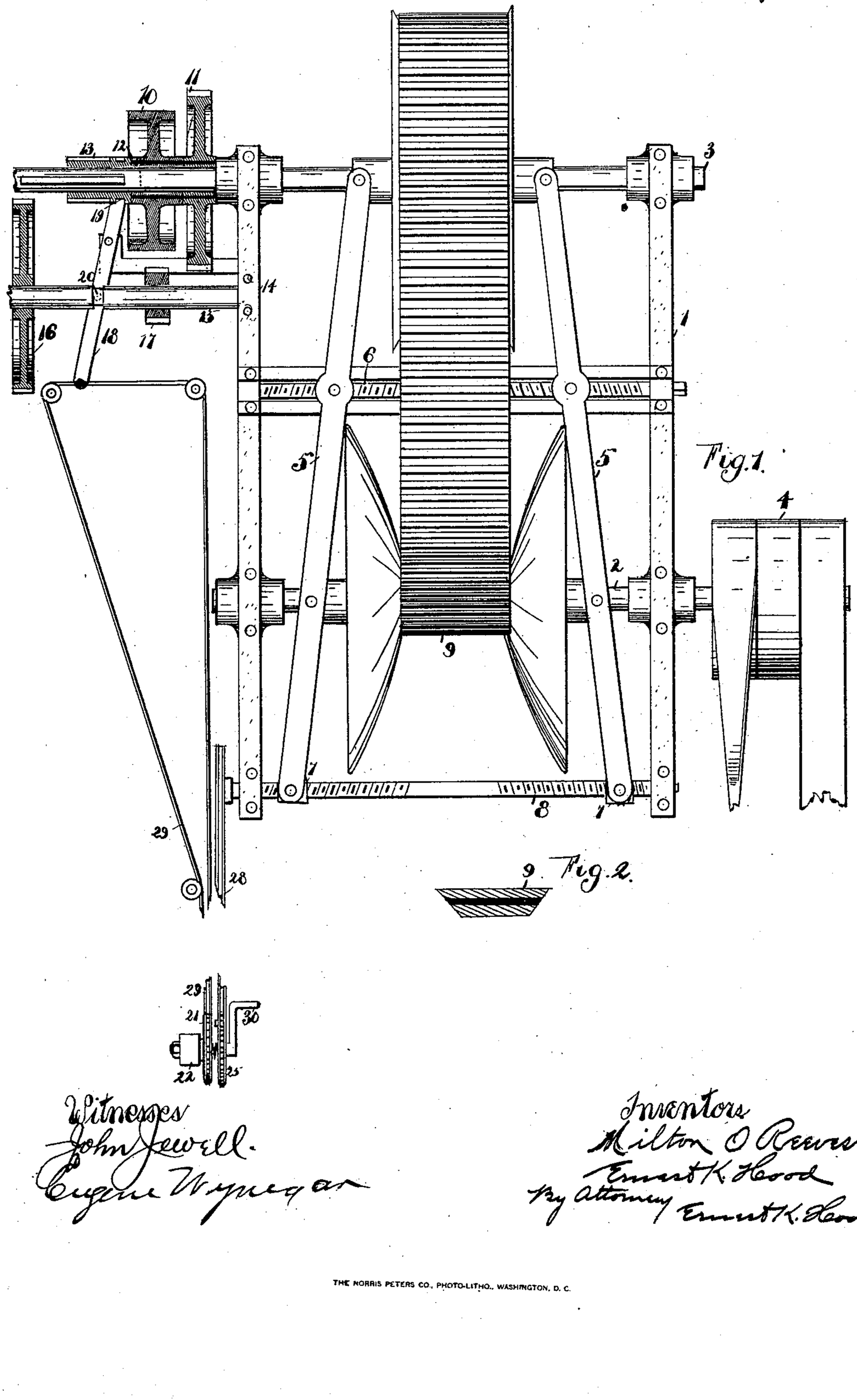
(No Model.) 3 Sheets—Sheet 1.

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

SPEED VARYING MECHANISM.

No. 587,403. Patented Aug. 3, 1897.



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(No Model.) 3 Sheets—Sheet 2.

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

SPEED VARYING MECHANISM.

No. 587,403. Patented Aug. 3, 1897.

