(No Model.) 3 Sheets—Sheet 1.

G. H. WEBB.

LATHE FOR TURNING METAL.

No. 599,275. Patented Feb. 15, 1898.

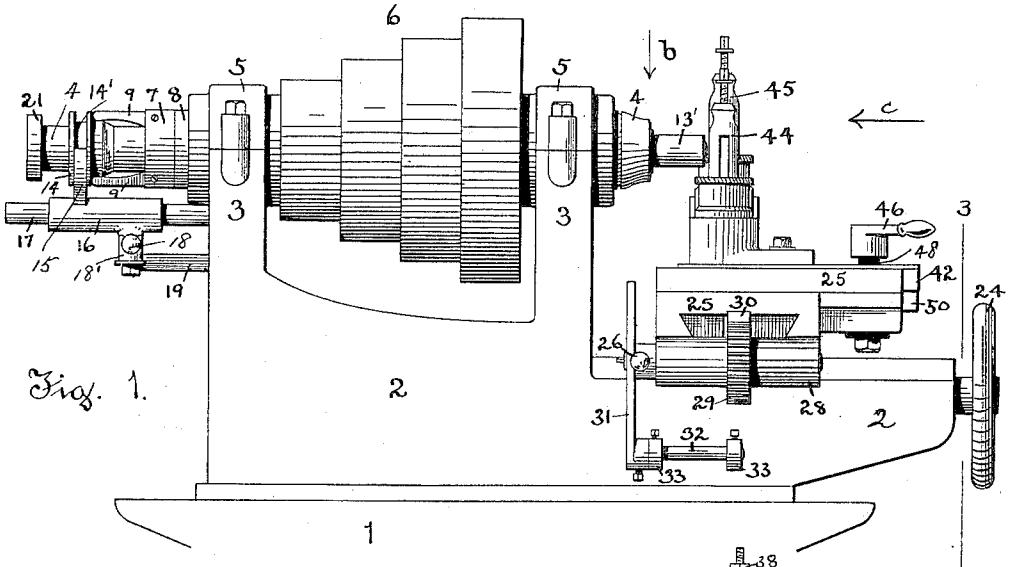


Fig. 1.

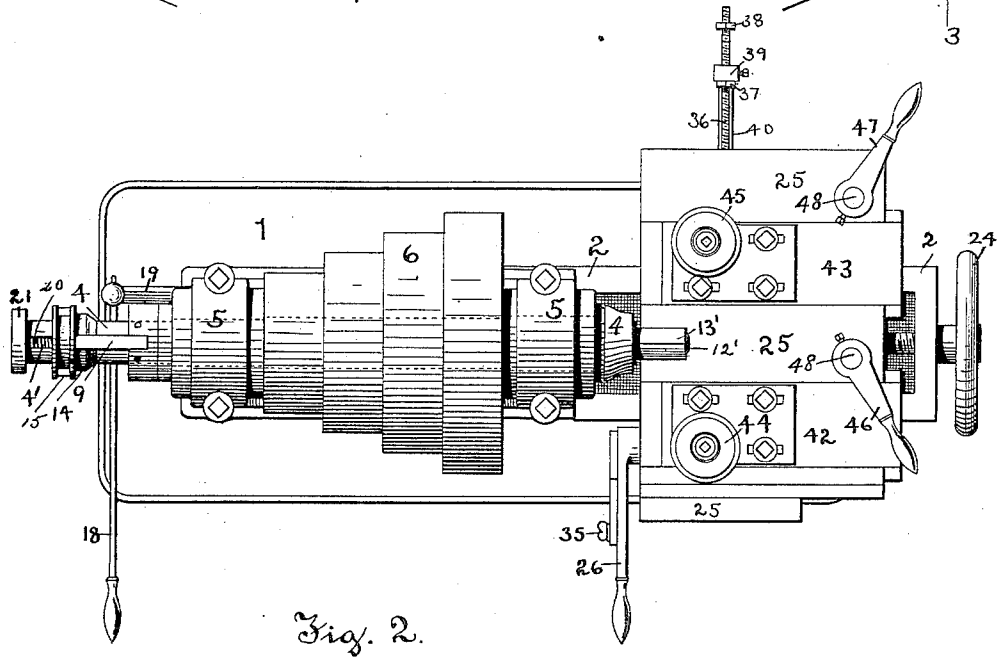


Fig. 2.

