Nov. 18, 1924. 1,516,196

A. B. LINDSTROM

PLAIN RELIEVING ATTACHMENT FOR LATHES

Filed Feb. 27, 1922

Fig. 1.

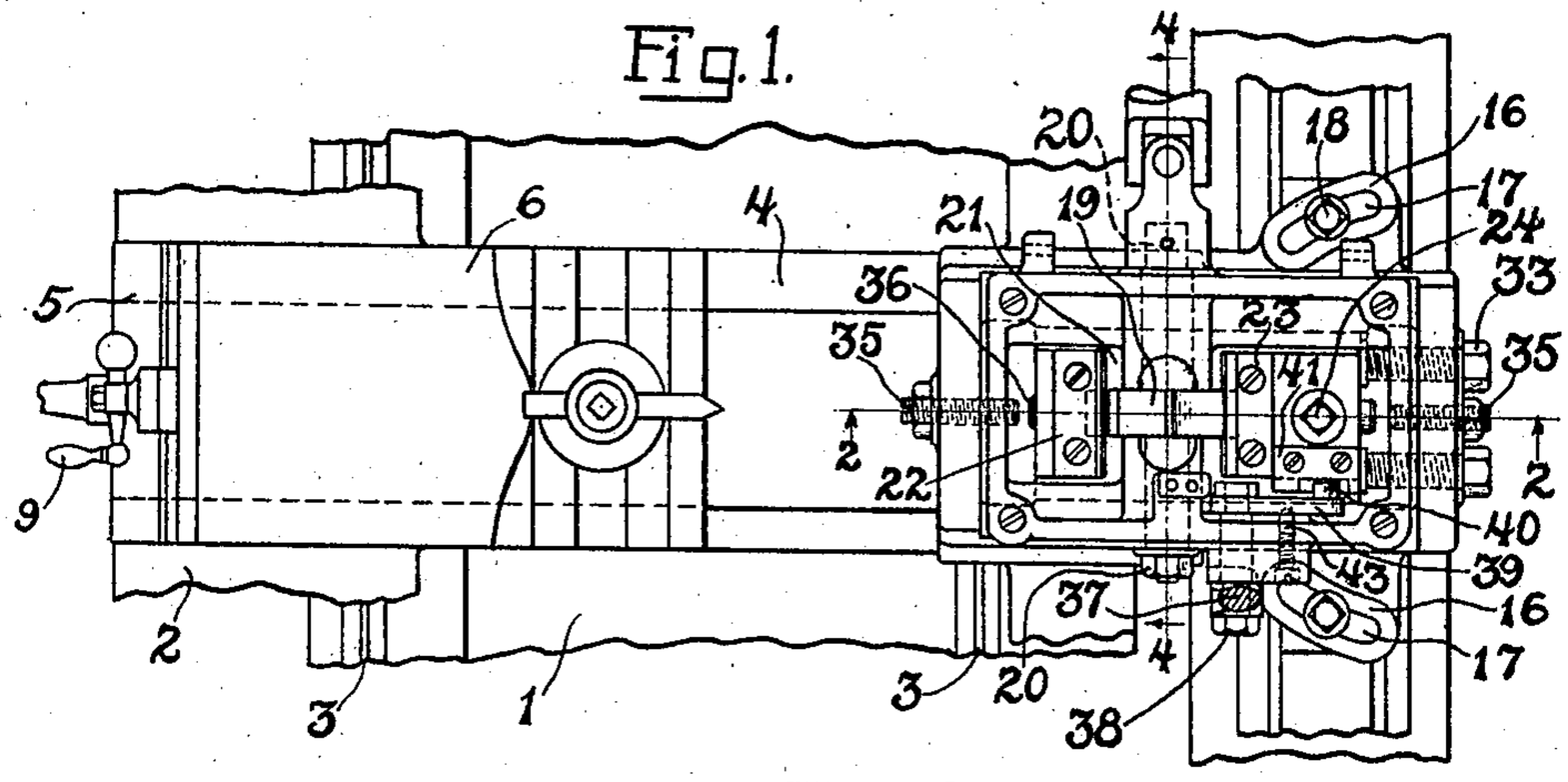

Fig. 2.

