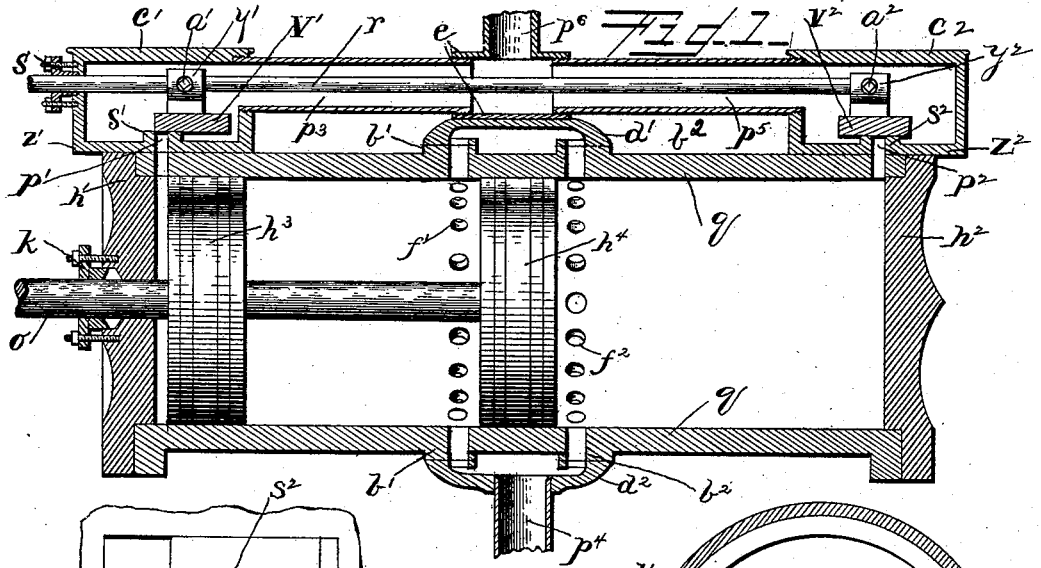
(No Model.)

G. SMITH.

STEAM ENGINE.

No. 491,141. Patented Feb. 7, 1893.



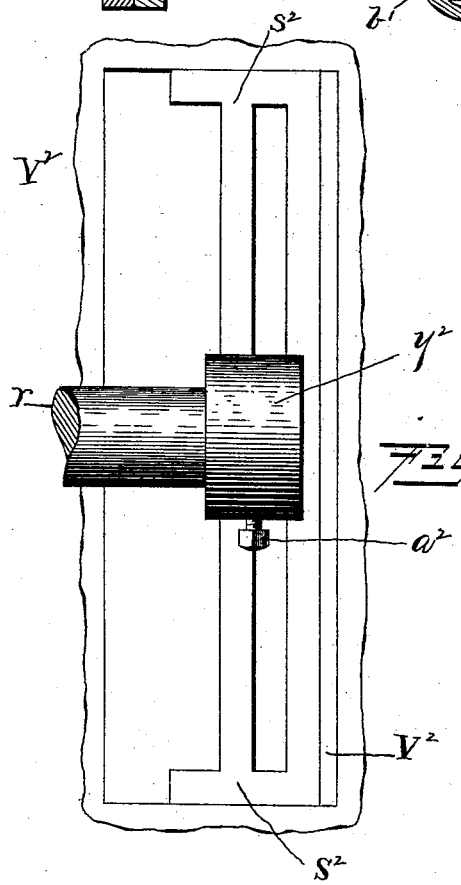


Fig. 2.

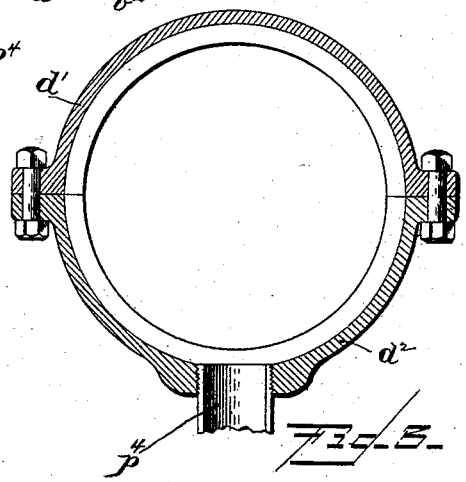


Fig. 3.

