Feb. 11, 1941. J. AMOUR 2,231,314

REVERSING VALVE GEAR

Filed May 22, 1939 3 Sheets-Sheet 1

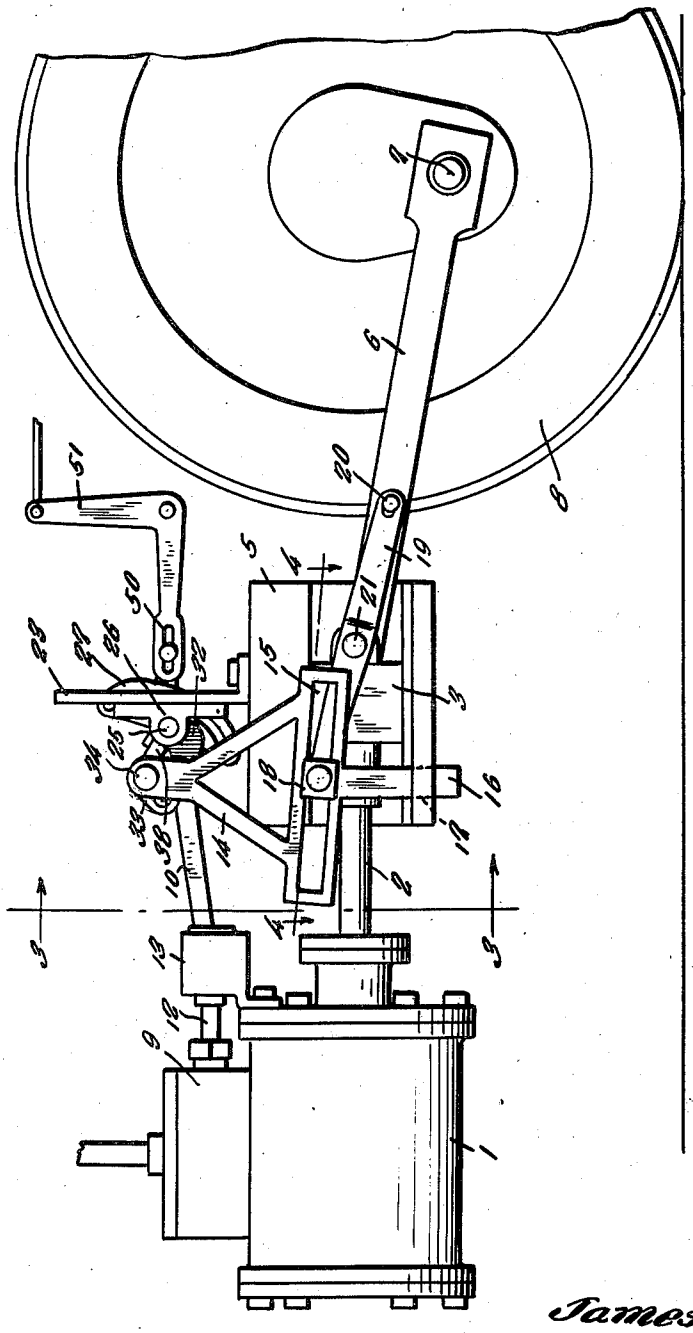


Fig. 1.