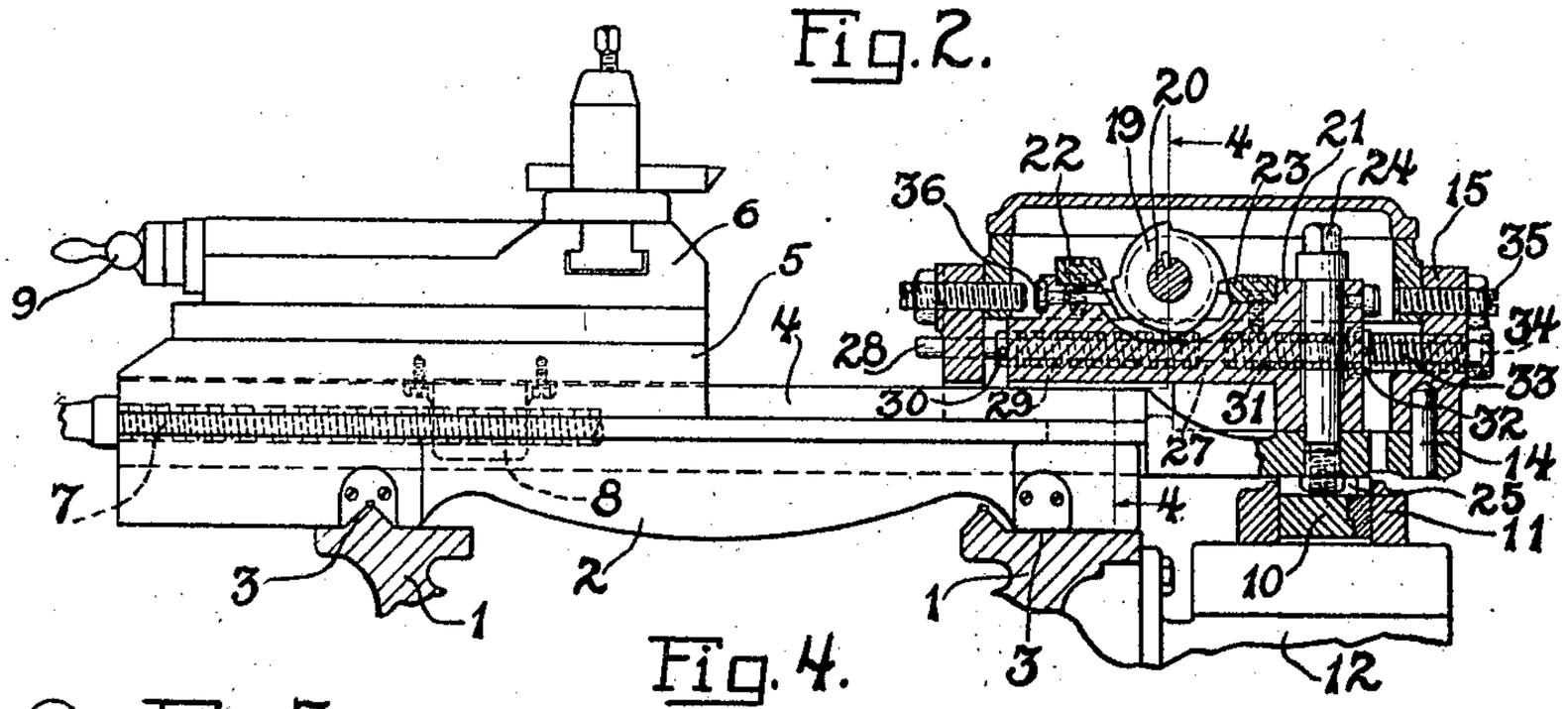

Fig. 3.

