T. B. COYLE.

SAFETY VALVE FOR AIR BRAKES.

APPLICATION FILED MAY 11, 1910.

967,731. Patented Aug. 16, 1910.

Fig. 1.

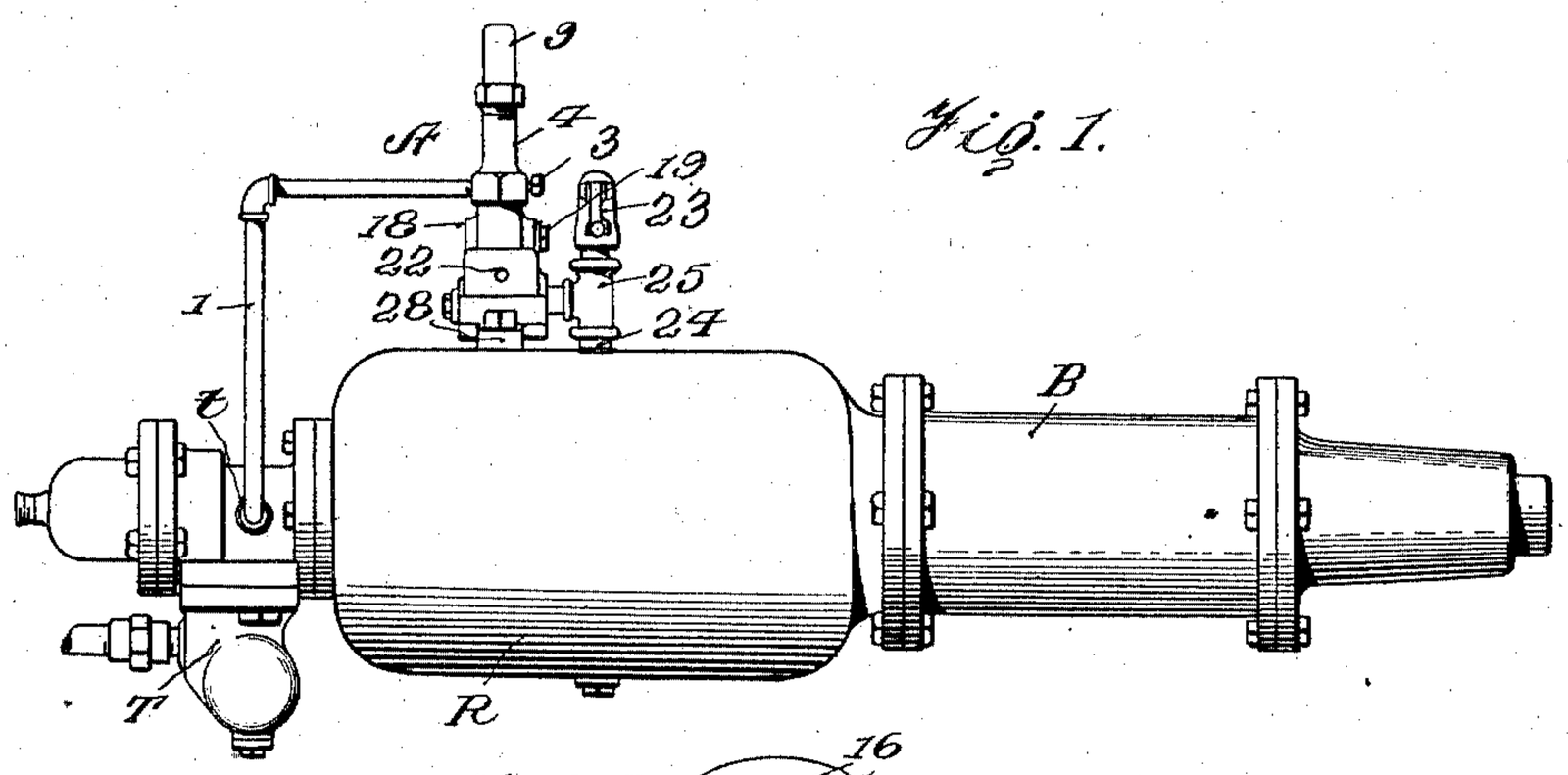


Fig. 2.

