Oct. 18, 1949. R. W. BROWN 2,484,874

ADJUSTABLE VARIABLE SLIDE ACTUATOR

Filed Feb. 18, 1948 3 Sheets-Sheet 1

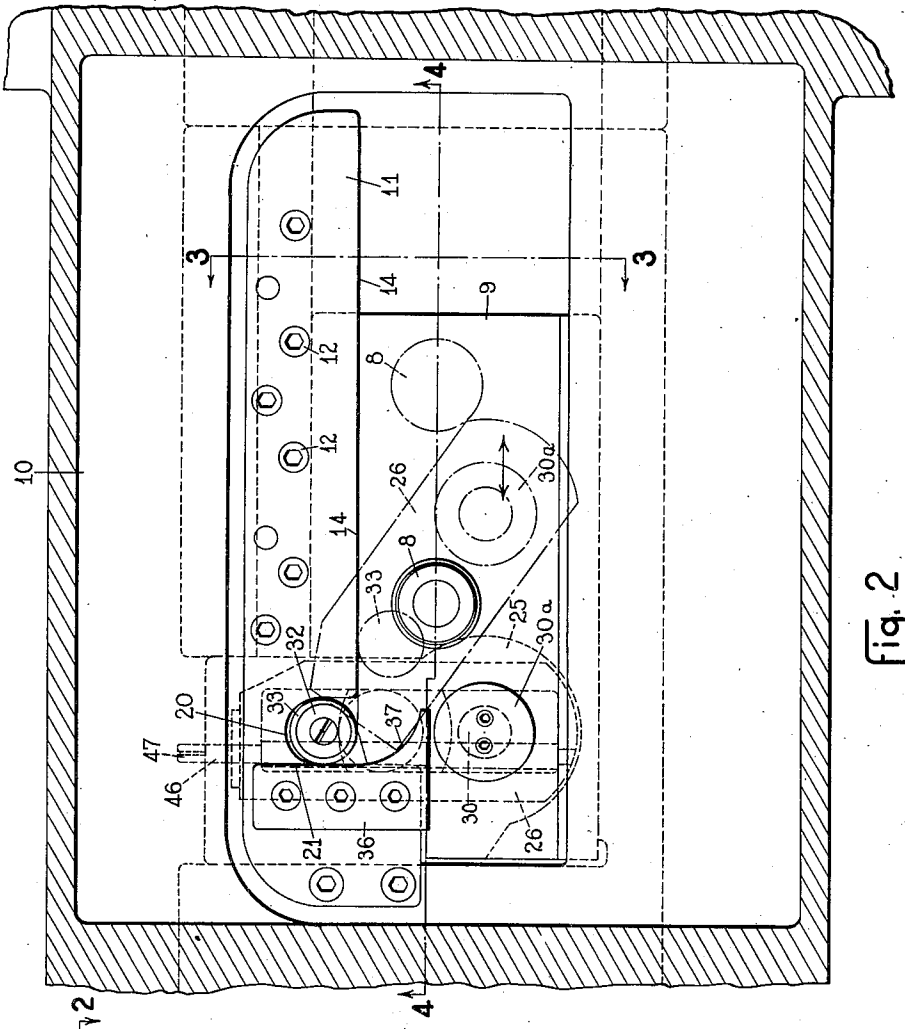


Fig. 2

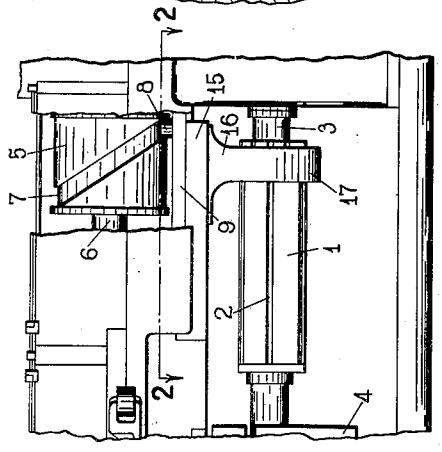


Fig. 1

Inventor
Roger W. Brown
by Wright Brown Quinby & Clay
Attys

Oct. 18, 1949. R. W. BROWN 2,484,874

ADJUSTABLE VARIABLE SLIDE ACTUATOR

Filed Feb. 18, 1948 3 Sheets-Sheet 2

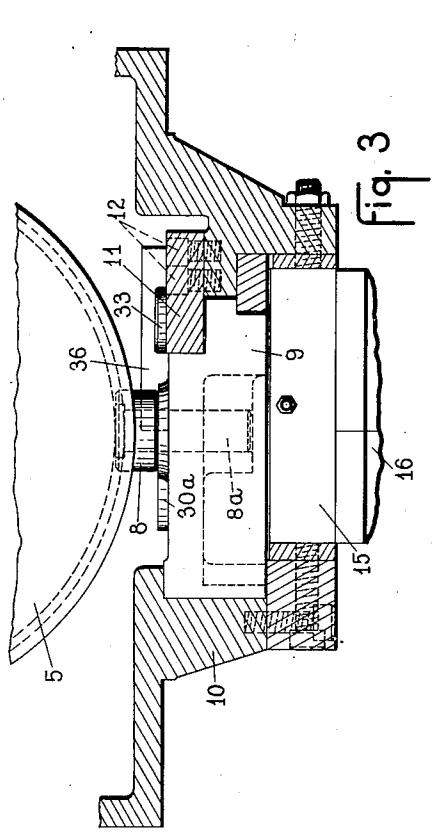


Fig. 3

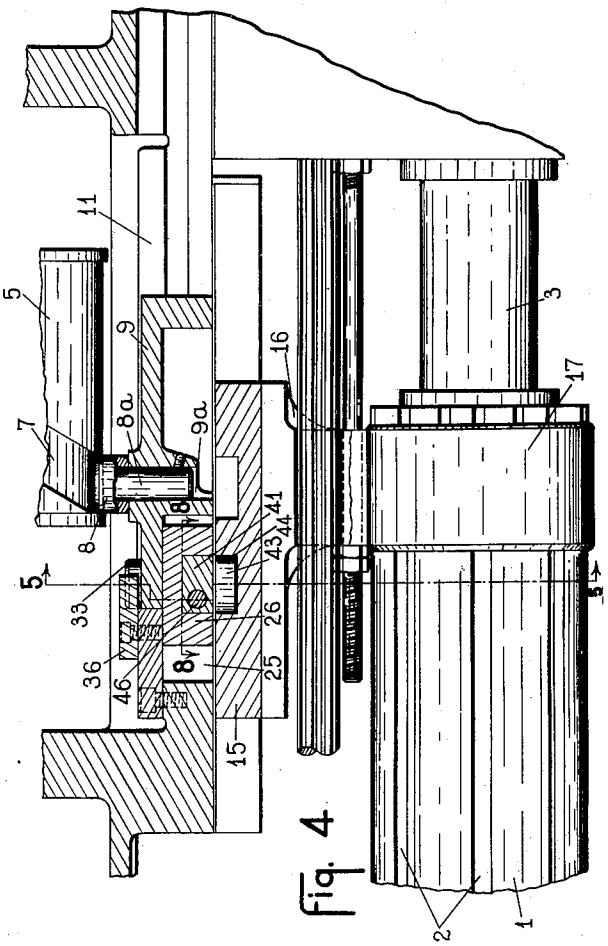


Fig. 4

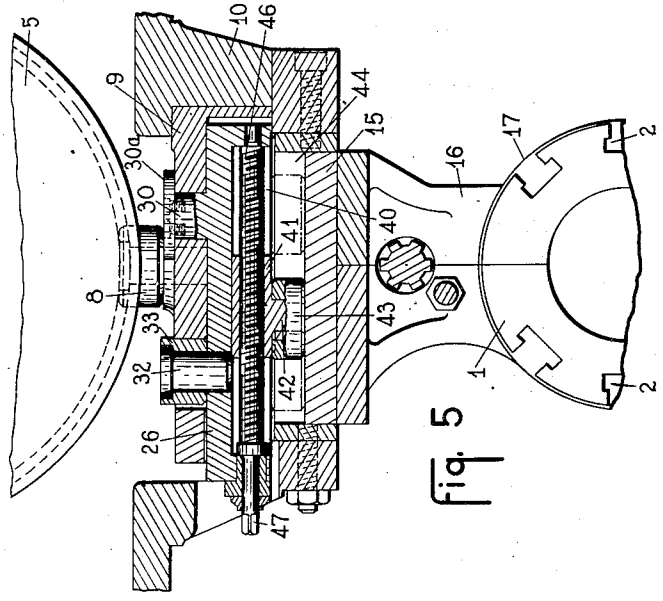


Fig. 5

Inventor
Roger W. Brown
by
Wright Brown Quinby & Clay
Atty's

Oct. 18, 1949. R. W. BROWN 2,484,874

ADJUSTABLE VARIABLE SLIDE ACTUATOR

Filed Feb. 18, 1948 3 Sheets-Sheet 3

Fig. 7

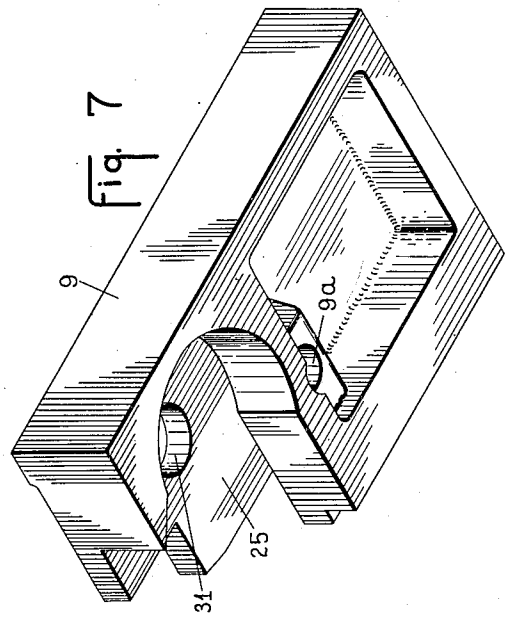


Fig. 8

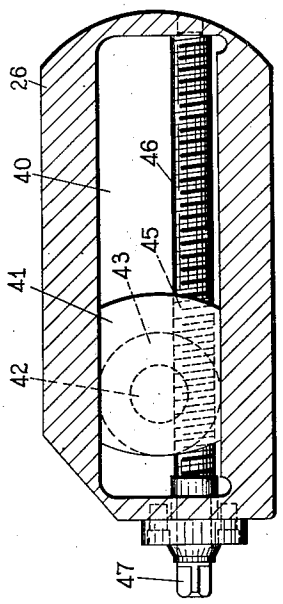
