(No Model.)

2 Sheets—Sheet 1.

A. B. LANDIS.

VALVE GEAR.

No. 368,771. Patented Aug. 23, 1887.

Fig. 5.

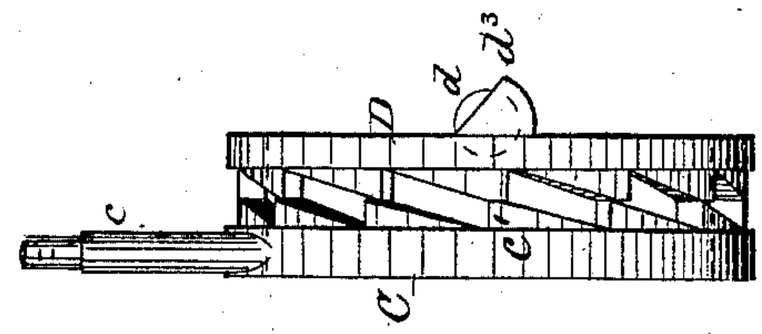


Fig. 2.

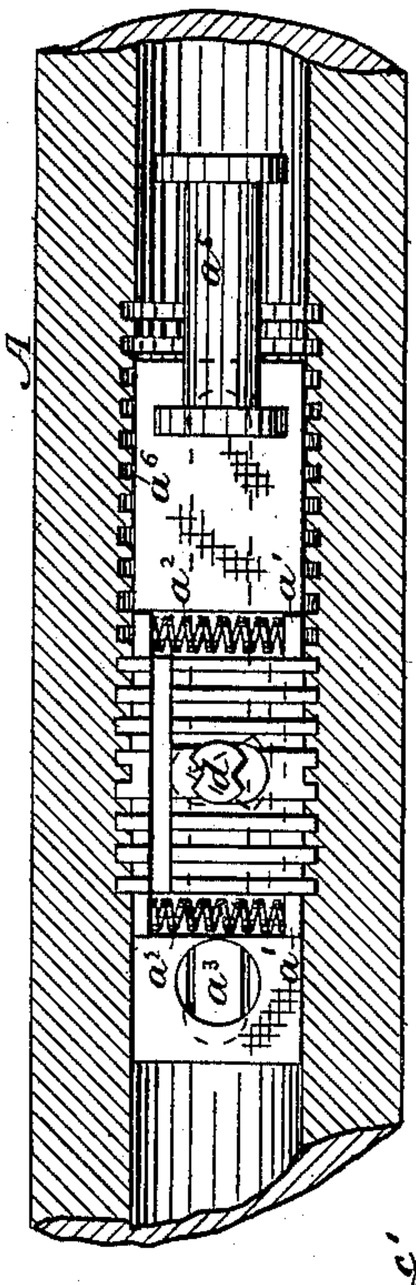


Fig. 1.

