

No. 795,410.

PATENTED JULY 25, 1905.

L. A. NORTH.  
CYLINDER RELIEF VALVE.  
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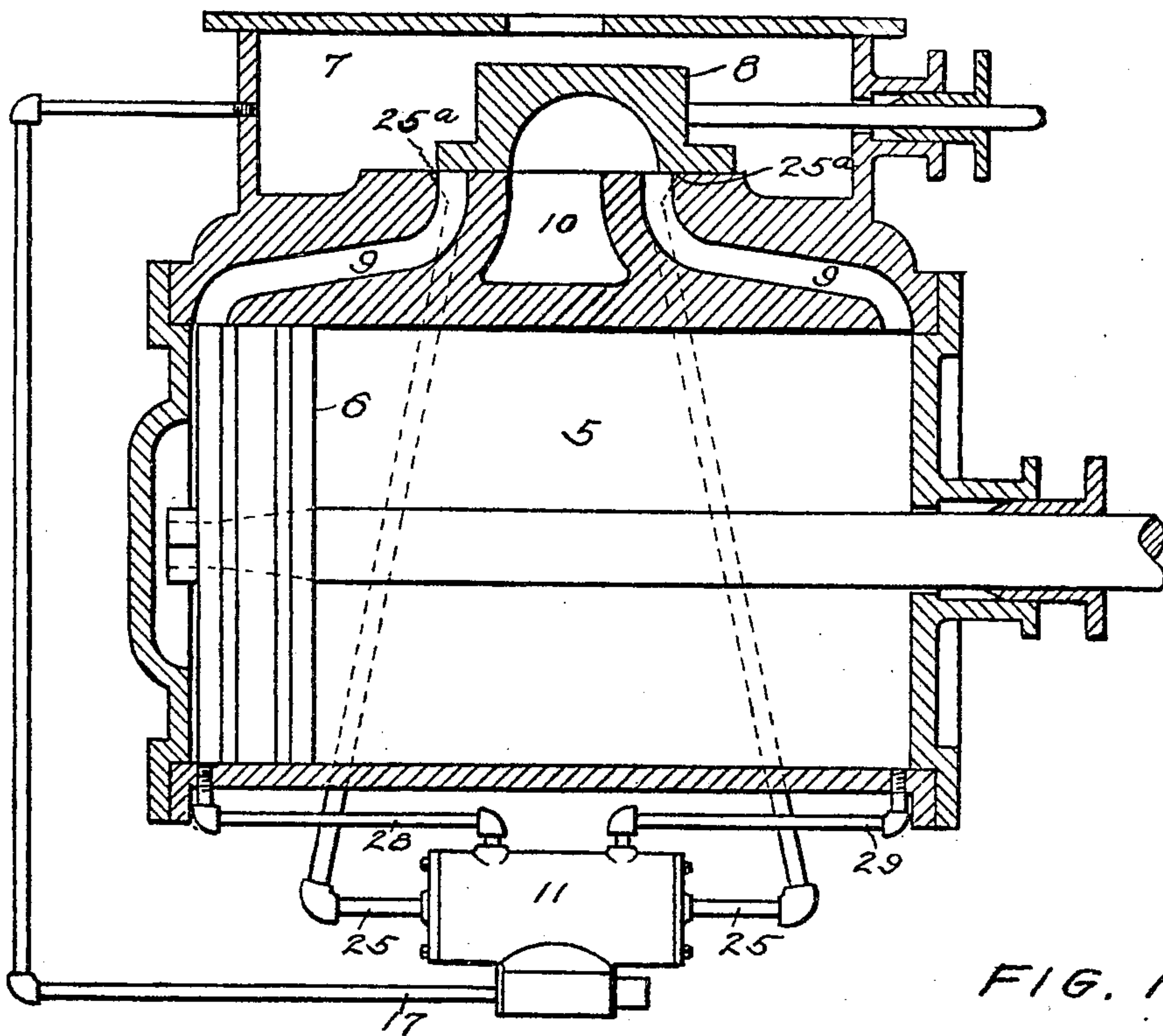


FIG. 1.