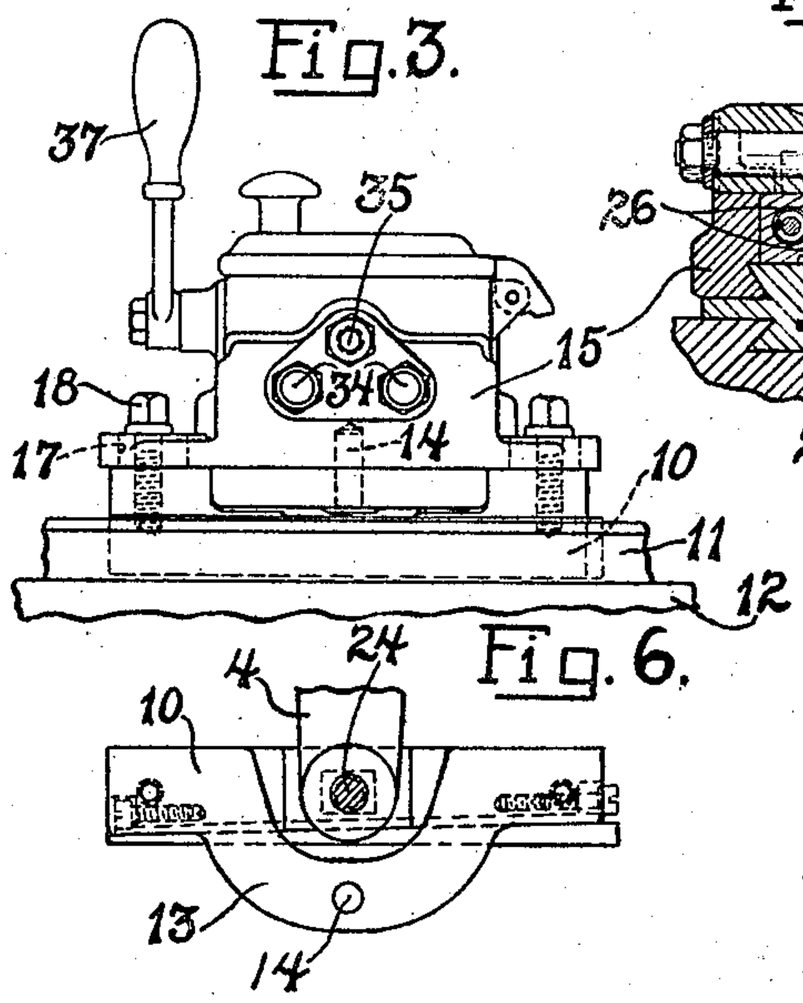

Fig. 4.

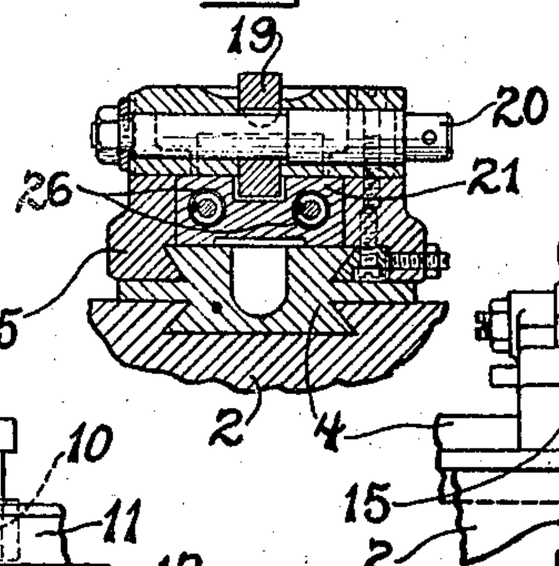

Fig. 5.

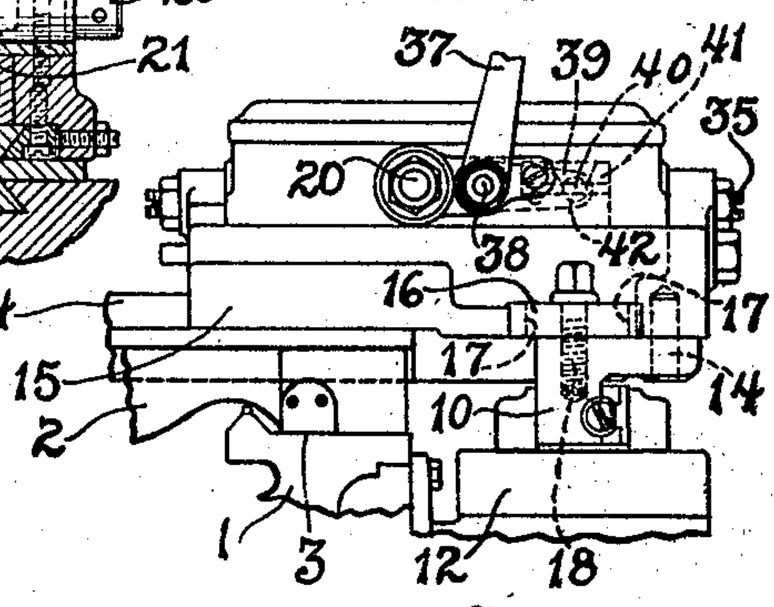

Fig. 6.

