

No. 618,068.

Patented Jan. 24, 1899.

A. G. DIVET.  
REVERSIBLE VALVE GEAR.

(Application filed Mar. 25, 1898.)

(No Model.)

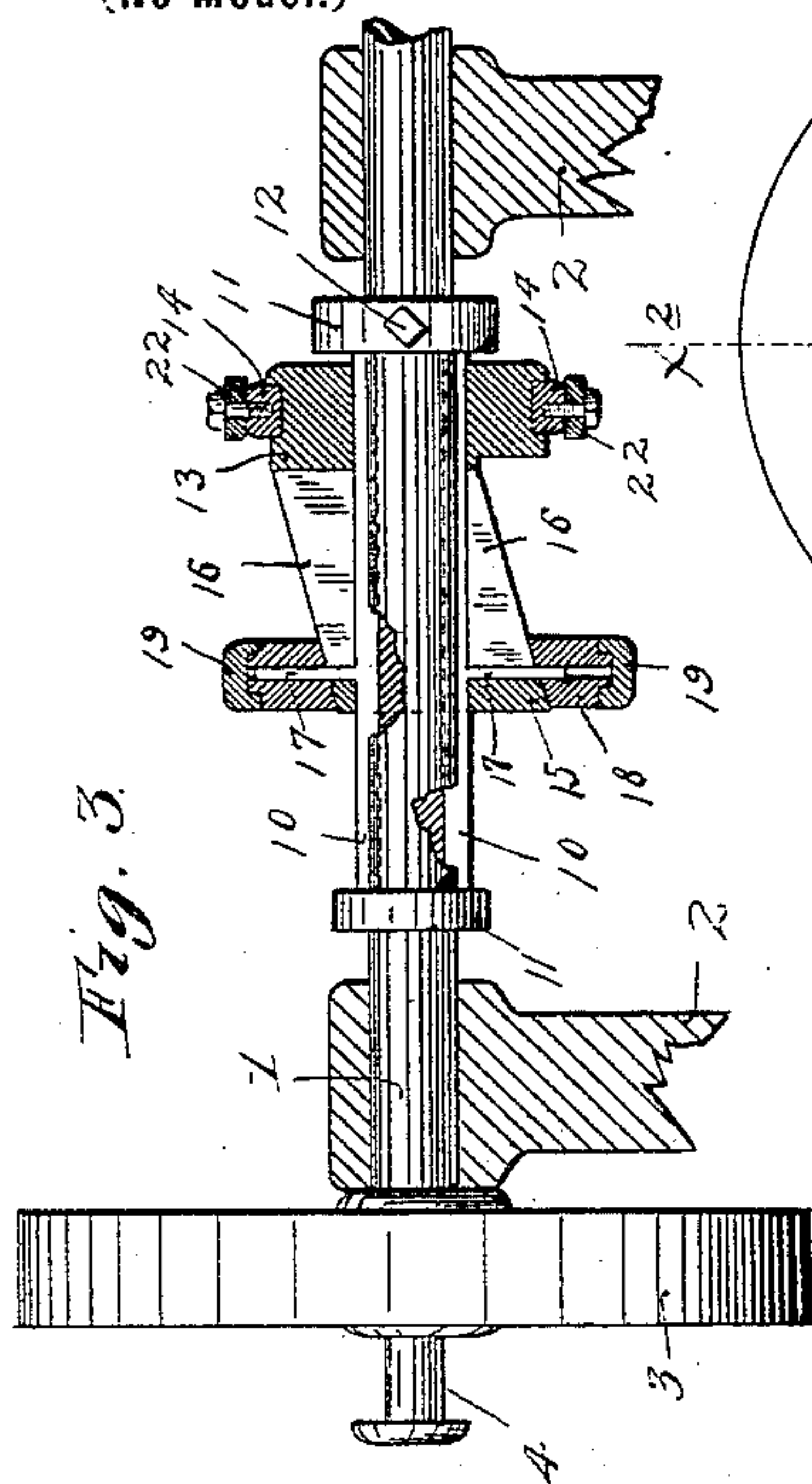


Fig. 3.

