

Nov. 24, 1931.

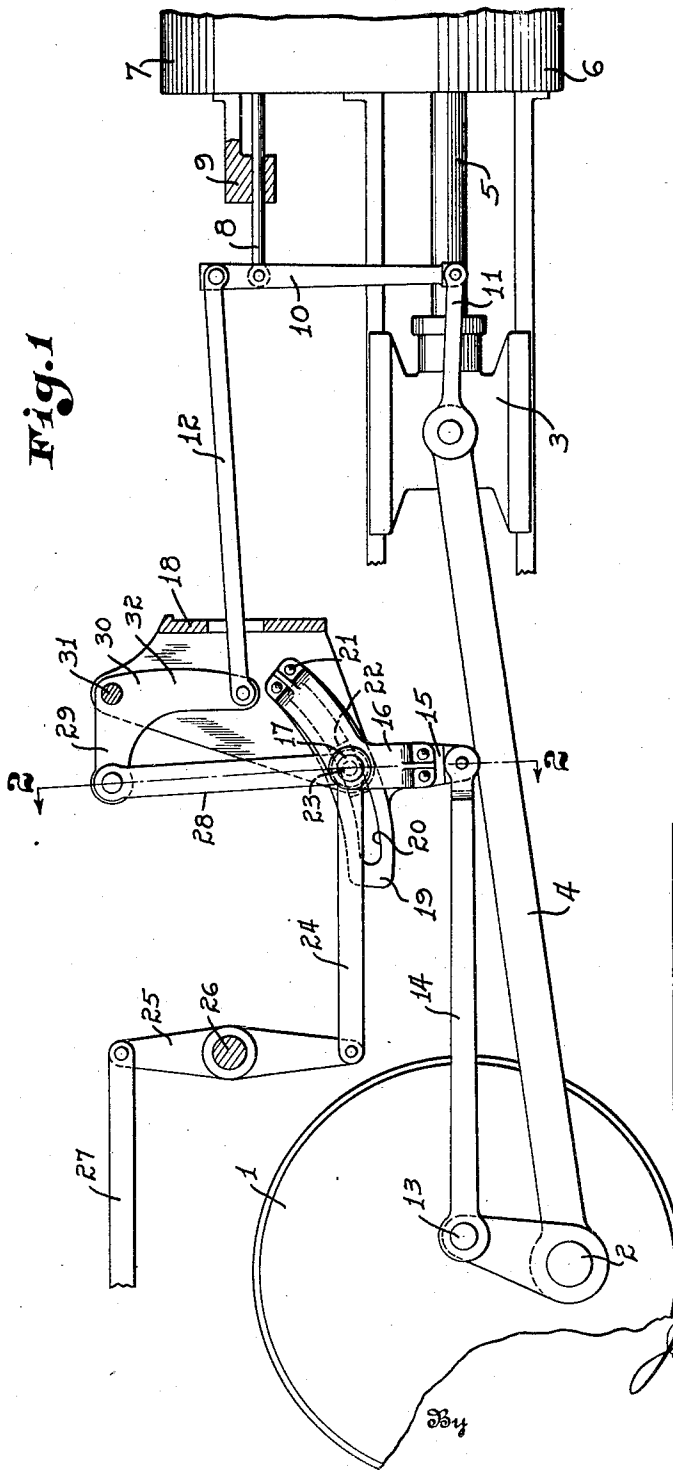
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LOCOMOTIVE VALVE GEAR

