(No Model.) 2 Sheets—Sheet 1.

M. LEITCH.

SHIFTING ECCENTRIC FOR OPERATING PUMPS.

No. 540,394. Patented June 4, 1895.

Fig. 2.

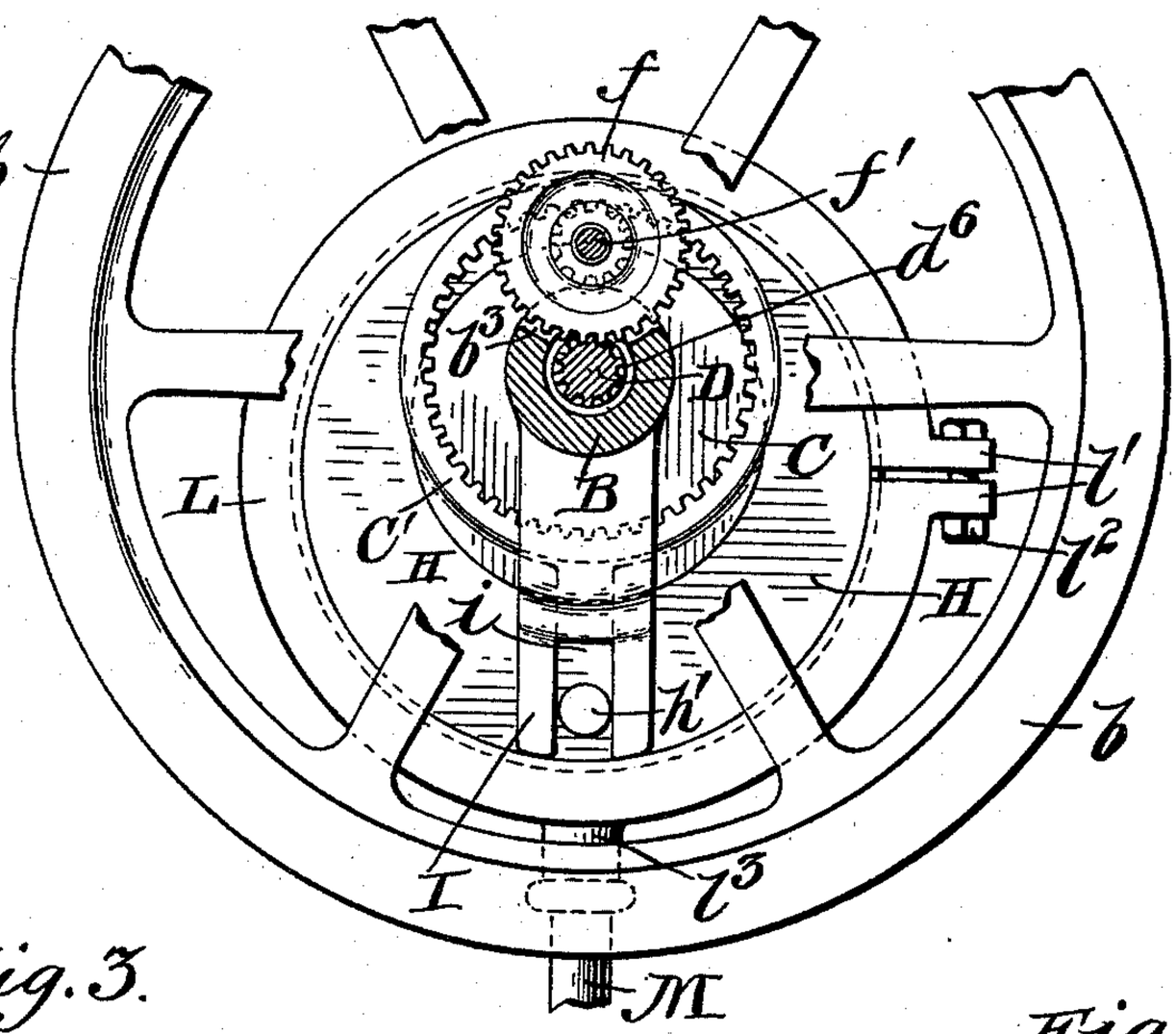


Fig. 3.

