(No Model.)

3 Sheets—Sheet 1.

T. L. CALKINS.

SPEED GOVERNOR.

No. 299,618. Patented June 3, 1884.

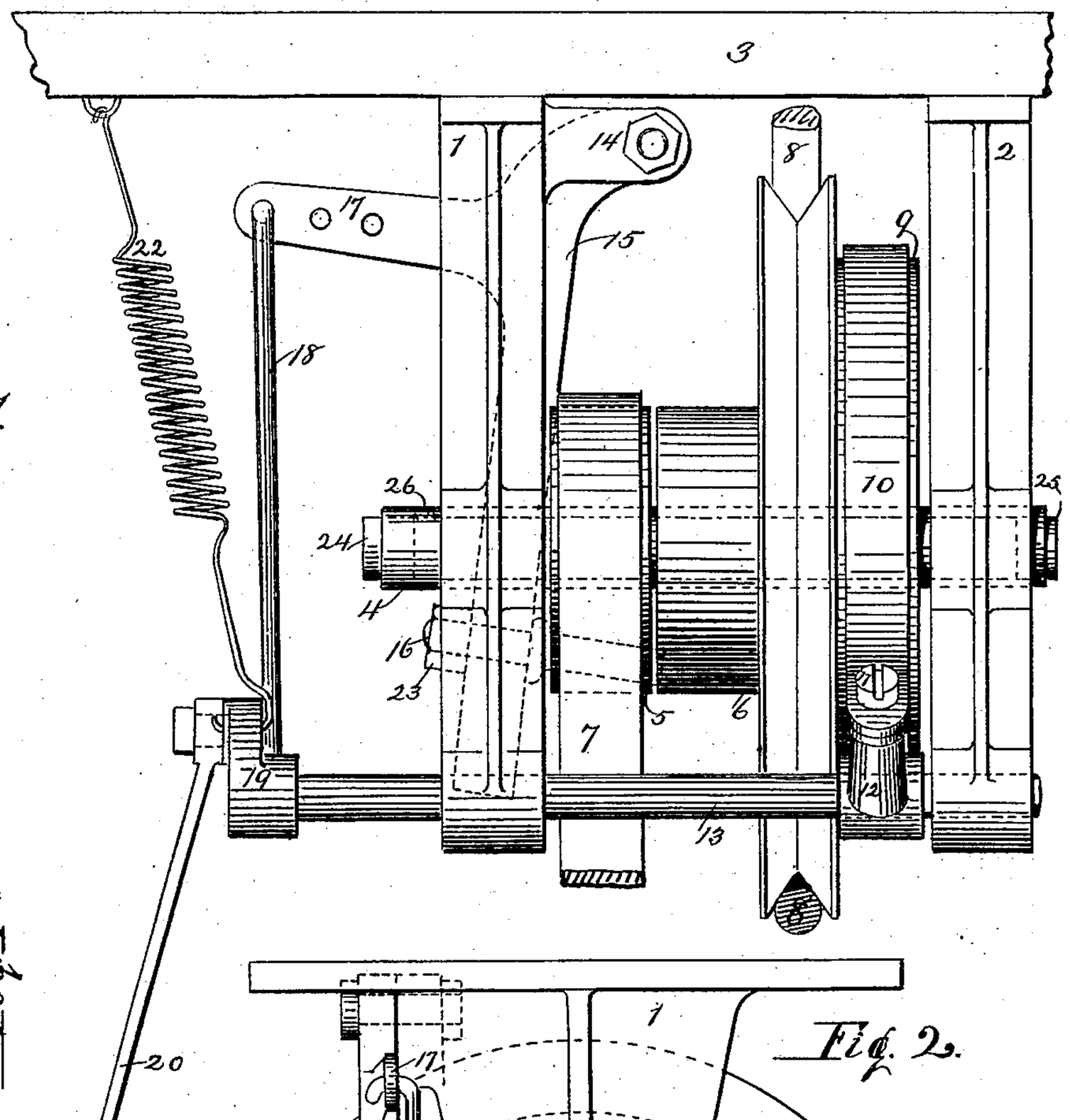

Fig. 1.

