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SUPPLEMENTAL AIR BRAKE MECHANISM.

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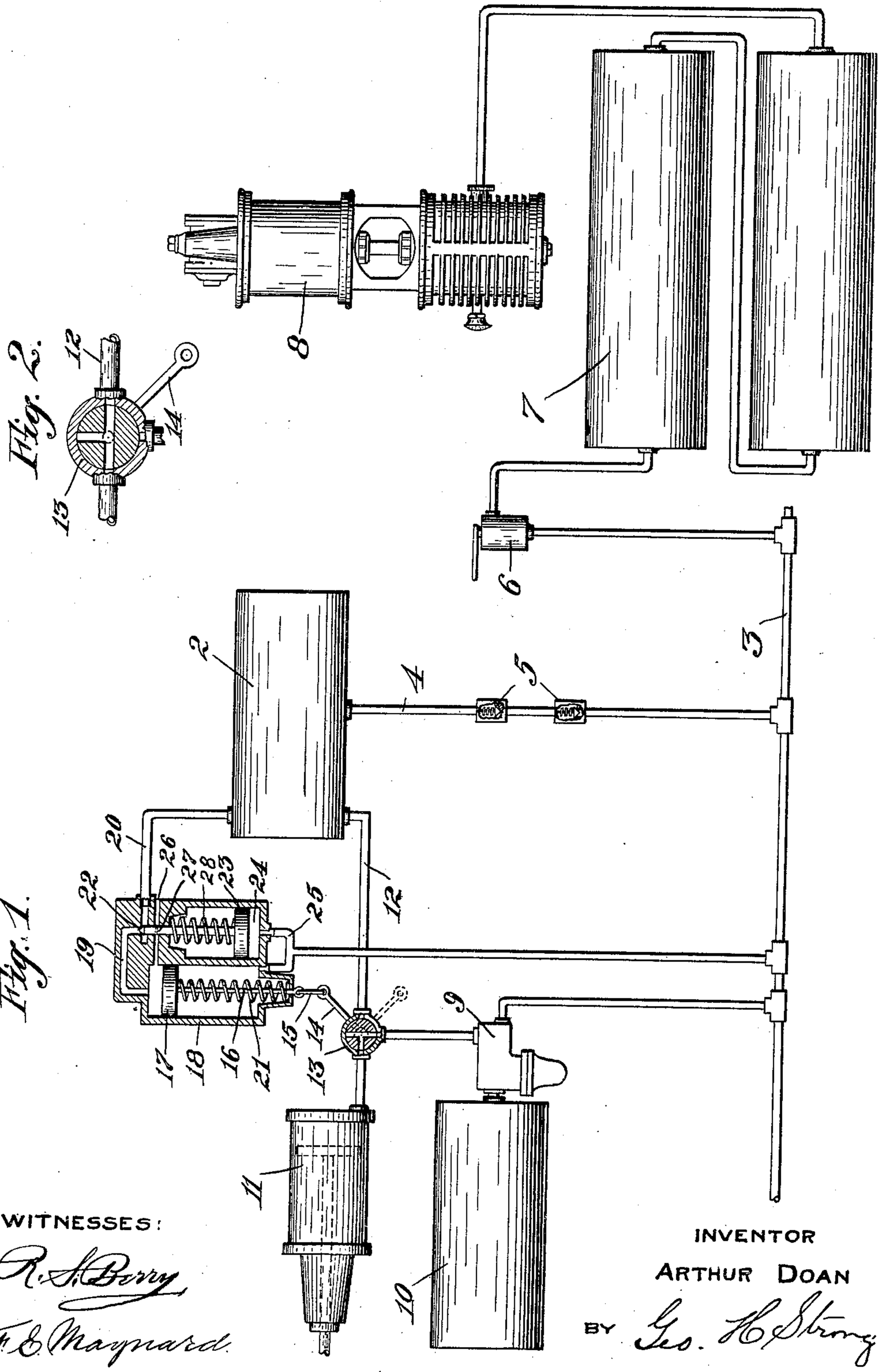
934,293. Patented Sept. 14, 1909.



