K. RUSHTON.

LEVER MECHANISM FOR OPERATING THROTTLE VALVES.

APPLICATION FILED MAR. 15, 1913.

1,149,951.

Patented Aug. 10, 1915.

2 SHEETS—SHEET 1.

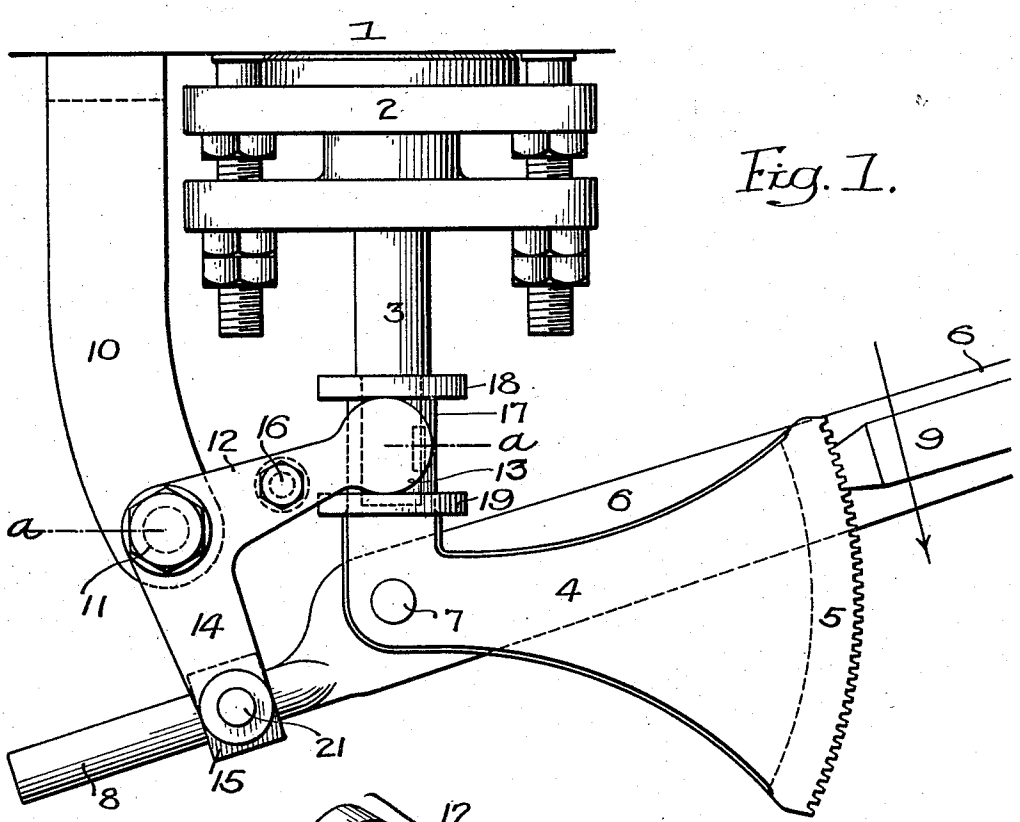


Fig. 1.

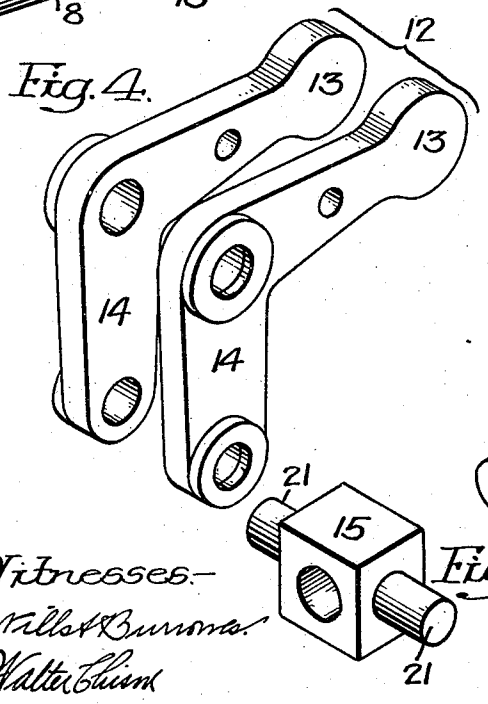


Fig. 4.

Fig. 5.