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UNITED STATES PATENT OFFICE.

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PLAIN RELIEVING ATTACHMENT FOR LATHES.

Application filed February 27, 1922. Serial No. 539,524.

To all whom it may concern:

Be it known that I, AUGUST BERNHARD LINDSTROM, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Plain Relieving Attachments for Lathes, of which the following is a specification.

This invention relates to lathes and particularly to an improved relieving attachment therefor. It is the primary object of the invention to provide such an improved mechanism easily applicable to an ordinary lathe and particularly adapted to perform exterior and interior relieving operations upon various kinds of work, such as milling cutters, hobs, taps, dies, reamers, etc. In a copending application Serial No. 609,030 is illustrated a lathe provided with an improved relieving attachment. Reference to such application should be made for a full illustration and description of the general lathe structure which within itself comprises no part of the present invention and is therefore not illustrated herein.

It is an object of the invention to provide a relieving attachment comprising a rotary cam adapted to move along the lathe bed with the tool carriage and cam follower means connected to the tool slide and operative on either side of the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

It is another object of the invention to provide a mechanism of the above type comprising a rotary cam, a pair of cam followers respectively at opposite sides of the cam, and means whereby either follower may be placed in operative engagement with the cam to operate the tool slide in either direction for performing either exterior or interior relieving operations, hand operated means also being provided in connection with the mechanism for moving and holding both cam followers disengaged from the cam thereby releasing the mechanism from operation even though the cam continues to rotate.

A further object of the invention is to provide a mechanism of the above type in connection with a former bar at the rear of the lathe bed, the tool slide being operatively connected to the former bar and relieving mechanism whereby the work is given the shape of the former and relieved by the relieving mechanism.

With the above and other objects in view, my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawing. In such drawing annexed hereto and forming a part of this specification, I have shown one embodiment of my invention as applied to the bed and tool carriage of a lathe, but it will be understood that the invention can be otherwise embodied and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

Referring to the figures of the drawing:

Figure 1 is a plan view of the attachment as applied to a lathe.

Fig. 2 is a side view thereof partially in section on line 2—2 of Fig. 1.

Fig. 3 is a rear end elevation.

Fig. 4 is a cross section thereof on line 4—4 of Figs. 1 and 2.

Fig. 5 is a side elevation of the relieving mechanism.

Fig. 6 is a detail plan view of the former bar.

In the drawing, 1 indicates the bed of a lathe, 2 the tool carriage slidable on the ways 3 thereof, 4 a taper slide on the carriage, 5 a tool slide on the taper slide, and 6 a tool support slidably mounted on the tool slide 5. A screw 7 journaled in the taper slide operatively engages a nut 8 on the tool slide 5 whereby the latter can be adjusted. The tool support 6 can be adjusted on the tool slide 5 by the usual screw handle 9.

A former or taper bar 10 is mounted in a guide 11 on a bracket 12 secured to the bed. The bar is provided with a yoke-shaped portion 13 on which is seated and secured by a pin 14, one end of a box-like housing 15. The other end of this housing is slidably mounted on the taper slide, as illustrated in Fig. 4. The housing is furthermore provided with a pair of projecting ears 16 having arcuate slots 17 through which project tap bolts 18 whereby to secure the housing to the taper bar in any angular position of the latter.

A rotary cam 19 is mounted on a shaft 20

journaled in the housing 15, this shaft being driven from the headstock gearing in the usual manner. One specific form of drive for this shaft is fully illustrated in the above mentioned copending application, it being sufficient for the present invention however to state that this shaft is driven from the headstock spindle in the usual manner. A block 21 is mounted for reciprocation transversely of the shaft 20 in the housing. This block is provided with two cam followers 22 and 23 respectively on opposite sides of the cam. A bolt 24 extends vertically through the block and taper slide whereby the taper slide is secured to the block, the bar 10 being recessed transversely at 25 to permit movement of these elements transversely thereof.

