

3 SHEETS—SHEET 1.

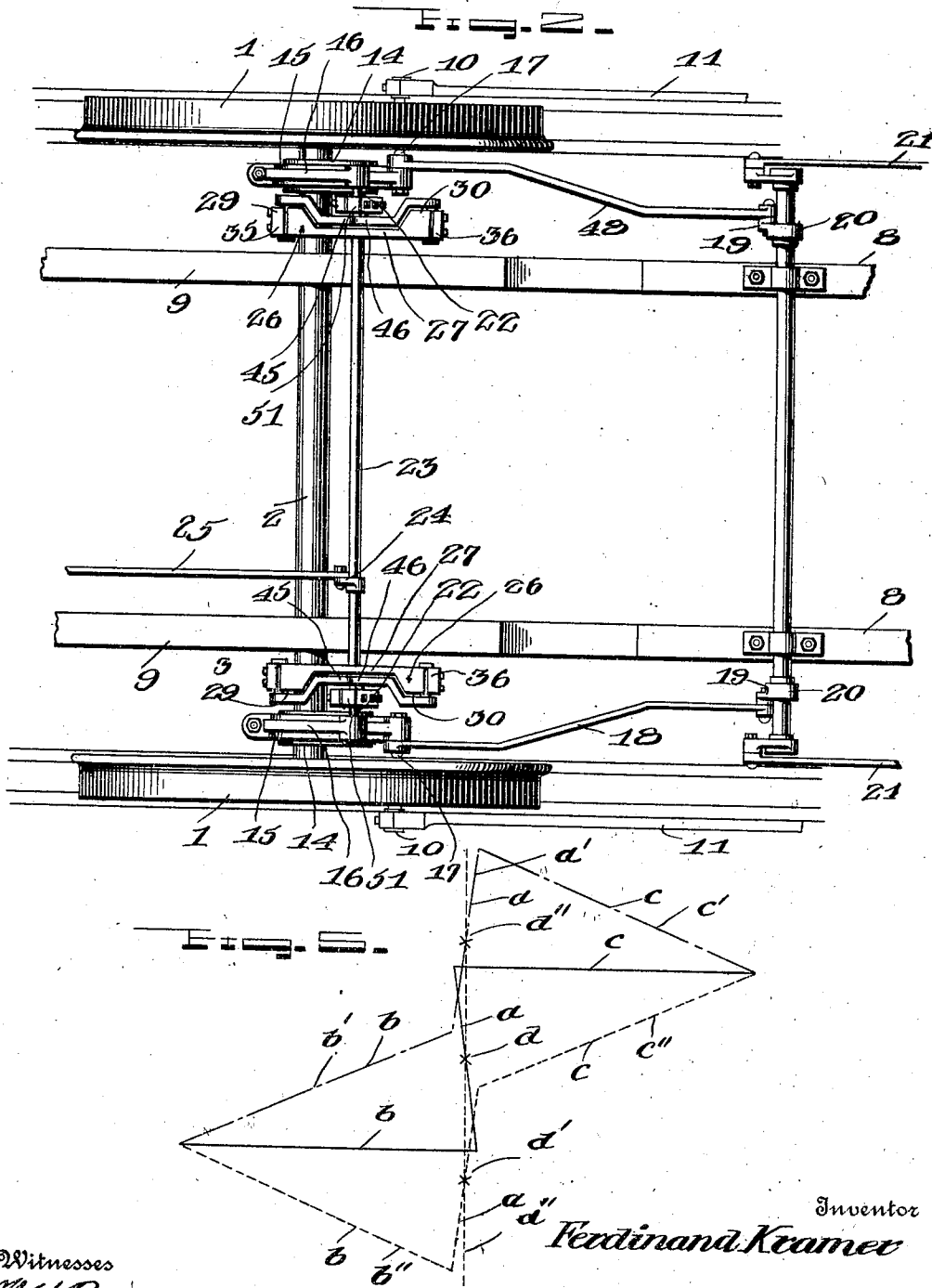


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VALVE OPERATING MECHANISM.
APPLICATION FILED MAY 25, 1911.

1,017,977.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 2.



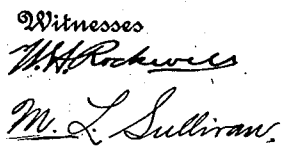
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FERDINAND KRAMER, OF GREEN TIMBER, IDAHO.

VALVE-OPERATING MECHANISM.

1,017,977.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed May 25, 1911. Serial No. 629,421.

To all whom it may concern:

Be it known that I, FERDINAND KRAMER, a citizen of the United States, residing at Green Timber, in the county of Fremont, State of Idaho, have invented certain new and useful Improvements in Valve-Operating Mechanisms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to new and useful improvements in valve gears for engines and more especially to that class of radial valve gears in which the amount of lead, variable cutoff, and expansion in reverse action is obtained from one eccentric, crank, or radial to which an arm is attached having its outer end pivoted in a guide, and the object of my invention is to provide an improved reverse block mechanism for valve gears of the above described character.

A further object of my invention is to provide a reverse block provided with split bearings, so arranged that they may be readily adjusted to take up all wear. And a still further object of my invention is to provide a reverse block which will be accurate in operation, and which will not knock or pound.

With these and other objects in view, my invention will be more fully described, illustrated in the drawings and then specifically pointed out in the claims, which are attached to and form a part of this application.

