No. 638,359. Patented Dec. 5, 1899.

# W. L. SCHELLENBACH.

## VARIABLE SPEED MECHANISM.

(Application filed May 2, 1899.)

(No Model.) 2 Sheets—Sheet 1.

fig. 1.

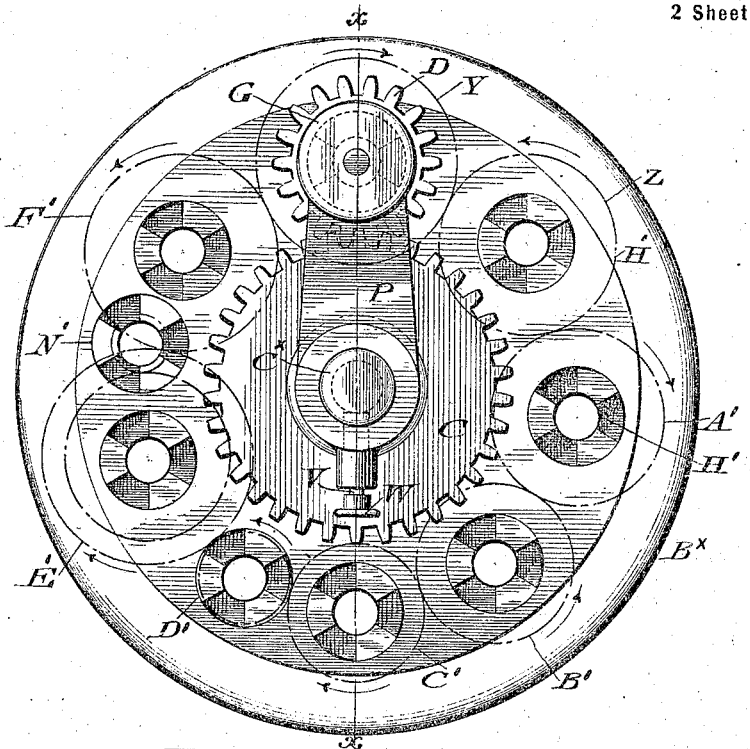
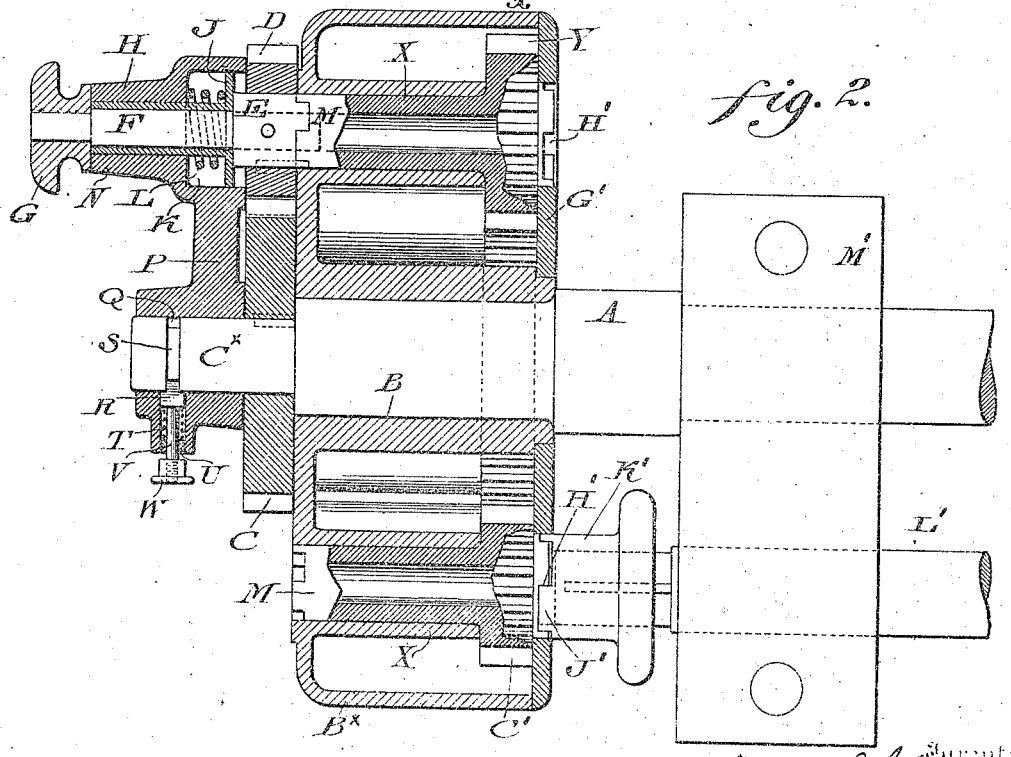



fig. 2.




