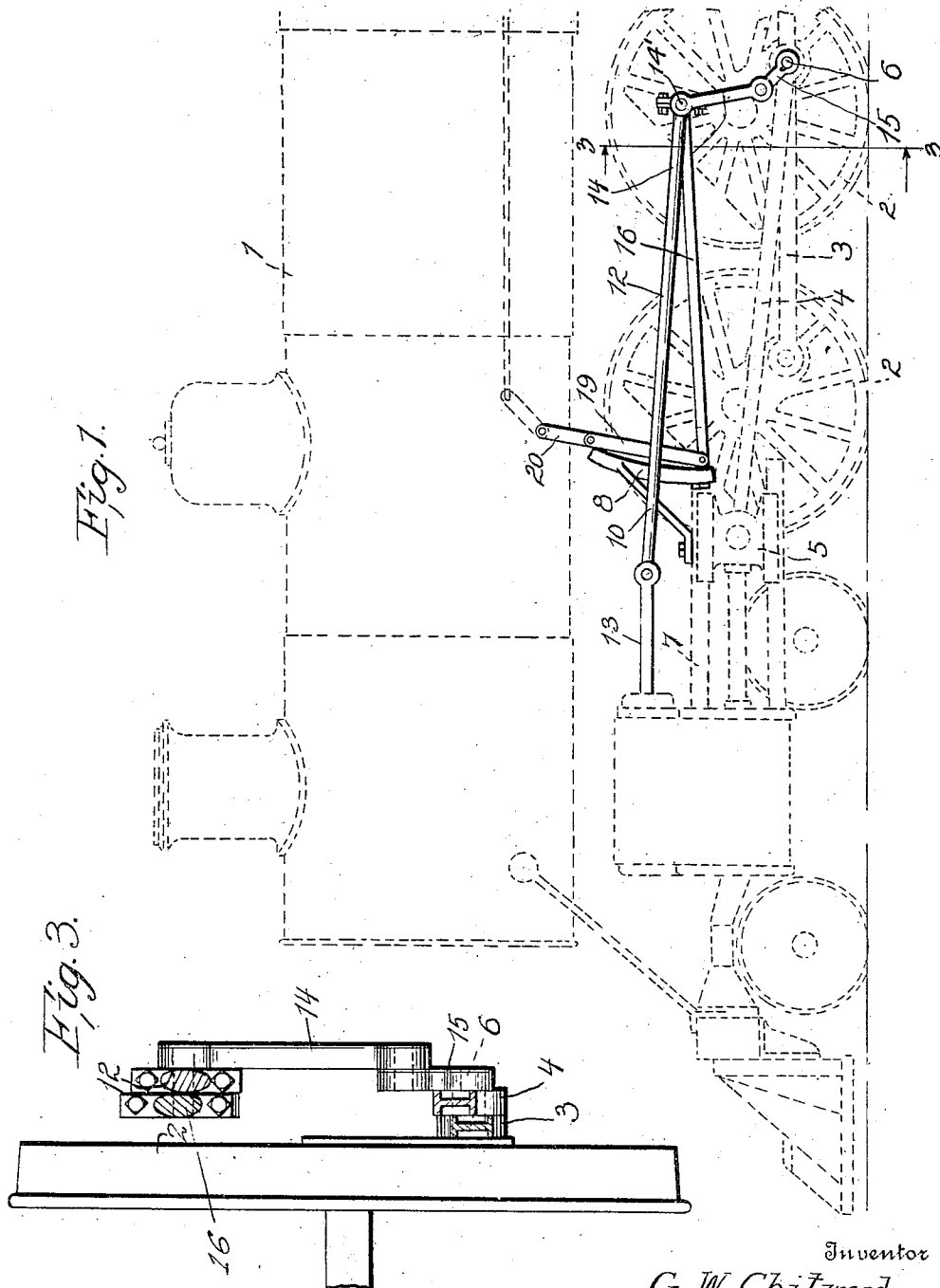


G. W. CHITWOOD & R. T. POPLIN.
 ECCENTRICLESS VALVE GEAR FOR STEAM ENGINES.
 APPLICATION FILED DEC. 23, 1912.

1,058,152.

