

M. M. & D. J. MULVIHILL & J. P. & M. L. ROONEY.

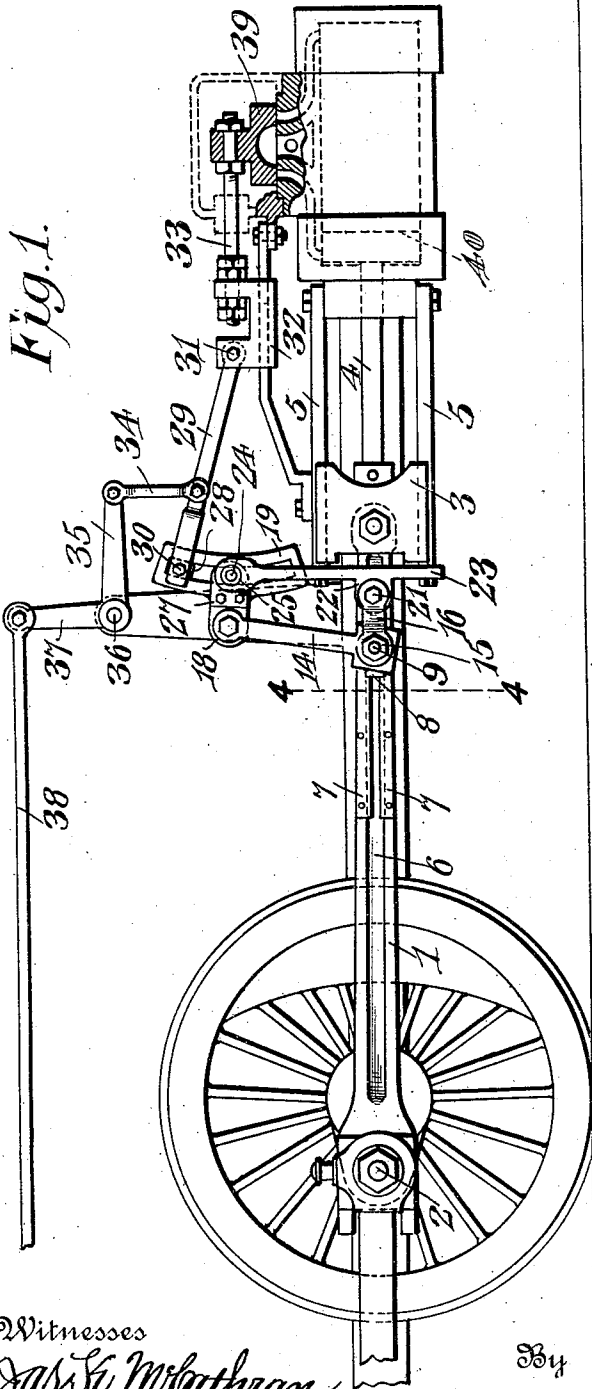
VALVE GEAR.

APPLICATION FILED MAY 12, 1910

980,820.

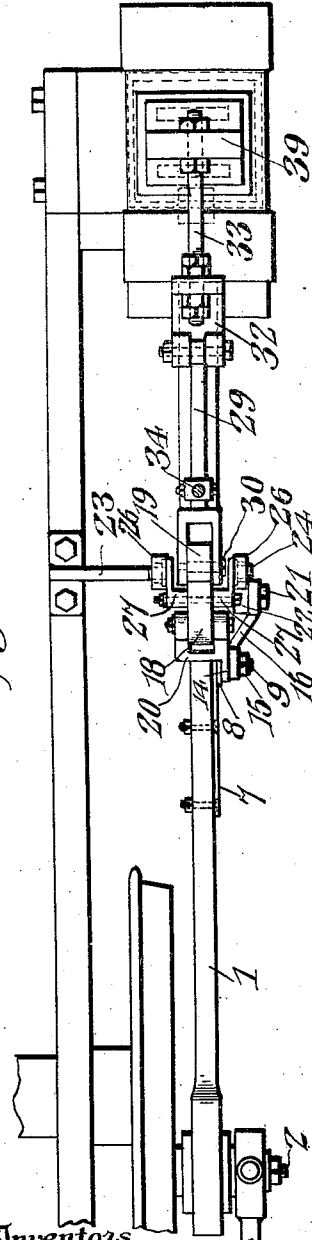
Patented Jan. 3, 1911.