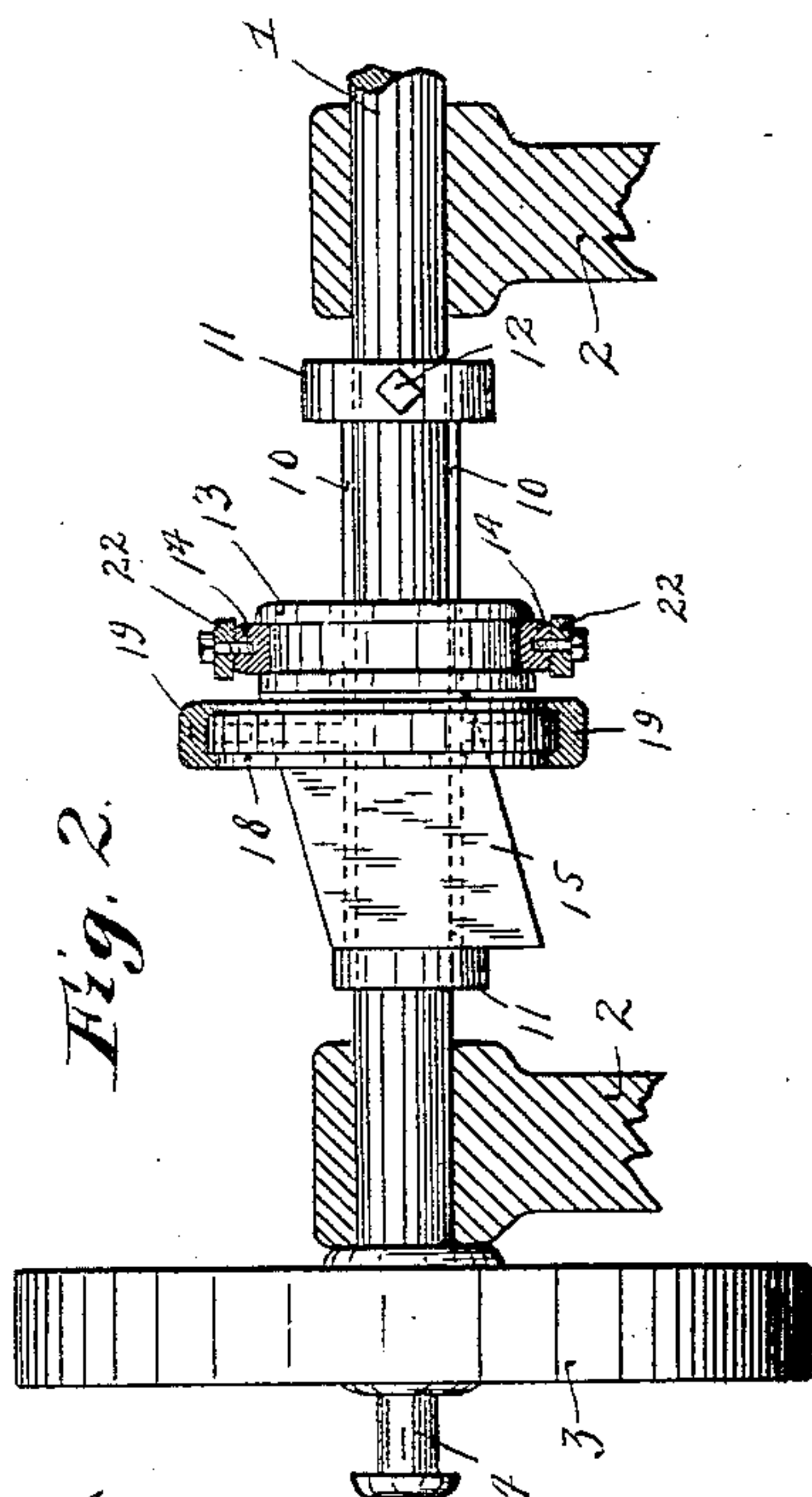


Fig. 2.

