

(No Model.)

J. R. COOK & C. S. HINCHMAN.
STEAM ENGINE VALVE.

No. 479,401.

Patented July 26, 1892.

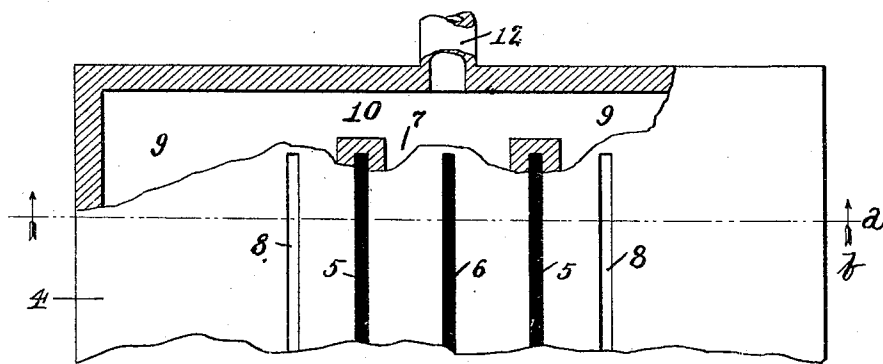
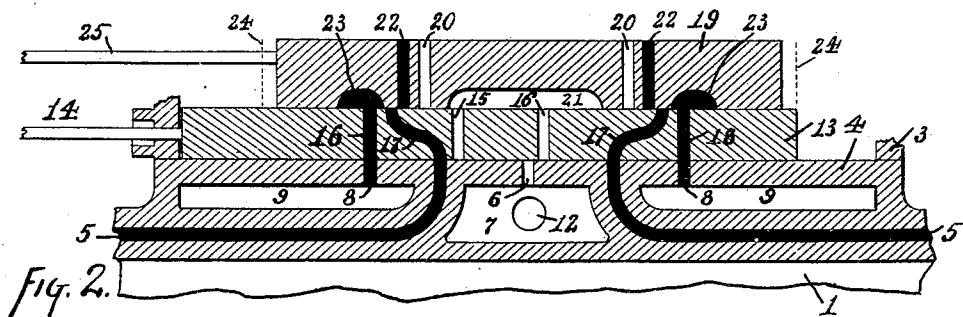
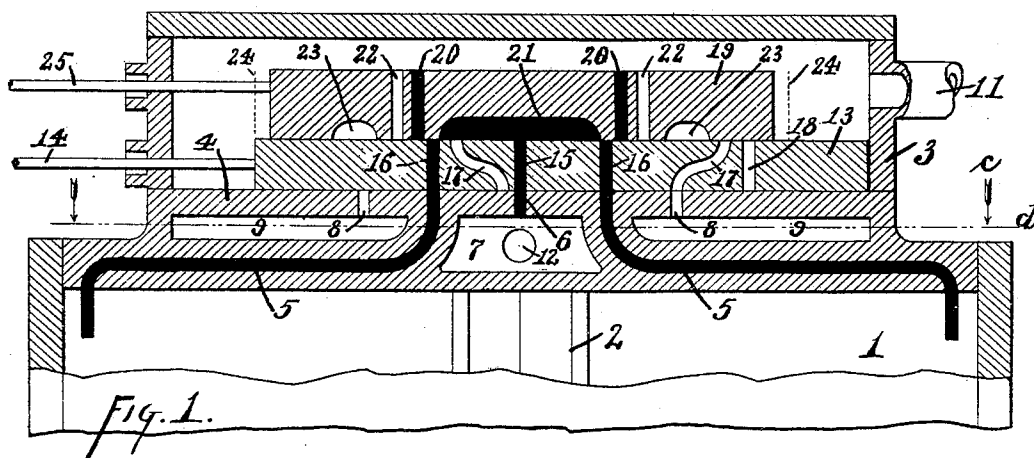


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN R. COOK AND CAREY S. HINCHMAN, OF RUSHVILLE, INDIANA.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 479,401, dated July 26, 1892.

Application filed April 21, 1892. Serial No. 429,992. (No model.)

To all whom it may concern:

Be it known that we, JOHN R. COOK and CAREY S. HINCHMAN, of Rushville, Rush county, Indiana, have invented certain new and useful Improvements in Steam-Engine Valves, of which the following is a specification.

This invention relates to a peculiar construction and arrangement of slide-valve and seat-plate designed to permit of the ready reversal of the direction of motion of the engine controlled by the valve.

Our improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through a portion of the cylinder and the steam-chest and valve, illustrating our invention, this section being taken in the plane of line *a* of Fig. 3 and viewed in the direction indicated by the arrow *b*, this view showing the valve arranged to give the engine a certain direction of motion, the passages, &c., shown in solid black being those which are in this case employed; Fig. 2, a similar section showing the valve arrangement adjusted to produce the contrary direction of motion, the passages, &c., in active employment in the second case being again shown in solid black; and Fig. 3, a plan of a portion of the main valve-seat, portions below the same appearing in section in the plane of line *d* of Fig. 1, viewed in the direction of arrow *c*. In Figs. 1 and 2 the operating-valve is shown in its position of mid-stroke, with steam-ports covered.