3 SHEETS—SHEET 1.



Witnesses
Jas. E. McElathran
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Fig. 2.

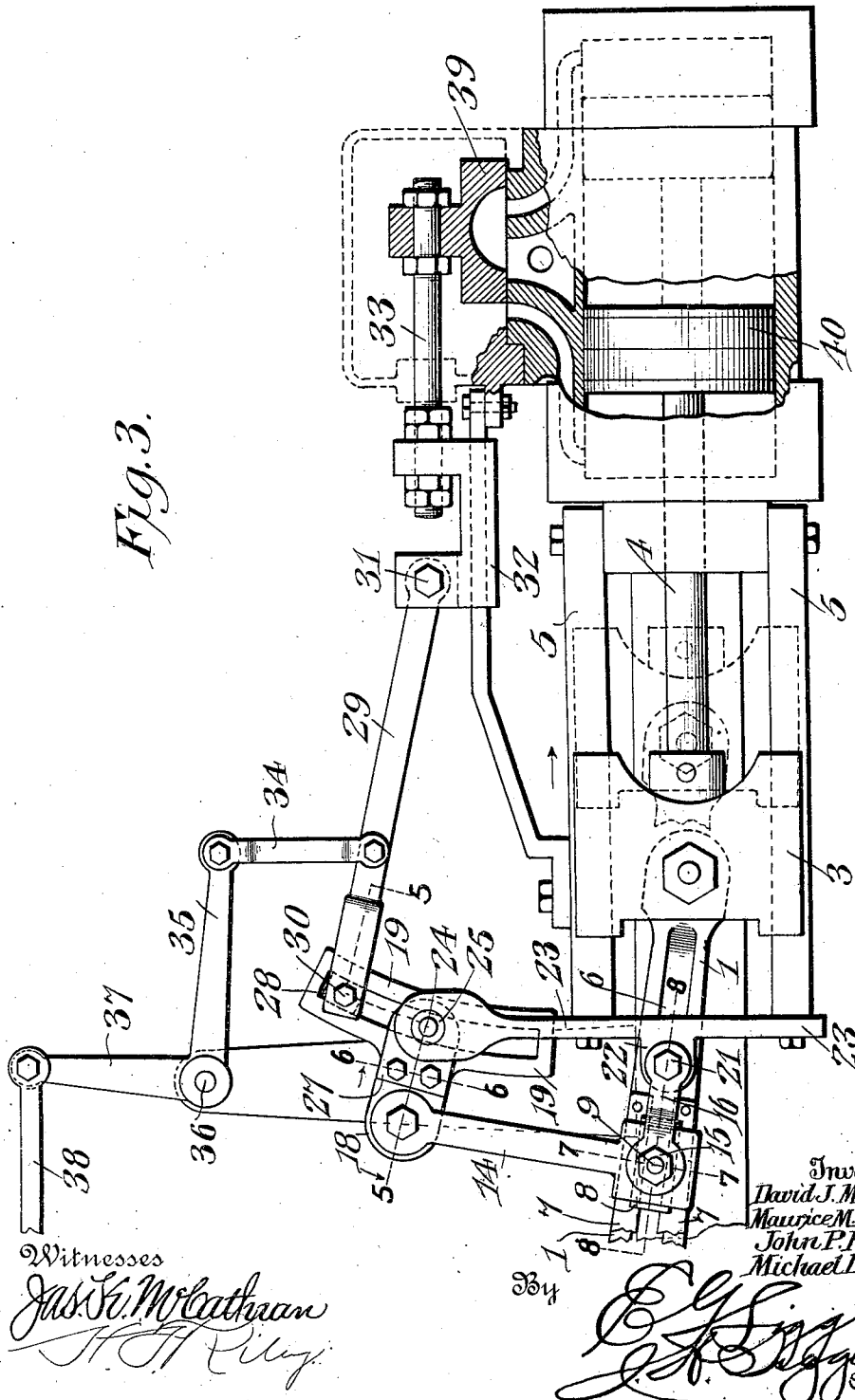