Patented Apr. 8, 1913.

2 SHEETS-SHEET 1.



Witnesses

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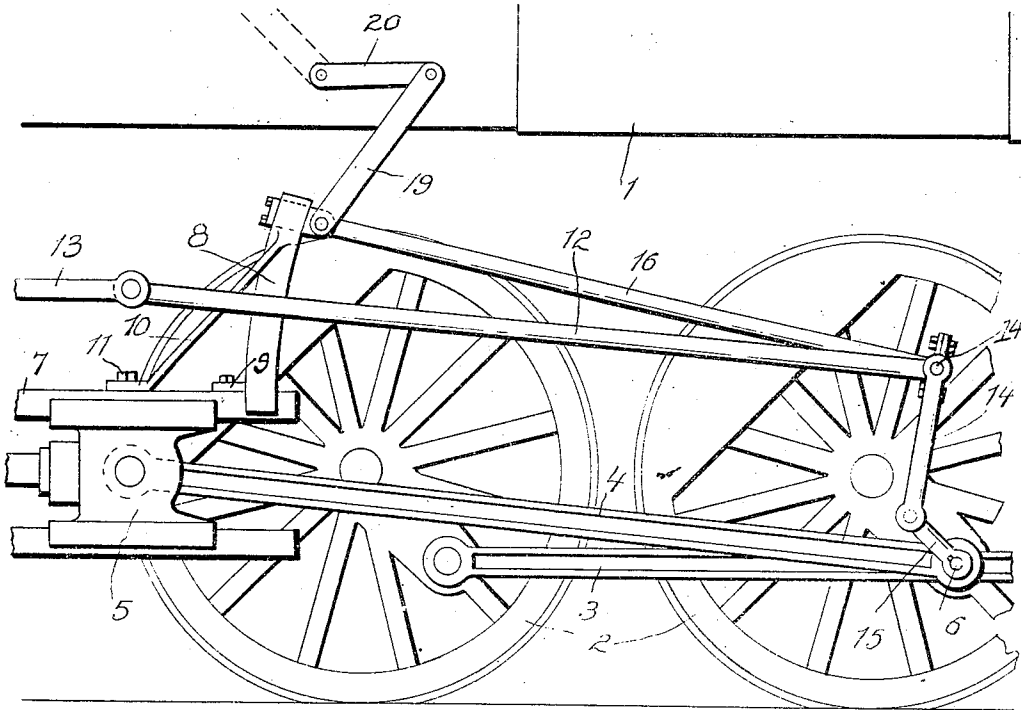
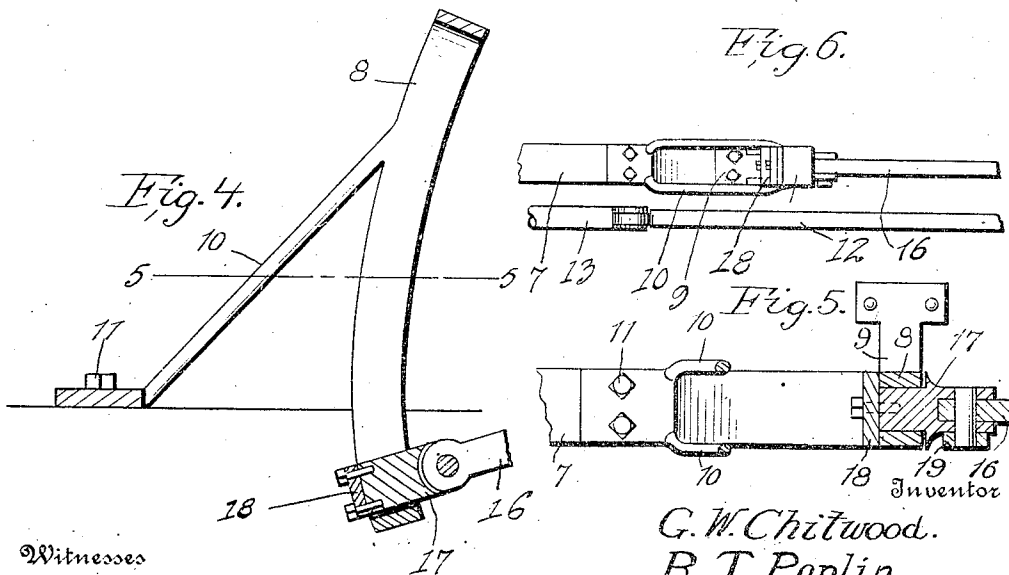