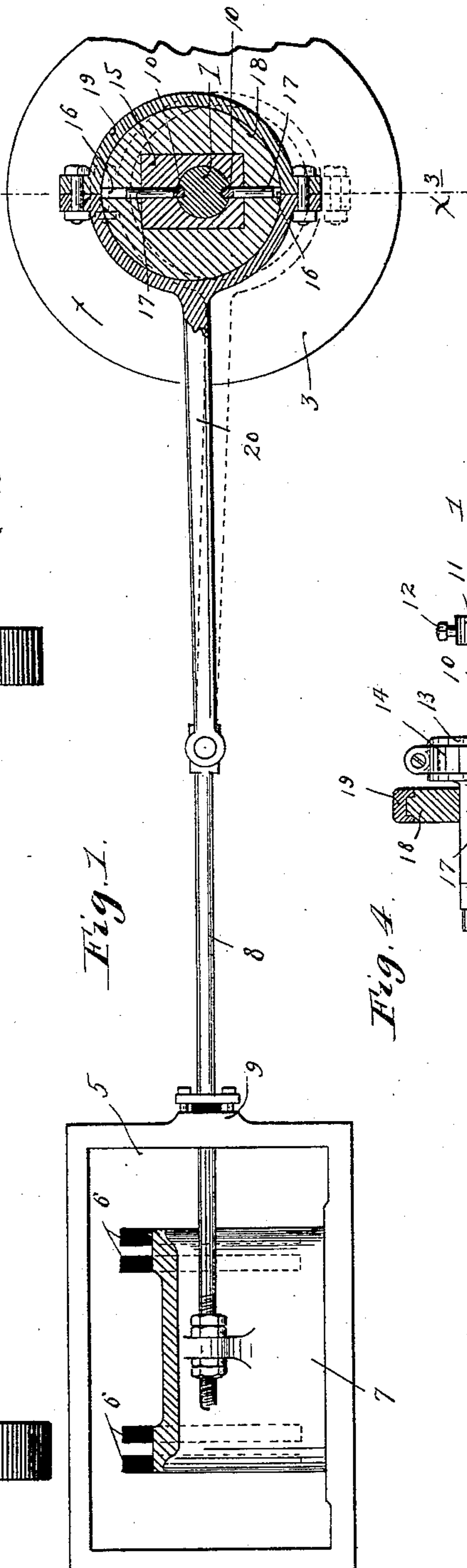


Fig. 1.

