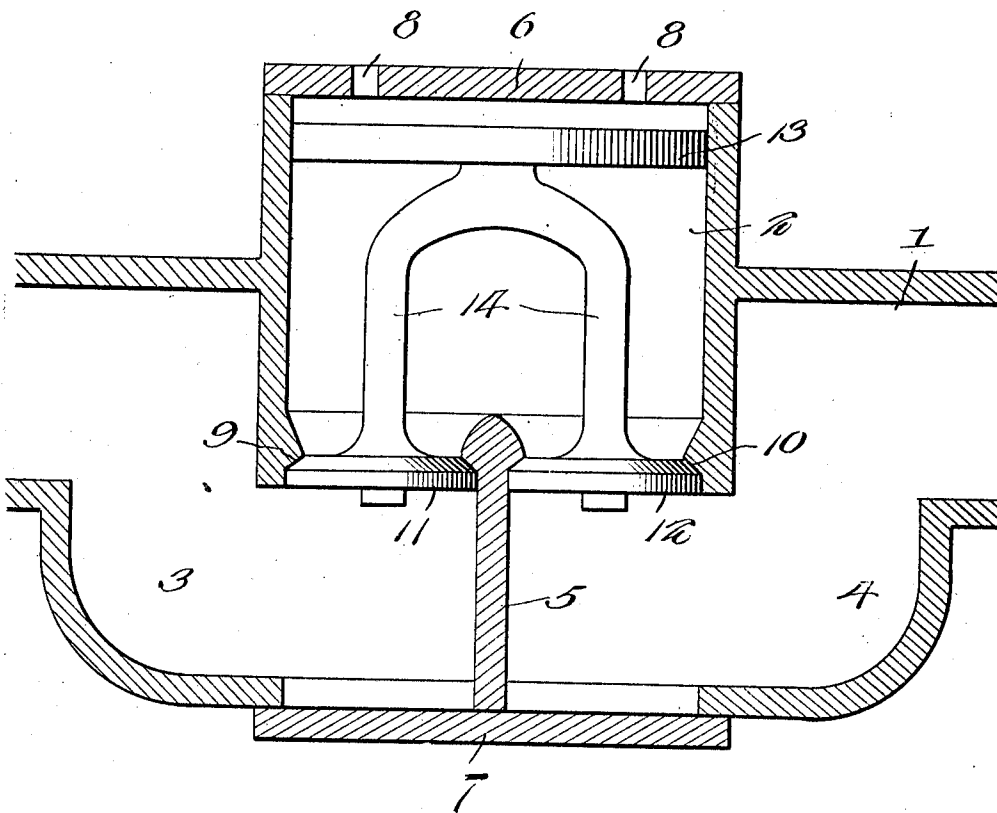


C. G. STONE.
ENGINE PRESSURE EQUALIZING VALVE.
APPLICATION FILED AUG. 5, 1910.

1,004,493.

Patented Sept. 26, 1911.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES G. STONE, OF NORTH BESSEMER, PENNSYLVANIA.

ENGINE PRESSURE-EQUALIZING VALVE.

Specification of Letters Patent.

Patented Sept. 26, 1911.

1,004,493.

Application filed August 5, 1910. Serial No. 575,677.

To all whom it may concern:

Be it known that I, CHARLES G. STONE, a citizen of the United States, residing at North Bessemer, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Engine Pressure-Equalizing Valves, of which the following is a specification.

The present invention is designed to equalize the pressure at opposite ends of an engine cylinder without establishing communication between the engine cylinder and the atmosphere, the mechanism being of such construction as to accomplish the desired result automatically when the pressure within the cylinder is sufficiently reduced from any cause.

The invention is particularly adapted for locomotive engines so as to equalize the pressure upon opposite sides of the pistons when a partial vacuum is formed in one end of the cylinders from any cause. This result is accomplished by means of the valve mechanism shown in the accompanying drawing, which is a sectional view of a casing having passages which are in communication with opposite ends of the cylinder of a locomotive engine and valves for controlling communication between said passages.

The numeral 1 designates a casing which comprises a chamber 2 and passages 3 and 4, the latter being in communication with opposite ends of the engine cylinder, not shown, to be equipped with a valve mechanism embodying the invention. The passages 3 and 4 are separated by means of a partition 5 and communicate with the chamber 2. A cap plate 6 closes the outer end of the chamber 2 and a cap plate 7 closes openings communicating with the passages 3 and 4. Openings 8 are formed in the cap plate 6. Valve seats 9 and 10 are formed at the juncture of the passages 3 and 4 with the chamber 2 and are adapted to be closed by means of valves 11 and 12 which open into the respective passages 3 and 4. A piston 13 is arranged to operate in the chamber 2 and has the valves 11 and 12 connected thereto by means of a fork 14, which is attached at a central point to the piston 13 and has its members forming stems to which the valves 11 and 12 are secured. It will be understood that the piston 13 and the valves 11 and 12 move in unison.

When the engine is in active service the passages 3 and 4 are connected to opposite

ends of the engine cylinder and when the latter is under pressure, as when the engine is in normal working condition, the pressure within the passages 3 and 4 serves to hold the valves 11 and 12 seated, thereby preventing communication between the passages 3 and 4 and opposite ends of the cylinder. When the pressure within one or the other end of the engine cylinder falls below a given pressure or a partial vacuum is created therein from any cause the pressure within the passages 3 or 4 connected with said end of the cylinder is correspondingly reduced, with the result that the valve is drawn inward into such passage, thereby unseating both valves 11 and 12 and establishing communication between the two passages 3 and 4 through the inner ends of the chamber 2 and at the same time equalizing the pressure between opposite ends of the engine cylinder. When a partial vacuum is created within any one of the passages 3 or 4 the piston 13 moves inward with the valves 11 and 12, this being due to atmospheric pressure upon the outer side of the piston 13. It will be observed that the pressure between the passages 3 and 4 and opposite ends of the engine cylinder is equalized without establishing communication between the engine cylinder and the atmosphere. The instant the partial vacuum is overcome and the engine assumes normal working condition the pressure within the passages 3 and 4 acting upon the inner face of the piston 13 moves the latter outward in the chamber 2 and seats the valves 11 and 12 and the pressure acting upon said valves holds them seated until such time as an abnormal condition may exist when the valves 11 and 12 will again automatically unseat and admit of equalization of pressure between opposite ends of the engine cylinder.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claim appended hereto.

It should be understood that the valves do not open and close with each stroke of the piston, but remain open as long as the pressure within the cylinder is below a given point and will remain closed so long as the pressure within the cylinder is above a given point, thereby reducing the wear on the valves to a minimum amount.

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

A valve mechanism for the purposes specified comprising a casing having a chamber which is in communication at one end with the atmosphere and which has independent passages leading from its opposite end and

in communication with opposite ends of the engine cylinder, said passages having valve seats at their juncture with the chamber, a piston arranged to reciprocate in the chamber, and valves connected with the piston to move therewith and adapted to open into said passages and to close upon said valve seats upon outward movement of the piston in the chamber.

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

CHARLES G. STONE.

Witnesses:

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