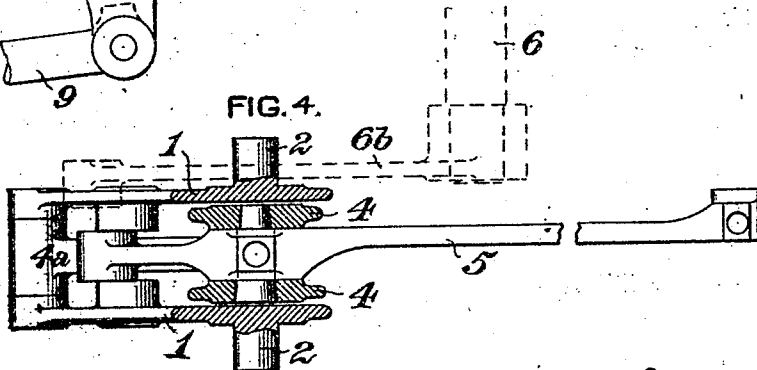
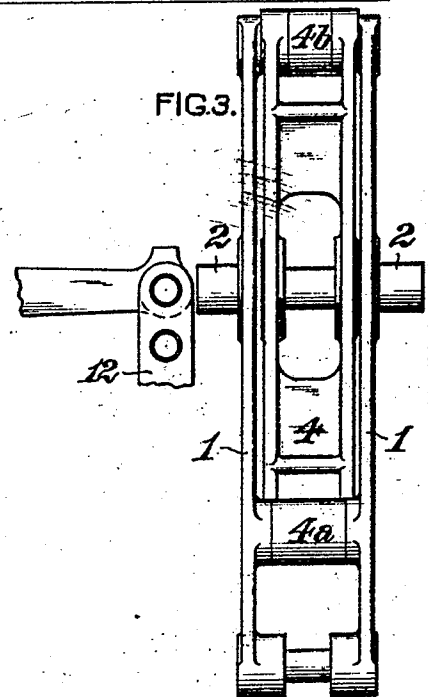
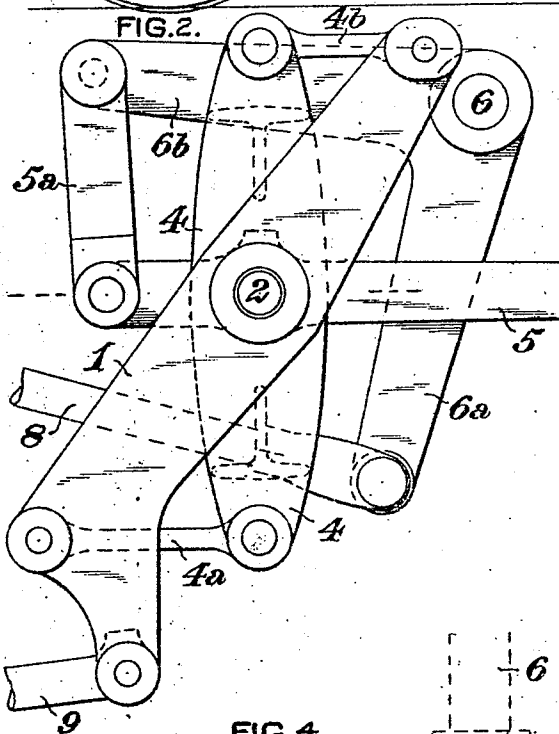
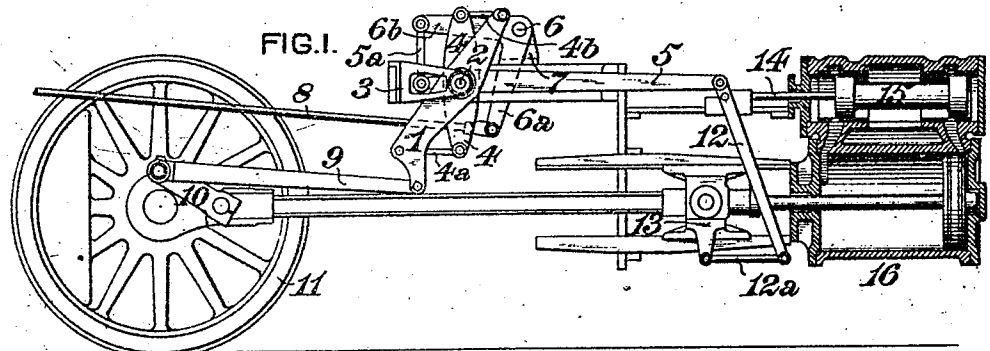


J. G. BLUNT,
VALVE GEAR.
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VALVE-GEAR.

976,542.

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To all whom it may concern:

Be it known that I, JAMES G. BLUNT, of Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Valve-Gears, of which improvement the following is a specification.

My invention more particularly relates to locomotive engine valve gears of the so-called radial type, and its object is to provide a valve gear of such type which, while embodying all the advantages of those now in service, shall attain the additional ones of simplicity and economy of construction and maintenance, requiring only such machine work as can be effected on lathes or boring mills, and, in its practice, of producing positive movement at all points of cut off, by avoiding the slip of the ordinary link block.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a side view of a valve gear illustrating an embodiment of my invention, as applied on a locomotive engine; Fig. 2, a similar view, on an enlarged scale, of the same, detached from its support; Fig. 3, an end view; and, Fig. 4, a plan or top view, partly in section.