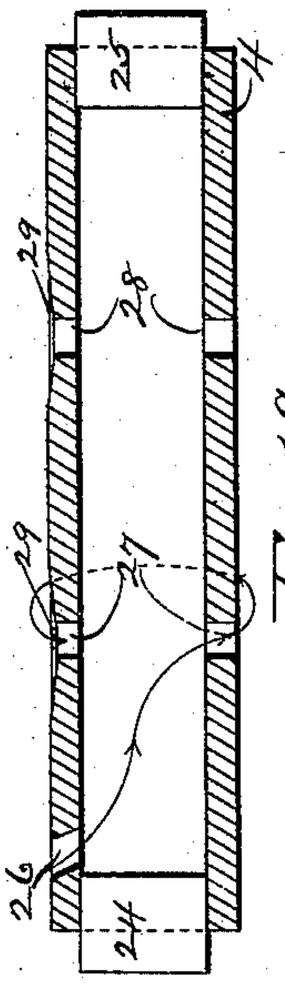

Fig. 1a.

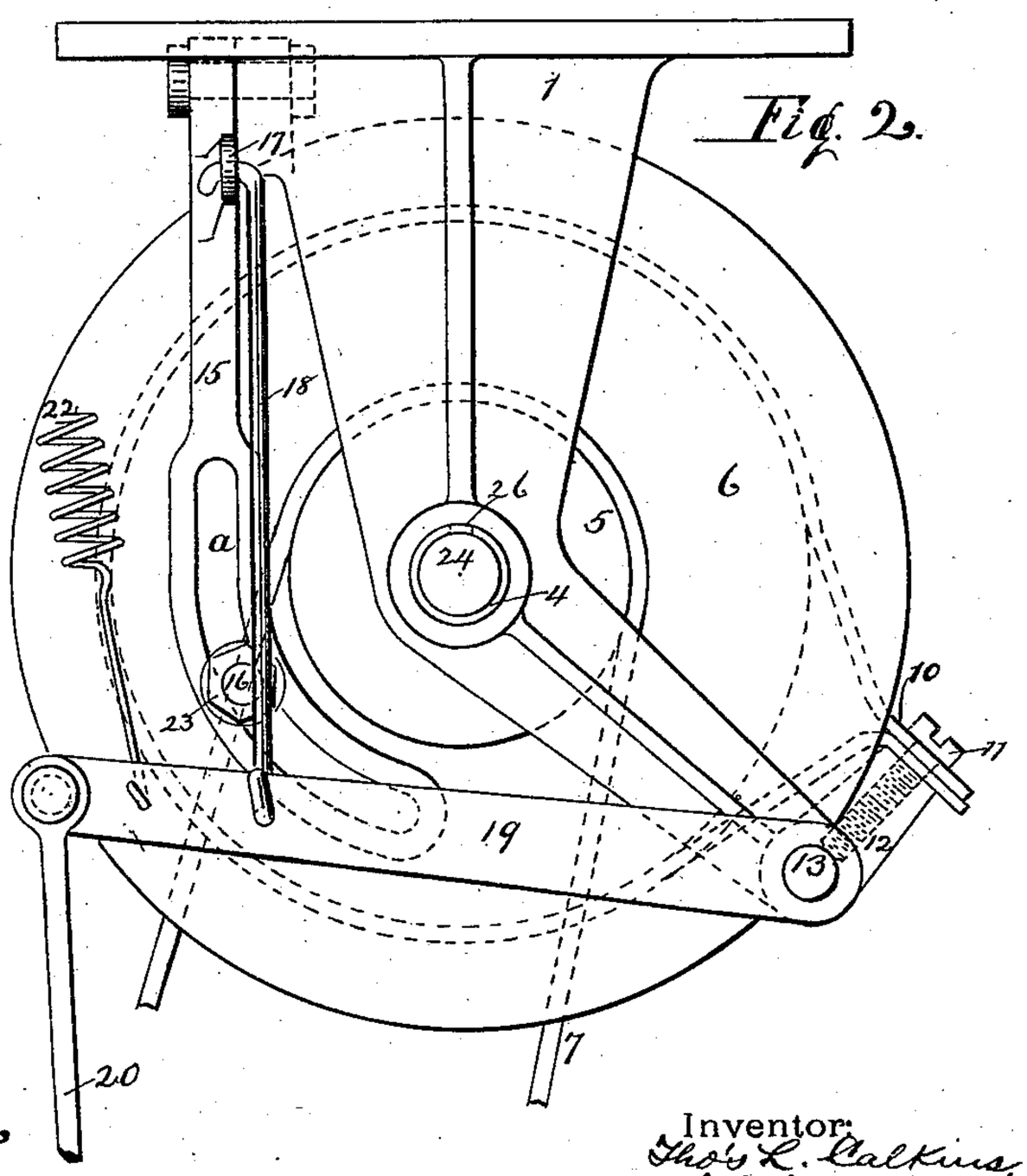

Fig. 2.

Witnesses:
Charles E. Baker
Herman T. C. Krauss

Inventor:
Thos L. Calkins,
by John Thomson, Atty.

(No Model.)

3 Sheets—Sheet 2.

T. L. CALKINS.

SPEED GOVERNOR.

No. 299,618. Patented June 3, 1884.