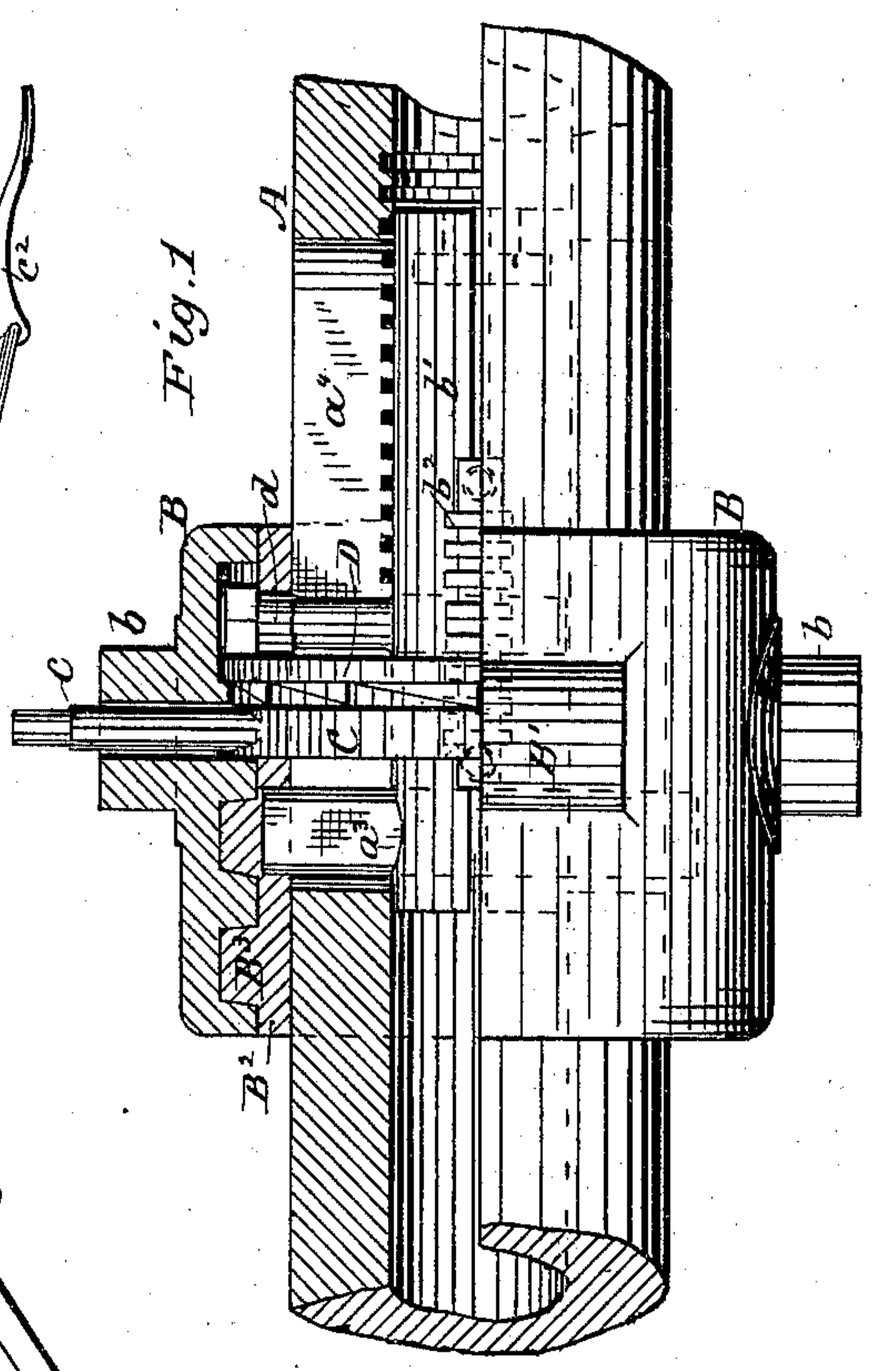


Fig. 3.

