J. M. TATMAN.

GEARING FOR LATHES.

APPLICATION FILED JAN. 29, 1912.

1,031,396.

Patented July 2, 1912.

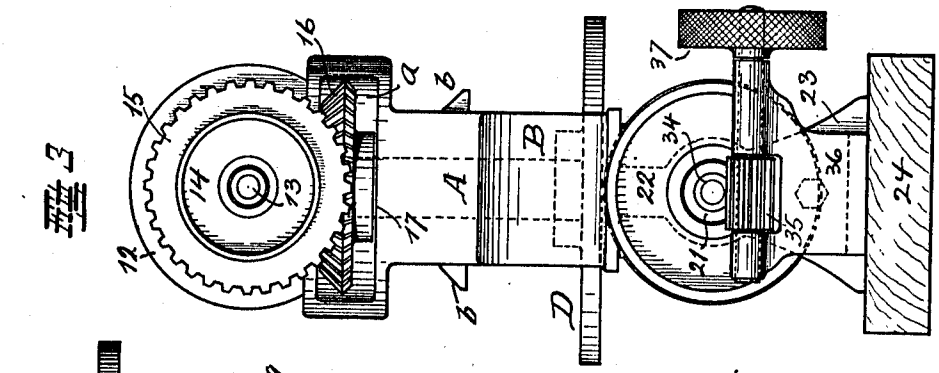

Fig. 3.

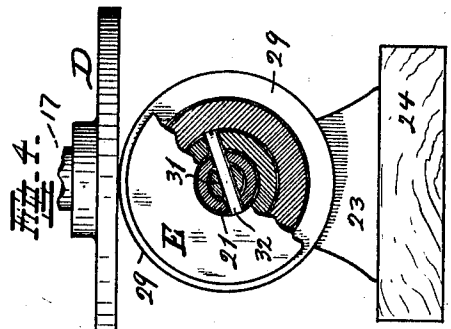

Fig. 4.

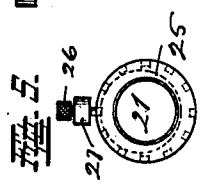

Fig. 5.

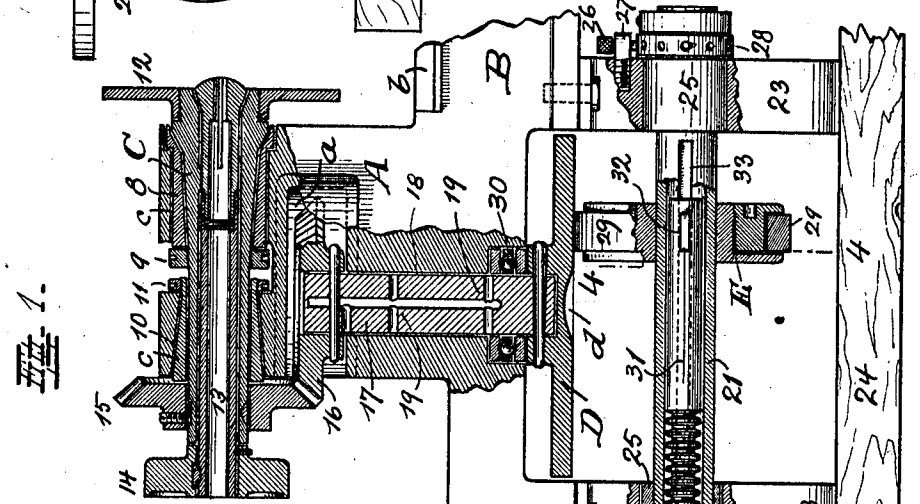

Fig. 1.

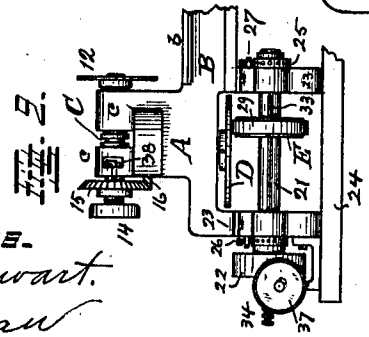

Fig. 2.

