No. 676,492. Patented June 18, 1901.

B. B. FARNHAM.

CYLINDER MOLD DRIVE.

(Application filed Mar. 6, 1901.)

(No Model.)

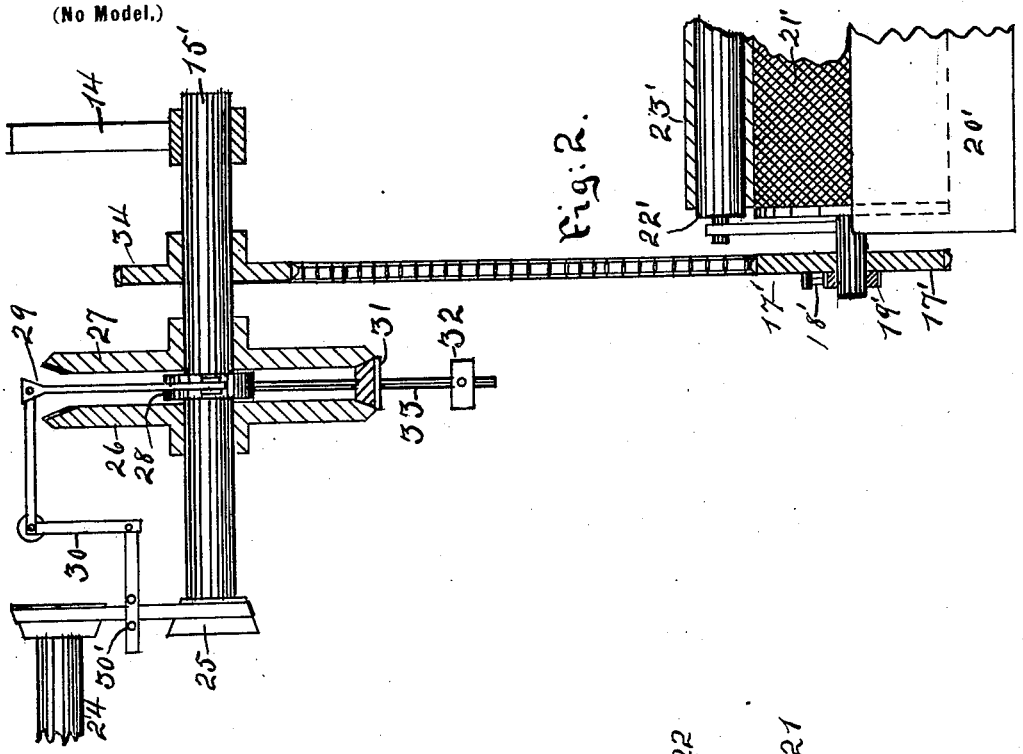

Fig. 2.

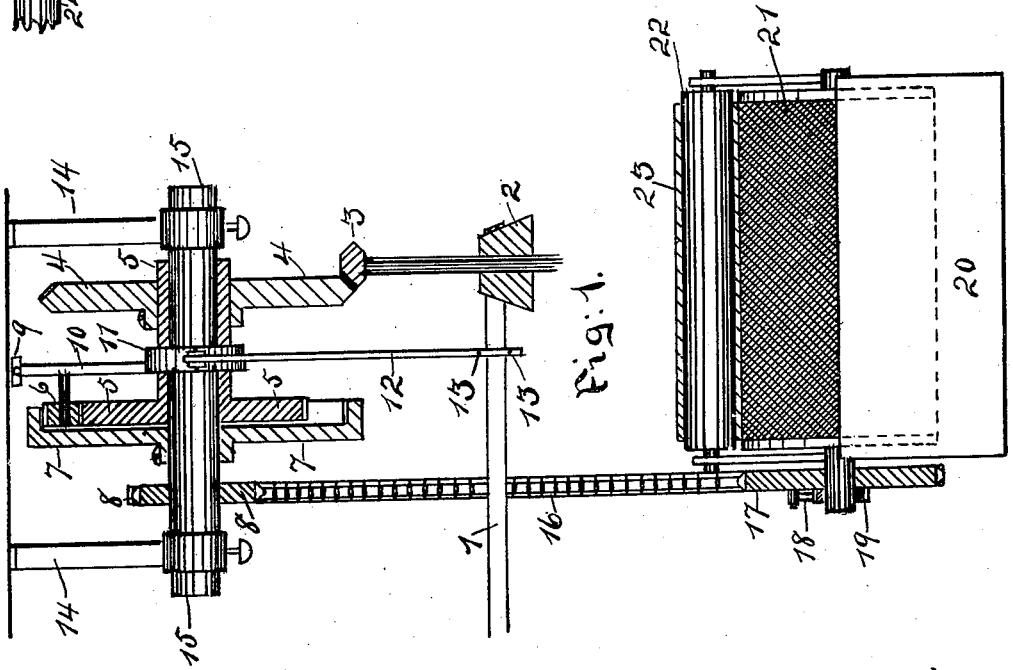

Fig. 1.