WITNESSES:

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SUPPLEMENTAL AIR-BRAKE MECHANISM.

934,293. Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed March 10, 1909. Serial No. 482,527.

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 Supplemental Air-Brake Mechanism, of which the following is a specification.

This invention relates to air-brake systems for railway service, and pertains particularly to automatic safety appliances for use in conjunction with systems already installed.

The objects of my invention are to provide a device which will insure the proper and positive application of the wheel-brakes automatically under all conditions; to provide a safety apparatus that will automatically charge and discharge itself without the direct attention of the engineer; to provide a device, in combination with the usual air-brake system, that will be effective to apply sufficient pressure to the brake cylinder to cause the brakes to stop the train in case the train-line is broken, or pressure in the train-line becomes reduced so that the air pressure in the train line is unable to perform its required functions.

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 elevation of the apparatus some parts being in section. Fig. 2 is a section of the three-way valve.

In the present embodiment of my invention I employ an air-reservoir 2 which is connected to the usual train-line or pipe 3 by pipe 4, in which are mounted suitable check-valves 5 adapted to open to permit fluid to pass from the train-line 3 into the reservoir 2, and to prevent back flow to the train line when the pressure in the latter is less than that in the reservoir 2. The pressure of fluid in the train-line 3 is controlled by the usual engineer's valve 6 through which air is admitted from the usual main reservoir 7, this being charged by the pump 8. Thus when the engineer opens the valve 6, allowing high pressure into the train-line 3, the safety reservoir 2 is charged to an equal pressure with the train-line.

At 9 is shown the common triple valve through which air may be admitted into the brake-reservoir 10; whence it may again pass through valve 9, (when the engineer operates the control valve 6 to reduce the pressure in train-line 3) to the brake cylinder 11, and so operate the brakes in the usual fashion.

It has been found that sometimes, especially when the train is running down a long grade, the pressure in the brake reservoir 10 is allowed, through accident or carelessness, to get so low that it does not exert sufficient force on the brakes to check or hold the trains, thereby resulting in a runaway, or else calling for the application of the hand-brakes. To obviate this, I connect the brake cylinder 11, and the auxiliary reservoir 2 by a pipe 12, in which is disposed a three-way valve 13. Valve 13 is so arranged that when it is turned one way, the air may pass directly from the reservoir 10 to the brake cylinder 11, but when the valve is turned another way (and which position is its normal position) no air passes through pipe 12. The pipes 4—12 constitute a by-pass connection between the train-line and brake cylinder 11 controlled by valve 13, and the latter is controlled automatically by the air pressure in the train-line by the following means: The valve 13 is provided with a handle 14, to the free end of which a link 15 is connected to a piston-rod 16 secured in the piston 17, slidable in the chamber 18. The upper end of chamber 18, above piston 17, communicates with the air pressure reservoir 2 through the port 19 and pipe 20. A spring 21 acts on the under side of the piston to tend to raise it. The use of this spring however is optional. Port 19 is controlled by a needle-valve 22 secured in a piston 23 reciprocating in chamber 24, and the two chambers 18 and 24 are connected at their ends by the ports 19 and by a forked pipe 25 communicating with the train-line 3. The pressure of the air in the train line is normally effective upon piston 23 to lift the latter and close valve 22, and also uphold piston 17 and close valve 13.