Witnesses.
M. H. Stewart.
T. LeBeau

Inventor:
James M. Tatman
by C. Spengel atty.

UNITED STATES PATENT OFFICE.

JAMES M. TATMAN, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI PRECISION LATHE CO., OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

GEARING FOR LATHES.

1,031,396. Specification of Letters Patent. Patented July 2, 1912.

Application filed January 29, 1912. Serial No. 674,028.

To all whom it may concern:

Be it known that I, JAMES M. TATMAN, a citizen of the United States, and residing at Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Improvements in Gearing for Lathes; and I do declare the following to be a clear, full, and exact description of the invention, attention being called to the drawing which accompanies this application and forms a part thereof.

This invention relates to new and useful improvements in lathes more particularly of that species also known as precision lathes.

The features of the invention consist mainly of the means for rotating the lathe-spindle, of means for changing the speed of this rotation and of certain details of construction, all as hereinafter described and pointed out in the claims.

The invention is also illustrated in the accompanying drawing in which:—

Figure 1, shows the head-end of the lathe, partly in side elevation and with parts broken away on a longitudinal central section. Fig. 2, is a side-elevation of these parts shown at reduced scale. Fig. 3, is an end-view of the head-end of the lathe as it appears when viewed from the left of Fig. 1. Fig. 4, is a vertical cross-section of certain parts and as indicated by line 4—4 in Fig. 1. Fig. 5, illustrates a shaft-adjusting device.

This invention concerns only the head end of the lathe with adjacent parts of the bed thereof. This latter, the tail-stock and the carriage with the tool-holding and adjusting devices are not involved and therefore not shown.

A indicates the head-stock and B the lathe-bed which serves to support the aforementioned carriage and tail-stock, ways *b* being provided to which these latter are fitted. The head-stock is rigidly connected to the lathe-bed, by preference it is integral.

C is the lathe-spindle, mounted in bearings *c*—*c* provided on the upper part of the head-stock. Provision to compensate for wear in these bearings is made by screw-adjustable, tapering split sleeves, interposed between the spindle and these bearings. Sleeve 8 in one of these bearings is interiorly tapered and seated upon a complementary, tapered portion of the spindle. A screw-collar 9 threaded upon the spindle serves to adjust this sleeve and to push it further into the bearing as wear increases. Sleeve 10 in the other bearing is exteriorly tapered and fitted into the complementary tapered bearing. A screw-collar 11 is threaded upon its smaller end and serves to adjust this sleeve by pulling it farther into this bearing.

The spindle is made hollow and provided with the usual face-wheel 12 to permit connection of work-holding devices, chucks, dogs, &c. A split chuck or collet is shown within the spindle and held in work-clamping position by a screw-connected pull-rod 13, manipulated for adjustment by a hand-wheel 14. The spindle is rotated by a pair of complementary bevel-gears 15 and 16, the first mounted upon the spindle and the other upon an upright shaft 17, and occupying a recess *a* in the head-stock. This shaft is supported in a bearing 18, formed in the head-stock and in part of the lathe-bed below the head-stock and extends below this latter where a friction-disk D is connected thereto. Channels 19 for distribution of lubricant are provided in this upright shaft. This shaft is rotated by a friction-wheel E mounted upon a shaft 21 and driven by a pulley 22. Shaft 21 is supported on feet 23, provided to support the lathe-bed below the head-stock. A similar foot is provided under the other end of the lathe-bed. These feet may rest upon a suitable base which may be a plank 24. The bearings for shaft 21 are contained in cylindrical boxes 25 fitted to corresponding openings in said feet and movable in a rotary direction therein. These bearings are formed eccentrically within said boxes, and in the assembling and first adjustment of the parts, they occupy their lowest position as best shown in Figs. 1 and 5, that is one in which shaft 21 is farthest away from disk D. Possibility is thus given to raise this shaft to restore driving contact between the friction-elements if impaired by wear between their engaged surfaces. For such purpose said boxes are moved, each to a like extent, within the openings which they occupy, thereby raising the shaft correspondingly and moving wheel E harder against disk D. Pins 26 are used to hold these boxes in their adjusted positions and also against rotation, said pins

