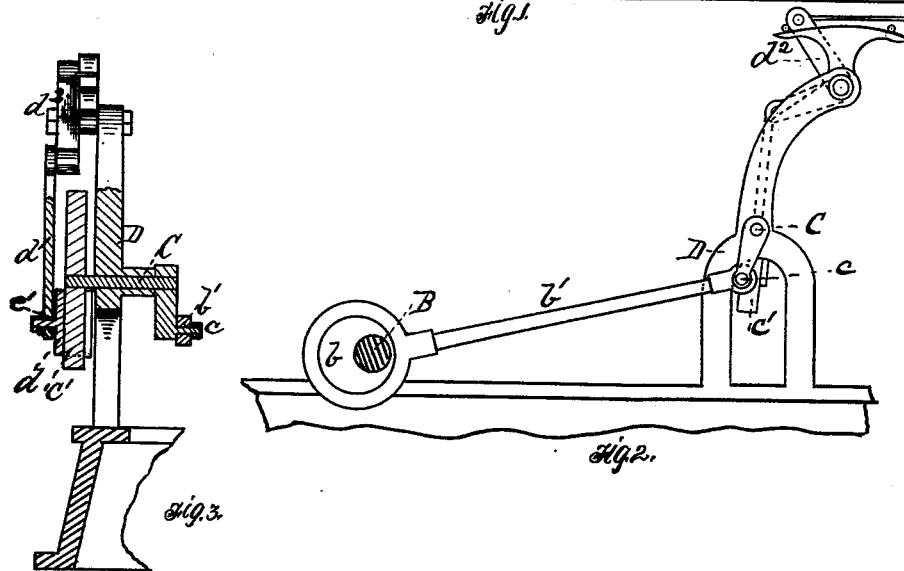
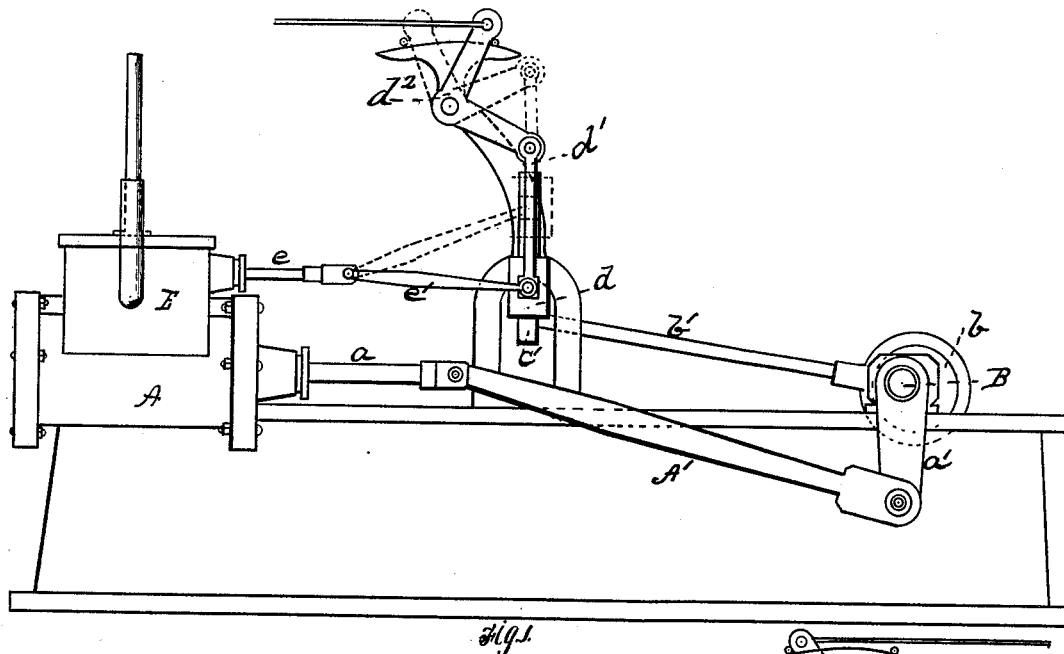


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Witnesses.

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UNITED STATES PATENT OFFICE.

DANIEL R. PRYOR, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HIMSELF
AND THOMAS D. EVANS, OF SAME PLACE.

IMPROVEMENT IN REVERSING-GEARS FOR LOCOMOTIVES, &c.

Specification forming part of Letters Patent No. **220,417**, dated October 7, 1879; application filed
June 20, 1879.

To all whom it may concern:

Be it known that I, DANIEL R. PRYOR, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Reversing-Gears for Locomotive and other Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of devices embodying my invention. Fig. 2 is a similar view of a portion of the opposite side, and Fig. 3 is a sectional detail view.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of reversing-gears for locomotive and other engines, and consists in the combination, with a single eccentric and its rod, of a rock-shaft, to which the eccentric-rod is connected, a slide-bar secured to the rock-shaft, and a slide coupled to the valve-rod and reversing-lever by intermediate pivoted levers, &c., whereby a positive, simple, and efficient reversing-gear is obtained, and one wherein the minimum of friction and wear occurs.

