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CARRIAGE STOP MECHANISM FOR LATHES

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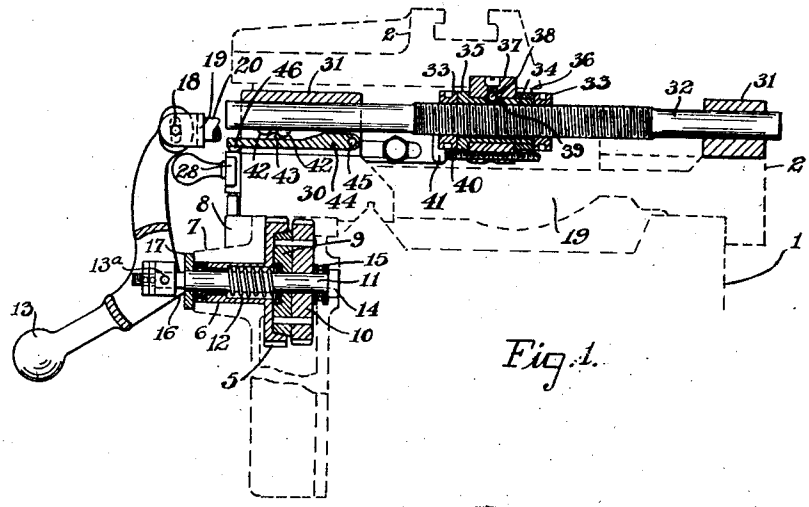


Fig. 1.

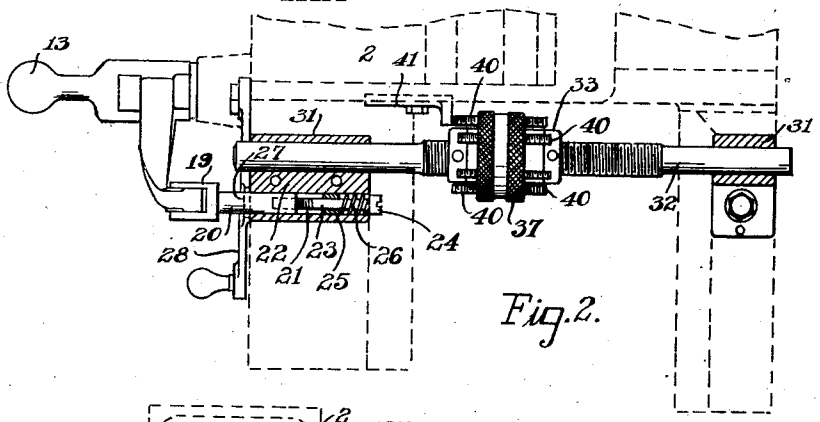


Fig. 2.

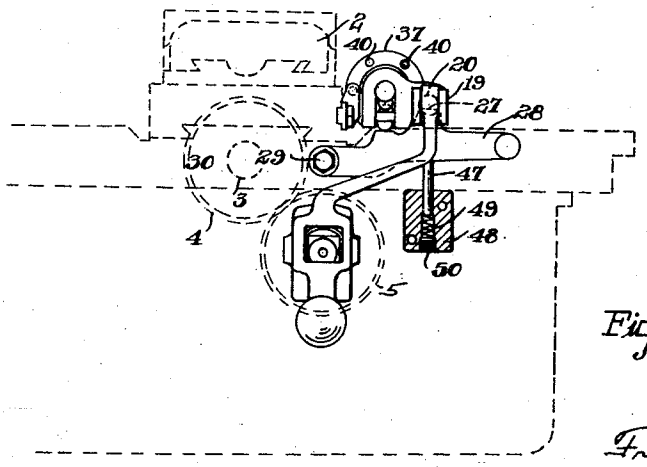


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CARRIAGE STOP MECHANISM FOR LATHES.

Application filed June 22, 1927. Serial No. 200,663.

This invention relates to new and useful improvements in lathes.

It is one of the principal objects of my invention to provide a simple and efficient device for automatically disengaging the cross feed or diameter turning tools of lathes. The cross feed or diameter stop mechanism as ordinarily furnished on lathes is, in some cases, merely a hand measuring device, necessitating the operator actually disengaging the cross feed mechanism before the cutting tool has reached the required diameter, and finishing the cut by hand by means of the cross feed screw. In other such mechanisms ordinarily furnished on lathes, the cross feed stop mechanisms may actually, through a clutch mechanism or other means, bring the cutting tool to a definite stop when the required diameter has been reached, but in no such mechanism so far developed does the mechanism automatically disengage the cross feeding mechanism.

