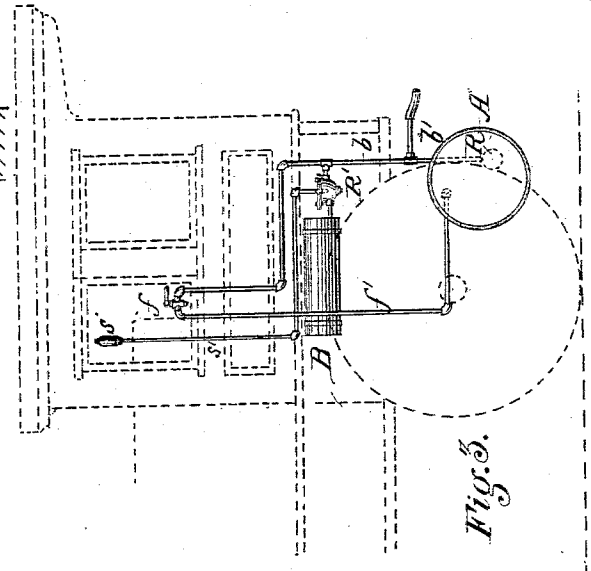

Fig. 3.

Witnesses
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GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR RELIEVING PRESSURE IN BRAKE-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 300,543, dated June 17, 1884.

Application filed November 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing at Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Apparatus for Relieving Pressure in Brake-Cylinders; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a sectional view (enlarged) of the valve for relieving the air-pressure in the brake-cylinder. Fig. 2 is a view of the bottom of a car, showing the usual arrangement of air-reservoir, brake-cylinder and pipes, the signaling-pipe, and the exhaust-valve. Fig. 3 is a side view of an engine-cab, showing the arrangement of the main reservoir, the auxiliary signaling-reservoir, and the necessary pipe-connections.

My invention is designed for use in connection with what are commonly known as "automatic brakes," and I have shown it as applied to the Westinghouse automatic brake, in connection with a signal-operating mechanism in which a fluid pressure in excess of atmospheric pressure, but less than the pressure in the brake apparatus, is ordinarily maintained.

It sometimes happens that the brakes are applied accidentally by the bursting of the hose-connection, and the object of this invention is to provide a means additional to that ordinarily used for releasing the brakes, and to this end I utilize the signal-operating pipe to convey pressure from the main reservoir to a valve mechanism the ports of which connect with the brake-cylinder.

A is the main reservoir, attached, as usual, under the foot-board of a locomotive. B is the signaling-reservoir. A′ is the auxiliary reservoir, usually arranged one under each car, and C is the brake-cylinder, which is provided with a piston and piston-stem connected with a brake-lever in any suitable way.

The location of the triple valve is shown at a and the brake-pipe at a', Fig. 2. The triple valve and brake-cylinder are connected by the pipe a^3. The main reservoir A is provided with a reducing-valve, R. This valve R is connected by a pipe, b, through a short branch to a signaling-valve, R′, on the end of the signaling-reservoir B, and the signaling-valve R′ is connected by a pipe, s', to the signal s, which in this case is a whistle. By the use of the reducing-valve R only sufficient pressure is maintained in the signaling-reservoir and its pipes extending under the train to operate the signal. The pipe b is extended above the signaling-valve, and is connected with one of the ports of a cock, f, the other port of this cock being connected by a pipe, f', with the main reservoir A. Near the main reservoir, but above the reducing-valve, the pipe b is provided with a branch b', which is connected with the signaling-pipe b^2, extending under the cars, the signaling-pipe under each car being connected with the pipe under the tender or other cars by the usual hose and coupling.

Under each car the signaling-pipe is provided with a branch, b^3, which is connected by an elbow, b^4, to the valve mechanism D, which is connected to the same head of the brake-cylinder as the pipe a^3, leading from the triple valve a. This valve mechanism D, Fig. 1, is formed of two parts, d and d', recessed at their ends, which recesses form, when the parts are secured together, the diaphragm-chamber d^1. The part d is also provided with a longitudinal passage, d^2. In the chamber d^1 is placed the flexible diaphragm d^3, which is held at its edge between the two parts d and d' of the valve-case. Within the part d' is formed a valve-chamber, d^4. From one end of this chamber d^4 extends a passage, d^7, connecting the chamber d^4 with the recess d^5. This passage d^7 is intersected by an exhaust-port, d^8. The other end of the chamber d^4 is tapped, and into the end of this chamber is screwed the plug d^9. This plug also is screwed into the cylinder-head, and is provided with a central longitudinal passage, d^{10}, and a series of two or more inclined passages, d^{11}. These inclined passages connect the chamber d^6 with the passage d^{10}, midway of its length. The end of the passage d^7 which opens into the valve-chamber d^6 is provided with a valve-seat, against which is normally pressed the valve c by the spring c', which surrounds one of the valve-stems c^2 and bears at its ends against