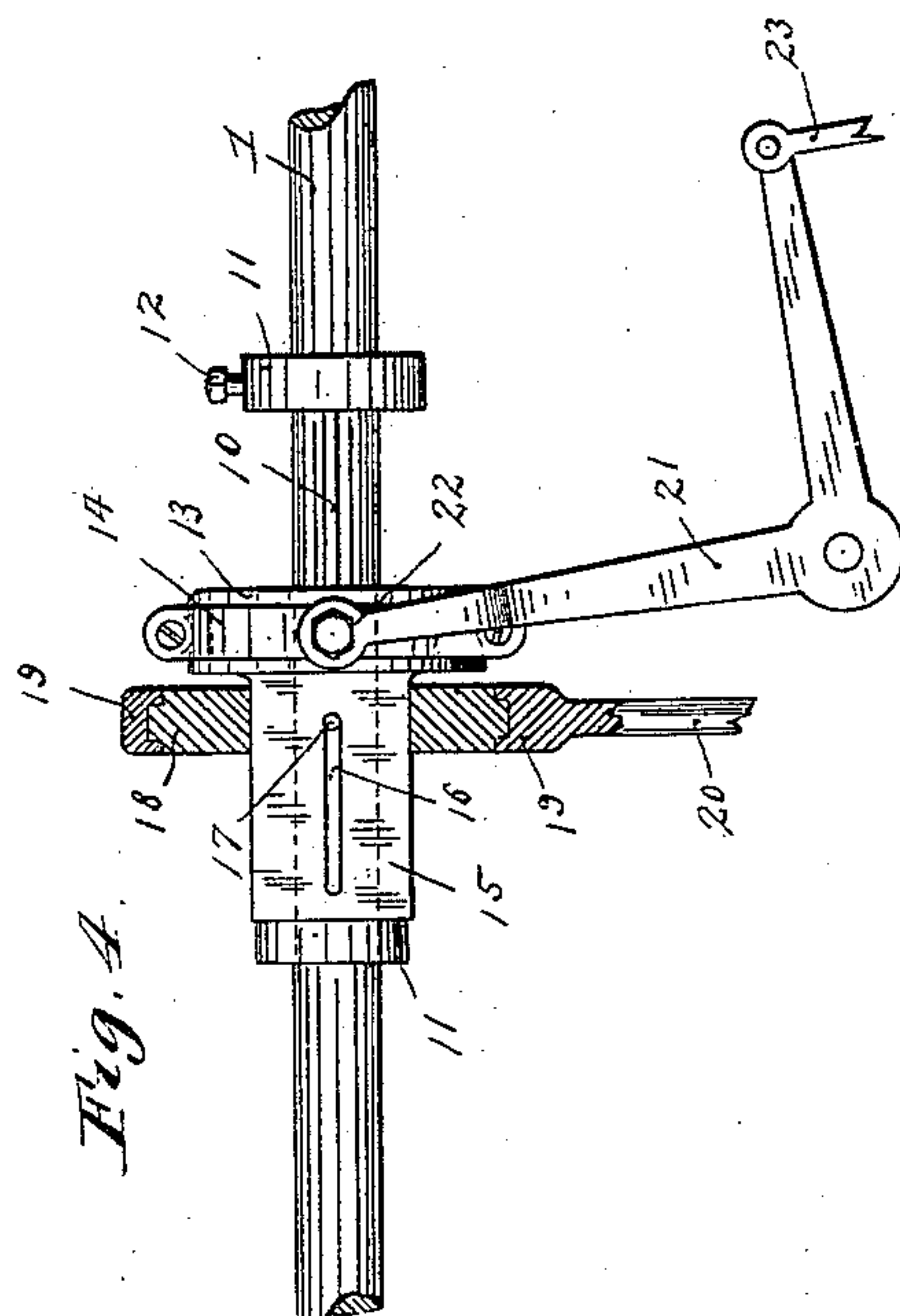


Fig. 4.

Witnesses.  
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# UNITED STATES PATENT OFFICE.

ARTHUR G. DIVET, OF WAHPETON, NORTH DAKOTA.

## REVERSIBLE VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 618,068, dated January 24, 1899.

Application filed March 25, 1898. Serial No. 675,101. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR G. DIVET, a citizen of the United States, residing at Wahpeton, in the county of Richland and State of North Dakota, have invented certain new and useful Improvements in Reversible Valve-Gears; 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 has for its principal object to so improve engine valve-gears that they may be readily reversed; but it has also for its object to so improve said valve-gear that the engine may be started and stopped by shifting the eccentric thereof.

To the ends above indicated my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The preferred form of my invention is illustrated in the accompanying drawings, wherein like numerals indicate like parts throughout the several views.

Figure 1 is a diagram view, partly in plan and partly in side elevation, some parts being sectioned and others broken away, illustrating the action of my improved valve-gear on the slide-valve which controls the admission and exhaust of steam or air to and from the cylinder. Fig. 2 is a view, partly in front elevation and partly in vertical section, on the line  $x^2 x^3$  of Fig. 1. Fig. 3 is a view corresponding to Fig. 2, but with more of the parts shown in section and with the eccentric and cam-block for controlling the same occupying different positions; and Fig. 4 is a detail view, principally in plan, but partly in horizontal section and with some parts broken away, illustrating means for shifting the cam-block.

1 indicates the crank-shaft of the engine, mounted in bearings 2 and provided at one end with the crank-disk 3, having the wrist-pin 4. The fly-wheel or belt-engaged driving-pulley is not shown, but would be carried by the end of the crank-shaft, which is broken away.

5 indicates the steam-chest of the engine, provided with ports 6.

7 indicates the slide-valve, which works in

the steam-chest 5 and coöperates with the ports 6 in the ordinary manner. The valve 7 is provided with a stem 8, which works outward through a stuffing-box 9 in the end of said steam-chest 5.