Inventor

James Amour

By Clarence A. O'Brien and Hyman Berman

Attorneys

Feb. 11, 1941. J. AMOUR 2,231,314

REVERSING VALVE GEAR

Filed May 22, 1939 3 Sheets-Sheet 2

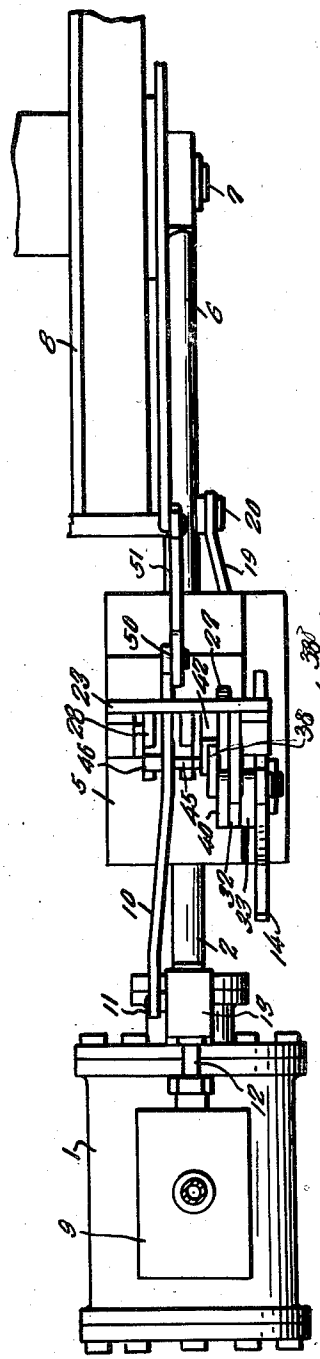


Fig. 4.

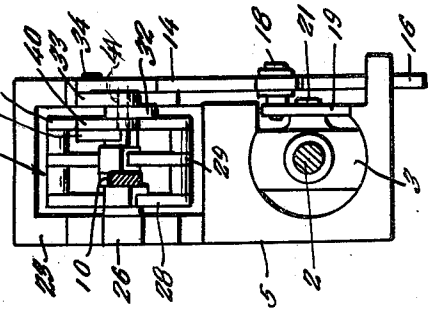


Fig. 5.

Inventor

James Amour

By Clarence A. O'Brien and Hyman Berman

Attorneys

Feb. 11, 1941. J. AMOUR 2,231,314

REVERSING VALVE GEAR

Filed May 22, 1939 3 Sheets-Sheet 3

Fig. 5.

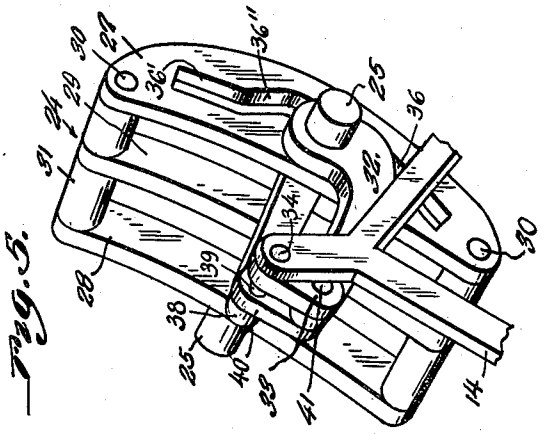
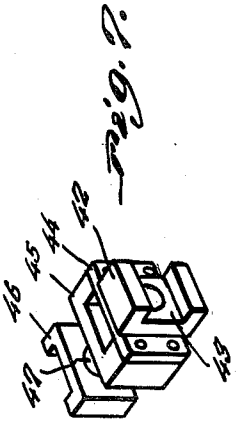


Fig. 7.



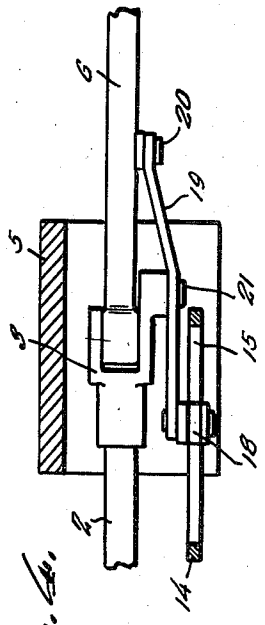
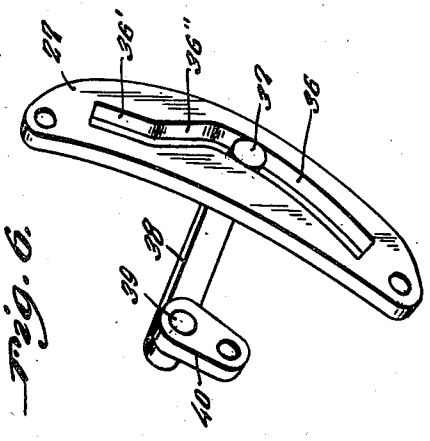


Fig. 6.

