

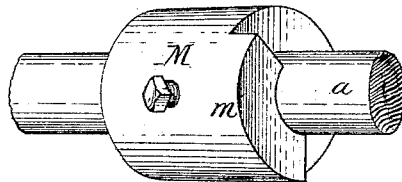
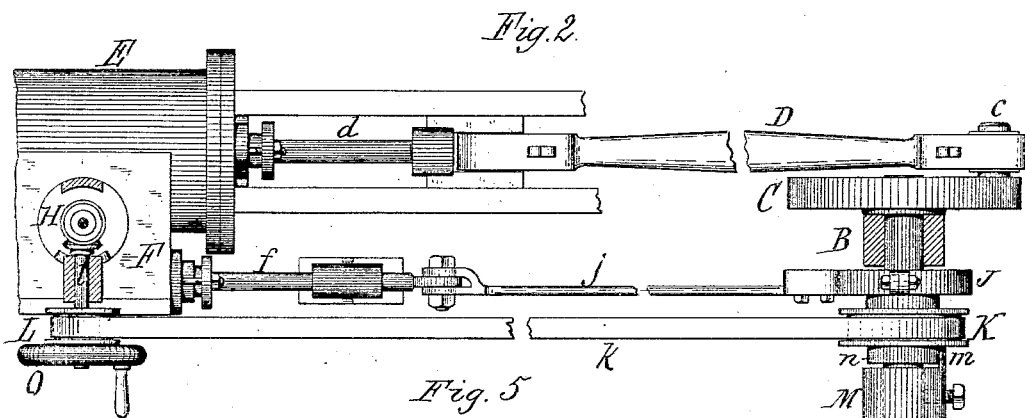
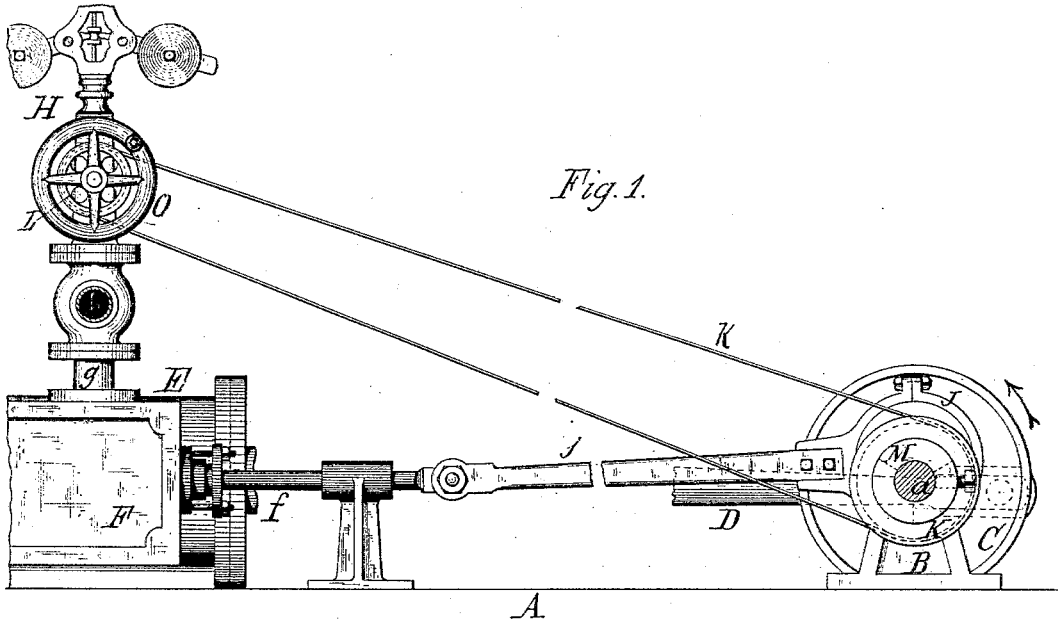
(No Model.)

