R. K. LE BLOND & W. F. GROENE.

LATHE GEARING.

APPLICATION FILED AUG. 27, 1909.

980,974.

Patented Jan. 10, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

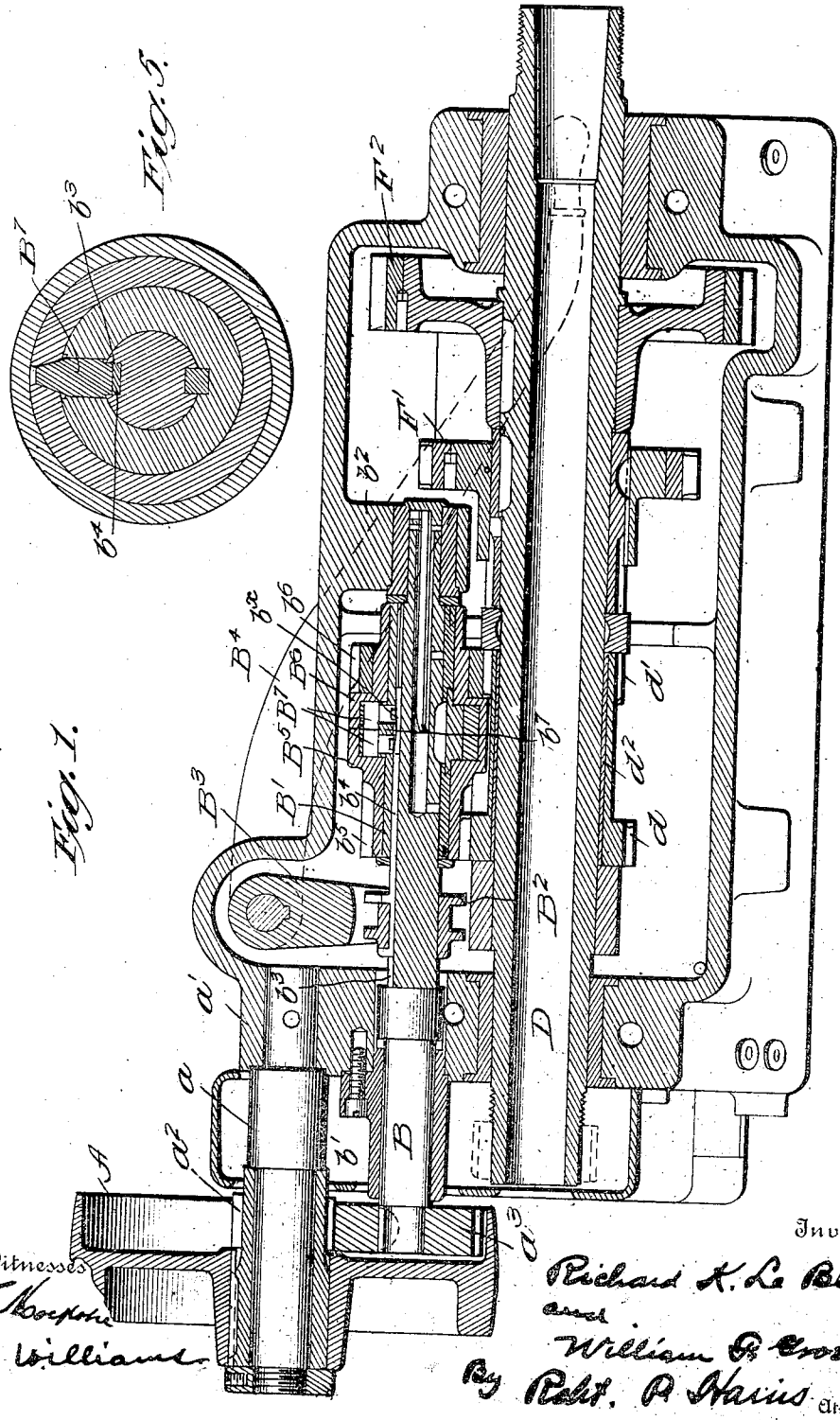

Fig. 2.

