

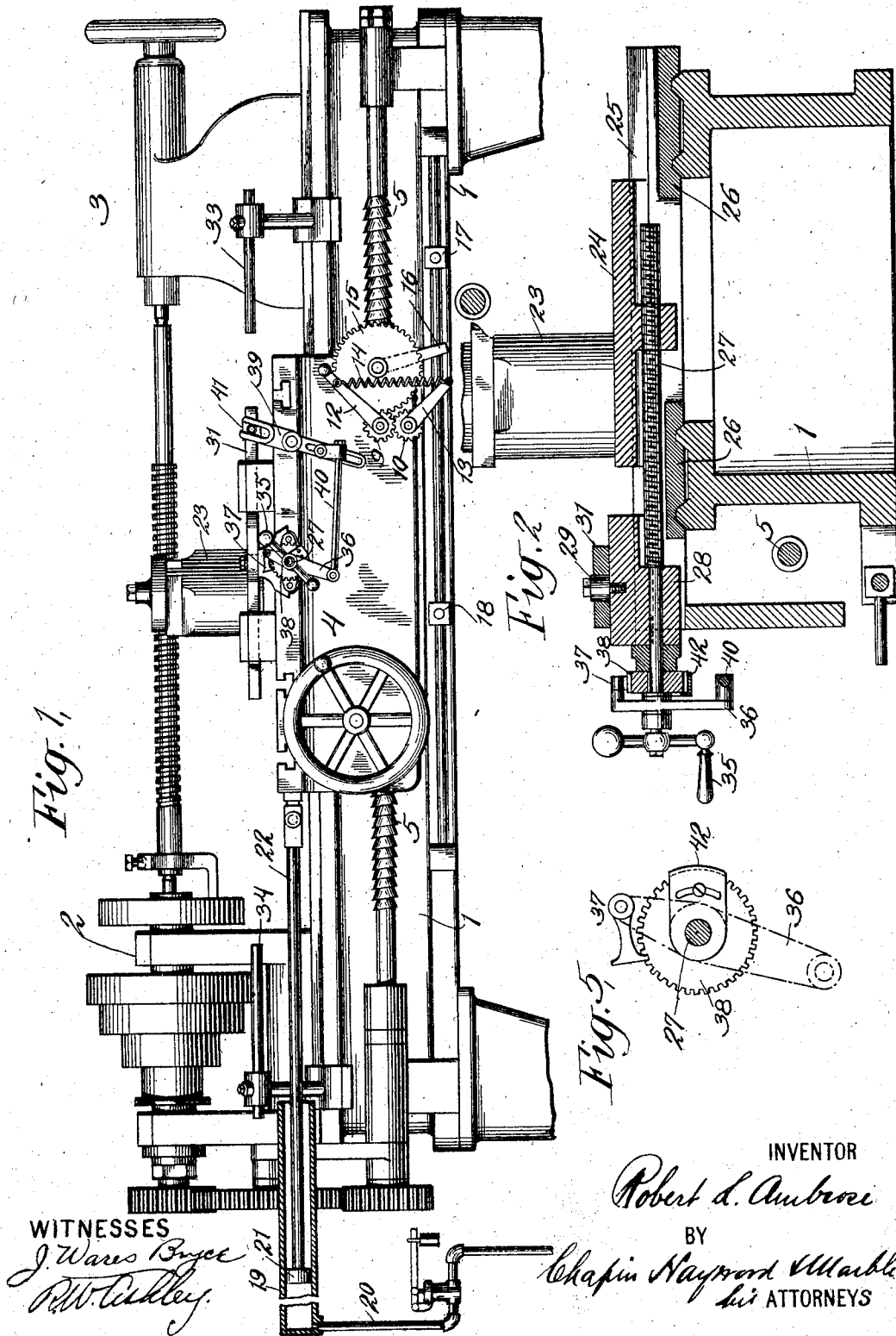
No. 796,171.

PATENTED AUG. 1, 1905.

R. L. AMBROSE.
LATHE.

APPLICATION FILED JULY 22, 1902.

