J. D. Beers,

Steam Slide Valve.

No. 5,051. Patented Apr. 3, 1847.

Fig. 1.

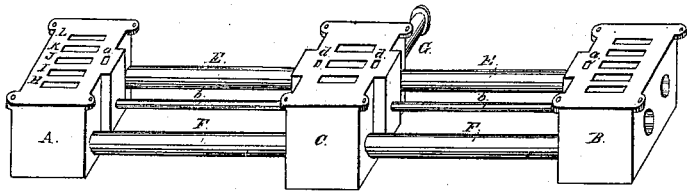


Fig. 2.

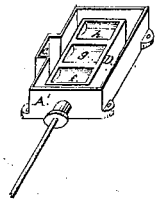


Fig. 3.

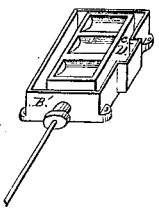


Fig. 4.

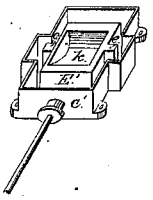


Fig. 5.

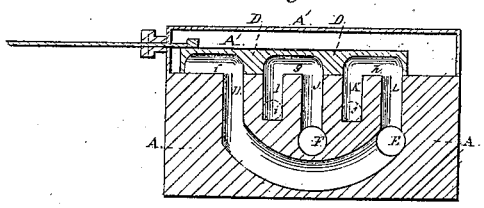


Fig. 6.

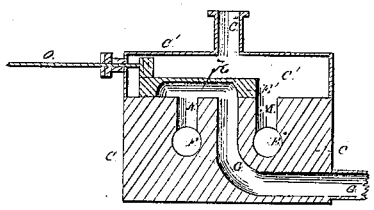
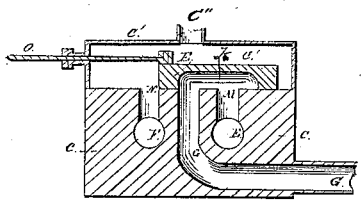


Fig. 7.



UNITED STATES PATENT OFFICE.

J. D. BEERS, OF PHILADELPHIA, PENNSYLVANIA.

VALVE OF STEAM-ENGINES.

Specification of Letters Patent No. 5,051, dated April 3, 1847.

To all whom it may concern:

Be it known that I, JOHN D. BEERS, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and improved manner of constructing and arranging slide-valves and steamways of locomotive and other steam engines, by which arrangement they are rendered more efficient and the motion of the engine is more readily reversed than under the modes of construction heretofore adopted; and I do hereby declare that the following is a full and exact description thereof.

In the accompanying drawings, Figure 1, is a perspective view of three valve seats with the steam-tubes by which they are connected together. Figs. 2, and 3, are the steam chests of the two outer valve seats, and Fig. 4, that of the inner, or middle, seat. Within each of these the slides of said valves are also shown.

As represented in Fig. 1, the apparatus is adapted to a combination with the two cylinders of a locomotive, or other, engine; but it is not necessary to show these cylinders, the valve seats, A, and B, being connected with them in the ordinary manner. The steam chests, A, and B, are to be secured by screw bolts on their respective seats, as usual, and the steam chest C′, on the middle seat, C.

Fig. 5, is a sectional view of the outer valves, A, and B, in a vertical plane through their middles, and Figs. 6, and 7, a like sectional view of the valve, C. It will be seen that in the valve seats, A, and B, there are five openings in one range, all equal in size; there is, also, a sixth, *a*, which is small, and which communicates with the small tubes, *b*, *b*, which are for the purpose of supplying steam to the steam chests, so as to press upon the slides, D, D, contained in those chests; the projecting cavities, *c*, *c*, on the steam chests, embrace these openings, and thereby admit steam to press constantly on the slides. The slides, D, D, embrace, and extend beyond, the five openings first named, but are unconnected with the small ones, *a*, *a*, there never being any communication between the steam contained in the steam chest above the slides, and that supplied to the cavities, or steam passages, below the slide. The slides of these valves are furnished with three steam cavities, these being necessary to their action, under my arrangement.