Referring to the drawings, it will be seen that the general principle of my improved valve gear accords with that of the well known "Walschaert" gear, which has been introduced to a large extent in railroad service, it being actuated by connections with a return crank on a locomotive driving wheel, and with a cross head, respectively.

In the practice of my invention, the description of which is made of the gear on one side only of the locomotive; that on the opposite side being similar, I provide a double armed lever, 1, composed of two parallel side plates, provided with trunnions, 2, which are journaled in bearings in a supporting bracket, 3, suitably secured to the frame of the locomotive. A link, 4, composed of two side plates, connected by intermediate webs or ribs, is located between the side plates of the lever, 1, and is journaled, at its middle, on a substantially horizontal radius bar, 5. The lower arm of the link, 4, is coupled, by a rod, 4^a, to the lower arm of the lever, 1, and the upper arm of the link is coupled, by a rod, 4^b, to the upper arm of said lever, the rods, 4^a and 4^b, being of unequal length, so as to effect a substantially radial movement of the link when the radius bar is moved to

change the direction of movement or point of cut off. An oscillatory reverse shaft, 6, is journaled in brackets, 7, secured to the engine frame, and is connected by a downwardly depending reverse arm, 6^a, fixed upon it, and by a reach rod, 8, coupled thereto, with a reverse lever (not shown) in the cab of the locomotive, by the movement of which lever, the reverse shaft may be rocked in its bearings, in the ordinary manner. The lower arm of the lever, 1, is coupled, by an eccentric rod, 9, to an eccentric crank, or return crank, 10, fixed upon one of the driving wheels, 11, of the locomotive.

An arm, 6^b, is fixed upon the reverse shaft, 6, adjacent to each of its ends, and is coupled, by a rod, 5^a, to the radius bar, 5, a short distance in rear of the link, 4. The forward end of the radius bar is coupled to the upper end of a combination lever, 12, the lower end of which is coupled, by a combination link, 12^a, to the adjacent cross head, 13, of the locomotive. A valve stem, 14, upon which is fixed a steam distribution valve, 15, which is here shown as of the inside admission piston type, but which may be of any other known and preferred form, is coupled to the combination lever, 12, the valve, 15, controlling the admission and exhaust of steam to and from the adjacent cylinder, 16, of the locomotive.

In the operation of a valve gear substantially as above described, the radius bar, 5, is raised or lowered by the reverse shaft, 6, when rocked in its bearings by the reverse lever, in accordance with the desired direction of movement of the locomotive, and to an extent governed by the degree of expansion or point of cut off to be effected. The movement of the radius bar, in either direction, will move the pins connecting the radius bar, 5, with the link, 4, out of line with the axis of the trunnions, 2, of the lever, 1, and the movement of the return crank, 10, which is rigidly connected to the driving wheel, 11, will effect a corresponding, but reduced, degree of longitudinal movement of the radius bar, 5. This movement, in combination with the movement of the cross head, 13, which is connected to the combination lever, 12, by the combination link, 12^a, reciprocates the distribution valve, 15, to effect the admission and exhaust of steam to and from the cylinder, 16, as in the operation of the "Walschaert" valve gear.

It will be seen that, under my invention, the radius bar is connected positively to the operating rod, instead of through the intermediation of a block sliding in a segmental link as in the ordinary construction, and therefore that as the slip of a block in a link is avoided, positive movement is imparted to the radius rod and connected distribution valve, in any and all positions to which the radius rod may be moved for adjustment of the point of cut off in either forward or back motion. Further, as only pin or pivotal connections of the operating members are required, they may be fitted with an economy of machine shop work, and maintained in operation at minimum cost.

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

1. The combination, in a steam engine valve gear of the radial type, of an eccentric crank, a radius bar, a valve stem coupled to the radius bar, a double armed link, journaled centrally on the radius bar and positively connected to the eccentric crank at its ends, and means for imparting movement to the radius bar relatively to the eccentric crank.

2. The combination, in a steam engine valve gear of the radial type, of an eccentric crank, a radius bar, a valve stem coupled to the radius bar, a double armed link, journaled centrally on the radius bar and posi-

tively connected to the eccentric crank at its ends, and an oscillatory reverse shaft adapted to impart movement to said radius bar relatively to the eccentric crank.

3. The combination, in a steam engine valve gear of the radial type, of an eccentric crank, a radius bar, a valve stem coupled to the radius bar, a double armed lever journaled in fixed bearings and coupled at one end to the eccentric crank, a double armed link coupled, at its opposite ends to opposite arms of the lever, and coupled intermediately to the radius bar, and an oscillatory reverse shaft carrying an arm coupled to the radius bar.

4. The combination, in a steam engine valve gear of the radial type, of an eccentric crank, a radius bar, a valve stem coupled to the radius bar, a double armed lever journaled in fixed bearings and coupled at one end to the eccentric crank, a double armed link journaled on the radius bar, coupling rods of unequal length connecting the arms of the link to the arms of the lever, and means for imparting movement to the radius bar relatively to the eccentric crank.

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Witnesses:

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