The usual construction heretofore adopted for locomotive and equivalent engines has been what is termed the "link-motion;" or, in other words, two eccentrics (fore and back) and eccentric-rods, the latter connected at their extremities by a slotted bar or link, within which moves up and down a sliding pin on the valve-rod, the eccentric-rods being adjustable by a lever mechanism, so as to change the action of the eccentrics on the valve-rod, and thus alter or reverse the throw of the valve. The main objections to such devices are the multiplicity of parts, the friction to be overcome, and the power necessarily exerted to change the position of the eccentric-rods and reverse the engine, (the power required being greater when the engine is at rest,) all of which detracts from quick and accurate action.

In some classes of engines a modified gear has been heretofore used, wherein a single eccentric and eccentric-rod were employed, the eccentric-rod being provided with a yoke, link, or its equivalent, and made changeable in its connection to a rock-shaft which actuated the

valve-rod, so as to only obtain a reverse with full throw of the valve, no means of adjusting the throw of the valve being provided; and such a construction, while dispensing with one eccentric and eccentric-rod, has not materially reduced or simplified the devices, and is open, in most respects, to the objections before specified.

In other cases a single eccentric has been employed, its rod connected directly to a pin or rock-shaft carrying a slotted segment or link wherein worked a sliding block, to which the valve-rod was connected; but in such construction the friction and wear are considerable, there is a tendency of the block to cramp and bind during adjustment thereof, there is no means of readily adjusting and controlling the throw, and to supply the same would involve the interposition of a movable guide between the segment or link and the reversing-lever, which would complicate the devices and increase the friction and wear as well as the power required to reverse the engine.

The object of the present invention is to simplify and cheapen the construction of valve-gear in engines of the class specified, wherein the valve is operated and reversed from a single eccentric, and also to reduce the power required to operate the reversing-gear, thus rendering it more easily and accurately adjustable, either to reverse or regulate the throw of the valve.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the cylinder, having its piston-rod *a* connected to the pitman or connecting-rod *A'*, and the latter attached to crank *a'* of shaft or axle B. The usual cross-head, to which the piston-rod is connected, will be employed; but as it and its construction and connections are well known the same have been omitted from the drawings. *b* indicates an eccentric secured to the shaft or axle B, and connected by its eccentric-rod *b'* to the crank-pin *c* of a rock-shaft, C, which has its bearings on the framing D, or at any other suitable point.

On the end of rock-shaft C, opposite the crank-pin *c*, is secured a bar or rod, *c'*, carrying a slide, *d*, which is operated from the reversing-lever through the intermediate pivoted

lever, d^1 , and bell-crank d^2 , and the slide d is connected directly to the valve-rod e by the interposed pivoted lever or pitman e' , so that the valve-rod will receive its motion directly from the rock-shaft.

With the reversing-lever the usual notched segment-bar, (not shown,) or any desired equivalent means, will be employed in order to retain the slide at any set which may be given it.

E indicates the valve-chest, provided with the usual or any approved valve, and e represents the valve-rod, connected to the slide d , as before specified.

The devices being constructed and arranged substantially as specified will operate as follows: The slide d having been moved into the position on bar c' as shown in Fig. 1, or in the same relation to the rock-shaft C as the crank-pin c , to which the eccentric-rod is connected, the valve-rod e will advance with the eccentric-rod the same as if a "fore" eccentric were employed, and, as shown, will give the full throw to the valve. Now, if the reversing-lever be moved to actuate the slide d , (through the lever d^1 and bell-crank d^2), to cause it to approach the rock-shaft C or center of motion, the valve will continue to move with the eccentric-rod until the center of motion or rock-shaft is reached; but its throw will gradually decrease, and can be set at any point by means of the notched segment, as before specified.

When the slide d has been brought over the

rock-shaft or on the center, the steam will be cut off and the engine will be at rest.

The continued operation of the lever to carry the slide away from the rock-shaft C , and opposite the point of connection of the eccentric-rod, will cause the valve-rod to take its motion from the rock-shaft and move in an opposite direction to the eccentric-rod, thus reversing the engine, the eccentric now acting as a "back eccentric," and the throw of the valve gradually increases as the slide recedes from the center of motion or rock-shaft.

The advantages of my invention are the simplicity and effectiveness of the devices, the reduction of friction and wear, and the small amount of power necessarily exerted in reversing.

Having thus set forth the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

The combination, with a slide-valve, of reversing-gear consisting of the single eccentric b and its rod b' , the rock-shaft C and its slide-bar c' , the slide d , and the mechanism whereby it is connected to the valve-rod and reversing-lever, the whole constructed and arranged substantially as and for the purpose specified.

In testimony whereof I, the said DANIEL R. PRYOR, have hereunto set my hand.

DANIEL R. PRYOR.

Witnesses:

F. W. RITTER, Jr.,
JAMES H. PORTE.