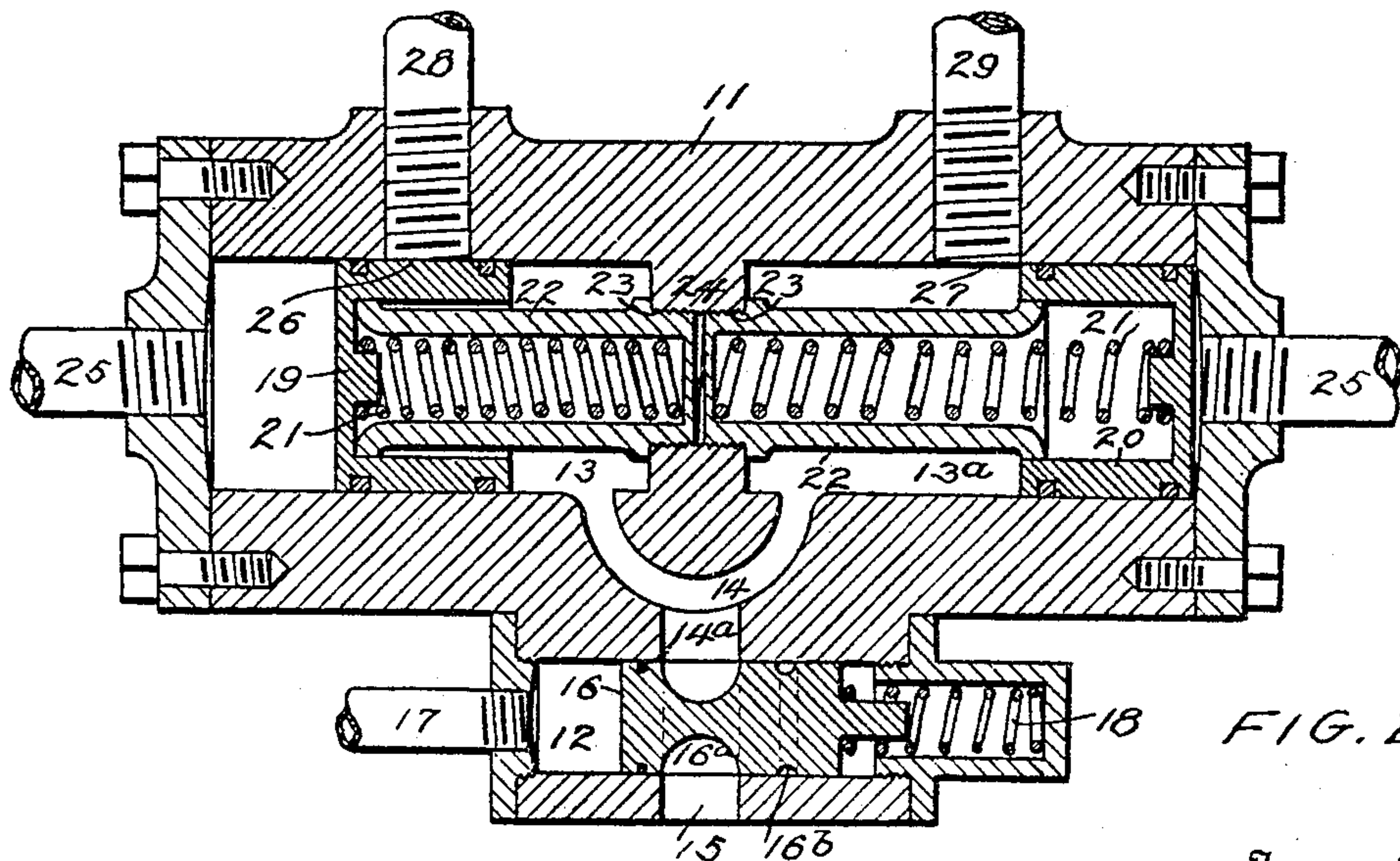


FIG. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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## CYLINDER RELIEF-VALVE.

No. 795,410.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed January 7, 1905. Serial No. 240,004.

*To all whom it may concern:*

Be it known that I, LOUIS A. NORTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Cylinder Relief-Valves, of which the following is a specification.

My invention relates to a cylinder relief-valve, and more particularly an automatic valve which is operated by steam-pressure from the cylinder.

The arrangement is such that the valve and piston travel together, the former being always kept open to the exhaust side of the cylinder, so that dead steam and condensation can freely escape.

The invention consists in certain novel features of construction hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of a steam-engine cylinder provided with my relief-valve. Fig. 2 is an enlarged sectional view of the valve.

Referring specifically to the drawings, 5 denotes the cylinder, and 6 the piston working therein. The steam-chest is shown at 7 and contains a slide-valve 8, which controls the steam-ports 9 to the cylinder. The exhaust-port is indicated at 10.

The relief-valve comprises a casing 11, having valve-chambers 12, 13, and 13<sup>a</sup>. The chambers 13 and 13<sup>a</sup> communicate with each other through a passage 14 and also with the chamber 12 through a port 14<sup>a</sup>. The chamber 12 opens to the atmosphere at a port 15 and contains a piston-valve 16, which controls this port and also the port 14<sup>a</sup>. The chamber 12 is tapped by a pipe 17, which communicates with the steam-chest and through which pipe steam is admitted to the chamber to work the valve 16. This valve is so arranged that when steam is turned on it will be moved forward and uncover the ports 14<sup>a</sup> and 15 and establish communication therebetween through a groove 16<sup>a</sup>, which extends around the piston-valve 16. The valve also has a relatively small groove 16<sup>b</sup>, which is arranged to establish communication between the ports 14<sup>a</sup> and 15 when steam is turned off. A spring 18 behind the valve moves it to this position when the steam is turned off.