a

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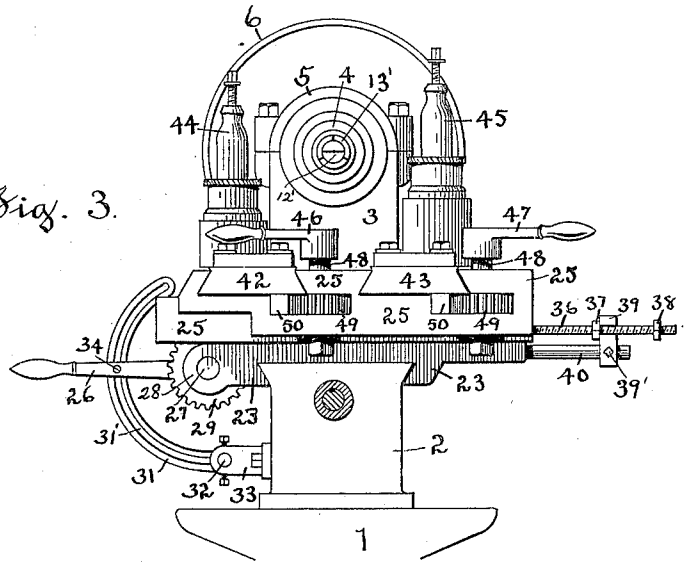
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Fig. 3.



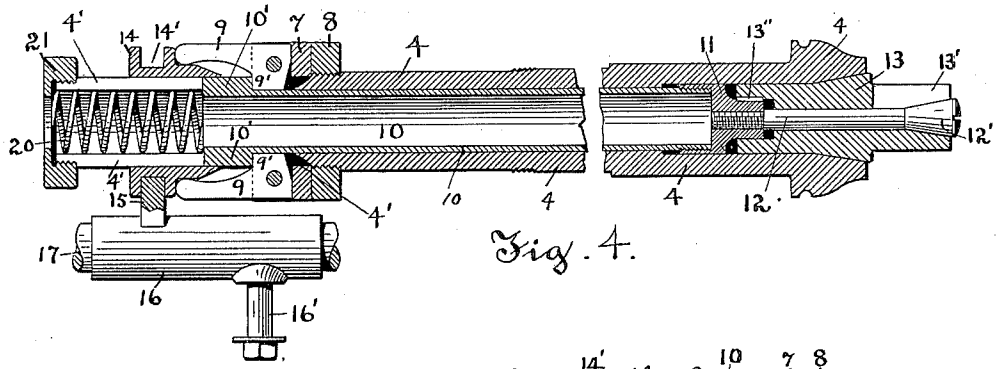
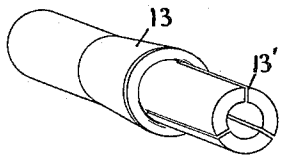


Fig. 4.

Fig. 5.



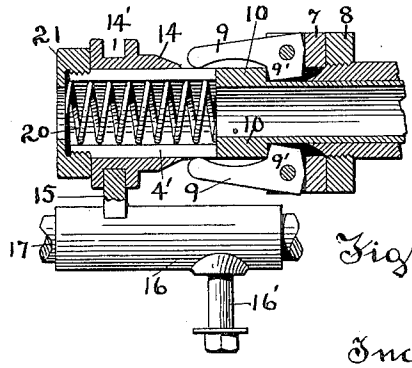


Fig. 6.

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Fig. 7.