the valve c and the plug d^9. The valve-stem c^2 extends throught he valve-chamber d^6, and enters and is guided by the central passage, d^{10}, of the plug d^9. The other side of the valve is provided with a short-winged stem, c^3, which extends into the passage d^7 and guides the valve c to its seat. Against the end of the winged stem bears the pressure-stem e, which works in the enlarged part of the passage d^7 to the right of the exhaust-port d^8. The end of this pressure-stem, where it extends into the exhaust-port d^8, is provided with wings, and its end which extends into the diaphragm-chamber d^3 bears by its enlarged head c' against the diaphragm d^5.

The operation of my mechanism is as follows: The main reservoir A, the signal-reservoir B, the auxiliary reservoirs A′ under the cars, and the brake and signal pipes are all charged with fluid under pressure, the pressure in the signal reservoir and pipes being less than that in the other reservoirs and pipes. The brakes having been applied by the bursting or breaking of the brake-pipes, to release them the engineer turns the cock f, thereby allowing the full pressure of the main reservoir to act in the signal-pipes. This pressure, acting on the diaphragm d^5, moves the stem e^3, and through that the valve c is unseated, thereby allowing a free exhaust from the brake-cylinder through passages d^{10} and d^{11}, the chamber d^6, the passage d^7, and the exhaust-port d^8, and thus relieving the wheels from the pressure of the brake-shoes.

The spring c' should have sufficient tension to withstand the normal pressure in the signal-pipes, which, as before stated, is less than that in the main and auxiliary reservoirs and the brake-pipes.

Under each car is formed a branch, m, in the signaling-pipe, said branch extending up into the car, where it is provided with a suitable cock to enable the conductor to signal to the engineer by allowing a slight escape of fluid from the signal-pipe.

In so far as relates to the construction of the parts hereinbefore described, I consider all known substitutes and equivalents therefor as within the scope of my invention.

I claim herein as my invention—

1. The method of releasing brakes operated by an artificially-created fluid-pressure, consisting in releasing the pressure in the brake-cylinder by increasing the fluid-pressure on a movable diaphragm, substantially as set forth.

2. The combination of a brake-cylinder, an exhaust-valve, an independent signal-pipe, the main reservoir, and a cock for admitting the full pressure of the main reservoir into the signal-pipe, substantially as set forth.

3. In a fluid-pressure brake mechanism having a brake-pipe for operating the brakes by the use of any desired pressure, and a signal-pipe normally charged with a less pressure, both connected with the brake-cylinder, and, in combination therewith, a pressure-relieving mechanism arranged in the line of communication from the signal-pipe to the brake-cylinder, and a cock arranged in the pipe which connects the main reservoir with the signaling-pipe, substantially as set forth.

4. A fluid-pressure brake and signaling apparatus having, in combination, a brake-pipe and an independent signaling-pipe, a connection from one to the other through a common reservoir, and means for keeping the signaling-pipe continuously charged with fluid-pressure, but at a less pressure than that normally contained in the brake-pipe, substantially as set forth.

5. In combination with a brake-cylinder, C, and a pipe, a^3, for the supply and discharge of fluid-pressure in the normal operation of the brakes, an independent exhaust-valve, a movable diaphragm for operating said valve, a spring to hold said valve to its seat as against normal pressure, and a fluid-pressure-supply pipe and cock for applying an excess of fluid-pressure to unseat said valve, substantially as set forth.

6. In an exhaust-valve, the combination of the parts d and d', the part d having the passage d^2 and recess d^3, the part d' having the passages d^{10}, d^{11}, d^6, d^7, and d^8 and recess d^3, the diaphragm d^5, the presser-stem e, the valve c, provided with guides, and the spring c', substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEORGE WESTINGHOUSE, JR.

Witnesses:

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