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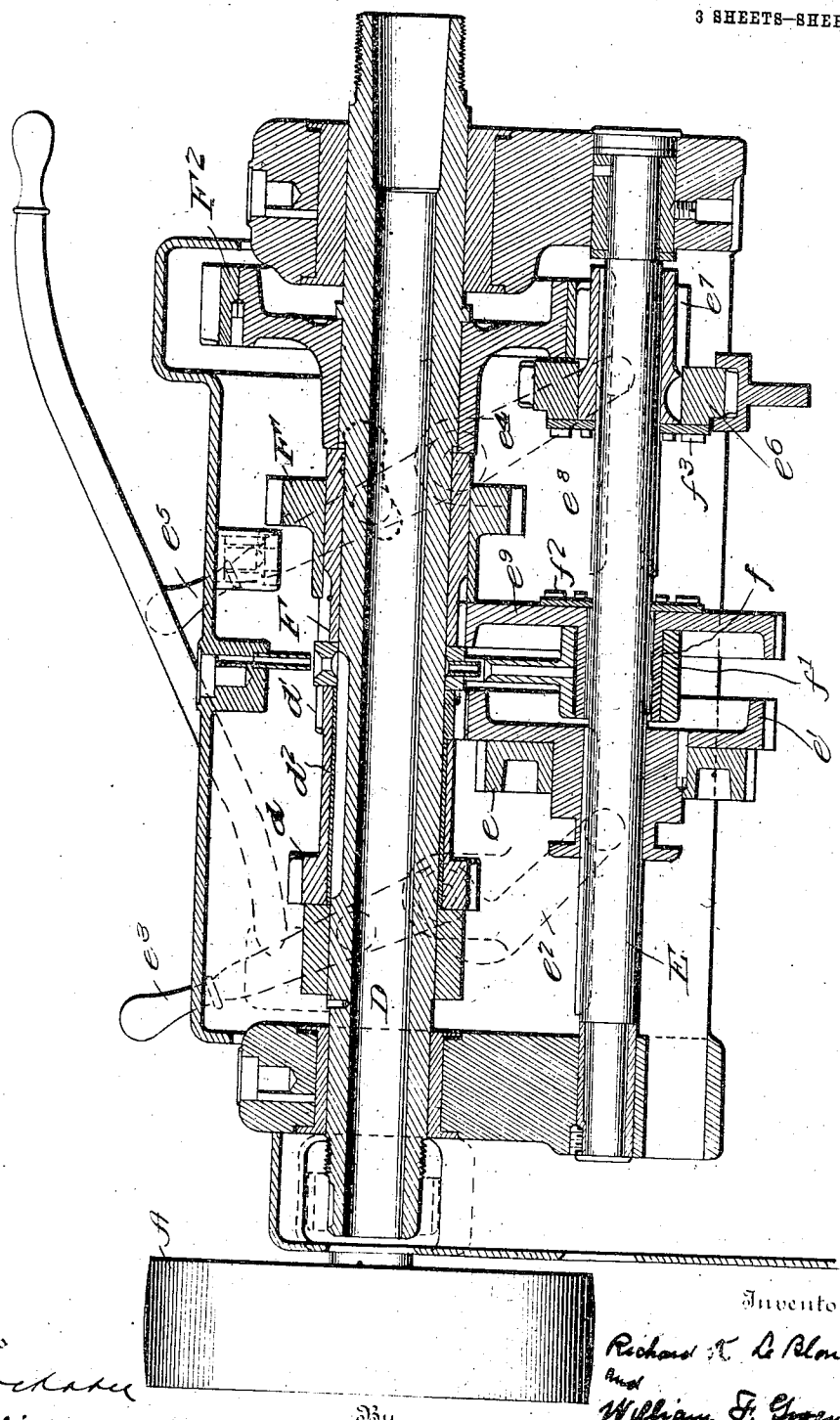

Fig. 2.