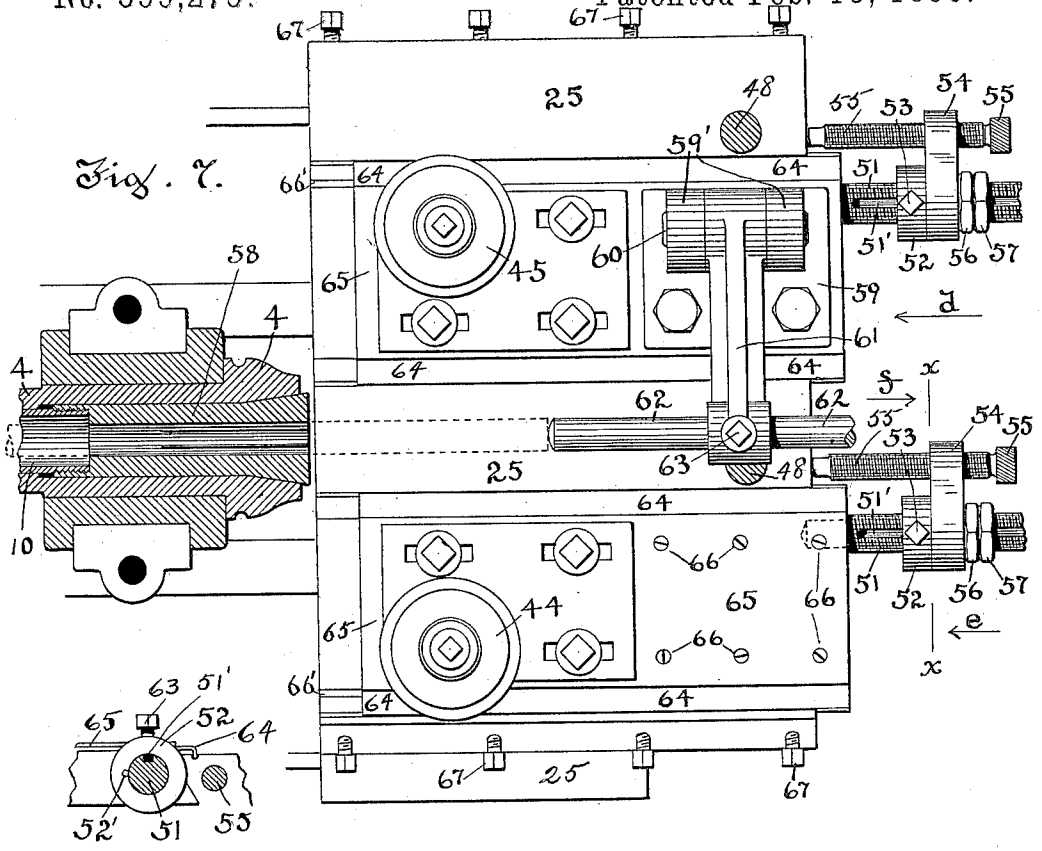


Fig. 9.

Fig. 10.

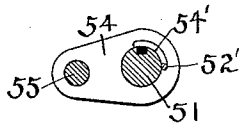


Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE H. WEBB, OF PAWTUCKET, RHODE ISLAND.

LATHE FOR TURNING METAL.

SPECIFICATION forming part of Letters Patent No. 599,275, dated February 15, 1898.

Application filed November 13, 1896. Serial No. 611,930. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WEBB, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Lathes for Metal-Turning, &c., of which the following is a specification.

My invention relates to lathes or machines for cutting or turning metal; and the object of my invention is to improve upon lathes of this class now in general use, and more particularly to provide an expanding collet upon which the work to be operated on is supported and secured and means for expanding the collet; also, to provide quick-return handles for the slides which carry the tool-posts; also, gages for said slides; also, a gage carried on one of said slides for gaging the length of the stock when the machine is used for cutting up stock; also, guards to protect the sliding bearings of said slides; also, mechanism for holding the handle of the cross-slide in adjusted position.

My invention consists in certain novel features of construction of my improvements above referred to, as will be hereinafter fully described.

Referring to the drawings, Figure 1 is a side view of a lathe or machine embodying my improvements, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a plan view looking in the direction of arrow *b*, Fig. 1. Fig. 3 is a section on line 3 3, Fig. 1, looking in the direction of arrow *c*, same figure. Fig. 4 is a central longitudinal section of the cone-pulley hollow shaft, the expanding collet, and operating mechanism. Fig. 5 shows the expanding collet removed. Fig. 6 shows the clutch mechanism shown at the left in Fig. 4 in its opposite position. Fig. 7 is, on an enlarged scale, a plan view of the slides carrying the tool-posts provided with gages for limiting the forward travel of said slides and with a gage for gaging the length of the stock and shows a sectional view of an internal collet of old construction to be used when the stock-gage is used. Fig. 8 is an end view of the parts shown in Fig. 7, looking in the direction of arrow *d*, same figure. Dotted lines show the opposite position of the gages. The gage shown on the end of the upper slide in Fig. 7 is not shown in this figure. Fig. 9 is a section on line *x x*, Fig. 7, looking in the direction of arrow *e*, same figure; and Fig. 10 is a section on line *x x*, Fig. 7, looking in the direction of arrow *f*, same figure.