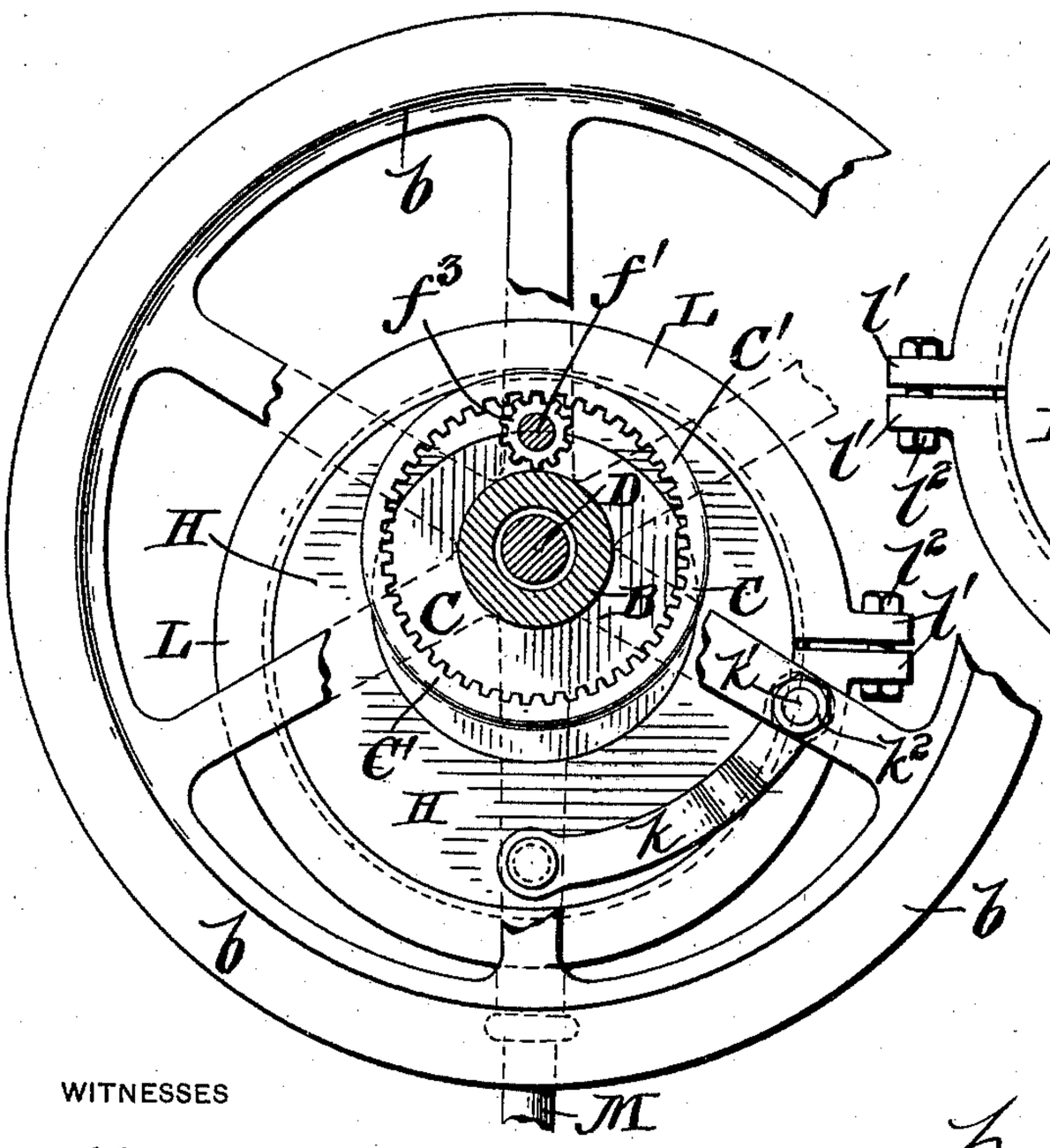