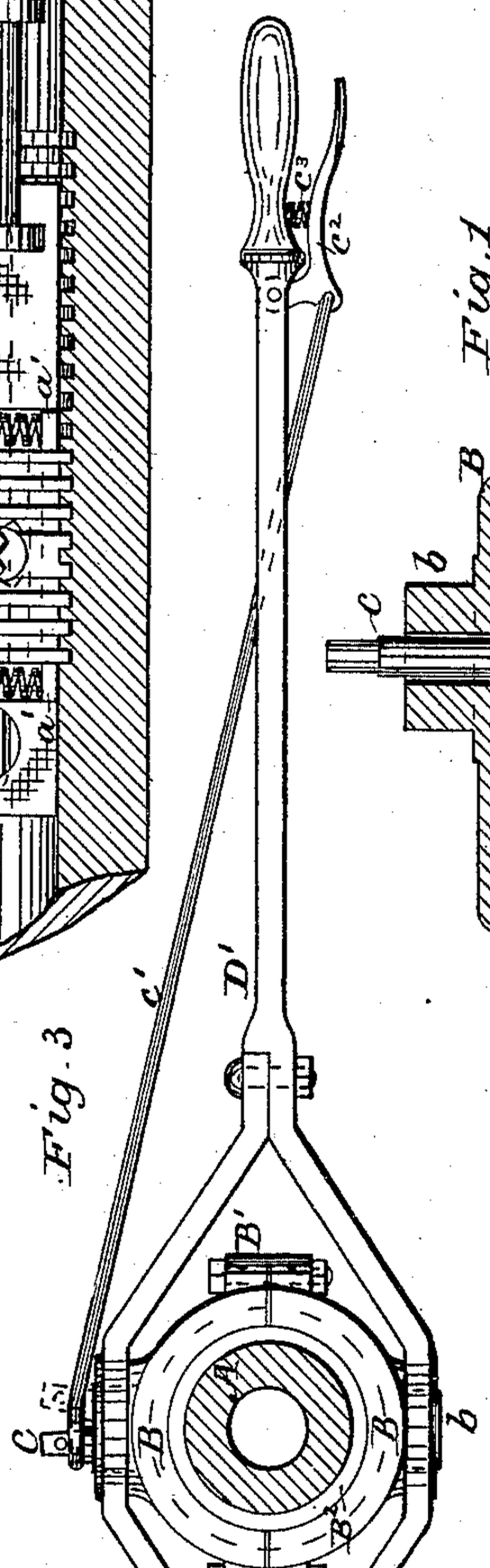


Fig. 4.

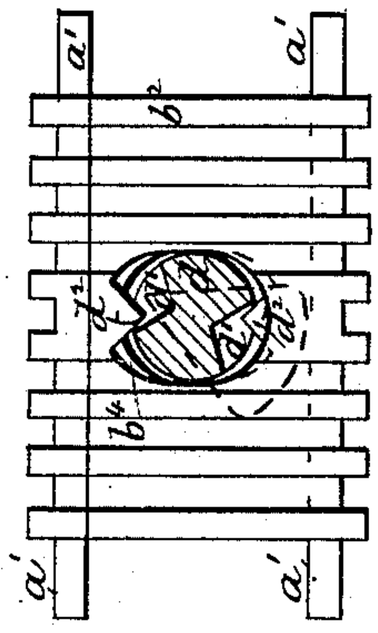


Fig. 6

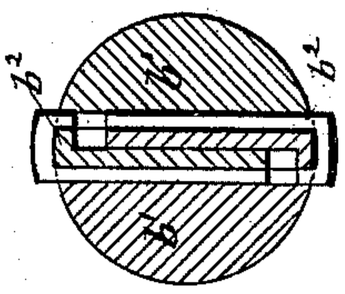
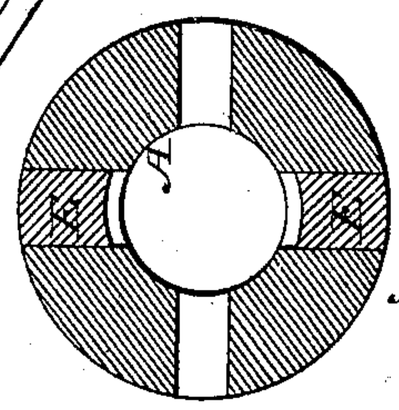


Fig. 7.



Witnesses.

E. C. Wurdeman.

I. J. Masson

Inventor.

Abraham B Landis,

by E. E. Masson
atty.

(No Model.) 2 Sheets—Sheet 2.

A. B. LANDIS.

VALVE GEAR.

No. 368,771. Patented Aug. 23, 1887.