2 SHEETS—SHEET 1.



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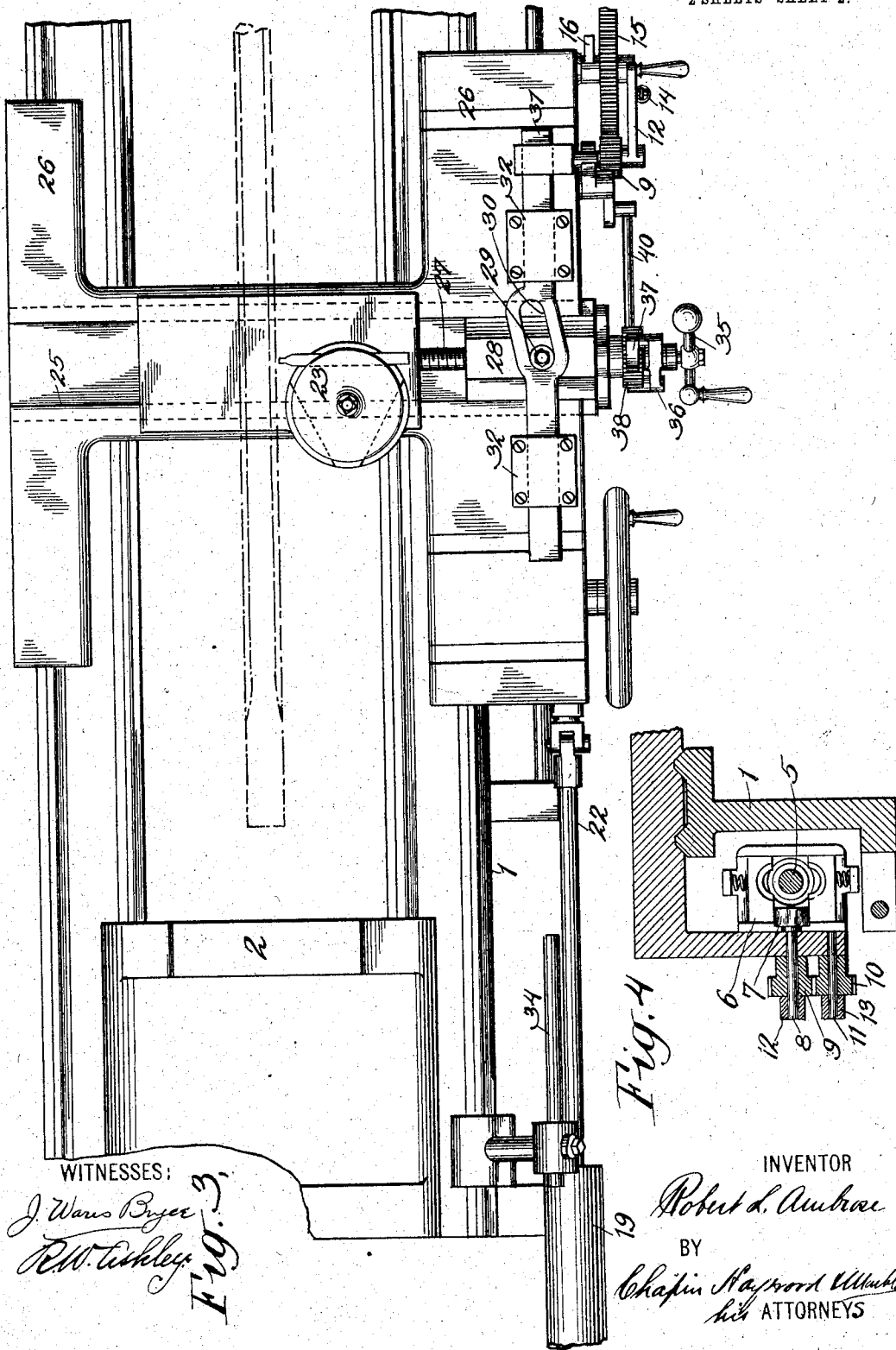
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UNITED STATES PATENT OFFICE.

