No. 722,245. PATENTED MAR. 10, 1903.

F. J. NUTTING.

VARIABLE SPEED TRANSMISSION MECHANISM.

APPLICATION FILED JUNE 12, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

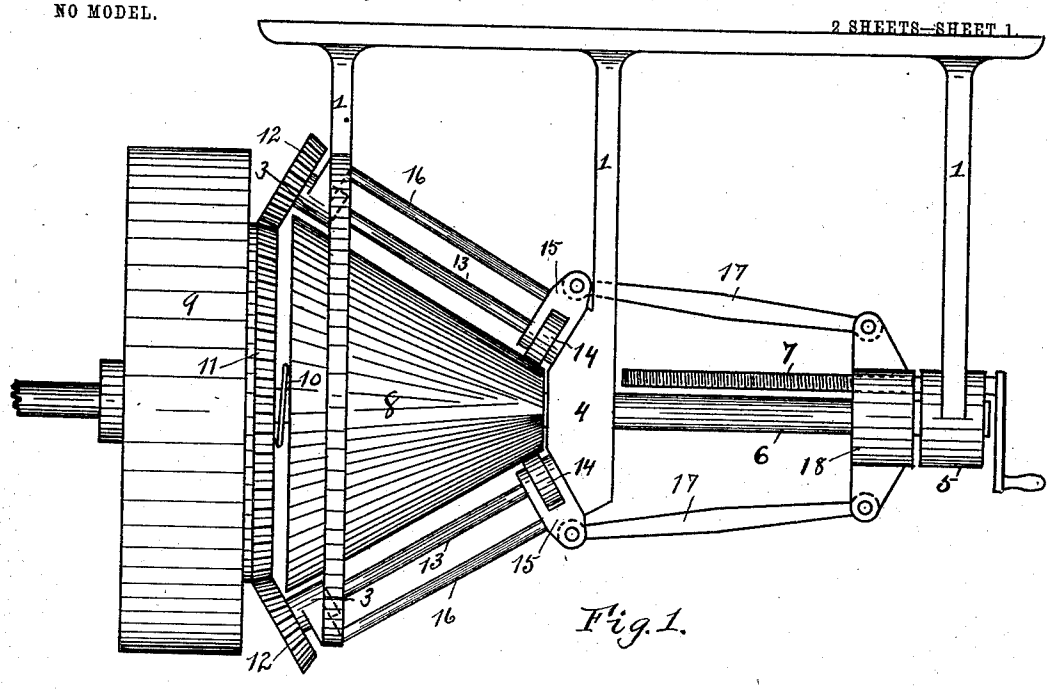

Fig. 1.

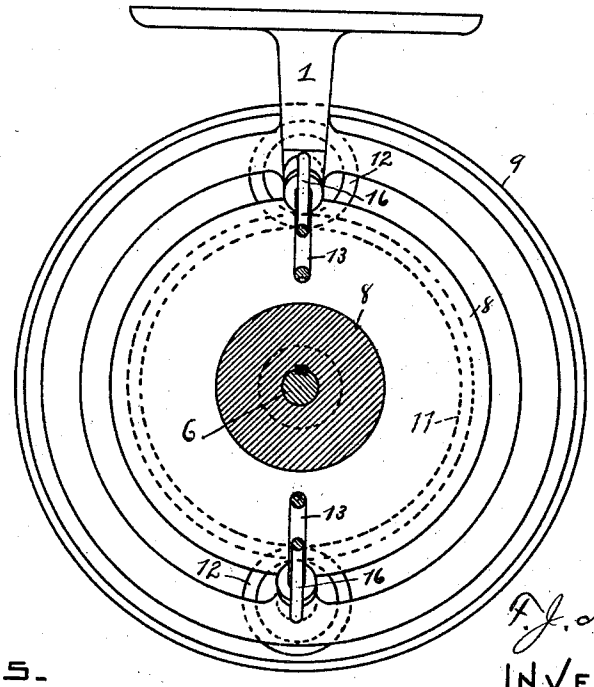

Fig. 2.

WITNESSES-
Matthew Siebler
C. M. Theobald.

F. J. Nutting,
INVENTOR
By R. J. McCarty,
his ATTORNEY

No. 722,245. PATENTED MAR. 10, 1903.

F. J. NUTTING.

VARIABLE SPEED TRANSMISSION MECHANISM.

