(No Model.) 2 Sheets—Sheet 1.

H. S. PARK.

CAR RESERVOIR RELIEF VALVE FOR AIR BRAKES.

No. 421,427. Patented Feb. 18, 1890.

Fig. 1

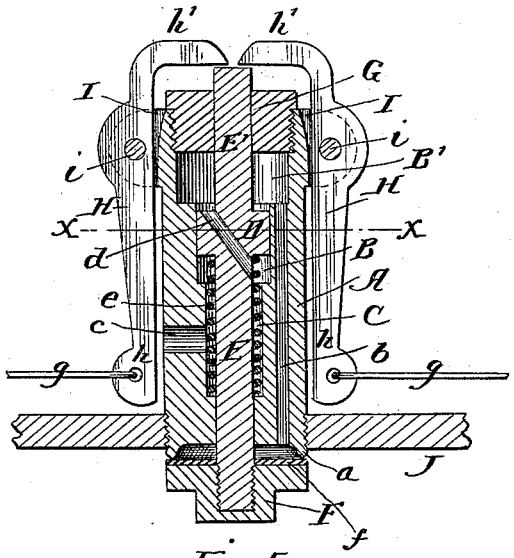


Fig. 5.

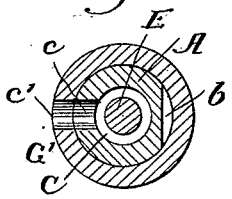


Fig. 4.

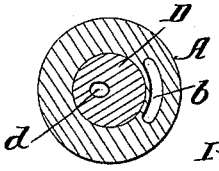


Fig. 2.

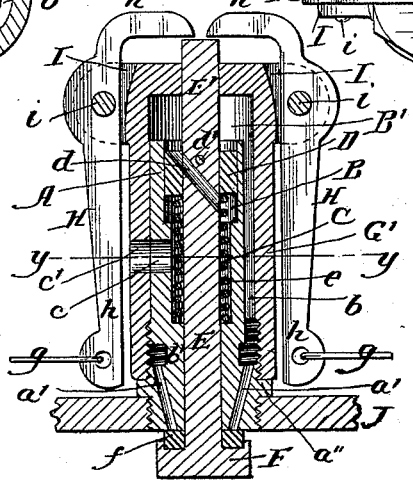
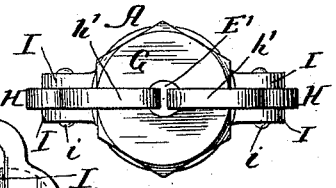


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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CAR RESERVOIR RELIEF VALVE FOR AIR BRAKES.

No. 421,427. Patented Feb. 18, 1890.

Fig. 6.

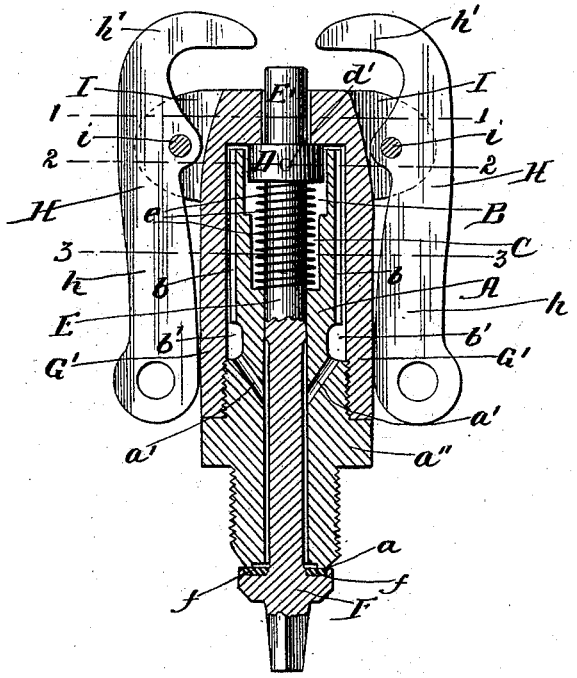


Fig. 7.

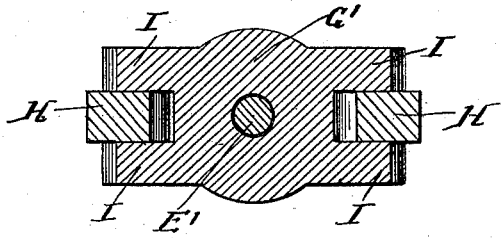


Fig. 8.