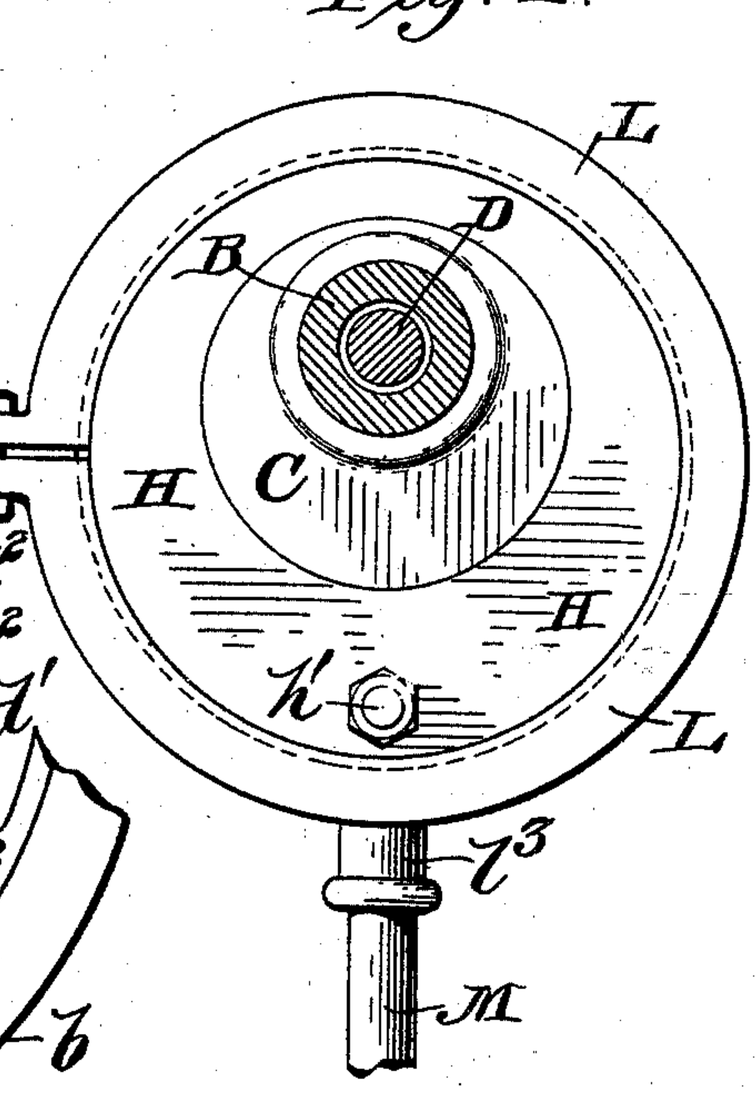


