To all whom it may concern:

Be it known that I, ARTHUR DRUMMOND, a subject of the King of Great Britain and Ireland, residing at Ryde's Hill, near Guildford, in the county of Surrey, England, have invented certain new and useful Improvements in or Relating to the Tool Slides of Lathes, (for which I have filed applications in England, Nov. 23, 1916, Patent #109,701; France, July 19, 1920, #519,405, and Belgium, July 9, 1920, #231,196,) of which the following is a specification.

This invention relates to the tool slides of lathes of the type adapted for very accurate work, in which the cross slide is clamped or locked in position after each adjustment for successive cuts, the chief object of the invention being to enable the various movements of the cross slide to be effected by the operation of a single member.

According to this invention the locking bolt of the cross slide is provided with a locking arm or lever adapted, when turned in one direction, first to release the slide and on further movement to withdraw it from the working position and to hold it in withdrawn position, and, when turned in the opposite direction, first to allow the slide to move to working position and on further movement again to lock the slide.

In a construction embodying this invention the aforesaid arm or lever is provided with a nut or tapped boss screwing on the end of the locking bolt (which passes as usual through a slot in the slide), a pawl engaging a small fixed ratchet which retains the arm in the unlocked position, the unlocking movement of the lever first unscrewing the nut to release the slide and then, on continued movement, withdrawing the slide through a pin or stop so as to move the tool away from the work. To return the tool for the new cut the pawl is released at the reversal of the lever and the slide allowed to move forward again as the lever turns until the working position is reached, the further movement of the lever relocking the slide.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which—

Figure 1 is an elevation partly in section and Figure 2 is a plan of a construction embodying my invention; and

Figures 3 and 4 are similar views of a simplified construction suitable for use where the withdrawing movement is of constant length.

A is the main slide or saddle of the lathe. B is the cross slide carrying the tool b and slotted at b' through which slot the bolt a passes. C is the locking arm or lever having the nut or tapped boss c screwing on the bolt a and provided with the cam projection c' adapted to meet the pin b' of the cross slide.

Referring to the construction shown in Figures 1 and 2 the slide is provided with a small fixed ratchet D with which engages a pawl d carried by the nut c. The locking arm C is not made in one with the nut c but is pivoted to it at c" and is provided with a quadrant member c" moving between the stops c' on the nut, springs c" being interposed between the stops and the ends of the quadrant. The arm is thus free to turn through a limited angle in either direction without turning the nut. The end of the arm carries a pin c" which projects into the slot d' of the pawl d and movement of the lever relatively to the nut causes the pawl to be withdrawn from the fixed ratchet disc D so that the nut is free to turn.

The operation of the device is as follows:

At the end of a cut the locking arm C is turned in the release direction, the first part of the movement withdrawing the pawl d from the ratchet D. Continued movement acting through one of the stops c' turns the nut c and releases the cross slide from the clamping pressure of the nut, the cam projection c' then meeting the pin b'.
locking arm, nut and pawl now move together and the cross slide B is pressed back through the pin \(b^2\) against the pull of the spring \(b^1\) until the tool \(b\) is clear of the work. Immediately the arm \(C\) is released the springs \(c\) cause it to spring back to its central position relatively to the stops \(c\) and cause the pawl \(d\) to engage the ratchet \(D\) and to hold the whole device in its withdrawn position. After movement of the cross slide \(B\) to its new position for the next cut the arm \(C\) is turned in the opposite direction, the initial movement again withdrawing the pawl \(d\) from the ratchet \(D\) so that the nut \(c\) is free to turn on the bolt \(d\), when the locking arm acts through the forward stop \(c\) and turns the nut \(c\). Continued movement allows the pin \(b^2\) of the cross slide \(B\) to travel forward with the slide under the action of the spring \(b^1\) until the tool \(b\) is in cutting position, the nut \(c\) screwing down on the bolt \(a\) until, after the slide \(a\) is in position, the nut binds tightly upon it and clamps it to the saddle \(A\). While the slide \(a\) is held in withdrawn position the usual micrometer adjustment is made by means of the micrometer \(E\), the end of which meets the anvil \(c\) carried by the main slide \(A\), and so limits the forward position of the slide \(B\).

