(No Model.)

J. F. MULLANEY.

SPEED REGULATING MACHINE.

No. 368,302. Patented Aug. 16, 1887.

Fig. 2.

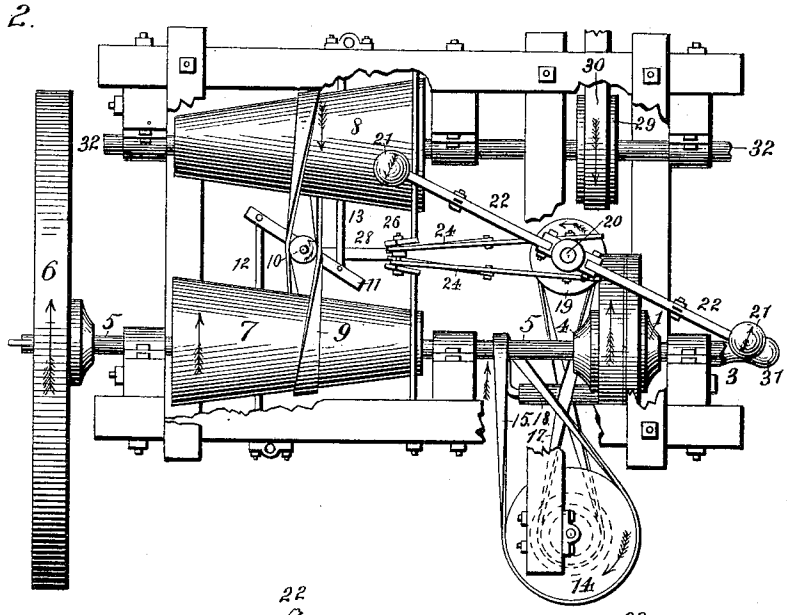
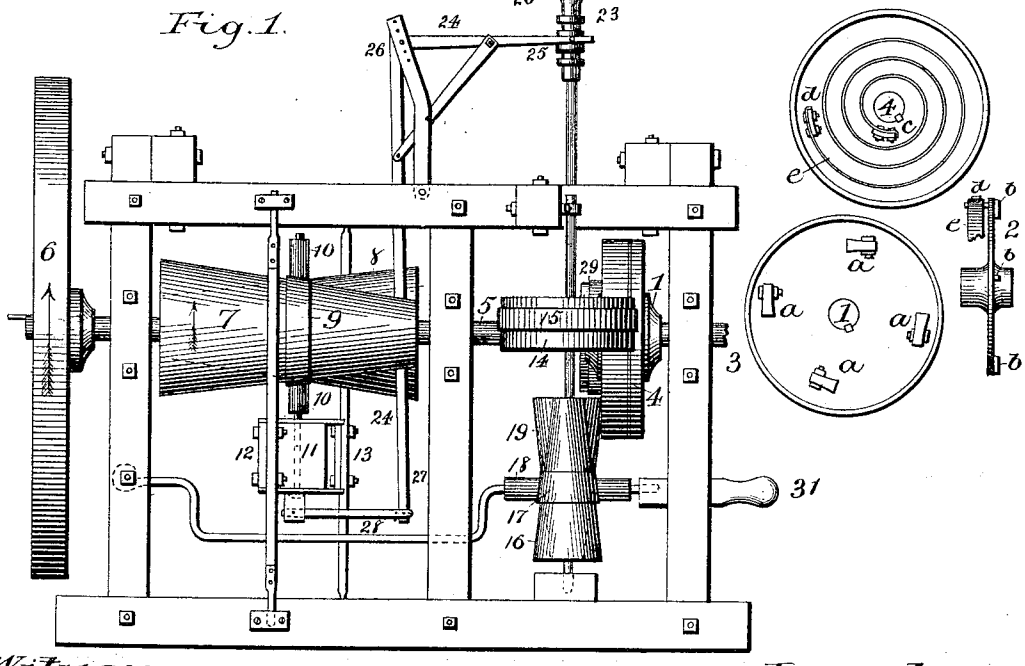


Fig. 3.

Fig. 1.



Witnesses:

C. Bray

E. G. Bray

Inventor:

John Francis Mullaney

UNITED STATES PATENT OFFICE.

JOHN FRANCIS MULLANEY, OF PLAINVILLE, KANSAS.

SPEED-REGULATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 368,302, dated August 16, 1887.

Application filed October 23, 1884. Serial No. 146,342. (No model.)

