(No Model.) 2 Sheets—Sheet 1.

W. L. SCHELLENBACH.

ENGINE LATHE.

No. 557,031. Patented Mar. 24, 1896.

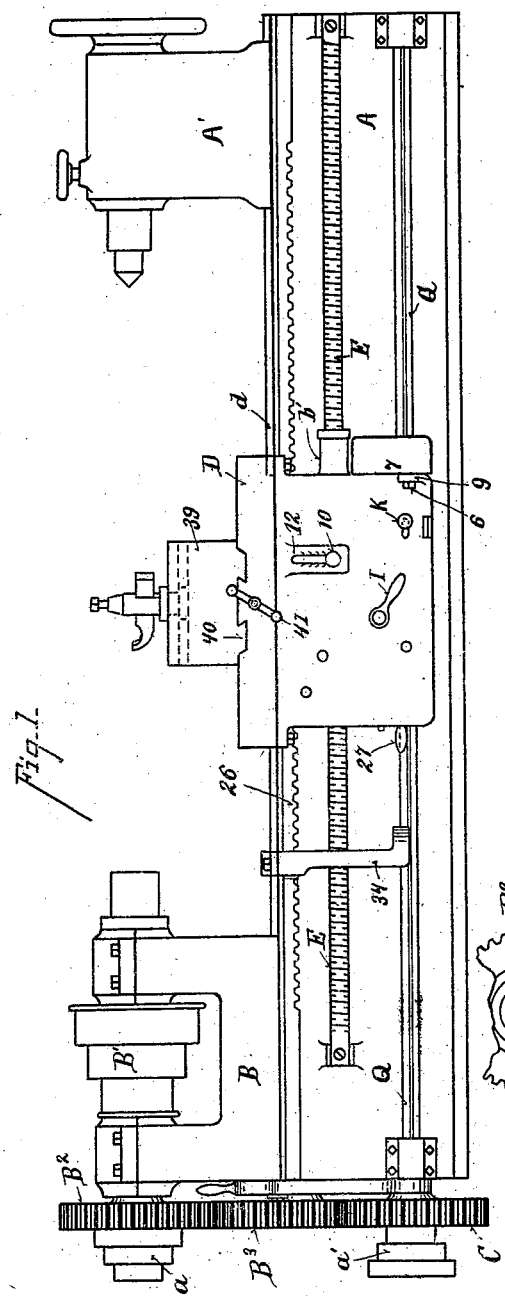

Fig. 1.

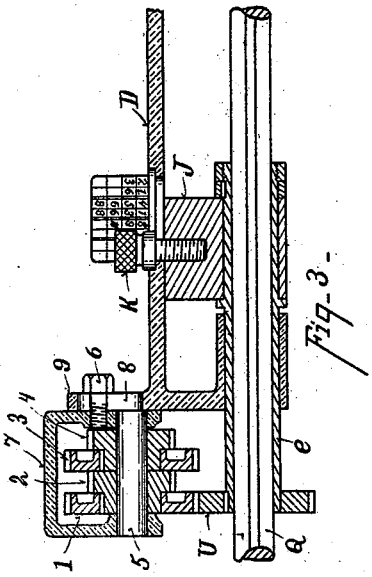

Fig. 3.

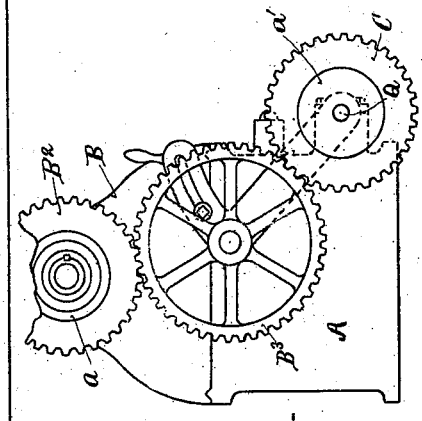

Fig. 2.