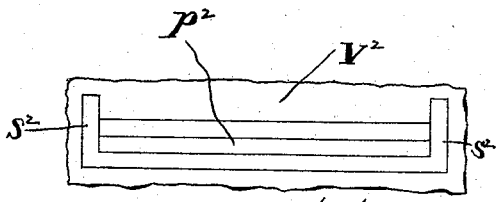


Fig. 4.

WITNESSES

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By John S. Deyo Jr. Attorney

UNITED STATES PATENT OFFICE.

GEORGE SMITH, OF LITTLE ROCK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF NINE-TENTHS TO DIXIE A. NEAL, ORRIN B. NEAL, AFTON H. NEAL, BLAN A. NEAL, JOHN L. BOOTH, A. G. GRIFFIN, T. S. ANDERSON, J. H. EMISON, J. M. WRIGHT, AND W. P. DAVIS, OF EL PASO, AND JOHN A. PHELPS, OF WHITE COUNTY, ARKANSAS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 491,141, dated February 7, 1893.

Application filed October 3, 1892. Serial No. 447,634. (No model.)

To all whom it may concern:

Be it known that I, GEORGE SMITH, a citizen of the United States, residing at Little Rock, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Steam-Engines—Locomotive, Stationary, or Marine; and I do 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, which form a part of this specification.

My invention has relation to improvements in steam engines, locomotive, stationary, or marine.

In the accompanying drawings: Figure 1 is a vertical sectional view of my invention. Fig. 2 is a view of the valve on its seat. Fig. 3 is a cross section of the sectional conduit, and Fig. 4 shows the valve seat.

In referring to the drawings letters of reference are as follows: Steam chests, c' and c^2; set screws, a' and a^2; valve yokes, y' and y^2; valves, v' and v^2; valve seats, s' and s^2; valve seat plates, z' and z^2; admission ports, p' and p^2; valve rod, r; stuffing-boxes, s and k; piston rod, o; cylinder heads, h' and h^2; cylinder, q; piston heads, h^3 and h^4; exhaust ports, f' and f^2; sectional conduit, d' and d^2; bosses, b' and b^2; steam pipes, p^3 and p^4 and p^5; admission pipe, p^6; T-elbow, e. The cylinder, q, is constructed to work two pistons. The center of said cylinder is perforated with a double set of holes, f', f^2, through which the dead steam passes into the exhaust jacket, each piston serving as its own exhaust valve, and discharging its own steam. The freedom of this exhaust enables the steam to be expanded farther than in any of the ordinary types. By doing away with the exhaust cavity in the ordinary valve, and using the admission valve solely as an admission valve, and not as a combined admission and exhaust valve, it is rendered practically balanced. There is no surplus space between valve seat and cylinder, the port being straight and direct from the valve seat to the cylinder; this, together with its location at the extreme end of the cylinder effects an immense saving of dead space and a corresponding saving of steam. This engine can be run at a higher rate of piston speed than any single piston engine by reason of the freedom of its exhaust.

Another feature of the valve gear is that the valve seat plates, z', z^2, are detachable from their steam chests, c' and c^2, and also from the main cylinder, q. This makes their renewal or repair the simplest possible. The steam chests, c' and c^2, are situated at each end of the cylinder and are connected by steam pipes, p^3, p^5, screwing into a T-elbow e, into which the supply pipe, p^6, also screws. The governor is also connected with supply pipe, p^6. The valve rod, r, also passes through the pipes, p^3, p^5, thus obviating the necessity for a stuffing box in steam chest c^2. This rod, r, is connected with valves by yokes, y', y^2, and set screws, a', a^2. The sectional conduit, d', d^2, is made in two parts and bolted together in contact with the raised bosses, b', b^2, which encircle the cylinder q. The construction of the sectional conduit and the raised bosses enables the exhaust ports, f', f^2, to be partially or wholly closed by merely slipping the jacket, d', d^2, around on the cylinder bosses, b', b^2.

Having described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a steam engine the combination of the steam admission valves at each end of the cylinder, with the two sets of exhaust ports located centrally in the cylinder and the two pistons which control the exhaust ports.

2. In a steam engine the combination of the two pistons with the cylinder provided with two sets of exhaust ports centrally located in the cylinder and controlled by the pistons, the

distance between the ports being such that they are opened to each side of one of the pistons at the end of its stroke, whereby the steam may be exhausted each side of the piston.

3. In a steam engine the combination of the cylinder provided with two sets of exhaust ports located centrally in the cylinder with a sectional conduit attached to the cylinder, which connects the exhaust ports to the main exhaust pipe.

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

GEORGE SMITH.

Witnesses:
W. L. HARKRIDER,
H. K. ADAMS.