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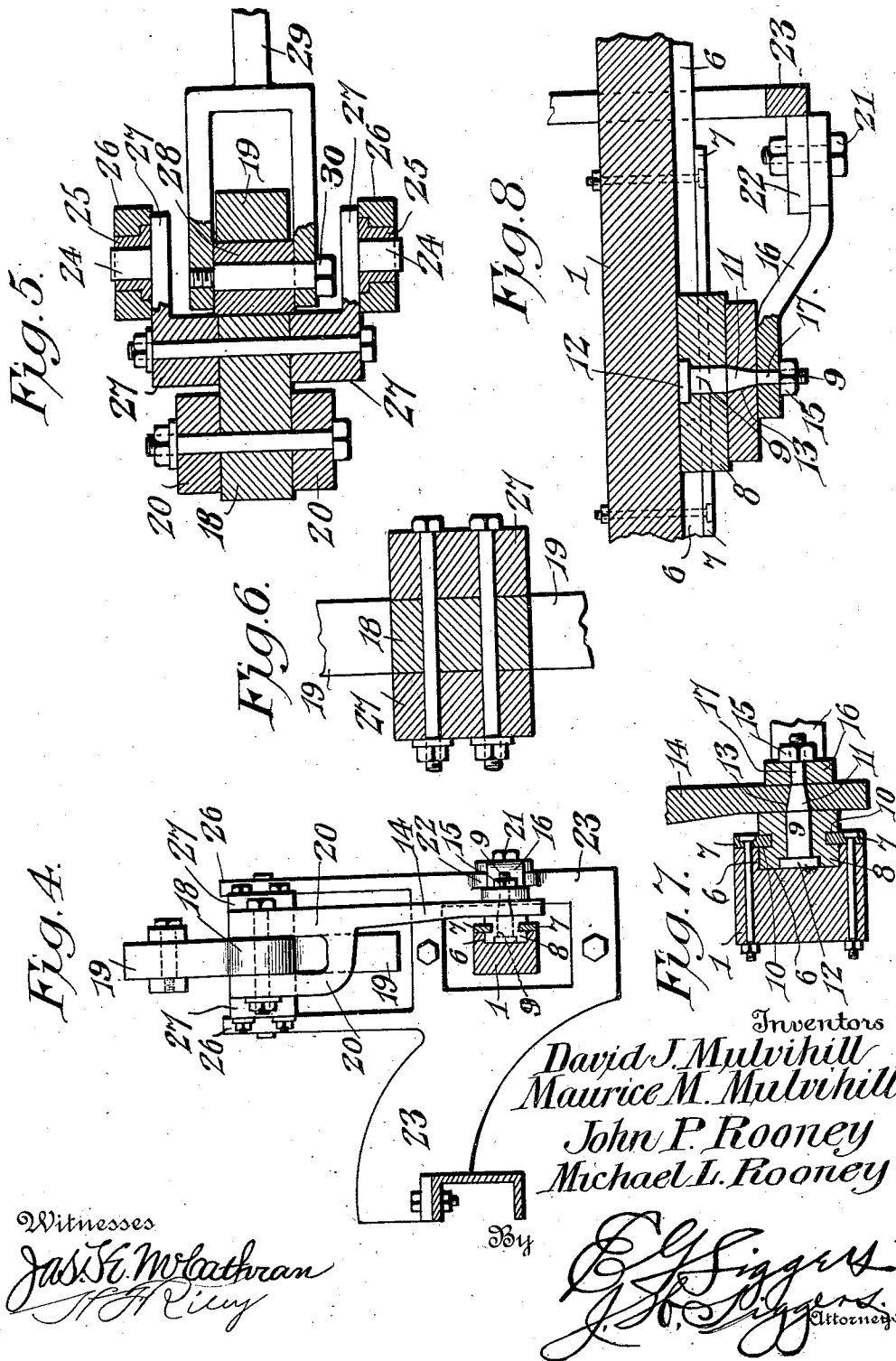
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UNITED STATES PATENT OFFICE.

