

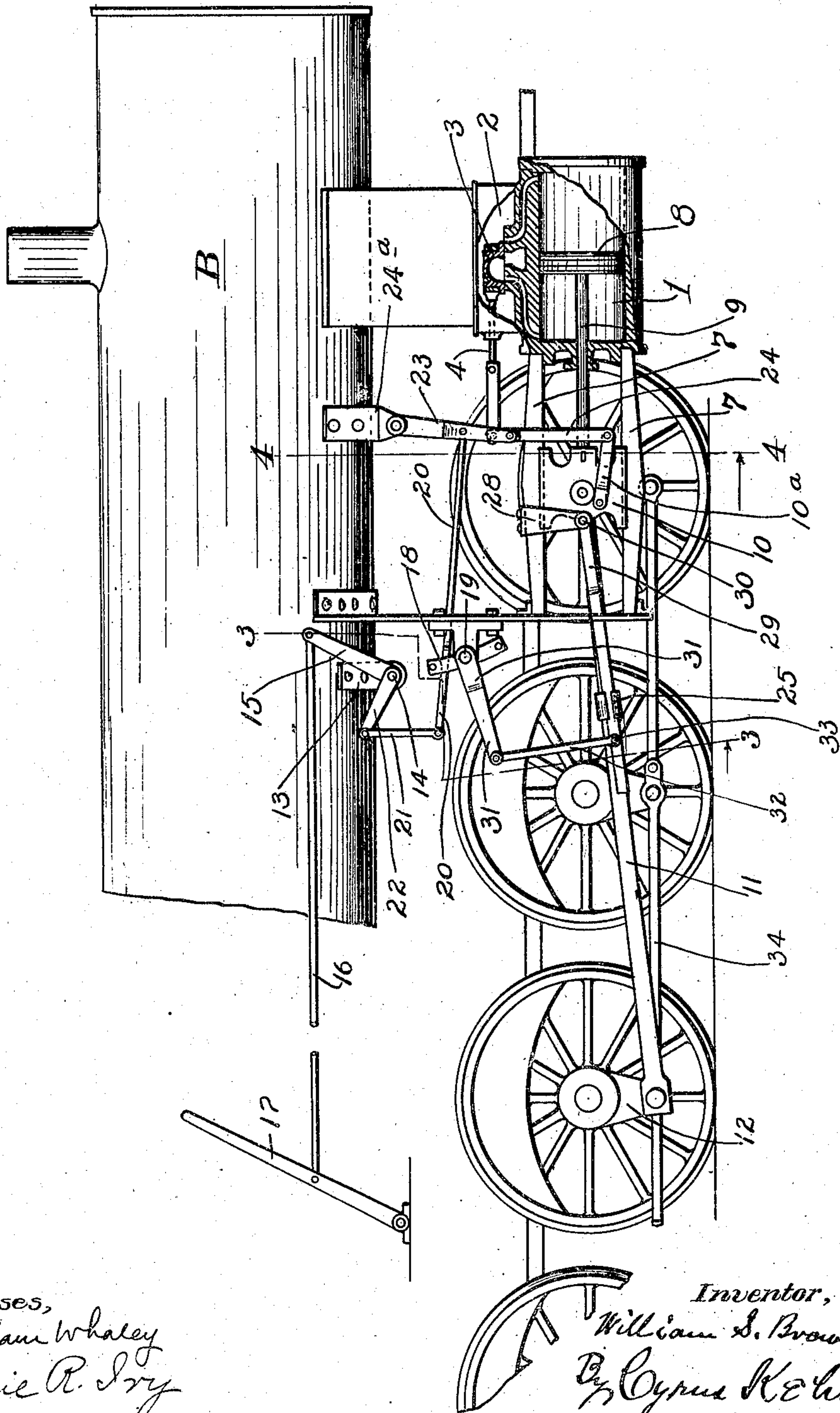
W. S. BROWN.  
LOCOMOTIVE VALVE GEAR.  
APPLICATION FILED MAR. 12, 1908

901,066.

Patented Oct. 13, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses,  
William Whaley  
Carrie R. Ivy

