(No Model.)

J. RARICK, Jr., & J. L. WALKER.

VALVE GEAR FOR OSCILLATING ENGINES.

No. 557,228. Patented Mar. 31, 1896.

Fig. 1.

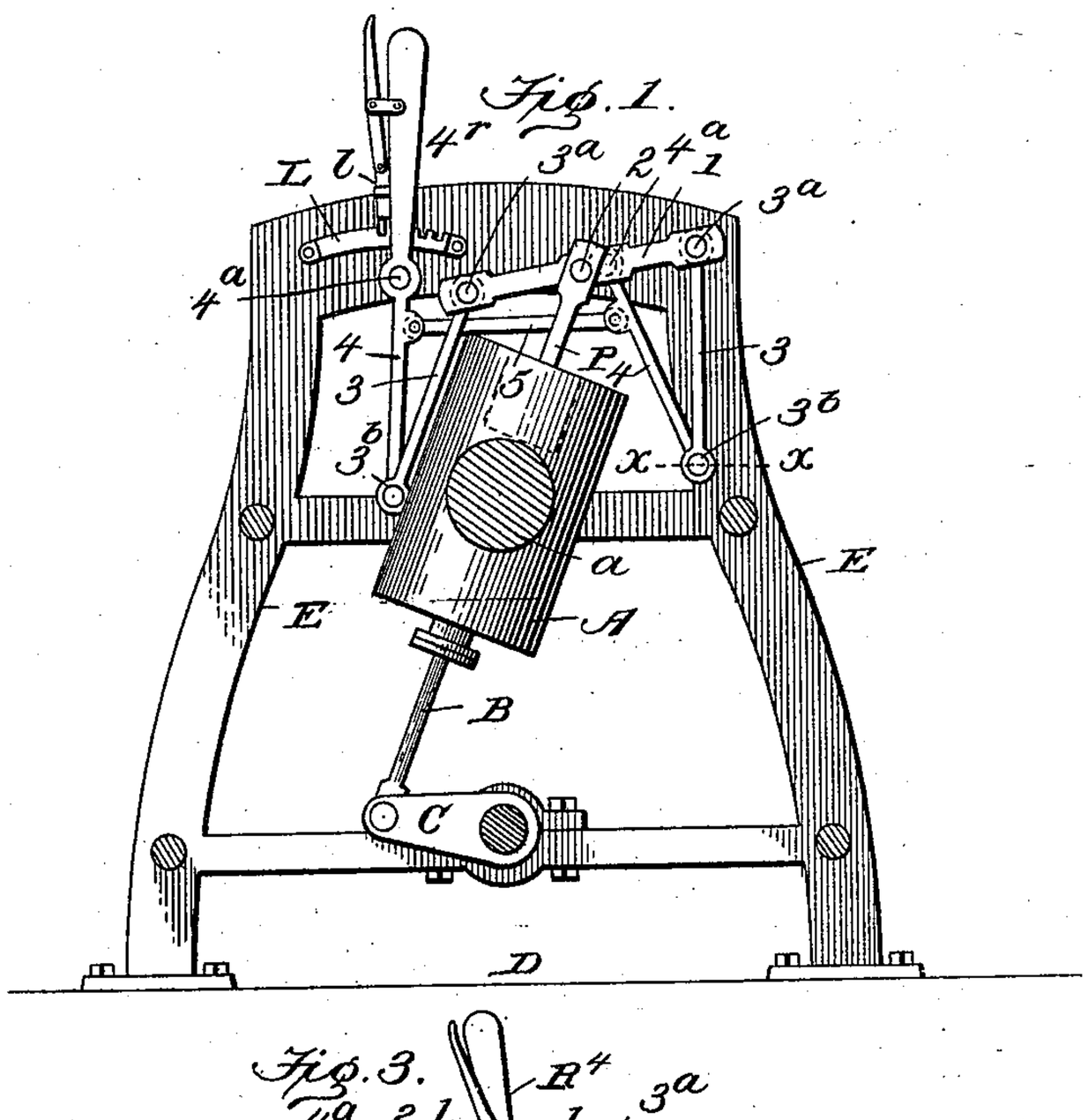


Fig. 2.