It is another object of mv invention to provide a mechanism wherein it is possible to duplicate any one of a number of diameters from 1 to 6 or more, with the cutting tools operating either on the "in feed" or on the "out feed" and not only to have the cutting tools automatically stopped accurately when the proper diameter has been reached, but also to automatically disengage the cross feeding mechanism, bringing it to a definite and positive stop.

A further object of the invention is to provide a device of this kind which will be simple in construction, positive in its operation, and which can be applied to mechanisms of standard construction without material modification thereof.

Other objects of the invention will appear as the device is described in detail.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of the apron of an engine lathe with its associated parts. Figure 2 is a top plan view of the same, partly in section. And Figure 3 is an end view thereof, partly in section.

In these drawings, I have illustrated one embodiment of my invention and have shown the same as applied to a lathe mechanism of well-known construction, but it will be understood that the invention may be applied to mechanisms of various kinds, and that the actuating device itself may take various forms without departing from the spirit of the invention. In these drawings I have shown only that part of the lathe mechanism with which the invention is directly connected.

Referring to the accompanying drawings for a detailed description of my invention, the numeral 1 designates an engine lathe, having a movable tool rest 2. To the latter there is connected a cross feed screw 3 to which there is keyed a cross feed pinion 4 which meshes with a cross feed gear 5 having a hub 6 journaled in a member 7 secured to the apron 8. (See Figure 1.)

The outer face of the gear 5 is concaved to receive a cone clutch member 9 pinned to a cross feed friction gear 10 which is free to turn with it on a shaft 11 that passes through the hub 6 of the gear 5. Surrounding the shaft 11 between a shoulder in the interior of the hub 6 and the interior surface of a recess in the cone clutch member 9, is a spring 12. Against the compression of this spring the clutch member 9 is adapted to be drawn by a cross feed lever 13 pivotally secured by a pin 13ª to the outer end of the shaft 11. The latter, which is free to move longitudinally through its bearings, has secured to its inner end a collar 14 which is in engagement with a thrust bearing 15 that in turn engages the hub of the clutch member 9 to force it into tight contact with the gear 5 when the shaft 11 is drawn outwardly by a depression of the lever 13. The middle part of this lever is pointed as at 16 in Figure 1, to engage a plate 17 secured to the member 7, which acts as an abutment for the lever when it is depressed to draw the clutch member 9 into engagement with the gear 5. The gear 10 is continuously driven by means not shown to rotate the gear 5, and through it the cross feed mechanism, when the gear 5 and cone 9 are engaged as above described.

Pivotally secured by a pin 18 to the inner end of the lever 13 is a slotted head 19 on the outer end of a shaft 20 longitudinally movable in a hole 21 in a block 22 secured to the apron 8. Secured to the inner end of this shaft 20 is a screw 23. Surrounding this screw between its head 24 and an annular stationary member 25 in the hole 21 is a helical spring 26 which is compressed when the shaft 20 is drawn outwardly by the lever 13. Formed in the bottom of the outer end of the shaft 20 is a slot 27 which is brought to a point by the depression of the lever 13, to engage a trip lever 28 pivoted by a pin 29

to the carriage 30, thereby holding the clutch member 9 in positive engagement with the gear 5 to operate the cross feed screw 3.

For the purpose of automatically bringing the cutting tool to a definite stop when a required diameter has been reached on the work being operated upon, I have provided the following means. Longitudinally movable through bearings 31, 31 mounted on the carriage 30, is a rod or shaft 32 which is threaded at its middle portion to receive two spanner collars 33, 33 between which is a sleeve 34 formed at one end with a flange 35. Carried by the sleeve 34 between its flange 35 and a retaining collar 36 is a cylindrical stop turret 37 formed with a radial hole adapted to receive at its inner end a spring tension ball 38 free to enter any one of a number of concave notches 39 formed in the periphery of the sleeve 34. (See Figure 1). By turning the spanner collars 33, 33, the turret 37 may be moved to a desired position on the shaft 32.

The turret 37 is formed with a series of axial threaded holes to receive contact elements such as adjustable screws 40. These screws which are set for various diameters of the work to be turned, co-operate with a dog 41 attached to the tool rest 2 to disconnect the cross feed drive mechanism.

By turning the turret 37 to a position to bring a desired adjustable stop screw 40 into the path of movement of the dog 41, the latter will engage the screw to automatically stop the cross feed mechanism at the time when the work has been turned to the diameter represented by that screw. This is accomplished by the following means.

