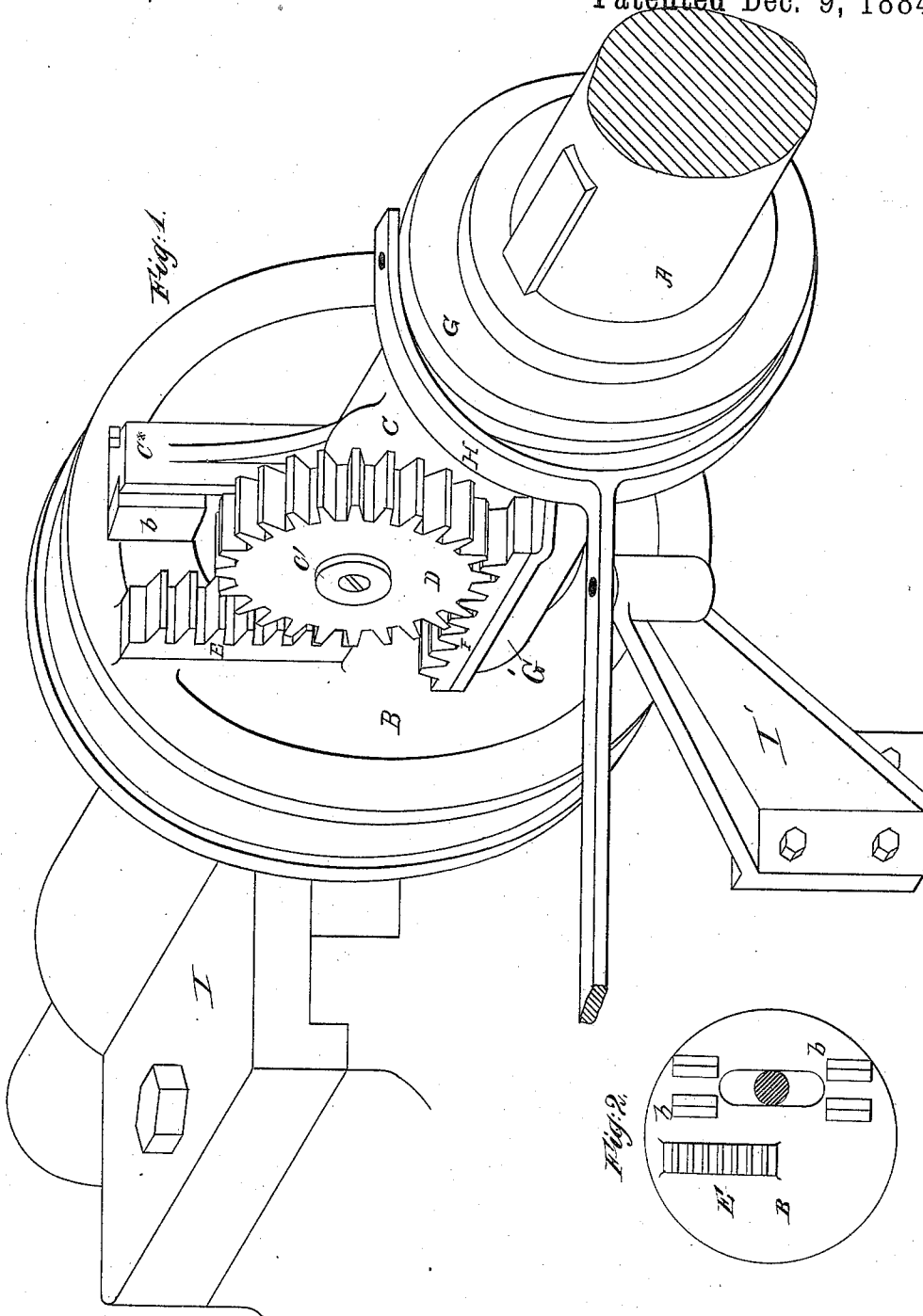


(No Model.)

M. R. MOORE.  
REVERSING VALVE GEAR.

No. 308,917.

Patented Dec. 9, 1884.



Witnesses:  
Charles R. Searle,  
W. C. Day.

Inventor:  
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by his attorney  
T. L. Nelson

# UNITED STATES PATENT OFFICE.

MATTHEW R. MOORE, OF INDIANAPOLIS, INDIANA.

## REVERSING VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 308,917, dated December 9, 1884.

Application filed July 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHEW R. MOORE, of the city of Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Reversing Valve-Gears for Steam-Engines, for which I wish to obtain Letters Patent of the United States; and I do hereby declare that the following specification is such a full, clear, and complete description of the same as will enable any person skilled in the art to which it pertains to understand and construct the same, reference being had to the drawings hereto attached, and forming part of this specification, and to the letters of reference marked thereon.