To all whom it may concern:

Be it known that I, JOHN FRANCIS MULLANEY, a citizen of the United States, residing at Plainville, in the county of Rooks and State of Kansas, have invented a new and useful Speed-Regulating Machine, of which the following is a specification.

My invention relates to machinery where a steady, regular, or nearly uniform speed or motion is desired, and where the original or motive power is not so regular or uniform as required or desired; and the objects of my invention are, first, to obtain from an irregular motive power of an ununiform motion a uniform and regular motion, and conduct the latter to the machinery which it is required to be turned or operated thereby; second, when there is an excess of power, to hold the same in reserve, to be expended as needed to keep up the required motion.

My invention is especially applicable for manufacturing machinery when driven by wind-power, but is intended for any power to which it is desirable to connect it.

I attain the above objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical front view of the entire machine, (except the head of and a part of the arms of the governor.) Fig. 2 is a top view of the machine as it appears entire, with some parts of the frame broken off to admit of a better view of the parts beneath. Fig. 3 is an exposed view of the three separated parts of the spring-and-ratchet coupling.

Similar numbers and letters refer to similar parts of the machine throughout the entire description of the several views.

In Fig. 3, 1 illustrates a part of spring-and-ratchet coupling, composed of a dish-shaped disk of cast metal, and containing four ratchet-pawls, *a a a a*, which catch on and engage four corresponding projections at *b b b* in ratchet-wheel 2. Disk 1 is attached by a key (or otherwise) to the power-shaft 3, and turns ratchet-wheel 2 by means of the ratchet-catches described above. The ratchet-wheel 2 is about two inches less in diameter than disks 1 and 4, and serves to connect them. It is attached to disk 4 by means of a coil-spring, (shown in drawings of disk 4,) one end of which is fastened to disk 4 at *c*, and the other end to ratchet-wheel 2 at *d*. Ratchet-wheel 2 has a long hub, which turns freely over the ends (not shown) where the two shafts 3 and 5 meet, and assists in keeping them on the same line.

Attached to the left side of the periphery of disk 1 is a broad annular flange, the edge of which passes beneath the edge of a similar flange attached to the right side of disk 4, and these two flanges and their respective disks form a sort of casing for the spring-and-ratchet coupling and for concealing ratchet-wheel 2.

The horizontal power-shafts 3 and 5 are separate pieces, which meet in the thimble or sleeve-like hub of ratchet-wheel 2, and are connected in motion by the three parts of the spring-and-ratchet coupling by means of keys in the hubs of disks 1 and 4. When the speed of disk 1 slackens more than can be compensated by the spring *e*, the power reserved in the fly-wheel 6 will tend to carry the machinery on shaft 5, which will be then disconnected from the power-shaft 3 by means of the ratchet-pawls *a a a a*, which will slip back on ratchet-wheel 2 without materially retarding the motion of shaft 5. On shaft 5 is a long cone-pulley, 7, connected to its mate or opposite cone-pulley, 8, by a cross-belt, 9.

In going from pulley 7 to pulley 8 and back the belt 9 passes on opposite sides of a vertical roller, 10, which is intended to force the belt 9 to the right or left, accordingly as the velocity increases or decreases. These cone-pulleys with the vertical roller, all connected by belt 9, substantially as set forth in the accompanying drawings, are among the chief features of my machine. When the belt 9 is moved to the right, pulley 7 may increase its number of revolutions per minute without increasing the revolutions per minute of pulley 8, and if the belt 9 is carried to the left the velocity of pulley 7 may be decreased without decreasing the velocity of pulley 8. Thus, though the velocity of pulley 7 may vary to nearly twice its usual velocity, the velocity of pulley 8 may be maintained uniform if the belt 9 be moved as described above.

The vertical roller 10 is supported on a suspended carrier, 11, which is itself supported on the two opposite squares 12 and 13, as plainly shown in Fig. 1. This carrier 11, thus

suspended, moves with the slightest possible friction, and at the same time secures to the roller 10 its proper line of direction between the two large pulleys 7 and 8.

A pulley, 14, is made to turn by the belt 15. On the same upright shaft, and turning with it, is smaller cone-pulley 16, Fig. 1, running a belt, 17, which, passing on either side of a horizontal roller, 18, turns another small cone-pulley, 19, which is the mate or opposite of pulley 16. On the same upright shaft with pulley 19, and turning with and by it, is a common centrifugal governor, 20, of which 21 21 are the centrifugal weights and 22 22 22 22 the connecting-rods and weight-rods, and 23 is the governor-slide, which is connected with the lever 24, which is a simple right-angled lever of the first class, of which 25 is the power end, 26 is the self-adjusting fulcrum, which moves automatically to the right and left to maintain a certain distance between it and the governor-slide 23, although the distance between fulcrum 26 and the upright shaft, upon which the slide 23 works, will not always be the same, but variable, and 27 is the end which moves the weight, which is the connecting-piece 28, which moves the suspended carrier 11, supporting the vertical roller 10, substantially as set forth above, and illustrated in the accompanying drawings.