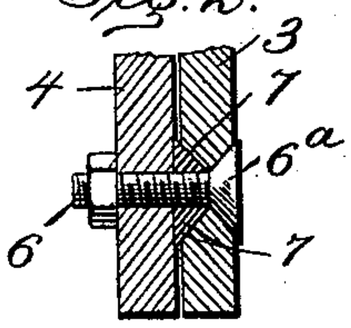
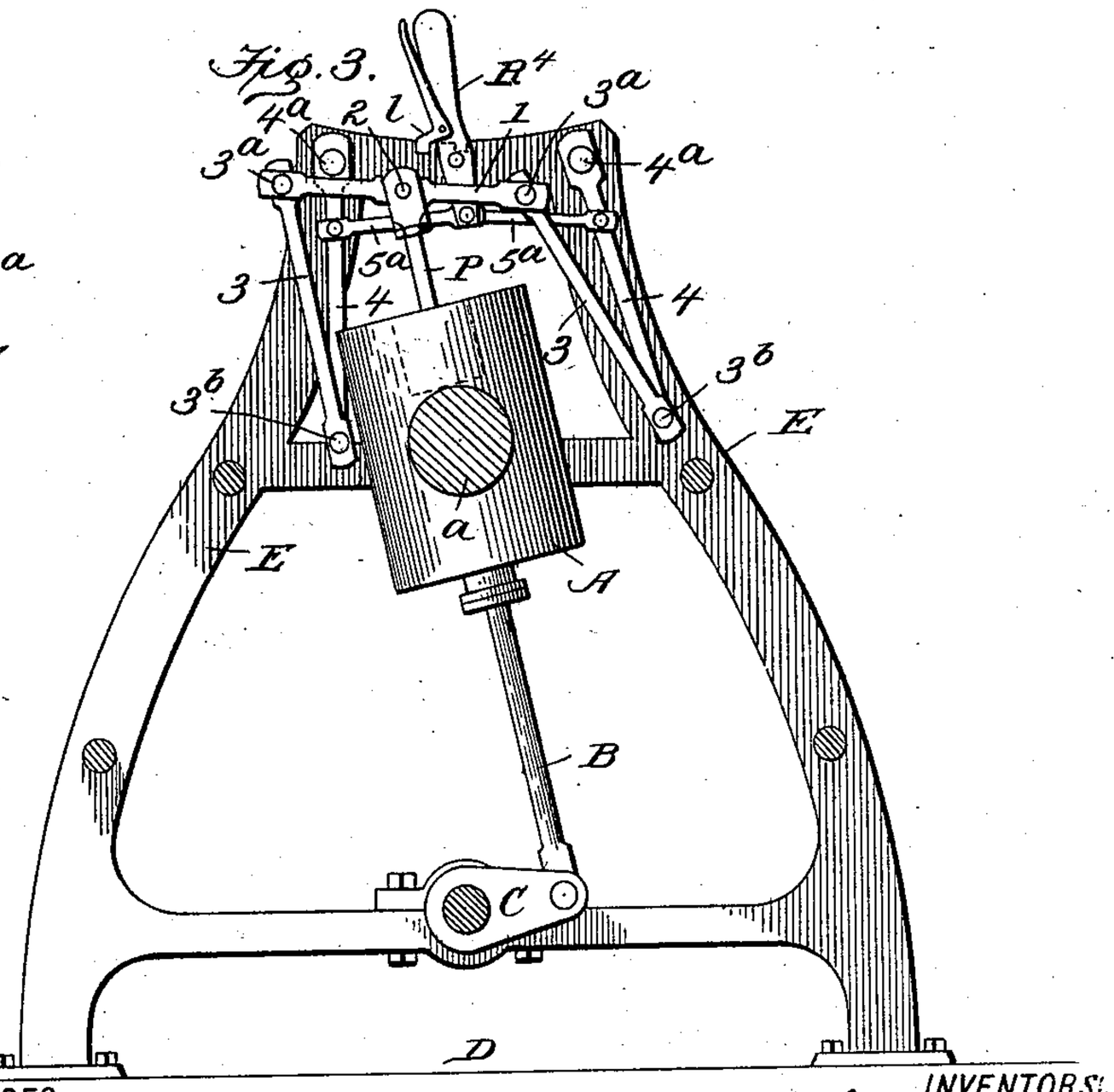


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN RARICK, JR., AND JAMES LEE WALKER, OF NEW BRIGHTON, PENNSYLVANIA.

VALVE-GEAR FOR OSCILLATING ENGINES.

SPECIFICATION forming part of Letters Patent No. 557,228, dated March 31, 1896.

Application filed June 26, 1895. Serial No. 554,090. (No model.)

To all whom it may concern:

Be it known that we, JOHN RARICK, Jr., and JAMES LEE WALKER, citizens of the United States, residing at New Brighton, Beaver county, State of Pennsylvania, have invented certain new and useful Improvements in Valve-Gear for Oscillating Engines; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of valve-gear embodying our invention, together with so much of an oscillating engine and its frame as suffices to illustrate the application of the gearing thereto. Fig. 2 is a sectional view on the line *x x*, Fig. 1, the pivotal joint provided to take up the wear or slack of the links and secure evenness of motion and accuracy in the operation of the link-and-lever system; and Fig. 3 is an elevation of a modification of the link-and-lever system of reversing-gear.

Like symbols refer to like parts wherever they occur.

Our invention relates to the construction of reversing-gear for oscillating engines, and is especially adapted for that class employing slide-valves, which valves receive their motion directly from the cylinder.

It has for its object a simplification of the reversing-gear, a decrease in the friction and wear of the mechanism, and the reduction or removal of strain from the valve-rod and valve.

To this end the main feature of our invention embraces the combination, with an oscillating engine and its valve, of a "floating" or link suspended or supported valve-lever or bar and means for shifting the points of support of said floating lever, whereby the pivotal connections between the valve-lever and valve-rod remain in line with the valve and the valve and its rod are relieved of strain.

There are other minor features of invention, all as will hereinafter more fully appear.

