(No Model.) 2 Sheets—Sheet 1.

M. O. REEVES & E. K. HOOD.

VARIABLE SPEED COUNTERSHAFT.

No. 588,354. Patented Aug. 17, 1897.

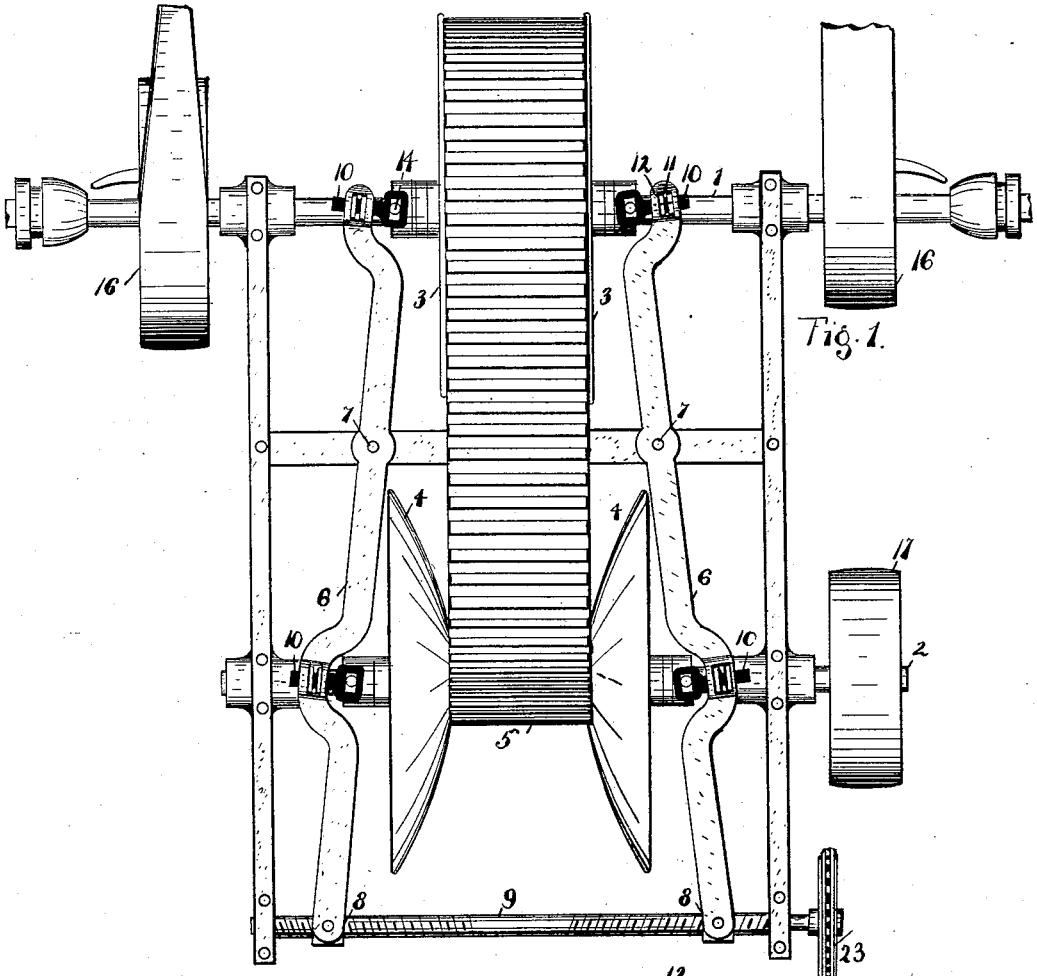

Fig. 1.

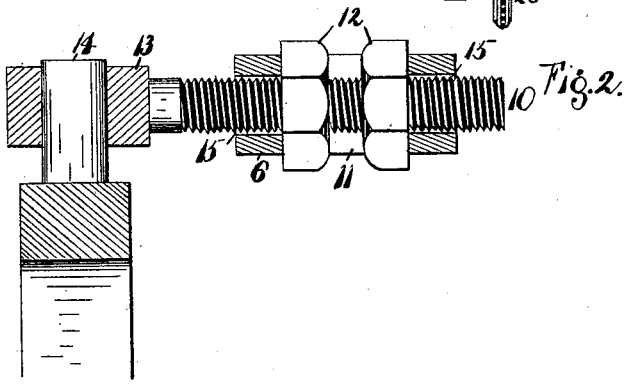

Fig. 2.

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Katharine High

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By Attorney Ernest K Hood.

(No Model.) 2 Sheets—Sheet 2.