Filed Oct. 20, 1930

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Fig. 2

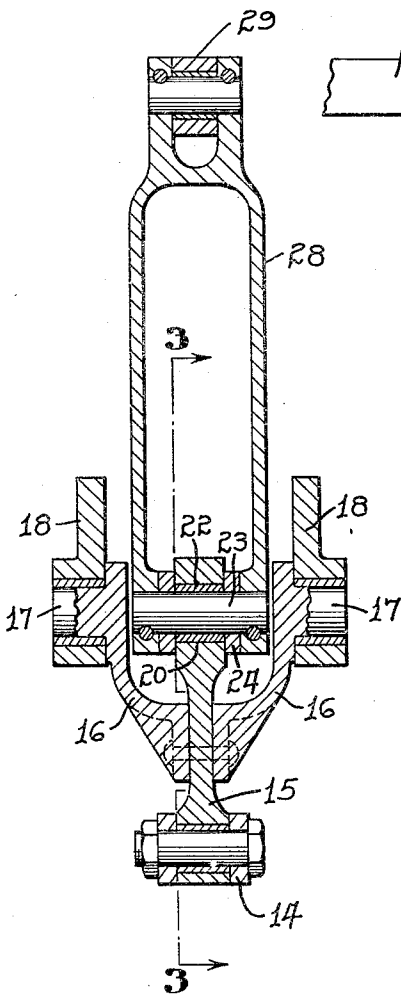


Fig. 3

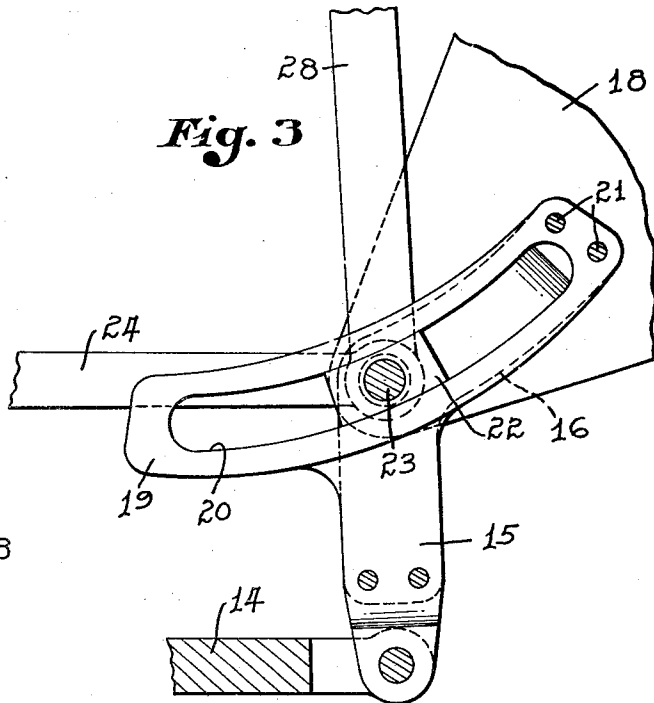
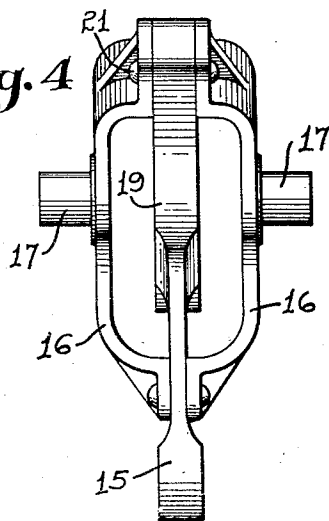


Fig. 4



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LOCOMOTIVE VALVE GEAR

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This invention relates to valve gears for locomotives, and an object is to provide a simple and efficient valve gear in which the number of parts is reduced to a minimum, the operation improved, and in the construction of which a sturdy and reliable arrangement is provided.

Other objects and advantages of the invention will be apparent to those skilled in this art, and an embodiment of the invention is shown for purposes of illustration, but not of limitation, on the accompanying drawings, in which:

Figure 1 is a side elevation of the valve gear showing enough of the locomotive structure to enable the construction and arrangement to be readily understood;

Figure 2 is a vertical sectional elevation on the line 2—2 of Fig. 1 showing the connection between the radius bar, link extension, and the mounting for the link;

Figure 3 is a sectional elevation on the line 3—3 of Fig. 2; and

Figure 4 is an end elevation of the link assembly.

The illustrated embodiment of the invention comprises a locomotive having a drive wheel 1 having the usual crank pin 2, which is connected to the main cross head 3 by a connecting rod 4. The piston rod 5 is reciprocated by the cross head 3 relative to the cylinder 6, as will readily be understood. Reciprocated in the valve chest 7 is the usual valve having a valve stem 8, the movements of which are guided by a guide 9. It is to be understood that only so much of the locomotive structure is shown as to enable the construction and operation of the valve gear to be readily understood.

The valve rod 8 is pivotally connected to a vertically disposed combination lever 10 adjacent the upper end thereof. The lower end of the combination lever is pivotally connected by a union link 11 to the cross head 3, and derives its motion therefrom. Pivotally connected to the upper end of the combination lever 10 is a valve rod 12 which derives its movement from the main driving wheel 1 of the locomotive, as will hereinafter appear.

Mounted on the drive wheel 1 in rear of the

eccentric pin 2 is a crank pin 13, to which is pivoted an eccentric rod 14 extending forwardly therefrom and having a bifurcated end pivotally connected to the lower end of a link extension 15. Riveted to opposite sides of the link extension 15 are cheek plates 16 of bent lever form. Projecting laterally from the cheek plates 16 at substantially the apex of the angle thereof are trunnions 17, which are journaled in a gear frame 18 rigidly mounted in any suitable manner on the locomotive frame.

Integral with the upper portion of the link extension 15 is a curved link 19 having an elongate arcuate slot 20. It will be apparent that the link extension 15 and link 19, together form a substantially T-shaped member. In the form shown the link 19 is inclined with the forward end thereof uppermost. This end is rigidly secured between the outer ends of the cheek plates 16 by rivets 21.

Slidable in the elongate slot 20 of the link 19 is a link block 22 through which extends a pin 23. The pin 23 projects beyond the opposite sides of the link block 22, and pivoted thereon is a bifurcated end of a reach rod 24, the opposite end of which is connected to a lever 25 which is pivoted intermediate its ends to a rod 26. Leading from the upper end of the lever 25 is a reach rod 27, which leads to the locomotive cab to control the operation of the valve gear, as will readily be understood.