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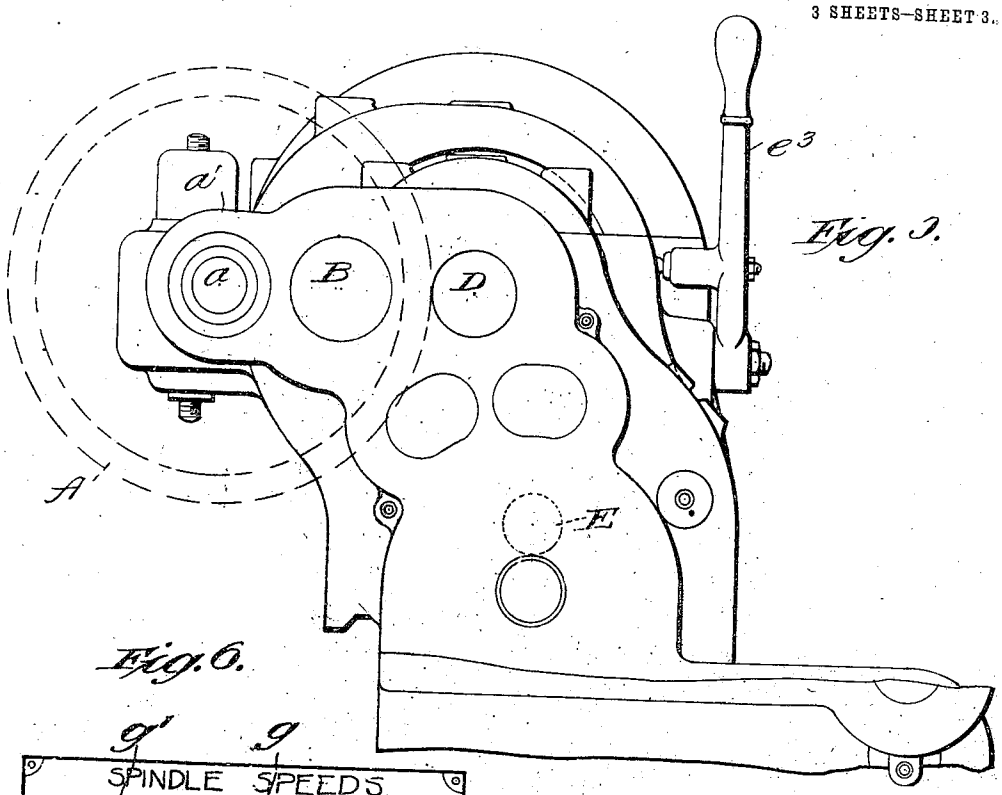
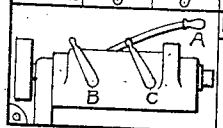


Fig. 3.

Fig. 6.

g' g

SPINDLE SPEEDS.					
POSITION OF LEVERS			SPINDLE SPEEDS	WORK DIA. FOR SURFACE SPEEDS		
A	B	C		40 FT.	50 FT.	60 FT.
			9.5	16 1/8	20	24 1/8
			13.5	11 3/8	14 1/16	17
			16.5	9 1/4	11 1/2	13 7/8
			23.5	6 1/2	8 1/8	9 3/4
			31	4 15/16	6 1/8	7 3/8
			44.5	3 7/16	4 1/4	5 1/8
			54	2 13/16	3 1/2	4 1/4
			77	2	2 1/2	3
			104	1 1/2	1 13/16	2 3/16
			148	1	1 1/4	1 5/16
			180	7/8	1 1/16	1 1/4
			256	5/8	3/4	7/8

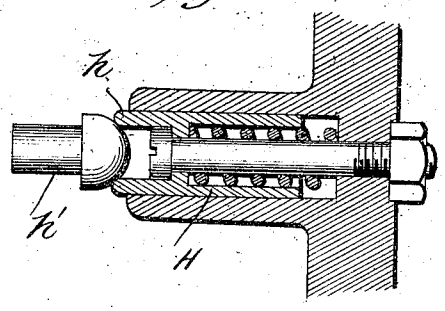


DRIVING PULLEY 300 R.P.M.

g2

G

Fig. 4.



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UNITED STATES PATENT OFFICE.

RICHARD K. LE BLOND AND WILLIAM F. GROENE, OF CINCINNATI, OHIO, ASSIGNORS TO THE R. K. LE BLOND MACHINE TOOL CO., OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

LATHE-GEARING.

980,974. Specification of Letters Patent. Patented Jan. 10, 1911.

Application filed August 27, 1909. Serial No. 514,964.