In the accompanying drawings, 1 is the stand or table for the machine.

2 is the frame upon which the several parts are supported.

3 are stands on the frame, upon the upper ends of which are bearings for the cone-pulley shaft 4. Caps 5 are secured on the top of said stands. The cone-pulley 6, in this instance consisting of four pulleys of different diameters, is fast on the shaft 4, which is made hollow or of shell-like construction, as shown in Fig. 4. A collar 8 is screwed on the shaft 4 and is used to adjust the collar or sleeve 7 on said shaft. The collar 7 has two levers or dogs 9 pivoted in slots therein on opposite sides of the shaft 4, which have projections 9′ therein, which extend into slots 4′ in the shaft 4 and engage lugs or projections 10′, which also extend in the slots 4′ in the shaft 4 (see Fig. 4) and are made integral with the tube 10, which extends within and is adapted to have a longitudinal motion in the shaft 4 and to revolve with said shaft.

Upon the outer end of the tube 10 is screwed a cap 11, and into said cap is screwed the end of a rod 12, which extends through the collet 13 and the outer end 12′ of which is enlarged and made tapering inwardly to expand the split end 13′ of the collet 13 when the rod 12 is drawn within the collet in the manner to be hereinafter described.

The collet 13 fits in the end of the hollow shaft 4 and is made cone-shaped at its middle portion to be drawn into and held in the flaring opening in the end of the shaft 4. (See Fig. 4.) The outer end 13′ of the collet 13 is slit longitudinally, as shown in Fig. 5, to allow it to expand and thus hold the gear or other piece placed thereon to be operated upon. A key 13″ is used between the collet 13 and the cap 11 to make the collet and said cap hold their relative positions.

The free ends of the dogs 9 are adapted to ride on the cone 14, which is loose upon the inner end of the shaft 4 and adapted to be moved longitudinally thereon by a yoke 15, which extends into a peripherial groove 14′

in the cone 14. The yoke 15 is fast on a sleeve 16, mounted to slide on a rod 17, secured to the stand 3. A handle-lever 18, pivoted at its inner end on a rod 19, secured to the stand 3 (see Fig. 2) and provided with a hub 18′, which fits over the stud 16′ on the sleeve 16, is used to move the cone 14 longitudinally on the shaft 4.

Arranged within the outer end of the hollow shaft 4 is a spiral spring 20, one end of which bears against the end of the tube 10 and the other end of which bears against a collar or disk 21, screwed onto the end of the shaft 4. By turning the collar 21 on or off the tension of the spring 20 can be regulated. The spring 20 acts to force the tube 10 outwardly, and also the expander-rod 12, to allow the split end 13′ of the collet 13 to contract, while the movement of the lever 18 to the right, as shown in Fig. 4, acts through the dogs 9 to move the tube 10 in the opposite direction and draw in the expander-rod 12 to expand the end 13′ of the collet 13 and secure thereon the hub of the gear to be worked on or a nut or other piece of work.

It will thus be seen that by moving the handle-lever 18 to the left in Fig. 2 the cone 14 is moved to the left, as shown in Fig. 6, the dogs 9 are released from engagement with the cone, and the spring 20 can act to move the tube 10 to the right and the expander-rod 12 so that the enlarged end of said rod will move out of the split end 13′ and allow it to contract or come together and release whatever is supported thereon. By moving the handle-lever 18 in the opposite direction the cone 14 is moved to the right, as shown in Fig. 4, the dogs 9 are raised, and, striking against the projection 10′ on the tube 10, (see Fig. 4,) move said tube to the left against the action of the spring 20 and draw the enlarged end 12′ of the expander-rod 12 into the split end 13′ of the collet 13 to expand the same and secure the gear, &c., thereon.