Secured to the outer end portions of the pin 23 is the lower end of a bifurcated radius bar 28, the upper end of which is pivoted to a relatively short horizontal arm 29 of a bell crank lever 30, which is pivoted at 31 to the gear frame 18. The bell crank 30 has a relatively long depending or vertical arm 32, which is pivoted at its lower end to the valve rod 12.

In the operation of the above described valve gear it will be apparent that the valve rod 8 receives movement through the union link 11 from the cross head 3. Movement is also imparted to the upper end of the combination lever 10 from the eccentric crank 13 which, through the eccentric rod 14, imparts

movement to the link assembly, which pivots about the trunnions 17. It will be apparent to those skilled in this art that the change in location of the link block 22 forwardly or rearwardly of its central position changes the valve operation. In the construction shown movement of the link block to the left from central position (Figure 1) changes the travel of the valve when the locomotive is moving forwardly. When it is desired to reverse the movement of the locomotive the link block 22 is moved forwardly in the slot 20 (Figure 1), thereby reversing the operation of the valve and causing the locomotive to move in the opposite direction. It will be obvious that the change in position of the link block alters the rocking movement of the link assembly, thereby changing the amount of vertical movement of the radius bar 28, which is transmitted to the valve rod 8 through the bell crank 30, valve rod 12, and combination lever 10.

It will be readily understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claims. For example, the eccentric pin 13, instead of following the crank 2, may be positioned in advance thereof, and when in this position the above described effect of moving the link block 22 is reversed.

What is claimed is:

1. In a locomotive valve gear, the combination with the eccentric rod, valve stem, and cross head, of a bell crank, a combination lever, an operative connection between one end of said combination lever and said cross head, an operative connection between the opposite end of said combination lever and one arm of said bell crank, and mechanism connecting the other arm of said bell crank and said eccentric rod, said mechanism comprising a substantially T-shaped link, a connection between an end of said link and said eccentric rod, trunnions for mounting said link, means to connect said trunnions to said link, said link having an elongate arcuate slot, a block adjustable in said slot, means to adjust said block, and a radius bar connected at one end to said other arm of the bell crank and at the opposite end of said block.

2. In a locomotive valve gear, the combination with the main frame, eccentric rod, valve stem, and cross head, of a support mounted on the frame, a bell crank journaled on said support, a valve rod pivoted to one arm of said bell crank, a vertically disposed combination lever pivoted at its upper end to the opposite end of said valve rod, a connection between said valve stem and combination lever located a short distance from the pivoted connection to the valve rod, a union link connecting the lower end of said combination lever and cross head, and mecha-

nism connecting the other arm of said bell crank with said eccentric rod, said mechanism including a link assembly having a link element provided with an elongated arcuate slot, check plates on opposite sides of said link element, trunnions on said check plates journaled in said support, an adjustable link block movable in said slot, and a connection between said link block and said other arm of said bell crank.

3. In a locomotive valve gear, the combination with the main frame, eccentric rod, valve stem, and cross head, of a support mounted on the frame, a bell crank on said support, a combination lever, an operative connection between the one end of said lever and an arm of said bell crank, an operative connection between the opposite end of said combination lever and said cross head, a connection between said combination lever and valve stem, and mechanism connecting the other arm of said bell crank and said eccentric rod, said mechanism including a link assembly having a link element provided with an elongate arcuate slot, check plates rigid with opposite sides of said link element, an extension on said link element connected to said eccentric rod, trunnions on said check plates journaled in said support, a block adjustable in said slot, and a radius bar connecting said block and said other of the bell crank.

4. In a locomotive valve gear, the combination with the main frame, eccentric rod, valve stem, and cross head, of a support mounted on the frame, a bell crank journaled on said support, a valve rod pivoted to one arm of said bell crank, a combination lever, a union link connecting the lower end of said combination lever to said cross head, connections between said combination lever and said valve rod and valve stem respectively, and mechanism connecting the other arm of said bell crank with said eccentric rod, said mechanism comprising a link having an elongate arcuate slot, an extension depending from said link, a pivotal connection between said extension and said eccentric rod, check plates secured to opposite sides of said link, trunnions on said check plates journaled on said support, a link block movable in said arcuate slot, a radius bar pivoted to said other arm of the bell crank, a pin connecting the lower end of said radius bar to said link block, and a reach rod pivoted to said pin.

5. In a locomotive valve gear, the combination with the main frame, eccentric rod, valve stem, and cross head, of a support mounted on the frame, a bell crank journaled on said support, a combination lever connected to actuate said valve stem, a connection between one end of said combination lever and said cross head, a rod connecting one arm of said bell crank and the opposite

end of said combination lever, and mechanism connecting the other arm of said bell crank and said eccentric rod, said mechanism comprising a substantially T-shaped link having an elongate, arcuate slot in the cross part thereof, a pivotal connection between the lower part of said link and said eccentric rod, trunnions journaled in said supports, a rigid connection between said trunnions and said link, an element adjustable in said slot, a reach rod for imparting adjusting movements to said element, and a radius bar connecting said other arm of the bell crank and said element.

In testimony whereof I have hereunto signed my name to this specification.

JAY D. PURDY.

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