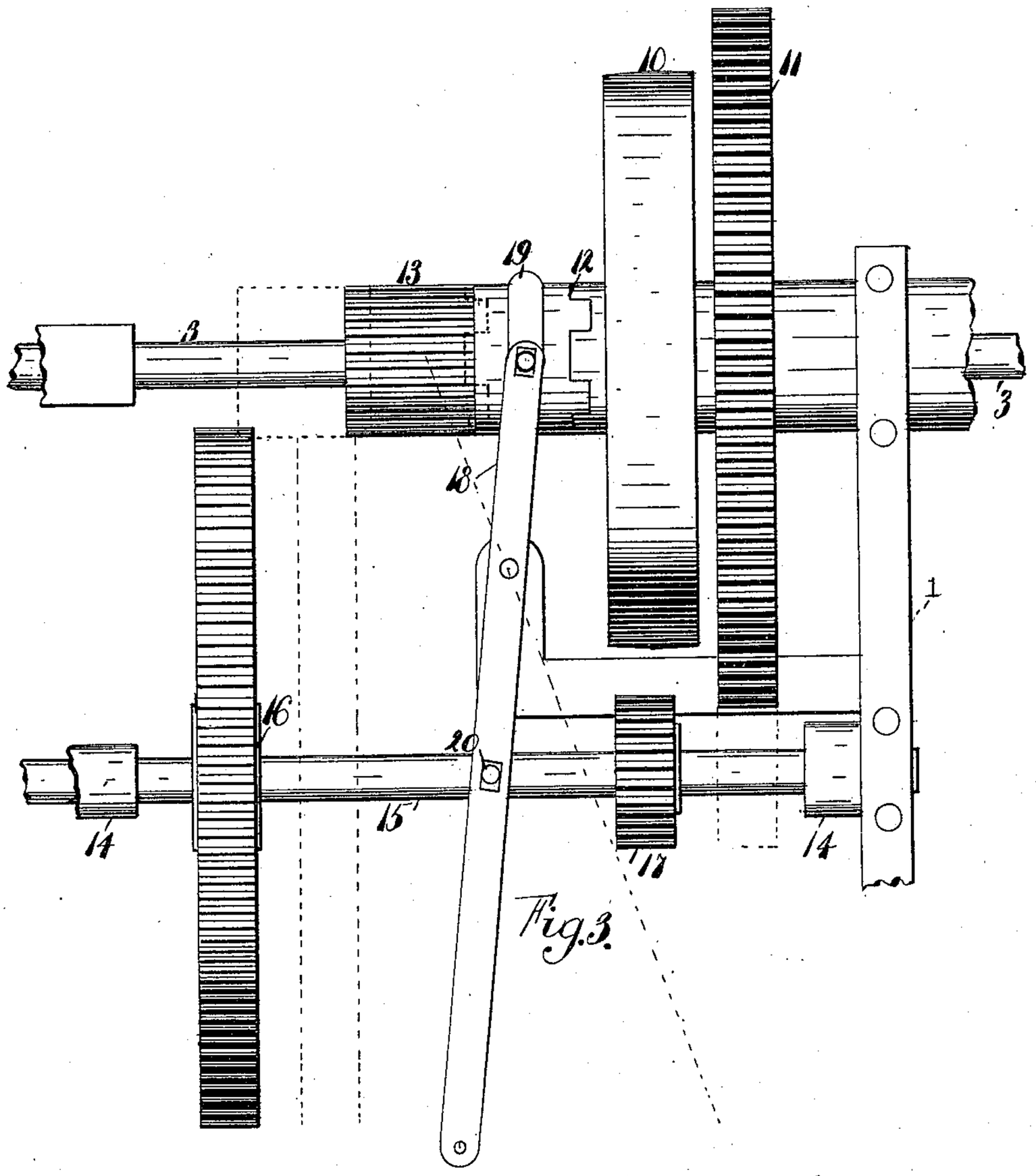

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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

SPEED VARYING MECHANISM.

No. 587,403. Patented Aug. 3, 1897.