The steam seat, C, has three principal openings that are to be embraced by the cavity in the slide E′; the middle one being embraced constantly, the two outer ones alternately; it has, also, two small openings, *d*, *d*, that communicate with the tubes *b*, *b*, and supply steam to the steam chests of A, and B; the slide, E′, has two projections, *e*, *e*, upon it, which close the openings, *d*, *d*, when situated directly over them. The valve C, receives the steam from the boiler through the top of the steam chest, as shown at C″, Figs. 6, and 7. E, E, are the tubes that convey the steam into the valves, A, and B, from which it passes into the cylinder; and F, F, those that convey the exhaust steam from the valves A, and B, into C, whence it passes through the escape pipe G, Figs. 1, 6, and 7. Immediately before the steam passes into the tubes, E, E, it passes through the tubes, *b*, *b*, and thence into the steam chests of A′, and B′, and presses on the slides D, D, in said chests, which it holds firmly on their seats. The valves A, and B, are precisely alike, and the sectional view of that marked A, in Fig. 5, will, therefore, serve to explain the operation of both. The cavities in the slide D, are marked *f*, *g*, and *h;* those in the seat, H, I, J, K, and L. The cavities L, and H, communicate with the tube E. The steam way J, communicates with the pipe F; and the dotted lines at *i*, and *j*, represent steam ways communicating with the cylinder.

Figs. 6, and 7, are sections of the valve C, Fig. 1, showing the slide E′, in different positions; *k*, is the cavity in said slide.

M, is a steam way communicating with the pipe E, and N, a steam way communicating with the pipe F.

In the operation of the engine, steam is allowed to pass into the steam chest, C′, C′, Fig. 6, and the slide E′, being so situated as to allow it to enter the steam way M and the tube E, it is conveyed to the outer valves, and enters them as at E, Fig. 5, and is conveyed through L, and K, to the opening *j*, communicating with the cylinder. The escape steam is at the same time passing out from the opposite end of the cylinder into the valve seat at *i*, and through I, and J, into the tube F, and thence along said tube to the middle valve C, Fig. 6, which it enters at F, and passes through the way N, to the escape pipe G, G.

The slide D, D, Fig. 5, when steam is to pass into the opposite ends of the cylinders

will be moved by its eccentric until the cavity *f*, forms a communication between H and I; and the cavity *g*, a communication between J, and K, for the escape.

The manner of reversing the engine by these valves is by passing the steam into the tube F, which was previously the escape tube, and by passing the escape steam through the tube E, which was previously the steam tube. For this purpose the rod, or stem, *o*, is furnished with a lever by which the position of the valve can be changed, and made to assume that shown in Fig. 7. When in this situation, the steam will pass from the chest C′, through the passage N, and into the tube F; from said tube it will enter the valve A, Fig. 5, at F, and passing through J, and I, will enter the cylinder through the opening indicated by *i*. The escape steam will at the same time pass from the cylinder through the opening *j*,—and through K, and L, into the tube E, from which it will enter the middle valve at E, Fig. 7, and passing up M, will be conducted to the escape pipe G, G. It will be seen that under this arrangement, the motion of the engine may be instantaneously reversed and that with unerring certainty.

I have represented the three valves, A, B and C, Fig. 1 as in a right line, but the place of the middle valve may be varied in numerous ways; my improvement, however, is independent of any particular position of this part which may be arranged according to the fancy, or the judgment of the builder of the engine.

Having thus fully described the nature of my improvement in the manner of constructing and arranging the slide valves and steam ways of locomotive and other steam engines, what I claim therein as new, and desire to secure by Letters Patent is—

The manner of arranging their respective steam ways and the cavities in their slides, as herein set forth, and represented in the accompanying drawings; that is to say, I claim the employment of the five openings, or steam cavities, in the valves A and B, in combination with the three cavities in the slides D, and with the tubes E and F, connecting the valves A and B with the valve C under an arrangement of the respective steam passages as represented, and for the purpose set forth; by which the respective parts thereof are made to operate, and the action of the engine; may be reversed substantially as described and this I claim whether the arrangement made, be precisely the same with those of which exemplifications are herein given, or be varied therefrom, while the same end is attained by means substantially the same.

JOHN D. BEERS.

Witnesses:
THOS. P. JONES,
LEML. WILLIAMS.