

UNITED STATES PATENT OFFICE.

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STEAM-ENGINE VALVE.

936,773.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN C. GLENN, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engine Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to engine valves, and has for its object the construction of a valve that is substantially balanced under various pressures of steam, and at the same time will be steam or air tight.

In the carrying out of the objects of my invention my plan is to exclude the boiler pressure from the top of the valve, and apply the interior cylinder pressures to the top of said valve instead. This I accomplish by means of the mechanism hereinafter described, and which is illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal vertical section of a steam-chest, valve, and port mechanism, embodying my invention. Fig. 2 is a top or plan view of the same with the chest cover removed therefrom. Fig. 3 is an edgewise view in elevation of my improved valve mechanism. Fig. 4 is a plan view of the lower member of the valve mechanism. Fig. 5 is a plan view of the under side of the upper valve member thereof.

In these drawings A indicates a valve-seat of a steam-chest; A' and A² indicate steam ports leading from the valve seat into the cylinder; B indicates the piston in the cylinder; C indicates the cylinder head and D indicates the steam-chest cover. Upon the valve-seat A I place a lower valve member E having upon its upper surface a ring F of sufficient diameter to practically exclude the boiler pressure from the upper side of said valve member E, (see Fig. 4). In the lower valve member E within the ring F thereon, there are auxiliary cylinders G the bottoms of which are closed with the exception of ports g' therethrough adapted to alternately coincide with the cylinder ports A' A². On the top of this valve member E, I place another valve member H (see Fig. 5), the upper surface of

which contacts with the inside face of the valve chest cover D. This valve member H, is provided on its under surface with a downwardly projecting ring J adapted to fit over the ring F on the valve member E and form a telescopic joint therewith, and on the valve member H inside of the ring J at points coinciding with the cylinders G on the valve member E, there are pistons K provided with ports f', which extend there-through so as to communicate with the inside surface of the valve chest cover D. These pistons telescope into the auxiliary cylinders G on the valve member E when the valve members E and H are placed together, in like manner as do the rings F and J on said valve members, and I preferably insert packing f between the rings F and J so as to form a steam tight joint between them, and between the auxiliary cylinders G and pistons K, I preferably place packing rings k so as to form steam tight joints between them, and between the bottoms of the cylinders G and the pistons K operating therein, I preferably place spiral springs k² inserted in shallow holes k' as illustrated in Fig. 1, which operate to retain the valve members E and H in constant contact with the valve-seat A and the inner surface of the valve-chest cover D, which springs operate to prevent the rattling of the valve when in operation, but are not an essential feature of my invention. The steam chest cover D is preferably provided on its inner surface with transverse grooves d with which the ports f' in the valve coincide as the valve commences to admit steam to the cylinder ports A' and A² and operate as secondary ports for the admission of steam to the cylinder. The valve members E and H when placed together so as to form my improved valve are operated by means of a valve rod L in the usual manner.

In operation when it is desired to operate the engine, boiler pressure steam is admitted to the steam-chest and occupies the space at each end M (see Fig. 1) and each side N (see Fig. 2) of the valve mechanism hereinafter described, and the interior space O within the valve members E and H communicate with the atmosphere through the exhaust. When the valve mechanism is moved forward to admit steam into the port A' steam also passes over the edge of the upper valve member H by reason of the groove d in the steam chest cover D and down

through the ports f' and g at the same instant that the lower valve member E uncovers said port A' , thus constituting a double ported valve. As the steam passes 5 through the ports f' and g it enters the space in the interior of the ring G under the piston K. While in that position the other end of the valve has uncovered the port A^2 to the exhaust, and the ports lead- 10 ing to the piston K at that end of the valve are sealed and the exhaust end of the valve permitted to run free, but for the slight pressure of the spring k . When, however, the valve mechanism closes in the exhaust 15 as the piston B nears the end of its traverse for the purpose of creating a compression of vapor in the cylinder equal to the boiler pressure, or slightly in excess thereof, so that there will be no waste steam in the cylinder 20 between the piston B and the head C, said compression is communicated through the port g to the under side of the piston K in the ring G and prevents the valve section E from being lifted off of its seat A, the area 25 of the piston K being equal to or slightly greater than the area of the steam port.

Thus it will be seen that in my improved valve I have excluded the boiler pressure from the upper side of the valve and confined it to the ends and sides thereof, thereby substantially balancing the valve. I have applied the conditions of the interior of the cylinder to the top of said valve in such a manner that the valve is steam tight, is bal- 35 anced under all pressures of steam, cannot be lifted from its seat by compression within the cylinder, and runs free at its exhaust end.

Having thus shown and described my invention so as to enable others to construct and operate the same, what I claim as new and desire to secure by Letters-Patent is:

1. The combination in a steam engine valve, of two valve-members, outer rings 45 thereon adapted to telescope together, auxiliary cylinders on one of said valve-members, bottoms in said auxiliary cylinders having ports therethrough adapted to form passages between the cylinder ports and the space within said auxiliary cylinders, and 50 pistons on the other valve-member adapted to telescope into said auxiliary cylinders, substantially as set forth.

2. The combination in a steam engine

valve, of two valve-members, an outer ring 55 on each of said valve-members, one telescoping into the other, auxiliary cylinders on one of said valve-members inside of the outer rings thereon, bottoms on said cylinders having ports adapted to communicate with the 60 cylinder ports, and pistons on the other valve-member having ports therethrough and adapted to telescope into said auxiliary cylinders, substantially as set forth.

3. The combination in a steam engine 65 valve, of two valve-members, an outer ring on each of said valve-members one telescoping within the other, auxiliary cylinders on one of said valve-members inside of the outer ring thereon, bottoms in said cylinders 70 having ports therein adapted to communicate with the cylinder ports, pistons on the other valve-member having ports there- through communicating with the inside of the steam-chest cover, spiral springs between 75 the bottoms of the auxiliary cylinders and the pistons operating therein, substantially as set forth.

4. In a steam engine valve the combination of a lower valve member adapted to al- 80 ternately open and close the steam ports of a steam engine, a ring upon the upper surface of said valve member, an auxiliary cylinder adjacent to each end of said valve member having ports leading therefrom 85 through said valve-member to the seat thereof, an upper valve member, a ring on the under surface thereof adapted to form a telescopic joint with the ring on the lower member, pistons having ports therethrough to 90 the steam-chest cover, adjacent to each end of said upper valve member, said pistons being adapted to enter and operate in the auxiliary cylinders on the lower valve member, springs between said pistons and the 95 bottoms of said auxiliary cylinders, and a steam-chest cover having transverse grooves in the inside surface thereof across which grooves said upper valve member reciprocates during the operation of the engine, 100 substantially as set forth.

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

JOHN C. GLENN.

Witnesses:

H. M. STURGEON,
G. J. MEAD.