J. West,

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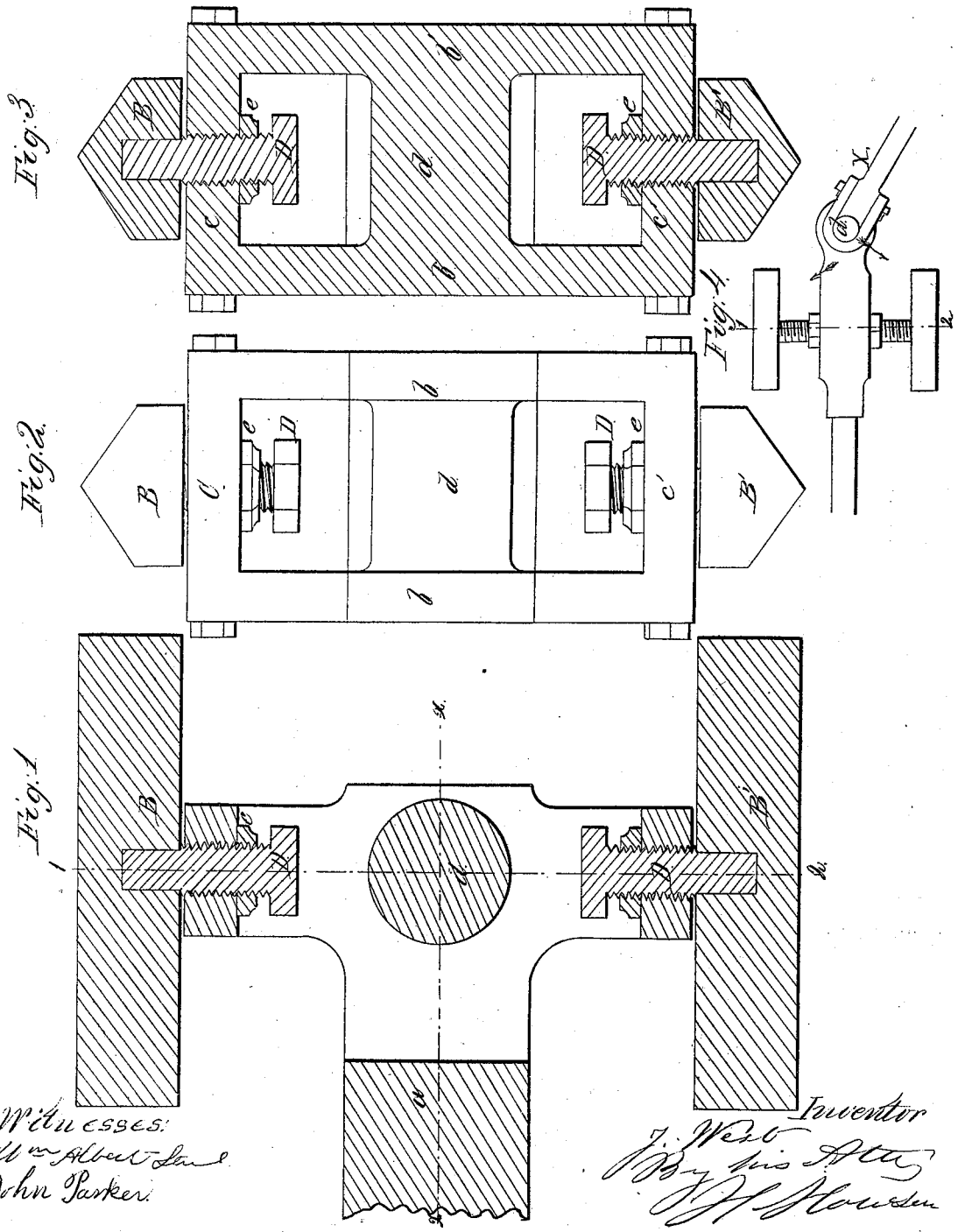

Witnesses:
Wm Albert Lane
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UNITED STATES PATENT OFFICE.

JOHN WEST, OF BETHLEHEM, PENNSYLVANIA.

IMPROVEMENT IN CROSS-HEADS.

Specification forming part of Letters Patent No. **54,457**, dated May 1, 1866.

To all whom it may concern:

Be it known that I, JOHN WEST, of Bethlehem, Northampton county, Pennsylvania, have invented an Improvement in Cross-Heads; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists of a cross-head constructed in the peculiar manner fully described hereinafter, with the view of preventing the bending and breaking of the piston-rod, the rocking of the piston, and unequal wearing of the sliding blocks.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a vertical section of my improved cross-head; Fig. 2, an end view of the same; Fig. 3, a section on the line 1 2, Fig. 1; and Fig. 4, a view showing a cross-head of the ordinary construction.

The cross-head consists of the portion *a*, to which the end of the piston-rod is secured, and the side pieces or cheeks, *b* and *b'*, connected together by the upper and lower transverse pieces, *c* and *c'*, and by the pin *d*, which is embraced by the strap at the end of the connecting-rod.

The whole of these parts are in the present instance represented as made in one piece and of cast-iron, although the pin *d* may be made separately from the other parts and afterward secured to the same, and the cross-head may be otherwise constructed in a manner differing from that illustrated, without departing from the main features of the invention.

B and B' are the two sliding blocks, the outer edge of each of which is made of a V form to suit similarly-shaped grooves in the guides.

In each of the sliding blocks B B' of the cross-head fits the plain end of a stud, D, one of which is screwed into each of the transverse pieces *c c'*, each of the studs being furnished with a jam-nut, *e*.

The horizontal line *x x* represents the center line of the cylinder and piston-rod, and 1 2 is a line drawn through the center of the pin *d* at right angles to the line *x x*, the said line 1 2 coinciding with the center line of the studs D D and bisecting each sliding block at a point midway between its opposite ends.

It has been usual to so construct cross-heads of this class that the pin *d* was situated in advance of or behind the vertical line 1 2.

Owing to the inclined positions assumed by the connecting-rod, as shown in Fig. 4, pressure was exerted on the cross-head in the direction of the arrow, first one guide and then the other having to resist this pressure as the engine operated. This being the case, it will be evident that when the pin *d* is situated in advance of the line 1 2, as shown in Fig. 4, there is a tendency to rock the cross-head, and consequently to bend the piston-rod and rock the piston as it passes back and forth in the cylinder, the motion thus imparted to the cross-head also tending to wear away the sliding blocks at the ends, so that they become rounded on their bearing-faces.

By so arranging the pin *d*, however, that a line drawn vertically through its center shall bisect the slides the above-mentioned force will be exerted directly on the centers of the sliding blocks, and will consequently have no tendency to rock the cross-head, the bending or breaking of the piston-rod, rocking of the piston, and unequal wearing of the sliding blocks being thus prevented.

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

The within-described cross-head, consisting of the portion *a*, to which the piston-rod is secured, the side pieces, *b* and *b'*, transverse pieces *c* and *c'*, the pin *d*, the sliding blocks B and B', and screw-studs D D, the whole being arranged as and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN WEST.

Witnesses:

CHARLES E. FOSTER,

JOHN WHITE.