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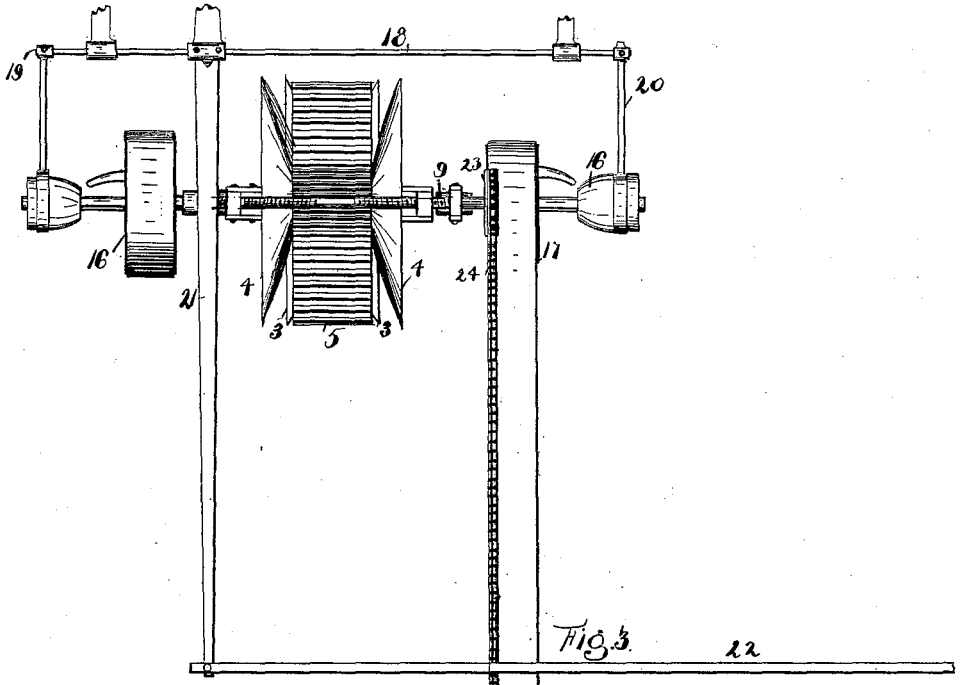

Fig. 3.

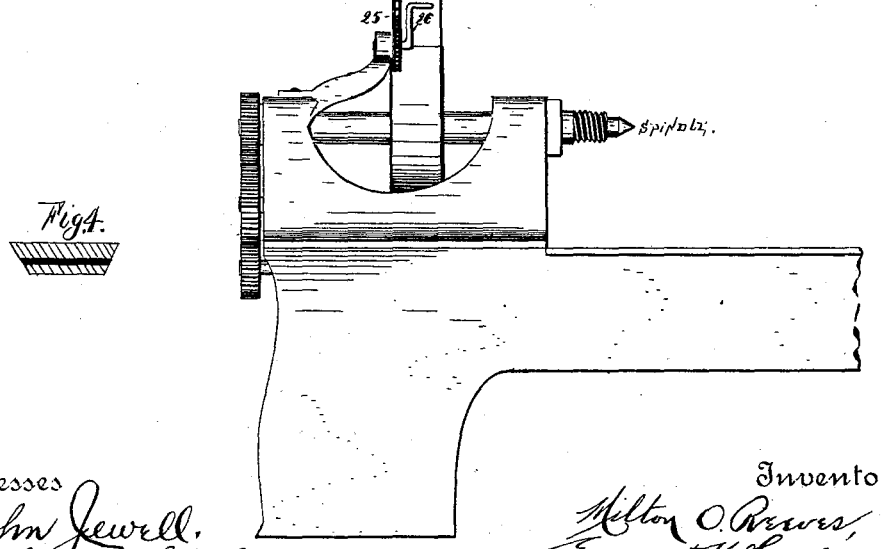

Fig. 4.

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UNITED STATES PATENT OFFICE.

MILTON O. REEVES AND ERNEST K. HOOD, OF COLUMBUS, INDIANA, ASSIGNORS TO THE REEVES PULLEY COMPANY, OF SAME PLACE.

VARIABLE-SPEED COUNTER-SHAFT.

SPECIFICATION forming part of Letters Patent No. 588,354, dated August 17, 1897.

Application filed March 25, 1897. Serial No. 629,160. (No model.)

To all whom it may concern:

Be it known that we, MILTON O. REEVES and ERNEST K. HOOD, citizens of the United States, residing at Columbus, in the county of Bartholomew and State of Indiana, have invented certain new and useful Improvements in Variable-Speed Counter-Shafts, of which the following is a specification.

The object of our invention is to provide a variable-speed counter-shaft which will be simple in construction, compact, and efficient; a device having a wide range between maximum and minimum speed; a device in which the speed may be varied to a minute degree without stopping the machine, and a device in which the parts may be adjusted for wear, shrinkage, or stretching of the transmitting-belt.

Our invention consists in a combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a plan of our device; Fig. 2, a detailed section of the belt-tightening arrangement; Fig. 3, a diagrammatic elevation of our device belted to an ordinary lathe, and Fig. 4 a cross-section of the belt.

