JOHN WATSON.

Improvement in Valves for Steam Engines.

No. 125,105. Patented March 26, 1872.

Fig. 1.

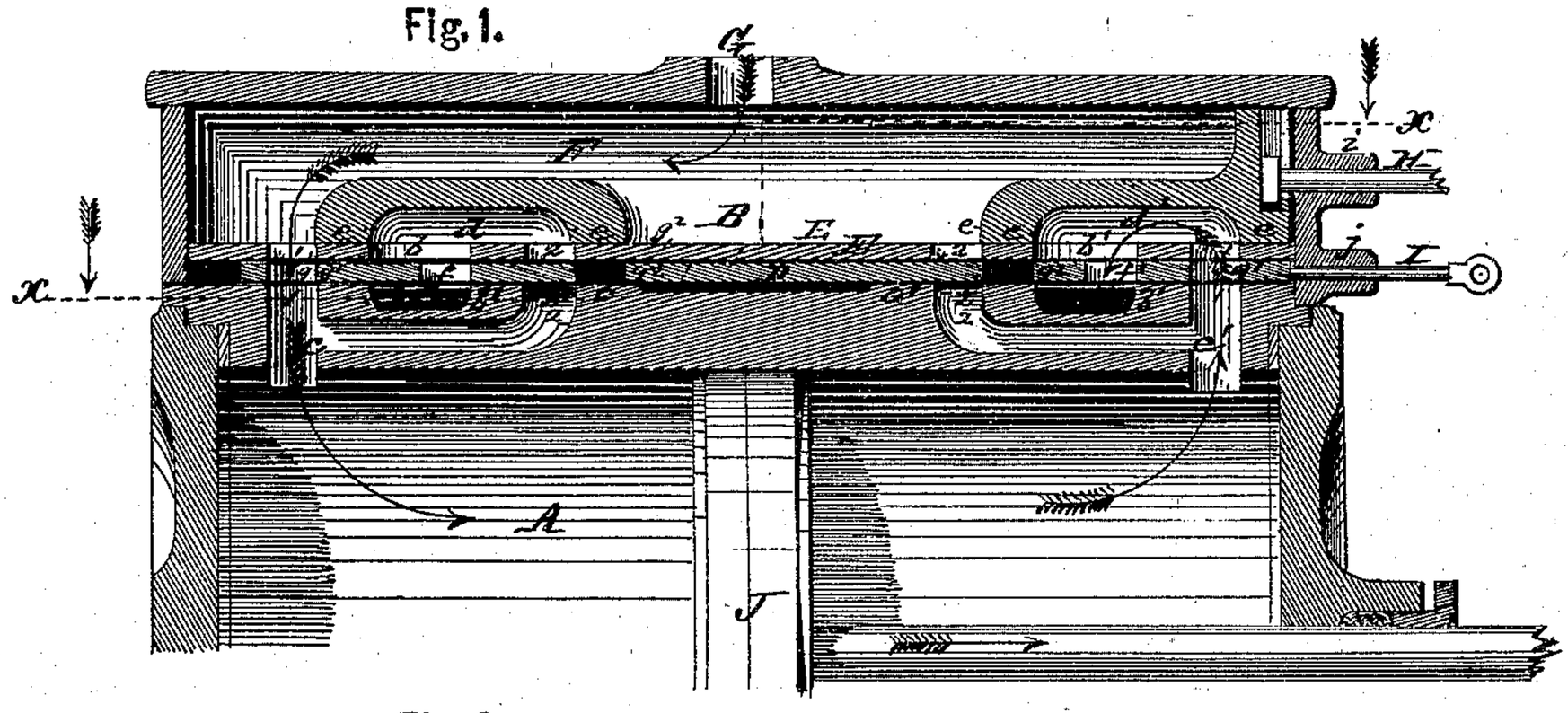


Fig. 2.