The object of my invention is to provide a more simple, cheap, and convenient valve-gear than any now in use, whereby the motion of a steam-engine may be reversed, so that the engine-shaft may be made to revolve forward or backward at the will of the engineer.

My improvement relates to that class of reversing valve-gears wherein the eccentric which gives motion to the valve is not fixed upon the engine-shaft, but has a slotted hole for the shaft to extend through, so that, being in the proper position to give motion in one direction, the eccentric may be slipped across the shaft into another position proper for giving motion in the opposite direction; and it consists in providing a simple, convenient, and efficient mechanism for so slipping the eccentric from one position to the other, and holding the same in place while the engine may be in motion. The arrangement is such that it may also be used as a variable expansion-gear, the lead given to the valve remaining constant in all positions for both forward and backward motions.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a perspective view. Fig. 2 is a side view of the eccentric detached.

Similar letters of reference indicate like parts in both figures where they occur.

Referring to the drawings, the construction and operation of the device may be understood from the following description.

Fig. 1 represents a portion of the engine-shaft A with the eccentric and reversing-gear

upon it. The eccentric B is not fastened directly to the shaft, which extends through a slotted opening therein, but without touching.

C is a collar surrounding and bolted to the shaft, having two projecting guide-arms which slide in guideways *b*, formed on the eccentric B, back and forth. The collar C also bears a stud, C', upon which turns a small cog-wheel or pinion, D, which gears with a rack, E, fixed upon the eccentric, and also with another rack, F, borne by an arm, G', projecting from a sliding collar. This collar G is set upon a feather, which compels it to revolve with the shaft; but it may be shifted longitudinally or held in any position within its traverse by means of the clutch-fork H, the handle of which is pivoted to a bracket, I, projecting from the engine-frame I, and extends, further, to any convenient point, (not represented,) where it may be provided with the notched sector and detent usually employed to fix the position of reversing-levers.

The eccentric is so proportioned and is secured to the shaft by means of the fixed collar C in such a way that when in the position shown in Fig. 1—that is, slid out to one side as far as its slotted hole will permit—it will give the valve the proper motion to drive the engine in one direction, cutting off the steam at about three-quarters stroke. The position of the slotted hole and gib-arms is such that when the eccentric is at the middle of its traverse, as shown in Fig. 2, or as nearly concentric with the shaft as it can come, it will still have throw enough to move the valve through a space equal to twice its lap and lead, and this throw will be exactly opposite that of the engine's crank if the valve be directly connected, or will coincide with the crank if the valve-motion be reversed by a rock-shaft. When the eccentric is carried to the opposite limit of its traverse, it will have the right position with reference to the crank to give the valve-motion required to drive the engine in the reverse direction. It will now be readily seen how by working the handle H the eccentric may be traversed from one side to the other, thus reversing the motion of the engine; also, that since the angular advance of the eccentric increases in proportion as its throw diminishes as it approaches the middle of its traverse, the valve will be caused to cut

off the steam earlier, while its lead will remain constant. The arrangement thus becomes as efficient a variable expansion valve-gear as is possible with a single valve.

5 Some important advantages are possessed by this device over other arrangements in common use for effecting the same purpose. There are no parts of this reversing-gear subjected to wear while the engine is running, other  
10 than those common to a non-reversing engine with fixed eccentric. As compared with the "link-motion," which is most generally in use, it has fewer parts, no pins nor sliding blocks subject to wear, and gives a more correct valve action. As compared with other  
15 patented devices for shifting the eccentric, it is simpler, more compact and positive, and being arranged entirely upon one side of the eccentric makes it possible to bring the latter  
20 close to the main bearing of the engine and get as direct a connection with the valve as with the ordinary non-reversing fixed eccen-

tric. This device is of course as applicable to air or gas as to steam engines.

I am aware of Patent No. 231,834, of 1880, 25 and the construction therein set forth is not sought to be covered in this application.

What I claim is—

In a reversing valve-gear for steam and analogous engines, the combination, with the 30 shaft A and frame I I', of the collar C, secured to the shaft, and having guide-arms C\* and stud C', the eccentric B, having guideways b and rack E, the collar G, having projecting arm G', supporting rack F, and having feather- 35 connection with the shaft, and the lever H, all arranged and operating as and for the purposes set forth.

Indianapolis, Indiana, July 12, 1883.

MATTHEW R. MOORE.

Witnesses:

H. H. HANNA,  
FRANK F. VATER.