APPLICATION FILED JUNE 12, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

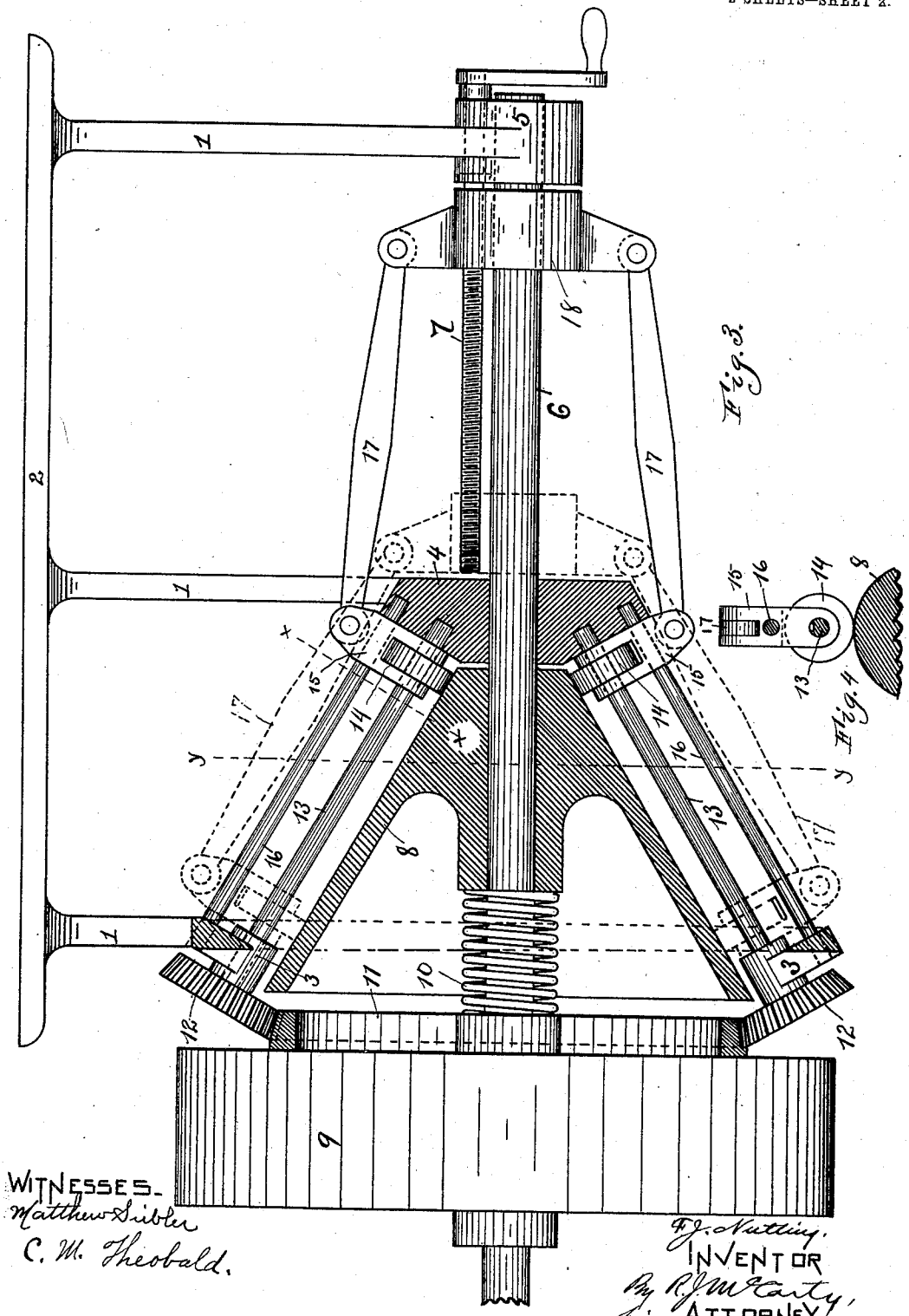

Fig. 3.

Fig. 4.

WITNESSES.
Matthew Sibler
C. M. Theobald.

F. J. Nutting,
INVENTOR
By R. J. McCarty,
his ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK J. NUTTING, OF DAYTON, OHIO.

VARIABLE-SPEED-TRANSMISSION MECHANISM.

SPECIFICATION forming part of Letters Patent No. 722,245, dated March 10, 1903.

Application filed June 12, 1902. Serial No. 111,304. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. NUTTING, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Variable-Speed-Transmission Mechanism; and I do 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.

This invention relates to new and useful improvements in speed-varying mechanism.

The object of the said invention is to provide simple and effective mechanism of the above character through which the speed of a driven shaft—such, for example, as a counter-shaft or a motor-vehicle propelling-shaft—may be varied as desired.

The main advantage of the invention lies in the ability to multiply the power given out by the cone-pulley, which is done by increasing the number of power-transmission rollers, which are arranged at opposite points on the periphery of the cone-pulley. The power transmitted from the cone-driver will be in proportion to the number of transmission-rollers through which said power is transmitted to the driven pulley. It will be borne in mind that the transmission-rollers convey movement to a common member—namely, the driven pulley. It will perhaps be made more clear by assuming only one transmission-roller to be driven from the cone-driver. In the event that this transmission-roller would at times slip in its contact with the cone-pulley there would be moments of cessation in its movement. Consequently the driven pulley would not move during such periods. In the event that there were two or more of such transmission-rollers in gear with the cone-driver the additional roller or rollers would convey the power to the driven pulley. The latter would not be affected by the slipping of one of the transmission-rollers only to this extent that there would be less power transmitted from the cone-driver for the moment, owing to the inaction of the slipping transmission-roller. Another advantage lies in the manner of mounting the speed-transmission rollers on diametrically opposite sides of the cone-pulley and in the means for shifting said speed-transmission rollers and locking them by the same operation at any desired point along the circumference of the cone-pulley.