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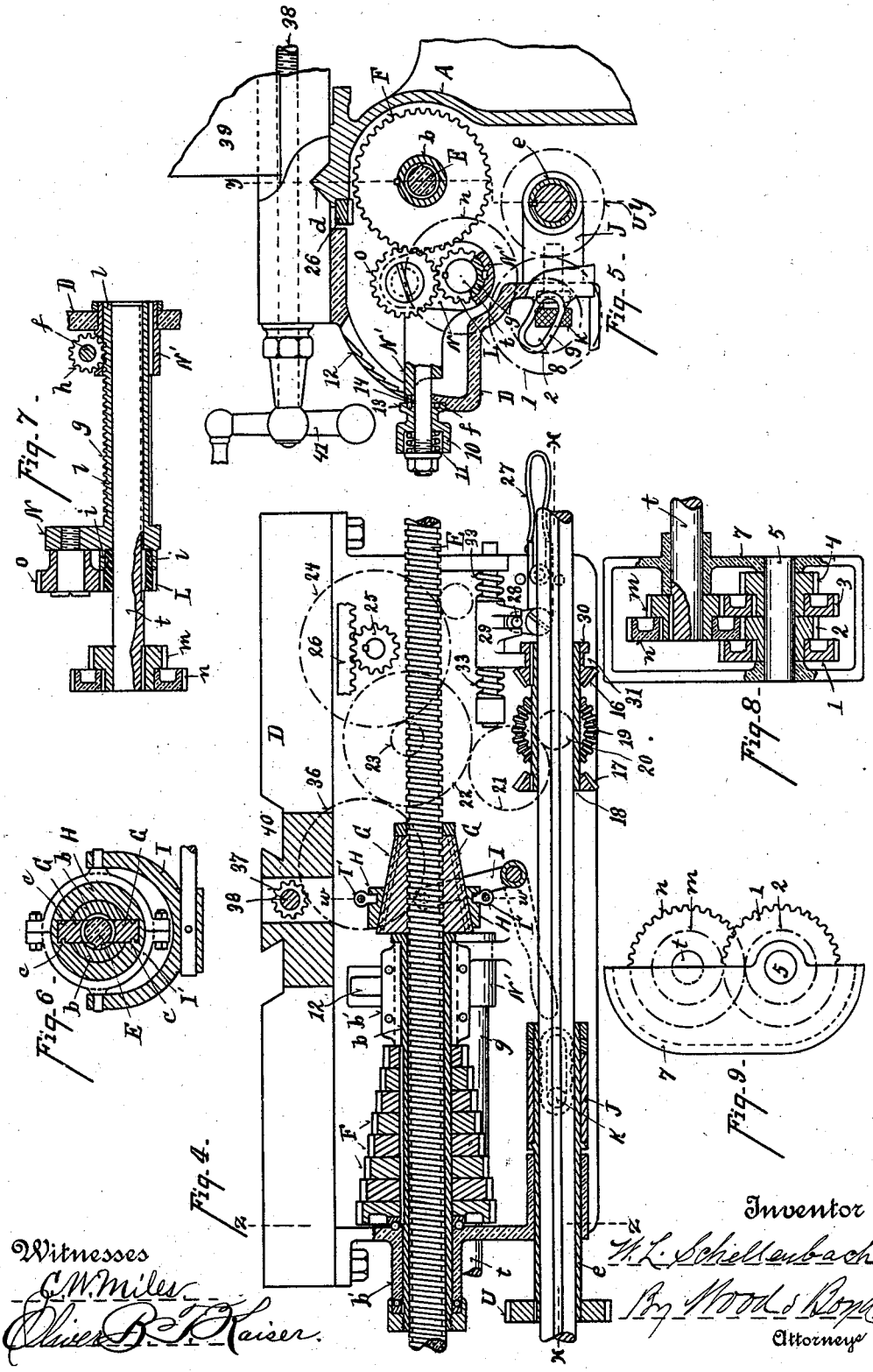

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UNITED STATES PATENT OFFICE.