We will now proceed to describe our invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the cylinder of an oscillating engine; *a*, its trunnions or center; B, the piston-rod; C, the crank operated thereby; D, the bed-plate, and E the frame, in which the cylinder is journaled.

The frame E will be extended above or beyond the cylinder sufficiently far to afford a suitable support or point of attachment for the reversing-gear hereinafter described, which gear is preferably located at the opposite end of the cylinder from the piston and crank C, thus rendering it easier to clean, pack, and oil the parts, and, if desired, said extension of the frame E may be made available to surround the engine by a suitable jacket in any of the well-known ways.

1 indicates a bar or floating lever, to the center of which the valve-rod P is pivotally connected, as at 2, and said bar or floating lever 1 is movably supported (or suspended, as the case may be) by links 3 3 pivotally connected therewith on opposite sides of its connection with the valve-rod, as at 3^a 3^a. The swinging links 3 3 are in turn and by their opposite ends pivotally connected with and supported from levers 4 4, as at 3^b 3^b, and the levers 4 4 are journaled by their opposite ends on studs 4^a 4^a or other suitable fixed points on the frame E and connected by a cross-rod 5, so that the levers 4 4 shall move in unison and thus carry the movable pivots or fulcra 3^b 3^b equal distances to or from the plane of the trunnions and crank-shaft and the pivotal connection 2 between floating lever 1 and valve-stem P to one or the other side of said plane, as the case may be. The pivotal connections or joints between the levers 4 and links 3, or between the links 3 and floating lever 1, are preferably of the character shown in detail in Fig. 2—that is to say, a suitable threaded bolt 6 is provided with a conical head, as at 6^a, and with a coniform nut 7, so that the bolt and nut 7 afford a means of obtaining a fixed connection with one of the parts (or levers) and the conical head 6^a and coniform nut 7 form an adjustable cone-bearing for the moving part (link) adapted to take up wear and slack and secure an even and easy movement of the parts one on the other.

The reversing-lever is preferably obtained by extending one of the levers 4 beyond the pivot 4^a, as at 4^r, (see Fig. 1,) and providing the usual rack L and spring-dog *l;* but if pre-

ferred a separate reversing-lever R^4 may be employed pivoted on the frame (see Fig. 3) at a point intermediate of the levers 4 4 and connected therewith by a plurality of connecting-rods 5^a, so as to move said levers 4 4 equally and in unison, as hereinbefore specified.

The construction being of the general character hereinbefore specified, the reversing-gear will operate as follows: When the reversing-lever 4^r or R^4 is moved to bring the levers 4 4 substantially parallel or the pivot-points 3^b 3^b each the same distance from the plane of the cylinder-trunnions and crank-shaft, the pivotal point 2 of connection between the floating lever 1 and the valve-rod P will be in the plane of the cylinder and trunnions and the motion of the valve will be so limited that the ports will not uncover and no movement of the engine will occur. When, however, the reversing-lever is moved so as to carry the pivot-points (fulcra) 3^b 3^b the one to and the other from the said plane, the point of connection 2 between floating lever 1 and valve-rod P will be correspondingly moved to one or other side of the said plane and the engine will move in one or other direction, as the case may be.

Having thus described the nature, construction, and operation of our improved reversing-gear, what we claim, and desire to secure by Letters Patent, is—

1. The combination with an oscillating engine and its valve, of a floating lever or bar with which the valve-rod is connected, and means for changing the fulcra or points of support of said floating lever, substantially as and for the purposes specified.

2. The combination with an oscillating engine and its valve, of a suspended or supported bar with which said valve is connected, links for suspending or supporting said bar, and means for changing the points of link-support, substantially as and for the purposes specified.

3. The combination with an oscillating engine and its valve, of a floating bar with which said valve is connected, link supports or suspensions for said floating bar, and levers on which said links are pivoted said levers having fixed pivots or points of support, substantially as and for the purposes specified.

4. The combination with an oscillating engine and its valve, of a floating lever or bar with which said valve is connected, link suspensions or supports for said floating bar, lever-supports for said links said levers having fixed fulcra, and a reversing-lever for actuating said lever-supports, substantially as and for the purposes specified.

5. The combination with an oscillating engine and its valve, of a floating lever or bar, with which the valve is connected, link suspensions or supports for said bar, lever-supports for said links both of said levers having fixed fulcra and one of said levers extended beyond said fulcra to constitute a reversing-lever, and means for connecting said lever-supports to cause them to move in unison, substantially as and for the purposes specified.

6. In a valve-gear mechanism, the combination of a floating bar to which the valve-rod is attached, swinging links for the support of said floating bar, levers for the support of said swinging links said levers having fixed pivots—or fulcra—and adjustable cone-bearings for the swinging links; substantially as and for the purposes specified.

7. In a reversing valve-gear mechanism, the combination of a floating valve-lever, link suspensions or supports therefor, and lever-supports for the links said lever-supports having fixed fulcra; substantially as and for the purposes specified.

In testimony whereof we affix our signatures, in presence of two witnesses, this 19th day of June, 1895.

JOHN RARICK, JR.
JAMES LEE WALKER.

Witnesses:
J. F. DUNLAP,
O. A. TIECHE.