Fig. 4.



Inventor

James Amour

By Clarence O'Brien

and Hyman Berman

Attorneys

Patented Feb. 11, 1941 2,231,314

UNITED STATES PATENT OFFICE

2,231,314

REVERSING VALVE GEAR

James Amour, Frackville, Pa.

Application May 22, 1939, Serial No. 275,075

1 Claim. (Cl. 121—164)

This invention relates to reversing valve gear for locomotives, the general object of the invention being to provide a compact arrangement of the parts, with the parts supported from the cross head guide and also to provide means for advancing the valve lead as the engine speeds up to any desirable or satisfactory working lead.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claim.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is an elevation of the device, this view also showing a cylinder and a valve and a drive wheel.

Figure 2 is a top plan view of the parts shown in Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a perspective view of the rocking frame.

Figure 6 is a view showing the slotted member of the rocking frame separated from the rest of the frame to show how the pin of an arm engages the slot of said part.

Figure 7 is a view of the block assembly which has sliding movement in the rocking frame.

In these drawings the numeral 1 indicates a cylinder of the locomotive which contains the usual piston, the rod 2 of which is connected with the cross head 3 slidably arranged in the guide member 5 and said cross head is connected by the bar 6 with the crank 7 of the drive wheel 8. The flow of steam to the cylinder 1 is controlled by a valve in the chest 9, said valve being reciprocated by means of a link 10 pivotally connected as shown at 11 to the stem 12 of the valve, the connection 11 including means connected to a slide arranged in a guide member 13. All the above features are conventional.

In carrying out my invention, I provide a substantially triangular-shaped member 14 which is formed with an enlarged base portion having an elongated slot 15 therein and a stem 16 extends downwardly from the central portion of the base through a slot 17 formed in the base of the guide member 5 of the cross head 3. The slot 17 loosely receives the stem 16 and permits rocking movement of the stem. A block 18 has sliding movement in the slot 15 and is pivotally connected to one end of a lever 19 which has its other end pivoted to a part of the bar 6, as shown at 20 and an intermediate part of the lever 19 is pivoted to a part of the cross head as shown at 21 as more particularly shown in Figure 4. This arrangement is such that the triangular member 14 will be raised and lowered by the reciprocatory movement of the cross head under the action of the piston in cylinder 1. The member 14 can also be tilted as will be hereinafter described.

An inverted U-shaped frame 23 is fastened to the top of the guide member 5 and a rockable link frame 24 is supported in the frame 23 by means of the trunnions 25 extending from intermediate parts of the side members of the frame 24 and engaging bearing members 26 attached to the side members of the frame 23. The link frame 24, as shown in Figure 5, includes the three curved bars 27, 28 and 29 held in spaced relation by the rivets 30 passing through the upper and lower ends with spacers 31 on said rivets. An arm 32 is welded or otherwise rigidly connected to an intermediate part of the outer face of the bar 27 and the adjacent trunnion 25 may be carried by the inner end of this arm 32 or said trunnion may be attached to the bar 27 and passed through a hole in the arm 32 with the arm rigidly connected with the trunnion. The other end of the arm 32 is connected to an elongated block 33 at one end of the block and the other end of the block being pivoted, as at 34 to the upper end of the triangular-shaped member 14.