ROBERT L. AMBROSE, OF TARRYTOWN, NEW YORK, ASSIGNOR TO RAND DRILL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

LATHE.

No. 796,171.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed July 22, 1902. Serial No. 116,494.

To all whom it may concern:

Be it known that I, ROBERT L. AMBROSE, a citizen of the United States of America, residing at Tarrytown, county of Westchester, State of New York, have invented certain new and useful Improvements in Lathes, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in lathes, and particularly to that class of lathes known as "screw-cutting" lathes.

My invention consists in the provision, in connection with gearing for feeding the lathe-carriage forward positively and for automatically withdrawing the tool from engagement with the work at a predetermined point, of certain improved automatic quick-return mechanism for returning the carriage quickly and positively to an initial position, in the provision of certain improved means for operating the cross-feed of the lathe at certain periods, and in various other novel features of construction and combination of parts, as will appear more fully hereinafter.

The main object of my invention is to cause the various movements of the lathe, as described, to operate automatically and successfully.

My invention further consists in certain details of construction and combination of parts, as will hereinafter be more fully described; and further objects of my invention will appear hereinafter.

I will now proceed to describe a lathe embodying my invention and will then point out the novel features in claims.

In the drawings, Figure 1 is a front view of a lathe embodying my invention. Fig. 2 is a view in transverse section, the plane of section being taken substantially upon the axis of the cross-feed screw. Fig. 3 is a top view of the lathe. Fig. 4 is a detail sectional view showing the relative arrangement of the longitudinal feed-screw for the carriage and the split nut carried by the carriage and adapted to engage therewith. Fig. 5 is a detail view, on an enlarged scale, of certain parts of the carriage, cross-feed mechanism, and a shield employed in connection therewith.

An ordinary form of screw-cutting lathe is illustrated herein, in which 1 designates the bed, and 2 3 the headstock and tailstock, which

carry means whereby an object to be acted upon may be supported.

26 designates the lathe-carriage as a whole, and 5 the longitudinal feed-screw, adapted in its rotation to cause the carriage to move longitudinally along the bed. The carriage carries a split nut 6, which when closed is adapted to engage the longitudinal feed-screw, thereby connecting the feed-screw with the carriage. (See particularly detail Fig. 4.) A cam 7, mounted upon a spindle 8, is also carried by the carriage, and when turned in the position at which it is shown in Fig. 4 of the drawings will force the two portions of the split nut 6 apart and cause them to disengage the feed-screw. A pinion 9 is secured to the same spindle 8 to which the cam is secured and meshes with a small gear-wheel 10 upon a spindle 11, also carried by the carriage. Levers 12 and 13 are mounted upon the spindles 8 and 11 and are secured to the respective pinions 9 and 10. A spring 14 tends to draw the two levers 12 and 13 together. The lever 12 is preferably provided with a knob or handle, by which it may be turned by hand to the left looking at Fig. 1 or returned again to the position in which it is shown in Fig. 1. The pinion connections will cause the levers 12 and 13 to have similar movements upon opposite sides of their centers, and a movement to a position slightly past their centers in either direction will cause the spring 14 to act to continue the movement on such side of the centers to the limit allowed. When the levers 12 and 13 are in the position shown in Fig. 1 of the drawings, the cam 7 will be in the position shown in Fig. 4 and the split nut at such times out of engagement with the feed-screw. When the levers 12 and 13 are on the opposite sides of their centers, the cam will be in such a position as to permit a spring connection with which the split nut is provided to force the split-nut members together to again engage the feed-screw. The carriage further carries a spur-gear 15, which meshes with the pinion 9. Secured to move with the spur-gear 15 is a tripping-finger 16, and stationary abutments 17 18 are carried by the bed and arranged in the path of movement of the finger 16. Upon the continued return movement of the carriage along the bed 1—that is to say, upon the continued movement to the right of Fig. 1—the tripping-finger 16

will strike the stationary abutment 17 and will partially rotate the spur-gear 15, so as to throw the levers 12 and 13 upon the opposite sides of their centers. This will cause the split nut 6 to reengage the feed-screw 5, and the carriage 26 will be then fed forward along the bed in a direction toward the left of Fig. 1 until the tripping-finger 16 strikes the stationary abutment 18, when the levers 12 and 13 and their correlated parts will be returned to the position in which they are shown in Fig. 1 and the split nut 6 caused to again disengage the feed-screw 5.