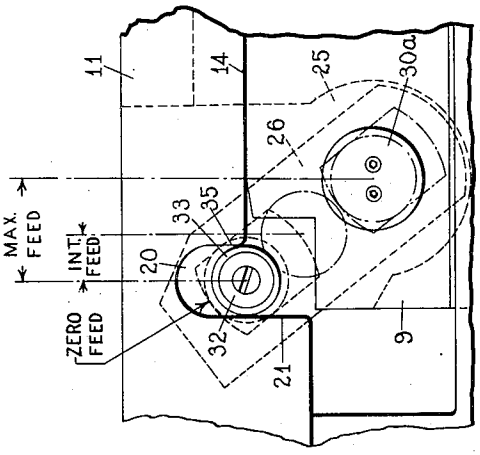


Fig. 6



Inventor
Roger W. Brown
by Wright Brown Quinby & May
Attys

Patented Oct. 18, 1949

2,484,874

UNITED STATES PATENT OFFICE

2,484,874

ADJUSTABLE VARIABLE SLIDE ACTUATOR

Roger W. Brown, Windsor, Vt., assignor to Cone Automatic Machine Company Inc., Windsor, Vt., a corporation of Vermont

Application February 18, 1948, Serial No. 9,197

4 Claims. (Cl. 74—110)

1

This invention has for an object to provide a mechanism by which a slide may be moved in an adjustable variable manner by a moving means having a fixed law of motion.

A further object is to provide a mechanism by which a slide having slow and fast motions may have the relative extents of the fast and slow motions adjustable.

Still another object is to provide for adjustment of the relative lengths of the traverse of a slide at fast idle speed and a slow working speed and particularly as applied to a movable tool carrier, and more particularly to a tool carrier of a multiple spindle lathe.

A further object is to provide means for varying the amounts and rates of motion for the slow working motion of a tool carrier, without requiring any change of actuating cams.

Further objects and advantages will appear from a description of an embodiment of the invention shown in the accompanying drawings in which

Figure 1 is a fragmentary side elevation, partly broken away, of a multiple spindle lathe embodying the invention.

Figure 2 is a sectional view to a larger scale on line 2—2 of Figure 1.

Figures 3 and 4 are detail sectional views on lines 3—3 and 4—4, respectively, of Figure 2.

Figure 5 is a detail sectional view on line 5—5 of Figure 4.