Mounted in a suitable frame are two parallel shafts 1 and 2, preferably spaced about eighteen inches apart and each carrying a pair of longitudinally-adjustable cone-shaped disks 3 and 4, respectively, each provided with oblate spheroid driving-faces. Stretched between the pairs of disks is a beveled-edged driving-belt 5. Corresponding disks of each pair have heretofore been connected by levers pivoted half-way between the shafts, as shown in the drawings. This method of construction is shown in the application of M. O. Reeves, one of the inventors herein, filed October 12, 1896, Serial No. 608,552, for improvement in speed-varying mechanism. In this type of machine difficulty has been found in lacing a belt tight enough to work efficiently upon the disks, and even if laced tight enough when the device was set up the lacing would stretch or pull out and some difficulty encountered.

In our present arrangement we have shown a construction which enables the use of a continuous driving-belt having no laced joint. The levers 6, which connect the corresponding disks of each pair, are provided with slots 11, adjacent to hubs of the disks 3 and 4. Passing transversely through openings 15 in the levers and at right angles to slots 11 are screw-studs 10, having enlarged slotted ends 13, adapted to engage the ends of thrust-collars 14, contacting with the disk-hubs. Carried by screws 10 and within slots 11 are two threaded nuts 12, adapted to jam against opposite sides of the slot and lock the stud to the lever. In placing the belt upon the disks two of the disks are removed from the shaft. The belt is then slipped over the shafts and the disks replaced in their proper position. Nuts 12 are then adjusted so as to move the pairs of disks toward each other until the belt is of the proper tension. It will be understood that for thus tightening the belt it is only necessary to have the stud-screws upon the ends of the levers, so as to adjust but one pair of disks.

We have found that by using nuts upon both thrust-collars—that is, the thrust-collars for both pairs of disks—it is an easy matter to get the disks in the exact relation necessary to obtain best results—that is, the belt can be adjusted to occupy the largest driving diameter upon one pair of disks and the other disks may then be adjusted so that the belt occupies the smallest driving diameter of them.

Secured to shaft 1 upon opposite sides of the frame are two clutch-pulleys 16, belted to the main driving-shaft. One of the clutches is for direct and the other for reverse driving. The engaging sleeves of the clutches are yoked to a shifter-rod 18 by means of strap-yokes 19 and 20. A shifter-lever 21 is secured to shifting-rod 18 and is connected with a horizontal shift 22, located conveniently to the machine-operator. By throwing shift 22 in one direction one clutch engages shaft 1 and the machine is driven in one direction, and by throwing the shift in the opposite direction the other clutch is engaged and the machine is reversed.

We have shown a preferred arrangement for operating levers 6, consisting of a right and left hand threaded shaft 9, carrying nuts 8, engaging with levers 6. A sprocket 23 is

mounted on the end of screw-shaft 9 and a sprocket-chain 24 passes around the sprocket 25 adjacent the operator, provided with an operating-handle 26. It will be seen that by the above arrangement the forward and reverse movement of the machine and the variation of speed is entirely within the control of the operator and is conveniently located. The device is adapted to take the place of the ordinary cone counter-shaft and spindle-cone.

Our improved counter-shaft occupies less space than the ordinary cone counter-shaft and considerably reduces the weight of overhead machinery common to all shops.

We claim as our invention—

1. In a speed-varying mechanism, the combination of a frame, two parallel shafts mounted therein, a pair of cone-shaped driving elements splined to each shaft, a belt connecting the pairs, levers pivoted between the shafts and adjacent to the corresponding driving elements of each pair, and a transversely-adjustable connection between one or more of the levers and its corresponding driving element, substantially as and for the purpose set forth.

2. In a variable-speed counter-shaft, the combination of a frame, two parallel shafts mounted therein, a pair of cone-shaped driving elements, splined to each shaft, a belt connecting the pairs, levers pivoted between the shafts, and adjacent to the corresponding driving elements of each pair, threaded studs carried by the lever and engaging with thrust-collars contacting with the hubs of the driving elements, and means for adjusting the studs transversely relatively to the lever, substantially as and for the purpose set forth.

3. In a variable-speed counter-shaft, the combination of a frame, two parallel shafts mounted therein, a pair of cone-shaped driving elements splined to each shaft, a belt connecting the pairs, levers pivoted between the shafts and adjacent to the corresponding driving elements of each pair, threaded studs carried by the levers, and engaging with thrust-collars contacting with the hubs of the driving elements and lock-nuts, mounted on the studs and adapted to jam against the levers, substantially as and for the purpose set forth.

4. In a variable-speed counter-shaft the combination of a frame, two parallel shafts mounted therein, a pair of cone-shaped driving elements, splined to each shaft, a belt connecting the pairs, levers pivoted between the shafts, and adapted to actuate the driving elements, a direct and reverse clutch carried by one of the shafts, a shifter adapted to actuate either clutch and a pulley secured to the other shaft and adapted to carry a belt connecting with a machine to be operated, substantially as and for the purpose set forth.

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