Fig. 1



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ECCENTRICLESS VALVE-GEAR FOR STEAM-ENGINES.

1,058,152.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed December 23, 1912. Serial No. 738,333.

To all whom it may concern:

Be it known that we, GEORGE W. CHITWOOD and ROBERT T. POPLIN, citizens of the United States, residing at Butterfield, in the county of Barry and State of Missouri, have invented certain new and useful Improvements in Eccentricless Valve-Gear for Steam-Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an eccentricless valve gear for steam engines and has for its primary object to provide an engine valve gear wherein the use of the usual eccentric is dispensed with, thus greatly reducing the weight of the gear and permitting of the easy and quick actuation of the reversing elements thereof.

A further object of the invention resides in the provision of a valve gear of the above character which is extremely simple in its construction, has few joints, thus rendering the same very efficient and durable in operation and which may be manufactured at comparatively small cost.

Another object of the invention is to generally improve and simplify valve gears for steam engines and to produce a gear which is primarily designed for use upon locomotive engines, though it will become apparent from the following description that with slight modifications, the invention may also be rendered applicable to the various types of stationary engines.

With the above and other objects in view as will become apparent as the description proceeds, the invention consists in certain constructions, combinations and arrangements of the parts that we shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation showing our improved valve gear applied to use upon a locomotive. Fig. 2 is an enlarged side elevation showing the provision of the reversing rod when the operation of the valve has been reversed. Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2. Fig. 4 is a detail vertical section through the guide, showing the sliding block mounted therein and the reversing rod connected to said block. Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 4, and Fig. 6 is a

plan view of the guide standard and portions of the reversing rod and valve stem connecting rod.

In the illustrated embodiment of our invention, we have shown the improved valve gear applied to a locomotive engine wherein 1 indicates the boiler of a locomotive of any usual or preferred type and 2 the drive wheels which are connected by the driver 3 in the ordinary well known manner.

4 indicates the connecting rod, one end of which is connected to the cross head 5, the other end of said rod being journaled upon a gudgeon 6 provided upon one of the drive wheels 2. The cross head 5 is of course, suitably connected to the end of the piston rod and moves between the parallel way-bars 7. Upon the upper way-bar 7, an arcuate vertically disposed guide standard 8 is mounted, said standard being provided with an obliquely inclined brace 10 which is securely bolted to the upper way-bar 7 as indicated at 11. A second brace or attaching plate 9 is integrally formed with the standard and projects transversely from one side thereof, said brace being also suitably secured to the way-bar. The purpose of this arrangement will be clearly disclosed in the following description.

12 designates the valve stem connecting rod, one end of which is connected to the stem 13 of the sliding valve arranged in the steam chest of the piston cylinder for sliding movement to control the supply of steam to the opposite ends of the cylinder. This connecting rod 12 is disposed outwardly of the guide standard 8 and the rear end thereof is provided with a sectional bearing or journal box to receive a wrist pin 14 secured or formed upon one end of a rocker arm 14. The lower end of this arm is pivotally connected to one end of a sub-crank pin 15, the other end of which is keyed upon the gudgeon 6 as clearly shown in Fig. 2 of the drawings. The reversing rod designated by the numeral 16 is also provided with a sectional journal boxing at its rear end to receive the wrist pin 14. The forward end of the reversing rod 16 is pivotally connected to a block 17 which is mounted for vertical movement in the longitudinal slot of the arcuate guide standard 8. This block is removably retained in position in said slot by means of the cap plate 18 bolted or otherwise secured to the block and extending upon opposite sides of the slot in

the standard 8 as shown in Fig. 5. To the block 17, one end of a link 19 is pivotally connected. The other end of this link is similarly connected to one arm of a bell crank lever 20 which is operated through the medium of a rod or any other preferred means extending to the engineer's cab of the locomotive.