Spring means for normally keeping one of the cam followers in engagement with the cam is preferably mounted in the block 21. The block is preferably provided with a pair of such spring means on opposite sides of the cam, such means being mounted in bores 26 in the block. The construction in each bore being identical, a description of one will suffice. Each bore comprises two outer portions having an annular shoulder 27 therebetween, a smaller opening extending through the center of each shoulder portion 27. A bolt 28 extends through the end walls of the housing 15 and through the bore 26 and the opening within the shoulder 27. A spring 29 is mounted adjacent one end of the bolt between a collar 30 thereon and the shoulder 27, and a spring 31 is mounted adjacent the other end of the bolt between a collar 32 thereon and the shoulder 27. A bushing 33 threaded in the housing is journaled on the outer end of the bolt between the collar 32 and bolt head 34. It will be seen that the bolt may be moved longitudinally by rotating the bushing 33.

In the position illustrated in Fig. 2, the bushing 33 is screwed inwardly thereby holding the spring 31 under compression and the follower 23 in engagement with the cam. As thus adjusted, rotation of the cam will operate to draw the tool toward the cam in its relieving movement. Such operation is used in exterior relieving wherein the tool is mounted as shown in the drawing. To reverse the relieving movements of the tool, the bushing 33 is screwed outwardly whereby the spring 31 is released and the spring 29 compressed. As thus adjusted, the follower 22 will be forced into engagement with the cam and rotation of the cam will operate to force the tool away from the cam in its relieving movements. This operation is used in interior relieving where the tool is mounted to point in the opposite direction from that shown in the drawing. Adjustable stops 35 are threaded in each end of the housing for limiting the reciprocating movements of the block and thereby the relieving movements of the tool, shoes 36 being provided on the block for engagement with the stops.

A handle 37 is provided for holding both cam followers disengaged from the cam thereby releasing the mechanism from operation even though the cam continues to rotate. This handle is mounted on a shaft 38, the inner end of which carries an arm 39 provided with a stud 40 at its free end. The reciprocating block 21 is provided with a notched plate 41 having a recess therein with angular sides leading into a bottom portion 42. This recess is beneath the stud 40 and rotation of the handle 37 to the right will at any time move the stud into the recess and thereby move and hold the block in a neutral position with both cam followers disengaged from the cam. A spring pressed detent 43 is provided for holding the handle in either of its two positions.

In operation, the work piece to be relieved is mounted on the lathe centers in the usual manner and the tool is moved up to the work by means of the screw 7. It will be understood that the gearing ratio between the lathe spindle and the cam 19 depends upon the number of teeth on the work piece to be relieved, this ratio of course being such that the cam will progressively force the tool into engagement with each tooth on the work piece as the same is rotated, the springs 31 being adapted to move the tool in the opposite direction. The cam and springs therefore operate to reciprocate the tool toward and from the work as the latter rotates, such operation of course being synchronous with the rotation of the work whereby each tooth of the work piece is cut with relief in the well known manner. The tool must of course be positively moved by the cam in the cutting direction and such direction can be changed by adjusting the bushings 33 as above described. It is believed that the construction and operation of the mechanism will be clearly understood without further description thereof.

What I claim is:

1. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a pair of cam followers, means for giving relieving movements to the tool slide when one or the other of the followers is engaged with the cam, and means for operatively engaging either follower with the cam, the tool slide being adapted to be positively operated in one direction for performing exterior relieving operations when one follower is engaged with the cam and being adapted to be positively operated in the opposite direction for performing in-

terior relieving operations when the other follower is engaged with the cam.

2. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam, a pair of cam followers on diametrically opposite sides of the cam, spring means for normally holding one or the other of the followers in engagement with the cam, and adjustable means for operatively engaging either follower with the cam for operating the tool slide in either direction for performing either exterior or interior relieving operations.

3. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, cam follower means operatively connected to the tool slide, spring means for normally holding the follower means in engagement with the cam, and adjustable means for causing the spring means to operate on the follower means to hold the same engaged on either side of the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

4. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam on the carriage, a pair of cam followers operatively connected to the tool slide, spring means operative on the followers, and adjustable means for causing the spring means to operate on either follower to hold the same engaged with the cam for operating the tool slide in either direction for performing either exterior or interior relieving operations.

5. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam on the carriage, a block operatively connected to the tool slide and provided with means for engaging the cam, spring means operative on the block, and adjustable means operative on the spring means to optionally hold the follower means engaged with either side of the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

6. In a relieving attachment for lathes, the combinaton of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a block operatively connected to the tool slide and supporting a pair of cam followers respectively on opposite sides of the cam, spring means operative on the block, and adjustable means operative on the spring means to optionally hold either follower in engagement with the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

7. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a reciprocable block operatively connected to the tool slide and supporting a pair of cam folowers respectively on opposite sides of the cam, adjustable means for limiting the reciprocating movement of the block, spring means operative on the block, and adjustable means operative on the spring means to optionally hold either follower in engagement with the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

8. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a block operatively connected to the tool slide and supporting a pair of cam followers respectively on opposite sides of the cam, a bolt adjustable on the carriage and extending into the block, spring means on the bolt adapted to operate by compression on the block, the bolt being adjustable to place the spring means under compression in either direction on the block thereby holding one or the other follower in engagement with the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations.

9. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a reciprocable block operatively connected to the tool slide and supporting a pair of cam followers respectively on opposite sides of the cam, a pair of springs adapted to operate in opposite directions on the block to respectively hold one or the other follower in engagement with the cam, and adjustable means for placing either spring under compression thereby holding its follower in engagement with the cam whereby the tool slide may be operated in either direction for performing either exterior or interior relieving operations.

10. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a housing on the carriage, a rotary cam supported in the housing, a block reciprocably mounted in the housing, connected to the tool slide and supporting a pair of cam followers on opposite sides of the cam, a bolt extending through the housing and block, and a pair of springs on the bolt adapted to operate respectively in opposite

directions on the block to hold one or the other follower in engagement with the cam, the bolt being adjustable to place either spring under compression thereby holding its follower in engagement with the cam whereby the tool slide may be operated in either direction for performing either exterior or interior relieving operations.

11. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam, a pair of cam followers, spring means for normally holding one or the other of the followers in engagement with the cam, adjustable means for operatively engaging either follower with the cam whereby the tool slide may be operated in either direction for performing either exterior or interior relieving operations, and means for holding both followers disengaged from the cam.

12. In a relieving attachment for lathes, the combination of a bed, a tool carriage thereon, a tool slide supported by the carriage, a rotary cam movable along the bed with the carriage, a block operatively connected to the tool slide and supporting a pair of cam followers respectively on opposite sides of the cam, spring means operative on the block, adjustable means operative on the spring means to optionally hold either follower in engagement with the cam whereby to operate the tool slide in either direction for performing either exterior or interior relieving operations, and means optionally engageable with the block for holding both followers disengaged from the cam.

13. In a relieving attachment for lathes, the combination with a bed, a tool carriage thereon, a former bar at the rear of the bed, a taper slide on the carriage, and a tool support on the taper slide, a housing secured to the former bar, a rotary cam supported in the housing, a pair of cam followers operatively connected to the tool support, and adjustable means for operatively engaging either follower with the cam for operating the tool support in either direction for performing either exterior or interior relieving operations.

14. In a relieving attachment for lathes, the combination with a bed, a tool carriage thereon, a former bar at the rear of the bed, a taper slide on the carriage, and a tool support on the taper slide, a housing secured to the former bar, a rotary cam supported in the housing, a pair of cam followers operatively connected to the taper slide, spring means operative on the followers, and adjustable means for causing the spring means to operate on either follower to hold the same engaged with the cam for operating the taper slide in either direction for performing either exterior or interior relieving operations.

15. In a relieving attachment for lathes, the combination with a bed, a tool carriage thereon, a former bar at the rear of the bed, a taper slide on the carriage, and a tool support on the taper slide, a housing secured to the former bar, a rotary cam supported in the housing, a block reciprocable in the housing and operatively connected to the taper slide, a pair of cam followers on the block at opposite sides of the cam, spring means operative on the block, and adjustable means operative on the spring means to optionally hold either follower in engagement with the cam whereby to operate the taper slide in either direction for forming either exterior or interior relieving operations.

In testimony whereof, I hereto affix my signature.

AUGUST BERNHARD LINDSTROM.