The operation is then as follows: Should

the pressure in the train-line 3 be reduced excessively, or below a given safe pressure so as to lower the pressure on the under sides of the pistons 17 and 23 below the normal high pressure in the supplemental tank 2, the piston 23 would be depressed by the spring 28 and allow the fluid in the reservoir 2 to enter chamber 18 above the piston 17 and depress this, thus turning the lever 14 so that the valve 13 will be actuated, establishing direct communication between the brake cylinder 11, and the high pressure reservoir 2. The pressure in the latter will then be effective to positively set the brakes irrespective of the pressure in the train-line 3. This gives the pump a chance to catch up in its work, and bring the air in the train-line again up to a safe pressure. As soon as normal pressure is again established through the system, the pistons 17 and 23 will be actuated through the pressure in pipe 25 to close valve 22, and turn the lever 14 to cut off communication between the brake cylinder and the reservoir 2; the brakes then being taken care of by the air through reservoir 10. When the valve 22 closes the air above piston 17 escapes through port 26 in the piston casing and port 27 in the valve 22; which ports coincide only when the valve is seated so that there is no loss of pressure when the valve 17 is open.

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

1. In an air-brake system, the combination with a train-line pipe and the brake cylinder, the auxiliary reservoir, triple valve, and connections between the train-line through the triple valve and auxiliary reservoir to the brake cylinder, of a by-pass connection between the train-line and the brake cylinder around the triple valve, a valve in said by-pass, a high pressure reservoir chargeable from the train-line and interposed in said by-pass, and means controlled by the difference in pressure between said high pressure reservoir and the train-line for opening and closing the valve in the by-pass.

2. The combination in an air-brake system, of a train-line, a brake cylinder, a high pressure reservoir connected with the train-line and also having a fluid connection with the brake cylinder, a valve in said connection between the high pressure reservoir and the brake cylinder, and means operated by the difference in pressure between the high pressure reservoir and the train-line to actuate said valve, said last-named means including a cylinder inclosing a piston, which latter is connected with the stem of said valve, said valve being closed and opened by the movements of said piston, connections between the space at the top of said piston and said high pressure reservoir, and a valve in said last-named connections and operable by the pressure in the train-line.

3. The combination in an air-brake system, of a train-line, a brake cylinder, a high pressure reservoir connected with the train-line and also having a fluid connection with the brake cylinder, a valve in said connection between the high pressure reservoir and the brake cylinder, means operated by the difference in pressure between the high pressure reservoir and the train-line to actuate said valve, a piston operating in a cylinder, connections between the piston and said valve to operate the latter in unison with the movements of the piston, said cylinder connected at one end with said high pressure reservoir and connected at the opposite end with the train-line independent of said high pressure reservoir, and a valve in said connections between said piston cylinder and high pressure reservoir, said valve operative through said connections between the piston cylinder and train-line.

4. The combination in an air-brake system, of a train-line, a brake cylinder, a high pressure reservoir connected with the train-line and also having a fluid connection with the brake cylinder, a valve in said connection between the high pressure reservoir and the brake cylinder, means operated by the difference in pressure between the high pressure reservoir and the train-line to actuate said valve, a piston operating in a cylinder and connected with the valve stem to operate the latter on the movement of the piston, said cylinder connected at one end with the high pressure reservoir and the other end connected with the train-line, and a valve in the said connections between said last-named cylinder and said high pressure reservoir, said valve having a stem connected with a piston operating in an independent cylinder, and which latter cylinder is also connected with the train-line independent of the high pressure cylinder.

5. The combination in an air-brake system, of a train-line, a brake cylinder, a high pressure reservoir connected with the train-line and also having a fluid connection with the brake cylinder, a valve in said connection between the high pressure reservoir and the brake cylinder, means operated by the difference in pressure between the high pressure reservoir and the train-line to actuate said valve, a piston operating in a cylinder and connected with the valve stem to operate the latter on the movement of the piston, said cylinder connected at one end with the high pressure reservoir and the other end connected with the train-line, and a valve in the said connections between said last-named cylinder and said high pressure reservoir, said valve having a stem connected

with a piston operating in an independent cylinder, and which latter cylinder is also connected with the train-line independent of the high pressure cylinder, the stem of said last-named valve having a port registrable with exhaust ports in said first-named piston cylinder.

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

ARTHUR DOAN.

Witnesses:
CHARLES A. PENFIELD,
CHARLES EDELMAN.