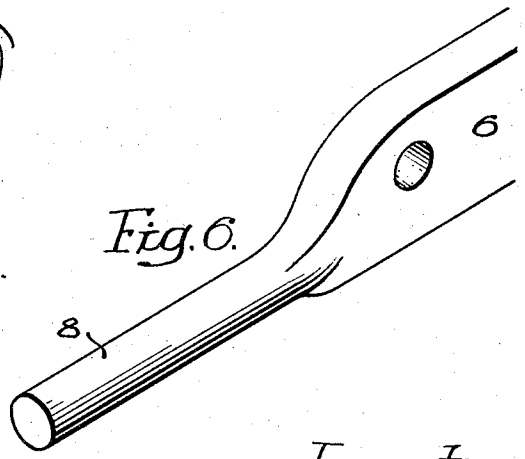


Fig. 6.

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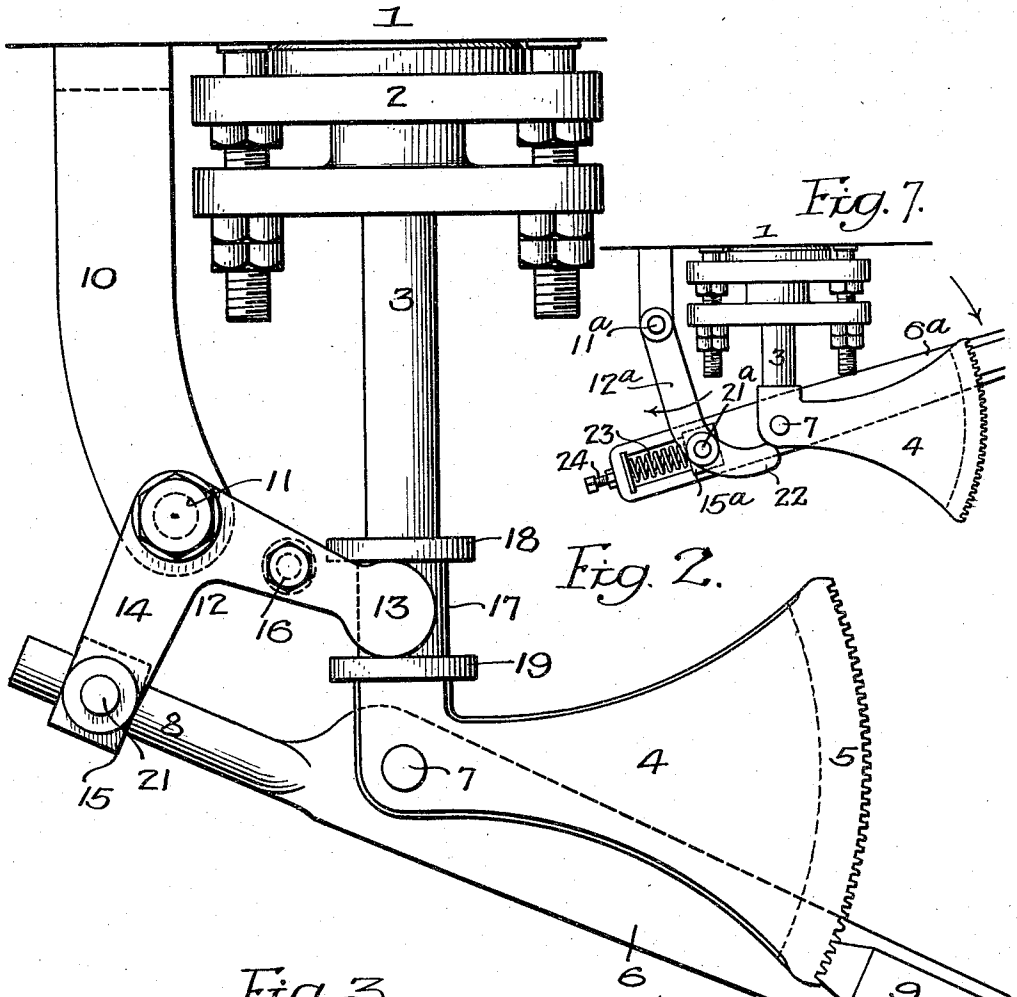


Fig. 2.

Fig. 7.

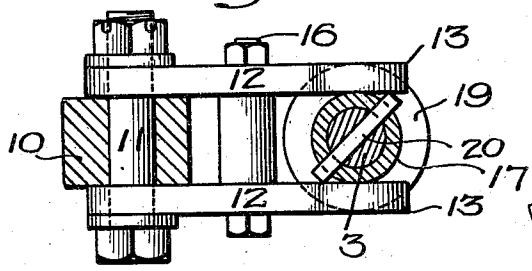


Fig. 3.