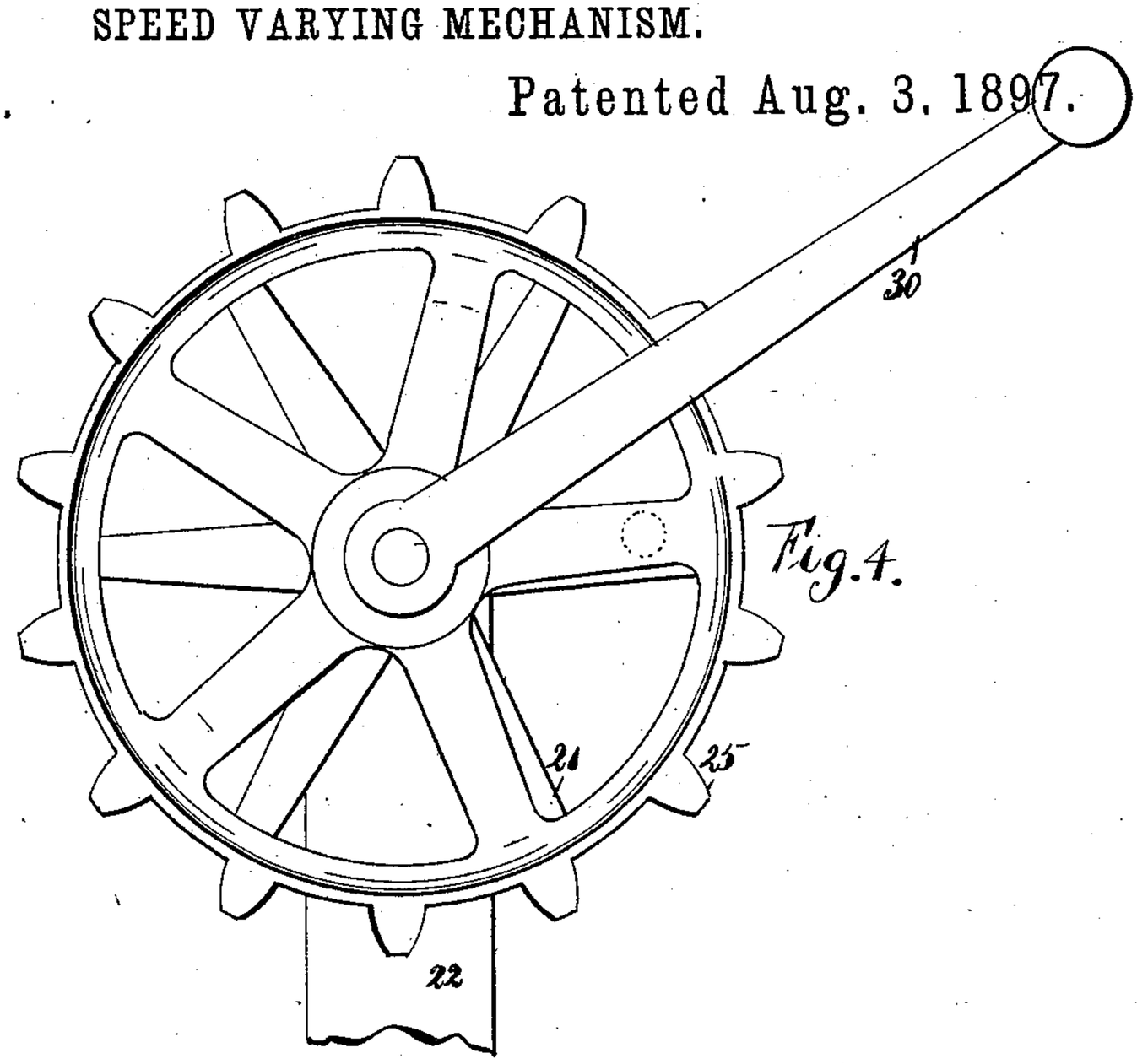

Fig. 4.

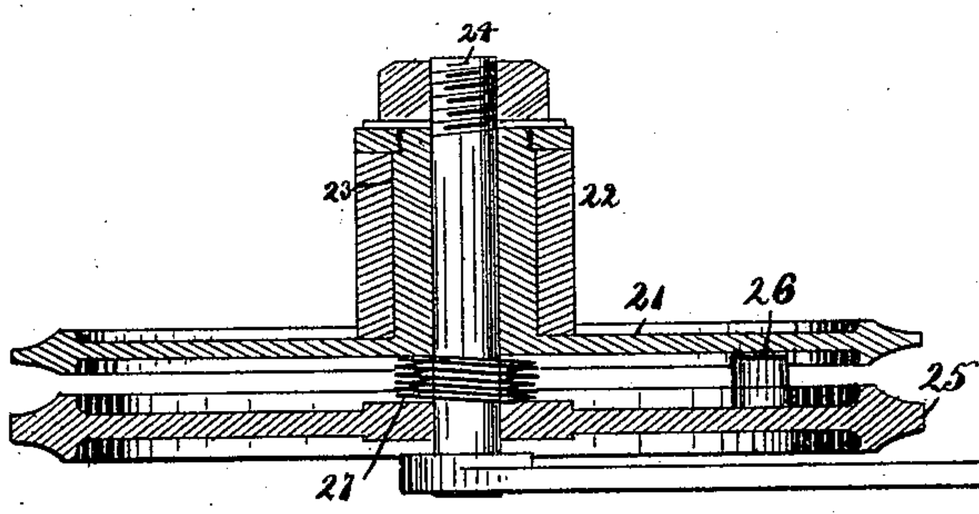

Fig. 5.