To all whom it may concern:

Be it known that we, RICHARD K. LE BLOND and WILLIAM F. GROENE, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Lathe-Gearing, of which the following is a full, clear, and exact specification.

This invention relates to certain new and useful improvements in speed changing mechanism.

The invention has for its object the production of improved mechanism whereby a number of different speeds may be imparted to a driven shaft from a driving shaft rotating at a constant speed.

A further object is to provide means for increasing the number of possible changes in the rate of rotation of the driven shaft with respect to the constant speed of the power, without increasing the size of the head or housing.

A further object is to so arrange the speed changing mechanism and the controlling means therefor that in moving the handles in a given direction, the speeds always increase in a regular proportion, thus avoiding the peculiar jumps in speeds that occur in the mechanisms covered by the patents issued to us and upon which this is an improvement, said patents being numbered 845,005 and 857,562, and dated February 19, 1907 and June 18, 1907, respectively.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a horizontal sectional view illustrating our improved speed changing mechanism; Fig. 2 is a vertical sectional view thereof. Fig. 3 is an end view; Figs. 4 and 5 are details; and Fig. 6 is a view of the direct reading index plate.

Referring to the drawings, A designates a driving pulley, secured upon a stub shaft a, mounted within housing a'. Secured to said pulley is a pinion a^2 which meshes with a gear a^3 mounted upon the driving shaft B. The driving shaft B is mounted in suitable bearings b', b^2, carried by or forming part of the housing, and securely keyed thereon is a sleeve B′, provided with a longitudinal channel b^3 to receive a shifting blade b^4, which is given longitudinal movement through engagement with a shifting collar B^2, mounted on said shaft, said collar being shifted to give longitudinal movement to the blade by means of the yoke B^3 and lever B^4.

Mounted to rotate on the sleeve B′ are two sister gear shells B^5 and B^6, carrying gears b^5 and b^6, these shells being conjointly arched centrally to receive friction rings operated by dogs B^7, seated in bosses b^7, in the sleeve B′, and adapted to be projected therefrom by the cam faces b^x to force the rings into engagement with the inner wall of one or the other of the gear shells, according as the shifting blade is moved in one direction or the other to lock one or the other of the gears b^5 and b^6 to the sleeve, and therefore to the shaft.

Meshing with the gear b^5 is a gear d, and meshing with gear b^6 is a gear d', said gears d and d^1 being mounted upon a sleeve d^2 running loosely on the main or driven spindle D, whereby the operation of the clutching mechanism will deliver two distinct speeds to this sleeve gear. Immediately below the spindle D is an auxiliary or transmission shaft E carrying sliding gears e, e'. By means of a yoke e^2 and lever e^3, the gear e may be thrown into mesh with the gear d, and gear e' may be thrown into mesh with gear d^1, thereby imparting variations in the speed of shaft E, according to the trains of gears through which power is transmitted. Also mounted on the shaft E are sliding gears e^6 an e^7, which are driven by a long double feather e^8, on said shaft. These gears e^6 and e^7 are arranged to mesh with gears F′, F^2, all keyed fast to the spindle D and are shifted by yoke e^4 and lever e^5. The gear F also on said main spindle meshes with a gear e^9, provided with a long hub or boss f carried in a bearing f', of the main head casting, said gear e^9, being merely an idler that is meshed with the gear F at all times. The face of gear e^9 is provided with clutch teeth f^2 arranged to be engaged by complemental teeth f^3 of pinion e^6. When the gears e^6 and e^7 are slid far enough on the shaft E the clutch teeth are engaged to drive the gear e^9 at the speed of shaft E, so that by the movement of the lever three

distinctive speeds are obtained on this movement, namely, from gear e^7 to gear F^2, from gear e^8 to gear F', and from gear e^9 to gear F.

In order to aid the operator in making quick changes of speed and to accurately shift the levers e^3 and e^5, we have arranged the index plate G which is designed to be attached to the cover of the machine in plain view of the operator. In the middle column g of the plate are indicated twelve spindle speeds with which the head is provided; immediately to the left, at g', the position of the levers for each speed is shown. The position of the levers for getting any definite speed can thus be determined at once by the operator without being obliged to carry a series of letters and numbers in his mind, while setting the handles. The index plate also gives, at g^2, the proper work diameter for surface speed 40, 50, and 60 ft. a minute, from which the operator can determine at a glance the position of the levers to obtain the correct surface speed for the work. In making selection the spindle speed can be entirely ignored, the operator merely selecting the surface speed required for his work, and opposite this can be seen at once the position of the levers.

