R. C. STEVENS.

STEAM ENGINE.

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1,112,490.

Patented Oct. 6, 1914.

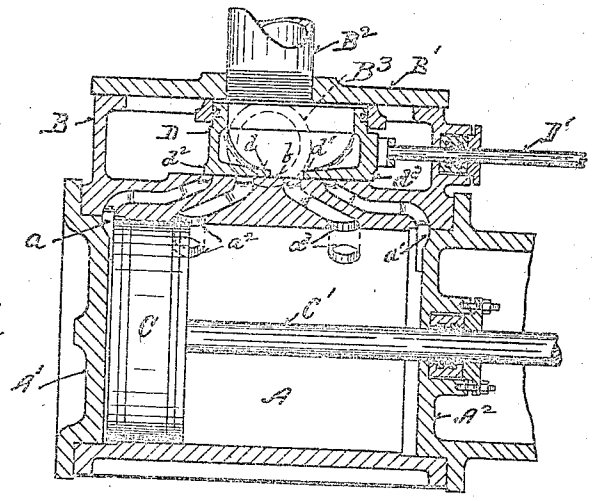


Fig. 1.

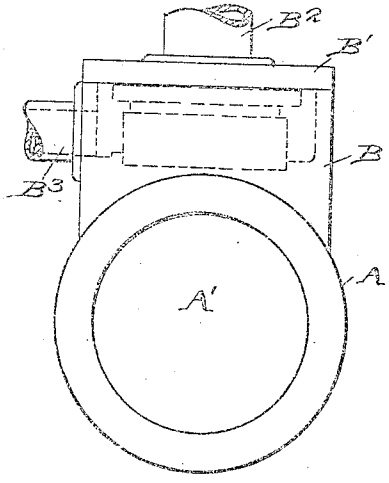


Fig. 2

Witnesses.
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UNITED STATES PATENT OFFICE.

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STEAM-ENGINE.

1,112,490. Specification of Letters Patent. Patented Oct. 6, 1914.

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To all whom it may concern:

Be it known that I, ROBERT C. STEVENS, 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-Engines; 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 steam engines of that type wherein the steam enters the cylinder at the ends thereof and exhausts therefrom at points intermediate of the ends by means of independent exhaust ports, known to the art as independent exhaust uniflow engines.

Heretofore in the construction of steam engines having independent exhaust ports, it has been necessary to provide a plurality of valves to open and close said ports to the admission and exhaust of steam, which entails a multiplicity of ports in the valve gear and consequent complication.

It is therefore an object of my invention to adapt a steam engine having independent exhaust ports to the use of a single valve by means of which all of the ports of the engine may be properly opened and closed with relation to the engine piston.

The features of my invention are hereinafter shown and described and are illustrated in the accompanying drawings, in which:—

Figure 1, is a longitudinal central section of an engine cylinder and valve, embodying my invention. Fig. 2, is an end view in elevation, of the same.

In this drawing A, indicates an engine cylinder, A′ and A^2, indicate the cylinder heads; B, indicates the valve-chest, B^2, indicates the exhaust pipe; B^3, indicates the steam inlet pipe; C, indicates the piston, and C′, indicates the piston-rod; D, indicates the engine valve, and D′, indicates the valve-stem.

The cylinder A, is provided with steam ports a and a', and with exhaust posts a^2, and a^3. The steam ports a and a', and the exhaust ports a^2 and a^3, lead toward the intermediate portion of the valve chest B, and have their exit through the valve-seat surface b, of the inner wall thereof. Upon the valve-seat surface b, I place a valve D, which is designed to receive the exhaust steam in its interior and guide it to the exhaust pipe B^2, and which is so proportioned on its inner or exhaust edges, d and d', that these edges never uncover the entrances of the steam ports a and a', and the outer or steam edges d^2 and d^3, will alternately cover and uncover the entrances into the steam ports a and a', so that the steam exhaust will be regulated by the valve D, uncovering the exhaust ports a^2 and a^3 and the compression is regulated by the edges of the piston C, passing over and closing the exhaust ports a^2, and a^3, or under certain conditions said compression may be determined by the exhaust edges d and d', closing one or other of the exhaust ports a^2 or a^3, before they are completely covered by the piston C. The exhaust steam passes through the valve D, and I therefore have shown said valve as being preferably of the semi-balanced expanding type, as it is necessary to perfectly separate the steam which is introduced into the valve-chest B, around the valve D, for operating the engine, from the exhaust steam within the valve, but it will be obvious that other forms of valves may be utilized without departing from my invention.

From the drawing and the foregoing description, it will be obvious that I am enabled to construct an engine having a short cylinder, and short, light piston similar to the ordinary steam engine, but with the added advantages of independent exhaust ports through which the cool steam may escape without cooling the walls of the steam intake ports, without addition of a multiplicity of valves and their accompanying complications of valve gear for opening and closing said exhaust ports.

In operation, when steam is admitted to the valve-chest B, around the valve D, therein, and the valve is in the position shown in the drawing, the piston C, will be thereby moved toward the right, and the exhaust from the cylinder will be through the exhaust ports a^3, which will remain uncovered by the valve D, until about when said ports are covered by the piston C, and compression commences and continues to the end of that stroke of the piston, the valve D, during this time maintaining the exhaust ports a^2, closed so as to confine the steam

within the cylinder to near the end of the piston stroke. The valve D, is moved toward the left, which causes the steam port a, to be covered, thereby cutting off the steam therefrom, and also causes the exhaust port a^3, to be covered, and the exhaust port a^2, to be opened to exhaust and the steam port a', to be opened to steam, which operation of the valve D, and piston C, continues until steam is excluded from the valve-chest B.

From the foregoing description of the construction and operation of an engine embodying my invention, it will be obvious that by means of my invention I am enabled to combine the advantages of the simple slide valve engine with those of the independent exhaust uniflow engines without complication of parts, incident to multiple valves.

Therefore having fully shown and described my invention so as to enable others to utilize the same, what I claim as new and desire to secure by Letters-Patent, is:—

1. The combination in a steam engine, of a cylinder having a steam intake port in the wall of said cylinder at the end thereof, an independent exhaust port in the wall of said cylinder spaced from said intake port, a piston in said cylinder, a valve chest with which said port communicates, a valve therein adapted to alternately open said steam port to steam, and said exhaust port to exhaust in proper time with relation to the movement of the piston.

2. The combination in a steam engine, of a cylinder having steam inlet ports and independent exhaust ports in the wall thereof spaced from said inlet ports, a piston in said cylinder, heads on said cylinder, a valve-chest with which said ports communicate, a hollow valve therein adapted to alternately open said exhaust ports and receive the exhaust steam thereinto and conduct it to the engine exhaust pipe, and to alternately open said steam inlet ports to admit steam thereinto from said valve-chest, in proper time with relation to the movement of said piston, substantially as set forth.

3. In a steam engine, the combination of a cylinder having steam inlet ports at its ends, and independent exhaust ports in the walls thereof spaced from said inlet ports located between each of said steam inlet ports and the middle of said cylinder, a piston in said cylinder adapted to pass each of said exhaust ports during its movement toward each end of the cylinder, heads on said cylinder, a valve chest with which all of said ports communicate, and a valve therein adapted to alternately open said steam ports to steam and said exhaust ports to exhaust, in proper time with relation to the movement of said piston, substantially as set forth.

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

ROBERT C. STEVENS.

Witnesses:
H. M. Sturgeon,
P. V. Gifford.