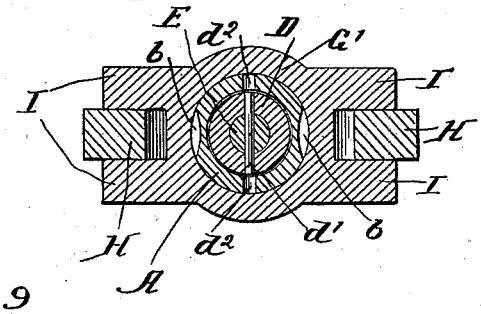
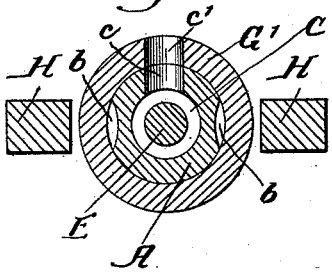


Fig. 9.



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UNITED STATES PATENT OFFICE.

HARVEY S. PARK, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF ALLEGHENY COUNTY, PENNSYLVANIA.

CAR-RESERVOIR RELIEF-VALVE FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 421,427, dated February 18, 1890.

Application filed April 27, 1889. Serial No. 308,882. (No model.)

To all whom it may concern:

Be it known that I, HARVEY S. PARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Reservoir Relief-Valves for Air-Brakes; and I do hereby declare that the following is a full, true, and correct description of the invention, reference being had to the accompanying drawings, forming a part hereof, in which—

Figure 1 is a sectional elevation showing a normally-seated valve in one arrangement; Fig. 2, a sectional elevation showing the normally-seated valve in a modification of the arrangement; Fig. 3, a top or plan view; Fig. 4, a cross-section on line *x x* of Fig. 1; Fig. 5, a cross-section on line *y y* of Fig. 2. Fig. 6 is a sectional elevation showing a solid piston instead of a vented one. Fig. 7 is a cross-section on line 1 1 of Fig. 6. Fig. 8 is a cross-section on line 2 2 of Fig. 6. Fig. 9 is a cross-section on line 3 3 of Fig. 6.

It is very desirable in the operation of air-brakes to have a ready means for bleeding the brakes in case of rupture of the train-pipe or breakage of the train or for other causes, which bleeding is for the purpose of releasing the brakes, which become set from the causes named or otherwise; and the object of this invention is to construct a relief-valve which can be applied to the car-reservoir and by which the air can be vented to release the brakes and have such relief-valve automatic in returning to its normal position after the brakes are released; and to this end the invention consists of a normally-seated valve controlling an air-passage from the car-reservoir; and it further consists in the devices and combinations of devices hereinafter described, and pointed out in the claims as new.

In the drawings, A represents a plug, screw-threaded at its lower end to enter a screw-threaded opening in the car-reservoir, and having at its lower end, as shown in Fig. 1, a bead or ridge forming a valve-seat *a*. As shown in Fig. 2, the plug A has the valve-seat *a* dispensed with and its lower end has air-passages *a'* and its exterior has a flange *a''*, to abut against the face of the car-reservoir when the plug is in place.

B is a chamber in the plug A, and through the plug A is a passage *b*, which communicates with the interior of the car-reservoir and with a chamber B' in the plug A above the chamber B, forming a communication between the interior of the car-reservoir and the chamber B. As shown in Fig. 1, the passage *b* is formed through the plug A, and, as shown in Fig. 2, the passage *b* is formed by cutting away one side of the plug A.

C is a chamber in the plug A, leading from the chamber B and having a port *c* leading therefrom through the walls of the chamber A to the atmosphere, as shown in Fig. 1, and, as shown in Fig. 2, the port *c* coincides with a port *c'*, which leads to the atmosphere.

D is a piston located in the chamber B and having a diagonal passage *d*, by which communication is had on both sides of the piston with the chamber B.

E is a stem on which is located the piston D, and, as shown in Fig. 1, the piston D and stem E are formed in one piece, while, as shown in Fig. 2, the piston is formed separate from the stem and is attached to the stem by a pin *d'*. The stem E below the piston D is encircled by a spring *e*, located in the chamber C, one end of which spring *e* abuts against the piston D and the other against the bottom of the chamber C, and the stem E is continued above the piston D to form an extension E' of the stem E.

F is a valve connected with the stem E to operate below the lower end of the plug A. As shown in Fig. 1, the valve F is screw-threaded onto the end of the stem E and its acting face has a packing *f* to coact with the valve-seat *a*. As shown in Fig. 2, the valve F is formed with the stem E and the packing *f* is entered into a groove in the acting face of the valve, so as to close the passage *a* when the valve F is seated against the end of the plug A, and with the construction shown in Fig. 2 the passages *a'* lead to an annular passage *b'* around the exterior of the plug A, with which passage *b'* the passage *b* communicates.