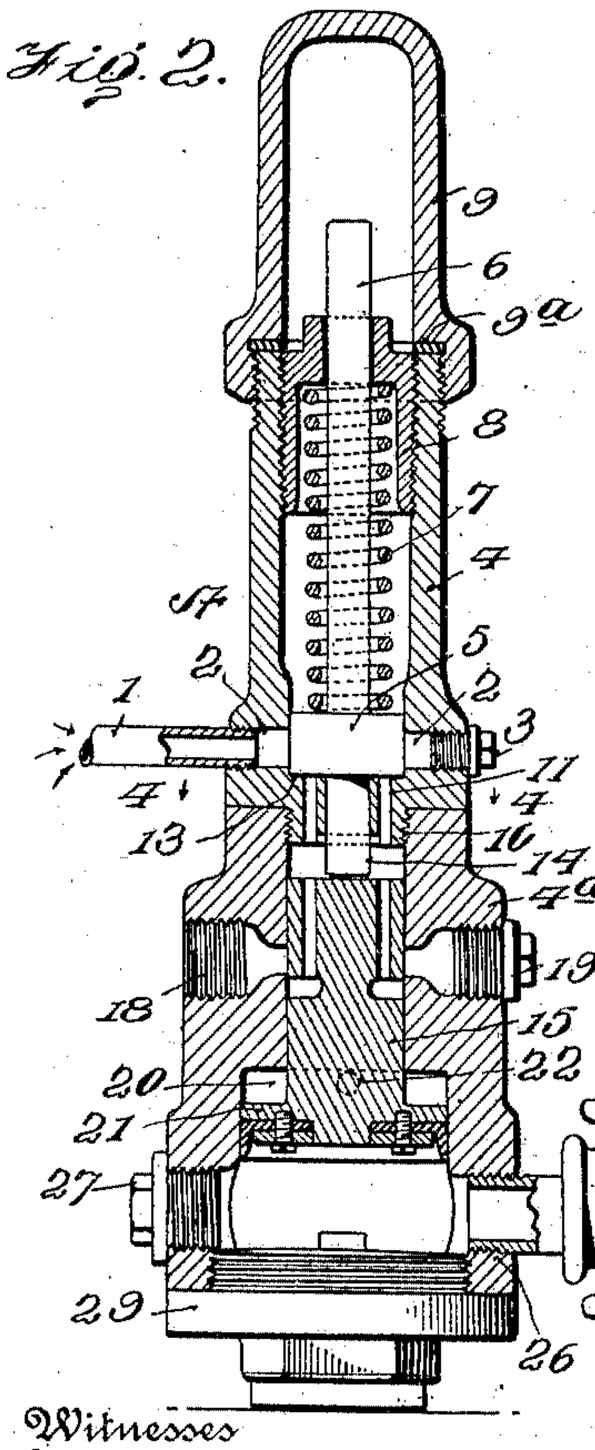


Fig. 5.

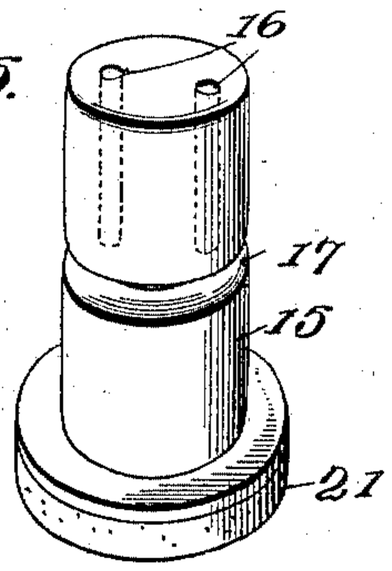
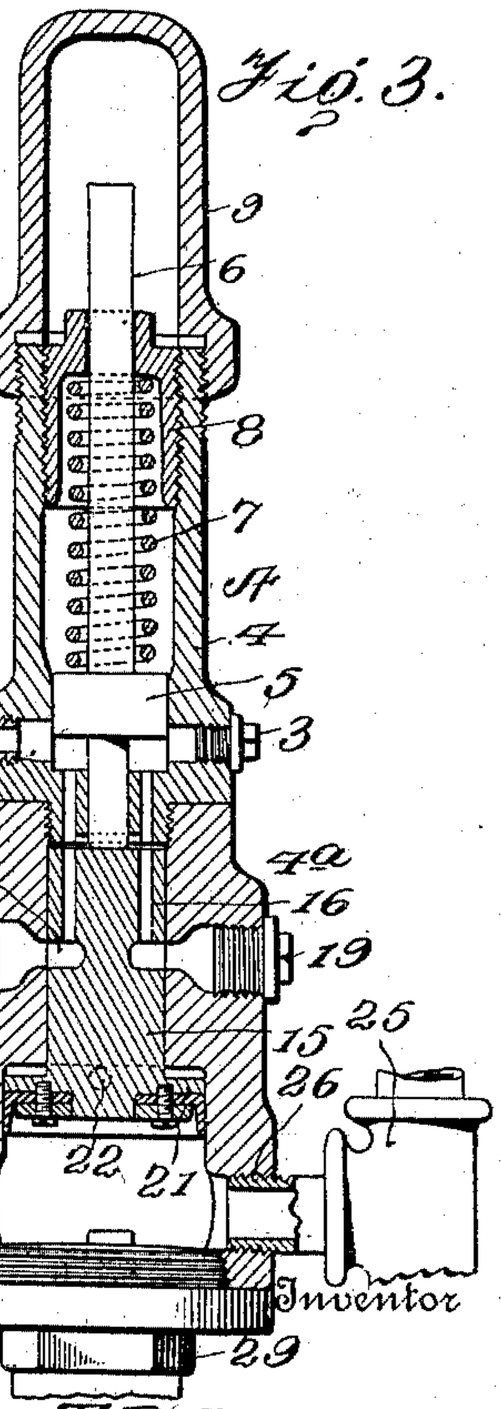