In the drawings, 1 indicates the cylinder, provided with the usual valve-seat, which seat has, however, peculiarities to be hereinafter referred to; 2, the piston; 3, the steam-chest, mounted, as usual, on the valve-seat of the cylinder; 4, the valve-seat of the cylinder, on which the steam-chest is located, as usual; 5, the usual steam-ports extending from the valve-seat to the ends of the cylinder; 6, the usual exhaust-port in the valve-seat midway between the two steam-ports; 7, the usual exhaust-pocket under the valve-seat, into which the exhaust-port 6 leads; 8, a pair of additional exhaust-ports in the valve-seat, dis-

posed one outwardly beyond each of the steam-ports 5 in the seat; 9, additional exhaust-pockets under the valve-seat, one at each end, and into which the exhaust-ports 8 lead, the exhaust-pockets 7 and 9 being in free communication with each other; 10, communicating passage under the valve-seat, forming, virtually, a communicating side pipe, placing exhaust-pockets 7 and 9 in free communication with each other; 11, usual steam-admission to steam-chest; 12, usual exhaust connection from the exhaust-pockets; 13, a seat-plate seating steam-tight upon the valve-seat and adapted to be moved by hand to extreme positions of adjustment either to the right or to the left, Fig. 1 showing this plate adjusted to the extreme right and Fig. 2 showing it adjusted to the extreme left; 14, a stem attached to this plate and projecting out of the steam-chest through a suitable stuffing-box, this stem serving as means by which the plate may be adjusted to its right or left position; 15, an exhaust-port through this plate in such position that when the plate is adjusted to the extreme right, as in Fig. 1, it will coincide with and form an extension of the exhaust-port 6 in the valve-seat; 16, a pair of steam-ports through the plate in such position as to coincide with and form extensions of the steam-ports 5 when the plate is adjusted to the right and in such position, also, as that when the plate is adjusted to the left, as in Fig. 2, the left-hand one of these ports will coincide with and form an extension of the left-hand one of the exhaust-ports 8; 17, a pair of steam-ports through the plate, one located between port 15 and the left-hand one of port 16 and the other one located to the right beyond the right-hand port 16, these ports being in such position that when the plate is adjusted to the left, as in Fig. 2, they will coincide with and form extensions of the steam-ports 5 of the valve-seat; 18, an exhaust-port through the plate outwardly beyond the right-hand one of ports 17, in such position that when the plate is adjusted to the left, as in Fig. 2, it will coincide with and form an extension of the right-hand exhaust-port 8; 19, a slide-valve arranged for sliding motion upon the seat-plate 13, which plate forms the seat for this reciprocating slide-valve, which valve will be recip-

roated in the usual manner; 20, a pair of steam-ports through the valve in such position that when the seat-plate is adjusted to the right, as in Fig. 1, the reciprocations of the slide-valve will bring these ports 20 alternately into coincidence with their respective steam-ports 16 in the seat-plate; 21, an exhaust-pocket under the slide-valve between these steam-ports; 22, a pair of steam-ports through the slide-valve outwardly beyond the ports 20, in such position that when the seat-plate is adjusted to the left, as in Fig. 2, the slide-valve in its reciprocations will bring these ports 22 alternately into coincidence with their respective steam-ports 17 in the seat-plate; 23, exhaust-pockets under the slide-valve outwardly beyond the ports 22 and in such position that when the seat-plate is adjusted to the left, as in Fig. 2, the reciprocations of the slide-valve will place the ports 17 in the seat-plate alternately in communication with their respective exhaust-ports 16 and 18; 24, dotted lines indicating the extremes of travel of the slide-valve, and 25 the usual stem of the slide-valve.

Assume the seat-plate to be adjusted permanently to the right, as in Fig. 1, and the slide-valve to be given reciprocating motion with a stroke indicated by the lines 24. In such case steam goes to the cylinder through ports 20 and 16 and exhausts through ports 16, pocket 21, ports 15 and 6, and pocket 7. The operative ports are shown in solid black, and the white ports are idle ports, as are also the pock-

ets 23 and 9. In the case above mentioned it will be obvious that the engine will have a certain direction of motion due to the direction of advance of the eccentric, as usual.

If we wish to reverse the direction of motion, whether the engine be at rest or running, we adjust the seat-plate to the left-hand position, as in Fig. 2. This adjustment has caused the abandonment of ports 20 15 16 6 and pockets 21 and 7 and has brought into action certain ports which were idle in the former case. The cylinder now takes steam through ports 22 and 17 and exhausts through ports 16 and 17 at the left and 17 and 18 at the right and through pockets 23 and 9.

We claim as our invention—

In a steam-engine valve, the combination, substantially as set forth, of a valve-seat with two steam-ports and with three exhaust-ports, a seat-plate adjustable on said valve-seat and provided with ports to coincide with the two steam-ports and central exhaust-port of the valve-seat when the plate is in one position and with ports to register with the steam-ports and two outside exhaust-ports of the valve-seat when shifted to another position, and a slide-valve working upon said seat-plate and having three exhaust-pockets and four steam-ports.

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