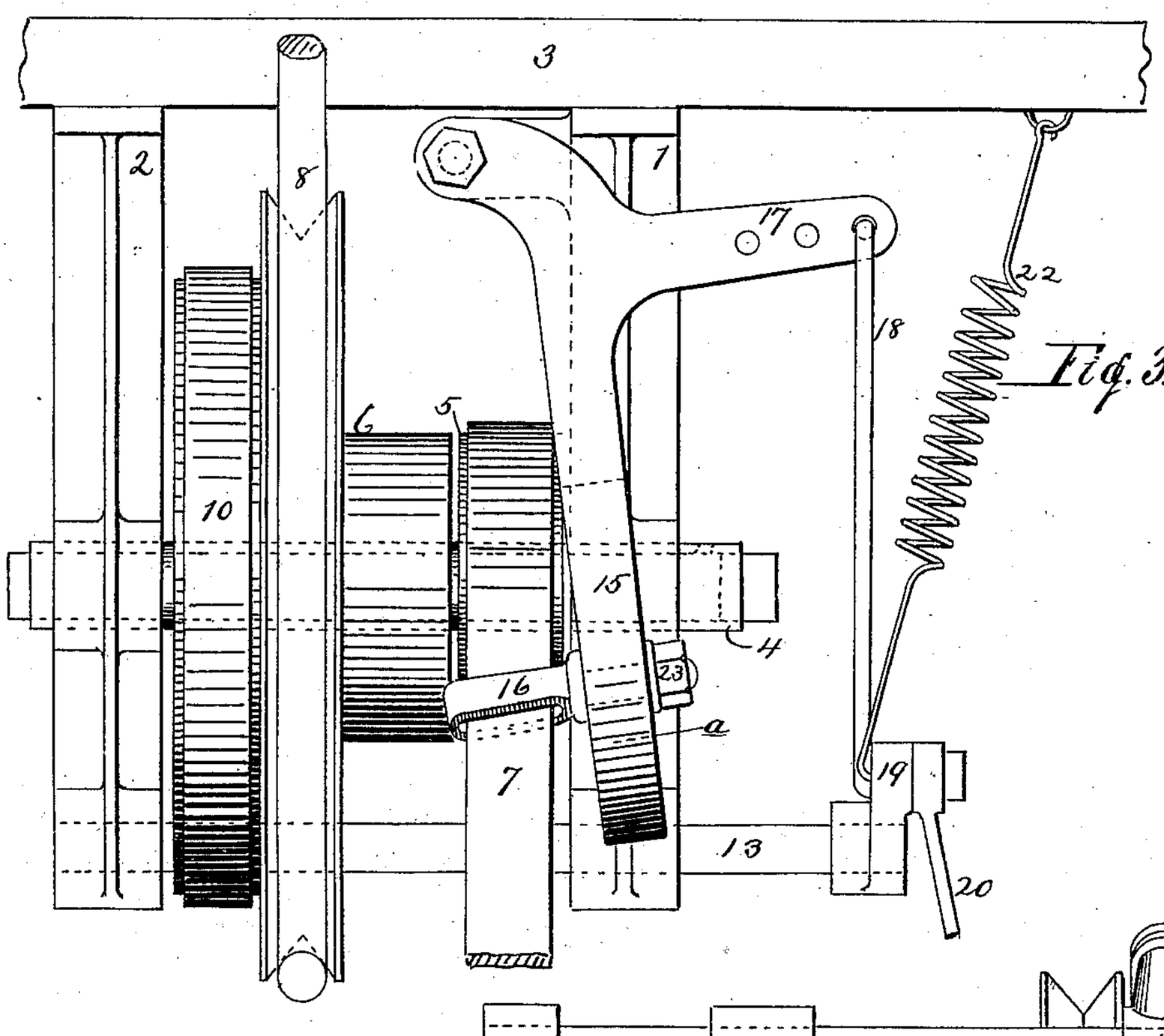

Fig. 3.