Figure 6 is a somewhat diagrammatic view illustrating the effect of adjustment of a crosshead block on the extent of feed.

Figure 7 is an inverted perspective view of the cam actuated slide.

Figure 8 is a detail sectional view on line 8—8 of Figure 4 showing the lever and crosshead.

The invention is shown in the accompanying drawings as applied to the end working tool slide of a multiple spindle lathe of the well known Cone type. As shown in Figure 1, a turret 1 having longitudinal grooves 2 in which end working tools may be clamped is mounted for axial motion along a bar 3 which is arranged coaxial to an indexing work spindle carrier 4 in which work spindles are arranged in circular array parallel to and about the axis of the bar 3. The tool-carrying turret 1 is arranged to be moved toward and from the work holder by a cam 5 carried by an overhead cam shaft 6, this cam having a cam groove 7 with which cooperates a follower roll 8 in operative relation to the slide member 9 mounted for reciprocation parallel

2

to the axis of the shaft 3. The roll 8 is journaled on a pin 8a mounted in a perforation 9a in the slide member 9.

The slide member 9 is mounted in ways 10 and as shown best in Figure 3 one side of these ways is formed by a portion of the machine frame, while the other side includes a guide member 11 secured to the frame, as by screws 12, and overlying a portion of the slide 9.

As shown best in Figure 2, the member 11 has an edge 14 for the major portion of its length parallel to the lines of motion of the slide 9, and of a second slide member 15 which is secured to a bracket 16 having a yoke 17 secured to the turret 1. The guide member 11 adjacent to one end has a transverse slot 20 cut back from the edge 14 and one edge of this slot forms an abutment 21 perpendicular to the edge 14 and extending laterally and spaced from this edge. The slide 9 is shown from beneath in Figure 7. It has on its under face at its forward end a recess 25 within which is fulcrumed an end portion of a lever 26 shown detached in Figure 8. As shown in Figure 5, this fulcrum is formed as an upwardly extending boss 30 which engages within a perforation 31 in the slide member 9 and is retained in position by a plate 30a secured by screws to its upper end. The lever 26 also carries near one end a stud 32 on which is journaled a cam roller 33. This cam roller extends up and is adapted to engage with the edge 14 of the guide member 11, or in the slot 20. In Figure 2 this cam roll 33 is shown well within the slot, while in Figure 6 it is shown as partly within the slot, being in engagement with the wall portion 21 and between this wall portion 21 and the opposite face of the slot 20. This wall portion 21 constitutes a shoulder which prevents continued motion of the lever with the slide 9 after the roll 44 on the lever engages it. A guide plate 36 overlies and is secured by screws to the upper face of the member 11, this plate also being engaged at suitable times by the cam roll 33 and being provided with a concave roll-guiding edge 37 opposite to the entering end of the slot 20. In dotted lines in Figure 2, the roll 33 is shown as in engagement with the side edge 14 of the guide strip 11.

The lever 26 has a longitudinal guideway 40 therein within which is slidably mounted a block 41 having a depending boss 42 on which is journaled a cam roll 43. This cam roll 43 engages in a slot 44 transverse to and in the upper face of the member 15. The block 41 is adjustable lon-

gitudinally of the guideway 40, and to this end it is provided with a threaded bore 45 for the reception of a screw 46 which is journaled lengthwise of the lever 26 and is provided at its outer end with a polygonal head 47 with which a suitable wrench may be engaged so that the screw 46 may be turned, thus adjusting the block 41 lengthwise of the guideway 40 and of the lever 26 toward and from the fulcrum 30.