Fig. 4.



WITNESSES

E. Everance.
W. S. Hockman.

INVENTOR

Meredith Leitch
by his Attys
Munn Emrick & Lawrence

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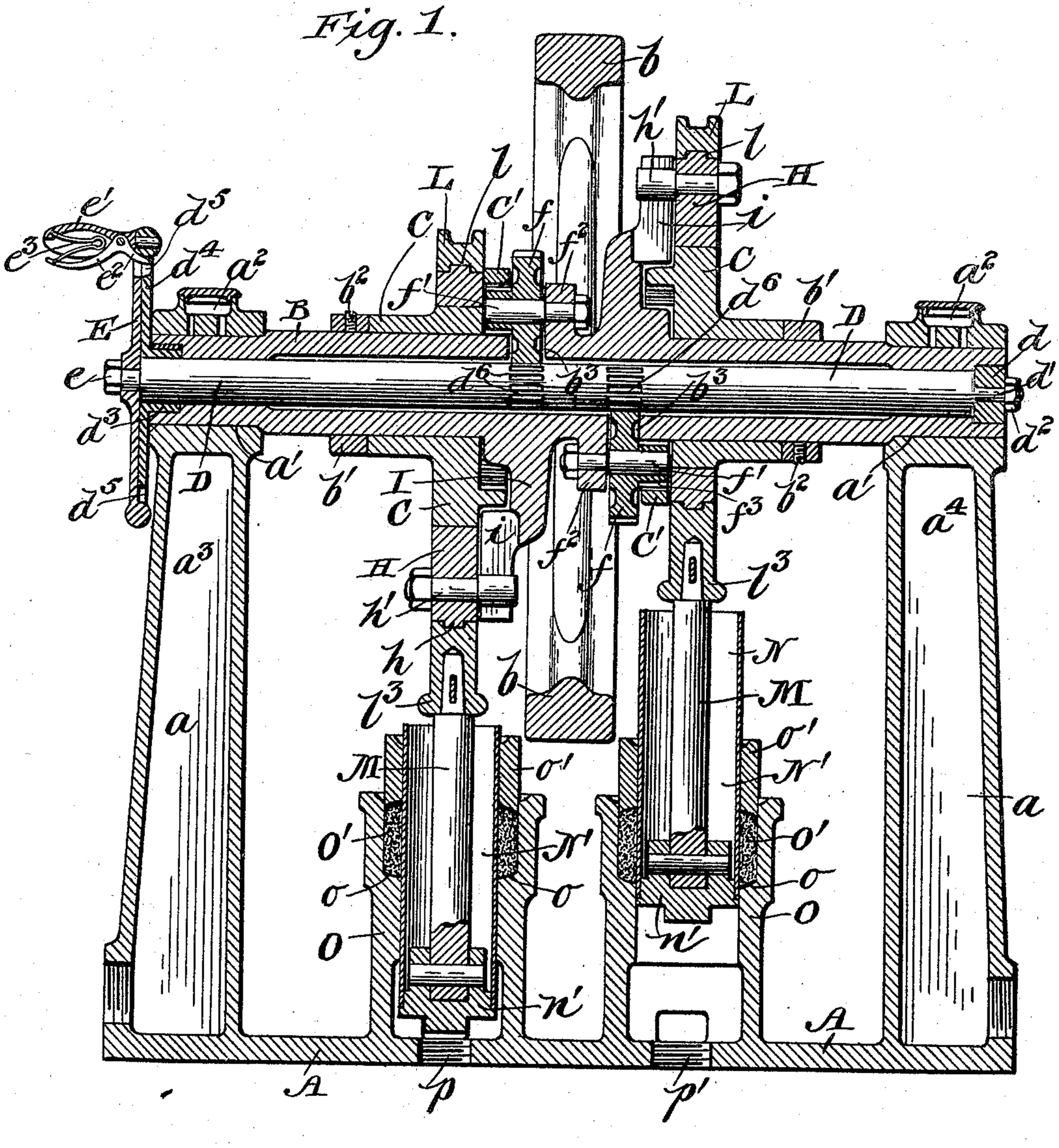

WITNESSES

Severance.
W. S. Hockman.

INVENTOR

Meredith Leitch
by his Atty
Mann, Semmes & Mann

UNITED STATES PATENT OFFICE.

MEREDITH LEITCH, OF RICHMOND, VIRGINIA.

SHIFTING ECCENTRIC FOR OPERATING PUMPS.

SPECIFICATION forming part of Letters Patent No. 540,394, dated June 4, 1895.

Application filed March 1, 1896. Serial No. 540,148. (No model.)

To all whom it may concern:

Be it known that I, MEREDITH LEITCH, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Shifting Eccentrics for Operating Pumps; 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 relates to improvements in pumps with shifting eccentrics and is an improvement on my invention for which I filed application in the United States Patent Office on the 21st day of March, 1894, which application was serially numbered 504,531 and allowed August 17, 1894, and on which the patent was issued March 5, 1895.

The invention has more particularly to do with steam boiler and water feed pumps or other analogous water feeding devices and the invention consists in the combination of an operating shaft, one or more adjusting eccentrics mounted thereon, operating eccentrics adapted to have their eccentricity increased or decreased by said adjusting eccentrics and means for operating said adjusting eccentrics and locking them in any desired position.

It also consists of the combination of an operating shaft, adjusting eccentrics mounted on the same, operating eccentrics connected to said adjusting eccentrics, means for operating said adjusting eccentrics, and water feeding devices connected to said eccentrics and operated thereby.

It also consists of certain other novel constructions, combinations and arrangements of parts all of which will be hereinafter more particularly set forth and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 represents a central vertical longitudinal section of the mechanism embodying my invention. Fig. 2 represents a side elevation, partly broken away, of the two eccentrics, the operating-gearing, belt-wheel, &c. Fig. 3 represents the same with one of the gear-wheels omitted and a modified form of connection between the balance-wheel and the eccentric; and Fig. 4 represents a side elevation of the two eccentrics, one within the other.