Witnesses
L. Bonville,
P. F. Hagen.

Inventor:
William L. Schellenbach.
By
Wiedenheim & Fairbanks.
Attorneys.

No. 638,359. Patented Dec. 5, 1899.

# W. L. SCHELLENBACH.

## VARIABLE SPEED MECHANISM.

(Application filed May 2, 1899.)

(No Model.) 2 Sheets—Sheet 2.

fig. 3.

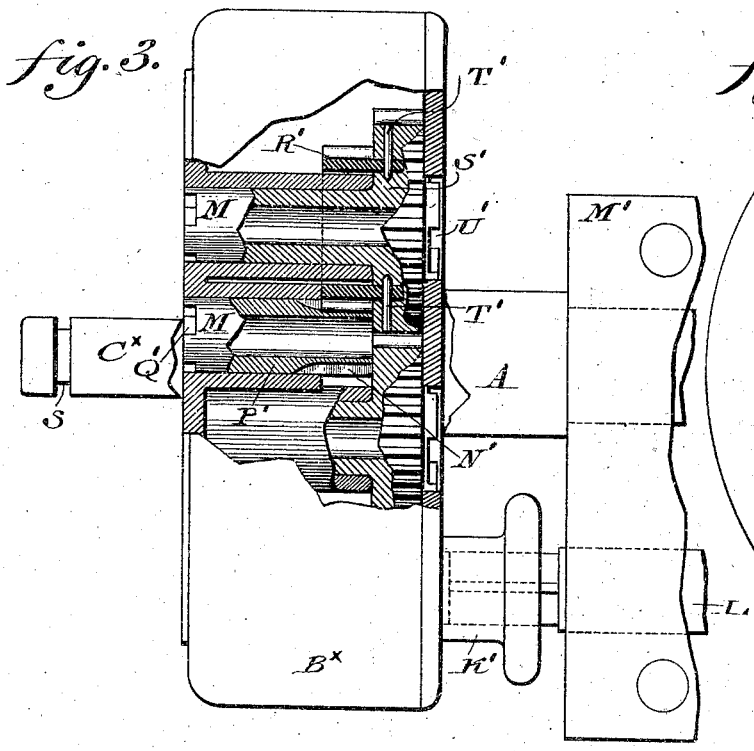



fig. 4.

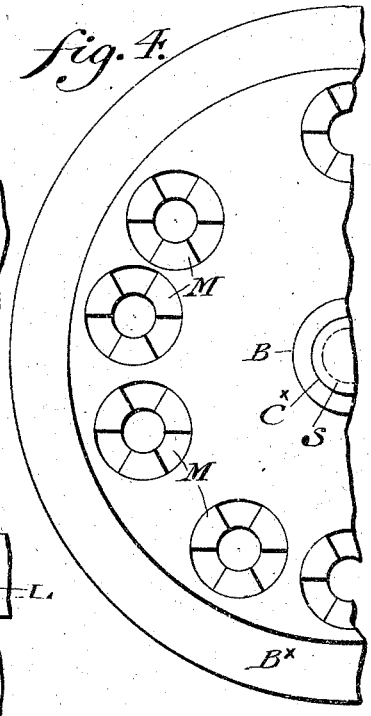



fig. 5.