Secured to the bottom part of the front end of the rod 32 are cam projections such as the two hardened buttons 42, 42 that are adapted to engage a similar button 43 on the outer end of a lever 44. This lever is pivoted at its rear end by a pin 45 to the bearing block 31. Secured to the bottom part of the front end of this lever 44 is a hardened button 46 adapted to contact the lever 28 to disengage it from the slot 27 in the shaft 20, thereby releasing the clutch member 9 from the gear 5 to stop the cutting tool at the predetermined point. For instance, when the dog 41 is carried by the tool rest 2 into engagement with the stop screw 40 set for this point, it will cause the turret 37 carrying this screw to shift the shaft or rod 32 longitudinally. Such a movement of the shaft in either direction will cause the buttons 42, 42 to engage the button 43 on the lever 44, to depress the lever, and through its engagement with the lever 28, disengage it from the shaft 20 to stop the cutting tool. Therefore, it is possible with my device, to automatically bring the cutting tool to a definite stop when a required diameter on the work being turned has been reached.

When the trip lever 28 is depressed by the lever 44, it will engage a tension rod 47 that is slidable in a hole in a member 48 secured to the apron 8. The lower end of this rod engages a spring 49 which rests on a screw 50 in said hole. By means of this spring construction the lever 28 will be under the influence of an upward force for entrance into the slot in the shaft 20 to hold the cross feed mechanism in positive engagement with the driving clutch when the handle is again depressed.

I do not desire to be limited to the number of stop screws 40 employed in the turret 37, as their number may be increased or diminished if desired to represent the diameter of the work to be turned.

My automatic cross feed stop device will disengage any type of cross feed mechanism whether it be of the cone friction, jaw clutch or sliding gear type. It will not only automatically stop, at the required diameter, the cutting tool when travelling in either direction, but will automatically disengage the cross feed, making it unnecessary for the operator to perform this function, thereby making it absolutely fool proof and saving the time of the operator.

Having described my invention, I claim:

1. In a lathe, a carriage, a tool rest free to move in either direction on said carriage, cross-feed mechanism for advancing said tool rest toward the work, driving means for said cross-feed mechanism, a clutch device for connecting the driving means to the cross-feed mechanism, a control device for holding a clutch engagement between the cross-feed and the driving means, a shiftable member to actuate the control device to release the clutch from the cross-feed mechanism, a rotatable turret on said shiftable member, adjustable stop elements on said turret, corresponding to the diameters of the work required, and a member on said tool rest for engagement with a selected stop element to move the shiftable member to release the clutch and stop the operation of the cross-feed mechanism when a required diameter on the work has been reached.

2. In a lathe, a carriage, a tool rest free to move in either direction on said carriage, cross feed mechanism for advancing said tool rest toward the work, driving means for said cross feed mechanism, a clutch device for connecting the driving means to the cross feed mechanism, said driving means being secured to the clutch member, a cross feed level for drawing the clutch member into positive engagement with the cross feed mechanism, a shaft connected to said lever, a trip lever for engagement by said shaft to hold the clutch in positive engagement with the cross feed mechanism, a shiftable member, a projection on said member, means for engagement by said projection to contact the trip lever and disengage it from the shaft to release the

clutch, an adjustable stop means on said shiftable member, and a member on the tool rest to engage the adjustable stop means for the purpose specified.

3. In a lathe, a carriage, a tool rest free to move in either direction on said carriage, cross feed mechanism for advancing said tool rest toward the work, driving means for said cross feed mechanism, a clutch device for connecting the driving means to the cross feed mechanism, a control device for holding a clutch engagement between the cross feed mechanism and the driving means, a shiftable member to actuate the control device to release the clutch from the cross feed mechanism, a rotatable turret on said shiftable member, adjustable stop elements on said turret corresponding to the diameters of the work required, and a dog on said tool rest for engagement with a selected stop element to move the shiftable member to release the clutch and stop the operation of the cross feed mechanism when a required diameter on the work has been reached.

4. In a lathe, a carriage, a tool rest free to move in either direction on said carriage, cross feed mechanism for advancing said tool rest toward the work, driving means for said cross feed mechanism, a clutch device for connecting the driving means to the cross feed mechanism, said driving means being secured to the clutch member, a cross feed lever for drawing the clutch member into positive engagement with the cross feed mechanism, a shaft containing a slot, connected to said lever, a trip lever adapted to be engaged by the slot in said shaft to hold the clutch in positive engagement with the cross feed mechanism, a shiftable rod, a cam projection on said rod, a lever pivoted below said rod for engagement by said cam projection to contact the trip lever and disengage it from said shaft to release the clutch, an adjustable stop element on said rod, and a dog on the tool rest to engage the stop element for the purpose specified.

In witness whereof I have hereunto set my hand this 20th day of June, 1927.

FRED C. DULL.