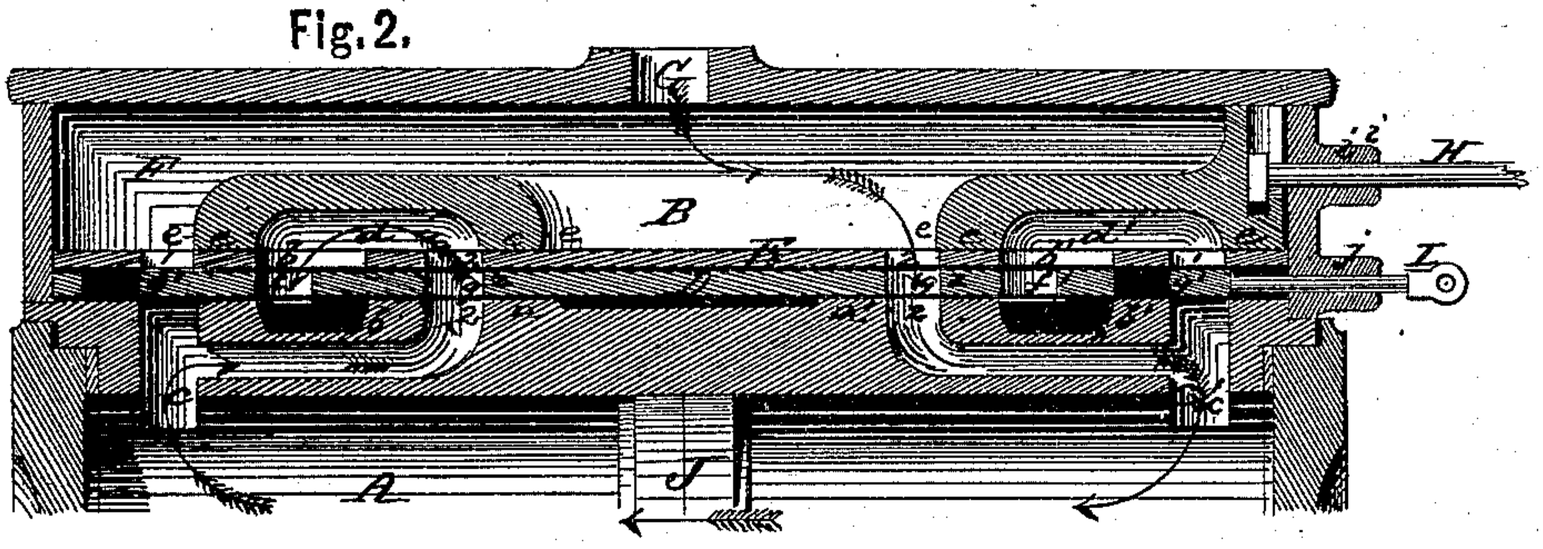


Fig. 3.