The bar 27 of the frame 24 is formed with an elongated slot 36, see Figures 5 and 6, the major portion of which is of flat arcuate shape and one end portion is substantially straight as shown at 36' and with an intermediate portion 36'' extending at an incline and connecting the part 36' with the major part of the slot. A pin 37 passes into the slot and is attached to one end of an arm 38 having its other end pivoted to the end of a block 40, the other end of the block 40 being connected to the pin 41 which pivots the block 33 with the arm 32. As shown in Figure 5, the blocks 33 and 40 with the pin 41 form a crank which is carried by the arm 32 and pivotally connects the arm 38 with the triangle 14. The arm 38 passes through a block 42 which has a slot 43 therein through which the arm 38 slidingly passes. The block 42 is

pivotally connected to a plate 44 attached to a slotted block 45, the slot of which has the bar 29 of frame 24 slidingly passing therethrough and a third slotted block 46 has its slot slidingly receiving the bar 28 of frame 24 and this block 46 is connected to the block 45 by a pin 47. See Figure 7. This pin 47 passes through a hole in the link 10 which is connected with the stem 12 of the valve in chest 9, the link 10 projecting beyond the pin 47 where it is connected by a pin and slot connection shown generally at 50 with a bellcrank lever 51 which is connected in a suitable manner to a control member in the cab of the locomotive so that the parts can be manipulated by the engineer to adjust the block assembly shown in Figure 7 on the rockable link frame 24 and during this adjustment the pin 37 of the arm 38 moves in the slot 36 in bar 27 of the frame as said arm 38 slides through the slot 43 of block 42 of the block assembly.

As will be seen during reciprocatory movement of the cross head 3 by the piston in cylinder 1, the triangular member 14 will be raised and lowered and this substantially vertical movement of the member 14 will impart a rocking movement to the link frame 24 due to the fact that the frame 14 is connected to the frame 24 by the arm 32 and block 33 with the pivot 34.

This rocking movement of link frame 24 will reciprocate the valve in chest 9 through the connections 10, 11 and 12, and the block assembly shown in Figure 7 if said block assembly is either in a position below the transverse center of the frame 24 or above said transverse center, it being understood that the block assembly is adjusted in the frame 24 by means of the bellcrank 51 connected with the extended end of the link 10. If the block assembly shown in Figure 7 is in a center position in the frame 24 then the parts are in neutral position and the rocking of the link frame 24 will not move the valve in chest 9.

When the bar 10 and the block assembly shown in Figure 7 are at the bottom of the link frame 24 the engine will be in a forward motion and when the block assembly is at the top of the link frame 24 the engine will be in reverse motion and in either one of these two positions of the valve parts the movement of the member 14 by the lever 19 under the action of the connecting rod 6 will cause the link frame 24 to move the valve parts to give the valve substantially its full stroke. By adjusting the member 51 to move the block assembly upwardly or downwardly from one end or the other the arm 38 is shifted and the pin 37 will engage an intermediate part of the groove 36 which moves the arm 38 to the right in Figure 6 and this turns the crank composed of the blocks 33 and 40 and the pin 41 and thus shorten the connection between the arm 32 and the top of the triangle 14 and thus movement of the link frame 24 by the triangular member 14 is reduced and, of course, this reduces the stroke of the valve. This movement of the parts 40, 33 and 41 by the arm 38 also tilts the triangle 14 which, in turn, brings the point of valve setting to a more lead opening.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts provided that such changes fall within the scope of the appended claim.

Having described the invention, what is claimed as new is:

A valve gear for locomotives comprising an oscillatable link frame, a part of which has a cam slot therein, a block assembly slidably arranged in the link frame, a link connected with the valve and rotatably connected with the block assembly, means for adjusting the link to move the block assembly vertically in the link frame, a vertically arranged frame guided for vertical movement and for slight tilting movement, said frame having a substantially horizontal slot therein, a block slidably arranged in the slot, a lever having one end connected with the block, means for pivotally connecting an intermediate part of the lever with the cross head of the engine, and means for connecting the opposite end of the lever with the connecting rod of the engine, an arm fastened to the link frame, a crank pivotally connected with the outer end of the arm, means for connecting the crank with the vertically movable frame for transmitting movement of the frame to the link frame, a second arm slidably arranged in the block assembly, a pin at one end of the second arm engaging the cam slot and means for pivotally connecting the other end of the second arm to the crank for adjusting the crank by the movement of the second arm by movement of the pin in the slot when the block assembly is adjusted.

JAMES AMOUR.