

(No Model.)

N. T. GREENE.

SLIDE VALVE FOR STEAM ENGINES.

No. 439,349.

Patented Oct. 28, 1890.

FIG. 1.

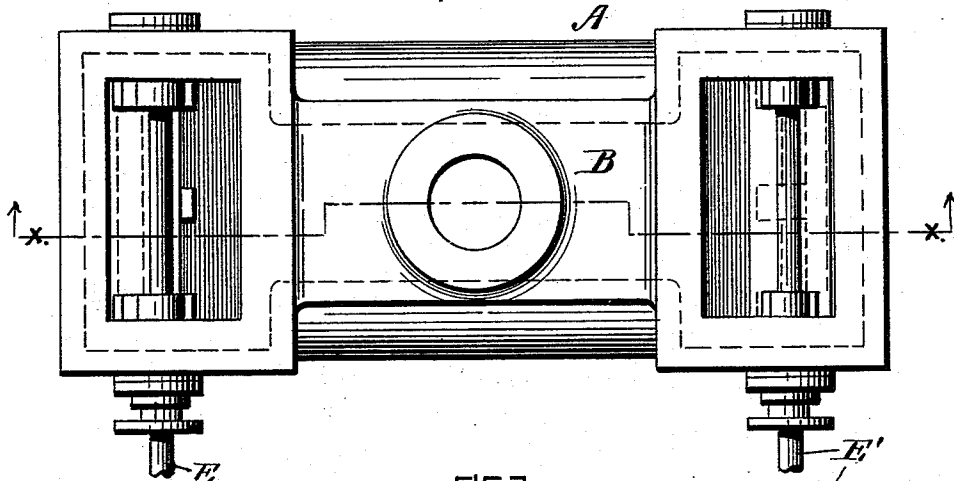


FIG. 2.

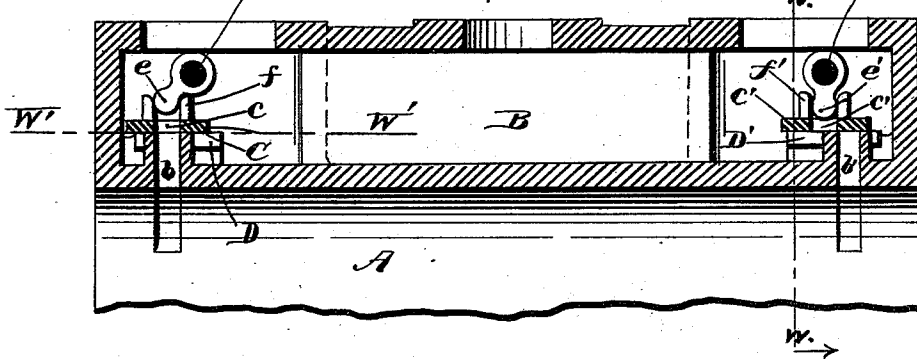


FIG. 3.

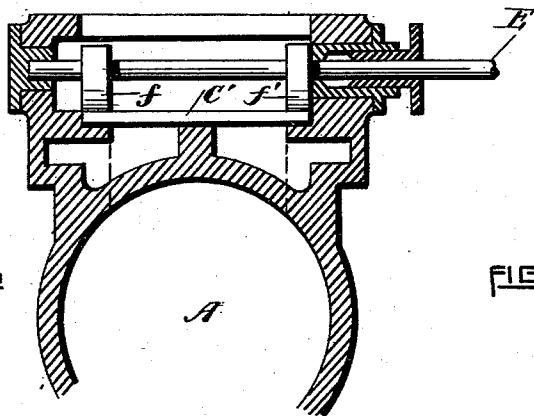
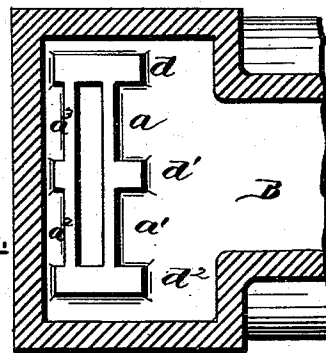


FIG. 4.



WITNESSES.

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SLIDE-VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 439,349, dated October 28, 1890.

Application filed July 28, 1888. Serial No. 281,272. (No model.)

