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DIRECT AIR BRAKE SYSTEM.

APPLICATION FILED APR. 1, 1909.

951,987.

Patented Mar. 15, 1910.

Fig. 2.

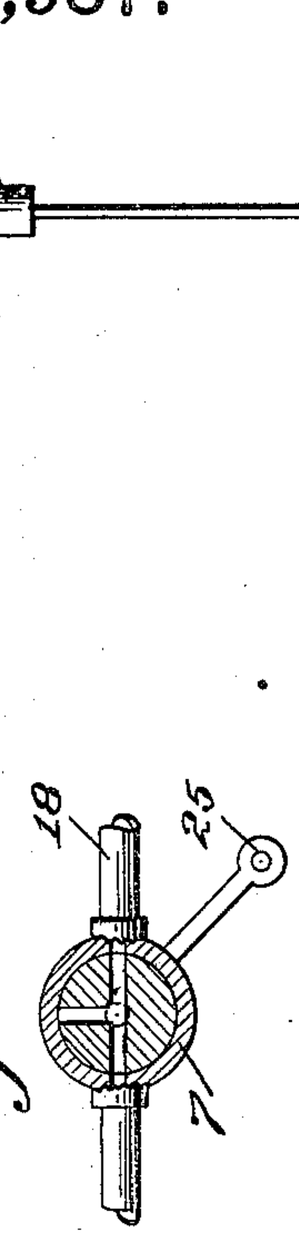

Fig. 1.

WITNESSES:

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DIRECT AIR-BRAKE SYSTEM.

951,987. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed April 1, 1909. Serial No. 487,157.

To all whom it may concern:

Be it known that I, ARTHUR DOAN, citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Direct Air-Brake Systems, of which the following is a specification.

My invention relates to air-brake systems for railway service, and pertains especially to an automatic auxiliary attachment.

There are two generally recognized systems of air-brake control, one known as the straight air, and the other as the automatic. The ordinary straight air system takes the air direct from the main reservoir or reservoirs on the engine, through the train-line and delivers it into the brake cylinders, without the use of any auxiliary reservoirs or triple valves on the cars. The chief objection to this system is the danger of the train breaking in two and allowing it to run away, because when the connections are interrupted with the main reservoir on the engine, in such a system, there is nothing to operate the brakes. In the automatic system, a triple valve and auxiliary reservoir is employed on each car, with sufficient reserve pressure generally maintained in the auxiliary to operate the brakes.

I have designed a system in which I combine with the usual and simple straight air system, an auxiliary system which does away with the triple valve and employs a special arrangement of mechanism whereby on anything going wrong with the air in the main reservoir or pumps, or the train breaking in two, the brakes will be set automatically. My system is applicable alike to freight or passenger trains, and may be operated by the usual signal line.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic representation in elevation and partial section of my system. Fig. 2 is a sectional view of a suitable form of three-way cock.

A represents the usual pump, and 2 the main reservoir, both located on the engine.

3 represents a straight air line leading from the reservoir, and connected across the gaps between the cars by the usual flexible coupling 4.

5 is an air-brake cylinder operated from the straight air line 3 by the air passing through the branch pipe 6 and the three-way valve 7. The passage of the air from the reservoir 2 into the straight air line 3 is suitably controlled by the usual engineer's valve 8.

In ordinary running, to set the brakes, the engineer throws the valve 8 to allow the air to pass into the straight air line 3, and thence through the normally open valve 7 to the brake cylinder 5. When it is desired to release the brakes, the valve 8 is turned in the opposite direction, and exhaust takes place through a pipe 9 beneath the engine.

So much of the mechanism thus far described represents the straight or direct air system.

Connecting with the main reservoir 2 is a pipe 10 by which the air is led into the auxiliary line 11 through a regulating valve or governor 12 and a three-way cock or valve 13. The gaps in the line 11 between the cars are bridged by a hose coupling 14 similar to coupling 4.

15 is an auxiliary reservoir on a car, connecting with the auxiliary line 11 by a pipe 16 in which are disposed the check-valves 17. If the pressure in the main reservoir 2 is 150 or 200 pounds, more or less, it is designed that the reservoir 15 should contain a constant pressure of say 75 to 100 pounds; this pressure in the reservoir 15 being controlled by the governor 12. The reservoir 15 is also connected with the brake cylinder 5 by a pipe 18, but the flow of air from reservoir 15 to the brake cylinder 5 is normally cut off by means of the three-way valve 7, since it is only designed to operate the cylinder from the auxiliary 15 when the air in the straight line pipe 3 fails, or the train breaks in two, or something else goes wrong with the system.