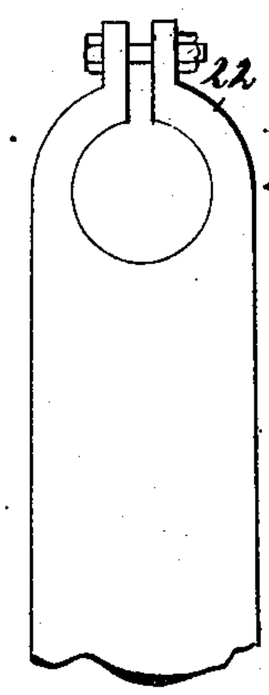

Fig. 6.

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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.

SPEED-VARYING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 587,403, dated August 3, 1897.

Application filed March 25, 1897. Serial No. 629,159. (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 of America, residing in the city of Columbus, in the county of Bartholomew and State of Indiana, have invented certain new and useful Improvements in Speed-Varying Mechanism, of which the following is a specification.

The object of our invention is to provide mechanism for varying the speed between an initial driving mechanism and driven mechanism, to provide a device having a wide range between maximum and minimum speed, a device adapted to vary the speed to a minute degree without stopping the machine at any time, and a device adapted to reduce the speed of the driven device to a fraction of a revolution per minute.

A further object of our invention is to provide means for actuating an initial and supplemental speed-varying device which will be simple in construction and efficient; and our invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a plan of our device; Fig. 2, an end section of the belt; Fig. 3, an enlarged detail of the supplemental speed-varying arrangement; Fig. 4, an enlarged elevation of the operating device; Fig. 5, a sectional plan of the same, and Fig. 6 a detail of the supporting-post for the operating device.

The numeral 1 represents a frame carrying two parallel shafts 2 and 3, the former being the driving and the latter the driven shaft. Mounted on the end of shaft 2 is an ordinary tight and loose pulley 4, carrying a straight and crossed belt for direct and reverse driving. Splined to shaft 2, within the frame, is a pair of cone-shaped disks provided with oblate spheroid driving-faces. Splined to shaft 3 is a second pair of cone-shaped disks of like construction and having similar driving-faces. Levers 5, pivoted halfway between the shafts, connect the individual members of each pair of disks, so that as one pair move apart the other pair move together simultaneously therewith. A screw-shaft 6 is adapted to move the lever-pivots transversely across the frame toward or away from each other. The levers 5 are extended at one end and engage with nuts 7, carried by a right and left hand threaded shaft 8, adapted to move the levers simultaneously toward or away from each other. Stretched between the pairs of disks is a beveled edged driving-belt 9. Power applied to shaft 2 will be transmitted through belt 9 to shaft 3, and by moving one pair of driving-disks apart and the other pair together the belt works upon different relative diameters and the speed of the driven shaft is varied to any desired degree.

It has been found in practice with an initial speed equal to that of standard line-shafting that very slow speeds of the driving-shaft were only attainable by using very large driving-disks to obtain sufficient difference between the relative diameters upon which the belt worked. These large disks occupied considerable space and were difficult to make. For the purpose of obtaining these very low speeds without abnormally large driving-disks we provide the following mechanism: Loosely mounted on the shaft 3 is a pulley 10, having secured thereto a gear 11. The pulley and gear are adapted to rotate on the shaft, but are held against longitudinal movement by any well-known means. The outer end of the hub of pulley 10 is provided with one member of a jaw-clutch 12. Splined to shaft 3 is the other member of clutch 12. Carried by this latter member is a gear 13. Mounted in bearings 14 is a sliding countershaft 15, carrying a gear 16, adapted to engage with gear 13, and a gear 17, adapted to engage with gear 11. A lever 18, pivoted half-way between the shafts, engages with a yoke 19, carried by the sliding part of clutch 12, and with a collar 20, carried by shaft 15. It will be seen that when the clutch is locked the pulley 10 will be driving direct with shaft 3. The gears are so located relatively to each other that when lever 18 is moved the clutch first disengages from pulley 10, then the gears 16 and 13 and 17 and 11 respectively are thrown into mesh, and power applied to shaft 3 is transmitted through the gears to pulley 10, thereby reducing the speed. These gears may be sized so that when the belt is working on the smallest diameter of the driving-disks carried by shaft 3—that is, ordinarily, the fastest speed—and the gearing is in engagement the speed of pulley 10 will be a

little below the slowest speed of shaft 3 when working direct, and by operating the driving-disks the speed may be lowered to a fraction of a revolution per minute.