MAURICE M. MULVIHILL, DAVID J. MULVIHILL, JOHN P. ROONEY, AND MICHAEL L. ROONEY, OF RENOV, PENNSYLVANIA.

VALVE-GEAR.

980,820.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed May 12, 1910. Serial No. 561,000.

To all whom it may concern:

Be it known that we, MAURICE M. MULVIHILL, DAVID J. MULVIHILL, JOHN P. ROONEY, and MICHAEL L. ROONEY, citizens of the United States, residing at Renovo, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Valve-Gears, of which the following is a specification.

The invention relates to improvements in valve gears.

The object of the present invention is to simplify and improve the construction of valve gears for locomotives and other engines, and to provide an inexpensive and efficient outside valve gear, which may be readily applied at a very small cost to any locomotive, and which when assembled will be in full view and easily accessible.

A further object of the invention is to provide a valve gear, adapted to be operated without lap or lead, whereby when the reversing lever is in a central position, the valve will be absolutely stationary, thereby preventing the bad effects resulting from the movement of valves having lap and lead when the steam is cut off and a locomotive is drifting.

Another object of the invention is to dispense with cross head connections, and to enable the valve gear to be actuated directly by the main rod, and to produce an early admission of steam and a late cut off, so that steam will be admitted to the cylinder full ninety per cent. of the stroke, whereby the power of an engine will be materially increased.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claim here-to appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claim, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a side elevation, partly in section, of a valve gear, constructed in accordance with this invention and shown applied to a portion of a locomotive. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged side elevation of the valve gear, partly in section. Fig. 4

is a transverse sectional view on the line 4—4 of Fig. 1. Fig. 5 is a sectional view on the line 5—5 of Fig. 3. Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 3. Fig. 7 is a similar view on the line 7—7 of Fig. 3. Fig. 8 is a detail sectional view on the line 8—8 of Fig. 3.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the embodiment of the invention illustrated in the accompanying drawings, 1 designates a main rod of a locomotive, connected at its rear end to the crank pin 2 and at its front end with the cross head 3 of a piston rod 4. The cross head 3 operates in suitable guides 5, and the main rod is provided with a longitudinal guideway, preferably formed by the usual longitudinal groove 6 and a pair of plates 7, bolted or otherwise secured to the outer face of the main rod above and below the groove 6, and extending inwardly over the same to form projecting flanges for retaining a slide block 8 in the groove of the main rod. The slide block 8, which carries a pivot 9, is provided with upper and lower grooves 10 to receive the projecting portions of the plates 7. The pivot 9, which has an intermediate tapered bearing portion 11, is provided at its inner end with a head 12, which is countersunk in the inner face of the slide block. The bearing portion 11 is tapered outwardly and fits in a tapering opening 13 of an upright link 14, secured on the pivot 9 by a nut 15, which also retains a substantially horizontal link 16 on a cylindrical bearing portion 17 of the pivot 9. The outer end of the pivot is threaded and the cylindrical bearing portion is located between the threaded portion and the tapered bearing portion, as clearly illustrated in Figs. 7 and 8 of the drawings.