Fig. 3.



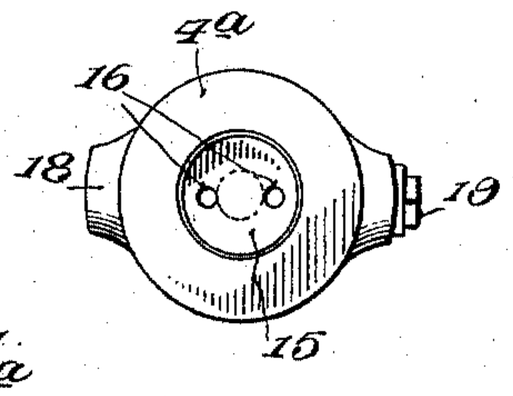


Fig. 4.

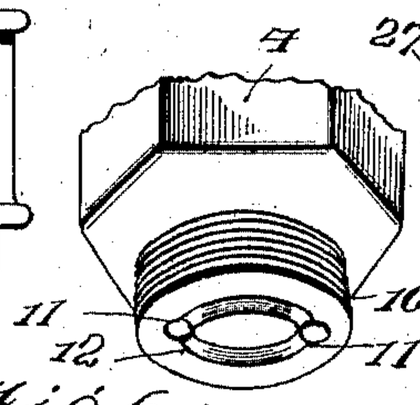


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

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SAFETY-VALVE FOR AIR-BRAKES.

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To all whom it may concern:

Be it known that I, THOMAS B. COYLE, a citizen of the United States, residing at Ashley, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Safety-Valves for Air-Brakes, of which the following is a specification.

This invention comprehends certain new and useful improvements in fluid pressure brake systems, and has for its primary object a simple, durable and efficient construction of safety valve which will positively and automatically prevent the releasing of the brakes after any application thereof, until the auxiliary reservoirs have been recharged to normal pressure, thereby precluding the possibility of the train running away on a grade by the premature releasing of the brakes, that is, before normal or standard pressure has been restored.

The invention also has for its object a safety valve of this character which will not interfere with any of the ordinary functions of the brake appliances, which will not require any changes in construction of the standard railway brake equipments now in common use, and which will be sensitive in its action to automatically permit the releasing of the brakes as soon as the auxiliary reservoirs have been recharged to a predetermined pressure, the device being capable of adjustment, whereby the releasing action may be caused to take place with the air pressure in the auxiliary reservoirs at different degrees of pound pressures.

The invention also has for its object an improved safety valve which in its operation will provide that the rear of a train equipped with the invention will release more quickly, or at least as quickly as the brakes at the head end of the train. And the invention has for a further object to generally improve this class of devices, to render them susceptible of more general use and adaptation, and to render them possessed of simplicity, the parts being comparatively few in number and capable of being freely assembled and disassembled.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of my improved safety valve, illustrating it in an applied position; Figs. 2 and 3 are enlarged vertical sectional views of the valve, illustrating the parts thereof in two different positions; Fig. 4 is a top plan view of the lower section of the valve casing; Fig. 5 is a detail perspective view of the piston valve which is mounted in such section; and, Fig. 6 is a fragmentary perspective view of the lower end of the upper section of the valve casing.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawing, B designates a brake cylinder, R an auxiliary reservoir and T a quick action triple valve, all of these parts being of any desired or conventional type and design, selected for the purpose of illustration only.