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UNITED STATES PATENT OFFICE.

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CYLINDER-MOLD DRIVE.

SPECIFICATION forming part of Letters Patent No. 676,492, dated June 18, 1901.

Application filed March 6, 1901. Serial No. 50,071. (No model.)

To all whom it may concern:

Be it known that I, BION B. FARNHAM, a citizen of the United States, residing at Castleton, New York, have invented certain new and useful Improvements in Cylinder-Mold Drives; 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a new and improved cylinder-mold drive, more especially for paper-making machines.

In the drawings, Figure 1 shows an end elevation of one of the cylinders in its vat with the couch-roll and felt web and a vertical sectional view of the drive suspended overhead, and Fig. 2 a similar view of another form of my drive.

My invention relates to what is known in a paper-mill as a "cylinder-mold drive," the cylinder-mold, with its couch-roll and felt web, being shown set in the tank 20 in Fig. 1 and at 20′ in Fig. 2. The drive is preferably suspended overhead by brackets 14. The cylinder-mold 21 revolves in the pump-vat 20 and picks up the pulp and as it revolves carries it under the felt web 23, which acts as a belt about the couch-roll 22 and presses the extra moisture in the pulp out, which passes through the meshes in cylinder-mold 21, which is a wire-screen cylinder, preferably, the felt web 23 being operated by passing over a rotating drum, (not seen,) as is usual in paper-mills, the web picking up the forming sheet of paper and carrying it to its destination. To the shaft of the cylinder-mold 21 I have attached the sprocket-wheel 17 and also a ratchet-wheel 19, and a dog 18 is attached to the wheel 17, so that any backward movement of the ratchet-wheel 17 will cause the ratchet 18 to engage with teeth on the ratchet-wheel 17. Otherwise the ratchet slides over the teeth. The drive consists of a driving-belt 1, which revolves the cone-pulley 2, and this revolves the small gear 3. Gear 3 meshes with gear-wheel 4, which is fastened or keyed to the hub of gear-wheel 5, running loose on the shaft 15, and its teeth mesh with those on the pinion 6, which is rotatable about a pin attached to the arm 10, as shown. Pinion 6 meshes with the internal teeth of a wheel 7, which is made fast on the shaft 15 and gives the shaft revolution. On the hub of gear-wheel 5 is a loose-running collar 11, having an arm 10 and an adjustable weight 9 thereon and a belt-shifting rod 12, pivoted to ears thereon and carrying a fork 13 13, in which the belt 1 rests and runs. On the shaft 15 is also a sprocket-wheel 8, made fast thereto and carrying a sprocket-chain 16, which passes to and engages with the sprocket-wheel 17. The power that moves shaft 15 and sprocket-wheel 17 may therefore be traced through belt 1, cone-pulley 2, gear 3, gear-wheel 4, hub and gear-wheel 5, pinion 6, internal-toothed gear-wheel 7, to shaft 15, to sprocket-wheel 17, and any variation between the speed or pull of cylinder-mold 21 and web 23 and that of the drive will communicate a lateral swing to the arm 10, which will partly rotate collar 11 and cause belt-shifting rod 12 to move, thus shifting belt 1 over the surface of cone-pulley 2, thus increasing or decreasing the speed of the drive and keeping the speed of the cylinder-mold 21 and that of the web 23 practically uniform, and this is necessary, as without a cylinder-drive the only motion given that cylinder was by the movement of web 23, and any irregularity in the movement of that web caused by its slipping or stretching or from any other cause would put an extra stress upon the forming sheet of paper carried by the web, and an imperfect sheet of paper would be the result.

