H. Bates,

Steam Slide Valve.

No. 11,925. Patented Nov. 14, 1854.

Fig. 1

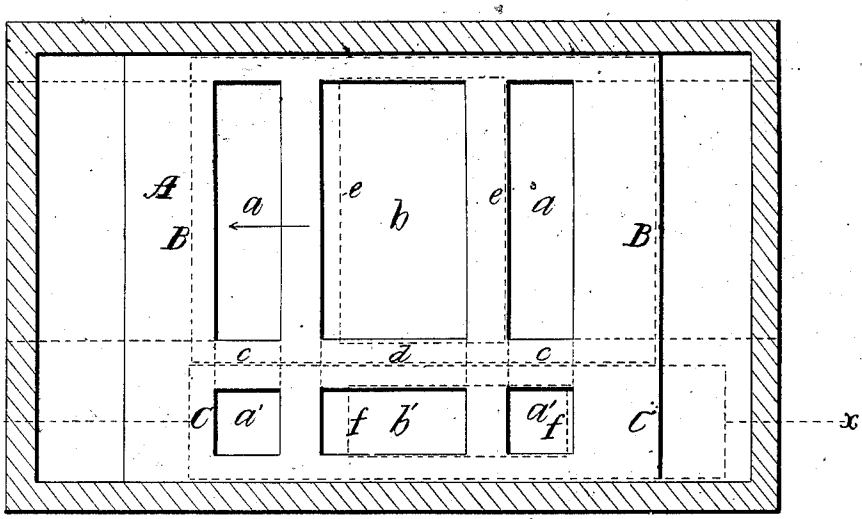


Fig. 2

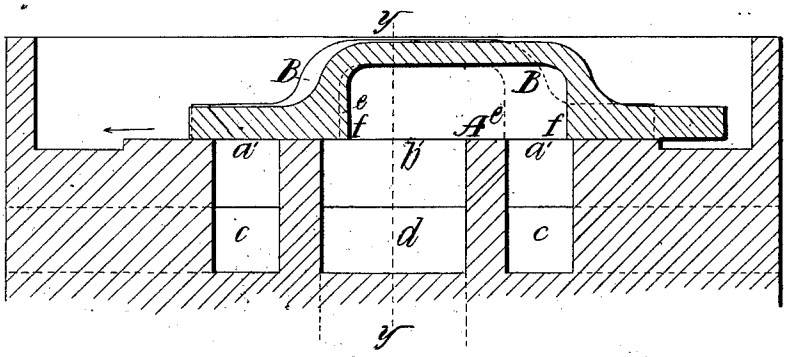
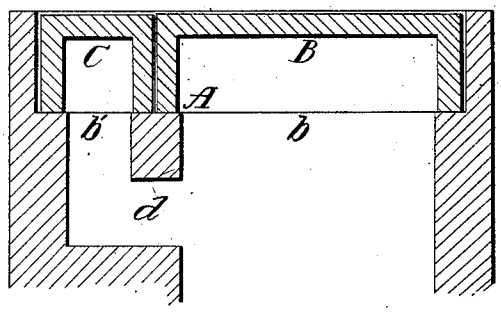


Fig. 3



UNITED STATES PATENT OFFICE.

HENRY BATES, OF NEW LONDON, CONNECTICUT.

SLIDE-VALVE FOR THE EXHAUST-STEAM.

Specification of Letters Patent No. 11,925, dated November 14, 1854.

To all whom it may concern:

Be it known that I, HENRY BATES, of New London, in the county of New London and State of Connecticut, have invented a new and useful Combination of Slide-Valves for Steam and other Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying and forming part of this specification, in which—

Figure 1, is a horizontal section or interior view of the valve chest of a steam engine showing the application of my invention. Fig. 2, is a section in the line *x*, *x*, of Fig. 1, and Fig. 3, a section, o fthe line *y*, *y*, of Fig. 2.

Similar letters of reference indicate corresponding parts in the several figures.

This invention is intended to overcome the great difficulty which is encountered in giving the short slide valve any very considerable amount of lap for the purpose of cutting off the steam early in the stroke, viz, the choking or closing of the exhaust port sometime before the stroke of the piston terminates. It also allows greater freedom of exhaust, even where the lap of the valve is not sufficient to cause the above difficulty to be produced in any considerable degree.

The invention consists in the employment, combined with the usual slide valve, of a supplemental slide valve constructed and operated as herein described to work over a separate series of ports communicating with the same passages as the ports of the usual valve, and to leave a free exhaust till the end of the stroke of the piston.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A is the valve seat having steam ports *a*, *a*, and an exhaust port *b*, arranged in the usual manner (see Fig. 1) and covered by a slide valve B, having a sufficient degree of lap to cut off the steam shortly after half stroke. This valve is shown in all the figures, but in Fig. 1, it is shown in red outline with the exhaust cavity *e*, *e*, in the face dotted.

a', *a'*, *b'*, are the ports over which the supplemental exhaust valve C, works. These ports are arranged side by side with the ports *a*, *a*, *b*, the ports *a'*, *a'*, communicating with *a*, *a*, by transverse passages *c*, *c*, and the port *b'*, communicating with *b*, by a transverse pasage *d*. The ports *a'*, *a'*, *b'*, may be of any area that may be considered most advantageous, but about one fourth of the area of their respective ports *a*, *a*, *b*, will serve every purpose. The valve C, contains a cavity *f*, *f*, in its face like the common slide valve, the length of which cavity is such that it will exactly cover the exhaust port *b'*, and the two spaces between it and the ports *a'*, *a'*. The entire length of the valve is sufficient to allow it to receive such a movement as to bring one and the other of the ports *a'*, *a'*, into full communication with the port *b'*, without uncovering either to admit steam from the valve chest. The valve is set in the same way as a common slide valve constructed without lap or lead, so that one or other of the ports *a'*, *a'*, as may be required will always, except at the instant of the piston being at the end of its stroke, be in communication with the exhaust port *b'*. The movement of the valve C, must be produced by a separate eccentric or cam, the latter being preferable as by it the exhaust may be opened wide almost instantaneously.

The effect of the supplemental exhaust valve will be understood by reference to Figs. 1 and 2, where the usual valve B, supposed to be moving in the direction of the red arrow, is represented in a position, it would assume shortly after half stroke, having cut off the steam at the left hand port *a*, and since closed the exhaust through the right hand port *a*, but the exhaust through the right hand port *a'*, has scarcely yet commenced to be contracted, and will not be closed till the stroke of the piston.

The supplemental exhaust valve and ports not only insure a free exhaust to the end of the stroke; but, before the ordinary exhaust port is closed, or if the ordinary valve is so constructed as not to close the exhaust before the end of the stroke, it enlarges the area of exhaust passage relatively to the area of steam passage.

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

The employment substantially as herein described, in combination with the usual

slide valve, of a supplemental exhaust slide valve C, to be operated by separate mechanism to work over a separate series of ports which are similarly arranged to, and communicate with the same passages as the usual ports, for the purpose of giving a free exhaust till the termination of the stroke of the piston and for enlarging the area of passage for the exhaust, as herein fully set forth.

HENRY BATES.

Witnesses:
PELEY WILLIAMS,
WM. H. ROWE.