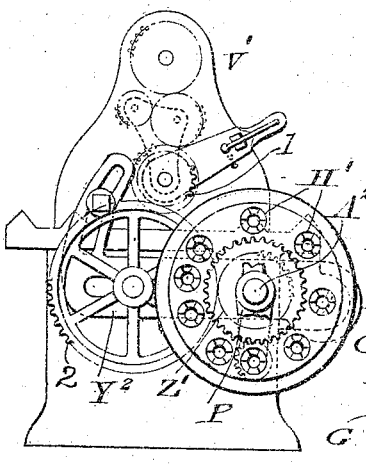
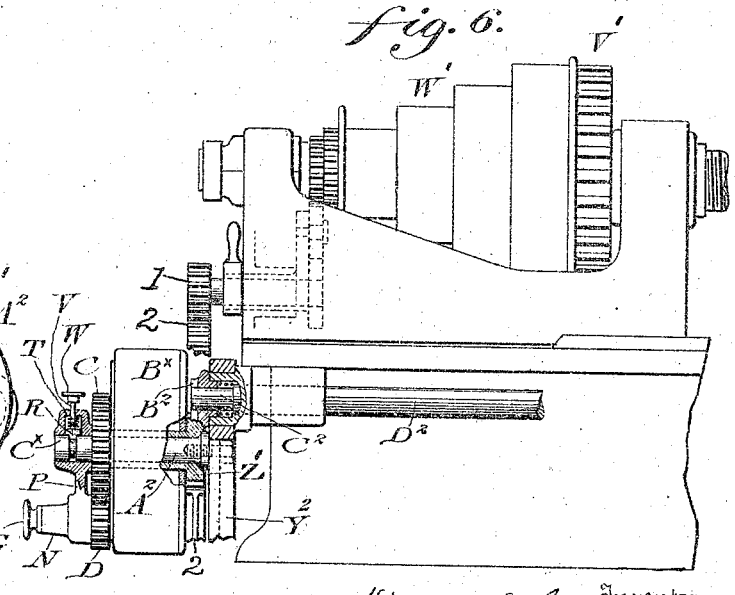



fig. 6.




Witnesses
L. Bonville,
P. F. Eagles.

Inventor
William L. Schellenbach.
Wiedersheim & Fairbanks.
Attorneys

# UNITED STATES PATENT OFFICE.

WILLIAM L. SCHELLENBACH, OF PHILADELPHIA, PENNSYLVANIA.

## VARIABLE-SPEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 638,359, dated December 5, 1899.

Application filed May 2, 1899. Serial No. 715,288. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. SCHELLENBACH, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Variable-Speed Mechanism, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a novel construction of a variable-speed mechanism, as hereinafter fully set forth and claimed.

Figure 1 represents an end elevation of a variable-speed mechanism embodying my invention. Fig. 2 represents a section on line *x x*, Fig. 1, certain of the parts being shown in elevation. Fig. 3 represents a side elevation, partly in section, of the parts seen in Fig. 1. Fig. 4 represents a partial plan view of Fig. 3. Fig. 5 represents an end elevation of an engine-lathe having my invention applied thereto. Fig. 6 represents a front elevation of Fig. 5, showing certain of the parts broken away or in section.

Similar letters and numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates a main driving-shaft or initial source of power which revolves in suitable bearings and is provided with a reduced portion which revolves in a bearing B in the center of housing $B^{\times}$.

C designates a spur-gear which is keyed to and slips onto portion $C^{\times}$ of the shaft A and is adapted to mesh with a pinion D, which is keyed to slip over the clutch member E, the latter being bored to receive the stem F and pinned thereto, the stem F being mounted in the sleeve or bushing H, which has the flange J, which is located in the recess K, said flange having one end of the spring L contacting therewith, while the other extremity thereof abuts against a wall of said recess, whereby the clutch member E is always held in contact with the juxtaposed clutch member M.

N designates a boss in which the sleeve H is supported, said boss being a part of the arm P, which is provided with an opening Q, through which passes the reduced portion $C^{\times}$ of the main shaft A. The diameter of the reduced portion $C^{\times}$ of said main shaft A is made to correspond with the diameter of said clutch member E in order to provide a means of changing the position of gears C and D in Figs. 1 and 2, gear C being the driver and gear D the driven. These conditions may be reversed and gear D be placed on reduced portion $C^{\times}$ of said shaft A and gear C slipped onto clutch member E, which operation makes gear D the driver and gear C the driven. Thus two variations of speed are produced by changing the position of gears C and D. When it is desired to change the position of gear C D, the arm P is adapted with a plunger or locking device R, which may be withdrawn from the groove S in reduced portion $C^{\times}$ of said shaft A, thus permitting said arm P to be removed from reduced portion $C^{\times}$ of shaft A. When the arm P is in the position shown in Figs. 1 and 2, the plunger or locking device R is provided with a tongue engaging the groove S, whereby lateral motion of the arm P relative to said groove is prevented.