With my drive attached to the cylinder-mold the operation is as follows: The drive is set at the start to transmit to the sprocket-wheel 17, and therefore to the cylinder-mold 21, a rotation equal to and in unison with the motion of web 23, so that as the web 23 passes between the cylinder-mold 21 and couch-roll 22 there is no longitudinal stress put upon the web, and the only effect upon the web is the pressure caused by couch-roll 22. As the web picks up and carries the paper and it is squeezed between the cylinder-mold 21 and web 23 an extra stress may be put upon the web, or if the web by considerable use is made thin in spots or for any other reason it does not move with a uniform speed, and

thus make a uniform pull on cylinder-mold 21, thus causing an imperfect sheet of paper to be formed, the increase or decrease of the web's pull, whichever the case may be, will result in a tendency to either slow up the motion of the drive on account of the extra pull or to let it run faster on account of the decrease of the normal pull of the web 23, and as the drive attempts to slow up against the extra pull of the web pinion 6 will roll forward over the teeth of gear-wheels 5 and 7 and move arm 10 and weight 9 forward, which will move belt-shifter 12 and fork 13 and also belt 1 forward and farther down the inclined face of cone-pulley 2, which will decrease the speed or force of the drive precisely enough to cause cylinder-mold 21 to rotate enough slower to relieve the strain on web 23, and in case there is any slip of web 23 or its pull on cylinder-mold 21 is reduced the arm 10 and belt-shifter will automatically recede and draw the belt 1 farther upon the circumference of the cone-pulley 2, and the cylinder-mold will take up increased speed and the motion of the web 23 and cylinder-mold 21 will be kept uniform and the forming sheet of paper carried by the web will be uninjured.

In Fig. 2 I show another form of my device, in which the shaft 15′ receives motion from cone-pulley 25 through shaft 24. Gear-wheel 26 is fast to the shaft 15′, and gear-wheel 27 is loose on the shaft. Between them is the collar 28, loose on the shaft, having an arm 33, also acting as a journal for small gear 31, the arm 33 having an adjustable weight 32. Collar 28 also has a pivoted arm 29, pivoted to ears on the collar, as seen, to allow of motion preferably at the point of fixture, and attached to arm 29 is a bell-crank 30, its outer link having a fork 30′, so that when the fork is moved in a direction transverse the belt it will move the belt up or down the cone-pulley 25. 20′ shows the vat, 21′ the cylinder-mold, 22′ the couch-roll, and 23′ the felt web, of the ordinary paper-making machine. To the journal of the cylinder-mold is attached the sprocket-wheel 17′ and ratchet-wheel 19′ and a ratchet 18′, all operating similarly to the same parts shown in Fig. 1. As the web 23′ moves over and drives couch-roll 22′ the friction on cylinder-mold 21′ rotates that cylinder. Any variation in the pull of the web 23′, either an increase or decrease, will be communicated to the sprocket-chain and to sprocket-wheel 34 and gear-wheel 26, which will cause pinion 31 to travel forward or backward, and as it does so collar 28 is partly revolved, which throws arm 29 out or draws it in, as the case may be, when the bell-crank will be operated so as to move the fork 30′ up or down, and thus move the belt up or down the face of the cone-pulley 25, which will alter the speed of the drum, so as to cause it to make cylinder-mold 21′ to move in unison with the web 23′ and prevent any damage to the forming sheet of paper.

The weights 9 in Fig. 1 and 32 in Fig. 2 are made adjustable on the rods that carry them in order that they may at the start be given exactly the position on the rods that will cause their weight to counterbalance the normal pull on the web and hold the pinion 6 in Fig. 1 and the small gear in Fig. 2 in one position, but to allow them to travel back and forth when necessary.

My device may be applied to any similar moving piece of mechanism, and I therefore do not confine myself to its operation with a cylinder-mold. It will be seen, therefore, that my cylinder-mold is in fact operated by a plurality of powers each separate from the other—that is, by the power of the moving web and also by the power of the belt 1—and I counterbalance the one power against the other to make a shifting power to accommodate itself to any unevenness in the movements of the web.

What I claim, therefore, is—

1. In a driving mechanism for a cylinder-mold and other machines, a shaft, a sleeve loosely mounted thereon, means for driving said sleeve comprising a friction-cone and belt, a gear fixed to the sleeve, a weighted pivotally-mounted arm for shifting said belt, a pinion carried by said arm and meshing with said gear and an internal gear meshing with the pinion and fixed to said shaft, substantially as described.

2. A speed-governor comprising a shaft, gears mounted thereon, a pivotally-mounted weighted arm, a pinion carried thereby and engaging said gears, means for driving one of said gears comprising a friction-cone and belt, and means connected to said arm for shifting the belt as the tension upon the shaft is varied substantially as described.

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

B. B. FARNHAM.

Witnesses:
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JAMES M. BROWN.