

H. L. FLATHER.
FEED REVERSING MECHANISM AND STOP MOTION.

(Application filed Feb. 4, 1898.)

(No Model.)

3 Sheets—Sheet 1.

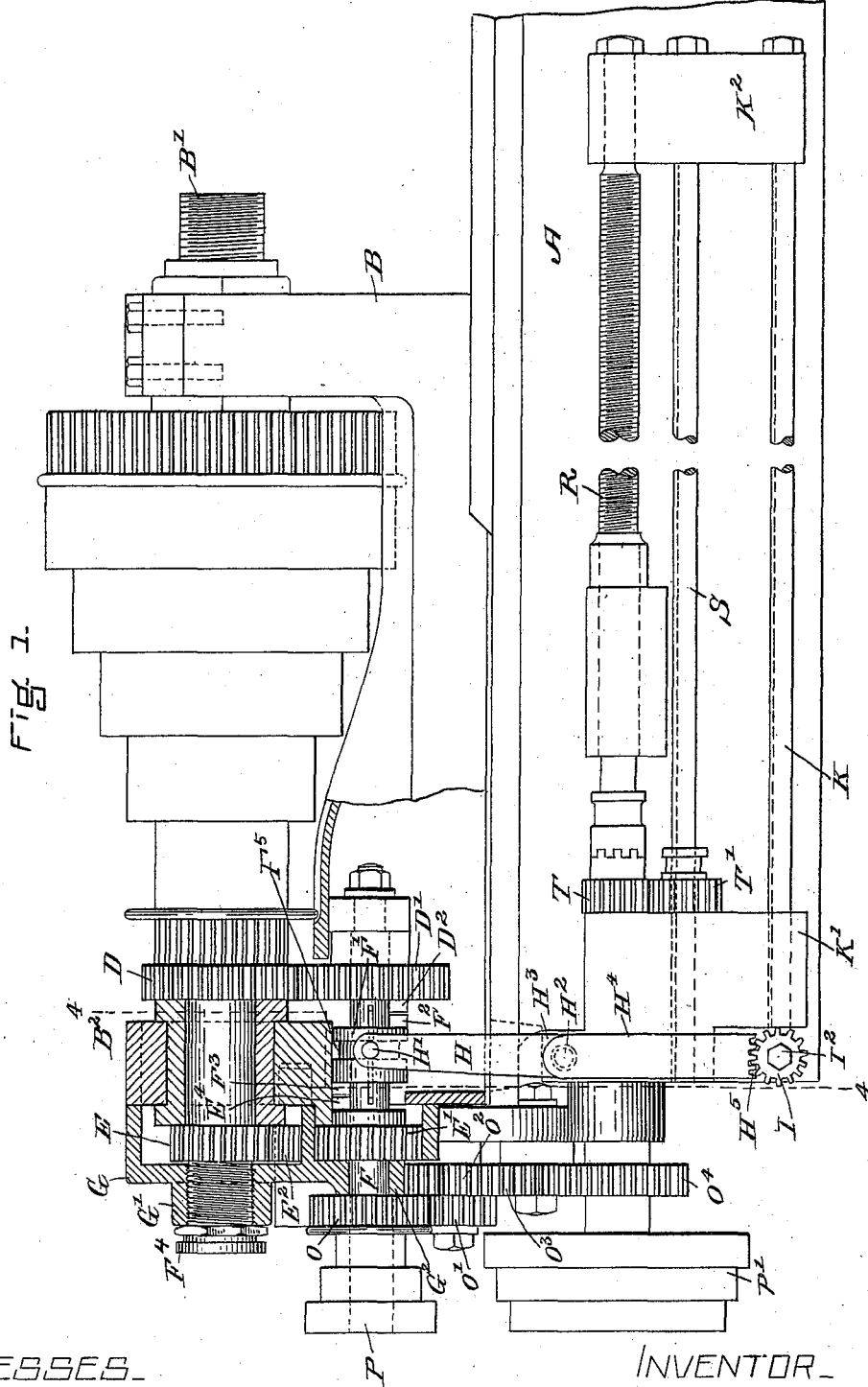


Fig. 1.