From reference to Fig. 2 of the drawings, it will be seen that the valve stem connecting rod 12 intersects the arcuate slotted guide standard 8 substantially midway between its ends, and in order to insure an equal stroke of the steam chest valve both in its forward and reverse operation, it will be obvious that the reversing rod 16 at its forward end must be moved the same distance above as below the rod 12. Thus when the rod 16 is shifted through the movement of the bell crank lever 20, the rocker arm 14 will be moved to the opposite side of the wrist pin upon the upper end of the crank pin 15 from the position shown in Fig. 1. so that the operation of the steam chest valve is reversed. A uniform length of stroke of the valve is assured in either position of the reversing rod 16.

From the foregoing description taken in connection with the accompanying drawings, it is thought that the construction and operation of our improved eccentricless valve gear will be readily understood. When it is desired to reverse the operation of the engine, it is only necessary to shift the bell crank lever 20 whereupon the forward end of the reversing rod is moved to its uppermost or lowermost position in the slotted arcuate standard 8, as the case may be. Owing to the fact that the use of all eccentrics is eliminated and but few joints are necessitated in the construction of the improved valve gear, it will be obvious that the reversing rod may be easily and quickly shifted by the operator. Owing to the extreme simplicity of the device, it will be apparent that the same is highly efficient in actual use and that practically no expense will be incurred in maintaining the gear in highly efficient working order. It will also be appreciated that by eliminating the use of eccentrics in devices of this character, the weight of the gear is materially reduced and the same may also be manufactured at relatively small cost.

While we have shown and described the preferred construction and arrangement of the several elements employed, it will be understood that our improved valve gear is susceptible of a great many minor modifica-

tions which may be necessitated in order to adapt the invention to the various different types of steam engines, and that such minor alterations as may fairly come within the scope of the appended claims are fully anticipated and may be resorted to in the practical development of our invention.

Having thus described the invention, what is claimed is:

1. In an eccentricless valve gear, the combination with the engine steam chest valve, of an arcuate guide member, a crank pin carried by one of the movable parts of the engine for travel in a circular path, a rocker arm having one of its ends fulcrumed upon said crank pin, a rod connected to the stem of the sliding valve, a reversing rod, means for slidably mounting one end of said reversing rod in the arcuate guide member, the other ends of said connecting rod and reversing rod being pivotally mounted upon the other end of the rocker arm, and means connected to the reversing rod adapted to be manually operated to shift said reversing rod in the guide member and dispose said rocker arm with relation to the crank pin to reverse the operation of the steam chest valve.

2. In an eccentricless valve gear for locomotives, the combination with the steam chest valve, of a vertically disposed arcuate slotted guide mounted upon the cross head frame of the engine, a sub-crank pin keyed upon the driving rod gudgeon of one of the driving wheels, a rocker arm fulcrumed at one of its ends upon said sub-crank pin, a connecting rod connected at one end to the stem of the steam chest valve and pivotally mounted at its other end upon the opposite end of said rocker arm, a block movably mounted in said slotted guide, a reversing rod pivotally connected to one end of said block, the other end of said rod being pivotally mounted upon the latter end of the rocker arm, and manually operable means connected to said block to shift the same in the guide member and dispose said rocker arm with relation to the sub-crank pin to reverse the operation of the steam chest valve.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

GEORGE W. CHITWOOD.
ROBERT T. POPLIN.

Witnesses:

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