G, Figs. 1 and 3, is a cap screw-threaded

into the chamber B′ of the plug A, so as to tightly close such chamber, which cap has a central hole, through which the end of the stem-extension E′ projects, as shown in Fig. 1. The cap G of Fig. 1 is replaced in the construction of Fig. 2 by a cylinder G′, having an interior chamber with a screw-thread at its lower end, by which the cylinder G′ is screwed onto and around the plug A above the flange a'', and in this construction the end of the cylinder G′ has a central hole for the passage of the stem-extension E′, for the end thereof to project beyond the end of the cylinder.

H are levers, one for each side of the plug A, and each lever consisting of an arm h and an end h', which end h' lies over the end of the stem-extension E′, as shown in Figs. 1, 2, and 3. The arm h of each lever H has attached to its end one end of a wire or cord g, the other end of which extends to the side of the car, so as to be readily accessible, and these wires or cords g furnish a means for drawing the arm h of either lever H outward to force the end h' of such lever against the end of the stem-extensions E′, to move the stem E, and with it the piston D and valve F, inward or down to open the valve F.

I represents ears on opposite sides of the plug A, as shown in Fig. 1, or on opposite sides of the cylinder G′, as shown in Fig. 2, between which ears the levers H are pivotally mounted on a pin or pivot i.

J is the car-reservoir, into which the plug A is screw-threaded.

The parts are assembled by inserting the stem in the plug A, and in the construction of Fig. 1 screwing the valve F onto the stem E and screwing the cap G into the chamber B′, and in the construction of Fig. 2, after the stem E is inserted, the piston D is attached to the stem E by the pin d', for which purpose the wall of the plug A around the chamber B has on opposite sides a hole d'', which holes are in line one with the other, and through one of which the pin d' can be driven through the piston D and stem E, as shown in Fig. 8, and the cylinder or cap G′ screwed onto the plug A. The levers H are attached between the ears I by the pins or pivots i for their ends h' to lie above and in line with the stem-extension E′, when the valve is ready for use.

In use the plug A is screw-threaded into the car-reservoir J and the wires or cords g are run from the ends of the levers H to the sides of the cars. The valve F is normally seated on the end of the plug A, and is held to its seat by the pressure of the car-reservoir air on its inner face, and when seated the escape of the air from the car-reservoir is prevented, as the valve F closes the passage b; but if, for any cause, the brakes are set and it becomes necessary to release them, and this cannot be done by air-pressure in the usual manner of setting and releasing air-brakes, all that is required is for a brakeman or other person to draw on either cord or wire g, which pulls the arm h attached to such cord outward, and moves the lever H for the end h' to press against the end of the stem-extension E′ to force the stem E inward or down and open the valve F for the air in the car-reservoir J to enter the passage b, either direct with the construction of Fig. 1, or through the communicating passages a' and b' with the construction of Fig. 2, and this air, passing through the passage b, enters the chamber B′ and the chamber B above the piston, and through the passage d enters the chamber B forward of the piston to pass into the chamber C and out through the port c to the atmosphere, thereby venting the car-reservoir to the atmosphere and releasing the brakes. The valve F will be held open until the car-reservoir is exhausted by the pressure of the air on the piston D, and when the air is exhausted the action of the spring e will return the valve F to its seat, closing the passage b, so that the car-reservoir can be again recharged for the brake to go into service again. The return of the valve F to its seat is automatic and will occur with the venting of the car-reservoir, and in the event the spring e does not tightly close the valve it will close it sufficiently to prevent the escape of air in recharging the reservoir, and so that the pressure of the air in the reservoir will effectually close the valve, and when the valve F is closed it will be held firmly to its seat by the pressure of the air in the car-reservoir against its outer face, and such pressure will act and hold the valve to its seat until overcome by the pressure of the end h' of the lever H on the stem-extension E′, by which the valve F will be forced down, and as soon as opened the pressure of the car-reservoir air will be both on the inner and outer face of the valve F, so that the pressure on the inner face of the valve and the outer face of the piston will furnish an excess of power over the pressure on the outer face of the valve, by which the valve F will be held open against the pressure of the spring e, and this excess of pressure is had on the outer face of the piston by reason of the port c being of a larger diameter than the passage d, allowing the air to escape from the chamber B faster than it enters such chamber through the passage d, the result being an excess of pressure on the outer face of the piston D, which operates to hold the valve F open until the car-reservoir is completely vented and the brakes released. It will be seen that with this construction of a normally-closed relief-valve the escape of air is prevented until the valve is mechanically opened by the action of a lever H; and it will further be seen that by having such valve automatic in its return no attention is required in seeing that the valve is closed, as

is now the case with relief-cocks in use with air-brakes, so that after the valve is opened an engineer will know that when the car-reservoir is vented and the brakes released and the air-brake again coupled into service it will not be necessary for an inspection to be made for the purpose of seeing that the vent-cock or release is closed, as is now required before the train starts, thus enabling a quicker start of the train to be had, as when the brake is coupled into service the relief-valve is closed and the train can start at once.