I have shown means whereby yielding pressure may be applied to return the carriage to its initial position when the feed-nut is disengaged from the feed-screw in a cylinder 19, which is in open communication at one end through the pipe 20 with a source of compressed air or the like and a piston 21, mounted in said cylinder and connected with the carriage 4 by means of a connecting-rod 22. When forced forward, the carriage will move against the resistance of yielding pressure within the cylinder 19, and such pressure will move the carriage in the opposite direction when the split nut 6 is disengaged from the feed-screw. This yielding-pressure device for returning the carriage to its initial position constitutes a quick return for the carriage, which is capable of moving it back very rapidly and much more rapidly than could be done by reversing the lathe, as in ordinary practice, and yet without shock or jar either at starting or stopping.

The carriage is provided with a tool-holder 23, mounted upon a suitable slide 24, having a transverse movement in suitable guides 25 upon the carriage 26. A cross-feed screw 27 has a threaded engagement with a depending lug arranged upon the under side of the slide 24, and the said cross-feed screw is suitably mounted in and carried by a block 28. The block 28 is also mounted to move transversely upon the carriage 26, and as a matter of construction may conveniently be arranged to slide in the same guides 25 in which the slide 24 is mounted. The block 28 has a projection 29 thereon, which may conveniently carry an antifriction-roller. The said antifriction-roller engages an angular cam-slot 30, arranged in a sliding cam-bar 31, mounted to slide longitudinally in suitable ways 32 upon the carriage 26. Stationary abutments 33 34 are arranged upon the bed 1 and in the path of movement of the cam 31. When the carriage approaches the limit of its movement in either direction, the cam 31 engages either the stationary abutment 33 or 34, in accordance with which direction the carriage is moving. A movement of the cam 31 to the left with respect to the drawings will force the block 28 inwardly and, by reason of the fact that the block 28 carries the cross-feed screw 27, will move the tool-holder 23 and the tool carried

therein toward the work. A movement in the opposite direction and to the position in which the parts are shown in Fig. 3 of the drawings will move the transversely-movable block and tool-holder outwardly to withdraw the tool from the work.

A cross-feed may be given to the tool-holder entirely independent of such bodily transverse movement by rotating the feed-screw 27 in the ordinary manner, as by the handle 35. I have provided automatic means, however, by which a cross-feed may be given to the tool-holder upon each reciprocation of the carriage along the bed, and hence upon each cross-reciprocation of the tool-holder with respect to the carriage 26. Such means comprises a lever 36, loosely mounted upon the cross-feed screw 27, a pawl 37, carried by said lever, a toothed wheel 38, secured to the said cross-feed screw 27, an operating-lever 39, pivotally mounted upon the slide-rest, and a link 40, secured to the lever 36 at the opposite end to that carrying the pawl 37 and secured at its other end to the operating-lever 39, the operating-lever 39 having at its opposite end a connection 41 with the cam 31. When the cam 31 is operated to move the tool-holder and block bodily inward, the feed-screw 27 will at the same time be given a partial rotation so as to feed the tools slightly forward with reference to the position it held at the previous stroke. A movement of the cam in the opposite direction to withdraw the tool-holder will cause the pawl 37 to ride freely over one or more teeth of the wheel 38 to be in a position to again operate upon the next stroke. The connection between the link 40 and the operating-lever 39 will preferably be an adjustable one, so that the amount of feed given to the cross-feed screw may be varied as desired.