T designates a spring mounted in a suitable recess, one end of said spring contacting with the plunger R, while its opposite end abuts against the plug U, through which passes the stem V, the latter being provided with a thumb-piece or head W. The housing $B^{\times}$ is provided with a plurality of bearings X, in which are located the clutch members M, the extension of the latter serving as bearings for the gears employed, the same being designated by the pitch-circles Y Z A′ B′ C′ D′ E′ F′, it being understood that the pitch-circles of said gears are of different diameters, as will be understood from the dotted lines in Fig. 1, said gears being held in position in the housing $B^{\times}$ by means of the plate G′. Each of the gears Y Z A′ B′ C′ D′ E′ F′ is provided with a recessed face H′, as will be understood from Fig. 1 and from the left-hand portion of Fig. 2, said recessed face H′ acting as a portion of a clutch and adapted to engage a similar recessed portion J′ on the member K′, which is mounted upon the counter-shaft L′, to which, it will be understood, the different variations of speed are to be imparted, said counter-shaft and main shaft H revolving in suitable bearings M′.

In the broken view (seen in Fig. 3) I have shown provision made for the employment of a ninth variation of speed through the medium of the gear N′, said gear being seen in

side elevation in said figure and mounted upon or attached to the portion P', which is provided with the recessed face Q'. The gear N' meshes with the toothed ring R', which is secured to the portion S' by means of the fastening devices T', whereby it will be seen that the clutch member U', Fig. 3, which is adapted to engage the member K', (seen in Fig. 2,) can be rotated at a different rate of speed when desired.

In Figs. 5 and 6 I have shown my invention as applied to an engine-lathe, V' designating the lathe, which may be of the usual construction, power being transmitted from the cone W' through the intermediate gearing to the pinion 1, and thence by the usual transmitting-gear 2 to the sleeve-gear Z', which is mounted upon fixed stud $A^2$, which is secured in the slot of the usual stud-plate $Y^2$. The sleeve-gear Z', which is mounted upon the fixed stud $A^2$, corresponds to the shaft A. (Seen in Fig. 1.) The other parts of Fig. 6 (seen at the left of said figure) correspond to the similarly-lettered parts in Fig. 2. The arm P (seen in Figs. 5 and 6) carries a clutch member corresponding to the member E, (seen in Fig. 2,) which is adapted to engage the desired clutch member M, by means of which power is imparted to the clutch member $B^2$, which is mounted upon the portion $C^2$ of the feed-shaft or screw-rod $D^2$ to which it is desired to impart the different speeds.

The operation is as follows: When a desired speed is to be imparted to the feed-shaft or screw-rod $D^2$, the housing $B^\times$ is rotated until the proper gear therein can be brought in position to engage with the clutch $B^2$ on the portion $C^2$ of said screw-rod $D^2$. The stem F is then pulled outwardly, the member E leaves the clutch member M, and the arm P is rotated until the member E is opposite the desired clutch member M, whereupon the parts E and M interlock. Thus the speed is imparted from the gear 1 by the transmitter 2 to the sleeve-gear Z', which passes through the housing $B^\times$ and is secured to gear C, gear C meshing with and driving gear D, which imparts motion to clutch member E, which engages clutch member M, secured to the various sizes of gears contained within the housing $B^\times$, these gears of various sizes having clutched faces and being adapted to engage the clutch $B^2$, which rotates in unison with the screw-rod $D^2$.

The arm P can be readily removed from its support $C^\times$ by properly manipulating the head W.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a variable-speed mechanism, a main shaft, a plurality of gears of different diameters geared together, means for gearing said main shaft to any one of said gears, a counter-shaft, and means for gearing any one of said gears to said counter-shaft.

2. In a variable-speed mechanism, a main shaft, a housing carried thereon, a plurality of gears of different diameters having intermeshing teeth and clutch members mounted in said housing, a gear carried by said shaft, a pinion meshing with said gear, and an arm, a stem and clutch member on said arm, said pinion being supported upon said stem and clutch member, said clutch member being adapted to engage the clutch members of said gears.

