No. 666,438. Patented Jan. 22, 1901.

G. L. REENSTIERNA.

SPEED VARYING DEVICE.

(No Model.) (Application filed Oct. 16, 1899.)

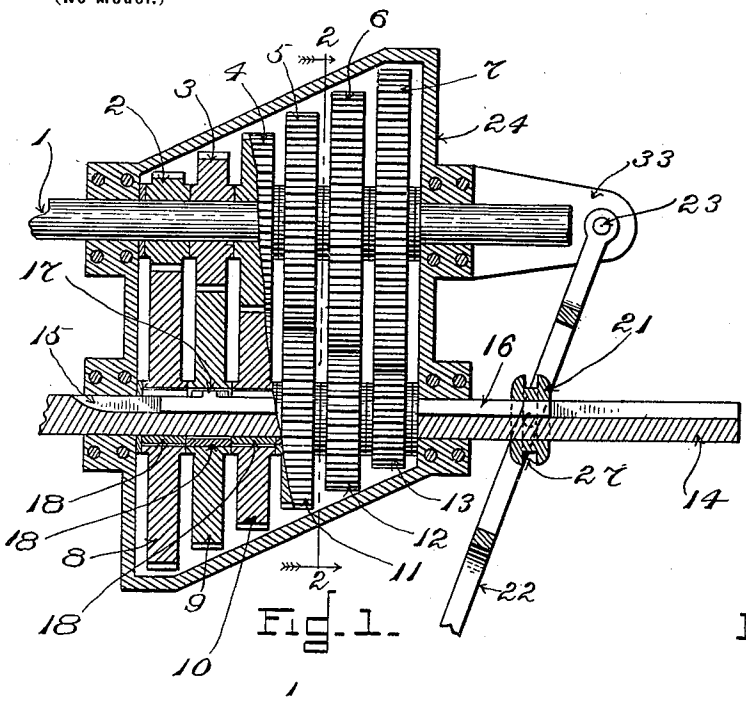


Fig. 1.

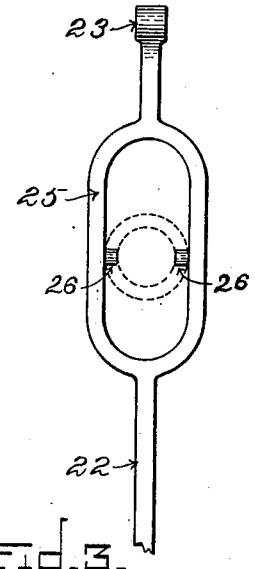


Fig. 3.

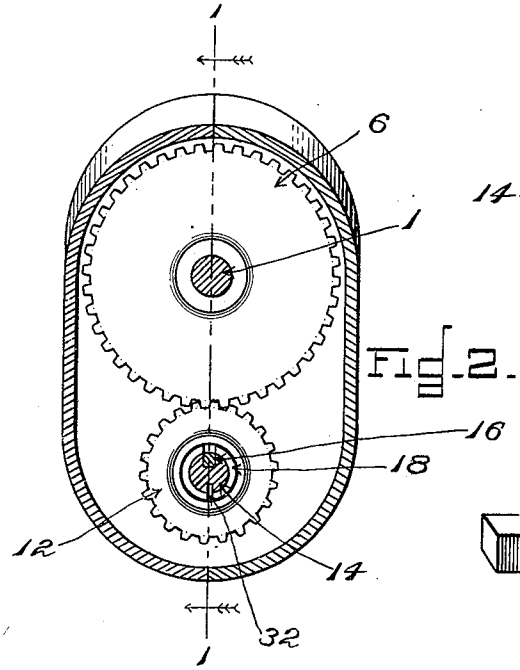


Fig. 2.

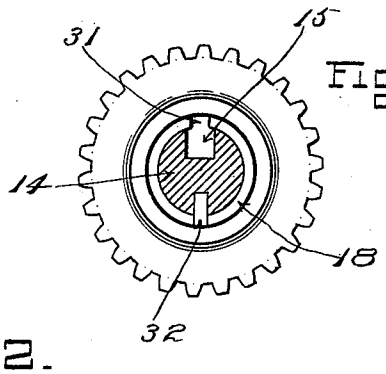


Fig. 4.

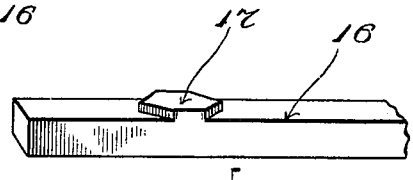


Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

GUSTAF L. REENSTIERNA, OF WINCHESTER, MASSACHUSETTS.

SPEED-VARYING DEVICE.

SPECIFICATION forming part of Letters Patent No. 666,438, dated January 22, 1901.