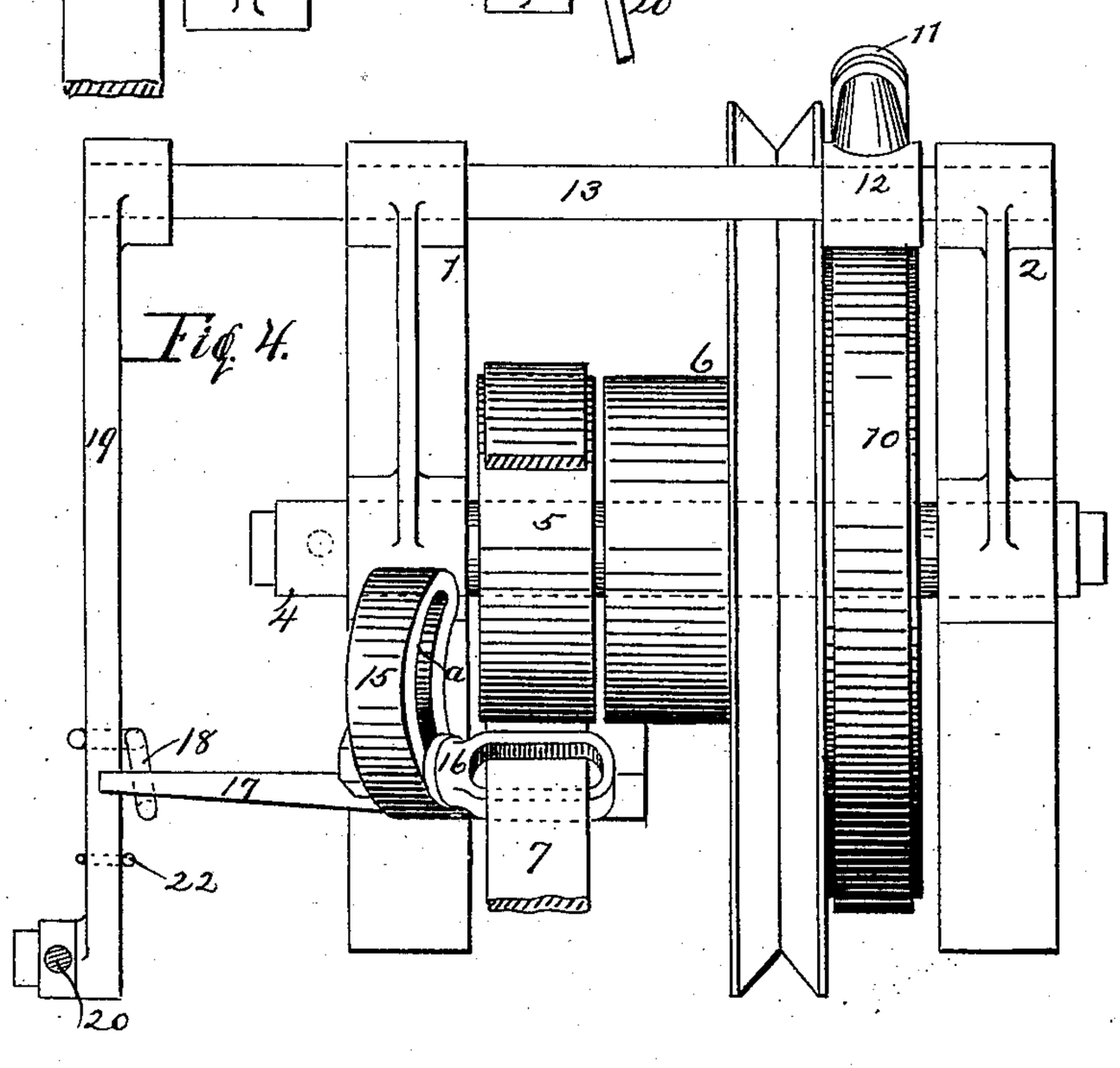

Fig. 4.

Witnesses:
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(No Model.)

3 Sheets—Sheet 3.

T. L. CALKINS.

SPEED GOVERNOR.

No. 299,618. Patented June 3. 1884.

Fig. 5.

