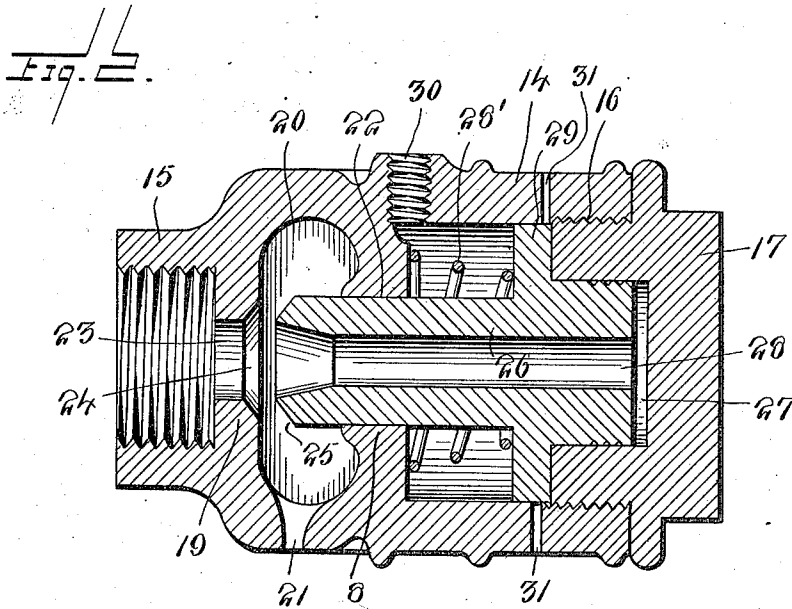
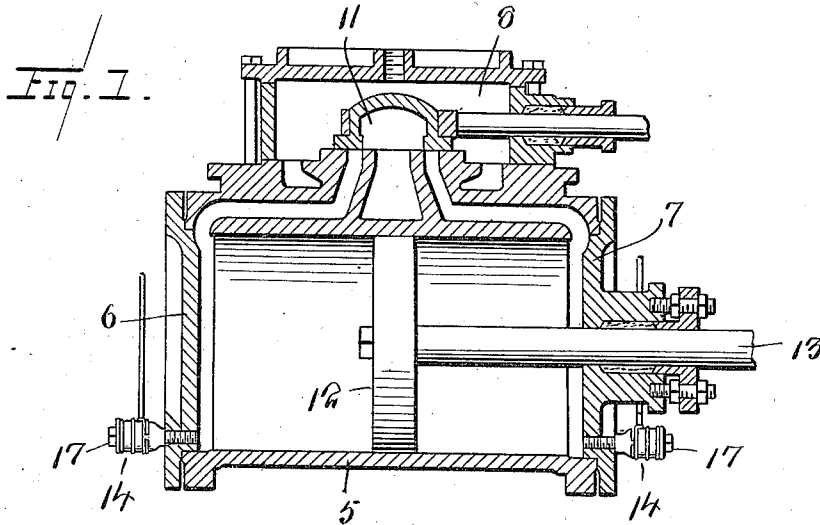


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CYLINDER COCK AND STEAM CHEST RELIEF VALVE.
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1,063,164.

Patented May 27, 1913.



Witnesses
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UNITED STATES PATENT OFFICE.

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CYLINDER-COCK AND STEAM-CHEST RELIEF-VALVE.

1,063,164.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed August 21, 1912. Serial No. 716,273.

To all whom it may concern:

Be it known that we, JAMES R. McCUMBER and THOMAS G. FULCHER, citizens of the United States, residing at Princeton, in the county of Mercer and State of West Virginia, have invented new and useful Improvements in Cylinder-Cocks and Steam-Chest Relief-Valves, of which the following is a specification.

10 The invention relates to valves and more particularly to the class of automatic relief valves for use on steam engines, marine engines, locomotives, pumps or the like.

15 The primary object of the invention is the provision of a valve of this character wherein on the closing of the throttle the fluid contained within a steam chest or cylinder will be instantly discharged to the atmosphere thereby obviating the possibility of the bursting of the head of the cylinder or otherwise distortion of the coöperative parts thereof.