WILLIAM L. SCHELLENBACH, OF LIBERTY, INDIANA.

ENGINE-LATHE.

SPECIFICATION forming part of Letters Patent No. 557,031, dated March 24, 1896.

Application filed November 15, 1895. Serial No. 569,089. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. SCHELLENBACH, residing at Liberty, in the county of Union and State of Indiana, have invented certain new and useful Improvements in Engine-Lathes, of which the following is a specification.

My invention relates to that class of lathes ordinarily termed "engine-lathes."

One of the objects of my invention is to provide ready means for changing the speed of the feeding-gear moving the tool-carriage.

Another object of my invention is to provide mechanism which will change the speed and set it to any desired rate for screw-cutting, so that any desired pitch of thread may be readily obtained by setting the speed, the adjusting-screws having indexes so that the parts can be brought accurately and quickly to the proper position.

Another object of my invention is to provide an increased range of speed adjustment.

Another object of my invention is to provide two sets of feeding mechanism—to wit, the screw-feed and the rack-and-pinion feed, with ready means for throwing the same out of or into gear.

The various features of my invention will be more fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my improved lathe in position for use. Fig. 2 is a left-hand elevation of Fig. 1. Fig. 3 is a section on line *x x*, Fig. 4. Fig. 4 is a section on line *y y*, Fig. 5. Fig. 5 is a section on line *v v*, Fig. 4. Fig. 6 is a section on line *w w*, Fig. 4. Fig. 7 is a detailed view of the adjusting devices. Fig. 8 is a sectional plan view of the outside change-gear and housing. Fig. 9 is an end elevation of Fig. 8.

A represents the bed of the lathe; A′, the tail-stock; B, the head-stock.

B′ represents the main driving-pulley.

B^2 represents the spur-gear, and B^3 a transmitter connected so that it may be thrown out of and in mesh with gear B^2. Gear B^3 meshes with and drives gear C on the shaft Q, which transmits motion to the several feeding-gears of the tool-carriage D.

a a′ represent cone-pulleys, also for changing the speed, if desired, of shaft Q.

When it is desired to feed the tool-carriage by a screw-feed, I provide the following devices: E represents a screw-threaded rod rigidly connected at each end to one side of the lathe-bed. The base portion of the tool-carriage D is preferably a hollow box, which spans the screw-shaft, and inside thereof is mounted a series of cone-gears F, which are attached to a sleeve *b* by a spline. Said sleeve is journaled in the boxes *b′*. To the inner end of said sleeve is attached the screw-feed, which consists of wedge-shaped jaws G. These jaws are inserted in slots cut into the sleeve, as shown in Fig. 6, which sleeve is enlarged on the inner end, as shown in Fig. 4. These jaws are splined to the collar H by tapered splines *c*. The segmental faces of these jaws are threaded to engage with the screw-rod E and drive the carriage along the ways by motion imparted through gears F. Collar H is operated by a bell-crank lever I, engaging split ring I′, so as to move the collar H longitudinally with shaft E and remove the wedge-jaws G and disconnect their threads from engagement with screw-rod E. The driving of gears F when the screw-wedges are in engagement with the screw-rod propels the carriage D along its way *d* upon the lathe-bed.

In order that the speed of the screw-jaws may be readily increased or decreased, I provide the following transmitting mechanism and shifting mechanism: Shaft Q transmits motion by means of gear U mounted upon a sleeve *e* splined to shaft Q. Said sleeve is adjustable laterally on shaft Q by means of the outer sleeve J, which is sleeved upon the sleeve *e*. K represents a set-screw, the inner end of which taps the sleeve J to hold it in a fixed position. When the set-screw is released the sleeve J may be moved laterally, carrying with it the sleeve *e* and gear U. Gear U transmits motion to either one of the gears 1 2 3 4, as desired. These gears are mounted loosely upon shaft 5, gears 1 and 2 are splined together and gears 3 and 4 are splined together, and they are held in adjustable engagement with the gear U by means of set-screw 6, which taps into the housing 7, said set-screw 6 sliding in a slot 8 in upright 9 on the carriage D. The housing 7 is slid in or out to bring either one of the gears 1 2 3 4 into mesh with the transmitter U, as desired.