The link 14 extends upwardly from the main rod 1 to a centrally arranged arm 18 of a reverse link 19, and the upper portion 20 of the upright link is preferably forked, as shown in Fig. 4 to straddle the central arm of the reverse link 19. The approximately horizontal link 16 is angularly bent to off-set its front end from the plane of the rear end to enable its front end to be pivoted by a bolt 21 to an ear 22, extending from the guide yoke 23, which connects the rear ends of the cross head guides. The link 16 may, of course, be pivoted to any other

fixed portion of the locomotive or engine to which the valve gear is applied, and it oscillates vertically and causes the pivot 9, when actuated by the main rod of a locomotive, to travel in an arcuate path, the distance between the pivots 9 and 21 always remaining constant.

The reverse link 19, which is curved, is provided at opposite sides with centrally arranged laterally extending pivots 24, which are mounted in suitable bearings 25 of spaced supports 26, preferably consisting of arms or portions formed integral with and extending upward from the yoke 23, to which the link 16 is pivoted. The pivots 24 are preferably formed integral with approximately L-shaped plates or arms 27, which are bolted to the reverse link at the central portion thereof adjacent to the inner end of the central arm 18. The reverse link receives a slidable link block 28, which is pivoted to the rear end of a forwardly extending radius rod 29 by a bolt 30, or other suitable fastening device. The reverse link, the slide block and the radius rod constitute reverse mechanism similar to that employed in the Walschaert valve gear, and the front end of the radius rod is pivoted by a bolt 31 to the slide 32 of the valve stem 33, and it is connected at an intermediate point by a lifting link 34 with a lifting arm 35 of a reversing shaft 36. The reversing shaft has an upwardly extending arm 37, which is connected by a reach rod 38 with the reversing lever (not shown). The mechanism for operating the radius rod to move the same to opposite sides of the pivot of the reverse link to reverse the engine and at intermediate points to vary the cut-off is of the ordinary construction, and it may be modified to suit the locomotive or engine to which the valve gear is applied.

The valve rod 33 is connected with a slide valve 39, which is an ordinary D valve or outside admission valve, but the valve gear is equally applicable to an inside admission or piston valve and may be employed with equal facility on engines having either type of valve.

When the main rod is reciprocated, the link 14 will be moved upward and downward and the reverse link will be oscillated and will communicate its motion to the valve 39 through the radius rod and the valve rod. This movement gives an early admission and a late cut-off. In Fig. 3 of the drawings, the full lines show the cross

head 3 and piston 40 traveling in the direction of the arrow and having moved a sufficient distance to completely open the valve, which dwells and remains substantially stationary until the cross head and the piston advance to the dotted positions shown in Fig. 3. The valve gear is quick at the ends of the stroke and slow at the center, and steam is admitted during ninety per cent. of the stroke. As the valve remains open for so long a period there is an equal distribution of steam on the forward and backward strokes of the valve, which is not affected by the angularity of the eccentric rod. The valve is closed by the travel of the piston from the dotted line position, shown in Fig. 3, to the right hand end of the stroke. The valve is adapted to operate without lap or lead and, therefore, has no motion when the reversing lever is in a central position. Also this obviates the necessity of employing a combined lever, or other cross head connection for producing sufficient valve travel to secure lap and lead. The valve gear is an outside gear and is located above the main rod and the cross head guides and is in full view and easily accessible.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

The combination of a main rod having a longitudinal guide-way, a centrally pivoted reverse link located above the plane of the main rod and having a centrally arranged arm, a radius rod connected with the reverse link, means for connecting the radius rod with a valve, an upright link pivotally connected at its upper end with the central arm of the reverse link, and an oscillatory link having a fixed pivot at one end and pivotally connected at its other end to the upright link and arranged at an angle to the same, said upright link being actuated by the main rod and slidably connected with the guideway thereof at a fixed point on the oscillatory link.

In testimony whereof we affix our signatures in presence of two witnesses.

MAURICE M. MULVIHILL.
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Witnesses:

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