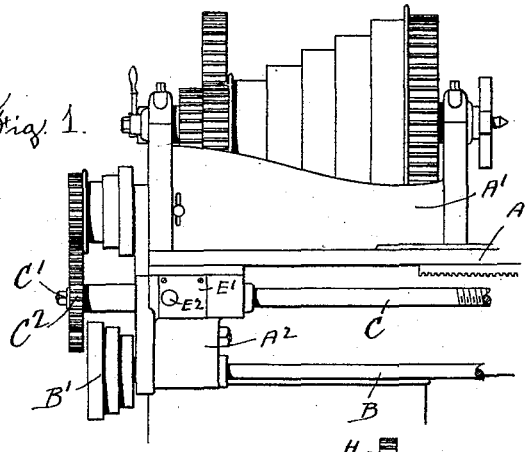
(No Model.)

G. D. CHAPMAN.

LATHE.

No. 566,060. Patented Aug. 18, 1896.

Fig. 1.



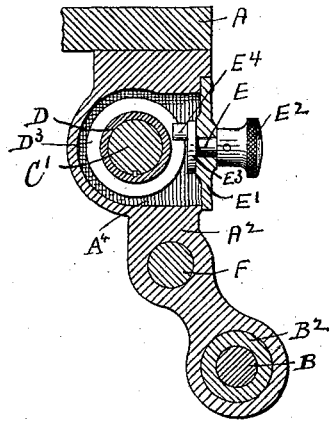


Fig. 4.

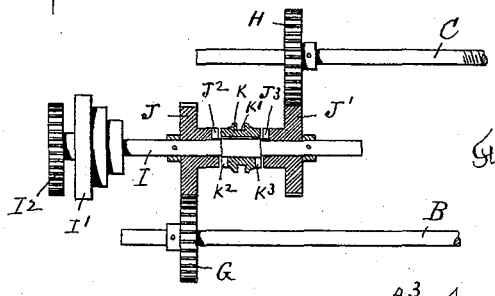


Fig. 5.

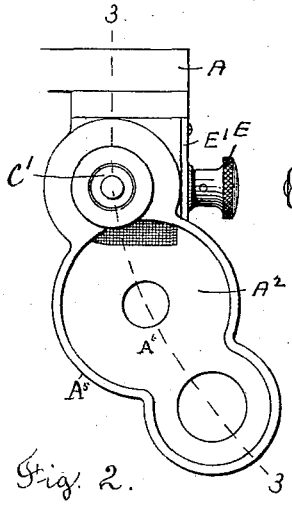


Fig. 2.

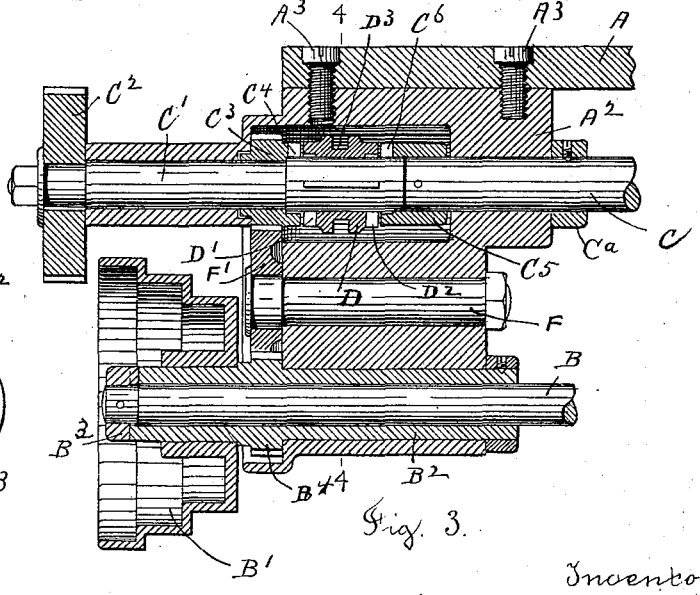


Fig. 3.

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LATHE.

SPECIFICATION forming part of Letters Patent No. 566,060, dated August 18, 1896.

Application filed February 25, 1895. Serial No. 539,692. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. CHAPMAN, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Lathes, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same and representing such portions of a lathe as embody my invention.

My invention is adapted particularly to that class of lathes known as "engine-turning" lathes, which are provided with parallel rotating shafts journaled in brackets at the side of the lathe-bed and employed to impart a traversing motion to the tool-carriage along the ways of the lathe, one of said shafts being provided with a screw-thread and known as the "feed-screw," while the other is designated the "feed-rod."