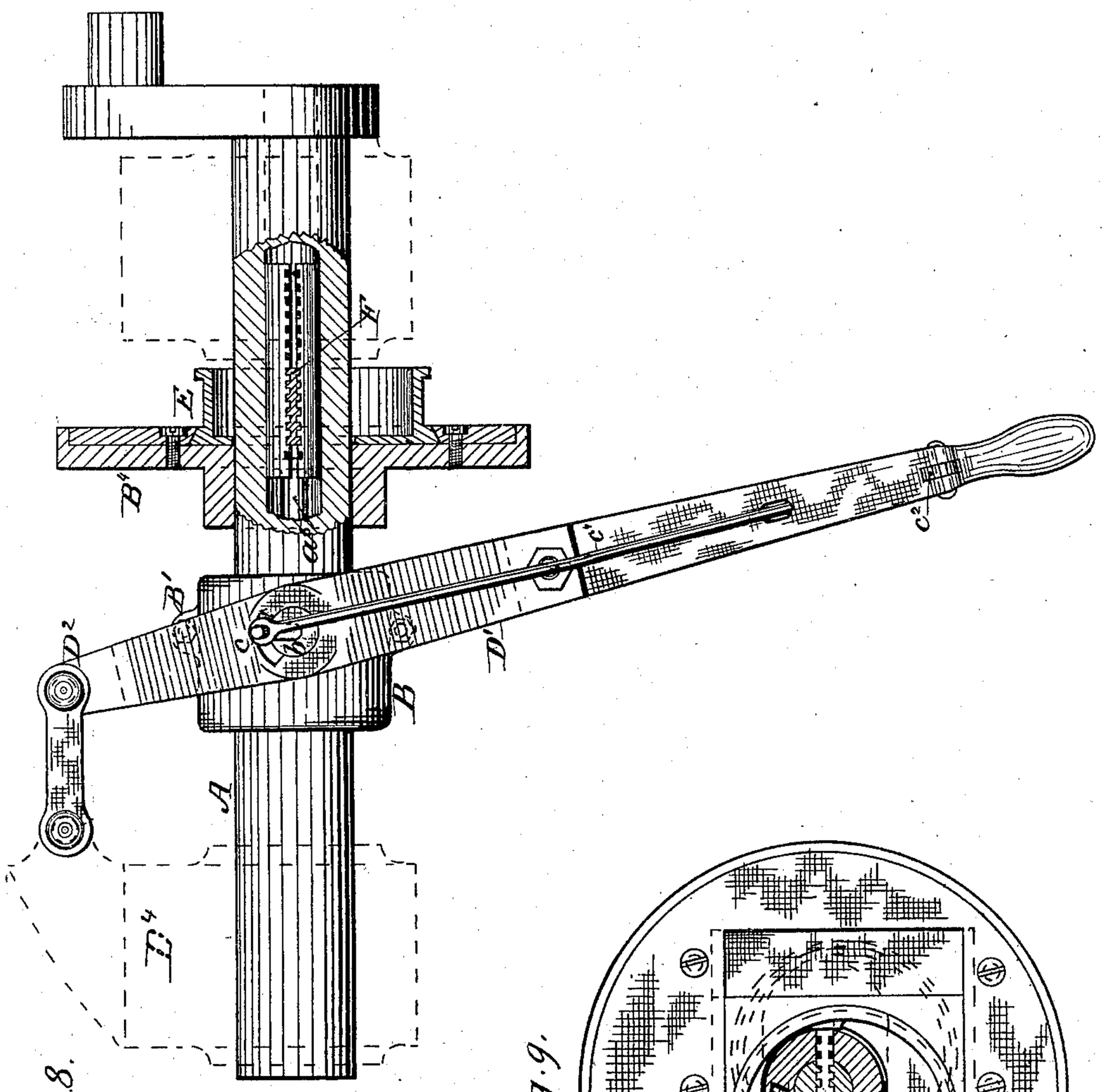


Fig. 8.