A in the drawings represents the base of the apparatus. This base is provided at each end with a hollow upright standard a in the upper end of which is formed a journal box a' in which a hollow operating shaft B has its end journaled; suitable oil cups a^2 being provided in said journal boxes. The said shaft B is provided with a fly or belt wheel b cast integral therewith and transmitting the power from any suitable source to said shaft. Adjusting eccentrics C are loosely mounted on said shaft upon opposite sides of the belt wheel and are respectively confined against longitudinal movement in an outward direction by collars b' secured to said shaft by set screws b^2. Each of the adjusting eccentrics is provided upon its inner face with an annulus C′ whose center is the shaft B. Each annulus is provided upon its inner circle with rack teeth thus forming an annular rack on the inner side of each adjusting eccentric by means of which said eccentric may be revolved. The shaft B as before stated, is hollow to accommodate an eccentric actuating rod D which passes through the entire length of said shaft. One end of this rod is mounted in a block d by means of a bolt d' and securing nut d^2 and the opposite end passes loosely through the hub d^3 of a disk d^4. Said hub is keyed rigidly to the shaft B and the disk is notched about its periphery as at d^5. A disk E is rigidly secured to this end of the rod by a bolt e and is provided with an operating handle e' having a catch e^2 pivoted therein and held in its normal position engaging any one of said notches d^5 by a pronged spring e^3. The end of the catch works through an aperture in said disk E and is adapted to engage any one of the notches cut in the periphery of the disk d^4 and thus the said disk E and the rod D may be turned independently of the shaft B and then locked to the same so as to rotate therewith.

The rod D is provided near its middle with two annular rows of longitudinal grooves or depressions d^6 into which cog wheels f, f are adapted to mesh respectively; said wheels passing through slots b^3 in shaft B. The wheels f, f, are each journaled on pins f', f'

which are rigidly mounted in projections f^2, f^2 of the shaft B. The hubs of each of the wheels f, f, are extended and provided with cog teeth f^3, f^3 adapted to mesh with the annular rack C'. It will thus be seen that the adjusting eccentrics C may be turned on the shaft to any desired position and locked in such position. The eccentrics C, C are preferably so arranged and connected to the gears that they will always be diametrically opposite to each other in eccentricity no matter how they are adjusted; but if so desired the rod D may be made in two parts and a disk and locking mechanism applied on both ends so that the eccentrics may be adjusted independently of each other.

Operating eccentrics H surround the eccentrics G peripherally and are each provided with a peripheral strap retaining flange or bead h. These eccentrics are loosely mounted upon the adjusting eccentrics and are each connected to the shaft B by a slotted arm I formed integral with the shaft B. These arms extend radially from the shaft near its middle and at diametrically opposite sides and are each provided with an angular slotted end i adapted to receive a pin h' secured to the operating eccentric and thus said eccentrics are caused to revolve with the shaft B but can move laterally thereto when they are being adjusted because of said pin and slot connection. In lieu of this slot and pin connection I have shown in Fig. 3 the belt wheel b connected to one of the eccentrics by an angular segmental link k which has one of its ends pivotally attached to a spoke of the belt wheel by a bolt and nut k', k^2 and its opposite end secured in a similar manner to the eccentric H.

An eccentric strap L provided with an annular groove l is secured about each eccentric by its lugs l', l' being secured together by a bolt l^2, the groove l fitting over the flange or bead h and thus securing the strap against lateral displacement. Each strap is provided upon its under side with a nipple l^3 within which the upper end of a plunger rod M is secured so that as said eccentrics revolve the rods are alternately raised and lowered. Pistons or plungers N are connected to the lower ends of said rods and are composed of cylinders N' having heads n' at their lower ends said heads closing said ends. These piston cylinders are adapted to operate in cylinder casings O which are preferably cast integral with the base A. The inner surface of each of these casings is provided with an annular ledge o which forms a seat for supporting the packing O' which is forced against the piston cylinder to make a water tight joint by means of collars o'.

Water inlet and outlet ports p, p' are provided in the lower part of each of the casings. The water first enters an air chamber a^3 of one of the supporting standards a and is drawn from the same into the first pump and from this pump is forced into an air chamber a^4 formed in the other supporting standard a. The other pump acts in exactly the same manner but with an alternating action in regard to the first mentioned pump, that is, one pump will be drawing water from chamber a^2 while the other is forcing water into the chamber a^4. Suitable valves are provided in the passages leading to the inlets p' so that a backward flow of water in said passage is prevented.