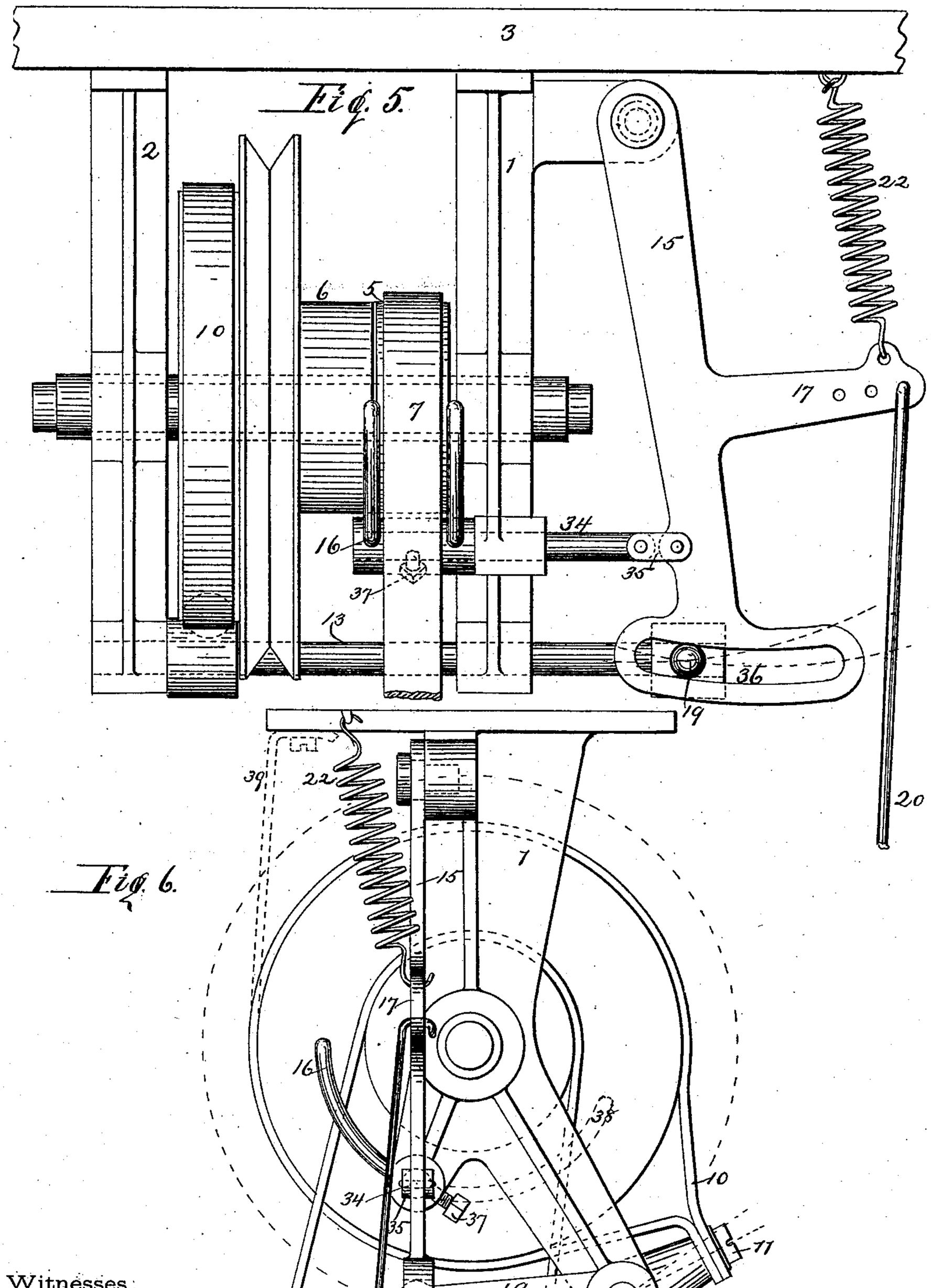

Fig. 6.

Witnesses:

Wm. Thomas,

Herman F. C. Kraus

Inventor:

Thos. L. Calkins,

by John Thomson, Atty.

UNITED STATES PATENT OFFICE.

THOMAS L. CALKINS, OF NEWARK, NEW JERSEY.

SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 299,618, dated June 3, 1884.

Application filed July 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS L. CALKINS, of Newark, Essex county, and State of New Jersey, have invented certain new and useful Improvements in Speed-Governors, of which the following is a specification.

My invention relates to speed-governors—occasionally termed "speed-motors"—referring particularly to that class used in connection with sewing-machines driven by power.

The object of my invention is to furnish a device that shall be simple, durable, cheap to construct, readily adaptable to the various styles of machines in common use, easy to operate and adjust, and that shall place an operative of but ordinary skill in complete control of a power-driven machine by the use of the treadle alone, thereby leaving both hands free at all times for manipulating the work.

The objectionable features in the devices hitherto used and the manner of overcoming them will be referred to from time to time in the description to follow.

In the drawings, Figure 1 is a front elevation of my invention; Fig. 1ª, a longitudinal section of hollow shaft. Fig. 2 is a side elevation as viewed from the left-hand side of Fig. 1. Fig. 3 is a back elevation. Fig. 4 is a plan, viewed from below. Figs. 5 and 6 are respectively front and side elevations showing certain modifications.

1 2 in the drawings represent a pair of brackets secured to the under side of the bench or table 3, upon which rests the sewing or analogous machine. (Not shown in the figure.) The shaft 4 is fitted tightly to the brackets, and does not turn. Upon this shaft is mounted an idle-pulley, 5, and combined driving-pulley and friction-drum 6. Both of these pulleys are loose upon the shaft. The main driving shaft and pulley, as in ordinary practice, are mounted upon standards close to the floor, (not shown,) and from which passes upward the governor-belt 7. From the V-shaped step in the pulley 6 passes up through the table the belt 8, connecting directly with the machine to be driven. Passing around the driving-pulley on the friction-drum or enlarged step 9 is a friction band or brake, 10, secured by a screw, 11, to the stud 12 and shaft 13.