It is plain that an increase in the velocity of shaft 5 increases the revolutions of pulleys 14, 16, and 19, and the speed of the weights 21 will tend to raise them, which raises the slide 23, thus raising the lever-arm 25 and moving the lever-arm 27 to the right, and drawing with it, by means of the rod 28, the carrier 11 and roller 10, thus moving the belt 9 to the right, and, though pulley 7 has increased its velocity and the fly-wheel 6 has received a greater momentum, the speed of pulley 8 has not changed, nor that of pulley 29, carrying the belt 30, which is to give the power to the machinery proper.

If the speed of pulley 29 is wished to be increased without changing the average speed of shafts 3 and 5 and pulley 7, the lever 31 is raised, by which means the horizontal roller 18 will be raised, elevating the belt 17 to a smaller surface on the cone-pulley 16 and to a larger surface on its mate, (cone-pulley 19,) and thus though the velocity of pulley 16 be the same as formerly, yet the velocity of pulley 19 will be reduced, allowing the weights 21 21 to lower the slide 23, thus forcing lever-arm 27, connecting-rod 28, carrier 11, and roller 10 to the left, carrying the belt 9 toward the larger end of pulley 7, and although pulley 7 revolves no faster than formerly, yet belt 9 goes much faster, because of the increased surface over which it must travel in the same time, and pulley 8 is caused to go still faster, because of the increased velocity of the belt 9 and the decreased size of the pulley 8 near the left end, thus increasing the number of revolutions of pulley 29 and its belt 30 and all machinery on shaft 32.

I claim as my invention and ask for Letters Patent for—

1. In a speed-regulating machine, the dish-shaped disk 1, rigidly attached to driving-shaft 3, and having ratchet-pawls *a a a a*, in combination with ratchet-wheel 2, provided with four projections, *b b b*, that engage ratchet-pawls *a a a a*, substantially as described.

2. In speed-regulating machines, the combination, with disk 1, provided with ratchet-pawls *a a a a*, and having a broad annular flange projecting from the left side of its periphery, and ratchet-wheel 2, provided with projections *b b b*, and a long sleeve-like hub working freely over the end of shafts 5 and 3, of the dish-shaped disk 4 and a large coiled spring attached to disk 4 at *c* and to ratchet-wheel 2 at *d*, substantially as described, and for the purposes set forth.

3. In a speed-regulating machine, the spring-and-ratchet coupling consisting of disks 1 and 4 and ratchet-wheel 2, and the coiled spring and ratchet-pawls, substantially as described and illustrated.

4. In a speed-regulating machine, the combination, with the two opposite cone-shaped pulleys 7 and 8, having straight inclined surfaces and mounted rigidly on shafts, of crossed belt 9, passing on either side of roller 10, and said roller 10, substantially as described.

5. In speed-regulating machines, the combination, with centrifugal governor 20, of the vertical cone-pulleys 19 and 16, connected by crossed belt 17, passing on either side of roller 18, and said roller 18, substantially as described and illustrated.

6. The connecting cross-belt 17, in combination with roller 18, vertical cone-pulleys 19 and 16, and horizontal lever 31, as described and illustrated.

7. In a speed-regulating machine, the combination of the lever 24, the centrifugal governor 20, fulcrum 26, roller-carrier 11, and squares 12 and 13, substantially as described and illustrated.

8. In speed-regulating machines, the combination of the shaft 5, the cone-pulley 7, fly-wheel 6, belt 15, and pulley 14, mounted on a vertical shaft with cone-pulley 16, all substantially as described and illustrated.

9. In speed-regulating machines, the combination, with a suitable frame, of the driving-shaft 3, provided with a driving-pulley, the shaft 5, provided with cone-pulley 7, belt 9, fly-wheel 6, and belt 15, the centrifugal governor 20, and its vertical revolving shaft carrying vertical cone-pulley 19, all substantially as described and illustrated.

JOHN FRANCIS MULLANEY.

Witnesses:
LEVI JONES,
A. M. KING.