2 Sheets—Sheet 1.

R. W. AITKEN.  
VALVE GEAR FOR ENGINES.

No. 303,785.

Patented Aug. 19, 1884.



Chas. Buchheit  
Edw. J. Brady

Witnesses.

Robt. W. Aitken Inventor.  
By Mitchell & Brandt  
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

R. W. AITKEN.  
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Fig. 3.

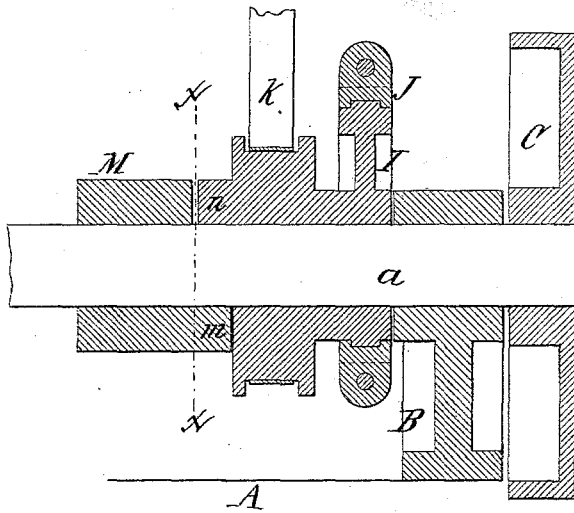
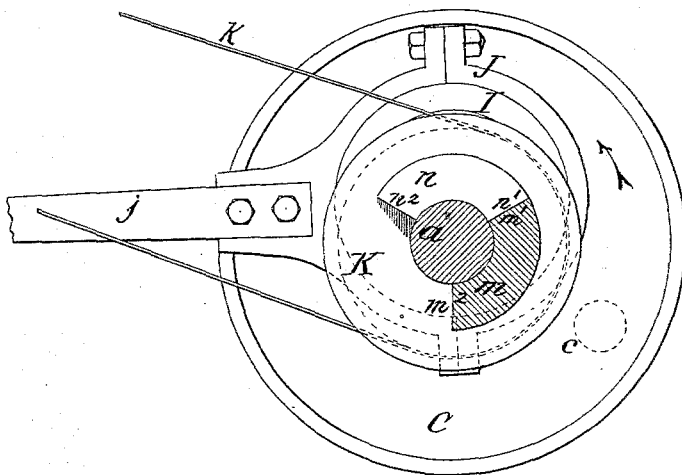


Fig. 4.



Chas. J. Deuchheit  
 Edw. J. Brady  
 Witnesses.

Robt. W. Aitken, Inventor.  
 By Michelus & Bonnet,  
 Attorneys.

# UNITED STATES PATENT OFFICE.

ROBERT W. AITKEN, OF BUFFALO, NEW YORK, ASSIGNOR TO THE PITTS  
AGRICULTURAL WORKS, OF SAME PLACE.

## VALVE-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 303,785, dated August 19, 1884.

Application filed April 18, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. AITKEN, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Valve-Gear for Reversible Steam-Engines, of which the following is a specification.

My invention is designed more particularly for use in that class of reversible steam-engines which is employed for operating thrashing-machines and similar agricultural machines, and which require to be simple in construction and capable of being operated and kept in working order by persons who are but little acquainted with such machinery.

The object of this invention is the construction of a simple valve mechanism for such reversible steam-engines in which but a single eccentric is employed, and which can be shifted by a simple movement to reverse the motion of the engine-shaft, and in which no gear-wheels are employed.

My invention consists of the peculiar construction of the reversible valve-gear, which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation, and Fig. 2 a top plan view, of a steam-engine provided with my improvement. Fig. 3 is a vertical section of the eccentric and connecting parts on an enlarged scale. Fig. 4 is a partly sectional side elevation thereof, the section being taken in line *x x*, Fig. 3. Fig. 5 is a perspective view of the collar secured to the shaft.

Like letters of reference refer to like parts in the several figures.