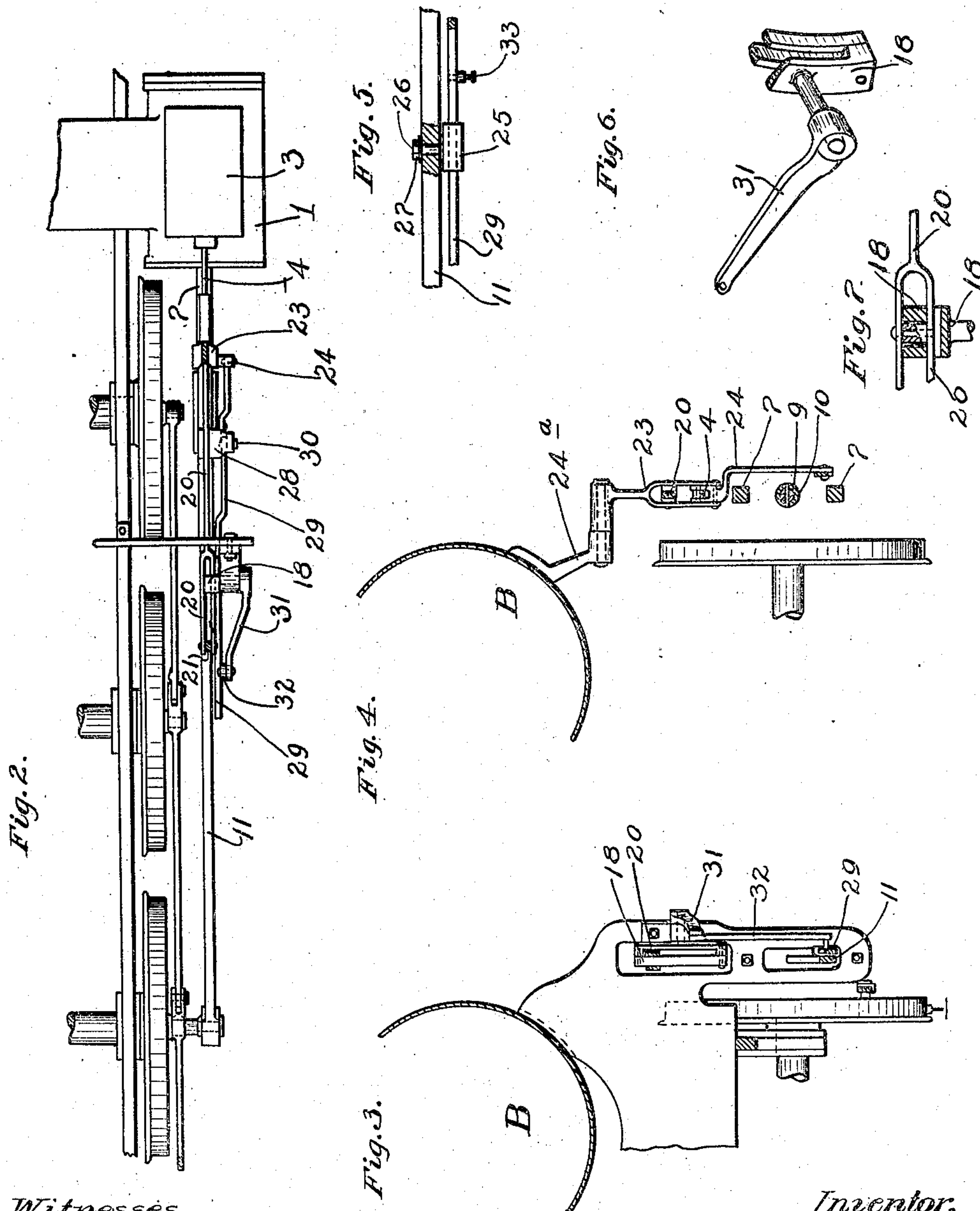
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# UNITED STATES PATENT OFFICE.

WILLIAM S. BROWN, OF KNOXVILLE, TENNESSEE.

## LOCOMOTIVE VALVE-GEAR.

No. 901,066.

Specification of Letters Patent.

Patented Oct. 13, 1908.

Application filed March 12, 1908. Serial No. 420,561.

*To all whom it may concern:*

Be it known that I, WILLIAM SHERMAN BROWN, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Locomotive Valve-Gears, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to mechanism for transmitting motion from the connecting rod or pitman of a locomotive to the valve which admits steam to the cylinder.

The objects of the improvement are to provide a construction which is simple and which avoids irregularity of valve action due to lost motion or "pounding" at the crank and the parts of which are accessibly located.

In the accompanying drawings, Figure 1 is a side elevation, portions being broken away, showing my improvement applied to one side of a locomotive; Fig. 2 is a plan of a portion of the mechanism shown by Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 1, looking in the direction of the arrow; Fig. 4 is a section on the line 4—4 of Fig. 1, looking in the direction of the arrow; Fig. 5 is a detail plan showing a connection between the connecting rod or pitman and another member of the apparatus; Fig. 6 is a detail perspective of a reversing link and an arm attached thereto; Fig. 7 is a horizontal detail section through the upper half of the reversing link.

Referring to said drawings, 1 is the cylinder, 2 is the valve chest, 3 is the slide valve located within said chest, 4 is the usual valve stem extending through said casing.

The ordinary piston, 8, is located within said cylinder and has applied to it the ordinary piston rod, 9, which is joined to the ordinary cross-head, 10, confined between the usual horizontal, parallel guide-bars, 7. To said cross-head is coupled one end of the usual connecting rod or pitman, 11, the other end of said rod being coupled to the usual crank, 12.