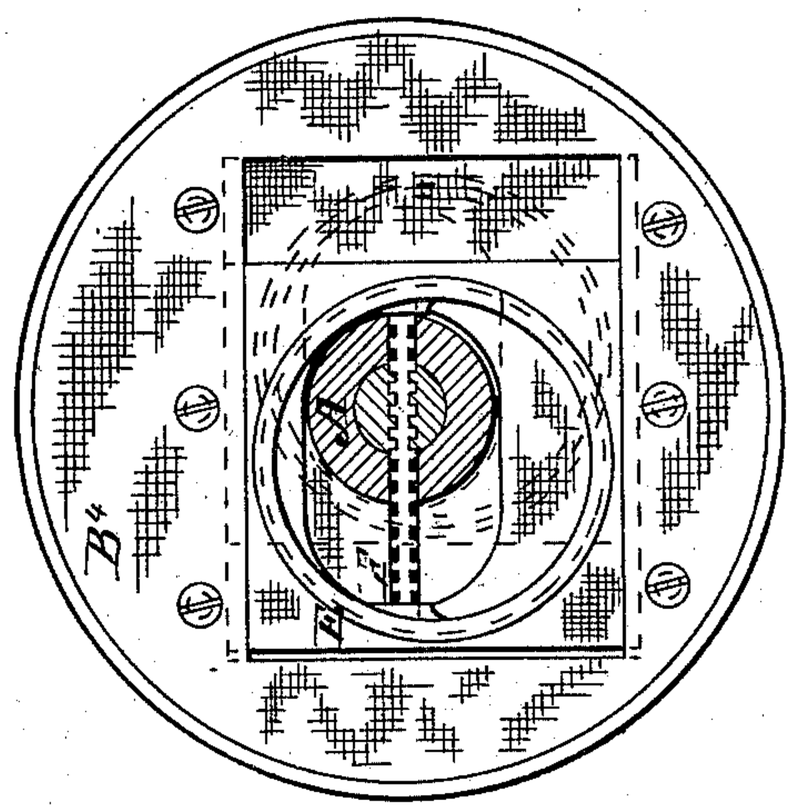


Fig. 9.

Witnesses.

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UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 368,771, dated August 23, 1887.

Application filed October 19, 1886. Serial No. 216,621. (No model.)

To all whom it may concern.

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin, State of Pennsylvania, have invented certain new and useful Improvements in Valve-Gears, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in valve-gears. It can be used in connection with the angularly-ribbed bars shown in the patents granted to me November 18, 1884, No. 308,079, and June 30, 1885, No. 321,117, and is also applicable to other means for moving an eccentric; and the objects of my improvements are to produce a device by which an eccentric is locked in any position it may be set and held from within the crank-shaft to prevent end-thrusts on the wearing parts of the collar, as when the operating-lever is retained by a notched sector, and thereby durability of the collar is obtained, loss of motion is prevented, and the use of a notched sector is dispensed with. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a hollow shaft provided with a valve-gear constructed in accordance with my invention. Fig. 2 is a longitudinal section of the same shaft cut at right angles to Fig. 1. Fig. 3 is a transverse section of the same shaft, taken on a smaller scale, and showing the operating-levers. Fig. 4 represents on a larger scale, in side view and partly in section, the parts used to latch the device to the interior of the hollow shaft. Fig. 5 represents in side view a pair of operating-rings to produce the unlatching of the parts. Fig. 6 is a transverse section of the internal semi-cylindrical bars carrying the latching device. Fig. 7 is a section of a shaft, showing a modification of the internal grooves, with latching-pieces inserted on each side of the shaft. Fig. 8 is a top view of the crank-shaft and operating-lever upon the same scale as Fig. 3, the shaft being partly in section to show the valve-gear and ribbed bar therein, and also the eccentric thereon. Fig. 9 is a transverse section of the shaft, showing the eccentric and ribbed bar in front view.

In the drawings, A represents the shaft of an engine bored a portion of its length.

B^2 is a collar, made in two halves, fitted upon the shaft and provided with circular ribs B^3.

B is another collar, provided with internal circular grooves to receive the ribs B^3 of the inner collar, B^2. The outer collar, B, is made in two halves, united together by means of lugs B′ and bolts passing through them. It is also provided with trunnions *b*, to connect it with the operating-lever D′, that is pivoted at the end D^2 to a bracket, or to some stationary part, D^4, of the engine, said lever being used to move the sleeve upon the shaft A. Said shaft has a longitudinal slot, a^4, through which the transverse bar a^3 passes, and said bar passes also through the semi-cylindrical bar *b*′, placed within the hollow shaft, and having its ends connected with the inner collar, B^2, it can move the bars *b*′ longitudinally. Within the collar B is placed a ring, C, provided with an arm, *c*, that is made to pass through one of the trunnions *b*, and extending beyond is connected to one end of the latch-rod *c*′. The opposite end of this rod *c*′ is attached to the finger-lever c^2, that is pivoted to the operating-lever D′, adjacent to its handle, and forced outwardly by the spring c^3. The ring C has on one side a series of beveled teeth, C′, that bear against similarly-beveled teeth on the side of the ring D. By moving the arm *c* with the rod *c*′ and the finger-lever c^2 from the position shown in full lines to that shown in dotted lines in Fig. 3, a lateral movement is given to the ring D, as shown in Fig. 5, by the beveled face of its teeth bearing against the beveled face of the teeth C′.