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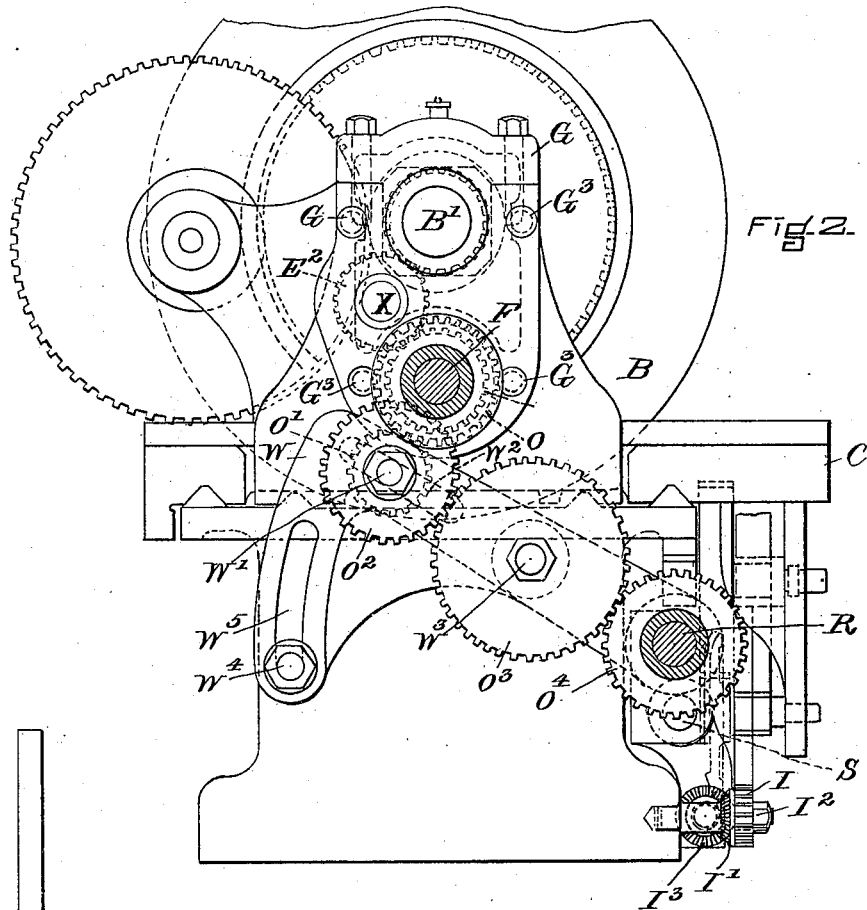


FIG. 2.

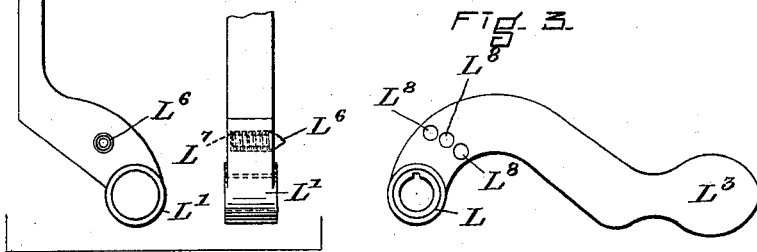


FIG. 3.

FIG. 3.^a

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No. 617,567.

Patented Jan. 10, 1899.