3. In a variable-speed mechanism, a shaft, a housing arranged to be rotated, a plurality of intermeshing gears of varying diameters having bearings in said housing, a gear mounted on said shaft, a pinion meshing with said gear, an arm having a clutch and stem upon which said pinion is mounted, said stem and said shaft being arranged to receive either said gear or said pinion and allowing either to be the driver or driven.

4. In a variable-speed mechanism, a shaft, a rotating housing, a gear attached to said shaft, a rotating arm, a clutch member thereon, a pinion mounted on said clutch member, a plurality of intermeshing gears of various diameters contained within said housing, clutch members located at one end of said gears, and adapted to engage with said clutch member on said arm, clutch-members on the opposite sides of said gears and a counter-shaft having a clutch member to engage said last-mentioned clutch members of said gears.

5. In a variable-speed mechanism, a shaft, a housing mounted thereon, a plurality of intermeshing gears of different diameters, bearings in said housing for said gears, clutch members for the latter, a gear mounted on said shaft, an arm supported on the latter, a stem carried by said arm, a bushing in which said stem is mounted, said bushing having a flange seated in a recess in said stem, a spring bearing on said flange, a clutch member against which said flange abuts, a pinion carried thereby, said clutch member being adapted to interlock with said clutch members carried by said gears, and interlocking devices common to the latter and to the shaft to which speed is to be imparted.

6. In a variable-speed mechanism, a housing, a plurality of gears, having bearings therein, an arm, a bearing on which said arm is rotatably supported, a pinion carried by said arm and meshing with a gear, a clutch member on which said pinion is mounted, means for operating said clutch member, a groove in said bearing and a spring-pressed locking device engaging said groove.

7. In a variable-speed mechanism, the combination of a stud-plate having a stud attached thereto, a sleeve-gear rotating upon said stud, a housing suitably supported to rotate upon a sleeve-gear, a driving-gear on the outer end of said sleeve-gear, an arm carried by said stud, a locking device for preventing displacement of said arm to said stud, a stem carried by said arm and a pinion mounted upon said stem adapted to mesh with said

driving-gear, a clutch member adapted to move laterally within said pinion, a driven shaft or rod and variable-speed transmission devices intermediate said clutch member and said driven shaft or rod

8. In a variable-speed mechanism, the combination of a stud-plate, a driving stud-gear 1, the transmitting-gear 2 secured to the slotted stud-plate $Y^2$, a sleeve-stud $A^2$, a rotating housing, a sleeve-gear passing through the latter, a series of gears varying in size located in said housing, a gear secured to said sleeve-gear and meshing with a pinion carried by a stem which has its bearing in rotating arm P, a clutch member upon said stem adapted to engage any one of the various-sized gears contained within said rotating housing, a shaft having a clutch $B^2$ keyed to slide thereon and adapted to be engaged with any one of the various-sized gears contained within said housing.

9. In a variable-speed mechanism, a main shaft A, a counter-shaft L', a housing $B^\times$ mounted on said main shaft, a pinion C mounted on the portion $C^\times$ of said main shaft, an arm P also mounted on said portion $C^\times$, means for preventing lateral shifting of said arm, a spring-pressed clutch member and pinion carried by said arm, a plurality of intermeshing gears carried in said housing, an inner pinion N' also located in said housing, a toothed ring R' supported in said housing and means for transmitting power from said pinion and ring to the desired point.

10. In a variable-speed mechanism, rotatable driving and driven members, a plurality of gears of different diameters geared together to rotate in unison at all times, means for gearing any one of said gears to one of said members, and means for gearing any one of said gears to the other of said members.

11. In a variable-speed mechanism, a shaft, a plurality of gears of different diameters suitably mounted around said shaft, said gears being geared together to rotate in unison at all times, gearing driven by said shaft, means for connecting one member of said last-mentioned gearing with any one of said plurality of gears, a counter-shaft, and means for connecting any one of said plurality of gears with said counter-shaft.

WILLIAM L. SCHELLENBACH.

Witnesses:
JOHN A. WIEDERSHEIM,
WM. C. WIEDERSHEIM.