The arrangement of pawl and locking arm illustrated is of course subject to variation and the drawings show merely a typical construction, the essential feature of which is the automatic release of the pawl at the beginning of the return or locking movement of the arm \(C\).

Referring to the simplified device shown in Figures 3 and 4 the locking arm \(C\) and nut \(c\) form one member and the cam arm or projection \(c\) meeting the slide pin \(b^2\) is formed with a notch \(c\) into which the pin \(b^2\) projects at the end of a withdrawal movement. As before, the initial release movement of the arm \(C\) starts unscrewing the nut \(c\) and releases the slide \(B\), whereupon the cam projection \(c\) begins to press back the pin \(b^2\) with the slide \(B\) and against the action of the spring \(b^1\) (Figure 2), the movement continuing until the notch \(c\) reaches the pin \(b^2\), when further movement is checked owing to the shape of the notch, which forms a stop. The locking action is equally simple, the forward movement of the arm \(C\) first releasing the pin \(b^2\) from the notch \(c\) and allowing the slide \(B\) to travel forward until checked by the micrometer device (Figure 2) when the final movement locks the slide in its new position. The notch \(c\) and pin \(b^2\) take the place of the ratchet and pawl device of the first construction and no springs are required beyond the spring \(b^1\) of the slide itself. The arm \(C\) has however to be turned through a definite distance at each withdrawal and is not retained until the notch \(c\) reaches the pin \(b^2\).

It will be seen that for the complete operations of unlocking, withdrawing and retaining the slide and for returning the slide and relocking it only two movements of a single handle or lever are necessary, the operations being limited by suitable stops so that the operator can make no error, as except for the micrometer adjustment he has nothing to do but pull and push a small lever and move the slide along the lathe bed for the new cut. Having fully described my invention, what I desire to claim and secure by Letters Patent is:

1. In operating means for the cross slides of lathes in combination a guide member, a cross slide movable in said guide member, a clamping element in fixed relation to the guide member, a cooperating clamping element moveable relative to said fixed element adapted to clamp the cross slide to the guide member, locking means in fixed said guide member, a releasable detent for said locking means carried by said movable clamping member, said movable clamping member being provided also with an abutment and a projecting cam surface, a projection on the cross slide in the path of said cam surface, a pivotally mounted lever having one end operably associated with said detent and having a part engageable with said abutment, said parts being so constructed that when in clamping position there is lost motion between the detent and lever, between the lever and abutment and between the abutment and projection, said lost motion being taken up sequentially in the order named by movement of the lever in one direction to first release the locking means and then loosen the clamping means and then withdraw the cross slide from operative position.

2. In operating means for cross slides of lathes in combination a guide member, a cross slide reciprocably mounted in said guide member, spring means for drawing said cross slide into operative position, a projection on said cross slide cooperate with means for withdrawing said cross slide against the tension of the spring, clamping means for said cross slide comprising an element fixed to said guide member and an element rotateable thereon, a ratchet fixed relative to said guide member, a pawl carried by said rotateable clamping element releasably engaging with said ratchet, said pawl provided with a slot and said rotateable clamping element being provided with a pair of abutments and a projecting cam surface the latter being adapted to cooperate with the projection on the cross slide, a lever pivotally mounted on said rotateable clamping member intermediate said abutments having one end engageable in the slot of said pawl and having portions engageable with the cam surface.
selectively with one or the other abutment, there being lost motion between said portions and said abutments, and resilient means acting through said lever to throw said pawl into locking engagement with said ratchet when said lever is released.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ARThUR DRUMMOND.

Witnesses:

J. EUSTACE,

A. C. IVES.