20 Another object of the invention is the provision of a valve of this character wherein on the opening of the throttle the steam entering the piston cylinder of a locomotive or the like engine will effect the automatic closing of the valve thereby preventing the escape of steam from said cylinder, thus sustaining the requisite steam pressure therein for the working of its piston, the valve being under manual control when closed under the action of steam pressure whereby it may be opened should the occasion require without operating the throttle.

25 A further object of the invention is the provision of a valve in which a single movable part is employed so that there will be no possibility of the said valve becoming ineffective and which will avoid the necessity of the cleaning of the valve or require close attention thereto.

30 A still further object of the invention is the provision of a valve of this character which is simple in construction, possesses few parts thereby assuring accuracy and positiveness in its operation as well as sufficiency and reliability and which is inexpensive in manufacture, the valve being readily mounted on a steam cylinder at any point thereof and may be supported in any position desired without possibility of rendering it ineffective in operation.

35 A still further object of the invention is

the provision of a valve of this character in which the accumulation of water within a steam cylinder will be avoided as the valve will automatically operate to discharge the water to the atmosphere from the cylinder. 60

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be as exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

40 In the drawings: Figure 1 is a vertical longitudinal sectional view of a single expansion cylinder steam chest and attachment with the relief valve constructed in accordance with the invention applied thereto, the latter being shown at side elevation. Fig. 2 is an enlarged vertical longitudinal sectional view through one of the relief valves. 70

Similar reference characters indicate corresponding parts throughout the several views in the drawing. 80

Referring to the drawings by numerals 5 indicates generally the cylinder 6 the front head 7 and the back head 8 the steam chest 11 and 12 and 13 the slide valve and piston respectively adapted to work within the steam chest and cylinder of the single expansion type for use on the locomotive. The single expansion cylinder and its steam chest form no part of the present invention but are shown merely for the purpose of illustrating the application of and the manner of operation of the automatic relief valve hereinafter described. 90

Adapted to be mounted upon the front and back heads 6 and 7 of the cylinder 5 are relief valves and for the sake of brevity only one of the same will be hereinafter fully described. Each relief valve comprises a cylinder shell or casing 14 provided at one end with a reduced or contracted nipple 15 the same being threaded for the mounting of the said shell or casing 14 upon the front or back cylinder head while the opposite open end of the shell or casing 14 is formed with interiorly threads 16 in which is detachably engaged a removable cap 17 designed to close the said open end of the shell or casing and will permit access to be had to the interior thereof when desired. Formed in- 110

teriorly of the shell or casing 14 forwardly of the reduced nipple 15 are spaced annular flanges or webs 18 and 19 providing therebetween an escape chamber 20, the same communicating with the atmosphere through a discharge port 21 formed in one side of the shell or casing 14. The web or flange 18 is formed with a central guide opening 22 alining with a central opening 23 formed in the web or flange 19 and this latter opening 23 has its wall provided with a valve seat 24 in which is adapted to engage the beveled valve end 25 of a slidable piston 26, the latter working through the side opening 22 so as to control the opening 23 whereby connection will be closed between the nipple 15 and the chamber 20 or communication may be had therebetween for a purpose presently described.

The cap 17 is formed in its inner face with a recess or pocket 27 in which works the outer end of the piston 26 which is formed with a central inwardly tapering port or passage 28 opening through opposite ends thereof and serves as a steam vent for admitting steam fluid to the recess or pocket 27 from the cylinder 5 so that the steam fluid will act upon the outer end of the piston 26 for forcing it inwardly and thereby bringing the beveled valve end 25 into engagement with the seat 24 thus shutting off communication between the cylinder 5 and the chamber 20, the piston 26 being normally acted upon by means of a coiled expansion spring 28' which surrounds the said piston and has one end resting against the flange or web 18 while its opposite end rests against a laterally extending annular flange 29 formed on the piston 26, the said flange 29 being designed as a steam head and adapted to abut against the inner face of the cap 17 when the piston 26 is moved outwardly under the action of a spring 28 surrounding the same.

Provided in one side of the shell or casing 14 is an inlet port 30 to which is adapted to be connected a fluid supply pipe which is adapted to deliver fluid into the shell or casing between the flanges 18 and 29 on the casing and piston respectively so that the said piston 26 can be acted upon when under steam pressure so as to bring the valve end 25 to open position against the resistance of steam pressure acting upon the said piston thereby opening the valve for permitting the escape of fluid pressure within the cylinder 5 through the chamber 20 and port 21 to the atmosphere.