In some machines it is desired to utilize more power than the traction of an ordinary belt will allow, and by substituting a gear or sprocket for pulley 10 the ordinary back gearing of any machine provided for this purpose may be entirely done away with and sufficient traction obtained for operating the machine which is to be driven.

We have shown a preferred form of mechanism for operating the device, consisting of a sprocket-wheel 21, mounted in an adjustable clamp-bearing 22 and having an opening 23 extending longitudinally through the hub. Passing through this opening is a spindle 24, carrying a sprocket 25 adjacent to sprocket 21. The sprockets are adapted to operate normally independently of each other, but may be actuated concurrently by moving sprocket 25 longitudinally in the direction of sprocket 21 until a pin 26 engages with sprocket 21. A spring 27 normally holds the sprockets apart. A chain 28 passes around sprockets 25 and a sprocket carried by screw-shaft 8, and a chain 29 passes around sprocket 21 and is connected with and adapted to actuate lever 18. It will be seen that the disks may be actuated by revolving the hand-lever 30, and by moving the same laterally and revolving it the lever which actuates the gearing and the clutch will be operated. The hand-lever may then be allowed to return to its normal position and the disks operated while the gearing remains in mesh. To disengage the gearing and reëngage the clutch, the reverse operation is gone through with.

It will be understood that various methods of constructing the operating device are within the scope of our invention.

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; a supplemental speed-varying mechanism connected with one shaft; means for moving the members of one pair of driving elements together, and the others apart concurrently, and means for engaging or disengaging the supplemental mechanism, substantially as and for the purpose set forth.

2. 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; a supplemental speed-varying mechanism connected with one shaft; means for moving the members of one pair of driving elements together, and the other pair apart concurrently, and means for engaging or disengaging the supplemental mechanism controlled by the means for actuating the disks, substantially as and for the purpose set forth.

3. 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; a pulley loosely mounted on one shaft; a clutch splined to the shaft adapted to engage or disengage with the pulley; a gear carried by the clutch; a gear carried by the pulley; intermediate gears adapted to connect the aforesaid gears; means for disengaging the clutch and engaging the gears successively or vice versa, and means for moving the members of each pair of driving elements concurrently but in opposite directions, substantially as and for the purpose set forth.

4. In a speed-varying mechanism the combination of a frame, two paraliel shafts mounted therein, a pair of cone-shaped driving elements splined to each shaft; a belt connecting the pairs; a pulley loosely mounted on one shaft; a clutch splined to the shaft, and adapted to engage or disengage with the pulley; a gear carried by the clutch; a gear carried by the pulley; a lever yoked to the clutch and adapted to slide it longitudinally; intermediate gears adapted to slide in mesh with the clutch and pulley gears and controlled by the lever, and means for actuating the driving elements concurrently in opposite directions, substantially as and for the purpose set forth.

5. In a speed-varying mechanism of the class described the combination of an initial and supplemental speed-varying mechanism an actuating-sprocket supported in a bearing and provided with a hollow hub; a spindle taking through the hub, carrying a second sprocket and adapted to slide longitudinally; a pin carried by one disk and adapted to engage with the other and means for normally holding the sprockets apart, substantially as and for the purpose set forth.

6. 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; a pulley loosely mounted on one shaft; a clutch adapted to engage or disengage the pulley with the shaft, intermediate gearing adapted to engage with the pulley and shaft when the pulley is disengaged from direct connection with the shaft; a lever connected with the clutch, an intermediate gearing and adapted to actuate them successively; a sprocket adapted to actuate the disks concurrently in opposite directions; a sprocket adjacent thereto and adapted to actuate the lever, and means for engaging or disengaging the sprockets, substantially as and for the purpose set forth.

MILTON O. REEVES.
ERNEST K. HOOD.

Witnesses:
EUGENE WYNEGAR,
JOHN JEWELL.

Correction in Letters Patent No. 587,403.

It is hereby certified that in Letters Patent No. 587,403, granted August 3, 1897, upon the application of Milton O. Reeves and Ernest K. Hood, of Columbus, Indiana, for an improvement in "Speed-Varying Mechanism," an error appears in the printed specification requiring correction, as follows: In line 121, page 2, the word "an" should read *and;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 24th day of August, A. D. 1897.

[SEAL.]

WEBSTER DAVIS,
Assistant Secretary of the Interior.

Countersigned:

A. P. GREELEY,
Acting Commissioner of Patents.