being seated in projections 27, provided on feet 23 and engage with their ends one of a number of socket-openings 28 provided for the purpose in the extended ends of said boxes. End-thrust produced in shaft 17 by this adjustment and by the contact between the friction-elements is counteracted by a ball-bearing 30 provided above disk D.

The engaged surfaces between the friction-elements are of a material dissimilar and of a character which favors frictional contact.

By preference the face of wheel E is formed by a ring 29, made of a material like leather, fiber or compressed paper. The body of this wheel is vertically divided and consists of two screw-connected parts, each comprising a flange adapted to hold ring 29 between them and permitting also removal of this ring and replacing thereof in case wear has gone beyond limits restorable by adjustment of boxes 25.

Rotation of the spindle in opposite directions is had by positioning wheel E, so as to contact with disk D either on one or on the other side of the center thereof and each one of these rotations may be varied in speed according to the distance at which wheel E engages disk D from its center. For such purpose the position of wheel E is rendered adjustable lengthwise on its shaft 21, a rod 31 being provided for the purpose within said shaft, the latter being hollow for the purpose. This rod is connected at one end to wheel E and extended beyond the outer end of shaft 21 where it is accessible for manipulation. Its connection to wheel E is by means of a key 32 attached to said rod and extending through slots 33 in shaft 21 and beyond them into the hub-portion of wheel E. See Fig. 4. This latter is thereby locked to shaft 21 for rotation, while slots 33 in said shaft permit at the same time its longitudinal adjustment which may be had without interference with the rotation.

Any suitable means may be used to move rod 31 to shift the position of wheel E, as for instance a handle may be provided in connection therewith. The means I have shown consist of a rack and pinion, the rack-teeth being formed in the outer portion of rod 31 and as shown at 34 in Fig. 1. 35 is the pinion for this rack, its shaft being mounted in a suitable support 36 and provided with a hand-wheel 37 for manipulation.

A depression *d* is provided in the center of disk D, so that, when the face of the wheel E is below this depression, no frictional contact takes place. The reduced resistance to any adjusting movement experienced by the operator at that moment serves also as a notice to him, in case he is shifting to reverse direction of rotation, that wheel E has arrived in a position from which further movement in the same direction will bring about the desired effect. In case he is merely changing speeds it indicates to him that he must not go beyond it.

38 is an adjustable locking pin and by being adapted to be shifted into engagement with gear-wheel 15, serves to hold the spindle against rotation while hand-wheel 14 is manipulated.

Having described my invention, I claim as new:

1. In a lathe of the kind described, the combination of a spindle horizontally mounted for rotation, a bevel-gear carried on it; an upright shaft, a bevel-gear at the upper end thereof and in mesh with the gear on the spindle, a friction-disk at its lower end, a complementary friction-wheel to rotate it and a driving-shaft for the friction-wheel.

2. In a lathe of the character described, the combination of a spindle, a driving-shaft, complementary friction elements, one of which is adjustably mounted on the driving-shaft, means whereby the other element is operatively connected to the spindle, and means to shift the element on the driving-shaft, to change direction of rotation and speed of rotation.

3. In a lathe, the combination of a frame, a support rigidly connected thereto and provided with an upright shaft-bearing and with horizontally disposed spindle-bearings, a spindle mounted in these bearings and a shaft in the upright bearing, complementary bevel gears operatively connecting the upright-shaft and the spindle, complementary friction elements, one of which is carried by the upright shaft and a driving-shaft for the other element.