A represents the bed-frame of the engine, *a* the shaft thereof, B one of the pillow-blocks in which the shaft is supported, C the crank-wheel, *c* the crank-pin, D the connecting-rod, *d* the piston-rod, E the steam-cylinder, F the valve-chest, *f* the valve-rod, *g* the steam-pipe, leading to the valve-chest, and H the governor applied to the steam-pipe, all of ordinary and well-known construction.

I represents the eccentric, mounted loosely on the shaft *a*, so as to be capable of turning thereon.

J is the strap surrounding the eccentric I,

and *j* the rod which connects the strap J with the valve-rod *f*.

K represents a pulley or chain-wheel cast with or otherwise secured to the hub or side of the eccentric I, so as to turn with the same.

*k* represents an endless belt or chain, which runs around the pulley K and around a pulley, L, secured to the horizontal shaft *l* of the governor, thereby transmitting motion from the shaft *a* to the governor.

M represents a collar secured to the shaft *a*, adjacent to the pulley K, and *m* is a segmental projection formed with or secured to the side of the collar M, and engaging against a similar projection, *n*, formed with or secured to the side of the pulley K, as clearly shown in Figs. 2, 3, and 4. The projection *m* is secured to the shaft *a* by means of the collar M, with its center in the same radial plane with the crank-pin, as clearly shown in Fig. 4. When the parts are in the position shown in Fig. 4, in which the radial front side, *m'*, of the projection *m* rests against the radial rear side, *n'*, of the projection *n*, the engine-shaft is caused to rotate forwardly, as represented by the arrows in Figs. 1 and 4. When the eccentric is turned forward on the shaft until the radial front side, *n'*, of the projection *n* rests against the radial rear side, *m'*, of the projection *m*, the eccentric is placed in the position in which it will cause the engine-shaft to rotate backwardly. The eccentric is readily placed in this position by turning the pulley K in the direction in which it runs with increased speed until the face *n''* of the projection *n* comes in contact with the rear side, *m''*, of the projection *m*.

In order to enable the pulley M to be so turned, the pulley L of the governor-shaft is provided with a hand-wheel, *o*. Upon giving the hand-wheel *o* a quick turn in the direction in which it runs, this accelerated motion is transmitted by the endless belt or chain *k* to the pulley K and the eccentric I, attached thereto, thereby moving the eccentric out of the position which it occupies on the shaft *a*, until it is stopped by the projection *n* coming in contact with the projection *m*. If preferred, the pulley L may be an idler-pulley, serving only as a means for reversing the engine, and in that case the pulley may be made larger in diameter than the pulley K, to reduce its speed

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and permit it to be more readily turned forward. When the eccentric has been moved forward so as to bring the sides  $m^2$  and  $n^2$  of the projections  $m n$  in contact with each other, 5 as hereinbefore described, and the direction in which the engine-shaft rotates having been reversed thereby, the eccentric is again with its projection  $n$  on the forward side of the projection  $m$ —that is to say, it is in front of 10 the projection  $m$  in the direction in which the engine rotates at the time. The eccentric is therefore returned to its former position (shown in Fig. 4) by giving the pulley K a quick turn in the direction in which it runs. 15 It is evident from the foregoing that the engine is reversed from forward to backward, and vice versa, by simply giving the pulley K a quick turn in the direction in which it runs. 20 My improved reversing-gear is extremely

simple in construction, and therefore produced at comparatively small expense and easily manipulated and kept in working order by the class of persons who ordinarily operate agricultural and similar machinery. 25

I claim as my invention—

The combination, with the engine-shaft, of the eccentric I, mounted loosely on said shaft, a projection,  $m$ , secured to said shaft and provided with two stops adapted to support 30 the eccentric respectively in its forward and backward position, a pulley, K, secured to the eccentric I, a hand-pulley, L, and an endless belt or chain,  $k$ , running around the pulleys K and L, substantially as set forth.

ROBERT W. AITKEN.

Witnesses:

JNO. J. BONNER,  
CHAS. F. GEYER.