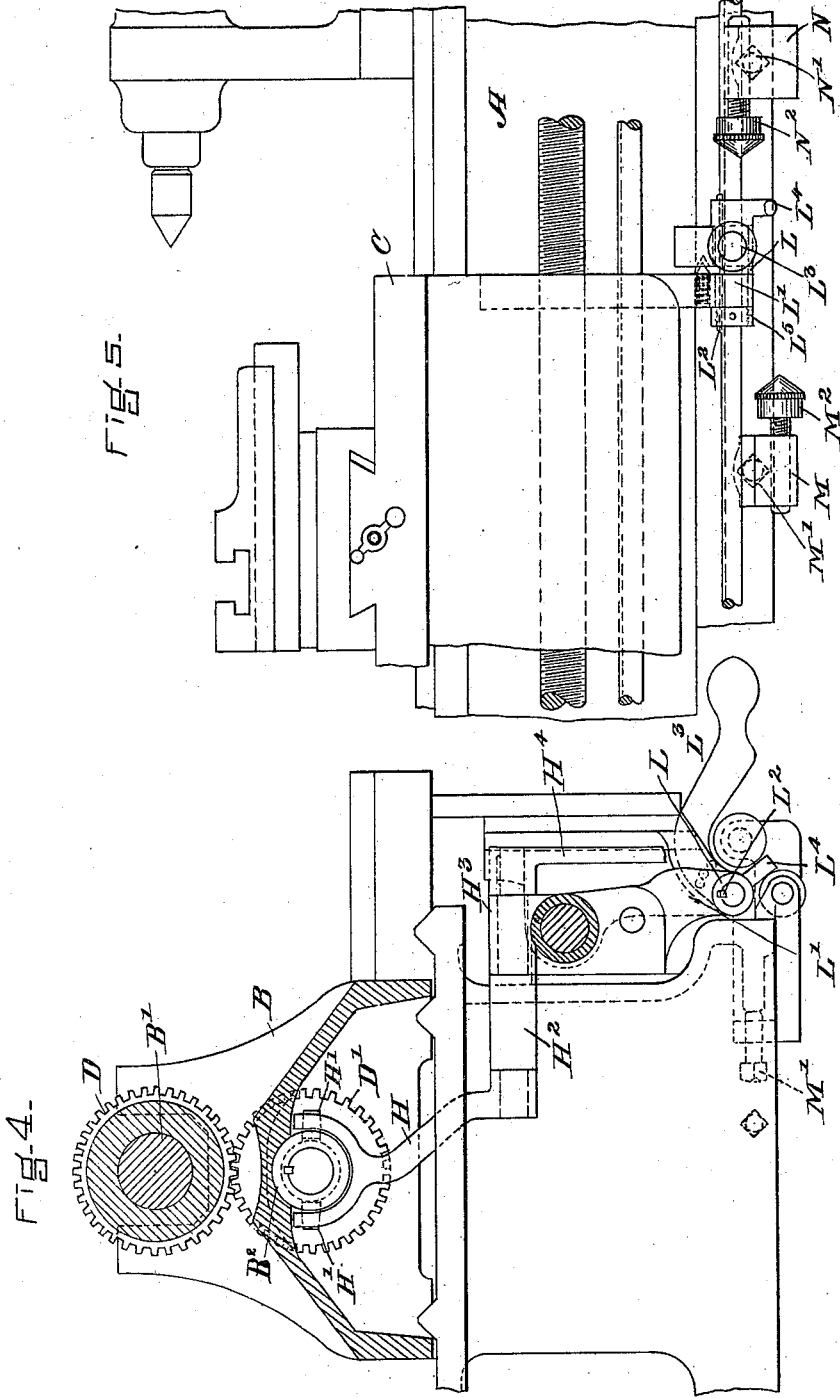
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3 Sheets—Sheet 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

HERBERT L. FLATHER, OF NASHUA, NEW HAMPSHIRE.

FEED-REVERSING MECHANISM AND STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 617,567, dated January 10, 1899.

Application filed February 4, 1898. Serial No. 669,166. (No model.)

To all whom it may concern:

Be it known that I, HERBERT L. FLATHER, a citizen of the United States, residing at Nashua, county of Hillsborough, and State of New Hampshire, have invented certain new and useful Improvements in an Automatic Stop-Motion and Feed-Reversing Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a feed-reversing mechanism and an automatic stop-motion connected therewith, together with an improvement in the bearings for the upper feed-shaft and clutch mounted thereon.

The object of my invention is to arrange the upper feed-shaft so as to reduce the gears necessary to produce a right and left feed to a minimum and at the same time to arrange the bearings for the upper feed-shaft and clutch mounted thereon so that the tendency to cramp the clutch and spring the upper feed-shaft out of alinement when coarse threads and heavy cuts are being taken is entirely eliminated.

A further object of my invention is to provide a feed-reversing rod that may be operated from the apron by the operator for the purpose of causing the carriage to feed in either direction or to throw the feedworks out of operation entirely, or the reversing-rod may be operated upon by adjustable stops provided with cone-headed adjusting-screws which contact with a projection mounted on the reversing-rod and operates to stop the feedworks when the carriage is feeding in either direction.

Another object of my invention is to arrange and construct the adjustable stops so that the projection attached to the reversing-rod will pass freely by said stops when the feedworks are out of operation.

The novel features of my invention are more fully described and pointed out by means of the drawings accompanying this specification.