To all whom it may concern:

Be it known that I, NOBLE T. GREENE, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Slide-Valves for Steam-Engines; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

The invention hereinafter described is an improvement upon that type of engine shown and described in the Letters Patent granted to me March 13, 1855, No. 12,507, in which the flat slide steam-valves are operated by means of rock-shafts as distinguished from being operated by sliding valve-rods working through stuffing-boxes, and said improvement relates to the construction and arrangement of said steam-valves and the valve-seats therefor relatively to each other, in combination with rock-shafts for operating said steam-valves. Heretofore the valve-seats of engines of this type using a flat slide-valve operated by a rock-shaft have been substantially of the same or greater area than the area of the under side of the valve. Such valves being unbalanced, it follows that they are worked with a large amount of friction on their faces. It has been heretofore very desirable to have the areas of such slide-valves no larger than is absolutely necessary for the requirements of closing the ports in order to diminish as much as possible the friction of the faces of the valves on their seats, due to the unbalanced pressure of the steam in the steam-chest. The result has been that such valves not having a broad surface to slide upon a corresponding supporting-surface are liable, when operated by rock-shafts and arms, either directly or by the interposition of connecting-links, to rock upon their seats and in a short time cause the face of the valve to wear rounding or become curvilinear in form.

The improvement hereinafter described consists in a flat slide-valve with a bearing-surface considerably larger than the valve-seat proper, in combination with a rock-shaft for operating the same, whereby the tendency of the valve to wear rounding, when operated by such rock-shaft, will be overcome without at the same time incurring the disadvantage

of proportionately increasing the friction due to the steam-pressure upon such excess of surface. To this end I mount the valve so combined with an operating rock-shaft upon an elevated valve-seat, so that the greater part of that portion of the valve which is in excess of the actual requirements to cover the port is at all times open to steam-pressure upon its under as well as upon its upper side, whereby substantially all that portion of the valve so in excess of the actual requirements for completing the closing of the port is balanced. By this means I am enabled to employ a flat slide-valve of much greater area than is required to perform the office of completely closing the port, whereby a broad bearing-surface is given to the valve without any substantial increase in friction due to such extended area, and the liability of the valve to wear rounding upon its face is practically entirely removed or greatly obviated, notwithstanding that the valve is combined with and operated by a rock-shaft.

Referring to the accompanying drawings, Figure 1 is a top view of a cylinder and its steam-chest, showing the arrangement of the valve-operating rock-shafts. Fig. 2 is a longitudinal section taken on the line X X of Fig. 1. Fig. 3 is a transverse section taken on the line W W of Fig. 2. Fig. 4 is a horizontal section through the steam-chest, taken on the line W' W' of Fig. 2.

As the improvement hereinafter described relates solely to the steam-valves and the valve-seats therefor, in combination with the means for operating the valves, the drawings represent only so much and such parts of a steam-engine as will be necessary for a proper understanding of said improvement. The remaining portions, it will be understood, may be of any desired form or construction. In the drawings, A is the cylinder with its steam-chest B, which is represented in the drawings as extending the entire length of the cylinder.

C C' are the steam-valves located one at each end of the cylinder and provided with the usual ports $c c'$, communicating, respectively, with the ports $b b'$ in the cylinder.

D D' are the valve-seats, which are elevated above the wall of the cylinder, as shown in Fig. 2, and are cut away, as at $a a' a^2 a^3$, Fig.

4, leaving a bearing-surface for the extension of the valve at the points $d d' d^2$. By this arrangement it will be seen that the steam in the steam-chest has access to the under as well as the upper side of that portion of the valve which is extended to give an increased bearing-surface, whereby such extended portion is substantially balanced, thereby preventing any substantial increase in friction by reason of such extension of the valve.

10 E E' are the rock-shafts for operating the steam-valves. The means for operating these rock-shafts are not shown, but may be any of the well-known arrangements for giving the proper rocking movement to the rock-shafts to open and close the valve. In the arrangement shown in the drawings the rock-shafts are located one near each end of the cylinder and directly above the valves. These rock-shafts are provided, respectively, with the rock-arms $e e'$, and each of the steam-valves is provided with the upwardly-projecting ears or lugs $f f'$, between which lugs the rock-arms upon the rock-shafts are arranged to work, as clearly shown in Fig. 2, so that the rocking of the shaft in one direction or the other will slide the valve to open or close the steam-port in the cylinder, as will be readily understood. It is obvious, however, that the rock-shafts may, if desired, be located at one side of the steam-valves, and the rock-arms thereon con-

nected with the valves by means of suitable connecting-links, as exhibited in my said prior patent, No. 12,507.

By the construction and arrangement of the steam-valves and valve-seats therefor relatively to each other, as hereinbefore described, the liability of the valve to wear rounding upon its face, due to its being combined with a rock-shaft for operating it, is practically overcome or greatly obviated, and that without substantially increasing the friction between the valve and its seat.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a steam-engine, a flat slide steam-valve and an elevated valve-seat therefor of substantially less area than the area of the under surface of said valve, in combination with a rock-shaft for operating said valve whereby the steam in the steam-chest will at all times have access to exert pressure upon the excess of area on the under side of the valve, and the liability of the valve to wear rounding on its face, due to its operation by said rock-shaft, be practically overcome without substantially increasing the friction between the valve and its seat, substantially as set forth.

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Witnesses:

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