It will be understood that the operations above described are done while the shaft and cone-pulley are in operation.

On the frame 2 is arranged the main slide 23, (see Fig. 3,) which has a longitudinal motion on ways in the direction of the length of the machine and is operated by a hand-wheel 24 at the front of the lathe (see Figs. 1 and 2) in the ordinary way. For the hand-wheel 24 a gear may be substituted, to be operated by power.

On the main slide 23 is mounted on ways to have a transverse motion the cross-slide 25, which is operated by a handle-lever 26, secured at its inner end on a shaft 27, turning in bearings 28 on the main slide 23. A pinion 29, fast on the shaft 27, meshes with a toothed rack 30 on the cross-slide 25 in the ordinary way.

In connection with the operating handle-lever 26 of the cross-slide 25 I use a slotted quadrant-arm 31, secured in this instance at its lower end on a shaft 32, adjustable circumferentially in bearings 33 on the frame 2. (See Figs. 1 and 3.) A screw 34, secured at one end in the lever 26, extends through the slot 31′ in the quadrant-arm 31, and a thumb-nut 35 is screwed on said screw. (See Figs. 2 and 3.) To move the handle 26, the thumb-nut 35 is loosened and after the handle 26 is raised or lowered to adjust the position of the cross-slide 25 as desired the thumb-nut 35 is turned up and acts to bind and hold the handle 26 in a fixed position on the quadrant-arm 31 and prevent any movement of the cross-slide 25. By the use of the slotted quadrant-arm 31 and the thumb-nut 35 the handle 26 may be quickly released and the cross-slide 25 moved more or less, as desired, and then held in position and a very fine adjustment of the cross-slide 25 may be obtained.

A stop-gage rod 36 may be used in connection with the cross-slide 25 to limit the motion of said slide 25. The gage-rod 36 is secured at its inner end to the cross-slide 25 and is made screw-threaded and carries two adjusting-nuts 37 and 38, which are adjusted as desired to limit the motion of the slide 25 by engaging a collar 39, fast on a rod 40, secured to the main slide 23. The gage-rod 36 passes loosely through an open-end slot in said collar 39 and by loosening the set-screw 39′ the collar 39 may be swung down on the rod 40 out of engagement with the gage-rod 36 to allow the gaging-nuts to pass by the same when desired.

On the cross-slide 25 are mounted to move at right angles to the movement of the cross-slide 25 two slides 42 and 43, each carrying in this instance a turret tool post or holder 44 and 45 of any ordinary construction and operation and arranged on opposite sides of the collet 13.

In order to move the slides 42 and 43 and the tool-posts 44 and 45 thereon quickly and return them to their position to operate on the work, I employ two handles 46 and 47, one for each slide 42 and 43. Each handle 46 and 47 is secured on a vertical stud or shaft 48, supported in the cross-slide 25. A gear 49 is fast on said stud or shaft 48 and meshes with a rack 50 on the lower side of each slide 42 and 43. It will thus be seen that by swinging or moving the handles 46 and 47 in one direction or the other a very quick movement is communicated to the tool-post slides to bring the tool-posts into position for the tools to operate on the work or to move them away from the work.

I may provide each of the tool-post slides 42 and 43 with gages, as shown in Fig. 7, to limit the inward motion thereof, said gages consisting of a screw-threaded rod 51, secured in the end of the slide and provided with a longitudinal groove 51′, in this instance on the upper side thereof, and a collar 52, mounted on the screw 51 to slide freely thereon, but prevented from turning by a set-screw 53, extending into the groove 51′, which screw also serves to secure the collar in the desired po-

sition on the screw 51. A swinging arm 54 is also loosely mounted at one end on the screw 51 and carries in its other end an adjusting-screw 55, which may be turned in or out and is adapted to engage at its inner end with the edge of the cross-slide 25. An adjusting-nut 56 and a locking-nut 57 are also mounted on the screw 51 and in connection with the collar 52 serve to hold the arm 54 in place on the screw 51 and allow the same to have a rocking motion thereon and move the screw 55 up over the slide 42 or 43 and out of action, as shown by dotted lines in Fig. 8.