These gears 1 2 3 4 transmit motion to either of gears *m n* in housing 7, as shown by the transverse section Fig. 8, to shaft *t*. Shaft *t* carries the transmitting-gear L splined on shaft *t*. *o* represents a shiftable intermediate gear journaled on the oscillating arm N upon sleeve *l*. Said sleeve is likewise connected to the main shiftable gear L by pins or keys entering an annular groove *i* in the hub of the gear L, so that said gear is free to revolve and can be shifted laterally on the shaft *t* by means of the rack *g* and pinion *h* on the shaft *f* to adjust said gear laterally on the shaft *t* and shift the intermediate gear *o* into engagement with any one of the cone-gears F. Said shaft *f* is secured in position by means of knurl 10 and spring 11. In order adjust the said gears L and *o* laterally and to bring gear *o* into mesh with the smaller ones of the cone-gears the shaft *f* has got to be elevated at the outer end so that gear *o* will mesh with the smaller cone-gear. Now as the change from the larger to the next smaller makes a change increasing the speed of the feed and thereby increasing the pitch of the threads, notches are provided on the segment 12 for each step of increase, there being one notch for each of the smaller cone-gears F. Hence the operator can readily tell by this index with which of the cone-gears to make his adjustment and the adjustment when made is readily noted. An index may be made on the base 13 of the knurl so as to indicate the number of turns of shaft *f* and gear *h* which are required to show the distance that gear *o* is to be moved to bring it into position to engage the proper member of the cone-gear F. 14 represents a lock-pin which holds the knurl in the adjusted position on the lever N′, the shaft *f* being journaled in the said lever N′. It will be observed that the spring 11 rests in the recess of the knurl and allows the knurl to be pulled out at any time to release the engagement of the pin 14. It will be thus seen that I employ two sets of change feed-gears, one of them being intermediate between the cone-gear F and the main driving-gear C—to wit, the gears 1 2 3 4 and U. Thus there is an increased range of adjustment and variation of speed over what could be obtained by the cone-gear F and the shiftable gear *o*, and as each set of change-gears has an index-plate they can be so numbered as to obtain all the ranges of adjustment ordinarily required in an engine-lathe.

I have shown eight members of the cone-gear and I have shown four changes of speed for the intermediate change-gear, each four of which multiply the change of speed for each of the cone members, thus making thirty-two changes of adjustment in all, outside of the changes which may be obtained in the main driving-gear.

It is sometimes desired to employ the rack-and-pinion feed for the tool-carriage. In Fig. 4 I show the construction and arrangement of these parts. 16 17 represent bevel-gears mounted upon sleeve 18, which sleeve is splined upon shaft Q. 19 represents a bevel-gear journaled opposite and adapted to engage with either one of the bevels 16 or 17. 20 represents a spur-gear engaging and driving gear 21, which in turn transmits motion to gear 22. Spur-gear 23 on the hub of gear 22 transmits motion to gear 24. 25 represents a spur-gear upon the axis of gear 24, which transmits motion to the apron from rack 26, which is formed on the lathe-bed. As the gear 25 is keyed to a shaft which journals in the tool-carriage D, a revolution of said gear propels the carriage on its ways across the bed of the lathe, according to the direction in which the same is revolved. In order that this gear may be normally held out of engagement, I provide a lock-lever 27, which carries a crank-arm 28 engaging with the gear-shifter 29, one arm of which yokes around the hub 30 of gear 16 and engages with the groove 31, so that as said shifter 29 is moved backward and forward the gears 16 17 may be brought into or out of mesh with gear 19, as desired. 33 represents springs which normally hold the shifter 29 in the middle position when both gears 16 and 17 are out of mesh, and it is the position they occupy when the screw-feed is employed to move the tool-carriage. When it is desired to use the rack-feed, the screw-feed is thrown out and the setting-lever 27 is moved to bring into engagement one of the bevel-gears 16 or 17, as desired, when the rack-teeth operate the tool-carriage. In order to automatically trip and throw the rack-gear out, I provide a stop 34 on the lathe, against which the setting-lever strikes when it is moved into the central position. This stop 34 may be adjusted along the lathe to any desired point.