In the drawings, Figure 1 represents a front elevation of a portion of a lathe-bed with the head-stock mounted thereon, a portion of the head-stock being cut away to show the upper

feed-shaft clutch and gears mounted thereon and sections of the lead-screw, feed-rod, and the clutch-operating rod and its connecting mechanism. Fig. 2 is an end elevation of the same and shows the casing attached to the outer end of the head-stock in which the upper feed-shaft has a bearing, together with the feed, gearing, and a portion of the carriage. Fig. 3 is a detached side elevation of the handle, which is mounted to slide on the reversing-rod and used to turn said reversing-rod in operating the clutch. Fig. 3^a represents a side elevation and a front elevation of the reverse-rod bearing, which is attached to the apron of the tool-carriage in which the reverse-rod is revolubly and longitudinally movable. Fig. 4 is a cross-section through the line 4 4, Fig. 1, and shows an end view of the clutch and clutch-operating mechanism. Fig. 5 is a front sectional elevation of a portion of the lathe-bed and the tail-stock mounted thereon, together with a section of the carriage, feed-screw, feed-rod, reversing-rod, and the stops and handle for operating the same.

Similar letters refer to similar parts throughout the several views.

A represents a lathe-bed, on which are mounted the head-stock B and the carriage C. The head-stock B has bearings, in which are revolubly mounted the live-spindle B', which is provided with a cone-pulley and back-gears such as are usually found in engine-lathes. The gears D and E are revolubly mounted on the live-spindle B' on either side of the bearing B².

F is the upper feed-shaft and has loosely mounted thereon the feed-gears D' and E', which are driven by the gears D and E, the gear E' being driven by the gear E through the medium of the intermediate gear E², which meshes with the said gears E and E'.

F' is a clutch mounted on the upper feed-shaft F with spline, so that it revolves with said feed-shaft F, but has a free longitudinal movement on the same. It is also provided with a bearing in the head-stock for its outer surface. Said clutch F' is provided with the clutch-teeth F² and F³. The clutch-tooth F² is adapted to engage with the clutch-tooth D², which is attached to the inner side of the

gear D', while the clutch-tooth F³ is adapted to engage the clutch-tooth E⁴, attached to the inner side of the gear E'.

G is a casing attached to the rear end of the head-stock B and inclosing the gears E, E', and E² and is provided with the bearing G' for the stop-screw of the live-spindle B' and the bearing G² for the outer end of the upper feed-shaft F.

The location of the bearing G² is an important feature of my invention, as it places said bearing near the feed-gears and feed-cone, and thereby prevents the tendency to cramp said feed-shaft F by reason of the strains incident to use.

H represents a clutch-lever, one end of which is forked and provided with the studs H' H', which operate in the groove F⁵ in the clutch F'. The outer end of the clutch-lever H is screwed to one end of the rocker-shaft H². Said rocker-shaft H² is provided with the bearing H³, in which it freely oscillates. To the other end of the rocker-shaft H² is attached the lever H⁴ by one of its ends, its other end being provided with the gear-teeth H⁵, which mesh with the spur-gear I. The spur-gear I has the bevel-gear I' secured to its inner face. The said gears I and I' have a bearing and revolve freely on the stud I², which is secured to the bed of the lathe. The bevel-gear I³ is attached to one end of the reverse-rod K and is adapted to mesh with the bevel-gear I'. Said reverse-rod K has the bearing K' at one end and the bearing K² at its other end and the bearing L' attached to the carriage intermediate said bearings K' and K².

L is a sleeve which surrounds the clutch-rod K and is adapted to freely oscillate in the bearing L'. Said sleeve L is provided with the key L², which fits loosely in a keyway in the reverse-rod K, thereby permitting a free longitudinal movement of the sleeve L on the rod K, but compelling them to rotate together. The sleeve L is provided with the handle L³, the projection L⁴, and the collar L⁵ to confine it in place.

M and N are adjustable stops and are adapted to be attached to the bottom of the lathe-bed A on its front edge at any point between the legs of the lathe. The stop M is provided with the binding-screw M' and the cone-headed adjusting-screw M², which is adapted to contact with the projection L⁴, while the stop N has the binding-screw N' and the cone-headed adjusting-screw N², adapted to contact with the projection L⁴. The adjusting-screws M² and N² have threaded bearings in projecting portions of the adjustable stops M and N, and the said projecting portions are shaped to permit the projection L⁴ to pass freely by them when it is in a central position and the feedworks are out of operation. When the feedworks are in operation and the tool is cutting in either direction, the projection L⁴ is either thrown up or down and in the path of one of the ad-

justing-screws M² or N², so that when the cutting-tool has reached the point at which the operator has set the adjustable stops to throw the feedworks out of operation the projection L⁴ will contact with one of the adjusting-screws M² or N² and be thereby thrown into its central position, stop the feedworks, and freely pass by both adjustable stops. The series of feed-gears O, O', O², O³, and O⁴ drive the feed-screw R from the upper feed-shaft F. The said feed-screw R may also be driven by a belt running on the cone-pulleys P and P', the pulley P being mounted in the outer end of the feed-shaft F and the pulley P' on the outer end of the feed-screw R.