Application filed October 16, 1899. Serial No. 733,711. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF L. REENSTIERNA, a citizen of the United States, residing at Winchester, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Speed-Varying Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to mechanism for varying the speed of a driven shaft without varying the speed of the driving-shaft; and the object of my invention is to accomplish this result by providing the driving-shaft with a series of wheels fast thereon, providing the driven shaft with a set of wheels loose thereon corresponding in inverted order with the size of the driving-wheels, and means for keying any one of the driven wheels at pleasure with the driven shaft.

My invention will now be fully described and the novel features particularly pointed out in the claims.

In the drawings, Figure 1 is a sectional elevation on the plane indicated by the line 1 1, Fig. 2. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a detail of the operating-lever. Fig. 4 is a cross-section of the driven shaft, showing in side elevation one of the driven wheels and its split ring. Fig. 5 is a detail view of the sliding expander by which the loose wheels may be keyed to the shaft.

The driving-shaft 1 has the set of wheels 2 3 4 5 6 7 of varying sizes mounted fast thereon, so as to turn at all times with the shaft and which mesh with the wheels 8 9 10 11 12 13 of corresponding size, but in inverted order of arrangement, so that the largest wheel of one set will mesh with the smallest wheel of the other set. The second set of wheels are so mounted on a series of split rings 18 on the shaft 14 that they all revolve loosely thereon, except one at a time, which gives rotation to the shaft 14. A shiftable locking device is provided, which may be moved to lock any one of the loose wheels to the shaft 14, according to the speed desired, as will now be fully described.

According to the preferred form of construction the shaft 14 is formed with a longitudinal groove 15, in which slides the bar 16, the said bar having thereon the raised portion 17, wedge-shaped at its opposite ends or otherwise shaped, so as to engage with the split ring and expand it. Mounted on the shaft 14 are a series of split rings 18, one for each gear on shaft 14. The rings are preferably fixed to the shaft by pins 32 and so set that the split 31 in each of the rings will be in alinement with the groove 15, the split being normally a little narrower than the groove. A grooved collar 21 is mounted loosely on the shaft 14, but fast to bar 16, so that said collar will revolve with the shaft 14 and may slide thereon longitudinally. A lever 22, pivoted at 23 to the arm 33, projecting from the casing 24, is formed with a yoke 25, which includes between its branches the collar 21. Pins 26, provided, preferably, with rolls, extend from the branches of the yoke into the groove 27 of collar 21, so that by moving the lever 22 the collar 21 will be moved longitudinally on the shaft 14 and slide the bar 16 in its groove 15. By sliding the bar so as to cause the expander 17 to enter the space 31 between the ends of one of the rings 18 the ring will be spread so as to come into frictional contact with the hub of the wheel and cause the shaft 14 to revolve with speed corresponding to the speed of that wheel, all the rest of that set of wheels being then mere idlers. When it is desired to change the speed, the handle of lever 22 is grasped and pushed one way or the other to bring the expander 17 into engagement with the ring belonging to the gear, which will give the desired speed. Fig. 2 shows the expander 17 wedged into the ring, thus locking the wheel and shaft together.

The device is very simple and quickly manipulated, and the shift may be made without stopping the machine.

It will be obvious that the invention is equally applicable if friction-wheels be employed instead of gear-wheels.

What I claim is—

1. A variable-speed mechanism comprising a shaft and a series of different-sized wheels fixed thereon, a second shaft, a series of split rings on said second shaft, a set of wheels of different sizes normally loose on said shaft, and in driving engagement with the first-mentioned wheels, a sliding expansion device on said second shaft and mechanism for mov-

ing the same lengthwise of the shaft from one split ring to another whereby any required one of the split rings may be expanded by the said expansion device and its wheel keyed to the second shaft, substantially as described.

2. A variable-speed mechanism, comprising a shaft and a series of different-sized wheels fixed thereon, a second shaft having a longitudinal groove therein, a bar in said groove provided with an expander, a series of split rings mounted on said second shaft whose openings aline with the said groove, a series of wheels of different sizes mounted loosely on said rings, and mechanism by which said bar may be moved so as to cause said expander to spread any one of the rings desired, and thereby lock its gear to the second shaft, substantially as described.

3. A variable-speed mechanism comprising a shaft and a series of different-sized wheels fixed thereon, a second shaft having a longitudinal groove therein, a bar which slides in said groove and which has an expander thereon wedge-shaped at its ends, a series of split rings mounted on said second shaft whose openings aline with said groove, a series of wheels of different sizes mounted loosely on said rings, a collar mounted on said shaft so as to slide longitudinally thereon and made fast to said bar and a shifting-lever which engages with said collar whereby the bar may be moved in the groove and cause said expander to spread any one of the rings desired and lock its wheel to the second shaft, substantially as described.

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

GUSTAF L. REENSTIERNA.

Witnesses:

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ALICE H. MORRISON.