The passage *d* affords a quick release by allowing a free escape of the air; but the result of releasing the brake by escaping the air from the reservoir and holding the relief-valve open by the pressure of air on a piston can be had with a solid piston, in which case the air will pass out around the piston and the stem-extension E′, neither of which need be air-tight in the chamber B and cap G, respectively, and with either a vented piston or a solid piston a normally-seated valve is utilized, which valve, after its first opening, will be held open by air-pressure on the piston until the air has escaped, and will be closed by the action of the spring for recharging the reservoir.

A solid piston is shown in Figs. 6, 7, 8, and 9, and, as shown, the air-passages *a′* do not extend to the bottom of the plug A, but enter the passage in the plug for the stem E, and passages *b* are provided on opposite sides of the plug A. The stem-extension E′ has a space around it, as shown in Fig. 7, and the piston D has a space around it, as shown in Fig. 8, which space permits air to pass around the piston to escape at the port *e*, while the space around the extension E′ permits air to escape on the return of the piston.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a car-reservoir relief-valve, the combination of a normally-seated valve opened against the pressure and an eduction-passage from the car-reservoir controlled by the valve, whereby the pressure of the escaping air, after the valve is initially opened, will hold the valve open until the required reduction is reached, and a further reduction will cause the valve to automatically close the passage against further escape and for recharging the reservoir, substantially as specified.

2. In a car-reservoir relief-valve, the combination of a normally-seated valve opened against the pressure, a stem carrying the valve, a piston on the stem, and an eduction-passage controlled by the valve and leading around the piston for the escaping pressure, after the valve is first opened, to hold the valve open until the pressure in the reservoir is reduced, substantially as and for the purposes specified.

3. In a car-reservoir relief-valve, the combination of a normally-seated valve opened against the pressure, a stem carrying the valve, a piston on the stem, a plug, and an eduction-passage in the plug controlled by the valve and leading around the piston for the escaping pressure, after the valve is initially opened, to hold the valve open until the pressure is reduced, substantially as and for the purposes specified.

4. In a car-reservoir relief-valve, the combination of a normally-seated valve opened against the pressure, a stem carrying the valve, a piston on the stem, a plug, an eduction-passage in the plug controlled by the valve and leading around the piston for the escaping pressure, after the valve is initially opened, to hold the valve open until the reservoir-pressure is reduced, and a spring for closing the valve on the reduction of the pressure, substantially as and for the purposes specified.

5. In a car-reservoir relief-valve, the combination of a plug having a vent-passage, a chamber in said plug communicating with the atmosphere, a vented piston in said chamber, a stem connected with the piston, and a valve attached to the stem and controlling the vent-passage through the plug, substantially as and for the purpose specified.

6. In a car-reservoir relief-valve, the combination of a plug having a vent-passage, a chamber in said plug communicating with the atmosphere, a vented piston in said chamber, a stem connected with the piston, a valve attached to the stem and controlling the vent-passage through the plug, and a return-spring for the piston, substantially as and for the purposes specified.

7. In a car-reservoir relief-valve, the combination of a plug having a vent-passage, a chamber in said plug, a vented piston in said chamber, a passage from the chamber to the atmosphere, a stem connected with the piston, a valve attached to the piston and controlling the vent-passage through the plug, a spring for returning the piston, and a lever for moving the piston-stem to open the valve, substantially as and for the purpose specified.

8. The plug A, having a passage *b* and a chamber B, in combination with the piston D, having a passage *d*, stem E, and valve F, substantially as and for the purposes specified.

9. The plug A, having the passage *b*, chamber B, chamber C, and port *c*, in combination with the piston D, having the passage *d*, stem E, and valve F, substantially as and for the purpose specified.

10. The plug A, having the passage *b*, chamber B, chamber C, and port *c*, in combination with the piston D, having the passage *d*, stem E, spring *e*, and valve F, substantially as and for the purposes specified.

11. The plug A, having the passage *b*, chamber B, chamber C, and port *c*, in combination with the piston D, having the passage *d*, stem E, spring *e*, valve F, and a lever H, substantially as and for the purposes specified.

12. The plug A, having the passage *b*, chamber B, chamber C, and a port *c*, in combination with a piston D, having a passage *d*, stem E, spring *e*, valve F, stem-extension E′, lever H, and car-reservoir J, substantially as and for the purposes specified.

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