The levers e^3 and e^5 are locked by means of spring pressed latches H each provided with sockets h arranged to engage a headed stud h', thereby preventing accidental movement of said levers.

In operation it will be noted that the clutch on shaft B will cause rotation of either gear b^6 or b^6, which in turn would give two speeds to each of the gears, d, d', meshing with gears e, e', whereby four speeds may be given to shaft E. In this connection it will be noted that the gear e^6 is driven from shaft E so that four speeds are obtained for each of the gears e^9, e^6, and e^7, making twelve speeds for the spindle D, the increase or decrease in speed, as the case may be, being made progressively, as per index G. The gears are so arranged that the movement of the levers e^3 and e^5 increases or decreases the speed, the increase taking place by movement of both handles in the same direction. Moving the lever e^5 to the right would increase the speed of shaft D as gear e^6 would mesh with F'. Moving farther to the right would cause the drive to go from e^9 to F, further increasing the speed. Moving lever e^3 to the right would increase the speed as the drive will be from d to e, whereas in the extreme left it goes from d' to e'.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent of the United States, is:—

1. A speed changing gearing comprising a driving shaft, selectable gearing mounted thereon, a transmission shaft, a plurality of sets of independent shiftable change speed gears mounted on said transmission shaft, a driven shaft, gears thereon, independent means for shifting each set of gears on the transmission shaft, said shifting means being movable in one direction to progressively increase the speed of the driven shaft and movable in the opposite direction to progressively decrease the speed of said driven shaft, an idler operatively connected with said driven shaft, and means coöperating with one of said sets of shiftable gears for operatively connecting said idler with said transmission shaft.

2. A speed changing mechanism comprising a driving shaft, selectable gears mounted thereon, a transmission shaft, a plurality of independent sets of shiftable gears thereon, a driven shaft, gears thereon, a pinion on said driven shaft, an idler meshing with said pinion, means for shifting the gears on said transmission shaft, and means coöperating with one of said sets of shiftable gears for connecting said idler with said transmission shaft.

3. A speed changing mechanism comprising a driving shaft, selectable gears mounted thereon, a transmission shaft, a plurality of independent sets of shiftable gears thereon, a driven shaft, gears thereon, a pinion on said driven shaft, an idler meshing with said pinion, means for supporting said idler independently of said shafts, and means cooperating with one of said sets of shiftable gears for connecting said idler with said transmission shaft.

4. A speed changing mechanism comprising a driving shaft, selectable gears mounted thereon, a transmission shaft, a plurality of independent sets of shiftable gears thereon, a driven shaft, gears thereon, a pinion on said driven shaft, an idler meshing with said pinion, said idler being provided with a hub, a sleeve in which said hub is mounted, and means coöperating with one of said sets of shiftable gears for connecting said idler with said transmission shaft.

5. A speed changing mechanism comprising a driving shaft, selectable gears mounted thereon, a transmission shaft, a plurality of independent sets of shiftable gears thereon, a driven shaft, gears thereon, an idler meshing with a pinion on said driven shaft and supported independently of the transmission shaft, means for shifting the gears on the transmission shaft, and means for operatively connecting said idler and one of the last mentioned gears.

6. A speed changing mechanism comprising a driving shaft, selectable gears mounted thereon, a transmission shaft, a plurality of independent sets of shiftable gears thereon, a driven shaft, gears thereon, an idler supported independently of said shafts and

meshing with a pinion on said driven shaft, said idler being provided with clutch teeth, and means for shifting the gears on the transmission shaft, one of said gears being provided with clutch teeth arranged to engage the clutch teeth of said idler.

In testimony whereof we have signed our names to this specification in the presence of two witnesses.

RICHARD K. LE BLOND.
WILLIAM F. GROENE.

Witnesses:
FRANK S. PARKS,
GRACE A. PUGH.