To limit the rocking motion of the arm 54, I provide a recess 54′ therein, (see Fig. 10,) into which a pin 52′ on the collar 52 extends. When the arm 54 is raised, the end of the recess 54′ engages with the pin 52′, as shown by dotted lines, Fig. 8, and limits the movement of said arm.

When the lathe is used for cutting up stock or operating on a continuous bar of metal, I substitute for the collet 13 (shown in Fig. 5) the collet 58. (Shown in Fig. 7.) This collet is of the ordinary construction and operation and is screwed directly onto the end of the tube 10, and the bar or rod to be operated on extends through the tube 10 and the collet and is secured within the collet by moving the collet to the left, Fig. 7.

In order to gage the length of the stock or the pieces to be cut off from the bar, I provide a gage, which in this instance is mounted on the slide 43 and consists of a plate 59, bolted upon the top and outer end of said slide. The plate 59 is provided with stands 59′ for a rod or shaft 60, on which is mounted to swing one end of the arm 61. A downward projection 61′ on the lower side of said arm in this instance engages a rest or stop 59″ on the plate 59 (see Fig. 8) and limits the rocking motion of said arm.

In the outer end of the arm 61 is supported a rod 62, which is adjustable longitudinally and secured by a set-screw 63. The rod 62 forms the gage against which the end of the rod or bar to be operated on strikes. When the arm 61 and gage-rod 62 are not in use, they may be swung over and out of the way, as indicated by dotted lines in Fig. 8.

In order to prevent the chips and grit from getting into the sliding bearings of the slides 42 and 43, I may provide side guards or plates 64, extending out from the upper edges of the slides 42 and 43, with their outer edges bent downwardly and extending into grooves in the top of the cross-slide 25, as shown in Fig. 8. In this instance the guards 64 are secured upon the slides 42 and 43 by a plate 65, extending upon the top of each slide and secured thereto by screws 66′ or otherwise.

In order to provide for any wear of the slides 42 and 43 in their bearings, so that they will not work properly, I may provide gibs 66, extending along the outer edge of each slide and adjusted by means of screws or bolts 67.

It will be understood that the details of construction of my several improvements may be varied, if desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lathe, or metal-turning machine, the combination with the cross-slide having a rack thereon, a pinion engaging said rack, and a lever or handle for turning said pinion, of a slotted quadrant-arm secured at its lower end on a shaft adjustable circumferentially in its bearings, and connected with said lever or handle by a pin or screw thereon extending through the slot in said arm, and a nut on said screw to secure the lever or handle to the quadrant-arm, and hold the slide in its adjusted position, substantially as shown and described.

2. In a lathe or metal-turning machine, the combination with the cross-slide, and a slide, carrying a tool post or holder, and provided with a rack thereon, and supported on and adapted to move with said cross-slide, and to move independently thereof in a direction at right angles to the movement of said cross-slide, and a handle or lever secured on a vertical shaft mounted in the cross-slide, and a gear fast on said shaft to mesh with the rack on the tool-post slide, to communicate a quick motion to the slide, of a gage for limiting the inward motion of the tool-post slide, said gage consisting of an adjustable screw supported in the end of a rocking arm mounted on a screw-threaded rod secured in the end of the slide, said arm adapted to be moved up to throw the gage-screw out of action, substantially as shown and described.

3. In a lathe or metal-turning machine provided with a collet through which the rod to be operated on extends, the combination with the slide carrying the tool-holder, of a plate bolted upon the top and the outer end of said slide, and provided with bearings for a rod or shaft on which is mounted to swing in a vertical plane, in a direction at right angles to the longitudinal motion of the slide, one end of an arm, the other end of said arm carrying a rod adjustable therein to act as a gage, and against which the end of the rod being operated on will strike, substantially as shown and described.

4. In a lathe or metal-turning machine, the combination with the slide carrying a tool-holder, and provided with beveled edges adapted to slide in beveled ways, of side guards or plates made separate from said slide, and extending out from the upper edges of the slide, and secured thereto, and with their outer edges bent downwardly, and extending into grooves in the top of the cross-slide, substantially as shown and described.

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