In the operation of the relief valve when the throttle of the locomotive is closed the piston 26 under the action of the spring 28' will be fastened thereby retracting the valve end 25 of the same from the seat 24 thus establishing communication between the cylinder 5 and the chamber 20 so that fluid

such as water or steam contained within the said cylinder 5 will escape therefrom through the port 21 to the atmosphere so that in this manner all possibility of the bursting of the front and back heads 6 and 7 of the cylinder 5 will be avoided. Now on the opening of the throttle a portion of the steam entering the cylinder 5 will be conveyed through the opening 23 in the valve shell or casing 14 thence through the port or passage 28 onto the recess or pocket 27 when it will act upon the outer end of the piston 26 against attention of the spring 28' causing the piston to move inwardly in the direction of the valve seat 24 and as the steam expands the same will act against the end engaged in the pocket 27 thus causing the positive seating of the valve end 25 in the valve seat 24 thereby closing the said valve and shutting off communication between the cylinder 5 and the chamber 20 so as to prevent any possibility of the escape of steam pressure within the cylinder while the throttle is open. Should it be desired to open the relief valve during the existence of steam pressure within the cylinder it is only necessary to admit fluid through the port 30 into the shell or casing 14 so that the fluid will act upon the flange 29 or the piston 26 causing the latter to move outwardly thereby retracting the valve end 25 of the same from the seat 24 so that steam may pass from the cylinder 5 through the chamber 20 and port 21 to the atmosphere thus reducing the steam pressure within the cylinder, the supply of fluid admitted through the port 30 will be manually controlled in any desirable manner.

It will be apparent that the accumulation of water within the cylinder of other fluid when the throttle is closed is obviated thereby overcoming the possibility of the bursting of the cylinder head or otherwise damage to its coöperative parts.

The shell or casing 14 and diametrically opposite sides is provided with steam escape vents 31 which permits the escape of excessive steam when acting upon the piston 26 within the shell or casing of the valve.

From the foregoing it is thought that the construction and operation of the invention will be clearly understood and therefore a more extended explanation has been omitted.

What is claimed is:—

1. In an automatic relief valve, the combination with a casing adapted to be connected to a steam cylinder and having independent fluid pressure and outlet chambers, a floating piston arranged within the casing, a cap detachably engaged in and closing one end of the casing and having a pocket receiving one end of the piston, a seat formed on the casing and receiving the other end of the piston, and resilient means normally holding the piston unseated.

2. In an automatic relief valve, the combination with a casing adapted to be connected to a steam cylinder and having independent fluid pressure and outlet chambers, 5 a floating piston arranged within the casing, a cap detachably engaged in and closing one end of the casing and having a pocket receiving one end of the piston, a seat formed on the casing and receiving the 10 other end of the piston, resilient means normally holding the piston unseated, and means for admitting fluid to the pressure chamber.

3. In an automatic relief valve, the combination with a casing adapted to be connected to a steam cylinder and having independent fluid pressure and outlet chambers, 15 a floating piston arranged within the casing, a cap detachably engaged in and closing one end of the casing and having a pocket receiving one end of the piston, a seat formed on the casing and receiving the other end of the piston, resilient means normally holding the piston unseated, means for admitting 20 fluid to the pressure chamber, the said piston being provided with a fluid passage opening through opposite ends thereof for permitting fluid to pass from the said steam cylinder into the pocket for the seating of 25 the said piston and automatically shutting

off communication between the said steam cylinder and the outlet chamber.

4. In an automatic relief valve, the combination with a casing adapted to be connected to a steam cylinder and having independent fluid pressure and outlet chambers, 35 a floating piston arranged within the casing, a cap detachably engaged in and closing one end of the casing and having a pocket receiving one end of the piston, a seat formed on the casing and receiving the other end of the piston, resilient means normally holding the piston unseated, means for admitting fluid to the pressure chamber, the said piston being provided with a fluid passage 45 opening through opposite ends thereof for permitting fluid to pass from the said steam cylinder into the pocket for the seating of the said piston and automatically shutting off communication between the said steam 50 cylinder and the outlet chamber, and a fluid head formed on the piston and working within the pressure chamber.

In testimony whereof we affix our signatures in presence of two witnesses.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."