During the pumping operations the chamber a^3 acts as a vacuum chamber and the chamber a^4 as an air compression chamber, and by means of these chambers a steady feed of the water is secured.

It will be seen from the foregoing description that the eccentricity of the eccentrics may be increased or decreased at will by simply turning the handle as in Fig. 1, which movement rotates the adjusting eccentrics in the operating eccentrics and thus moves said eccentrics up or down, one moving up the exact distance that the other moves down which causes the said eccentrics to always stand in the same relative position to each other, with respect to their throw.

The greater the eccentricity of the eccentrics, the longer the strokes of the pumps will be and the greater the volume of water fed, but as the eccentricity is decreased by moving the adjusting eccentrics the pumps move slower in proportion until they stop entirely when the eccentrics are adjusted to a concentric position on the shaft B, with the latter passing exactly through their centers.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of an operating shaft, an adjusting eccentric loosely mounted thereon, an operating eccentric mounted on said adjusting eccentric and adapted to have its eccentricity increased or decreased by said adjusting eccentric, means for operating said adjusting eccentric and positively locking it to the shaft, and means connecting the operating eccentric with the shaft so that it revolves therewith but can move radially therefrom but independent of the same, substantially as described.

2. In a feed water mechanism, the combination of an operating shaft one or more adjustable eccentrics loosely mounted thereon, operating eccentrics mounted on said adjusting eccentrics and adapted to have their eccentricity increased or decreased by said adjusting eccentrics, means for operating said adjusting eccentrics and positively locking them to the shaft, means connecting the operating eccentrics with the shaft so that they revolve therewith, but can move radially therefrom but independent of the same, and water feeding devices connected to said eccentrics and operated thereby, substantially as described.

3. The combination of an operating shaft,

adjusting eccentrics loosely mounted on the same, operating eccentrics mounted on said adjusting eccentrics and connected to the shaft to revolve therewith, but be capable of radial movement thereon, gearing for operating said adjusting eccentrics, and devices mounted on the shaft for positively locking said gearing to the same, substantially as described.

4. The combination of a hollow operating shaft, adjusting eccentrics loosely mounted on the same, operating eccentrics mounted on said adjusting eccentrics and connected to the shaft to revolve therewith, but be capable of radial movement thereon, a rotatable rod loosely mounted in said shaft, devices for operating said rod and locking it to said shaft, and gearing for imparting the motion of said rod to said adjusting eccentrics, substantially as described.

5. The combination of a hollow operating shaft, adjusting eccentrics loosely mounted upon the same and provided with annular racks concentric with the shaft, gears mounted on the shaft and engaging said racks, a rotatable rod on said shaft for operating said gears, means for locking said rod to said shaft, operating eccentrics mounted on said adjusting eccentrics and means for connecting said operating eccentrics with the shaft so as to revolve therewith but be capable of vertical movement thereon, substantially as described.

6. In a feed water pumping mechanism, the combination of an operating shaft having radial slotted arms, adjusting eccentrics loosely mounted on said shaft, means for operating said eccentrics and locking them in the adjusted position, operating eccentrics mounted on said adjusting eccentrics, and having pins engaging said slotted arms, straps about said eccentrics and feed water pumps connected to and operated by said straps, substantially as described.

7. The combination with a hollow shaft, adjusting eccentrics mounted on the same and provided with annular racks concentric with the shaft, gears mounted on the shaft and respectively engaging said racks, a rotatable rod in said shaft for operating said gears, devices for operating said rod, means for locking said rod to said shaft at will, and operating eccentrics mounted on said adjusting eccentrics but connected to the shaft so as to revolve therewith, substantially as described.

8. The combination of an operating shaft having radial slotted arms, adjusting eccentrics loosely mounted on said shaft, means for operating said eccentrics, and operating eccentrics mounted on said adjusting eccentrics and provided with pins which engage said slotted arms, substantially as described.

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

MEREDITH LEITCH.

Witnesses:
HENRY H. CLARKE,
HARRY CAUSTON.