On a bracket, 13, is journaled a horizontal rock-shaft, 14, (there is a similar bracket, not shown, at the other side of the engine, in which said shaft is also journaled) and from said rock-shaft rises an arm, 15, to the

free end of which is coupled a rod, 16, the other end of which rod is coupled to the usual reversing lever, 17. An ordinary reversing link, 18, is pivoted at 19 in the usual manner and 20 is the usual bar extending through said link and secured therein by a vertically slidable pivot. A link, 21, is coupled to a horizontal arm, 22, of the rock-shaft, 14, and the adjacent end of said bar, 20. The other end of said bar, 20, is coupled to a forked link, 23, between the ends of the latter, the lower end of which link is coupled to the approximately upright link, 24, a little way below the lower end of the latter, and the upper end of which link, 23, is coupled to a bracket, 24<sup>a</sup>, secured to the boiler, B. To the cross-head, 10, is coupled one end of an approximately horizontal link, 10<sup>a</sup>, and to the opposite end of said link is coupled the lower end of the link, 24, and, as above stated, the link, 24, is coupled to the link, 23, a little way below the upper end of the link, 24, and to the upper end of said link, 24, is coupled the outer end of the valve stem, 4.

To the outer face of the connecting rod or pitman, 11, is applied a swiveled guide-block, 25, by means of a stem, 26, extending rearward through said rod and surrounded at the back of said rod by a nut, 27, or similar means for keeping said stem in position, the front of said block being horizontally slotted for the passage of the arm, 33, described below. (See Figs. 1, 2, and 5.)

From the upper parallel guide-bar, 7, a bracket, 28, extends downward, and a bar, 29, is hinged to said bracket at 30. Said bar extends slidably through said guide-block, 25.

On the reversing link, 18, is an approximately horizontal rigid arm, 31; and to the outer end of said arm is coupled the upper end of an approximately upright link, 32, the lower end of said link being coupled to the outer end of a short arm, 33, on the bar, 29, which, as above described, rests slidably in the swiveled guide-block, 25. During the movement of the connecting rod and the guide-block 25, said block passes to each side of the arm, 33.

The operation will be readily understood from an inspection of the drawings. The axis of the bar, 29, being fixed, and the guide-block, 25, being slidable on said bar and swiveled to the main rod, said guide-



block will rise and fall and slide on said bar toward and from the axis or joint of said arm. The up and down movement of said guide-block raises and lowers the free end of said bar, whereby oscillatory motion is imparted to the link, 32, and through the latter to the arm, 31, and the reversing link, 18. The oscillation of said reversing link causes the oscillation of the link, 20, and the oscillation of the link, 23; and the oscillation of the link, 23, causes the oscillation of the link, 24. But such movement of the link, 24, is modified by the movement of the link, 10<sup>a</sup>, with the cross head, 10. The movements of the reversing link and the cross head are preferably so timed as that each will act upon the valve stem in the same direction during the opening and closing of the valve ports, whereby the movement of the valve at such times is accelerated.

It is to be observed that only three pieces are used to transmit motion from the connecting rod to the reversing link, and that the transverse, and not the longitudinal, motion of the connecting rod is transmitted, so that an irregular lengthwise movement of the connecting rod due to lost motion or "pounding" at the crank is not transmitted to the reversing link. And it will be observed, on inspecting Figs. 1 and 2, that the portions of the transmitting mechanism between the connecting rod and the valve stem are all applied outside of the space occupied and traversed by the drive wheels, D, and the parallel rod, 34. The adaptation of my mechanism to this arrangement is an important feature; for there is no available space between the connecting rod and the parallel rod and drive wheels. Furthermore, all of this mechanism is readily accessible for inspection, cleaning, oiling, adjustment, or repairing.

I claim as my invention:

1. In a valve gear for locomotives, the combination of a guide-block journaled to the engine connecting rod, a bar slidable in said guide-block and hinged at a relatively fixed point, a reversing link in operative relation with the distributing valve of the engine, an arm rigid with said link, and a link joining said arm and said bar, substantially as described.

2. In a valve gear for locomotives, the combination of a guide-block journaled to the engine connecting rod, a bar slidable in said guide-block and hinged at a relatively fixed point, a reversing link, an arm rigid with said link, a link joining said arm and said bar, a bar, 20, leading from the reversing link, a link, 23, hinged to a fixed support and coupled to said bar, and a link, 24, coupled to said link, 23, and to the valve stem, substantially as described.

3. In a valve gear for locomotives, the combination of a guide-block journaled to the engine connecting rod, a bar slidable in said guide-block and hinged at a relatively fixed point, a reversing link, an arm rigid with said link, a link joining said arm and said bar, a bar, 20, leading from the reversing link, a link, 23, hinged to a fixed support and coupled to said bar, a link, 24, coupled to said link, 23, and to the valve stem, and a link, 10<sup>a</sup>, coupled to the cross-head and to the link, 24, substantially as described.

In testimony whereof I have signed my name, in presence of two witnesses, this 7th day of March, in the year one thousand nine hundred and eight.

WILLIAM S. BROWN.

Witnesses:

CYRUS KEHR,

R. S. C. HUTCHINSON.