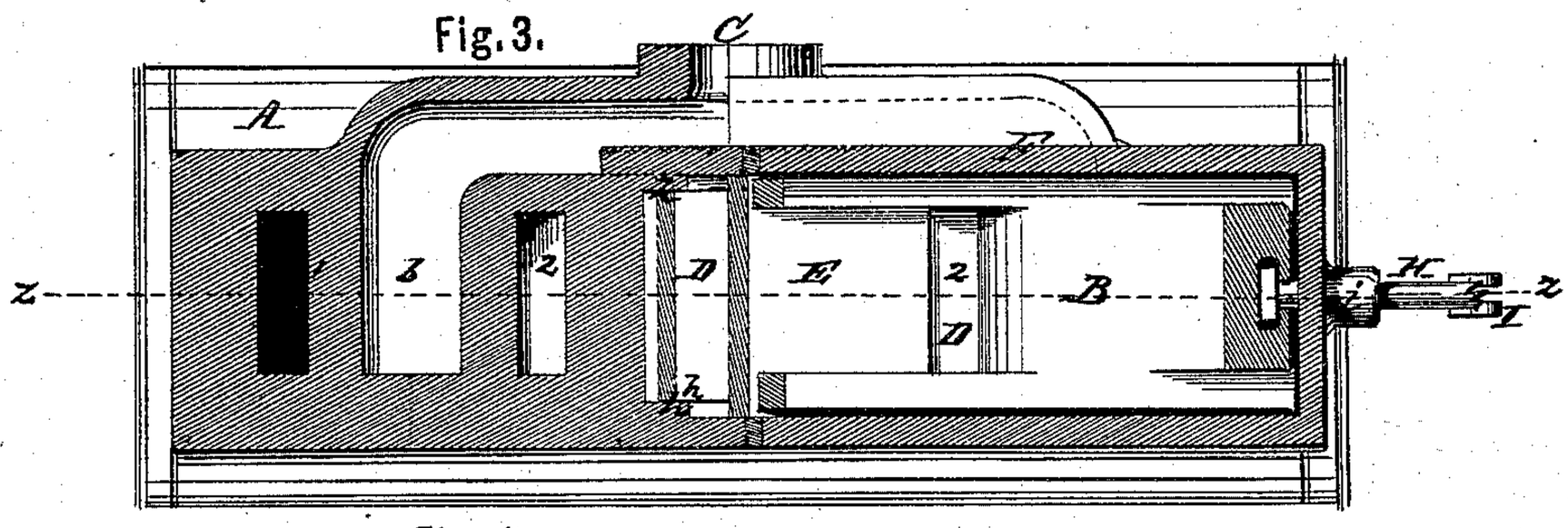


Fig. 4.

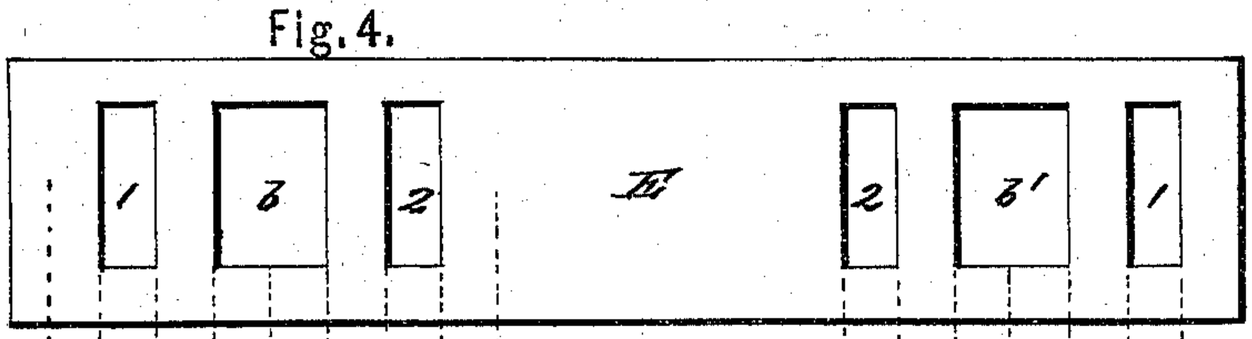
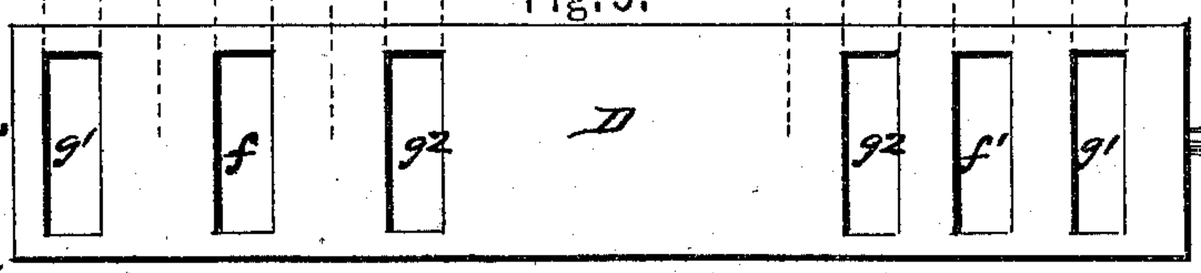


Fig. 5.



WITNESSES.
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125,105

UNITED STATES PATENT OFFICE.

JOHN WATSON, OF TOLEDO, OHIO.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 125,105, dated March 26, 1872.

Specification describing an Improvement in Steam-Engines, invented by JOHN WATSON, of Toledo, in the county of Lucas, State of Ohio.