Mounted upon the bracket 1 at 14 is a shipping-lever, 15, and belt-shipper 16. Projecting from said lever outward is an arm, 17, connected by the rod 18 to the friction-lever 19, the latter being secured to the shaft 13. Attached to the friction-lever is a rod, cord, or chain, 20, passing down and connected to a treadle, 21. Also attached to the friction-lever and table is a spring, 22, the tension of which is upward. The stop to the upward movement of the spring is the friction-band 10, the effect of the spring being, as shown, to vibrate the stud 12 outward, and hence causes the friction-band to hug the drum.

It is obvious that the normal condition of the device, as a whole, is that assumed in the figures, in which the idle-pulley is being driven by the driving-belt, while the driving-pulley 6, the belt 8, and the driven machine are positively locked against movement by the friction developed in the band 10 through the tension of the spring.

Now, supposing it desirable to start the machine at its highest speed, the foot of the operative forces the treadle down, and as a consequence the friction-lever is drawn downward with it, which in turn and in the same instant carries the stud inward—thereby slackening the friction-band and relieving the drum—and also carries inward, through the medium of the connecting-rod 18, the belt-shifting lever and its shipper, the belt thereby being shifted from the idle to the driving pulley. Thus in exactly the ratio of the movement of the driving-belt from one pulley to the other is the friction-band loosened upon the drum or enlarged step 9. Therefore the friction to drive and the friction to restrain gradually change their conditions up to and beyond the point of equilibrium between the two frictions. The point at which this change shall take place, however, is a variable one in this, that it rises or falls in the ratio of the duty performed by the sewing-machine. It is also an adjustable point in this, that the friction of the band may be set to any average of duty required by simply loosening the screw 11 and setting the stud in or out with respect to the friction-drum to effect the desired result. The driving-friction also

reaches and passes beyond the equilibrium-point in a gradually cumulative ratio. Therefore, the governing conditions automatically adjusting themselves to the conditions governed, I am thereby enabled by the simple use of the treadle alone to operate the driven machine at any speed, though the duty may be variable, or to vary the speed, though the duty may be constant; and herein, particularly, the practical results of my invention differ broadly from those hitherto used, in that between absolute rest in the machine and the highest speed at which it may be driven I may instantly change from one extreme to another, or very gradually accelerate the speed to the highest at which the work may be properly manipulated and maintain the speed so reached, or, again, as gradually decrease from a high to a low speed of operation and maintain the speed from which the best results are then obtained.

It will be observed that the relative movement of the stud necessary to fully let off the restraining friction with respect to the movement necessary to shift the belt is very slight, that the treadle-action has a long leverage for effecting the movement of the belt and the friction-band, and that the spring is attached at that portion of the lever-action farthest from its fulcrum. Hence a single spring of light tension is ample both for carrying back the driving-belt to its normal position, and also for developing ample friction for stopping the driven machine. The important advantage derived from this arrangement is that the strain upon the operative or the effect of vibration is hardly noticeable, even from long and constant operation.

To readily adapt a single governor to belts operating at different angles from the main shaft or in different directions of movement, as with a cross-belt, I form a curved slot, *a*, in the lower portion of the shifting-lever 15, in which the belt-shipper 16 is adjustably secured, as by the nut 23. To adjust the shipper to the proper side of the belt or to the required angle, it is simply necessary to loosen the nut 23, slide the shipper to its position, and reset the nut.

As either or both of the pulleys are in constant operation at high speed, it is important that the lubrication of their bearings should be thoroughly maintained. To effect this I use a hollow tube for the shaft 4, plugging both ends, as at 24 25, Figs. 1 and 1ª, boring a primary oil-hole at 26 through one side of the tube, the said oil-hole standing vertically, facing upward. At that portion of the shaft or tube forming a bearing for the pulleys I bore one or more oil-holes entirely through the tube, crosswise, said oil-holes also standing in a vertical direction when shaft is in position, as 27 28. As a result it will be seen that when the tube is filled from the oil-hole 26, the oil will flow out at 27 28, thereby lubricating the pulleys, and as the pulleys revolve the oil will be carried up and around the shaft, and that when the supply of oil is in the least in excess of requirements it will simply collect in the "gutters" 29, formed on the upper side of the shaft, and again flow back into the tube; hence the lubricant is kept in constant circulation, and a single supply may be used indefinitely long.