A complete cycle of operations is then as follows: Starting with the carriage at the extreme right of Fig. 1, with the levers 12 and 13 upon the opposite sides of their centers to which they are shown, and the feed-nut 6 consequently in engagement with the feed-screw 5, the cam 31 in its position to the left of the figures in the drawings, and the tool and tool-holder 23 in its inward adjustment, rotation of the driving members of the lathe will advance the carriage 4 along the bed toward the left of Fig. 1 of the drawings and against the yielding pressure within the cylinder 19 until finally the cam 31 strikes the stationary abutment 34, and the tool-holder 23 and tool carried thereby are gradually withdrawn from the work. At about the same time the tripping-finger 16 will come into engagement with the stationary abutment 18 and will gradually force the levers 12 and 13 over to the opposite sides of their centers until when the tool has been entirely withdrawn from the work the feed-nut will be finally caused to disengage the feed-screw 5. Elastic pressure in

the cylinder 19 acting upon the piston 21 will now quickly return the carriage 26 along the bed until the cam 31 is engaged by the stationary abutment 33 to again move the tool and tool-holder toward the work, and simultaneously the tool will be slightly fed forward with respect to its previous position by the cross-feed mechanism. At about the same time the tripping-finger 16 engages the abutment 17, so as to reengage the feed-nut with its feed-screw. This cycle of operations may be continued indefinitely, and to avoid the tool being fed inwardly beyond the predetermined point I have provided an adjustable shield 42, adjustably secured to the toothed wheel 38 and which after the toothed wheel 38 and the cross-feed screw 27 have been rotated a predetermined distance will pass in beneath the pawl 37 and prevent it engaging the teeth of the said wheel 38. By this means no further inward feed of the tool will be caused by the automatic action and continued reciprocation of the parts; but such movement will merely be free movements.

I do not desire to be limited to the precise details of construction or combination of parts herein shown and described, as the same may obviously be varied within wide limits without departing from the spirit and scope of my invention, and it is further evident that parts of my invention may be used separately or in connection with other parts of different construction.

What I claim is—

1. In a lathe, the combination with a bed, and means for supporting work to be acted upon, of a longitudinally-movable carriage, longitudinal feeding mechanism therefor comprising gearing arranged to feed the carriage positively, means for releasing the carriage therefrom automatically, and automatic return mechanism for the carriage comprising a cylinder and piston, the one secured to a fixed support and the other connected to the carriage, and means for supplying fluid under pressure to said cylinder.

2. In a lathe, the combination with a bed, and a lead-screw, of a carriage, a split nut carried thereby adapted to grasp said screw, and means for contracting or expanding said nut, comprising an operating-arm, another arm

geared thereto, and arranged to point in a diametrically opposite direction when in an intermediate position, a spring connecting said arms and means for operating said arms automatically, to throw them upon opposite sides of said diametrically opposite intermediate position.

3. In a lathe, the combination with a bed, and a carriage longitudinally movable thereon, of cross-feed mechanism for said carriage, a ratchet-wheel and pawl for operating the same, means operated by the movement of the carriage for operating said pawl, and an adjustable guard for the ratchet-wheel, and carried thereby.

4. In a lathe, the combination with a bed having stationary abutments, and a carriage longitudinally movable along said bed, of a tool-holder transversely movable upon said carriage, a longitudinally-movable cam-slide upon said carriage arranged to move the tool-holder transversely in opposite directions, said cam-slide arranged to be moved longitudinally with respect to said carriage by said stationary abutments, a cross-feed mechanism for said tool-holder including a ratchet mechanism for operating the same, and connections between said ratchet mechanism and said cam-slide, for operating the said ratchet mechanism.

5. In a lathe, the combination with a bed having stationary abutments, a carriage longitudinally movable along said bed, and a tool-holder transversely movable upon said carriage, of a cam-slide longitudinally movable upon said carriage, and arranged in its longitudinal movements to impart transverse movements to the tool-holder; said cam-slide moved longitudinally with respect to said carriage by engagement with said stationary abutments in the longitudinal movement of said carriage, cross-feed mechanism for said tool-holder comprising a ratchet mechanism, an operating-lever pivoted to the carriage and engaged by the cam-slide, and an adjustable connection between the said lever and the said ratchet mechanism.

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Witnesses:

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