The object of my invention is to provide means by which either the feed-rod or feed-screw of the lathe can be connected with a rotating spindle, which is driven through a system of gearing known as "change-gears," such as are commonly employed in driving the feed-screw of the lathe; and it consists in the construction and arrangement of parts as hereinafter described, and set forth in the annexed claims.

Referring to the accompanying drawings, Figure 1 represents the head of a lathe, showing a portion of the bed and one of the brackets attached thereto, in which the feed-rod and feed-screw are journaled. Fig. 2 represents an end view of the bracket. Fig. 3 is a sectional view of the bracket on line 3 3, Fig. 2. Fig. 4 is a sectional view of the bracket on line 4 4, Fig. 3; and Fig. 5 represents a modified construction and arrangement of the clutching device, the operating parts only being shown.

Similar letters refer to similar parts in the different figures.

A denotes a portion of the lathe-bed, A′ the head in which the live-spindle of the lathe is journaled, and 2 is a bracket attached to the lathe-bed by screws A^3 A^3. The bracket A^2 supports one end of a feed-rod B and a feed-screw C, the opposite ends of the feed-rod and feed-screw being usually supported by a bracket attached to the opposite end of the lathe-bed. (Not shown in the drawings.)

The end of the feed-rod B is inclosed in a rotating sleeve B^2, journaled in the bracket A^2, said feed-rod and sleeve being operatively connected in any suitable manner—in the present instance by means of a collar B^3, attached to the end of the feed-rod and engaging the end of the sleeve B^2 by means of clutch-teeth. Attached to the sleeve B^2 is a cone-pulley B′, by which rotary motion is imparted to the sleeve B^2 and rod B by means of a belt connection with a driving-pulley in the usual and well-known manner. The sleeve B^2 is provided with a pinion B^4, either attached thereto or formed integrally with the sleeve, by which rotary motion can be imparted to the sleeve B^2 and rod B by means of connected operating mechanism, as hereinafter described.

The end of the feed-screw C is journaled in the bracket A^2, and is provided with an attached collar C^a, bearing against the side of the bracket, in order to receive the end thrust of the feed-screw.

Journaled in the bracket A^2 is a rotating spindle C′, with its axis in alinement with the axis of the feed-screw C and with their opposing ends contiguous. Attached to the spindle C′ is a gear C^2, forming one of a train of gears known as "change-gears," by which the spindle C′ is connected with the live-spindle of the lathe. Turning loosely upon the spindle C′ is a pinion C^3, provided at its side with clutch-teeth C^4.

Attached to the end of the feed-screw C is a collar C^5, provided with clutch-teeth C^6 on the side opposite the pinion C^3.

Sliding on the spindle C′, but having a spline connection therewith, is a sleeve D, having at one end clutch-teeth D′, adapted to engage the clutch-teeth C^4 on the pinion C^3, and having at its opposite end clutch-teeth D^2, adapted to engage the clutch-teeth C^6 on the collar C^5, and constituting a clutch by which the rotary motion of the driving-spindle C′ is imparted by the sliding motion of the sleeve D in the direction to the screw C and in the opposite direction to the pinion C^3 and feed-rod B. The sleeve is provided with an annular groove D^3 to receive the ac-

tuating-pin of the shipping mechanism, which consists of a spindle E, journaled in a plate E′, attached to the bracket A^2 and having a milled knob E^2, by which the spindle E is rotated by the operator in order to rotate the plate E^3 attached to the spindle E. The plate E^3 is provided with an eccentric-pin E^4, which engages the annular groove D^3 of the sleeve D, the pin E^4 being placed either directly above or below the axis of the spindle E when the sleeve D is midway between the pinion C^3 and collar C^5, and with its teeth disengaged from the teeth C^4 and C^6, thereby allowing the spindle C′ to rotate without imparting its motion to either the pinion C^3 or collar C^5.

A slight rotation of the spindle E in one direction serves to slide the sleeve D along the spindle C′ and carry the teeth D′ into engagement with the teeth C^4, causing the pinion C^3 to be rotated, while the rotation of the spindle E in the opposite direction will carry the teeth D^2 into engagement with the teeth C^6, imparting a rotary motion to the shaft C.

Held in the bracket A^2 is a stud F, upon which is placed an intermediate gear F′, capable of rotating on the stud F and engaging the pinion C^3 and the pinion B^4, so the rotation of the pinion C^3, turning loosely on the spindle C′, will impart a rotary motion to the feed-rod B through the pinion B^4 and intermediate gear F′. When the feed-rod is driven through the change-gear and spindle C′, the belt connection between the cone-pulley B′ and its driving-pulley is removed by throwing off the belt, as is usually done when the cutting-tool is actuated by the feed-screw.