Figure 1 is a side elevation partly in section of a part of a locomotive embodying my invention. Fig. 2 is a top plan view of the reversing block mechanism. Fig. 3 is a detail side elevation of the reversing block. Fig. 4 is a detail top plan view of the same, and Fig. 5 is a diagrammatic view representing the motion of the reversing block.

Referring more specifically to the drawings in which similar reference numerals designate corresponding parts throughout and which show my reverse block applied to the valve gear of a locomotive, 2 is the main driving axle, 1 is one of the driving wheels, 3 one of the forward truck wheels, 4 a portion of the forward truck, 5 one of the cylinders, 6 the steam chest, 7 the valve, 8 a portion of the main frame of the engine, and 9 a part of the main frame on the opposite side of the engine.

10 is a crank pin to which is connected

one end of the rod 11, the other end of which is connected to the cross head 12 mounted in the cross head guards 13.

Keyed upon the main driving axle 2 is an eccentric 14 provided with the customary eccentric strap 15, which strap has an upward extension 16 carrying a crank pin 17 to which is secured by one end the connecting rod 18, the other end of which is pivotably secured to one end of the valve operating arm 19, said arm being pivotably mounted on the frame as at 20. A connecting rod 21 joins the other end of this arm with the valve 7. The extension 16 is also provided with a pin 22 the purpose of which will be hereinafter explained.

Suitably journaled in the frame is a rock shaft 23 upon which is keyed the crank arm 24 and a connecting rod 25 joins this crank arm with a reverse lever of the locomotive by which means said shaft may be rocked. Keyed upon one end of this rock shaft 23 is the reverse block, which as a whole is designated by the numeral 26.

The reverse block 26 consists primarily of a body member 27 the central portion of which is provided with a bore 28 by means of which said body portion is keyed upon the rock shaft 23. This body portion as shown is substantially elliptical in form and provided at either end with enlargements 29 and 30 the outer portions of which are cut away to form bearing faces 31 and 32, said bearing faces being further cut away to form the half bearings 33 and 34. Bearing blocks 35 and 36 provided with half bearings 37 and 38 respectively are secured to these bearing faces by means of tapped bores 39 and bolts 40. As will be readily understood the bearings thus formed may be readily adjusted by the bolts 40 to take up any wear and journaled in these bearings are the crank pins 41 and 42, said crank pins extending entirely through the bearings and being provided at their rear ends with flanges 43 and 44 while they are provided at their outer ends with the crank arms 45 and 46 respectively, which as best shown in Fig. 4 of the drawings are substantially Z-shaped to conform with the body member. The free ends of each of said crank arms is provided with an outwardly extending crank pin, that of the crank arm 45 being designated by the numeral 47 while that of the crank arm 46 is designated by the numeral 48. These latter crank pins being journaled

in bearings 49 and 50 respectively, one adjacent either end of the bearing block 51, which block as shown is also provided with a centrally located bearing 52 in which is journaled the pin 22 of the eccentric strap. As shown, the bearing block 51 is composed of two members, adapted to be secured together by means of bolts 53 and the nuts 54, in such a manner as to render them readily adjustable for taking up all wear.

As shown in Fig. 1 of the drawings the reverse block is in position to actuate the valve for a downward motion of the engine, the driving axle 2 upon being revolved raising the eccentric strap and through the reverse block and connecting rod opening the valve 7 to admit steam in front of the piston. If the hand lever is operated to reverse the block 26 it will be readily seen that said block will cause the valve controlling levers to move in the opposite direction, which will reverse the engine.

The diagrammatic view shown in Fig. 5 of the drawings best represents the motion of the reverse block. In this view *a* represents the block 51, *b* the crank arm 45 and *c* the crank arm 46, said arms being shown with the block at the center of its stroke. As the eccentric is further operated the arm *b* is revolved until it reaches the position *b'* while the arm *c* is revolved until it reaches the position *c'* when *a* will assume the position shown at *a'*, which shows the top of the stroke. A further revolving of the eccentric moves these portions back to the central position, and then downwardly to the position shown at *a''*, *b''* and *c''*. In this diagram *d* represents the position of the pin 22, and as shown at *d'* and *d''* this pin moves in an absolutely straight line and it will thus be seen that the valve action will always be free.

From the above description it will readily

be understood that I have constructed a reverse block mechanism which is extremely simple in its operation and in which all the bearings are so formed as to permit of ready adjustment for taking up the wear of the parts.

What I claim is:—

1. The combination with a rock shaft and an eccentric strap having an extended arm, of a reverse block for valves, comprising a body keyed upon said shaft and provided at each end with a split bearing, pins rotatably mounted in said bearings, crank arms carried by said pins, a link pivotably connecting the free ends of each of said crank arms, said link being provided with a centrally located bore adapted to engage with the arm of the eccentric strap.

2. The combination with a rock shaft and an eccentric strap having an extended arm provided with a pin, of a reverse block for valves, comprising a body keyed upon said shaft, a crank pin journaled in each end of said body, crank arms carried by said pin and provided at their free ends each with a second crank pin, a split bearing block each member of which is provided with a plurality of half bearings, means for adjustably securing said members together to form a plurality of bearings, one of said second mentioned crank pins being journaled in a bearing in one end of said block, the other of said crank pins being journaled in a bearing in the other end of said block, and the pin of said extended eccentric strap being journaled in a bearing centrally located in said block.

In testimony whereof, I affix my signature, in presence of two witnesses.

FERDINAND KRAMER.

Witnesses:

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