Generally speaking, my improved safety valve aims to prevent the discharge of air from the brake cylinder through the exhaust port *t* of the triple valve, even with the handle of the engineer's brake valve in the "release" position, until the auxiliary reservoir has been recharged to standard or normal pressure. To this end, in carrying out my invention, I secure to the exhaust port *t* of the triple valve T, a valve pressure conductor which consists of a pipe 1 of any desired construction and requisite length, said pipe leading at one end to an air inlet port 2 formed in the wall of one section 4 of the safety valve casing A. In the preferred construction and arrangements of the parts, there are two of these ports 2 formed in the section 4 at diametrically opposite points, so that either one of them may be used for the connection of the pipe 1, according to the position of the valve casing or the section 4 thereof, the other one of the openings 2 being closed as by a screw plug 3.

A valve 5 is movable longitudinally in the valve casing section 4 and is designed in one

position to overlap and close the inlet ports 2. This valve 5 is formed with a stem 6 which is encircled by a helical expansion spring 7 which exerts a tension upon the valve to close the same, the said stem passing through and guided by a tension regulating nut 8 which is screwed into the end of the valve casing section 4, the nut and protruding end of the valve stem being covered by a protecting screw cap 9 and preferably an interposed gasket or washer 9ª. Obviously, by the provision of the nut 8, the tension of the spring 7 may be varied so as to require varying degrees of pressure on the valve 5 to open the same.

In the present embodiment of the invention, the valve casing section 4 is formed at one end with an exteriorly threaded nipple 10 by which said section is detachably connected to and supported by the section 4ª of the casing A, and communication is established between the inlet port or ports 2 of the section 3 and the interior of the section 4ª by means of any desired number of longitudinally extending passages 11 formed in the section 4 and leading through the nipple, as clearly illustrated in the drawing. In the present instance, there are two of these communicating passages 11 arranged in diametrical relation to each other and connected at their outer ends by an annular groove 12, designed to facilitate the passing of the air, when the valve 5 has been moved from its seat. The valve 5, in its closed position, rests upon an annular shoulder 13 which is formed in the section 4 of the valve casing, and is provided with a pin 14 which protrudes through the nipple 10 and is designed for engagement by a piston valve 15 movable longitudinally in the section 4ª.

The piston valve 15 is formed in one end with longitudinally extending passages 16 that are two in number in the present embodiment of the invention, said passages opening at their discharge ends into an annular groove 17 which extends around the periphery of the valve 15. These passages 16 and groove 17 are designed to establish communication between the passages 11 and an air outlet port 18 of which there are two formed in the wall of the section 4ª, one of the said outlet ports 18 being closed by a plug 19 and the other open to the atmosphere or into the ordinary hand retainer, according to the particular position of the valve casing A on the auxiliary reservoir R. The section 4ª is formed with a chamber 20 in which the packed head 21 of the piston valve 15 works, and a vent orifice 22 is preferably formed in the wall of the section 4ª, communicating with said chamber so as to avoid the formation of a cushion back of the head of the valve.

In applying my improved safety valve, I preferably detach from the auxiliary reservoir R, the ordinary bleed cock 23 and secure a nipple 24 in the opening in which said bleed cock is ordinarily screwed. A T-coupling 25 is secured by one of its branches to the nipple 24, the bleed cock 23 is connected to an opposite branch of the T-coupling, and the third branch of the T-coupling is secured in a port 26, of which there are two formed in the section 4ª of the valve casing, near the attached end thereof, one of the openings or ports 26 being normally closed as by a screw plug 27. The valve casing is supported upon the auxiliary reservoir R, being secured thereto by stud bolts or similar fastening devices extending through the base 28 of the valve casing. The base end of the valve casing may be closed by a screw cap 29 or the like, so that access may be had to the piston valve 15 whenever desired, for the purpose of replacement or repair.

From the foregoing description in connection with the accompanying drawing, the operation of my improved safety valve for air brakes will be apparent.

In the practical use of the device, after any application of the brakes has been made and the handle of the engineer's brake valve moved to the released position which would ordinarily exhaust the air in the brake cylinder, such exhaust, with my invention, can not take place until the auxiliary reservoir has been fully recharged to normal or predetermined pressure. This is due to the fact that so long as the pressure in the auxiliary reservoir is below the normal, the piston valve 15 will not be capable of moving the valve 5 to the open position against the tension of the spring 7, which has been set by the tension adjusting nut 8 so that it will yield to opening movement only by a pressure, say one pound in excess of the normal. Hence, the air pressure can get no farther than the pipe 1 and the port 2, the latter being overlapped and closed by the valve 5, as illustrated in Fig. 2. So soon, however, as the air pressure in the auxiliary reservoir reaches and slightly exceeds the normal pressure, it will, acting on the head 21 of the piston valve 15, cause said valve to move in a direction to push the valve 5 against the tension of the spring 7, thereby opening the port 2 and establishing communication between the port 2 and the outlet port 18, through the instrumentality of the passages 11 and 16 and the annular grooves 12 and 17. The exhaust from the triple valve will thus be open and the brakes permitted to instantly release, but it is to be particularly noted that such release can not be effected until the auxiliary reservoir has had its air pressure fully restored. Not only does my invention provide this positive element of safety and preclude the possibility of a train running away on a grade by a premature re-