I am aware that it is not new to operatively connect the feed-screw and the feed-rod of a lathe so the rotary motion of one will be imparted to the other, and I am also aware that it is not new to provide means by which the feed-rod and feed-screw can be connected or disconnected at will, and I do not claim either of these features broadly. The purpose of my present invention is to provide an improved means for accomplishing these results by which a single clutch only is required to connect the driving power communicated through the change-gears with either the feed-rod or feed-screw, and to simplify the construction and render it less liable to wear, and also to inclose the operating mechanism within the supporting bracket or framework.

In Fig. 5 I have represented a modified form of construction which, however, comes within the scope of a part of my invention, and other modifications will readily occur to those conversant with the construction of this class of machinery.

In the modified construction illustrated by Fig. 5, B denotes the feed-rod and C the feed-screw. To the feed-rod B, I attach the gear G, and to the screw C, I attach the gear H. Journaled between the feed-rod and feed-screw is a spindle I, to which rotary motion is imparted through either the cone-pulley I′ or the gear I^2, both of which are attached to the spindle I. Turning loosely upon the spindle I are the gears J and J′, provided upon their opposing sides with clutch-teeth J^2 and J^3. Sliding on the spindle I and between the gears J J′ is a sleeve K, having a spline connection with the spindle and provided with an annular groove K′ and with clutch-teeth K^2 and K^3, adapted to engage the teeth J^2 and J^3 on the gears J J′.

A shipping mechanism similar to that described above can be employed to slide the sleeve K and carry it midway the gears J J′ with its teeth disengaged from the teeth J^2 J^3, or to the right or left, bringing its teeth into engagement with either the teeth J^2 J^3, allowing the feed-rod B and feed-screw C to be entirely disconnected from the driving power, or either the feed-rod B or feed-screw C to be connected with the driving power at will.

In the modified construction shown in Fig. 5 it will be observed that the driving-spindle C′, which is shown in Fig. 3 as in alinement with the feed-screw C, is transferred to a position midway between the feed-rod and feed-screw and becomes the driving-spindle I; and it will be obvious that the driving-spindle can either be placed in alinement with the feed-screw, as shown in Fig. 3, in which case the sliding sleeve is made to engage clutch-teeth on the collar C^5, carried by the feed-screw, or it can be placed out of alinement with the feed-screw, as shown in Fig. 5, requiring intermediate gears. It will also be obvious that the feed-rod B and feed-screw C could be made to change places by making B the screw and C the feed-rod.

The gist of my invention, so far as it relates to the clutching mechanism itself is concerned, consists in employing a single rotating sliding clutch operatively connected with the driving power as communicated through the change-gears and placed between connected operative mechanism leading on one side to the feed-screw and on the other side to the feed-rod, whereby the sliding motion of the clutch in one direction serves to connect the driving power with the feed-rod, and its sliding motion in the opposite direction serves to connect it with the feed-screw, thereby enabling me to secure the extreme variation in the movement of the cutting-tool when actuated through the feed-rod as when actuated through the feed-screw. The bracket A^2 is provided with a chamber A^4, closed by the plate E′ in order to inclose the clutching mechanism, the milled knob E^2 being the only portion exposed to view, and at the edge of the bracket A^2 is a curved flange A^5, forming a chamber A^6 to inclose the pinion B^4 and the gear F′, so the front view of the lathe shows none of the connecting mechanism between the screw C and the feed-rod B.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a lathe, the combination with a feed-

screw and a feed-rod having parallel axes and journaled on the bed of the lathe, of a rotating spindle and means for imparting rotary motion thereto, mechanism for operatively connecting said spindle with said feed-screw, mechanism for operatively connecting said spindle with said feed-rod, the two connecting mechanisms aforesaid comprising a common clutching mechanism, whereby either the feed-screw or the feed-rod is connected with the rotating spindle by the operation of a single clutching mechanism, substantially as described.

2. In a lathe, the combination of a feed-screw, a feed-rod and a driving-spindle, all journaled on the bed of the lathe, means for imparting rotary motion to said driving-spindle, a pinion running loosely on said driving-spindle, a sliding clutching mechanism having a spline connection with said driving-spindle and adapted to connect said driving-spindle with said feed-screw when moved in one direction, and to connect said driving-spindle with the pinion running loosely thereon when moved in the opposite direction, and means for connecting said loose pinion with said feed-rod, substantially as described.

Dated this 11th day of February, 1895.

GEO. D. CHAPMAN.

Witnesses:

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J. M. SARGENT.