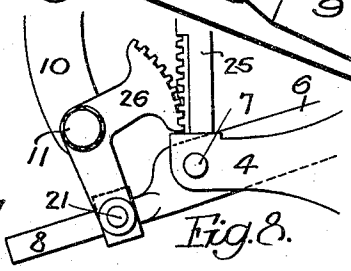


Fig. 8.

Witnesses—

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UNITED STATES PATENT OFFICE.

KENNETH RUSHTON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

LEVER MECHANISM FOR OPERATING THROTTLE-VALVES.

1,149,951. Specification of Letters Patent. Patented Aug. 10, 1915.

Application filed March 15, 1913. Serial No. 754,579.

To all whom it may concern:

Be it known that I, KENNETH RUSHTON, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Lever Mechanism for Operating Throttle-Valves, of which the following is a specification.

My invention relates to certain improvements in lever mechanism for operating throttle valves of locomotives.

The object of my invention is to construct the mechanism so that the valve can be lifted off of its seat with comparatively little exertion and can then be rapidly moved to the full open position.

Locomotives have increased in size and capacity to such an extent that a very large throttle valve must be used, consequently these valves are difficult to operate with the old lever mechanism. In the lever mechanism constructed in accordance with my invention the fulcrum is movable, giving a variable leverage.

When the valve is to be lifted off of its seat the fulcrum is close to the connection with the valve rod, and, as the valve is raised from its seat and balanced, then the fulcrum recedes as the operating lever is turned on its pivot, thus decreasing the leverage but increasing the movement of the valve rod. I am thus enabled to readily operate the valve without extending the movement of the operating lever.

In the accompanying drawings: Figure 1 is a plan view of sufficient of lever mechanism for throttle valves to show the lever in position when the valve is closed; Fig. 2 is a similar view showing the mechanism in the position when the valve is full open; Fig. 3 is a sectional view on the line *a*—*a*, Fig. 1; Fig. 4 is a perspective view of the two armed lever which carries the fulcrum block; Fig. 5 is a perspective view of the fulcrum block; Fig. 6 is a perspective view of a portion of the operating lever, and Figs. 7 and 8 are views illustrating modifications of the invention.

Referring to the drawings, 1 is the boiler.

2 is a stuffing box of any ordinary type.

3 is a rod which passes through the stuffing box and is connected to the throttle valve within the boiler.

4 is a head secured to the end of the rod having a toothed segment 5 of the ordinary type.

6 is the operating lever pivoted at 7 to the head 4 and having an extension 8 beyond the pivot 7.

9 is the latch which locks the lever to the segment so as to hold the lever 6 in the position to which it is adjusted. This latch is operated by the ordinary mechanism extending to the hand hold of the lever.

10 is a bracket secured to the boiler, in the present instance, and pivoted at 11 to this bracket is a two armed lever 12. One arm 13 of this lever engages the rod 3 and the other arm 14 carries the fulcrum block 15, the block being pivoted to the arm, as shown, and the extension 8 of the operating lever passes freely through this block, as illustrated in Fig. 1.

In the present instance, the lever 12 is made of two plates spaced apart, one plate being located on one side of the bracket 10 and the other on the opposite side, the two plates being connected together by a pin 16. The heads 13 of the plates are rounded and one extends on one side of the rod 3 and the other extends on the opposite side.

Ordinarily, the valve rod 3 is reduced and fits in the socket in the head 4, and in order to apply my invention to the usual construction I reduce the head at 17 to form a lower shoulder for the reception of a ring 19 and also reduce the length of the head and locate an upper ring 18 between the end of the head and a shoulder on the valve rod 3. The rounded heads 13 of the lever fit between the two rings. The head is secured to the rod by the ordinary diagonal pin 20, Fig. 3.

The fulcrum block 15 is quadrangular in shape, in the present instance, and has two trunnions 21 which extend through openings in the arms 14 of the lever 12.

The operation is as follows: When the valve is closed, the operating lever 6 is in the position illustrated in Fig. 1, and the fulcrum block 15 is close to the pivot 7 of said lever, consequently, when the operating lever is moved in the direction of the arrow, Fig. 1, the valve is slowly forced off of its seat and as the lever is moved back, the fulcrum block 15 slides away from the pivot 7, decreasing the leverage but increasing the

movement of the valve with a minimum amount of movement of the operating lever.