lease of the brakes with the air supply in the auxiliary reservoir depleted to an extent where a subsequent effective application can not be made, but it provides that in a train equipped with my improved safety valves, the brakes on the cars at the rear of the train will release, if not more quickly, at least as quickly as the brakes on the head end of the train. This is due to the fact that as the auxiliary reservoirs are manifestly recharged somewhat more quickly from the front end of the train in a rearward direction, in succession, the piston valves 15 at the front end of the train will be first moved toward, but not completely to the released position, the release ports being held for a retarded opening movement and thereby insuring that practically all the cars of the train will release their brakes at practically the same instant.

It is to be understood my invention is not limited to any particular manner of maintaining the safety valve on the auxiliary reservoir and that various other changes may be made in the construction, arrangement and proportions of the parts without departing from the scope of the invention as defined in the appended claims.

Having thus described the invention, what is claimed as new is:

1. The combination with an auxiliary reservoir and triple valve, the latter provided with an exhaust port, of a valve casing having interior communication with the reservoir, a piston valve mounted in said casing and exposed to the air pressure in the reservoir, said piston being formed with end opening longitudinal air outlet passages, and an annular groove connecting the passages, the casing being formed with an outlet port with which the groove is designed to register in one position of the piston valve, the casing being provided with another port having communication with the exhaust port of the triple valve, and a spring pressed valve adapted to overlap said last named port, the last named valve being formed with a protruding pin extending into the path of movement of the piston valve and adapted to be engaged by the end thereof, the casing being further formed with passages establishing communication between the passages in the piston valve and the port which communicates with the triple exhaust port.

2. In an air brake system, the combination with an auxiliary reservoir and a triple valve, the latter provided with an exhaust port, of a valve casing having interior communication with the auxiliary reservoir and provided with a plurality of ports, one of which has communication with the triple valve exhaust port, a piston valve mounted in said casing and exposed to the auxiliary reservoir pressure, a spring pressed valve mounted in the casing and adapted to close the port which communicates with the triple valve exhaust port, the casing being further formed with passages establishing communication between said last named port and the end of the piston valve, and the piston valve being formed with a passage adapted to establish communication between the just mentioned passage and the other port in the valve case.

3. In a valve of the character described, a valve casing constructed in two separable sections, one of which is adapted for interior communication with an auxiliary reservoir and the other of which is formed with a port by which it is adapted for communication with the exhaust port of a triple valve, a piston valve in the first named section, such section being formed with an outlet port controlled by the piston valve, and a spring tension valve in the other casing section adapted to close the port leading from the exhaust port of the triple valve, said tension valve being provided with a protruding pin adapted to be engaged by the piston valve and the section of the casing which carries the tension valve being formed with passages adapted to pass the air from the port of said section into the other section upon the unseating of the tension valve.

4. A valve of the character described, comprising a casing constructed in two sections, one of which is supported upon the other, one section being formed at one end with a threaded nipple screwing into the adjoining end of the other section, the first-named section being formed with an annular shoulder constituting a valve seat and with passages leading from said seat to the interior of the other section, and with a port adapted for communication to a triple valve exhaust port and communicating with the valve seat, a spring pressed valve mounted in said section and normally held in said seat, said valve being provided with a pin protruding into the other section, said other section being arranged for interior communication with the auxiliary reservoir and formed with an outlet port, and a piston valve mounted in said last named section and adapted to establish communication between the first-named passages and the outlet port and to engage the pin of the first named valve so as to unseat the latter.

5. In an air brake appliance, an auxiliary reservoir, a T-coupling secured to the bleed cock port thereof, a bleed cock mounted on one end of said coupling, a valve casing supported on the auxiliary reservoir and having interior communication with the T-coupling, a piston valve mounted in said casing, a tension valve mounted in said casing, the casing being formed with inlet and outlet ports, the latter being controlled by the pis-

ton valve and the former by the tension valve, said former port being arranged for communication with the exhaust port of a triple valve and the tension valve being adapted to close said port and arranged for engagement by the piston valve so as to open said port and permit the air to flow from the exhaust port of the triple valve through the outlet port which is controlled by the piston valve.

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

THOMAS B. COYLE. [L. S.]

Witnesses:

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DELROY KISNER.