It is sometimes desired to feed the tool-post automatically across the tool-carriage. To accomplish this I provide a gear 36 meshing with gear 23 and transmitting motion to gear 37 on the tool-shaft 38, which tool-shaft is threaded in the tool-head 39 and moves it in the dovetailed ways 40 on the face of the tool-carriage D.

If desired, the gear 36 may be adapted to be shifted out of engagement with the gear 37, so that the tool head or post 39 can be moved laterally by rotating the tool-shaft 38 through the medium of the handle 41, but as this does not constitute any part of my present invention, I do not deem it necessary to illustrate the same, especially in view of the fact that shiftable gears are well known.

I claim—

1. In a lathe the feeding devices for the tool-carriage consisting substantially of a screw-rod attached to the lathe, a series of cone-gears, a nut attached thereto and engaging with the screw-rod, a shiftable gear and a transmitter mounted upon a laterally and rotary adjusting-arm, substantially as specified.

2. In a lathe employing a stationary screw-

rod, cone-gears and a nut connected thereto, a shiftable gear and a transmitter mounted upon a laterally and rotary adjusting-arm and means for locking the parts to their adjusted position, substantially as specified.

3. In a lathe in combination with a tool-carriage a screw-rod secured to the lathe, a series of cone-gears loosely journaled upon said screw-rod, and the wedge-jaws G, connected to the journals of the cone-gear and means for opening and closing said jaws, substantially as specified.

4. In a lathe in combination with the tool-carriage D the screw-rod E, cone-gears F, wedge-jaws G, and the shiftable gear *o* mounted upon the adjustable arm N which carries the transmitter L, and provided with the knurl and index adjustment, substantially as specified.

5. In a lathe a feed-screw rod attached to the lathe in combination with a tool-carriage, a series of cone-gears, journaled upon the screw-rod, a shiftable intermediate gear mounted upon an arm having a transmitting-gear as its center and secured to a traveling sleeve mounted upon the transmitting-shaft, and devices for adjusting said sleeve longitudinally and mechanism for adjusting the shiftable intermediate gear radially on said shaft, substantially as specified.

6. In a lathe employing a screw-rod for operating a traveling tool-carriage, the feed-shaft Q, in combination with a train of changeable gears mounted upon the tool-carriage and adapted to be adjusted longitudinally and radially, and the nuts 6 and K, for securing the parts in their adjusted position, substantially as specified.

7. In a lathe employing a stationary screw-rod secured thereto, and traveling tool-carriage having journal-supports for a longitudinal feeding-shaft Q, the combination of a train of changeable gear for transmitting motion to the cone-gear, and a second set of interchangeable gears interposed between the gear of said shaft Q and the cone-gear F, substantially as described.

8. In a lathe having a traveling tool-carriage, the combination with the cone-gears F, of the shafts 5 and Q journaled on the carriage and provided respectively with the transmitter-gear U, and the series of intermediate shiftable gears, the shaft *t* having the gears *m* and *n* co-operating with said shiftable gears, the shiftable gear *o* mounted on the shaft *t* and engaging any of the cone-gears, and means for shifting the shiftable gear, substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM L. SCHELLENBACH.

Witnesses:

C. W. MILES,

OLIVER B. T. KAISER.