The improvement hereinafter fully set forth and claimed is illustrated in the accompanying drawings, of which—

Figure 1 is a side elevation. Fig. 2 is a sectional elevation on the line *y y* of Fig. 3. Fig. 3 is a longitudinal sectional elevation. Fig. 4 is a section on the line *x x* of Fig. 3.

In carrying my invention into practice I make use of any suitable bearing, which in the present case consists of three hangers 1, which project from a plate 2 and which provide bearings 3, 4, and 5 for the speed-varying mechanism. The latter bearing supports one end of the uniformly-driven shaft 6, as does also bearing 4. Bearing 5 also supports an operating-screw 7, which will be again referred to.

8 designates a cone-pulley, which is splined on the shaft 6, and 9 is a driven belt-pulley, which is loose on said shaft.

10 designates an expansion-spring surrounding the shaft 6 and which exerts outward pressure against the hub of the cone-pulley 8.

11 designates a ring on the inner face of the loose pulley 9 and which is provided with bevel gear-teeth that mesh with two or more bevel-gears 12 12, fixed to shafts 13 13. These are two variable-speed-transmitting shafts that are journaled in the bearings 3 and 4 and lie parallel with the face of the cone-pulley 8. Variable speeds are transmitted to said shafts 13 13 and through them to the power-transmission pulley 9 by means of friction-rollers 14 14, which are movable to any point throughout the length of the cone-pulley 8 to transmit variable speeds from said cone-pulley to driven pulley 9. The said friction-rollers are splined to the shafts 13 and are movable along said shafts by the following means: 15 15 designate carriages, which loosely inclose the shafts 13 13 and the rollers 14 14. These carriages are movable along guide-rods 16, which have their ends mounted on the bearings 3 4. 17 17 designate shifting-levers,

which are pivotally connected at one end to the carriages 15 15 and at the other end to a shifting-collar 18, said shifting-collar being movable on the shaft 6 by means of the operating-screw 7. With the movement of the shifting-levers 17 17 the variable-speed-transmitting rollers 14 14 are movable to uniform positions on the circumference of the cone-pulley and are locked in such position by means of said screw 7. The speed of the shaft to be driven from pulley 9, it will be understood, will be greater or less accordingly as the speed-transmission rollers 14 14 are brought nearer to or farther from the larger diameter of the cone-pulley by the proper movements of the shifting-levers 17 17. The proper contact between the speed-transmission rollers 14 14 and the cone-pulley is maintained through the pressure of the helical spring 10. All liability of the speed being varied unintentionally by an accidental slipping of the speed-transmission rollers 14 14 is obviated by the screw 7, which, as before stated, locks the shifting-levers in the desired position. This operating-screw 7, therefore, in addition to providing convenient means for shifting the levers 17 17, also serves as means for locking the speed-transmission rollers at any point on the periphery of the driving-cone.

Having described my invention, I claim—

1. In a speed-varying mechanism, a driving-shaft and a power-transmitting pulley loose upon said shaft, in combination with a cone-pulley splined upon said shaft, two shafts mounted parallel to the periphery of said cone-pulley, gearing interposed between said shafts and the loose pulley and through which said pulley receives motion, variable-speed-transmission rollers splined upon said shafts and through which variable speeds are transmitted from the cone-pulley to the loose pulley, carriages loosely mounted upon said shafts and inclosing said speed-transmission rollers, shifting-levers connected to said carriages and by means of which the said carriages and the speed-transmission rollers are shifted along the shafts to vary the positions of contact between said rollers and the cone-pulley, and means for operating said shifting-levers and for locking said levers in position after each adjustment of the speed-transmission rollers relatively to the cone-pulley, substantially as set forth.

2. In a speed-varying mechanism, the combination of a driving-shaft, a loose power-transmission pulley splined upon said shaft, two shafts mounted parallel with the face of said variable-speed pulley, gearing interposed between said shafts and the loose pulley, variable-speed-transmission rollers splined upon said shafts, carriages through which said rollers are moved along said shafts to vary their points of contact with the variable-speed-transmission pulley, guides along which said carriages are movable, operating-levers connected to said carriages, a shifting-collar movable on the main shaft and to which said shifting-levers are connected, and an operating-screw by means of which said shifting-collar is actuated to move the operating-levers and whereby the variable-speed-transmission rollers are actuated to vary their contact with the variable-speed pulley, and by means of which operating-screw the positions of the shifting-levers are locked in various positions, substantially as set forth.

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

FREDERICK J. NUTTING.

Witnesses:

R. J. McCARTY,

J. A. WORTMAN.