Leading out from the cylinder or reservoir 15 is a small pipe 19 which taps the valve casing 20, in which is a port 21 leading into a cylinder 22 on top of the piston 23. The stem 24 of piston 23 extends down through a suitable stuffing-box in the lower end of cylinder 22 and connects with lever 25 on the stem of the three-way cock 7. A spring 26 acts on the under side of piston 23 normally to hold it up and keep open valve 7 so that the straight line pipe 6 will ordinarily be in communication with the brake cylinder, at the same time cutting off communication between the latter and the

auxiliary 15. This spring is particularly employed to insure the piston 23 being held up so as not to turn off the valve 7, and in case it is necessary or desired to cut out the auxiliary at any time by the normally open cock 19′.

The port 21 is controlled by a needle valve 27 carried by a piston 28 which works in a cylinder 29 formed in the casing 20. The space on the under side of each of the pistons 23 and 28 is in constant communication through the branch pipes 30 and pipe 31 with the auxiliary line 11, and the pressure of the air in this auxiliary line is effective ordinarily to lift both pistons 23 and 28, the one to turn the valve 7 so as to cut out the auxiliary reservoir 15 from the brake cylinder, and the other piston 28 operative to close port 21.

In practice, the auxiliary reservoir 15 is maintained normally charged at a pressure sufficient to operate the brake cylinder in case of need. Ordinarily, though, this auxiliary system is not called into use except when something goes wrong with the pump, or the train breaks in two; under all other conditions the brake cylinder being operated through the air from the straight line pipe 3 by suitably manipulating the engineer's valve 8. In case an emergency arises where the straight air line fails, then either by turning the lever 13 to allow exhaust to take place to the atmosphere through a port 32, or in case the train breaks in two, so as to reduce the pressure in the auxiliary line 11, then, and in that event, the pressure being reduced on the under side of the pistons 28 and 23, allows the air from the auxiliary to pass in on top of piston 23, forcing the latter down, turning valve 7, and cutting off communication between the brake cylinder and pipe 6, and opening communication between the brake cylinder and auxiliary 15; and thereupon the air passing from the auxiliary to the brake cylinder operates the brakes.

It is to be observed that I do not use a triple valve in this system, but by a combination of the straight line and my auxiliary system I obtain an automatic system which is very simple, and which, moreover, possesses the desired requisites of safety.

Under some circumstances the auxiliary line 11 may be used for the signal line, and the signal mechanism in the cab (not necessary here to be shown) may be operated from a lever 33; thus rendering the system of automatic signals from the train to the cab applicable on freight trains.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. The combination in an air-brake system, of a main reservoir, a brake cylinder, a straight line connection between the brake cylinder and said reservoir, a three-way valve and an engineer's valve in said connections, an auxiliary line connected with the main reservoir, a supplemental reservoir connected therewith, and mechanism controlled by the difference in pressure between the auxiliary line and the auxiliary reservoir, said mechanism being normally connected with the three-way valve and operating said three-way valve so as to cut out the straight line connection and connect the auxiliary reservoir with the brake cylinder.

2. In an air-brake system, the combination of two air lines connected therewith, a brake cylinder connected with each air line, a three-way valve in said last-named connections and operative to connect the brake cylinder with one or the other of said lines, one of said lines connected with an auxiliary reservoir, and fluid-controlled mechanism for operating said three-way valve, said mechanism including a spring pressed piston subjected to fluid pressure and a lever on the three-way valve connected to said piston.

3. In an air-brake system, the combination of a main reservoir, a brake cylinder, a straight air line connection between the brake cylinder and main reservoir, an engineer's valve and a three-way cock in said connections, an auxiliary line connected with the main reservoir, an auxiliary reservoir with which said auxiliary line connects, a governor valve and a three-way valve in the auxiliary line, connections between the auxiliary reservoir and the brake cylinder through said three-way cock, and mechanism for actuating said three-way cock operative through the difference in pressure between the auxiliary line and the auxiliary reservoir.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR DOAN.

Witnesses:
CHARLES A. PENFIELD,
CHARLES EDELMAN.