To prevent the ring D from taking a circular movement, a small dowel-pin is inserted in said ring and engages with a slot in the collar B and allows said ring D to have an end movement. A pin, *d*, passes through a hole in the inner collar, B^2, and through the slot a^4 in the shaft and through the semi-cylindrical bars *b*′. This pin has a segmental or eccentric head, d^3. One of the projecting corners of the said segmental or eccentric head d^3 of the pin *d* being pushed laterally by the ring D, this pin *d* is partly revolved, and as longitudinal grooves *d*′ are made in the surface of its body, the beveled edges of said grooves bear against the

points d^2, projecting in the holes b^4 of the small latching-pieces b^2, and draw them together, as shown in Fig. 4, as the angular point d^2 is on the opposite side of the hole from the points which engage with the slots within the shaft. In Fig. 4 the latching-pieces b^2 are brought together or in the position that unlatches them from the grooves a^6 in the shaft. In Fig. 2 the latching-pieces are made to enter the grooves a^6 and become clutched therein by means of the springs a^2 a^2 bearing on the end lugs, a', of said latching-pieces.

In operation, by pressing on the finger-lever c^2, a partial revolution is given to the ring C by means of its arm c, which, by means of its beveled teeth against the beveled teeth of the ring D, gives to said ring D a lateral movement, and the latter partly revolves the pin d, which, by the engagement of its notches d' with the points d^2, draws the latching-pieces b^2 together and disengages them from the grooves or slots a^6 within the shaft A, and the latter is free to be moved by the lever D′ to any desired position within the range of movement of the latter. As the latching-pieces have a series of notches to engage with the shaft, the amount of bearing-surface is greatly multiplied, and consequently its durability is increased. The sides of the latches d^2 are also provided with a series of grooves for engagement with the interior of the semi-cylindrical bars b' to increase their durability.

Instead of having grooves cut within the solid shaft, said shaft may have longitudinal slots in its side for the reception of blocks E, having slots or grooves cut upon their face for engagement with the latching-pieces b^2.

The latching and unlatching can be done whether the engine is at rest or running at a high speed. In the latter case the segmental head of the pin d slides on the ring D only when in the act of reversing. Therefore all wear is practically removed. The semi-cylindrical bars b' are provided with a link-pin, a^5, to connect them to any device—as, for example, with the ribbed bar F and the eccentric E, secured to the disk B^4 upon the shaft A, in the manner fully described in my patent of November 18, 1884, No. 308,079; but the locking device can be connected to other eccentric shifting mechanism—such as screws, rack and pinion, angle-crank, &c.—without departing from the spirit of my invention.

Having now fully described my invention, I claim—

1. The combination of a hollow shaft, longitudinally slotted and provided with internal grooves or notches, with the bars b' within said shaft, the latching-pieces b^2, and grooved pin d, engaging with said latching-pieces, substantially as and for the purpose described.

2. The combination of a hollow shaft, longitudinally slotted and provided with internal grooves or notches, the bars b' within said shaft, having the bar a^3 transversely across them, the latching-pieces b^2, and grooved pin d, substantially as and for the purpose described.

3. The combination of a hollow shaft, longitudinally slotted and provided with internal grooves or notches, the latching-pieces b^2, and grooved pin d, with the ring D, having beveled teeth on one side, and the ring C, having similar teeth, substantially as and for the purpose described.

4. The combination of a hollow shaft, longitudinally slotted and provided with internal grooves, the latching-pieces b^2, and grooved pin d, with the rings D and C, the latter having an arm, c, the collar B, having perforated trunnions, and the lever D′, substantially as described.

5. The combination of a hollow shaft longitudinally slotted, provided with internal grooves or notches, with a latching device to engage with said notches, substantially as and for the purpose described.

6. The combination of a collar, B, having perforated trunnions, with the rings D and C, having beveled teeth, the latter ring having an arm, c, the rod c', and lever D′, substantially as and for the purpose described.

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

ABRAHAM B. LANDIS.

Witnesses:

D. M. GOOD, Jr.,

C. E. BESON.