To facilitate in cleaning the floor, and to remove material that might collect and interfere with the proper action of the treadle 21, I mount it in two seats, 30 31, Fig. 1. On one of these seats, 30, and on the same side of the treadle, is formed a cone-shaped bearing, 32, while the seat 31 on the opposite side is made like a "half-box." A trunnion, 33, is formed on this side of the treadle, and rests in the half-box. To remove the treadle from its position it is simply necessary to first raise the trunnion side of the treadle upward, and at the same time draw the cone-shaped bearing on the opposite side outward, when the treadle may be swung forward or back, be entirely detached from the governor, or again be instantly reset in operative position, as desired.

In Figs. 5 and 6 are shown some modifications of the devices for operating the belt-shipper and friction-lever. In this instance I impart a direct reciprocating movement to the shipper 16 by mounting it upon a shaft, 34, having a bearing in the bracket, and connecting the said shaft to the shipping-lever by a link, as 35. In the lower portion of the shipping-lever is formed a slot or cam, 36, into which projects the end of the friction-lever, the function of said cam being to vibrate the friction-lever, as the case may require, the conditions of operation being identical with those already set forth. In this modification the belt-shipper admits of considerable change in the angle of the belt without adjustment, as will be seen from the figure; but for extreme cases, by loosening the set-bolt 37, the shipper may be removed from its shaft and set to the reversed position indicated by dotted outline 38.

The friction-band, instead of passing entirely around the pulley, may be arranged as at dotted outline 39, Fig. 6, one end of the band being secured to the bracket and the other end to the stud.

I do not herein broadly claim the hollow shaft provided with oil-holes, as I reserve that for another application.

What I claim is—

1. The combination, in a speed-governor, of an idle and driving pulley, said driving-pulley having a friction-drum, a friction band or brake bearing upon said drum and connected to a stud upon the rocking shaft 13, a belt-shipping lever and shipper, connections between shipping-lever and the rocking shaft, and means for operating said rocking shaft, whereby the shifting of the belt and friction of the brake are controlled relatively to each other, substantially as set forth, to produce the required rate of speed, as described.

2. The combination, in a speed-governor, of idle and driving pulleys, said driving-pulley having a friction-drum, a friction band or brake bearing upon said drum and connected to the rocking lever 13, a belt-shipper and lever, also connected to said rocking shaft, a retracting-spring, as 22, and a treadle and connections to the rocking shaft, whereby the shaft may be operated and the shifting of the belt and friction of the brake controlled relatively to each other, substantially as set forth.

3. The combination, in a speed-governor, of the idle and driving pulleys, the latter being provided with a friction-drum, a rocking shaft, as 13, supported in the brackets of the governor, a friction-brake adjustably connected to a stud upon the shaft, a pivoted belt-shifter lever and shipper connected by the rod 18 and lever 19 to the rocking shaft, and means for operating the shaft, and thereby controlling the relative movement of the brake and belt-shifter, substantially in the manner set forth.

4. In a speed-governor, a belt-shifting lever provided with a curved slot and a belt-shipper, and means for adjusting the shipper in the slotted lever, so as to accommodate it to the varying angles of the driving-belt, as set forth.

5. The combination, with loose pulleys, of a hollow stationary shaft closed at both ends, and provided with an oil-feeding hole at or near one end, and having oppositely-arranged oil-holes in the top and bottom of the shaft, whereby the oil is kept in constant circulation and lubricates the bearings of the loose pulleys, as set forth.

6. The combination, with loose pulleys, of a hollow stationary shaft closed at both ends, and provided at or near one end with an oil supply or feeding hole, and having oppositely-arranged oil-holes in the top and bottom of the shaft, the upper holes being provided with gutters leading thereto, whereby the loose pulleys are lubricated and the excess of oil is returned to the hollow shaft, as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS L. CALKINS.

Witnesses:
CHARLES C. BARTON,
LYMAN H. ESSEX.