The chambers 13 and 13<sup>a</sup> contain piston-valves 19 and 20, respectively, which work at opposite ends of the chambers. Behind each

piston is a spring 21, contained in tubular casings 22, having reduced and threaded ends 23, which screw into a partition 24, extending across and between the chambers 13 and 13<sup>a</sup>. Steam to work the valves 19 and 20 is supplied to each chamber 13 and 13<sup>a</sup> through pipes 25, which communicate with two supplementary ports 25<sup>a</sup> under the valve 8 and tap opposite ends of the casing 11. The ports 25<sup>a</sup> are preferably cut slightly ahead of the ports 9, so as to admit steam—say one-sixteenth ahead—to give time to the relief-valve to operate ahead of the piston. The valves 19 and 20 control ports 26 and 27, respectively, the port 26 communicating with one end of the cylinder by a pipe 28 and the port 27 with the opposite end of the cylinder by a pipe 29.

In the drawings the position of the parts is shown at the beginning of the outward stroke of the piston. The valve 16 being under steam-pressure from the steam-chest through the pipe 17 uncovers the ports 14<sup>a</sup> and 15. Steam-pressure through the pipe 25 enters the chamber 13 and forces the valve 19 inwardly to cover the port 26. The valve 20 not being under steam-pressure is forced outwardly by its spring 21 to uncover the port 27. This establishes communication with the exhaust end of the cylinder and permits the condensation to pass therefrom through the pipe 29 into the chamber 13<sup>a</sup> and out of the latter through the ports 14<sup>a</sup> and 15, the two last-mentioned ports being open, as already stated. At the inward stroke of the piston the position of the valves 19 and 20 is reversed, the former uncovering the port 26 and permitting dead steam and condensation to escape from the pipe 28, and the valve 20 covers the port 27. When the steam is shut off, the valve 16 is pushed back by its spring 18 and the valves 19 and 20 are pushed outwardly by their springs 21, whereby the ports 14<sup>a</sup> and 15 are placed in communication with each other through the groove 16<sup>b</sup> and the ports 26 and 27 are uncovered. The dead steam and condensation which fails to escape to the atmosphere by reason of the limited size of the groove 16<sup>b</sup> circulates from one end of the cylinder to the other through the pipes 28 and 29, the chambers 13 and 13<sup>a</sup>, and the passage 14. The object in making the grooves 16<sup>b</sup> small is to prevent enough cold air entering the cylinder to lower the temperature thereof. This arrangement is especially advantageous in a locomotive-engine when running throttled



or drifting. The groove 16<sup>b</sup> also enables the cylinder to be drained when the engine is standing idle, whereby freezing of the condensation is prevented.

Having thus described my invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. The combination with a cylinder relief-valve having an outlet-port to the atmosphere, and means to connect the same alternately to opposite ends of the cylinder, of a steam-actuated valve controlling said port and arranged to open when steam is admitted to the cylinder, said valve having a small drip-passage, and means to close the valve and to open said drip-passage when steam is shut off.

2. A cylinder relief-valve comprising a casing having communicating chambers and an outlet-port common to both of said chambers, inlets to the chambers from opposite ends of the cylinder, steam-actuated valves controlling said inlets, another steam-actuated valve controlling the outlet, and springs behind the valves to open the inlets and to partly close the outlet when the steam is shut off.

3. A cylinder relief-valve comprising a casing containing a partition and valve-chambers on opposite sides of the partition, a passage connecting the chambers and having an outlet to the atmosphere, inlets to the chambers from

opposite ends of the cylinder, steam-actuated valves in the chambers and arranged to connect the same alternately with opposite ends of the cylinder, a steam-actuated valve controlling the outlet-port, and a spring behind the same to partly close it when steam is shut off.

4. A cylinder relief-valve comprising a casing containing a partition and valve-chambers on opposite sides of the partition, a passage connecting the chambers and having an outlet to the atmosphere, inlets to the chambers from opposite ends of the cylinder, steam-actuated valves in the chambers and arranged to connect the same alternately with opposite ends of the cylinder, a steam-actuated valve controlling the outlet-port and arranged to open the same when steam is admitted to the cylinder, and springs behind the valves to open the inlets and to close the outlet when steam is shut off, the outlet-port valve having a small drip-passage which registers with the outlet-port when the valve is in closed position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS A. NORTH.

Witnesses:

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H. G. BATCHELOR.