When the tool slide is in its retracted position, the lever 26 is in the angular position where the cam roll 33 engages with the edge 14, and as the slide is moved forward by the action of the cam drum 5 with the follower 8 engaging in the cam groove 7, the slide mechanism comprising the members 9 and 15 with their interconnection through the lever 26 move as a unit and at the same speed. As soon as the roll 33 moves beyond the edge 14, it is guided by impingement on the edge 21, or on the edge of the curved guide plate 36 shown in Figure 2, to enter the slot 20. The slide 15 then no longer moves as a unit with the slide 9, but is moved through the lever 26 which swings in a clockwise direction, the roll 33 entering the slot. The slide 9 continues as before to be moved in accordance with the contour of the cam groove 7 and the speed of rotation of the cam carrying it, but the movement of the slide 15 is modified. It will be noted that the lever 26 is rocked by the motion of the slide 9 about the axis of the follower roll 33, the rocking force from the slide 9 being exerted on the lever 26 through its connection with the slide 9 by the pivot 30. The motion of the slide 9 from the point where the roll 33 starts to enter the slot 20 to the point where the lever 26 is substantially perpendicular to the line of travel of the slide 9 at the limit of throw of the cam 5 is constant for all adjustments of the block 41, but the resultant motion of the member 15 is dependent upon the position of the block 41 with reference to the axes of pivot 30 and of the roll 33, being maximum where the axis of the follower 44 is in line with the fulcrum axis 30 as shown in right hand dotted lines in Figure 5, this being the maximum feed position shown in Figure 6, and is least when the axis of the follower roll 42 is in axial alinement with the roll 33 in the dotted line position of Figure 6, the feed motion of the member 15 then being zero. As this motion of the member 15 while the lever 26 is swinging constitutes the entire slow feed motion of the slide 15, which is during the time that the lever moves between its inclined position to the path of motion of the slide 9 and its perpendicular position, the amplitude of motion of the member 15 as well as its velocity is determined by the adjustment of the block 41.

On retraction of the slide 9, the lever is swung back to its inclined position its roll 33 following down the wall 21 of the guide member 11 and finally against the face 37 of the guide plate 36 (see Figure 2), this returning the lever toward inclined position where it remains during the remaining retracting motion of the slide 9. The member 15 retracts with the slide 9 at a relatively high speed determined by the inclination of the cam groove 7 and the speed of rotation of the cam shaft 6.

From the foregoing description of an embodiment of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from its spirit or scope.

I claim:

1. A device of the class described, comprising a pair of members reciprocable in parallel paths, means for reciprocating one of said members, and operative connections between said members for driving the other of said members from said one member comprising a lever fulcrumed on one of said members and pivotally and slidably connected for motion transverse to said paths to the other of said members, stationary guide means preventing swinging of said lever during motion of said members and permitting said lever to move bodily with said members in one direction to a predetermined point during which motion said members move together and for stopping bodily motion of said lever while permitting swinging of said lever on motion of one of said members in the same direction beyond said point, said guide member being shaped to cause the other of said members to move with respect to said one member at a velocity dependent upon the distance from its fulcrum of the connection of said lever to said other member.

2. A mechanism of the class described, comprising a reciprocable member, a lever, a block adjustable along said lever from and toward its fulcrum and laterally slidable relative to said member, a slide movable parallel to said member and on which said lever is fulcrumed, means holding said lever against swinging motion throughout a predetermined extent of motion of said slide during which said reciprocable member is moved simultaneously with, by and at the same velocity as said slide, and stationary guide means preventing the motion of an end portion of said lever with said slide at a predetermined position of said slide to cause further motion of said slide to swing said lever on its fulcrum and move said member at a velocity dependent upon the adjustment of said block along said lever.

3. A mechanism of the class described, comprising a reciprocable member, a lever, a block adjustable along said lever from and toward its fulcrum and pivoted to and laterally slidable with respect to said member, a slide movable parallel to the direction of motion of said member and on which said lever is fulcrumed, and a guide along which said slide moves and having a portion along which a portion of said lever spaced from said fulcrum operatively bears, a part of said guide portion being parallel with the line of motion of said slide and holding said lever against swinging motion as said slide is moved toward one end of its motion to a predetermined point, said guide having a lateral slot to permit said lever portion to enter said slot and rock during continued motion of said slide to cause said member to be moved by said slide proportional to the distance of said fulcrum from the pivotal connection to said lever of said member.

4. A mechanism of the class described, comprising a reciprocable member, a lever, a block adjustable along said lever from and toward its fulcrum and pivoted to and laterally slidable with respect to said member, a slide movable parallel to the direction of motion of said member and on which said lever is fulcrumed, a guide along which said slide moves and having a portion along which a portion of said lever spaced from said fulcrum operatively bears, a part of said guide portion being parallel with the line of motion of said slide and holding said lever against swinging motion as said slide is moved toward one end of its motion to a predetermined point, said guide having a lateral slot to permit said lever portion to enter said slot and rock during continued motion of said slide to cause said member to be

moved by said slide proportional to the distance of said fulcrum from the pivotal connection to said lever of said member, said slide having a shoulder beyond said slot to be engaged by and prevent continued motion of said lever in the direction of motion of said member after the engagement of said lever on said shoulder.

ROGER W. BROWN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,369,039	Gocht	Feb. 6, 1945