To the intermediate portion of the crank-shaft 1 a pair of long longitudinally-extended keys 10 are secured by means of suitable key-seats and a pair of collars 11, held in place on said shaft by set-screws 12. Sliding on the shaft 1 and keys 10 is a cam-block 13, which is caused to rotate with said shaft. The head of this cam-block 13 is provided with an annular groove, in which a shipper-collar 14 works, and it is provided with the cam-acting extension 15, that is rectangular in cross-section and extends at an angle to the axis of the shaft. Longitudinal slots 16 extend through the inclined faces of the cam-block 15, and diametrically-extended pins or fingers 17 project from the keys 10 and work through said slots 16. The eccentric 18 is provided with a rectangular perforation that fits the cam portion of said cam-block. This eccentric 18 is held in a plane at a right angle to the axis of the shaft 1, and while it is free to move in the plane in which it is set it is held against movement longitudinally of the shaft by means of the projecting pins or fingers 17, which work in diametrically-extended seats in said eccentric. With the construction shown, wherein the diametrically-projected pins or fingers 17 are formed integral with the keys 10, the keyways for the said keys should be run to one end of the shaft 1, or some other provision should be made which would permit the parts to be readily put together. It is of course evident that the diametrically-projecting pins or fingers might be driven, screwed, or otherwise secured in place after the other parts have been properly assembled and also that one or more of these diametrically-projecting pins or fingers might be directly secured to the shaft itself.

A two-part eccentric-strap 19 works on the eccentric 18 and is provided with an arm 20, the free end of which is pivoted to the outer end of the valve-stem 8.

The cam-block 13 15 is adapted to be shifted at will and held where set by means of a suitable hand-operated device, which, as shown, involves a bell-crank 21, one arm of which is



pronged and pivotally connected to the ring or collar 14, as shown at 22, and the other arm of which is connected to a hand piece (not shown) by means of a link 23 or other suitable connections.

As previously stated, it is the salient object of my invention to provide an improved reversing device for reversing the valve-gear and causing the same to reverse the action of the engine. Figs. 1 and 2 illustrate one position of the eccentric and Fig. 3 illustrates another extreme position of the same. It will be noted that in Fig. 2 said eccentric is thrown to a point of eccentricity to its axis of rotation diametrically opposite to the point of eccentricity which is given in Fig. 3. This, of course, will give the said eccentric a reversed action. As is evident, the above movement of the eccentric is caused by moving the cam-block longitudinally on the crank-shaft. The extreme movement of the cam-block will move said eccentric and its strap from the positions indicated by full lines into the positions indicated by dotted lines in Fig. 1. It is, however, very important to note that in passing from one extreme position to another the eccentric is moved to an intermediate point, where it stands concentric to its axis of rotation, or, in other words, to the axis of the shaft 1. In this position it is evident that the valve 7 will not be moved by the rotation of the crank-shaft 1 and eccentric. In this case the engine will soon be brought to a stop or standstill by the continued application of steam to one end of the cylinder. Hence it is evident that this movement of the eccentric may be utilized to start and stop the engine.

It will of course be understood that I do

not limit myself to the particular construction above described. On the contrary, it is thought to be obvious that my invention is capable of a large range of modification.

The expression "eccentric and strap" is used broadly in this specification and in the claims and is intended to include a crank and pitman as well as the ordinary eccentric and strap.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a valve-gear, the combination with a shaft, of a cam-block mounted to rotate with but free to move axially on said shaft, an eccentric mounted on said cam-block and rotatable therewith, and a radially-projecting guide pin or finger carried by said shaft and engaging said eccentric and operating to hold the said eccentric against movement longitudinally of the shaft, but permitting the same to move transversely thereof, substantially as described.

2. In a valve-gear, the combination with a shaft, of a cam-block carried by but mounted to slide on said shaft, diametrically-projected pins or fingers working through longitudinal slots in said cam-block, an eccentric mounted on said cam-block and held for movement in a given plane by said projecting pins or fingers, an eccentric-strap working on said eccentric, and means for moving said cam-block at will, substantially as described.

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

ARTHUR G. DIVET.

Witnesses:

J. A. SLATTERY,  
CHAS. E. WOLF.