This invention relates to means for reversing the steam in reciprocating engines without link-motion or special eccentric; and is especially intended for locomotive and marine engines. The first part of the invention consists in a peculiar combination and arrangement of ports in the cylinder, and in a single perforated slide beneath the valve, by shifting which one set of ports may be closed and another simultaneously opened, as required, to secure the desired reversal, the same being thus accomplished at any part of the stroke, and instantaneously or gradually, as preferred. The invention consists, further, in arranging such reversing slide beneath a supplemental valve-seat, by which it shall be relieved of pressure.

In the drawing, Figures 1 and 2 are vertical longitudinal sections of a reciprocating steam-engine illustrating my invention, the valve being shown in the same position in both figures, and the reversal of the steam by the reversing slide indicated by arrows. Fig. 3 is a horizontal section on the planes indicated by the line *x x*, Fig. 1, and illustrating, by the line *z z*, the plane of said figure and Fig. 2. Figs. 4 and 5 are plans of the supplemental valve-seat and reversing slide, the dotted lines indicating the positions of the ports of the latter relatively to those of the former.

In carrying out my invention I construct a cylinder, A, with the customary valve-seats *a a'*, for a double D-valve, B, and with the customary exhaust-ports *b b'* terminating in a discharge-neck, C, but of double length. Instead of the common cylinder-passages, I employ compound passages *c c'*, each leading from two ports, 1 2, on opposite sides of the exhaust-ports *b b'*, and at equal distances therefrom. The cavities *d d'* of the valve B are adapted to unite the ports 1 or 2 with the exhaust-ports *b b'*, and their ends *e e'* to occupy the spaces between the ports.

From the above description it will be apparent that without further provision both ends of the cylinder, unless cut off, would be open to both steam and exhaust at the same time. To control these ports so that only one set of cylinder-ports (1 or 2) shall be fully open at one time, and so as to admit of closing or opening either set at will, I arrange on the valve-seats *a a'* a slide, D, with perforations *f f'* and g^1 g^2, the former adapted to connect with the exhaust-ports *b b'*, and the latter to open, respectively, the cylinder-ports 1 and 2, as illustrated in Fig. 5. To relieve this slide from pressure, so as to adapt it to be readily shifted by hand, I cover it with a plate, E, perforated correspondingly with the valve-seats *a a'*, and supported by shoulders *h*, (Fig. 3,) or their equivalent, which plate forms the valve-seat proper. The slide D, supplemental valve-seat E, and valve B are inclosed in a steam-chest, F, of proper dimensions, having a collar or aperture, G, for the admission of steam above the valve, and collars or stuffing-boxes *i j* through which the valve-rod H and a rod, I, by which to shift the slide E, extend, the former to an eccentric and the latter to a hand-lever. or their equivalents.

The reversing operation is clearly illustrated in Figs. 1 and 2. The piston J is represented in Fig. 1 as making its up-stroke, the steam having access to its face through port 1 of the cylinder-passage *c* and the contiguous perforation g^1 of the slide D, and escaping from its back through port 1 of cylinder-passage *c'*, perforation g^1 at that end of slide D, cavity *d'* of valve B, perforation *f'* of slide D, and exhaust-port *b'*. It is now desired to reverse the engine. The slide D being relieved of pressure by the supplemental valve-seat E, is readily shifted by hand to the opposite end of its space, as shown in Fig. 2. Cylinder-port 1 is now closed and cylinder-port 2 open, that of passage *c*, (before steam,) through perforations g^2 and *f* of slide D, and cavity *d* of valve B, remaining over the same to the exhaust, and that of passage *c'*, (before exhaust,) through perforation g^2 of slide D, to steam. The flow of steam and the stroke of piston J are consequently reversed, as indicated by the arrows.

The valve B may, if preferred, ride on the reversing slide D, the steam pressure being balanced in any suitable manner.

Claims.

What I claim as new herein is—

1. The single reversing slide D, constructed with the perforations $g^1 f g^2$, $g^2 f' g^1$, in combination with the double D-valve B, and the cylinder A having valve-seats a a', with ports 1 b 2, 2 b' 1, and passages c c', arranged as shown, for the purpose specified.

2. The plate E, perforated correspondingly with the valve-seats a a', as shown and described, in combination with the described reversing slide D and double D-slide-valve B, for relieving the said slide from pressure, as set forth.

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Witnesses:
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