S is the feed-rod, which is driven by the feed-screw R through the medium of the gears T and T'. Said feed-screw R and the feed-rod S revolve in the bearings K' and K², attached to the lathe-bed A.

W is an adjustable swinging arm which is pivoted on a projection of the bearing K' and is provided with the stud W', secured in the slot W². Said stud W' has revolubly mounted thereon the gears O' and O². The swinging arm W is also provided with the stud W³, upon which is revolubly mounted the gear O³, and the binding-screw W⁴ secures the said swinging arm W in position and operates in slot W⁵.

X is a stud secured in the head-stock upon which the gear E² is revolubly mounted. The gear E² has sufficient longitudinal movement on the stud X to permit the operator to disengage it from the gears E and E', if desired.

L⁶ is a locking-pin which has a bearing in the bearing L'. It is pressed outward by the spiral spring L⁷, which surrounds it. The locking-pin L⁶ is provided with a cone-shaped head adapted to engage in any one of the series of holes L⁸ L⁸ L⁸ in the inside of the handle L³. The series of holes L⁸ L⁸ L⁸ and the locking-pin L⁶ are provided for the purpose of retaining the handle L³ in either of its positions—to wit, for driving the carriage either to the right or left or when the feed mechanism is out of operation.

F⁴ represents the step or thrust bearing of the live-spindle B', which has a threaded bearing in the casing G.

The adjusting-screws M² and N² are used for the purpose of obtaining a fine adjustment of the stops in cases where the work being done has slight variations in length.

A worm or spiral cam operating on worm-gear teeth may be used instead of the bevel-gears I' and I² or fixed cones or cams attached to the stops M and N in place of the adjusting-screws M² and N² without departing from the spirit of my invention.

What I claim is—

1. In a lathe, the combination of a head-stock with a casing attached to its rear end which is provided with a threaded bearing to receive the live-spindle step, and a bearing for the outer end of the upper feed-shaft, two series of feed-gears connecting the said

live-spindle and the upper feed-shaft, one of said series of feed-gears being inclosed by said casing.

2. In a lathe, the combination of a lathe-bed having adjustable stops attached thereto, adjusting-screws having a threaded bearing in said stops, a reversing-rod having a projection mounted thereon, longitudinally movable and rotating therewith and means for operating the clutch mounted on the upper feed-shaft from the reversing-rod.

3. In a lathe, the combination with adjustable stops movably mounted on the lathe-bed, of a longitudinally-movable projection mounted on the reversing-rod, means for contacting said projection with said stops and automatically throwing it out of their path and the means for connecting said reversing-rod and the clutch on the upper feed-shaft.

4. In a lathe, automatic stop mechanism consisting of adjustable stops attached to the lathe-bed, a reversing-rod operated by said adjustable stops, bevel-gears connecting the reversing-rod and a spur-gear, a lever having gear-teeth cut in one of its ends adapted to engage the spur-gear, and means for connecting the lever and a clutch.

5. In a lathe, the herein-described feed mechanism consisting of feed-gears mounted on the live-spindle on either side of its rear bearing; a support attached to the rear end of the head-stock; an upper feed-shaft one

end of which has a bearing in said support, its other end having a bearing in the head-stock; feed-gears loosely mounted on the upper feed-shaft, and a clutch mounted on said upper feed-shaft adapted to engage either of said feed-gears, said clutch having a bearing on the feed-shaft and a bearing in the head-stock, and means for engaging and automatically disengaging said clutch, as shown.

6. Automatic stop mechanism, consisting of adjustable stops having adjustable contact-screws threaded therein, a reversing-rod having a longitudinally-movable projection mounted thereon adapted to contact with said adjustable stops and be automatically thrown out of their path.

7. Feed mechanism consisting of an upper feed-shaft, feed-gears mounted thereon and driven from the live-spindle, a clutch having a bearing on said upper feed-shaft and a bearing for its outer surface in the head-stock, means for connecting said clutch with the reversing-rod and automatic stops for operating said reversing-rod.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 12th day of January, A. D. 1898.

HERBERT L. FLATHER.

Witnesses:

R. P. ELLIOTT,
EDWARD T. BEACH.