By using the construction illustrated in the drawings, I am enabled to apply my invention to existing valve operating devices by removing the head, reducing it at 17 and placing a ring above and below the portion 17, and substituting a bracket and the two armed lever carrying the movable fulcrum for the ordinary link to which the operating lever is directly connected.

In Fig. 7, I have illustrated a modification of my invention in which a single pivoted arm is substituted for the two armed lever illustrated in Fig. 1. The head 4 is attached to the valve rod 3, as in Fig. 1, and the lever 6^a has a slotted extension beyond the pivot 7. In this slotted extension is a block 15^a.

12^a is the lever pivoted at 11^a and trunnions 21^a of the block are mounted in the lever, as shown. The end 22 of the lever 12^a bears against the rear surface of the segment 4 and a spring 23, controlled by an adjusting screw 24, bears against the block 15^a and holds the end of the lever 22 against said segment so that as the lever 6^a is moved in the direction of the arrow, Fig. 7, the rear portion of the segment 4 acts as a cam and forces the lever in the direction of its arrow against the pressure of the spring and carries the fulcrum block away from the pivot 7.

The lever 12 may be geared to the valve rod in place of the construction shown in Fig. 1. The rod may have a rack 25 thereon and the lever may have a toothed segment 26 meshing with the rack, as in Fig. 8.

While I have described my invention as particularly adapted for use in operating throttle valves located in locomotive boilers, it will be understood that the invention can be used for operating other valves without departing from the essential features of the invention.

I claim:

1. The combination in throttle valve operating mechanism, of a valve rod; an operating lever pivoted thereto; a fulcrum for said lever; and means for automatically moving the fulcrum away from the pivot and thus decreasing the leverage as the lever is operated to open the throttle valve.

2. The combination in lever mechanism for operating throttle valves, of a valve rod; a head secured thereto; an operating lever pivoted to the head; a bracket; a two armed lever pivoted to the bracket, one arm of said lever engaging the rod; a fulcrum block carried by the other arm of the lever; an operating lever having an extension beyond the pivot and projecting through said block so that as the operating lever is moved in one direction, the fulcrum block will move away from the pivot and when the lever is moved in the opposite direction the fulcrum block will move toward the pivot.

3. The combination in mechanism for operating throttle valves, of a valve rod; an operating lever pivoted thereto; a lever pivoted to a fixed point and having two arms, one arm carrying the fulcrum for the operating lever, the other arm engaging the valve rod so that when the operating lever is moved to open the valve, the fulcrum will be close to the point where the lever is connected to the valve rod and as the lever is moved, the fulcrum will be moved away from said pivot.

4. The combination in means for operating throttle valves, of a valve rod; a head secured to the rod and having a toothed segment; an operating lever pivoted to the head and having a latch engaging the teeth of the segment, the operating lever having an extension beyond the pivot; a fulcrum block mounted on the extension; and means carrying the fulcrum block and engaged by the rod so that as the lever is operated to open the valve the fulcrum block will be moved away from the pivot of the lever on the head.

5. The combination in mechanism for operating throttle valves, of a valve rod; a head secured thereto; flanges on the rod; an operating lever pivoted to the head and having a rearward extension; a two armed lever; a fixed bearing for said lever, one arm of said lever extending into the space between the flanges of the rod; a fulcrum block pivotally mounted on the other arm of the lever, the extension of the operating lever projecting through the fulcrum block so that as the operating lever is moved to open the valve, the fulcrum block travels on the extension.

6. The combination in means for operating throttle valves, of a valve rod; a head thereon; flanges on the rod; an operating lever pivoted to the head and having an extension beyond the pivot; a bracket; a pivot pin on the bracket; a two armed lever consisting of two plates spaced apart, one arm of each plate having a rounded head extending into the space between the flanges of the rod; and a block pivotally mounted between the other arm of the plate and also mounted on the extension of the operating lever.

7. The combination in means for operating valves, of a valve rod; a head secured to the rod; an operating lever pivoted to the head; a fulcrum block mounted on the lever; and means engaging the fulcrum block actuated by the valve rod so that as the operating lever is moved to open the valve the fulcrum will be moved away from the point where the lever is pivoted to the head.

8. The combination in valve operating mechanism, of a valve rod; an operating

lever pivoted thereto; a fulcrum for said lever; and a lever carrying the fulcrum and pivoted to a fixed point and controlled by the rod so that as the rod is moved by the operating lever it causes the lever carrying the fulcrum block to move it away from the point where the operating lever is pivoted to the rod.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

KENNETH RUSHTON.

Witnesses:
LEON P. THOMAS,
J. CARRYL SHINN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."