4. In a lathe, the combination of a frame, a support thereon provided with an upright shaft-bearing and with a recess at the upper end of this bearing, spindle-bearings on this support above this recess, a spindle mounted therein and a shaft in the upright bearing which extends into the recess above this bearing and below the same, a bevel-gear mounted on the upper end of the shaft and within said recess, another bevel-gear on the spindle in mesh with this gear, complementary friction-elements, one of which is carried on the lower end of the upright shaft and a driving-shaft for the other friction-element.

5. In a lathe, the combination of a support, two horizontally disposed spindle-bearings thereon, a spindle supported in these bearings, a split-sleeve in one of them and interiorly tapered and fitted against a correspondingly tapering surface on the spindle, a split-sleeve in the other bearing, it being exteriorly tapered and fitted into the correspondingly tapered bearing, a screw-collar mounted on the spindle to adjust the interiorly tapered sleeve, a screw-collar to adjust the other sleeve, it being

mounted on the smaller end of the same, an upright shaft supported on the support, complementary bevel-gears, one on the shaft and one on the spindle to rotate this latter, complementary friction-elements, one of which is carried on the upright shaft and a driving-shaft for the other element.

6. In a lathe, the combination of a support, a frame for it, spaced feet to support the frame, a spindle horizontally mounted on this latter, an upright shaft below the spindle, means whereby the two are operatively connected, a friction-disk at the lower end of the upright shaft, a complementary friction-wheel to rotate it, a driving-shaft upon which this friction-wheel is mounted, cylindrical boxes containing eccentrically formed bearings for this shaft supported on the feet mentioned, and means to rotarily adjust these boxes on said feet, to maintain driving-contact of the friction-wheel with the friction-disk.

7. In a lathe, the combination of a spindle, complementary friction-elements, means whereby one of these elements is operatively connected to the spindle, a hollow driving-shaft upon which the other element is mounted, a key whereby this element is locked to the driving-shaft for rotation therewith, a rod within the hollow shaft to which the key is connected and which extends endwise beyond said shaft and means at the projecting end of said rod to manipulate it for shifting the friction-element on the driving-shaft.

8. In a lathe, the combination of a spindle, complementary friction-elements, means whereby one of these elements is operatively connected to the spindle, this particular element being provided with a central depression in its flat working face, a hollow driving-shaft upon which the other element is adjustably mounted and means to shift this adjustably mounted friction-element to a position on either side of said depression in the other element whereby the direction of rotation of this latter element is changed accordingly, the driving contact being broken while the face of the adjustable element is opposite said depression in the other element.

9. In a lathe, the combination of a spindle, complementary friction elements, means whereby one of these elements is operatively connected to the spindle, a hollow driving-shaft upon which the other element is mounted, a key whereby this element is locked to the driving shaft for rotation therewith, a rod within the hollow shaft to which the key is connected and which extends endwise beyond said shaft, the outer part of this rod being constructed to form a rack, a pinion supported in mesh with this rack and means to manipulate the pinion to move said rod for adjustment of the element mounted on the driving-shaft.

10. In a lathe, the combination of a support, a frame for it, spaced feet to support the frame, a spindle horizontally mounted on this latter, an upright shaft below the spindle, means whereby the two are operatively connected, a friction-disk at the lower end of the upright shaft, a complementary friction-wheel to rotate it, a driving-shaft upon which this friction-wheel is mounted, cylindrical boxes containing eccentrically formed bearings for this shaft supported on the feet mentioned and extended beyond them where they are provided with sockets, said boxes being adjustable in a rotary direction and holding pins provided opposite the extended part of these boxes and adapted to hold them in their adjusted positions when in engagement with one of the sockets therein.

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

JAMES M. TATMAN.

Witnesses:
M. H. STEWART,
C. SPENGEL.